Comprehensive Plan Update
Public Comment on the May 2010 Planning Commission Draft
5/7/2010-5/28/2010

General Comment on Entire Plan

Cindy Hill Stone 5/24/2010 7:27

Ladies and Gentlemen,

I find the revision of the original comp plan draft to be an amazing task and I think you should all pat each others backs (Group hug).

I do find two obvious oxymorons.

1. Density Bonus----------existing development potential. (Manage Growth)
2. Workforce housing ---------regardless of employment. (Housing needs)

I feel Theme 8 is a heroic endeavor but not enforceable in this plan. It can only be achieved through education.

Save Historic Jackson Hole 5/26/2010 14:44

Theme 2 Manage Growth-

One potential conflict is Policy 2.3.e which limits discretion in land use decisions, but then says "regulations and incentives will be performance based." At least is does say the "intent and limits of the incentives will be clearly stated." Unless incentives are clearly defined, they are discretionary. The statement that "If small town, rural character is to be preserved, human needs must be provided within existing development potential" seems pretty clear, but in the Housing Theme it mentions giving limited density bonuses. This conflict should be resolved. Policy 2.1.d talks about transferring density from the rural county and converting non-Residential potential into residential potential in town. No mechanism is proposed or an audit system to be sure this is not abused. Indicator 1 basically says we will follow the LDRs. Is that what the JP& Z C, meant? It seems redundant, like promising to stop at red lights.

Theme 4 Meet our Community's Housing Needs-

Generally this Theme seems confusing and in need of some clarification. The definition of workforce housing as "all housing occupied by people living in the community year round regardless of deed restrictions or employment" is very confusing and vague. We would ask the JP& Z C to confirm that this is what they recommended. Policy 4.3.b to "allow density increases for restricted workforce housing in target areas of town" is in conflict with Theme 2 managing growth. Even if "Base density allowances will have to be set low enough to allow for density bonuses that do not increase residential development potential," it is difficult to understand how this will maintain the goal of no net increase in total Town and County development potential. We ask the JP& Z C to confirm that the goal for indicator 1 is to increase the percentage of workforce housed locally. Our understanding was the goal was to stay above 65% but not necessarily to keep increasing the percentage. It is unrealistic to expect it to increase forever.

Theme 5 Provide for a Diverse and Balanced Economy-

Although the Theme talks about "Developing a better economy without building a bigger economy" indicators for skier days, National Park visitation, monthly lodging occupancy rates, airport enplanement, and local domestic product are all targeted to increase. This seems to be in

conflict with principle 5.2 which says “Economic development will occur within the growth management policies of the community - with the primary goal of improving the local economy not necessarily physically expanding it.”

Theme 6 Develop a Multi-Modal Transportation Strategy-
Policy 6.3.c: to “Review land use proposals and decisions against their transportation network impacts” Is not necessary if total development potential in Town and County is limited. Instead the plan should review what transportation network is needed to service the development potential that is allowed. The goal to increase Level of Service for all modes in indicator 7 seems to conflict with other statements to discourage vehicle use.

Theme 8 Energy Conservation-
This is a new Theme which has not been reviewed so our comments are more general. Principle 8.4 misses an important way to reduce energy which is to build smaller public buildings and not build unnecessary public buildings. Consider requiring larger buildings to have higher energy efficiency. Policy 8.5.c suggests pursuing methane capture in the landfill. Is this possible since we do not operate the landfill in Sublette County? Is the goal of indicator 2 to reduce the number of carbon neutral buildings in 2030? How will indicator 4, per capita miles driven be measured? Indicator 7 seems to be a goal, and should be restated. The draft does not discuss efforts to reduce idling, which is a topic the Town has been working on.

Sara Adamson 5/27/2010 11:51

As a professional in the field of historic preservation, I'd like to add my personal support to this draft of the Comprehensive Plan, specifically section 3.6 for its recognition of the importance of historic preservation in promoting heritage tourism and economic development. Our historic buildings may be humble, but they meet nationally-recognized criteria for historic significance. And while they may not be as old as historic structures in other communities, they are the oldest buildings we have, and if we don't allow them to survive to 100 years, they will never be 300 years old.
I also support Theme 8 and its recognition of the sustainability of reusing existing buildings, a practice that further supports the local economy by putting more construction dollars in the pockets of local construction laborers than new construction, while reducing waste. Thank you for leading the county in recognizing that recycling buildings is as important as recycling cans and bottles, if not more so.

Joe Albright 5/27/2010 12:25

On line, I was reading what I believe to be the latest rewrite of the comp plan. I'd like to comment on what I believe is an omission.

Unless I missed it, I believe the comp plan draft doesn't state what the population of Teton County is today and what it was 10 and 20 years ago.

Nor do you state what the population is estimated to be in 2030 or 2050 if the coming decades the new comp plan is fully implemented. I really believe that is a glaring hole in the draft. I urge you and the planning commissioners to let the people know the overall impact on population of your various changes you have approved.

I believe that the 1994 comp plan did include the 1990 Teton County population . I don't see how we could exclude population from our basic planning document.

Thanks to everyone for all their work on this.

Teton County Historic Preservation Board 5/27/2010 15:46

On behalf of the Teton County Historic Preservation Board (the Board) I am writing in strong support of the Planning Commission's Teton County/Jackson May 7, 2010 Draft Comprehensive Plan. Specifically, the board supports the careful consideration paid to the community's cultural resources in the plan's emphasis on the role that preserving heritage plays in maintaining community character, promoting economic development, and by promoting sustainable practices through the reuse of existing structures (found in Themes 3 and 8).

The value of our historic resources is sometimes less obvious than in older communities, but Jackson Hole does have historic buildings that meet nationally-recognized criteria for historic significance. The town and county were designated a Preserve America Community by the Advisory Council for Historic Preservation, a Federal agency, in 2009, identifying Jackson Hole as a cultural asset important to the nation. The county is home to over 350 structures listed on or eligible to the National Register of Historic Places, and the area contains many more potentially eligible sites and structures that have yet to be evaluated.

The Board supports the current draft of the Comprehensive Plan, which clearly articulates the importance of these nationally-recognized resources through policies 3.6a, b, and c and provides for their consideration during the planning process. We applaud the plan's support for the mission of the Teton County Historic Preservation Board to identify and protect these resources. The plan, as drafted, is also consistent with the existing town Preservation Ordinance (15.38.020).

This plan also acknowledges the core value of preserving the community character of Jackson Hole. Community members poled in the Lake Research Partner's 2007 survey ranked preservation of community character as the second most important goal of the comprehensive plan (shown by the support of 90% of respondents). The character of any community is inextricably linked with an understanding of its roots, and with the built environment that represents those roots. When asked what defines community character, this Board has found many residents mention historic resources such as the town square, Mormon Row, the Wort Hotel, Jackson Drug, and the valley's historic ranches. We support the plan's goal of guiding development in a way that is respectful of that heritage.

In terms of economic development, that heritage is critical to attracting heritage tourism, a valuable asset to the valley's economy. Studies have shown tourists who travel to historic sites stay longer and spend more money each day of their trip than other types of tourists. Those are economic benefits this community reaps simply by preserving what we already have, and they are benefits we endanger if we do not protect our heritage. Historic preservation promotes economic development in another critical way. As opposed to new construction, in a project reusing an existing building, whether it is historic or just old, more of the construction dollars go to labor than to materials, keeping those dollars circulating in the community.

Lastly, we applaud the plan for its recognition of the sustainability of the reuse of existing buildings (Theme 8). Green building professionals estimate it takes from thirty-five to fifty years for a new building - even an energy efficient, LEED-certified building - to recoup the embodied energy lost when an existing building of its size is demolished. The embodied energy in an existing building is equivalent to five to fifteen gallons of gasoline per square foot. New construction also creates significant waste - waste that constitutes 25% of the nation's municipal waste stream. The Jackson Hole community is passionate about reuse and recycling. The Board supports the current draft of the Comprehensive Plan for clearly articulating the connection between building reuse and sustainability.

We appreciate your consideration of our comments and hope that we can continue to provide feedback for this important planning document.

Sincerely,

Jesse O'Connor
Teton County Historic Preservation Board President

Kathy Tompkins 5/28/2010 10:26

I just wanted to say thanks so much to all of the planning commissioners for all the hard work and long hours put it in to get the plan going in the right direction. I echo what SHJH and Rich Bloom submitted for comments. The contradictions about staying within our growth limits and bonus densities need to be addressed. Put more bite in the growth watchdog end of it. Implement an environmental commission, define better, workforce housing with emphasis on not going below 65% instead of increasing growth by increasing workforce percentage that can live and work in the valley (the dog chasing its tail syndrome). Remember that some people do choose to live somewhere else and come to work here.

The FLUP is going to be the key to a successful comp plan. Get the planning commissioners review and recommendations to the county commissioners before the election to get their stance and then we can get going on the FLUP. Thanks again.

Frank and Patty Ewing 5/28/2010 13:46

After careful reading of comments submitted by Armond Acri, rather than restating them we endorse his comments emphasizing the following:

Theme 1: The emphasis which recognizes protecting wildlife as primary is based on the overwhelming public input. This emphasis in Theme 1 must influence all other themes in the plan. Wildlife and open space protection is the most important value in the community.

Theme 2: Delete in policy 2.4.e "regulations and incentives will be performance based." That is discretionary, and incentives and discretionary tools should be eliminated. Theme 2 still does not address the cost of growth to the community. I repeat my comments of 2/16/2010, growth should pay its own way, not the community, and this should be the overriding dictum for managing growth. Build out should be clearly identified and provide guidance in policy creation. Growth rate regulation should be implemented to slow the impacts of development to natural resources and community infrastructure.

Theme 4: Clarify definition of workforce housing. Policy 4.3.b is very troublesome because it allows density bonus for target areas in town. No net increase in total Town and County development potential. The comments submitted by Rich Bloom are very clear, and we support those comments. Workforce housing should be provided in greater proportion by commercial development and include a mix of rental and ownership options. Commercial development potential should be limited with sensitivity to building design, community character, and not exacerbate the need for workforce.

Theme 6: The more growth, the bigger the buildings, whether residential or commercial, the more energy needed and consumed.

Gail Jensen 5/28/2010 17:08

Dear Teton County and Town of Jackson Planning Commissioners, Planning Staff,

First of all, I want to thank of you for your thoughts, considerations and the unbelievable time commitment for the benefit of our community. I very much appreciate each of you and I hope those that have not been involved really show their appreciation as well.

Generally the new draft is greatly more representative of what the community wanted verses the first draft. With the County and Town being so divergent in goals and policies, I do not know how you could have done a better job trying to reconcile between the 2 commissions. Until the BCC

reviews this new draft, and the FLUP maps are prepared, it seems pointless to take this draft much further. I hope that you will take the time now to correct some obvious inconsistencies.

VISION

The new graphic and 2009 Vision on Page 10 represents that Theme 1 is above all and is the # 1 consideration in planning. I do not see this as the first and most important thing to be considered in each one of the following themes as I read through the full draft plan. This priority needs to be repeated at the beginning of all themes.

I am also concerned with the overuse of the word sustainability. Yes there is a definition; however, this word has so many different meanings to so many people. The definition provided in the draft indicates a balance where the Page 10 graphic is clear on the priority of Theme 1.

Theme 1

Establishing the Environmental Commission is the key to this Theme and tasking them to develop baselines. Without baselines, and knowing where we are now, we have nothing to measure. Unless there are real numbers attached to this theme it lacks meaning and certainly planning staff, commissioners, and the BCC can not make planning decisions based on numbers or facts as there are none. The LDR's will not have these numbers or baselines. When will these be filled in? Is this Theme not the #1 priority and we have no recent data?

Theme 2

There is inconsistent language in 2.1.a. The first sentence limits to existing base development rights allowed today, yet the next sustenance indicates there can be additive growth. This is confusing and sends confecting messages and offers no predictability yet offers vague flexibility. Public benefit? Who decides? The elected officials at the time? This is recurring throughout Theme 2.

Policy 2.2.b possible increase in non-residential is inconsistent with other policies in theme 2.

Does Policy 2.4.c. mean platted but undeveloped lots can no longer apply for variances? Is this a taking?

Policy 2.4.f. Shouldn't wildfire mitigation be required for all properties including existing for the protection of all in the community? If your neighbor does not mitigate their existing home they put you at risk.

Policy 2.2.d.Policy which indicates just Teton Village could have local convenience expanded is inconsistent with Strategy 2.1 which allows local convenience at all Resorts.

Policy 2.6.a Does "Natural Resource conservation" also mean wildlife and wildlife habitat?

Theme 4

I agree with Rich Blooms comments. I feel there is inconsistency in the density bonuses/incentives in this Theme and keeping with the existing base development rights as described in Theme 2.

I still do not see the 65% number really documented anywhere unless you use the vague workforce housing description which is meaningless as it includes about every breathing human in Teton County.

Theme 8

I feel there should be wording that confirms enforcement of building codes with real inspections in our Town and County.

I had hoped to not be so rushed to get these comments out by your deadline. I did not see the draft of the Administration Chapter? Did I miss this? Is this not up for review too?

Thank you again for considering my comments.

Pegi Sobey 5/28/2010 19:02

We've come a long way since work began on our Jackson/Teton County Comprehensive Plan to "update and prioritize the values in the 1994 Plan." In the early stages of this process, the Comp Plan Survey results clearly confirmed that stewardship of wildlife and scenic and natural resources

remains our community's TOP priority.

A simple comparison between drafts illustrates that our community's efforts over these last several years have begun to reap rewards and benefits to the future of our community in the form of a vastly improved draft Comp Plan. I am certainly appreciative of the Town and County Planning Commissions' willingness to listen and carefully consider a majority of the recommendations made during what inevitably became a very complex planning exercise over the last year that has culminated in the current draft's release. Commissioners, therefore, have a plethora of information in the public record upon which to evaluate whether this draft is truly representative of the community's vision and, in fact, the promised improvement to our existing plan.

An initial review of this draft indicates, ironically, that the Comp Plan has now come full circle and more closely resembles an update to the 1994 Plan that we anticipated from the start. I am heartened to see that this draft aims to identify wildlife protection as the community's overall top priority, protect scenic vistas and preserve rural character in the county, while also identifying wildlife and natural resources as the foundation of our economy.

While this draft plan looks better at first glance, a closer evaluation proves that it lacks essential policies needed to ensure unequivocal protection for Jackson Hole's irreplaceable wildlife, scenery and community character.

Theme One:

This draft is missing detailed language, data, action plans and specific timelines that could provide assurances that subsequent land development regulations will actually provide stronger protection for wildlife. This draft does not, for example, promote a true cap on development nor does it show whether the amount of development as proposed will or will not have negative, irreversible impacts on local wildlife and the community.

Theme Two:

This draft plan proposes contradictory future patterns for both centralizing and dispersing commercial development.

Theme Three:

This draft's definition of our Town's "character and charm" is less definitive than our current plan.

Theme Four:

This chapter needs work. By substituting "workforce" in place of "affordable" housing, its principles and policies become unnecessarily confusing and vague. The idea that smaller, free-market homes function as accessible, affordable homes for the workforce has not been demonstrated to hold true in this or any other resort community and is unrealistic at best.

Theme Five:

None of the indicators include baseline data, and many sections contradict the goal of economic independence from growth and expansion.

Theme Six:

The level of analyses that typically accompany a comprehensive plan is missing. County-preferred and WYDOT Level of Service standards must be reconciled.

Theme Seven:

Policies must be refined for consistency between realistic goals that can be implemented versus a wish list. This is impossible to determine unless infrastructure and public facilities needed for buildout and future development patterns are projected.

Appendix I:

The new table must be reconciled as to the cap plus light industrial plus local convenience commercial, as well as numbers associated with overall development potential.

Of grave concern, is your deferral to date of review of the 65-page section — the Future Land Use Plan. The Future Land Use Plan includes appropriate types of development and conservation

efforts, wide ranges of expected development potential for newly proposed land-use types and a table of priorities that will take precedence in each district. Therefore, many of the most difficult questions remain unanswered. I think you will agree that the final state of the Future Land Use Plan will be the true test of the themes and policies that are being proposed. This fact unnecessarily complicates evaluation of the overall plan without a clearer understanding of this critical section.

The desire for predictability to future land use decisions appears to remain as elusive as ever. Adequate analyses of fiscal impacts, transportation, natural resource inventories, etc. that typically accompany comprehensive planning processes have been conspicuously absent in this revision process to date.

Each theme independently includes a number of unique strategies, but the draft plan does not correlate or prioritize them. A comprehensive priority list of strategies needs to be incorporated into the plan.

Jackson Hole and Teton County deserve a comprehensive plan that will preserve and protect our wildlife, scenic vistas, natural resources, community character and quality of life in a sustainable and predictable manner.

Let's continue to work together to create a Comprehensive Plan of which we can all be proud.

Thank you for the opportunity to comment on this draft plan.

Elise Prayzich 5/29/2010 12:55

To Jackson and Teton County Planners,

Thank you all for the tremendous effort over the past year - that took a lot of patience and stamina, for sure!

I would comment that the Draft Plan is certainly a lot better - closer to what we operate under now, actually.

However, I worry that the language suggesting "local commercial every 1/4 mile" is disconcerting, as is the fact that the "rate of growth" has been removed from the document.

And, with some 67 pages of Future Land Use Plans still to be reviewed, it seems the document is certainly not done, and this latter section is such an important part of the Plan - nailing down details that the Themes and Policies suggest.

Thank you again for your hard work on this effort!

Jackson Hole Conservation Alliance
(307) 733-9417 • www.jhalliance.org

May 28, 2010

Town of Jackson & Teton County Planning Commissions
cc: Alex Norton
Re: May 2010 Draft – "Themes and Policies" section of the Jackson/Teton County Comprehensive Plan
Submitted via email to Alex Norton

Dear Commissioners,

On behalf of the Jackson Hole Conservation Alliance, thank you for the opportunity to comment on the May 2010 draft of the "Themes and Policies" section of the Jackson/Teton County Comprehensive Plan. **We really appreciate your hours and hours of time over the last year to improve the plan; in numerous ways, the new draft represents a significant improvement over the April 2009 draft. However, to be clear, we believe there are a number of outstanding issues with this draft section of the plan, many of which relate to previous votes you took or ideas that have already been presented to you but were never discussed or voted upon.** With this in mind, we will not reiterate all of these points at this time. **Our comments are specifically framed within the recommended structure for public comment for this round of planning commission review, and will therefore be brief.** We anticipate that many of our concerns will be addressed during the upcoming review by elected officials.

Also, over the last several years, members of the public, including the Conservation Alliance, have submitted extensive, detailed input to help shape our community's next comprehensive plan, including suggestions for ways to improve the various drafts. **You already have a lot of information in the public record** that should help you determine to what extent the draft section you are forwarding on to elected officials is truly representative of the community's vision and the original intent of this planning process – to improve our existing plan.

Below are comments related to the Future Land Use Plan, the overall review process, Theme Eight, the Administration Chapter, inconsistencies and key areas of contradiction organized by theme, and new ideas.

Future Land Use Plan (FLUP) & Review Process

While we understand your decision to defer review of the Future Land Use Plan at this point, it is critical that you clarify your intentions for the upcoming FLUP review process. Specifically, please clarify whether you think elected officials should "formally act upon" or adopt the "Themes and Policies" section of the plan prior to your review of the FLUP. **Based on how the plan was structured,** it appears that the FLUP is intended to be the predictable piece of the overall plan to guide future decisions and that it should be considered as a formal section of the plan, not something separate from it. Until the draft plan is considered and reviewed for consistency in its entirety, no single portion of it should replace our existing plan.

Because the document in its entirety has not been reviewed, many of the really hard questions remain unanswered. Specifically, the FLUP – a 65-page portion of the plan – includes considerable narrative on what types of development and conservation efforts are appropriate across the valley's 25 districts. It provides wide ranges of expected development potential for newly proposed land-use types, and perhaps most significantly, includes a table that identifies the priorities (theme-wise) that will take precedence in each of the districts. It appears, based on the way the plan was structured, that the review of the FLUP will be the part of the planning process that will test everyone's understanding of the themes and policies that are being brought forward. For example, are the policies in the May 2010 draft clear enough, predictable enough, etc., to direct clear, effective land development regulations?

Also, while we appreciate that you, as planning commissioners, are not going to undertake a line-by-line review of the plan, we believe it is critical to acknowledge how important this step will be prior to

adoption of the plan. Based on our organization's decades of history in participating in reviews for individual applications in both the town and county, one thing is clear: the details and specific wording within our community's comprehensive plan matter a lot, because decision makers rely heavily on the Comp Plan for direction. At a minimum, a line-by-line analysis, including legal review, should occur well before plan adoption to ensure the proposed wording is clear enough to meet the community's desired intent. Prior to concluding this phase of your review, please provide recommendations regarding this step of the process – who should do a line-by-line review and when – to assure the public this critical step will be undertaken at some point.

Theme 8
Please refer to both the written comments that we submitted on April 12, 2010 and the May 28, 2010 memo, included as an attachment.

Administration
Please refer to the written comments that we submitted on April 1, 2010.

Theme-By-Theme Analysis
While significant strides have been made, below are several <u>key</u> topics that would benefit from additional clarification to eliminate potential contradictions or inconsistencies. In general, and as we have expressed throughout this process, many of the policies in the draft are too broad and as a result leave the door open for diverse interpretations. In a number of cases, because the text is so abbreviated for certain policies, the context or rationale, which can help to more clearly provide guidance for land development regulations, is absent. We expect the elected officials to address this central issue of the draft plan – the shift to a far less detailed comprehensive plan than the existing plan.

In short, **we have identified many of the topics below with the primary goal of this process in mind – to increase predictability for landowners, decision makers, and other members of the public in future land use decisions.** As a result, the basic contradiction is, in some cases, the policies' failure to be consistent with the overarching goal of the new plan – to improve upon and lessen the uncertainties and unpredictability of our current plan.

<u>Theme One: Practice Stewardship of Wildlife, Natural Resources and Scenic Vistas</u>
Inconsistencies and Potential Contradictions
- This theme lacks the detail typically necessary (such as recent data and the scenic policy-related illustrations that exist in our current plan) to guide strong land development regulations for wildlife and scenic resource protection.
- Even though wildlife is stated as the highest priority of the community, and the new plan is supposed to ensure greater predictability and accountability, no expected timelines are identified to carry out the actions or strategies that would increase our chances of actually protecting wildlife.

<u>Theme Two: Manage Growth Responsibly</u>
Inconsistencies and Potential Contradictions
- This theme includes vague, contradictory language regarding caps on development potential. (In some instances, it is unclear whether the implied goal for density neutrality supercedes policies related to density increases.)
- Several questions remain regarding references to potential transfers of development.
- Policies regarding the proposed future pattern of development for commercial development have the potential to be contradictory in some cases (the draft calls for both centralizing and dispersing commercial development).

<u>Theme Three: Uphold Jackson as "Heart of the Region"</u>
Inconsistencies and Potential Contradictions
- To ensure growth is not for growth's sake, the intent of "growth neighborhoods" in town, specifically as it relates to unrestricted "workforce housing" should be clarified – See summary of theme four for discussion regarding "**workforce housing."**
- If the "character and charm" of the Town are not more adequately defined, success in protecting

them will be difficult to achieve. (The draft's approach to character is less defined than our existing plan.)

Theme Four: Meet Our Community's Housing Needs

Inconsistencies and Potential Contradictions

- **This chapter needs a lot of work. If significant changes are not made to this chapter, it alone could undermine all the improvements made to the new draft over the last year.** Switching the focus to "workforce housing" without adequate inclusion of "affordable housing" criteria and specificity has made this chapter's principles and policies unnecessarily confusing and vague. In general, there is awkward wording throughout the entire chapter.
- Policy language is inadequate for setting and meeting a 65% quantitative goal.
- Currently proposed policies, which have some good and reasonable intentions, need more detailed description to ensure no loopholes are being created. (Examples include requiring "mitigation on a sliding scale" and promoting that "small, local entrepreneurial businesses should be exempt from requirements.")
- The chapter appears to be largely based on the myth that smaller, free-market homes function as accessible, affordable homes for the workforce. (This idea rarely holds true in resort communities, and has not been demonstrated to hold in this community in the long term.)

Theme Five: Provide for a Diverse and Balanced Economy

Inconsistencies and Potential Contradictions

- The indicators, as in all chapters, need a lot of work. (None of them include baseline data, and some of the goals are questionable given the goals of the chapter.)
- Some sections of the draft plan contradict this theme's goal of an economy not dependent on growth and expansion.

Theme Six: Develop a Multi-Modal Transportation Strategy

Inconsistencies and Potential Contradictions

- The role of Appendix K (existing transportation chapter) needs to be clarified to avoid confusion in the future.
- This theme currently lacks the level of analysis that accompanies a comprehensive plan. Prior to consideration and adoption of the FLUP section of the plan, considerably more analysis should be required.
- This theme needs to reconcile County-preferred and Wyoming Department of Transportation Level of Service (LOS) standards.

Theme Seven: Provide Quality Community Facilities, Services and Infrastructure

Inconsistencies and Potential Contradictions

- This theme needs to clarify concurrency review requirements, given that the following language was removed, "project the infrastructure and public facilities needed for the buildout and future development pattern."
- Policies need to be refined to ensure that the chapter goals are realistic and able to be implemented (rather than just a wish list), particularly given the role of the FLUP section.

Appendix I: Buildout and Numbers

Inconsistencies and Potential Contradictions

- Anytime a new document is to be released during this process that refers to the findings of the Buildout and Employee Generation task forces, the members of the task forces should have the opportunity to review the document before it's released. And, as we have stated before, we believe it is critical when presenting numbers to always attach information regarding the assumptions that were used to arrive at those numbers. Appendix I should include a list of assumptions. This would help to alleviate confusion for the public regarding the development potential associated with the new draft, and make things clearer for planners and community members who will refer to these numbers in the future.
- The descriptions with the table, particularly the reference to a cap "+ light industrial and + local convenience commercial" should be consistent with the policy language regarding caps. (In both the town and county, when is additional local convenience commercial and light industrial

permitted beyond the "caps"?)
- Also, ultimately, actual existing baseline allowances should be used to determine potential development, not figures that include many assumptions (including those for redevelopment).

New Ideas
It is unclear how you will specifically define and address "new ideas" in your review. Over the last year, **the public (both in written form and in verbal testimony) introduced a number of new ideas and suggestions on which votes were never taken by planning commissioners**. At this point, we assume any ideas that were previously brought forward in public comment will not be considered "new ideas" (regardless of whether a vote was taken related to these ideas), and will therefore not be considered during this phase of your review.

To provide one broad, comprehensive "new idea" for this plan, we recommend that you identify a comprehensive priority list of strategies to be incorporated into the text of the new plan (or you should make a recommendation that the elected officials develop this list as part of their review). Currently, the independent chapters include a number of strategies unique to each theme, but the draft plan, as a whole, doesn't prioritize them in relation to one another. (For example, the 1994 Plan included a list at the end of the first chapter that identified the top issues that needed immediate attention upon adoption of the plan. A similar, but more specific approach with timelines, would be good to take with this new plan.)

Closing Thoughts
Based on our review of the new "Themes and Policies" section, we believe there have been some great steps in the right direction, but there are still a lot of remaining questions and issues that need to be clarified prior to adoption of a new comprehensive plan. The key factors of this uncertainty include:

1) There are many outstanding issues associated with the FLUP section. (It is structured to be a section of the plan, not something separate from our comprehensive plan.)
2) Some of the policies' language is broad and vague, leaving potentially very diverse interpretations in the future when drafting land development regulations. (There are a number of issues that still need to be reconciled at some point, some of which can only be done at a more detailed level than the level at which the issues have been reviewed to date.)
3) Many of the tasks are still ahead of us that should play a role in the FLUP section discussion, such as an updated Natural Resources Overlay and Scenic Resources Overlay. And,
4) There are several key topics within the plan that should be more representative of the information gained in years of public input. However, again, to respect the structure of your review not to reconsider topics, we will emphasize these topics again as the draft gets forwarded to elected officials.

Thank you for your consideration of these comments. Again, we really appreciate your dedication of time and energy throughout this planning process and all the efforts you have made on behalf of our community.

Sincerely,

Kristy Bruner
Community Planning Director

Becky Tillson
Community Planning Associate

Theme 2: Manage Growth Responsibly

Shawn Ankeny 5/20/2010 15:17

Please do not deny homeowners the right to build a stand alone Guest House. Several people I know have recently bought their lots knowing that they would be able to build a guest house on the property eventually. I believe that if Guest Houses are no longer allowed, main houses will become that much larger, and that much more noticeable in the landscape. To be able to build a small Guest House and a moderately sized house breaks up the mass and creates smaller scale structures, which have a more quaint feel, like those of the olden days of Jackson Hole. I do not believe that eliminating Guest Houses will help wildlife in any way. Instead, it seems like eliminating them would take away coveted rights of the landowner to build on the land they own. I would rather not see Jackson turn into a place of 8000 sf houses. The fabric and beauty would benefit from grouped smaller scale structures.
Thank you for your consideration!

Robert E. Moore Jr. 5/21/2010 5:38

Dear Planning Commission,
I expect that you use this forum to gauge popularity of particular issues as it is convenient, though be it misleading. One should be aware that not everyone has the time or ability to follow your latest endeavor. I fall into this forementioned group having to rely on our local news media which is obviously biased. I just thought to clear my conscious I needed to add my two cents by speaking out against eliminating ARU's. Any more infringements than have already been inflicted by yourselves and your staff upon property owners in this valley is just plain wrong.
Thank you for your service and your time.

Susan Shepard 5/21/2010 19:50

I am opposed to the elimination of the option to build guest houses that exists under current law. I would like to build one to house my adult children who are struggling with the economy right now. It could later be rented out to a couple who need reasonably priced housing.
Also, it will impact second homeowners who bring a great deal of revenue (hence Jobs, charity and business support) to our valley.
I am sending a more comprehensive letter outlining my concerns.

Charlie Ross 5/24/2010 13:50

I think that guest houses should be allowed in the new comp plan.

Christy Gillespie 5/24/2010 14:07

In regards to: " Policy 2.1.a, lines 6 and 7, where it reads, â€œâ€¦accessory residential units associated with residential uses will not be allowed.â€ As a realtor in this valley and property owner I'm extremely disappointed that the planning commission for even considering this. Guest houses create jobs in the valley and provide housing. In a time when the economy is already in a downturn and builders are out of work - is this really the right time for you take an anti-growth policy on guest houses? Not to mention, all the other services industries that will be affected by this - architects, landscapers, cleaners, etc.

Jack Delay 5/24/2010 14:21

Dear trusted representatives,

I write to voice my serious concern and opposotion to Policy 2.1.a, specifically the proposition that accessory residential units will not be allowed. The caretaker or guest apartments are a sought after feature for many of our residents as well as new buyer's looking to put down roots at some level in the community and have been a long accepted element in county residential properties. It was a key feature for me when I bought my home.

I am not certain what reasoning led to this provision in the plan but I would be happy to debate it or provide further comment as I'm confident I would find it flawed.

In no uncertain terms I oppose this provision.

Thank you for your attention in this matter.

Tom Hunter 5/24/2010 14:31

The elimination of guests homes in your draft proposal is arbitrary and will irrevocably damage the marketplace for high end homes. Restrictions such as this at this time will kill what's left of the golden goose. Please reconsider this portion of your draft plan.

Edie Lewis 5/24/2010 14:31

Dear Teton County representatives,

I write to voice my serious concern and opposition to Policy 2.1.a, specifically the proposition that accessory residential units will not be allowed. The caretaker or guest apartments are a sought after feature for many of our residents as well as new buyer's looking to put down roots at some level in the community and have been a long accepted element in county residential properties.

In no uncertain terms I oppose this provision.

Thank you for your attention in this matter.

Madeleine Emrick 5/24/2010 15:03

I really object to the elimination of guest houses in this new proposed plan. Our world is changing very rapidly and as a lot of us age we may need assisted living. I think that guest houses will be a great way to be able to stay in our homes and have someone providing us care. I also think many guest houses become beautiful spaces for living for many who cannot afford to buy properties. I know many caretakers who live very happily in these guest houses. If you want to limit growth limit future development but do not change what was once allowed. Thanks, Madeleine

John Hanlon 5/24/2010 16:02

Re: Theme two on managing growth responsibly:

I feel it is unwise to take away the guest house in the county. They should be added to the town and long term rental allowed too. When housing is tight and prices are high is one way the locals can pay their mortgage. It allows more quality to lives of people who live here. Some are turned away because they can't pay a mortgage in this high priced community.

Another advantage to guest houses is that they allow people to come and visit without having to actually move here so the impact on the community is lessened.

A third benefit they provide is that if locals can rent guest houses then we will have less need for bigger apartment and condo complexes. If there are several hundred seasonal summer workers in the area and many of them are renting in various apartment complexes those place start looking like fraternity row. (just go by Ponderosa village on Friday evening in the summer time - you'll see). But if seasonal workers are renting a guest house behind a private home there will not be a "keg

party" there because the owner would never allow it. This translates to less disturbance calls to the sheriff/police too.
A fourth benefit is that it leaves other housing available, thus lessening the demand to build more publicly subsidized housing by Teton county.
Please keep guest houses in the plan.

Darren Kleiman 5/25/2010 9:17

I wish to voice my OPPOSITION to section 2.1.a of the most recent draft of the Comprehensive Plan, specifically as it pertains to ARUs. The proposed legislation stating "...accessory residential units associated with residential uses will not be allowed." will have unintended consequences beyond anyone's imagination. While control of density in theory is a good idea, this is NOT the right way to achieve the goal.
Commissioners, vote NO on the Comp Plan or you'll be out of a job next election.

Bomber Bryan 5/25/2010 9:32

TC Planners and Commissioners,
I am strongly against the proposed language in the Draft Comp Plan that defines the inability to construct future ARU's. This is not the answer to managing growth in Teton County. What exists is history, and fo-forward management has to do with future allowable deeds (residential development) and proper mitigation policies.
Thank you for your time and consideration.

Chad Budge 5/25/2010 9:36

If the elimanation of guest houses is being considered, I am extremely opposed to that.

Rob DesLauriers 5/25/2010 11:12

Eliminating a property owner's right to build a guest house (Policy 2.1.a.) is equivalent to a taking of rights. It is inappropriate and unfair. Please remove. Thank you.

Nancy Clancy 5/25/2010 12:30

Eliminating guest houses is absurd and there is no reason for it.

Tom Evans 5/25/2010 12:48

I am not in favor of taking away the accessory residential unit associated with residential uses in Teton County. I find it interesting that this is being considered. I have a guest house and I use for guest and friends and it is a wonderful addition to our household. It allows me the opportunity to also use if for staff and or employees without taking up any housing needs in the balance of the county. I don't see what the purpose is to not allow guest houses other than wanting to take jobs away from architects, contractors and landscape companies or for that matter eliminate future housing of employees in the valley.
By disallowing you are continuing to increase the demand for housing and in return will increase the amount of rent someone will have to pay. You need to be more proactive in this economic climate and not take away a potential job that does no harm in keeping the accessory units in place as it currently is in the master plan.

Ken Mahood 5/25/2010 14:01

I am opposed to removing the provision for accessory residential units associated with residential

uses in the county. This is the wrong approach and should not be adopted.

Brett Bennett 5/25/2010 16:15

I oppose the elimination of guest houses as noted in Policy 2.1.a.
Guest homes are an integral component to the employee housing base. The elimination of future guest homes would reduce the capacity for the valley to absorb future housing needs, would require more "affordable housing blocks" to be built and would increase commuter traffic from Star Valley and Teton Valley.

Chris Jaubert 5/25/2010 16:19

I strongly disagree with Section 2.1.a of the Comprehensive Plan. It border line attempts to diminish our freedoms as land owners more so than the current FAR regulations. The current regulations atleast allow individuals to decide how they want to develop their own land (to a degree) but still controls the FAR. I think if someone wants to build a 3000sf Main house and then a 4000sf Guest House, they should be allowed to do so. The proposed method is just one step closer to the government completely dictating (and limiting) what we can build on our own land. The next step will inevitably be to cut down the allowable square footage of the one allowed building unit thus mandating that we all live in cabins. If the intention is to limit the amount of "building" per square acre, then just decrease the allowable square footage per unit, not the allowable number of units. Personally I think the current system is more than restrictive enough to accomplish the goal.

Phil Stevenson 5/25/2010 17:29

I strongly object to the language contained in Policy 2.1.A which states,in part, "...accesory residential units associated with residential uses will not be allowed". This would appear to be a direct prohibition on guest houses, which I believe would be a huge mistake. More than almost anywhere else in the country, when you live in Jackson, people want to come and visit, often for weeks at a time. For those who can afford them, a guest house is a gracious way to house visitors, and I don't see how they in any way are harmful to the citizens of Teton County, especially when they are limited to 1,000 square feet.

Mark S. Dalby 5/25/2010 18:42

I firmly disagree with removing the option to build ARU's (Accessory Residential Units) on our land and in our community. For many, this provides another means of income to help support our families. Additionally, it provides low income housing for families in need of living space, which is extremely limited for our workforce. With the further expansion of the airport, which drives our growth bringing financial stability to our local economy, this seams a mistake.
There should be incentives for ARU's to help our community.
Landowner's should have the power to choose.

Steven Bohl 5/26/2010 6:33

Good Morning,
We completed the construction of our guest home last May. We also had a building permit approved for our main home, however, do to economic changes we have postponed the main house construction for a year or two. Our property address is 5235 Fish Creek Rd, Wilson.
As you can imagine, if we lose the ability to build a main house, with the exclusion of an accessory structure provision, this would dramatically impact our property. We complied with the maximum of 1,000 sq ft for a guest house in anticipation of building the main house.

We have owned homes in the Jackson area for over 10 years and are planning on retiring in the area in two- three years with the completion of the main house. We bought this lot specifically for the building of the guest home and main home as proven by our approved building permits. Please consider this unique situation and not significantly impact our property value.

Todd Lamppa 5/26/2010 7:41

Regarding any changes to the allowance of having a guest house or mother in law apartment, I believe it would be unfair to property owners if the county prohibited the right to have a place for guests or family members to reside. Let each development decide during the development process whether or not it is appropriate to have guest homes or apartments within the project, but dont take away the right for the whole county.

Penny Gaitan 5/26/2010 9:37

To Whom It May Concern:

With regards to the current draft of the Comprehensive Plan, I am very concerned and opposed to the Policy 2.1a, especially the proposition that future constructions of accessory residential units not being allowed. I have a 3 acre piece of property with home and plan to build a guest house for one of my children to be able to move back to the area and live in Jackson Hole. I haven't had the ability to do it yet, but that was the purpose of the purchase years ago. This ability to put a guest home on property has been allowed use for years and I would like to see that continued. I do not understand why it was even considered to change this regulation, but I definitely oppose this change.

Thomas Ward 5/26/2010 10:06

The transfer of density from county to town seems ill considered as well as a thinly veiled piece of political gerrymandering.

It will remove housing stock that is often utilized by caretakers (tax paying working types) as well as eliminating the prospect of some construction opportunities for general contractors (also tax paying working types).

The proposed amendment does not outline how these density credits will be transferred. An ARU in the county is 1000sf for a private residential development and 850sf for a commercial development. Neither of these floor areas would qualify as an affordable/employee housing unit as outlined by the housing authority, so if these are to be combined, how? This should be outlined in the proposed amendment. I did not see whether or not his would apply to new developments or be applied retroactively to all lots eligible for an ARU. These specifics should be worked out prior to being proposed for approval. I am certain that our elected county officials would require the points above, but I felt compelled to comment myself.

Barry Cox 5/26/2010 10:16

Planning Commission,

I strongly object to the comprehensive plans intent to not allow accessory residential units, guest houses.

Garnett Smith 5/26/2010 15:23

I hear the new plan has a provision stating that "accessory residential units associated with residential uses" will be prohibited. If this means there will be no guest houses allowed I am opposed to that.

I am the owner of 2 lots in 3 Creek Ranch and if guests houses are not allowed then I think the value of these lots will decline.
I purchsed these lots with the idea that guests houses were allowed. If you grandfather existing owners that is one thing, but if you plan on applying this moratorium to existing owners I feel it will result in the taking of a right that was in the purchase price and would result in a dimunition of value.

Bitsy Smith 5/26/2010 15:27

Although I am in favor of limiting growth in the county, I would like to make a comment regarding the estate lots at 3 Creek Ranch. These lots are 2 1/2 to 3 acres in size and were sold with the understanding that a guest house could be built on the lot if the owner desired to to so.
I think this could devalue the property, and hope that your proposal would only effect lots that are smaller in size.
Bitsy Smith
3 Creek Ranch Board of Directors

Carol Linton 5/26/2010 16:02

Commissioners and Planners,
I have been a Jackson homeowner since 1987. I have lived in three different areas of the valley, bought and sold 5 times. My husband is a fourth generation Wyomingite; he owns a Wyoming business that has just celebrated its 50th year. I am telling you this because I am trying to impress that we are not "newcomers" to the valley.
Eliminating guest houses in the Valley is not in your realm to impose. If the CCR's of a subdivision allow it, and the property is of a size to allow it, then you are taking away an individual's property rights. Why not put a restriction that it must be within a certain distance from the main home (clustering which you are fond of)? Clustering guest homes to main homes is the right solution. Eliminating guest homes from lots that allow them is just plain wrong.

Jake Ankeny 5/27/2010 7:41

I stand in strong opposition to the elimination of the ARU from the Comprehensive Plan and future LDR's. People have reduced their main residence sizes to allow for future, potential ARU's. I can only imagine their disbelief, frustration and potential litigation that would come from such an action. You should also strongly consider who has benefited from ARU's, namely caretakers, mothers-in-law, family members, etc. This is too severe of an action to take in these down economic times as well.

Linda Hanlon 5/27/2010 10:07

Dear Representatives,
I am writing to express my serious concern and opposition to Policy 2.1.a, specifically the proposition that accessory residential units will not be allowed. The caretaker or guest apartments are a sought after feature for many of our residents and have been a long accepted option in residential properties in the county.
I am a Realtor with JH Sotheby's International Realty and I live in the county. I do not support this proposition.
Thank you for your attention in this matter.

Matt Faupel 5/27/2010 15:16

If guest houses are considered AR units then this is a terrible idea. Guest houses do not have the issues that you are trying to mitigate with AR units being rented, etc. They are essentially guest bedrooms that are private. They can also provide housing for caregivers, nannies and caretakers who you are now saying either need to live off site or in the home of the owner. This is simply an unneeded restriction and a large right taken away from a landowner.

If enforcement is the issue, fix the issue, do not avoid the issue, fix it and do not penalize those who are not the issue.

Kristin Vito 5/27/2010 15:36

Dear County Commissioners:

I am opposed to the ban on future guest homes in the county. Most guests houses are used for just guests or caretakers. Eliminating future accessory units will eliminate caretakers from being able to live close to their work and will eliminate guests from staying with friends and family. I do not believe that this is the intention of the ban.

Thank you for your time,

Karen Parent 5/27/2010 21:56

I strongly believe that eliminating the option to build separate, free-standing guest houses is a mistake. The opportunity to have a separate "outbuilding" helps to reduce and minimize the bulk and scale of larger homes.

Furthermore, guest houses help provide housing for caretakers/employees on these properties.

Why would the county remove this tool in the new comp plan? This tool has not created a problem - so why take the option away? It makes no sense.

Kim & Bob McGregor 5/27/2010 22:25

Sirs,

I just heard that one of the new provisions of the new comp plan draft is the elimination of guest houses. New I haven't thought this through completely since I just found out about this today and comments are due tomorrow. However, on the face of it this seems completely backwards and counterproductive. Think about it. Who uses guest houses?

1- Guests (temporary visitors)

2- Relatives (children trying to make it in Jackson, or parents now living in the guest house)

3- Renters

4- Caretakers

Now we obviously want to continue to allow people to have guests. And we all know how hard it is for children to continue to live in the valley once they are out of the house, this is one way to facilitate this transition and keep families together in Jackson.

So what about renters and caretakers? Guest houses are small, by regulation. So renters (and caretakers) are consequently also small: young couples, singles, maybe a new small family. People who have a hard time making it in Jackson. The very people we are building affordable housing for and worrying about providing rentals for (Witness the Townâ€™s moratorium on condominium conversions last year). This is not the type of population increase we are concerned about. This is the type of population increase we are trying to encourage--working people.

One of the main concerns and goals of the plan is that Jackson go forward as a viable, balanced, and sustainable community. These are the people and this is the housing we need. Not new subdivisions where people with money can drive up the overall cost of living in Jackson.

Concentrate on limiting that kind of growth, and leave this kind of affordable housing alone.
Thank you,

Jennifer Reichert 5/28/2010 11:01

Dear Teton County Commissioners,
We are saddened and appalled to learn that guest houses would now not be allowed on properties.
Fifteen years ago my husband and I purchased a 4.5 acre parcel south of town. Ten years ago, we began building and moved into our home. In the past two years we just finished our basement. Now, we are trying to save to add a guest house. We live in a neighborhood where maybe 1/3 of our neighbors have guest homes and bought here because of the ability to have a guest home for future needs. We have parents who may have future health issues or needs that would require close or live in type care. Some of our neighbors have guest houses, we would like the same opportunity for our property.
We greatly appreciate your efforts to look at maximizing wildlife conservation and minimizing impact. However creating a blanket moratorium on guest houses does not seem fair or just to the private property rights of individuals and landowners in Teton County. There does not appear to be any regard to the size of the lot or the homeowner's immediate neighborhood.
Thank you,

Virginia Mahood 5/28/2010 12:14

I am opposed to eliminating guest houses under the current draft of the comprehensive plan. Specifically under policy 2.1.a, lines 6 and 7, where it states, "…accessory residential units associated with residential uses will not be allowed." Guest houses are a vital element of our community. They provide affordable housing for employees and a means for a homeowner to subsidize their mortgage through rentals. The construction of guest homes also provides much needed work for the construction industry. What guest houses provide greatly outweigh their impact on the environment. If a homeowner needs a guest home and they are banned under the current plan, they will be forced to buy adjacent land to develop that site for their needs. Please do not exclude "accessory residential units" from the comp plan.

Patricia Smith 5/28/2010 14:23

To Whom It May Concern:
I believe that the comprehensive plan should not exclude people from being able to build guest homes.

Theme 4: Meet Our Community's Housing Needs

May 27, 2010 Rich Bloom

Comprehensive Plan Comments – 5.7.2010 Draft

Theme 4: Meet Our Community's Housing Need

I have read the May 7, 2010 draft and have decided to submit comments only on Theme 4 as it has the most disconnects from the other chapters, your joint votes and also where we have been heading in workforce housing solutions as a community the last number of years as well as the current Town and County LDR's.

I will focus only on those areas that I think do not represent your votes via other chapters - or fully represent the intent of the votes on this theme that you took. Recognize that the questions asked by staff to the joint planning commissions greatly influenced the votes and what they meant. I hope you will review the intent of some of your votes recognizing this limitation – without feeling it is in anyway "revisiting" any of the votes. This is an important point as you will see from my comments that follow.

Although my input is informed from my long history of creating workforce rental housing in the private sector (TSS), 30 plus years living in this county, well known community organizing – not only on planning issues but also advocating for workforce housing, and my current nine month involvement as a member of the Town/County Housing Blue Ribbon Panel – I am commenting solely as an individual.

Workforce Housing definition page 53:

- Your votes, all of our LDRs and the work of the last years by our community have defined this as housing for our workforce.
    - This new definition of *"all housing occupied by people living in the community year-round regardless of deed restriction or employment."* - is very, very problematic! Workforce housing is tied to employment period – whether in deed restricted or free market housing units – whether owned or rented – whether seasonal or year-round. Please clarify that workforce housing – is for the workforce.
    - See my discussion later on how this focus on workforce housing then achieves secondarily the other goals of social diversity, sense of community and generational continuity that you have identified.
    - Also an emphasis for incentives can be more weighted for year-round and/or emergency service workers - without changing the definition of workforce housing in this manner by dropping all employment requirements as part of the definition and solely focusing the definition on year-round employees when seasonal employees remain a critical need for our economy – and community.

Why This Theme is Addressed and other areas throughout the theme:

- The key issue here is that supporting the goal of at least 65% of our workforce living locally will result in the other three bullets being achieved – socioeconomic and demographic diversity, generational continuity and a sense of community.
    - It needs to be clear that the reason we are focusing on the plan is to address workforce housing goals – and that will achieve these other three bulleted goals – not the other way around!
    - The way staff interpreted your votes (and how they constructed the votes themselves) – we are left with whether we should incent or mitigate for retirees, generational continuity – or for our workforce? It is for workforce housing that this theme is addressing – but to be consistent with your votes – the other goals of diversity, generational continuity and sense of community will be achieved by this statement of ideal and focus on what we are intervening on (workforce housing – your votes also on priority for year-round employees and emergency service workers) through regulation, mitigation, exactions and incentives.
    - It is currently the greatest flaw in this theme – and what I am suggesting is not inconsistent with your votes.
    - This is also found in Principle 4.1 – which should be rewritten to focus on workforce housing which then leads to achieving the other three bulleted reasons for this effort.

- "*Catch-up*" – is clearly not something we have talked about since identifying the goal of housing at least 65% of our workforce locally. This is old language and dated thinking from the 2005 Housing Needs Study that predated our establishment of a realistic and achievable goal of no less than 65% of our workforce being housed locally.
    - Since we are at 70% plus, and have never dipped below 67% - the discussion has focused on "*keeping up*".
    - I want to point out that you never took a vote on these two terms.
    - It is a gigantic leap to now say we want to achieve 100% of our workforce living locally – the financial and regulatory implications of that are simply draconian and unachievable. I would strongly recommend removing all references to "*catch-up*".
    - Again this is mentioned under "A Residential Workforce - page55 – *"The community's goal is to increase the percentage of the workforce living locally, improving the existing situation."*
        - This again is Theme four's second greatest weakness and will do great harm to our affordable housing efforts if it is included as written. It must be made clear that we will not be incenting for a goal above 65% of our workforce living locally - or our collective work over the last number of years will have all gone to waste. You need to clarify that the focus is not falling below 65% - for our workforce – living locally.
        - This is a very important point and I cannot emphasize it enough! My suggestion I also believe falls within the votes you did take – it is simply of matter of using more precious language in the plan.
- The statistics staff states on page 53 in the first paragraph, are not updated to the reality of the last two plus years where1,800 workers have been lost in just over a year and housing prices have retreated 30-40% from 2007 highs along with rents, increased vacancies, total houses for sale and distressed sales.
    - To be fair in this section you need to direct staff to bring this section current. The Teton County Housing Authority has more current statistics, and possible language, as it is something the Blue Ribbon Panel has been working on.

Within Current Development Potential Concepts

- There are numerous examples where the density portion of any incentives conflicts with the votes from other themes – especially in Theme 1 and 2. It is addressed in one or two occasions in this Theme 4 but generally if should be clear that any targeted growth areas in town, density tools etc. – exist only within the overall Town County potential – simply this language needs to line up with Theme 2 where any up zone is tied to a County down zone, or conversion of Town commercial to residential. As Theme 4 reads currently, this concept is not consistently or clearly stated.
- Again from my in-depth understanding of workforce housing issues – the need for the next ten years is quite modest – in the neighborhood of a few hundred units – especially given the economic and affordability (both rental and ownership) impacts of the last two plus years. Your votes from the other themes should tie to this reality and the constraints you have put through votes and language in Theme 1 and 2 about working within the current overall development potential.

Since this is meant as constructive criticism – and the points I have addressed are very concerning to me and the community – I wanted to close with some balancing comments. Overall the new draft, especially Theme 1 and 2 as well as 3 – are a tremendous improvement from the draft of last April 2009. I want to thank the planning commissions and staff for all of your work. Although there are some sections in the other themes I wanted to address – I limited myself to these fairly large disconnects and unclear intent found in Theme 4.

In closing - thank you for all the hours you have spent on this process – it is appreciated. I will not be able to attend the next public meeting so hope all of you give my comments due consideration and attention.

Rich Bloom – submitted solely as an individual

Theme 5: Provide for a Diverse and Balanced Economy

Jackson Hole Chamber of Commerce 5/28/2010 8:31

We congratulate the Town and County planning staffs and planning commissions on an improved Comprehensive Plan. The following are our comments on Theme 5, "Provide for a Diverse and Balanced Economy":

GENERAL:

(1)Change Policy 5.1.b to 5.1.c, change Policy 5.1.c to 5.1.d, and add the following policy as Policy 5.1.b: Title = "Strengthen community orientation of tourism economy." Explanation = "Jackson Hole and Teton County should appeal to a broad range economic demographic. A continued and new focus on middle class families should be integrated into our plan. Family visitation has been central to the success of our community's tourism economy. Left unattended, current economics are driving new commercial development towards high-end business that is unaffordable for many families. In order to continue to attract families, commercial development policy will support affordability for visiting families. The policy and tourism goal of providing a high level of services and amenities is not limited to high-end development and high priced services."

(2)Add the following as Policy 5.2.d: Title = "Orient economic development towards community self-reliance." Explanation = "As the community strives towards energy efficiency and other means of economic self-reliance, the community should promote the recruitment, formation, and growth of businesses that support our goals of self-reliance. Such "green" businesses would be consistent with our community's orientation towards balancing economic, social, and environmental interests and concerns and create "green collar" jobs for our community. Our community's tourism economy would be strengthened by the attraction of discriminating travelers who select Jackson Hole as their destination of choice because of our community's economic development orientation and progress towards energy efficiency and self-reliance."

(3) Revise the last sentence in Principle 5.3 to read, "Economic diversity in Teton County will focus on creating a network of small locally owned, operated, and supported businesses consistent with the community's stewardship, social, cultural and arts, and heritage goals."

Theme 6: Develop a Multi-Modal Transportation System

YELLOWSTONE-TETON
CLEAN ENERGY COALITION

May 28, 2010

Town of Jackson and Teton County Planning Commissions
Re: Proposed Theme Six Comments
Submitted via email to Alex Norton and Tyler Sinclair

Dear Commissioners and Staff,

On behalf of the Yellowstone-Teton Clean Energy Coalition, I would like to thank you for the opportunity to provide comment the May 7 2010 version of the Jackson/Teton County Comprehensive plan.

Below are general suggestions followed by specific comments on proposed Theme Six – *Develop a Multi-Modal Transportation Strategy*.

Theme Six - "Develop a Multi-Modal Transportation Strategy"

Transportation choices drastically affect a variety of critical elements of a community including public health, the environment, and local economies. Considering the large portion of energy and emissions attributed to transportation activities in this community, local policy and planning related to transportation play a crucial role in a community's sustainability. Sustainable transportation policies that address municipal fleets, commuter options, and alternative transportation systems cannot focus on simply displacing traffic congestion, but must also consider measurable strategies to seek a reduction in the role that petroleum based fuels play in local transportation. This will play a critical role on the long-term sustainability and security of the transportation models adopted in this community.

Statement of Ideal:

- Consider, 'alternative fuels' in lieu of, "clean and renewable fuels." This matches better with language in the next section of the document.

- Add language to include the use of 'advanced vehicle technologies' in the description of the basis for the proposed transportation system.

P.O. Box 11756, Jackson, WY 83002
phil@ytcleanenergy.org 307.413.1971
www.ytcleanenergy.org

YELLOWSTONE-TETON
CLEAN ENERGY COALITION

Why is this theme addressed?

- Consider changing, **"Reduce economic impacts** of a changing world, where the cost of oil will continue to rise." to ' **Increase long-term economic security** by decreasing the role of (foreign) petroleum on local transportation systems."

Principles and Policies

Policy 6.2a

- Define, 'active modes of transportation.'

Policy 6.2.d

- Is **'Level of Service D'** a high enough level of service to receive WYDOT Funds? This seems to be at odds with the later mentioned Policy 6.3.d describing increased cooperation with WYDOT.

Policy 6.3.b

- Consider including language about communicating with, or engaging, existing, transportation focused organizations in developing transportation network decisions. Organizations such as ours have direct connections for funding sources that could support projects in this area.

Policy 6.3.d

- The use of alternative fuels, advanced vehicle technologies, and other strategies to reduce petroleum consumption play a role in diminishing the collective effects of transportation on natural resources through improved local air quality. Harmful exhaust emissions including sulfur dioxide, nitrogen dioxide, carbon monoxide, benzene and the secondary production of ground level ozone all result from vehicle emissions. Albeit less tangible, these harmful substances all pose serious threats to local air quality and natural resources.

Strategies

Strategy 6.1

- Include 'supporting alternative fuels and advanced vehicle technologies' to the funded programs.

Strategy 6.2

- Consider including, 'and to better facilitate the use of alternative fuels' into the reasons for supporting a new START facility.
- Consider pursuing transit from Jackson to GRTE, beyond the airport, to accommodate visitors and employees travelling to the Park

Strategy 6.6

- Define 'periodically' for purposes of reviewing the entire transportation system.

Strategy 6.9

- Consider adding language to better define what the 'Travel Study' will constitute.

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YELLOWSTONE-TETON
CLEAN ENERGY COALITION

- What will function as the baseline for this study? The first step should be establishing this prior to the 5-year interval as described and how it related to the Indicators identified. This highlights the necessity for further study to establish baseline for the indicators.
- 1996 Travel Study should not be considered baseline.

Strategy 6.10

- How exactly will Appendix K and the information it contains be 'utilized'?
- When will TAC update/or complete a more detailed transportation plan?

Thank you for your ongoing, tireless efforts in the process of rewriting this important document. I have included several resources collected from communities throughout the country that could have bearing on the rewriting of the Jackson/Teton County Comprehensive Plan's Theme Six. Please consider our organization as a resource in any efforts to promote more efficient transportation systems and technologies in this community.

Best,

Phillip Cameron
Executive Director

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JACKSON HOLE ENERGY EFFICIENCY ACTION PLAN

FALL 2007

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1. INTRODUCTION

In 2007, the Jackson Town Council and Board of Teton County Commissioners took action to improve energy efficiencies and reduce heat trapping gas emissions by forming an Energy Efficiency Advisory Board (EEAB) tasked with improving energy efficiency in local governmental operations. In order to provide focus for the newly formed Board, the Town and County adopted an aggressive energy reduction target for local government operations, committing to 10% reduction in electricity and fossil fuel use by the year 2010 (10x10).

The EEAB is composed of seven community leaders that work in close coordination with citizens and Town and County staff serving on Action Teams. Action Teams have formed around five key areas to assess government energy use and provide input and ideas for steps to meet the 10x10 challenge.

Over the last six months, the EEAB has developed a quantitative baseline of Town and County government's energy use and drafted this Jackson Hole Energy Efficiency Action Plan to achieve the goals of 10x10. The following summarizes the Action Plan's short-term recommendations from the EEAB and the five Action Teams for the Town of Jackson and Teton County to achieve 10x10.

Summary of Recommendations

1. Engage a data consultant to quantify net benefits of fuels and fleet measures for achieving 10x10 efficiencies
2. Engage a facilitator to integrate 10x10 actions into employee's daily operations
3. Expand Action Teams to include land use and transportation
4. Begin working on a community plan for energy efficiency
5. Update and revise this action plan in six months
6. Assess budget and staffing needs for FY 2008-2009
7. Continue the Energy Efficiency Advisory Board until January 2011

Fiscal Impact

Recommended expenditures as of the fall of 2007 include hiring a consultant who can determine the costs and quantify energy savings of Fuels and Fleet action steps, as well as a facilitator to integrate the recommended actions into employee's daily operations. These are outlined below:

- Baseline Data Consultant- $10,000
- Fuels and Fleet Data Consultant- $10,000
- 10x10 Employee Meeting- $5,000
- Facilitator for Focus Group Meetings- $3,000
- Total Recommended Expenditures: $28,000

Funding requests for other actions recommended in this Plan will be brought before the Jackson Town Council and/or Teton County Board of Commissioners for approval during the budget cycle. Each recommended measure will include costs and savings, as well as efficiencies gained and reductions in heat trapping gasses.

1. PURPOSE

The Jackson Hole community faces challenges with regard to the supply of safe and affordable energy. Energy demand to support Town and County operations continues to grow despite historically high energy prices, mounting concerns over energy security, and the recognition of human effects on global climate change. The decisions we make now regarding our energy supply and demand can either help our community address these challenges or complicate our ability to secure a stable energy future.

Improving the energy efficiency of our buildings and facility operations, as well as reducing our fossil fuel use are two of the most constructive and cost-effective ways to address these challenges. Increased investment in energy efficiency, renewable energy, and energy conservation can lower energy bills, reduce demand for fossil fuels, help stabilize energy prices and energy system reliability, and help reduce air pollutants and heat trapping gas emissions.

The Jackson Hole Energy Efficiency Action Plan (Action Plan) charts the short-term course for achieving the 10x10 goals, outlined in the 10x10 Resolution (Appendix 1-b), as well as recommends a longer-term process to expand the efficiency efforts to areas of government influence, partner with other organizations working on similar efforts, and set meaningful future goals for reducing heat trapping gasses. This plan will evolve over time, with annual updates that summarize what has been achieved and highlight areas of improvement to meet 10x10 and beyond.

Looking forward, the Action Plan recognizes that meaningful investment in energy efficiency, renewable energy, and energy conservation in Jackson Hole cannot happen based on the work of Town and County operations alone. Through ongoing efforts by the Town and County to advance land use planning, improve multimodal transportation systems, expand recycling and use of consumables, and update building standards, Local Government can engage the larger community energy efficiency work. As efforts to achieve 10x10 result in energy savings in Town and County operations, opportunities for partnering with other organizations and business in Teton County will emerge to improve energy efficiency throughout the community. The Action Plan has identified programs and activities to bring the appropriate stakeholders together to be part of a collaborative effort to increase energy efficiency and reduce heat-trapping gasses produced in Jackson Hole.

Finally, the Action Plan also recommends long-term goals and outlines specific strategies for reducing countywide emissions of heat trapping gases. The best available science, including the recent reports by the Intergovernmental Panel on Climate Change, recommend reducing emissions of heat trapping pollutants by 80 percent from today's levels by 2050. Many communities around the US and the world have committed to this goal, but their plans for achieving the goal generally lack specifics. This Action Plan calls for setting the goal and putting in motion a process to study the effects of climate change on our community and develop a list of defined projects that can help us achieve these goals.

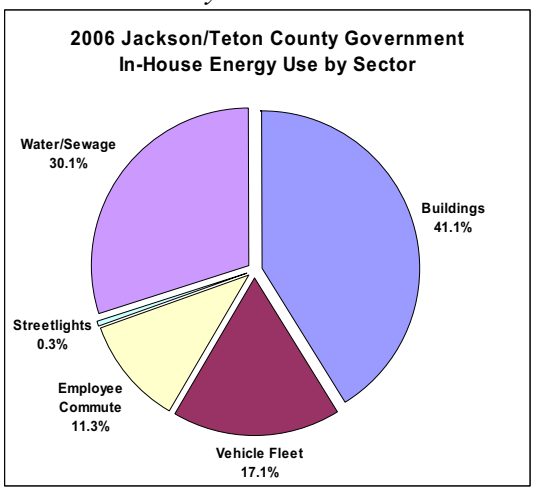
3. ENERGY USE SNAPSHOT

The Baseline Action Team quantified all of the energy used in 2006 to support Town and County government operations[1]. This is the baseline from which we will try to achieve ten percent energy reductions. The Team then forecasted energy use in 2010, assuming the construction of a number of planned new buildings. **Table 1 shows that to meet 10x10, we have to reduce our projected energy use by 15 percent, with close to 20 percent savings in buildings.**

Table 1. Baseline energy use and 10x10 target

	2006 Energy Use (kWh)	2010 10x10 Goal (kWh)	2010 Forecasted Use (kWh)	% Reduction by 2010 Forecast Required To Meet 10x10 Goal
Buildings	10,890,900	9,801,810	12,040,587	18.6%
Vehicle Fleet	4,542,352	4,088,117	4,542,352	10.0%
Employee Commute	3,003,237	2,702,913	2,949,650	8.4%
Streetlights	91,213	82,092	91,213	10.0%
Water/Sewage	7,974,773	7,177,296	8,520,553	15.8%
Total	26,502,474	23,852,227	28,144,355	15.3%

Table 2. 2006 Jackson/ Teton County Government In-House Energy Use by Sector



It is also useful to list the facilities and vehicle fleets that contribute significantly to the forecasted 2010 energy use in order to help identify where efforts will have the most impact. Therefore, all facilities and/or fleets contributing more than 2.5% of the total energy use in 2010 are listed below from largest to smallest:

- Waste Water Treatment Plant 21.93% of total energy use
- Parks and Recreation Rec Center 14.2% of total energy use
- Teton County Court House 5.75% of total energy use
- Teton County Sherriff's Office 4.23% of total energy use
- New Parking Structure 3.02% of total energy use
- Teton County Jail 2.9% of total energy use
- Jackson Police Department 2.79% of total energy use
- Teton County Public Works Streets 2.51% of total energy use

[1] Our baseline does not include the energy used for town and county services, such as public transportation, recycling, trash transfer. These will be included in a future report that considers community-wide energy use and recognizes the net energy use of these services.

4. STRATEGIES

Strategies used in this Action Plan are broad statements that set direction for developing specific actions.

Baseline

1. To establish baseline energy use and emissions
2. Forecast energy use and emissions in 2010
3. Forecast improvements to energy use and emissions in 2010
4. Monitor actual improvements in energy use and emissions in 2010 from actions taken by EEAB and Action Teams

Communications

1. Share with Town and County employees the issues related to energy use, energy independence, energy efficiency and conservation, financial savings, and environmental protection in a way that engages them and inspires them to make positive personal choices around these topics
2. Communicate to Town & County employees the significance of the 10x10 resolution and their roles in achieving that goal
3. Communicate the programs, challenges, and successes of the Town and County energy projects to a broad audience

Facilities Energy Use

1. Assess and evaluate Facilities
2. Modify current daily operational practices for conservation
3. Identify specific projects for implementation
4. Submit recommendations to respective agencies for consideration and action
5. Develop and adopt standards for new Town and County buildings

Fuels & Fleet

1. Adopt policies encouraging improvements to the overall energy use and impacts of the vehicle fleet
2. Upgrade facilities to permit reduced idling, better maintenance, and alternative fuel usage
3. Improve the way we do business to reduce miles traveled, while accomplishing the same job/task
4. Improve the fuel efficiency of the current vehicles we use
5. Replace the vehicles we use with more fuel-efficient vehicles
6. Replace and/or reduce current fossil fuel use with non-fossil alternative fuels-biodiesel, ethanol, electricity, and hydrogen
7. Consider fuel/energy savings when evaluating and adding levels of services offered to the community
8. Offer incentives to employees that will reduce the energy use and impact of their commute to work

Green Buildings

1. Meet or exceed United States Green Building Council's Silver LEED Standard for all Town and County buildings
2. Build one or more key public buildings built and certified to a Silver LEED standard
3. Implement High Performance Residential Home Program for residents in the community

5. SHORT-TERM RECOMMENDATIONS: 6 months

Organization

- Utilize consultants and staff to complete detailed analysis of action items- $
- Add two additional workgroups: land use and transportation(referenced in Beyond 10x10 Section)
- Partner with other community based institutions/organizations to expand energy efficiency.
- Identify future staffing structure for FY 2008-2009
- Continue Energy Efficiency Advisory Board until January 2011

Baseline

- Forecast energy use and emissions reductions expected from recommended actions- $
- Monitor energy use, emissions reductions, and progress towards the 10x10 goals-$

Communications

- Implement all employee meeting and employee focus groups- $
- Develop an employee program to effectively engage staff in 10x10 Goals.
- Continue to engage in outreach and education activities with other like communities.
- Utilize the 10x10 brand when referring to the Energy Efficiency initiative

Facilities Energy Use

- Complete Energy Audits on all Town and County facilities *(started)*-$
- Identify, prioritize, and begin to implement specific projects based on cost benefit analysis

Fuels and Fleet

- Utilize a consultant to quantify reductions and perform a cost benefit analysis-$
- Prioritize identified actions.

Green Building

- Develop a Town and County building policy for new buildings and retrofits *(started)*.
- Identify a Town or County building project for LEED Silver demonstration.
- Implement the High Performance Residential Home Program *(started)*.
- Adopt and begin implementing the International Energy Code *(started)*…

$ Future costs may be associated- will be brought as individual items before the Elected Boards.

6. LONG-TERM RECOMMENDATIONS: 6 months and Beyond

Organization

- Develop long-term policies for maximizing energy efficiency
- Set Town and County goal for reducing greenhouse gas (GHG) emissions
- Determine future staffing structure to achieve 10x10 and beyond- $

Communications

- Refine and implement a Community Plan for energy efficiency
- Implement an Employee Program to effectively engage staff in the 10x10 Goal-$
- Continue to engage in outreach and education activities with other communities

Baseline

- Continue to monitor efficacy of Town and County actions
- Establish baseline and forecast of county-wide GHG emissions- $
- Work with Lower Valley Energy to weather-normalize results to baseline data
- Literature review and summary of climate change in the West

Facilities Energy Use

- Work with Green Buildings Action Team to develop and adopt standards and guidelines for all facilities constructed by the Town and County to reduce future energy use
- Continue building retrofits to improve energy efficiency *(started)*- $
- Evaluate the operational practices of Town and County buildings and develop a plan to address energy use reduction and foster employee participation in the plan

Fuels and Fleet

- Support employee carpooling, use of public transit, and use of alternative transportation
- Support development of new START and fleet facility-$
- Implement more energy efficient fleet maintenance practices
- Develop green fleet procurement policy
- Incorporate biofuels and necessary infrastructure as deemed desirable/possible-$

Green Buildings

- Support implementation of adopted green building policy
- Support necessary staff training to implement green building policy- $

$ Future costs may be associated- will be brought as individual items before the Elected Boards.

7. BEYOND 10x10

Achieving 10 percent energy reductions by the year 2010 will offer the Town of Jackson and Teton County substantial economic and environmental benefits. Additional substantial energy efficiency gains can be realized by **expanding the scope of the 10x10 initiative to include non-governmental organizations, businesses, and residents.** Through the leadership demonstrated in the 10x10 initiative and the conduct of the EEAB and Action Teams, the Town and County should collaborate with the private sector to further pursue goals set forth in the U.S Mayor's Climate Protection Agreement and the County's Climate Change Resolution (Attachment 1-c).

The work of Town and County government includes: improving the public transportation infrastructure, permitting and inspecting new buildings, developing land use plans that protect environmental resources and allow reasonable growth, and solid waste management practices that minimize costs and risks associated with burying waste. Developing plans to improve energy efficiency throughout these areas of influence can **expand energy efficiency far beyond government operations**, bringing the benefits of reduced energy use and corresponding cost savings, and reduction of fossil fuel use and corresponding heat trapping gas emissions. The following are the beyond 10x10 recommendations:

1. Expand 10x10 to areas of government influence, including Land Use and Transportation.
2. Set heat trapping gas emission reduction targets.

The GfK Roper Yale Survey on Environmental Issues states that 3 in 4 Americans want their own city or local government to do more to reduce heat-trapping gases that cause global warming (see Supporting Documents 3-b). The EEAB recognizes that global climate change presents one of the foremost economical, social and environmental threats to our community and the world. Increasing concentrations of heat trapping pollutants in the atmosphere are causing higher temperatures, resulting in more frequent intense storms and forest fires, rising sea levels, changes in precipitation, reduced snow pack and water availability, biodiversity loss, species extinction, changes in infectious disease incidence, increases in mortality due to heat stress, and human displacement. The economy of Jackson Hole depends on sufficient and sustained snow pack and water supply, and healthy, diverse plant, fish, and wildlife populations.

Global warming is more than a quality of life issue. It is about our future ability to live in Jackson Hole and how that future rests on the choices we make in our daily lives. In order to address the threats presented by global climate change, governments, businesses and the individual citizen must commit to action now and into the future. The EEAB recognizes the need to address climate change head on with a consistent, community-wide program of energy efficiency and reduction of greenhouse gas emissions. **This program should include further energy efficiency and heat trapping gas emissions reduction targets**.

FINAL DRAFT
Regional Alternative Fuels, Vehicles, and Infrastructure Report

CEC Agreement Number: 160-06-002
SANDAG OWP: 3200300

Submitted by the San Diego Association of Governments to the California Energy Commission

July 2009

ACKNOWLEDGEMENTS

This Draft Report was prepared by SANDAG staff with the assistance of the SANDAG Regional Energy Working Group and the San Diego Regional Clean Cities Coalition. It was developed with assistance from the California Energy Commission, as part of a regional energy strategies partnership.

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As of May 1, 2009

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Executive Summary: Final Draft Regional Alternative Fuels, Vehicles, and Infrastructure Report

The San Diego Association of Governments (SANDAG) has developed this regional assessment of alternative fuels, vehicles, and infrastructure to identify and recommend regional and local government actions that will expand the deployment of alternative fuel vehicles in the San Diego region. The scope of this report includes policy and program opportunities, fleet and franchisee applications, infrastructure options, and strategic regional collaboration. The report objective is to increase alternative fuel vehicle use and infrastructure availability by providing useful information and tools that will enable SANDAG, its member agencies and other regional stakeholders to take action. Increasing alternative fuel vehicle and infrastructure deployment in the San Diego region will contribute to federal, state, and regional goals for petroleum reduction, climate stabilization, improved air quality, and clean economic development. To accomplish this, the report focuses on the following areas:

- Federal and state funding opportunities and incentives for alternative fuels, vehicles, and infrastructure.
- A detailed assessment of available alternative fuels, vehicle technologies, and infrastructure.
- Recommended alternative fuels for the San Diego region for different vehicle classes and fleet applications tied to the funding opportunities.
- Opportunities to integrate alternative fuel vehicles and/or infrastructure components into budgeted near-term regional transportation projects.
- Regional alternative fuel, vehicle or infrastructure efforts underway.
- Tools to help local governments, including sample fleet and procurement policies, alternative fuel and vehicle cost calculators, and alternative fuel vehicle case studies for government fleets.
- Report recommendations and next steps.

Alternative Fuel Vehicles (AFV) operate fully or in part on fuels other than gasoline or petroleum diesel, such as electricity, ethanol, hydrogen, natural gas, biomass-based diesels, and propane. These fuels can be used in a variety of fleet applications that range from light-duty passenger cars to heavy-duty vehicles like refuse haulers, buses, and sweepers. Alternative fuels also can be used in off-road applications such as forklifts, and agricultural and construction equipment.

State and federal energy policy provides significant opportunities for the San Diego region to increase the deployment of alternative fuel vehicles and infrastructure. Although petroleum fuels will play a decreasing but significant role in the region's transportation fuel portfolio for the foreseeable future, a move away from petroleum to alternative fuels would provide several benefits to the region and state:

Table 1. California Transportation-Fuel Policies and the San Diego Regional Impact

Objectives	State Goals and Milestones	San Diego Regional Impact*
GHG Reduction	Reduce GHG emissions to 1990 levels by 2020 and 80% below 1990 levels by 2050	Regional targets for GHG reduction from passenger cars and light-trucks in 2020 and 2035 are currently under development
Petroleum Reduction	Reduce petroleum fuel use to 15% below 2003 levels by 2020	38% reduction below expected 2020 levels
Alternative Fuel Use	Increase alternative fuel use to 20% of on-road fuel demand by 2020, 30% by 2030	398 million gallons by 2020 713 million gallons by 2030
In-State Biofuels Use	Increase biofuel use to one billon gasoline gallons equivalent (gge) by 2010, 1.6 billion gge by 2020, two billion gge by 2050	5% of fuels in 2010, 6.5% of fuels in 2020, 2050 tbd.
In-State Biofuels Production	In-state production of 20% of biofuels used in state by 2010, 40% by 2020, 75% by 2050	16 million gallons by 2010, 51 million gallons by 2020, 2050 tbd.

*No regional requirements exist for these policies. The targets are theoretical and based on San Diego Region population and fuel data and forecasts

Regional Benefits of Alternative Fuel Vehicles

- Protection against petroleum price volatility and supply uncertainty,
- Reduction of greenhouse gas emissions causing global climate change,
- Reduction of local air pollutant emissions that result in adverse public health impacts,
- Lessening of dependence on foreign petroleum imports, and
- Creation of economic benefits in California by replacing imported petroleum fuels with alternative fuels and vehicle technologies produced in the state.

Over the course of developing this report, SANDAG has worked with the California Energy Commission (Energy Commission), local governments, public agencies, and regional stakeholders including the San Diego Regional Clean Cities Coalition, the Air Pollution Control District, San Diego Gas and Electric, the San Diego Regional Airport Authority, Port Authority, regional transit agencies, universities, and industry. Several positive results already have accrued from the undertaking of this regional alternative fuels assessment:

- SANDAG has served as facilitator for developing a San Diego regional strategic alliance on alternative fuels,
- SDG&E and a major auto manufacturer have asked SANDAG to be a partner to facilitate widespread introduction of electric vehicles (and associated infrastructure) to the San Diego region,
- SANDAG has facilitated public and private stakeholder meetings with the Energy Commission on potential AB 118 projects in the region,
- SANDAG has been invited to join the Board of the region's Clean Cities Coalition and work with the Coalition to implement report recommendations.
- SANDAG is serving as the lead applicant for a comprehensive regional, public-private alternative fuels proposal to the U.S. Department of Energy and Energy Commission.

The report concludes with four sets of recommendations that if carried out will help prepare the region for wide-scale use of alternative fuels, vehicles and infrastructure.

- The first prioritizes alternative fuels for different vehicle classes. This information can help local governments, public agencies and other fleet operators in making decisions regarding new vehicle purchases and/or vehicle retrofits.
- The second identifies potential regional, near-term budgeted transportation projects that could be expanded to include an alternative fuels component.
- The third focuses on collaborative approaches and measure to prepare the region as a whole for alternative fuel vehicles.
- The fourth comprises measures that SANDAG could undertake as follow-up to this report and that are not addressed in earlier recommendations.

In general, the information provided in this report can assist local governments and fleet owners in the San Diego region and all of California in the deployment of alternative fuels, vehicles, and infrastructure.

SECTION 1. Introduction

California has adopted aggressive policies to increase the use of alternative fuels to power vehicles and off-road equipment, as well as address air quality and climate change concerns. The San Diego region is well-positioned to establish a robust alternative fueling network that will enable local fleet operators, and the general public, to select alternative fuel vehicles to replace traditional gasoline or diesel-fueled vehicles.

The choice of which alternative fuel will vary based on vehicle class and customer needs. The region will utilize alternative fuels that meet the state's low carbon fuel standard (LCFS), which is determined by a full fuel cycle analysis ("well to wheels"). Fuels with lower carbon intensities than conventional gasoline and diesel qualify for the LCFS and are eligible for state aid to increase their deployment. The significant financial and technical resources of the state and federal government will be critical to increasing alternative fuels, vehicles and infrastructure in the San Diego region. The state has enacted several laws that create a framework for lessening consumption of petroleum-based transportation fuels and reducing greenhouse gas emissions from the transportation sector. In general, California employs a three-pronged approach to implement this framework:

- Improve the fuel efficiency and lower greenhouse gas emissions from passenger vehicles (e.g., Pavley Standards, zero-emission vehicle [ZEV] program)
- Reduce the carbon intensity of transportation fuels (Low Carbon Fuel Standard); and
- Integrate regional land use and transportation planning to reduce emissions from vehicle travel (Senate Bill 375).

This report focuses on the first two approaches by examining how SANDAG can help local governments in the region accelerate the deployment of highly fuel efficient alternative fuel vehicles and develop the supportive infrastructure. SANDAG recognizes the critical importance of siting fueling stations, charging points, vehicle maintenance facilities, and other infrastructure necessary to support alternative fuel vehicles in coordination with vehicle purchases. Such regional coordination is needed to provide customers (e.g., fleet managers and the general public) with a level of certainty and dependability that infrastructure will be available to support their investment in an alternative fuel vehicle. Deployment of alternative fuel vehicles and development of supportive infrastructure, initially for local government fleets, will help the region lay the groundwork for a wider rollout of alternative fuel vehicles to the general public.

Regional Alternative Fuels-Related Businesses

Aptera Motors – Two-wheel electric cars
New Leaf Biofuel – Biodiesel production from restaurant waste oil
ISE Corporation – Hybrid electric system manufacturing
Synthetic Genomics – Biofuel research using photosynthetic algae
General Atomics – Algae-based biodiesel production
Kai BioEnergy Corp – Bio Crude Oil from microalgae
Carbon Capture Corporation – Algae derived from CO_2 capture to development biofuels
Sapphire Energy - Renewable gasoline from microorganisms

State and federal energy policy provides significant opportunities for the San Diego region to increase the deployment of alternative fuel vehicles and infrastructure. Although petroleum fuels will play a decreasing but significant role in the region's transportation fuel portfolio for the foreseeable future, a move away from petroleum to alternative fuels would provide the following benefits to the region and state:

- Protection against petroleum price volatility and supply uncertainty,
- Reduction of greenhouse gas emissions causing global climate change,
- Reduction of local air pollutant emissions that cause adverse public health impacts,
- Lessening of dependence on foreign petroleum imports,
- Creation of economic benefits in California by replacing imported petroleum fuels with alternative fuels and vehicle technologies produced in the state, and
- Economic and workforce development in the clean energy sector by building new infrastructure to accommodate the development, production, and use alternative fuels.

- Accelerating the transition of local government fleets to alternative fuel vehicles is an important initial step to achieving these benefits in the San Diego region. Table 2 identifies key quantitative policy objectives for climate change, petroleum reduction, and alternative fuel use in the state and the San Diego region's estimated per-capita portion based on forecasts of population and fuel consumption.

Table 2. California Transportation-Fuel Policies and the San Diego Regional Impact

Objectives	State Goals and Milestones	San Diego Regional Impact*
GHG Reduction	Reduce GHG emissions to 1990 levels by 2020 and 80% below 1990 levels by 2050	Regional targets for GHG reduction from passenger cars and light-trucks in 2020 and 2035 are currently under development
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In-State Biofuels Production	Produce in California 20% of biofuels used in state by 2010, 40% by 2020, and 75% by 2050	16 million gallons by 2010 51 million gallons by 2020 2050 tbd.

*****No regional requirements exist for these policies. Theoretical targets are based on San Diego Region's population and fuel data and forecasts; targets not estimated for 2050 because population and fuel consumption data forecasts are not yet available for that year.

In preparation of this report, SANDAG worked with local governments, public agencies, and regional stakeholders including the San Diego Regional Clean Cities Coalition, the Air Pollution Control District, San Diego Gas and Electric, the San Diego Regional Airport Authority, the Port Authority, regional transit agencies, universities, and private industry. As a result, SANDAG has: served as facilitator for developing a regional strategic alliance for alternative fuels, been asked by SDG&E and a major auto manufacturer to help facilitate widespread introduction of electric vehicles and supporting infrastructure in the region, facilitated public and private stakeholder meetings with the Energy Commission on potential AB 118-funded projects, been invited to join the Board of the San Diego Clean Cities Coalition and work with them on report implementation, and served as the lead applicant for a comprehensive public-private funding proposal to the U.S. Department of Energy and California Energy Commission.

Regional Planning Efforts

As the region's Metropolitan Planning Organization (MPO), SANDAG is a logical entity for identifying locations for alternative fuel infrastructure that meets regional needs. Also serving as the regional transportation planning agency, SANDAG can ensure that alternative fuel, vehicle, and infrastructure considerations are integrated with development of the regional transportation network. SANDAG can recommend specific alternative fuel and vehicle technologies to local governments and regional stakeholders that are tailored to the unique characteristics of the San Diego region. Lastly, SANDAG can facilitate a regional alternative fuel deployment by local governments and regional stakeholders through development of a unified regional vision, consistent programs, coordination of funding applications, and development of standardized guidelines for infrastructure siting, permitting, and education.

Over the course of developing this assessment, SANDAG has become identified as a leading source for information on policies, programs, funding opportunities, public and private partnerships, and other aspects related to alternative fuels. The agency also has facilitated several regional clean transportation efforts. As a result, SANDAG has been asked to help facilitate the introduction of battery electric vehicles to public fleets and support a regional recharging network. The agency also has been asked to serve on several clean transportation committees including

the San Diego Clean Cities Coalition Board, the San Diego County Regional Airport Authority's Fly Green Task Force, and the San Diego Regional Sustainability Partnership.

Two plans currently under development in partnership with the Energy Commission address transportation energy issues: the Regional Energy Strategy (RES) Update and the Regional Climate Action Plan (RCAP). Both are scheduled for consideration by the SANDAG Board of Directors in late 2009. These plans, among others, will serve as foundations for addressing greenhouse gas reductions in the next update of the Regional Transportation Plan (RTP), which is scheduled for adoption in fall 2011.

The RES Update and RCAP recognize that energy use is responsible for more than 90 percent of GHG emissions in the San Diego Region. The largest contributors are on-road transportation (46 percent), electricity generation (25 percent) and natural gas end use (9 percent). Adopting energy efficiency measures for buildings, accelerating the deployment of alternative fuel vehicles, and considering the energy impacts of land use and transportation planning decisions, all contribute to meeting the state law to reduce GHG emissions economy-wide to 1990 levels by 2020 and the long-term goal of reducing GHG emissions to 80 percent below 1990 levels by 2050. As of this writing, supporting the deployment of alternative fuel vehicles is central to the 2030 vision of the RES Update.

The RCAP will provide a framework in which the region can make decisions regarding greenhouse gas emission reductions and adapting to climate change. The primary purpose of the plan is to analyze and recommend policies that can help the next update of the RTP achieve the soon to be established regional targets for GHG emission reductions from passenger cars and light trucks required by SB 375. In addition to improving land use and transportation planning coordination, SANDAG will examine the acceleration of alternative fuel vehicle deployment above and beyond state mandates as part of the climate change strategy for the region.

Transportation Fuels: Petroleum and Alternatives

The following section briefly explains the reasons for focusing on alternative fuels in the context of existing petroleum-based transportation fuels, expansion of alternatives, regional impacts and opportunities. Petroleum is a fossil fuel derived from the remains of plants and animals that died millions of years ago, were buried, and compressed. Petroleum is a nonrenewable energy source because it takes millions of years to form. Oil is the raw material that petroleum products are made from and petroleum generally refers to crude oil or the refined products obtained from the processing of crude oil (gasoline, diesel fuel, heating oil, etc.)

The amount of crude oil produced domestically in the United States has been decreasing each year since the 1970s. However, the use of products made from crude oil has been growing, making it necessary to bring more oil from other countries. According to the Energy Information Administration (EIA), about 58 percent of the crude oil and petroleum products used in the United States are imported from other countries. The world's top five crude oil-producing countries are Saudi Arabia, Russia, Iran, China and the United States. Domestic offshore drilling accounts for about 24 percent of the nation's oil production.

After crude oil is removed from the ground, it is sent to a refinery by pipeline, ship or barge. At a refinery, different parts of the crude oil are separated into useable petroleum products. Crude oil is measured in barrels. A 42-U.S. gallon barrel of crude oil provides slightly more than 44 gallons of petroleum products including 20 gallons of motor gasoline and 7 gallons of diesel.

Gasoline and diesel are nonrenewable fuels made from petroleum. Gasoline is used in most U.S. passenger vehicles with internal combustion engines. According to EIA, Americans use about 385 million gallons of gasoline every day. Diesel can only be used in a diesel engine, a type of internal combustion engine used in many cars, boats, trucks, trains, buses, and farm and construction vehicles. Diesel fuel contains about 14 percent more energy per gallon than gasoline. Diesel technology also offers a greater power density than other fuels, which is discussed in Section 5. When petroleum products are burned as fuel, they give off carbon dioxide (CO2), the primary greenhouse gas causing global climate change. The use of petroleum products also emits other pollutants - carbon monoxide, nitrogen oxides, particulate matter, and unburned hydrocarbons - that help form air pollution and at certain concentrations are harmful to human health.

According to the 2007 RTP, daily travel demand in the region was about 16.7 million daily trips and 85 million vehicles miles traveled (VMT) as of 2006. Nearly 100 percent of these trips and vehicle miles are made with gasoline and diesel vehicles, and account for about 1.5 billion gallons of gasoline and diesel consumption. The RTP forecasts that under a business-as-usual scenario, there will be 111 million VMT daily in 2030. Without efforts to increase deployment of alternative fuel or more fuel efficient vehicles, forecasted regional travel demand equates to annual gasoline and diesel consumption of 2.4 billion gallons by 2030. Avoiding the outcomes of this business-as-usual scenario and achieving petroleum reduction, climate stabilization, air quality, and green economy goals require the region to quickly and carefully undertake a new approach to transportation planning, which includes the deployment of alternative fuels, vehicles, and infrastructure.

Report Components

To initiate the transition to alternative fuel vehicles, this report aims to identify and recommend regional and local government actions that will expand their deployment in the San Diego region. To help the region accelerate the deployment of highly fuel efficient alternative fuel vehicles and develop the supportive infrastructure, the report addresses the following areas:

- Section 2. Federal and State Resources
- Section 3. Alternative Fuels Overview
- Section 4. Vehicle Availability and Fleet Applications
- Section 5. Fuel and Vehicle Characteristics and Performance
- Section 6. Greenhouse Gas Emissions and Petroleum Reduction
- Section 7. Alternative Fuel Availability and Infrastructure
- Section 8. Alternative Fuel Considerations for Regional Transportation Projects
- Section 9. Recommendations
    - Recommended alternative fuels for different vehicle classes and fleet applications;
    - Recommended transportation project types that could potentially be enhanced to include an alternative fuels component;
    - Recommended regional and local government planning measures focused on preparing for wide-scale deployment of alternative fuels, vehicles and infrastructure.
    - Additional recommended measures that SANDAG could undertake as follow-up to this report.

The report also features appendices with more detailed information on alternative fuels including: important federal and state incentives for alternative fuels, links to learn more about alternative fuel vehicle availability, detailed listing of alternative fuel vehicle models and prices for multiple vehicles classes that are purchased by the state of California, sample fleet and procurement policies including explanation of the process to participate in state of California vehicle contracts, alternative fuel and vehicle cost calculators, alternative fuel vehicle case studies for government fleets, address locations of existing alternative fuel infrastructure, and regional resources for more information on the topic of alternative fuels.

SECTION 2. Federal and State Resources

Significant resources exist at the federal and state levels to help direct the increased development and deployment of alternative fuels across California. California is a leader in this area and several laws are key policy drivers for the growth in alternative fuels, vehicles and infrastructure. This section summarizes the main policies, programs and financial and technical assistance. For a more substantial list of federal and state tax incentives and programs, see Appendix A.

Due to the current economic recession, most governments are facing serious economic constraints. Even so, a window of opportunity exists for the region to take advantage of financial resources offered by the federal government (primarily through the American Recovery and Reinvestment Act of 2009) and state government (through the Alternative and Renewable Fuel, Vehicle Technology, Clean Air, and Carbon Reduction Act of 2007).

By adopting a strategic regional approach, the San Diego region can promote a comprehensive approach to investment and deployment in alternative fuels, vehicles, and infrastructure. SANDAG identified regional projects and opportunities to potentially take advantage of new federal, state, and local funding sources, and public-private partnerships. SANDAG also investigated its existing local, state and federal funding and resources to identify what might be leveraged. In particular, the Regional Transportation Investment Plan (RTIP) –budgeted transportation-related capital improvements projects for the next five years (2009-2013) – was reviewed to identify project types that could potentially be augmented with an alternative fuel vehicle and/or infrastructure component. The RTIP includes projects to be undertaken by the California Department of Transportation (CALTRANS), SANDAG, the region's transit agencies, and local jurisdictions.

Funding Allocations for Alternative Fuels in the United States

As part of the AB 118 Investment Plan, the Energy Commission performed a gap analysis to help determine where best to apply state funding for alternative fuels. They found that overall funding from federal, state and private sources totaled about $35 billion per year and that biofuels was the most funded fuel category. Of the $35 billion, research and development (R&D) expenditures totaled about $11 billion per year with most funding focused on biofuels, followed by fuel cells and batteries.

Overall, federal funding for alternative fuels has focused on three primary areas: next generation biofuels processes and pilot-plant construction; energy storage; and plug-in hybrid electric vehicles. The American Recovery and Reinvestment Act of 2009 (federal stimulus bill) allocates $3 billion for transportation programs and an additional $2 billion to transportation-related tax incentives. The Energy Commission has stated it will work with the Department of Energy (DOE) to leverage AB 118 funds and support projects in the clean energy sector that provide long-term economic benefits and promote sustainability.

The American Recovery and Reinvestment Act of 2009

The American Recovery and Reinvestment Act of 2009 (ARRA, P.L. 111-5) was signed into law by President Obama on February 17, 2009. The stated purposes of the law include the following:

1. To preserve and create jobs and promote economic recovery.
2. To assist those most impacted by the recession.
3. To provide investments needed to increase economic efficiency by spurring technological advances in science and health.
4. To invest in transportation, environmental protection, and other infrastructure that will provide long-term economic benefits.
5. To stabilize state and local government budgets, in order to minimize and avoid reductions in essential services and counterproductive state and local tax increases.

Energy provisions are a featured part of ARRA. More than $42 billion is provided in appropriations for energy programs, mainly for energy efficiency and renewable energy. ARRA also provides more than $21 billion in energy tax incentives, primarily for energy efficiency and renewable energy. More than $11 billion is provided in grants for state and local governments through three DOE programs:

- The Weatherization Assistance Program (WAP);
- The State Energy Program (SEP), which provides states with discretionary funding for various energy efficiency and renewable energy purposes; and
- The new Energy Efficiency and Conservation Block Grant Program (EECBG), which helps reduce energy use and greenhouse gas emissions.

New transportation-related grant programs support state and local government and transit agency purchases of alternative fuel and advanced technology vehicles, multi-modal use of transportation electrification, and manufacturers' development of facilities for advanced battery production. DOE ARRA funds for alternative transportation fuels include:

- $1.5 billion in grants for U.S. manufacturers to produce high-efficiency batteries and their components;
- $500 million in grants for U.S. manufacturers to produce other components needed for electric vehicles, such as electric motors; and
- $400 million for projects that demonstrate and evaluate plug-in hybrids and other electric infrastructure concepts.

Of the $21 billion in tax incentives, $14.1 billion is directed to renewable energy, $2.3 billion to energy efficiency, $2.2 billion for transportation, $1.6 billion for manufacturing, and $1.4 billion for state and local government energy bonds. When electric vehicles are purchased by U.S. residents, they can claim a tax credit of up to $7,500. Federal tax incentives are further addressed after the ARRA discussion.

ARRA's Energy Efficiency and Conservation Block Grants

On March 26, 2009, the DOE released guidelines and funding allocations for the EECBG segment of ARRA. DOE allocated $351.5 million to the State of California for local governments to use for projects and programs to reduce total energy use.

The purpose of the EECBG Program is to assist local governments in creating and implementing strategies to:

- Reduce fossil fuel emissions in a manner that is environmentally sustainable and, to the maximum extent practicable, maximizes benefits for local and regional communities;
- Reduce the total energy use of the eligible entities; and
- Improve energy efficiency in the building, transportation, and other appropriate sectors.

In keeping with the agenda of the ARRA, and supporting the goal of immediate investment in the economy, funding recipients are required to commit all funds within eighteen (18) months from the effective date of the award. One EECBG area of emphasis is the development and implementation of transportation programs including:

- State, local and regionally-integrated planning activities like that in Senate Bill 375 (Statutes of 2008), that coordinates transportation, housing, environmental, energy, and land use planning with the goal of reducing greenhouse gas emissions and vehicle miles traveled.
- Idle-reduction technologies and/or facilities to conserve energy, reduce harmful air pollutants, and reduce greenhouse gas emissions from freight movement.

The Energy Commission will distribute EECBG funds for smaller cities and counties. Large municipalities (i.e., Cities with populations greater than 35,000 and Counties populations greater than 200,000) apply directly to DOE for block grant funding. For the San Diego region, the following cities will need to apply for funding directly through the Energy Commission:

- City of Del Mar
- City of Solana Beach
- City of Coronado
- City of Lemon Grove
- City of Imperial Beach

The Energy Commission anticipates receiving at least $33.6 million through the federal ARRA EECBG program and is waiting for guidelines from DOE for qualification requirements. They will hold workshops and conduct outreach on program requirements and the application process. Small cities and counties can sign up for updates and developments through the Energy Commission Block Grant Listserv.

Federal Tax Incentives for Alternative Fuels

The federal government provides tax incentives for alternative fuels, vehicles, and infrastructure. There are three key tax credits for the retail sale of alternative fuels:

- Conventional ethanol: $0.45 per gallon,
- Biodiesel and renewable diesel: $1.00 per gallon, and
- Alternative fuels other than ethanol and biodiesel (e.g., LPG): $0.50 per gallon.

In addition, there are tax credits for small ethanol and biodiesel producers ($0.10 per gallon), and a tax credit for the production of cellulosic biofuels (up to $1.01 per gallon, depending on the fuel). There also is a vehicle purchase tax incentive, established through the Emergency Economic Stabilization Act of 2008. The act established a tax credit for the purchase of plug-in vehicles, including battery-electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs). For passenger vehicles, the credit is a maximum of $7,500, depending on the vehicle's battery capacity. After 250,000 vehicles are sold, the credit is to be phased out.

Tax credits are also available for natural gas vehicles, the value of which varies depending on vehicle characteristics including size, incremental cost, and emissions performance. If a natural gas vehicle is sold to a tax-exempt entity, the seller may claim the credit or pass along savings from the credit to the purchases, although the latter option is not required. Incentives are also available to certain mix-fuel or dual-fuel vehicles with a gross vehicle weight rating of more than 14,000 pounds that operate on at least 90 percent alternative fuels and those that operate on at least 75 percent alternative fuel. In general, the tax credit values range from a low of $2,500 to a high of $32,000. More information on incentives for natural gas vehicles is available on the website for Natural Gas Vehicles for America.

An alternative fuel infrastructure tax credit is available for the cost of installing alternative fueling equipment placed into service after December 31, 2005. Qualified alternative fuels are natural gas, liquefied petroleum gas (propane), hydrogen, electricity, E85, or biodiesel blends containing a minimum of 20% biodiesel. The tax credit amount is 30 percent, not to exceed $30,000 for equipment placed into service before January 1, 2009; and a maximum of 50 percent, not to exceed $50,000, for equipment placed into service on or after January 1, 2009. Consumers who purchase residential fueling equipment may receive a tax credit of up to $2,000 for equipment placed into service after December 31, 2008. The maximum credit amount for hydrogen fueling equipment placed into service after December 31, 2008, and before January 1, 2015, is $200,000. The credit expires December 31, 2010, for all other eligible fuel types.

State Resources for Local and Regional Governments

In addition to federal policies and programs that provide financial assistance, California is dedicating significant resources to accelerate deployment of alternative fuels across the state. Key policy drivers related to transportation-energy include:

- Global Warming Solutions Act of 2006 (AB 32)
  - Reduce GHG emissions to the 1990 level by 2020
- Motor Vehicle Greenhouse Gas Emission Regulations (AB 1493)
  - Reduce GHG emissions from light-duty vehicles by 18% by 2020 and 27% by 2030
- Reduce Petroleum Dependency (AB 2076)
  - Reduce on-road gasoline and diesel demand To 15% Below 2003 levels by 2020
  - Increase Use of Non Non-Petroleum Fuels To 20% of On Road Fuel Consumption by 2020 and 30% by 2030
- State Alternative Fuels Plan (AB 1007)
  - Increase the use of alternative fuels in 2012, 2017 and 2022
- Bioenergy Action Plan (Executive Order)
  - Increase in-state biofuel production to 20% by 2010, 40% by 2020 and 75% by 2050
- Carl Moyer Program and Proposition 1B incentives for Clean Diesel and Alternative Fuels and Technologies
- Low Carbon Fuel Standard
  - Reduce carbon intensity of California's transportation fuels by at least 10% by 2020
- Alternative and Renewable Fuel, Vehicle Technology, Clean Air, and Carbon Reduction Act (AB 118), which is detailed below.

Alternative and Renewable Fuel, Vehicle Technology, Clean Air, and Carbon Reduction Act of 2007

The Alternative and Renewable Fuel, Vehicle Technology, Clean Air, and Carbon Reduction Act, also known as Assembly Bill (AB) 118, provides approximately $200 million in annual incentive funding to promote alternative fuel and vehicle technologies and infrastructure. The purpose is to help develop and deploy innovative technologies that transform California's fuel and vehicle types to help reduce petroleum demand and attain state air quality and climate change policies. AB 118 should help create the impetus for the long-term transition to alternative fuels. The incentive funding will be provided by three state agencies: the Energy Commission, the California Air Resources Board (ARB) and the Bureau of Automotive Repair (Table 3).

Table 3. California AB 118 Funded Programs

State Agency	Program Name	Annual Funding
Energy Commission	Alternative and Renewable Fuel and Vehicle Technology Program	$120 million
Air Resources Board	Air Quality Improvement Program	$50 million
Bureau of Automotive Repair	Enhanced Fleet Modernization Program	$30 million

Energy Commission and ARB projects will be funded beginning in 2009 while the Bureau of Automotive Repair program will begin January 1, 2010. While furthering California's petroleum reduction and climate change goals, the programs cannot hinder implementation of other regulations or interfere with efforts to achieve and maintain ambient air quality standards and reduce emissions of toxic air contaminants. There is an economic development component to these programs to ensure that education, outreach and workforce training is provided to:

- Attract and retain clean technology businesses;
- Fund financial incentives and private investment;
- Encourage market creation and informed consumer choice; and
- Leverage innovation and use renewable and waste resources.

The San Diego region is already taking steps to promote a clean energy sector. State and federal resources available could provide the extra leverage to cultivate this burgeoning economic cluster.

California Sustainability Goals for Alternative Fuel Projects

The Energy Commission established sustainability goals and criteria to ensure that alternative and renewable fuel and vehicle deployment projects, on a full fuel-cycle assessment basis (explained in Section 6 of this report) will not adversely impact natural resources, especially state and federal lands. The recommendations in this San Diego regional assessment are consistent with the state's sustainability goals and criteria, as shown in Table 4. Local alternative fuel projects in the San Diego region seeking state funding will use the criteria and the full fuel-cycle analysis as guides.

Table 4. Sustainability Criteria for Funding Alternative Fuel Projects through AB 118

- Strong preference for projects with substantial reductions in GHG emissions
- Strong preference to projects demonstrating environmental protection, natural resource preservation and superior environmental performance
  - Projects that maximize use of waste streams as feedstocks
  - Use of existing best management practices (BMPs) from natural resource and pollution control agencies
  - For purpose-grown energy crops:
- Sustainability best management practices plan for specific bio-energy crops
- Use of lands historically used for agricultural purposes
- Use of marginal crop lands not used for food and that do not displace food crops
- Use of crops uniquely suited to climate, water and natural resource constraints in California
  - Projects that 1) use water efficiency and water use reduction measures, 2) use recycled or reclaimed water, and 3) reduce / eliminate point and nonpoint source wastewater discharge
  - Projects that use 1) renewable energy or 2) cogeneration in production, processing or distribution
  - Projects that use forest biomass resources collected or harvested in a manner that does not diminish ecological values & that are consistent with restoration, fire risk management & ecosystem management goals
  - Projects that create benefits to state natural resources or ameliorate degraded resources
  - Alternative fuel infrastructure projects that use 1) low carbon intensity fuels, 2) fuels produced in accordance with natural resource and superior environmental performance goals, or 3) fuels produced in accordance with a certified sustainability protocol
- Preference to projects that 1) produce certified sustainable feedstocks, or 2) produce or distribute alternative fuels, in accordance sustainability certification standards

Source: CEC Investment Plan, Sustainability Evaluation Criteria for Funding Projects through AB 118

The Energy Commission Alternative and Renewable Fuel and Vehicle Technology Program

The Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP) will award approximately $120 million per year through 2015 to develop innovative technologies and alternative fuels and to deploy them into the marketplace. Eligible project types include:

- Improvements to the characteristics of alternative and renewable low-carbon fuels,
- In-state production and infrastructure for alternative and renewable low-carbon fuels,
- Improvements to light-duty, medium-duty, and heavy-duty vehicle technologies to lower greenhouse gas emissions,
- Acceleration of the commercialization of vehicles and alternative and renewable fuels, and
- Related workforce training, and program promotion and education.

The program will provide grants, loans, loan guarantees, revolving loans, and other appropriate measures to further the goals of AB 118. The Energy Commission will provide funding to entities, including public agencies, private businesses, public-private partnerships, vehicle and technology consortia, workforce training programs, fleet owners, consumers, recreational boaters, and academic institutions. On April 22, 2009, the Energy Commission adopted the Investment Plan for the Alternative and Renewable Fuel and Vehicle Technology Program. The Investment Plan set funding allocations for alternative fuel types that will be re-evaluated on an annual basis. Allocations are based on a scenario of alternative and renewable fuels and advanced vehicle technology deployment, potential greenhouse gas reductions, the level of current public and private funding, and feedback received from stakeholders. The first funding allocations total $176 million for fiscal year (FY) 2008-2009 and FY 2009-2010 as shown in Table 5.

Table 5. California Energy Commission Funding Allocation Summary for Alternative & Renewable Fuel & Vehicle Technology Program

Category	Investments	Total
Electric Drive	▪ Convert hybrid electric vehicles to plug-in hybrid vehicles ▪ Electrify operations at the state's major ports and truck stops ▪ Develop & demonstrate advanced hybrid electric technologies for medium- and heavy-duty trucks ▪ Increase the number of electric charging stations ▪ Provide incentives to locate manufacturing facilities for electric vehicles and components in the state	$ 46 million
Hydrogen	▪ Increase the number of hydrogen fueling stations	$ 40 million
Ethanol	▪ Develop fuel production facilities that use waste material as feed stocks ▪ Increase the number of E-85 fueling stations	$ 12 million
Renewable Diesel/ Biodiesel	▪ Develop fuel production facilities that use waste material as feed stocks ▪ Construct blending and storage terminal facilities	$ 6 million
Natural Gas	▪ Purchase medium- and heavy-duty vehicles for ports, school districts, and public fleets ▪ Purchase light-duty vehicles for public fleets ▪ Increase the number of fueling stations ▪ Develop biomethane production plants	$43 million
Propane	▪ Purchase school buses and light-duty vehicles for public fleets	$ 2 million
Non-GHG	▪ Establish workforce training programs ▪ Continue research into sustainability issues ▪ Conduct a public outreach and education ▪ Provide program technical assistance ▪ Conduct environmental/market/technology assessments ▪ Develop standards and certifications	$ 27 million
TOTAL for FY 2008-09 and FY 2009-10 allocations:		$ 176 million

Air Quality Improvement Program

The Air Quality Improvement Program (AQIP), a voluntary incentive program to implement AB 118, is administered by the ARB to fund clean vehicle and equipment projects, research on biofuels production and the air quality impacts of alternative fuels, and workforce training. The AQIP is funded through 2015 and the proposed budget for fiscal year (FY) 2009-10 is $42.3 million, as shown in Table 6. AQIP FY 2009-10 project solicitations are expected during Summer/Fall 2009. Project selection and funding is expected during Fall/Winter 2009 for the following areas:

- Vehicle and equipment projects (accelerated deployment, technology demonstration)
- Research to determine the air quality impacts of alternative fuels
- Advanced technology workforce training

The AQIP will compliment other ARB incentive programs, including the Carl Moyer Memorial Air Quality Standards Attainment Program, Goods Movement Emission Reduction Program and Lower-Emission School Bus Program. AQIP can provide incentives to projects that do not fit within the statutory framework of these existing incentive programs, which focus on reducing near-term ozone and particulate matter pollution and exposure to toxics.

Table 6. Projects Proposed for AQIP Funding in FY 2009-10

Project Description	Funding Target
Deployment/Commercialization Projects	
Hybrid Truck and Bus Voucher Incentive Project	$25 million
Zero-Emission and Plug-In Hybrid Light-Duty Vehicle Rebate Project	$5 million
Lawn and Garden Equipment Replacement Project	$2 million
Zero-Emission All-Terrain Agricultural Work Vehicle Rebate Project	$1.3 million
Advanced Technology Demonstration Projects	
Locomotives	$2 million
Marine Vessels	$1 million
Transit and School Buses	$3 million
Off-Road Equipment	$2 million
Agricultural Equipment	$1 million
TOTAL PROPOSED FUNDING	$42.3 million*

*Available AQIP funding based on the proposed FY 2009-10 State Budget.

The Bureau of Automotive Repair Enhanced Fleet Modernization Program

The third AB 118 incentive program is the Enhanced Fleet Modernization Program (EFMP), which will be administered by the Bureau of Automotive Repair (BAR) to provide approximately $30 million in annual funding to retire the highest polluting vehicles in the areas of the state with the greatest air quality problems. EFMP will expand the BAR Consumer Assistance Program (CAP). The state provides up to $1,000 per vehicle through CAP for the retirement or repair of vehicles that fail their most recent Smog Check. BAR will administer the EFMP when it begins January 2010, but first ARB is required to establish the guidelines for its implementation.

SECTION 3. Alternative Fuels Overview

Alternative Fuel Vehicles (AFV) can operate on fuel other than gasoline or petroleum-based diesel. The primary alternative transportation fuels include electricity, ethanol, hydrogen, natural gas, biomass-based diesels, and propane. Other potential transportation fuel sources, such as ammonia, may hold promise in the future but are not addressed in this report. These fuels can be used in a variety of fleet applications that range from light-duty passenger cars to heavy-duty vehicles like refuse haulers and sweepers. Alternative fuels can also be used in off-road applications such as forklifts, and agricultural and construction equipment. The various alternative fuels are briefly described below. The following section evaluates the origins and current use of fuel in the region and identifies existing distribution and fueling infrastructure.

Regional Gasoline and Diesel Consumption

Gasoline and diesel provide the vast majority of transportation energy in the region. In 2007, the region consumed approximately 1.5 billion gallons of gasoline and diesel fuel in on-road vehicle transportation. Under a business-as-usual scenario, annual gasoline and diesel consumption would increase to almost 2.4 billion gallons in 2030. Actual vehicle fuel consumption data and future projections for select years from 2000 to 2030 are provided below in Table 7.

Table 7. San Diego County Past and Projected Vehicle Fuel Consumption (gallons)

Year	Gasoline	Diesel	Total
2000	1,222,122,000	154,059,000	1,376,181,000
2003	1,283,877,000	170,721,600	1,454,598,600
2005	1,325,047,000	181,830,000	1,506,877,000
2006	1,301,605,000	180,726,000	1,482,331,000
2007	1,309,422,000	185,695,000	1,495,117,000
2010	1,401,166,000	200,479,000	1,601,645,000
2015	1,581,563,000	223,177,000	1,804,740,000
2020	1,745,982,000	246,121,000	1,992,103,000
2025	1,906,105,000	268,083,000	2,174,188,000
2030	2,082,980,000	294,032,000	2,377,012,000

Source: 2007 California Motor Vehicle Stock, Travel and Fuel Forecast. May 2008.

Petroleum Origin and Distribution

United States petroleum production peaked in 1970 at around 11.6 million barrels per day (mmbd), and domestic production has since declined steadily, to approximately 8.3 mmbd in 2006. The gap between domestic supply and demand has been increasingly filled by imports. In 2005, approximately 60 percent of California's supply was produced in the United States, with 20 percent of the total supply originating in Alaska and 40 percent in California. Of the remaining 40 percent that was imported from abroad, the most significant sources were Saudi Arabia (14 percent of total supply), Ecuador (10 percent), Iraq (5 percent), and Mexico (3 percent). The San Diego region does not produce any significant quantity of petroleum and, therefore, must rely on imports.

San Diego County is part of a larger fuel distribution region in the southwestern United States, centered on the Los Angeles refinery center. The region—which includes counties in Southern California, as well as exports to Arizona, New Mexico, and parts of Nevada—is supplied by refineries in Los Angeles and by imports of finished gasoline and blending components received at the Port of Los Angeles. Gasoline is imported from Washington State, Gulf of Mexico states, and foreign sources, predominately in East Asia and Western Europe. California is not connected by pipeline to other oil refining centers, so all imports must arrive by ship. Out-of-state imports account for approximately ten percent of gasoline consumed in California, with the remaining 90 percent refined in-state.

There are no refineries in the San Diego region. All gasoline delivered to the San Diego region arrives through one Kinder Morgan pipeline that originates in the Los Angeles refinery center and ends at the Kinder Morgan terminal in Mission Valley.

Alternative Fuels Overview

Electricity

Battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) are powered by a source of electricity external to the vehicle, such as the electricity grid or a distributed energy source. As opposed to conventional vehicles powered by the internal combustion engine (ICE), BEVs run on electric motors powered by rechargeable battery packs. The BEV stores electricity in an energy storage device such as rechargeable battery packs. Electricity powers the vehicle's wheels via an electric motor. BEVs have a limited energy storage capacity, which must be replenished by plugging into an electrical source external to the vehicle.

PHEVs are powered by an ICE and a rechargeable battery, which displaces the need for some or all of the need for ICE power and gasoline consumption. In both BEV and PHEV technologies the batteries must be charged externally (i.e., plugged-in). A plug-in is similar to a standard hybrid but is equipped with a battery that can be recharged by connecting a plug to an electric power source. Most PHEVs are passenger cars, but commercial passenger vans, utility trucks, school buses, and motorcycles also are available in plug-in versions. Standard hybrids are considered a vehicle efficiency improvement rather than an alternative fuel vehicle technology. Medium- and heavy-duty trucks, buses, and non-road vehicles can saturate market niches earlier than passenger vehicles at a much lower level of manufacturing (3,000 to 5,000 vehicles per year) to achieve cost competitiveness with diesel vehicles. Hybrid hydraulic trucks use hydraulics, charged by the engine, to offer power boost to the engine and auxiliary functions. Electric hybrid trucks use the engine to recharge the batteries which assist the engine and auxiliary functions.

Biofuels: Biomass-based Diesel

Biomass-based diesel is a new broad term that includes biodiesel and renewable diesel, as well as specific feedstock- and process-based diesels such as algae-based diesel, biomass-to-diesel, and diesel from thermal depolymerization of industrial and processing waste. Of these fuels, only biodiesel is commercially available in California and the United States today. Biodiesel is simple to use, biodegradable, nontoxic, and essentially free of sulfur and aromatics.

Biodiesel refers to a non-petroleum-based diesel made from vegetable oils or animal fats using a process called transesterification, which produces a glycerol as a byproduct which remains mixed in with the biodiesel. Pure biodiesel contains no petroleum, but it can be blended at any level with petroleum diesel to create a biodiesel blend. Typical biodiesel blends range from 5 to 99 percent. Biodiesel can be legally blended with petroleum diesel in any percentage. Pure biodiesel (B100) or higher-level biodiesel blends with petroleum diesel can be used in a standard diesel engine. However, as discussed later in the report, blends greater than B20 are not typically recommended for use without at least some engine modifications, and may void the engine warranty. B100 and blends of B20 (20 percent biodiesel, 80 percent petroleum diesel) or higher are typically considered biodiesel fuel. Lower level blends (below B20) are considered diesel fuel.

Renewable diesel fuel can be made from similar feedstocks and can be used directly in an oil refinery, where the feedstocks are transformed into a diesel fuel through hydrocracking and hydrogenation. The refinery-based process produces no glycerol and the renewable diesel product is chemically identical to ideal diesel fuel, requiring no modifications for any diesel engine. Biodiesel works in any diesel engine with few or no modifications to the engine or the fuel system. All diesel vehicles, new and old, can use B5 blends. The United States Navy and Marine Corps are two of the largest users of biodiesel in the San Diego region. Biodiesel blends are used in the City of Carlsbad vehicle fleet, UCSD bus fleet, and Hornblower Cruises marine vessels. The City of Chula Vista is planning to switch its diesel-based fleet to biodiesel in the near term. UCSD imports approximately 10,000 gallons of biodiesel monthly from an Orange County distributor, while other fleets are served by Soco Group, which sells approximately 25,000 gallons monthly in the region. Biodiesel is locally produced by New Leaf Biofuels.

Biofuels: Ethanol

Ethanol is an alcohol-based fuel derived from various plant materials (i.e., biomass feedstocks) including corn, sugar cane, barley, and wheat. Ethanol is produced by fermenting and distilling starch crops that have been converted into simple sugars. Ethanol can also be produced from cellulosic biomass such as trees and grasses and is called bioethanol.

Ethanol is most commonly used to increase octane and improve the emissions quality of gasoline. More than 95 percent of the gasoline in California contains a low-level blend of ethanol (about 6%) to oxygenate the fuel and reduce air pollution. E85 (85% ethanol, 15% gasoline) is considered an alternative fuel that can be used in flexible fuel vehicles (FFVs). FFVs are capable of operating on gasoline, E85 (85% ethanol, 15% gasoline), or a mixture of both. Despite the limited availability of E85, the state features many flex-fuel vehicles, which are capable of running on either gasoline or E85. Energy Commission staff estimate that one to two percent of the California passenger vehicle fleet consists of FFVs, most of which are American-made light-duty trucks and sport utility vehicles.

Hydrogen

Hydrogen is not naturally occurring and must be produced from an energy source, such as natural gas or water. Hydrogen can be produced for use as a transportation fuel in fuel-cell vehicles, which generate electricity from hydrogen. Hydrogen fuel cell vehicles (FCVs) are zero-emission vehicles that produce no tailpipe GHG emissions. Fuel cells generate electricity through an electrochemical process, using hydrogen as the fuel, to power an electric motor which drives the vehicle. When the hydrogen is used in a fuel cell, only water and heat are produced. Hydrogen can be produced at a central station either through reforming hydrocarbon fuels like natural gas or electrolyzing water. In either case, the produced hydrogen is then delivered to fueling stations by truck or hydrogen pipeline to be pumped into vehicles' hydrogen tanks. Hydrogen can also be produced by reformation or electrolysis at the fueling station itself.

Today, very little hydrogen is produced for use as a vehicle fuel, and hydrogen for industrial purposes is produced through the reformation of natural gas. Hydrogen has the potential to be produced from low-carbon renewable resources, providing significant GHG benefits from well to wheels when used in a fuel cell vehicle.

Natural Gas

Natural gas has a high octane rating and excellent properties for spark-ignited internal combustion engines. It is non-toxic, non-corrosive, and non-carcinogenic. It presents no threat to soil, surface water, or groundwater. More than 99 percent of the natural gas used in the U.S. comes from domestic or other North American sources. However, increasing demand for natural gas in power plants will require new supplies from non-North American countries, increasing our dependence on foreign sources of energy. The Energy Information Administration (EIA) predicts that by 2025, more than 15 percent U.S. natural gas supplies will be imported from countries other than Canada and Mexico.

The vast majority of natural gas is a non-renewable fossil fuel extracted from gas and oil wells. Much smaller amounts are derived from supplemental sources such as synthetic gas, landfill gas and other biogas resources, and coal-derived gas. Because of the gaseous nature of this fuel, it must be stored onboard a vehicle in either a compressed gaseous (compressed natural gas, or CNG) or liquefied (liquefied natural gas, or LNG) state. Compressed natural gas, or CNG, is a mixture of hydrocarbons, mainly methane. Found in gas wells or produced in conjunction with crude oil, natural gas is a clean-burning, domestically produced fuel that generates significantly fewer emissions than conventional gasoline or diesel when used to power vehicles. Although vehicles can use natural gas as either a liquid or a gas, most vehicles use the gaseous form. Compressed at pressures of 3,000 pounds to 3,600 pounds per square inch, the natural gas is stored on-board a vehicle in specially designed and constructed cylinders. Vehicles that run on CNG have engines and fuel systems that are optimized for gaseous fuel use.

To store more energy onboard a vehicle in a smaller volume, natural gas can be liquefied. To produce Liquefied Natural Gas (LNG), natural gas is purified and condensed into liquid by cooling to -260°F (-162°C). At atmospheric pressure, LNG occupies only 1/600 the volume of natural gas in compressed gaseous form. Because it must be kept at such cold temperatures, LNG is stored in double-wall, vacuum-insulated pressure vessels. LNG fuel systems typically are used only with heavy-duty vehicles. LNG is clear, colorless, odorless, non-corrosive, and non-toxic.

Propane

Propane, also known as liquefied petroleum gas (LPG), is produced as part of natural gas processing and crude oil refining. Propane can be turned into a liquid at a moderate pressure (160 pounds per square inch [psi]) and is stored in pressure tanks at about 200 psi at 100 degrees Fahrenheit. When propane is drawn from a tank, it changes to a gas before it is burned in the engine. It is non-toxic and presents no threat to soil, surface water, or groundwater. Dedicated propane vehicles are designed to run only on propane; bi-fuel propane vehicles have two separate fueling systems that allow the vehicle to be powered by either propane or gasoline.

Definitions

Definitions for alternative fuel vehicle and engine types are provided below.

Biofuel: A solid, liquid or gaseous fuel obtained from relatively recently lifeless biological material and is different from fossil fuels, which are derived from long dead biological material. Also, various plants and plant-derived materials are used for biofuel manufacturing. The two most common types of biofuels are ethanol and biodiesel.

Flex-fuel: A flexible fueled vehicle has a single fuel tank, fuel system, and engine. The vehicle is designed to run on unleaded gasoline and an alcohol fuel (usually ethanol) in any mixture. These engines have sensors to analyze the fuel mixture, and adjust the fuel injection and timing. Since fuel composition and engine controls vary widely from one car to the next, flex-fuel vehicles do not ensure fewer emissions than dedicated gas-powered vehicles.

Bi-fuel: A bi-fuel vehicle has two separate fuel systems, one for gasoline or diesel and another for propane, natural gas, or hydrogen. Because these fuels are stored in pressurized tanks, they cannot be simply pumped into the gasoline tank. Like flex-fuel vehicles, bi-fuel vehicle emissions vary from car to car depending on engine controls and the fuel chosen - making them not necessarily cleaner than a dedicated gas vehicle.

Dedicated: A dedicated alternative fuel vehicle has only one fuel system. Unlike flex-fuel or bi-fuel vehicles, the vehicle only uses the alternative fuel.

SECTION 4. Vehicle Availability and Fleet Applications

Alternative fuel vehicles are available for use in light-duty, medium/heavy-duty, and non-road applications. This section describes vehicle availability and fleet applications for these vehicle classes. The commercial availability of factory-made alternative fuel vehicles or retrofit technologies and their incremental costs compared to standard gasoline and diesel vehicles are also discussed. A summary of potential alternative fuel fleet applications is provided in Table 8. A listing of websites providing information about alternative fuel vehicle availability is provided in Appendix B. Information regarding alternative fuel vehicles and standard hybrid electric vehicles purchased by the state of California, including purchase price, is provided in Appendix C. Appendix D provides information on state of California vehicle purchase contracts, including explanation of how local governments can use the contracts and take advantage of the negotiated purchase prices, sample local government alternative fuel vehicle policies, and a listing of case studies on alternative fuel vehicles in government fleets. Links to tools and calculators for alternative fuel vehicles are provided in Appendix E.

Table 8. Summary of Potential Alternative Fuel Fleet Applications

Fleet Application	Biodiesel*	Electricity	Ethanol (E85)	Hydrogen	Natural Gas	Propane
Passenger Vehicle	--	PHEV, BEV	FFV	FCV	CNG	LPG
Taxicab	--	HEV	--	--	CNG	LPG
Vanpool-Shuttle	B20	n/a	FFV	--	CNG	--
Refuse Hauler	B20	HEV	--	--	CNG, LNG	--
Sweeper	B20	n/a	--	--	CNG, LNG	--
Other Medium/ Heavy-Duty	B20	HEV	--	--	CNG, LNG	--
Forklift	--	BEV	--	--	CNG	LPG
Low-speed Vehicle**	--	NEV	--	--	CNG	LPG

*Blends up to B20
**E.g., traffic checker, neighborhood vehicle, other off-road vehicle)

Light-Duty Vehicles

A variety of alternative fuel vehicles are available for light-duty fleet applications or will be in the near-future, including biodiesel (B5) passenger cars, battery electric vehicles (BEV), plug-in hybrid electric vehicles (PHEV), flex-fuel vehicles (FFV), hydrogen fuel cell vehicles (FCV), compressed natural gas (CNG) vehicles, and propane vehicles using liquefied petroleum gas (LPG). Some of these vehicles are factory-made and available commercially or will be in the near-future while others are available through after-market retrofits or conversions. Potential fleet applications include light-duty passenger cars, pick-up trucks, and sport utility vehicles (SUVs), vanpools, and taxicabs. A brief discussion of alternative fuel vehicles for light-duty applications is provided below.

Only one Original Equipment Manufacturer (OEM) produces a factory-made light-duty natural gas passenger vehicle (NGV): the Honda Civic GX. Several European auto manufacturers are interested in introducing NGVs into the US market, and are seeking regulatory support for bringing Euro-certified vehicles to the US market. Two firms are certified by the California Air Resources Board (CARB) to provide dedicated NGV retrofits in California. Baytech Corporation retrofits many 2009 model year vehicles certified by CARB, and BAF Technologies retrofits two Ford 2006 model-year engine families that include the Crown Victoria, F-Series Pickup, E-350 Van, and E-450 Shuttle. Light-duty CNG applications include passenger cars, vanpools, taxicabs, and traffic checkers. These companies should be contacted to obtain information about the cost of NGV retrofits. The cost of the light-and heavy-duty vehicles is substantially more than their gasoline and diesel counterparts. Factory-made light-duty NGVs have a cost premium of about $7,000.

Several OEMs offer Flex Fuel Vehicles (FFVs) capable of running on E85, gasoline, or some combination thereof, in the light-duty vehicle category, primarily Chrysler, Ford, and GM. For model year 2009, there are approximately three dozen models available, including eight sedans, 14 SUVs, nine pick-up trucks, and five vans. OEMs typically offer FFVs at the same price as comparable gasoline vehicles. Manufacturers of light-duty passenger vehicles, of which there is only one in California in 2009, do not currently accept biodiesel blends of B6-B20.

With the exception of a small number of BEVs available from Tesla Motors for a price of over $100,000, BEVs and PHEVs are not currently available commercially in California or the United States, but several are expected to become available in the near future. Nissan plans to introduce its BEV in a small number of early markets, including the San Diego region, starting in 2010. Factory-made BEVs and PHEVs will be appropriate for many light-duty vehicle fleet applications once they become available. Retrofit of standard hybrid vehicles to PHEVs is an existing option for light-duty fleet applications. After-market companies employ existing technology to convert standard hybrid electric vehicles to PHEVs. In a typical conversion, a larger battery pack that can be charged by regular electrical outlets is added to the existing vehicle's battery configuration.

Factory-made PHEVs are expected to provide greater efficiency than converted PHEVs. A number of automakers are planning to introduce PHEVs in California beginning in 2010, including Toyota, General Motors, Ford, Volkswagen, Chevrolet, and a couple of California startup companies.[1] In the meantime, retrofit vehicles provide an opportunity for the region to secure early GHG reductions and prepare the market for the introduction of new production PHEVs. Plug-in hybrid electric vehicles are expected to cost between $6,000 and $12,000 more than comparable gasoline vehicles and battery electric vehicles and $8,000 to $15,000 more than gasoline vehicles. According to the Energy Commission, conversion costs for PHEVs are estimated at $11,000 per vehicle. Calcars.org estimates the following conversion costs by battery type: $6,000 to $10,000 for lead-acid, $8,000 and up for nickel-metal, and $10,000 and up for lithium chemistries.

According to the Energy Commission, mass market availability of light-duty electric drive passenger vehicles at affordable prices will require several automakers to manufacture vehicles in high volume assembly lines approaching 50,000 to 100,000 vehicles per year. It is likely that small commuter size battery electric vehicles, once produced in large volume, will be attractive in the market place and volume may grow to significant market share in this segment. Retrofitting hybrid vehicles as plug-in hybrids can help condition the market for future electric vehicle sales by familiarizing consumers with the technology, thereby creating demand for batteries and vehicle components that could lead to cost reductions, design improvements, and development of a skill base for the maintenance of these vehicles. One company, A123 Systems, has received a waiver from ARB to retrofit up to 500 Toyota Prius vehicles to plug-in hybrid configuration.

There are currently no new light-duty propane vehicles available in California. Most propane vehicles are retrofits. The Roush F-150 is certified for retrofit applications by the U.S. Environmental Protection Agency, Air Resources Board. Roush Industries is developing a dedicated propane pickup truck to meet OEM-like standards.[2] The California state fleet operates nearly 1,600 bi-fuel propane Ford F-150 pickup trucks. Las Vegas, Nevada operates propane taxicabs.[3]

The average cost of converting a light-duty gasoline vehicle to a dedicated propane fuel vehicle ranges from $4,000 to $12,000. Retrofits for medium-duty applications cost between $7,000 and $12,000. Converting diesel engines to propane operation is possible, but not economically practical. The cost of a propane forklift is usually between $16,000 and $24,000, which is comparable to a gasoline-powered forklift and approximately $10,000 less than a diesel forklift. The initial cost of a propane vehicle is significantly more than a gasoline vehicle. The upfront costs of propane fleet vehicles can be offset by lower operating and maintenance costs over vehicles' lifespan. Payback period varies based on vehicle usage. Payback period will be the shortest for vehicles that travel long distances and have high fuel consumption.

[1] http://en.wikipedia.org/wiki/Plug-in_hybrid
[2] http://www.afdc.energy.gov/afdc/vehicles/propane_availability.html
[3] http://www.ycstrans.com/profile.html

Hydrogen FCVs are significantly more expensive than other vehicles, and only available to a few demonstration fleets in the United States. Honda is leasing its fuel cell vehicle – the FCX Clarity – to customers for a price of $600 per month. However, the price of production of hydrogen fuel cell vehicles is not widely reported. Fuel cells are very expensive to manufacture and costs must decrease sizably in order to be cost-effective for mass production and competitive with other vehicle technologies. Since fuel cells contain water, they experience significant problems in cold weather (i.e., temperature at which water freezes).

Table 9. Light-Duty Vehicle Incremental Cost Comparison to Standard Gasoline Vehicles

Vehicle	Purchase Price	Retrofit Price
Biodiesel (B20 or above)	n/a	n/a
Plug-in Hybrid	$6,000 to $12,000	$11,000
Battery Electric*	$8,000 to $15,000	n/a
Flex Fuel	Comparable	n/a
Hydrogen	Significantly Higher	n/a
Natural Gas	$7,000	Contact Retrofit Companies
Propane	Not for sale	$4,000 to $12,000

*The Nissan EV available to fleets in the San Diego region is expected to be available for an incremental cost of $10,000.

Medium- and Heavy-Duty Vehicles

Most major heavy-duty diesel engine vehicle manufacturers state that using biodiesel blends of up to B20 will not void their parts and workmanship warranties.[4] A few heavy-duty manufacturers accept blends higher than B20. Several fleets in the Bay Area have been using B50 to B99 blends for over five years. If biodiesel fuels are standardized and accepted by all vehicle and engine manufacturers for all concentration levels and feedstocks, biodiesel blends could be used in up to one million diesel vehicles operating in California today. Heavy-duty fleet applications for biodiesel blends include diesel-powered work trucks, buses, refuse haulers, and non-road equipment.

The natural gas industry estimates that there are approximately 300 street sweepers and 1,900 refuse trucks fueled by natural gas in California. Medium- and heavy-duty vehicles powered by CNG or LNG are currently available from several manufacturers, including at least five refuse haulers and three sweepers.[5] The most likely future markets for medium- and heavy-duty NGVs are short- and medium-haul applications. CNG will be the fuel choice for most applications – except for long-haul – when the price of CNG is competitive with diesel. LNG is preferable for long-haul applications (class 8 trucks). At least three to four companies producing natural gas engines abroad are expected to enter the California market with existing or new engines for heavy-duty applications.[6] Medium/heavy-duty fleet applications for CNG include shuttle buses, refuse haulers, sweepers, and work trucks. LNG also is used for refuse haulers and sweepers. In the San Diego region, CNG currently fuels a large number of transit buses while LNG fuels refuse hauler fleets such as those of Waste Management (located in the City of El Cajon) and the City of San Diego. Incremental costs for heavy duty NGVs are about $40,000 to $50,000 (e.g., refuse haulers, transit buses) and up to $70,000 to $80,000 for class 8 vehicles. With diesel trucks likely requiring additional improvements (therefore costs) to achieve 2010 CARB emissions standards, the cost differential between CNG and diesel is expected to decrease.

Propane engines and fueling systems are available for medium- and heavy-duty vehicles like school buses and street sweepers. Propane is viewed as an economical retrofit option for such fleet applications. Three companies currently offer propane conversions for gasoline engines; all are retrofits to medium-duty GM engines (6.0 and 8.1 L models). Cummins offers a propane-fueled version of its 5.9 L engine (B propane Plus). This engine is available new vehicles from multiple manufacturers including El Dorado National, Elgin Sweeper Company, Ottawa Truck, and Freightliner Custom Chassis Corporation.

[4] AB 118 Investment Plan, April 2009 Draft. P. 24.
[5] http://www.afdc.energy.gov/afdc/vehicles/natural_gas_availability.html
[6] AB 118 Investment Plan. P. 28

Refuse haulers, transit and school buses, and utility trucks are all good candidates for hybrid electric and hydraulic hybrid applications. ISE Corporation, located in the City of Poway, produces both gasoline and fuel cell hybrid electric systems for heavy-duty applications. No factory-made battery electric or plug-in medium- or heavy-duty vehicles are currently available in California. E85 is not typically used in heavy- or medium-duty fleet applications, due in part to its relatively lower energy intensity compared to other fuels.

Non-Road Vehicles

Electricity has the potential to replace diesel fuel in a number of non-road markets, including neighborhood electric vehicles (NEVs) and fleet applications like forklifts. Currently, these vehicles are limited in number, but there is room for growth. Several factory-made low-speed NEVs are available for non-road applications, including passenger and cargo vans, crew and extended cab trucks, and passenger vehicles.[7] Propane and CNG have also been successfully used in off-road applications like forklifts. There are currently several thousand propane forklifts in California. There is technical potential to use hydrogen in several non-road applications, but none are commercially produced or available today, and there is no available timeline for when such technologies may become available to fleets or commercially.

Maintenance Issues

Propane engines have up to twice the lifespan of gasoline engines due to the high octane rating and low carbon and oil contamination characteristics. For these reasons propane vehicles have relatively lower maintenance costs - a primary advantage of propane vehicles in fleet applications. Spark plugs in propane engines can last 80,000 to 100,000 miles, while spark plugs in unleaded gasoline engines last around 30,000 miles. Forklifts powered by propane require less maintenance than gasoline and diesel forklifts.

Biodiesel blends result in a marked improvement in lubricity compared to petroleum diesel. Blends as low as one percent can provide up to a 65 percent increase in lubricity, which means biodiesel results in less engine wear than petroleum diesel. In general, blends greater than B20 can impact fuel system components such as natural rubber compounds that are incompatible with biodiesel. Manufacturers recommend that natural or butyl rubbers not be allowed to come in contact with pure biodiesel. Blends of B20 or lower do not typically exhibit degradation or need changes. If a vehicle's fuel system contains these materials and users wish to fuel with blends greater than B20, replacement with compatible components is recommended. Lower level biodiesel blends are recommended in very cold climates, but in most of California's moderate climate regions higher blends (B20 and above) can be used year-round without the problems associated with low temperatures. Automakers and engine manufacturers will need to show widespread acceptance of all biodiesel/renewable diesel blend concentrations for use in all diesel vehicles.

Other than lower gas mileage, drivers see little difference when using E85 versus gasoline. When considering total costs for electric vehicles, include the cost battery replacement at about 20,000 miles ($1,000 or $2,000) against the cost of tune-ups, oil changes, mufflers, starters, water pumps, etc during the same 20,000 miles for a standard gasoline or diesel vehicle. Electric motors require less maintenance than gasoline engines.

[7] http://www.afdc.energy.gov/afdc/progs/vehicles_search.php

SECTION 5. Fuel and Vehicle Characteristics and Performance

This section compares the performance of alternative fuels and vehicles to standard gasoline and diesel fuels and vehicles. Fuel energy content, fuel economy, and fuel prices for alternative fuels and vehicles are discussed in this section.

In general, alternative fuels and vehicles provide horsepower, acceleration, levels of safety and a cruising speed similar to gasoline and diesel vehicles. In some instances, BEVs have smoother operation and better acceleration than standard vehicles. Pure biodiesel and blends have somewhat less power than petroleum diesel fuel. Table 10 describes energy content of alternative fuels compared to the amount of energy in a gallon of a gasoline and diesel. Fuel energy content is an important determinant of vehicle performance measures such as fuel economy and driving range.

Generally, alternative fuels have lower energy contents than an equivalent amount of gasoline. Pure biodiesel and blends have higher energy content than gasoline, but lower energy content than petroleum diesel. Reformulated California gasoline (5.7% ethanol) has an energy content of about 111,836 British Thermal Units (BTUs) per gallon; one gallon of petroleum diesel contains about 129,000 BTUs. An alternative fuel, E85 for example, contains about 81,800 BTUs per gallon, about 72-77% of the energy in one gallon of gasoline. This means that approximately 1.39 gallons of E85 are needed to provide the same amount of energy as one gallon of gasoline. Thus, gallons of gasoline equivalent (GGE) for E85 would be 1.39. Please refer to the following table for the energy content for other alternative fuels.

Table 10. General Alternative Fuel Characteristics Comparison with Gasoline and Diesel

Fuel	Energy Content (low or net value)	Energy Comparison (% of gasoline energy)	Gallons of Gasoline Equivalent (GGE)
Gasoline	115,000 BTU/gal	100%	1.0 gallon
Gasoline (reformulated, 5.7% ethanol)	111,800 BTU/gal	97%	1.03 gallons
Petroleum Diesel	129,000 BTU/gal	112%	0.89 gallons
B100	118,000 BTU/gal	103% (91% of diesel)	0.97 gallons
B20	127,000 BTU/gal	110% (98% of diesel)	0.91 gallons
CNG	112,000 BTU/gal	97% (87% of diesel)	1.03 gallons
Electricity	3,413 BTU/kwh	3% (1 kwh)	33.4 kwh
Ethanol (E85)	81,800 BTU/gal	71%	1.41 gallons
Hydrogen	30,500 BTU/gal	27%	3.8 gallons
LNG	75,000 BTU/gal	65%	1.53 gallons
Propane	84,000 BTU/gal	73%	1.39 gallons

Sources: http://www.afdc.energy.gov/afdc/fuels/properties.html, http://en.wikipedia.org/wiki/Miles_per_gallon_gasoline_equivalent, http://www-cta.ornl.gov/data/download27.shtml, http://hydrogen.pnl.gov/cocoon/morf/hydrogen/article/401

Notes: Kwh = kilowatt-hour, lb(s) = pound(s), BTU = British Thermal Unit,

Energy content can be expressed in high (gross) or low (net) heating values. For the high heating value, the water produced by the combustion is assumed to be recondensed to a liquid. For the low heating value, the water remains as a gas. Since engines exhaust water as a gas, the low heating value is the appropriate value for comparing fuels.

Fuel Economy

Miles per gallon of gasoline equivalent (MPGGE) is a metric used to allow for fuel economy performance comparisons among various alternative fuels and vehicles. MPGGE is based on the amount of heat energy in one gallon of gasoline. The equivalent fuel economy of an alternative fuel is equal to the amount of that fuel required to produce the same amount of heat energy and the distance the vehicle can travel on that same amount of energy. MPGGE is a measure of the distance vehicles can travel on an equal amount of heat energy.

Standard gasoline passenger cars have a range of about 300-400 miles and fuel economy of 21-22 miles per gallon. As shown in Table 11 below, standard hybrids, plug-in hybrids, and battery electric vehicles can travel about 40 percent to 250 percent farther than standard gasoline passenger cars using the same amount of energy. These alternative fuel vehicle technologies are more energy efficient than standard gasoline cars. CNG, propane, and E85 provide fuel economy performance similar to a standard passenger car running on gasoline. B20 provides similar fuel economy to a standard diesel passenger car, while B100 provides somewhat lower fuel economy.

Table 11. Passenger Car Fuel Economy

Alternative Fuel/Vehicle Technology	Fuel Economy (mpgge)
Gasoline internal combustion engine vehicle (ICEV), 2005 light-duty auto (LDA) mix	20.8
Gasoline, ICEV	22.33
CNG, ICEV	22.33*
Propane, ICEV	22.33
E85, Flex Fuel Vehicle (FFV)	23.00
E85, dedicated ICEV	23.89
B100, Diesel ICEV	26.31
ULSD, Diesel ICEV	28.80
B20, Diesel ICEV	28.80
Hydrogen, ICEV/Internal Combustion-Hybrid Electric Vehicle	29.02
Gasoline, hybrid electric vehicle (HEV)	30.14
Gasoline, plug-in hybrid electric vehicle (PHEV)	31.26
Hydrogen, Full Cell Vehicle (FCV) /Fuel Cell-Hybrid Electric	44.65
PHEV Grid Mode	80.38
Battery Electric Vehicle (BEV)	80.38

Source: Full Fuel Cycle Assessment Tank to Wheels Emissions and Energy Consumption. TIAX LLC, February 2007.
Notes:
*ACEEE reports that the Honda Civic GX, the only CNG passenger car for-sale in California, achieves 24 mpgge with city driving, and 36 mpgge with highway driving.
MPGGE = miles per gallon of gasoline equivalent

The lower fuel economy of E85 is due to the lower energy content of E85. As a result, about 1.39 gallons of ethanol are required to transport a vehicle the same distance as one gallon of gasoline. When accounting for the energy content of E85, costs are generally higher than gasoline on an energy equivalent basis.[8,9] As a result, E85 will provide less range than the same FFV running on gasoline.

Internal combustion engines convert less than 20% of gasoline energy into power that moves the vehicles. Vehicles using electric motors powered by hydrogen fuel cells are much more energy efficient. The energy in 2.2 lb (1 kg) of hydrogen gas is about the same as the energy in 1 gallon of gasoline. A light-duty fuel cell vehicle must store 11-29 lb (5-13 kg) of hydrogen to enable an adequate driving range of 300 miles or more. Because hydrogen has a low volumetric energy density (a small amount of energy by volume compared with fuels such as gasoline), storing this much hydrogen on a vehicle using currently available technology would require a very large tank—larger than the trunk of a typical car. Advanced technologies are needed to reduce the required storage space and weight. Because of its low energy content, it is difficult to store enough hydrogen on a vehicle to get it to travel more than 200 miles.

A CNG-powered vehicle gets about the same fuel economy as a conventional gasoline vehicle on a gasoline gallon equivalent (GGE) basis. A GGE equals about 5.7 lb (2.6 kg) of CNG. The driving range of a Honda Civic GX dedicated CNG sedan with a full tank filled at a pressure of 3,600 pounds per square inch (psi) is 200 to 225 miles. Most CNG stations fill at 3,600 psi, but if filled at 3,000 psi the vehicle's range will decrease proportionately. Natural gas

[8] http://www.consumerenergycenter.org/transportation/afvs/ethanol.html
[9] http://www.afdc.energy.gov/afdc/ethanol/e85_specs.html

trucks, like many other alternative fueled vehicles, typically have a shorter driving range than their diesel counterparts. This shorter range is a result of natural gas having a lower energy content and difficulty in packaging the high-pressure storage cylinders on the truck. Adding additional storage cylinders can increase the truck's driving range, but the added weight will reduce the amount of weight the vehicle can carry. LNG has a higher storage density than CNG, and therefore provides longer-range than CNG, which makes it a more viable alternative to diesel fuel than CNG for long-haul heavy-duty vehicle applications.

An electric motor is much more efficient than an ICE. Electric motors convert about 75% of battery energy to power the vehicle; an ICE converts about 20% of gasoline energy to power the vehicle. Range for BEVs is more limited than for conventional vehicles, and spans from 50 to 130 miles. The Nissan BEV offers a range of about 100 miles. Although there are different PHEV formats, in general, a PHEV conversion can only run on battery power at lower speeds (e.g., below 35 miles per hour for a Prius conversion). At present, converted PHEVs can travel approximately 30-40 miles before the battery will be fully discharged. The combination of an electric battery with an ICE affords PHEVs comparable or even superior range to a standard gasoline vehicle, as opposed to the more limited range of a BEV. PHEVs feature higher fuel economy than standard hybrids because the vehicles use electricity to run in electric-mode longer and more often than standard hybrid cars, which offsets use of the ICE and gasoline consumption.

Dedicated propane engines typically have a shorter driving range than their gasoline and diesel counterparts. More propane is required to drive an equivalent range to a gasoline vehicle. Shorter range is the result of propane's lower energy density and difficulty in packaging the high-pressure storage cylinders on the truck. A gallon of propane contains about 14-25[10] percent less energy than a gallon of gasoline, and dedicated gas-injection propane vehicles have lower efficiency than gasoline engines. Hence the lower range than comparable gasoline engines. Bi-fuel propane engines offer similar range to gasoline engines. Driving range can be increased by adding additional storage tanks to the vehicle, but the extra weight will reduce the amount of weight the vehicle can carry.

Biodiesel blends perform very similar to low sulfur diesel in terms of power, torque, and fuel without major modification of engines or infrastructure. One of the major advantages of biodiesel is that it can be used in existing engines and fuel injection equipment with little impact to operating performance. Biodiesel shows similar horsepower, torque, and haulage rates as conventional diesel fuel. B20 has similar heat content to that of petroleum diesel fuel (about 98 percent), which means a vehicle fueled with B20 will have about 99 percent of the driving range as when fueled with petroleum diesel. A gallon of B100 has about 91 percent of the heat content as a gallon of petroleum diesel.

Fuel Price

In addition to characteristics like energy content and fuel efficiency, fuel price is an important consideration in an analysis of alternative fuels and vehicles. Table 12 below provides the average price for gasoline, petroleum diesel, and alternative fuels tracked in the Clean Cities Alternative Fuel Price Report. The data provided is based on data collected from the West Coast of the U.S. in January 2009, the most recent date for which the information is available. The data is reported in average price per gallon and converted to average price per gallon of gasoline (GGE) and diesel gallon equivalent (DGE). As of January 2009, the price of CNG was lower than both gasoline and petroleum diesel on a GGE and DGE basis. The cost of other fuels was greater than gasoline and petroleum diesel.

Prices of CNG fuel are generally less than gasoline and diesel fuel, on an equivalent energy basis. The average price of CNG on the west coast is $1.81 per GGE. Federal excise tax for CNG is $0.183 per GGE while state tax is $0.0875 per GGE, compared to the state tax of $0.18 per gallon for gasoline. Fleets can apply for a California Fuel Use Permit and receive an exemption from state tax on CNG for $168 per vehicle per year. CNG fuel is comparatively less expensive than gasoline and diesel. Only in a minimal number of high-mileage fleet vehicle applications are the fuel cost savings adequate to amortize the CNG vehicle capital costs. LNG Price information was not able to be obtained for this report.

[10] http://www.consumerenergycenter.org/transportation/afvs/lpg_propane.html

Table 12. Alternative Fuel Price Comparison with Gasoline and Diesel

Fuel	Average Price/Standard Deviation ($/gal)	Average Price ($/gge)	Average Price ($/dge)
Gasoline	$2.04 / 0.26	$2.04	n/a
Petroleum Diesel	$2.36 / 0.37	n/a	$2.36
B100	$3.48 / 0.89	$2.34	$2.57
B20	$2.72 / 0.47	$2.48	$2.53
CNG*	$1.81 / 0.54	$1.81	$2.03
Ethanol (E85)	$2.19 / 0.58	$3.09	$3.46
Propane	$2.50 / 1.05	$3.45	$3.85

Sources: Clean Cities Alternative Fuel Price Report. January 2009.
Notes:
Dge = diesel gallon equivalent
*CNG price is reported per gge so no additional conversion is required.
** Electricity is reported in price per kilowatt-hour (kwh).

On average, a gasoline gallon equivalent (GGE) of propane is more expensive than gasoline. Federal excise taxes for propane (13.6 cents per gallon) are lower than for gasoline (18.4 cents) and diesel fuel (24.4 cents per gallon). There is limited information available on the cost of hydrogen as a transportation fuel. However, the cost is considered uneconomically high at present relative to alternative and conventional transportation fuels.

There are significant cost savings when you evaluate the cost to charge an electric vehicle versus the cost of gasoline. Electric vehicles with direct current (DC) electric systems get about 0.4 kilowatt-hours (kWh) per mile, while those with more efficient alternating current (AC) systems get about 0.174 to 0.288 kWh per mile. At an electricity rate of $0.13 per kWh[11], it would cost about $0.05 per mile for DC operation and $0.03 cents per mile for AC operation. The per-mile costs of a gasoline vehicle with a fuel economy of 25 miles per gallon would vary depending on the price of gasoline:

- $0.04/mile when gasoline is $1.00/gallon;
- $0.08/mile when gasoline is $2.00/gallon;
- $0.12/mile when gasoline is $3.00/gallon; and
- $0.16/mile when gasoline is $4.00/gallon.

The cost of charging an electric vehicle is lower than the cost of fueling a standard gasoline vehicle when the price of gasoline remains above about $1.25 per gallon. A study by San Diego Gas & Electric (SDG&E) confirmed the advantages that PHEVs offer over standard hybrids and gasoline vehicles in terms of improved fuel economy and fuel costs, as well as tailpipe carbon dioxide (CO_2) emissions. SDG&E tested the performance of two 2007-model standard hybrid vehicles and then converted them into plug-in hybrid electric vehicles using a lithium-ion battery conversion kit. The results are shown in Table 13.

Table 13. Advantages of Plug-in Hybrid Electric Vehicle Retrofits versus Standard Hybrid and Gasoline Vehicles

Performance Measures	Advantages of Plug-in Hybrid Retrofit Compared to	
	Standard Hybrid[2]	Standard Gasoline
Fuel Economy	60% improvement	205% improvement
Tailpipe CO_2 Emissions[1]	37% reduction	67% reduction
Fuel Costs	18% reduction	57% reduction

Source: SDG&E Clean Transportation Program.
Notes:
1. PHEVs also would indirectly generate GHG emissions associated with the generation of electricity used to charge the battery.
2. Standard hybrid represents performance by the same vehicle prior to the plug-in conversion.

[11] SDG&E time-of-use tariff for electric vehicles ranges from $0.12 - $0.15 per kWh during off-peak period.

Controlled experiments conducted by Recharge IT, an initiative of Google.org, also demonstrate that converted PHEVs achieve better fuel efficiency, lower CO_2 emissions, and cheaper fuel costs when compared with standard hybrid and gasoline vehicles.

The following table uses the average fuel price and fuel efficiency information to determine the price per distance and price differentials that alternative fuels require to cost-effectively compete with gasoline (Table 14). The analysis shows that per-mile costs for fuel are lower than standard gasoline vehicles for vehicles running on B20, CNG, standard hybrid and plug-in hybrid engines, and battery electric motors. The price differential column shows the price difference between a fuel and gasoline required for that fuel to be a cost-effective alternative. The price differential is provided as a percentage for gasoline at any price, and as the per-gallon cost at existing gasoline prices. For example, the results for E85 indicate that this fuel must be priced at least 27 percent lower than gasoline in order to be cost-effective. At the current gasoline price this translates into a maximum cost for E85 of $1.49 per gallon. The table also shows that battery electric vehicles are more cost-effective to fuel than standard gasoline vehicles as long as the price of electricity is at or below $0.22 per kilowatt-hour (kWh).

Table 14. Alternative Fuel Passenger Car Cost Comparison to Gasoline

	Average Price			Fuel Economy	Price Per Mile		Price Differential to Compete with Gasoline			
Fuel	**Per Unit**		**Per GGE**	**MPGGE**	**1 mile**	**100 miles**	**Any Gasoline Price**	**Current Gasoline Price**		
Gasoline	$2.04	gal	$2.04	22.33	$0.09	$9.14	n/a	n/a		
Petroleum Diesel	$2.36	gal	$2.08	28.8	$0.07	$7.21	Max. 47% higher	up to	$2.99	gal
B100	$3.48	gal	$3.45	26.31	$0.13	$13.09	Max. 19% higher	at most	$2.43	gal
B20	$2.72	gal	$2.48	28.8	$0.09	$8.59	Max. 42% higher	up to	$2.89	gal
CNG	$1.81	gge	$1.81	22.33	$0.08	$8.11	Equal Price	up to	$2.04	gge
E85 (FFV)	$2.19	gal	$3.09	23	$0.13	$13.43	Min. 27% lower	at most	$1.49	gal
Propane	$2.50	gal	$3.45	22.33	$0.15	$15.45	Min. -28% lower	at most	$1.48	gal
HEV	$2.04	gal	$2.04	30.14	$0.07	$6.77	n/a	n/a		
PHEV, Gasoline Mode	$2.04	gal	$2.04	31.26	$0.07	$6.53	n/a	n/a		
Electric/PHEV Grid Mode	$0.13	kWh	$4.34	80.38	$0.05	$5.40	See above discussion	up to	$0.22	kWh

Notes
Based on average fuel prices as reported in the Clean Cities Alternative Fuels Price Report, January 2009.
Prices may not add due to rounding

SECTION 6. Greenhouse Gas Emissions and Petroleum Reduction

Alternative fuels and vehicle technologies will be need to achieve the state's goals for greenhouse gas (GHG) emissions reduction, petroleum reduction, and climate stabilization. The potential GHG emission reductions, and petroleum and fossil fuel savings of alternative fuels compared to standard gasoline and diesel vehicles on a full fuel cycle basis is discussed below and summarized in Table 15.

Table 15. Full Fuel Cycle Comparison of Alternative Fuels to Standard Gasoline Vehicles

Alternative Fuel	Full Fuel Cycle Analysis		
	GHG Reduction	Petroleum Reduction	Fossil Fuel Reduction
Biomass-based Diesel			
Biodiesel (B20)	10-13%	15-17%	n/a
Renewable Diesel (RD30)	20%	29%	n/a
Electricity			
Hybrid Electric	25%	25%	25%
Plug-in Hybrid	48%	60%	46%
Battery Electric	72%	99.8%	65%
Ethanol (E85)			
Midwest Corn	15-28%	70-73%	27-45%
California Corn	36%	70-73%	27-45%
Sugar Cane	68%	73-75%	72-80%
Cellulose	60-72%	73-75%	72-80%
Hydrogen			
Electrolysis	26%	99.7%	13%
Natural Gas	54%	99.7%	41%
Biomass	91%	99.7%	89%
Natural Gas			
CNG – light-duty vehicle	20-30%	>99%	4-13%
CNG – heavy-duty vehicle	11-23%	>99%	2-8%
LNG – heavy-duty vehicle	11-16%	>99%	3-7%
Propane			
Light-duty	18-20%	5% (from petroleum) 98% (from natural gas)	9-12%
Medium/Heavy-duty[12]	2.3% higher than diesel; 18.6% lower than gasoline	n/a	n/a
Non-road (forklift)[13]	2.7% lower than diesel; 19% lower than gasoline	n/a	n/a

Source:
Full Fuel Cycle Assessment: Well-to-Wheels Energy Inputs, Emissions, and Water Impacts, TIAX LLC. Prepared for the California Energy Commission, June 2007 Energy Commission-600-2007-004-F

Plug-in hybrid electric vehicle (PHEV) retrofits offer the opportunity to obtain approximately 40-70 percent GHG emission reductions (depending on the electricity mix) compared to a gasoline vehicle and 15-30 percent GHG emission reductions compared to a gasoline hybrid Toyota Prius. PHEVs demonstrate significant potential to reduce GHG emissions and petroleum and fossil fuel consumption.

[12] http://www.propanecouncil.org/uploadedFiles/Propane_Reduces_GHG_Emissions_(2007).pdf
[13] http://www.propanecouncil.org/uploadedFiles/Propane_Reduces_GHG_Emissions_(2007).pdf

BEVs do not produce any GHG or criteria air pollutant emissions at the tailpipe. Emissions attributed to the electricity powering the vehicle are those attributed to electricity generation or distributed energy sources. Full fuel-cycle emissions of BEVs using today's electricity grid are as much as 70 percent lower than the emissions of conventional gasoline vehicles.

Electrification of non-road applications offers similar GHG emission reduction benefits to electric passenger vehicles: minimum 30 percent fuel savings, efficiency improvements, and GHG emission reductions. GHG emissions and petroleum consumption from medium- and heavy-duty truck applications can be reduced through hybrid electric and hydraulic hybrid technologies. Electric vehicles will become even cleaner on a full fuel-cycle basis as California continues to shift to renewable electricity generation systems and increases installation of renewable and clean non-renewable distributed generation.

Generally, the higher the biofuel concentration of the biofuel blend, the greater the potential GHG emission reductions. Depending on the feedstock, fuel production process, blend concentration and vehicle type, the various biodiesel and renewable diesel fuels could reduce greenhouse gas emissions by 61 to 94 percent compared to conventional diesel fuel.

Ethanol can achieve modest to substantial GHG emission reduction depending upon the type and location of the feedstock. According to the most recent analysis by the California Air Resources Board, the GHG emissions of corn-based ethanol produced in the Midwest and delivered to California, on average, slightly exceed the emissions of gasoline when indirect land use effects are taken into account. Corn-based ethanol produced in California can achieve GHG emissions reductions relative to gasoline, while alternate feedstocks like sugarcane and cellulosic ethanol can achieve much larger GHG emission reductions compared to corn-based ethanol and gasoline.

Vehicles operating on natural gas can reduce GHG emissions by as much as 30 percent compared to gasoline and diesel vehicles on a full fuel cycle basis. However, the use of biomethane in the same vehicles has a much greater greenhouse gas benefit, reducing emissions by as much as 97 percent.

Like BEVs, hydrogen fuel cell vehicles do not produce GHG emissions at the tailpipe. On a full fuel cycle basis, hydrogen can reduce GHG emissions by 26% to 91% depending on the method of producing hydrogen. Although on-site steam reformation of natural gas is not the ultimate goal, it does provide a number of near-term benefits such as a 50 percent "source-to-wheel" reduction in greenhouse gas emissions and a 40-90% reduction in emissions of smog forming and toxic emissions compared to today's gasoline-powered cars. Hardly any petroleum is consumed in the full fuel cycle of hydrogen.

For the production of hydrogen by electrolysis, how the electricity is generated determines the amount of greenhouse gas emissions because it can be produced using fossil resources (i.e., natural gas and coal) or renewable resources like solar, wind, geothermal, hydroelectric, and, biomass. When using renewable resources the emissions can be zero. However, when hydrogen is produced using the current mix of sources on the California grid, particulate matter (PM) emissions and the greenhouse gas (GHG) emissions can be greater than those associated with gasoline on a well to wheels basis. The state has set goals to use renewable resources to produce hydrogen that exceed the state's 20% Renewable Portfolio Standard (RPS) requirement. For electrolysis to be a viable and sustainable method of producing hydrogen, it must employ more clean renewable electricity than what the grid alone currently provides.

Propane offers moderate GHG emission reductions. When produced along with natural gas, propane reduces GHG emissions by 9 to 19 percent compared to gasoline, slightly better than propane derived from petroleum. Emissions reductions are substantial when an engine, such as in a forklift, is replaced by propane.[14]

[14] http://www.afdc.energy.gov/afdc/vehicles/emissions_propane.html

SECTION 7. Alternative Fuel Availability and Infrastructure

Widespread use of alternative fuels and deployment of alternative fuel vehicle technologies is contingent upon critical issues like the source and available supply of the fuel, capability to produce the fuel at a commercial scale, availability of infrastructure to distribute the fuel to the region, and facilities for vehicle fueling or charging. A discussion of these issues as they relate to the deployment of alternative fuels and vehicles in the San Diego region is provided below. The address and type of access for existing alternative fueling and charging infrastructure in the region is provided in Appendix F. See Figures 1-5 at the end of Section 7 for the distribution of existing alternative fueling infrastructure in the region, and by the following subregions: South County, Mid-City and East County, North City, and North County.

Table 16. Summary of Alternative Fuel Availability and Infrastructure

Fuel	Existing Fueling-Charging Infrastructure	Cost of Additional Fueling-Charging Infrastructure	Availability of Production-Distribution Infrastructure
Biodiesel Fueling	2 public, 5 private	Information not available	Storage and blending terminals, port off-loading sites needed
E85 Fueling	3 public	$100,000 to $250,000	Storage and distribution facilities needed in order to scale-up consumption
Electric Charging	19 public, 15 private or unknown*	Upgrade existing: $200 to $3,000 New Public: $2,500 to $5,000 New Residential: $1,300 to $1,500	Existing Electricity Grid and Distributed Energy Sources
CNG Fueling	7 public, 15 private	Home Refueling: $4,750 Small Station: $350,000 Medium Station: $500,000 Large Station: $950,000 Add Public Fast Fill Dispenser: $125,000	Existing Natural Gas Pipeline Network
LNG Fueling	2 private	Large Station: $1,200,000 Combined: LCNG and LNG Station: $1,600,000	Existing, but West Coast off-shore LNG terminals also needed
Hydrogen Fueling	1 public, 1 private	$500,000 to $5,000,000	Significant investment required
Propane Fueling	19 public	$65,000	Existing

Notes:
*All existing electric charging points must be upgraded for compliance with SAE standards; some existing charging points may have been removed or damaged or otherwise no longer exist as noted in Appendix F.

Biofuel: Biomass-based Diesel

Biomass-based diesel refers to biodiesel and renewable diesel, including diesel derived from algae, biomass, and industrial and processing waste. Only biodiesel is commercially available today. Additional progress is needed to produce biomass-based diesel fuels from renewable feedstocks low in GHG emissions, including waste sources and algae, and to demonstrate the viability of these sources. Moving beyond these oils and into “second generation” feed sources and plants are necessary to reach higher blend levels and deeper GHG emission reductions. Biomass-based cellulose, waste, and algae are likely second generation feed sources.

California has 11 biodiesel plants with a combined 2009 theoretical capacity of 87 million gallons, although these plants will likely produce less than 25 million gallons in 2009 due to the relatively lower price of petroleum-based diesel. A change in the price disparity between biodiesel and petroleum diesel will be needed to improve the economics of commercial biodiesel production and its availability to local government fleets in the San Diego region.

The region currently features one biodiesel production facility operated by New Leaf Biofuel, which collects waste oil from restaurants for processing into pure biodiesel (B100). According to the Energy Commission, recycled cooking oil is the lowest-cost feedstock for biodiesel production. As of 2008, production was approximately 13,000 gallons per month. The company is developing a new processing facility with maximum production capacity of 140,000 gallons per month, the equivalent of about 1.68 million gallons of B100 per year.

Longer-term, deployment of blending and storage terminals is needed to increase the availability of biodiesel and renewable diesel to customers in the region as well as the state. California lacks bulk terminal, bulk storage, and terminal blending facilities for biodiesel. Moreover, a minimum of two deepwater port access offloading sites are needed for the state to access foreign supplies at a competitive economic level with petroleum. The Energy Commission is providing funding for blending and storage terminal projects to facilitate infrastructure development in the state.

Buying directly from biodiesel producers is the most likely method of purchase for fuel distributors and bulk B100 purchasers of biodiesel. Some individual consumers may also buy biodiesel directly from producers by the drum. Distributors will typically deliver or fill large quantities of fuel in pure form (B100) or other common mixtures like B20. A list from the National Biodiesel Board (NBB) of NBB biodiesel producers and marketers is available online.

Development of new technology or new types of infrastructure is not required for biodiesel fueling. Existing petroleum diesel fueling stations can dispense biomass-based diesels and biodiesel. Where new fueling pumps or stations are required to support biodiesel use by local government fleets, installation costs would be comparable to those for petroleum diesel fueling infrastructure. In general, the standard storage and handling procedures used for petroleum diesel can be used for biodiesel. The fuel should be stored in a clean, dry, dark environment. Acceptable storage tank materials include aluminum, steel, fluorinated polyethylene, fluorinated polypropylene, and Teflon. Copper, brass, lead, tin, and zinc should be avoided.

Existing public fueling pumps or stations in the San Diego region are located at Pearson Fuels in the City Heights community of the City of San Diego and at the Soco Group petroleum distribution facility in the City of El Cajon. Private biodiesel fueling stations are located at military installations throughout the region. The statewide and local production of B100 provides a near-term opportunity for local governments in the San Diego region to employ blends of biodiesel in existing diesel vehicles and applications. Investments in biodiesel fueling infrastructure would be needed to support biodiesel use in fleet applications.

Biofuel: Ethanol (E85)

Over 90% of ethanol used in California is imported from outside the State. About 80% is produced from corn in the Midwest United States and transported to California by rail. Another 12% is comprised of foreign imports primarily from Brazil via marine transport. The approximately 8% produced in-state comes from three plants, none of which are located in the San Diego region. Two more plants are under construction and 14 are in the active development stages. California plants are idle as of April 2009 due to the relatively low price of oil and refined petroleum products like gasoline relative to ethanol blends of E85[15]. A change in the price disparity between E85 and gasoline will be needed to improve the economics of commercial ethanol production and its availability to local government fleets in the San Diego region. Moreover, the Energy Commission reports that new storage and distribution facilities would be needed in the state to scale-up E85 consumption.

[15] California Energy Commission 2009 Integrated Energy Policy Report (IEPR) Transportation Workshop, 14 April, 2009.

There are no fleet-based E85 fueling stations in the region, and public access to fueling stations is limited. E85 is currently available at Pearson Fuels in the City Heights community of the City of San Diego, Bressi Ranch Shell in the City of Carlsbad, and Oceanside Texaco in the City of Oceanside. New fueling stations would be needed to support the use of E85 in local government fleets in the region. The Energy Commission estimates the cost of new E85 fueling capacity at an existing or new station at $100,000 to $250,000. There are factors hindering a transition to E85 in California and the San Diego region. One is the limited number of facilities dispensing E85. In addition, it is difficult for local government fleets to justify investments in expansion of E85 infrastructure with the current price differential between E85 and gasoline. Because one gallon of E85 has roughly three-quarters the energy content of one gallon of gasoline, vehicles running on E85 achieve lower fuel economy than gasoline. Therefore, the price of E85 must be proportionately lower than gasoline in order for fleet mangers to economically justify a transition.

In addition, the Energy Commission reports that the most recent calculations from the California Air Resources Board indicate that corn-based ethanol produced in the Midwest results, on average, in higher GHG emissions on a full fuel cycle basis than gasoline. As a result, it would appear that E85 will only help the region contribute to GHG reduction targets if derived from corn ethanol produced in California or ethanol from lower carbon feedstocks other than corn. Additional investment in the production and distribution infrastructure to support large-scale ethanol production from such lower carbon sources is likely needed before local government fleets in the San Diego region can justify commitment of resources to E85 fueling infrastructure and vehicles.

Electricity

Unlike some alternative fuels, the infrastructure for the production and distribution of electricity to power battery electric and plug-in hybrid vehicles is already in place in the form of the existing power grid and distributed energy sources like photovoltaic solar panels. According to the Electric Power Research Institute, California's existing electricity capacity could recharge as many as 4-million plug-in hybrids if charged during off-peak hours when electricity use is relatively low. However, the existing electric charging infrastructure in the San Diego region is inadequate in numbers and will be incompatible with new charging connection formats to support forthcoming BEVs and PHEVs.

For some early release BEVs and PHEVs, recharging is as simple as plugging them into an electric outlet. Currently available converted plug-in hybrids can recharge their batteries through a standard household outlet (110/120-volt) and charge in five to six hours with a 5-kwh lithium-ion battery. OEM production plug-in hybrids are anticipated to recharge in as little as three hours using a 220/240-volt wall unit for an 8-kilowatt-hour battery. Nissan reports that the BEV they will introduce in the San Diego region in 2010 will charge in eight hours using a 220/240-volt wall unit and improvements by 2012 are expected to reduce the charge time to 4 hours by increasing the charging amperage.

There are approximately 32 existing electric charging stations remaining in the San Diego region. Most if not all of these facilities were constructed in the late 1990s and early 2000s when first generation electric vehicles were sold in California. Locations include San Diego International Airport, Saturn dealerships, UCSD, Scripps medical facilities, and regional shopping center locations (e.g., Costco stores). With the phase out of electric vehicles, these stations do not receive much use. These sites feature various types of charging technology and are in various states of disrepair. As noted in Appendix F, chargers have been removed at some locations. Existing sites will need to be upgraded or replaced to support the next generation of battery electric and plug-in hybrid vehicles. The sites must be upgraded and new sites installed to meet the standards established by the Society of Automotive Engineers (SAE) for electric vehicle connections. Existing public access charge points need to be upgraded to include Society of Automotive Engineers (SAE) 1772 Level I (110V) and Level II (220V) compliant connectors to charge new OEM battery electric and plug-in electric vehicles. The SAE standards have been crafted to be compatible with electric vehicles from all manufacturers.

In addition to upgrading existing charge points, a much larger, strategic and more comprehensive regional network of new electric charging stations will be needed to support the thousands of battery electric and plug-in hybrid vehicles expected in the next few years. Installation of new charging sites will need to reflect the amount and

location of local government fleet purchases. Moreover, installation of electric charge infrastructure in the San Diego region also will need to keep up with the broader roll-out of electric drive vehicles to the general public. Level I and II connectors installed at fleet yards or locations where fleet vehicles are parked or stored when not in use should be adequate to support the integration of battery electric and plug-in hybrid vehicles into local government fleets. A comprehensive regional network of charging stations will need to consist of Level I and II[16] connectors at residential and publicly accessible locations as well as infrastructure capable of quickly charging battery electric vehicles to facilitate longer-distance travel (i.e., trip distances equal to or greater than the approximately 100-mile range of battery electric vehicles). SAE Standards for Level III (440V) "fast-charging" are under-development and expected to be finalized in the near-future. Fast-chargers would charge battery electric vehicles to 80 percent capacity in an estimated 26 minutes in the case of the forthcoming Nissan EV.

In addition, companies like Better Place have proposed "battery exchange" stations in which, instead of re-charging a vehicle's battery, a vehicle's depleted battery is exchanged for a fully-charged battery. Whatever the means or technology, substantial deployment of electric vehicles in the San Diego region will require installation of re-charging infrastructure that is time-competitive with standard vehicle re-fueling at gasoline and diesel service stations. The following ratios are recommended for the initial installation of electric charging points to support the initial rollout of electric vehicles in the region:

- 1 charge point per vehicle to be installed at home base charging location
- 1 – 1.5 charge points per vehicle in a public access location (this ratio will decrease in the future as the number of installed chargers increases; recommended ratios for the mid- and long-term as still under review)
- Level III connectors, battery-exchange facilities, or a comparable technology to support long-distance battery electric vehicle travel should be sited along major regional and interregional corridors. At a minimum, such facilities will need to be sited at a ratio of one every 100 miles.

Although upgrade costs to existing infrastructure will range from $200 to $3,000 per site, future costs to expand the number of charge outlets at upgraded sites will be minimal.

Table 17. Current Cost Estimates for Electric Charging Points

Type of Charging Point	Estimated Cost
Upgrade Existing Charge Point	$200 - $3,000
Install New Public Charge Point	$2,500 - $3,500 $3,000 - $5,000 (SDG&E)
Install New Residential Charge Point	$1,300-$1,500
Source: Draft AB 118 Investment Plan; SDG&E.	

More detailed regional analysis of electric charging infrastructure to support the deployment of electric vehicles to the general public is outside the scope of this effort but will be performed by SANDAG at a future date.

Natural Gas

California produces 15.4 percent of its natural gas, and the rest is imported by pipeline from Canada and the Rocky Mountain and Southwestern states. To meet growing demand, California needs to develop additional supplies of natural gas. Because North American supply basins are maturing, additional reliance on imported supplies is needed, including liquefied natural gas (LNG). Since natural gas is already widely used in electricity generation and residential, commercial and industrial end-uses, substantial use of natural gas as a transportation fuel would create additional demand for new supplies of natural gas from imported or renewable sources, as discussed below.

[16] It is currently anticipated that the preferred level for charging on BEVs and PHEVs will be Level II (220V) charging due to the increased charging time for the larger sized batteries being proposed for these vehicles (battery sizes ranging from16-30 kWh). Level I (110V) charging will also be compatible with larger sized batteries, but will provide relatively slower charging time. Level I charging may be preferred for vehicles with smaller battery sizes, such as electric scooters.

Development of biomethane as a transportation fuel is a major part of the natural gas vehicle (NGV) industry's long-term plan for viability. Biomethane from landfill gas has an extremely low carbon intensity compared to diesel, gasoline, and North American natural gas. Feasibly recoverable biogas from landfills, wastewater treatment, and dairy waste, if used to produce biomethane transportation fuel, could displace virtually all diesel used for transportation purposes and reduce GHG emissions by more than 24 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) per year in California. The Energy Commission has allocated funding incentives to support up to ten biomethane production plants in California.

LNG is produced both world-wide and domestically at a relatively low cost. Existing use of LNG for transportation purposes is derived from domestic sources. However, a majority of the world's LNG supply comes from countries with the largest natural gas reserves: Algeria, Australia, Brunei, Indonesia, Libya, Malaysia, Nigeria, Oman, Qatar, Trinidad, and Tobago. LNG is transported in double-hulled ships specifically designed to handle the low temperature of LNG. These carriers are insulated to limit the amount of LNG that evaporates. LNG carriers are up to 1,000 feet long, and require a minimum water depth of 40 feet when fully loaded. Currently there are approximately 140 LNG ships world-wide. LNG terminals in the United States are located along the East Coast and Gulf of Mexico. There are plans to construct two offshore LNG terminals along the west coast of the United States.[17] When LNG is received at most terminals, it is transferred to insulated storage tanks specifically built to hold LNG. These tanks can be found above or below ground and keep the liquid at low temperature to avoid evaporation. Clean Energy operates an LNG plant in Boron, California that can produce up to 160,000 gallons of LNG per day and is designed to be upgraded to a maximum production capacity of up to 240,000 gallons of LNG per day. In addition to the Boron plant, two plants in Arizona serve LNG vehicles in Southern California.

Natural gas is readily available to end users through existing utility infrastructure. San Diego Gas & Electric (SDG&E) distributes natural gas to end-use customers for various non-transportation purposes. Natural gas fueling infrastructure can be linked to this existing regional network to provide natural gas as a transportation fuel for potential local government fleet applications. Significant financial and time investments in infrastructure to transport and distribute natural gas to end users have already been made. This gives fuels like CNG an advantage over other alternatives such as hydrogen, ethanol, and biodiesel, which require significant time and financial investments in infrastructure that would be needed to scale up production and distribution of those fuels to end users.

With the consumption of CNG increasing nationwide 145 percent during the past six years, the fueling infrastructure has also grown. California has more than 200 CNG fueling stations. In Southern California alone, there are more than 100 public fueling stations in major metropolitan areas from Los Angeles to the Mexican border. Another 50 stations are now under construction. There are approximately 22 existing locations in the San Diego region offering CNG, with another two locations offering LNG. These facilities primarily support CNG and LNG use in public and private fleet applications including the region's two primary transit agencies, multiple school districts, military facilities, refuse hauler Waste Management (LNG), and the City of Chula Vista. In addition, UCSD has plans to construct a new CNG station and is actively seeking Federal Stimulus funding to support their efforts. Fueling infrastructure for natural gas consists of the following seven types of facilities:

- CNG home refueling appliances
- Small-capacity CNG stations
- Medium-capacity CNG stations
- Large-capacity CNG station
- Large-capacity LNG stations
- CNG dispensers added to existing gasoline stations
- Combined CNG and LNG stations (LCNG)

Large amounts of capital are required to expand infrastructure. For the fleet operator, the overall economics are favorable if the fuel cost savings can amortize the additional equipment costs. This equation favors high fuel use applications, which is one reason why heavy duty vehicles are the fastest growing natural gas vehicle segment in California. Current cost estimates for natural gas infrastructure are provided in Table 18.

[17] http://www.energy.ca.gov/lng/documents/4_WEST_COAST_PROJECTS_PROPOSALS_STATUS_UPDATE.PDF

Table 18. Current Cost Estimates for Natural Gas Infrastructure

Type of Infrastructure	Estimated Cost
Home Refueling Appliance	$4,750
Small Station	$350,000
Medium Station	$500,000
Large CNG Station	$950,000
Large LNG Station	$1,200,000
Add Public Fast Fill Dispenser	$125,000
Combined LCNG & LNG Station	$1,600,000
Source: AB 118 Investment Plan	

Small, medium, and large CNG stations can be added to existing gasoline stations or built as "stand alone" CNG stations. It is also possible for a single station to dispense both CNG and LNG, and in fact LNG can be gasified to CNG with conventional pumps with less energy than it takes to compress pipeline gas to CNG, though CNG from LNG is more expensive than CNG from pipeline gas. The state of natural gas infrastructure and supply would appear adequate to support deployment of CNG and LNG as fuels in appropriate local government fleet applications. The potential for growth in the regional use of LNG over the longer-term may be contingent upon the construction of West Coast LNG terminals or additional in-state LNG plants.

Connection with Hydrogen

Natural gas could also play a role in a hydrogen fuel future. Because natural gas and hydrogen are similar fuels with similar properties, lessons learned with NGVs can be applied to the development of hydrogen transportation systems. Moreover, natural gas fueling infrastructure can be used to dispense hydrogen. Use of hydrogen enriched natural gas (e.g., 20% hydrogen and 80% natural gas) in heavy-duty vehicles can reduce emissions from pure natural gas by about 50 percent.

Hydrogen

There are a number of ways that hydrogen can be produced including electrolysis of water, steam reformation of natural gas, biomass gasification and coal gasification to name a few. The two most common ways to produce hydrogen are steam reformation of natural gas and electrolysis of water at a central station. It is important to note that unlike other fuels, hydrogen is not an energy source but an energy carrier. Energy is required to create hydrogen fuel. After hydrogen is produced, it would be delivered to fueling stations by truck or pipeline for pumping into vehicles' hydrogen tanks. Another option is for hydrogen to be produced by reformation or electrolysis at the fueling station.

Currently, most hydrogen is produced by steam reformation of natural gas, one of the cheapest methods. This process lays a foundation for increasing the use of renewable feed stocks because hydrogen stations that are constructed initially using natural gas could be modified to accept fuels derived from renewable and other sources of energy as they become available. Additionally, the experience gained and improvements made at stations using natural gas reformation could be applied to new reformation stations sited where renewable fuels such as biomass, municipal solid waste, and landfill gas can be used as the fuel source.

In addition to the infrastructure investments required to produce hydrogen, delivery of hydrogen to end users would require the building of an extensive system for transporting, distributing, and storing hydrogen. Significant investment of money and time would be required to deliver hydrogen to end-users. Currently, very little hydrogen is produced for use as a transportation fuel. Moreover, the cost of production is currently expensive. With respect to fueling infrastructure, the San Diego region contains two hydrogen fueling stations: one publicly accessible station at the City of Chula Vista Corporation Yard and a private station located on the Camp Pendleton Marine Corps Base. The cost of additional hydrogen stations is estimated by the Energy Commission to range from $500,000 - $5,000,000 depending on the size.

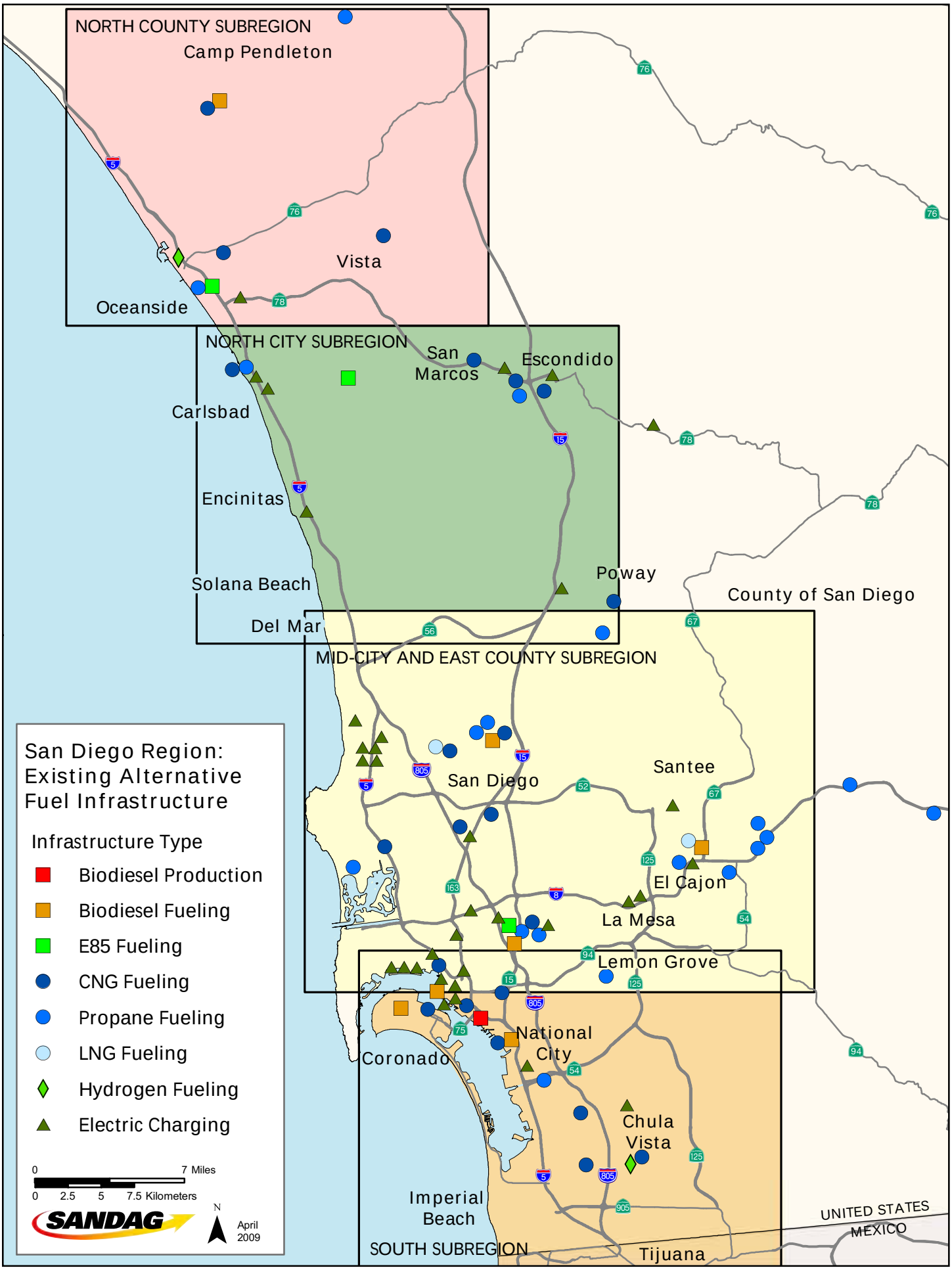
Propane

The infrastructure of the propane distribution system is well-established. Propane is shipped from the point of production (natural gas or oil well) to bulk distribution terminals via pipeline, railroad, barge, truck, or tanker ship. Propane dealers fill trucks at terminals and distribute propane to end users, including retail fueling stations. Most propane consumed in the U.S. is produced domestically. Very little new infrastructure is needed to support propane forklifts; propane suppliers can maintain on-site storage tanks for fleets or have cylinder exchange programs.

Propane is widely available and its use could easily be expanded if demand for propane as a transportation fuel increases. There are currently 19 stations in the San Diego region that supply propane. There is potential to quickly expand the infrastructure for propane vehicle fueling, as existing propane stations can be used for vehicle fueling through the addition of fuel capacity, a tank pump, and metering equipment. Additional fueling infrastructure for propane can be installed at low cost at for publicly accessible stations, and upgrading existing propane infrastructure for vehicle fueling is cost effective as well. There is potential to quickly expand the infrastructure for propane vehicle fueling, as existing propane stations can be used for vehicle fueling through the addition of fuel capacity, a tank pump, and metering equipment.

Refueling of a propane vehicle involves filling the vehicle's on-board storage cylinder from a dispenser connected to a storage tank. Just as propane is stored in the engine fuel tank as a liquid, it is stored and handled as a liquid at the fuel dispenser. Propane is pumped from the dispenser storage tank into the vehicle tank. Propane refueling is comparable to the amount of time needed to refuel a gasoline or diesel vehicle (about 10-12 gallons per minute). The Energy Commission estimates that the average cost of a propane fueling station is $65,000.

New supplies of propane may become available with advancements in processes that derive propane from renewable sources. Bio-propane could give propane an additional advantage as a transitional fuel that will be beneficial economically and environmentally in the coming years. Although renewable sources of propane are not currently available commercially, they have potential as an alternative fuel option in the future. Renewable propane can be derived from several feedstocks such as algae, row crops, and wood. The derivation of renewable propane requires little additional energy use and results in a product that contains the same energy content as propane derived from petroleum. However, renewable sources of propane are not available in large quantities or commercially and would be unable to support a large vehicle population or fleet. At this time, renewable propane appears unlikely to play a large role as a transportation fuel in local government fleets in the San Diego region.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MID-CITY AND EAST COUNTY SUBREGION
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El Cajon
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Lemon Grove
National City
Coronado
Chula Vista
Imperial Beach
SOUTH SUBREGION
Tijuana
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CNG Fueling
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LNG Fueling
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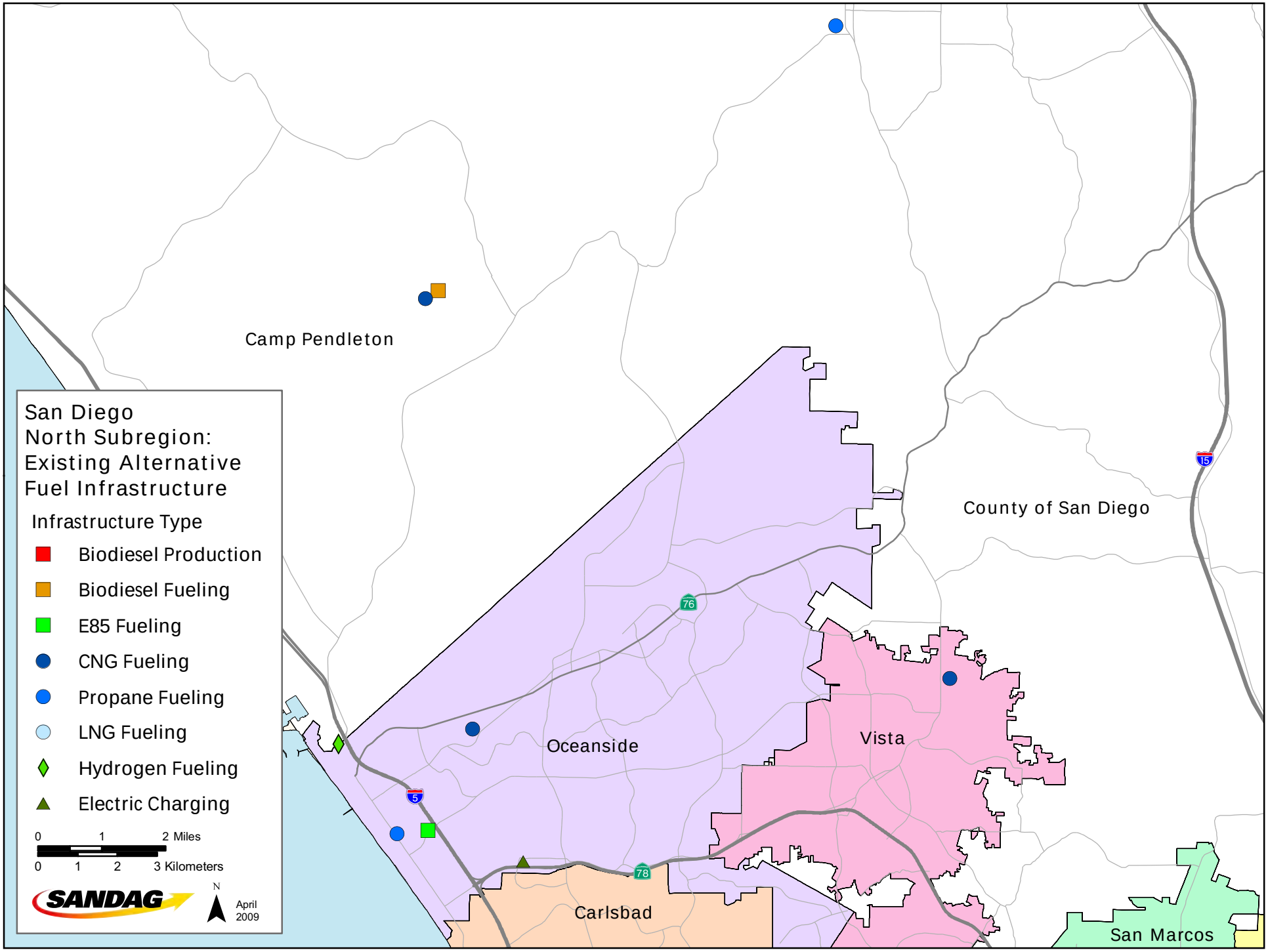
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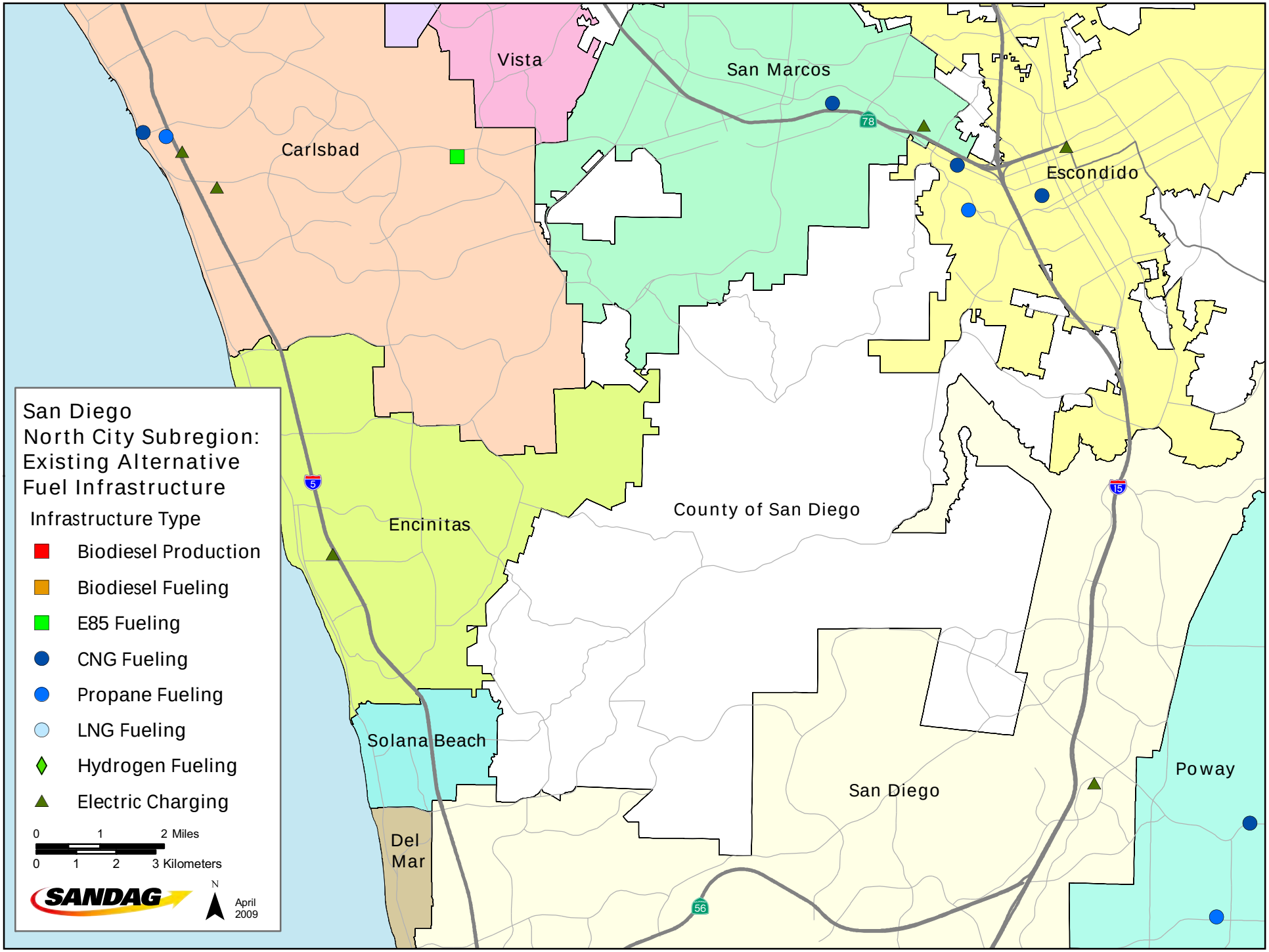
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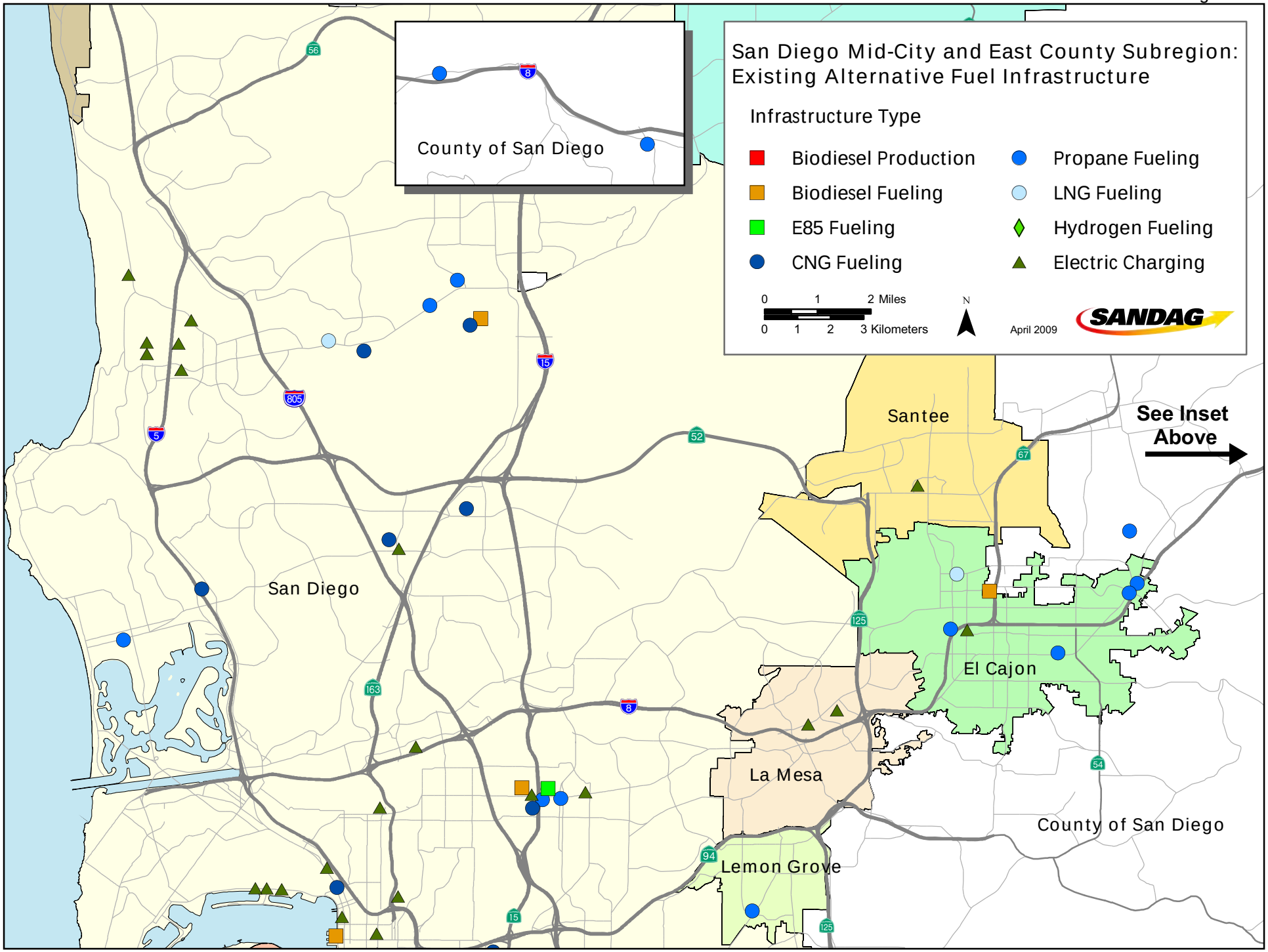
San Diego Mid-City and East County Subregion:
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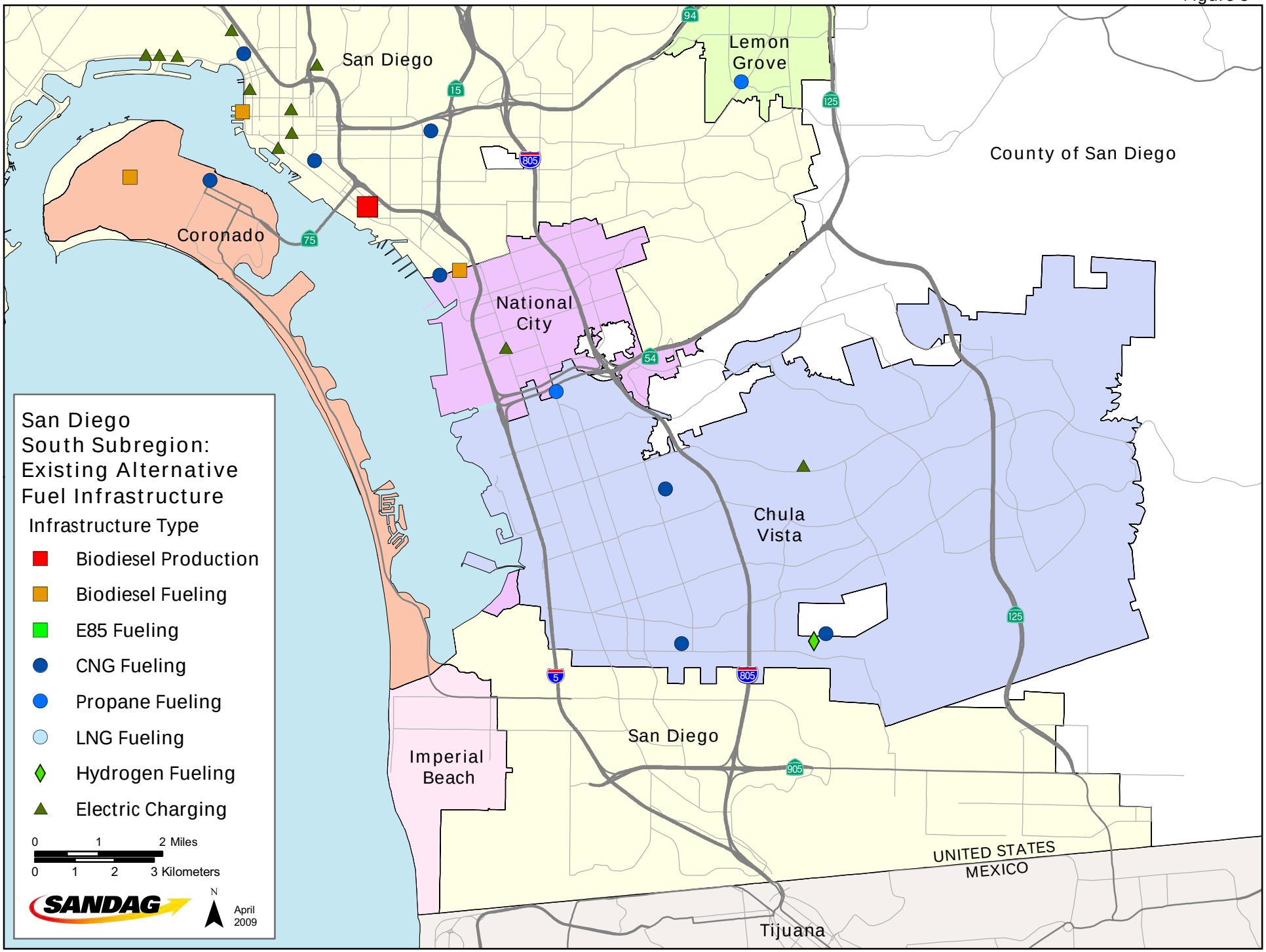
Figure 5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Biodiesel Fueling
E85 Fueling
CNG Fueling
Propane Fueling
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SECTION 8. Alternative Fuel Considerations for Regional Transportation Projects

Regional Areas of Emphasis

One objective of this study was to identify how a Metropolitan Planning Organization (MPO) like SANDAG or other regional body can facilitate the increased use of alternative fuels and vehicles. One potential approach would involve the integration of alternative fuel vehicles and infrastructure considerations with the core SANDAG functions of regional transportation planning. This report takes a broad view of its core transportation planning and implementation areas to determine project types potentially suitable for integration of alternative fuel vehicle considerations. Importantly, increased use of alternative fuels would advance the goals of the San Diego Regional Transportation Plan (RTP) (Figure 6.). Further analysis was undertaken to determine how the increased use alternative fuels and vehicles could be integrated into the four main components of the RTP (Figure 7.).

Figure 6. SANDAG RTP Goals

Figure 7. RTP Four Components

RTP Components

Land Use – Transportation Connection

- Connecting land use and transportation
  - Smart growth concept map
  - Smart growth and public health
  - Air quality
  - Better urban design for a healthier lifestyle
- Using land use and transportation plans to guide other plans and investments
- Incentives and collaboration

Transportation Demand Management

- RideLink
  - Park and ride lots
  - Vanpools
  - Carpools
  - Transit
  - Guaranteed ride home

Transportation Systems Development

- Implementing the regional transit plan and network
- Flexible roadway system
- Goods movement and intermodal facilities
- Aviation and ground access
- Enhanced smart growth land use alternative
- Planning across borders

Transportation Systems Management

- Congestion management program
- High occupancy toll lanes
- Advanced technologies and innovative services (smart parking)

Using the four RTP components as a guide, a list of potential regional transportation program areas warranting further investigation was developed. The program area analysis focused on the identification of possible “shovel-ready” projects that could be enhanced with an alternative fuels or vehicles component and the identification of funding to support implementation of that enhancement. Focus areas for the San Diego region that could be analyzed further include:

- Transit stations accessible from the managed lanes on Interstates 15, 805, and 5. Potential for priority parking, charging stations, fueling stations on-site or in the vicinity:
    - Bus Rapid Transit centers are under construction or planned every 3 miles on the I-15 corridor, then the I-805 and I-5 corridors.
    - Federal and state funds could enable alternative fuel infrastructure enhancements during construction.
- Establishing public access electric charging stations in opportune locations throughout the region:
    - Partner with SDG&E to plan region-wide public charging network.
    - Address permitting or other municipal barriers to siting infrastructure in a regionally consistent manner.
    - Provide consistent outreach and information to local governments and regional stakeholders to integrate electric vehicles and infrastructure in local government fleets.
- Bus rapid transit circulator routes, stations, infrastructure, vehicles:
    - Purchase of alternative fuel buses with performance above and beyond existing state requirements.
    - Projects under construction that could be augmented include: Super Loop, Mid-City Rapid Bus and Escondido Rapid Bus.
- Vanpools and other rideshare options:
    - Retrofit vanpools from gasoline to CNG. SANDAG has over 650 vanpools and must purchase approximately100 new vans annually due to new vanpool start-ups and turn-over of existing vans with high mileage.
    - In phases, converted compressed natural gas (CNG) vans can be purchased in public-private partnership through entities like the University of California San Diego (UCSD), Enterprise and VPSI (vanpool vendors) and natural gas-supplier Clean Energy.
    - Strategically identify vanpool vehicles for CNG conversion based on proximity of vanpool route to CNG fueling infrastructure.
- Goods movement projects to reduce idling, petroleum consumption, and GHG emissions:
    - Truck stop electrification (TSE) at the US-Mexico Ports of Entry (POE).
    - Conduct feasibility study of TSE at Otay Mesa crossing and third border crossing under development. Concept developed with EPA Region 9.
    - Identify alternative fuel infrastructure (stations and maintenance facilities) that could be incorporated into or in vicinity of the San Ysidro-Tijuana POE under redevelopment.
- Airport transportation coordination
    - Destination Lindbergh project to optimize San Diego International Airport.
    - Multi-modal transit station planned for airport reconfiguration.
    - Airport shuttle bus and taxi retrofits and new purchases.
    - Airport CNG fueling station and electric charging infrastructure.

Since many of these transportation areas are addressed by multiple regional, state, federal and even international entities, SANDAG considered a collaborative approach to benefit the region. Concurrently, state (such as AB 118) and federal (such as the stimulus) funding opportunities were under development. Regional discussions on alternative fuels transformed into strategies to fund and implement projects ready in the near-term. To aid in the identification of potential project types, near-term (i.e., in or before 2013) budgeted infrastructure projects included in SANDAG's adopted 2008 Regional Transportation Improvement Plan (RTIP) were analyzed. RTIP projects include capital improvements, engineering and planning studies conducted by the California Department of Transportation (Caltrans), regional transit agencies, local governments and SANDAG. From these regional transportation program reviews, several project types have been identified and recommended for potential further study as described in Section 9. Report Recommendations.

SECTION 9. Recommendations

This section provides recommendations to maximize the economic, environmental, and social benefits of the transition to alternative fuels, vehicles, and supporting infrastructure in the San Diego region. Four types of recommendations are provided. In many cases, implementation of the recommendations and progress toward a regional transition to alternative fuels, vehicles, and infrastructure will be contingent upon the availability of funding to the region.

- The first recommendations prioritize alternative fuels and vehicles for different vehicle classes. This information can help local governments, public agencies and other fleet operators navigate the various alternative fuel and vehicle options and make decisions regarding new vehicle purchases, retrofits, and fuels that meet regional as well as their own objectives.
- The second set of recommendations identifies potential regional, near-term budgeted transportation projects that could be enhanced to include an alternative fuels component.
- The third set of report recommendations focus on preparing the region for a wider rollout of alternative fuel vehicles to the general public.
- The fourth series of recommendations are additional measures that SANDAG could undertake as follow-up to this report.

Part 1: Vehicle and Fuel Recommendations

Light-Duty Vehicle Applications: Passenger Cars and Light-Trucks

The following vehicle and fuel recommendations for light-duty vehicle applications are presented in order of priority.

Recommendation #1: Electricity

- For vehicles with limited range requirements (about 100 miles per day), battery-electric vehicles are recommended.
- For vehicles with longer range requirements (greater than 100 miles per day), use of plug-in hybrid electric vehicles (PHEV) is recommended. At present time, standard hybrid electric vehicles must be converted to PHEV, although PHEVs produced by OEMS are expected to become available in the marketplace in late 2010.
- Install Society of Automotive Engineers (SAE) Level I (110/120v) and Level II (220/240v) compliant electric charging points proportionate with vehicle conversions and purchases at a ratio of 1.5 charging points per vehicle to support initial introduction of BEV and PHEV vehicles (1 vehicle = 1 charging point at vehicle home base + 0.5 charging at public access location). The charging point-to-vehicle ratio can be lowered in the future as electric vehicles becomes more common.
- Coordinate vehicle conversions, purchases, and electric charging point installation with state and federal funding opportunities.

Pros

- At present, electricity is the best available option for GHG reductions at the tailpipe and on a full fuel cycle basis.
- Opportunity for even greater full fuel cycle GHG reductions with anticipated increases in the state renewable portfolio standard (RPS) and distributed generation at charging point.
- Nearly 100 percent petroleum reduction.
- Best available fuel economy rating of 80 miles per gallon of gasoline equivalent (mpgge) according to the Energy Commission (some BEVs achieve significantly higher mpgge).
- In general, electricity is cheaper fuel than gasoline as long as gasoline is priced above approximately $1.25 per gallon.
- Infrastructure to distribute electricity to end-users – the existing electric grid – is already in place.

- Electric charging points are substantially less expensive to install than fueling stations for conventional and alternative fuels. Costs to expand the number of charge outlets at upgraded sites will be cost-effective.
- Battery electric vehicles will be available to public fleets in the San Diego region in 2010 at a price of approximately $27-$30,000.
- Battery electric vehicles will be available to the general public by 2012
- Government funding and incentives are available to cover the incremental costs of new and retrofitted battery electric and plug-in hybrid vehicles:
    - Federal tax credit of $7,500 per vehicle for battery electric,
    - A 10 percent federal tax credit is available for electric drive retrofits,
    - For FY08-FY10, an average of $10,000 per plug-in hybrid retrofit from the Alternative and Renewable Fuel and Vehicle Technology Program administered by the Energy Commission,
    - Up to $5,000 per vehicle rebate for battery electric vehicles (only $3,000 for battery electric vehicles with a range of 50 to 100 miles) and up to a $3,000 per vehicle rebate for plug-in hybrid vehicles from the Air Quality Improvement Program administered by the California Air Resources Board, and
    - If federal ARRA awards are received, vehicle and infrastructure costs may be reduced further.

Cons

- Vehicle/retrofit cost is greater than the cost of a standard gasoline vehicle.
- Battery electric vehicles may have limited range of about 100 miles.
- Large-scale production and commercial availability of battery electric and plug-in hybrid vehicles does not exist at present (but is expected in the near-term [1-3 years] future).
- Without proper planning, a significant market penetration of battery electric and plug-in hybrid vehicles could negatively impact the region's electricity grid, including increased peak demand and increased minimum load demand.

<u>Recommendation #2: Compressed Natural Gas</u>

- Where electric vehicles are not an option, purchase new compressed natural gas (CNG) passenger vehicles.
- Consider retrofitting standard passenger vehicles to CNG vehicles.
- Consider deploying CNG vehicles in taxicab fleets.
- Take advantage of existing CNG fueling infrastructure where available, and construct and/or support construction of new CNG fueling infrastructure when needed to support vehicle purchase and/or retrofit.
- Coordinate vehicle conversions, purchases, and fueling station installation with state and federal funding opportunities.

Pros

- Full fuel cycle GHG emission reductions of 20-30 percent relative to standard gasoline vehicles.
- Nearly 100 percent petroleum reduction.
- CNG is cheaper than gasoline on a per-gallon-equivalent basis.
- Regional infrastructure to distribute natural gas to end-users – the existing natural gas pipeline network – is already in place.
- Approximately 22 existing CNG fueling stations in the region.
- Biomethane, if and when commercially available in the region, provides opportunity to achieve further GHG emission reductions (up to 97 percent compared to gasoline) using the same natural gas infrastructure, fueling stations, and vehicles.
- Government funding and incentives are available:
    - For FY08-FY10, an average of $6,667 per vehicle for the purchase of light-duty vehicles (the Energy Commission will consider funding vehicle retrofits to CNG) and $400,000 per fueling station from the Alternative and Renewable Fuel and Vehicle Technology Program administered by the Energy Commission,
    - Federal ARRA funding available to further offset costs of vehicles and infrastructure
- Can serve as transitional fuel to achieve early GHG reductions until other lower-carbon fuel options become commercially viable.

Cons

- Natural gas supplies are finite and non-renewable.
- Natural gas is heavily relied upon in non-transportation sectors, particularly electricity generation.
- Only one Original Equipment Manufacturer (OEM) offers a light-duty CNG passenger vehicle in California, which is more expensive (about $10,000) than a comparable gasoline vehicle.
- Fueling infrastructure to support rollout of CNG passenger vehicles to the general public would involve significant financial investment.

Recommendation #3: Ethanol (E85)

- Where fleets own Flexible Fuel Vehicles (FFV) and E85 is available, establish policies that require fueling with E85.
- If previous recommendations are not achievable, purchase FFVs for light-truck and sport utility vehicle applications. As stated above, establish policies that require fueling with E85 when fueling infrastructure is available.
- Install E85 fueling infrastructure to support FFV and any dedicated E85 vehicles**.** Take advantage of state funding for E85 fueling stations.
- Improve regional access to E85 fueling stations by siting new fueling infrastructure in currently under-served areas.
- Routinely monitor the in-state ethanol production industry, including the types of feedstocks. E85 will provide substantial benefits when feedstocks from biomass waste streams and bioenergy crops within California are used to produce ethanol at a commercial scale.

Pros

- Vehicle purchase price is similar to a comparable gasoline vehicle.
- E85 fueling infrastructure and vehicles for current generation ethanol also will be able to accommodate next generation ethanol produced from feedstocks with greater benefits.
- Fueling stations already installed in the region.
- Full fuel cycle petroleum reduction of 70-75 percent relative to a standard gasoline vehicle.
- Government funding and incentives are available:
    - For FY08-FY10, an average of $100,000 per fueling station from the Alternative and Renewable Fuel and Vehicle Technology Program administered by the Energy Commission, and additional funds will be allocated to support low-carbon ethanol productions plant in California.

Cons

- Price of E85 is less economical than gasoline and other alternative fuels on a gallon of gasoline equivalent basis.
- Current generation of feedstocks has minimal or possibly negative GHG emissions performance, and the timing for commercial availability of next generation feedstocks is uncertain.
- Fueling infrastructure to support rollout of E85 to the general public would involve significant financial investment.
- FFVs are typically only available in the light-duty truck category (e.g., sport utility vehicles and pick-up trucks).

Recommendation #4: Propane

- Retrofit existing or newly purchased light-trucks
- Take advantage of existing propane fueling infrastructure in the region, where possible.
- Construct new fueling infrastructure to support vehicle retrofits.

Pros

- Infrastructure to support propane distribution to end-users is already in place.
- Potential for renewable propane to compete with other alternative fuels in future years.
- Full fuel cycle GHG reduction of 18-20 percent compared to standard gasoline vehicle.
- Nearly 100 percent of U.S. propane consumption is derived from domestic sources.
- Relatively lower fueling infrastructure costs ($65,000) than other alternative fuels.

- Government funding and incentives are available:
  - For FY08-FY10, a total of $1 million for light-duty vehicles in public fleets from the Alternative and Renewable Fuel and Vehicle Technology Program administered by the Energy Commission.
  - Federal incentives available to support propane fueling stations.
- Can serve as transitional fuel to achieve early GHG reductions until other lower-carbon fuel options become commercially viable.

Cons

- New OEM propane passenger cars or light trucks are not available for-sale in California.
- Propane retrofits are not available for passenger cars in California.
- Minimal petroleum reduction (5 percent) when propane is derived from petroleum.
- Lower GHG reduction that other alternative fuel options.
- Price of propane is less economical than gasoline and other alternative fuels on a gallon of gasoline equivalent basis.

Recommendation #5: Biodiesel

Manufacturers of light-duty diesel vehicles do not currently except biodiesel blends greater than B5. Therefore, the purchase of light-duty diesel vehicles and fueling with B5 would provide relatively minimal benefit compared to other alternative fuels in terms of increasing alternative fuel use, lessening petroleum dependence, and reducing greenhouse gas emissions. If and when light-duty diesel vehicle manufacturers accept biodiesel blends of B20 and higher, this recommendation and the role of biodiesel in light-duty vehicles will be re-evaluated.

Recommendation #6: Hydrogen

The cost and availability of hydrogen fuel cell vehicles and infrastructure currently makes them uncompetitive. Regional investment in this technology is not recommended at this time. As the vehicles, production, distribution and fueling infrastructure become more available, this will be re-evaluated.

Medium and Heavy-Duty Vehicle Applications

Alternative fuel and vehicle selection is dependent on several factors including cost and availability of vehicles and fuel supply (including grant and tax credits available), whether franchisee is considering purchase of new vehicles or retrofits/conversions of existing fleet vehicles, and level of comfort with addressing maintenance and changing from standard practice. Therefore, recommendations are provided, but not prioritized, regarding each fuel.

Biodiesel

- Use biodiesel blends up to B20 in existing diesel vehicles and equipment (when consistent with manufacturer warranty). Make a priority of contracting with in-region and in-state biodiesel producers.

Natural Gas

- CNG is a recommended option for medium-duty applications such as vans and shuttle buses. Both CNG and LNG are recommended options for heavy-duty applications like refuse haulers and street sweepers. CNG is best suited to short- and medium-haul applications, while LNG is better suited for long-haul applications.
- In FY08-FY10, an allocation of $23 million will be made available for medium- and heavy-duty natural gas vehicle rebates through the Alternative and Renewable Fuel and Vehicle Technology Program administered by the Energy Commission.

Propane

- Propane retrofits are an option in the medium-duty vehicle class for application such as vans and cargo trucks (heavy-duty propane engines and vehicles are not available). Three companies in California provide propane retrofits for gasoline engines, and all apply to medium-duty GM engines (6.0 and 8.1 L models).
- Funding is available to support propane retrofits through the Alternative and Renewable Fuel and Vehicle Technology Program administered by the Energy Commission.

Hybrid Electric and Hydraulic Hybrid

- Although not alternative fuels, hybrid electric and hydraulic hybrid technologies are viable options for medium- and heavy-duty application such as refuse trucks, drayage trucks, utility trucks, as well as transit and school buses.
- Cost differentials compared to diesel trucks range from $35,000 for retrofits to $80,000 for new vehicles. The differential cost of a gasoline hybrid electric bus is about $150,000 compared to a CNG bus. In FY08-FY10, the ARB will offer $25 million in incentives for the purchase of new medium- and heavy-duty diesel hybrid vehicles through its Air Quality Improvement Program.

Non-Road Applications (Neighborhood electric vehicles, forklifts)

Electricity and propane are recommended as viable options to gasoline- and diesel-powered non-road vehicles as described below:

Electricity

- Battery electric non-road vehicles such as forklifts and neighborhood electric vehicles provide opportunities to reduce GHG emissions and petroleum consumption associated with non-road movement of people and cargo.
- Funding for non-road applications will be available through the Air Quality Improvement Program administered by the ARB.

Propane

- The purchase and maintenance costs of propane forklift are comparable to a gasoline-powered forklift.
- Fueling infrastructure costs are minimal to support propane forklifts.
- As described above, the full fuel cycle GHG and petroleum reduction benefits of propane are superior to gasoline.

Fueling Infrastructure

- Coordinate alternative fuel and/or vehicle purchase with fueling/charging infrastructure siting.
- When siting fueling infrastructure to support fleet vehicles, consider locations that can be leveraged or expanded to allow public access (at the same time or at a future date).
- Consider state and federal funding opportunities, public and private partnerships or private industry making entire investment to address infrastructure costs

Part 2: Transportation Project Recommendations

Using the approach described in Section 8, staff reviewed RTIP projects for the potential to accommodate an alternative fuels, vehicles, or infrastructure component. Nineteen potential projects were identified for further investigation, as shown in Table 19.

Additional meetings with regional stakeholders included local governments, alternative fuel distributors, a local refinery owner, fueling station owners, public agencies, transit agencies, APCD, goods movement and cross-border players, vanpool vendors, major universities, businesses, CCSE and SDG&E. These meetings generated strong interest in a coordinated regional approach for the expansion of alternative fuels, vehicles and infrastructure in the San Diego region.

Table 19. RTIP Projects with Potential to Accommodate Alternative Fuels, Vehicles, or Infrastructure	
RTIP Project	**Description**
I-15 BRT Transit Stations Project	From SR 163 to SR 78 - construct transit stations along the I-15 corridor including stations at Mira Mesa Blvd, SR 56, Rancho Bernardo Road, and Del Lago Blvd; modify Escondido Transit Station. [designated parking, charging potential and siting of alternative fueling infrastructure in vicinity]
Metropolitan Planning	Countywide - ongoing regional transportation planning including the regional vanpool program and survey and inventory of bridges [include alternative fuels and vehicles questions]
Mid-Coast Super Loop	University City in San Diego - design and construction of transit priority treatments queue jumper lanes, street modifications, new and modified transit stations, and acquisition of 12 expansion shuttles [designated parking, charging and potential alternative fuel shuttles]
Regional Rideshare Program	Countywide - Component of overall regional Transportation Demand Management [Integration of CNG retrofit vans for vanpool; EV or PHEV sedans for 1st/ last mile for rideshare program]
San Diego Smart Parking Pilot Project	Selected Coaster Stations - provide access to real-time parking availability, conduct evaluations, analysis of parking strategies and pricing [designated alternative fuel vehicle parking, charging, monitor smart parking results for GHG reductions]
I-5/805 Port of Entry	On I-5 US/Mexico Border to Willow Road and On I-805 from Border to San Ysidro Blvd - modify port of entry [plan for role of alternative fuels, stations, maintenance facilities]
San Ysidro Intermodal Freight Facility	From Commercial St. to International Border - SD&AE Freight Yard & South Line Mainline in San Ysidro- environmental studies, design, site planning, & construction for an international freight facility; signal installation for track & rail cars [Opportunity to include refueling for buses and trucks]
I-15 BRT Downtown Transit Stations	Downtown San Diego (East Village and financial core area) - construct transit stations and transit lanes [designated alternative fuel vehicle parking and charging]
I-15 BRT Mid-City Transit Stations	At University Avenue & at El Cajon Blvd. (mid-city area of San Diego) - construct transit stations & transit lanes [designated alternative fuel vehicles parking and charging]
Escondido Maintenance Facility	Escondido at Washington and Centre City - improvements to maintenance facility including electronic gates, surveillance systems, video cameras, security [Bus refueling option]
East County Bus Maintenance Facility	New bus facility in the City of El Cajon to provide capacity for operation and maintenance for 100-150 vehicles [Bus refueling option]
South Bay Bus Maintenance Facility	In City of Chula Vista – expand existing facility from 4 to 9 acres to permit up to 150 buses [Bus refueling option]
South Bay BRT	From Otay Ranch to downtown San Diego - plan, design, and construct transit stations, transit way, local street and road modifications, freeway modifications [designated alternative fuel vehicle parking and charging]
Oceanside-Escondido Rail Project	From Oceanside to Escondido - design & construct 22 mile light rail (Sprinter) including 15 stations and maintenance facility –maybe completed [stations completed, but designate alternative fuel vehicle parking, add charging. Possible for maintenance facility to include alternative fuel component]
Solana Beach Inter-modal Transit Station	Solana Beach train station - construct parking structure, part of mixed-use transit oriented development [designated alternative fuel vehicle parking and charging]
San Luis Rey Transit Center	In Oceanside - construct new multi-modal transit center as a component of a transit-oriented, mixed-use development which would include retail, commercial, residential and office space [designated alternative fuel vehicle parking and charging]

I-15 BRT Operations and Vehicles	From Escondido to San Diego - planning, operations and vehicle acquisition for BRT service along I-15 corridor [include alternative fuel component to planning going forward]
Rail Vehicles & Related Equipment	NCTD service area - locomotive purchase/overhaul, revenue vehicles, misc. support equipment including vehicles, spare components and signal equipment upgrade/replacement. Exempt Cat: Mass Transit - Purchase new buses and rail cars to replace existing vehicles or minor expansions of fleet. [SANDAG staff provided ARRA transit grant information for use (TIGGER)]
Bus & Rail Rolling Stock	MTS service area - purchase replacement buses (9 mid-size CNG, 141 ADA small, 11 medium, 83 40-foot CNG, 10 high capacity) and Light Rail Vehicle rehabilitation, LRV Tires, rehabilitation of electronic control circuit for U2s and LRV HVAC retrofit [SANDAG staff provided ARRA transit grant information for use (TIGGER)]

Part 3: Planning Recommendations

The third set of report recommendations focus on preparing the region as a whole for alternative fuel vehicles. A concerted regional approach to addressing infrastructure needs for alternative fuels is one of the foundations to successfully implementing several interrelated state and regional goals including climate change, petroleum dependence, economic prosperity, and air quality. A coordinated infrastructure strategy, by a regional entity like an MPO or APCD, is necessary to provide customers (e.g., fleet managers and the general public) with a level of certainty that infrastructure will be available to support their investment in an alternative fuel or vehicle. Deployment of alternative fuel vehicles and development of supportive infrastructure, initially for local government and public agency fleets, will help the region lay the groundwork for a wider rollout of alternative fuel vehicles that the general public can embrace.

Support a Regional Approach to Alternative Fuels Infrastructure Planning: Continue Development of a Regional Strategic Alliance

SANDAG has proposed to the Energy Commission the idea of forming a regional strategic alliance consisting of a regionally-planned approach to increasing alternative fuel use, availability, and production. SANDAG could facilitate collaboration with other regional agencies and organizations[18] working toward state and regional goals for reducing GHG emissions, lessening petroleum dependence, and advancing the use of alternative fuel sources. In a letter to the Energy Commission in November 2008, SANDAG provided the concept and framework for a regionally-coordinated approach. Early agency buy-in came from:

- San Diego Air Pollution Control District (APCD)
- Metropolitan Transit System (MTS)
- North County Transit District (NCTD)
- San Diego County Regional Airport Authority
- San Diego Gas and Electric (SDG&E)
- California Center for Sustainable Energy (CCSE)
- University of California, San Diego (UCSD)
- Other public agencies and private companies

[18] See Appendix G for a listing of regional alternative fuel resources.

The purpose of a strategic alliance is to ensure that regional infrastructure needs are identified and met in an orchestrated and timely manner that provides convenient and safe public access to refueling and recharging sites in line with demand. Whether for local government fleets or the general public use, the transition to alternative fuel vehicles will not reach a critical mass without a strong regional (as well as interregional) emphasis on providing for the necessary infrastructure. Regional coordination of the transition to alternative fuels from an agency like SANDAG communicates to the market (e.g., fuel producers and suppliers, vehicle manufacturers, potential customers, and others) that the San Diego region is committed to, and seeks to attract, investment in alternative fuels, vehicles, and infrastructure.

In response to early federal ARRA funding opportunities and state AB 118 opportunities, entities in the region have been coordinating efforts to submit regional, multi-stakeholder proposals. SANDAG is facilitating this effort with the San Diego Regional Strategic Alliance in mind. Additionally, the Alliance would be able to leverage existing regional partnerships, funding mechanisms and transportation investments. Possible actions include SANDAG regionally administering federal and/or state alternative transportation funds. This effort could be done in coordination with or similar to funds allocated through *TransNet*, a regional half-cent sales tax measure for transportation improvements and smart growth development. The San Diego Regional Strategic Alliance would utilize this report to find ways to accelerate the deployment of alternative fuels, vehicles and infrastructure in the region.

Support Development of a Regional Electric Vehicle Charging Network

The San Diego region will be one of a handful of US metropolitan regions in which Nissan will introduce all-electric vehicles (EV), which will be available to fleet operators in 2010 and the general public by 2012. Nissan and SDG&E have partnered on this project and SANDAG is taking internal steps to become a formal partner.

Dependent on funding assistance, SANDAG will assist SDG&E and Nissan in identifying appropriate sites for 220W – 4- to 8-hour charging, 26-minute fast-charging, and/or battery swapping areas. The focus for SANDAG is the establishment of a region-wide network of public access charging stations for battery electric vehicles (BEV) and plug-in hybrid vehicles (PHEV). Depending on what level of funding that Nissan and ETEC receive through a federal transportation electrification grant, or SANDAG through a federal Clean Cities application, the San Diego region will see between 100 and 1,000 BEVs available for purchase or lease in late 2010.

Nissan and SDG&E are seeking SANDAG assistance with:

- Identifying any permitting barriers for home, office and public recharging sites in the local jurisdictions.
- Developing and promoting a regionally consistent, standard approach to EV infrastructure permitting, training and installation.
- Adequate infrastructure siting across the region.

The Nissan EV has an anticipated range of 100 miles on a single charge and is expected to cost about $30,000. The San Diego region has committed to purchasing a minimum of 100 cars. SANDAG is working with SDG&E to introduce EV and PHEV information and resources to fleet operators from around the region and discuss opportunities to integrate these vehicles into fleets and install charging infrastructure. Siting of public access charging will be done cooperatively with SANDAG and the region's local governments. SANDAG and SDG&E have provided letters of support to the federal ETEC-Nissan proposal to support EV deployment, coordination and installation of electric charging infrastructure, and training of local dealerships to service the vehicles. SANDAG is submitting federal and state proposals on behalf of the region to secure funding to implement this project in addition to other alternative fuel projects.

Further study the regional transportation project types in Table 19 to determine whether an alternative fuels component is feasible and beneficial

SANDAG should further refine its list of potential projects from the RTIP. Working across the agency, staff should continue assessing the potential for each project and hold discussions with the appropriate lead agency if not SANDAG (e.g. Caltrans, transit agency, or local government).

Support economic development mechanisms and measures for the clean energy sector

SANDAG and local governments can leverage the transition to alternative fuels and vehicles to concurrently achieve environmental as well as clean economic development goals. Workforce training is necessary to ready the region for growth in the alternative transportation field. The region also should support the existing biotech cluster as it expands into research and development of alternative fuels.

- Provide training and education to existing construction workers and firms on clean energy materials and business practices.
- Local governments should enlist existing organizations like San Diego Workforce Partnership to explore new approaches to providing education and training opportunities to workers employed by temporary staffing agencies. The San Diego region has a large number residents employed in the temporary field.
- Utilize community colleges and university extension programs to provide programs to prepare workers for the opportunity to remain actively employed and transition to the Clean Energy Sector.
- Local governments can partner with regional schools, Workforce Investment Boards (WIBs), and community colleges to bring funding to the San Diego region to spur green economy knowledge and skills.
- Integrate green jobs initiatives into existing workforce systems.
- Leverage resources at universities, community and technical colleges, WIBs, community-based organizations, and economic development agencies:
  - Universities offer four-year degree programs and graduate degrees in business, engineering, and the sciences.
  - Community colleges offer both two-year business and technical degree programs and certification programs.
  - Many High Schools offer trade preparation with hands-on technical laboratories, apprenticeship programs and some certification programs.
  - The Department of Labor, partnering with community colleges, technical high schools, unions and business offer job skills training programs and apprenticeships.

Part 4: Potential Recommendations as Follow-up to the Report

- Use this report to inform development of its Regional Energy Strategy Update, Regional Climate Action Plan and Sustainable Region Program.
- Undertake an inventory of local government and member agency fleet vehicles, including factors such as the total number of vehicles by class and fuel type, and annual vehicle turnover.
- Develop an electric vehicle charging plan for the San Diego region. Potential elements could include but are not limited to:
  - Upgrade existing charge points to current SAE standards,
  - Develop criteria for public charging point siting,
  - Analysis of the impact to the region's electricity grid,
  - Opportunities for charging with clean and renewable distributed generation
  - Electric vehicle charging tariffs,
  - "Fast-charging" considerations (i.e., SAE Level III vs. the battery exchange concept)
  - Guidelines and permit streamlining for residential installation (including both single- and multi-family dwellings),
  - Assistance with rebate applications for vehicle purchases.
- Create an action plan for the incorporation of alternative fuels and vehicles into SANDAG's vehicle fleet, and the vehicle and equipment fleets of contractors, funding recipients, and the like, including vehicles used in the vanpool program. The plan should include the identification of fueling and/or charging infrastructure where necessary to support increased alternative fuel and vehicle use.

- Identify opportunities to integrate alternative fuels, vehicle, and infrastructure considerations into existing SANDAG funding programs for smart growth land use development.
- Streamline permitting for electric charger and alternative fueling infrastructure installation.
- Support in-region production of alternative fuels and vehicles, including research and development activities.
- Support electricity and natural gas tariffs for alternative fuel vehicles that encourage their use.
- Investigate joint procurement or aggregation options that would reduce the purchase cost of alternative fuels and vehicles for regional fleets.
- Identify ways to capture the economic benefits of the transition to alternative fuels and vehicles for the region and State.
- Identify region's inventory of waste materials for potential use as biofuel feedstocks (biodiesel and ethanol) for production facilities
- Incorporate the identification of fueling-charging infrastructure locations into local government planning processes such as the General Plan.
- Develop detailed standards for the siting of fueling-charging infrastructure.
- Continue the study of opportunities for truck stop electrification and vehicle retrofits at the international border.
- Support electrification in non-road applications at San Diego International Airport and other regional airports where applicable.
- Work with regional stakeholders such as the Energy Working Group, San Diego Clean Cities Coalition, and others to coordinate and support implementation of this report.

Appendix A. Federal and State Laws and Incentives

Federal

Energy Policy Act of 1992

The 102nd Congress passed the Energy Policy Act of 1992 (EPAct 1992, P.L. 102-486). Among other provisions, this law requires the purchase of alternative fuel vehicles by federal agencies, state governments, and alternative fuel providers. Under EPAct 1992, a certain percentage— which varies by the type of fleet (i.e., federal, state, or fuel provider)—of new passenger vehicles must be capable of operating on alternative fuels, including ethanol, methanol, natural gas, or propane. EPAct 1992 established a tax credit for the purchase of electric vehicles, as well as tax deductions for the purchase of alternative fuel and hybrid vehicles.

Energy Policy Act of 2005

In light of high fuel prices in the early 2000s, continued growth in domestic and global petroleum demand, and other energy policy concerns, Congress began working on comprehensive energy legislation in 2001, which stalled in the legislature for several sessions until the 109th Congress passed the Energy Policy Act of 2005 (EPAct 2005, P.L. 109-58), which was signed by President Bush on August 8, 2005.

Energy Independence and Security Act of 2005

The Energy Independence and Security Act (EISA) of 2007 calls for improved vehicle fuel economy by tightening corporate average fuel economy (CAFÉ) standards. Passenger cars and light trucks must reach efficiency of 35 miles per gallon by the year 2020. EISA includes provisions to increase the supply of renewable alternative fuel sources by setting a mandatory Renewable Fuel Standard, requiring transportation fuel sold in the U.S. to include a minimum of 36 billion gallons of renewable fuels by 2022, including advanced and cellulosic biofuels as well as biomass-based diesel. In addition, EISA includes grant programs to encourage development of cellulosic biofuels, plug-in hybrid electric vehicles and other emerging electric technologies, and the inclusion of electric drive vehicles under EPAct 1992.

The 2008 Farm Bill

Recent Farm Bills, especially the 2002 and 2008 Farm Bills (P.L. 107-171 and P.L. 110-246, respectively), have included titles to promote biofuels and other farm-based energy supplies. The 2002 Farm Bill established programs to promote the development of biofuels and biorefineries; the 2008 Farm Bill expanded on these programs, and expanded existing biofuels tax credits to promote the development of cellulosic fuels—fuels produced from woody or fibrous materials such as perennial grasses, fast-growing trees, and agricultural and municipal wastes.

Federal Alternative Fuels and Advanced Vehicles Incentives
▪ Advanced Technology Vehicle (ATV) Manufacturing Incentives
▪ Alternative Fuel Excise Tax Credit
▪ Alternative Fuel Infrastructure Tax Credit
▪ Alternative Fuel Mixture Excise Tax Credit
▪ Biobased Transportation Research Funding
▪ Biodiesel Income Tax Credit
▪ Biodiesel Mixture Excise Tax Credit
▪ Biomass Research and Development Initiative
▪ Cellulosic Biofuel Producer Tax Credit
▪ Fuel Cell Motor Vehicle Tax Credit
▪ Heavy-Duty Hybrid Electric Vehicle (HEV) Tax Credit
▪ Improved Energy Technology Loans
▪ Light-Duty Hybrid Electric Vehicle (HEV) and Advanced Lean Burn Vehicle Tax Credit
▪ Qualified Alternative Fuel Motor Vehicle (QAFMV) Tax Credit
▪ Qualified Plug-In Electric Drive Motor Vehicle Tax Credit

▪ Renewable Energy Systems and Energy Efficiency Improvements Grant
▪ Small Agri-Biodiesel Producer Tax Credit
▪ Small Ethanol Producer Tax Credit
▪ Value-Added Producer Grants (VAPG)
▪ Volumetric Ethanol Excise Tax Credit (VEETC)

Federal Laws and Regulations
▪ Aftermarket Alternative Fuel Vehicle (AFV) Conversions
▪ Alternative Fuel Definition
▪ Alternative Fuel Definition - Internal Revenue Code
▪ Alternative Fuel Tax Exemption
▪ Clean Air Act Amendments of 1990
▪ Corporate Average Fuel Economy (CAFE)
▪ High Occupancy Vehicle (HOV) Lane Exemption
▪ Idle Reduction Equipment Excise Tax Exemption
▪ Idle Reduction Facilities Regulation
▪ Import Duty for Fuel Ethanol
▪ Renewable Fuel Standard (RFS) Program
▪ Tier 2 Vehicle and Gasoline Sulfur Program
▪ Updated Fuel Economy Test Procedures and Labeling
▪ Vehicle Acquisition and Fuel Use Requirements for Federal Fleets
▪ Vehicle Acquisition and Fuel Use Requirements for Private and Local Government Fleets
▪ Vehicle Acquisition and Fuel Use Requirements for State and Alternative Fuel Provider Fleets
▪ Vehicle Incremental Cost Allocation

Federal Programs
▪ Air Pollution Control Program
▪ Alternative Transportation in Parks and Public Lands Program
▪ Biobased Products and Bioenergy Program
▪ Clean Agriculture USA
▪ Clean Cities
▪ Clean Construction USA
▪ Clean Fuel Fleet Program (CFFP)
▪ Clean Fuels Grant Program
▪ Clean Ports USA
▪ Clean School Bus USA
▪ Congestion Mitigation and Air Quality (CMAQ) Improvement Program
▪ National Clean Diesel Campaign (NCDC)
▪ National Fuel Cell Bus Technology Development Program (NFCBP)
▪ Pollution Prevention Grants Program
▪ SmartWay Transport Partnership
▪ State Energy Program (SEP) Funding
▪ Voluntary Airport Low Emission (VALE) Program

California Incentives
Alternative Fuel and Vehicle Research and Development Incentives
Alternative Fuel Vehicle (AFV) Rebate Program
High Occupancy Vehicle (HOV) Lane Exemption
Alternative Fuel Vehicle (AFV) and Fueling Infrastructure Grants
Alternative Fuel Incentive Development
Emissions Reductions Grants
Heavy-Duty Vehicle Emissions Reduction Grants
Lower-Emission School Bus Grants
Alternative Fuel and Advanced Technology Research and Development
Vehicle Emission Reduction Grants - Sacramento

Electric Vehicle (EV) Parking Incentive - Sacramento
Employer Invested Emission Reduction Funding - South Coast
Technology Advancement Funding - South Coast
Low-Emission Vehicle Incentives and Technical Training - San Joaquin Valley
Air Quality Improvement Program Funding - Ventura County
Alternative Fuel and Advanced Technology Vehicle and Infrastructure Incentives - Vacaville
Clean Vehicle Parking Incentive - Hermosa Beach
Clean Vehicle Parking Incentive - San Jose
Alternative Fuel Vehicle (AFV) and Hybrid Electric Vehicle (HEV) Parking Incentive - Santa Monica
Electric Vehicle (EV) Parking Incentive - Los Angeles Airport

California Laws and Regulations
Regional Climate Change Initiative
Alternative Fuel Vehicle Retrofit Regulations
Alternative Fuel Tax
Alternative Fuel and Advanced Vehicle Procurement Requirements
Alternative Fuel and Vehicle Policy Development
Hydrogen Energy Plan
Heavy-Duty Truck Idle Reduction Requirements
Low Emission Vehicle (LEV) Standards
Mobile Source Emissions Reduction Requirements
Fuel Efficient Tire Program Development
Alternative Fuel Promotion - San Jose
Fleet Fuel Use and Vehicle Acquisition Requirements - San Francisco
Neighborhood Electric Vehicle (NEV) Access to Roadways - Placer and Orange Counties

California Utilities/Private
Alternative Fuel Vehicle (AFV) and Hybrid Electric Vehicle (AFV) Insurance Discount
Electric Vehicle (EV) Charging Rate Reduction - SMUD
Electric Vehicle (EV) Charging Rate Reduction - LADWP
Electric Vehicle (EV) Charging Rate Reduction - SCE
Low-Emission Vehicle Electricity Rate Reduction - PG&E
Natural Gas Vehicle Home Fueling Infrastructure Incentive - South Coast
Low-Emission Taxi Incentives - San Francisco
Employee Vehicle Purchase Incentives - Riverside

Resources

The American Council for an Energy Efficient Economy (ACEEE) conducts engineering and economic studies of the potential for efficiency improvement and provides advice regarding the development of programs and policies to realize this potential in the market. They take an integrated approach to the issue, addressing how fuel efficiency relates to emissions, safety, clean production, and renewable fuels and seek to encourage manufacturers to produce high-efficiency, low-pollution vehicles and also to motivate consumers to purchase them. A cornerstone of this effort is ACEEE's Green Book®: The Environmental Guide to Cars and Trucks and its Web site: www.Greenercars.com.

Appendix B. Alternative Fuel Vehicle Availability

The following Web sites contain information about the availability of alternative fuel vehicles and retrofits:

United States Department of Energy, Alternative Fuels Data Center
Light-duty and Low-speed vehicle search
http://www.afdc.energy.gov/afdc/progs/vehicles_search.php
Heavy-duty vehicle search
http://www.afdc.energy.gov/afdc/vehicles/heavy/index.php
Flexible Fuel Vehicle Availability
http://www.afdc.energy.gov/afdc/vehicles/flexible_fuel_availability.html
Natural Gas Vehicle Availability
http://www.afdc.energy.gov/afdc/vehicles/natural_gas_availability.html
Propane Vehicle Availability
http://www.afdc.energy.gov/afdc/vehicles/propane_availability.html
Plug-in Hybrid Availability
http://www.afdc.energy.gov/afdc/vehicles/plugin_hybrids_availability.html
Electric Vehicle Availability
http://www.afdc.energy.gov/afdc/vehicles/electric_availability.html
Hydrogen Fuel Cell Vehicle Availability
http://www.afdc.energy.gov/afdc/vehicles/fuel_cell_availability.html

United States Environmental Protection Agency, Green Vehicle Guide
http://www.epa.gov/greenvehicles/

FuelEconomy.gov
http://www.fueleconomy.gov/feg/byfueltype.htm

California Air Resources Board, Drive Clean
http://driveclean.ca.gov/en/gv/vsearch/cleansearch.asp

California Energy Commission, Consumer Energy Center
http://www.consumerenergycenter.org/transportation/buying_a_car/index.html

California Department of General Services, Best Practices Manual, Vehicles/Transportation
http://www.green.ca.gov/EPP/Vehicles/lightDV.htm#types

Automotive News Guide to Hybrid Vehicles and Advanced Technology Powertrains
http://www.autonews.com/section/altfuels

Union of Concerned Scientists, Hybrid Center
http://www.hybridcenter.org/

Union of Concerned Scientists – Buying a Greener Vehicle
http://www.ucsusa.org/clean_vehicles/technologies_and_fuels/hybrid_fuelcell_and_electric_vehicles/buying-a-greener-vehicle.html

Propane Vehicles and Conversions:
http://www.propanecouncil.org/uploadedFiles/Engine%20Fuel%20Product%20Listing%2011-08.pdf

BAF Technologies, CNG Conversions
http://www.baftechnologies.com/Home.html

Baytech Corporation, Compressed Natural Gas and Propane Vehicle Conversions
http://www.baytechcorp.com/

Appendix C. State of California Alternative Fuel Vehicle Purchases

Vehicle Type	Fleet Application	Price
Hybrid Electric		
Compact Hybrid 4-Door Sedan	Passenger car	$24,720
Compact Hybrid 4-Door Sedan	Passenger car	$24,720
Group I Hybrid 2-Wheel Drive SUV	Light-truck	$31,894
Group I Hybrid 2-Wheel Drive SUV	Light-truck	$31,894
Group III Hybrid 4-Wheel Drive SUV	Light-truck	$47,790
Group III Hybrid 4-Wheel Drive SUV	Light-truck	$47,590
Group III Hybrid Pickup, Reg. Cab	Light-truck	$34,740
Group III Hybrid Pickup, Reg. Cab	Light-truck	$34,890
Mid-Size Hybrid 4-Door Sedan	Passenger car	$25,840
Mid-Size Hybrid 4-Door Sedan	Passenger car	$25,840
Mid-Size Hybrid 5-Door Hatchback	Passenger car	$22,953
Mid-Size Hybrid 5-Door Hatchback	Passenger car	$22,593
Ethanol (E85)		
4-Door Large Sedan E-85	Passenger car	$17,036
4-Door Large Sedan E-85	Passenger car	$17,211
4-Door Midsize Sedan E85	Passenger car	$16,925
4-Door Midsize Sedan E85	Passenger car	$17,125
Group III Pickup 2WD Extra Cab E-85	Light-truck	$17,650
Group III Pickup 2WD Extra Cab E-85	Light-truck	$17,800
Group III Pickup 2WD Reg. Cab E-85	Light-truck	$15,594
Group III Pickup 2WD Reg. Cab E-85	Light-truck	$15,482
Group III SUV 4WD E-85	Light-truck	$30,497
Group III SUV 4WD E-85	Light-truck	$30,697
Group IV Minivan 7-Passenger E-85	Van	$20,222
Group IV Minivan 7-Passenger E-85	Van	$20,472
Group V Minivan Cargo E-85	Van	$18,712
Group V Minivan Cargo E-85	Van	$18,962
Group VI Cargo Van E085	Van	$16,988
Group VI Cargo Van E085	Van	$17,188
Group II 8-Passenger Van E-85	Van	$19,585
Group II 8-Passenger Van E-85	Van	$19,785
Compressed Natural Gas (CNG)		
Dedicated CNG Group I 2WD Cab & Chassis Crew Cab Min 167" WB	Cargo Truck	$53,309
Dedicated CNG Group I 2WD Cab & Chassis Crew Cab Min 167" WB	Cargo Truck	$53,909
Dedicated CNG Group I 2WD Cab & Chassis Extra Cab min 154" WB	Cargo Truck	$52,367
Dedicated CNG Group I 2WD Cab & Chassis Extra Cab min 154" WB	Cargo Truck	$52,967
Dedicated CNG Group I 2WD Cab & Chassis Reg. Cab	Cargo Truck	$50,918
Dedicated CNG Group I 2WD Cab & Chassis Reg. Cab	Cargo Truck	$51,518
Dedicated CNG Group I 4WD Cab & Chassis Reg. Cab	Cargo Truck	$53,648
Dedicated CNG Group I 4WD Cab & Chassis Reg. Cab	Cargo Truck	$54,248
Dedicated CNG Group II 15K GVWR 2WD Cab & Chassis Reg. Cab	Cargo Truck	$70,585
Dedicated CNG Group II 15K GVWR 2WD Cab & Chassis Reg. Cab	Cargo Truck	$69,786
Dedicated CNG Group III 17.5K GVWR Cab & Chassis Reg. Cab	Cargo Truck	$70,797
Dedicated CNG Group III 17.5K GVWR Cab & Chassis Reg. Cab	Cargo Truck	$71,596
Dedicated CNG Group III Passenger Van	Van	$55,201

Appendix C. State of California Alternative Fuel Vehicle Purchases

Vehicle Type	Fleet Application	Price
Dedicated CNG Group III Passenger Van	Van	$55,801
Dedicated CNG Group IV Extended Passenger Van	Van	$58,481
Dedicated CNG Group IV Extended Passenger Van	Van	$59,081
Dedicated CNG Group V 2WD Cab & Chassis Reg. Cab	Light-truck	$46,363
Dedicated CNG Group V 2WD Cab & Chassis Reg. Cab	Light-truck	$46,963
Dedicated CNG Group V 2WD Pickup Reg. Cab	Light-truck	$46,628
Dedicated CNG Group V 2WD Pickup Reg. Cab	Light-truck	$47,227
Dedicated CNG Group VII 4WD Cab & chassis Reg. Cab	Cargo Truck	$49,030
Dedicated CNG Group VII 4WD Cab & chassis Reg. Cab	Cargo Truck	$49,630
Dedicated CNG Group VII Cargo Van	Cargo Van	$52,339
Dedicated CNG Group VII Cargo Van	Cargo Van	$59,938
Dedicated CNG Group VII 4WD Pickup Reg. Cab	Light-truck	$49,304
Dedicated CNG Group VII 4WD Pickup Reg. Cab	Light-truck	$49,904
Bi-fuel Gasoline and CNG		
Group I Med. Duty Cab & Chassis Bi-Fuel Gas & CNG Reg. Cab 2WD	Cargo Truck	$81,682
Group I Med. Duty Cab & Chassis Bi-Fuel Gas & CNG Reg. Cab 2WD	Cargo Truck	$82,482
Group II Cab & Chassis Bi-Fuel Gas & CNG Reg. Cab 2WD	Cargo Truck	$70,786
Group II Cab & Chassis Bi-Fuel Gas & CNG Reg. Cab 2WD	Cargo Truck	$71,585
Group II Med. Duty Cab & Chassis Bi-Fuel Gas & CNG Reg. Cab 2WD	Cargo Truck	$84,140
Group II Med. Duty Cab & Chassis Bi-Fuel Gas & CNG Reg. Cab 2WD	Cargo Truck	$84,940
Group III Cab & Chassis Bi-Fuel Gas & CNG Reg. Cab 2WD	Cargo Truck	$71,797
Group III Cab & Chassis Bi-Fuel Gas & CNG Reg. Cab 2WD	Cargo Truck	$72,596
Group III Med. Duty Cab & Chassis Bi-Fuel Gas & CNG Reg. Cab 2WD	Cargo Truck	$84,761
Group III Med. Duty Cab & Chassis Bi-Fuel Gas & CNG Reg. Cab 2WD	Cargo Truck	$85,561
Propane (LPG)		
Group I Med. Duty Cab & Chassis Dedicated LPG Reg. Cab 2WD	Cargo Truck	$59,032
Group I Med. Duty Cab & Chassis Dedicated LPG Reg. Cab 2WD	Cargo Truck	$59,832
Group II Cab & Chassis Dedicated LPG Reg. Cab 2WD	Cargo Truck	$47,636
Group II Cab & Chassis Dedicated LPG Reg. Cab 2WD	Cargo Truck	$48,436
Group III Cab & Chassis Dedicated LPG Reg. Cab 2WD	Cargo Truck	$48,647
Group III Cab & Chassis Dedicated LPG Reg. Cab 2WD	Cargo Truck	$49,447
Group II Med. Duty Cab & Chassis Dedicated LPG Reg. Cab 2WD	Cargo Truck	$61,490
Group II Med. Duty Cab & Chassis Dedicated LPG Reg. Cab 2WD	Cargo Truck	$62,290
Group III Med. Duty Cab & Chassis Dedicated LPG Reg. Cab 2WD	Cargo Truck	$62,111
Group III Med. Duty Cab & Chassis Dedicated LPG Reg. Cab 2WD	Cargo Truck	$62,911
Neighborhood Electric		
Short Utility NEV	Light-truck	$11,115
2-Passenger NEV	Passenger car	$10,230
2-Passenger NEV	Passenger car	$10,230
3-Door Hatchback NEV	Passenger car	$16,800
3-Door hatchback NEV	Passenger car	$16,300
4 -Passenger NEV	Passenger car	$13,475
4-Passenger NEV	Passenger car	$13,475
Long Utility NEV	Light-truck	$12,575
Long Utility NEV	Light-truck	$12,575
Short Utility NEV	Light-truck	$11,115

Source: http://www.bidsync.com/DPX?ac=agencycontview&contid=3695

Appendix D. Sample Purchase Contracts, Policies, and Case Studies

State of California Vehicle Contracts

California Vehicle Purchase and Lease Policy
http://www.documents.dgs.ca.gov/osp/sam/mmemos/mm06_03.pdf
Hybrid Vehicle Purchase
http://www.bidsync.com/DPX?ac=agencycontview&contid=3694
Neighborhood Electric Vehicle Purchase
http://www.bidsync.com/DPX?ac=agencycontview&contid=4243
Alternative Fuel Vehicle Purchase
http://www.bidsync.com/DPX?ac=agencycontview&contid=3695
Trucks, Vans, and Utility Vehicles (Gasoline and Diesel)
http://www.bidsync.com/DPX?ac=agencycontview&contid=3712

About Statewide Vehicle Contracts

The Department of General Services competitively bids and makes vehicle contracts available to California governmental entities helping to meet their vehicle fleet needs. These vehicle contracts leverage pricing based upon California government business volume enhanced by manufacturer and dealer incentive programs provided to government. They also provide a broad spectrum of vehicles at an 8 to 12 percent cost savings over volume commercial fleet pricing (based upon KBB dealer invoice pricing). Generally, contract ordering begins in October and extends through the following March to June timeframe of the Model Year, depending upon manufacturer production schedules. The contracts provide for a 30-day notice of production cut-off dates.

The State of California vehicle contracts are available to any California Governmental entity defined by the California Government Code section 10298, including: county and city governments, K-12 education, special districts, colleges and universities. Customer agencies order directly from the contract dealer; an additional copy of the order goes to the California Department of General Services (DGS) Procurement Division.

DGS charges an administrative fee for use of the contracts. The fee is minimal compared to the time spent and costs agencies would otherwise incur during the specification development, negotiation and the bid process. Contract notifications include contract terms, dealer contact information, and vehicle specifications. Customer agencies should contact the dealer(s) for help with model changes and pricing on options or deletions. All purchase orders must be complete, with all options, deletions, prices, colors, FOB points, etc., indicated before submittal to the dealer. Per the contract ordering procedures, all state and local agencies must submit a copy of purchase orders to Department of General Services, Procurement Division, Master Contracts.

We will post official ordering cut-off dates as the manufacturers make them available to us. Please submit orders as early as possible; dealers have the option of offering to roll-over contract pricing to the next model year after the manufacturer's order cut-off date but they are not required to do so. Orders may be sent to the dealer either by mail or by fax. If you fax an order in, please do not mail the hard copy or a duplicate order may be issued.

Sample Local Government Policies and Ordinances

Ann Arbor, Michigan - Green Fleet Policy
Seattle, Washington - Clean and Green Fleet
City of San Diego - Alternative Fuel Policy
Portland, Oregon - Biofuels Policy
Sacramento Region, California - Model Low-Emission Vehicle & Fleet Ordinance
San Francisco, California - Clean Vehicles and Alternative Fuels Ordinance
San Jose, California - Green Fleet Policy

Case Studies[1]

Santa Monica, California
- BiFuel (CNG-Diesel) transfer tractor and trailer truck, CNG refuse hauler, CNG traffic checker

Bureau of Sanitation - Los Angeles, California
- LNG (dual-fueled) refuse hauler

Specialty Solid Waste and Recycling - Sunnyvale, California
- CNG refuse hauler

NorCal Waste - San Francisco, California
- LNG (diesel ignition) refuse hauler

Waste MGMT - Washington, PA
- LNG Refuse Hauler

Ann Arbor, Michigan
- Fuel Cell passenger vehicles,

Portland International Airport
- CNG, HEV passenger vehicles, B20 sweepers, CNG shuttle buses/vans, CNG, Propane off-highway vehicles

Seattle-Tacoma Airport
- Electric airport ground support equipment, CNG shuttle buses/vans, CNG, Propane passenger vehicles

San Jose Airport
- CNG shuttle buses and vans

Salt Lake City Airport
- CNG, B20 shuttle buses, electric, hybrid light-duty vehicles, CNG heavy-duty trucks

New York City, New York
- HEV taxis

Yellow Cab - San Francisco
- HEV, CNG taxis

Las Vegas, Nevada
- Propane taxis

Iowa State Police
- E85 police cars

Lake Jackson, Texas
- CNG passenger vehicles, refuse haulers, forklifts

Hoover, Alabama
- E85 police vehicle (Chevrolet Tahoe), B20 off-highway vehicle

Redwood National & State Parks
- HEV, Electric passenger vehicles, B20 medium/heavy-duty vehicles, Electric tractor

Carnegie Mellon University
- E85 police car, electric vehicles, B20 shuttle buses and vans

Fayetteville, Arkansas
- B-20 fire department vehicles

City of Vacaville, California
- CNG vehicles and electric vehicles

Clean Cities Program, US Dept of Energy
- Success stories: http://www1.eere.energy.gov/cleancities/accomplishments.html.

[1] http://www.nlc.org/ASSETS/4D4B15DC22EC4B0387E4F503AD9D39E3/CPB%20-%20Alternative%20Fuels%200808.pdf

Appendix E. Tools and Calculators

Puget Sound Green Fleets
Green Fleets Calculator

Alternative Fuels and Advanced Vehicles Data Center, U.S. Department of Energy
Petroleum Reduction Planning Tool

Propane Calculator for fleets
http://www.propanecouncil.org/fleetcalculator/

Electric Vehicle Cost Calculator
http://www.ccds.charlotte.nc.us/~jarrett/EV/cost.php

Natural Gas Vehicle Cost Calculator
http://www.afdc.energy.gov/afdc/vehicles/natural_gas_calculator.html

Flexible Fuel Vehicle Cost Calculator
http://www.afdc.energy.gov/afdc/progs/cost_anal.php?0/E85/

Cool Fleets (GHG emissions and lifecycle costs)
http://www.coolfleets.com/

Enhanced Efficiency Factor Costing Methodology
http://www.ofa.dgs.ca.gov/AFVP/EEFCM11.htm

Alternative Fuel Vehicles Incentives
http://www.driveclean.ca.gov/incentives_search.php

Alternative Fuel Prices
http://www.afdc.energy.gov/afdc/fuels/prices.html

Appendix F. San Diego Regional Alternative Fuels Facility Locations

Name	Facility Type	Address	City	Zip	Access
Bressi Ranch Shell	E85	2740 Gateway Rd	Carlsbad	92076	Public
OceansideTexaco	E85	1660 Oceanside Blvd	Oceanside	92054	Public
Pearson Fuels	E85	4001 El Cajon Blvd	San Diego	92105	Public
Pearson Fuels	Biodiesel	4001 El Cajon Blvd	San Diego	92105	Public
North Island Naval Air Station	Biodiesel	n/a	n/a	n/a	Private
San Diego Naval Base	Biodiesel	n/a	n/a	n/a	Private
Soco Group	Biodiesel	145 Vernon Way	El Cajon	92020	Public
Hornblower Cruises	Biodiesel	1066 N. Harbor Drive	San Diego	92101	Private
Miramar Marine Corps Air Station	Biodiesel	Miramar Way	San Diego	92145	Private
Camp Pendleton Marine Corps Base	Biodiesel	n/a	n/a	n/a	Private
New Leaf Biofuel	Biodiesel-production	2285 Newton Avenue	San Diego	92113	n/a
Asia Business Center *(may no longer exist)*	Electric Charging	4660 El Cajon Boulevard	San Diego	92105	n/a
Ken Grody Ford Carlsbad	Electric Charging	5555 Paseo del Norte	Carlsbad	92008	n/a
Saturn of Kearny Mesa	Electric Charging	4525 Convoy Street	San Diego	92111	n/a
Saturn of El Cajon	Electric Charging	541 N. Johnson Avenue	El Cajon	92020	n/a
Saturn of Escondido	Electric Charging	859 N. Broadway	Escondido	92025	n/a
Saturn of National City	Electric Charging	2202 National Boulevard	National City	91950	n/a
Saturn of West 78	Electric Charging	2205 Vista Way	Oceanside	92054	n/a
Balboa Park Auto Museum *(charger removed)*	Electric Charging	n/a	San Diego	92104	n/a
Costco - Rancho Bernardo	Electric Charging	12350 Carmel Mountain Road	San Diego	92128	n/a
Costco - Chula Vista	Electric Charging	895 East H Street	Chula Vista	91910	n/a
Costco - La Mesa	Electric Charging	8125 Fletcher Parkway	La Mesa	91941	n/a
Costco - Santee	Electric Charging	101 Town Center Parkway	Santee	92071	n/a
Costco - San Marcos	Electric Charging	725 Center Drive	San Marcos	92069	n/a
County of San Diego Administrations Building *(charger removed)*	Electric Charging	n/a	n/a	n/a	n/a
Lindbergh Field – Operations *(charger may have been removed)*	Electric Charging	3165 Pacific Highway	San Diego	n/a	Private
Wells Fargo Plaza *(charger removed)*	Electric Charging	401 B Street	San Diego	92101	Public
Gaslamp Quarter District *(charger removed)*	Electric Charging	614 Fifth Avenue	San Diego	92101	Public
San Diego Convention Center *(public access no longer available)*	Electric Charging	111 W Harbor Drive	San Diego	92101	Public
San Diego International Airport - Commuter Terminal	Electric Charging	3225 North Harbor Drive	San Diego	92101	Public
San Diego International Airport - Terminal 1	Electric Charging	3665 North Harbor Drive	San Diego	92101	Public
Mercy Hospital	Electric Charging	4077 Fifth Avenue	San Diego	92103	Public
San Diego International Airport - Terminal 2	Electric Charging	3707 North Harbor Drive	San Diego	92101	Public
Mission Valley Mall	Electric Charging	1640 Camino Del Rio N	San Diego	92108	Public
Pearson Fuels - Clean Energy	Electric Charging	4001 El Cajon Blvd	San Diego	92105	Public
Grossmont Center *(charger removed)*	Electric Charging	5500 Grossmont Center Drive	La Mesa	91942	Public
Hyatt Regency La Jolla	Electric Charging	3777 La Jolla Village Drive	La Jolla	92122	Public

Appendix F. San Diego Regional Alternative Fuels Facility Locations

Name	Facility Type	Address	City	Zip	Access
UCSD - Thornton Medical Center	Electric Charging	Medical Center Drive	La Jolla	92093	Public
UCSD - Copy Center	Electric Charging	201 University Center	La Jolla	92093	Public
UCSD - School of Medicine	Electric Charging	Osler Lane	La Jolla	92093	Public
Scripps Green Hospital	Electric Charging	10666 N Torrey Pines Road	La Jolla	92037	Public
Scripps Memorial of La Jolla	Electric Charging	9888 Genesee Avenue	La Jolla	92037	Public
Scripps Memorial (Encinitas) *(charger removed)*	Electric Charging	354 Santa Fe Drive	Encinitas	92024	Public
San Diego Wild Animal Park	Electric Charging	15500 San Pasqual Valley Road	Escondido	92027	Public
Costco - Carlsbad	Electric Charging	951 Palomar Airport Road	Carlsbad	92009	Public
Camp Pendleton Marine Corps Base	CNG	n/a	n/a	n/a	Private
Miramar Marine Corps Air Station	CNG	Miramar Way	San Diego	92145	Private
Lindbergh Field Shell-Clean Energy	CNG	2521 Pacific Highway	San Diego	92101	Public
Pearson Fuels - Clean Energy	CNG	4001 El Cajon Blvd	San Diego	92105	Public
City of Chula Vista	CNG	1800 Maxwell Road	Chula Vista	91911	Private
Chula Vista Education Center	CNG	84 East J Street	Chula Vista	91910	Public
SDG&E Northeast Service Center	CNG	1623 Mission Road	Escondido	92029	Private
SDG&E Service Center - Kearny Mesa	CNG	5488 Overland Avenue	San Diego	92123	Public*
SDG&E Service Center - Miramar	CNG	6875 Consolidated Way	San Diego	92121	Public*
SDG&E Service Center - Carlsbad	CNG	4940 Carlsbad Boulevard	Carlsbad	92008	Public*
SDG&E Beach Cities	CNG	4848 Santa Fe St.	San Diego	92109	Private
SDG&E Centre City	CNG	701 33rd St.	San Diego	92102	Private
Naval Air Station - North Island Coronado	CNG	200 Alameda Blvd	Coronado	92118	Private
San Diego Transit-Imperial Avenue Division	CNG	120 Imperial Avenue	San Diego	92101	Private
San Diego Transit-Kearny Mesa Division	CNG	4630 Ruffner Street	San Diego	92111	Private
Metropolitan Transit System - South Bay	CNG	3650 Main Street	Chula Vista	91911	Private
North County Transit District East	CNG	400 North Spruce Street	Escondido	92025	Private
North County Transit District West	CNG	305 Via Del Norte	Oceanside	92054	Private
Naval Public Works Center - 32nd Street Station	CNG	411 Cummings	San Diego	92116	Private
Poway Unified School District	CNG	13626 Twin Peaks Road	Poway	92064	Public**
San Marcos Unified School District	CNG	215 Mata Way	San Marcos	92069	Private
Vista Unified School District	CNG	1222 Arcadia Avenue	Vista	92084	Private
City of San Diego	LNG	8353 Miramar Place	San Diego	92121	Private
Waste Management	LNG	1001 West Bradley Avenue	El Cajon	92020	Private
City of Chula Vista	Hydrogen	1800 Maxwell Road	Chula Vista	91911	Public*
Camp Pendleton	Hydrogen	Carmelo Drive and Harbor Drive	Oceanside	92058	Private
Petrolane	Propane	584 North Marshall Avenue	El Cajon	92020	n/a
ProFlame Inc.	Propane	15289 Old Highway 80	El Cajon	92020	n/a
County Propane Service	Propane	12812 Jackson Hill Drive	El Cajon	92021	n/a

Appendix F. San Diego Regional Alternative Fuels Facility Locations

Name	Facility Type	Address	City	Zip	Access
Dick Rogers Shell	Propane	1699 East Main Street	El Cajon	92021	n/a
U-Haul	Propane	1186 East Main Street	El Cajon	92021	n/a
Taylor Rental Corp.	Propane	1717 East Main Street	El Cajon	92021	n/a
Alpine Shell	Propane	1340 Tavern Road	Alpine	91901	n/a
San Diego - Pearson Ford	Propane	4067 El Cajon Boulevard	San Diego	92105	Public
U-Haul	Propane	4311 El Cajon Boulevard	San Diego	92105	Public
U-Haul	Propane	99 North 4th Avenue	Chula Vista	91910	Public
U-Haul	Propane	1805 Massachusetts Avenue	Lemon Grove	91945	Public
U-Haul	Propane	9650 Camino Ruiz	San Diego	92126	Public
U-Haul	Propane	13210 Poway Road	Poway	92064	Public
U-Haul	Propane	802 South Coast Highway	Oceanside	92054	Public
Ferrellgas	Propane	8088 Miramar Road	San Diego	92126	Public
Ferrellgas	Propane	107 South Vinewood Street	Escondido	92029	Public
Ferrellgas	Propane	1425 Grand Avenue	San Marcos	92069	Public
Westmart	Propane	4990 Avenida Encinas	Carlsbad	92008	Public
North County Welding Supply Incorporated	Propane	526 West Aviation Road #A	Fallbrook	92088	Public

Sources: http://www.afdc.energy.gov/afdc/fuels/stations_locator.html; www.evchargermaps.com; www.weststart.net/ccm; San Diego Gas & Electric.
Notes:
*Card access only
**Credit card required

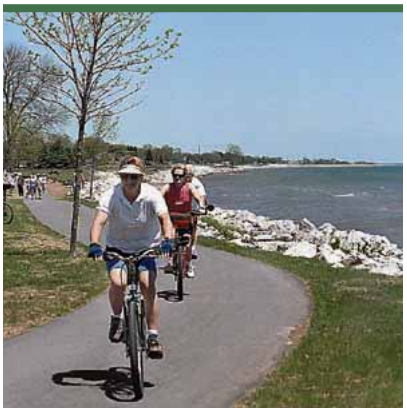
Appendix G. Regional Alternative Transportation Resources

San Diego Regional Clean Fuels Coalition (This is also the San Diego Regional Clean Cities Coalition)	Clean Fuels is a network of more than 80 volunteer, community-based coalitions, which develop public/private partnerships to increase use of alternative fuels & alternative fuel vehicles; expand use of fuel blends; promote informed consumer choices; and advance use of idle reduction technologies in heavy-duty vehicles.
California Center for Sustainable Energy (CCSE)	CCSE manages the Fueling Alternatives Rebate program, funded by the California Air Resources Board. This program provides rebates of up to $5,000 for consumers who purchase or lease new eligible modes of transportation, such as neighborhood electric, electric and compressed natural gas vehicles. CCSE also hosts the annual Street Smart event where the public can learn about alternative transportation options.
San Diego Gas and Electric (SDG&E)	SDG&E runs a Clean Transportation Program that focuses on three areas: (1) On-road and non-road electric vehicles, (2) Electric idling initiatives, and (3) Education and outreach.
San Diego EcoCenter for Alternative Fuel Education	The EcoCenter provides alternative fuel education to 4th-8th grade students in San Diego County. It operates from the 6,000-square-foot EcoCenter that contains a theater and exhibit hall. They provide an environmental field trip experience to about 26,000 middle school students each year.

Toward a ***Sustainable*** Community:

A Toolkit for Local Government

"The future is literally in our hands to mold as we like. But we cannot wait until tomorrow. Tomorrow is now." –Eleanor Roosevelt



Toward a *Sustainable* Community:

A Toolkit for Local Government

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Cover photos (top to bottom): S. Gruder, M. Rehwald, 1000 Friends of Wisconsin, and S. Gruder.

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The power is within you.

UW Extension

This is a crucial time for people to rethink how we meet our needs today to help to ensure a desirable future for following generations. Local government officials must play their part in reinventing our institutions to help communities and residents stay healthy and whole. This is because we have entered an era where human generated pressures on the natural world are unprecedented and threaten our current way of life. A few examples include depletion of nonrenewable resources – 65% of U.S. oil is gone and the world is at or past peak oil; insufficient drinking water for two thirds of the world's population; consumption of land and loss of topsoil at unsustainable rates; projected loss of 90% of the world's fisheries by 2048; extinction of a distinct species of plant or animal, on average, every 20 minutes (qualifying the present period as one of the six great periods of mass extinction in the history of Earth[1]); and the presence of 250 persistent toxic chemicals not known before 1945, many of which are now found in human tissues.

Global climate change is considered the most serious threat facing the world today. Due to human activities, our atmosphere contains 32 percent more carbon dioxide, one of the main greenhouse gases that keeps heat from escaping the earth's surface, than at the start of the industrial era.[2,3] Carbon dioxide is one of the main greenhouse gases that keeps heat from escaping the earth's surface. We put 70 million tons of it into the atmosphere every 24 hours.[4] Global warming, one measure of climate change, reveals a rise in the average global temperatures substantially higher than at any time in the last 1,000 years. **"Climate change threatens the basic elements of life for people around the world – access to water, food production, health, and use of land and the environment."[5]**

Sir Nicholas Stern, the former chief economist of the World Bank, released a report warning that not fighting global warming now could bring on a worldwide depression, shrinking the global economy by 20%. The report states that if we continue with the status quo rather than taking action to address global climate change, up to 200 million people could become refugees as their homes are hit by drought or flood. **Stern found that the cost of action to cut emissions is manageable and that the economics show it is urgent to cut emissions now. "Mitigation – taking strong action to reduce emissions – must be viewed as an investment," the report states.**

Yet, a time of great challenge is also a time of great opportunity. And local governments can be instrumental in moving communities toward solutions.

Local governments have a key role to play in reducing greenhouse gas emissions by increasing energy efficiency and reducing fossil fuel use.[6] Some approaches include phasing out coal plants, expanding renewable energy sources and public transit, and implementing new efficiency standards for vehicles and buildings. Local governments can also pass policies that protect natural resources, which are climate-sensitive public goods.

[1] Levin, Donald, A., The Real BioDiversity Crisis, American Scientist, January-February 2002

[2] Oreskes, Naomi, Beyond the Ivory Tower: The Scientific Consensus on Climate Change, Science 3 December 2004: Vol. 306. no. 5702, p. 1686

[3] Intergovernmental Panel on Climate Change Fourth Assessment Report, Climate Change 2007: The Physical Science Basis, Summary for Policy Makers, February 2007. With input from 2,500 of the world's leading scientists, economists and risk experts, is the most comprehensive evaluation of climate change. http://www.ipcc.ch/SPM2feb07.pdf

Also see Union of Concerned Scientists, Global Warming FAQs www.ucsusa.org/global_warming/science/global-warming-faq.html

[4] Gore, Al, Transcript: Finding Solutions to the Climate Crisis, New York University School of Law, September 18, 2006

[5] Stern Review: The Economics of Climate Change, Executive Summary, p. vi, October 30, 2006.

[6] David Suzuki Foundation, Climate Change: Impacts and Solutions http://www.davidsuzuki.org/Climate_Change/Science/

Contents

Appendices 35-47

Why this Toolkit?

Individuals and groups across Wisconsin are calling upon local governments to enact policies and take actions that are aligned with the principles and concepts of sustainability. Several communities and a county in Wisconsin have recently shown leadership by adopting resolutions stating their intent to follow well-accepted principles and concepts of sustainability. They are becoming "eco-municipalities" or "green communities" or "sustainable communities."

"Just suppose, for a minute, that all the departments, boards and agencies of a city or town, and all the sectors of the larger community have a common vision about a sustainable community future and a shared understanding of a new set of playing rules for how to get there."

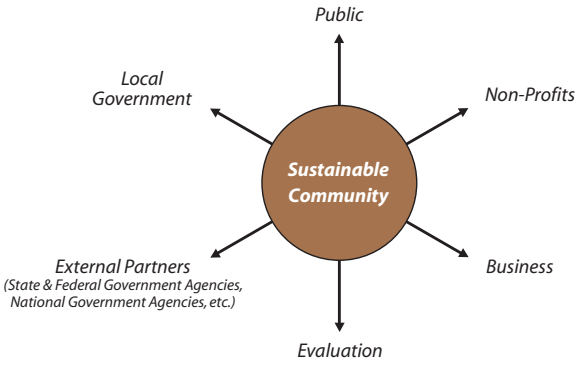
– "The Natural Step for Communities: How Cities and Towns Can Change to Sustainable Practices," by Sarah James and Torbjörn Lahti

The purpose of this toolkit is to provide ideas and descriptions of specific actions that a local government can take to transform itself into a model of sustainable practices. These practices can result in cost savings and increased employment, and enhance environmental quality and community well-being. The message of this toolkit is simple: local governments can lead by example.

The focus of this toolkit is narrow, by design, and intended to address only the internal workings of local government. Specifically, it addresses sustainable approaches to energy, building, transportation, purchasing, investment, and hiring. It provides practical tools for making these functions of local government more supportive of long-term human and environmental health and well-being. It provides strategies that can be implemented through traditional means of policy development, fiscal administration, local government programs, and education. Other important areas where government can lead by example and that should be included in local sustainability programs but that are not included in this toolkit include storm water and drinking water, integrated waste management, and natural resource management. In addition, this guide does not address comprehensive planning, food systems, parks and open space, and many of the other areas that local governments address in their daily work. Future guides are planned to address those issues.

The various local government functions and strategies listed in this guide are intended to be viewed and implemented as part of a whole system approach to sustainability. If they are approached and implemented in a piecemeal manner, the objective of sustainability will be more difficult to achieve.

Finally, a significant dimension to building sustainable communities is the process of engaging the entire community. While it is not specifically addressed by this toolkit, it should be incorporated into any sustainable community program design.



What is Sustainable Development?

The "Brundtland Report" definition of sustainable development – shown below – has been the most commonly used or cited definition since 1987 when the world community gathered to address this critical issue. Sustainability acknowledges the biophysical or environmental limits that the natural world imposes on economic activity and social and political institutions.

Recently, emphasis has shifted to the *science of sustainability* and a focus on the core principles of ecological limits. Regardless of the definition or approach, there is a shared sense that sustainable development explicitly recognizes the interconnections and relationships between the economy,

"Sustainable development is...development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

– World Commission on Environment and Development, Our Common Future, 1987

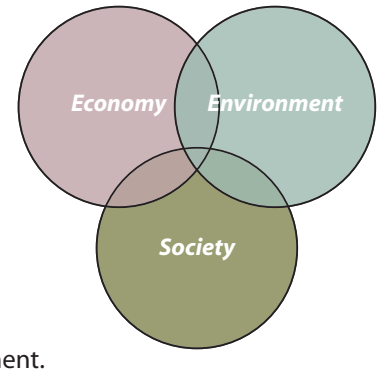
Photos by (from left): S. Gruder, L. MacKinnon, 1000 Friends of Wisconsin

society, and the environment. These are often seen as three types of capital – economic, social, and natural.

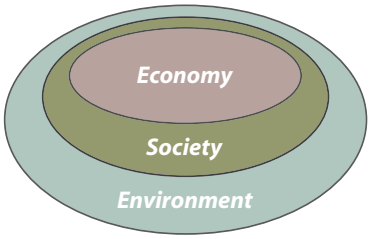
When sustainable development has been represented as three interconnected types of capital, the emphasis is on the linkages between the economy, society, and the environment.

But when a systems view is used, the emphasis shifts specifically to the ecological limits imposed on the economy and society. In this case, a concentric circles diagram is used to model sustainability and sustainable development. Here, the economy and society function within a larger environmental system, or biosphere, and are limited by the carrying capacity of the natural environment.

The Linkages View of Sustainable Development



The Systems View of Sustainable Development



This concept of sustainability speaks to the need for consideration of all forms of capital in community decision making but places prime importance on the services of natural capital that are essential to all life on this planet.

The Natural Step Approach

This toolkit presents the principles of "The Natural Step" as a sustainability framework, both because it works and because it has been adopted by a growing number of Wisconsin local governments. It provides a shared framework around which they and other communities are developing and implementing sustainable practices. But which framework a local government adopts – and there are others available – is less important than the act of adopting one. Such a step is a key part of the process of moving toward sustainability.

S. Gruder photo

Karl-Henrik Robèrt, founder of The Natural Step.

The Natural Step (TNS) sustainability framework and process originated in Sweden in 1983.[7] The first Swedish eco-municipality, Övertorneå, was a pilot project that used this framework in a northern rural town of 5,000. Success in Övertorneå sparked what today is a network of 70 eco-municipalities across Sweden. These eco-municipalities represent over a quarter of the country's municipalities, ranging from villages of 300-400 residents to the capital city of Stockholm with a population of over 700,000. Many communities around the world are now exploring and implementing this model and a number of Wisconsin's communities are among the first in the United States to do so.

Five local governments in northern Wisconsin – the Cities of Washburn and Ashland in 2005 and the City of Bayfield, Town of Bayfield and Douglas County in 2006 – adopted resolutions stating their intention to become eco-municipalities based on this model. The City of Madison launched a sustainable city program in 2004 and passed a resolution adopting The Natural Step as its guiding sustainability principle in 2005. Madison city staff from all twenty- five departments were then formally trained in The Natural Step framework in 2006. Also in 2006, the Village of Johnson Creek in

The Natural Step's Four System Conditions for a Sustainable Society

In the sustainable society, nature is not subject to systematically increasing . . .

- concentrations of substances extracted from the Earth's crust;
- concentrations of substances produced by society;
- degradation by physical means;

and, in that society,

- people are not subject to conditions that systematically undermine their capacity to meet their needs.

Source: The Natural Step

Jefferson County passed a resolution adopting the The Natural Step sustainability principles.

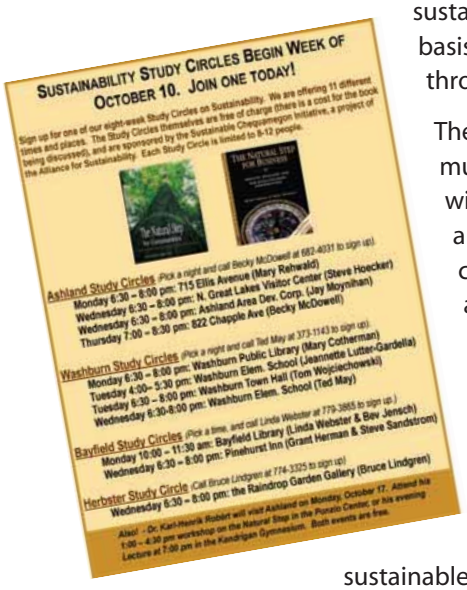
What is an eco-municipality? It is a city, town, or region that aspires to develop an ecologically, economically, and socially healthy community for the long term, using The Natural Step or other framework for sustainability[8] as a guide, and a democratic, highly participative development and decision-making process as the method.

M. Rehwald photo

Sarah James and Torbjörn Lahti conducting a seminar on the eco-municipality model for Wisconsin communities.

The Natural Step takes a "systems approach" to creating sustainability. It is based, in large part, on laws of nature. Embedding the non-negotiable laws of nature in business, government, institutions, and the way we operate as a society is an identified route toward sustainability. In order to be sustainable over the long term, laws and policies developed by humans must cooperate with, mimic, or be consistent with the laws of nature. The Natural Step is a key international example of a science-based sustainability initiative.

According to the authors of *The Natural Step for Communities: How Cities and Towns Can Change to Sustainable Practices,* Sarah James and Torbjörn Lahti, "Many communities in the United States and around the world have initiated and are carrying out sustainable development projects. Green building programs, affordable housing, open space preservation, recycling, climate change initiatives, smart growth initiatives, are just a few of these. While these initiatives have made progress toward sustainable goals, they largely are occurring on a project-by-project or issue-oriented basis. Frequently these efforts, as laudable as they are, are unconnected and unintegrated throughout municipal governments and the larger communities."



SUSTAINABILITY STUDY CIRCLES BEGIN WEEK OF OCTOBER 10. JOIN ONE TODAY!

Sign up for one of our eight-week Study Circles on Sustainability. We are offering 11 different times and places. The Study Circles themselves are free of charge there is a cost for the book being discussed), and are sponsored by the Sustainable Chequamegon Initiative, a project of the Alliance for Sustainability. Each Study Circle is limited to 8-12 people.

Ashland Study Circles (Pick a night and call Becky McDowell at 682-4031 to sign up).
Monday 6:30 – 8:00 pm: 715 Ellis Avenue (Mary Rehwald)
Wednesday 6:30 – 8:00 pm: N. Great Lakes Visitor Center (Steve Hoecker)
Wednesday 6:30 – 8:00 pm: Ashland Area Dev. Corp. (Jay Moynihan)
Thursday 7:00 – 8:30 pm: 822 Chapple Ave (Becky McDowell)

Washburn Study Circles (Pick a night and call Ted May at 373-1143 to sign up).
Monday 6:30 – 8:00 pm: Washburn Public Library (Mary Cotherman)
Tuesday 4:00– 5:30 pm: Washburn Town Hall (Tom Wojciechowski)
Tuesday 6:30 – 8:00 pm: Washburn Elem. School (Jeannette Lutter-Gardella)
Wednesday 6:30-8:00 pm: Washburn Elem. School (Ted May)

Bayfield Study Circles (Pick a time, and call Linda Webster at 779-3865 to sign up.)
Monday 10:00 – 11:30 am: Bayfield Library (Linda Webster & Bev Jensch)
Wednesday 6:30 – 8:00 pm: Pinehurst Inn (Grant Herman & Steve Sandstrom)

Herbster Study Circle (Call Bruce Lindgren at 774-3325 to sign up)
Wednesday 6:30 – 8:00 pm: the Raindrop Garden Gallery (Bruce Lindgren)

Also! - Dr. Karl-Henrik Robèrt will visit Ashland on Monday, October 17. Attend his 1:00 – 4:30 pm workshop on the Natural Step in the Purpin Center, or his evening Lecture at 7:00 pm in the Kandrigan Gymnasium. Both events are free.

They go on to say, "In contrast to this 'silo approach' to sustainable development, the eco-municipality model uses a *systems approach.* Key ingredients of this systems approach are widespread community awareness-raising and integrated municipal involvement, using a common "sustainability language" based upon the Natural Step framework. Using this common language brings about a shared understanding of what sustainability means and how to achieve it throughout all sectors of municipal government and the wider community. The likelihood of conflict and competition among resulting actions is therefore minimized, since all sectors are using the same 'sustainability playing rules.' "[9]

How to Move Toward Sustainability

There are a number of fundamental steps a municipality can take to initiate a sustainable community program although there is no single route. Local governments can provide leadership to organize the process through municipal channels; or, this can occur through community involvement and grassroots efforts (see Appendix 2, Sustainable Chequamegon Initiative) ; or, it can evolve through both top-down and bottom-up approaches (see Appendix 3, Fano Guidelines). Ten basic steps to consider are outlined below.

1. **Convene a task force**/committee/study group/green team (see Appendix 4, Marshfield Mayor's letter to prospective eco-municipality committee members).
   - Purpose: develop recommendations with regard to sustainable community development for consideration by elected officials.
   - Group make-up: include wide representation of various businesses, utilities, architecture, engineering, energy experts, watershed experts, farmers, local environmental non-profits, city departments, local officials, local residents,

community social agencies, schools, faith-based groups, university, two-year campus or technical colleges.

- Process: Assess the current situation – identify existing green initiatives; identify key areas and opportunities; identify gaps and barriers; develop a vision statement and key goals; recommend actions based on goals.

2. **Commit to becoming a sustainable community through a formal resolution** (see Appendix 5, A through F, for local community resolutions)

3. **Adopt a guiding principle or framework for sustainability.** This guide presents the principles of The Natural Step as a sustainability framework because it works as both a process and as a measure of what constitutes sustainability based on the fundamental laws of science. It has been adopted by a number of Wisconsin local governments, the American Planning Association, and communities around the world, including many Canadian cities.[10] But there are other examples, as well, and communities across the country have developed their own frameworks and have excellent web sites where it is possible to review their work.

   The applicability of The Natural Step to local planning and sustainable development efforts has been recognized by the American Planning Association (APA). In its *Planning for Sustainability Policy Guide,* the guiding objectives for policies and practices are based on The Natural Step's "four system conditions for a sustainable society" (see Appendix 1, Benefits of Using the Natural Step Sustainability Framework to Guide Implementation of Madison's Sustainable City Goals).

M. Rehwald photo

Washburn City Council discussing eco-municipalities and The Natural Step framework.

4. **Establish a standing committee** or advisory board to oversee implementation of the sustainable community program and to further develop a strategic sustainable community plan. Consider a committee of 12-15 members with varying length terms and strengths that complement the implementation plan.

5. **Establish a department, reconfigure existing departments, or appoint or hire a director of sustainable development.** The purpose of this "office of sustainable development" is to implement the strategic sustainability plan, leverage investments wisely, and coordinate the program across departments. Include a staff representative from each department to be the green liaison or point person. Note: Sustainability is necessarily a holistic approach and therefore negates the traditional silo approach of government.

Objectives of APA's Strategy for Planning for Sustainability

Planning for sustainability requires a systematic, integrated approach that brings together environmental, economic and social goals and actions directed toward the following four objectives:

- Reduce dependence upon fossil fuels, extracted underground metals and minerals.
- Reduce dependence on chemicals and other manufactured substances that can accumulate in Nature.
- Reduce dependence on activities that harm life-sustaining ecosystems.
- Meet the hierarchy of present and future human needs fairly and efficiently.

Source: American Planning Association's Planning for Sustainability Policy Guide, 2000. http://www.planning.org/policyguides/sustainability.htm

6. **Educate and train staff and officials across departments about sustainability.** This is important for creating organizational capacity to lead by example and move toward sustainability. Education is also key to integrating sustainability effectively into the government culture.

    - The City of Madison has undertaken this step. Madison trained personnel across 25 departments in The Natural Step to develop a common language and integrated approach to sustainability citywide. As a result of the training and continuing application of lessons learned by interdepartmental teams, staff will be able to make decisions based on sustainability impacts, evaluate existing programs, policies and practices as to whether they meet the systems conditions for sustainability, develop short- and long-term action plans to achieve sustainability, and prioritize and initiate new projects and policies based on the city's sustainability goals (see Appendix 6, Madison Mayor's Memo.).

7. **Establish demonstrations.** Either move various existing initiatives into examples of sustainability or initiate new projects that showcase sustainability principles. This provides staff with experience using sustainable planning, decision making and green practices, allows leadership to show progress and success, and provides the private and public sector local models and successes to learn from and emulate.

8. **Adopt Full Cost Accounting.** Full Cost Accounting, or "FCA", is the analysis of all the costs, as well as the advantages, of all proposed alternatives, and the presentation of those findings to decision makers. In FCA, "cost" is not just the monetary cost to the organization making decisions. It also includes the social and environmental costs to anyone else affected by the decision. This process can be especially useful for government agencies that represent a variety of interests when deciding how to allocate public funds and/or other resources. Organizations that use FCA have experienced budget savings.

    Performing an FCA helps avoid "externalizing" a cost. In economics an externality is a cost "side-effect". In the context of local government decision making, a decision that may not create a direct cost for the decision maker or her department or program can often create negative costs for somebody else's department or program, and that will ultimately cost the community as a whole.

    FCA can be applied across the broad range of decisions made every day by local governments. For example, in purchasing fleet vehicles a local government can use FCA to help choose between different options. One of the vehicle options might have the lowest "purchase price" but, from a lifecycle perspective, the local government will need to determine whether it's *really* the "less expensive vehicle" if it uses more fuel and releases more toxins and carbon dioxide. The public health and quality-of-life costs affected by

S. Gruder photo

Our future generation.

that decision are not truly external to local government. FCA will help you determine the costs of those "cheaper" vehicles' "side effects" to your the community, residents and others affected by the decision.

Another example would be using FCA on a community's solid waste operations. In this case, the community would need to go beyond a simple analysis of the capital and operating costs of a facility. FCA would include:

- Front-end costs of engineering and site planning
- Direct and indirect daily operating costs:
  - *Direct cost* – costs of specific services, salaries, parts, interest on debt
  - *Indirect cost* – costs of support from general government services such as purchasing, administration, legal, fleet maintenance
- Back- end costs such as closing a facility at the end of its useful life, post-closure care and monitoring

9. **Measure, track, record, and report progress and results.** What gets measured gets accomplished. Local governments can demonstrate leadership by assessing and continuously improving their contribution to a sustainable community. Sustainability indicators typically are tied to the sustainable community goals and measure progress toward meeting each of the goals. There are many examples of community sustainability indicators.[11] Minneapolis, Minnesota, for example, created a sustainable city plan in 2003 with 24 indicators ranging from water quality to public health.[12] The process of developing indicators can bring different sectors of the community together. "Indicators reveal the common goals and shared values that foster alliances across traditional boundaries, provide citizens with a better compass for understanding community problems and maximizing regional assets, and compel change toward progress" according to Redefining Progress in the *Community Indicators Handbook,* 2nd Edition, a best practices resource.[13]

10. **Publicize.** Communicate the efforts and results to staff, local officials, and to the private, public, and non-profit sectors.

The goal of this toolkit is to provide towns, cities, villages, counties and regions with specific actions to take to preserve options for future generations and for enhancing quality of life and securing the health of people, the economy, and the environment now and for the future. As local governments move forward with a process, whether using the ten steps outlined above or some others, consider working with county University of Wisconsin-Extension community development and natural resource educators to help move toward a sustainable community.

The next sections of this guide discuss the purpose, strategy and actions of specific areas within local government. Within each section are one or two case studies as well as a list of specific resources.

Santa Monica, California (http://santa-monica.org/epd/) developed a Goal/Indicator Matrix that not only measures progress for each goal but demonstrates linkages between the areas. As a result, on the ten-year anniversary of their sustainable city program, Santa Monica was able to report their successes to the public.

This included reducing dry weather pollution to the Bay by 95%; first U.S. city to buy 100% renewable electricity and cut greenhouse gas emissions by 6%; toxic-free parks and public buildings; water savings of over 328,500,000 gallons per year; established a Blue Line (voted best bus line in the country) and is now a leader in clean air technology; a growing group of sustainable business leaders helping the local economy, environment, and quality of life.

[7] James, Sarah and Torbjörn Lahti, 2004, The Natural Step for Communities: How cities Cities and Towns Can Change to Sustainable Practices, New Society Publishers, British Columbia, Canada.

[8] For more about the Natural Step, go to www.naturalstep.org.

[9] James, Sarah and Torbjörn Lahti, "The Eco-Municipality Model for Sustainable Community Change: A Systems Approach to Creating Sustainable Communities," 277 pages, May 2005.

[10] The Natural Step Canada, www.naturalstep.ca

[11] Sustainable Measures: Communities That Are Working on Indicators. www.sustainablemeasures.com/Resources/Communities.html

[12] www.ci.minneapolis.mn.us/environment/Sustainability-Initiatives.asp

[13] Community Indicators Handbook, 2nd Edition, 2006; www.redefiningprogress.org/cihb/index.shtml

Purpose

Currently, the energy sources upon which we largely depend – coal, natural gas and oil – have many negative impacts on all three forms of capital: social, economic, and natural. Air pollution and greenhouse gas emissions, primarily from power plants, cars, and buildings, cause respiratory diseases and drive climate change, which in turn adversely affects economic productivity and environmental health (Hurricane Katrina's destruction of New Orleans is but one example).[14] Further, the instability of oil and gas markets and declining availability of oil have high costs for local governments and their constituents.

"The Stone Age did not end for lack of stone, and the Oil Age will end long before the world runs out of oil."

– Sheikh Zaki Yamani, ex-Minister of Energy, Saudi Arabia, 1999

The most cost-effective way to reduce these negative impacts is to increase energy efficiency – that is, squeezing more productivity out of the energy we use, which enables us to use less of it. By consuming less energy, we reduce the need for energy production in the first place and realize immediate savings. Coupling that with using clean energy from locally available renewable sources including solar, wind, biogas, and biomass will bring Wisconsin closer to energy independence and economic sustainability.

Local governments' facilities and operations use significant amounts of energy. Due to their relatively large power and fuel purchases, as well as involvement in smart growth and economic development plans, there are many opportunities for promoting clean energy initiatives. Using green approaches to planning, designing and operating buildings, developments and transportation can accommodate growing populations and economies while reducing dependence on external energy sources. This promotes resource efficiency and provides meaningful savings to taxpayers and improvements in the health of local communities.

Benefits of Renewable Energy:

- Stabilizes energy costs for a community, its businesses and residents
- Grows employment opportunities
- Keeps dollars in the local economy
- Preserves a community's quality of life, air, water and land
- Reduces reliance on foreign and polluting sources of energy

Energy sustainability is about finding alternative ways of structuring the energy sector, and alternatives to our fossil-fuel based economy. Its goal is to provide plentiful, reasonably priced energy to all sectors of society safely and to support the health of our economy, people and environment without limiting the ability of future generations to meet their energy needs. Energy savings and the adoption of renewable forms of energy are key approaches to achieving this.

Strategy

Leading by example, local governments can green their own facilities and operations, influence the private sector, and work with local groups to educate, empower and challenge their local residents. They can help inspire change and drive innovation.

Public officials can:

- Adopt policies that set targets for renewable energy purchase and installation and energy efficiency goals for government facilities, operations and transportation;
- Influence local building codes, specifications and standards to promote renewables purchase and installation, energy efficiency and green design;
- Initiate a multi-departmental sustainable energy effort in the context of broader sustainable development goals (e.g., smart growth, clean energy initiatives, transportation policies, community health and infrastructure development);
- Reduce fossil fuel use in public transit, purchase electric vehicles and hybrids, use biodiesel and ethanol, establish minimum fuel efficiency standards;
- Develop the urban core for residential living in addition to office and retail;
- Provide incentives and guidelines for the private sector to power and drive green;
- Assess, monitor and report the effectiveness of clean energy strategies and projects including benefits, achievements and savings to share with local businesses and taxpayers;
- Educate city staff, developers and the community about energy efficiency and renewable energy.

U.S. buildings alone are responsible for more CO_2 emissions than those of any entire country in the world except China.

– Kinzey et al., The Federal Buildings Research and Development Program: A Sharp Tool for Climate Policy, 2002 ACEEE proceedings, Section 9.21.

All photos by S. Gruder

Solar hot water heat on low-income housing.

Solar electric awning on Memorial High School, Madison, Wisconsin.

Microturbines at the Sauk County, Wisconsin, landfill.

Solar parking canopy, City of Madison, Wisconsin, and Madison Gas and Electric.

Actions

Local government can lead by example by establishing renewable energy and energy efficiency policies and goals, and an implementation plan to achieve them. The steps should include the following:

1. Pass a resolution that the local government will save, power, transport and build green. Consider adopting the Kyoto Protocol by signing on to the Mayors' Climate Protection Agreement;[15]
2. Form an integrated clean energy team as partners to implement the clean energy program, including the local government, local utility and fuel providers, businesses, non-profits and farmers. This team can help to develop, stimulate, promote and attract local green energy initiatives and businesses as an economic development opportunity;
3. Create and adopt sustainable energy principles, plans, and incentives including a measurable goal such as 10% energy reduction in city operations by 2010 with a certain percentage of the savings staying with the departments that achieved them;
4. Adopt the U.S. Green Building Council's LEED Green Building Rating System – Leadership in Energy and Environmental Design – for Existing Buildings (EB) as a performance standard to upgrade and operate city buildings to higher efficiency;
5. Require that new homes meet ENERGY STAR[16] homes standards, and encourage use of Wisconsin Green Built Home or the LEED for Homes programs;
6. Allocate staff time for training and an adequate budget for energy analysis and upgrades;
7. Make renewable energy use and efficiency part of standard procedures. Modify requests for proposals, specification and contract language to ensure sustainable energy policies and procedures are an integral part of each project. Modify building and vehicle codes and standards;
8. Adopt purchasing policies for ENERGY STAR[17] equipment and computers;
9. Build bike trails and lanes and provide bike racks;
10. Develop a few demonstration renewable energy projects as models, e.g., a renewable energy commercial center, housing project, school or vehicle fleet;
11. Document energy use and respective savings and monitor performance over time.

Green Building Saves Energy and Money. The energy savings from green building result primarily from reduced electricity purchases and from reduced peak demand.

"On average, green buildings are 28% more efficient than conventional buildings and generate 2% of their power on-site from photovoltaics (PV). The financial benefits of 30% reduced consumption at an electricity price of $0.08/kWh are about $0.30/ft2/yr, with a 20-year NPV of over $5/ft2, equal to or more than the average additional cost associated with building green."

Source: Kats, Gregory H., Green Building Costs and Financial Benefits, 2003, developed for the Massachusetts Technology Collaborative. http://www.cap-e.com/ewebeditpro/items/059F3481.pdf

Case Study

Madison, Wisconsin Green Framework

Madison adopted a comprehensive green framework, much of which has energy impacts: Build Green/Power Green/Save Green/Buy Green/Drive Green/Manage Green. Within this framework, green building has been a central focus because of its potential for enhancing energy conservation and efficiency (see Green Building chapter). Madison set a goal of purchasing 10% of its annual electricity from renewable sources by 2007 and 20% by 2010 in keeping with the state targets. The city is also planning a Solar Mile along a main thoroughfare to highlight its commitment to renewable energy.

Solar panel installation.

Kay Schindle photo

City of Madison fire station solar thermal panel installation.

Madison hired an energy engineer to measure city building energy use and to assess city properties for their solar energy suitability. In order for the engineer to establish city baseline energy use and to track energy savings, the city purchased energy software. The energy engineer attended the solar site assessor training provided by The Midwest Renewable Energy Association. Additionally, the city received technical assistance, funding, and incentives from Focus on Energy, Madison Gas & Electric (MGE) (its main utility), Wisconsin Energy Conservation Corporation (WECC), MSB Energy Associates, UW-Extension and U.S. Department of Energy's Million Solar Roofs Program. The city also trained its facilities operations and engineering staff in commissioning and retro-commissioning, building in-house expertise to evaluate space use, identify sub-optimal lighting and HVAC performance, and to upgrade systems.

Energy efficiency projects: installing meters and measuring energy use in all city buildings, increasing roof insulation and retrofitting lighting with high efficiency lamps in two buildings being repaired; commissioning a new engineering building to optimize mechanical system operations; continued retro-commissioning of existing facilities; and developing lighting, heating and ventilation standards for city facilities and targeted upgrade projects. Energy trainings will be conducted with 35 staff across city departments. Five new hybrid buses will be purchased by Madison Metro, fuel-efficient fleet cars are being purchased, and a fuel-efficiency standard for city vehicles developed. Purchasing specifications for ENERGY STAR computer equipment are being developed and a power management software evaluation is underway monitoring the power usage of 100 city PC users to reduce power consumption of non-critical computers.


Implementation

- Mayor funds green initiatives in capital budget
- Mayor promotes program via press conference, TV City Channel appearances, etc.
- Mayor appoints smaller Sustainable Design & Energy Commission for implementation

The Capital Times

Mayor wants city to be bright green

Renewable energy initiatives include: analyzing all city fire stations, libraries and field operations for suitability for solar energy; installing solar hot water heat or solar thermal panels on two fire stations and the Monona Terrace Convention Center; incorporating solar thermal into the design of a parks maintenance facility; teaming with MGE to identify and install visible renewables installations; and including renewables in the Mayor's capital budget. A solar canopy at the city pool, a wind turbine on a public golf course and photovoltaic panels and educational energy monitoring computers at a library are being considered for joint MGE projects. Capital budget funding was secured for outfitting eight other fire stations with solar thermal heating in 2007.

Resources

Focus on Energy:

- Energy efficiency for government facilities: For program information and assistance, call 1-800-762-7077 or e-mail at Govinfo@focusonenergy.com

- Renewable energy information and incentives: a detailed web site including fact sheets, case studies, resources and contractors. Also includes technical assistance, site assessments and cash incentives for installations and feasibility studies. *www.focusonenergy.com/page.jsp?pageId=130*

The Center for Renewable Energy and Sustainable Technology (CREST) publishes an extensive listing of reports on renewable energy, including state-by-state economic impacts, as well as development and policy manuals.
www.crest.org

CREST has a report that supports the argument for renewable energy in Wisconsin called Component Manufacturing: Wisconsin's Future in the Renewable Energy Industry, which is available at:
www.crest.org/articles/static/1/binaries/Wisconsin%20Report_Short_2.pdf

Community Energy Opportunity Finder is an interactive tool that will help determine a community's best bets for energy solutions that benefit the local economy, the community, and the environment. The Finder helps a community collect information on its energy use, and then demonstrates the potential energy savings; dollar savings; reductions in carbon dioxide, nitrogen oxides, and sulfur dioxide emissions; and job creation from energy efficiency programs. Developed by Rocky Mountain Institute.
www.energyfinder.org/

Database of State Incentives for Renewable Energy (DSIRE) provides an exhaustive listing of active incentives for renewable energy at every governmental level.
www.dsireusa.org

Energy Center of Wisconsin is a non-profit that serves Wisconsin by providing information and education on energy efficiency.
www.ecw.org

Green-E Renewable Electricity Program is a certified green power provider.
www.green-e.org

ICLEI Local Governments for Sustainability is an association of local governments that have made a commitment to sustainable development. ICLEI provides technical consulting, training, and information services to build capacity, share knowledge, and support local government in the implementation of sustainable development at the local level.
www.iclei.org

Midwest Renewable Energy Association is an extensive resource for renewable energy and energy efficiency in central Wisconsin. They have a Renew
the Earth Institute that showcases renewable energy and holds classes, as well as
the largest sustainable living and renewable energy fair in the country held
annually each June.
www.the-mrea.org

Midwest Rural Energy Council has information and educational tools about renewable energy and efficiency in rural areas.
www.mrec.org/index.htm

RENEW Wisconsin provides detailed information on renewable energy legislative initiatives, utility initiatives, installation case studies, and related information via web site newsletter and issue briefs, and provides project facilitation and educational presentations. This network promotes clean energy strategies – conservation and energy efficiency, renewable energy, and low-emission distributed generation – for powering the state's economy in an environmentally sound manner.
www.renewwisconsin.org

Wisconsin Energy Conservation Corporation (WECC) is a not-for-profit organization that administers energy programs and provides policy analysis to a broad range of customers. For more than 25 years, WECC has worked to provide high-quality, affordable opportunities to increase energy efficiency, lower utility bills, aid in reducing the environmental impacts of energy use and promote economic development in communities.
www.wecc.usa.org

[14] Spreading the Word on Global Warming, ABC News Video on Demand http://abcnews.go.com/Video/playerIndex?id=1774402

[15] "U.S. Mayors' Climate Protection Agreement ", Cities Working Together to Protect Our Air Quality, Health and Environment: A Call to Action. Wisconsin Mayors Friedrich P. Schnook, Ashland; Michael J. Neitzke, Greenfield; John D. Medinger, La Crosse; Dave Cieslewicz, Madison; Irene Blakely, Washburn; Theresa M. Estness, Wauwatosa; Tom Barrett, Milwaukee; Jack F. Chiovatero, New Berlin; Gary Becker, Racine; Don Richards, River Falls; Gary Wescott, Stevens Point; and Jeannette Bell, West Allis, signed the agreement along with mayors in 50 other U.S. states.

[16] Home Performance with ENERGY STAR, a program through Wisconsin Focus on Energy, includes site assessments and cash back rewards for eligible customers. See www.focusonenergy.com or call 1.800.762.7077

[17] EPA's ENERGY STAR products and programs, http://www.energystar.gov/

Why Build Green?

There are over 76 million residential buildings and nearly 5 million commercial buildings in the U.S., which cost over $240 billion a year to operate. They account for:

- 36% of total energy use (65% of electricity consumption)
- 30% of greenhouse gas emissions
- 30% of raw materials use
- 30% of waste output (136 million tons annually)
- 12% of potable water consumption

By 2010, another 38 million buildings will have been constructed.

Purpose

Green Building, or sustainable design, is an approach to building design, construction and operation that considers the building, its property, and place in the community as a whole system to create economical, environmentally sound and healthy spaces in which to live and work. Green buildings are designed to reduce environmental impacts on the site, and on water, energy and resource use while creating healthy indoor environments.

Local governments build, own and operate a wide variety of buildings and facilities including offices, jails, park shelters, libraries, police and fie stations, maintenance buildings, airports and water treatment plants. Local governments also develop land use plans. There are green approaches to planning, designing and operating buildings and developments to accommodate growing populations that will help promote resource efficiency, provide meaningful savings to taxpayers and improve the health of local communities.

The government sector is a significant driver of green building. The U.S. Green Building Council (USGBC), a national non-profit organization that created the LEED (Leadership in Energy and Environmental Design) Green Building Rating System, a third party certification program, has created a market transformation to green building. Although the government sector is a relatively small part of the USGBC membership compared with the design and construction industry, government buildings comprise 45% of the 774 million square feet of LEED green building projects. Ninety local governments across the U.S. have green building policies, three quarters of which adopted the LEED Green Building Rating System. Additionally, 16 states have green building policies as does the federal government.

The benefits of green building to a local government are:

- Decreased costs for building operation and maintenance;
- Decreased costs for community infrastructure (roads, sewer, waste water treatment, energy generation, and landfills);
- Increased productivity;
- Reduced electrical peak demand costs and fossil fuel use;
- Reduced water use;
- Reduced water and air pollution; and
- Enhanced competitiveness by spurring private sector work and living environments with superior health and comfort.

M. Rehwald photo

An increasing number of local builders and organizations in Wisconsin are providing green building and energy services.

Strategy

Local government can lead by example by greening its own facilities and operations, influencing the private sector, and working with local groups to educate, empower and challenge the local citizens.

Public officials can:

- Adopt sustainability principles and green building policies for their own facilities;
- Influence local building codes, specifications and standards to promote green design and construction;
- Provide incentives and guidelines for the private sector to build green;
- Assess and monitor the effectiveness of green strategies and projects; and
- Educate city staff, developers and the community about green building.

"The U.S. Green Building Council has over 60 chapters in 30 countries, including the Wisconsin Green Building Alliance (www.wgba.org) and a membership of more than 7,000 organizations that are creating a market transformation to green building. LEED green building projects cover over half a billion square feet of space or 5% of the commercial marketplace and are located in every state of the U.S." (as of October 2006), US GBC

All photos by S. Gruder

Green building team for the Dane County, Wisconsin, Justice Center.

Sustainable development workshop city/private sector training.

Solar site assessment by Focus on Energy for Monona Terrace LEED-EB project, Madison, Wisconsin.

Actions

Local government can lead by example by establishing green building policies and goals and creating a framework to implement them. The steps to take include:

1. Support commitments from local government to build smart. Adopt a green building resolution in the context of broader sustainable development goals (smart growth, community health, infrastructure development, energy initiatives, transportation policies, etc.).
2. Form a multi-departmental green building team – a working group of personnel: parks, public works, water utility, public health, comptroller's office, and purchasing to assist with aspects of green building. Also, consider initiating an advisory group of staff and outside experts such as: private developers, builders, architects, engineers, utilities, non-profits, haulers, renewable energy providers, and motivated residents.
3. Develop an action plan with long- and short short-term actions to green municipal building stock.
4. Create and adopt sustainable building design principles. These can be voluntary and/or mandatory, varying by sector. For example, mandatory LEED certification for city buildings, phased in for private projects receiving TIF funds and for affordable housing. More than forty municipalities have adopted the LEED Green Building Rating System for municipal buildings, additions, renovations and existing buildings.[18]
5. Allocate staff time for green building training and budget for it. Staff include department managers (decision makers), architects, engineers, code officials, facility managers, and landscape/grounds personnel.
6. Make green building part of standard procedures. Modify requests for proposals, specification and contract language to ensure sustainable building policies and procedures are an integral part of each project. Modify building codes and standards.
7. Pilot green building projects as models, e.g., certify a few new buildings and an existing building using the LEED Green Building Rating System
8. Create incentives for building owners and developers to design and build green such as green building commercial and residential tax credits, faster project approval times, density bonuses, reduced storm water fees, etc.
9. Document government building energy, water use, and landfilling and respective savings and monitor performance over time. Use quantification to document benefits, achievements and savings to relate to local businesses and taxpayers.

Three primary challenges to building green are perceptions about budget (first or initial cost), experience of the design/build team, and time. Studies have shown that the cost of designing and building LEED silver and gold buildings is the same or within 2% of traditional buildings. The State of California commissioned the first rigorous assessment of the costs and benefits of green buildings.[19] The report analyzes not only up-front costs but attempts to quantify the environmental and human health benefits of green buildings in financial terms. According to this study, minimal increases in up-front costs in the range of 0-2% will result in life cycle savings of 20% of total construction costs or more than 10 times the initial investment. The operational savings alone over the life of the building return its initial cost many times over. If the cost of personnel is factored in, a mere 1% increase in productivity can cover the energy costs of the building in just one year according to the Rocky Mountain Institute. Yet, governments typically don't consider life cycle costs and they separate capital from operating budgets.

As for the other two challenges, experience of the design team and project timeline, these can be addressed from the outset by indicating in requests for qualifications and proposals the local government's intent to design and construct a LEED certified building. Require teams to submit qualifications to accomplish that. The Wisconsin Green Building Alliance lists professional members involved with green building to target for solicitation. As there is a learning curve with using an integrated design approach and green building, and added time needed for deconstruction rather than demolition of existing buildings, project timelines should be designed to accommodate this.

Case Studies

Madison Green Building Program and Demonstration Projects

In Madison, LEED was adopted for all new and existing city buildings with plans to require it in the future for private sector projects receiving TIF funding. This was adopted as part of the city's *Building a Green Capital City: A Blueprint for Madison's Sustainable Design and Energy Future:*

http://webapp.cityofmadison.com/sustainable_design/index.html

A Sustainable Design and Energy Committee was appointed by Madison's mayor and the city council with diverse representation and partnership to advise municipal officials, administration and staff on implementing green building, energy conservation and renewable energy initiatives as part of a sustainable city program. Members are key stakeholders including: municipal officials, developers, the design and construction industry, utilities, energy conservation and renewable energy providers, Focus on Energy, financial institutions, local community groups and state agencies.

S. Gruder photo

Green roof on City of Madison, Wisconsin, engineering building.

Three pilot building projects are being certified to LEED: Monona Terrace Convention Center as a LEED for Existing Buildings project, the parks maintenance building as a LEED for New Construction, and a library as a LEED for Commercial Interiors project. Green operations policies developed for the Monona Terrace Convention Center are being used as templates for city-wide application, including those for green cleaning and green purchasing, and as templates for other buildings that will be certified under the LEED-EB program. Existing building stock is being evaluated and ranked as to which will go for LEED-EB certification. Madison's mayor also supports private sector LEED projects by appearing at press events for green building openings.

City staff, including engineers, architects, facilities and operations managers, purchasing agents and building inspectors, were trained in commissioning (Cx) and retro-commissioning (Rx). Cx and Rx are baseline requirements of LEED. Commissioning (for new buildings) and retro-commissioning (for existing buildings) are systematic methods of identifying operational and maintenance improvements for buildings, and for ensuring their continued optimized performance over time.

Reasons to commission and retro-commission buildings include: bringing equipment to its optimal operational state; reducing energy and demand costs; increasing equipment life; improving indoor air quality; reducing staff time spent on complaints and emergency calls; increasing occupant satisfaction; and improving facility operation and maintenance.

Requests for qualifications and proposals and contract language for architectural and engineering firms were modified to reflect the LEED green building requirement. The city will hire a Facilities and Sustainability Manager in 2007 to provide in-house oversight and expertise to implement the green building and sustainable city program.

State of Wisconsin Green Building Executive Order and Pilot

On April 11, 2006, Governor Jim Doyle signed Executive Order 145 Relating to Conserve Wisconsin and the Creation of High Performance Green Building Standards and Energy Conservation for State Facilities and Operations.

The first state high performance green building project is the LEED Gold DNR Northeast Regional Headquarters near Green Bay. An investment of $70,000 to help make that building more environmentally sound is expected to have a payoff in energy savings of $500,000 over 20 years. Included in the design improvements were efforts to take advantage of daylight, maximize the use of recycled materials and recycle waste, and minimize the building's footprint on its surrounding environment.

S. Gruder photo

Wisconsin Governor Jim Doyle signs the green building executive order in 2006.

Resources

University of Wisconsin-Extension has many resources to help Wisconsin communities build green. These are available from local Extension agents or on the web site of the Solid & Hazardous Waste Education Center at: *www.shwec.uwm.edu*

Some SHWEC resources include:

- Building Alternatives for Public Projects: A Smart Growth Approach, a fact sheet for municipal officials on the what, why and how of green building
- Government Green Building Programs Inventory, listing U.S. municipalities with green building policies and programs and details about each
- Building Green Guide: sustainable product choices – a searchable database of green building products and services and where to get them in Wisconsin and the Midwest

Other Useful Resources:

AIA, "Writing the Green RFP: Sustainable Design Language for Consultant Requests."
www.aia.org/cote_rfps

U.S. Green Building Council State and Local Government Tool Kit
www.usgbc.org

U.S. Green Building Council
www.usgbc.org

Wisconsin Green Building Alliance
www.wgba.org

"Whole Building Design Guide" is a gateway site for up-to-date information on integrated 'whole building' design techniques and technologies. Maintained by the federal government, this site is filled with useful technical resources and links from design tools to specifications to operation and maintenance management systems.
www.wbdg.org

[18] Gruder, Sherrie, Government Green Building Programs Inventory, UW-Extension Solid & Hazardous Waste Education Center, Pub No 615.SG.0701

[19] The Costs and Financial Benefits of Green Buildings, Principal Author: Greg Kats, October 2003. Prepared in partnership with the US Green Building Council and California's Sustainable Building Task Force for 40+ California state agencies, www.cap-e.com/spotlight/index.cfm?Page=1&NewsID=25770

Purpose

Our transportation choices affect everything – public health, the environment, and our economy. Pollution produced by fossil-fuel burning vehicles is responsible for public health problems that decrease our quality of life and impose significant financial costs on individuals and the community as a whole. It also results in serious reductions in the health, productivity and enjoyment of our air, agricultural crops, forests, lakes, rivers and other waterways. Finally, as the resources that feed our fossil-fuel dependent transportation policies become scarcer and more expensive, communities are beginning to recognize that those policies simply are economically unsustainable. The many negative effects of pollution and global climate change resulting from vehicle emissions is now recognized as one of our largest challenges from the local to the global level.

1000 Friends of Wisconsin photo

Sustainable transportation options give community residents choices for work and play.

A local government's transportation and mobility policies play a major role in a community's sustainability. Those policies and decisions should address how to move residents, employees, visitors, as well as materials and goods to, from, and within the community in a more sustainable manner. The results of such policies have the potential to generate environmental, public health, and social benefits, as well as significant cost savings for communities.

Sustainable transportation policies must address several areas, including the municipal fleet, parking, commuter options and transportation alternatives. Such policies call for:

- Including transportation practices that reduce emissions of carbon dioxide (CO_2) and other greenhouse gasses;
- Practices that reduce the use and waste of fossil fuels by providing alternative modes of transportation; and
- Practices that minimize the environmental impacts, health hazards and costs of transportation.

Transportation Benefits

The benefits of sustainable transportation policies and practices include:

- conserve natural resources
- safeguard and improve public health by eliminating or reducing air pollution and ozone action days
- minimize or eliminate the environmental impacts from pollution and toxics that result from fossil fuel use
- transport workers, residents and visitors to the community efficiently and effectively
- reduce local government operating costs
- encourage local economic development through sustainability-related products and services
- encourage other organizations, businesses, and individuals in the community to adopt similar goals.

Strategy

One strategy for putting such policies in place includes:

- Identifying current transportation policies;
- Evaluating current transportation policies throughout the local government – across departments rather than just within the streets, parking, transit and other departments traditionally associated with transportation;
- Determining how transportation policies relate to and affect other governmental/organizational policies. Work to ensure that land use, business development policies, public transit, and municipal transportation policies all operate as a system whose parts work together toward reduction of fossil fuel use;
- Outlining the rational basis for adopting a sustainable transportation policy;
- Identifying immediate and longer term policies;
- Setting short- and long-term goals; and
- Identifying measurements to track achievement toward goals.

G. David photo

All generations benefit from sustainable community transportation policies.

Photos by (from left): W. Lyles, 1000 Friends of Wisconsin

Local governments can encourage their employees and residents to bicycle by providing adequate and convenient facilities.

A sustainable transportation system usually requires a mix of several available options – pedestrian, bicycle and public transit options.

An increasing number of local government transit authorities are exploring renewable fuels for their busses.

Actions

Municipal Fleet Vehicles

- Purchase or lease fleet vehicles that are the most fuel efficient in their class and/or powered by renewable fuel sources (this includes not only passenger vehicles, but garbage trucks and other community service vehicles). This can include a vehicle fleet fueled by compressed natural gas, methane captured from landfills, ethanol (E85), electric and ultra-low sulfur diesel;
- Convert existing diesel vehicles to biodiesel (e.g., school buses and trucks);
- Keep vehicles well maintained to ensure efficient performance (e.g., proper tire pressure, regular tuning, etc.);
- Provide incentives for employees to operate vehicles efficiently;
- Switch to refined motor oil for fleet vehicles, and look for products that meet eco-label standards;
- Train employees and community members in eco-friendly driving techniques that conserve fuels, release fewer emissions into the atmosphere and prolong vehicle life. [Examples: In Luleå, Sweden, driving students drive a specified route and energy consumption is measured, then it's done again after eco-driving instruction on topics such as tire inflation, fuel conserving acceleration and braking, and optimum fuel conservation speeds. In Övertorneå, Sweden, eco-driving is part of the high school driving class curriculum. The town also has courses for trucking industry and business employees in order to reduce emissions. They estimate that they have trained 70% of the drivers in Övertorneå to be more aware of how their driving practices affect fuel use and equipment costs];
- Consider creating a "bicycle fleet" for employees to use for local work-related trips in order to improve employee health, air quality and reduce fleet vehicle costs.

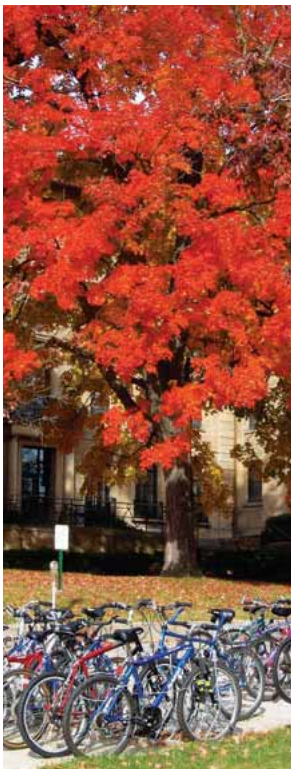
Parking

- Change parking policies at the work site to make it easier for employees to switch to transportation alternatives;
- Provide parking priority and reduced-price or free parking to people who ride share or drive super-low emitting hybrids or electric vehicles;
- Support those who walk, cycle or bus to work through incentives and alternatives to parking benefits.

Commuter Options and Transportation Alternatives

- Evaluate which transportation options are currently subsidized by the community and whether those subsidies promote sustainable transportation choices;
- Improve transit service and equipment;

- Work with neighboring local governments to coordinate regional public transit opportunities including mass transit, shuttle buses, carpooling and vanpooling, bicycle and pedestrian infrastructure;
- Promote Transit Oriented Development (TOD) that minimizes the need to drive to work, school, errands, recreation and other typical destinations;
- Provide and encourage ride sharing programs;
- Provide hybrid car-share cars or become a "member" of an existing car share program so employees can take advantage of community car sharing;
- Make it more convenient for people who choose to cycle, walk or run to work by providing showers, lockers, and secure bicycle parking at work sites, and by designing safe, connected streets and dedicated bicycle trails and lanes with adequate lighting and bike racks that encourage pedestrian and bicycle use and discourage high speed traffic;
- Allow for variable work hours to help connect potential ride sharers and eliminate car trips;
- Allow telecommuting.



W. Lyles photo

Miscellaneous

- Work with private businesses to reduce truck trips by increasing truck load capacity, coordinating trips with other distributors, creating flexible pick-up/drop-off times, utilizing empty trucks for "green returns" (return of recyclable materials);
- Maintain existing local stores and markets in residential neighborhoods and develop new ones so that customers can shift from driving to biking or walking for short trips.

Case Studies

Portland , Oregon Transportation Actions Reduce Greenhouse Gases

In 1993 Portland became the first U.S. city to adopt a strategy to reduce emissions of carbon dioxide (CO_2). In 2001 Multnomah County joined the effort to create the *Local Action Plan on Global Warming* with a goal of reducing carbon dioxide emissions to 10% below 1990 levels by 2010.

On a per capita basis, Portland and Multnomah County CO_2 emissions have fallen 13% since 1993. This is contrary to the national trend, where per capita CO_2 emissions in the U.S. have increased slightly over the same period, with total greenhouse gas emissions up 13%. The reduction is due to multiple factors, including the following transportation actions:

- The addition of two major light rail lines and the Portland Streetcar and 75% growth in public transit use since 1990.
- All diesel vehicles and equipment that use the city's fueling stations currently are fueled by a 20% biodiesel blend (20% biodiesel/80% diesel, also known as B20). Each year the city uses about 600,000 gallons of B20.
- In early 2002, the city took delivery of 30 Toyota Priuses, hybrid gasoline-electric vehicles that get 50 mpg.
- In 2001 the city finished replacing incandescent traffic signals with LED bulbs, saving 3% of total city CO_2 emissions and cutting the city's electricity bill by $265,000 per year.

Portland points out that "while the actions of one city will have only a small impact on global CO_2 emissions, many cities together can achieve meaningful reductions. Since the adoption of the 1993 plan, more than 400 municipal governments worldwide have followed Portland's lead and adopted "climate change mitigation plans" that include transportation actions.

"Creating and Implementing a Trip Reduction Program at the Work Place," Whistler, British Columbia, Canada: "Go Green" Program

The GO GREEN Choices Program recommends an 11-step plan for reducing trips to work. The detailed plan begins by discussing the reasons for trip reduction, and ends by providing tools to implement and maintain a program to reduce the number of cars arriving at the workplace every day.

The eleven steps of the program are: 1) Making the move – Securing management approval. 2) Who do you work for? – Creating an employer profile. 3) Where do you work? – Analyzing your work site. 4) Who works here? – Conducting an employee transportation survey. 5) Room to move – Setting your trip reduction targets. 6) What's in it for me? – Proposing incentives. 7) The price of a program – Creating a budget. 8) The go ahead – Presenting your plan. 9) On the road – Promoting your plan. 10) Green means go – Implementation of the plan. 11) Staying on the right track – On-going evaluation. More details can be found at: *www.gogreen.com/choices/getstarted/1.html*

Resources

1000 Friends of Wisconsin
www.1kfriends.org

City of Portland, Oregon's Transportation Sustainability Program
www.portlandonline.com/transportation/index.cfm?c=35707

Whistler Canada's Comprehensive Sustainability Plan – Transportation
www.whistler.ca/files/PDF/Admin/Whistler_2020/August_Final_Drafts/Transportation_Draft_Strategy_Final.pdf

Community Car Sharing

Car Sharing Network
www.carsharing.net/

Madison's Community Car program:
www.communitycar.com/

Using bikes to replace other vehicles in the workplace

"Bicycles in the Workplace for a Healthy Business"
www.breezerbikes.com/docs/BreezerFleetBrochure.PDF

For examples of communities around the world using bikes for employees, see "Post, Parks and Petite Bourgeoisie On Your Bikes" on the International Bicycle Fund website "Workbikes" section
www.ibike.org/economics/workbike.htm

"From the Margins to the Mainstream: A Guide to Transportation Opportunities in your Community"
Surface Transportation Policy Project, a guide to federal law and funding for local government transportation programs
www.transact.org/PDFs/margins2006/STPP_guidebook_margins.pdf

Toward Sustainable Transportation Indicators for California, MTI REPORT 02-05, August 2003
http://transweb.sjsu.edu/mtiportal/research/publications/documents/02-05/Lee_4Mar04.htm

Seattle, Washington: "Way to Go" Program

Way to Go, Seattle is the City of Seattle's umbrella program for a variety of initiatives intended to improve livability by reducing automobile usage for non-work trips and increasing the use of busing, biking, walking, trip consolidation and carpooling instead. For more information see:
www.cityofseattle.net/waytogo/

Way To Go Seattle – Seattle Transportation Program
www.cityofseattle.net/waytogo/

Way to Go Seattle – Car Cost Worksheet
www.cityofseattle.net/waytogo/carcostworksheet.htm

Way To Go Seattle – Commute Trip Reduction program
www.seattle.gov/transportation/commute.htm

Way To Go Seattle – One Less Car Challenge
www.cityofseattle.net/waytogo/onelesscar.htm

Purpose

Procurement Benefits

Community and environmental benefits of green purchasing:

- Conserve natural resources
- Minimize environmental impacts such as pollution and use of water and energy
- Eliminate or reduce toxics that create hazards to workers and the community
- Support strong recycling markets
- Reduce materials that are landfilled
- Increase the use and availability of products that protect the environment
- Identify environmentally preferable products, services and distribution systems
- Create a model for successfully purchasing environmentally preferable products that encourages other purchasers in your the community to adopt similar goals
- Create incentives for existing and new sustainable local business

Environmentally preferable purchasing (EPP) or green purchasing is the purchase of "products and services [that] have a lesser or reduced effect on human health and the environment when compared to other products and services that serve the same purpose." EPP, however, not only protects the environment; it also protects human health, saves money, and improves the overall quality of government purchases. EPP was formally adopted by the Federal Government in 1993 and expanded in 1998 Executive Orders though part of the Resource Conservation and Recovery Act (RCRA).

Green purchasing considerations and environmental approaches reduce impacts on: air, water and land, greenhouse gas emissions, resource availability, biodiversity, energy, toxics generation, disposal and health impacts, waste generation, packaging and transport energy.

Rather than addressing environmental problems on a single-medium basis, such as energy efficiency or recycled content, environmentally preferable purchasing is targeted at minimizing environmental impacts across all environmental media by using a lifecycle assessment approach. The benefits of environmentally preferable purchasing to local government include improved ability to meet existing environmental goals, improved community and worker safety and health, reduced liabilities, and reduced disposal costs.

Governmental procurement policies can reflect the principles and concepts of sustainability. Indeed, governments can model the way for businesses and households. Such policies call for:

- Practices that reduce waste by increasing product efficiency and effectiveness;
- The purchase of products that eliminate or minimize environmental impacts, toxics, pollution, and hazards to workers and the community;
- The purchase of products that are reused or refurbished, include recycled content, are durable and long-lasting, conserve energy (ENERGY STAR appliances and electronics) and water, use agricultural fibers and residues, reduce greenhouse gas emissions, use unbleached or chlorine-free manufacturing processes, are free of lead, mercury, PVC and other known toxics, use wood from sustainably managed forests, are regional or local.

Strategy

A strategy for putting green purchasing in place might include:

- Identifying current procurement policies;
- Discussing and evaluating current policy(ies) with Department Heads;
- Explaining the rational basis for adopting an Environmentally Preferable Purchasing Policy;
- Adopting an Environmentally Preferable Purchasing Policy and Implementation Guidance for the policy. See references below for model policies and implementation guides;
- Using a "best value" approach for most purchases as opposed to a "low bid wins" purchasing approach. With best value purchasing, purchasers can identify and consider a wider variety of factors. A purchasing evaluation score sheet, for example, might base 40% of the total score on price, 30% on performance, and the remaining 30% on environmental or other preferential purchasing considerations (e.g., local supplier, or small or woman- or minority-owned businesses).

S. Gruder photo

Herman Miller green office furniture.

Actions

- Encourage purchasers to examine environmental considerations along with traditional factors such as product safety, price, performance, and availability when making purchasing decisions. Each of these factors, including environmental performance, provides important

information about a product's or service's overall value and quality. As a result, environmental considerations should be a regular part of the normal purchasing process.

- Compare environmental attributes such as recycled content, energy efficiency, or reduced toxicity of competing products. A product's environmental attributes can serve as a measure of its overall environmental impacts.

Case Studies

Environmentally Preferable or Green Purchasing Policy success stories include.[20]

Seattle, Washington's Copernicus Project produced direct cost savings of $2.3 million in 2001 and indirect savings of $600,000. In 2002, the direct and indirect cost savings were $3.14 million and $400,000, respectively.

Starbucks, by switching to thinner trash bags, has saved $500,000 annually and reduced the company's annual use of plastic by 750,000 pounds – without impacting performance.

Seattle Swedish Medical Center's supply expenses accounted for 23% of annual net revenues. Today, with the Supply Chain Management system in place, that amount has been reduced to 17.2% – a difference of $16 million.

The Aberdeen Proving Ground, an EPA Green Lights partner, is replacing standard PCB-containing fluorescent light ballasts with energy-efficient, PCB-free, electronic ballasts as part of its energy efficiency efforts. The project will save the military installation $1.2 million per year .

King County, Washington saved $550,000 in 2002 by purchasing environmentally preferable products. In 2003, the County saved $580,000.

Herman Miller, Inc. without its waste reduction efforts, would be sending eighty million pounds of waste to the landfill each year. Instead, it is sending six million pounds, avoiding $1 million in disposal costs.

Resources

National Association of Counties. Local Government Environmental Purchasing Starter Kit: Introduction, 1999. Provides tips on how to start an environmental purchasing program. 2.4 MB PDF available at: *www.newdream.org/procure/start/overview.pdf*

The above introduction is part of a larger environmental purchasing starter kit which includes a sample purchasing resolution, baseline survey, and press release. For more information on the starter kit, visit: *www.newdream.org/procure/start/naco.php*

Scot Case. "Establishing Green Purchasing Priorities." Government Procurement, April 2004, 5 pages. Describes the process government purchasers are using to prioritize and integrate environmentally preferable products into their purchasing efforts. Available at: *www.newdream.org/procure/Establishing_Green_Purch_Priorities.pdf*

Scot Case. "Finding the Best Green Value: Strategies Balance Cost, Human Health, and Environmental Concerns." Government Procurement, February 2005. Suggests strategies for balancing human health and environmental concerns with cost concerns. Includes a discussion of calculating life cycle costs, applying price preferences, and adopting best value purchasing. Available at: *www.newdream.org/procure/Green_Value.pdf*

Liddel, Beth. Pacific NW Pollution Prevention Resource Center, "Environmentally Preferable Purchasing (EPP) Programs and Strategies: Integrating Environmental and Social Factors into Procurement Practices," October 31, 2003 *www.p2pays.org/ref/24/23958.pdf*

[20] Liddel, Beth. Pacific NW Pollution Prevention Resource Center, "Environmentally Preferable Purchasing (EPP) Programs and Strategies: Integrating Environmental and Social Factors into Procurement Practices," October 31, 2003 www.p2pays.org/ref/24/23958.pdf

Purpose

Local governments are called upon to exercise competent and responsible stewardship in how they manage their financial resources. In order to function effectively and to carry out their financial responsibilities, they depend on a reasonable return on investments and are required to operate in a fiscally sound, responsible and accountable manner.

"Millions of people and thousands of institutions want their investments to express social values"

– Paul Hawken (see Resources section)

Socially responsible investing is when you take your beliefs and values and apply them to how you invest your money.

Socially responsible investment incorporates social, environmental, and corporate governance concerns into investment decisions to promote corporate responsibility and sustainability worldwide.

When a local government adopts operational principles and/or mandates, such as those related to sustainability, the combination of these considerations with fiscal responsibilities suggests the need for a clear and comprehensive set of policies to guide local government investments and other related activities. A description for such an approach is socially responsible investment. Investing with a focus on sustainability is a component of, but narrower than, socially responsible investment.

The socially responsible investment (SRI) industry in the United States is a relatively recent phenomenon. The first SRI mutual fund—Pax World Fund—was created in 1971. The SRI movement gained a serious foothold in the financial industry in the 1980s. It now represents over $2 trillion in assets in the United States. Between 1995 and 2005, the number of SRI mutual funds grew from 55 to 200.

Socially responsible investors screen companies and mutual funds for those that coincide or conflict with their beliefs. As of 2005, two-thirds of all SRI funds had five or more screens in place. Across all SRI mutual funds, over 300 screening criteria are employed today versus only five 20 years ago. Since not all investors are in agreement, this points to the importance of having an agreed upon set of principles at the community level. A local government's adopted sustainability framework can help provide these principles.

In the past, an argument against socially responsible investing was that it would not be profitable. A range of studies have since shown that socially-conscious mutual funds are able to match or beat the overall performance of the stock market, using the S&P 500 (a broad stock market index of 500 companies) as an indicator of overall market performance. Academic and market studies have repeatedly shown that screened SRI funds earn financial returns comparable to those of their unscreened counterparts.

Others look at financial performance in a different light. "We believe that striving to attain the highest rate of financial return is a direct cause of social injustice and environmental degradation, as it consistently leads to externalization of costs on the environment, the future, workers, and other peoples"[21] (Hawken and the Natural Capital Institute 2004). They advocate changes in screening criteria, a moderation of investor expectations, and more transparency and disclosure of SRI fund portfolios.

If a local government decides to pursue a socially responsible investment strategy, it will need to figure out what its environmental and social priorities are. A key component to the creation of a sustainable community is the adoption of a community-wide policy or mission statement. The process necessary for such a large-scale plan brings stakeholders to the table and encourages open discussion and creative problem solving.

Strategy

Socially responsible investment includes three fundamental strategies – screening, shareholder advocacy (or corporate engagement), and community investing. A local government can pursue all three strategies, just one of them, or any combination that it decides upon.

Screening

The gist of screening local government investments is summed up with the maxim: "Invest your principal with your principles." That guideline can be applied to both stocks and bonds, and takes the form of positive or negative screens. Intuitively, screening seems like the best way for an investor to express disapproval or support for a public company. The criteria for inclusive, proactive positive screens can range over a spectrum of concerns. Negative or avoidance screening excludes companies that are directly or partially involved in certain industries, practices, or services. Virtually any screen can be used positively or negatively.

Examples of issues underlying screens include: environment, human rights, labor, abortion, contraception, animal rights, tobacco, alcohol, gambling, defense, pornography, biotechnology, community investment/support, corporate governance, business practices, employment equality, employment diversity, non-marital partner benefits, workplace conditions, foreign operations, nuclear power, renewable energy, beneficial products and services, and sustainability. Screens may also extend to the company's suppliers or customers.

Shareholder Advocacy

Shareholder advocacy efforts include engaging in dialogue with companies and submitting and voting on shareholder resolutions. Action is focused on positively influencing corporate behavior. Socially conscious investors often work cooperatively to steer management on a course that they believe will improve financial performance over time and enhance the well-being of all of the company's stakeholders – customers, employees, vendors, communities and the natural environment, as well as stockholders.

Community Investing

Community investing provides capital to people in low-income, at-risk communities who have difficulty accessing it through conventional channels. Many social investors earmark a percentage of their investments to community development financial institutions (CDFIs) that work to alleviate poverty, create jobs, and provide affordable housing and small business development financing in disadvantaged communities.

Community investing is the fastest-growing component of SRI, with total assets more than tripling from $5.4 billion in 1999 to more than $18 billion in 2005. This growth in assets has been accompanied by an increase in the number of options that are readily available to both individual and institutional investors. There were eleven certified CDFIs in Wisconsin as of April 2006.

Actions

Basic steps may include the following:

- Decide if the local government wants to model sustainability through its own actions and policies;
- Decide if the local government wants to have an investment approach that reflects its sustainability and, perhaps, other environmental and social principles;
- Do research on the basics of investing, the current investment strategies of the local government, and the basics of socially responsible investing;

- Agree upon a set of principles, at the community level, that will be used as the basis of the local government's investment decisions;
- Set the environmental and social priorities that will determine the type of "screened" investment portfolio the local government wants to have;
- Positive screening identifies those types of companies and funds that the local government wants to support and invest in;
- Negative screening identifies those types of companies and funds that the local government does not want to support or invest in;
- Determine how strictly to enforce or follow positive and negative screening choices;
- Consider a take-no-prisoners attitude where it screens no matter how small the transgression;
- Consider how far along the supply chain to hold companies accountable;
- Determine whether to invest in individual companies or in mutual funds (where the fund manager does the research on the financial and social sides, but where the local government may not agree with every company chosen);
- Determine the local government's financial goals
    - Assess the level of risk it is comfortable with
    - Assess how important rates of return are to its portfolio
    - Determine whether the local government is focusing on short-term, longer-term, or a mixed portfolio of investments;
- Decide whether the local government will manage its investment or if it will have others do it (such as a financial manager or a mutual fund manager).

There are many socially responsible mutual funds available. The choice does not have to be overwhelming. Here are three steps to follow:

1. Get a list of funds by doing an Internet search for "socially responsible investing" or "socially responsible mutual funds." There are also web sites listed in the resources section below, some of which have complete listings of socially responsible mutual funds. For example, the SRI Mutual Fund Chart at www.socialinvest.org provides information on more than 100 funds – including account minimums, screens, and performance information.
2. Check out each fund's web site before requesting a "prospectus" from them. A prospectus provides information on the fund manager's philosophy on screening and investing, the fund's financial performance, and an application form. This way a local government can quickly determine whether the fund's environmental and social priorities are compatible with its own. Typically, each web site will also provide financial information about the fund.
3. After locating a preferred mutual fund, the local government can order a prospectus online or call the mutual fund's 1-800 number.

Up to this point, the emphasis in this section has been primarily on the screening strategy. A local government may decide that it wants to expand its "strategy portfolio" and pursue shareholder advocacy and community investing, as well.

Companies are owned by the people and institutions, such as communities and local governments, who invest in them. Shareholders are increasingly using this leverage to persuade companies to adopt practices that are conscientious and socially and environmentally responsible. For example, in 2005, SRI shareholders filed 348 resolutions on social and environmental issues ranging from climate change to global labor standards to political contributions. Shareholders are becoming increasingly

successful with these strategies. Given the relative importance of institutional investors, this provides another means for communities to influence corporate behavior to reflect their agreed-upon social and environmental principles.

Community investing helps to fill the need for financing in low-income communities that is not being met by conventional financial institutions and services. Through community investing, local governments can invest directly in community-based financial institutions that use their money to provide resources and opportunities for lower-income people and social enterprises. Community investment institutions provide financing for affordable housing, small businesses and micro-enterprises, environmental projects, and vital community services like education and child care.

Communities can also invest in "high-impact" community investment funds like community development loan funds, micro-enterprise funds, pooled funds, and community development venture capital. These are generally long-term (one to five years) investments that offer market or below-market returns that are not insured. Another approach is to invest in SRI mutual funds that have a community investing component.

Case Studies

The Green Wave Initiative in California

This initiative was launched in February 2004 with California's two major public pension funds dedicating $1.15 billion to investments that clean up the environment and create jobs while bolstering the funds' financial returns. The pension funds are being invested in the stocks of environmentally responsible companies and in funding that will grow new industries to develop clean energy and environmental technologies. The funds are also pushing companies to improve their environmental practices and curb global warming; and they are implementing landmark energy conservation goals for their massive real estate holdings (Source: California Political Desk, April 21, 2006).

Wisconsin Women's Business Initiative Corporation (WWBIC)

The Wisconsin Women's Business Initiative Corporation (www.wwbic.com) is an economic development corporation providing quality business education, technical assistance and access to capital for entrepreneurs. Established in 1989, WWBIC consults, educates and mentors owners of small and micro businesses throughout Wisconsin. It concentrates its efforts with women, people of color, and those with lower incomes. WWBIC was one of the first CDFIs in Wisconsin and the first statewide certified CDFI in the U.S., one of the first Small Business Administration (SBA) Women's Business Centers, and one of the first SBA Microlenders.

American Indian Chamber of Commerce of Wisconsin

A recent entry into the Native CDFI world is the American Indian Chamber of Commerce of Wisconsin (www.aiccw.org). The chamber started the First American Capital Corporation, a certified CDFI that received funding from the CDFI Fund, leveraged it for additional funding, and loaned it to Indian businesses across Wisconsin. "We're covering the whole state of Wisconsin and every Indian in the state," said Executive Director Craig Anderson, so funding is stretched thin. Still, he said, they can do a lot with little.

Resources

The Local Government Investment Pool offered by the State of Wisconsin is:
www.swib.state.wi.us/lgip.asp

The policies of the State Investment Board and contacts are available on the site as well.

Socially responsible investing resources on the web include:

Changemakers:
www.changemakers.org

Ethical Investment Mutual Funds:
www.rawdc.org/invest/funds.html

Good Money:
www.goodmoney.com

Ethical Investment Research Service:
www.eiris.org

Green Century:
www.greencenturyfunds.com

GreenMoney Journal:
www.greenmoney.com

Interfaith Center on Corporate Responsibility:
www.iccr.org

Natural Investing:
www.naturalinvesting.com

Open Directory – Business Investing Socially Responsible:
http://dmoz.org/business/investing/socially_responsible

RSF:
www.rsfsocialfinance.org

Shared Interest:
www.sharedinterest.org

Social Investment Forum:
www.socialinvest.org

Social Investment Organization:
www.socialinvestment.ca

SocialFunds.com:
www.SocialFunds.com

Socially Responsible.org:
www.sociallyresponsible.org/investing.htm

SRI News.com:
www.srinews.com

SustainableBusiness.com:
www.sustainablebusiness.com

Vision Capital Management:
www.visioncapitalinvestment.com

The Natural Capital Institute released a report in October 2004 that addresses financial management companies offering mutual funds that screen their portfolios against non-financial criteria, which is the socially responsible or ethical investing community. "It examines current portfolio practices, reveals how SRI funds are actually allocated, shows how the industry misleads investors, and recommends how the industry can reform itself in order to respond to investors who want to invest with a conscience and purpose (Hawken 2004)."
www.naturalcapital.org

The above report can be downloaded in PDF format (pages 31-33 provide a wide range of internet-based resources on mutual funds, screening criteria, and indices) by going to this link (then click on "Download Report" under the Socially Responsible Investing Project):
www.naturalcapital.org/Projects.html

The Community Investing Center has detailed social and financial performance information and the largest database of investment opportunities in the area of community investment.
www.communityinvest.org

The Community Development Financial Institutions Fund was created for the purpose of promoting economic revitalization and community development through investment in and assistance to CDFIs. The CDFI Fund was established by the Reigle Community Development and Regulatory Improvement Act of 1994, as a bipartisan initiative. It is part of the U.S. Department of the Treasury.
www.cdfifund.gov

The Coalition of Community Development Financial Institutions was formed in 1992 as an ad-hoc policy development and advocacy initiative. It is the lead national organization in the United States promoting the work of CDFIs. The Coalition represents CDFIs working in all 50 states and the District of Columbia. This national network of CDFIs includes community development loan funds, community development banks, community development credit unions, micro-enterprise lenders, community development corporations and community development venture capital funds. The CDFI web site includes extensive information and state-by-state profiles.
www.cdfi.org

United States Conference of Catholic Bishops. Socially Responsible Investment Guidelines. Principles for USCCB Investments. November 12, 2003. Washington, DC: Office of Finance/Accounting Services, United States Conference of Catholic Bishops.

Socially Responsible Investing: How the SRI industry has failed to respond to people who want to invest with conscience and what can be done to change it. Natural Capital Institute, Sausalito, CA. Hawken, Paul, October 2004.

SRI in the United States. Schueth, Steven J.
www.firstaffirmative.com/news/sriArticle.html

Want to Build a More Sustainable World? Start with Socially Responsible Investing. Conway, Justin, and Larsen, Todd. A Co-op America Real Money feature in Utne Magazine, Nov./Dec. 2005.

[21] The Natural Capital Institute report, October 2004. Click on "Download Report" under the Socially Responsible Investing Project at www.naturalcapital.org/Projects.html

Purpose

Human resources refers to the individuals in an organization, whether public or private, and more specifically to the organization's unit that deals with hiring, firing, training, and other personnel issues, such as benefits. The way in which an organization treats its employees is critical regardless of whether an organization is using a sustainability perspective. The difference in an organization using a sustainability perspective is the degree to which employees participate in decision making, and the use of a sustainability framework in that decision making. In addition, creating healthy work environments can affect a range of local government goals related to sustainability, such as reducing energy use. More specifically, employees need to have a living wage, a healthy work environment, understand how and where they fit into the organization, and appropriate and regular training. By creating more satisfied and loyal employees, local governments also will create stronger, healthier communities and support their local economy.

"In the context of greening operations, the objectives of human resources management are to ensure the health and safety of employees; to equip employees to meet the requirements of all applicable regulations, guidelines and policies; and to encourage employees to incorporate environmental considerations into their daily activities"

- Public Works and Government Services Canada

Strategy

A human resource office must establish a strategy to accomplish its sustainability purpose. Below are some strategies to consider as the local government begins to change the way it interacts with its employees. The strategies below offer a way to begin to think about human resources in a sustainable way.

- Adopt human resource management practices that foster innovative working arrangements that support sustainability objectives. For example, allowing employees to telecommute (work from home) can improve a local government's transportation sustainability. Perhaps the amount of parking can be reduced. By reducing the amount and costs of parking and/or allowing employees to work at home the local government can promote and perhaps even subsidize the use of alternative transportation modes, and/or less driving to work, which means less pollutants in the air, less fuel used, and potentially healthier employees.
- Pursue actions that affect and engage all local government employees. For example, give all employees the opportunity to take a course in sustainability, such as The Natural Step framework.
- Infuse environmental awareness into all training programs, particularly orientation.

Actions

A local government can take many actions to achieve sustainability through its human resources department. Several actions are listed below. A local government should choose actions that fit its strategy and goals.[22]

- Hire and promote people with diverse backgrounds, experiences and perspectives;
- Educate employees about The Natural Step approach to sustainability, or another sustainability framework that the local government is using;
- Compensate employees fairly. Ensure fair compensation internally (between staff that hold similar positions) and externally (between your employees and the market value of those positions);
- Pay employees a 'livable' wage for the community. Paying staff a livable wage will increase loyalty, reduce staff turnover, improve customer service, and ultimately strengthen the community by allowing employees to live and participate in the community where they

work and contribute to a healthy local economy;

- Offer medical and dental benefits to employees;
- Consider prorated health care benefits for part-time employees;
- Empower employees to think creatively, generate ideas, and make decisions. Encourage them to do so regardless of whether success is guaranteed. Employees will feel more ownership if they can contribute innovations and ideas;
- Try to avoid layoffs. Develop a list of other cost-cutting options that could be implemented before layoffs. Include staff in identifying options;
- Consider conducting a confidential survey annually to ensure that employee needs are being met;
- Provide time off or flexible work arrangements for employees who volunteer in the community;
- Promote and support career development. This can be done through activities/programs such as goal setting, mapping out a career plan, establishing a mentoring program, and supporting/rewarding skills development;
- Develop an open, trusting environment where issues and ideas can be comfortably raised. Employees, customers, suppliers and other stakeholders will be more likely to share issues and ideas if they feel comfortable doing so. Their ideas may bring new innovations to the local government and increased awareness of surfacing issues may enable the local government to respond to them before they become unmanageable;
- Encourage school visits to the workplace and allow employees to become student mentors;

It is useful to have a target for accomplishing local government actions. Human resources will need to establish a timeline for achieving actions. For example, "By March 2007, establish environmental training plans and train 10% of the workforce."

In addition, the local government will need to measure how it is doing. Local governments and businesses have commonly accepted the use of performance measures for this task. Sample performance measures include:

- Number of environmental training courses developed
- Number of employees receiving environmental training
- Number of environmental regulatory infractions
- Number of diversity candidates hired

Case Studies

Below are two examples of organizations that have "greened" their human resources department or operations.

Interface, Inc.

Interface understands the importance of sustainability education across the globe. The company is working internally to educate all Interface employees, sponsoring non-sales events to educate their customers and suppliers, and reaching out to many of the communities in which they operate. Interface Europe in Northern Ireland established a challenge program for local high schools to submit environmental projects. Interface Flooring Systems in Canada is working with local civic leaders to promote The Natural Step in local government, industries, and institutions through

their 'Quinte Initiative.' Prince Street is using their facility as a teaching tool to educate 8th grade students on career opportunities relating to manufacturing and the environment. Interface Flooring Systems participated in an initiative to raise school children's awareness of pollution in the local Chattahoochee River."[23]

The University of Houston's Health Science Center

The Center "is dedicated to educating its community and offering itself as a model to other institutions working toward sustainability. Internally, the school is attracting interest from graduate students and providing sustainability education to the University's Historically Underutilized Businesses Program (HUB). HUB's mission is to identify small, minority, and woman-owned businesses, and to encourage them to partner and contract with the University. The Health Science Center (HSC) is itself supporting local vendors through contracts for food service, construction materials, and wood flooring. Every 60 days the HSC provides free workshops on The Natural Step and sustainability for UTH students as well as local businesses, schools, and organizations. In addition, the University's award winning film, featuring its sustainable building project, has been translated into Spanish in order to reach audiences that might not otherwise have access to the information."[24]

Resources

The Natural Step for Communities: How Cities and Towns Can Change to Sustainable Practices, James, Sarah and Torbjörn Lahti, 2004, New Society Publishers, British Columbia, Canada (pages 184-191). Includes a training example from the City of Eksjö, Sweden.

For more information on "living wage," the Living Wage Campaign website and available guide can help local governments with defining a living wage in their area and other tips about establishing a living wage within a community.
www.livingwagecampaign.org

Sustainable Development in Government Operations PWSC (Public Works and Government Services Canada).
www.pwgsc.gc.ca/realproperty/text/pubs_sd_gov/goals-e.html
January 3, 2006.

A deeper look at System Condition Four, Rosenblum, Jill. Spring 2000. The Natural Step Newsletter, 1(11).
www.naturalstep.org/learn/docs/articles/sc_four.pdf
January 31, 2006.

Whistler – It's Our Nature.
www.whistleritsournature.ca/toolkits/smallbusiness/smallbizframe.html
January 3, 2006

[22] Adapted from Whistler, It's Our Nature, January 3, 2006 www.whistleritsournature.ca/toolkits/smallbusiness/smallbizframe.html

[23] A deeper look at System Condition Four, Rosenblum, Jill. Spring 2000. The Natural Step Newsletter, 1(11), January 31, 2006 www.naturalstep.org/learn/docs/articles/sc_four.pdf

[24] ibid

Appendix 1

Benefits of Using the Natural Step Sustainability Framework to Guide Implementation of Madison's Sustainable City Goals*

Communities are where we live and work, and therefore where the impacts of our collective decisions that affect our land, air and water become most obvious. Madison is charged with planning for our development and managing our systems of waste, water, energy, and transportation, among others, all of which are fundamental to long-term sustainability.

In addition, Madison interacts with many local suppliers and stakeholders. By demonstrating leadership and commitment to sustainability in its own operations, the city can act as a role model for individuals and organizations in the community. In order to do this effectively, Madison will require the engagement of staff at all levels of city government and will need to align individuals and departments with a variety of interests, functions, responsibilities, and time and financial pressures.

The Natural Step Framework will help Madison overcome these challenges by:

- Facilitating the development of a shared understanding of and language for sustainability. A common understanding that is based on science and a system-wide approach will help to align the actions of different city departments and agencies, while still allowing them to work independently.
- Structuring a process for working together to identify, organize, and prioritize actions and investments for sustainable city operations.
- Introducing principles of sustainability that can be used to connect the city's long-term sustainability objectives – as described in the City-Council adopted Blueprint for a Green Capital City – with day-to-day actions and decisions.

The Process

Municipalities around the world have used The Natural Step ("TNS") sustainability framework to guide their decision making. While each community has different needs and approaches, these municipalities have all used some variation of the following steps:

1) An initial group of city staff and senior managers is introduced to TNS framework. By the end of this introduction, staff should be able to describe TNS and explain why it is relevant to their municipal organization. A one-day introductory workshop is usually the most effective way to achieve this.

2) Next, a core group of city staff members should be trained to be TNS trainers. The goal is to enhance the capacity of this core group so that they can present the TNS framework, facilitate dialogue, identify opportunities, and be internal resource people for as the city implements its sustainability goals.

3) The next critical step is to understand the current sustainability performance of the city as a whole or of particular departments. The Natural Step provides a methodology for performing this assessment using a full sustainability perspective. How is Madison performing in terms of sustainability? Where are high leverage areas for improvement? The output of this process is a Sustainability Analysis document.

4) Using the Sustainability Analysis as a baseline, the next step is to undertake initiatives to improve the overall sustainability performance of the municipality. This may involve coordinating existing programs and activities and/or developing new ones, with the overall goal of incorporating a sustainability perspective into city management systems, policies and plans.

Note that the Sustainable Design and Energy Task Force has already performed some of the work outlined in items 3 and 4 above through its development of the Blueprint document adopted by the City Council.

Benefits

Some of the benefits Madison might expect from using the TNS Framework to implement its sustainable city goals include:

- Alignment of municipal departments and staff toward a common vision of sustainability
- Clarity in assessing and organizing actions and programs for sustainable municipal operations
- Enhanced policies and programs incorporating a sustainability perspective (e.g. procurement policies, environmental management systems)
- Enhanced reputation as a proactive contributor to a more sustainable community

*Adapted by Lisa MacKinnon and Sherrie Gruder from "The Natural Step Canada Services for Municipal Operations" Briefing Note.

Appendix 2

The Sustainable Chequamegon Initiative: A Grass Roots Movement

A new spirit took root among hundreds of Chequamegon area residents in the spring of 2005 following an international conference in Ashland sponsored by the Alliance for Sustainability, entitled "Sustainable Sweden: the Eco-municipality Movement." The conference was the outcome of many slideshow presentations to local governments and other organizations by an Ashland city councilor who had visited Sweden the preceding summer. She visited several of Sweden's seventy "eco-municipalities" that are known throughout the world for having moved toward a sustainable society over the past twenty years. These municipalities all have adopted The Natural Step (TNS) (see Appendix A), a scientific framework based on sustainable principles to bring about systematic changes in business, government, education, energy production, waste disposal, transportation, and agriculture. After hearing these presentations, thirteen local entities, including three city councils, two tribal councils, and four educational institutions, donated at least $1,000 each to co-sponsor the "Sustainable Sweden" conference that was held in February 2005 at the AmericInn in Ashland.

This conference was a *turning point* for the Chequamegon Bay region. Over 200 participants listened to Torbjörn Lahti, father of the eco-municipality movement in Sweden, and Sarah James, co-author of The Natural Step for Communities, present their experiences and stories of many communities in Sweden that have embraced and moved toward sustainability. Attendance included elected officials, mayors, city and tribal employees, educators, business owners, builders, planners, and interested citizens. One feature of the conference was to have participants brainstorm, discuss, and prioritize potential local community action projects that would be based on sustainable development principles. In the end, over four dozen projects were identified. Several organizational meetings following the conference moved many of these initiatives forward.

A delegation of local community representatives from Sweden visits the Chequamegon Bay region in 2005 (from left): Lars Thunberg, Tammy Persson, Lena Bengtén and Torbjörn Lahti.

In June 2005, a delegation of Swedish municipality leaders came to present their success stories to 450 area residents in the Big Top Chautauqua tent. They received a standing ovation for their ideas and for the work local citizens had begun. In July 2005, the Washburn City Council received national recognition for passing an eco-municipality resolution. In early fall, the City Council of Ashland followed suit. **Together, Washburn and Ashland became the first two communities in the United States to pass eco-municipality resolutions.**[25]

In October 2005, ninety people joined a first round of Study Circles. These nine discussion groups, of eight to twelve citizens each, met one night a week for two months in homes, businesses, and libraries throughout the Chequamegon Bay region to discuss the book The Natural Step for Communities by Torbjörn Lahti and Sarah James and how the sustainable development ideas described in the book might be incorporated in these communities.

In January 2006, a public celebration of outcomes from these Study Circles led to **a second round of Study Circles** and the formation of three organizational committees, including the Planning and Organization Committee that spent two months developing a strategic plan for 2011.

Other significant events that took place during the past year included:

1. Ashland Mayor Fred Schnook and Washburn Mayor Irene Blakely signed the U.S. Mayors' Climate Change proposal along with 218 other mayors in the U.S. who want to reduce their contributions to global warming.
2. Bayfield became one of four communities in Wisconsin to pilot a "Travel Green" certification program. Twenty-four businesses volunteered to participate. Sustainable Bayfield, one of several groups created through the Sustainable Chequamegon Initiative, surveyed Apple Fest booth vendors in 2005 to assess the quantity of waste generated at this annual October event that draws thousands of people to Bayfield. With the assistance of Sustainable Bayfield, vendors will reduce the waste stream at the 2006 Apple Fest. The Bayfield group also sponsored a sustainable business seminar and is developing bio-diesel guidelines for city and Apostle Islands National Lakeshore use.
3. In Ashland, one study circle lobbied successfully to increase the Bay Area Rural Transit (BART) bus funding that will improve the frequency and availability of stops in the region.

4. In Washburn, the Public Works Director replaced inefficient showers in the city's parks with a more sustainable, on-demand shower heating systems.
5. The Daily Press, the daily newspaper for the region, published a 30-page special section – "Northland Innovations" – which told twenty success stories of sustainable enterprises in the Chequamegon Bay region.
6. The Alliance for Sustainability (AFS), a local, non-profit group that has sponsored educational programs for the past fourteen years, created the Sustainable Chequamegon Initiative (SCI) which is seeking to establish a Sustainable Chequamegon Center to be staffed in 2006 (the establishment of a Center/office is part of this Strategic Plan). The AFS board will have oversight of this Center.
7. Washburn Elementary School has developed a school-wide plan to become a Green & Healthy School.
8. The Town of La Pointe organized a study circle that has formed a Sustainable Madeline group, is planning a sustainability education series, and is using biodiesel in its dump trucks (summer 2006). The La Pointe School students planted and shared a Three Sister's Garden with the community and are involved in composting school waste. They also planted a small orchard and garden that will be the basis for food preservation activities.

Appendix 3 Fano Guidelines

An analysis of 40 European cities and towns identified conditions crucial for building capacity for successful sustainability policies. Named the Fano Guidelines after Fano, Italy, where they were presented in 2004 (see www.governingsustainablecities.org), these ten approaches support and expand the steps presented in the section of this toolkit on *How to Move Toward Sustainability*.

Building Capacity for Local Sustainability includes:

1. Learning as an organization
2. Moving away from policy silos within local government
3. Making alliances with people and organizations
4. Facilitating the process and developing credible leadership
5. Encouraging creativity and innovation in policy making
6. Communicating to make a difference
7. Catalyzing action through raising environmental awareness
8. Maintaining commitment to achieving the long-term vision
9. Sharing experience with peers
10. Influencing all levels of government

[25] The Sustainable Chequamegon Initiative Strategic Plan 2006-2011, pages 3-7

Appendix 4

Letter from Marshfield Mayor Michael D. Meyers to Committee Members

City of Marshfield
City Hall Plaza
630 S. Central Avenue
P.O. Box 727
Marshfield, Wisconsin 54449-0727

MARSHFIELD
The City in the Center

Michael D. Meyers
Mayor
(715) 384-2919
Fax (715) 384-9310
mayor@ci.marshfield.wi.us

June 1, 2006

Dear Eco-municipality Committee Member:

Thank you for agreeing to serve on the city's Eco-municipality Committee. I am honored to have such a group of individuals interested in learning more about this concept and how it might be applied by the City of Marshfield, your place of business, and you personally.

The first meeting is scheduled for June 27, 2006 from 3:00 – 5:00 p.m. at the City Hall Plaza Building in the Common Council Chambers (basement).

I will be joining you as a Committee member because this topic is important to the future of Marshfield for a number of reasons, looking at things from an economic, environmental, and quality of life perspective.

The charge of this Committee are several: to learn more about the concept; to see how this can be applied to the city, our businesses and to each member personally; and to report back to the Common Council with a summary of our findings and any recommendations that the Committee may have that will propel Marshfield into the future.

Respectfully yours,

Michael D. Meyers
Mayor

Appendix 5A

Sample Resolutions for Becoming an Eco-municipality

RESOLUTION # _____
City of Ashland, Wisconsin

Eco-Municipality Designation Resolution

Adoption of Sustainable Community Development Policy

WHEREAS, the City of Ashland has adopted a Comprehensive Plan (2004 – 2024) that calls for "The Making of an Exceptional City", and includes dozens of references to sustainable practices; and

WHEREAS, the adoption of the four systems conditions of the Natural Step can provide a framework that will assist city employees and elected officials in moving in a more sustainable direction; and

WHEREAS, the willingness of the city to move in the direction of becoming an eco-municipality can serve as a model for others and encourage economic development along similar lines in our city and region; and,

WHEREAS, the City of Ashland has a pledge of support through mentorship and consulting from The National Association of Swedish Eco-Municipalities; and

WHEREAS, the following four guidelines were developed by the American Planning Association to help communities implement sustainable practices:

1. Reduce dependence upon fossil fuels, and extracted underground metals and minerals.
2. Reduce dependence on chemicals and other manufactured substances that can accumulate in Nature.
3. Reduce dependence on activities that harm life-sustaining ecosystems**.**
4. Meet the hierarchy of present and future human needs fairly and efficiently.

NOW THEREFORE BE IT RESOLVED that The City of Ashland hereby endorses the principles of sustainable community development described herein, and agrees to apply these principles whenever possible in its planning, policy making, and municipal practices.

Adopted by the City Council of Ashland, Wisconsin this 13th day of September, 2005

_____ _____
Fred Schnook, Mayor Date

_____ _____ _____ _____
Attorney Date City Clerk Date

Appendix 5B1

City of Bayfield
Bayfield County – Wisconsin

A Resolution: A Commitment to Sustainability in the City of Bayfield

WHEREAS, The City of Bayfield acknowledges that the people of Bayfield, Wisconsin desire to create a stable, sustainable future and acknowledge that such a future is not certain.
We recognize that it will take the goodwill and determined work of individuals and communities around the world to achieve this goal. We wish be part of this international network and declare sustainability to be a goal of this City.

We wish to integrate our economy, environment, society and governance in ways that foster vibrant social and economic conditions, and a healthy ecosystem. To that end, we commit ourselves to creating the conditions necessary for a sustainable future. By seeking innovative and flexible solutions to the challenges that confront us, by sharing our knowledge, and by coordinating our actions, we strive to:

1. Reduce and eventually eliminate our contribution to the progressive buildup of materials (and their associated wastes) that are extracted from the Earth's crust.
2. Reduce and eventually eliminate our contribution to the progressive buildup of synthetic materials produced by human society.
3. Reduce and eventually eliminate our contribution to the ongoing physical degradation
of the Earth.
4. Reduce and eventually eliminate our contribution to conditions that undermine people's ability to meet their basic needs.

THEREFORE, BE IT RESOLVED that the City of Bayfield declares its commitment to sustainability as outlined above.

Adopted this 13th day of December in the year 2006 and signed.

_____

_____

_____

_____

_____

THIS IS TO CERTIFY THAT the foregoing is a true and correct copy of a resolution duly and legally adopted by the CITY OF BAYFIELD at a regular meeting held on the 13th day of December in the year 2006.

_____
Billie Hoopman, Clerk

Appendix 5B2

TOWN OF BAYFIELD
Bayfield County – Wisconsin
RESOLUTION 2006-18
A Resolution
Supporting Sustainability in the Town of Bayfield

WHEREAS, the Town of Bayfield Board of Supervisors does hereby acknowledge societies desire to create a stable, sustainable future. We further acknowledge that such a future is not certain, and that it will take the goodwill and determined work of many individuals, organizations, and communities around the world to achieve our goal.
And WHEREAS, we are proud to be part of a community as rich in natural amenities, economic opportunities, and social responsibilities as the town of Bayfield, and to be working on behalf of a future in which our economy, environment, society and governance are integrated in ways that foster vibrant communities, strong economies, and healthy ecosystems. To that end, we commit ourselves to creating the conditions necessary for a sustainable future. By seeking innovative and flexible solutions to the challenges that confront us, by sharing our knowledge, and by coordinating our actions, we strive to:

1. Reduce and eventually eliminate our contribution to the progressive buildup of materials (and their associated wastes) that are extracted from the Earth's crust.
2. Reduce and eventually eliminate our contribution to the progressive buildup of synthetic materials produced by society.
3. Reduce and eventually eliminate our contribution to the ongoing physical degradation of Nature.
4. Reduce and eventually eliminate our contribution to conditions that undermine people's ability to meet their basic needs.

NOW, THEREFORE, BE IT RESOLVED that the Town of Bayfield Board of Supervisors declares its commitment to sustainability as outlined above.
Adopted this 16th day of October in the year 2006 and signed.

_____ _____
Tom Gordon, Chair Gerald L. Carlson, Supervisor

_____ _____
Richard L. Carver, Supervisor Richard C. Compton, Supervisor

_____
William Ferraro, Supervisor

THIS IS TO CERTIFY THAT the foregoing is a true and correct copy of a resolution duly and legally adopted by the TOWN OF BAYFIELD at a regular meeting held on the 16th day of October 2006.

_____
David L. Good, Clerk

Link:

www.townofbayfield.com/files/archive/Ordinances%20&%20Resolutions/Resolution%202006-18%20Sustainability(Clerk%20sig).pdf

Appendix 5C

RESOLUTION #41-06
RESOLUTION BY THE ENVIRONMENT, AGRICULTURE AND EXTENSION COMMITTEE

Subject: Eco-County Designation Supported

WHEREAS, Douglas County acknowledges that a clean and healthy environment determines the quality of life, where the environment can support and sustain the community, and where citizens are committed to local and regional cooperation and a personal philosophy of stewardship, and

WHEREAS, the willingness of Douglas County to move in the direction of eco-county designation can serve as a model for our citizens, encouraging economic development and industrial initiatives while protecting the ecosystem in which they raise their families, and

WHEREAS, Douglas County adopted the Land and Water Resource Management Plan (2002), adopted the Eco-Industrial Development Resolution (2005), is a strong partner in the Lake Superior Binational Forum and St. Louis River Citizen Action Committee, has created policies to control the use of herbicides, disbursement of mercury, remediated the Hog Island site, and implemented a recycling program, and

WHEREAS, Douglas County will include many references to sustainability practices in their comprehensive planning process, and

WHEREAS, Douglas County endorses the following four guidelines which were developed by the Natural Step, and adopted by the American Planning Association, to help communities implement sustainable practices:

1. Reduce dependence upon fossil fuels and extracted underground metals and minerals;
2. Reduce dependence on chemicals and other manufactured substances that can accumulate in Nature;
3. Reduce dependence on activities that harm lifesustaining ecosystems; and
4. Meet the hierarchy of present and future human needs fairly and efficiently.

NOW, THEREFORE, BE IT RESOLVED that the Douglas County Board of Supervisors accept the recommendation of the Environment, Agriculture and Extension Committee and hereby endorses the principles of sustainable community development described herein, and agrees to apply these principles whenever possible in its planning, policy-making and practices.

Dated this 18th day of May, 2006.
(Committee Action: Unanimous) (Fiscal Note: None)

ACTION: Motion by Browne, second Hendrickson, to adopt. Browne advocated strongly for this resolution, and noted Douglas County would be the first county in the nation with this designation.
Brief discussion. Motion carried.

Appendix 5D

STATE OF WISCONSIN VILLAGE OF JOHNSON CREEK JEFFERSON COUNTY
RESOLUTION 37-06

Adoption of Sustainable Community Development Policy Village of Johnson Creek, Wisconsin

WHEREAS, in the sustainable society, nature is not subjected to systematically increasing concentrations of substances extracted from the Earth's crust, because human society mines and uses substances from below the Earth's surface that are steadily accumulating at levels far greater than their natural occurrence, are being emitted into the atmosphere, cannot break down further and have outstripped the earth's ability to restore itself, and,

WHEREAS, in the sustainable society, nature is not subject to systematically increasing concentrations of substances produced by society, because human society has been manufacturing synthetic substances faster than these materials can be broken down, and,

WHEREAS, in the sustainable society, nature is not subject to systematically increasing degradation by physical means, because human activity is breaking down natural systems –including land, water, forest, soil and ecosystems - by depletion and destruction faster than these natural systems can renew themselves, and,

WHEREAS, in the sustainable society, human needs are met worldwide, because if people around the world cannot meet their basic human needs for air, water, food, shelter, means of livelihood, mobility, equal treatment, equal access, safety, participation in decisions affecting their lives, the right to peaceful enjoyment of life, a connection with nature, and psychological and spiritual connection and meaning, then such inequality will continually undermine the goals identified above, and,

WHEREAS, by endorsing sustainable community development, the Village of Johnson Creek is joining an international network of eco-municipalities and pledging to educate itself further about sustainable activities and to develop initiatives in support of sustainable practices, and,

WHEREAS, the Village of Johnson Creek has a pledge of support through mentorship and consulting from The National Association of Swedish Eco-Municipalities;

NOW THEREFORE BE IT RESOLVED, the Village Board of the Village of Johnson Creek hereby endorses the principles of sustainable community development, as proposed in The Natural Step Program, and agrees to apply these principles in its planning, policy making and municipal practices.

Adopted by the Village Board of Trustees this 14th day of August 2006.

_____
Fred Albertz, Village President

ATTEST: _____
Joan Dykstra, Clerk-Treasurer

Appendix 5E

City of Madison Resolution
Legislative File Number 02486 (version 1)

Adopting The Natural Step Model For Eco-Municipalities As A Guiding Framework For The City Of Madison's Sustainable City Program And Providing Training In Both The Natural Step And Retro-Commissioning For City Staff.

WHEREAS, the recommendations of the "Building a Green Capital City" report, which call for Madison to "adopt a guiding principle on sustainability" to guide the process of Building a Green Capital City, have been approved by the Madison City Council;

WHEREAS, The Natural Step (TNS) model fits this need and has been well shown by the experience of several cities in the United States and over 75 cities worldwide;

WHEREAS, the Sustainable Design and Energy Committee has recommended that the Natural Step model for Eco-municipalities be adopted by the City of Madison as its guiding sustainability framework;

WHEREAS, training recommended by the Sustainable Design and Energy Committee in TNS over a 6 month period is available for City staff and officials at a cost of approximately $20,000;

WHEREAS, it has been determined that the energy and operational/maintenance savings opportunities in City of Madison facilities and operations need to be measured, analyzed, and discerned in house;

WHEREAS, City staff will be required to carry out the energy savings retrofits;

WHEREAS, the Sustainable Design and Energy Committee has recommended that appropriate staff be identified by the Mayor's Office and become trained in commissioning and retro-commissioning at a cost of approximately $30,000;

WHEREAS, funds are available in the City's 2005 Operating Budget for both TNS training and a course on retro-commissioning;

WHEREAS, the City could explore and identify partners to share in this training and cost;

NOW THEREFORE BE IT RESOLVED, that the City of Madison adopt The Natural Step Model for Eco-Municipalities as a guiding framework for the City's Sustainable Program; and,

BE IT FURTHER RESOLVED, that training in TNS be provided for targeted City staff and officials over a 6 month period in 2006 at a cost not to exceed $20,000 with funds appropriated and carried over from the 2005 budget; and,

BE IT FURTHER RESOLVED, that training in commissioning and retro-commissioning be provided for appropriate City staff which have been identified by the Mayors Office in 2006 at a cost not to exceed $30,000 with funds appropriated and carried over from the 2005 Budget; and

BE IT FURTHER RESOLVED, That the City of Madison will explore and identify other partners to share in this training and its cost.

A total of $50,000 has been appropriated and is available in the 2005 Operating Budget - Account No. GN01-54301-287000. Funds not contracted or encumbered by the end of this year will lapse to the General Fund balance and may be appropriated again next year by amending the 2006 Operating Budget.

Appendix 5F

RESOLUTION #05-021
City of Washburn, Wisconsin

Adoption of Sustainable Community Development Policy

WHEREAS, in the sustainable society, nature is not subject to systematically increasing concentrations of substances extracted from the Earth's crust, because human society mines and brings into use substances from below the Earth's surface, that along with their emissions are steadily accumulating at levels far greater than their natural occurrence and cannot break down further; and,

WHEREAS, in the sustainable society, nature is not subject to systematically increasing concentrations of substances produced by society, because human society has been manufacturing synthetic substances faster than these materials can be broken down, and,

WHEREAS, in the sustainable society, nature is not subject to systematically increasing degradation by physical means, because human activity is breaking down natural systems—land, water, forests, soil, ecosystems—by depletion and destruction faster than these natural systems can renew themselves; and,

WHEREAS, in the sustainable society, human needs are met worldwide, because if people around the world cannot meet basic human needs—air, water, food, shelter, means of livelihood, mobility, equal treatment, equal access, safety, participation in decisions that affect our lives, the right to peaceful enjoyment of life, a connection with nature, and psychological and spiritual connection and meaning—then this inequality will continually undermine the goals identified above; and,

WHEREAS, by endorsing sustainable community development, The City of Washburn is joining an international network of eco-municipalities, and taking the initiative to become one of the first four eco-municipalities in the United States; and,

WHEREAS, the City of Washburn has a pledge of support through mentorship and consulting from The National Association of Swedish Eco-Municipalities;

NOW THEREFORE BE IT RESOLVED that The City of Washburn hereby endorses the principles of sustainable community development, as proposed in The Natural Step Program, and agrees to apply these principles in its planning, policy making, and municipal practices.

Adopted by the Common Council for the City of Washburn, Wisconsin this 11th Day of July, 2005.

_____
Irene Blakely, Mayor

Appendix 6

Madison Mayor's Memo Outlining the City's Reasons for Using The Natural Step Sustainability Framework

RE: **The Natural Step**

From: Mayor Dave Ceislewicz
To: Department and Division Heads Meeting
Date: September 25, 2006

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their needs. (UN Brundtland Report, 1987)

The City must move toward sustainability. As a service provider, the City of Madison and its operations have a huge impact on the environment. With over 2,700 employees, it is the eighth biggest employer in Dane County.
It maintains over 750 miles of street, occupies over 3.7 million square feet of office and building space, consumes 54 million kWh of electricity and 1.3 million therms of natural gas, hauls almost 60,000 tons of garbage and recycling, maintains 6,000 acres of parks, and burns over 2.3 million gallons of fuel to run its buses and fleet vehicles.
It's hard to imagine a single entity in the area that has a bigger impact on the environment than City government.

Because the City is both consumer and steward of our environment and its resources, we must incorporate the principles of sustainability to ensure the needs of tomorrow can be met.

Areas for improvement. Based on basic scientific principles, The Natural Step framework lays out many conditions and methods that will help the City make progress toward sustainability. To ensure we are moving toward sustainability, the City will take the following steps.

1. Because resources like fossil fuels, metals and minerals can have adverse effects when they are dispersed and accumulate in our land, air and water, the City will reduce its consumption of materials extracted from the Earths crust.

2. Because the accumulation of pesticides, fertilizers and other persistent chemicals are harmful to people and the environment, the City will reduce its dependence on these kinds of man-made chemicals.

3. Because ecosystems take a long time to recover from physical destruction (if they can at all), the City will mitigate its impact through wise land use policies, low-impact maintenance practices and environmentally friendly design.

4. Because everyone deserves to be healthy and safe, the City will work to ensure safe working and living environments for its residents, visitors and employees.

A comprehensive approach. We have already made a lot of progress toward these goals. However, we can do even more if we approach decisions about our policies, operations and capital improvements in a more systematic way.
Using The Natural Step framework, the City will:

a) Work to increase awareness of sustainability among its staff and management. This will provide us with a common language and keep all of us thinking about the impact we have during the course of our daily tasks.

b) Take an inventory of current efforts that make progress toward sustainability and be frank about areas that need improvement. We will enhance our current efforts and identify additional improvements.

c) Formulate vision of what sustainability means for the City and identify long-term goals necessary to achieve that vision.

d) Incorporate the awareness and terminology of sustainability into our budget decisions, program administration and project development.

To achieve this, we will ask questions of relevant projects or policies like:

- Does this help move the City toward sustainability (even if incrementally)?
- Will elements of this project serve as a potential stepping stone toward other changes or initiatives?
- Will increased implementation costs yield savings in the long-run or provide a social or environmental return on investment?
  Some likely candidates and examples for treatment using The Natural Step are:
- Land use planning annexation, acquisition, density, zoning, watershed management
- Transportation maintenance and construction of transit systems, streets, parking facilities
- Infrastructure management utility operations, building maintenance, public housing operations
- Economic development rewarding and encouraging businesses to use less fossil fuel, recycle more and use fewer man-made chemicals
- Parks and open space mowing, maintenance, lighting

Toward a *Sustainable* Community:

A Toolkit for Local Government

1000 Friends of Wisconsin

Authors:

Sherrie Gruder, *UW-Extension, Madison, Solid and Hazardous Waste Education Center*

Anna Haines, *UW-Stevens Point, Center for Land Use Education*

Jerry Hembd, *UW-Superior, Northern Center for Community and Economic Development*

Lisa MacKinnon, *1000 Friends of Wisconsin*

Jane Silberstein, *UW-Extension, Ashland County*

focus on energy
The power is within you.

UW Extension

Capital District Transportation Committee
One Park Place Albany NY 12205-2676 518-458-2161 518-459-2155 (fax)

New Visions 2030

The Plan for a Quality Region

Summary Document

August 2007

August 2007

Dear Capital District Resident,

The Capital District Transportation Committee is pleased to share with you its draft New Visions 2030 Plan through this Summary Document. Through countless contributions from residents, businesses, transportation providers and state and local government representatives, CDTC has shaped a new approach to transportation policy and investment for the coming years.

We believe that the plan described in this report will meet the region's transportation needs in a cost effective manner while also promoting safety, enhancing the environment, building strong communities, and improving the overall quality of life. Through the New Visions effort, CDTC has come to believe more firmly than ever in the Capital Region's assets and in the need to use transportation investments and services to build on current strengths.

The Plan responds to regional voices who have described the desirability of planning for a quality region: a region that develops and sustains healthy urban, suburban, and rural communities that function interdependently and readily adapt to change; a region that creates economic, educational, social, cultural and recreational opportunities and provides safe neighborhood environments and housing choices for all; a region that protects sensitive environmental resources and fosters community identity and "a sense of place" in all parts of the region. The relationship between land use planning and transportation is central to the Plan, which calls for urban investment, concentrated development patterns, and smart economic growth.

The plan calls for preservation of our existing infrastructure along with a steady, even pace of improvements in related areas—highway and bridge conditions and design; pedestrian and bicycle accommodations; arterial management; traffic control and information technology; transit service; intermodal facilities; congestion management; community/transportation compatibility; and economic development. With cooperation, these transportation actions can help the region meet some very lofty goals and move even closer to becoming one of the most livable, economically attractive areas of the nation.

Working together, New Visions 2030 will become a reality.

Sincerely,

Mayor John T. McDonald III

Chairman

What is CDTC?

The Capital District Transportation Committee (CDTC) is the designated Metropolitan Planning Organization or MPO for the Albany-Schenectady-Troy metropolitan area. Every urbanized area in the United States with a population of over 50,000 must have a designated MPO for transportation in order to qualify for any Federal transportation funding. The simple purpose of each MPO is to provide a forum for State and local officials to discuss transportation issues and reach a consensus on transportation plans and specific programs of transportation projects. CDTC fulfills this purpose for both the Albany and Saratoga Springs urbanized areas and surrounding communities. The U.S. Department of Transportation (USDOT) relies on each MPO to make sure that the transportation projects that use Federal funds are the products of a continuing, comprehensive, and cooperative planning process and meet the priorities of the metropolitan area. Federal law requires CDTC to maintain an up-to-date Regional Transportation Plan (RTP) to guide decisions regarding the over $100 Million in annual federal highway and transit funds (including match) spent in the Capital District. To put "teeth" into the MPO process, the USDOT will not approve metropolitan transportation projects unless they are on the MPO's program - the budget-constrained Transportation Improvement Program (TIP).

CDTC has its origins in the old Capital District Transportation Study (CDTS), set up in 1965 through agreements between New York State and the four Capital District counties (Albany, Rensselaer, Saratoga, and Schenectady) and the 78 municipalities in those counties. Membership and participation has expanded over the years, and currently the CDTC Policy Board is composed of elected and appointed officials from

- the four counties;
- eight cities (Albany, Schenectady, Troy, Saratoga Springs, Cohoes, Watervliet, Mechanicville and Rensselaer);
- the New York State Department of Transportation (NYSDOT);
- the Capital District Transportation Authority (CDTA);
- the Capital District Regional Planning Commission (CDRPC);
- the New York State Thruway Authority (NYSTA);
- the Albany Port District Commission*;
- the Albany County Airport Authority; and
- the Town of Colonie; and
- at-large members representing the area's towns and villages.

This membership list is larger and more comprehensive than for most MPOs. Additionally, a technical group (CDTC's Planning Committee) includes the planning counterparts to the Policy Board officials as well as planners from a number of other towns and villages. The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) serve as advisory members at both policy and planning levels.

The CDTC sets its own broad agenda for planning activities. With a small professional staff funded with FHWA, FTA and county funds and the assistance of other member agencies, it investigates issues critical to the future of the Capital District. CDTC's planning approach can be characterized by two words: Stewardship and Vision. Stewardship refers to the responsibility of CDTC (collectively) to care for that which has been entrusted to us. CDTC has responsibility for existing transportation facilities and services, public resources, personal resources that are impacted by transportation decisions (like safety, comfort, and convenience, in addition to dollars and cents), and natural resources. Vision refers to the responsibility of CDTC to look to the long-range future of the area and make sure that the transportation system works then as well as now. The goals of the Capital District's residents, businesses and communities must be incorporated into our plans and programs. An awareness of problems to be averted and the development of innovative ways to achieve the region's goals are important to achieving and maintaining economic health and quality of life here.

CDTC is a recognized national leader in many planning and policy areas: the range of issues addressed through the CDTC forum is unusually broad; the coordination of land use and transportation policy is extensive; and the respect for CDTC as a collaborative decision-making forum is high. CDTC's policies and products represent strong consensus positions of the Capital Region and have very real impacts on real world actions.

CDTC Members

CDTC Policy Board
Chairman
Mayor John T. McDonald III
Staff Director
John P. Poorman

_____
Michael G. Breslin, Albany County
Charles E. Houghtaling, Albany County
Kathleen Jimino, Rensselaer County
Neil J. Kelleher, Rensselaer County
Philip Barrett, Saratoga County
Robert L. Phillips, Saratoga County
Susan E. Savage, Schenectady County

Mayor Gerald D. Jennings, City of Albany
Mayor John T. McDonald III, City of Cohoes
Mayor Anthony J. Sylvester, City of Mechanicville
Mayor Daniel J. Dwyer, City of Rensselaer
Mayor Valerie Keehn, City of Saratoga Springs
Mayor Brian U. Stratton, City of Schenectady
Mayor Harry J. Tutunjian, City of Troy
Mayor Robert D. Carlson, City of Watervliet
Mary Brizzell, Town of Colonie
Mindy Wormuth, Town of Halfmoon
Frank Quinn, Town of Glenville
Ellen McNulty-Ryan, Village of Green Island (Alternate)
Mark Evers, Town of North Greenbush, (Alternate)
John O'Donnell, Albany County Airport Authority
Terrence P. Hurley, Albany Port District Commission
Michael Stammel, Capital District Regional Planning Commission
Raymond J. Melleady, Capital District Transportation Authority
Astrid Glynn, New York State Dept. of Transportation
William D. Rinaldi, New York State Thruway Authority

Non-Voting Members
Richard Frederick, NYSDOT Reg. 1
Brigid Hynes-Cherin, FTA
Robert E. Arnold, FHWA

What is New Visions 2030?

What is a Regional Transportation Plan?

According to federal law, a Regional Transportation Plan (RTP or "plan") is a comprehensive long-range (20-30 year) plan for the transportation system of a metropolitan area, updated at least every four years by the designated Metropolitan Planning Organization (MPO). The RTP includes goals, objectives and policies. The RTP also recommends specific transportation improvements within a balanced budget.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act, A Legacy for Users (SAFETEA-LU) is the current transportation legislation that authorizes federal highway and transit funds and provides the underlying authority to MPOs such as CDTC. SAFETEA-LU added new responsibilities to CDTC's list and provided a July 2007 deadline for compliance. With this deadline in mind, the CDTC staff, Planning Committee and Policy Board accelerated work to allow CDTC to adopt a new RTP that complies with all provisions of SAFETEA-LU.

What is New Visions?

CDTC's plan is called "New Visions", reflecting the wholesale shift in planning philosophy that led to the first New Visions plan adoption in 1997 after several years of intensive technical work and public dialogue. Twenty-five bold principles gained the status of regional policy at that time and have guided planning and investment ever since.

The impact of the New Visions plan – and the integration of environmental, fiscal, land use and community issues into transportation decisions that is at the heart of the New Visions principles – has been substantial over the past decade. New Visions has spurred 54 "Community and Transportation Linkage" joint planning studies in 30 municipalities with over $3,000,000 in funding. It has provided priority for a NY 5 "Bus Rapid Transit" and land use plan across five municipalities. It has "leveled the playing field" to allow local governments to compete fairly with the state for highway repair and upgrade funds. It has ensured that steady progress will be accomplished in all areas, even during times of financial shortfalls. It has funded dozens of "spot" bike and pedestrian accommodations, sidewalks and trails. It has put a priority on operating the system, leading to the first advanced regional transportation management center, road patrols and transit – highway information connections. And it has reconciled highway planning to be more realistic and better balanced with community character.

One need only look at downtown Schenectady (with an economic renaissance supported in part by the major State Street Streetscape project enabled by New Visions), the Rensselaer Rail Station (funded in part by federal highway funds "flexed" by CDTC), rehab of I-87 and I-90 and other major roads, CDTA's new hybrid-electric bus fleet or similar projects to see the importance of New Visions. New Visions is a living plan that has a direct impact on planning philosophy and public investment. It is not a "shelf plan" in any respect, but has had great staying power – all 25 of the adopted principles were re-adopted in 2001, again in 2004 and are still valid today.

What is New Visions 2030?

The effort to go beyond the existing plan and create a "New Visions 2030" plan has been underway for a number of years, with continuous refinement and expansion of subject matter from that in previous plans. Public involvement has ranged from engagement in the dozens of "Linkage" studies at the local level to a recent Center for Economic Growth / SUNYA / CDTC / CDRPC (Capital District Regional Planning Commission) work documenting the fiscal impact on the region of several alternative growth scenarios for the next 30+ years. *Will this region be stagnant, or grow by a quarter-million people or more? Does it matter if the cities survive? Can we make a difference through intelligent local planning? How vulnerable will the region be if there is an energy crisis?*

A long list of new areas for exploration for 2030 called for new technical work and new opportunities for public reaction. Over the past several years, five working groups examined issues ranging from local governmental practices to the "big ticket" question, from "larger than regional policy questions" to the high cost of reconstructing an aging expressway system. The working groups posed new policy questions with which the region must grapple.

Why is the new plan important?

In the past several months, the policy and fiscal aspects of the multitude of these New Visions activities have been reviewed and highlighted. One by one, CDTC's Planning Committee and subsequently the Policy Board have examined each of over a dozen draft New Visions 2030 elements that represent new draft regional policy on issues ranging from human service transportation coordination to "big ticket" initiatives.

The CDTC Policy Board has now released these draft materials for public review. These new policy commitments include a handful of new planning and investment principles and a new financial plan, among other items, and will be additionally circulated for public comment between now and October 2007. Over the summer, CDTC staff will work with a "Quality Region Task Force" (which has been in place since the 2030 work started) to look for gaps in this new material and to help develop more polished summary materials for even wider public distribution. At its October Policy Board meeting, CDTC would then be asked to either adopt New Visions 2030, extend the public comment period, or both. The type of action would be dictated both by public comment received and by the work carried out with the Quality Region Task Force over the summer. The new plan will fully reflect the new planning requirements of SAFETEA-LU and ensure CDTC's full compliance with federal law.

The content of the new plan is important. CDTC's track record for a decade is to abide by its policies and the draft set of expanded principles frames the way this region will look at such items as transit service, urban reinvestment, roundabouts, the scope of projects, treatment of Northway and other expressway congestion and highway widening issues in general. Public buy-in to the refined New Vision approach is critical.

New Visions 2030 adoption also reflects a significant milestone along a long path. As noted, the bulk of the underlying philosophy was first fully articulated in the original New Visions plan in 1997. Since that time, CDTC and its members have been seriously engaged in implementing and refining the plan. In contrast to many other metro areas, the Capital District's physical landscape increasingly reflects the regional planning philosophy. CDTC's TIP (Transportation Improvement Program) reflects the plan and joint land use – transportation plans that have been developed in nearly 30 municipalities since the original New Visions adoption.

The new plan broadens the scope and deepens the treatment of many issues. The incorporation of alternative growth and development scenarios into the plan has few parallels in the nation. The consideration of potential "big ticket" initiatives that would call for transportation investment of billions of dollars carefully frames a simultaneously cautious and creative policy framework. Cautious, because the plan does not commit to major system redesign or dramatic new services without the funds to support them. Creative, because the plan empowers CDTC members and others to continually explore big ideas. This innovative approach ensures that the Capital District maintains vision during periods of financial constraint.

New official principles for the region are articulated for critical issues of safety, security and community context; consideration of roundabouts; tradeoffs between capacity and other project considerations; and a commitment to "managing" any new capacity considered on the expressway system. These, like the existing planning and investment principles, will not only keep transportation decisions in the Capital District focused on collective goals but will also serve as model statements for consideration elsewhere.

Adoption of the plan – after further public review – will officially end one chapter and initiate a new one in the New Visions saga. New work is called for in the plan. Not the least of the next steps is joint effort at all levels of government to ensure that the modest, steady growth in real resources required by the plan is a reality.

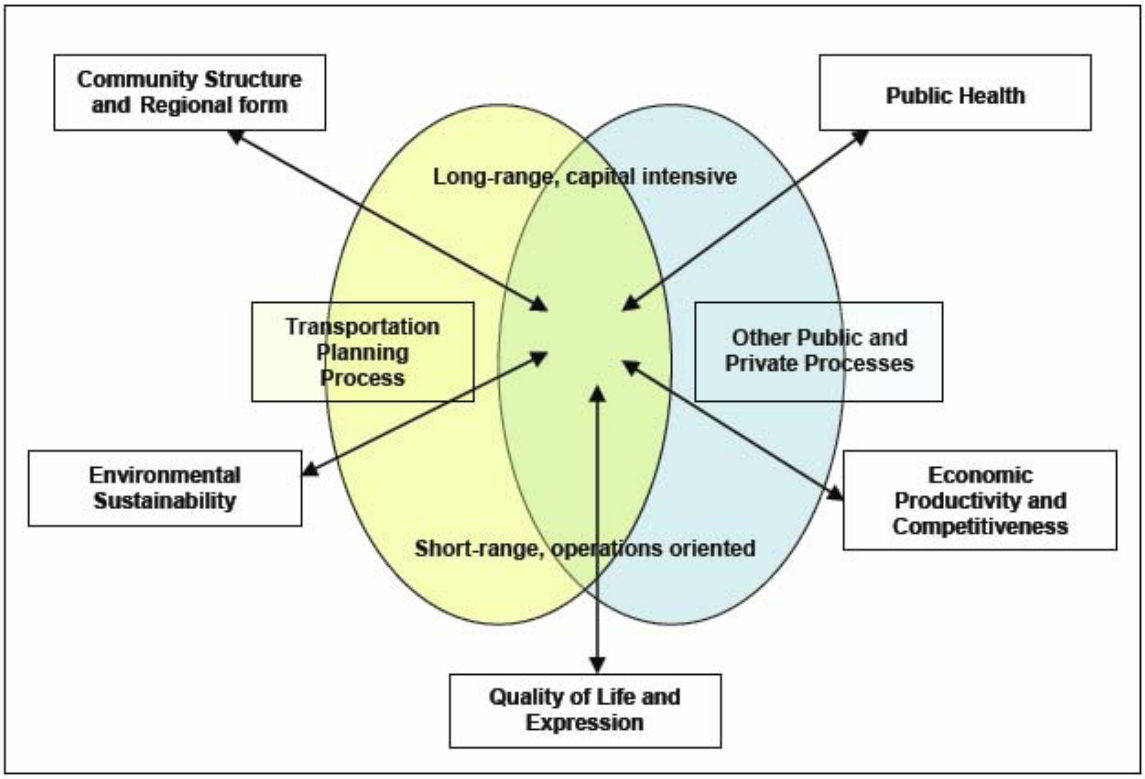
The New Visions Plan is a holistic plan that will maintain the Capital District as a quality region…

A QUALITY REGION develops and sustains healthy urban, suburban, and rural communities that function interdependently and readily adapt to change. A quality region creates economic, educational, social, cultural and recreational opportunities and provides safe neighborhood environments and housing choices for all; protects sensitive environmental resources and fosters community identity and "a sense of place" in all parts of the region.

Components of New Visions 2030

- Principles
- Strategies and actions
- Comprehensive budget
  - 17 categories from bridge maintenance to land use planning
  - Covers all funding sources at all levels
  - Steady progress policy
- Alternative Growth Futures
- Big Ticket Initiatives

A Holistic View of Transportation Planning



Comprehensive Budget

New Visions establishes funding for the following budget categories:

- Intermodal facilities
- Transit capital
- Transit operations
- Priority highway rehab
- Other highway rehab
- Bridge rehab
- Highway and bridge operations
- ITS/ traffic infrastructure
- ITS operations
- CMS Strategic projects
- Community / Economic projects
- Supplemental bike/pedestrian
- Supplemental goods movement
- Supplemental arterial management
- Supplemental safety actions
- Demand management
- Integrated planning & outreach

Reasonably Anticipated Revenues

CDTC's regional plan is fiscally constrained. That is, CDTC may not identify actions or projects as "committed" if it is not reasonable to anticipate that revenues will be available to advance the actions or projects at the intended time.

The New Visions financial plan is fiscally constrained on the same basis as have been previous New Visions plans. In the New Visions 2030 plan, CDTC and its members commit to the necessary rehabilitation of the entire transportation system, along with modest upgrades and improvements. Recent increases in the cost of materials coupled with the need to rebuild a nearly 50-year-old Interstate system have pushed the cost of the plan up 40% in the past six years – more than eating up funding increases provided in that period.

Even with these cost increases, the 2030 plan is fiscally balanced over time – *but only if public funding increases regularly over the next 25 years as it has in the past.* An essentially "flat" level of revenues would lead to serious, unacceptable declines in physical and service conditions and make even the most modest improvements difficult to accomplish.

While it is reasonable to anticipate that funding will be available over coming decades to carry out all elements of the New Visions plan, **it is imperative that CDTC and its members work with all interested parties at the federal, state and local level to explore prudent and timely actions to secure these funds**. Discussion of "big ticket initiatives" must occur simultaneously with discussion of budget gaps for the basics. It may be necessary to link the "urgent" with the "desired" to elicit sufficient public support for legislative action to provide the necessary resources.

The budget commitments in the New Visions 2030 plan are modest and conservative. In accord with adopted principles, emphasis is placed on system management and operations, coordinated land use and transportation planning, system preservation and re-investment and safety and air quality initiatives. Discretionary system expansion budgets are modest, but necessary.

The budget maintains CDTC's "steady progress" principle. That is, until funding levels match in real dollars the New Visions budget levels, funding commitments can be made to individual projects across all project types but at a slower pace of implementation than in the financial plan. CDTC will continue to seek bike and pedestrian accommodations, intermodal improvements, transit service improvements, new system operations initiatives and the like along with system preservation projects even while working with its partners to secure the necessary funding for full implementation. It will not be possible to achieve long-term system objectives across all subject areas without making steady progress (at a pace affordable by current funding) in all subject areas over the next 30 years.

New Visions 2030 Finance Plan
Regional Transportation Plan Budget by Element

			previous	new
		Current Invest-ment Levels	New Visions 2025 Full Implemen-tation	New Visions 2030 Full Implemen-tation
REGIONAL PROGRAMS[1]				
1	Intermodal Facilities	**31.900**	***41.095***	**41.600**
2	Transit Infrastructure	**12.000**	***11.491***	**16.807**
3	Transit Service	**60.000**	***41.860***	**63.000**
4	ITS (Technology) and Traffic Infrastructure	**6.300**	***12.790***	**15.250**
5	ITS (Technology) and Traffic Operations			
6	Highway Rehab, Reconstruction and Redesign -- Priority Network	**55.000**	***87.805***	**148.500**
7	Highway Rehabilitation & Reconstruction – Other	**12.500**	***15.250***	**20.730**
8	Bridge Rehab & Reconstruction	**55.100**	***82.100***	**89.100**
9	Highway and Bridge Maintenance	**191.000**	***174.300***	**217.875**
10	Strategic Highway and Bridge Actions -- CMS-based (capacity)	**17.400**	***10.277***	**8.939**
11	Strategic Highway and Bridge Actions – Economic Development /Community Compatibility	**9.500**	***8.712***	**12.286**
12	Supplemental Goods Movement Accommodations	**14.800**	***3.665***	**5.130**
13	Supplemental Bike & Pedestrian Accommodations		***2.618***	**3.670**
14	Supplemental Access Management Actions		***0.500***	**0.700**
15	Supplemental Safety Actions		***3.800***	**5.300**
16	Demand Management	**0.500**	***1.600***	**2.000**
17	Integrated Planning & Outreach	**2.600**	***3.610***	**4.500**
	SUBTOTAL	**468.600**	***501.473***	**655.387**

1 All values are in millions of 2007$, annually over 25 years, 2006-2030.

New Visions Addresses Issues Important to the Capital District

Transportation Safety- The New Visions 2030 plan lays out a clear strategy to meet a long-standing goal of improving the safety of the transportation system for all of its users both in response to new federal requirements and recent developments in the state of the practice. The plan relies on an integrated approach for safety planning activities which not only supports the continued use of traditional safety countermeasures on high speed facilities (clear zones, rumble strips, etc.), where appropriate, but also encourages use of the "Complete Streets" concept (where arterials, collectors and local roads are designed and operated to enable safe access for all users) and innovative design techniques. These include use of roundabouts, "visual friction" (the visual cues drivers get from the road environment to slow down), and access management techniques (to reduce conflict points between users of a roadway). This integrated approach also recognizes that education and enforcement efforts by local safety professionals also has a real impact on driver behavior and that designing improvement projects in sync with surrounding community context can help encourage responsible driving behavior. Taken together this approach will help reduce the level of risk for the region's most vulnerable users of the transportation system, namely bicyclists, pedestrians, children and the elderly.

Transit Service- Transit provides travel options, increases mobility and can support economic development. The New Visions Plan incorporates CDTA's Transit Development Plan which will improve and grow a variety of transit services for the Capital District. CDTC is investing in Bus Rapid Transit or BRT in the Route 5 corridor. "Big ticket" initiatives outline a vision of potential further investment in BRT and fixed guideway transit systems as a means of supporting regional growth.

Highways and Bridges- The cost to maintain the highway and bridge infrastructure in the Capital District over the next 20 years is staggering. The plan provides for $3.4 billion worth of investment in highway rehabilitation, reconstruction and redesign and $1.8 billion in bridge maintenance, repair and replacement by 2030. The New Visions Plan makes a strong commitment to keeping the region's highway and bridge system in good condition.

Travel Demand Management- The New Visions Plan continues to call for a variety of programs and initiatives aimed at managing travel demand. Park and ride lots, encouraging car pooling, telecommuting, employer based programs, guaranteed ride home, and support of use of non-auto modes such as transit, bicycle and pedestrian investments are strongly supported by CDTC.

Traffic Congestion- The Plan incorporates the CDTC "Congestion Management Process" (CMP). The CMP recognizes that congestion is worst in the AM and PM peaks; and that the most unbearable congestion is related to incidents, especially on

the expressway system. An accident during rush hour on the Northway can back up traffic for hours. The CMP calls for an emphasis on managing congestion—rapid clearing of incidents, information for travelers to avoid incidents, and taking advantage of technology (Intelligent Transportation Systems) including signal timing and coordination. The CMP also relies on travel demand management and encourages transit, pedestrian and bicycle travel. The Plan identifies the future option of managed lanes on the expressway system. An example of a managed lane could be a "HOT" lane on the Northway—a premium service lane that allows carpoolers for free, other drivers for a toll, and allows transit service to bypass congestion. A HOT lane is identified as one of the unfunded "big ticket initiatives" in the Plan.

Bicycle and Pedestrian Transportation- CDTC has made a strong commitment to improving bicycle and pedestrian facilities. This means incorporating sidewalks and pedestrian crossings and bicycle lanes in highway construction projects; encouraging site design by developers that provides high quality pedestrian access; developing bike/hike trails; encouraging the incorporation of bicycle and pedestrian accommodations into city, village and town plans. One of the currently unfunded "big ticket initiatives" described in the Plan presents a vision for a regional greenways program that would result in 280 miles of bike-hike trails linking parks, natural areas, cultural features, historic sites, neighborhoods and retail areas.

Environmental Quality- The New Visions Plan charts a course for environmental quality in the Capital District. The plan fosters protection of open space and environmentally sensitive areas, moderation of growth of vehicle miles traveled (or VMT) to support energy conservation and air quality, and identification of opportunities for larger- than-project specific mitigation of transportation impacts. By encouraging sustainable development patterns and site design, urban reinvestment and community-based land use planning, along with transit, bicycle and pedestrian investments and strong participation in the Clean Cities program, the Plan seeks to create a sustainable transportation system over the long run in the Capital District.

The Importance of Local Communities- The New Visions Plan recognizes the critical importance of land use and development. CDTC has sponsored the Linkage Planning Program which provides funding for cities, towns and villages to prepare community-based transportation and land use plans consistent with New Visions principles. Where and how the region's communities plan and design the places we work, live, and shop can have a real and direct impact on the region's arterial and collector street system. A comprehensive arterial management program that promotes properly located and spaced driveways and signalized intersections, use of raised medians, and emphasizes connected streets, sidewalks, and transit access, in the end, will provide a safe and efficient arterial street system and quality communities. At the regional level, CDTC has evaluated regional growth patterns and concluded that development which is transit-oriented and concentrated around centers holds the best hope for regional quality of life and a sustainable transportation system.

Economic Development- CDTC has worked with the Center for Economic Growth, ARISE (A Regional Initiative Supporting Empowerment), the Business / Higher Education Roundtable and members of the Quality Region Task Force to articulate regional economic development needs and the transportation investment needed to support regional economic growth. CDTC worked with CEG, CDRPC, and UAlbany to assess the fiscal impacts of regional growth scenarios. There is strong support from the business community for urban reinvestment and concentrated growth patterns and a strong transportation system that will support sustainable economic growth for the region.

Freight movement- The New Visions Plan recognizes the importance of planning and developing appropriate programs to meet the increasing demands freight movements put on the transportation system. New Visions recognizes the importance of freight to the regional economy and to private sector businesses. Congestion management and infrastructure investments will support goods movement in the capital district.

Public Participation- The New Visions 2030 development has included Quality Region Task Force, five working groups, the Bicycle and Pedestrian Task Force, the Goods Movement Task force, and the Finance Task Force; and public involvement in the dozens of Linkage studies at the local level. The CDTC Policy Board has now released the draft Plan materials for public review. Over the summer, CDTC staff will work with a "Quality Region Task Force" (which has been in place since the 2030 work started) to look for gaps in this new material and to help develop more polished summary materials for even wider public distribution. At its October 4, 2007 Policy Board meeting, CDTC will then be asked to either adopt New Visions 2030, extend the public comment period, or both. The type of action would be dictated both by public comment received and by the work carried out with the Quality Region Task Force over the summer. The new plan will fully reflect the new planning requirements of SAFETEA-LU and ensure CDTC's full compliance with federal law.

Security- Security has become an important factor in transportation planning. CDTC will continue to follow the lead of NYSDOT and CDTA with security related issues and continue to provide a forum for operational discussion related the transportation system in the Capital District. If needed, CDTC will assist a security coordinating agency to the extent possible.

Alternative Development Scenarios

The Capital District is a region at a critical crossroads. With the prospect of increased development pressure and growth potential, the region is being challenged to assess its ability to accommodate growth in a sustainable manner. During the development of the New Visions 2030 Plan, CDTC received strong support from regional partners for developing a plan that sustains the Capital District as a quality region.

The future is uncertain, and CDTC decided to analyze different scenarios of growth. **Four different future development scenarios were considered**. These scenarios were developed to test the impacts of growth. CDRPC conducted an in depth analysis of the demographic distributions and land use patterns for four scenarios:

1. **Status Quo Trend**- This is CDRPC's baseline forecast (9% growth in population, 15% growth in households by 2030, current development patterns continuing); this is the official Plan forecast, and can be considered the most likely based on past trends;
2. **Concentrated Growth**- This scenario assumes the baseline growth rate, but with more concentrated development patterns resulting from urban reinvestment and suburban planning;
3. **Trend Hyper-Growth**- This scenario assumes "hyper-growth" (29% population growth and 35% household growth by 2030), with trend patterns of dispersed development; the rate of growth mirrors the national average of one percent per year;
4. **Concentrated Hyper-Growth**- This scenario assumes hyper-growth occurring in a concentrated pattern resulting from more urban reinvestment and suburban planning.

The four growth scenarios were represented and modeled in detail at the zonal level, and are illustrated in the maps on page 16.

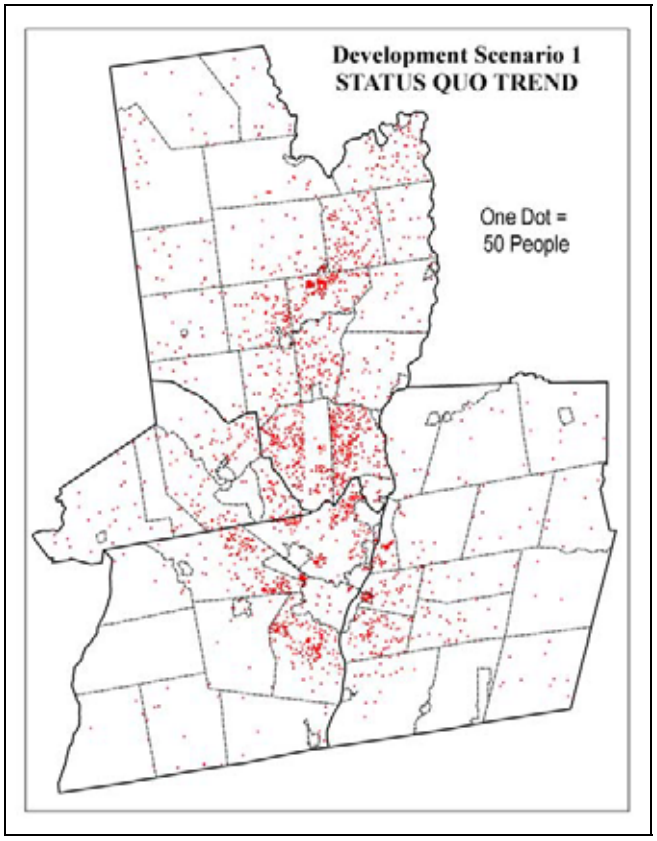
Under any growth scenario, it was found that the positive benefits of concentrated development patterns are significant for the transportation system and for regional quality of life. The New Visions Plan supports and encourages concentrated development in the Capital District. The urgency for coordinated, high quality planning is even greater under a scenario of high growth. This urgency will be necessary because the impacts of a high growth scenario with dispersed development patterns would threaten to make the region's quality of life unsustainable.

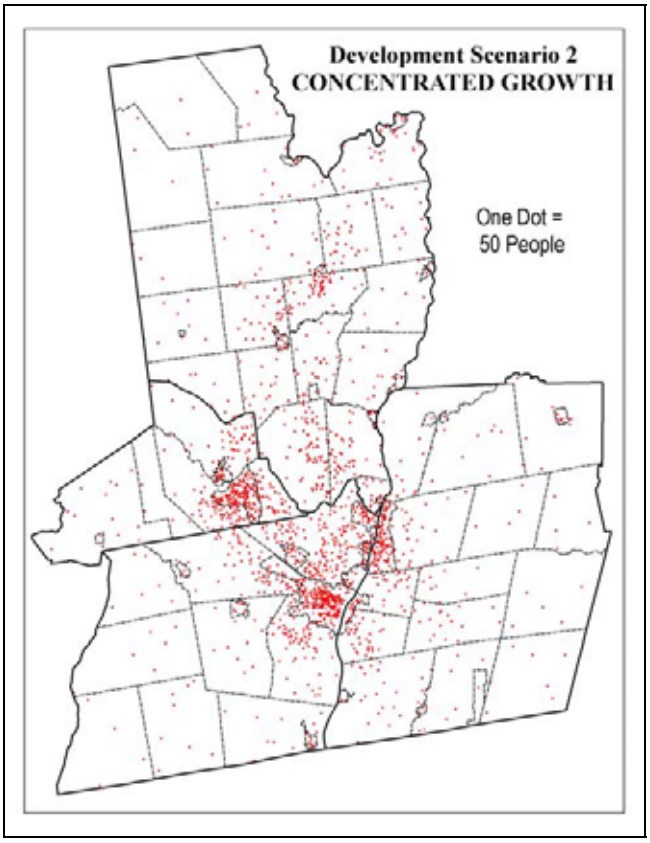
CDTC worked with CEG, CDRPC, and UAlbany to assess the fiscal impacts of regional growth scenarios. There is strong support from the business community for urban reinvestment and concentrated growth patterns and a strong transportation system that will support sustainable economic growth for the region.

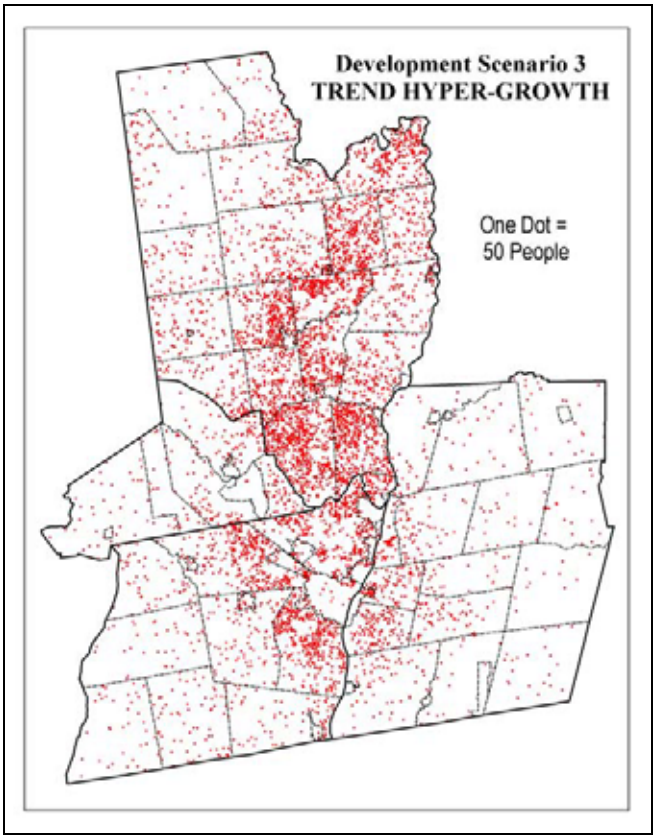
Achieving the benefits of the concentrated development scenarios will require continued strong public support and much concerted regional and community leadership. New Visions 2030 calls for transportation investments that support urban reinvestment and high quality suburban planning. The New Visions for a Quality Region process has confirmed a consensus that seeks to use transportation policy (and other public policy) in the region to:

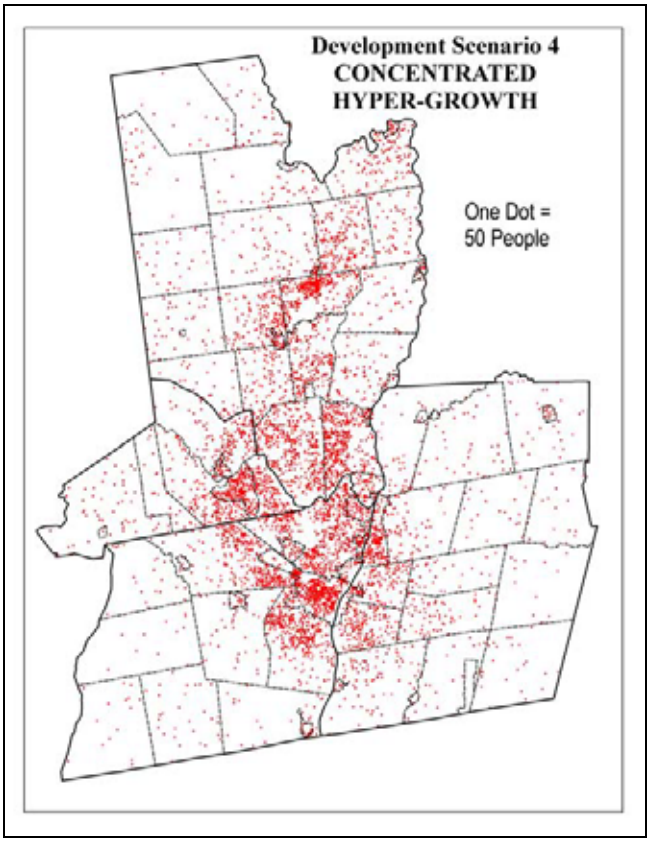
- Encourage sustainable economic growth with good-paying jobs;
- Revitalize urban areas;
- Help build community structure in growing suburbs;
- Preserve open space and agricultural land;
- Make communities more walkable and livable;
- Provide meaningful transit options;
- Connect all residents with job opportunities;
- Mitigate growing congestion and maintain reasonable mobility on the highway system; and,
- Encourage land use and transportation planning.

Population Growth from 2000 to 2030
Under Four Alternative Development Scenarios









Big Ticket Initiatives

The Plan calls for consideration of potential "big ticket" initiatives. These initiatives would be supported by higher growth scenarios, yet they could be pursued with trend growth as well. Funding is not identified, yet the plan puts forward the vision of bold investments that could be feasible if the public supports the vision and funding can be found.

The Plan is cautious, because it does not commit to major system redesign or dramatic new services without the funds to support them.

The "big ticket" initiatives also represent a creative approach, because the plan empowers CDTC members and others to continually explore big ideas. This innovative approach ensures that the Capital District maintains vision during periods of financial constraint.

The big ticket initiatives are listed on pages 20 to 21, along with descriptions and cost estimates.

During the development of the New Visions 2030 Plan, six conditions were identified that have allowed such initiatives to occur in other regions and that could make the big ticket initiatives feasible in the Capital District. Some of these conditions may already be present for some initiatives. All of these are conditions that the Capital District may grow into.

1. **A sense of urgency is typically present.** This sense of urgency may be related to long-standing issues of great magnitude (such as the congestion present in London prior to areawide pricing) or to an experience and atmosphere of rapid growth. *This sense of urgency may not be present in the Capital District for many of the initiatives under current growth trends, but it could emerge strongly under higher growth scenarios.*

2. **A champion is typically a critical element as catalyst and sustainer of the initiative.** Elected officials or, occasionally, planning professionals are often directly associated with marshalling the support and forging the necessary partnerships to make an initiative a reality. The champion is often essential to shepherding the initiative through difficult implementation phases of environmental analysis, NIMBY opposition and cost increases. Without a visible champion, an initiative could die easily in the face of such obstacles. *The big initiatives for the Capital District will require champions.*

3. **The initiative reflects the sensibilities and community values of the region, producing a strong community consensus.** For example, Portland's and

Minneapolis' initiatives in the areas of growth management, environmental stewardship and livability both draw from and reflect the personal priorities of the local residents and business leaders. Big initiatives today are not likely to succeed simply because they fall within the purview of a powerful government agency; they require broad public support. *The feasible big initiatives presented in this paper have been selected because they are consistent with New Visions planning principles, which have enjoyed strong and growing support among Capital District communities.*

4. Commitment to a major initiative is as much related to a subjective rationale as to objective analysis. This does not mean that a decision to reconstruct the Central Artery in Boston or a regional rail system in Raleigh-Durban is unfounded. Rather, it means that regions pursue major initiatives as much because they want to as because they believe the initiative is economically efficient in achieving results. The "look and feel" of the completed project; the desire to make a *public* statement of the region's priorities; the hope of lasting positive benefits are at least equal to calculations of user savings, transit ridership, emissions reductions or cost effectiveness in the decision process. *The subjective rationale for the big ticket items in the Capital District is compelling.*

5. Funding is achieved through a combination of local sources and state or federal funds – *reflecting a willingness to pay*. The funding paradox ("We can't plan something big because we don't have money and we can't get money because we haven't planned anything big") is resolved in successful initiatives by (1) securing local financial support for a popular initiative with public support by promising external funds to vastly subsidize the local cost; and (2) leveraging the local enthusiasm and local funding commitment to obtain external (state or federal) funds from discretionary pots.

The question of the willingness to pay for big ticket items has an uncertain answer in the Capital District under existing conditions. Growth pressures brought about by the high growth scenarios may influence the public on this, especially if investments are viewed as tools to manage the growth and protect and enhance community quality. Further, higher growth scenarios may lead to increases in regional transportation revenues, for example, an increase in mortgages related to higher population growth will create more revenue for funding public transit; and higher population growth will result in increasing shares of federal funds. This type of funding increase would present opportunities that would influence the public's thinking. More concentrated development patterns with urban reinvestment would support premium transit service and reduce costs per vehicle mile traveled, creating opportunities for public support of increasing revenue.

Finally, forecasts of future levels of State and federal funding are uncertain; but if those funding levels were to increase, the region would be well positioned to take advantage of those funds if a consensus has been developed about the types of big initiatives that should be pursued. The recent state investments and incentives for

Nanotech and chip fab industries in the Upstate communities raises the possibility that the external funding needed to help support big transportation initiatives in the Capital District may be from the state budget as much or more than from the federal budget.

6. In the absence of the conditions to support big initiatives, it is difficult to attain comparable impact through incremental changes. Incremental actions, such as those contained in CDTC's existing New Visions plan and funded in the Transportation Improvement Program, are different in kind as well as in scale from big initiatives that derive from a sense of urgency. For example, in the absence of expectations of rapid growth in the region, in 2000 CDTC chose a Bus Rapid Transit (BRT) option for the NY 5 corridor and full implementation will not be completed until 2015. Over that same timeframe, other metropolitan areas will have built substantial regional rail systems, undertaking the difficult and expensive actions because of urgency caused by growth. The substantial commitment to rail transit in those metropolitan areas will produce a land use impact (with development more oriented to station locations) that the slow rollout of BRT in the Capital District cannot. *Forty years from now Capital District residents may wonder why their region lacks the transportation infrastructure evident in other areas and conclude that planners and elected officials at the beginning of the 21st century lacked foresight. For that reason, it is important to at least consider big initiatives for the Capital District.*

The big ticket initiatives represent an investment tool that will help manage growth in a way that will sustain the Capital District as a quality region. Investments in the big ticket initiatives can catalyze a more concentrated development pattern under any growth scenario. The caveat is that the big ticket initiatives are currently unfunded, and by themselves will not induce high growth.

Maximum Twenty-Year Scale of Hypothetical "Big Initiatives" In the Capital District (Implementation between 2010 and 2030)

	Hypothetical "Big Initiative"	Approximate *Maximum* Twenty-year scale in the Capital District	Twenty-year cost estimate	Comments
	**Regional greenway program**	10 miles per year; 280 total including existing	$150 M	Scale reference is Seattle's plan for 800 miles of paths. Cost at approximately $500 K/mile based on local experience.
	**Riverfront access and urban development program**	Implementation of a majority of existing plans	$1,000 M	Could draw from multiple fund sources, not just transportation. If significant Interstate redesign is included, could approach $3 B - $4 B based on Boston's Central Artery precedent.
	**Street Reconstruction and Reconfiguration**	40 lane miles per year; 800 total	$2,400 M	New Visions intended to address 25 lane miles per year; this is 50% more aggressive. Cost at approximately $3 M per lane mile.
	**Roadway widening and connections program**	10-15 lane miles per year; 200 total	$1,000 M	Scale comparable to double the intended ten-year implementation in New Visions 2021 plan. Mix of modest ($2.5 M per lane mile) and costly ($7 M per lane mile) projects.
	**Suburban town center development**	5-10 lane miles per year; 150 total	$175 M	Cost at approx. $1 M+ per lane mile as mix of access and collector roads. Developer-built or financed connections not included in the total.
	**Bus service expansion, BRT program with transit oriented development**	100 route miles total including NY 5	$200 M capital $400 M add'l oper.	Scale and cost estimated at 5-10 times that for NY 5 BRT.
	**Guideway transit system with transit-oriented development**	50 route miles guideway with 50 route miles of non-guideway BRT.	$2,100 M capital $1,450 M add'l oper.	Scale comparable to planned expansion in Portland over 20 years; capital cost of $40 M/mile derived from Portland, Phoenix, and Columbus plans. Operating cost estimated at $1.25 M/year per linear mile. Includes ½ of BRT non-guideway plan also.
	**Managed lane program**	50 route miles total with approx. 75 lane miles	$750 M $10 M operating	Scale at one or two lanes per center-line mile where physically feasible in Interstate system in Albany County, extensions north, east, west. Cost at $10 M per lane mile.

Maximum Twenty-Year Scale of Hypothetical "Big Initiatives" In the Capital District (Implementation between 2010 and 2030)

	Hypothetical "Big Initiative"	Approximate *Maximum* Twenty-year scale in the Capital District	Twenty-year cost estimate	Comments
	**Highway noise program**	40 locations on expressway system	$40 M	Scale addresses all existing warrants; noise mitigation costs for widenings are included in guideway and managed lane budgets above.
	**Demand management program**	40,000 participants	$50 M (public)	Scale at 10% of regional workforce; Cost estimated at $20/month for ¼ of participants, self-financed by employers for remaining participants. $20/month is derived from CDTC experience.
	**Clean, efficient vehicle program**	public transit fleets, private vehicle incentive to double hybrid sales (2010), declining incentive to 2030	$550 M	Scale at 30% purchase price incentive in 2010 to double hybrid sales to 2,800; incentive declines as hybrid market expands. Estimated $100,000 price increase for 300 transit vehicles of varied sizes.
	**Intelligent traffic management program**	Full ITS deployment on priority network; including real-time traffic info on entire system	$135 M	Working Group B estimates as continuation of current $6.7 M/yr; purchases more as costs decrease. Cost does not include rapidly-expanding private investment (vehicles, services)
	**Video surveillance and enforcement program**	Full deployment on priority ITS network	Supported by fines	Red light running cameras and possibly, speed enforcement cameras
	**Comprehensive Traffic Safety program**	Capital investment at several times the set aside in SAFETEA-LU, plus other features	$200 M	Capital improvements, driver education, traffic enforcement, improved community and site design.
	**Major highway system construction**	Approx. 20-25 arterial and 5-10 lane miles of expressway annual	$3,000 M to $5,000 M	**Not included in the Plan**--Not consistent with community values or public policy (such as the State Energy Plan, State Transportation Plan and the New Visions Plan).
	**Take-a-lane program**	No feasible implementation for contra-flow lanes. Tolling existing toll-free facilities in theory could reach 100 route miles	more than supported with toll revenue-	**Not included in the Plan** --Not supported by traffic dynamics; no excess capacity in off-peak to yield a lane. Tolling existing toll-free facilities not yet politically plausible.

New Visions Principles

Planning and investment principles guide decision-making at CDTC. As statements of principle, they provide a framework for funding decisions, project selection criteria, and corridor-level planning. The original New Visions plan in 1997 led to the articulation of 25 principles which have been reaffirmed in subsequent updates of the plan. After more than ten years of public vetting, they have had significant impacts on how transportation planning is approached and where public transportation investments are made in the region. These 25 principles are carried forward into New Visions 2030. These principles have described CDTC's commitment to:

The New Visions planning and investment principles have significantly impacted transportation in the region since 1997.

- **system preservation first**
- **technology, operations and demand management**
- **jurisdiction blind investments**
- **plan and build for all modes**
- **transportation *and* land use**
- **fiscal realism**
- **steady progress with balanced implementation**

New Visions 2030 articulates six new principles which address the following issues:

- **safety**
- **security**
- **consideration of roundabouts**
- **tradeoffs between capacity and other project considerations including community context**
- **a commitment to "managing" any new capacity considered on the expressway system**
- **environmental stewardship**

CDTC'S 31 ADOPTED PLANNING & INVESTMENT PRINCIPLES

The following is a list of the principles adopted in CDTC's New Visions 2030 Regional Transportation Plan. CDTC attempts to respect these principles in all its actions.

PRESERVE AND MANAGE

Improve System Performance

1) CDTC is committed to the maintenance, repair and renewal of the existing highway and bridge system in a cost-effective manner that protects and enhances rideability, public safety and accessibility.
2) Funding for appropriate repair and renewal will be based on the function and condition of the facility -- not ownership.
3) Encouraging bicycle and pedestrian travel is a socially, economically and environmentally responsible approach to improving the performance of our transportation system.
4) In addition to supporting desired land settlement patterns, transit service helps meet multiple regional objectives in the Capital Region.
   - Transit contributes to congestion management, air quality and energy savings;
   - Transit offers an alternative travel mode, reducing auto dependence; and
   - Transit provides essential mobility for those who do not operate a private vehicle.
5) Improve the safety of the regional transportation system by creating a traveling environment that is consistent with the community context and provides a reasonable range of risk for all users of the system.
6) Transportation planning and implementation in the Capital Region includes examination of security issues and incorporation of security actions that: protect lives and coordinate the use of resources and manpower through established plans and protocols; provide services during and after disaster emergencies to aid citizens and reduce human suffering resulting from a disaster; and provide for recovery and redevelopment after disaster emergencies.
7) The needs of the older driver will be considered as transportation facilities are maintained and rehabilitated.
8) Increased efficiency in current vehicles/programs is preferable to fleet expansion to provide for special transportation needs.

Manage Congestion

9) Management of demand is preferable to accommodation of single-occupant vehicle demand growth.
10) Cost-effective operational actions are preferable to physical highway capacity expansion.
11) Capital projects designed to provide significant physical highway capacity expansion are appropriate congestion management actions only under certain conditions.
12) Significant physical highway capacity additions carried out in the context of major infrastructure renewal are appropriate only under certain conditions.
13) Incident management is essential to effective congestion management.
14) Any major highway expansion considered by CDTC will include a management approach.
15) In project development and design, other performance measures, such as pedestrian, bicycle and transit access, community quality of life, and safety will be considered along with congestion measures.
16) The New York State Department of Transportation guidelines for roundabouts will be used for all CDTC federal aid projects that involve intersection improvements.

Protect Our Investment

17) Managing traffic flows on the Capital Region expressway and arterial system is critical for both economic and social reasons.
18) Major capital projects must have a plan for operating budgets for the life of the project.
19) Maintaining the health and improving the efficiency of the existing freight facilities in the region through public/private partnerships is a high priority.

CDTC'S 31 ADOPTED PLANNING & INVESTMENT PRINCIPLES

DEVELOP THE REGION'S POTENTIAL

Build Upon our Strengths

20) The transportation system of the Capital Region is an important part of the region's attractiveness.

21) Transportation investments will help preserve and enhance the Capital Region's existing urban form, infrastructure, and quality of place.

Use Transportation Investment as a Tool

22) Transit facilities and services can be an essential element of the social, economic and cultural fabric if supportive policies and investments are in place.

23) Neighborhood-based local planning efforts are important to the success of an overall regional plan that emphasizes livable communities.

LINK TRANSPORTATION AND LAND USE

24) Land use management is critical to the protection of transportation system investment.

25) Design of street layout and location of complementary uses creates a pedestrian scale and provides increased accessibility without compromising the attractiveness of development.

Link Transportation Investments to Land Use Planning

26) Transportation investments will encourage residential and commercial development to locate within an Urban Service Area defined for the Capital Region.

27) Environmental stewardship is one of CDTC's emerging roles and is crucial to the success of and quality of life in this region. Transportation investments must improve or preserve the region's cultural and natural environment.

28) Transportation investments will not encourage development in environmentally sensitive areas and will help to preserve rural character.

29) Arterial management guidelines will be flexible enough to deal with the Capital Region's various roadway types and the specific land use patterns surrounding them

PLAN AND BUILD FOR ALL MODES

30) CDTC's planning efforts will be comprehensive enough to encompass all modes, including air, water, freight, intercity and local transit, pedestrian and bicycle.

31) Possible bicycle/pedestrian-related improvements will be considered from the perspective of developing a system -- not just based on whether a particular facility is currently used.

CDTC'S DRAFT 13 STRATEGIES & 47 ACTIONS

The following is a list of the draft strategies and actions for CDTC's *New Visions 2030* Regional Transportation Plan. They represent CDTC's intended implementation program.

MAINTAIN GOOD INFRASTRUCTURE CONDITIONS

1) Ensure adequate highway and bridge maintenance efforts.
2) Pursue an effective highway and bridge rehabilitation and reconstruction program.
3) Continue to maintain transit equipment and facilities in a state of good repair.
4) Embrace a" risk assessment" approach for capacity considerations in infrastructure project design.
5) Maintain, update, and enhance priority treatment networks for transportation investments.
6) Explore changes in road ownership or state funding opportunities as ways to level the playing field between various roadway owners.

PRO-ACTIVELY PLAN VIBRANT COMMUNITIES

7) Prepare and maintain Regional Development Strategies.
8) Develop a New Visions Planning Guidebook.
9) Continue to provide funding for and staff participation in community based planning through the Community and Transportation Linkage Planning Program.
10) Develop a New Visions Training Program that specifically targets local planning board members and other local decision makers.
11) Engage county planning and encourage intermunicipal planning and information sharing.
12) Continue to undertake access management plans for priority network arterials as opportunities arise.
13) Maintain a program for transportation projects directed explicitly at community enhancement or regional economic development.

PLAN FOR A SAFER AND MORE SECURE TRANSPORTATION SYSTEM

14) Establish a Safety Working Group to coordinate CDTC's safety planning activities with regional safety partners.
15) Develop a formal safety management system for the Capital Region that goes beyond traditional approaches.
16) Facilitate interagency cooperation and coordination of security planning activities.

REACH OUT FOR FULL PARTICIPATION

17) Emphasize public participation in transportation planning, programming and implementation.

DESIGN EFFECTIVE FACILITIES

18) Improve continuity between the planning, programming and design of transportation projects, regardless of fund source and road ownership.
19) Routinely make road projects bicycle, pedestrian and transit friendly.

ENHANCE THE MANAGEMENT AND OPERATION OF THE REGIONAL TRANSPORTATION SYSTEM

20) Implement Intelligent Transportation Systems (ITS) on the priority network.
21) Continue to support the Transportation Management Center and incident management activities.
22) Continue to promote sound arterial management planning and design practice as one tool to improve transportation system performance on all Capital Region arterial streets.
23) Facilitate the collection of transportation data to foster regional transportation planning and analysis.

SUPPORT INTERMODAL TRANSPORTATION

24) Improve intermodal passenger connections throughout the region.

25) Continue to support and facilitate goods movement planning and intermodal activities.

26) Improve surface access to the Port of Albany.

27) Continue to support improved surface access to the Albany International Airport.

28) Eliminate at-grade railroad crossings where feasible and improve at-grade railroad crossing safety.

PROVIDE RELIABLE, EFFICIENTAND ACCESSIBLE TRANSIT SERVICE

29) Continue to restructure and enhance transit service to meet 21st century needs.

30) Support transit through design of the built environment and use of technology.

31) Maintain the Regional Transportation Coordinating Committee to serve as the forum for coordinating the transportation activities of human service agencies and local transit services, such as CDTA.

TREAT ALL MODES FAIRLY IN THE CAPITAL PROGRAM

32) Direct transportation funding to support ***New Visions 2030*** concepts.

33) Continue to provide funding for implementation of small, cost-effective improvements.

ENHANCE DEMAND MANAGEMENT

34) Continue and expand demand management initiatives using the best available technologies.

35) Engage New York State as a full partner in parking management and transit promotion.

36) Consider highway pricing (particularly congestion pricing) and broad parking policies (including cashing out).

ENSURE THE ENVIRONMENTAL IMPACTS OF TRANSPORTATION ACTIONS ARE CONSIDERED WHILE CREATING A MORE SUSTAINABLE TRANSPORTATION SYSTEM

37) Support the deployment and use of Clean Fuels and Clean Fuel Technology in the Capital Region.

38) Continue to update CDTC's Title VI/Environmental Justice (EJ) document and consider the impacts of planning, project programming and project design on CDTC's Title VI/EJ populations.

39) Specifically consider environmental and cultural resource impacts of transportation planning, project programming and design.

40) Explore Green Corridors and opportunities to reinforce open space protection efforts in the Capital Region.

EXPLORE BIG TICKET/BIG IDEA INITIATIVES

41) Refine and further articulate the Big Ticket/Big Idea Initiatives for the Capital Region.

42) Continue to explore options for the Regional Greenway Concept.

SECURE ADEQUATE FUNDING TO FULLY IMPLEMENT THE PLAN

43) Build a coalition to lobby for regional transportation projects.

44) Explore local funding mechanisms for implementation of the plan.

45) Increase the use of mitigation costs and public/private partnerships to finance transportation improvements.

46) Include demand management and transit support in developer-financed traffic mitigation programs.

47) Explore changes in funding rules to better align funding with function.

The Full New Visions 2030 Plan is documented in the reports listed below. They are available on CDTC's website: www.cdtcmpo.org.

Effects of Alternative Development Scenarios in the Capital District
(Working Group A: Draft Summary | Draft Final Document)

Expressway System Options
(Working Group B: Draft Summary | Draft Final Document)

"Big Idea" Transportation Initiatives For The Capital Region
(Working Group C: Draft Summary | Draft Final Document)

Larger than Regional Policy Concepts
(Working Group D: Draft Summary | Draft Final Document)

Concepts for Assisting Local Decision Making in a Regional Context
(Working Group E: Draft Summary | Draft Final Document)

Bicycle and Pedestrian Game Plan and Toolbox
(Draft Summary | Draft Final Document)

The Metropolitan Congestion Management Process
(Draft Summary | Draft Final Document)

Environmental Justice Analysis
(Draft Summary | Draft Final Document)

Meeting the Environmental Mitigation and Consultation Requirements of SAFETEA-LU: An Opportunity to Continue Moving Toward a Sustainable Regional Transportation System
(Draft Summary | Draft Final Document)

New Vision 2030 Finance Plan
(Draft Summary | Draft Final Document)

Goods Movement Plan
(Draft Summary | Draft Final Document)

Safety Planning in the Capital District
(Draft Summary | Draft Final Document)

Security (Draft Summary | Draft Final Document)

CDTC's 31 Adopted Planning & Investment Principles

CDTC's Strategies and Actions

While not directly a part of New Visions 2030, the following two documents were recently approved and are incorporated into CDTC's planning efforts to ensure SAFETEA-LU compliance.

- **Coordinated Public Transit-Human Services Transportation Plan**: Executive Summary | Final Document | New Visions Summary
- **Public Participation**: Final Document

Theme 8: Energy Conservation

Nancy H Taylor 5/18/2010 2:19

Comments on Theme 8. Thank you very much for adding Theme 8 to the draft Comprehensive Plan. It is crucial that it be included as part of our planning process.

I would suggest that the word "Renewable" be used instead of "alternative" when you are speaking about energy, particularly where it is used as a theme heading. The word "alternative" implies that it is a practice that is on the fringe. The use of renewable energy needs to become mainstream for all of our citizens, even those who frown on "alternative" options for their lifestyle.

The use of wind as a renewable resource for energy generation is really not a viable source for Teton County. We don't want to discourage the use of home wind turbines as they becomes more viable in the future, but at this time we do not have enough wind to make wind energy cost effective.

It might be worth mentioning solar thermal or the heating of hot water from solar panels, as it is a very cost-effective way to heat water with a very short pay-back period.

There was a Green Building Action Team which was a branch of the EEAB that drew up Green Building Guidelines for residential housing. We spent several years drawing up these guidelines and it would be good if they were incorporated into the LDRs connected to Theme 8. Please talk to Jesse Stover in the Building Department. There also needs to be some financial incentive to encourage green building for residential and commercial development.

The Energy Mitigation Regulations need to be mentioned with more emphasis, as the size of 2nd and 3rd vacation homes does a great deal to increase the carbon footprint of Teton County.

There was also a community 10X10 effort headed by Sarah Mitchell. We drew up several suggestions for education and retrofitting which could be mentioned in Theme 8.

Thank you for your consideration. I would be happy to answer any further questions on this theme.

Energy Efficiency Advisory Board 6/1/2010 12:20

The suggestions below are based on limited discussion at the May 19th EEAB meeting, individual attention to the chapter and from ideas obtained from other U.S. communities that are addressing similar topics.

Beginning at the top…

Title: please consider utilizing (throughout the document) a more active, outcome oriented word in place of “theme”. Suggestions-goal, objective, target, intention. Plan chapters are the foundation for regulation and the title of the sections should reflect that status.

Statement of Ideal: needs a more definitive vision/description. Suggestion-“Address reduction of local energy use including per capita consumption, transportation, construction standards/materials/locations through efficiency, conservation, sustainable practices such as renewable sources and infrastructure such as smart grid technology across all sectors of the community.

Requires definition of “efficiency”, “conservation” and “sustainability”.

Why is this theme addressed?:

No need to call attention to the idea that Comp Plans “typically govern land uses”…the 1994 Plan was also atypical in its attention to wildlife resources, habitat and migration so we crossed that

bridge a long time ago. Suggestion-begin the paragraph with the statement that "95% of the community's energy impacts are attributable to transportation and building activities…etc" without including 'justification' for including it in the Plan. The Plan is the ONLY place that County policy may be expressed as regulation -likely the most important reason for including energy conservation along with a variety of related subjects. Town Council, on the other hand, is able to pass ordinances.

In the second paragraph under this section, suggest eliminating the first sentence and adding the following ideas in the second sentence: "Indications of climate change have become evident in our county and region. It is believed that these effects impose unacceptable impacts on **natural resources, wildlife, economic vitality, human health and welfare** -including skiing, river running, fishing, hunting, air quality, unusual weather events and other interests. Stewardship of these values have long been expressed as top priorities by the community and are the basis for sustainability." The remainder of the paragraph seems to provide good back-up information. Further expansion of the economic and/or social considerations may be helpful.

For example, "Wiser use of energy resources can lead to cost savings for local governments, residents, and businesses; reinvestment in the local economy; improved quality of life and public health; facilitation in reaching local and national goals; and a more secure future. In addition, eligibility for federal funding in the transportation sector is enhanced.

In summary, suggest including social and economic interests along with wildlife. We want this document to stand up in court, yes? Three-legged stool is better and would be supported by legal advisors, I believe.

Paragraph beginning with **"The use of non-renewable energy sources…"** mixes concepts, it seems. No matter what is done, LVE has told us that energy costs will increase in the near future. Suggest staying away from the economics of energy delivery

(unless solid information is obtained on the subject) and, instead, emphasizing the benefits of consolidated development patterns, reduced consumption and emissions, etc.

Final paragraph in this section, suggest delineating "leaders" as the "Mayor and Council and Board of County Commissioners" (also suggest alternating first mention of these entities throughout the document as this is a very mutual undertaking).

Principles and Policies (beginning pg 92):

Suggest defining "home area networks: (sec. 8.1)

Sec. 8.1.b: Good. Is there buy-in from LVE? They have done a better job than most utilities and should be given credit as well as a leadership role (sounds like town and county would do the initiating that has already been done, at least to some degree).

Sec. 8.1.c: Renewable and 'bridge' fuels should be included along with hybrid and electric vehicle technologies. Transportation accounts for 80% of greenhouse gas emissions and consumes approximately two-thirds of the oil used in the nation. Suggested example language to include- "Advanced fuels for transportation are also produced regionally. These include biofuels produced from rapeseed, camelina, sorghum, waste vegetable oil and other cellulosic materials such as wood waste. The Idaho National Lab, a neighboring research facility is engaged in research and refinement of these options along with the further development of hybrid and electric vehicle technology such as plug-in options. This outstanding resource should be utilized as fully as possible. Finally, although not renewable, there is an abundant supply of natural gas in our own backyard that is already piped directly into Jackson Hole. Natural gas is a much cleaner and generally economical 'bridge' fuel, especially conducive to fleets, waste haulers, school buses or individuals who have gas service to their homes and would like the convenience of filling up in their own garage."

Jackson Hole Conservation Alliance
(307) 733-9417 • www.jhalliance.org

April 12, 2010

Town of Jackson and Teton County Planning Commissions
Cc: Town of Jackson and Teton County Planning Staffs
Re: Proposed Theme Eight: "Energy Conservation"
Submitted via email to Alex Norton

Dear planning commissioners and planning staff,

On behalf of the Jackson Hole Conservation Alliance, thank you for the opportunity to comment on the proposed Theme Eight of the draft Comprehensive Plan, "Energy Conservation." Conceptually, we fully support the writing, adoption and implementation of this proposed theme. As suggested by some of the planning commissioners in the April 8 hearing, we also support that the new theme have a broader intent to address climate change and adaptation issues.

Included below are our comments regarding this theme, the first of which pertain to the existing Principle 1.3 and related policies, strategies and indicators, followed by several comments regarding what we believe should be added to this theme.

Amendments to existing plan principles/policies: *(please refer to our comments on Theme One for more contextualized explanations)*

1. Energy conservation on a broad level is an essential goal. However, in terms of the statement in Principle 1.3 about "lower energy bills," it is important to remember that it is safe to assume that *energy costs will significantly increase once total energy demand in Teton County approaches a certain level*. While reducing energy demand per capita is a necessary and essential policy, it is clear that the amount of development proposed within this plan will dramatically increase total energy demand, and therefore energy costs, despite how much is reduced per capita.
2. Policy 1.3c: Incentives should also be provided for reuse and/or recycling of materials in existing structures prior to razing.

Questions/Additions to a proposed Theme Eight:

1. The role of climate change with regard to our wildlife populations, water quality and conservation, and economy are not yet adequately addressed in Principle 1.3. There needs to be more language specific to the Greater Yellowstone Ecosystem *within the dynamic context of a changing climate*. In addition, the policies in this theme should speak to what it means to be a gateway community committed to the stewardship of two premier national parks and one of the last relatively intact ecosystems in North America, specifically in terms of the example that we set for visitors.
2. *Conservation of energy is fiscally responsible; it is arguably the biggest cost savings measure that this community can take*. Language to prioritize energy conservation beyond land use pattern and standards for new construction should be included. We need to set aggressive energy conservation goals and then carry them forward; this could include goals for the interim while larger changes are being implemented.
3. Air and water quality are essential to the health of the ecosystem, economy and community. Any and all growth and development will negatively impact these resources, so it will be important to continue to commit to mitigating those impacts.

4. *Education of the public will be a critical component of the success of the goals of this theme*. For example, developers and contractors could receive materials and information during the building permit review process regarding best building practices (green building). The more conversation about efficiency and conservation that takes place, the more likely people are to amend their behaviors.
5. In the energy audit conducted by the JHESP, it was determined that *transportation is the number one CO2 (carbon dioxide) producer in Teton County*. In most communities across the country, buildings are the number one CO2 producer, followed by transportation. But, here in Teton County, including the airport, transportation is the largest contributor. This must be addressed in Theme Eight beyond what policy 1.3b and c mention, and be at least mentioned in Theme Six.
6. This theme should mention the concept of the responsibility of individuals and communities to act locally to reduce our impacts on the changing global climate.
7. In the creation of the indicators for this theme, it will be important to include both numerical and narrative descriptions of baseline conditions, or measurable starting points.

Thank you again for your continued work on this Plan and for your attention to these comments. We also encourage you to seriously consider the recommendations made to this body by other external groups and commissions whose exclusive, or at least primary, charge is energy efficiency and related policy considerations. In the writing of these comments, we also referred to several other community plans from across the country; we are by no means the first community to consider the incorporation of a broad definition of "energy conservation" into our community's planning and vision document. We urge you to consider examples from other communities as well. Lastly, we applaud your efforts at including the important concepts of energy efficiency, climate responsible strategies and energy conservation into this Comp Plan. In addition to upholding the original intent to weave the concept of sustainability throughout the themes and policies, having a chapter directly related to sustainable community development will strengthen the overall Plan.

Sincerely,

Kristy Bruner
Community Planning Director

Becky Tillson
Community Planning Associate

Jackson Hole Conservation Alliance
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May 28, 2010

Town of Jackson and Teton County Planning Commissions
Cc: Town of Jackson and Teton County Planning Staffs
Re: Theme Eight: "Energy Conservation"
Submitted via email

Dear planning commissioners and planning staff,

On behalf of the Conservation Alliance, thank you for your attention to this memo regarding the May 7 draft of Theme Eight of the draft Comprehensive Plan. We understand that this theme, because it is new, will be reviewed differently than the other themes, and so have included the following broad, overarching comments.

What it did well:
1. It generally introduces many important topics into our planning process – from awareness of global climate change to concrete steps we can take on a local level and our responsibility to the larger ecosystem;
2. It focuses on ecosystem adaptation in the face of a changing climate;
3. It mentions possible changes to the ways we treat building materials and encourages "reuse, repurposing and renovation of existing buildings and building materials";
4. It encourages non-chemical methods for cleaning our drinking water;
5. It has started a list of indicators to measure our success.

Needs improvement/still to do:
1. The definitions of sustainability in the Vision chapter and Theme Eight should be reconciled;
2. The field of energy efficiency and sustainable living (from building standards to waste reduction and disposal) is constantly evolving and advancing. A mention of a commitment to keeping up with technological advances would strengthen the theme in the long run;
3. The timeline for implementation of some of the larger strategies can end up being quite protracted. In the interim, it would be appropriate to pursue some "low-hanging fruit" strategies, such as supporting existing groups and energy conservation efforts, adopting an idle-free ordinance and continuing the legacy of the 10X10 initiative;
4. When discussing disposal of waste, it is also important to discuss waste reduction strategies;
5. Looking forward, the plan could benefit from a policy committing to exploring economically feasible ways to expand the diversity of items that can be recycled locally;
6. As with most of the other indicators throughout the plan, there is no baseline data included in the plan yet. We cannot measure reductions or increases without knowing the starting points. We need to set concrete and measurable goals;
7. Lastly, clarification of the role of this theme in relation to the others would be helpful. One of the original intents of this planning process was to weave the concept of sustainability throughout the plan. But, seemingly in an effort to give "sustainability" a broader and more prevalent role in the plan, planning commissioners voted to give it its own chapter. Even so, sustainability and energy conservation should play a role in this plan that is slightly different than that of the other themes. It should continue to be woven throughout the rest of the themes, even if it is merely

through additional references to other topics. Regardless of the exact form of this theme, it would be beneficial to discuss its role.

We would like to reiterate that we appreciate the inclusion of this theme into the overall plan. It encompasses some very valuable and forward-thinking concepts and is an excellent addition to the plan.

Sincerely,

Kristy Bruner
Community Planning Director

Becky Tillson
Community Planning Associate

Administration

Jackson Hole Conservation Alliance

April 1, 2010

Town of Jackson and Teton County Planning Commissions
Re: Administration Chapter
Submitted via email to Alex Norton

Dear Planning Commissioners,

On behalf of the Jackson Hole Conservation Alliance, thank you for the opportunity to comment on the April 2009 draft of the Jackson/Teton County Comprehensive Plan. Following are comments specific to the Administration chapter.

Overall, we really appreciate the efforts to add this chapter and incorporate a more clear commitment to enforcement of the community's comprehensive plan in the future. Based on a thorough review of our existing plan, it is clear that a major obstacle was not necessarily the existing policies or recommendations, but rather a lack of enforcement. Ultimately, a comprehensive plan is only as effective for a community as the willingness and ability to enforce it. Unfortunately, the current draft will not provide increased accountability (particularly without clear timelines for specific strategies).

Attached are line-by-line comments and suggestions for discussion related to administration of the plan. Listed below are the key points that we hope are addressed and clarified during your review of the chapter:

- Clear purpose and need for the Future Land Use Plan (FLUP), particularly as it relates to the proposed criteria for amendments to the FLUP - (The FLUP is too detailed in many ways, and lacks analysis to support what it proposes);
- Clear process for prioritizing strategies by elected officials on an annual basis, particularly as it relates to the need to make sure the highest community priorities are upheld on a comprehensive, long-term basis;
- Clear process for upholding the overall priority of a predictable community vision within the context of potential incremental amendments to the comprehensive plan and the FLUP (versus amendments to the land development regulations which this chapter does not address);
- Potential additional criteria for policy changes and adjustments to the new plan, including the FLUP.

As a concluding chapter of the plan, this chapter raises a central issue that has been discussed throughout this planning process. How much detail should a comprehensive plan address versus the subsequent land development regulations? And more specific to this chapter, how often should broader policies and vision statements outlined in the comprehensive plan be amended versus sections of the plan or land development regulations that actually involve implementation? While we support that the land development regulations are the more appropriate place for many of the details (such as specific development standards), it has been unclear how the FLUP portion of the draft comp plan (some of which is highly detailed) is to be linked with the draft's very broad-based themes and policies. This clarity is important in terms of deciding when and under what conditions (such as a completed analysis of transportation impacts) the community should adopt the FLUP, which currently includes parcel-level-looking maps for twenty-five districts in the town and county. If you choose to delay the FLUP discussion until a later date, it will be necessary to revisit, at some point, all of the statements regarding the FLUP, including those in the administration chapter.

Thank you for your consideration of these comments.

Sincerely,

Kristy Bruner
Community Planning Director

Becky Tillson
Community Planning Associate

Administration

Statement of Ideal

Continuously improve upon the policies of the Comprehensive Plan[1]

Why Is an Administration Chapter Important?

This chapter is the dynamic work plan required for the implementation of the Comprehensive Plan. Although the community vision for the valley has not significantly changed over the past twenty years, the circumstances within which we implement the vision are in continual flux. We can not entirely anticipate future environmental, social, and economic challenges as we seek to be stewards of wildlife and natural resources and provide for the needs of the community. Therefore, while the community remains consistent in its vision, we must be able to be dynamic in our implementation strategies. This chapter gives structure to the ways in which the community will analyze and respond to contemporary challenges without threatening the viability and attainment of the community vision.

Implementation of the 1994 Comprehensive Plan lacked rigorous and consistent review of its strategies. Through this Administration Chapter, the community commits to a proactive, honest, and consistent analysis of the strategies, actions, and programs intended to realize the community vision.

Administration Chapter Purpose

Each of the seven themes of this Plan contains a number of policies intended to guide future decisions. Each theme also contains a list of Strategies and Indicators intended to be used as an implementation guide. This chapter discusses implementation of those theme specific policies, strategies, and indicators within the context of the entire plan, specifically:

1. Who is Responsible for Implementing the Comprehensive Plan;
2. How to Monitor progress of this Plan; and
3. How the Community will Respond to Changing Conditions.

Who is Responsible?

Implementation of the Comprehensive Plan is the responsibility of the entire community.[2] Elected officials, town and county Planning Departments, and other government and non-profit organizations have specific roles. The community is equally important to the success of the Comprehensive Plan. All decisions ultimately affect the community's ability to conserve natural resources and manage growth. Therefore, it is essential that the community remains invested in the successful implementation of this Plan. The concept of sustainability is a tool that the

community can use in order to evaluate individual and community actions.[3]

The Community

The Jackson/Teton County community plays an important role in the success of the Comprehensive Plan. Specifically, this Plan challenges each citizen to:

1. Make day-to-day decisions that are consistent with the policies of the Comprehensive Plan. Each member of the community is responsible for shifting his/her mode of travel, minimizing wildlife impacts, reducing resource consumption, finding workforce housing solutions, and supporting local businesses. If community members do not take responsibility for the implementation of this Plan, and encourage their peers to do the same, we will not achieve our community vision.

2. Stay involved in local government and monitor the decisions of elected officials, Planning Directors, and other governmental and quasi-governmental agencies. The citizens of Jackson/Teton County must stay involved in comprehensive planning efforts[4]. Where government and other organizations are falling short in the implementation of this Plan, the community will hold them accountable and take additional action where needed.

Town and County Planning Departments

The Town of Jackson and Teton County Planning Departments will administer this Plan. Planning Department staff is responsible for:

- Executing the strategies of the Plan;
- Monitoring the indicators;
- Processing amendments to this Plan;
- Annually reporting on the State of this Plan to elected officials;
- With direction from elected official, annually prioritizing the most important strategies[5];
- Updating and amending this Plan as directed by the elected officials;
- Reporting directly to the public, every 5 years, on Plan achievements; and
- Reviewing land development regulations, zoning maps, and development plan applications for consistency with this Plan.

Elected Officials

The Town Council and Board of County Commissioners are responsible for making decisions that are consistent with this Plan. They are responsible for allocating the necessary funding to implement the policies and strategies contained in this Plan.[6] They are also responsible for working with neighboring jurisdictions to find regional solutions to transit and housing issues that have the least impact on the entire ecosystem and that maintain intergovernmental agreements for service provision. Elected officials should familiarize themselves with the contents of this Plan to ensure that the Plan remains an accurate reflection of the community vision. Each year, elected officials will be responsible for :

- Receiving and reviewing the State of the Plan report presented by staff; and
- Determining the two to seven priority strategies for implementation over the next year[7].

Governmental, Quasi-Governmental, and Non-Profit Agencies and Organizations

Governmental, quasi-governmental, and non-profit organizations and agencies are responsible for working with town and county planners to find solutions to community issues, which are consistent with this Plan. These agencies and organizations will play a crucial role in data gathering in order to analyze indicators, analyze the success of strategies and to study the feasibility of proposed strategies[8]. The collective input from all non-profits will be helpful in monitoring community perception of and satisfaction with this Plan. Agencies and organizations are also responsible for working with each other to pool resources and find mutually beneficial solutions towards community goals associated with workforce housing, transit, and other community issues.

How to Monitor Progress of this Plan

Each theme of this Plan includes a number of strategies and indicators. The strategies represent a course of action for implementing the policies

outlined in the Plan. The statistical indicators in each chapter provide a gauge to evaluate success. Monitoring of the indicators provides a way for the community to both assess progress on the plan and to anticipate necessary policy and strategy changes. Monitoring will happen in two tiers—annual analysis and 5-year review.

Annual Analysis

Every year, the town and county Planning Departments, elected officials, and partnering agencies and organizations will analyze this Plan's strategies and indicators and implement any required changes. This will occur in two ways:

- Annual State of the Plan Report. Each year, town and county planning staff (with input from government, quasi-government, and non-profit organizations) will compile the data necessary to analyze the indicators of the Plan. A status report (with a focus on community priorities) will be completed and presented to the joint town and county Planning Commissions and elected officials in April of each year.
- Annual Work Plan. Based on the State of the Plan Report and town and county Planning Commission recommendations, the joint elected officials will also establish the priorities for the next year. These priorities will be the focus of town and county Planning Staff for the next year and will receive more detailed review in the next year's State of the Plan Report. Each year, about two to seven priority strategies will be identified depending on available resources.[9]

5-Year Review

Every five years, the town and county will conduct a more detailed community review of the Comprehensive Plan. Town and county planning staff will host public meetings to:

- Affirm the community vision and principles of the Plan;
- Present a progress report; and
- Facilitate discussion on desired Plan updates and amendments.

Town and county planning staff will report back to the joint Planning Commissions and elected officials on the results of the community meetings. Elected officials and the joint Planning Commissions will provide direction regarding Plan updates and amendments. In years where a 5-Year Review occurs, the review will substituted for the annual analysis.

How the Community will Respond to Changing Conditions

This Plan is intended to be a dynamic document and may need to be amended and updated as community conditions change. Amendments may include improvements to the Future Land Use Plan to more effectively implement the land use policies of this Plan;[10] and policy amendments required to realize the community vision.

Future Land Use Plan Amendments

Future Land Use Plan (FLUP) amendments may be periodically necessary to better implement the policies of the Comprehensive Plan and to respond to policy changes or adjustments. FLUP amendments can be requested by:

- the Town of Jackson or Teton County Planning Director,
- the town or county Planning Commission,
- the Town Council, the Board of County Commissioners, or[11]
- any member of the public with a recognized interest in the subject land (either the owner of record or their authorized agent).

FLUP amendments shall not be processed concurrently with development plan applications that rely on a particular FLUP amendment. FLUP amendments will be reviewed and adopted according to the following procedure:

1. Application for an amendment by an authorized party.
2. Review of the proposal by town and county planning staff with a recommendation to the joint Planning Commission.
3. Public hearing before the Joint Planning Commission. Joint Planning Commission makes a recommendation regarding the application to the elected officials.
4. Town Council and Board of County Commissioners jointly hear the application.
5. Jurisdictional body approves, approves with conditions, or denies the application.

To approve a FLUP amendment, the appropriate jurisdictional body must make a positive finding that the proposed amendment:[12]

1. Better implements the community vision.
2. Is consistent with the principles and policies expressed in the Comprehensive Plan at a communitywide level.
3. Is consistent with priorities of the district in which it occurs.
4. Is a response to at least one of the following:
   a. The policies of the Comprehensive Plan are not being implemented by the current Future Land Use Plan.
   b. The community's characteristics have substantially changed, warranting a revision to the FLUP directly related to the change in characteristics.
   c. The values and priorities of the community have changed warranting a FLUP revision.

Vision, Theme, Policy, and Administration Amendments

Amendments to portions of the Comprehensive Plan other than the FLUP will also be periodically necessary to respond to changing community conditions and better implement the community vision. These amendments will be of a greater policy nature and have wider reaching local and regional implications. These amendments can be proposed by the town or county Planning Director, the town or county Planning Commission, the Town Council, the Board of County Commissioners or any member of the public.[13] These amendments will be reviewed and adopted by the following process.

1. Application for an amendment by an authorized party.
2. Town and County Planning staff reviews the proposal and presents a staff report to the joint Planning Commission.
3. The joint Planning Commission holds a public hearing and makes a recommendation on the application to the elected officials.
4. The Town Council and Board of County Commissioners jointly hear the application.
5. Both bodies must approve, approve with conditions, or deny the application.

To approve a proposed vision, policy, or administration amendment, the Town Council and Board of County Commissioners will find that it:

1. Better implements the community vision.
2. Is consistent with the other policies and strategies of this Plan.
3. Responds to indications that at least one of the following situations exists:
    a. The policies of this Plan are not being implemented.
    b. The community's characteristics have substantially changed, warranting a revision to the Plan's policies directly related to the change in characteristics.
    c. The values and priorities of the community have changed.

Jackson Hole Conservation Alliance comments

[1] This statement of ideal should include a goal that is more measurable than "continuously improve upon."

[2] While we appreciate the broad intent of such a sentence, it is really important to also include more specific statements regarding responsibility associated with specific strategies if this new plan is to be more predictable, accountable and measurable. (This can occur within the theme-based chapters instead of the broader administration chapter.)

[3] Perhaps this statement is left over from an earlier goal of the plan to integrate the concept of sustainability throughout the plan. As a whole, the concept of sustainability has a decreased role, particularly given that it is only primarily mentioned in the introduction and administration chapters. We hope that the new Chapter Eight will place greater emphasis on the concept.

[4] In terms of responsibility on the part of the public, many people have found the comp plan process itself very difficult to remain involved in for a number of reasons, including a feeling that considerable public input has not been adequately weighed and incorporated. In terms of citizen involvement, how does this broader statement relate to more specific criteria outlined later in the chapter, specifically the criteria for requesting FLUP amendments (a general citizen or organization cannot do this)? Will the Future Land Use Plan include overlays, such as the NRO and SRO?

As we have stated before, it is critical to discuss the structure of the FLUP as the central predictable element of the plan. (For example, the proposed criteria for amendments appear to be the most restrictive for the FLUP.)

[5] Additional clarification should be provided as to how prioritization will occur on an annual basis. While some flexibility on the part of elected officials to set priorities is important, it is also important to recognize that the community's highest priority strategies will often require a commitment to long-term monitoring and should not be influenced by piecemeal decisions. It seems more appropriate for the plan to set broad priorities for implementation based on the long-term community vision, upon which more detailed projects will be selected by elected officials.

[6] Even though the plan calls out specific policies and strategies, it is not based on fiscal analysis or the community's ability to afford the actions called out in the plan. In short, no financial analysis was done to determine whether the proposed policies are feasible. As the community adopts strategies for implementation, fiscal considerations will be increasingly essential.

[7] Similar to point (5), more clarification on priority-setting should be available, particularly since setting priorities was one of the key goals of this entire process. Do priorities have to be jointly agreed upon, or will the different jurisdictions set their own priorities? We raise this given the recent efforts to establish an Environment Commission, which has demonstrated how lowered priorities in one jurisdiction stall or prevent the highest priorities from being implemented in the other jurisdiction.

[8] To what extent were agencies and organizations involved in establishing a framework for monitoring and identifying feasible indicators? Are indicators (across different themes) expected to be changed at a later date once a closer analysis is enabled and facilitated by other agencies?

[9] As in point (7), two to seven priorities, per year, is a wide range. We understand the need to be flexible, based on availability of resources year-to-year, but where did this range come from? And, is this suggesting that if we don't have available resources, we won't pursue particular strategies, such as research and monitoring? If we are only committing, for example, to two of the many strategies outlined in the plan, are we really getting further along in terms of effective implementation? Some clarification would help. For a start, the plan should include a summary list of all strategies (that are now outlined specific to each theme) in order to generate and specify a *comprehensive* priority list.

[10] The role of the FLUP maps is critical. This chapter suggests how critical a role they play in the overall plan. We believe that their structure and function must be critically analyzed and discussed, particularly since they are the piece that is supposed to add so much predictability to the implementation of the plan.

[11] To clarify, can a request be made by an individual commissioner or elected official, or does a majority have to make a request? As the text currently reads, it is unclear how the amendment can be requested. If an individual member of these bodies can make a request, it could be more clear by stating "**a member** of the town or county Planning Commission", rather than referencing the body as a whole. While of course amendments must be reviewed and adopted or denied by the entire body, it would be helpful to clarify the language regarding requests.

[12] Again, related to the FLUP, it is essential to discuss the role that the FLUP is intended to have in the overall new plan. This section of the plan regarding potential amendments raises a lot of questions about the appropriate balance between flexibility and predictability.

How do these amendment requests relate to the annual/five year reviews? What is the downside of setting a specific time each year (or during five-year reviews) that amendment requests to the comprehensive plan are permitted? This would allow a comprehensive look at proposed amendments, as opposed to piecemeal proposals. (**Amendment requests to a comprehensive plan should be approached much differently than changes to land development regulations.**) And, how will future amendments to the FLUP be processed in relation to amendments to zoning maps?

This amendment criteria raises the larger question of how proposed amendments to the FLUP maps are tied/linked to the broader goals of the comp plan, particularly criteria number three – "is consistent with priorities of the district in which it occurs."

[13] Why can any member of the public propose a broad-reaching amendment to "vision, theme, policy and administration" but not a FLUP amendment?