

Town of Silver City
Mayor's Climate Protection Agreement Citizens Advisory Committee

TOWN OF SILVER CITY CLIMATE ACTION PLAN

1/13/09

ACKNOWLEDGMENTS

This Committee would like to thank not only the Town of Silver City council, management and staff, but also the staff from Senator Bingaman's office and the numerous community members who took the time to attend our meetings and presentations or give input through other methods. Special thanks goes to Mr. Mark Cantrell's 2007-2008 Third Grade Class and Ms. Ella Kirk who set up this Committee's meeting with his class.

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EXECUTIVE SUMMARY

Acting on the initiatives put forth by local citizens and Mayor James Marshall, the Town Council of Silver City passed Resolution 2007-31 on September 25, 2007 creating the Mayor's Climate Protection Agreement Citizen's Advisory Committee. The creation of the Committee is part of a global strategy to address climate change and was developed out of protocol targets in the Kyoto Accords. This strategy strives to address climate change at its source: in the daily operations of municipalities and their surrounding communities.

The Advisory Committee worked the past twelve months to research and develop a Town of Silver City Climate Action Plan that will reduce greenhouse gas emissions (GHGE) while saving Town and taxpayer dollars, improving quality of life for area residents, and building our local economy.

Through the course of this period, the Committee learned a great deal. There are many "low to no cost" changes municipalities and individual residents can do to lower GHGE and improve efficiency and cost effectiveness. In addition, just a little bit of up front cost can lead to tremendous benefits in the end. The Committee would like to emphasize these "take home messages".

- The Town has the opportunity to save \$115,000 - >\$1million annually by implementing the Action Plan recommendations (**Table follows**)
- The Town and residents may reduce GHGE by up to 23,000 tons annually (**Table follows**)
- Grants and other sources of funding assistance are out there for those who look
- Technical assistance (TA) programs are also available
- Funding and TA resources are expected to improve under the Obama administration
- The EPA and NM agencies are committed to facilitating renewable energy projects in the state – a priority state for the EPA
- Renewable energy projects are potentially significant job generators (key in upcoming federal legislation)
- The "green collar economy" is an opportunity for Silver City to mitigate the impacts of the mine lay-offs
- NM and federal agencies need to create robust renewable energy markets in order to make these projects economically viable

The Advisory Committee developed an overall aim of reducing greenhouse gas emissions in municipal operations and the surrounding community. Strategies to achieve that aim include:

- improve energy efficiency and promote renewable energy
- support community education
- support green land use and other policy changes

A variety of measurements can assist in monitoring whether the aim is accomplished. The overall outcome measure is to attain a 15% reduction in Town and community

GHGE as measured from the emissions inventory baseline (Addendum: Systems Framework “Tree” Diagram.)

A total of thirteen action recommendations are presented in the Climate Action Plan. The recommendations are placed in order considering need, urgency, potential benefit and/or ease of implementation and cost effectiveness.

- Creation of an Office of Community Sustainability
- Solar Energy Installation
- Energy Efficient Retrofits for Town of Silver City Buildings
- Energy Efficiency/Sustainability Education for Greater Silver City Community
- Compact Florescent Light Distribution Project
- PhotoVoltaic Panel Covered Parking Structure at the Visitor Center
- Silver City Inner Loop and River Walk Proposal
- Town of Silver City Street Lighting Plan
- LED Traffic Signals
- Creative Renewable Energy: A Local Financing Structure
- Town of Silver City “Green” Standards for Building
- Plastics Policy
- Municipal Fleet Conversion to Biodiesel

The Committee requests from the Town Council a Statement of Support for the proposed Plan, including the hire of a contractor (approximately \$2,000) to do a funding opportunities search, and a Commitment to Pursue the Recommendations. The contractor performing the funding opportunities search must be versed in researching and acquiring federal, state, and foundation funds. The Committee will continue to act on its mandate in advising the Town on energy efficiency, carbon emissions and alternative energy options and is willing to assist the Town in implementing recommendations (as noted in the Plan.)

**Climate Change Action Plan Recommendations:
Summary of GHG Emission Reductions
(Target = 1526 tons/year of CO₂ from TOSC emissions baseline 2003)**

Climate Change Action Plan Recommendation	Town of Silver City GHG emission reductions (CO₂ tons/year)	Community-wide GHG emission reductions (CO₂ tons/year)
Early Successes		
Installation of SCADA system	25	
Purchase of NEVs for water meter reading	15	
Water pump replacement	99	
State Mandated Actions		
B5 Biodiesel Mandate for Political Subdivisions by 2010 ¹	8 – 20	
B5 Biodiesel Mandate for all consumers by 2012 ²		1163 – 2907
Action Plan Recommendations		
Office of Sustainability	See ³	1041 ⁴
Solar power installation ⁵	4942 - 8832	
Energy efficiency retrofits	129	
Educational programs to facilitate energy efficiency in homes		2903
PV Parking Structure	16	
Creative financing		5140
Street Lighting ⁶	223 - 952	
CFL's		242
Bikeability/Walkability		168
LED Traffic Lights	212	
Green building standards	86	
Plastics policy		56
Biodiesel	78	
TOTAL	5,833 – 10,464	10,713 – 12,457

¹ The low end of the range assumes the biodiesel will come from soybeans with the upper end of the range assuming that the biodiesel is made from waste grease.

² Ibid.

³ It is envisioned that the Office of Sustainability would oversee the implementation of action plan recommendations. Therefore the emission reductions and cost savings of individual actions could be attributable to the Office of Sustainability.

⁴ Implementation of low-income weatherization is used as an indicator of the potential for community-wide emission reductions from the Office of Sustainability.

⁵ Low end of range based on using solar power for electricity to power town's water infrastructure; high end of range based on using solar power for all of the town's electricity.

⁶ Low end of range based on replacement of mercury vapor street lights with sodium or metal halide. High end of range based on 2-hour decrease in street light usage.

**Climate Change Action Plan Recommendations:
Summary of GHG Emission Reductions and Potential Cost Savings
To Town of Silver City**

Climate Change Action Plan Recommendation	GHG emission reductions (TOSC only) (CO₂ tons/year)	Annual Cost Savings Potential⁷
Early Successes		
Installation of SCADA system	25	\$7300
Purchase of NEVs for water meter reading	15	\$4600
Water pump replacement	99	?
Action Plan Recommendations		
Office of Sustainability ⁸	See below	See below
Solar power installation ⁹	4,942 – 8,832	\$576,400– \$1,074,000
Energy efficiency retrofits	129	\$20,700
PV Parking Structure	16	\$3300
Street Lighting ¹⁰	223 - 952	\$44,000 – \$171,700
LED Traffic Lights	212	\$29,000
Green building standards	86	\$15,400
Biodiesel	78	(\$9200)
TOTAL with solar installation	5,825 – 8,910	\$691,500 – \$1,065,00
TOTAL without solar installation	883 - 1612	\$115,100 – \$242,800

⁷ Cost savings do not include capital costs of implementing recommendation.

⁸ It is envisioned that the Office of Sustainability would oversee the implementation of action plan recommendations. Therefore the emission reductions and cost savings of individual actions could be attributable to the Office of Sustainability.

⁹ Low end of range based on using solar power for electricity to power town's water infrastructure; high end of range based on using solar power for all of the town's electricity needs.

¹⁰ Low end of range based on replacement of mercury vapor street lights with sodium or metal halide. High end of range based on 2-hour decrease in street light usage.

INTRODUCTION

The stated purpose of the Committee was to research what other municipalities are doing to reduce green house gas emissions (GHGE) in their communities, to explore and secure funding to assist in the planning and implementation of GHGE reduction strategies, and to assist with a carbon emissions inventory. There are several climate protection benefits and they include:

- save Town and taxpayer dollars
- build local economy and create new jobs
- improve air quality and public health
- improve community “livability”

The inventory phase of the Committee’s work was accomplished through the use of the ICLEI (International Coalition of Local Energy Initiatives) energy inventory model. The Committee was extremely fortunate to have highly skilled and experienced members from the scientific community, as well as cooperative city personnel, to assist in developing the results from the model.

The Committee was also tasked with prioritizing (and analyzing) activities outlined in the U.S. Mayor’s Climate Change Protection Agreement. The conclusion of this effort was the creation of The Town of Silver City Climate Action Plan consisting of a goal, outcome measure, strategies and indicators that will lead to overall GHGE reduction, and detailed recommendations to the Town Council that are practical, verifiable, flexible, and phased (**Addendum: Systems Framework “Tree” Diagram**).

The Committee is made up of ten community members from a variety of backgrounds and training. It has met twice a month since January 2008 and used a facilitated process in achieving its purpose. Extensive research and “public input” have been accomplished and will continue to guide the Committee and Town in implementing recommendations.

The Plan is intended to be a guiding framework, not a rigid set of tasks. The Plan’s primary purpose is to reduce the production of green house gases from municipal activities. Secondly, efforts toward this reduction are intended to be applied to the community as a whole.

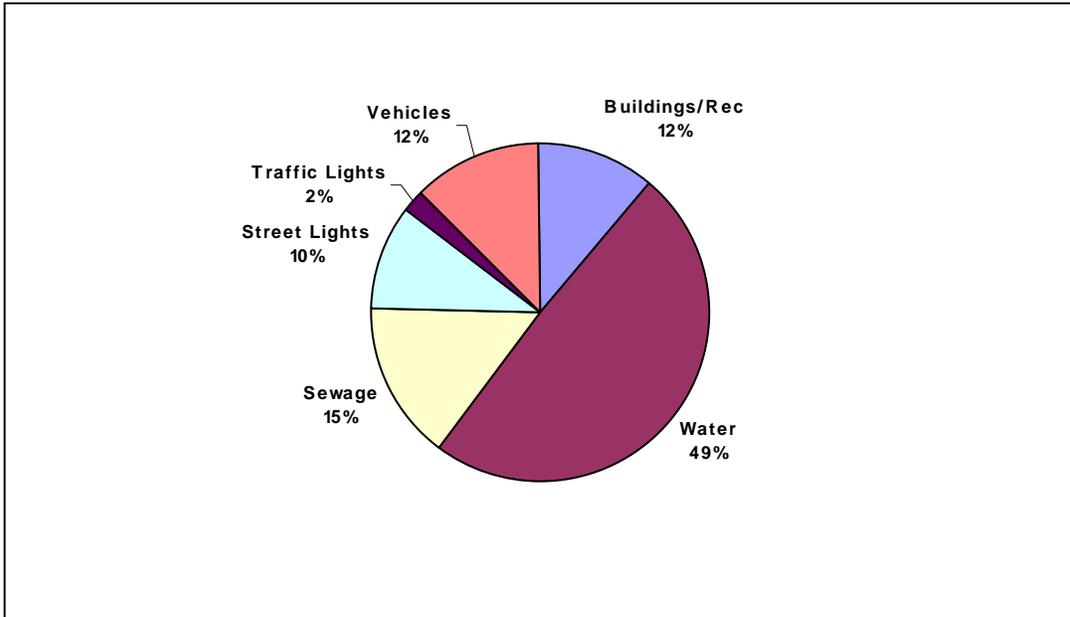
Silver City Government Greenhouse Gas Emissions Base Year 2003

Methodology: Fuels used to provide energy services are the major sources of greenhouse gas emissions for the Town of Silver City government. These fuels include gasoline, diesel, natural gas (NG), and the fuels used to produce electricity. When these fuels are burned to release energy they also emit carbon dioxide (CO₂). Emission factors relate the pounds of CO₂ produced per unit of fuel consumed. We used the DOE voluntary emission factors (<http://www.eia.doe.gov/oiaf/1605/coefficients.html>) for gasoline, diesel and natural gas and the EPA GRID values for NM for electricity (www.epa.gov/solar/egrid/index.htm). The values are 19.56 lbs CO₂/gal gasoline, 22.38 lbs CO₂/gal diesel, 11.708 lbs CO₂/therm NG, and 1.99 lbs CO₂/kWh.

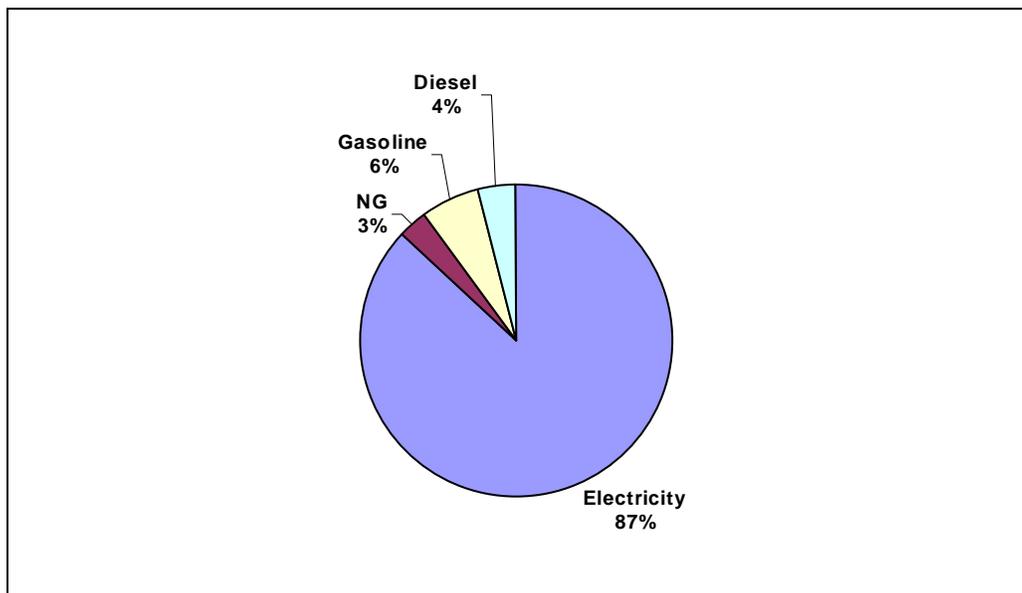
The emissions for the year 2003 (2007 for gasoline and diesel) were computed by multiplying the quantity of fuel used in a year (gallon, therms or kWh) by the appropriate emission factors. We gathered consumption data from 100 electric meters, 14 NG meters, and 13 gasoline and diesel accounts. The results are summarized in the table and graphs below.

End Use	CO ₂ Emissions, tons					Cost, \$				
	Total	Electricity	NG	Gasoline	Diesel	Total	Electricity	NG	Gasoline	Diesel
Buildings/Rec	1,172	862	310			163,080	126,175	36,906		
Water	4,942	4,942				576,440	576,440			
Sewage	1,539	1,539				202,389	202,389			
Street Lights	1,019	1,019				130,064	130,064			
Traffic Lights	238	238				34,468	34,468			
Fire vehicle	75			17	58	17,766			4,368	13,398
Police vehicle	271			270	1	71,582			71,332	250
Sanitation	200			29	171	47,129			7,614	39,515
Street vehicle	160			78	82	39,415			20,591	18,824
Water vehicle	124			98	26	31,897			25,983	5,913
Other	431	231		144	56	55,669	4,817		37,952	12,900
Total	10,172	8,832	310	636	394	1,369,899	1,074,353	36,906	167,840	90,800
Percent		87	3	6	4		78	3	12	7

CO2 Emissions by End Use



CO2 Emissions by Energy Source



**SILVER CITY RESIDENTIAL, COMMERCIAL &
TRANSPORTATION
GREENHOUSE GAS EMISSIONS
BASE YEAR 2007**

Methodology: Greenhouse gas emissions from the community of Silver City were estimated for the residential, commercial, and transportation sectors. Not included are emissions from the industrial sector or from use of natural gas. The community is defined as those residents and businesses having a zip code of 88061 or 88062. The calculation of emissions is similar to that used to determine the Town government emissions. The quantity of fuel used for energy services was multiplied by an emission factor to calculate the tons of CO₂ emitted. PNM provided data for residential and commercial electricity use. Gasoline and diesel consumption was estimated by using the state per capita consumption and the Silver City community population (NM per capita consumption is 488 gallons gasoline/person and 258 gallons diesel/person).

	CO₂ Emissions, Tons				Energy Consumption		
	Total	Electricity	Gasoline	Diesel	Electricity	Gasoline	Diesel
					kWh	M gal	M gal
Sector							
Residential	51,416	51,416			51,674,171		
Commercial	52,005	52,005			52,266,260		
Transportation	155,915		97,204	58,711		9.39	5.25
Total	259,336	103,421	97,204	58,711			

EARLY SUCCESSES

The Town of Silver City council, management and staff deserve praise for progress in a number of areas to increase efficiency of the Town's operations. These initiatives have achieved cost savings and green house gas emission (GHGE) reductions from the 2003 baseline inventory. Examples include:

- **SCADA System for Remote Management of Town's Water Distribution System**

Silver City is in the process of installing a SCADA (Supervisory Control and Data Acquisition) system to monitor and control pumping from the town's well fields. Currently, the Water Utilities Department staff drive out to the town's well fields multiple times a day to turn pumps on and off. The SCADA system will allow the Water Utilities Department to perform this function remotely. Because some operation and maintenance duties will need to be performed weekly on the pumps, the total vehicle miles traveled (VMT) will decrease from 900 miles /week (3 trucks X 300 miles/week) to 200 miles per week for a net savings of 700 miles/week or 36,400 miles per year.

Using the Climate and Air Pollution Planning Assistant (CAPPA model) and assuming city truck fuel efficiency of 15 mpg, an annual reduction of 36,400 miles/year results in a cost savings of \$7280 (@\$3/gallon gasoline) and GHGE reductions of 25 tons/year.

- **Purchase of Neighborhood Electric Vehicles (NEVs) for Meter Reading**

The town has two Neighborhood Electric Vehicles (NEVs) on order to conduct meter reading rather than using its F150 trucks. These vehicles are more energy efficient than light duty trucks.

The CAPPA model was utilized to estimate cost saving and emission reductions using the following assumptions:

- NEVs will drive 12,000 mi/year/vehicle
- Price of gasoline: \$3/gallon
- Fuel of efficiency of truck that is replaced: 15 mpg

CAPPA estimates a gasoline savings of 1606 gallons (15 tons of CO₂) and cost savings of \$4579/year. The NEVs would use 2408 kWh in electricity and result in 2.4 tons of CO₂ emissions. The net GHGE reduction is estimated at 13 tons/year.

- **Replacement of well and pump motors at the Town well fields**

The Town has replaced almost all its well and pump motors at the Town owned well fields. The CO₂ emission from the use of electricity for the water system in 2003 was 4,942 tons. An assumption is made that energy efficient motors are 2% more efficient than those they replaced. This amounts to a GHGE reduction of approximately 99 tons per year. Also, water utility costs have decreased by 30% since the installation of the new motors.

- **Automated garbage pick-up system**

The move to an automated garbage pick-up system has led to a change from 6 diesel-fueled vehicles six-days per week, to 4.5 vehicles 5-days per week.

PLAN RECOMMENDATIONS

Introduction

The Committee believes that a combination of practicality, cost efficiency, education and the overall philosophy of taking better care of our community and world is feasible. In developing the Plan, consideration was given to the possibilities for supporting concepts of conservation, education, planet sustainability, and “re-branding” the image of our Town and community. Potential for economic development was considered, as well as linkages to on-going and related community efforts and plans. For example, the Grant County Community Health Plan has two priorities that can benefit: economic development and fitness & nutrition, and the efforts of the Walkability, Bikeability and Accessibility groups dovetail nicely with a Town of Silver City Climate Action Plan.

AIM: Reduce greenhouse gas emissions (GHGE) of the Town of Silver City and surrounding community.

OUTCOME MEASURE: By 2015, 15% reduction in Town and Community GHGE as measured from baseline. The inventory of '03 Town data indicates 10,172 tons of CO2 emissions annually and a target reduction of 1,526 tons. Residential, commercial and transportation data for the 88061 and 88062 area codes for 2007 indicate 259,336 tons of CO2 emissions annually and a target reduction of 38,900 tons.

STRATEGIES:

- Improve efficiency and promote renewable energy (Mayors Climate Protection Agreement #5)
- Support community education (MCPA #12)
- Support “green” land use and other policy changes (MCPA #2)

INDICATORS:

- Town decreases kilowatt hour usage; Town decreases gallon gas usage; Town decreases gallon water usage
- Town increases resources for outreach/education to address the AIM; # of presentations, etc. related to the AIM (community groups, agencies, Town, etc.)
- Town increases budget for actions such as walk and bikeability, “urban” gardens, solar technology, Office of Community Sustainability, etc.; Town increases “green” policies

Much brainstorming, research, and public input went in to the action recommendations. Examples of criteria used to assist in selection and prioritization

- ease of implementation
- GHGE reductions to lead to the 15% reduction overall
- ease of measuring/tracking progress
- cost/benefit -- upfront costs, cost per GHGE reduction, cost savings, current available resources for implementation and maintenance, etc.
- distributional impacts/equity issues
- understandability, marketability, and community readiness

The Plan Recommendations are on the following pages.

Creation of an Office of Community Sustainability

Recommendation:

The Town of Silver City endorses the creation of, and research funding for, an *Office of Community Sustainability* utilizing the strategic plans and goals outlined below.

Rationale:

1. Downward pressure in the economy, upward pressure in the cost of energy, and compromising environmental conditions pose a substantial local and global threat.
2. Appropriate strategies to combat all three compromising conditions would be to (a) strengthen the local economy through job development, education and assistance to consumers that would reduce energy costs (and GHGE's) in homes and businesses; and (b) broadly develop programs through multi-level government & private partnerships to reduce municipal and community environmental impact.
3. Energy conservation can offset some increase in energy costs, but programs need to be developed that will help the community to cope with the long term effects of increasing food, transportation and energy costs.
4. Community sustainability is partially defined as the availability of affordable renewable energy, development of urban agriculture (farm-to-table local food sources), a stable and healthy environment, and the strengthening and development of our local economy.

Greenhouse Gas Emission Reduction (tons):

This office oversees implementation of the Plan recommendations and GHGE reductions and cost savings of individual actions discussed in this report could be attributable to the Office. Low-income weatherization is an example of the magnitude of community emission reduction potential. Using the CAPP model – if 500 Silver City homes were weatherized, 1041 tons of GHGE will be reduced per year.

Cost/Benefit:

The creation of the Office has been a strategic priority in successful plans developed in other cities. In New Mexico, the cities and institutions of Santa Fe, Albuquerque, Albuquerque Public Schools, and Belen, to name a few, have comparable “offices” within their government. The position may be opened as a full or part-time position and funding possibilities will be researched through the Contractor (recommended in the Executive Summary to this Climate Action Plan) and the Climate Protection Advisory Committee. Repositioned savings generated by the Town Performance Energy Audit (see “Energy Efficient Retrofits” recommendation, **page 9**) may be one means of funding this Office over the long term.

Suggested Roles and Responsibilities:

1. Oversee the implementation of the Town of Silver City Climate Action Plan
2. Advise the Town on “sustainable policies” and energy efficiency purchases
3. Create a joint partnership with Habitat for Humanity, PNM, etc. in the development of a Home Energy Audit Team to assist citizens in lowering their general energy use.
4. Secure funding for outreach programs to broaden energy conservation of businesses and consumers (e.g. “what does it have to do with me?” and “what can I do?” info)
5. Advocate urban agriculture (e.g. victory gardens, inner city cash crop production, and fruit and nut orchards) on public and private land.
6. Assist in the creation of a Town financing model for local, home renewable energy installations in a way which keeps cash in the local economy, creates new ‘green jobs’, and lowers GHGEs (see “Berkley Finance Model” recommendation, **page 16.**)

Solar Energy Installation

Recommendation Statement:

1. The Town of Silver City approves a resolution to pursue the completion of a solar installation that would provide sufficient power to pump the Town's water and/or sufficient power to provide for all of the Town's electrical needs.
2. The Town commissions a feasibility study and/or pursues joint venture partnerships (**see below.)

Rationale:

1. A solar installation to provide power for the Town's water or total electrical needs will save the Town 42 – 78 % of its annual energy budget, respectively, and reduce carbon dioxide emissions by 51 – 87 %.
2. Silver City is one of the top two areas in NM for generating utility grade solar power.
3. There is a low operating cost after the initial up front research and development costs.
4. Solar installations are easy to site and permit with private partner applications for BLM right-of-way or State land leases currently on-going in Hidalgo and Luna counties.
5. There is minimal transmission loss.
6. There is good integration with electric vehicles.
7. Resources for potential collaboration include: jashen@borregosolar.com; Evelin Wheeler, Director PNM Regulatory Affairs, evelin.wheeler@pnmresources.com ; Don Maez, PNM Technical Account Manager Dmaiz@pnm.com; and Freeport-McMoRan/EPA feasibility studies on the use of reclaimed mine tailing piles for a renewable energy project
8. Citations include:
 - <http://www.innovationwatch.com/choiceisyours/choiceisyours-2008-05-15.htm>
 - <http://www.wipp.energy.gov/science/energy/solarpower.htm>
 - <http://technology4life.wordpress.com/2008/01/31/the-world%20s-largest-pv-solar-plant-open-in-southern-spain>
9. See **Addendum: U.S. Solar Map**

Greenhouse Gas Emission Reduction (Tons):

Based on the emission inventory table, potential GHGE reductions are 4,942 tons annually for the "water only" project and 8,832 tons for the "total Town electrical needs" project.

Cost/Benefit:

- **It is suggested the Town contract a funding opportunities search (approximately \$2,000) with a contractor experienced in federal, state and foundation resource development to ascertain external funding needs and provide an in-depth report of funding opportunities and recommendations to the Town.

Implementation Plan:

1. The Town of Silver City passes a resolution committing the Town to pursuit of a solar installation and pursuit of financial capability.
2. The Mayor's Climate Protection Advisory Committee continues research on the project, including research into potential joint partnerships.
3. With financial resources, a feasibility study or actual development begins. This should include: expected cost of, and most cost effective means of, the installation; best choice of technology (Photovoltaic, Nano, panel mounting technology, etc.); land requirements and costs, including potential use of reclaimed mine tailings sites; apparent legal obstacles; and detailed costs, length of time until solar field operation, "pay-back" calculations, and other relevant data.

Energy Efficient Retrofits for Town of Silver City Buildings

Recommendation Statement:

The Town of Silver City contracts with a Performance Energy Contractor to implement energy efficiency measures that achieve energy cost savings and reduce greenhouse gas emissions.

Rationale:

According to ICLEI-Local Governments for Sustainability, buildings account for 40% of total energy use and approximately 35% of greenhouse gas emissions in the United States. A variety of measures can be implemented to improve energy efficiency of buildings such as switching to compact fluorescent light bulbs (CFL's), upgrading HVAC systems, weatherization (e.g., insulation, window replacement), and appliance and office equipment replacement. A Performance Energy Contractor will perform an energy audit on town buildings and assist the town with financing and implementation of energy efficiency measures. There is no upfront capital cost to the town and the contractor is paid for their services out of the energy cost savings achieved.

Greenhouse Gas Emission Reduction (tons):

Using the Climate and Air Pollution Planning Assistant (CAPPA), a 10% improvement in the energy efficiency of approximately 100,000 square feet of town buildings would result in reduction of 129 tons of CO2 emissions.

Cost/Benefit:

Using the CAPPA model, these measures would achieve a cost savings of \$20,727/year. The payback time is 7.2 years.

- No upfront cost to the Town
- Energy efficiency measures would be financed over no more than 10 years.
- Contractor would get paid out of the energy cost savings.

Implementation Plan:

1. Develop an RFP and solicit bids for a Performance Energy Contractor (refer to WNMU and local school districts where energy audits have already been performed.)
2. Select contractor and negotiate the contract.
3. Conduct energy audit and implement energy efficiency measures as recommended.

Energy Efficiency/Sustainability Education for Greater Silver City Community

Recommendation Statement

The Town of Silver City support climate protection education efforts, including:

- development and distribution of a Sustainability Education Guide
- Sustainability Conference/Green Expo

Rationale

According to new statistics reported by McKinsey and Co. (Wall Street Journal On-line, 10/2/2008), US consumers have direct or indirect control over 65% of the country's greenhouse gas emissions. However, even though seven in ten Americans say that they want more federal action on climate change, it is unclear if the public has made a connection between their own personal actions and the climate crisis, according to the Pew Center on Global Climate Change. "Increased awareness of the connection between consumer choices and climate change could help spur wider action and a better understanding of the role that every individual can play in addressing this problem," stated Eileen Claussen, the organization's president to attendees at a recent U.S. EPA Senior Executive Service Meeting (http://www.pewclimate.org/press_room/speech_transcripts/ec_epa).

A Sustainability Education Guide would connect residents of southwestern New Mexico to the information, businesses, organizations and government agencies that can help them implement personal changes to reduce greenhouse gas emissions.

A Sustainability Conference/Green Expo will provide educational opportunities for attendees to hear speakers on key climate protection topics; participate in hands-on, Do-It-Yourself (DIY) workshops; connect potential customers with vendors who provide green goods and services; and participate in a Green Building Home Tour to inspire attendees to implement energy efficiency retrofits in their existing homes or to "build green."

Greenhouse Gas Emission Reduction

Using the CAPP model, a 10% improvement in energy efficiency targeted at 3000 homes would save 2903 tons of CO₂.

Cost/Benefit:

There is no planned out-of-pocket costs to the Town of Silver City for supporting these efforts. The benefits to the town include:

- Creation of a positive image
- GHGE reductions that contribute to the overall Action Plan aim and outcome measure
- Fostering local and regional markets for "green" building and "green" businesses that can lead to economic development and "clean jobs" for the Silver City area
- Support of a vision of sustainability for our communities.

Implementation Plan

1. The Climate Protection Agreement Citizens' Advisory Committee volunteers to participate in planning teams for the Guide and Conference/Expo.
2. The Guide will be completed for roll out at the conference. The conference is tentatively scheduled for late June/early July 2009.

Compact Florescent Light Distribution Project

Recommendation Statement:

The Town of Silver City support and participate in a Community Compact Florescent Light (CFL) Distribution project.

Rationale:

1. Promotional distribution programs raise awareness of the benefits of CFLs and encourage participants and their neighbors to buy additional bulbs on their own.
2. Installing CFLs is one of the simplest and most cost-effective energy saving measures: only two bulbs will save approximately 300 lbs. of CO₂ from the atmosphere annually; CFLs use about 75% less energy than incandescent bulbs; families can save at least \$30. in electricity and replacement costs for each bulb they replace; CFLs last 10 times longer than incandescent bulbs.
3. Resources include: Susan Fullen, PNM Customer Service and Energy Efficiency Department, susan.fullen@pnmresources.com; Kumiko Styes, PNM Environmental Sustainability Project Manager, Kumiko.styes@pnmresources.com ; and Sharon James, PNM Energy Efficiency Program Administrator, Sharon.james@pnm.com
4. Citations include:
 - www.gelighting.com/na/home_lighting/ask_us/faq_compact.htm#disposal
 - www.eere.energy.gov/consumer/your_home/lighting_daylighting/index.cfm/mytopic=12040?print
 - ICLEI Climate and Air Pollution Planning Assistant
 - 22 metric tons of CO₂ emissions X 1.1 = “tons of emissions”

Greenhouse Gas Emission Reduction (Tons):

Every 1000 bulbs distributed and utilized would reduce 44 tons of CO₂ emissions. At a Town of Silver City population of approximately 10,000, **only one bulb per person can reduce annual CO₂ emissions by 440 tons.**

Cost/Benefit:

1. PNM has a program that allows 4 free bulbs per family. The ICLEI model estimates “\$2.58” per bulb. At Walmart, 6 bulbs cost approximately \$10. to \$13. So \$2.00 per bulb is maybe a good average, with bulk pricing decreasing the cost.
2. Every 1000 bulbs distributed and utilized will save 44,000 kWh of energy and \$4,000 annually.
3. Minute amounts of mercury are in the CFL bulbs, but with multi-thousands of them in use, and eventually needing disposal, the mercury amounts add up. The Town should promote the annual Hazardous Material Pick-up Day to encourage safe disposal of the bulbs.
4. CFLs work for approximately 10 years; one question remains which is the cost/benefit related to disposal every 10 years vs. not using them vs. incandescent bulbs?

Implementation Plan:

1. Town passes a Statement of Support for a Community Compact Florescent Light Distribution Project.
2. The Advisory Committee works with the Green Expo planning group to coordinate this project.
3. The Green Expo planners work with PNM and/or local businesses and Town to develop the structure, financing, promotion, distribution, evaluation and sustainability plan for the CFL project (to include disposal options.)

PhotoVoltaic Panel Covered Parking Structure at the Visitor Center

Recommendation Statement:

Town of Silver City approve construction of a 8 kW PhotoVoltaic Panel Covered Parking Structure for the Silver City Visitor Center.

Rationale:

1. A photovoltaic panel system (PV) brings a clean and efficient energy solution to the attention of Silver City businesses, residents, and visitors to the region.
2. The panel system reduces the Town's carbon footprint.
3. 50 to 100% of the Visitor Center power needs will be provided by renewable energy.
4. The parking structure will provide shade as well as solar powered charging stations for Town and community electric vehicles (EVs.)
5. The system dispels the fear of change to renewable energy and educates and encourages the Town, other local governments, and the public to implement solar solutions.
6. The Town will gain recognition as a Solar Energy Center in Southwest New Mexico
7. Growth of the regional economy is encouraged by this support of renewable energy industry opportunities.
8. Building the parking structure will provide training opportunities for local electrical contractors and others in the building industry.
9. Citations include:
 - www.solarindustrymag.com/e107_plugins/content/content.php?cat.5.view
 - WENTZ ELECTRIC CO., L.L.C., Silver City, NM
 - Connie Adler and Judith Nelson Residential PV System
 - New Mexico Incentives for Renewables and Efficiency
 - www.dsireusa.org

Greenhouse Gas Emission Reduction (Tons): (Allyson – run this thru the CAPP model)

1,188 kWh/month X 12 months/year X 2.2 lb CO₂/kWh divided by 1 ton (2000 lbs) =
16 tons of CO₂ reduced per year

Cost/Benefit:

- The cost of building the Parking Structure will be financed by, for example, grant money, legislative capital outlay requests, fundraising and volunteer labor, etc.
- Average kW hours used monthly by the Visitor Center is 2,134 kW
- Kilowatt-hours produced per month (NM average) of a 8 kW system is 1,188 kW (saving the Town \$1,426./year)
- Sales income of the 1,188 kW is: 1,188 kW/month X 12 X \$.13/kWh = \$1,853/year.
- Total “dollar” benefit to the Town is \$1,426 savings + \$1,853 sales = \$3,279/year.
- The Parking Structure serves as not only covered parking, but is a renewable source of energy for the Visitor Center and the Town's Electric Vehicles.

Implementation Plan:

1. Town approves the construction of a 8 kW Photovoltaic Panel Covered Parking Structure.
2. Town agrees to act as Fiscal Agent for the project, if needed.
3. Town develops community partners such as interested building contractors
4. Town undergoes financial search, creative financing, researches loans, etc.
5. The structure and infrastructure is built.
6. There is strong marketing of Town of Silver City “re-branding” by the proposed Office of Community Sustainability

Silver City Inner Loop and River Walk Proposal

Recommendation Statement:

The Town of Silver City approves Phase 1 of the Silver City Inner Loop project (The Loop) and agree to consider Phases II- IV (see full WAAG/BAG proposal) for future implementation.

Rationale:

1. The Loop is a safe and cost-effective corridor for pedestrians, bicyclists, and motor vehicles that connects high density residential areas of Silver City to schools, libraries, swimming pool, parks, hospital, churches, commercial establishments, and other social services. Encouraging bicycling and walking in Silver City saves money for city residents, improves their transportation flexibility, promotes community health and fitness, reduces road maintenance and enforcement costs for the town, and attracts visitors and potential residents looking for recreational activities and a “green” lifestyle.
2. In recognition of Silver City’s priceless and beautiful riparian areas, a second related project--the Silver City River Walk / Bicycle Trail--would run along the Pinos Altos Creek and San Vicente Arroyo. The River Walk is similar to what other cities, such as Santa Fe and Albuquerque, have already accomplished.
3. These safe corridors follow the earlier corridors identified and mandated in the Silver City Comprehensive Plan (1969 and 2003), Trails and Open Spaces Plan (Resolution 2002-07), and Floodplain Management Plan (2003).
4. Citations include: www.epa.gov/oms/climate/420f05004 , appendix WAAG/BAG full proposal

Greenhouse Gas Emission Reduction (tons):

If 10% of citizens now driving two miles roundtrip to work and school along The Loop choose to bike or walk 40 weeks of the year, the conservative estimated savings in gas would be \$69, 280/yr. with reduced GHGE of 168 tons a year.

Cost/Benefit:

Materials:

Paint	10 gallons @ \$20 gallon =	\$200
Sharrow appliqué	1 @ \$300 per sharrow =	\$300
Metal Signage (5)	5 @ \$50 per sign =	\$250

Labor:

Staff Time (painting)	6 hours @ \$50.00/hour =	\$300.00
Staff Time (mapping)	5 hours @ \$50.00/hour =	<u>\$250.00</u>
	TOTAL	\$1,300

Implementation Plan for Phase 1:

A. Paint and Signage

- 1) Paint new bike lanes at strategic locations along The Loop. Extend existing bike lane on Swan Street. Paint bike lanes on designated areas of 12th, Silver, & Grant Sts. and Cain Drive
- 2) One Sharrow (signage on the road surface encouraging motorists to share the road with cyclists and pedestrians) installed on Little Walnut Rd. (bikelane ends/significant rd. constriction)
- 3) Place metal signage at five strategic locations along the route (see map).
- 4) Paint lines to alert motorists and cyclists of road constrictions (Little Walnut Rd; Cain Drive)
- 5) Make safety zones and painted cross walks at schools more visible to motorists.

B. Mapping – Provide Town staff time to finalize mapping for Silver City River Walk by denoting existing and needed easement acquisitions along Pinos Altos Creek within Silver City and San Vicente Arroyo (nearly complete map available).

Town of Silver City Street Lighting Plan

Recommendation Statement:

The Town of Silver City creates and enforces a lighting plan to ensure that street lights are adequate but not excessive for neighborhood needs.

Rationale:

1. Street lighting accounts for about 10 percent of the Town's electricity demand, which in turn contributes nearly 90 percent of the Town's greenhouse gas emissions. Shaving electricity use in this sector could yield substantial emissions reductions as well as some lowering of utility costs.
2. In many areas of the city, street lights burn in already well-lighted places. In others, drivers and pedestrians have difficulty seeing their way. And in still others, huge floodlights glare unnecessarily when they could be fitted with sensors to light up an area only when needed.
3. New lighting should be installed under a lighting plan developed in consultation with police, fire and ambulance services, PNM, and outside advisors such as this committee.

Greenhouse Gas Emission Reduction (tons):

Assuming 1,300 mercury vapor street lights shifted to sodium or metal halide, the Town would reduce carbon dioxide emissions by 245.3 tons per year (ICLEI model). The model further forecasts annual electricity cost savings of more than \$44,000, with the project paying for itself in about 2.5 years.

With a one hour decrease in usage time, \$85,828 is saved and 476 tons of GHGE are reduced annually. A two hour decrease, increases that savings to \$171,655 with a GHGE reduction of 952 tons.

Cost/Benefit:

Establishing a rational and efficient lighting plan will require some staff time for committee work, research and presentation. However, the town will realize considerable benefits, from slowing the increase in one of its largest cost centers (electricity), to enhancing Silver City's attractiveness as a "dark sky" destination.

Implementation Plan:

1. The Town authorizes a Town of Silver City Lighting Plan Committee.
2. The Town directs staff to work with the Lighting Plan Committee to research, develop and implement a lighting plan governing the installation and usage of street lights.

LED Traffic Signals

Recommendation:

Replace all those incandescent traffic signals not currently scheduled for replacement with LED signals.

Rational:

- LED lights utilize about 10% of the energy used by existing incandescent lights resulting in an 84% reduction in greenhouse gas emissions.
- They are brighter and have a much longer lifetime.
- All new traffic lights are required to be LED.
- Most larger cities in the US have converted to LED lights as a cost savings measure.

GHG Reduction:

The GHG emissions from electricity used in the 13 intersections with 142 traffic signals and 88 walk lights were 253 tons of CO₂ in the base year 2003. After Phase 1 and 2 of the Hwy 180 project, replacement of the remaining 76 traffic signals and 56 walk lights will result in a total reduction of 212 tons (84%).

Cost/Benefit:

- The cost of electricity for traffic signals in 2003 was \$34,500/year.
- After “Phase2” (current highway work in the Town limits) the cost will be about \$22,000/year.
- Replacing all remaining signals with LEDs will bring the electricity cost to an estimated \$5,500/year.
- There will be an annual savings of \$29,000 from the base year, or \$16,500 after “Phase 2.”
- Based on the NM DOT prices for LED bulbs the capital cost would be \$44,500 resulting in a simple payback period of about 2.7 years.

Implementation:

1. Identify lights to be retrofit (all, red and green, walk lights).
2. Determine who would implement conversion: city staff, contractor, fire department?
3. Get accurate retrofit costs.
4. Identify and apply for grant funds.
5. Train city staff, if they do conversion, and complete replacement of bulbs.
6. Verify savings from utility bills.

Creative Renewable Energy: A Local Financing Structure

Recommendation Statement:

The Town of Silver City approve research and analysis of the Berkeley Finance Model as a potential method of public financing for private solar photovoltaic (PV) electrical production, other renewable energy installations, and/or other energy efficiency projects.

Rationale:

The Berkeley Solar Finance Model is being replicated across the nation. Town encouragement of renewable energy development is a job producer. With rising energy costs, local communities are seeking ways to control energy costs and keep funds from flowing out of the community to energy providers. The largest obstacle to local alternative energy production is a lack of affordable and appropriate financing. The Berkeley Solar Finance Model provides the following solutions:

- Creates a method of financing that attaches the cost of a solar PV system or solar hot water system to a residence
- Seeks to provide financing for the model from the State to the municipalities through a dedicated Solar Finance Authority, specific bonds, or other financial vehicle
- Loans qualified citizens the cost of their solar or hot water system and then levies a 20 year tax assessment on the property which is paid back in amortized payments on either their property tax or water bill

A New Mexico and/or Silver City model may include renewable energy projects in general.

Cost/Benefit:

- The average cost of a solar power system calculated in the Berkeley research (after state and federal tax incentives) came to roughly \$65 per month for a 20 year fixed term (\$15,600.)
- Currently, PNM purchases the power from solar PV until 2018 at \$.13 per kWh under their renewable energy credit (REC) program. In addition, PNM offers 'net metering' which is worth an additional \$.10 per kWh of any solar power generated less than or equal to the amount of power used in the building
- In this example, the REC payments (\$.13 x 500kWh = \$65.) and the net metering savings (\$.10 x 500kWh = \$50.) are a total of \$115/month. The payment to the Town for the system is \$65/month which leaves \$50 more each month for residents to save or spend in the local economy.

The cost of an individual's current energy use and the cost of a comparable solar PV system can be calculated from a web site www.dsireusa.org

Greenhouse Gas Emission Reduction (tons):

Assuming 330 Silver City homes install a 3kW PV electrical system by 2015, there would be a GHGE reduction of 1100 tons.

Implementation Plan:

1. The Town approves further research and analysis, with a timeline, of the Berkeley Model.
2. Research will include codifying operations of the finance model and working out how a NM Solar Finance Authority, or some other potential funding source, can be developed

Town of Silver City “Green” Standards for Building

Recommendation Statement:

The Town passes a resolution that all Town owned or operated new buildings and remodels comply with a specified LEED, Energy Star, or NAHB “Green” level: LEED-- Leadership in Energy and Environmental Design program of the U.S. Green Building Council; Energy Star-- a program of the U.S. Environmental Protection Agency and Department of Energy; NAHB-- National Homebuilders Association.

Rationale:

1. Average LEED buildings save 30% on energy; 35-50% on CO2 emissions; 35-50% on water; 50-90% on waste costs.
2. An Energy Star level of insulating, alone, can save up to 20% on heating and cooling costs and up to 10% on total annual energy bills.
3. Financial incentives are available for “sustainably built” buildings
4. Resource: Susie Marbury (NM Energy, Minerals, and Natural Resources Dept.), LEED AP, Susie.marbury@state.nm.us , www.cleanenergynm.org
5. Citations include:
 - Notes from Energy Efficiency Forum, April 2008
 - www.energystar.gov/index.cfm?c=home_sealing.hm_improvement_sealing 6.20.08

Greenhouse Gas Emission Reduction (Tons):

Depending on the “standards” chosen, the emission decrease per change will differ. As an example, when the new public library is built to minimally Silver LEED standards, the 25,000 square foot structure will save 86 tons of GHGE annually.

Cost/Benefit:

As above, costs vary depending on the “standard” chosen. See examples under Rationale # 1,2 and using the public library example again, \$15, 400 in annual energy cost savings; 129,800 kWh electricity saved; 2500 therms of natural gas saved; and a 6.5 year payback.

Implementation Plan:

1. Town advisory committee researches various “levels” of LEED, Energy Star and NAHB Green standards and recommends 3-5 Standards (from one or more of the programs) that homeowners will be encouraged to, and Town must, achieve.
2. Town agrees to a Standards structure for Town, with encouragement to homeowners.
3. Town resolution is passed that mandates all new and remodel Town buildings will be built to the Standards.

Plastics Policy

Recommendation Statement:

1. The Town of Silver City support education of public and business community regarding benefits of using alternatives to plastic, paper, or otherwise disposable shopping bags.
2. The Town of Silver City, in partnership with the business community, support further study into a potential full or partial ban on the use of plastic shopping bags to provide more accurate information on the Town of Silver City's current use of disposable shopping bags, information regarding trends toward increased use of non-disposable alternatives, and information on wording and results of policies nationwide

Rationale:

1. An education program will increase public awareness of energy used to produce and recycle disposable bags, and the greenhouse gas emissions this energy use produces.
2. An education program will increase public awareness of the high cost of recycling disposable bags and problems associated with biodegradability of some of these disposable bags.
3. An education program will increase public use of canvas, cloth, or otherwise non-disposable shopping bags, and encourage business owners to provide this kind of alternative.
4. Study and discussion around a potential ban may build collaboration between the public, Town government, and business community toward an atmosphere of "re-branding" our community and protecting our environment
5. **citations needed**

Greenhouse Gas Emission Reduction (tons):

Approximately 1 reusable bag is used for every 342 plastic bags. Using that number, each person using plastic bags adds 11 lbs. CO₂ into the atmosphere annually versus 0.3 lbs. for those using a cloth bag. For a population of 10,000, plastic bag users add an extra 57 tons of GHGE annually while reusable bag users add only an extra 1.4 tons.

Cost/Benefit:

Initial cost would be the time involved for a Town of Silver City staff member to participate with the committee mentioned in the following paragraph.

Implementation Plan:

1. Town works with, for example, GRIP or the Gila Sustainable Community Forum to plan and develop implementation strategies for the educational component.
2. Strategies will include ideas for sustainability of the educational programs (e.g. The Forum has discussed the possible use of canvas shopping bags as a gift for donation to The Forum -- a potential method of fundraising for further educational outreach.)
3. A Town and community committee is organized to complete the recommended study on disposable versus non-disposable bag use and to provide, if warranted, a "Plastics Policy" recommendation to the Town.

Municipal Fleet Conversion to Biodiesel

Recommendation Statement:

The Town of Silver City incorporate the entire municipal, diesel-fueled fleet to use B5 biodiesel (5% biodiesel/95% petroleum diesel) no later than 2010 and that the Town continue research into the feasibility of using B20 Biodiesel (20% biodiesel/80% petroleum diesel.)

Rationale:

1. Conversion of municipal fleets to biodiesel is a simple and effective way to reduce GHGE. No vehicle equipment conversion is necessary and no upfront capital cost.
2. After July 1, 2010, [New Mexico Statutes](#) 57-19-28 and 57-19-29, provide that all diesel fuel sold to state agencies, political subdivisions of the state, and public schools for use in operating on-road motor vehicles must contain at least 5% biodiesel (B5). After July 1, 2012, all diesel fuel sold to consumers for use in on-road motor vehicles must be B5.
3. After July 1, 2012, all diesel fuel consumers throughout the state will be using B5.

Greenhouse Gas Emission Reduction (Tons):

For this analysis, the entire municipal fleet is incorporated (fire, police, sanitation, street, water and other vehicles). According to the baseline inventory, the municipal fleet used 35,194 gallons of diesel fuel in 2007. It is assumed that this quantity of diesel fuel will be used by the town in 2010. The conversion of 35,194 gallons of diesel to B5 would result in 7.8 – 19.5 tons/year of GHGE reductions. The lower end of the range assumes the biodiesel will come from soybeans with the upper end of the range assuming that the biodiesel is made from waste grease.

Increased GHGE reductions are possible if B20 (20% biodiesel/80% petroleum diesel) is used, however other cost factors must be looked at (see Implementation section below.) If the cost/benefit of utilizing B20 is decided favorably, approximately 78 tons of GHGE can be reduced annually.

In 2007, 5,246,777 gallons of diesel fuel were sold to Silver City area drivers. Assuming that this same amount of diesel will be B5 in 2012, the GHGE reduction is 1163 – 2907 tons/year, depending upon whether biodiesel is produced from soybeans (low end of range) vs. waste grease (high end of range).

Cost/Benefit:

Although there is no up-front capital cost to the Town with the use of B5, biodiesel costs more per gallon than petroleum diesel at this time. If on further research it was decided to use B20 biodiesel, increased costs would vary dependent on if the Town chose to purchase B20 from a distributor or produce the biodiesel itself.

Implementation Plan:

1. The Town institutes a policy to utilize B5 biodiesel in the entire municipal diesel-fueled fleet.
2. The Town and Climate Change Advisory Committee continue research into the feasibility of using B20 biodiesel either as a purchase agreement with a distributor or building, staffing and managing a facility and program for local production.

