# Mount Lebanon Community Greenhouse Emissions Inventory & Climate Action Plan - 2012 Update

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# **Executive Summary**

# Climate Change is Here

During the early years of climate action policy negotiations the causes and effects of climate change may have seemed speculative. To many who may not have had the opportunity to witness the acute and rapid changes occurring in the artic regions or be threatened by potential sea level rise and frequent coastal storms, global climate change could have appeared abstract. Unfortunately, increasingly frequent and extreme weather events associated with a progressively changing climate are hitting closer to home. There are fewer and fewer portions of the U.S. and the World left unaffected by the steady and increasing destabilization of the climatic conditions that make it possible for our communities to prosper.

The changes felt here and across the nation are being recorded as part of an going monitoring effort to document if and how the fundamental measures of our climate are changing. "Climate Change Indicators in the United States, 2012," published by the U.S. Environmental Protection Agency in December of 2012 provides a broad review of the observed changes in 26 indicators of the state of our climate and the human impacts of climate changes<sup>1</sup>. Among glacier melt and tropical storm activity are indicators also inclusive of America's heartland.

#### **Observed Changes in U.S. Climate Conditions (US EPA)**

#### Temperatures

• Since 1901, average temperatures have increased across the lower 48 states, with the last 30 years experiencing more rapid warming. Seven of the 10 warmest years on record have been witnessed since 1990.

#### Precipitation

 Precipitation has increased at an average rate of 6 percent per century across the lower 48 states since 1901. Eight of the top 10 years for intense one-day precipitation events have occurred since 1990.



#### Human Health Impacts

- The ragweed pollen season, which is extended by warmer temperatures and later fall frosts, has increased at eight out of 10 locations studied in the central United States and Canada since 1995, likely prolonging the allergy season for millions of people across the country.
- Since 1980, greater than 7,000 deaths have been reported in U.S. as the result of heat-related illnesses.

<sup>&</sup>lt;sup>1</sup><u>http://www.epa.gov/climatechange/science/indicators/download.html</u>

Although not all weather related disasters are attributable to climate change, climate change is strongly implicated in the increased frequency and intensity of many recent extreme weather events<sup>2</sup>. It is noteworthy that there were 14 and 11 U.S. weather disasters that cost \$1 billion or more each in 2011 and 2012 respectively, while the average annual number of \$1 billion-plus weather disasters for the previous decade was 5 per year. Total costs for the 2011 and 2012 disasters were \$61 billion and \$142 billion respectively. The financial and human cost of these events is projected to increase in the near future<sup>3</sup>. Swift and strategic action to reduce GHG emissions remains the most prudent recourse.

# In Mount Lebanon - Climate Action has Begun

In 2008, Mt. Lebanon signed the US Mayors Climate Protection Agreement – pledging to reduce local greenhouse gas emissions, improve air quality and enhance community livability and sustainability. Upon signing the accord, the Municipality joined ICLEI – Local Governments for Sustainability, initiating its participation in ICLEI's Cities for Climate Protection (CCP) campaign. This campaign is structured upon the following five climate protection milestones:

- 1. Conduct a baseline greenhouse gas (GHG) emissions inventory and forecast,
- 2. Adopt an emissions reduction target,
- 3. Develop a local action plan,
- 4. Implement plan strategies, and
- 5. Monitor and verify results.

In 2010, Mt. Lebanon completed the first three milestones with a baseline inventory of emissions for the year 2006; an action plan centered on ten strategies to collectively reduce community-wide greenhouse gas emissions by 6% over the next 5 years; and a longer-term goal of reducing emissions to 17% below 2006 baseline by 2020. After two years of strategy implementation, the community sought to 1) assess the impact of actions taken to date and 2) to amend and update the Community Climate Action Plan, effectively completing the first cycle of this five step program.

The updated inventory revealed that as of 2011, greenhouse gas emissions have reduced modestly, but progressively to 3.7% below the 2006 baseline. This change is driven by a 14.3% reduction in emissions from the transportation sector and is in spite of a 4.1% increase in emissions associated with of electricity consumption.





<sup>&</sup>lt;sup>2</sup> http://www.pnas.org/content/early/2013/03/14/1209980110

<sup>&</sup>lt;sup>3</sup> http://www.gao.gov/highrisk/limiting federal government fiscal exposure

Contributing to this overall reduction are a number of explicit projects or programs that have been implemented by the municipality since 2010 to reduce greenhouse gas emissions, save money, and improve quality of life in the community. These six represent the most significant current actions.

Sector	Name / Description	Year Completed	Est. Annual GHG Reduction	Percent of Baseline Emissions	Estimated Annual Cost Savings
			MT CO <sub>2</sub> -e	%	2012 \$
WASTE	Residential Recycling Competition	2011	1104	0.4%	\$0
MUNI	Municipal Facilities Energy Efficiency Retrofit	2012	1052	0.2%	\$140,930
TRANS	Washington Rd. Traffic Light Synchronization	2011	759	0.2%	\$300,082
MUNI	LED Traffic Light Retrofit	2011	312	0.1%	\$60,979
WASTE	E-waste Recycling	2012	124	0.0%	\$0
TRANS	"No Idling Zones" Established	2011	66	0.0%	\$20,625
Totals			3,417	0.9%	\$522,616

Table 1: Reduction Measures Implemented Since 2010

Despite these reductions, the distribution of emissions by sector for 2011 follows similar proportions to the 2006 baseline and indicates similar targets for action strategies. The residential sector continues to represent nearly half of the community's GHGs and in fact now holds a 3% greater share than it did in 2006. Electricity consumption by the residential and commercial sectors continues to be the primary and an increasing source of emissions from energy use.



Table 2: 2011 Annual Contributions of GHGs by Sector & from Energy Use by Energy Type

Lastly, the existing residential and commercial recycling and composting programs resulted in an additional net greenhouse gas emissions reduction of 7,842 MT CO<sub>2</sub>-e annually. Subtracting these

existing recycling and composting net reductions from the annual emissions total drops the 2011 net emissions to 4.8% below the 2006 baseline.

# An Updated Plan of Action - The Road Ahead

To initiate the next iteration of climate action, the Community Climate Team has developed six new greenhouse gas reduction measures for this 2012 update in partnership with SEEDS, Inc. and the Duquesne University Center for Environmental Research and Education. These six measures have been integrated with nine of the original ten measures proposed in 2010 for a total of 15 strategies across five themes: Residential, Commercial, Institutional, Transportation, and Waste Reduction & Recycling.

The 15 strategies comprising this second phase of the Climate Action Plan have the collective potential to reduce community-wide GHG emissions by more than 20,113 MT  $CO_2$ -e annually, once fully implemented.



Figure ES 2: Projected Emissions and Reductions

From 4.8% below baseline levels in 2011, these new strategies combined with the current programs are projected to bring emissions to 11% below the baseline by 2015. But based on these strategies alone, emissions are expected to drop to only 12% by 2020, leaving a deficit of 5% to the Community's stated reduction goal. To continue progressive reductions capable of achieving the Community's goal of 17% below the baseline by 2020 and beyond, additional reduction measures and/or expanded participation in the proposed measures will be required.

Examples of reductions capable of bridging the current gap to the goal include an additional 50% of households achieving a 30% efficiency improvement on their energy bills or the Mt. Lebanon business community achieving an average of 17% energy savings.

Sector	Nar	ne / Description	Year Proposed	Annual GHG Reduction in 2020	Percent of Community 2006 Emissions	Annual Community Cost Savings
				MT CO <sub>2</sub> -e	%	2012 \$
RES	1.	Continue adoption of Residential Energy Efficiency and Conservation Measures	2010	2914	0.9%	\$460,000
RES	2.	Junior Energy Auditors	2012	544	0.2%	\$85,902
RES	3.	Getting in Touch with Wattley	2012	544	0.2%	\$118,501
RES	4.	ReEnergize Pittsburgh	2012	1092	0.3%	\$172,382
СОМ	5.	Continue adoption of Commercial Energy Efficiency and Conservation Measures	2010	2468	0.8%	\$350,000
MUNI	6.	Implement Addl. Energy Conservation Measures in Municipal and School District Buildings and Operations	2010	1165	0.4%	\$155,808
MUNI	7.	LED Streetlight Retrofits	2010	27	0.0%	\$4,400
MUNI	8.	Fuel Efficient Fleet Replacement	2012	183	0.1%	\$82,994
TRANS	9.	Complete Traffic Light Synchronization	2010	380	0.1%	\$114,000
TRANS	10.	Establish "Best Workplaces for Commuters" Program	2010	327	0.1%	\$99,788
TRANS	11.	Promote & Facilitate Active Transportation	2010	TBD		TBD
WASTE	12.	Continue Residential Recycling Competition	2010	1104	0.3%	0
WASTE	13.	Establish Commercial Recycling Services Purchasing Cooperatives	2010	1400	0.4%	TBD
WASTE	14.	Pay-As-You-Throw	2012	7881	2.5%	TBD
WASTE	15.	Backyard Composting	2012	12	0.0%	0
Totals				20,113	6.32%	\$1,961,638

# **Summary of Proposed & Continuing Strategies**

#### 1. Residential Action 1: Increase Adoption of Energy Efficient Lighting, HVAC Equipment, Appliances, and Energy Conservation Measures by the Residential Sector [2010, updated]

This strategy seeks to use Act 129<sup>4</sup> to encourage residential property owners to avail themselves of the rebates and incentives offered by Duquesne Light, by with outreach through elementary schools, surveying homeowners, publicizing Act 129 and synergistic rebates, and bulk purchasing of energy audits for interested residents. For the 2012 update this strategy is bolstered by Residential Actions 2, 3, & 4.

<sup>&</sup>lt;sup>4</sup> Act 129 is state legislation that requires PA electric utilities to offer energy efficiency rebates and incentives to produce a 3 percent decrease in electric use by 2013 and an additional 2% by 2016. This action will work to meet or exceed the 3 percent reduction goal among Mt Lebanon's residential and commercial properties.

#### 2. Residential Action 2: Employ Junior Energy Auditors at Home [2012]

This project will involve high school students conducting energy audits of their homes. The 11th grade Environmental Geoscience class and faculty have agreed to integrate this program into their second semester curriculum related to the topic of energy. Students will monitor their homes energy usage, identify opportunities for conservation, implement strategies and document their savings.

#### 3. Residential Action 3: Get in Touch with "Wattley" [2012]

In succession with the Student Energy Audit program, these high school students and members of the Environmental Club will spread awareness of the free Energy Efficiency Kits available through Duquesne Light. In order to measure the effectiveness of these kits, the student auditors will evaluate the savings made by utilizing the products provided by Duquesne Light. The Environmental Club should distribute flyers throughout the school and community in order to spread awareness of this free program.

#### 4. Residential Action 4: Amp up Energy Efficiency through ReEnergize Pittsburgh [2012]

ReEnergize PGH is a coalition of local government, professionals, community organizations, and energy utilities aimed at creating jobs, reducing emissions and energy bills, and improving home comfort. Mt. Lebanon has been selected as a "pilot community" for implementing residential energy efficiency outreach. Two members of the Mt. Lebanon Environmental Team have been selected as ambassadors for the program. The ambassadors will provide direct outreach to residences helping homeowners connect to the variety of energy efficiency financial and technical assistance resources available.

# 5. Commercial Action 1: Increase adoption of energy efficient lighting, HVAC equipment, appliances, and motors by the commercial sector [2010, updated]

This strategy seeks to use Act 129 to encourage owners of commercial businesses and properties to avail themselves of the rebates and incentives offered by Duquesne Light. Steps to implement include surveying commercial organizations, publicizing relevant Act 129 incentives and complementary programs, gaining and publicizing commitment to efficiency, coordinate bulk purchasing of energy audits and conservation services.

# 6. Institutional Action 1: Implement Energy Conservation Measures in Municipal and School District Buildings and Operations [2010, updated]

The community's public institutions have initiated a bold pursuit of building energy efficiency opportunities to meet the plan's greenhouse gas reduction targets, including performance contracted energy efficiency retrofits of the recreation center, library, municipal building, public safety building, and

parking authority. Still opportunities remain for additional municipal and school building retrofits, purchasing policies, and behavior modification programs, and to employ a full or part-time energy manager to coordinate township climate and energy actions.

#### 7. Institutional Action 2: LED Streetlight Retrofits [2010, updated]

LED street lighting reduces electricity consumption up to 50%. The municipality owns over 160 street lights and should retrofit them with LED lamps.

#### 8. Institutional Action 3: Fuel Efficient Municipal Fleet Replacement [2012]

By using fuel- efficient vehicles, hybrid vehicles, and auxiliary power units in the municipality's fleet replacement program, Mt. Lebanon can reduce fossil fuel consumption, greenhouse gas emissions, and municipal fuel costs. This measure is aimed at providing the municipality with helpful guidelines and resources for analyzing the current fleet replacement plan and identifying comparable alternative fuel or fuel efficient vehicles.

#### 9. Transportation Action 1: Additional Traffic Signal Synchronization [2010, updated]

Traffic signal synchronization (TSS) coordinates traffic signal timing along a series of intersections to improve traffic flow and reduce congestion, fuel consumption and emissions on arterial streets. Completion of the US Route 19 synchronization has resulted in improved traffic flow and measurable GHG reductions. The municipality is planning additional synchronization along Bower Hill, Cochran, & Beverly Roads with intention of reducing congestion and improving revitalization and economic development along those corridors.

# 10. Transportation Action 2: Implement *Best Workplaces for Commuters* program at Municipality, School District, and Hospital as a model for other businesses in the community [2010]

The *Best Workplaces for Commuters* program offers resources and guidance for businesses on how to develop effective commuting programs for employees, including financial incentives for ride sharing / carpooling, taking public transit, biking or walking to work, and developing telework business schedules. If certain baseline commuter choices are met, the business will be recognized nationally as a model for effective commuting policies. It is suggested to begin with a goal of 10 percent reduction in using single occupancy vehicles to get to work.

#### 11. Transportation Action 3: Promote and Facilitate Walking and Biking [2010, updated]

Promote and facilitate biking and walking within the municipality and regionally, building on Mt. Lebanon's walking community image and culture, current and developing walking and biking events, and regional partnerships. The municipality has planned to improve pedestrian safety through improved crosswalks, sidewalks, and traffic calming infrastructure targeting areas used heavily by student pedestrians.

# 12. Waste Action 1: Continue Competitive Residential Waste Reduction and Pursue Recycling Goal [2010, updated]

In 2011 Mt. Lebanon led the region's first inter-municipal recycling competition and took top honors among South Hills municipalities. Still Mt. Lebanon's residential recycling rate languishes well behind the national average. Establish quantitative solid waste diversion or recycling goals. Pursue it with Waste Actions 2 and 3 and share the successes and shortcomings of these practices with the neighboring municipalities to encourage continued and deeper recycling participation regionally.

# 13. Waste Action 2: Establish a Commercial District Recycling & Eco-Purchasing Cooperative [2010]

Capitalize on existing business networks and the demand for low-cost commercial recycling to establish eco- purchasing cooperatives in Mt. Lebanon's established business districts. This leading-edge program could be initiated immediately as a pilot cooperative to purchase lower-cost recycling services for Mt. Lebanon's business districts, and eventually offering cooperative or bulk purchasing of eco-friendly consumable products and services such as recycled paper products and energy audits.

#### 14. Waste Action 2: Implement Pay-As-You-Throw (PAYT) [2012]

Pay As You Throw (PAYT) is a solid waste and recycling collection and billing system that incentivizes waste reduction by charging residents for the actual amount of waste picked up by the waste haulers. Many of the communities with the highest waste recycling rates utilize this technique. Mt. Lebanon is currently considering this system for its residential waste service.

#### 15. Waste Action 3: Promote Backyard Composting [2012]

Backyard composting reduces organics disposed of in landfills, which reduces methane emissions from decomposition and GHG emissions from waste disposal vehicles. Mt. Lebanon has proposed a "pay-as-you-throw" (PAYT) waste disposal program in order to reduce the amount of recyclables and organics in the waste stream. Because this program will charge each resident based on the amount of waste generated, a composting program may garner much interest and support from residents seeking to reduce overall household costs.

# Acknowledgements

The enclosed report and second iteration of Mount Lebanon's evolving plan of climate action has been made possible by a dedicated group of citizens, officials, volunteers, and staff. Namely the community of Mt. Lebanon itself is working to create a climate of leadership, activism, cooperation, and resilience in response to the global and local economic, social, and environmental challenges associated with human contributions to climate change.

Special thanks are extended to the Mt. Lebanon Environmental Team, municipal staff, and Environmental Sustainability Board for their leadership and financial support. We are especially grateful of the Local Government Academy for providing the grant funds to complete this inventory and action plan update and to the energy utilities serving Mt. Lebanon; Equitable Gas, Columbia Gas, and Duquesne Light; and the Southwestern Pennsylvania Commission, all of whom provided the data necessary to complete the community-wide greenhouse gas emissions inventory and forecast. Additional thanks are given to the Department of Environmental Protection for funding Mount Lebanon's first greenhouse gas inventory and action planning effort through the PA DEP GHG Pilot grant.

The Mt. Lebanon community emissions inventory and climate action plan update have been developed under a collaborative process with citizens, staff, consultants, students, and board members.

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# Foreword

In 2009 the community and municipal government of Mt. Lebanon took a leadership role by beginning the process of measuring, reducing, and monitoring greenhouse gas emissions. Our global atmospheric concentration of greenhouse gasses (GHGs) has surpassed and is rapidly exceeding the current recommended maximum of 350 parts per million (ppm) with dire consequences to climate and quality of life locally and globally. Concurrently concerns about the rising cost, availability, and impact of energy resources are growing at every level of community and government.

In early 2008 the Mt. Lebanon Environmental Community Action Team (ECAT) successfully petitioned the Commission to lead the community by example in energy and climate action and sign the US Mayors Climate Protection Agreement, joining more than one thousand US Mayors and "Cool Cities" nationwide that have recognized the need to reduce local greenhouse gas emissions, improve air quality, and enhance community livability and sustainability. With funding by Mt. Lebanon residents, most of whom are Environmental Team members, the Municipality of Mt. Lebanon subsequently joined the International Council for Local Environmental Initiatives (ICLEI) as a full member and initiated its participation in ICLEI's Cities for Climate Protection (CCP) campaign.

The Municipality is one of a handful of communities in the region taking a leadership role in climate protection and carrying out the CCP campaign's Five Milestones to reduce community-wide greenhouse gas and air pollution emissions.

- 1. Conduct a baseline emissions inventory and forecast of GHG emissions,
- 2. Adopt an emissions reduction target for a forecast year,
- 3. Develop a Local Action Plan,
- 4. Implement plan strategies, and
- 5. Monitor and verify results.

In 2009 the Municipality was awarded a Pennsylvania Department of Environmental Protection (PA DEP) launched a \$20,000 Pilot GHG Grant toward the development of a community-wide greenhouse gas emissions inventory and local climate action plan. Mt. Lebanon's Environmental Community Action Team (ECAT), a volunteer group comprised of Mt. Lebanon residents, and municipal staff partnered with SEEDS, a sustainability-driven non-profit organization, and Envinity, a PA-based energy services company to complete the objectives of the PA DEP GHG Pilot Grant Program.

In 2010, Mount Lebanon completed the first three milestones with a baseline inventory of emissions for the year 2006; an action plan centered on ten strategies to collectively reduce community-wide greenhouse gas emissions by 6% over the next 5 years; and a longer-term goal of reducing emissions to 17% below 2006 baseline by 2020. After two years of strategy implementation, the community sought to 1) monitor and verify the impact of actions taken to date and 2) to amend and update the Community Climate Action Plan, effectively complete the first cycle of this five step program. With a \$5000 grant

from the Local Government Academy, Mount Lebanon hired SEEDS, Inc. and the Duquesne University Center for Environmental Research and Education to complete an inventory and action plan update.

This report represents the completion of the first cycle of all 5 steps of the Cities for Climate Protection program.

Included in this report are:

- Background on greenhouse gasses, climate change, and local climate action (Appendix A);
- Explanations of the inventory analysis and how it was conducted;
- A revision of Mt. Lebanon's baseline emissions for the year 2006;
- Successive annual emissions inventories from 2009 to 2011;
- Estimated impact of reduction measures implemented to date;
- Forecast of future emission levels to 2025 with and without current reduction efforts;
- 2012 action planning approach & community climate team priority survey results;
- Updates to measures proposed in 2010;
- Six newly proposed reduction measures;
- A listing of additional reduction measure ideas recommended or under consideration (Appendix D).

# **Inventory & Forecast**

# **Methodology Summary**

The first step toward reducing greenhouse gas emissions is to identify baseline levels and sources of emissions as well as the sectors of the community that are responsible for the bulk of these emissions. This information is then used to inform the selection of a reduction target and develop a local plan of action. Annual inventories of greenhouse gas emissions may be then compared to the baseline gauge progress towards the reduction target and verify strategy success. ICLEI's Cities for Climate Protection campaign assists local governments to systematically track energy and waste related activities in the community by providing software and standardized methodology for estimation and reporting emissions.

#### Software

ICLEI's The Clean Air Climate Protection (CACP) software tracks emissions of greenhouse gasses and also criteria air pollutants 5 (nitrogen oxides, sulfur oxides, carbon monoxide, volatile organic compounds, and particulate matter) that result from the use of electricity, fuel and waste disposal. It then reports the greenhouse gasses in equivalent carbon dioxide emissions<sup>6</sup> (CO<sub>2</sub>-e). It also translates all energy units into British Thermal Units (Btus).

#### **Metrics**

These two metrics, carbon dioxide equivalents and British thermal units are accepted industry standards, but may deserve some explanation.

#### *CO*<sub>2</sub>*-e* (*Carbon Dioxide Equivalents*)

Carbon dioxide is the most prevalent gas that contributes to the greenhouse effect<sup>7</sup> and is emitted in greatest quantity from fossil fuel combustion. However two other products of fossil fuel combustion and waste decomposition, methane and nitrous oxide, are also emitted to the air and are more potent contributors to the greenhouse effect per unit of mass. The greenhouse-effect potency of these gases is typically expressed through their potential to cause global warming<sup>8</sup> relative to carbon dioxide.

<sup>&</sup>lt;sup>5</sup> Criteria air pollutants include the six air pollutants regulated by the US EPA under the National Ambient Air Quality Standards due to their ubiquity and potential harm to human and environmental health.

 $<sup>^{6}</sup>$  Because different greenhouse gasses have different atmospheric warming potentials, total emissions are converted to carbon dioxide equivalents (CO<sub>2</sub>-e) to provide a standard unit of measurement.

<sup>&</sup>lt;sup>'</sup> See the US EPA's Causes of Climate Change website for more information

http://www.epa.gov/climatechange/science/causes.html#greenhouseeffect

<sup>&</sup>lt;sup>8</sup> Even though the global effects of greenhouse gas emissions are now commonly referred to as "climate change" it is the warming effect of these gases that serves as the common metric for comparison.

Thus the combined contribution of the combustion gases can be expressed as total carbon dioxide equivalents. In this context, this is typically reported as  $MT CO_2$ -e or metric tons of carbon dioxide equivalents.

Greenhouse Gas	Global Warming Potential as CO2-e (100 yr horizon)
Carbon Dioxide (CO <sub>2</sub> )	1
Methane (CH <sub>4</sub> )	24
Nitrous Oxide (N <sub>2</sub> O)	310

 Table 3: Global Warming Potentials (Source: US EPA Climate Leaders Emission Factors<sup>9</sup>)

#### Btu (British thermal unit)

The British thermal unit is a standard unit measure of energy or the heat content of a fuel or energy source. All forms of energy and fuels can be expressed in terms of Btus and it is commonly used to compare the energy content of different energy sources. In this context, it is typically reported as mmBtu or million British thermal units.

	Equivalents				
1 mmBtu	1 million Btus				
	10 therms of natural gas				
	1 million cubic feet of natural gas				
	11 gallons of propane				
	7.2 gallons of gasoline				
	80 lbs of coal				
	293 kWh of electricity				

Table 4: mmBtu Equivalents (Source: EIA Energy Conversion Factors<sup>10</sup>)

#### Inventory Scope

The community-wide inventory was calculated in terms of carbon dioxide equivalents and British thermal units using the CACP 2009 software and its default calculations, values and assumptions. The scope of analysis generally includes all activities<sup>11</sup> occurring within the municipality of Mt. Lebanon and reports both scope 1 – direct and scope 2 – indirect emissions.

<u>SCOPE 1 – DIRECT EMISSIONS</u> are defined as emissions released within the community including fossil fuels burned for heating homes and businesses or vehicles driven with the municipality.

<sup>&</sup>lt;sup>9</sup> US EPA Climate Leaders Emission Factors for Greenhouse Gas Inventories.

http://www.epa.gov/climateleadership/documents/emission-factors.pdf

<sup>&</sup>lt;sup>10</sup> http://www.eia.gov/forecasts/aeo/pdf/appg.pdf

<sup>&</sup>lt;sup>11</sup> Emissions or activities may be excluded that fall are considered de minimis – emissions from one or more sources, for one or more gases which, when summed, equal less than 5% of the communities total emissions

<u>SCOPE 2 – INDIRECT EMISSIONS</u> also occur as the result of energy consumed within the community, but the actual emissions are emitted by sources outside the municipality. Impacts resulting from the consumption of purchased electricity, heat, or steam are considered indirect and represent Scope 2.

<u>SCOPE 3 – INDIRECT EMISSIONS</u> represent all indirect emissions not classified under Scope 2. This includes emissions resulting from the extraction and manufacturing materials and products consumed within the municipality, but produced outside the municipality; and emissions from services rendered to the Mt. Lebanon community but emitted outside the municipality (e.g. solid waste disposal, wastewater treatment, and regional transportation)

Inventory activity inputs and total scope 1 and 2 emissions created by community activities have been categorized by the software into four community sectors:

<u>RESIDENTIAL</u> – inputs include total annual electricity and natural gas consumed by residential households<sup>12</sup>, within the municipality.

<u>COMMERCIAL<sup>13</sup></u> – inputs include total annual electricity and natural gas consumed by commercial sector activities. The commercial sector represents management, professional, and service organizations including wholesale, retail, communications, financial, health care, food services, hospitality, and office activities. Also included in this category are educational institutions, houses of worship, and municipal governmental operations.

<u>TRANSPORTATION</u> – inputs include total annual on-road vehicular and local on-road transit transportation within the municipality. This includes transportation for residential, commercial, and industrial activities. Emissions are based on estimated total vehicle-miles traveled (VMT) and an estimated distribution of vehicle and fuel types. The local transit service, the Pittsburgh Port Authority provides both on-road and rail service. Only Port Authority bus transportation miles are included in the estimated community-wide VMT.

<u>WASTE</u> – inputs include weight and composition (i.e. percentages of organic and inorganic materials) of solid waste generated annually within the community during. Additional inputs include the method of solid waste management (e.g. landfill, incineration, composting, open dumping, etc.), and the percentage of methane capture and flaring or recovery for use.

For Mt. Lebanon, the emissions reported through the forth category, Waste, represent Scope 3 emissions because the landfills serving Mt. Lebanon are located outside the political boundary of the municipality.

<sup>&</sup>lt;sup>12</sup> Households in apartment buildings with individual meters that receive energy utility bills directly from the utility are categorized as Residential, while households in apartment buildings with master energy meters for the entire building are categorized as Commercial based on how the data is reported by the utility companies.

<sup>&</sup>lt;sup>13</sup> Because there are so few industrial facilities in Mt. Lebanon the industrial sector has been combined with the commercial sector for both the inventory and action plan.

#### **Data Sources**

Data for the inventory have been collected from municipal records, regional energy utilities, and local and state government agencies. The inventory data sources summarized below are detailed in Appendix B.

ELECTRICITY: All electricity consumption data for residential, commercial, and industrial sectors were provided by Duquesne Light.

<u>NATURAL GAS</u>: Natural gas consumption data were provided by Equitable Gas, Dominion Peoples<sup>14</sup>, and Columbia Gas, the Township's three providers for the residential, commercial and industrial sectors

<u>TRANSPORTATION</u>: Historical vehicle miles traveled within the municipality were provided by the Pennsylvania Department of Transportation's Bureau of Planning and Research for all road class types except municipally owned local roads, for which no data sources were available.

<u>WASTE:</u> Quantities of residential solid waste and recycling collected annually within the municipality were available through the Mt. Lebanon Department of Public Works, as were reported quantities of commercial recyclables collected. However, commercial solid waste collection is not reported to the municipality, county or state, by municipality, therefore commercial solid waste collection was estimated<sup>15</sup>.

#### Backcasting

For the baseline inventory, several of the utility providers were not able to provide consumption and customer records back to the year 2006. In order to estimate the total community-wide emissions for the year 2006, the data was weather normalized and backcasted to year 2006<sup>16</sup>. The same process of weather normalization served as the starting point for the community emissions forecast.

#### Forecasting

The CACP 2009 software enables communities to project emissions from the baseline year or current year (in this case weather normalized 2009) to any forecast year of interest. An emissions forecast may be made if rates of energy use growth for each fuel type and sector are assumed. The energy use growth rates developed for each sector of the Mt. Lebanon community were comprised of two factors:

<sup>&</sup>lt;sup>14</sup> Dominion Peoples did not provide data for the 2012 inventory update.

<sup>&</sup>lt;sup>15</sup> The CACP software does not allow for the reporting of recycling in the baseline inventory, but does provide an opportunity for reporting recycling in the quantification of greenhouse gas reduction measures.

<sup>&</sup>lt;sup>16</sup> For electric, 2009 monthly data were used to create linear regressions between monthly Heating Degree Days (HDD), monthly Cooling Degree Days (CDD), and monthly electric usage. These monthly regressions were used to backcast electric usage for 2006 based on the HDD and CDD for 2006. And for natural gas monthly data were used to create a linear regression between monthly Heating Degree Days (HDD) and gas usage for both residential and commercial sectors. These monthly regressions were used to backcast gas usage for 2006.

1) sector growth<sup>17</sup> (e.g. for the residential sector: percent growth in the number of households; for the commercial or industrial sectors: percent growth in the number of establishments) and 2) projected changes per capita energy demand relative to each sector<sup>18</sup>.

#### **Reduction Measure Analysis**

In addition to inventorying, the CACP 2009 software provides tracking of existing and proposed reduction measures that can be applied to the baseline and forecasted emissions. Data on existing community reduction measures were provided by the Mt. Lebanon Department of Public Works, including residential and commercial recycling and composting.

#### **Updated Inventory Results**

Mt. Lebanon's community-wide emissions baseline inventory was completed for the year 2006. This inventory update includes annual emissions analyses of the years 2009, 2010, and 2011 using the CACP 2009 software and data described in the methodology above.

The 2006 baseline emissions were originally reported as 288,558 metric tons of carbon dioxide-equivalents (MT CO<sub>2</sub>-e). As part of *this* inventory update, revised natural gas consumption data were provided by Columbia gas which has in turn resulted in a revised baseline that is 11.7% higher than originally reported. The revised baseline is 322,398 MT CO<sub>2</sub>e which equates to the emissions from 67,000 passenger cars or the carbon sequestered by 264,261 acres of U.S. forestland, annually. These emissions result primarily from the direct combustion of fossil fuels or the consumption of electricity produced from fossil burning sources. The remaining 1% of estimated community-wide emissions is associated with landfill gas – methane released from the decomposition of solid waste generated by the community.



Figure 1: Comparison of per capita Community Emissions

The 2006 Mt. Lebanon community-wide emissions still represent less than 1% of the statewide emissions and per capita annual emissions for township residents reported in Figure 1 were less than those of Pittsburgh and US national averages<sup>19</sup>, but compared to the international average, Mt. Lebanon is responsible for 2.2 times more GHG emissions per person.

<sup>&</sup>lt;sup>17</sup> Annual municipal population, household, and commercial business projections from 2010 to 2030 were obtained from the Southwest Pennsylvania Commission's Municipal Profiles and US Census 2008 National Projection, both based on the 2000 Census.

<sup>&</sup>lt;sup>18</sup> Annual projections of national energy use were available from the 2012 release of the US Energy Information Administration's Annual Energy Outlook (AEO). AEO data used for the community projections included national projections of electricity, natural gas, diesel gasoline consumed by the residential, commercial, industrial, and transportation sectors.

<sup>&</sup>lt;sup>19</sup> The scope of the State and National emissions inventories is more comprehensive (includes additional secondary emissions sources) than the municipal inventory, which likely results in higher per capita emissions estimates.

#### 2006 - 2011 Emissions Inventory & Baseline Comparison

The most recent analysis shows that total greenhouse gas emissions have reduced modestly, but progressively to 3.7% below the 2006 baseline (Figure 2). This change is driven by a 14.3% change in emissions from the transportation sector and is in spite of a 0.7% increase in emissions associated with Mt. Lebanon's consumption of electricity (Table 5).



Figure 2: 2006-2011 GHG Emissions by Sector

Sector	2006	2009	2010	2011	2011-2006 % Change
Residential	143,456	142,285	146,194	144,398	0.70%
Commercial / Industrial	98,795	97,514	96,969	97,218	-1.60%
Transportation	77,060	72,137	68,753	66,024	-14.30%
Waste	3,087	2,941	2,985	2,939	-4.80%
Total	322,398	314,877	314,901	310,578	-3.70%
% Change from Baseline	0.00%	-2.30%	-2.30%	-3.70%	

Table 5: 2006-2011 GHG Emissions by Sector

The contributions by sector for 2011 follow similar proportions to the 2006 baseline and indicate similar priorities for action strategies (Figure 3 - Figure 6). The residential sector continues to represent nearly half of the community's GHGs and in fact now holds a 3% greater share than it did in 2006.



Figure 3: Contributions of GHGs by Sector, 2006 & 2011



Figure 4: Contributions of GHGs from Waste by Waste Type, 2006 & 2011

Waste represents the smallest GHG contribution, in part, because the regional landfills serving Mt. Lebanon's waste haulers recover the majority of greenhouse gases that are emitted as the waste decomposes. However, waste reduction and recycling can still provide opportunity for substantial emissions reductions if the avoided energy for the production of raw materials is considered in the analysis<sup>20</sup>.



Figure 5: Contributions of GHGs from Energy Use by Energy Type, 2006 & 2011

Energy consumption continues to be the primary driver of community greenhouse gas emissions, so it is important to consider the different energy sources. Figure 2 illustrates that electricity is the lead contributor of GHG emissions at 55%. However, electricity makes up only 26% of municipal-wide energy use (Figure 3). This comparison highlights that emissions-per-unit energy consumed are not equivalent for all energy sources. For each unit of electricity consumed from the regional electricity grid, energy is lost in generation, transmission, and distribution, which results in a higher emissions profile for electricity than for fuels combusted for transportation or heating. These energy losses are illustrated in Figure 7.

<sup>&</sup>lt;sup>20</sup> Inclusion of Scope 3 indirect emissions reductions associated with recycling that is collected within a community, but managed outside the community boundaries has historically been a common practice for community GHG inventories. The most recent guidance from ICLEI for community GHG inventories (October 2012) has excluded emissions reductions associated with recycling. ICLEI expects to release a guidance for reporting emissions reductions from recycling and composting later this year. The intent of *this* inventory update is to demonstrate change against the 2006 baseline and demonstrate the success of the originally proposed climate action strategies; therefore emissions reductions associated with recycling continue to be included in this analysis.



Figure 6: Contributions of Site Energy Consumption by Energy Type, 2006 & 2011



Figure 7: Inefficiencies in Grid-Delivered Electricity (Source: National Academies Press 2008 What You Need To Know about Energy)

Table 6 lists the assumed emissions intensities of energy sources consumed within Mt. Lebanon by million British thermal units (mmBtu).

Source	2006	2011	
	kg CO2-e	kg CO2-e	
	per mmBtu	per mmBtu	
Electricity <sup>21</sup>	213	210	
Natural Gas	53	53	
Gasoline	78	78	
Diesel	79	79	

Table 6: Average Emissions Intensity by Source and Inventory Year

#### **Current Measures**

Since the 2006 baseline year numerous efforts have been underway within Mt. Lebanon that have served to reduce energy use and waste generation costs, improve quality of life, and reduce greenhouse gas emissions. Many of these actions were recommended by or recognized in the 2010 Community Climate Action Plan.

The six actions listed in Table 7 represent the most significant measures currently implement. Those measures completed by or in 2011 account for a portion of the 3.7% reduction observed in 2011.

Sector	Name / Description	Year Completed	Est. Annual GHG Reduction	Percent of Baseline Emissions	Estimated Annual Cost Savings
			MT CO <sub>2</sub> -e	%	2012 \$
WASTE	Residential Recycling Competition	2011	1104	0.4%	\$0
MUNI	Municipal Facilities Energy Efficiency Retrofit	2012	1052	0.2%	\$140,930
TRANS	Washington Rd. Traffic Light Synchronization	2011	759	0.2%	\$300,082
MUNI	LED Traffic Light Retrofit	2011	312	0.1%	\$60,979
WASTE	E-waste Recycling	2012	124	0.0%	\$0
TRANS	"No Idling Zones" Established	2011	66	0.0%	\$20,625
Totals			3,417	0.9%	\$522,616

#### Table 7: Reduction Measures Implemented Since 2010

Not included in the 3.7% are the existing residential and commercial recycling and composting programs which resulted in an additional net greenhouse gas emissions reduction of 7,842 MT  $CO_2$ -e annually. Subtracting these existing recycling and composting net reductions from the annual emissions total drops the 2011 net emissions to 4.8% below the 2006 baseline.

<sup>&</sup>lt;sup>21</sup> Electricity emission intensity is derived from the emissions per kWh for the RFC West regional electricity grid as reported by the US. EPA's eGRID 2012 database.

# **Updated Forecast Results**

#### 2025 Community Forecast

This projection of consumption and emissions considers the trajectory of community-wide emissions if Mt. Lebanon proceeds with "business as usual" (BAU), without any additional local reduction measures. Expected changes at a national level, such as vehicle fuel efficiency, appliance efficiency, and electricity generation due market trends and recent Federal regulations, are however included.

As described in the Methodology, forecasts of community-wide emissions were developed from projected community population growth and changes in energy demand across sectors and energy types. Expected changes in the national per capita energy use for each energy type and sector are based upon the US Energy Information Administration's Annual Energy Outlook (AEO).

In the 2010 Action Plan, "BAU" emissions were forecasted to rise progressively, increasing to 333,833 MT  $CO_2$ -e by 2025. However, the Annual Energy Outlook was substantially revised between 2010 and 2012. Under the 2012 AEO projections, total greenhouse gas emissions are expected to decline gradually without additional community action to 305,182 MT  $CO_2$ -e or 5.3% below baseline emissions by 2025. Figure 6 details the progression of annual emission change according to the four community sectors. Of these, the Commercial sector is projected increase by 6.6% of its 2006 emissions by 2025, while the Residential sector is expected to decrease slightly by 2.3%. The Transportation sector is expected to decrease significantly with a 25% reduction. Lastly, under the "BAU" scenario, the Waste sector is expected to remain constant from 2011.



Figure 8: Projected Community GHG Emissions by Sector

# **Emissions Reduction Targets**

In 2010, the Community Climate Team established a provisional goal of a community wide emissions reduction target of 17% below 2006 levels in 2020. The goal mirrors the President's targets for reducing emissions as put forth in the 2009 Copenhagen Climate Talks<sup>22</sup>. That goal is retained for the 2012 update, leaving open the opportunity for a deeper and/or longer term reduction target to be set in a subsequent iteration of the action plan.

# **Community Climate Actions**

The Community Climate Team views action planning as an evolving process. This report represents the first and second iterations of Mt. Lebanon's plan. Strategies will continue to be developed and evaluated for this living document of climate action.

In 2010, strategies to achieve the objectives of the CCP campaign were initially developed by six action planning committees formed from the Community Climate Team. The six committees included:

- Residential
- Commercial
- Institutional
- Active Transportation
- Waste Reduction
- Outreach

Ten strategies from these committees were selected for further development and analysis by the Project Team. These actions were chosen to first meet the objectives of the PA DEP GHG Pilot Grant, namely to identify practical municipally-led strategies for significant community-wide greenhouse gas emissions reduction. They also were selected based on their political, financial, and logistical feasibility relative to available municipal resources and partnerships and therefore represented fairly short-term (1-3 years) implementation strategies.

For the 2012 update, strategies have been pursued relative to the themes of the six action planning committees, but the Community Climate Team did not divide into individual committees. Instead the 2012 Community Climate Team priorities were established through a handful of community meetings and an online survey (Figure 9). From these priorities new reduction measures were developed by graduate students at Duquesne University's Center for Environmental Research & Education. These strategies were then refined with the Community Climate Team.

For this second iteration of the Mt. Lebanon Community Climate Action Plan, six new strategies have been integrated into the existing ten for a total of 15 reduction measures (Table 8).

<sup>&</sup>lt;sup>22</sup> http://www.whitehouse.gov/the-press-office/president-attend-copenhagen-climate-talks

Descriptions of each strategy as well as initial analysis of the reduction potential are reported below with some suggestions for longer-term strategy development. Additional strategies recommended by the Project Team and Action Planning Committees are listed in the appendix as strategies under consideration.

# **Summary of Community Climate Team Survey Results**

In October of 2012, an online survey soliciting priority topics, strategies, and audiences for climate action was distributed amongst the broad Community Climate Team established in 2010.



#### Figure 9: Community Climate Team Survey Results

The survey indicated nearly equal priorities for energy, waste management, transportation, and watersheds as the most important aspects of sustainability facing Mt. Lebanon. Homeowners were selected as the highest priority audience to target. And incentives, followed by public education and technical assistance received the highest scores for general climate action strategy mechanisms favored by the Community Climate Team.





# **Summary of Strategies To-Date**

Based upon these priorities fourteen planned and proposed strategies chosen for the second iteration of the Community Climate Action Plan have the potential to reduce community-wide GHG emissions by more than 20,113 MT CO<sub>2</sub>-e annually, once fully implemented.

Sector	Nan	ne / Description	Year Proposed	Annual GHG Reduction in 2020	Percent of Community 2006 Emissions	Annual Community Cost Savings
				MT CO <sub>2</sub> -e	%	2012 \$
RES	16.	Continue adoption of Residential Energy Efficiency and Conservation Measures	2010	2914	0.9%	\$460,000
RES	17.	Junior Energy Auditors	2012	544	0.2%	\$85,902
RES	18.	Getting in Touch with Wattley	2012	544	0.2%	\$118,501
RES	19.	ReEnergize Pittsburgh	2012	1092	0.3%	\$172,382
СОМ	20.	Continue adoption of Commercial Energy Efficiency and Conservation Measures	2010	2468	0.8%	\$350,000
MUNI	21.	Implement Addl. Energy Conservation Measures in Municipal and School District Buildings and Operations	2010	1165	0.4%	\$155,808
MUNI	22.	LED Streetlight Retrofits	2010	27	0.0%	\$4,400
MUNI	23.	Fuel Efficient Fleet Replacement	2012	183	0.1%	\$82,994
TRANS	24.	Complete Traffic Light Synchronization	2010	380	0.1%	\$114,000
TRANS	25.	Establish "Best Workplaces for Commuters" Program	2010	327	0.1%	\$99,788
TRANS	26.	Promote & Facilitate Active Transportation	2010	TBD		TBD
WASTE	27.	Continue Residential Recycling Competition	2010	1104	0.3%	0
WASTE	28.	Establish Commercial Recycling Services Purchasing Cooperatives	2010	1400	0.4%	TBD
WASTE	29.	Pay-As-You-Throw	2012	7881	2.5%	TBD
WASTE	30.	Backyard Composting	2012	12	0.0%	0
Totals				20,113	6.32%	\$1,961,638

Table 8: Summary of Strategies Proposed and Continuing from 2010

From 4.8% below baseline levels in 2011, these new strategies combined with the current programs are projected to bring emissions to more than 11% below the baseline by 2015. But based on these strategies alone, emissions are expected to drop to only 12% by 2020, leaving a deficit of 5% to the Community's stated reduction goal. To continue progressive reductions capable of achieving the Community's goal of 17% below the baseline by 2020 and beyond, additional reduction measures and/or expanded participation in the proposed measures will be required.



Figure 6: Projected Community GHG Emissions by Sector

Examples of reductions capable of bridging the current gap to the goal include an additional 50% of households achieving a 30% efficiency improvement on their energy bills or the Mt. Lebanon business community achieving an average of 17% energy savings.

# Residential

The residential sector represents nearly half of the community-wide emissions, of which almost 60% is attributed to electricity consumption. It is also the sector with the most documented growth in emissions from the 2006 baseline. Not surprisingly energy use and homeowners where the top targets chosen in the Community Climate Team survey. As such this sector the highest priority sector in the development of strategies. The residential action proposed in to 2010, to increase adoption of energy efficiency and conservation remains and is supported by three additional measures which provide more explicit programs by which to achieve residential energy efficiency.

# Residential Action 1: Increase the adoption of energy efficient lighting, HVAC equipment, appliances, and encourage the implementation of energy conservation measures by the residential sector [Proposed 2010]

#### Summary Description:

This action will work to meet or exceed a 3% reduction goal among Mt Lebanon's residential properties. This strategy seeks to use Act 129<sup>23</sup> to encourage residential property owners to avail themselves of the rebates and incentives offered by Duquesne Light, as follows:

- 1. Encourage local elementary schools to participate in the Duquesne's "School Home Energy Pledge."
- 2. Conduct survey of homeowners to document need, challenges, and opportunities. Consider using Duquesne's online energy audit tool.
- 3. Launch publicity campaign on Act 129, Energy Star tax credits and synergistic programs through channels to include the MTL magazine (federal tax credits, Keystone HELP financing, PA Home Energy rebates, PA Sunshine Rebates, the emerging federal HomeSTAR rebate program).
- 4. Organize bulk purchase of audits

#### Partners:

Mt. Lebanon Environmental Team can organize volunteers for direct outreach to homeowners.

MTL Magazine and Township staff can help publicize programs and successes with the MTL Magazine.

**The Environmental Sustainability Board** is uniquely positioned to develop partnerships and liaison with Township staff.

<sup>&</sup>lt;sup>23</sup> Act 129 is state legislation that requires PA electric utilities to offer energy efficiency rebates and incentives to produce a 3% decrease in electric use by 2013 for Phase I. For Phase II, Duquesne Light has proposed to achieve an additional 2% efficiency gain through rebates and incentives.

**The Mount Lebanon Commercial District Office** (potential) <u>may</u> be willing to help extend the bulk purchasing of energy audits for the business community to residential homeowners through a collective procurement program. Batches of packages audits could be bid to qualified firms who are required to follow a base level of service, such as PA Home Energy guidelines.

**Mt Lebanon School District** (potential) The Mt. Lebanon School District provides an introduction to the Physics and Ecology of Energy Conservation at the Elementary, Middle and High School levels. Duquesne Light has a School Energy Pledge Program, in which families of elementary school children pledge to install energy devices, some of which are provided free to the children by Duquesne Light. The Mt. Lebanon School District should be encouraged to take part in this program.

**PA Home Energy** (potential) promotes Home Performance with Energy Star in Pennsylvania through a network of certified auditors and contractors. They have a 3<sup>rd</sup> party quality assurance program for both the audits and the contractor installation. They offer financial incentives of \$200-1000 when the improvements are made. The audit also gives the homeowner access to better lending rates through the Keystone HELP loan. <u>www.pahomeenergy.com</u>

**Diagnostic Energy Auditors Association of Western PA** (potential) is an association of certified auditors and energy professionals on Western PA. Most members are certified HERS raters and perform audits through the PA Home Energy program.

**Keystone HELP Loan Program** offers energy efficiency financing for home performance improvements. Loans can be secured or unsecured. \$325 credits available toward cost of certified Energy Audit. Having an energy audit done also lowers interest rate by one point. <u>http://www.keystonehelp.com/</u>

**Home Owners' Associations** (potential) Consider reaching out through existing neighborhood or homeowner associations, such as the Mount Lebanon Main Line Home Owner's Association. <u>http://www.mtlebanonmainline.org</u>

#### Quantification:

Market Size: 13,610 housing units, 75% of which are owner occupied.

<u>Market Penetration</u>: To meet Act 129 reduction goal of 3% by 2013, anticipate the need for 20% participation (2700 homes) in the 3 year window with an average of 15% reduction per home. Alternate participation versus average reduction as follows:

If average reduction is 10%, 30% participation (4100 homes) If average reduction is 15%, 20% participation (2700 homes) If average reduction is 20%, 15% participation (2000 homes) If average reduction is 30 %, 10% participation (1400 homes)

#### Reduction:

- The average residential dwelling in Mt Lebo uses 8500 kWh electric per year.
- The average residential property in Mt Lebo uses and 72 Mcf natural gas per year.
- Assume 15% reduction in electric per participating home.
- Assume 5% reduction in gas as co-benefit of synergistic measures.
- <u>A total of 3,465,000 kWh saved per year.</u>
- <u>A total of 7300 Mcf saved per year.</u>
- <u>A total of 2914 MT CO<sub>2</sub>-e reduced per year</u>

#### Cost and Cost Savings:

	OWNER	YEARLY COST	Co2-e savings	PAYBACK PERIOD
	INVESTMENT	SAVINGS		
Per housing unit	\$ 1,700	\$ 170	1.08	10 YEARS
2700 housing units	\$ 4.6 million	\$ 459,000	2,914	10 YEARS

#### Administration Cost: TBD

#### Key Contacts:

AFC first (Keystone HELP Loan) Jennifer Allen Program Manager Keystone HELP & CT Solar Lease jallen@afcfirst.com (610)433-7486 PA Home Energy www.pahomeenergy.com Alex Mordas Building Program Consultant amordas@psdconsulting.com (724) 610-0769 Diagnostic Energy Auditors Association of Western PA Tim Carryer, *Director Green Over Green* (412)310-3503

#### References:

http://factfinder.census.gov for 2000 census data

#### Summary Description:

This project will involve high school students conducting energy audits of their home. The project can be structured as a competition between different classrooms and will run duration of a school semester. Each student, with the help of the assigned teacher, will review their electric bill, identify 2-3 aspects in their home that consume electricity and propose 2-3 behavioral changes that will help reduce electric energy consumption. The changes will be implemented for the period of the audit (once school semester), after which the students will compare their electric bill. The students with the greatest change can be rewarded with recognition and a pizza party.

#### Targets:

Sector(s): Residential

Audience(s): School students, household members, community members

Emission Sources(s): Electric

#### **Reduction Mechanism:**

The primary reduction mechanism is through behavioral changes. Students participating in this project will be the principal leader/role model for the household. They will identify those activities that waste energy and change behaviors. Examples of such activities include turning off lights and electronic devices when leaving a room, placing electronic devices on "smart" power strips, increased use of natural light, and replacing old incandescent bulbs with energy efficient CFL bulbs.

#### Process and Timeline:

This project will involve participation by the 11th grade Environmental Geoscience class and faculty. Beginning in the second semester, coinciding with the school curriculum related to the topic of energy, students will learn about energy audits. Prior to the launch of the project, consumption and customer records for the previous year of the student households needs to be gathered from the utility provider. Having completed consent forms signed by the respective parents authorizing the disclosure of the requested information and explaining the purpose and scope of the project to utility representative will facilitate a timely and effortless gathering of data.

Using the historical electricity consumption data from the previous year, students can estimate their emissions for that year which will serve as a baseline. Each student will then propose 1-2 simple, low cost changes that they are willing to follow for the duration of the project in order to reduce their consumption of electricity. These changes can be behavioral, such as turning off lights and devices when not in use, or physical, such as replacing the most heavily used incandescent bulbs with energy efficient CFL bulbs, or a combination of changes.

Throughout the semester students can present different strategies that they implement at their home, share successes and challenges and other information they have researched. Energy performance of in individual strategies could be evaluated by students using inexpensive energy monitors such as "Kill-a-Watt" meters.

In an effort to sustain interest and momentum, this project can be structured as a competition between students of different sections of a particular grade. At the end of the semester the students will calculate their energy savings and present the results. The class with the greatest savings can be acknowledged and rewarded.

Upon the successful completion of the energy audits, the students can then help with implementation of the "Get in Touch with Wattley" strategy. Students will canvass their neighborhood, targeting both residential and commercial properties, distributing energy saving kits and spreading awareness on the GHG emissions reduction efforts in Mt. Lebanon. For more details, please refer to the CFL Outreach strategy.

#### Partners:

Mt. Lebanon High School Faculty can help training students to become junior energy auditors.

**High School Students** will perform audits of their home electricity consumption and will help spread the word throughout the community

MTL Magazine and Township staff can help publicize programs and successes with the MTL Magazine.

**Duquesne Light Co.** could provide energy saving kits to be distributed in the community by the high school students.

#### Quantification:

<u>Market Size</u>: The demographic profile data of Mt. Lebanon Township for 2010 from the U.S. Census Bureau Fact American Fact Finder<sup>24</sup> indicates that there are 15,040 housing units, of which 94.4% are occupied.

<u>Market Penetration</u>: Initially this project will target the households in the participating classes (approximately 50-100 households based on an average classroom of 50 students). However, once the project has been established and by combining this strategy with Residential Action 3 "Getting in Touch with Wattley", a greater number of households and businesses can be reached.

<sup>&</sup>lt;sup>24</sup> Profile of General Population and Housing Characteristics: <u>http://mtlebanon.org/DocumentCenter/Home/View/880</u>

<u>Reduction</u>: Assume a household average of 10% sustained emissions reduction achievable through conservation measures adopted by 75 students. The 2011 average annual household emissions were 10.27 MT  $CO_2$ -e.

Total Annual Reduction (at year n) = 10.27 MT  $CO_2$ -e \* 10% \* 75 students \*n (# of years the program is in place)

Total Annual Reduction (2020) = 544 MT CO<sub>2</sub>-e

<u>User Cost</u>: As a behavior based program there will be no user costs.

Administration Cost: There will be no additional cost to the school district.

<u>Cost Savings</u>: Estimated average annual savings per participating household are \$225.65 in 2012 US \$ at current utility rates assuming the majority of emissions reductions will be due to electricity reductions.

#### Barriers and Opportunities:

- Initiating project; organizing lesson plans and teaching students how to perform energy audits
- Securing free energy efficient kits for distribution
- Students get first-hand knowledge that they can share with parents and bring about a direct change
- Students can help spread the message across the community

#### Co-benefits:

- Cost savings for homeowners and business owners
- Indirect air quality improvement
- Publicity for the community
- Helps create a community culture that is aware of the environmental impacts of GHG

#### Key Contacts:

MTLSD Environmental Geosciences Faculty

Robert Bergstresser Mt. Lebanon High School rbergstressor@mtlsd.net 412.344.2000 x 13357

#### Resources:

See Env. Geosciences Class Page on Energy <a href="http://oldwww.mtlsd.org/senior/science/rbergstresser/">http://oldwww.mtlsd.org/senior/science/rbergstresser/</a>
#### Summary Description:

In succession of the Student Energy Audit program, these high school students and members of the Environmental Club will spread awareness of the free Energy Efficiency Kits available through Duquesne Light. Additionally, in order to measure the effectiveness of these kits, the student auditors will evaluate the savings made by utilizing the products provided by Duquesne Light. The Environmental Club should distribute flyers throughout the school and community in order to spread community awareness of this free program.

## Targets:

Sector(s): Residential

Audience(s): Students, Teachers, Community members

Emission Sources(s): Electricity

#### **Reduction Mechanism:**

By increasing the efficiency of electric devices in the household, significant community greenhouse gas reductions could be made.

#### Process and Timeline:

This program could be implemented immediately in accordance with the Junior Energy Auditor program. Students would need to have a parent visit the <u>www.wattchoices.com</u> website and enter their Duquesne Light account information in order to receive their free Energy Efficiency Kit. After these kits were received, comparisons could be made with previous month's bills to evaluate the effectiveness of the kits. In order to promote the effectiveness of the program, students could advertise in the school newspaper, engage the community going door to door as a group, or distributing flyers advertising the kits or post flyers in high people traffic areas. If this program proves effective at reducing household energy bills, it could then be advertised in the Mt. Lebanon Magazine and possibly other media sources.

#### Partners:

**Mt. Lebanon High School Environmental Geosciences Class** - Robert Bergstresser, high school science teacher, willing to offer the energy auditing assignment in his 11th grade Environmental Geoscience class.

Mt. Lebanon High School Environmental Club- necessary for completing organizing and completing outreach initiatives

**Duquesne Light** Dave Defide- Duquesne Light - could have interest in partnering with the program for Act 129 requirements

Mt. Lebanon Magazine - would assist in outreach

Lebo Alerts https://leboalert.mtlebanon.org - would assist in outreach

## Quantification:

<u>Reduction</u>: Assume an additional household average of 10% sustained emissions reduction achievable through energy efficient products installed via this program. The 2011 average annual household emissions were 10.27 MT  $CO_2$ -e.

Total Annual Reduction (at year n) = 10.27 MT  $CO_2$ -e \* 10% \* 75 students \*n (# of years the program is in place)

Total Annual Reduction (2020) = 544 MT CO<sub>2</sub>-e

<u>User Cost</u>: Products are provided by the Duquesne Light Watt Choices program there will be no user costs.

Administration Cost: There will be no additional cost to the school district.

<u>Cost Savings</u>: Estimated average annual savings per participating household are \$225.65 in 2012 US \$ at current utility rates assuming the majority of emissions reductions will be due to electricity reductions.

<u>Barriers and Opportunities</u>: Garnering enough interest in the school to reach a large number of people in the greater community.

<u>Co-benefits</u>: Annual energy cost savings for residents of Mt. Lebanon, reduction of peak energy levels for Duquesne Light, reduction of municipal greenhouse gas emissions.

## Key Contacts:

MTLSD Environmental Geosciences Faculty Robert Bergstresser Mt. Lebanon High School rbergstressor@mtlsd.net 412.344.2000 x 13357

Watt Choices Program Dave Defide Duquesne Light <u>ddefide@duqlight.com</u>

## Resources:

See Env. Geosciences Class Page on Energy <a href="http://oldwww.mtlsd.org/senior/science/rbergstresser/">http://oldwww.mtlsd.org/senior/science/rbergstresser/</a>

See Watt Choices homepage https://www.duquesnelight.com/wattchoices/

# Residential Action 4: Amp up Energy Efficiency through ReEnergize Pittsburgh [Proposed 2012]

## Summary Description:

ReEnergize PGH is a coalition of local government, professionals, community organizations, and energy utilities aimed at creating jobs, reducing emissions and energy bills, and improving home comfort. Mt. Lebanon has been selected as a "pilot community" for implementing residential energy efficiency outreach. Two members of the Mt. Lebanon Environmental Team have been selected as ambassadors for the program. The ambassadors will provide direct outreach to residences helping homeowners connect to the variety of energy efficiency financial and technical assistance resources available.

## Targets:

Sector(s): Residential

Audience(s): Homeowners

Emission Sources(s): Electricity and Natural Gas

## Reduction Mechanism:

Providing homeowners with targeted information about energy and water efficiency and conservation programs along with financial assistance information tailored to their financial situation, homeowners may be able to more readily implement low cost measures as well make longer term efficiency investments.

## Process and Timeline:

ReEnergize Pittsburgh provides outreach on energy efficiency strategies, products, financing, and technical assistance. The program is being piloted in 14 communities across Pittsburgh and Allegheny County. Mount Lebanon has been selected as one of the pilot communities, in part, due to its existing climate action effort. Outreach to homeowners will be led by community ambassadors, citizens selected from each community based upon their community outreach experience, knowledge of energy and environmental issues, and passion for leading community resiliency.

#### Partners:

**ReEnergize PGH** is a regional sustainable economic development strategy focusing on using residential energy efficiency upgrades on a large scale to improve air quality through decreased energy use and to advance a robust local energy efficiency industry by upgrading clusters of targeted buildings and homes. This is a widespread community engagement and education campaign, adaptive to neighborhoods of different demographics, intentional about connecting people directly to energy efficiency resources, and integrated into multiple levels of education. By taking a "metro" or regional approach that connects city and county residents to energy efficiency information, resources and services serve to advance the goals of the Pittsburgh climate action plan, further regional collaboration, engage stakeholders at the community level, build critical partnerships and stimulate green business & workforce development. http://www.reenergizepgh.org/

**Mt. Lebanon Environmental Team** The Mt. Lebanon Environmental Team is a group of local Mt. Lebanon (Pennsylvania) citizen volunteers devoted to improving the environment by working with residents, elected officials, institutions, businesses and the Mt. Lebanon Environmental Sustainability Board. The team is dedicated to responding to the global and local economic, social and environmental challenges associated with energy demand and human contributions to climate change and to improve the effects of these changes on our community and neighbors. <u>http://www.lebogreen.org/blog/Quantification:</u>

Market Size: 10,118 owner occupied household units.

<u>Market Penetration</u>: Program organizers expect to reach approximately 200 households per year in each neighborhood.

<u>Reduction</u>: Program organizers anticipate a 5% average annual energy reduction among households reached and expect 10% of households to invest in deeper energy retrofits. Expected annual GHG reduction by 2020 is 1,248 MT CO<sub>2</sub>-e.

<u>Cost Savings</u>: Expected annual cost savings per homeowner is \$170.

#### Key Contacts:

ReEnergize Pittsburgh Zaheen Hussain z.hussain@gtechstrategies.org

Mt. Lebanon Environmental Team – ReEnergize Pittsburgh Ambassadors

Kathy Hrabovsky kathy@kah-architects.com Abby Lawler-Morycz lawmor9@gmail.com

## Commercial

The commercial sector represents 31% of community emissions and is forecasted to experience the greatest growth in emissions in the next 10 years. Electricity clearly dominates this sector's baseline emissions at 84% and that fraction is expected to grow if unchecked. Like the residential sector, one commercial sector strategy stood out as a low-cost, politically feasible, municipally-led strategy, with potential for significant community wide reductions. No new strategies have been developed for the commercial sector for 2012, but Commercial Action 1 from 2010 remains very relevant and not direct action was taken to implement this measure since it was first proposed in 2010.

# Commercial Action 1: Increase adoption of energy efficient lighting, HVAC equipment, appliances, and motors by the commercial sector [Proposed 2010]

## Summary Description:

This action will work to meet or exceed a 3% reduction goal amongst Mt Lebanon's commercial properties (for-profit and non-profit). This strategy seeks to,

- 1. Assemble list of businesses, non-profits, and property owners/managers.
- 2. Conduct survey to document need, challenges, and opportunities.
- 3. Engage 5 largest property owners in owner/lessee partnership discussions.
- 4. Develop capacity with volunteers (student or community) to train businesses on using Portfolio Manager.
- 5. Develop financing resources for implementation of capital intensive measures.
- 6. Launch publicity campaign to encourage commercial business and property owners to avail themselves of the rebates and incentives offered by Duquesne Light on Act 129<sup>25</sup> and synergistic programs (tax credits, Energy Star rebates, and Conservation Commitment Program using MTL newsletter and direct email / mail marketing).
- 7. Use Energy Star Challenge program as a way to get businesses on board, track progress, and recognize achievement.
- 8. Pool businesses for bulk purchasing of energy audits or services.
- 9. Facilitate a pilot lessor-lessee shared savings agreement.
- 10. Track Performance using shared Energy Star portfolio manager accounts.

## Partners:

ECAT can organize volunteers for direct outreach to businesses.

MTL Magazine and municipal staff can help publicize programs and successes with the MTL Magazine.

<sup>&</sup>lt;sup>25</sup> Act 129 is legislation that requires PA electric utilities to offer energy efficiency rebates and incentives to produce a 3% decrease in electric use by 2013 for Phase I. For Phase II, Duquesne Light has proposed to achieve an additional 2% efficiency gain through rebates and incentives.

**The Environmental Sustainability Board** is uniquely positioned to develop partnerships and liaison with municipal staff.

**The Mount Lebanon Commercial District Office (potential)** can reach out to the business community. The Office will be key for gathering data, building relationships, marketing programs, and publicizing achievements. The MLBDO could also help coordinate bulk purchasing programs for energy audits or services (including lighting retrofits).

**All Facilities Energy Group** is the Conservation Service Provider responsible for working with Small Commercial organizations to deploy Act 129 programs in Duquesne Light's service area. They offer low-cost energy audits to qualifying organizations.

**The Commonwealth Financing Authority** offers several grant and loan programs for energy efficiency and renewable energy. The Alternative and Clean Energy offers 1% interest loans for up to 50% of the cost of energy conservation projects. Non-profit, for-profit, and governmental organizations are eligible. As of March 2010, 16% of the program's \$165 Million was allocated.

**The Reinvestment Fund / PA Green Energy Loan Fund (potential)** offers low market rate (3.5% to 6.5%) financing for energy conservation projects that are part of a Guaranteed Energy Savings Agreement (GESA). Loans are also available for projects that save 25% over the system replaced or 25% facilitywide. Because the financed projects must be large (> \$400,000) the Fund would be most appropriate for the largest commercial property owners looking to make improvements to multiple facilities.

## Quantification:

Market Size: 400 commercial properties.

<u>Market Penetration</u>: To meet Act 129 reduction goal of 3% by 2013, anticipate needing 30% participation (120 businesses) will participate in the 3 year window. Alternate participation versus average reduction as follows:

If average reduction is 10%, 30% participation (120 businesses) If average reduction is 20%, 15% participation (60 businesses) If average reduction is 30%, 10% participation (40 businesses)

## Reduction:

- The average commercial property in Mt Lebo uses 260,000 kWh electric.
- The average commercial property in Mt Lebo uses and 620 Mcf natural gas.
- Assume 10% reduction in electric.
- Assume 5% reduction in gas as co-benefit of synergistic measures.

- A total of 3,120,000 kWh saved per year.
- <u>A total of 3,720 Mcf saved per year.</u>
- <u>A total of 2914 MT CO<sub>2</sub>-e reduced per year</u>

<u>Cost and Cost Savings</u>: Estimate the first cost and annual cost savings per user and community wide.

	OWNER	YEARLY COST	Co2-e savings	PAYBACK PERIOD
	INVESTMENT	SAVINGS		
Per business	\$21,000	\$3,000	24	7 YEARS
120 businesses	\$25.2m	\$360,000	2,914	7 YEARS

<u>Administration Cost</u>: Estimate the first cost and annual cost by the administrator (e.g. municipality) to coordinate the strategy or program.

5% of annual savings or \$18,000 per year for 3 years. Includes value of volunteer time.

Barriers and Opportunities: List any logistical or implementation challenges or synergies.

Challenge	Opportunity
Act 129 Incentives only lower installed cost by about 10%.	Must leverage financing programs available including the CFA, TRF, and PBEF. Develop Energy Efficiency financing options with local lenders. Promote grant and loan programs.
Many businesses lease their facility but pay their utilities.	Develop a trial lessor-lessee shared savings agreement.
Energy Audit cost barrier too steep for many small businesses.	Pooling together of businesses interested in auditing to generate better pricing for aggregate pool. Organize free system-specific audits (e.g. lighting) from vendors.

#### Key Contacts:

#### The Mount Lebanon Business District Office

Eric Milliron 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3412

### **All Facilities Energy Group**

Jim Bellante james.bellante@allfacilities.com Steve Moritz stephen.moritz@allfacilitiesenergygroup.com

#### The Commonwealth Financing Authority

Alternative and Clean Energy Program Ryan Emerson, Site Development Division Phone: 717-346-8191 ryemerson@state.pa.us

#### The Reinvestment Fund / PA Green Energy Loan Fund

Rob Sanders Managing Director, Energy 215-574-5850 Rob.Sanders@trfund.com

# Institutional (Municipal / Schools)

The institutional sector is a subset of the commercial sector and includes municipal, school, and other public facilities and operations within the municipality.

## Institutional Action 1: LED Retrofits of Street Lights [Proposed 2010]

#### Summary Description:

LED street lighting reduces electricity consumption up to 50%. The municipality owns over 160 street lights and should retrofit them with LED lamps.

#### Targets:

Audience(s): Municipal Operations

Emission Sources(s): Electric

#### Reduction Mechanism:

Upgrading to more efficient and longer lasting light bulbs results in reduced electricity consumption and associated indirect greenhouse gas emissions and criteria air pollutants.

#### Process and Timeline:

- 1. Quote received from Republic ITS for traffic signals (Winter 2010)
- 2. Contract for traffic signal replacement(Spring 2010)
- 3. Monitor actual energy savings of traffic signals (2011)

#### Partners:

#### Mt. Lebanon Dept. of Public Works

#### **PA League of Cities & Municipalities**

#### Quantification:

Market Size: 160 municipally owned street lights

Market Penetration: 100% retrofit of municipally-owned street lights

Reduction: 29.5 MT CO<sub>2</sub>-e<sup>26</sup>

<u>User Cost</u>: User capital cost is represented by the administration cost, and user maintenance costs are included in the net maintenance cost savings below.

Administration Cost: No quote available

<u>Cost Savings</u>: Street Lights: \$4,400 in annual energy savings, no maintenance saving estimate is available.

<u>Co-benefits:</u> E.g., Job creation, cost savings, improved quality of life, air quality.

Co-benefits include reduced risk to signal maintenance personnel and reduced maintenance costs due to reduced bulb replacement frequency.

#### Key Contacts:

#### Mt. Lebanon Dept. of Public Works

Tom Kelley 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3869

References:

<sup>&</sup>lt;sup>26</sup> Savings of 41,120 kWh for street lights based on Demonstration Assessment of Light Emitting Diode (LED) Street Lighting, Phase III Continuation, Pacific Gas and Electric, November 2009

## Summary Description:

The community's public institutions have begun to initiated a bold pursuit of building energy efficiency opportunities to meet the plan's greenhouse gas reduction targets, including performance contracted energy efficiency retrofits of the recreation center, library, municipal building, public safety building, and parking authority. Still opportunities remain for additional municipal and school building retrofits, retrocommissioning, purchasing policies, and behavior modification programs, and to employ a full or part-time energy manager to coordinate township climate and energy actions.

The community's public institutions have begun to initiated a bold pursuit of building energy efficiency opportunities to meet the plan's greenhouse gas reduction targets, including performance contracted energy efficiency retrofits of the recreation center, library, municipal building, public safety building, and parking authority. Still opportunities remain for deeper savings at municipal and school facilities through retrofits and retro-commissioning; purchasing policies that prioritize minimal energy consumption, such as an Energy Star procurement policy, fuel efficiency for fleet vehicles and lifecycle cost analysis. Public institutions should also implement behavior modification programs to reduce the impacts of occupant behavior on energy use and employ a full or part-time energy manager to coordinate township climate and energy actions.

## Targets:

Sector(s): Institutional

Audience(s): Municipal golf course, recreation center, public library, municipal building, public works facilities, public safety building and parking authority.

Emission Sources(s): Primarily Electric and Natural Gas

## Reduction Mechanism:

Energy management, conservation programming, and capital improvements result in increased efficiency of municipal operations, thus directly reducing electric and natural gas consumption.

## Quantification:

<u>Market Size:</u> For municipal operations activities, the market is the full scope of municipal energy use.

<u>Reduction</u>: For municipal operations, benchmarking has indicated that energy management could yield 10-15% savings in annual electric and gas usage or 663,010 kWh in electric savings and 13,868 therms in gas savings or 2217 MT  $CO_2$ -e.

Note: The Municipality has agreed to a performance contact with Linc Mechanic with a total estimated emissions reduction of  $1050 \text{ MT CO}_2$ -e which would be included in this reduction.

<u>User Cost</u>: For municipal operations, once low-cost operational improvement projects are implemented, there will be additional implementation costs to achieve reduction targets. Estimated at \$400,000 based on a 5 year average project payback. Energy Service Company Guaranteed Energy Savings Agreement leases and grant funding can be used to decrease or eliminate upfront capital costs.

Facility	Current Energy Star Score	Target Energy Star Score	Percent Energy Reduction	Elec Savings Potential (kWh)	Gas Savings Potential (therm)	Annual Cost Savings
Mount Lebanon Public						
Library	n/a	n/a	15%	159,580	0	\$15,958
Mount Lebanon Golf Course	n/a	n/a	15%	5,370	0	\$537
Mt. Lebanon Municipal Building	30	50	17%	92,120	2652	\$12,394
Mt. Lebanon Public Works	22	50	26%	69,600	11217	\$20,420
Public Safety Building	n/a	n/a	15%	232,530	0	\$23,253.90
Recreation Center	n/a	n/a	15%	55,860	0	\$5 <i>,</i> 586
			Total:	663,010	13,868	\$82,944

## Implementation Plan:

The town should establish a municipal energy office/officer to pursue these projects and identify further conservation projects. The office/officer would make a dedicated effort toward attainment of energy conservation and climate stewardship goals. The office/officer would be responsible for setting municipal conservation and cost savings goals, managing implementation, and tracking and reporting progress. The cost of establishing the office would be partially recouped through savings from grants obtained and implemented project/program cost savings. The office would also have community-outreach responsibilities: working to manage or support the implementation of community-wide strategies adopted as part of the climate action plan. Because the officer position would likely be part-time, it would be advisable to share this employee with other partner organizations (other regional municipalities or institutions within Mount Lebanon) where he or she could remain dedicated to common energy and climate stewardship activities.

## Process and Timeline:

- 1. Determine officer's responsibilities, level of township commitment, and working budget.
- 2. Solidify partners if the officer is to be shared.
- 3. Recruit and hire officer.

- 4. Develop 5 year energy management strategy for Mount Lebanon.
- 5. Identify top community-wide Climate Action strategies for Energy Office to support.
- 6. Implement projects, track performance and progress toward goals (energy, cost savings, and climate impact reduction).
- 7. Report on and leverage achievements.

## Partners:

Several other organizations in the region have expressed interest in developing a similar part-time position. Cost sharing an office/officer with other interested parties would minimize the financial outlays for the municipality while delivering a net financial gain.

**St Clair's Hospital (potential)** - St. Clair's has expressed an interest in engaging Act 129 programming and supporting climate stewardship goals. St Clair's uses over \$1 million per year in utilities and could utilize an experienced energy manager to implement and track their programs. Such programs could include employee commuting incentives, operational improvements, or capital intensive long-term solutions like combined heat and power (CHP).

**Mount Lebanon School District (potential)** - The Mt Lebanon School District has demonstrated a commitment to energy conservation with many successful projects and programs deployed. The School District may be interested in sharing an energy manager/officer to take their efforts through the next stage.

**Peters Township (potential)** - Peters Township is a neighboring municipality currently developing a Strategic Energy Management Plan. They have expressed interest in retaining the services on an energy manager during the first few years of plan implementation, and could be a good partner for sharing an energy manager/officer with Mt Lebanon.

**Penn Hills (potential)** - Penn Hills is a Pittsburgh suburban municipality who recently completed an Energy Efficiency Conservation Strategy as part of their DOE EECBG allocation. They are presently in the project implementation stage of their first round of energy conservation projects. They have many basic energy management opportunities remaining and have expressed interest in retaining the services on an energy manager during the first few years of plan implementation. Penn Hills could be a good partner for sharing an energy manager/officer with Mt Lebanon.

## Key Contacts:

St Clair's Hospital Steve Novicki 412.942.2300 <u>Steve.Novicki@stclair.org</u> Mount Lebanon School District Gerald Ingram, Facilities Director 412.344.2090 gingram@mtlsd.net

#### Peters Township

Paul Lauer, Assistant Manager (724) 941-4180 PFLauer@peterstownship.com 610 East McMurray Road McMurray, PA 15317-3496

#### Penn Hills

Meg Balsamico, Planner MBalsamico@pennhills.org (412) 798-2129

## Administration Cost:

- Allocate \$12,000 per year for Energy Office budget (salary and operating expenses)
- This is 15% of the projected annual savings from 5-year plan projects.
- This will add one year to the payback for 5-year plan projects.

Cost Savings: \$80,000 per year at the township after full implementation of 5-year plan projects.

	5 year	6 year	10 year
Projects	\$400,000		
Salary	\$ 60,000		
Savings	\$400,000	\$480,000	\$800,000
Net Savings	(\$60,000)	\$20,000	\$340,000

## Institutional Action 3: Fuel Efficient Fleet Replacement [Proposed 2012]

#### Summary Description:

The US Environmental Protection Agency and the Department of Transportation's National Highway Traffic Safety Administration are issuing final ruling to reduce GHG emissions and improve fuel economy for light-duty vehicles for model years 2017 through 2025. The ruling is aimed towards reaching an average fuel economy of 54.5 miles per gallon for light-duty vehicle manufactured in 2025<sup>27</sup>. By using fuel efficient vehicles in the municipality's fleet replacement program, Mt. Lebanon can target the proposed standards by reducing fossil fuel consumption and greenhouse gas emissions. This project is aimed at providing the municipality helpful guidelines and resources for analyzing the current fleet replacement plan and identifying comparable alternative fuel or fuel efficient vehicles that will result in the reduction of greenhouse gas emissions, while decreasing municipal fuel costs.

Targets:

Sector(s): Transportation

Audience(s): Municipality

Emission Sources(s): Electric, Natural Gas, Gasoline, Diesel

<u>Reduction Mechanism</u>: The GHG reduction will be achieved by adding fuel efficient, or alternative fuel vehicles to the municipality's fleet program. The alternative fuel or fuel efficient vehicles will replace the costly and heavy GHG emitting vehicles Mt. Lebanon currently uses, with comparable gasoline-electric hybrids, compressed natural gas, and other fuel efficient vehicles that will save Mt. Lebanon gas money while decreasing the size of their carbon footprint.

Additionally if feasible, the size of the vehicles should be assessed to minimize overall size of the vehicles necessary to perform specific duties. This reduction in vehicle size will also help to maximize fuel efficiency.

<u>Process and Timeline:</u> Mt Lebanon will be replacing approximately 32 vehicles, consisting of police cars, vans, and light trucks between 2013 to 2017. Currently the municipality's acquisition policies aim to purchase replacement vehicles at the lowest possible price and the highest possible quality. The goal of this project is to shift the focus of these goals to include best fuel efficiency into these purchase parameters. If Mt. Lebanon's purchasing committee adopts this additional parameter to their decision making process, the municipality could potentially begin acquiring more fuel efficient or alternative fuel replacement vehicles by 2014.

<u>Partners:</u> List key partners and briefly describe their strengths and role in strategy implementation.

Mt. Lebanon Department of Public Works - Assigned with the overall responsibility for fleet purchases and maintenance for Mt. Lebanon's fleet vehicles.

Mt. Lebanon Police Department - Needed to provide specific needs and qualities of replacement emergency vehicles.

<sup>&</sup>lt;sup>27</sup> http://www.nhtsa.gov/fuel-economy

Mt. Lebanon Fire Department - Needed to provide specific needs and qualities of replacement emergency vehicles.

## Quantification:

<u>Market Size:</u> Describe how many users could participate (e.g. homeowners, commuters, businesses, non-profits)

Currently Mt. Lebanon's fleet replacement plan identifies an inventory of 111 vehicles that will be replaced over the next five years (2013-2017). Of the 111 total vehicles, approximately 32 police, fire, and administrative vehicles should be analyzed for their potential to be replaced with a comparable replacement vehicle with higher fuel efficiencies. The remaining 79 vehicles will not be addressed in this project since they are mainly comprised of specialty vehicles, heavy trucks, trailers, and field equipment.

<u>Reduction:</u> Currently, 18 Mt. Lebanon Police Department police sedans area scheduled for replacement between 2013 and 2017. Assuming the majority of the sedans are Ford Crown Victorias (or similar), containing police interceptor 8-cylinder, 4.6 liter engines with an approximate fuel economy of 14 mpg/city and 21 mpg/highway (ref.- fueleconomy.gov).

If the municipality's police fleet replacement program begins incorporating more fuel efficient vehicles into the police force such, the following alternatives might be considered:

**Dodge Charger**, with a 6-cylinder, 3.9L SPFI engine that achieves 19 mpg/city and 23.2 mpg/highway.

With an average annual police department fuel consumption of 31,000 gallons of gasoline per year, the municipality can expect to consume just 22,840 gallons per year if the entire fleet were replaced by the Chargers. The reduction of approximately 8,158 gallons annually can save the municipality \$32,600/year.

Along with annual cost savings of \$32,000/year, by switching out the police department's Crown Victorias with the Dodge Chargers, the municipality can expect to decrease CO2 emissions by 72.5 MT  $CO_2$ -e.

**Hybrid Technology** (Ford Escape Hybrid, Nissan Maxima Hybrid, Chevy Tahoe Hybrid, etc.) for police and service vehicles that spend a significant portion of their operating hours idling or in stop and go situations, substantial reductions can be achieved in fuel consumption – far greater than those predicted by comparisons of EPA fuel economy ratings. Evaluations of police cruiser fuel consumption after changing to hybrid vehicles documented a 70% reduction in Westwood, NJ<sup>28</sup>. There are 24 vehicles in the Police

<sup>&</sup>lt;sup>28</sup> webapps.icma.org/pm/9006/public/feature1.cfm?author=robert s. hoffmann&title=hybrid police patrol vehicles praised

fleet that may be suitable for hybrid vehicles. If they were to achieve similar savings, CO2 emissions could be reduced by  $183 \text{ MT CO}_2$ -e.

**Auxiliary Power Units** are alternative option for vehicles that may not have a suitable hybrid replacement but still spend a significant portion of their operating hours idling. Auxiliary power units are useful for police and service vehicles, which often require extensive comfort, radio, or computer support while stopped. These units may be comprised of batteries, fuel cells, or small engines. They can provide heating, cooling, and electronic device power without the vehicle's engine running.

<u>Cost Savings</u>: 183 MT CO<sub>2</sub>-e in GHG reduction would equate to \$82,994 in fuel cost savings annually at current fuel rates.

Barriers and Opportunities: List any logistical or implementation challenges or synergies.

If Electric Vehicles are implemented in the replacement plan, EV charging structures will need constructed and maintained.

Reduction in federal and state level alternative fuel funding programs, along with possible localized budget reductions due to the weakened economy could slow progress.

<u>Co-benefits:</u> E.g., Job creation, cost savings, improved quality of life, air quality.

- More efficient operational practices
- Decreases GHG emissions = improved air quality
- Fuel cost savings
- Increases environmental awareness amongst the community members.

Key Contacts: List the contact information of any key partners or resources.

Tom Kelley - Director of Public Works Municipality of Mt. Lebanon PA 710 Washington Rd. Pittsburgh, PA 15228 Phone: 412-343-3869 Fax: 412-343-3753 Email: <u>tkelley@mtlebanon.org</u>

Coleman McDonough - Chief of Police Mt. Lebanon Police Department 555 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3400 Fax: 412-343-6235 Nicholas Sohyda - Fire Chief Mt. Lebanon Fire Department 555 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3402

<u>References</u>: Please list any resources or references used in your strategy development our estimation.

US Department of Energy - Alternative Fuels Data Center (tremendous resource for fleet fuel reduction strategies) http://www.afdc.energy.gov/case/

Center for Climate and Energy Solutions http://www.c2es.org/federal/executive/vehicle-standards#timeline

## **Transportation (Active Transportation)**

The transportation sector contributed 21% of the community wide emissions. 94% of the estimated transportation emissions occurred on 15 miles of principal and minor arterial roadways which represent 16% of the length of streets in the municipality.

## Transportation Action 1: Traffic Signal Synchronization [Planned 2010]

#### Summary Description:

Traffic signal synchronization (TSS) coordinates traffic signal timing along a series of intersections to improve traffic flow and reduce congestion, fuel consumption and emissions on arterial streets. Completion of the US Route 19 synchronization has resulted in improved traffic flow and measurable GHG reductions. The municipality is planning additional synchronization along Bower Hill, Cochran, & Beverly Roads with intention of reducing congestion and improving revitalization and economic development along those corridors.

## Targets:

Sector(s): Transportation

Audience(s): Municipal planners and transportation engineers and all Mt. Lebanon drivers

Emission Sources(s): Gasoline, Diesel, and Other Transportation Fuels

#### **Reduction Mechanism:**

Reduction in delays at intersections and starting and stopping reduces fuel consumption and associated GHG emissions, and criteria air pollutants including smog precursors.

## Partners:

**Southwestern PA Commission** has agreed to assist in funding the Cochran Rd. signal synchronization and funded the US 19 Study.

Trans Associates provided study and recommendations for Cochran/Beverly Rd. signal synchronizations.

## Quantification:

<u>Market Size:</u> The Municipality maintains 8.9 miles of principal arterial roadways in Mt. Lebanon. In 2008, principal arterial streets represented 59% of the community wide estimated vehicle miles traveled.

<u>Market Penetration</u>: Other communities, such as Austin, TX have achieved as much as a 10% efficiency improvement from comprehensive traffic signal synchronization.

<u>Reduction</u>: Total reduction potential is TBD, however the recent Washington Rd. synchronization resulted in a 759 MT  $CO_2$ -e reduction. It is assumed that these two projects may be capable of at least half of that reduction or 380 MT  $CO_2$ -e.

<u>User Cost:</u> Direct user cost is assumed to be zero.

<u>Administration Cost</u>: Given that the measure was already planned and \$203,500 of local matching funding has been committed for traffic congestion abatement, zero administration cost for GHG reduction is assumed. Potential for actual administrative revenue on future synchronization projects has been demonstrated by the City of Portland Oregon, which monitored intersection CO2 levels before and after synchronization to receive funding in exchange for tradable carbon credits.

<u>Cost Savings</u>: Total annual vehicle fuel cost savings is conservatively estimated to \$150,041. Additional fuel savings and brake wear associated reduced stops and starts as well as traffic accident reductions will add to user cost savings.

## Barriers and Opportunities:

Challenge	Opportunity
Indirect emissions increases could result from	Potential to pursue carbon credit financing for US
improved traffic flow, by reducing use of mass transit or other alternative forms of travel to avoid congestion.	19 and other future synchronization projects

## Co-benefits:

The primary co-benefits of improving car emissions which are the precursors to smog and particular risk to children, the elderly, and people suffering from respiratory illnesses are greatly increased during idling.

## Key Contacts:

Mt. Lebanon Dept. of Public Works Tom Kelley 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3869

Southwestern PA Commission

**Trans Associates** 

Whitman, Requardt and Associates, LLP 300 Seven Fields Boulevard Suite 130 Seven Fields, PA 16046-4356

## References:

Carbontrust.org Portland Synchronization Carbon Credits

## Transportation Action 2: Implement *Best Workplaces for Commuters* program at Municipality, School District, and Hospital as a model for other businesses in the community [Proposed 2010]

#### Summary Description:

The *Best Workplaces for Commuters* program offers resources and guidance on how to develop effective commuting programs for a business' employees, including financial incentives for ride sharing / carpooling, taking public transit, biking or walking to work, and developing telework business schedules.

If certain baseline commuter choices are met, the business will be recognized nationally as a model for effective commuting policies.

It is suggested to begin with a goal of 10% reduction in using single occupancy vehicles to get to work. This goal can be reached with a combination of the above-mentioned incentives.

## Targets:

Audience(s): Initially public partners (municipality, school district, hospital), extending to other area employers.

Emission Sources(s): Gasoline, Diesel

#### Reduction Mechanism:

Programming and incentives to encourage alternative commuting  $\rightarrow$  reduced vehicle miles traveled.

#### Process and Timeline:

- 1. Assign a Lead Person at each organization
- 2. Gain Management Support
- 3. Survey Employees
- 4. Determine Best Specific Strategies to Implement (primary eligible incentives)
- 5. Establish a Budget
- 6. Market and Promote the Programs in the Organization
- 7. Make Use of External Resources
- 8. Track and Promote Success

#### Partners:

Mt. Lebanon Economic Development Office

**Bike Pittsburgh** 

St. Clair Hospital (Proposed) Mt. Lebanon School District (Proposed) Commute Info Program of the SPC (Proposed) American League of Bicyclists (Proposed)

#### Quantification:

<u>Market Size</u>: There are currently approximately 150 employees working for the Municipality, 400 employees working for the School District, and approximately 2,600 employees working for the Hospital. Assuming each participating organization represents 2000 United States Census data for how people get to work in Mount Lebanon (69% single occupancy vehicles, 14% public transport, 9% carpool, 8% other), we will target approximately 15 employee commuting changes at the Municipality, 28 employee commuting changes at the School District, and 178 employee commuting changes at the Hospital.

<u>Market Penetration</u>: The initial goal is to reduce the use of single occupancy vehicles by 10% at each the Municipality, the School District, and the Hospital. This can be achieved through gaining management support, surveying the employees on what incentives might work, and effectively promoting the programs within the company.

<u>Reduction</u>: Assuming each of these employees drives 15 miles round trip to work, this will save a total of 3,000 miles saved per work day, which equates to approximately 772,000 miles and 302 MT CO<sub>2</sub>-e annually, based on average passenger vehicle fuel efficiency.

<u>User Cost:</u> Estimate the first cost and annual cost per user.

It will cost nothing to the employee to participate in the program. To qualify for the *Best Workplaces for Commuters* program, the company must provide at least \$30 / month for an alternative way to work, i.e. public transportation passes, cash out for not having a parking spot, or reduced parking costs for carpoolers. Thus, it will be a positive cash flow to the employee for choosing a new way to work.

<u>Administration Cost</u>: To qualify for the *Best Workplaces for Commuters* program, the company must provide at least \$30 / month for an alternative way to work, i.e. public transportation passes, cash out for not having a parking spot, or reduced parking costs for carpoolers. Thus, the initial cost to the employer for the 10% reduction goal will be approximately \$74,000.

<u>Cost Savings</u>: Each company can total the amount it spends on maintaining parking lots, leasing parking spots, and the accrued tax benefits from meeting *National Standard of Excellence* guidelines for offering commuting options.

## **Opportunities**

- Increasing the demand of public transport (busses, light rail, etc.) by these companies can help support, maintain, and potentially even grown existing public transit infrastructure services through the municipality.
- Reduce traffic throughout the municipality
- Increase the safety of the employees through public transportation
- Reduce employee stress of commuting and sitting in traffic
- Retain employees through a supportive transportation structure

## Co-benefits:

- Reduce traffic throughout the municipality
- Improved air quality through decrease in automobile transmissions
- Combine with student Safe Routes to School program to increase carpooling, walkership, and biking to school, leveraging the success.

## References:

www.bestworkplaces.org

http://www.commuteinfo.org/

http://www.commuteinfo.org/emp\_how.shtml - resources for employers

http://www.saferoutesinfo.org/getting\_started/

## Transportation Action 3: Promote and Facilitate Biking and Walking [Proposed 2010]

#### Summary Description:

Promote and facilitate biking and walking within the township and regionally, building off of Mt. Lebanon's walking community image and culture, current and developing walking and biking events, and regional partnerships. The municipality has planned to improve pedestrian safety through improved crosswalks, sidewalks, and traffic calming infrastructure targeting areas used heavily by student pedestrians. Develop a campaign and coalition of diverse community interests leading towards a safer, more practical, and more utilized biking and walking community.

## Targets:

Audience(s): Commuters (in town and to downtown), through traffic, students, shoppers, leisure traffic, event attendees, and recreation

Emission Sources(s): Gasoline and diesel transportation fuels

## Reduction Mechanism:

Active transportation awareness and education, combined with fostering a culture that values active transportation and infrastructure improvements and maintenance for safety and ease of use, can replace car transportation with active transportation reducing vehicle energy consumption, GHG emissions and criteria air pollutants including precursors to smog formation.

## Process and Timeline:

- 1. Formalize a Bike-Pedestrian or Active Transportation committee that can:
  - a. Guide municipal transportation choices and objectives,
  - b. Serve as focal contact point for regional partners, and
  - c. Initiate the development of a Safe Routes to School program.
  - (Could be established as a subcommittee of the Environmental Sustainability Board)
- Implement planned pedestrian infrastructure improvements outlined in the 2013-2017 Capital Improvement Program<sup>29</sup>
- 3. Leverage regional organization and municipal experiences with best practices regarding low cost active transportation infrastructure including:
  - a. Bike racks
  - b. Bike space leases and other amenities at park and rides
  - c. Share the road signs
  - d. Sharrows
  - e. Better coordination with public transit

## Partners:

## Mt. Lebanon Economic Development Office

Eric Milliron 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3412

<sup>&</sup>lt;sup>29</sup> http://mtlebanon.org/DocumentCenter/View/8982

#### **Bike Pittsburgh**

Lou Fineberg Project Manager lou@bike-pgh.org

## Pedestrian Safety Committee (Proposed)

School District (Proposed)

## Parking Authority (Proposed)

#### Quantification:

<u>Market Size:</u> According to the Southwestern PA Commissions municipal statistics approximately 11,000 workers in Mt. Lebanon drive alone to work and 1167 are employed within the municipality.

Market Penetration: TBD

Reduction: TBD

User Cost: TBD

Administration Cost: TBD

Cost Savings: TBD

Barriers and Opportunities: List any logistical or implementation challenges or synergies.

Challenge	Opportunity
<ul> <li>Challenging walking and biking routes in town and to downtown</li> <li>Port Authority T is unavailable to bikes during rush hour</li> </ul>	<ul> <li>Already recognized as a walkable community</li> <li>Bike – pedestrian advocate within Economic Development Office</li> <li>Established relationship with Bike Pittsburgh</li> <li>Well- established City program</li> </ul>

Co-benefits:

Reduce obesity and improve health

Key Contacts: List the contact information of any key partners or resources.

Mt. Lebanon Economic Development Office Eric Milliron 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3412

Bike Pittsburgh

Lou Fineberg Project Manager lou@bike-pgh.org

## References:

http://www.saferoutesinfo.org/index.cfm

http://bike-pgh.org/resources/for-politicians-community-leaders/

http://bike-pgh.org/events/car-free-fridays/

http://www.city.pittsburgh.pa.us/cp/assets/09\_pgh\_bike\_initiatives.pdf

http://www.city.pittsburgh.pa.us/cp/assets/05\_BikePlan2.pdf

## Waste (Recycling & Waste Reduction)

The waste sector presents a somewhat unique opportunity in that waste sector reduction strategies are capable Under the ICLEI community emissions analysis methodology it is encouraged for communities include the

# Waste Action 1: Establish a Competitive Residential Waste Reduction and Recycling Goal [Proposed 2010]

#### Summary Description:

In 2011 Mt. Lebanon led the region's first inter-municipal recycling competition and took top honors among South Hills municipalities. Still Mt. Lebanon's residential recycling rate languishes well behind the national average. Establish quantitative solid waste diversion or recycling goals, pursue it with Waste Actions 2 and 3 and to share the successes and shortcomings of these practices with the neighboring municipalities to encourage continued and deeper recycling participation regionally.

## **Reduction Mechanism:**

Solid waste reduction and recycling can result in a net reduction of greenhouse gas emissions by primarily three mechanisms: 1) diverting organic waste (paper, food, plant material, wood, textiles, etc.) from landfills where the decomposing waste has the potential to release methane gas to the atmosphere 2) displacing demand for energy and greenhouse gas-intensive virgin materials (trees, metals, petroleum, etc.) with less energy and greenhouse gas-intensive recycled materials, and 3) reducing the actual consumption of materials and their associated embodied carbon footprint. When landfills, like those serving Mt. Lebanon, capture landfill gas for energy use or even just flaring, the second and third mechanisms far outweigh the impact of the first.

In Mount Lebanon residential solid waste currently comprises less than 1% of the community's contribution of greenhouse gas emissions, yet significant reduction potential remains through recycling and waste reduction and displacement of virgin materials. This strategy focuses foremost on increasing the fraction of residential solid waste recycled with emphasis on not increasing material consumption as a result of promoting recycling.

## Process and Timeline:

- 1. Build from Waste Management's existing municipal recycling monitoring and reporting program to establish a recycling competition among the South Hills townships (SHACOG)
- 2. Establish recycling baselines for each municipality.
- 3. Develop an educational campaign targeting both students and residents about the benefits of recycling utilizing materials and assistance available through WM and publicity through MTL magazine.
- 4. Launch a two- part competition coordinated by the municipality and the Recycling and Waste Reduction Action Planning Committee.
  - a. Part 1. SHACOG recycling competition collect municipal waste recycling rates and publicize through quarterly reports from WM and MTL magazine
  - b. Part 2. "The Biggest Loser" Family Competition track the weekly progress of a few different families across the municipality in their attempt to achieve zero waste and publicize through MTL and/or television, radio, newspaper, web. Focus on families with school children and encourage students and families to chart their own progress against the competitors.
- 5. Environmental Sustainability Board and Public Works provide awards based on
  - a. Highest % of waste diversion
  - b. Greatest increase in waste diversion from baseline
  - c. Highest GHG reduction value from baseline
- 6. Use program success to prepare students and schools for the statewide "GreenSylvania" school recycling competition in 2011.

#### Partners:

**Recycling & Waste Reduction Action Planning Committee** may assist Public Works in the monitoring and scoring the progress and determining award winners.

Waste Management provides monitoring and reporting of municipal recycling rates.

**Mt. Lebanon Public Schools** (proposed) organizes student recycling communications and ensures continuity of recycling messages from "School to Home."

**Environmental Sustainability Board** provides a platform for competition partnership, coordination and oversight.

MTL Magazine and Township staff can help publicize programs and successes with the MTL Magazine.

#### Quantification:

<u>Market Size:</u> In 2006 there were 10,738 households in Mt. Lebanon contributing more than 16,600 tons of solid waste and 900 tons of recycled material, a recycling rate of 5.6%. In 2009, with the introduction of single stream recycling, the recycling rate doubled to 12% with over 1,800 tons of material recycled.

<u>Market Penetration</u>: The current number of households participating in curbside recycling is not available at this time. City-wide recycling rates of up to 70% percent have been achieved by US communities. The US EPA reports the national average recycling rate is 33%.

<u>Reduction</u>: The GHG reduction potential of solid waste recycling varies by material. Based on the US EPA Waste Assessment and Reduction and Model (WARM) and the residential solid waste composition typical of suburban communities in Southwestern PA, the estimated reduction potential of diverting 50% one ton of Mt. Lebanon's commercial solid waste is 1.34 MT  $CO_2$ -e. Establishing and meeting a short term goal of reaching the national average recycling rate would result in 7341 MT  $CO_2$ -e.

User Cost: There are no direct costs of increased recycling to residents.

<u>Administration Cost</u>: Municipal administrative costs for this program would be associated with establishing the reporting process with Waste Management, directing program communications through MTL magazine and assisting the Environmental Sustainability Board in administering awards, estimated as 60 hrs in 2010. Publicizing the competitions through MTL magazine would be considered inclusive to the costs of producing the magazine.

<u>Cost Savings</u>: No direct savings are expected for the residents. Waste Management or a future contracted waste management service will likely receive increased revenue with an increase in

recycled materials as the value of recycled material continues to increase relative to the cost of collection and landfilling.

#### Barriers and Opportunities:

Opportunities

- WM has existing educational materials
- WM profits from increased recycling
- MTL can publicize at no additional cost
- Community Climate Team can oversee competition
- WM can be tasked with monitoring and reporting

## Co-benefits:

- Direct local co-benefits are limited but, regional, and global benefits
- Commonly reported job benefits of recycling versus land filling is 5 to 1
- Decreased demand for virgin timber, metal and fossil resources

#### Key Contacts:

Mt. Lebanon Dept. of Public Works

Tom Kelley 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3869

Environmental Sustainability Board Andrew Baram Andrew.baram@yahoo.com

## References:

http://www.epa.gov/osw/conserve/tools/localgov/index.htm

http://www.ilsr.org/recycling/recyclingmeansbusiness.html

http://www.zerowastepgh.org/index.html

http://www.grrn.org/zerowaste/community/index.html

# Waste Action 2: Establish a Commercial District Recycling & Eco Purchasing Cooperative [Proposed 2010]

## Summary Description:

Capitalize on existing business networks and demand for low cost commercial recycling to establish eco purchasing cooperatives in the established business districts of the municipality. The program could be initiated immediately as a pilot cooperative to purchase lower cost recycling services for the Beverly Road Business District and later be expanded to include other business districts within the municipality and offer cooperative or bulk purchasing of eco-friendly consumable products and services such as recycled paper products and energy audits. This leading edge program would initially be administered between the municipal business district manager and the Beverly Road Business Association (BRBA).

## Targets:

Sector(s): Commercial, Waste

Audience(s): Mt. Lebanon Business Districts:

- Beverly Rd. (Pilot audience)
- Washington Rd.
- Cochran Rd.
- Galleria

Emission Sources(s): Commercial building natural gas and electricity consumption, life cycle energy use of products, solid waste

## Reduction Mechanism:

At least three general GHG reduction mechanisms could be employed within this strategy including solid waste reduction and recycling, reducing commercial building energy use, and reducing the energy and GHG intensity of materials purchased by commercial businesses. With the initial focus on recycling, the primary mechanisms related to solid waste emissions and the energy intensity of materials.

Solid waste reduction and recycling can result in a net reduction of greenhouse gas emissions by primarily three mechanisms: 1) diverting organic waste (paper, food, plant material, wood, textiles, etc.) from landfills where the decomposing waste has the potential to release methane gas to the atmosphere 2) displacing demand for energy and greenhouse gas-intensive virgin materials (trees, metals, petroleum, etc.) with less energy and greenhouse gas-intensive recycled materials, and 3) reducing the actual consumption of materials and their associated embodied carbon footprint. When landfills, like those serving Mt. Lebanon, capture landfill gas for energy use or even just flaring, the second and third mechanisms far outweigh the impact of the first.

## Process and Timeline:

- 1. Develop a pilot recycling service purchasing cooperative (Spring/Summer 2010)
  - a. Solicit interest from Beverly Rd. Business Association and survey existing waste and or recycling service providers and fees.
  - b. Request price quotes from recycling service providers including Waste Management and Allied Waste based on individual and bulk purchasing agreements.
  - c. Present proposed cost savings and request signatures from BRBA business.
  - d. Negotiate final price with recycling provider.
  - e. Monitor pilot successes and challenges and report financial, energy, and greenhouse gas emissions savings to other businesses and community.
- 2. Develop funding for expansion and coordination of program (Winter/Spring 2011)
  - a. Survey interest throughout other business districts
  - b. Develop funding proposal based on pilot success and additional interest
- 3. Expand cooperative to other business districts (Spring Summer 2011)
  - a. Repeat process for remaining business districts
  - b. Renegotiate prices and contracting with service providers
  - c. Request to integrate savings reporting into commercial recycling bills
- 4. Utilize process successes and challenges and coordination funding to facilitate discussion for Business Improvement District formation and long-term funding of cooperative purchasing model (Winter 2012).

#### Partners:

**Mt. Lebanon Commercial Districts Office** facilitates price negotiation, identifying interested business, coordinating with the district associations, and monitoring the success of the pilot.

**Mt. Lebanon Dept. of Public Works** based on experience with residential recycling assists in negotiating level of service and pricing with area commercial recycling providers.

**Recycling & Waste Reduction Action Planning Committee** may assist making the case to business owners to participate in the pilot or other business district purchasing cooperatives.

## **Recycling Service Providers**

## Quantification:

<u>Market Size:</u> For the pilot, there are 60 businesses currently operating in the Beverly Rd. Business District. For future expansion there are 565 businesses listed in the Mt. Lebanon Business Directory.

Market Penetration: For the pilot, 80% participation is expected for the recycling cooperative.

<u>Reduction</u>: The GHG reduction potential of solid waste recycling varies by material. Based on the US EPA Waste Assessment and Reduction and Model (WARM) and the commercial solid waste composition typical of suburban communities in Southwestern PA, the estimated reduction potential of diverting 50% one ton of Mt. Lebanon's commercial solid waste is 1.49 MT CO<sub>2</sub>-e. 80% of the Beverly Rd. Business District represents approximately 10% of Mt. Lebanon's commercial businesses. The commercial waste generated in 2009 is estimated at more than 23,000 tons. The total GHG reduction potential of the pilot is therefore estimated at over 1400 MT CO<sub>2</sub>-e.

User Cost: [Pending response from Waste Management or other]

<u>Administration Cost</u>: The administrative cost for the Business District Manager to coordinate the pilot is estimated as 50 hrs in 2010.

Cost Savings: [Pending response from Waste Management or other]

Barriers and Opportunities: List any logistical or implementation challenges or synergies.

Opportunities

- Recycling is a legal requirement for businesses within the municipality
- Existing interest in recycling.
- Existing communication network within business districts and history of cooperative action
- Municipal staff in place to facilitate process and assist in further development
- This pilot also serves as a litmus test for the development of business improvement districts which could allow for a broader suite of financing options available for green practices and energy efficiency as well as services offered by or through the municipality.

Barriers

- No enforceable ordinance for commercial recycling
- Unwillingness to pay for the service
- Content to wait until it is offered free
- Conservative priorities

## Co-benefits:

Direct local co-benefits are limited but, regional, and global benefits Commonly reported job benefits of recycling versus land filling is 5 to 1 Decreased demand for virgin timber, metal, and fossil resources

Key Contacts: List the contact information of any key partners or resources.

The Mount Lebanon Business District Office Eric Milliron 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3412

Mt. Lebanon Dept. of Public Works Tom Kelley 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3869

References:

## http://epa.gov/globalwarming/climatechange/wycd/waste/calculators/Warm\_Form.html

## Waste Action 3: Establish a Pay-As-You-Throw (PAYT) Program [Proposed 2012]

#### Summary Description:

Pay As You Throw (PAYT) is a solid waste and recycling collection and billing system that incentivizes waste reduction by charging residents for the actual amount of waste picked up by the waste haulers. Many of the communities with the highest waste diversion (or recycling) rates utilize this technique. Mt. Lebanon is currently considering this system for its residential waste service.

#### **Reduction Mechanism:**

Solid waste reduction and recycling can result in a net reduction of greenhouse gas emissions by primarily three mechanisms: 1) diverting organic waste (paper, food, plant material, wood, textiles, etc.) from landfills where the decomposing waste has the potential to release methane gas to the atmosphere 2) displacing demand for energy and greenhouse gas-intensive virgin materials (trees, metals, petroleum, etc.) with less energy and greenhouse gas-intensive recycled materials, and 3) reducing the actual consumption of materials and their associated embodied carbon footprint. When landfills, like those serving Mt. Lebanon, capture landfill gas for energy use or even just flaring, the second and third mechanisms far outweigh the impact of the first.

In Mount Lebanon residential solid waste currently comprises less than 1% of the community's contribution of greenhouse gas emissions, yet significant reduction potential remains through recycling and waste reduction and displacement of virgin materials. This strategy attempts to incentivize reducing

material consumption, increasing material reuse and recycling, and reduce solid waste generation all of which result in greenhouse gas emissions reductions.

## Process and Timeline:

See PAYT proposal currently under review by Mt. Lebanon Public Works (Spring 2013)

#### Partners:

**Environmental Sustainability Board** provides a platform for competition partnership, coordination and oversight.

**MTL Magazine** and Township staff can help publicize program and its GHG reduction benefits with the MTL Magazine.

## Quantification:

<u>Market Size:</u> In 2011 there were 10,118 owner-occupied households in Mt. Lebanon contributing more than 14,941 tons of solid waste and 2,420 tons of recycled material, a recycling rate of 13.9%.

<u>Market Penetration</u>: The current number of households participating in curbside recycling is not available at this time. City-wide recycling rates of up to 70% percent have been achieved by US communities (Los Angeles, San Jose, New York, and Chicago are all above 50%). The US EPA reports the national average recycling rate as 34.1%.

Cranberry Township recently implemented PAYT and witnessed a solid waste generation reduction of 42%.

<u>Reduction</u>: The GHG reduction potential of solid waste reduction varies by material and whether it's reduced, recycled, or composted. For this reduction estimated, it is assumed that an additional 25% of Mt. Lebanon's residential solid waste is diverted to recycling. Based on the US EPA Waste Assessment and Reduction and Model (WARM) and the residential solid waste composition typical of suburban communities in Southwestern PA, the estimated reduction potential of diverting an additional 25% Mt. Lebanon's residential solid waste is 7881 MT CO<sub>2</sub>-e.

User Cost: TBD.

Administration Cost: TBD.

Cost Savings: TBD.

#### **Barriers and Opportunities:**

Opportunities

• MTL can publicize at no additional cost

## Co-benefits:

- Commonly reported job benefits of recycling versus land filling is 5 to 1
- Decreased demand for virgin timber, metal and fossil resources

#### Key Contacts:

Mt. Lebanon Dept. of Public Works Tom Kelley 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3869

Environmental Sustainability Board Andrew Baram Andrew.baram@yahoo.com

References:

http://www.epa.gov/epawaste/conserve/tools/payt/index.htm

http://lebomag.com/9969/is-pay-as-you-throw-the-way-to-go/

#### Waste Action 4: Community Backyard Composting Program [Proposed 2012]

#### Summary Description:

Backyard composting reduces organics disposed of in landfills, which reduces methane emissions from decomposition and GHG emissions from waste disposal vehicles. Mt. Lebanon has proposed a "pay-as-you-throw" (PAYT) waste disposal program in order to reduce the amount of recyclables and organics in the waste stream. Because this program will charge each resident based on the amount of waste generated, a composting program may garner much interest and support from residents seeking to reduce overall household costs.

Participation in the backyard composting program could be catalyzed by conducting education classes at the library or a robust advertising campaign. The Pennsylvania Resource (PRC) Council offers affordable backyard composters that can be sold during popular community events such as Earth Day.

## Targets:

Sectors: Residential & Waste

Audiences: Homeowners & Gardeners

Emission Sources: Gasoline, Diesel & Methane

## Reduction Mechanism:

1. Backyard composting program  $\rightarrow$ Increased participants in backyard composting  $\rightarrow$  Reduced volume of organics in waste stream  $\rightarrow$  Reduced methane emissions from decomposing organics  $\rightarrow$  Reduced GHG emissions

2. Backyard composting program  $\rightarrow$ Increased participants in backyard composting  $\rightarrow$  Reduced volume of organics in waste stream  $\rightarrow$  Reduced volume of total waste for pickup  $\rightarrow$  Reduced GHG emissions from waste disposal vehicles

## Process and Timeline:

1. Apply for Act 101 composter grant (Winter 2013). The Pennsylvania DEP offers grant through Act 101 to partially subsidize the cost associated with the purchase of an Earth Machine. Grant 903 covers up to 90% of a bulk composter purchase, which reduces the overall user costs. (See Resources below for details)

2. Schedule a community outreach and education day with PRC (Winter 2013). Ideally, this should be a well attended and popular event, such as Mt. Lebanon's Earth Day event. In addition to Earth Day, other popular library events should be considered.

3. Distribute information and advertisements for event and composter sale throughout community (Spring 2013). Overall community awareness may be achieved by the door-to-door distribution of flyers by volunteers.

4. Develop an online webpage with composting tips and resources (Spring 2013). Because many interested residents may not be able to attend a formal composting class, online resources may be an effective form of education. Additionally, this approach will allow interested residents to participate year-round, even if the formal class is not currently offered.

5. Conduct on-site educational program to coincide with the sale of composters (Spring 2013). PRC has expressed interested in conducting an informal demonstration and education during Mt. Lebanon's Earth Day or other community event.

## Partners:

**Pennsylvania Resource Council** – Provides educational classes featuring affordable Earth Machine composters. PRC has valuable information for communities exploring composting programs, which

includes ideas on how to maximize participation. PRC has expressed interested in conducting an informal demonstration and education during Mt. Lebanon's Earth Day or other community event.

**Mt. Lebanon Dept. of Public Works** - Responsible for the development and implementation of the PAYT program, which may provide information to residents regarding the benefits of composting. Currently, the PAYT program is still being developed but should include backyard composting as a mechanism for waste reduction.

**Rolliers Hardware** – May be interested in selling Earth Machine composters at their store on Washington Road. This would provide Mt. Lebanon residents the opportunity to acquire composters year-round and without formal classes.

**Mt. Lebanon Library** – May be interested in hosting educational classes on composting. Providing composing information to a captive audience at popular library events may be an effective awareness strategy.

## Quantification:

<u>Market Size:</u> In 2011 there were 10,118 owner-occupied households in Mt. Lebanon contributing more than 14,941 tons of solid waste. Based on regional waste composition estimates 10.8% of this waste is food scraps and 9.0% is yard trimmings.

<u>Market Penetration</u>: The current number of households participating in backyard composting is not available at this time.

<u>Reduction</u>: If 2% of Mt. Lebanon's households participated in composting approximately, 12 MT  $CO_2$ -e could be reduced annually.

<u>User Cost</u>: PRC offers a composting class (which includes one Earth Machine) for \$50. If purchased without the class, the 80-gallon composter costs \$60. These costs may be greatly reduced if Mt. Lebanon is awarded the PA DEP 903 grant. Additionally, Earth Machines feature a 10-year warranty, which will ensure no additional costs in the foreseeable future.

## Administration Cost:

## Cost Savings:

If implemented in conjunction with a "pay-as-you-throw" waste disposal program, significant savings on trash disposal fees can accumulate. As noted above, the average household may be able to divert more than 600 pounds of solid waste. The exact savings are dependent upon the proposed trash fee, which has not yet been determined.

Barriers and Opportunities: List any logistical or implementation challenges or synergies.
Challenge	Opportunity
Lack of awareness regarding composting program within the Mt. Lebanon community	Backyard composting program likely to garner more interest if implemented as a waste reduction within a PAYT program
General apathy or lack of interest in educational seminars or purchase of an Earth Machine Composter	Backyard Composting may be popular among Mt. Lebanon's extensive gardening community
	Online presentations or webinars may provide composting education to those unable to attend formal classes offered by PRC
	PA DEP offers grants for the purchase of composters under Act 101. The grant covers up to 90% of the costs, and thus, reduces cost burden on residents.

<u>Co-benefits:</u> E.g., Job creation, cost savings, improved quality of life, air quality.

1. Cost savings associated with the purchase of trash bags and waste disposal fees.

- 2. Cost savings associated with reduced need for fertilizers and gardening soil.
- 3. Reduces volume of waste in landfills.

4. Reduces need for fertilizers, which can runoff into local streams and rivers causing harm to aquatic life.

5. Fosters general interest in environmental awareness and stewardship.

Key Contacts: List the contact information of any key partners or resources.

### Pennsylvania Resource Council

Nancy Martin Email: nancym@ccicenter.org Phone: (412) 488-7490 x 247

### Mt. Lebanon Dept. of Public Works

Tom Kelley 710 Washington Road Pittsburgh, PA 15228 Phone: (412) 343-3869

<u>References</u>: Please list any resources or references used in your strategy development our estimation.

### **Cranberry Township**

Lorin Meir (724) 776-4806 x1176

Earth Machine - http://www.earthmachine.com/index\_r.html

### Pennsylvania Resource Council -

http://www.prc.org/community\_adultedu.html#\_PRC\_West\_Backyard\_Composting%20Classe

PA DEP Grant Application (Act 101, 903) - <u>http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-</u>86685/2500-FM-BWM0213%20Instructions.pdf

Mount Lebanon Community Greenhouse Emissions Inventory & Climate Action Plan (2010)

Feasibility of a Monetary Incentivized Collection Program within a Tax Based Rate Structure for the Mt. Lebanon Community (2012)

## **APPENDIX A – Background**

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### **Climate and the Greenhouse Effect**

The gasses that trap heat in the Earth's atmosphere are sometimes referred to as greenhouse gases (GHG). When sunlight enters the Earth's atmosphere, some of this solar radiation is immediately reflected and leaves the planet without turning into heat. Some of it is absorbed by the ground, which then re-emits thermal radiation, heat. To maintain a consistent range of temperatures, incoming solar radiation coming in must be balanced by the loss of heat escaping to space.

Greenhouse gases – including Carbon Dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>), and Nitrous Oxide (N<sub>2</sub>O) and others – create the atmospheric blanket that prevents large fluctuations between night and day temperatures. For example, the moon, which has no GHGs, fluctuates from night-time temperatures of 300°F below zero to over 200°F during the day. GHG traps the heat absorbed by the earth, slowing its escape into space.



Figure 10: The Greenhouse Effect<sup>30</sup>

This greenhouse effect is a natural occurrence. It happens on Earth and is in effect on every planet that has an atmosphere, including Venus. However, on Venus, the high concentration of GHGs in its atmosphere means that its surface temperature is a consistently sweltering >800°F.

<sup>&</sup>lt;sup>30</sup>Source: US Global Change Research Information Office

We cannot survive without our atmosphere and the greenhouse gasses it contains, but the concentration of these gasses in our atmosphere is triggering change in Earth's climate.

### **Greenhouse Gas Levels and Trends**

From the time humans first appeared on the planet to the beginning of the Industrial Revolution, the atmospheric concentration of  $CO_2$  remained consistently well under 300 parts per million (ppm). Beginning in the 18<sup>th</sup> century, humans started burning coal and gas, taking carbon that was stored under the earth for millions of years and releasing it into the atmosphere in a matter of decades.

Our current atmospheric concentration of  $CO_2$  is now over 380 ppm and rising. This rise is has been correlated with global warming<sup>31</sup>, which may lead to glacial melting, increased drought, increased storm intensities, rising sea levels, and the spread of insect-borne diseases like Lyme and malaria. And because it takes time for our climate to adapt, we are not yet experiencing the full effect of our current level of  $CO_2$ , which continues to increase unabated<sup>32</sup>.

International scientific and political communities recognize that we are facing alterations in weather patterns, ocean behavior, and biological processes. As James Hansen of National Aeronautics and Space Administration (NASA) wrote recently, "If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that  $CO_2$  will need to be reduced from its current 387 ppm to at most 350 ppm."<sup>33</sup>

Previous efforts to set GHG reduction goals, such as the Kyoto Protocol, were based on stabilizing atmospheric  $CO_2$  to 550 ppm, 200 ppm more than the updated target. The current scientific consensus is that our climate and way of life is at much greater risk within a shorter timeframe than previously thought.

### **Climate Change: Global & Local Effects**

Globally, increases in GHG's and subsequently mean global temperatures are expected to affect water availability, ecosystem health, food production, coastal security, and human health. Figure 2 charts the Intergovernmental Panel on Climate Change's expectations for the occurrence and severity of effects with increasing temperature above the temperatures of the late 20<sup>th</sup> century.

Locally, by the end of this century climate change is expected to shift Western Pennsylvania's climate to mimic summers typical of Northern Kentucky under a low emissions scenario, or Northern Alabama under a high emissions scenario as depicted in Figure 3. This general shift would likely affect the region in some of the following ways:

<sup>&</sup>lt;sup>31</sup> US Global Change Research Program, Our Changing Planet: US Climate Change Science Program for Fiscal Year 2009

<sup>&</sup>lt;sup>32</sup> Hansen, James, et al. <u>Target Atmospheric CO<sub>2</sub>: Where Should Humanity Aim?</u> Submitted April 7, 2008.

<sup>&</sup>lt;sup>33</sup> Hansen, James, et al.

- More severe weather and greater susceptibility to flooding
- Reduced air quality and water quality
- Higher rates of infectious diseases and heat-related illnesses and deaths
- Increased spread of mosquito and tick-borne diseases such as Lyme disease
- □ Increased spread of invasive plant and insect species
- □ Higher prices and shortages of basic goods, such as food and energy.

#### Global Mean Average Temperature Relative to 1980-1999 (°C)



Figure 11: Expected effects with rising temperature (Adapted from: IPCC AR4 Synthesis Report<sup>34</sup>)

<sup>&</sup>lt;sup>34</sup> IPCC Assessment Report 4 – Climate Change 2007: Synthesis Report

Western Pennsylvania



### Figure 12: Expected shift in Western Pennsylvania summer climate (Source: Union of Concerned Scientists, 2008)

Of particular concern to the Greater Pittsburgh Region is the rise in summer urban temperatures. It is projected that the number of days above 90°F in the Pittsburgh region could double by mid-century to more than 50 days each summer. By the end of the century 25 days or more of 100°F or greater days are possible. With the increase temperatures comes an increase in health risks particularly for children, the elderly, and poor.



Figure 13: Expected increases in heat indices in Pittsburgh (Source: Union of Concerned Scientists, 2008)

### **Greenhouse Gas Sources**

With 5% of the world's population, the United States accounts for approximately 25% of the world's human GHG emissions and 30% of the world's waste<sup>35</sup>. Human or anthropogenic sources of GHG emissions include,

- <u>FOSSIL FUEL COMBUSTION</u> Carbon dioxide emitted from the combustion of fossil fuels for heating, transportation, and electricity production represents by far the largest fraction of global GHG emissions;
- <u>DEFORESTATION & LAND USE CHANGE</u> When biologically productive ecosystems are disturbed, carbon dioxide may be released from soils and decrease the ability of ecosystems to uptake and retain carbon.
- <u>AGRICULTURE</u> Methane and nitrous oxide, two potent greenhouse gases, are emitted from livestock, manure, soil, and synthetic fertilizer management.
- <u>LANDFILLS</u> Methane and carbon dioxide are released as organic waste (paper, food, wood, etc.) decomposes in landfills without oxygen;
- <u>REFRIGERANTS AND INDUSTRIAL CHEMICALS</u> Extremely potent greenhouse gases including hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF<sub>6</sub>) are used and emitted in a variety of products and industrial processes.

<sup>&</sup>lt;sup>35</sup> Halls, Chris, et al. <u>Living Planet Report 2006</u> (Gland, Switzerland: World Wildlife Fund International 2006)



Figure 14: Territory size shows proportion of all GHG emissions from each country<sup>36</sup>

We must collectively face the uncomfortable fact that our current global civilization and actions have become the primary driver of climate change and global warming. If we do not change our present course, the scientific community overwhelmingly agrees that the Earth's response will be a nearly ice-free planet, preceded by a period of chaotic weather and shoreline changes. This decade is perhaps the last chance we have of changing course and avoiding a climactic tipping-point<sup>37</sup>.

### **Greenhouse Gas Reduction Initiatives**

Six states have enacted mandatory GHG reduction laws, and 13 others have set voluntary targets. Many more are focusing on energy-efficiency policies as a cost-effective approach to reducing GHG emissions. The federal government is likely to enact greenhouse gas legislation in the near future. Units of government that enact energy policies now will be a step ahead.

There is no single, 'silver-bullet' solution to the problems associated with climate change, atmospheric greenhouse gas concentrations, or the inefficient use of resources. It takes multiple measures and initiatives, including those at the local level.

<sup>&</sup>lt;sup>35</sup> © Copyright 2006 SASI Group (University of Sheffield) and Mark Newman (University of Michigan). Worldmapper, Map #299 http://www.worldmapper.org/

<sup>&</sup>lt;sup>37</sup> Hansen, James, et al.

### **Reduction Benefits: Economic**

Maintaining and improving our quality environmental resources goes hand-in-hand with long-term financial viability and stewardship. Monitoring GHGs in conjunction with finances is one way to quantify progress. Many GHG reduction measures are directly linked to financial savings and economic benefits such as:

- Reducing energy & resource consumption From public transportation to electricity use, to waste management, activities that reduce energy and resource consumption have quantifiable financial returns.
- Streamlining municipal & institutional operations institutions and intuitional departments that work cooperatively, sharing tools and resources, will be more cost effective both from a purchasing perspective and from a productivity perspective.
- Local Economic Development For example, a study conducted by the Institute for Local Self Reliance<sup>38</sup> found that for every 15,000 tons of waste:
  - Landfilling the waste creates 1 job
  - Composting the waste creates 7 jobs
  - Recycling the waste creates 9 jobs.

### **Reduction Benefits: Health**

Reducing GHG emissions also improves health and wellbeing. Reducing GHGs by decreasing electrical consumption and vehicle miles driven will reduce pollutants that negatively affect human health, like sulfur and nitrogen oxides, mercury, VOCs and particulates. These reduction strategies include land use planning that gets people out of their cars, keeps downtowns dense and diverse, and preserves woodlands, farmlands, and open space. This kind of planning:

- Reduces traffic congestion,
- Reduces air and water pollution,
- Prevents the need for large new infrastructure development, allowing resources to be directed to updating existing infrastructures,
- Minimizes the urban heat island effect,
- Enhances public health,
- The bottom line is that many actions taken to reduce GHG emissions result in the preservation and improvement of Mt. Lebanon's environmental health, economic and social

<sup>&</sup>lt;sup>38</sup> Institute for Local Self Reliance, Wealth to Waste Homepage <http://www.ilsr.org/recycling/>

wellbeing. These are the same factors that make our community a desirable destination for families, visitors, and businesses.

APPENDIX B – Clean Air Climate Protection Software – 2006 & 2011 Community Inventory Detailed Reports

	co,	N <sub>2</sub> O	СН	Equiv	co	Energy
	(tonnes)	(kg)	(kg)	(tonnes)	(%)	(MMBtu)
idential						
Mt. Lebanon, PA						
Columbia Gas Data						
Natural Gas	41,740	79	3,933	41,847	13.0	786,659
Subtotal Columbia Gas Data	41,740	79	3,933	41,847	13.0	786,659
Data Sources: Mike Belsky Manager - New Business Deve Columbia Gas	elopment					
Data Library Cycle 8 Forecast of Municipal Mt. Lebanon website Business Directory http://www. &txtBusinessName=&txtZipCo	Population, Households mtlebanon.org/Business de=&txtCity=&txtState=&	and Business Stat Directoryii.aspx?ys &txtAreaCode=	s snShowAll=0&lngN	ewPage=0&txtL	etter=&IngE	BusinessCategoryID=0
Data Files: Columbia Gas Data SPC 2007 Pop Household Bus Calculation Files: Mt Lebo Nori	a.pdf Stats by Muni_growth r malized Utilities_bkedit.x	ate edit.xls ls				
Notes: Only 12/2009 - 7/2008 of against heating and cooling de	consumption data was av gree days and backcast	vailable and no cus to 2006 using 2000	stomer number data 6 heating and cooli	a was a∨ailable. ng degree days.	Consumpt	ion data was weather normalized
Assumptions: Assume no chai	nge in customers or base	e energy demand f	rom 2006 to 2009.			
Calculations: BACKCAST - Ba Degree Days (HDD) and gas u	ecause only 1 full year's sage for both residential	data were provided and commercial s	d, monthly data we sectors. These mo	re used to create nthly regressions	e a linear re s were used	gression between monthly Heatin d to backcast gas usage for 2006
INDICATORS - Estimated # c Peoples and Equitable Gas fro Dominion Peoples	f residential and comme m the total municipal hou	rcial customers by useholds and busir	v subtracting the # c nesses.	of residential and	l commerci	al customers served by Dominion
Natural Gas	6,159	12	580	6,175	1.9	116,075
Subtotal Dominion Peoples	6,159	12	580	6,175	1.9	116,075

Data Source: Barbara J. Kushner Dominon Peoples barbara.j.kushner@dom.com

Southwestern PA Commission Data Library Cycle 8 Forecast of Municipal Population, Households and Business Stats

Mt. Lebanon website

Business Directory http://www.mtlebanon.org/BusinessDirectoryii.aspx?ysnShowAll=0&IngNewPage=0&txtLetter=&IngBusinessCategoryID=0 &txtBusinessName=&txtZipCode=&txtCity=&txtState=&txtAreaCode=

Data File: Fw: Green House Gas Inventory-Mt. Lebanon, PA;

co <sub>2</sub>	N <sub>2</sub> O	сн <sub>4</sub>	Equiv CO	Energy	
(tonnes)	(kg)	(kg)	(tonnes) (%)	(MMBtu)	

SPC 2007 Pop Household Bus Stats by Muni\_growth rate edit.xls Calculation Files: Mt Lebo Normalized Utilities\_bkedit.xls

Note: Only 2005 and 2009 data available. Only sales service accounts, not transportation. Consumption data was weather normalized against heating and cooling degree days and backcast to 2006 using 2006 heating and cooling degree days.

Assumptions: Assume no change in customers or base energy demand from 2005 to 2006.

Calculations: BACKCAST - Since 2 years of Residential and Commercial data were available (annual totalization), the data were linearly correlated to Heating Degree Days (HDD). Consumption was backcasted to 2006 based on that annual HDD.

Note: The monthly regression of Columbia data showed a strong correlation between gas consumption and HDD. The annual regression of Equitable data showed a strong correlation for Residential, but the Commercial correlation was weak (likely due to the unknown change in commercial accounts). Unexpectedly the consumption trends inversely to HDD in this case, which is likely due to the small data set. This could be improved by either obtaining at least 16 monthly data or at least 5 years of annual data.

#### Duq Light

Electricity	81,922	9,711	13,696	85,221 26.4	400,834	40 20
Subtotal Duq Light	81,922	9,711	13,696	85,221 26.4	400,834	1

Data Sources: Michele R. Sandoe Director, Customer Care Duquesne Light

Southwestern PA Commission Data Library Cycle 8 Forecast of Municipal Population, Households and Business Stats

Data Files: Duquesne Light Data.pdf; SPC 2007 Pop Household Bus Stats by Muni\_growth rate edit.xls Calculation Files: Mt Lebo Normalized Utilities bkedit.xls

Notes: Only 12/2009 - 7/2008 consumption data was available and no customer number data was available. Consumption data was weather normalized against heating and cooling degree days and backcast to 2006 using 2006 heating and cooling degree days. Generation mix for Duquesne light was not available.

Assumptions: Assume no change in customers or base energy demand from 2006 to 2009. Assume grid average electricity.

Calculations: BACKCAST - Because only 1 full year's data were provided, 2009 monthly data were used to create a linear regressions between monthly Heating Degree Days (HDD), monthly Cooling Degree Days (CDD), and monthly electric usage. Regressions were performed for both Residential and Commercial sectors. These monthly regressions were used to backcast electric usage for 2006 based on the HDD and CDD for 2006. See calculation file for details.

INDICATORS - The linear growth rate between the SPC's 2005 and 2010 households estimate for Mt. Lebanon is 0.28% applied to the 2005 estimate of 13300 households equals 13337 households for 2006.

Equitable Gas

Natural Gas	10,187	19	960	10,213	3.2	191,996	12
Subtotal Equitable Gas	10,187	19	960	10,213	3.2	191,996	

Data Source: Scott M. Waitlevertch External Communications & Government Relations Manager

co <sub>2</sub>	N <sub>2</sub> O	CH4	Equiv CO	Energy	
(tonnes)	(kg)	(kg)	(tonnes) (%)	(MMBtu)	

Equitable Gas 225 North Shore Drive Pittsburgh, PA 15212 (O) 412-395-2314 (F) 412-395-3166 swaitlevertch@equitablegas.com

Southwestern PA Commission Data Library Cycle 8 Forecast of Municipal Population, Households and Business Stats

Mt. Lebanon website

Business Directory http://www.mtlebanon.org/BusinessDirectoryii.aspx?ysnShowAll=0&IngNewPage=0&txtLetter=&IngBusinessCategoryID=0 &txtBusinessName=&txtZipCode=&txtCity=&txtState=&txtAreaCode=

Data File: Community Data/Natural Gas/Equitable Gas Mt Lebanon Usage Data 2005-2008.xls SPC 2007 Pop Household Bus Stats by Muni\_growth rate edit.xls Calculation Files: Mt Lebo Normalized Utilities\_bkedit.xls

Calculations: BACKCAST - No backcasting was necessary as 2006 data were availble.

Note: A regression was performed between annual HDD and annual consumption. The data show a strong correlation for Residential, but not Commercial. It is suspected that unknown change in small number of commercial accounts could be at cause. To improve, the number of annual accounts could be requested.

ubtotal Residential	140,009	9,821	19,170	143,456	44.5	1,495,564	
ommercial							
Mt. Lebanon, PA							
Columbia Gas							
Natural Gas	17,458	33	1,645	17,502	5.4	329,016	
Subtotal Columbia Gas	17.458	33	1.645	17.502	5.4	329.016	

NOTE: Updated 10/17/2012 with updated backcast data based on revised 2009 commercial and industrial useage.

Data Sources: Mike Belsky Manager - New Business Development Columbia Gas

Southwestern PA Commission Data Library Cycle 8 Forecast of Municipal Population, Households and Business Stats

Mt. Lebanon website

Business Directory http://www.mtlebanon.org/BusinessDirectoryii.aspx?ysnShowAll=0&IngNewPage=0&txtLetter=&IngBusinessCategoryID=0 &txtBusinessName=&txtZipCode=&txtCity=&txtState=&txtAreaCode=

Data Files: CPA Data July 2008 - June 2012.xls SPC 2007 Pop Household Bus Stats by Muni\_growth rate edit.xls

co <sub>2</sub>	N <sub>2</sub> O	CH <sub>4</sub>	Equiv CO <sub>2</sub>	Energy	
(tonnes)	(kg)	(kg)	(tonnes) (%)	(MMBtu)	

Calculation Files: MT Lebo Normalized Utilities\_bkedit2012update.xls

Notes: Units changed to DTH in 2012 data set. Only 12/2009 - 7/2008 consumption data was available and no customer number data was available. Consumption data was weather normalized against heating and cooling degree days and backcast to 2006 using 2006 heating and cooling degree days. Generation mix for Duquesne light was not available.

Assumptions: Assume no change in customers or base energy demand from 2006 to 2009.

Calculations: BACKCAST - Because only 1 full year's data were provided, monthly data were used to create a linear regression between monthly Heating Degree Days (HDD) and gas usage for both residential and commercial sectors. These monthly regressions were used to backcast gas usage for 2006.

INDICATORS - Estimated # of residential and commercial customers by subtracting the # of residential and commercial customers served by Dominion Peoples and Equitable Gas from the total municipal households and businesses.

#### Dominion Peoples

Natural Gas	1,578	3	149	1,582 0.5	29,737	,
Subtotal Dominion Peoples	1,578	3	149	1,582 0.5	29,737	

Data Source: Barbara J. Kushner Dominon Peoples barbara.j.kushner@dom.com

#### Southwestern PA Commission Data Library Cycle 8 Forecast of Municipal Population, Households and Business Stats

#### Mt. Lebanon website

Business Directory http://www.mtlebanon.org/BusinessDirectoryii.aspx?ysnShowAll=0&IngNewPage=0&txtLetter=&IngBusinessCategoryID=0 &txtBusinessName=&txtZipCode=&txtCity=&txtState=&txtAreaCode=

Data File: Fw: Green House Gas Inventory-Mt. Lebanon, PA; SPC 2007 Pop Household Bus Stats by Muni\_growth rate edit.xls Calculation Files: Mt Lebo Normalized Utilities\_bkedit.xls

Note: Only 2005 and 2009 data available. Only sales service accounts, not transportation. Consumption data was weather normalized against heating and cooling degree days and backcast to 2006 using 2006 heating and cooling degree days.

Assumptions: Assume no change in customers or base energy demand from 2005 to 2006.

Calculations: BACKCAST - Since 2 years of Residential and Commercial data were available (annual totalization), the data were linearly correlated to Heating Degree Days (HDD). Consumption was backcasted to 2006 based on that annual HDD.

Note: The monthly regression of Columbia data showed a strong correlation between gas consumption and HDD. The annual regression of Equitable data showed a strong correlation for Residential, but the Commercial correlation was weak (likely due to the unknown change in commercial accounts). Unexpectedly the consumption trends inversely to HDD in this case, which is likely due to the small data set. This could be improved by either obtaining at least 16 monthly data or at least 5 years of annual data.

	co,	N <sub>2</sub> O	СН4	Equi	v CO2	Energy
	(tonnes)	(kg)	(kg)	(tonnes)	(%)	(MMBtu)
Duq Light						
Electricity	72,412	8,584	12,106	75,328	23.4	354,302
Subtotal Duq Light	72,412	8,584	12,106	75,328	23.4	354,302
Data Sources: Michele R. Sandoe Director, Customer Care Duquesne Light Mt. Lebanon website Business Directory http://www &txtBusinessName=&txtZipCo Data Files: Duquesne Light D Calculation Files: Mt Lebo No Notes: Data was only availabl data was available. Consump cooling degree days. General Assumptions: Assume no cha Mt. Lebanon business director Calculations: BACKCAST - E Heating Degree Days (HDD), Commercial sectors. These n file for details.	mtlebanon.org/Busines ode=&txtCity=&txtState= ata.pdf; SPC 2007 Pop rmalized Utilities_bkedit e as commercial and inc tion data was weather n tion mix for Duquesne lig ange in customers or bas ry is equal to number of Because only 1 full year's monthly Cooling Degree nonthly regressions were	sDirectoryii.aspx?y =&txtAreaCode= Household Bus Sta xls dustrial combined. ormalized against h ght was not availabl se energy demand Duq Light commerce a data were provide b Days (CDD), and e used to backcast	snShowAll=0&lngN ats by Muni_growth Only 12/2009 - 7/20 eating and cooling le. from 2006 to 2009 cial and industrial cu d, 2009 monthly da monthly electric us electric usage for 2	lewPage=0&txtl n rate edit 008 consumption degree days ar . Assume grid a ustomers. ata were used to age. Regressic 2006 based on t	_etter=&lngE n data was a nd backcast average elect o create a lin ons were per he HDD and	BusinessCategoryID=0 available and no customer number to 2006 using 2006 heating and ctricity. Assume # of businesses ir ear regressions between monthly formed for both Residential and d CDD for 2006. See calculation

#### Equitable Gas

Natural Gas	4,372	8	412	4,383	1.4	82,399	1
Subtotal Equitable Gas	4,372	8	412	4,383	1.4	82,399	

Data Source: Scott M. Waitlevertch External Communications & Government Relations Manager Equitable Gas 225 North Shore Drive Pittsburgh, PA 15212 (O) 412-395-2314 (F) 412-395-3166 swaitlevertch@equitablegas.com

Southwestern PA Commission Data Library Cycle 8 Forecast of Municipal Population, Households and Business Stats

Mt. Lebanon website

Business Directory http://www.mtlebanon.org/BusinessDirectoryii.aspx?ysnShowAll=0&IngNewPage=0&txtLetter=&IngBusinessCategoryID=0 &txtBusinessName=&txtZipCode=&txtCity=&txtState=&txtAreaCode=

Data File: Community Data/Natural Gas/Equitable Gas Mt Lebanon Usage Data 2005-2008.xls SPC 2007 Pop Household Bus Stats by Muni\_growth rate edit.xls Calculation Files: Mt Lebo Normalized Utilities\_bkedit.xls

co2	N_2 <sup>0</sup>	сн <sub>4</sub>	Equiv CO <sub>2</sub>	Energy	
(tonnes)	(kg)	(kg)	(tonnes) (%)	(MMBtu)	

Calculations: BACKCAST - No backcasting was necessary as 2006 data were availble.

Note: A regression was performed between annual HDD and annual consumption. The data show a strong correlation for Residential, but not Commercial. It is suspected that unknown change in small number of commercial accounts could be at cause. To improve, the number of annual accounts could be requested.

Subtotal Commercial	95,820	8,628	14,312	98,795 30.6	795,454

#### Transportation

#### Mt. Lebanon, PA

Mt. Lebanon owned - Local (Non-Federal Aid)

Diesel	2,823	8	9	2,825	0.9	38,588	
Gasoline	14,509	942	799	14,818	4.6	204,697	
Subtotal Mt. Lebanon owned - L	17,332	950	808	17,643	5.5	243,285	

Data Source: Mr Gaye F Liddick | Transportation Planning Manager Department of Transportation Bureau of Planning and Research PO Box 3555 | Harrisburg PA 17105 Phone: 717.787.5983 | Fax: 717.783.9152

Data File: Community Data/Transportation/Mt. Lebanon Township VMT.xls Notes: Mt. Lebo owned local road data not available from PennDOT, which comprise 81.7% of total linear miles of roadway in the municipality.

Mt. Lebanon owned - Minor Arterial (Federal Aid)

Diesel	2,233	7	7	2,235	0.7	30,528	
Gasoline	11,479	745	632	11,723	3.6	161,943	
Subtotal Mt. Lebanon owned - M	13,712	752	639	13,958	4.3	192,472	

Data Source: Mr Gaye F Liddick | Transportation Planning Manager Department of Transportation Bureau of Planning and Research PO Box 3555 | Harrisburg PA 17105 Phone: 717.787.5983 | Fax: 717.783.9152

Data File: Community Data/Transportation/Mt. Lebanon Township VMT.xls

#### Mt. Lebanon owned - Other Principal Arterial

Diesel	242	1	1	243	0.1	3,314	
Gasoline	1,246	81	69	1,273	0.4	17,579	
Subtotal Mt. Lebanon owned - (	1,488	82	69	1,515	0.5	20,893	2

Data Source:

Mr Gaye F Liddick | Transportation Planning Manager Department of Transportation

# Community Greenhouse Gas Emissions in 2006 Detailed Report

	co <sub>2</sub>	N <sub>2</sub> O	CH4	Equiv	CO2	Energy	
	(tonnes)	(kg)	(kg)	(tonnes)	(%)	(MMBtu)	
Bureau of Planning and Research PO Box 3555   Harrisburg PA 17 Phone: 717.787.5983   Fax: 717	105 .783.9152						
Data File: Community Data/Trans	portation/Mt. Lebano	n Township VMT.xl	6				
ennDOT owned - Collector (Federal	Aid						
Diesel	404	1	1	404	0.1	5,520	
Gasoline	2,075	135	114	2,120	0.7	29,280	
ubtotal PennDOT owned - Co	2,479	136	116	2,524	0.8	34,800	
Data Source: Mr Gaye F Liddick   Transportation Department of Transportation Bureau of Planning and Research PO Box 3555   Harrisburg PA 17 Phone: 717.787.5983   Fax: 717 Data File: Community Data/Trans	on Planning Manager 105 .783.9152 portation/Mt. Lebano	n Township VMT.xl;	5				
ennDOT owned - Local (Non-Feder	al Aid)						
Diesel	125	0	0	125	0.0	1,714	
Gasoline	644	42	36	658	0.2	9,091	
ubtotal PennDOT owned - Loc	770	42	36	784	0.2	10,804	
Data Source: Mr Gaye F Liddick   Transportation Department of Transportation Bureau of Planning and Research PO Box 3555   Harrisburg PA 17 Phone: 717.787.5983   Fax: 717 Data File: Community Data/Trans PennDOT owned - Minor Arterial	on Planning Manager 105 .783.9152 portation/Mt. Lebano	n Township VMT.xl	5				
Diesel	1,020	3	3	1,021	0.3	13,943	
Gasoline	5,243	340	289	5,354	1.7	73,965	
Subtotal PennDOT owned - Mir	6,263	343	292	6,375	2.0	87,908	
Data Source: Mr Gaye F Liddick   Transportation Department of Transportation Bureau of Planning and Research PO Box 3555   Harrisburg PA 17 Phone: 717.787.5983   Fax: 717	on Planning Manager 105 .783.9152						

# **Community Greenhouse Gas Emissions in 2006 Detailed Report**

	co	N <sub>2</sub> O	сн	Equi	v co	Energy
	(tonnes)	2 (kg)	4 (kg)	(tonnes)	2 (%)	(MMBtu)
PennDOT owned - Other Principal A	rterial					
Diesel	5,481	16	17	5,487	1.7	74,934
Gasoline	28,175	1,829	1,552	28,774	8.9	397,499
Subtotal PennDOT owned - Otł	33,656	1,845	1,569	34,261	10.6	472,432
Data Source: Mr Gaye F Liddick   Transportati Department of Transportation Bureau of Planning and Researc PO Box 3555   Harrisburg PA 17 Phone: 717.787.5983   Fax: 71 Data File: Community Data/Tran	ion Planning Manager 105 7.783.9152 sportation/Mt. Leband	on Township VMT.)	ds			
Subtotal Transportation	75,699	4,149	3,529	77,060	23.9	1,062,594
Waste						
Mt. Lebanon, PA Commercial Recycling Residuals	0	0	1 786	38	0.0	Disposal Method - Managed Landfili
Subtotal Commercial Recycling	0	0	1,786	38	0.0	
Data Source: Tom Kelley, Director of Public W Municipality of Mt. Lebanon 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3869 Fax: 412-343-3753 E-mail: Tkelley@mtlebanon.org Data File: 2006 904 Report.pdf Assumptions: Assumed waste ty commercial recycling in the muni	/orks /pe-share characteriza cipality was cardboar	ation to be 100% ba	ased on email state	ement by John M	1cGorar	n of Repulic Services that virtually all
Commercial Solid Waste						Disposal Method - Managed Landfil
Paper Products	0	0	52,869	1,110	0.3	
Food Waste	0	0	10,694	225	0.1	
Plant Debris	0	0	744	16	0.0	
Wood or Textiles	0	0	8,818	185	0.1	
Subtotal Commercial Solid Wa:	0	0	73,126	1,536	0.5	

Updated: 1/1/13 - volume calculation corrected to reflect recycling totals with residuals for both residential & commercial. Previously commercial did and residential did not, inflating the commercial volume estimate.

Data Source:

co <sub>2</sub>	N <sub>2</sub> O	сн <sub>4</sub>	Equiv CO	Energy	
(tonnes)	(kg)	(kg)	(tonnes) (%)	(MMBtu)	

Tom Kelley, Director of Public Works Municipality of Mt. Lebanon 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3869 Fax: 412-343-3753 E-mail: Tkelley@mtlebanon.org

Data File: Community Data/Waste/Mt. Lebo Community Waste and Recycling.xls; 2006 904 Report.pdf

Note: No data available on commercial solid waste

Assumption: Temporarily assume commercial solid waste to recycling fraction is similar to residential in 2006. Assumed waste type-share characterization to be similar results of 2003 PA MSW Composition Study for SW PA: See Table 7 and 8 "suburban" columns.

Commercial paper - 31.9% food - 11.4% plant - 1.4% wood and textiles (all other organics) - 18.8% all other waste - 36.5%

Calculation: Residential 16842.4 tons solid waste / 1210 tons recycling = 13.92 tons solid waste/ ton recycling \* 1289 tons recycling = 17942 tons commercial solid waste

Residential Recycling Residuals	Disposal Method - Managed Landfill					
Paper Products	0	0	947	20	0.0	
Subtotal Residential Recycling	0	0	947	20	0.0	

Updated: 1/1/13 - 205 tons are reported in the 2006 DEP 904 report, but appeared to have been entered as 0 in original inventory.

Data Source: Tom Kelley, Director of Public Works Municipality of Mt. Lebanon 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3869 Fax: 412-343-3753 E-mail: Tkelley@mtlebanon.org

Data File: 2006 904 Report.pdf

Assumptions: Temporarily assumed waste type-share characterization to be 50/50 paper and other waste

	5
Paper Products 0 0 49,940 1,049 0.3	
Food Waste 0 0 9,511 200 0.1	
Plant Debris 0 0 4,491 94 0.0	
Wood or Textiles 0 0 7,221 152 0.0	
Subtotal Residential Solid Wasi 0 0 71,163 1,494 0.5	

Data Source:

	co2	N <sub>2</sub> O	СН	Equiv	co	Energy
	(tonnes)	(kg)	(kg)	(tonnes)	(%)	(MMBtu)
Tom Kelley, Director of Public	c Works					
Municipality of Mt. Lebanon						
710 Washington Road						
Pittsburgh, PA 15228						
Phone: 412-343-3869						
Fax: 412-343-3753						
E-mail: Tkelley@mtlebanon.or	ra					
Data File: Community Data/M	'9 /aste/Mt. Lebo Communi	ty Waste and Recvo	lina xls			
Data File: Community Data/W Assumptions: Assumed waste "suburban" columns. Residenital	/aste/Mt. Lebo Communi e type-share characteriza	ty Waste and Recyc tion to be similar re:	bling.xls sults of 2003 PA N	MSW Compositio	on Study fo	or SW PA: See Table 7 and
Data File: Community Data/W Assumptions: Assumed waste "suburban" columns. Residenital paper - 32.1%	/aste/Mt. Lebo Communi e type-share characteriza	ty Waste and Recyc tion to be similar re:	ling.xls sults of 2003 PA N	MSW Compositio	on Study fo	or SW PA: See Table 7 and
Data File: Community Data/W Assumptions: Assumed waste "suburban" columns. Residenital paper - 32.1% food - 10.8%	/aste/Mt. Lebo Communi e type-share characteriza	ty Waste and Recyc tion to be similar re:	ling.xls sults of 2003 PA N	MSW Compositio	on Study fo	or SW PA: See Table 7 and
Data File: Community Data/W Assumptions: Assumed waste "suburban" columns. Residenital paper - 32.1% food - 10.8% plant - 9.0%	/aste/Mt. Lebo Communi e type-share characteriza	ty Waste and Recyc tion to be similar re:	ling.xls sults of 2003 PA N	MSW Compositio	on Study fo	or SW PA: See Table 7 and
Data File: Community Data/W Assumptions: Assumed waste "suburban" columns. Residenital paper - 32.1% food - 10.8% plant - 9.0% wood and textiles (all other or	/aste/Mt. Lebo Communi e type-share characteriza ganics) - 16.4%	ty Waste and Recyc tion to be similar re:	Sling.xls sults of 2003 PA N	MSW Compositio	on Study fo	or SW PA: See Table 7 and

Subtotal Waste	0	0	147,021	3,087 1.0	
Total	311,528	22,598	184,032	322,398 100.0	3,353,612

	co,	NgO	СН	Equiv	vco	Energy
	(tonnes)	(kg)	(kg)	(tonnes)	(%)	(MMBtu)
dential						
lt. Lebanon, PA						
Columbia Gas Data						
Natural Gas	41,702	79	3,930	41,809	13.5	785,949
Subtotal Columbia Gas Data	41,702	79	3,930	41,809	13.5	785,949
Data Sources: Mike Belsky Manager - New Business Devel Columbia Gas	opment					
Data Files: CPA Data July 2008 Calculation Files: MTL Utility Da	- June 2012 Ita Summary.xls					
Notes: Units changed to DTH in	2012 data set.					
Assumptions:						
Calculations: INDICATORS - Estimated # of Peoples and Equitable Gas fron Dominion Peoples	residential and comme n the total municipal ho	ercial customers by useholds and busin	subtracting the # desses.	of residential and	d commerci	al customers served by Dom
Calculations: INDICATORS - Estimated # of Peoples and Equitable Gas from <i>Dominion Peoples</i> Natural Gas	residential and comme n the total municipal ho 3,845	ercial customers by useholds and busin	subtracting the # desses.	of residential and	d commerci	al customers served by Dom
Calculations: INDICATORS - Estimated # of Peoples and Equitable Gas from Dominion Peoples Natural Gas Subtotal Dominion Peoples	residential and comme n the total municipal hor 3,845 3,845	ercial customers by useholds and busin 7 7 7	subtracting the # desses.	of residential and 3,855 3,855	d commerci 1.2 1.2	al customers served by Dom 72,460 72,460
Calculations: INDICATORS - Estimated # of Peoples and Equitable Gas from Dominion Peoples Natural Gas Subtotal Dominion Peoples NOT UPDATED!	residential and comme n the total municipal hor 3,845 3,845	ercial customers by useholds and busin 7 7 7	subtracting the # desses.	of residential and 3,855 3,855	d commerci 1.2 1.2	al customers served by Dom 72,460 72,460
Calculations: INDICATORS - Estimated # of Peoples and Equitable Gas from Dominion Peoples Natural Gas Subtotal Dominion Peoples NOT UPDATED! Data Source: Barbara J. Kushner Dominon Peoples barbara.j.kushner@dom.com	residential and comme n the total municipal hor 3,845 3,845	ercial customers by useholds and busin 7 7 7	subtracting the # desses.	of residential and 3,855 3,855	d commerci 1.2 1.2	al customers served by Dom 72,460 72,460
Calculations: INDICATORS - Estimated # of Peoples and Equitable Gas from Dominion Peoples Natural Gas Subtotal Dominion Peoples NOT UPDATED! Data Source: Barbara J. Kushner Dominon Peoples barbara.j.kushner@dom.com Southwestern PA Commission Data Library Cycle 8 Forecast of Municipal P	residential and comment n the total municipal hor 3,845 3,845 2,845	ercial customers by useholds and busin 7 7 7 and Business Stat	subtracting the # desses.	of residential and 3,855 3,855	d commerci	al customers served by Dom 72,460 72,460
Calculations: INDICATORS - Estimated # of Peoples and Equitable Gas from Dominion Peoples Natural Gas Subtotal Dominion Peoples NOT UPDATED! Data Source: Barbara J. Kushner Dominon Peoples barbara.j.kushner@dom.com Southwestern PA Commission Data Library Cycle & Forecast of Municipal P Mt. Lebanon website Business Directory http://www.m &txtBusinessName=&txtZipCod	residential and comme n the total municipal hor 3,845 3,845 °opulation, Households ntlebanon.org/Business e=&txtCity=&txtState=#	and Business State	subtracting the # desses.	of residential and 3,855 3,855 ewPage=0&txtL	d commerci 1.2 1.2 etter=&lngE	al customers served by Dom 72,460 72,460 3usinessCategoryID=0
Calculations: INDICATORS - Estimated # of Peoples and Equitable Gas from Dominion Peoples Natural Gas Subtotal Dominion Peoples NOT UPDATED! Data Source: Barbara J. Kushner Dominon Peoples barbara.j.kushner@dom.com Southwestern PA Commission Data Library Cycle 8 Forecast of Municipal P Mt. Lebanon website Business Directory http://www.m &txtBusinessName=&txtZipCod Data File: Fw: Green House Gas SPC 2007 Pop Household Bus Calculation Files: Mt Lebo Norm	residential and comme n the total municipal hol 3,845 3,845 3,845 Population, Households ntlebanon.org/Business e=&txtCity=&txtState=# s Inventory-Mt. Lebano Stats by Muni_growth m nalized Utilities_bkedit.x	ercial customers by useholds and busin 7 7 7 7 9 and Business State Directoryii.aspx?ys &txtAreaCode= n, PA; rate edit.xls	subtracting the # desses.	of residential and 3,855 3,855 ewPage=0&txtL	d commerci 1.2 1.2 1.2	al customers served by Dom 72,460 72,460 3usinessCategoryID=0
Calculations: INDICATORS - Estimated # of Peoples and Equitable Gas from Dominion Peoples Natural Gas Subtotal Dominion Peoples NOT UPDATED! Data Source: Barbara J. Kushner Dominon Peoples barbara J. Kushner Dominon Peoples barbara.j.kushner@dom.com Southwestern PA Commission Data Library Cycle & Forecast of Municipal P Mt. Lebanon website Business Directory http://www.m &txtBusinessName=&txtZipCod Data File: Fw: Green House Gas SPC 2007 Pop Household Bus Calculation Files: Mt Lebo Norm Note: Only 2005 and 2009 data Consumption data was weather	residential and comme n the total municipal hor 3,845 3,845 20pulation, Households ntlebanon.org/Business e=&txtCity=&txtState=d s Inventory-Mt. Lebano Stats by Muni_growth r halized Utilities_bkedit.x available. Only sales s normalized against her	and Business State Directoryii.aspx?ys &txtAreaCode= n, PA; ate edit.xls ds	subtracting the # desses.	of residential and 3,855 3,855 ewPage=0&txtL	d commerci 1.2 1.2 .etter=&IngE using 2006 I	al customers served by Dom 72,460 72,460 BusinessCategoryID=0
Calculations: INDICATORS - Estimated # of Peoples and Equitable Gas from Dominion Peoples Natural Gas Subtotal Dominion Peoples NOT UPDATED! Data Source: Barbara J. Kushner Dominon Peoples barbara.j.kushner@dom.com Southwestern PA Commission Data Library Cycle & Forecast of Municipal P Mt. Lebanon website Business Directory http://www.m &txtBusinessName=&txtZipCod Data File: Fw: Green House Ga: SPC 2007 Pop Household Bus Calculation Files: Mt Lebo Norm Note: Only 2005 and 2009 data Consumption data was weather Assumptions: Assume no chang	residential and comme n the total municipal hor 3,845 3,845 20pulation, Households ntlebanon.org/Business e=&txtCity=&txtState=a s Inventory-Mt. Lebano Stats by Muni_growth m nalized Utilities_bkedit.x available. Only sales s normalized against hea ge in customers or base	and Business State and Business State Directoryii.aspx?ys &txtAreaCode= n, PA; ate edit.xls ds ervice accounts, no ating and cooling de e energy demand fr	subtracting the # desses.	of residential and 3,855 3,855 ewPage=0&txtL ckcast to 2006 u	d commerci 1.2 1.2 1.2 .etter=&IngE	al customers served by Dom 72,460 72,460 BusinessCategoryID=0

co <sub>2</sub>	N <sub>2</sub> O	сн	Equiv CO	Energy	
(tonnes)	(kg)	(kg)	(tonnes) (%)	(MMBtu)	

Heating Degree Days (HDD). Consumption was backcasted to 2006 based on that annual HDD.

Note: The monthly regression of Columbia data showed a strong correlation between gas consumption and HDD. The annual regression of Equitable data showed a strong correlation for Residential, but the Commercial correlation was weak (likely due to the unknown change in commercial accounts). Unexpectedly the consumption trends inversely to HDD in this case, which is likely due to the small data set. This could be improved by either obtaining at least 16 monthly data or at least 5 years of annual data.

#### Dug Light

Electricity	85,737	10,205	14,152	89,198	28.7	424,249
Subtotal Duq Light	85,737	10,205	14,152	89,198	28.7	424,249

Data Sources: Kevin Baden Duquesne Light Residential Coordinator Energy Efficiency and Demand Response Programs 411 Seventh Ave Mail drop 8-6 Pittsburgh PA 15219 Office 412 393-6549

Southwestern PA Commission Data Library Cycle 8 Forecast of Municipal Population, Households and Business Stats

Data Files: Mt Lebanon monthly 2010-12 - revised.xlsx; SPC 2007 Pop Household Bus Stats by Muni\_growth rate edit.xls Calculation Files: MTL Utilities\_2012.xls

Notes: Generation mix for Duquesne light was not available.

Assumptions:

Calculations:

INDICATORS - \*\*CHECK\*\*The linear growth rate between the SPC's 2005 and 2010 households estimate for Mt. Lebanon is 0.28% applied to the 2005 estimate of 13300 households equals 13337 households for 2006.

#### Equitable Gas

Natural Gas	9,511	18	896	9,536	3.1	179,257	
Subtotal Equitable Gas	9,511	18	896	9,536	3.1	179,257	

Data Source: Scott M. Waitlevertch External Communications & Government Relations Manager Equitable Gas 225 North Shore Drive Pittsburgh, PA 15212 (O) 412-395-2314 (F) 412-395-3166 swaitlevertch@equitablegas.com

Southwestern PA Commission Data Library

co <sub>2</sub>	N <sub>2</sub> O	сн <sub>4</sub>	Equiv CO	Energy	
(tonnes)	(kg)	(kg)	(tonnes) (%)	(MMBtu)	

Cycle 8 Forecast of Municipal Population, Households and Business Stats

Mt. Lebanon website

Business Directory http://www.mtlebanon.org/BusinessDirectoryii.aspx?ysnShowAll=0&IngNewPage=0&txtLetter=&IngBusinessCategoryID=0 &txtBusinessName=&txtZipCode=&txtCity=&txtState=&txtAreaCode=

Data File: Community Data/Natural Gas/Equitable Gas Mt Lebanon Usage Data 2005-2008.xls SPC 2007 Pop Household Bus Stats by Muni\_growth rate edit.xls Calculation Files: Mt Lebo Normalized Utilities\_bkedit.xls

Note:

Assumptions:

Calculations: BACKCAST - No backcasting was necessary as 2006 data were avaialble.

Note: A regression was performed between annual HDD and annual consumption. The data show a strong correlation for Residential, but not Commercial. It is suspected that unknown change in small number of commercial accounts could be at cause. To improve, the number of annual accounts could be requested.

btotal Residential	140,796	10,309	19,341	144,398	46.5	1,461,915	
ommercial							
Mt. Lebanon, PA							
Columbia Gas							
Natural Gas	17,040	32	1,606	17,084	5.5	321,153	
Subtotal Columbia Gas	17,040	32	1,606	17,084	5.5	321,153	÷
Data Sources: Mike Belsky Manager - New Business De Columbia Gas Data Files: CPA Data July 20 Calculation Files: MTL Utility Notes: Units changed to DTH	velopment 008 - June 2012 Data Summary.xls H in 2012 data set.						
Assumptions:							
Calculations:							
INDICATORS - Estimated # Peoples and Equitable Gas f	t of residential and comm rom the total municipal h	nercial customers b ouseholds and busi	y subtracting the # on nesses.	of residential and	d commer	cial customers served by	y Dominion
Dominion Peoples							

Natural Gas	554	1	52	555	0.2	10,440	
Subtotal Dominion Peoples	554	1	52	555	0.2	10,440	

NOT UPDATED: No data received assumed to be equivalent to 2009

Data Source:

co <sub>2</sub>	N <sub>2</sub> O	СН4	Equiv CO <sub>2</sub>	Energy	
(tonnes)	(kg)	(kg)	(tonnes) (%)	(MMBtu)	

Barbara J. Kushner Dominon Peoples barbara.j.kushner@dom.com

Southwestern PA Commission Data Library Cycle 8 Forecast of Municipal Population, Households and Business Stats

Mt. Lebanon website

Business Directory http://www.mtlebanon.org/BusinessDirectoryii.aspx?ysnShowAll=0&IngNewPage=0&txtLetter=&IngBusinessCategoryID=0 &txtBusinessName=&txtZipCode=&txtCity=&txtState=&txtAreaCode=

Data File: Fw: Green House Gas Inventory-Mt. Lebanon, PA; SPC 2007 Pop Household Bus Stats by Muni\_growth rate edit.xls Calculation Files: Mt Lebo Normalized Utilities\_bkedit.xls

Note: Only 2005 and 2009 data available. Only sales service accounts, not transportation. Consumption data was weather normalized against heating and cooling degree days and backcast to 2006 using 2006 heating and cooling degree days.

Assumptions: Assume no change in customers or base energy demand from 2005 to 2006.

Calculations: BACKCAST - Since 2 years of Residential and Commercial data were available (annual totalization), the data were linearly correlated to Heating Degree Days (HDD). Consumption was backcasted to 2006 based on that annual HDD.

Note: The monthly regression of Columbia data showed a strong correlation between gas consumption and HDD. The annual regression of Equitable data showed a strong correlation for Residential, but the Commercial correlation was weak (likely due to the unknown change in commercial accounts). Unexpectedly the consumption trends inversely to HDD in this case, which is likely due to the small data set. This could be improved by either obtaining at least 16 monthly data or at least 5 years of annual data.

#### Duq Light

Electricity	71,866	8,554	11,863	74,767	24.1	355,611	
Subtotal Duq Light	71,866	8,554	11,863	74,767	24.1	355,611	
Data Sources: Kevin Baden Duquesne Light Residential Coordinator Energy Efficiency and Demand 411 Seventh Ave Mail drop 8-6 Pittsburgh PA 15219 Office 412 393-6549 Southwestern PA Commission Data Library Cycle 8 Forecast of Municipal Data Files: Mt Lebanon month SPC 2007 Pop Household Bus Calculation Files: MTL Utilities	d Response Programs Population, Households Ny 2010-12 - revised.xls s Stats by Muni_growth _2012.xls	s and Business Sta x; rate edit.xls	ts				
Notes: Generation mix for Du	quesne light was not av	ailable. C & I comb	bbbbied				

Assumptions:

co2	N <sub>2</sub> O	CH <sub>4</sub>	Equiv CO <sub>2</sub>	Energy	
(tonnes)	(kg)	(kg)	(tonnes) (%)	(MMBtu)	

Calculations:

INDICATORS - \*\*CHECK\*\*The linear growth rate between the SPC's 2005 and 2010 households estimate for Mt. Lebanon is 0.28% applied to the 2005 estimate of 13300 households equals 13337 households for 2006.

Equitable Gas

Natural Gas	4.799	9	452	4.812	1.5	90,450
Subtotal Equitable Gas	4.799	9	452	4.812	1.5	90.450
Data Octometri	.,			.,		,
Data Source:						
Scott M. Wallevench						
External Communications & Gove	ernment Relations wa	anager				
225 North Shara Drive						
Ditteburgh DA 15212						
(A) 412-395-2314						
(E) 412-395-3166						
swaitlevertch@equitablegas.com						
Southwestern PA Commission						
Data Library						
Cycle 8 Forecast of Municipal Po	pulation, Households	s and Business Stat	s			
Mt. Lebanon website						
Business Directory http://www.mtl	lebanon.org/Busines	sDirectoryii.aspx?ys	snShowAll=0&IngNe	wPage=0&txtL	etter=&IngB	usinessCategoryID=0
&txtBusinessName=&txtZipCode	=&txtCity=&txtState=	&txtAreaCode=				
Data File: Community Data/Natur	al Gas/Equitable Gas	s Mt Lebanon Usag	e Data 2005-2008.x	ds		
SPC 2007 Pop Household Bus S	itats by Muni_growth	rate edit.xls				
Calculation Files: Mt Lebo Norma	lized Utilities_bkedit.	xls				
Note:						
Assumptions:		5242222244242 - 56 - 56	10 10220			
Calculations: BACKCAST - No b	ackcasting was nece	ssary as 2006 data	i were a∨aialble.			
Note: A regression was performe	d between annual HE	DD and annual cons	umption. The data	show a strong o	correlation f	or Residential, but not
Commercial. It is suspected that	unknown change in s	mall number of com	nmercial accounts c	ould be at caus	e. To impro	ove, the number of annual
accounts could be requested.						
total Commercial	94 260	8 507	13 073	07 218	21.2	777 654
	54,200	0,337	13,373	57,210	51.5	111,004
nsportation						
Mt. Lebanon, PA						
Mt. Lebanon owned - Local (Non-Fed	eral Aid)					
Diesel	2,695	8	8	2,697	0.9	36,838
Gasoline	13,421	900	764	13,716	4.4	189,352
Subtotal Mt. Lebanon owned - L	16,116	908	773	16,414	5.3	226,190

cc	N <sub>2</sub> 0	СН <sub>4</sub>	Equiv CO	Energy	
(tonne	s) (kg)	(kg)	(tonnes) (%)	(MMBtu)	

Data Source:

Heather Heslop | Program Analyst - HPMS PA Department of Transportation | Bureau of Planning & Research 400 North Street | Harrisburg, PA 17120 Phone: 717.787.1840 | Fax: 717.783.9152 www.dot.state.pa.us

Data File: Mt. Lebanon Township VMT.xls Assumptions: Calculations:

Notes: Mt Lebanon-owned - Local VMT has been estimated by PennDOT, since 2009. Previous estimates were made using the CACP "Transportation Assistant" and AADT data from Twp transportation engineer.

Mt. Lebanon owned - Minor Arterial (Federal Aid)

Diesel	1,901	6	6	1,903	0.6	25,985	
Gasoline	9,467	635	539	9,675	3.1	133,564	
Subtotal Mt. Lebanon owned - N	11,368	641	545	11,578	3.7	159,548	

Data Source: Heather Heslop | Program Analyst - HPMS PA Department of Transportation | Bureau of Planning & Research 400 North Street | Harrisburg, PA 17120 Phone: 717.787.1840 | Fax: 717.783.9152 www.dot.state.pa.us

Data File: Community Data/Transportation/Mt. Lebanon Township VMT.xls Assumptions: Calculations:

Mt. Lebanon owned - Other Principal Arterial

Diesel	205	1	1	205	0.1	2,804	
Gasoline	1,021	69	58	1,044	0.3	14,410	
Subtotal Mt. Lebanon owned - (	1,226	69	59	1,249	0.4	17,214	
Data Source: Heather Heslop   Program Analysl PA Department of Transportation 400 North Street   Harrisburg, PA Phone: 717.787.1840   Fax: 717. www.dot.state.pa.us	- HPMS   Bureau of Planning 17120 783.9152	& Research					
Assumptions: Calculations:	ontation/mit. Lebanor						
PennDOT owned - Collector (Federal )	Aid)						
Diesel	429	1	1	430	0.1	5,866	

-

# Community Greenhouse Gas Emissions in 2011 Detailed Report

	co	со, N,O СН		Equiv	, co2	Energy	
	(tonnes)	(kg)	(kg)	(tonnes)	(%)	(MMBtu)	
Gasoline	2,137	143	122	2,184	0.7	30,151	
Subtotal PennDOT owned - Co	2,566	145	123	2,614	0.8	36,016	
Data Source: Heather Heslop   Program Analys PA Department of Transportation 400 North Street   Harrisburg, PA Phone: 717.787.1840   Fax: 717 www.dot.state.pa.us Data File: Community Data/Trans	st - HPMS )   Bureau of Planning 17120 7.783.9152 sportation/Mt. Lebanc	) & Research on Township VMT.xl:	5				
Assumptions: Calculations:							
PennDOT owned - Local (Non-Feder	al Aid)						
Diesel	116	0	0	116	0.0	1,582	
Gasoline	576	39	33	589	0.2	8,133	
ubtotal PennDOT owned - Loc	692	39	33	705	0.2	9,715	
Data Source: Heather Heslop   Program Analys PA Department of Transportatior 400 North Street   Harrisburg, PA Phone: 717.787.1840   Fax: 717 www.dot.state.pa.us Data File: Community Data/Trans Assumptions: Calculations:	st - HPMS )   Bureau of Planning 17120 7.783.9152 sportation/Mt. Lebanc	g & Research on Township VMT.xl:	s				
PennDOT owned - Minor Arterial							
Diesel	851	3	3	852	0.3	11,630	
Gasoline	4,237	284	241	4,330	1.4	59,779	
Subtotal PennDOT owned - Mir	5,088	287	244	5,182	1.7	71,409	
Data Source: Mr Gaye F Liddick   Transportation Department of Transportation Bureau of Planning and Research PO Boy 3555   Harrisburg PA 17	on Planning Manager						

Phone: 717.787.5983 | Fax: 717.783.9152

Data File: Community Data/Transportation/Mt. Lebanon Township VMT.xls Assumptions: Calculations:

	co	CO <sub>2</sub> N <sub>2</sub> O CH <sub>4</sub> tonnes) (kg) (kg)	сн	Equiv CO		Energy
	(tonnes)		(tonnes)	2 (%)	(MMBtu)	
PennDOT owned - Other Principal A	rterial					
Diesel	4,643	14	14	4,648	1.5	63,477
Gasoline	23,127	1,551	1,317	23,635	7.6	326,278
Subtotal PennDOT owned - Otł	27,770	1,565	1,331	28,283	9.1	389,755
Data Source: Mr Gaye F Liddick   Transportati Department of Transportation Bureau of Planning and Researc PO Box 3555   Harrisburg PA 17 Phone: 717.787.5983   Fax: 71 Data File: Community Data/Tran Assumptions: Calculations:	on Planning Manager h 7105 7.783.9152 sportation/Mt. Leban	on Township VMT.;	ds			
ubtotal Transportation	64,826	3,653	3,108	66,024	21.3	909,847
Vaste						
Mt. Lebanon, PA						
Commercial Recycling Residuals						Disposal Method - Managed Landfil
Paper Products	0	0	1,786	38	0.0	
Subtotal Commercial Recycling	0	0	1,786	38	0.0	
Data Source: Tom Kelley, Director of Public W Municipality of Mt. Lebanon 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3869 Fax: 412-343-3753 E-mail: Tkelley@mtlebanon.org Data File: 2006 904 Report.pdf Note: No data on residuals avail Assumptions: Assumed to be eq McGoran of Repulic Services the	/orks able after 2006 jual to 2006 residual t at virtually all commen	onnage. Assumed v	vaste type-share ch municipality was ca	naracterization t ardboard. Assu	o be 10 med 90	0% based on email statement by Johr % methane recovery.
Commercial Solid Waste						Disposal Method - Managed Landfil
Paper Products	0	0	52,869	1,110	0.4	
Food Waste	0	0	10,694	225	0.1	
Plant Debris	0	0	744	16	0.0	
Wood or Textiles	0	0	8,818	185	0.1	
Subtotal Commercial Solid Wa:	0	0	73,126	1,536	0.5	
Data Source:						

co <sub>2</sub>	N <sub>2</sub> O	CH4	Equiv CO	Energy	
(tonnes)	(kg)	(kg)	(tonnes) (%)	(MMBtu)	

Tom Kelley, Director of Public Works Municipality of Mt. Lebanon 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3869 Fax: 412-343-3753 E-mail: Tkelley@mtlebanon.org

Data File: Community Data/Waste/Mt. Lebo Community Waste and Recycling.xls; 2006 904 Report.pdf

Note: No data available on commercial solid waste

Assumption: Temporarily assume commercial solid waste to recycling fraction is similar to residential in 2006. Assumed waste type-share characterization to be similar results of 2003 PA MSW. Assumed 90% methane recovery. Assumed waste type-share characterization to be similar results of 2003 PA MSW Composition Study for SW PA: See Table 7 and 8 "suburban" columns.

Commercial paper - 31.9% food - 11.4% plant - 1.4% wood and textiles (all other organics) - 18.8% all other waste - 36.5%

Calculation: Residential 16842.4 tons solid waste / 1210 tons recycling = 13.92 tons solid waste/ ton recycling \* 1289 tons recycling = 17942 tons commercial solid waste

Residential Recycling Residuals						Disposal Method - Managed Landfill
Paper Products	0	0	1,889	40	0.0	
Subtotal Residential Recycling	0	0	1,889	40	0.0	
Data Source: Tom Kelley, Director of Public Works Municipality of Mt. Lebanon 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3869 Fax: 412-343-3753 E-mail: Tkelley@mtlebanon.org						
Data File: 2006 904 Report.pdf; MTL I Note: No data on residuals available a Assumptions: Temporarily assumed w that 2006 % residuals applies.	Res Waste & Rec fter 2006 ⁄aste type-share cl	ycling.xls haracterization to	be 50/50 paper and o	other waste. 7	Assume	ed 90% methane recovery. Assume
	2012 20 202020000	NO1 12 1		10 NOVEL 1983	1201-120	a anala sanatana salahan analahan

Calculations: 2006 Residential 205 tons residuals / 1210 tons recycling = 16.9%. 2009 Residential Recycling - 2420.01 tons \* 16.9% = 409.0 tons residuals

Residential Solid Waste						Disposal Method - Managed Landfill
Paper Products	0	0	44,302	930	0.3	
Food Waste	0	0	8,437	177	0.1	
Plant Debris	0	0	3,984	84	0.0	

	co,	со <sub>2</sub> № <sub>2</sub> 0 сн		Equiv	vco	Energy	
	(tonnes)	(kg)	(kg)	(tonnes)	(%)	(MMBtu)	
Wood or Textiles	0	0	6,406	135	0.0		
Subtotal Residential Solid Wasi	0	0	63,130	1,326	0.4		
Data Source: Tom Kelley, Director of Public W Municipality of Mt. Lebanon 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3869 Fax: 412-343-3753 E-mail: Tkelley@mtlebanon.org Data File: MTL Res Waste & Red Assumptions: Assumed waste typ "suburban" columns. Residenital paper - 32.1% food - 10.8% plant - 9.0% wood and textiles (all other organ all other waste - 31.7%	orks cycling.xls be-share characteriza ics) - 16.4%	tion to be similar re	esults of 2003 PA N	//SW Compositi	ion Study f	or SW PA: See Table 7 and 8	
Subtotal Waste	0	0	139,930	2,939	0.9		
Total	299,882	22,559	176,351	310,578	100.0	3,149,416	

# **APPENDIX C – Completed Measures**

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INSTITUTIONAL ACTION: LED RETROFITS OF MUNICIPAL TRAFFIC SIGNALS	104
TRANSPORTATION ACTION: ESTABLISH "NO IDLING ZONES"	106

### Summary Description:

LED traffic lights reduce electricity consumption of signals by 60 to over 90% and as well as reduce maintenance costs through lower replacement frequencies. Mt. Lebanon has already retrofitted half of its municipally owned signals. The remaining lamps are planned for replacement.

### Targets:

Audience(s): Municipal Operations

Emission Sources(s): Electric

### **Reduction Mechanism:**

Upgrading to more efficient and longer lasting light bulbs results in reduced electricity consumption and associated indirect greenhouse gas emissions and criteria air pollutants.

### Process and Timeline:

- 1. Quote received from Republic ITS for traffic signals (Winter 2010)
- 2. Contract for traffic signal replacement(Spring 2010)
- 3. Monitor actual energy savings of traffic signals (2011)

### Partners:

Mt. Lebanon Dept. of Public Works

### **Republic ITS**

### PA League of Cities & Municipalities

### Quantification:

Market Size: 1500 municipally owned signal lamps; 567 remaining to be retrofitted

Market Penetration: 100% retrofit of municipally-owned traffic signals

Reduction:

Traffic signals: 309 MT CO<sub>2</sub>-e for total retrofit, 114 MT CO<sub>2</sub>-e for remaining lamps;

<u>User Cost</u>: User capital cost is represented by the administration cost, and user maintenance costs are included in the net maintenance cost savings below.

<u>Administration Cost</u>: Traffic Signals: \$57,737 (Republic ITS price quote for remaining 567 lamps), assumed \$152,743 for entire retrofit.

<u>Cost Savings</u>: Traffic lights: Based on \$17,230 in annual energy and \$5,820 in maintenance savings<sup>39</sup> estimated by Republic ITS for the remaining 567 lamps, total cost savings for all are assumed to be \$60,979. However, maintenance savings may be overestimated for Mt. Lebanon where maintenance is performed by municipal staff.

<u>Co-benefits:</u> E.g., Job creation, cost savings, improved quality of life, air quality.

Co-benefits include reduced risk to signal maintenance personnel and reduced maintenance costs due to reduced bulb replacement frequency.

### Key Contacts:

### Mt. Lebanon Dept. of Public Works

Tom Kelley 710 Washington Road Pittsburgh, PA 15228 Phone: 412-343-3869

### **Republic ITS**

James-Michael Trotta Phone: 978-262-9010

### References:

Grand Traverse County Greenhouse Gas Emissions Analysis Phase 1 – Final Report Part 1 – City of Traverse City Municipal Analysis 2008

<sup>&</sup>lt;sup>39</sup> Republic ITS's estimate of energy cost savings is consistent with SEEDS' analysis of traffic light energy use in other municipalities. If the Mt. Lebanon municipal average price for electricity of \$0.107/kWh is assumed the signal efficiency improvement is estimated to be 78%. SEEDS has documented a range of LED retrofit improvement from 44% to 80% with an average of 60%. Maintenance savings may be overestimated for Mt. Lebanon where maintenance is performed by municipal staff.

### Transportation Action: Establish "No Idling Zones"

### Summary Description:

Place signs around Mt. Lebanon that state "No Idling Zone". Place signs in areas where people idle while waiting for children, etc. Educate people that a car's engine switches into an idling mode after only ten seconds. It is better at that point to turn off the motor (if appropriate). Educate residents about how car pollution affects people's health. Children are especially vulnerable since their lungs are developing, and they breathe fifty percent more pound than do adults. Educate residents about how wasteful idling is and how excessive idling harms car engines.

### Targets:

Audience(s): All drivers

Emission Sources(s): Gasoline and diesel transportation fuels

### Reduction Mechanism: Reduced car emissions

### Process and Timeline:

- 1. Place no-idling signs at schools by next school year
- 2. Place no-idling signs around the municipality by the end of 2010. Include Recreation Center, Tennis Courts, Library, Dixon Fields
- 3. Ask businesses to place no-idling signs in their store-front windows. Implement immediately.
- 4. Ask doctors to provide literature about the dangers of car pollution, post signs. Implement immediately.
- 5. Ask gas stations to post signs that Mt. Lebanon is a no-idling community

### Partners:

### Mt. Lebanon Business District Office

School District: work with superintendent. He has already agreed to post signs.

**Local Religious Congregations:** Work with local churches and temples especially those that have preschools and religious schools.

**Local sports organizations:** approach groups like the Mt. Lebanon Hornets and ask them to post noidling on their websites and venues.

Girls Scouts & Boy Scouts: ask troops to distribute pledge cards that ask people not to idle

**Insurance Agents:** Have agents explain that leaving an idling car, unattended could raise rates.
#### Quantification:

<u>Market Size:</u> Mt. Lebanon has 13,600 households and average idling in the US is reported as 5 min or more.

Market Penetration: Assume 10% of households reduce car idling by 2 minutes daily.

<u>Reduction</u>: Assume 33g of CO2 per minute. 13,600 x 10% x 365 days/yr x 2 minute/day x 33g CO2/minute x  $1MT/10^{6}g = 66 MT CO2$  per year.

<u>User Cost:</u> Assumed to be zero.

Administration Cost: TBD

<u>Cost Savings</u>: Save gasoline and maintenance costs (idling causes engine wear). Assuming 8.8 kg  $CO_2$ -e / gallon of gasoline savings per year per household would be \$15 or \$20,625 community wide.

#### Co-benefits:

Improved air quality leading to better health.

#### References:

Environmental Defense Fund's study on the impact of idling in NYC, Air Watch Northwest's website, State of Connecticut, EPA, DEP website.

#### Resources:

U.S. Dept. of Energy Energy Efficiency & Renewable Energy Alternative Fuels Data Center Website – Light Duty Vehicle Idle Reduction Strategies http://www.afdc.energy.gov/conserve/idle\_reduction\_light.html

# **APPENDIX C – Additional Strategies under Consideration**

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#### Active Transportation Recommendations as of 2/25/2010

**Top Priorities:** 

Become a League of American Cyclist's "Bike-friendly Community"

- Covered bike racks at T station, high school, middle schools
- Safe routes to grocery stores
- Safe routes to high school, middle school, recreation center
- Incentive programs to promote biking at high school
- Could Florida Rd. be for bikes? Put bike racks there
- Put bike paths along Cedar Rd.

Promote Walking in our Community

- Safe Routes to School- A Federal Program
- Implement Middle School Safety Study
- Road Diet: Explore ways to make Washington Rd. (between library and Mt. Lebanon Blvd) safer
- Explore ways to make Bower Hill Rd. safer for walkers
- Increase pressure on parents to promote walking (Human School Bus, health)
- Safe routes for older residents, routes to grocery stores, etc.

Convert Mt. Lebanon fleet to hybrid and/or electric cars

- What is required for a charging station?
- Bikes for police officers?

#### No Idling

- Educate community about health risks associated with idling, how it wastes gas, is bad for car engine, etc. "If you're stopped for more than 10, turn it OFF and on again."
- Place signs at all schools telling parents not to idle
- Place no idling signs at Recreation Center
- Place signs at Library
- Place signs at gas stations
- Ask local pediatricians to discuss health risks of idling with parents of asthmatics

#### **Promote Carpools**

- Examine whether larger employers, such as St. Clair High School and school district, can encourage their workers to carpool
- For students who live far from high school, introduce carpool incentives (HOV parking spaces)
- Software for schools to match families for carpooling and the Human Bus

#### Commercial

Educate Mt Lebanon businesses/commercial facilities on Act 129:

- Benefits of an energy audit
- Facilitate coordination of Not For Profit organizations into a group to obtain free energy audits from Duquesne Light. (Churches, Continuing Care Facilities)
- Help businesses take advantage of the Act 129 tax rebates and other tax rebate programs.
- Promote Energy Star Lighting Retrofit Program

Develop goal setting and attainment recognition program for area businesses

Arrange cooperative agreement for commercial recycling services and other green products in business districts

- Develop a business district program for cooperative purchasing
- Recycling contract
- Purchase green consumables
- Energy auditing services

Later Phases

- Encourage packaging reduction
- Mandate? Commercial renovations meet a minimum environmental sustainability criteria

## **Municipal / Schools**

## Recommended Strategies - Ranked:

Title	Description
Energy Star procurement policy	Purchase only Energy Star rated equipment and appliances for municipal / school use. Require 3-party, permanent, on site equipment to be Energy Star rated (vending machines, cafeteria equipment).
Traffic signal synchronization and optimization	Decrease idling and acceleration emissions through traffic signal synchronization and optimization along key corridors. Existing traffic engineer is prepared to evaluate and implement.
Require continuous building energy management	Require tracking the energy consumption of all municipal/school district buildings. May require sub-metering. Require tracking energy use in Portfolio Manager. Require public disclosure.
Fleet fuel efficiency	Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program to discourage idling.
Alternative transportation	Promote the use of alternative transportation by public employees (public transit, biking, walking, and carpooling). Provide incentives.
Turn computers off at night	Turn computers off at night
Mandate any publicly funded building construction meet High Performance building guidelines	Any publicly funded building (municipal or school district) would need to be LEED certified, Energy Star certified or another high performance building standard.
Energy Auditing, standards and upgrades	Procure Energy Auditing Services for ALL municipal /school district buildings and structures (including library, parking garages and lots). Develop facility efficiency goals. Require energy upgrades. (Upgrades could be funded through Performance contracts if necessary)
Initiate local CNG infrastructure for fleet vehicles	Convert municipal fleet to CNG; receive CNG fueling station; promote CNG fleet conversions for solid waste hauling and other local business fleet vehicles
Retrofit all traffic lights to LED	Retrofit all traffic lights to LED
Upgrade street lights to LED	Upgrade street lights to LED
Land use, zoning	Adopt and enforce land-use policies that reduce sprawl, preserve open space and create compact, walkable urban communities
Establish a Municipal Energy Office	Establish a Municipal Energy Office(r) to promote and oversee energy efficiency programs and opportunities within municipal operations, business, and residential sectors. Dedicated to ensuring implementation and increased effectiveness of the listed strategies
Renewable energy	Install renewable energy system on site or purchase portion of energy from renewable sources

### **Recycling & Waste Reduction**

Establish residential recycling and waste reduction goals for the community and report recycling goal progress [by neighborhood, if possible]

- Encourage recycling education through schools and ask students to take what they have learned about recycling at school into their homes.
- Establish competition between townships and/or between Mt. Lebanon neighborhoods.
- Continue community education and enticement efforts through Mt. Lebanon Magazine, the municipal web site, Earth Day activities, and other efforts. Emphasize current recycling and trash tonnage, the increased goal for recycling, the reduced goal for trash, and what items are acceptable for single stream recycling in Mt. Lebanon. Equate tonnage of trash and recycling to the how many football sized holes 10 feet deep would be need to hold one year of Mt. Lebanon's trash and recycling.
- Encourage non-profit and volunteer organizations to raise money for themselves by collecting newspaper and aluminum cans from commercial establishments and residents who are not engaged in a recycling.

Educate and set community goals for new Mt. Lebanon E Recycling Program.

• Expand types of items taken and collection site hours & locations. Tactics are similar to those above.

#### 2010 and beyond Actions

Prepare Proposals and seek commissioner and community feedback on lower cost waste reduction Ideas:

- Establish trash and recycling can placement central to every 4 to 8 residences, so that collecting truck does not have to stop as often. This should improve productivity and enable Mt. Lebanon to bargain for a reduced cost from vendor at contract negotiation.
- Reduce Trash pick-up to every other week from weekly. Residents who follow single stream guidelines have reduced their trash significantly, and usually fill just half a trash can in a week.
- Adopt "Pay as You Throw" system for trash pickup. This provides an economic incentive to reduce one's trash and use single stream recycling program.

#### Residential

#### COMMITTEE RECOMMENDATIONS:

# 1. In relation to: Adopt housing energy performance standards for rental and/or owner occupied housing a/o require new leases report to tenants.

We thought that this Action might not be well-received in our community due to the mandatory nature and we believe that a voluntary compliance program would be a positive, first step in the introduction of performance standards for the Community. A voluntary compliance program may turn into a Community–wide adoption program due to the competitive nature of the rental and sales markets.

In the future, a mandatory program may be implemented, but we would recommend focusing on inspection at the time of sales transactions, not lease turnovers. Lease turnovers may occur on a yearly basis and may pose unnecessary hardship upon landlords. Sales transactions do not happen as frequently and contain other mandatory requirements, so they may provide a better opportunity to introduce mandatory inspection and compliance with energy code issues. See Item No. 2, below.

The portion of the Action related to **disclosure of utility information** may be better-received by the Community and we believe that we should move forward with that portion of the Action-Summary Description. This type of mandatory requirement is simple, free and, in fact, may help to promote thoughtful consideration of energy issues as utility costs rise in the Community. **Please require a mandatory disclosure of utility information for a minimum of 12 months for all lease turnovers and sales transactions.** 

# 2. In relation to: Adopt energy performance standards for housing a/o require title transfers to report to buyers.

Similar to Item No. 1, we thought that this Action may not be well-received due to the mandatory requirements and would recommend a voluntary compliance program if renovation is not included in the sales transaction/title transfer. The State of PA does require compliance with the IECC 2009 for all new construction and for major renovations. Mt. Lebanon's building inspector strictly enforces all regulations.

If the Municipality could provide a funding program for Home Energy Ratings, in the future, we believe that a mandatory program for Ratings and compliance could be suggested. The Municipality could apply for grant funds or apply for local funding from the Mt. Lebanon Endowment in order to assist home-owners, buyers and/or sellers, in the procurement of Home Energy Ratings. The cost of Home Energy Ratings ranges from \$350-\$1,000. If the Municipality could fund a portion of this cost, the program may be more palatable. Home Energy Ratings suggest compliance with Energy Star or HERS standards which are stricter than the IECC 2009. The IECC 2009 theoretically produces a HERS rating of 100. Energy Star requires a HERS rating of 85. A Net Zero Energy Home would be a 0 rating on the HERS scale. We would suggest that the Municipality set a target minimum HERS rating of 85.

3. In relation to: **Low and Fixed Income Home Energy Audits & Weatherization**. The organization, CCI - Conservation Consultants, Inc., already provides a local program for low-income residents. The Municipality could institute an education and outreach campaign to introduce low-income, fixed-income, elderly, etc., residents to the CCI program. The CCI program includes professional services, not youth or volunteer services, which would guarantee that residents would receive a quality installation.

4. In relation to: Leverage Act 129 to ensure Mt Lebo meets or exceeds 2% reduction target. The Mt. Lebanon School District provides an introduction to the Physics and Ecology of Energy Conservation at the Elementary, Middle and High School levels. Duquesne Light has a School Energy Pledge Program, in which families of elementary school children pledge to install energy devices, some of which are provided free to the children by Duquesne Light. The Mt. Lebanon School District should be encouraged to take part in this program.

We were informed that there are consultants available to reach out to residents to promote residential rebates. The Municipality should contract with a consulting firm, similar to the way that they consult with RENPLAN, to develop consults for residential rebates that would be considered part of the ACT 129 program. See the commercial section for contact information on ALLFACILITIES ENERGY GROUP, Stephen Moritz, 412-242-6200.

#### ADDITIONAL RECOMMENDATIONS

#### 5. ACTION: EDUCATION

We believe that Community Education should be an important component of any Action item in the Climate Action Plan. If the general public understands the reasons and benefits for the recommended strategies, they will be much more likely to adopt them. If the general public feels that they are an important part of the process, they will be much more willing to adopt recommended strategies, as well.

**SUMMARY DESCRIPTION:** The Municipality should develop a comprehensive education program which focuses on energy use in the U. S., losses generated in electricity production, the role that buildings play in energy consumption, what contributes to heating and cooling losses, how much energy can be saved in the conservation process, and (possibly most importantly) how that energy savings translates into dollar savings for the consumer. The education program may also introduce the various funding options through state and federal programs (ACT 129, tax incentives, loans, etc.) to make energy conservation more of a reality for consumers.

This education program can be implemented through: articles and inserts in Mt. Lebanon Magazine and local newspapers. Opportunities for presentations, by local experts, on the subject of energy conservation and savings include: community meetings; community festivals (Earth Day, First Fridays, Light-Up Night (perhaps LED lights could be featured at such an event), etc.); information tables at Farmer's Markets; presentations for various religious, elderly, or youth organizations; a Community Survey (to develop an profile of the type of Sustainable Community residents would like to participate in), etc.

#### 6. ACTION: CONSERVATION

We believe that the promotion CONSERVATION should be an important component of any Action item in the Climate Action Plan. The general public can benefit greatly from an understanding of how simple life-style changes can increase their energy and cost savings. We believe that implementation of these measures must be on a voluntary level as part of the first step in the Climate Action Plan.

SUMMARY DESCRIPTION: Conservation measures can be achieved in a series of levels:

SIMPLE – measures requiring relatively light effort and investment

MODERATE – measures requiring slightly more effort and cost

ADVANCED – measures requiring advanced knowledge, expertise, technology and cost

The municipality could include education on the following conservation measures as part of the community education program:

SIMPLE - encourage:

- the use of daylighting or the turn-off of light fixtures and electrical devices this encompasses interior and exterior lighting (landscape lighting, seasonal lighting), etc.
- the reduction of "vampire" loads from small appliances by turning them completely off when not in use this includes TV's, play-station type devices, microwaves, coffee machines, computers, printers, etc.
- $\cdot$  the use of natural ventilation by not using air conditioning systems in the summer months
- the turn-down of thermostats during the winter months
- the participation in the recycling program and implement a new ecycling program perhaps monitor participation and enforce the Municipal Ordinance with fines, etc.
- the caulking and/or weather stripping of windows and doors, and openings in the building envelope (particularly at attic and basement, and easy to reach locations such as plumbing penetrations, ductwork penetrations, light fixture penetrations, etc..)

#### MODERATE – encourage:

- the switch from incandescent lamps to compact fluorescent lamps
- the installation of power strips that permit the easy reduction of vampire loads

• the purchase of Energy Star appliances (or better) for Kitchen, Laundry and small appliances, and for mechanical equipment such as boilers, furnaces, air conditioners, hot water heaters, etc.

• the installation of programmable thermostats to control mechanical equipment

• Home Energy Ratings as part of the PA Home Energy or Energy Star program

• the installation of air-sealing and thermal insulation installed in direct contact with each other, referred to as a "thermal boundary" at the exterior perimeter of a residence as part of the Home Energy Rating

#### ADVANCED – encourage:

- the switch from incandescent lamps to LED lamps
- the installation "green" switches that permit the easy reduction of vampire loads

the use of "zoning" of mechanical equipment if new equipment is being installed and if the size of a residence warrants "zoning"

 $\cdot$   $\,$  the use of Heat Recovery or Energy Recovery systems when fresh air is introduced into the residence

 $\cdot$  the installation of geo-thermal heat pump heating/cooling systems where new systems, and new construction and/or renovation is included

 $\cdot$  the installation of Energy Star windows and doors when building new or as part of a renovation

 the use of sub-metering as a way to track energy use by heating/cooling/appliances/lighting/etc. – sub-metering will show the actual energy use for each item metered separately which permits a home owner to monitor energy use for various systems – this information can also be used in the community, or even online, to encourage a healthy competition between neighbors for the best performance

#### 7. ACTION: EXPLORE RENEWABLE ENERGY SOURCES

We believe that, due to the high present cost of the installation of renewable energy sources (wind, solar hot water, PV, etc.), our initial focus should be on EDUCATION and CONSERVATION at this time; however, these features could be included in future education programs for those community members who are ready to embrace them.