



CITY COUNCIL AGENDA ITEM

August 18, 2010

TO: John Szerlag, City Manager

FROM: John M. Lamerato, Assistant City Manager/Finance & Administration
Mark F. Miller, Acting Assistant City Manager/Economic Development Services
Carol Anderson, Parks and Recreation Director
Sam Lamerato, Superintendent of Fleet Maintenance
Susan Leirstein, Purchasing Director
Steve Pallotta, Building Operations Director
Timothy Richnak, Public Works Director

SUBJECT: Energy Efficiency and Conservation Block Grant
Rapid Energy Assessment Program and Sustainability Savings

The U.S. Department of Energy awarded the City of Troy an Energy Efficiency and Conservation Block Grant (EECBG) in the amount of \$921,100. The City executed the agreement in September of 2009. As part of the process the City was required to prepare a funding strategy that was included in the funding application. Carlisle/Wortman Associates, Inc. (CWA) assisted the City in preparation and submittal of the required application documents, which is an eligible expenditure. In addition CWA assisted the City in preparing a Rapid Energy Assessment Program (REAP), which is also an eligible expenditure. The REAP is completed and the City is implementing the EECBG strategy.

At the Study meeting Mark Miller will discuss the EECBG application and budget justification. This justification includes a description on how the dollars are going to be spent. In addition Mr. Miller will discuss the federal reporting requirements. Zak Branigan from CWA will discuss the REAP and how it will be useful for the City in making decisions related to environmental sustainability.

It is our estimate that when we replace the boiler in the original City Hall building there will be a 30% annual natural gas savings, while the LED parking lot lighting improvements will net a \$14,000 annual savings. Steve Pallotta will be at the meeting to answer questions regarding the proposed building improvements and the energy audits for eleven City owned buildings. Regarding vehicles, we anticipate using the funding to pay for alternative energy or hybrid vehicle upgrades when purchasing replacement vehicles for the City fleet. At this point we only have experience with hybrid vehicles and they save approximately \$1,000 per year for each car in fuel costs. We have not used electric vehicles, but are researching this issue. Sam Lamerato and Tim Richnak will be available to answer questions regarding energy savings related to fleet management.

All of the activities or capital projects are completely funded by the EECBG Program which is part of the American Recovery and Reinvestment Act (Recovery Act) of 2009 and represents a Presidential priority to deploy the cheapest, cleanest, and most reliable energy technologies across the country. It



CITY COUNCIL AGENDA ITEM

is intended to assist U.S. cities, counties, states, territories, and Indian tribes to develop, promote, implement and manage energy efficiency and conservation projects and programs designed to:

- Reduce fossil fuel emissions;
- Reduce the total energy use of the local communities;
- Improve energy efficiency in the transportation, building, and other appropriate sectors; and
- Create and retain jobs.

The EECBG Program utilizes formula and competitive grants to empower local communities to make strategic investments to meet the nation's long-term goals for energy independence and leadership on climate change.

Attachments

2 CWA memos

REAP

MM/mr\AGENDA ITEMS\2010\08.23.10 – Energy Efficiency and Conservation Block Grant Rapid Energy Assessment Program and Sustainability Savings



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MEMORANDUM

TO: City Council
FROM: Richard K. Carlisle
DATE: August 19, 2010
RE: Energy Efficiency and Conservation Block Grant Program

The City of Troy was required to develop a preliminary budget for the Energy Efficiency and Conservation Block Grant dollars it was receiving through the program. The following budget justification was a required portion of the grant application. The program allows for a high degree of variation from the original draft budget to accommodate project changes, fluctuating costs, or new opportunities. The following five projects were included in the budget following the results of the City of Troy Rapid Energy Assessment Process and consultation with the City staff.

1) Wind Energy Project. The City has researched available wind energy conversion systems that would be appropriate for installation at the City's municipal campus. The system chosen met the City's goals of demonstrating alternative energy sources in a developed setting. The installed cost for each wind energy conversion system was quoted at a maximum of \$12,000 per unit. This price includes the wind spire, installation at the proposed site, and the electrical hook up. Because the actual installation cost is unknown at this time, we are estimating that each wind spire will cost \$5,400 (45%), and the installation will cost \$6,600 (55%). Therefore, two wind spires will comprise the following totals of the object class categories:

Supplies:	\$10,800
Contractual:	<u>\$13,200</u>
	\$24,000

2) LED Lighting Projects. The City has been working with a lighting consultant to determine the potential for retrofitting internal and external lights at five municipal locations – the city hall, police department, library, court house and fire training warehouse. Existing fixtures were evaluated, and LED alternative fixtures proposed. The proposed lighting program would save the City approximately \$15,000 annually in reduced electricity costs, and additional dollars due to significantly reduced maintenance requirements. A schedule of new

light fixtures was prepared that identifies 502 fixtures throughout the City's campus that could be converted to LED. The costs per building are:

City Hall:	226 fixtures at a cost of \$83,689
Police Department:	68 fixtures at a cost of \$20,660
Library:	117 fixtures at a cost of \$24,295
Court House Exterior:	9 fixtures at a cost of \$2,628
Fire Training Warehouse:	20 fixtures at a cost of \$18,920
City Campus Parking & Roadway Lighting:	62 fixtures at a cost of \$68,492

Installation of the fixtures was estimated at \$150 per fixture. The proposed budget is as follows:

Supplies:	\$218,684
Contractual:	<u>\$75,300</u>
	\$293,984

- 3) **Energy Audits for High-Priority Buildings.** Energy audits for eleven buildings have been estimated at \$0.14 per square foot, with a \$1,000 minimum cost. The City is currently reviewing proposals from a variety of bidding firms for this project. The buildings chosen for audits (the City's worst energy performers) equal approximately 303,379 s.f. Therefore, the cost to audit these buildings is as follows:

Contractual:	<u>\$42,473</u>
	\$42,473

- 4) **High Efficiency Vehicles.** This budget item makes up the increment between purchasing a conventional vehicle and an alternative energy or hybrid vehicle. The estimated increment is approximately \$6,000 per vehicle, and the City is proposing to replace 30 vehicles over the grant period. Therefore, the cost to upgrade to hybrid vehicles is as follows:

Equipment:	<u>\$180,000</u>
	\$180,000

- 5) **Energy Improvements for High Priority City Buildings.** The results of the energy audits will better determine the cost of making the energy efficient building renovations. However, one project that has been identified is replacing the boiler at City Hall. The boiler was originally installed in 1965 and has exceeded its useful life. The City intends to install two smaller, more efficient, LEED conscious boilers that will use significantly less energy than the existing system. The proposed boilers (Lochinvar Power Fin boilers) are rated at 87% efficiency. This budget justification includes the costs of equipment and supplies, as well as labor for removal of existing units and infrastructure and installation of the updated equipment.

1. *New boilers- \$34,000.00*
2. *Pumps and piping - \$8500.00*

3. *Insulation* - \$2500.00
4. *Testing and Balancing* - \$4500.00
5. *Gas piping and VFD power venting* - \$7600.00
6. *Concrete* - \$2000.00

Equipment:	\$34,000
Supplies:	\$25,100
Contractual:	<u>\$70,800</u>
	\$129,900

Specific equipment, supplies, and contractual amounts are not yet available for the following retrofit preliminary budgets. These budgets were roughly estimated by distributing the remaining money in the EECBG grant on a square foot basis. The City of Troy is allowed to move money from one facility to another or from one project to another, without prior approval of the Department of Energy, and we expect these allotments to change upon receipt of the results from the Energy Audit project.

Preliminary Retrofit Budgets for included buildings:

- City Hall
(other than boiler) (130,030 sq. ft., 42.86%) \$101,040.82
- DPW Garage (61,500 sq. ft., 20.27%) \$47,789.05
- Fire Station 1 (6,616 sq. ft., 2.18%) \$5,141.01
- Fire Station 2 (5,072 sq. ft., 1.67%) \$3,941.24
- Fire Station 3 (8,700 sq. ft., 2.87%) \$6,760.40
- Fire Station 4 (4,911 sq. ft., 1.62%) \$3,816.13
- Fire Station 5 (6,000 sq. ft., 1.98%) \$4,662.35
- Fire Station 6 (6,600 sq. ft., 2.18%) \$5,128.58
- Nature Center (8,184 sq. ft., 2.70%) \$6,359.44
- Library (44,630 sq. ft., 14.71%) \$34,680.09
- Police/Fire Training (21,136 sq. ft., 6.97%) \$16,423.89

Total retrofits
(all buildings, not including City Hall Boilers): \$235,743.00

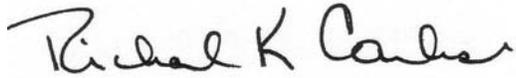
Project Total:

City Hall Boiler project	\$129,900.00
Retrofits	\$235,743.00

Total Retrofit Budget all projects: \$365,643.00

*City of Troy EECBG
August 19, 2010*

CARLISLE/WORTMAN ASSOC., INC.

A handwritten signature in black ink that reads "Richard K. Carlisle". The signature is written in a cursive style with a large, prominent "R" at the beginning.

Richard K. Carlisle, PCP, AICP
President



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MEMORANDUM

TO: City Council

FROM: Richard K. Carlisle

DATE: August 18, 2010

RE: Rapid Energy Assessment Program (REAP)

The City of Troy engaged Carlisle Wortman Associates (CWA) to conduct our proprietary process, the Rapid Energy Assessment Process (REAP) in 2009. This process was designed by our firm to help communities analyze many different areas of energy use and compare them in order to better understand their energy bottom line. Also, the REAP process allows the City to quickly identify those areas where it can save the most energy for the least amount of investment, thereby yielding the greatest possible results. Using a unique scoring calculus and a large bracket-style program, the REAP narrows the scope of the City's energy policy by eliminating areas of little concern in the City's unique position, while supporting those areas where the City could make the best possible impact.

The REAP process was conducted as part of, and funded by, the City's Energy Efficiency and Conservation Block Grant (EECBG). The EECBG required that the City develop an Energy Strategy. The Strategy was required to identify projects and anticipated savings within the bounds of the EECBG grant rules, and must also quantify economic development benefits, such as jobs created, that are made possible by grant dollars. While the City of Troy was well positioned to initiate this grant process, and the City's facilities management team had already taken great strides in advancing energy efficiency for existing buildings, the REAP took the analysis a few steps further. By expanding the scope of the program beyond facilities, the REAP was able to find other unique opportunities for energy and cash savings for the City, and also identify more clearly where the City was struggling to keep the lights on.

The REAP looked at four primary areas of municipal energy use: facilities, transportation, renewable energy opportunities, and energy policy. Each of these four areas was considered in two different ways; internally (those elements which affect the City's own bottom line), and externally (how is the issue treated within the community as a whole).

The first area of study, facilities, is self explanatory. With the work already done by the City's staff, a great deal of data was available to the project team. The facilities analysis resulted in a recommendation to hire a team of energy auditors with grant funding to make recommendations

on those buildings responsible for more than one percent of the City's overall energy budget. The grant would then fund projects designed to carry out those recommendations, thereby making the City's largest energy consuming facilities more efficient, saving the City money. The second area, transportation, looked at support for fuel efficient vehicles for City functions, as well as transportation policy to encourage mass transit and non-motorized transit. It looked at infrastructure development for non-motorized pathways and the City's policies on telecommuting, carpooling, etc. Renewable energy opportunities identified possible installations for various renewable energy facilities and considered them whether they would be modest in scale and owned by the City to offset some energy use at municipal buildings, or more broad in scope and be tied to utilities. It looked at private and public installations at a large scale, small scale, and a variety of different technologies. The final area, policy, makes recommendations on employee behavior, work flow and operations, and the City's long term planning policies.

The results of the REAP analysis are contained in the final REAP report you have been provided with. This report recommends a variety of projects, many of which are accomplished by the grant program we will present you tonight. The remaining projects can be integrated over time as the City moves forward with zoning, planning, and capital improvements decisions to make the City of Troy an energy leader.

CARLISLE/WORTMAN ASSOC., INC.



Richard K. Carlisle, PCP, AICP
President

City of Troy

DRAFT 5.6.10



Carlisle/Wortman 2010
Rapid Energy Assessment Process Report



Acknowledgments

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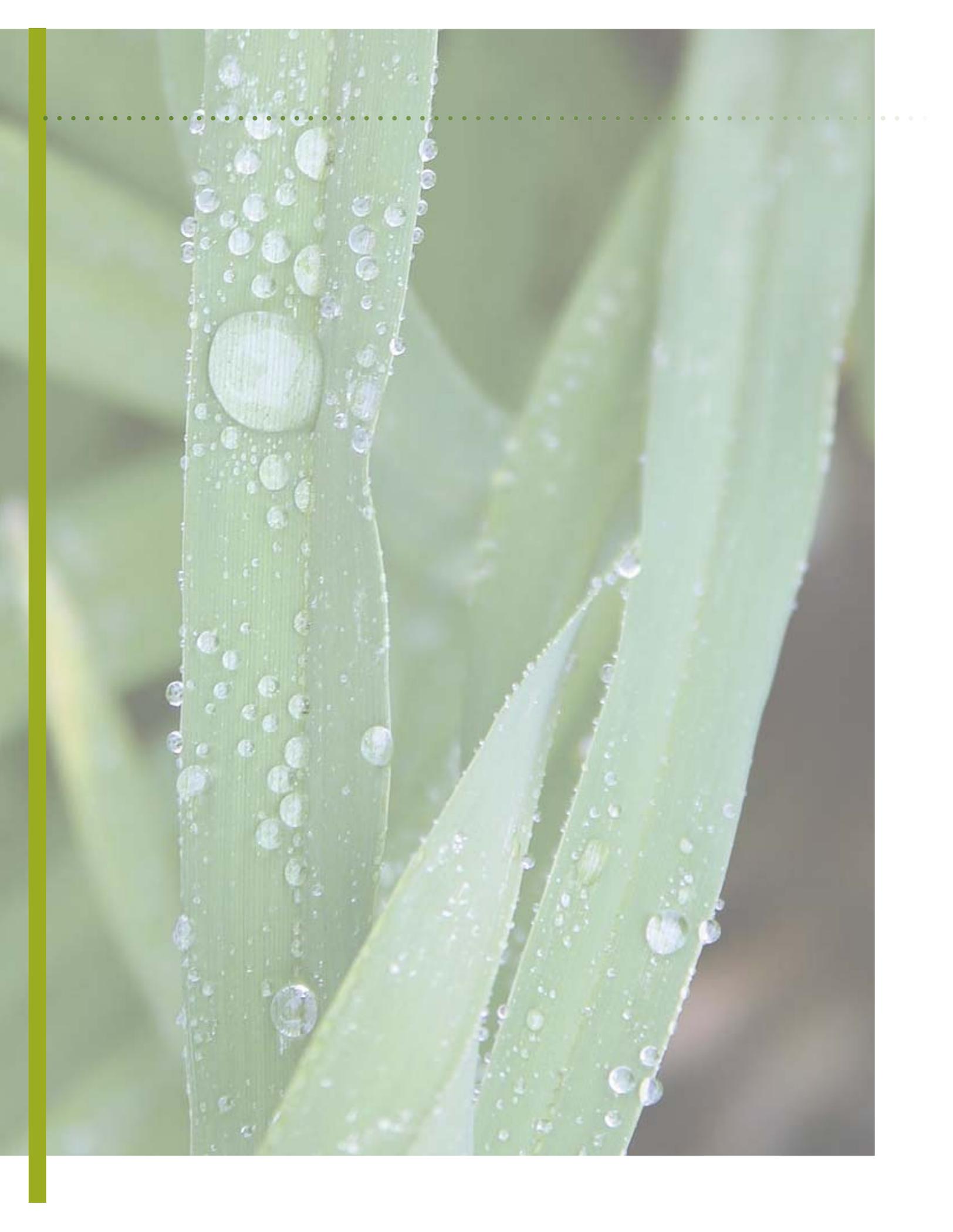
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Introduction

Energy has become a critical consideration for Michigan communities. As revenues decline, awareness of energy issues has grown. As communities compete for the best businesses and dollars, the most successful communities have made energy a primary component of their policy decisions. In order to support this shift, the City of Troy has implemented the Rapid Energy Assessment Process© (R.E.A.P.). The R.E.A.P will allow Troy to identify the most immediate energy-related areas in which the City can improve, and obtain the best benefit from any available grant funding. The R.E.A.P. will also help Troy effectively develop a conservation strategy and begin quantifying energy use to make the City more energy efficient over time. The R.E.A.P. will help by providing a baseline against which energy usage and savings can be compared. In many cases, the measures identified by the R.E.A.P. process may provide savings to the City of Troy without any special funding whatsoever.



Elements of REAP

The Rapid Energy Assessment Process includes the following assessment programs in four categories, each listed with summarized areas in which the City will be assessed:

1. Renewable energy

- Identification of alternative energy obstacles in local regulations
- Identification of the potential for wind, solar, and other alternative energy sources
- Analysis of existing use of energy and the source of that energy for municipalities

2. Policy

- Analysis of existing planning, zoning, and other regulations for energy issues
- Review of internal operations
- Review of local codes for obstacles to green building and site development

3. Building conservation

- Analyze existing municipal buildings for energy issues
- Review of existing building stock and infrastructure in a general survey to identify retrofit potential

4. Transportation

- Review local transportation options and municipal fleets for energy efficiency opportunities
- Analyze access to transit and non-motorized options

This document will contain the results and recommendations from the assessment process. The document will provide a list of recommended projects that require various levels of time and resources. Recommended projects will be prioritized according to several factors:

1. Funding availability: What activities are eligible for existing grant funding, or can be paid for with other sources of revenue?
2. Feasibility and data needs: How close is Troy to being able to complete this project? Is the necessary information available? Can energy use be quantified for this measure?
3. Required personnel: Can the project start and be completed with available personnel, can the project create jobs, or can contractors do the work?
4. Potential benefit: What is the benefit of this project, and does it justify the expense or effort when reviewed against other similar projects?

Ultimately, this document will distill the many options available into a smaller, more immediate collection of projects that can and should be pursued. The document will conclude with a summary of the Energy Efficiency and Conservation Strategy, whose projects were largely based on the results of this analysis.

The R.E.A.P. Report will serve as Troy's long-term plan for sustainable development and energy efficiency to ensure that Troy residents are able to realize the significant quality of life benefits that are on offer. The City of Troy feels it has a new opportunity for sustainable practices that enhance the community and allow it to compete in the national marketplace for 21st century jobs and workers. The connection between a sustainable economy and sustainable building and living practices has never been more urgent or apparent.

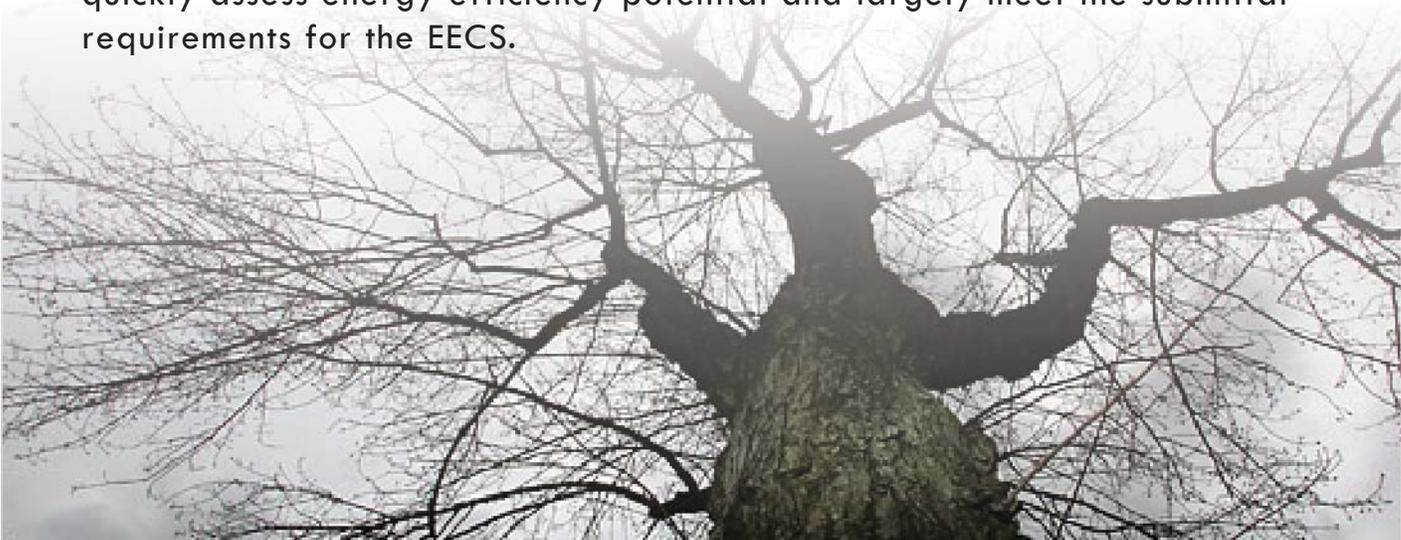
EECBG and the Energy Efficiency and Conservation Strategy Summary

In January 2007, the United States Congress passed the Federal Energy Independence and Security Act. That act most notably increased the Corporate Average Fuel Economy for automobile manufacturers by 2020. However, the bill also authorized a program called the Energy Efficiency and Conservation Block Grants (EECBG). These block grants were intended to provide money for a wide range of local government activities that:

- Reduce fossil fuel emissions
- Decrease total energy consumption
- Improve energy efficiency in transportation, building, and other sectors
- Spur economic growth
- Create and/or retain jobs

Although many groups had pushed for full appropriation of the EECBG program, it never passed the Senate. The program, however, found new life in 2009 as part of the American Recovery and Reinvestment Act. In the bill, \$2.8 billion was slated for EECBG disbursements to state and local governments, and another \$400 million for competitive grants through the Department of Energy.

EECBG grants were intended to provide money for projects such as developing energy conservation strategies, programs to conserve energy used in transportation, revising zoning requirements to promote energy efficiency, and developing non-motorized infrastructure and plans. The receipt of this money obligated the community to prepare an Energy Efficiency and Conservation Strategy (EECS) within 120 days from the time of the award, a short time frame. The R.E.A.P. allows communities to quickly assess energy efficiency potential and largely meet the submittal requirements for the EECS.



The Importance of the Energy and Land Use Connection

Local units of government have largely relied on state and federal programs to tackle the energy issues of today. However, as the EECBG demonstrates, it is the local units of government that the federal and state governments are relying on to actually execute energy efficiency and conservation programs.

Long-term energy efficiency and conservation must be clearly and directly tied to land use planning and community development. Compact, smart-growth, walkable communities are intrinsically energy efficient. The use of transit and non-motorized transportation are tremendous energy savers. Green building, low-impact development, transit-oriented development, and mixed-use projects all contribute to community-wide energy savings, and all are currently visible topics in community planning.

This clear connection reveals that energy planning and community planning should go hand-in-hand, and that with an affordable, easily implemented tool like the Rapid Energy Assessment Process, we have an opportunity to firmly implant energy planning into the everyday role of local government.



REAP Process Flowchart

1:

Communities take inventory of efficiency of their facilities/ community in preparation of effectively using money and qualifying for grants.

2:

Initial data is analyzed by the R.E.A.P. project team.

3:

R.E.A.P. project team develops an in depth critique of 63 areas of potential energy savings.

4:

Communities develop and implement an Energy Conservation Strategy.

5:

Reduction in costs, CO2, air pollution.

6:

The City is now well positioned for energy funding.

Energy Measures _internal measures

RENEWABLE ENERGY

I.RE.1.a	Solar energy generation on government facilities: photovoltaic	20
I.RE.1.b	Solar energy generation on government facilities: thermal	20
I.RE.2.a	Wind energy generation on government facilities: on site generation	23
I.RE.2.b	Wind energy generation on government facilities: utility scale generation	11
I.RE.3	Landfill gas collection	18
I.RE.4	Hydroelectric generation	0
I.RE.5	Geothermal heating and cooling for government facilities	19

POLICY

I.P.1	Create an energy program manager position	20
I.P.2	Create an energy efficiency improvement revolving loan fund	16
I.P.3.a	Operations: adopt a municipal operations energy practices policy	25
I.P.3.b	Operations: conduct regular departmental energy reports and training	25
I.P.4.a	Conduct comprehensive municipal operation energy tracking	25
I.P.4.b	Adopt comprehensive quantitative operation energy reduction targets	24
I.P.5	Purchase renewable energy credits	10
I.P.6	Participate in utility provider renewable energy programs	13
I.P.7	Obtain membership with national organizations to reduce energy use	15
I.P.8	Consider alternative scheduling (such as a 4 day work week)	22
I.P.9	Implement technologies for remote work and meeting capabilities	15
I.P.10	Implement hoteling concept in municipal facilities for multi-use capability	17
I.P.11	Adopt LEED requirement policy for new municipal buildings	11

BUILDING CONSERVATION

I.BC.1	Reduce heat island effect of municipal facilities	22
I.BC.2	Reduce light pollution for municipal facilities	25
I.BC.3	Install native and water efficient landscaping at municipal facilities	22
I.BC.4	Reduce wastewater at municipal facilities (reduce, reuse, recycle)	24
I.BC.5	Reduce potable water use at municipal facilities	24
I.BC.6	Obtain energy audits for municipal facilities	25
I.BC.7	Install automatic lighting controls	25
I.BC.8	Install building insulation	25
I.BC.9	Incorporate passive solar heating	16
I.BC.10	Install new natural daylighting elements (solar tubes, skylights, etc.)	23
I.BC.11	Install energy efficient light fixtures	25
I.BC.12	Install natural ventilation systems	17
I.BC.13	Purchase energy efficient appliances	25
I.BC.14	Increase efficiency of heating and cooling systems	25
I.BC.15	Adopt a policy to purchase local materials	20
I.BC.16a	Adopt a policy to use 100% recycled paper	22
I.BC.16a	Adopt a policy to use environmentally friendly office supplies	22

TRANSPORTATION

I.T.1	Encourage and incentivise alternative transportation commuting (bicycle, walking, transit, etc.)	16
I.T.2	Encourage and incentivise carpooling	23
I.T.3	Replace police vehicles with more fuel efficient units	24
I.T.4	Purchase diesel powered vehicles and equipment (fuel with biodiesel)	19
I.T.5	Provide hybrid or alternative fuel vehicles for municipal use	25
I.T.6	Adopt average fuel economy standard	23
I.T.7	Provide priority parking for hybrid or alternative fuel vehicles	25
I.T.8	Provide secure, sheltered bicycle storage and showers for employees	22
	Conduct life-cycle analyses when purchasing new vehicles	22

Energy Measures _external measures

RENEWABLE ENERGY

E.RE.1	Permit and create incentives for solar energy generation	17
E.RE.2	Permit and create incentives for geothermal energy generation	17
E.RE.3.a	Permit and create incentives for wind energy on-site	17
E.RE.3.b	Permit and create incentives for wind energy for utility scale applications	15

POLICY

E.P.1	Adopt zoning provisions promoting energy efficiency	25
E.P.2	Adopt master plan provisions promoting energy efficiency	25
E.P.3	Organize urban gardening programs	19

BUILDING CONSERVATION

E.BC.1.a	Waste reduction: encourage construction waste recycling	16
E.BC.1.b	Provide recycling facilities	12
E.BC.2	Develop a green building guideline guidebook or manual for the community	20
E.BC.3	Implement expedited permitting for green building projects	18
E.BC.4	Provide density bonuses for energy efficient development	25
E.BC.5	Provide education for and promotion of builders developing green building competency and proficiency	24

TRANSPORTATION

E.T.1	Adopt a non-motorized transportation plan	15
E.T.2	Install bike lanes	23
E.T.3	Increase public transit ridership with incentives and improved facilities	12
E.T.4	Create incentives for transit-oriented developments	23



FEASIBILITY	DATA/ ANALYSIS NEEDS	FUNDING AVAILABILITY	REQUIRED PERSONNEL	POTENTIAL BENEFIT
3	4	3	4	3
3	4	3	4	3
3	4	3	4	3
1	4	3	4	3
5	5	5	5	5
5	5	5	5	5
4	4	4	5	2
3	4	5	3	1
0	2	5	5	0
3	5	4	4	4
1	4	5	4	4
5	5	5	5	5
5	5	5	4	5
1	5	3	5	1
3	5	5	5	5
1	4	2	3	2
5	5	5	5	3

RAPID ENERGY ASSESSMENT PROCESS



High Priority Recommended Measures:

Internal Measures

- Operations: adopt a municipal operations energy practices policy
- Operations: conduct regular departmental energy reports and training
- Conduct comprehensive municipal operation energy tracking
- Adopt comprehensive municipal operation energy goals
- Reduce light pollution for municipal facilities
- Reduce wastewater at municipal facilities
- Reduce potable water use at municipal facilities
- Obtain energy audits for municipal facilities
- Install automatic lighting controls
- Install building installation
- Install energy efficient light fixtures
- Purchase energy efficient appliances
- Increase efficiency of heating and cooling systems
- Replace police vehicles with more fuel efficient units
- Provide hybrid alternative fuel vehicles for municipal use
- Provide priority parking for hybrid or alternative vehicles

External Measures

- Adopt zoning provisions promoting energy efficiency
- Adopt master plan provisions promoting energy efficiency
- Provide density bonuses for energy efficient development
- Provide education for and promotion of builders developing green building competency and proficiency

High Priority Measures

There are 16 internal measures and 4 external measures which the REAP analysis has graded “high priority.” The complete descriptions of these measures are found within the measure worksheets later in this report. The High Priority Measures include a few projects related to management of the City’s existing resources and energy obligations. The first four High Priority Measures are:

1. Adopting an energy practices policy
2. Conducting regular energy reporting for buildings and departments
3. Doing comprehensive energy tracking
4. Setting of energy goals

These measures require little more than a shift in policy and an acknowledgement that energy has become a top priority. While there may be a requirement of additional staff time and some basic software and equipment, these measures are much easier to implement and set the tone for the others in the REAP Report and the City’s Energy Efficiency and Conservation Strategy.

The next major batch of High Priority Measures is related to the wasting of energy within City buildings. Water conservation, reducing light pollution, enhancing the building envelope and taking advantage of free sources of energy from nature are all accounted for in this series of measures.

Besides buildings, the City uses a great deal of resources on running equipment and vehicles. Given the proven viability of energy efficient applicants and hybrid vehicles, which have been analyzed over time by the City’s Fleet Manager, the REAP revealed that there are several areas where the City can achieve rapid savings as it replaces aging cars, trucks, and equipment.

The remaining High Priority Measures are primarily related to policy issues. Incentivizing the use of hybrid vehicles with priority parking, for instance, is a cheap and visible way to promote energy efficient vehicle adoption. The other, more widespread policy issues like master plan and zoning provisions incentivize energy efficiency with density bonuses and PUD consideration, and excellent and powerful tools to promote energy efficiency and conservation within the community.

Low Priority Recommended Measures:

Internal Measures

- Solar energy generation on government facilities: photovalic
- Solar energy generation on government facilities: thermal
- Wind Energy generation on government facilities: on site generation
- Landfill gas collection
- Geothermal heating and cooling for government facilities
- Create an energy program manager position
- Consider alternative scheduling
- Reduce heat island effect of municipal facilities
- Install native and water efficient landscaping at municipal facilities
- Install new natural daylighting elements
- Adopt a policy to purchase local materials
- Adopt a policy to use 100% recycled paper
- Adopt a policy to use environmentally friendly office supplies
- Encourage and incentivise carpooling
- Purchase diesel powered vehicles and equipment
- Adopt average fuel economy standard
- Provide secure, sheltered bicycle storage and showers for employees
- Conduct life-cycle analyses when purchasing new vehicles

External Measures

- Organize urban gardening programs
- Develop a green building guideline guidebook or manual for the community
- Implement expedited permitting for green building projects
- Install bike lanes
- Create incentives for transit-oriented developments

Low Priority Measures

There are 18 internal measures and 5 external measures which the REAP analysis has graded “low priority.” These are measures which have merit, and would provide a benefit to the City, but which may have a higher cost barrier for entry, may not be eligible for grant funding, or may have a less aggressive payback period. In other words, while positive, they are not as immediate as those in the High Priority category.

The first few measures are all related to renewable energy production for local government facilities. Renewable energy, especially in Southeast Michigan (where reliable wind and solar are scarce) has a lower payback generally than many areas around the country. However, renewables are explicitly encouraged by the EECBG program and do provide a visible, dependable payback, even if it is a slow one. One specific measure, on-site wind energy generation, received a grade of “Low Priority” for the reasons noted above, but was still included in the City’s EECBG Strategy because of its low cost and very visible nature. Therefore, even though it will produce a somewhat nominal amount of actual energy, it will provide significant benefits in monitoring turbine performance, creating a visible commitment to renewables for the City, and supporting the Michigan economy (the specified turbines are manufactured here).

The next collection of measures is related to policy. Creation of a new energy manager position, for instance, is a good idea but a difficult one to implement in the City’s current state of reducing workforce. Also, some cultural issues that would be beneficial may take time to implement and could complicate delivery of City services, like reducing the workweek.

There are also a few measures related to site and building enhancements that may be beneficial, but harder to implement, less reliable, or not as applicable as others in the City’s unique circumstances.

The main bulk of external measures in the Low Priority category have to do with incentivizing and providing resources for green building in the City. These are excellent ways to help the City redevelop in a sustainable manner, but could be complicated by the current down market and limited resources of the City.

Measures not recommended:

Internal Measures

- Wind energy generation on government facilities: utility scale generation
- Hydroelectric generation
- Create an energy efficiency improvement revolving loan fund
- Purchase renewable energy credits
- Participate in utility provider renewable energy programs
- Obtain membership with national organizations to reduce energy use
- Implement technologies for remote work and meeting capabilities
- Implement hoteling concept in municipal facilities for multi-use capability
- Adopt LEED requirement policy for new municipal buildings
- Incorporate passive solar heating
- Install natural ventilation systems
- Encourage and incentivize alternative transportation commuting

External Measures

- Permit and create incentives for solar energy generation
- Permit and create incentives for geothermal energy generation
- Permit and create incentives for wind energy on-site
- Permit and create incentives for wind energy for utility scale applications
- Waste reduction: encourage construction waste recycling
- Provide recycling facilities
- Adopt a non-motorized transportation plan
- Increase public transit ridership with incentives and improved facilities

Measures not Recommended

There are 12 internal measures and 8 external measures which the REAP analysis has graded “not recommended.” These are measures which have little merit or political will, would not be practical for a local unit of government to deliver, or which are infeasible for one of many reasons within the City of Troy. These measures may have merit in other circumstances, or as circumstances within Troy evolve, but currently rank far lower than the High and Low Priority measures mentioned previously.

The first two measures relate to utility scale energy generation using wind or hydroelectric power. The City is not a primary utility provider, and has no moving water sufficient for hydroelectric generation. Also, the City’s wind energy potential and relatively high land costs would not be conducive to utility scale wind energy generation on very large turbines.

The next four measures that are not recommended rely on having excess funding available, and none of them offer an immediate payback. Membership in education organizations, developing a revolving loan fund, purchasing renewable credits and renewable energy from our utility provider all have some merit, but not in relation to other stronger measures in this analysis.

Other measures related to City facilities have weak applicability, like “hoteling” and remote work facilities. The City’s delivery of services relies on first-person interaction that is not conducive to remote work, and the main City functions are centralized, reducing the hoteling benefit. The most expensive and difficult building improvements, as well as a policy requiring LEED certification, are also not recommended for the obvious reasons of cost and complication in Troy.

Permitting and incentivizing renewable energy production fall to this status because the City already allows for renewable facilities, reducing the need to pursue these measures, and no immediate resources exist to promote or incentivize them. The final measures that are not recommended have to do with developing expanded recycling capabilities, which is not applicable given the easy access City residents and businesses already enjoy to these services. Extensive resources devoted to alternative transportation enhancement are also not recommended until the regional transit infrastructure is improved.

How to Read Measure Worksheets

Assessment area headings



Feasibility

Data/Analysis Needs

Measure Title will be located here

This first box will contain a brief introduction to the measure being analyzed. It will also describe the local context under which a measure could be considered.

The feasibility of the measure will be assessed in light of budget issues, environmental factors, procedural obstacles, or other factors that would make the pursuit of the measure possible or would indicate that the measure should not be pursued.

Many measures require some sort of data or analysis to implement. In many cases, the data has already been compiled or is available. In some cases, the lack of data may reduce the feasibility of a measure.

X

X

I.RE.1.a

This is the measure's number. The number is derived from four sources:

- *Internal or External Measure: I or E*
- *Renewable Energy, Policy, Building Conservation, or Transportation: RE, P, BC, or T*
- *The number within the assessment area: 1, 2, 3, etc.*
- *Subitem within a measure (for example, wind energy has two subitems): a, b, etc.*

Funding Availability

Primarily, this section will discuss whether or not a measure could be funded by immediate sources, such as the Energy Efficiency and Conservation Block Grant program. It may also refer to other potential sources of funding or describe potential revenue the measure could generate.

X

Personnel/Resources

This section will describe if existing staff or consultants can complete the measure, or if the measure will create jobs or require special assistance.

X

Potential Benefit/ Impact

This final assessment area will describe the anticipated benefit in the specific case of the City of Troy. Mostly, it will describe if savings can be expected for the City's bottom line, but it may also describe if there are benefits that would directly support the long term goals of the City, even if no energy savings are anticipated.

X

Total Score: **XX**

Assessment area scores

Total measure score



Internal Measures

The internal measures are those measures which have a direct impact on the day-to-day operation of the local unit of government. These measures deal with the administration, typical workplace policies, long term planning, physical plant obligations, transportation, and other issues that are under the umbrella of local government. These areas require a local unit of government to consider its energy obligations carefully in the face of fluctuating prices and availability of fuel and other resources. These measures will assist the community in developing effective energy policies and strategies for reducing dependence on energy in many areas.

Measure Worksheets

_internal
measures

Solar Energy Generation: Photovoltaic

Solar photovoltaic (PV) energy is a renewable form of electricity produced from converted sun energy. In most applications, solar PV is tied directly into a building's electrical system through a DC to AC inverter. Relative to other forms of electricity, both conventional and renewable, solar PV is not always cost effective. However, solar PV has huge potential due to its ease of operation, lack of moving parts, and its appropriateness for nearly any site. Solar PV remains an important part of future renewable energy development. As advances in solar PV continue to reduce the marginal cost of electricity it produces, solar PV will continue to increase in use across the world.

Feasibility

Solar energy has less of a payback in Michigan than it could in climates with a greater number of sunny days. However, given the efficiency gains in modern solar PV equipment, the payback for PV installations is more realistic than ever. That being said, solar is a proven technology that may not be ideally suited in small installations in Michigan when compared with other renewable systems.

3

Data/Analysis Needs

12-24 months of electric bills for each facility to determine appropriate PV installation size. Facility site plans, roof pitch, orientation, nearby obstructions, etc. required to site potential PV equipment.

5

I.RE.1.a

Solar Energy Generation: Thermal

Solar thermal energy is a renewable energy that converts sun energy into heat. Typically, solar thermal technology is used to heat a building's hot water, and reduce the amount of natural gas or electricity that would normally fulfill this function. It is an efficient, inexpensive form of renewable energy which is easy to implement in new construction or in retrofits. Financially, solar thermal systems make the most sense in buildings that heat a lot of water, such as pools, firehouses and correctional facilities, or buildings that use water for radiant heat. They are an especially effective investment when a building is due for an old water heater or boiler replacement.

Much like solar PV, solar thermal equipment is limited by the overall solar energy we have access to in a predominantly cloudy northern environment. Solar thermal equipment, however, is efficient in ways that solar PV is not. For instance, the heat is immediately transmitted from the sun to the water, where in a PV installation, the solar energy is transmitted into electricity which is then used to

3

power something else, creating a "middleman."

12-24 months of water bills for each facility and summer months' natural gas bills. With summer gas bills, one can remove natural gas used to heat buildings from the equation and determine the potential energy savings for a solar thermal installation.

5

I.RE.1.b

Funding Availability

Solar PV currently qualifies for tax breaks (30% of cost) for individuals, with no maximum. EECBG entitlement communities can use grant money to purchase Solar Photovoltaic equipment or use money from an energy revolving loan fund. Funding may also be available from service-specific revenue sources as they are reinvested. For instance, parking fees are

reinvested in PV powered parking meter stations.

5

Personnel/Resources

Facility utility bills can be furnished by the finance department or by a facilities manager. Maintenance personnel will also be necessary to help determine the age of existing equipment and a possible site for the solar collector (typically on the roof of a commercial or office building). Solar PV equipment must be installed by a qualified contractor.

4

Potential Benefit/ Impact

While expensive, Solar PV is deployable in most situations. Without noisy moving parts, it is suitable for rural, suburban or urban settings. Even grey places, such as Portland, Oregon, have extensively deployed PV systems. Solar PV may still require a significant pay back period, but it offers a visible commitment to renewable energy and can serve as a demonstration for the public.

3

Total Score: 20

Solar thermal qualifies for tax breaks for individuals, up to \$3,000. EECBG entitlement communities can use grant money to purchase solar thermal equipment or use money from an energy revolving loan fund.

5

Facility utility bills can be furnished by the finance department or by a facilities manager. Maintenance personnel will also be necessary to help determine the age of existing equipment and a possible site for the solar collector (typically on the roof of a commercial or office building). Solar thermal equipment must be installed by a qualified contractor.

4

With an investment of a few thousand dollars, solar thermal systems can significantly reduce natural gas used to heat water and the corresponding CO2 emissions. Depending on how intensive a building's hot water use is, solar thermal systems can pay themselves back in just a few years.

3

Total Score: 20

Measure Worksheets

_internal
measures

Wind Energy Generation: On-Site

Sited near or on the building they serve, small wind turbines turn to convert wind energy to electricity, effectively reducing the amount of electricity from fossil fuels that a building uses. Small “private” use turbines are tied into a building’s electrical system and provide electricity only to one building, or to a group of buildings. Under the right circumstances, turbines are as cost effective as conventional fossil fuel electricity. Modern private turbines can provide a positive return on investment in 5-10 years given proper conditions. The effectiveness of wind power is highly dependent on site conditions, and prevailing electric utility rate structures. A variety of incentives are possible, such as offering income tax credits, property tax exemptions, coverage of a percentage of the installation cost, and rebates.

Feasibility

The installation of on-site wind energy systems is becoming more and more feasible as the renewable energy industry continues to innovate with regard to system design and manufacture. Several companies in Michigan produce small wind systems and technicians are readily available, especially for residential-grade systems. Given the relatively small amount of energy they produce, they are

5

ideally suited to small buildings and installations.

Data/Analysis Needs

12-24 months of electric bills for each facility to determine appropriate wind turbine installation size. Facility site plans, roof pitch, orientation, nearby obstructions, etc. required to site potential wind turbine equipment.

5

I.RE.2.a

Wind Energy Generation: Utility Scale

Utility-scale wind turbines are large machines that use wind power to create electricity for more than one home, business or facility. They are hundreds of feet in height and require a team of professional engineers to plan for their installation. Utility-scale wind turbines can provide power for two to three hundred homes when producing near their peak performance. Governments with large tracts of land can enter into contracts with wind developers to rent their land or they can develop the turbines themselves and arrange for the sale of the electricity to an electrical utility. Large facilities such as manufacturing plants can construct utility scale turbines and use the entirety of the electricity produced. However, excess electricity generated can be sold into the grid.

The wind energy potential for many sites in Michigan are excellent, but within Troy very little potential exists. This, and given the relatively high property costs within Troy when compared with more rural areas with higher wind energy potential, make installation of a large-scale turbine or turbines highly unlikely.

1

Extensive wind data must be collected for a specific site for potential wind energy projects. This data collection requires that a meteorological tower be erected with an anemometer installed. This type of study is time consuming and potentially expensive.

1

I.RE.2.b

Funding Availability

Private wind turbines qualify for tax breaks (30% of cost) for individuals, with no maximum. EECBG entitlement communities can use grant money to purchase wind turbine equipment or use money from an energy revolving loan fund. As with solar energy, wind energy offers a predictable, dependable savings on energy bills. There are financial mechanisms available that allow low interest loans to be paid back with these future savings over a number of years.

5

Personnel/Resources

Facility utility bills can be furnished by the finance department or by a facilities manager. Maintenance personnel will also be necessary to escort trained personnel around a site to determine site appropriateness. Qualified contractors will install wind energy systems and municipal staff should be trained how to maintain it.

5

Potential Benefit/ Impact

Wind power has the highest energy per dollar invested ratio of any available electricity-producing renewable energy. A well sized system, on an adequate site with rate mechanisms that allow excess electricity to be "sold" back to the utility can effectively reduce fossil fuels by as much as 50%. In many cases, private wind turbines can pay for themselves in 10 years or less.

3

Total Score: 23

Utility scale wind energy systems are typically developed by private, for-profit enterprises. Occasionally, these enterprises may partner with municipalities.

3

Manpower for the design, installation, and monitoring of wind energy systems is typically the responsibility of the private enterprise that owns them. There are available professionals locally, and there are plenty of technically trained potential employees that could be retrained for wind energy work.

3

The payback for commercial-scale wind energy systems varies widely. Even if the wind energy potential was high enough to justify an installation, there is little benefit to the City as a financial entity, given that commercial systems are generally privately owned. Environmentally, there is a considerable benefit to large-scale renewable energy production.

3

Total Score: 11

Measure Worksheets

_internal
measures

Landfill Gas Collection

Landfills can be an asset that have largely been considered a liability. Garbage deposited in landfills decomposes, and as it does, it lets off gas. Roughly 50% of this gas is carbon dioxide and the remaining 50% is methane. Less than 1% of the gas emitted from landfills is other organic compounds, with trace amounts of inorganic chemicals. This methane can be used to generate electricity or heat in nearby buildings. Since the garbage is “free” to the municipality, the source of electricity is free as well. An infrastructural investment is necessary to harness and use the gas.

Feasibility

The City of Troy has an existing capped landfill that was redeveloped as a golf course. While potential may exist to capture emissions, it would take a high investment in terms of study and analysis, as well as ultimately of equipment and infrastructure, to initiate a program. Consequently, the potential for this measure is relatively low.

Data/Analysis Needs

A technical analysis will have to be done to assess the feasibility of a system as well as potential costs and revenues.

3

2

I.RE.3

Hydroelectric Generation

Hydroelectricity is electricity generated by harnessing the gravitational energy of falling water. The most widely used form of renewable energy, hydroelectric generation accounts for about 20% of the world's electricity. Water is dammed, and as it sits, it builds up potential energy. Once released, the water flows over a turbine, turning the rotary blades of the turbine which rotates attached electromagnets, generating a current which goes through a transformer. Energy is then transmitted over power lines. The flow of the water must be controlled and monitored, but the process takes advantage of water falling down large drops in elevation.

There is no river or other moving water in Troy of sufficient flow to justify a hydroelectric system for electricity generation.

Flow data and technical analysis of potential and demand, cost estimates, and other information would be needed were there a body of water sufficient to justify a hydroelectric system.

0

0

I.RE.4

Funding Availability

An upfront infrastructural expenditure is needed, but in most cases, a landfill gas (LFG) system will pay for itself quickly by recouping savings on utility bills. LFG systems' cost effectiveness greatly depends on the cooperation of the electrical utility with rates for excess electricity produced. Now that Michigan has a Renewable Portfolio Standard, utility

5

companies should be willing to help establish a LFG system.

Personnel/Resources

The installation of a methane capture system would take a team of specialized contractors and designers. However, once installed, the City's existing public works department could likely manage and operate the system with some training.

3

Potential Benefit/ Impact

A landfill gas system produces electricity or heat without creating extra CO2 emissions from fossil fuel power plants, thus offsetting these CO2 emissions. It also reduces the amount of methane that would otherwise escape into the atmosphere. Additionally, LFG systems provide revenue for the owner of the gas and savings for end users. Landfill gas systems

5

have a 25 year track record of safety and dependability.

Total Score: 18

Funding for hydroelectric systems is often complex because such systems may produce excellent renewable energy, but they can also have a severe and potentially negative impact on ecosystems.

0

Specially trained employees are required to design, install, and operate a hydroelectric system, although this is not applicable in Troy.

0

There are no potential projects in Troy for hydroelectric generation, and therefore no potential benefit to considering one.

0

Total Score: 0

Measure Worksheets

_internal
measures

Geothermal For Government Facilities

Geothermal systems use ground source heat pumps to extract or return heat to the earth. Below 6 feet or so, the earth stays at a relatively constant temperature. By running liquids through pipes dug into the earth, a building can be cooled off in the summer and heated in the winter. This form of geothermal technology is an effective and predictable form of energy. It is also one of the most cost effective forms of renewable energy available. Ground source technology is most appropriate in applications where a building has an ample amount of land to run pipes underground. Ground source geothermal technology can be retrofit to existing buildings, and used in new construction.

Feasibility

Geothermal systems are not new technology, they have been installed in many circumstances around the country. They are gaining widespread acceptance of late due to escalating energy costs and a focus on green building. The cost may be initially high, and they can consume a great deal of land, so they are not an energy source without compromise. The City could consider geothermal systems

4

to shed some load at certain buildings or in new construction in the future.

Data/Analysis Needs

12-24 months of electric and gas bills for each facility to determine economic feasibility and run cost/benefit analysis. Building area, and construction type to determine necessary size of system. Site plans to determine if there is room for a geothermal system.

3

I.RE.5

Energy Program Manager Position

The communities with the most success conserving energy, saving money, and reducing CO2 emissions all have one person in charge of coordinating energy initiatives for the entire organization. This person is responsible for coordinating internal energy savings measures for building facilities, educating staff, the public and elected officials, and being an advocate for programs that can reduce CO2 emissions and save money. This position is vitally important and has been shown to pay for itself through energy savings, reduction of duplicative services, and interdepartmental coordination.

In order to determine feasibility for this measure in a community, political will, existing work patterns and municipal operation must be reviewed and gauged. Typically, funding for a new position is the most inhibiting factor. Often the energy program manager duties are added to an existing role.

3

An overall organization structure schematic detailing how the energy program manager can become involved in practices around the municipality.

5

I.P.1

Funding Availability

Ground source heat exchangers currently qualify for tax credits (30% cost) for individuals, with no maximum. EECBG entitlement communities can use money from grants or from an energy revolving loan fund to purchase equipment. Grants from State Energy Offices are often available for renewable energy programs. Ground source heat exchangers are a very economical investment, often paying for themselves in just a few years (8-10 year payback.)

4

Personnel/Resources

The installation and design of geothermal systems require qualified trained personnel. Once installed, the systems require very little additional manpower or support. Design and installation can require a great deal of personnel time and effort, and could be expensive.

4

Potential Benefit/ Impact

Geothermal Energy could reduce the impact of building energy consumption by a significant amount in an economically sound manner. In Troy, ground source technology may pay for itself in around 8 years. Further, with a lifetime of 20-30 years or more, maintenance costs are also greatly reduced. Therefore the potential benefit is high, but slightly offset by the high cost in a time when the City has fewer financial resources.

4

Total Score: 19

The Energy Program is generally paid for from a departmental or general fund budget. The EECBG program authorizes funding for administration of energy programs related to EECBG grants. In smaller communities, existing employees with an appropriate skill set could be tasked to perform energy program management duties on a part time basis.

3

The energy program manager needs consistent support from management and elected officials. The nature of the position invites criticism from those concerned with budgets in the short term and who do not see its long term benefit and necessity. Creation of the position requires a leader to educate the organization of the position's benefits and to outline quantifiable goals in order to avoid second guessing the position's importance.

5

The impact of an energy program manager depends on several factors, including resources provided, size of the organization, performance of individuals, and the will of elected officials. A well-positioned energy program manager, can bring in grant funds, save money, raise awareness in the community, change an organization's culture and make significant reductions in CO2 emissions and energy costs.

4

Total Score: 20

Measure Worksheets

_internal
measures

Energy Efficiency Loan Fund

Energy efficiency revolving loan funds provide loans to developers to “buy down” the interest rate on loans for eligible energy efficiency projects in conjunction with commercial, industrial, and institutional property operations. Varying types of financial assistance could be made available, and will vary by community. The purpose of this type of revolving loan is to encourage businesses and institutions to upgrade building shells and mechanical and electrical systems to exceed minimum energy efficiency standards, and to upgrade equipment and processes to make operations more energy efficient. Eligibility standards, inspections, and program monitoring are essential to a successful energy efficiency revolving loan fund program.

Feasibility

The feasibility of revolving loan funds vary by community and situation. Grant money in the EECBG program could fund this initiative, as could general fund dollars. However, the City is currently without surplus to accomplish this. Without a guaranteed funding source of sufficient size so as to make the program worthwhile, it is feasible, but not highly feasible.

2

Data/Analysis Needs

An in-depth analysis of financial and legal issues would be required to establish a revolving loan fund. This is easily achieved by the City’s existing staff and consultants.

5

I.P.2

Municipal Operations Energy Practices

A municipal operations energy practices policy is a document adopted by the elected governing body or mandated by an administration. It covers general daily practices and instructs employees how to manage certain activities. A typical policy will cover such procedures as purchasing environmentally friendly materials, recycling where possible, not idling vehicles, restricting the use of space heaters and turning off lights and computers, among other guidelines.

This measure is easily accomplished by the City facilities management team and human resources professionals. It requires very little investment for a potentially great return, as it establishes a culture of saving energy without installing new equipment or major renovations.

5

In order to quantify energy savings, this measure would require information about existing energy consumption by building and department, if possible. Mostly, the accomplishment of the measure would require a solid understanding of all areas where employee behavior effects energy.

5

I.P.3.a

Funding Availability

While not specifically mentioned in the legislation of the Energy Efficiency and Conservation Block Grant program, this measure is in line with the intention of the bill.

3

Personnel/Resources

This measure is best managed by existing City financial and legal personnel, but would also likely require an outside professional to accomplish. The project would require a great deal of effort on the part of staff, which is already at capacity in terms of productivity and workload. While personnel is available, adjustment may be required to proceed.

3

Potential Benefit/ Impact

Energy efficiency revolving loan fund programs facilitate interest rate reduction on loans to customers for the purchase of energy saving products, technologies and services. There is a great deal of benefit to the business receiving the loan, and the City will reduce its overall energy use community-wide, however, no immediate reduction in the City's energy bottom line is to be anticipated.

3

Total Score: 16

Existing staff, often with the help of consultants or other outside resources such as those published by other municipalities, can lead the development of a best practices policy. They should enlist management for other employees and elected leaders to establish the right set of policies. Because existing staff can be used, extra resources will not be needed.

5

Existing staff can produce this policy without a great deal of external help.

5

Individual daily decisions contribute to building energy use as well as indirect energy costs absorbed by other organizations. For instance, by simply enabling computer power management (monitor shut-off, etc.), an organization can save approximately \$60 per year per computer in electricity costs. This is but one example of how a simple set of policies can greatly reduce costs and energy consumption.

5

Total Score: 25

Measure Worksheets

_internal
measures

Regular Energy Reports + Training

Implement a system for reducing the amount of energy use per facility by engaging employees to encourage them to take responsibility for their actions at work. Includes establishing and energy leader/champion/team, organizing power usage details, reporting power usage details, creating consensus use reduction goals, regularly reporting results, recording strategies for improvement, and recognizing individual achievement.

Feasibility

This measure is easily accomplished by the City facilities management team and human resources professionals. It requires very little investment for a potentially great return, as it establishes a culture of saving energy without installing new equipment or major renovations.

5

Data/Analysis Needs

Baseline energy data for the City's existing costs. This information was collected as part of this process. Baseline and ongoing data is being monitored and managed by the City's facility management team.

5

I.P.3.b

Comprehensive Energy Tracking

Recording, tracking and analyzing municipal energy use and costs involves compiling data obtained by your utility provider and fleet services company. Primarily, this involves recording information from electric and gas bills per facility, and recording fuel usage of municipal vehicles by vehicle and by driver. Over time, data can be analyzed to determine such things as where energy and money are being wasted, which departments and buildings create the most CO₂, identify options to reduce energy use and save money, and report results and progress. In smaller operations, simple spreadsheets can be used. In larger operations, databases offer a more powerful set of analysis options.

This measure is easily accomplished by the City facilities management team. It requires very little investment for a potentially great return, as it establishes a culture of saving energy without installing new equipment or major renovations. It also helps with capital expenditures planning.

5

Provide the number of facilities, vehicles and annual energy budget to determine the level of sophistication recommended for sound energy management.

5

I.P.4.a

Funding Availability

Existing staff can lead the development of a regular reporting regime. Because existing staff can be used, extra resources will not be needed.

5

Personnel/Resources

Existing staff can produce this policy without a great deal of external help.

5

Potential Benefit/ Impact

Information is required to justify future expenditures or recognize energy savings. Good data can facilitate successful grant applications and allow the City to adjust its budget for energy costs. Just by closely monitoring costs, inefficiencies or seasonal fluctuations are often recognized and projects can be chosen to have a large impact on energy conservation.

5

Total Score: 25

Staff can be used to compile information, if not currently available. EECBG money can also be used to hire resources to help compile and analyze information. There is free as well as commercial software available to help with cataloging and analysis.

5

Skills necessary include the ability to transcribe energy and dollar amounts from utility bills (which report electric and natural gas per meter per month) for each facility to a database, basic mathematics to separate compiled months, and spreadsheet competency to perform annual summaries and produce graphs. Facilities management staff in Troy currently perform these

5

functions and could help implement a comprehensive tracking protocol.

The tracking of energy consumed is fundamental for measuring an energy program's impact. With organized records and an understanding of the specifics of energy use in your organization, you have the ability to target areas for reduction and savings. Also, by creating a baseline energy use, an organization has an objective measure with which to track the effectiveness of any

5

particular energy project both in terms of CO2 and dollars reduced.

Total Score: 25

Measure Worksheets

_internal
measures

Quantitative Energy Reduction Targets

The development and adoption of a program of energy reduction targets is a measure which motivates a community to execute many of the other measures described by this document. Setting targets creates a motivating factor for departments within the City and helps focus the City's efforts year to year. The setting of goals costs little, but the commitment to achieving the goals can cost a great deal if significant projects must be undertaken to meet them. The success of goal setting depends on the level of ambition the goals include, and the time frame.

Feasibility

This project alone is a commitment to exploring energy reduction, and the City's participation in the EECBG program and Green Communities Challenge are also commitments to reducing energy use. The actual establishment of formal, qualitative goals may require a significant political will, especially in the face of the City's current challenges.

4

Data/Analysis Needs

Because of fiscal and political impacts, senior executives and elected officials will need to discuss how ambitious a target to set and organize the proper mechanisms for officially adopting the policy. Leaders can use case studies and models from other jurisdictions to determine what is

realistic
and
feasible.

5

I.P.4.b

Renewable Energy Credits

Renewable energy credits are tradable, non-tangible energy commodities that represent proof that one (1) megawatt hour (MWh) of electricity was generated from an eligible renewable energy resource. These credits can be sold, traded or bartered. Renewable energy credits can incentivize carbon-neutral renewable energy by providing a production subsidy to electricity generated from renewable sources. The energy associated with renewable energy credits is sold separately and used by another party. There are two (2) markets for renewable energy credits – compliance and voluntary. Qualifying renewable technologies include: solar electric, wind, geothermal, low-impact hydropower, biomass/biofuels, and fuel cells.

The purchase of renewable energy credits is technically possible; however, given that there are no actual energy reductions or cost savings measures, and that the City is experiencing serious budget challenges, the participation in an energy credits program is not at all feasible at this time.

0

Baseline community-wide energy data to determine the amount of credits purchased, etc. This information has been tabulated and is available, although it would take some work to complete the full, community-wide picture.

4

I.P.5

Funding Availability

Essentially no funding is required for the setting of goals.

5

Personnel/Resources

City officials and executives will need to schedule several meetings to determine the political will of the target, the finances involved, and to develop a target in line with shared values, financial goals, and environmental necessity.

5

Potential Benefit/ Impact

An officially adopted policy informs staff and community that the municipality officially recognizes the fiscal benefits and environmental necessity for reducing energy use. This target mandate can be used as rationale when making important purchasing decisions and will help to change business as usual, allowing staff and community to evaluate a program's successes.

5

Total Score: 24

It is unclear if grant money can be used for the purchase of renewable credits, and the City's EECBG funding is allocated towards more direct energy saving programs. No general fund money or other funding is currently available.

0

This program only requires staff time from existing staff. Most of the necessary information is available, and some administrative time would be required to investigate potential energy credit programs.

4

Until Cities are required to meet maximum energy caps or until the City self-imposes greenhouse gas limits or other targets, the implementation of such a program has little tangible, immediate benefit to the City of Troy specifically. While it technically would help to improve renewable energy and conservation efforts on a large scale, it would not have

immediate benefits for Troy itself.

2

Total Score: 10

Measure Worksheets

_internal
measures

Utility Renewable Energy Programs

Due to increasing consumer interest in environmental responsibility, CO2 reduction, and owing to state mandates, most utility companies now offer consumers the ability to purchase electricity from renewable sources. Typically, the utility will charge a premium per kWh for the renewable electricity provided. If the utility provider does not produce electricity through renewable means on its own, consumers can use the money from the program to purchase renewable energy from elsewhere. In Michigan, DTE Energy's "Green Currents" and Consumer's Energy's "Green Generation" programs offer consumers and residents renewable options. Both companies also give scale discounts for organizations which use more electricity.

Feasibility

The purchase of renewable energy at the local level is technically possible; however, given that there are no actual energy reductions or cost savings, and that the City is experiencing serious budget challenges, the participation in an energy credits program is not feasible at this time. The fact that the renewable energy money would be spent more locally does make this a more attractive option than a national renewable energy credit program, however.

1

Data/Analysis Needs

Information about historical energy costs to determine the cost of implementation. This information is available.

5

I.P.6

National Organization Membership

There are several non-profit organizations whose mission is to do develop resources that help municipalities plan for and implement conservation strategies and measures. These organizations typically have experienced personnel who are knowledgeable about the process, politics, and technical details involved in reducing energy use. Examples of popular organizations include International Consortium for Local Climate Initiatives (ICLEI) and Climate Communities and Energy Star for Government.

This measure is technically possible; however, given that there are no actual energy reductions or cost savings, and that the City is experiencing serious budget challenges, membership is less feasible at this time. There are more immediate benefits in terms of resources and ideas, however, and membership is far more affordable than green energy credits or renewable energy purchase, slightly improving the feasibility of such a measure.

2

Membership organizations typically have requirements for members (e.g. 5-step process to address green house gas emissions (e.g. ICLEI), pledge to reduce energy use by a specific amount). These requirements require a point person to interact with the organization to implement the process.

3

I.P.7

Funding Availability

At this time there is no funding source for this option.

0

Personnel/Resources

The decision to purchase renewable energy must be made at the level of elected leaders in concert with an effort to promote environmental responsibility and publicity. The implementation of such a program would require no additional staff time or new personnel.

5

Potential Benefit/ Impact

The major benefit of participating in a utility renewable energy program is a reduction in CO2 created through daily operations, allowing municipalities to take responsibility for their own carbon footprint, while setting an example for residents and businesses. Simultaneously, they can also obtain LEED credits. However, there is not likely to be any immediate tangible benefit to the City itself.

2

Total Score: 13

Some organizations charge a fee to gain the resources available to member communities while others simply offer free resources and ask for a commitment. ICLEI, the pre-eminent organization in providing resources for local governments to plan for energy efficiency, has membership rates between \$600 and \$4,500 annually (depending on population). Although affordable,

2

the City currently has little financial resources available for such a program.

A point person should be assigned to handle the interface with the national organization and report progress. This person should become acquainted with the organization's resources and product offerings. He/she should be someone familiar with energy and climate change issues, as well as be comfortable formulating, implementing, and measuring plans. This could be

5

an existing staff person.

It can be a very complex and daunting undertaking to plan for and implement energy reduction strategies. These national organizations bring to bear case studies and experience from hundreds of other governmental units that have jumped the same hurdles. It is extremely helpful to have a path laid out before going through the process. Further, these organizations

3

provide a network to publicize progress and gain recognition.

Total Score: 15

Measure Worksheets

_internal
measures

Alternative Scheduling - 4-day week

The four day work week is an idea that is gaining much popularity in the United States. This measure is intended to save money by cutting building operations by one day each week. Because the building is not operating at its peak energy use, the energy used on the closed day is much lower than working days. The measure is also intended to reduce gasoline expenditures by employees, saving them both energy and time. Four day work weeks have shown to reduce energy use in buildings by approximately 10%. It is also noteworthy that a four day work week is more effective in the summer when air conditioners draw a lot of electricity during peak demand periods in the middle of the day.

Feasibility

In order to determine feasibility for this measure in a community, political will, existing work patterns and meeting schedules must be reviewed and gauged. The enactment of a four day work week does not require a large expenditure of initial funds. Having some employees work four day weeks saves little energy. Entire departments and buildings must be shut down to realize a true benefit.

3

This kind of sacrifice is difficult in a full-service community.

Data/Analysis Needs

12-24 months of Utility Bills for each facility, employee work locations and home addresses (names can be omitted), daily natural gas use in order to calculate natural gas savings.

5

I.P.8

Remote Work + Meeting Capabilities

Today's worker spends 24.4 hours on average each way commuting to work. This translates to nearly eight and one-half days annually driving to and from work. Additionally, most local governments have at least several different work locations that employees will commute between for meetings. With that many miles being driven, many organizations are investing in technologies that will allow workers to do more of their time from home and other nearby locations. These technologies include laptops, virtual private networks, "Soft Phones" which allow customers to reach you by your office phone number whenever you are plugged into the internet, instant messaging software, and teleconferencing areas.

In order to determine feasibility for this measure in a community, political will, existing work patterns and meeting schedules must be reviewed and gauged. It is less likely in a service-oriented community than in private industry, given how the City must provide services in person. Many City functions can not be done remotely.

1

12-24 months of Utility Bills for each facility, employee work locations and home addresses (names can be omitted), and daily natural gas use in order to calculate natural gas savings.

5

I.P.9

Funding Availability

Planning for a switch to a four day workweek, including all educational materials, is an authorized use of Energy Efficiency Conservation grants under the language of the bill. The City of Troy is actually well positioned to execute a four-day work week without any funding, as they have initiated such programs in some areas of operation, in the form of furlough days.

5

Personnel/Resources

Typically, the facilities department will handle the billing and collect historical data. The facility manager is instrumental in determining the actual benefit of this measure. Putting this into action requires an education campaign among the public to publicize that operating hours will change.

4

Potential Benefit/ Impact

Reducing electric costs by 10% can be significant both in terms of dollars and CO2 emissions. Additionally, a four day workweek saves employees money and reduces CO2 emissions from driving. An added bonus is employees typically cite a four day workweek as a way to increase work/life balance and create more flexibility, which enhances their job satisfaction.

5

Total Score: 22

Much of the technology required to permit telecommuting is already available to office personnel in Troy. Department managers and white collar professionals have remote access to workstations and email, and typically have City-issued mobile phones, occasionally with email access. However, there are likely to be additional costs to a widespread program, requiring City funds.

3

Existing City staff would be able to implement a more widespread telecommuting program if it were deemed valuable to the City without a great deal of additional outside support.

5

Given that first-person interaction with the public is a primary component of the City's operation, and that telecommuting by some employees does not actually reduce a building's energy use, there isn't a great deal of initial benefit to the City. Employees have a benefit in a reduction in vehicle trips and time spent, however, it would not reduce costs at the City significantly.

1

Total Score: 15

Measure Worksheets

_internal
measures

Hoteling Concept

Office hoteling is the concept in which an employee is asked to share his/her workstation with other employees. Generally, office work stations are dedicated to an employee, and they create their own personal space. In the concept of hoteling, cubicles and other office equipment are shared based upon employees' needs. Working out of various offices or telecommuting are also forms of hoteling. By implementing the hoteling concept, the municipality can reduce the office square footage needed, decreasing energy costs and spending less money overall per employee.

Feasibility

In order to determine feasibility for this measure in a community, existing work patterns and meeting schedules must be reviewed and gauged. Given reductions in staff and the availability of excess space in Troy, it is unlikely that the hoteling concept would have a great benefit, and to a degree this concept is already in place where departments like the Planning Department host consultant desks and administrative employees from other departments.

2

Data/Analysis Needs

12-24 months of Utility Bills for each facility, employee work locations and home addresses. This is available.

5

I.P.10

LEED Requirement Policy

Green building standards relate to environmental sustainability as normal building standards relate to safety and structural integrity. Green building standards address such issues as energy use, resource waste and CO2 emissions. The pre-eminent green building standard is the Green Building Council's Leadership in Energy and Environmental Design (LEED) program.

A great deal of apprehension exists with regard to requiring City facilities constructed in the future become LEED certified, or required to meet any third-party green building standard. While efficiency should be at a premium in facility design, formally requiring a third-party certification could complicate public projects. Elective compliance with LEED should be encouraged, if possible.

1

A projected schedule of building projects and an estimated cost of acquiring LEED status so as to make the true cost of this program predictable. This information is not easy to predict beyond a short time frame, although a rough estimate may be possible.

3

I.P.11

Funding Availability

While not specifically mentioned in the legislation of the Energy Efficiency and Conservation Block Grant program, this measure is in line with the intention of the bill. The program would likely require very little funding, because it essentially involves the more efficient use of existing resources.

4

Personnel/Resources

This measure is would require some setup time from City IT staff and a degree of training or understanding from existing employees, however no new staff or personnel would be required.

5

Potential Benefit/ Impact

This easy to implement measure may have little benefit, in where it can already be implemented, it has been implemented. Most City administrative employees already work in the same facility. Most departments are single-purpose, and spreading employees around the facility could impact service in a negative way.

1

Total Score: 17

The implementation of a green building certification standard costs nothing, but the impact could be that building costs could be increased in the future by the policy's requirements. There are funding sources available for energy efficiency and conservation in municipal buildings, but it is difficult to determine without specific projects pinpointed.

3

No personnel would be required to adopt a standard, but LEED Accredited Professionals would likely be required to implement green building programs to comply with the policy. The City would require appropriate accreditation from the design firms hired for upcoming projects.

3

While energy efficiency and conservation is an appropriate goal for new building construction and renovation of government buildings, the main benefit for third party certification is publicity and guidance. Buildings can be made to be certifiable, but would operate just as efficiently whether or not actual certification is achieved. If efficiency is still a priority, this has no significant benefit.

1

Total Score: 11

Measure Worksheets

_internal
measures

Reduce Heat Island Effect

The urban heat island effect is two-fold. Dark-colored surfaces in the urban environment absorb heat from the sun in the summer, thus radiating that heat back into the air causing urban temperatures to be 6-10 degrees Fahrenheit higher than in rural locations. These surfaces also cause a decrease in evaporative cooling capacities. Pavement cannot retain water in the same way that soil and plants can, instead allowing rain water to drain into gutters and sewers, and decreasing evaporative cooling in the urban surroundings. Higher temperatures then require excessive energy to cool buildings, and can increase the amount of air pollution. The heat island effect can be reduced via the introduction of light-colored surfaces and vegetation in place of impervious, dark colored surfaces.

Feasibility

This measure can be incorporated into facilities improvement projects, implemented as existing materials age, or implemented on it's own merit. Virtually any City building could benefit from this measure in that the cooling needs of the building would be reduced and energy costs limited. While potentially expensive, it would likely be done only when existing materials were worn out anyway, reducing the large up-front expense.

4

Data/Analysis Needs

Structural information about the buildings and baseline energy data for the structure involved, to estimate potential energy savings and calculate the return on investment. This information is partially available and would be easily obtained in the event that a building roof would need repair.

5

I.BC.1

Reduce Light Pollution

Light pollution results from an overuse of outdoor lighting. "Sky glow," or the glow of a city's lights as seen from a distance, is perhaps the most recognized indicator of light pollution. Resulting in wasteful spending on light that is directed into the sky, light pollution also impacts local wildlife, human circadian rhythms, and the ability to view stars. Reducing light pollution is sometimes as simple as lighting only when necessary. Installing devices such as motion sensors, reflectors, and light shields represent basic light conservation steps. Developing an acclimation to the dark and decreasing the wattage of lights are other useful measures to take. However, remaining aware of safety and other concerns which require adequate lighting is also necessary.

A reduction in light pollution will not always have a significant impact on energy use, although if the program involve outdoor sensors and reduced lighting intensity, it certainly will. The City has a substantial number of outdoor lighting fixtures and reducing their intensity, coverage, and duration to no more than is needed for safety and function would have a big impact. Reduced lighting can simply be accomplished with a switch out of fixtures or bulbs, in many cases, but can be expensive.

5

Photometric information for areas under consideration, technical information about the fixtures in question, and an understanding of minimum light levels necessary to acheive safe conditions while reducing light pollution. A qualified lighting contractor can provide this date during a scope phase.

5

I.BC.2

Funding Availability

This measure would be eligible for funding in any grant program that permits renovation or construction of energy efficiency measures in municipal buildings. Also, conventional capital improvements funding could be used for this measure in that it can be incorporated into any renovation project for a municipal building.

5

Personnel/Resources

This measure would require a specialized contractor and potentially a designer conversant and experienced with alternative roofing materials (white roof, green roof) that reduce heat island effect. Once installed, no special personnel needs would be needed.

4

Potential Benefit/ Impact

This measure could, in certain buildings, have a substantial impact. If the building is not due for renovations or new roofing, however, it is likely that the project would not bear a feasible return on investment. However, if existing roofing is being replaced, a white roof or living roof system could represent a decent return and improve the heat island effect of the site.

4

Total Score: 22

This measure would be eligible for funding in any grant program that permits renovation or construction of energy efficiency measures in municipal buildings. Also, conventional capital improvements funding could be used for this measure in that it can be incorporated into any update project for existing lights. Also, specific grant programs for LED lights and other energy

5

efficient lights could be leveraged to reduce energy and light pollution simultaneously.

A qualified lighting contractor would be required to analyze and install specialized lighting equipment designed to reduce light pollution and reduce energy usage. Such contractors are readily accessible.

5

Reducing light pollution is a good goal for aesthetic and environmental purposes. The added value to this program is that in reducing levels, energy consumption is also likely to be reduced. By switching to timers and LED lighting fixtures, one could save 60% or more in annual electricity costs for a typical parking lot.

5

Total Score: 25

Measure Worksheets

_internal
measures

Native + Water Efficient Landscaping

Approximately 26 billion gallons of water are consumed daily in the United States, of which approximately 7.8 billion gallons are devoted to outdoor uses — mostly landscaping. Water-efficient landscaping uses plants appropriate to local conditions, efficient irrigation, and suitable planning and design to minimize water use. Plants are grouped based on water needs, irrigation is scheduled and sometimes uses gray water. Turf is limited. While education and planning is costly, maintenance costs are generally reduced in the long-term. Additionally, water bills will be lower, natural resources conserved, and overall energy use decreased.

Feasibility

The City of Troy spends a great deal of money and resources on landscaping. By selecting native and more water efficient landscaping for park and right-of-way projects, as well as on the municipal campus or at any City facility, the City can reduce its maintenance costs and reduce the water use necessary to maintain less sustainable species. This measure is feasible in that it can be implemented little by

little over time as annual landscaping materials are selected.

5

Data/Analysis Needs

Technical information on the water use and existing plants for a particular landscaping installation would be necessary to understand what species of native plants would be feasible, successful, and most efficient. This would likely require collaboration between staff and consultants.

4

I.BC.3

Reduce Wastewater

Reducing wastewater (the water collected from drains, including rainwater) is essential to energy and cost savings. Treating wastewater is significantly more expensive than the cost of incoming water. Reducing wastewater generated and reusing wastewater where possible can minimize this cost. Reducing wastewater begins with educating staff about water-efficiency methods, and continues with the appointment of a staff member to monitor water use. Making certain that equipment is water efficient, guarding against leaks, and reusing wastewater are all effective reduction measures. Waterless urinals and toilets can also be used to conserve wastewater.

Reducing wastewater is a cultural as well as a physical measure. It is feasible to reduce wastewater by incorporating wastewater capture and retreatment measures, which can be expensive. However, water use (and therefore costs) can be reduced by using low-flow toilets and sinks with motion sensors etc. Many of these elements are already present in Troy and can be expanded with regular maintenance programs.

5

An understanding of water bills, usage, and rates to understand the return on investment for reduction projects, as well as an analysis of options for reducing wastewater, are required. Most of this information should be reliably available already at the City.

5

I.BC.4

Funding Availability

This measure could likely be implemented as part of the City's typical capital expenditures in that it involves selecting one material over another. This measure would be eligible for funding in any grant program that permits renovation or construction of energy efficiency measures. Grant money for energy reduction may be applicable to this measure, but largely it would be implemented as part of the City's annual landscape planting.

5

Personnel/Resources

Some specific guidance by a qualified landscape contractor familiar with native species may be required initially and during installation, but City staff could be trained to maintain new plants, and especially how to reduce the potable water used to maintain the plants.

4

Potential Benefit/ Impact

This measure would likely take a series of seasons to implement on a broad basis, and would also require a significant amount of education for City staff. Once installed, native plants are heartier, requiring less water and resources. They also survive much better over time, reducing potential costs for replacement. Actual benefit can't be calculated without a thorough understanding of existing and proposed materials.

4

Total Score: 22

This measure could likely be implemented as part of the City's typical capital expenditures in that regular maintenance and replacement of fixtures is an ongoing program. These types of improvements should be eligible for funding in any grant program that permits renovation or construction of energy efficiency measures. However, the City's own capital expenditures may

4

be limited in the coming years until revenues are increased.

The City's existing maintenance personnel and qualified contractors would be able to implement and maintain water-saving features.

5

A reduction in wastewater is a reduction in initial water use, which will reduce costs to the City. Limiting wastewater and making better use of water resources will save the community money and energy over time. Wastewater is a specific subset of overall water conservation measures, in that non-potable water recaptured from wastewater uses can be used for some things, such as landscaping.

5

Total Score: 24

Measure Worksheets

_internal
measures

Reduce Potable Water

Reducing potable water use can be achieved through retrofitting existing buildings and through careful design of new buildings. Replacing plumbing fixtures and appliances with water efficient versions is an initial step, e.g. high-efficiency toilets which use 20% less water, waterless urinals, etc. Municipalities can also establish guidelines for new municipal buildings. In a more basic sense, leaks should be reported and fixed in an expedited manner.

Feasibility

Reducing potable water is a cultural as well as a physical measure. It is feasible to reduce water use by incorporating wastewater capture and retreatment measures, which can be expensive. However, water use (and therefore costs) can be reduced by using low-flow toilets and sinks with motion sensors etc. Many of these elements are already present in Troy and

5

can be expanded with regular maintenance programs.

Data/Analysis Needs

An understanding of water bills, usage, and rates to understand the return on investment for reduction projects, as well as an analysis of options for reducing all water use, are required. Most of this information is already available at the City.

5

I.BC.5

Obtain Energy Audits

Energy audits can determine how and where energy is used in municipal buildings, thereby identifying opportunities for saving energy and cost reductions. An audit can also provide the data necessary to determine a building's carbon footprint, allowing for the development of policies to reduce greenhouse gas emissions. Audits can yield recommendations as varied as physical improvements and improving data management.

Energy auditors are readily available and affordable in the area. A good energy audit can reveal many things from low-hanging fruit such as behavioral issues and small changes like light bulbs, to more impactful renovations and upgrades that can improve a building's efficiency, such as new HVAC equipment.

5

12-24 months of utility bills for each facility.

5

I.BC.6

Funding Availability

This measure could likely be implemented as part of the City's typical capital expenditures in that regular maintenance and replacement of fixtures is an ongoing program. These types of improvements should be eligible for funding in any grant program that permits renovation or construction of energy efficiency measures. However, the City's own capital expenditures may

4

be limited in the coming years until revenues are increased.

Personnel/Resources

The City's existing maintenance personnel and qualified contractors would be able to implement and maintain water-saving features.

5

Potential Benefit/ Impact

A reduction in potable water will reduce costs to the City. While water reduction may not always appear as clearly related to energy use as renewable energy, limiting water use and making better use of water resources will save the community money and energy over time.

5

Total Score: 24

Energy audits are immediately eligible for funding with the City's EECBG grant. They are affordable and will provide immediate benefits to the City. In the future, the City should consider having audits done of all City facilities, even with general operating funds, as they will provide benefits to the building managers.

5

Qualified energy auditors are readily available in the area.

5

Without any substantial investment, the City can benefit from a high degree of understanding on how to maximize the savings potential for its facilities that receive an audit. Many audit recommendations require no investment at all, such as programming existing HVAC equipment or implementing employee practices. An audit is

5

an investment in education about the City's existing resources.

Total Score: 25

Measure Worksheets

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measures

Automatic Lighting Controls

Automatic lighting controls offer a mechanism for minimizing lighting usage, thereby reducing lighting and air conditioning costs. Lighting sensors can respond to motion, daylight levels, and usage concerns to assure that artificial lighting is used only when necessary. Added benefits include improved safety and comfort.

Feasibility

Automatic lighting controls are widely spread throughout City of Troy facilities. Often, they simply involve a seeing eye switch available at many home improvement suppliers. This is an easily achieved measure with an immediate payback.

5

Data/Analysis Needs

A basic understanding of the electrical system where applicable to select and install motion-detecting switches and equipment.

5

I.BC.7

Increase Building Insulation

Building insulation decreases heating and cooling needs by resisting the flow of heat from a warmer to a cooler space. Inadequate insulation causes energy waste; approximately 50 to 70 percent of the energy used in the average American home comes from heating and cooling. The amount of energy conserved will depend on the local climate, the size and construction of the building, and the living habits of its inhabitants. The best insulation type will be situation dependent, based on accessibility, space available, availability, and price. Comparison of insulation types is based on the R-value, which is a measure of the resistance to heat flow, and is dependent on the type of material and its thickness.

An advanced understanding of the existing conditions within each building under consideration must be obtained prior to fully determining the feasibility of this measure. However, it is likely that one or more of the City's buildings would benefit from improved insulation. Like any building improvement measure, it is likely that this is a feasible, realistic, and obtainable measure to reduce energy consumption.

5

A complete building energy audit will reveal potential areas for insulation improvement. An auditor will analyze the building envelope and identify areas where insulation could enhance energy conservation and efficiency. Audits are available from local vendors at a reasonable cost.

5

I.BC.8

Funding Availability

This measure could likely be implemented as part of the City's typical capital expenditures in that regular maintenance and replacement of switches and lighting is an ongoing program. These types of improvements should be eligible for funding in any grant program that permits renovation or construction of energy efficiency measures.

While the City's own capital expenditures may be limited in the coming years, this measure is very affordable.

5

Personnel/Resources

No specialized personnel would be required. An electrician can easily install many motion sensing switches in a single day.

5

Potential Benefit/ Impact

This easy to implement measure can have a large impact in terms of dollars saved. If widespread, it will have a noticeable impact on electrical use and should be implemented wherever possible.

5

Total Score: 25

This measure could likely be implemented as part of the City's typical capital expenditures in that regular maintenance of structures is an ongoing program. Insulation would be eligible for funding in any grant program that permits renovation or construction of energy efficiency measures.

5

Enhanced insulation can be installed by a qualified contractor, readily obtainable within the community. The type and cost of contractor would depend on the type and application of the insulation materials themselves, as many different varieties of insulation are available depending on the situation.

5

Improving the building envelope is one of the fastest ways to increase the energy efficiency of an existing building. If possible, based on the construction and existing conditions within a building, new insulation can provide a significant benefit in that a tighter envelope loses less heated or cooled air, and therefore requires less HVAC capacity throughout the year.

5

Given the relative low cost of insulation, this project has a rapid payback.

Total Score: 25

Measure Worksheets

_internal
measures

Passive Solar Heating

Passive solar heating is mechanically simple and reliable, offering a highly cost effective means of heating buildings. If incorporated into the original design, there can be little to no additional cost in installation. A variety of methods exist; site and climate will largely determine which approach is most appropriate. Sunlight enters via the collector, is absorbed on a dark surface, and is stored in thermal mass, such as a masonry wall. The thermal mass then distributes the solar energy as the interior temperature drops. Variations such as greenhouses, water walls, roof ponds, and flat plate solar collectors, work in a similar manner: direct gain, indirect gain, isolated gain.

Feasibility

This technology is extremely efficient in terms of operation and can provide a significant benefit; however, it is relatively difficult to apply in a retrofit situation. When contemplated as part of the original design, it is easily achieved for no additional cost. For a renovation, HVAC systems can be compromised. For instance, thermal advantages may be available by adding skylights in winter, but the

3

same skylights could force the air conditioning to work harder in summer.

Data/Analysis Needs

An in-depth and sophisticated understanding of building energy modeling is usually required to apply passive solar heating to an existing building. It would take a specialized contracted engineer to design and implement a system that would not compromise other

3

systems in the building.

I.BC.9

Install Daylighting

Effective daylighting will depend on the internal layout of a particular space; however there are measures to increase daylighting without completely redesigning a building. Daylighting provides optimum levels of light, can improve employee comfort, and results in significant energy savings. Ensuring that debris and landscaping is not obstructing windows, installing skylights, and corresponding shading devices are first steps toward achieving proper daylighting. Windows and openings should be north-oriented or diffused, as direct lighting can cause glare and discomfort. Proper shading is paramount in allowing for controlled solar gain. Lightshelves and angled ceilings can also be used to reflect light around a room, further diffusing it. Daylighting, when used effectively, can significantly reduce costs.

Daylighting is a common retrofit. Skylights, larger windows, light shelves, and the shades or other window treatments that allow you to control light levels, can usually be installed in any building.

5

No special data or information is needed aside from a good understanding of how the space to be daylit will be used to properly design daylighting strategies and avoid negative issues like glare.

5

I.BC.10

Funding Availability

Like any building improvement contemplated for energy efficiency, it is likely that energy grant dollars would be eligible for this project. However, energy savings must be quantifiable and accurate in advance, which would require a sophisticated and potentially expensive process to obtain. Therefore, while grant money may fund this project, it has a high cost barrier for entry.

3

Personnel/Resources

It would require specialized design personnel to design and install a passive solar heating system in a retrofit application. Once installed, no special personnel would be required.

4

Potential Benefit/ Impact

This measure has a potentially high value in new design and construction applications. However, in retrofit applications it is often expensive, and potentially even impossible to implement, for less payback than other systems. If the City considers new construction in the future, such systems should be contemplated.

3

Total Score: 16

Like any building improvement contemplated for energy efficiency, it is likely that energy grant dollars would be eligible for this project. However, energy savings must be quantifiable and accurate in advance. In this measure, the number of lights that would be left off and for how long would provide the information needed to make a determination.

5

It may require specialized design personnel to design and install daylighting elements in a retrofit application. Once installed, no special personnel would be required for this passive system.

4

Daylighting has added value in that it can reduce energy costs for lighting, but can also improve the quality of life for the building's inhabitants. However, care must be taken when designing daylighting systems in that it can have a negative effect on heating and cooling in that the building envelope may be altered or compromised.

4

Total Score: 23

Measure Worksheets

_internal
measures

Energy Efficient Light Fixtures

Light emitting diodes (LED) produce light with little energy use. Over the last 20 years LED technology has expanded in regard to the available colors, intensity, and power consumption. LEDs use much less power than traditional incandescent bulbs, have a longer life span, and do not contain harmful chemicals. LEDs can be used to replace traffic and street lights to reduce power consumption and utility expenditures. LEDs can also be easily dimmed and arrayed to illuminate focused areas. Many cities across the U.S. are now installing LEDs, including Ann Arbor, Anchorage, San Jose, Los Angeles and Pittsburgh.

Feasibility

LED lights are now designed to retrofit nearly any existing fixture. They are far more efficient and have become affordable. Existing fixtures and bulbs must be changed, and the payback for LED systems has become far more attractive.

5

Data/Analysis Needs

A sophisticated understanding of existing lighting systems and annual energy costs. A qualified LED contractor will conduct this analysis at no charge.

5

I.BC.11

Natural Ventilation

Natural ventilation can be used as an alternative to air-conditioning, resulting in a 10-30% savings in energy consumption. Natural ventilation uses natural wind forces and buoyancy to circulate fresh air through buildings. Buoyancy, better known as stack ventilation, is attributable to the difference in indoor and outdoor air temperature and moisture. The greater the difference in indoor/outdoor temperature and moisture, and the height of the opening, the greater the resulting natural air flow. Since it is not effective at reducing humidity, natural ventilation use is limited in humid climates. Employee satisfaction and comfort can be increased when natural ventilation is used in combination with daylighting, and offers control over thermal conditions.

Most City of Troy buildings were designed with closed systems and no opening windows, or at least HVAC systems that were designed to operate optimally as closed systems. While opening windows can certainly provide natural ventilation, they must be implemented carefully so as not to “trick” the HVAC system and force the air conditioning or furnace to operate at higher levels

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than necessary, consuming additional energy.

A sophisticated analysis from an engineer or architect may be necessary to determine the feasibility of implementing a natural ventilation system in a retrofit application. A thorough understanding of the buildings current energy use would also be required. New construction applications would not

3

require any special data.

I.BC.12

Funding Availability

LED lighting is specifically mentioned in the EECBG program as an eligible activity. LED systems can also be installed as part of ongoing replacement or maintenance of existing lighting.

5

Personnel/Resources

Specialized LED technicians will design and install LED fixtures, but regular City employees can maintain these systems after installation with no advanced training.

5

Potential Benefit/ Impact

LED lighting can save over half the annual energy cost for existing lighting in many cases. The actual payback depends on the operation schedule, intensity, and number of existing lights. While premium LED fixtures are more expensive to install, they last longer and provide more light with less energy by providing optimum cooling for the LED units.

5

Total Score: 25

Building improvements, such as the installation of a natural ventilation system, may be eligible for grant money in the EECBG or other programs if it can be demonstrated that a reduction in energy consumption can be quantified. Installation of such systems may be cost prohibitive if the building is not conducive to the integration of such a system, however.

4

Specialized technicians will design and install natural ventilation systems, or they are conceived of at the time the building was designed. Regular City employees can maintain these systems after installation with no special training.

5

When conceived of as part of the buildings initial design, natural ventilation is a tremendous way to increase indoor air quality and potentially regulate temperature without relying exclusively on conventional HVAC. However, when used in a retrofit situation, they can be costly and ineffective if not done properly. In fact, a poor natural ventilation system can increase energy use by requiring the HVAC system to work overtime treating outdoor air.

2

Total Score: 17

Measure Worksheets

_internal
measures

Energy Efficient Appliances

Energy efficient appliances can use 10-50% less energy and water than ordinary models. These models can be more expensive, savings on utility bills will more than offset the initial cost. The best way to ensure that an appliance is energy efficient is to read the energy guide label now required by the FTC. Energy guide labels provide the annual energy consumption of appliances, and are useful for comparing appliances. Additionally, small steps can be taken manually to assure that you are using your appliances efficiently, such as adjusting refrigerator temperature based on the season, using ceiling fans, and turning off computers when not in use.

Feasibility

Appliances routinely require maintenance and replacement through City facilities. These could include kitchen, laundry, computing, and other equipment. It is feasible and advisable to select the most energy efficient models the budget will allow.

5

Data/Analysis Needs

In order to make a determination of value for an energy efficient appliance, it is useful to know the anticipated use and existing bill for the old equipment so as to determine potential savings when weighing cost factors. This information should be readily available.

5

I.BC.13

Efficient Heating + Cooling

Heating and cooling loads account for the majority of building energy usage. Simple measures can reduce this usage, such as changing air filters regularly (at least every 3 months), maintaining HVAC equipment yearly, installing a programmable thermostat, and sealing heating and cooling ducts. Assuring that equipment is installed properly and is sized according to building size and usage is also important. Improperly installed systems with duct leakage can cause a system to deliver only 70% of the cooling it produces. Installation of heating and cooling systems specifically designed to be energy efficient is an option at the expiration of an older system.

In Troy, the City Hall and other buildings have aging HVAC systems that are nearing the end of their useful life. Although high in initial cost, significant HVAC upgrades are often necessary. The City has a track record of upgrading systems, controls, and supporting duct work to improve energy efficiency and can continue to do so as the need arises.

5

A current and sophisticated review of the building's existing systems and use, as well as a realistic idea of the buildings long-term needs, must be established to determine the capacity of HVAC systems. This information can be collected by a qualified contractor.

5

I.BC.14

Funding Availability

This measure is relatively cost effective and can be implemented over time as equipment is replaced. The purchaser can simply select the most energy efficient model the budget can afford, taking into consideration the additional savings to be realized over a conventional model. Current EECBG grant money may also cover the purchase of some appliances.

5

Personnel/Resources

No special personnel are required to implement this measure.

5

Potential Benefit/ Impact

This easy to implement measure can have a large impact in terms of dollars saved, gallons of gas reduced, and CO2 emissions reduced. The purchase of energy star rated electronics and equipment can result in a rapid payback, even if they were to cost more initially. In many cases, energy efficient alternatives are within the same price range as conventional equipment.

5

Total Score: 25

This measure can be funded by the EECBG program, as it directly relates to the programs mission of increasing energy efficiency in government buildings. Also, improvements in energy efficiency can be programmed into conventional capital improvements planning for replacement of existing systems.

5

As with any HVAC installation, qualified contractors would be required to install and optimize any new equipment. However, once installed, only periodic specialized maintenance would be required and City employees could largely maintain any system.

5

The majority of the building's energy use is related to regulating indoor temperature. If the building envelope is operating optimally, the greatest leap in efficiency can be made from upgrading to more efficient HVAC equipment. Given that many systems in the City's portfolio will require improvement in the next ten years, this is an achievable and realistic measure with a great payback.

5

Total Score: 25

Measure Worksheets

_internal
measures

Purchase Local Materials

Buying local materials can reap both economic and environmental benefits. Local purchasing reduces greenhouse gas emissions by reducing shipping and transportation mileage, lowers packaging material needs, and decreases waste from unwanted bulk purchases. Purchasing local materials also contributes to the local economy, making the community stronger and more sustainable.

Feasibility

The City purchases millions of dollars worth of goods every year. While not necessarily reducing the City's cost or actual energy consumption, buying local does have a net overall benefit to the region in terms of energy saved. Landscaping materials, food, furniture, building supplies, and other goods produced or manufactured within 100 or 200 miles would be an overall positive benefit to the State or region.

5

Data/Analysis Needs

Knowledge of local alternatives for goods purchased would be required to make local buying decisions. This would take no additional effort beyond what is normally done in obtaining information about potential goods for purchase.

5

I.BC.15

100% Recycled Paper

Recycling can help to minimize both production energy usage and waste. Paper production accounts for approximately 35% of all felled trees. Recycling just half of the world's paper usage could save 20 million acres of forest. In addition to saving natural resources, recycling offers a 40-64% energy reduction. Paper accounts for about 35% of municipal solid waste, and the Environmental Protection Agency (EPA) determined that recycling creates 75% less air pollution and 35% less water pollution than making non-recycled paper. Given the abundance and easy access to recycled paper, this is a simple way to conserve energy. Energy conservation can also come from in-house recycling (e.g. double-sided printing, "scrap" paper bins, etc.)

100% recycled paper is affordable and available at all office supply vendors. A simple policy change would make this an easily achieved measure that is feasible.

5

An estimate of the amount of paper used by the City to determine potential cost when seeking vendors to supply the City with paper would be required.

5

I.BC.16.a

Funding Availability

Local goods are not necessarily energy efficient in and of themselves, and are therefore not necessarily covered by any grants solely based on their point of manufacture. The most important factor in considering cost for local goods is that the purchasing rules of the City allow for local materials to be competitive, even when that may not always be the most inexpensive option.

4

Personnel/Resources

No special personnel needs are required, although this measure could have a benefit, if adopted across the region, in promoting local job creation.

3

Potential Benefit/ Impact

This easy to implement measure could, if adopted across the State or region, have a large impact with regard to overall energy use. However, it does not have a significant direct energy benefit that the City could expect.

3

Total Score: 20

The City routinely buys paper products for use in City operations. Although some departments have significantly reduced paper use by switching to paperless applications, records, and meeting packets, there will undoubtedly remain a need for purchasing of paper for the foreseeable future. If similar quality paper at a similar cost can be found, 100%

5

recycled paper should be paid for with typical departmental budgets.

No special personnel would be required for the purchase of recycled paper.

5

There is little immediate energy efficiency or conservation improvements in terms of actual energy dollars spent to operate City buildings. However, recycled paper does present an overall benefit in terms of waste reduction, energy savings, and natural features protection. In other words, it is good for the larger regional, state, and country, but would have little

2

immediate effect on the City's own energy bottom line.

Total Score: 22

Measure Worksheets

_internal
measures

Environmentally Friendly Supplies

Buying recycled and re-manufactured office products (e.g. recycled toilet paper, office paper, ink for printers, etc.) is a simple step toward achieving greater energy efficiency. Re-using supplies within the office (e.g. double-sided printing, promoting use of mugs rather than disposable cups) can be equally straightforward and valuable. Office products should be non-toxic, recyclable and/or made from recycled content, re-manufactured, or re-usable. Even office furniture can be purchased from retailers specializing in furniture made from recycled materials. Many companies offer a variety of environmentally friendly office products, some offer specialized products, such as Xerox's solid ink cartridges which produce 90% less waste.

Feasibility

Environmentally friendly office supplies are affordable and available at office supply vendors, many of whom specifically call out eco-friendly supplies. A simple policy change would make this an easily achieved measure that is feasible.

5

Data/Analysis Needs

An estimate of the supplies used by the City to determine potential cost when seeking vendors to supply the City would be required.

5

I.BC.16.b

Alternative Transportation

According to the U.S. Census American Community Survey, the average American commute takes over 24 minutes each way. That equates to over 100 hours a year in the car, well over the two weeks vacation time most Americans take. Besides the monetary expense and the effect commuting can have on an individual's mental health, the cumulative effect of fuel consumption is a major source of green house gas emissions. Alternative forms of transportation such as walking, biking, public transit and carpooling, can get commuters out of their cars. The City can encourage alternative commuting for employees in many ways, such as reducing parking spaces, providing transit passes for free, setting up ride-share boards, creating a friendly interdepartmental commuter challenge, and providing shared vehicles for emergency needs.

Several of the items identified in this measure, such as ride share boards and creating a commuter challenge program, can be done at little or no cost. Providing incentives for transit ridership, such as paying for passes, could be more difficult due to the lack of adequate existing transit service in Troy. Also, reducing parking spaces and proving vehicles could increase costs with little benefit. Overall,

2

this measure may be possible, but unlikely until access is improved.

Information about commuting habits of employees, a study regarding the potential cost and availability of providing transit passes, and costs of providing City vehicles for shared carpools would also be required. This collection of information relies on the willingness of

3

employees to be a part of the program.

I.T.1

Funding Availability

The City routinely buys office supplies for use in City operations. If similar quality supplies at a similar cost can be found, environmentally friendly alternatives should be paid for with the same funds that would have bought conventional supplies.

5

Personnel/Resources

No special personnel would be required for the purchase of environmentally-friendly office supplies.

5

Potential Benefit/ Impact

There is little immediate energy efficiency or conservation improvements in terms of actual energy dollars spent to operate City buildings. However, environmentally-friendly office supplies do present an overall benefit in terms of waste reduction, energy savings, and natural features. While good for the larger regional, state, and country, but would have little immediate effect on the City's own energy bottom line.

2

Total Score: 22

It is not clear if the EECBG program would subsidize the costs of implementing a full alternative transportation program that included providing carpooling vehicles or paying for bus passes. However, it is likely that the grant could pay for portions of the program that would lead to increased transit ridership or reduced vehicle trips or fuel usage. There are also

4

many transit-oriented grants available.

No specialized personnel would be required to implement these items within the alternative transportation measure, but it would take strong central leadership and department heads committing to the program and encouraging and educating their staff to participate.

4

This measure would actually show a likely reduction in energy use for getting City staff to work. However, that cost is currently born by the employees themselves, and is not subsidized by the City. The City does provide carpool vehicles for employees to use for official business, such as attending conferences, etc., saving the City from paying multiple mileage reimbursements.

3

Total Score: 16

Measure Worksheets

_internal
measures

Feasibility

Data/Analysis Needs

Carpooling

A carpool consists of two or more people who drive together in a private vehicle. There are a variety of ways to encourage employee carpooling, such as free, reduced cost, or preferred parking, rideshare matching to duplicate schedules and commuting areas, and prizes. This measure does not include consideration for providing City owned vehicles for carpooling, only incentivising carpooling for employees in their own vehicles.

This measure mainly involves facilitation and education, and costs little or no money to implement. This measure could almost exclusively be completed through the City's intranet.

No specific data would be required to complete this measure.

5

5

I.T.2

Police Fleet Management

Public safety is a very important, but very energy intensive, governmental function. Police patrols happen 24 hours a day and vehicles rarely get turned off. Police vehicles are frequently chosen for a combination of handling, speed, and cost, with less regard to fuel efficiency. Often, these factors result in the purchase of vehicles with large eight-cylinder engines. There are alternative vehicles that have smaller engines or are hybrids, get better fuel economy, and still serve the high performance demand necessary for police enforcement. By making the small switch from a V-8 to a V-6 engine, a police force can reduce its fuel use by 20% per year. At \$3/Gallon, and 200,000 gallons a year, a community could save \$120,000 in gasoline expenses. Additionally, this measure has been shown to reduce CO2 emissions by several percent.

This measure may be feasible for a portion of the public safety fleet. Currently, options for pursuit rated vehicles are limited, although many police forces are shifting to six-cylinder, hybrid, or turbocharged cars with better fuel economy for other personnel, such as detectives or administration. Smaller displacement cars may eventually be suitable for all police activities. The Ford Police Interceptor is nearing the end of production, and will be replaced by higher efficiency models.

Detailed information about anticipated usage and a set of unique specification requirements for different vehicles within the Police Department would be required to determine if smaller displacement or hybrid models would be suitable for Police duty.

4

5

I.T.3

Funding Availability

Alternative transportation programming is specifically mentioned in the legislation of the Energy Efficiency and Conservation Block Grant program, and it is in line with the intention of the bill. However, it would require little to no actual funding.

5

Personnel/Resources

This measure would require no specialized personnel, and what little actual effort would be required on the City's behalf (facilitating the organization of rideshare pools) could be done by existing personnel, such as the Information Technology department.

5

Potential Benefit/ Impact

This easy to implement measure can have a large impact in terms of dollars saved, gallons of gas reduced, and CO2 emissions reduced. However, that cost is born by the employees of the City, not the City itself. Therefore, there is less benefit to the City's own bottom line. However, in the face of financial concessions from City staff, and potentially rising fuel costs, promoting a culture of carpooling could become a benefit for employees and help retain City workers.

3

Total Score: 23

The EECBG grant can cover the difference between a conventional vehicle and an alternative fuel vehicle. For instance, the difference between a Ford Fusion and a Fusion Hybrid can be funded. The result is a car that costs the City the same, but with expanded fuel economy, reducing the overall cost of ownership. Even without grant support (depending on

5

the use) the additional cost of a hybrid could be paid back by the fuel savings.

No specialized personnel would be required to implement this measure, although the overall economy should continue to be carefully monitored by the Fleet Manager to identify energy savings and calculate payback data.

5

While it can not necessarily be done quickly, as vehicles mature and are replaced, alternative fuel or smaller displacement vehicles should be considered. The City Fleet Manager has already shown significant fuel savings for vehicles throughout the City's departments for hybrid pilot projects. The City should use EECBG funds to cover the difference between vehicles

5

the City needs to buy anyway, and the hybrid alternative.

Total Score: 24

Measure Worksheets

_internal
measures

Purchase Diesel Powered Equipment

Diesel-powered vehicles are a less known fuel-efficient option. In response to EPA mandates in late 2006, ultra-low-sulfur diesel (ULSD) is now a product of oil refineries. "Clean Diesel," as it is called, must have sulfur concentrations of no more than 15 parts per million (ppm). In addition, maximizing a diesel's fuel economy can lead to 9 extra miles per gallon. Given the fluctuating cost of diesel versus gasoline, it is difficult to predict the actual potential savings, which is also heavily reliant on usage and driving or operating habits of staff who use the vehicles and equipment.

Feasibility

The City has already purchased some diesel equipment, and is actively reviewing long-term fuel usage data for these units. In many instances, the Fleet Manager has determined that in the City of Troy's unique patterns of use, that diesel, given the higher fuel costs per gallon, does not usually result in a net savings to the City.

2

Data/Analysis Needs

Detailed information about anticipated usage and a set of unique specification requirements for different vehicles or pieces of equipment would be required to determine if diesel models would be suitable for City duty. This information is available

from the
Fleet
Manager.

5

I.T.4

Provide Alternative Fuel Vehicles

Hybrid vehicles combine two or more technologies, generally an internal combustion engine merged with a battery powered electric motor. The electric motor aids the gas engine in starting and accelerating. While idling, the car typically runs on electric power alone. Thus, the use of gasoline is reduced, as are toxic emissions. Technology continues to advance – some vehicles now have systems where each time the driver uses the brakes the battery is recharged. While a traditional vehicle generally retains only 60% of their value after a five year period a hybrid vehicle retains 75%. These technologies are currently evolving rapidly and fresh approaches to hybrids are occurring regularly.

The City has already purchased some hybrid vehicles, and is actively reviewing long-term fuel usage data for these units. In many instances, the Fleet Manager has determined that in the City of Troy's unique patterns of use, that hybrids usually result in a large net savings to the City.

5

Detailed information about anticipated usage and a set of unique specification requirements for different vehicles or pieces of equipment would be required to determine if hybrid models would be suitable for City duty. This information is available

from the
Fleet
Manager.

5

I.T.5

Funding Availability

The EECBG grant can cover the difference between a conventional vehicle and an alternative fuel vehicle, and may cover diesel or biodiesel vehicles. The result is a car that costs the City the same, but with greatly expanded fuel economy, reducing the overall cost of ownership. Even without grant support, depending on the use, the additional cost of a diesel might be paid back by the savings in fuel costs, although data from Fleet Management suggests otherwise for Troy

5

Personnel/Resources

This measure is best managed by the Fleet Manager in cooperation with the City Manager's office. The manager would need to meet with department heads to determine their needs and work to find a satisfactory vehicle. Methods for accurate recording of mileage and fuel use may also be required.

5

Potential Benefit/ Impact

While it can not necessarily be done quickly, as vehicles mature and are replaced, diesel vehicles should be considered. At this time, Troy information suggests that diesels may not show a savings in the current climate, given the habits of the drivers who use them and volatile diesel fuel costs.

2

Total Score: 19

The EECBG grant can cover the difference between a conventional vehicle and a hybrid vehicle. The result is a car that costs the City the same, but with greatly expanded fuel economy, reducing the overall cost of ownership. Even without grant support, depending on the use, the additional cost of a hybrid usually will be paid back by the savings in fuel costs, based on data from Troy's experience thus far with Ford hybrids.

5

This measure is best managed by the Fleet Manager in cooperation with the City Manager's office. The manager would need to meet with department heads to determine their needs and work to find a satisfactory vehicle. Methods for accurate recording of mileage and fuel use may also be required.

5

While it can not necessarily be done quickly, as vehicles mature and are replaced, hybrid vehicles should be considered. At this time, Troy information suggests that hybrids do show a savings for the City's use.

5

Total Score: 25

Measure Worksheets

_internal
measures

Average Fuel Economy

While federal regulations to improve average fuel economy in miles per gallon of cars exists (Corporate Average Fuel Economy or CAFE), the United States has one of the lowest standards of average fuel economy. These standards are expected to become more stringent in the near future (currently only requiring 27.5 mpg for cars and 23.1 mpg for trucks, expected to increase to 39 mpg and 30 mpg, respectively, by 2016). However, municipalities can adopt their own, more rigorous average fuel economy standards. By doing so, greenhouse gas emissions from vehicles will be limited and fuel costs will be reduced in a standardized way.

Feasibility

In order to determine feasibility for this measure in a community, political will, existing driving habits, and operations schedules must be reviewed and gauged. The enactment of an average fuel economy does not require a large expenditure of initial funds, but would require Troy to implement other measures to achieve this measure.

4

Data/Analysis Needs

Extensive information about existing vehicles fuel usage, remaining life with the City, utility to the departments they serve, and a good understanding of realistic alternatives to reduce fuel consumption.

4

I.T.6

Priority Parking for Hybrid Vehicles

A reduction in personal vehicle demand for gasoline is one of the most efficient ways to lessen crude oil consumption and both the dependence and emissions that come from gasoline usage. Hybrid or alternative fuel vehicles combine two or more technologies, thereby reducing traditional gasoline use and reducing toxic emissions. Not only are hybrid vehicles more fuel efficient, they generally have better mileage and greater valve retention. Providing priority parking (e.g. alternative fuel vehicle parking bays near building entrances, free meter parking) for hybrid or alternative fuel vehicles can incentivize their use, encouraging more individuals to drive vehicles less hazardous to the environment.

This measure would require very minimal effort and expense, but would be a visible sign that the City is giving a high priority to conservation. Also, the City has extra parking available in most areas, including City Hall's main east lot.

5

No special information would be required.

5

I.T.7

Funding Availability

While not specifically mentioned in the legislation of the Energy Efficiency and Conservation Block Grant program, it is in line with the intention of the bill. This activity may be eligible as a transportation programming item. It would not require a significant outlay of funds initially, but would require the City to purchase more economical vehicles in the future. Comprehensive monitoring of fuel usage is already available from Troy's fleet management team.

5

Personnel/Resources

This measure is best managed by a fleet manager in cooperation with the City Manager's office. The manager would need to meet with staff to determine their needs and work to find satisfactory alternative vehicles over time.

5

Potential Benefit/ Impact

This measure can have a large impact in terms of dollars saved, gallons of gas reduced, and CO2 emissions reduced. Many municipal vehicles are expensive to maintain and fuel, and a comprehensive goal setting for a higher average fuel economy would institutionalize economical decisions in vehicle purchasing and operation, perpetrating the work already begun by Fleet Management.

5

Total Score: 23

There is essentially a very small cost associated with this measure. Costs would include a few small signs and a limited amount of striping paint to identify these spaces. It is in the spirit of the EECBG grant to program funds for transportation programming, but it is unclear of this specific measure could be covered. That said, the minimal cost could simply be absorbed within existing maintenance programmed funds.

5

No special personnel would be required; existing City facilities staff could convert several spaces to hybrid or other alternative fuel vehicle only spaces.

5

This measure would have no real impact on the City's energy bottom line. That said, it would be a unique incentive for City residents or employees who choose to drive such vehicles, and would be an outward symbol of the City's effort to promote energy efficiency. Given its very low cost, it would be advisable to install a single hybrid/alternative fuel vehicle space in visible City lots, such as near the main entrance at City Hall.

5

Total Score: 25

Measure Worksheets

_internal
measures

Intent

Feasibility

Data/Analysis Needs

Provide Bike Storage + Showers

Providing bicycle storage and showers for employees are small measures which can promote bicycle commuting. Commuters tend to support biking if their travel time is reasonable and convenient, if they have secure storage upon arrival, and if there is somewhere for them to freshen up before beginning their work day.

For City Hall, sheltered bike parking could be made available in the Police Department's garage, or under a carport, where a single parking space could shelter a dozen or more bikes. The shower facility for general employees may require renovation of a rest room or rooms, which could cost between 5 and 20 thousand dollars, depending on the scale of the project. The City could also consider allowing free

5

use of Community Center facilities for bike commuters and walkers, with storage there.

No real data is needed, but a good understanding of the plumbing and systems of existing facilities could be required to select a location for installing showers for City employees.

4

I.T.8

Life-Cycle Analyses for New Vehicles

A life-cycle analysis determines the environmental influence of a product based on its existence, often in direct comparison to the status quo. A four step process including goal and scope, life cycle inventory, life cycle impact assessment, and interpretation, can indicate whether a higher cost is truly environmentally advantageous enough to warrant the difference. Doing so for new vehicles can help determine the best option and actually reduce expenses over time.

This is already partially done in Troy. The City Fleet Management Team maintains vehicles largely in-house, keeps diligent records with regard to maintenance expenses and material, and monitors overall fuel consumption and efficiency. The City has complete records detailing initial costs, including licensing, etc. Therefore the actual cost of ownership is well known. It would only take a small amount of effort

4

to incorporate a few more elements to understand the true life cycle of most City vehicles.

Comprehensive data about the fueling and maintenance of every vehicle the City owns, and a good projection of the anticipated cost of fueling and maintaining a potential vehicle, would be necessary. An understanding of the environmental issues related to the manufacture

4

& disposal of a vehicle is needed.

I.T.9

Funding Availability

While not specifically mentioned in the legislation of the Energy Efficiency and Conservation Block Grant program, it is in line with the intention of the bill. If the City were to make the Community Center showers and lockers free for City Employee bike or walking commuters, it would require hardly any cost.

4

Personnel/Resources

This measure could be administered by on-site staff at whichever building would be given this treatment. It may require specialized contractors if the facility were renovated, but only regular maintenance from City Staff once in place.

5

Potential Benefit/ Impact

This measure would provide a benefit and incentive to Troy employees that choose to live close to work and/or commute sustainably. While it could cost a great deal to construct showers and appropriate storage, use of the Community Center for municipal campus employees would be very inexpensive. It may not reduce the City's own energy use, but would comply with the City's Master Plan by encouraging sustainable transportation.

4

Total Score: 22

While not specifically mentioned in the legislation of the Energy Efficiency and Conservation Block Grant program, it is in line with the intention of the bill. Also, it would require hardly any cost initially, but could add more hours to the monitoring of the City's fleet and purchasing efforts.

4

This measure could be administered by the City's Fleet Manager.

5

Ultimately, this measure would likely save the City energy and money over time. Having a comprehensive understanding of all the costs and issues associated with a vehicle prior to purchase, insofar as possible, will help the City make the most cost effective and environmentally friendly choices with regard to vehicles. It may require additional management, but does not necessarily require any other immediate costs.

5

Total Score: 22



External Measures

The external measures are those measures which have more impacts out in the community, but have an indirect impact on the day-to-day operation of the local unit of government. These measures deal with land use, economic development, and the energy needs of residents and businesses within the community. They deal with resource management, incentives for the initiation of energy conservation measures, and enhancement of transportation options. While these measure play an important role in the long term redevelopment of the community, they have far less immediate impact on the energy bottom line for the local unit of government.

Measure Worksheets

_external
measures

Permit/Incentivize Solar Energy Generation

Solar power is energy derived from converting sunlight into electricity. Installation cost is typically high, but solar power is one of the most reliable sources of energy – while intermittent, it is somewhat predictable. A variety of incentives are possible, such as offering income tax credits, property tax exemptions, coverage of a percentage of the installation cost, and rebates. Additionally, programs can be established for residents to sell their solar energy back to the grid.

Feasibility

The City does not currently prohibit solar energy generation, in fact solar panels would be permitted in Troy. There are no local incentives, however, and it is unclear if the City is able to do more than encourage renewable energy installations at this time, given the limited resources. Potential future incentive zoning measures for projects with renewables may be appropriate and feasible.

3

Currently, the City uses “green development” as a criteria for permitting PUDs.

Data/Analysis Needs

Comprehensive solar energy potential data and a good understanding of the potential payback is required to educate residents and businesses about solar energy. No special data is needed to permit or incentivize solar installations.

4

E.RE.1

Permit/Incentivize Geothermal Energy

Geothermal systems use ground source heat pumps to extract or return heat to the earth. The ground source systems rely on the Earth’s relatively constant temperature below six feet. By running liquids through pipes dug into the earth, a building can be cooled off in the summer and heated in the winter. This form of geothermal technology is an effective and predictable form of energy. It is also one of the most cost effective forms of renewable energy available. Ground source technology is most appropriate in applications where a building has an ample amount of land to run pipes underground. Ground source geothermal technology can be retrofit to existing buildings or used in new construction.

The City does not currently prohibit geothermal systems, in fact, they would be permitted in Troy subject to building code provisions. There are no local incentives, however, and it is unclear if the City is able to do more than encourage renewable energy installations at this time. Potential future incentive zoning measures for projects with renewable may be feasible.

3

Currently, the City uses “green development” as a criteria for permitting PUDs.

Comprehensive potential energy data and a good understanding of the heating and cooling needs and potential payback is required to educate residents and businesses about geothermal energy. No special data is needed to permit or incentivize these installations.

4

E.RE.2

Funding Availability

This activity could be funded by the EECBG program, although the limited funding available to apply to this program versus others would mean that any incentive program involving assistance in funding would be undercapitalized. Free or inexpensive measures, like adding zoning incentives, would require no special funds.

3

Personnel/Resources

This measure, if it included financial incentives (similar to a facade improvement program in a DDA or using CDBG funds) would require sophisticated financial management. This may be available within existing staff, but could require outside accounting or legal professionals.

4

Potential Benefit/ Impact

If directly supporting owners with funds or resources, this measure may be difficult to implement, expensive to be successful, and ultimately benefit only a small number of businesses. Providing zoning incentives would be more easily and inexpensively achieved, but would require a more comprehensive approach in the zoning ordinance, as discussed in measure E.P.1.

3

Total Score: 17

This activity could be funded by the EECBG program, although the limited funding available to apply to this program versus others would mean that any incentive program involving assistance in funding would be undercapitalized. Free or inexpensive measures, like adding zoning incentives, would require no special funds.

3

This measure, if it included financial incentives (similar to a facade improvement program in a DDA or using CDBG funds) would require sophisticated financial management. This may be available within existing staff, but could require outside accounting or legal professionals.

4

If directly supporting owners with funds or resources, this measure may be difficult to implement, expensive to be successful, and ultimately benefit only a small number of businesses. Providing zoning incentives would be more easily and inexpensively achieved, but would require a more comprehensive approach in the zoning ordinance, as discussed in measure E.P.1.

3

Total Score: 17

Measure Worksheets

_external
measures

Permit/Incentivize Wind Energy On-Site

Sited near the building they serve, small wind turbines turn to convert wind energy into electricity, effectively reducing the amount of electricity from fossil fuels that a building may depend upon. Small “private” use turbines are tied into a building’s electrical system providing electricity only to one building, or to a small group of buildings. Under the right circumstances, turbines are as cost effective as conventional fossil fuel electricity. Modern private turbines can provide a positive return on investment in 5-10 years given proper conditions. The effectiveness of wind power is highly dependent on site conditions, and prevailing electric utility rate structures.

Feasibility

The City does have provisions permitting wind energy generators. There are no local incentives, however, and it is unclear if the City is able to do more than encourage renewable energy installations at this time, given it’s limited resources. Potential future incentive zoning measures for projects with renewable may be appropriate and feasible. Currently, the City uses “green development” as a criteria for permitting PUDs.

3

Data/Analysis Needs

Comprehensive wind energy potential data and a good understanding of the potential payback is required to educate residents and businesses about wind energy. No special data is needed to permit or incentivize wind installations.

4

E.RE.3.a

Permit/Incentivize Utility Scale Wind Energy

Utility-scale wind turbines are large machines that use wind power to create electricity for more than one home, business or facility. They are hundreds of feet in height, and require a team of professional engineers to plan for their installation. Utility-scale wind turbines can provide power for two to three hundred homes when producing near their peak performance. Governments with large tracts of land can enter into contracts with wind developers to rent their land. Municipalities can expedite the permitting process for these developers as an incentive to use utility scale wind generation, thereby making the application process more conducive to this scale of wind energy development.

Given the limited wind energy potential and high cost in Troy, large turbines are unlikely. The City does have provisions permitting wind energy generators. There are no local incentives, however, and it is unclear if the City is able to do more than encourage renewable energy installations at this time, given it’s limited resources. The Planning Commission has expressed potential concerns about large scale wind energy generators.

1

Comprehensive wind energy potential data and a good understanding of the potential payback is required to educate residents and businesses about wind energy. No special data is needed to permit or incentivize wind installations.

4

E.RE.3.b

Funding Availability

This activity could be funded by the EECBG program, although the limited funding available to apply to this program versus others would mean that any incentive program involving assistance in funding would be undercapitalized. Free or inexpensive measures, like adding zoning incentives, would require no special funds.

3

Personnel/Resources

This measure, if it included financial incentives (similar to a facade improvement program in a DDA or using CDBG funds) would require sophisticated financial management. This may be available within existing staff, but could require outside accounting or legal professionals.

4

Potential Benefit/ Impact

If directly supporting owners with funds or resources, this measure may be difficult to implement, expensive to be successful, and ultimately benefit only a small number of businesses. Providing zoning incentives would be more easily and inexpensively achieved, but would require a more comprehensive approach in the zoning ordinance, as discussed in measure E.P.1.

3

Total Score: 17

This activity could be funded by the EECBG program, although the limited funding available to apply to this program versus others would mean that any incentive program involving assistance in funding would be undercapitalized. Free or inexpensive measures, like adding zoning incentives, would require no special funds.

3

This measure, if it included financial incentives (similar to a facade improvement program in a DDA or using CDBG funds) would require sophisticated financial management. This may be available within existing staff, but could require outside accounting or legal professionals.

4

If directly supporting owners with funds or resources, this measure may be difficult to implement, expensive to be successful, and ultimately benefit only a small number of businesses. Providing zoning incentives would be more easily and inexpensively achieved, but would require a more comprehensive approach in the zoning ordinance, as discussed in measure E.P.1.

3

Total Score: 15

Measure Worksheets

_external
measures

Zoning to Promote Energy Efficiency

Adopt creative zoning provisions that require new buildings to be built in ways that minimize energy use and green house gas emissions. Such provisions could include allowing density bonuses and/or expedited site plan review for buildings that reach a certain level of green building. Additionally, zoning requirements could be altered to allow or even incentivize urban farming/vegetable gardens, on-site renewable energy production, landscaping on the southern exposure of homes, mixed-use development within residential areas, and district heating and cooling schemes.

Feasibility

This measure is currently underway as part of the City's comprehensive zoning ordinance rewrite project.

5

Data/Analysis Needs

No specific data is needed, but the input and will of the Planning Commission and City Council must be solicited.

5

E.P.1

Master Plan Provisions

A community's master plan is a document that establishes a long-range community vision. By examining current trends, engaging the public, and analyzing a community's past, a master plan provides guidance and strategies for local decision-making. Currently, communities are being challenged by more expensive, less available, energy. Long commutes, expensive food, a low density development pattern, and an expensive supply of electricity are all elements that contribute to the energy crisis that can be addressed in a master plan. As energy prices get even higher and resources become more scarce, those communities that have not planned accordingly will be at a large disadvantage.

Communities frequently review and update master plans. This measure involves the incorporation of new energy-specific issues and a reassessment of existing issues in the context of energy. The 2008 City of Troy Master Plan already includes an entire chapter on green development and efficiency, much of which inspired the City to complete this REAP project.

5

No special information or data is needed.

5

E.P.2

Funding Availability

This could be funded partially by the EECBG program, if the project was not already funded from other means. This project will be accomplished using funds that have been set aside for the zoning ordinance.

5

Personnel/Resources

This measure is being handled collectively by the City's Planning staff, Planning Commission, and Planning Consultant.

5

Potential Benefit/ Impact

This easy to implement measure can have a large impact in terms of promoting energy efficiency throughout the City by offering zoning incentives to developers. Typically, the incentives, like parking reductions and density bonuses, themselves contribute to energy efficiency. The energy efficiency of private developments within Troy will have a positive impact on redevelopment and quality of life in the community.

5

Total Score: 25

Planning activities related to energy efficiency improvements are eligible for EECBG funding. Many of the initiatives that are paid for as part of developing an energy conservation strategy can be applied to planning, and when the City of Troy Master Plan is due for a review, this report and the EECS will be available to inform that revision.

5

This measure has been handled collectively by the City's Planning staff, Planning Commission, and Planning Consultant.

5

While it is difficult to quantify the immediate benefit of revising a Master Plan, it is a critical document that establishes other quantifiable measures and a series of goals. It establishes the community's vision of itself for the future and informs decision making in all areas of government.

5

Total Score: 25

Measure Worksheets

_external
measures

Urban Gardening Programs

Intent

The U.S. has highly developed food production and distribution networks that have become so advanced that most consumers have no idea where their food came from or how it was produced. Most of the time, the food we eat comes with great investments in energy, in the form of chemical fertilizers, petroleum powered farm machinery, hormone production and use, and transportation to get the food to market, among other costs. When people in cities have the ability to grow their own food, they reduce the energy used to produce food and have it shipped to market. Further, growing food locally increases health consciousness and reduces vehicle trips.

Feasibility

Urban gardening does exist in Troy, although the City does not provide or facilitate such a program. Given the availability of space within large City parks, the relatively low cost for the City to initiate a program, and the potential for revenue to support the program, it certainly is feasible, if not probable in the current economic climate.

Data/Analysis Needs

Estimated participation and fees would be necessary to determine if the project's cost could be offset by participant revenue. It would take publication and marketing to get interested parties to commit to the program.

4

4

E.P.3

Construction Waste Reduction

Deconstructing buildings rather than demolishing them can be a valuable part of sustainable building construction, as it allows for the possibility of reuse. Preparing for reuse with bins on-site for organizing materials can streamline the process. Scrap materials can be used in a variety of ways. For example, leftover masonry can be crushed and used for fill, leftover rigid insulation can be used as ventilation baffles, and scrap lumber can be used as compost. Additionally, materials can simply be collected and distributed to recycling centers. Municipalities can establish waste benchmarks and incentives, as well as, provide recycling facilities and education opportunities for construction companies.

This measure is largely accomplished voluntarily by contractors who find that they can profit from recycling construction debris and can gain LEED or other green building points for recycling. The City can incentivize green building generally and recognize construction waste management as a component of green building.

Depending on how the City were to accomplish encouragement of construction waste management, the measure could require cash analysis of construction debris and a plan on how to recycle that debris.

3

4

E.BC.1.a

Funding Availability

While not specifically mentioned in the legislation of the Energy Efficiency and Conservation Block Grant program, it is in line with the intention of the bill. However, it would not result in an immediate, measurable reduction in energy usage, so it may be complicated. Urban gardening could be funded by participant subscription fees.

4

Personnel/Resources

To initiate the design and construction of an urban gardening plot, some special assistance may be required. However, most maintenance and setup for the facility after initial construction is completed by participants.

5

Potential Benefit/ Impact

This measure could be profitable, or break-even, with a stable subscriber base. However, it would take an initial outlay of City funds to initiate, and a host of new issues regarding liability, traffic, and protecting plants from other park users, may diminish the return. Also, this project would not provide an immediate energy savings directly to the City.

2

Total Score: 19

Managing waste and promoting recycling is within the bounds of many grant programs, including the EECBG. Also, private partners who have developed systems to profit from recycling and developers who know how to repurpose construction materials can bear the majority of any costs anticipated with the encouragement of construction waste management.

5

Experienced contractors and waste management professionals are the best source of information with regard to effective waste management. The encouragement of recycling and reducing construction debris would best be performed by consultants to the City.

3

The management of waste from construction and encouragement of recycling is an important goal on a large scale. There is little to be gained immediately in terms of energy use, however, by the City of Troy for financing a program to encourage construction debris management. At a maximum, the City could include debris recycling as a stated item when it developed green building materials or zoning incentives for efficient design.

1

Total Score: 16

Measure Worksheets

_external measures

	Intent	Feasibility	Data/Analysis Needs
Recycling Facilities	<p>Providing recycling facilities to encourage product reuse is a valuable part of sustainable living. Less waste directed to landfills means improvement in the environment, lower transportation costs, and lower energy consumption. This measure can be enacted in tandem with construction waste recycling. Offering reuse options in concert with recycling facilities is also an important element of reducing the amount of waste generated by a community.</p>	<p>The City of Troy already participates in a regional recycling facility program, and offers curb side pickup and regular curb side trash and compost pickup as well. The City uses private contract waste haulers.</p>	<p>Extensive data with regard to potential trash and recycling revenue and the long-term effects of providing a City-owned recycling facility would be required.</p>
		0	2

E.BC.1.b

Green Building Guideline Manual	<p>Developing a green building manual will enable the community to guide developers and residents to appropriate options for energy efficiency and waste reduction. Energy efficient means may include ways to improve indoor air quality, increasing energy and water efficiency, conserving natural resources and planning for a livable, vibrant community. By defining the community's green initiatives, developers and residents can be educated on the most suitable ways to conserve/reduce energy consumption in their community.</p>	<p>The only impediment to producing a green building manual is cost, but there are no regulatory or other obstacles that would prevent the creation of such a document.</p>	<p>A thorough understanding of green building would be required in order to authoritatively produce this document. Such expertise could be contracted.</p>
		3	5

E.BC.2

Funding Availability

Given that the City already provides access to this service, funding is in place. There are many sources of revenue for waste hauling and recycling can often be profitable, depending on the program.

5

Personnel/Resources

This measure can be accomplished with dedicated waste management staff, or with a qualified contractor. The City uses contract hauling services and participates in a regional recycling facility program.

5

Potential Benefit/ Impact

This measure is in place in Troy. Troy residents have access to extensive recycling services. There is no benefit to pursuing new recycling initiatives in Troy.

0

Total Score: 12

Public education projects related to energy efficiency may be eligible for EECBG funds, however, it would be difficult to quantify energy savings anticipated as a result of the project. That said, this would be a relatively inexpensive measure with a high return in terms of assisting applicants in selecting green options. It could also have an economic development component,

4

connecting developers and contractors with green building suppliers.

The development of a green building manual would likely be completed by a consultant on contract to the City.

4

This measure could assist the City in working with the development community, especially if the City were to incentivize green building. In other words, such a document could connect developers with suppliers, inform the developers of the green elements the City is encouraging, and provide resources that could save time and money in the design and entitlement process. It may not

4

result in any immediate energy savings, but could have long-term benefits.

Total Score: 20

Measure Worksheets

_external
measures

Expedited Permitting

An opportunity made possible by establishing a green building manual and green building zoning standards is the implementation of an expedited permitting process for projects that meet these specific criteria. An expedited permitting process can be a critical factor for a developer in that the costs associated with the entitlement process can be reduced. Allowing expedited review and permitting for green building projects will not only provide an incentive to the developer, it can help the community meet its long-term energy reduction goals.

Feasibility

Given the low volume of applications and efficiency of the streamlined building and planning departments at the City, permitting is currently a relatively efficient and rapid process in Troy. The applicants' materials are distributed and reviewed digitally, making for fast turnover. There is little to no room to make the process even faster at this time. In the future, should volume increase substantially, the City may be in a better position to capitalize on this measure.

1

Data/Analysis Needs

No data is required for this measure, other than a set of standards used to make a determination that a project would qualify for expedited permitting.

4

E.BC.3

Density Bonuses

Density bonuses can be used to encourage energy efficient development by granting a greater development yield to the owner. Density bonuses are earned by the developer meeting certain sustainable living requirements, i.e. greater energy efficiency per unit, reduced parking area, natural resource preservation, low-impact stormwater management, etc. By clearly defining terms which must be met by the developer, a community can allow for an increase in the density of a development and institute an expedited review process.

The City does use energy efficiency as one of several qualifying criteria for Planned Unit Development approval. PUDs can gain density through their unique process. In other words, the City has already begun to adopt incentive zoning for energy efficiency. This could be expanded in the comprehensive zoning rewrite project.

5

No specific data or information would be required to implement this measure, but there would be a necessary process with the Planning Commission and City Council to determine the standards and appropriate levels of bonus for energy efficiency.

5

E.BC.4

Funding Availability

While not specifically mentioned in the legislation of the Energy Efficiency and Conservation Block Grant program, it is in line with the intention of the bill. This measure would really require very little to no funding to implement.

5

Personnel/Resources

A LEED AP or other qualified green building professional would be required to design the application and standards for expedited permitting, and staff would be required to receive training to recognize such an application and determine if it meets the standards.

4

Potential Benefit/ Impact

This measure could increase the number of energy efficient developments that are proposed in Troy. With education, developers would come to recognize that energy efficiency helps projects get through the entitlement process faster in Troy, building a culture of green building. Greener buildings result in less demand for public services and a net benefit to the City in the long-term.

4

Total Score: 18

The EECBG program will cover the development of local regulations geared towards energy efficiency, and the has already initiated and funded the comprehensive zoning rewrite project.

5

Planning and zoning consultants, working with City Staff, are capable of developing these standards and working with the Planning Commission and City Council to get them revised and approved.

5

This measure would help the City achieve a series of goals laid out in the 2008 Master Plan, Big Beaver Corridor Study, and Vision 2020 project. It would encourage developers to build dense projects with green features in urban locations, and possibly with a mix of land uses. It has been shown that these measures will have a long-term benefit to the City of Troy in terms of economic development and quality of life.

5

Total Score: 25

Measure Worksheets

_external
measures

Green Building Proficiency Education

Establishment of a green building manual and green building zoning standards can educate builders on best practices in energy conservation. After development of specific standards, outreach can be provided to builders in the form of offering additional information via website, workshops oriented toward specific green building options, and by providing energy efficient suggestions through staff review.

Feasibility

Should the City produce a green building manual, provide zoning incentives for green building, and continue to support new methods of development, this measure would help the City achieve those goals. By bringing in qualified instructors and providing free or subsidized education to potential developers and owners, this measure could help initiate a groundswell of green building.

5

Data/Analysis Needs

A qualified instructor would likely be hired to achieve this measure, and would have all the information necessary to produce such a program.

5

E.BC.5

Non-Motorized Transportation Plan

A non-motorized transportation plan offers opportunities to establish connectivity via transit, bikeways, greenways, and walkways. These various non-motorized alternatives assure pedestrian and bike safety, while reducing resource use, auto emissions, energy conservation, and promoting a healthy lifestyle. The plan should take community interests into consideration, and should result in a better environment on roads for both drivers and non-drivers.

The City has already contracted with a private group and completed a draft of a City-wide pathways plan, making this measure obsolete.

1

A comprehensive understanding of the existing and potential local and regional non-motorized pathway network, commuting habits, and transit options.

5

E.T.1

Funding Availability

The EECBG program will cover the development of local regulations geared towards energy efficiency, and would fund education programs to promote those regulations. This could also be achieved by leveraging private and in-kind donations from contractors and green building suppliers who would benefit from the exposure.

5

Personnel/Resources

This measure would require a series of qualified instructors hired or who would volunteer to help achieve this measure, as well as existing City staff.

4

Potential Benefit/ Impact

This measure would help the City achieve other measures related to promoting green building in the community. It would help achieve a series of goals laid out in the 2008 Master Plan, Big Beaver Corridor Study, and Vision 2020 project. It has been shown that dense energy efficient projects will have a long-term benefit to the City of Troy by attracting new demographics and reducing demand for public services.

5

Total Score: 24

The EECBG program would fund transportation programming like this, but this project has already been completed in Troy, and is awaiting action at the City Council level.

3

A team of consultants worked with the City Parks and Recreation staff to develop a Pathways Plan draft.

5

There is little benefit to pursuing this measure, as the City has already drafted a Pathways Plan in the recent past.

1

Total Score: 15

Measure Worksheets

_external
measures

Bike Lanes

As legal vehicles, bicycles should travel on the street. This is often difficult given motorists' resistance to bicyclists in their lane. Providing bicycle lanes that meet AASHTO guidelines is one of the best ways to promote safe biking and driving in cooperation. Bikers and drivers alike tend to obey the traffic laws more effectively in the presence of bike lanes. Pedestrian and biker safety are increased when bikers travel on the street. The more conducive streets are to bicyclists, the more likely people are to consider biking a viable alternative to driving.

Feasibility

This is a long-term measure. It is costly to install bike lanes in many cases when the bike lane is the only component of the project. However, the City's long-term streets projects could potentially integrate bike lanes as roads are resurfaced, widened, or otherwise improved.

3

Data/Analysis Needs

Fully engineered analysis and design of roadways under consideration.

5

E.T.2

Public Transit Ridership Incentives

Incentivizing public transit ridership is one way to decrease excess driving, which creates expense and additional fuel consumption. Businesses can encourage public transit ridership via free transit passes or "parking cash-outs," in which an employer gives employees the choice of a parking space at work or a cash payment upon giving up the parking space. Parking cash-outs have been shown to reduce driving to work by 20% or more. Companies can also create shuttle systems to drive people to and from public transit stations. Public transit ridership often increases due to increased service frequency and hours of operation, coordination between modes of transportation, improved stops and stations, lower fares and discounts, transit/cycling coordination, and multi-modal access guides.

This measure is difficult to implement at this time, due to a lack of adequate public transit to many areas within Troy. However, this is a measure that the City should consider in the long term as the Transit Center and other regional improvements take place.

1

A good understanding of local transit options and an analysis of how many potential workers and residents could benefit from an incentive program to understand the potential benefits. Such an analysis could be difficult to complete accurately and affordably.

4

E.T.3

Funding Availability

Transportation programs, including the installation of non-motorized pathways, are included in the EECBG eligible projects. There are also a variety of transportation and bicycle advocacy grants available, as well as other public funding for bike lanes and pathways. Also, they can be integrated with other funded projects.

5

Personnel/Resources

Qualified transportation engineers must design and integrate bike lanes into existing road projects. The City has access to an experienced traffic engineering staff and qualified consultants.

5

Potential Benefit/ Impact

Bike lanes are most often cited by residents polled with regard to transportation improvements. Improved bike access throughout the City is supported by the Master Plan and Vision 2020. By installing bike lanes, the City would be providing an amenity that could help to attract new demographics, including young families and professionals, to Troy.

5

Total Score: 23

EECBG funds could potentially contribute to this sort of program, but would not be sufficient to make an impact without additional funding. Such projects are often funded by DDAs, however the City's DDA may not have the capital to achieve such a program at this time.

2

Dedicated employees would be required to administer this sort of program, most likely in partnership with regional transit organizations. It is unlikely that such a program could be absorbed by existing staff, given the amount of time and expertise required.

3

While transit ridership incentives have been shown to increase ridership when well-funded in transit-rich areas, the lack of good transit right now would likely hinder the success of such a program. Once transit access improves, such a program should be considered.

2

Total Score: 12

Measure Worksheets

_external
measures

Transit-Oriented Development

Transit oriented developments (TODs) are those which have a concentration of land uses around a transit station or transit corridor (within ¼ mile or a 5-7 minute walk), generally characterized by moderate to high density residential development, mixed-uses, reduced parking, and a pedestrian orientation. Developers tend to make their decisions for how and where to develop based on return on investment – a TOD can be perceived as riskier for a developer, but as transit becomes more popular, TOD type development will increase in popularity as well. Providing incentives for TODs such as tax exemptions, expedited permit review processes, and density bonuses will motivate developers where TODs are being considered.

Feasibility

The City is actively pursuing TOD projects by creating the Transit Center Master Plan District, jointly planning with the City of Birmingham, building a new Transit Center, and funding the zoning ordinance rewrite, which will create TOD provisions for the area. This measure is already underway.

5

Data/Analysis Needs

A good understanding of the principles and opportunities of TOD.

5

E.T.4

Funding Availability

Developing new ordinances encouraging energy efficient developments like TODs could be funded by the EECBG program; however, this measure is already underway and already funded.

5

Personnel/Resources

This measure is being achieved by a partnership between the elected and appointed officials of the City of Troy, the City of Birmingham, and the staff and consultants of each community.

5

**Potential Benefit/
Impact**

This measure is already underway in Troy.

3

Total Score: 23



Energy Efficiency & Conservation Strategy

Introduction:

Energy Efficiency and Conservation Block Grants (EECBG) provide funding opportunities for specific projects related to the implementation of the Rapid Energy Assessment Process (R.E.A.P.). This document illustrates the City of Troy's priorities in energy conservation, therefore illustrating the community's energy efficiency and conservation priorities. EECBG funds made available to the City in 2009 total \$906,100.

What is the Energy Efficiency and Conservation Block Grant Program?

In January 2007, the United States Congress passed the Federal Energy Independence and Security Act which authorized both the increase in the Corporate Average Fuel Economy for automobile manufacturers by 2020, and the Energy Efficiency and Conservation Block Grant (EECBG) program. The program was ultimately funded in 2009. The program is intended to provide money for a wide range of local government activities that:

- Reduce fossil fuel emissions
- Decrease total energy consumption
- Improve energy efficiency in the transportation, building, and other energy consuming sectors
- Spur economic growth
- Create and/or retain jobs

Program Eligibility:

Cities with a population of 35,000 or more, including Troy and counties with 200,000 or more are entitled to a grant from the U.S. Department of Energy.

Eligible Activities:

The following are examples of eligible activities specified in the EECBG legislation:

- Development of an Energy Efficiency and Conservation

Strategy and technical consultant services to assist in the development of such strategy

- Residential and commercial building energy audits
- Financial incentive programs for energy efficiency improvements
- Grants to nonprofit organizations and governmental agencies for the purpose of performing energy efficiency retrofits
- Energy efficiency and conservation programs for buildings and facilities
- Development and implementation of transportation programs to conserve energy, including non-motorized plans, flexible work schedules, promotion of zoning requirements that require energy efficiency
- Building codes and inspections to promote building energy efficiency
- Energy distribution technologies that increase energy efficiency, including distributed generation, combined heat and power, and district heating and cooling systems
- Material conservation programs including source reduction, recycling, and recycled content procurement programs that lead to increases in energy efficiency
- Reduction and capture of methane and greenhouse gases excluding carbon capture or sequestration from power plants
- Energy efficient traffic signals and streetlighting
- Renewable energy technologies on government buildings
- Any other appropriate activity that meets the purposes of the program and is approved by the Department of Energy

City of Troy’s Strategy:

The City of Troy’s proposed Energy Efficiency and Conservation Strategy focuses on the following goals. These goals will be met through the implementation of a broad range of new energy conservation technologies:

1. Implement technologies that will provide the City with the most significant energy savings in operating its administrative campus and other public facilities.
2. Implement technologies that will save the City money in terms of installation, operation, and maintenance of its public facilities.
3. Implement technologies that demonstrate to the public new ways to conserve energy that can be transferred to residential, office, and industrial settings.
4. As described by the actions included in the strategy, all energy and cost savings will be monitored, quantified, and reported to the City's residents to encourage implementation of new technologies in local homes and businesses.

City of Troy's Activities:

The City of Troy's planned activities are:

City municipal facilities audits: The eleven buildings being audited were identified as the poorest energy performers of the City's facilities for which the City pays the energy costs. This is determined through an analysis of annual energy usage. These audits will identify physical and operational improvements that will make the buildings more energy efficient. After improvements have been installed, the energy use of the buildings will be monitored and savings reported to the public. The goals of implementing these audits are to conserve energy, save tax dollars spent on municipal operations, and demonstrate to residents and visitors the benefits of new energy saving building technologies, encouraging them to adopt similar measures in their homes and businesses.

Budget: The eleven buildings to be audited total approximately 303,379 square feet in area, therefore the cost to audit all eleven buildings at \$0.14 per square foot equals an estimated \$42,473.

.....

Implementation:

- Solicit bids, rate, and choose contractor to conduct energy audits for 11 high-priority City buildings.
- Contractor to conduct energy audits, draft report, and review with City staff. Finalize report.
- Contractor and City staff to present final report on energy audits to City Council. City Council to review and approve energy efficiency building projects recommended in energy audits.

Energy improvements for high-priority City buildings:

Upon conclusion of the energy audit process, the City will then make the improvements that promise the most significant energy savings. After the improvements have been installed, the energy use of the buildings will be monitored and savings reported to the public. The goals of installing energy saving building improvements are to conserve energy, save tax dollars spent on municipal operations, and demonstrate to residents and visitors the benefits of new energy saving building technologies.

Budget: The results of the energy audits will better determine the cost of making the energy efficient building renovations. However, replacement of the boiler at City Hall has already been identified as an energy efficient measure. The City intends to install two smaller, more efficient boilers that will use significantly less energy than the existing system. In addition, each building was allocated \$0.78 per square foot for renovations. It is estimated that 45% of the total project cost will be for supplies, and the remaining 55% for labor \$365,643 (\$106,085 Supplies, \$169,558 Contractual, \$90,000 Equipment).

Implementation:

- Solicit bids, rate, and choose contractor to install energy efficient building improvements recommended by energy audit results. (NOTE: Lighting work will be combined with installation of outdoor City campus and roadway lighting improvements, outlined below).
- Contractor to install building improvements under supervision of City staff.

- Monitor energy savings due to building improvements.
- Report quarterly energy savings to the public to encourage similar improvements in residential, office and industrial settings.

LED lighting improvements: As part of the a comprehensive effort, the City will also install LED lighting at its administration campus and along City roadways. The project scope of the outdoor lighting improvements is a result of an energy reduction analysis conducted for the City in 2009. It is estimated that the LED installations specified will save the City \$15,685 in electricity annually, and will also significantly reduce, and nearly eliminated maintenance costs. The LED lighting will also result in significant energy reduction in energy usage, estimated to be up to 60% over the current fixtures. Energy savings will be monitored and reported to the public, encouraging similar modifications at residential and business properties.

Budget: The City has been working with a lighting consultant to determine the potential for retrofitting internal and external lights at five (5) municipal locations – the city hall, police department, library, court house and fire training warehouse. Existing fixtures were evaluated, and LED alternative fixtures proposed. A schedule of new light fixtures was prepared that identifies 502 fixtures that could be converted to LED. Installation of the fixtures was estimated at \$150 per fixture. This totals \$293,984 (\$218,684 Supplies; \$75,300 Contractual).

Implementation:

- Solicit bids, rate, and choose contractor to install LED lighting improvements at City buildings, in City campus parking lots, and along City roadways.
- Contractor to install lighting improvements under supervision of City staff.
- Monitor energy savings due to lighting improvements.
- Report quarterly energy savings to the public to encourage similar improvements in residential, office and industrial settings.

Wind energy project: Another demonstration and encouragement to the public to support alternative energy generation includes installation of two smaller-scale vertical axis wind turbines, to determine their feasibility for widespread adoption. These wind energy conversion systems will reduce the City's dependence on electricity generated from coal or other non-renewable resources.

Budget: The City has research available wind energy conversion systems that would be appropriate for installation at the City's municipal campus. The system chosen met the City's goals for demonstrating alternative energy sources in a developed setting. The installed cost for each wind energy conversion system was quoted at a maximum of \$12,000 per unit. This price includes the system, installation at the proposed site, and the electrical hook up. Because the actual installation cost is unknown at this time, it is estimated that each system will cost \$5,400 (45%), and the installation will cost \$6,600 (55%). Therefore, two systems will total approximately \$24,000 (\$10,800 Supplies, \$13,200 Contractual).

Implementation:

- Solicit bids for wind energy conservation system (WECS), rate proposals and choose product supplier.
- Work with manufacturer to identify qualified contractors to install WECS. Solicit bids, rate, and choose contractor.
- Contractor to install WECS under supervision of City staff and product manufacturer.
- Monitor energy savings due to WECS.
- Report energy savings to the public to encourage similar improvements in residential, office and industrial settings.

Transportation projects: The City will take advantage of their regularly-scheduled fleet purchases to upgrade between 18 and 30 vehicles to hybrids over the period of the grant. Each year would provide approximately \$6,000 to \$10,000 per vehicle for each vehicle, for a total grant obligation of \$180,000 over three years to cover the difference between a conventional vehicle and the hybrid or alternative fuel version.

The City of Troy has replaced, on its own, several conventional vehicles (Ford Escape SUVs) with hybrid alternatives (Ford Escape Hybrids) when they were due to be replaced, and has realized up to a 50% fuel efficiency increase.

Budget: The cost of this program is the difference between purchasing a conventional vehicle and an alternative energy or hybrid vehicle. The estimated increment is \$6,000 to \$10,000 per vehicle, and the City is proposing to replace 18 to 30 vehicles over the grant period, costing a total of \$180,000 of equipment.

Implementation:

- City to purchase hybrid vehicles as part of regularly-scheduled annual capital improvements.
- Monitor energy savings due to hybrid vehicle purchases.
- Report energy savings to the public to encourage similar improvements in transportation choices.



Carlisle / Wortman 2010
Rapid Energy Assessment Process Report