

## **MEASURES TO REDUCE GREENHOUSE GASES FROM ENERGY USE**

### **ENERGY TRENDS**

In 1990, the Fort Collins community's consumption of electricity and natural gas accounted for approximately 898,000 tons or 66% percent of all CO<sub>2</sub> locally emitted into the air. This number is expected to nearly double by 2010, in the absence of energy conservation measures. In addition, per capita CO<sub>2</sub> emissions from local energy consumption show a modest increase. In 1990, 10.23 tons of CO<sub>2</sub> were released per person (including residential, commercial, and industrial energy use). In 1995, the number increased 3% to 10.57 tons of CO<sub>2</sub> per person. The 2010 forecast shows per capita greenhouse gas emissions from energy consumption increasing to 11.33 tons per person, an 11% increase over 1990 levels.

### **Electric Industry Deregulation**

With impending deregulation of the electric utility industry in many states, utilities are striving to become as competitive as possible by reducing their expenses. In many cases, this means a decrease in support for energy conservation programs, at a time when evidence of global warming indicates conservation programs are needed. According to an October, 1998 report by the Environmental Working Group and World Wildlife Fund, between 1993 and 1997, U.S. utilities cut their combined investment in energy saving programs by 45%. These cuts forced consumers to spend over \$1 billion more than needed on electric bills (*Home Energy*, Jan/Feb 1999, pg. 7).

Under potential deregulation, utilities are also striving to diversify in order to extend their potential customer base. This often means addition of renewable energy sources such as wind, despite added costs. The Fort Collins Utility has already successfully implemented a Wind Power Pilot program, offering voluntary purchase of wind power at a higher rate.

It is unclear what direction electric deregulation will take in Colorado. What is certain is that customers will be able to choose who provides the electricity they use. The market uncertainties make it more difficult for utilities to commit to programs that will position them unfavorably in a competitive market. However, this concern must be weighed against the financial and environmental losses that may occur in the absence of steps toward increased sustainability and decreased greenhouse gas emissions.

### **Wind Energy in Fort Collins**

#### Wind as Renewable Energy Source

Wind energy, along with solar energy, is considered a "Tier 1" renewable resource. Both of these renewable resources are more expensive in electric utility applications than conventional resources, however, in most instances wind energy has a significant economic advantage over solar.

The general exception is for situations in which an electric system infrastructure does not exist and the economics of a solar system are improved by avoiding the cost of constructing that

infrastructure. Solar is currently a viable option in a number of remote location applications. In these instances, the solar system is typically integrated with a local battery design to provide reliable power.

The most cost-effective wind systems are large and well integrated with a conventional electric system. Wind energy costs are driven primarily by capital, financing, operation, and maintenance over the amount of electrical energy produced during a turbine's lifetime.

### Wind in the Deregulated Electric Marketplace

There are concerns that deregulation of the electric utility marketplace will put more pressure on prices and reduce the ability of utilities to invest in renewable energy resources. In states that have already opened electricity markets, "green energy" is one alternative being offered to consumers. In all instances, these "green" resources represent a premium energy resource that is more costly than conventional resources. While customer choice for green energy options is seeing some acceptance, additional regulatory requirements are being considered to ensure a minimum amount of green energy is included in the electrical energy mix. In Colorado, there is discussion of including a green energy requirement in any deregulation legislation. If this approach is taken, the percentage could likely be 2-4% of a supplier's energy sales from renewables.

### Wind as Energy Resource vs Capacity Resource

In general, electricity has two fundamental components; energy and capacity. Energy can be thought of as the fuel that is consumed to serve consumers' needs. One kilogram of coal will produce enough electricity to light a 50-watt light for about 35 hours. Capacity can be thought of as the system or hardware that is required to meet varying requirements. In the above example, if ten 50-watt lights were required at one time rather than one, a system with 10 times more "capacity" would be required. Capacity can also be understood in terms of timing, and the ability to provide energy at the time it is needed.

Because of the intermittent nature of wind resources, wind generation has little or no value as "capacity" to electrical energy because wind does not necessarily blow when electricity is needed. While wind is a viable energy resource, its lack of significant capacity value diminishes its economic value. This concept is significant in understanding the level of "green pricing" support required for wind projects. As noted above, the same issue generally exists for solar energy and it is normally dealt with through the use of storage batteries.

As an aside, it is worth noting that from the perspective of serving the electrical requirements of the Fort Collins community, current need is for more capacity to cover high demand periods. The wholesale power supplier, Platte River Power Authority (PRPA), will strive to meet needs in the near future, but, again, investments in wind energy will not address the need for added capacity.

## **CITY ENERGY POLICY**

With passage of the City's comprehensive management plan, *City Plan*, in 1997, a clear commitment to energy conservation was stated in the following policies:

**ENV-1.23 Global Climate.** The City will employ strategies to increase energy efficiency and the use of renewable energy sources (except residential woodburning), in order to reduce the impact of the Fort Collins community on global warming.

**ENV-4.** Energy efficiency and use of renewable energy resources will be encouraged, facilitated, and regulated in both the public and private sector through information and educational services, financial incentive programs, requirements and incentives in the planning process, and enforcement of regulations such as the Energy Code.

**ENV-4.1. Renewable Energy.** The use of solar energy and other renewable resources are recommended energy sources.

**ENV- 4.6 Remove barriers to renewable energy use.** The City will eliminate unnecessary barriers to utilization of renewable energy resources in new and existing buildings which arise through application and enforcement of City Codes.

**ENV-4.7 Renewable energy in new development.** The use of renewable energy resources should be considered in the layout and construction of new development.

**ENV-4.9 Additional policy development.** Comprehensive policies will be developed to encourage the use of alternative forms of energy, such as wind-generated power and solar energy.

In addition, sustainability is one of four core community values articulated in *City Plan*. Sustainability is defined as the long-term social, economic, and environmental health of the community. Energy efficient building practices are cited as one of the approaches that will help make Fort Collins a sustainable community.

In 1997, Fort Collins City Council passed Resolution 97-51, outlining the Utility's role as energy provider, user, and educator. This resolution states:

**"That as a user of energy,** the City administration shall, in design and construction of all City facilities, emphasize and utilize the latest, available, proven technologies to provide energy efficient and cost effective heating, cooling, lighting and hot water services in buildings owned, co-owned or leased by the City for municipal purposes. In particular, the City will utilize in the construction and remodeling of City facilities the most current solar heating technologies for hot water heating that are suitable for such facilities, using the expertise and resources of the City's electric utility staff in identifying and/or developing such technologies. The City shall also regularly evaluate the latest technologies utilizing alternative fuels for transportation and, to the greatest extent practicable, apply such technologies to the operation of City vehicles in order to provide energy efficient transportation.

## **ENERGY MEASURES**

**That as a supplier of electrical energy**, the City shall seek to encourage among its customers the wise, efficient and conservative use of electricity. Accordingly, electric utility rates shall be designed not only to be non-discriminatory and to cover the costs of service, but also to provide, to the extent authorized by law, pricing structures that encourage use patterns which will conserve energy and result in the most efficient and economical use of the City's electric supply system.

**That as community leader**, the City should also regularly evaluate means by which City-wide demand and usage of fossil fuels can be reduced and should attempt to develop means by which it can further such goals, through the City's role as educator, promoter and regulator. Accordingly, the City's energy-related work plans should address:

- (1) the identification of total energy usage by fuel type and by end usage type,
- (2) the development and adoption of measurable energy demand management goals,
- (3) the identification and prioritization of demand management opportunities in the areas of education, promotion and regulation, and
- (4) the implementation of selected demand management strategies not only for City facilities but also for the City as a whole.

Sec. 6. That the City Manager shall annually evaluate the progress of City staff and City Boards and Commissions in implementing the policies established under provisions of this Chapter and to submit to the City Council a report and recommendation regarding the same no later than December 31 of each calendar year. “

## **ENERGY MEASURES**

Seven “New” and two “Pending” measures were evaluated by the Staff Technical Team and the Citizen Advisory Committee for their cost-effectiveness in reducing greenhouse gas emissions that result from energy use. These measures, presented in order of their ranking, are discussed in detail below.

### NEW

- Replace Traffic Signals with LED's
- Increasing Utility Commitment to Wind Energy through Green Pricing Programs
- Optimization of City's WasteWater Treatment System
- Reduce Energy Use in City Government Buildings by 15% (from 1990 levels), Per Gross Square Foot
- City Government Purchase of WIND POWER
- Develop a Commercial Green Building Program
- Lobby for Mandatory Renewables in Deregulation (or Comparable Energy Conservation Measures)

### PENDING

- Increased Voluntary Energy Efficiency Training for Builders
- Develop a Residential Green Building Program

**Replace Incandescent Traffic Signals with Light Emitting Diodes (LED's)**

**Status:** New Measure  
**Staff Team Ranking:** 1<sup>st</sup> out of 12 New Measures  
**Citizen Committee Ranking:** 1<sup>st</sup> out of 12 New Measures

**Estimated CO2 Savings in 2010:** 3,137 tons/yr (if all 202 intersections have LED's Reds and Don't Walks)

**Supporting Policy direction:**

Resolution 97-51:

**As a user of energy** the City administration shall, in the design and construction of all City facilities, emphasize and utilize the latest, available, proven technologies to provide energy efficient and cost effective heating, cooling, lighting and hot water services.....

Resolution 97-97:

“The Council intends for the City to take a leadership role in increasing energy efficiency and reducing greenhouse gas emissions from municipal operations”

PRINCIPLE ENV-4:Energy efficiency and the use of renewable energy will be encouraged, facilitated, and regulated in both the public and private sector .....

Policy ENV 1-13. Innovations. The City will consider adoption of successful air quality improvement strategies in effect elsewhere, including municipal practices, public information campaigns, incentive/promotion programs, and regulations.

**Description:**

The conversion of traffic signal red light bulbs from incandescent lamps to LED's is a growing practice across the nation. LED's consume less energy, have a longer life, and require less maintenance.

In 1997, the City conducted a pilot test of red LED's and “Don't Walk” signs. The results indicated that LED's would save \$1.46 /signal/day in electrical costs. Generally, LED's pay for themselves in three to four years, and have a life span of seven to ten years. In Fort Collins, installation of LED's directly supports the Traffic Operations Department's highest priority of preventive maintenance, since they require significantly less maintenance.

As of 1999, the City has already installed 28 intersections (336 LEDs, at 12 signals per intersection) with red LED signals. If the City installs all new traffic signals using LED reds and Don't Walks (an estimated 4 new intersections per year), and retrofits all existing intersections in the next budget cycle (2000-2001), this would cost the City \$286,000 for the retrofits, and \$8,500/year for new signal installation (at a cost of \$2,132 per intersection, each intersection having 12 LED reds and 8 Don't Walks). However, the City would have saved a cumulative \$992,650 by 2010. This cost savings is based on an energy savings of 13,627 kWh/intersection/year (metered results at Drake and Taft) at an energy cost of \$0.043/kWh (traffic signal electric rate).

**Implementing Department:** Streets

**Recommended Timeframe for Completion:** 2000 for retrofits, ongoing installation of new LED's

**Recommended Approach for Implementation:**

A cost-benefit analysis has been conducted, indicating a 3 year payback for complete Red and Don't Walk signal retrofit. Creative funding mechanisms are currently being explored. (Total NEW Cost is \$371,000; total savings realized by 2010 is \$993,000; Net savings is \$622,000 by 2010.)

**Estimated Implementation Cost:** \$370,968 by 2010 total NEW costs (\$286,000 in 2000 for retrofits; \$8,528 each year thereafter for installation of four new signals/yr.)

**Estimated Annual Operating Cost:** EXISTING staff resources to install the signals

**Potential Funding Source(s):** General fund; productivity savings, etc.

**Annual Cost Savings:** \$ 101,961 in 2010

**Cumulative Cost Savings:** \$ 992,650 in 2010.

Productivity savings due to decreased maintenance.

**Other Benefits:**

- 1) Save tax payer dollars
- 2) Reduce preventative maintenance costs (each relamping costs ~\$20 in staff and truck time)
- 3) Reduce costs of emergency relamping
- 4) Reduce liability for accidents due to burned-out signals
- 5) Saves in the disposal of many used light bulbs per year
- 6) Reduce Air Pollution Emissions that contribute to visibility degradation and health problems:
  - Reduce 0.3 tons Nitrogen oxides/yr
  - Reduce 0.4 tons sulfur oxides/ year
- 7) Excellent opportunity to lead by example, investing in a highly cost-effective energy savings measure.

NOTE: These calculations do not take into account retrofit or installation of Pedestrian signals, or green LED's.

**Other Success Stories:**

Overland Park, KS retrofitted 27 intersections with red LED's, for an total investment of \$39,000 and an annual savings of \$109,000, yielding a simple payback of two years.

Denver, CO - installed thousands of LED's for an annual savings of \$360,00 in labor and material costs plus energy rebates from Public Service Company of \$500,000.

Philadelphia, PA - retrofitted 200 intersections with red LED's based on a four year payback schedule, with a total investment of \$39,000 and an annual savings of \$8,159.

**Increasing Utility Commitment to Wind Energy through Green Pricing Programs**

**Status:** New Measure  
**Staff Team Ranking:** 3rd out of 12 New Measures  
**Citizen Committee Ranking:** 2nd out of 12 New Measures

**Estimated Equivalent CO2 Savings in 2004:** 4,103 tons/yr (2 turbines)  
**Estimated Equivalent CO2 Savings in 2010:** 10,256 tons/yr (5 turbines)

**Supporting Policy Direction:**

ENV-4. Energy Efficiency and use of renewable energy resources will be encouraged, facilitated, and regulated in both the public and private sector through information and educational services, financial incentive programs, requirements and incentives in the planning process, and enforcement of regulations such as the Energy code.

ENV-4.1. The use of solar energy and other renewable resources are recommended energy sources.

ENV-4.9 Additional Policy development. Comprehensive policies will be developed to encourage the use of alternative forms of energy, such as wind-generated power and solar energy.

**Description:**

Based on the success of the current wind program, additional options for continuing expansion of the wind program would be developed. A sequenced process where successive steps build on information gained from and success of earlier steps will help to ensure an effective renewable energy initiative. Additionally, as the Colorado reregulation process evolves, the City Council will have a better understanding of any legislative requirements or standards that may be relevant to the electric utility.

For purposes of this report it is assumed that voluntary support and legislative standards will enable the project to grow by an average of one additional turbine every other year beginning in 2002. If implemented at this rate, a total of five more turbines would be installed between 2002 and 2010.

**Implementing Department:** Utilities

**Recommended Timeframe for Completion:** 2010

**Estimated Implementation Cost:** Additional economic burden of investment risk (about \$3.2 million for 2 turbines)

**Estimated Annual Operating Cost:** \$10,000 in existing staff resources/year

**Potential Funding Source(s):** NA

## **ENERGY MEASURES**

### **Annual Cost Savings:**

It has been estimated that ancillary benefits of reducing GHG's (air pollution reduction, decreased health impacts, etc.) might account for about 30% of the cost per ton of carbon reduced.

### **Other Benefits:**

- Continued diversification of services provided by the Utility.
- Decreased dependency on diminishing fossil fuel resources; increased sustainability
- Five turbines would Reduce Air Pollution Emissions that contribute to visibility degradation and health problems

Reduce 23.3 tons Nitrogen oxides/yr

Reduce 0.2 tons VOC's/yr

Reduce 1.2 tons carbon monoxide /yr

Reduce 24.5 tons sulfur oxides/ year

Reduce 0.7 tons of particulate matter (PM10)/yr

- Reduction of adverse environmental impacts associated with conventional forms of electricity generation (coal mining, drilling for NG, damming rivers, nuclear storage)

**Optimization of City’s WasteWater Treatment System**

<b>Status:</b>	New Measure
<b>Staff Team Ranking:</b>	4th out of 12 New Measures
<b>Citizen Committee Ranking:</b>	4th out of 12 New Measures

**Estimated Equivalent CO2 Savings in 2004:** 961 tons/yr

**Estimated Equivalent CO2 Savings in 2010:** 961 tons/yr

**Supporting Policy direction:**

Resolution 97-51:

**As a user of energy** the City administration shall, in the design and construction of all City facilities, emphasize and utilize the latest, available, proven technologies to provide energy efficient and cost effective heating, cooling, lighting and hot water services.....

Resolution 97-97:

“The Council intends for the City to take a leadership role in increasing energy efficiency and reducing greenhouse gas emissions from municipal operations”

**Description:**

Water distribution is often the largest single component of energy use by local governments. Across the United States, energy consumption accounts for 50 to 75% of the costs of operating municipal water systems. Of this, water pumping often consumes 80% or more of the electricity used in water distribution and treatment, and therefore represents a prime opportunity for local governments to save energy and money. Many cities, including Fort Collins, are using Supervisory Control and Data Acquisition (SCADA) systems to slash their energy costs.

The Fort Collins Utility has suggested that an evaluation of motors at its water treatment facilities would be useful for increasing savings. By upgrading to high efficiency motors and pumps, the water reclamation and water treatment plants would reduce electrical load. This reduction in electrical energy translates into CO2 savings from reduced coal consumption by power suppliers.

In 1997, CSU’s Industrial Assessment Center completed an audit of the East Drake Water Reclamation Facility that conducts a significant portion of waste water treatment for Fort Collins. Seven assessment recommendations were made. Looking only at the four recommendation that had a payback of 2.7 years or less and that resulted in real energy savings, (not just rate reductions), they would result in a combined energy reduction of 486,000 kWhr/yr in electricity and 69,000 ccf/yr in natural gas. The Utility intends to have an energy engineer evaluate the IAC report and develop recommendations for implementation.

(NOTE: If this type of assessment is conducted at the City’s other water treatment facilities, further opportunities for energy savings and greenhouse gas reduction might be identified, beyond the savings estimated here.)

## ENERGY MEASURES

<b>Implementing Department:</b>	Utilities
<b>Recommended Timeframe for Completion:</b>	2002
<b>Estimated Implementation Cost:</b>	\$ 83,960 total cost
<b>Estimated Annual Operating Cost:</b>	Likely to be offset by energy cost savings
<b>Potential Funding Source(s):</b>	Grants, General Fund, Utility
<b>Annual Cost Savings:</b>	\$ 37,450/year (2.2 year simple payback)

**Other Benefits:**

- Better use of taxpayer dollars.
- Energy cost savings can be used to implement other conservation or service programs.
- Digester gas (methane) is used more efficiently when generating heat for boilers, rather than being flared off.
- This measure would reduce other air pollution emissions:  
Reduce 0.1 tons VOC's/yr  
Reduce 0.2 tons carbon monoxide /yr  
Reduce 1.4 tons sulfur oxides/ year

**Reduce Energy Use in City Government Buildings by 15% (from 1990 levels), Per Gross Square Foot**

**Status:** New Measure  
**Staff Team Ranking:** 7th out of 12 New Measures  
**Citizen Committee Ranking:** 3rd out of 12 New Measures

**Estimated CO2 Savings in 2010:** 3,129 tons

**Supporting Policy direction:**

Resolution 97-51:

**As a user of energy** the City administration shall, in the design and construction of all City facilities, emphasize and utilize the latest, available, proven technologies to provide energy efficient and cost effective heating, cooling, lighting and hot water services in buildings owned, co-owned or leased by the City for municipal purposes.

Resolution 97-97:

“The Council intends for the City to take a leadership role in increasing energy efficiency and reducing greenhouse gas emissions from municipal operations”

PRINCIPLE ENV-4:Energy efficiency and the use of renewable energy will be encouraged, facilitated, and regulated in both the public and private sector .....

Policy ENV 1-13. Innovations. The City will consider adoption of successful air quality improvement strategies in effect elsewhere, including municipal practices, public information campaigns, incentive/promotion programs, and regulations.

**Description:**

The goal of 15% reduction per gross square foot can be achieved through implementation of numerous short-tem and long-range strategies, outlined below.

**Create a focal point for municipal energy management by hiring an Energy Manager or creating an Interdepartmental Energy Management Team.**

The Energy Management Team would be responsible for:

- Coordinating with the P2 Assistance for New Source Review applicants.
- Compiling annual progress report that identifies energy conservation measures implemented, capital and operational costs of these measures, dollar savings, greenhouse gas savings, and other environmental impacts.
- Recommending future actions to promote energy efficiency in the City .
- Identifying barriers to meeting the 15% reduction goal.
- Identifying funding options for municipal energy efficiency.
- Evaluating the costs and benefits of incentives for increasing energy efficiency in departments, including:  
--re-establishing an Energy Fund to encourage implementation of

## **ENERGY MEASURES**

energy efficiency measures and to facilitate tracking costs and savings,

--having those City departments housed in the new administrative building responsible for paying their own utility bills, providing an incentive to conserve energy, beginning with the 2002 budget cycle,

-- having each department metered and responsible for paying its own utility bills.

--evaluate the cost-effectiveness of hiring an Energy Manager for the City.

Conduct an education campaign for City staff on energy usage.

The Energy Management Team would be responsible for developing and conducting an employee survey to identify energy consumption habits at work. The team would then develop an education plan to improve the energy efficiency of individual employees, and develop an interdepartmental energy challenge.

### **Conduct energy audits of City government buildings using expertise that exists at the Fort Collins Utility and Platte River Power Authority, and implement recommended actions.**

The Fort Collins Utility and Platte River Power Authority would conduct energy audits of major City-owned buildings and review recommendations from the 1997 HVAC and Lighting Audit for City Buildings.

Energy efficiency actions recommend by the audits would be implemented. If City budget lacks funds to implement energy-saving recommendations, Performance Contracting could be considered. In Performance Contracting, an energy firm conducts energy audits, provides capital, and implements efficiency measures. In return, the client agrees to pay a portion of the energy savings to the contractor for a specified number of years. This approach would allow the City to implement energy conservation measures with no initial capital investment.

### **Ensure that City buildings constructed by Facilities Services use Green Building criteria.**

A new goal would be set for all new buildings constructed through Facility Services to use the "Green Building" criteria developed in 1999 for the new Administration Building. The City expects to build several new buildings over the next decade, including an administration building, performing arts center, library, community center, and horticulture center. Applying Green Building criteria would result in a 25% reduction in annual energy costs, compared to buildings constructed under Fort Collins' existing energy code. This would set an excellent example for the City as a leader in energy efficiency, and establish a good precedent for future municipal construction. This alone would account for 39% (1,222 tons of CO<sub>2</sub> in 2010) of 15% per sq. ft. reduction goal.

### **Establish a purchasing guideline or policy to replace old motors with high efficiency new motors.**

Currently, many City departments choose to rewind old motors that have failed, rather than purchase high efficiency new ones, due to higher initial costs. However, it is fairly common for motors to be damaged during the rewind process and to suffer efficiency losses of 1-2%, which can

**Fort Collins Local Action Plan to Reduce Greenhouse Gas Emissions**

translate into higher energy costs. Working conjunction with the Purchasing Department, a guideline for purchasing new high efficiency motors would be developed.

**Consider joining ENERGY STAR BUILDINGS**

Joining ENERGY STAR Buildings would require an agreement between the City government and the U.S. EPA. In this agreement, the City would agree to:

- Designate a Strategic Energy Director and a Communications Director,
- Benchmark municipal building energy performance,
- Upgrade at least one pilot building within two years of the agreement date, and
- Upgrade 60% of municipal facilities within seven years.

The EPA would agree to:

- Assist local government in benchmarking and planning,
- Offer workshops and objective information about energy-efficient technologies and applications,
- Provide analytical tools to calculate potential savings, and
- Communicate successes.

**Fund new position for an HVAC Control technician**

A request has been made to fund a new position for an HVAC Control Technician . This person would ensure that the City’s HVAC system and automated building control systems are operating at maximum efficiency.

**Implementing Department:** Facility Services

**Recommended Timeframe for Completion:**2010

**Recommended Approach for Implementation:**

Consider a policy on energy consumption expectations for municipal operations and facilities. The 2000 Council Policy Agenda raises the question, “What policies would enhance the City’s efforts toward energy conservation?”

**Estimated Implementation Cost:** Unknown. Energy audits of major City facilities are being conducted in '99 – 2000.

**Estimated Annual Operating Cost:** \$60,000 (for HVAC Control Technician)

**Potential Funding Source(s):** General fund; Financing; Performance contracting

**Annual Cost Savings:** A 15% reduction of both electricity and natural gas leads to a cost savings of \$185,101/yr in 2010.

### **Other Benefits:**

- Save tax payer dollars in the long run
- City leads by example.
- Reduce Air Pollution Emissions that contribute to visibility degradation and health problems:
  - Reduce 0.3 tons Nitrogen oxides/yr
  - Reduce 0.4 tons sulfur oxides/ year

### **Precedent:**

In 1999, President Clinton passed an Executive Order mandating that federal facilities reduce energy consumption 30% by 2005 and 35% by 2010, relative to 1985 levels. The same Executive Order established a greenhouse gas reduction goal for federal facility energy use of 30% by 2010, compared to 1990 emissions levels, through life-cycle cost-effective energy measures.

**City Government Purchase of WIND POWER**

**Status:** New Measure  
**Staff Team Ranking:** 5th out of 12 New Measures  
**Citizen Committee Ranking:** 7th out of 12 New Measures

**Estimated Equivalent CO2 Savings in 2004:** 2,051 tons  
**Estimated Equivalent CO2 Savings in 2010:** 2,051 tons

**Supporting Policy Direction:**

**ENV-1.23 Global Climate.** The City will employ strategies to increase energy efficiency and the use of renewable energy sources (except residential woodburning), in order to reduce the impact of the Fort Collins community on global warming.

**ENV-4.1. Renewable Energy.** The use of solar energy and other renewable resources are recommended energy sources.

**Description:** Under this measure, the City would commit to wind-generated power from one 660 Watt wind turbine. There are several reasons for the City to consider this measure.

- 1) The adopted policies in City Plan clearly support the use of renewable energy.
- 2) The City of Fort Collins strives to lead by example whenever possible. Examples include the high level of commitment to alternative fueled vehicles in City fleets, offering employees free bus passes to reduce driving, etc. Purchase of wind power by City government sets a good example for other businesses to follow.
- 3) The level of citizen commitment to the Wind Power Pilot Program also shows that many citizens support the use of renewable energy sources. This measure provides the City with an opportunity to reflect a strong community environmental value by supporting clean, renewable energy.

**Implementing Department:** Utilities

**Recommended Timeframe for Completion:** 2001

**Recommended Approach for Implementation:** Commit to one more turbine at Medicine Bow site at the next opportunity. This issue has been identified for resolution in the current Council's Policy Agenda.

**Estimated Implementation Cost:** Existing staff resources

**Estimated Annual Operating Cost:** \$47,000 (3.97% of each City department's current utility cost)

**Potential Funding Source(s):** General Fund

**Annual Cost Savings:**

None at current electricity rates

**Other Benefits:**

- The City demonstrates leadership by example.
- One turbines would Reduce Air Pollution Emissions that contribute to visibility degradation and health problems:
  - Reduce 4.7 tons Nitrogen oxides/yr
  - Reduce 0.004 tons VOC's/yr
  - Reduce 0.24 tons carbon monoxide /yr
  - Reduce 4.9 tons sulfur oxides/ year
  - Reduce 0.14 tons of particulate matter (PM10)/yr
- Reduction of adverse environmental impacts associated with conventional forms of electricity generation (coal mining, drilling for NG, damming rives, nuclear storage)

**Related Success Story:**

In 1999, Santa Monica, CA became the first major city in the world to agree to have all of its municipal power needs served by clean, renewable energy. The City Council voted unanimously to enter into agreements with Commonwealth Energy of Orange County to purchase 5 megawatts of renewable power from geothermal sources for its municipal needs for one year. The city will pay a 5% premium, or roughly about \$140,000 more per year, using green energy.

**Develop a Commercial Green Building Program**

**Status:** New Measure  
**Staff Team Ranking:** 8th out of 12 New Measures  
**Citizen Committee Ranking:** 8th out of 12 New Measures

**Estimated CO2 Savings in 2010:** 3,186 tons (assuming a 5% reduction of energy consumption in projected new commercial and industrial construction between 2002 – 2010.)

**Supporting Policy Direction:**

ENV-4. Energy Efficiency and use of renewable energy resources will be encouraged, facilitated, and regulated in both the public and private sector through information and educational services, financial incentive programs, requirements and incentives in the planning process, and enforcement of regulations such as the Energy code.

**Description:**

Under this new measure, the City would establish a program for builders to integrate environmental features into the design and construction of new commercial buildings. The measure could be voluntary, mandatory, or some hybrid. The measure could establish a “green” certification program for new commercial buildings as well as an education and outreach effort to stimulate the market. The certification program could be similar to Boulder and Denver’s programs, allowing the builder to choose from a list of green design standards.

Green design standards would apply to areas such as landscaping; construction debris recycling, water conservation, recycled content, resource efficient and less toxic building materials, insulation, active and passive solar design, and energy efficient lighting, appliances, and HVAC systems.

**Implementing Department:** Building and Zoning

**Recommended Timeframe for Completion:** This measure could be considered when the City’s energy code is next updated. It could also be considered as an extension (Phase II) of the New Source Review Pollution Prevention Pilot program that interacts with builders during the development review process.

**Recommended Approach for Implementation:** Education and outreach about green building practices should begin early on, followed by consideration of a more structured program of certifications.

**Estimated Implementation Cost:** \$15,000 staff time to evaluate this measure and develop a recommendation.

**Estimated Annual Operating Cost:** \$35,000 (half FTE to administer the program; shared with Residential Green Builder program FTE)

**Potential Funding Source(s):** General Fund; Governor’s Office of Energy Management and Conservation

**Annual Cost Savings:**

To commerce and industry: \$148,000 in electricity and natural gas costs per year by 2010.

**Other Benefits:**

- Stimulates a local market for “green” building materials so that others can obtain them for remodels
- Water conservation
- Indoor Air Quality improvements
- Toxics Use Reduction
- Reduce air pollution emissions that contribute to visibility degradation and health problems in 2010 as follows:
  - Reduce 7.2 tons Nitrogen oxides/yr
  - Reduce 0.1 tons volatile organic compounds/yr
  - Reduce 0.4 tons carbon monoxide/ year
  - Reduce 6.9 tons of sulfur oxides/yr
  - Reduce 0.2 tons of particulate matter/yr

**Lobby for Mandatory Renewables in Deregulation (or Comparable Energy Conservation Measures)**

<b>Status:</b>	New Measure
<b>Staff Team Ranking:</b>	11th out of 12 New Measures
<b>Citizen Committee Ranking:</b>	6th out of 12 New Measures
<b>Estimated CO2 Savings in 2004:</b>	60,000 tons
<b>Estimated CO2 Savings in 2010:</b>	71,561 tons

**Supporting City Policy:**

ENV- 4.6 Remove barriers to renewable energy use. The City will eliminate unnecessary barriers to utilization of renewable energy resources in new and existing buildings which arise through application and enforcement of City Codes.

ENV-4.7 Renewable energy in new development. The use of renewable energy resources should be considered in the layout and construction of new development.

**Background:**

Production of energy from renewable sources such as wind, solar, or hydropower does not produce CO<sub>2</sub> in the course of generating electrical power. In the near future, utility companies will become deregulated and the market will open up to power producers in the private sector. By requiring utilities to provide a certain percentage of power from renewable resources, CO<sub>2</sub> reductions can be obtained. Recently, lawmakers from both houses and both parties have introduced proposals specifying that a gradually increasing percentage of the nation's electricity be generated from renewable resources. These proposed renewable portfolio standards (RPS) range from 4 percent in 2010 to 20 percent in 2020. A 1996 Land and Water Fund report, *How the West Can Win*, projects that Colorado could achieve 16% renewable energy generation by 2015.

Conceptually, renewable energy enjoys significant support, nationally and locally. According to the results of national polls, most households would be willing to pay more than \$2 extra per month for renewables, and would thus appear willing to support a renewables target of 20 percent in 2020. According to a recent poll conducted by Fort Collins Utility, at least 35% of citizens would be willing to pay \$5/ month for wind-generated (renewable) power.

Nationally, studies have been released that look favorably on the economic impact of renewable energy. A recent report by the Union of Concerned Scientists, [A Powerful Opportunity](#), analyzed costs of adopting the 20% by 2020 renewable portfolio standard proposed by the Clean Energy Act of 1999. They found it to be both affordable and achievable, and to be more cost-effective than adopting a lower renewable standard of 5%. Similarly, a U.S Department of Energy report projected that for Colorado customers, deregulation would result in a 19% savings, on average.

In May of 1998, the Colorado Legislature enacted an electric industry study bill (Senate Bill 98 - 152). This law creates a panel to assess "whether restructuring of the retail electric industry is in the best interests of all classes of Colorado electricity consumers and the state as a whole." This panel is studying a number of specific questions related to deregulation. Economic analyses recently

## ENERGY MEASURES

completed by Stone and Webster for this panel found that there would be a negative economic burden from deregulation in Colorado:

- “Restructuring the electric industry in Colorado will likely lead to an increase in retail electricity rates throughout the state. This finding holds for the current customers of all utilities, for all but one customer class (irrigation customers), for all years, for all regulatory cases considered, and for all scenarios considered.”

The Stone and Webster report did not evaluate the impacts of a Renewable Portfolio Standard. Conflicting findings on the economic impact of deregulation illustrate the difficulty in accurately predicting local impacts of restructuring.

If the decision was made to support a mandatory renewable portfolio standard in Colorado, Fort Collins would have an advantage over other utilities that are not already offering wind power if a renewable standard was adopted. Fort Collins projected electricity consumption in 2010 is estimated to be 5,356,000 mBTU's. If 4% of this is met by renewable sources, a savings of 71,561 tons of CO<sub>2</sub> could be realized in the year 2010.

**Implementing Department:** Legislative Affairs, NRD???

**Recommended Timeframe for Completion:** start in 1999, ongoing

**Recommended Approach for Implementation:** The Fort Collins Utility has the mandate to provide low-cost, reliable power to the citizens of Fort Collins. Arguments have been made that energy conservation is a more cost-effective way to reduce the environmental impacts of electric power generation than is the use of renewable energy. This debate should actively be carried out by City elected officials, with input from citizens and City staff.

If a decision was made to support a renewable portfolio standard, changes could be adopted in the City's 2000 Legislative Policy Agenda to designate a lobbyist, with the responsibility to identify relevant bills and actions at the state and national legislature and to draft the City's responses. Also, the City could establish a working relationship with CML and NLC to participate in their campaigns to boost renewables.

Depending on the outcome of the Colorado Electric Advisory Panel's recommendation to the Colorado General Assembly, deregulation may or may not be pursued now. If no action is taken now, the issue is likely to arise again at some point in the future.

**Estimated Implementation Cost to City Gov.** Unknown

**Estimated Annual Operating Cost:** \$2,500(2 weeks EXISTING staff time)

**Potential Funding Source(s):** NA

**Annual Cost Savings:** Based on today's energy prices, renewable energy costs more. However, it is possible that electrical energy costs will increase under deregulation in any case, so the added price for renewable energy will be relatively less.

---

## **Fort Collins Local Action Plan to Reduce Greenhouse Gas Emissions**

### **Other Benefits:**

- Reduce air pollution emissions that contribute to visibility degradation and health problems:
  - Reduce 162 tons Nitrogen oxides/yr
  - Reduce 1.5 tons volatile organic compounds/yr
  - Reduce 8.3 tons carbon monoxide/ year
  - Reduce 171 tons of sulfur oxides/yr
  - Reduce 4.5 tons of particulate matter/yr
- The development of domestic renewable energy will keep energy dollars in the US and create jobs.
- Reduces the adverse environmental impacts associated with conventional forms of electricity generation (coal mining, drilling for natural gas, damming rivers, nuclear storage.)

**Increased Voluntary Energy Efficiency Training for Builders**

**Status:** Pending Measure  
**Staff Team Ranking:** 4th out of 12 Pending Measures  
**Citizen Committee Ranking:** 9th out of 12 Pending Measures

**Estimated CO2 Savings in 2004:** 8,649 tons  
**Estimated CO2 Savings in 2010:** 20,840 tons

**Supporting City Policy:**

ENV-4. Energy Efficiency and use of renewable energy resources will be encouraged, facilitated, and regulated in both the public and private sector through information and educational services, financial incentive programs, requirements and incentives in the planning process, and enforcement of regulations such as the Energy code.

**Description:**

Increased training opportunities on energy efficiency construction would help local homebuilders implement existing City energy codes for residential and commercial construction. The City's Building and Zoning Department would be interested in offering more training opportunities to builders.

**Estimated Implementation Cost:** \$10,000/year

**Potential Funding Source(s):** General Fund; grants

**Annual Cost Savings:** \$124,818/year total in 2010 to new home owners, today's energy prices

**Other Benefits:**

- Reduce air pollution emissions that contribute to visibility degradation and health problems:
  - Reduce 47.7 tons Nitrogen oxides/yr
  - Reduce 1.0 tons volatile organic compounds/yr
  - Reduce 3.6 tons carbon monoxide/ year
  - Reduce 36.3 tons of sulfur oxides/yr
  - Reduce 1.0 tons of particulate matter/yr

**Develop a Residential Green Building Program**

**Status:** Pending Measure  
**Staff Team Ranking:** 8th out of 12 Pending Measures  
**Citizen Committee Ranking:** 5th out of 12 Pending Measures

**Estimated CO2 Savings in 2010:** 1,665 tons

**Supporting Policy Direction:**

ENV-4. Energy Efficiency and use of renewable energy resources will be encouraged, facilitated, and regulated in both the public and private sector through information and educational services, financial incentive programs, requirements and incentives in the planning process, and enforcement of regulations such as the Energy code.

**Description:**

Under this new measure, the City would establish a program for builders to integrate environmental features into the design and construction of new residential buildings. The measure would be modeled after the City of Boulder’s “Green Points Program” (mandatory) and the Denver area “Built Green” program (voluntary). The measure would establish a “green” certification program for new residential buildings as well as an education and outreach effort to stimulate the market for homeowners to buy a certified “green” home. The certification program would be similar to Boulder and Denver’s programs, allowing the builder to choose from a list of green design standards.

Green design standards would apply to areas such as landscaping, construction debris recycling, water conservation, recycled content, resource efficient and less toxic building materials, insulation, active and passive solar design, and energy efficient lighting, appliances, and HVAC systems.

**Implementing Department:** Building and Zoning

**Recommended Timeframe for Completion:** Consider this measure when the City’s energy code is next updated.

**Recommended Approach for Implementation:** The City of Fort Collins could consider developing a Green Builder program during the next update of the Model Energy Code, which will begin in 2000 and be completed in 2001. This evaluation would establish whether to use the voluntary approach used by the Denver Metro Home Builders Association, or the mandatory approach used by the City of Boulder. A hybrid approach might entail increasing permit fees, but providing the opportunity to reduce fees to current levels if a specified level of green building standards were met.

At the same time, the City would help stimulate a local market for green homes through promotional materials, such as articles and demonstration home shows in a Parade of Homes. The Denver Metro HBA resources may be available to use.

## ENERGY MEASURES

**Estimated Implementation Cost:** To Denver HBA program : The program is subsidized by the Governor’s Office of Energy Conservation (OEC) and other major partners (e.g. Public Service CO., Energy Rated Homes of Colorado)

To homebuilders: Annual builder enrollment dues are \$150 plus \$20/home that is certified (\$50/home with a “Built Green” yard sign). In addition, builder pays the added costs to build green. Based on a large volume builder like US Home – hard costs/home are about \$1,100- \$1,300/home. This could be more or less depending on the builder, what selections they make, and what their previous building practices were. Energy upgrades are the most expensive if not already building to MEC 93 standards, but this is also the biggest cost savings to the consumer.

**Estimated Implementation Cost:** \$15,000 to develop and review program

**Estimated Annual Operating Cost:** \$70,000 (one new FTE to administer the program)

**Potential Funding Source(s):** General Fund; Governor’s Office of Energy Management and Conservation

**Annual Cost Savings:** To homeowner: \$/ft<sup>2</sup> on energy and water bills

**Other Benefits:**

- Stimulates a local market for “green” building materials so that others can obtain them for remodels
- Water conservation
- Indoor Air Quality improvements
- Toxics Use Reduction
- Reduces other air pollution emissions