

ARE WE USING RESOURCES WISELY AND ARE WE PLANNING AND BUILDING FOR THE FUTURE?

## HOW CAN I HAVE A POSITIVE IMPACT?

**WHERE DOES IT COME FROM?**

**HOW DO WE SUSTAIN IT, REDUCE CONSUMPTION AND DIVERSIFY FOR FUTURE GENERATIONS?**

**DOES IT HAVE NEGATIVE CONSEQUENCES FOR HUMANS AND THE ENVIRONMENT?**

HOW DO WE CREATE LONG TERM SUSTAINABLE ENERGY CONSERVATION ACTIONS?

**HOW MUCH DOES IT COST?**

**Jackson and Grand County**

**Energy Strategy**

**WHY ARE WE NOT CONSERVING MORE ENERGY?**

*HOW DO WE REDUCE CONSUMPTION WHILE NOT SPENDING MONEY?*

WHAT IS A RELIABLE SCIENCE BASED AND ENVIRONMENTALLY SAFE ENERGY SOURCE THAT WORK A DAY PEOPLE CAN AFFORD?

**HOW DO WE MINIMIZE CONSUMPTION?**

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This Strategy was prepared with funding from the Governor's Energy Office. The Strategy will be available on the internet for an indefinite period of time. BEDA has made every reasonable effort given the scope of work to assure the accuracy of the contents. However the sources it is based on are subject to changes, omissions and errors. THIS DOCUMENT IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY. THE USER ASSUMES THE ENTIRE RISK AS TO THE ACCURACY AND THE USE OF THIS DOCUMENT AND ANY RELATED OR LINKED DOCUMENTS



Governor's  
Energy Office

## Introduction

On June 10, 2010, twelve team members from Jackson and Grand County began the process of developing an Energy Strategy for the region. The questions on the cover of this Strategy are those that they asked about energy use in our region at the first meeting.

While the planning process has been a local effort, the impetus and funding came from the federal level. In 2007 President Bush signed the *Energy Independence and Security Act* which established the Energy Efficiency and Conservation Block Grant Program (EECBG). The program supports the “*deployment of the cheapest, cleanest, and most reliable energy technologies we have—energy efficiency and conservation—across the country*”<sup>1</sup>.

In 2009, the EECBG program was funded by the *American Recovery and Reinvestment Act*. Grand County Business and Economic Development Association applied for and was awarded grant funding for non-entitled<sup>2</sup> EECBG communities through the Governor’s Energy Office to support the development of a regional Energy Strategy for Grand and Jackson Counties.

During the five month planning process the team discussed energy as a controllable cost, an economic opportunity, an economic vulnerability, a national security issue, a necessity and a comfort. The team expressed a strong desire to position the region so that it is more energy independent, more resilient to fluctuating energy prices and better able to capitalize on local sustainable resources.

The team explored the issues confronting the region and articulated a vision of an economy and environment worthy of passing on to future generations.

The mission of the Regional Energy Team is:

***To ensure efficient resource use and support affordable, renewable energy so the local economy, environment and future generations will thrive.***

The vision of the Regional Energy Team is:

***A thriving economy supported by local energy solutions and sustainable use of resources.***

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<sup>1</sup> *Department of Energy EECBG Website*

<sup>2</sup> Those communities which do not receive a direct formulaic grant from the Department of Energy

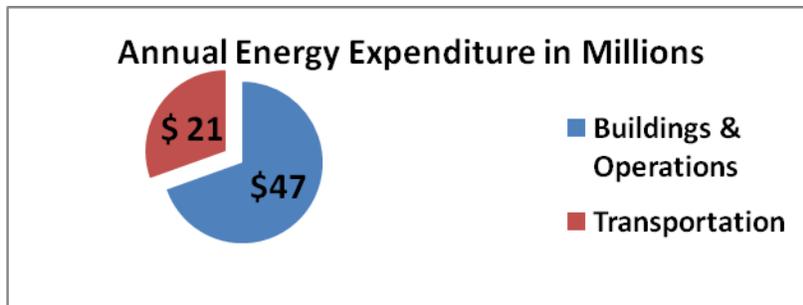
## Team Work

The team performed a SWOT Analysis to provide a foundation for the strategic Strategy. SWOT is an acronym which stands for Strengths Weaknesses Opportunities and Threats and is commonly used in strategic planning processes. The inventory of the region's strengths, weaknesses, opportunities and threats can be found on [BEDA's website](#). The content areas for the Strategy were developed and team members worked on a [GAP Analysis](#) for the following content areas.

- Buildings and Operations
- Transportation
- Economic Development
- Education
- Water use, treatment, waste water treatment, storm water management
- Materials Management and Solid Waste
- The Regulatory Environment,
- The Management of Public Lands

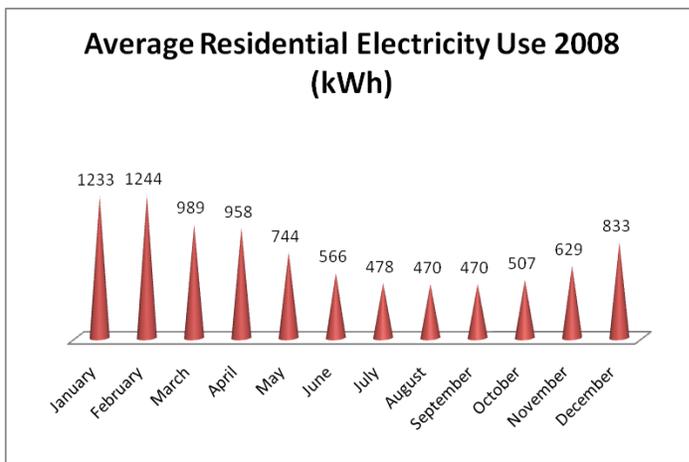
The GAP analysis helps to define the current situation, where we want to be in 2015 and activity in the content area, what we need to know and the **gaps** that must be addressed to achieve the vision.

A need for education, training and technical resources was identified in almost all content areas. Effective financing mechanisms, economic development strategies and an institutionalized commitment to building capacity were also identified as gaps.



Source Data: See Appendix 2

A preliminary assessment of energy use in the region, helped focus the Strategy (*Energy Assessment Appendix 2*). Buildings and operations consume approximately 70% of the energy used in the region. Electrical and natural gas consumption are highest in the winter months. There is a large seasonal variation in residential use which suggests inefficient housing stock, electric space heaters, outdoor hot tubs, heat tapes and engine heaters. Higher occupancy may also play a role in this variation.



Source Data: Mountain Parks Electric Average Residential Usage 2008

The Strategy supports and encourages the efforts of large power users in the region to make their operations more efficient and incorporate local renewable generation. Mining related activities, pumping water for trans-basin diversions and snow making operations are the largest operational uses of energy<sup>3</sup>.

In addition the team discussed formulating an equivalent “mpg” rating for buildings, intentional energy use, examples of no and low cost measures and better building standards. Providing consumers with simple building performance information could spur better building practices with minimal regulation. Lighting retrofits and timers/sensors on heat tapes were identified as simple measures with the potential for quick impact and short payback.

The team discussed the lack of knowledge, awareness and attention given to energy use in our day-to-day lives. At one point, we provided the example as we left the lights on in the meeting room when we took the meeting outside on a sunny day. CSU extension, the schools, Ranges and Rivers, Chambers of Commerce and Infinite West were identified as partners who could help bring awareness to energy use. Demonstration projects and peer-to-peer exchanges were also discussed as effective ways to promote adoption of energy efficient practices.

Water use, treatment, waste water treatment, and storm water management were not addressed in depth due to the complexity of the regional issues and lack of time. The GAP analysis identified that Grand County has an established baseline for water quality and quantity as well as an ongoing monitoring system. The Grand County Water Information Network Work is working on a database that will make the information readily available. Jackson County does not have a baseline that is readily available.

The water-energy nexus deserves more exploration by the team. As defined by Sandia Labs:

*“These two critical resources are inextricably and reciprocally linked; the production of energy requires large volumes of water while the treatment and distribution of water is equally dependent upon readily available, low-cost energy. The nation’s ability to continue providing both clean, affordable energy and water is being seriously challenged by a number of emerging issues”.*

<sup>3</sup> Energy use data from Climax Molybdenum Henderson Mill is NOT included due to proprietary concerns. Winter Park Resort Association is aggregated in the commercial sector data from MPEI.

To meet this challenge the Energy Strategy supports and encourages activities that will conserve water and ensure water quality and quantity. These activities are as simple as the installation of aerators on faucets, as time consuming as updating codes with improved water conservation standards and measures to protect water quality, and as complicated as supporting the ongoing operation of the Shoshone Power Plant by the Colorado River Water Conservation District <sup>4</sup>. While recognizing the importance of preserving individual rights, the Energy Strategy is supportive of additional flexibility in policy and law so that the potential of conservation and efficiency efforts to improve the health of the Colorado River and Platte Rivers are realized.

Waste minimization and recycling was not addressed in depth due to time constraints. In Jackson County an accounting of the tonnage recycled would be a useful starting point. In Grand County the Grand Resource and Recycling Coalition is working on the issue.

While there was discussion of using codes as an effective means of increasing building performance, the receptiveness of jurisdictions to such an approach varies. For this reason the strategy focuses on voluntary programs and measures.

A constant throughout the meetings was the desire to diversify and improve the local economy in a sustainable manner. The preferred path is to use the resources at hand: Mountain Parks Electric, Xcel, Walden Gas Utility, the railroad corridor, the pellet plants, existing contractors and the abundance of woody biomass. The pellet plants and the railroad corridor represent significant economic development potential. The loss of the ski train is a blow to transportation efficiency, tourism in Grand County and Grand County's historical heritage.

The Strategy is a living document and will be modified as stakeholders provide additional input and direction. It is ambitious for a region that has had minimal organizational capacity and few resources devoted to the issues of energy use, sustainability and economic development<sup>5</sup>. In order for the vision of the Regional Energy Team to be realized the team must establish volunteer working groups and involve others to achieve these goals.

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<sup>4</sup> or preserving a virtual call for this water right.

<sup>5</sup> Mountain Parks Electric and Xcel provide programs focused on building and operational energy efficiency and NWCCOG is working on a Comprehensive Development Strategy. The region does not have the organizational capacity, the level of integration amongst partners or funding support that has led to the establishment of programs in other areas.

## The 2012 Challenge

**The Regional Energy Team challenges our region to cut energy consumption by 10% by the end of 2012. Action by residents, businesses and governments could keep approximately \$4.5 million dollars<sup>6</sup> in the local economy, create local employment opportunities and reduce energy related emissions and water consumption.**

## Two Year Strategy

**Goal #1: Reduce energy use in existing buildings and operations by collaborating on six model demonstration activities by April 2012.**

The activities are designed to:

- **Increase the energy literacy of energy consumers, managers and contractors.**
- **Demonstrate the assessment and upgrade process.**
- **Demonstrate energy management and benchmarking.**
- **Provide accessible models for the local community and for peer groups.**

**Strategy 1a:** Partner with Jackson County and Mountain Parks Electric to assess and upgrade lighting in the Jackson County Road Shop. Present the project as a case study for other public and private shops.

**Strategy 1b:** Work with a maximum of ten businesses in a small scale Main Street Energy Efficiency Program to assess and upgrade business facilities in 2011. The program will also provide training to business owners, local energy professionals and lighting contractors. BEDA has applied for a grant and technical support through the Governor's Energy Office for this project.

**Strategy 1c:** Partner with the Grand County Library District, the Town of Kremmling and others on an assessment and training project to improve the energy efficiency and comfort of the Kremmling Library and provide local training for builders. The library is a converted metal building owned by the Town of Kremmling and has been identified by the Library District as a building which uses more energy than average.

**Strategy 1d:** Partner with the North Park Child and Family Center (or another Jackson County Facility) on an assessment and training project to improve the energy efficiency and comfort of the facility and increase the capacity of local residents to implement energy conservation

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<sup>6</sup> Total estimated energy costs for the region are \$68 million. Approximately 70% of these costs are for power and fuels that are not produced in the region.

measures. BEDA has applied for a grant through the Governor's Energy Office for this project. The child care center is a modular building.

**Strategy 1e:** Assist one governmental agency in adopting Energy Star Portfolio Manager to track their energy and water consumption and benchmark their facilities. Present the results of this project to other agencies and facilities.

**Strategy 1f:** Assist one water and wastewater facility in adopting Energy Star Portfolio Manager to track their energy and water consumption, benchmark their facilities and identify upgrades.

## **Goal #2: Reduce energy and water consumption by convening two facility manager roundtables and two educational workshops by April 2012.**

**Strategy 2a:** Partner with utility providers and businesses to host semi-annual facility manager roundtables in 2011.

**Strategy 2b:** Host a fleet management workshop in collaboration with local governments and businesses. The workshop will cover industry trends, provide a sample fleet management policy and explore ways for fleet managers to collaborate on fleet management, fueling options and other issues.

**Strategy 2c:** Host a community planning workshop that explores location efficiency, regional linkage, community health, economic sustainability and environmental quality in collaboration with local governments and nonprofits.

## **Goal #3: Reduce energy consumption in new buildings by working with one jurisdiction to adopt a VOLUNTARY above code building program and a pledge that new public buildings achieve targets outlined by the 2030 challenge.**

**Strategy 3a:** Work with building officials, contractors and realtors on the adoption of a VOLUNTARY program which uses third party certification to assure high performing buildings. Examples of programs are EnergyStar, LEED and Passive House.

**Strategy 3b:** Partner with the building association on training opportunities.

**Strategy 3c:** Promote quality building in the marketplace. The Grand County Board of Realtors has applied for a grant which will add GEO recommended searchable fields to the Multiple Listing Service and provide training to the realtors on how to use the new fields.

## **Goal #4: Formalize the Regional Energy Team by July 2011.**

**Strategy 4a:** Create a permanent Regional Energy Team with members who represent a broad range of partners including the towns, counties, and utilities, businesses, builders, realtors, the tourism sector, non profits, state and federal agencies. Establish a means of appointment and the frequency of meetings.

## Five Year Strategy

### **Goal #5: Add 2.0 megawatts of renewable energy generation in Region 12a by 2015. (This goal does not include the 3.65 megawatt Williams Fork hydro project by Denver Water)**

**Strategy 5a:** Support MPEI's efforts to drive demand for renewable energy including local green power and pellet programs.

**Strategy 5b:** Support the development of local renewable resources: The Town of Grand Lake's hydro project, biomass combined heat and power units, biomass powered heating districts and geothermal generation.

**Strategy 5c:** Collaborate with MPEI on methods to make locally generated renewable energy more accessible to coop members without a negatively impacting the general rates. These could include: community systems, bulk purchase agreements, solar or biomass coops, power purchase agreements etc.

### **Goal #6 Improve the energy performance and comfort of 50 buildings in Region 12a by 2015.**

**Strategy 6a:** Develop a building improvement program which is a partnership between contractors, realtors, banks, utilities and non profits. The program will support and encourage building improvement by integrating assessments with upgrades, provide access to financing and add a level of quality assurance. A sustainable source of funding for the program will be established. The program will verify reduced energy consumption over time. The program will promote quality building in the market place. Several supporting actions for this program have already been accomplished.

- BEDA applied for and has been awarded a grant for Energy Audit Equipment which will be made available to participating energy professionals and contractors.
- BEDA has applied for and been awarded an Outreach Grant which can be used in part to promote building efficiency in 2011.
- The Grand County Board of Realtors has applied for a grant which will add GEO recommended searchable fields to the Multiple Listing Service and provide training to the realtors on how to use the new fields.

### **Goal #7: The installation of 250 new pellet or biomass heat appliances in the region by 2015.**

**Strategy 7a:** Support the installation of pellet stoves in the weatherization program by funding a buy down program.

**Strategy 7b:** Incorporate pellet heating in the building improvement program.

**Goal #8: Increase the availability and utilization of energy efficient transportation.**

**Strategy 8a:** Form a transportation efficiency stakeholder group to work on the related issues of mobility, health, water and air quality, recreation, regional linkages and sustainable economic development.

**Strategy 8b:** Re-establish the ski train and explore additional uses of the railroad which will lead to economic development.

**Strategy 8c:** Establish local/voluntary funding for a transportation efficiency program.

## **Appendix 1 Acronym and Definitions Cheat Sheet**

**BEDA**: Grand County Business and Economic Development Association

**BMPs**: Best Management Practices

**CDPHE**: The Colorado Department of Public Health and Environment

**CSU**: Colorado State University

**DOE**: The United State’s Department of Energy

**DOLA**: The Colorado Department of Local Affairs

**EE**: Energy Efficiency, see [ENERGYSTAR](#) for more information.

**EERE**: Energy Efficiency and Renewable Energy

**EECBG**: The Energy Efficiency and Conservation Block Grant Program

**EGSD**: The East Grand School District

**EIA**: The Energy Information Administration, a federal agency that tracks energy pricing, reserves and consumption.

**EPC**: Energy Performance Contracting is a building improvement model that uses the cost savings from improved efficiency to pay back capital improvements. The improved buildings are more comfortable and efficient. [The State of Colorado assists Public Agencies](#) in navigating the EPC process.

**GCLD**: Grand County Library District

**GRRC**: The Grand Resource and Recycling Coalition

**HPBP**: The High Performance Building Program is for new commercial and public building projects. The program uses whole building design which “can reduce energy use by 50% or more while lowering maintenance and capital costs, improving employee productivity, enhancing occupant comfort and health, and reducing environmental impacts.” (Recharge Colorado) The HPBP provides assistance to public agencies and lists resources available to non public entities that have new building projects.

**LEED**: Leadership in Energy and Environmental Design (a rating system with third party verification that was developed by the US Green Building Council)

**MPEI**: Mountain Parks Electric Incorporated is a consumer owned electrical cooperative. The not-for-profit energy provider serves energy consumers in Grand and Jackson Counties and portions of Routt, Summit and Larimer. With federal loans from the Rural Utilities Service, North Park Rural Electric Association (NPREA) erected lines in Jackson County, an area that investor owned utilities would not go.

In 1950 the lines were energized and in 1953 NPREA purchased several small power providers, changed its name to Mountain Parks Electric and moved the headquarters from Walden to Granby.

**NREL:** The National Renewable Energy Laboratory

**NWCCOG:** Northwest Colorado Council of Governments, voluntary association of county and municipal governments working together. NWCCOG provides weatherization services to income qualified residents living in our region.

**OATS:** Older Adult Transportation Service a publicly funded transportation provider in Jackson County. The OATS van provides critical transportation services for those who are unable to drive.

**PACE Finance:** Property Assessed Clean Energy finance. A mechanism that uses the assessments collected from participating property to finance energy efficient and renewable energy improvements.

**SUSTAINABLE:** Meeting the needs of the present population without compromising the ability of future generations to meet their own needs.

**TSG&T:** Tri-State Generating and Transmission Association. A wholesale power provider owned by its member Coops, TSG&T provides power to Mountain Parks Electric.

**WPRA:** The Winter Park Recreational Association commonly referred to as the Winter Park Resort or Ski Area.

**XCEL:** Xcel Energy is an investor owned utility which supplies natural gas to consumers in Grand County. Xcel also services a limited number of electrical consumers in Grand County including Climax Molybdenum.

## Appendix 2: Energy Assessment for Grand and Jackson Counties

The purpose of this energy assessment is to provide a general overview of the energy used in the region so that the Regional Energy Team can design strategies and take actions which will support their vision:

***A thriving economy supported by local energy solutions and sustainable use of resources.***

The assessment is based on information from energy providers, census data, sales tax and surveys by the U.S. Energy Information Administration. While some figures are exact, others are estimated or extrapolated. The majority of the data used in the assessment is from 2009. The assessment attempts to accurately report energy consumption in the region, given the information readily available but relies on extrapolation in an attempt to quantify information that is unavailable.

The total energy use of the region is estimated at 4 million MMBTU. Consumers spend approximately \$68 million to meet their energy needs<sup>7</sup> with at least two thirds of that money leaving the region<sup>8</sup>. There is significant seasonal variation in energy use due to winter heating loads.

Renewable fuel and energy production is led by the two pellet plants which produce approximately 1.3 million MMBTU of pellet fuel annually and a hydroelectric facility at Williams Fork Reservoir which generates approximately 26,000 megawatt hours of electricity annually.

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<sup>7</sup> This excludes power used at Climax Molybdenum Henderson Mill see worksheet 1

<sup>8</sup> This conservative estimate assumes that the rate of dollars flowing out of the region on transportation fuels and natural gas is similar to electricity: 2009 USDA-RUS. More likely approximately 5% of transportation fuel dollars stay in the local economy (<http://energyalmanac.ca.gov/gasoline/margins/index.html>).

## Energy Use Snapshot<sup>9</sup>:

Figure 1: ANNUAL ENERGY USE (2009)

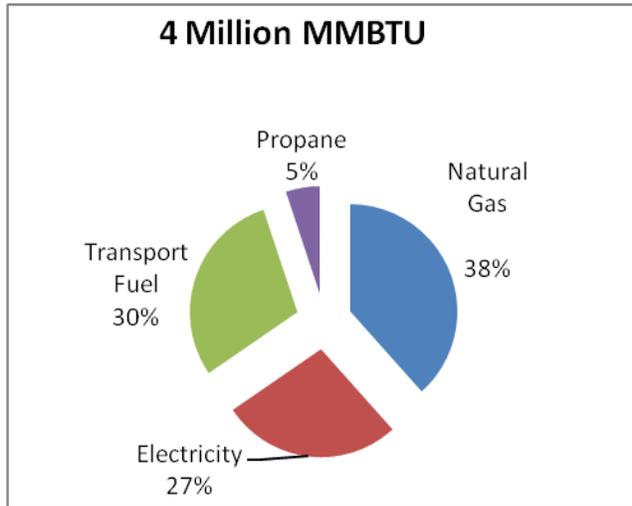
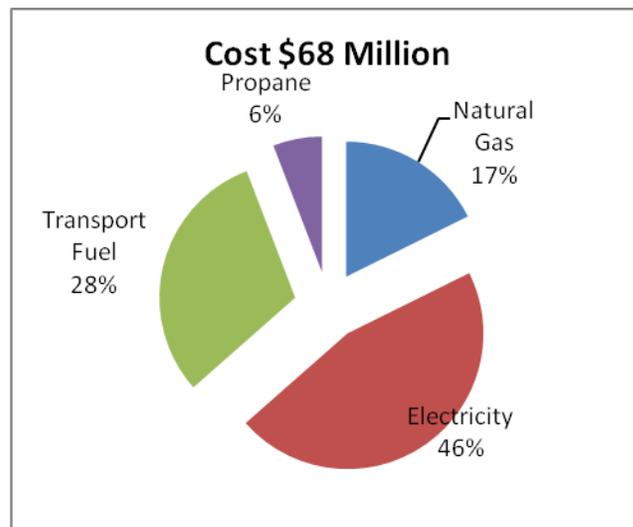
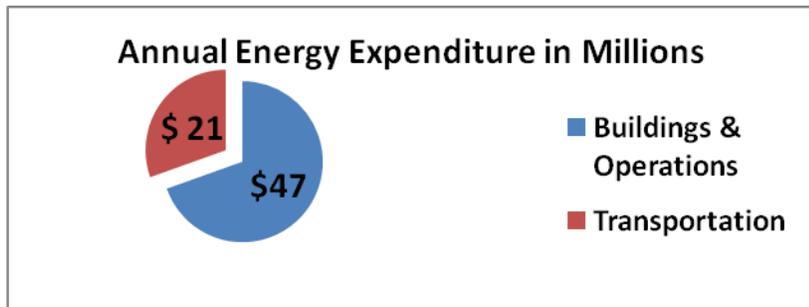


Figure 2: ANNUAL ENERGY COST



<sup>9</sup> See worksheet at end of Appendix 2

Figure 3: USE TYPE



### Summary:

The region is served by four main energy providers:

- Mountain Parks Electric Incorporated (MPEI): a not for profit member owned cooperative that provides electricity to Grand and Jackson Counties
- Xcel: an investor owned utility that provides natural gas and natural gas transport services in Grand County. Xcel provides electricity to approximately eleven premises including the Climax Molybdenum Henderson Mill.
- The Town of Walden Gas Utility: The natural gas provider in Walden and Jackson County.
- The Western Area Power Administration: The provider of electricity to the Colorado Big Thompson Project for water pumping.

Additional energy is provided by liquid transportation fuels, propane, woody biomass, hydro, sun and wind.

### Electricity:

Mountain Parks Electric Incorporated (MPEI) is a consumer owned cooperative providing electrical service to the region. The Cooperative distributes power purchased from Tri State Generation and Transmission Association (TSG&T) to approximately 19,400 consumers. Included in this figure are almost 500 meters in Summit, Routt and Larimer Counties<sup>10</sup>. Xcel Energy, an investor owned utility, provides electrical service to 11 premises including the Climax Molybdenum Henderson Mill.<sup>11</sup> The electricity used by Climax is not included in this assessment and is estimated to equal the electricity used by the region. The Western Area Power Association sells power directly to the Bureau of Reclamation for Colorado Big Thompson pumping operations. Water pumping for trans-basin diversions accounted for approximately 17% of the electrical consumption in 2009.

<sup>10</sup> Rob Taylor email. Approximately: Routt County: 7 meters, Summit County: 424 meters, Larimer County: 58 meters.

<sup>11</sup> Data from Xcel Energy Susannah Pedigo

Table 1: 2009 ELECTRICITY CONSUMPTION ESTIMATES BY PROVIDER<sup>12</sup>

Use Type	Total 2009 mWh
Residential MPEI <sup>13</sup>	138,041
Residential Xcel <sup>14</sup>	115
Commercial 1000 kVa or less MPEI <sup>15</sup>	105,066
Commercial more than 1000 kVa MPEI <sup>16</sup>	37,754
CBT WAPA <sup>17</sup>	43,594
Public Street and Highway Lighting MPEI <sup>18</sup>	494
Other Sales to Public Authority MPEI <sup>19</sup>	15,011
<b>TOTAL</b>	<b>340,075</b>

Table 2: 2009 ELECTRICITY USE BY SECTOR

Sector	mWh	# of Consumers
Residential <sup>20</sup>	138,156	16245
Commercial/Industrial <sup>21</sup>	142,820	3168

<sup>12</sup> This does not include the power Xcel supplies to the Climax Molybdenum Henderson Mill which is estimated to match the total regional consumption listed in this table.

<sup>13</sup> 2009 USDA-RUS 7 MPEI from Joe Pandy

<sup>14</sup> 2009 Xcel Grand County Consumption Susannah Pedigo 8/13/2010

<sup>15</sup> 2009 USDA-RUS 7 MPEI from Joe Pandy

<sup>16</sup> 2009 USDA-RUS 7 MPEI from Joe Pandy

<sup>17</sup> Colorado Big Thompson (CBT) Consumption Data from John Girard Western Area Power Administration 12/8/2010

<sup>18</sup> 2009 USDA-RUS 7 MPEI from Joe Pandy

<sup>19</sup> 2009 USDA-RUS 7 MPEI from Joe Pandy

<sup>20</sup> Xcel and MPEI

<sup>21</sup> Does not include Climax Molybdenum Henderson Mill

Street Lighting <sup>22</sup>	494	11
Water Pumping <sup>23</sup>	58,605	

Figure 4: ELECTRICITY USE BY SECTOR 2009

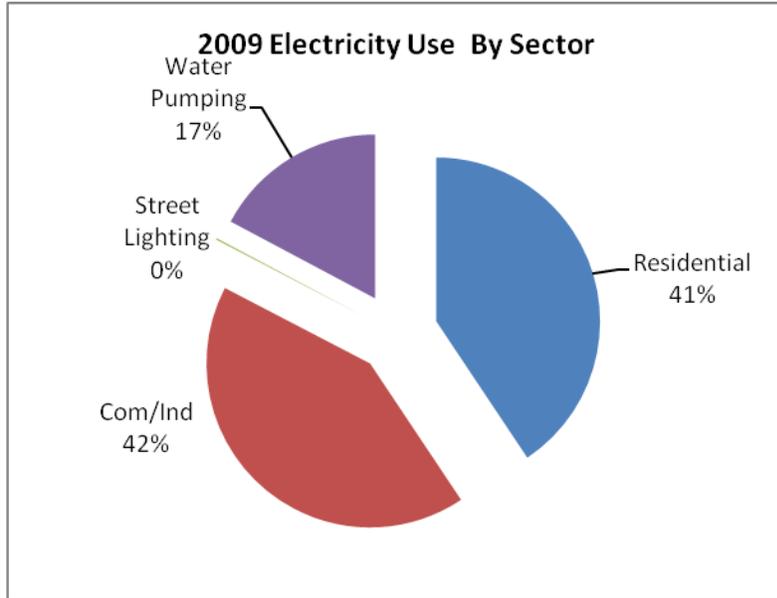
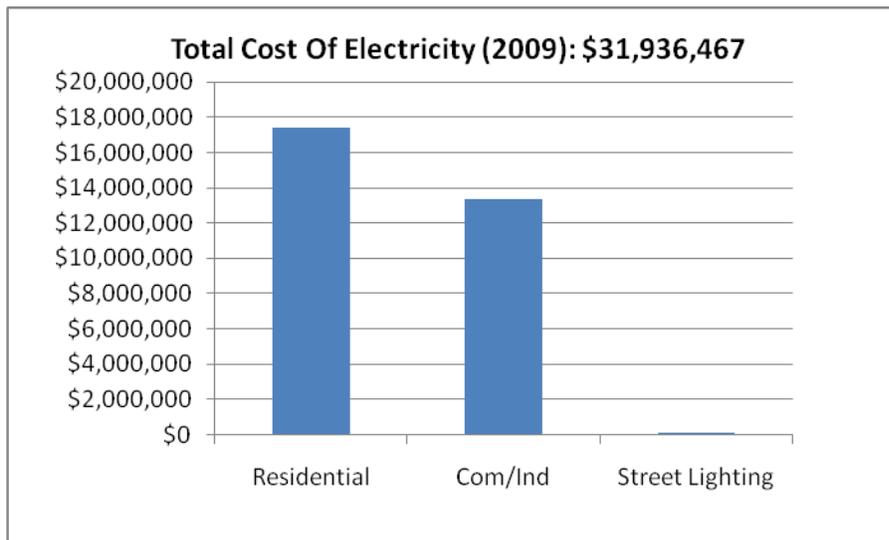


Figure 5: COST OF ELECTRICITY BY SECTOR<sup>24</sup>



<sup>22</sup> USDA-RUS Form 7 MPEI 2009

<sup>23</sup> WAPA CBT and sales to public authorities 2009 USDA-RUS 7 MPEI

<sup>24</sup> Includes service charges, excludes Xcel approx \$11,500 annual residential

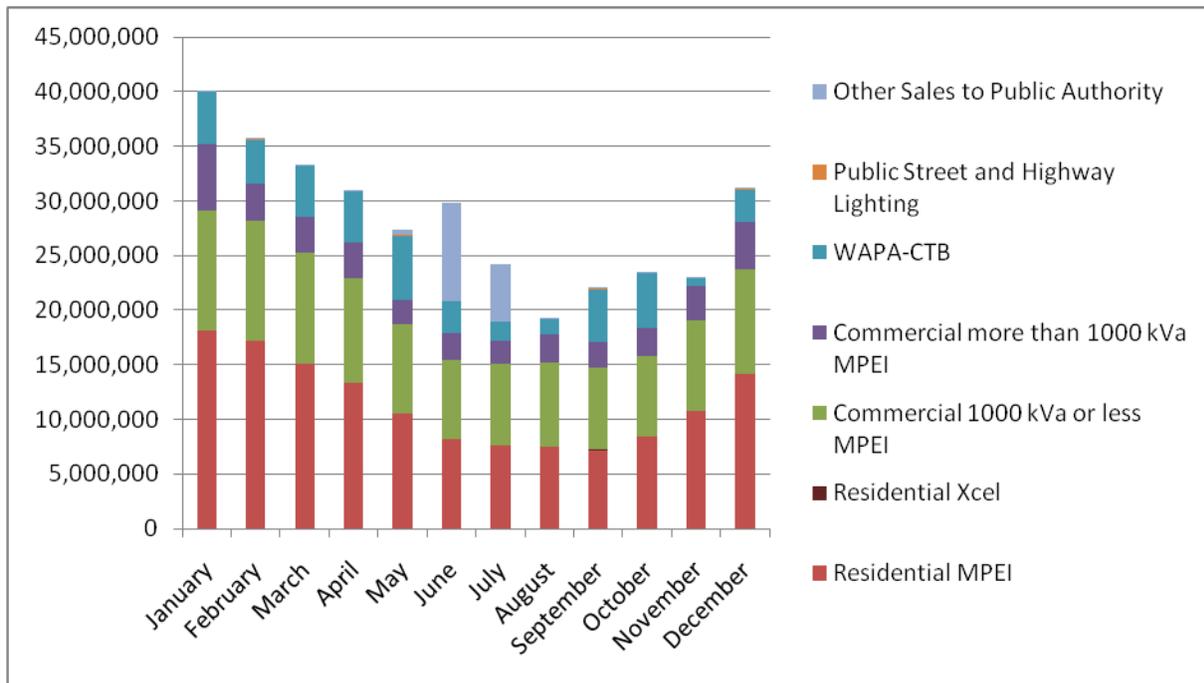
In 2009, the average residential home serviced by MPEI used 709 kWh per month. The Colorado Average is 680 kWh<sup>25</sup>.

Table 3: 2009 RESIDENTIAL AVERAGE MONTHLY ELECTRICAL USE (KWH)

Gilpin	Empire	Clear Creek	MPEI	Park	Summit
445	658	665	709	758	803

Peak power demand for the region occurs during December and January and is in the evening.<sup>26</sup> This contrasts with TSG&T’s demand which peaks during the summer months in the late afternoon.<sup>27</sup>

Figure 6: SEASONAL VARIATION (kWh)



<sup>25</sup> 2010 Colorado Utilities Report p 8, The Colorado Governor’s Energy Office

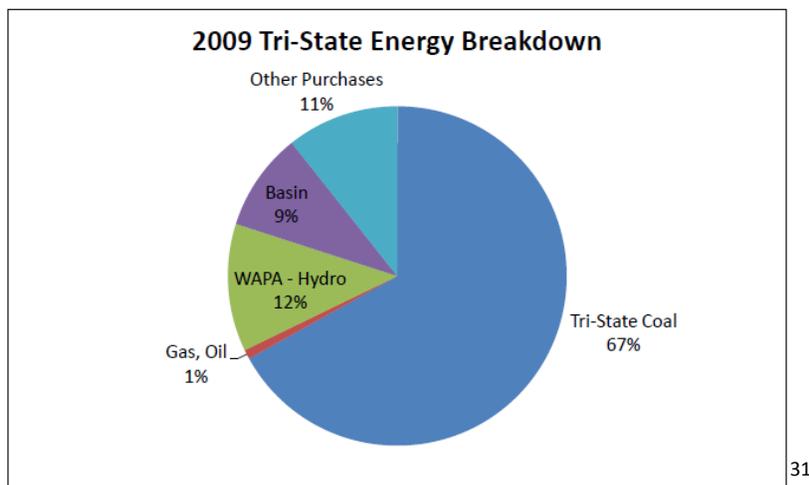
<sup>26</sup> USDA-RUS Form 7 MPEI, time of day peak: general discussions with MPEI, Rob Taylor

<sup>27</sup> Integrated Resource Plan/Electric Resource Plan, Tri-State Generation and Transmission Association November 2010.

About a third of each dollar spent on electricity is used by MPEI to provide and maintain the distribution system. About two thirds of the dollar is used to buy power from TSG&T. In 2009 MPEI customers spent approximately \$32 million with almost \$20 million dollars passing through MPEI to purchase power from TSG&T.

TSG&T depends on coal fired generating plants to provide base load resources. TSG&T’s plants are located in Colorado, Wyoming, New Mexico and Arizona. Estimated life spans of the mines supplying coal to the plants range from “through at least 2014” at Craig’s Trapper Mine to “through at least 2040” at Laramie Station’s Dry Fork mine in the Powder River Basin<sup>28</sup>. Coal prices are forecast to rise from approximately \$1.60 to \$2.05 by 2025 with electricity prices forecast to increase approximately 3.6% annually.<sup>29</sup> Water for the plants is supplied by the Yampa River, San Miguel River, San Juan River, Grayrocks Dam and Reservoir and underground wells in Arizona and New Mexico<sup>30</sup>.

Figure 7: TSG&T GENERATION RESOURCES



Renewable resources are 14% of TSG&T’s breakdown<sup>32</sup>. The resources include wind resources and methane capture at hog farms in Colorado and Wyoming, hydro in Colorado and the new Cimarron Solar Facility in New Mexico.<sup>33</sup>

TSG&T is investing in energy efficiency by supporting the upgrades of appliances, lighting, pumps, certain member load control devices and other devices. TSG&T’s Energy Efficiency

<sup>28</sup> Tri-State Generation and Transmission Association Inc website

<sup>29</sup> *Integrated Resource Plan/Electric Resource Plan*, Tri-State Generation and Transmission Association November 2010 pp 110,111.

<sup>30</sup> Tri-State Generation and Transmission Association Inc website

<sup>31</sup> Copied from: *Integrated Resource Plan/Electric Resource Plan*, Tri-State Generation and Transmission Association November 2010 page 34 Figure 5.

<sup>32</sup> Tri-State Generation and Transmission Association Inc website

<sup>33</sup> Tri-State Generation and Transmission Association Inc website

Credit Program provides incentive payments to consumers if they replace old equipment with high efficiency models. The program is ENERGY STAR based and provides a wide variety of incentives for consumers. It is structured for 1-3 year pay back.<sup>34</sup> MPE supports members with assessments to identify appropriate upgrades.

## Natural Gas

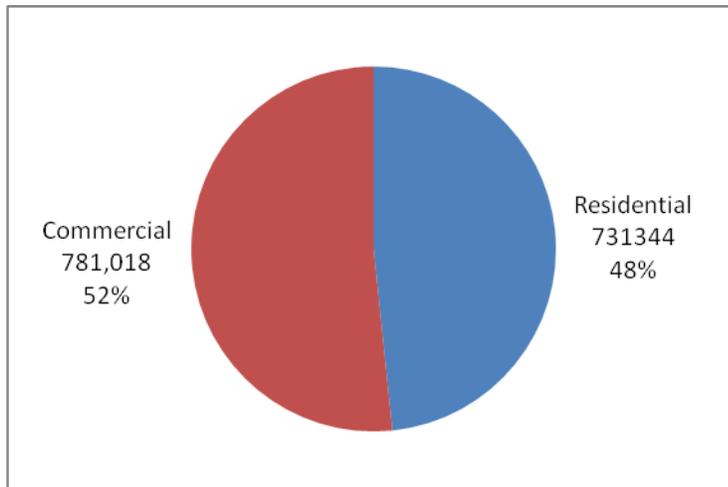
There are two natural gas providers in the region, Xcel and The Walden Gas Utility. Transport gas is included in Xcel’s consumption numbers.

Table 4: NATURAL GAS CONSUMPTION (2009)

Source	Consumption	Price per unit	Unit	Cost	Customers
Xcel	1512362	6.20	Dth	\$ 10,606,734 <sup>35</sup>	9153
Walden	60000	6.10	Dth	\$366,000	600
<b>Total</b>	<b>1572362</b>			<b>\$10,972,734</b>	<b>9753</b>

Aggregated data from Xcel shows that total commercial/industrial use accounts for 52% of consumption while residential use is 48%.

Figure 8 : NATURAL GAS CONSUMPTION BY PREMISE TYPE (2009 XCEL)



The average residential premise served by Xcel consumed 90 DTh of natural gas in 2009. Table 5 compares average residential monthly residential energy consumption in different geographic regions in Colorado.

<sup>34</sup> *Integrated Resource Plan/Electric Resource Plan*, Tri-State Generation and Transmission Association November 2010 pp 182.

<sup>35</sup> Includes estimated service and facility charges.

Table 5: 2009 RESIDENTIAL AVERAGE MONTHLY NATURAL GAS CONSUMPTION (THERMS)

	Grand	Clear Creek	Lake	Summit	Average Monthly Cost (Grand)	Average Annual Cost (Grand) <sup>36</sup>
Gilpin	75	83	80	111	\$60	\$714

Benchmark Comparison between Xcel users and Walden Utility are not possible without additional information. The Walden Gas Utility was formed when the natural gas field that had supplied the town was exhausted. The town formed the utility and installed a natural gas line from Wyoming.<sup>37</sup>

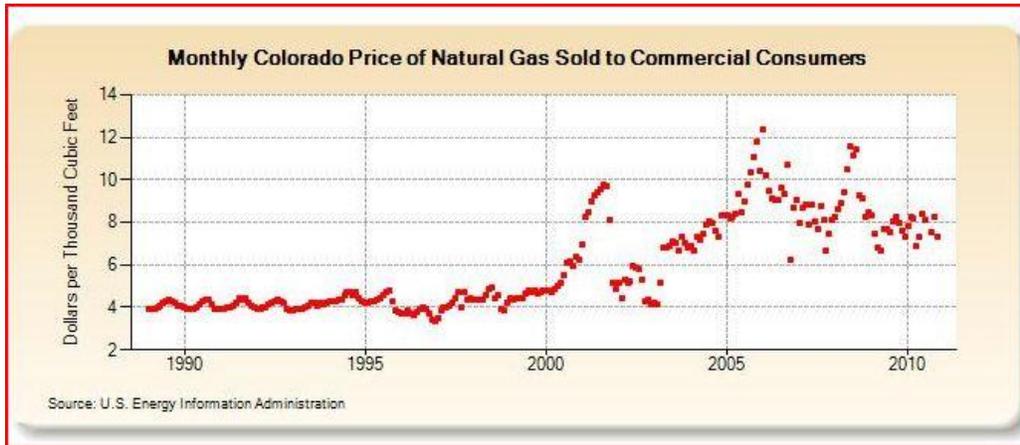
Xcel’s commercial customers in Grand County are eligible for reduced rates on energy audits and incentives for energy efficiency upgrades. Energy efficient boiler upgrades, tune ups, pipe insulation, hot water heaters, outdoor resets and stack dampers are measures that Xcel’s commercial customers can take advantage of. Residential energy consumers do not have access to Xcel’s residential programs which are limited to households which purchase both electricity and gas from Xcel.

The price of natural gas has fluctuated over the last two decades. In the 1990’s consumers enjoyed relatively stable prices while the 2000’s ushered in more volatility.

<sup>36</sup> Includes \$10 per month service fee and natural gas @\$0.66/therm 1/11 Xcel.

<sup>37</sup> Additional data from Walden Gas would be useful to determine the efficiency of homes serviced by the Utility. Data on the infrastructure vs fuel cost would determine whether a reduction of gas consumption could benefit consumers without risking bond repayment..

Figure 9: NATURAL GAS PRICES



It is important to note that MPE’s consumers pay a fixed rate per kWh or kW of electricity throughout the year which allows them to forecast energy costs. Natural gas consumers are subject to more volatility as natural gas prices increase during the heating season and are adjusted quarterly. Despite the volatility, natural gas is cheaper per unit of energy than electricity and is the primary heating fuel in the region<sup>38</sup>.

### Propane:

Approximately 12% of households in the region heat with propane. Propane accounts for roughly four percent of the energy consumed in the region and \$4 million of energy expenditure. Determining the precise amount of propane consumed annually has not been possible. This figure is based on information from the 2000 Census, the U.S. Energy Information Administration, Department of Local Affairs and discussions with two propane providers.

#### Residential Propane Use in Grand and Jackson Counties<sup>39</sup>

Residential Units	Average Annual Gallons	Average Monthly Therms	Average Monthly Cost	Average Annual Cost
1972	841	76	\$163	\$1,956

Propane is more expensive per energy unit than natural gas and follows the price of oil closely.<sup>40</sup> Consumers who rely on propane are more vulnerable to price volatility than those

<sup>38</sup> Natural Gas @ .66/therm (1/1/11) = .66¢/kBtu, Electricity @ 9.3¢/kWh = 2.7¢/kBtu and Census survey of primary heating types.

<sup>39</sup> Residential housing units with primary fuel type LPG extrapolated from Census and DOLA, average annual use based on EIA survey of Western Mountain Region Heating and Hot Water. One gallon of propane = .918 therm. Price at \$2.32 /gallon: Independent Propane 2/28/2011. Discussions with propane companies revised the estimate up to approximately 2,000,000 gallons annually.

who rely on electricity, natural gas, wood/biomass or other renewable energy sources for heating.

### Household Heating Types<sup>41</sup>

Figure 10: PRIMARY HEATING FUEL IN GRAND COUNTY

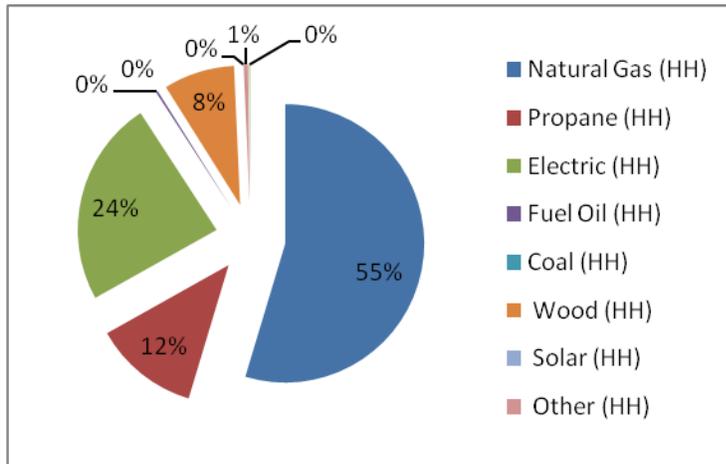
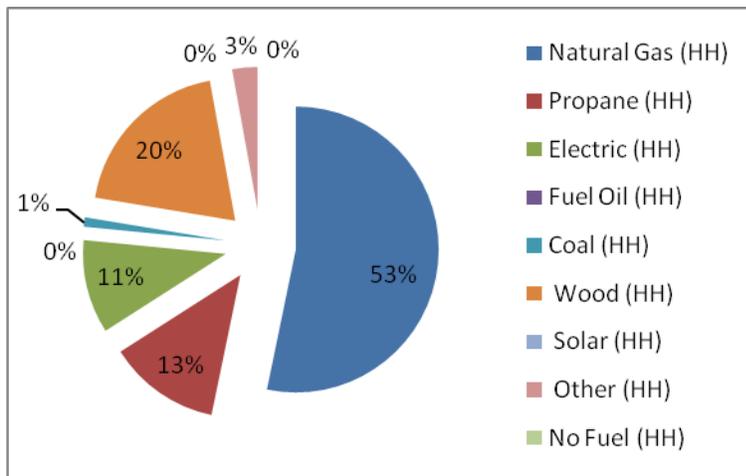


Figure 11: PRIMARY HEATING FUEL IN JACKSON COUNTY



<sup>40</sup> Propane @ \$2.32 gallon (2/28/2011) = 2.5¢/kBtu, Natural Gas@ .64/therm (1/1/11) = .64¢/kBtu, Electricity @ 9.3¢/kWh = 2.7¢/kBtu.

<sup>41</sup> From 2000 Census data

## Renewable Energy and Renewable Energy Potential:

**Hydro:** The Denver Water Board increased the generating capacity at the Williams Fork Reservoir from a 3.0 to 3.65 megawatt turbine. The project was funded using Clean Renewable Energy Bonds. William's Fork generates enough electricity to serve approximately one fifth of MPE's residential consumers or approximately 26,000 megawatt hours.<sup>42</sup>

Other potential hydro sites include Wolford Mountain Reservoir, Grand Lake and Fraser water systems, the Denver Water Board siphons and agricultural irrigation flows in Grand and Jackson Counties.

**Pellet Manufacture:** Confluence Energy and Rocky Mountain Pellet have an estimated annual pellet manufacturing capability of 200,000 tons<sup>43</sup>. The plants, if operating at full capacity could contribute \$20-30 million dollars to the local economy and produce almost as much pellet energy as the region uses in electricity, heating and transportation fuels combined<sup>44</sup>.

**Wood Heat:** Approximately 1300 households in the region depend on wood as their primary heating fuel. Mountain Parks Electric uses pellets to heat their warehouse complex. Wood chips fuel the dryers used by Confluence Energy and Rocky Mountain Pellet Company Inc for their pellet production.

An increasing number of homes and businesses heat with self contained outside wood boilers. Quantifying the exact increase is beyond the scope of this assessment. The adoption of biomass heating technology is shaped by fuel prices, local regulation and federal tax policy. Tax credits for the installation of biomass heating appliances have been reduced to \$300 compared to 30% of the system cost for solar and wind. Grand County is revisiting their permitting requirements for biomass boilers.

There have been efforts by various entities to locate traditional electrical generation plants fueled with beetle killed wood in the region. The low wholesale price of electricity combined with the required rate of return and a lack of guaranteed long term feedstock have retarded these efforts. A plant located where the electricity and heat can be used directly by a large energy consumer may make the economics feasible but is dependent on favorable feedstock analysis. The deployment of smaller combined heat and power gasification units at multiple individual facilities is also being explored. The sale of power and heat at retail rates directly to the energy consumer may improve the economics. The production of transportation fuel from beetle killed wood also remains of interest but so far has been elusive.

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<sup>42</sup> While the electrons probably do flow to MPE consumers the electricity is purchased by Xcel.

<sup>43</sup> Discussions with plant operators.

<sup>44</sup> Pellet wholesale \$100-\$150 per ton, 200,000 tons pellets= 3.2 Million MBTU @ 8000 Btu/lb, excludes Climax.

The release of an anticipated U.S. Forest Service Feedstock Analysis Report for the region will aid investors in making informed decisions. Sustainable harvest of woody biomass is thought to approximate five to six bone dry tons per acre. Until the report is issued, NREL's dynamic mapping tool provides a glimpse into the availability of woody biomass and an illustration on how our region compares nationally: <http://www.nrel.gov/gis/biomass.html>. A Report on the role of forest management, woody biomass utilization for energy and carbon sequestration can be found at [http://www.fs.fed.us/rm/pubs/rmrs\\_p061.html](http://www.fs.fed.us/rm/pubs/rmrs_p061.html).

**MPEI Green Power:** About five percent of MPE members purchase green power blocks at \$0.50 per 100kWh. The MPEI Board of Directors voted in 2010 to change the program so that these dollars will stay in MPEI service territory. The dollars will fund a grant program designed to support local renewable energy projects. MPEI Green Power members purchase approximately 3600 megawatt hours of green power annually.

**Solar:** The region has a solar resource of approximately 5 kWh/m<sup>2</sup>/day<sup>45</sup>. The Recharge Colorado rebate program and the availability of net metering contributed to the installation of at least 28 kW of solar photovoltaic capacity in 2010.<sup>46</sup> No rebates were paid for solar thermal installations.

The region lends itself to cost effective solar design elements. Passive solar gain through the optimal orientation of buildings can significantly reduce heating loads. The use of transpired solar walls (<http://www.nrel.gov/docs/fy06osti/29913.pdf>) is cost effective in our region. An example of this technology is the Big Horn Lumber warehouse in Silverthorne. Smaller installations are in Granby and just outside Hot Sulphur Springs. Incorporating day lighting technologies into new and existing buildings is a cost effective means to reduce energy costs.

**Wind:** The region does not compare favorably to eastern portions of Colorado for utility scale wind generation. [http://www.windpoweringamerica.gov/images/windmaps/co\\_80m.jpg](http://www.windpoweringamerica.gov/images/windmaps/co_80m.jpg) Grand County has revised regulations regarding small wind projects and several small turbines have been installed.

**Geothermal Resource Potential:** The region appears to have deep geothermal resource potential. Additional assessments are necessary to quantify the resource.  
[http://www.nrel.gov/gis/images/geothermal\\_resource2009-final.jp](http://www.nrel.gov/gis/images/geothermal_resource2009-final.jp)

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<sup>45</sup> <http://www.nrel.gov/gis/solar.html>

<sup>46</sup> Rebate data through 12/6/2010 from Recharge Colorado

Worksheet 1:

Energy Type	Source	Consumption	Price/Unit	Unit	Cost	Customers
Natural Gas	Xcel 2009	1512362	6.20	Dth	\$ 10,606,734	9153
Natural Gas	Walden 2009	60000	6.10	Dth	\$ 366,000	600
Electricity kWh	MPEI 2009	314,744,578		kWh	\$ 31,936,467.00	19,400
Gas <sup>47</sup>	Dept of Revenue 07-08/DOLA	6867720	2.33	gallon	\$ 16,001,788	
Diesel <sup>48</sup>	Dept of Revenue 07-08/DOLA	2038754	2.47	gallon	\$ 5,035,722	
Propane	See Heat Worksheet DOLA/EIA	2,000,000	2.00	gallon	\$ 4,000,000	
					\$ 67,946,711	

2009	Month	January	February	March	April	May	June	July	August	September	October	November	December	Average Monthly mWh	Total 2009 mWh
Residential MPEI	kWh Sold	18,094,299	17,217,893	15,129,274	13,298,576	10,509,683	8,150,543	7,631,550	7,505,832	7,193,246	8,377,040	10,762,580	14,170,795	11,503	138,041
Residential Xcel	kWh Sold	13,265	11,372	10,996	11,604	9,403	7,979	7,698	6,942	6,656	7,526	8,312	13,194	10	115
Commercial 1000 kVa or less MPEI	kWh Sold	11,013,900	10,946,875	10,080,416	9,668,892	8,209,115	7,297,980	7,414,550	7,694,757	7,493,171	7,410,177	8,265,536	9,570,975	8,756	105,066
Commercial more than 1000 kVa MPEI	kWh Sold	6,055,592	3,365,352	3,360,808	3,267,608	2,214,344	2,382,384	2,163,491	2,543,121	2,440,008	2,553,160	3,136,576	4,271,104	3,146	37,754
WAPA-CTB	kWh Sold	4,779,000	4,048,000	4,630,000	4,582,000	5,846,000	2,991,000	1,744,000	1,411,000	4,794,000	5,033,000	755,000	2,981,000	3,633	43,594
Public Street and Highway Lighting	kWh Sold	39,249	38,997	39,996	39,510	59,706	39,528	39,564	39,600	39,573	39,672	39,672	39,375	41	494
Other Sales to Public Authority	kWh Sold	47,320	49,712	46,696	45,032	560,000	8,960,000	5,174,484	20,592	14,664	21,008	31,616	39,520	1,251	15,011
<b>TOTALS</b>	<b>mWh</b>	<b>40,043</b>	<b>35,678</b>	<b>33,298</b>	<b>30,913</b>	<b>27,408</b>	<b>29,829</b>	<b>24,175</b>	<b>19,222</b>	<b>21,981</b>	<b>23,442</b>	<b>22,999</b>	<b>31,086</b>	<b>28,340</b>	<b>340,075</b>

<sup>47</sup> This number was arrived at by allocating fuel consumption proportionately based on percent of state population.

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