

# **State Energy Program Formula Grant Plan**

## **American Recovery and Reinvestment Act (ARRA)**

### **State of Wyoming**

**Administered by the Wyoming Business  
Council, State Energy Office**

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## INTRODUCTION

The State of Wyoming State Energy Office has been allocated \$24,941,000 based on formula grant through the American Recovery and Reinvestment Act (ARRA) of 2009. The objectives of the ARRA include job creation, preservation and economic recovery. The Wyoming State Energy Office recognizes that the ARRA SEP seeks to 1) increase energy efficiency to reduce energy costs and consumption for consumer, businesses and governments; 2) reduce reliance on imported energy, 3) improve the reliability of electricity and fuel supply and the delivery of energy systems and 4) reduce the impacts of energy production and use on the environment. SEP primary objectives include:

- Stimulating the creation or increased retention of jobs;
- Saving energy (kwh/therms/gallons/BTUs/etc.);
- Increasing energy generation from renewable sources; and
- Reducing greenhouse gas (GHG) emission

Wyoming has developed three programs which together focus on the areas of energy efficiency for government, non-profit and consumer markets and the installation of renewable energy systems. These programs were developed because of their simplicity and ability to achieve significant energy efficiency improvements across consumer, business and governmental sectors as well as increase energy generation from renewable sources. The implementation of these programs which focus on construction and retrofits will stimulate the creation or retention of jobs. Due to the long-term nature of the investments (essentially capital investments in structures), it is also our hope that these programs will create lasting energy efficiency improvements and behavioral change across a variety of Wyoming constituents.

Wyoming's electric power generation is primarily coal-fired (approximately 97%) so energy efficiency improvements and renewable power installations have the added benefit of reducing greenhouse gas (GHG) emissions. Lastly, these programs were developed to be simple, easy to measure and implement and to leverage existing state resources providing a higher likelihood of success that funds can be deployed in a timely and appropriate manner.

## BACKGROUND

Wyoming is an energy producing rural state with a population of just over 500,000 people. Our State produced roughly 11% of the nation's BTUs and powered homes, businesses and governments in 38 states in 2006. Wyoming is blessed with natural resources including coal, natural gas, uranium and wind resources. Dramatic growth in Wyoming's extractive industries, particularly natural gas development, has resulted in an increase in energy consumption since 1990. In 2006, Wyoming energy consumption totaled 480,894MMBtu, up 19% from 1990 levels. However, this measurement does not tell the whole of Wyoming's story. Wyoming's GDP also increased by 127% over this same time period, and when measured in terms of energy intensity, each dollar in GDP

was delivered with 47.5% less power in 2006 than in 1990. The weatherization and PV programs are intended to reverse this trend.

Wyoming recognizes the Energy Policy Act of 2005 (EPACT), PL 109-58, Title I, Subtitle B, Section 123, as amended states:

“Each State energy conservation plan with respect to which assistance is made available under this part on or after the date of enactment of the Energy Policy Act of 2005 shall contain a goal, consisting of an improvement of 25 percent or more in the efficiency of use of energy in the State concerned in calendar year 2012 as compared to calendar year 1990, and may contain interim goals.”

The SEP FOA Program Guidance in Section 4.1 further call for “per capita” energy consumption reduction. A “per capita” energy consumption reduction measure is highly inappropriate for the State of Wyoming. Wyoming’s low population base, role as a net energy exporter for our national benefit and high consumption of transportation fuels by non-resident traffic combine to distort a simple “per capita” energy consumption measure so that it is not a meaningful energy efficiency goal or measure.

A more appropriate energy goal for Wyoming will apply the “energy productivity” goal established in the 2006 DOE Strategic Plan<sup>1</sup>. This goal (Goal 1.4 – Energy Productivity) aims to “Cost-effectively improve the energy efficiency of the U.S. economy” by improving the productivity of energy production, delivery and end-use. Within the description for Goal 1.4, DOE characterizes energy productivity as the ability to create more economic value (gross domestic product, worker productivity, and air quality) from a fixed amount of energy. Many energy efficiency technologies exist today that produce more lighting, heating, or transportation services, but the higher capital costs associated with these technologies often outweigh the lower energy costs over the life of the technology. As a result, energy efficient technologies do not always increase energy productivity.

Analysis of the DOE EIA data for Wyoming, depicted in Table 1, shows substantial improvement in energy productivity for industry as a function of both per capita and Wyoming RGDP. While industrial energy consumption increased 95.5% between 1990 and 2006, the industrial sector has lowered energy consumption per capita by 7.5% and as a function of Wyoming RGDP by 54.1%. On the other hand, the 2006 energy consumption per capita for the transportation, commercial and residential sectors have increased above 1990 levels by 33.9%, 29.0% and 5.0%, respectively. On a RGDP basis the energy consumption has decreased by 32.5% for transportation, 35.9% for commercial and 47.8% for residential.

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<sup>1</sup> The DOE 2006 Strategic Plan is available online at <http://www.energy.gov/about/strategicplan.htm>.

## Mandatory Activities

The following activities and details on compliance are required in each State Plan:

- establish mandatory lighting efficiency standards for public buildings;

The Wyoming State Energy Office through the Wyoming Energy Conservation Improvement Program facilitates lighting standards for new and renovated buildings of all types. All new state buildings must incorporate stringent lighting standards.

- promote carpools, vanpools, and public transportation;

Wyoming State government has initiated a preferential car pool parking program in Cheyenne for vehicles with three or more occupants and has also implemented a flex-time program for state employees

- incorporate energy efficiency criteria into procurement procedures;

The Wyoming State Energy Office encourages state purchases of Alternative Fuel Vehicles (AFV) and recycled products, and to promote recycling.

- implement mandatory thermal efficiency standards for new and renovated buildings, or in states that have delegated such matters to political subdivisions, adopt model codes for local governments to mandate such measures;

Building code assistance project has been part of previous and current state energy plans promotes awareness and encourages adoption of building codes at all local levels. The Wyoming State Energy Office sponsors pneumatic and digital controls, VAV and boiler seminars for building maintenance and operations personnel to enhance building efficiencies.

- permit right turns at red traffic lights and left turns from a one-way street onto a one-way street at a red light after stopping; and

Prior to 1967, it was illegal to make any turn against a steady red light. In 1967, the Legislature authorized municipalities to allow for right turns against a red light in their jurisdictions. In 1971, it became legal to make right turns on a red light statewide, unless prohibited by sign. In 1984, the statutory language was amended to include left turns against a red light onto a one way street.

*Wyoming Statutes 31-5-403 (a)(i)(C) states:*

(C) Except when a sign is in place prohibiting a turn, vehicular traffic facing any steady red signal may cautiously enter the intersection to turn right, or to turn left from a one-way street into a one-way street after stopping as required

by subparagraphs (A) and (B) of this paragraph. The vehicular traffic shall yield the right-of-way to pedestrians lawfully within an adjacent crosswalk and to other traffic lawfully using the intersection;

- ensure effective coordination among various local, state, and federal energy efficiency, renewable energy and alternative transportation fuel programs within the state. This requirement is especially important in light of the substantial ARRA funding that will be provided to local governments under the EECBG. State Plans should detail how SEP and EECBG funding will be coordinated.

The procedures outlined in the Mandatory Measures have been and are being implemented in Wyoming and procedures are in place to ensure coordination between the various Wyoming entities involved in the application of these measures.

## **PROGRAM**

A summary of the three programs follow:

- A grant program to promote a pre-selected set of energy efficiency upgrades for public, Tribal entities, non profit and joint powers boards owned facilities. Specifically, the grants would only be used to improve building components such as: 1) attic/ceiling improvements; 2) the sealing of cracks and/or insulation of foundations; 3) upgrading of interior lighting; 4) insulation and sealing of HVAC ductwork; 5) replacement of boilers/furnaces; 6) installation of on demand water heaters and 7) measures to improve the efficiency of HVAC systems including replacement. These seven improvement areas are considered high value projects because they provide significant energy savings. Total funding for this program is projected at approximately \$18.9MM.
- An expansion of the Residential Photovoltaic program to include other renewable energy sources such as wind and geothermal heat pumps. Further, the program is amended to be based on a per kW credit which promotes both residential and commercial adoption. Installations of these renewable resources will displace coal-fired power generation which carries a 2,000 lb/hour CO<sub>2</sub> footprint. These programs are expected to employ more than 20 contractors to install renewable energy producing equipment around the state. This program leverages tax credits available to consumers bringing the average cost of an installed system down from \$20,000 to \$10,000. Projected total funding for this program is \$2.560MM
- An expansion of the weatherization program to households with income levels of up to 250% of the poverty level, or approximately \$65K/year for a family of four.

Leveraging the infrastructure and reporting systems being developed to deploy more weatherization contractors around Wyoming. Program seeks 1% participation over 3 years or approximately 480 homes. Total funding for this program is estimated at \$3.480MM.

The stimulus bill provides \$3 billion for support of the State Energy program Formula Grants, American Recovery and Reinvestment Act (SEP ARRA) program. This will be a new Department of Energy (DOE) program requiring rules and guidance from DOE. Wyoming will receive an allocation of \$24,941,000. There are no matching requirements for the DOE awards funded by ARRA 2009. The application deadline for states is May 12, 2009. The allocation must be obligated /committed within 18 months from the effective date of the award with projects completed and all funds expended within 36 months of the effective date of the award.

## **FACILITY RETROFIT PROGRAM**

### **Program summary**

#### *Use of funds*

Grants will be made to governmental, Tribal entities, nonprofit organizations, and joint powers boards for the purpose of retrofitting existing facilities to improve energy efficiency. Structural change to the facility may be allowed under the program if it is needed to accomplish the proposed retrofit. If the facility is 50 years or older, applicants must provide verification that the State Historic Preservation Office (SHPO) has been contacted, consulted and report results of that consultation. All improvements must be done under the most recent building codes. No new construction is allowed as we assume that any new construction is being designed under the most current building codes with maximum cost-effective energy efficiency incorporated in the plan.

Examples of eligible improvement / retrofit items are:

1. Attic/ceiling insulation (Using different R-levels for building, depending on building type and county). *See ASHRAE guidelines listed below.*
  - a. Reduces heat gain and loss
2. Insulation of foundation (same thing as above)
  - a. Reduces heat gain and loss
3. Lighting – replacement of existing lighting with energy efficient lighting system, occupancy controls, auto dimming according to natural light.
  - a. Reduces cooling and energy use.
4. Insulation of HVAC ductwork (including the sealing of duct joints and seams) and removing ductwork outside the building conditioned space, and potentially

- the installation of more efficient HVAC systems, such as those incorporating thermal zones or occupancy controls.
- a. Reduces heat gain and loss in the ductwork.
  - b. Reduces energy consumption.
5. Replacement of boilers/furnaces to energy efficient models
    - a. Reduces energy consumption.
  6. Replacement of hot water heaters with on-demand water heaters.
    - a. Minimizes distribution losses.
  7. Replacement of Air Conditioning (HVAC) systems
    - a. Reduces energy consumption.

The overall program goal is to improve energy efficiency by 25-30% on average per applicant. Further, each improvement will be completed to ANSI/ASHRAE/IESNA Standard 90.1–2007 in accordance with the requested building code compliance information.

Efficiency improvement calculations will vary based on the age of the structure, the level of energy efficiency improvements required and the local weather conditions. Although tables and methods of calculating the amount of energy savings per application are not simple we hope to identify standard measurements for applicants to use. The State Energy Office will develop a streamlined program which allows applicants to readily complete their expected energy savings as part of their application process. The SEO will work with local utilities and the University of Wyoming/ Manufacturing-Works ([www.manufacturing-works.com](http://www.manufacturing-works.com)) as well as call upon the number of DOE and EIA resources to develop the basic energy savings expectations. .

US DOE has free design tools for commercial and government buildings on their software. See: [http://www1.eere.energy.gov/buildings/commercial\\_initiative/](http://www1.eere.energy.gov/buildings/commercial_initiative/)

Energy Information Administration:  
[http://www.eia.doe.gov/emeu/efficiency/energy\\_savings.htm](http://www.eia.doe.gov/emeu/efficiency/energy_savings.htm)

Federal Energy Mandates:  
[http://www1.eere.energy.gov/femp/services/printable\\_versions/energy\\_aware\\_oec.html](http://www1.eere.energy.gov/femp/services/printable_versions/energy_aware_oec.html)

Energy Efficiency in Workplace:  
[http://www.energysavers.gov/your\\_workplace/](http://www.energysavers.gov/your_workplace/)

HVAC group: breaks out recommendations for improvements by building type and climate by county.  
<http://www.ashrae.org/publications/>

Building Design Guide:  
[http://www.wbdg.org/design/minimize\\_consumption.php](http://www.wbdg.org/design/minimize_consumption.php)

Buildings Energy Data Book:  
<http://buildingsdatabook.eren.doe.gov/>

Our research indicates that retrofitting existing facilities in the manner described above will:

- ◆ generate the greatest amount of energy savings with the funds available
- ◆ result in long term sustainable energy savings
- ◆ minimize the need for additional staffing or contract assistance
- ◆ allow for matching programs through local utilities to leverage funds
- ◆ be measurable for reporting and audit purposes
- ◆ quickly resulting in increased employment for local contractors and crews throughout the state
- ◆ require the purchase of large amounts of materials (insulation, windows, lighting, etc.) which will enhance rejuvenation of the economy

#### *Eligible applicants*

All units of local government, non-profits, Tribal entities and joint powers boards may apply to the State Energy Office for a sub-grant. \$18,000,000 will be set aside for these eligible applicants. Any facility being retrofitted must belong to the applicant and must be located within the boundaries of the State of Wyoming.

A standard application along with supporting required documents must be submitted to the State Energy Office by the eligible applicant on or before the application due date (application attached).

#### *Sub-grant amounts*

The maximum sub-grant award will be \$750,000. A minimum 10% match is required for these sub-grants to leverage the available Federal funds. There is no minimum award. Projects may exceed \$750,000. However, the project amount in excess of \$750,000 must be funded from local or other sources.

#### *Leverage*

Wherever possible, applicants will be encouraged to identify utility cost-sharing programs and other federal incentives to leverage the State's investment in these seven pre-selected categories of improvements.

### *Energy savings*

The intent of this program is to retrofit existing buildings to maximize energy savings and create sustainable reduction in energy usage. Work remains to be completed to develop an efficient and accurate estimating system to determine average energy savings for the 7 pre-approved improvements for commercial structures. It is our intent to develop a tracking system to calculate energy savings from these improvements and to achieve the SEP goal of 10MMBtu/\$1,000 spent.

### *Reporting and audit*

Projected energy savings in numerous applications (insulation, lighting retrofits, windows, HVAC, etc.) can be calculated from tables available to the industry. The SEO will develop a tool to enable applicants to calculate their projected energy savings. Applicants can get assistance in this area from their local utility or the University of Wyoming, Manufacturing–Works (M-W) [www.manufacturing-works.com](http://www.manufacturing-works.com) or any number of other vendors who assist in energy efficiency audits.

The State Energy Office will contract with a third party to complete an inspection and audit of each project. After each project is completed and before payment of the final invoice by the State Energy Office the third party engineer will inspect the facility and prepare a written report verifying the work has been completed per plans and specifications. The engineer completing the inspection will also prepare an independent projection of the energy savings that should be achieved with the retrofit. The report will be delivered to the State Energy Office and this information will be reported in aggregate on a quarterly basis in accordance with the SEP.

### *Infrastructure*

#### Marketing

- Development of a statewide marketing and outreach plan to promote the benefits of the program.
- Design of a web interface that allows grantees to identify nearby projects, and to understand the economics of the plan.
- Statewide presentations or videoconference to provide technical assistance to all eligible applicants.
- Customer support including information on program website and access to staff.
- Presentation and informational booth at the Wyoming Association of Municipality conference June 10th-12th, 2009.

### Decision process

- Applications will be received and reviewed by State Energy office staff.
- Applications will be rated based on projected percent of energy savings and local match giving the highest rating to projects that will generate the greatest amount of energy savings per SEP dollar expended.
- Staff will make recommendations for sub grant awards to the Wyoming Business Council board. The board will make final decisions at regularly scheduled quarterly public meetings.

### Distribution

- A process for disbursing and ensuring the grants are made for actual projects. Disbursement will address tracking for online reporting of installed base, capacity and jobs created by geographic area.

### Monitoring

- A process for conducting audits, calculating and reporting energy savings on each project. Each project will be audited for energy savings upon completion of the retrofit and three calendar years of post completion reporting will be required.

### *Staffing Requirements & Job Creation*

Depending on the success and speed with which the program expands, the program will require 2 to 4 full-time employees. Initially the program will be staffed by the State Energy Office Program Manager and Sherry Hughes, State Energy Office Senior Program Specialist supported by Ben Avery Business and Industry Division Director (existing positions). A part time administrative assistant (existing position) may be increased to full time during the peak of application review, contract processing and sub-grant closing.

Program servicing will be administered through the State Energy Office using the same grant administration process in place and developed by the Wyoming Business Council, Investment Ready Community Division for the Business Ready Community Program.

### *Job Creation*

In addition to the direct job creation associated with administration of the program, additional jobs will be created for contractors and others through the incremental equipment, supplies, and installation induced by the program. DOE estimates that every \$92,000 results in one job created. Job creation is a secondary purpose of this program.

### *Implementation Timeline*

To take advantage of the critical summer construction season in Wyoming, this program will ramp up within the next 3 months with development of a marketing program and outreach to eligible applicants. Tracking and reporting processes are identified in this program overview.

### *Timeline*

<u>Step</u>		<u>Budget</u>
1. June 09 - ongoing	marketing	\$60,000
2. June – July 2009	web-site update to support the program	
3. July – August 2009	receive initial applications	
4. July – August 2009	revise the contract with M-W for energy audits and reporting	
5. September 2009	initial applications approved by WBC Board	
6. October 2009	process and close sub-grant agreements with awardees'	
7. Ongoing	project monitoring and inspections	

Steps 1, 3, 5 and 6 will be repeated quarterly until all grant funds have been awarded and obligated.

### *Participation*

The program is projected to assist in financing 100 to 125 projects throughout the state based on an assumption that projects will average \$200,000. This represents nearly 100% of the 122 communities and counties in the state. The program provides sufficient funding for nearly every community and county to fund a project.

### *Need*

The Market Research Center at the University of Wyoming has prepared two reports based on Dun and Bradstreet database that, while incomplete, does provide a summary of square footage of public buildings for certain market segments. Two significant markets not covered by the reports are State of Wyoming buildings and local government buildings. The following tables show the results of the reports.

Community Colleges	2,165,832
Hospitals	2,862,658
Nursing Homes	1,422,000
School Districts	4,216,200
Museums	864,760

Totals	11,531,450 sq. ft.
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This is not inclusive of all nonprofits and joint powers boards.

We have inquired directly to Wyoming Association of Municipalities and Wyoming County Commissioners Association for information on total square footage of those public owned facilities. That information is not readily available. However, 15 of the 122 cities and counties in the state have completed investment grade audits. The total dollar amount of identified projects for those 15 communities is \$14,673,834. It is estimated that the need for facility retrofits for all 122 cities and counties would exceed \$120,000,000. Clearly the need exceeds projected funding for the program.

*Program Income*

There is no anticipated program income

*Transparency of information*

Complete details of the program including marketing, application process, approval process, approved awardees for sub-grants, projected energy savings per project, project monitoring during the retrofit period, final third party audit and annual reports of energy savings will be posted on the Wyoming Business Council (WBC), State Energy Office and the State of Wyoming's web-sites. Significant upgrade to the WBC web-site will be completed to accomplish this.

*Implementation*

- Efficient implementation is critical to the success of the program and our ability to report progress to the Federal Government. The summary below outlines how each program will work.
  1. The facility retrofit program will receive applications from eligible applicants.
  2. The applications will identify the facility/facilities to be retrofitted, the type of improvement, projected energy savings and cost.
  3. WBC staff will evaluate applications and recommend approval or denial.
  4. Applications will be acted on during regular quarterly public meetings by the Wyoming Business Council Board of Directors.
  5. Upon approval by the Board, staff will prepare contracts for the facility owner according to the retrofit plan with the assistance of the State Attorney Generals Office.

6. There will be at least three on-site inspections of each project during the retrofit project period to be conducted by a third party contractor.
7. Upon completion the third party contractor will provide a written report to the State Energy Office verifying that work has been completed according to plans and specifications before the final invoice will be paid to the facility owner.
8. The third party contractor will provide a written report of the projected energy savings based on the work that has been completed.

The Wyoming Business Council State Energy Office will be responsible for program success.

*Metrics*

The State Energy Office understands that program goals seek to calculate energy savings with a minimum target of 10MMBtu/\$1,000 invested. Based on the program size and an average expected useful life of 10 years, the State must generate 19,200MMBtu in savings/annum from the dollars invested in this program. Wyoming looks forward to receiving additional DOE assistance in calculating the BTU/sq footage improvement to be expected.

- Achieve primary program goals
  - # jobs created (conservative)
  - Energy saved (**Our target for the facilities retrofitted is an energy efficiency gain of 25%**)
  - Promote renewable energy consumption
  - Lower GHG emissions

*Facility retrofit program usage*

	Year			
	2009	2010	2011	Cumulative
Dollar amount of eligible projects	\$60,000,000	\$66,000,000		\$126,000,000
Retrofit project totals	\$6,000,000	\$12,000,000		\$18,000,000
Number of projects	57	60		117
Average grant amount per project est. (\$750k max)	\$200,000	\$200,000		
Targeted cumulative energy savings	25%	25%		25%

*Facility retrofit program budget*

<b>Program Budget</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>Cumulative</b>
Sub-grants	\$6,000,000	\$12,000,000		\$18,000,000
Operations & Administration				
Program Administration – travel *	\$10,000	\$10,000	\$10,000	\$30,000
Office Expense	\$8,000	\$8,000	\$3,000	\$19,000
Marketing	\$40,000	\$10,000	\$10,000	\$60,000
Web-site maintenance	\$7,000	\$7,000	\$2,000	\$16,000
Legal Support	\$10,000	\$10,000	\$5,000	\$25,000
Contract for third part auditor @3%	\$250,000	\$250,000	\$250,000	\$750,000
<b>Total Operations &amp; Administration</b>	<b>\$325,000</b>	<b>\$295,000</b>	<b>\$280,000</b>	<b>\$900,000</b>
<b>Total Program Costs</b>	<b>\$6,325,000</b>	<b>\$12,295,000</b>	<b>\$280,000</b>	<b>\$18,900,00</b>

## **EXPANSION OF RESIDENTIAL PHOTOVOLTAIC SYSTEM INSTALLATION PROGRAM**

### **Program Summary**

The proposed program is an expansion of the existing residential photovoltaic system installation program. The program will be expanded in two primary ways: 1) funding amounts will be increased from \$2,000 per project to no more than \$5,000 not to exceed 50% of project cost, with a total granting of \$2.5MM over the next 3 years and 2) renewable installations will be expanded to allow for PV, wind and geothermal heat pumps and 3) depending upon demand, the program may be scaled at a later date to allow small and medium sized businesses to participate.

One of the longest running energy office programs in Wyoming, \$562K in grant monies have leveraged \$1.3MM in private investment to generate 103kW in installations in 196 homes over the last decade. The current program provides up to \$2,000 for residential photovoltaic installations with funding for a total of 37 program participants.

Applications are accepted in early June by email, on-line, fax, letter and hand delivery. Application processing is timed so that funds are available as early as possible in the fiscal year (July 1) and in time for the summer construction season. Only system components purchased or installed prior to the last signature being affixed to the grant agreement between the Wyoming State Energy Office and the property owner can be funded. The mailing address of the applicant and the physical address where the system will be installed are also required. Only one grant per applicant, per residence is permitted. Demand has exceeded program capacity by a factor of 3, so grantees have been selected by lottery.

Additionally, the federal government provides a residential renewable energy tax credit to 30% of qualified expenditures on PV, wind and geothermal systems as of January 1, 2009. There is no maximum rebate for systems installed after January 1, 2009. Coupled with Wyoming's program, this could mean that a \$20,000 PV system could cost as little as \$10,000 to install and a \$40,000 wind generation facility could cost \$23,000. Geothermal heat pump installations are also expected to range between \$20,000 and \$40,000 so the economic benefit would be commensurate with other renewable energy installations. Incentives from this program range in benefit from 7-15%, but coupled with the federal tax credit, the capital costs are reduced by nearly 50%.

Given the ultimate capital cost of the improvement, the average Wyoming home price of approximately \$250K and average income in Wyoming, this incentive program most likely will only make sense for homeowners in the top third of the market in terms of household income, and select small businesses. The installation of local renewable power systems in Wyoming does however benefit the nation and creates job opportunities for contractors. It's estimated that a crew of 2 people can complete 1-2 installations/week, most likely focused on the summer and fall construction season in Wyoming. A decline in indigenous power consumption will allow Wyoming to further contribute to meeting our nation's growing energy demands.

### *Target Market*

As of 12/31/06, there were 223,235 housing units in the State of Wyoming of which 163,252 were single family housing units. Furthermore, the rate of construction of new housing stock is approximately 2,000 units per year. Wyoming has experienced a tremendous housing shortage over the last several years as a result of the rapidly growing energy extractive industries.<sup>2</sup> For purposes of this analysis and based on expected growth through 2008, we will assume that the market potential is a total of 170,000 homes.

From that, we assume homeowners with the financial capacity to complete a \$10-20K capital project represent one-third of these homes. To be conservative, mobile homes, apartments, ranches and multi-unit buildings have not been included.

The expanded program seeks an installed base of 1% of qualified households of single family housing stock through the remainder of 2009 and through 2011. At this rate, 561 homes in Wyoming would have installed a renewable energy system, representing more than a 4-fold increase in the program in 2009 and an 8-fold increase in the program in 2010 and 2011. This is an ambitious increase in the program, but achievable with a very targeted marketing campaign. Program participants are likely to be middle and higher income families as stated above.

### *EM&V*

The primary metrics which will be tracked include number and type of installations by geographic location and the amount of renewable energy generating capacity installed by source. Energy savings through MMBTU and CO2 reduction can be estimated based on EIA data and replacement of fossil based electricity consumption with renewable power, however, actual data for power generation is required to complete the calculation and without utility assistance, this information may be difficult to obtain. EM&V costs are estimated to range between 2-5% of the program and total program administration costs are estimated at 14%.

### *Infrastructure*

The primary infrastructure required to implement this program includes:

- A process for screening, recruiting and monitoring qualified contractors. A sufficient contractor base across the State of Wyoming to conduct the work, seasonally or potentially year round. The idea of “tiger teams” has been suggested to develop extremely efficient and qualified small teams who would travel the state to complete installations. Proactive scheduling would allow for full employment of teams.
- Development of a statewide marketing and outreach plan to promote the benefits of the program. Design of a web interface that allows grantees to find nearby projects, to understand the economics of the installation.

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<sup>2</sup> 2007 Wyoming Housing Conditions Report, WCDA and the Wyoming Housing Database Partnership

- A process for working with utility companies to leverage marketing efforts and address systems issues, if any.
- A process for conducting audits, calculating and reporting energy savings to the homeowner and to the program. The intent is to audit at least 10% of the projects each year, of which 50% of them should be during the construction period.
- A process for disbursing incentives and ensuring grants are made for actual projects. Disbursement should address tracking for online reporting of installed retrofits.
- Customer support including information on program website and access to staff.

### *Staffing Requirements & Job Creation*

Depending on the speed with which the program expands, the program will require .5-1 full-time employees. At minimum, the program requires one part-time program manager and one part-time staff member for tracking applications, funds disbursements, verifying projects and conducting quality assurance. The program is currently managed by Sherry Hughes, Senior Energy Program Specialist with assistance provided by Luana Krause, part time Administrative Assistant. For purposes of this budget it is assumed that a third party firm will be engaged to create the statewide marketing program and the web interface to launch this significantly expanded program. Initial phases of the program may require an additional staff for a period of 6 months to perform start-up activities but the cost is not allocated to this budget at this time.

### *Available Contractors*

Currently, there are 14 renewable energy installers in Wyoming.<sup>3</sup> Not all of these installers focus on small scale renewable installations, but several do appear to work on solar, wind and geothermal heat pump installations. One firm, Creative Energies, indicates an ability to meet the increased demand immediately and reports an influx of job applications to work on renewable energy installations.

Several Wyoming non-profits and community colleges also have or are developing workforce development programs for wind turbine technicians and weatherization contractors. This program will enhance the work prospects for these newly trained technicians.

Wyoming is challenged in sourcing readily available labor & materials across the entire state. Wyoming will work with other surrounding states to develop a regional network that enhances the number of installers available to serve Wyoming. It will be necessary

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<sup>3</sup> Energy.soureguides.com

to work with current solar installers to expand their geographic range and hire laborers to ensure availability of adequate labor resources.

With a goal of completing 140 installations in 2009, Wyoming should be able to meet the demand with a slightly expanded installer base in teams of 2-4 who can travel the state over the next 6 months and conduct installations. This number will need to double by 2010 to meet demand. This assumption is based on a timeframe of 1 week/project. If the “tiger team” model is developed it is possible that implementation timeframes and regional installations will be much faster. We expect up to 2-3 installations per week for a very efficient workforce operating in one local community. To take advantage of the summer season, program marketing and contractor outreach will be critical near-term priorities. At the height of the program, approximately 21 direct contracting jobs will be created. This directly creates approximately 8 jobs per million dollars spent by the program.

### *Job Creation*

In addition to the direct jobs associated with implementing the program, additional jobs are created for contractors and others through the incremental equipment, supplies, and installation induced by the program, as well as through economic effects resulting from homeowner spending of funds that would otherwise go toward utility bills. In total, it is estimated that approximately 12 jobs will result per million dollars spent by the program using a 50% multiplier (Excluding jobs related to manufacturing and distribution of equipment and supplies.)

### *Implementation Timeline*

To take advantage of the critical summer construction season in Wyoming, this program will strive to ramp up within the next 2 months with development of a marketing program and outreach to consumers and contractors. There is a list of previous applicants who will be contacted immediately. The program strives to create a 10-fold increase in 2009 with only 7 months remaining in the year. Tracking and reporting processes will also need to be developed simultaneously with marketing and contractor recruitment.

June/July: Design marketing program, contact contractors and let them know of the expanded program. Launch info on website.

July/Aug: Begin rolling applications for grants. Develop audit and reporting process.

Launch marketing program to run through September

Sept: Sample audit of installations.

Quarterly audits and reporting on installations, system size and jobs created.

### *Sample Program Performance*

### *Savings*

Energy savings will vary based on the location of the home and the renewable resource available in that region. The Renewable Energy Atlas of the West estimated the annual

solar electricity generation potential in Wyoming to be 72 billion kWh and the potential for wind electricity generation at 883 billion kWh. However, resources vary tremendously from the southeastern portion of the state to the western part of the state. Nonetheless, a 25% capacity factor and 20 year useful life for the project was assumed for purposes of these calculations. These are fairly low capacity factors for wind given Wyoming's extraordinary renewable resources. Wyoming is heavily dependent upon coal-fired power generation with nearly 97% of its fuel source deriving from coal. The EIA Residential Energy Consumption Estimates were used for baseline calculations of BTUs consumed.

*Participation*

An aggressive renewable installation program could reach approximately 1% of eligible homes and financially capable owners (561 homes) over three years, with aggressive marketing and development of an efficient contractor base. The absolute capital cost of the program will affect the likely number of applicants tremendously as perhaps as few as 20-30% of Wyoming homeowners could afford a capital improvement project of \$20-30K in any given year. Fewer will likely elect to invest in renewable generation over other improvements.

*Photovoltaic program usage*

Illustrative program implementation costs follow. Reported costs vary depending upon the implementation approach taken, the number of installers and the degree of market participation. The key calculation of MMBtus per source installation is linked to a projection of renewable power generation over the entire life cycle of the installation (e.g. energy savings are calculated for 20 years).

	Year			
	2009	2010	2011	Cumulative
Potential of Eligible Homes	56,100	56,100	56,100	56,100
Participation Rate	0.25%	0.50%	0.25%	1.00%
Participants	140	281	140	561
Average Cost per Participant	\$ 4,732	\$ 4,487	\$ 4,549	\$ 4,564
Program Cost	\$ 663,643	\$ 1,258,586	\$ 638,041	\$2,560,269
Jobs per \$1M	8	9	8	8
Jobs Created	5	11	5	21
Per Unit Source MMBtu Saved	245	245	245	
MMBtu Saved Over System Life	34,384	68,769	34,384	137,537
Source MMBTU saved per \$1,000	19.3	18.3	18.6	18.6

*Photovoltaic program budget*

<b>Program Budget</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>Cumulative</b>
Grants	\$561,000	\$1,122,000	\$561,000	\$2,244,000
Operations & Administration				
Program Administration – travel	\$30,000	\$62,500	\$32,500	\$125,000
Office Expense	\$1,500	\$3,000	\$1,500	\$6,000
Marketing	\$55,000	\$55,000	\$30,000	\$140,000
Legal Support	\$15,000	\$15,000	\$15,000	\$45,000
<b>Total Operations &amp; Administration</b>	<b>\$101,500</b>	<b>\$135,500</b>	<b>\$79,000</b>	<b>\$316,000</b>
<b>Total Program Costs</b>	<b>\$662,500</b>	<b>\$1,257,500</b>	<b>\$640,000</b>	<b>\$2,560,000</b>

Wyoming's program is similar to existing programs in many other states, though the addition of small scale wind installations is a unique feature tailored to Wyoming's specific renewable resources.

## **WEATHERIZATION PROGRAM FOR MIDDLE INCOME RESIDENTIAL CONSUMERS**

### **Program Summary**

The proposed program is a new weatherization program for Wyoming families earning between 215 and 250% of the federal poverty limit. The program will leverage the expanding weatherization program being administered by the Department of Family Services (DFS) and is expected to total \$3.48MM in funding. Anticipated service levels are based on US Census Bureau extrapolations on Wyoming residences with an expected 48,000 eligible households. Based on a 1% participation rate, and a weatherization cap of up to \$6,500 but an average expected grant of \$5,000 and funding not to exceed 80% of costs, weatherization services are expected to total \$3.119MM.

According to a Wyoming Community Development Act study commissioned in 2007, Wyoming had approximately 163,252 units of single family, apartments, and mobile homes. Assuming this number has increased due to the continued energy boom, we estimate total housing stock at 170,000 homes. The report indicated that less than 10% of the housing stock was constructed with good to excellent craftsmanship. Nearly 50% of the housing stock was rated as average with the remaining 35% rated as fair and the remaining 5% rated as low quality. Based on this distribution, it seems most likely that housing stock for middle income families is fair to average, and therefore likely to present ample opportunities to conduct cost-effective weatherization work.

This is a new proposed program for the SEO, but is not a new program for the State of Wyoming. Funds will not supplant existing programs, but rather will take advantage of the existing infrastructure and contractor network developed by the DFS to expand the program to reach a market segment not otherwise serviced through the SEP. The weatherization program in Wyoming increased significantly in 2008 and is administratively coordinated with the LIEAP application process. Despite additional federal funding, DFS rejected more than 1,000 applications based on need criteria and due to limited funding. The ARRA weatherization expansion will meet this demand, but the experience is illustrative of what the state may expect with the launch of a weatherization program targeting middle income homeowners.

In addition to an outreach and marketing campaign, we hope to rely upon cooperation from energy utilities to promote the program and to leverage appliance rebates and other available energy efficiency incentives provided by those utilities. Additional program leverage will be achieved by requiring a 20% homeowner contribution.

### *Target Market/Participation*

See attached chart for anticipated distribution of households who might apply for this program. Note the middle income weatherization market is essentially equal in size to the traditional weatherization market. Please also note that it is not possible in the State reporting system to identify the specific market segment between 200% and 215% which will be covered through the existing weatherization program. This clarification will occur on the application process to ensure the program is not supplanting other funds. The program seeks an installed base of 1% of qualified households meeting the HHI requirements of single family housing stock through the remainder of 2009 and through 2011. We estimate 480 homes in Wyoming will benefit from this program. As another

data point, DFS expects to weatherize approximately 1,000 additional homes through its expanded weatherization funding. The expansion to a larger market segment will still only represent a fraction of the 170,000 single family homes in Wyoming—of which over 120,000 homes are in average or worse condition

### *EM&V*

The primary metrics which will be tracked include number and type of installations by geographic location. Energy savings through MMBTU and CO2 reduction can be estimated based on EIA data and reduction in fossil based electricity and natural gas consumption. Actual data for power generation is required to complete the calculation and without utility assistance, this information may be difficult to obtain. The program goal is to achieve a 30% improvement in energy efficiency which in a typical home represents approximately 11 MMBtu. Anticipating that the energy efficiency benefit continues for 20 years or the remaining useful life on the house, each \$6-7K spent per home generates approximately 226MMBtu. This equates to a savings of 17.1MMBtu/\$1,000 spent on the program. This is a highly paper intensive process and total program administration, marketing and staffing costs are expected to be 10% of the total \$3.48MM program cost.

### *Infrastructure*

Developing sufficient infrastructure is the primary concern of the program. The expansion of weatherization to lower income homes has placed significant stress on existing State resources that we cannot be certain that the contractors or state agencies can expand and serve an additional and significant market segment. However, the SEO and DFS believe the potential advantage of leveraging the existing weatherization program and to reach an additional Wyoming market segment is so significant as to justify the risk associated with the logistical challenge.

The RFP process for contractors which will be completed in the next three months will be critical. Additionally, the SEO will need to work closely with DFS to identify a third party capable of processing applications and reporting in accordance with the plan. Given the skills and customer set of the SEO and DFS, this program is best administered through DFS. If the SEO and DFS are not able to overcome the logistical challenges critical to successful implementation, monies from this program will divert back to the retrofit program no later than 06/30/2010. Critical work steps for developing infrastructure for the program include:

- Development of a process for screening, recruiting and monitoring qualified contractors. The SEO intends to piggy-back on DFS's request for proposal process to identify contractors who can serve the entire weatherization market in Wyoming. This is such a significant programmatic increase that we are concerned about our ability to obtain sufficient qualified contractors across Wyoming to conduct the work, seasonally or potentially year round. Highly trained teams traveling statewide might be used to address program needs in areas

where available qualified weatherization labor proves insufficient. Careful scheduling would allow for full employment of such teams.

- Development of a statewide marketing and outreach plan to promote the benefits of the program. This could be coordinated with the DFS program to promote weatherization to lower income homes. Because of the distinct target market, some new print and radio outreach may be required to reach the middle income market. Partnership with utility providers is essential. Design of a web interface that allows applicants to identify weatherization contractors in their area and project the savings.
- Creation of a process for conducting audits, calculating and reporting energy savings to the homeowner and to the program. The intent is to audit at least 10% of the projects each year, of which 50% should be during the year the work is completed.
- A process for disbursing incentives and ensuring grants are made for actual projects. Disbursement should address tracking for online reporting of installed base, capacity, jobs created by geography.
- Customer support including information on program website and access to staff.

### **DFS Procedures for Middle Income Weatherization**

- DFS will work with the Low Income Energy Assistance Program (LIEAP) vendor who determines eligibility for the Low Income Energy Assistance program and Weatherization program to also process the applications and determine eligibility for the Middle Income Weatherization Program. If the LIEAP vendor is not able to provide staff for the Middle Income Weatherization program, DFS will hire temporary staff to process the applications and provide the eligibility determination for the program through its duration.
- DFS will control the front end of the program. DFS will determine when applications are accepted, how long applications will be accepted, how eligibility is determined and will be the agency to submit the applications for the Middle Income Weatherization services to the contractors.
- The same policy and procedures utilized in the low income program will be utilized for the Middle Income Weatherization program so that there are not two sets of policy and procedures that are different.
- DFS will RFP for the Middle Income Weatherization Services. Existing contractors may submit proposals as well as any new contractors.

- DFS will contract out the monitoring. DFS will either complete a bid waiver for so that a contract is executed with the Wyoming Community Development Authority (WCDA) or will RFP for this service.
- Contractors will collect the 20% cost from the customers before any of these funds are spent for Weatherization services.

### **Weatherization Work**

All Weatherization work completed must meet or exceed all local and state building codes. The following activities fall within the scope of this program and shall be considered for Weatherization:

1. Caulking and weather-stripping of doors and windows;
2. Furnace efficiency modifications limited to:
  - Replacement burners designed to increase the energy efficiency of the heat system;
  - Devices for modifying flue openings to increase energy efficiency of the heat system;
  - Electrical or mechanical furnace ignition systems to replace standard gas pilot lights;
  - Furnace inspection, safety and tune-up procedures;
  - Duct testing and sealing;
  - Insulate ducts and heating pipes;
  - Replacement of diffusers, registers and air filters;
  - Installation of vent dampers;
  - Installation of programmable thermostats;
3. Wall, floor, ceiling, attic, and foundation insulation plus other building shell measures:
  - Blower door-directed air sealing of the building shell;
  - Repair or replace primary windows and doors;
  - Install storm windows and doors;
  - Minor repairs to enable installation of energy efficiency measures;
4. Water heater insulation;
5. The following insulating or energy conserving devices or technologies are also authorized:
  - Materials used as a patch to reduce air leakage through the building envelope;
  - Water flow controllers;
  - Materials used for heating system/cooling system tune-ups, repairs and other energy efficiency modifications;
  - Vapor barriers;
  - Materials and measures to improve attic ventilation;
  - Pipe and boiler insulation;

- Materials used for water heater modifications which will increase energy efficiency;
  - Trailer skirting;
  - Heat exchangers;
  - Hot water heat pumps;
  - Waste heat recovery devices;
  - Furnace and modification equipment/materials;
  - Replacement furnaces and boilers (replacement of furnaces that are 30 or more years old is allowed if a significant improvement in energy efficiency can be shown) [replacement is also allowed, regardless of age of furnace, when furnace no longer functions or when furnace presents a health and safety issue];
  - Wood/pellet stoves;
  - Ventilation equipment;
  - Replacement refrigerators (replacement refrigerators will not have ice and water in the door);
  - Install motor controls such as variable speed drives;
  - Convert incandescent lighting to fluorescent;
  - Other materials listed in Appendix A of 10 CFR 440 dated 02/01/2002;
6. Health and safety measures, including:
- Installation of smoke and carbon monoxide alarms;
  - Repair or replace vent systems on fossil-fuel-fired heating systems and water heaters to ensure that combustion gases draft safely to the outside;
  - Install mechanical ventilation to ensure adequate indoor air quality if house is air-sealed to building tightness limit;

### *Staffing Requirements & Job Creation*

#### *Program Administration*

Depending on the speed with which the program expands, the program requires 2-4 full-time employees. This is generally driven by a 10:1 ratio of applications to grants made. Processing nearly 5,000 applications over 3 years will take at least 2 people. At minimum, the program requires one part-time program manager and one part-time staff member for tracking applications, funds disbursements, verifying projects and conducting quality assurance. For purposes of this budget it is assumed that a third party firm will be engaged to create the statewide marketing program and the web interface to launch this significantly expanded program. Initial phases of the program may require an additional staff for a period of 6 months to perform start-up activities but the cost is not allocated to this budget at this time.

#### *Available Contractors*

DFS currently contracts with 3 vendors for weatherization activities. These contractors have indicated an ability and willingness to scale up their businesses to accommodate increased activity. Wyoming will conduct an RFP to solicit additional contractors but concurrently launch

the ARRA weatherization program with the contractors currently working for the DFS on the existing weatherization program. State. We will work closely with DFS to include language in the RFP which addresses the potential to increase the reach of the program to middle income homes, and the contractor's ability to meet that additional demand.

### *Job Creation*

In addition to the direct jobs associated with implementing and administering the program, additional jobs will be created for contractors and others through the incremental equipment, supplies, and installation induced by the program, as well as through economic effects resulting from homeowner spending funds that would otherwise go toward utility bills. In total, it is estimated that approximately 6 jobs will result per million dollars spent by the program.

### *Implementation Timeline*

The launch of this program is highly contingent upon the successful expansion of the primary weatherization program and the positive and sufficient responses to an RFP. Therefore, the program will not launch until September, 2009.

June/July: Work with DFS to develop RFP and discuss reporting, administration requirements of contractors. Launch info on website.

July/Aug: Review applications and select contractors. Meet with DFS to determine how their program rollout is going.

Sept: Formalize administration and reporting relationship with DFS, contractors and any other third party processing or verification firms. Quarterly audits and reporting on weatherization work completed from contractor to SEO, with review by DFS.

Sept: Launch marketing campaign to promote the program.

October: Begin weatherization work and complete through 2011.

Sample Program Performance

### *Savings*

Energy savings will vary based on the location and quality of the home in addition to an energy efficiency improvements already installed at a home. Owners will be required to pay a minimum of 20% of the total weatherization work to demonstrate their own investment in the project. Assuming a 30% energy savings can be achieved from the basic weatherization improvements, approximately 11MMBtu will be saved in each installation. The value of those savings is then extrapolated an additional 10 years based on the remaining useful life of the housing stock. This is an extremely conservative estimation of duration of benefits, but may be an aggressive goal for percentage of improvement achieved. It is only because of the low to medium quality of the housing stock that these estimates are possible. Reduction in total energy consumed can then be translated into an average CO2 emissions reduction associated with the program.

Wyoming looks forward to working with the DOE on developing effective metrics and accepted reporting mechanisms.

*Budget*

Illustrative program implementation costs follow. Reported costs vary depending upon the implementation approach taken, the number of installers and the degree of market participation. The key calculation of MMBtus per source installation is linked to a projection about the duration of the efficiency improvements over an average of 10 years. This budget is meant to be illustrative only.

	Year			
	2009	2010	2011	Cumulative
Potential of Eligible Homes	48,000	48,000	48,000	48,000
Participation Rate	0.25%	0.50%	0.25%	1.00%
Participants	120	240	120	480
Average Cost per Participant	\$ 6,626	\$ 6,376	\$ 6,618	\$ 6,499
Program Cost	\$ 795,120	\$ 1,530,240	\$ 794,112	\$3,119,472
Jobs per \$1M	5	6	5	6
Jobs Created	4	9	4	18
Per Unit Source MMBtu Saved*	113	113	113	
MMBtu Saved Over Program	13,560	27,120	13,560	54,240
Source MMBTU saved per \$1,000	17.1	17.7	17.1	17.4

## Estimate of Population below Poverty: 2007

	<b>Number</b> BT 200 and 250% FPL	<b>Percent</b> BT 200 and 250% FPL	<b>Number</b> below 100% FPL	<b>Percent</b> below 100% FPL
Wyoming	48,000	9.3	48,149	9.5
Albany County	4,824	15.9	4,839	16.2
Big Horn County	1,087	9.7	1,090	9.9
Campbell County	2,380	5.8	2,387	5.9
Carbon County	1,479	10.0	1,484	10.2
Converse County	1,198	9.2	1,202	9.4
Crook County	462	7.3	463	7.5
Fremont County	4,648	12.4	4,662	12.7
Goshen County	1,712	14.5	1,717	14.8
Hot Springs County	483	10.8	485	11.0
Johnson County	641	7.8	643	8.0
Laramie County	6,784	8.0	6,805	8.2
Lincoln County	1,267	7.7	1,271	7.9
Natrona County	6,948	9.7	6,970	9.9
Niobrara County	272	12.3	273	12.6
Park County	3,000	11.3	3,009	11.5
Platte County	988	11.7	991	12.0
Sheridan County	2,346	8.4	2,353	8.6
Sublette County	413	5.2	414	5.3

**Estimate of Population below Poverty: 2007  
(Cont'd)**

	<b>Number</b> BT 200 and 250% FPL	<b>Percent</b> BT 200 and 250% FPL	<b>Number</b> below 100% FPL	<b>Percent</b> below 100% FPL
Sweetwater County	2,826	7.2	2,835	7.4
Teton County	962	4.8	965	4.9
Uinta County	1,929	9.6	1,935	9.8
Washakie County	774	10.0	776	10.2
Weston County	576	8.6	578	8.8

Note:

Estimates of 100% FPL for Wyoming and counties, and 200%-250% FPL for Wyoming are from U.S. Census Bureau. The estimate of 200%-250% FPL for counties were just extrapolated as formula shows.

**Total combined program budget**

<b>Program Budget</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>Cumulative</b>
Sub-grants (retrofit and PV)	\$6,561,000	\$13,122,000	\$561,000	\$20,244,000
Sub contract to DFS - weatherization	\$3,480,000			\$3,480,000
Program Administration –	\$40,000	\$72,500	\$42,500	\$155,000
Office Expense	\$9,500	\$11,000	\$4,500	\$25,000
Marketing	\$95,000	\$65,000	\$40,000	\$200,000
Web-site maintenance	\$7,000	\$7,000	\$2,000	\$16,000
Legal Support	\$25,000	\$25,000	\$20,000	\$70,000
Contract for third part auditor @3%	\$250,000	\$250,000	\$250,000	\$750,000
<b>Total Operations &amp; Administration</b>	<b>\$426,500</b>	<b>\$430,500</b>	<b>\$359,000</b>	<b>\$1,216,000</b>
<b>Total Program Costs</b>	<b>\$10,467,500</b>	<b>\$13,552,500</b>	<b>\$920,000</b>	<b>\$24,940,000</b>

State	MSN	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
WY	TETCB	403,107.1	391,633.8	423,345.0	409,137.0	409,633.4	404,927.0	417,737.6	417,460.6	422,874.0	428,149.6	431,644.9	442,169.1	444,873.0	460,379.1	453,518.9	461,347.1	480,893.6
WY	TPOPP	453.7	459.3	466.3	473.1	480.3	485.2	488.2	489.5	490.8	491.8	494.0	493.0	497.2	499.4	503.3	506.5	512.8
WY	TEIPB	888.5	852.7	908.0	864.8	852.9	834.6	855.7	852.9	861.6	870.6	873.8	896.8	894.7	921.9	901.2	910.8	937.9
	% from 1990		-4.0%	2.2%	-2.7%	-4.0%	-6.1%	-3.7%	-4.0%	-3.0%	-2.0%	-1.7%	0.9%	0.7%	3.8%	1.4%	2.5%	5.6%
WY	GDPRX	13150	13271	13337	13897	14087	14567	15732	14904	14859	15931	17331	18941	19619	21685	23420	26589	29904
WY	TETGR	30.7	29.5	31.7	29.4	29.1	27.8	26.6	28.0	28.5	26.9	24.9	23.3	22.7	21.2	19.4	17.4	16.1
	% from 1990		-3.7%	3.5%	-4.0%	-5.1%	-9.3%	-13.4%	-8.6%	-7.2%	-13.3%	-18.8%	-23.8%	-26.0%	-30.7%	-36.8%	-43.4%	-47.5%
	% from 2000												-6.3%	-9.0%	-14.8%	-22.2%	-30.3%	-35.4%
	TEACB	81,240.1	75,941.7	79,987.9	84,755.1	83,291.2	96,011.4	96,027.9	98,055.1	101,209.3	115,459.2	109,000.8	110,904.9	110,037.6	119,404.0	115,261.7	119,350.7	122,935.6
	TEAPB	179.1	165.4	171.6	179.2	173.4	197.9	196.7	200.3	206.2	234.8	220.7	224.9	221.3	239.1	229.0	235.6	239.8
	% from 1990		-7.7%	-4.2%	0.1%	-3.2%	10.5%	9.9%	11.9%	15.2%	31.1%	23.2%	25.6%	23.6%	33.5%	27.9%	31.6%	33.9%
	Ratio of GDP	6.2	5.7	6.0	6.1	5.9	6.6	6.1	6.6	6.8	7.2	6.3	5.9	5.6	5.5	4.9	4.5	4.1
	% GDP from 1990		-7.4%	-2.9%	-1.3%	-4.3%	6.7%	-1.2%	6.5%	10.3%	17.3%	1.8%	-5.2%	-9.2%	-10.9%	-20.3%	-27.3%	-33.5%
	TECCB	40,281.3	42,415.0	40,478.5	45,146.8	44,294.8	42,754.0	47,832.6	44,565.2	45,568.3	45,519.0	49,091.2	50,321.0	50,999.1	50,862.8	52,268.0	55,043.6	58,714.0
	TECPB	88.8	92.4	86.8	95.4	92.2	88.1	98.0	91.1	92.8	92.6	99.4	102.1	102.6	101.9	103.9	108.7	114.5
	% from 1990		4.0%	-2.2%	7.5%	3.9%	-0.7%	10.4%	2.6%	4.6%	4.3%	11.9%	15.0%	15.5%	14.7%	17.0%	22.4%	29.0%
	Ratio of GDP	3.1	3.2	3.0	3.2	3.1	2.9	3.0	3.0	3.1	2.9	2.8	2.7	2.6	2.3	2.2	2.1	2.0
	% GDP from 1990		4.3%	-0.9%	6.1%	2.6%	-4.2%	-0.7%	-2.4%	0.1%	-6.7%	-7.5%	-13.3%	-15.1%	-23.4%	-27.1%	-32.4%	-36.9%
	TEICB	246,081.7	235,906.8	268,064.7	240,984.1	245,633.1	227,864.3	233,273.1	236,544.4	238,422.0	229,456.7	233,963.3	242,158.5	241,783.4	248,812.7	245,051.5	245,065.9	257,124.2
	TEIPB	542.4	513.7	574.9	509.4	511.4	469.7	477.9	483.3	485.8	466.6	473.6	491.2	486.3	498.3	486.9	483.8	501.5
	% from 1990		-5.3%	6.0%	-6.1%	-5.7%	-13.4%	-11.9%	-10.9%	-10.4%	-14.0%	-12.7%	-9.4%	-10.3%	-8.1%	-10.2%	-10.8%	-7.5%
	Ratio of GDP	18.7	17.8	20.1	17.3	17.4	15.6	14.8	15.9	16.0	14.4	13.5	12.8	12.3	11.5	10.5	9.2	8.6
	% GDP from 1990		-5.0%	7.4%	-7.3%	-6.8%	-16.4%	-20.8%	-15.2%	-14.3%	-23.0%	-27.9%	-31.7%	-34.1%	-38.7%	-44.1%	-50.7%	-54.1%
	TERCB	35,504.3	37,370.4	34,814.5	38,250.4	36,413.9	38,297.7	40,604.4	38,295.9	37,674.3	37,153.3	39,589.8	38,784.6	42,052.6	41,299.4	40,937.7	41,886.9	42,119.7
	TERPB	78.3	81.4	74.7	80.9	75.8	78.9	83.2	78.2	76.8	76.7	80.1	78.7	84.6	82.7	81.3	82.7	82.1
	% from 1990		4.0%	-4.6%	3.3%	3.1%	0.9%	6.3%	0.0%	-1.9%	-2.0%	2.4%	0.5%	8.1%	5.7%	3.9%	5.7%	8.6%
	Ratio of GDP	2.7	2.8	2.6	2.8	2.6	2.6	2.6	2.6	2.5	2.4	2.3	2.0	2.1	1.9	1.7	1.6	1.4
	% GDP from 1990		4.3%	-3.3%	1.9%	-4.3%	-2.6%	-4.4%	-4.8%	-6.1%	-12.3%	-15.4%	-24.2%	-20.6%	-29.5%	-35.3%	-41.7%	-47.8%

GDPRX = real gross domestic product by State in million chained (2000) dollars

TEACB = total energy consumed by the transportation (Billion Btu)

TEAPB = transport TEAPB = transportation sector's energy consumption per capita (Million Btu)

TECCB = total ene TECCB = total energy consumed by the commercial sector (Billion Btu)

TECPB = commer TECPB = commercial sector's energy consumption per capita (Million Btu)

TEICB = total ene TEICB = total energy consumed by the industrial sector (Billion Btu)

TEIPB = industria TEIPB = industrial sector's energy consumption per capita (Million Btu)

TERCB = total ene TERCB = total energy consumed by the residential (Billion Btu)

TERPB = residenti TERPB = residential sector's energy consumption per capita (Million Btu)

TETCB = total ene TETCB = total energy consumed within Wyoming (Billion Btu)

TETGR = total ene TETGR = total energy consumed per dollar of real gross domestic product (Thousand Btu per chained (2000) dollar)

TEIPB = energy c TEIPB = energy consumption per capita within Wyoming (Million Btu)

TPOPP = resident TPOPP = resident population in Wyoming, including the Armed Forces residing in each State