

VII. Residential/Commercial/Industrial Options

The residential, commercial, and industrial fossil fuel combustion sector accounted for 18 percent of Utah’s gross GHG emissions in 2005.¹ Options include:

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¹ Greenhouse Gas Inventory and Reference Case Projections, 1990-2020; Center for Climate Strategies, February 2007 http://www.deq.utah.gov/BRAC_Climate/docs/Final_Utah_GHG_I&F_Report_3-29-07.pdf

RCI-1 - Utility Demand Side Management

Benefit/Cost of Reducing CO₂e:

Arizona:	103 MMt between 2007-2020; 9.2% of 2020 emissions; \$-36/ton
New Mexico:	6.5 MMt between 2007-2020; 1.17 % of 2020 emissions; \$-23.54/ton
Colorado:	High reduction potential; Low cost
Montana:	6.6 MMt between 2007-2020; 2.57% of 2020 emissions; \$-21/ton
Oregon:	4.18 MMt between 2007-2025; 4.4% of 2025 emissions; Cost effective
N. Carolina:	135 MMt between 2007-2020; 7.5% of 2020 emissions; \$-24/ton

Assessment: High Priority. Bin A. 18 out of 22 votes.

This policy option has a substantial GHG emissions reduction potential and cost savings. Some utilities in Utah already offer demand side management (DSM) programs and have experience in their implementation.

This policy option involves the adoption of energy savings standards or targets for utility demand side management programs, the potential expansion of DSM programs to include all utilities, and the development of mechanisms for funding cost-effective energy efficiency programs.²

The goal of a utility DSM program is typically to secure additional investment in energy efficiency programs in order to secure cleaner energy at a lower or equivalent cost. DSM programs can cover a wide range of energy efficiency and conservation efforts. Performance based incentives, efficiency portfolio standards, energy trusts, decoupling of rates and revenues, and appropriate rate treatment for efficiency, are examples of policies to implement DSM programs.^{3 4}

A DSM program may be independently administered by a utility but typically is enacted by state legislation in the form of a Public Benefit Fund (PBF). A small charge – typically equivalent to a \$0.27 to \$2.50 - is placed on a consumer's electricity bill in order to secure funding for investment in energy efficiency programs. Non-profit organizations may also play a role in program administration. Flexibility in the administration of the program is important if the program is to be cost effective and have maximum effect.^{5 6} Examples of energy efficiency measures include lighting retrofits, weatherization⁷, heating and cooling system improvements, and efficient building design.

² Both Rocky Mountain Power and Questar currently have programs to fund DSM programs. In addition, Rocky Mountain released an assessment on DSM potential. See:

<http://www.pacificorp.com/Article/Article75535.html>

³ <http://www.nmclimatechange.us/ewebeditpro/items/O117F10150.pdf>

⁴ http://www.epa.gov/cleanenergy/pdf/gta/guide_action_full.pdf

⁵ See http://www.epa.gov/cleanenergy/pdf/gta/guide_action_full.pdf;

⁶ http://www.swenergy.org/pubs/Natural_Gas_DSM_Programs_A_National_Survey.pdf;

⁷ Including high efficiency windows and insulation

RCI-2 - Voluntary Efficiency Targets

Benefit/Cost of Reducing CO₂e:

New Mexico: 4.6 MMt between 2007-2020; 0.7% of 2020 emissions; N/A \$/ton

Colorado: Low reduction potential; Low cost

Assessment: High Priority. Bin A. 19 out of 22 votes.

While efficiency targets do not offer direct GHG emissions reduction benefits, this policy option helps demonstrate State leadership on energy efficiency and can serve as a catalyst to implement energy efficiency initiatives.

This policy option could apply statewide. An example of such leadership is Governor Huntsman's goal of achieving a 20% increase in energy efficiency by 2015.

RCI-4 - Green Power Purchasing

Benefit/Cost of Reducing CO₂e:

New Mexico: 2.3 MMt between 2007-2020; 0.1% of 2020 emissions; \$7/ton

Colorado: Low reduction potential; Medium cost

N. Carolina: 2 MMt between 2007-2020; 0.1% of 2020 emissions; \$3/ton

Assessment: Medium Priority. Bin A. 16 out of 22 votes.

The GHG emissions reductions associated with green power purchasing are modest, these programs are being implemented by some of the state's utilities and are well-accepted by the public and business community.

Programs to promote the purchase of green power could include:

- Education to increase the level of consumer awareness of renewable energy benefits and options;
- Requiring utilities to provide information on fuel sources and their emissions to consumers;
- The formation of large customer buying groups or aggregation;
- The verification of the claims regarding a green energy product in order to protect the consumer; and
- States agencies can purchase green power to meet their own needs thus helping to form the renewable market

Green power offers customers the opportunity to buy electricity generated from sources that emit no CO₂. Typical examples include non-emitting nuclear generation, large hydroelectric facilities, and renewable resources such as wind, geothermal, biomass, and small hydro.⁸

EPA defines green power as those renewable energy sources with the highest environmental benefits, including solar, wind, geothermal, biogas, biomass, and low-impact hydroelectric.⁹

Green-e, a leading independent certification and verification program for renewable energy, has developed a national standard for the certification of renewable energy.¹⁰

⁸ See http://www.pge.com/about_us/environment/features/clean_energy.html.

⁹ See www.epa.gov/greenpower/whatis/index.htm.

¹⁰ See http://www.green-e.org/docs/Appendix_D-Green-e_National_Standard.pdf.

Rocky Mountain Power currently offers this option to its customers through its Blue Sky program. Blue Sky is sold in increments; each 100 KWh block represents about 10 percent of the average customer's monthly electricity usage. Payments go directly toward the purchase of renewable energy and renewable energy credits. Over 20,000 customers are currently participating.

RCI-5 - Rate Design

Benefit/Cost of Reducing CO₂e:

Arizona:	16 MMt between 2007-2020; 0.9% of 2020 emissions; \$-63/ton
New Mexico:	3.6 MMt between 2007-2020; 0.3% of 2020 emissions; \$-40/ton
Colorado:	Medium reduction potential; Low cost
Montana:	0.2 MMt between 2007-2020; 0.1% of 2020 emissions; \$-12/ton
Oregon:	0.16 MMt between 2007-2025; 0.2% of 2025 emissions; Cost effective

Assessment: High Priority. Bin A. 15 out of 22 votes.

Although GHG reductions from this policy option are modest, it sends an economic signal to consumers to use energy wisely and can result in cost savings. To avoid potential challenges in implementation, impacts on all parties need to be considered.

Rate design encourages energy efficiency and conservation through such tools as inverted block rates, smart meters, and peak time surcharge rates. This option is primarily aimed at the residential sector, although there may be some commercial sector applications. Regulatory barriers and impacts on all customer classes and utilities need to be considered.

RCI-6 - Distributed Generation with Combined Heat and Power Systems (including Reducing Barriers)

Benefit/Cost of Reducing CO₂e:

Arizona: 16 MMT between 2007-2020; 1.6% of 2020 emissions; \$-25/ton
Colorado: High reduction potential; Low cost
Oregon: 0.54 MMT between 2007-2025; 0.6% of 2025 emissions; Cost effective
New Mexico: 6.4 MMT between 2007-2020; 0.9% of 2020 emissions; \$4/ton

Assessment: High Priority. Bin B. 19 out of 22 votes.

Combined Heat and Power (CHP) systems can double the energy output per unit of energy input, but there are significant barriers to implementation. Utah-specific analysis will be required to identify and create a strategy to advance this option.

This option might include removing regulatory and other barriers to CHP and/or providing incentives to encourage CHP applications. The option has long-term GHG reduction potential. It is difficult to implement where infrastructure is already in place and much easier to do where it is not in place, such as at “greenfield” sites. Access to information and cost of a local system are also considerations.

Because virtually all industries require electricity in addition to thermal energy, combined heat and power (CHP) projects have become popular strategies for reducing energy consumption. CHP refers to the sequential production of thermal and electric energy from a single fuel source.

In the CHP process, heat is recovered that would normally be lost in the production of one form of energy. For example, in the case of an engine configured to produce electricity, heat could be recovered from the engine exhaust and used for processes or water heating, depending in part on the exhaust temperature. The recycling of waste heat differentiates CHP facilities from central station electric facilities. The overall fuel utilization efficiency of CHP plants is typically 70-80 percent versus 35-40 percent for utility power plants. The basic components of any CHP plant include a prime mover, a generator, a waste heat recovery system, and operating control systems. Typically, CHP systems are configured around three basic types of generators: 1) steam turbines; 2) combustion gas turbines; and 3) internal combustion engines.

RCI-7 - Distributed Generation with Renewable Energy Applications

Benefit/Cost of Reducing CO₂e:

Arizona: 10 MMt between 2007-2020; 1.28% of 2020 emissions; \$31/ton
Colorado: Medium reduction potential; Medium cost
Oregon: 0.54 MMt between 2007-2025; 0.6% of 2025 emissions; Cost effective
N. Carolina: 29 MMt between 2007-2020; 1.4% of 2020 emissions; \$1/ton
New Mexico: 1.6 MMt between 2007-2020; 0.4% of 2020 emissions; \$105/ton

Assessment: High Priority. Bin B. 17 out of 22 votes.

Both the BRAC and the SWG felt that the level of difficulty would be higher than the Bin A originally recommended by the sector group. There was also a feeling that the cost/benefits needed more investigation.

Distributed renewable energy resources have the potential to cut GHG emissions. Although initial costs can be a barrier, they can be shared among many parties through utility rebates, tax incentives, and other measures. Importantly, there are no transmission and distribution losses associated with these resources.

This policy option consists of state and/or utility programs aimed at increasing the installation of distributed renewable energy, such as photovoltaic panels and small wind turbines. This option could include incentive programs and other measures that help make distributed renewables more competitive with conventional resources. The state could also decide to support research and development funding of promising renewable technologies.¹¹

Net metering is a strategy for providing electric power generation from renewable sources. It uses a single meter to measure the difference between the total generation and total consumption of electricity by customers with small generating facilities by allowing the meter to turn backward. Net metering can increase the economic value of small renewable energy technologies for customers. It allows the customers to use the utility grid to “bank” their energy: producing electricity at one time and consuming it at another time. This form of energy exchange is particularly ideal for renewable energy technologies. In many states small-scale electricity generated from renewable energy sources is sold back to the electric utility at retail prices rather than cost.¹² Utilities in at least 41 states have net metering programs.

Utah enacted legislation in 2002 requiring all investor-owned electric and cooperative - but not municipal - utilities to offer net metering to their customers. Eligible generating systems include fuel cells, solar, wind and hydropower systems with a maximum capacity of 25 kilowatts (kW). Total participation in the program is limited to 0.1% of the cumulative generating capacity of each utility's peak demand in 2001.

¹¹ See: <http://www.nmclimatechange.us/ewebeditpro/items/O117F10150.pdf>

¹²2000 Utah Office of Energy and Resource Planning (OERP) report

If a customer generates more electricity than he uses during a billing period, then the utility must credit him for the net excess generation (NEG) at a rate equal to the utility's avoided cost or higher. NEG is carried over to the customer's next monthly bill until the end of each calendar year, at which point any remaining NEG is granted to the utility. A utility may not levy additional charges or fees on net-metered customers, unless it is authorized to do so by the Utah Public Service Commission. Utilities may not require additional liability insurance for systems that meet applicable local and national standards regarding electrical and fire safety, power quality and interconnection requirements.

In February 2007, the Utah Division of Public Utilities published a report on the status of the state's net-metering program.¹³ This publication included a discussion of best practices adopted by other states, program barriers, and recommendations for improvement. Rocky Mountain Power's interconnection agreement and application for net metering service is available online.¹⁴

¹³ <http://www.psc.state.ut.us/misc/06docs/0699903/NetMeteringReport.pdf>

¹⁴ <http://www.utahpower.net/Navigation/Navigation552.html>

RCI-8 - State Appliance Efficiency Standards

Benefit/Cost of Reducing CO₂e:

Arizona: 7 MMt between 2007-2020; 0.6% of 2020 emissions; \$-66/ton
New Mexico: 2.1 MMt between 2007-2020; 0.3% of 2020 emissions; \$-46/ton
Colorado: Medium reduction potential; Low cost
Montana: 1.5 MMt between 2007-2020; 0.4% of 2020 emissions; \$-36/ton
Oregon: 0.41 MMt between 2007-2025; 0.4% of 2025 emissions; Cost effective
N. Carolina: 5 MMt between 2007-2020; 0.4% of 2020 emissions; \$-62/ton

Assessment: High Priority. Bin A. 17 out of 22 votes.

Although the reduction potential may be modest overall, this policy option is highly-cost effective and can be readily implemented.

This policy option could be based upon existing appliance standards in other states, or new, Utah-specific standards could be developed for appliances not covered by federal programs. The feasibility of this option would be driven by local energy costs and principle-driven decisions.

Some examples of state appliance efficiency standards are presented below.

California's Appliance Efficiency Regulations include standards for both federally-regulated appliances and non-federally-regulated appliances. Twenty-one categories of appliances are included in the scope of these regulations. The standards within these regulations apply to appliances that are sold or offered for sale in the state.¹⁵

Arizona law sets minimum energy efficiency standards for the following 12 products not covered by current federal standards: torchiere light fixtures, exit signs, commercial refrigerators and freezers, commercial clothes washers, large commercial air conditioning equipment, icemakers, spray nozzles used in commercial kitchens, low-voltage distribution transformers, metal-halide lamp fixtures, power supplies for electronic devices, unit heaters, and traffic signals. According to the Southwest Energy Efficiency Project (SWEET), the standards will save Arizona consumers and business a total of \$650 million on energy bills by 2030.¹⁶

¹⁵ See <http://www.energy.ca.gov/appliances/2006regulations/index.html>

¹⁶ See http://www.eere.energy.gov/state_energy_program/news_detail.cfm/news_id=9028

RCI-9 - Solar Hot Water and Photovoltaic Codes for New Buildings

Benefit/Cost of Reducing CO₂e:

N/A

Assessment: Medium Priority. Bin B. 15 out of 22 votes.

Although the GHG emissions reduction potential of this policy option is modest in the near-term, if distributed solar resources were widely-deployed, the emissions reductions could ultimately become significant. However, implementation of such a program could be potentially difficult.

Every new building without this option represents a lost opportunity to include renewable energy resources during the construction phase at a lower initial cost. New buildings could be required under certain conditions to be configured and wired for solar hot water heaters and photovoltaic panels. In addition, buildings with heavy use of heated water could be required to install solar water heaters.

RCI-10 - Energy Management Training / Training of Building Operators

Benefit/Cost of Reducing CO₂e:

Colorado: High reduction potential; Low cost

Assessment: Medium Priority. Bin B. 17 out of 22 votes.

This can be a low-cost option with important GHG reduction benefits, but training building operators can be difficult due to the complexity of building systems and skill requirements involved.

This policy option would involve the State taking an active role in supporting facility energy management training. In addition to building operator training, this option could also include benchmarking and tracking energy use to assist in identifying opportunities for savings. An energy profile evaluates a property's potential for energy savings. This information also helps determine baseline energy performance and can be used to benchmark a building's performance against comparable properties.

An energy accounting system records information from the energy profile over time. An energy accounting system is generally kept in a simple spreadsheet or tracked through computer software. Buildings equipped with an energy management system may be able to use this to automatically generate real-time information for an energy accounting system. Once these systems have been installed, this historical record enables energy managers to later measure program results against baseline performance. It can also indicate when problems arise, such as through abnormally high energy costs related to equipment failure.

Added components of an energy accounting system may include monthly or more frequent energy-use and cost reports, changes in occupancy or facility usage, utility rate schedules, and performance tracking of major equipment systems.¹⁷

Building Operator Certification (BOC) is a professional development program in the energy efficient operation of building systems to qualify facility professionals for certification. BOC is a growing national program, now in 16 states including Washington, Oregon, California, Illinois, Ohio, New York, New Jersey, and Massachusetts.

¹⁷ See: Fire Your Power: Commercial Office Buildings, Available at http://www.fypower.org/bpg/module.html?b=offices&m=Planning_an_Energy_Program&s=Energy_Profiles

RCI-11 - Government Lead by Example with Mandatory Efficiency Targets

Benefit/Cost of Reducing CO₂e:

Arizona:	3 MMt between 2007-2020; 0.2% of 2020 emissions; \$-4/ton
New Mexico:	0.9 MMt between 2007-2020; 0.2% of 2020 emissions; \$-20/ton
Colorado:	Low reduction potential; Low cost
Montana:	1.7 MMt between 2007-2020; 0.6% of 2020 emissions; \$-5/ton
Oregon:	0.117 MMt between 2007-2025; 0.1% of 2025 emissions; N/A on cost
N. Carolina:	7 MMt between 2007-2020; 0.5% of 2020 emissions; \$-14/ton

Assessment: High Priority. Bin A. 19 out of 22 votes.

While the direct GHG emissions reduction potential of this option is modest due to the small emissions footprint of State facilities relative to that of Utah as a whole, efficiency improvements can be highly cost-effective and there is value in the State showing leadership on efficiency.

Governor Huntsman has called for a 20 percent increase in energy efficiency in Utah by 2015. On March 17, 2006, House Bill 80 was enacted, amending and updating state energy efficiency policy. Under this bill, the Division of Facilities Construction and Management is required to administer the State Building Energy Efficiency Program. The Division is responsible for developing guidelines and procedures for energy efficiency in state facilities, and assisting state agencies, commissions, divisions, boards, departments, and institutions of higher education in implementing these procedures into their facilities.

Additionally, the Division is charged with developing incentives that promote energy conservation and the reduction of energy costs in state buildings, procuring energy efficient products when practicable, analyzing state agencies' energy consumption, establishing an advisory group to assist with the development and implementation of the State Building Energy Efficiency program, and providing a yearly energy savings report, including long-term strategies and goals, to both the governor and the legislature.

The State Building Board is required to work in conjunction with the Division to establish design criteria, standards, and procedures for the planning, design, and construction of new state buildings and improvements to existing state facilities. Among other outcomes of a proposed building project, life-cycle costing of the most prudent cost of owning and operating the facility, in addition to other analyses, must address the expected energy efficiency of a given facility.

Each state entity must develop a program to manage energy efficiency and cost conservation and to appoint a staff member to coordinate the energy efficiency program. Agencies may enter into an energy savings agreement for a term of up to 20 years.¹⁸

¹⁸See

http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=UT09R&state=UT&CurrentPageID=1&RE=1&EE=1

RCI-12 - State Promotion and Tax or Other Incentives for Efficient Products (e.g. EnergyStar)

Benefit/Cost of Reducing CO₂e:

Colorado: Medium reduction potential; Low cost
Oregon: Cost effective

Assessment: High Priority. Bin B. 19 out of 22 votes.

While these programs help reduce initial costs of energy efficiency and can lead to important GHG emissions reductions, there are costs associated with implementation.

This program could be modeled on the current Renewable Energy Tax Credit program. State tax or other incentives could be provided for the purchase of energy efficient products such as appliances. There are also federal energy efficiency incentives that could serve as an example for the development of such a policy option.

Because energy efficiency measures often pay for themselves over time, this type of program may require lower levels of support than are typically needed for renewable energy or clean vehicle incentive programs.

RCI-14 - Fuel Switching to Less Carbon-Intensive Fuels

Benefit/Cost of Reducing CO₂e:

Colorado: Medium reduction potential; Medium cost

Oregon: 0.1 MMT between 2007-2025; 0.1% of 2025 emissions; Cost effective

Assessment: Medium Priority. Bin D. 17 out of 22 votes.

This policy option is aimed primarily at the industrial sector. Fuel costs and regulatory requirements influence fuel choices in the industrial sector. More information is needed to evaluate this option.

RCI-15 - Reinvestment Fund

Benefit/Cost of Reducing CO₂e:

Colorado: Medium reduction potential; Low cost

Assessment: Medium Priority. Bin B. 11 out of 22 votes.

GHG emissions reduction potential is modest because public buildings represent a small fraction of total state emissions, but there is value in public sector leadership and these programs help remove financial barriers for energy efficiency projects.

This option recommends the expansion of the public schools revolving loan fund that was established during the 2007 Legislative General Session to cover all public buildings.

A revolving loan fund (RLF) is a funding mechanism that can provide needed capital for energy efficiency projects in the public sector. In Utah's 2007 legislative session, a \$5 million RLF was established for energy efficiency projects implemented by school districts in K-12 schools. There are a number of other such funds around the United States, including funds in California, Idaho, Iowa, Missouri, Nebraska, Ohio, Oregon, and Texas. These funds typically feature below-market interest rates ranging from three to five percent, although zero interest loans also exist. When interest is charged it enables the fund to preserve its capital, thereby providing funding capacity over the long term.

Some states have established RLFs that are available to the public sector in its entirety. The Texas LoanSTAR (Saving Taxes And Resources) program was created in 1989 with \$98.6 million in capital. Between 1989 and 2006, a total of 187 loans worth more than \$234 million were made to state agencies, institutions of higher education, local governments, school districts, and county hospitals. This means the fund has "revolved" 2.3 times since 1989. Most loans are made at a 3% interest rate and must be repaid within 10 years. Cumulative energy savings from these projects now exceeds \$180 million.¹⁹

The SWG recognized this option could have a high potential benefit to municipal government.

¹⁹ Preliminary draft, Utah Energy Efficiency Strategy.

RCI-16 - Focus on Small and Medium Enterprises (SMEs)

Benefit/Cost of Reducing CO₂e:

Colorado: Low reduction potential; Low cost

Assessment: High Priority. Bin D. 9 out of 22 votes.

This policy option is aimed at providing technical assistance for small and medium commercial and industrial enterprises that may be underserved by current DSM programs. Typically this has been done through a university and/or State energy agency, but this support could be provided by utilities as well.

The Industrial Assessment Center (IAC) at Arizona State University provides free energy, waste and productivity analysis studies to qualified Arizona and Nevada Manufacturers, recommending methods to conserve resources, and reduce operating costs. Funding comes from the US Department of Energy. On average, implemented recommendations from assessments performed by the IAC at ASU saved each customer about \$65,000 per year.²⁰

In Arizona's Energy Advisor program, small to medium-sized businesses (those under 20,000 square feet) whose peak summer demand is less than 100 kilowatts can receive on-site energy audit and computer analysis of cost-effective energy efficiency measure for \$150 through SRP's Energy Advisor program.²¹

Although this policy option could be beneficial, it is difficult to determine the GHG emissions reduction potential of this option. More information about these programs and how one might be structured in Utah is needed to evaluate this policy option. (NOTE: This paragraph was originally the first paragraph.)

²⁰ See <http://www.eas.asu.edu/~iac/index.html>

²¹ See <http://www.swenergy.org/programs/arizona/utility.htm>

RCI-17 - Participation in Voluntary Industry-Government Partnerships

Benefit/Cost of Reducing CO₂e:

Colorado: Low reduction potential; Low cost

Assessment: Medium Priority. Bin B. 7 out of 22 votes.

Although the GHG emissions reduction potential of this policy option is likely to be modest, industry-government partnerships are a low-cost measure.

Federal support for these measures can be leveraged to bolster state-level efforts.

Federal examples of industry-government partnerships include:

The Natural Gas STAR Program is a flexible, voluntary partnership between EPA and the oil and natural gas industry. Through the Program, EPA works with companies that produce, process, and transmit and distribute natural gas to identify and promote the implementation of cost-effective technologies and practices to reduce emissions of methane, a potent greenhouse gas. There is no upfront cost to joining the Natural Gas STAR Program and members have found significant economic benefits from participation. Some of the Best Management Practices (BMPs) have small incremental costs over standard technologies or processes, they are generally cost effective, and can be recouped in as little as 1-2 years.²²

The SF₆ Emission Reduction Partnership for Electric Power Systems is a collaborative effort between EPA and the electric power industry to identify and implement cost-effective solutions to reduce sulfur hexafluoride (SF₆) emissions. SF₆ is a highly potent greenhouse gas used in the industry for insulation and current interruption in electric transmission and distribution equipment. Currently over 70 utilities participate in this voluntary program.²³

There is also a new Energy Star program for refineries. Conoco-Phillips Billings, Montana refinery was recently recognized as the first operation to receive an Energy Star rating for superior performance.²⁴

²² See <http://www.epa.gov/gasstar/>

²³ <http://www.epa.gov/electricpower-sf6/index.html>

²⁴ <http://yosemite.epa.gov/opa/admpress.nsf/4b779454038214c1852572a000651fe2/59ab6ae263da9895852572bb0047de!OpenDocument>

RCI-19 - Water Pumping, Treatment, and Use Efficiency

Benefit/Cost of Reducing CO₂e:

Arizona: 6 MMt between 2007-2020; 0.5% of 2020 emissions

Assessment: Medium Priority. Bin B. 14 out of 22 votes.

This option offers GHG emissions reductions and has important water conservation co-benefits. Additional work is required to determine how such programs might be structured in Utah.

At the residential level, water pumping and treatment efficiency is typically confined to improvements homeowners can make.

Programs for treatment efficiency are tailored to specific industry types. Examples of previously implemented strategies can be found for electronics, semi-conductor, cleanroom, fume hood, pulp & paper, stone, glass and clay products, and food products industries.²⁵

The Agricultural Pumping Efficiency Program (APEP) is a multi-level program addressing the resource management problems in California. Eligibility extends to all owners or users of a non-residential, PG&E electric or natural gas account that is primarily used for pumping water for the following: Production agriculture; landscape or turf irrigation; municipal purposes, including potable and tertiary-treated (reclaimed) water but excluding pumps used for industrial processes, raw sewage, or secondary-treated sewage. APEP goals include:

- Getting highly efficient hardware in the field, including pumping plants, irrigation systems, and water distribution systems.
- Ensuring that this hardware is managed correctly.

APEP has operated with funding from a variety of sources including the California Energy Commission, the California Public Utilities Commission, and the Federal Environmental Protection Agency. It works with agriculturalists and municipal and private water companies.²⁶

In Utah, approximately 70% of developed water is used in agriculture.²⁷ However, the Farm Bureau points out that, for the farmer, the saving potential from water pumping efficiency is relatively small, given current commodity prices.

²⁵ http://www.energy.ca.gov/process/industry/industry_intro.html

²⁶ <http://www.pumpefficiency.org>

²⁷ Utah Water Supply/Facts brochure published by Utah Division of Water Resources. Available at: www.water.utah.gov/brochures/default.asp

RCI-20 - Incentives for Improved Design and Construction (e.g. Energy Star, LEED, green buildings, expedited permitting)

Benefit/Cost of Reducing CO₂e:

Arizona: 18 MMt between 2007-2020; 1.9% of 2020 emissions; \$-17/ton
New Mexico: 7.4 MMt between 2007-2020; 1.3% of 2020 emissions; \$-2/ton
Colorado: Medium reduction potential; Low cost
N. Carolina: 10 MMt between 2007-2020; 0.6% of 2020 emissions; \$-14/ton

Assessment: High Priority. Bin A. 21 out of 22 votes.

This policy option can offer significant GHG emissions reduction benefits and potential cost savings. In addition, such incentive programs can be readily implemented.

Improved design and construction incentives can include tax credits, preferential permitting, enhanced utility incentives, education, and training.

Utah currently has an Energy Star program. Energy Star® labeled homes incorporate energy savings in design and construction and use 15 percent less energy.²⁸

Rocky Mountain Power and Questar offers incentives to contractors who build energy-efficient homes. Energy efficient mortgages are available to purchase these homes and to remodel existing homes.²⁹

Rocky Mountain Power's Energy FinAnswer provides cash incentives to help commercial and industrial customers improve their heating, cooling, refrigeration, compressed air, lighting, or industrial process. New construction and retrofit projects for all industrial facilities can participate as well as new commercial projects and retrofits in facilities larger than 20,000 square feet.³⁰

²⁸ <http://www.energystar.gov>

²⁹ http://www.utahenergystar.org/financial_benefits.html

³⁰ <http://www.rockymtnpower.net/Navigation/Navigation71490.html>

RCI-21 - Improved Building Codes

Benefit/Cost of Reducing CO₂e:

Arizona: 14 MMt between 2007-2020; 1.3% of 2020 emissions; \$-18/ton
New Mexico: 16.6 MMt between 2007-2020; 2.3% of 2020 emissions; \$-12/ton
Colorado: High reduction potential; Low cost
Montana: 1.6 MMt between 2007-2020; 0.7% of 2020 emissions; \$-9/ton
Oregon: 0.61 MMt between 2007-2025; 0.6% of 2025 emissions; Cost effective
N. Carolina: 29 MMt between 2007-2020; 1.6% of 2020 emissions; \$-17/ton

Assessment: High Priority. Bin A. 20 out of 22 votes.

This option offers significant GHG emissions reduction benefits and cost savings. Improved codes can be readily implemented.

Building codes set the minimum standards to which homes and other buildings must be constructed. Improved building codes could increase building energy efficiency requirements. In addition to setting new standards, training for contractors and others and enforcement of standards is critical.

New Mexico is considering requiring buildings to cut energy use by 50 Percent per sq ft by 2010.

Improved building codes require new buildings to meet minimum energy efficiency requirements and could also be applied to existing buildings undergoing renovations. Codes usually address improvements in “thermal resistance” in the exterior and windows, air leakage, and heating and cooling efficiencies.³¹

The Arizona Climate Change Advisory Group recommended that Arizona adopt a statewide code or strongly encourage municipalities to adopt and maintain improved building codes. The CCAG also recommends that Arizona or the municipalities adopt the 2004 International Energy Conservation Code (IECC), and consider adopting innovative features from California’s latest Title 24 Building Energy Codes, such as lighting efficiency requirements in new homes. In addition, the CCAG recommends that Arizona and local jurisdictions should update energy codes regularly, such as a three-year cycle of review based on the national model codes release.³²

Arizona is a “home-rule state” meaning that the municipalities are able to adopt and enforce their residential and commercial building energy codes. According to the Southwest Energy Efficiency Project (SWEET), Arizona passed legislation encouraging local governments to voluntarily adopt of the 2000 International Energy Code (IECC) and ASHRAE Standard 90.1-1999. State government buildings must comply with ASHRAE Standard 90.1-1999, the most recent and model standard for energy efficiency in commercial buildings.³³

In California, Energy Efficiency Standards for Residential and Nonresidential Buildings were established in 1978 in response to a legislative mandate to reduce energy consumption. California

³¹ See http://www.epa.gov/cleanenergy/pdf/gta/guide_action_full.pdf

³² See <http://www.azclimatechange.us/ewebeditpro/items/O40F9347.pdf>

³³ See Southwest Energy Efficiency Project (SWEET)<http://www.swenergy.org/>

Title 24 is updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. Currently in the process of being updated, the first phase of the development process will include a series of public workshops. The second phase will present draft language for the 2008 Standards based on the discussions in the first phase and will offer opportunities for further public input. The third phase will be the formal rulemaking. California's building efficiency standards (along with those for energy efficient appliances) have saved more than \$56 billion in electricity and natural gas costs since 1978. It is estimated the standards will save an additional \$23 billion by 2013.³⁴

³⁴ <http://www.energy.ca.gov/title24/index.html>

RCI-23 - Waste/Recycling

Benefit/Cost of Reducing CO₂e:

Arizona: 36 MMt between 2007-2020; 2.3% of 2020 emissions
New Mexico: 8.4 MMt between 2007-2020; 1.1% of 2020 emissions
Oregon: 6.61 MMt between 2007-2025; 6.9% of 2025 emissions

Assessment: High Priority. Bin A. 19 out of 22 votes.

This policy option can have significant GHG emissions reduction benefits and has important co-benefits. Recycling programs are already in place in much of Utah and can be readily implemented.

In most cases, the energy input for recycling is less than the energy required to manufacture new products from raw materials.

This option should be coordinated with the cross-cutting sector.

Goals

1. Reduce energy consumption by:

- a. Implementing appliance efficiency measures including:
 - i. Utility demand side management programs (RCI-1)
 - ii. State appliance efficiency standards (RCI 8)
 - iii. State promotion and tax or other incentives for efficient products (RCI-12)

- b. Implementing building efficiency measures including:
 - i. Utility demand side management programs (RCI-1)
 - ii. Energy management and building operator training (RCI-10)
 - iii. Reinvestment Fund (RCI-15)
 - iv. Incentives for improved design and construction of buildings (RCI-20)
 - v. Improved building codes (RCI-21)

- c. Implementing other efficiency measures including:
 - i. Utility demand side management programs (RCI-1)
 - ii. Rate design programs (RCI-5)
 - iii. Distributed generation with combined heat and power systems (RCI-6)
 - iv. Water pumping, treatment and use efficiency (RCI-19)
 - v. Waste/recycling (RCI-23)

2. Reduce CO₂ emissions per unit of energy consumed by:

- a. Green Power Purchasing (RCI-4)
- b. Distributed generation with renewable energy applications (RCI-7)
- c. Solar hot water and photovoltaic codes for new buildings (RCI-9)
- d. Fuel switching to less carbon-intensive fuels (RCI-14)

3. Adopt the following program enablers:

- a. Voluntary efficiency targets (RCI-2)
- b. Government lead-by-example with mandatory efficiency targets (RCI-11)
- c. Focus on small and medium enterprises (RCI-16)
- d. Participation in voluntary industry-government partnerships (RCI-17)

Sorted By Priority:

#	Policy Option	Priority	Bin	Vote
RCI-20	Incentives for Improved Design and Construction (e.g. EnergyStar, green buildings, expedited permitting)	High	A	21
RCI-21	Improved Building Codes	High	A	20
RCI-11	Government Lead by Example w/Mandatory Efficiency Targets	High	A	19
RCI-2	Voluntary Efficiency Targets	High	A	19
RCI-23	Waste/Recycling	High	A	19
RCI-12	State Promotion and Tax or Other Incentives for Efficient Products (e.g. EnergyStar)	High	B	19
RCI-6	Distributed Generation with Combined Heat and Power Systems (including Reducing Barriers)	High	B	19
RCI-1	Utility Demand Side Management	High	A	18
RCI-8	State Appliance Efficiency Standards	High	A	17
RCI-7	Distributed Generation with Renewable Energy Applications	High	B	17
RCI-5	Rate Design	High	A	15
RCI-16	Focus on Small and Medium Enterprises (SMEs)	High	D	9
RCI-10	Energy Management Training/ Training of Building Operators	Medium	B	17
RCI-14	Fuel Switching to Less Carbon-Intensive Fuels	Medium	D	17
RCI-4	Green Power Purchasing	Medium	A	16
RCI-9	Solar Hot Water and Photovoltaic Codes for New Buildings	Medium	B	15
RCI-19	Water Pumping, Treatment, and Use Efficiency	Medium	B	14
RCI-15	Reinvestment Fund	Medium	B	11
RCI-17	Participation in Voluntary Industry-Government Partnerships	Medium	B	7

Sorted By Vote:

#	Policy Option	Priority	Bin	Vote
RCI-20	Incentives for Improved Design and Construction (e.g. EnergyStar, green buildings, expedited permitting)	High	A	21
RCI-21	Improved Building Codes	High	A	20
RCI-11	Government Lead by Example w/Mandatory Efficiency Targets	High	A	19
RCI-12	State Promotion and Tax or Other Incentives for Efficient Products (e.g. EnergyStar)	High	B	19
RCI-2	Voluntary Efficiency Targets	High	A	19
RCI-23	Waste/Recycling	High	A	19
RCI-6	Distributed Generation with Combined Heat and Power Systems (including Reducing Barriers)	High	B	19
RCI-1	Utility Demand Side Management	High	A	18
RCI-10	Energy Management Training/ Training of Building Operators	Medium	B	17
RCI-14	Fuel Switching to Less Carbon-Intensive Fuels	Medium	D	17
RCI-7	Distributed Generation with Renewable Energy Applications	High	B	17
RCI-8	State Appliance Efficiency Standards	High	A	17
RCI-4	Green Power Purchasing	Medium	A	16
RCI-5	Rate Design	High	A	15
RCI-9	Solar Hot Water and Photovoltaic Codes for New Buildings	Medium	B	15
RCI-19	Water Pumping, Treatment, and Use Efficiency	Medium	B	14
RCI-15	Reinvestment Fund	Medium	B	11
RCI-16	Focus on Small and Medium Enterprises (SMEs)	High	D	9
RCI-17	Participation in Voluntary Industry-Government Partnerships	Medium	B	7