

# CHAPTER 6

## ENERGY

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The topic of energy is pervasive to every element of human activity, interaction and comfort. The economic impacts associated with fossil fuel consumption, and the unique potential of the Juneau's renewable hydroelectric sites, presents policy makers with an enviable opportunity for guiding future community growth toward renewable energy sources. There is also the need to balance the needs of the consumers with the sustainability of our energy sources.

Access to affordable, secure supplies of energy is necessary for almost every activity of government, business, and private residents. The overall goal of an energy policy should be to assure least cost alternatives to energy sources. Costs could be classified as broadly as actual out of pocket costs to the consumer, impact costs to the city budget or impact costs on our environment. Given the ways in which communities are affected by, and affect the global arena, energy policy should reflect the need to establish a fair degree of independence from uncertain international energy markets, and to ensure responsible contributions of our community to the global human and natural environment. The ultimate goal needs to be creation of an energy system that is sustainable, locally and globally. Energy policies can play a crucial role in the development of a local, regional, and national energy system that can help assure the long-term economic viability of Juneau and the Southeast Alaska region.

Further development of renewable energy sources will be needed to convert energy systems from fossil fuels for both local and regional use. Juneau is fortunate to have significant but not unlimited hydro opportunity as well as tidal and other potential renewable energy sources, all of which should be elements of a comprehensive energy program. Least-cost, or integrated-resource planning, in which investment in energy conservation is weighed against investment in energy purchase, and in which life-cycle costs are included in all decision making, can provide a framework for cost-effective, responsible energy planning and conservation. Working capital must also be equally weighed as it is likewise a scarce resource economically defined. Education is an important element in giving direct assistance to energy users and for maintaining an informed citizenry. As used below, "near-term" means one to five years and "long-term" means five years or longer.

The Alaska Electric Light & Power Company (AEL&P) is the Regulatory Commission of Alaska certificated electrical utility provider for Juneau in its specific service area, which does not encompass the entire borough; all efforts to plan, manage, or otherwise affect electrical energy production, distribution, or use should therefore involve AEL&P. Another private company, Juneau Hydropower, Inc., is in the process of applying for permits to construct a new hydroelectric project at Sweetheart Creek at the time of this update. Currently all electrical energy production with associated transmission is provided by AEL&P.

The increased use of renewable energy needs to be encouraged to offset energy consumption of non-renewable sources. This should be accomplished in two manners: conservation of energy consumption with more efficient application and reduced need; and increased development of renewable resources. Programs to reduce energy consumption including building envelope heat loss reduction; application of heat pump technology, biomass and other technologies; and LED lighting application, all of which should be supported. Renewable energy producers should be encouraged to continue planning for development, and ultimately the implementation of renewable energy sources, including hydropower, to offset the consumption of non-renewable energy sources.

There is ultimately limited, although substantial, hydroelectric generation potential in the Juneau area, and associated costs of extending transmission lines to remote sites well suited for hydropower development are high. Users should consider taking steps to conserve available energy or private industry will need to speed up the pace of developing and constructing new hydropower facilities based on market forces.

The 2011 *Juneau Climate Action and Implementation Plan (CAP)*, adopted by the Assembly under Resolution 2593, describes fossil fuel energy use in Juneau by a variety of sectors, and makes recommendations for conservation and alternative sources that do not have the negative external effects of fossil fuel energy sources; namely, dependence on foreign sources, negative impacts to air quality, and the climate impacts of greenhouse gas emissions from fossil fuel combustion. The CAP, its goals, and its strategies should be referred to when making energy plans, policy or investment decisions so as to ensure that Juneau’s energy systems reflect the local and global impacts of energy decisions.

## Energy Planning

For many reasons, energy production, conservation, and use have come to the forefront of world consciousness in recent times. In Juneau, the avalanche-induced disruptions of the supply of hydroelectric energy to the community in the spring of 2008 and again in 2009 made energy issues even more visibly relevant to the well being of the community. New energy sources are being discovered and new technologies for energy generation, transmission, and conservation are being developed. Federal and state funding sources are becoming available for renewable and/or efficient energy planning and projects. It would be beneficial to the community for the CBJ government to work with utility providers and energy developers to examine these emerging sources, technologies, and funding sources for potential use in the community and as a revenue source when sold to ratepayers such as cruise ships, Greens Creek Mine, the Couer Kensington Gold Mine, and other future large load users.

Understanding where energy is used in the community (internal and external uses), its sources, and the financial and social implications of energy use is fundamental to establishing a sound policy for energy development and use. In order to implement the policies outlined in this chapter it is necessary to establish a plan for the future use of energy resources in the borough. The *Juneau Climate Action and Implementation Plan* of 2011 (CAP) contains much more detailed analysis of energy use than is included in this Plan.

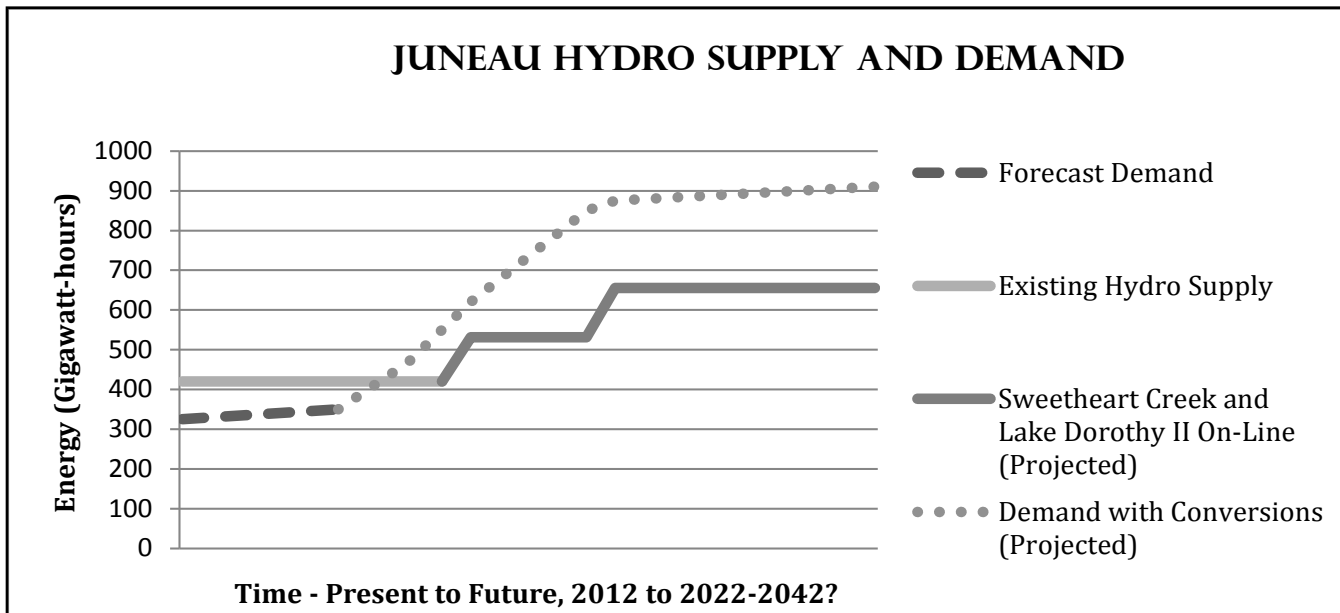


Figure 6.1

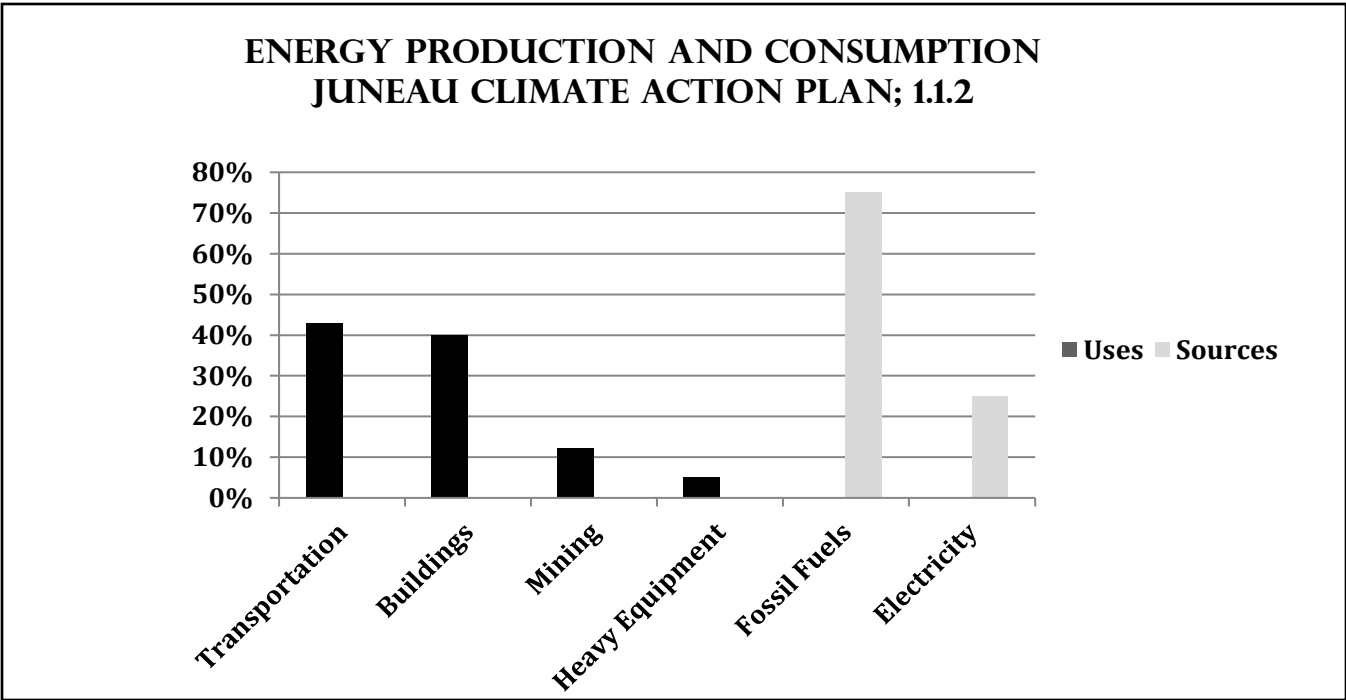


Figure 6.2

**POLICY 6.1. TO WORK WITH UTILITY AND ENERGY PROVIDERS TO ANALYZE THE LOCAL ENERGY SYSTEM, POTENTIAL RENEWABLE ENERGY SOURCES, AND EMERGING TECHNOLOGIES; TO ESTABLISH A LONG-TERM ENERGY PLAN; AND TO IMPLEMENT THAT PLAN FOR THE AFFORDABLE AND SUSTAINABLE USE OF ENERGY IN THE COMMUNITY.**

**Implementing Actions**

- 6.1 - IA1 Analyze Juneau’s internal and external energy economies and systems throughout system life-cycles.
- 6.1 - IA2 Develop and implement a long range energy plan for Juneau that addresses both private-sector, public-sector, and CBJ government energy conservation and management goals, objectives, and an action plan. The plan should consider renewable energy sources, emerging technologies, and other plans being developed within the region and the state.
- 6.1 - IA3 Host research projects that identify energy sources that use renewable resources such as hydro, tidal, solar, wind, and energy from organic waste (e.g., cellulosic ethanol) that can be used by households, businesses, and the public sector.
- 6.1 - IA4
  - (i) Develop and examine scenarios for alternative long-term energy plans, including a risk management plan.
  - (ii) Based on alternative scenarios, identify courses of action for each scenario.
  - (iii) Implement actions that maintain flexible energy strategies that best meet Juneau’s future energy needs.
- 6.1 – IA5 Conduct public meetings to explain and develop the community’s long-range energy plan.
- 6.1 – IA6 Once an energy plan is developed, undertake an immediate reconsideration and rewrite of the policies and actions in this chapter for approval by the CBJ Assembly.
- 6.1 – IA7 Assign a CBJ staff member to work with the Commission on Sustainability and provide them resources as necessary to ensure that Implementing Actions 6.1 – IA1, 2, and 4 are implemented in the near-term.

**POLICY 6.2. TO SUPPORT THE DEVELOPMENT OF RENEWABLE ENERGY RESOURCES IN JUNEAU AND IN THE SOUTHEAST ALASKA REGION.**

**Implementing Action**

- 6.2 - IA1 Work with the State of Alaska, Southeast Conference, Tlingit Haida Central Council, Douglas Indian Association, AEL&P, independent energy producers, and other interested entities toward the planning, funding, and development of renewable resources in Juneau and within the region.
- 6.2 - IA2 Promote conversion from fossil fuel heating systems to geothermal, thermal, heat pump, biomass, or biofuel systems.
- 6.2 - IA3 Promote the development and use of renewable energy sources to help meet the goals, strategies, and objectives of the *Juneau Climate Action and Implementation Plan* of 2011.

**POLICY 6.3. TO SUPPORT THE DEVELOPMENT OF A SOUTHEAST ALASKA INTERTIE.**

- 6.3 - IA1 Work with the State of Alaska, Southeast Conference, Tlingit Haida Central Council, Douglas Indian Association, AEL&P, independent energy producers, and other interested entities toward the planning, funding, and development of a regional electrical intertie.
- 6.3 - IA2 Support State of Alaska projects to extend electrical power along Glacier Highway to Cascade Point to improve highway safety, provide emergency services, reduce electrical costs and carbon emissions, and facilitate economic development.

**Support State Capital Functions Through Energy Efficiency**

As Alaska's capital city, it is vital for Juneau to offer modern transport and communications systems and facilities to Alaska residents who wish to participate in state legislative affairs. Over the years, the community has invested in such facilities, systems, and infrastructure and will continue to support effective citizen participation in state affairs. As the availability of fossil fuels decreases throughout the world, it will be increasingly important to identify energy-efficient means of assuring cost-effective electronic and physical access to the capital city.

**POLICY 6.4. TO PROVIDE COST-EFFECTIVE AND ENERGY-EFFICIENT FACILITIES, SYSTEMS AND INFRASTRUCTURE THAT STRENGTHENS JUNEAU'S ROLE AS THE STATE CAPITAL.**

**Standard Operating Procedure**

- 6.4 - SOP1 Invest in energy-efficient technologies and equipment that provide affordable electronic and physical access to state legislative, courts and other governmental agencies for Alaskan residents.
- 6.4 - SOP2 The CBJ government must weigh the additional costs of public investment up front with long-term savings over the life of the improvement, and the improvement must at least generate a positive return over its life to be implemented.

**Energy Efficient CBJ Buildings and Projects**

In addition to keeping costs to Juneau taxpayers as low as possible and conserving energy in general, it is the role of the CBJ government to set an example for businesses and individuals in adopting cost-effective energy saving technologies and operating procedures.

**POLICY 6.5. TO INCORPORATE TECHNOLOGIES AND OPERATING PRACTICES THAT WILL PROMOTE EFFICIENT AND COST EFFECTIVE ENERGY USE INTO ALL OF ITS NEW AND EXISTING BUILDINGS AND ENERGY-USING PROJECTS.**

**Standard Operating Procedure**

- 6.5 - SOP1 Replace inefficient street lighting and lighting in CBJ-owned buildings and facilities with efficient fixtures upon replacement cycle.

**Implementing Actions**

- 6.5 - IA1 Establish and fund a revolving energy conservation investment fund to invest in energy-saving public projects that meet CBJ government return-on-investment criteria.
- 6.5 - IA2 Invest in necessary metering equipment to produce monthly project energy reports.
- 6.5 - IA3 Conduct energy audits and establish energy management goals for CBJ-owned buildings.
- 6.5 - IA4 Develop and implement a system for rewarding CBJ employee initiative and responsibility in good energy management.
- 6.5 - IA5 Continue to incorporate LEED-Juneau principles and standards when designing public structures and facilities, with appropriate fuel cost sensitivity analyses over the long term life of the Project.
- 6.5 - IA6 When designing new facilities or major renovation of CBJ-owned facilities, analyze life-cycle costs of energy applications, and use that analysis to guide future development. [see also 6.7 - IA2]
- 6.5 - IA7 Analyze the workings of CBJ water and wastewater facilities and incorporate energy-saving methods and technologies where appropriate.
- 6.5 - IA8 CBJ government is to set an example for businesses and individuals in adopting cost-effective energy-saving technologies and operating procedures. Conduct post-improvement analysis of the energy savings. These results should be published as a learning and development tool for the building community.

**Maximize Use of Local Energy Resources**

Juneau’s fossil fuel supply is subject to disruption due to a variety of reasons: embargoes, price hikes, shipping disputes, or disasters, among others. Use of local energy resources reduces these risks. As the Snettisham avalanches of 2008 and 2009 showed, however, dependence on exposed, remote transmission lines for delivering electricity to users exposes the electrical system to unforeseen disruption. Most of the money used to purchase fossil fuels leaves the community. Juneau can have a much healthier local economy if we develop and encourage the use of our own energy resources that are adequately protected from disruption by relatively predictable natural disasters such as avalanches.

**POLICY 6.6. TO MAXIMIZE THE RATIO OF LOCAL, RENEWABLE-SOURCE ENERGY TO IMPORTED FOSSIL-SOURCE ENERGY IN JUNEAU’S INTERNAL ENERGY ECONOMY.**

**STANDARD OPERATING PROCEDURE**

- 6.6 - SOP1 Encourage energy conservation to reduce the amount of money leaving the community to pay for fuels.

**Implementing Actions**

- 6.6 - IA1 Seek federal and state funding to convert the CBJ fleet and, particularly, public transit vehicles, to dual-fuel, hybrid, or other fuel technologies with reduced carbon footprints and enhanced sustainability over fossil-fuel burning vehicles.

- 6.6 - IA2 Where practicable in large industrial operations, encourage co-generation processes to transform by-product heat to electrical energy for use by the operation and adjacent uses or for transmission to a nearby electrical grid.
- 6.6 - IA3 Where practicable and where there are no significant adverse impacts to marine or other ecosystems, encourage the use of tidal, geothermal, wind, heat pump technologies and other renewable energy sources to generate energy for adjacent uses or for transmission to the electrical grid.
- 6.6 - IA4 Encourage dual-fuel systems that are cost effective for buildings.
- 6.6 - IA5 Coordinate with the University of Alaska, other research organizations, and companies to identify potential renewable energy sources to power vehicles, vessels, aircraft, and structures. Analyze both the short- and long-term costs and environmental impacts of energy production and distribution systems giving preference to dependable, cost-competitive, and renewable sources that do not adversely affect natural resources and wildlife habitat when choosing a source of energy.

**Maximize Efficient Use of Renewable Energy Resources**

In 1995, about 85% of the energy used in Juneau was provided by fossil fuels. By 2010, fossil fuels accounted for only 77% of the total energy consumed in the borough. Conservation and renewable resources could displace much of this fossil fuel and greatly reduce both the dependence on these fuels and the export of capital from Juneau and Alaska.

**POLICY 6.7. TO MAXIMIZE THE EFFICIENT USE OF RENEWABLE ENERGY RESOURCES.**

**Implementing Actions**

- 6.7 - IA1 Coordinate efforts with the University of Alaska and other research organizations and entities to identify potential renewable energy sources to fuel vehicles, vessels, aircraft, structures, and utilities and to heat structures. Analyze both the short- and long-term costs and environmental impacts of energy production and distribution systems and give preference to dependable, cost-competitive, renewable sources that do not adversely impact natural resources and ecosystems when choosing a source of energy.
- 6.7 - IA2 When designing new facilities or major renovation of CBJ-owned facilities, analyze life-cycle costs of energy applications with consideration of renewable sources given priority. [see also 6.5 – IA6]

**Full-Cost Analysis**

The very real environmental and social costs, now and in future generations, of relying completely on fossil fuels are not included in the prices paid for fossil fuel-based energy. Wise local and global energy production and use requires that external costs be internalized into energy prices, in order to conserve energy and to encourage its production from renewable, low-impact sources. Additionally, federal, state, and municipal budgets are strained with fewer funds trickling down to the city. Working capital or funds available for investment are therefore a scarce resource not unlike energy. Therefore, careful consideration of impact on the local citizenry must include how redirecting scarce dollars to renewable energy or conservation may have a very real impact. Because national and state policies have not been implemented to do this, the CBJ government should take the initiative to protect the long-term interests of its residents. The exact dollar value of these costs is hard to determine, yet they must not be ignored since they ultimately have a major economic impact on the quality of life.

**POLICY 6.8. TO INCLUDE THE FULL COSTS (DIRECT AND INDIRECT) OF ENERGY USE IN ITS ECONOMIC ANALYSES.**

**Standard Operating Procedure**

- 6.8 - SOP1 Use quantifiable external and indirect costs in establishing the cost of energy when conducting life-cycle cost analyses of CBJ-owned facilities, projects, and operations.

**Implementing Action**

- 6.8 - IA1 Incorporate energy costs, fuel cost volatility, and inflation into scenario analyses conducted as part of long-term energy planning.

**Minimize Utility Investment**

The peak rate of energy use (peak load) determines the size of generators, transformers, wires, backup generators, and other equipment needed. The cost of these capital investments has a major impact on rates and can be reduced by leveling out energy use on a daily and seasonal basis. Although these improvements are the responsibility of the utility provider and are in response to market forces, the costs of the improvements are paid by rate payers, including the CBJ government. Accordingly, it is the CBJ government's responsibility to support efforts that encourage non-utility private energy investments which reduce the community's financial investment in the electrical system.

**POLICY 6.9. TO ENCOURAGE ELECTRICAL ENERGY USE PATTERNS THAT MINIMIZE UTILITY INVESTMENT.**

**Implementing Action**

- 6.9 - IA1 Work with electrical utility providers and energy developers to develop programs and educational materials promoting energy conservation.

**Energy Efficient Buildings**

Juneau's maritime climate and comparatively cold winters mean that keeping living spaces warm excessively consume energy if efficient heating, insulating and ventilating practices, materials, equipment and design are not used in the construction of new buildings and in remodeling existing buildings.

**POLICY 6.10. TO ENCOURAGE COST EFFECTIVE ENERGY EFFICIENT BUILDING AND REMODELING PRACTICES.**

**Implementing Actions**

- 6.10 - IA1 Encourage the installation of energy-efficient heating systems in new construction.
- 6.10 - IA2 Encourage participation in current residential energy efficient mortgage programs and other energy efficiency programs for both new and existing homes and businesses. Encourage favorable lending rate programs for energy efficient multifamily housing and commercial construction or renovation.
- 6.10 - IA3 Establish energy efficient standards for new and existing buildings and adopt them into local Building Code, CBJ 19.
- 6.10 - IA4 Encourage the conversion of existing heating systems from fossil fuel to renewable sources of energy.
- 6.10 - IA5 Consider enacting water conservation ordinances that lead to significant energy savings for the CBJ government, and in turn to utility customers, in pumping water and in treating wastewater.

- 6.10 – IA6 Encourage consideration of “life cycle” costs, the use of energy efficient construction techniques, materials, and equipment that are consistent with acceptable health and safety standards and that are appropriate for local climatic conditions, while keeping project costs low.
- 6.10 – IA7 Consider providing incentives supporting 6.10 – IA6.

## **Industrial Energy Use**

The design and operation of industrial developments can be managed to reduce, transfer, or minimize energy waste and to maximize use of renewable energy. Mining projects tend to be energy intensive and short-lived (tens of years). Within Juneau mining projects could have a great effect on the community’s energy economy and be greatly affected by the CBJ energy policy. For industries with large amounts of fuel material by-products (e.g., wood waste), or with high temperature energy by-products (e.g., steam), the generation of electrical energy for sale to the utility grid can be useful and increase overall community energy efficiency. Similarly, there are industries that produce large amounts of heat as a by-product, e.g., over one megawatt thermal, and that could use this energy resource to displace fossil fuel energy in nearby structures for space heating or other low temperature processes. The CBJ government could play a role in making such projects viable, saving considerable energy dollars for use in the community, rather than for export to pay fossil fuel energy costs.

### **POLICY 6.11. TO ENCOURAGE INDUSTRIAL AND COMMERCIAL USERS TO BE AS EFFICIENT AS POSSIBLE IN THEIR USE OF ENERGY, TO USE RENEWABLE ENERGY SOURCES, AND TO MAKE ENERGY BY-PRODUCTS AVAILABLE FOR USE ELSEWHERE IN THE COMMUNITY.**

#### **Implementing Actions**

- 6.11 – IA1 Encourage energy intensive projects to follow adopted CBJ energy policy.
- 6.11 – IA2 Assist those proposing energy intensive projects in understanding, at the earliest point in their projects, the adopted CBJ energy policy.
- 6.11 – IA3 Require the use of renewable and environmentally-sensitive energy sources for energy intensive projects, where cost effective.
- 6.11 – IA4 Encourage the development of co-generated electrical energy at avoided cost.
- 6.11 – IA5 Encourage appropriate land use patterns of development close to potential sources of surplus by-product heat.

## **Public Education on Energy**

Individual consumer decisions and behavior are significant in governing the extent of required energy development. Nationally, there is a trend toward using rate incentives to further community energy goals. The effect of these incentives is maximized by advising consumers on how to take advantage of them. Only a well-educated citizenry is able to make well-informed decisions.



**POLICY 6.12. TO INCREASE PUBLIC UNDERSTANDING OF HOW INDIVIDUAL AND CBJ GOVERNMENT ENERGY DECISIONS AFFECT INDIVIDUAL CONSUMER COSTS, AS WELL AS THE LIVABILITY AND SUSTAINABILITY OF THE COMMUNITY.**

**Implementing Actions**

- 6.12 – IA1 The CBJ Commission on Sustainability and the Juneau School District should work together to improve energy education in K-12 public school educational curriculum within the Juneau Douglas School District, including:
- energy as a fundamental human need;
  - historical perspective of energy; understanding our local energy system, and how it fits within the regional, state, federal, and world systems;
  - helping students become smart consumers;
  - informing future voters on the need to establish and maintain an energy system that is high quality, secure, equitable, and sustainable; and
  - a multi-disciplinary approach to energy.
- 6.12 – IA2 Encourage the private sector, with financial assistance from the CBJ government and support from the Commission on Sustainability, to conduct a public education program to explain the benefits of conservation of energy.
- 6.12 – IA3 Conduct public meetings to explain and discuss the Energy Chapter of this Plan.
- 6.12 – IA4 Suggest that the Regulatory Commission of Alaska consider allowing utility providers to charge rate payers for the company’s investment in conservation efforts and education on a cost benefit basis.

