

ENERGY

Introduction

Energy costs in rural Alaska have risen steadily over the last three decades and skyrocketed since 2001. Dillingham residents have experienced the impacts of rising energy costs as they pay more to heat and light their homes and businesses, or to fuel their cars, trucks or snowmachines. These costs ripple through the whole economy, pushing up the cost of doing business and governing the community. Residents are spending more for goods and services at local businesses and paying extra to barge large orders from Anchorage and the Lower 48. Airfreight has also risen dramatically with the increase in fuel prices and the decrease in freight subsidies.

In response, residents are researching and implementing new ways to increase energy efficiency, conservation and production. Some are turning to wood stoves and increasingly buying wood-fueled furnaces. Others are installing energy efficient light ballasts or small wind turbines to supplement their electricity needs.

This chapter begins with background data that documents current energy trends in Dillingham. Following this overview of current trends is the community's energy plan. The plan articulates the community's long-term goals and objectives, as well as specific strategies to address energy issues in Dillingham.

The trends and policy sections of this chapter are grouped by three categories. These categories represent the three ways in which energy is produced and consumed:

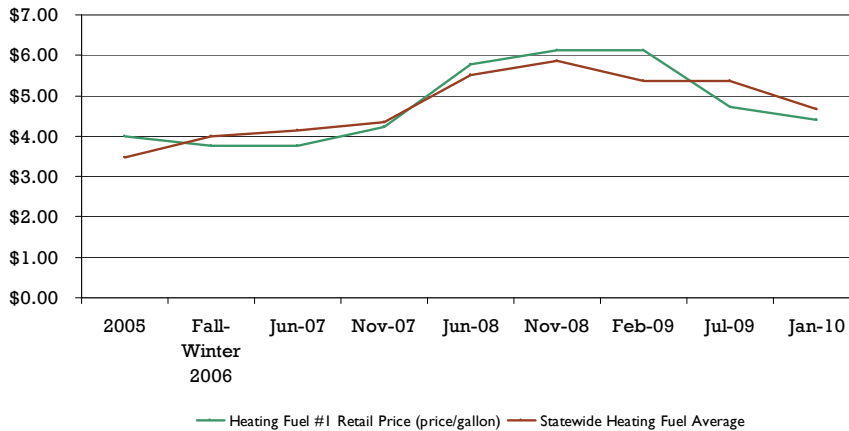
- Electricity: Energy used in homes, businesses and public facilities for lighting, appliances, manufacturing and many other uses; currently produced by diesel generators.
- Heating: Energy used for heating homes and other buildings; currently produced by fuel oil stoves, wood stoves and furnaces, and, in some instances, electricity.
- Transportation: Energy used by vehicles, boats, planes, four wheelers and snow-machines, fueled by a range of imported, petroleum-based products.

Trends in Heating & Electricity

Much of the energy used for indoor heating in Dillingham comes from burning heating oil. Currently, all of the electricity for lighting and other purposes is generated with diesel-powered generators. Between 2005 and 2008, the cost of heating oil increased fifty percent, from \$4.00/gallon to over \$6.00/gallon. More

recently, these prices have dropped below the state average but still remain high.¹ The table below illustrates the rise in heating oil costs between 2005 and 2008 and the more recent decline.

Table 8.1 Comparison of Heating Oil, Dillingham and State Average, 2005-2010



Source: <http://commerce.alaska.gov/dcra/researchanalysis/RAPublications.htm>

Nushagak Electric & Telephone Cooperative is the local electricity provider. Current residential rates for electricity in Dillingham are \$0.32 per kWh.² the state average is approximately \$0.17 per kWh (kilowatt hour).³ Nushagak Electric provides power with a diesel fueled powerhouse with seven generators, the oldest of which dates to 1988, that have an average efficiency of 14.16 kWh/gallon and an average yearly load of two megawatt hours.⁴ Recent investments have significantly increased the efficiency of the community's electrical generators.

Trends in Transportation

The cost of marine diesel and gasoline has been gradually increasing over the past several years and both have seen a steep price increase in 2008 and 2009 but have recently returned to 2007 levels.

Marine diesel #2 is shipped to Dillingham, stored at the Delta Western facility and dispensed at the marine dock.⁵ The table below illustrates the price increases

¹ The price of heating oil in January 2010, \$4.41 per gallon, is below both the regional average and state average (\$4.57 and \$4.68 per gallon, respectively). (Source: <http://commerce.alaska.gov/dcra/researchanalysis/RAPublications.htm>)

² Source: <http://www.nushtel.com/electric/electric.htm>

³ Source: http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_b.html

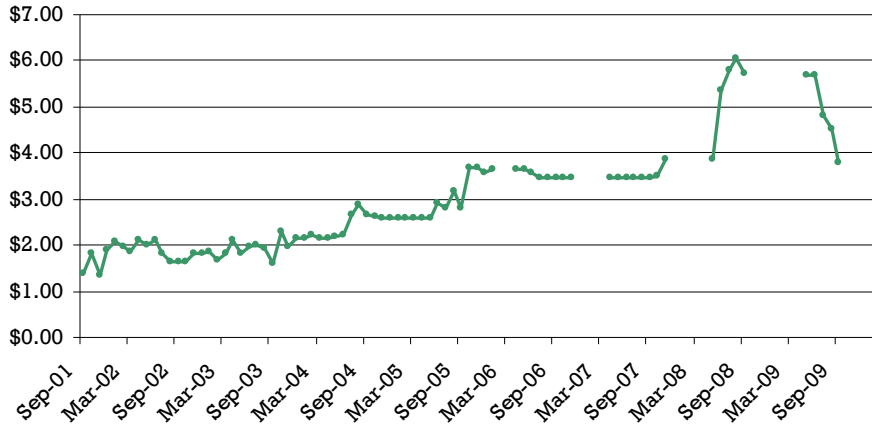
⁴ Source:

http://74.125.155.132/search?q=cache:4uYIVcgeFcMJ:www.aidea.org/AEA/RenewableEnergyFund/Round_1_October_2008/Applications/6/Renewable%2520Grant%2520Application.doc&alaska&energy&authority&nushagak&diesel&cd=1&hl=en&ct=clnk&gl=us

⁵ The marine facility is closed between the months of December and April, generally, as the marine diesel gels during cold temperatures.

between 2001 and 2010, gradually increasing from \$1.38 per gallon in 2001 to just under \$4.00 in early 2010. The gaps in the chart depict months when no fuel was sold.

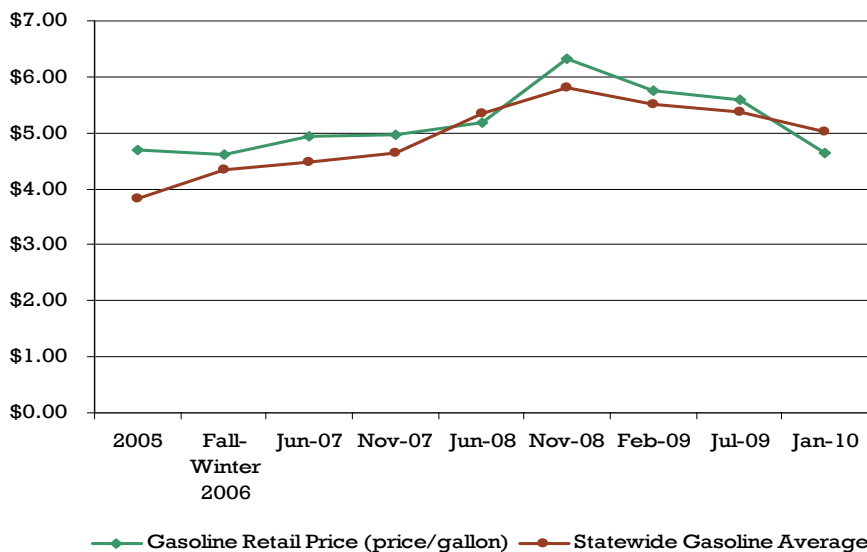
Table 8.2 Monthly Cost per Gallon of Marine Diesel, 2001-2010



Source: <http://www.psmfc.org/efin/data/fuel.html#Data>

Gasoline prices have undergone a similar pattern, increasing gradually with a spike in 2008 and 2009 returning to pre-spike levels in 2010. Gasoline is also barged to Dillingham and stored at the Delta Western facility. Prices for gasoline in Dillingham have generally been above the statewide average. See the figure below for the comparison between Dillingham prices and the statewide average. While this set of data, derived from State sources, shows gasoline prices falling below \$5.00/gallon; residents (and consulting team members) have always paid more than that in the last year.

Table 8.3 Cost of Gasoline, Dillingham and State-wide Average, 2005-2010



Recent Initiatives

The rising cost of energy affects all aspects of life for Dillingham residents. Over the past five years, Dillingham residents have worked with local, state and federal partners to identify specific strategies to address increasing energy costs. All strategies aim at creating a more energy self-sufficient community.

- Researching Renewable Energies: Several local entities continue to contribute to a body of research on renewable energy sources including hydro, wind, tidal, solar and geothermal.⁶
 - Nushagak Electric & Telephone, Inc. is investigating the Lake Elva Hydroelectric Project, which has an estimated capacity of 1.5 MW.⁷
 - Naknek Electric is drilling its third deep geothermal test hole in the Alaska Peninsula area, and preliminary results show very positive potential for use of geothermal energy to produce electricity, which could then be extended to Dillingham.
 - Between 2003 and 2007 V3 Energy, LLC studied wind energy feasibility in Bristol Bay through an evaluation of eight sites in the region.⁸ The two sites in Dillingham (Wood River and Kanakanak) were rated as Fair. Recently, the Bristol Bay Health Corporation has also investigated options for wind power.
 - The University of Alaska Bristol Bay campus is researching the tidal energy potential of Nushagak Bay.⁹
- Implementing Energy Efficiency Strategies & Using Renewable Energies
 - In 2009, BBNA hosted an energy conference with a primary focus on information sharing related to energy efficiency. Many local homeowners are taking steps such as replacing traditional light bulbs with energy efficient bulbs at home. Some residents have used Alaska Housing Finance Corporation (AHFC) Weatherization programs to retrofit their homes to make them more energy efficient.¹⁰ The City of Dillingham is

⁶ While these options have the potential to lead to greater local energy self-sufficiency and to provide a way to avoid the continuing escalation of costs for petroleum, local energy prices are not likely to fall dramatically. In the short-term, prices per unit of power could even increase due to the heavy upfront investment.

⁷ Source: <http://www.cvea.org/resources/pdfs/ruralite2/pg28April09Renewables.pdf>

⁸ <http://www.akenergyauthority.org/PDF%20files/RuralEnergyConference/VaughtV3EnergyLLCPresentation.pdf>. The final report is available here: <http://apps1.eere.energy.gov/tribalenergy/pdfs/bbnc03final1.pdf>.

⁹ <http://www.akenergyauthority.org/PDF%20files/AK%20Energy%20Final.pdf>

¹⁰ While these programs are good, there are limitations to making them work in Dillingham. Right now, there are only a few local energy raters, and raters from out of town are often not interested in traveling to Dillingham, as it is cost prohibitive.

replacing light ballasts and lights citywide, and the Senior Center staff is prioritizing improvements that will make the Senior Center facility more energy efficient.

- Some residents are using external wood-fired water and/or space heaters to supplement or replace fuel-oil fired heating systems.¹¹
- Some residents are supplementing city power with small wind powered electrical generators. Many businesses are also exploring the use of renewable energies, the use of energy efficient technologies, and a range of policy changes to address high energy costs. Dillingham High School is researching the installation of a wind turbine. The Bristol Bay Housing Authority is focusing on the use of appropriate energy efficient technologies and housing density in their development projects.

Goals, Objectives & Strategies

Overarching Goal: Reduce energy consumption and costs to decrease the cost of living, facilitate diverse economic development, and ensure Dillingham’s viability into the future.

GOAL 1: Reduce energy consumption.

Electricity & Heating

Objective 1A: Develop local capacity to assess energy use in residential, commercial and public facilities.

Strategies:

1. Educate the larger community about options for energy ratings of homes and businesses. Increase capacity to audit and inspect public facilities to reduce energy use.
2. Support increased local rater certification and recertification.
3. Increase local capacity to audit and inspect residential, commercial and public facilities to reduce energy use.
4. Identify baseline data on current electricity use and set usage targets and a system for measuring progress towards targets.

Objective 1B: Improve the energy efficiency of residential, commercial and public facilities.

Strategies:

¹¹ Wood heating brings up questions of continuing wood supply and potential air quality issues.

1. Promote state and federal reimbursement programs for homeowners and businesses that improve energy efficiency.
2. Educate homeowners and building owners about simple actions that can reduce energy use.
3. Replace fixtures and equipment in public facilities with the most efficient technologies.
4. Develop a local reimbursement fund to support residential and commercial energy audits and retrofits.

Transportation

Objective 1C: Reduce energy used for transportation (see also Land Use and Transportation chapters).

Strategies:

1. Improve facilities for non-motorized transportation (for example, trails and pathways).
2. Promote non-motorized forms of transportation (including cycling and walking) by providing an organized trail and sidewalk system.
3. Explore options for a local transit system based on the van services provided by major employers.
4. Create a service to connect drivers and passengers for car and vanpools.
5. Provide local residents with information on:
 - Ways to decrease fuel consumption.
 - Conversion methods and renewable fuels for personal and commercial vehicles.
6. Encourage bicycle maintenance as a business.
7. Concentrate land uses to reduce the need for driving, and reduce requirements for building and maintaining roads and other public infrastructure.

General

Objective 1D: Gather and promote best practices from other communities to conserve energy and educate the community on the benefits of energy conservation.

Strategies:

1. Gather and share research results from UAF's Cold Climate Housing Research Center and other sources with local developers and facility owners.
2. Identify and adopt an energy efficient building code for all new construction.

3. Identify and develop pilot projects that demonstrate innovative techniques to conserve energy.
4. Develop a link to statewide web-based and an in-person forum for gathering and sharing information on energy efficiency and conservation.

GOAL 2: Develop new, renewable energy sources and innovative methods to reduce the cost of energy.

Electricity & Heating

Objective 2A: Explore the feasibility of developing renewable sources of energy including wind, hydro, geothermal, biomass, tidal, and solar.

Strategies:

1. Work with Nushagak Cooperative, Choggiung and other entities to develop feasibility assessments and a capital plan for developing new energy sources to supplement or replace existing infrastructure:
 - Document existing energy use patterns and trends.
 - Develop a practical assessment of the costs and benefits of renewable energy sources.
 - Provide accurate public information about the costs and benefits of maintaining the current system of electrical production compared to developing new energy sources.
2. Investigate options for specific new or improved local energy sources:
 - Wind energy as a source of power for individual buildings and as a community power supply; inventory potential sites and identify potential operators.
 - Clean burning and efficient wood stoves and furnaces. Conversion of burnable landfill refuse into an energy source.
 - Conversion of fish waste into a fuel source for the fishing industry and of local resources (such as cooking oil) to vehicle fuel.
 - Options for increased electric space heating and the use of electric cars.
 - Options for the cooperative purchase of fuel to reduce retail costs.
3. Based on the research above, implement the use of new energy sources.
4. Develop an education campaign and local resource guide for local businesses and homeowners.

Objective 2B: Explore the feasibility of developing non-diesel sources of energy including wood, peat and natural gas.

Strategies: See strategies under Objective 2A.

Objective 2C: Explore the feasibility of distributed energy systems.

Strategies:

1. Determine a practical strategy and possible incentives to develop shared energy systems within small subdivisions and commercial campuses.

GOAL 3: Reduce reliance on costly imported goods; increase production and reliance on local resources.

Objective 3A: Develop interest in the community to grow and gather food locally.

Strategies:

1. Advocate for establishing a UAF Extension presence in Dillingham to support education programs like 4H that teach people about the benefits of growing food locally.
2. Explore the feasibility of developing a passively heated commercial greenhouse to grow food:
 - Explore the feasibility of using waste heat to support the greenhouse.
 - Explore the feasibility of converting fish waste into fertilizer for gardens, farms and greenhouses.
3. Support and expand the Farmer's Market.
 - Identify a good location.
 - Develop a local growers' association to help lead the effort.
4. Provide programs that demonstrate proper techniques for the harvest, care and preparation of subsistence resources, including fish and meat canning, drying and other preservation methods:
 - Explore the feasibility of a large-scale root cellar.

Objective 3B: Develop and sell locally produced building materials.

Implementation Plan

Priority Strategies	Timeframe			Primary Responsibility
	0-5 yrs	6-10 yrs	11-20 yrs	
GOAL 1: Reduce energy consumption.				
Objective 1A: Develop local capacity to assess energy use in residential, commercial and public facilities.				
1. Educate the larger community on energy rating.	x			UAF BB Campus
2. Support increased local rater certification and recertification.	x			UAF BB Campus
3. Increase local capacity to audit and inspect residential, commercial and public facilities to reduce energy use.	x			UAF BB Campus - residential & commercial City - public facilities
4. Identify baseline data on current electricity use and set usage targets and a system for measuring progress towards targets.	x			Nushagak Cooperative
Objective 1B: Improve the energy efficiency of residential, commercial and public facilities.				
1. Promote state and federal reimbursement programs for homeowners and businesses that improve energy efficiency.	x			UAF BB Campus
2. Educate homeowners and building owners about simple actions that can reduce energy use.	x			UAF BB Campus
3. Replace fixtures and equipment in public facilities with the most efficient technologies.	x			City
4. Develop a local reimbursement fund to support residential and commercial energy audits and retrofits.	x			City (?)
Objective 1C: Reduce energy used for transportation.				
1. Improve facilities for non-motorized transportation, for example, trails and pathways.	x			City & Tribe
2. Promote non-motorized forms of transportation including cycling and walking.	x			City
3. Explore past options for a local transit system, based on the van services provided by major employers.	x			City, BBNA, Curyung
4. Create a service to connect drivers and passengers for car and vanpools.	x			City

Priority Strategies	Timeframe			Primary Responsibility
	0-5 yrs	6-10 yrs	11-20 yrs	
5. Provide local residents with information on: ways to decrease fuel consumption; conversion methods and renewable fuels for personal and commercial vehicles.	x			BBNA & UAF BB Campus
6. Encourage bicycle maintenance as a business.				
7. Concentrate land use to reduce the need for driving, and reduce requirements for building and maintaining roads and other public infrastructure.	x			City
Objective 1D: Gather and promote best practices from other communities to conserve energy and educate the community on the benefits of energy conservation.				
1. Gather and share research results from UAF's Cold Climate Housing Research Center and other sources with local developers and facility owners.	x			UAF BB Campus
2. Identify and adopt an energy efficient building code for all new construction.	x			City
3. Identify and develop pilot projects that demonstrate innovate techniques to conserve energy.	x			UAF BB Campus
4. Develop link to statewide web-based and in-person forum for gathering and sharing information on energy efficiency and conservation.	x			UAF BB Campus
GOAL 2: Develop new, renewable energy sources and innovative methods to reduce the cost of energy.				
Objective 2A: Explore the feasibility of developing renewable sources of energy including wind, hydro, geothermal, biomass, tidal, and solar.				
1. Work with Nushagak Cooperative, Choggiung and other entities to develop feasibility assessments and a capital plan for developing new energy sources to supplement or replace existing infrastructure.	x			Nushagak; BBNA Nushagak Cooperative - electric; Choggiung - home heating is combination
2. Investigate options for specific new or improved local energy sources.	x			City & UAF BB Campus
3. Based on research above, implement use of new energy sources.		x		City & UAF BB Campus
4. Develop an education campaign and local resource guide for local businesses and homeowners.		x		City & UAF BB Campus

Priority Strategies	Timeframe			Primary Responsibility
	0-5 yrs	6-10 yrs	11-20 yrs	
Objective 2B: Explore the feasibility of developing non-diesel sources of energy including peat and natural gas.				
See strategies under Objective 2A.				
Objective 2C: Explore the feasibility of distributed energy systems.				
Determine a practical strategy and possible incentives to develop shared energy systems within small subdivisions and commercial campuses.		x		Private enterprise, City, BBNA
GOAL 3: Reduce reliance on costly imported goods; increase production and reliance on local resources.				
Objective 3A: Develop interest in the community to grow and gather food locally.				
1. Support education programs like 4H that teach people about the benefits of growing food locally.	x			UAF BB Campus Cooperative Extension Service
2. Explore the feasibility of developing a passively heated commercial greenhouse to grow food.		x		Local residents that are good candidates to lead this effort: Raebelle Whitcomb, Tony Harmon, and Tim and Kathy Meyers
3. Support and expand the Farmer's Market.		x		City, local residents
4. Provide programs that demonstrate proper techniques for harvest, care and preparation of subsistence resources including fish and meat canning, drying and other preservation methods. Explore feasibility of large-scale root cellar.		x		Curyung & SAFE
Objective 3B: Develop and sell locally produced building materials.				