

Alternative Energy Program**FY2002 Request: \$5,787,000****Reference No: 32591****AP/AL:** Appropriation**Project Type:** Construction**Category:** Development**Location:** Statewide**Contact:** Robert Poe, Jr.**Election District:** Statewide**Contact Phone:** (907)269-3000**Estimated Project Dates:** 07/01/2002 - 06/30/2007**Brief Summary and Statement of Need:**

This appropriation is requested for expected federal funds and state match for alternative energy projects (Fuel Efficiency Improvements, Conservation, Wind, Biomass).

Funding:

	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Total
Fed Rcpts	\$5,287,000	\$5,500,000	\$5,500,000	\$5,500,000	\$5,500,000	\$5,500,000	\$32,787,000
G/F Match	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$3,000,000
Total:	\$5,787,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$35,787,000

<input checked="" type="checkbox"/> State Match Required	<input type="checkbox"/> One-Time Project	<input type="checkbox"/> Phased Project	<input checked="" type="checkbox"/> On-Going Project
9% = Minimum State Match % Required		<input type="checkbox"/> Amendment	<input type="checkbox"/> Mental Health Bill

Operating & Maintenance Costs:

	<u>Amount</u>	<u>Staff</u>
Total Operating Impact:	0	0
One-Time Startup Costs:	0	
Additional Estimated Annual O&M:	0	0

Prior Funding History / Additional Information:

The match for this program was not funded in FY 2001. Federal funding was received as part of a larger federal energy program appropriation, which contained several programs. Prior funding history for this larger appropriation: FY 96 1,000,000; FY 97 10,000,000; FY 98 30,000,000; FY 99 0.0; FY 00 30,450,000

Purpose of the Appropriation

The diesel efficiency and alternative energy program seeks to lower the cost of power and heat by developing alternatives to diesel-based energy systems as well as enhancements to diesel-based technology. Most of the program focus is in rural areas where average energy costs are highest and cost reduction alternatives are most needed.

Diesel efficiency and alternative energy developments proposed for FY02 include:

- Construction of new "waste heat" recovery and distribution systems in connection with conventional diesel powerplants in rural villages.
- Microturbine and battery storage demonstration projects.
- Identification and installation of energy conservation measures in rural schools and other large buildings.
- Further development and testing of wind energy projects.
- Installation of wood-fired boilers in rural communities where wood heat is less expensive than oil.
- Technology development to convert fish waste and beetle-killed timber into combustible gas.
- Development of an ethanol manufacturing plant using wood waste as feedstock.

The Authority requests \$500.0 in State general funds and \$5.2 million in federal authority to finance these initiatives.

Additional proposals for energy efficiency and alternative energy are expected to emerge from the rural energy plan that is now being prepared for the Authority and its co-sponsors – the Denali Commission and the U.S. Department of Agriculture – Rural Development. These additional proposals are expected to be available for review and consideration in early 2001. The Denali Commission has clearly expressed its interest in contributing federal grant funds to the most cost-effective efficiency and alternative energy projects that emerge from this process.

Fuel Efficiency Improvements

- *"Waste Heat" Recovery from Diesel Generators.* Presently there are at least 51 systems in rural communities that recover jacket water heat from diesel generators and distribute it to nearby schools, water treatment plants, and other facilities. Depending on the distance of the heating loads from the power plant and the ability of the loads to utilize "waste heat" when it is generated, heat recovery can be an attractive option for reducing costs of heating major facilities.

Over the last decade, upgrade and replacement of diesel power plants in rural villages have created new opportunities for heat recovery as many of these projects have been designed for easy connection to a waste heat system. This includes the diesel powerplant upgrades that the Authority is now developing under its RPSU (Rural Power System Upgrade) program. Additional capital funds would support the installation of these systems, where possible in conjunction with the installation of a new diesel powerplant.

The Authority requests \$200.0 in State general funds to help finance these systems. Every effort will be made to attract matching federal funds, specifically from the Denali Commission which is the primary funding agency for the Authority's RPSU program. Assuming a 30% match requirement, \$200.0 in State funds can be used to acquire \$467.0 of federal funds from the Denali Commission, meaning \$667.0 would be available in total to finance waste heat recovery. Depending on the size of the candidate communities, this amount could finance the development of 3-4 waste heat recovery systems.

- *Microturbine Demonstration.* Two firms have recently developed diesel microturbines in the 30 to 75 kW range with potential for heat recovery. There is significant interest by rural utilities in microturbines because of their potential for reducing O&M costs due to fewer moving parts compared to internal combustion systems, their lack of oil lubrication systems, and promise of reduced air emissions.

\$30,000 in State general funds are requested for a grant to an electric utility or group of utilities for installation and testing of a diesel-fueled microturbine in a combined heat and power application. Funds would be matched with local and federal sources to purchase a unit, install and operate it in a road-accessible location, and test its performance under standard protocols used by the National Rural Electric Cooperative Association's Cooperative Research Network. The estimated cost and sources of funds are as follows:

Source of Funds

Amount

Alternative Energy Program

FY2002 Request: **\$5,787,000**
Reference No: **32591**

USDOE	\$70.0
State (AEA)	30.0
Electric Utility	<u>50.0</u>
TOTAL	\$150.0

- *Energy Storage System Demonstration.* Diesel-battery hybrid systems offer potential fuel saving, reduced maintenance, and improved reliability over current multiple diesel configurations. The addition of energy storage can replace spinning reserve, reduce engine start-stop cycles, and allow use of a smaller, less costly diesel generator. Following an assessment of demonstration project economics and fuel savings by a computer model being developed by USDOE, a system will be installed in a remote Alaskan village served by AVEC and monitored to verify predicted savings. Hybrid diesel-battery systems provide a flexible platform that can be configured to receive wind, solar, hydro, or other sources of intermittent electrical energy.

The Authority requests \$20,000 in State general funds to help finance a cooperative project between the Alaska Village Electric Cooperative, the Alaska Energy Authority, and USDOE/Sandia Laboratories to install and test a diesel-battery storage system. The estimated cost and sources of funds are as follows:

<u>Source of Funds</u>	<u>Amount</u>
USDOE	\$60.0
State (AEA)	20.0
Electric Utility	<u>40.0</u>
TOTAL	\$120.0

USDOE funds for projects like the microturbine demonstration or the battery storage project do not typically involve formal match requirements. However, it is usually necessary to compete for the available funds and one of the evaluation criteria used by USDOE is the amount of State and local contribution. The Authority believes that some level of State participation, even if relatively small, is necessary to succeed in the competition for these federal grants.

Based on the foregoing plans for fuel efficiency improvements, the Authority is requesting \$597.0 in federal authority as follows:

<u>Federal Funds</u>	<u>Potential Amount</u>
Waste heat recovery	\$ 467.0
Microturbine demonstration	70.0
Energy storage demonstration	<u>60.0</u>
TOTAL	\$597.0

Conservation

The Rebuild America program provides federal funds primarily to conduct energy audits of commercial and institutional buildings. Energy "auditors" examine these larger buildings, analyze energy use, recommend cost-effective energy conservation measures, and provide training of facility operators.

Program administration costs are included in the Authority's operating budget and are supported by both State and federal dollars. All of the funds that pay for actual energy audits are included in the capital budget. Whether the expenditure is for administrative or program purposes, the Rebuild America program requires a 1:1 match – that is, all federal dollars must be matched with an equal amount of State dollars.

To date, the Authority has conducted energy audits in 85 rural communities. The largest 3 structures, including the school, are examined in each community. An additional 25 communities will be covered by the program during FY01, leaving approximately 75 rural communities for which this service has not been provided. The federal Rebuild America grant that is supporting the FY01 effort, along with the State matching funds associated with it, will be completely expended by the end of this fiscal year.

Alternative Energy Program

FY2002 Request: **\$5,787,000**
Reference No: **32591**

The audits completed to date have identified conservation measures that would save schools and other rural facilities over \$1.4 million per year at a capital cost of \$2.4 million. These are very cost effective investments – typical measures include retrofitting to efficient lamps and ballasts, installing setback thermostats and occupancy sensors, controlling boiler water temperature based on outdoor temperature, tuning and upgrading heating systems, installing energy efficient motors, and improving building envelope and insulation.

The Authority has funded four demonstration projects based on energy audit recommendations. Follow-up efforts are planned for the coming year to determine how many of the recommendations in the 85 audited communities have been implemented to date.

The Authority requests \$80.0 in State general funds for two purposes:

- \$50.0 would be used to match \$50.0 in federal Rebuild America funds, providing \$100.0 in total to continue providing energy audits. At a cost of approximately \$4.0 per community, this would allow us to conduct energy audits in approximately 25 communities in FY02.
- \$30.0 would be used to help finance energy conservation measures. The Authority's intent is to use this amount to leverage as much local and federal participation as possible. The Denali Commission has clearly indicated its interest in funding cost-effective alternative energy projects, including conservation. Given the Commission's policy of requiring a 30% match, the Authority would seek \$70.0 from the Denali Commission for energy conservation if \$30.0 in State funding is made available.

Based on these plans for conservation funding, the Authority is requesting \$120.0 in federal authority as follows:

<u>Federal Funds</u>	<u>Potential Amount</u>
Rebuild America energy audits	\$ 50.0
Energy conservation measures	<u>70.0</u>
TOTAL	\$120.0

Wind

- *Selawik Low Penetration Wind Demonstration.* Recent experience with wind energy systems in Kotzebue indicates that wind energy offers significant promise as a supplement to diesel fuel. This unique project will demonstrate the use of wind energy systems to displace diesel fuel storage as well as reduce diesel fuel use. Another objective will be to apply second generation design and improved project management methods to lower costs and expand wind-diesel system capabilities. The project has been proposed by AVEC which is the electric utility serving Selawik.

The estimated project cost is \$600.0 which would cover the cost of installing 2-4 small wind turbines in combination with efficient diesel generators. AVEC has indicated that it will contribute \$135.0 to the project if the balance of project costs can be obtained from State or federal grants. The Authority requests \$125.0 in State general funds and anticipates total project funding as follows:

<u>Source of Funds</u>	<u>Amount</u>
Federal	\$ 340.0
State (AEA)	125.0
AVEC	<u>135.0</u>
TOTAL	\$600.0

- *Testing and evaluation of alternative turbines at the Kotzebue Wind Farm site.* \$10,000 is requested to help obtain \$115,000 of federal funds for testing of various small wind turbines that are potentially applicable in Alaska. Side-by-side cold weather testing will be conducted on selected wind turbines that have been designed to withstand unusually harsh conditions. Funds will be used for data collection and evaluation, or as seed funds to pay for installation costs of turbines that hold promise for village power use.

Alternative Energy Program

FY2002 Request: **\$5,787,000**
Reference No: **32591**

- *Wind Resource Assessment and Database Preparation.* \$10,000 is requested to help obtain \$15,000 in federal funds for analysis of existing meteorological data to predict annual wind energy output at 75 locations in rural Alaska. Funds will be used to contract with a specialist to analyze existing wind resource data, correlate that information with ground measurements, and prepare reports.

Based on the foregoing plans for wind energy projects, the Authority is requesting \$470.0 in federal authority as follows:

<u>Federal Funds</u>	<u>Potential Amount</u>
Selawik demonstration	\$ 340.0
Alternative wind turbines testing	115.0
Wind resource assessment	<u>15.0</u>
TOTAL	\$470.0

Biomass

For over 10 years, the U.S. Department of Energy (USDOE) has issued an annual grant of \$50.0 to the Authority to administer a biomass energy program. The federal grant requires a \$25.0 match from the State. Both of these amounts are shown in the operating budget and support the staff and related administrative costs associated with the biomass program.

This request, however, is for \$25.0 in State general funds to help leverage additional USDOE funding for specific biomass projects. There are three project areas for which USDOE funding will be sought in FY02:

- Replacing oil-fired boilers with wood-fired boilers can be a simple way to reduce energy costs in rural communities that have access to an inexpensive wood supply. In the village of Dot Lake, the Authority recently helped to install a wood-fired boiler that now supplies heat to a washeteria and nearby residences. The \$66.0 project cost was covered by a combination of State, federal (USDOE), and local contributions.

The USDOE funds that were obtained for the project do not have a minimum match requirement. However, as previously noted, it is usually necessary to compete for the available funds and one of the evaluation criteria used by USDOE is the amount of State and local contribution. The Authority believes that some level of State participation, even if relatively small, is necessary to succeed in the competition for these federal grants.

There are additional prospects in rural Alaska for the installation of wood-fired boilers to reduce energy costs. One that we are presently investigating is the village of Circle in the Upper Yukon region. The requested capital funds are a necessary part of the financing package that could support installation of this and other similar projects during FY02.

- Anchorage Municipal Light and Power (AML&P) and the Electric Power Research Institute (EPRI) have approached both USDOE and AEA for support in developing projects that would convert fish and wood waste to low Btu gas through anaerobic digestion technology developed at University of California Davis. The process would address problems of current grind and dump disposal at smaller fish processors, low fish waste flow periods at large processors (e.g. Unalaska), and disposal of large quantities of beetle-killed timber in Southcentral Alaska.

At present, AML&P and EPRI have requested \$25.0 to develop a preliminary design and business plan for the application of this technology.

- Southeast Alaska Ethanol Development. To date, \$389.6 has been committed to a technology assessment, feasibility analysis, and preliminary design of a facility that will convert wood residues to fuel grade ethanol:

<u>Source of Funds</u>	<u>Amount</u>
USDOE	\$300.0
State (AEA)	41.6
Sealaska Corporation	<u>48.0</u>
TOTAL	\$389.6

Alternative Energy Program**FY2002 Request: \$5,787,000****Reference No: 32591**

An additional \$4.0 million is included in the USDOE budget that is presently making its way through the Congressional budget process. The funds would be used for continued technology development, preliminary design, and site selection studies in southeast Alaska.

Based on these plans and developments for biomass projects, the Authority is requesting \$4.1 million in federal authority as follows:

<u>Federal Funds</u>	<u>Potential Amount</u>
Wood-fired boilers	\$ 50.0
Anaerobic digestion	50.0
Southeast ethanol	<u>4,000.0</u>
TOTAL	\$4,100.0

SUMMARY OF REQUEST

The Authority requests \$500.0 in State general funds for Alternative Energy as follows:

<u>Purpose</u>	<u>Amount of State Funds (000s)</u>
Fuel Efficiency Improvements	\$ 250.0
Conservation	80.0
Wind Energy	145.0
Biomass	<u>25.0</u>
TOTAL	\$ 500.0

The Authority requests federal authority for alternative energy as follows:

<u>Purpose</u>	<u>Amount of Federal Authority (000s)</u>
Fuel Efficiency Improvements	\$ 597.0
Conservation	120.0
Wind Energy	470.0
Biomass	<u>4,100.0</u>
TOTAL	\$5,287 .0