Port Graham Woody Biomass Community Waste Heat Project

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For
Port Graham Tribal Council
U.S. of Energy Tribal Energy Program
Annual Tribal Energy Conference 2012
November 13-16, 2012

Mount Torbert
Beluga Lake
Susitna
Flat Horn Lake
Stephan Lake
Knik
Eklutna Lake
Baker 13,176 ft
Mount Spurr
Chakachamna Lake
Figure Eight Lake
Little Susitna
Bashful Peak
Eagle
Mount Goode
Anchorage
Fire Island
Campbell Lake
Mount Muir
Tyonek
Turnagain Arm
Chugach National Forest
Port Wells
Black Peak
Trading Bay
Hope
A L A S K A
Whittier
Peak
Clark
l Park
eserve
Nikiski
Salamatof
Prince Willia
Chugach State Park
Sterling
Cooper Landing
Moose Pass
Kalgin Island
Kenai
Soldotna
Skilak Lake
Cohoe
Kasilof
Clam Gulch
Kenai National Wildlife
Cook Inlet
Tustumena Lake
Ninilchik
Happy Valley
Fox
Anchor Point
Anchor
Kachemak City
Homer
Halibut Cove
Teeworm Peak
Storm Mou
Mount Diabl
3501 ft
Seldovia
Nanwalek
Port Graham
Nuka Bay
Chugach Islands
P a c i f i c O c e a n

Port Graham, Alaska

- Approximately 134 people
- Annual fuel consumption 53,100 gallons diesel fuel for heat
- Annual electrical usage 1,340,000 kWh/yr

Funding Agencies

- US Department of Energy Tribal Energy Program (DOE/TEP)
  http://apps1.eere.energy.gov/tribalenergy/

- Alaska Energy Authority (AEA)
  http://www.akenergyauthority.org/

4-Steps to Project Development

- Step 1 — Developing an Energy Strategy
- Step 2 — Developing a Feasibility Study
- Step 3 — Planning, Designing, Permitting, Purchase Agreements
- Step 4 — Shovel Ready Development and Testing

Strategic Plans

- Integrated Resource Management Plans
- Phase I November 2006
- Phase II October 2009
- Port Graham Corporation Forest Stewardship Plan

Why

- Heating cost is approximately $6.00 gallon for fuel oil.

Where

Possible Heating Pipe Line for Port Graham Garn boiler phase 1

What

When

Feasibility Studies

- DoE Tribal Energy Program Port Graham Woody Biomass Feasibility Study July 2007
- Internal CHP Feasibility Study 2009
- Internal GARN Boiler Feasibility Study 2010

Wood Combustion Scenarios

A. Wood Furnaces/Boilers	*Feedstock: Logs, wood chips, or pellets*
1. Indoor Wood Boilers	Individual homes' and village buildings' heat
2. Small Outdoor Wood Furnaces	Individual homes' and village buildings' heat
3. Moderate Outdoor Wood Furnaces	Multiple (3–4) homes' and village buildings' heat
B. Automated Combustion System	*Feedstock: Wood chips*
1. Moderate Combustion System	Village buildings' heat and cannery steam
2. Large-Scale Combustion System	Entire village, i.e., homes and village buildings' heat and cannery steam

EERC Table I. Wood Combustion Scenarios

Feedstock Costs

Feedstock	Heating Value	Price/Cost	Per MMBtu
Diesel	130,000 Btu/gal	$6.00/gal	$46.00
Wood, dry	8100 Btu/lb	$60/ton	$4.20
Logs, 12% moisture	7100 Btu/lb		
Chips, 12% moisture	7100 Btu/lb	$97/ton	$6.80
Pellets, 5% moisture	7700 Btu/lb	$240/ton	$15.00
Fish Oil	120,000 Btu/gal	$1.00/gal	$8.50

EERC Table 3. Feedstock Costs

Politics

- Public opinion—local kind
- Local and private utility
- Public Utility Cooperatives
- State Regulatory Commission
- Federal Tax Credits and other support
- Carbon Credits
- Consultants and consulting firms and “other” experts

Step 3—Planning, Designing, Permitting, and Purchase Agreements

- Planning—an endless exercise
- Design—engineering design for technology and site design and fitting/ retro-fitting
- Permitting—meeting regulatory requirements and land-use agreements
- Purchase Agreements—who will buy your product and what formal agreements are needed to obtain your fuel source
- Funding your project, matching and down payments, and what is the Pay Back Period*

Step 3—Planning, Designing, Permitting, and Purchase Agreements

- Alaska Department of Environmental Conservation
- Alaska Department of Fish and Game
- Alaska Department of Natural Resources
- Regulatory Commission of Alaska
- US Army Corp of Engineers
- US Bureau of Land Management
- US Coast Guard
- US Environmental Protection Agency
- Federal Aviation Administration
- Federal Energy Regulatory Commission
- US Forest Service
- US Fish and Wildlife Service
- And Others

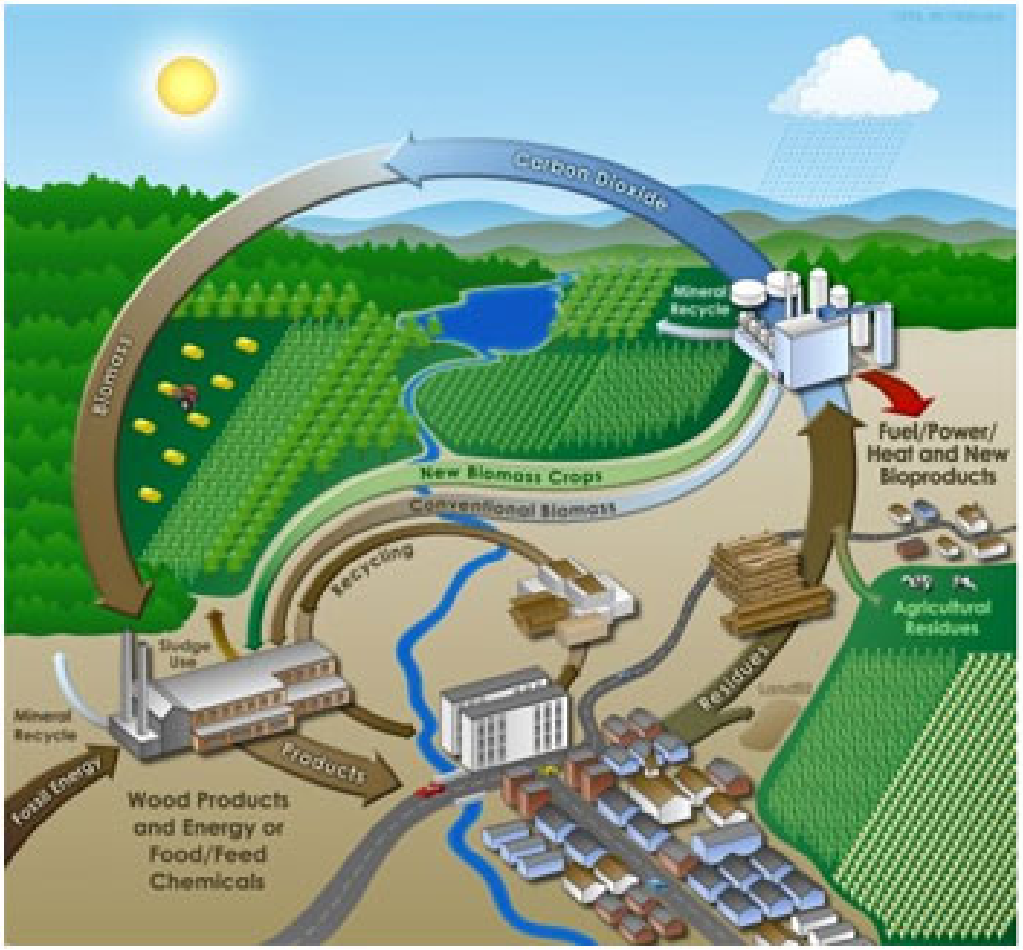
Step 3—Planning, Designing, Permitting, and Purchase Agreements

- Long-term agreements
- Everybody wants to make money
- Everybody wants free energy
- Cost and collection
- What does the forest look like?

Step 4—Next Steps
Shovel Ready Project and Testing

- Now you can build
- Who manages the project?
- Who does the construction?
- Who does the testing?
- Who operates and sustains the project?
- Who collects the fees, operates, and manages the technology?

Questions


Carbon Dioxide
Biomass
Mineral Recycle
Fuel/Power/ Heat and New Bioproducts
New Biomass Crops
Conventional Biomass
Recycling
Agricultural Residues
Sludge Use
Mineral Recycle
Fossil Energy
Products
Residues
Wood Products and Energy or Food/Feed Chemicals