2-05-09 Overview: Biomass Energy in Alaska

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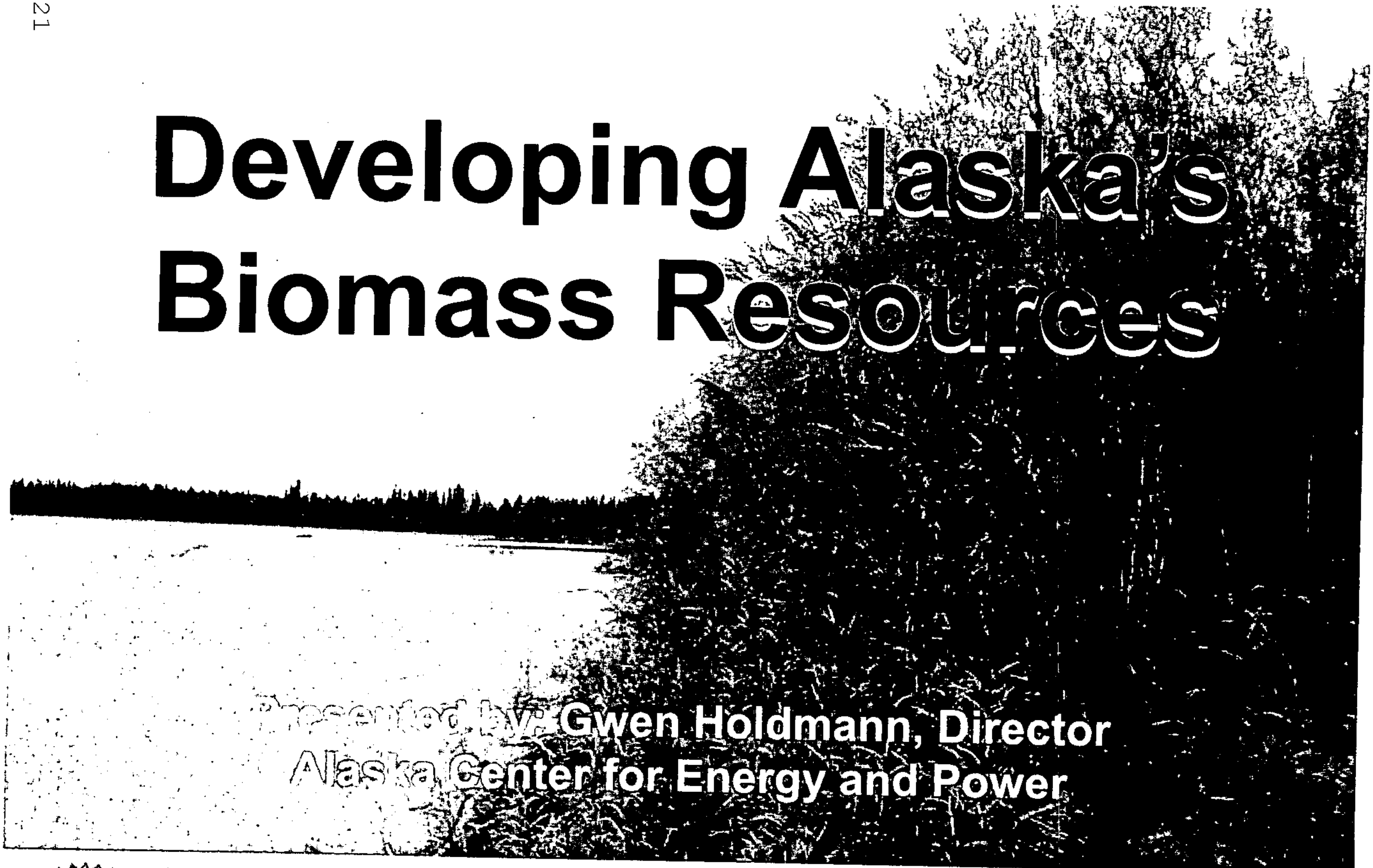
Developing Alaska's Biomass Resources



Presented by: Gwen Holdmann, Director
Alaska Center for Energy and Power

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Fostering innovative solutions to Alaska's energy challenges through applied energy research at the University of Alaska

Biomass Resources

- Harvested timber (round logs)
- Residue and waste from sawmills
- Fish oil
- Municipal waste
- Energy crops
- Algae
- Methane

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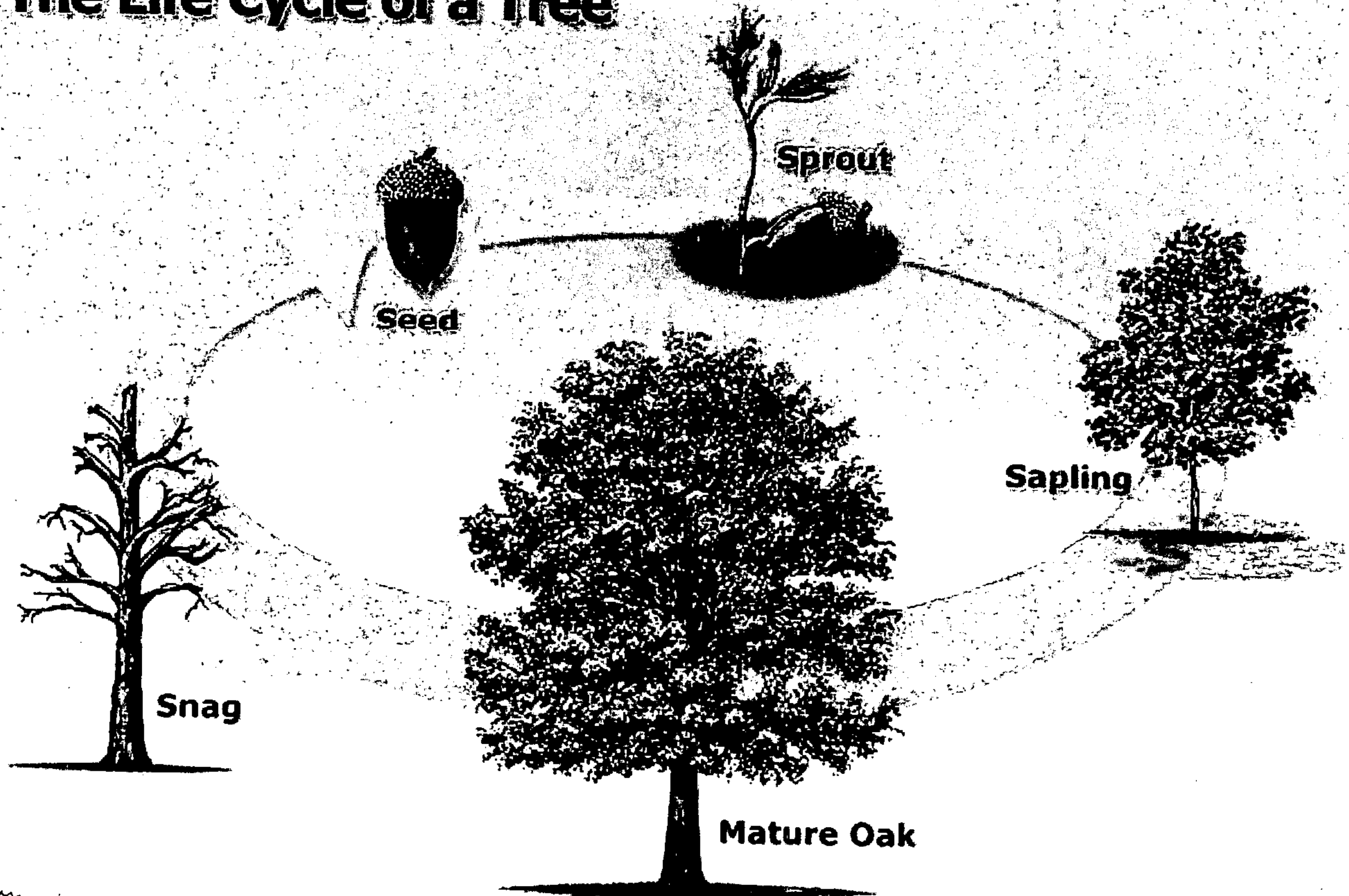
The Life Cycle of a Tree



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Northern Commercial woodpile in Fairbanks
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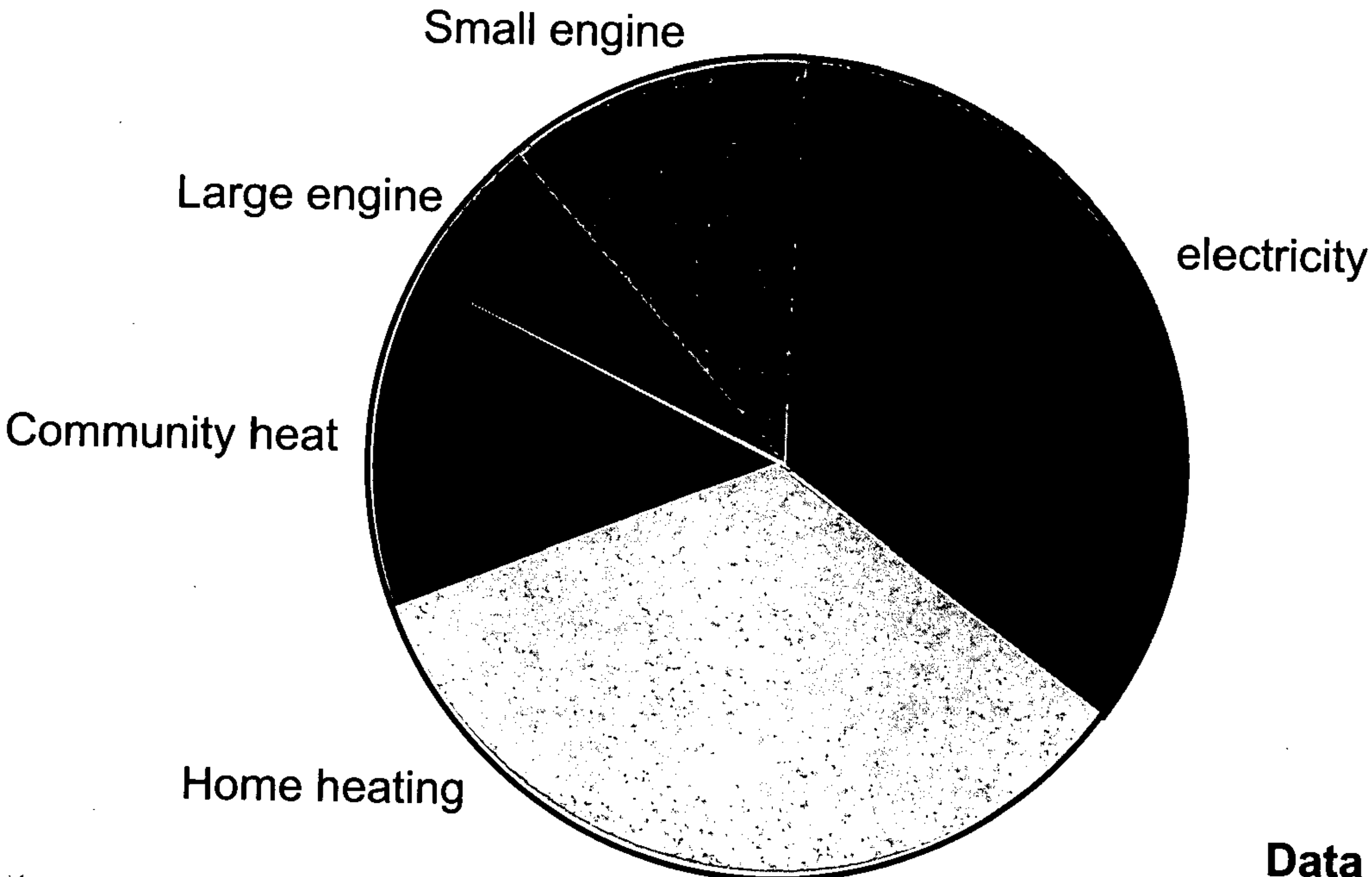
Advantages of Biomass

- Can supply on demand, base load power
- Available year-round with storage
- Carbon neutral
- Can be processed into a syngas or liquid fuel
- Can be used for power generation, space heating, and transportation applications

Energy Input in PCE Communities



Data from ISER/UA

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Disadvantages of Biomass

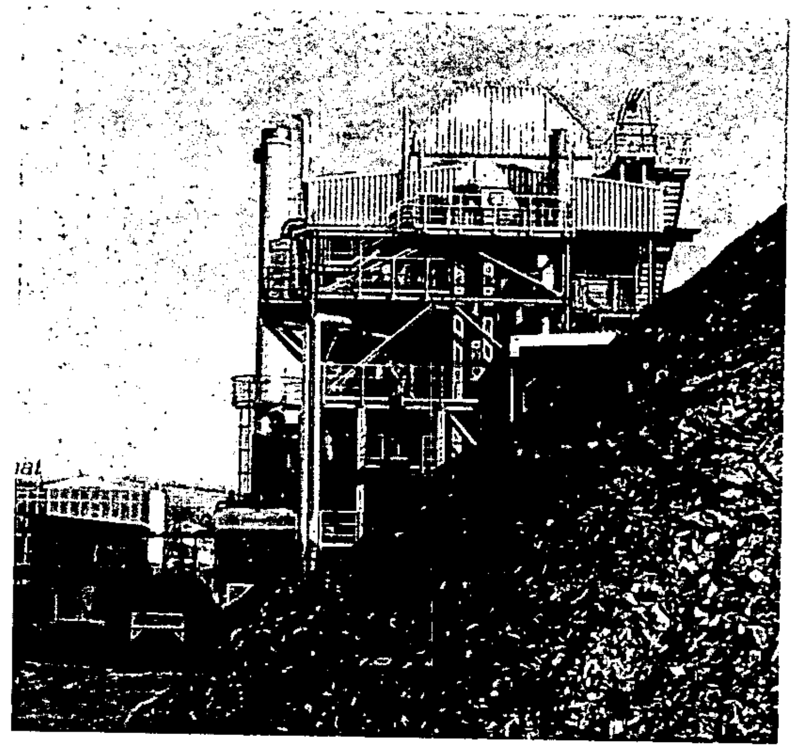
- Expensive to handle, low energy density
- Must be utilized near its source
- Labor intensive
- Bulky, storage can be a challenge

Biomass in the Lower 48

- The use of biomass has achieved widespread acceptance as a power source
- Typical technology is biomass-fired boilers and Rankine steam cycle for power generation
- Resource includes landfill gas, MSW, wood & wood residue
- EIA data indicate that in 2006, net summer capacity for biomass totaled 9,910 MW (~1% of total U.S. generating capacity)

Biomass use Worldwide

- Primary energy source for ½ of the world's population
- Europe is a leader in clean technologies
- A variety of generation technologies being utilized
- India also a leader



2 MW plant in Güssing, Austria

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Research Challenge

- Reduce capital costs
- Improve efficiency of energy conversion (the smaller the system, the inherently less efficient)
- Lower emissions
- Improve integration with existing generation systems

Gasification vs. Direct Combustion

- Incomplete versus complete combustion to form a syngas
- Gasification can be more efficient than direct combustion
- Very little industrial scale gasification being done
- Main challenges are economic and integration with downstream processing applications, also difficult to achieve optimal performance for varying fuel conditions

Biomass as a crop

- It would require approximately 500 acres to grow a biomass crop to fuel a 500 kW generator, assuming production of 5 tons/acre/year
- Biomass crops are fast growing crops grown specifically for energy generation
- High cost of production relative to fossil fuels, but more of the money stays in the community
- Chicken and egg problem – what comes first, the crop or generation facility?

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Biomass as a crop

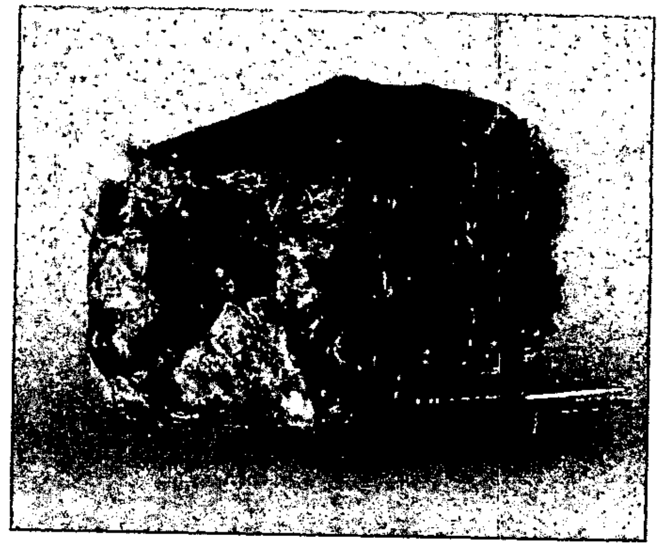
- It would require approximately 500 acres to grow a biomass crop to fuel a 500 kW generator, assuming production of 5 tons/acre/year

The Opportunity

- Alaskan rural communities represent a high value niche market for emerging technologies
- Alaskan villages could provide global leadership in rural biomass power systems
- There is a nitch market for small (100kW to 5MW) modular biomass power systems

Experience in Alaska

- Co-firing in coal power plants
- Phytoremidiation
- Revegetation
- Landfill caps
- Bioenergy crops

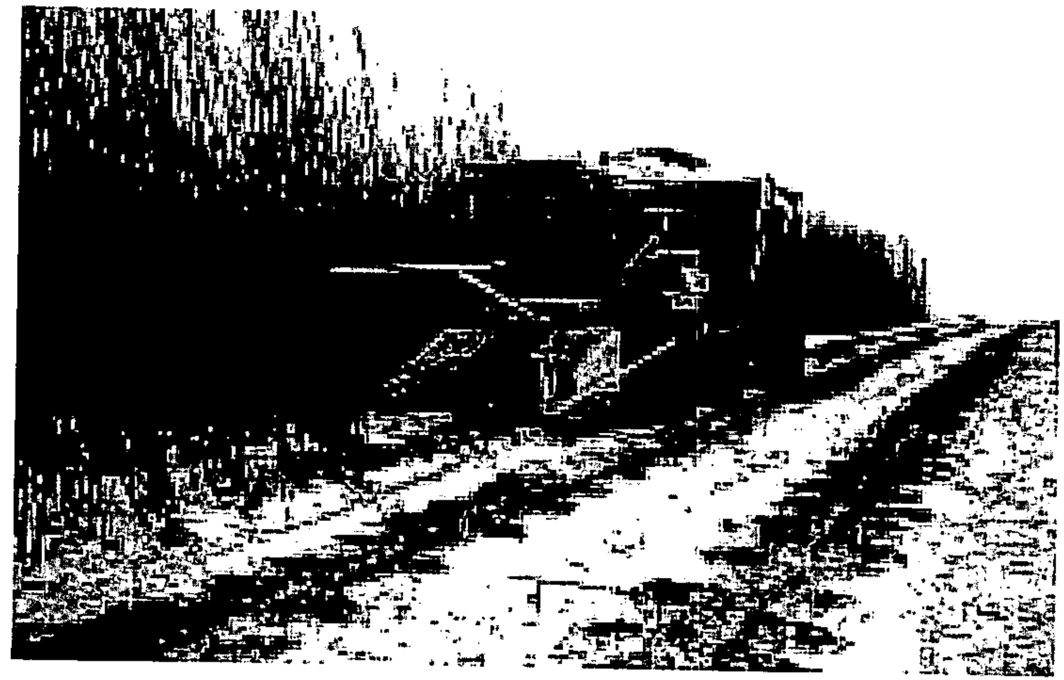


Eielson Recycling Program densified 1500 tons per year of waste paper and cardboard discontinued in 2006

Sweden's Experience in Willow Farming

- Started in 1970's
- Many analogies for Alaska (similar latitude)
- Controlled pollination, hybridization and cloning all are extensively used
- Fully mechanized from planting to harvesting
- Biomass is chipped onsite and stored or directly burned in CHP plants

SUNY's Experience in Willow Farming



New York University 500 acre willow biomass test plot. Crop is co-fired in nearby coal power plant

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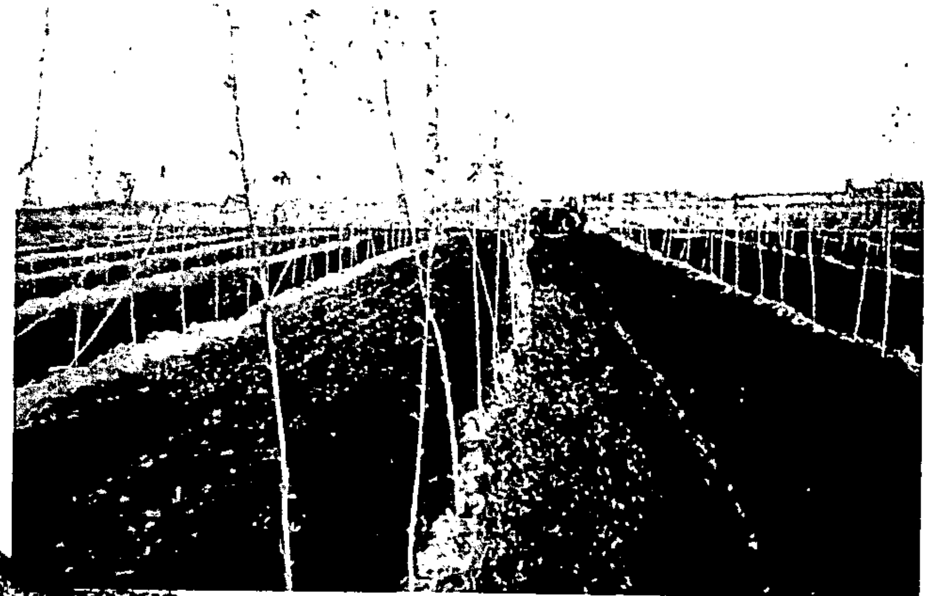
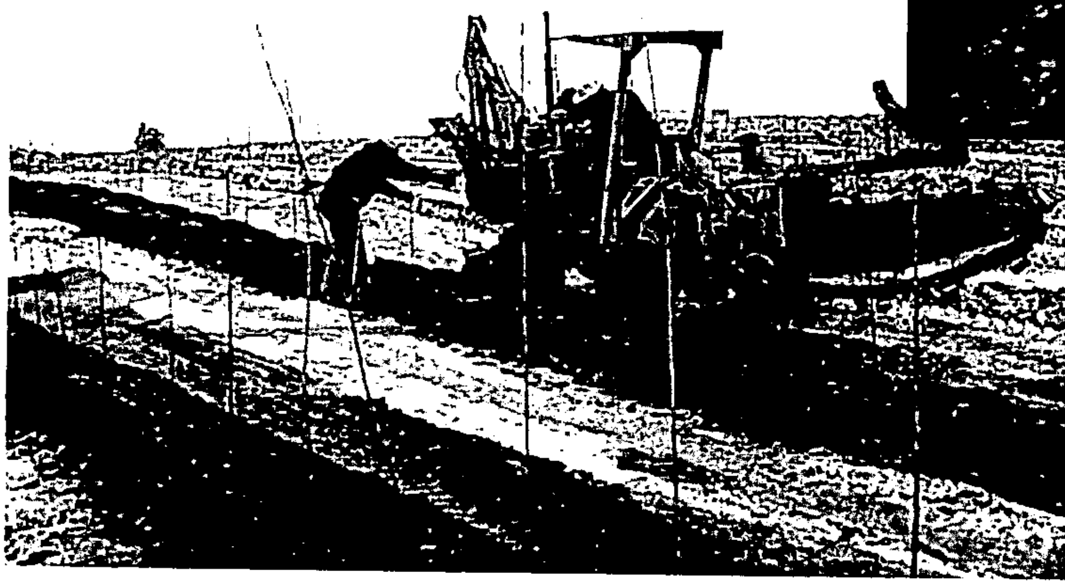
Phytoremediation

Used to treat urban wastewaters, landfill leachate, industrial wastewaters and sewage sludge



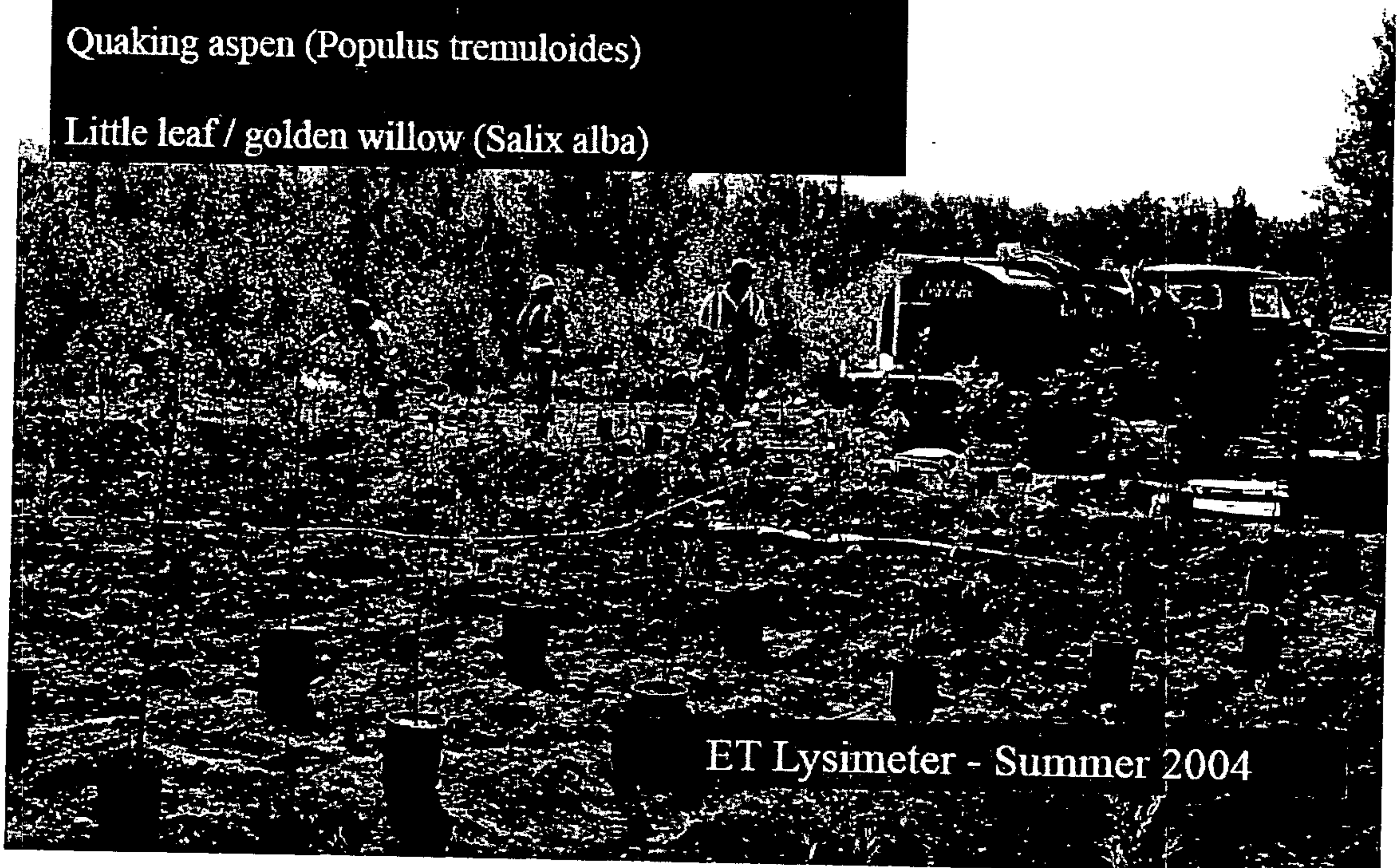


Institute of Northern Engineering

Planting:
Balsam poplar (Populus balsamifera)
Black cottonwood (Populus trichocarpa)

Quaking aspen (Populus tremuloides)

Little leaf / golden willow (Salix alba)



Fast growing grasses

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Woody Biomass

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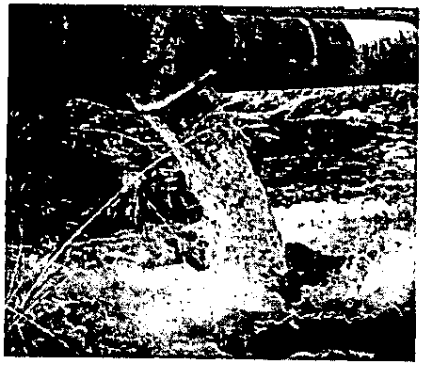

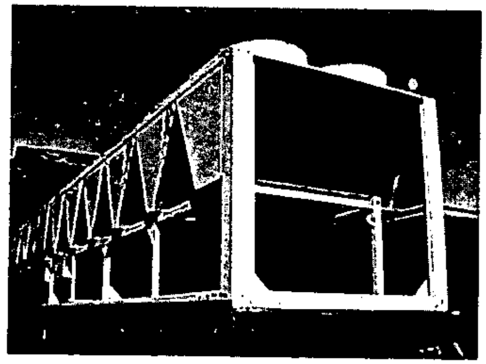

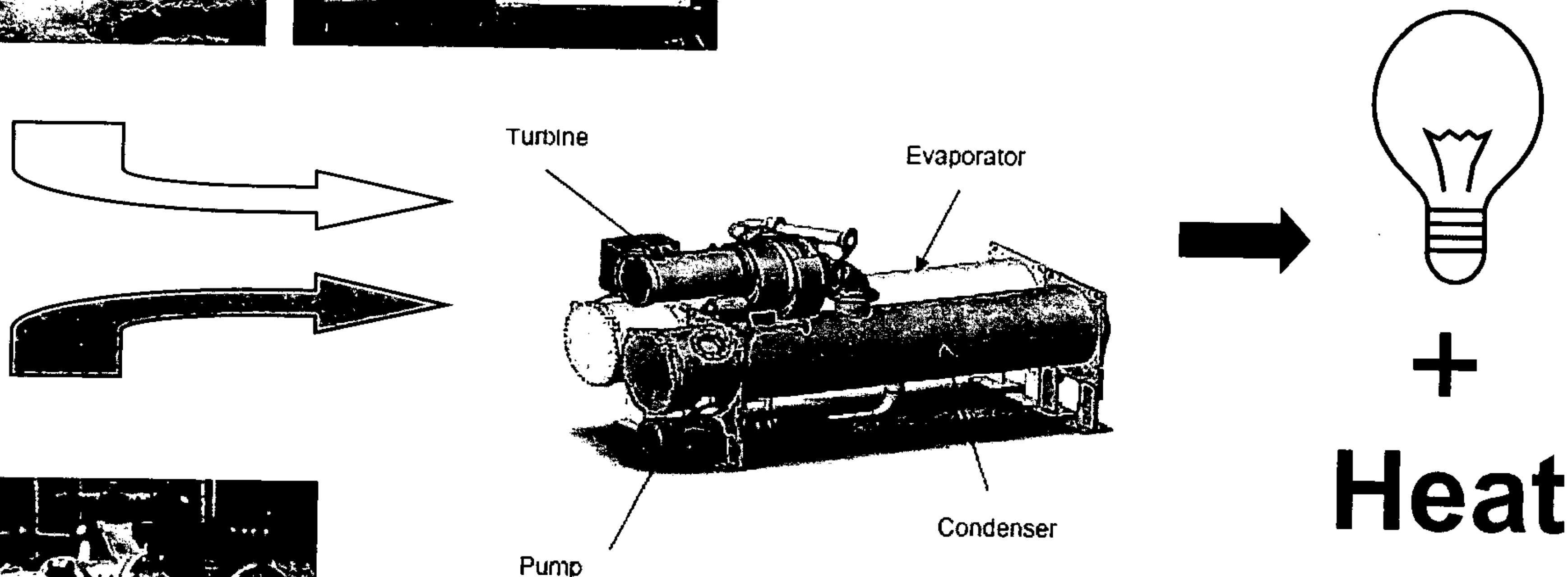

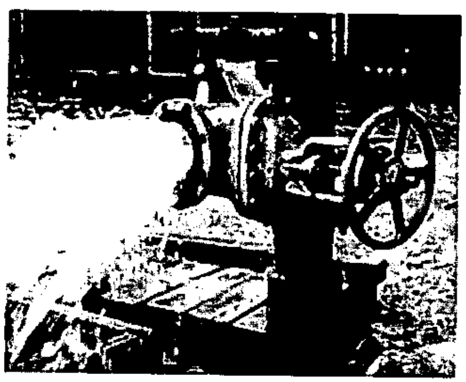

Chena Geothermal Powerplant
Organic Rankine Cycle (ORC) technology

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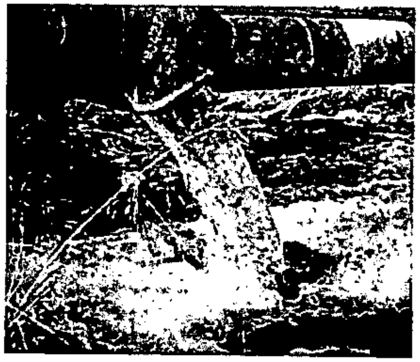

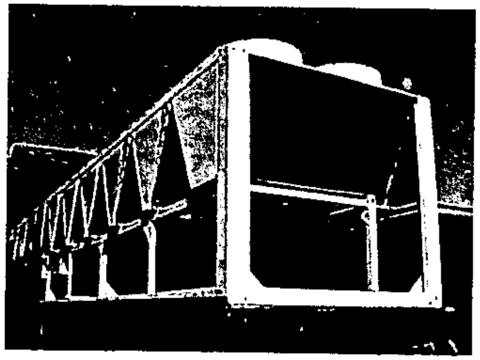

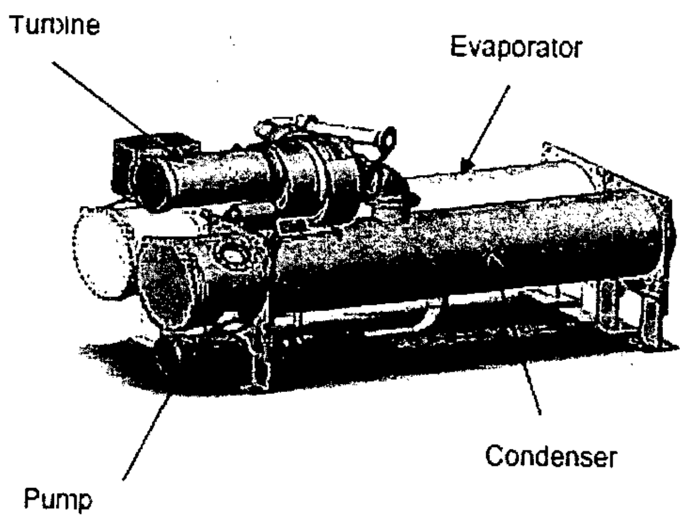

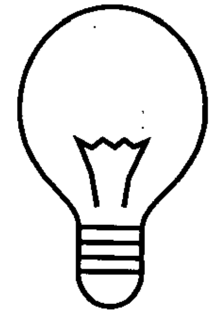

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Heat

Chena Geothermal Powerplant
Organic Rankine Cycle (ORC) technology

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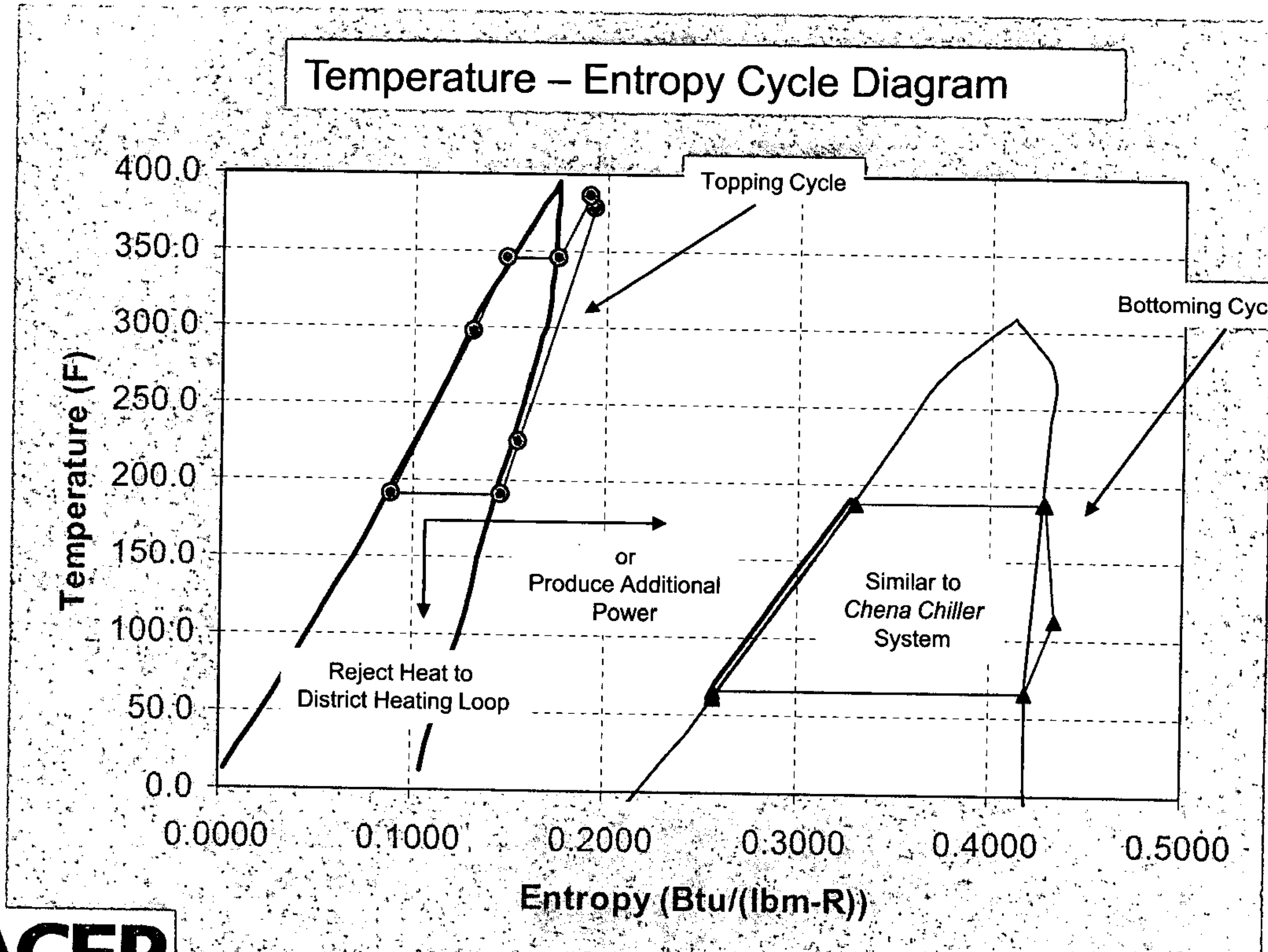
Topping cycle doubles efficiency to >20% and increases energy utilization to 80%



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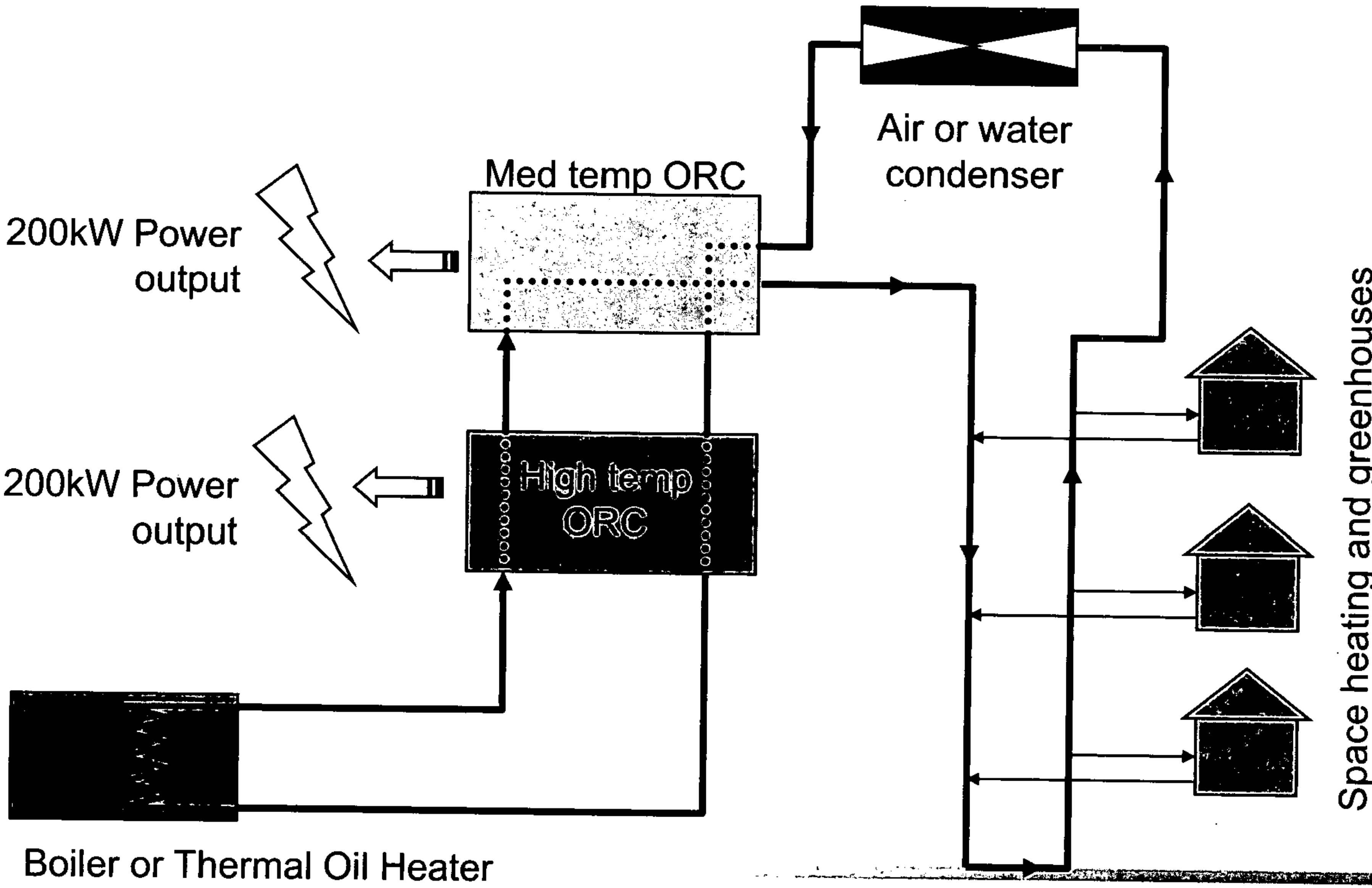
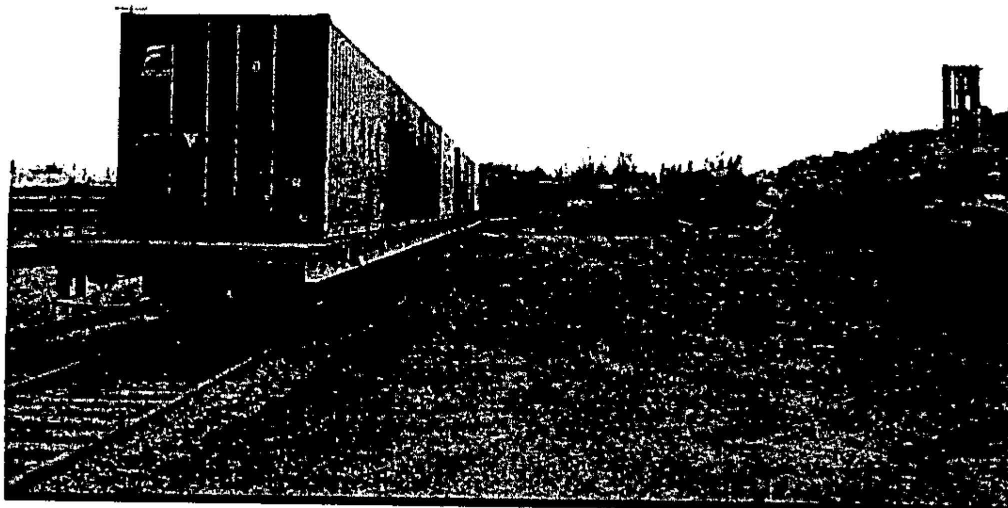
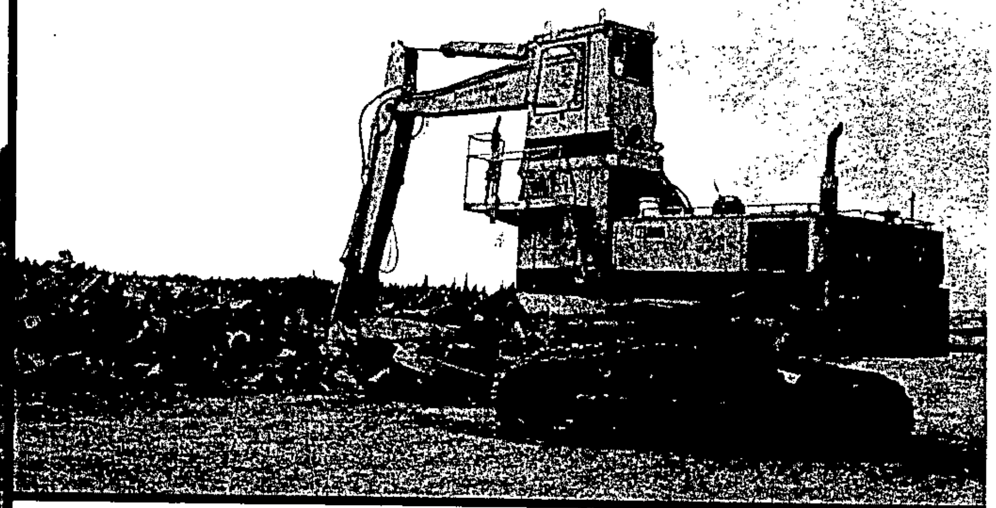
The Goal: Combined Heat and Power (CHP)



Demonstration Project at K&K Recycling





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Demonstration Project at K&K Recycling

- Located near North Pole
- 400kW gross, 300kW net output
- Fuel is 5000 tons of paper, cardboard and brush supplemented with farmed willow (future)
- Designed for rural village application – thermal oil boiler, load following
- Estimated cost to generate power is 6.4¢ per kWhr
- Co-located with heat load (space heating, greenhouses)

www.uaf.edu/acep

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ACEP RESEARCH MISSION: To meet state and local need for applied energy research by working towards developing, refining, demonstrating, and ultimately helping commercialize marketable technologies that provide practical solutions to real-world problems.

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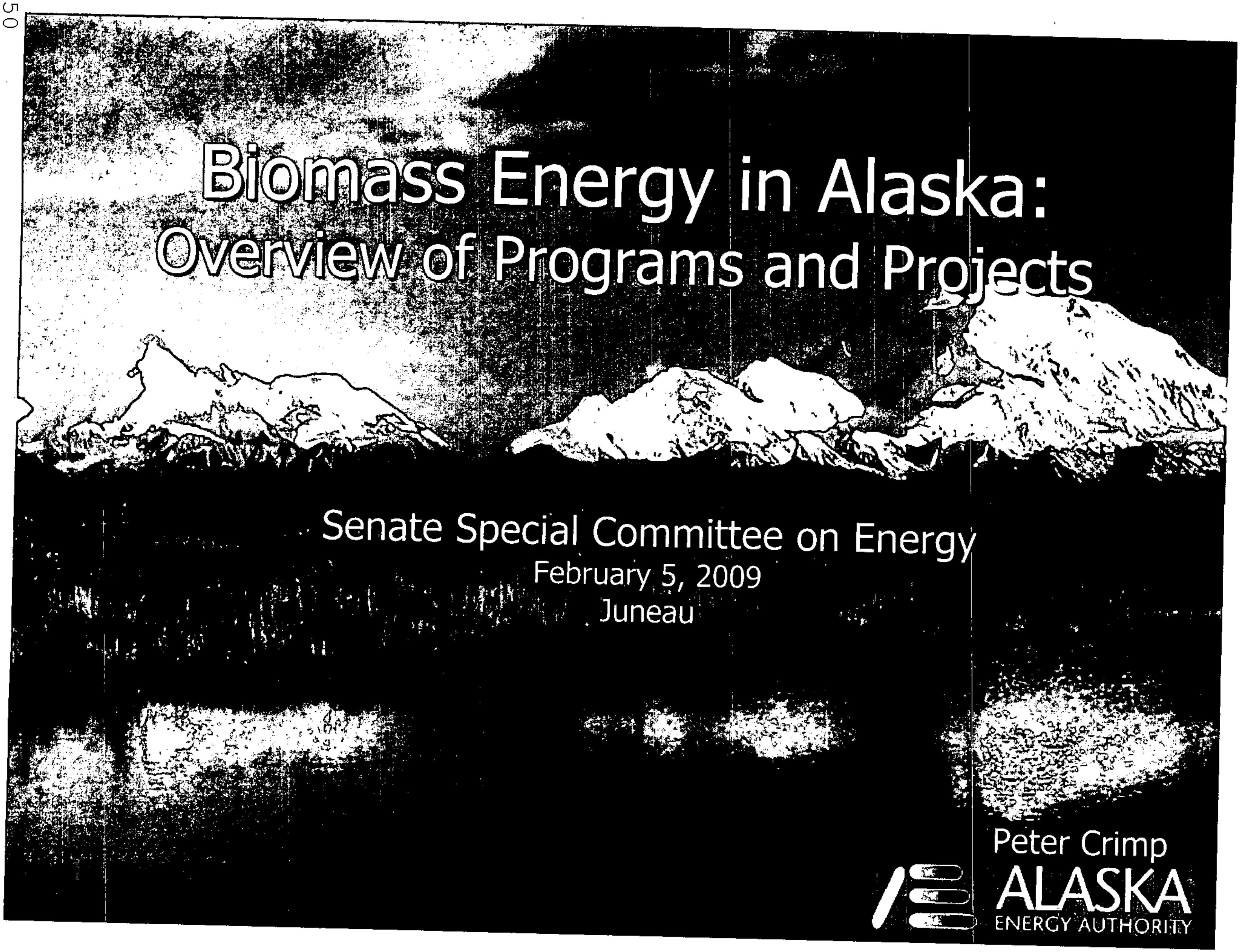


Biomass Energy in Alaska:
Overview of Programs and Projects
Senate Special Committee on Energy
February 5, 2009
Juneau
Peter Crimp
ALASKA
ENERGY AUTHORITY

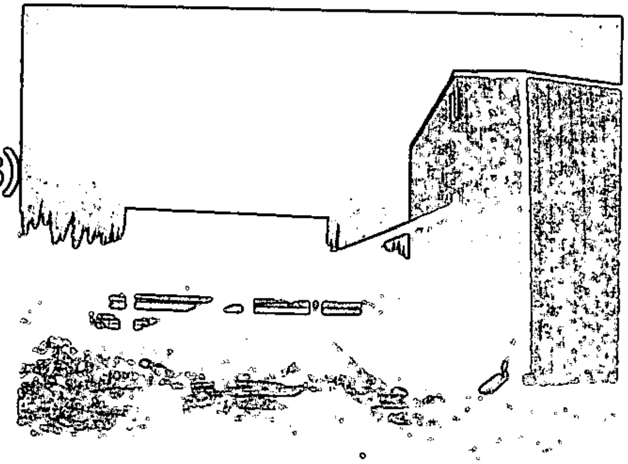
Alaska Energy Authority

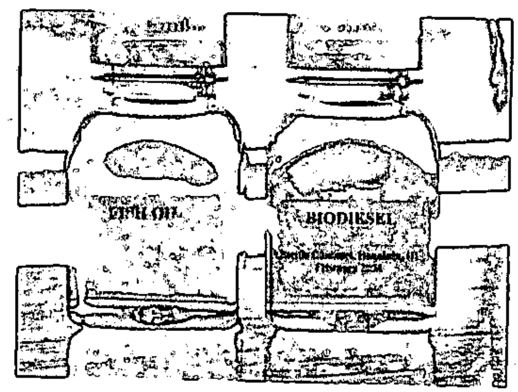
- Public corporation with Alaska Industrial Development and Export Authority
- Infrastructure Owner: Anchorage-Fairbanks Intertie, Bradley Lake Hydro, Healy Clean Coal Plant
- Rural Energy Group: Tank farm and power system construction
- Alternative energy

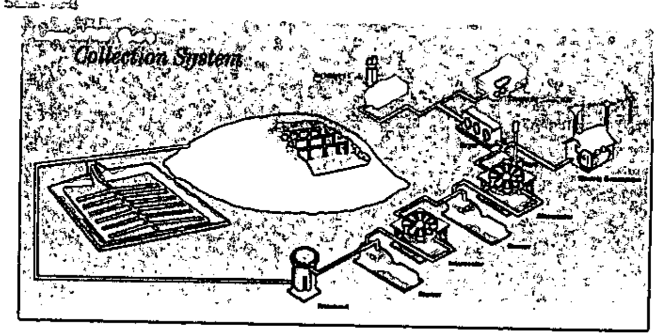
Biomass

- <u>Wood Energy Program</u>:
  - Alaska Wood Energy Dev Task Group (45 locations)
  - Craig District Heating project
- <u>Fish Oil Biodiesel Program</u>:
  - Engine and handling tests at UAF and NPS
  - Develop fish oil rendering module
- <u>Municipal Waste</u>:
  - Anchorage Landfill Gas feasibility analysis
- <u>AEA Program Managers</u>:

Ron Brown (wood, waste) RBrown@aidea.org
James Jensen (biofuels) JJensen@aidea.org







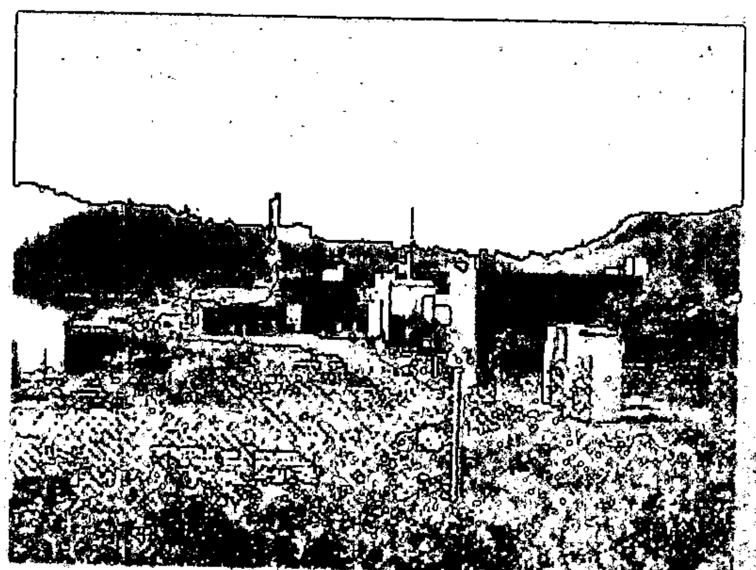
ALASKA

Wood—the old standby

Photo : UAF Archives

Northern Commercial, Fairbanks

Alaska Pulp Co., Sitka 25 MW

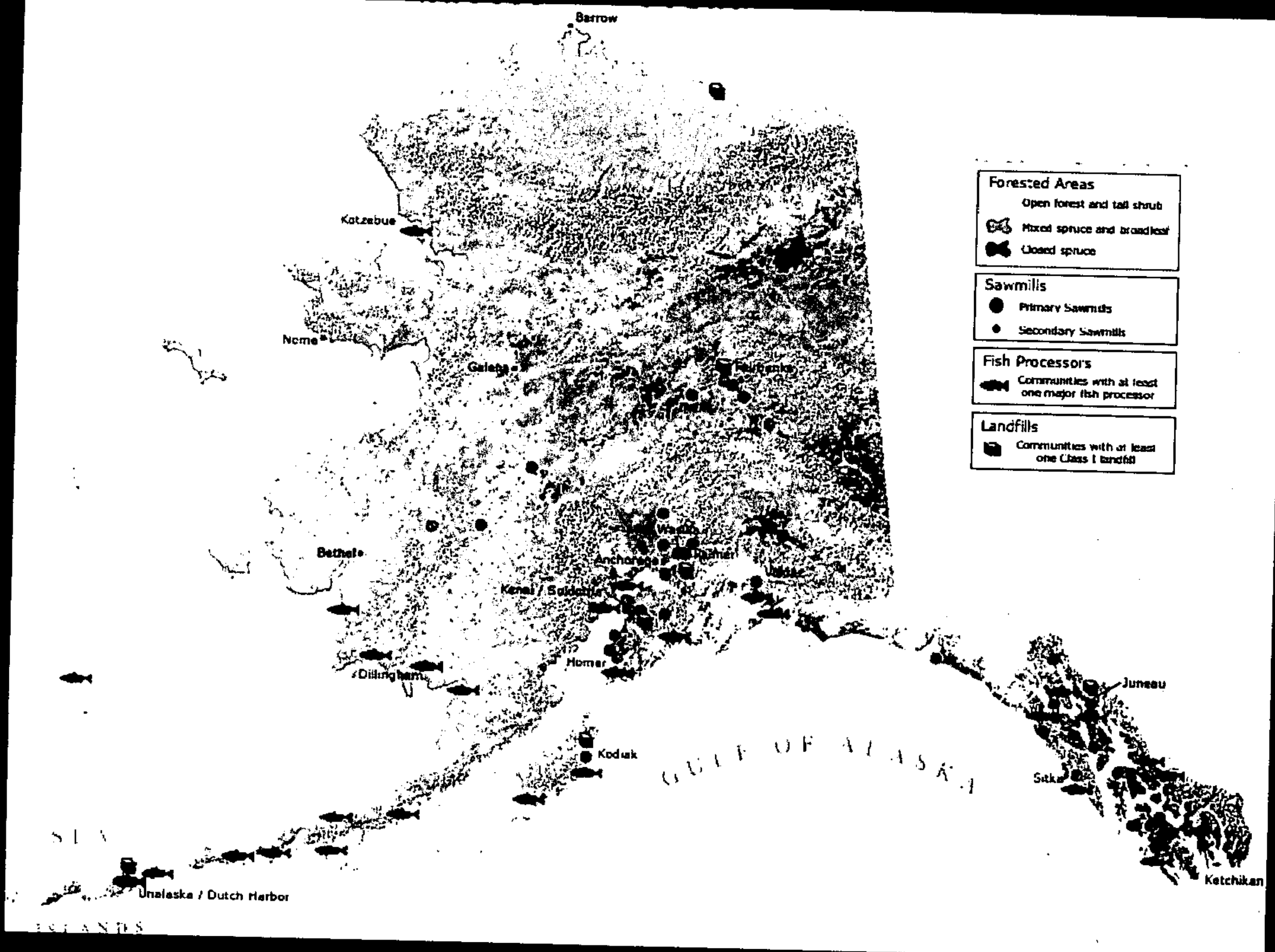


Ketchikan Pulp Co., 38 MW

What I'll Talk About

- Supply of resource vs demand
- Energy conversion options in Alaska—focus on community systems
- Economic considerations
- Current projects in development

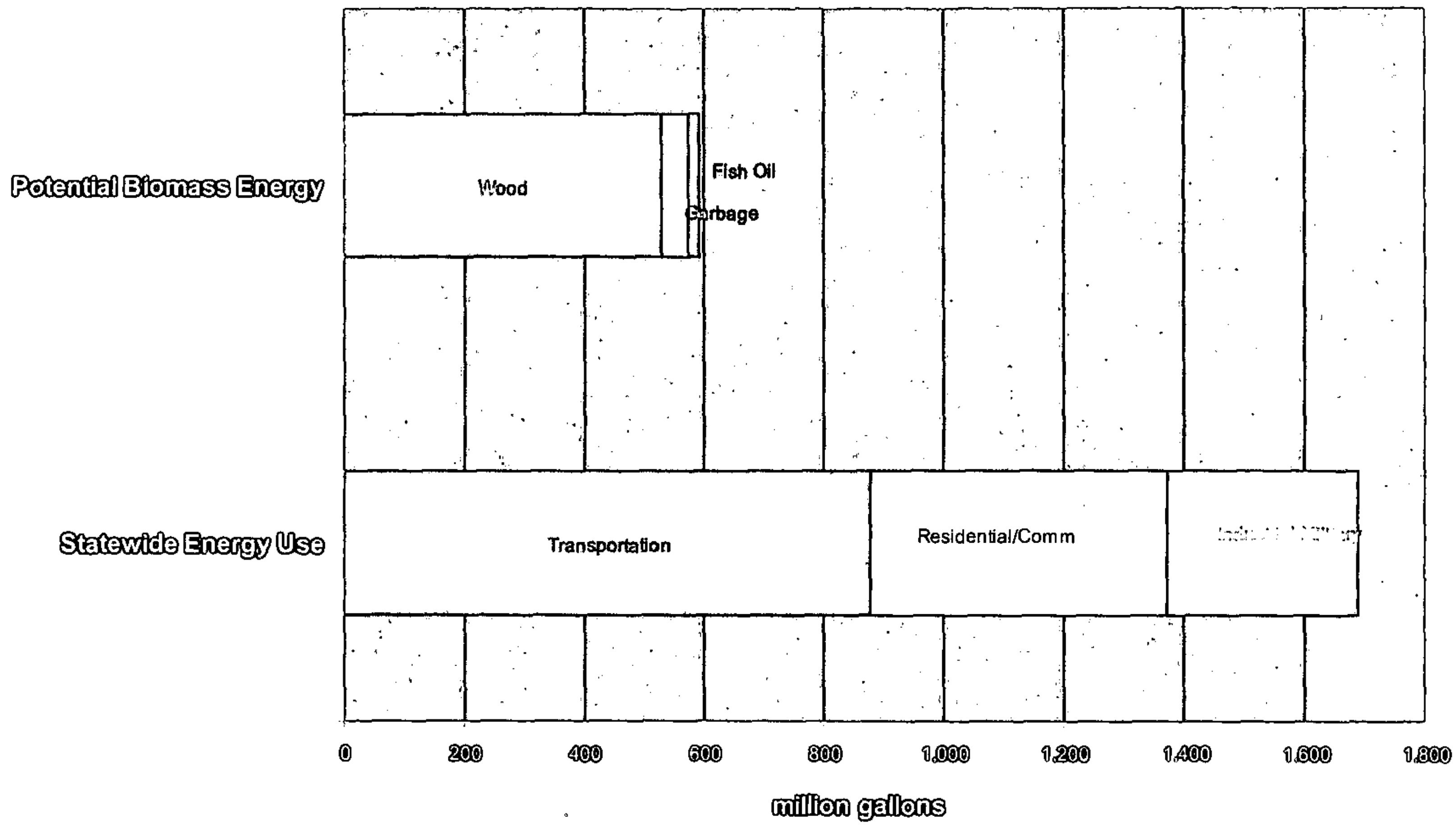
Alaska Biomass Energy Resources



Wood Biomass

- 100,000 cords used for heating annually
- Alaska has enormous wood resources
  - 18,500 sq miles of available, productive forest
  - Can grow 3.5 million cords of wood per year
- Forest Benefits
  - Forest fuels removal to reduce wildfire risk
    - Use trees killed by spruce bark beetle
  - Wildlife habitat enhancement

Potential Biomass Energy
vs
Actual Alaska Energy Use
(in diesel gallon equivalents)



Wood Energy Technologies

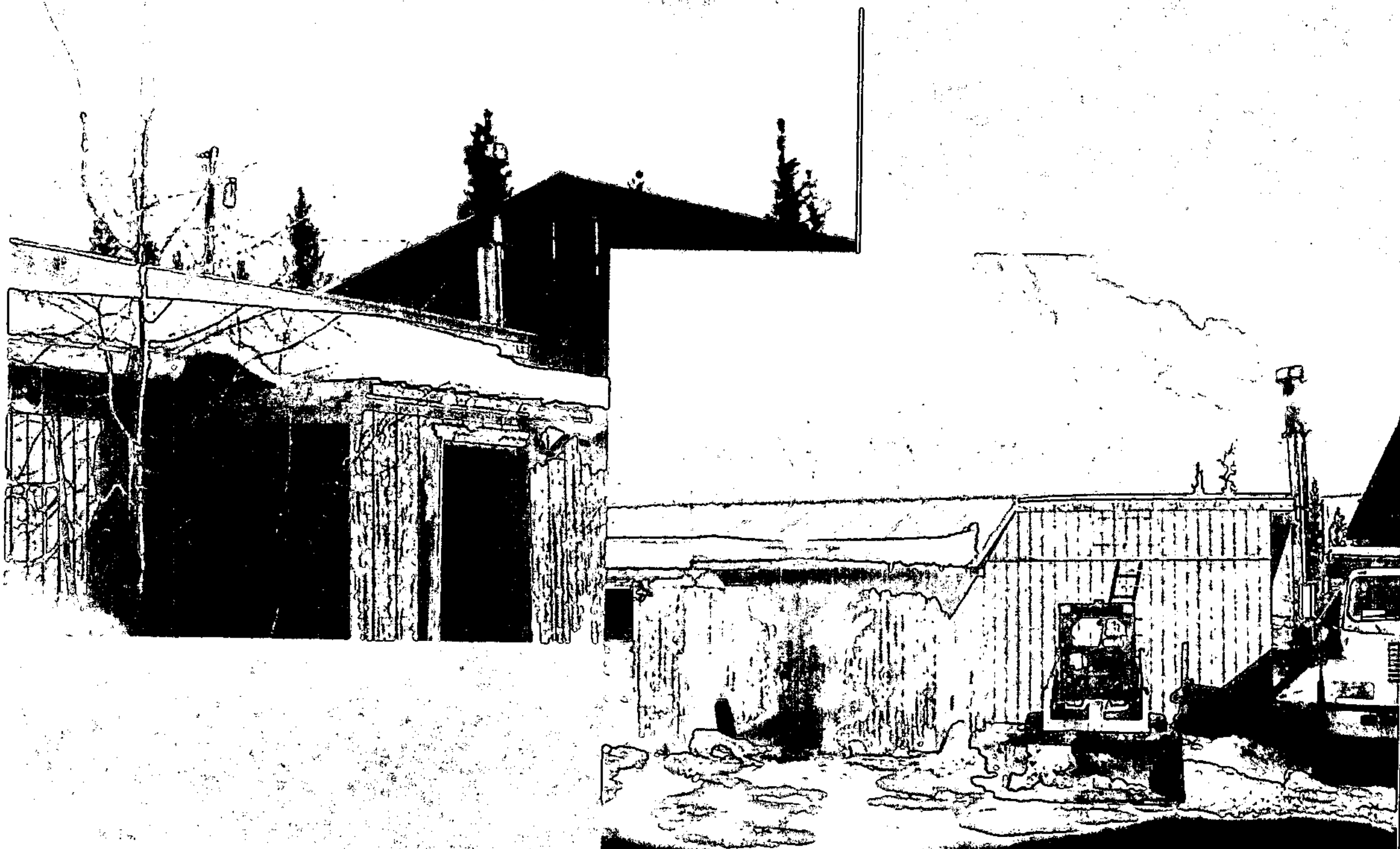
- Residential wood heating
- Stick-fired with thermal storage
- Pelletized wood fuel
- Chip/residuals boilers and heaters
- Gasification & pyrolysis
  - Producer gas
  - Liquid fuels

Considerations

- Air pollution
- Fuel supply—depletion, aesthetics, conflicts
- System reliability and complexity
- Economic feasibility
  - Heat and power buyers
  - Other alternatives

Burning wood wrong

Burning Wood Right

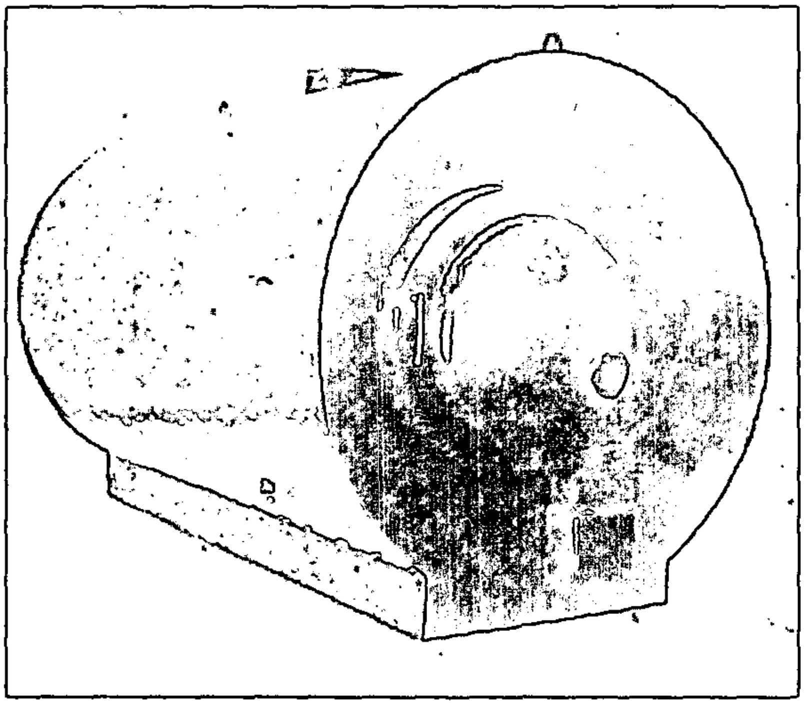


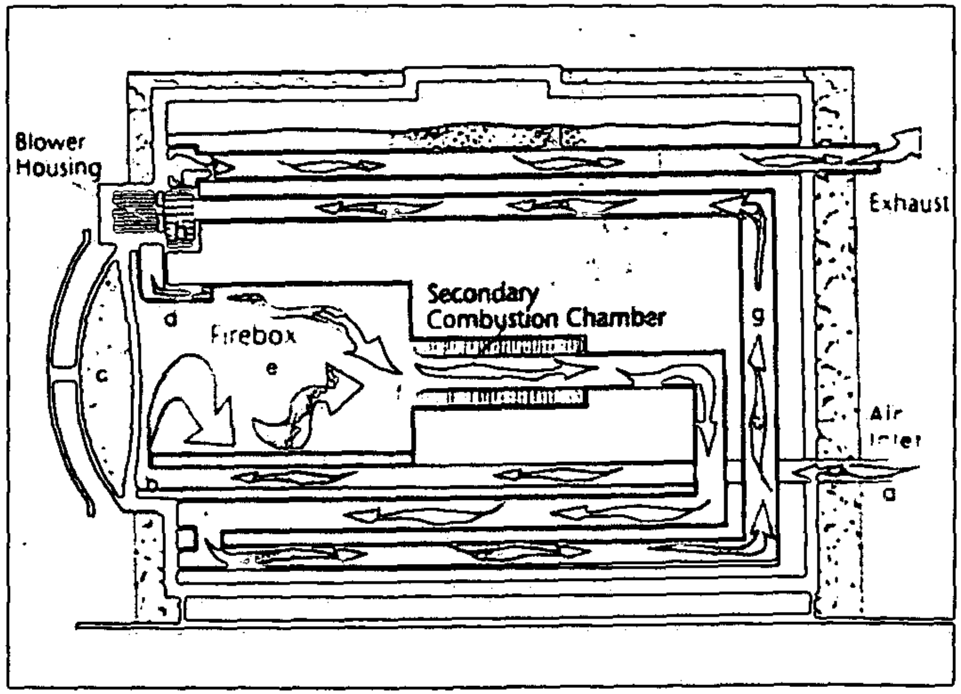
Wood-Fired Facility Heating

Economically feasible when

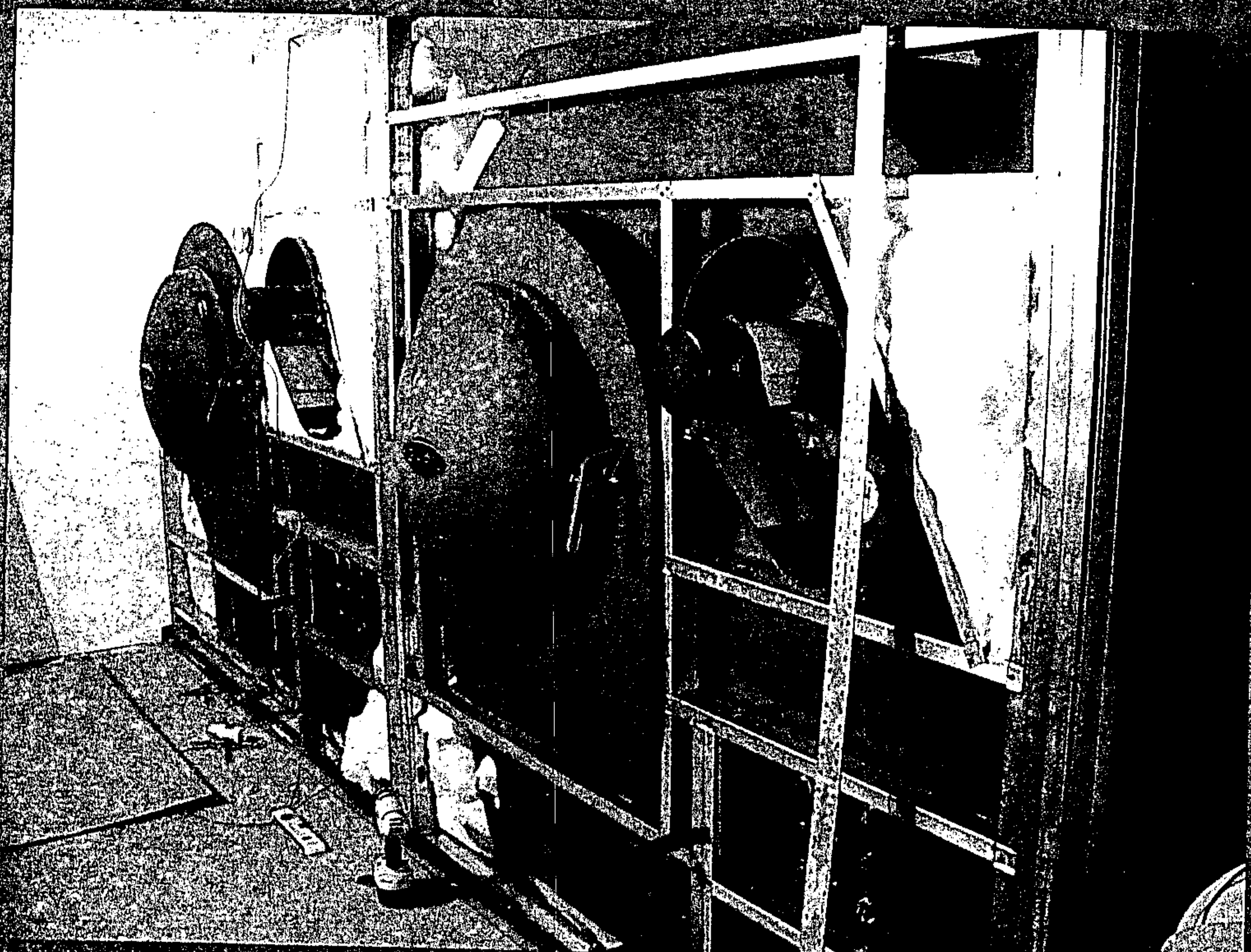
- Low to moderately priced fuel available
- Oil, propane, or electric energy displaced

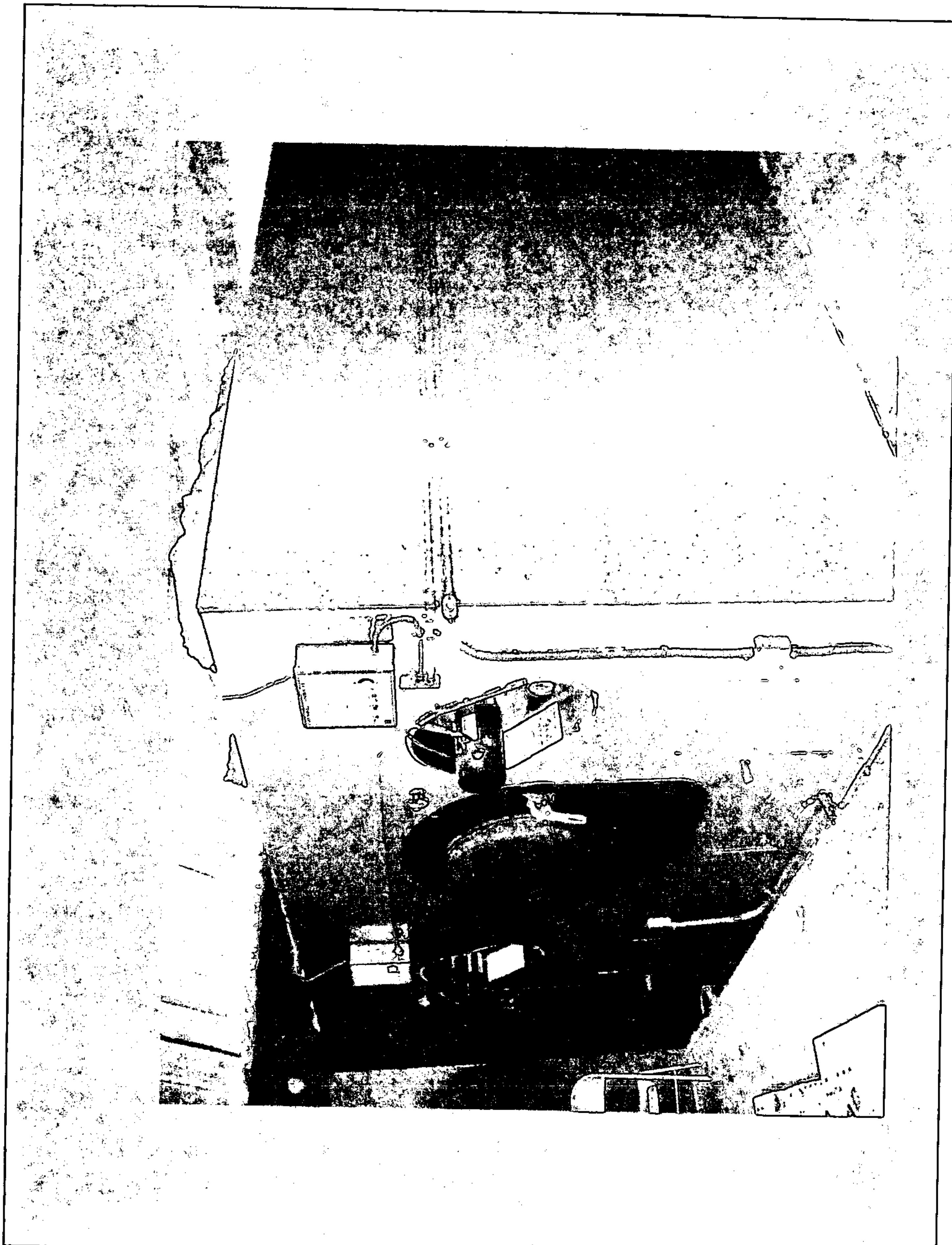
Cordwood Boiler System
(Garn—Dectra Corp)



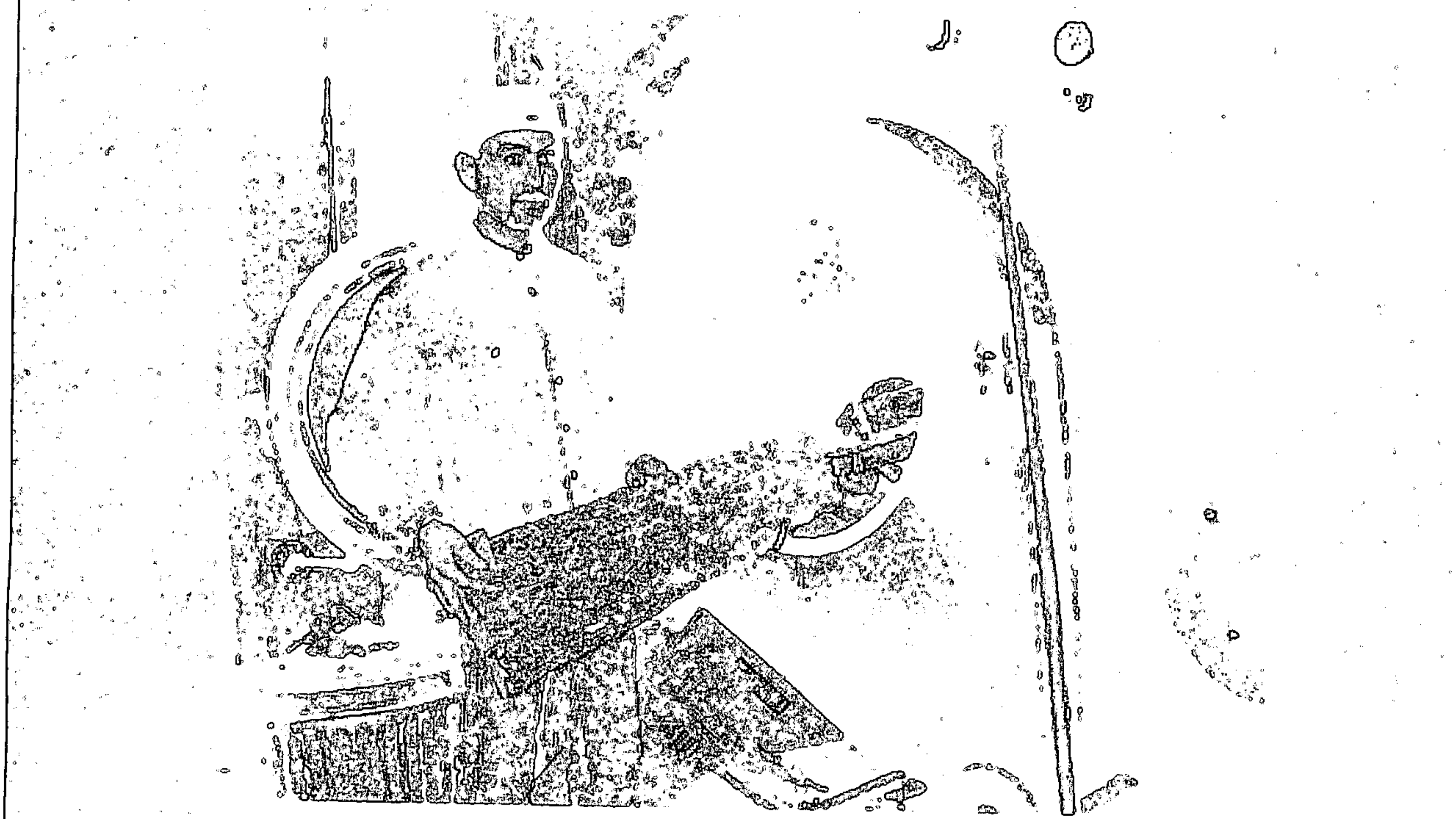


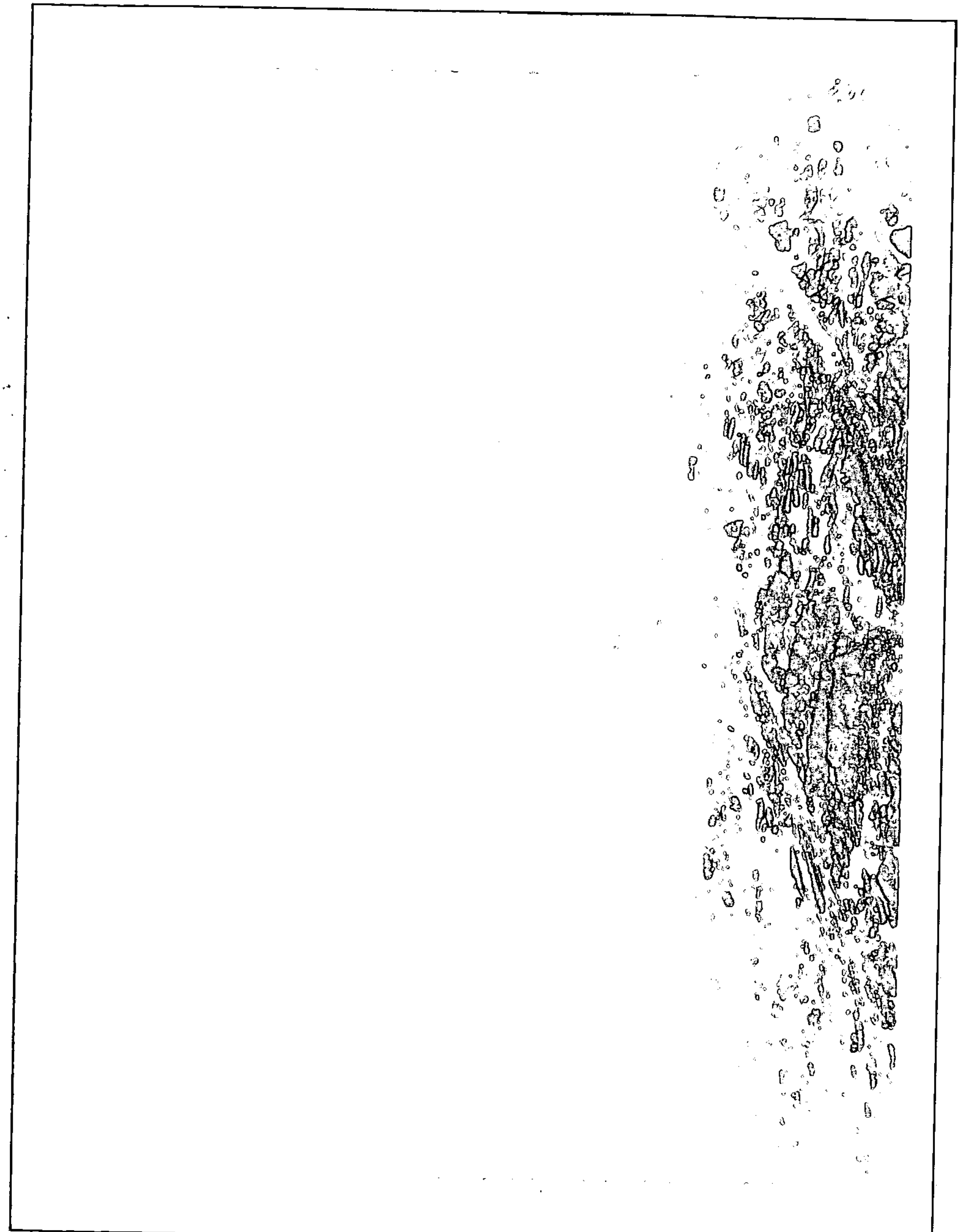
Tanana Installation (Fall 07)



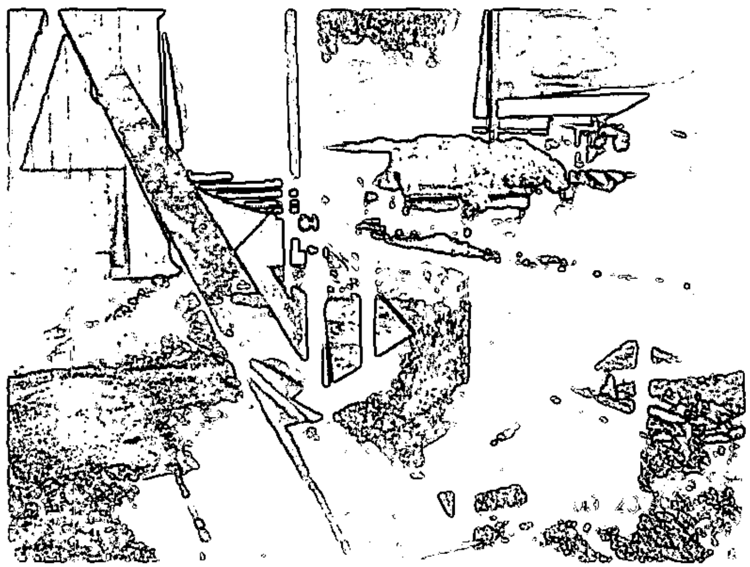
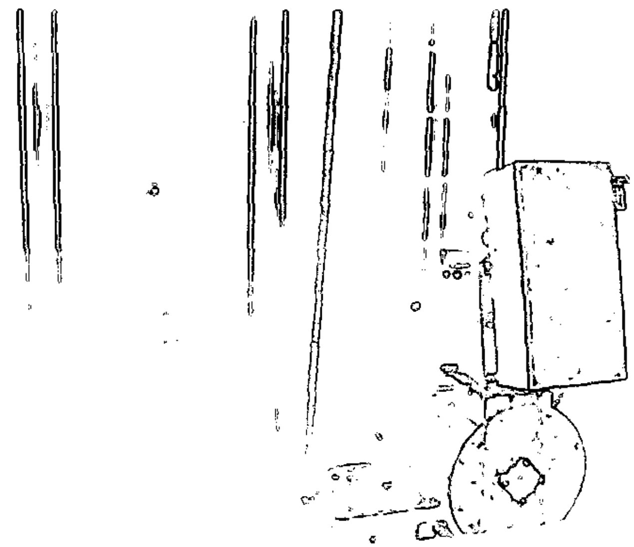


Dot Lake System Operation

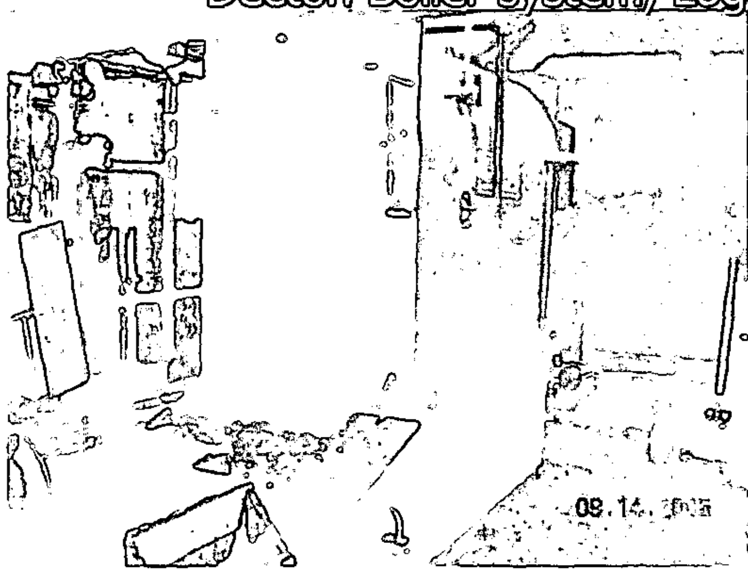
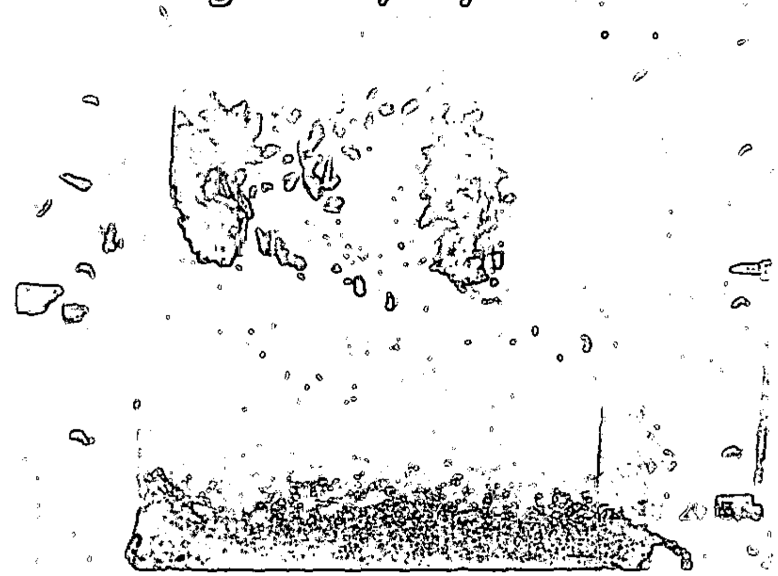




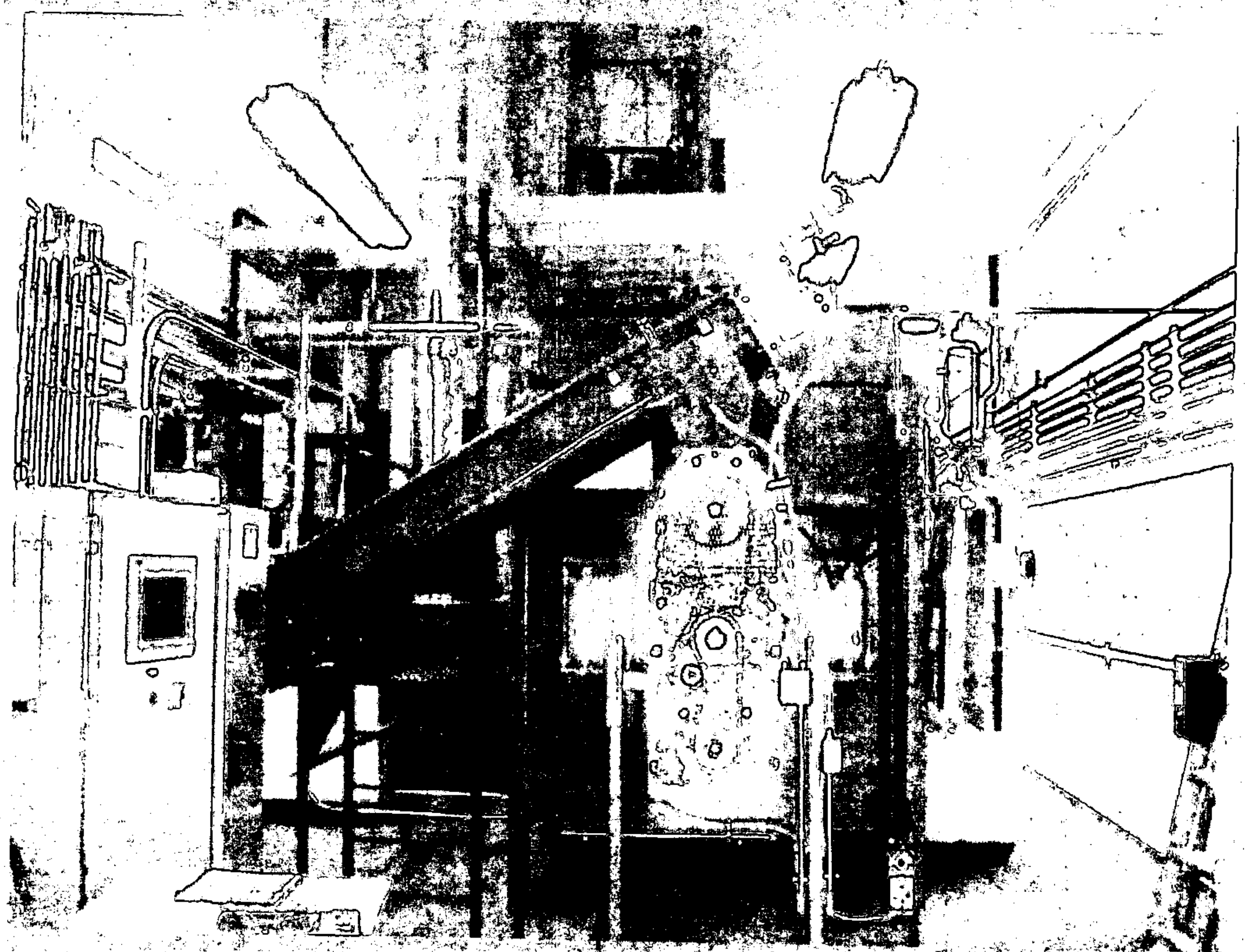
Chip-fired Facility Heating

Decton Boiler system, Logging and Milling Assoc., Dry Creek

Craig Community Heating System

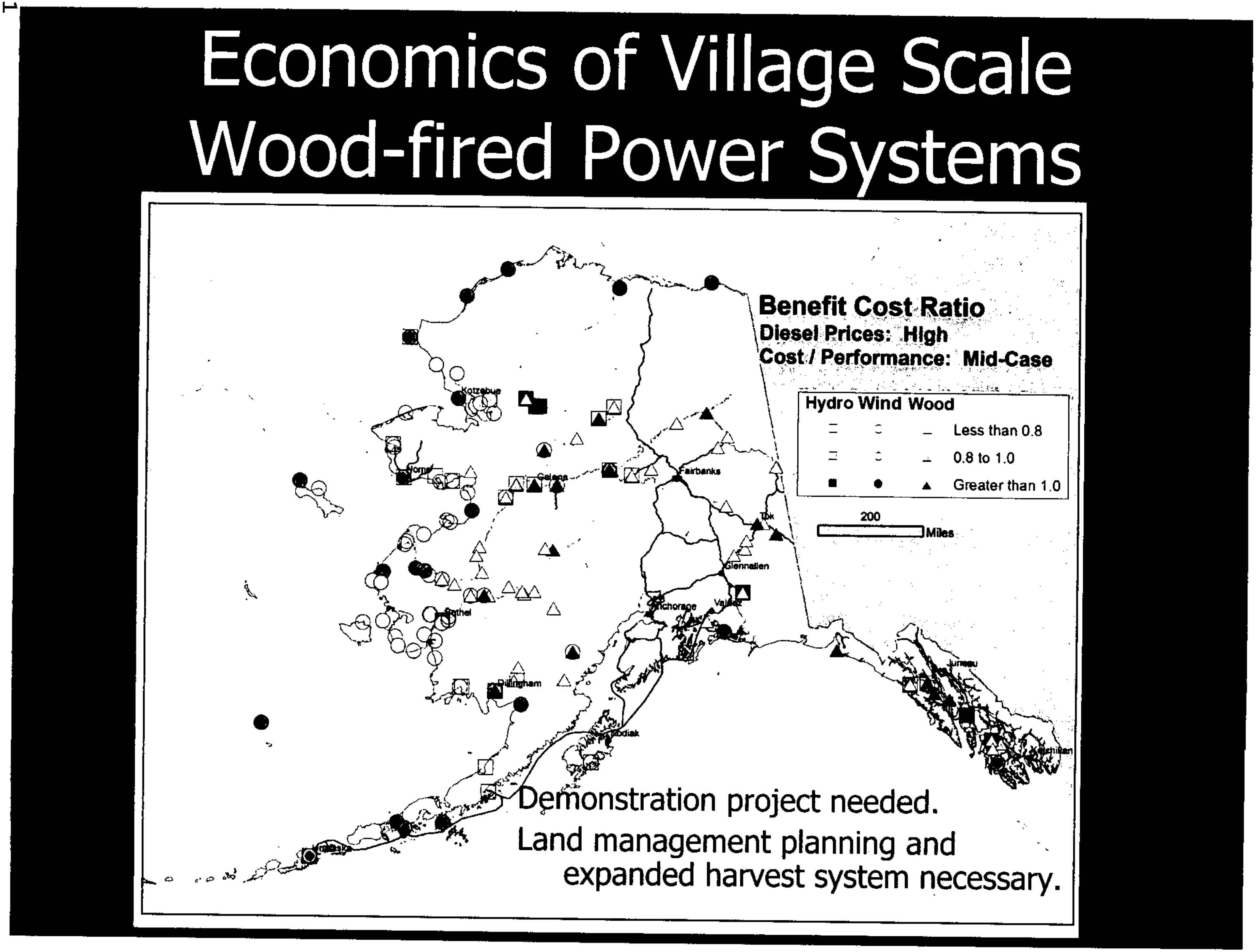


Wood-Fired Power

Currently economic when

- Plentiful-low cost fuel available
- Diesel power is displaced
- Large market for both power and heat

Few commercialized small systems suitable for village power.


Economics of Village Scale
Wood-fired Power Systems
Benefit Cost Ratio
Diesel Prices: High
Cost / Performance: Mid-Case
Hydro Wind Wood
Less than 0.8
0.8 to 1.0
Greater than 1.0
200
Miles
Kotzebue
Nome
Galena
Fairbanks
Tok
Glennallen
Anchorage
Valdez
Bethel
Dillingham
Kodiak
Juneau
Demonstration project needed.
Land management planning and
expanded harvest system necessary.

CPC BioMax 50 kW Unit

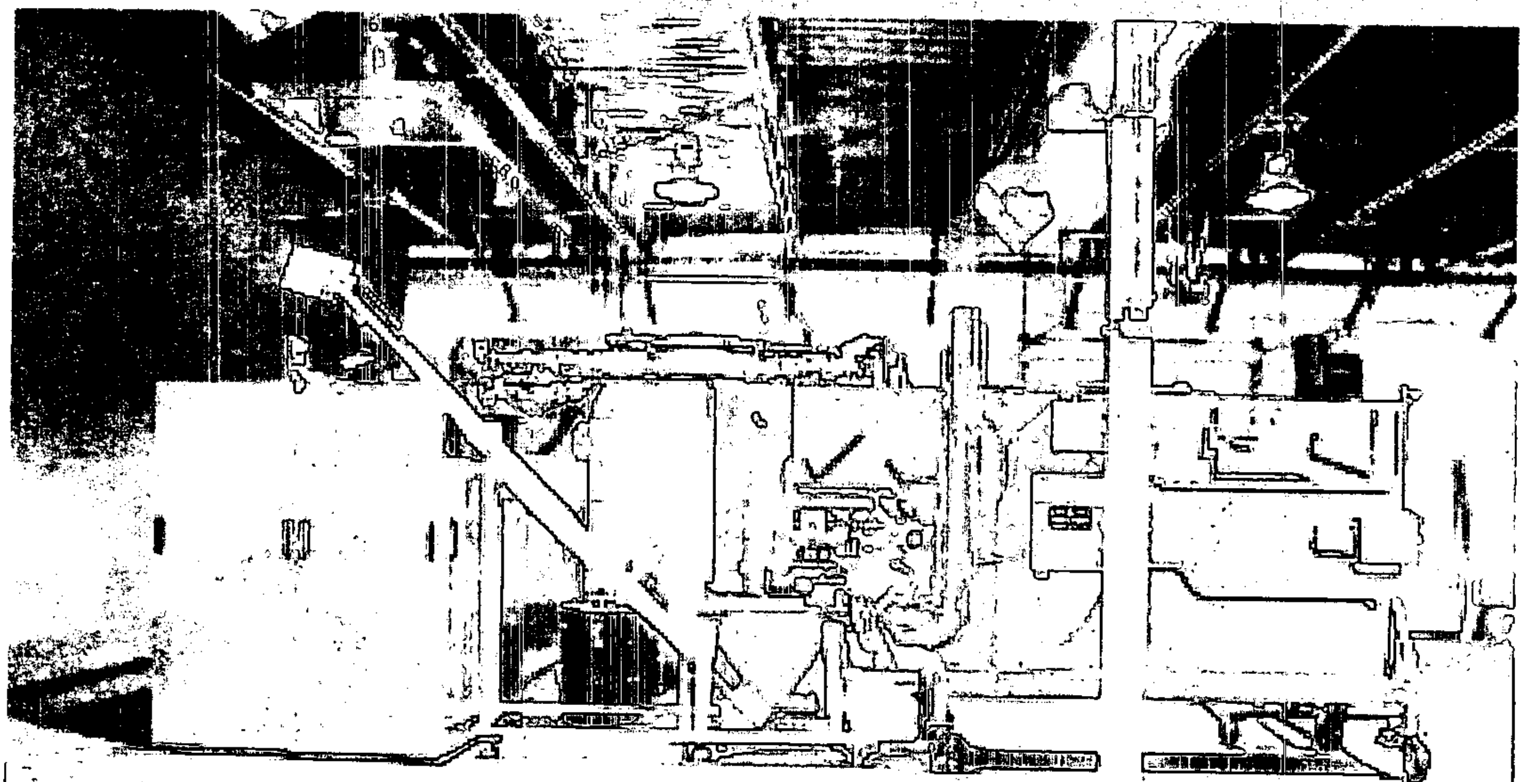
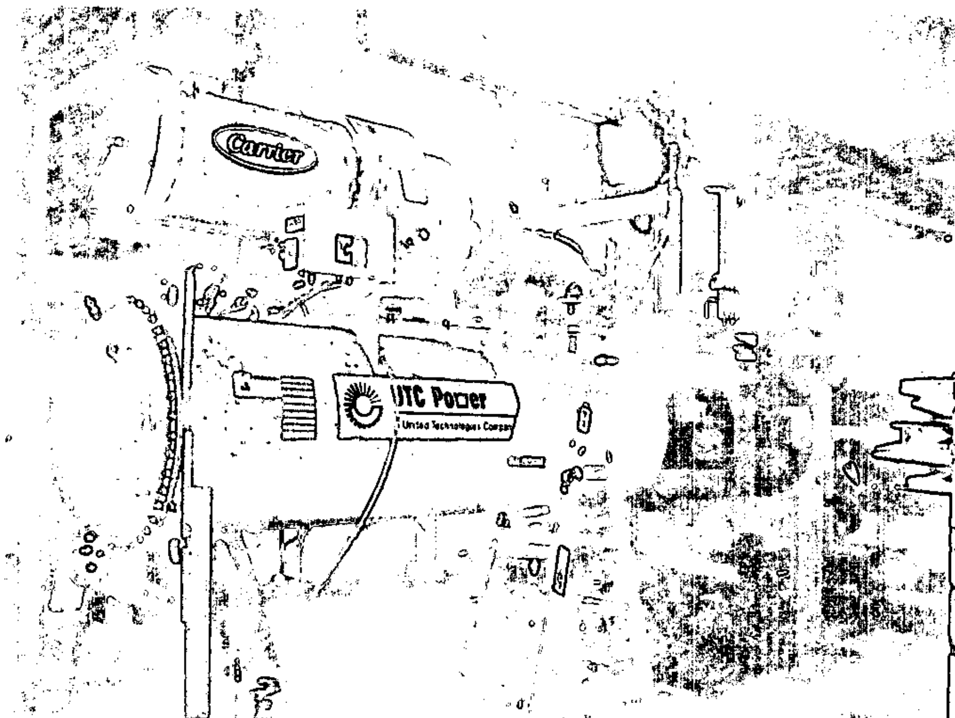
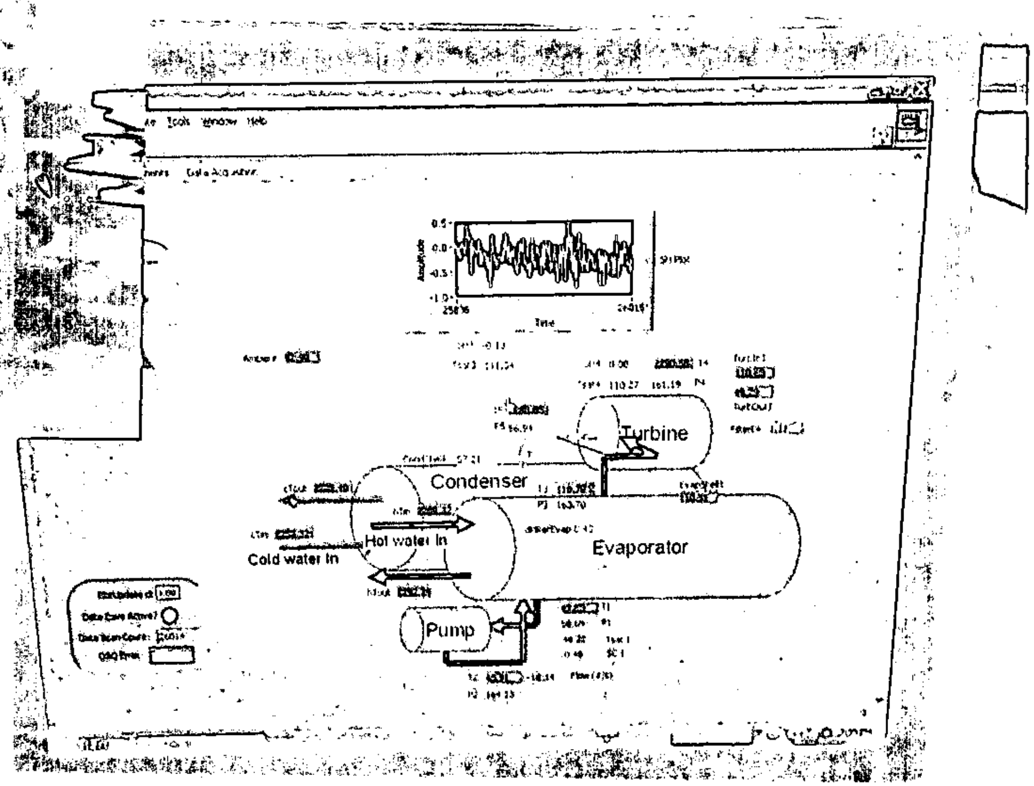


Photo: Community Power Corp.

Planned Organic Rankine Cycle

North Pole

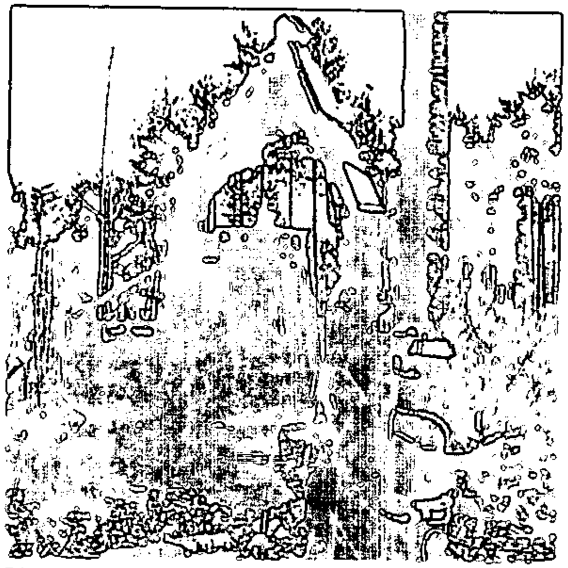


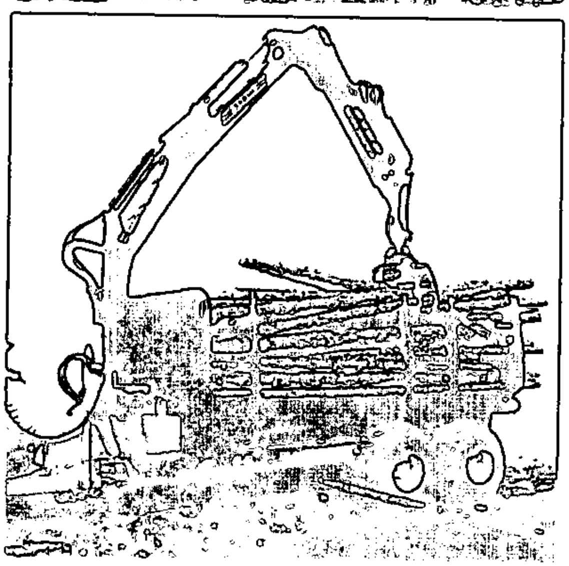


Chena Hot Springs

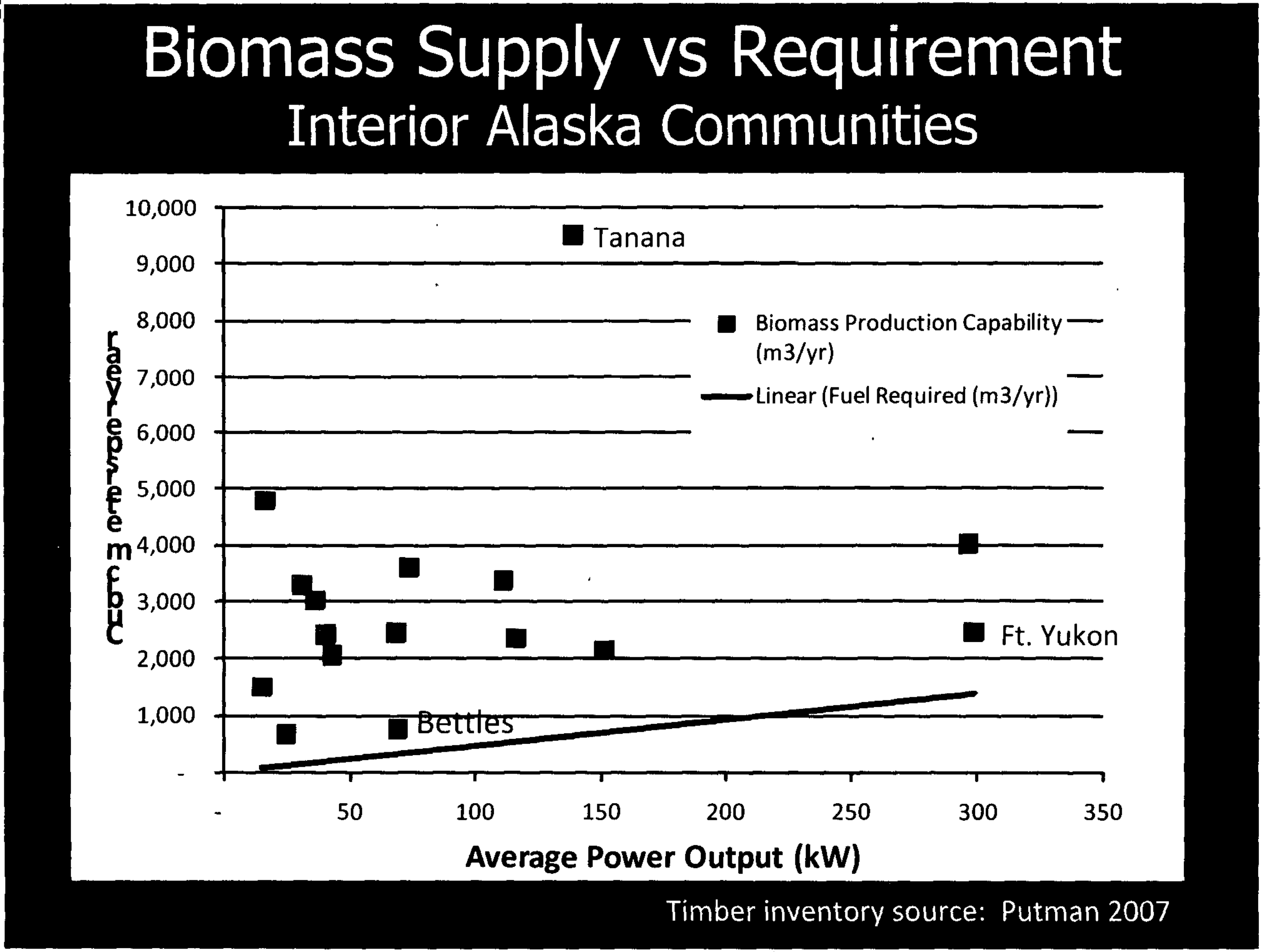
(2 x 200 kW)

AVI Proposed Rural Wood Fuel Supply System



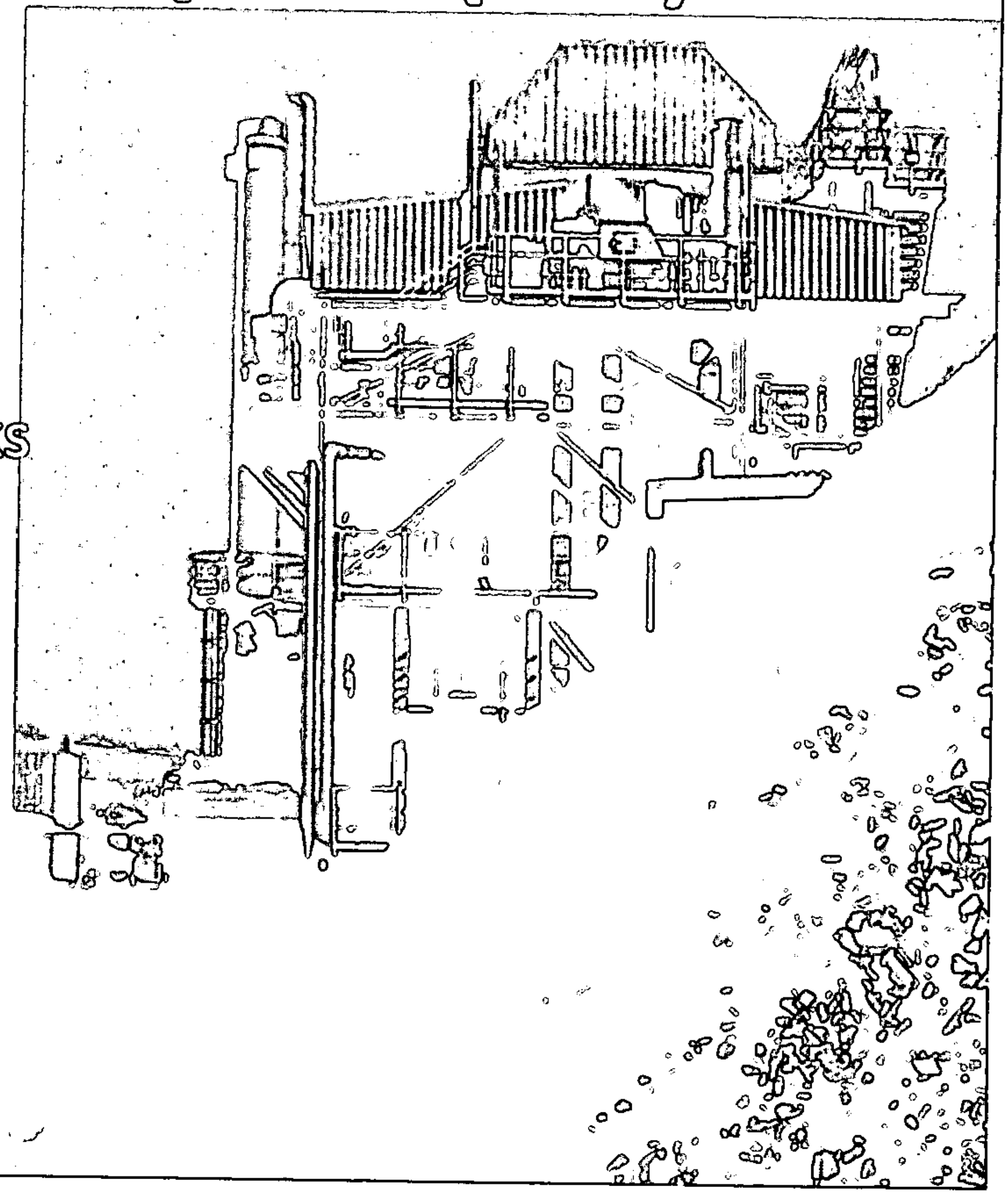


- Establish regional subsidiary
- Harvest on village lands according to locally developed management plans
- Provide to tribes for local sales for heating and power
- Capital costs for system capable of producing 7,000 TPY: $580,000

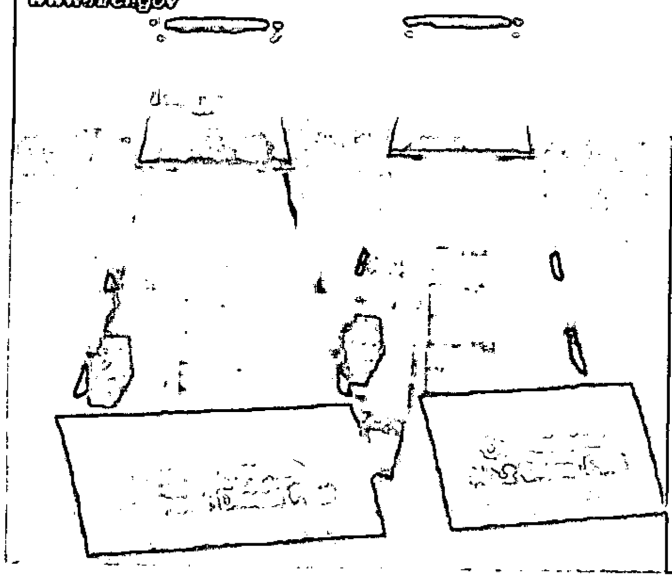

Biomass Supply vs Requirement
Interior Alaska Communities
Tanana
Biomass Production Capability (m3/yr)
Linear (Fuel Required (m3/yr))
Ft. Yukon
Bettles
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
-
Cubic meters per year
-
50
100
150
200
250
300
350
Average Power Output (kW)
Timber inventory source: Putman 2007

Biomass to Liquids (BTL)

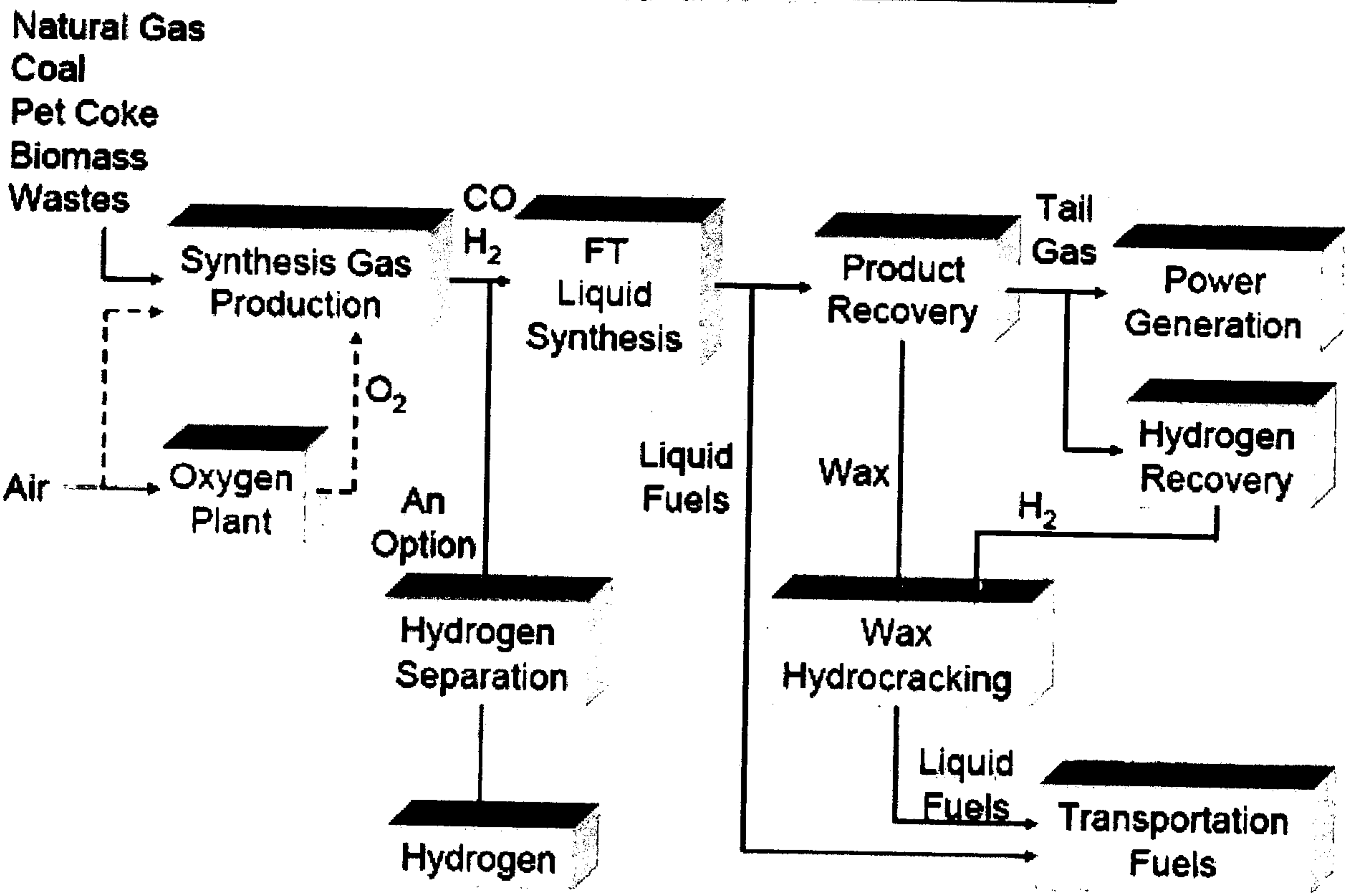
- Carbon Neutral
- Reduced Emissions CO, NO_x and Particulates
- Wide range of liquid fuels can be produced
- FEDC proposal in Fairbanks starts with coal feedstock and transitions to biomass



www.nrel.gov



Fischer-Tropsch Technology



Conclusions

- Wood-fired space heating larger buildings is simple, reliable, and widely cost-effective.
- But wood requires a commitment above oil-fired systems.
- Power generation is more complex, but small-scale technology is advancing.
- Chip-fired heating provides a stepping stone to power production in rural Alaska.
- Biorefineries are the future.

Thanks

Peter Crimp
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- ★ Bristol Bay Borough is the Sockeye Salmon Capital of the World
- ★ Bristol Bay harvested 173 million pounds of sockeye salmon in 2008
- ★ Average waste (throw away) per fish is 30%
- ★ 57 million pounds of waste is flushed back in to Bristol Bay

Currently using fish oil as a source of energy:

1) Dutch Harbor - Unisea Inc. Renders fish oil for in house energy use
2) Kodiak - Cooperative facility for rendering fish oil and value added fish pellets
3) Juneau - Floating processor rendering fish oil for resale

A successful co generation of energy facility - Ugashik Community Center

Thank you for your interest in renewable energy. There is a world of energy yet to be discovered.

Yvonne Kopy, Bristol Bay Borough Planner/ Grant Writer
PO Box 189, Naknek, AK 99633 907-246-4224
email: planning@theborough.com

Naknek Electric Association, Inc.
Proposed Regional Geothermal Generation Project

December 2007

Naknek Electric Association, Inc. (NEA) is exploring geothermal power production in an effort to improve its ability to provide reliable and affordable electricity. The cooperative faces an urgent need to identify sound alternatives to diesel generation due to the increasing and unpredictable costs of fossil fuels. These costs threaten the economic health and sustainability of the Bristol Bay and Lake Regions of western Alaska. Recently, the diesel fuel surcharge, which is reflected in the electric rate charged to NEA consumers, has increased by about 68% or more than $73.00 per month for a typical residential customer. Information indicates that development of geothermal power production will stabilize and lower electric rates in Naknek and throughout the region where approximately 6,500 people live in 25+ isolated rural communities.

Bristol Bay is considered the Sockeye Salmon capital of the world. In recent times, the harvest of Sockeye Salmon in a single summer topped 45 million fish. Since the area has a natural economic base, lowering the cost of electricity is expected to significantly improve the local economy. If energy costs can be reduced several seafood processors have indicated they would be interested in extending their seasons in the Bay to include secondary processing of salmon.

NEA's interest in geothermal power took root over a decade ago when the cooperative began researching local geothermal energy potential. It found considerable research data completed within the Katmai National Park and Preserve which warranted further exploration. The park boundary lies just a few miles from NEA's electric lines. During preliminary discussions with federal officials, it appeared that gaining access to the identified potential resource through park and refuge lands would be excessively expensive and time consuming. NEA continued to watch for geothermal opportunities, and focused on improving diesel production efficiency and other efforts to stabilize electric rates.

NEA found that today's drilling technology supports the development of geothermal resources at approximate depths of 10,000 feet or more. Therefore, it may be possible to find a resource outside the national park and close to existing road and electric distribution infrastructure. NEA is currently assessing local geothermal resources, available geothermal power technologies and options for a transmission system that will extend the benefit of geothermal resource development to all communities in the region.

Thus far, NEA has completed research, review, and assessment of thermal imagery map overlays, oil well production and log data, and regional faults and fractures data. It has also completed surface testing, which shows the presence of minerals indicative of an underlying geothermal resource, and has drilled three shallow test wells, reaching bedrock. NEA just finished its thermal probe testing, while seismic 3D modeling is currently still in progress. Data from both methods of analysis will be available in mid December of this year. NEA hopes the data provided will assist in determining which site is optional for drilling a deep well of 10,000+ feet.

With resource identification, NEA proposes construction of a 25 MW geothermal plant serving 25+ villages within the Bristol Bay and Lake Regions. This project would be the first utility-grade geothermal development in Alaska. The initial cost estimate for the plant and approximately 450 miles of transmission line interconnecting regional villages is $200 million. Over the past decade NEA has invested approximately $1 million in initial research and exploration of renewable alternative energy and is committed to being a financial partner as the project proceeds. NEA is approaching both state and federal governments for matching assistance.

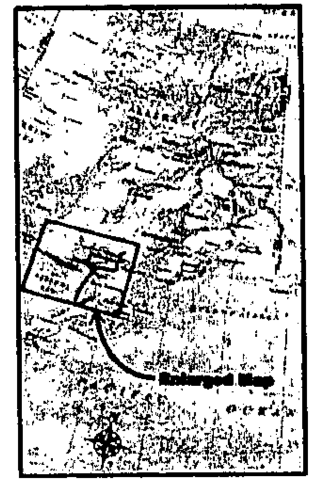
Proposed Project:

- 25 MW Geothermal Generation Facility
- 450 miles of transmission lines to bring electric energy to 25+ villages. Lines would extend from Naknek/King Salmon to Pilot Point; to Iliamna/Port Alsworth; and to Dillingham/New Stuyahok/Togiak and beyond
- Initial Load: 18 MW with full potential to use 25 MW within two years

Benefits:

- Dramatic drop in the cost of power production, estimated to decrease 70%
- Cleaner environment with elimination of 3.5 million gallons of diesel fuel now used to generate electricity
- An energy base for long-term economic development sustaining local communities

While NEA's interest in the project focuses on production of electricity, identification of a geothermal resource could bring many other benefits, including hydrogen production, hot water heating to nearby communities, and the development of spas, greenhouse projects, and other related businesses.



PROPOSED REGIONAL GEOTHERMAL DISTRIBUTION NETWORK

424 Miles Overhead

24 Miles Under Lake Illiamna

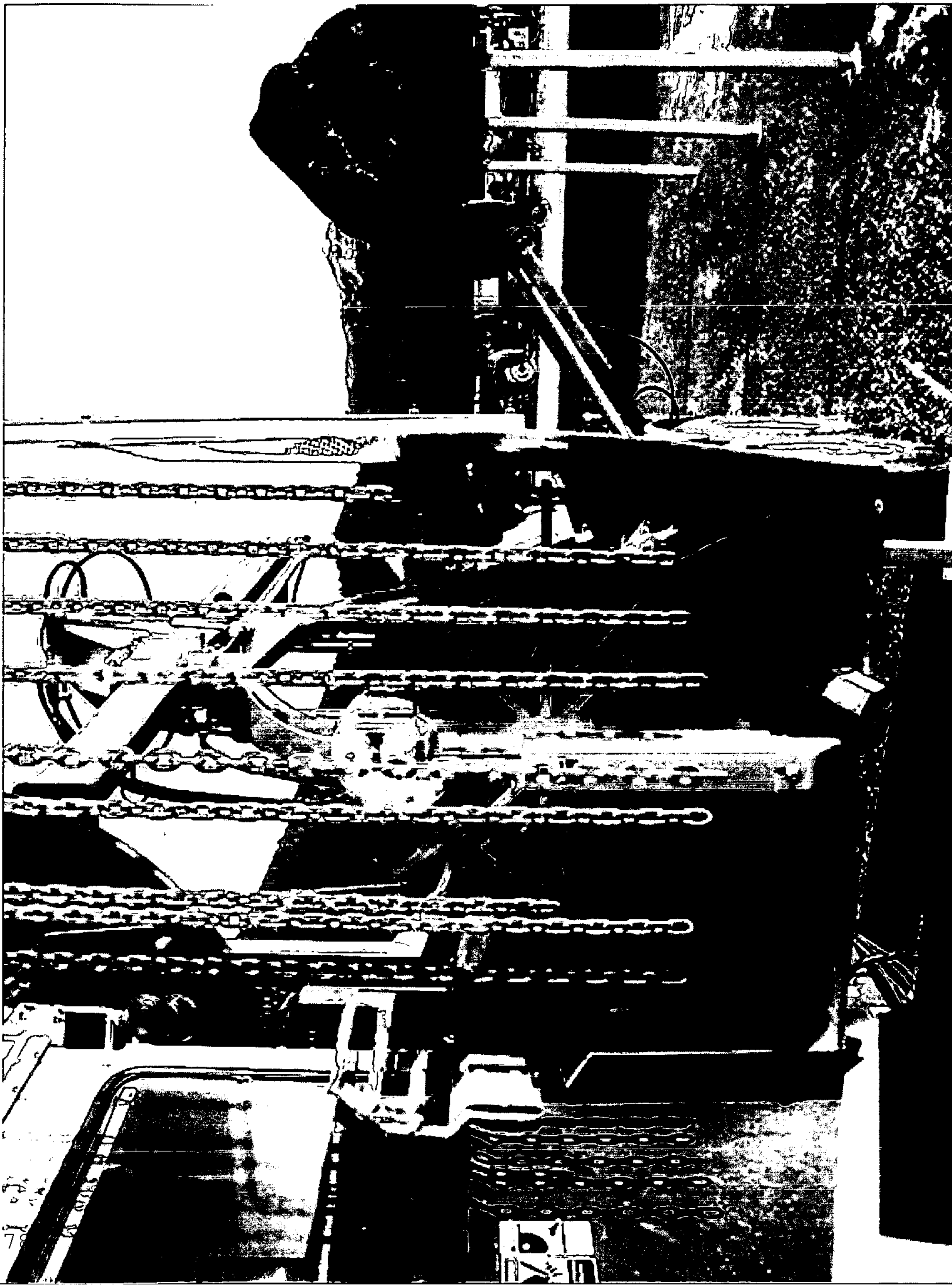
424 - 41 - 31 +56 +56 = 464 m

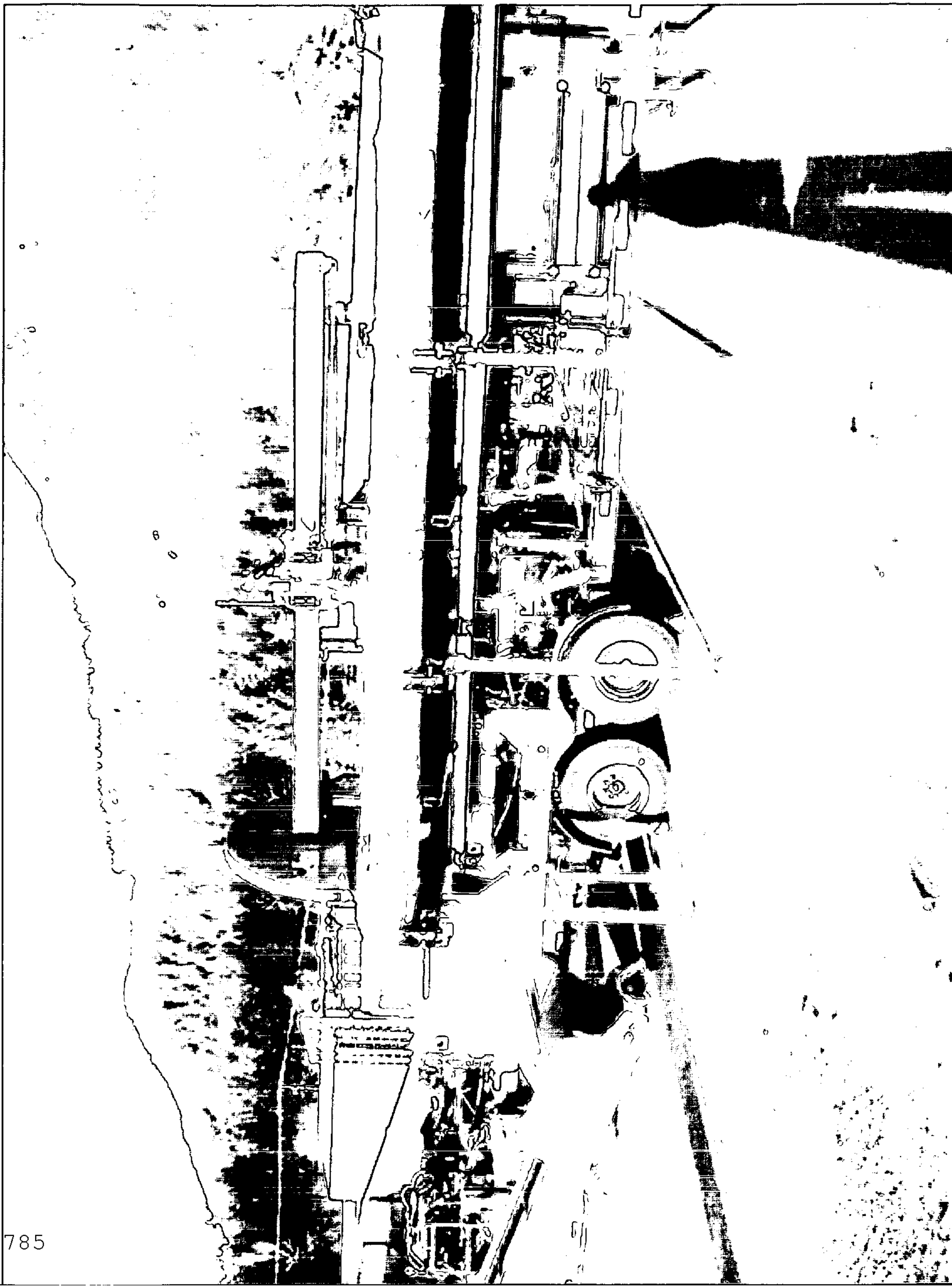
N

NOTE: ALL SHOWN DISTANCES ARE APPROXIMATE MILAGE

APPROXIMATE SCALE in MILES

PREPARED BY
COASTAL SURVEYORS
FOR
NAKNEK ELECTRIC COOP





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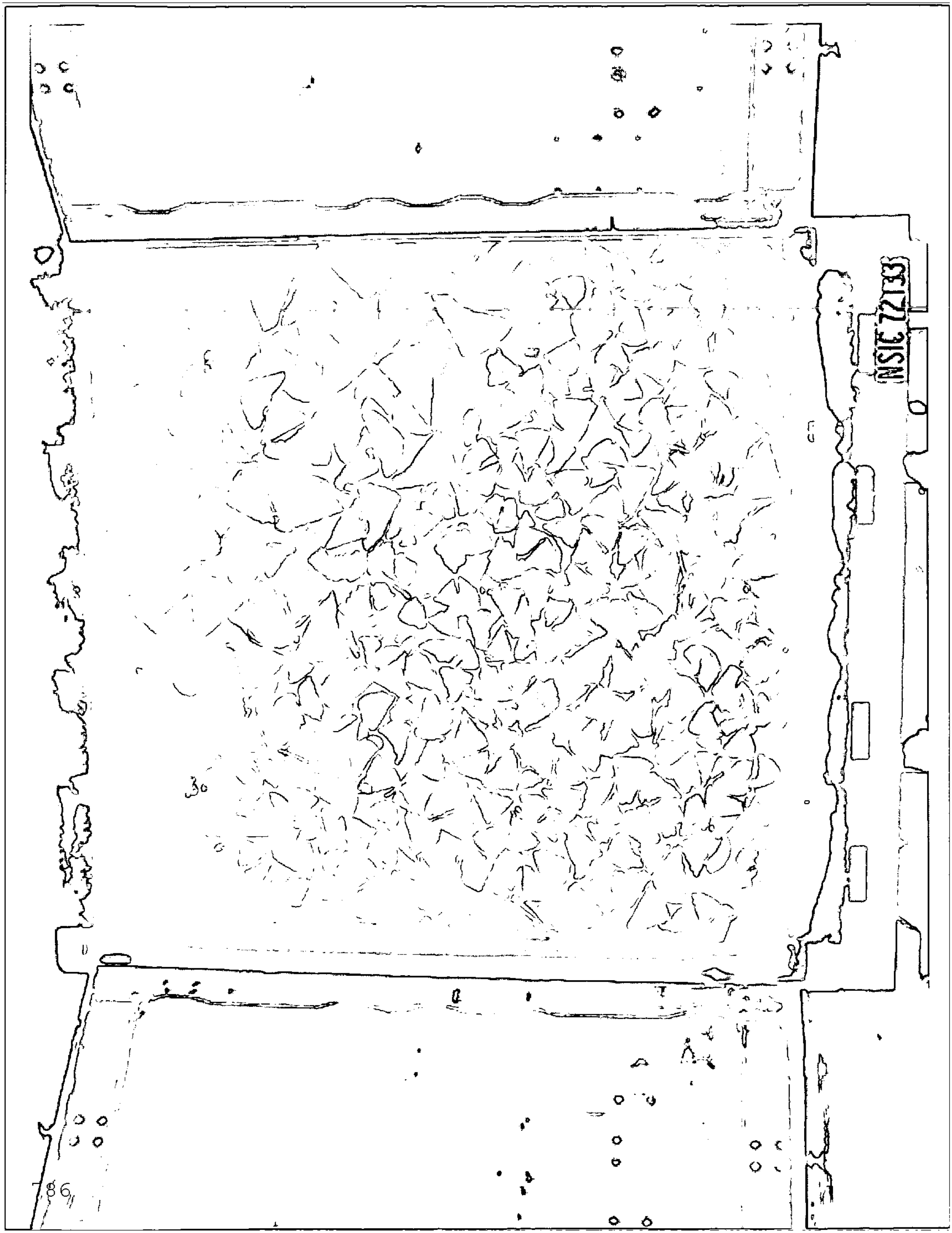
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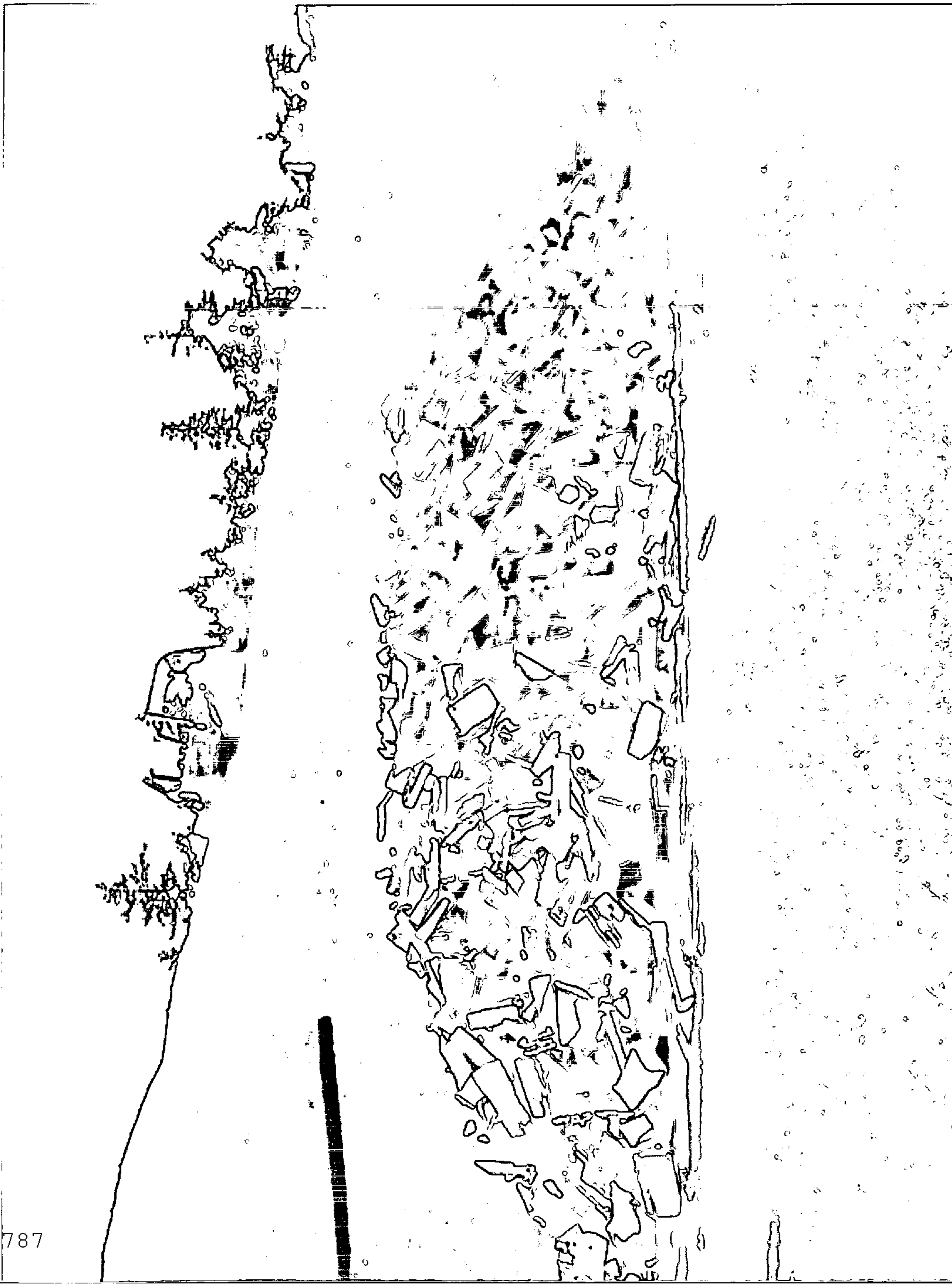

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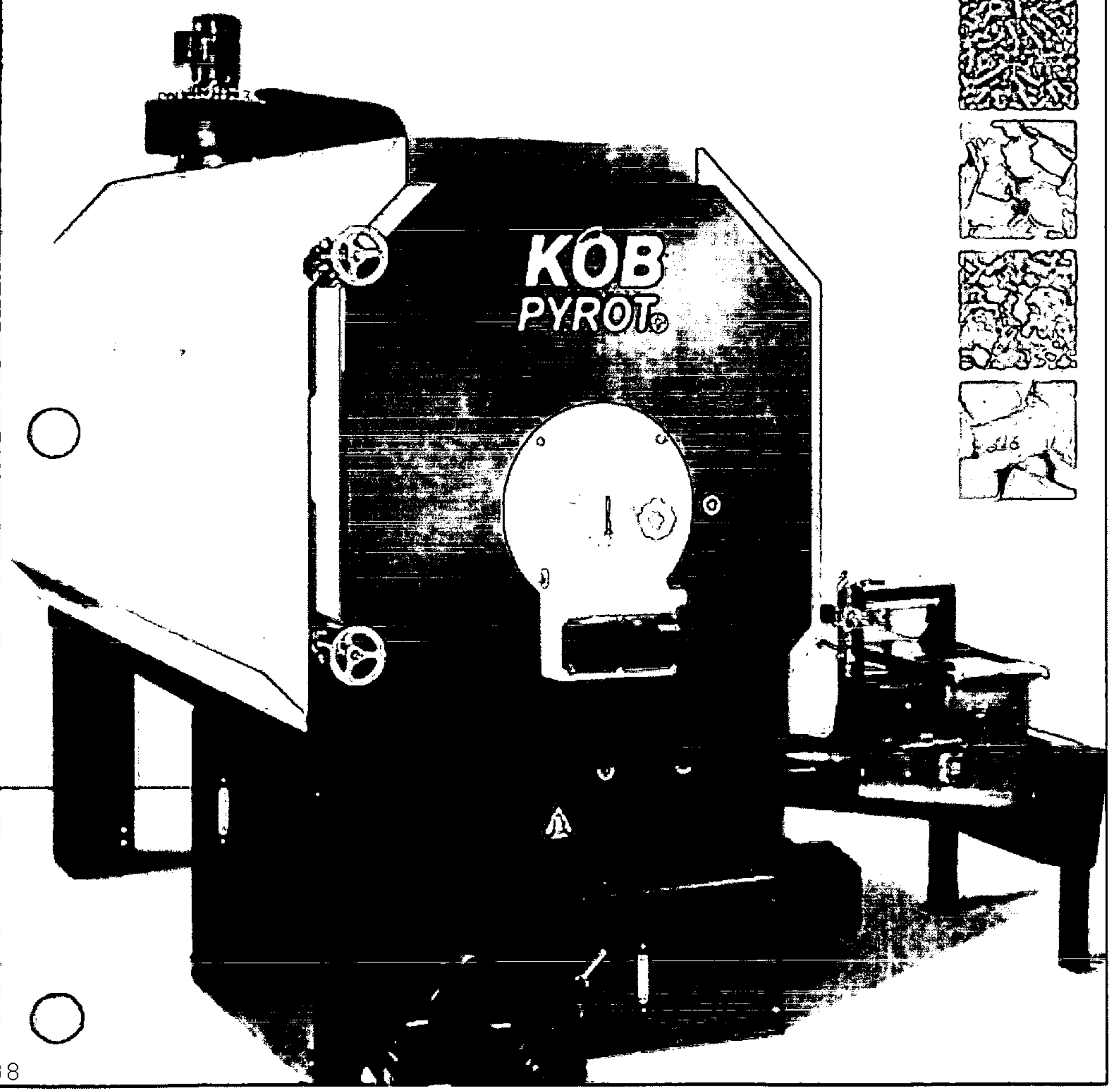
Our New Generation



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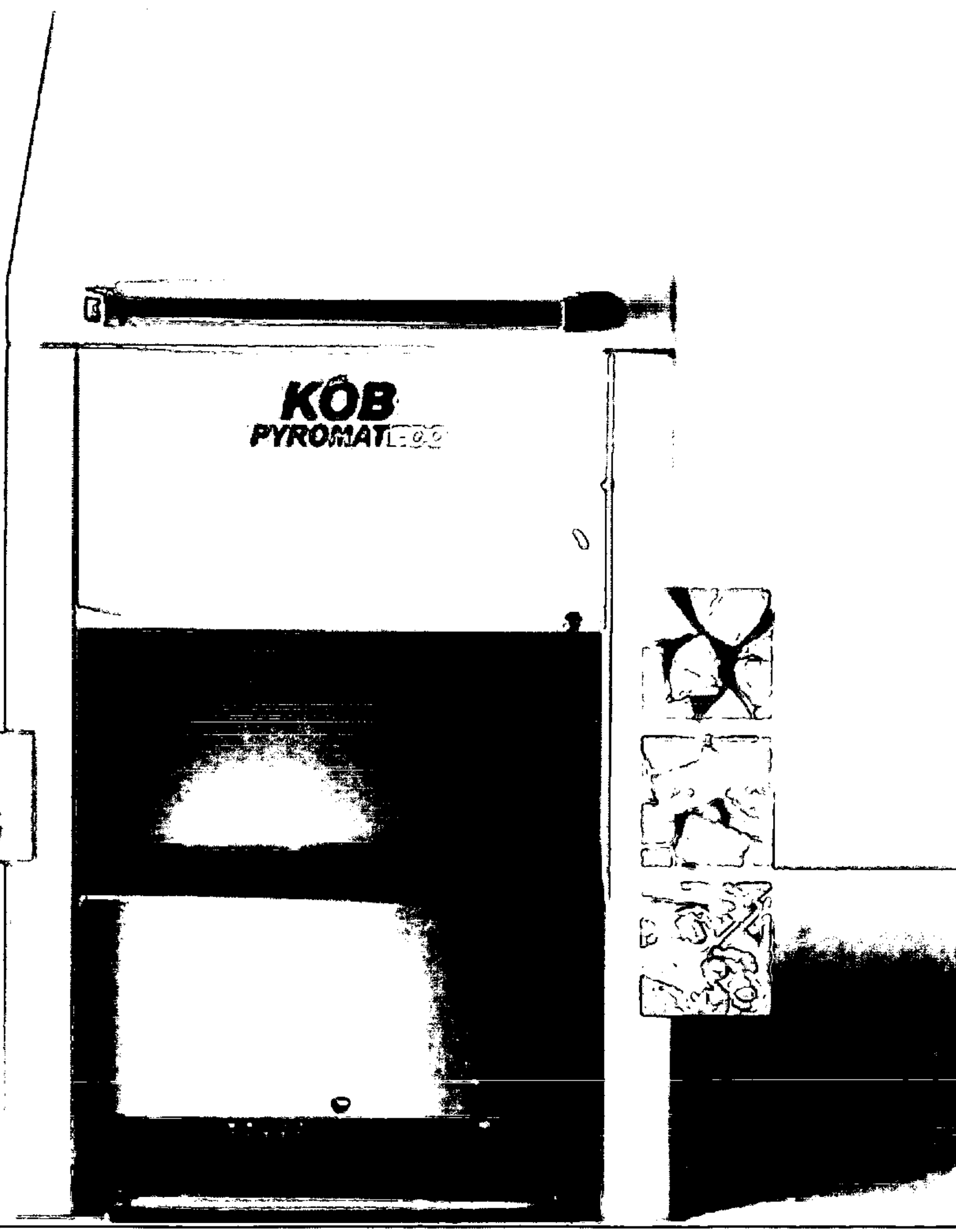
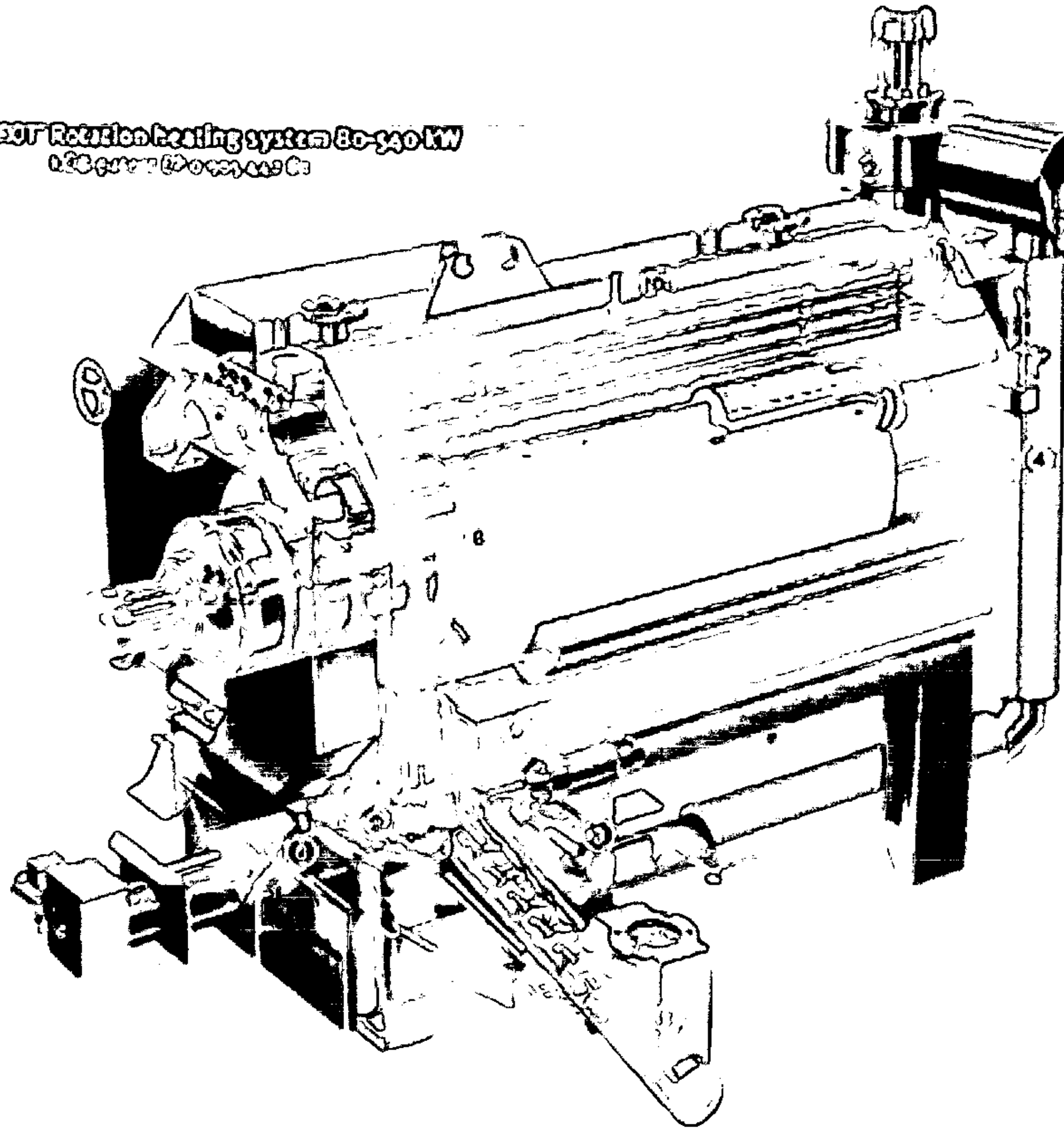


KOB

Energy efficient.

PYROT Rotation heating system 80-540 KW



PYROT Rotary combustion

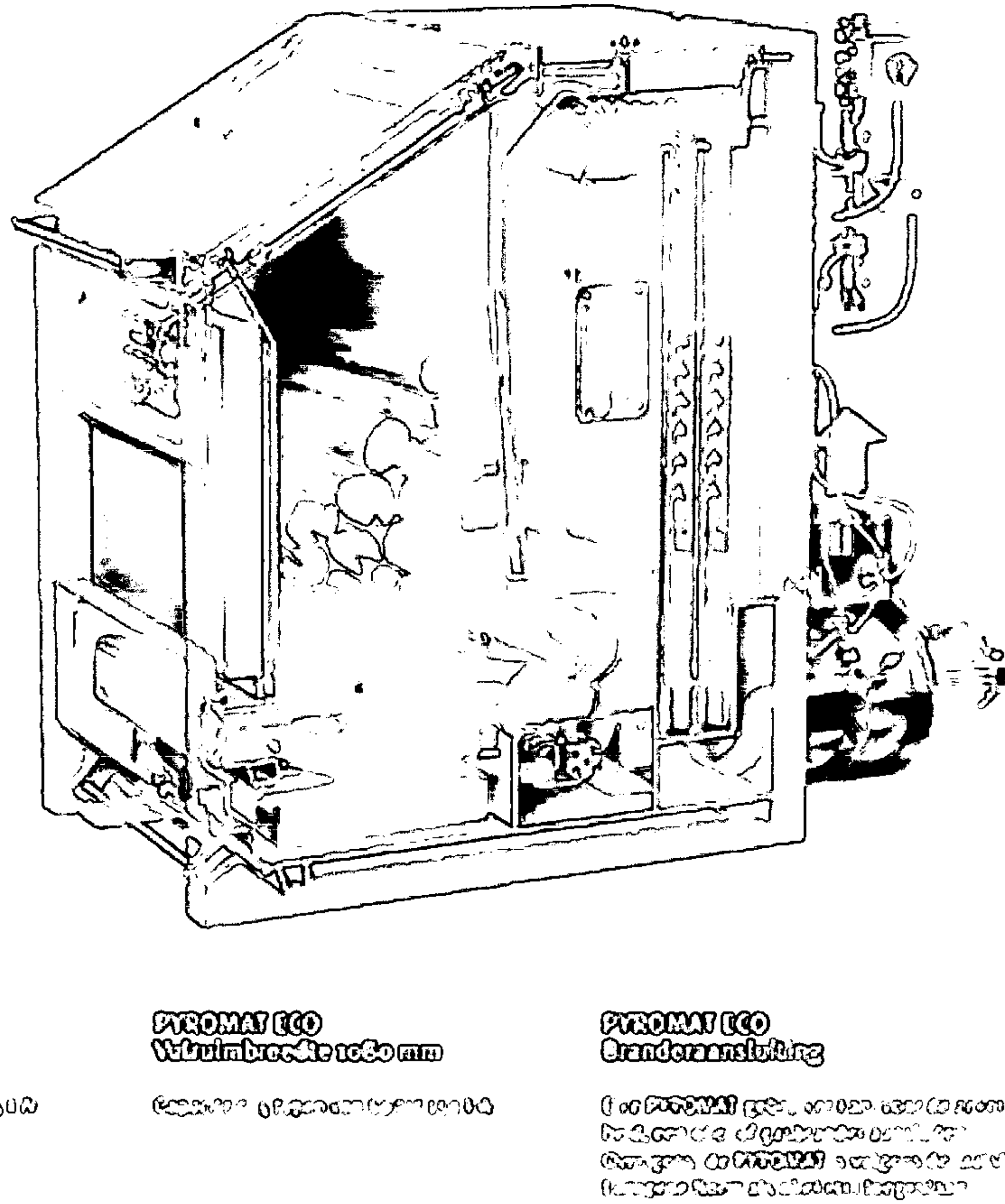
The new dimension in combustion technology

[illegible]

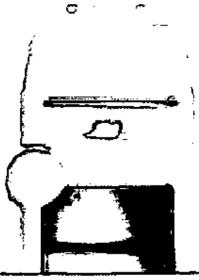
High efficiency

[illegible]

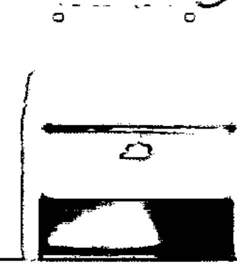
Efficiënt met energie.



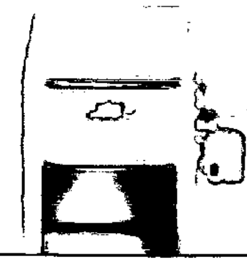
PYROMAT ECO
Vulruimbreedte 550 mm



PYROMAT ECO
Vulruimbreedte 1080 mm



PYROMAT ECO
Branderaansluiting



WOOD TO ENERGY

Wood is a viable source of energy producing BTU's of heat at a cost to the consumer comparable to electricity when produced by hydro, wind, coal or natural gas. Wood burning appliances that employ new technology provide a safe, efficient and clean means to convert the readily available supply of wood fiber in many regions of Alaska to a reliable, environmentally friendly and economic source of fuel to heat residential and commercial buildings.[1]

FIBER SUPPLY

In Southeast Alaska, the commercial harvest of timber from the Tongass National Forest on lands owned by the Federal Government, State, Alaska Mental Health Trust, University of Alaska and Sealaska all generate a substantial volume of logs not suitable for sawing. This material is currently chipped and sold to pulp and paper mills or left in the woods. Pacific Log & Lumber, a sister company also owned by the Seley Family Partnership will harvest approximately 25 Mmbf of timber annually to supply saw quality logs to it's sawmill in Ketchikan. Approximately 30% of the timber harvested is unsuitable for the manufacture of lumber and in recent years has been chipped and transported for sale to Pulp and Paper mills in Canada and Washington.

Alaska Chip currently maintains a decked log fuel wood inventory of approximately 1.8 Mmbf. Based upon a conversion of 209 CF per Mbf and 85 CF solid wood equivalent per cord, this inventory will yield approximately 4,425 cords of wood. The annual total volume of logs harvested by Pacific Log & Lumber not suitable for producing sawn lumber is approximately 7.5 Mmbf yielding 33,187 cords.

When you consider that one cord of hemlock will yield the same BTU value as 157 gallons of #2 diesel, it is easy to grasp the potential benefits that our wood fuels program will generate for our Customer, our Communities and our Company. There are many factors that affect the delivered cost of home heating fuel to the consumer with most of them outside the control of government or the consumer. Alaska Chip can predict the future cost of wood fiber up to 12 months in advance of production and is giving ample notice of price changes to the customer.

The Tongass Land Management Plan recently released by the US Forest Services identifies a sustainable annual harvest of 267 Mmbf. With a 30% fuel wood component, this supply source alone has the ability to replace 31 Million Gallons of #2 Diesel heating fuel.

MARKET

The conversion of logs to a transportable form will entail the production of split wood, commonly known as cord wood and wood chips blended with bark and sawdust (bio-mass). Many homes in Alaska currently have a wood burning stove or fireplace as a secondary heat source. They are often used simply for the ambiance created by the crackling fire and visible

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[1] Pellet Fuels Institute "Compare Fuel Costs" calculator
www.pelletheat.org/3/residential/compareFuel.cfm

flame or the pleasure derived from wood heat on a cold and damp day. With the high cost of heating oil, this secondary means to heat the home has in many cases become the primary source.

When researching the market, we found that many elderly citizens prefer burning wood but have until now, been unable to locate a supplier who can guarantee delivery of seasoned split wood to their home.

Most new wood fired boilers are an environmentally acceptable means to produce heat for larger homes, commercial buildings and multiple tenant dwellings. In this application it is preferred to utilize wood in a chip or pellet form. The consistent size of the wood fuel allows the transfer of fuel from on-site storage to the boiler by a mechanized means such as an auger or moving bed system.

The proximity of the end user to the fuel source, thereby reducing transportation cost and the current cost of oil or electricity will determine the economic viability of wood energy as a primary heating source on a region by region basis thus establishing the marketplace.

With a commercial supply of wood fuels and the availability and distribution of environmentally safe and efficient wood fired stoves and boilers, people in the tree growing regions of Alaska will benefit the most by converting to wood energy as their primary heat source. Even with the initial investment to purchase a wood fired boiler or wood stove, burning wood instead of oil will result in a savings of 50-60%.

The attached Brackley statistics estimate the total green tons of wood required to replace oil as the primary heating fuel of both the residential and commercial sectors from Yakutat to Ketchikan is 592,951 green tons or a log equivalent of 104,026 Mbf. The communities of Juneau, Sitka and Ketchikan that we consider our primary market due to the transportation advantage total 75,396 Mbf (72% of the total Southeast Alaska usage) or 171,903 cords. The single processor that we are operating today will produce 30,000 cords of split wood a year operating at full time two shift capacity to meet 17% of the existing demand.

As a Nation, lowering our dependency on oil may be one of the most important tasks we face. 20,238 homes located on the Alaskan Panhandle from Yakutat to Ketchikan burn 14,581,479 gallons of diesel as the primary heat Source. [2] This dependency on oil could be significantly reduced by converting to wood fuels.

WOOD BURNING APPLIANCES

Utilizing heating appliances like those developed, improved and operated in Europe today minimizes the cost of conversion to wood burning technology. A modern boiler can be ordered to operate on split wood, pellets, chips, coal and other manufactured products.[3] The KOB (German manufactured) units are specifically developed to burn wood and are far superior to conventional

[2] Department of Energy, Energy Information Administration publication

[3] KOB PYROMAT DYN model 45, 65, 85 www.koeb-schaefer.com

heating systems with regards to economic efficiency, operating safety and user-friendliness. All operating phases are continuously monitored by microprocessors and controlled fully automatically. The result is perfect, emissions-optomised regulation of the output. With the use of very modern technologies, maximum comfort, environmental protection and reliability are achieved.

The European environmental standards for air quality very stringent. These wood burning appliances operating on wet wood chips utilize an automatic variable drying system at the front of the boiler. The wet wood chips are pre-dried in a special auger module. Through a heat exchanger, air is preheated to about 80 degrees C and blown into the auger with the wood chips. Uniform drying is accomplished by the movement of the chips inside the large auger. The exhaust temperature controls the output of the pre-drier. If dry material is introduced the heat output is reduced. In the area of fuel storage and loading, each system requires individual planning.

There are many wood stove manufacturers in the United States and abroad. The quality and capability of the stove is generally synonymous with the purchase price. Most manufacturers have focused on design, efficiency and affordability and provide a variety of options and safety features to the buyer. Most stoves are designed for installation in mobile homes and meet EPA Phase II standards with emissions at 3.1 to 4.5 grams/hr when burning seasoned wood. These stoves are generally of steel or cast iron construction with the burning chamber lined with fire brick, pressed vermiculite or another material extending the stove life.

While there are many stoves to choose from, it is important that homeowners are motivated to choose a model that has been designed for safe operations and minimized emissions. In Oregon, about 94,000 homes burn wood for heat. Half of these homes do so in wood stoves. Oregon environmental officials enacted the first wood-stove emission regulations in the mid-1980's, which the EPA later used as its model for federal standards. The Oregon Department of Environmental Quality is pursuing legislation that would require replacement of "non-certified" wood stoves when a home is sold.[4]

TRANSPORTATION COSTS

Our greatest challenge with fuel wood has been to determine the most efficient and affordable transportation system to move our product to the customer. Communities in proximity to commercial forest harvest operations will enjoy the lowest possible cost for wood energy. The ability to provide wood heat as a competitive energy source is inversely related to the distance from commercial harvest operations and the transportation cost of the wood fuel. Of course this relationship applies to all forms of energy shipped to Alaska - especially heating oil which unlike wood, must be shipped from the Lower 48.

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[4] Statesman Journal November 2, 2006

In order to utilize available barge space on existing common carriers, our shipping containers must meet certain criteria in regards to size and weight for stowage onboard these vessels in conjunction with 20 and 40' boxes commonly used by transporter. They must be efficiently loaded at our plant, easily discharged at the customers location and then returned for refilling. No specialized equipment or handling is required to move split wood in this fashion from the production site to an Alaska community located on the water. Open top gondolas or ½ high's, currently utilized to ship waste best meet these requirements but are in short supply and represent a substantial expense to purchase.

ADVANTAGES OF WOOD FUEL

The most important advantage of wood fuel is that it is grown in Alaska and is plentiful, cost effective and environmentally safe compared to other available fuels. Unlike fossil fuel, burning wood is carbon neutral. The need for expensive tank farms is eliminated as wood can be stacked out doors and tarped if a warehouse, hangar or other covered building is not immediately available. If wood gets wet unlike a pellet, it can be easily dried. Unlike diesel, extreme cold temperatures have no effect on burn ability. The potential liability from a leaky oil storage tank has been eliminated completely.

Wind turbines will work when a steady wind of 8-40 knots can be maintained 80% of the year, provided a grid of sufficient size is available to blend wind produced energy with diesel, hydro or other base load.

Hydropower is plentiful in Alaska, but includes the cost of transmission lines and is economic only when demand will be sufficient over time to amortize the initially high capital cost. Moreover, hydropower has long lead permitting and construction time lines and is subject to litigation. With 90% of the Alaska communities having fewer than 5,000 homes and no common grid to tie them together, neither hydro nor wind produced power will be as cost competitive in most places. In those areas of Alaska in which hydropower will be determined to be more competitive than wood fuel over the long term, wood fuel can be a short term solution until the hydrofacilities are built and operating and then provide a reliable backup for periods when hydropower is interrupted.

TIME FRAME

The need for wood fuel as an alternative to diesel is immediate. Due to fluctuations in the delivered cost of diesel, many residents in Southeast Alaska have shut down their diesel fired boilers and have plugged in portable electric room heaters. Local utilities in Ketchikan and Sitka are unable to meet the forecasted demand for electric power during portions of the winter months without the use of diesel generators. As the Legislature and the Administration have already determined, the cost to heat a home in Southeast Alaska (or anywhere else in Alaska) in winter with diesel fired generators is significant. With governmental assistance to promote conversion to wood fuel, annual heating costs and dependency upon diesel can be significantly reduced.

The Renewable Energy Fund and grant program represents recognition of the problem and a substantial investment in resolving it. I challenge the Legislature to invest a portion of the funds in projects that provide an immediate benefit. Give high consideration to applicants who are willing to match dollar for dollar in investment. Support the development of new concepts but don't overlook proven technology. Alaskan's need relief from the uncertainty and high delivered cost of diesel today.

BUSINESS MODEL

Alaska Chip will implement it's wood to energy plan in three steps;

A Split Wood for residential usage

B Chips for residential and commercial chip fuel boilers

C Bio Fuel production

Alaska Chip has invested $500,000 in new equipment to produce wood fuel. Our Multitek 4030 processor has been delivered to Ketchikan and we are producing cord wood with distribution points in Ketchikan and Juneau. Our distribution will be expanded to Sitka in the near future.

The Forest Service and Coast Guard have issued contracts to engineering companies to study the potential for converting facilities located in Southeast Alaska from oil fired to wood fired boilers. In both cases these companies have concluded that wood chips provide the best source of wood fuel as they can easily be metered to the boiler from a storage silo depending upon the demand for heat. We have also found this to be true in Europe where we have studied wood fuel heat systems that have been operating for many years.

Alaska Chip currently produces approximately 15,000 Green Tons of wood chips a year that are sold to pulp and paper mills. We have thc ability to expand our production to 55,000 Green Tons.

An equally important part of implementing this plan is to source the best chip fired boiler for this region. In addition to providing raw material, we will train employees to sell, operate and service these boilers. While there are several that appear to meet our needs, the final choice will be made after the Forest Service and Coast Guard studies have been completed.

For commercial accounts, Alaska Chip will offer an energy contract allowing the customer to immediately realize the cost benefits of converting from an oil-fired to a wood fired system. Existing heating equipment will remain in place. The customer will provide adequate space to install the wood fired boiler and chip storage silo in or next to the building. Alaska Chip will own, operate and maintain the boiler system and the necessary supply of wood fuel.

There are several companies interested in bringing biofuel technology to Alaska. Alaska Chip has entered into a working agreement with one of these companies who specializes in catalyst development and gasification and follow a course based on the Fischer Tropsch process, which is the conversion of gas to liquid fuel using a catalyst. Alaska Chip's active participation is limited to providing biomass and plant site location.

SUMMARY

The demand for affordable energy and the quantity of diesel used today to ultimately meet most energy needs from Yakutat to Ketchikan have been quantified by the Forest Service in the attached reports. Information regarding demand and usage in coastal communities in Western Alaska is also available from other sources.

A viable, sustainable and economic supply of fuel wood exists on the Tongass National Forest. This often under utilized component of the forest is left in the woods or chipped and barged to pulp and paper mills 800 water miles to facilities in Washington and Canada. Can it provide a greater economic benefit utilized in Alaska?

The Seley Family has the longest continuously operating forestry related business in the State of Alaska today. We see wood fuel as an important component in our business plan to insure that we can continue operating profitably and have directed our investment in infrastructure accordingly.

GOVERNMENT ASSISTANCE

This business model complies with the stated goals of the State of Alaska to promote and support a reduction in the cost of energy for Alaskans, particularly in the winter. While we meet the stated intent of the Alaska Energy Authority's Renewable Energy Grant Program, we were clearly not an eligible applicant based upon the criteria in section 1.4 of the application. Not being a government entity or an electric utility removed 3 of the 4 types of entities that would qualify leaving " a legal entity that owns or operates facilities for the generation of energy". While we felt we could make a pitch towards qualification under this criteria, it would be difficult at best.

We have made our initial investment of $500,000 to purchase equipment and make facility improvements as necessary for the commercial production of split wood. This investment was justified on the needs expressed by Ketchikan and Sitka alone and without assistance from the State or Federal Government. This startup business is operating and meeting both our cost and sales projections. We would like to expand the business to match our production capacity, fiber supply and market demand.

We read and hear about the demand for wood in Western Alaska communities and villages and the cost of fuel oil in that region. In each case, the viability of converting to wood will depend upon transportation costs.

The power cost equalization program provides financial assistance to many rural communities by effectively subsidizing the cost of energy resulting in a cost to the State. I believe there is an opportunity to reduce this expense substantially to both the State and the consumer with wood fuel.

Today I am requesting the assistance of the State of Alaska and specifically the Legislators representing the many coastal communities to assist in determining demand and the potential cost savings to both the end user and the State.

Steve Seley Jr.
President - Alaska Chip Ltd.
(907) 225-2692
(907) 617-7440
s.seley@seley.com

Brackley Statistics

Potential for biomass heating systems at large energy-using facilities in Sitka

Facility ID	Fuel oil consumption (gal/yr)		Wood Fuels	
			Cordwood (MC30) (cords) g	Bulk Fuel (MC50) (tons) h
Hames PE Center	51,000		567	1,437
US Coast Guard (Air Station Sitka)	140,000		1,556	3,944
SEARHC (hospital only)	131,100		1,457	3,693
SEARHC (non-hospital)	33,300		370	938
Sitka High School	65,700	b	730	1,851
Blatchley Middle School	40,150	c	446	1,131
Keet Gooshi Heen Elem. School	27,000	a	300	761
Baranof Elementary School	27,600	a	307	777
Pacific High School	4,300	a	48	121
Sitka Airport	20,400	c	227	575
Sitka Animal Shelter	3,300	c	37	93
Centennial Hall	8,700	c	97	245
Sitka Fire Hall	9,200	a	102	259
Sitka Public Library	4,000	a	44	113
Sitka Public Services Center	8,300	a	92	234
Sitka Community Hospital	68,000		756	1,915
Waste Water Treatment Plant	13,000	b	144	366
Sawmill Cove Admin Bldg	9,000		100	254
Mt Edgecombe High School	142,300		1,581	4,008
University of Alaska SE, Sitka	10,500		117	296
800 Sitka residences	360,000		4,000	10,141
TOTAL				
Units	**1,176,850 gal**		**13,078 cds**	**33,152 tons**
Value / cost ($)	**5,884,250** d		**2,615,600** e	**2,652,160** f

NOTES:

- a reported consumption for 2006
- b reported consumption for 2007
- c average of 2006 and 2007 reported consumption
- d at $5.00 per gallon
- e at $200 per cord
- f at $80 per ton
- g assumes one standard cord of hemlock firewood (MC30) = 90 gallons of #2 fuel oil
- h assumes one ton of hemlock "bulk fuel" (MC50) = 35.5 gallons of #2 fuel oil

Dan Parrent
Juneau Economic Development Council
(907) 747-5688
dparrent@ptialaska.net

Updated: September 16, 2008

Estimated volumes of wood required to replace fuel oil currently used by Residences and Commercial Sector users in various communities in Southeast Alaska. This table has been prepared using 2005 Census Data and Department of Energy, Energy Reporting Agency Data. Commercial Sector estimates based upon a level of use 1.47 times that of Residential Users. Prepared by: Allen M. Brackley, July 2008

	Census District	Number homes using fuel oil	Average fuel oil usage (F32 AK Energy Use gallons	Therms @ 135,000/gallon/100,000btu	Bone Dry Tons wood at 164/bdt (see Q30) "AK Energy Use"	To totally replace fuel oil in heating all homes (bdt)	To meet Commercial use (schools, municipal buildings, etc) Residential * Factor of 1.47 (bdt)	Total to meet the needs of Residential and Commercial Sectors - Industrial, Transportation and Power Generation n not considered (bdt)	Green Tons	Cords at 2.5/green ton	MBF equivalent of traditional logs at 5.7 tons/MBF
SE	Haines	706	508,673	686,709	4,187	4,187	6,155	10,343	20,685	8,274	3,629
SE	Juneau	8,131	5,858,386	7,908,820	48,225	48,225	70,890	119,115	238,229	95,292	41,795
SE	Ketchikan	4,145	2,986,473	4,031,738	24,584	24,584	36,138	60,722	121,444	48,578	21,306
SE	Prince Wales-Outer Ketchikan	1,420	1,023,110	1,381,199	8,422	8,422	12,380	20,802	41,604	16,642	7,299
SE	Sitka	2,392	1,723,436	2,326,639	14,187	14,187	20,855	35,041	70,083	28,033	12,295
SE	Skagway-Hoonah-Angoon	1,050	756,525	1,021,309	6,227	6,227	9,154	15,382	30,764	12,306	5,397
SE	Wrangell-Petersburg	2,152	1,550,516	2,093,197	12,763	12,763	18,762	31,526	63,051	25,220	11,062
SE	Yakutat	242	174,361	235,387	1,435	1,435	2,110	3,545	7,090	2,836	1,244
	Total	20,238	14,581,479	19,684,997	120,030	120,030	176,445	296,475	592,951	237,180	104,026

Note: The Department of Energy, Energy Information Administration publishes data that reflects the total btu equivalents of various froms of energy that are used in the United States. This information is available for each of the states. The published information is divided into sectors (Residential, Commercial, Industrial, Transportation and Electrical Power. In this table the btu values for distillate fuels (classification used for heating oil) have been converted to gallons of oil based upon a Gbtu value of 135,000btu/gallon. The values in this table represent an equivalent volume of wood at a Gbtu value of 8,200 btu/pound (164 therms/bone dry ton of wood fiber). It is recognized that the actual volumes required must take into account the moisture content of the various forms of wood used to replace the oil and the efficiencies of the specific burning systems (wood stoves, pellet stoves, furnaces, chip burning systems) that are used to replace oil equipment. Ultimately the actual demanded volumes will increase depending upon the form of wood used and equipment. These numbers are intended for planning purposes. It is obvious that a complete replacement of distillate fuels will not take place so ultimate demand will be lower than the values in the table. The above errors will tend to cancel out and the ultimate levels of demand approch the value in the above table.

Region	Borough/Census Area	Utility Gas	Bottled, Tank, LP	Electricity	Fuel Oil Kerosene	Coal or Coke	Wood	Solar Energy	Other Fuel	No Fuel Used	Total Housing Units
GA	Anchorage	79,128	860	12,405	939	35	249	9	625	572	94,822
GA	Kenai Peninsula	7,828	1,240	1,267	6,525	69	1,361	6	98	44	18,438
GA	Matanuska-Susitna	12,296	876	984	4,971	2	1,321	20	65	21	20,556
GA	Valdez-Cordova	117	230	107	3,004	3	403	1	18	1	3,884
	Total	**99,369**	**3,206**	**14,763**	**15,439**	**109**	**3,334**	**36**	**806**	**638**	**137,700**
		72.2%	**2.3%**	**10.7%**	**11.2%**	**0.1%**	**2.4%**	**0.0%**	**0.6%**	**0.5%**	**100.0%**
GF	Denali	0	10	12	563	68	89	0	2	41	785
GF	Fairbanks North Star	761	389	2,850	22,851	893	906	0	826	301	29,777
GF	Southeast Fairbanks	5	11	22	1,386	0	552	0	120	2	2,098
	Total	**766**	**410**	**2,884**	**24,800**	**961**	**1,547**	**0**	**948**	**344**	**32,660**
		2.3%	**1.3%**	**8.8%**	**75.9%**	**2.9%**	**4.7%**	**0.0%**	**2.9%**	**1.1%**	**100.0%**
SE	Haines	4	12	22	706	0	240	0	7	0	991
SE	Juneau	159	335	2,574	8,131	0	172	0	153	19	11,543
SE	Ketchikan	28	243	576	4,145	0	260	0	109	38	5,399
SE	Prince Wales-Outer Ketchikan	16	173	109	1,420	0	512	0	23	9	2,262
SE	Sitka	16	70	724	2,392	0	52	0	24	0	3,278
SE	Skagway-Hoonah-Angoon	4	39	53	1,050	2	194	2	23	2	1,369
SE	Wrangell-Petersburg	8	74	156	2,152	0	177	0	16	4	2,587
SE	Yakutat	0	4	8	242	0	9	0	2	0	265
	Total	**235**	**950**	**4,222**	**20,238**	**2**	**1,616**	**2**	**357**	**72**	**27,694**
		0.8%	**3.4%**	**15.2%**	**73.1%**	**0.0%**	**5.8%**	**0.0%**	**1.3%**	**0.3%**	**100.0%**
SW	Bethel	36	42	128	3,700	3	265	0	38	14	**4,226**
SW	Bristol Bay	0	0	4	463	0	4	0	2	17	**490**
SW	Dillingham	3	4	38	1,422	4	41	0	10	7	**1,529**
SW	Kodiak Island	46	95	257	3,819	0	59	0	114	34	**4,424**
SW	Lake and Peninsula	1	5	12	527	0	37	2	4	0	**588**
SW	Wade Hampton	5	5	7	1,453	0	127	0	2	3	**1,602**
	Total	**91**	**151**	**446**	**11,384**	**7**	**533**	**2**	**170**	**75**	**12,859**
		0.7%	**1.2%**	**3.5%**	**88.5%**	**0.1%**	**4.1%**	**0.0%**	**1.3%**	**0.6%**	**100.0%**
	Total All	**100,461**	**4,717**	**22,315**	**71,861**	**1,079**	**7,030**	**40**	**2,281**	**1,129**	**210,913**
		47.6%	**2.2%**	**10.6%**	**34.1%**	**0.5%**	**3.3%**	**0.0%**	**1.1%**	**0.5%**	**100.0%**

FIREWOOD FACT SHEET

Firewood was the primary source of fuel until the 1800s when it was displaced by coal and later by oil. Firewood is a renewable resource, provided the consumption rate is controlled to sustainable levels. Proper forestry practices applied to firewood allow the use of a carbon-neutral, or even carbon negative, energy source, since the carbon dioxide released by the burning of firewood was previously absorbed from the ambient atmosphere through photosynthesis. Because of this, firewood can be considered to be a form of solar energy.

There are approximately 35 million fireplaces in the United States today. The use of wood as fuel is projected to increase by over 50% over the next two decades. Burning wood is environmentally sound. The process does not contribute to greenhouse gases. A growing tree absorbs carbon dioxide from the air and into its molecular structure. When the tree dies and decays, it releases the carbon back into the air. The same thing happens when the wood form a tree is burned. The same amount of carbon is released back into the atmosphere. Thus, burning wood is just a faster reversal of the natural cycle. This is unlike burning fossil fuels such as oil or gas. These fuels will release carbon dioxide, which has been buried in the earth for thousands of years, into the atmosphere.

The common measurement for firewood is by the cord or fraction of a cord. A cord of wood corresponds to a woodpile measuring 4' x 4' x 8' or 128 CF of space. The actual solid wood measurement of a cord depends upon the straightness of the piece, how it is split and how it is stacked. The total cubic feet in a cord can vary from 70 to 90 or more cubic feet.

Cordwood is sold in both a seasoned and unseasoned form. Seasoned wood generally has been split, stacked and air dried until the wood reaches equilibrium with the moisture in the surrounding air.

Of the 39 species of wood predominate across the United States, Hemlock ranks number 14 in production of BTU's per cord. Alaska Yellow Cedar is another good specie that is preferred by many in the Southeast Alaska region. Seasoned hemlock generates 8,000 to 8,500 Btu per pound. (Cord weight dry 2,590 lbs - 21,377,500 Btu/cord) A gallon of oil produces 136m Btu's. Approximately 157 gallons of oil is required to produce an equal number of Btu's to one cord of hemlock.

To easily compare energy costs per Btu from various sources, go to WWW.Seley.com and navigate to Alaska Chip & Firewood Sales. Click on Firewood Facts. Scroll to the bottom of the page and click on the BTU efficiency calculator. This will link to the Pellet Fuels institute site where you can enter your current cost of Wood Pellets, electricity, delivered Fuel Oil, propane, natural gas, Coal or Wood to determine the most efficient source of heat in your region.

What is Pellet Fuel?
Burning the Fuel
Compare Fuel Costs
Fuel Availability
Brochure
FAQs
Benefits
Find a Retailer

Pellet Fuels Institute
1901 North Moore St
Suite 600
Arlington, VA 22209
(703) 522-6778

Compare Fuel Costs

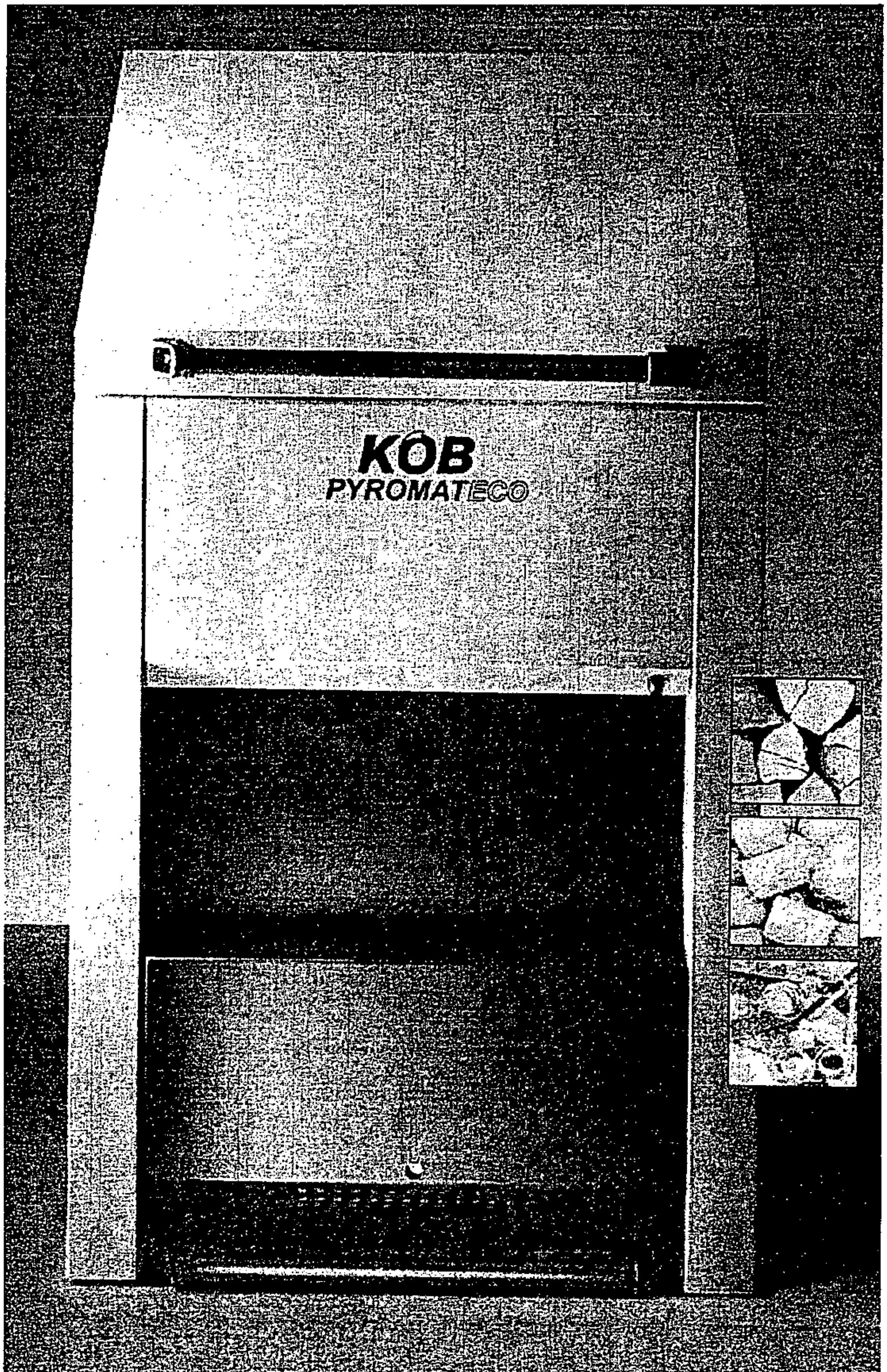
Pellet fuel is a cost stable and price competitive fuel. A good way to understand the price benefits of pellet fuel is to compare it against other home heating fuels. The following chart can assist in comparing home heating fuels.

The values shown are national averages. You may enter your own costs to compare. Enter amounts in dollars except for the cost of electricty, which is in cents. Do not enter a decimal point.

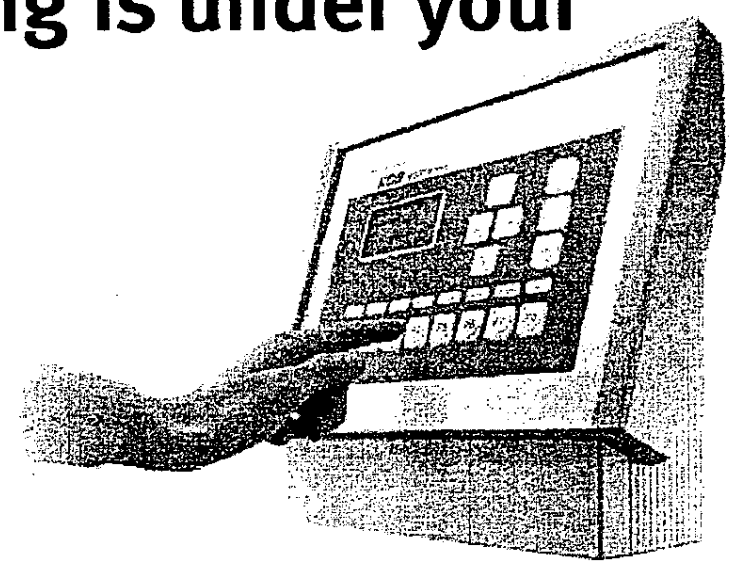
Wood Pellets Cost per ton in dollars $ 225 Appliance Efficiency 80 % **Cost per million BTU=$17.15**	
Fuel Oil #2 Cost per gallon in dollars $ 3.26 Appliance Efficiency 78 % **Cost per million BTU=$30.29**	**Electricity** Cost per kWh in cents 10 ¢ Appliance Efficiency 100 % **Cost per million BTU=$29.31**
Natural Gas Cost per therm in dollars $ 0 Appliance Efficiency 78 % **Cost per million BTU=$0.00**	**LP Gas / Propane** Cost per gallon in dollars $ 2.47 Appliance Efficiency 78 % **Cost per million BTU=$34.67**
Hardwood (air dried) Cost per cord in dollars $ 190 Appliance Efficiency 60 % **Cost per million BTU=$15.83**	**Coal** Cost per ton in dollars $ 0 Appliance Efficiency 75 % **Cost per million BTU=$0.00**

Calculate

Heating with Logs.



Everything is under your control.



Our new generation

Our PYROMAT ECO, specially built to extract heat from wood, incorporates the latest combustion technology.

Multiple fuels


Logs

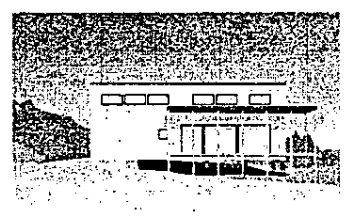

Briquettes


Joinery waste, shavings and sawdust


Offcuts and scrap

A wide variety of uses


Agriculture/Businesses


Detached homes

Slow burning for long lasting heat generation

The capacity of the loading chamber can be used to its maximum. With good heating system design and configuration, a single load of fuel can provide heat for up to three days.

Easy-to-fill

The filling lid is supported by a preloaded gas spring that helps make it easy to open. The various fuel types are asily loaded from above.

Emission-free operations

The exhaust blower starts at the touch of a button - quickly firing up the system. While heating, when refilling and during cleaning, the exhaust blower prevents all smoke and dust emissions.

Easy-to-clean

The ash box can be emptied with the exhaust blower without causing any formation of dust.

Completely computer controlled

The micro processor in the ECOTRONIC controller collects all the relevant operating data and controls output to meet the current demands for heat.
The heating system is permanently monitored - in all phases of its operations, from firing up – to heating up – to refilling – up to the burn out phase. Its operating efficiency is kept at an optimum with motorized air vents.

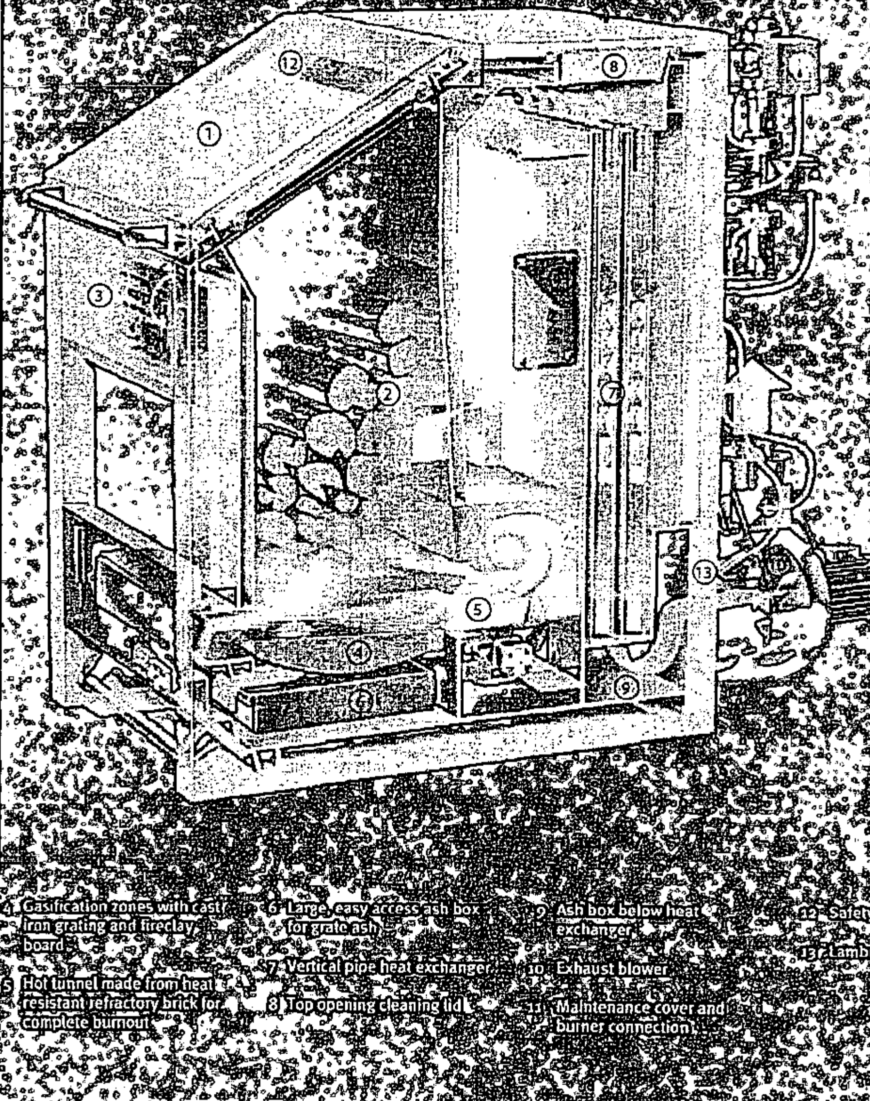
Easy-to-operate

The boiler and heating systems can be controlled at the touch of a button. The contol panel with its well laid out buttons and easy to read screen allows heating control adjustments to be made quickly and easily.

The advantage for the operator

The facility is delivered by a specialist ready for operation. After a simple introduction to the controls, the new owner wil be ready to operate the system.

Economical



1 Large firebox with easy access door

2 Top down conical firebox

3 Electronic burner control panel

4 Gasification zones with cast iron grating and fireclay board

5 Hot tunnel made from heat resistant refractory brick for complete burnout

6 Large, easy access ash box for grate ash

7 Vertical pipe heat exchanger

8 Top opening cleaning lid

9 Ash box below heat exchanger

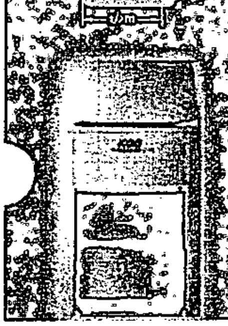
10 Exhaust blower

11 Maintenance cover and burner connection

12 Safety heat exchanger

13 Lambda sensor

PYROMAT ECO
Width of load area 550 mm
Power output: 7 types from 30 to 85 kW

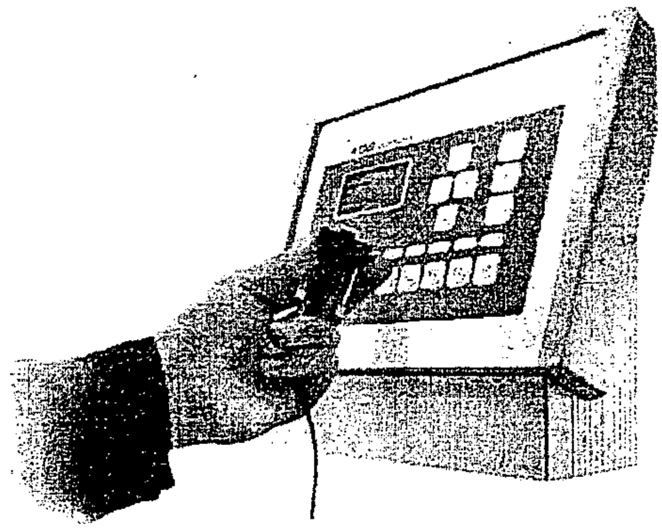


PYROMAT ECO
Width of load area 1080 mm
Power output: 4 types from 60 to 150 kW

PYROMAT ECO
Burner connection

An additional oil boiler may be connected for backup or to cover holiday periods.
The PYROMAT is certified as an oil boiler in accordance with the latest EN-standards.

Plug and Play.



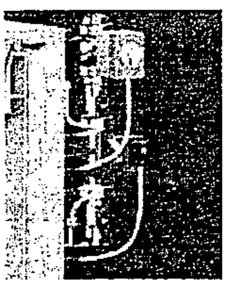
ECOTRONIC control system

The ECOTRONIC facility control system is a decentralized microprocessor system (CAN-BUS) with various modules connected to a data transmission line in a simple fashion.

Control module

The operating interface is organised in a simple an logical manner. The control module can be mounted either on the burner or on a wall.

The ECOTRONIC as a boiler controller.



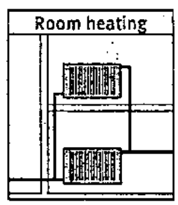
Firing controller.

The firing controller is built into the burner to control the motor-driven air vents by means of an integrated lambda probe. Internally, everything is already wired an ready to plug in. The result is a perfect output control system optimised in terms of emissions.

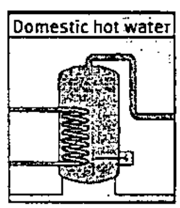
Burner group controler.

Keeping the return temperature up makes for a long service life of the burner. Conduction of heat to the accumulator, disconnection of the exhaust fan and closing of the air vents all go to guarantee the best possible protection against overheating. The burner group (pump and control valve) is mounted on the burner ready to plug in.

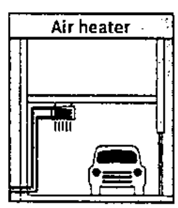
The ECOTRONIC as a heating regulator unit.



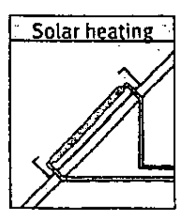
- Heating regulation controlled by atmospheric conditions with digital timer for a daily or weekly programm.
- Available on request with room thermostat
- ECOcircuit and frost-protection functions
- Simple setting of the individual heating curve



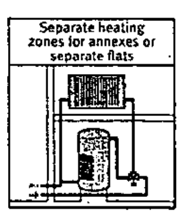
- Automatic reloading of the domestic hot water heater from the boiler or accumulator
- Quantity control with minimum return temperature for precise storage stratification
- In summer operation, up to 14 days' of domestic hot water available from the heat accumulator



- Quantuty control with minimum return temperature for precise storage stratification
- Pump curcuit with timer available (day and night programmes)



- When furnished by the sun, heat is conducted into the utility water heater or into the heat accumulator.
- This control system makes it possible for a maximum amount of heat to be transferred from the solar collector into the heating system.



Easy and efficient heat control for an annex:
- Using weather guided heating controls (as for main central heating)
- At pre-programmed times (e.g. at night) more heat is diverted to the domestic hot water tank.

Using a distributor module and manifold, on the thermal distributor. the system can be expanded to as many as twelve zones.

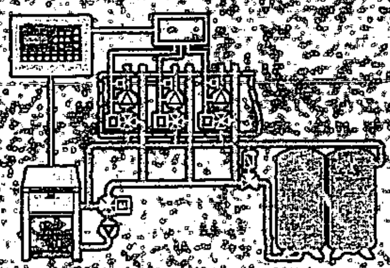
Advantages for the electrician.

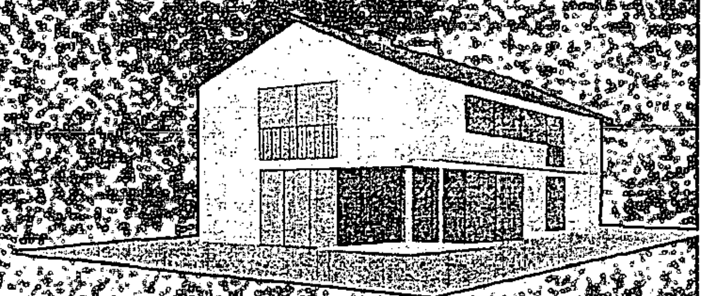
The complete facility control system (including the control systems for all the heat consumers) comes from one source.
Problem-free, simple installation of the modules ready to plug in.

KÖB
Wärme aus Holz

Heating concepts.

ECOTRONIC meets individual heating requirements. It can control up to 12 system groups.





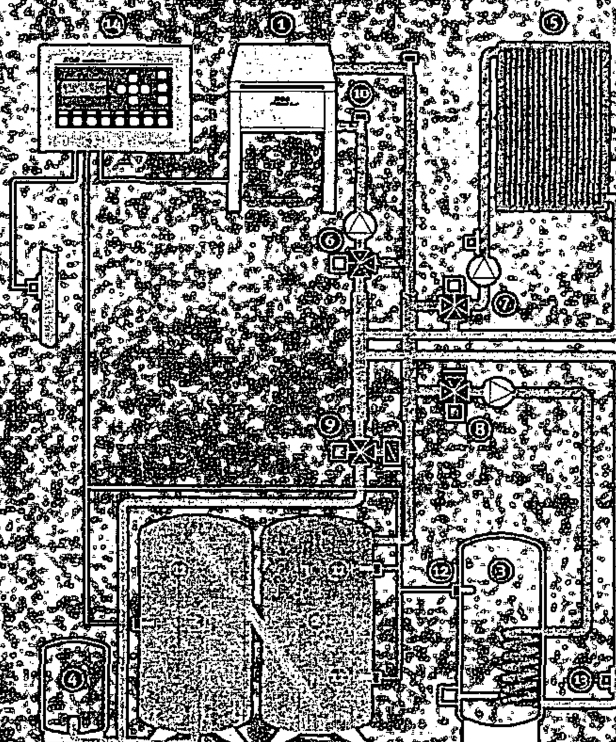
Heat accumulator

- Perfect heating with logs requires an accumulator of sufficient size (mandatory since 2000 according to EN 303-5). Precise stratification of the hot water is necessary in order to make optimmum use of it.
- The ECOTRONIC with its supplementary storage control valce provides an excellent guarantee of this function.
- As a result, solar energy can be used in ideal fashion in combination with log heating.

Heat management system (ECO-function)

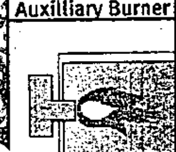
- During the burning phase, the boiler heat not required for heating purposes is carried to the accumulator with precise temperature stratification.
- After burn-out, the residual heat i the boiler is comletely used. KÖB's exloitation of residual heat was honoured during the course if the Swiss campaign programme ENERGIE 2000. An additional yield of 9% per burn-out was observed in testing. Only after this is the heat supply carried out from the heat accumulator. The ingenious control modules for convient heating discharge the accumulator with precise temperature stratification.
- This produces a supply of heat frin the accumulator for the longest possible period of time.
- The automatic ignition system makes it possible to start the burner system with exact timing at the end of the phase.

System with heat storage tank



1 PYROMAT ECO burner
2 Heat storage tank
3 Domestic hot water tank
4 Expansion tank
5 Room heater
6 Burner group
7 Heater group
8 Boiler group
9 Heat storage tank control valve
10 Burner return circuit sensor
11 Heat storage tank feed sensor
12 Boiler sensor
13 Boiler return circuit sensor
14 ECOTRONIC

Auxiliary Burner

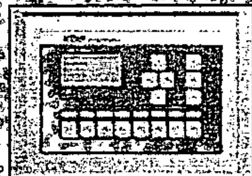


Auxiliary burner.

Automatically switches to auxiliary burner to meet heat demands. Use as single unit or parallel to the wood burner.
Integrated return circuit valves in parallel operating mode.

Full service...

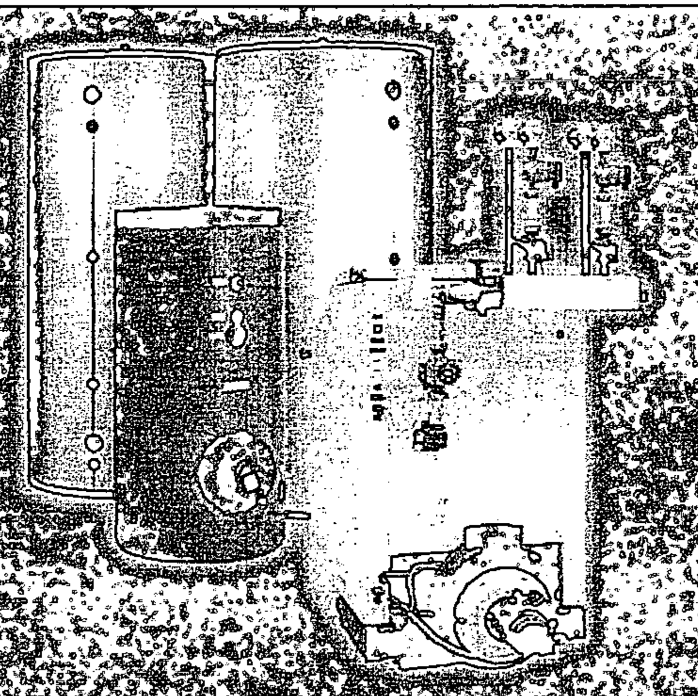
The entire system is from the same manufacturer. This has many benefits. For one, all components of the KÖB system are tuned to function together as a complete heating system. The operator is sure of the safety, reliability and quality of each component. Every system is the sum total of its components...



Proven technology

A KÖB-heating system is a tried and proven high-end, precision manufactured product built with first rate materials.

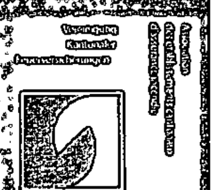
The PYROMAT ECO is a next-step development of the Pyromat that has been providing heat from wood in over 5.000 heating systems. All KÖB components are thoroughly researched and tested under the harshest conditions, then inspected and certified by the relevant authorities.



System components

- Burner system with burner group (burner pump, burner control valve) is ready-to-plug. Includes ready-to-plug operating module, heat storage tank sensor and heat storage tank control valve.
- Burner accessories for special applications such as firebox extensions and exhaust gas dedusters.
- Wall mounted heat distributors with control module for minimal wiring effort. With plug ready auxiliary burner system as a total solution – just connect it to the control module.
- An extensive range of high quality heat storage tanks and domestic hot water tanks. All sizes – even customized sizes – with accessories to feed in solar energy or for electrical recharging are available at short notice.

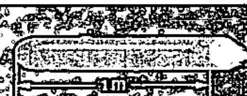
Certificates



TÜV – tested according to EN 303-5

Certificate Holzenergie Schweiz Nr. 0002

Test report EMPA – certification VKF



Boiler type Pyromat	for heating requirements kW1)	Boiler output kW	Capacity Width mm	Capacity contens Liter	Ext. dimensions Height mm	Ext. dimensions Length2) mm	Ext. dimensions Width mm	Weight kg	Exhaust vent ø in mm
ECO 35	14 – 32	35 – 40	550	185	1433	958	795	750	160–200
ECO 45	15 – 40	38 – 50	550	185	1433	958	795	760	160–200
ECO 55	18 – 48	45 – 60	550	255	1490	1163	795	920	160–200
ECO 65	22 – 60	55 – 75	550	255	1490	1163	795	935	160–200
ECO 75	24 – 64	60 – 80	550	255	1490	1313	795	1040	200
ECO 85	30 – 76	75 – 95	550	255	1490	1313	795	1065	200
ECO 61	24 – 68	60 – 85	1080	375	1433	1018	1324	1300	200
ECO 81	30 – 80	75 – 100	1080	375	1433	1018	1324	1320	200
ECO 101	36 – 96	90 – 120	1080	500	1490	1353	1324	1680	250
ECO 151	44 – 120	120 – 170	1080	500	1490	1353	1324	1720	250

1) At the operator's request and need for easy operations

2) With mounted exhaust blower plus 500 mm

2-10-09 Pathway to a Comprehensive Statewide Energy Plan

<target><bill></bill><subject>2-10-09 Pathway to a Comprehensive Statewide Energy Plan</subject><comm>SENE26</comm></target>

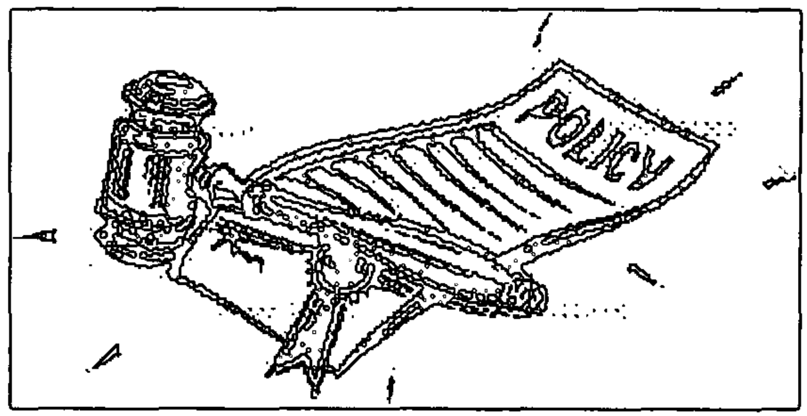
State Energy Policy

Developing an Energy Strategy

Kate Marks
Energy Program Director
National Conference of State Legislatures

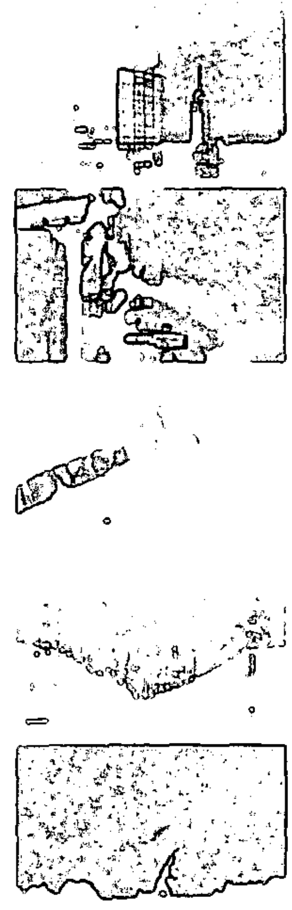
State Case Studies

- Process followed
- Structure of task force
- Objectives of the policy
- Topics covered
- Metrics and Results



What topics do states address?

- Petroleum
- Natural gas
- Coal
- Fuel diversity
- Transportation
- Economic development
- Coalbed methane
- Electricity reliability
- Security
- Transmission



- Net energy balance
- Imports vs. exports
- Energy efficiency and conservation
- Wind
- Biomass
- Ethanol
- Solar
- Oil
- Electric utilities

Goals and Objectives

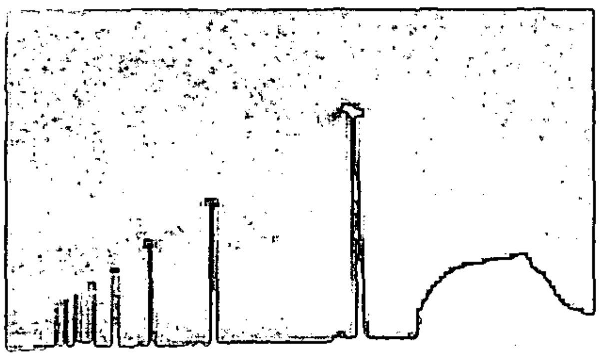
- Improve the public health and environmental quality
- Promote wise land use
- Ensure energy reliability and security
- Implement strategies supportive of a sound economy
- Develop an achievable sustainable energy strategy
- Implement a strategy by which the state can lead by example
- Improved mobility of people and goods
- Low-cost, reliable, and sustainable energy, produced in-state to the fullest extent possible

Goals and Objectives

- Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people
- Increased energy self-sufficiency where the ratio of indigenous to imported energy use is increased
- Reduce the ratio of energy consumption to economic activity
- Increase the use of cost effective renewable resources
- Expand forested areas to ensure a future supply of wood fuel and reduce atmospheric carbon dioxide
- Maintain low-cost energy

KANSAS

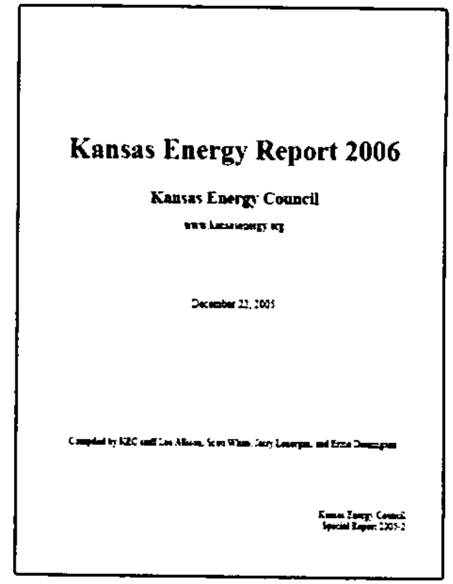
Process and Structure



- Est. by Gov. Sebelius in 2004, in Executive Order 04-05
- Kansas Energy Council
  - Large and diverse group
  - Governor expanded the council to include additional sectors
- Council divided into standing committees
- Council participants paid their own way and used their own time

KANSAS

Report and Recommendations

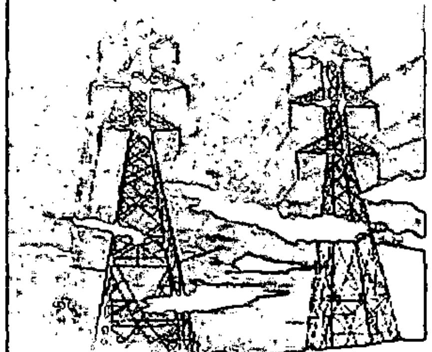

Kansas Energy Report 2006

Kansas Energy Council

December 22, 2005

- Legislative (5), Executive (3), and agency (4) recommendations
- Included short- and long-term goals
- Comprehensive policy
  - Considered entire energy profile
- Updated on a staggered basis
- Budget allocated for staff time = $100K

KANSAS



Results and Lessons Learned

- Passed ethanol, efficiency, electricity transmission bills
- Increased federal funding
- Developed a transmission authority

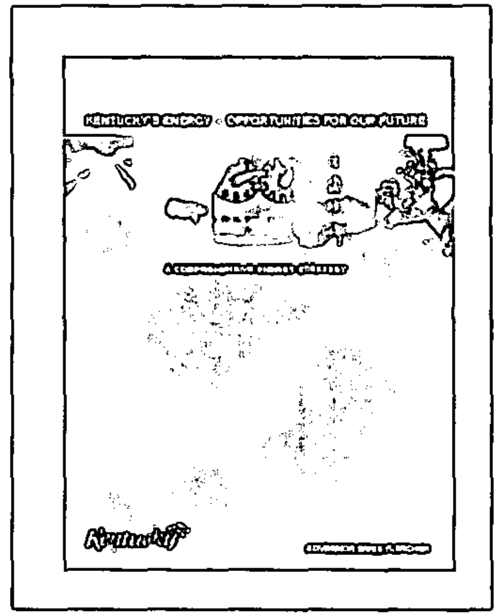
Keep in mind...

"We're doing this for the
next generation,
not the next election."

Rep. Tanya Pullin (KY)
House Chair, Energy Committee

KENTUCKY

Report and Recommendations

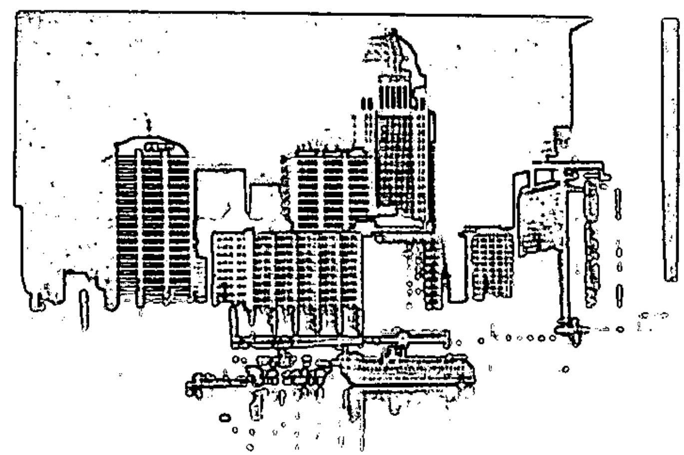


- Report is a 'guiding' policy
  - Less than 40 pages
- 54 recommendations
- Governor has passed 8 executive orders based on recommendations
- 2-3 recommendations per session are introduced to legislature

KENTUCKY

Process and Structure

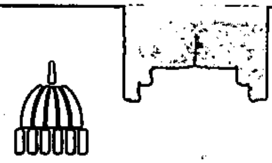
- "Took no time and no money"
- Bipartisan - Enthusiasm from both sides
- Energy Policy Task force
  - 7 members
- Public input
- *General* policy



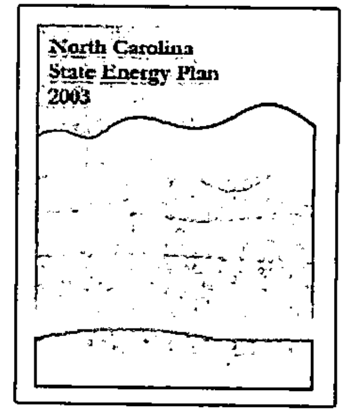
NORTH CAROLINA

Energy Policy Working Group

- Held nine days of expert sessions
- Input from over 25 stakeholders affected by energy consumption and supply
- Public input
- Created draft set of recommended policies and programs to the Energy Policy Council



NORTH CAROLINA



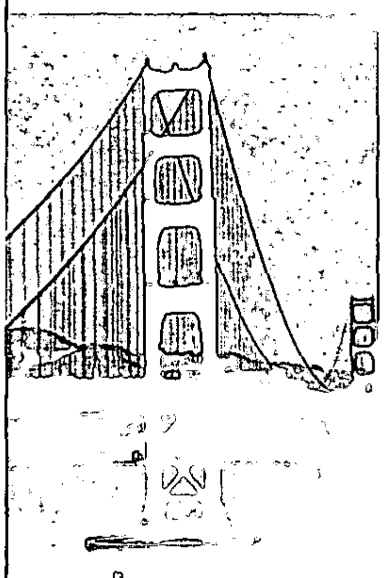
Report and Recommendations

- The Council approved 93 measures to develop an energy plan.
  - Recommended 15 key legislative, regulatory, and administrative policies for action that year
- Energy plan:
  - Directs State Energy Office activities
  - Makes recommendations to utilities
  - Makes requests to general assembly
    - Develop an RPS
    - Investigate public benefits fund

NORTH CAROLINA

- State Energy Office and Appalachian State University Energy Center staff compiled the plan
- Plan involves a significant follow-up effort
  - SEO reports quarterly to the council
  - Revise the plan annually
- Funding proposals to the State Energy Office must be consistent with energy plan

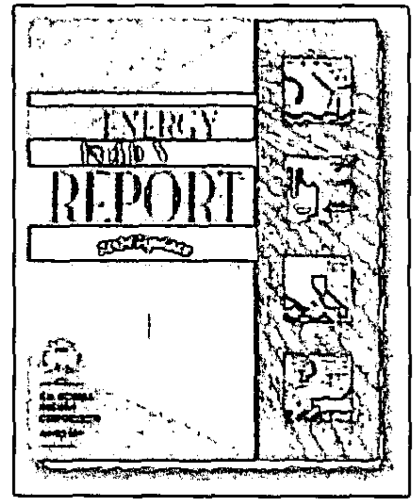
CALIFORNIA



Process and Structure

- IEPR Committee
  - 2 of the 5 commissioners comprise the committee
- 2-year process
- Public input – 60 hearings around the state
- Legislative and expert input – 140 organizations
- Governor's office reviews report and sends to the legislature

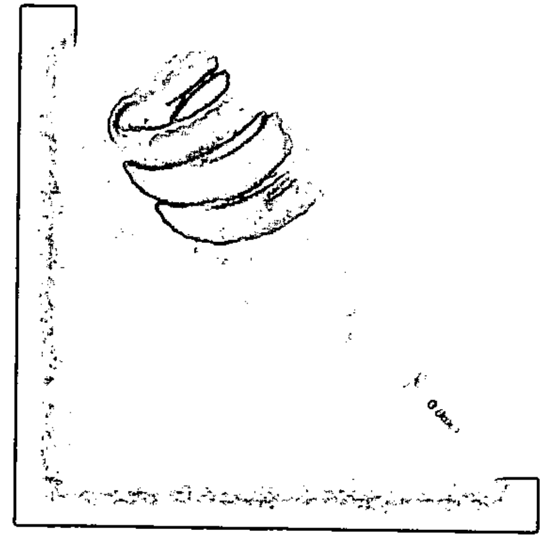
CALIFORNIA



Report and Recommendations

- Integrated Energy Policy Report (IEPR) required by statute every 2 years
- Full-time staff at CEC develop report
- Forecast and recommendation report
- Consultant cost: $2 million

IDAHO



- Established an interim committee in 2006 through a concurrent resolution
- Objectives: Ensure reliable, low-cost energy supply, protect the environment, and promote economic growth

Lessons Learned and Next Steps

General Principles

- Create a 'guiding', or *flexible*, policy
  - Use legislation or executive orders to address specifics
- Timeframe:
  - Policy development typically takes 3-24 months
- Adopt specific goals that the recommendations in the policy will help to achieve
- Create a capacity for analysis
- Determine frequency of policy updates (~ 2 yrs)
- Give the policy "teeth"

Lessons Learned and Next Steps

General Process

- Review state energy statistics and trends
- Involve state government leadership
- Consult national, state, and local organizations and experts
- Use state agency expertise and give the agency the tools it needs to operate effectively
- Involve the public
- Track progress

Contact Information

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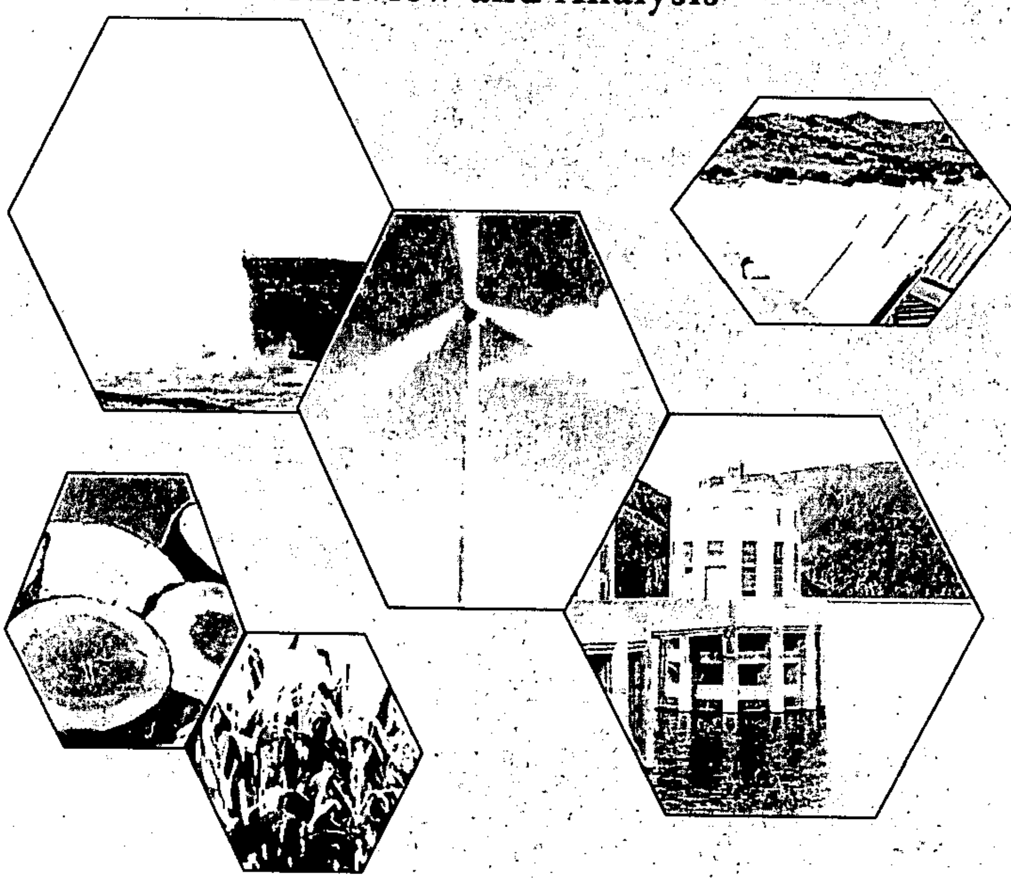
NATIONAL CONFERENCE *of* STATE LEGISLATURES

The Forum for America's Ideas

State Renewable Portfolio Standards

A Review and Analysis



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State Renewable Portfolio Standards
A Review and Analysis

by
Matthew H. Brown
Jennifer A. DeCesaro

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June 2005

NCSL

The National Conference of State Legislatures is the bipartisan organization that serves the legislators and staffs of the states, commonwealths and territories.

NCSL provides research, technical assistance and opportunities for policymakers to exchange ideas on the most pressing state issues and is an effective and respected advocate for the interests of the states in the American federal system. Its objectives are:

- To improve the quality and effectiveness of state legislatures.
- To promote policy innovation and communication among state legislatures.
- To ensure state legislatures a strong, cohesive voice in the federal system.

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Executive Summary

Beginning in the late 1990s, many state policymakers began to express their concern that their state's energy mix had become too dependent on out-of-state fossil energy sources. These policymakers saw the economic benefits they could derive from building new in-state energy resources. Many also thought their states would benefit from the environmental attributes of renewable energy resources. As a result, the states began to adopt a renewable portfolio standard—commonly called an RPS. As of mid-2005, 19 states plus the District of Columbia have adopted a renewable portfolio standard.

In its early years this standard dictated that any electricity retailer in the state generate some part of its power from renewable energy. As it developed, portfolio standards began to rely on a new system of tradable renewable energy credits to guarantee and verify compliance. Through this credit system, each retailer needs to accumulate enough credits to demonstrate that it had met the portfolio standard's goals. One credit is equal to one megawatthour of renewable electricity. Thus, if a retailer's obligation was to comply by using 1,000 megawatt hours of electricity from renewable energy, the retailer could either generate renewable power on its own or it could buy it from another company.

As renewable portfolio standards developed, a number of similar questions began to appear in state after state. These were as follows.

- *What resources qualify toward meeting the RPS?*

  Typically, solar, wind, geothermal and small hydroelectric qualify. States do not always allow large hydro, certain kinds of biomass or other technologies like fuel cells from hydrogen to qualify, however. One state—Pennsylvania—allows waste coal to qualify for its advanced energy portfolio standard.

•*How large should the RPS be, and how quickly should it be phased in?*

The size of the RPS varies a great deal, from only 2 percentage points of the total state's generation to as high as 25 percent in the case of New York. The RPS is always phased in over a period of several years.

•*How will regulated utilities recover their costs?*

In some cases, but not all, the RPS will impose additional costs on utilities or their customers. Most state laws and regulations allow utilities to recover any additional costs related to complying with the portfolio standard, but some also place restrictions on cost recovery. A few use other funds, called public benefit funds, to reimburse utilities for any additional costs of the RPS.

• *Will out-of-state resources qualify for the state's RPS?*

Most states allow renewable energy generated from out of state to qualify for the RPS. Some place restrictions on qualification, saying that the energy must be delivered to the state or that the energy must be delivered to the regional system operator that, in turn, feeds electricity into the state.

•*Can companies use their green pricing programs to qualify toward their RPS obligations?*

Only Arizona currently allows utilities to use their green pricing programs (programs through which customers voluntarily pay a little extra each month to subsidize utility renewable energy investments) to help meet the renewable energy goals of the RPS. In general, states have concluded that green pricing programs are voluntary and are designed to allow customers to help utilities pay for investments they are not otherwise required to make.

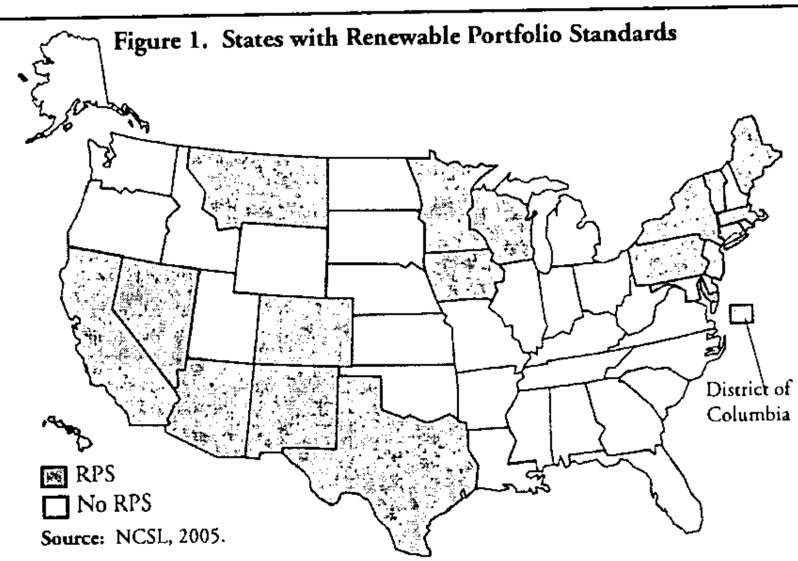
The experience with renewable portfolio standards is somewhat limited to date; many are in the early years of a multi-year phase-in. States can begin to derive some early lessons from the experience thus far, however. The document concludes with a discussion of these lessons.

INTRODUCTION

The United States generates its electricity with gas, coal, nuclear power, some oil, and some renewable energy such as wind, hydroelectric power, solar power, biomass or geothermal energy. Coal, gas, hydropower and nuclear energy dominate that mix, and probably will continue to do so for the foreseeable future. Renewable energy's currently small proportion of the total is increasing rapidly, but from a very small base. As state policymakers seek to speed up the growth in renewable energy, one of the most common policies under consideration is a renewable portfolio standard (RPS).

The renewable portfolio standard is a flexible mandate that requires power retailers to put renewable energy into the mix of fuels they use to generate electricity. In its most basic form, the portfolio standard places a requirement on utilities, saying they must build or buy a certain amount of renewable energy capacity each year. In practice, most portfolio standards have developed into more complex and nuanced policies. Twenty states and the District of Columbia now have such a standard as shown in figure 1.

Figure 1. States with Renewable Portfolio Standards



Source: NCSL, 2005.

This document describes how portfolio standards work and answers the major questions that state policymakers ask about their design. With 19 laws[1] in place around the country, a body of experience now is available that can instruct policymakers on the design of these standards.

This document is divided into several sections:

1. A discussion of what the RPS accomplishes and fails to de well;
2. Cost of the RPS and cost recovery for the RPS;
3. A description of what resources qualify for these standards;
4. The structure, size and phase-in of these standards;
5. A discussion of who administers the RPS;
6. Applicability of and exemptions from the RPS;
7. How out-of-state resources qualify;
8. A discussion of tradable renewable energy credits;
9. The overlap between green pricing programs and the RPS; and
10. Lessons from the RPS.

This document is not designed to analyze the advantages or disadvantages of a renewable portfolio standard, but to provide background to help states determine whether an RPS suits its resources, needs and priorities. Table 1 summarizes the major arguments for and against the portfolio standard.

Table 1. Portfolio Standards Pros and Cons

Proponents Say	Opponents Say
The RPS can save customers money or, at the very least can add an element of stability to electricity rates, since most renewable "fuel" is free. The capital cost of wind energy is competitive with that of coal plants.	The cost of renewable energy lies in its high capital cost, which can be as much as twice the cost of the lowest cost natural gas-fired power plants. It is possible to lock in fuel prices for natural gas.
Renewable energy can contribute to energy security by helping the country become more energy independent and, at the same time, by protecting the environment.	Renewable energy helps energy security but must be considered in the context of domestic resources such as coal or natural gas.
Wind energy is predictable, to a point. Techniques for day ahead and hour ahead projections of wind output at a particular location have improved substantially. So long as wind is well integrated with the rest of the electric system acting as a backup, wind can work well. When wind makes up around 15 percent of electricity generation, typical integration costs are around one-half cent per kilowatt hour (kWh). Solar installed in southwestern regions of the country has a production profile that closely matches the peak energy needs in those regions. Biomass, geothermal and hydroelectric power are not intermittent and can be baseload.	Wind energy is intermittent and that intermittency adds cost to wind power plants. Power companies need to be able to lock in a predictable supply of power.
The RPS presents a market-based approach to integrating valuable new renewable resources into the electric system. Perfect markets do not exist in the delivery of electric energy services. Utilities traditionally have little or no experience with such technologies. Thus, RPS policies help overcome market barriers.	An RPS is a mandate that adds complexity and new regulatory burdens to an already heavily regulated industry.
The RPS requires the power sector to adopt new technologies and to learn about and integrate those new technologies. They are ready for the marketplace, but many utility systems are not accustomed to them.	The RPS may force power systems to adopt new technologies before they are really ready. Renewable energy does not always fit into the existing system and, in some cases may need new transmission infrastructure.
The RPS diversifies the fuel mix the country uses to generate electricity. Fuel diversity can stabilize prices and alleviate the effects of supply disruptions.	Government mandates have failed in the past and can actually increase costs and risks.

Source: NCSL, 2005.

WHAT DOES THE RPS ACCOMPLISH?

Depending on the area of the country, the RPS tends to produce a great deal of utility-scale wind development, landfill gas development, and some geothermal energy development. States can tailor the RPS so that, outside its simplest form, it can encourage other types of technologies such as solar, small-scale wind or fuel cells. In New England, the RPS is encouraging development of fluidized bed biomass systems.

Renewable energy project developers like the RPS because it guarantees a market for their product. The RPS creates certainty, and that certainty gives developers the confidence to make investments in resource assessment, to negotiate lease agreements with landowners, and to apply for permits. It gives them the certainty they need to make an investment and, in turn, helps developers secure financing.

As a policy tool, the RPS does a good job of using market forces to drive down prices for new renewable energy sources. Rather than set a floor price or offer a subsidy for green power, it creates a market and then drives developers to compete on price to supply that market.

What Does the RPS Fail to Do Well?

The RPS is not always the best policy tool to encourage small-scale or distributed energy technologies. In most cases, it has been designed to encourage large, utility-scale projects. Some states, such as Colorado, tailored their RPS to encourage small-scale renewable energy projects, but the results from that effort are not yet available.[2]

Unless it is designed to do so, the RPS is not the best policy to encourage higher-cost technologies. In general, it promotes competition among renewable energy technologies and results in large supplies of least-cost technologies. Several states, including New Jersey, have developed different percentage goals for different technologies. This approach creates a market for both types of technologies and does not allow one technology to dominate. (The tiered technology approach is discussed further in the following section.)

HOW MUCH DOES AN RPS COST?

Renewable portfolio standards may cost ratepayers additional money, or they may save money. This depends on several factors, including the region of the country and the design of the portfolio standard. There are several factors to consider.

- Higher requirements may equal higher costs if technology and investments are not able to keep up with the requirements of the portfolio standard.

- Regions with higher quality renewable resources may see cost reductions as the result of an RPS. Those with poorer resources may see cost increases. New Jersey, for example, does not have the near-term potential to develop the same amount of renewable resources that Colorado does, and, although Colorado has estimated that its RPS will result in cost decreases for electricity customers, New Jersey predicts that it will see cost increases of more than $11 per customer per year as the RPS reaches its targets.

- Regions that currently rely heavily on more expensive nonrenewable resources such as natural gas may see cost reductions.

- The design of the standard influences cost. A standard that asks for the lowest cost renewable energy technologies will be less expensive than one that requires carve-outs for specific, higher cost resources such as solar power. A higher goal for the less mature-and possibly more expensive-technology will make the standard more expensive.

- Cost is difficult to measure. Most renewables have no fuel cost and, as a result, can ensure price stability into the future, even if they may cost a bit more at first. There is some value to this price stability, although it is difficult to quantify. Fossil fuel-based generation faces risks from fuel price increases and future environmental regulation.

Table 2 demonstrates the results of several cost studies of renewable portfolio standards in various parts of the country. In general, the studies showed neither dramatic cost increases nor dramatic savings. Savings or cost increases all were within 0.5 percent of the existing rates, approximately $3.50 per year for the typical household. New Jersey was the exception to this rule, with a substantially higher cost estimate.

Table 2. Cost Impacts of Renewable Portfolio Standards

State	Author(s) of Study	Incremental Target Year	Overall Rate Impacts	Average Effect on Residential Bill
California	UCS/SEA/ LaCapra	41,000 GWh* (2010)	Savings: 0.5% in 2010	Savings:$3.50 per year in 2010
Colorado	Binz	4,500 GWh (2020)	Savings: 0.5% expected value	Savings: $2.40 per year expected value
Washington	Tellus et al.	14,300 GWh (2023)	No impact	No effect
Minnesota	Wind	6,300 GWh (2010)	Savings: 0.7% on average	Savings: $4.60 per year on average
Iowa	Wind	4,400 GWh (2015)	Savings: 0.3% on average	Savings: $3.40 per year on average
Wisconsin	UCS/SEA/ LaCapra	7,500 GWh (2013)	Cost: 0.6% on average after 2010	Cost: $3.30 per year on average after 2010
Pennsylvania	Black and Veatch	17,000 GWh (2015)	Cost: 0.46% on average	Cost: $3.50 per year on average
New Jersey	CEEEP/ Rutgers	15,500 GWh (2020)	Cost: 3.7% in 2020	Cost: $33 per year in 2020
New York	DPS/SEA/ LaCapra	12,000 GWh (2013)	Cost: 0.32% in 2009	Cost: $3 per year in 2009

* GWh = 1,000 MW

Source: Lawrence Berkeley National Laboratory, 2004.

Cost Recovery

The deployment of new renewable energy resources and supporting transmission infrastructure can be costly, and the method used by utilities to recover those costs can be an important issue for any state that still regulates some or all of its utilities' electricity rates. Even in states that restructured their utility industry, cost recovery methods can be controversial if the utilities continue to operate under a rate cap—meaning they cannot raise their electricity rates. States can address cost recovery in several ways. In some states, legislation specifically guarantees that they can recover their costs-eventually, if not immediately; in others, certain categories of costs are specified that utilities can or cannot recover. A third approach describes the mechanism through which utilities can recover their costs (such as a surcharge on utility rates for all customers).

- Arizona lets utilities use its system benefit fund (a fund established and financed through a small charge that every utility customer pays) to pay for additional costs that the RPS imposes on them.

- California's utility commission will set a benchmark price for renewable energy purchases. The system benefit fund will cover costs over this benchmark price. As of early 2005, the utility commission had not yet set the benchmark price, although it is likely to be based on an estimate of long-term market prices for renewable energy.

- Connecticut's distribution utilities (those that serve Connecticut customers with power they buy from other companies that own power plants) have a guarantee that they will recover the costs of the first 100 megawatt (MW) of renewable energy they purchase.

- Maryland and the District of Columbia guarantee that their utilities will be able to recover their prudently incurred costs, including compliance fees (those fees that companies pay as an alternative to buying renewable energy). The mechanism would be an additional fee placed on all customers' bills. Maryland specifies that compliance fees are recoverable only if the commission determines that compliance fees represent the least cost way to meet the standard, if the utilities' renewable energy supplier fails to meet its obligations, or if Tier I resources are unavailable.

- Legislation in Nevada, New Jersey, New Mexico, Rhode Island and Wisconsin specifies that utilities can recover costs related to the RPS if the commission determines that they are prudent and reasonable. In Nevada, contracts entered into between renewable energy providers and a Nevada utility and approved by the Nevada Public Utilities Commission are deemed prudent by statute for purpose of cost recovery. Conversely, New Mexico's statute stipulates that utilities can recover reasonable costs related to interconnecting the renewable energy generators with the power grid. This legislation adds that the utilities can defer recovery of their costs by tracking the costs in an account, and that those deferred costs can accrue interest until they are actually placed into the rate base. Rhode Island adds that the distribution utilities may recover their costs for supporting the New England credit trading program. (A later section of this paper addresses credit trading.)

Cost Caps on the RPS

Many states try to limit the effects of the costs of the RPS on individual consumers. They do this in several ways, including explicit caps on potential increases in consumers' bills or through indirect ways such as alternative compliance mechanisms and penalties, all of which are described below.

Colorado is one state that sets an explicit cost cap with a requirement that the portfolio standard not result in an additional charge of more than $.50 per residential customer per month. The cost cap in Colorado may create some difficulties as the state attempts to meet its 0.4 percent solar energy goal. Installation of solar energy tends to cost in the range of $8,000 to $9,000 per Kilowatt (kW), compared to a typical cost of approximately $1,000 to $1,200 for wind energy. The interaction of the cost cap and the solar requirement may create challenges for the state.

Massachusetts,[3] New Jersey, and Rhode Island give an option to comply with the RPS by paying a fee of $.05 per kWh; Connecticut's fee is $05.5, instead of purchasing either tradable renewable energy credits (RECs) or entering into a contract to buy renewable energy. In Maryland, compliance fees are $.02 per kWh for Tier 1 resources and $.015 for Tier 2 resources. The funds from these alternative compliance mechanisms in Connecticut, Maryland, Massachusetts and New Jersey go into a fund to support other clean energy projects.

Montana requires all non-restructured utilities to comply with the standard as long as the per kilowatt hour cost of the renewable generation does not exceed the cost of power from other generating sources by more than 15 percent. A public utility that does not comply with the standard may be assessed an administrative penalty of $10 for each megawatt hour of renewable energy credits they fail to procure.

WHAT QUALIFIES AS RENEWABLE?

States make many distinctions about which resources count toward the renewable portfolio standard. They distinguish not only among the technologies that qualify as renewable, but also the size of the qualifying system and other characteristics of the system.

In the majority of states that have an RPS, all renewable generation meets the renewable standard, whether or not it existed prior to adoption of the standard. Thus, if a state had a 20 percent standard such as California's, then any existing renewable resources qualify, but companies would need to acquire new resources to come up to the 20 percent standard. Just six states address this point.

- Hawaii allows the use of all preexisting renewables to meet the RPS.

- Maryland places a limit on the use of preexisting renewables.

- Massachusetts does not allow preexisting renewables to count toward the RPS; all resources must be new. However, the Department of Energy Resources may provide a preexisting plant with a waiver that qualifies any increased output over a defined annual baseline as "new.

- Montana does not allow most preexisting renewables to count towards the RPS—all qualifying resources must have commenced operations after January 1, 2005.

- Two of the remaining three states—Rhode Island and Wisconsin—allow preexisting facilities to account for only a certain percentage of each year's requirements. In Rhode Island, for example, no more than 2 percent of each year's requirements can be met with pre-1998 resources. Texas allows retail electric providers to use pre-1999 resources to offset some of their RPS obligation if they have preexisting supply agreements.

The size of the qualifying renewable energy system is a question only for hydroelectric power. States that include hydroelectric power in their standard usually limit the size of the system that qualifies. Finally, five states—Connecticut, Maryland, New Jersey, New York and Pennsylvania—and the District of Columbia, separate the qualifying technologies into two tiers. The rationale for having two tiers is not outlined in any state's RPS language. However, those included in the first tier tend to be less environmentally intrusive than those in the second tier, which usually include large-scale hydroelectric power and waste-to-energy facilities. States usually have different percentage goals for each tier. This is described in greater detail below.

Qualifying Technologies

Every renewable technology has its own definition and a unique set of policy issues. This section describes each technology and its relationship to the RPS.

Biomass

In the most general sense, biomass is plant matter such as trees, grasses, agricultural crops and residues or other biological materials, such as municipal solid waste and sewage sludge. Biomass power plants burn this material as fuel or convert it into liquid or gaseous forms to produce electricity, among other things. Some state definitions of biomass are more broad and may include landfill gas, municipal waste and digester gases from municipal wastewater treatment facilities.

Because biomass is one of the more complex renewable technologies, it consistently raises a number of policy issues. These include:

- Whether all the qualifying biomass resources included in the definition of biomass are truly renewable.

- What is the emissions profile of biomass? Biomass is unusual among the renewables in that it releases some emissions into the air. As a general rule, these emissions (especially of sulfur) are very low and are subject to the same regulations as all other power plants. Biomass power plants generate the same amount of carbon dioxide as fossil fuel plants, but as new trees or crops grow, they remove carbon dioxide from the atmosphere. As long as plants are continuously replenished to make a feedstock for biomass energy, the biomass power plants are carbon neutral, meaning that they release zero net carbon dioxide emissions.

- Because of the abundance of biomass energy resources, the advanced stage of many biopower technologies, and the prevalence of landfill gas facilities, biomass has the potential in some states to dominate the resources that supply a state's RPS.

These policy discussions often result in laws that distinguish between desirable and less desirable kinds of biomass. Some states exclude certain categories of biomass (such as wood waste that has been treated with chemical preservatives) from the RPS altogether. Others place the biomass they feel is less desirable into Tier II.

Every state with a renewable portfolio standard includes biomass in its definition of a renewable energy resource. It is what is included in the definition of biomass that varies from state to state, however. Six states—Arizona, California, Iowa, Maine, Texas and Wisconsin—do not further define the biomass resource or generating system. The remaining states and the District of Columbia further define biomass.

Some of those states that further define biomass have an all-inclusive definition and some differentiate among resources. The definition of biomass in Colorado, Minnesota, Nevada, New Mexico and Rhode Island is comprehensive and includes agricultural wastes, wood wastes, energy crops, landfill methane, biogas, municipal wastes, industrial digester gases and neat biodiesel.[4]

In contrast, Hawaii differentiates among biomass resources and includes only the biomass portion of municipal solid waste, biofuels or fuels derived entirely from organic sources in its definition of biomass. Hawaii allows landfill gas and waste-to-energy to qualify for the RPS, but does not define them as biomass.

Vermont focuses its biomass definition on methane and other flammable gases produced by the decay of sewage treatment plant and landfill wastes and the anaerobic digestion of agricultural products, byproducts or wastes. Excluded from this definition are all forms of solid waste, with the exception of agricultural and silvicultural wastes.

Montana is another state that differentiates among biomass resources and includes landfill or farm-based methane gas, gas produced from wastewater treatment, and "low-emission, nontoxic biomass" based on dedicated energy crops, animal wastes, or solid organic fuels from wood, forest, or field residues. Not included in this definition are wood pieces that have been treated with chemical preservatives such as creosote, pentachlorophenol, or copper-chroma-arsenic.

In Connecticut, a biomass facility may include biomass gasification plants that use as fuel biomass that regenerates or that, when used, will not deplete the resource. The state places these biomass facilities in Class I or Class II, based on the date that operations began. If the facility began operation after July 1, 1998, and has a nitrogen oxides emission rate of less than .075 pounds per million Btu of heat input, it is in Class I; facilities in operation prior to July 1, 1998, with a nitrogen oxides emission rate of .2 pounds per million Btu of heat input or less, are in Class II. Connecticut does not include methane gas from landfills in the biomass definition, but includes it as a Class I resource. Connecticut's NOx emission limit of 0.075 pounds per million Btu is an important criterion. Class I biomass resources must not emit more than .0075 pounds per million Btu of NOx.

Maryland identifies qualifying biomass as nonhazardous organic material available on a renewable or recurring basis. The state specifically excludes from this category unsegregated[5] solid waste, post-consumer waste paper, and invasive exotic plant species. Tier I includes all qualifying biomass, as well as methane from anaerobic digesters or wastewater treatment plants; Tier II includes the incineration of poultry litter and waste-to-energy technologies.

Biomass is included only in New Jersey's Class I renewables. Included in the definition are methane gas, bioenergy crops and wood wastes.

New York is another state that includes biomass only in one tier. Eligible biomass resources included in the Main Tier of New York's RPS are waste-to-energy facilities. The Main Tier[6] also includes biogas and liquid biofuels. The Customer-Sited Tier includes no biomass technologies.

Pennsylvania includes biomass in both Tier I and Tier II. The Tier I definition of biomass includes agricultural wastes, wood wastes, sustainable crops and biomass portions of municipal solid waste. Also included in Tier I, but not in the definition of biomass, are landfill methane, biogas and liquid biofuels. Tier II resources include wood pulp and wood manufacturing byproducts.

The District of Columbia defines qualifying biomass as agricultural wastes, wood wastes and cofired biomass.[7] Tier I includes all qualifying biomass, while Tier II includes waste-to-energy technologies.

Fuel Cells

Hydrogen is the simplest and most plentiful element, yet it does not occur naturally as a gas. Some type of conversion process must separate the hydrogen from another element, such as from oxygen in water. This process requires an energy source, such as a wind turbine, solar cell or fossil fuel. Once the hydrogen is separated, a fuel cell passes hydrogen through a membrane to produce electricity, heat and water. Often compared to a battery—both convert the energy produced by a chemical reaction into usable electric power—a fuel cell will produce electricity as long as fuel (hydrogen) is provided and will never lose its charge. Hydrogen fuel cell technology shows a great deal of promise, but is still new and relatively untested.

Some states permit fuel cells to qualify as a renewable technology that can help meet the portfolio standard requirements. States that classify resources by tiers always class fuel cells as a Tier I resource. Two issues arise consistently when states discuss fuel cells, however:

- Fuel cell technologies still are in the early stages of development and their potential to penetrate the renewables market is small; and

- A state can specify that the fuel cells need to be powered by renewable resources; without this specification, a fuel cell powered by fossil fuels may receive credit in a state's RPS.

Thirteen states include some form of fuel cell technology in their RPS. Seven of the states—California, Hawaii, Massachusetts, Montana, New Jersey, Rhode Island and Wisconsin—and the District of Columbia qualify the fuel cell definition by requiring that the fuel cells use renewable resources. New Mexico states that the fuel cell may not be fossil fueled. Maryland specifically requires that the fuel cell use methane or qualifying biomass resources.

Hawaii is unique in that it addresses the potential for a fuel cell to be powered simultaneously by both renewable and nonrenewable energy sources, but only the renewable portion receives credit for the RPS. Pennsylvania states that the energy source for the fuel cell must be obtained without combustion.

Three states—Connecticut, Maine and New York—do not further qualify the requirements of the fuel cell.

Geothermal

Geothermal energy—the earth's heat—is the thermal energy contained in the rocks and fluids in the earth's crust. In most areas, this heat reaches the surface in a very diffuse state. Due to a variety of geological processes, some areas—including substantial portions of many western states—are underlain by high-temperature geothermal resources, which have tremendous potential for producing electricity. Geothermal power plants use well-established technology but have a high initial cost (mostly because developers usually have to drill a significant number of exploratory wells before they locate an effective underground resource. There is no fuel cost once developers find the resource, however. Geothermal resources are based in nature and geothermal plants have capacity factors as high as 97 percent, higher than any other generation resource.

Certain issues consistently arise when states discuss geothermal resources.

- Although most geothermal power plants are considered to be a completely clean source of energy, certain air emissions may be associated with the operation of certain types of geothermal plants. Flash steam geothermal plants convert ("flash") hot water in an open process into steam to drive turbines. This process exposes the minerals and gases in the geothermal fluid to the above-ground atmosphere. The nitrogen oxide and sulfur dioxide emissions associated with flash steam geothermal plants result from capturing and incinerating the hydrogen sulfide that occurs naturally in some geothermal resources. The chemical composition of each geothermal reservoir is unique, but certain compounds such as arsenic and boron may be commonly found in these resources due to their volcanic nature. In a flash steam plant, these minerals may pose a hazard that must be addressed.

- Many newer geothermal plants use a modern binary geothermal process, where the geothermal fluids pass through a heat exchanger and never expand in the open above-ground atmosphere. In these binary plants, neither nitrogen oxide and sulfur dioxide emissions nor hazardous mineral deposits pose a problem, since binary plants are completely closed loop systems; the geothermal fluids are re-injected into the reservoir to be reheated and reused.

- Various siting issues may be associated with geothermal facilities. The initial resource exploration can be intrusive if numerous test wells are drilled into the ground. Once developers locate an adequate resource and they situate the geothermal power facility directly over that fuel source, it requires no additional land. In scenic areas, developers build the geothermal facility with a low height profile and use various mitigation measures to reduce intrusion on the visual landscape.

- Potential water quality issues arise in development of a geothermal well. Geothermal water contains higher concentrations of dissolved minerals than do cold groundwater aquifers. To prevent mixing geothermal water and groundwater, developers cement pipe or casing into the ground.

- The availability of the geothermal resource varies geographically. Geothermal resources that are capable of generating electricity exist in most western states including, Texas. No eastern states have resources that are capable of generating geothermal electricity.

- Some western states with a significant geothermal resource may find that geothermal energy takes a considerable share of the total renewable resource standard, potentially overwhelming some other resources.

Thirteen states—California, Colorado, Hawaii, Maine, Maryland, Montana, Nevada, New Jersey, New Mexico, Pennsylvania, Rhode Island, Texas and Wisconsin—and the District of Columbia, include geothermal resources in their definitions of what qualifies as renewable resource within the portfolio standard. Rhode Island does not directly refer to geothermal but, rather, to "the heat of the earth." Although some eastern states include geothermal in their definitions of renewable energy, they will not see development of geothermal electric power plants because they lack geothermal resources. Such states could, however, see geothermal heat pumps, which use the constant temperature a few feet below ground level to help pump warm air in winter or cool air in summer into a building or a home; heat pumps do not generate electricity.

Hydroelectric

Hydroelectric power is generated by the power of moving—but not necessarily falling—water. A pumped storage hydroelectric plant produces energy during peak demand periods using water pumped into an elevated reservoir during off-peak periods. When a facility uses both pumped reservoir water and natural current flow, it is referred to as a combined pumped-storage hydroelectric plant. Low-impact hydropower facilities minimize the environmental impacts—river flows, water quality, and threatened and endangered species—of their facilities, which does not necessarily mean that they are small in scale.

Hydroelectric is a well-established technology: therefore, its issues also are well established. They include the following.

- Hydropower facilities can affect a large geographic area. The storage reservoirs can inundate large areas of forest, farmland, wildlife habitats, scenic areas and even towns, especially as part of larger projects with greater power generation. In addition, dams can cause significant changes in river ecosystems, both upstream and downstream.

- Operating hydropower facilities have had detrimental effects on fish populations, some of which are endangered or threatened species. Dam operators use mitigation efforts such as fish ladders and screens around turbine blades to lessen the severity of these effects, but the controversy over fish dominates discussion of hydropower policy, particularly in the Pacific Northwest.

- Because so many hydropower facilities—both large and small—are in operation and have paid off much of their capital costs, the technology potentially could take over the RPS unless states restrict the requirement by specifying that only new facilities qualify or by specifying that only facilities below a certain size qualify.

- Particularly with drought in the Pacific Northwest the output from hydropower plants is unpredictable.

Only four states do not include hydroelectric power as a qualifying renewable energy source in their portfolio standards. The 16 that include hydroelectric power do so at varying levels. Table 3 outlines the qualifications in each participating state.

Five of the states that include hydroelectric power in the RPS—Hawaii, Maine, Nevada, New Mexico and Texas—do not place restrictions on the types of facilities that qualify as renewable.

Table 3. State RPS Qualifying Hydroelectric Resources

State/Jurisdiction	Qualifying Hydroelectric Resource
California	Small hydroelectric generation of 30 MW or less owned by an electrical corporation as of the enactment.
Colorado	Hydroelectricity with a nameplate rating of 30 MW or less.
Connecticut	Run-of-the-river hydroelectric power facilities with a generation capacity of 5 MW or less that does not cause an appreciable change in river flow that began operations after effective date.
Maryland	In Tier I, small hydroelectric power plants of less than 30 MW in capacity; in Tier II, hydroelectric power other than pump storage generation.
Minnesota	Hydroelectric power plants with a capacity of less than 60 MW.
Montana	Hydroelectric projects that do not require a new appropriation, diversion, or impoundment of water and that has a nameplate rating of 10 megawatts or less.
Nevada	Small hydroelectric generation of 30 MW or less.
New Jersey	Included only in Class II at hydroelectric generation facilities of 30 MW or less.
New York	Hydroelectric power plant upgrades and hydroelectric plants of under 30 MW without storage impoundments.
Pennsylvania	Low-impact hydroelectric in Tier I and large-scale hydroelectric (including pumped storage) in Tier II.
Rhode Island	Small hydroelectric generation of 30 MW or less.
Vermont	Hydroelectric facility with a generating capacity of 200 MW or less.
District of Columbia	In Tier II, hydroelectric power other than pumped storage generation.

Source: NCSL, 2005.

Ocean Energy

New technologies to harness the movement and heat of the ocean are in the early stages of penetrating the renewable energy market. One such technology uses wave movement to drive an electrical generator; the power then is transported to shore via an underwater cable. Ocean thermal energy conversion technologies use the ocean's natural thermal gradient—the fact that the ocean's layers of water have different temperatures—to drive a power-producing cycle. Technology also can harness tidal currents using offshore underwater devices that resemble wind turbines.

The world's oceans cover more than 70 percent of the earth's surface, giving them the potential to become one of the world's major power sources. In spite of this, there are issues associated with their inclusion in a state's RPS, including the following.

- Ocean conversion technologies are in the early stages of development, and their potential to penetrate the renewables market is so small at this time that they might be overlooked.

- Because of the off-shore nature of these technologies, their potential effect on the ocean's fisheries and surfers could prompt opposition.

Coastal states—California, Connecticut, Hawaii, Maine, Massachusetts, New Jersey, New York, Rhode Island and Texas—and the District of Columbia include ocean resources in their definitions of qualifying renewable energy technologies. Those that have tiered resource classifications include these technologies in the first tier. Identified resources include ocean waves, tidal current and ocean thermal energy conversion. Although Wisconsin, is not a coastal state, it borders Lake Michigan and includes tidal or wave action resources as qualifying technologies.

Solar

Solar technologies harness the sun's energy to provide heat, light, hot water and electricity. Photovoltaic (solar cell) systems convert sunlight directly into electricity. Concentrating solar systems use the sun's heat to run a generator to produce electricity.

Although solar technologies are widely accepted, there are issues associated with their inclusion in RPS policies, including the following.

- Solar technologies are commercially available, yet they rarely have been deployed on a large, utility-scale level. Without specific set-asides in a state's RPS policy, solar technologies are unlikely to benefit from the RPS.

- Large-scale solar installations require a considerable amount of open space, which could result in potential siting issues.

- If solar generators that are not connected to the power grid qualify for the RPS, how are they tracked?

- Because solar system output varies with season and daily solar intensity (even though a photovoltaic system will provide some energy on a completely overcast day), solar energy production may not be entirely constant or predictable. This is usually a significant problem only in extremely rainy climate zones.

- Solar facilities cost considerably more than most other renewable resources and can drive up the cost of an RPS.

Every RPS allows solar resources to qualify. States with tiered resource structures include it in the first tier. Five states—Arizona, Colorado, Nevada,[8] New Jersey and Pennsylvania—set aside a specific percentage of their RPS goal solely for solar resources. These setasides recognize the high initial cost of solar and thereby ensure a market is created for solar development.

Wind

Fossil and nuclear generators create steam that spins a turbine to generate electricity; wind turbine blades connect to a shaft that spins the turbine to generate electricity. For utility-scale wind, a large number of high-capacity turbines are connected to a single point of control to form a wind plant or wind farm. Homeowners, farmers and ranchers in windy areas typically use small wind systems for off-grid electricity generation, water pumping or other applications.

Although wind energy produces no air or water pollution and poses no threat to public safety, it does face obstacles, including the following.

- The best wind sites often are far from major load centers and require significant transmission investment to develop.

- A public perception that the land between turbines is occupied and cannot be used for other purposes. In fact, wind turbines themselves occupy only a small fraction of this land area, and the rest can be used for gazing, agriculture, or other purposes or left in its natural state.

- Its effect on wildlife–especially bird and bat populations–whether endangered species are affected, and whether wind energy may contribute to habitat degradation or loss maybe a problem.

- Concerns exist about the visual effect of wind turbines and their effect on property values and tourism.

- Because the wind does not blow all the time, its intermittency can affect the integration of utility-scale wind facilities onto the grid.

- Wind technology is widely accepted and cost-effective; because of this, utility-scale wind facilities have the potential to dominate a state's RPS to the exclusion of other renewable technologies.

As is the case with solar, wind technologies are included in every RPS. In those states that have tiered resource structures, wind is included in the first tier. New York is the exception; here, it is included in both the Main Tier and Customer-Sited Tier. No state distinguishes between the types of wind technologies that qualify, i.e., small and utility-scale.

Other Resources

Additional resources and technologies are identified in the definitions of qualifying renewables in five states (see table 4).

Table 4. Other Qualifying Resources in State RPS

State	Other Qualifying Resources
Connecticut	Low-emission advanced renewable energy conversion technologies included in the Tier I classification.
Hawaii	Includes an assortment of alternative energy sources such as solar and heat pump water heating; seawater air conditioning district cooling systems; solar air conditioning and ice storage; quantifiable energy conservation measures; and the use of waste heat from cogeneration and CHP (combined heat and power) facilities, excluding fossil-fueled qualifying facilities.
Massachusetts	Hydrogen from renewable energy resources and technologies.
Montana	The renewable energy fraction from the "eligible renewable resources" of electricity production from a multiple-fuel process with fossil fuels.
Nevada	Allows for "qualified energy recovery process." That is defined as a system with a nameplate capacity[9] of not more than 15 MW that converts the otherwise lost energy from: (a) The heat from exhaust stacks or pipes used for engines or manufacturing or industrial processes; or (b) The reduction of high pressure in water or gas pipelines before the distribution of the water or gas, to generate electricity if the system does not use additional fossil fuel or require a combustion process to generate such electricity. The term does not include any system that uses energy, lost or otherwise, from a process that has as its primary purpose the generation of electricity, including, without limitation, any process involving engine-driven generation or pumped hydrogeneration.
Pennsylvania	Incorporates a range of other resources and technologies, including waste coal, coal mine methane, demand-side management and distributed generation.
Texas	Specifically excludes all fossil fuels and waste products from fossil fuels. Indirectly, this excludes fuel cells that rely on hydrogen extracted from natural gas or any other fossil fuel.
Vermont	No form of nuclear is considered renewable. Qualifying SPEED resources are contracts for in-state resources in the SPEED program that meet the definition of new renewable energy, whether or not renewable energy credits are attached. Nonqualifying SPEED resources are contracts for in-state resources in the SPEED program that are fossil-fuel based, combined heat and power facilities. At least 20 percent of the facility's fuel's total recovered energy must be thermal and at least 13 percent must be electricity. The design system efficiency must be at least 65 percent, and the facility must meet air quality standards established by the Agency of Natural Resources.

Source: NCSL, 2005.

STRUCTURE, SIZE AND PHASE-IN OF RPS

The size of the RPS—usually measured in a percentage of electric generation or electric capacity or energy—typically is one of its most important parts. Whether energy or capacity is used as the measure of the size of the RPS is an important factor. California and Nevada, for example, use energy as the RPS measure. Iowa, Minnesota and Texas use capacity as the RPS measure. For example, Texas requires 2,000 MW of renewable generation capacity by 2009. If this RPS requirement is met from wind with a 30 percent capacity factor, it could be less than the energy equivalent renewable output of only 800 MW of geothermal in Nevada with a 97 percent capacity factor. Thus, absolute percentages are not necessarily an accurate measure of the relative magnitude of a state RPS requirement.

Most states phase in their requirements over several years. Table 5 illustrates the size of the RPS in the 19 states and the District of Columbia, with a standard in place. They range from a low of 1.1 percent in Arizona to a high of 25 percent is in New York, with varying degrees in between. Again, these percentages must be compared in the context of whether they are an energy requirement or a capacity requirement.

Table 5. State RPS Requirements

State/ Jurisdiction	Title of Standard	Renewable Energy Requirement	Deadline
Arizona	Environmental Portfolio Standard	1.1%	2012
California	Renewables Portfolio Standard	20%	2010
Colorado	Renewable Energy Requirement	10%	2015
Connecticut	Renewables Portfolio Standard	10%	2010
Hawaii	Renewable Portfolio Standard	20%	2020
Iowa	Alternative Energy Law	105 MW - 2%	1999
Maine	Renewables Portfolio Standard	30%	2000
Maryland	Renewable Energy Portfolio Standard and Credit Trading	7.5%	2019
Massachusetts	Renewable Energy Portfolio Standard	4%	2009
Minnesota	Xcel Energy Wind and Biomass Generation Mandate	1,125 MW wind 125 MW biomass	2010 N/A
Montana	Montana Renewable Power Production and Rural Economic Development Act	15%	2015
Nevada	Renewable Energy Portfolio Standard	15%	2013
New Jersey	Renewables Portfolio Standards	6.5%	2008
New Mexico	Renewables Portfolio Standard	10%	2011
New York	Renewable Portfolio Standard	25%	2013
Pennsylvania	Alternative Energy Portfolio Standard	18%	2020
Rhode Island	Renewable Energy Standard	16%	2019
Texas	Goal for Renewable Energy	2,000 MW	2009
Vermont	Renewable Energy, Efficiency, Transmission and Vermont's Energy Future	10% of 2005 retail electricity sales	2012
Wisconsin	Renewable Portfolio Standard	2.2%	2011
District of Columbia	Renewables Portfolio Standard	11%	2022

Source: NCSL, 2005.

States approach the timeline for meeting the RPS target in various ways. The majority has an annual or biannual incremental increase, often 1 percent, until a particular year. A handful of states have a five-year increase, and Colorado has uneven increases; of 3.6 percent and 10 percent. Most of the remaining states do not identify specific incremental increases; instead, they identify only the final target date.

Vermont's SPEED Program

Vermont approached the RPS in a unique way by creating the sustainably priced energy enterprise development (SPEED) program. By January 1, 2007, the Vermont Public Service Board is required to establish SPEED, which is intended to encourage the development of renewable energy projects and long-term contracts for renewable energy. Prior to January 1, 2012, the Public Service Board is required to determine the amount of qualifying SPEED resources that have come into service or that are projected to come into service between January 1, 2005, and January 1, 2013. If the SPEED resources exceed total statewide growth in demand between 2005 and 2012 or if they exceed 10 percent of the total statewide load for 2005, the RPS will not be in force. If the established goal had not been met, the RPS will go into effect one year following the board's determination.

Those states with tiered resource classifications tend to have a yearly increase for Tier I resources, while Tier II resources are either given one target or long-range incremental increases.

The deadline for meeting the standards in two states—Iowa and Maine—has passed; in fact, Maine met the standard with hydroelectric and biomass before the RPS passed, and Iowa exceeded its standard using wind. Texas will probably meet its 2009 goal by the end of 2005. The remaining of the states still faces deadlines, which range from 2007 to 2020. Massachusetts is the only state that has neither a fixed target date nor a percentage. The state has a 4 percent requirement by 2009 that will continue to increase by 1 percent per year until the state Division of Energy Resources ends the increases.

Oversight and Review of RPS

Four states—Hawaii, Maryland, Rhode Island and Vermont—call for additional review of the RPS.

Hawaii RPS Study

The Hawaii Legislature passed a renewable portfolio standard during its 2004 legislative session. Senate Bill 2474 (Hi. Rev. Stat. Ann. §§269-91 – 269-95) required the public utilities commission (PUC) to conduct a renewable portfolio standards study. By December 1, 2006, the PUC must develop a utility ratemaking structure to provide incentives that encourage Hawaii's electric utility companies to use the state's renewable energy resources to meet the RPS. The PUC is to look at allowances for deviation from the standards if the utilities cannot meet them effectively.

In addition to its own study, the PUC must contract with the University of Hawaii's Natural Energy Institute to conduct independent studies about projected standards for five and 10 years beyond the current standards. The institute also will look at the capability of the state's utility companies to achieve the RPS in a cost-effective manner, factoring in the effect on rates, reliability, cost of renewable energy resources and technologies, and environmental impacts.

The PUC will revise the RPS if the study indicates in conflict with the standards established in the 2004 legislation. The PUC will update the Legislature prior to the start of the 2009 session and every five years thereafter.

Maryland RPS Review

The Maryland General Assembly passed an RPS—Senate Bill 869, Md. Code Ann. §§7-700 – 7-710—during the 2004 legislative session. Included is a requirement that the Public Service Commission (PSC) provide a status report to both the governor and the General Assembly by December 1, 2009. The status report will include a review of the RPS implementation; the availability of, and the price effect on, Tier I renewable energy sources; the amount of compliance fees that electricity suppliers pay; and the subsequent use of those fees to create new Tier I renewable energy sources.

The PSC must conduct a review of the RPS before January 1, 2016, and report to the governor and General Assembly by January 1, 2017. This review will evaluate the environmental and economic effects of the standard, including the effect of Tier II renewable sources. The PSC will develop recommendations for the continuation of the RPS for both Tier I and Tier II sources and include the classification of resources in tiers, alterations to the tier system, and whether the tiers should continue, and if so, at what percentages.

Rhode Island RPS Review

The Rhode Island Public Utilities Commission (PUC) must determine the adequacy of renewable energy supplies to meet the increase in percentage requirements to go into effect in 2011 and then again in 2015. If the PUC determines that inadequate supply exists, it may delay the implementation of the scheduled percentage increases for one year or may recommend to the General Assembly a revised schedule of percentage increases.

Vermont RPS Report

The Vermont Public Service Board must file a report with the Senate committees on Natural Resources and Energy and on Finance and the House committees on Natural Resources and Energy and on Commerce before December 30, 2007, and again before December 20, 2009. The report should include:

- The total cumulative load growth in Vermont from 2005 through the end of the year preceding the date the report is due;
- A report on the tradable renewable energy credit market, including prices;
- A report on the SPEED program;
- A summary of contracts held or projects developed by Vermont retail electricity providers;
- An estimate of potential effects on rates, economic development and jobs if the renewable energy target is met and if it is not met;
- An assessment of the supply portfolios of Vermont retail electricity providers;
- An assessment of the energy efficiency and renewable energy markets; and
- Any recommendations for statutory change, including recommendations for rewarding utilities that make substantial investments in SPEED resources.

ADMINISTRATION OF THE RPS

In almost all cases, a state's Corporation Commission, Public Utilities Commission, Public Service Commission or Public Utilities Board oversees administration of the RPS. A number of the commissions are left with the traditional powers of regulatory oversight and enforcement. However, a state may choose to grant the commission additional penalty authority to include levying fines for noncompliance with the RPS. A commission may verify compliance with the RPS through annual compliance filings by a load-serving entity. The Massachusetts energy agency the Division of Energy Resources (DOER), administers the RPS; this includes rulemaking and compliance verification. The ultimate penalty authority, however, is delegated to the D T E (PUC); this includes suspension or revocation of license to sell electricity at retail in Massachusetts.

Although legislation leaves the administration of the RPS in the hands of the commission, the rulemakings usually involve various entities that have expertise in different areas. In Pennsylvania, for example, the Energy and Technology Development Office determines resource eligibility, while the PUC outlines the trading and tracking system for the renewable energy credits as well as the interconnection and net metering standards. The Massachusetts RPS is administered by DOER, the energy agency, including rule making and compliance verification, but the ultimate penalty authority is delegated to the DTE (PUC) as suspension or revocation of license to sell electricity at retail in Massachusetts.

Applicability and Exemptions

Every RPS in place today outlines some specific applicability requirements. The Iowa RPS, for example, was applicable only to investor-owned utilities (IOU); New Jersey specifically calls for electric power suppliers to comply; Pennsylvania requires rural electric cooperatives to offer energy efficiency programs to customers; and the New Mexico PRC requires rural cooperatives to offer a voluntary green power tariff if their wholesale suppliers make these renewable resources available, but does not require them to meet renewable energy requirements. Wisconsin is the one state that requires IOUs, municipal utilities and rural cooperatives to comply with the RPS. Minnesota's RPS is unique in that it applies to only one utility, Xcel Energy; all other utilities must demonstrate "good faith efforts."

Just as there are applicability requirements, there also are exemptions to compliance with an RPS. Almost every state with an RPS exempts municipal utilities and rural electric cooperatives from compliance. In a handful of states, however, this is not the case. In Colorado, for example, municipal utilities and rural cooperatives may self-certify their compliance if they have an equivalent RPS in place. Colorado also provides a compliance exemption for utilities that have less than 40,000 customers, and the state allows utilities to ask their customers for an exemption from the RPS on a one meter, one vote basis. Hawaii requires its cooperative on the island of Kauai to comply with the standard. Connecticut, a state with tiered qualifying resources, uses these tiers to exempt suppliers of solely Class II resources from compliance with the RPS. Montana exempts restructured utilities and cooperatives from the renewable energy standard. However, cooperatives with 5,000 or more customers must implement a renewable energy standard that recognizes the legislature's intent to encourage new renewable energy production and rural economic development. Vermont exempts retail electricity providers that demonstrate compliance with the standard would impair the provider's ability to meet the public's need for energy services after safety concerns are addressed at the lowest present value life cycle cost, including environmental and economic costs.

Unique exemptions in other states include:

- Those exempt from electric restructuring;
- Electricity customers under a rate cap;
- Public power agencies;
- Load serving entities under restructuring rate freezes or stranded cost recovery; and
- Municipal utilities, unless they open their markets to retail competition.

Qualification of Resources Built out of State

State policymakers tend to focus on the RPS for many reasons, but one of the most important is that it encourages people to build renewable energy projects in state. Policymakers want the economic development that comes with the RPS. Many also want the other benefits that come with an RPS, including the environmental effects of renewable energy and the lower overall fuel price risk and higher energy security. For many people, however, the in-state economic development benefits are crucial. The RPS can be a tool to encourage developers to build in the state that has the RPS policy.

Some legal and practical issues exist, however, that may limit a state's ability to place a preference on in-state resources.

The Legal Background

Beginning in the 1920s, the U.S. Supreme Court began to interpret the Commerce Clause of the U.S. Constitution in ways that essentially precluded states from imposing barriers to commerce with other states. During the last 100 years, the courts have developed a long and extensive case history that makes it very difficult for a state to require that its residents purchase only products that are made in the state. Such a requirement would place an "undue" burden on interstate commerce that would make it difficult for companies based outside the state to sell their products to state residents.

The same arguments will likely follow for electricity, although no court case has specifically tested the application of the Commerce Clause to state renewable energy portfolio standards. In general, it seems clear that it would violate the courts' interpretation of the Commerce Clause to require that utilities buy power from in-state generators.

Since this requirement of RPS policies has not been challenged in the courts, states include language in their policies that restrict, or partially restrict, renewable energy production to in-state resources. Some states do not go so far as to require that the renewable power plant be in-state, but do require proof that the power plant is delivering electricity into the state.

- Arizona requires that electricity produced by landfill gas, wind and biomass be generated within the state. It also states that out-of-state solar power is eligible only if it is used by Arizona customers.
- California requires that the renewable generation be delivered into California for California customers' use.
- Nevada and Texas allow renewables to be located out of state if a dedicated transmission line brings them into the state. In Nevada,

that transmission line cannot be shared with more than one other nonrenewable energy generator.

- Massachusetts requires that off-grid generators and those located on the customer side of the meter be located in the state. All other generators either must be located in the ISO-New England control area or deliver their output into that control area.

- Rhode Island requires that small-scale, off-grid generators that are located on the customer side of the meter be located in the state.

- Massachusetts requires that off-grid generators and those located on the customer side of the meter be located in the state. All other generators either must be located in the ISO-New England control area or deliver their output into that control area.

Instead of disqualifying out-of-state resources outright, at least one state attempts to finesse the issue simply by offering extra credit to certain types of resources. (The utilities earn 1 credit per unit of every other resource) Colorado's law gives 1.25 credits to in-state resources; out-of-state resources would qualify for only one credit toward meeting the standard. Because this policy also sets up a preference for a resource that is not available to an out-of-state company, it could possibly raise the same constitutional issues as an outright prohibition on using out-of-state resources to satisfy the RPS standard. The final question, then, is whether it is worthwhile for any company or state to take these issues to the courts.

Legal or Not, Is it Helpful to Disqualify Out-of-State Resources?

Two policy goals conflict with one another in the determination whether to require in-state renewable resources. The first addresses economic development that results from new renewable energy projects inside the state. A new wind project, for example, generates tax revenue for local governments, new jobs, and annual revenues of about $2,500 per megawatt for landowners who host the wind turbines. There is little question that most state policymakers prefer that a renewable energy standard attract jobs and revenues into state.

On the other hand, restricting the portfolio standard to in-state resources can increase the cost of the standard if better renewable resources exist outside the state. Arizona's wind resources might be good, but Colorado's resources are better. It might be less expensive to let the market decide whether it makes sense to import renewable energy from far away or to build it in-state.

Renewable Energy Credits and Location of Resources

Many states do not require that an electricity retailer actually have a contract for a physical supply of renewable energy; instead they allow the retailer to buy tradable renewable energy credits. These credits could be generated inside or outside the state, or state laws could require that eligible credits be generated within a certain geographic region. Maryland, for example, requires that such credits be generated in the geographic region surrounding Maryland.[10] Texas, on the other hand, requires that such credits be generated inside the state or by a generator that is directly connected to Texas.

WHAT ARE TRADABLE RENEWABLE ENERGY CREDITS?

When a wind, solar, biomass, geothermal or other renewable energy power plant generates electricity, a meter tracks how many megawatt hours or kilowatt hours of power it generates. The generator earns money by selling these megawatt hours. Renewable energy generators now can earn more money by selling another product, tradable renewable energy credits (RECs). An REC is a certificate that documents the generation of renewable energy; each REC demonstrates that someone produced 1 megawatt-hour or a kilowatt-hour of electricity from renewable energy. That certificate can be retired or can be sold to companies that need to comply with voluntary renewable energy goals or government mandates but that choose not to build or buy the renewable resources directly.

How Do RECs Work?

Using a wind farm as an example, details of REC operation are shown below.

1. A wind farm generates electricity, and a meter measures how much it generates. The meter can take the measurement in many places, but might do so at the substation where the power from the wind farm enters the electric grid, so that measurement would incorporate any losses that occur between the wind farm and the point where it enters the grid.

2. The meter sends the information to a central administrator that automatically records the megawatt hours generated, and assigns each megawatt hour a unique identification code. That code identifies where and when the megawatt hour of renewable energy was generated.

3. The central administrator puts the information on a Web site or electronic bulletin board in an account for the generator. The REC now can be tracked electronically if it is traded, used or retired. Again, one REC is equal to one megawatt hour of renewably generated electricity.

4. Different parties can see online the credits that are available. Under some models, the central administrator brokers deals between buyers and sellers of these credits, or the central administrator could simply record such deals as the buyers and sellers report them. Under the second model, the central administrator does not act as a broker, but only as a facilitator or an information hub that tracks the use, trading or retirement of RECs.

5. This system creates tradable renewable energy credits that allow the participants to prove they have acquired enough credits to meet their obligations under a portfolio standard or to meet voluntary goals. The system also ensures that a credit for a MWh is used appropriately and is not counted more than once.

6. Renewable energy producers that sell the tradable renewable credits are left with energy that lacks any renewable attributes. Any claim that the remaining energy has renewable attributes is deceptive and may attract the interest of state consumer protection enforcers.

What Policies Do RECs Support?

RECs support mandatory portfolio standards by providing a method by which companies that do not meet the requirements can comply by purchasing credits.

RECs also support voluntary green pricing programs by giving companies a way to meet their own goals. A voluntary green pricing program is one in which companies make a voluntary commitment to buy a certain percentage of their electricity from green energy. In Colorado, for example, Xcel Energy offers its customers an opportunity to pay $2.50 extra for 100 kWh blocks of wind-powered electricity. Xcel has chosen to sign power purchase agreements to buy power from wind farms. An alternative way for Xcel to meet its obligations would be to purchase RECs on the market.

State governments can use RECs to satisfy their internal goals for purchasing green power. For example, Rhode Island is purchasing 1,650 RECs per year for five years in order to partly offset the electric load from the State House. States can use estimated emission reductions from renewable energy measures and include them in state implementation plans (SIP). A SIP details how a state will meet an air quality standard in a nonattainment area. Electric sector projects that result in quantifiable emission reductions at fossil fuel-fired electric generating facilities and improve air quality in nonattainment areas can qualify for SIP credit. The U.S. Environmental Protection Agency (EPA) has issued guidance that encourages states to increase the generation of electricity from renewable resources.

Where Are Credit Trading and Tracking Programs Being Used?

People in most of the country can buy tradable credits, but formal tracking systems are relatively new. Such systems exist in places where voluntary green pricing programs are becoming more popular and in places that have mandatory renewable energy portfolio requirements. Tracking systems exist—or will shortly be established—to cover New England, New York, the PJM area (Pennsylvania, New Jersey, Maryland, Delaware, Washington, D.C.), the upper great plains, Texas, and the full western region of the country.

Overlap Between Green Pricing Programs and Renewable Portfolio Standards

Green pricing refers to programs that almost all utilities offer through which their customers can pay a small amount of extra money to buy "green" power, or power generated from renewable energy resources. Colorado's Xcel Energy offers a green pricing program that it calls Windpower. Through this program, customers can pay an extra $2.50 each month for 100 kWh of wind power. If a customer wants to cover all her energy usage with wind power and that customer uses 700 kWh per month, the customer would pay and extra $17.50 per month. In general, it has been established that these green power purchases are in addition to what the utility would otherwise be doing to meet its regulatory mandates—but for the customer's voluntary green power purchase, the utility would not be buying, generating or supporting the wind or other renewable energy project. As a result, in every state except for Arizona, green power programs do not count towards utility's renewable energy obligations.

Lessons from the Renewable Portfolio Standard

✓ *Have realistic expectations of what the RPS can accomplish.*

In its simplest form, the RPS is a good policy to support the least expensive and large-scale renewable resources such as landfill gas, geothermal and wind. It is possible, although more complex and costly, to add additional measures within the RPS to stimulate other technologies such as solar power and fuel cells.

✓ ***Recognize that long-term contracts are important to renewable energy producers, since renewables benefit by having a long time to recover their high initial capital costs.***

✓ *Be certain that goals are achievable.*

Renewable energy capacity is large, but not limitless. This is especially true in eastern states that attempt to limit the geographic scope of qualifying renewable resources and thus make it potentially difficult to meet the higher renewable resource goals in the later years of the standard. States may wish to consider not only their own requirements, but those of neighboring states, paying particular attention to any in-state or other geographic requirements placed on the portfolio standard. Goals should incorporate a realistic assessment of how long it takes to plan for and construct renewable energy facilities.

✓ ***Be realistic about the interaction of cost caps and the requirements of the RPS.***

Colorado has a 1 percent per customer per month cost cap, but may have difficulty remaining within the bounds of that cost cap because it also has a 0.4 percent solar set-aside within the portfolio standard. Utilities are required to subsidize solar systems with a payment of at least $2 per watt; the cost of a fully installed solar system costs between $8 and $9 per watt. It might be difficult to meet the solar set-aside requirement and still remain within the bounds of the 1 percent cost cap.

✓ ***Be clear about whether the portfolio standard will allow existing renewable resources to qualify or whether only new resources will qualify.***

Maine had more than achieved its 30 percent portfolio standard goal by the time it had enacted its legislation because its existing stock of renewable energy capacity qualified under the standard and exceeded 30 percent. Pennsylvania is addressing whether existing hydroelectric power plants should qualify or whether the standard should include only new plants.

✓ ***Be clear about the definition of qualifying resources.***

Both biomass and hydroelectric power have complex definitions. When crafting resource definitions, especially for biomass and hydroelectric power, it is important to be either extremely specific or intentionally general. An explicit definition lets the rulemaking body know that the resources outlined in the legislative definition are those that need to be included in the rules. A general definition, sometimes consisting of just one word, gives the rulemaking authority the discretion to identify eligible qualifying resources.

✓ ***Consider and define whether and how to let non-electric resources—such as geothermal heat pumps or energy efficiency—qualify.***

Hawaii gives credit in its portfolio standard for energy efficiency measures. No states explicitly allow geothermal heat pumps to qualify, although it would be possible to do so. These resources need to be measured carefully and verified if they are to count as qualifying resources. They also have the potential to overwhelm other resources if the standard does not limit them.

✓ ***Be careful about in-state qualification requirements.***

Some states attempt to require that the renewables be built in-state. Some states attempt to define a larger—but still restricted—geographic boundary in which the renewable energy project must operate. Some of these requirements may be contrary to Commerce Clause restrictions and may limit available, low-cost renewable resources.

✓ ***Provide the regulators some flexibility in how the RPS is implemented.***

Legislators rely on the RPS to be a market-based solution to the expansion of renewable energy development in their states. This makes it important that regulators have the capacity to respond quickly to the market and its changes. Regulators can use this flexibility when setting alternative compliance payment increments.

✓ ***Address how solar photovoltaics and other renewable resources located off the grid will count toward meeting the portfolio standard.***

New Jersey requires that the systems have an automated meter attached to them that measures the amount of electrical energy produced from the solar array. Inspectors verify that energy reported as generated is actually generated in order to qualify for renewable Energy Credits.

✓ ***Clarify who owns the renewable energy attributes for purposes of owning and selling renewable energy credits.***

Since tradable renewable energy credits (REC) may become an important part of the renewable energy financing picture and because these RECs are valuable, it may be important to clarify who owns them. If a utility subsidizes them or if taxpayers or ratepayers subsidize the utility to build renewable energy facilities, who owns the RECs? Is there a way to split ownership of the RECs? Is it too administratively burdensome to split ownership of such RECs? Should states specify in law who owns the credits?

✓ ***Clarify the relationship between renewables secured through green pricing programs and renewables secured because of renewable portfolio standards.***

Arizona is the only state that currently allows the utilities to count their purchases of renewable energy that are supported by voluntary payments to help them meet their obligations under the renewable portfolio standard. Other states have chosen to draw a division between these two programs because green pricing programs are generally understood to be voluntary programs that support purchases the utility or energy retailer would not make, but for the customer's voluntary payment.

✓ ***Be careful when crafting legislation that outlines the mechanisms for the renewable energy credit trading program.***

Trading programs generally have moved beyond individual state borders and now increasingly function at a regional level. If legislators place too many restrictions on the trading program they will not function as effectively as they might with more flexibility.

✓ ***Allow regulators the authority to set the alternative compliance payment (ACP) price.***

In New Jersey and other states, companies can pay an alternative compliance payment instead of actually buying RECs or installing renewable energy. If an ACP is set in legislation, the mechanism does not allow response to market forces in market time; the legislature may be required either to change the price or give regulators the authority to do so. For example, the New Jersey Public Utilities Board (PUB) sets the ACP annually, looking forward to the REC market for the upcoming year. The authority of the PUB protects against a few people controlling too much of the market or limited availability of RECs. As with REC trading programs, the setting of the ACP price benefits from a regional approach rather than an individual state approach.

✓ ***Understand that the more complex the RPS structure, the more difficult the standard may be to meet. Standards that include provisions such as set-asides for certain technologies, tiers, complicated and convoluted cost recovery and tracking mechanisms add complexity which can add cost and create difficulty in compliance.***

Vermont's RPS is unlike any of the 20 others. It addresses additional issues, including:

- Small-scale distributed generation and energy efficiency;
- Standards for interconnection of distributed generation to the energy grid;
- Advocacy for a regional electricity reliability policy;
- Electric grid planning at least cost;
- Investigation of the regional potential for energy conservation and efficiency programs; and
- Commercial building energy standards.

Notes

1. States have adopted portfolio standards through a variety of means; Colorado through ballot measure, New York and Arizona through committee order and the remainder through legislation.

2. Many small projects may qualify in Massachusetts. Perhaps the logic is backward——smaller projects may enjoy the RPS if barriers to small project deployment, such as interconnection, are removed.

3. For the Massachusetts RPS, the $.05 fee changes annually, according to changes in the Consumer Price Index. Accordingly, the payment for 2005 is $05.3.

4. Neat biodiesel refers to a 100 percent biodiesel fuel that is not blended with traditional diesel.

5. Unsegregated waste includes all wastes, whether chemically treated or not. Unsegregated waste has a far different emissions profile than untreated waste.

6. New York defines its tiers differently from some states. The Main Tier consists primarily of medium to large-scale electric generation facilities that are expected to compete against each other. The Customer-Sited Tier includes "behind the meter" facilities sited on customers' premises that generally are not economically competitive with Main Tier facilities.

7. Cofired biomass refers to biomass mixed and burned with coal to generate electricity.

8. Nevada specifically provides additional credit—a 2.4 multiplier—for installation of distributed solar photovoltaic systems. This multiplier is intended to reflect the added benefits from the installation of distributed renewable generation that does not incur line losses and provides local distribution system support.

9. Nameplate capacity refers to a power plant's maximum ability to generate electricity under ideal conditions.

10. Maryland specifies that credits must come from 1) the regional transmission organization, PJM; 2) a state adjacent to PJM; or 3) a control area adjacent to PJM if the energy is delivered into PJM.

State Renewable Portfolio Standards
A Review and Analysis

States began to develop renewable portfolio standards in the 1990s in an attempt to build new in-state energy resources, benefit from the environmental attributes of renewable energy resources, and lessen their dependence on fossil energy resources.

Early standards dictated that any electricity retailer in the state generate some part of its power from renewable energy sources, which may include solar, wind, geothermal, biomass and small hydroelectric. As the standards developed, a new system of tradable renewable energy credits also developed to guarantee and verify compliance.

This book describes state experiences with renewable portfolio standards to date and discusses some lessons learned.

NATIONAL CONFERENCE of STATE LEGISLATURES
The Forum for America's Ideas

Item # 014159
Price: $10
ISBN 1-58024-410-6

Electric Market Overview: Renewables

Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

Renewable Energy Portfolio Standards (RPS)

28 States and D.C. have an RPS

WA: 15% by 2020

OR: 25% by 2025; small utilities 5-10%

ID: Priority to DR, EE, and in-state RE

CA: 20% by 2010; goal: 33% by 2020

NV: 20% by 2015; solar 5% per year

UT: 20% by 2025

CO: 20% by 2020; co-ops & munis 10%; includes 4% solar

AZ: 15% by 2025; includes 30% DG

NM: 20% by 2020; co-ops 10%

TX: 5,880 MW by 2015; goal: 10,000 MW by 2025

MT: 15% by 2015

ND: 10% by 2015

SD: 10% by 2015

NE: studying RPS

KS: goal - 20% wind by 2020; introduced RPS bill

MN: 25% by 2025 Xcel 30% by 2020

IA: 105 MW in RPS goal: 1,000 MW wind by '11

MO: 15% by 2021; at least 2% solar

OK: Studying an RPS

AR: Utility IRPs to include RE

WI: 10% by 2015

IL: 25% by 2025

MI: 10% by 2015, and new RE capacity: 1,100 MW by 2015

OH: 12.5% by 2025; 0.5% solar

IN: 2 bills introduced

KY: Report recommends RPS

ME: 40% by 2017 goal: 3 GW wind by 2020

NH: 23.8% BY 2025

VT: 25% by 2025

MA:15% by 2020; goal: 250 MW solar by 2017

RI: 16% by 2019

CT: 23% Class I/II by 2020 4% Class III by 2010

NY: 25% by 2013

PA: 8% Tier I, 10% Tier II by 2020; 0.5% solar set-aside

NJ: 22.5% by 2020; 2% solar

DE: 20% by 2019, with 2% solar

DC: 20% by 2020, with 0.4% solar

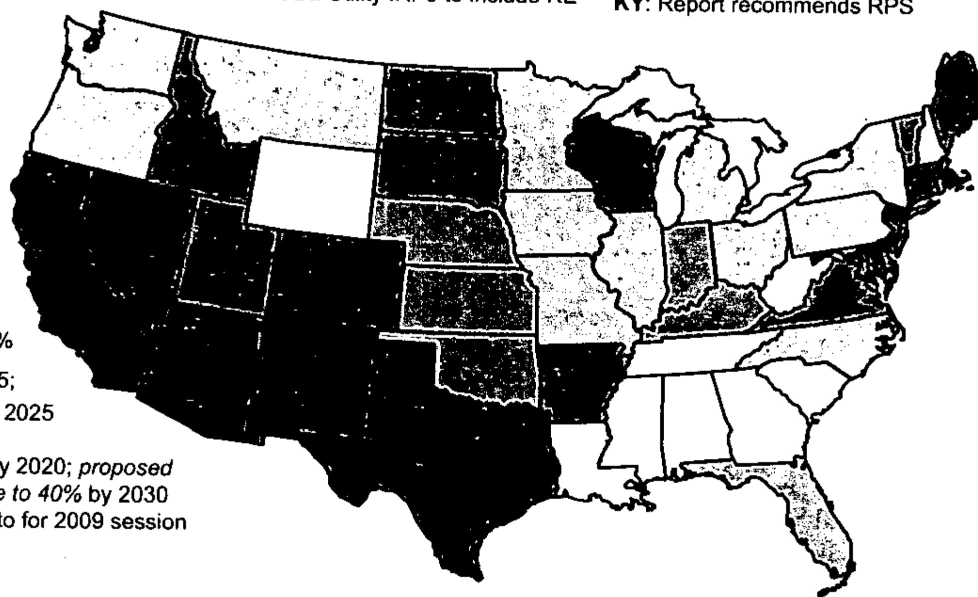
MD: 20% by 2022, with 2% solar

VA: 12% by 2022

TVA: 50% of generation from zero- or low-carbon sources by 2020*

NC: 12.5% by 2021 co-ops & munis: 10% by 2018

FL: draft RPS to legislature: 20% by 2020



HI: 20% by 2020; *proposed increase to 40%* by 2030 agreed to for 2009 session

AK: issued Energy Report

- RPS
- Strengthened/ amended RPS
- Voluntary standards or goals
- Proposed RPS or studying RPS
- Other renewable energy goal

Updates at: http://www.ferc.gov/market-oversight/mkt-electric/overview/elec-ovr-rps.pdf

Notes: Alaska has no RPS; TVA's "Renewable Energy and Clean Energy Assessment" is not a state policy: the Public Power Authority called for 50% of generation from zero- or low-carbon sources by 2020.
Abbreviations: DG: distributed generation; DR: demand response; EE: energy efficiency; IRP: integrated resource plan, RE: renewable energy.
Sources: Derived from data in: EEI, EIA, LBNL, PUCs, State legislative tracking services, Database of State Incentives for Renewables and Efficiency, Pew Center, and the Union of Concerned Scientists.

Updated February 2, 2009

Renewable Energy Portfolio Standards

- **A Renewable Portfolio Standard (RPS)** requires a percent of energy sales or installed capacity to come from renewable resources.
- **29** states – including D.C. – have renewable energy standards.
- **Six** have renewable goals without financial penalties: KS, ND, SD, UT, VT and VA.
- **Six** states proposed RPS bills or released studies that propose including more RE in state resources: FL, IN, KS (bills) and AK, KY, NE (state energy reports).
  - **Florida's PSC** sent its draft RPS to the legislature in response to an April 2008 legislative requirement. The legislature will decide how to proceed.
  - **Indiana's** House introduced two bills for an RPS in January. A traditional one has a 20% by 2020 target; the other creates two compliance tiers. An RPS bill did not pass last year.
  - **Kansas** introduced an RPS bill, with a 20% by 2020 target based on a utility's average peak load (in MW) for 2016-18. (Jan 14)
  - **Alaska** issued "Sustainable Energy for Alaskans" as a guide for communities to review local energy sources including in-river hydro, wind, solar, wave, tidal, biomass, and geothermal, in addition to traditional resources. It does not recommend state action or set a RE goal. (Jan 7)
  - **Nebraska's** "*Interim 2009 Energy Plan*" supports enacting an RPS and stresses EE, RE, and Nebraska's commitment to nuclear power. A final report will identify regulatory and statutory activities following the comment period, which closed Jan 23.

OVERVIEW OF 2008 RPS DEVELOPMENTS:

- **Three states passed a new RPS:** Ohio, Michigan, and Missouri. Ohio's and Michigan's were by state legislation; Missouri's was the third RPS to pass by ballot (after Colorado and Washington state).
- **Five jurisdictions amended or strengthened** existing standards: Washington, D.C.; Maryland; Massachusetts; Minnesota; and New Hampshire.
- **Four states** with an existing goal or RPS strengthened them: ME, VT, CA, HI. Maine enacted an installed wind goal. Vermont increased its goal to 25% RE by 2025. California's goal, set by Executive Order, is to increase RE to 33% by 2020. Hawaii set a goal of 40% of energy from renewable sources by 2030.
- **Four states** adopted a voluntary RPS or renewable goal: SD, UT, KS, and FL. South Dakota (Feb) and Utah (April) enacted goals without non-compliance penalties. An MOU between the Governor and Kansas utilities created its goal. Florida's goal, via Executive Order, is for utilities to produce 20% from RE; the PSC sent a draft RPS to the legislature on Jan 30.
- Kentucky and Oklahoma are working to establishing a renewable standard by legislation in 2009. In 2008, OK passed a bill allowing recovery of wind-related transmission costs.
- **Sixteen** states include energy efficiency in their RPS or renewable goals. Several issued major energy plans or draft plans with goals encompassing renewable energy, energy efficiency, and greenhouse gas reduction, including Kentucky, New Jersey, New York, and Vermont.

Abbreviations: EE: Energy Efficiency; MOU: Memorandum of Understanding; PSC: Public Service Commission; RE: renewable energy; RPS: Renewable Portfolio Standard

Updated February 2, 2009

2-26-09
Work Session: Comprehensive Energy Plan Resources

<target><bill></bill><subject>2-26-09 Work Session
Comprehensive Energy Plan
Resources</subject><comm>SENE26</comm></target>

Alaska State Legislature
Senate Special Committee on Energy

Cambridge Energy Research Associates Qualifications

February 26, 2009 • Juneau, Alaska

David Hobbs, Managing Director

Michael Marinovic, Vice President, Consulting

James R. Meitl, Senior Director, Business Development

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The CERA Mission

To provide insight into the energy future...

- Provide comprehensive, **integrated** research and thought leadership on market fundamentals, industry dynamics, and strategy in the energy sector
- Offer unique **insights**, often well ahead of conventional wisdom, into the most pressing challenges—economic, geopolitical, financial, technological, regulatory, environmental, and managerial
- Help clients **anticipate** the energy future and make informed strategic, investment, and market decisions
- Foster a **community** of senior-level decision makers

Source: Cambridge Energy Research Associates.

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CERA Strategic Consulting and Advisory Services

- **Our Perspective.** Concerns over climate change, energy security and economic development are reshaping the competitive landscape of the global energy business. Through our unique integrated global energy scenarios and outlooks, we analyze markets in a global context while bringing quantitative results at the local level.

- **Our Approach.** Few consulting firms can match CERA's unique blend of profound energy industry knowledge, leading research, and hands-on experience. In working with our clients on strategy engagements, we leverage our deep knowledge and market leading research from all parts of the energy industry.

- **Our Experience.** CERA has provided the energy industry with advice and critical insight for more than 20 years. We have a diverse clientele of more than 400 leading governments, energy firms, and non-governmental organizations worldwide providing CERA with unparalleled breadth and depth of experience.

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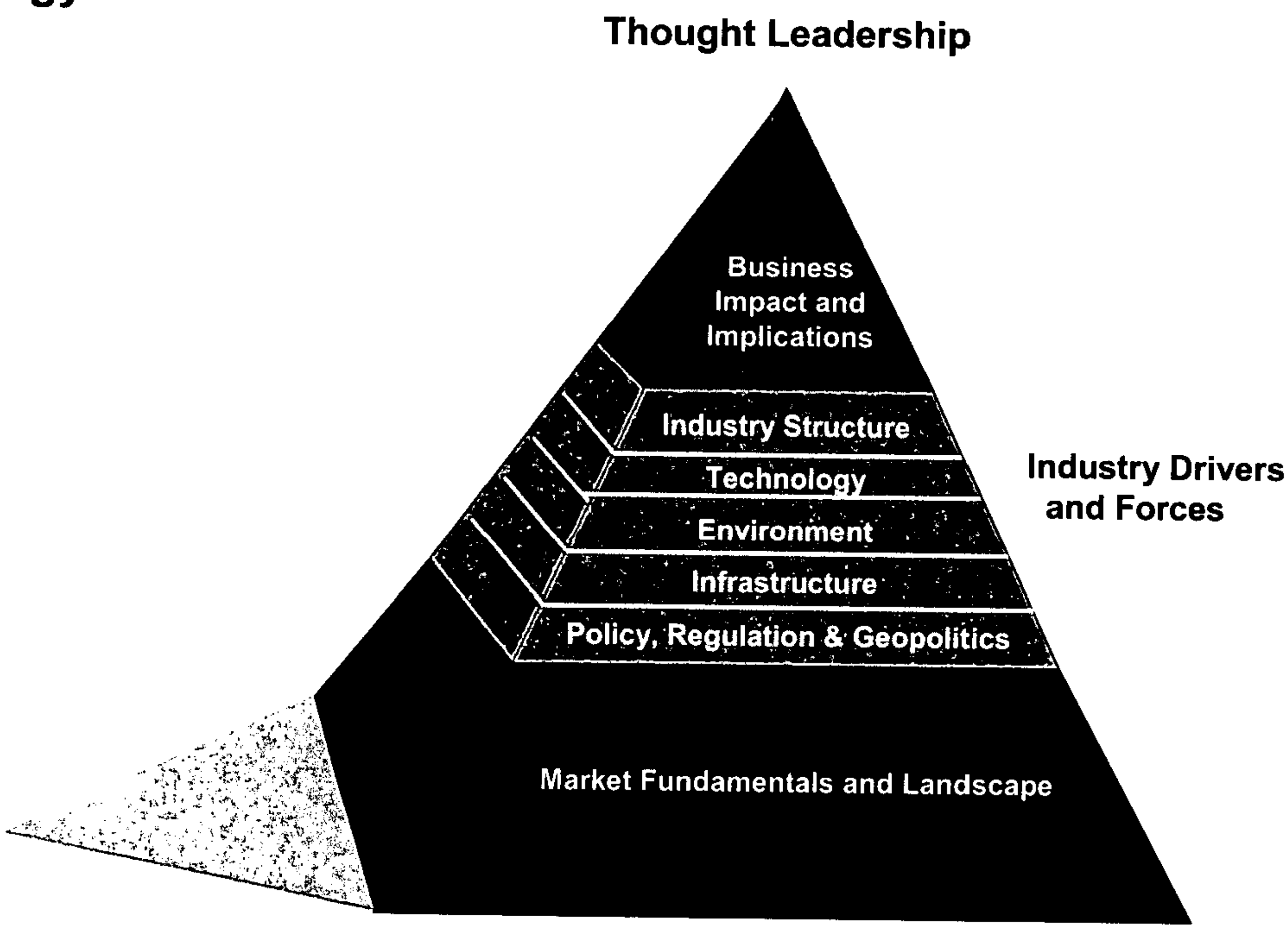
CERA Advisory and Consulting Services

Insight delivered through analysis of fundamentals, industry drivers, and strategy



Source: Cambridge Energy Research Associates.

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Policy Methodology and Selected Previous Engagements

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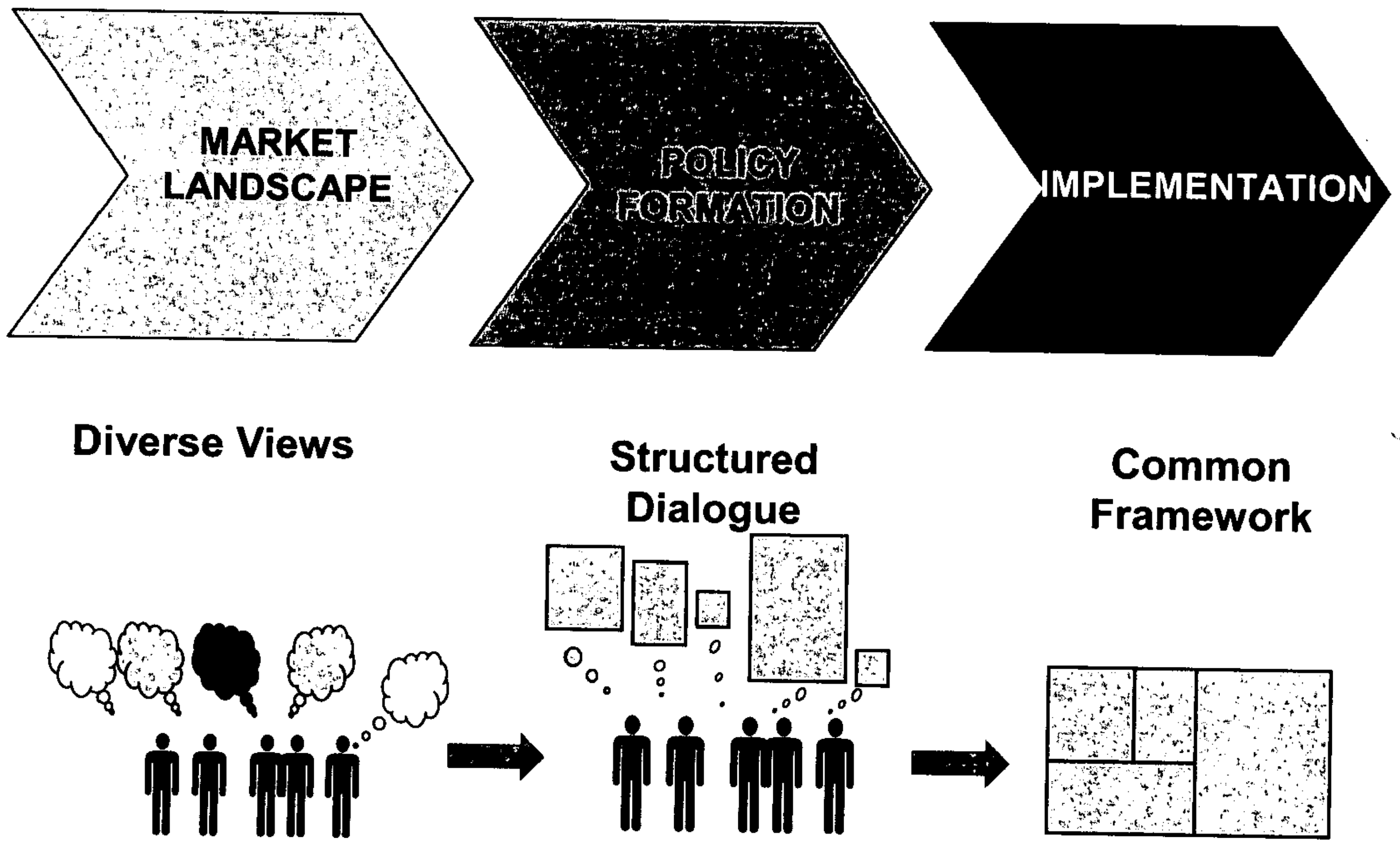
Energy Policy Roadmap Components



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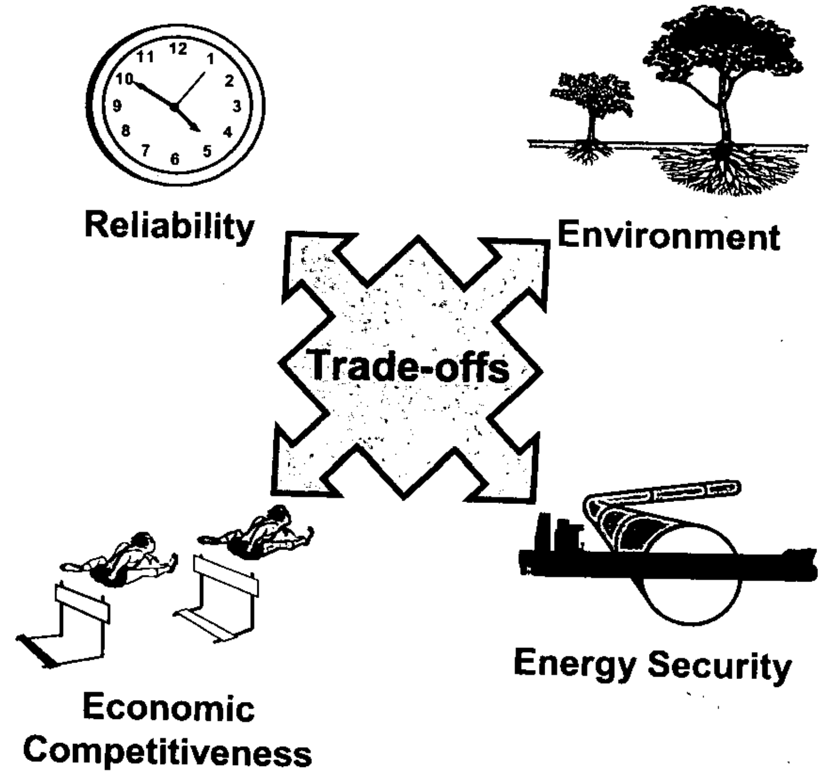
Role of the Market Landscape in Developing an Energy Roadmap

Defining the Landscape → *Defining the Policy Choices*

- Growth objectives
- Social, environmental and planning constraints & commitments
- Outside Linkages
- Geopolitical, economic, fuel and technology outlooks
- Supply and demand projections regionally and Globally
- Current Institutional Structures



Source: Cambridge Energy Research Associates.

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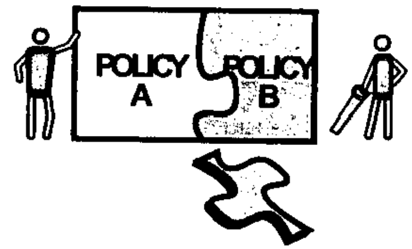
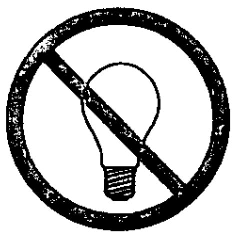
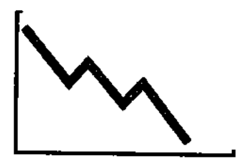
Policy trade-offs Must be Recognized and Resolved Early on



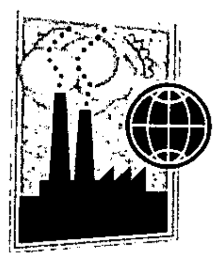
Or Face the Consequences…



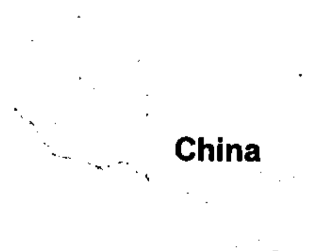
Blackouts



Lack of Investment



Environmental Consequences



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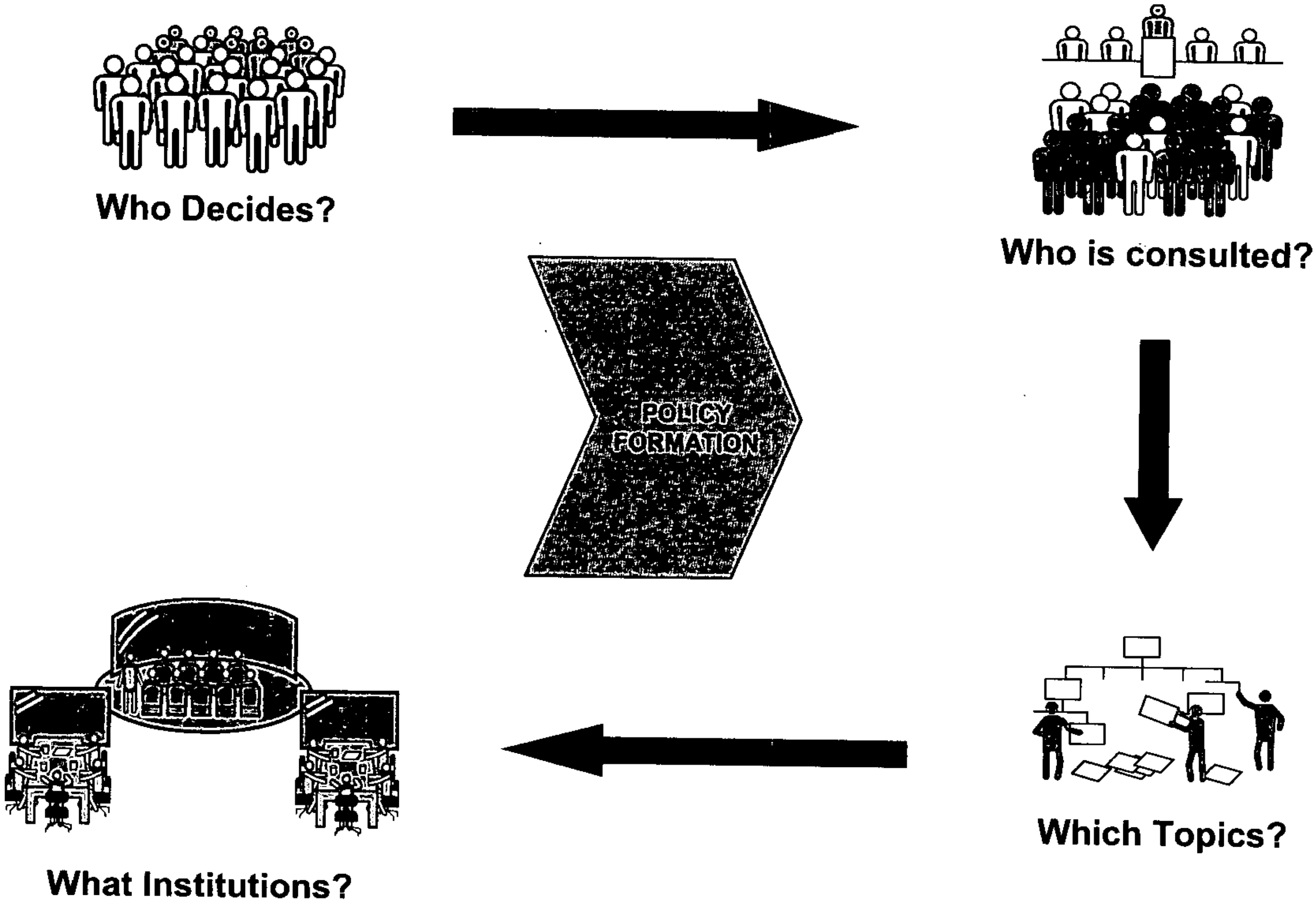
Four Key Policy Formulation Questions



We have assisted oil and gas clients in developing a broad range of strategies across the world.

Corporate
- IOC's strategy for high-oil price environment
- Independent's corporate portfolio strategy
- Supermajor's CO2 strategy

National Energy and Resource Development
- National resource plan based on fundamental gas demand supply forecast
- Create national resource planning and dev't

Business Unit & Regional
- SE Asia regional upstream gas strategies
- North Sea regional and country strategies
- West Africa business unit strategies

Exploration & Country Entry
- Middle East country gas entry strategy
- Atlantic Margin exploration strategy
- Various other country entry strategies

Major Resource Development
- Caspian region mega investments
- GOM and West Africa DW developments
- Major new Siberian resource development

Operating Asset Strategies
- Arctic mega asset renewal strategy
- Mature offshore asset cluster strategies
- Steam and CO2 flooding investments

Unconventional Resources
- In-situ and mined oil sands
- Tight gas, CBM and shale gas developments
- New unconventional resource technologies

LNG and GtL
- LNG liquefaction investments
- Portfolio assessment of GtL opportunities
- IOC's LNG portfolio strategy

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Case Example

Oil & Gas Producing Country (2007)

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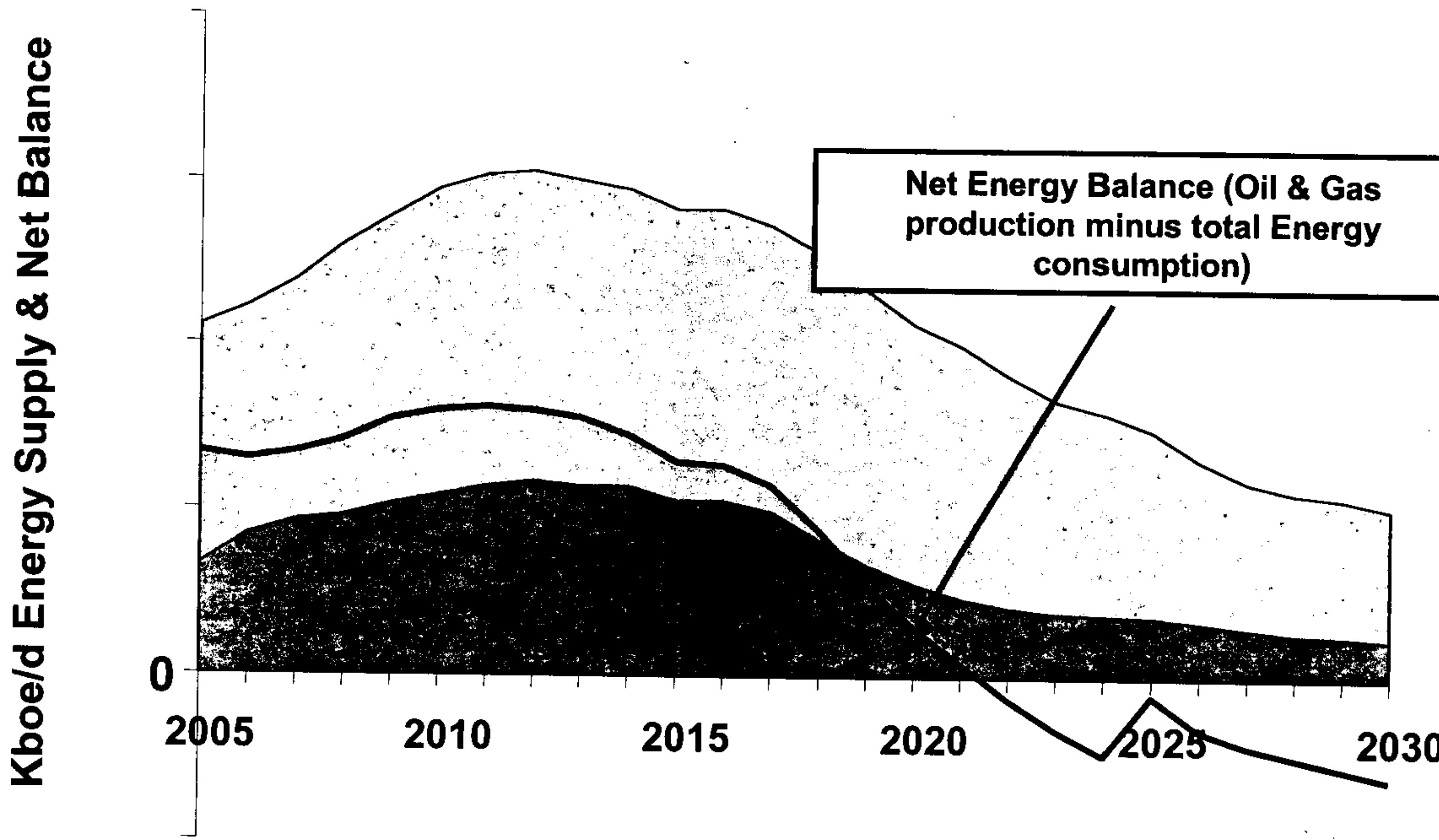
Case Example

Emerging Energy Balance Shift Drove the Need for Policy Review



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Source: CERA analysis, study data

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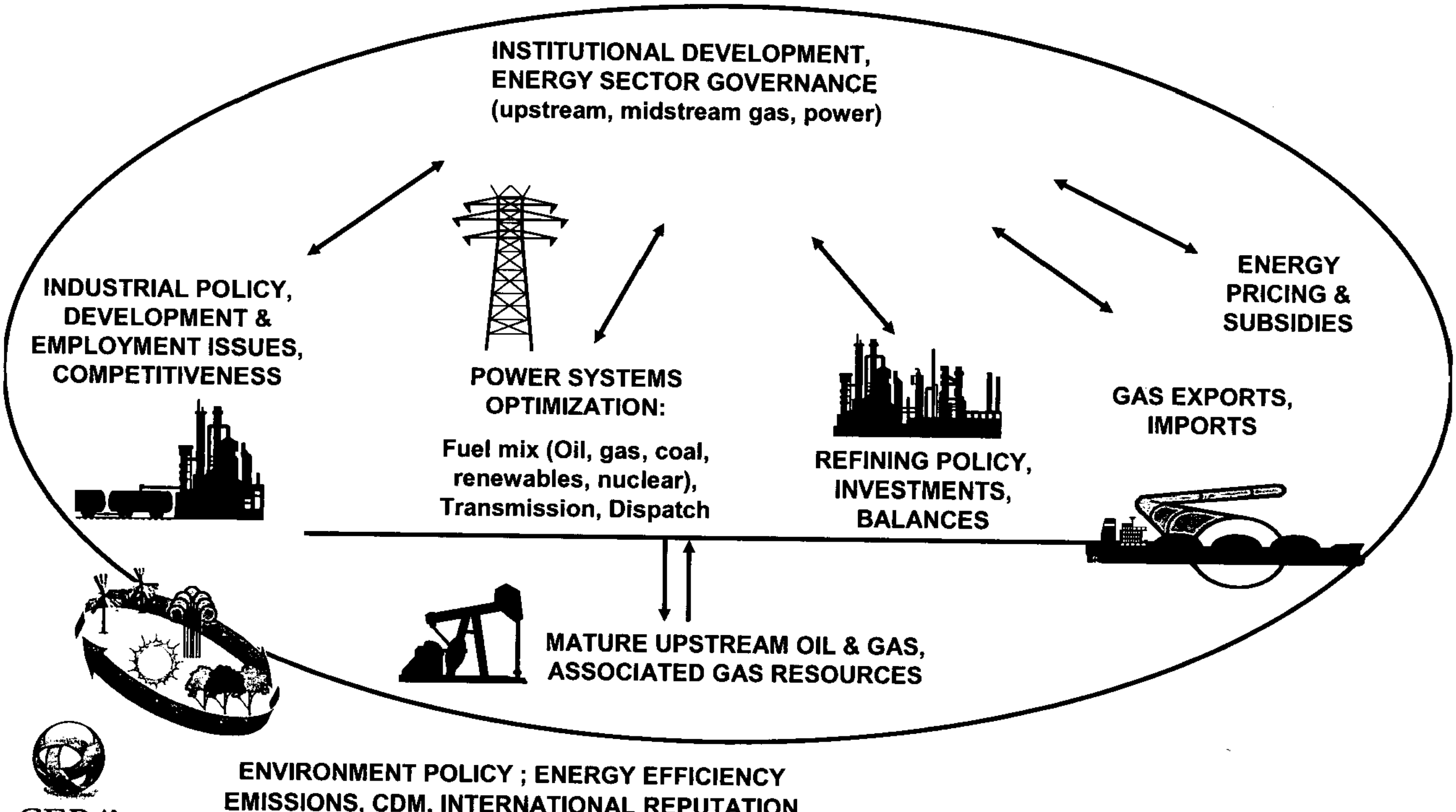
Case Example

Study Embraced the Entire Energy Spectrum



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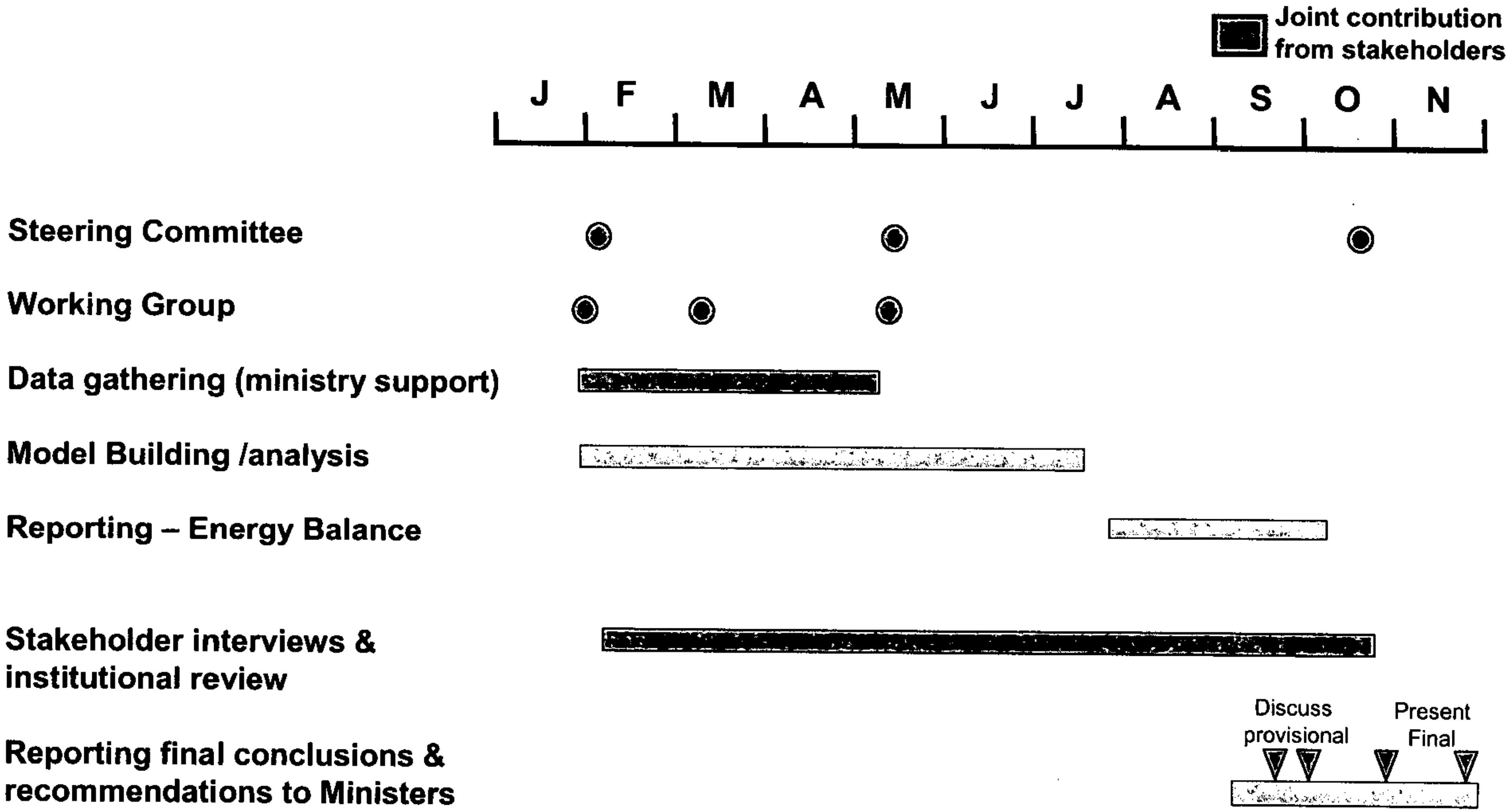
Case Example

Stakeholders were Engaged Throughout



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Case Example

Notional Country Energy Strategies were Developed to Test Stakeholder views

Notional Country Strategy

1. Policy Focus	Restrict / control demand across all sectors	Depend on neighbours for supplies	Give preference to upstream oil energy needs
2. Energy Supply Policies.			
3. Energy Demand Policies			
4. Energy Export Policy			
5. Fuel Mix Policy			
6. Industrialization / development policy			
7. Energy User contracts			
8. Employment			
9. Environm. Policy			
10. International Diplomacy			
11. Govt Regulatory Approach			
12. Foreign companies			

As part of the Stakeholder engagement process, CERA conducted a workshop to surface constraints / agendas affecting policy choices

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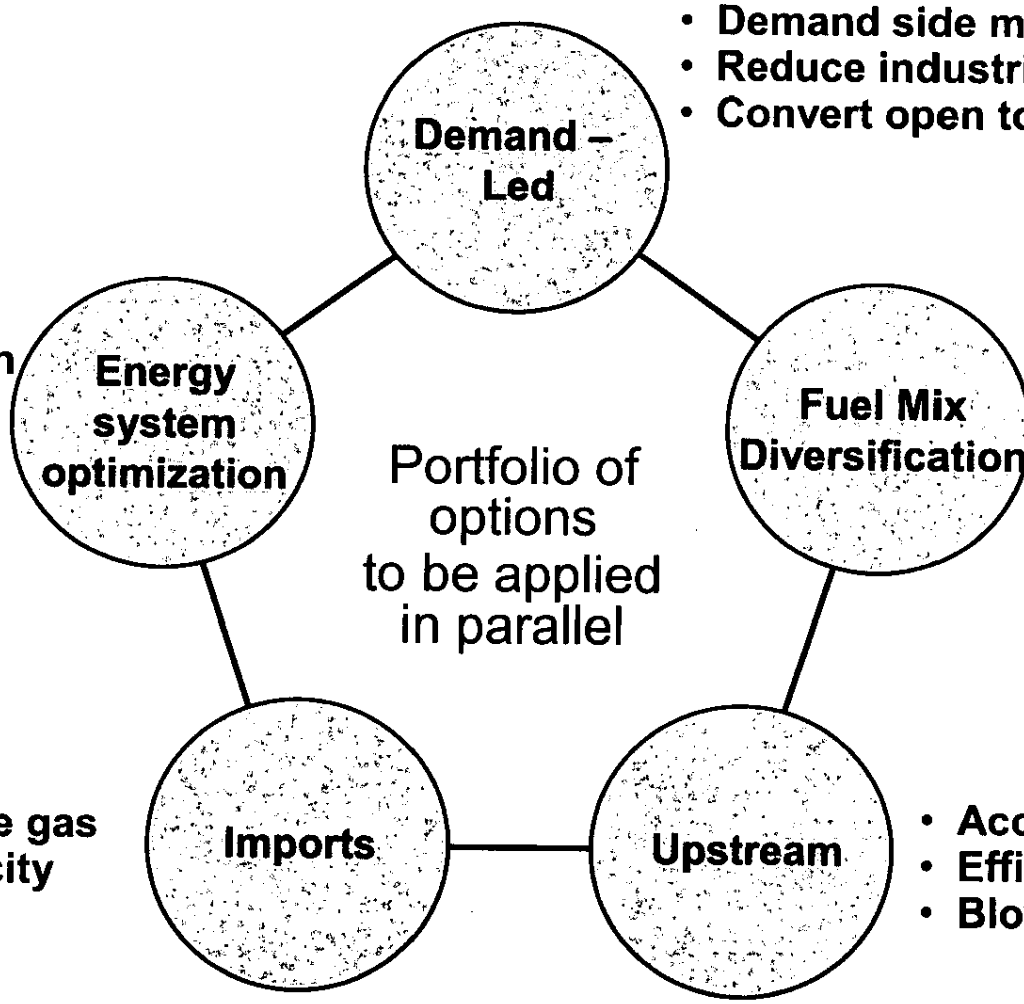
Case Example

The Study Analysed a Portfolio of Options to Optimize Future Energy Balance



Demand – Led
- Demand side management
- Reduce industrial gas demand
- Convert open to combined cycle

Energy system optimization
- Grid integration / upgrading
- Dispatch optimization

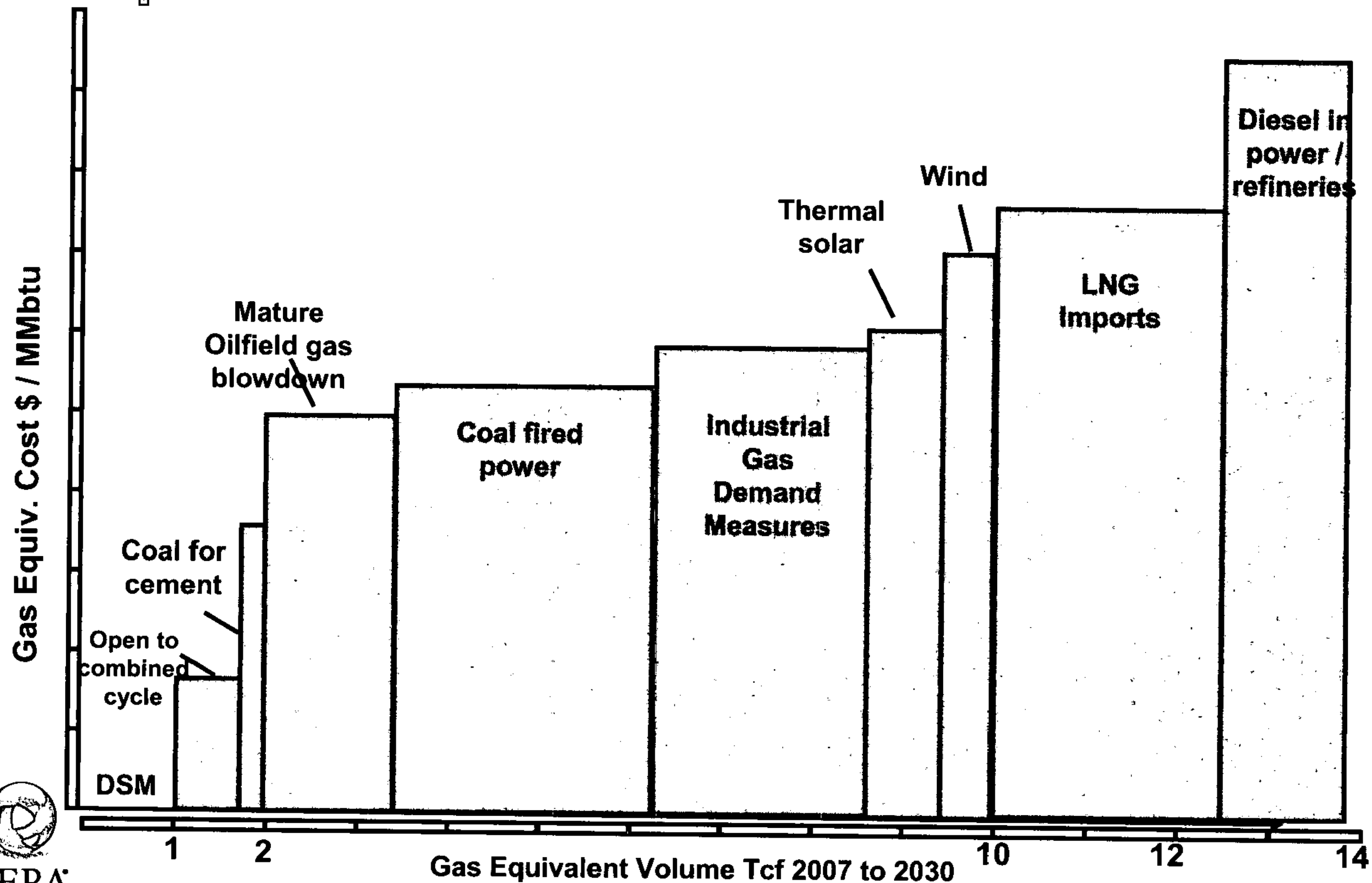
Fuel Mix Diversification
- Liquid burning for power
- Renewables
- Coal fired power
- Industrial fuel switching

Imports
- LNG
- Pipeline gas
- Electricity

Upstream
- Acceleration
- Efficiency
- Blowdown

Costs of Energy Balance Options were Compared

Case Example



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Case Example

Qualitative Considerations were Critical in Developing Final Energy Policy Recommendations

Qualitative Factors to Consider	Key Questions
Strategic Fit	• Willingness to depend on neighbours ? • Attitude toward existing gas user contracts ? • What value does diversification have (gas or fuel sources) ? • Is there a strategic upside for certain options
Risks and Vulnerabilities	• What risks or uncertainties impact implementation ? • How robust is an approach to different global energy scenarios ? • How might institutional capability influence do-ability ?
Alternatives & Trade-offs	• Do more radical options exist ? • What- if certain options excluded ?

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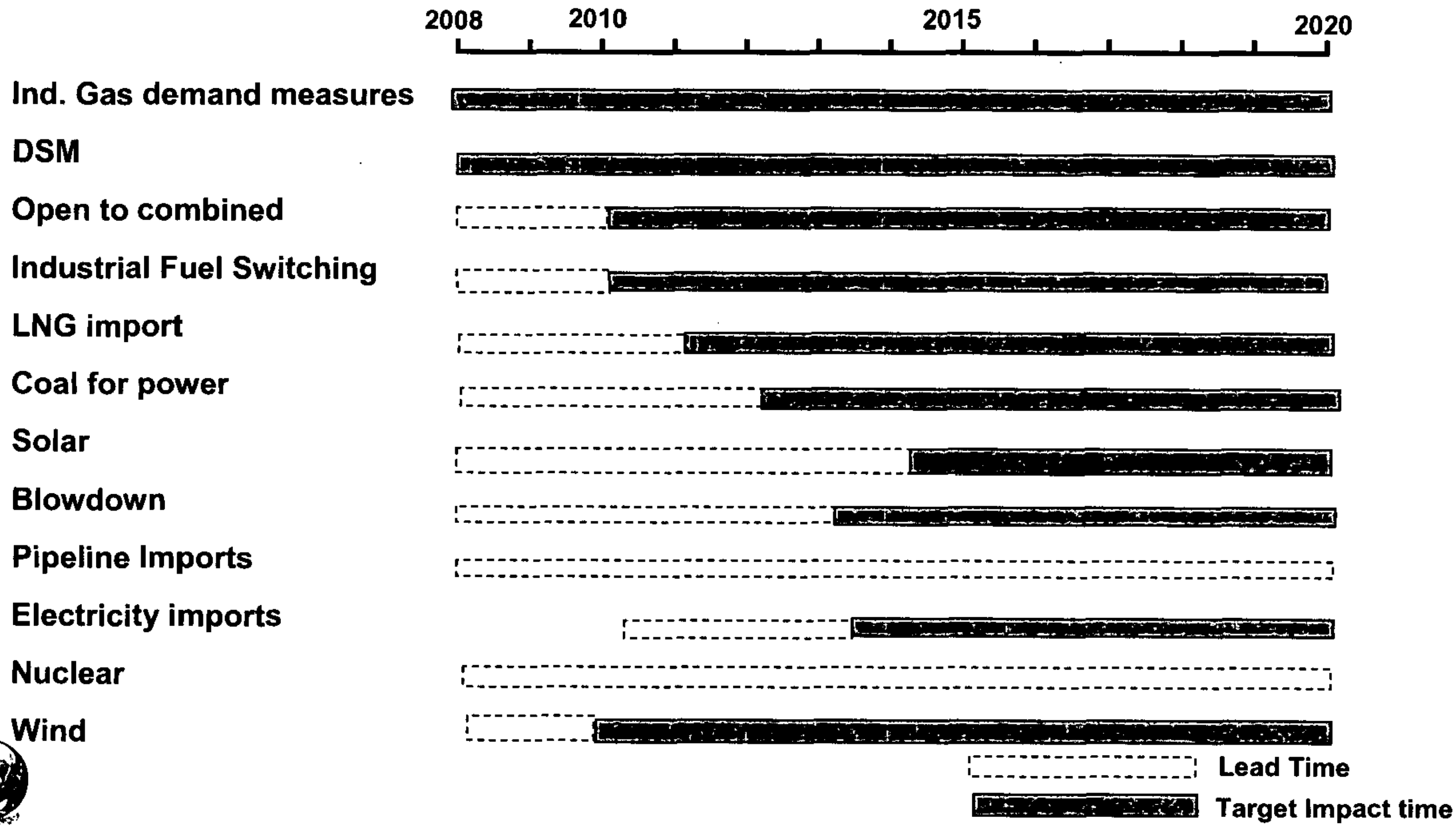
Case Example

Early Planning for Implementation was Recommended

Conservative / prudent planning assuming firm supply and no pipeline imports



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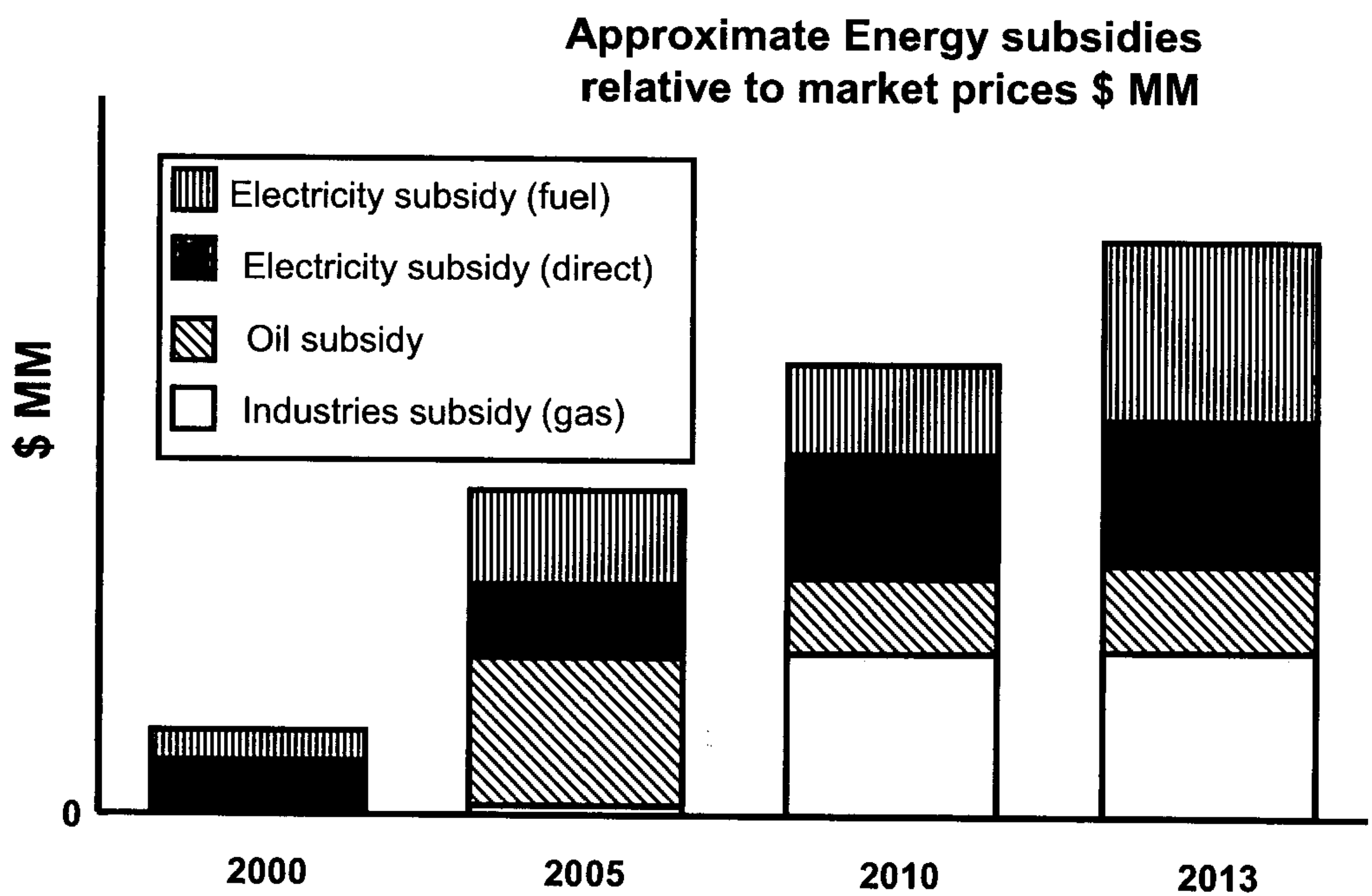
Case Example

Identifying the Cost of Energy Subsidies Assisted Pricing Policy Thinking



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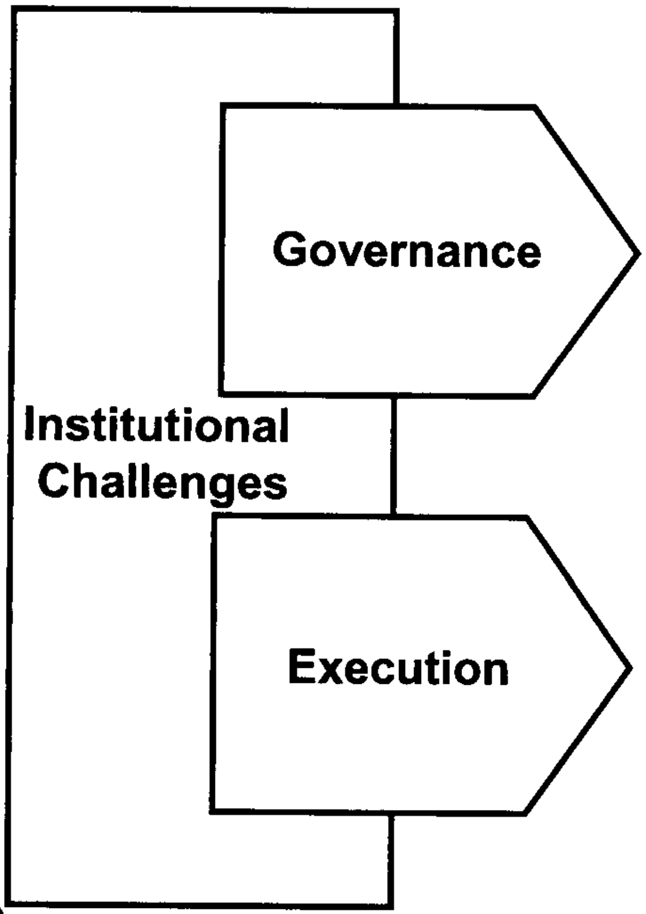
Case Example

Identification of Institutional Challenges and Solutions were Important When Recommending a Policy Roadmap



Governance

- Long term sector planning and data inventory
- Policy setting
- Designing and creating new institutional structures
- Allocating responsibilities and following-up
- Independent technical capability

Execution

- Co-ordinating wide range of policy actions (arising from this study)
- Individual actions are doable, but delivering all in parallel is a major challenge

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Learnings : Key Success Factors for Energy Policy Related Projects

- **Tailored, issue driven analysis**
  - Identify critical issues to address early on
  - Tailor model / analysis to focus on those issues
  - Broad remit for recommendations : technical, economic, institutional, etc.
- **Build on existing knowledge**
  - Review existing reports, work with local experts
- **Seek and build senior Stakeholder consensus**
  - Early engagement with full range of stakeholders
  - Continue to seek their views as project progresses
- **CERA's independence and objectivity**
  - Flexibility to explore and deliver sometimes sensitive messages

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Selected Additional Energy Policy Experience

- World Bank – Yemen
- Ministry of Finance Economic Affairs – Barbados
- ExxonMobil – US
- Brazilian Petroleum Institute –Brazil
- Government Authority –Pakistan
- Ministry of Petroleum / Sonangol – Angola
- Bureau Of Minerals and Petroleum – Greenland
- Ministry of Energy – Kuwait
- Nigerian National Petroleum Corporation – Nigeria
- General Planning Council – Libya
- Confidential – Middle Eastern Country
- Directorate General of Hydrocarbons – Gabon
- Agencia Nacional de Hidrocarburos – Colombia
- JNOC / JOGMEC – Japan
- SOCAR – Azerbaijan
- Chinese NOC – China
- Government of Kazakhstan – Kazakhstan
- PetroEcuador – Ecuador
- ONAREP - Morocco

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Recent Strategic Consulting Experience Related to Climate Change and Clean Energy

- **Assessment of Voluntary Carbon Markets.** CERA developed a framework to assess the current and potential future demand for energy efficiency services, green power procurement and carbon offsets by businesses to achieve voluntary GHG emissions reductions.

- **GHG Policy Analysis.** CERA developed carbon abatement cost curves to inform the development of policy and business strategies related to the implementation of GHG policies.

- **GHG Policy and Market Strategies.** CERA has advised a variety of clients on the business risks and opportunities related to emerging GHG policies and markets.

- **Investment Strategies.** CERA has advised on investment and business strategies for technology providers and power generators by using a scenario framework to assess the potential risks and opportunities for various strategy options.

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CERA Scenarios – Testing Strategies against a Range of Different Futures

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CERA's Scenario Process

INPUTS

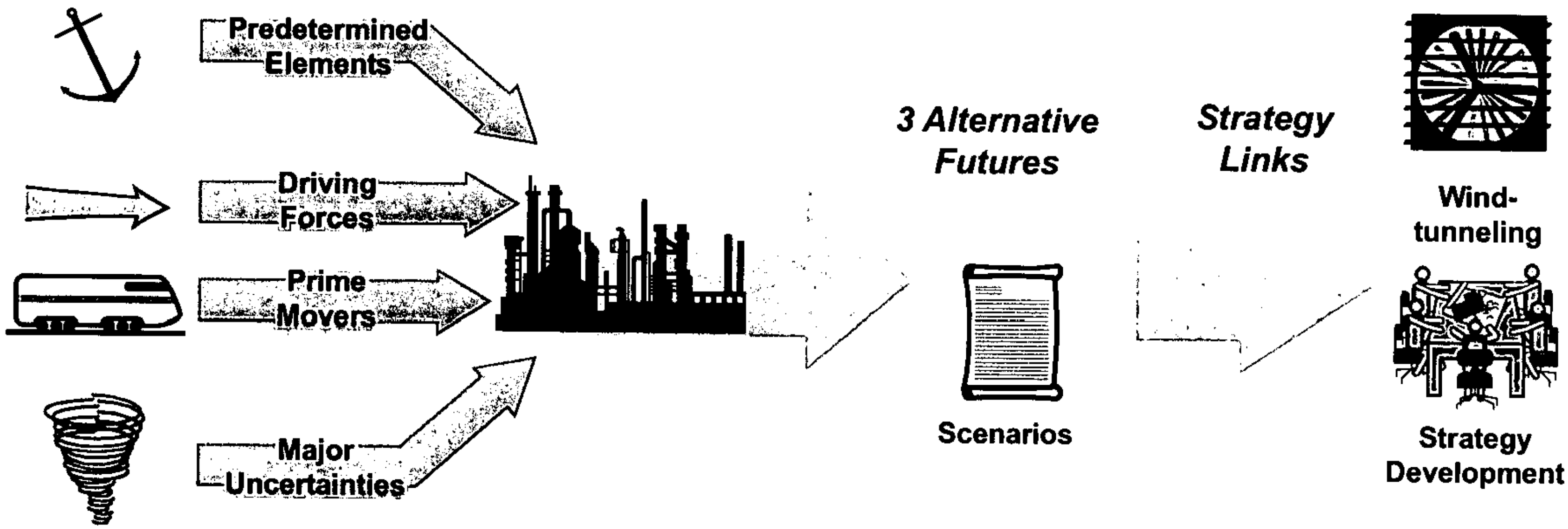
Factors that will shape the future

SCENARIOS

Combine inputs into alternative views of the energy future with signposts for each

STRATEGY

Apply scenarios to develop and test strategies



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Source: Cambridge Energy Research Associates.
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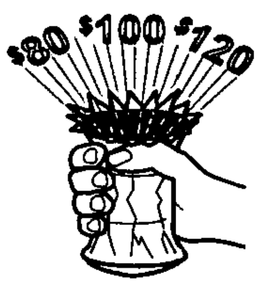
CERA's Global Energy Scenarios are the Backbone of Our Vision of the Future

ASIAN PHOENIX The center of global economic and political gravity shifts to Asia. Strong growth in China and India puts them on a path to eventually challenge the United States for global economic pre-eminence. Piecemeal international efforts to manage carbon emissions.



BREAK POINT Oil supply difficulties limit production growth. Average annual oil prices surpass $150 per barrel (nominal). Fear of peak oil encourages moves to enhance energy efficiency and accelerate growth of alternative fuels. Oil loses its monopoly on transportation. Strong, coordinated international focus on limiting CO_2 emissions drives carbon prices and research and investment in clean energy

GLOBAL FISSURES Widespread political backlash against free trade and globalization, combined with global trade and political disputes and growing security concerns over ongoing terrorist threats results in lower economic growth and weaker energy demand. Little to no effort to limit carbon emissions.

Source: Cambridge Energy Research Associates.

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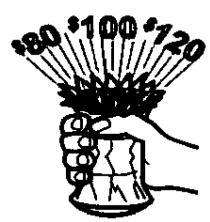
2008 US Scenarios Policy Drivers

	RPS	Tax Incentives	Cap-and-Trade
	❑ The 29 existing state standards remain in effect but increased compliance flexibility temper demand.	❑ Federal ITC and PTC peter out during the lead-up to federal cap-and-trade policy.	❑ RGGI continues, followed by WCI and a program in the Midwest. ❑ A federal program takes effect in 2015. ❑ Prices stay at \$20-\$35/ton.
	❑ All existing, proposed and non-binding state goals are met.	❑ The PTC and ITC are extended through the start-up of federal cap-and-trade policy and are slowly phased out.	❑ A federal program starts up in 2012, requiring a 30% reduction below 2007 levels by 2030 leading to \$100/ton prices by 2020. ❑ RGGI gets integrated into the federal program.
	❑ A difficult economic environment saps the momentum behind state programs.	❑ The PTC fails to get extended past 2009 and the ITC reverts back to 10%.	❑ RGGI continues operating up until 2018 but prices remain at \$2/ton. ❑ A federal program, as well as additional regional programs stall.

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2008 US Scenarios Overview

	ASIAN PHOENIX	BREAK POINT	GLOBAL FISSURES
International Outlook	❑ Trend economic growth. ❑ Continued growth in world trade. ❑ India, China, FSU, and Middle East continue development of home markets.	❑ Productivity suffers from high commodity prices, reducing long run growth potential. ❑ Increased reliance on multilateral trading agreements and international solutions to regional conflicts.	❑ Economic growth slows as international trade declines. ❑ NA and European backlash against globalization. ❑ Focus shifts to national adjustment issues. ❑ Emergence of resource nationalism.
Technology Outlook	❑ Technology development dependent on government subsidies and demonstration projects.	❑ Rapid pace of technology development requires more public/private initiative and risk sharing. ❑ Domestic/foreign joint ventures develop.	❑ Technology development directed toward promoting energy security within North America.
Regulatory Environment	❑ Continuing experimentation with alternative regulatory solutions. ❑ State challenge federal initiatives.	❑ Enhanced commitment to competitive solutions at the federal and state levels. ❑ Move toward multi-state regional compacts.	❑ States successfully assert regulatory authority over resource adequacy planning and infrastructure siting issues.
Industry Structure	❑ Continuation of current hybrid environment with mix of competitive and regulated entities.	❑ Increasing reliance on private capital and market-determined returns on gas and power investments.	❑ Increasing reliance on traditional vertically-integrated utilities and command and control regulation and policies.

Source: Cambridge Energy Research Associates.

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2008 US Scenarios Overview (continued)

	ASIAN PHOENIX	BREAK POINT	GLOBAL FISSURES
Economic Growth	❑ Recession of 2008-09 is not severe. ❑ 2011: return to long-term trend growth. ❑ Slowing population/labor force growth after 2020 reduces trend growth.	❑ High energy prices make recession of 2008-09 worse. ❑ Productivity growth slows as capital is substituted for energy in production process.	❑ Recession delayed to 2009-10 but is severe as world trade shrinks. ❑ Productivity growth well below historic norms.
Growth in Power Demand	❑ 1.6% CAGR to 2020. ❑ Recession slows growth until 2013. ❑ 1.6% CAGR after 2020 even as population growth slows.	❑ 1.1% CAGR to 2020 due to rising real power prices and sharper recession. ❑ 1.0% CAGR after 2020 as real prices escalate and population growth slows.	❑ 1.1% CAGR to 2020. ❑ 1.4% CAGR after 2020 despite declining population growth rate.
Investment	❑ Near term drivers: demand growth and tighter reserve margins. ❑ Long term drivers: continued demand growth, aging plants and environmental programs.	❑ Aggressive push for renewables and GHG legislation. ❑ Early retirement of fossil fuel units and accelerated investment in transmission. ❑ Investment requirements similar to AP.	❑ Need for transmission and generation reduced. ❑ Lower demand growth and greater reliance on domestic coal and natural gas.
Policy and Regulation	❑ Rising nominal retail rates. ❑ Some states end retail choice and reduce renewables targets. ❑ Federal GHG legislation by 2015. ❑ Many states move to reassert control over resource adequacy.	❑ 2012: Federal GHG legislation begins. ❑ Aggressive state RPSs. ❑ Regional transmission planning initiatives. ❑ FERC asserts federal authority over transmission siting.	❑ Increasing emphasis on energy security and independence. ❑ Emphasis on local reliability. ❑ Regional climate change initiatives abandoned.
Technology	❑ Focused in generation, transmission, and distribution (metering). ❑ Reliance on government subsidies for commercial scale development.	❑ Strong push for renewables, GHG abatement, and efficiency accelerate smart grid development. ❑ Commercialization of CC&S, PHEV, and storage technologies accelerated.	❑ Low economic growth pressures government budgets to support new technologies. ❑ Funding for new initiatives delayed a decade.

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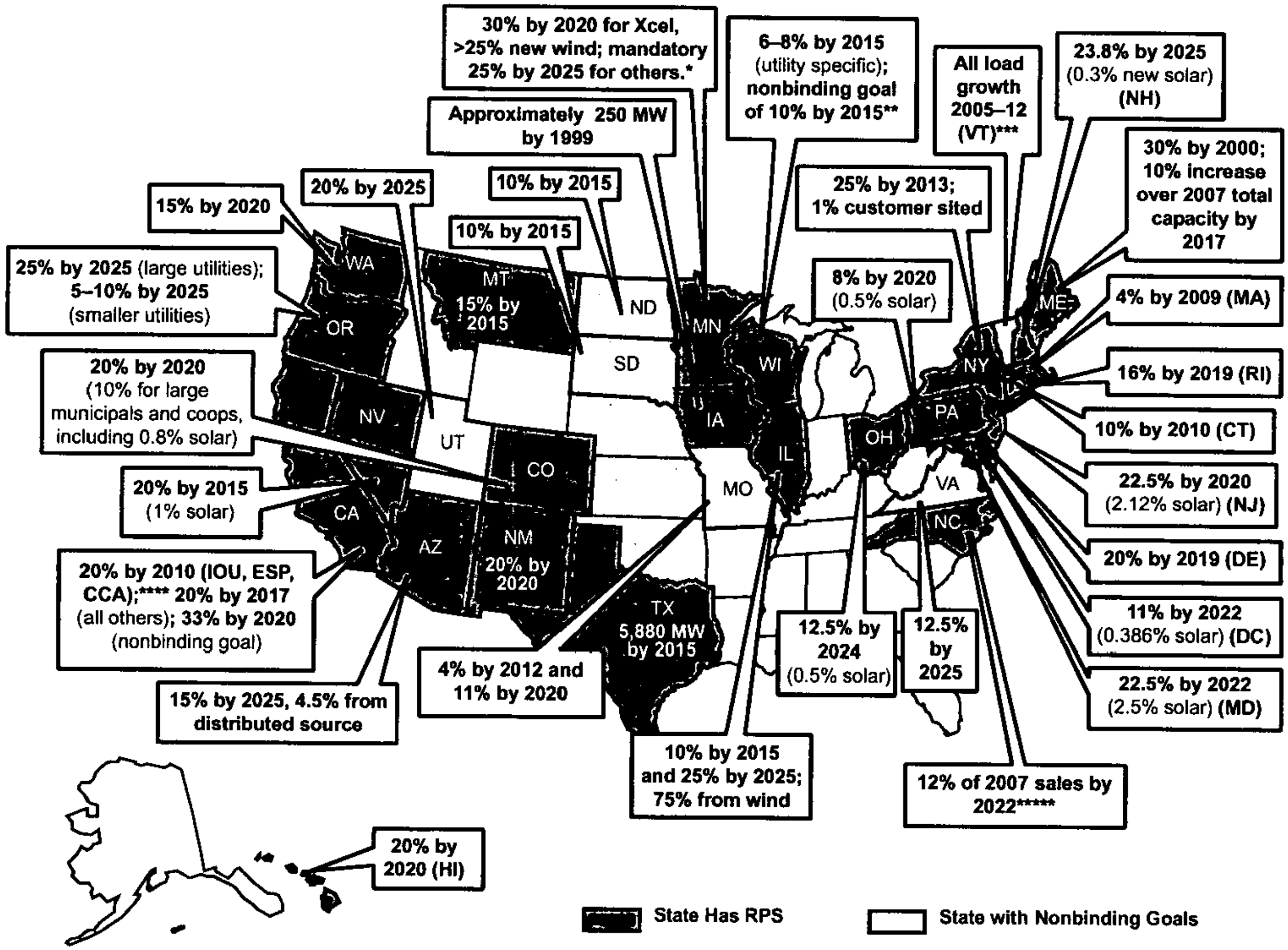
State Renewable Portfolio Standards Driving Renewable Investments



Source: Cambridge Energy Research Associates, Database of State Incentives for Renewable Energy (DSIRE).
*Previous Minnesota RPS was a nonbinding goal except for Xcel Energy.
**Vermont's voluntary standard becomes mandatory in 2013 if it is not met by 2012.
***California: IOU = investor-owned utility; ESP = energy service provider; CCA = community-choice aggregator).
****Wisconsin requires all utilities to increase renewables contributions by 6 percent over the 2001–03 average level by 2015and has a nonbinding goal of 10 percent by 2015.
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Selected CERA Studies

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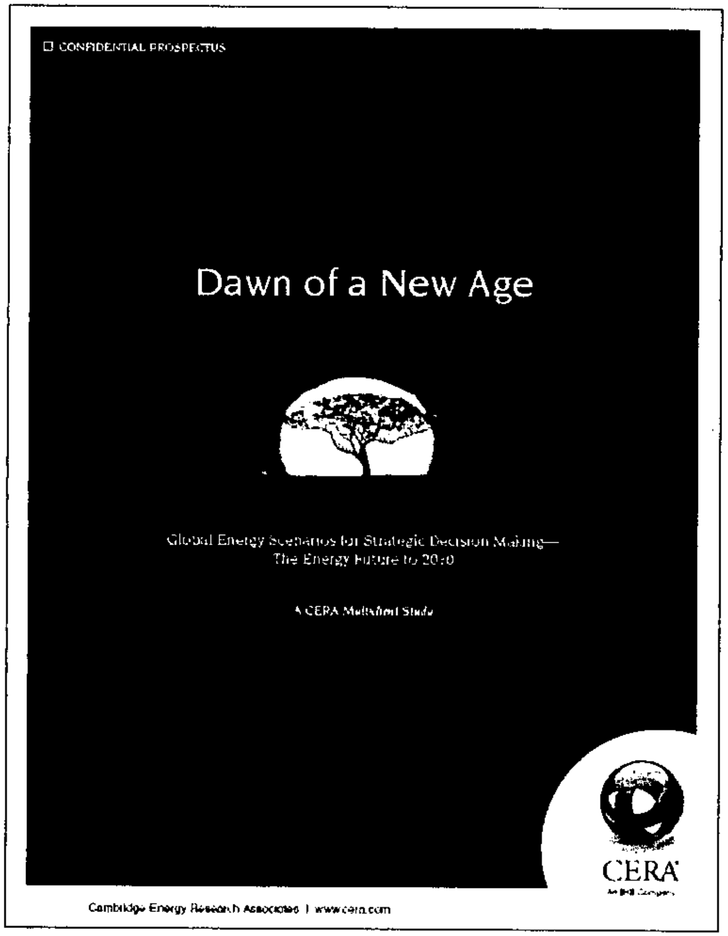
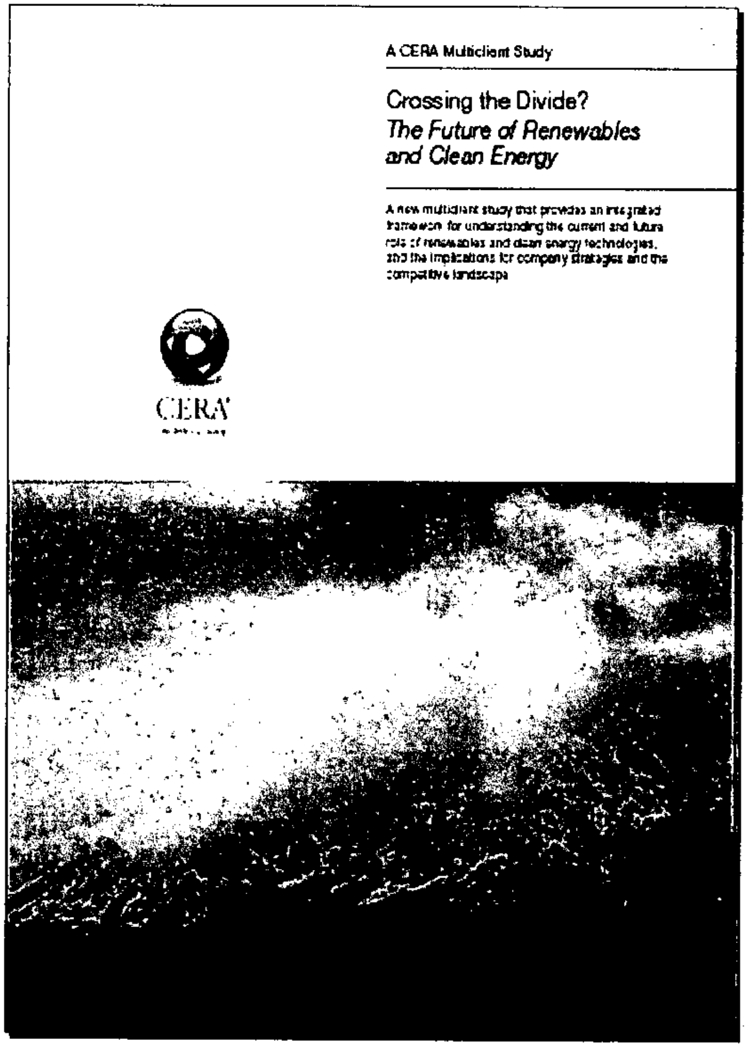
Global Energy Scenarios
Dawn of a New Age Multiclient Study



CERA's *Dawn of a New Age* study presents three long-term global energy scenarios to assess different paths for global energy supply and demand and to help define key risks and opportunities for a range of energy segments and geographic regions.

Clean Energy Technologies
Crossing the Divide Multiclient Study



CERA's *Crossing the Divide* study presents three long-term global energy scenarios to assess the winners and losers among various clean energy technologies and help define key risks and opportunities for a range of energy segments and geographic regions.

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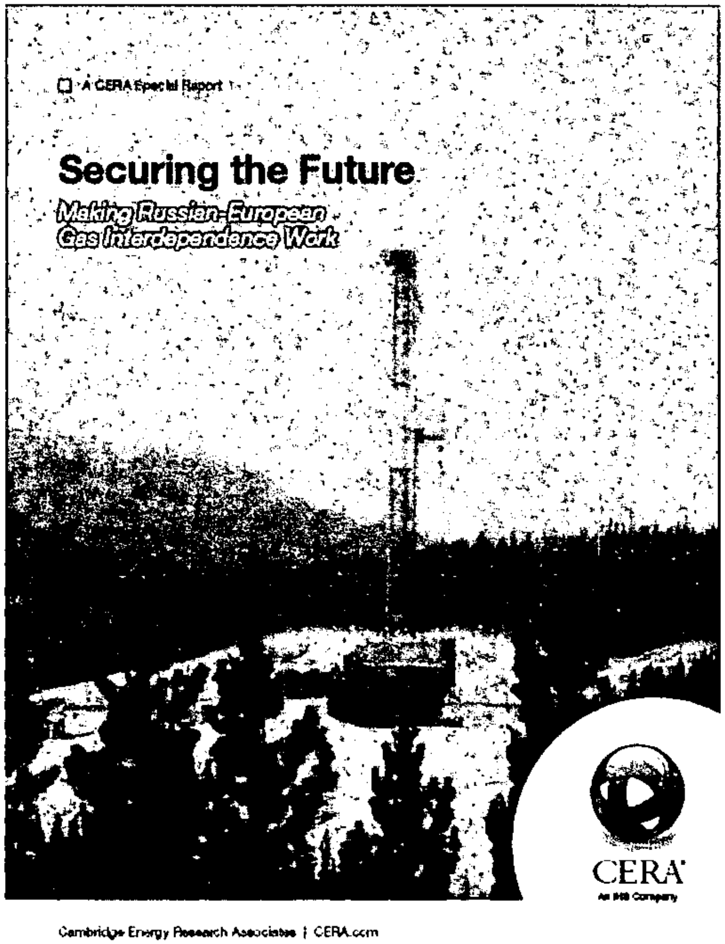
Multi Stakeholder Dialogue
Securing the Future Multiclient Study



CERA's *Securing the Future* study resulted from an extensive dialogue between multiple stakeholders to understand what was (and was not) achievable in securing the benefits of the gas trade between Europe and Russia. It identified the requirements to ensure mutual benefits and identified the risks to all parties from failing to nurture a trade that has benefited all parties for several decades.

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The leading provider of insight and critical information in four key domains

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About CERA

- Leading international energy research and advisory firm
- Founded in 1983
- An IHS Company
- Global presence with offices in 14 countries.
- Staff of over 200 professionals including leading energy market, industry, and geopolitical experts covering all major sectors on a regional and global basis
- Extensive network of distinguished Senior Associates
- Diverse clientele of senior executives at leading energy industry corporations—an exceptional community of strategy and planning executives—and leading policymakers globally.

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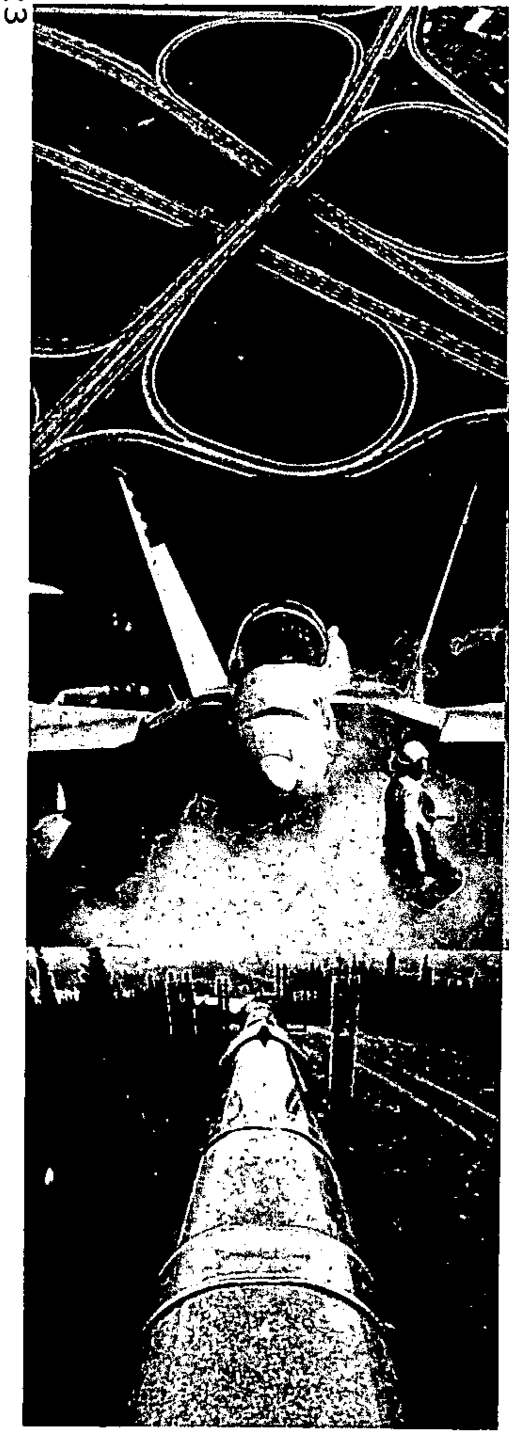

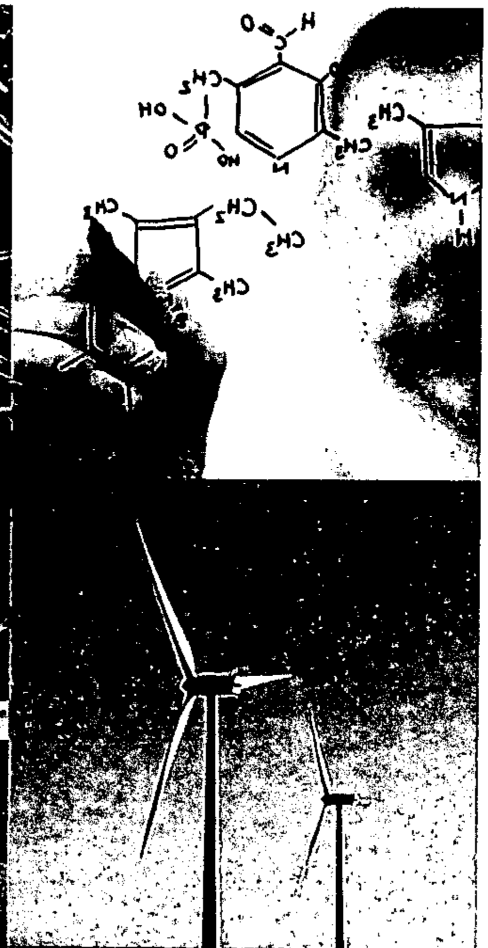

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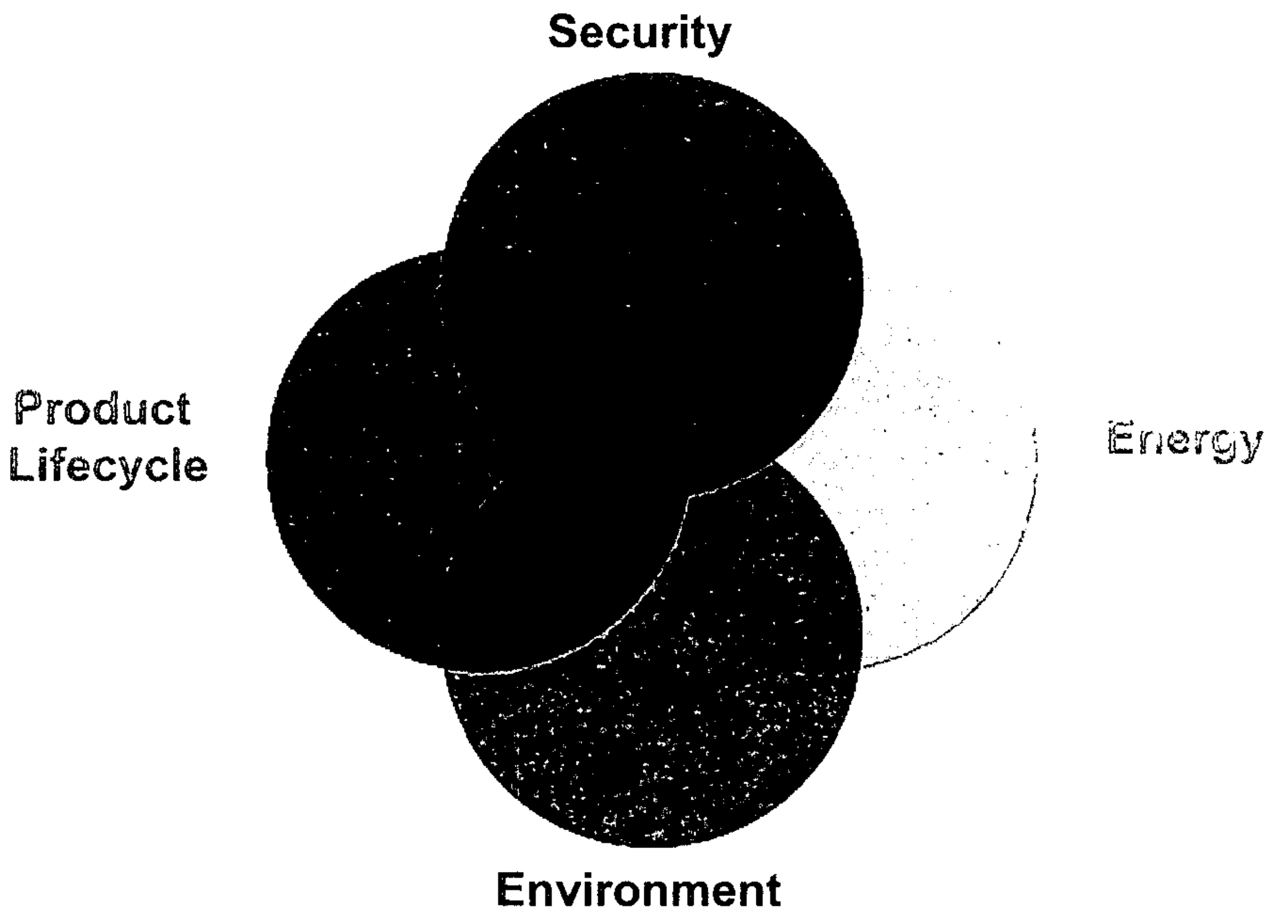
Four Domains of Insight and Critical Information



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If you have any questions about this presentation or CERA in general, please feel free to contact

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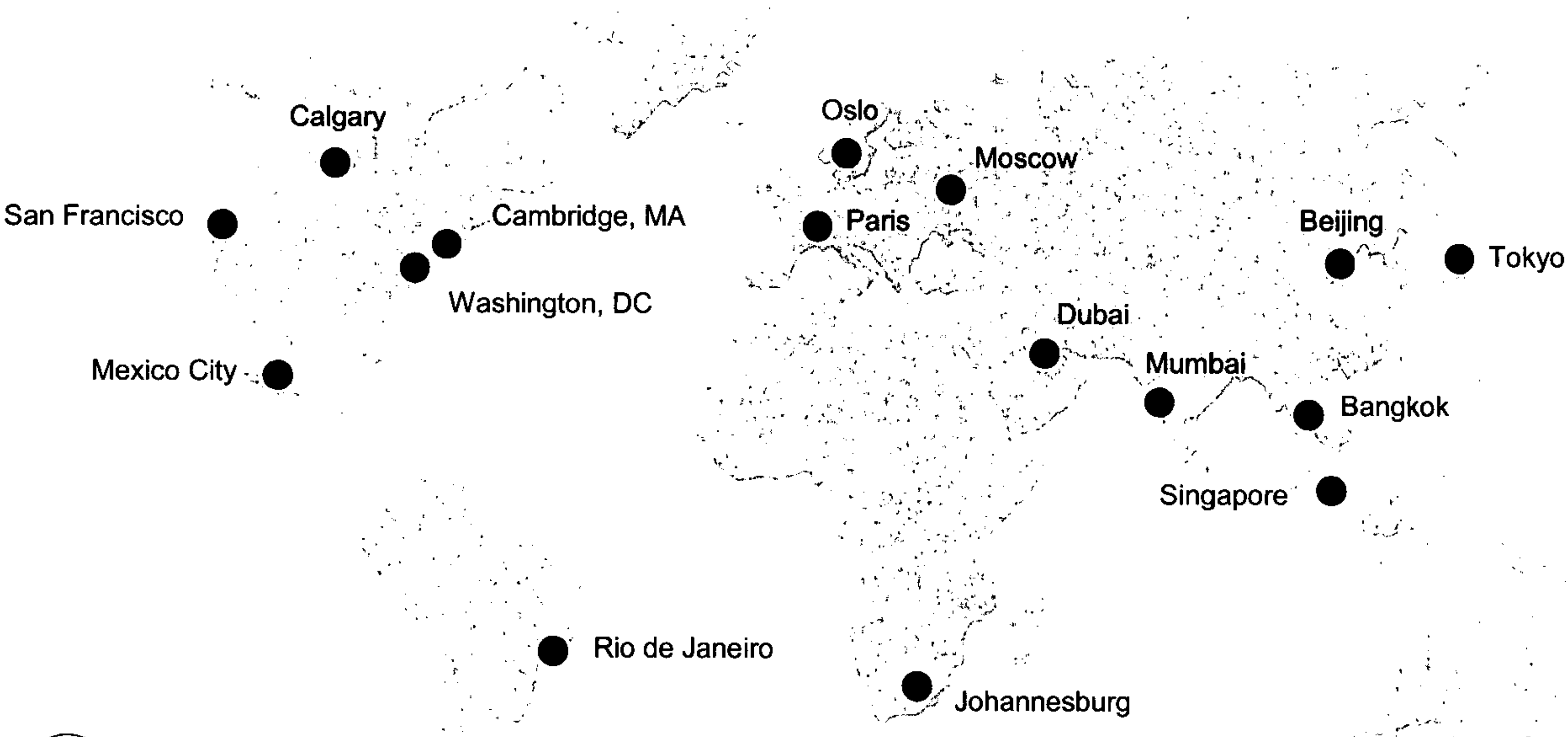

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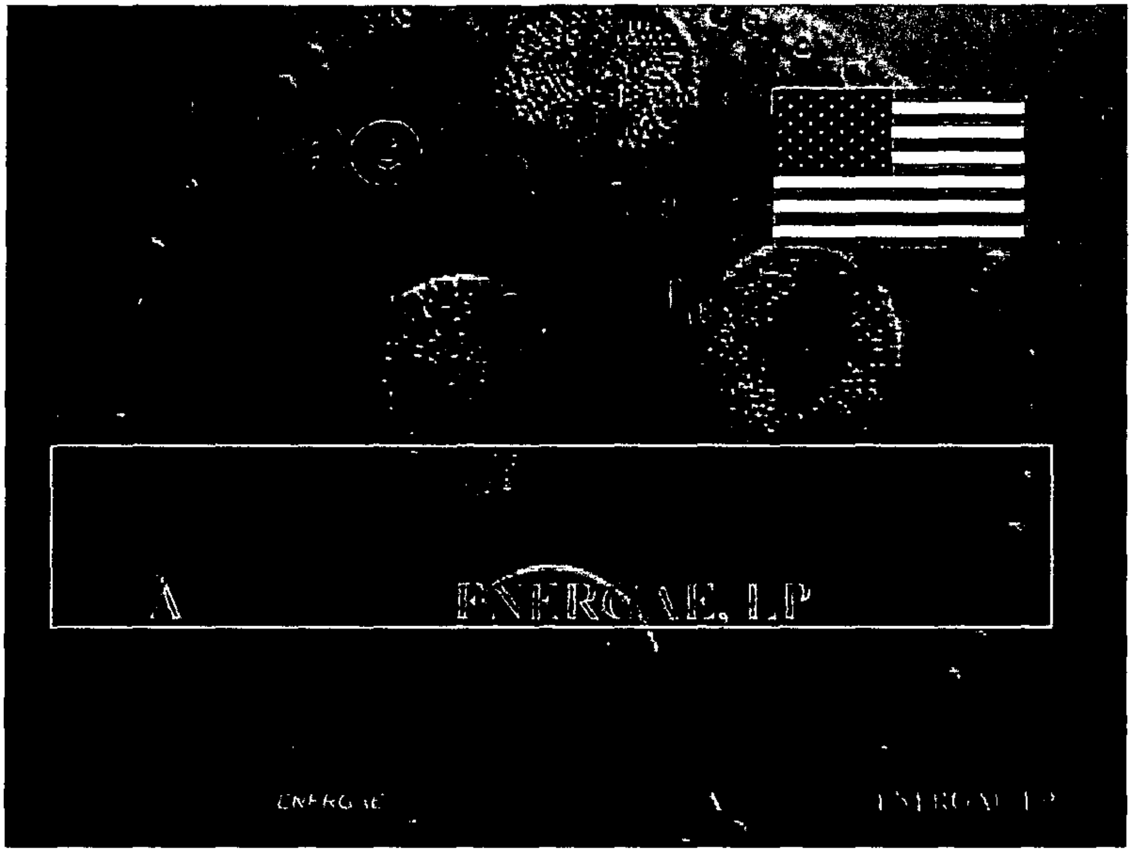

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Endless Supply of ENERGAE BLACK LION ENERGAE, LP

"... ALGAE is the holy grail, if we crack it we can probably give up on everything else..."

Dr. Jerry Murphy, Environmental Research Institute, University College Cork, Ireland

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ALASKA HAS A PROBLEM

Alaska is the energy capital of the U.S. and yet delivery of a low cost energy solution to remote villages has been elusive

Lack of a solution tempers growth to these areas and threatens to undermine long term expansion of capital & growth to Alaska

Alaska's wealth is inextricably tied to its remote regions where raw materials for capital creation lies

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ALASKA HAS A PROBLEM

Alaska is perceived a big oil's big brother, yet fuel costs in remote villages are among the highest in the world – higher than Central America or other developing countries who have no access to oil finds.

the long term financial health of Alaska's Native Corporations and remote regions lies with delivery of a cost effective energy solution to its own: you can have all the wealth in the world, but if you can't provide for your own, you have a problem

Endless Supply of [illegible]

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energy alternatives

diesel fuel – $.24 to $.25 per kwh

- efficient energy source – yet, even with Alaska's abundant oil resources, they can't supply remote areas inexpensively
- costly transportation
- environmentally challenged

solar – $.35 to $.45 per kwh

- too much land required for 1 megawatt of power
- heat value non-existent/limited in winter months

wind – $.25 to $.29 per kwh

- average efficiency rating on wind generators is 35%
- costly to install and maintain relative to energy return
- lack of energy grid to maximize return

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__natural gas__ – $.09 per kwh
- perfect source; too costly to install relative to total population
- costly conversion from current diesel energy platforms

__geothermal__ – $.29 per kwh
- excellent source, but few areas have access
- costly conversion of current diesel energy platforms

__coal__ $.06 to $.08 per kwh
- lowest cost energy source, but infrastructure non-existent
- unwanted discharge – "true clean coal" solution elusive
- costly conversion of current diesel energy platforms

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Alaska needs an energy platform solution that provides the following:

- kwh – low cost
- environment – safe
- diesel platform – combined with no interruption
- transportation – current infrastructure
- scalable – energy platform expanded as need dictates
- set-up time – months, not years
- infrastructure – reasonable costs
- maintenance/upkeep – low
- renewable – "green"
- operation – ease of use

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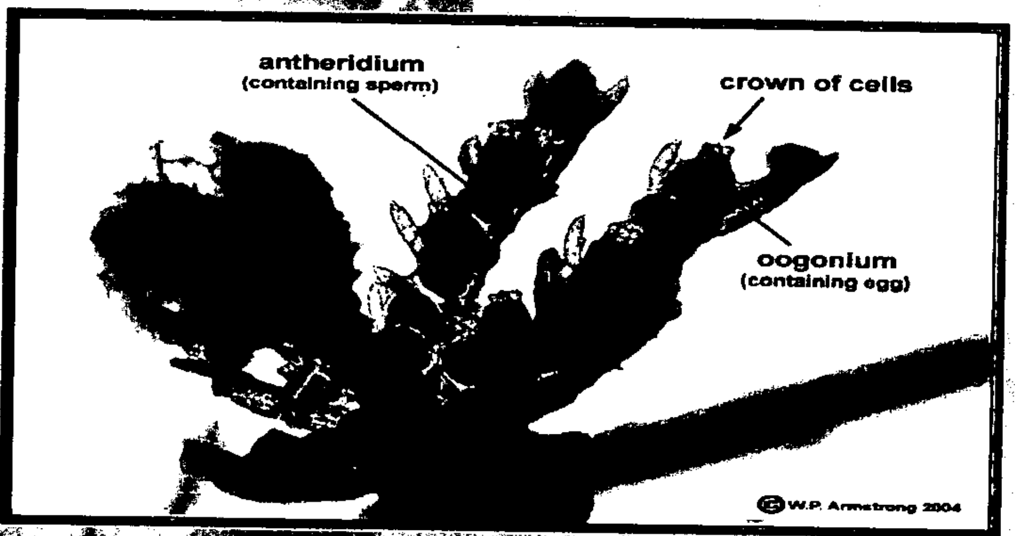
Alaska needs Algae



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ALGAE $.15 per kwh

- current diesel system – retained, enhanced
- manufactred oil – on site, at will
- self-sustaining energy – does not require outside source to function
- weather – operates in sub-zero under low cost greenhouse
- BTU quantity/quality – manipulate relative to need
- maintenance – low cost
- turn-key systems – RWE builds, maintains
- ongoing operation – locals without Phds

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ALGAE history

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National Research Energy Lab (NREL) spent $450 million studying alternative biofuels from 1977 through 1995, $25 million of which went to Algae research

- **qualified Algae strains relative to oil *quantity***
- **qualified Algae strains relative to oil *quality***
- **published Algae white paper in 1998 detailing findings**

– $12 oil - Clinton administration cut funding

– Algae research – shifted overseas due to Algae growth problems

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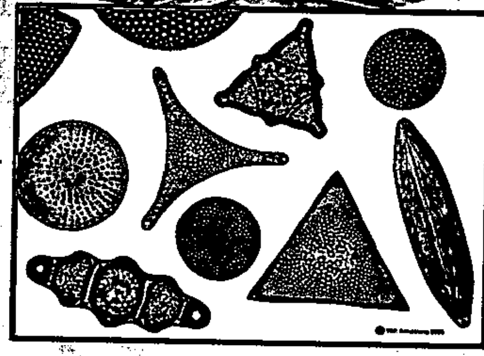
bad ALGAE - massive growth, limited energy value



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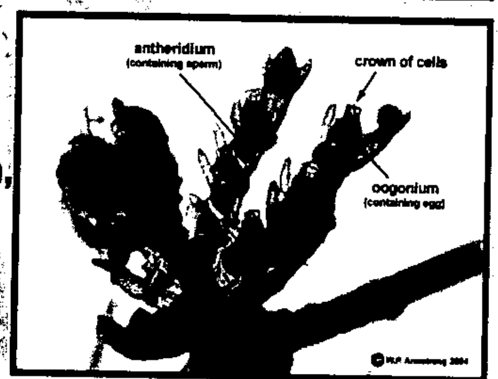
cymbella
nitzschia
amphora
bacillariophytes



good ALGAE - massive growth, much energy value

green algae
dunilelia salina

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ALGAE growth worldwide - exploding

Shanghai, China - the world's most populous city, Pacific Ocean, 2008

Indian Ocean, 2008

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The Carolinas were hard hit with ALGAE problems

They turned to two men to find a solution: Richard Armstrong & Tim Tompkins

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Armstrong - physicist, electrical engineer, bio-systems & process systems specialist

Tompkins - chemical engineer, bio-engineer

together Armstrong & Tompkins built $7 billion in pulp, paper, & energy in the southern states - BF Goodrich, Duke Power, Bowater, Rhone Poulec, GE & others

Armstrong & Tompkins had worked to solve "bad" ALGAE growth problems for these companies. Armstrong & Tompkins never had to put out a resume to bid a job, word of mouth & reputation was enough

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Carolinas - "…get rid of it, or find a use for it…"

Armstrong & Tompkins visited ALGAE research centers worldwide

what they found… ALGAE <u>was loaded with oil</u>; firms were growing it

but, <u>two major problems</u> associated with ALGAE oil eluded solutions

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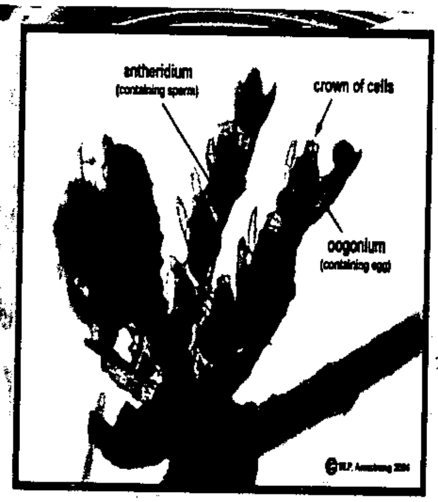

Problem 1 – Growth: starving the ALGAE increased the oil value, but it slowed the growth

Problem 2 – Oil Extraction: extracting energy from ALGAE's 'tight' cell walls was costly

After much research, personal capital & trial & error Armstrong & Tompkins invented solutions

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In developing their solutions, Armstrong & Tompkins' visited all known ALGAE bioreactors...

ALGAE bioreactor - a man-made incubation unit in which ALGAE is grown in order to produce oil & other ALGAE bi-products

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many good ideas.........but most fell short...either too costly to build or they couldn't efficiently extract oil

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Armstrong & Tompkins ***A.T. Bioreactor*** design principles

- Produce large quantities of high energy value Algae and bi-product
- Cost effectively produce the oil & bi-product
- Complete automation to manage input/ouput

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if you could build a customizable, fully automatic, computer controlled engine to grow massive amounts of oil, *what would it look like?*

the engine would need to be high tech, ultra durable, made of thermo-isolated materials to prevent energy loss. it would need to achieve optimal nutrient monitoring, optimal light exposure, optimal water flow, optimal CO2 & NOx intake & exchange, and optimal oil extraction.

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it would look like this...

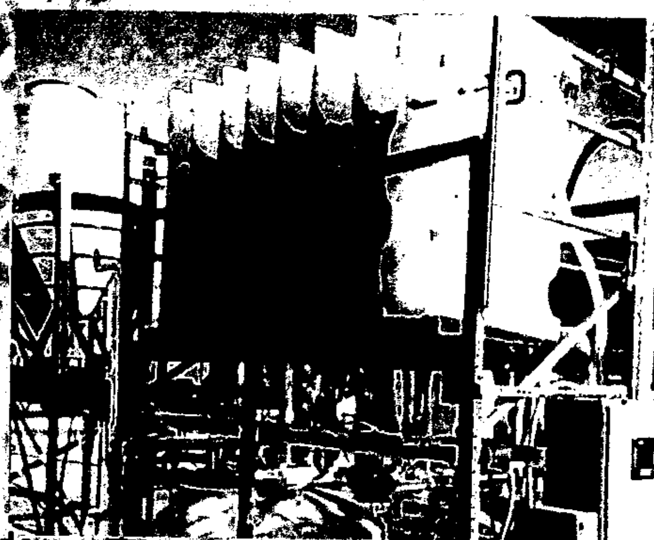
it would have

full automation

constant monitoring of
- nutrients
- light
- gas exchange/intake
- water flow
- PH level
- temperature controlled

continuous harvesting

self-sustaining – low quality oil burned to provide electricity for the entire unit



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ALGAE optimization & automation produce the following:

low cloud point

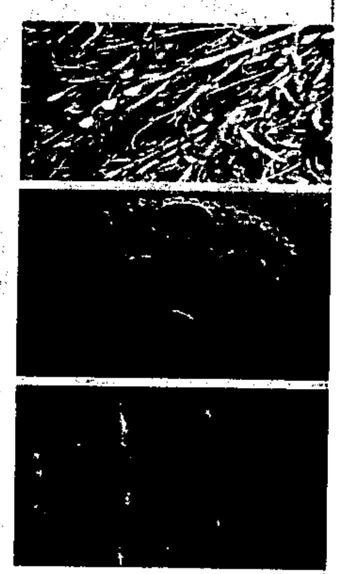
cleaner oil

low sulfur

fuel for vehicles – direct use

high quality oil & BTU value

sucks up nasty gases while growing



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ALGAE traits

35% to 80% of body weight in oil

fastest growing organism known to man

ALGAE oil combined with diesel fuel produces superior burn ratios & cleaner fuel

ALGAE can eat noxious gases produced by burning fuel – turns them into harmless organic carbons

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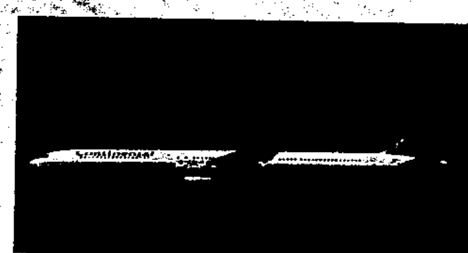
products derived from ALGAE oil

- jet fuel
- gasoline
- plastics
- hydrogen
- Ethanol



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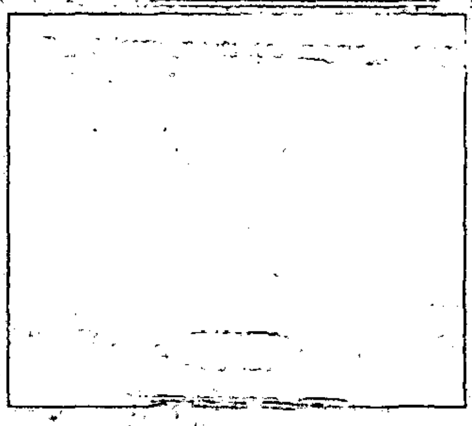
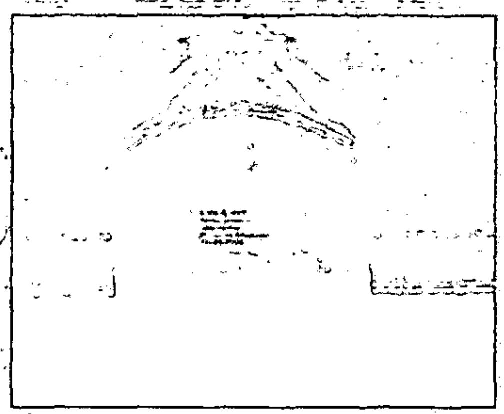
sample Algae growth rate





It took <u>30 hours for ALGAE to grow 20 fold</u> in Armstrong & Tompkins bioreactor using their proprietary nutrient solution & automation

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Armstrong & Tompkins Bioreactor

A. T. Bioreactor	Others
closed System	open pond system
full Automation	partial automation
super strains	local wild strains
<u>98% of oil extracted using proprietary harvesting methods</u>	<u>45% of oil extracted using "pressing"</u>
cleaner oil extraction	less quality oil
low cost to produce	high cost to produce
low cost to build	high cost to build
optimal CO2 intake	poor CO2 management

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some of RWE curent agreements

1. Universities - super Algae strains

2. South Carolina Power & South Carolina Gas & Electric, the largest power production companies in the Carolinas
   - free CO_2 and NO_x

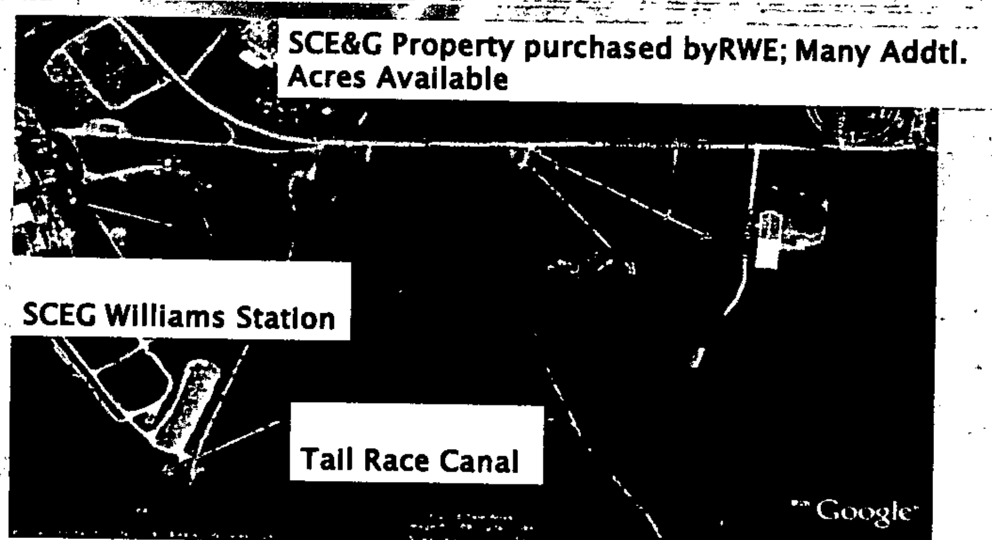
3. State of South Carolina -
   - $13 million in tax credits,
   - pays for all worker training,
   - 250,000 acres for $25 an acre

4. largest coal-fired power production company in the nation

Endless Supply of ENERGAE

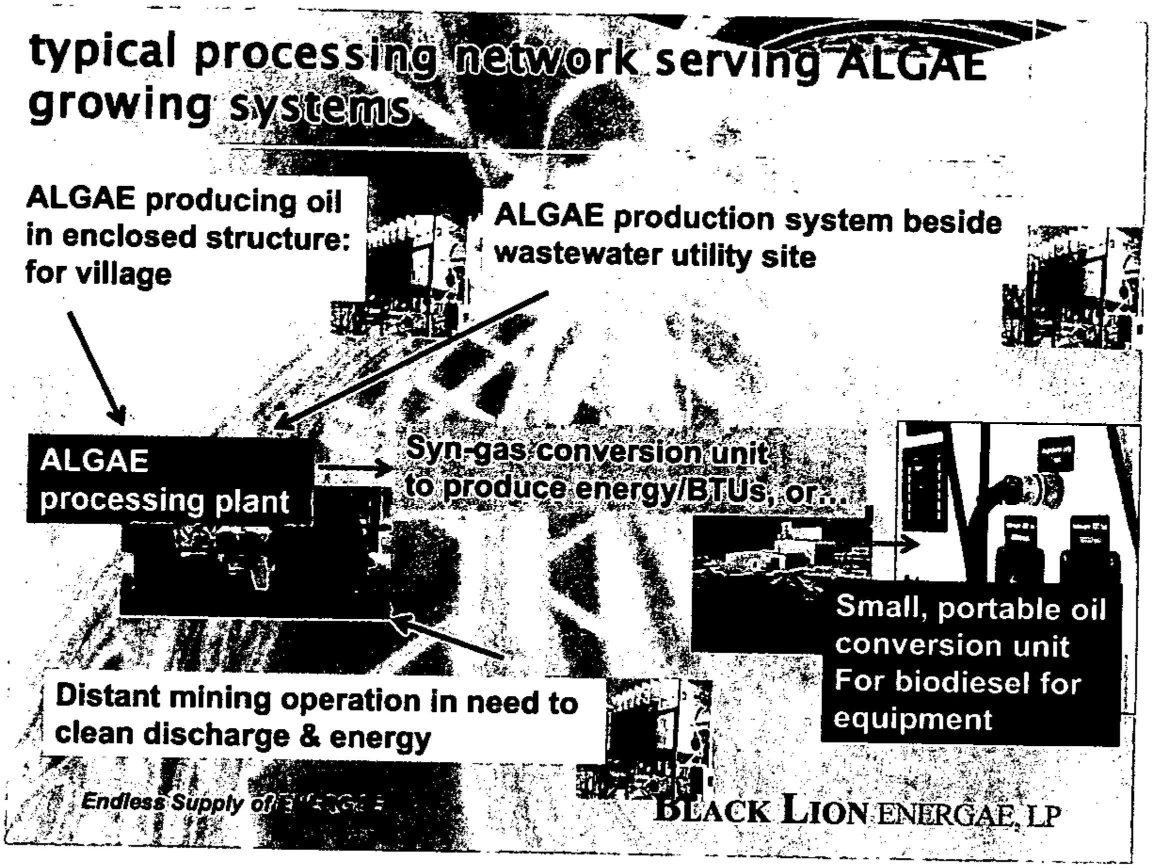
BLACK LION ENERGAE, LP

S.C.EG & S.C. Power - RWE's owned site



Endless Supply of ENERGAE

BLACK LION ENERGAE, LP


typical processing network serving ALGAE growing systems
ALGAE producing oil in enclosed structure: for village
ALGAE production system beside wastewater utility site
ALGAE processing plant
Syn-gas conversion unit to produce energy/BTUs, or...
Small, portable oil conversion unit For biodiesel for equipment
Distant mining operation in need to clean discharge & energy
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BTU & system production
Endless Supply of
BLACK LION ENERGAE, LP

our vision – U.S. native groups

Native owned lands in Alaska and the Southwest hold the keys to energy production in the U.S.

Southwest U.S. – perfect for growing Algae low cost, but they lack the capital

Alaska – can provide the capital

Together, the native groups can help provide the energy needs for the U.S., and in the process return an investment for their shareholders

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ALGAE BTU value groups

oil

- bio-lubricants
- gasoline, ethanol additives, plastics

cake – natural drying, no drying agents

- synthetic gas
- omega 3s & other vitamins
- feed

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oil & cake production & profit

1540 bioreactors per acre	~	38,500 gallons of oil per annum
	+	285 tons of cake
Biodiesel spot price $1.90 per gallon	=	$73,150
Cake $120 a ton	=	$34,200
cost to produce $.85 per gallon	=	$32,725
		======
Net profit (~acre)	=	$74,625

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Net profit	=	$74,625
shipping	=	$11,550
conversion @ modular biodiesel plant in Alaska	=	$13,475
distribution from southwest	=	$4,620
		=====
EBITDA		$44,980

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cost per gallon of ALGAE oil to Alaska

production	=	$0.85
shipping to port	=	$0.30
shipping to villages	=	$0.35
conversion at villages	=	$0.45
Misc.	=	$0.10
Middleware markup	=	$0.25
		====
Total		$2.30
offsetting cake revenue reduction	=	$0.90
Net cost per gallon	=	$1.40

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optional revenue source - CO2 & NOx

ALGAE eats CO2 & NOx

ALGAE chemically changes CO2 & NOx gases into organic carbons

organic carbons are harmless to the environment and can be consumed by animals as feed when dried

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EBITDA	=	**$44,980**
Optional revenue	=	**$20,000**
38,500 gallons of ALGAE consumes 10,000 tons of CO2 while growing; CO2 producers will pay up to $2 per ton to rid CO2		
38,500 gallons of ALGAE consumes 50 tons of NOx & other gases while Growing; NOx producers will pay $350 a ton to rid NOx	=	**$17,500**
		======
EBITDA per 38,500 oil gallons with Optional	=	**$119,980**

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industries that need CO2/NOx gas management discharge solutions

Coal	**Mining**	**Steel**	**Cement**
CO2	CO2	CO2	CO2
NOx	NOx	NOx	NOx
SOx	SOx		

average 3 million ton Coal plant will spend

gas management	=	**$60 million per year**
installation of scrubbing equipment	=	**$200 million**

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ALGAE solution

800 acres of ALGAE beside a 3 million ton coal plant:

gas discharge reduction	=	**$35 million**
oil/cake net revenue	=	**$39.58 million**
		=====
combined annual savings	=	**$74.58 million**
		or $24.86 per ton
scrubbing cost installation reduction	=	**$120 million**
		or $4.50 per ton
		(amor. 15 yrs)

$24.86 + $4.50 = $29.36 per ton

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ALGAE systems allow for an environmentally safe expansion of the coal, petroleum and mining industries in Alaska and beyond

ALGAE sucks up the nasty discharges, turning them into organic carbons which are harmless

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Proposal: State of Alaska sponsored

ALGAE pilot project in Alaska, expected costs & installation

2.25 megawatt power system

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first step: perform low cost feasibility study to determine costs associated with creating 2.25 megawatts of power

second step: if viable cost-wise, install

- ALGAE bioreactors
- newest, small scale Florida Hydro wind design to provide electrical generation for dark winter months, growing ALGAE under artificial lighting
- covered enclosure
- optional oil processing & diesel production units

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expected system cost for first/single 5 megawatts of power

feasibility study	=	$0.250 million
3000 Algae bioreactors & set-up costs	=	$1.50
syn-gas processing station	=	$1.25
<u>optional</u> oil processing station	=	$1.75
enclosures	=	$2.00
wind	=	$2.00
		=====
Total		$8.75 million

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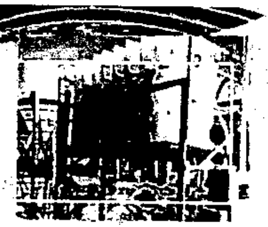
expected ALGAE BTU value



3000 units (system)	~	75,000 gallons of oil per system per year +
	+	540 tons of biomass
BTU value oil (syngas)	=	12,242 megawatts per annum
BTU value biomass	=	5,975 megawatts
wind	=	1,000 megawatt
		====
	=	19,217
combined syngas BTU value	~	2.25 megawatts per hour

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monitoring/maintenance, pilot project year 1

testing/monitoring costs	= $150,000
- 1 fulltime employee to manage system & maintenance	
- RWE manager for communication/ electrical distribution	= $75,000
RWE phase study	= $100,000
	=======
Total	= $325,000

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expected revenue from energy production

2.25 megawatts & $.20kwh	= $3.94 million
10,000 gallons of oil not converted to BTU value for study and distribution @ $3.00 a gallon	= $0.03
	======
total	= $3.97 million

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village prototype system can be profitable in first year of operation

produces 2.25 megawatts of energy

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additionally: ALGAE consumes gas & wastewater

CO2, Nox & other Gases

Algae eats CO2 and NOx gas groups - ALGAE chemically changes CO2 & NOx gases into organic carbons which are harmless to the environment and can be consumed by animals as feed when dried

Wastewater

ALGAE will populate when fed wastewater from human or animal waste; converts waste into organic carbons

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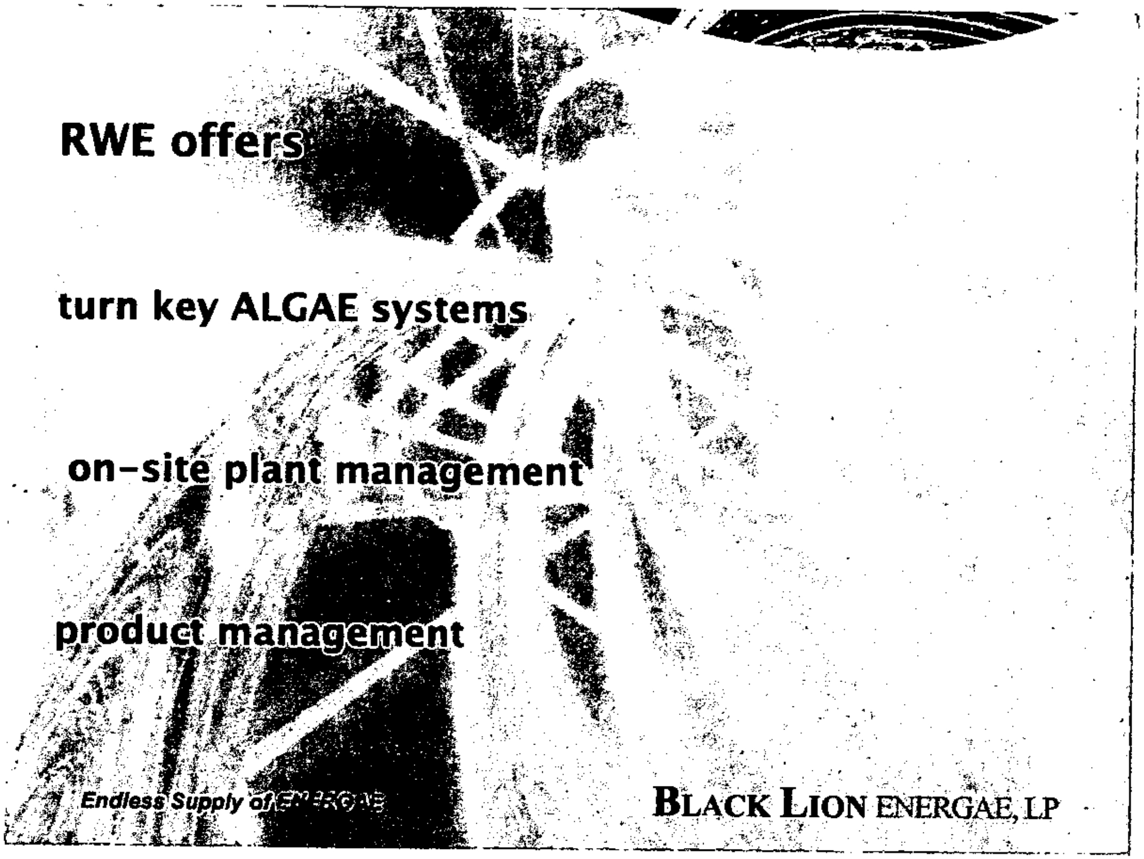
RWE offers
turn key ALGAE systems
on-site plant management
product management
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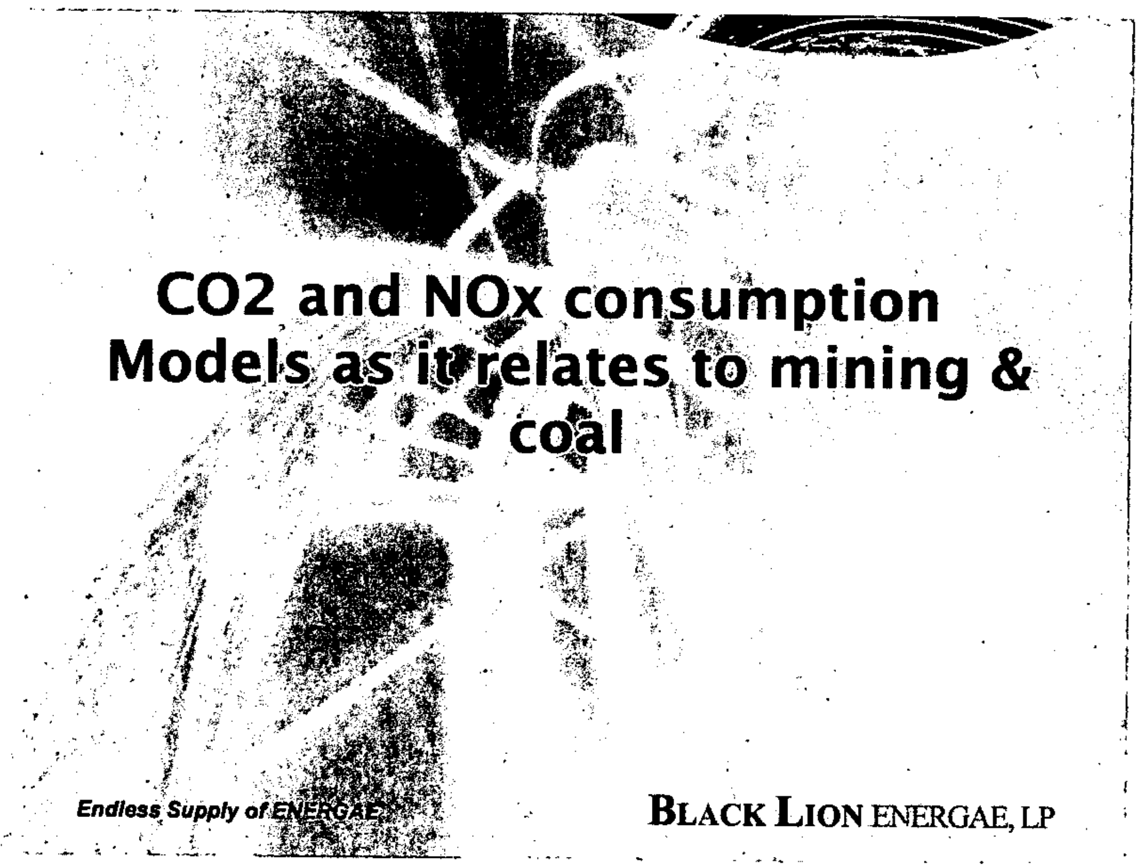
CO2 and NOx consumption Models as it relates to mining & coal
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In January 2009 the EPA fined Kentucky Utilities' largest coal-fired power plant \$140 million in fines and equipment upgrades to <u>clean-up NOx & Sulfur Oxide emissions. The plant had already spent \$270 million</u>

Both the EPA & the E.U. have a ZERO tolerance for NOx emissions

But, what of CO2?
- World currently operating under TWO CO2 models

<u>E.U./Kyoto model: Each</u> country/industry is allotted "x" CO2 emissions

All CO2 emissions are monitored

If you exceed CO2 emissions you must
1. purchase carbon "credits" or
2. be heavily fined

<u>U.S. Model:</u>
...voluntary...but...

ALL CO2 emissions are NOW recorded by the EPA

California is mandating a CO2 trading market

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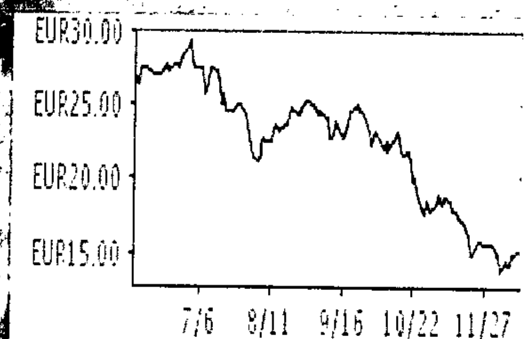
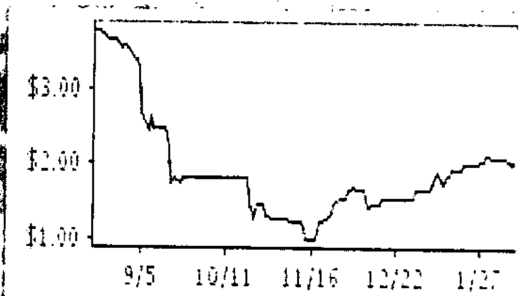
Mandatory Carbon Trading Market in Europe
(\$15 E.U. converts to \$19 U.S.)



Voluntary Carbon Trading Market in the U.S.



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E.U. Problem: there are not enough carbon credits relative to demand - $30 billion traded in 2008

U.S Problem: The US Supreme Court gave the EPA the "right" to mandate all CO2 emissions

Coal Problem: coal plants must spend addtl $50 million per ton of coal produced per annum to clean-up CO2 emissions, not including NOx upgrades

Mining Problem: water and gas discharge from mining operations run into multiple millions of clean-up

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minimal cost to clean CO2/NOx gases in Alaska

CO2 per coal ton	$3 to scrub/sequester
	$6 for equipment to scrub
NOx per coal ton	$5 to scrub
(bound & thermal)	$8 for equipment to scrub
	====
	$22 per ton
small sized coal plant 1.5 million tons of coal per annum	1.5 X $22 = $33 million per

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TVA TWO POWER "Lines" ~ 1000 Megawatt each – are SHUT DOWN, due to

- being "over limit" on CO2 & NOx
- annual revenue loss = $500 million per annum
- cost to correct: $200 million + $50 million per year operating costs

Increased EPA mandates on coal, mining, steel & cement now being set up for mandates

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RWE Solution: ALGAE system

- consumes all CO2
- consumes all Nox & other nasty gases
- reduces need for costly scrubbing equipment
- puts people back to work
- produces additional revenue streams
- cleans up mining, cleans up coal

RWE's solution – half the corrective cost of using scrubbing – RWE's solution produces revenue

EPA's solution for TVA – $250 million COST not including ongoing $50 million per annum!

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other revenue sources from algae cake & oil

- Plastics
- Fertilizers
- Cosmetics
- Enzymes
- amino-acids
- Antioxidants
- superoxide dismutase
- Phycocyanin
- carotenoids, etc.

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mining

Algae can be programmed to suck up mining's "other" output, turns output into harmless organic carbons for fertilizer and animal feed

produces badly needed low-cost energy for remote mining locations

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potential combined NET revenue if oil & cake separated and sold individually

oil	–	$1.05 per gallon
cake	–	$0.90 per gallon
CO2/Nox	–	$1.94 per gallon
Royalties	–	$0.12 per gallon
		======
subtotal	–	$4.01 per gallon

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foreign petroleum oil

how does Algae compare?

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**D.O.E . Figures*	*No. 2 Diesel Fuel*	*Algae Oil*
Cost per gallon *At $40 per barrel oil** *At $10 Barrel oil = ($.22)*	($.86)	N/A
Cost to Grow Oil or Convert Diesel Fuel	($0.93)	($0.85)
Convert Algae Oil to No. 2 Diesel Fuel	N/A	($0.45)
SG&A & Marketing	($0.25)	($0.25)
Shipping/Handling	($0.25)	($0.30)
Subtotal	($2.04)	($1.85)
Bi-Product Revenue Cake	NA	$0.90
Bi-Product Revenue Carbon Credits	N/A	$1.94
Bio-Diesel $1.00 per gallon credit	N/A	$1.00
Total	**($2.04)**	**$1.99**

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In January 2009, $17 billion left American pockets to purchase foreign oil - $381,000 per minute

the U.S. imports 67% of the oil it consumes

we have a solution

Canada - 2.028 million barrels per day
Saudi Arabia - 1.48[illegible] million barrels per day
Mexico - 1.296 million barrels per day
Venezuela - 1.071 million barrels per day
Nigeria - 0.775 million barrels per day
Iraq - 0.467 million barrels per day

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other oils vs. ALGAE oil

350 gallons – Palm Oil <u>per acre per year</u>

Fatty acid – HIGH | Conversion to Diesel – LOW

303 gallons Canola/Rapeseed

Fatty acid – LOW | Conversion to Diesel – HIGH

150 Soy Oil

Fatty acid – LOWER | Conversion to Diesel – VERY HIGH

38,500 gallons & more Algae Oil

Fatty acid – Extremely Low | Conversion to Diesel – 1 to 1

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competitors

<u>Valcent Products</u> – No revenues, demonstration model, produces product called Vertigro – website claims similar gallons per acre but system is costly

<u>Solazyme</u> – The company utilizes proprietary genetic engineering methods to develop and optimize commercially relevant biochemical pathways ys production of hydrocarbons.

<u>LiveFuels</u> – A national alliance of labs and scientists dedicated to transforming algae into biocrude by the year by the year 2010. Working on breeding various strains of algae, driving down the costs of harvesting algae and extracting fats and oils

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Infinifuel Biodiesel - Nevada - home to a unique biodiesel project under development and is being touted as the world's first geothermal powered and heated biodiesel plant. Geothermal "wells" will be used as energy to grow ALGAE on 300 acres; still under development.

PetroAlgae - commercializing environmentally friendly ALGAE developed by a research team at Arizona State University that generates over two hundred times more oil per acre than crops like soybeans. Using a cost-effective, modular cultivation process that can be scaled. Working on converting ALGAE oil to plastics.

Sapphire - a developer scalable photo-bioreactors for the production of alternative oil products from algae oil. Sapphire's closed photo-bioreactors are expensive, but designed for high-end oil market products. Bill Gates dumped over $50 million into this project and they make oil for $2.50 a gallon and more

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production/value goals

	2009	2010	2011	2012	2013
RWE oil in MGPY	3	15	30	60	100
RWE Partner MGPY	0	15	40	60	100
	===	===	===	===	===
	3	30	70	120	200
Projected Value Per Unit	$1665	$2368	$3780	$6890	$11,450

Based on Profit per Unit current unit price $1000

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Richard Armstrong Resume

Richard Armstrong, President, Chairman

SUNY- Binghamton, Electrical and Chemical

Brome CC, Math and Physics Major

Senior member ISA, Instrumentation Society of America

Extensive experience in building large chemical plants. ***Project design/manager on over 5 billion dollars in projects on pulp & paper & chemical processes including transesterification processes.*** **Experience includes project design, start-up and commissioning of pulp dryers, bleach plants, paper machines, scrubber systems, electrical distribution, emergency generators, plant automation, system networks, electronic primary and final control elements and programming/configuration of PLC's and distributive control systems for boiler houses, chemical batch reactors, conveyor systems, Pharmaceuticals, pulp and paper plants as well as petrochemical.**

- **Has extensive experience in negotiating large equipment purchases.** ***Every project over the last 35 years has been on budget and on time.***
- **Partial list of clients:** ***Bowater Pulp & Paper, Rhone Poulenc Chem., BF Goodrich, Duke Power, Phillip-Morris, AMEX, GE***

Endless Supply of [illegible]

BLACK LION ENERGAE, LP

TIM TOMPKINS RESUME

Tim Tompkins, CTO

Technical Association for the Pulp and Paper Industry (TAPPI) – member since 1989

Carolinas Air Pollution Control Association (CAPCA) – member since 1996

B.S., Pulp and Paper Technology

N. C. State University

Engineer on over 2 billion dollars in projects on boilers, Pulp & Paper & chemical processes and often managed these facilities. **Pulping and bleaching projects include a new 50 ton-per-day chlorine dioxide plant and storage tank system, bleach plant modifications, recycle and de-ink pulp facilities, pulp dryer system modifications, pulp mill studies, chilled water system modernization, and design of several cooling tower systems. Papermaking projects include white water system modifications, vacuum pump installations, cleaner modifications and additions, post consumer waste recycle system, and ground calcium carbonate system. Environmental projects include scrubber additions and modifications, storm water collection and treatment, and several Cluster Rule related jobs that included: studies, capital cost, design, and construction.**

Endless Supply of ENERGAE

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3-12-09 Energy Presentations

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Presentations</subject><comm>SENE26</comm></target>

"Turnagain Arm Tidal Bridge Electric Generation Plan"

A Renewable Clean Energy Project For Railbelt Area,
About 70% of Alaska's Electricity Needs

Prepared By

Little Susitna Construction Company, Inc.

In Association With

Blue Energy Canada, Inc.

821 N Street, Suite 207
Anchorage, AK 99501

February 6, 2009

Dominic S.F. Lee, P.E.

President & CEO

ABSTRACT

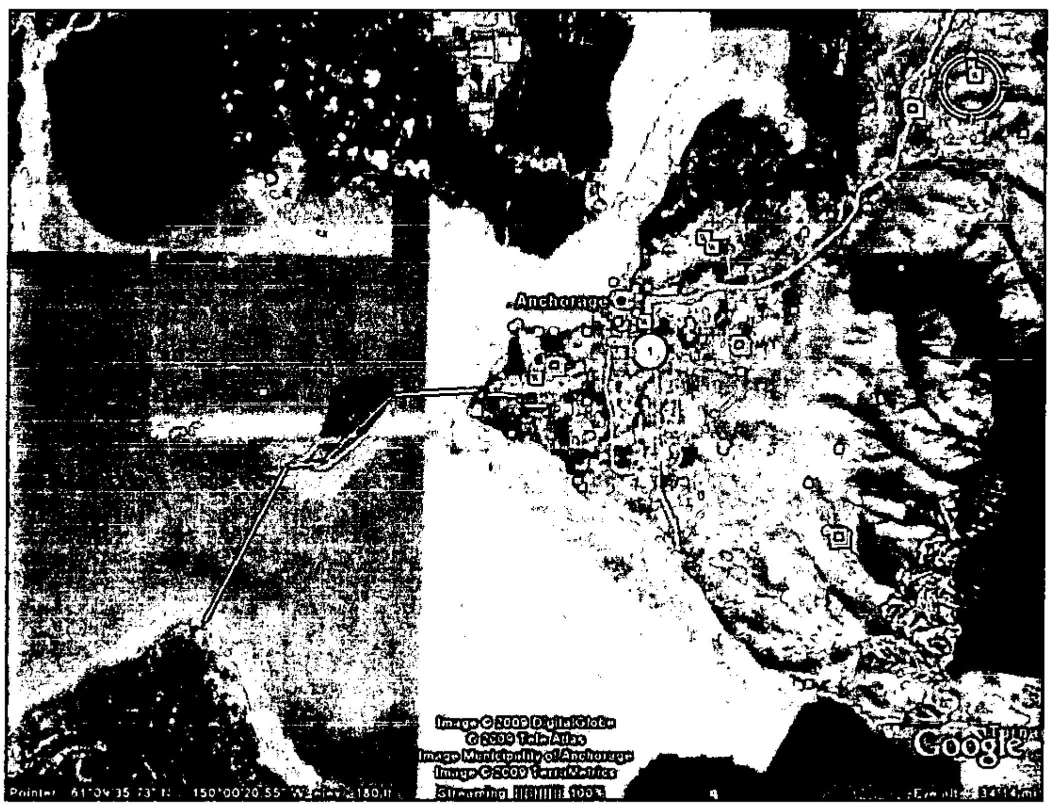
A tidal opportunity in Alaska is at hand to turn into reality. With the new ocean current generation system, the Davis Turbine Power System, Dominic S.F. Lee, P.E. of Little Susitna Construction of Anchorage and Martin Burger of Blue Energy Canada, Inc. of Vancouver, B.C. Canada have teamed up to bring a $2.8 billion project to Anchorage to harness the cheap energy of the world's fourth highest tide location at Turnagain Arm. Not only does Dominic bring the idea to construct this project, he also brings the financing, engineering team and project management expertise to this project. The result of this project will be the production of 2,200 megawatts of peak power with a base daily average of 1,200 megawatts tidal bridge facility which can supply 70% of Alaska's electricity need, plus a surplus for future industries. The project will produce electricity in the 6 to 8 cents per kilowatt hour range. This is in contrast to the current rates of 13¢ and 30¢ per kilowatt hour in the railbelt which would cut an average household's electricity bill by 50 to 75 percent. The Turnagain Arm Tidal Bridge Power Project not only produces emission and fuel free energy, but will have a small ecological footprint, allowing marine life, nutrients, and sediments to travel through the bridge.

Another benefit of this project is its allowance of a 15 mile causeway, a two-lane highway across the Turnagain Arm from Anchorage to North Kenai's Possession Point. This causeway will let those traveling from Anchorage to Kenai enjoy a 30 minute drive rather than a 3 hour drive around the Turnagain Arm and through the Chugach Mountains. It would also save them an average of about 25 gallons of gasoline for each round trip.

The use of tidal energy eliminates the seismic risks associated with large hydroelectric dams, a constant danger in Alaska, as well as the CO_2 emissions associated with natural gas. Best of all, the tide will always be available into the future without further expense of future exploration and drilling, or failure through depleted water sources associated with hydroelectric projects. Tidal power produces far more power than windmill or solar construction without the periods of down time for weather conditions, and the construction cost per kilowatt hour is the cheapest of all types of renewable energy projects.

During construction, this project will provide 4,500 jobs for 5 years and 100 jobs after

construction for operations and maintenance. After all, this is the best renewable, sustainable, clean energy available in Alaska. The Turnagain Arm Tidal Bridge project would effectively establish Alaska as the tidal power technology seat for the Pacific Rim markets. Alaska will be the leader and academic center for renewable energy in the USA. This project will streamline the process of developing similar future projects. This will create an additional 5,000 jobs in Alaska for fabrication and support of these kinds of projects in the Pacific Rim. The Pacific Rim will be a large market that includes, but is not limited to, the Philippines, China, Japan, New Zealand and Korea. It is a very large market that will require a great deal of support on may levels. The time schedule for the total project is estimated to be six years. If this project was started now, in February 2009, by 2015 Alaska's renewable energy will come on line. What a fantastic opportunity for Alaska.



EXECUTIVE SUMMARY

Introduction

Mankind has dreamed for centuries of harnessing the abundant energy of the tides. A number of plants have been built around the world with the oldest (since 1954) being a 240 megawatt tidal power plant in LaRance, France. This French project has commercially proven that tidal projects are a large viable source of renewable, sustainable, clean, and economically cheap energy amongst all the other electricity production plants, such as oil-fired, coal-fired, nuclear, wind, solar, and biomass fuel, even the conventional hydroelectric dam project.

Tidal power is Alaska's largest source of energy and long after the oil and gas fields have been depleted the tides will still be providing clean low cost energy. The State has hundreds of billions in tidal reserves and early tidal resource development action would leverage economic developments by multiples for the Pacific Rim.

Turnagain Arm has the fourth highest tide in the world, 25 feet (7.6m) between low tide and high tide and it is a perfect location to install a tidal bridge to generate electricity according to the world experts in tidal power. The project will be less susceptible to earthquake in the water than a massive concrete dam at the Susitna River where as recently as 1964 the area experienced one of North America's strongest earthquakes. It is predicted that the probability of a high magnitude earthquake happening again in this area is significant.

Turnagain Arm Tidal Power Concept

Turnagain Arm sees the largest tidal range in the United States, with a mean of 30 feet (9.2 m), and the fourth highest in the world, behind Bay of Fundy (11.7m), Ungava Bay (9.75m), and Bristol Channel (9.6m). The ocean's natural 12-hour 25-minute tidal cycle is close to Turnagain Arm's natural resonance frequency, which then reinforces the tide similar to water sloshing in a bathtub. Tidal fluctuations in the main body of Cook Inlet, while not as extreme as the shallow and narrow Turnagain Arm, regularly reach 25 feet (7.6m) and exhibit currents in excess of 5 knots (9.3 km/h) at full tidal flow. This is a significant tidal resource that is situated just south of Anchorage, which is situated as the hub of the Railbelt region.

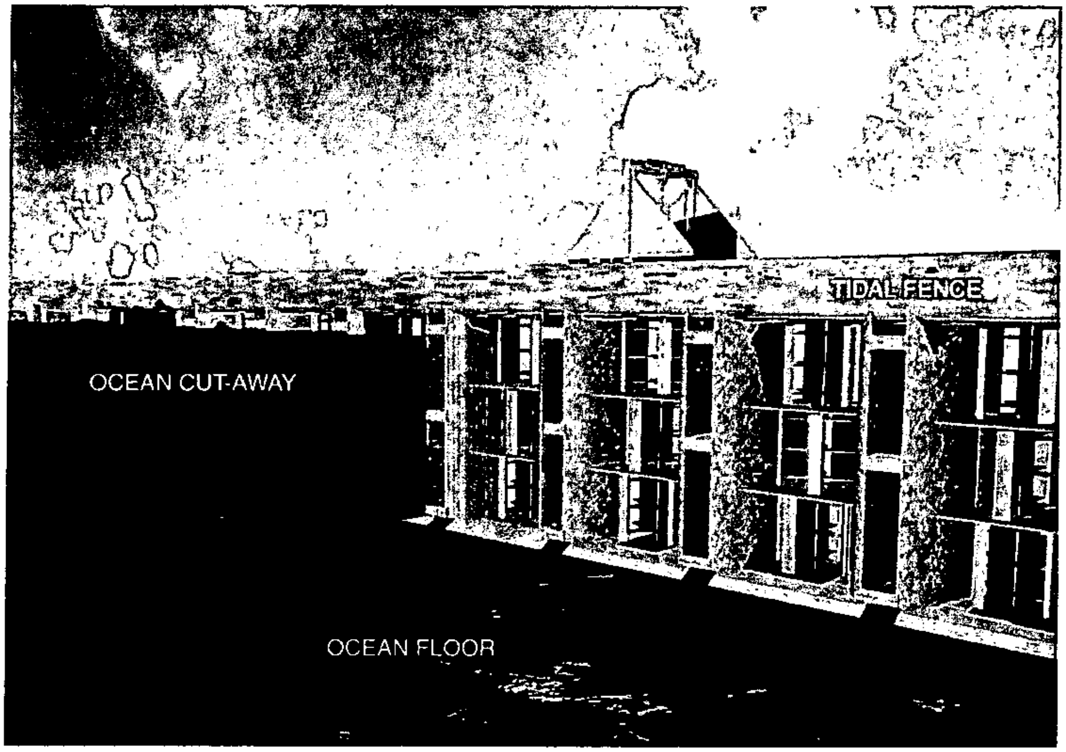
The Railbelt region electrical grid is defined as the areas of six regulated public utilities that extend from Fairbanks to Anchorage and the Kenai Peninsula. Sixty-five percent of the Alaskan population lives within the Railbelt Region.

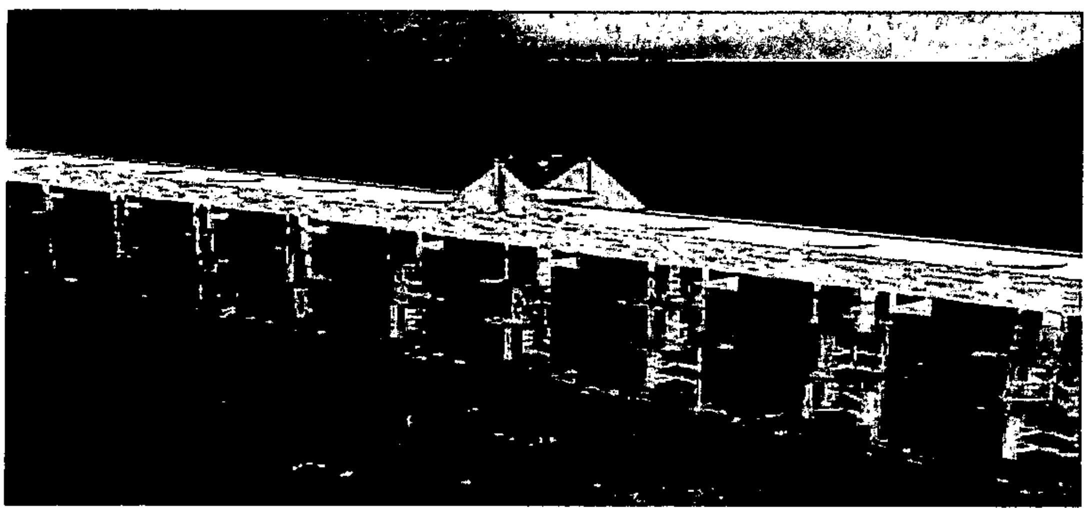
The southern portion of the Railbelt region: the Mat-Su Valley, Anchorage, and Kenai Peninsula, are highly dependent on natural gas as the source of electricity and heat, and the majority of the generation is combustion turbine generation. The Cook Inlet gas basin still yields large quantities of natural gas for power generation and space heating, but known reserves are now falling and dropping field operating pressures are causing concern that the region may not be able to depend on lower Cook Inlet for adequate gas supplies in the future. There are several proposals to construct pipelines that could bring Alaskan North slope natural gas into the Railbelt, which could even be integrated into a tidal bridge spanning Anchorage to Fire Island to the northwest corner of the Kenai. Nearly all of the thermal generating capacity from coal fired and natural gas fired power plants in the Railbelt is more than 20 years old, and much of it is more than 30 years old.

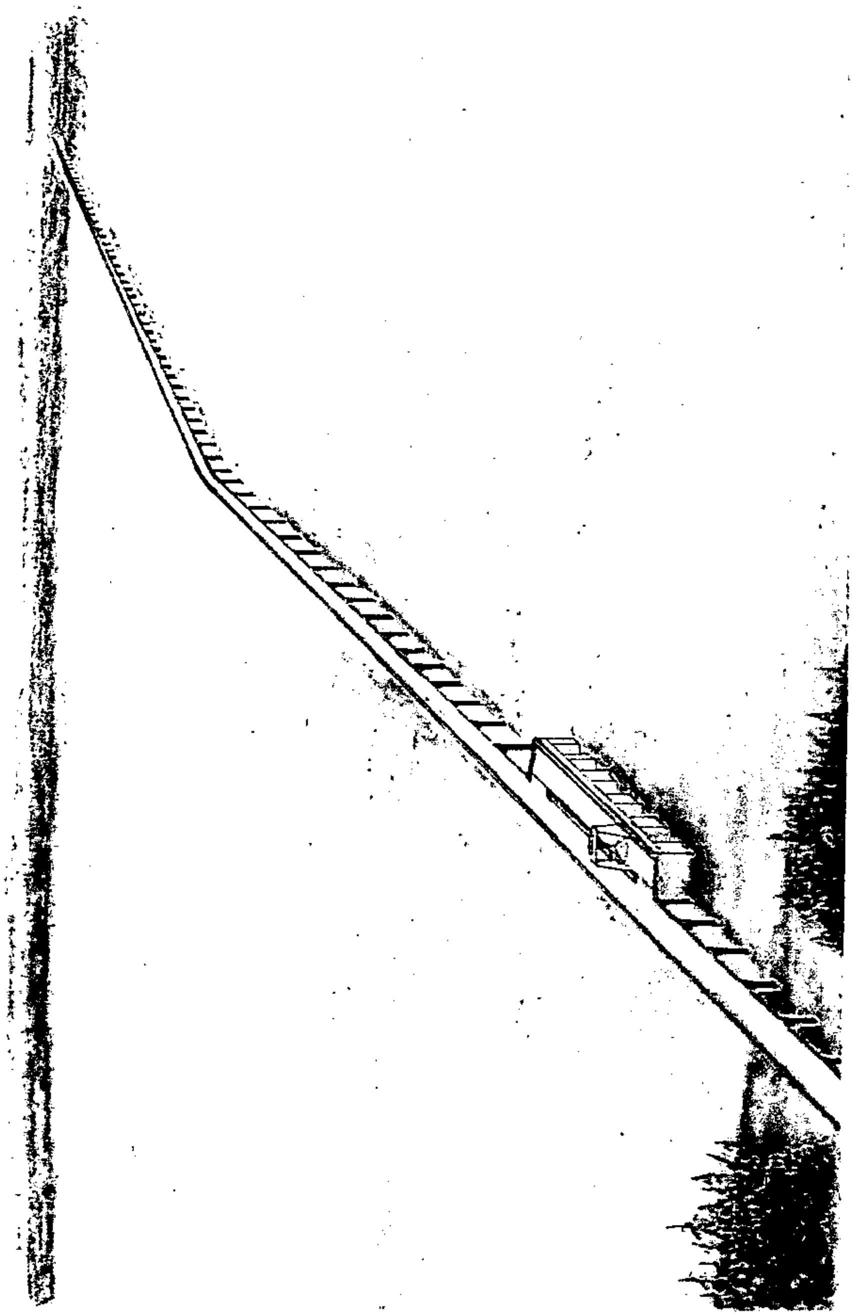
Due to the shallow, sandy bathymetric conditions a 3 mile 25 foot tall piling supported, two lane causeway will be constructed between the point to the south of the Anchorage International Airport and Fire Island. A 4 mile road along Fire Island will connect to a 8 mile tidal bridge to the northwest of the Kenai Peninsula. This route will shorten the drive to the west coast of the Kenai Peninsula significantly, though the actual benefits of this need to be further studied. For a 2200 MW project, the average daily output will be 1200 MW. In order to properly estimate the output of the tidal bridge, hydrographic resource assessments will need to be carried out.

The Turnagain Tidal Bridge Power Project is very environmentally friendly. The structure, the gear boxes, the generators, and the electrical switch gear are all located above water level while the Davis Turbine rotor is located 12 feet below the low tide line. The tidal bridge will have a blockage ratio of approximately 50%, though this will ultimately be determined with the appropriate hydrographic studies. The rotor diameter will be approximately 10.5 meters and turning at 25 rpms. Marine life access for Beluga migration will be designed into the project.

Since the turbines are installed 12 feel below low tide line, the winter ice in the Turnagain Arm will float above this level and will not damage the turbines.


TIDAL FENCE
OCEAN CUT-AWAY
OCEAN FLOOR





Picture shows a modular Davis Turbine generator unit attached to the causeway from Fire Island to North Kenai Possession Point.

968

<u>The Work Plan</u>

1. Step 1 will be to construct a two-lane highway from Raspberry Road into Kincaid Park, go west to Fire Island, then cross Turnagain Arm with a causeway to North Kenai Possession Point and connect to Kenai's road system to Kenai/Soldotna. The route would be 15 miles long with 11 miles over the water and would have an approximate $300 million construction cost.

2. Step 2 would entail the construction of a three mile long tidal bridge with the patented Davis Turbine Power system to produce electricity from 0 MW at slack tide to 2200 megawatts at peak power with a base daily average of 1,200 megawatts of net electricity.

3. Step 3 would entail connecting this electricity to Chugach Electric Association's (CEA) electrical grid at the Raspberry Road substation. From this substation all the electricity needed could be delivered to Southcentral Alaska, the Railbelt and Fairbanks areas.

4. The current Railbelt area electricity generation peak capacity and charge per kilowatt hour is as follows:

a.	CEA	480 megawatts	16¢/Kwh
b.	ML&P	183 megawatts	13¢/Kwh
d.	Homer	90 megawatts	24¢/Kwh
d.	GVEA	223 megawatts	15¢/Kwh
e.	Ft. Wainwright, Eielson AFB	20 megawatts	N/A
Total:		996 megawatts	

5. The availability of cheap excess electricity can be used to attract industries to Alaska such as mining, aluminum smelting, zinc smelting, and petrochemical.

6. Connecting Anchorage to North Kenai by a two lane causeway to compare to existing road system will:

   a. Save time - 30 minutes instead of 3 hours.

   b. Save fuel - 25 gallons per round trip (average of 15 mpg).

   c. Cut CO_2 emissions by 80%.

   d. Generate income through tolls per car and truck that use the causeway.

7. Utilizing this clean energy will enable the owners to sell their emission credits

worth millions of dollars for not dumping millions of tons of CO_2 into the atmosphere.

8. This project will be financed through public offerings of stocks and bonds and private investment firms from Asia.

9. After 20 years in operation, the debt service will be paid off, all the future electricity generated will be free.

The Financial Plan

The State of Alaska Department of Transportation should help pay for the 2 lane causeway (est. $300 million), part of the construction cost can be recovered through use tolls and with Federal Highway matching funds and State money. Public financing for 80% of the $2.5 billion cost of the tidal bridge project, can be accomplished by issuing U.S. Department of Energy guaranteed bonds for $2 billion.

A private Asian investment firm has expressed a serious interest in investing 20%, or $500 million, into this project in the form of stocks. This firm would then be a 20% owner of the Turnagain Arm Tidal Bridge Hydroelectric Corporation. The other 80% ownership will be held by the general public or any investment company, or perhaps even the State of Alaska.

The Organization

Little Susitna Construction Company, Inc. (Prime Consultant) is an Architectural, Mechanical, Electrical and Civil/Structural engineering and construction firm operating in Alaska since 1980. Little Susitna is also licensed by the State of Alaska as a general contractor, electrical (inside and outside) contractor, and mechanical contractor. It is an electrical union shop with a signatory agreement with I.B.E.W. Local 1547 for 27 years.

Dominic S.F. Lee, P.E., educated both in China and the United States, Dominic Lee came to the United States in 1962 and to Alaska in 1977. An American citizen, he is the founder and CEO of this company. He has earned B.S. and M.S. degrees in Electrical Engineering (Power Systems major), a M.S. in Mechanical and Aerospace Engineering, all from the University of Missouri at Columbia, Missouri. He also did graduate study in arctic, civil, environmental and wave engineering at the University of Alaska, Anchorage. He has worked in the engineering design of electrical, mechanical, and structural renovation of the 70-year-old Bonneville Hydroelectric Dam near Portland, Oregon in 1990 for the Portland District U.S. Army Corps of Engineers. He was the engineer on record and received a citation from the U.S. Army Corps of Engineers for a job well done. Mr. Lee is currently licensed as a professional Mechanical and Electrical Engineer in Alaska and ten other states, WA, OR, HI, CA, MO, TX, LA, MS, AL and GA.

In 2005 Mr. Lee was invited to China by the Three Gorges Dam Project engineers as an expert consultant to solve some of the unexpected problems they encountered during the construction phase of the world's largest hydroelectric construction project ($500 billion construction cost).

Mr. Lee is also an experienced project manager. He managed the construction inspection contract for 10 years with the U.S. Coast Guard for their nation-wide capital improvement construction projects totaling $1.5 billion in construction cost. He and his engineers received over 25 citations and commendations by the U.S. Coast Guard's captains and admirals for projects well done. Mr. Lee is well qualified to manage this project.

Blue Energy Canada, Inc.. Blue Energy is a private consulting firm in ocean engineering and construction. Blue Energy is based in Vancouver, British Columbia, Canada. The firm holds the patent for the Davis Turbine Power System, which is proposed to be used in this project in Alaska.

The application of the Davis Turbine is to harness the movement of the tides in the world's oceans, which contains vast reserves of untapped, sustainable energy. With this Canadian proprietary Davis Turbine Power system, this massive new energy resource can be harnessed. The Davis Turbine is a low cost, simple mechanical device. It employs a hydrodynamic lift principle, actually causing the vertical turbine foils to move faster than the speed of the water. The system has multiple vertical axis hydro turbines with straight foils mounted in a duct structure to form a tidal fence. There are large marine structures of reinforced concrete and steel, and can be installed across an estuary with tides exceeding 1 meter or more and a tide velocity exceeding 2 meters per second or more. A typical installation across a 1 Km (.62 mile) crossing can produce more electricity than a large nuclear power plant. Or, in terms of oil, about 100,000 barrels per day at a construction cost of less than $1,400 per kilowatt. The tidal bridge power system can be built without the attendant pollution, maintenance, corrosion and radioactive fuel disposal problems, and produce electricity as cheap as 4¢ per kilowatt hour.

The tidal power plant mechanical equipment is designed to last for 50 years, the marine caissons for 100 years, and fuel for the system is free since it is generated from the ocean current. While power output is cyclical due to the ebb and flow of tides, sufficient flexibility exists in the country's current integrated grid to manage by either pumped storage, or by utilizing existing natural gas plans for peak demand loads.

Blue Energy Canada, Inc. is the world's leader in tidal bridge hydroelectric power generation. Their proprietary Davis Turbine was proposed for use in the Philippines for a $2.9 billion, 2,200 megawatt tidal current project at Dalupiri Passage. Dalupiri Passage is a four kilometer stretch of water between Dalupiri Island and Samar Island of the Philippines. Blue Energy Canada also recently signed a Joint Venture Memorandum of Understanding (MOU) with India's Reliance Group out of Mumbai, India. This 100 billion dollar company has asked Blue Energy to provide them and expedited technology pathway to design and build the 22,000 megawatt tidal bridge hydroelectric project in Gujarat in the Bay Kambhat, India.

Mr. ***Barry V. Davis*** MRAeS, C.Eng, ASTC, and co-founder of Blue Energy Canada, Inc., is the inventor of the Davis Turbine. Mr. Davis has an outstanding record as an aeronautical and hydrodynamics engineer, having played key roles in the development of two Canadian landmark technological achievements, the Avro Arrow and the Bras D'Or. He is the inventory of the Davis Turbine that will be used in the tidal bridge. These products were developed with the help of the Canadian government.

Mr. Davis worked with DeHavilland Aircraft Company in Australia and England on the development of military and commercial aircraft, and subsequently with Avro Aircraft Limited in Toronto on development of the Avro Arrow supersonic fighter-bomber, which was recognized as the world's best when it was completed in 1958.

Subsequently, Mr. Davis joined DeHavilland aircraft of Canada as Chief Hydrodynamic Designer for the Bras D'Or high-speed hydrofoil sub-chaser, working on all aspects of the design, particularly the foils, hull and propellers. This state-of-the art craft, again a world leader, was successfully built and tested but, like the Arrow, cancelled due to changing strategic and budgetary priorities.

After working for a number of years as an independent marine and hydrodynamic consultant, Barry founded Nova Energy Limited to develop and field test Ducted Vertical Axis Hydro Turbines which was supported by the National Research Council of Canada. During the 1980s, successful trials were conducted with several different prototypes in the St. Lawrence River near Cornwall, Ontario; the East Sheet Harbour River, a tidal site in Nova Scotia; and the Gulf Stream off Miami, Florida. These trials, together with a number of independent assessments by different authorities, confirmed the viability of the Davis Turbine.

After three-years back in the aircraft industry with Canadair working on the Challenger Business Jet and the Regional Jet, Barry (soon to be joined by Martin Burger) founded Nova Energy Ltd., the predecessor of Blue Energy, to continue development and marketing of the Davis Turbine. Although Mr. Davis passed away in 2004, his legacy of the Davis Turbine is just beginning to revolutionize our world in the capable hands of Martin Burger through Blue Energy.

Mr. ***Martin J. Burger*** - Founder & Director. From 1990 - 2000 collaborated with Barry Davis to develop and promote the Davis Hydro Turbine, evolving the turbine design from a stand-alone unit to the ocean class tidal bridge. A passionate futurist and conference speaker on sustainability and energy technology solutions, Martin has acted in an advisory capacity in matters of energy sustainability with his vision for a low cost clean energy future. He presented a tidal power technology briefing to President Ramos and his Caucus of the Philippines, was a Keynote Speaker at COFE I & II (Conference of Future Energy), and OPEC I & II. He was selected by Hazel Henderson as a keynote speaker at OPEC I visioning a future after oil, and was asked to sponsor the follow-up OPEC II conference in Vancouver, British Columbia, the home of Blue energy Canada, expanding on OPEC I and briefing delegates on high density sustainable energy opportunities.

Interested in beneficial yet stranded technology solutions, Martin has evaluated over 400 innovations in the past 20 years and brings an out-of-the- box perspective, unwavering commitment, engineering / heavy construction expertise, and visionary leadership to Blue Energy. Prior to his role with Blue Energy Martin played key roles in the success of two technology driven companies and in the development of several world-scale construction projects in the petrochemical energy and mining sectors.

Mr. Burger is a civil engineering graduate with distinction from Northern Alberta Institute of Technology. From Cree ancestry, he has a high affinity for Mother Earth, and is sensitive to her environmental pain. Mr. Burger believes that it's important to participate in the future through children. He is a mentor on sustainable energy for the Wonder Tree School.

Jon Ellison - CEO. Mr. Ellison received a bachelor degree from the University of Chicago in 1995. He became an investor in the company in 2003, and since then has been involved in the development of the company serving as a general manager through 2007. In an emerging space where experience is almost non-existent, Jon worked closely with the founding CEO on international business developments for two years and has a visceral feel for the technology and resource developments. Jon's infectious enthusiasm and his performance in directing the company's advanced rotor design development program at UBC, lead to his promotion as Blue Energy's new CEO in January 2008.

Dr. Sergey Barmichev - Formerly from the Russian Rocket Program, Dr. Barmichev has twenty-three years of experience as a structural mechanics engineer, dynamical modeler, a computer applications support specialist, a project manager of interdisciplinary teams, and an applied mathematics consultant. He received his masters in 1974 at St. Petersburg, Russia developing numerical methods to linearize the form and development of optimal strategies for the equations of motion of navigation of missile platforms. He received his doctorate in 1989 in St. Petersburg with his thesis devoted to Finite Element Analysis methods. Dr. Barmichev was Russia's key rocket scientist on the Boeing Moscow Sea Launch Rocket Program when he moved to the United States in 1997. He is currently employed by Boeing working as an aerospace engineer on the world's first all composite airliner, the Boeing Dreamliner. Dr. Barmichev offers a wealth of knowledge concerning materials and finite element analysis, prototype development, and mathematics.

Geoff Smith - Geoff Smith has over 40 years of experience in a wide range of energy sector consulting projects and programs. He is President of NexEnergy Inc., a California-based energy consulting firm and small business. Prior to this he was conducting and managing consulting work in a variety of areas. He gained a wealth of experience as a senior manager at Bechtel Corporation, directing the technical advisory efforts for a $200 million international energy and environmental program sponsored by USAID in Washington DC, and a $60 million Egyptian Industrial energy efficiency and environmental project for USAID/Cairo. Geoff is greatly experienced in energy planning; power systems planning; including solar, ocean and other renewable technologies; energy technology assessment; energy systems design; conservation and efficiency; greenhouse gas reduction and capture, energy audits; and economic and financial analysis and market studies. Geoff received his B.S. in Mechanical Engineering at McGill University as well as his M.S. in Electrical Engineering at McGill University. He received his M.B.A., Finance at Golden Gate University. He is a Registered Mechanical Engineering in California and a member of the Institute of Electrical and Electronic Engineers (IEEE) and the American Society of Mechanical Engineers (ASME).

COST ESTIMATE BY PHASE

For the purpose of planning for project costs, the project will be broken down into five (5) phases.

Phase 1 - The Preliminary Studies Phase ($10,000,000 funded by Alaska's Renewable Energy $100 Million Grant Program or special Legislative appropriation. Time Frame: Approx. 1 Year). Phase 1 is required to confirm the Turnagain Arm waterway's geophysic and ocean current hydrology are suitable and that this would be the best location for this project.

1. Feasibility Study - 30,334 Manhours @ $150/Hr. = $4,550,000
    a) Assess the ocean resources parametrics from available marine and tide charts.
    b) Preliminary siting investigation.
    c) Assessing hydrographic resources.
    d) Cross depths.
    e) Geophysics, bottom conditions.
    f) Geotechnical Investigation.
    g) Environmental Impact Assessment
    h) Examine the existing electric grid proximity and connectivity issues.
    i) Substation and switch yard.
2. Hydrographic Computer Modeling - 3,334 Manhours @ $150/Hr. = $1,250,000
    a) Computer model the tidal regime with data from existing tide gauges.
    b) Insert a tidal fence and run model for preliminary analysis.
    c) Calibrate the fence with tidal phasing and run model for 50 years.
    d) Fine tune the computer model with field data.
3. Perform Field Hydrology Survey & Environmental Study - 4,000 Manhours @ $150/Hr. = $600,000
    a) Install tide gauges.
    b) Measure currents and perform bathymetry study.
    c) Perform wetland assessment.
    d) Using field-measured data, calibrate and confirm the hydrographic computer

modeling.

e) Calibrate the fence with tidal phasing and run the model forward for 100 years.

4. Preliminary Tidal Fence Design and Preliminary Engineers Analysis - 5,334 Manhours @ $150/Hr. = $800,000
   a) Thin Shell Concrete Caisson Design.
   b) Foundation Design.
   c) Size Electrical Generators and drive Line components.
   d) Rotor Design.
   e) Ancillary Equipment Design.
5. 3-D Numeric Hydrodynamic Computer Modeling of Tidal Fence with Performance Analysis - 4,667 Manhours @ $150/Hr. = $700,000
6. Small Scale Flume Tank Model to Verify Tidal Fence Design - 5,000 Manhours @ $150/Hr. = $750,000
7. Constructability Study - 5,334 Manhours @ $150/Hr. = $800,000
   a) Seabed composition.
   b) Navigational Clearance.
   c) Import large rock to fill the foundation to support the turbines.
   d) Bathymetry and hydrographic survey.
   e) Piling installation.
   f) Turbine module installation.
   g) Causeway constructability.
   h) Connection to existing power grid.
8. Cost Estimation - 2,334 Manhours @ $150/Hr. = $350,000
   a) System engineering design.
   b) Environmental Impact Statements
   c) Federal regulations.
   d) State regulations.
   e) Right-of-Way.
   f) Land purchase.

g) Financing.

h) Construction cost.

i) Project management cost.

j) Operation and Maintenance Costs.

9. Risk Management and Risk Ranking the Project - 666.67 Manhours @ $150/Hr. = $100,000

   a) Insurance.

   b) Earthquake effects.

10. Public relations to obtain commitment from utilities in Railbelt and commitment from State of Alaska and Federal Governments - 666.67 Manhours @ $150/hr. = $100,000

Phase 2 - Design & Development Phase ($100 Million Funded By Public Offering. Time Frame: 1 Year)

1. Engineering design of tidal bridge causeway, substations and connection to existing electrical grid.
2. Site Survey.
3. Ocean Current Tide Survey.
4. Ice, and Winter Operation Study.
5. Environmental Impact Statement.
6. Obtain Right-of-Way Permits.
7. 3-D numeric hydrodynamic computer modeling of the tidal bridge performance.

Phase 3 - Construction Document Phase ($100 Million Funded By Public Offering. Time Frame: 1 Year)

1. Final Engineering Design.
2. Final Construction Cost Estimate.
3. Sign Final Commitment Documents Buy/Sell Electricity With Utility Companies In The Railbelt.
4. Sign Funding Source Final Agreement.

5. Complete Land Acquisition.

Phase 4 - Construction Phase ($2.6 Billion. Time Frame: 4 Years)

1. Advertise for bids for turnkey construction for:
    a) Causeway.
    b) Tidal Bridge Hydroelectric Plant.
    c) Sub-station and Grid Connection.
    d) Operation.
2. Start Up, Commissioning Equipment.

Phase 5 - Operation & Maintenance Phase (Funded by Operation Income)

1. Management.
2. Operation and Maintenance.

FINANCING PLAN

1.	Causeway (Design and Construction)	$300 Million
2.	Preliminary Study (Phase 1)	$10 Million
3.	Engineering Design (Design Development and Construction Document)	$200 Million
4.	Construction of Tidal Bridge and Substation, Intertie W/Existing Grid	$2.20 Billion
5.	Miscellaneous Finance Costs, Public Relations, Headquarters, Staffing, Construction Management, Permits	$100 Million
Total		$2.810 Billion

Public Finance $2.5 Billion

20% ($0.5 Billion) by Investment Firm in Asia.

80% ($2.0 Billion) by Public Offing of U.S. DOE-guaranteed bonds.

Finance Breakdown

1. Phase 1 $10 Million Preliminary Study by grant from State of Alaska under renewable energy program or special legislative appropriation.
2. $300 Million Causeway between Kenai and Anchorage by the State of Alaska Department of Transportation (costs can be recovered by levying tolls on cars and trucks). The State can also issue bonds for this causeway project, and use matching funds from the Federal Highway Department.
3. $2.2 Billion Tidal Bridge Hydroelectric Plant.
   $100 Million Substation, Connection to electrical grid system, infrastructure, misc.
   $200 Million Engineering, Design, Environmental Impact Statement.

Total $2.810 Billion

CONCLUSION

The new Turnagain Arm Tidal Bridge Corporation will operate as a publically owned company.

Turnagain Arm Tidal Bridge $2.5 billion debt serviced by selling electricity to all railbelt electrical utility companies, new industries, and selling emission credits.

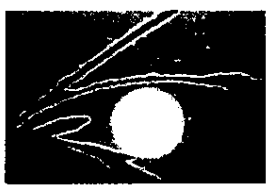
The State of Alaska is responsible for the causeway's $300 million debt, which can be serviced by collecting users fees, emission credits, and Federal Highway matching funds. The state will get 70% of its electricity from this renewable energy project by 2015. This is 10 years ahead of the Governor's plan to have 50% of Alaska's energy generated by alternative sources by 2025.

After 20 years, the debt service will be paid off and all the electricity generated after 2035 will be free, renewable, clean energy. There is NO FUEL required.

The merits of the Turnagain Tidal Bridge Project are self evident. What is less evident is that timely action on this sustainable power initiative can provide a whole new forward looking economic sector in that the Pacific rim is anxiously waiting for the scale up of this technology. The principals at Blue Energy Canada Inc. are very amenable to the Alaskan lifestyle and are open to locating their Pacific Operations here in Alaska.

ALASKA COOK INLET
BELUGA AREA
RESOURCE DEVELOPMENT

SYNTHETIC GAS FROM COAL & BIO-MASS
FOR ELECTRIC POWER GENERATION
FOR F-T TRANSPORTATION FUELS
ENHANCED OIL RECOVERY (EOR)
WHILE SEQUESTERING CO_2



POSITIVE CHANGES FOR THE PEOPLE & REGION

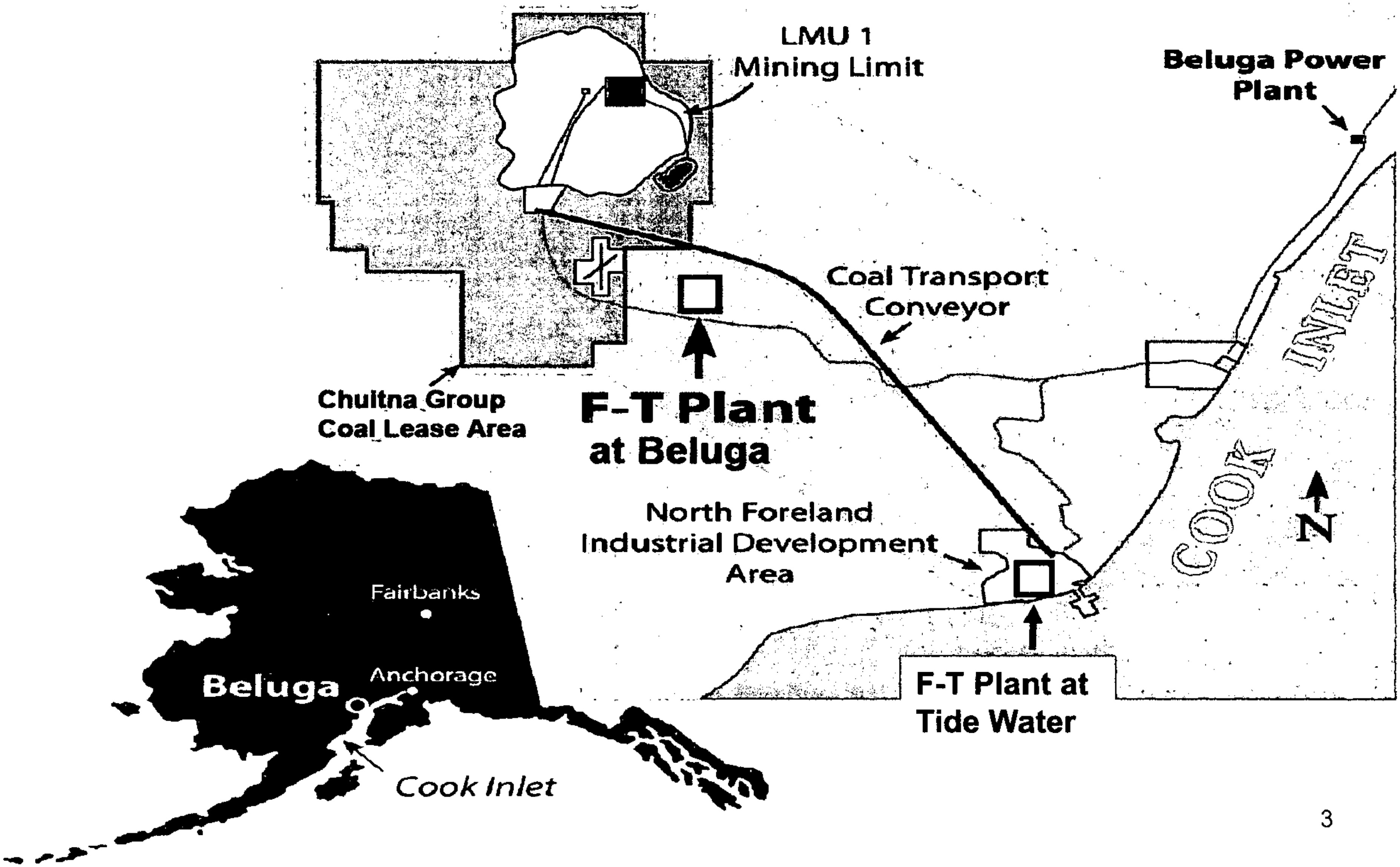
March 12, 2009

ALASKA BELUGA CTL THE BEST - LOCATION

- Long term Federal support for CTL - *$500 million/yr*
- Access to local natural resource (coal) *17 million tons/yr*
- Access to unlimited cooling water *Cook Inlet – no fresh water*
- Access to electric power grid *makes 200 to 400 MW of power*
- Access to natural gas system *can make synthetic pipeline gas*
- Access to skilled labor *1,600 direct jobs – 7,000 indirect*
- Access to export markets *no negative impact on local refinery*
- Access to proven CO_2 sinks ? *Depleted oil and gas reservoirs*
- Tide water location reduce capital costs *$12 billion CAPEX*
- Local markets that need the same products *jet fuel*
- Local fuel storage allows for fuel supply competition-lower costs

80,000 bbl/d Coal To Liquids "Beluga CTL Plant"

(Mine Mouth or Tide Water)

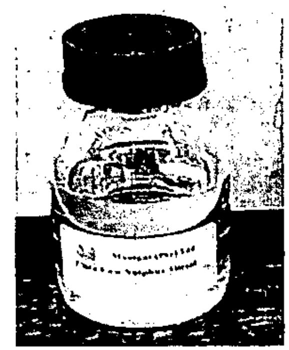


WHAT DOES 1.3 BILLION TONS OF WEST COOK INLET COAL REPRESENT

- 2 BILLION BARRELS OF FUELS
  - The SASOL F-T process will turn 1 ton of West Cook Inlet coal into 1.5 barrels of product
  - 1.5 barrels x 1.3 billion tons =

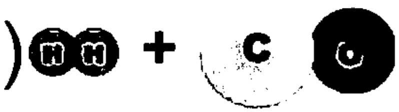
    2 billion barrels of fuels

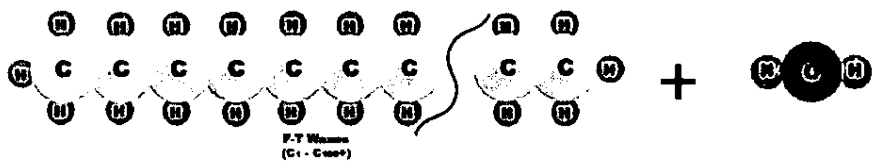
BILLIONS OF TONS OF BELUGA COAL **EQUALS** **BILLIONS OF BARRELS OF F-T FUELS**



Three Steps in CTL/BTL/GTL Refining to make F-T Fuels

CTL/BTL/GTL Processes use 3 distinct steps, all commercially proven to convert a gas, liquid or solid into synthetic transport fuels:

- Step 1 - Syn-Gas generation (H_2 & CO) 
- Step 2 - The F-T reaction (long paraffin chains ➡ wax)



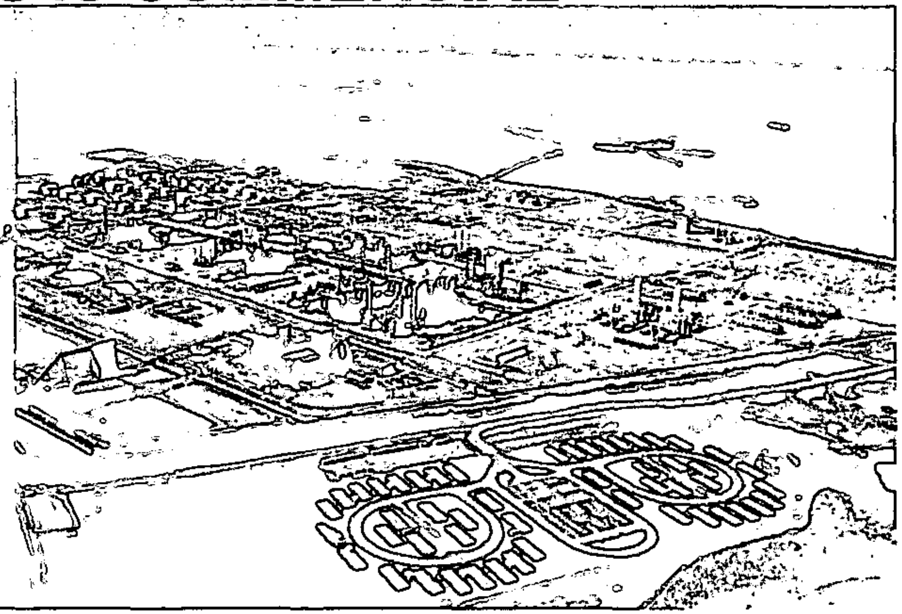
(water)

- Step 3 - Product upgrading (hydrocracking of the long chain F-T paraffin to produce the desired end product – similar to a crude oil refinery)
  - Kerosene – Diesel – Gasoline - Jet Fuel – Naphtha

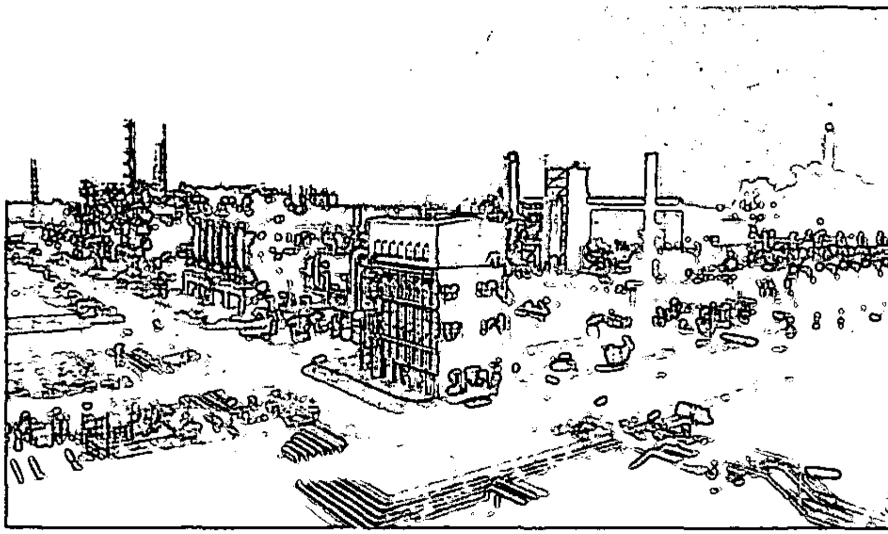
    C_{10}-C_{13} C_{14}-C_{20} C_5-C_{10} C_{10}-C_{13} C_4-C_{10}

THE F-T PROCESS IS COMMERCIAL

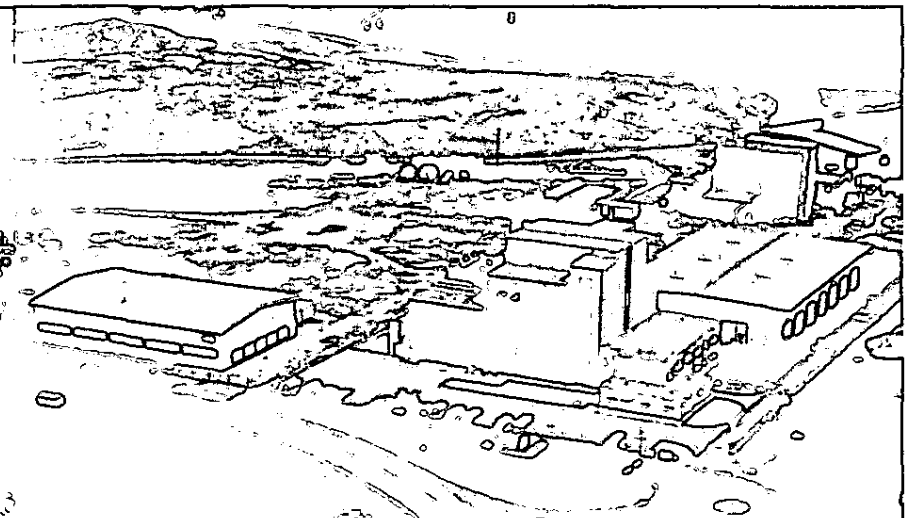
South African Secunda 150,000 BPD Coal to Liquids (CTL)



South African Mossgas 47,000 BPD Gas/Condensate to Liquids (GTL)



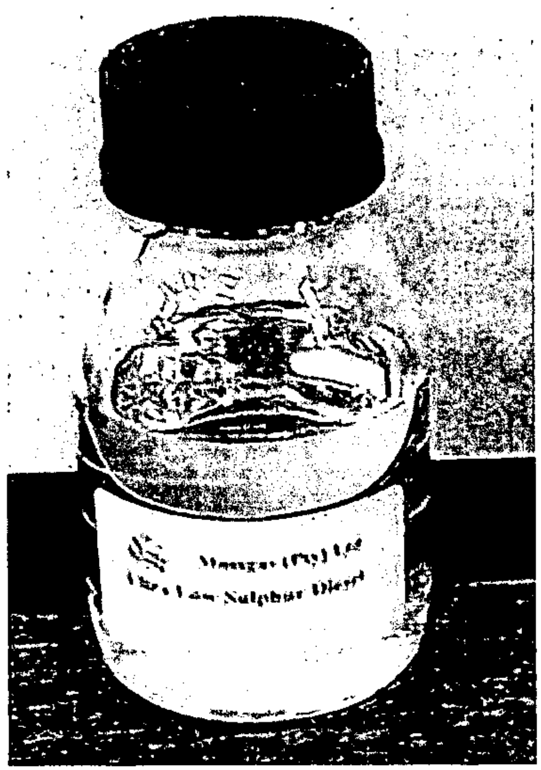
Shell Bintulu 15,000 BPD Gas to Liquids (GTL)



CHOREN Freiberg 500 BPD Biomass to Liquids (BTL)

SYNTHETIC DIESEL

F-T DIESEL
AS CLEAN AS CNG



U.S. EPA* APPROVED

NON-TOXIC

U.S. FDA APPROVED

ZERO SULFUR

ZERO AROMATICS

70 + CETANE

PM10 ≤ CNG

*EPA Water Docket, EB 57 located at 401 M Street SW Washington DC, 20460 Reference Docket No. W-98-26 in UNOCAL data file 4.A.a.3, Vol 13

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COOK INLET OIL & GAS FACILITIES

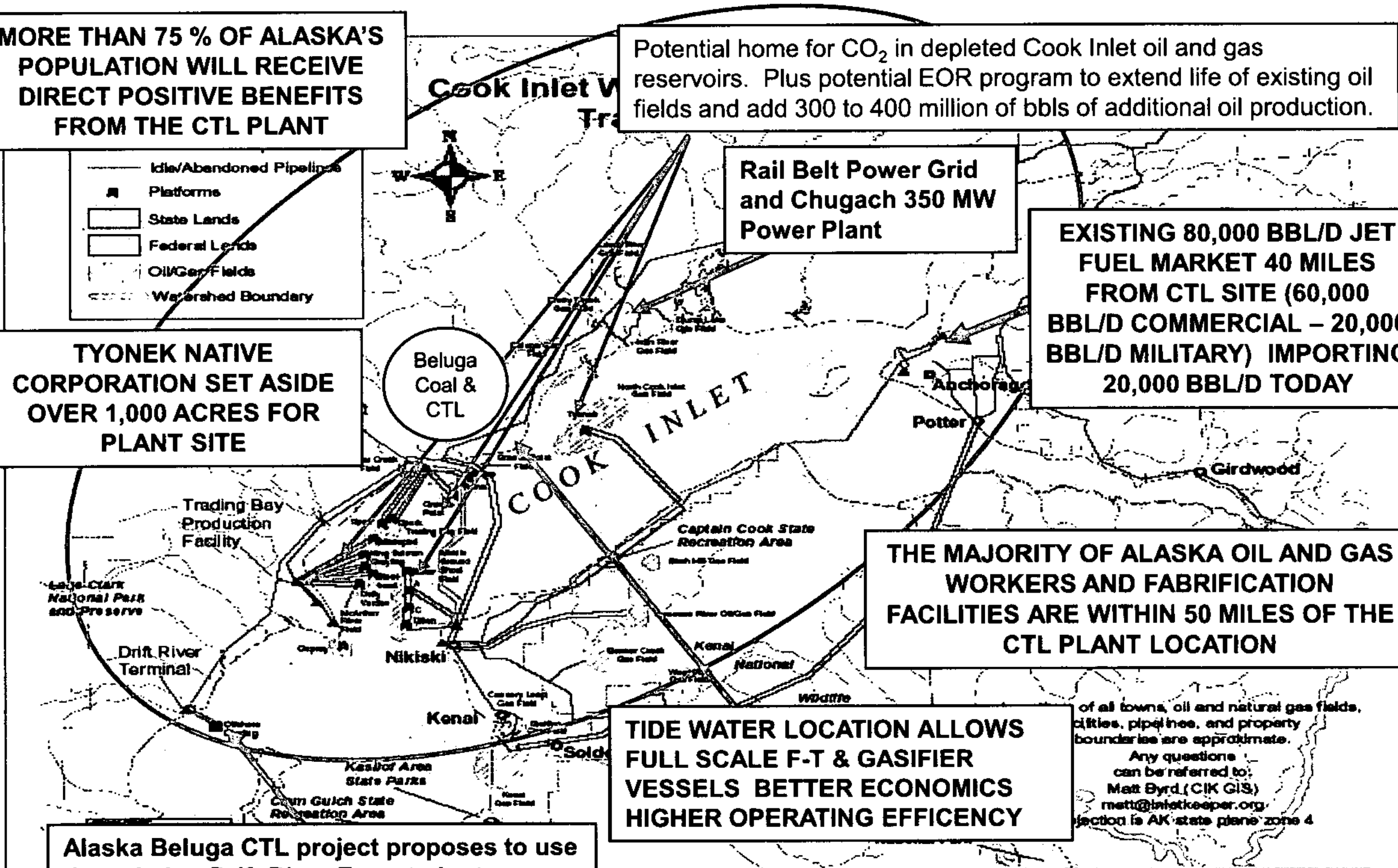
MORE THAN 75 % OF ALASKA'S POPULATION WILL RECEIVE DIRECT POSITIVE BENEFITS FROM THE CTL PLANT

Potential home for CO_2 in depleted Cook Inlet oil and gas reservoirs. Plus potential EOR program to extend life of existing oil fields and add 300 to 400 million of bbls of additional oil production.

Rail Belt Power Grid and Chugach 350 MW Power Plant

EXISTING 80,000 BBL/D JET FUEL MARKET 40 MILES FROM CTL SITE (60,000 BBL/D COMMERCIAL – 20,000 BBL/D MILITARY) IMPORTING 20,000 BBL/D TODAY

TYONEK NATIVE CORPORATION SET ASIDE OVER 1,000 ACRES FOR PLANT SITE

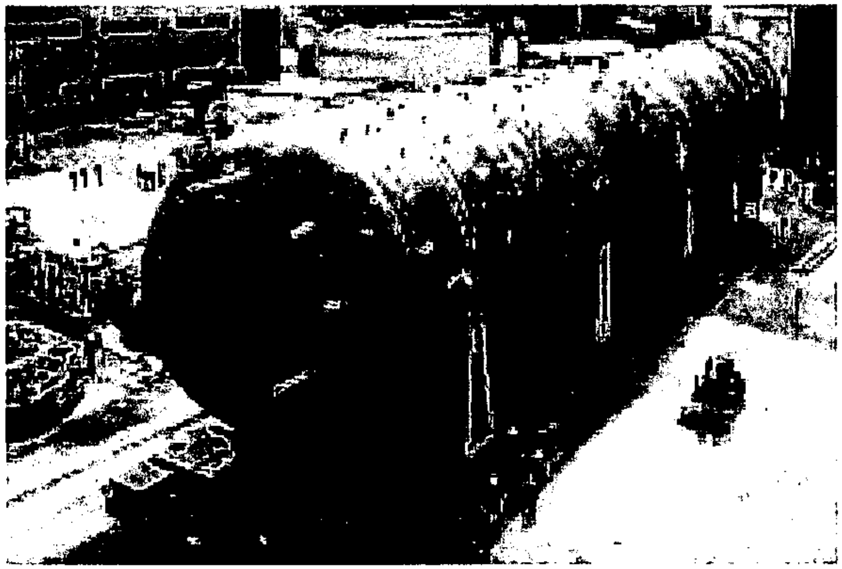


THE MAJORITY OF ALASKA OIL AND GAS WORKERS AND FABRIFICATION FACILITIES ARE WITHIN 50 MILES OF THE CTL PLANT LOCATION

TIDE WATER LOCATION ALLOWS FULL SCALE F-T & GASIFIER VESSELS BETTER ECONOMICS HIGHER OPERATING EFFICENCY

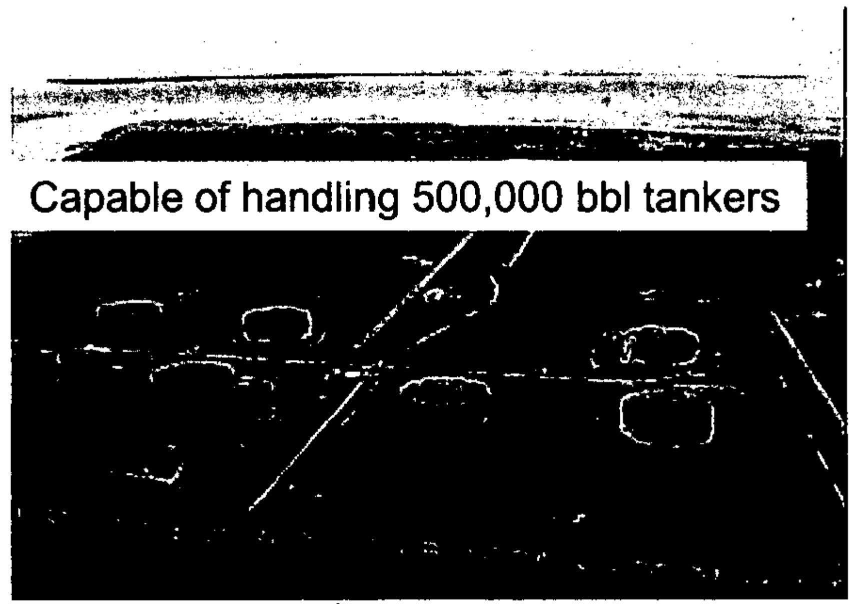
Alaska Beluga CTL project proposes to use the existing Drift River Export pier to move F-T products to US and Asian markets

COOK INLET TIDE WATER LOCATION



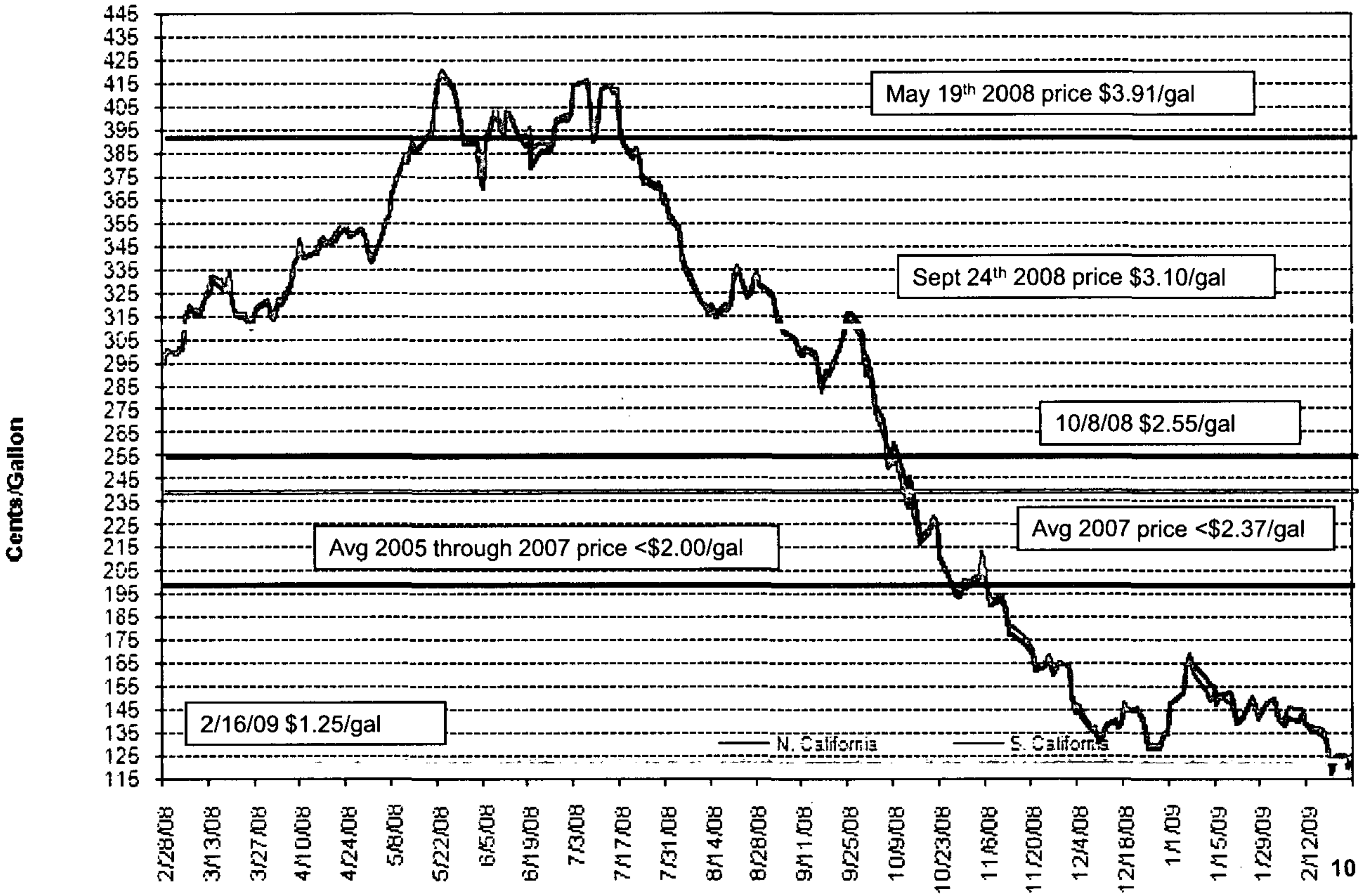
42" Diameter, 180' Tall, can only be delivered via ship/barge at a tide water location

Drift River Export Terminal - no ice issues
no new piers to permit



991

CARB Diesel Fuel Average Rack Prices
(As of 2/25/09)

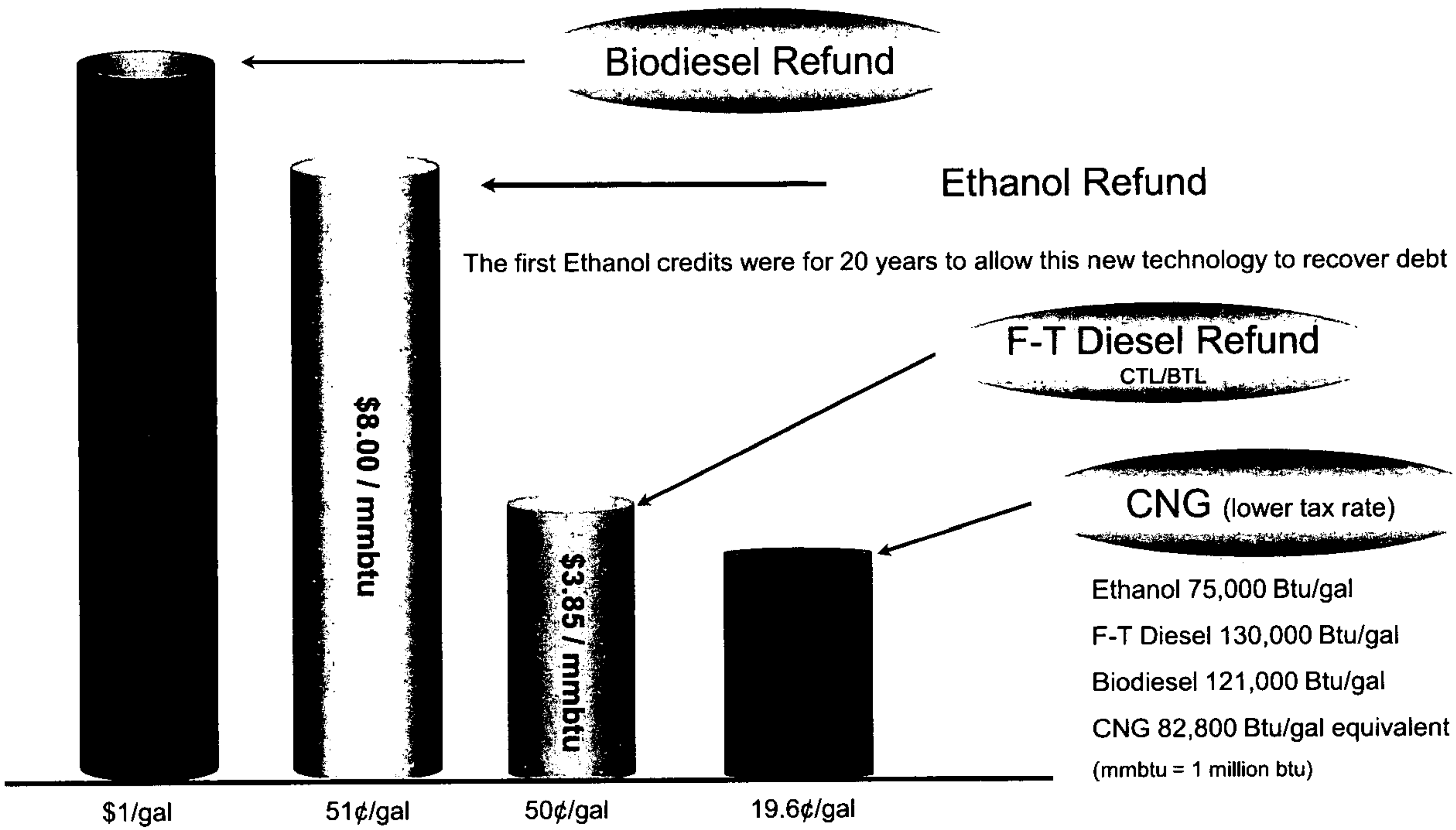


10

Source: Oil Price Information Service

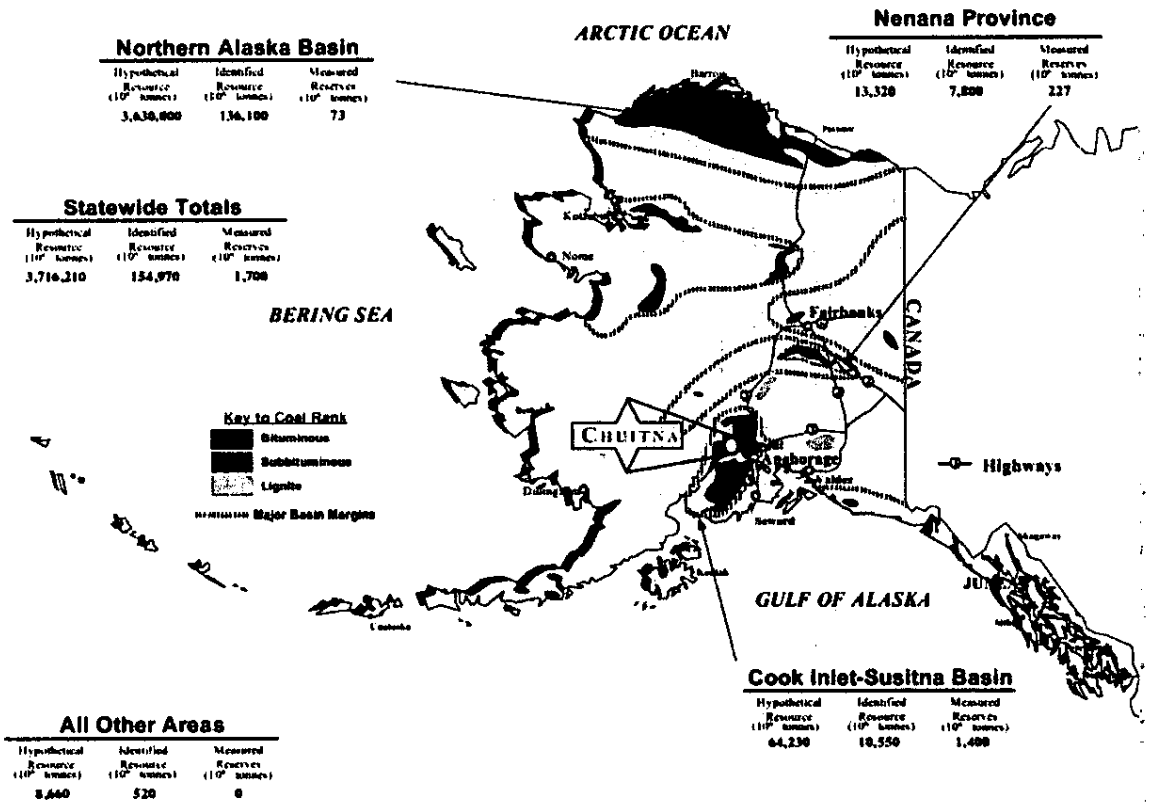
Energy Credits for F-T Fuels (CTL - BTL)
On a $/million btu basis vs Biodiesel & Ethanol

(At the Federal level only)



Energy Credits that F-T Diesel receives is less than half the Energy Credit of Biodiesel & Ethanol on a $/million btu basis

THINK OUT SIDE OF THE BOX
Alaska's Coal Resources & Reserves



ALASKA LEGACY PROJECT

Estimated Recoverable Coal Reserves

(10^9 tonnes)

World Total	1,038
North America	256
United States	246+Alaska
Alaska (measured)	2
Alaska Estimated	200
CHUITNA (measured)	>1

Note: The Northern Alaska Basin could potentially have upwards of 1.5 to 2.5 trillion tons of bituminous coal reserves – more coal than the total proven reserves in the world today!

FEAR OF CARBON EMISSIONS BIGGEST OBSTACLE TO ALASKA CTL

- IS EXPORT THE ONLY WAY TO AVOID CARBON CAPTURE OR SEQUESTERING?
- OBAMA ADMINISTRATION DISCUSSED CAP & TRADE COULD COST BELUGA CTL PLANT $180 million/year
- "IS ANTHROPOGENIC GLOBAL WARMING (now called Climate Change) FACT OR FICTION"?
  - Are you a Global Warming Extremist or Global Warming Skeptic?
- GOVERNOR SIGNS AGREEMENT WITH THE CENTER FOR CLIMATE STRATEGIES (CCS)
  - CCS SAYS NO DEBATE ON CLIMATE CHANGE ALLOWED

995

PEOPLE SAY
THERE IS NO SUCH
THING AS CLEAN COAL
TECHNOLOGY

THEY ARE
MISS-INFORMED

966

THEY DON'T UNDERSTAND THE DIFFERENCE BETWEEN GASIFICATION WITH CAPTURE, I.E.

BTL - CTL - GTL also called F-T

or

GASIFICATION WITHOUT CAPTURE
Integrated Gasification Combined Cycle (IGCC)

AND WORSE YET
THEY LOOK AT COMBUSTION WITH SCRUBBERS AND THINK THIS IS THE BEST THERE IS

WE NEED TO EDUCATE THEM

See http://www.youtube.com/watch?v=w5Y1w7708qc or

http://www.gasification.org/media/videos.aspx

CTL is really clean coal technology because all of the impurities listed below if present are captured and disposed of:

Impurities that are removed from Syngas before it enters the F-T reactor in step two. This is the main reason F-T fuels cost so much and are so clean

- **CO_2**
- Catalyst Poisons:
  - H_2S
  - COS
  - HCN
  - HCl
  - $Fe(CO)_5$
  - $Ni(CO)_4$
  - Hg
  - Traces of Cd, Se and other metal vapors

CO_2 IS NOT A POLLUTANT !

WITHOUT CO_2 LIFE AS WE KNOW IT WOULD BE ENDED

IT HAS BEEN SHOWN THAT WITH THE INCREASE IN ATMOSPHERIC CO_2 WE ARE GREENING THE EARTH

CURRENT ESTIMATES ARE THAT THE EARTH HAS INCREASED PLANT GROWTH BY 15%

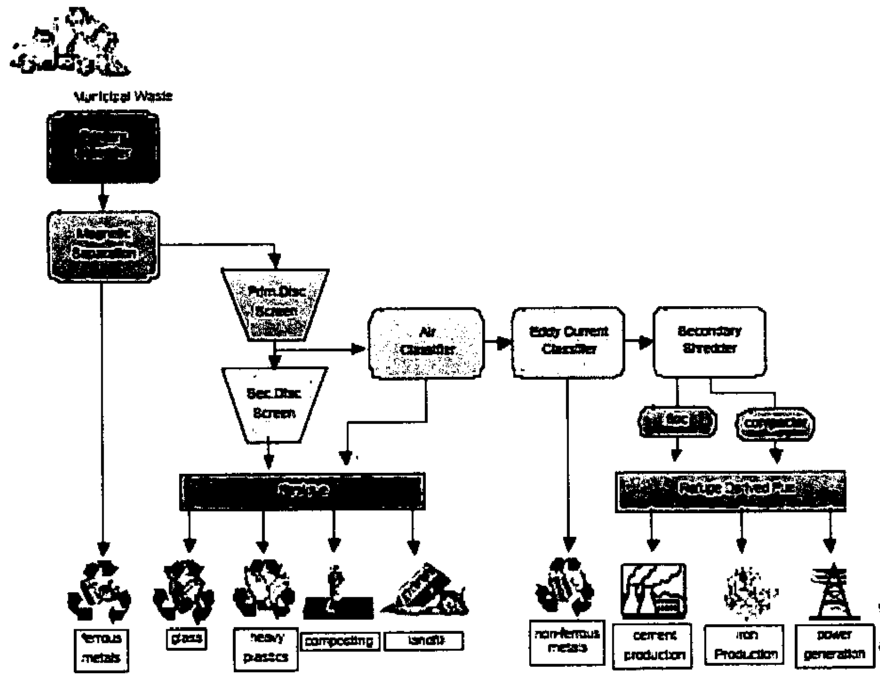
LOWERING CTL'S CARBON FOOTPRINT

MSW – RDF

A SECOND RESOURCE TO MAKE F-T FUELS AT THE TYONEK PLANT SITE

1000

TYPICAL RDF FACILITY



RDF Production Facility

THE BELUGA CTL PROJECT REPRESENTS VALUE ADDED

LETS ASSUME THAT YOU WANT TO SELL / EXPORT 52,000 T/D OF LOCAL COAL RESOURCES

IF YOU DEVELOP THE COAL RESOURCE FOR EXPORT THEN 19 MILLION TONS /YR ARE EXPORTED TO CHINA

- 52,000 t/d coal sold @$25/ton = $475 million/yr
  - $600 million CAPEX Mine and Export Terminal
  - 200 jobs in a camp setting

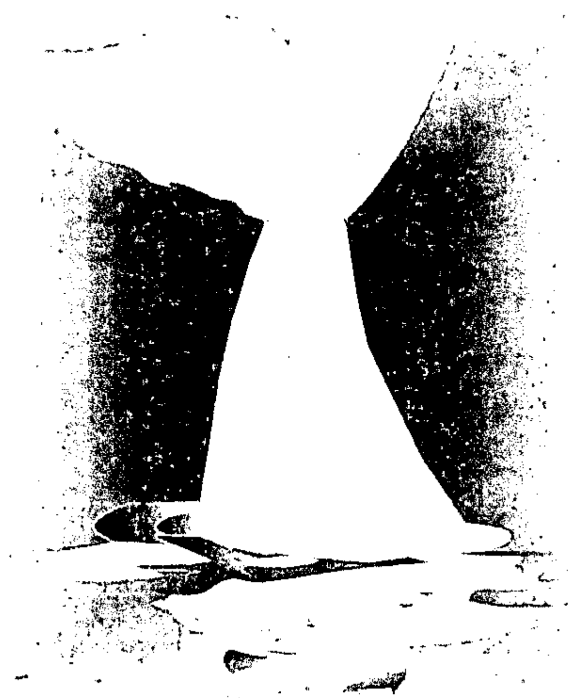
- GREAT FOR CHUITNA or is it **CH**U**I**T**NA**
  BUT WHAT ABOUT ALASKA?

THE BELUGA CTL PROJECT REPRESENTS VALUE ADDED

IF YOU BUILD A CTL PLANT & USE THE SAME VOLUME OF COAL

- 84,000 bbl/d of F-T Products @ $2.5/gal = $3 billion/yr
  - $12.8 billion CAPEX CTL Plant and Mine
  - 1,600 + Permanent Direct Jobs at Mine and CTL Plant
  - 5,000 + Indirect Jobs supporting the CTL Project
  - Over 5,000 + during construction (3 to 5 years)
- 350 + Million Barrels of EOR Crude Oil
  - $6 billion in State Royalty/PPT income ($70/bbl crude)
- 350 – 500 MW of Low Cost Waste Heat Electricity
  - $1.4 to 2.0 billion in rate payer savings over 15 yrs (3¢/kw savings)

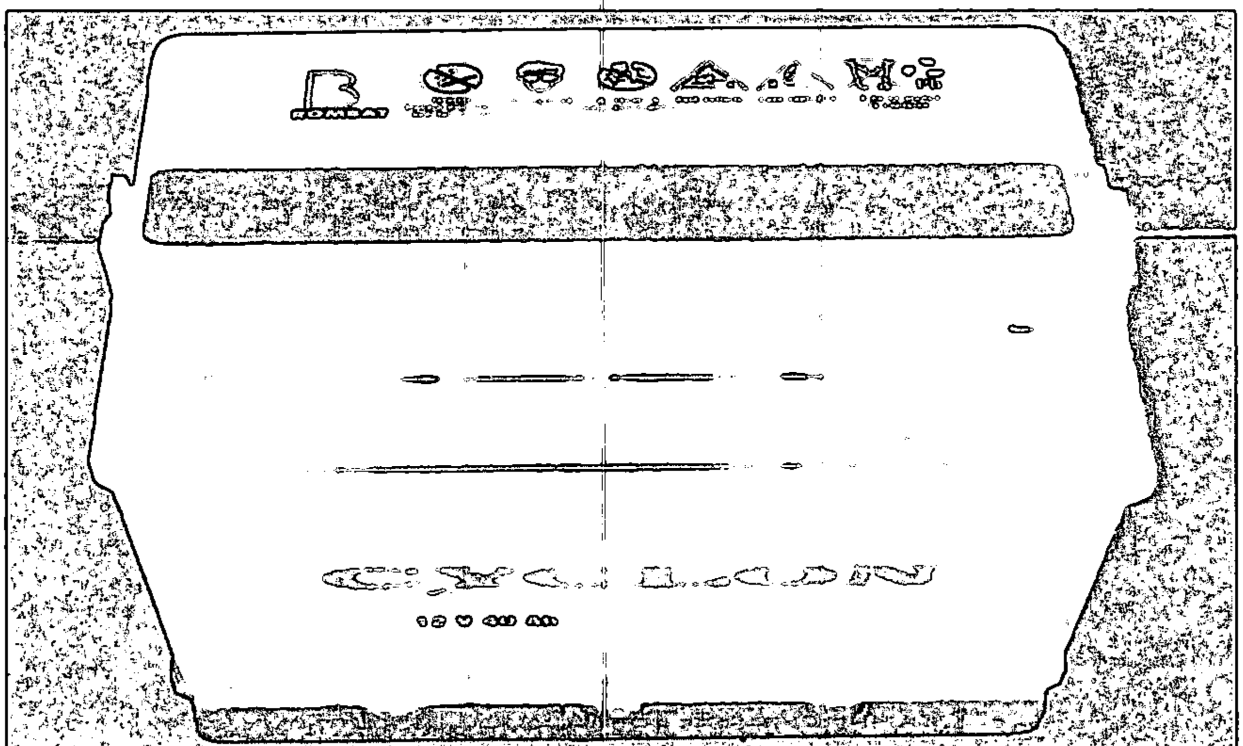
BETTER FOR ALASKAN's!



THANK YOU

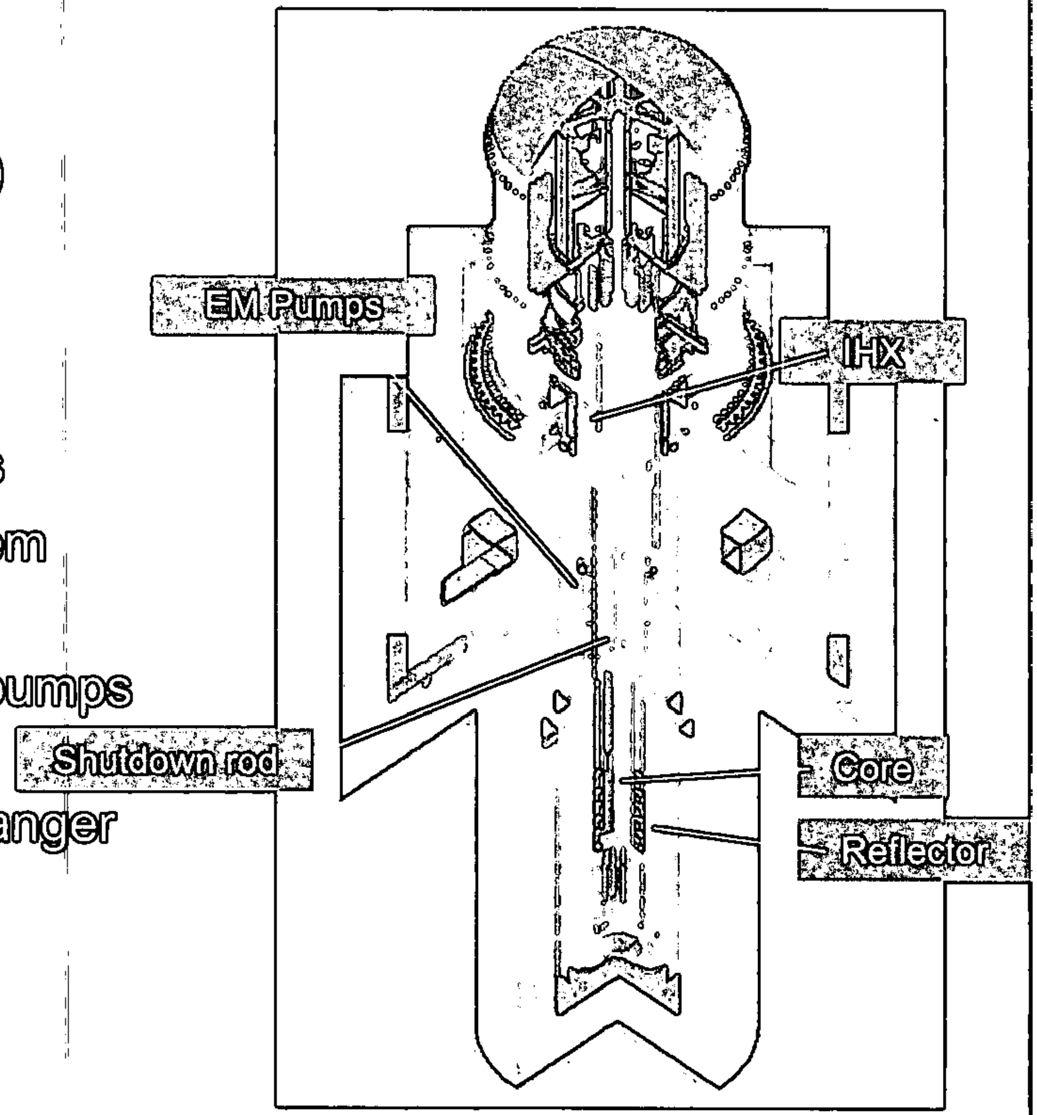
Nuclear Battery

- Battery



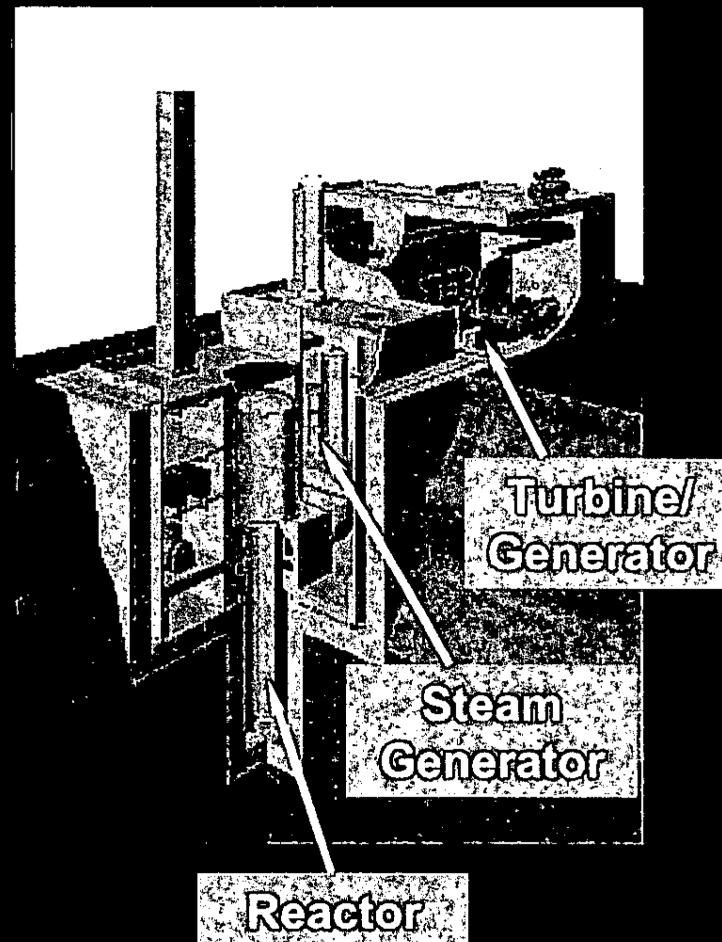
Plant Description

- Reactor
  - Core
    Metallic fuel core (U-10%Zr)
  - Reactivity control
    Movable reflectors
  - Shutdown system
    Shutdown rod and reflectors
  - Primary heat transport system
    - Pumps: Annular type
      Electro-magnetic (EM) pumps
    - IHX: Annular type
      intermediate heat exchanger



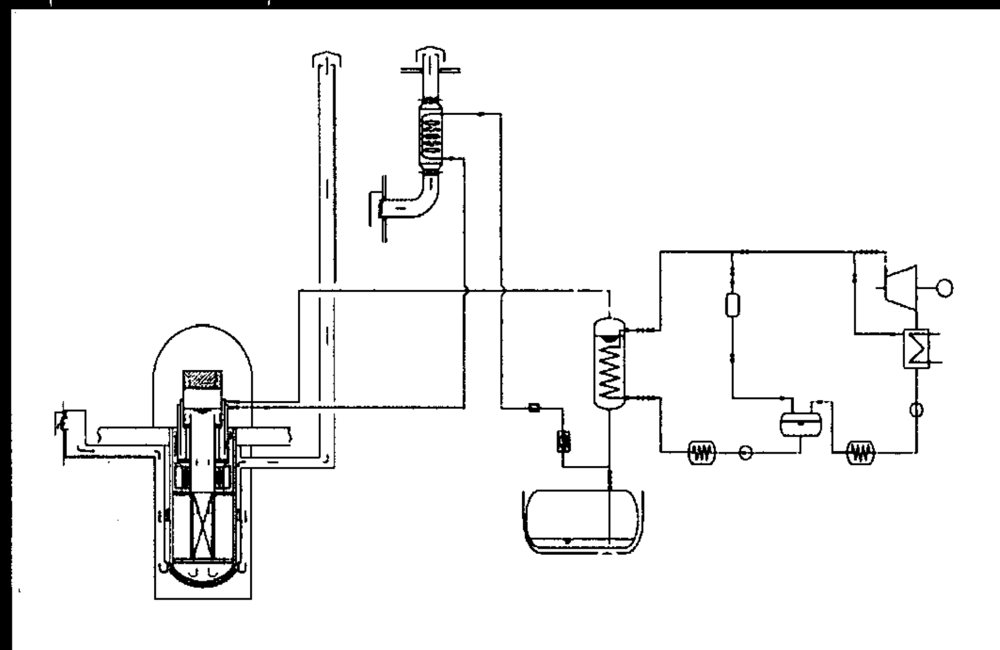
Overview

- **Sodium cooled fast reactor**
- **30 MWt (10MWe)**
- **Application**
  - Remote areas of small power demand (e.g., Galena Alaska)
  - Considered a candidate for GNEP grid-appropriate small and medium reactor design
- **Main features**
  - Passive safety
  - No onsite refueling for 30 years
  - Low maintenance requirement
  - High inherent security



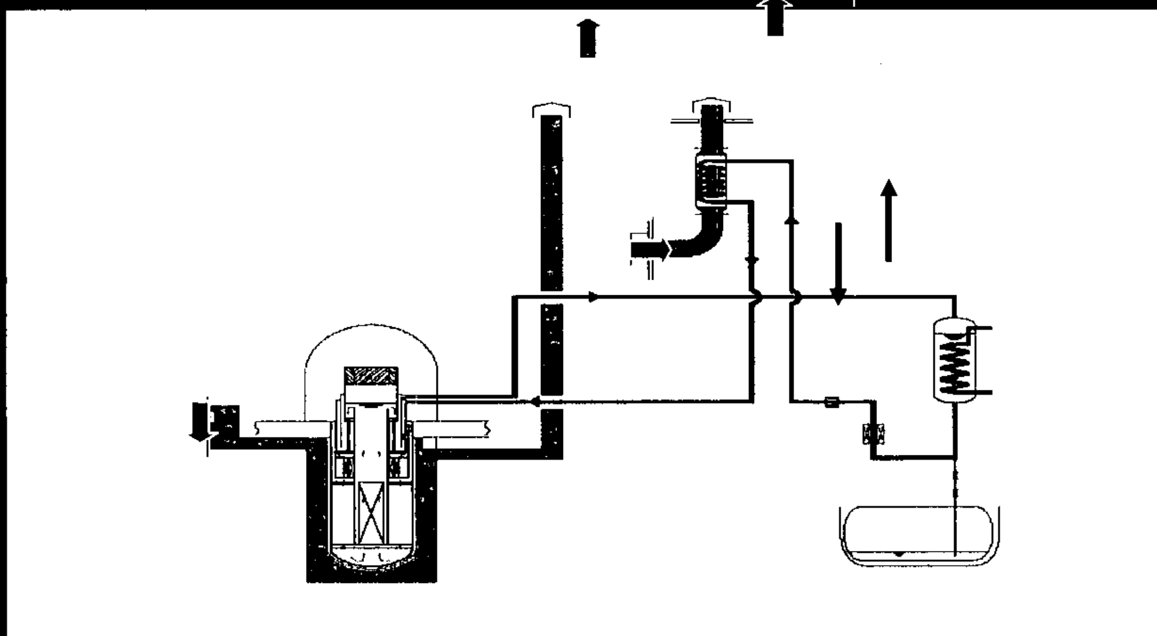
Plant Description

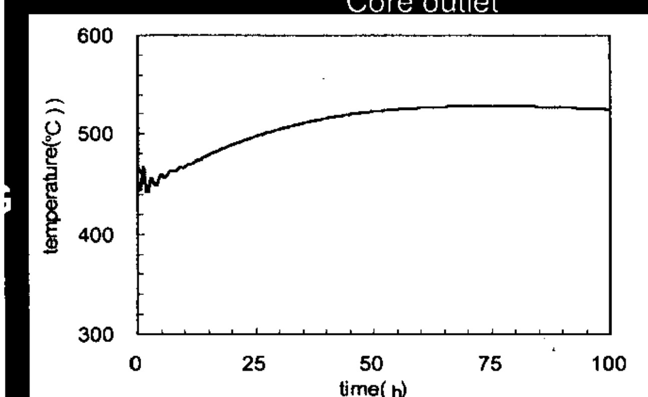
- **Heat transport systems**
  - Primary heat transport system: Inside the reactor
  - Intermediate heat transport system
    - Steam generator
    - EM pump
    - Air cooler
    - Dump tank
  - Water & steam system
    - Turbine Generator



Passive Decay Heat Removal

- **Heat removal by natural circulation & natural air draft**
  - RVACS: Natural air draft outside the guard vessel
    - Sufficient cooling capacity by only RVACS
  - IRACS: Natural circulation of sodium and air draft of air cooler

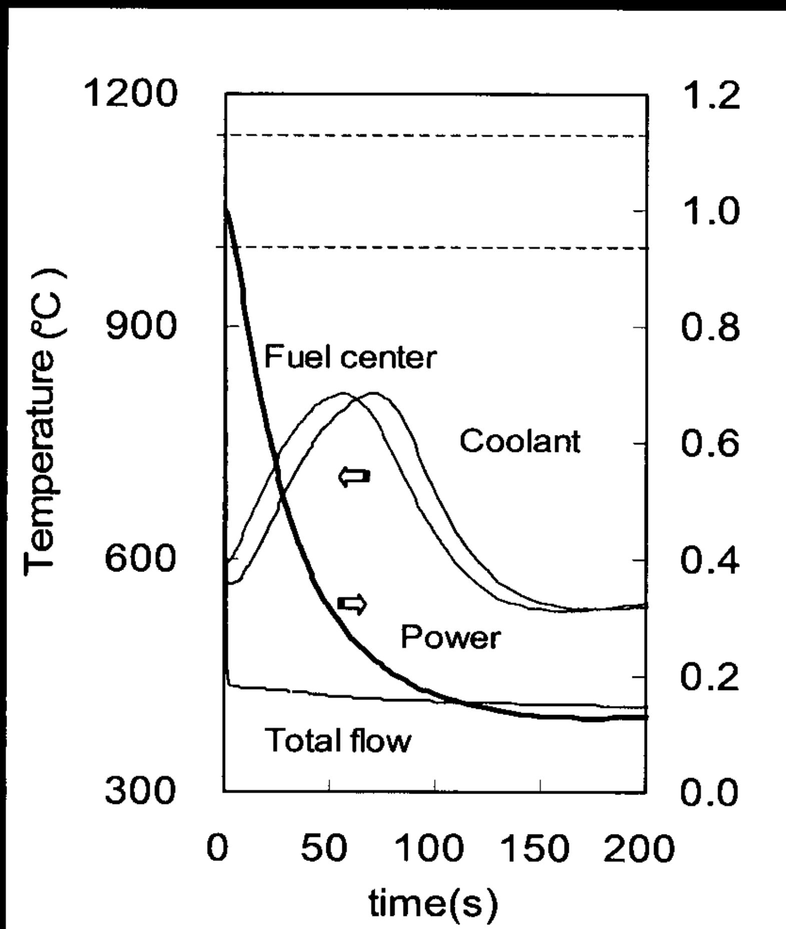


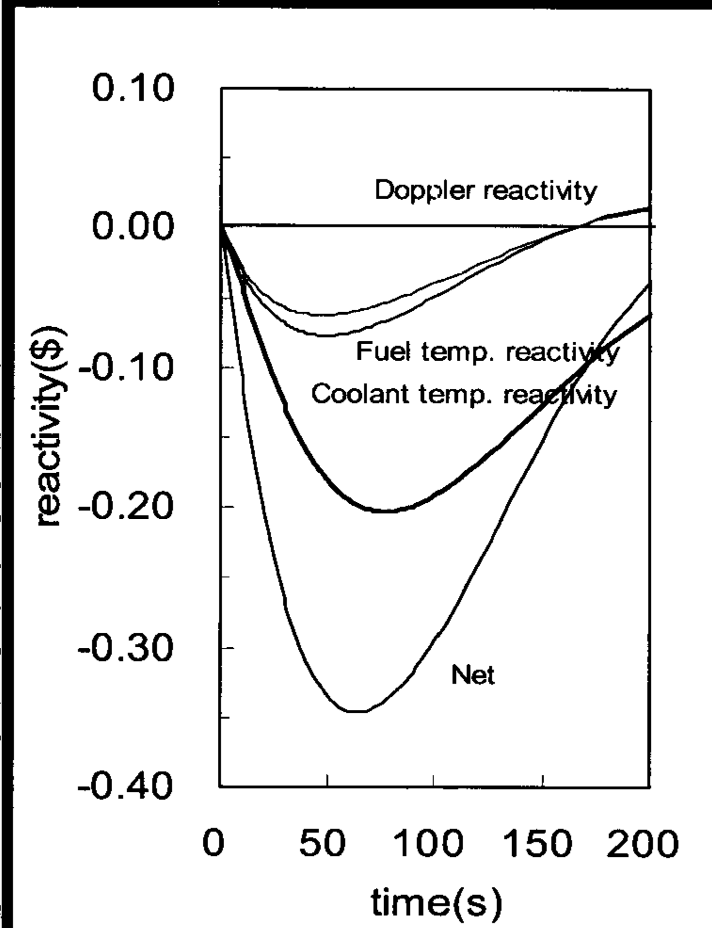


Loss of offsite power
Assumption : Heat removal by only RVACS

Passive Shutdown for Unprotected Events

- Safety Analysis of Unprotected sudden loss of flow
  Large margin to coolant boiling and fuel melting





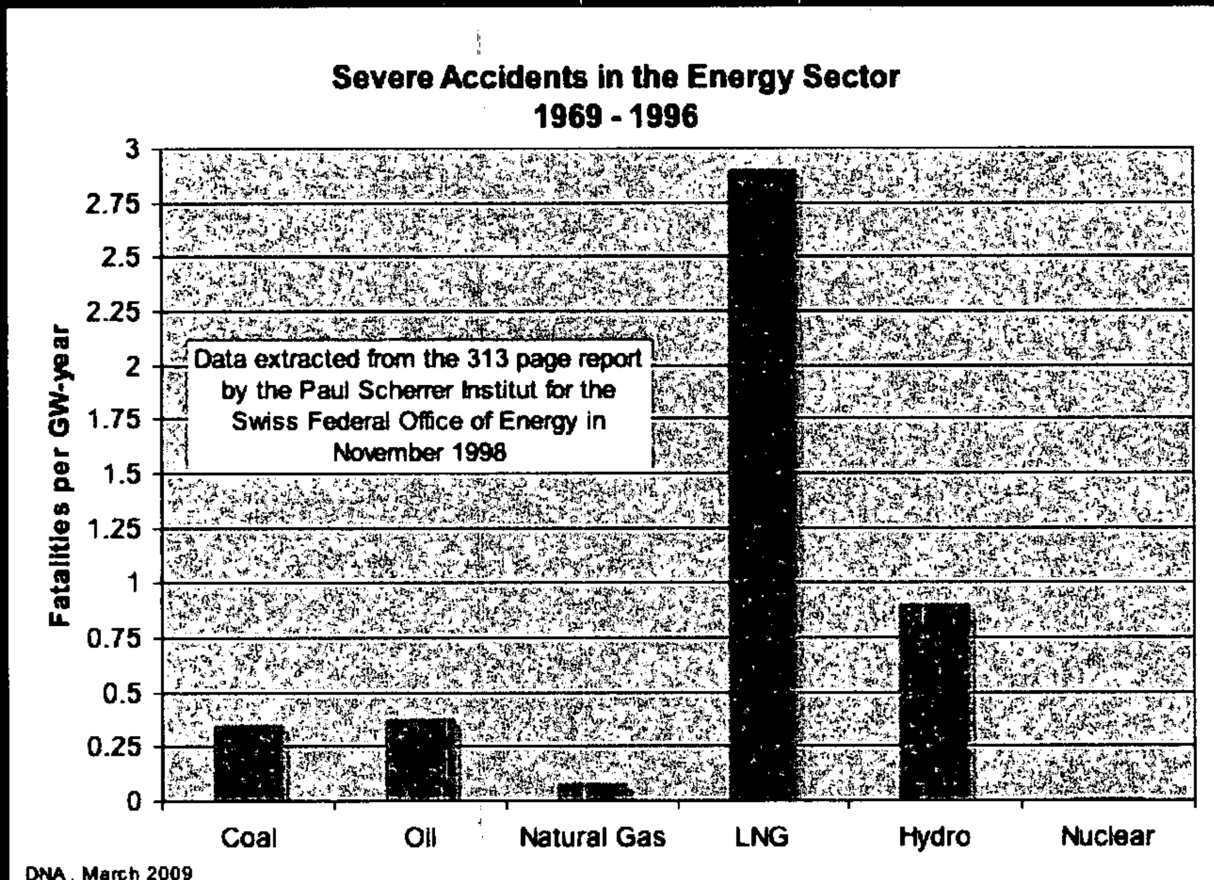
Main Design Features

- Safety Features
- Key Features of 4S
  - Passive safety
  - No onsite refueling for 30 years
  - Low maintenance requirement
  - High inherent security

Safety Features

- Low pressure system with pool design and guard vessel
- Negative coolant temperature coefficient promotes safe, stable operation.
- Large margin to coolant boiling or cladding failure
- Reliable, redundant and diverse scram systems
- Smaller excess reactivity with metallic fuel core design – limited potential for reactivity insertion accident
- Passive, reliable, and diverse shutdown heat removal systems

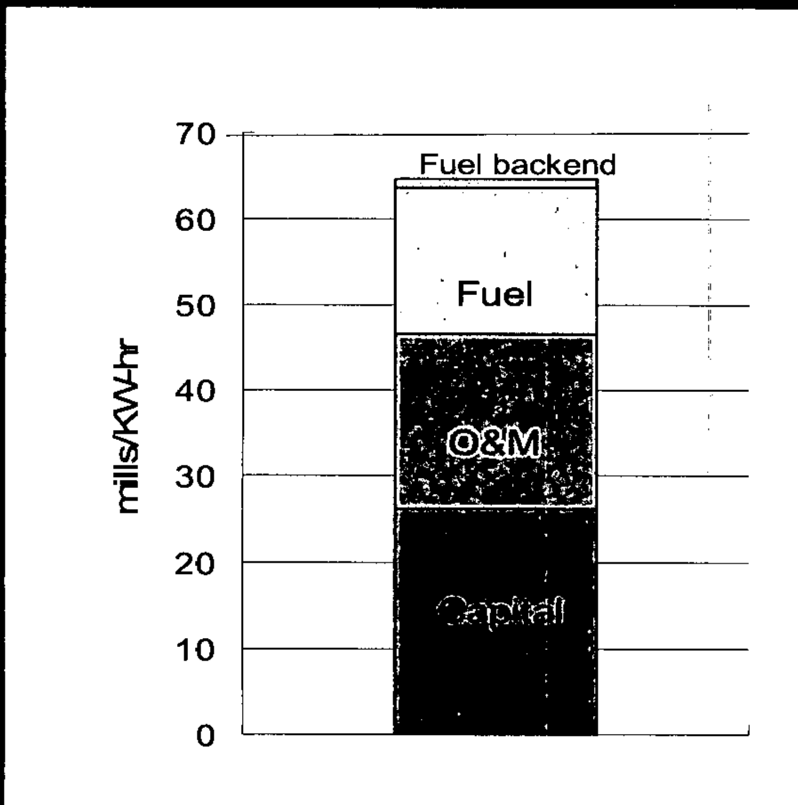
Safety


Severe Accidents in the Energy Sector
1969 - 1996
Fatalities per GW-year
3
2.75
2.5
2.25
2
1.75
1.5
1.25
1
0.75
0.5
0.25
0
Data extracted from the 313 page report by the Paul Scherrer Institut for the Swiss Federal Office of Energy in November 1998
Coal
Oil
Natural Gas
LNG
Hydro
Nuclear
DNA . March 2009

Tests to Support 4S Design

Design Feature	Verification Item	Required Testing	Status
Long cylindrical core with small diameter Reflector controlled core	Nuclear design method of reflector control core with metallic fuel	Critical experiment	Done
High volume fraction metallic fuel core	Confirmation of pressure drop in fuel subassembly	Fuel hydraulic test	Done
Reflector	Reflector drive mechanism with fine movement	Test of reflector drive mechanism	Done
RVACS	Heat transfer characteristic between vessel and air	Heat transfer test of RVACS	Done
EM pump	Structural integrity Stable characteristics	Sodium test of EM pump	Done and Planned
Steam generator (Double wall tubes)	Structural integrity Heat transfer characteristic Leak detection	Sodium test of steam generator Leak detection test	Done and Planned
Seismic isolation	Applicability to nuclear plant	Test of seismic isolator	Done

4S Preliminary Cost Estimate



- 50MWe (135MWt) :
  10 MWE variant
- Commercial_plant
  (mass production phase)
- Plant Construction:
  $ 2,500 $3,000/KWe
  Busbar Cost:
  $.065 mills-$.070 /KW-hr*

Absolutely the Funniest Joke Ever...

Does anybody out there have any memory of the reason given for the establishment of the DEPARTMENT OF ENERGY during the Carter Administration?

Ready? It was very simple, and at the time everybody thought it very appropriate. The Department of Energy (located appropriately at 1000 Independence Ave) was instituted 8-04-1977 to LESSEN OUR DEPENDENCE ON FOREIGN OIL. HEY, PRETTY EFFICIENT, HUH?

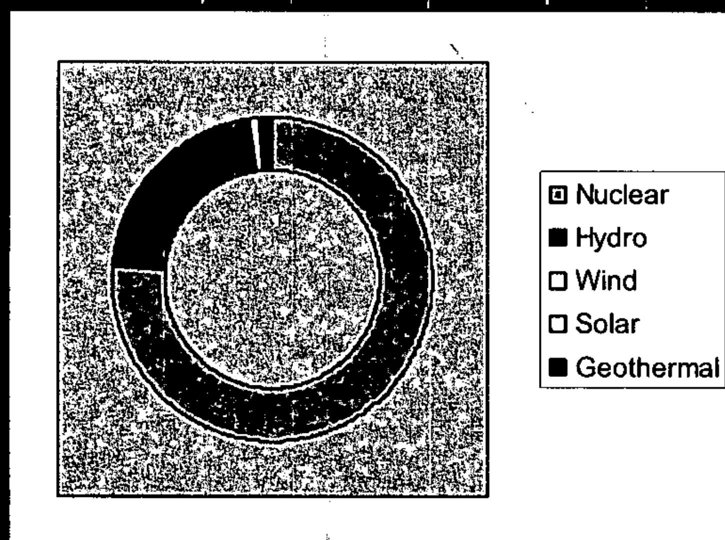
And now it's 2008, 31 years later, and the budget for this necessary department is at $24.2 billion a year, they have 16,000 federal employees, and approximately 100,000 contract employees and look at the job they have done!

- This is where you slap your forehead and say 'what was I thinking?'

1016

Emission Free Energy in the United States

Nuclear	Hydro	Wind	Solar	Geothermal
76.20%	21.60%	0.70%	0.10%	1.40%



Energy Crisis

MY-T solutions LLC

- National security; we are too dependent on foreign oil,
- Cost; the cost of energy is driving up the cost of living and damaging the economy,
- Carbon footprint; too much of energy use involves the use of hydrocarbons,
- Over consumption; Americans use too much energy and need to conserve.

Potential Solutions:

MY-T Solutions LLC

- Natural Gas
- Lower demand
- Wind and Solar energy production
- Geothermal
- Offshore Drilling/ANWR
- Nuclear power generation
- Nuclear hydrogen generation
- Coal to Liquids
- Biomass
- Hydroelectric

Toshiba 4S Project

☺Thank You

Marvin Yoder
907 227-7158
marviny59@gmail.com

3-25-09 Alaska Coal Update

<target><bill></bill><subject>3-25-09 Alaska Coal Update</subject><comm>SENE26</comm></target>

Alaska Coal Update

Alaska State House Energy Committee

March 24, 2009

Steve Denton, VP Business Development
Usibelli Coal Mine, Inc.

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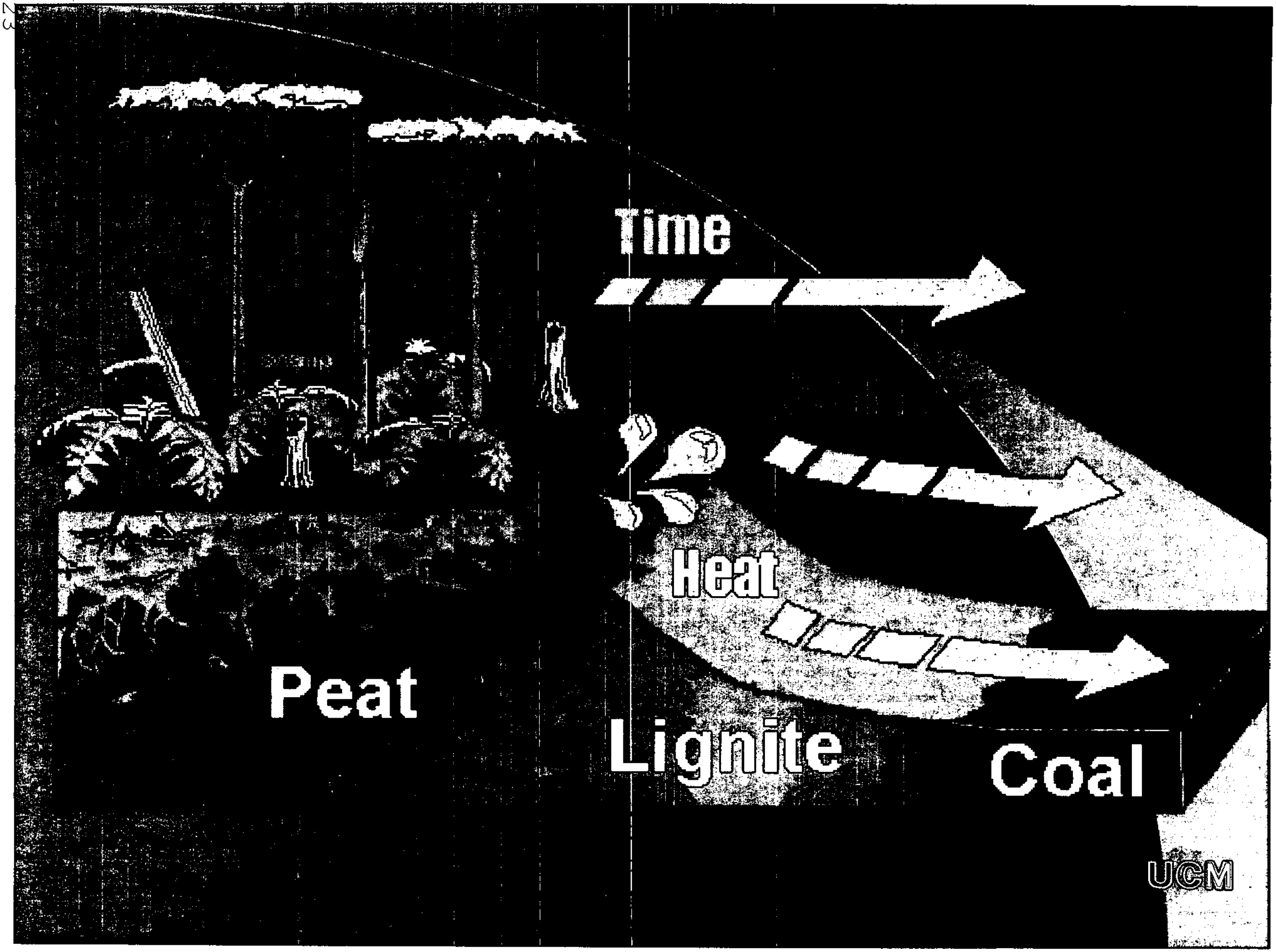
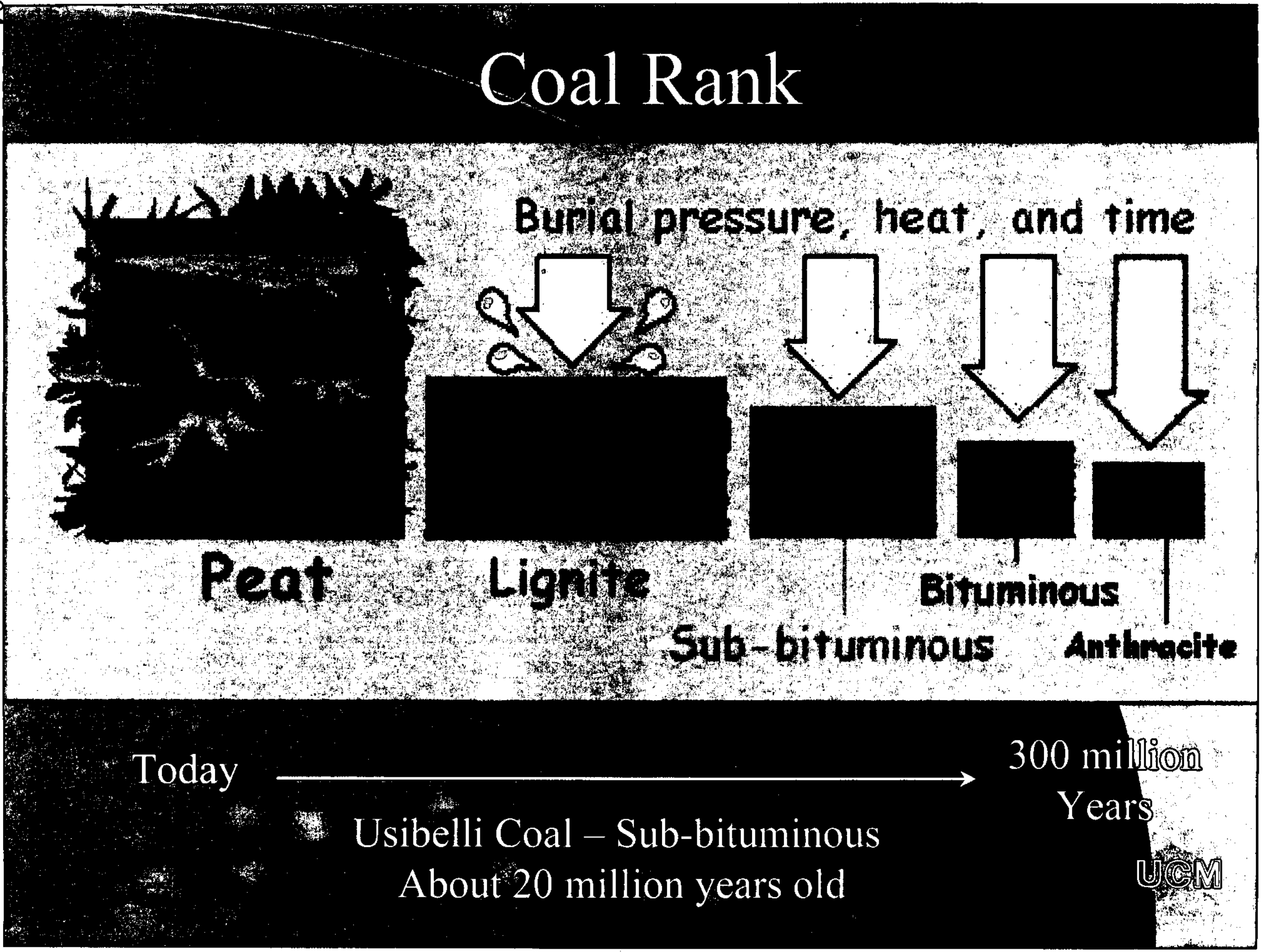
Alaska Coal Update

- Formation of Coal
- Coal Resources
- Transportation Infrastructure
- Alaska Coal Consumption
- Coal Exports
- Coal Utilization and Technology

UCM


Time
Heat
Peat
Lignite
Coal
UCM


Coal Rank
Burial pressure, heat, and time
Peat
Lignite
Sub-bituminous
Bituminous
Anthracite
Today
300 million
Years
Usibelli Coal – Sub-bituminous
About 20 million years old
UCM

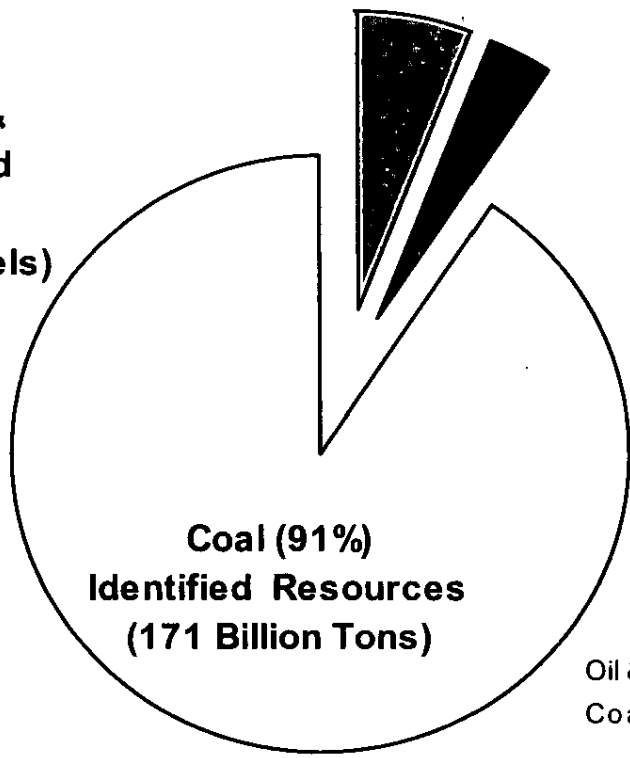
1025

Alaska's Coal Resources

Alaska Fossil Fuel Energy Resources

(Based on contained energy)

Oil (6%)
Discovered &
Undiscovered
Resources
(31 Billion Barrels)

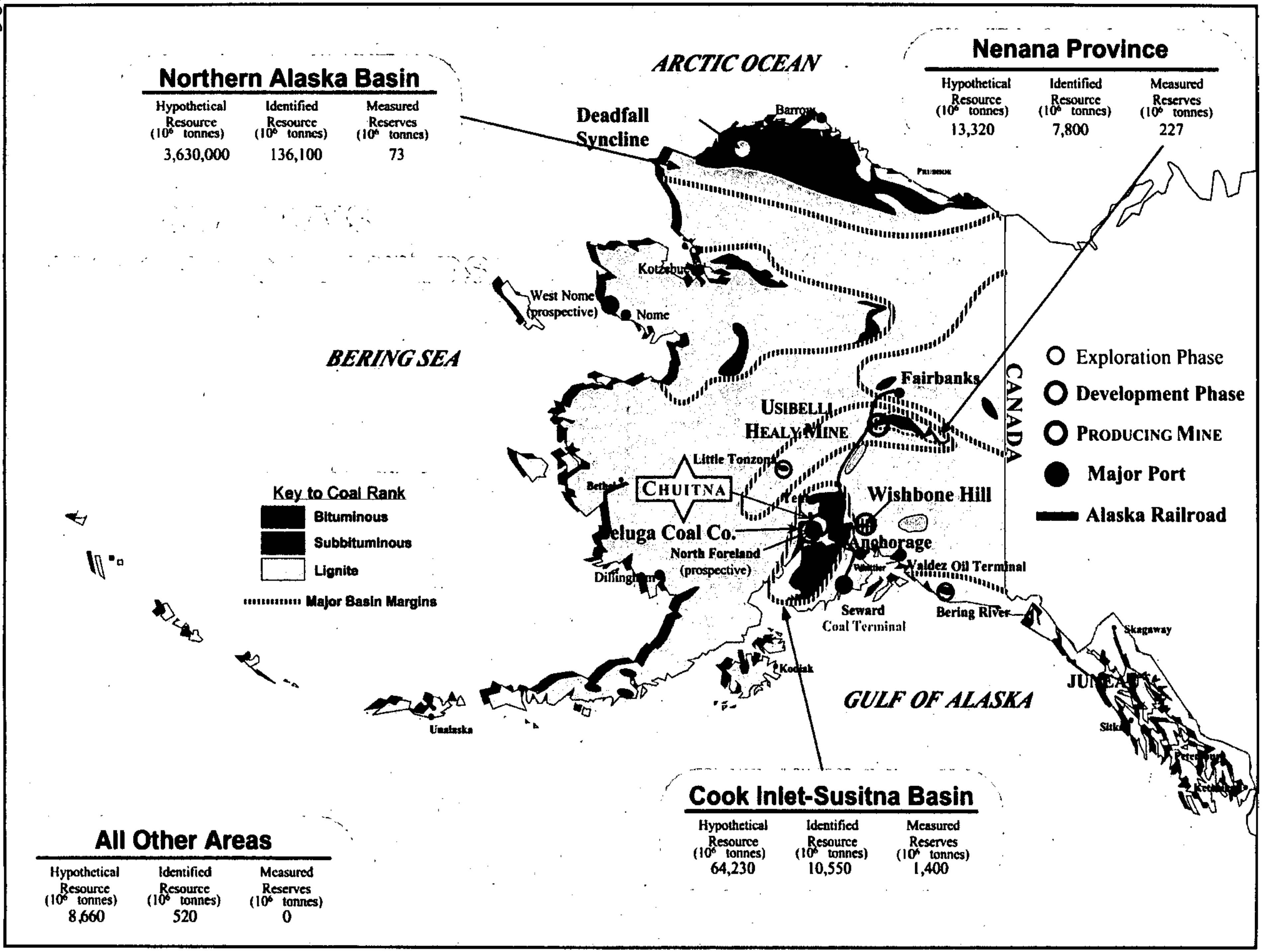


Gas (3%)
Discovered &
Undiscovered
Resources
(94 Trillion Cubic Feet)

Coal (91%)
Identified Resources
(171 Billion Tons)

Oil & Gas Data Source: Alaska DNR DOG, 3/20/01

Coal Data Source: Alaska DNR DGGS Spec. Rpt. #37, 1986


Northern Alaska Basin
Hypothetical Resource (10^6 tonnes) 3,630,000
Identified Resource (10^6 tonnes) 136,100
Measured Reserves (10^6 tonnes) 73
ARCTIC OCEAN
Nenana Province
Hypothetical Resource (10^6 tonnes) 13,320
Identified Resource (10^6 tonnes) 7,800
Measured Reserves (10^6 tonnes) 227
Deadfall Syncline
Barrow
Kotzebue
West Nome (prospective)
Nome
BERING SEA
Fairbanks
USIBELLI HEALY MINE
Little Tonzona
CHUITNA
Bethel
Beluga Coal Co.
North Foreland (prospective)
Dillingham
Wishbone Hill
Anchorage
Whittier
Valdez Oil Terminal
Seward Coal Terminal
Bering River
Skagaway
Kodiak
Unalaska
GULF OF ALASKA
JUNEAU
Sitka
Petersburg
Ketchikan
CANADA
Exploration Phase
Development Phase
PRODUCING MINE
Major Port
Alaska Railroad
Key to Coal Rank
Bituminous
Subbituminous
Lignite
Major Basin Margins
Cook Inlet-Susitna Basin
Hypothetical Resource (10^6 tonnes) 64,230
Identified Resource (10^6 tonnes) 10,550
Measured Reserves (10^6 tonnes) 1,400
All Other Areas
Hypothetical Resource (10^6 tonnes) 8,660
Identified Resource (10^6 tonnes) 520
Measured Reserves (10^6 tonnes) 0

Alaska Coal Deposits With Export Potential

Deposit	Coal Rank	Million Short Tons	
		Reserves	Resources
Nenana (Healy)	Sub-Bituminous	500	7,000
Wishbone Hill	HV Bituminous	20	52
Cook Inlet	Sub-Bituminous	1,400	10,000
Deadfall Syncline	HV Bituminous	30	100+
Bering River	LV Bituminous	35	60

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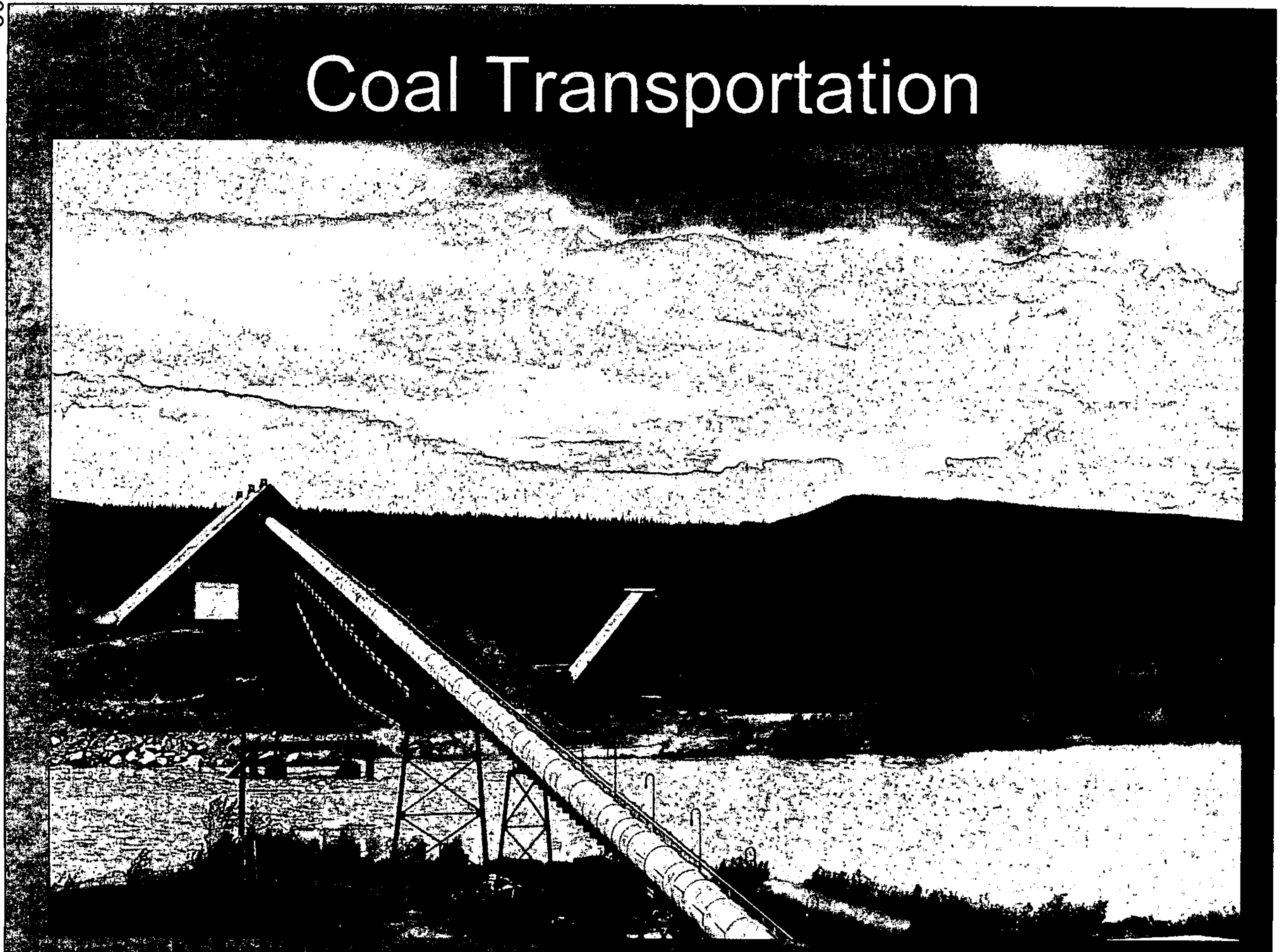
Coal Transportation

Alaska Railroad Corporation

- Owned by State of Alaska
- Fairbanks to Seward – 470 miles
- Healy to Seward – 358 miles
- Mostly single line
- Severe grades and corner radius areas
- Summer traffic congestion
- Maximum 80 car unit train to Seward

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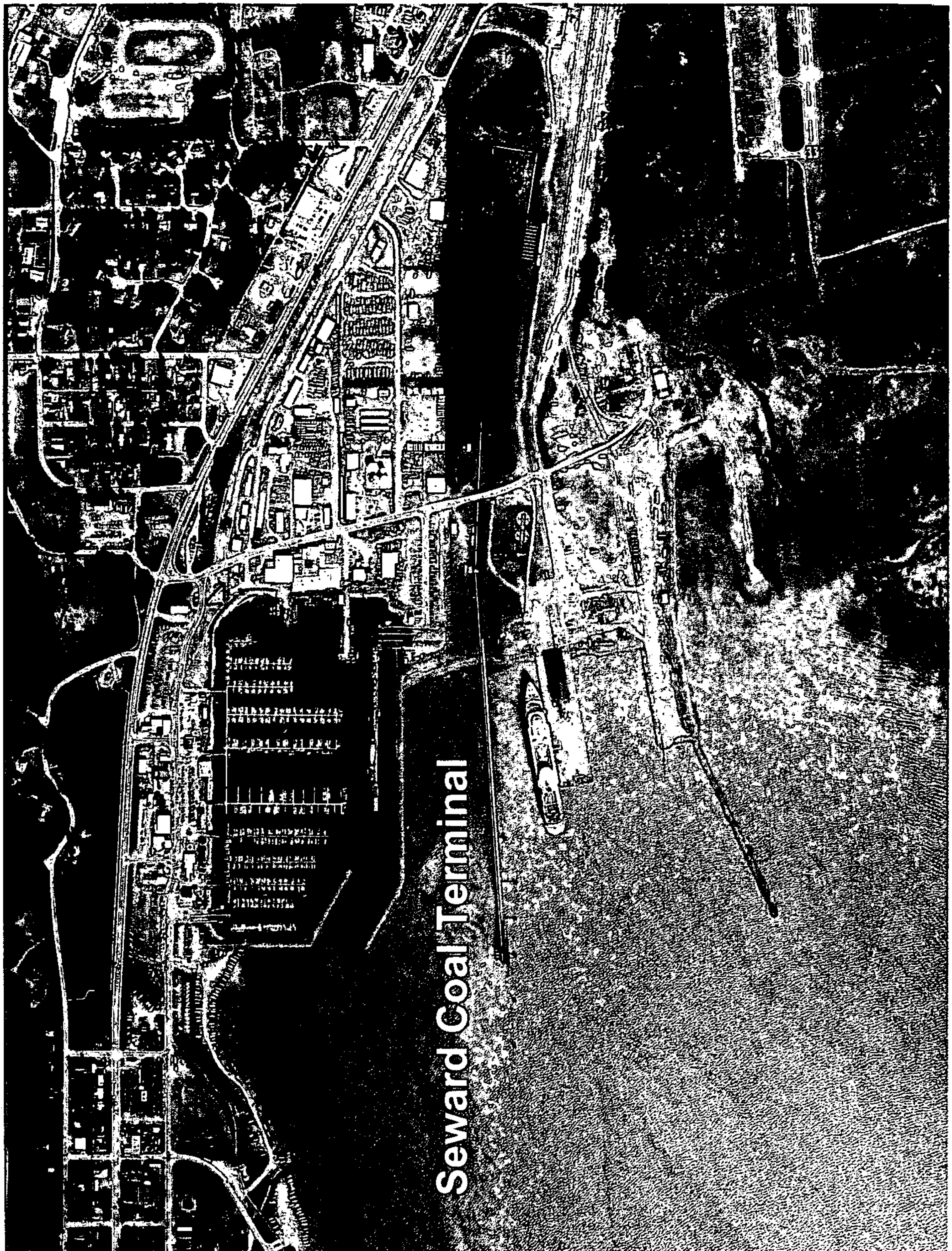
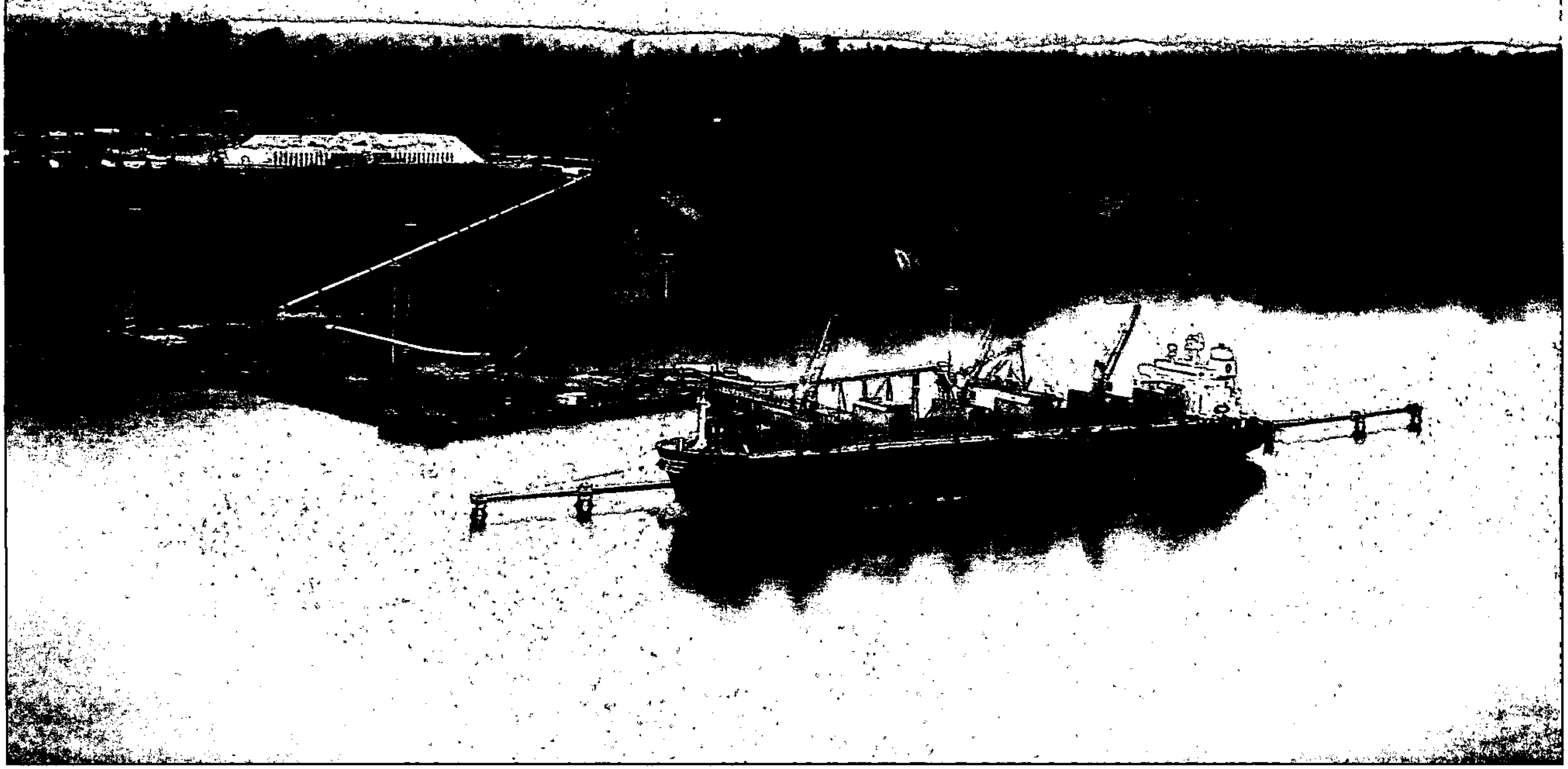

Seward Coal Terminal

SEWARD COAL TERMINAL

- 1.5 million mt/year capacity
- 12,000 to 16,000 mt/day loading rate
- 120,000 mt stockpile capacity
- 16 meter draft (53 feet)
- 90,000 ton maximum ship size
- Owned by the Alaska Railroad Corp.
- Operated by Aurora Energy Services, LLC, affiliate of Usibelli Coal Mine, Inc.

Port MacKenzie Bulk Terminal



Port MacKenzie

- Located about 150 miles closer by rail, about 2 days longer for bulk carriers.
- Currently no rail service, 43 miles new track required.
- Cape class draft, high tide departure due to shoals.
- Extreme tide range – 35 feet
- Currents to 5 knots at angle to dock
- 9 – 10 month ice free season
- Fixed loading arm
- Currently loading wood chips and gravel

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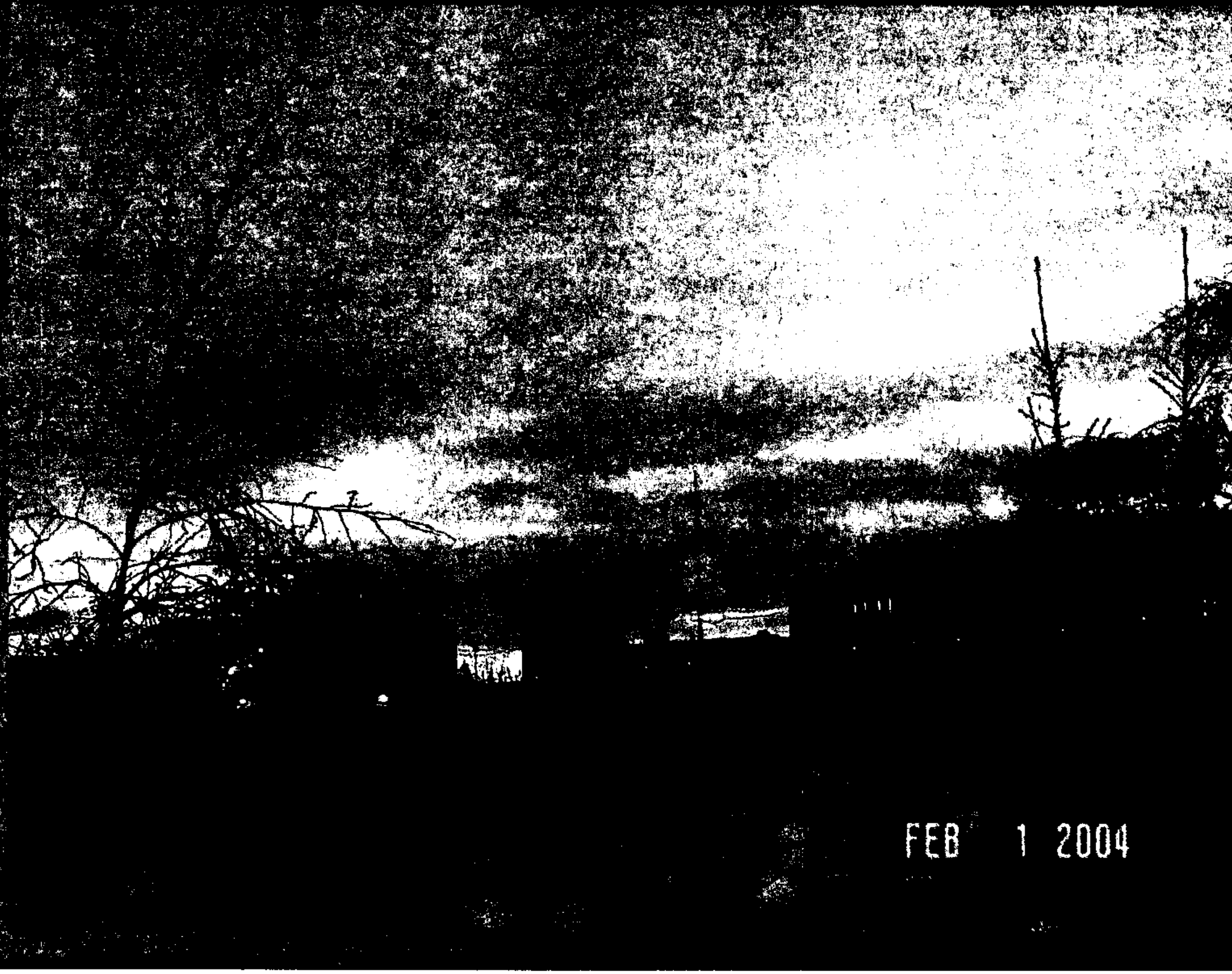
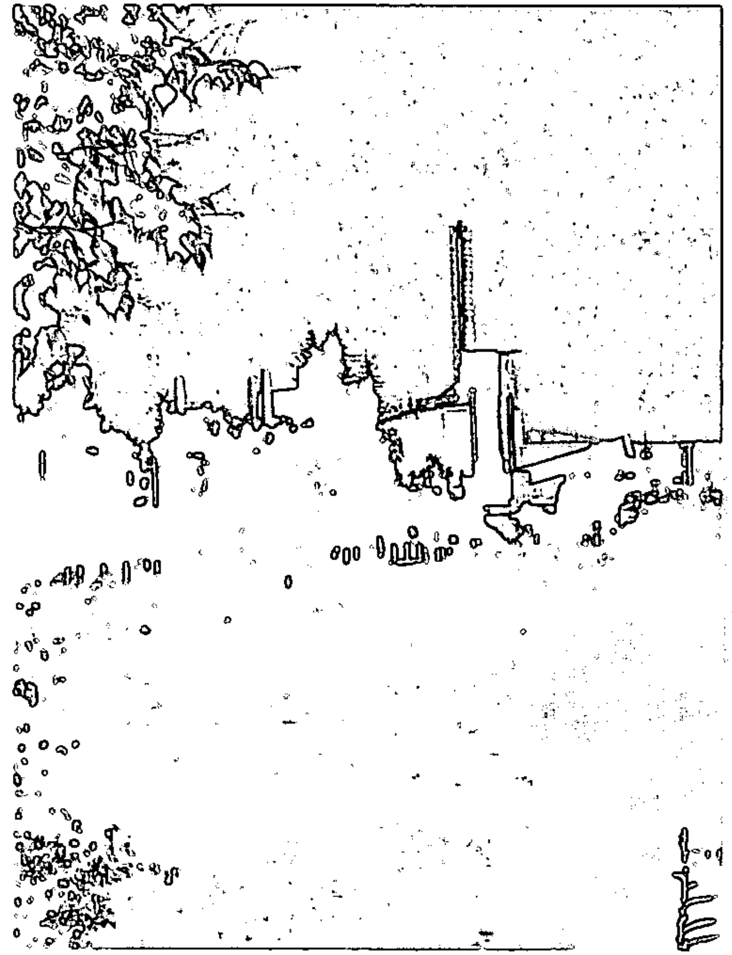
Alaska Coal Consumption

2008 – 962,024 tons of 1.54 million



Co-Generation

- Both heat and electricity production
- High efficiency
- Low cost space heating
- High building density best
- Improved air quality



- Aurora Energy
- University of Alaska
- 3 Military Bases

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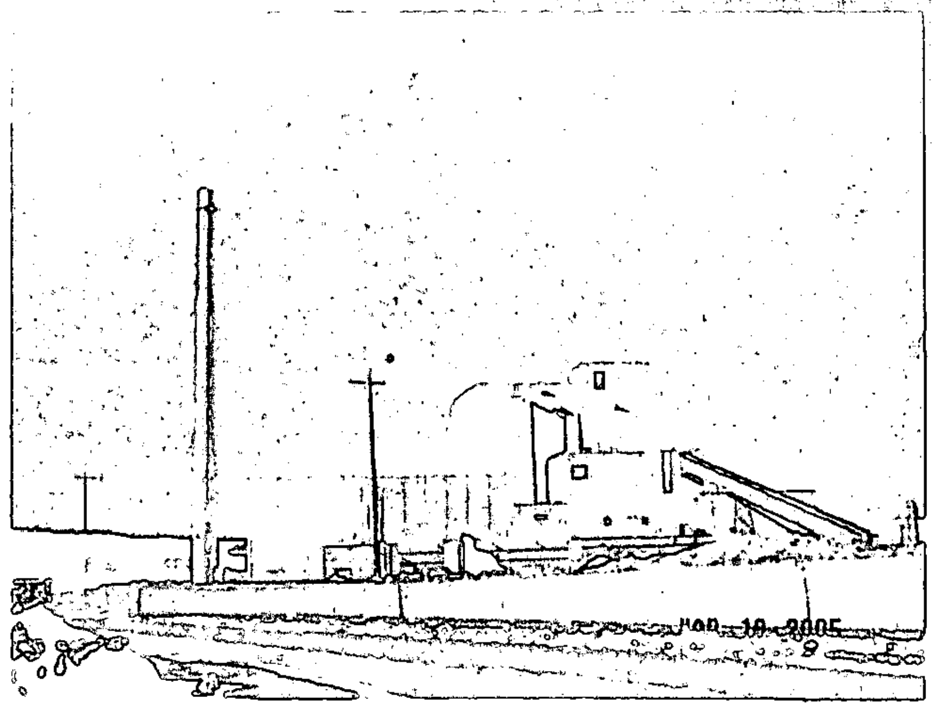
Mine Mouth Generation

- Lowest fuel transport cost
- Facilitates waste coal use
- Less site conflicts for large units
- HV transmission lines required



GVEA Unit1 and HCCP

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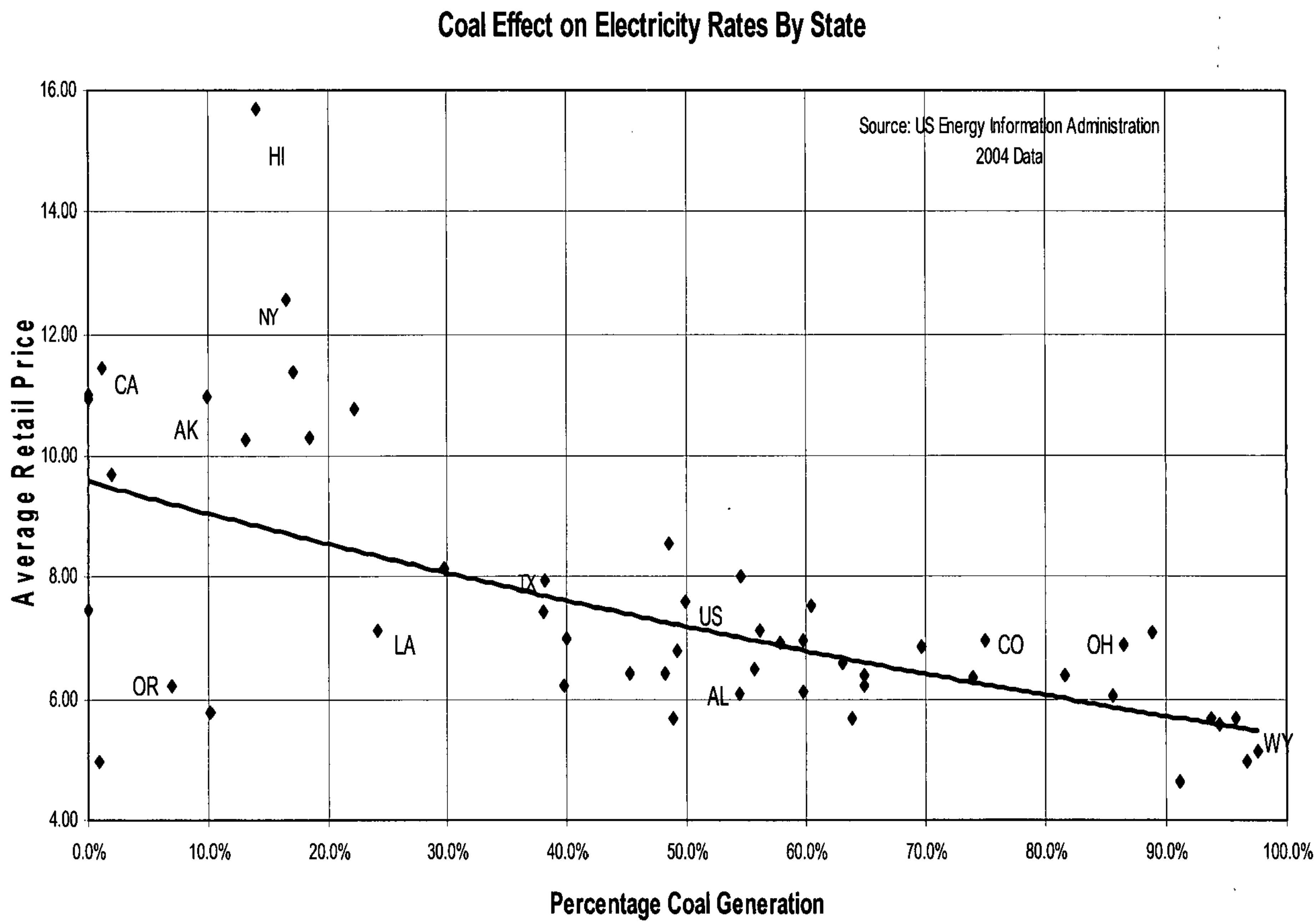
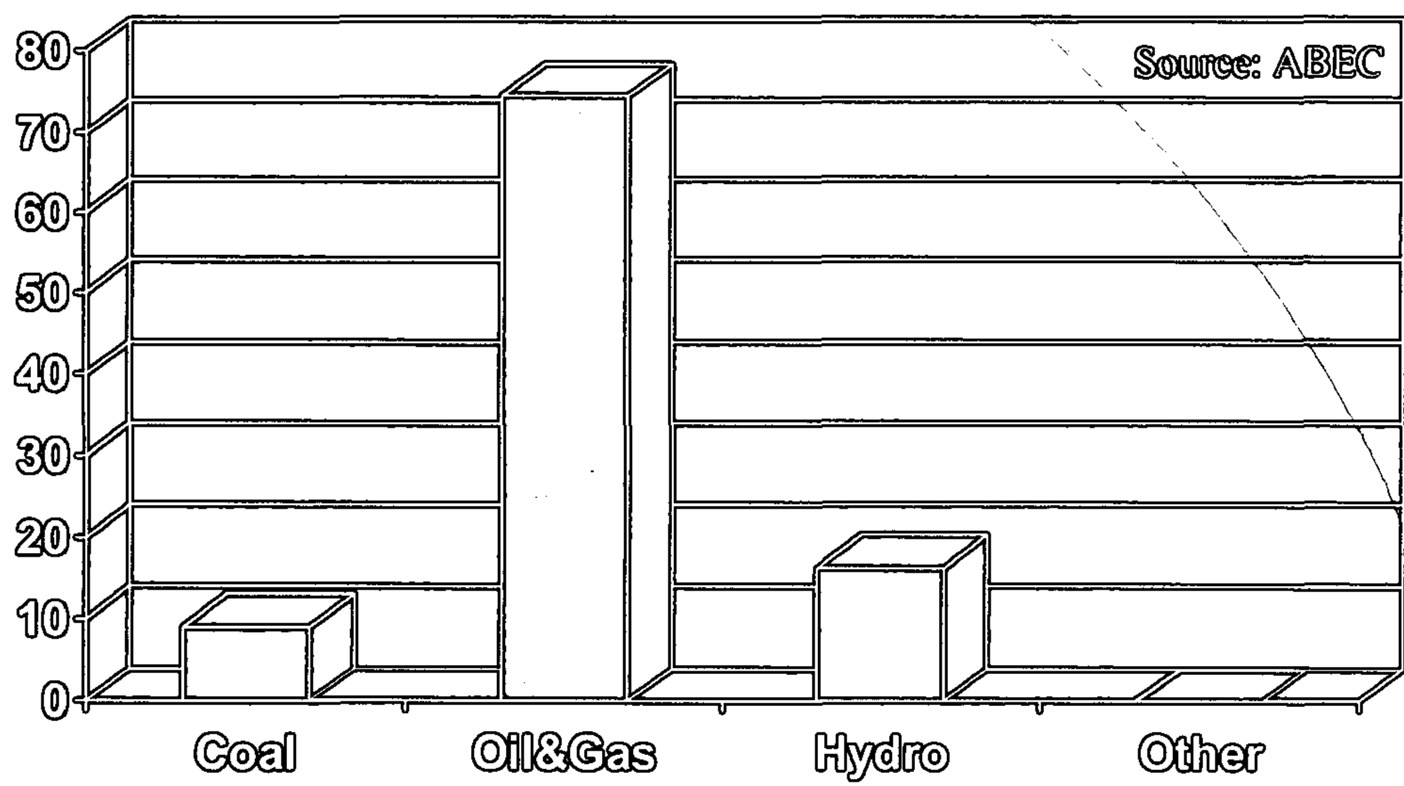

Coal Effect on Electricity Rates By State
Source: US Energy Information Administration
2004 Data
Average Retail Price
16.00
14.00
12.00
10.00
8.00
6.00
4.00
HI
NY
CA
AK
TX
US
LA
CO
OH
OR
AL
WY
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
Percentage Coal Generation

Alaska's Generation Mix



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Coal Exports

World Coal Production

EIA Preliminary 2007 Data

(million short tons)

North America	1,234
Central/South America	92
Europe	814
Eurasia	537
Middle East	1.4
Africa	289
Asia & Oceania	4,069
Total	7,036

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PacRim Coal Importers

EIA Preliminary 2007 Data
(million short tons)

	Production	Consumption	Imports
Japan	0	207	207
South Korea	3	106	103
China/Hong Kong	2,804	2,904	100
India	528	579	51
Taiwan	0	73	73
Thailand	20	36	16
Malaysia	1	12	11
Mexico	12	19	7
Chile	1	6	5
TOTAL	3,369	3,942	573

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PacRim Coal Exporters

EIA Preliminary 2007 Data
(million short tons)

	Production	Consumption	Export
Australia	428	146	282
Indonesia	180	50	130
Russia	347	261	86
South Africa	283	203	80
Vietnam	44	19	25
Canada	76	62	14
TOTAL	1,358	741	617

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Usibelli Coal Exports

- Maximum 723,000 metric tons - 1990
- Recent years (metric tons):

	Asia	Chile	Total
2004	408,840	86,110	494,950
2005	362,660	93,360	456,020
2006	319,610	73,170	392,780
2007	0	279,624	279,624
2008	157,654	365,160	522,814
2009 (est)	350,000	420,000	770,000

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Coal Utilization Technology

CLEAN COAL = CLEAN COAL TECHNOLOGY (CCT)

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Clean Coal Technology
Pollution Control Factors

- Strategies
  - Pre Combustion
  - Combustion
  - Post combustion
  - Gasification
- Green House Gases
  - Carbon dioxide
  - Methane
  - H_20 and NO_x
- Pollutants
  - ROX, SOX, & NOX
    - Particulates (ROX)
    - Sulfur dioxide (SOX)
    - Oxides of nitrogen (NOX)
  - Trace Elements
    - Mercury
    - Chlorine
    - Selenium

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CCT Strategies

Pre-Combustion

- Washing and selective mining
- Primary benefits
  - Ash removal (particulates)
  - Higher heat value (improved efficiency)
  - Sulfur removal (pyrites)
  - Some trace element removal

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CCT Technologies
Combustion

- Combustion chemistry and temperature.
- Primarily for Particulate and NOx
- Examples
  - Low NOx Burners
  - Slagging Combustor
  - Staged combustion
  - HCCP (all of the above)
  - Fluid bed combustion

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CCT Strategies
Post-Combustion

- Removes pollutants from gas stream.
- Commonly used for all pollutants
- Examples:
  - Wet scrubbing (ROX, SOX and trace elements)
  - Baghouses (particulates)
  - Duct injection (SOX, NOX and trace elements)
  - Catalytic reduction (NOX)
  - HCCP, scrubbing, baghouse , duct injection

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CCT Strategies

Gasification, Coal's Future?

- Provides opportunity to control all pollutants to nearly 100% removal.
- Potential path to carbon capture
- New Life For An Old Technology
  - Fischer-Tropsch (FT) Fuel
    - Very clean burning, zero sulfur and metals
    - Low toxicity and volatile content
  - Fertilizer
  - Chemicals
  - Power generation

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Gasification Process

Organic material (C + H) + Water + *Not Enough* (O_2)

+ little heat

Results in gasification:

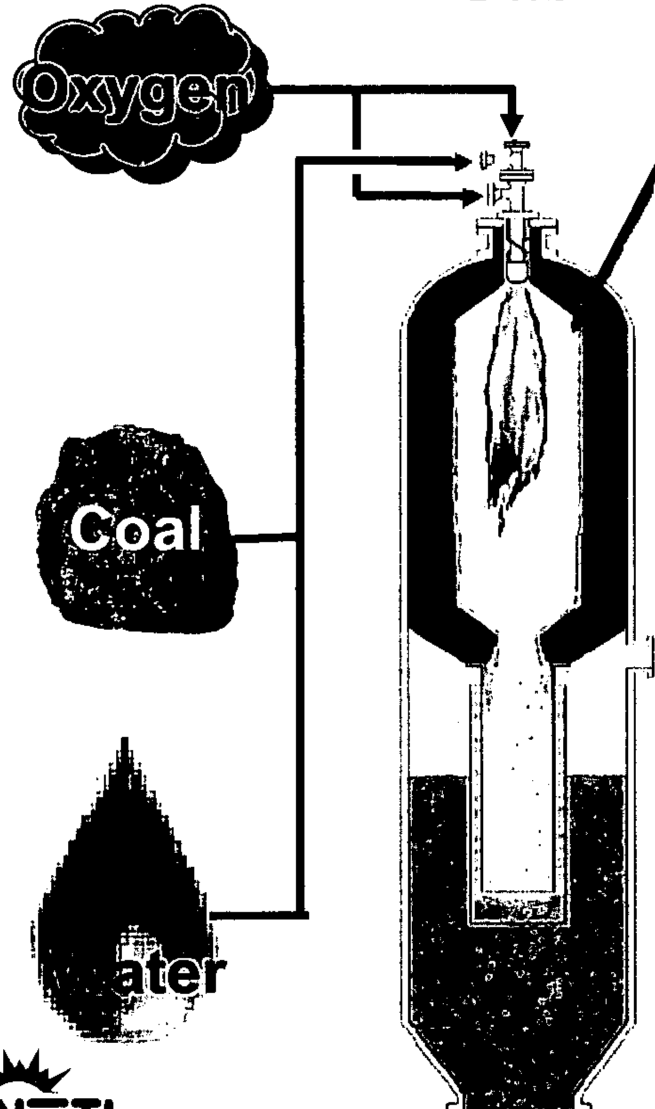
Some Heat + Carbon Monoxide (CO)

+ Hydrogen (H_2) + ash + pollutants

- Can convert almost any organic material into heat and a combustible gas
- Typically the organic material is coal or pet coke, but biomass, municipal waste, natural gas, etc. will all work (pet coke is refinery waste)

NETL

Gasification Process #2



Extreme Conditions:

- up to 1,000 psig
- 2,600 °F
- Corrosive slag (molten rock)

Products (syngas)

CO (Carbon Monoxide)
H_2 (Hydrogen)
[CO/H_2 ratio can be adjusted]

By-products

H_2S (Hydrogen Sulfide)
CO_2 (Carbon Dioxide)
Slag (Minerals from Coal)
Mercury, arsenic, cadmium, selenium…

NETL

Gasification Syngas Possibilities

Syngas
(CO + H2)

Power

Hydrogen
- Refineries
- **Future (Power, Cars)**

Chemicals
- Fertilizer
- Plastic
- Diesel Fuel

Current
Products

Product with
Subsidies

ICRC's Alaska-Based FT Fuel Activities

Current and Future FT Fuel Plant Feasibility Studies:

FT Plants to Produce DOD Validation Fuel

- Small-Footprint FT Plants in Rural Alaska

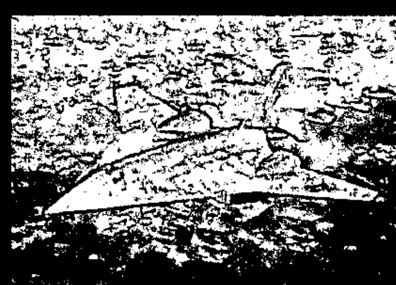
Previous Demonstrations of Syntroleum FT Fuel in:

- Denali National Park (DNP) Tour Buses, 2004
- DNP Snow-Removal Vehicles, Winter 2005
- Fairbanks North Star Borough Transit Buses, 2005
- Diesel Gen-Set at UAF (Simulates Rural Alaskan Village Power Generation Systems), 2004

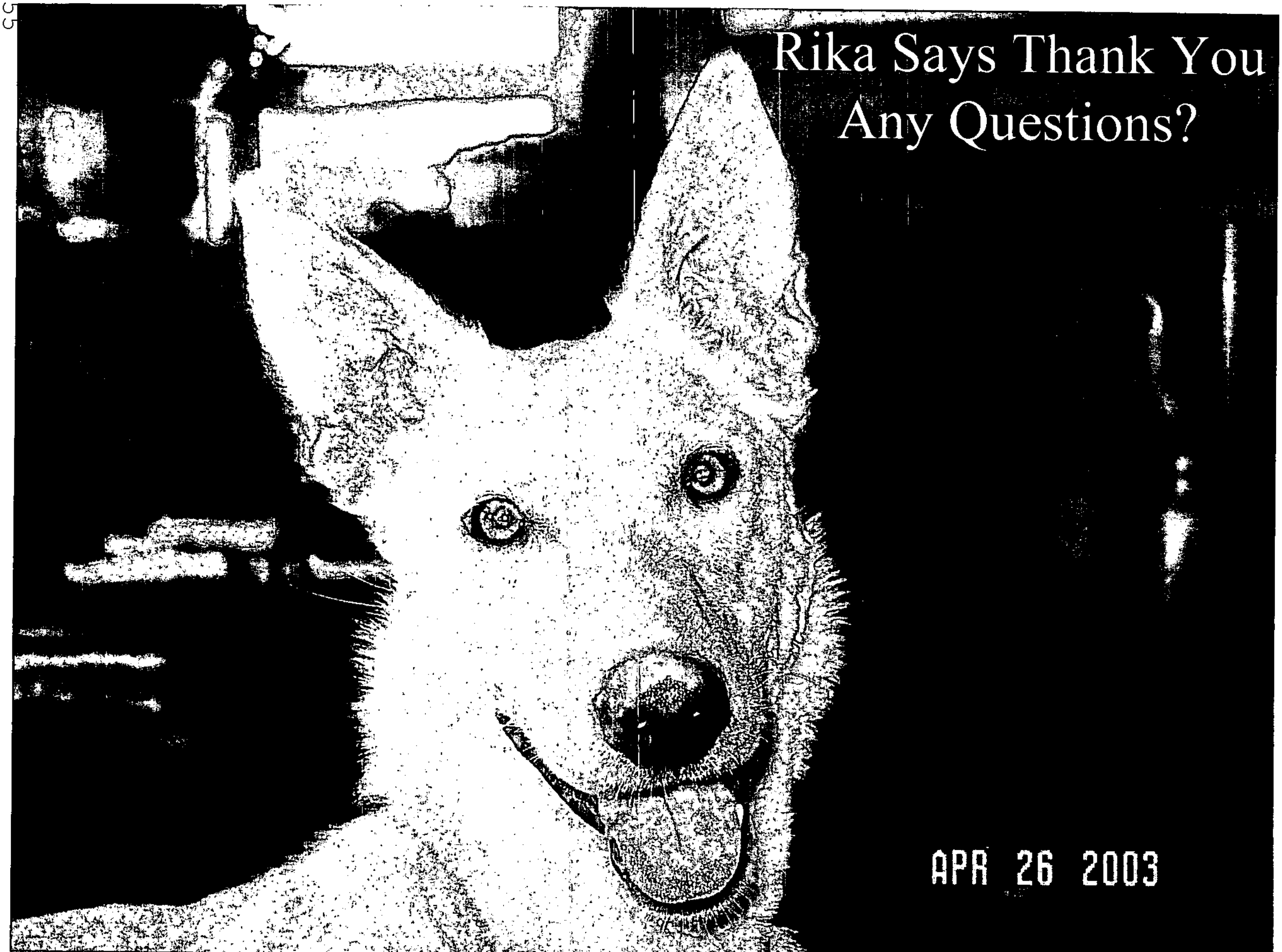
ICRC

ICRC Recognizes the Importance of the Defense F-T Fuels Initiative

- F-T fuel can be produced from abundant US domestic energy resources such as coal, reducing dependency on imported petroleum
- Fuel production can be spread across the country to reduce the terrorist threat
- Large emission reductions can be obtained with existing military equipment
- Excellent thermal stability of F-T fuel enables development of high-performance future aircraft



ICRC


Rika Says Thank You
Any Questions?
APR 26 2003

SB

31

<target><bill>SB 31</bill><subject>SB
31</subject><comm>SENE26</comm></target>

26-LS0217\C
Kane
2/11/09

CS FOR SENATE BILL NO. 31( )

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWENTY-SIXTH LEGISLATURE - FIRST SESSION

BY

Offered:
Referred:

Sponsor(s): SENATORS MCGUIRE, Ellis

A BILL

FOR AN ACT ENTITLED

"An Act relating to an alternative energy production tax credit that may be claimed or applied against tax due under the Alaska Net Income Tax Act; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* **Section 1.** AS 43.98 is amended by adding a new section to read:

Sec. 43.98.040. Alternative energy production tax credit. (a) An energy producer that produces alternative energy may claim an alternative energy production tax credit if

(1) the alternative energy produced supplies all or part of the energy required by commercial units owned or used by the energy producer; or

(2) the energy producer sells all or part of the energy produced as a commercial enterprise.

(b) An energy producer may claim a tax credit under this section in the amount of 35/100 cent for each kilowatt-hour of alternative energy produced or sold.

1057

A tax credit may be claimed for each of the first four years after the date the system used to produce alternative energy is placed into service.

(c) An unused tax credit under this section may be carried forward and applied against the tax liability of the energy producer for four years after the date the system used to produce alternative energy was placed into service.

(d) A tax credit provided under (a) of this section may be sold, assigned, exchanged, conveyed, or otherwise transferred, in whole or in part.

(e) A taxpayer acquiring a transferable tax credit may use the tax credit or a portion of the tax credit to offset taxes imposed under AS 43.20 (Alaska Net Income Tax Act). Any portion of the credit not used may be used at a later time or transferred under (d) of this section.

(f) The department shall

(1) prepare an application form for a tax credit under this section; and

(2) adopt regulations necessary for the administration of this section.

(g) In this section,

(1) "alternative energy" includes geothermal, solar, hydroelectric, wind, biomass, hydrokinetic or tidal, and wave energy;

(2) "energy producer" means an electric utility holding a certificate of public convenience and necessity under AS 42.05 or an independent power producer.

* **Sec. 2.** This Act takes effect January 1, 2010.

FISCAL NOTE

STATE OF ALASKA
2009 LEGISLATIVE SESSION

Fiscal Note Number: 1
Bill Version: **CSSB 31(ENE)**
(S) Publish Date: 3/2/09

Identifier (File Name): CSSB31(ENE)-DOR-TAX-03-02-09
Dept. Affected: Revenue 04
Title: **Alternative Energy Production Tax Credit**
RDU: **Taxation and Treasury**
Component: Taxation and Treasury
Sponsor: **Senators McGuire, Ellis, Thomas**
Requester: **(S) Energy**
Component No. **2476**

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required	Information					
OPERATING EXPENDITURES	**FY 2010**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**
Personal Services	108.9	0.0	108.9	108.9	108.9	108.9	108.9
Travel	2.0	0.0	2.0	2.0	2.0	2.0	2.0
Contractual	34.9	0.0	4.9	4.9	4.9	4.9	4.9
Supplies	0.5	0.0	0.5	0.5	0.5	0.5	0.5
Equipment							
Land & Structures							
Grants & Claims							
Miscellaneous							
TOTAL OPERATING	**146.3**	**0.0**	**116.3**	**116.3**	**116.3**	**116.3**	**116.3**
CAPITAL EXPENDITURES	**0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
CHANGE IN REVENUES ( )	*	**0.0**	*	*	*	*	*

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts							
1003 GF Match							
1004 GF	146.3	0.0	116.3	116.3	116.3	116.3	116.3
1005 GF/Program Receipts							
1037 GF/Mental Health							
Other Interagency Receipts							
TOTAL	**146.3**	**0.0**	**116.3**	**116.3**	**116.3**	**116.3**	**116.3**

Estimate of any current year (FY2009) cost: **0**

POSITIONS

Full-time	1.00	0	1.00	1.00	1.00	1.00	1.00
Part-time							
Temporary							

ANALYSIS: *(Attach a separate page if necessary)*

See Attached.

Prepared by: **Dan Stickel, Economist**
Phone (907) 465-3279
Division: Tax Division
Date/Time
Approved by:
Date
Agency

(Revised 9/2008 OMB)

STATE OF ALASKA **BILL NO.** CSSB 31(ENE)
2009 LEGISLATIVE SESSION

ANALYSIS CONTINUATION

Bill Language:
This bill will create a tax credit for electricity production from new alternative energy projects in the state. The amount of the credit will be 2.1 cents for each kilowatt hour of alternative energy produced or sold in "each of the first four years after the date the system used to produce alternative energy is placed into service," up to a limit of 20 percent of capital costs. The tax credit would be applicable only to the Alaska Corporate Net Income Tax. Unused tax credits could be carried forward or transferred.

For purposes of this bill, "alternative energy" means geothermal, solar, hydroelectric, wind, biomass, hydrokinetic or tidal, and wave energy. The credit could be claimed by an "electric utility holding a certificate of public convenience and necessity under AS 42.05 or an independent power producer." The term "independent power producer" would need to be defined in regulation and could potentially include any entity that chooses to implement an eligible alternative energy project.

The effective date of the bill is January 1, 2010. There bill includes a sunset date of January 1, 2025.

Revenues:
Revenues from this bill are indeterminate because we do not know the size or number of projects that would qualify for the credit. According to the US Department of Energy, Alaska currently produces 1.3 billion kilowatt hours of alternative energy annually (hydroelectric, biomass, solar and wind power; there is currently no commercial geothermal electric generation). For each 10 percent increase in alternative energy production, tax revenue to the state would be reduced by $2.7 million per year for four years.

Some examples of credits generated by possible projects include the following (These examples are for illustrative purposes only. They are based on publicly available information and typical capacity utilization rates):

- A 14-megawatt hydroelectric project such as the Lake Dorothy project near Juneau could be eligible for a $1.5 million annual credit (assuming the project operates at 60% of capacity). Over four years, this credit would amount to about 9.7% of the estimated $64 million capital cost.

- A 30-megawatt wind farm such as the Fire Island project near Anchorage could be eligible for a $1.7 million annual credit (assuming the project operates at 30% of capacity). Over four years, this credit would amount to about 12.3% of the estimated $54 million capital cost.

- A 1.2-megawatt wind farm such as the Nome wind farm could be eligible for a $66,000 annual credit (assuming the project operates at 30% of capacity). Over four years, this credit would amount to about 4.8% of the estimated $5.5 million capital cost.

Many smaller projects would likely also qualify for the credit. Based on our analysis of the sample projects listed above, we believe that for most projects, the total credit over four years would amount to less than 20 percent of capital expenditures.

We anticipate that this credit will mostly be used by corporations that acquire the credit through the transferability provision. The transferability provision will be used because many power producers are owned by municipalities, non-profits or S-corporations and therefore are not subject to the corporate income tax. Also, independent power producers, once defined in regulation, could potentially include individuals, sole proprietorships, LLC's, S-corporations, non-profits and other entities that are not subject to the corporate income tax.

Expenditures:
This bill would require the Department of Revenue to administer a new tax credit program, including the review and approval of credit applications and issuance and tracking of credit certificates. This new credit program will likely involve a large number of projects and millions of dollars in credits claimed annually.

The Department is requesting a Corporate Income Tax Auditor III position (Range 22) to audit the tax credits and manage the approval, issuance and tracking of the credits. There will also be $30,000 in one-time startup expenses: $20,000 for enhancements to our tax examination system, and $10,000 for an education and public outreach program.

ALASKA STATE LEGISLATURE

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Co-Chair
Senate Resources Committee

Chair
Senate Special Committee on Energy
Senate Special Committee on World Trade, Technology & Innovation

Member
Senate Judiciary Committee
Joint Armed Services Committee

SENATOR LESIL MCGUIRE

SPONSOR STATEMENT

SB 31: Alternative Energy Production Tax Credit

SB 31 encourages the development of Alaska's vast alternative energy resources by offering power producers and utilities a valuable production tax credit for each kilowatt-hour of electricity they produce from geothermal, wind, hydro, tidal, wave, biomass, in-river, or solar energy.

In its simplest terms, a tax credit is a direct reduction in the amount of taxes owed. The production tax credit created by SB 31 rewards power producers in the state of Alaska for producing electricity from alternative energy sources by offering to directly reduce the amount of state corporate income tax they owe. In Alaska, the corporate income tax rate is graduated from 1% to 9.4% in increments of $10,000 of taxable income. The 9.4% maximum rate applies to taxable income of $90,000 and over.

SB 31 offers a production tax credit in the amount of 0.35 cents per kilowatt-hour (kWh). What this means is that the state will directly reduce the amount of corporate tax owed by 0.35 cents for each kWh of energy produced. The tax credit is calculated based on one year of production and there are 8,760 kilowatt-hours in a year. A power plant that produces 100 kW of energy would be able to reduce their corporate tax by $3,066 per year (100 kW x $0.0035 x 8,760 kWh/year = $3,066/year). A 100 megawatt (1MW = 1000 kW) power plant, similar in size to the proposed Mt. Spur geothermal power plant, would be able to reduce their corporate tax liability by over $3 million per year. The credit can only be claimed for each of the first four years after a power plant is placed into service.

However, the dominant model for energy production in Alaska is not the privately owned power producer that pays corporate tax, but rather the publically owned cooperatives and municipal utilities that are tax exempt. To level the playing field and to ensure that all power producers in the state can benefit from the tax credit, SB 31 proposes a transferable tax credit. A transferable tax credit can be sold or traded on an open market to other corporate entities that are required to pay the state corporate income tax.

Because the production tax credit can only be claimed by a power producer that has made a significant investment in infrastructure and is already producing electricity, SB 31 allows a way to incentivize alternative energy development without requiring hefty state appropriations to unproven projects and technologies.

In energy plans across the nation, production incentives are playing an increasingly important role in encouraging the development of alternative energy resources. Twenty-five states offer some sort of alternative energy corporate tax incentives and five states and the federal government offer a production tax credit similar to the one proposed by SB 31.

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Senate Judiciary Committee
Joint Armed Services Committee

SENATOR LESIL MCGUIRE

Explanation of Changes

Explanation of changes from SB 31 (Version R) to CSSB 31 (Version C):

(1) Expanded from just geothermal to include other types of alternative energy: geothermal, solar, hydro, wind, biomass, tidal, and wave.

(2) Made the production tax credit transferable so that publically owned utilities could benefit as well.

(3) Corrected the misdrafted 35 cents to 0.35 cents.

(4) Added an effective date to comport with the January 1 start date of a new tax year.

ALASKA POWER ASSOCIATION
Alaska Power Association
703 West Tudor Road, Suite 200
Anchorage, Alaska 99503-6650
907-561-6103
Fax: 907-561-5547
www.alaskapower.org

February 10, 2009

Senator Lesil McGuire
Chair, Senate Special Committee on Energy

Re: Committee Substitute of SB 31, Alternative Energy Production Tax Credits

Dear Honorable Chair McGuire:

Alaska Power Association (APA) is the statewide trade association for the electric utilities that supply power to more than a half-million Alaskans in communities from Barrow to Unalaska and down the Inside Passage.

APA strongly supports the development of alternative energy projects. State financial assistance and incentives will play a critical role in getting these projects off the drawing board. The Committee Substitute for Senate Bill 31 would help encourage the construction of alternative energy projects through the use of tax credits. It is for these reasons that Alaska Power Association supports the Committee Substitute for Senate Bill 31.

I would like to offer the following suggested changes:

APA suggests defining the time during which a renewable energy producer could claim a credit as 48 months instead of four (4) years. Under the existing bill, if a utility or independent power producer started producing power in August, it could only claim a few months worth of production for that year. By counting months instead of years, the bill would allow for a full four (4) years of production to be claimed over a five-year period. The change could be made by amending subsection (b) to read as follows:

> (b) An energy producer may claim a tax credit under this section in the amount of .35 cents for each kilowatt-hour of alternative energy produced or sold. A tax credit may be claimed for each of the first ~~four years~~ **forty-eight months** after the date the system used to produce alternative energy is placed into service.

APA also suggests amending subsection (e) to clarify that it is referring to the credits described in subsection (d). The clarified language would read as follows:

> (e) A taxpayer acquiring a ~~transferable~~ tax credit **under (d) of this section** may use the tax credit or a portion of the tax credit to offset taxes imposed under AS 43.20 (Alaska Net Income Tax Act). Any portion of the credit not used may be used at a later time or transferred under (d) of this section.

APA believes that this minor change to section (b) and the clarification to subsection (e) are consistent with the intent behind Committee Substitute for SB 31.

If you have any questions regarding this letter, please contact me at 907-771-5703 or mleland@alaskapower.org. I will be traveling to an out-of-state meeting the day of the first hearing on this bill. As a result, I regret that I will not be able to testify at the hearing.

Thank you for your work on this and other issues of importance to the Alaska electric utility industry.

Sincerely,

Marilyn Leland
Executive Director

Alaska Conservation Alliance

Uniting for Alaska's Future

February 12, 2009

The Honorable Lesil McGuire
Alaska State Senate
Alaska State Capitol
Juneau, Alaska 99801-1182

Dear Senator Lesil McGuire,

On behalf of the 40 conservation groups and the 38,000 Alaskans that are represented by the Alaska Conservation Alliance, I am pleased to acknowledge our strong support for SB 31 to establish an Alternative Energy Production Tax Credit. This credit will give Alaskan communities, utilities and entrepreneurs the incentive needed to develop clean, stably priced clean energy sources.

As you are well aware, Alaska is at an energy crossroads. Much of the state's aging electricity generation infrastructure will have to replaced in the next decade. With power plant life spans of 20 to 100 years, decisions made today about electric power technology will affect generations of Alaskans to come. A decision now to base Alaska's energy infrastructure solely on fossil fuels will result in decades of energy price volatility. Additionally, it is commonly accepted that a carbon cap and trade system to limit the greenhouse gas emissions of fossil fuels, further increasing the costs associated with fossil fuels, will soon likely be implemented. An alternative energy production tax credit gives rural and urban communities incentive to tap a fuel-free, zero-carbon energy source that will stabilize Alaska's future energy costs.

Investing in clean energy production and research can help Alaska become an exporter of clean energy technologies to the world in addition to supplying Alaskans with clean and stably priced energy. Through incentives similar to the Geothermal Tax Credit, Germany built an $8.7 billion renewable energy industry, creating 170,000 jobs.

The Alaska Conservation Alliance would like to thank you for this opportunity to voice our support for SB 31 and we encourage passage of this bill.

Sincerely,

Kate Troll

Kate Troll
Executive Director

PO Box 1006600, Anchorage, Alaska 99501 • Ph. 907.258.6171 • Fax 907.258.6177 • www.akvoice.org
419 6th Street, Ste. 321, Juneau, Alaska 99801 • Ph. 907.463.3366 • Fax 907.463.2554

February 12, 2009

Alaska Senate Energy Committee

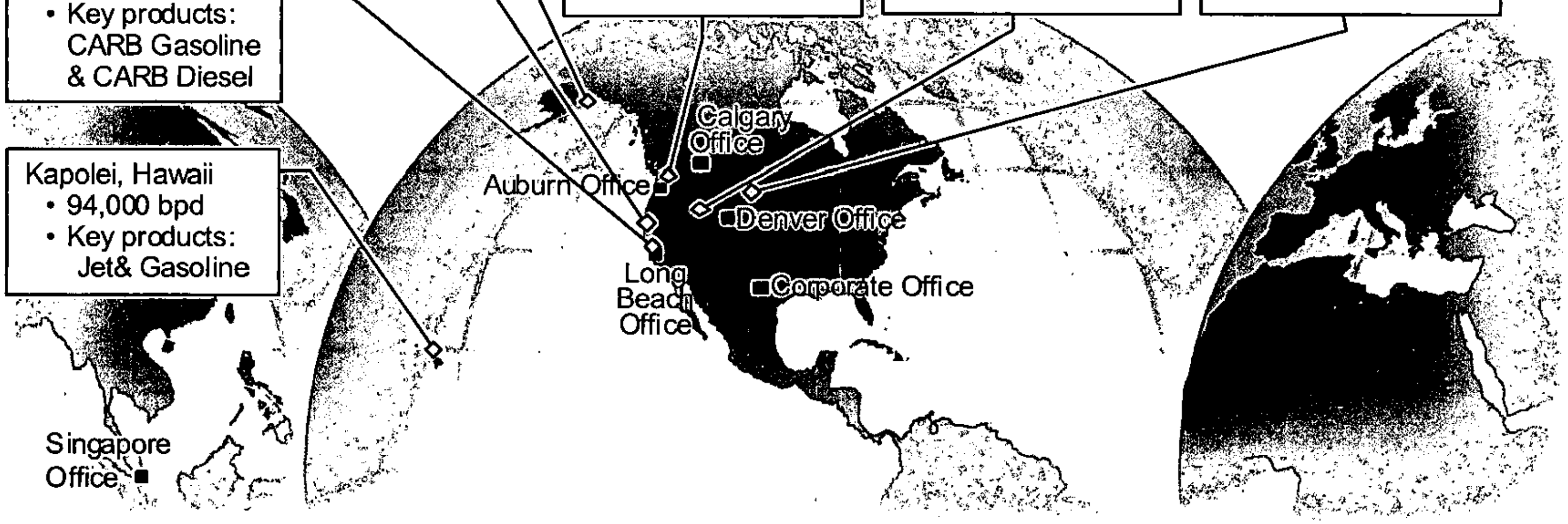
Kip Knudson, Tesoro Alaska

TESORO

1067

Tesoro - A Collection of Independent Refiner/Marketer Companies

- **No upstream assets**
- Headquartered in San Antonio, Texas
- Seven Refineries
- 660,000 bpd total crude capacity
- Retail network of over 850 sites
- 5,500 Employees
- Traded on NYSE: symbol TSO



TESORO

February 12, 2009

1068

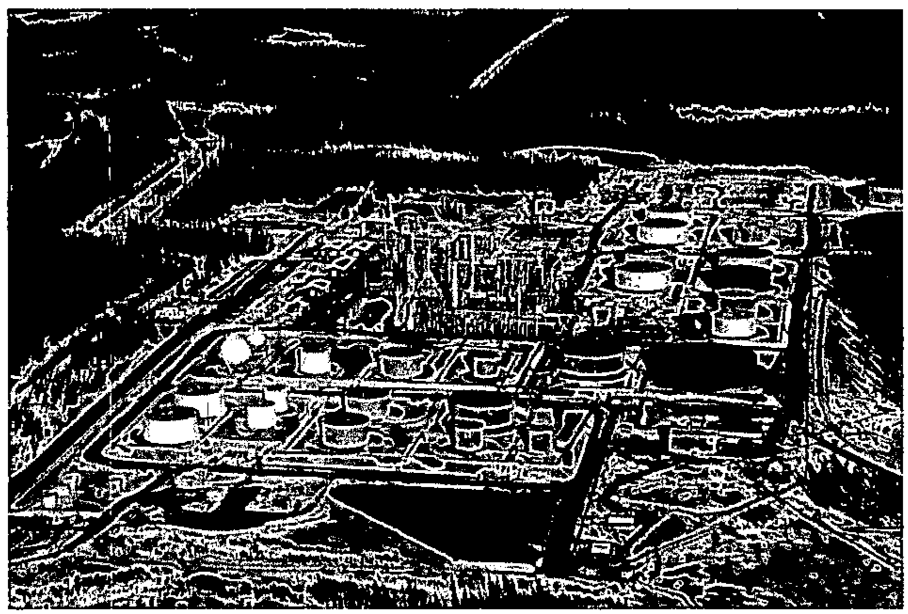
Kenai Refinery

History

- Built in 1969
- Constructed to operate on 100% ACI
- Crude capacity 17,500 b/d (17 employees)
- Cook Inlet production peaked at 225,000 bpd in 1970

Today

- 72,000 bpd nameplate crude capacity
- Employs over 200 people
- Award-winning safety record
- Product mix
  - Propane
  - Gasoline
  - Jet Fuel
  - Diesel Fuel
  - Heavy Vacuum Gas Oil
  - Fuel Oil / Bunker
  - Road Asphalt



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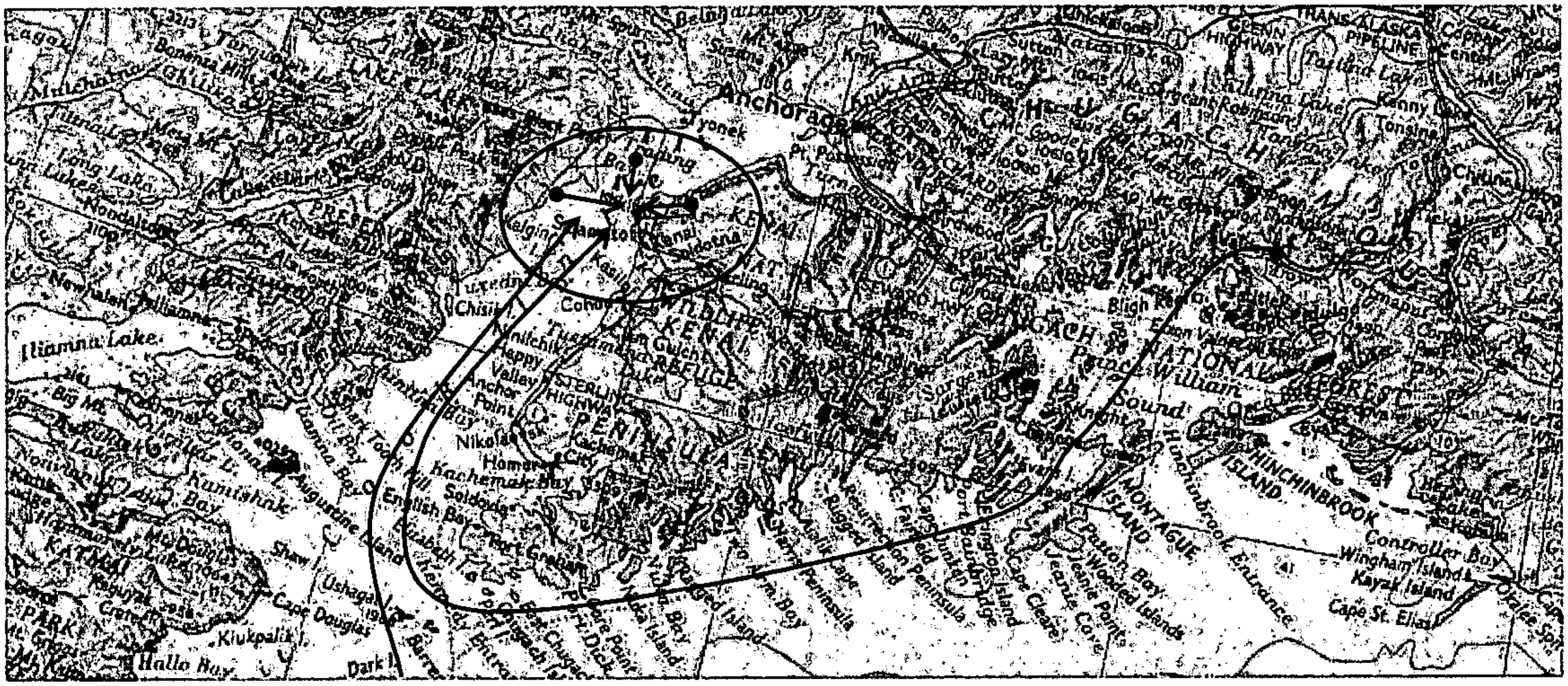
1069

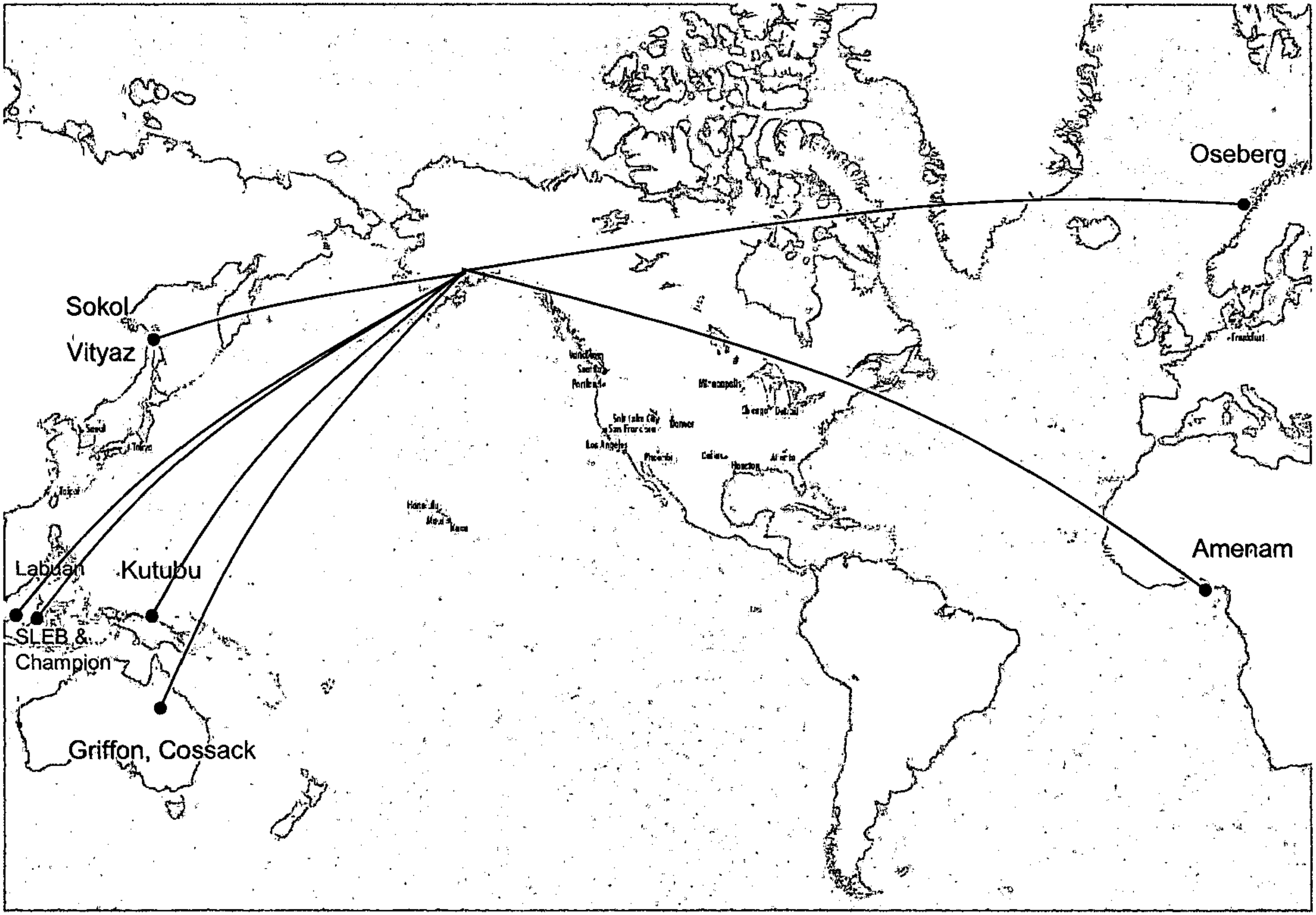
Crude Types



- Alaska North Slope - approximately 50%
- Cook Inlet - approximately 25%
- Light Foreign - approximately 25%

1070

Foreign Crude



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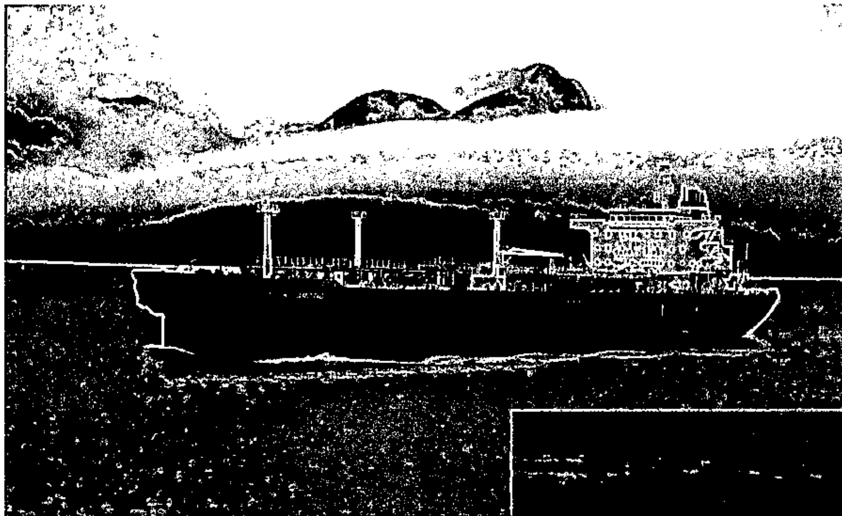
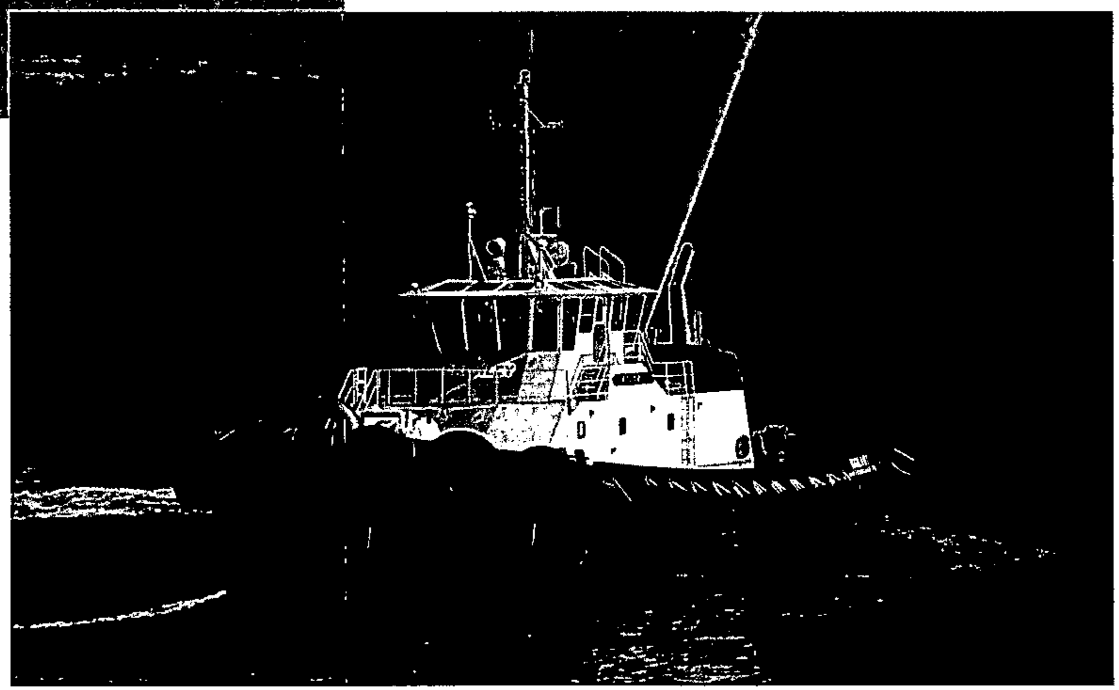
February 12, 2009

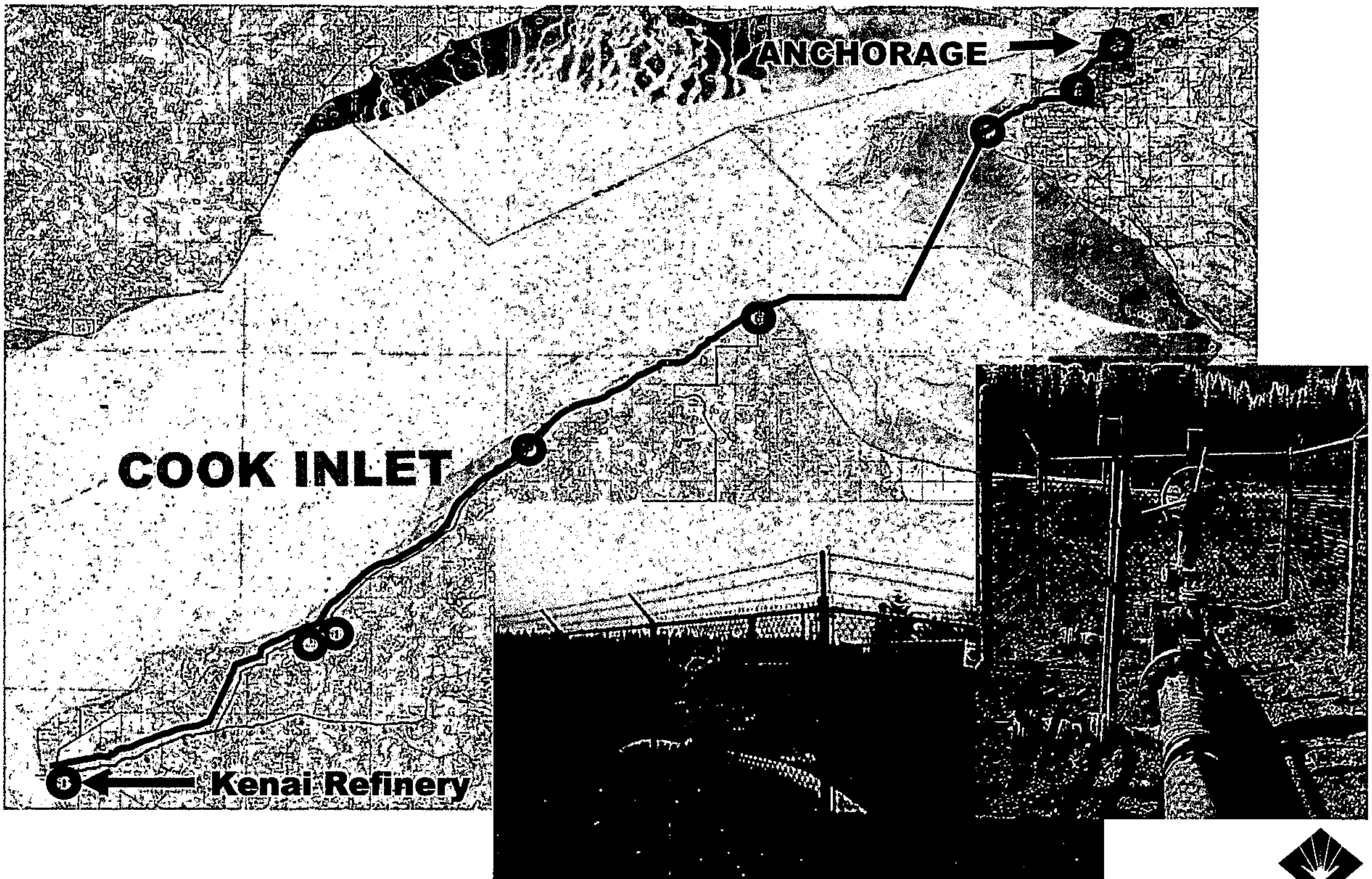
Marine Operations





- Three Jones Act double-hull tankers
- Double-hull ice-class foreign tankers
- Assist tug for Cook Inlet

Tesoro Alaska Pipeline



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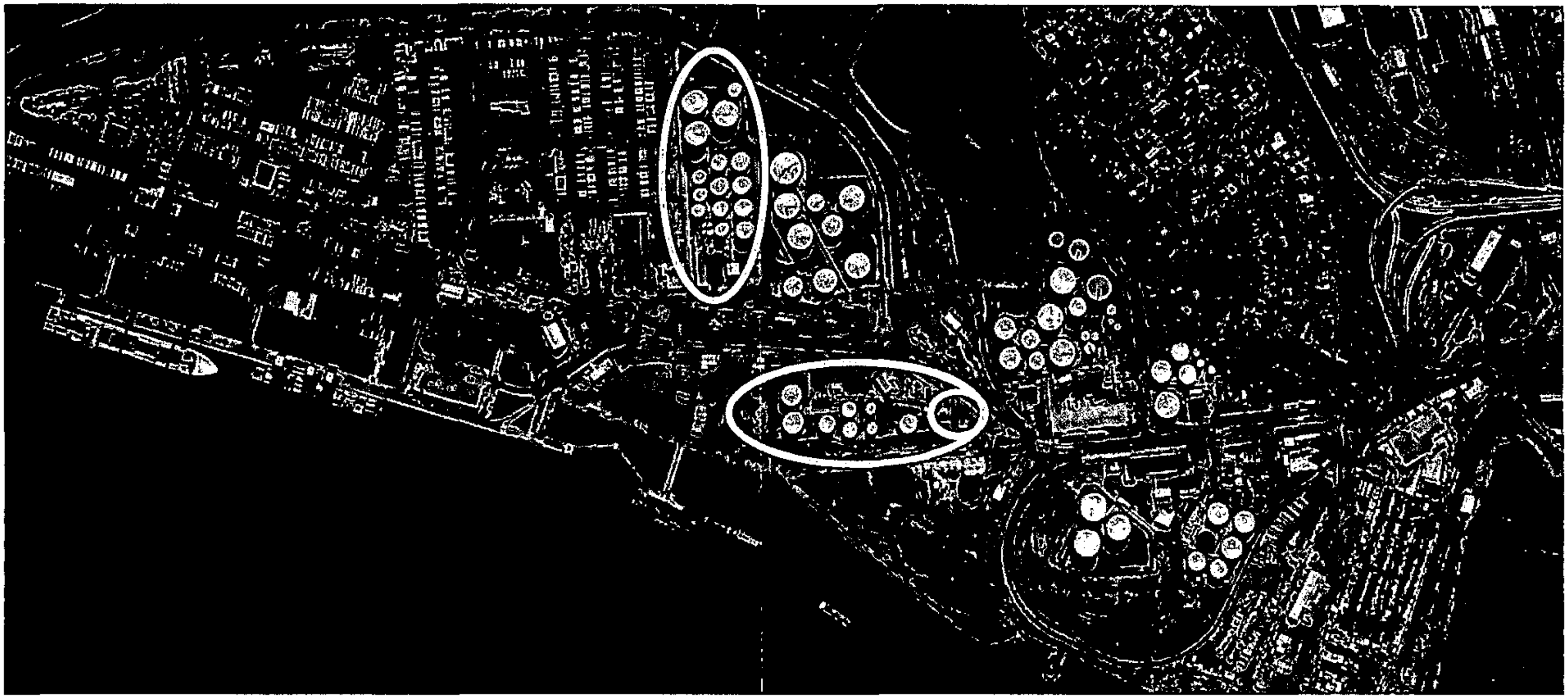
February 12, 2009

Tesoro's Anchorage tank farm



TESORO

February 12, 2009

Tesoro Marketing in Alaska

- 31 company-owned convenience stores - 29 sell fuel
- 56 wholesale branded sites as of 10-17-08

1075

Commodity fundamentals

- If the market experiences an oversupply of a commodity, prices fall
- If demand for a commodity cannot be met, prices increase
- Commodity markets, in the short term, are agnostic to the cost to produce
- In the long run, if commodity producers go out of business, the remaining producers must fill the customer demand, and prices likely will rise
- Two commodity examples that Alaskans are more familiar with:
  - Salmon
  - Oil

TESORO

1076

Refining/marketing has gotten very complicated over the past decades

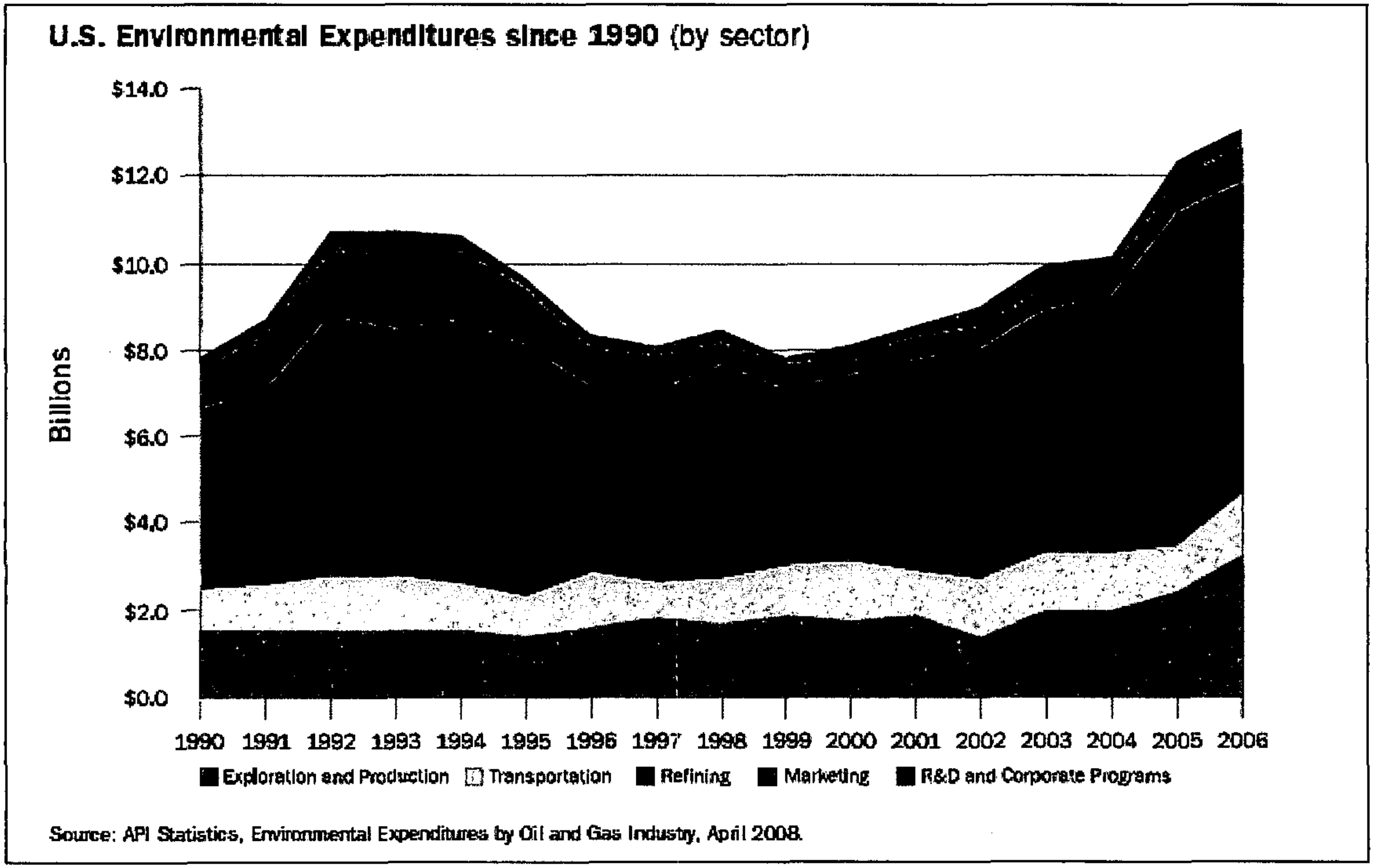
- Lead
- Oxygenate
- Vapor recovery
- Sulfur
- Spill response
- Pipeline integrity
- Underground storage tanks
- Flares
- Mixing zones
- PWS and CI marine navigation
- Above-ground storage
- Transportation Security Administration
- Metrology
- Biofuels in the NW
- Boutique fuels

Up next:

- Benzene
- Greenhouse gases
- Beluga whales

TESORO

Refiner investment just to stay in business



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Independent refiner

- An independent refiner's economic model is based on being more efficient and providing a competitive alternative to an integrated major.
- An independent refiner does not profit from high prices, but makes profit/loss based on the difference between the market cost of crude and market price of products

TESORO

1079

Two manufacturers, but lots of marketers

- Refiners make product (gasoline, diesel, jet, bunker, propane, etc.) on a ratable basis – let's say 50,000 barrels per day.
  - Low complexity refineries like those in Alaska have limited ability to vary the mix of production, and all refineries have minimum run rates and it is very complicated to turn refineries off, and then back on
  - Refiners, like all manufacturers, follow best-practices that encourage just-in-time inventories
  - Each refiner builds storage and distribution networks to satisfy customer needs, but does not engage in long-term storage of product
- Refiners then have to sell those 50,000 barrels of product on a ratable basis – every day, 365 days a year
- Which means that a refiner sells products in the following ways (referred to as "channels"):

TESORO

1080

Marketing terminology

- Retail
  - Company operated sites that sell fuel to the public
  - Refiner/marketer invests capital; owns/leases real property
  - Refiner/marketer employs staff
- Wholesale Branded Rack Sales
  - Distributors
    - Long-term commitment
    - Brand offerings (advertising, promotion, credit cards network and settlement)
    - Refiner/marketer invests capital for image
  - Dealers
    - Individual retailers that purchase refiner branded products
    - Long-term commitment
    - Refiner brand offerings (advertising, promotion, credit cards network and settlement)
    - Refiner/marketer invests capital for image

TESORO

Marketing terminology (cont.)

- Wholesale Unbranded Rack Sales
  - Contract
    - Term supply commitment that establishes volume and pricing basis
    - No brand support
  - Open Rack
    - Flexible supply arrangement that does not obligate either party on volumes
    - No brand support
- Bulk Sales
  - Large volume sales to customers with significant infrastructure and financial strength
    - Waterborne sales over wharf
    - Terminal sales
  - Exchanges
    - Deliveries (receipts) with other suppliers

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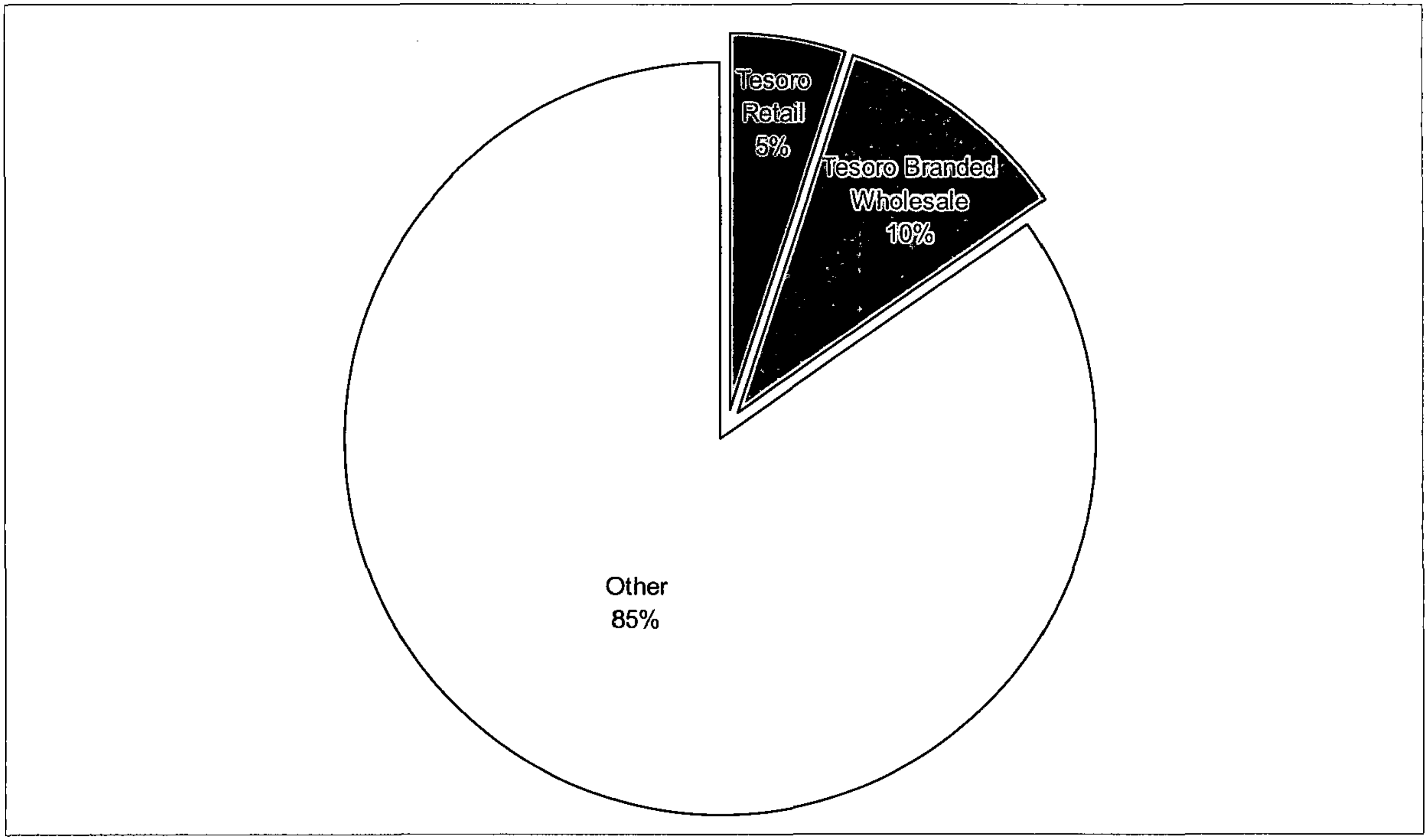
1082

Tesoro branded outlets compared to total Alaska market

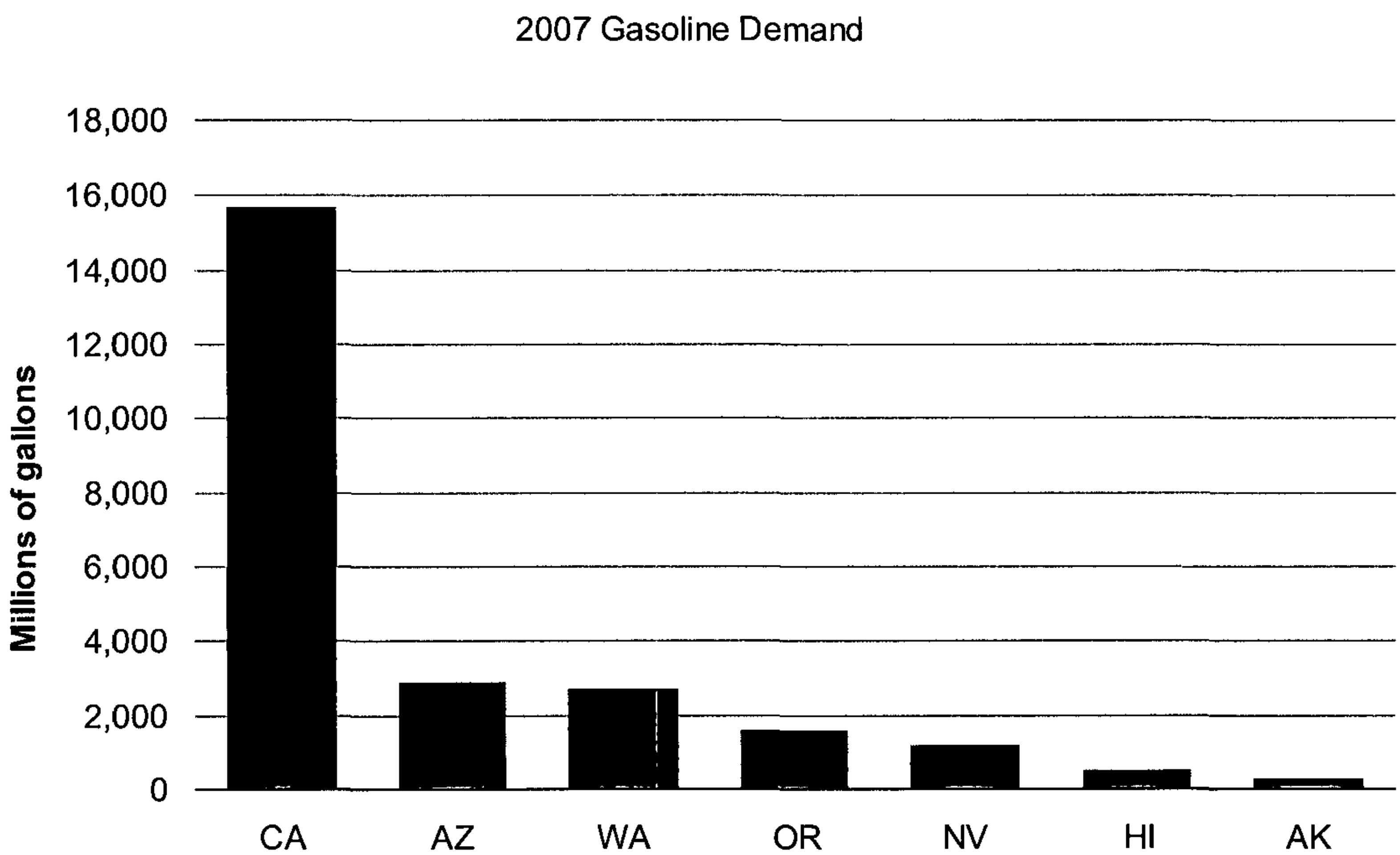


Source: 2007 National Petroleum News Station Count

TESORO

1083

Demand



Source: Federal Highway Administration

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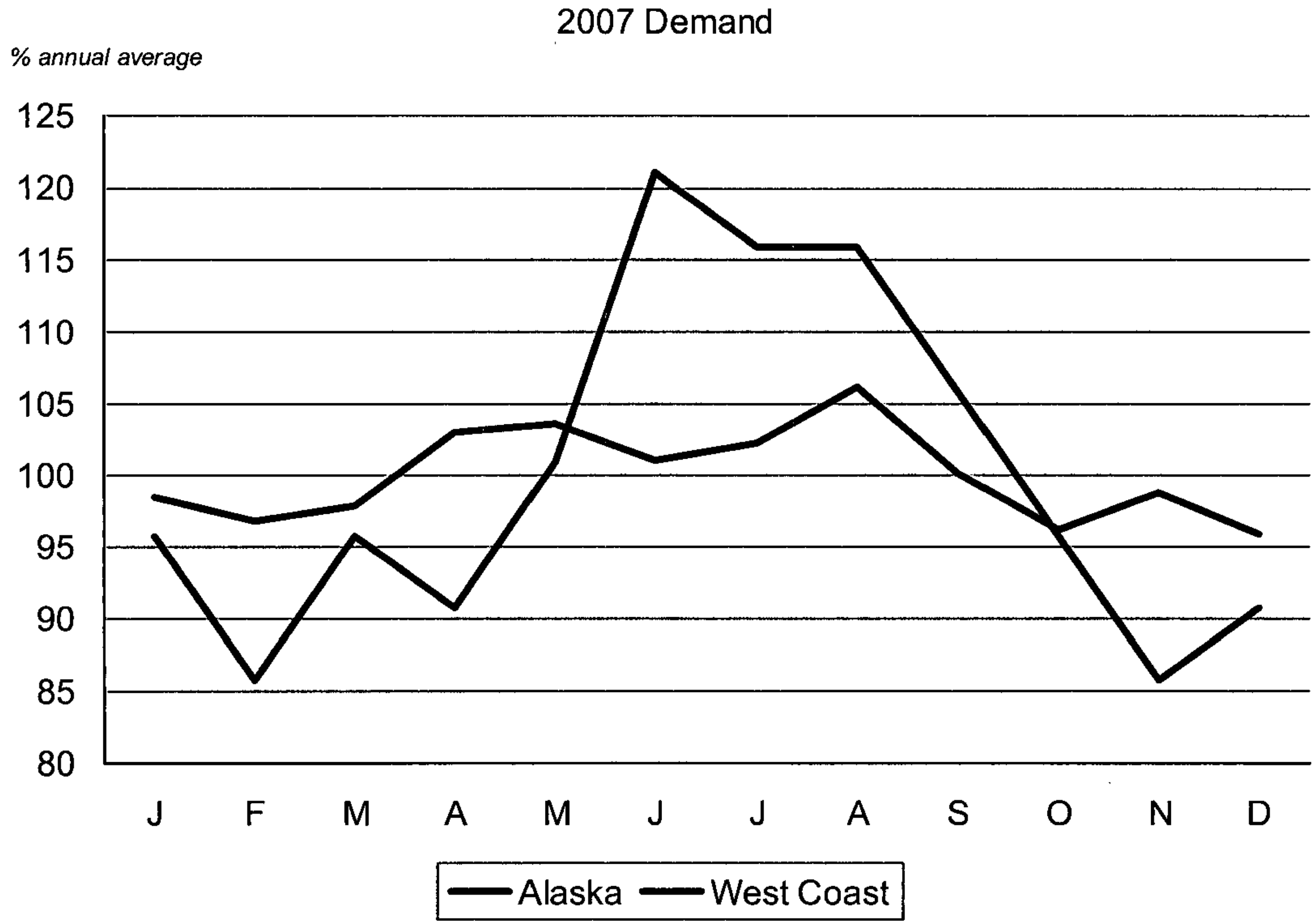
February 12, 2009

1084

Alaska market shows more seasonality



Source: Federal Highway Administration, DOE

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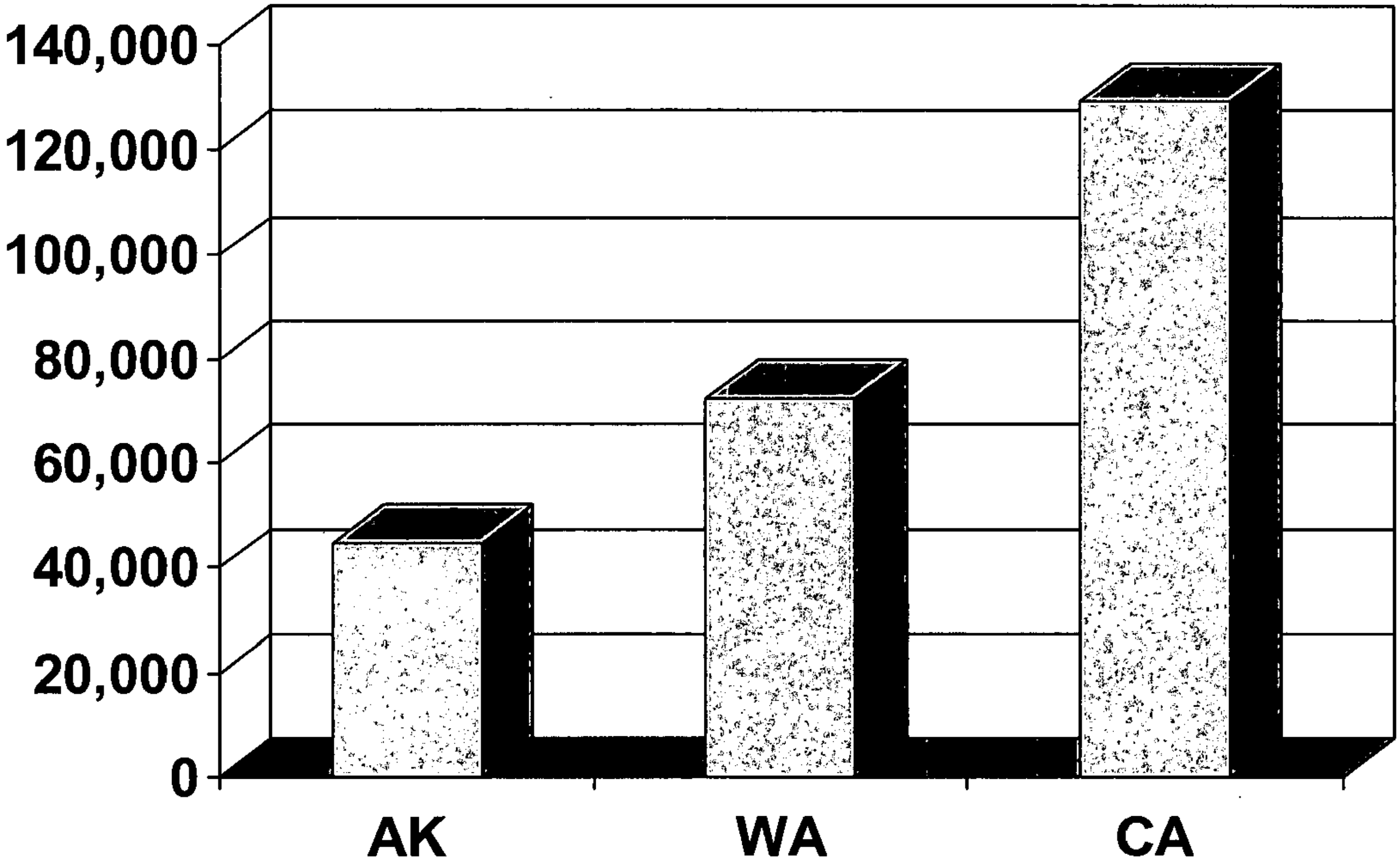
February 12, 2009

1085

Average monthly gallons sold per retail site



Sources: Energy Information Agency, National Petroleum News

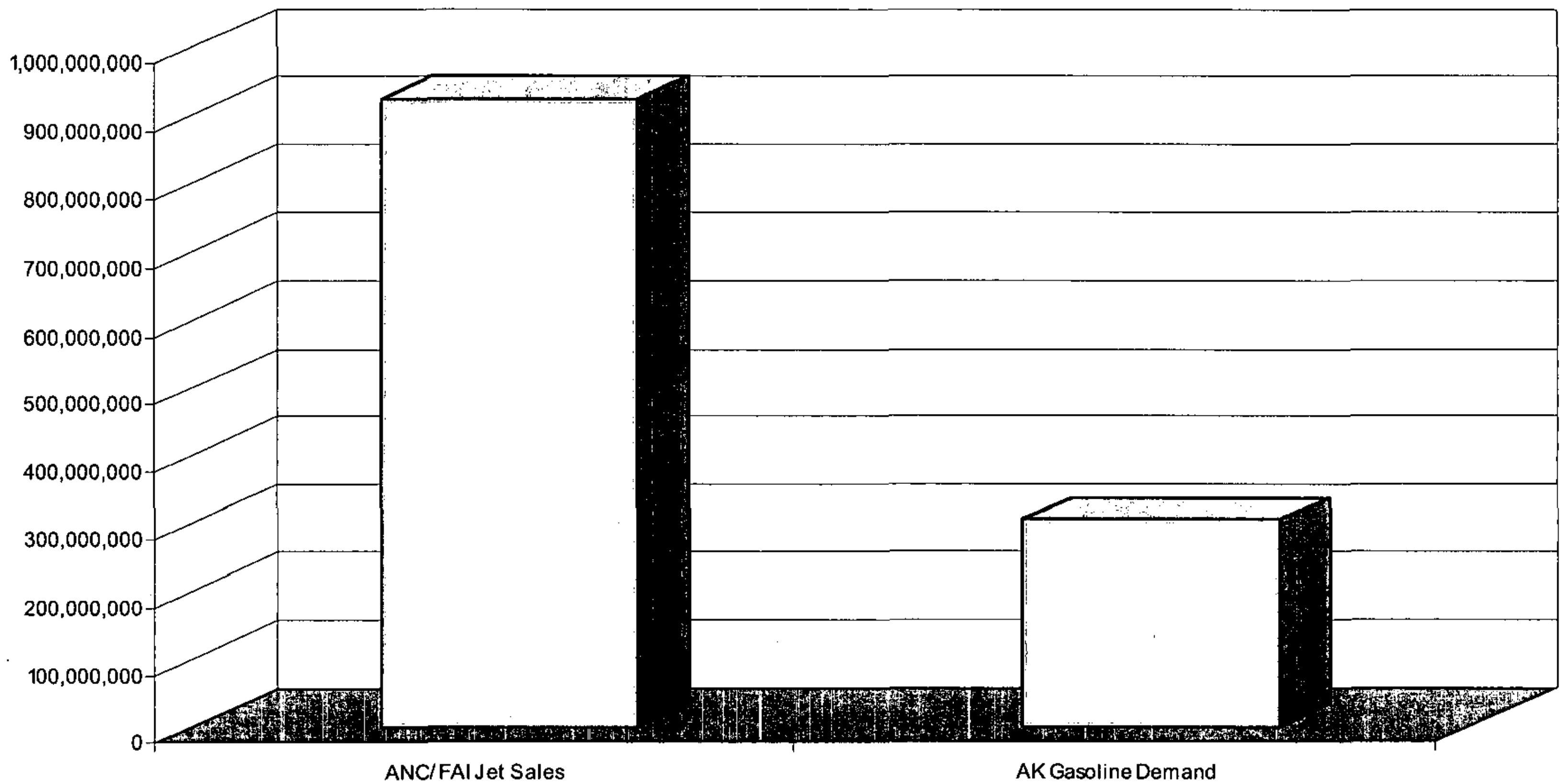
TESORO

February 12, 2009

1086

Jet fuel sold at ANC/FAI vs. total gasoline demand

2007 ANC/FAI Jet Sales vs. Total State Gasoline Demand



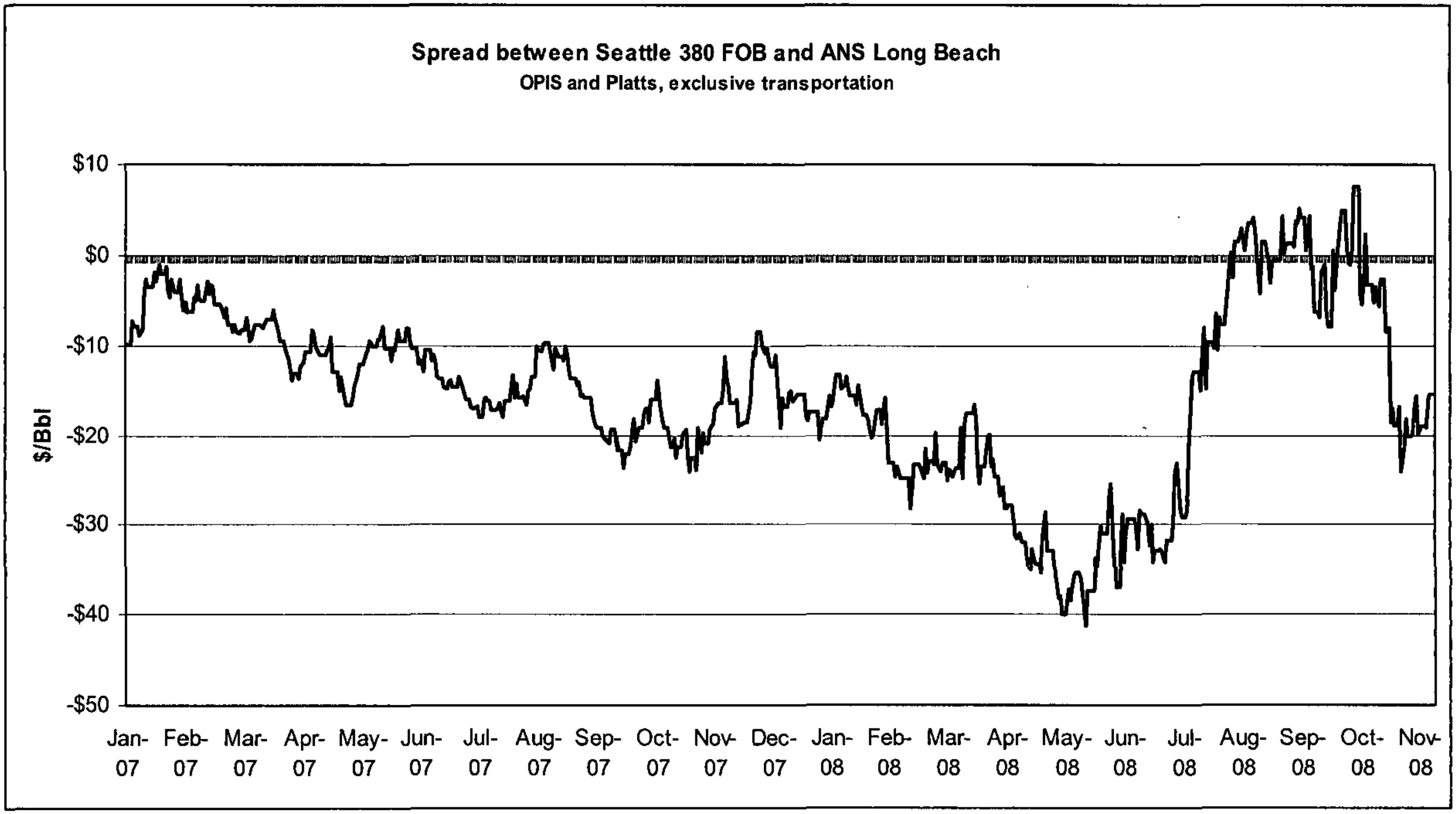
Sources: AK International Airport System and Federal Highway Administration

TESORO

February 12, 2009

1087

The market for Kenai "bottoms"

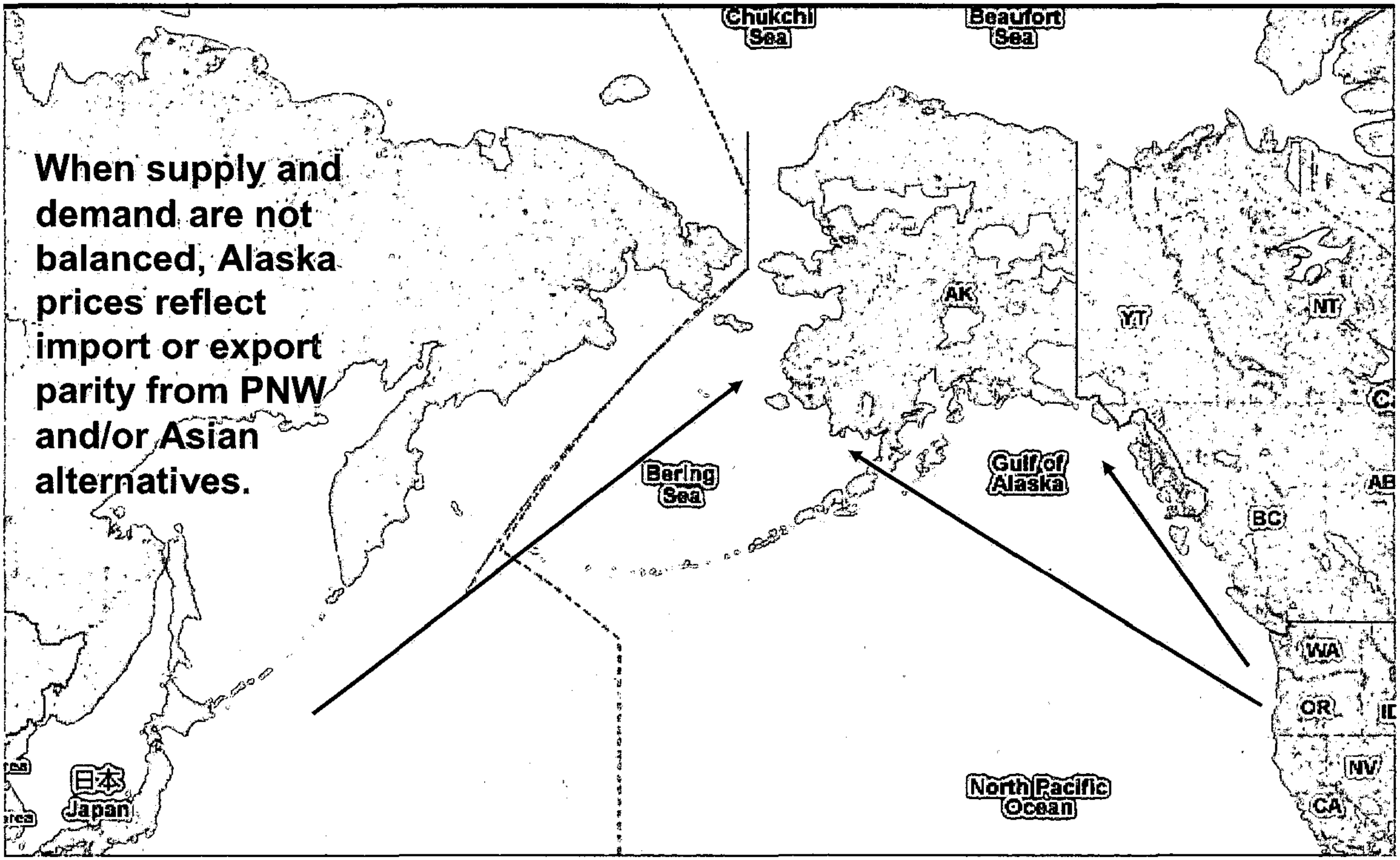


TESORO

1088

Price is determined by last barrel into market

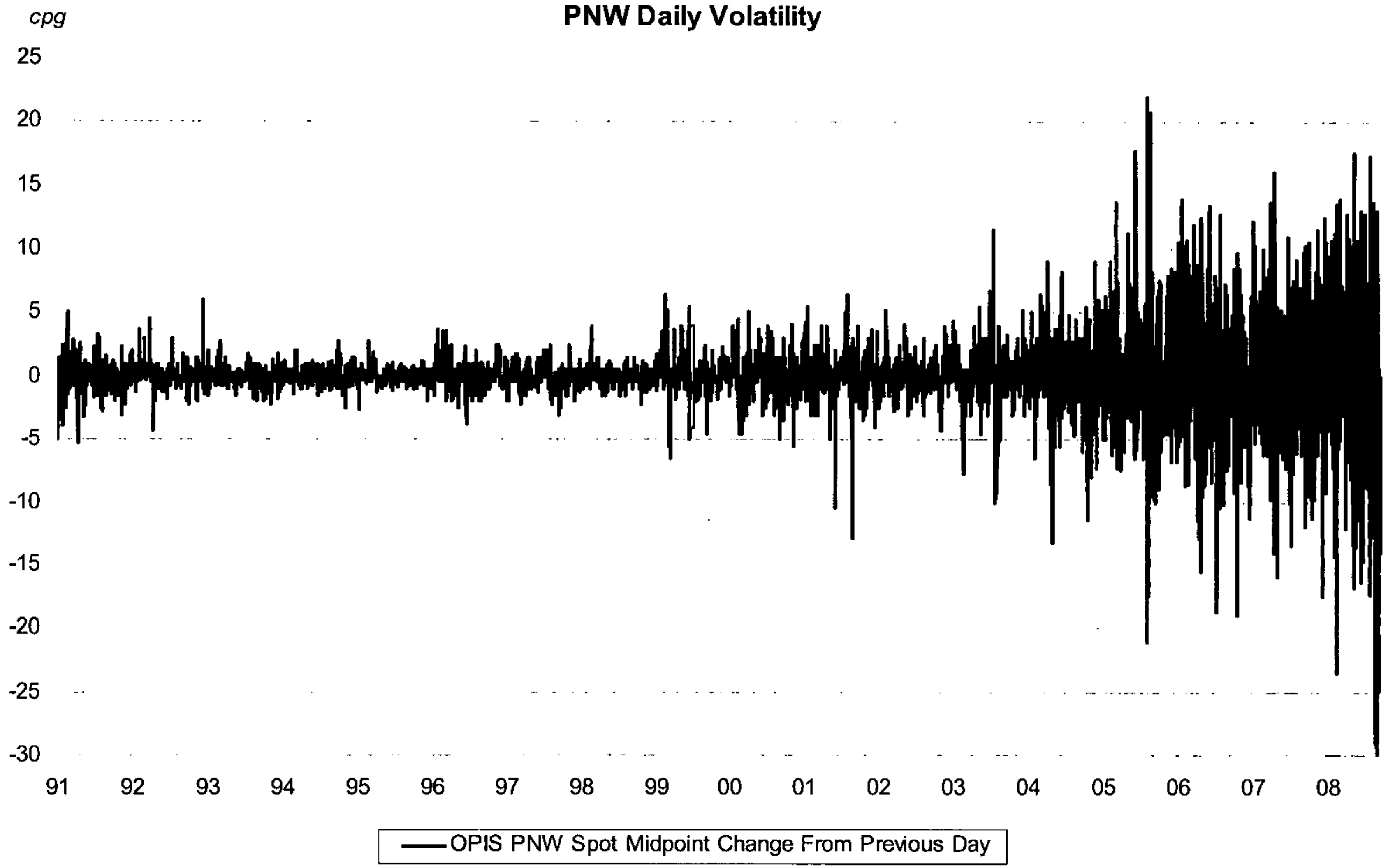
When supply and demand are not balanced, Alaska prices reflect import or export parity from PNW and/or Asian alternatives.



TESORO

1089

West coast market volatility

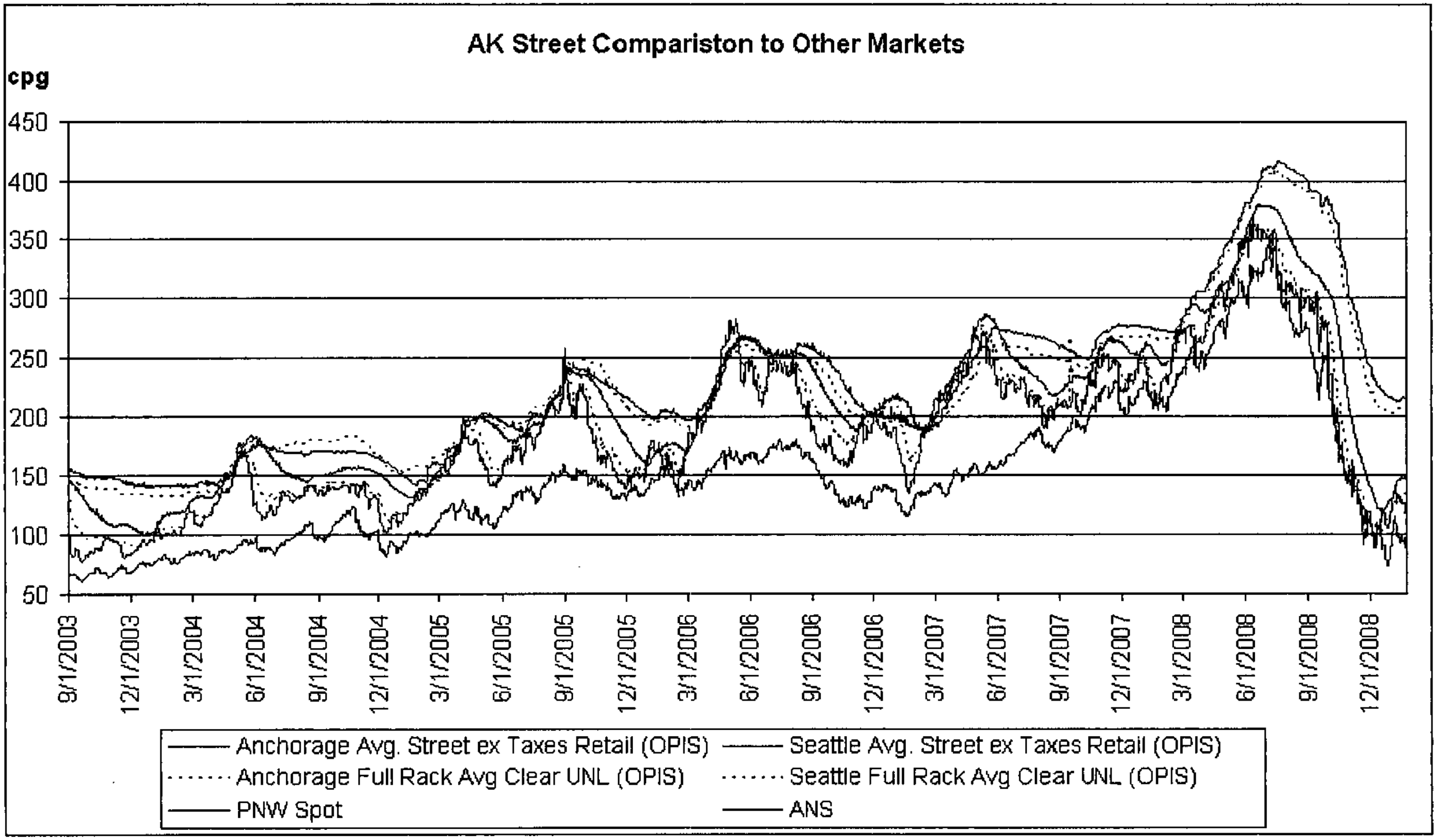


Source: OPIS

TESORO

February 12, 2009

Daily comparison of prices (ex. tax)



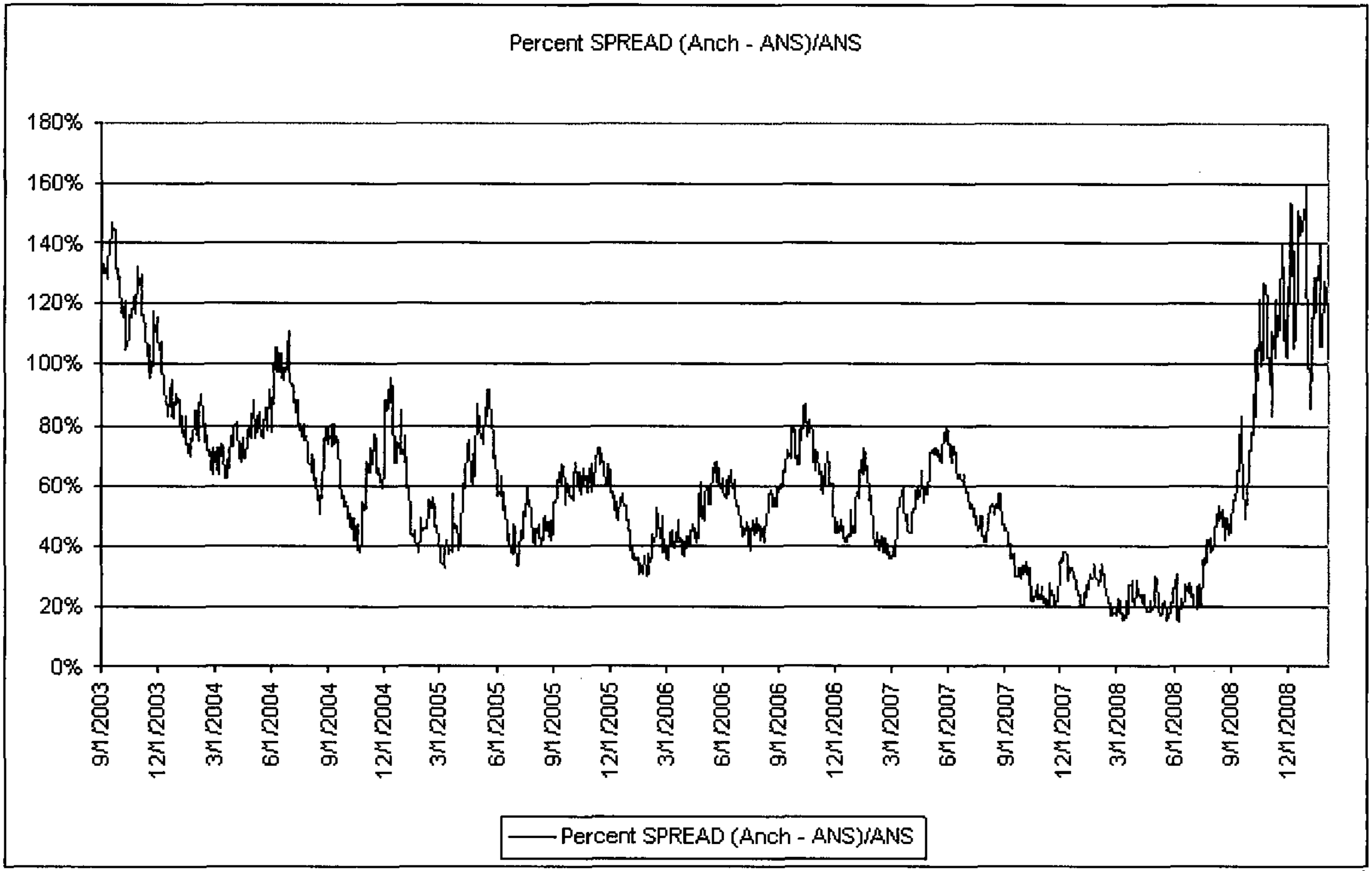
Source: OPIS and Platts

TESORO

February 12, 2009

1091

Daily street percentage spread Anchorage – Platts ANS (ex. tax)



Source: OPIS and Platts

TESORO

Value-add success story

- Over 39 years of adding value to Alaska oil
- Alaskans employed to make products that Alaskans buy
- Economists conclude that refineries result in a jobs multiplier of nine – so today the Kenai Refinery accounts for 1,800 jobs
- The existence of in-state refineries has helped underpin the growth of the international air cargo business
- The air cargo business has helped Alaska refiners to continue making gasoline and diesel
- Even though we are geographically distant from large fuel markets, reliability of supply is excellent

TESORO

1093

Alaska market is competitive and unique

- OR and AZ have no refineries
- AK refiners sell products through multitude of channels and also compete with import barrels
- Seasonality
- Volume
- Some manufactured products have no market in Alaska
- Government price caps will distort these market forces

TESORO

1094

Tesoro opposes price cap legislation

- This is not anti-gouging legislation, it is a price cap
- Regardless of the details, price caps are bad public policy – both for consumers and for refiners
- Price cap legislation will damage Tesoro's ability to do business in Alaska
- Price cap legislation will damage Alaska's value-add manufacturing future

TESORO

SB 31 – Testimony
(in the following order)

1.) Paul Thompson (via off-net)
Ormat

2.) Nick Goodman (via off-net)
TDX Power

3.) Sue Ely (in person)
Alaska Conservation Alliance / Alaska Conservation Voters

4.) Dan Stickel (in person)
Tax Division

There will probably be a couple of people calling in representing various utilities from around the state, but I don't have any confirmed names.

Available to provide the Department of Revenue's perspective and to answer questions will be:

Johanna Bales (via off-net)
Deputy Director, Tax Division

SB 54 – Invited Testimony

Potential Testifiers:

Kip Knutson, Tesoro Alaska
Justin Powell @ fairbanksgas.com (confirmed)
Gabe Aceves at AKPIRG (invited)
Called Lon Garrison – Sitka School Board (invited)
Jim Schwartz – Petersburg School Board (invited)
Mayor Weinstein (invited)
Magaret Hansen – Kotzebue (confirmed)
Merrick Pierce – Fairbanks (confirmed)

SB

54

<target><bill>SB 54</bill><subject>SB
54</subject><comm>SENE26</comm></target>

SENATE COMMITTEE REPORT
First Committee of Referral

DATE: 1/21/09

FURTHER: Resources
Judiciary

Date of 5-Day Notice: ____________
(in accordance with Uniform Rule 23)

DATE TURNED
IN TO OFFICE: ____________

Senate Special Committee on Energy Committee considered SENATE BILL NO. 54

SB 54 PRICE GOUGING INVOLVING ENERGY RESOURCES

"An Act making sales of and offers to sell certain energy resources by a refiner at prices that are exorbitant or excessive an unlawful act or practice under the Alaska Unfair Trade Practices and Consumer Protection Act."

and recommends:

[ ] be **replaced** with [ ] **SCS** or [✓] **CS** SB 54 (ENE)

[ ] adopt **previous** [ ] **SCS** or [ ] **CS** ____________ (______)

[ ] attached amendment(s)

[ ] adopt ____________ Letter of Intent

[ ] further referral to ____________ Committee

SENATE BILL:
[✓] Same Title
[ ] New Title

HOUSE BILL:
[ ] Same Title
[ ] Technical Title Change
[ ] New Title w/ SCR #____

NEW FISCAL NOTE(S):

Department	Date	Fiscal	Indet.	Zero	FN#
LAW	1/31		✓		

PREVIOUS FISCAL NOTE(S):

Department	Date	Fiscal	Indet.	Zero	FN#

[ ] **APPROPRIATION - no fiscal note**

SIGNATURES AND RECOMMENDATIONS:	PRINTED LAST NAME	DO PASS	DO NOT PASS	NO REC	AMEND
Albert Kookesh	Kookesh			x	
[signature]	Wielechowski	✓			
Bert Stedman	Stedman			✓	
CHAIR: [signature]	McGuire			✓	

1097

FISCAL NOTE

STATE OF ALASKA
2009 LEGISLATIVE SESSION

Fiscal Note Number:
Bill Version: **SB054**
() Publish Date:

Identifier (file name):	SB054-LAW-CIV-2-11-09	Dept. Affected:	LAW
Title	An Act related to refiner price gouging for motor fuel, diesel, and heating fuels.	RDU	CIVIL
		Component	COMMERCIAL & FAIR BUSINESS
Sponsor	Senator(s) Wielechowski, Ellis, French, Thomas		
Requester	ENE	Component Number	2717

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required			Information			
OPERATING EXPENDITURES	**FY 2010**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**
Personal Services							
Travel							
Contractual							
Supplies							
Equipment							
Land & Structures							
Grants & Claims							
Miscellaneous							
TOTAL OPERATING	***	***	***	***	***	***	***
CAPITAL EXPENDITURES							
CHANGE IN REVENUES ( )							

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts							
1003 GF Match							
1004 GF							
1005 GF/Program Receipts							
1037 GF/Mental Health							
Other Interagency Receipts							
TOTAL	***	***	***	***	***	***	***

Estimate of any current year (FY2009) cost:

POSITIONS

Full-time							
Part-time							
Temporary							

ANALYSIS: *(Attach a separate page if necessary)*

See attached page...

Prepared by:	Robert Meiners, Deputy Director	Phone	907.465.5427
Division	Administrative Services Division	Date/Time	1/31/09 11:00 AM
Approved by:	Talis Colberg, Attorney General	Date	1/31/2009
	Department of Law		

(Revised 9/10/2008 OMB)

FISCAL NOTE

STATE OF ALASKA **BILL NO.** SB054
2009 LEGISLATIVE SESSION

ANALYSIS CONTINUATION

SB 54 amends AS 45.50 to add a new section that prohibits a refiner from selling an energy resource at a price that is exorbitant or excessive. The bill only applies to motor fuel, diesel, and heating fuel. Violations of this law would become violations of the consumer protection act, and enforceable by the attorney general. The bill requires the attorney general to initiate an investigation upon belief that a refiner has engaged in a violation of the statute. Penalties under the statute are set at 10 times the economic benefit obtained through the refiner's conduct, or $50 million, whichever is greater.

Because it is difficult to predict when a refiner may be engaging in illegal conduct under this bill, the resources necessary to investigate and enforce this bill is unknown. The two recent gasoline pricing investigations undertaken by the attorney general required significant time and resources, including the retention of an expert economist. Petroleum pricing investigations take several months if not years. The most recent investigation spanned five months, and required a contract with an economic expert for $250,000. The prior investigation took three years, and significant resources, including retention of economic experts.

Accordingly, the fiscal impact of this legislation on the department of law is indeterminate, and would depend on the number of investigations required.

ALASKA STATE LEGISLATURE

Interim
716 W. 4th Ave, Ste. 540
Anchorage, AK 99501
(907) 269-0120
Fax: (907) 269-0122

Session
State Capitol, Rm. 115
Juneau, AK 99801
(907) 465-2435
Fax: (907) 465-6615

Senator Bill Wielechowski

SPONSOR STATEMENT
Senate Bill 54

"An Act making sales of and offers to sell certain energy resources by a refiner at prices that are exorbitant or excessive an unlawful act or practice under the Alaska Unfair Trade Practices and Consumer Protection Act."

Alaskans are paying far too much for heating and motor fuel. This bill will help reduce the cost of gasoline, and heating fuel for many Alaska residents, from road system communities where the price of gasoline is excessive, to rural communities where the price of heating fuel is far too high.

There is evidence that Alaska's refiners are marking up the cost they pay for crude oil at a rate that far exceeds the markup charged by West Coast refiners, and that is higher than the historical Alaska mark up. Many other states have price gouging laws, and Alaska should have one too.

Most Alaska motor fuel and heating oil is produced by the Tesoro and Flint Hills refineries, with most motor fuel coming from the former. Evidence to date shows that the high price Alaskans are paying for motor fuel and heating oil is caused in large part by this refiner mark-up. While it is understandable that fuel prices will rise and fall with the price of oil, there is questionable justification for the margins Alaska's main refiners are adding to their cost for Alaska crude oil.

This bill provides protection for Alaskan communities, individuals, and businesses that rely on refined petroleum products for heating and transportation by prohibiting refineries from charging excessive or exorbitant prices for heating oil, diesel, and automobile and aircraft fuel. An objective threshold is established where prices are presumed to be excessive or exorbitant, which refiners can rebut by showing that their prices are a reasonable response to expenses. The bill provides for monetary damages to deter potential violators.

During the recent fuel cost crisis, the rate at which Alaskan prices have been higher than Lower 48 rates has consistently exceeded historical norms, and Alaskan prices have increased while Lower 48 rates decreased. Even suspending Alaska's gasoline tax has not been able to eliminate this disparity.

This bill targets refinery prices, because the investigations conducted by the Legislative Research Division and the House Judiciary Committee have shown that the price disparities have arisen because of the prices that refineries sell products to retailers. This bill does not set or control pricing, and disparate pricing would still be legal if refiners can show their prices to be reasonable. This bill only applies to refiners with annual sales of over one million gallons of applicable fuel, exempting smaller community refiners.

While many other states' prohibitions against excessive fuel prices only apply in the event of natural disasters, terrorist attacks, or declared emergencies, Alaska has a unique Constitutional responsibility to ensure that natural resources are used to the maximum benefit of the Alaskan people. This bill prohibits refineries from charging exorbitant or excessive prices that are detrimental to state and local economies and the welfare of individual Alaskans. Also, this recent crisis has shown that high fuel costs alone can be enough to create an economic emergency.

LEGAL SERVICES

DIVISION OF LEGAL AND RESEARCH SERVICES
LEGISLATIVE AFFAIRS AGENCY
STATE OF ALASKA

(907) 465-3867 or 465-2450
FAX (907) 465-2029
Mail Stop 3101

State Capitol
Juneau, Alaska 99801-1182
Deliveries to: 129 6th St., Rm. 329

MEMORANDUM

January 23, 2009

SUBJECT: Senate Bill 54: sectional analysis
(Work Order No. 26-LS0209\E)

TO: Senator Bill Wielechowski

FROM: Jack Chenoweth
Assistant Revisor

Senate Bill 54 makes a refiner's sales of and offers to sell certain energy resources at prices that are exorbitant or excessive an unlawful act or practice under the Alaska Unfair Trade Practices and Consumer Protection Act (AS 45.50.471 - 45.50.561).

Bill section 1 amends AS 45.50.471(b) to add, as a new paragraph, the material enacted by bill section 2 to the list of "unfair methods of competition" and "unfair or deceptive acts or practice" set out in the Act.

Bill section 2 adds a new section, AS 45.50.483, to make sale of certain energy resources by Alaska refiners at a price that is "exorbitant or excessive" subject to provisions of the Act. More specifically,

- subsection (a) declares that a refiner may not sell or offer to sell an energy resource at an exorbitant or excessive price;

- subsection (b) specifies the types of fuel to which the section applies;

- subsection (c) declares that it is prima facie evidence that a wholesale price is exorbitant or excessive if the price exceeds by more than 10 percent the average wholesale price of the comparable energy resource charged by refiners in the state of Washington; it also provides that the refiner may rebut the presumption by providing evidence that the price charged was due to reasonable costs incurred by the refiner;

- subsection (d) directs the attorney general to initiate an investigation if that officer believes that this section is being violated;

- subsection (e) specifies the maximum amount the attorney general may recover in civil penalties upon the finding of a violation of the section; and

- subsection (f) supplies a definition for the term "refiner."

This memo was prepared in response to a request by George Ascott.

JBC:lmb
09-005.lmb

ALASKA STATE LEGISLATURE

Senator Bill Wielechowski

716 W. 4th Avenue,
Suite 540
Anchorage, AK 99501
(907) 269-0120

Senator.Bill.Wielechowski@legis.state.ak.us

Senator Bettye Davis

716 W. 4th Avenue,
Suite 450
Anchorage, AK 99501
(907) 269-0144

Senator.Bettye.Davis@legis.state.ak.us

August 11, 2008

Attorney General Talis J. Colberg
P.O. Box 110300
Juneau, AK 99811-0300

Dear Attorney General Colberg:

We are writing to request an investigation into gasoline pricing in Alaska. As you know, the price of gasoline in Alaska is the highest in the nation. As of today, the average Alaska price is $4.62/gallon, while the national average is $3.88/gallon. This gap of 75 cents is substantially higher than the 20 cent spread that has historically existed. In fact, the actual price spread is higher than 75 cents, as Alaska's gasoline tax—which was 8 cents/gallon until recently suspended—was the second lowest in the country.

We would like to know what is responsible for this unprecedented discrepancy in pricing. Specifically could collusion at the wholesale or retail level be inflating prices in Alaska? We note that in 1999, after the last investigation into gasoline prices was initiated, the spread between Alaska and Lower 48 prices narrowed dramatically. This has led many people to speculate about whether informal price-fixing may have been at work.

We urge you to initiate this investigation as soon as possible as many Alaskans are struggling with today's exorbitant prices and desperately need relief.

Please do not hesitate to contact us if you have any questions about this request.

Sincerely,

Bettye Davis

Senator Bill Wielechowski

Senator Bettye Davis

STATE OF ALASKA

Sarah Palin, Governor

DEPARTMENT OF LAW

OFFICE OF THE ATTORNEY GENERAL

P.O. BOX 110300
JUNEAU, ALASKA 99811-0300
PHONE: (907)465-2133
FAX: (907)465-2075

August 11, 2008

The Honorable Bill Wielechowski
Alaska State Legislature
716 W. 4th Avenue, Suite 540
Anchorage, AK 99501

The Honorable Bettye Davis
Alaska State Legislature
716 W. 4th Avenue, Suite 450
Anchorage, AK 99501

Re: Alaska Gasoline Pricing

Dear Senators Wielechowski and Davis:

Thank you for your August 11, 2008 letter requesting an investigation into gasoline pricing in Alaska. I am also concerned with the high cost of gasoline and the apparent disparity between prices in Alaska and markets in other parts of the United States. On Saturday, August 9, 2008, at the request of the Governor, I directed the Consumer Protection Unit within the Department of Law to initiate an investigation into Alaska gasoline pricing.

We completed a similar investigation in November, 2002 which lasted over three years. The results of that investigation did not find evidence of any illegal activity. This type of investigation is complicated, and will require significant resources including the retention of experts to assist us in gathering and deciphering documents and information. We do not know when the investigation, which must remain confidential, will be completed.

Thank you again for your inquiry. Please contact my office if you have any questions.

Sincerely,

Talis J. Colberg
Attorney General

Talis Colberg
Attorney General
P.O. Box 110300
Juneau, AK 99011-0300
www.law.state.ak.us

STATE OF ALASKA
DEPARTMENT OF LAW

Monica Jenicek
Special Assistant
907.269.5100
cell: 907.240.2275
monica.jenicek@alaska.gov

Press Release

ATTORNEY GENERAL'S OFFICE

For Immediate Release
November 20, 2008

UPDATE ON DEPARTMENT OF LAW'S GASOLINE PRICING INVESTIGATION

(Anchorage, Ak) - At the direction of Governor Sarah Palin, the Department of Law began an investigation into the pricing of gasoline in Alaska. The investigation was initiated in August, following the decline of gasoline prices across the country as the price of crude oil began to drop from record highs near $150 a barrel in July. Gasoline prices in Alaska, however, did not follow national trends, and soon became the highest in the nation. The Department's investigation is focused on explaining the slow decline of gasoline prices in Alaska, and whether the price of gasoline is the result of any illegal conduct, like price fixing or other collusive behavior.

The Department's investigation is ongoing, and must remain confidential under state law. The Department has gathered significant information from refiners, distributors, and retailers about the pricing of gasoline, and continues to gather additional data and information. The Department has retained Barry Pulliam, a Senior Economist at the Los Angles firm of Econ One, to assist the Department in its investigation. The Department has also attended two House Judiciary Committee hearings convened to discuss gasoline pricing issues.

The following is some useful information about gasoline pricing generally that may help explain some of the pricing for gasoline in Alaska.

1. The State of Alaska (or any state) does not regulate gasoline prices. Refiners, distributors, and retailers can sell gasoline at any price they want so long as those prices are not the result of collusive behavior, like "price fixing." If the price reached an "unconscionable" level, the price could also violate Alaska's consumer protection laws.

2. Because gasoline pricing is not regulated, economic forces including the available supply, consumer demand, and competition in the marketplace are the primary factors that determine gasoline prices.

3. Alaska does not have a price gouging law. Sellers of all goods and services (including gasoline) are not required to sell products on a "cost plus" basis. Thus, it does not matter what it costs the seller to acquire the goods or provide a service. Sellers can sell their products for whatever the market will bear. There is no "cap" on the amount of profit any business can make.

4. It does not matter what gasoline prices were when the price of oil was the same as it is today. For example, if refiners sold gasoline for \$1.10/gallon when oil was \$60 a barrel, this does not require them to sell it for \$1.10 every time oil is \$60 a barrel.

5. The price of gasoline in the lower 48 is not a good indicator of what prices "should be" in Alaska. The competitive forces that operate to control gasoline prices in the lower 48 are completely different from Alaska. The dynamics of supply, demand, and competition are unique in Alaska.

6. The demand for gasoline is not as "price sensitive" in Alaska as it is in other parts of the country. This means that regardless of the price, the demand does not change by much. This creates less incentive for suppliers to lower their price compared to areas of the country where demand drops significantly when prices rise.

7. Gasoline sold in Southeast Alaska is barged up from the Pacific Northwest and from Cook Inlet. Because fuel is only barged in once a month or every few months, it takes longer for prices to reflect current market conditions. It may take two or three months to exhaust current supply before less (or more) expensive gasoline is available and sold to retailers.

8. Some cities and boroughs charge tax on fuel sales. In the Kenai and Soldotna area, for example, the pump price adds a 6% city and borough tax that is not present in other cities, like Anchorage. Coupled with lower volumes and fewer stations, prices will tend to be higher in these communities.

The Department will complete its investigation to determine if there is any illegal activity among gasoline sellers that may be a cause of the high price of gasoline, and will prepare a summary of its findings when the investigation is done.

For further information, contact Department of Law Assistant Attorney General Clyde (Ed) Sniffen at (907) 269-5200.

###

Daily Fuel Gauge Report

AAA's Media Site For Retail Gasoline Prices

Metro Averages:

National Average

State by State Average

What's Moving the Market

National Media Contacts

Local AAA Club Media Contacts

Local AAA Clubs

Methodology

Get The Current Fuel Costs For A Trip

Select A Market

Prices updated: 1/27/2009 3:06:26 AM

Data provided by Oil Price Information Service in cooperation with Wright Express

Media are encouraged to localize fuel price stories by contacting their local AAA club media representative.

Current State Averages: Click on state for detailed information

**Prices Are In US Dollars Per Gallon.*

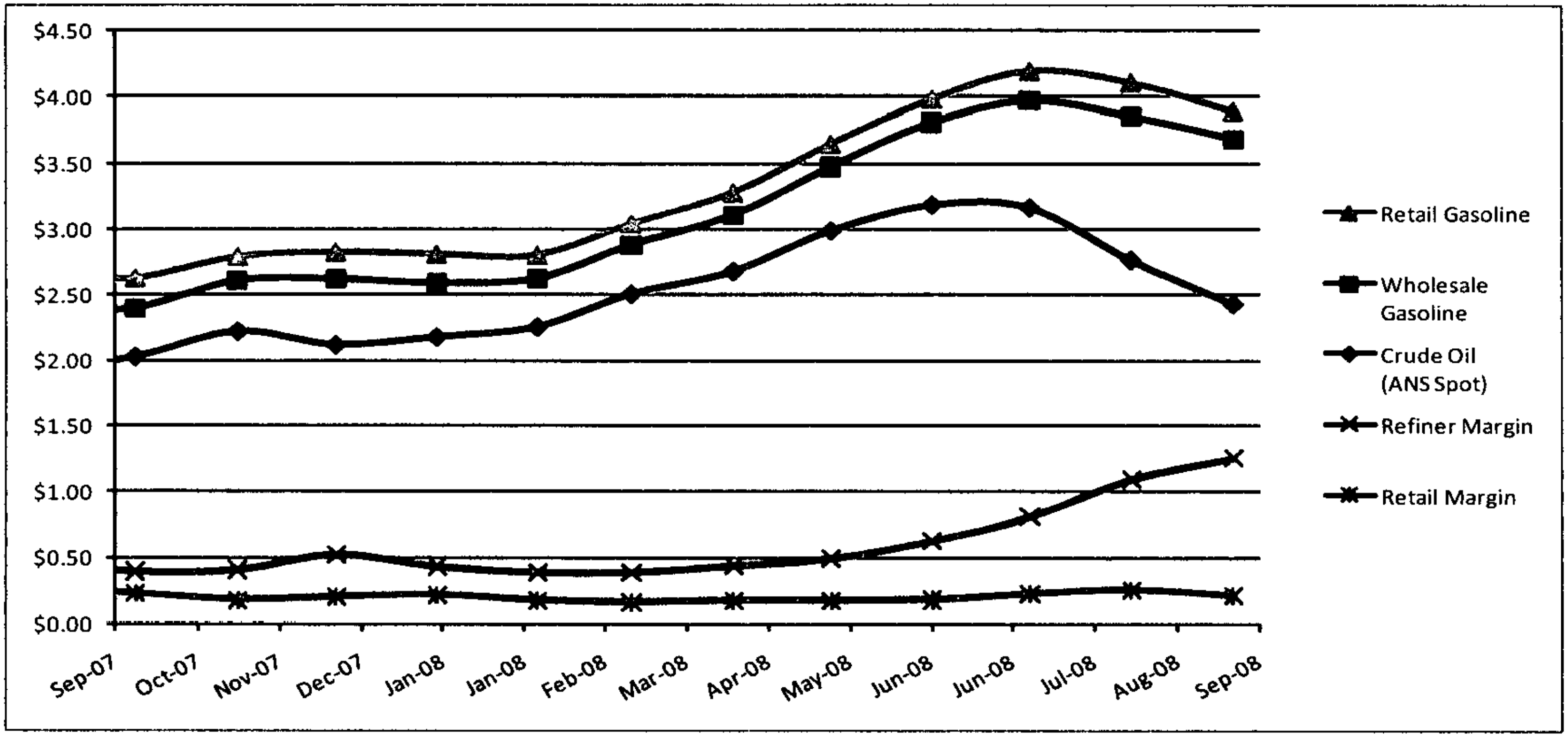
State	Regular	Mid	Premium	Diesel
Alaska	$2.536	$2.683	$2.837	$3.493
Alabama	$1.743	$1.863	$1.919	$2.317
Arkansas	$1.738	$1.834	$1.950	$2.270
Arizona	$1.887	$1.968	$2.081	$2.323
California	$2.101	$2.236	$2.273	$2.485
Colorado	$1.696	$1.814	$1.896	$2.317
Connecticut	$1.905	$2.068	$2.122	$2.779
District of Columbia	$1.895	$2.018	$2.079	$2.774
Delaware	$1.753	$1.862	$1.944	$2.401
Florida	$1.902	$2.060	$2.098	$2.424
Georgia	$1.741	$1.871	$1.954	$2.315
Hawaii	$2.342	$2.477	$2.523	$3.925
Iowa	$1.838	$1.935	$2.027	$2.303
Idaho	$1.689	$1.783	$1.832	$2.417
Illinois	$1.923	$2.069	$2.133	$2.483
Indiana	$1.831	$1.970	$2.025	$2.388
Kansas	$1.776	$1.823	$1.894	$2.259
Kentucky	$1.794	$1.923	$2.010	$2.255
Louisiana	$1.747	$1.862	$1.949	$2.304
Massachusetts	$1.797	$1.932	$2.006	$2.580
Maryland	$1.799	$1.913	$1.962	$2.446
Maine	$1.907	$2.057	$2.114	$2.637
Michigan	$1.894	$2.006	$2.087	$2.391
Minnesota	$1.831	$1.905	$1.954	$2.406
Missouri	$1.696	$1.765	$1.868	$2.121
Mississippi	$1.728	$1.822	$1.904	$2.173
Montana	$1.547	$1.613	$1.691	$2.426
North Carolina	$1.796	$1.906	$1.990	$2.378
North Dakota	$1.855	$1.920	$1.988	$2.697
Nebraska	$1.843	$1.884	$1.937	$2.327
New Hampshire	$1.776	$1.923	$1.992	$2.465
New Jersey	$1.668	$1.788	$1.856	$2.395
New Mexico	$1.862	$1.983	$2.069	$2.353
Nevada	$2.032	$2.142	$2.220	$2.363
New York	$1.966	$2.103	$2.148	$2.830
Ohio	$1.828	$1.949	$2.027	$2.391
Oklahoma	$1.710	$1.768	$1.866	$2.125
Oregon	$1.956	$2.064	$2.095	$2.505
Pennsylvania	$1.863	$1.964	$2.050	$2.578

Rhode Island	$1.855	$1.974	$2.039	$2.612
South Carolina	$1.692	$1.799	$1.887	$2.240
South Dakota	$1.813	$1.929	$2.008	$2.372
Tennessee	$1.713	$1.813	$1.900	$2.279
Texas	$1.720	$1.819	$1.885	$2.258
Utah	$1.649	$1.739	$1.815	$2.329
Virginia	$1.750	$1.836	$1.907	$2.351
Vermont	$1.843	$1.982	$2.069	$2.652
Washington	$2.000	$2.072	$2.175	$2.587
Wisconsin	$1.925	$1.999	$2.091	$2.393
West Virginia	$1.934	$2.022	$2.124	$2.519
Wyoming	$1.503	$1.567	$1.669	$2.304

AAA's Daily Fuel Gauge Report is updated each business day and is the most comprehensive retail gasoline survey available. Everyday over 100,000 self-serve stations are surveyed.

1110

Figure 1: Selected Components of Alaska Gasoline Prices, September 2007 to September 2008



Notes: All dollar amounts are per gallon. We use the word "margin" to mean the proportion of gasoline costs attributable to a certain step in the process of bringing a gallon of gasoline to the retail market. In this context, only a percentage of the total margin is taken as profit.
1) "Retail Gasoline" is the average price of gasoline "at the pump" to end-users and include taxes;
2) "Wholesale Gasoline" is the average price of gasoline charged by Alaska refinters to resellers;
3) "ANS Spot" is the cost of Alaska North Slope crude oil on the commodity market. We calculated this cost by dividing the price per barrel by 42 (the number of gallons in a standard barrel);
4) "Refiner Margin" is refiner wholesale price minus ANS Spot prices;
5) "Retail Margin" is retail price minus wholesale price.
Sources: U.S. Department of Energy, Energy Information Administration, *http://www.eia.doe.gov/.* ; ANS Spot prices are from the Alaska Department of Revenue, Tax Division, *http://www.tax.state.ak.us/.*

STATE OF ALASKA

DEPARTMENT OF LAW

OFFICE OF THE ATTORNEY GENERAL

FRANK H. MURKOWSKI, GOVERNOR

1031 WEST 4TH AVENUE, SUITE 200
ANCHORAGE, ALASKA 99501-1994
PHONE: (907) 269-5255
FAX: (907) 279-8644

December 29, 2004

Ms. Rynnieva Moss
Office of Representative John Coghill
State Capitol, Room 204
Juneau, Alaska 99801-1182

Re: Studies regarding gasoline prices in Alaska by AG's office

Dear Ms. Moss:

You have requested that the Department of Law provide you with copies of any reports done regarding investigation of gasoline pricing in Alaska. I have located two such reports which are enclosed, one prepared by the Alaska Department of Law dated December 21, 2001 and entitled, "Alaska Petroleum Products Pricing Investigation: Update and Status," and the other also prepared by the Alaska Department of Law, dated November 21, 2002 entitled, "Alaska Petroleum Products Pricing Investigation: Closing Report." Please let me know if you have any further questions.

Sincerely,

GREGG D. RENKES
ATTORNEY GENERAL

By:

David W. Márquez
Chief Assistant Attorney General
Legislation and Regulations Section
Legislative Liaison

DWM:cb

cc: Gregg D. Renkes, Attorney General
Scott Nordstrand, Deputy Attorney General
Kevin Jardell, Director, Governor's Legislative Office

ALASKA PETROLEUM PRODUCTS PRICING INVESTIGATION:
UPDATE AND STATUS
Prepared by the Alaska Department of Law
December 21, 2001

Introduction

The Office of the Attorney General for the State of Alaska began an investigation of Alaska petroleum prices in 1999 by issuing Civil Investigative Demands to petroleum refiners and product distributors. The investigation was begun because of public complaints and inquiries to the Attorney General about the high price of gasoline in Alaska in comparison to other states. The purpose of the investigation is to determine whether Alaska petroleum product pricing is the product of illegal price fixing or other anticompetitive behavior in violation of state or federal statutes.

The Attorney General's investigation is ongoing. The Department of Law is reviewing the documents and data provided by the state's gasoline marketers. The Department of Law has not made a determination regarding whether there is sufficient evidence to warrant bringing an antitrust or other enforcement action.

Background

To bring an action under Section One of the Sherman Act (the federal antitrust law) or under AS 45.50 (Alaska's antitrust law), there must be evidence of an illegal agreement. This could be an actual written agreement, testimony, or other evidence of an agreement to fix prices, divide the market, or otherwise restrain competition.

Under existing law, the State of Alaska does not attempt to regulate wholesale or retail gasoline prices. A business is free to set its own price, but it is illegal for a business to collude with competitors to set prices.

The state has reviewed thousands of pages of documents, conducted interviews, and reviewed market data to determine whether there is direct evidence of an illegal agreement.

All material and data provided to the state in response to the civil investigative demands of the Attorney General are confidential by statute. AS 45.50.592(e). The following is a summary of the non-confidential portions of the analysis prepared by the department to date.

Price Differences Between Alaska and the Lower 48

Retail prices of gasoline in Alaska have more closely followed prices in other West Coast states than prices in the rest of the U.S. Given Alaska's relative proximity to the West Coast, this probably is to be expected. Though Alaska's refineries supply much of the petroleum products required in the state, jet fuel, diesel, and gasoline have regularly been shipped from West Coast refineries to Alaska during the past decade. (Alaska's sources of supply for petroleum products are discussed in greater detail below.) In addition, gasoline and other products have been exported from Alaska to the West Coast. Because West Coast refineries are the closest alternative source of refined petroleum products outside Alaska, and because refined products move from Alaska to the West Coast, Alaska prices are influenced by West Coast prices.

Unfortunately, gasoline prices on the U.S. West Coast have, historically, been higher than prices in the rest of the U.S. Over the past seven years, the average retail price for gasoline, excluding taxes[1], on the West Coast has been 11 cents per gallon ("cpg") higher than the average retail price throughout the 50 states.

Concerns expressed by consumers and others about West Coast gasoline prices prompted the Federal Trade Commission ("FTC") to initiate an investigation. The FTC studied West Coast gasoline pricing practices for almost three years, but ultimately concluded that there was nothing unlawful about the manner in which West Coast wholesalers priced gasoline.

The FTC closed its West Coast investigation in May 2001. In doing so, it concluded that the West Coast has several important characteristics that set it apart from much of the rest of the U.S. gasoline market. One of the most important characteristics is the West Coast's relative distance from the Gulf Coast. The Gulf Coast is the largest refining center in the U.S. and an important source of supply of gasoline and other refined products. Refined products move to much of the U.S. from Gulf Coast refineries through a network of pipelines. There are no pipeline connections, however, between the Gulf Coast's refineries and the West Coast. This means that products like gasoline moving from the Gulf Coast's refineries to the West Coast must be shipped through the Panama Canal on marine tankers. This may explain in part why gasoline and other products refined on the West Coast command higher prices.

Unique product requirements, such as those imposed by the California Air Resources Board ("CARB"), also tend to raise the price of gasoline. In addition, there are a limited number of gasoline refiners and wholesalers on the West Coast, and all refiners and wholesalers do not compete in all metropolitan areas.

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[1] Retail gasoline prices at the pump include federal, state, and local taxes. Since Alaska has one of the lowest gasoline taxes in the nation, retail price comparisons understate the differences between prices in Alaska and elsewhere unless taxes are deducted.

Apart from the CARB standards, the West Coast market characteristics identified above are also present in Alaska. Compared to the West Coast, however, Alaska is even more distant from Gulf Coast product markets, has fewer refiners, and has even greater wholesale market concentration. This may explain in part why Alaska prices tend, on average, to be higher than those in other western states.

Yet these market characteristics, by themselves, do not explain why the price difference between Alaska and the West Coast grew sharply between 1995 and 1998. During this period, Anchorage-area prices were on average 17 cpg above retail prices in the Seattle area, a level nearly double the 9 cpg difference seen in the prior four years. This is curious given that Alaska refiners produced more gasoline during this period than was consumed here, and exported the surplus to the West Coast and Far East at prices lower than those offered in Alaska. Beginning in 1999, however—after the Attorney General initiated this investigation—the spread narrowed dramatically. Between January 1999 and December 2000, Anchorage-area retail prices averaged just 3 cpg above Seattle-area retail prices.

Supply and Demand of Petroleum Products

In addition to gasoline, the other major petroleum products sold in Alaska are jet fuel and diesel (No. 2 heating oil and No. 2 diesel fuel). These products and gasoline constitute more than 95% of the total volume of petroleum products sold in the state.

The Tesoro and Williams refineries produce gasoline, jet fuel, and diesel. The PetroStar refinery produces jet fuel and diesel, but no gasoline.

The Williams refinery, near Fairbanks, and the PetroStar refineries, near Fairbanks and in Valdez, all take Alaska North Slope crude ("ANS") directly from the TAPS line. Both companies reinject the unrefined portion of ANS back into the TAPS line.

Alaska's current demand for refined petroleum products is approximately 100 thousand barrels per day (MBD), or 1.5 billion gallons per year. Jet fuel consumption is just over 60 MBD, accounting for a little more than 60% of total demand for refined product in the state. Consumption of diesel and gasoline in Alaska runs approximately 16 MBD, or 245 million gallons per year, for each product.

More gasoline is produced in Alaska than is consumed. The excess is exported to the West Coast and foreign destinations. Nevertheless, gasoline, diesel, and jet fuel are barged into southeastern Alaska from Seattle-area refineries.

Historically, Alaska's refineries have not produced enough jet and diesel fuel to supply the state. These products are imported from the Far East or the West Coast.

Tesoro's refinery supplies the majority of gasoline consumed in Alaska, but Williams supplies most of the gasoline sold in Fairbanks and interior Alaska. Williams also ships gasoline and jet fuel by rail to Anchorage.

The Anchorage metropolitan area accounts for about 60% of the state's retail gasoline sales while Fairbanks, Juneau, the Kenai Peninsula, and Western Alaska account for roughly 10% of retail sales each. There are approximately 300 service stations in Alaska. About one-third of Alaska's 300 retail gasoline stations are located in the Anchorage area. The average retail station in Anchorage is larger and sells much higher volumes than stations in the rest of the state.

Alaska's Gasoline Industry Is Highly Concentrated

Williams, Tesoro, Chevron, and Texaco[2] account for the vast majority of gasoline marketed in Alaska. The state's two gasoline refiners, Williams and Tesoro, were also its largest gasoline marketers, accounting for nearly 65% of Anchorage-area sales between them in 1999. Chevron and Texaco accounted for approximately 32% of Anchorage volumes. These same four marketers have accounted for nearly all of Alaska's gasoline sales over the past decade.

For purposes of analyzing competition within a market, the U.S. Justice Department and the Federal Trade Commission categorize markets into the following three groups: Unconcentrated, Moderately Concentrated, Highly Concentrated. Alaska's gasoline industry is Highly Concentrated at both the refining and wholesale distribution levels. Wholesale gasoline markets in Alaska are more concentrated than in most other wholesale gasoline markets in the U.S. and on the West Coast. Analysis of the available market share data shows that with the exception of the southeast part of the state, concentration levels are much higher in regions outside of Anchorage.

Competition, Oligopoly, and Illegal Behavior

Unconcentrated markets are characterized by a large number of sellers offering the same or similar products to consumers who can shop for the best value. Unconcentrated markets are generally assumed to be competitive. The more sellers, the more likely competition will thrive. In a competitive situation, no single seller has market power; the

[2] Since the late 1990's, in the West and Midwest, Texaco brand gasoline has been marketed by Equilon, a joint venture between Texaco and Shell. As a condition to approving the recent merger of Chevron and Texaco, Alaska, other states, and the Federal Trade Commission required Texaco to divest its interest in Equilon to Shell or another buyer. Therefore, the Chevron-Texaco merger should not reduce competition in the Alaska gasoline market.

power to influence prices in the market on its own. Also where there are many sellers, it is difficult for sellers to coordinate their behavior or agree to volume or price restrictions without being detected.

In a competitive market, sellers are motivated to lower their prices in order to increase their sales, while buyers are motivated to seek out the best deal. Prices will tend to drop over time until they are close to sellers' costs. If prices begin to rise above costs, sellers will try to take advantage of the opportunity to increase profits by making more of the product available in the market. This increase in supply will in turn drive prices down to the point where they again are close to the sellers' costs. If prices fall to a level that does not cover sellers' costs, some sellers will go out of business. Those that are left will offer less of the product until prices start to increase again.

On the other end of the spectrum are highly concentrated markets, where there are relatively few sellers of a particular product. Economists call such a market an "oligopoly." Oligopolies do not always lead to higher prices, however. Prices in an oligopoly can be competitive even when there are very few sellers if, for example, potential new sellers are ready, willing, and able to enter the market in the event of even a small increase in price. In this situation, the threat of additional competition may tend to keep prices low. However, if there are relatively high costs associated with entering a market (entry barriers), existing sellers may be able to increase prices without much concern about attracting new competition.

When there are few sellers in a market, it is, presumably, easier for each to observe how its competitors react to decisions regarding output and prices, and each may take into account the potential impact of its own actions on market prices and the potential responses from other sellers. This type of competitive behavior, which is dependent in part on the expected actions or reactions of other sellers, is often referred to as "oligopolistic pricing" or "oligopolistic interdependence." In this environment, it is easy for sellers to develop a "live and let live" attitude toward their rivals that would not be possible to maintain in a competitive market. As a result, oligopolistic behavior can result in prices that are above competitive levels over extended periods of time.[3]

This type of interdependent behavior on the part of sellers is not generally regarded as a violation of antitrust laws so long as each business develops and implements its pricing and output decisions independently. That is, in determining what volumes to produce or what prices to offer, businesses can incorporate their expectations about a rival's likely reactions as long as those expectations are developed independently and without the aid of other sellers. If the sellers communicate about price setting or enter into

[3] Not all economists agree with this theory, and some would require empirical evidence supporting the theory before considering it valid for a particular market. In any event, whether higher-than-competitive prices in a market can be explained by oligopolistic interdependence is highly dependent on the facts.

an agreement that affects prices, it is considered collusion and a violation of the antitrust laws.

Economists believe collusion is more likely when certain conditions are present in a market, especially in markets for a relatively homogenous product like gasoline. These conditions include (1) the presence of only a few sellers (oligopoly), (2) inelastic demand, (3) relatively static or declining demand over time, (4) easy detection of sales by competitors, (5) price visibility, (6) difficulty of entry by potential new competitors, (7) frequent contact between sellers, and (8) few "fringe" or smaller sellers. All of these conditions are present in Alaska. But their presence, together with gas prices higher than one would expect in a competitive market, do not in themselves constitute a legal basis for an antitrust enforcement action. There must also be evidence of an illegal agreement or evidence that would allow the inference of such an agreement.

Additional Information on the Investigation

The companies have recently finished producing documents to the state. The state is in the process of reviewing and analyzing those documents to determine whether any laws or regulations have been violated.

Under Alaska's antitrust law, many aspects of this case are to be kept confidential. In particular, documents and their contents provided to the state in response to the Civil Investigative Demands (CIDs) issued by the Office of the Attorney General are to be kept confidential in the absence of a court order authorizing their disclosure to the public. AS 45.50.592(e). Such an order might be requested by the state if the investigation leads to an enforcement action. If the state finds no evidence of a violation of the antitrust laws, CID information may not be disclosed to the public in the absence of express authorization by the firm that provided the documents. AS 45.50.592(e). Because of the lawsuits filed against the state by some of the companies being investigated, court pleadings have been filed in the public record that contain some information about the investigation that would normally not be available to the public.

The state's initial CIDs were served upon several dealers of wholesale petroleum products in June, July, and August of 1999. Shortly thereafter, Tesoro, Chevron, and Texaco filed suit in Alaska Superior Court in Anchorage protesting the scope of the CID questions and the state's intended use of the produced documents. Those cases were consolidated under case number 3AN-99-8544CI. In an order issued October 7, 1999, the Superior Court upheld the propriety of the CIDs, with minor modification to a small number of questions, and the right of the state to share the documents with contract counsel without permission of the producing companies.

On October 13, 1999, Tesoro filed an appeal of the Superior Court's decision in the Alaska Supreme Court (Case No. S9379). Tesoro appealed both the scope of the CIDs and the state's right to share documents with contract counsel. The Alaska Supreme Court heard oral argument on November 15, 2000, but has yet to issue a decision.

The initial petition filed by Tesoro in the Superior Court explains Tesoro's contentions with respect to the scope of the CID. The CID, attached to the petition as an exhibit, lists the issues being examined by the Department of Law. Likewise, the state's opposition to Tesoro's petition outlines the issues that are the focus of the CID. The state's brief in the Alaska Supreme Court analyzes the issues being pursued and gives a brief history of the case proceedings. These documents are available at the state court clerk's office in Anchorage.

Other Resources

Interested persons may obtain gasoline pricing information from a number of sources on the Internet. The Energy Information Agency of the Federal Department of Energy tracks petroleum-related information nationwide. It compiles retail and wholesale gasoline pricing data and maintains reference documents about petroleum economics and various aspects of the energy markets:
http://www.eia.doe.gov/

There is information on average wholesale prices at:
http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_marketing_monthly/current/pdf/pmmtab35.pdf

The following article discusses the reasons that West Coast prices tend to be higher than those in the rest of the country:
http://www.eia.doe.gov/pub/oil_gas/petroleum/presentations/2001/senate_testimony_ca/index.htm

The following article explains the many factors influencing the costs of refining:
http://www.eia.doe.gov/emeu/finance/usi&to/downstream/index.html

In August 2001, the Federal Trade Commission conducted a hearing regarding factors influencing the price of refined petroleum products. Testimony and information regarding that hearing can be found at:
http://www.ftc.gov/bc/gasconf/

The American Automobile Association publishes daily average gasoline prices at:
http://www.fuelgaugereport.com/

Disclaimer: This page contains hyper links to World Wide Web sites that are created and maintained by other organizations. We have included these links because we think that visitors to our site may find them of interest. We do not guarantee the accuracy or completeness of any information presented on these sites. The Office of the Attorney General does not necessarily endorse the views expressed on these web sites.

ALASKA PETROLEUM PRODUCTS PRICING INVESTIGATION:

CLOSING REPORT

Prepared by the Alaska Department of Law

November 21, 2002

Introduction

At my direction, the Alaska Department of Law conducted an extensive three-year investigation into the pricing of petroleum products in Alaska. The investigation was initiated in 1999 in response to public complaints about the high price of gasoline in Alaska in comparison to other states. I am closing the investigation because there is insufficient evidence indicating a violation of the antitrust laws.

Conditions Prompting the Investigation

Historically, the price of gasoline on the West Coast of the United States averaged 11 cents per gallon (cpg) higher than the average retail price throughout the 50 states, excluding taxes,[1] and the price of gasoline in Alaska has tended to be higher than the price of gasoline on the West Coast by about 9 cpg. Between 1995 and 1998, however, gasoline prices in Alaska were as much as 17 cpg higher than West Coast prices. This was the impetus for the investigation. Immediately after I initiated the investigation, beginning in 1999, the spread between prices in Alaska and the West Coast narrowed dramatically, more closely tracking the historical spread between Alaska and the other states.

Legal Standards

In order to establish a violation of Alaska's antitrust statute, AS 45.50.562 and AS 45.50.564 (or the comparable federal law), there must be evidence that two or more companies entered into an express or "tacit" agreement to fix petroleum prices. A showing that companies charged prices in excess of the competitive level, or raised and lowered prices in a parallel fashion, is not enough to establish the existence of a tacit agreement. Instead, evidence of uniform pricing must be accompanied by additional evidence demonstrating that two or more parties had a "meeting of the minds" to engage in cooperative pricing behavior, such as: (1) actions contrary to an entity's independent economic interests; (2) departure from normal business practices; (3) motive to conspire; (4) opportunity to conspire; (5) high level of inter-company communications; and (6) past antitrust violations involving collective action.[2]

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[1] Retail gasoline prices at the pump include federal, state, and local taxes. Since Alaska has one of the lowest gasoline taxes in the nation, retail price comparisons understate the differences between prices in Alaska and elsewhere unless taxes are deducted.

[2] *See, In re Baby Food Litigation*, 166 F.2d 112, 122 (3d Cir. 1999) (proof of plus factors is a "prerequisite to finding that parallel action amounts to a conspiracy").

The Investigation

The investigation began in the summer of 1999 when my staff issued Civil Investigative Demands (CIDs) to refiners and distributors of petroleum products in the state. Hundreds of boxes of documents were produced in response to the demands. The investigation involved the review of thousands of pages of internal company documents, detailed analysis of pricing data, interviews of witnesses and potential witnesses, and formal depositions of several current and former oil company employees and executives.

Findings

My staff provided a summary of the investigation in a report entitled "Alaska Petroleum Price Fixing Investigation: Update and Status," December 21, 2001, http://www.law.state.ak.us/civil/oil-gas-mining/AKPPPI-1a_final.pdf. That report describes the economic conditions and market forces present in Alaska that affect the pricing of petroleum products. All of the information and data provided to me in response to the CIDs is, by statute, confidential. AS 45.50.592(e).

The investigation found that Alaska's gasoline industry is highly concentrated, in that four marketers accounted for the vast majority of gasoline sales during the relevant time period. When there are few sellers in a market, like Alaska, it is easier for them to observe how competitors react to decisions regarding output and prices, and each may take into account the potential impact of its own actions on market prices and the potential responses from other sellers. This type of interdependent behavior on the part of sellers often leads to parallel pricing, but that is not, in the absence of an express or implied agreement to set prices, a violation of the antitrust laws so long as each business develops and implements its pricing and output decisions independently. The investigation has not produced evidence of an express or implied agreement to set prices or to otherwise violate antitrust laws.

For the reasons set forth above, I am closing this investigation without further action. However, I expect the Department of Law to continue to monitor gasoline prices in Alaska.

Justin Powell
1075 Trianon Dr.
Fairbanks, Alaska

Testimony to Energy Committee on SB54
February 12, 2009

I imagine that all members of this committee have read the House Judiciary Committee's report on gas prices. In my testimony today I want to point our several omissions from the report that dramatically effect the conclusion the committee chair has reached.

The burden that high gas prices have on Alaska residents is real and our prices over the last year are unjustified. Gasoline, diesel and heating oil are not a luxury items that households can simple go without. In the winter, heating oil is literally a life and death matter. High energy prices have a ripple effect through the economy as every resident pays for our higher fuel costs several times over.

We have been paying over a dollar a gallon at the gas pump and this has been a highly visible and contentious issue. What is less obvious is that we then pay again in increase freight costs for food, clothing and retail products. We pay more to heat our homes and then in turn have to pay more for goods and services as businesses are forced to pass on their additional energy costs.

Lacking from the judicial committee report was quantitative information. Based upon the latest published information, the annual gasoline consumption in Alaska is 285 million gallons[1]. At a conservative estimate of $.80 cents over Seattle prices Alaska consumers are paying an additional $230 million dollars a year for gasoline alone. This is money that leaves our state and provides us no direct or indirect benefit.

The house judiciary committee report concluded that our gas prices are basically subsidizing jet fuel to keep Alaska's airline industry profitable. Unfortunately these findings were based on intuition rather than fact. As I just stated, Alaska's gas market is 285 million gallons annually. The jet market on the other hand is over four times this volume at 1.3 billion gallons annually[2]. If the extra $230 million dollars that Alaskans are paying was added to the cost of jet fuel it would raise the price by only 4.6 cents a gallon or 2%.

It is hard to reach the conclusion that 4.6 cents would bring an end to the Alaska airline industry. The report stated that refiners in Alaska do not base their gas prices on their cost but rather base the price on market conditions. The same holds true for the airline industry. Airline fares often cost double or more for endpoint within Alaska compared to fares in the lower 48. This is not a function of increased costs, but rather lack of competition. Even if fares did increase to cover the added 4 cents, at least then the cost would be born by the users of the service and not by all Alaskans.

[1] U.S. Energy Information Administration 2006 report, Consumption of 6,789 thousand barrels of gasoline.
[2] U.S, Energy Information Administration 2006 report, Consumption of 31,747 thousand barrels of jet fuel.

The report also said that Ft. Greely, Eielson and Ft. Wainwright would be impacted and potential shut down by any potential legislation. It is far flung to conclude that the military would sacrifice our national defense for 4.6 cents per gallon. Additionally, the prime supplier for all military installations in Alaska is the Petrostar refinery who would be exempt under section (f) of this bill.

In conclusion I feel that lower gas prices would have a positive effect on our economy and that the benefits far outweigh the potential impacts to the airline industry. Industries such as fishing, tourism, recreation and ground transportation are no less important than air transportation. The $230 million dollars extra we are currently paying at the pump would be spent within the state, benefiting Alaska's economy, rather than large airline corporations..

FISCAL NOTE

STATE OF ALASKA
2009 LEGISLATIVE SESSION

Fiscal Note Number:
Bill Version: **SB054**
() Publish Date:

Identifier (file name): SB054-LAW-CIV-2-11-09
Dept. Affected: LAW
Title: An Act related to refiner price gouging for motor fuel, diesel, and heating fuels.
RDU: CIVIL
Component: COMMERCIAL & FAIR BUSINESS
Sponsor: Senator(s) Wielechowski, Ellis, French, Thomas
Requester: ENE
Component Number: 2717

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required	Information					
OPERATING EXPENDITURES	**FY 2010**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**
Personal Services							
Travel							
Contractual							
Supplies							
Equipment							
Land & Structures							
Grants & Claims							
Miscellaneous							
TOTAL OPERATING	***	***	***	***	***	***	***
CAPITAL EXPENDITURES							
CHANGE IN REVENUES ( )							

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts							
1003 GF Match							
1004 GF							
1005 GF/Program Receipts							
1037 GF/Mental Health							
Other Interagency Receipts							
TOTAL	***	***	***	***	***	***	***

Estimate of any current year (FY2009) cost:

POSITIONS

Full-time							
Part-time							
Temporary							

ANALYSIS: *(Attach a separate page if necessary)*

See attached page...

Prepared by: Robert Meiners, Deputy Director
Phone 907.465.5427
Division: Administrative Services Division
Date/Time 1/31/09 11:00 AM
Approved by: Talis Colberg, Attorney General
Department of Law
Date 1/31/2009

(Revised 9/10/2008 OMB)

FISCAL NOTE

STATE OF ALASKA
2009 LEGISLATIVE SESSION

BILL NO. SB054

ANALYSIS CONTINUATION

SB 54 amends AS 45.50 to add a new section that prohibits a refiner from selling an energy resource at a price that is exorbitant or excessive. The bill only applies to motor fuel, diesel, and heating fuel. Violations of this law would become violations of the consumer protection act, and enforceable by the attorney general. The bill requires the attorney general to initiate an investigation upon belief that a refiner has engaged in a violation of the statute. Penalties under the statute are set at 10 times the economic benefit obtained through the refiner's conduct, or $50 million, whichever is greater.

Because it is difficult to predict when a refiner may be engaging in illegal conduct under this bill, the resources necessary to investigate and enforce this bill is unknown. The two recent gasoline pricing investigations undertaken by the attorney general required significant time and resources, including the retention of an expert economist. Petroleum pricing investigations take several months if not years. The most recent investigation spanned five months, and required a contract with an economic expert for $250,000. The prior investigation took three years, and significant resources, including retention of economic experts.

Accordingly, the fiscal impact of this legislation on the department of law is indeterminate, and would depend on the number of investigations required.

SB

71

<target><bill>SB 71</bill><subject>SB 71</subject><comm>SENE26</comm></target>

SENATE COMMITTEE REPORT
First Committee of Referral

DATE: 1/21/09

FURTHER: Resources
Finance

Date of 5-Day Notice: ________________
(in accordance with Uniform Rule 23)

DATE TURNED
IN TO OFFICE: ____________

Senate Special Committee on Energy considered SENATE BILL NO. 71

SB 71 ALTERNATIVE ENERGY FOR PUBLIC WORKS

"An Act relating to alternative energy systems for public works."

and recommends:

[ ] be **replaced** with [ ] **SCS** or [ ] **CS** ________________ (________)

[ ] adopt **previous** [ ] **SCS** or [ ] **CS** ________________ (________)

[ ] attached amendment(s)

[ ] adopt ________________ Letter of Intent

[ ] further referral to ____________ Committee

SENATE BILL:
[ ] Same Title
[ ] New Title

HOUSE BILL:
[ ] Same Title
[ ] Technical Title Change
[ ] New Title w/ SCR # _____

NEW FISCAL NOTE(S):

Department	Date	Fiscal	Indet.	Zero	FN#
DOT & PF	3/6			✓	

PREVIOUS FISCAL NOTE(S):

Department	Date	Fiscal	Indet.	Zero	FN#

[ ] **APPROPRIATION - no fiscal note**

SIGNATURES AND RECOMMENDATIONS:	PRINTED LAST NAME	DO PASS	DO NOT PASS	NO REC	AMEND
Albert Kookesh	Kookesh	X			
[signature]	Wielechowski				✓
CHAIR: [signature]	McGuire	✓			

1127

Alaska State Legislature

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GENE THERRIAULT
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While in session
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(907) 465-4797
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SENATE DISTRICT F

Senate Bill 71

Sponsor Statement

With the recent spikes in energy costs, Alaskans have turned their time and efforts to identify and develop alternative energy sources. Through the passage of HB 152 in 2008, the state established a funding source to support these efforts. Now we must prepare to use the alternative energy as it becomes available both to save money and to help make these energy sources viable on a broader scale to the public.

Senate Bill 71 proposes to expand state support for the development of alternative energy by constructing public facilities in such a way that they can easily use those energy sources without costly renovations or retrofitting. By preparing in advance to use alternative energy sources, the state may very well determine the economic viability of developing projects that will in turn support local jobs and infrastructure in the surrounding geographic area.

Senate Bill 71 does not require the state to purchase alternative energy at an increased cost to the public, nor does it require the state to add design changes where they do not make sense. Senate Bill 71 does bring recognition that state facilities are large consumers of energy and when alternative energy sources are applicable the state as a sizable consumer can open the door and lower costs for all other local energy consumers.

Email: Senator_Gene_Therriault@legis.state.ak.us

FISCAL NOTE

STATE OF ALASKA
2009 LEGISLATIVE SESSION

Fiscal Note Number:	
Bill Version:	**SB 71**
() Publish Date:	

Identifier (file name): SB71-DOT-SPF-3-06-09		Dept. Affected:	DOT&PF
Title	Alternaitve Energy for Public Works	RDU	Design, Engineer & Constructon
		Component	Statewide Public Facilities
Sponsor	Sen. Therriault		
Requester	S ENE	Component Number	2882

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required	Information					
OPERATING EXPENDITURES	**FY 2010**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**
Personal Services							
Travel							
Contractual							
Supplies							
Equipment							
Land & Structures							
Grants & Claims							
Miscellaneous							
TOTAL OPERATING	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
CAPITAL EXPENDITURES							
CHANGE IN REVENUES ( )							

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts							
1003 GF Match							
1004 GF							
1005 GF/Program Receipts							
1037 GF/Mental Health							
Other Interagency Receipts							
TOTAL	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Estimate of any current year (FY2009) cost:

POSITIONS

Full-time							
Part-time							
Temporary							

ANALYSIS: *(Attach a separate page if necessary)*

The Department designs and constructs the best buildings possible given the amount appropriated. Energy efficiency is a component of that. This bill will have no fiscal impact on the Department's operating budget.

Prepared by:	Mary Siroky, Legislative Liaison	Phone	465-4772
Division	Department of Transportation and Public Facilities	Date/Time	3/6/09 5:15 AM
Approved by:	Nancy Slagle, Admin Director	Date	3/6/2009
	Department of Transportation and Public Facilities		

(Revised 9/10/2008 OMB)

SB 132

<target><bill>SB 132</bill><subject>SB 132</subject><comm>SENE26</comm></target>

SENATE COMMITTEE REPORT
First Committee of Referral

DATE: 2/27/09

FURTHER: Resources
Finance

Date of 5-Day Notice: ____________
(in accordance with Uniform Rule 23)

DATE TURNED IN TO OFFICE: 03/13/09

Senate Special Committee on Energy considered SENATE BILL NO. 132

SB 132 SOUTHEAST ENERGY FUND

"An Act relating to the Southeast energy fund."

and recommends:

[ ] be **replaced** with [ ] **SCS** or [ ] **CS** ____________ (______)

[ ] adopt **previous** [ ] **SCS** or [ ] **CS** ____________ (______)

[ ] attached amendment(s)

[ ] adopt ____________ Letter of Intent

[ ] further referral to ____________ Committee

SENATE BILL:
[ ] Same Title
[ ] New Title

HOUSE BILL:
[ ] Same Title
[ ] Technical Title Change
[ ] New Title w/ SCR #_____

NEW FISCAL NOTE(S):

Department	Date	Fiscal	Indet.	Zero	FN#
DCCED	3/12			✓	

PREVIOUS FISCAL NOTE(S):

Department	Date	Fiscal	Indet.	Zero	FN#

[ ] **APPROPRIATION - no fiscal note**

SIGNATURES AND RECOMMENDATIONS:	PRINTED LAST NAME	DO PASS	DO NOT PASS	NO REC	AMEND
Albert M. Kookesh	Kookesh	x			
[signature]	Wielechowski			✓	
[signature]	STEDMAN	✓			
[signature]		✓			
CHAIR: [signature]	McGuire	✓			

1131

FISCAL NOTE

STATE OF ALASKA
2009 LEGISLATIVE SESSION

Fiscal Note Number:
Bill Version: **SB 132**
() Publish Date:

Identifier (file name): SB132-CED-AEA-03-12-09
Title: Southeast Energy Fund
Sponsor: Senator Stedman
Requester: Senate Special Committee on Energy

Dept. Affected: DCCED
RDU: Alaska Energy Authority
Component: Rural Energy Operations
Component Number: 2600

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required	Information					
OPERATING EXPENDITURES	**FY 2010**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**
Personal Services							
Travel							
Contractual							
Supplies							
Equipment							
Land & Structures							
Grants & Claims							
Miscellaneous							
TOTAL OPERATING	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
CAPITAL EXPENDITURES							
CHANGE IN REVENUES ( )							

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts							
1003 GF Match							
1004 GF							
1005 GF/Program Receipts							
1037 GF/Mental Health							
Other Interagency Receipts							
TOTAL	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Estimate of any current year (FY2009) cost:

POSITIONS

Full-time							
Part-time							
Temporary							

ANALYSIS: *(Attach a separate page if necessary)*

Senate Bill 132 proposes to broaden the authority of the existing Southeast Energy Fund managed by the Alaska Energy Authority. From this fund AEA could award grants for hydroelectric projects serving Southeast Alaska or "for other projects or programs designated by the legislature, to assist in meeting the energy needs of Southeast Alaska."

AEA does not foresee additional operating expenses from this bill as is. Depending on the capitalization of this fund AEA would need to draft regulations and develop a process to administer grants including an allocation method for the various types of eligible projects which would bring additional expenses.

Prepared by: Linda MacMillan, AEA and AIDEA Finance - Project Accountant
Phone 771-3029
Division: Alaska Energy Authority
Date/Time 3/12/09- 4:00pm
Approved by: Emil Notti, Commissioner
Department of Commerce, Community and Economic Development
Date 3/12/2009

(Revised 9/10/2008 OMB)

ALASKA STATE LEGISLATURE

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SENATOR BERT K. STEDMAN

SPONSOR STATEMENT

SB 132
SOUTHEAST ENERGY FUND

SB 132 provides a funding mechanism for construction of power generation projects in Southeast and for completion of the regional electrical grid. The state's goal should be to provide low-cost, renewable energy to all Alaskans and natural gas doesn't satisfy the energy needs of every region of the state. The communities in Southeast have a long history of working towards the long-term goal of energy independence by collaborating on power generation and transmission. However, most communities in the region are not on hydro power and the majority still burn oil to generate electricity and heat. In addition, many of the hydroelectric assets in Southeast are at or near capacity which severely limits regional economic growth opportunities.

While hydroelectric projects provide low-cost, renewable power over the long-term, they are extremely capital intensive. The state has a critical role to play in capitalizing these projects on the front end. The cost to complete the Southeast Alaska electric grid could be as high as $1.5 billion.

SB 132 broadens the authority of the existing Southeast energy fund to provide a mechanism for distributing capital funds to expand regional power generation and ultimately complete an electrical grid that interconnects Southeast communities.

The list of critical hydroelectric projects that may be funded through the Southeast Energy Fund include:

- Ketchikan-Whitman Lake Hydroelectric Project
- Petersburg-Ruth Lake Hydroelectric Project
- Sitka-Takatz Lake Hydroelectric Project
- Metlakatla Intertie to Ketchikan
- Sitka-Blue Lake Hydroelectric Project
- Prince of Wales Island Intertie
- Reynolds Creek Hydroelectric Project
- Falls Creek Hydroelectric Project
- Kake-Petersburg Intertie
- Metlakatla-Triangle Lake Hydroelectric Project

The communities in Southeast have spent years evaluating renewable energy options in the region. These projects have been vetted through a public process and most of them were specifically authorized by Congress as part of the 2001 Southeast Intertie Plan in P.L. 106-511.

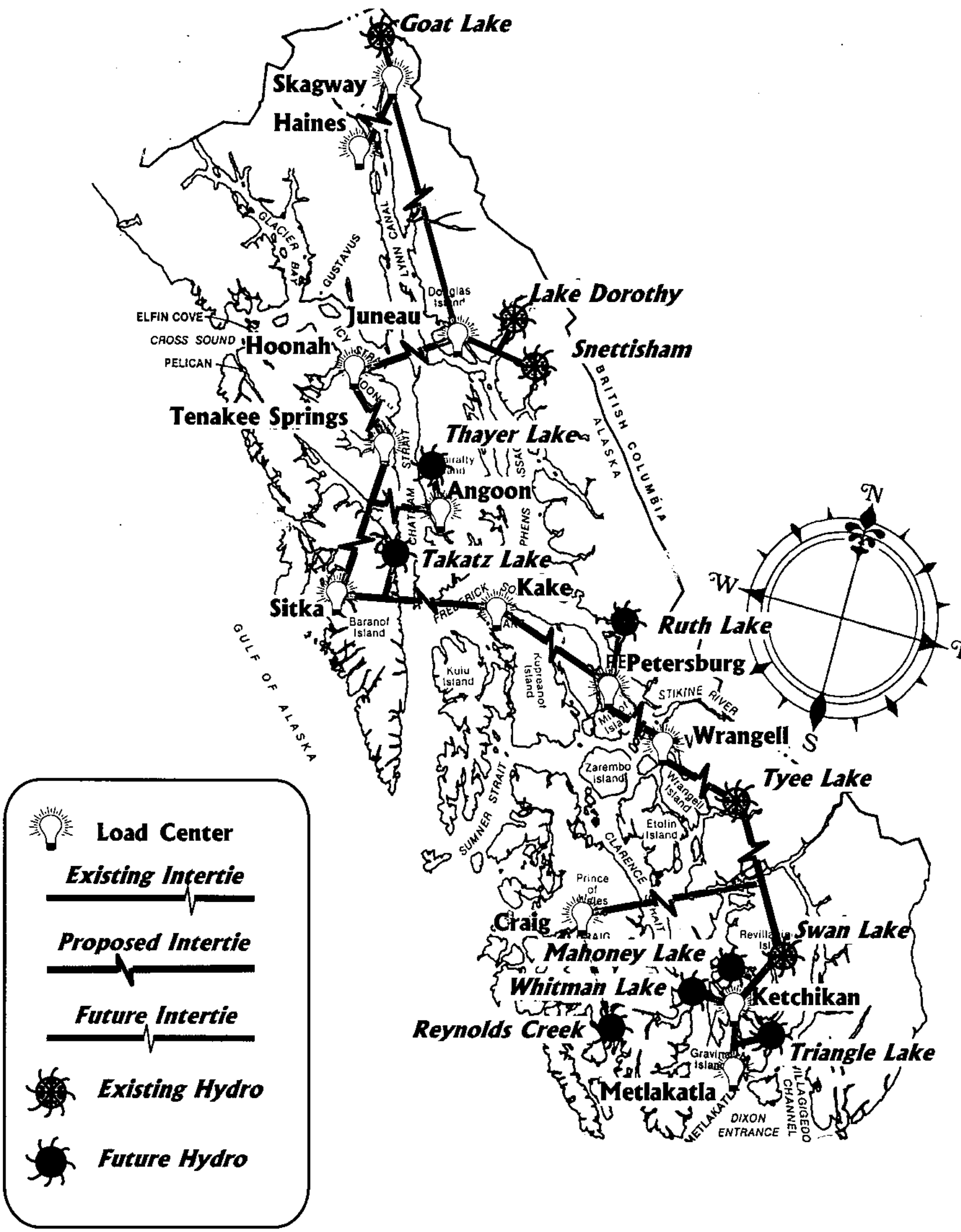
Why the Southeast Intertie?

- Immediate purpose is to provide lower cost hydroelectric generation to communities supplied with diesel-generated electricity.
- An integrated grid system can allow for the development of resources on a regional basis.
- As surplus energy is developed and rates lowered, economic development ventures will emerge.
- The Intertie system will be an enabler of other renewable resource development.

Southeast's Hydros = "Bullet Line"

Hydroelectric Site	Location	Planned Capacity	Community/Utility
Anita-Kunk Lakes	Wrangell	8.0 MW	Wrangell
Cascade Creek	Thomas Bay	80.0 MW	Cascade Creek, LLC
Connelly Lake	Haines Borough	10.0 MW	Alaska Power and Telephone
Connell Lake	Ketchikan	2.0 MW	Ketchikan Public Utilities
Elephant Falls	Hoonah	.6 MW	
Gartina Creek	Hoonah	.6 MW	
Kasidaya Creek*	Skagway	2.0 MW	Alaska Power and Telephone
Katlian River	Sitka	7.0 MW	
Lake 3160	Lace River	4.0 MW	Alaska Power and Telephone
Lake Dorothy*	Juneau	15.0 MW	Alaska Electric Light and Power
Lake Dorothy	Juneau	32.0 MW	Alaska Electric Light and Power
Mahoney Lake	Ketchikan	9.6 MW	Ketchikan Public Utilities
Neck Lake	Whale Pass	.3 MW	Alaska Power and Telephone
Reynolds Creek*	Prince of Wales Island	5.0 MW	Haida Corp.
Ruth Lake	Thomas Bay	20.0 MW	Multiple pending FERC applications
Scenery Creek	Thomas Bay	40.0 MW	Pending FERC application
Soule River	Hyder	42.0 MW	Alaska Power and Telephone
Sunrise Lake	Wrangell	4.0 MW	
Takatz Lake	Sitka	28.0 MW	City and Borough of Sitka
Thayer Creek	Angoon	1.0 MW	Kootznoowoo, Inc.
Thoms Lake	Wrangell	7.5 MW	
Triangle Lake	Metlakatla	4.0 MW	Metlakatla Power and Light
Tyee Lake expansion	Wrangell	11.5 MW	Southeast Alaska Power Agency
Water Supply Creek	Hoonah	.6 MW	
Whitman Lake	Ketchikan	4.6 MW	Ketchikan Public Utilities
TOTAL		***339+ MW***	

SOUTHEAST ALASKA ELECTRICAL INTERTIE



Southeast Conference

HATCH ACRES

1137

2/23/09

Southeast Conference Energy Program

Legislative Report – January 2009

Southeast Conference

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(907) 523-2310
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Mike Korsmo: SEC Board President
Shelly Wright: SEC Executive Director
J.C. Conley: SEC Energy Committee Chair
Robert Venables: SEC Energy Coordinator

Executive Summary

MISSION STATEMENT

The mission of Southeast Conference is to undertake and support activities that promote strong economies, healthy communities, and a quality environment in Southeast Alaska.

Southeast Conference is a private membership organization that works to advance the collective interests of the people, communities, and businesses of Southeast Alaska. It is the Alaska Regional Development Organization (ARDOR), Federal Economic Development District (EDD), and USDA Resource Conservation and Development (RC&D) Council for the region.

ENERGY COMMITTEE MISSION

Our vision for Southeast Alaska is to reduce, to the maximum extent possible, the use of diesel as a primary fuel source for the generation of electricity.

This will be accomplished through the utilization of the regions plentiful hydroelectric potential and the development of an interconnected transmission system to share these resources throughout the region.

ACCOMPLISHMENTS:

The Southeast Conference, working with its member communities and utilities, has been successful in developing regional plans and obtaining state and federal funds for many energy projects in the region. Our energy committee represents communities, organizations and utilities throughout the region. This is a 'working committee' dedicated to working together to solve the region's energy problems.

Plans and Organizational Work

- Completed an engineering/economic analysis of the entire Southeast Alaska Intertie Project (ACRES REPORT, 1998 AND D. HITTLE & ASSOCIATES, 2003 & 2005).
- Secured U.S. Congressional Authorization for SE Electrical Intertie System Plan (PL 106-511).
- Took a lead role in the formation of Kwaan Electric Transmission Intertie Cooperative (KWETICO), potential owner/operator of portions of the SE Intertie.
- Worked with AEA to develop the Southeast Alaska Energy Export Study (2007).
- Kake-Petersburg Transmission Intertie Study Update (due March 2009).

Current Utility Projects Underway

- Kasidaya Hydro Project near Haines/Skagway (Project operational, 2008).
- Juneau to Hoonah Intertie Segment (Project partially completed to Greens Creek).
- Swan-Tyee Intertie Segment (Project on schedule for completion October 2009).
- Kake-Petersburg Intertie Segment (Planning Study/Economic Analysis, update in progress, joint design/permitting project with AKDOT&PF and AEA).
- Reynolds Creek, Haida Corp. (partially funded, ready to construct this year).
- Prince of Wales Intertie (partially funded, ready to construct).
- Elfin Cove Utility Commission (in final design for hydroelectric facility).
- Gustavus Falls Creek Hydro (operational 2009, final phase ready to construct).

Southeast Conference Energy Program FY10

Funding Overview

To maintain its Energy program, Southeast Conference (SEC) is working to locate short-term funding and to identify long-term (and sustained) sources of income. The immediate goal is to secure funding for two years to maximize the effectiveness of the energy program and assist communities in their ongoing efforts to reduce energy costs and increase efficiencies.

Program Goals

- Reduce dependence on fossil fuels. This is critical in light of the recent volatility in oil prices.
- Bring affordable hydro power to communities where this is technically and economically feasible.
- Develop a regional electrical grid interconnecting Southeast communities and utilities with hydroelectric generation.
- Work with member communities and utilities to develop adequate energy infrastructure including alternative energy sources to meet current and future needs.
- Lower costs to rate payers and communities and increase economic development opportunities.

Priorities / Tasks

- Secure funding for permitting and design for Kake-Petersburg Intertie ($4.3 million).
- Work with IPEC and rural communities on solutions for their energy needs.
- Support Haida Corporation's efforts to advance the Reynolds Creek Hydro to completion.
- Begin working with federal and state funding agencies to construct the Kake-Petersburg Intertie.
- Facilitate efforts in Southeast to develop a regional Intertie and projects that increase hydro capacity.
- Work with member communities and utilities in their efforts to secure permits and funding for hydro and other alternative energy project development.
- Study alternative energy sources – biomass, hydrogen, wind, geo-thermal, tidal, and waste-to-energy.

Southeast Conference feels it is essential to develop and implement a regional energy plan for Southeast Alaska. We are working with the Alaska Energy Authority (AEA) and the Tlingit & Haida Energy Department to develop a regional energy plan and working with the communities to implement the opportunities that exist in their areas. Substantial and measurable progress has been made over the past couple of years, and it is important to keep the momentum of this program moving forward. The Southeast Conference Board of Directors has voted to maintain its energy coordinator position and its energy program as a core program within Southeast Conference and voted to support its staff in the pursuit of these goals. The position is currently being funded from reserves.

The following information is intended to demonstrate many areas where the State of Alaska can make an investment with significant impact and benefits to the region. These projects come from the communities and have been vetted through the public process. It is a work in progress and will be updated as more information comes to us from the communities.

Southeast Alaska Energy Projects with Estimated Funding Needs

Facilities and Infrastructure Construction Needs

- **Metlakatla Intertie to Ketchikan**: This is the southernmost leg of the SE Intertie system and is designed to transmit surplus hydroelectricity (approx. 8,500,000kW per year) to Ketchikan where the energy will be used to offset diesel generation (about 580,000 gallons). **CONSTRUCTION READY AT A PROJECT COST OF $7,652,000.**

- **POW Island Intertie**: AP&T proposes to construct a 48 mile line extension to the communities of Coffman Cove and Naukati Bay (both use 100% diesel generated power). This project will place these communities onto the POW grid which is supplied by hydroelectric power. This intertie will reduce fossil fuel consumption by 71,082 gallons per year and reduce the electrical rate by up to 60%. **CONSTRUCTION READY, PARTIALLY FUNDED, AP&T HAS REQUESTED $3,752,181 TO COMPLETE.**

- **Reynolds Creek Hydroelectric Power Project**: This 5 MW hydro facility is located 10 miles east of Hydaburg and is a joint venture between Haida Corporation and AP&T. The development of this resource is essential to meet the electrical needs of the POW Island as it grows and will prevent the use of supplemental diesel power. **CONSTRUCTION READY, PARTIALLY FUNDED, HAIDA POWER REQUESTING $13,720,000 TO COMPLETE.**

- **Gustavus Electric**: The Falls Creek Hydro Electric Project is an 800 kWh run-of-river hydroelectric facility which will provide electric power to the community of Gustavus. The project will displace existing diesel generation. Construction of the project is approximately 90% complete and will provide 90% of the community's electric needs. **FUNDING REQUESTED BY GUSTAVUS FOR COMPLETION, $750,000.**

- **Kake – Petersburg Intertie**: This is a high priority need in the region. Funding has been identified through HB 152 for final design and permitting. Detailed construction cost estimates will be available in March, but the project is estimated to cost between **$25-34 MILLION** and could be funded in phases. The AK DOT&PF has begun field work and is an active partner in the development of this project.

Capacity Development Projects: Final Design and Permitting

Ketchikan - Whitman Lake: The proposed Whitman Lake Hydroelectric Project is located approximately four miles east of Ketchikan, Alaska. KPU proposes to install 4.6 MW of hydropower generating capacity at the existing Whitman Lake Dam to provide an additional source of clean renewable energy to the city of Ketchikan and the Borough area including Saxman Village, while also enhancing the conversion of oil heat to electric heat and displacing expensive and nonrenewable diesel generation. Phases 1 & 2 are complete. **FUNDING FOR FINAL DESIGN IS REQUESTED BY KPU AT $1,300,000 (KPU MATCH, $320K).**

Sitka- Blue Lake Hydroelectric Project: This project will raise the height of the dam by 83 feet and expand the plant's capacity from 8MW to 18MW of capacity. Sitka has nearly maxed out available hydro resources. Multiple funding partners are expected to participate in order to bring this facility on line by 2015. The City and Borough of Sitka **REQUESTS FINANCIAL ASSISTANCE IN FY2010 OF $7,500,000.**

Hoonah Energy Needs: With the costs of the proposed Juneau to Hoonah intertie escalating to an estimated $40 million, Alaska Energy Authority (AEA) commissioned a conceptual study of the hydroelectric resources in the immediate area of Hoonah along with an analysis of the power plant needs that should be addressed concurrently. The findings are as follows:

- $4,061,317 Power Plant Replacement (2,600kW @ $1,562/kW)
- $4,558,500 Gartina Creek Hydroelectric Project (600kW)
- $3,946,500 Water Supply Creek Hydroelectric Project (600kW)
- $4,393,500 Elephant Falls Hydroelectric Project (600kW)

The development of any one of the three proposed hydro facilities would offset approx. 30% of Hoonah's projected annual demand. This would result in a savings of approx. 129,000 gallons of diesel fuel per year (saving approx. $380,000 using an est. fuel cost of $3.00/gallon). The development of any two of the three proposed hydroelectric facilities would offset about 50% of Hoonah's annual demand, with an approx. savings of $640K. No formal request has yet been made, **CAPITAL NEEDS ABOVE TOTAL, $16,959,817**. These projects will benefit the community significantly but will not meet all of Hoonah's energy needs. The Juneau to Hoonah Intertie Project is construction-ready and is still a long-term objective as part of the regional electrical grid network.

Elfin Cove Utility Commission: This hydroelectric power plant and associated infrastructure for access and connection will serve the community of Elfin Cove. Upon completion, the hydroelectric facility will include: a 1,000-foot long diversion conduit; a 1,300-foot long penstock to tidewater; and upgrades to the hydro power house. **FUNDING REQUEST BY ELFIN COVE FOR FINAL DESIGN AND FERC PERMITTING IS $395,200.**

Community Planning Efforts: Feasibility and Assessment

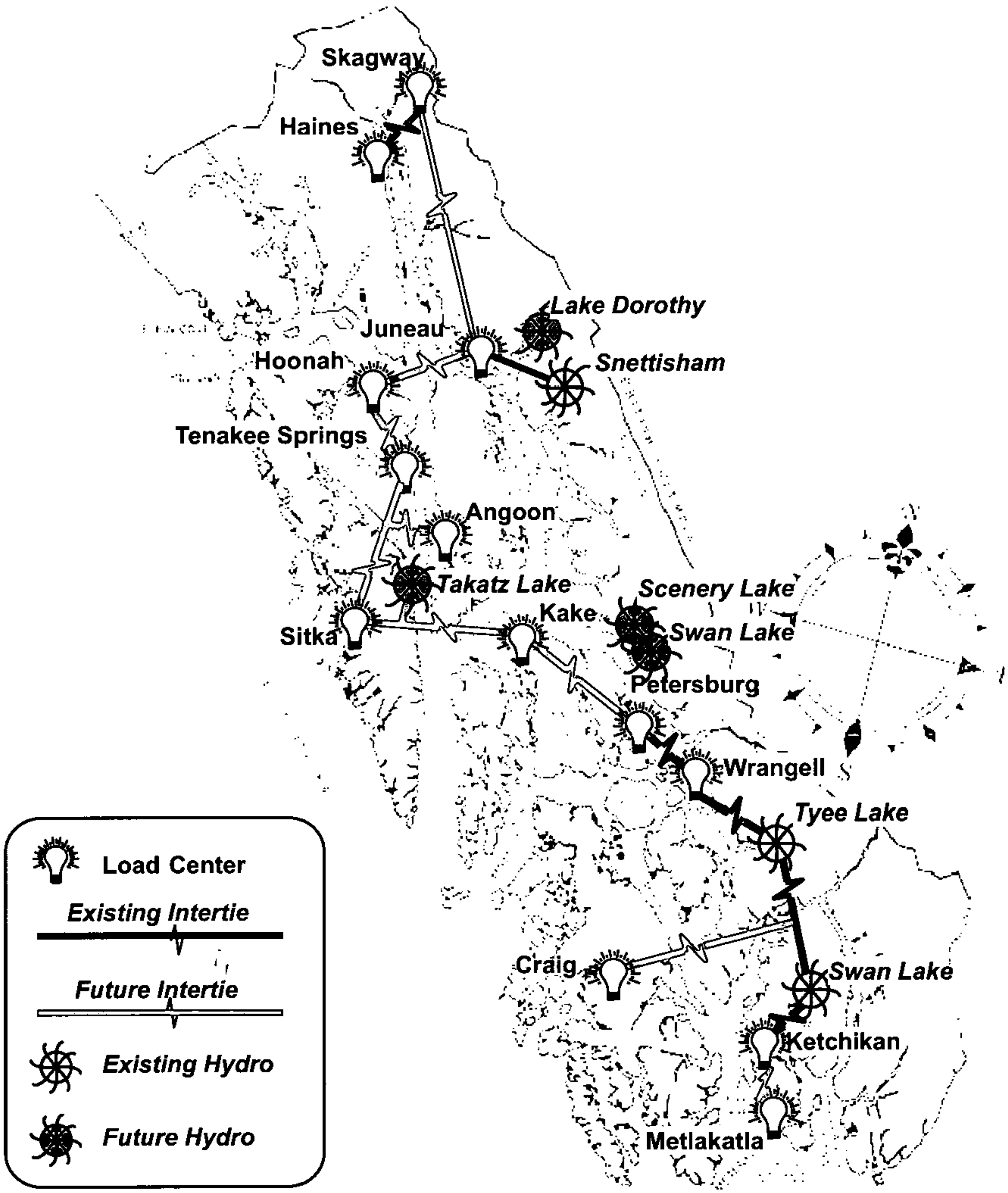
Petersburg – Ruth Lake: This Project would develop the hydro potential at Ruth Lake, with a total installed capacity of the powerhouse of 20 MW. The proposed Ruth Lake Hydroelectric Project would be interconnected to the existing transmission infrastructure currently owned and operated by the FDPPA. Ruth Lake would be a major addition to the energy resources to serve communities in an interconnected Southern Southeast Alaska grid. **PHASE 1 FUNDING REQUEST FROM THE CITY OF PETERSBURG FOR PRE-FEASIBILITY IS $160,000 AND PHASE 2 PERMITTING IS $2 MILLION.** Petersburg is providing matching funds of $540,000 for the two phases.

Metlakatla – Triangle Lake: This proposed 4MW hydroelectric project is located along the proposed transmission line intertie to Ketchikan. The Triangle Lake project will provide additional hydro power to Metlakatla and will offset diesel power generated in Ketchikan. **FUNDING REQUESTED BY METLAKATLA FOR FEASIBILITY ANALYSIS AND CONCEPTUAL DESIGN IS $500,000.**

Sitka – Takatz Lake: Sitka is engaged in a long range strategy to decrease its dependence on oil by developing its renewable energy resources, particularly the known hydroelectric resources on Baranof Island. This project is the study and investigation phase of developing Sitka's hydroelectric resources to determine the feasibility of developing the estimated 28MW Takatz Lake Hydroelectric Project. **THE ESTIMATED COST OF THIS STUDY AND INVESTIGATION OF THE HYDROELECTRIC POTENTIAL OF TAKATZ LAKE IS $2,000,000.**

This is a compilation of community projects that have gone through the public process. Most are part of the Southeast Intertie Plan authorized by Congress in 2001. More detailed information is available upon request. Other projects, such as Thayer Creek in Angoon will be added to this list as information becomes available.

Attachments to this report:
Map1_1997 Electrical Intertie System Plan
Map2_Kupreanof Island
Map3_POW & Reynolds Creek
Map4_Ruth Lake Hydroelectric Project
Map5_Upper Lynn Canal Regional Energy Infrastructure

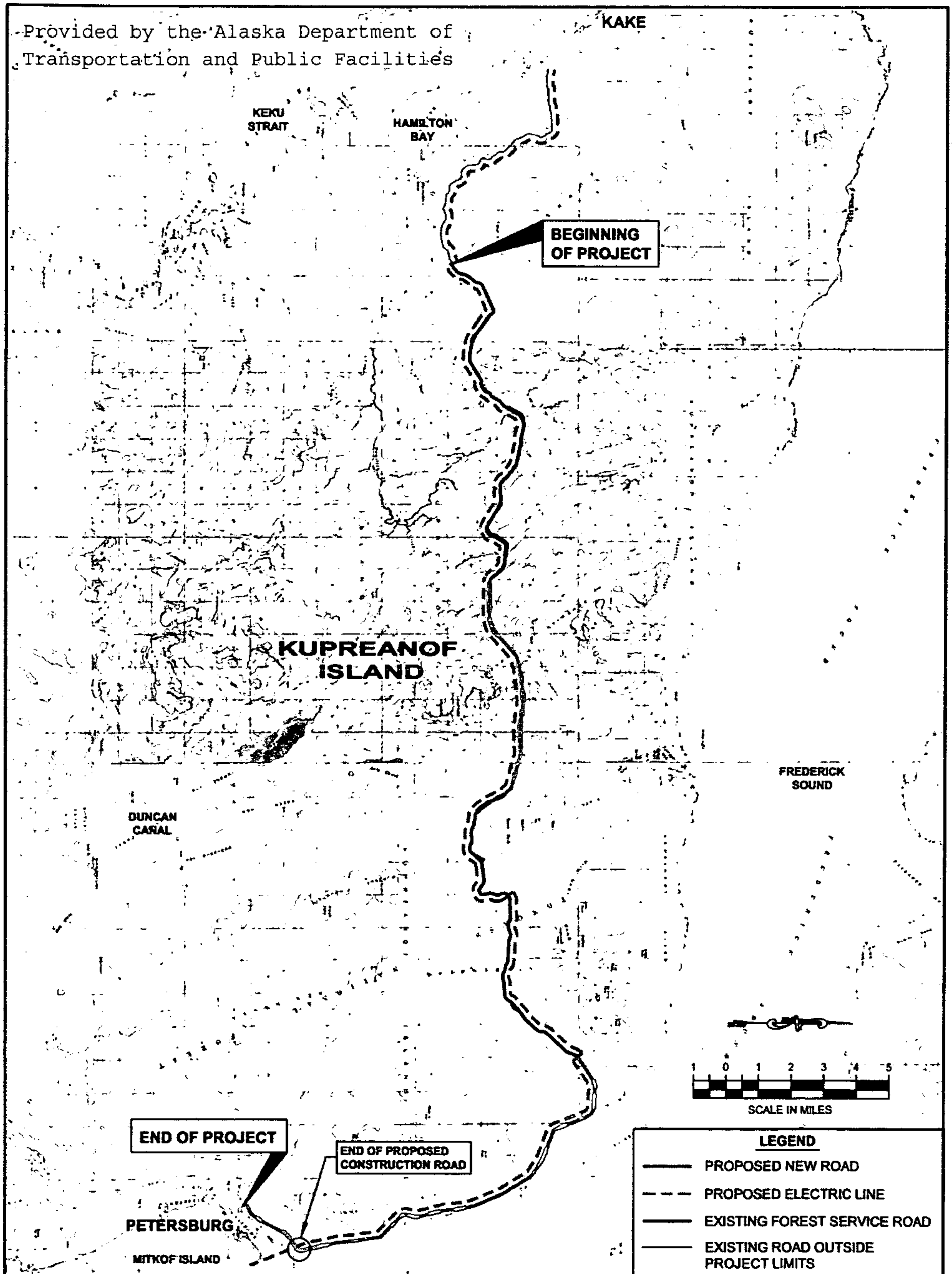


HATCH ACRES

Southeast Alaska Utilities

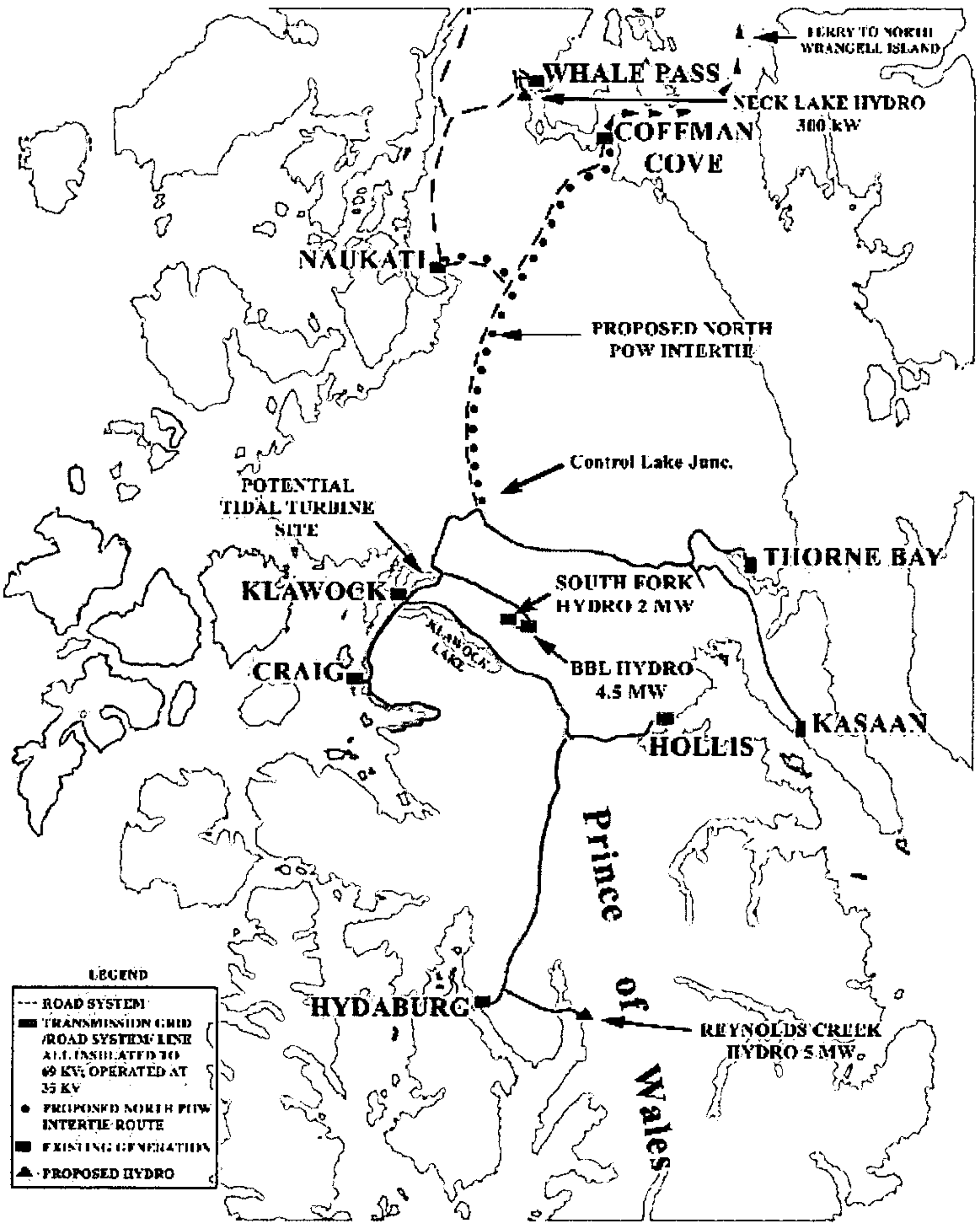
1997 ELECTRICAL INTERTIE SYSTEM PLAN

1144


Provided by the Alaska Department of Transportation and Public Facilities
KAKE
KEKU STRAIT
HAMILTON BAY
BEGINNING OF PROJECT
KUPREANOF ISLAND
FREDERICK SOUND
DUNCAN CANAL
END OF PROJECT
END OF PROPOSED CONSTRUCTION ROAD
PETERSBURG
MITKOF ISLAND
1 0 1 2 3 4 5
SCALE IN MILES
LEGEND
PROPOSED NEW ROAD
PROPOSED ELECTRIC LINE
EXISTING FOREST SERVICE ROAD
EXISTING ROAD OUTSIDE PROJECT LIMITS

1145

Prince of Wales Island Intertie & Reynolds Creek Electrical System



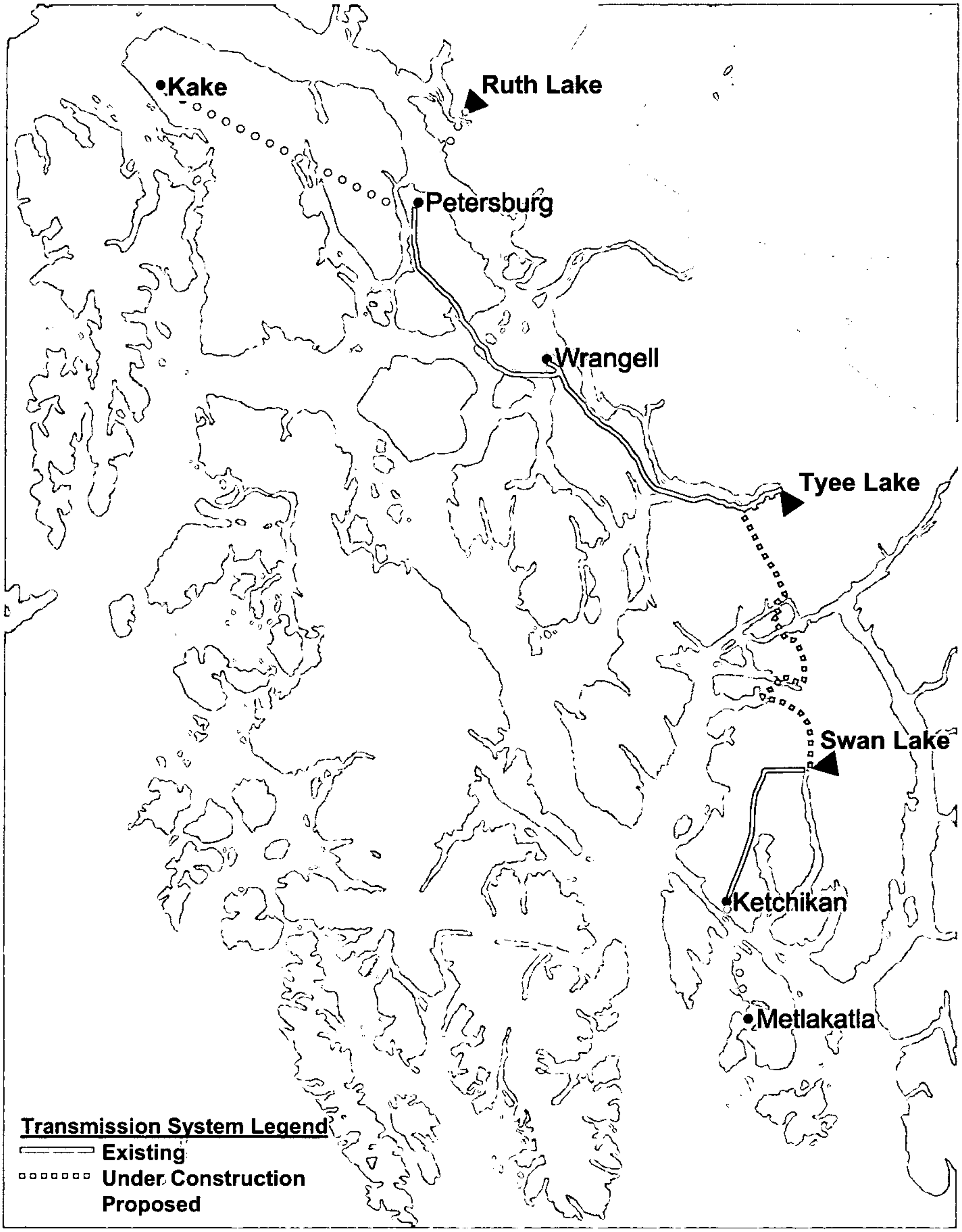
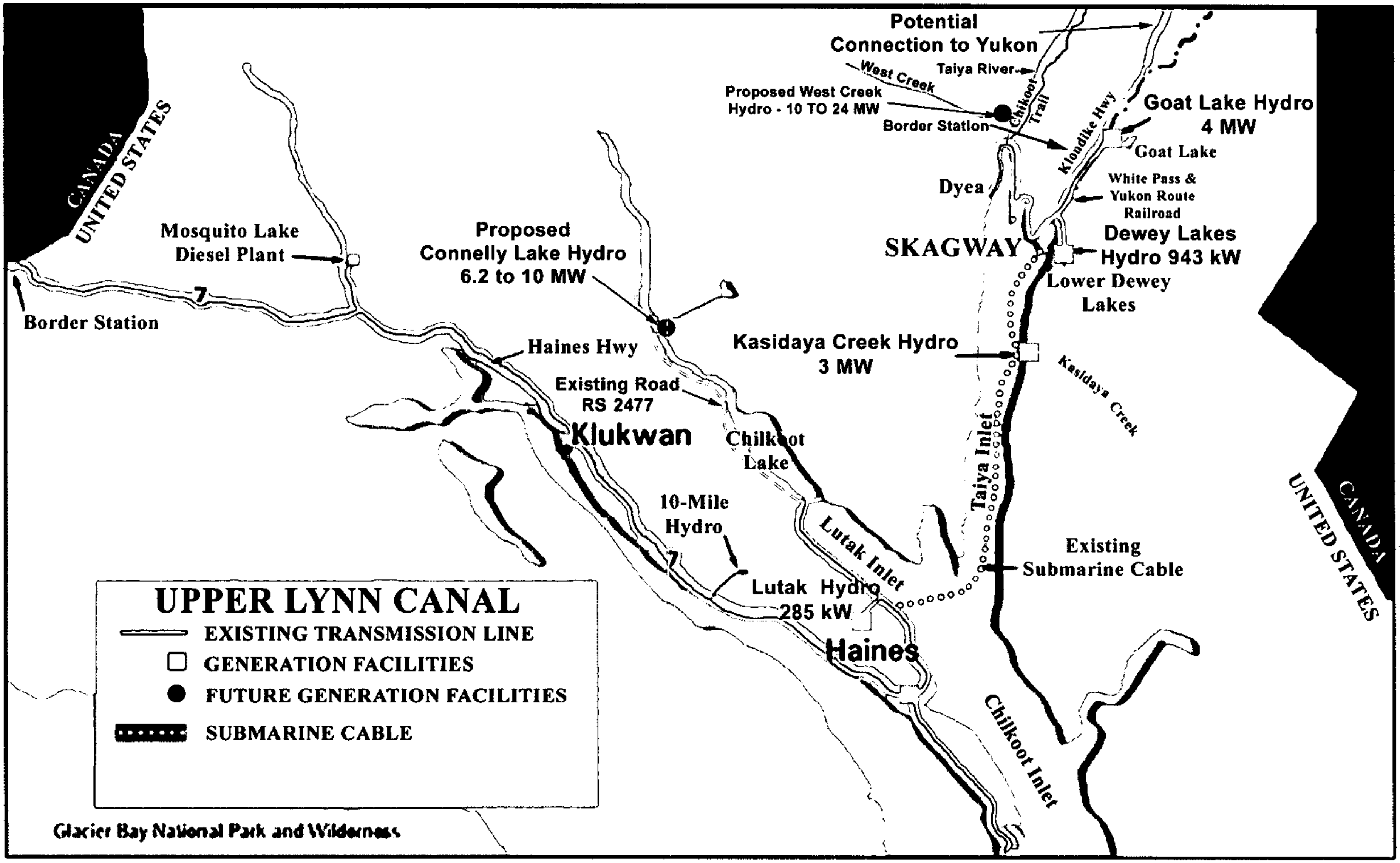


Exhibit F.2
Ruth Lake Hydroelectric Project
Southern SE Alaska Transmission System

UPPER LYNN CANAL REGIONAL ENERGY INFRASTRUCTURE



SB
150

<target><bill>SB 150</bill><subject>SB
150</subject><comm>SENE26</comm></target>

FISCAL NOTE

STATE OF ALASKA	Fiscal Note Number:	1
2009 LEGISLATIVE SESSION	Bill Version:	**SB 150**
	(S) Publish Date:	3/30/09

Identifier (file name):	SB150-UA-03-25-09	Dept. Affected:	University of Alaska
Title	An act establishing an emerging energy technology fund	RDU	University of Alaska Fairbanks
		Component	Fairbanks Campus
Sponsor	Senator McGuire		
Requester	Energy Committee	Component Number	741

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required	Information					
OPERATING EXPENDITURES	**FY 2010**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**
Personal Services							
Travel							
Contractual							
Supplies							
Equipment							
Land & Structures							
Grants & Claims							
Miscellaneous							
TOTAL OPERATING	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
CAPITAL EXPENDITURES							
CHANGE IN REVENUES ( )							

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts							
1003 GF Match							
1004 GF							
1005 GF/Program Receipts							
1037 GF/Mental Health							
Other Interagency Receipts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Estimate of any current year (FY2009) cost: 0.0

POSITIONS

Full-time	**0.0**						
Part-time							
Temporary							

ANALYSIS: *(Attach a separate page if necessary)*

The UA Alaska Center for Energy and Power (ACEP) will administer grant funds appropriated in to the "emerging energy technology fund." ACEP would provide services for an administrative fee similar to that used by the Denali Commission, 5%. Thus there would be no additional fiscal impact beyond what is appropriate into the fund. This would be a service fee charged on the amount of funding used on a project by project basis. At this time there is not an established amount to be appropriated for the fund. If there were $5 million in projects funded in a given year the service fee would total $250,000.

Prepared by:	Alesia Kruckenberg	Phone	907-450-8426
Division	University of Alaska	Date/Time	03/25/2009 5:00pm
Approved by:	Michelle Rizk	Date	03/25/2009 5:00pm
	University of Alaska		

STATE OF ALASKA **BILL NO.** SB 150
2009 LEGISLATIVE SESSION

ANALYSIS CONTINUATION

The UA Alaska Center for Energy and Power will administer grant funds appropriated in to the "emerging energy technology fund." This will entail:

Selecting and calling an advisory group to;
- establish priorities and criteria which are consistent with the statute.
- evaluating and prioritizing grant proposals
- awarding grants
- evaluating results of projects completed.

Fiscal administration, accounting, and reporting on project status and overall accomplishment of the funds invested;
- distribute funds to successful grant proposals
- provide regular report to various constituents on project status
- account for and report on funds balance
- provide annual report on results achieved.

ACEP would provide these services for an administrative fee similar to that used by the Denali Commission, 5%. Thus there would be no additional fiscal impact beyond what is appropriate into the fund. This would be a service fee charged on the amount of funding used on project by project basis. At this time there is not an established amount to be appropriated for the fund. If there were $5 million in projects funded in a given year the service fee would total $250,000.

ALASKA STATE LEGISLATURE

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Co-Chair
Senate Resources Committee

Chair
Senate Special Committee on Energy
Senate Special Committee on World Trade, Technology & Innovation

Member
Senate Judiciary Committee
Joint Armed Services Committee

SENATOR LESIL MCGUIRE

SPONSOR STATEMENT

SB 150: Emerging Energy Technology Fund

Because of Alaska's unique remote communities and abundant energy resources – both renewable and fossil-based – our state has great potential to become a world leader in researching and developing new energy technologies.

Although Alaska's commitment to renewable and alternative energy development is well proven by both the Renewable Energy Fund established last year and by Governor Palin's recently stated goal of 50% renewable power generation by 2025, the state nevertheless has no mandate or mechanism for funding energy research at the state, regional, or local level. Projects funded under the Renewable Energy Fund are explicitly limited to proven, existing, "off the shelf" technologies.

SB 150 creates a funding mechanism and designates an administrating agency for a competitive grant program aimed at funding projects designed to research and test new energy technologies. It establishes the Emerging Energy Technology Fund (EEFT) to be administered by the Alaska Center for Energy Power, the University of Alaska agency whose mission is to meet state, industry, and federal demand for applied energy research in order to lower the cost of energy throughout Alaska and develop economic opportunities for the state, its residents, and its industries.

Dollars spent on energy research via the EEFT could be handsomely leveraged to bring additional federal dollars to Alaska. In recent years, the U.S. Department of Energy has offered millions in federal grants that typically require a mere 20% cost share at the state level. Alaska's lack of a dedicated energy research program has caused us to miss out on these generous federal programs. Furthermore, with the Obama administration committing over $13 billion to renewable energy research and development, the need for a state energy research fund like the one created by SB 150 is more critical than ever. Every $1 of state funding invested in the EEFT could generate up to an additional $4 of investment from federal sources.

Our abundant renewable energy sources, vast proven but stranded fossil fuel energy supplies, and increasingly difficult-to-access oil and gas reserves combine to make Alaska an ideal place for companies and institutions to test new energy technologies. The EEFT would provide a means to further attract these types of projects and encourage the in-state development of new technologies that could be of great benefit to the state and its communities.

Alaska has the available natural resources, the financial means, and the political spirit to become a national and global leader in researching and developing new energy technologies. SB 150 creates the funding mechanism that will help us to achieve that goal.

ACEP
Alaska Center for Energy and Power

The Case for Funding Applied Energy Research

There is no doubt that energy is (and should be) foremost in the minds of Alaskans. Most of the money flowing through the Alaska economy is from the oil resources on the North Slope, and our lives are connected in both positive and negative ways with the price of energy.

Alaska's rural communities have reached a crisis level in the escalating cost of energy. Along the Railbelt, traditional fossil fuel based resources used for power generation, such as Cook Inlet natural gas, are in decline. Production of oil from the North Slope is also in decline. This has led state policymakers at both the legislative and executive level to begin the process of developing a comprehensive energy plan for the state. Alaska has the financial means, available resources, and political willpower to become a leader in developing renewables, stranded energy resources, and difficult to extract fossil fuel resources, including the vast proven heavy oil resources on the North Slope. Alaska has already made significant strides in this direction. The Alaska renewable energy fund created under HB152 and administered by AEA is by far the largest and most aggressive fund of its type in the country. In addition, Governor Palin's stated target to achieve 50% renewable power generation by 2025 is also the most ambitious goal among the 50 states.

In order to fulfill the vision of Governor Palin and many others of truly becoming a leader in the energy field, Alaska must invest in three areas: energy projects, energy policy, and energy research. It is essential to develop a plan which incorporates a balanced approach between these key elements, and elements of which are being worked on at the legislative and executive levels of state government. In addition, the Alaska Energy Authority has already been tasked with managing the project component; however projects funded under the Alaska Renewable Energy Fund are explicitly limited to proven, existing technologies. AEA currently has no mandate or capability to engage in energy research, and the current legislation does not allow for funding of any emerging technologies. While this is appropriate under the goals for this funding, the lack of identified funding for applied energy R&D greatly limits Alaska's ability to successfully achieve a leadership role in the energy field. This is particularly crippling in a state with very different conditions than are found elsewhere in the U.S. in terms of environment, population density, and the isolated nature of the electrical generation and transmission system.

While basic research addresses mostly scientific questions (what are the basic rules of the universe), applied research is aimed at developing technologies for immediate use. This requires understanding of the basic underlying science, but centers on producing cost effective, reliable, and locally appropriate technologies. An important part of this research is independent third party testing and verification of technologies before these are deployed in remote sites. A funded applied energy research program through the

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State of Alaska could ensure a much greater success rate for projects in the field, including the 77 projects recently funded under the Alaska Renewable Energy Fund.

For example, the Alaska Center for Energy and Power is currently involved in programs to test and evaluate new battery systems, waste heat recovery devices and hydrokinetic turbines. The goal is to ensure manufacturer performance claims are accurate and that the devices perform as expected under harsh Alaskan conditions. In one case, a waste heat recovery device had received numerous international rewards and looked like a very viable candidate for improving efficiency from diesel engines. However, when researchers from ACEP travelled to a location where the unit was purportedly in operation, it was quickly apparent that the manufacturer performance claims were not being realized in the field and that this was not a technology that should be invested in at this time. ACEP was able to alert the Alaska Energy Authority to this fact and prevented unnecessary expenditure of state funds on what undoubtedly would have been a failed and frustrating project. A relatively small investment (a few days of research and phone calls, a few thousand dollars spent on travel) allowed a good decision about the investment of hundreds of thousands of dollars that would have been spent purchasing equipment from out of state suppliers.

Dollars spent on energy research can also be leveraged to bring additional federal dollars to Alaska. The Alaska Center for Energy and Power frequently submits proposals for federal funds under the U.S. Department of Energy, which generally required 20% cost share for projects. The lack of state funding to date for ACEP has greatly hampered the ability to bring in this federal funding. At this time, given the $13 Billion the Obama administration intends to commit to renewable energy research, tremendous opportunities exist for tapping federal funding, but much of this funding will still require some demonstration of program support at the state level. Every $1 of state funding can generate an additional $4 of investment from federal sources.

According to the National Science Foundation, Alaska currently ranks 46th among states in terms of funding spent on R&D, and has no significant mechanism for funding energy research at the state, regional, or local level. Despite tremendous expenditures proposed for developing natural gas resources, renewable energy, and immediate short-term relief for the high cost of energy, the state has been slow to see the need for investment in research. If Alaska is truly to become a leader in energy, it will be necessary to invest in energy research in addition to project development.

By funding research as a part of the state's overall investment in energy projects, Alaska has the opportunity to truly become a leader on the world stage in energy development in a manner which can provide stable, affordable energy throughout the state while simultaneously developing economic opportunities for its residents and its industries. It is only by taking a balanced approach between forward-thinking policy, investment in cost-effective projects, and investment in research to 'peer over the horizon' at emerging technologies which will provide future energy solutions that this goal can be realized.

REAP

Alaska Emerging Energy Technology Development Fund

Background Narrative

The United States is entering a new era. The Obama administration is now promising an economic stimulus package that will likely top $700 billion. Many of those dollars will replace and repair crumbling infrastructure. A significant portion of the money will fund energy infrastructure, including renewable energy projects, new transmission lines, and research and development of emerging energy technologies.

Renewable energy has become mainstream, and is no longer considered "alternative." Large-scale wind, geothermal and hydroelectric technologies are mature and cost competitive. Other technologies such as biomass, solar, and ocean power (tidal and wave) are in various states of commercialization. One of the goals of the upcoming federal spending will be to bring those technologies to maturity to help lessen our dependence on foreign oil. But since very little oil is used to generate electricity in the United States, America will need to find new ways to apply renewable-sourced electricity to both heating and transportation.

Today there are several companies around the world working to capture "first mover" advantage in the electric car industry. The Israeli company *Better Place* has recently been grabbing headlines with its plan to create a charging station infrastructure where a customer simply pulls into the station and swaps a depleted battery for a freshly charged one. Others see renewable-sourced hydrogen and fuel cells as part of our transportation future.

Alaska is already seeing consumers in communities like Sitka and Juneau switch from oil based heating to relatively inexpensive hydro-based electric heat. Residents of those communities are also exploring ways to use electricity for transportation. If a new large hydro facility is built to serve the Railbelt, Southcentral Alaskans will do the same. Wave and tidal based electricity presents enormous potential for Alaskan communities to generate excess electricity to be used for heating and transportation. Alaska is also seeing a growing use of wood biomass for central heating facilities that are decreasing the use of heating oil. Some of those same communities are also interested in the technology that gasifies wood to generate electricity.

Necessary innovations in battery storage, tidal and wave power technology, biomass gasification, and hydrogen generation, transportation and storage all require continued research and development. Breakthroughs in ways to capture and store carbon also need more R & D. Private industry is already engaged in such R & D, and is being supported by a number of state-based funds and small federal programs. However, with the federal government now on the verge of much larger investment in such technologies, it's a good bet that the states with existing emerging energy technology development programs will be first in line for federal grant money.

Alaska's creation of the Renewable Energy Grant Fund in 2008 was a fundamental first step in the long process of decreasing Alaskans' dependence on volatile priced fossil fuels. Getting viable renewable energy projects in the ground is an essential long-term investment for many communities. But the Renewable Energy Grant Fund is only one component of an overall state renewable energy program.

Because of Alaska's unique remote communities and abundant renewable energy resources, our state has an excellent opportunity to become a world leader in renewable energy development. Unlike any other place in the nation, Alaska can demonstrate new technology *and save consumers money at the same time* because energy prices in rural communities are already so high. Demonstrating emerging technologies in rural Alaska could also lead to the state becoming a leading marketer of that expertise to the two billion people on the planet who do not yet have any electricity at all. However, the Renewable Energy Grant Fund was not designed or written to fund demonstration projects. In order for Alaska to be part of what many are calling the next industrial revolution in energy innovation, Alaska needs to create its own "Emerging Energy Technology Development Fund."

Such a Fund should encourage collaboration between Alaska institutions of higher learning and private industry, with a modest contribution of state money to capitalize and catalyze its creation. Because no state agency currently exists with the expertise to do so, the Fund should be administered by a newly created Alaska Energy Trust. The Trust should be a non-profit, non-governmental entity overseen by the Regulatory Commission of Alaska. This arrangement is similar to the one that established the very successful Energy Trust of Oregon. The Fund should provide both grants and loans to university researchers, non-profits, private industry and local governments to fund research and development, demonstration projects and market transformation of renewable and alternative energy technologies that have a high likelihood of becoming economically and technologically viable in the short term in a carbon constrained world. Equally important, the Fund should provide coordination and funding for targeted work force development and education programs that will train Alaska's next generation of construction workers, technicians, engineers and scientists that will guide us through the next century of energy innovation.

The Trust should be administered by a professional staff with oversight from an Advisory Committee that consists of nine representatives from state and federal agencies and private institutions that have expertise in emerging technologies. The methodology for funding projects should give the most weight to projects that create partnerships with Alaska entities, have matching funds and will lead to real benefits for the people of Alaska.

With the Governor's recent announcement that the goal of the State of Alaska shall be to obtain 50% of its electricity from renewable energy sources by the year 2025, the state has set an important target. Establishing an emerging energy technology development fund is a necessary and timely component of reaching that goal, stabilizing energy costs and diversifying Alaska's economy.

Establish an Emerging Energy Technology Fund

One of Three Priorities for Enhancing Alaska's Quality of Life and Protecting a Healthy Environment

The Need

The creation of the Renewable Energy Grant Fund in 2008 was a critical first step in the process of promoting a secure, clean energy future for Alaska. However, the Renewable Energy Fund is only one component of a renewable energy program and was not designed to fund developing technologies that are not yet fully commercialized like tidal, geothermal or battery storage. Because of Alaska's unique remote communities and abundant renewable energy resources, our state has an excellent opportunity to become a world leader in emerging renewable energy development. Unlike any other place in the nation, Alaska can demonstrate new technology *and save consumers money at the same time* because energy prices in rural communities are already so high. In order for Alaska to be part of what many are calling the next industrial revolution in energy innovation, Alaska needs to create its own "Emerging Energy Technology Development Fund." Establishing an Emerging Technology Fund is also necessary to help grow our cutting edge University programs and create a highly valued workforce.

With the Governor's recent announcement that the goal of the State of Alaska shall be to obtain 50% of its electricity from renewable energy sources by the year 2025, the state has set an important target. Establishing an emerging energy technology development fund is a necessary and timely component of reaching that goal, stabilizing energy costs and diversifying Alaska's economy. It could also favorably position Alaska to receive a larger portion of the upcoming $700 billion economic stimulus package. A significant portion of the federal money will fund energy infrastructure, including renewable energy projects, new transmission lines, and research and development of emerging energy technologies and those states with existing emerging technology development programs will be first in line for federal grant money.

The Proposal

The Alaska Conservation Alliance supports the creation of the Emerging Energy Technology Development Fund proposed by the Renewable Energy Alaska Project (REAP), a coalition of urban and rural Alaska utilities, businesses, conservation and consumer groups, and Alaska Natives. The Emerging Energy Technology Development Fund should help Alaska become a leader in research and implementation of technologies for battery storage, tidal and wave power, biomass gasification, and hydrogen generation, as well as transportation and storage of energy. The Fund should provide both grants and loans to university researchers, non-profits, private industry and local governments to fund research and development, demonstration projects and market transformation of renewable and alternative energy technologies that have a high likelihood of becoming economically and technologically viable in the short term. Equally important, the Fund should provide coordination and funding for targeted work force development and education programs that will train Alaska's next generation of construction workers, technicians, engineers and scientists that will guide us through the next century of energy innovation. After all, the $55 billion/year "clean energy" business is expected to at least quadruple worldwide by 2015.

The Benefits

- Develop commercially promising emerging energy technologies for use both in Alaska and in the world-wide market.
- Puts Alaska in prime position to tap into $700 billion Federal stimulus program.
- Alaska can demonstrate new technology and save rural energy consumers money.

Contact

- Kate Troll, Alaska Conservation Alliance, (907) 258-6174, kate@akvoice.org

2009 ACA Priority

Establish an Emerging Energy Technology Fund

SJR

7

<target><bill>SJR 7</bill><subject>SJR 7</subject><comm>SENE26</comm></target>

FISCAL NOTE

STATE OF ALASKA
2009 LEGISLATIVE SESSION

Fiscal Note Number: 1
Bill Version: SJR 7
(S) Publish Date: 4/10/09

Identifier (file name):
Title: SJR 7 OPPOSE U.N. DESIGNATION OF ARCTIC OCEAN
Sponsor: SENATORS THERRIAULT, Dyson
Requester: (S) Senate Special Committee on Energy

Dept. Affected:
RDU
Component
Component Number

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required	Information					
OPERATING EXPENDITURES	**FY 2010**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**
Personal Services							
Travel							
Contractual							
Supplies							
Equipment							
Land & Structures							
Grants & Claims							
Miscellaneous							
TOTAL OPERATING	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL EXPENDITURES							
CHANGE IN REVENUES ( )							

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts							
1003 GF Match							
1004 GF							
1005 GF/Program Receipts							
1037 GF/Mental Health							
Other Interagency Receipts							
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Estimate of any current year (FY2009) cost:

POSITIONS

Full-time							
Part-time							
Temporary							

ANALYSIS: *(Attach a separate page if necessary)*

Prepared by: SENATE SPECIAL COMMITTEE ON ENERGY
Phone 465-2995
Division
Date/Time 4/9/09 12:00 AM
Approved by: /s/ Senator McGuire, Chair
Date 4/9/2009

(Revised 9/10/2008 OMB)

Alaska State Legislature

SENATOR
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SENATE DISTRICT F

SJR 7

Sponsor Statement

SJR 7 is intended to send an important message to the President and Congress. Alaska has an economy that depends on natural resource development including extraction and transportation. Any action that would deny access to the resources that are now under state or national sovereign jurisdiction will directly impact the long-term stability and economic well being of our state and nation.

SJR 7 purposely omits any position or opinion on global warming. The focus of this legislative message is to reinforce the neccesity of access to natural resources in the northern latitudes. Any move toward global control over what is now United States sovereign territory is a threat not only to Alaska's economy but our nation's as well.

Email: Senator_Gene_Therriault@legis.state.ak.us

SENATOR
GENE THERRIAULT
Mailing Address:
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Fax: (907) 488-4271

Alaska State Legislature

Senate

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State Capitol
Juneau, Alaska
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Fax: (907) 465-3884
SENATE DISTRICT F

Memorandum of Request

To: **Senator Lesil McGuire / Chair Senate Energy Committee**

From: **Senator Gene Therriault** for GT

Date: **February 23, 2009**

Re: **Requesting a hearing for Senate Joint Resolution 7**

As momentum builds within the new federal administration to set aside greater amounts of land and water in protected areas, the temptation to further restrict control over these important elements is escalating.

SJR 7 sends a clear message that as stewards of our state's sovereign resources we oppose any attempt to place them in a political body that is outside both the state and federal jurisdiction.

It is with these serious issues in mid that I respectfully request that SJR 7 be taken up in your committee.

Thank you.

Email: Senator_Gene_Therriault@legis.state.ak.us

HCR

2

<target><bill>HCR 2</bill><subject>HCR
2</subject><comm>SENE26</comm></target>

SENATE COMMITTEE REPORT

DATE: 2/11/09

FURTHER: Resources
Finance

DATE TURNED
IN TO OFFICE: ____________

<u>Senate Special Committee on Energy</u> considered CS FOR HOUSE CONCURRENT RESOLUTION NO. 2(RES) am

HCR 2 IN-STATE GAS PIPELINE

Requesting the governor to provide energy security for all Alaskans first by pursuing development of a natural gas bullet pipeline from the North Slope to the Cook Inlet region; and requesting the governor to identify and negotiate where appropriate with one or more persons capable of producing natural gas from the Gubik area, and other areas on the North Slope if necessary, in sufficient quantities to support the energy needs of Alaskans and a bullet pipeline project.

and recommends:

[ ] be **replaced** with [ ] **SCS** or [ ] **CS** ____________________ (________)

[ ] adopt **previous** [ ] **SCS** or [ ] **CS** ____________________ (________)

[ ] attached amendment(s)

[ ] adopt ______________________ Letter of Intent

[ ] further referral to ______________ Committee

SENATE BILL:
[ ] Same Title
[ ] New Title

HOUSE BILL:
[ ] Same Title
[ ] Technical Title Change
[ ] New Title w/ SCR #_____

<u>NEW</u> FISCAL NOTE(S):

Department	Date	Fiscal	Indet.	Zero	FN#

<u>PREVIOUS</u> FISCAL NOTE(S):

Department	Date	Fiscal	Indet.	Zero	FN#

[ ] **APPROPRIATION - no fiscal note**

SIGNATURES AND RECOMMENDATIONS:	PRINTED LAST NAME	DO PASS	DO NOT PASS	NO REC	AMEND
[signature]	Wielechowski			✓	
[signature]	STEDMAN			✓	
CHAIR: [signature]	McGuire	✓			

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FISCAL NOTE

STATE OF ALASKA
2010 LEGISLATIVE SESSION

Fiscal Note Number: 1
Bill Version: **SCS CSHCR 2(FIN)**
(S) Publish Date: 3/30/10

Identifier (file name):
Title: HCR 2 IN-STATE GAS PIPELINE
Sponsor: Rep. Ramras
Requester: Senate Finance Committee

Dept. Affected: All
RDU
Component
Component Number

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required	Information					
OPERATING EXPENDITURES	**FY 2011**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**
Personal Services							
Travel							
Contractual							
Supplies							
Equipment							
Land & Structures							
Grants & Claims							
Miscellaneous							
TOTAL OPERATING	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
CAPITAL EXPENDITURES							
CHANGE IN REVENUES ( )							

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts							
1003 GF Match							
1004 GF							
1005 GF/Program Receipts							
1037 GF/Mental Health							
Other Interagency Receipts							
TOTAL	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Estimate of any current year (FY2010) cost:

POSITIONS

Full-time							
Part-time							
Temporary							

ANALYSIS: *(Attach a separate page if necessary)*

Prepared by: Senate Finance Committee
Co-Chair Bert Stedman/Co-Chair Lyman Hoffman
Phone 465-3873/465-4453
Date/Time
Approved by:
Date 3/29/2010

(Revised 11/6/2009 OMB)

Chair, Judiciary
Chair, Economic Development, Trade & Tourism
Energy
Military & Veteran Affairs
Joint Armed Services
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House of Representatives

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Representative Jay Ramras
District 10

Sponsor Statement for House Concurrent Resolution No. 2

Short Title: IN-STATE GAS PIPELINE **Contact: Margaret Dowling, 465-6841**

Purpose and Intent HCR 2:

The intent of House Concurrent Resolution No. 2 is to provide energy security for Alaskans. This resolution urges the Governor to take action that will facilitate development of a small natural gas pipeline, commonly referred to as the "bullet line." With completion of a large diameter gas line not expected until 2016 at the earliest, the bullet line, a smaller project that will be easier and quicker to complete, can bridge the gap in natural gas delivery and provide much needed natural gas to communities along its route between the North Slope and Cook Inlet. Because the gas will be extracted and delivered within the state, and for export, the cost of this resource to the ratepayers could be considerably less than the cost of other sources of fuel consumed by Alaska's residents today. Thus, the bullet line will provided certainty of supply and predictability of price for Alaskans along the bullet line route.

The Governor and key agencies in the executive branch are in a unique position to facilitate development of the bullet line. The executive branch has the authority and resources to locate companies or entities in Gubik or elsewhere in the North Slope that have significant quantities of natural gas and to negotiate contracts with those entities to guarantee commercially reasonable terms that will enhance economic viability of a bullet line. The time to act for energy certainty for all Alaskans is now.

Summary HCR 2:

- Requests that the Governor provide energy security for all Alaskans by taking action necessary to support the development of a natural gas pipeline that will deliver natural gas from the North Slope to Cook Inlet.

- Requests that the Governor identify entities in Gubik or elsewhere on the North Slope that have sufficient quantities of natural gas to support a gas line.
- Requests that the Governor negotiate a commitment with the identified entity for gas production on commercially reasonable terms that would support the economic viability of the gas line.

Benefits HCR 2:

- Secures an adequate supply of affordable natural gas for residential and industrial consumers from the North Slope to Cook Inlet.
- Increases jobs, and local and state revenue.

HCR 2 Testimony 2/3/09

Frank Abegg
Fairbanks resident, private citizen

I support building a Bullet Line to deliver in-state natural gas to the Railbelt.

I have been a volunteer working on the Interior Issues Council of the Fairbanks Economic Development Corporation (FEDC). This group was formed a few years ago to find ways to improve our health and lower the area's energy costs. During the past few months, and our community group investigated Alaska's gas fields, in-state pipeline/supply options, the gas market and potential future industry opportunities. The group identified three possible options for delivering InState gas to Alaskans: Fairbanks Natural Gas LNG from the North Slope, the ANGDA Spur Line from Delta Junction to Anchorage, and the ENSTAR Bullet Line from the North Slope to Anchorage. All three proposals have challenges to provide economical gas supply. However, I believe the Bullet Line is the best option for supplying future reliable and economical gas to Fairbanks and Anchorage. If the bullet line can secure sufficient market and operate at its projected 0.5 Bcf/day, then natural gas could be supplied from the North Slope in the $10 to $12/mcf range. FNG currently supplies gas to Fairbanks customers at $22.91/mcf.

One of the options we explored was the "Do Nothing" scenario. At present the Fairbanks area uses 50 million gallons of fuel oil for residential/commercial heating each year. At $2.50/gallon oil the Fairbanks spends $125 million annually. Switching to gas could save up to $60 million annually by switching to gas priced at $10-12/mcf. The local refineries, Flint Hills and PetroStar, and the electric utility, GVEA, also burn oil. If they switched to gas they could potentially save around $150 million annually, which could be over $200 million annual savings.

Currently the Anchorage area's residential/commercial customers and electric utilities use about 80 Bcf/yr of gas. With the Cook Inlet gas field depleting, they might need to import LNG in the future without instate gas from the bullet line. If the imported LNG cost an additional $3/mcf, then the Anchorage customers would need to spend an additional $240 million/year for gas.

Bottom line is that the Railbelt could see increased energy costs in the range of $500 million/year compared to building a bullet line. If the Bullet Line costs $4 billion at an investment rate of 12%, then its annual cost would be about $500 million. About the same cost. However, the Bullet Line would provide Alaskans' access to in-state resources, create jobs in its construction, opportunities for local industry and help Fairbanks solve the growing PM2.5 air quality non-attainment problem.

I recommend that the State provide assistance to private industry in the permitting and right-of-way and possibly roads needed for the bullet line construction. The goal should be to have gas delivered to Anchorage and Fairbanks within the next 5 years.

The FEDC Instate Gas Pipeline Supply Options Study will be officially released this week. The Study supports construction of the Bullet Line and recommends the State provide assistance. The Study supports building a limited size LNG facility on the North Slope to deliver gas to Fairbanks by 2011 and a Bullet Line that can deliver gas by 2016. The bullet line would provide access to market for the potential Nenana gas field, Yukon Flats, Gubik and Cook Inlet. Having multiple gas supplies should encourage competitive pricing of our future gas supply.

HCR

3

<target><bill>HCR 3</bill><subject>HCR 3</subject><comm>SENE26</comm></target>

SENATE COMMITTEE REPORT

DATE: 2/11/09

FURTHER: Resources
Finance

DATE TURNED IN TO OFFICE: 02/27/09

Senate Special Committee on Energy considered HOUSE CONCURRENT RESOLUTION NO. 3 am

HCR 3 IN-STATE GAS PIPELINE

Requesting the governor to provide energy security for all Alaskans by taking and encouraging all action that would support a natural gas bullet pipeline from the North Slope to the Cook Inlet region, including initiating any necessary negotiations to reopen the Agrium plant in Kenai.

and recommends:

[ ] be **replaced** with [ ] **SCS** or [ ] **CS** ______________ (________)

[ ] adopt **previous** [ ] **SCS** or [ ] **CS** ______________ (________)

[ ] attached amendment(s)

[ ] adopt ______________ Letter of Intent

[ ] further referral to ______________ Committee

SENATE BILL:
[ ] Same Title
[ ] New Title

HOUSE BILL:
[ ] Same Title
[ ] Technical Title Change
[ ] New Title w/ SCR #_____

NEW FISCAL NOTE(S):

Department	Date	Fiscal	Indet.	Zero	FN#

PREVIOUS FISCAL NOTE(S):

Department	Date	Fiscal	Indet.	Zero	FN#

[ ] **APPROPRIATION - no fiscal note**

SIGNATURES AND RECOMMENDATIONS:	PRINTED LAST NAME	DO PASS	DO NOT PASS	NO REC	AMEND
[signature]	Wielechowski			✓	
Bert Stedman	STEDMAN			✓	
CHAIR: Lesil McGuire	McGuire	✓			

1170

Chair, Judiciary
Chair, Economic Development,
Trade & Tourism
Energy
Military & Veteran Affairs
Joint Armed Services
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Fax: (907) 452-1146

Alaska State Legislature
House of Representatives

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State Capitol, Room 118
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Fax: (907) 465-2070
Toll Free: (877) 465-3004

Representative Jay Ramras
District 10

Sponsor Statement for House Concurrent Resolution No. 3

Short Title: IN-STATE GAS PIPELINE **Contact: Margaret Dowling, 465-6841**

Intent and Purpose HCR 3

The intent of House Concurrent Resolution No. 3 is to provide energy security for Alaskans by encouraging the Governor to take the lead in expediting reopening of Agrium U.S., Inc.; a facility that processes natural gas into urea fertilizer and other consumables. Reopening Agrium ensures a steady demand for natural gas that will enhance the economic viability of a gas bullet line, which will in turn benefit all Alaskans by providing certainty of supply and predictability of price for gas consumers.

The intent of HCR 3 is also to support the Alaska farming industry. Farms cover more than 25,000 acres in five boroughs with more than 300 farmers residing in the Matanuska-Susitna Borough and more than 130 farmers in the Fairbanks area. The value of those farms is approximately $22,700,000. Agrium U.S., Inc. was the only urea fertilizer plant in the state. After it closed in 2007, because it lacked sufficient supplies of natural gas with which to manufacture fertilizer, famers in Alaska experienced a 400% increase in the cost of fertilizer and the Alaskan job market lost over 150 jobs. Reopening Agrium will not only help increase the economic viability of a natural gas line, it will create jobs and reduce the cost of farming in Alaska.

Summary HCR 3:

- Requests that the Governor provide energy security for all Alaskans by taking action necessary to support the development of a natural gas pipeline that will deliver natural gas from the North Slope to Cook Inlet.

- Requests that the Governor initiate negotiations to reopen the Agrium U.S., Inc. facility, which closed in 2007 and which was a consumer of natural gas used in the production of fertilizer.

Benefits HCR 3:

- Secures an adequate supply of affordable natural gas for residential and industrial consumers from the North Slope to Cook Inlet.
- By reopening Agrium, demand for natural gas will be insured enhancing the economic viability of a natural gas bullet line, which in turn benefits Alaskans by providing certainty of supply and predictability of price for gas consumers along the bullet line route.
- Supports Alaska's farming industry by providing a local, cost competitive source of fertilizer.
- Increases jobs for Alaskans and state and local revenue.

HCR

4

<target><bill>HCR 4</bill><subject>HCR 4</subject><comm>SENE26</comm></target>

SENATE COMMITTEE REPORT

DATE: 2/11/09

FURTHER: Resources
Finance

DATE TURNED IN TO OFFICE: 02/27/09

Senate Special Committee on Energy considered HOUSE CONCURRENT RESOLUTION NO. 4 am

HCR 4 IN-STATE GAS PIPELINE

Requesting the governor to provide energy security for Alaskans by taking and encouraging all appropriate action to support development of a natural gas bullet pipeline from the North Slope to the Cook Inlet region including advocating an increase in the amount of natural gas that may be exported under authority granted by the United States Department of Energy.

and recommends:

[ ] be **replaced** with [ ] **SCS** or [ ] **CS** ____________________ (________)

[ ] adopt **previous** [ ] **SCS** or [ ] **CS** ____________________ (________)

[ ] attached amendment(s)

[ ] adopt ____________________ Letter of Intent

[ ] further referral to ______________ Committee

SENATE BILL:
[ ] Same Title
[ ] New Title

HOUSE BILL:
[ ] Same Title
[ ] Technical Title Change
[ ] New Title w/ SCR #_____

NEW FISCAL NOTE(S):

Department	Date	Fiscal	Indet.	Zero	FN#

PREVIOUS FISCAL NOTE(S):

Department	Date	Fiscal	Indet.	Zero	FN#

[ ] **APPROPRIATION - no fiscal note**

SIGNATURES AND RECOMMENDATIONS:	PRINTED LAST NAME	DO PASS	DO NOT PASS	NO REC	AMEND
[signature]	Wielechowski			✓	
Bert Stedman	STEDMAN			✓	
CHAIR: Lesil McGuire	McGuire	✓			

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Chair, Economic Development, Trade & Tourism
Energy
Military & Veteran Affairs
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Alaska State Legislature
House of Representatives

While in Session
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Juneau, Alaska 99801-1182
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Representative Jay Ramras
District 10

Sponsor Statement for House Concurrent Resolution No. 4

Short Title: IN-STATE GAS PIPELINE **Contact: Margaret Dowling, 465-6841**

Purpose and Intent HCR 4

The intent of House Concurrent Resolution No. 4 is to provide energy security for Alaskans by requesting that the Governor take all steps necessary to encourage development of a natural gas pipeline from the North Slope to the Cook Inlet Region, including advocating for an increase in the amount of natural gas that may be exported from the state under the authority granted by the United States Department of Energy. Increasing the volume of gas that may be exported from Alaska under U.S. Department of Energy licenses will increase demand and provide certainty and economic viability for a natural gas bullet line from the North Slope to the Cook Inlet Region.

Under current licenses with the U.S. Department of Energy, ConocoPhillips Alaska Natural Gas Corporation and Marathon Oil Company may export from the Kenai liquefied natural gas export facility up to 99,000,000,000,000 British thermal units (about 98,100,000,000 cubic feet) of liquefied natural gas during the two-year period from April 1, 2009 to March 31, 2011. After that time the Kenai liquefied natural gas export facility may be forced to close if the authority to export liquefied natural gas is not extended and if no new gas is discovered in the Cook Inlet region to meet both export and local demand. Local demand alone in the Cook Inlet region is expected to grow from 200,000,000 cubic feet a day to approximately 700,000,000 cubic feet a day during the period of 2010 to 2025. By supporting an increase in export licenses, the Governor will take the lead in insuring that Cook Inlet natural gas demand is supplied and that a natural gas bullet line from the North Slope to Cook Inlet is an economically viable project.

Summary HCR 4:

- Requests that the Governor provide energy security for all Alaskans by taking action necessary to support the development of a natural gas pipeline that will deliver natural gas from the North Slope to Cook Inlet.

- Requests that the Governor take appropriate action to advocate an increase in the volume of gas that may be exported under licenses issued by the U.S. Department of Energy to 60,000,000,000 cubic feet a year with that increase to be supplied by North Slope natural gas.

Benefits HCR 4:

- Secures an adequate supply of affordable natural gas for residential and industrial consumers from the North Slope to Cook Inlet.
- Enhances production and export of liquefied natural gas, thereby increasing jobs, and local and state revenue.
- Allows the Interior and other regions in the state to convert from fossil fuels to cheaper and cleaner burning natural gas, thereby increasing compliance with the fine particle air quality standard issued by the U.S. Environmental Protection Agency and enhancing Alaskan's health.

HCR

5

<target><bill>HCR 5</bill><subject>HCR
5</subject><comm>SENE26</comm></target>

SENATE COMMITTEE REPORT

DATE: 2/11/09

FURTHER: Resources
Finance

DATE TURNED IN TO OFFICE: 02/27/09

Senate Special Committee on Energy considered HOUSE CONCURRENT RESOLUTION NO. 5 am

HCR 5 IN-STATE GAS PIPELINE

Requesting the governor to provide energy security for all Alaskans by working on significant elements and components to support the timely construction of a natural gas bullet pipeline from the North Slope to the Cook Inlet region and to take necessary and appropriate action to assist and facilitate the process for a private entity to make a final investment decision to commit to the pipeline before November 1, 2010.

and recommends:

[ ] be **replaced** with [ ] **SCS** or [ ] **CS** ________________ (________)

[ ] adopt **previous** [ ] **SCS** or [ ] **CS** ________________ (________)

[ ] attached amendment(s)

[ ] adopt ____________________ Letter of Intent

[ ] further referral to ______________ Committee

SENATE BILL:
[ ] Same Title
[ ] New Title

HOUSE BILL:
[ ] Same Title
[ ] Technical Title Change
[ ] New Title w/ SCR #_____

NEW FISCAL NOTE(S):

Department	Date	Fiscal	Indet	Zero	FN#

PREVIOUS FISCAL NOTE(S):

Department	Date	Fiscal	Indet	Zero	FN#

[ ] **APPROPRIATION - no fiscal note**

SIGNATURES AND RECOMMENDATIONS:	PRINTED LAST NAME	DO PASS	DO NOT PASS	NO REC	AMEND
[signature]	Wielechowski			✓	
[signature]	Stedman			✓	
CHAIR: [signature]	McGuire	✓			

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Toll Free: (877) 465-3004

Representative Jay Ramras
District 10

Sponsor Statement for House Concurrent Resolution No. 5

Short Title: IN-STATE GAS PIPELINE **Contact: Margaret Dowling, 465-6841**

Purpose and Intent HCR 5

The intent of House Concurrent Resolution No. 5 is to provide energy security for Alaskans by requesting that the Governor take all steps necessary to encourage development of a natural gas pipeline from the North Slope to the Cook Inlet region – and to do so with all due speed.

Alaskans' demand for reasonably priced, clean burning fuel for their homes is on the rise. With the cost of electricity and home heating fuel still at record breaking prices, and with completion of a large diameter natural gas pipeline not expected until 2016, at the earliest, now is the time to take action to build a smaller gas line. HCR 5 requests that the Governor work to support the timely construction of a natural gas bullet pipeline from the North Slope to the Cook Inlet region, including assisting and facilitating a private entity to commit to investing in the bullet pipeline before November 1, 2010.

Summary HCR 5:

- Requests that the Governor provide energy security for all Alaskans by taking action necessary to support the development of a natural gas pipeline that will deliver natural gas from the North Slope to Cook Inlet.
- Requests that the Governor assist and facilitate the commitment of a private entity to invest in the bullet pipeline before November 1, 2010.

Benefits HCR 5:

- Secures an adequate supply of affordable natural gas for residential and industrial consumers from the North Slope to Cook Inlet.
- Enhances production and exports of liquefied natural gas, thereby increasing jobs, and local and state revenue.

- Allows thc Interior and other regions in the state to convert from fossil fuels to cheaper and cleaner burning natural gas, thereby increasing compliance with the fine particle air quality standard issued by the U.S. Environmental Protection Agency and enhancing Alaskan's health.