

02/20/13  
Alaska Energy  
Authority  
Overviews:  
Power Cost  
Equalization  
and Susitna-  
Watana Hydro

<TARGET><BILL></BILL><SUBJECT>02-20-13 Alaska Energy  
Authority Overviews Power Cost Equalization and Susitna-  
Watana Hydro</SUBJECT><COMM>HENE28</COMM></TARGET>

**Alaska Legislature  
House Special Committee on Energy**



**Rep. Charisse Millett**

Capitol Building, Room 403  
Juneau, AK 99801  
Phone (907) 465-3879  
Fax (907) 465-2069  
[rep.charisse.millett@akleg.gov](mailto:rep.charisse.millett@akleg.gov)

**Rep. Doug Isaacson**

Capitol Building, Room 13  
Juneau, AK 99801  
Phone (907) 465-4527  
Fax (907) 465-2197  
[rep.doug.isaacson@akleg.org](mailto:rep.doug.isaacson@akleg.org)

# Agenda

**Wednesday, February 20, 2013**

**8:00 – 10:00 a.m.**

**Barnes Committee Room (#124)**

**+PCE Overview**

Sara Fisher-Goad, Alaska Energy Authority

**+Susitna-Watana Hydro Project**

Sara Fisher-Goad, Alaska Energy Authority

Wayne Dyok, Susitna-Watana Hydro Project Manager, Nick Szymoniak, Project Economist.

Bills previously heard/scheduled

- \* First hearing in first committee of referral
- + Teleconferenced
- = Bill previously heard/scheduled

###



# Power Cost Equalization Overview

House Energy Committee

Feb. 20, 2013

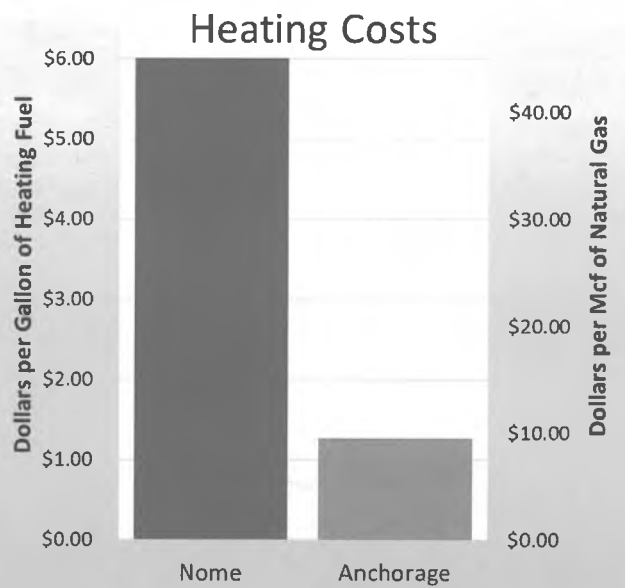
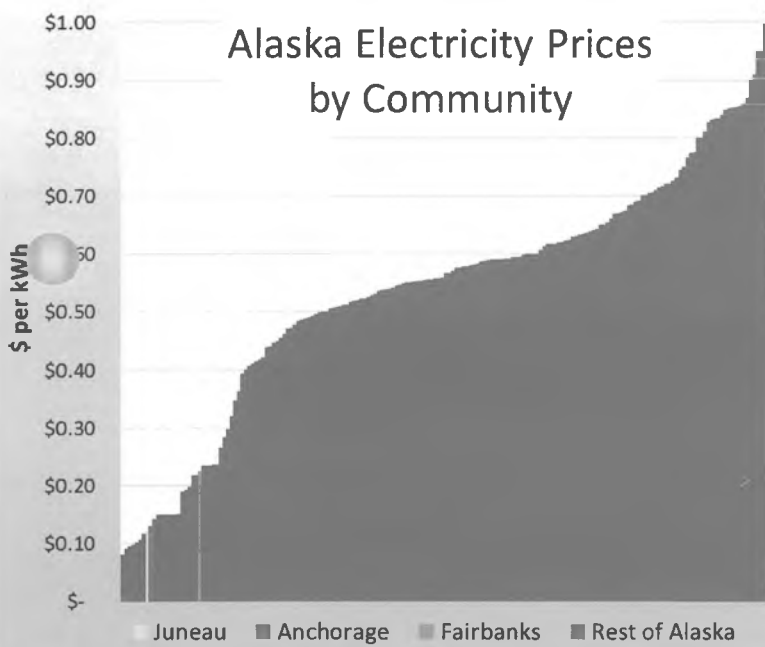


# Alaska Energy Authority

Mission: Reduce the Cost of Energy in Alaska

- Accomplished by:
  - Energy Planning and Policy
  - Investing in Energy Infrastructure
  - Diversifying Alaska's Energy Portfolio
  - Technical Training and Assistance

# Alaska's Energy Costs



## The Need for PCE

- Rural Alaska electrical rates can be 3 to 5 times higher than in urban Alaska
- Assistance needed in rural Alaska to maintain and operate basic infrastructure and systems
- Power Cost Equalization (PCE) created at a time when State funds were used to construct major energy projects to serve urban areas
- Four Dam Pool hydroelectric facilities:
  - State-owned assets in Kodiak, Valdez, Wrangell-Petersburg and Ketchikan
  - provided low-cost and reliable power
  - Four Dam Pool facilities sold to communities they served

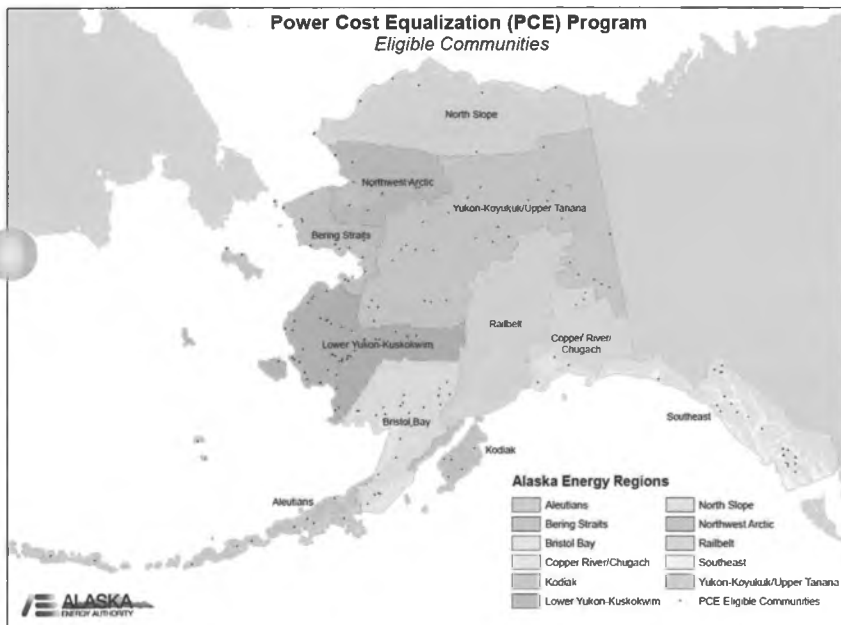
## Power Assistance Programs

- State of Alaska had two prior power-assistance programs
  - Power Production Assistance Program ('80)
  - Power Cost Assistance Program ('81)
- AS 44.83.162.-165 replaced previous programs with the PCE program
  - effective October 1984
  - Present law AS 42.45.100-190
- PCE program equalizes the power cost per kilowatt hour (kWh) statewide at a cost close-or equal- to the mean of power costs in Anchorage, Fairbanks and Juneau (AS 42.45.100(a)(1))

## PCE: Eligibility

- 1983- residential sales less than 7,500/MWh and 1984- used diesel greater than 75% of consumption (AS.42.45.150)
- Eligible:
  - about 30% of all kWh sold by participating utilities
  - community facilities (e.g. water and sewer, public lighting)
  - residential customers
- Not eligible:
  - State and Federal facilities (including schools)
  - commercial customers
- Railbelt electrical utilities, Juneau and Four Dam Pool communities are not eligible

# PCE: Participating Communities



- Approximately 81,000 Alaskans live in the 188 participating communities

## Calculating the Floor

| Utility                            | Rates \$ | % PCE floor | %Utility Sales Used |
|------------------------------------|----------|-------------|---------------------|
| Alaska Electrical Light & Power    | 0.1210   | 14.5        | 100.0               |
| Chugach Electric Association       | 0.1418   | 52.3        | 98.5                |
| Golden Valley Electric Association | 0.2162   | 6.6         | 20.7                |
| Matanuska Electric Association     | 0.1511   | 11.7        | 24.9                |
| Municipal Light & Power            | 0.1302   | 14.9        | 100.0               |
| Floor for FY 13                    | 0.1430   |             |                     |

## Calculating the PCE Level: Overview

The PCE level is:

- Calculated for each participating utility – per community
- Eligible Utility Costs determined by RCA
  - two categories of costs: fuel and non-fuel
  - non-fuel costs do not include utility profit
  - cannot exceed \$0.8142kWh
- Lowered by any additional State or federal assistance
- A utility is not eligible if their average rate is below the PCE Floor

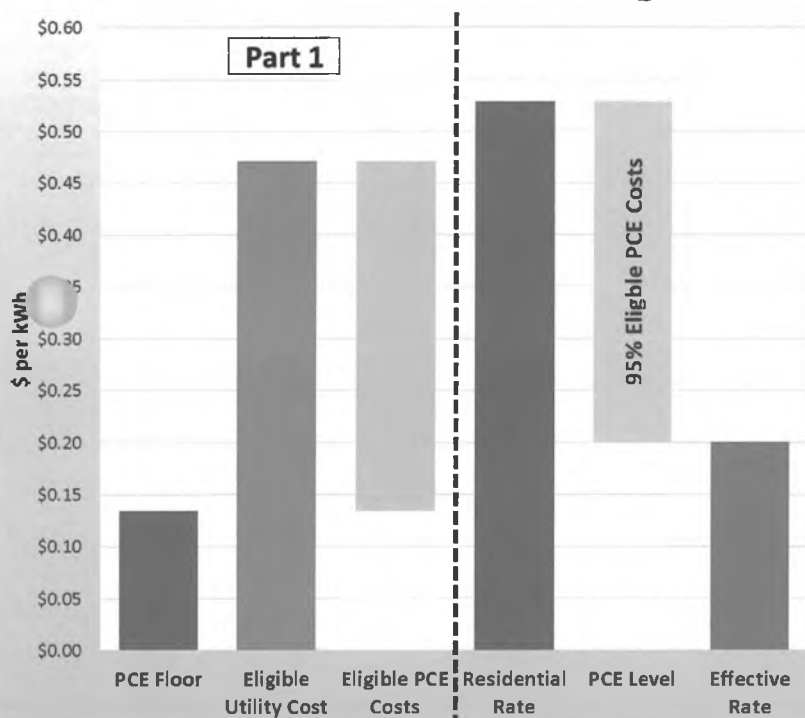
**Max PCE Level  
equals  
95%  
of  
(\$1.00 - \$0.1430)**

## PCE: Reducing Power Bills

- Residential: credit on first 500 kWh consumed each month (per customer)
- Community facilities: credit on 70 kWh x the community population (for the entire community)
- Customer's bill = total cost - the PCE credit
- Utilities are required to notify the customer of the PCE credit and the total cost of service with every bill
- Utilities are reimbursed on the customer credit

*Population numbers updated by Department of Commerce, Community and Economic Development on July 1, annually*

## Calculating PCE Rates: Part 1



- PCE Floor

- weighted average power cost of Anchorage, Fairbanks and Juneau
- determined by the RCA
- \$0.1430 per kWh (FY13)

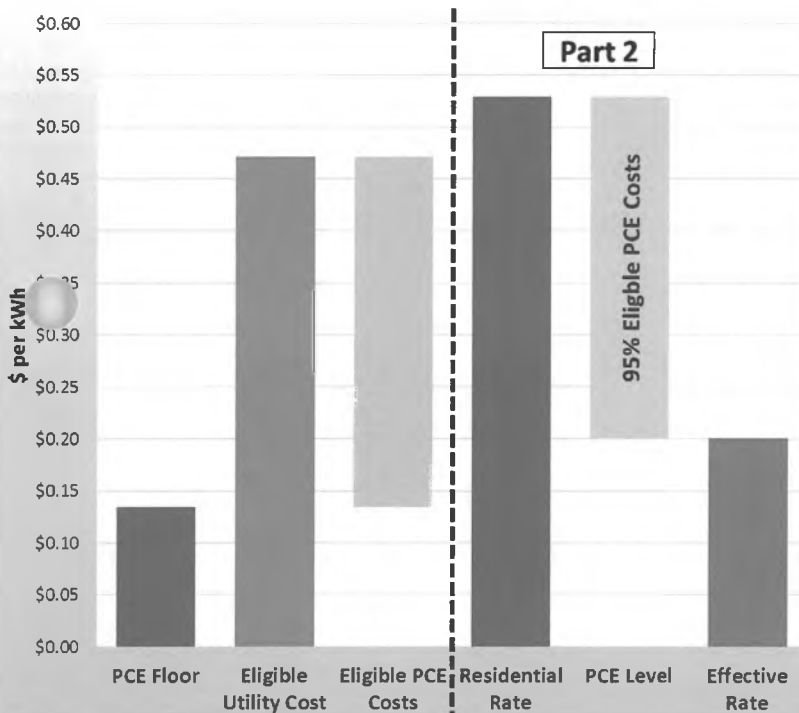
- Eligible Utility Costs (RCA verified)

- fuel costs and non-fuel costs only
- \$0.47 per kWh (current average)
- max cost of \$1.00 per kWh

- Eligible PCE Costs

- RCA Utility Cost minus the Floor

## Calculating PCE Rates: Part 2



- Residential Rate
  - calculated by the utility
  - \$0.53 per kWh (current average)
- PCE Level
  - 95% of the Eligible PCE Costs
  - calculated for each community
- Effective Rate
  - price customers pay for PCE-eligible kWhs
  - residential Rate minus PCE Level
  - \$0.22 per kWh (current average)

## PCE: Reducing Power Bills

### Sample Bill

|             |                        |   |                          |   |       |
|-------------|------------------------|---|--------------------------|---|-------|
| Without PCE | 600 kWh (kWh used)     | * | \$.50/kWh (utility rate) | = | \$300 |
| PCE Credit  | 500 kWh (PCE eligible) | * | \$.30/kWh (PCE rate)     | = | \$150 |

**\$300-\$150= \$150 (Customer Pays)**

## PCE: Administration

### AEA's role:

- Authorizes payment to electric utilities
- Determines eligibility for residential and community facility customers
- Administers the PCE Fund based on
  - fiscal appropriations by the Alaska Legislature
  - monthly reports submitted by participating utilities
- Ensures compliance with Statutes and regulations

### RCA's role:

- Determines eligibility of utilities
- Sets PCE rates, calculations based on use, costs and efficiencies
- Ensures compliance with Statutes and regulations

## PCE: Funding

1. PCE Endowment Fund
2. General Fund
3. PCE Fund and Rural Electric Capitalization Fund

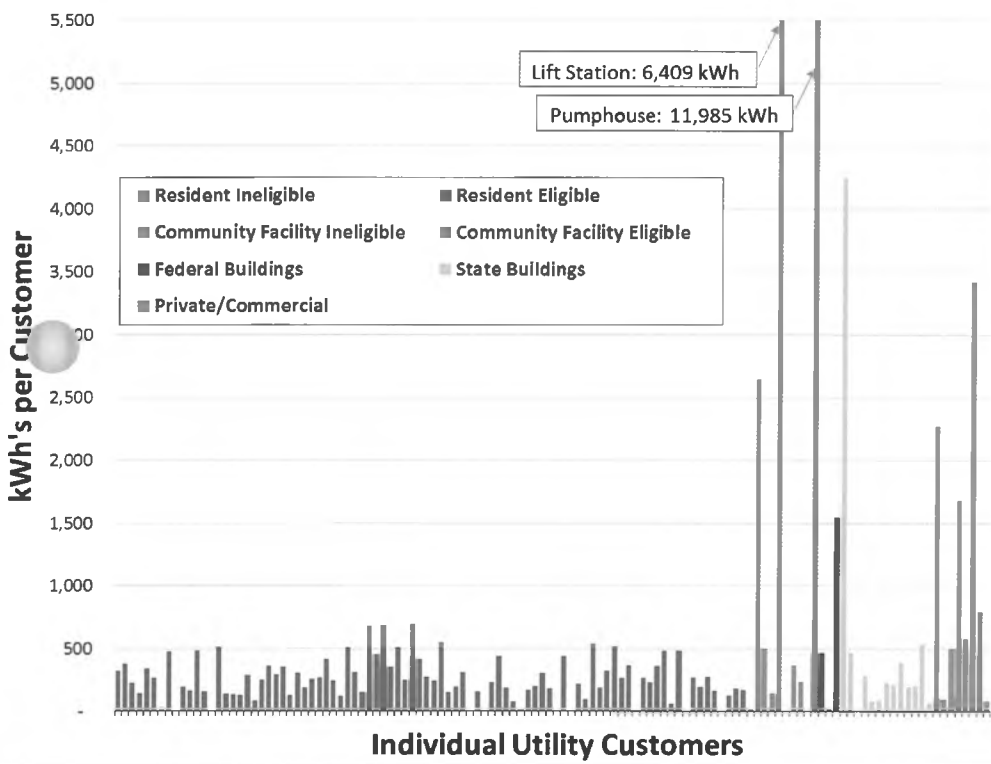
- PCE Payments totaling \$39.5 million at 100% (FY12)

# PCE: Funding

## PCE Endowment Fund

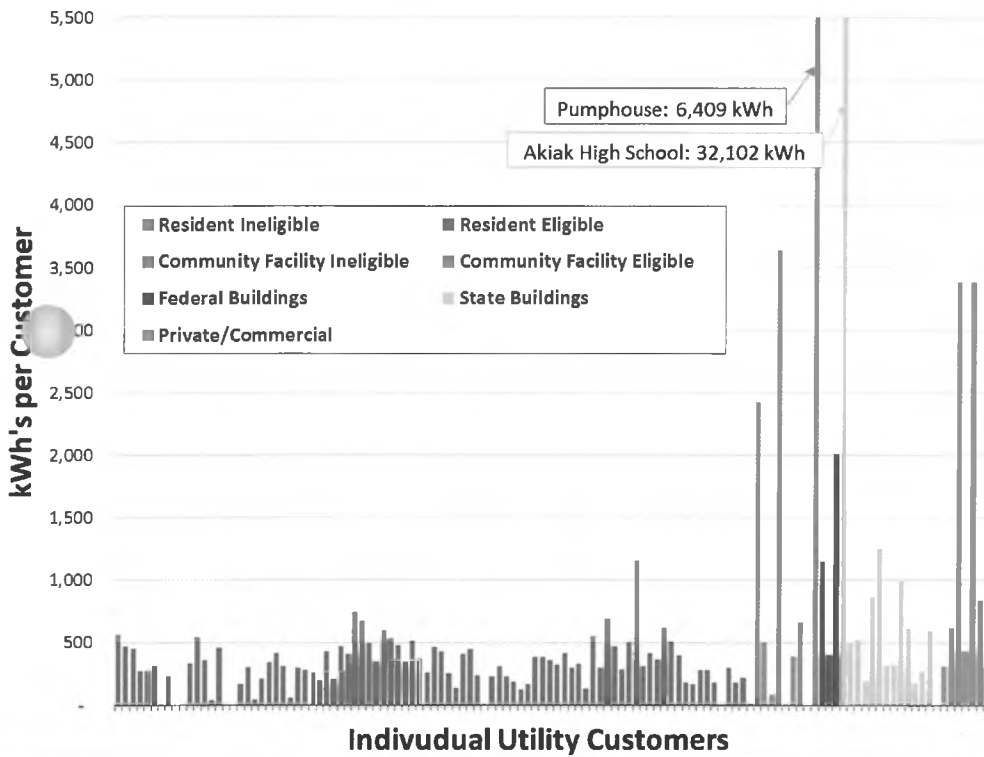
- AEA fund, managed by the Department of Revenue
- Created and capitalized in FY01 with funds from the Constitutional Budget Reserve and Four Dam Pool sale proceeds
- Further capitalized with General Funds in FY07 (\$182.7 million) and FY12 (\$400 million)
- 7% of the endowment fund's 3-year monthly average market value may be appropriated to the PCE program (AS 42.45.085 )
- Invested to earn 7% over time
- \$788 million in PCE Endowment Fund (as of 12/31/12)
- Anticipated to be only funding source in FY16

## July Akiak Electric Customer Use



- July customer usage is relatively low
- Bulk of Community Facility use is associated with water and sewer

## December Akiak Electric Customer Use



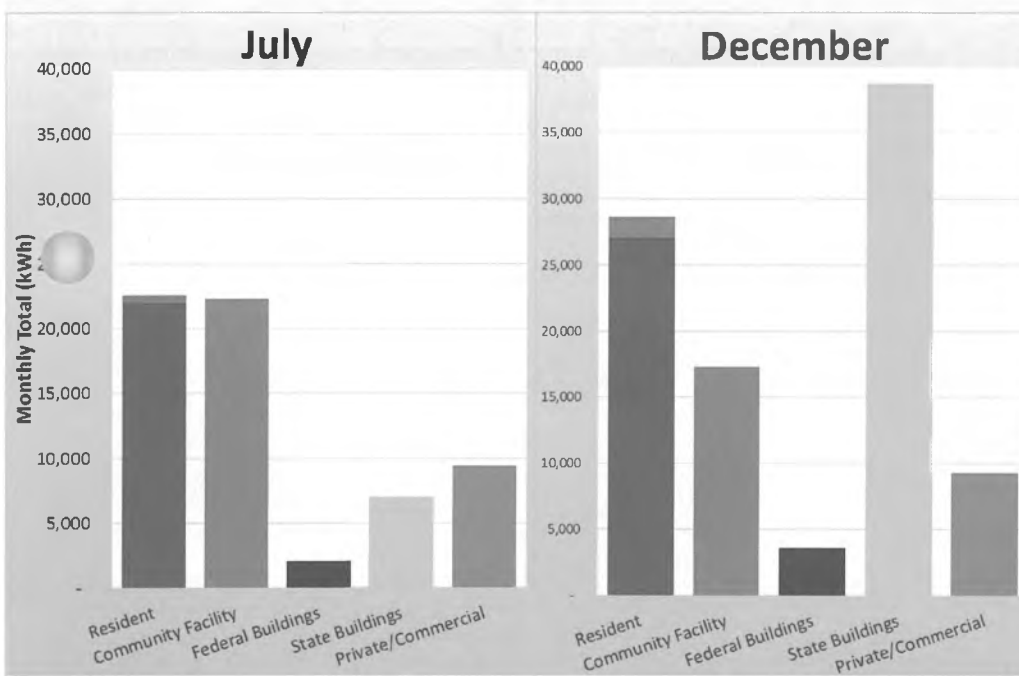
- Increase in total electric use in winter
- Akiak High School becomes the largest electric user in the community

## Community Example: Akiak



- Individual customer data for a summer month (July '12) and winter month (Dec. '12) in Akiak was used to demonstrate relative impact of PCE
- 121 electric customers in community
  - 89 residential
  - 9 community facilities
  - 3 Federal government
  - 13 State/local government
  - 8 commercial/private

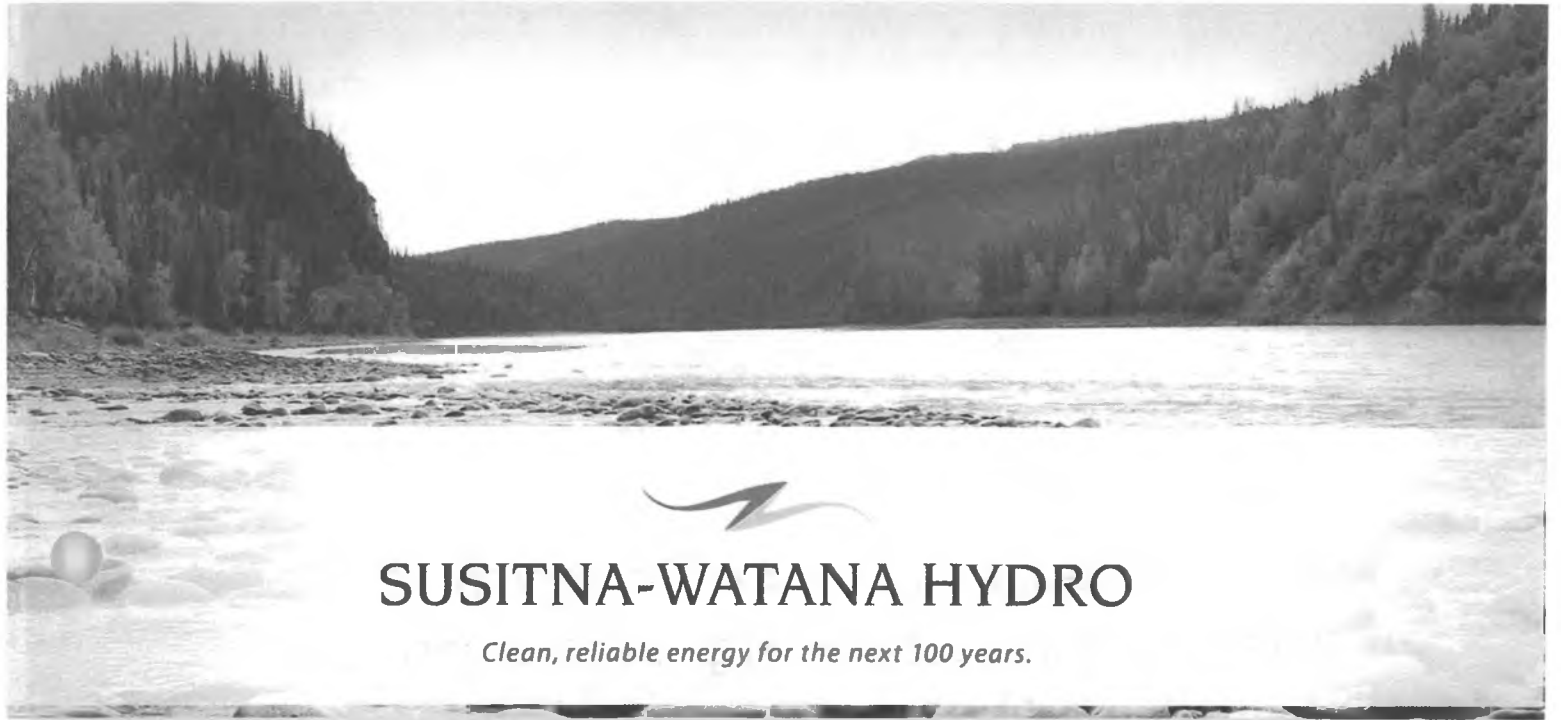
# Akiak Electric Use by Customer Type



- Increases (from July – Dec.)
  - total electric: 54%
  - total residential: 27%
  - ineligible residential: 14.6%
  - State buildings: 451%
- PCE eligible kWh
  - July: 70%
  - December: 45%
  - high eligible percentage, compared to state average



[AKEnergyAuthority.org](http://AKEnergyAuthority.org)



# SUSITNA-WATANA HYDRO

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[Susitna-WatanaHydro.org](http://Susitna-WatanaHydro.org)



# Alaska Energy Authority



## **Mission: Reduce the Cost of Energy in Alaska**

- Investing in Alaska's energy infrastructure
- Diversifying Alaska's energy portfolio
- Energy Planning and Policy
- Training and Technical Assistance

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1/10/2011

# Alaska's Energy Challenges

- Varied energy costs by region
- Declining oil production / highly volatile fossil fuel costs
- Aging facilities
- Dispersed communities, no central grid
- Short and long-term solutions necessary

# 2025 Renewable Energy Goal

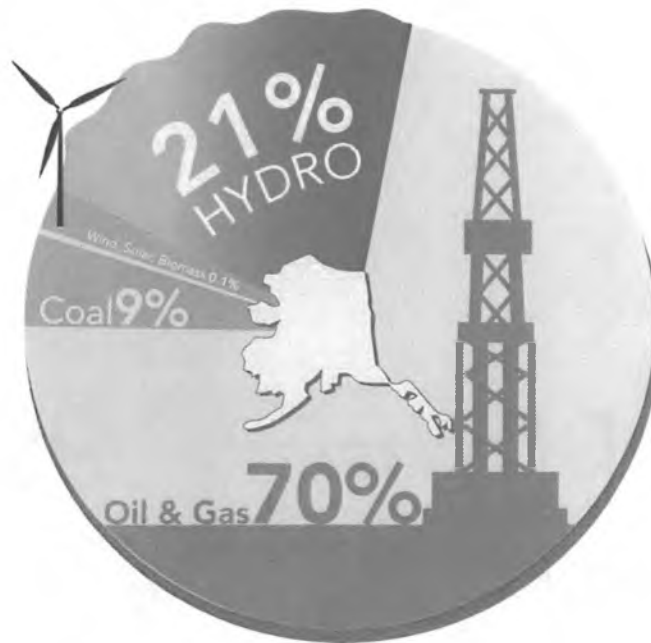


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# Alaska: Electricity Sources



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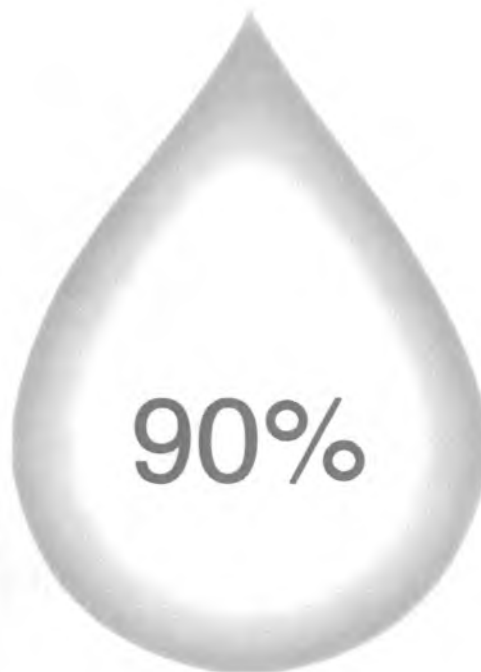
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# Renewable Electrical Power

Hydropower

all others 10%



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# Susitna Hydro: History



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# Why Susitna-Watana Hydro

- Serves ~80% of state's population
- 1,000 jobs during peak construction
- Stable electricity rates for 100+ years
- Long-term diversification
- Clean, reliable energy source
- Promotes integration of variable power sources

# Project Highlights

- Susitna-River Mile 184
- 87 River Miles from Talkeetna
- 22-32 River Miles upstream from Devils Canyon
- ~50 percent of Railbelt's Energy Demand

# Project Highlights

**Location:** River mile 184, above Devils Canyon

**Size:** 735-foot high dam

**Cost:** \$5.19 billion

**Reservoir:** About 42-miles long, average width of one mile

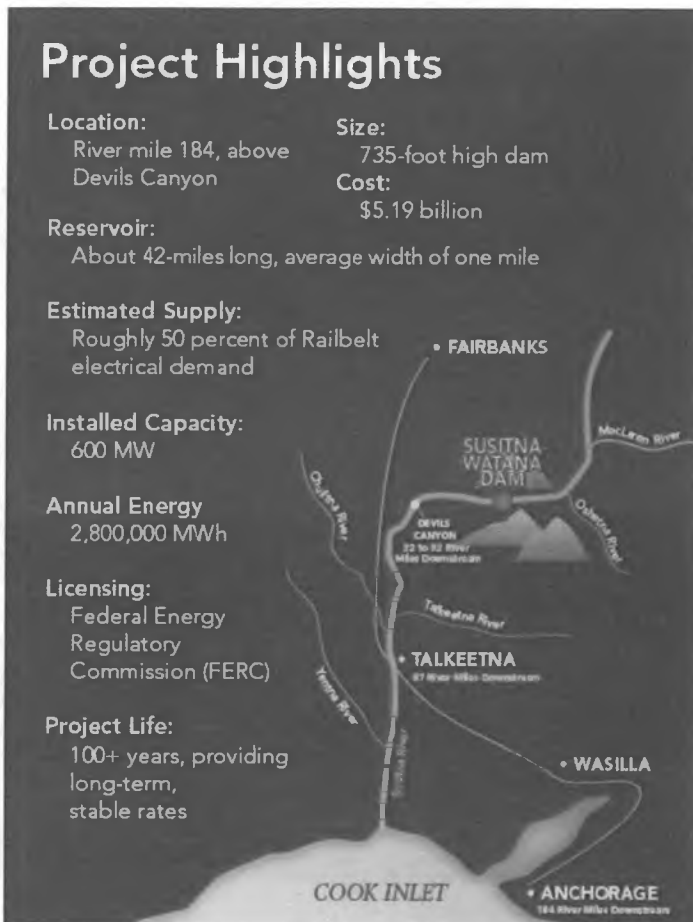
**Estimated Supply:** Roughly 50 percent of Railbelt electrical demand

**Installed Capacity:** 600 MW

**Annual Energy:** 2,800,000 MWh

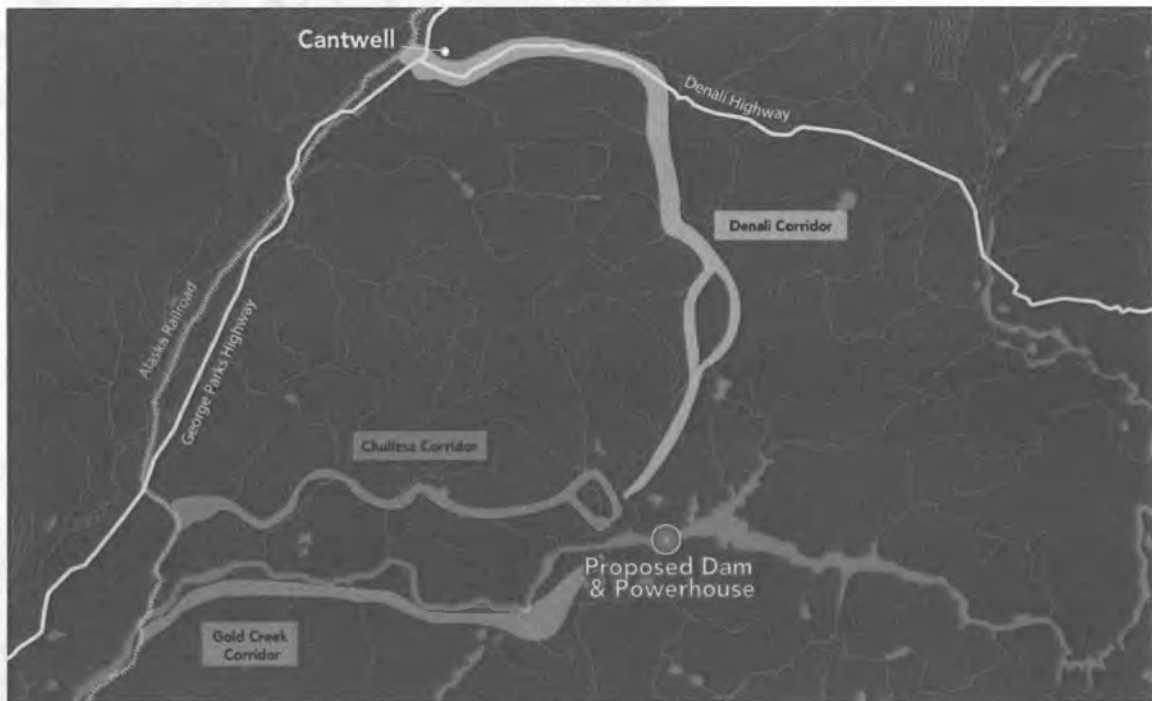
**Licensing:** Federal Energy Regulatory Commission (FERC)

**Project Life:** 100+ years, providing long-term, stable rates



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# Access and Transmission Alternatives



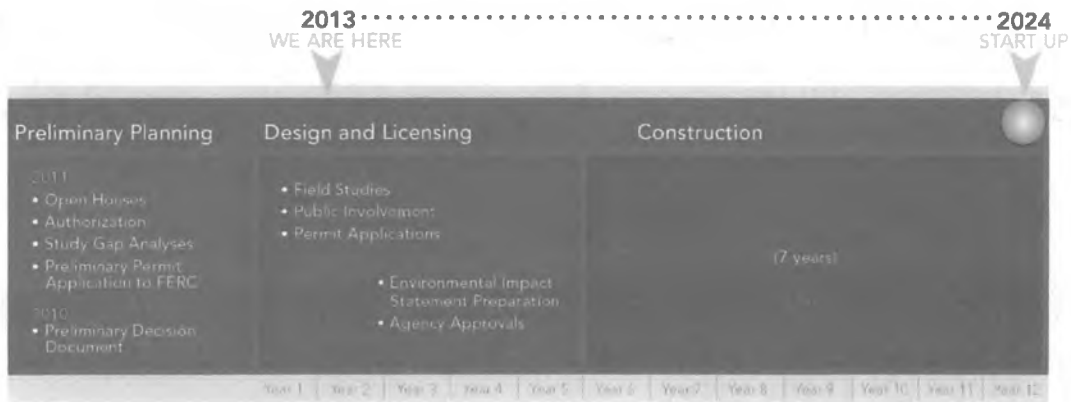
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# Project Timeline

## TIMELINE



# Employment

- 385: Total individuals contracted to work on Susitna-Watana Hydro (Outside AEA)
- Majority of workers are Alaskans
- Hydropower licensing experience in the Pacific Northwest
- 180 individuals anticipated to be in the field 2013

## Revised Study Plan

- Unprecedented effort
- Proactive approach
- 58 studies
- 186,000 acres



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# Susitna-Watana Hydro Environmental Program

- Early 2012 fieldwork, including important fish studies
- Development of a Revised Study Plan
  - significant stakeholder involvement
  - filed with FERC in 12/12
  - FERC Study Plan Determination on 44 studies  
2/1/2013
  - FERC Study Plan Determination on 14 studies  
4/1/2013

# Susitna-Watana Hydro

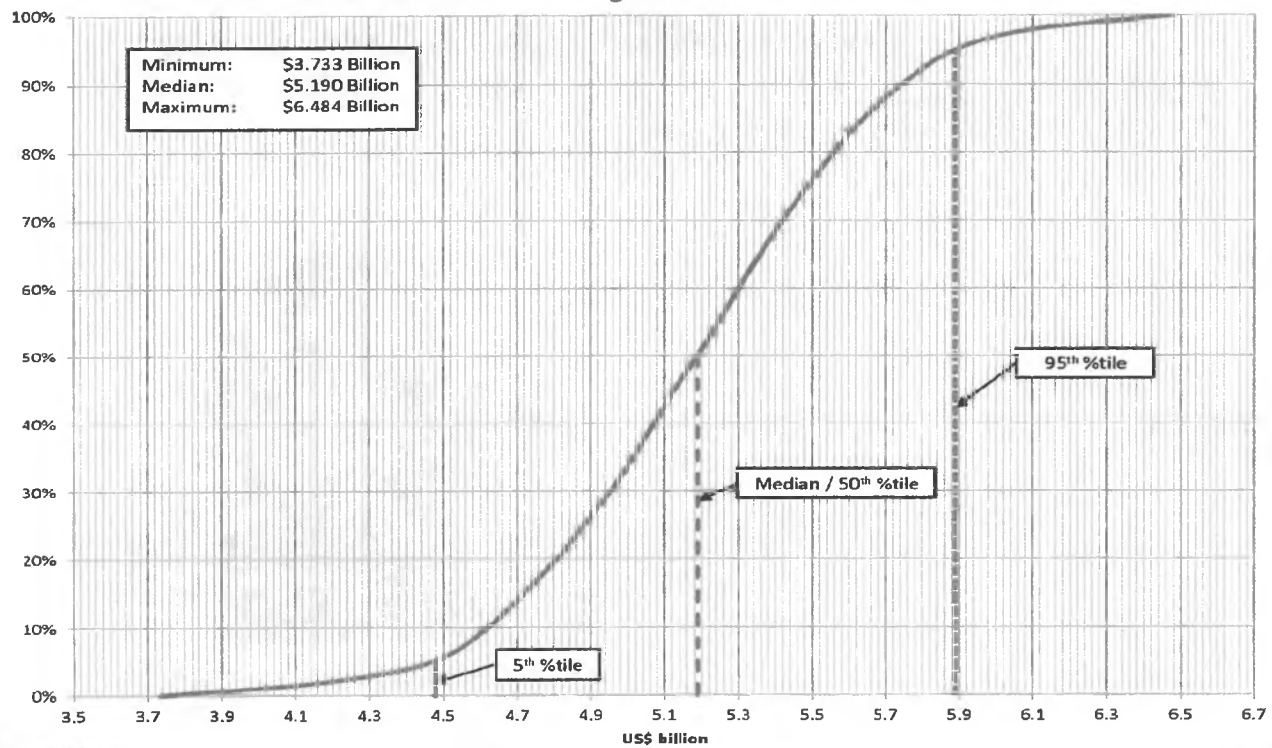
## Additional 2012 Accomplishments

- Licensing progress and meeting milestones
- Synthesized historical 1980s information
- Engineering
  - Progress refining design models
  - Identified three potential access routes
  - Brought on panel of international experts as board of consultants
  - 2012 geotechnical fieldwork and surveying
  - Development of engineering and project safety study plans
- Independent Cost Estimate

# Independent Construction Cost Estimate: Results

- AECOM tasked with unit-price estimate and independent construction schedule
- AECOM confirms
  - Feasible timeline
  - Roller-Compacted Concrete (RCC) dams constructible in cold climates
- AECOM recommends
  - Year-round construction
  - Consideration of early reservoir filling for early power generation
- Comparison between original and AECOM estimates within 9%
- Accuracy of the most probable estimate: -11% to +26%

# Probabilistic Range of Total Project Costs

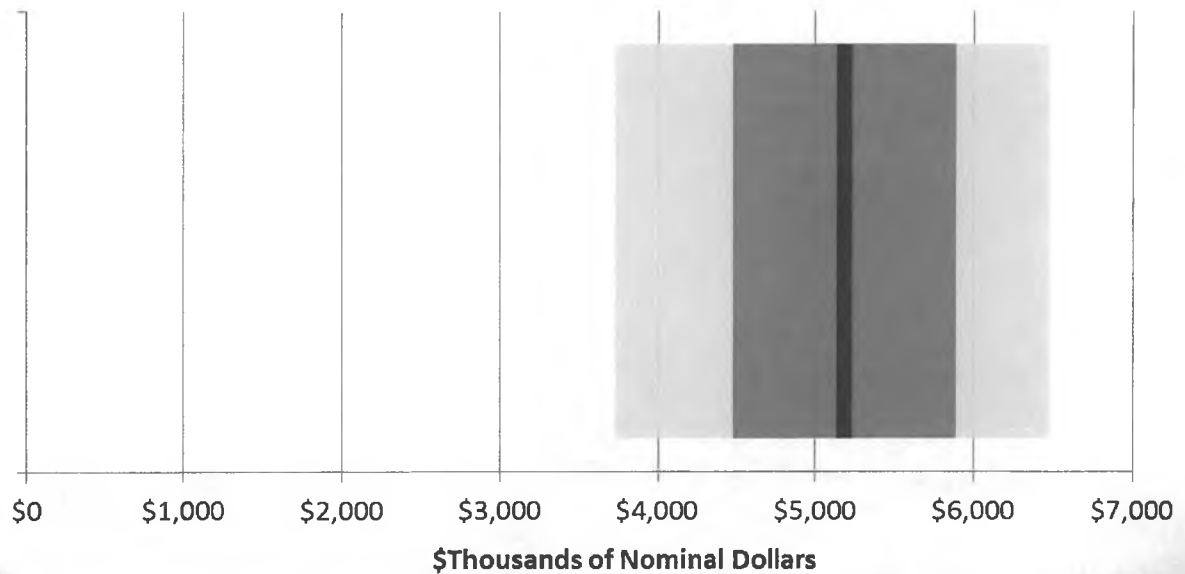


## Susitna-Watana Captial Costs

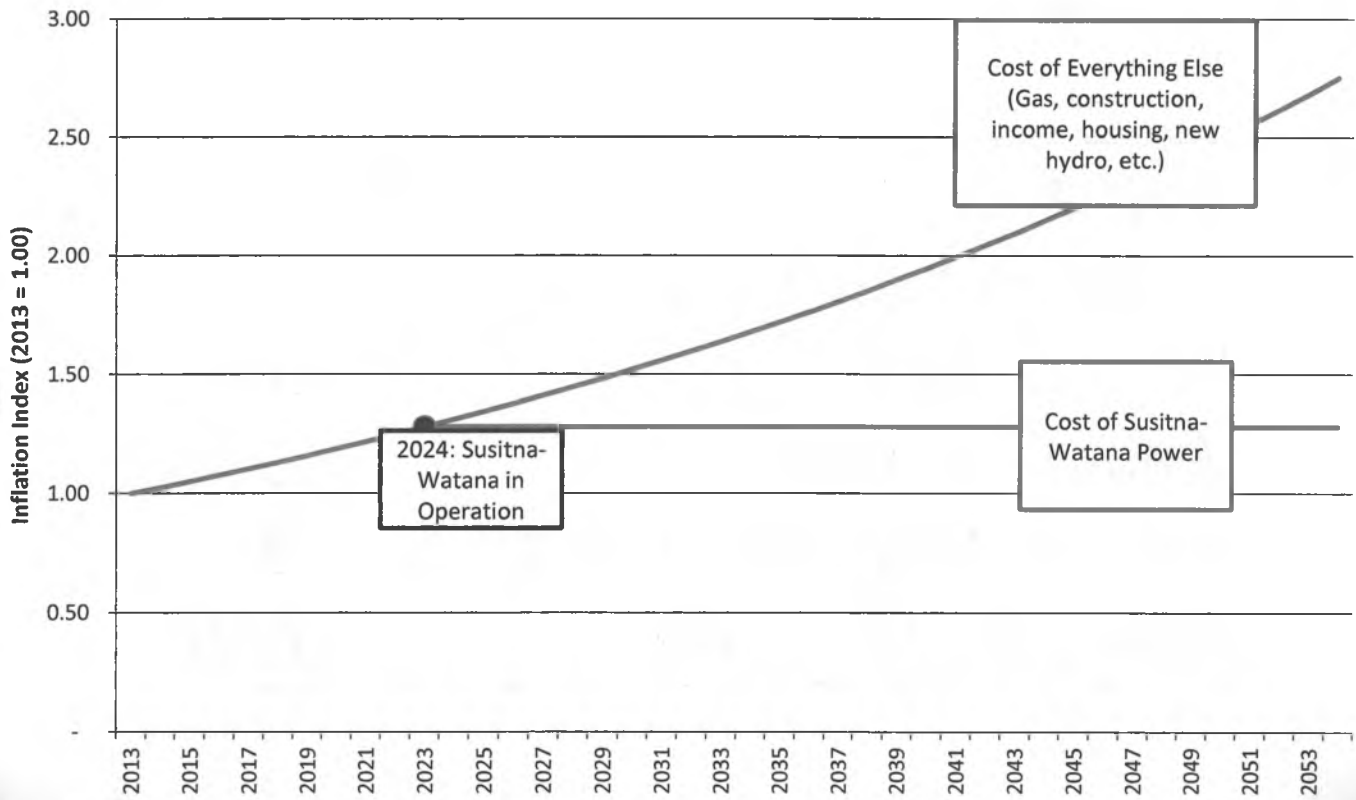
|              | Best Estimate | Low Estimate* | High Estimate* | Minimum Cost | Maximum Cost |
|--------------|---------------|---------------|----------------|--------------|--------------|
| January 2013 | \$5,190       | \$4,480       | \$5,890        | \$3,730      | \$6,480      |

*\*Low and High Estimates represent a 90% probability*

January 2013  
Cost Estimate



## Impacts of Inflation on Susitna-Watana Power Costs



# Base Case Economic Assumptions

|                           |         |
|---------------------------|---------|
| Capital Costs (\$mill)    | \$5,190 |
| Power Production (GWh)    | 2,800   |
| Interest Rate             | 5.00%   |
| Debt Term (years)         | 30      |
| Annual O&M Costs (\$mill) | \$16    |
| Operation Start Year      | 2024    |

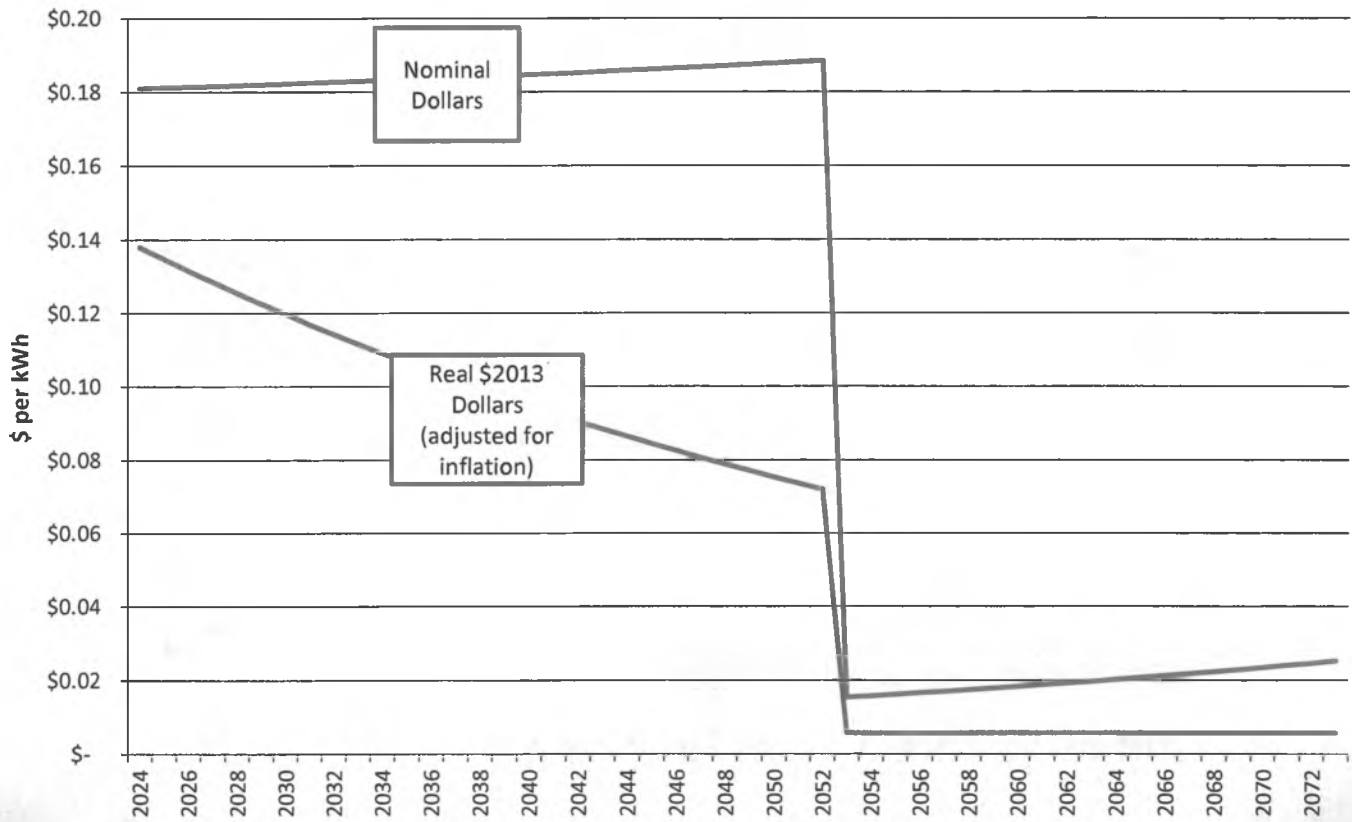
# Susitna-Watana Power Costs (\$/kWh)

|                                |         |
|--------------------------------|---------|
| Year 1 Rate (\$2024)           | \$0.181 |
| Year 1 Rate (\$2013 Real)      | \$0.138 |
| 10 Year Ave Rate (\$2013 Real) | \$0.124 |
| 25 Year Ave Rate (\$2013 Real) | \$0.106 |
| 50 Year Ave Rate (\$2013 Real) | \$0.061 |

Real= Adjusted for Inflation

Assumes no Direct State Financing

## Susitna-Watana Power Costs: Real vs. Nominal (Assumes no Direct State Financing)



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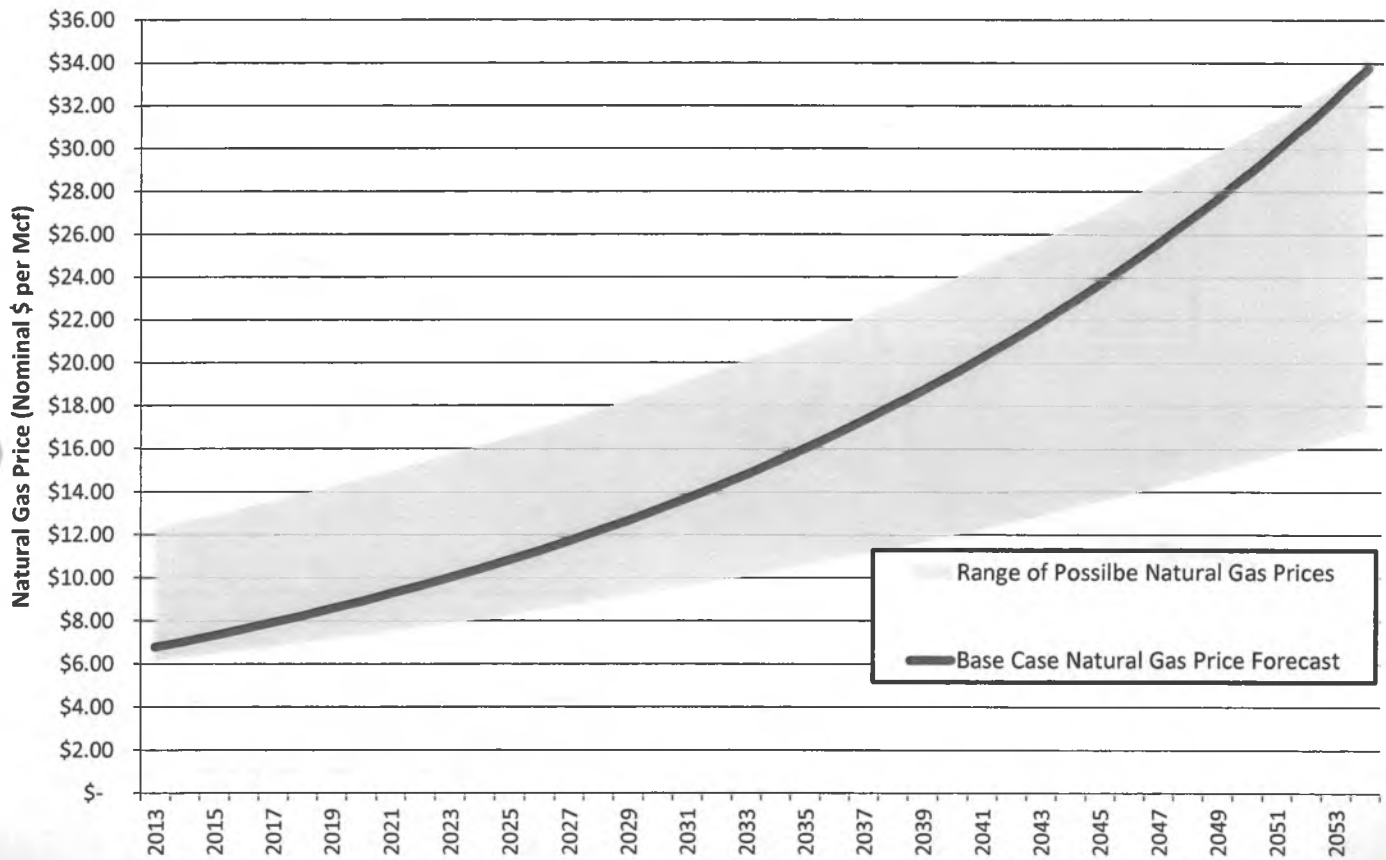
## Natural Gas Generation Comparison

- Competitive with natural gas in the early years, much lower-cost over long-term
- Future natural gas prices are unknown
- Assume a constant efficiency and non-fuel cost for natural gas generation
  - Heat rate of 8,000 (Btu/kWh)
  - Non-fuel cost of \$0.03 per kWh

# Natural Gas Price Forecast

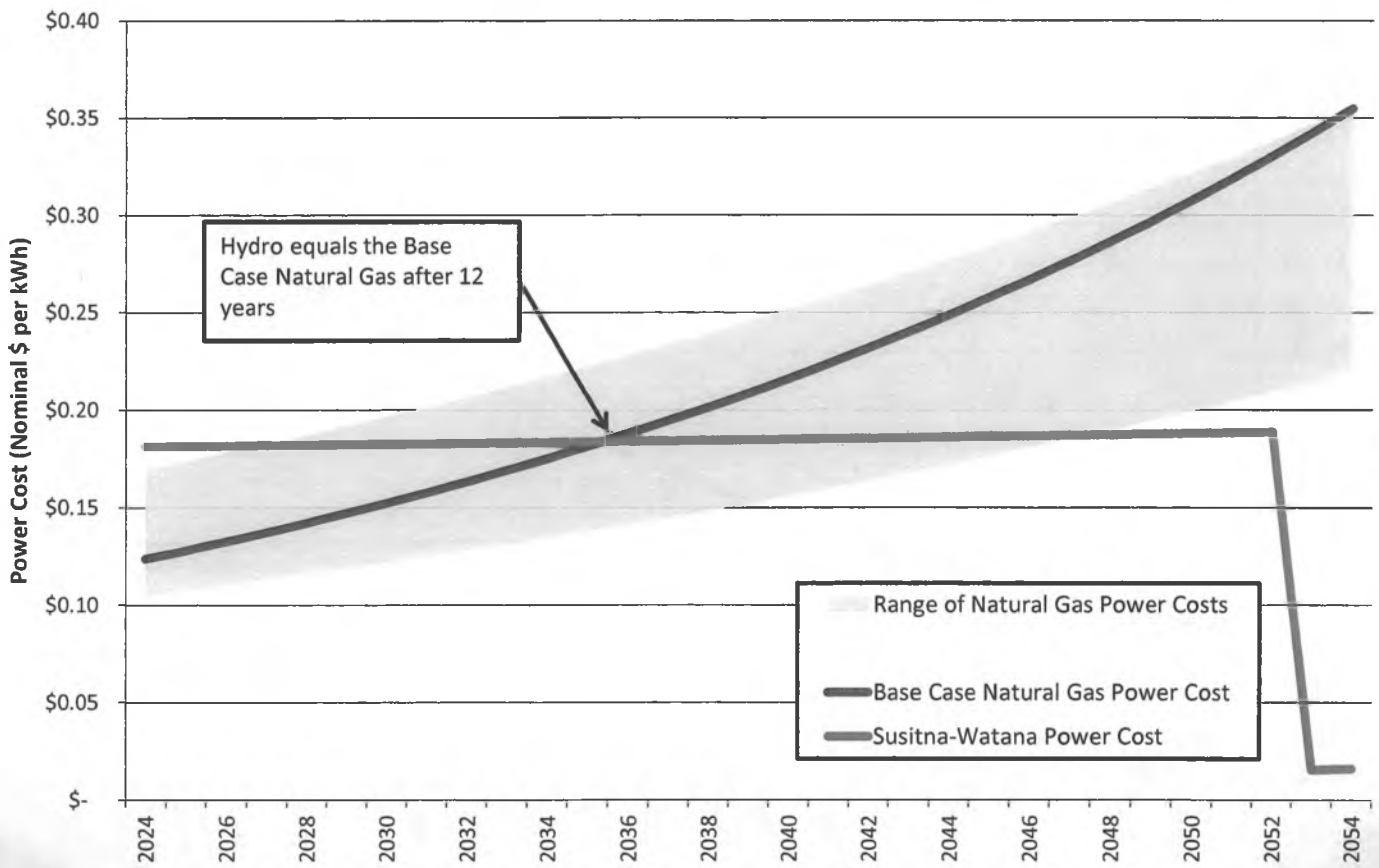
- A single forecast was needed for a “Base Case” comparison
  - \$6.50 per Mcf in 2012
  - Increases at 4% annually (1.5% greater than inflation)
- Realistically, future natural gas prices are better represented with a range
  - Prices can range \$6.00 to \$12.00 per Mcf in 2013
  - Range increase with inflation (2.5% annually)

# Natural Gas Price Forecast and Range



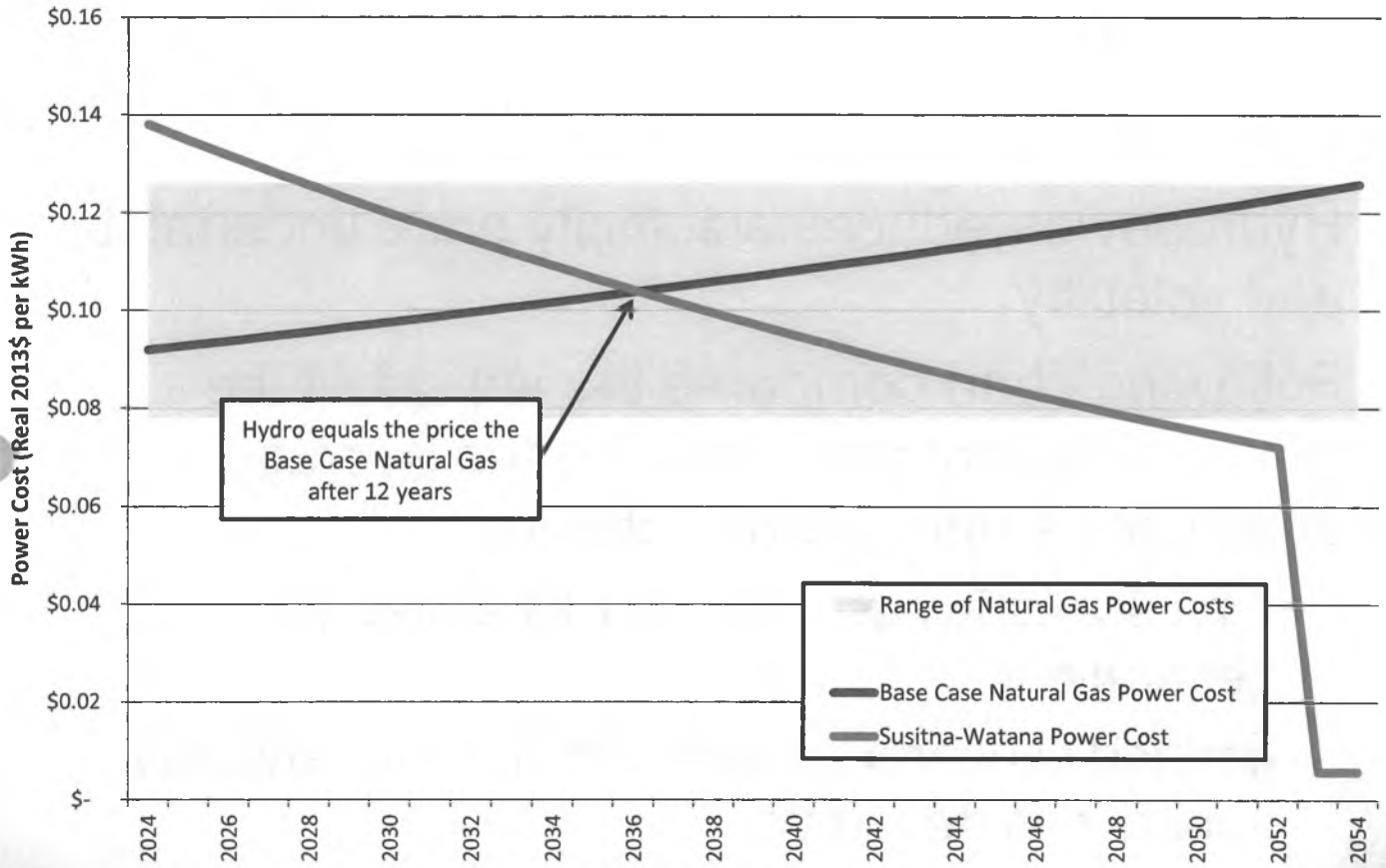
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# Susitna-Watana vs. Natural Gas Power Costs



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## Susitna-Watana vs. Natural Gas Power Costs



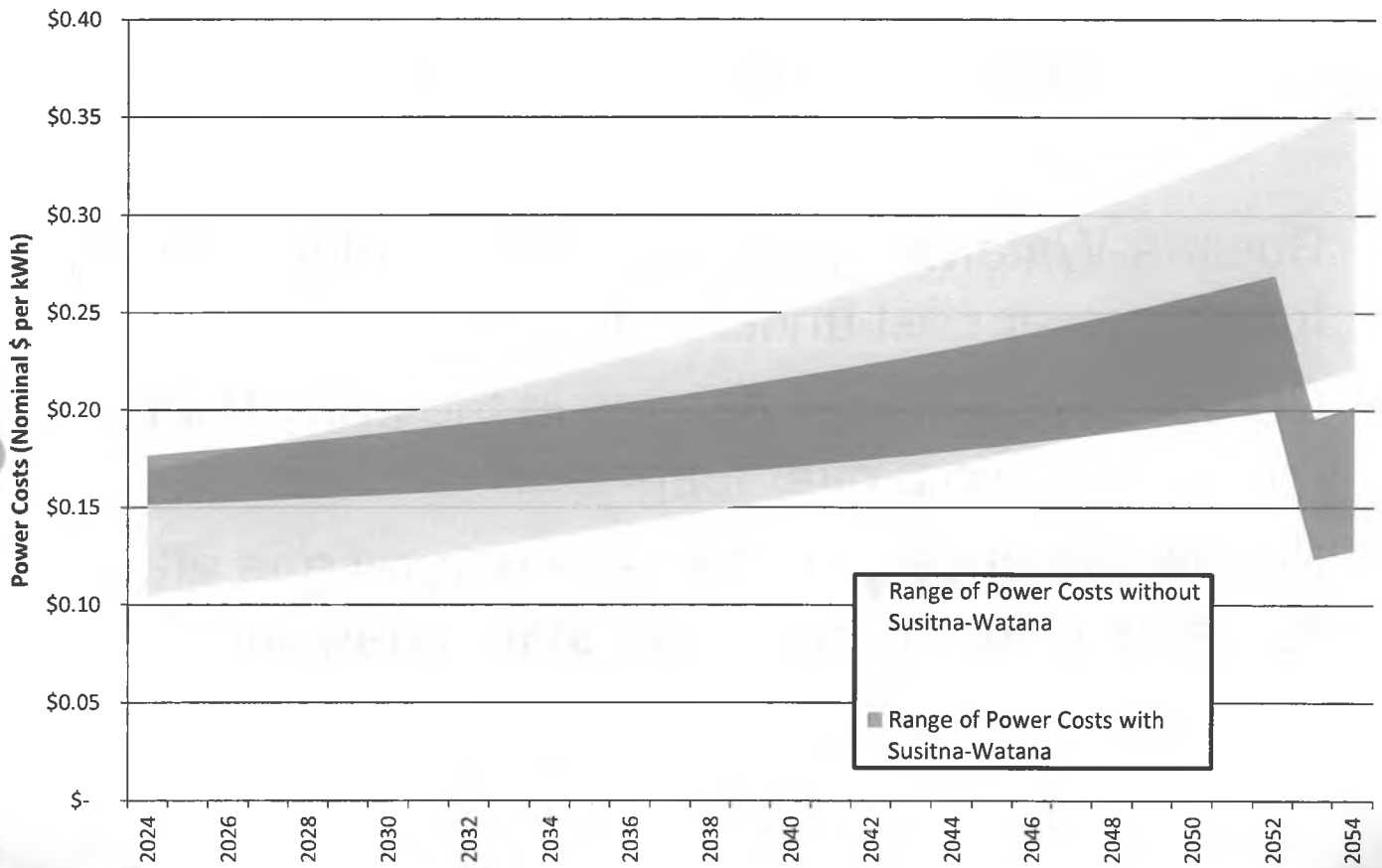
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1/31/2013

# Susitna-Watana Hydro Reduces Power Price Uncertainty

- Hydropower reduces electricity price uncertainty and volatility
- Following chart compares the impact of the range of natural gas prices on the average power costs under two scenarios
  - First scenario assumes 100% natural gas generation
  - Second scenario assumes 50% hydro and 50% natural gas generation

## Power Costs Under Range of Natural Gas Prices



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# Economic Takeaways

- Susitna-Watana Hydro can significantly reduce future power cost uncertainty
- Competitive with natural gas in the early years, much lower-cost over long-term
- Equals the price of base case natural gas after 12 years without any direct State financing

## 2013 Goals and Milestones

- Continued stakeholder and landowner outreach
- Implement the Revised Study Plan
  - Field work agreements with Alaska Department of Fish & Game
  - Logistical support, including helicopters and field camps
  - Obtaining permits from land owners
- Resources and Procurement Plan
- Utility Precedence Agreement
- Geotechnical exploration

FERC No. P-1424

## Diversifying Alaska's energy portfolio

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Search Site

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### Project Highlights

**Location:** River mile 184 above Devil's Canyon

**Size:** 750-foot high dam

**Reservoir:** 41-miles long, 2-miles wide (at widest)

**Estimated Supply:** Nearly 50 percent of Railbelt electrical demand

**Installed Capacity:** 600 MW

**Annual Energy:** 2,800,000 MWh

**Licensing:** Federal Energy Regulatory Commission



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But, as long as we are revising PCE legislation, we should also look at how to address the schism between the PCE formula and adding renewable energy and energy efficiency to community utilities.

**Talking Point:**

**When communities install renewable energy, because of the current PCE formula, it is the customers that do not receive PCE that benefit the most from the decrease in the cost to produce power.**

**As less fuel is used and the cost to produce power decreases, the PCE subsidy also decreases. Customers with PCE may end up paying more than before the renewable resource was developed. But non-PCE customers will benefit from the decrease in fuel costs.**

*"The PCE program does not address the fundamental barriers to improving energy efficiency. Because the formula currently used to calculate rates is directly tied to fuel costs, integrating alternative or renewable generation technologies could result in a lower PCE payment causing the effective electric rates to increase."*

**According to ISER surveys in PCE communities, energy use is roughly divided up as follows:**

**Electricity 27%      Transportation 33%      Space Heat 40%**

**Leading edge renewable projects are trying to address the significant heating energy needs by increasing the production renewable electrons and sending the excess to make heat for large community structures or groups of homes. This is a good idea and stands to make significant cuts to import fuel. But the PCE formula does not reward this and may actually be a disincentive.**

*"Including heat kWh in the PCE formula further exacerbates the problem of dividing by all kWh sold rather than diesel generated kWh only. An alternate application of the formula, dividing solely by diesel electric kWh sold, and offsetting electric revenue requirements with heat sales revenues can more accurately compensate the utility while providing benefits to community members."*