Chugach Electric Association

Review of Chugach Generation Planning

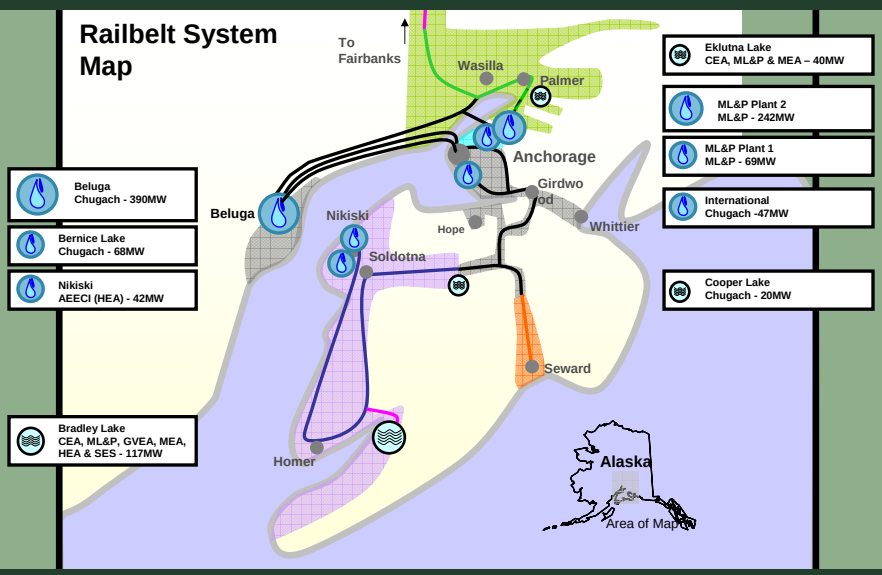
Board of Directors
May 16, 2007

How is new generation evaluated?

Least cost planning:

- **All generation plans must meet the load requirements**
- **The questions are:**
  - Which plan has the least cost?
  - Which plan has the least risk?

Generation Map



Existing Chugach Thermal Units

Chugach Generation	Production (GWh)
IGT 1,2 & 3	<1
Beluga 1 & 2	<1
Bernice 2, 3 & 4	4
Beluga 3	300
Beluga 5	300
Beluga 6/7/8	1500

Base Load Generation

Beluga 6/7/8:

- **Two-thirds of Chugach annual fuel expense**
- **End of service life for Unit 8**

What are the drivers?

Current Price of Gas & Risk of Higher Gas Prices

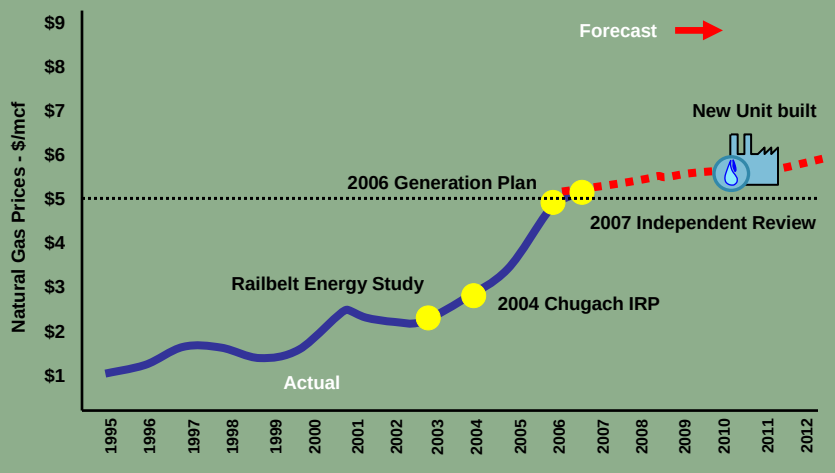
- Price of gas has more than doubled in the past five years
- Each $1/mcf gas increase adds $25 million to Chugach's cost of power – a 10% increase in customers bill

Cost to Rebuild and Uncertainty of Beluga Unit 8 Service Life

- $46 million to rebuild plus more than $25 million in fuel expense while Beluga unit 8 is out of service for rebuild
- Beluga unit 8 has four to nine years of life remaining. Rebuild needs to have already started. Chugach may have to operate Beluga unit 8 during this period of uncertain reliability. Or, Chugach can install a new base load generation unit by 2011.

How can these costs & risks be mitigated or reduced?

Gas Price and Generation Studies



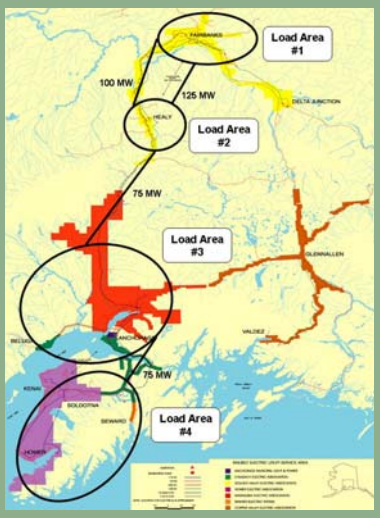
Railbelt Energy Study Scope

- RES examined various approaches to providing reliable, low cost electric service to Railbelt consumers over the next 30 years
- The RES was the first step in the planning process – it provided a broad assessment of the generation and transmission investments as if the region was collectively operated.
- The next step is for individual utilities to capitalize on the potential synergies identified in the RES by developing detailed individual integrated resource plans that can be used to make investment decisions.

Railbelt Energy Study Sponsors

- Anchorage Municipal Light & Power
- Chugach Electric Association
- Golden Valley Electric Association
- Homer Electric Association
- Seward Electric System.

Railbelt Energy Study – Load Areas



2004 Chugach IRP

Objective:

Identify the combination of capital investment that will:

- **Ensure least cost electric supply services to Chugach's retail and wholesale customers, and**
- **Maintain current levels of power supply reliability.**

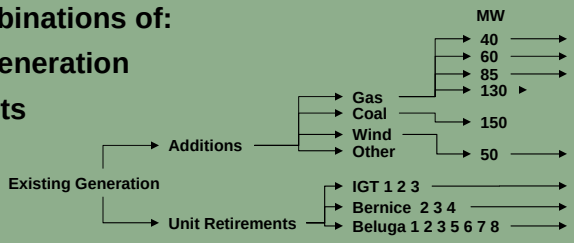
Approach:

- **Status Quo – full requirements of MEA, partial requirements of HEA – MEA has said full requirements not an option.**
- **Partial/Partial – MEA and HEA build some generation.**
- **Economy/Economy – economy market after 2014**

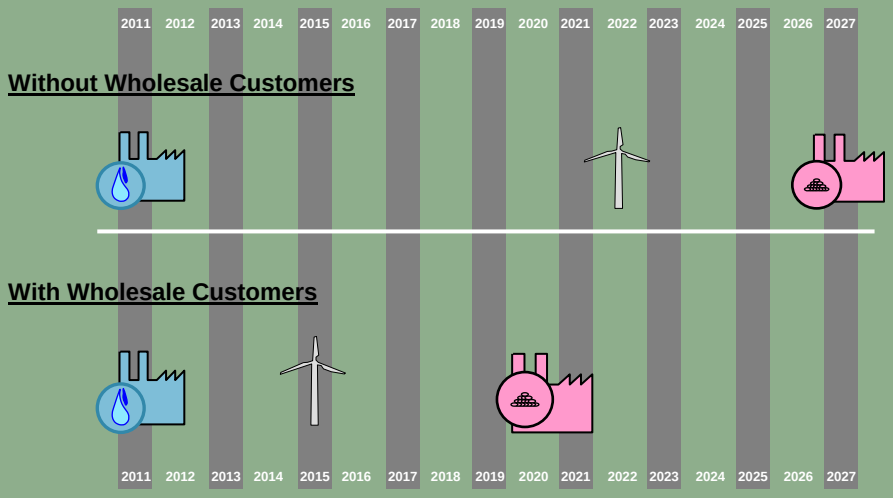
2004 Integrated Resource Plan
What is the least cost alternative?

Given the uncertainty in fuel price, loads and other factors, a dynamic model is used to evaluate all plan combinations for:

- **Each load forecast**
- **Upwards of 2,500 generation plans or "portfolios"**
- **Least cost computed for each of 25 years given all possible combinations of:**
  - **Existing generation**
  - **Retirements**
  - **New Units**



2004 Generation Plan - IRP Results



2005 – 2006 Investigations
Coal

- Emma Creek – 200 MW close to Healy
- Chuitna (remote site) – 130-260 MW close to Beluga
- Non-remote site – 130-260 MW
- Agrium Blue Sky Coal Gasification – 130 MW

Overall results:

- High capital costs compared to natural gas fired
- May require other Railbelt utilities to participate
- Longer lead times to build

2005 – 2006 Investigations
Alternative Power

Projects:

- Hydro – Chakachamna and Susitna River Dam potential
- Geothermal – Mt. Spur/other volcanic areas with geothermal potential
- Tidal – Turnagain/Knik Arm potential

Results:

- Capital costs too high for Chugach to finance alone
- Timeframe beyond Chugach's immediate needs

2005 – 2006 Investigations
Wind

- Chugach has been studying wind power since 1998.
- Intermittent energy resource that doesn't meet base load requirements.

2006 Generation Plan

Objective: Refine 2004 IRP

Approach: Identify specific generation plans to meet near term generation requirements

Generation: 60-260 MWs of gas and coal fired

2006 Generation Plan

Developed detailed generation plans:

Plan I Status Quo: rebuild Beluga 8

Plan II Flexibility Plan: three 60 MW unit + steam unit by 2012

Plan III Current FMP Plan: 130 MW unit by 2011

Plan IV 5-yr Deferral: 60 MW by 2009; 130 MW coal by 2015

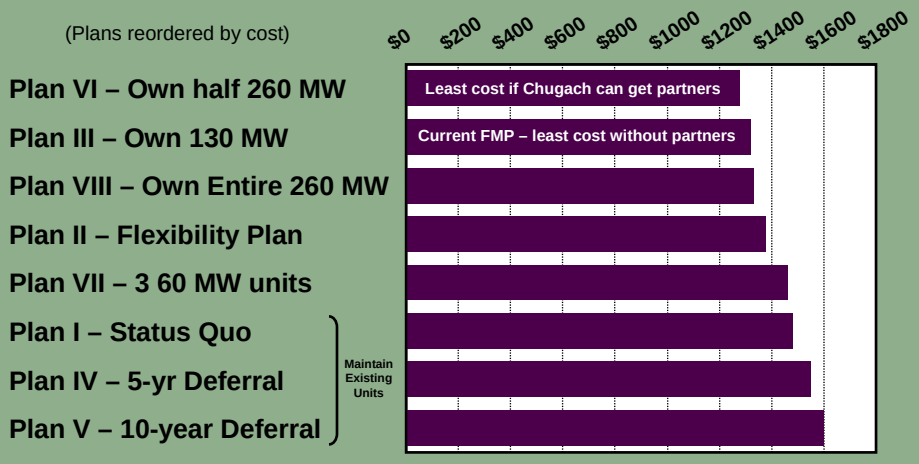
Plan V 10-year Deferral: 100 MW by 2009; 130 MW coal by 2015

Plan VI Own half 260 MW: Half 260 MW by 2011

Plan VII 3 60 MW units: New units by 2009, 2010, 2012

Plan VIII Own Entire 260 MW: Own entire unit by 2011

2006 Generation Plan Results ($ millions)*



* Net present value of costs from Independent Analysis and Risk Assessment of Chugach's 2006 Generation Plan

2006 Generation Plan Cash Flows

Annual cost of generation capital, O&M and fuel

2006 Generation Plan Economic Analysis - Sensitivity

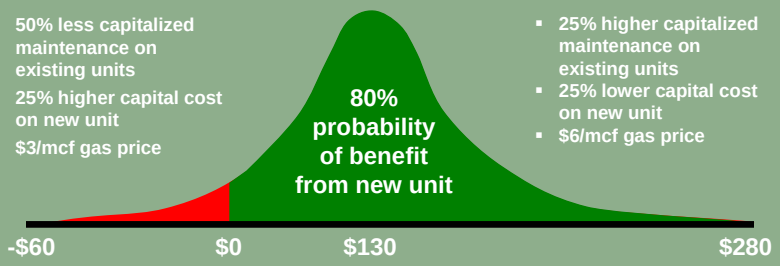
What is the sensitivity of achieving the $130 million savings by building a new unit in 2011 & retiring Beluga 8 in 2014 vs. maintaining existing generation?

What would decrease benefit?

- 50% less capitalized maintenance on existing units
- 25% higher capital cost on new unit
- $3/mcf gas price

What would increase benefit?

- 25% higher capitalized maintenance on existing units
- 25% lower capital cost on new unit
- $6/mcf gas price



The $130 million savings is the total difference in power cost (over 30 years) between building new generation and retiring Unit 8 vs. only maintaining the existing generation.

2006 Generation Plan
Economic Analysis - Sensitivity

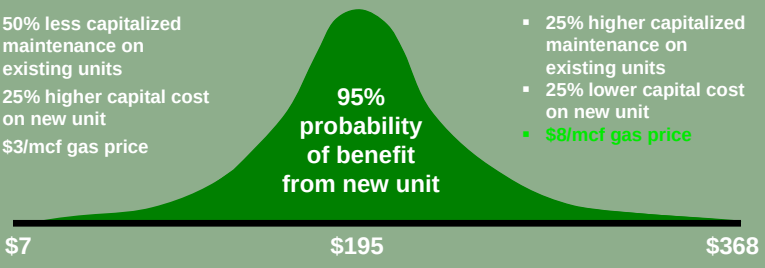
What if the gas price is higher than expected?

What would decrease benefit?

- 50% less capitalized maintenance on existing units
- 25% higher capital cost on new unit
- $3/mcf gas price

What would increase benefit?

- 25% higher capitalized maintenance on existing units
- 25% lower capital cost on new unit
- $8/mcf gas price



The $195 million savings is the total difference in power cost (over 30 years) between building new generation and retiring Unit 8 vs. only maintaining the existing generation.

2006 Generation Plan
Cost and Risk of Delaying New Generation

Cost

A one year delay in building the new unit costs approximately $8 million

Risk

Reliability of unit 8 decreases over time without life extension – possible 50 MW not available to meet winter load requirements

2007 Independent Review of 2006 Generation Plan Validates 2006 Generation Plan

Least Cost Plan strategy:

- Seek partners on a 206FA CC, Chugach to own half (approximately 130 MW)
- Own entire 206FA (approximately 260 MW) if financially viable
- Own 106FA
- Retire Beluga Unit 8 and Bernice Units 2, 3 & 4 in 2015

2006 Generation Plan – Best Generation Alternative

Gas-fired generation installed by 2011

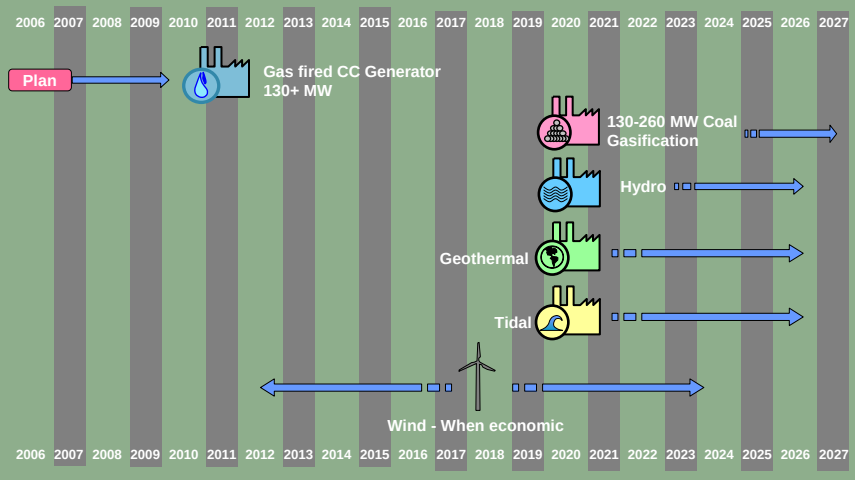
1. **Provides needed capacity**
2. **Reduces gas expense**
3. **Hedges possible increase in gas prices**
4. **Reduces reliance on aging equipment**
5. **Reduces reliance on transmission and submarine cables with Anchorage location**
6. **Positions Chugach to purchase energy from coal, wind, hydro and renewables when developed**

New Generation Cost Estimates ($ millions)

Capital cost estimates based on Black and Veatch preliminary feasibility analysis

	Half 260MWs	130MWs	260MWs
2007	$3.8	$7.5	$7.5
2008	$55.9	$84.9	$111.7
2009	$43.1	$65.5	$86.2
2010	$34.3	$52.1	$68.6
Total	$137.0	$210.0	$274.0

Generation Plan and Future Alternatives



2004 IRP, 2006 Generation Plant and 2007 Independent Analysis

130 MW gas-fired generation built by 2011 is least cost

Least Risk Plan
What are the risks associated with the generation plans?

Status Quo – Maintain Existing Units

- Risk of high fuel prices and inefficient generation significantly increasing cost to members.
- Risk of lower reliability due to higher force outage rate with aging base load generation

OR

Build New Gas-fired Generation

- Risk of construction cost over run

How does “maintain existing units” or “build new generation” fit with the long-term resource strategy?

Maintain Existing Units

Existing base load gas turbines life ends around 2020

OR

Build new gas-fired generation

New gas-fired generation payback is around 2020

EITHER PLAN

- **Positions Chugach to have major renewable generation in place around 2020**

Summary

Which plan is least cost and least risk?

- **New gas-fired generation is least cost.**
- **The least risk plan is a tradeoff:**
  - Maintain Existing Generation - risk of high fuel costs and lower reliability
  - Or, Build New Generation - risk of higher than planned construction cost
- Chugach is pursuing the Build New Generation alternative because partners in a larger generator mitigates financial risk, or
- Chugach can build the small generator and meet its financial planning criteria – again mitigating the financial risk.

New Generation Meets Mission Statement

Through superior service, safely provide reliable and competitively priced energy.