

2/09/12

Presentation by
Alaska Energy
Authority:
Southeast
Integrated
Resource Plan

<TARGET><BILL></BILL><SUBJECT>2-09-12 Presentation by Alaska
Energy Authority Southeast Integrated Resource
Plan</SUBJECT><COMM>HENE27</COMM></TARGET>



Southeast Integrated Resource Plan – SEIRP

Projections of Benefits to the
Residents of SE Alaska

The SEIRP is a draft report presently out for public comment and under review by the AEA.

House Energy Committee
Alaska State Legislature
February 9th, 2012

Yearly energy costs as a percentage of household income

<i>Angoon</i>	(\$)	(% of income)
Yearly Household Income:	\$28,479	
Yearly Utility Costs 2011:	\$9,067	31.8%
Yearly Utility Costs 2016 (no implementation):	\$9,980	35.0%
Yearly Utility Costs 2016 (full implementation):	\$6,958	24.4%

<i>Prince of Wales Island (Craig)</i>	(\$)	(% of income)
Yearly Household Income:	\$28,479	
Yearly Utility Costs 2011:	\$7,057	24.8%
Yearly Utility Costs 2016 (no implementation):	\$8,782	30.8%
Yearly Utility Costs 2016 (full implementation):	\$5,762	20.2%

<i>Juneau</i>	(\$)	(% of income)
Yearly Household Income:	\$48,062	
Yearly Utility Costs 2011:	\$7,073	14.7%
Yearly Utility Costs 2016 (no implementation):	\$8,124	16.9%
Yearly Utility Costs 2016 (full implementation):	\$5,858	12.2%



Angoon Home Budget

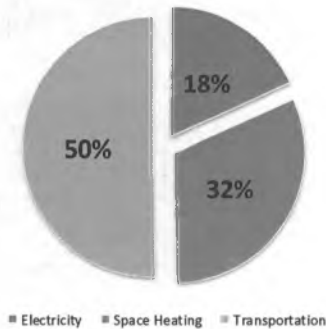
2016 Full Implementation

Input

Location:	Angoon		
Building Size:	1200	sq feet	
Space Heating Type:	Blomass, Pellets		Note: If Space Heating Type is Electricity, Space Heating Costs should equal Residential Electricity Rate
Space Heating Cost:	\$350.00	per TON	
Residential Electricity Rate:	\$0.61	per kWh	
PCE Eligible	YES		
PCE Rate	\$0.41	per kWh	
Gasoline Price:	\$4.53	per gallon	

Output

	Annual Costs	Monthly Costs
Electricity Costs	\$1,267	\$106
Heating Costs	\$2,192	\$183
Transportation Costs	\$3,499	\$292
TOTAL	\$6,958	\$580



2/9/2012

30.3% realized savings over "No Implementation"

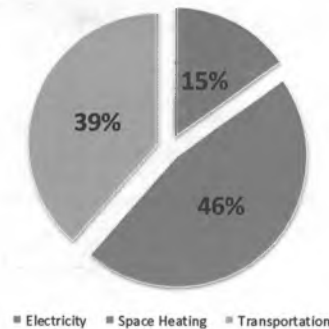
2011 Base Case

Input

Location:	Angoon		
Building Size:	1200	sq feet	
Space Heating Type:	Heating Fuel #1		Note: If Space Heating Type is Electricity, Space Heating Costs should equal Residential Electricity Rate
Space Heating Cost:	\$4.60	per gallon	
Residential Electricity Rate:	\$0.61	per kWh	
PCE Eligible	YES		
PCE Rate	\$0.41	per kWh	
Gasoline Price:	\$4.53	per gallon	

Output

	Annual Costs	Monthly Costs
Electricity Costs	\$1,370	\$114
Heating Costs	\$4,198	\$350
Transportation Costs	\$3,499	\$292
TOTAL	\$9,067	\$756



SEIRP - draft plan analysis

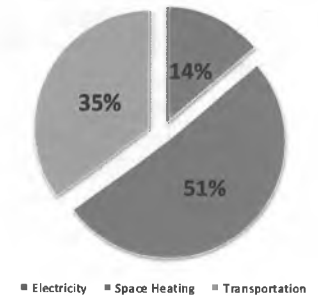
2016 No Implementation

Input

Location:	Angoon		
Building Size:	1200	sq feet	
Space Heating Type:	Heating Fuel #1		Note: If Space Heating Type is Electricity, Space Heating Costs should equal Residential Electricity Rate
Space Heating Cost:	\$5.60	per gallon	
Residential Electricity Rate:	\$0.61	per kWh	
PCE Eligible	YES		
PCE Rate	\$0.41	per kWh	
Gasoline Price:	\$4.53	per gallon	

Output

	Annual Costs	Monthly Costs
Electricity Costs	\$1,370	\$114
Heating Costs	\$5,111	\$426
Transportation Costs	\$3,499	\$292
TOTAL	\$9,980	\$832



10.1% increase from 2011

POW Island (Craig) Home Budget

2016 Full Implementation

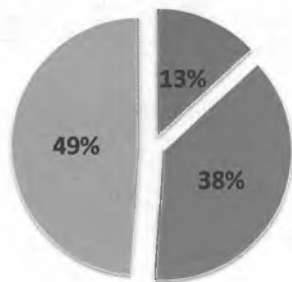
Input

Location:	Prince of Wales (Craig)	
Building Size:	1200	sq feet
Space Heating Type:	Biomass, Pellets	
Space Heating Cost:	\$350.00	per TON
Residential Electricity Rate:	\$0.22	per kWh
PCE Eligible:	YES	
PCE Rate:	\$0.07	per kWh
Gasoline Price:	\$3.64	per gallon

Note: If Space Heating Type is Electricity, Space Heating Costs should equal Residential Electricity Rate

Output

	Annual Costs	Monthly Costs
Electricity Costs	\$759	\$63
Heating Costs	\$2,192	\$183
Transportation Costs	\$2,811	\$234
TOTAL	\$5,762	\$480



■ Electricity ■ Space Heating ■ Transportation

34.4% realized savings over "No Implementation"

2/9/2012

2011 Base Case

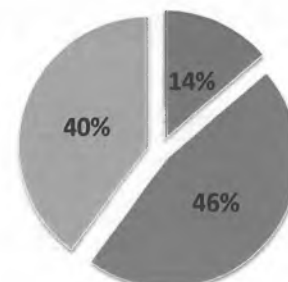
Input

Location:	Prince of Wales (Craig)	
Building Size:	1200	sq feet
Space Heating Type:	Heating Fuel #1	
Space Heating Cost:	\$3.59	per gallon
Residential Electricity Rate:	\$0.22	per kWh
PCE Eligible:	YES	
PCE Rate:	\$0.07	per kWh
Gasoline Price:	\$3.64	per gallon

Note: If Space Heating Type is Electricity, Space Heating Costs should equal Residential Electricity Rate

Output

	Annual Costs	Monthly Costs
Electricity Costs	\$970	\$81
Heating Costs	\$3,277	\$273
Transportation Costs	\$2,811	\$234
TOTAL	\$7,057	\$588



■ Electricity ■ Space Heating ■ Transportation



SEIRP - draft plan analysis

2016 No Implementation

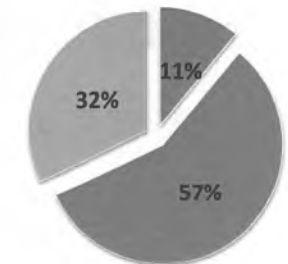
Input

Location:	Prince of Wales (Craig)	
Building Size:	1200	sq feet
Space Heating Type:	Heating Fuel #1	
Space Heating Cost:	\$5.48	per gallon
Residential Electricity Rate:	\$0.22	per kWh
PCE Eligible:	YES	
PCE Rate:	\$0.07	per kWh
Gasoline Price:	\$3.64	per gallon

Note: If Space Heating Type is Electricity, Space Heating Costs should equal Residential Electricity Rate

Output

	Annual Costs	Monthly Costs
Electricity Costs	\$970	\$81
Heating Costs	\$5,002	\$417
Transportation Costs	\$2,811	\$234
TOTAL	\$8,782	\$732



■ Electricity ■ Space Heating ■ Transportation

24.5% increase from 2011

4

Juneau Home Budget

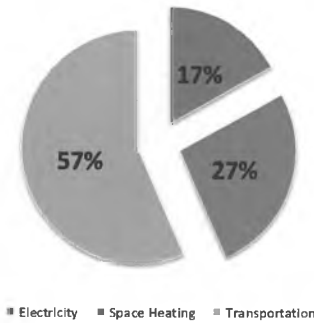
2016 Full Implementation

Input

Location:	Juneau	
Building Size:	1600	sq feet
Space Heating Type:	Biomass, Pellets	Note: If Space Heating Type Is Electricity, Space Heating Costs should equal Residential Electricity Rate
Space Heating Cost:	\$310.00	per TON
Residential Electricity Rate:	\$0.11	per kWh
PCE Eligible:	NO	
PCE Rate:	\$0.00	per kWh
Gasoline Price:	\$3.43	per gallon

Output

	Annual Costs	Monthly Costs
Electricity Costs	\$994	\$83
Heating Costs	\$1,553	\$129
Transportation Costs	\$3,311	\$276
TOTAL	\$5,858	\$488



27.9% realized savings over "No Implementation"

2/9/2012

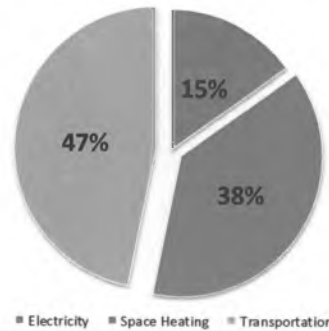
2011 Base Case

Input

Location:	Juneau	
Building Size:	1600	sq feet
Space Heating Type:	Heating Fuel #1	Note: If Space Heating Type Is Electricity, Space Heating Costs should equal Residential Electricity Rate
Space Heating Cost:	\$3.69	per gallon
Residential Electricity Rate:	\$0.11	per kWh
PCE Eligible:	NO	
PCE Rate:	\$0.00	per kWh
Gasoline Price:	\$3.43	per gallon

Output

	Annual Costs	Monthly Costs
Electricity Costs	\$1,067	\$89
Heating Costs	\$2,694	\$225
Transportation Costs	\$3,311	\$276
TOTAL	\$7,073	\$589



SEIRP - draft plan analysis

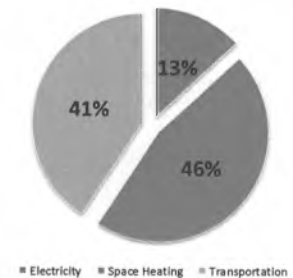
2016 No Implementation

Input

Location:	Juneau	
Building Size:	1600	sq feet
Space Heating Type:	Heating Fuel #1	Note: If Space Heating Type Is Electricity, Space Heating Costs should equal Residential Electricity Rate
Space Heating Cost:	\$5.13	per gallon
Residential Electricity Rate:	\$0.11	per kWh
PCE Eligible:	NO	
PCE Rate:	\$0.07	per kWh
Gasoline Price:	\$3.43	per gallon

Output

	Annual Costs	Monthly Costs
Electricity Costs	\$1,067	\$89
Heating Costs	\$3,746	\$312
Transportation Costs	\$3,311	\$276
TOTAL	\$8,124	\$677



14.9% increase from 2011

BUILDING A
WORLD OF
DIFFERENCE

9 February 2012

Southeast Alaska IRP

House Energy Committee



BLACK & VEATCH
Building a world of difference.

Key Findings

➤ Key Drivers

✓ **Limited Size** 20% - size of SE region relative to Railbelt

✓ **Economic Realities and Population Trends**

✓ **Limited Transmission**

✓ **Diesel Fuel Prices** 60% - 75% - space heating portion of monthly energy bill

Key Findings

➤ Key Drivers (continued)

✓ Significant uncertainties exist, including:

- Loads
- Resources
- Potential transmission additions
- Level of State financial assistance

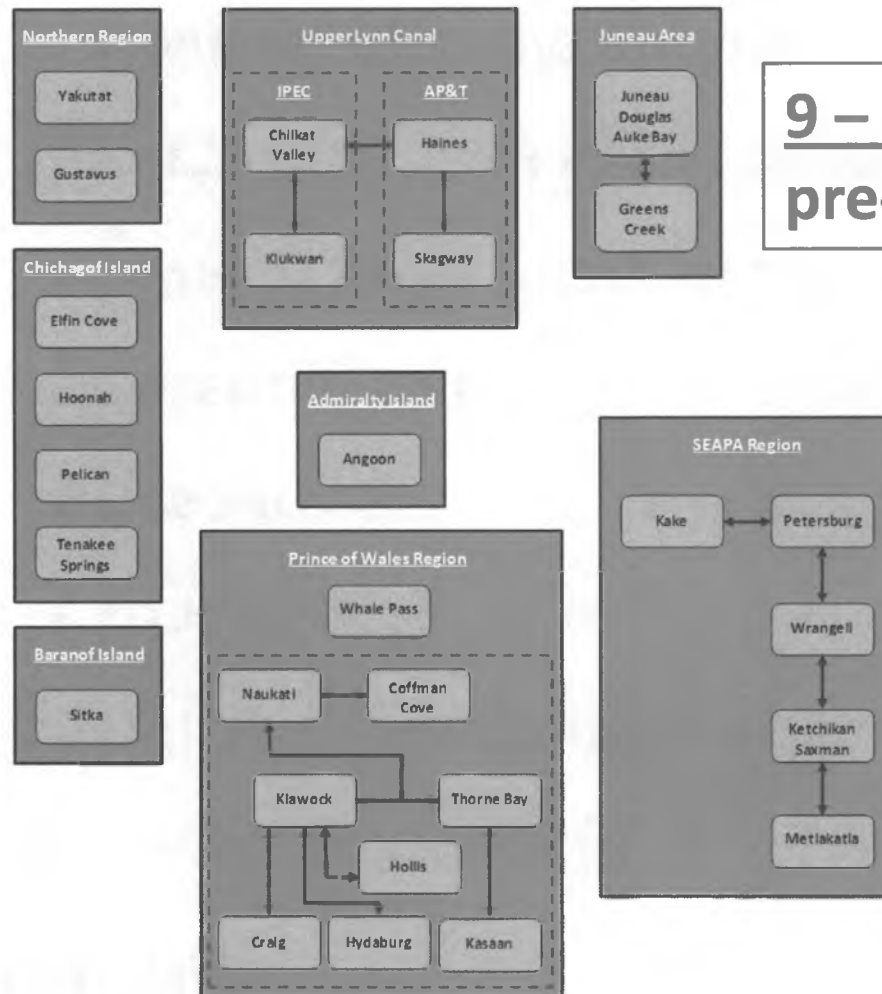
✓ Uncertainties lead to the need to:

- Develop multiple options
- Move towards a more balanced resource portfolio
- Maintain flexibility

Key Findings (continued)

- Subregional Differences Require Solutions for Each Subregion

Transmission Planning Regions



9 – 60+ cents/kWh – range of pre-PCE cost of electricity

Key Findings (continued)

- Shortage of Storage Hydro
- Space Heating Conversions
- Limitations Due to Quality and Inclusiveness of Project-Specific Information
 - ✓ Need to base analysis on generic hydro projects
 - ✓ Inability to make definitive selection
- 2 Integrated Cases:
 - ✓ Optimal Hydro/Transmission Case
 - ✓ Optimal DSM/EE, Biomass, Other Renewables Case

300/24 – number of hydro projects considered/passed screen

Key Findings (continued)

- Phased Approach to the Future
- Aggressive Pursuit of DSM/EE Delays Need for Incremental Hydro
- Aggressive Pursuit of Biomass Conversion will Result in Very Significant Space Heating Savings

RESOURCES	PHASE 1 (2012-2016)	PHASE 2 (2017 AND BEYOND)
Committed Resources	√	
DSM/EE Programs	√	√
Biomass Conversion Programs	√	√
Next Increment of Hydro and Other Renewable Projects		√

Key Findings (continued)

Committed Resources

PROJECT	DISCUSSION	TOTAL CAPITAL COST (\$ MILLION)	ESTIMATED REMAINING CAPITAL COST (\$ MILLION)
Blue Lake Expansion Hydro (Sitka, City of Sitka Electric)	Expansion will increase the capacity of the existing Blue Lake Hydro Project by an estimated 8 MW and increase the average annual energy from the project by approximately 34,500 MWh.	\$96.5	\$1.0 (Note 1)
Gartina Falls Hydro (Hoonah, IPEC)	New run-of-river project near Hoonah that will provide an estimated 0.44 MW of capacity and approximately 1,800 MWh of average annual energy.	\$6.3	\$5.5
Reynolds Creek Hydro (Hydaberg, Haida Energy and AP&T)	New storage project located that will provide an estimated 5 MW of capacity and approximately 19,300 MWh of average annual energy.	\$28.6	\$0.0 (Note 2)
Thayer Creek Hydro (Angoon, Kootznoowoo, Inc.)	New run-of-river project that will provide an estimated 1 MW of capacity and approximately 8,400 MWh of average annual energy.	\$15.2	\$6.0 (Note 3)
Whitman Lake Hydro (Ketchikan, KPU)	New storage project at an existing lake located that will provide an estimated 4.6 MW of capacity and approximately 15,900 MWh of average annual energy.	\$25.8	\$3.3 (Note 1)
Kake – Petersburg Intertie (Kwsan Electric Transmission Intertie Cooperative)	New 69 kV overhead and submarine cable transmission line connecting Kake and Petersburg.	\$53.8	\$48.3
Ketchikan – Metlakatla Intertie (Metlakatla Indian Community)	New 34.5 kV overhead and submarine cable transmission line connecting Ketchikan and Metlakatla.	\$12.7	\$8.2
	Totals	\$238.9	\$72.3

Notes:

1. Local bonding under way. Community request pending.
2. Authorized loans being negotiated.
3. \$7.0 million Renewable Energy Round 5 award recommendation.

Key Findings (continued)

- Economic Realities of SE Intertie Concept
 - ✓ Built upon previous studies, including SE Intertie Study
 - ✓ Two cases
 - Economic Case
 - Public Benefit Case
 - ✓ Insufficient loads to justify expansion of transmission network beyond transmission Committed Resources

0 – number of transmission segments with unit costs less than diesel under Economic Case

0.10 – 0.32 – benefit-cost ratios of transmission segments under Public Benefit Case

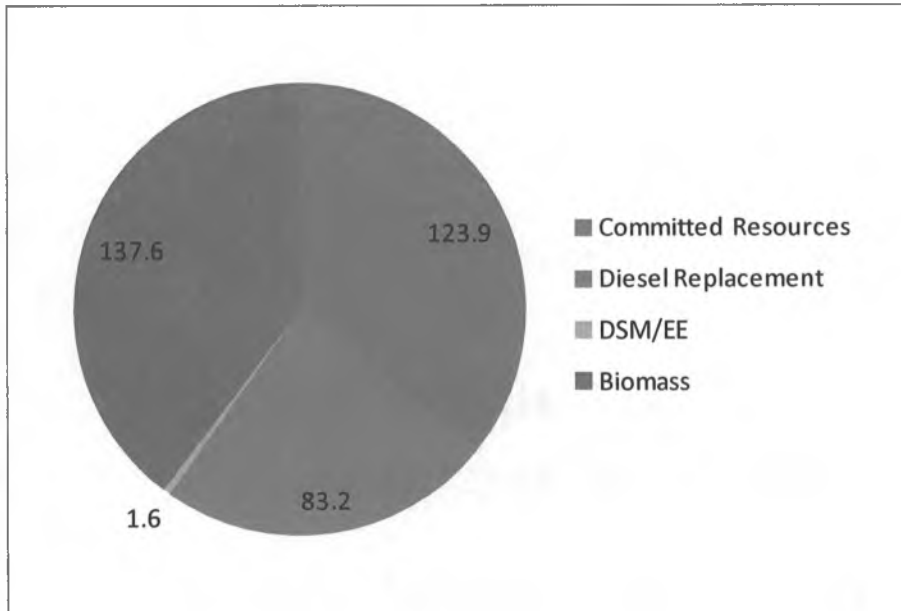
Key Findings (continued)

➤ AK-BC Intertie

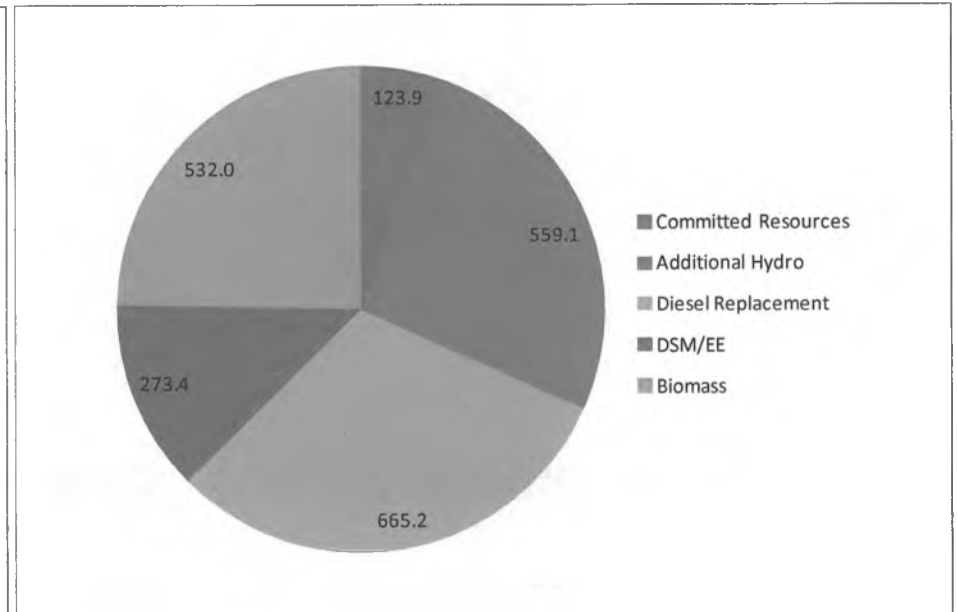
- ✓ Screening level analysis of both import and export scenarios
- ✓ Not justified based upon current market conditions
- ✓ Significant uncertainties exist – most would have adverse impact

Capital Investment by Category

Capital Investment by Category
2012 - 2014



Capital Investment by Category
2012 - 2061



Total Capital Investments

2012 – 2014 – \$346 million

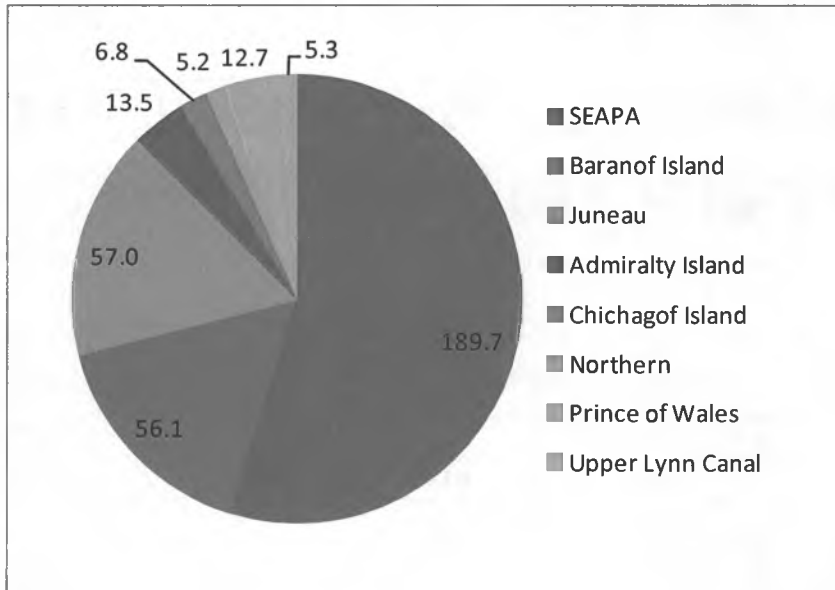
2012 – 2061 – \$2.15 billion

Hydro Included in Recommended Resource Portfolio

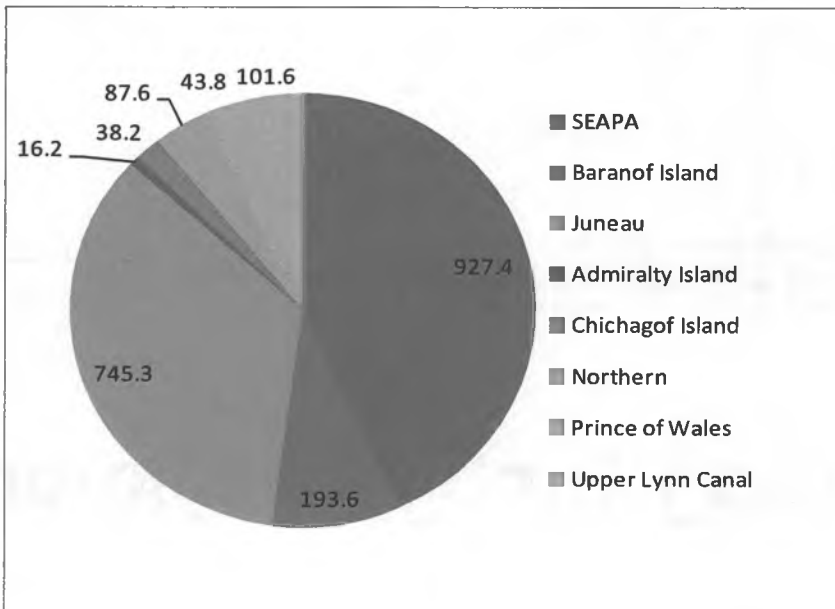
- 19 MW – Committed Resources
- 50 MW – other hydro

Subregional Equity Considerations

Capital Investment by Subregion – 2012 - 2014



Capital Investment by Subregion – 2012 - 2061



Capital Investment per Capita

	2012 - 2014	2012 - 2061
Urban Areas		
SEAPA	\$12,495	\$61,086
Baranof Island	\$6,313	\$21,796
Juneau	\$1,824	\$23,830
Urban Area Average	\$5,472	\$33,725
Rural Areas		
Admiralty Island	\$29,417	\$35,336
Chichagof Island	\$6,854	\$38,216
Northern	\$4,670	\$79,314
Prince of Wales	\$3,820	\$13,180
Upper Lynn Canal	\$1,507	\$28,732
Rural Area Average	\$4,620	\$30,496
Regional Average	\$5,348	\$33,255

Subregional Equity Considerations

OPTIMAL DSM/EE, BIOMASS AND OTHER RENEWABLES CASE - SAVINGS RELATIVE TO STATUS QUO CASE						
	Total Cumulative Net Present Value (CNPV) Savings - 2012 - 2061 (\$'000)					
	Utility System Plus DSM Costs ⁽¹⁾		Oil Space Heating Plus Biomass Costs		Total	
	\$	%	\$	%	\$	%
SEAPA	221,430	49%	418,993	43%	640,423	45%
Admiralty Island	(22)	0%	9,592	43%	9,570	32%
Baranof Island	1,671	2%	216,746	47%	218,417	39%
Chichagof Island	13,218	22%	29,950	51%	43,168	37%
Juneau	185,117	50%	977,503	46%	1,162,620	47%
Northern	33,670	38%	77,923	53%	111,593	47%
Prince of Whales	3,313	14%	180,036	49%	183,349	47%
Upper Lynn Canal	18,925	41%	172,791	50%	191,716	49%
Total Southeast Region	477,322	41%	2,083,534	46%	2,560,856	45%

⁽¹⁾Includes savings from generic hydro projects.

Electric / Space Heating / Total Savings

- 41% / 46% / 45% – Recommended vs. Status Quo Cases
- 17% / 46% / 42% – Recommended vs. Optimal Hydro Cases

Regional Supporting Studies and Other Actions

DESCRIPTION	TIME FRAME	ESTIMATED COST
General Public Outreach/Education Program	2012	\$250,000
Regional DSM/EE Program Start-up Costs	2012-2013	\$2,325,000
Regional Biomass Conversion Program Start-up Costs	2012-2013	\$2,225,000
Formation of Regional DSM/EE Entity Start-up Costs	2012	\$500,000
Formation of Regional Biomass Conversion Entity Start-up Costs	2012	\$500,000
Hydro Project-specific High Level Reconnaissance Studies	2012-2013	\$2,000,000
Hydro Project-specific FERC License Application Preparation	2012-2014	\$10,000,000
Regional Technical/Economic Market Potential Assessment of Non-Hydro Renewable Technologies	2012	\$500,000
Other Renewable Project-specific High Level Reconnaissance Studies	2012-2014	\$1,000,000
Support Tidal/Wave Technology Development	2012-2014	\$1,000,000
Develop Standard Power Sales Agreement	2012	\$200,000
Consider Development of Open Access Policy and Related Tariff (including terms and conditions of service)	2012	\$250,000
Update Southeast Alaska IRP in 2014	2014	\$750,000
Support Development of Tariff Structures That Better Reflect Costs	2012-2013	\$1,550,000
Support Development of Weather Normalized Load Forecasts	2013	\$375,000
Total		\$23,425,000



Overall Summary

- 20% - size of SE region relative to Railbelt
- 60-75% - space heating portion of monthly energy bill
- 9 – 60+ cents/kWh – range of pre-PCE cost of electricity
- 300/24 – number of hydro projects considered/passed screen
- 0 – number of transmission segments with unit costs less than diesel under Economic Case
- 0.10 – 0.32 – benefit-cost ratios of transmission segments under Public Benefit Case

Overall Summary (continued)

➤ Hydro Included in Recommended Resource Portfolio

✓ 19 MW – Committed Resources

✓ 50 MW – other hydro

➤ Electric / Space Heating / Total Savings

✓ 41% / 46% / 45% – Recommended vs. Status Quo Cases

✓ 17% / 46% / 42% – Recommended vs. Optimal Hydro Cases

Building a **world** of difference.®

Together



BLACK & VEATCH

