Energy Efficiency/Conservation

From a utility perspective

By

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Why Manage Load Growth?

- AELP Corporate Goals
  - Provide safe and reliable electric service from renewable resources
  - Provide among the lowest average electric rates for regulated utilities within Alaska over the long run while maintaining financial integrity
  - Use electric resources efficiently

New management position at AELP

- Energy Services Specialist

  Assist customers with energy investment decisions
  - Heating systems
  - Insulation and building efficiency
  - Lighting
  - Appliances
  - Electric Vehicles

  Provide information on Federal, State and Local funding

  Manage AELP's DSM program

  Trouble shoot customer energy usage problems

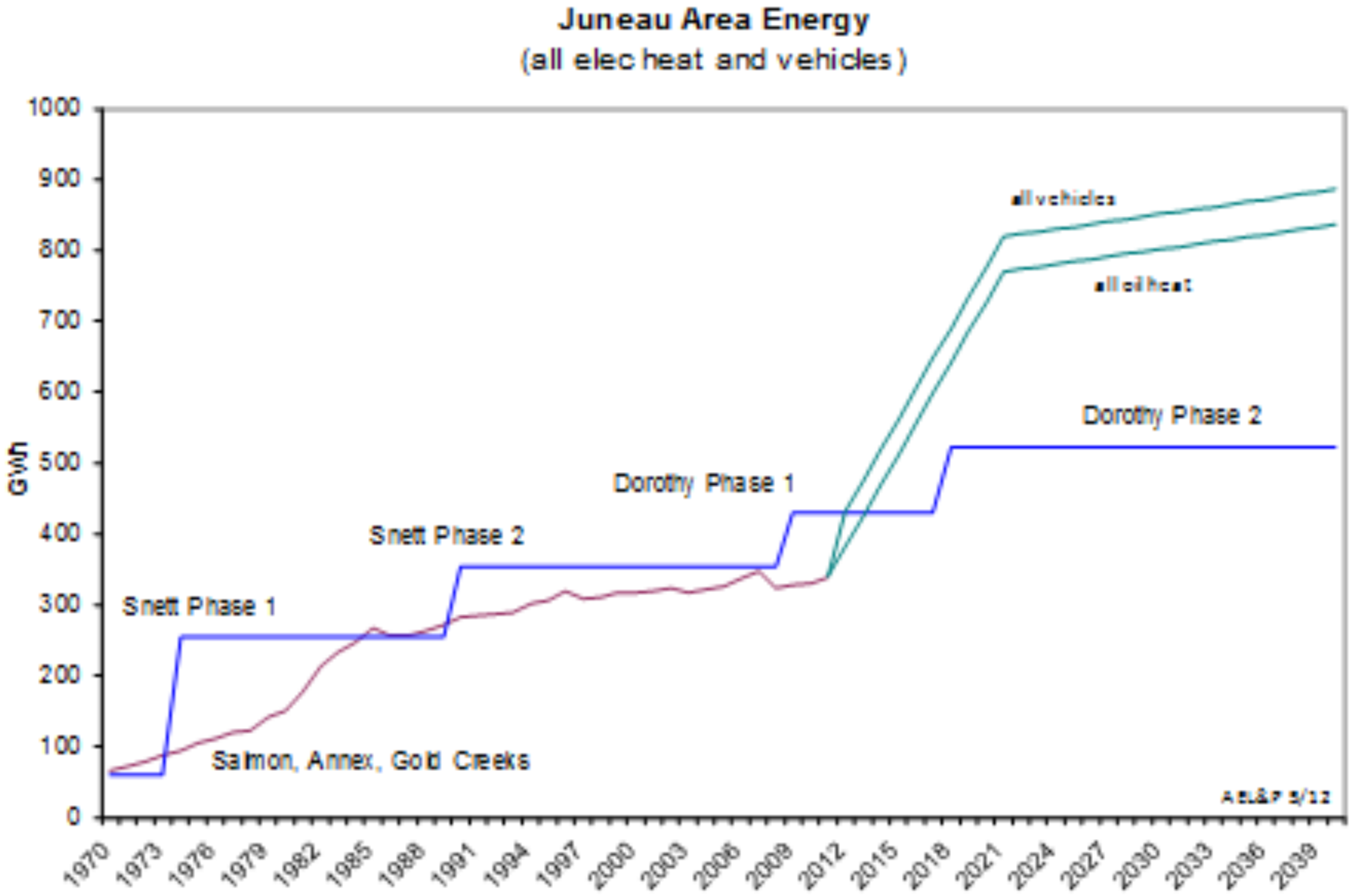
  Teach electrical safety in schools

  Goal: To postpone as long as possible the need for new base-load generation

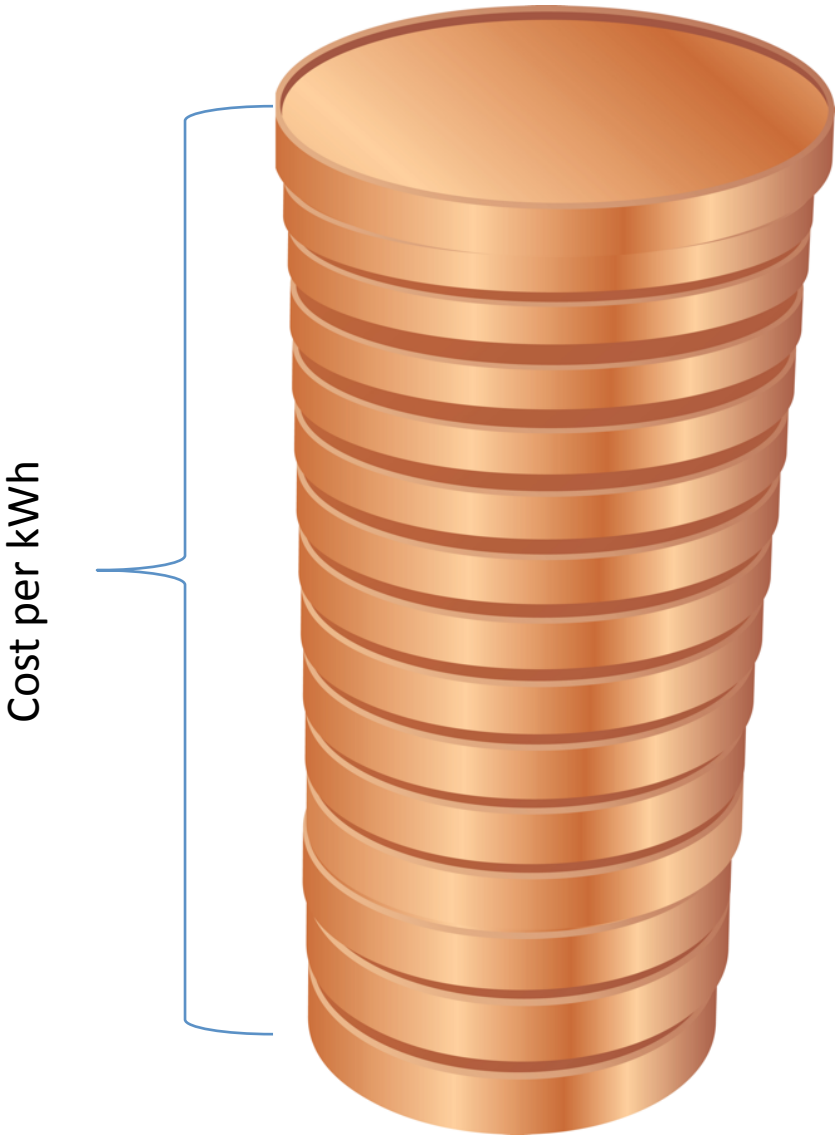
Approach

- Promote electrical efficiency measures as a way to generate bandwidth for loads that will shift from petroleum-based fuels to hydropower.

- Encourage biomass and heat pumps as alternatives to fuel oil for space heating.

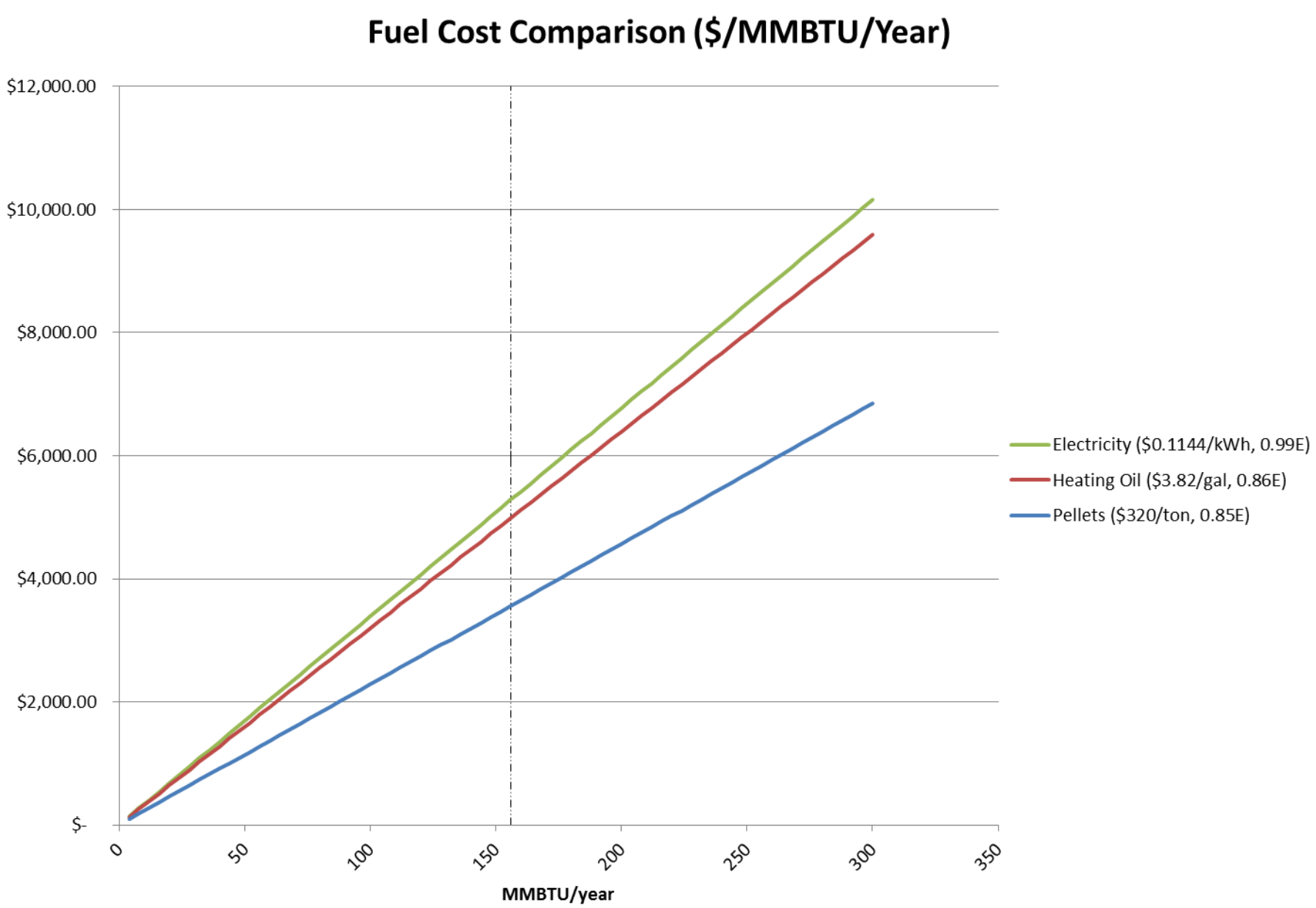

Juneau Area Energy
(all elec heat and vehicles)
GWh
1000
900
800
700
600
500
400
300
200
100
0
1970
1973
1976
1979
1982
1985
1988
1991
1994
1997
2000
2003
2006
2009
2012
2015
2018
2021
2024
2027
2030
2033
2036
2039
all vehicles
all oil heat
Dorothy Phase 2
Dorothy Phase 1
Snett Phase 2
Snett Phase 1
Salmon, Annex, Gold Creeks

Utility Rate Structure



- Line maintenance
- Generator maintenance
- Admin – Billing, purchasing, Accounting, payroll, regulatory compliance, etc.
- Interest on debt
- Cost of Capital
- Depreciation
- Metering
- Computer systems & security
- System operations
- Vehicle costs
- Fuel
- Taxes
- other

Cost per kWh = Total costs/Total KWh's


Fuel Cost Comparison ($/MMBTU/Year)
$12,000.00
$10,000.00
$8,000.00
$6,000.00
$4,000.00
$2,000.00
$-
0
50
100
150
200
250
300
350
MMBTU/year
Electricity ($0.1144/kWh, 0.99E)
Heating Oil ($3.82/gal, 0.86E)
Pellets ($320/ton, 0.85E)

Electric Vehicles

- In Juneau, electric vehicles use about as much oil as space heating

- Only a fraction of the hydro capacity is required to displace the oil used for transportation

Corporate Goal: Use Resources Efficiently

Heating

Oil used for space heating is efficient, around 86%, and comparable in cost to Juneau's current electric rates using old low-cost hydro projects.

Diesel generation at 30% efficiency or constructing new hydro for space heating will inflate electric rates.

Vehicles

Vehicles use fuel inefficiently, typically around 20%.

Very little new hydro is necessary to displace vehicle fuel.

Alaska's hydro projects
Indexed to 2012 $

Project	Completion Year	Actual Cost	Indexed Cost (2012 $)	avg MWh	$/MWh (2012 $)
Terror Lake	1984	$ 234,000,000	$ 482,936,170	117000	$ 4,128
Solomon Gulch	1981	$ 69,000,000	$ 157,853,774	46500	$ 3,395
Snettisham 1 (Long Lake)	1973	$ 88,000,000	$ 426,800,000	195000	$ 2,189
Swan Lake	1984	$ 96,171,483	$ 198,481,571	80000	$ 2,481
Tyee	1984	$ 128,691,456	$ 265,597,260	130000	$ 2,043
Bradley Lake	1991	$ 328,000,000	$ 580,583,942	370000	$ 1,569
Snettisham 2 (Crater Lake)	1989	$ 65,000,000	$ 116,759,259	105000	$ 1,112
Lake Dorothy	2009	$ 78,520,419	$ 84,816,043	75000	$ 1,131
Black Bear	1995	$ 11,000,000	$ 16,776,730	22200	$ 756
Goat Lake	1997	$ 10,100,000	$ 15,118,827	20100	$ 752

Summary

- Energy conservation and efficiency is the least cost alternative to acquire additional energy capacity
- Low cost hydro electricity is a limited resource and space heating is not the best use of those resources
- Vehicles are an efficient use of electric resources and usage is projected to grow substantially over the next twenty years.

- **Questions?**