Water to Fuel
Hydro Powered Electric Vehicles
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Alaska Electric Light & Power
The case for the EV on a national level

- National Security, electricity is diverse and domestic
- Electricity prices are stable
- The power sector has substantial spare capacity (constructed to meet peak demand)
- Electric network is well distributed
- Electric miles are less expensive than gasoline miles
- Electric miles are cleaner than gasoline miles
- Provides energy storage for peaking
- Government support (Reinvestment and Recovery act)
Planning for Juneau’s future

- Conversions from oil to electric space heating
- Reduction in lighting loads
- Increasing electric vehicle loads
Juneau’s energy sources

- AEL&P produces 429 million kWh’s from existing hydro resources, 100% of the electric load
- Juneau residents also use oil
  - 12 million gallons of oil annually for heating
  - 12 million gallons annually for transportation
- An additional 387 million kWh’s of hydro resource would be required to completely displace heating oil
- An additional 155 million kWh’s of hydro would displace all transportation fuel
## Oil to Hydro Conversion

**Light duty vehicles**

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Gas (gal)</th>
<th>IC MPG</th>
<th>KWh</th>
<th>EV mi/kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$3.3</td>
<td>30</td>
<td>$.11</td>
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<table>
<thead>
<tr>
<th>IC Cost per mile</th>
<th>EV cost per mile</th>
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<td>$.11</td>
<td>$.027</td>
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<table>
<thead>
<tr>
<th>Ave annual mi/vehicle</th>
<th>Savings per vehicle</th>
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<tr>
<td>10,000</td>
<td>$830</td>
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</table>
Annual fuel displacement
Light duty vehicles

Assumptions
Population  Drivers 80%  Miles/driver  total miles
32,000      25,600      10,000      256,000,000

kWh’s required @ 4 mi/kWh
64 million

Fuel displaced (30 mi/gal)
8.5 million gal
Lake Dorothy Hydro
Phase 1 of 2
15 megawatt 75 million kWh
(300,000,000 EV miles)
Cost $70 million – complete 2009
EV – good fit for Juneau

- Short daily commute
- Renewable energy
- Moderate temperature
AEL&P Regulatory Filing
Experimental EV Rate

• Justification – load research, cost of service, consumer acceptance
• $.06/kWh experimental off-peak
• $500 AEL&P investment in separately metered circuit
• Qualified EV – street legal, Plug-in or Plug-in Hybrid, 40 mile battery range
• Customer must agree to supply annual mileage
• Five year term
Consumer Issues:
Reliability
Range
Fuel availability
Cost
Conclusion

Objectives:

Reduce oil usage in Juneau
Provide affordable rates using renewable resources

Strategy:

Encourage energy conservation
Discourage conversion from oil to electric space heating
Encourage use of the Electric Plug-in Vehicle