Juneau Area Hydro Operations

Hydroelectric Project Type

• Run of the River

• Storage
Power = Flow*Net Head
Power = Flow \times Net\ Head

Flow = Precipitation \times Watershed\ Area

8760\ hours \times 60\ minutes \times 60\ seconds
Capacity vs. Energy

• Capacity is how many kilowatts (kW) you can generate at any instant

• Energy is how many kW-Hours (kWh) you can generate over a time period

• 1 kWh equals generating 1kW for one hour
Juneau's Electrical Usage
## Juneau’s Hydroelectric Capacity

<table>
<thead>
<tr>
<th>Plant</th>
<th>Capacity (KW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snettisham – Long Lake</td>
<td>47,160</td>
</tr>
<tr>
<td>Snettisham – Crater Lake</td>
<td>31,050</td>
</tr>
<tr>
<td>Lake Dorothy – Bart Lake</td>
<td>14,300</td>
</tr>
<tr>
<td>Salmon Creek</td>
<td>5,000</td>
</tr>
<tr>
<td>Annex Creek</td>
<td>3,600</td>
</tr>
<tr>
<td>Gold Creek</td>
<td>1,600</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>102,710</strong></td>
</tr>
</tbody>
</table>
Firm-Average-Wet Energy

kWhr

- Firm: 294,000,000
- Average: 430,000,000
- Wet: 518,000,000
Snettisham Water Year Precipitation (October 1 – September 30)
Storage Project in SE Alaska

Rule Curve – Operating Guidelines for Maximum Firm Flow

- Region 1 - Fill Due to Snow Melt in the Spring and early summer
- Region 2 - Fill Due to Rain in the late summer and fall
AEL&P Has Minimized Effect of Dry Water Years

- Surplus power sales
  - Customers with two heating systems receive discounted electric power but can be interrupted during a dry year.
    - Dual Fuel Program
  - Customers who have their own electrical generation can be interrupted during a dry year.
    - Princess Cruise Lines
    - Greens Creek Mine

![Interruptible % of Total Sales](chart.png)
A Drought Without Interruptible Load

- Run diesel generation
  - Cons
    - Air Emissions
    - High fuel cost per kWh
  - Pros
    - Can match your generation to your load (minimize short term costs)
- Build more hydro
  - Cons
    - High cost of construction, fixed generation output
    - High cost per kWh, lasting impact to electric rates
  - Pros
    - Long lifetime renewable energy