MEMORANDUM

TO: Power Committee

FROM: Charlie Black and Massoud Jourabchi

SUBJECT: Trends in Regional Energy and Peak Electricity Loads

Council staff has prepared a historical review of regional energy and peak electricity loads during 1995-2012. The presentation will review historical changes in the economic drivers of load growth, as well as changes in the sector level electricity sales during this period.

In brief, actual regional system energy loads (net of direct service industries) during 1995-2012 grew at an annual average annual rate of 0.40 percent per year. After removing impacts of weather, the annual average growth rate for regional energy loads was 0.46 percent per year.

For actual regional coincident system peak loads (net of direct service industries) during 1995-2012 the annual average annual rate of growth was negative 0.10 percent per year.
Trends in Energy and Peak Loads

January 15 2014

In today’s Presentation

• Economic Drivers behind Load growth?
• How sector level sales have been doing?
• How regional loads changing over time?
Economic Drivers Sector

Change in Sector Level Sales (MWA)
Data Center Loads in the NW 2011-2012

Large Data Center loads in the region represent about 5%-10% of non-Direct Service Industrial sales
- 350 to 500 average megawatts (~ half are in Oregon)
- As much electricity as lumber & wood products
- About half as big as Oregon’s pulp and paper sector

Smaller Data Centers loads within commercial buildings represent roughly 5%-6.5% of commercial sector sales
- About 300 to 400 average megawatts

Council’s 6th Plan Forecast for range of Custom Data Center Loads

As of 2012 we seen to be in the Price-Effect (Medium) to High case range
Comparison of Actual & Weather Normalized Energy MWa

1995-2012 Annual Growth Rate

<table>
<thead>
<tr>
<th>Actual Load Net of DSI (MWA)</th>
<th>0.40%</th>
</tr>
</thead>
<tbody>
<tr>
<td>WN Load net DSI</td>
<td>0.46%</td>
</tr>
</tbody>
</table>

Comparison of Actual & Weather Normalized Peak MW

1995-2012 Annual Growth Rate

| Peak Load Net of DSI (MW) | 1995-2012 Annual Growth Rate |
|----------------------------|==============================|
| Peak Load Net of DSI (MW) | -0.10%                       |
Actual Peak MW

Trends in Actual Loads

\[ y = 69.96x + 30235 \]

\[ R^2 = 0.0358 \]
Relationship between Deviation in Temperature and Peak Loads

How Normal Weather Peak Hour is Calculated

Step 1: Estimate Weather Normalized highest Energy Day
Step 2: Allocate that day’s energy across the hours

<table>
<thead>
<tr>
<th>Temperature (Monday December 9th 2013)</th>
<th>SeaTac</th>
<th>PDX</th>
<th>Spokane</th>
<th>Boise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yesterday's Temperature</td>
<td>26</td>
<td>20</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Today's Temperature</td>
<td>29</td>
<td>21</td>
<td>13</td>
<td>2</td>
</tr>
</tbody>
</table>

Normal Regional temperature for this date 38
Yesterday's Regional Temperature 20.12
Today's Regional Temperature 22.12

Deviation from Normal Temperature

<table>
<thead>
<tr>
<th>Yesterday</th>
<th>Today</th>
</tr>
</thead>
<tbody>
<tr>
<td>(18)</td>
<td>(16)</td>
</tr>
</tbody>
</table>

Weather Normalized Load (net of DSI) for today 23,339 MWa
Weather Normalized Peak hour (net of DSI) 27,607 MW