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**Presentation On:**  
**Northwest Hydro Benchmarking Study**

A Comparison of Hydro Generating Plants  
in the Pacific Northwest



# Overall Observations

- All the Northwest power projects benchmarked share similarities including:
  - Hourly wage rates for job classifications within NW power projects have similar wages rates. Wage rates for skilled craft workers – plant mechanics and electricians - averaged about \$30 per hour in 2004 for all NW Region participants.
  - Wage rates are increasing at about the same rate as inflation.
  - NW peer group staffing levels are relatively similar, with some notable exceptions discussed within the functional benchmarking analysis.
  - Most stations in the NW are experiencing similar age demographics characterized as an aging workforce that is just beginning to be replaced with younger workers.



# Conclusions

- Most of the NW hydro stations in this study compared favorably to HJA North American panel averages for the functions benchmarked.
- For the majority of functions, average costs for FCRPS stations and other NW stations were similar. Exceptions are where the FCRPS has:
  - Somewhat higher costs for Operations.
  - Lower Plant Maintenance costs in the Large segment and higher costs in the Medium and Small segments.
  - Much lower costs for Buildings and Grounds Maintenance.
- There was no discernable trend where benchmarks showed FCRPS stations were either consistently more costly or less costly than other regional stations.



## Conclusions (continued)

- Support costs (such as finance, human resources, and procurement) for all but two NW stations were below the HJA North American panel average, reflecting the structural advantage that NW utilities enjoy where support functions within the organization support multiple missions.
- Public Affairs & Regulatory costs comprise nearly half of benchmarked costs. PA&R costs for many NW stations are at or above the HJA North American panel average, reflecting significant program costs for fish mitigation, recreation, and visitor operations.



# Opportunities

- **Automation:**

- FCRPS stations have an opportunity to reduce Operations costs through automation. Many Small and Medium FCRPS stations with staffed controls rooms have significantly higher costs than automated stations in their peer groups. Medium-Large and Large FCRPS stations may also derive some cost improvements from development of an integrated automation strategy. Other HJA panel participants that have recognized these differences have developed plant automation strategies in cooperation with their plant modernization programs.

- **Water Management:**

- Currently, the water management function within the FCRPS resides in three agencies. Similar costs for other organizations in the NW study suggest an integrated three-agency review of the water management function might identify opportunities for process and cost efficiencies.



# Opportunities (continued)

- **Plant Maintenance:**

- Most NW stations costs were at or below HJA panel averages for their peer groups. There was some variability of costs among NW stations benchmarked. The study team recognized that continued sharing of maintenance practices could help all the regional utilities.



# HJA Consulting Hydro Benchmarking Program

- The program database includes 332 hydro stations, comprising 1,254 generating units that represent about 87,000 megawatts of installed capacity, about 50 percent of the hydro capacity in North America.
- HJA benchmarks the hydro business in seven distinct functional areas:
  - Operations
  - Plant Maintenance
  - Waterways and Dams Maintenance
  - Buildings and Grounds Maintenance
  - Support
  - Public Affairs and Regulatory
  - Investment
- This study addresses the first six functions listed above. Investment was excluded.



# Stations in the Northwest Regional Benchmarking Study

<b>Station</b>	<b>Owner</b>	<b>Data Year</b>
Chief Joseph	Corps of Engineers	2001
McNary	Corps of Engineers	2003
John Day	Corps of Engineers	2001
The Dalles	Corps of Engineers	2001
Lost Creek	Corps of Engineers	2004
Hills Creek	Corps of Engineers	2004
Detroit / Big Cliff	Corps of Engineers	2002
Green Peter / Foster	Corps of Engineers	2002
Lookout Point / Dexter	Corps of Engineers	2002
Hungry Horse	Reclamation	1999
Palisades	Reclamation	2004
Roza	Reclamation	2002
Anderson Ranch	Reclamation	2004
Skagit	Seattle City Light	1999
Boundary	Seattle City Light	1999
Rocky Reach	Chelan PUD	2000
Rock Island 1/2	Chelan PUD	2000
Lake Chelan	Chelan PUD	2000
Nisqually	Tacoma Power	1995
Cowlitz	Tacoma Power	1995
Cushman	Tacoma Power	1995
Priest Rapids / Wanapum	Grant County PUD	1996





# Operations

- Represents 11 percent of benchmarked expense costs.
- NW station operations cost average \$183,000 per generating unit:
  - Similar costs for North American peers.
  - \$53,000 per unit (29 percent) are associated with water management and generation dispatch functions.
  - Also accounts for power used within the station (i.e. station service).
- For NW stations with staffed control rooms, costs average \$219,000 per unit:
  - Similar to North American peers.
  - FCRPS costs average \$230,000 per unit.
  - Other NW stations average \$173,000 per unit.
  - Lost Creek (\$492,000 per unit) and FCRPS water management and generation dispatch costs are the biggest factors in the cost difference between FCRPS and other NW stations.



## Operations (continued)

- For automated NW stations, costs average \$119,000 per unit:
  - Less than the \$136,000 per unit cost of North American peer stations.
  - FCRPS costs average \$109,000 per unit.
  - Other NW stations average \$125,000 per unit. These costs do not include water management and generation dispatch costs for three Chelan PUD stations.
- Staffing:
  - Stations with **staffed control rooms** averaged 1.9 FTE per generating unit
  - **Automated** stations average 0.9 FTE per unit.
  - The difference is larger with Small and Medium stations - 2.2 and 0.7 FTE per unit, respectively.
  - This staffing level difference is the primary driver of cost differences between stations with staffed control rooms and stations that are automated.



# Plant Maintenance

- Represents 13 percent of benchmarked expense costs.
- Grouped into Large, Medium, and Small segments, less than or greater than 45 years of age.
- Larger stations cost less to maintain on a \$/MWh basis. Older stations are more costly than newer stations.
- Average costs range from \$0.67/MWh for Large stations to \$2.88/MWh for Small stations older than 45 years.



## Plant Maintenance (continued)

- With few exceptions, NW costs in all three Plant Maintenance peer groups are at or below HJA North American Panel averages:
  - Lookout Point / Dexter costs are 55 percent above average.
  - Green Peter / Foster costs are 14 percent above average.
  - Anderson Ranch costs are 10 percent above average.
- There were some stations with exceptionally low Plant Maintenance costs:
  - On the Columbia main stem, The Dalles, John Day, and Chief Joseph have costs that are 40 percent below the North American panel average for Large stations.
  - Cowlitz and Skagit are low cost Medium stations and Nisqually, Lake Chelan and Hills Creek are low cost Small stations. All have costs that are 50 percent below their North American panel averages. This is attributed to cultures that foster a high level of pride and personal responsibility among staff at smaller stations, multi-skilled craft, and less formalized approaches to maintenance management.



## Waterways and Dams / Buildings and Grounds Maintenance

- Combined, these functions represent 9 percent of benchmarked expense costs.
- Waterways and Dams Maintenance: With only two exceptions, costs for NW panel stations are well below HJA North American Panel averages (>\$100,000 per unit). The exceptions are:
  - Rocky Reach is 70 percent higher than the panel average for Medium sized stations.
  - Roza is 70 percent higher than average for Small stations, largely attributable to the extensive canal system for that station.
  - FCRPS stations costs average \$51,000 per unit.
  - Other regional stations costs average \$48,000 per unit.
- Buildings and Grounds Maintenance: Costs are well below the HJA North American panel average (\$36 per square meter) for all but two of the stations, Lake Chelan and Rock Island:
  - FCRPS stations costs average \$10 per square meter.
  - Other regional stations costs average \$33 per square meter.



# Support

- Represents 18 percent of benchmarked expense costs.
- All but three NW stations have lower Support costs than HJA's North American panel average (\$40,000 per station FTE):
  - Anderson Ranch likely has high Support costs (75 percent above average) because there are so few direct FTE at this small station.
  - Skagit (35 percent above average).
  - Rock Island (10 percent above average).
- FCRPS Support costs average \$30,000 per station FTE. Excluding Anderson Ranch, the average is \$27,000 per station FTE.
- Support costs for other NW stations also average \$27,000 per station FTE.
- One of the clear advantages that Corps, Reclamation, and other NW facilities share in this benchmark is they have robust support organizations that also serve business functions that are not benchmarked in this study (i.e., navigation, irrigation, and municipal water supply). This likely lowers the support cost per direct station FTE, while still providing many types of support services for other missions.



# Public Affairs and Regulatory

- Represents 49 percent of benchmarked expense costs.
- Includes costs for fish and wildlife, recreation, cultural stewardship, and licensing.
- About half of the NW benchmarking panel stations are near or above HJA's North American panel average (\$15,519 per MW) for PA&R costs.
  - BPA costs of approximately \$156 million per year are allocated to the FCRPS stations.
    - \$138 million direct fish program.
    - \$17 million Colville Settlement payment.
    - \$1 million agreements and grants.
  - Many of the FCRPS stations incur other Corps/Reclamation fish-related costs, as well as costs for recreation and visitor operations.
  - Other NW stations also incur costs related to Federal Energy Regulatory Commission fees, fish mitigation, recreation, and/or visitors.