NORTHWEST POWER POOL
Reliability Update

2013 Winter Cold Spell Update

Jerry D. Rust

Reliability Update
Facts and Figures Since my last visit

Lowest recorded Water Year – 1977 @ 50% of normal*

Highest recorded Water Year – 1997 @ 148% of normal*

2nd Lowest recorded Water Year – 2001 @ 54% of normal*

Most recent Water Year – 2013 @ 96% of normal*

* 30-year Average

Reliability Update
Where are We today

What impacts Reliability?

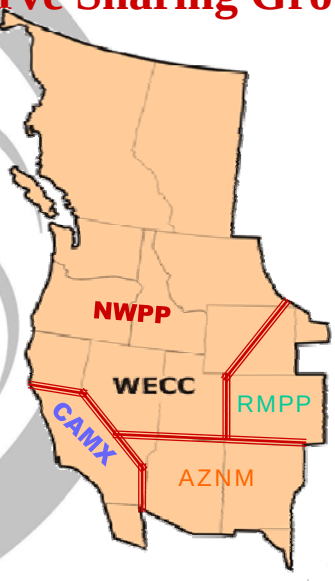
- Load
- Generation
- Economy
- Weather
- Constraints – the ability to deliver generation to load (transmission)

Demographics in NWPP
Electrical/Geographic Area

- 2 Canadian Provinces
- 8 U.S. States
- USA Federal, Public, Private, Provincial Ownership
- International Border (Treaties associated with water)
- Non-Jurisdictional as well as Jurisdictional
- Preference Act – Public Law 88-552
- 160 Consumer-owned electric utilities
- 22 Control Areas (39 in the Western Interconnection (WI))
- ~ 110,000 Megawatts Total Resources (44% WI)
- ~ 50% Winter Peak load of the WI
- ~ 50% Energy load of the WI
- Automated Reserve Sharing Procedures
- Hydro Coordination
- Hydro Thermal Integration
  - *Hydro located on the West (BC, ID, OR, WA)*
  - *Thermal located on the East (AB, CA, MT, NV, UT, WY)*

Western Interconnection Reserve Sharing Groups

Northwest Power Pool (NWPP RSG)
Alberta Electric System Operator
Avista Corporation
Balancing Authority of Northern California
Bonneville Power Administration
British Columbia Hydro & Power Authority
Chelan County PUD
Constellation Energy Control and Dispatch
Douglas County PUD
Grant County PUD
Idaho Power Company
NaturEner Power Watch
NaturEner Wind Watch
Northwestern Energy
PacifiCorp-East
PacifiCorp-West
Portland General Electric Company
Puget Sound Energy
Seattle City Light
Sierra Pacific Power Company
Tacoma Power
Turlock Irrigation District
Western Area Power Administration – UGP



Rocky Mountain (RMSG)
Public Service Company of Colorado
Western Area Power Administration – CM

Desert Southwest (SRSG)
Arizona Public Service Company
CECD – Arlington Valley
CECD – Griffith
CECD – Harquahala
CECD – Panda Gila River
El Paso Electric Company
Imperial Irrigation District
Nevada Power Company
Public Service Company of New Mexico
Salt River Project
Tucson Electric Power Company
Western Area Power Administration – LCD

Independent Balancing Authorities
California Independent System Operator
Comision Federal de Electricidad
Los Angeles Department of Water and Power

NORTHWEST PowerPool

Reliability Update
COLUMBIA RIVER RUNOFF

January through July volume runoff*
measured at The Dalles Dam

2013	2012	2011
98% (Actual)	120.6% (Actual)	133% (Actual)

* *30-year Average*

NORTHWEST PowerPool

Reliability Update
Historical Perspective

- Renewable Portfolio Standards
  - State of Washington – at least 15% of their energy requirement from renewable by 2020
  - State of Oregon – 25% by 2025 for large utilities
  - State of Montana – 15% by 2015
- Renewable Generation within the Northwest (USA)
  - 17 MW Solar
  - 908 MW Biomass
  - 38 MW Geothermal
  - 11,000 MW Wind

NWPP Area Wind

6-1-2010	6,671 MW
1-31-2011	7,807 MW
7-31-2011	7,953 MW
1-31-2012	8,594 MW
7-31-2012	9,894 MW
1-31-2013	10,718 MW
7-31-2013	10,903 MW
1-31-2014	11,403 MW forecasted

Reliability Update
UNKNOWN ISSUES TO WATCH

- **Extreme Weather Conditions, Summer** Every 1°F below normal increases Peak Demand by 300 MW
- **Precipitation** – Below normal precipitation impacts the future energy availability
- **Economic Conditions** – Recovery of the economy or further decline impacts load (~3 to 4,000 MW)

Participating Balancing Authorities

The NWPP Reserve Sharing Group includes all the Participating Balancing Authorities in the NWPP membership region:

- Avista
- Alberta Electric System Operator
- Balancing Authority of Northern California
- Bonneville Transmission
- British Columbia Hydro & Power Authority
- Chelan PUD
- Constellation Energy Control and Dispatch
- Douglas PUD
- Grant PUD
- Idaho Power
- NaturEner Power Watch
- NaturEner Wind Energy
- NorthWestern Energy
- PacifiCorp West
- PacifiCorp East
- Portland General Electric
- Puget Sound Energy
- Seattle City Light
- Sierra Pacific Power
- Tacoma Power
- Turlock Irrigation District
- Western Area Power Administration Upper Great Plains

Balancing Authority Loads at NWPP Peak ~ 66,700 MW (12-9-13 @ 17:00)

Preliminary Numbers

- Avista ~ 2,220 MW
- Alberta Electric System Operator ~ **10,830 MW**
- Balancing Authority of Northern California ~ 2,350 MW
- Bonneville Power Administration ~ **9,730 MW**
- British Columbia Hydro & Power Authority ~ **10,830 MW**
- Constellation Energy ~ 0 MW
- Chelan PUD ~ 630 MW
- Douglas PUD ~ 300 MW
- Grant PUD ~ 600 MW
- Idaho Power ~ 2,650
- NaturEner Power Watch ~ 0 MW
- NaturEner Wind Watch ~0 MW
- NorthWestern Energy ~ 1,700 MW
- PacifiCorp West ~ **3,930 MW**
- PacifiCorp East ~ 7**,550 MW**

  (Total ~ **11,480 MW**)
- Portland General Electric ~ 3,830MW
- Puget Sound Energy ~ 4,750 MW
- Seattle City Light ~ 1,730 MW
- Sierra Pacific Power ~ 1,720 MW
- Tacoma Power ~ 950 MW
- Turlock Irrigation District ~ 310 MW
- Western Area Power Administration Upper Great Plains ~ 90 MW

NORTHWEST PowerPool

NWPP Contingency Reserve Requirement

MSSC or 5% Load Responsibility served by hydro-generation plus 7% Load Responsibility served by thermal generation plus 5% Load Responsibility served by wind and photovoltaic

- MSSC range 800 to 1,500 MW
- 5/5/5/7% on average range 2,500 to 4,500 MW

NORTHWEST PowerPool

NWPP Extreme Weather Event (1-20 year)

A one in twenty (1-20) year extreme weather event or a 20°F below normal integrated over the entire NWPP area increases Peak Demand by ~6,000 MW. This adds an additional load requirement (load plus reserve) of ~7,000 MW.

NORTHWEST PowerPool

Reliability Update – Extreme Weather

	Load (MW)	Capacity Available Resources (MW)
Peak MW	**66,700**	**~110,000**
Wind MW		**(7,500)**
Op. Reserve Req.	**4,500**	
Sub-Total	**71,200**	**102,500**
Sustainability		**(10,500)**
Total	**71,200**	**92,000**
1 in 20 event	**7,000**	
Total	**78,200**	**92,000**

Includes 3,500 MW contribution from wind on peak

NORTHWEST PowerPool

NWPP Puget Sound Area Stability Issue

Puget Sound area system topology (transmission of generation from outside the area) requires monitoring during high loads. The area may become unstable with increasing loads with corresponding increase in generation transfers into the area.

The NWPP has established a trigger point (load level) which heightens the awareness of the issue.

NWPP Puget Sound Area Stability Issue

Trigger Point for the Puget Sound Load – 8,140 MW

Highest load during recent cold spell – 7,612 MW

No issues

Reliability Update
Recent Cold Spell

There were no problems within the NWPP area during the recent cold spell

- Planners anticipated and were prepared for the cold
- Event was short
- No significant outages (transmission or generation) during the event
- Event was at most a 1 in 5 year event in localized pockets (Puget Sound Area)

NORTHWEST PowerPool

QUESTIONS?

NORTHWEST PowerPool