Preliminary Review of July 24th Extreme Temperature Event

Northwest Power and Conservation Council

September 13, 2006

Astoria, Oregon

What happened on July 24th?

CALIFORNIA:

- CA ISO's forecasted peak load = 46,063 MW (based on average temperatures)
- CA ISO's actual peak on July 24th = 50,270 MW (called on 855 MW of interruptible load)
- CA ISO declared Stage 1 and Stage 2 emergencies, which means operating reserves ≤ 5%

NORTHWEST:

- NWPP's forecasted load ≈ 52,000 MW
- NWPP's actual load = 54,602 MW → 2,400 MW above normal
- In Pacific Northwest, PSE, PGE and PAC declared NERC Alerts 1 and/or 2, meaning all available resources in use, and/or load management procedures in effect, respectively
- **NWPP operating reserve requirements met at all times**

Were CA and/or NW Resource Adequate?

CALIFORNIA:

- CA ISO's Planning Reserve Margin (PRM) = 24.7%
  - Including interruptible loads and demand response
- CPUC's Resource Adequacy Requirement = 15-17%
- CA ISO was resource adequate

PACIFIC NORTHWEST:

- Pilot Capacity Standard proposed 15% PRM for July
- Council's assessment showed PRM substantially above 15% for July
- Northwest was resource adequate (assuming IPPs in region)

Overview of What Happened

- Temperatures were extreme in Northwest and in California – well beyond planning levels
- Loads were under-forecasted on Thursday and Friday when market positions for Monday were set
  - Prices on the 24th were at FERC caps ($400 per MWh) or higher
- Few generation outages - Colstrip unit and Chehalis unit
  - Wind performed at lower level than expected
- Relatively limited demand response

Overview of What Happened (con't)

- Approximately 3,500 MW of uncontracted NW IPP generation was included in our surplus assessment as available to the Northwest
  - Almost all sold to California - directly or through NW utilities
  - Interties were effectively full
- Bonneville set up river on Friday to maximize generation south of North of John Day transmission constraint without violating fish constraints
  - Asked TMT for leeway to curtail spill, if necessary, though it turned out not to be necessary

Temperatures

CALIFORNIA:

- CA ISO indicated combined probability of No. and So. California at simultaneous peak ~ 1 in 50 event

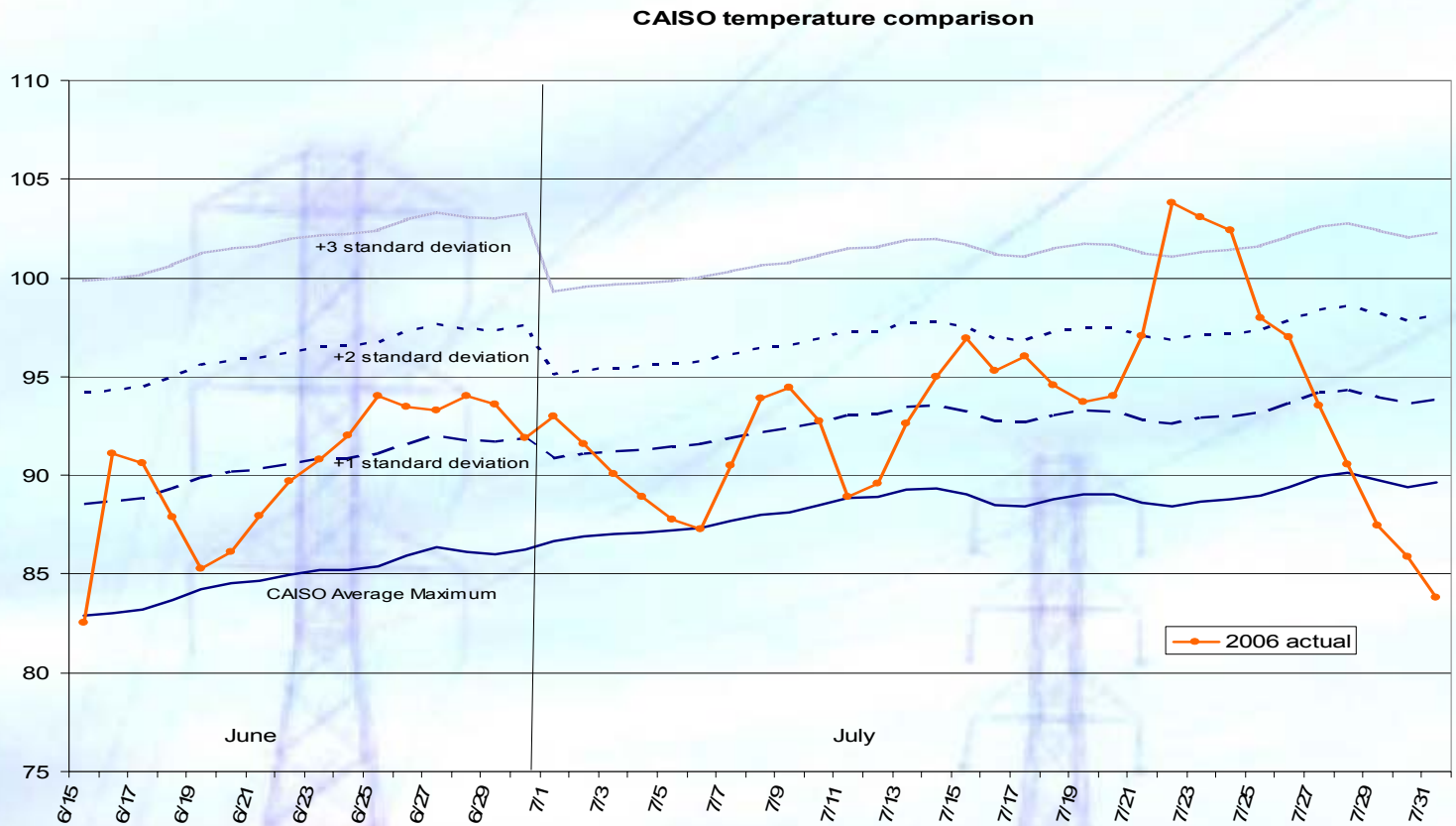
NORTHWEST:

- July 23rd was hottest day on record with July 24 only degree or two less. = 1 in 70 year event
- Combined probability of NW & CA experiencing record events = ???

EXTREMELY RARE TEMPERATURE EVENT

- Planning Standards are set perhaps for 1 in 10 or 1 in 20 year events, but not for such rare events

CA ISO temperatures ≥ 3 standard deviations above normal (CEC prelim. data)



Stale Forecasts & Forward Marketing

- Loads were under-forecasted on Thursday and Friday when market positions for Monday were set
  - Appears to have been significant forward sales to California on Thursday and Friday
- BPA did not sell into market for economy reasons, only for reliability needs
  - Limited sales to control areas with declared NERC alerts or CA ISO with declared stage 1 & 2 emergencies

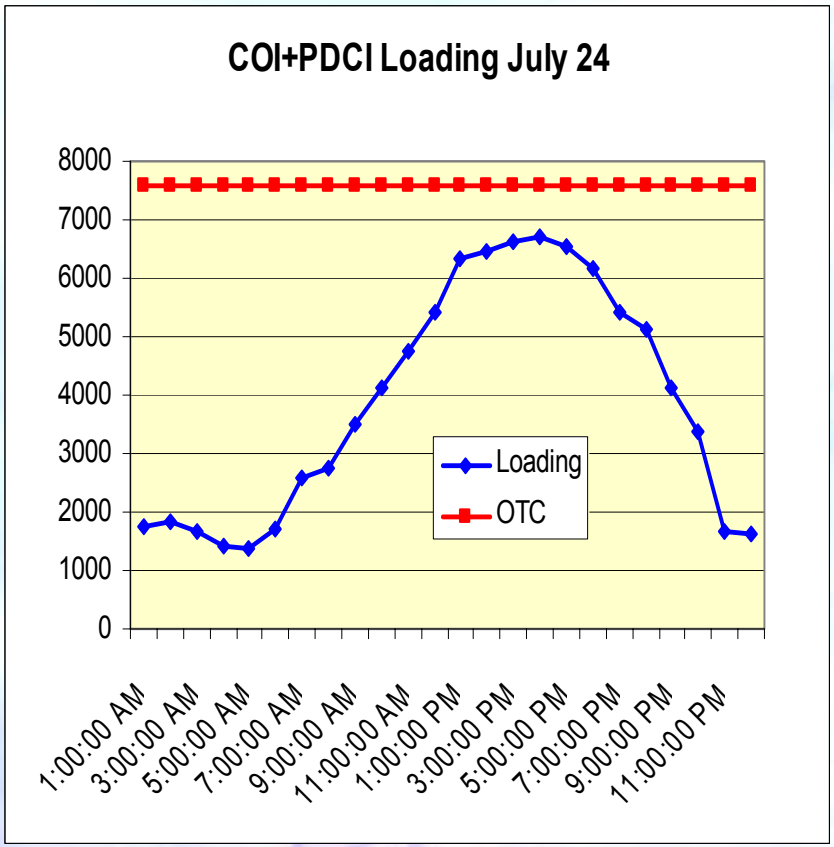
Examples: PDX and SEA max temps (yellow) almost always exceeded forecasts

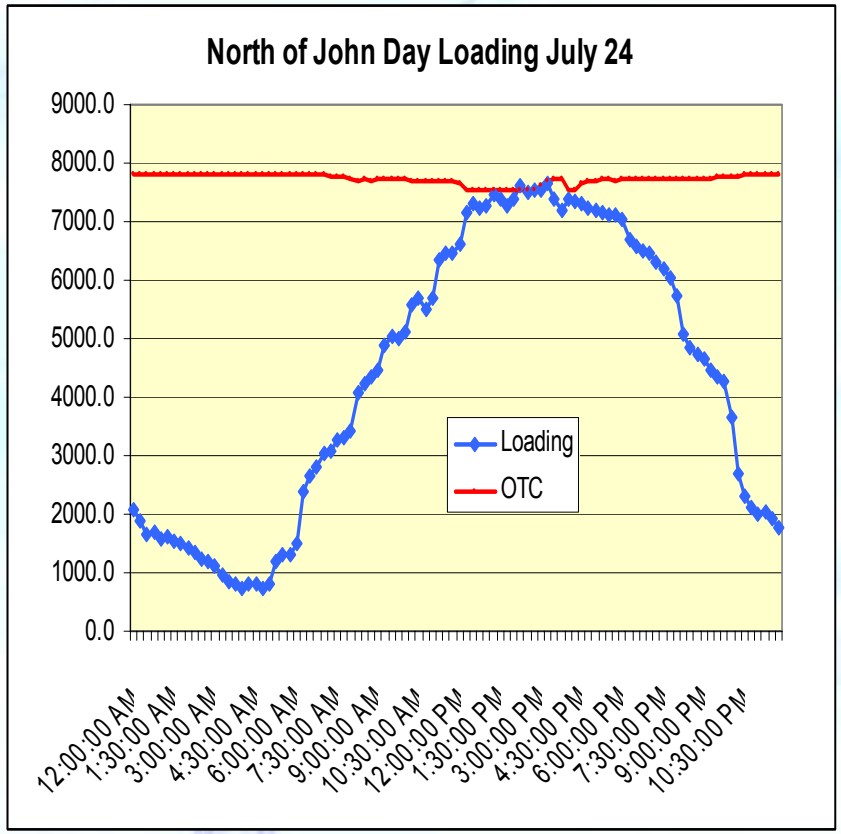
Station and Forecast Date		Forecast For Date				
Weather Station	Forecast Filed Date	7/20/2006	7/21/2006	7/22/2006	7/23/2006	7/24/2006
Portland - Portland International Airport	7/20/2006	95	100	98	95	90
	7/21/2006		104	98	93	89
	7/22/2006			93	95	90
	7/23/2006				101	88
	7/24/2006					97
Seattle - Seattle-Tacoma International Airport	7/20/2006	87	92	89	88	84
	7/21/2006		97	90	87	84
	7/22/2006			96	89	84
	7/23/2006				95	83
	7/24/2006					92

PNW Resources

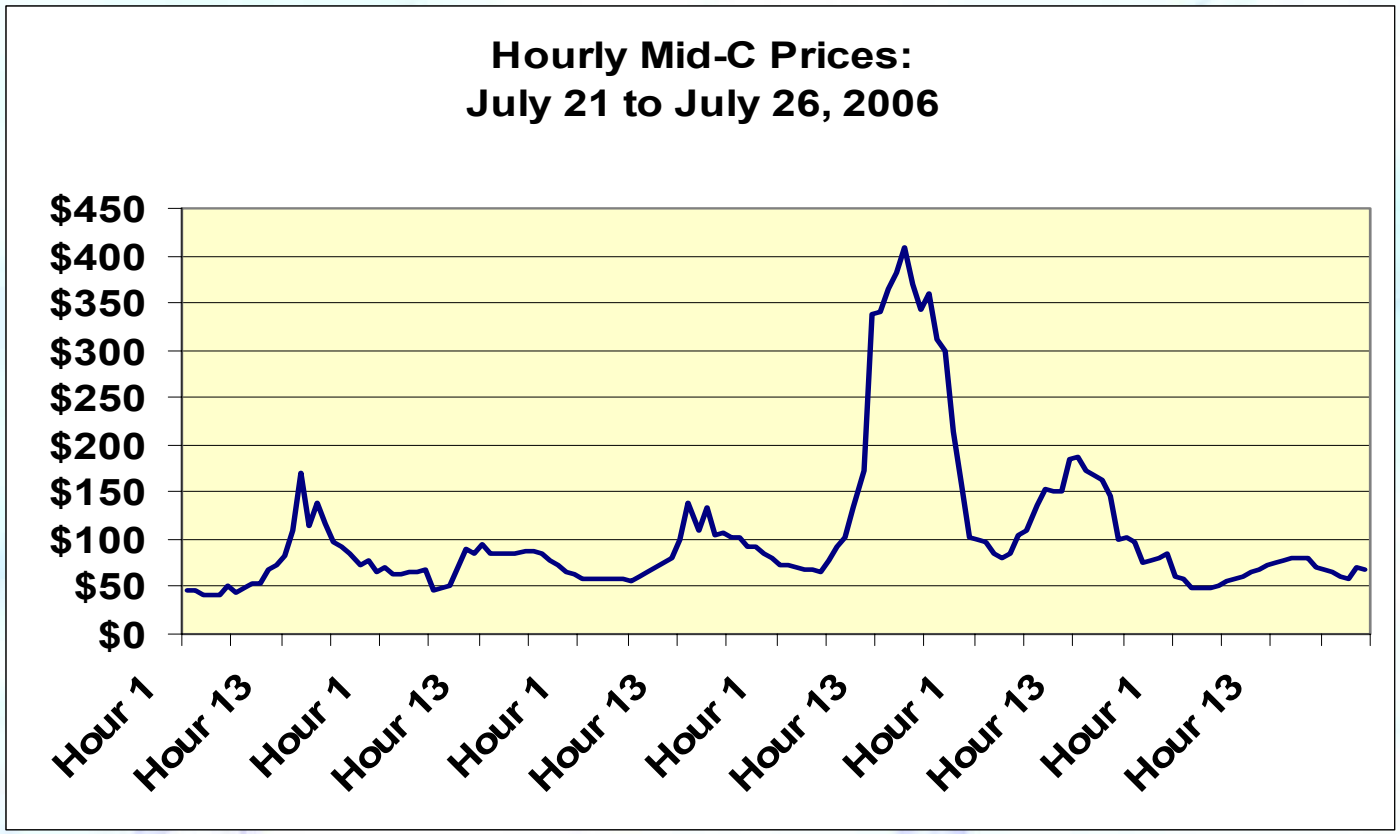
- Thermal resources forced out at time of afternoon peak:
  - Colstrip #4 (≈ 600 MW)
  - Chehalis (one unit ≈ 250 MW)
- FCRPS achieved sustained peaking cap (10 hour duration) 1,450 MW above normal July day amount with same water conditions
- Demand response (PGE, PSE, IPC, Snohomish, Avista, Chelan) ≈ 130 MW
- BPA wind at 6% capacity factor on peak hour; but 12 – 15% over 10 hour sustained peaking duration
  - California saw about 5% over peak hours

Interties were close to full and limited by internal BPA path loadings (NJD example)





Mid-Columbia hub prices spiked on the 24th



Uncontracted IPP Generation in PNW

- Approximately 3,500 MW of uncontracted IPP generation was included in our surplus calculation as potentially available for meeting Northwest load
- All of it (except one Chehalis unit on forced outage) running and either sold to California or to NW utilities to Powerex and probably resold to California

July Planning Assumptions vs. July 24, 2006 (Preliminary Estimates)

	Old Planning	July 24, 2006
Hydro ('37)	18,200*	17,200* (Est.)
Hydro Flex	1,000	1,450
Non-hydro	10,400	9,800
Net Imports	-2,500	-2,500
IPP	3,500	0
Wind	~300	160
Spot Imports	0	0
Total Resource	30,900	26,110 (Est.)
Exp Peak Load	22,200	23,200 (Est.)
Balance	8,700	2,910
Reserve	**39%**	**12-13%**

*"Old" includes 1998 BiOp spill, which is less than the current BiOp spill. July 24 hydro reduced about 1,000 MW-months as estimate.

Observations and Recommendations

- If sequence had not been over the weekend, forward selling would not have been so high - better for NW, worse for California
- On the other hand, loads might have been higher by the 4th day without the intervening weekend
- Operating protocols should be reviewed by NWPP
  - October NWPP meeting will review them, including defining what constitutes an “Emergency”
  - Should ERT (Energy Response Team) have been convened on July 24th?
- Steering Committee to review whether (or how much) uncontracted IPP generation to include in NW resource