

# Assessing Sustainable Hydro Capacity

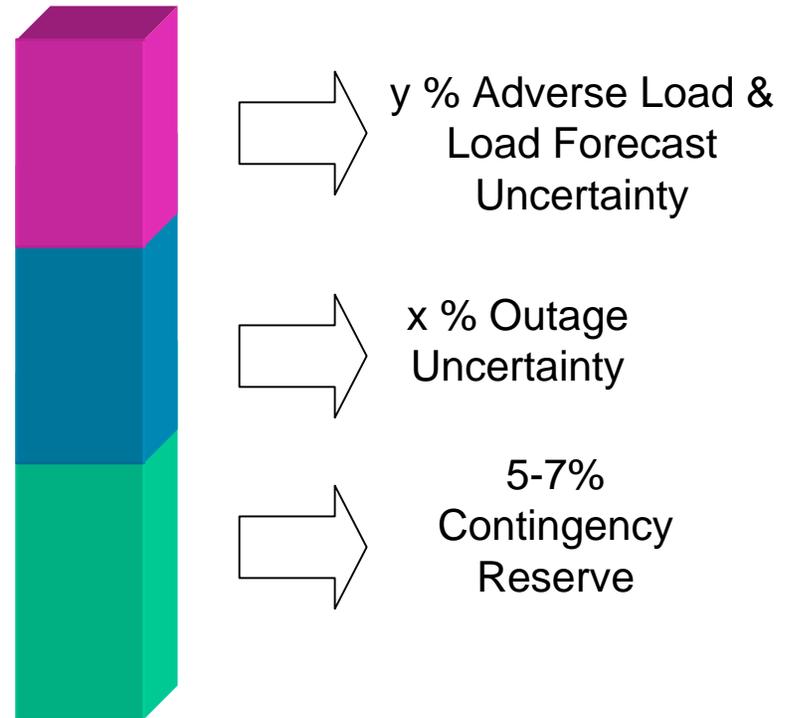
---

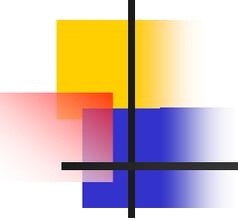
Mary Johannis  
PNW Resource Adequacy  
Technical Committee Meeting  
04-19-06

# Direction from Steering Committee

## Form of Capacity Metric & Target:

- Metric = Planning Reserve Margin Using 1 in 2 Loads
- Contingencies such as cold snap loads reflected in reserve margin

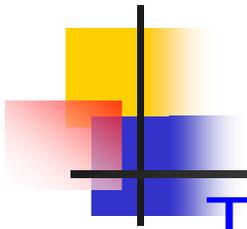




# Direction from Steering Committee

---

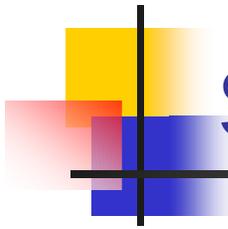
- Evaluate Sustained Peaking Capacity over peak hours of a number of Consecutive Days of Cold Snap or Heat Wave
  - Peak Hours Duration?
  - Off-peak Market Purchase Assumptions?
- Define Appropriate Duration for Sustained Peaking Capacity
- Develop Target for Capacity Metric, which is functionally equivalent to LOLP of 5%



# Progress on Assessing Sustainable Hydro Capacity

## Technical Committee Decisions:

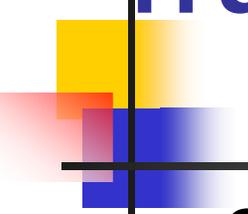
- Evaluate Sustained Hydro Capacity for Worst Case Cold Snap:
  - Current 1 in 2 Loads (2006 or 2007)
  - 1937 Water
  - February 1989 Temperatures, which increases Temperature Sensitive Loads
- Council to Perform Regional Bottom-Up Sustained Capacity Evaluation & Compare with Top-Down Evaluation
- BPA (Eric King) to lead Columbia River Hydro Evaluation Small Group



# Federal Columbia River Power System (FCRPS) Sustained Hydro

## ■ Background

- FCRPS instantaneous hydro capacity is estimated to be over 21,000 MW. However, this estimate overstates the amount of Federal hydro capacity actually available to meet firm load during a cold snap:
  - FCRPS has more generating units than hydro fuel available to operate all the units even for fairly short duration cold snap
  - Limited amount of water and water storage in the Columbia River basin
- An adjustment to the Federal system instantaneous hydro capacity estimates must be made to account for:
  - Actually availability of FCRPS hydro project units—generally, at least, one unit is out for maintenance at large facilities
  - Availability of water to operate the hydro project units and
  - Reductions for forced outage reserves and spinning reserves



# True Up of BPA Spreadsheet Model to Hoss Hourly FCRPS Model

---

- Spreadsheet Model run for:
  - February 1989 Temperatures
  - 2007 Loads
  - 1937 Water
  
- Spot check certain hours
  - For Federal Projects Check:
    - Discharge
    - Tailwater
    - Head
    - H/K
    - Generation

# FCRPS Assumptions for 4/14/06 Columbia R. Hydro Evaluation Mtg

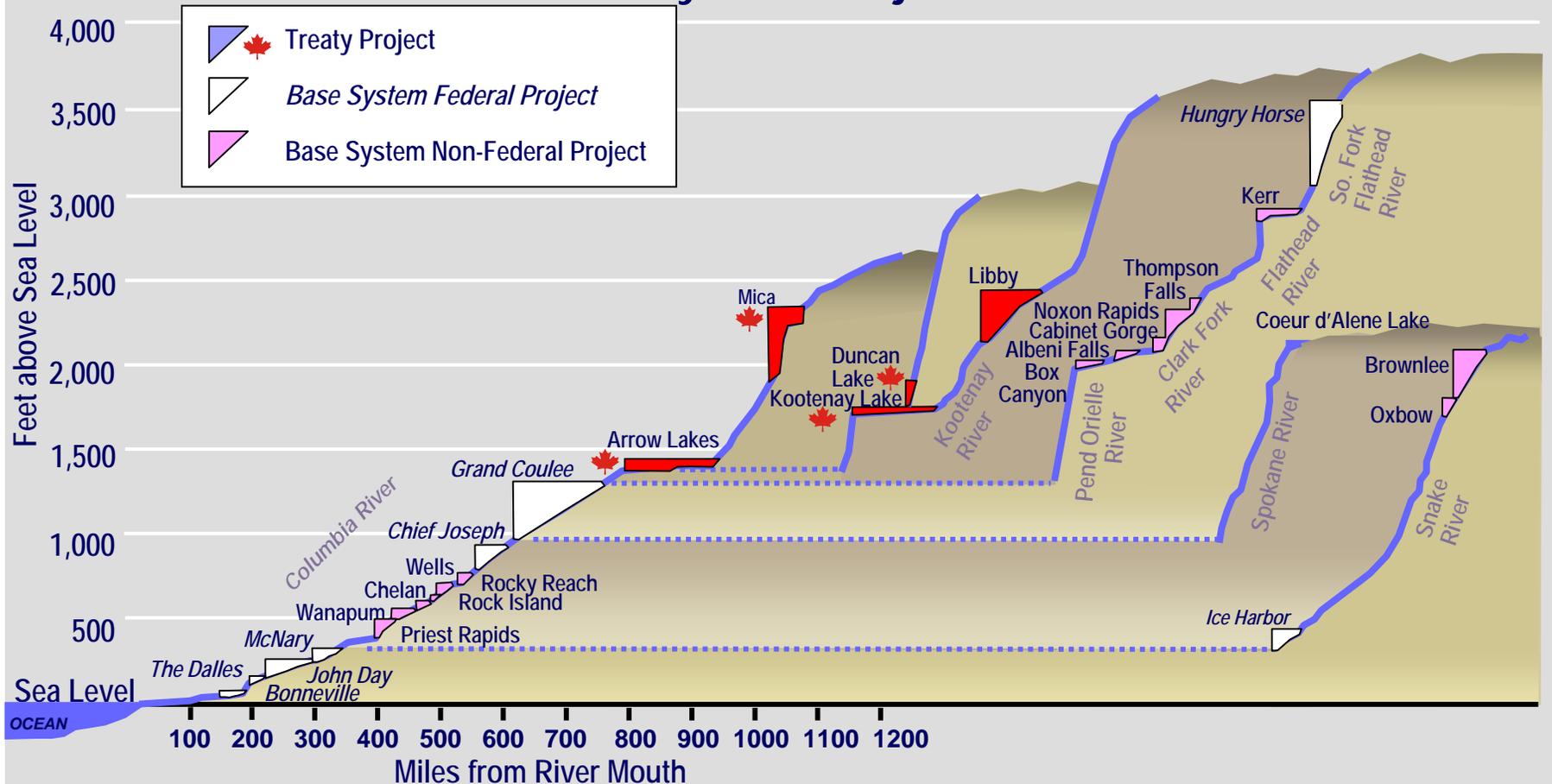
- Assumed Ability to Set up Columbia River Operations in Advance of Cold Snap
- Canadian Projects:
  - 10 KCFS above Treaty discharges
- Federal Projects:
  - LIB full load
  - HGH full load
  - DWR full load
  - GCL up to 2 feet/day draft
  - LWR Snake and LWR Columbia projects within operating ranges

# PNW Hydro Characteristics

- Common fuel supply, affected by non-power constraints
- Hydro operations have consequence, either immediately or in the future
- Hydro is used for regulation and load-following while thermal tends to be base loaded



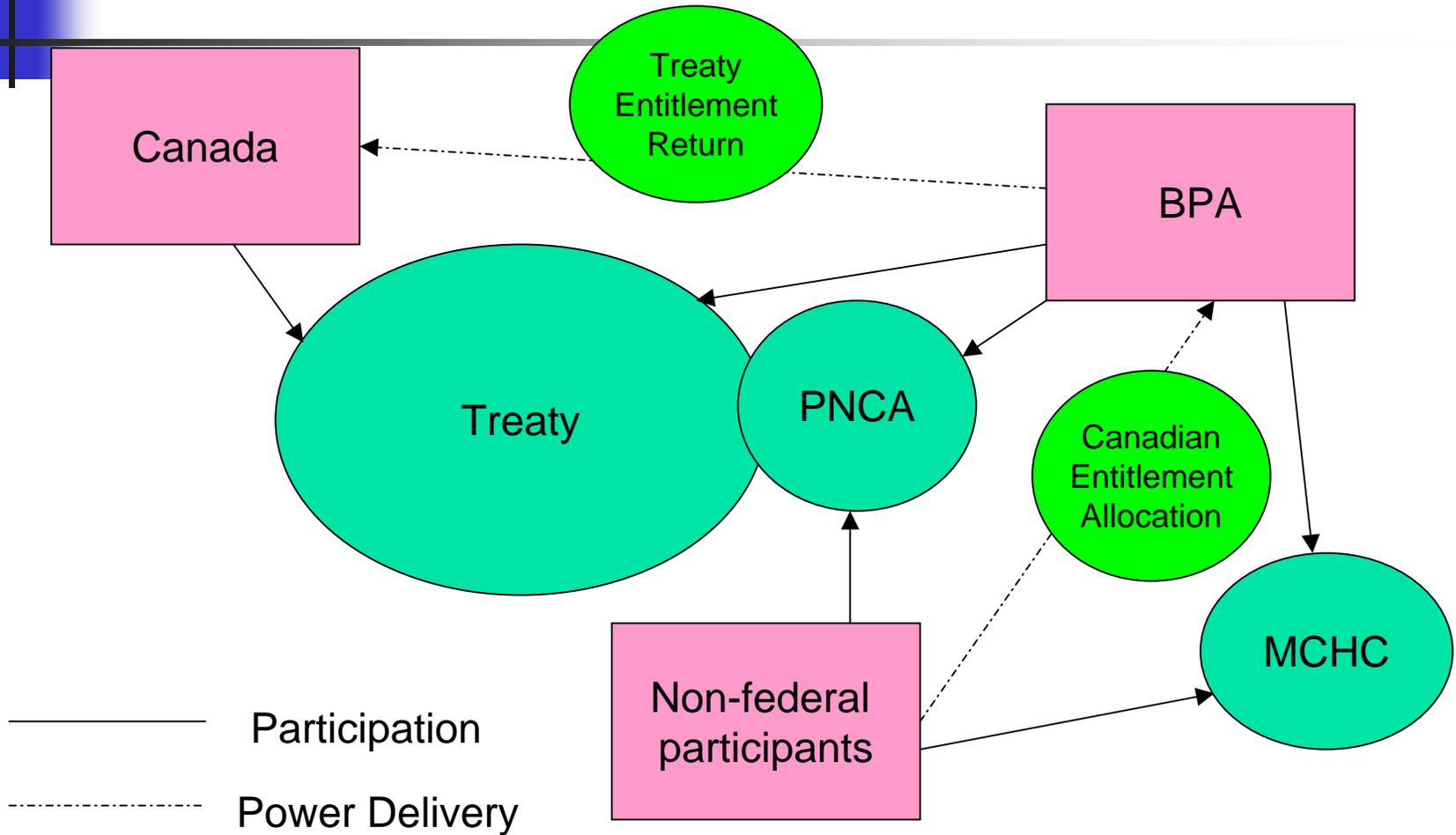
## United States – Canada Treaty and Columbia River Base System Projects



April 19, 2006

Results shown are Illustrative Only

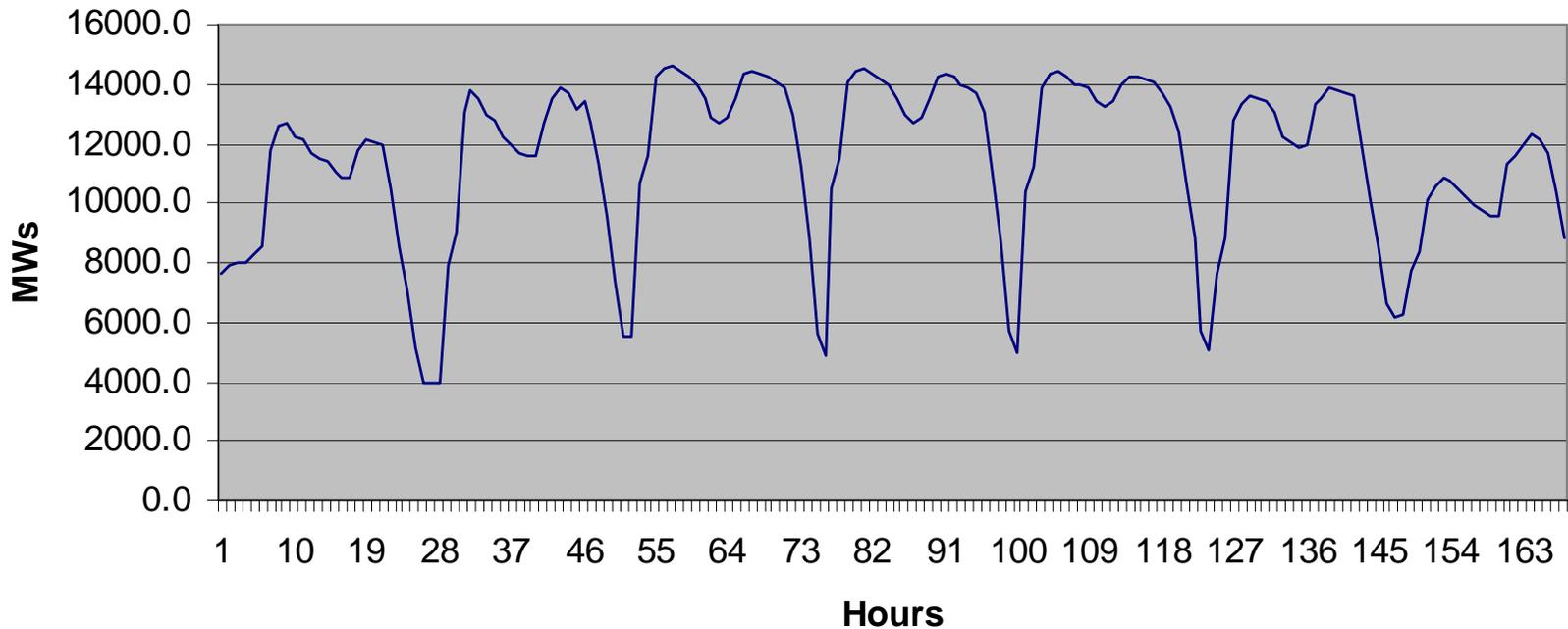
# Resource Coordination

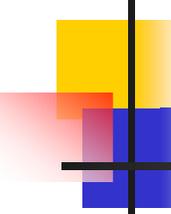


# FCRPS Generation –

(From Spreadsheet Model)

## System Loads Given 1989 Cold Snap





# FCRPS Results--4/14 Meeting

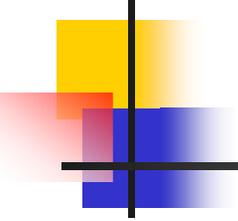
Rolling averages

<b>Capacity MWs</b>	<b>1 HR</b>	<b>2 HR</b>	<b>16 HR</b>	<b>24 HR</b>
Hydro	14,585	14,554	14,445	12,635
Day of the Cold Snap	3	3	3 & 5	3

# Columbia River Hydro Capacity Evaluation Meeting

## ■ OUTCOMES:

- AGREEMENT on Assumption that in a severe cold snap, it is OK to violate filling curves for a couple of days because Ability to Purchase Energy will allow reservoirs to fill by April 10
- NEED to Evaluate December Cold Snap
- DECISION to expand Spreadsheet Model to include Mid-Columbia non-Federal Dams
- COMPARISON of Resources to meet Cold Snap Load versus Resources to meet 1 in 2 Loads to ascertain "Worst Case" Capacity Metric Target
- COUNCIL to evaluate Loads & Resources associated with LOLP Study with Target of 5% to determine "Reasonable" Capacity Metric Target



# Next Steps

---

- BPA has solicited Plant Characteristics from Mid-Cs & will evaluate Sustained Hydro Capacity Evaluation for FCRPS & Mid-Cs
- Need to Confirm Durations:
  - 1 hour, 2 hour, 4 hour, 10 hour over 3 or 5 days
- Request to non-Federal Hydro Power Plant Owner/Operators to provide Sustainable Hydro Evaluation to Council by when?

# Request for Sustained Hydro Peaking Capabilities

<b>Hydro Utility</b>	<b>Nameplate Hydro MW</b>	<b>Responsible Person</b>
Avista	866	Clint Kalich
EWEB	150	Scott Spettel
Idaho Power	1690	Phil Devol
PPL Montana	498	Lance Elias
PacifiCorp	886	Peter Warnken
PGE	556	Pete Peterson
PSE	301	Aliza Seelig
Seattle	1722	Don Tinker
Snohomish	112	Robin Cross
Tacoma	721	Chris Robinson