Northwest Power and Conservation Council

November 3, 2005

MEMORANDUM

TO Power Committee

FROM: Jeff King

SUBJECT: Briefing regarding NTAC transmission assessment activities

This will be a briefing regarding the status of Northwest Transmission Assessment Committee (NTAC) studies having relevance to the availability of new generating resources to the Pacific Northwest. NTAC, operating under the auspices of the Northwest Power Pool, serves as an "… open forum to address forward looking planning and development for a robust and cost effective Northwest Power Pool area transmission system." Among its activities, NTAC has organized several working groups to identify and conduct preliminary assessments of transmission upgrades and additions needed to deliver power from a variety of promising but remote potential generating resources to western load centers.

The objective of this work is to develop preliminary assessments of the engineering characteristics and cost of various options that can serve as the basis for further assessment of the more promising options. Organizations participating in these assessments include Bonneville, Canadian and US utilities, resource developers, state and federal agencies and the Council. Participation is voluntary and participants bring in-kind services and available information to the table. Under the current Northwest transmission structure, further assessment of most of the options will require negotiated coordinated transmission service requests and the financial support of resource developers or purchasers. However, the level of detail and accuracy of the NTAC study group products are consistent with the Council's resource assessments, and will be very useful in advancing several action items of the 5th Plan and in incorporating a broader range of resources into plan updates and future power plans.

Three studies are in progress or recently completed:

- Transmission upgrades to deliver additional power from eastern Montana to Westside load centers (complete)

- A complex variety of new and upgraded transmission lines to deliver power from various BC, Alberta, Montana, Idaho and eastern Washington and Oregon resources to Westside load centers, the Bay Area, Las Vegas and Los Angeles (analysis underway)

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- ❖ Transmission and shaping requirements to deliver power from large-scale wind development in central and eastern Oregon and Washington to Westside load centers (work plan definition stage).

The PowerPoint slides to be used for the briefing are attached. Handouts providing additional detail regarding the options will be provided at the meeting. No committee decision or other action is required.

Attachment

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Status Report

NTAC Transmission Assessments

Jeff King

Northwest Power and Conservation Council

Portland, Oregon

Power Committee

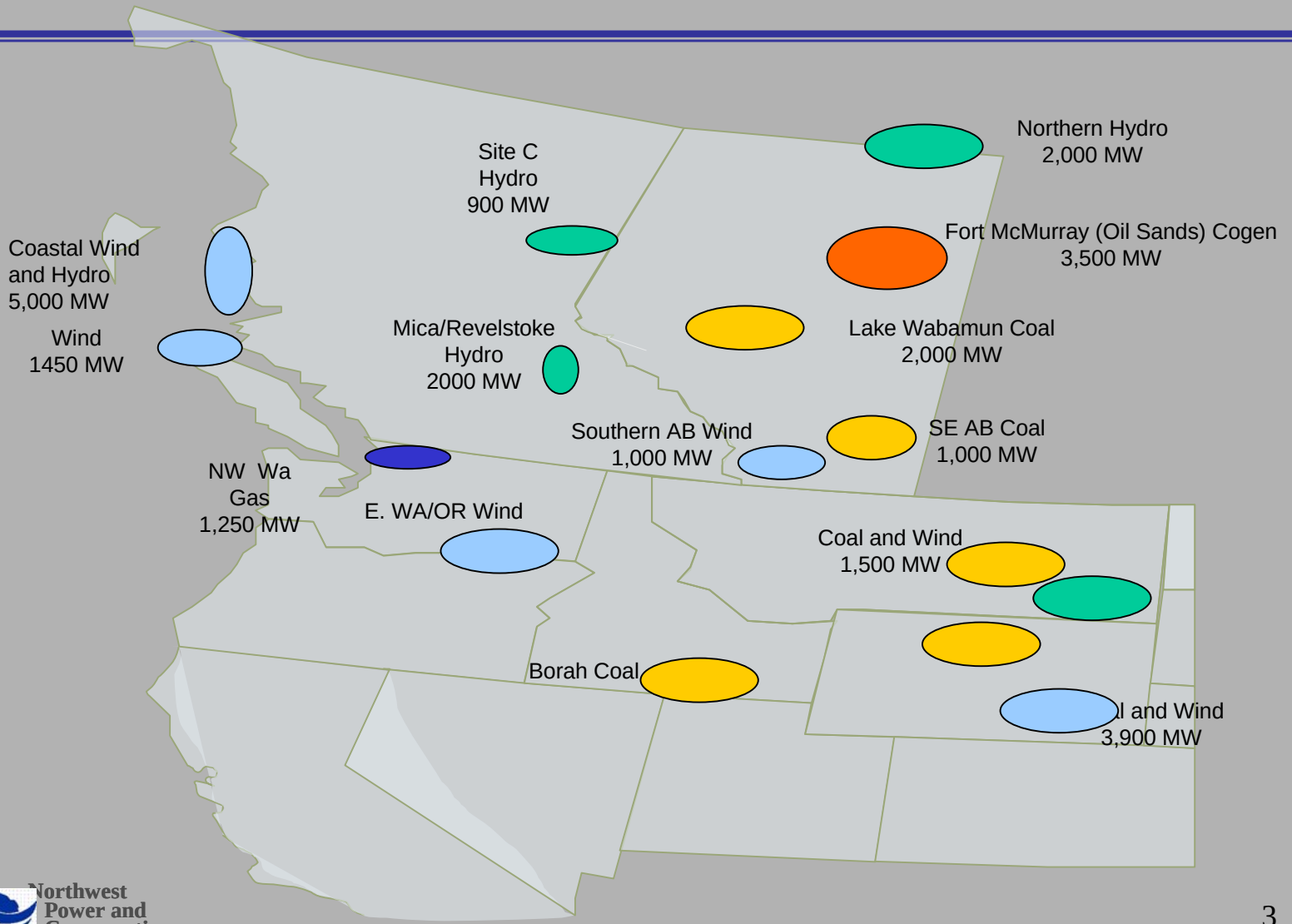
Coeur d'Alene, ID

November 16, 2005

Northwest Transmission Assessment Committee (NTAC)

- "Open forum to address forward looking planning and development for a robust and cost effective Northwest Power Pool area transmission system."
- Operates under auspices of Northwest Power Pool
- NTAC workgroups are formed to address transmission bottlenecks and transmission needed to support new generating resource development
  - **Montana-Northwest Transmission Study Group**
  - **Canada-Northwest-California Study Group**
  - **Wind Integration Study Group**

The inspiration



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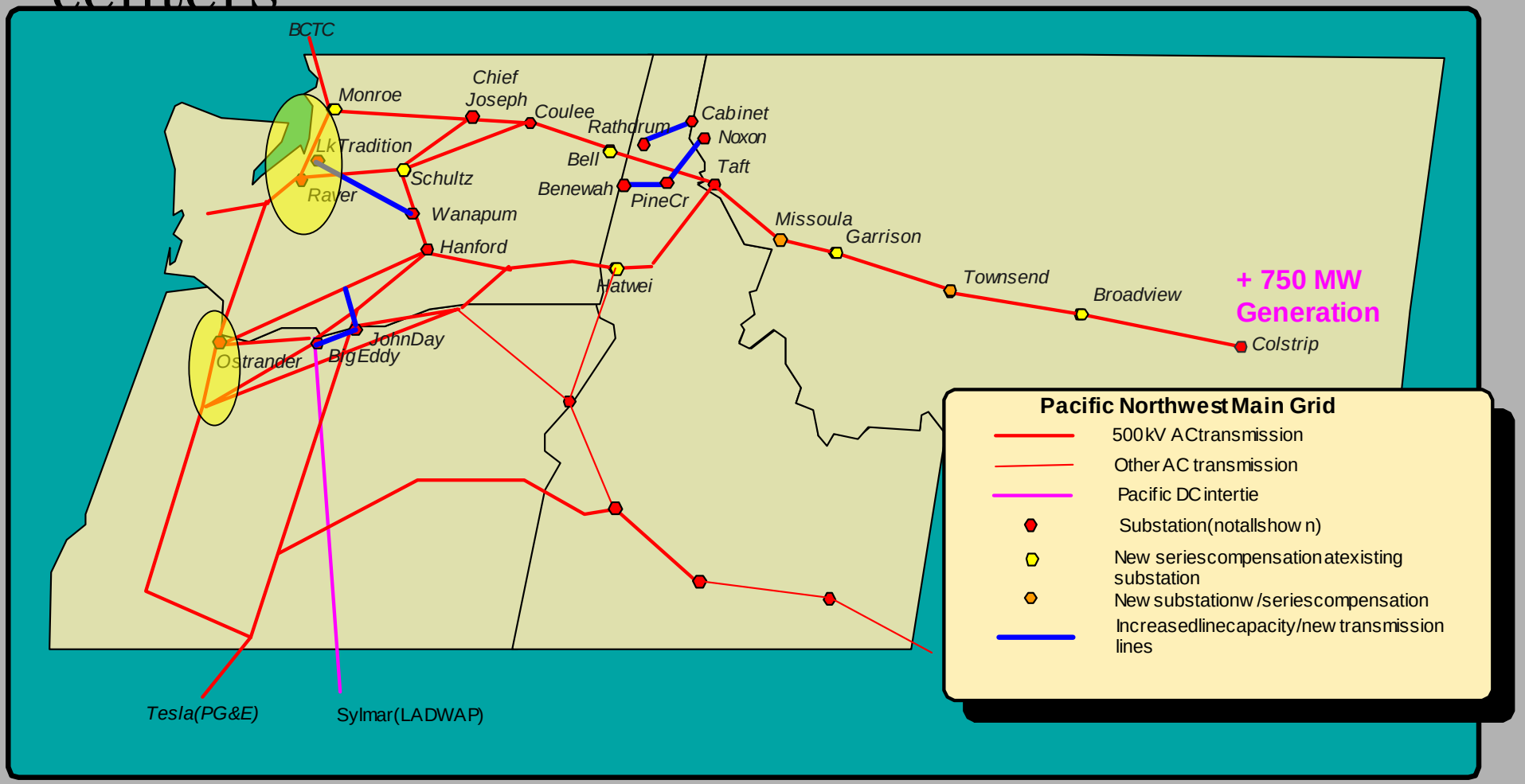
Relevance of these studies to the 5th Power Plan

- TX-1: Plan for long-distance transmission needs to support resource development
- GEN-8: Utilities & others should confirm wind power development capability
- GEN-9: Council will assess effects of wind shaping on other functions of the hydropower system
- GEN-15: Refine design & cost estimates for a transmission intertie from oil sands region to the Northwest

Montana-Northwest Transmission Study

- New generation in central or eastern Montana must traverse several constricted transmission cutplanes to reach Westside load centers.
- Identify needed upgrades to deliver 750 MW of new eastern MT generation to Westside load centers.
- New lines not considered.
- Preliminary assessment – not an investment-level study.

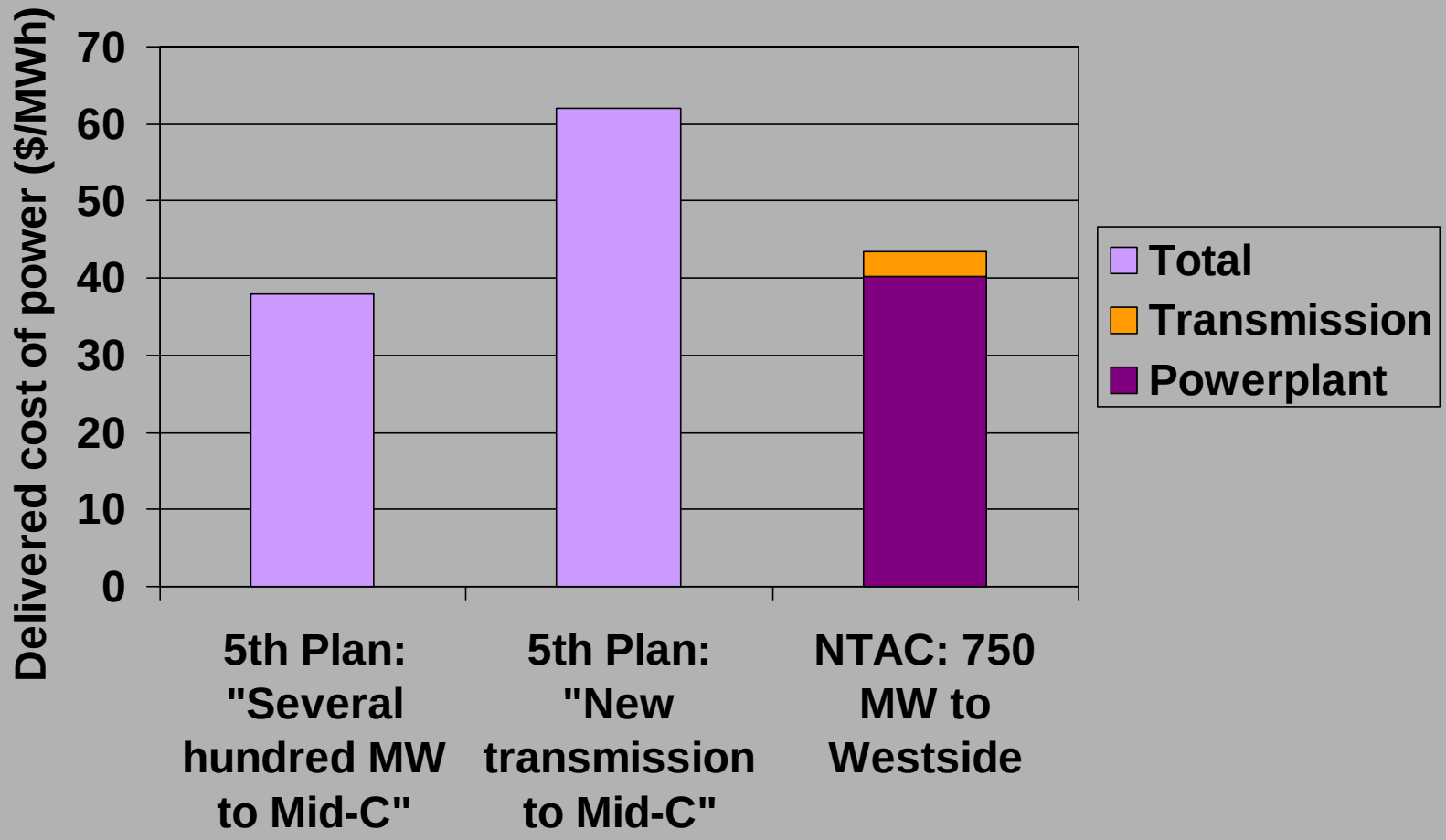
Upgrades needed to deliver 750 MW of new eastern MT generation to Westside load centers



Preliminary study findings

- Up to 750 MW of new generation in eastern Montana could be exported to Westside load centers by incremental upgrades to the existing system.
- The cost of these upgrades is estimated to be $367 - $445 MM (2004 $).
- Addition of more than 750 MW of new generation in Montana for export would require new transmission line construction in addition to these upgrades to the existing system.

NTAC estimate compared to 5th Plan estimates



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Status: Montana-Northwest Transmission Study

- Final report released October 2005; available at http://www.nwpp.org/ntac/publications.html.
- Additional refinement would require a coordinated Transmission Service Request study
- NorthWestern Energy is conducting a study from their queue for 500-750 MW of additional generation north of Colstrip – could lead to a coordinated study
- Would likely need to be funded by resoruce developer or customer

Canada-Northwest-California Transmission Study

- Provide high-level information on the feasibility of potential transmission projects to transfer new resources out of Canada to the Northwest and California.
- Focus is on new long-distance bulk transmission.
- Objective is to provide estimates of the total cost of delivered energy

Canada-Northwest-California study options I

1	Coastal BC wind & hydro	1600 or 3200 MW DC underwater cable from Prince Rupert to Vancouver Island to San Francisco. Possible Westside NW tap
2	Coastal BC wind & hydro, Puget Sound gas turbines	1000 or 1500 MW DC underwater cable from Vancouver I. to Olympic Peninsula; AC line to N. CA via I5 corridor & Captain Jack (OR).
3	AB oil sands cogen, AB coal, Site C, coastal BC wind & hydro, Puget Sound GTs	1500 MW AC line from N. AB to N. CA via I5 corridor and Captain Jack (OR)
4	Revelstoke & Mica Hydro, S. AB wind; eastern WA & OR wind	1500 MW AC line from south/central BC to N. CA via central WA & OR
5	Alberta oil sands cogen, hydro, coal, wind; Revelstoke & Mica Hydro; eastern WA & OR wind	1500 MW AC line from N. AB to N. CA via SE BC, N. ID, E. WA & central OR

Canada-Northwest-California study options II

6	Alberta oil sands cogen, hydro, coal, wind	a. 3000 MW DC from N. AB to Celilo; 1500 MW AC from Celilo to N. CA b. 3000 MW DC from N. AB to Celilo; 1500 MW DC from Celilo to N. CA c. 3000 MW DC from N. AB to Celilo d. 3000 MW DC from N. AB to LA via Celilo
7	Alberta oil sands cogen, hydro, coal, wind; MT coal & wind	a. 1500 MW AC from N. AB to Townsend (MT); 3000 MW DC from Townsend (MT) to S. CA b. as (a) + DC terminal near Las Vegas
7c	Alberta oil sands cogen, hydro, coal, wind; MT coal & wind	3000 MW DC from Townsend (MT) to S. CA via Las Vegas

Canada-Northwest-California study options III

8	Alberta oil sands cogen, hydro, coal, wind; MT coal & wind	3000 MW DC from N. Alberta to S. California via Townsend (MT) and Las Vegas area
9	Alberta oil sands cogen, hydro, coal, wind + MT coal & wind	3000 MW DC from Northern Alberta to N. California via Townsend (MT), Midpoint (ID), Captain Jack (OR)
10	Alberta oil sands cogen, hydro, coal, wind + SE BC hydro & central WA wind	300 MW upgrades to existing system

Status: Canada-Northwest-California study

- Transmission options identified

  Resources, load centers, general corridor (major intermediate substations), technology, voltage, capacity, mileage

- Transmission equal angle studies underway
- Transmission unit costs under development
- Preliminary resource costs being assembled

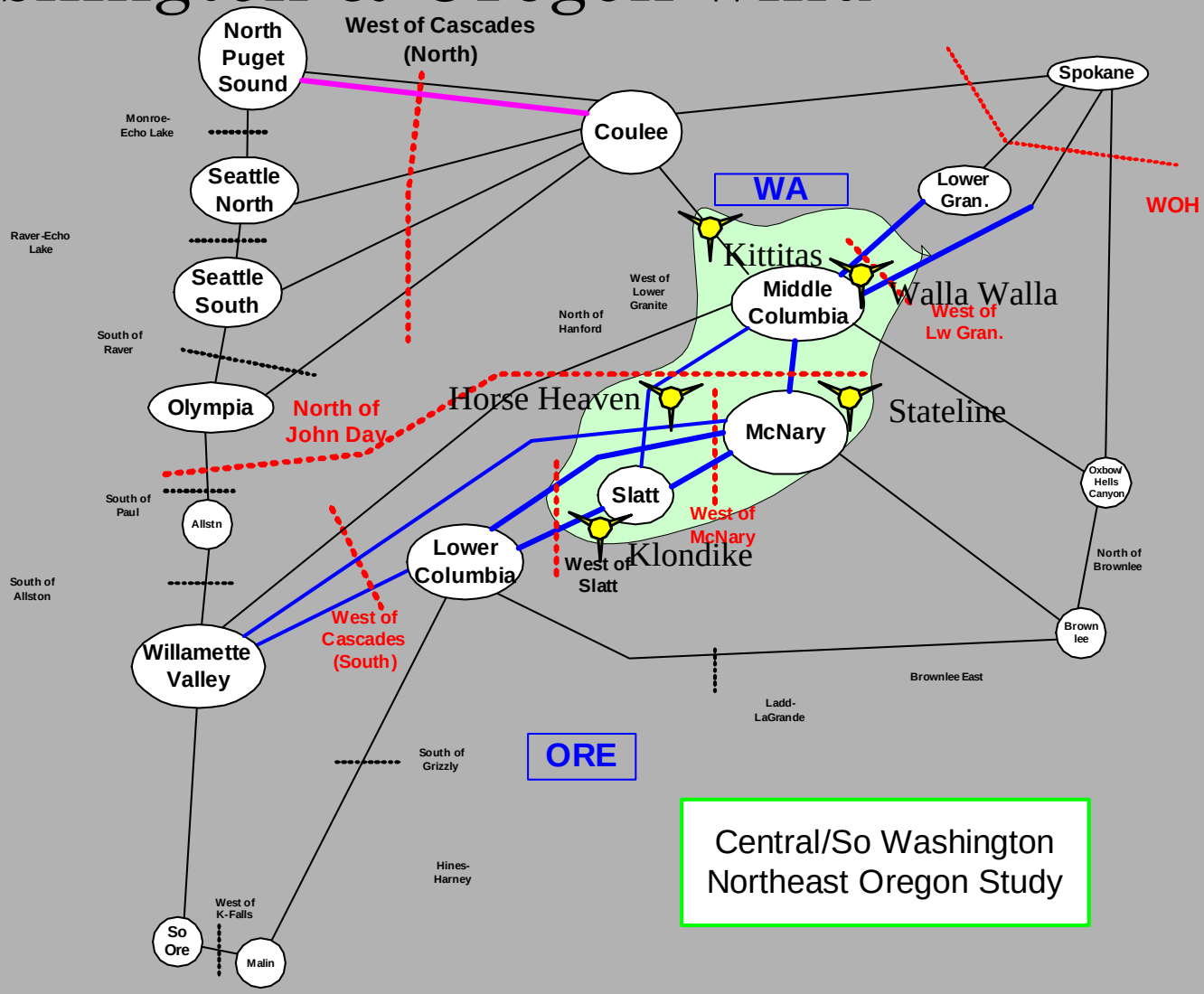
  US options based on 5th Plan estimates

- Draft report summer 2006?; final fall 2006?

WA & OR Wind Integration Study

- Prospect: 2000 – 5000 MW of new wind power in eastern OR & WA over next 10 – 15 years
- Objective: Identify transmission and system operation requirements for large-scale integration of windpower
  - Bulk transmission upgrades (location, type, cost)
  - Wind integration (shaping) capability & cost
  - Delivered cost of energy

Transmission bottlenecks may constrain full development of Washington & Oregon wind



Status: WA & OR Wind Integration Study

- Second kickoff meeting in October following summer hiatus.
- Final workplan not in place, but seems to be going in the right direction:
  - Greater geographic resolution
  - Better information re: spatial variation of wind (NREL input)
  - Effort to identify relevant integration studies from elsewhere.
  - Assessment of local shaping capability (i.e. eastside hydro projects)
- Next meeting Nov 21- firm up workplan
- Report dates not established