British Columbia Transmission CORPORATION

NorthWestern Energy
Delivering a Bright Future

IDAHO POWER
An IDACORP Company

PACIFICORP
A MIDAMERICAN ENERGY HOLDINGS COMPANY

Pacific Northwest Flexibility Markets

ACE Diversity Interchange (ADI) Project
Sharing Area Control Errors

July 2007

ADI Project

Founded on Negotiation Theory:

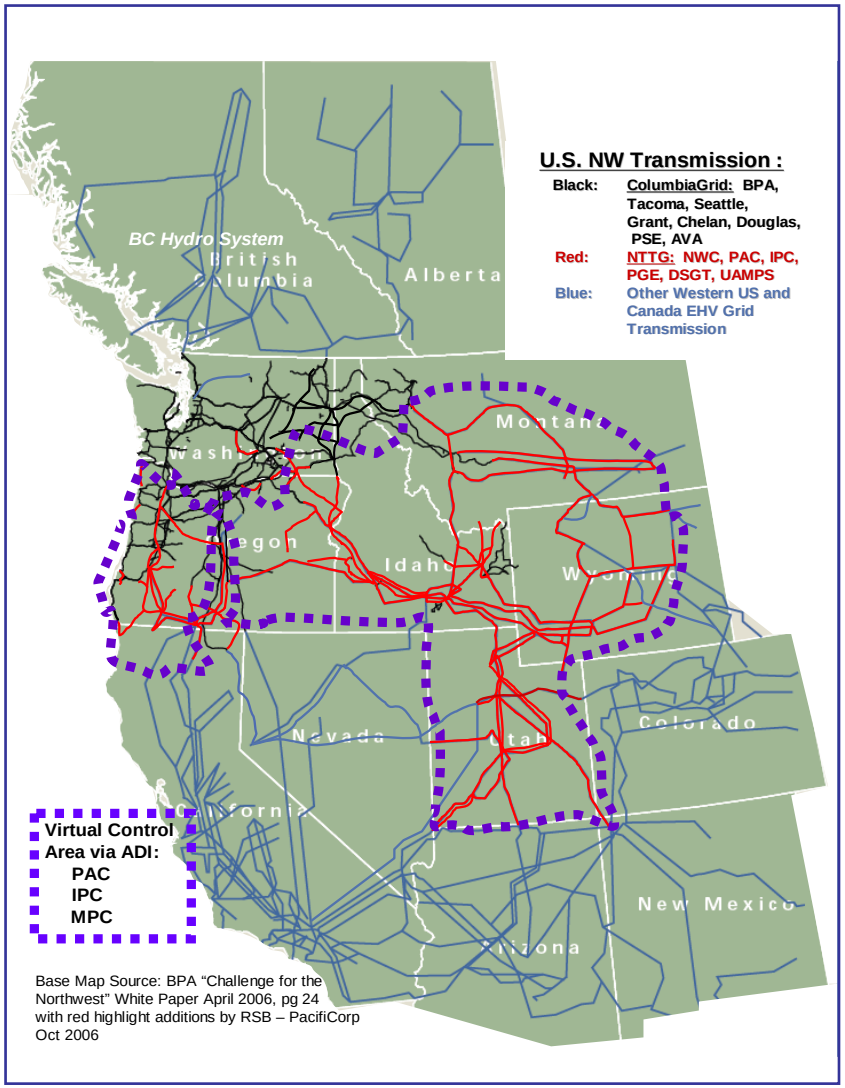
A transaction should occur if the parties involved are either held harmless or made better off.

Purpose of Presentation:

- Provide Update on the ADI Project:
  - current scope of ADI
  - status of the project
  - what ADI is and is not
  - how ADI works
  - why the companies are implementing ADI
  - the inherent safety of ADI
  - ADI suspension protocols
  - relevance of ADI to wind integration
  - next steps

Current Scope of ADI:

- The initial Participating Control Areas are:
  - Idaho Power Company
  - NorthWestern Energy
  - PacifiCorp – Eastern Control Area
  - PacifiCorp – Western Control Area
- The British Columbia Transmission Corporation is the "host" of this activity.
- Any control area operator located in the WECC and adjacent to and interconnected with one or more Participating Control Areas may join as a new ADI participant.



Status of the Project:

- The ACE Diversity Interchange Agreement (including the Technical Design) was executed November, 2006.
- Operating Group's implementation goal - March 31st, 2007.
  - ICCP links; ADI logic; information exchanges all in place.
  - ADI Suspension Protocols are completed and posted.
  - Testing completed; operating manuals developed.
  - All four control areas are operating ADI.
  - Evaluation on-going (July 2007).
- The Operating Group's goal to "GO LIVE" March 31, 2007 was achieved; the cost of implementation was less than $100,000.
- ADI presentations made to FERC and WECC; discussions regarding ADI with NWPP.

What is ACE Diversity Interchange or ADI?

- ADI is the pooling of individual Area Control Errors (ACE) to take advantage of control error diversity (sign differences associated with the momentary generation/load imbalances of each control area).
- By pooling ACE, participants will likely be able to:
  - Reduce control burden on individual control areas;
  - Reduce unnecessary generator control movement;
  - Reduce sensitivity to resources with potentially volatile output such as wind projects; and,
  - Realize improvements in Control Performance Standards.

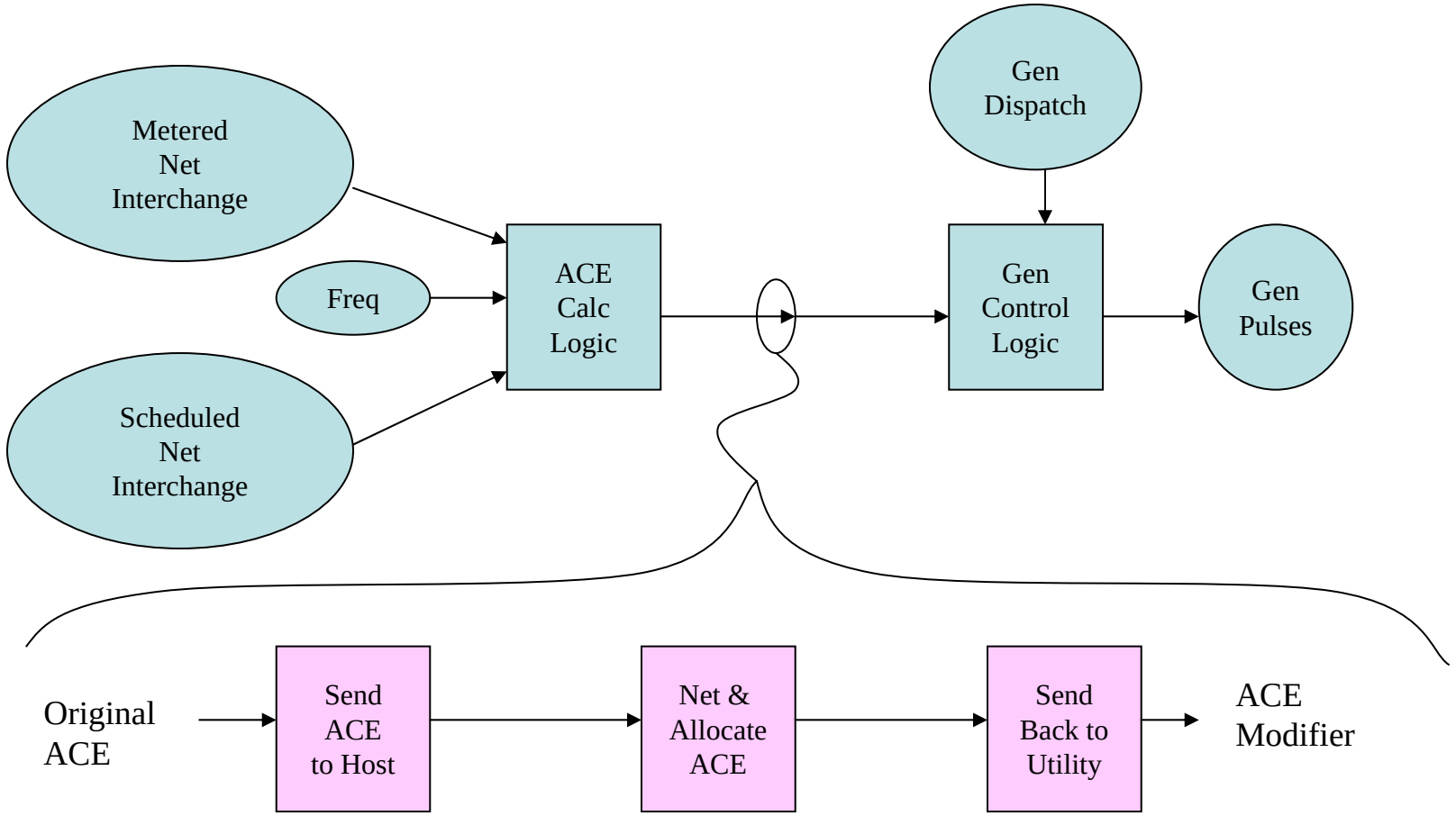
What ADI is Not:

- ADI does not provide load following.
- ADI is not an energy service.
- ADI is not an Ancillary Service.
- ADI does not require the purchase of transmission.
- ADI does not change any of the existing obligations of the Participating Control Areas.
- ADI does not require any additional regulatory oversight.

How Does ADI Work?

- ICCP Communication links are established between the Host and the Participating Control Areas.
- Time-stamped ACE values are sent to the Host.
- The Host evaluates ACEs for diversity; if there is no diversity, there is no ADI adjustment.
- If there is diversity, time-stamped ADI adjustments are calculated and sent back to the Participating Control Areas.
- The Participating Control Areas choose to either control to their original ACE or control to an ADI-adjusted ACE.
- The ACE that is reported for CPS purposes reflects an ADI-adjusted ACE unless a Participant suspends.
- ACE data and causes for suspension are broadcast to all participants ensuring transparency and supporting evaluation.

Introducing ADI to Existing Operations:



ADI Calculation:

CA	Raw ACE	ADI Adjustment	Adj. ACE
A	-46 MW	+46 MW	0 MW
B	-40 MW	+40 MW	0 MW
C	+60 MW	-46 MW	14 MW
D	+40 MW	-40 MW	0 MW
Net:	14 MW		14 MW

- If there is no diversity, there is no adjustment to ACE.
- ADI-adjusted ACE is no greater than the pooled Raw ACE.
- In this example, the "Majority Group" control areas have positive ACE values (Control Areas C and D, consistent with the Net Error); the "Minority Group" control areas have negative ACE values (Control Areas A and B).
- ADI Adjustments will not force a change in sign (+/-) for a participant.

Preliminary Quantification of ADI Benefits:

- Estimate of improvements to “negative” (load exceeds generation) and “positive” (load is less than generation) ACE values indicate a 20% improvement on average.
- December 4th, 2006; 2 hours of continuous ACE values for three participating control areas.

	Evaluated Control Areas		
Improvements:	A	B	C
Negative ACE	14%	22%	31%
Positive ACE	15%	10%	24%
Average Improvement:	20%		

- Evaluation to included: sum of MW-hours removed from ACE values for all control areas and for individual participants; sum of positive/negative corrections; sum of net corrections. Other analyses may be done on generator movement, CPS performance, etc.

The Inherent Safety of ADI:

- An ADI adjustment will be calculated only if there is ACE diversity (positive and negative values) among participants.
- An ADI adjustment will never make ACE worse, i.e., it will always move ACE toward zero or will have no impact.
- Participants have the right to ignore (suspend) ADI adjustments; suspension means that participants control to original ACE (status quo operations).
- ADI adjustment limits can be imposed to ensure fail-safe implementation (25 MW limit currently in place).
- ADI is projected to zero-out over time due to negative and positive adjustments canceling each other. This means that ADI is not expected to impact inadvertent interchange or the existing Automatic Time Error Correction term.

Why Suspend ADI?

- Host Will Suspend:
  - If ADI system fails (loss of ICCP links).
  - If participants exceed time skew limits.
  - If fewer than 3 control areas are participating.
- Participants Will Suspend:
  - If directed to suspend by PNSC.
  - If a frequency problem is detected.
  - If an OTC violation is in progress or expected.
  - If reserve sharing is in place.
  - If AGC is suspended for any reason.
  - If other concerns arise.
- Suspension Protocols are posted.

Relevance of ADI to Wind Integration:

- A “first step” in coordinating balancing services.
- Creation of a virtual control area for imbalances.
  - Momentary generation/load imbalances.
  - Negative and positive adjustments cancel each other.
  - Systems are directly interconnected.
  - Balancing Authorities maintain control.
- Potential next steps for longer-term balancing services:
  - Dynamic scheduling; firm transmission.
  - Operational requirements, e.g., ramping rates.
  - Technical requirements, e.g., communications, implementation protocols.
  - Settlement mechanism(s).

Next Steps:

- Evaluation of the project.
- Change Management process in place.
- ADI sponsors have been making presentations to explain the project, UWIG, WestConnect, Wind Integration workgroup, ColumbiaGrid, etc.
- Establishing operating standards, e.g., frequency of data sends; frequency of ACE calculations, etc.
- ADI sponsors are having participation discussions with WestConnect utilities.