Transmission Matters in Meeting the Integration Challenge

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Agenda

• The Integration Challenge
• Transmission and the Regional Challenge
• Transmission and the Local Challenge
• Transmission Matters in Meeting the Integration Challenge
The Integration Challenge

• More Efficiency, Conservation and DG affects Net Load
• More Variable Renewable Energy affects Net Load
Changes in Consumption & More Non-dispatchable Generation affects Net Load
The Integration Challenge

• Inflexible Generation is Less Valuable
• Flexible Resources are More Valuable
Base Load Resources have Less Value

Life for peaking plants doesn’t change much…

…flexible everyday resources are in much greater demand…

…but traditional base load is poorly matched to net load.
What Role does Transmission Play in Meeting the Integration Challenge?

• What Role Can Transmission Play in Support of Regional Reliability Solutions?
• What Role can Transmission Play in Support of Local Reliability Solutions?
A Path to Least Cost Integration in the Western Interconnection has been Defined
WGA’s WREZ Initiative - Phase III:

WREZ Phase III Building Blocks toward Least Cost Integration

- Expand Sub-hourly Scheduling
- Facilitate Dynamic Transfers
- Implement EIM
- Improve Forecasting
- Leverage Geographic Diversity
- Improve Reserves Management
- Retool Demand Response
- Use Flexibility of Existing Generation
- Focus on Flexibility in New Gas Generation
Example of How Transmission Matters: Building in Transmission Capacity for Dynamic Transfer Matters

A paper describing dynamic transfers can be found at: http://www.raponline.org/document/download/id/6603
E3 Results: CAISO/PacifiCorp EIM

Figure 1. Low and high range benefits under low (100 MW), medium (400 MW), and high (800 MW) PacifiCorp-ISO transfer capability scenarios (2012$)
How about Challenging Local Situations?
The California ISO “Duck Curve”:
Increasing solar means steep afternoon ramping.
Guess What: Ducks Can Fly

A duck in water has very much the shape of the CAISO graphic. The “fat body” floats, and the tall neck breathes.

A duck in flight stretches out its body and straightens its neck in order to reduce wind resistance.

Our job is to straighten this duck out.
Ten Strategies To Align Loads to Resources (and Resources to Loads) with **Illustrative Values for Each**

1. Targeted energy efficiency
2. Orient solar panels
3. Use solar thermal with storage.
4. Manage electric water heat
5. Require new large air conditioners to include storage
6. Retire older inflexible power plants
7. Concentrate demand charges into “ramping” hours
8. Deploy energy storage in targeted locations
9. Implement aggressive demand response programs
10. Use inter-regional exchanges of power

Not every strategy will be applicable to every utility.
Strategy 10: Inter-regional Power Exchanges

Take advantage of geographical diversity of loads, and geographical diversity of output from renewable resources.

Exchange 600 MWh per day from early to late evening using the existing inter-regional interties to Arizona, Nevada, Utah, and the Northwest
How Did We Do?

Pre-Strategy, without Solar/Wind: 73% LF
Pre-Strategy, with Solar/Wind: 63% LF
Post-Strategy, with Solar/Wind: 83% LF

Hourly Ramp: 340 MW vs. 400 today, and 550 w/o strategies
Teaching the Duck to Fly
Transmission Matters

• Transmission facilitates Low Cost Options to meet Regional Integration Challenges

• Transmission supports Low Cost Options to address Local Integration Challenges

• Are We Reflecting the Full Value of Transmission in the Evaluation of Regional Projects?
Resource Materials:

Mutually Beneficial Exchange in Non-ISO Regions:
http://www.raponline.org/document/download/id/6847

The Least Cost Integration Challenge:
http://www.raponline.org/document/download/id/5041

Dynamic Transfer Report:
http://www.raponline.org/document/download/id/6603

Teaching the Duck to Fly:
http://www.raponline.org/document/download/id/6977
About RAP

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- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

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