Northwest Power and Conservation Council

September 29, 2011

MEMORANDUM

TO: Power Committee

FROM: Wally Gibson

SUBJECT: Review of Proposed Energy Imbalance Market

Balancing (or imbalance) markets are part of the solution to the problem of integrating large amounts of variable generation into the hourly and sub-hourly operations of the system, as well as making dispatch more efficient overall. The goal of a balancing market is to assist balancing authorities by providing access to additional flexible resources at a lower cost than may be available to them in their own balancing authority areas.

There is a major effort at WECC to move forward a proposal for a centralized, westwide real-time balancing market. A WECC committee has developed the concept and WECC, with the support of states and provinces acting through the Western Interstate Energy Board, has sponsored a high-level, westwide benefit/cost study of the proposal, which was presented to the WECC Board September 21. In response, the WECC Board authorized continued investigation, focusing on developing a detailed market design, leaving open the question of what entity would be the market operator. There would need to be a critical mass of participants for the proposal to go forward.

The staff will present an overview of the proposed Energy Imbalance Market (EIM) and will review the conclusions of the benefit/cost study. A panel of NW utility representatives will comment on the proposal. The panel will consist of Patrick Damiano of ColumbiaGrid, who will discuss the work they have done in support of their member organizations, and Elliot Mainzer of Bonneville, John Cupparo of PacifiCorp and Kevin Nordt of Grant PUD, who will comment on the proposal from the perspective of their organizations.

851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204-1348
www.nwcouncil.org

Steve Crow
Executive Director

503-222-5161
800-452-5161
Fax: 503-820-2370

Review of Proposed WECC Energy Imbalance Market and Cost/Benefit Study
-- Revised October 24, 2011 --

Wally Gibson
NW Power and Conservation Council
Power Committee
October 11, 2011

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Overview

- One of a number of efforts that increases the efficiency of the grid, especially in accommodating variable generation (VG) – the one with the widest scope
- What is the issue?
- What are the potential benefits?
- Energy Imbalance Market (EIM) proposal
- High level costs and benefits from study
- Who would be market operator?
- Summary and observations

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What is the Balancing Issue?

- How to balance within-hour variation of loads and generation to maintain schedules across Balancing Authority (BA) boundaries
  - Loads and generation have to be in balance instantaneously to maintain system frequency
  - When load or generation varies uncontrollably, a BA has to have reserve generation to compensate
    - Variable generation increases the reserve requirement and the value in finding better solutions
- Currently each BA has to deal with its own problem in isolation

What are the Potential Benefits?

- More flexibility, potentially cheaper balancing solutions
  - Aggregates amount of variability that needs to be balanced across BAs – reduces overall need for balancing
  - Shorter implied scheduling interval – reduces need for resources
  - Access to larger pool of balancing resources for BAs
- Greater efficiency of dispatch for any participant (with or without VG)
- More efficient transmission usage
  - Uses currently unused (unscheduled, non-loop flow) transmission capacity and creates more room by voluntary redispatch if economic

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Energy Imbalance Market Proposal

- Real-time energy imbalance and congestion redispatch
- Centralized voluntary Western generation redispatch subject to real-time transmission constraints
  - On top of current bilateral markets and (mostly hourly) scheduling and unit commitment practices
  - Would operate on 5 minute basis
- Primary driver: variable generation balancing requirements
  - But: will redispatch for any economic opportunity
- Modeled on market currently in place in Southwest Power Pool (part of Texas, Oklahoma, Kansas, Nebraska, parts of five others)

Energy Imbalance Market Proposal – 2

- Initial participation choice by Balancing Authority (BA) and/or transmission provider – undecided
  - Expected to exclude organized markets (CAISO, AESO – Alberta) – could coordinate with them
  - May exclude PMAs (BPA, WAPA) – potential legal issues
- Within that choice, generators could choose to offer into balancing market or not
- In participating footprint, settlement of load and generation imbalances would be at nodal market prices, replacing current tariff provisions
- Requires independent market operator

What Does EIM Not Do?

- Be an RTO
- Change transmission service acquisition and reservation
- Change pre-scheduling and final hourly (or shorter if current practice) scheduling practices
- Change unit commitment of generation for day ahead and hour ahead
- Require any bidding into market, either load or generation
  - However, schedules, even if fixed, must be provided
- Change second to second regulation and frequency control within the 5 minute dispatch interval – still BA responsibility

Cost Issues

- Cost categories
  - Market operator – energy management system (EMS) and other software, control room, communications, computers, staff – not sensitive to footprint size
  - Market participants – software upgrades, computers, staff
  - Study looked at individual cost components, comparison with other markets
- Study done for two footprints (also benefits analysis)
  - Excluding CAISO and Alberta (current organized markets)
  - Excluding also: BPA and embedded NW BAs, WAPA, BC

Cost Issues – 2

- Wide range of estimated costs
  - New vs. existing facilities
  - Custom vs. standard software for market operator
  - Footprint size for participants
  - Scope control

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Annual Benefits

- Study done with production cost model – high level analysis
- Two benefit categories
  - Savings on flexibility reserves ~ 2/3 of total
    - Modeled reduced overall requirement (~ 1,000 MW less) reflecting diversity
    - Modeled wider market for procurement – footprint vs. local zone (~BA in many instances)
  - More-economic dispatch of all generation ~ 1/3 of total
    - Modeled by assuming no transaction barriers or friction
    - Issue: Payment for transmission use? – would affect benefits

Who Would be the Market Operator?

- Additional WECC study looked at WECC operating the market
  - Affects cost estimates
  - Looked at risks to WECC
    - Questions of governance, separation of market operations from regulatory (standards compliance) role
- Recent WECC Board action: pursue further investigation
  - Detailed market design
  - Process for selecting market operator
  - Depends on participant interest

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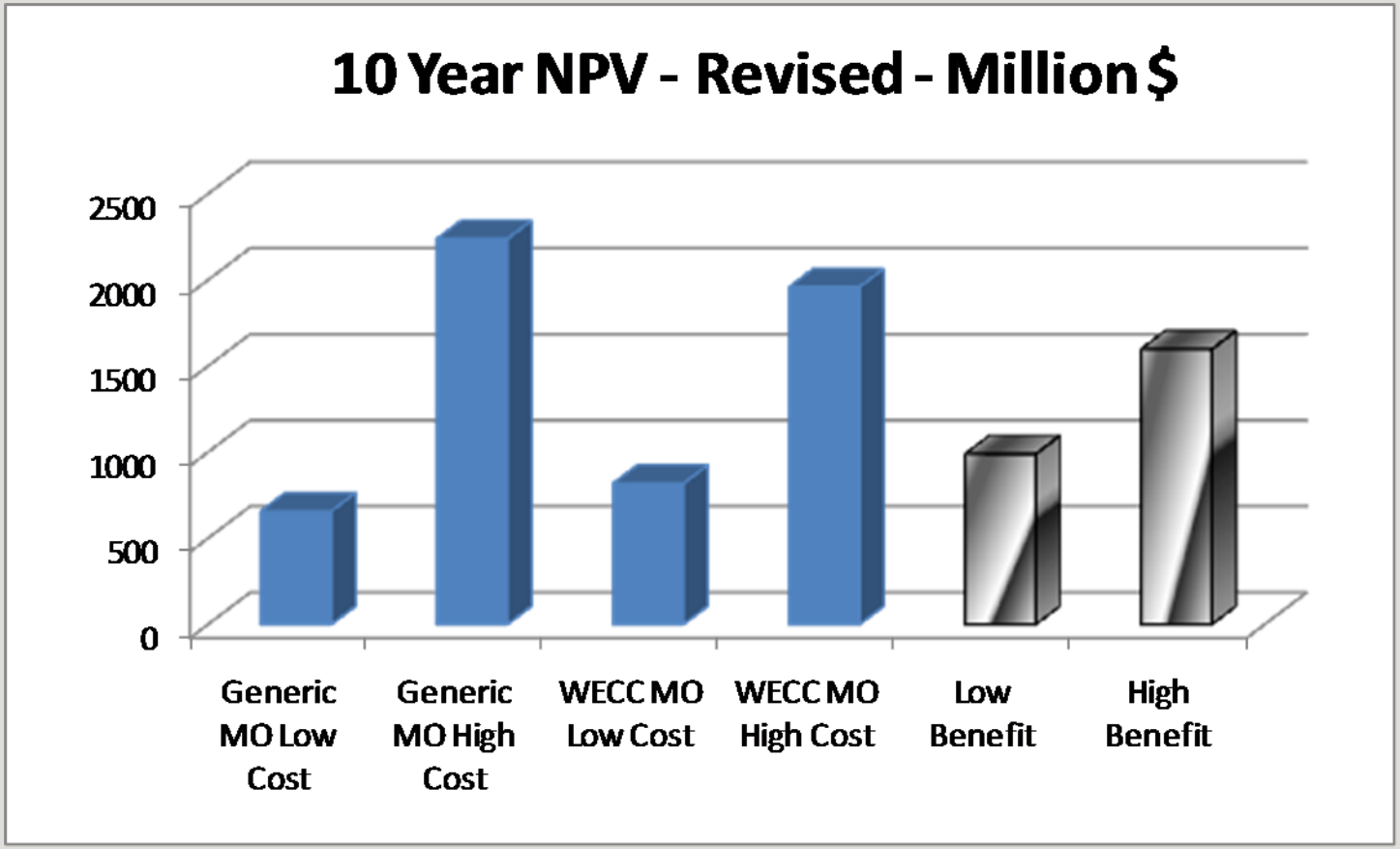
Summary Results (REVISED) – Different Market Operator Assumptions



Summary and Observations

- Net value depends on the details of implementation
- Need to control scope creep for market operator
- Off-the-shelf software saves a lot
- Ability to use existing systems/facilities saves a lot
- Larger footprint potentially more economic, particularly with seams agreement with CAISO (not in benefit range shown)
- What next? – Determine level of participant interest

Questions?