State-Provincial Steering Committee

2010 Study Request to the Western Electricity Coordinating Council

January 29, 2010

The State-Provincial Steering Committee (Steering Committee) requests that the Western Electricity Coordinating Council (WECC) conduct the following transmission expansion study as part of the Transmission Expansion Planning Policy Committee's (TEPPC) 2010 work plan.

The Steering Committee expects that TEPPC will develop a reference case or base case as a starting point for analyzing different scenarios. The Steering Committee supports the development of a reference case and requests that WECC study three specific scenarios – (1) High DSM Scenario; (2) Carbon Reduction Scenario, and (3) Breakthough Technology scenario. Our recommendations for the reference case and the three scenarios are described below. The Steering Committee and its work groups will provide TEPPC with more detailed assumptions and information during the study cycle to model these scenarios. This analysis should produce a least cost view of resource and transmission investments over the relevant planning horizon.

Reference Case: Utility IRPs and Plans

The Steering Committee recommends that this reference case be guided by existing utility integrated resource plans (IRPs), and other utility-level information, with appropriate review from state regulators. Reasonable steps will be taken to reconcile different utility IRP and other assumptions, with appropriate review by the state regulators. The following is a list of assumptions that would be incorporated:

- Current state/provincial laws and policies related to resource development
  - Current state/provincial RPS requirements and policies
  - Performance standards for emissions
- Load growth would be based on balancing area load forecasts
  - Consistent with utility and state assumptions on Energy Efficiency, DSM, and demand response
- Sensitivity analysis demand /load
  - High load case
  - Medium load case [utilities generally plan their future transmission systems based on medium load forecast]
  - Low load with aggressive energy efficiency/demand response (see Scenario 1)
- Planning Reserve margin consistent with plans in subregions
  - potentially need to adjust and refine for higher levels of variable generation
- Assumed near term generation resource additions
  - Include proposed generation resources that are (1) under construction, and (2) approved regulatory permits and interconnection requests to be built in the next 2-4 years
- Default assumption of no federal carbon regulation

- If new federal carbon regulations enacted by May 31, incorporate into the specification of western utilities for this study cycle.

We recommend using the most recent IRPs and other information that have been filed by utilities, with review by state officials on the SPSG. Additionally, we intend to engage and collaborate with utility resource planners through the Resource Planners Forum. We expect this will serve to better refine the IRP assumptions for accuracy and reasonableness for purposes of the final modeling scenario.

What we hope to learn from this scenario is:

1. The transmission needed to support the proposed future load growth and generation needs that are projected by the regional utilities.
2. Whether or not the WECC modeling indicates more, or less, transmission than is planned by utilities and transmission developers.
3. Do the Reference case results significantly change with different assumptions about future loads or natural gas prices.

Scenario One: High DSM Scenario

The Steering Committee requests a high Demand-Side Management (DSM) scenario that reduces loads to specified levels relative to the Reference Case reflecting implementation of DSM policies. The high DSM scenario will be constructed by aggregating the results from recent potential studies conducted within the region.

- The high DSM scenario will include end-use energy efficiency and demand response resources, and depending upon data availability, may also include distribution system efficiency upgrades.
- In the 2013 study cycle, the high DSM scenario will seek to include combined heat and power and distributed generation; however, time and resource constraints preclude the inclusion of these resources in the scenario for the 2011 study.
- Recommended DSM targets are set forth in Attachment1, Table 1. Table 1 describes the recommended approach for energy efficiency (EE), demand response (DR), combined heat and power (CHP) and distribution system efficiency upgrades. These recommendations have been informed by the technical assistance of Lawrence Berkeley National Laboratory (LBNL) and the non-state officials participating in the Steering Committee's DSM Working Group, as well as the state official/commissioner members of the DSM Working Group.

What we hope to learn from this scenario:

1. Improve TEPPC's capacity to model energy efficiency and demand response resources.
2. Evaluate the demand for new transmission if future loads are reduced by aggressive DSM policies.
3. Explore whether DSM policies create unanticipated shifts of power flows across the grid as indicated by TEPPC's 2008 findings in the WIRAB high efficiency case.

4. Identify the gaps in DSM potential data across the western interconnect and initiate a process to fill them prior to the 2013 study cycle.

Scenario Two: Carbon Reduction Scenario

The Steering Committee requests a carbon reduction scenario that meets specific emission targets. We recommend the benchmarks set in Waxman/Markey bill passed by the House of Representatives with the following carbon reduction targets: (a) 17% below 2005 levels by 2020; and (b) 42 % below 2005 levels by 2030. Evaluate the impacts of moving towards these targets for the years 2020 and 2030 in the following steps:

- Aggressive energy efficiency, conservation, and demand response policies that move beyond the levels assumed in the Reference case/IRP assumptions as identified in Table 1.
- Increased penetration of renewables beyond existing RPS levels under three portfolios: (a) relatively lower costs and greater share from interior wind, (b) relatively lower costs and greater share from centralized solar (CSP or PV) in the southwest, and (c) middle range portfolio between (a) and (b).
- Imposition of a carbon adder/tax sufficient to reach the carbon reduction targets.
- Assume carbon targets are met in the Western Interconnection; no investments in carbon offsets.
- Would allow the shutdown of coal fired generation resources in order to meet the applicable emission reductions.

<u>What we hope to learn from this scenario</u>:

1. The additional cost associated with meeting the Waxman/Markey targets as compared to the reference case.
2. Transmission needs of:
    a. High level of EE/DR policies
    b. A higher wind portfolio compared with a higher centralized solar portfolio
    c. Implications of widespread shift from coal-fired generation to natural gas-fired generation.
3. Additional renewable generation options above that required to meet the state RPS requirements.

Scenario Three: Breakthrough Technology Scenario

Scenario 3 is the new technology scenario for the year 2020 and 2030. Different technology breakthroughs have different transmission implications. We recommend studying the impacts if the following new technologies become available at cost-effective levels:

- Storage technologies
  - -e.g. batteries, flywheels, compressed air in geologic formations
- Photovoltaic systems
  - Central station PVs
  - Homes and businesses
- Nuclear (modular)
- IGCC and Carbon Capture and Sequestration
- Transmission innovation reducing line losses (e.g. super conductor lines)
- DSM (technical potential for EE and DR)

These new technologies would not be available until a specified date (e.g. 2025) at a cost effective level. Some additional assumptions that would have to be made are: ultimate saturation of the technology, penetration rate by year, location of the facilities, etc. All other modeling assumptions would be the same as in scenario 1

<u>What we hope to learn from this scenario</u>:

1. The change in new transmission and generation investment over the planning horizon; depending on the type of breakthrough technology and whether or not this is on a distributed basis.
2. The technology breakthroughs which would make the greatest difference in transmission needs.
3. The implications of breakthroughs in each type of technology on transmission needs.

Attachment 1

Table 1. Approach to treatment of DSM resources for Reference Case and Three Scenarios*

	Reference Case	**Scenario 1: High DSM (EE-DR)**	**Scenario 2: Carbon Reduction**		**Scenario 3: Technological Breakthrough**
Year(s) Covered	Through 2020	Through 2020	Through 2020	Through 2030	Through 2030
Study Year	2011	2011	2011	2011	2011
Energy Efficiency (EE)	Utility IRP with review from state regulatory body	Economic Potential (provided by DSM WG)	Economic Potential (provided by DSM WG)	Technical Potential (provided by DSM WG)	Technical Potential (provided by DSM WG)
Demand Response (DR)[1]	Utility IRP with review from state regulatory body	FERC DR National Potential study (Use "Expanded Business as Usual" scenario as default. States may opt to craft unique scenario. CA will use FERC's "Achievable Participation" scenario[4].)	Same as Reference Case	Extrapolated from Reference Case	Technical Potential (provided by DSM WG)
Combined Heat & Power (CHP)[2]	Utility IRP with review from state regulatory body	Same as Reference Case for 2011 (expand in 2013 study cycle)	Same as Reference Case	Extrapolated from Reference Case	Same as Reference Case
Distribution System Upgrades[3]	Utility IRP with review from state regulatory body	Placeholder (under consideration by DSM WG)	Placeholder (under consideration by DSM WG)	Placeholder (under consideration by DSM WG)	Placeholder (under consideration by DSM WG)

NOTES:

* The Steering Committee and its work groups will provide TEPPC with more detailed assumptions and information during the study cycle to model these scenarios. The table summarizes proposed approaches for treatment of different types of DSM resources for the 2010 and 2011 WECC TEPPC Study cycle. We assume that Reference Case and High-DSM case will be conducted in both 2011 and 2013. We assume that Carbon Reduction and Technological Breakthrough Scenario are conducted in 2011.

1. DR resources include multiple types of programs and pricing options, some of which require significant investment in enabling infrastructure (e.g. advanced meter rollout to facilitate critical peak pricing or real time pricing for residential and small commercial/industrial customers)
2. CHP – Subject to determination based on availability of suitable economic potential estimates of CHP across region. Due to time and resource constraints, DSM Work Group does not propose significant additional work on characterizing CHP potential for the 2010 study period for alternative scenarios. CHP will be address in more detail in 2013 Study period.
3. Distribution System Upgrades – DSM Work Group will investigate applicability of existing studies done for the Pacific Northwest to other states in the West and consider applying the results of Distribution System upgrade potential from the Pacific Northwest to other states in the West.
4. CA scenario is different from default scenario. It is credible that by 2020 in CA, universal AMI deployment is followed by dynamic pricing as default service for IOUs