Western Governors' Association

Western Renewable Energy Zones
Zone Identification and Technical Analysis (ZITA) Working Group
October 28, 2008
11:00 – 12:00 MDT

CALL SUMMARY

Next Steps
• **Call participants were asked to discuss and vet the technology assumptions with their colleagues and industry contacts, and submit all comments to Linda Davis (ldavis@westgov.org) by November 7, 2008. All comments will be discussed on the November 11, 2008 ZITA WG call.** • **If call participants have industry contacts that the WGA should be in touch with to discuss technology assumptions and the WREZ project, please contact Linda Davis at WGA.** • **Next call: Tuesday, November 4, 2008; 11:00 a.m. MST. This call will go over the criteria for narrowing down CSAs to REZs.**

Action Items
• **Richard Smart and Ryan Pletka will coordinate on the best way to provide comments on hydroelectric assumptions.**

- The purpose of today's call is to provide a brief update on the Technical Committee (TC) recommendations for the ZITA Work Group (WG) based on the TC's October 15-16 meeting, and to present and discuss technology assumptions for all six resources and what they will be used for.
- The TC made recommendations on narrowing down Candidate Study Areas (CSAs) and defining Renewable Energy Zones (REZs). Based on the discussion with the TC, NREL and Black & Veatch (BV) are in the process of further refining the resource maps, which will be ready for review within the next few days.

Technical Committee Recommendations and Technical Assumptions Discussion

- *Note: The "WREZ ZITA Technology.ppt" power point presentation accompanies the discussion on this call, and was distributed by Linda Davis to the ZITA WG on 10/29/08.*
- The technical assumptions will allow BV to pick proxy technologies and move forward with modeling assumptions.
- The broad, minimum criteria for different technologies will be refined so that there are separate sets of CSAs to work from.
- **Slide 2:**
  - The TC provided input on final CSA selection criteria for wind and solar resources. Biomass and hydro will be evaluated to enhance wind, solar and geothermal CSAs.
  - Wind and solar are the two starting points upon which to focus. The distinction between summary resources as in state resources, or those as out of state resources will be made. Resources will no longer be characterized as in-state or out-of-state.
  - Canadian data will be incorporated shortly. Ed Higginbottom and Dave Hurlbut are working on this.

- **Slide 3** shows the wind class recommendation based on the amount of resources in each state. There are high quality resources to capture in certain areas.
- **Slide 4:**
    - Identifies solar resource criteria in kWh/m2/day based on resource dense areas. In each case, the best resources in each state are identified.
    - It was noted that CSA maps are generated with dual access tracking data, but that single access tracking technology could be more representative of proxy technologies.
    - The resource maps are not technology-specific, but show insolation rates for solar.
    - It was indicated that power production, not DNI, should inform the power level for a certain region. BV indicated that the model used show both the technology and the resource, and that there will be consistency in resource technologies.
    - Western Texas is not included in this analysis, as it is not in the Western Interconnect.
    - The resource filters will be applied to the maps, which will then be redistributed to the WG for review.
- **Slide 6:**
    - Describes technology assumptions and characteristics.
    - The Modeling WG will be provided default assumptions in order to calculate cost metrics and design models. These assumptions proxy technology starting points. From a WG standpoint, it is easier to use technologies that are mature today, and set the baseline assumptions as they exist today. The model will be modified as necessary. Technologies may evolve over the next few years that will affect the model.
    - Different assumptions will differentiate regions (capital cost, capacity factors, operation costs, etc.). Some assumptions come directly from the CA RETI project work, where the process was similar, in that assumptions are put out and vetted with stakeholders.
    - Materials costs have recently escalated for various technologies, so adjustments have been made for inflation of steel and other related resources. Time and delivery are factored into costs, and will be provided to the Modeling WG.
- **Slide 7:**
    - Shows technology assumptions developed for each technology, that will evaluated in terms of cost and performance, economics of scale, size of projects, location of projects, air quality requirements, geography, site-specific requirements, capital costs, fuel costs, heat rate, capacity factor, typical size, different incentives, and other factors.
    - The numbers provided in the power point include all capital, direct and indirect project costs (permitting, financing costs, road construction, etc.), but do not include transmission costs.
    - In valuing solar thermal storage, time of delivery will be considered.
    - The levelized cost of energy includes cost margin and equity return for investors. The current return assumption is 15%. Future calls will address financing options. The value of energy is more important than the levelized cost of energy. Capacity value will be included in the cost model.
    - Seasonal dispatch data that shows how resources have been dispatched historically is available. This data includes an estimation of the time of day output based on resource data sets and DNI. Seasonable data will be provided to WG participants for review.
- **Slide 8** shows proxy technologies assumptions. The purpose is to provide a starting point based on technologies used in the past.
- **Slide 9** shows biomass assumptions and related performance and economic assumptions, to show potential plant size.
- **Slide 10**
    - Shows geothermal projects either by binary or flash type resources.

    - The choice of technologies will depend on resource regimes, fuel costs, OM costs, total capacity costs, technology assumptions, and other factors.
    - The 80-90% capacity comes from historical performance for binary and flash-based plants.
    - Transmission costs will be covered as a small component of the overall cost. The Modeling WG is developing a model that will determine transmission cost from each zone to various load points throughout WEC.
- **Slide 11:**
    - Highlights hydroelectric assumptions.
    - There are three categories for hydro, which makes it difficult to provide comprehensive resource costs and a typical generation range. Hydro development depends on topography.
    - Within projects with no dams or impoundments, a note will be made to indicate that those sites will be retrofitted.
    - Howard Schwartz indicated that there is interest in developing pumped storage and making it available to integrate wind. There are certain kinds of storage that could be developed separately, and sold as an ancillary service. The development of pumped storage technology in general would have an effect on the WREZ process. Special transmission would need to be built for pumped storage. BV indicated that there is not yet a working proposal for storage, but it will be considered.
    - **Richard Smart indicated that he can help refine the data and numbers based on his hydro experience. Richard and Ryan Pletka will coordinate on the best way to provide comments on hydroelectric assumptions.**
- **Slide 12**:
    - Shows basic solar thermal assumptions. All resources are competitive with one another, so this is the technology proposed to compare the technologies proposed.
    - The most proven and commercially available technologies were chosen.
    - Dry cooled parabolic trough with no storage is not widely deployed yet.
- **Slide 13:**
    - Shows solar PV assumptions. There are many solar technologies, and the single access tracking crystalline will be used.
    - The economics of scale with PV are not large, and there is not a great benefit in developing large scale PV plants on the construction side. The cost of energy is higher than solar thermal.
    - Typical assumptions for all costs, tax credits, energy cost and other factors apply to solar PV.
    - It was indicated that relative to the REZ rankings, the technology chosen should be single access, even though the data looks like it comes from dual access tracking. More resources are available with dual access. Ryan Pletka indicated that he welcomes any additional assumptions and data from call participants for CPV.
- **Slide 14** indicates wind technologies. Three-blade machines at 80m hub height will be used.
- **Slide 15:**
    - Describes future cost and performance.
    - BV will assign default assumptions and assume that there are not significant changes.
    - The WREZ project will not rank technologies against one another, but identify areas in the West that have the best prospects for high density, high voltage, and big transmission.
    - The assumption is that all technologies are mature and that no substantive developments or forecasts should affect those rankings.
    - The Modeling WG will be allowed to change their assumptions if technologies are not constant over time.

Technology Assumptions Discussion

- For the solar PV economics, the $7 resource designation is a base assumption. The kWh/m2/day includes all potential losses. There is generally a 15-20% loss of DC/AC output. For thin access films, $4 kWh/m2/day is usually considered. Ryan Pletka indicated that if anyone has additional data about this, he'd been happy to review it.
- Linda Davis requested that call participants discuss and vet these assumptions with their colleagues and industry contacts, and submit comments to her (ldavis@westgov.org) by November 7, 2008. All comments will be discussed on the November 11, 2008 ZITA WG call.
- If call participants have industry contacts that the WGA should be in touch with to discuss technology assumptions and the WREZ project, please contact Linda.
- The technology assumptions will be distributed for public comment, but the ZITA WG wants to ensure that the document is a realistic and feasible as possible.

Administrative Items

- Next call: Tuesday, November 4, 2008; 11:00 a.m. MST. This call will go over the criteria for narrowing down CSAs to REZs.

Call Participants:

Rebecca Coffman	
Linda Davis	Western Governors' Association
Jeff Hein	CPU
Ed Higginbottom	BC Transmission Corporation
Bart Jones	TransCanada
Julie Keil	PGE
LaVerne Kryiss	Western Area Power Administration
Mark Lausten	Sentech
Craig Lewis	Green Volts, Inc.
Todd Merowitz	EnExco
Jason Nordrel	Inifinia
Amanda Ormond	Ormond Group LLC
Martin Piszczalski	Sextant Research
Ryan Pletka	Black & Veatch
Howard Schwartz	WA State CTED Energy Policy
Richard Smart	Community Hydropower Consulting
Ron Steinbach	Tri-State Generation and Transmission Association, Inc
Lisa Szot	NM RETA
Henry Tilghman	Vestas
Cameron Yourkowski	Renewable Northwest Project
Allen Woo	BC Hydro

Facilitation:

Morgan Poncelet	Kearns & West (recorder)