

Western Governors' Association

Western Renewable Energy Zones
Zone Identification and Technical Analysis (ZITA) Working Group
November 13, 2008
11:00 a.m. – 12:00 p.m. MDT

CALL SUMMARY

Next Steps

- **Ryan Pletka to follow up with Scott Higginson and Jeff Hahn to get more information and background on biomass comments.**
- **Ryan Pletka to contact Ken Eklund to discuss the working assumption that a third of available biomass will be used for electricity.**
- **Ryan Pletka to discuss offline the issue of single or dual access tracking with Jason Nordrel.**
- **Arthur Haubenstock to provide written comments on the solar thermal technology assumptions.**
- **Ryan Pletka to contact Vestas in order to resolve discrepancies in O&M cost assumptions for wind technologies.**
- **Please direct all comments on the criteria to transition from a CSA to a REZ to Josh Finn, Black & Veatch (FinnJS@bv.com or (925) 949-5982), with a cc: to Linda Davis, WGA (ldavis@westgov.org or (303) 623-9378).**
- **As a reminder, the ZITA WG is also taking comments on the technology assumptions presented on the 10/28/08 call. Comments can be also directed to Josh Finn, Black & Veatch with a cc: to Linda Davis, WGA.**

- The purpose of today's call is to review the technology assumptions, discuss comments received from stakeholders on potential technology assumption modifications, and develop consensus on how to move forward.
- Documents discussed on this call were distributed by Linda Davis to the ZITA WG on 11/4/08:
 - Comments on ZITA Technology Assumptions.ppt
 - WREZ ZITA Technology.ppt

Discussion Technology Assumptions and Comments Received

- Ryan Pletka, Black & Veatch, discussed the comments received from stakeholders and WREZ process participants on the technology assumptions for all resources (wind, solar, geothermal, hydro and biomass). Only comments received on solar thermal, wind and biomass were received.
- The slides are ordered based on plant performance, capacity factor, economics and capital cost, and typical cost of energy ranges.
- There were comments received on the process that do not apply to the technology areas. These comments are listed on slide 3, and will be forwarded to the Generation and Modeling Working Group (WG).

Biomass

- Slide 4: Jeff Hahn (Covanta) and Scott Higginson (Renergy Holdings) provided comments and alternative data tables on biomass. Renergy Holdings' comments addressed the need to increase

the range of net plant heat and reduce the total project cost, as smaller capacity is more typical for the biomass industry. However, the total project cost is the final number which includes all project-related costs, including financing (e.g. interest during construction and any initial reserve funds that are capitalized into the final number). Covanta comments were similar but also slightly different, indicating that final costs should be raised. **Ryan Pletka will follow up with Scott Higginson and Jeff Hahn to get more information and background on these comments and need to follow up with him.**

- **Q:** Where Covanta recommends a change in technology, are there local factors that would cause fluidized bed plants to be preferred over stokers?

A: Fuel supply could be available locally. Generally, there is a mix of stoker and fluidized bed plants around the country. Covanta could be representing a specific perspective from the municipal solid waste industry.

- Anaerobic digestion will be characterized as a non-REZ resource. This was noted, as there is a significant amount of wet manure waste in ID. This type of resource is small and will be locally utilized (in the 1-2 MW range). The potential for small non-REZ resources will be quantified in the final WREZ study.
- There is competition between different biomass waste uses. In this case, the working assumption is that a third of technically available biomass is available for electricity. **Ryan will follow up with Ken Eklund offline.**

Solar Thermal

- NREL's main comment on the solar thermal technology assumptions is to consider adding short-term thermal storage for the CSP technologies. There were other comments received on the solar thermal technology assumptions, specifically asking that storage be incorporated. Storage is being incorporated into newer projects that are coming online and although the operational advantages may add value, they are not necessarily entered into the supply curve. There is no assumption for storage, as the technology is not yet commercial, although it is much closer to commercial application than other technologies, related to the timeframe of transmission planning. Storage could be entered into the transmission modeling. Adding thermal storage capability would increase capital costs and capacity factor.
- **Q:** How would including storage change the numbers?
A: Storage will increase the cost of energy but also increase the value of energy, as past analyses show. For transmission planning, anything that utilizes the line at higher percentages would decrease the low life cost of that transmission.
- **Q:** How does increased capacity factor increase the levelized cost of electricity, and how is capacity factor increased?
A: The output of the solar field in relation to steam turbine output is oversized. A plant is overbuilt, with a reserve tank for many hours of storage where plant output can be extended into evening hours. Because of this larger field, the capital costs go up. However, the cost increase is offset by increased capacity factor. There is not a great change in energy cost at the end of day.
- **Q:** What is the cost impact of upsizing the generator to match the field size? Is the intent is to stretch out the production time into non-solar times to provide electricity that can match the load later in the day?
A: Yes.
- **Q:** How are you dealing with the temporal factor?
A: An overall capacity factor would measure total percentage at a time. Studies will characterize typical meteorological-year output for plants in each location. That information will be used by the Modeling WG to value resource and firmness of capacity.
- Ryan indicated that the WREZ process will use dry cooled parabolic trough with no thermal storage, and no natural gas assist.

- **Q:** In the RETI project, the use of dry cooling with trough may have overestimated the cost of likely technologies that will be deployed in that situation. Why is the process not considering gas assist, since many states have provisions for multi gas technologies? That could substantially change the outcome of the modeling.
A: Gas assist could be considered. It has not been considered yet, because from a modeling standpoint, you may be increasing value, but you're not increasing the amount of renewable generation output. The focus is on getting renewable MWs delivered, comparing different areas on a relative basis and not trying to predict how development might occur.
- **Comment:** Natural gas extends the amount of renewable energy that you can use. Various technologies exist that expand the amount of usable solar energy that would otherwise not be able to be converted into energy. With a low solar output plan, gas may be used to generate any residual energy to run turbines.
- **Comment:** Ryan indicated that with default assumptions, users will be able to input any variables into the model.
- **Q:** Is it possible to predict water availability?
A: There is no data for that yet. There is the issue of physical water availability, as well as legal issues around water rights.
- **Q:** Do studies exist that define the number of solar plants that would be wet-cooled or dry-cooled?
A: If treated wastewater from municipal utilities is available, then some plants can be wet-cooled. Withdrawals from underground sources of surface flows have not yet been considered.
- **Q:** In the base model, would it make sense to model different proxies to demonstrate technology differences based on various conditions and variability?
A: This is a possibility, but at the end of the day, only one model will be chosen.
- **Q:** Will Black & Veatch provide guidance in working with the model in order to develop alternatives that respond to the current state of technology?
A: Yes. Ryan indicated that it was preferably to choose either storage or gas assist, but flexibility in modeling is possible in order to provide the best resource assessment approach.
- **Q:** Is the technology is based on single or dual access tracking?
A: The DNI data is based on a two method access tracking device, which will be modified for cosine losses. Determining how to go from generic to specific characterization is a topic for next week's WG call. **Ryan Pletka will discuss this further with Jason Nordrel offline.**
- **Arthur Haubenstock will provide written comments on the solar thermal technology assumptions to WGA.**

Wind

- One comment was received on wind technology assumptions, indicating the project and O&M costs seemed high.
- It was indicated that these numbers are consistent with current costs in the U.S. and Canada, although they are higher than costs that Vestas has modeled in their studies.
- The different in O&M cost could be a definitional issue (some costs include insurance, turbine warranty, labor onsite, property taxes, long term equipment replacement and maintenance). **Ryan Pletka will contact Vestas to resolve the comments.**

Administrative Items

- For the purpose of comparison, all costs and assumptions will be broken out by resource in the final report.
- In February 2009, the assumptions will be submitted for public comment. It is hoped that all concerns are Josh Finn, Black & Veatch (FinnJS@bv.com or (925) 949-5982), with a cc: to Linda Davis, WGA (ldavis@westgov.org or (303) 623-9378).

Call Participants

Steve Arenson	OSD Sustainability Office
Linda Davis	WGA
Steve Ellenbecker	Wyoming Governor's Office
Josh Finn	Black & Veatch
Katherine Gensler	SEIA
Mike Gretchen	E.ON Climate & Renewables
Arthur Haubenstock	BrightSource Energy
Ed Higginbottom	BC Transmission Corporation
Dave Hurlbut	NREL
Jan Inbrat	RES Americas
LaVerne Kryiss	Western Area Power Administration
Mark Lausten	Sentech
Larry Mansueti	U.S. Department of Energy
John McCaull	Geothermal Energy Association
Claude Mindorff	WindEau, Inc.
Jason Nordrel	Infinia
David Owen	BC Transmission Corporation
Martin Piszczalski	Sextant Research
Ryan Pletka	Black & Veatch
Elaine Sison Lebrilla	Sacramento Municipal Utility District
Jan Strack	Sempra Utilities
Cyrus Tashakkori	E.ON Climate & Renewables
Henry Tilghman	Vestas
Kathy Van Dame	Wasatch Clean Air Coalition
Lee Wallach	Solel Inc.
Dora Yen-Nakafuji	Lawrence Livermore National Laboratory

Facilitation

Abby Arnold	Kearns & West (facilitator)
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