

## Western Governors' Association

### Western Renewable Energy Zones Zone Identification and Technical Analysis (ZITA) Working Group August 22, 2008 10:00 – 12:00 MDT

## CALL SUMMARY BIOMASS

#### Decisions & Next Steps

- The ZITA WG will first consider candidate zones and then identify biomass potential within those zones, to enhance the economics of other resources. Biomass can be added to a REZ to help define a region with forested areas or crops raised. The WREZ process cannot quantify all biomass potential in the West.
- Potential biomass criteria are precipitation, elevation, existing roads, slope, density, tree diameter, and resource transportation.
- The group agreed that the proposed definitions are complete but need to be refined. Richard Nelson, Ryan Pletka and Scott Olsen will work on refining the biomass definitions as they apply to the WREZ process, and will include potential criteria for discussion. They will also add other sources of data for review, better define forest thinning and show what resource each biomass category includes. Urban rural interface and green waste sites will be included in forest residue (from private or national forests).
- The group agreed to use proxy technologies for biomass analysis. Advanced technologies will be discussed in a separate chapter of the report, and will not be part of the analysis.
- Potential cogeneration will be documented as a benefit to other resources.
- Once biomass definitions are set and the group agrees on how to quantify biomass, they will be shared with the E&L WG.

#### Action Items

1. Richard Nelson to send Ryan Pletka the UC Davis Report data for mapping purposes.
2. Linda Davis to forward WGA CDEAC Report website link to the ZITA WG.
3. Richard Nelson to provide a summary of his presentation as it relates specifically to electricity and the WREZ process, and will provide Ryan Pletka his relevant data.
4. Ryan to check with the Forest Service on whether they count beetle kill in the 'Healthy Forests Initiative.'
5. ZITA WG members on the call to send Ryan their considerations on the definitions.
6. Claude Mindorff to send to the group BC's Energy Plan.
7. Ryan Pletka to develop biomass as a power resource percentage recommendations for the group to discuss further.
8. Black & Veatch to refine biomass definitions.

#### Call Objective

- The purpose of this call is to discuss biomass resources within candidate study areas.

## Definition of Biomass Review, and Biomass Discussion

- Richard Nelson, Kansas State University, presented his biomass findings to the group. This, and Ryan Pletka's biomass definitions, will help determine criteria by which to define the biomass resource.
- Richard Nelson, in conjunction with the DOE and USDA, compiled the information for a recent WGA report that assesses biomass in the West. This report includes a summary of assumptions and how they were made.
- Richard referenced a UC Davis report that quantifies biomass in terms of the resource base of cost and quantity for liquid fuels production. UC Davis mapped out Richard's data county-by-county basis by tons/acre, to locate potential refineries. This task is difficult to accomplish for the entire United States, but can apply an additional resource overlay for specific candidate areas.  
**Richard will provide this to Ryan for his mapping.**
- WGA's 2006 CDEAC (Clean and Diversified Energy Advisory Committee) Report considered biomass potential in the West in terms of electricity generation and biofuels production (with a goal of 30,000 GW of renewable energy in the West by 2015). This report is on the WGA website. **Linda will forward the link to the ZITA WG.**
- Richard spoke to various slides of his PowerPoint presentation:
  - Slide 3 shows the percentage of total fuel that can be derived in the WGA region based on USDA data. The various feedstocks represented (high grain straws, wheat barley and oats, trimmings from grapes, almonds, etc.) take into account municipal solid waste (MSW), forest trimming, point-source slaughters and herbaceous crops.
  - Slide 5 shows additional resources. There is insufficient data to predict yields from a certain resource by region and by acreage, especially for switch grass and big bluestem. The NRCS has a database that shows yield by land capability, at low, medium and high activity levels (this is mostly determined by precipitation). That data is incorporated into the analysis. Marginal lands are lands that do not compete with food production, and are possible future resource bases. There is a significant amount of research in Europe that can also be used.
  - Slide 6 shows how agricultural crop residues add to biomass resources. Based on that data, supply curves were generated for harvesting and cost analyses. Sustainability was taken into account. This slide also indicates how much soil residue must remain in place to prevent soil erosion. **That criterion will eliminate candidate areas where residue need cannot be disturbed.** Carbon sequestration also has to be evaluated for remaining candidate areas.
  - Slide 7 shows land criteria based on precipitation and slope. It is difficult to model crops that have not been planted on a wide scale, such as herbaceous crops. Richard explained that energy crops are not as common westward of the Houston/Bismarck line, and irrigation is scarce in areas where they do exist. There is not enough data to determine whether herbaceous crops could provide biomass on a large scale. Elevation is a biomass criteria, and usually has to be 4500ft or less (calculated by experts).
  - Slide 8 shows USDA baseline data.
  - Slide 9 covers point source animal fats, to generate edible tallow for biodiesel. These resources are for liquid fuel production and are too scarce to provide power generation.
- Richard indicated that the Forest Service provides estimates based on existing practices of additional thinnings from beetle kill in diseased forests. The group discussed the issue of contention around forest thinnings, tree diameter. Tree diameter is the most important indicator of resource capability. This could be a potential criterion for the biomass resource. Most groups are accepting of a 16-inch tree diameter cap. Tree thinnings will have to be fully defined.
- Some of Richard's slides apply to liquid fuels, but Richard will work with NREL and Black & Veatch to parse out information relevant to the ZITA WG. **Richard will provide a summary of**

his presentation as it relates specifically to electricity, and will provide Ryan Pletka his relevant data.

#### Review of Draft Biomass Definitions

- Ryan Pletka, Black & Veatch, presented draft biomass definitions. The biomass definitions focus on waste resources. Ryan referenced NREL's 2005 set of biomass resource data and documentation. A broad assumption is that 35% of residue can be collected.
- Biomass data sets are not consistent and are not easily comparable with other resources, since there are many different biomass applications and considerations.
- High value products are corn, soybeans and animal tallow.
- Animal manure is a different resource and is too small and distributed to factor into large-scale power generation – it is not included in Ryan's definitions.
- Forest fire management and commercial logging activities contribute biomass resources. The forest fire reduction category includes clearing of forests devastated by the pine beetle. A certain percentage of this contributes to electricity generation. Therefore, power generation would be included in the definition of forest fire reduction. **Ryan will check with the Forest Service on whether they count beetle kill in the 'Healthy Forests Initiative.'**
- Forestry and agricultural residues are spatially distributed. Primary mill residues, secondary mill residues and urban wood residues are point-source resources, and their transportation issues are less of a concern. Bark trimmings are large sources of biomass.
- Urban wood residues include wood components of mainstream activities (demolition, tree trimmings for lines, etc.), and could include yard waste that ends up in landfills and the solid waste stream from organics (wood, paper, green waste sources). There exist state regulations for the diversion of waste stream that already is, or could potentially be converted to biomass generation. In other states, it's an untapped resource.
- Municipal solid waste is not included in the definitions. Clean wood is included, but not raw trash.
- A USDA/NAU study concluded that there are 8 million tons of biomass potential available for removal from forests. Biomass resource projects are designed to have environmental benefits, not to clear cut forests. There are multiple efforts across the West to thin lands and produce biomass. CA and AZ remove juniper and pinion from grasslands, but don't include those removals in calculating existing potential of biomass material from forest residue. The BC government has identified biomass generation from tree sources, and uses secondary waste that comes from timber and conventional lumber production. **Claude Mindorff will send to the group BC's Energy Plan.**
- There is great potential to grow crops for power production, and landowners are increasingly willing to explore resource development. Viable regions will be determined later.
- **Once biomass definitions are set and the group agrees on how to quantify biomass, they will be shared with the E&L WG.**
- **Urban rural interface and green waste sites need to be included in forest residue (from private or national forests).**
- **The group agreed that the proposed definitions are complete but need to be refined. Richard, Ryan and Scott will work on refining the biomass definitions as they apply to the WREZ process, and will include potential criteria for discussion. They will also add other sources of data for review. Ryan and Scott will work on better defining forest thinning and show what resource each biomass category includes. ZITA WG members on the call will send Ryan their considerations to the definitions.**

#### Additional Discussion Items

- **The ZITA WG will first consider candidate zones and then identify biomass potential within those zones, to enhance the economics of other resources. Biomass can be added to a REZ to help define a region with forested areas or crops raised. The WREZ process cannot quantify all biomass potential in the West.**
- Some biomass production facilities are not 100% renewable (akin to pumped storage projects for small hydro production), but biomass can enhance other renewable energy resources within a zone. For now, the group will focus on identifying resources in the West where enough electricity can justify large-scale transmission.
- Timeframe: The group discussed the timeframe needed for biomass to be valuable to the candidate study areas. While the E&L WG is reviewing candidate areas, there could be time for the ZITA WG to further discuss the status of biomass technologies and the ability for biomass to contribute to candidate resource areas. Candidate study areas will not be as defined as the final REZs, but will serve to gather feedback on potential zones and will be very similar. Amanda indicated that there might not be time to further define zones once the overlays are in place.
- Ryan indicated that proxy technologies exist for biomass. It is assumed in the studies that the current technologies are analyzed, but information on advanced technologies is also available. Those technologies will not greatly affect the status of current biomass technologies. If technologies change in the future, the analysis could be modified. The base-case will analyze what will occur in 15 years, based on present technologies. **The group agreed to use proxy technologies for biomass analysis. Advanced technologies will be discussed in a separate chapter of the report, and will not be part of the analysis.**
- Ryan indicated that not all biomass material is used for power production. It has many other uses, such as lumber, pellets, mulch and land uses. It is difficult to accurately define the biomass potential for power generation, especially since power is valued lower than other uses for biomass materials.
- The group discussed setting a criterion related to the percentage of biomass potential for energy production that can be used from the entire amount of biomass available. It was indicated that complete biomass potential should be evaluated for a zone, and then the zone can be evaluated based on the percentage of biomass that is available for power production, instead of setting a percentage criteria before considering complete biomass potential. The CA RETI process identified zones outside of percentage potential. There is space in the market for biomass production, for at least a third of the total biomass available. **Ryan will develop biomass as a power resource percentage recommendations for the group to discuss further.**
- Once the transmission is in place for renewable energy, there will be interest in setting up biomass plants close to transition lines. It is however, difficult to 'sell' a biomass plant without close transmission.
- Biomass potential in small areas could add up to create large areas of potential, which could shift the supply curve. Small hydro has the same issue of small potential that adds up.
- **Potential biomass criteria are precipitation, elevation, existing roads, slope, density, tree diameter, and resource transportation** (the latter can be resolved with a cost/supply curve). There is flexibility in plant location, since biomass is not a land-based resource, like solar.
- Howard Schwartz indicated that efforts are underway to consider gasification technologies, including gasifying woody products and other biomass. Commercial gasifiers provide gas to an oiler and burn it. Gasification is not at the same commercial scale as electrical power, but there is debate whether gas technologies are far enough along that they can be implemented and make economic sense. More advanced gas technologies are not fully commercialized, so they do not fit into the WREZ analysis. Black & Veatch also does work on gasification technologies. Energy crops for gasification will be footnoted since the data does not exist to determine their usefulness in the WREZ timeframe.

- The group discussed cogeneration capacity. Independent operations attached to feedlots could produce up to 3MW in cogeneration capacity. Cogeneration capacity adds up, especially if it is in or adjacent to larger resource areas (e.g. wind or solar). As technologies advance for conventional power plants, biomass plants could cogenerate. **Cogeneration will be documented as a benefit to other resources.**
- The group discussed conventional power plants switching to alternative fuel resources (e.g. for coal plants that are reaching the end of their life cycle). This is different from cogeneration plants. Depending on how many coal plants there are in the West, biomass plants could be put through existing coal plants, instead of building new plants. This is competition to the stand-alone plants that could be built. That consideration needs to be documented as another resource.

### Administrative Items

- There will be a September 22-23, 2008 meeting between the ZITA and the E&L WGs to evaluate resource maps and potential resource overlays.
- Upcoming call schedule:
  - August 22      Biomass
  - August 29      Wind
  - Sept 5th        CSP
  - Sept 12        Geothermal
  - TBD:            Summary memo and call all resource decisions
  - Sept 19        Brainstorm criteria for REZ
- There will also be future small hydro and biomass calls.

### Call Participants:

Jason Berry	Utah State Energy Program
Linda Davis	Western Governors' Association
<b>Lori Goodman</b>	<b>Denacare??</b>
Rich Halvey	Western Governors' Association
Ed Higginbottom	BC Transmission Corporation
Scott Higginson	Renegy
Kelly Knutsen	Utah Clean Energy Program
Laverne Kyriss	Western Area Power Administration
Mark Lausten	DOE Solar Technology
Claude Mindorff	WindEau, Inc.
Richard Nelson	Kansas State University
Scott Olsen	Black & Veatch
Amanda Ormond	Ormond Group LLC
Ryan Pletka	Black & Veatch
Howard Schwartz	WA State CTED Energy Policy
Lisa Szot	NM RETA
Madeleine West	Western Governors' Association

### Facilitation:

Abby Arnold	Kearns & West (facilitator)
Morgan Poncelet	Kearns & West (recorder)