Biopower CHP: A Great Duo, Homework Required

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Hmm – Maybe it’s a “Great Quad”?

Let’s count:

– Steam from boiler
– Power generation
– Carbon credits
– Baseload renewable power
Some history

Forest products:

- 1980s – Some mills installed CHP
- Gave a competitive advantage through the years – Control of power costs
- Many mills did not install CHP

Anaerobic digestion

- 1970 to 1990s – Failure rate of 50%

Conclusion – Homework required
And then

Energy price increases:
  – 2001-2002 “Perfect Storm”
  – CA deregulation, northwest drought
  – Natural gas prices higher & volatile (the gas bubble was over)
  – Energy costs killing out our industrial base

Anaerobic digestion
  – R&D to fix the technology - $5 million at WSU
Now – The time has come

Biopower CHP:

– WA Stimulus (ARRA): 120 MW funded ($30.5 million) & 201 MW under development
– MT Stimulus (ARRA): 8 Technical studies funded
– AK Renewable Energy Fund: $125 million Round 1 & 2 with 20 CHP projects; RFP for Round 3 has closed ($50 million)
– OR: 50% BETC, SELP loans includes renewable CHP, the “Unwritten Policy”

Anaerobic digestion

– Dairy Digesters: 9 revenue streams
Homework I

Utilities:

– We have a checkerboard of attitudes
– Varies by state and within states
– Depends on laws, policy, utility regulations
– A key report: Distributed Generation in Oregon: Overview, Regulatory Barriers and Recommendations
  http://chpcenternw.org/NwChpDocs/DistGenInOregon_Overview_RegBarriers_Reccomendations.pdf
– Standby Rates for Customer-Sited Resources from EPA CHP Partnership
– Need a good Power Purchase Agreement – 10 years plus
Homework II

Environmental:
- Burning slash piles or to the mill?
- Beyond Waste or to the landfill?
- Output-Based Emissions or Input-Based
  [http://chpcenternw.org/Library.aspx#environment](http://chpcenternw.org/Library.aspx#environment)
- A number of air emissions studies under way
Homework III

Climate change:

– Can you sell carbon credits and renewable energy credits?
– Yes, if you have a methane/fossil energy reduction pathway – Did you turn off the fossil energy boiler or shut down dairy lagoon
– State laws can be unclear
– Value not to be missed – Even if bundled
– Selling Carbon Offsets from your Clean Energy Project

http://www.chpcenternw.org/NwChpDocs/SellingCarbonOffsets.pdf
Hog fuel prices – It’s not the free fuel it used to be - IV

An investment grade study of supply is needed or you own it:

– Who else is moving forward?
– WA Olympic Peninsula example
– How local is it?

We need to maximize what we have

– Slash is moving to the mills
– BCAP and tax incentives
Bioenergy Policy choices

Which policy tectonic plate will win? Do we maximize

• Biofuel production – 36 BGY? – Get out of middle east
• Biopower CHP production – RPS/RES -
• Pellets and torrefaction cubes for Asia and Europe
• Biochar – Carbon negative and healthy soils
• Maximize rural economic development – Which end use yields the most rural jobs, And, who owns?
• Sustainability is an overriding key value – Right?
• What about compost and beauty bark?
Moisture – The target

• Major efficiency gains to reduce moisture content of the fuel
• Biomass Drying and Dewatering for Clean Heat and Power

http://www.chpcenternw.org/NwChpDocs/BiomassDryingAndDewateringForCleanHeatAndPower.pdf
Solution: Efficiency gains: Getting more out of the fuel

- CHP itself is an efficiency gain over standalone power generation
- What about the mill’s waste heat?
- Survey it – Can it be recycled?
- We have plans for this waste heat
- A number of old and newer technologies
Fuel Drying

Why?

• Significantly improves the efficiency of the boiler or gasifier.

• For boiler:
  – 5% to 15% improvements in efficiency
    (Boiler is not an efficient dryer, so dry fuel before boiler.)
  – 50% to 60% more steam production

• Improves combustion

• Reduces air emissions
The Key is Heat Recovery

Heat recovery is key to a cost effective dryer project.

• Recover flue gas of power boiler or gasifier.
• Recover heat from other waste heat sources
• Recover heat from dryer exhaust.
Conclusion

• Economic advantage – Make your own power on-site or sell it/wheel it
• Long-term feedstock supply is crucial
• Use the feedstock efficiently
• BIOMASS CHP – A WINNER!
Northwest Clean Energy Application Center

About the Center

• A multi-state effort – AK, ID, MT, OR & WA
  • WSU Extension Energy Program serves as lead
  • 100 plus Regional CHP projects totaling over 1,300 MWc
  • 94% industrial projects
  • Technical assistance information, reports and case studies
  • Problem solving & trouble shooting
  • Website [www.chpcenternw.org](http://www.chpcenternw.org)
  • Support of regional & state CHP initiatives