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Bioenergy: Combined Heat and Power

Opportunities and Challenges

Jim Lane
Editor & Publisher, Biofuels Digest

BiofuelsDigest
The world's most widely read biofuels daily

US Department of Agriculture 2010 Outlook Forum

Bioenergy: Combined Heat and Power

- Generate power through a steam turbine system
- Heat is captured and piped for additional distribution.
- 30 percent more efficient than “power alone” systems.
- Efficiencies as high as 80% of theoretical BTUs in biomass.
- Biomass only or co-fired with coal.
- Popular in Europe, less so in US.
- Heat is used for industrial, commercial or residential. In US, generally commercial.

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Bioenergy: CHP by the numbers

- 56 gigawatts (GW) of US CHP capacity, up from 10 GW in 1980.
- Widely used in heavy industry - pulp/paper, oil industries.
- 7% of US power capacity, 9% of production
- Average combustion efficiency is 68%, max is 90%
- Reduce NOx emissions by 90 percent compared to fossil fuel

Bioenergy: Is CHP for you?



- Competitive with central heating plants/grid power for industrial use
- Can be competitive at \$0.10 per KWh
- Good option for heavy industry within a corporate green standard.



Bioenergy: CHP and EPA



- EPA Combined Heat and Power (CHP) Partnership offers information, feasibility guides, regulation information.
- Partnership includes federal, state, and local government agencies and private organizations such as energy users, energy service companies, CHP project developers and consultants, and equipment manufacturers.

<http://www.epa.gov/chp/>

Bioenergy: Biomass Crop Assistance Program



- Up to \$40 per ton payments for crops used in renewable energy production.
- Controversy over diversion of crops from food, bio-based materials production.
- Uncertainty over use of BCAP to support export to Europe of biomass for power gen

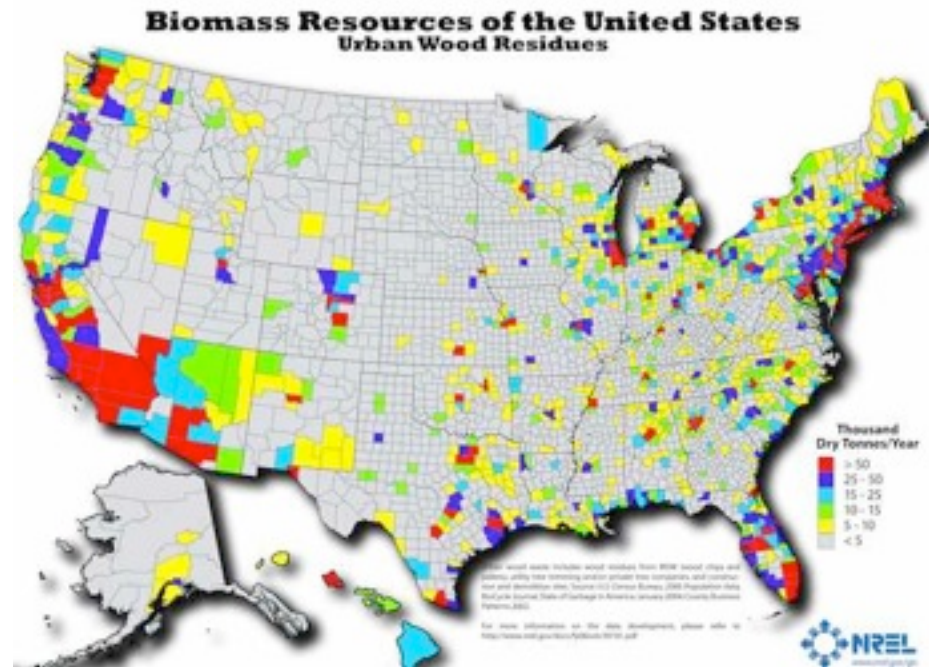
Bioenergy: CHP and funding



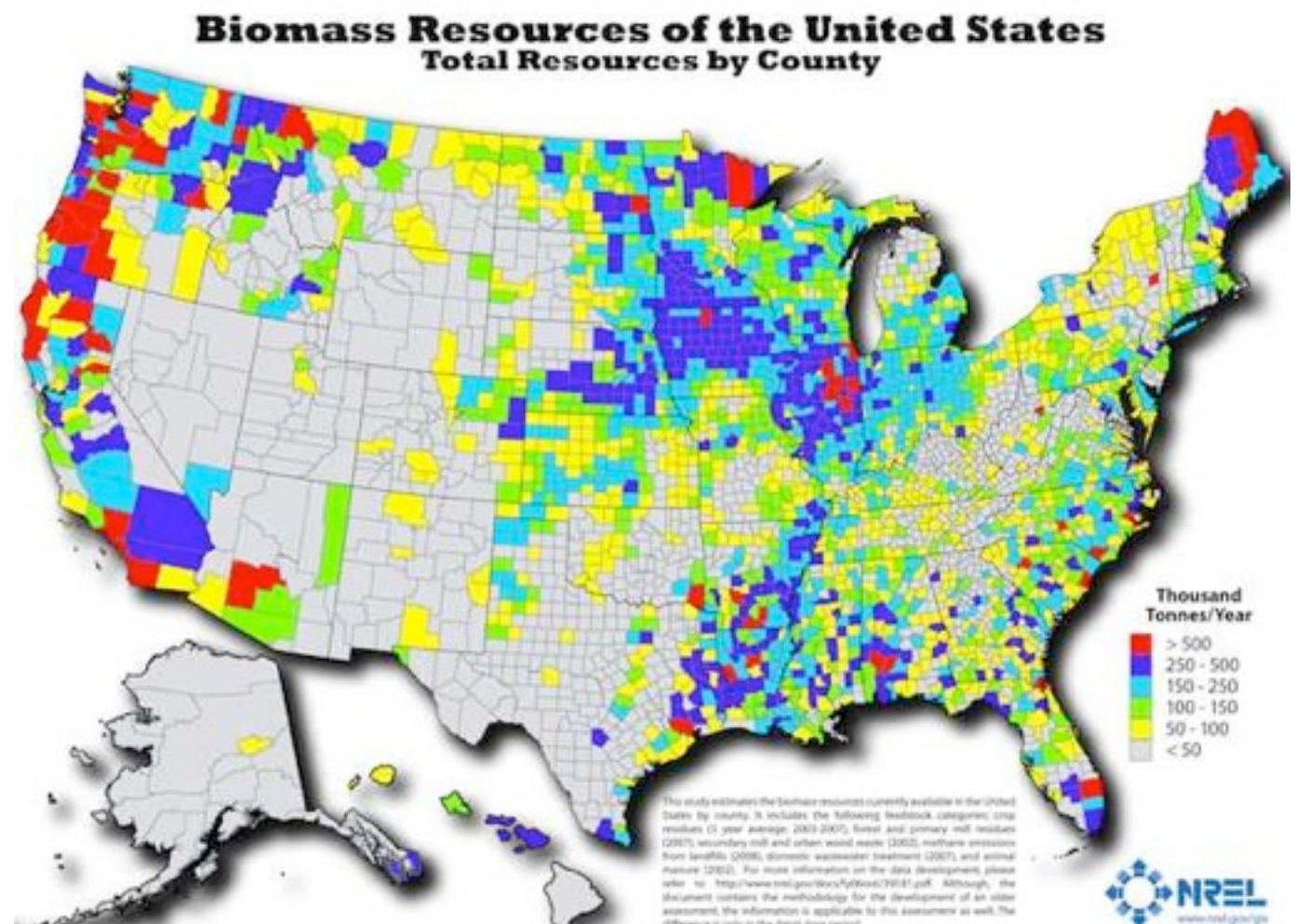
There are a large number of state and federal loan, grant, net metering, interconnection, and rebate options

- Adv. Power System Tech Program - Sec 1224
- Advanced Energy Manufacturing Credit
- AK Power Project Loan Fund
- AK Renewable Energy Grant Recommendation Program
- AK Sustainable Natural Alternative Power Program
- AL Agriculture Energy Efficiency Program
- AL Local Government Energy Loan Program
- AZ Energy Equipment Property Tax Exemption
- CA Loans for Energy Efficiency Projects
- CA Supplemental Energy Payments (SEPs)
- Central Eastern PA Loan Program (PP&L Territory)
- CHP Investment Tax Credit/Grant
- CT Custom Commercial Energy Efficiency Program
- CT Low Interest Loans for Customer-side DG
- CT Low Interest Loans for Customer-side DG
- CT New Energy Technology Grant Program
- CT Onsite Renewable Distributed Generation Program
- CT Property Tax Exemption
- CT Renewable Energy Property Tax Exemption
- DOE Climate Change Technology Program (CCTP)
- Energy Efficiency/Renewable Energy Loan Guarantees
- Energy Efficient Commercial Bldgs. Tax Deduction
- FL Renewable Energy Production Tax Credit
- Flextech - PON 1746
- Honolulu - Real Property Tax Exemption for Alternative Energy Improvements
- ID Low Interest Energy Loans
- Loan
- ID
- ID Renewable Energy Project Bond Program
- Grant, Rebate
- ID
- IL Biogas and Biomass to Energy Grant Program
- Grant
- IL
- IL CAIR EE and Renewable Energy Set-Aside
- Environmental Regulations
- IL
- IL Interconnection Standards
- Interconnection
- IL

Bioenergy: Biomass Resources



- 1 billion tons of sustainable biomass annually in US (Sandia study)
- Wood waste generally used in biomass power production, to date.
- Strategies follow the biomass dispersal.
- Preferred radius is 50 miles or less from plant.



Bioenergy: Competitive forces



- 70 percent of US woodchips are exported to Europe for power gen purposes.
- European buyers pay higher rates generally than are feasible for US power gen.

Bioenergy: CHP policy/tech barriers



- Lack of interconnection standards for interconnection of DG technologies - leading to heavy “proof” and “backup” barriers imposed by utilities
- Depreciation schedules slower than needed/rational
- Emissions avoidance regulations/credits typically do not recognize higher efficiencies of CHP systems

Bioenergy: CHP and finance



- Project finance is difficult for CHP projects
- Issues are: unstable policy environment, some technology risk, and uncertainty of feedstock costs.
- Project finance environment is generally difficult since global financial crisis of 2008, but improving slowly.

Bioenergy: CHP Conclusions



- Market generally favors export of biomass to Europe over domestic development of biomass power systems - timelines for payback on power gen are longer than stable policy cycles, profitability lower for power vs liquid fuels.
- CHP offers opportunities for project development where government assumes finance role - especially in industrial symbiosis or co-located schemes.
- CHP is generally most effective with heavy industry co-location. Residential and commercial heating options less developed in US.

Bioenergy: Combined Heat and Power Opportunities and Challenges

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