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# The Electricity Bias in Renewable Resources: Areas of Opportunity for Thermal Biomass Applications

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## **Introduction: Thermal vs. Electric**

While the United States has come a long way towards promoting Renewable Energy Technologies (RETs) in the last decade (Energy Policy Act of 2005, Energy Independence and Security Act of 2007, American Recovery and Reinvestment Act of 2009), significant areas of opportunity exist both in policy design and conceptual understanding of RETs. The specific problem is in the inequitable treatment of RETs depending on whether they primarily serve electricity-producing or thermal applications.

It is generally accepted that in order for RETs to achieve a high degree of market penetration, government assistance is required to incentivize participation. However, RETs that produce electricity generally receive a much greater share of government resources compared to RETs with thermal applications. This results in an uneven playing field within the RET sector, where thermal projects face

additional barriers to adoption. Biomass is a renewable resource with both thermal and electricity-producing applications. Through broader application and more equitable policy design, biomass could help to reduce the regional consumption of fossil fuels like coal for electricity production and natural gas for heating. This brief addresses the problem of uneven incentive structures for thermal and electric RETs in the context of Oregon's biomass industry, and highlights the current gaps in policy while suggesting alternative policy structures.

## **Current Biomass Incentives**

At the Federal level, policies help develop the infrastructure of the biomass industry, including the Repowering Assistance Biorefinery Program and the High Energy Cost Grant Program. These programs offer grants to facilities that develop biomass resources or fuels, or provide electricity from biomass. The Business Energy Investment Tax Credit offers a 10% credit to Combined Heat and Power (CHP) facilities (compared to 30% for other renewable resources). The Renewable Electricity Production Tax Credit offers biomass electricity producers a credit of 2.2 cents per kWh produced. The Residential Energy Efficiency Tax Credit offers a credit of \$300 for homeowners who install a biomass stove. While these incentives have helped the biomass industry grow, preference is clearly given to electricity-producing applications, and thermal applications are typically considered in the context of small domestic applications. Incentives for thermal applications are either very low (biomass stove credit) or must be paired with an electricity-producing application (CHP).<sup>i</sup>

In Oregon, there are a variety of incentive programs from State government, regional utilities, and not-for-profit organizations. Two similar infrastructure-building State policies are the Biomass Producer or Collector Tax Credit and the Tax Credit for Renewable Energy Equipment Manufacturers. These programs offer credits that help develop infrastructure for biomass resource availability, and assist in equipment development and production within the State. The Energy-Conservation Tax Credit is a personal credit of up to 35% of project fees, materials, and labor. The Residential Energy Tax Credit is a personal credit of up to \$1,500 for biomass heat pumps. The Small-Scale Energy Loan Program offers loans of varying amounts to a variety of RET projects, including both thermal and electricity biomass applications. The Renewable Energy Development Grant is similar; however, only biomass applications that produce electricity are eligible. There are various utility programs that offer rebates to homeowners who install biomass stoves for heating purposes, though the rebates are not substantial. Additionally, the Energy Trust of Oregon, a not-for-profit organization, offers incentives for a variety of large-scale Renewable Energy Projects, though they must produce electricity and be within the service area of PGE or Pacific Power. They also offer small-scale rebates for homeowners.

The State incentives, while more generous towards thermal biomass applications than Federal incentives, still show a clear preference for electricity-producing applications. For large-scale projects,

both are eligible for State loans, but only electricity-producers are eligible for State grants. This creates a framework in which thermal projects are less likely to receive interest from potential users because they would like to take advantage of projects with the potential for more incentives. This framework is further established by the State's Renewable Portfolio Standards (RPS). The RPS mandates that a certain percentage of the State's electricity consumption must come from renewable resources, with percentage goals increasing over time. The RPS currently targets 15% by 2015, 20% by 2020, and 25% by 2025, to be met by renewable resources.<sup>ii</sup> The RPS further caters to this framework by enforcing the notion that renewable energy is only usable in the form of electricity. This is a common perception, assisted by the perception of electricity-producing RETs (wind turbines, photovoltaic solar panels, hydroelectric dams) as the only uses for renewable resources. Thermal applications of RETs receive little attention even though heating makes up a significant portion of our nation's energy consumption; over 30% of the energy used in homes goes to heating.<sup>iii</sup>

The most recent development from the state level is the establishment of Oregon's Forest Biomass Strategy as developed by the Forest Biomass work group. This strategy does develop a Biomass Thermal initiative and articulates several recommendations for policy. These recommendations are: (1) Establish a thermal energy baseline; (2) Complete assessment of state-owned facilities; (3) Evaluate opportunities for district and small-scale CHP projects; (4) Create and host an information portal for renewable thermal energy; (5) Develop technical information and case studies for potential project owners; (6) Develop a state-issued "Produced with Oregon Bioenergy" Certificate; (7) Ensure renewable thermal projects are eligible for Oregon's Energy Incentives; (8) Develop and implement a Renewable Thermal Program; and (9) Develop Innovative Financial Models to support Thermal Projects.<sup>iv</sup> These recommendations support the promotion of thermal biomass projects, however current incentive structures have a gap between electricity-producing and thermal applications.

### **Areas of Opportunity**

In Oregon, where millions of acres of State and Federal forest require thinning to reduce the risk of wildfire, disease, and insect infestation, the supply of woody biomass feedstock for either electrical or thermal generation is likely to remain well above demand for some time. Biomass policy therefore has considerable parallel importance for issues in public land management and rural economic development.

The gap between electricity and thermal applications of biomass technologies not only hampers entry into the market, but it also creates a disincentive to conduct research and development for thermal applications. This has negative implications for the industry because in fact harnessing thermal energy is more efficient than energy conversions to produce electricity: less energy is wasted in producing thermal energy, compared to producing electricity.

Addressing this gap is an area of opportunity that has implications across multiple levels of policy. Leveling the playing field in both Federal and State policies would allow industrial and small-scale electricity and thermal applications to receive comparable incentives; the merits of each application would emerge in the economic marketplace. Thermal applications would benefit because their largest barrier is up-front cost. They can be considered cost-competitive once established, given the advantages of thermal energy conversion efficiency.

Another area of opportunity concerns the involvement of utilities. Utilities need to understand the regional benefit of thermal applications as well as electricity-producing applications in terms of the potential reduction in energy demand. This could be a point of contention, particularly for Investor-Owned Utilities, because demand reduction can also lead to profit reduction. However, reduction in base-load demand can help ease over-burdened utilities, transmission lines, and can reduce the need for peaker plants, resulting in overall cost cutting. Additionally, there is the opportunity for utilities to market and license thermal systems directly to their ratepayers. Leasing arrangements could be established with potential consumers, as could low-interest loans. These same mechanisms could also be possible for third-party organizations (both for-profit or not-for-profit), operating under a social business model. These organizations could facilitate the installation and operation of thermal systems by covering the initial up-front cost, and then ultimately making that money back over the life of the system. This would result in market stimulation and regional benefit by reducing energy consumption from fossil fuels and the corresponding environmental impact.

However, the most effective approach could come from the State by amending the RPS. Changing the RPS to include thermal applications as eligible would create a market incentive by allowing utilities to promote thermal applications. Incorporating thermal into the RPS would also require mechanisms to support compliance, including a means of explicitly measuring and valuing thermal energy. Comparable programs in Arizona and Iowa have established an equivalence of one Renewable Energy Certificate (REC – the standard measurement of RPS) per 3,415 Btu, and \$4.50 in credits per 1 million Btu, respectively. These measurement mechanisms allow the State and utilities to accurately quantify the amount of energy savings provided by thermal applications of biomass (or other resources).<sup>v</sup> This implicitly values energy *produced* from renewable resources and energy *saved* by using renewable resources as being on the same level, elevating energy conservation as a state priority.

If these areas of opportunity can be addressed, either comprehensively or in part, then the biomass industry will have a much higher likelihood of expanding. Additionally, regional benefit from shifting to this renewable resource for both electricity-producing *and* thermal applications will result in a significant reduction in fossil fuel and overall energy consumption.

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<sup>i</sup> <http://www.dsireusa.org/incentives/index.cfm?State=US&ee=1&re=1>

<sup>ii</sup> <http://www.dsireusa.org/incentives/index.cfm?re=0&ee=0&spv=0&st=0&srp=1&State=OR>

<sup>iii</sup> <http://energy.gov/energysaver/articles/overview-home-heating-systems>

<sup>iv</sup> [http://www.oregon.gov/energy/RENEW/Biomass/docs/Forest\\_Biomass\\_Strategy\\_110112.pdf](http://www.oregon.gov/energy/RENEW/Biomass/docs/Forest_Biomass_Strategy_110112.pdf)

<sup>v</sup> <http://biomassmagazine.com/articles/6227/biomass-thermal-in-renewable-portfolio-standards>

**Additional Sources:**

<http://www.pfpi.net/biomass-basics-2>

<http://www.biomassthermal.org/legislative/index.asp>

[http://www.epa.gov/chp/documents/biomass\\_chp\\_catalog.pdf](http://www.epa.gov/chp/documents/biomass_chp_catalog.pdf)