Oregon's State Wood Energy Team: A Grant Program Review

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All photos in this working paper feature Oregon SWET grant program recipients, and are courtesy of Marcus Kauffman, Oregon Department of Forestry.

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Executive summary

Oregon's State Wood Energy Team (SWET) is a state-level network supported by the United States Forest Service and led by Oregon Department of Forestry. The purpose of the SWET is to bring together experts in biomass energy to support the successful development and implementation of wood energy systems and businesses. One of the Oregon SWET'S activities is a small grant program for project feasibility, engineering, and construction activities. Six grants were awarded in 2013-2015, totaling $204,700. Oregon State University conducted an assessment of this program at the SWET's request in spring 2016 by interviewing grantees and contractors working on the grants. This assessment found the following:

What did SWET funding accomplish?

- Catalyzed projects that were nascent or slow-moving, particularly by allowing for sustained investment and attention, research into necessary issues, and creation of new key knowledge that enabled decisions.
- Created credible data, evidence, and proof of concept for projects, allowing them to become more competitive for further funding and investment.
- Fostered useful learning about new technologies and systems.
- Increased networks and relationships in the wood energy community.
- Provided a unique source of funding that was well-timed and appropriately sized for Oregon wood energy projects.

What challenges exist for wood energy?

- Prices of other fuels currently do not make wood energy competitive or show quick-enough returns for the investment.
- Up-front costs of installing wood energy systems remain a barrier.
- Grants and networking are available, but access to capital remains limited. Funding and loans for equipment investments are typically not available.
- The wood energy sector in the western United States is "marginal" and small, with limited public and policy understanding and support.

Recommendations for future SWET activities

- Encourage use of stewardship contracting to increase supply, especially of juniper.
- Showcase potential projects.
- Offer navigation of available resources and incentives.
- Document the concrete actions that have led to success so others can learn.
- Create increased political and agency support
- Help develop customers and markets.

Biomass utilization has become an integral component of forest management, yet biomass market development to date has been episodic and limited. Publicly-funded commercialization efforts have focused on linking forest biomass sources with scalable bio-energy technology to make measurable impacts on the nation's energy use. But there has been less investment in small-scale distributed bio-energy for forest health and rural community economic outcomes.

The USDA Forest Service supports biomass utilization through the Wood Innovation Fund; an annual competitive grant program with individual awards up to $250,000 and annual expenditures ranging from $5,000,000 to $9,000,000. Eligible projects include feasibility, design, and engineering for bio-energy and green building applications. The Forest Service also supports Statewide Wood Energy Teams (SWET), collaborative approaches to biomass enterprise development that marshal the collective expertise of state and federal agencies, research institutions, non-profits, and private sector partners to provide a more comprehensive suite of services. The purpose of the SWET is to bring together experts in a variety of arenas related to woody biomass energy, and to support the successful development and implementation of wood energy systems and businesses. In particular, these teams focus on addressing public perception, education and awareness, and coordination demands that previously have been unfunded and received less attention.

The Oregon SWET, under the leadership of the Oregon Department of Forestry, aims to build robust markets for the by-products of forest health, hazardous fuels reduction, and active forest management. By helping to create value for the low-value residuals from forest management activities, public and private forestland managers would be able to effectively expand the pace and scale of forest restoration, a key element of reducing the risk of high-intensity wildfire. The team has been influencing biomass markets by providing a coordinated and comprehensive approach to engagement, project

identification, development, financing, monitoring and communication. The primary objective is build a pipeline of commercially viable biomass end users, similar to the 19 biomass heat facilities already in place, and connect those projects to capital construction funding. In addition to start up resources, the team partners with local communities to raise the social acceptance of biomass energy.

In addition, Oregon's SWET also provides delivery of federal grant funds for business development. Many biomass utilization businesses are small and startup in nature. These businesses represented high-risk investments for federal grant funds. The Oregon SWET used federal funds and directly provided smaller grants and support to businesses to strengthen their entrepreneurial expertise as well as improve the return on investments on federal grant funds. If an applicant was unsuccessful or challenged to meet the requirements of a one-year grant for $30,000 from the state, it is unlikely that they represented an acceptable risk for federal funds. However, without the initial investment of pass-through funds from the state, the level of risk remained unknown and the biomass business untested.

At ODF's request, Oregon State University (OSU) engaged with the Oregon SWET in 2016 to help evaluate how the team's collaborative approach to advancing wood energy functioned. The assessment focused on the grant program. Specifically, OSU sought to identify:

- How did the SWET grants change the course of projects? What challenges did they help grantees overcome?
- What did the grant enable that may not have happened otherwise?
- How did the SWET grant build on or otherwise leverage other resources such as US Forest Service Woody Biomass Utilization Grants?
- Is the SWET grant a unique opportunity for biomass projects?
- What else has been valuable about the SWET from the grantees' perspectives?
- What challenges lie ahead for wood energy?

The focus of this report is to a) provide a summary of SWET grant investments from 2013-2015, and b) address the above questions and examine the value of the SWET's grant program to date; this report does not comprehensively evaluate the SWET effort as a whole or document all accomplishments and outcomes of the grant projects.

Approach

In May 2016, OSU interviewed five SWET grantees (businesses seeking biomass development) and contractors (providing technical services to the grantees) for perspective on all six grants. One interviewee was engaged in three of the grants. Interviewers took detailed notes, and then systematically reviewed these notes for responses to the questions and additional related information. They also reviewed grant applications and agreements for additional information. The findings presented below are based on the information and perspectives conveyed by interviewees. All interviewees had the opportunity to review draft report material prior to submission to ensure accuracy.

Findings

Overview of grant recipients

In the study period of 2013-2015, six grants totaling $204,700 were awarded (see Table 1, below, and Figure 1, page 5). SWET grants do not exceed $50,000 for an individual grant. The average grant was $34,117.

The value of the SWET Program

Projects that received SWET grants were at various stages of development, from feasibility (two grants) to design and engineering (two grants) and construction (two grants). Grantees therefore had unique situations and needs for the grant depending on project context. However, there were some common themes across grants. SWET funding was found to:

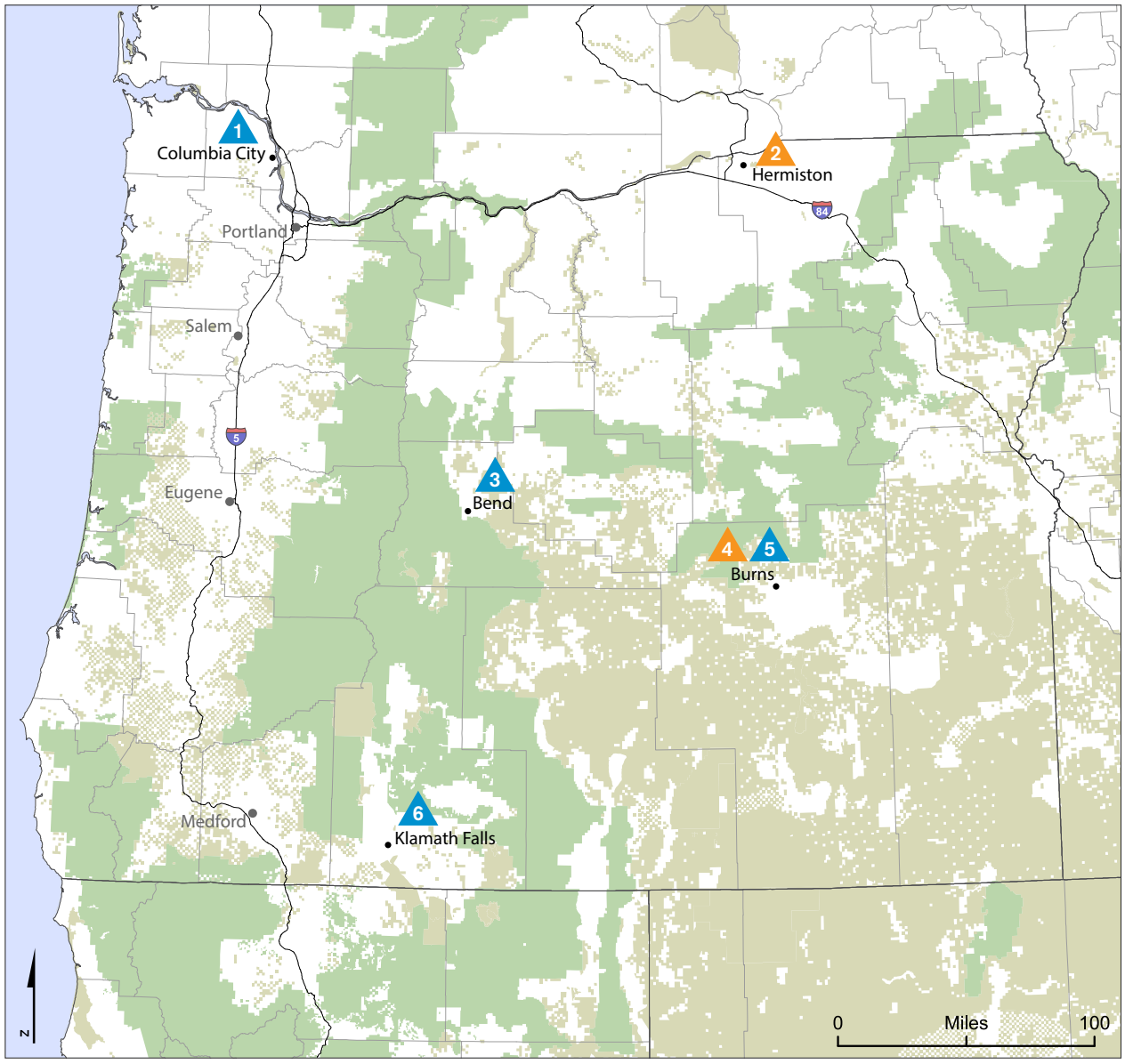
Catalyze and accelerate projects overall

Particularly for the feasibility and engineering grants, projects were characterized as nascent, still unproven, and/or moving slowly prior to receipt of grants. Wood energy projects at their early stages are typically privately or self-funded by technical consultants or the entities pursuing the project (e.g. a business or a city government). This early, exploratory work often takes place on the back of other projects and activities, and detracts from profit. Interviewees explained how this can naturally limit the amount of time, funding, and energy that project concepts receive. Also, a project that is on the "back burner" without sustained attention is not in

Table 1 Grants awarded by the Oregon State Wood Energy Team, 2013–2015

Year	Project name	Project owner	Location	System type	Funding uses	SWET grant	USFS	Capex investment	Status
2013	Harney Community Energy	Wisewood Inc.	Burns	Wood chip boiler	Design/ engineering	$47,700	$250,000	$1,900,000	Completion June 2016
2013	Nat'l Guard Hermiston Training Facility	Oregon National Guard	Hermiston	2 biomass thermal wood chip boilers	Design/ engineering	$50,000	$250,000	$7,750,988	Construction contract expected September 2016; completion in 2017
2015	Biochar Drying System Feasibility	Walking Point Farms	Columbia City	Biochar gasification system	Feasibility/ design	$22,000			Feasibility
2015	Integrated Juniper Utilization	Forest Energy Group	Klamath Falls	Integrated juniper manufacturing	Feasibility/ design	$25,000		$3,500,000	Production
2015	Thermal Energy System Design	Silver Sage Fisheries Inc.	Burns	Biomass thermal wood chip system	Feasibility/ design	$25,000		$1,000,000	Design & engineering
2013	Ski resort Design/ Engineering	Mt. Bachelor Resort	Bend	Biomass thermal wood chip system	Feasibility/ design	$30,000	$220,000	$2,500,000	Design & engineering

Figure 1 Oregon State Wood Energy Team grant recipients, 2013–2015



Data source: EWP

Project name and owner

1. Biochar Drying System Feasibility: Walking Point Farms LLC
2. Hermiston Training Facility Biomass Design & Engineering: Oregon National Guard
3. Ski Resort Biomass Design & Engineering: Mt. Bachelor Resort
4. Harney Community Energy Design & Engineering: Wisewood, Inc.
5. Thermal Energy System Design: Silver Sage Fisheries, Inc.
6. Juniper Utilization Feasibility & Design: Forest Energy Group

US Forest Service lands

Other federal lands

Biomass facility status

In development

In construction

an environment conducive to the types of innovation or creative thinking that may be required for the greatest project success. Finally, many potential wood energy users may not be familiar with biomass, and may not take the "deep dive" to learn more about it and may choose other technologies unless resources are available to explore this option. All interviewees described the SWET grants as "really speeding us up" and helping them push past barriers because they allowed real, sustained focus on the projects and often funded the expertise necessary to move the project forward.

Bring credible research, data, and proof of concept

Another reason that wood energy projects may move at a slow pace is a lack of necessary information. A considerable amount of information is needed to identify the appropriate technologies and systems to use, and to demonstrate the economic feasibility of a project over its life, and SWET grants helped recipients gather this information. As one interviewee described: "The SWET grant helped us confirm our ball park. We got credible references, studies, and conclusions from experts. We were able to debunk assumptions about what was available for supply, facilities, et.cetera, and get some different points of view." Examples of this type of work that SWET funds supported include:

- Further development of a juniper biofuel. Previous tests had been done at a very small lab scale to identify correct product specifications such as moisture, size, and debarking. But more work was needed to find the best handling and processing systems, and to see if a value-added product could also be created. The SWET grant allowed: the refinement of a processing flow, exploration of different heating systems, and testing of the economics of a juniper lumber product from residual jacketboards left from the production of the biofuel.
- Exploration of appropriate technologies for creation of biochar and heat for a soil amendment business. The SWET funding helped determine information like how to produce at scale and what kinds of facilities could be used. This also allowed the business to identify the right proportion of biochar relative to other components in a soil amendment blend.
- Development of an alternative to a pellet boiler for a ski area. The developed alternative represented a system that could utilize whole chips and thus better meet the community's forest restoration goals.

Key activities supported by SWET grants

- Bringing the right people/expertise to projects
- Gathering data, proving concepts, and conducting life cycle analyses
- Finding the right systems and technologies
- "Soft" yet crucial communication and outreach work to build support and investment

Make projects competitive for further funding and development

Interviewees described the SWET grant funding as a "launchpad" that allowed them to successfully compete for the next stages of funding. Having feasibility studies, technical analysis, and other documentation strengthened their applications to other programs such as the US Forest Service's Woody Biomass Utilization Grants and Wood Innovation Grants, or funds from the US Department of Defense Energy Conservation Investment Program. These programs require detailed evidence of project viability, which interviewees said SWET funding helped produce. As one interviewee accounted: "[After the SWET], we were able to obtain a Wood Innovation Grant from the US Forest Service. We had applied unsuccessfully last year. We just didn't have enough information. The work that the SWET supported took us to that level where this year, we did. We had a physical product we'd figured out how to make. We had data, photos, and samples. This tangible backup of our ideas was essential."

One interviewee also noted that a grant like the SWET can allow for a project to become more organized into a coherent package that funders can understand. Projects that have had inconsistent attention and investment may be in "disparate bits and pieces" of work and evidence, and the SWET helped this interviewee put the pieces together. Overall, interviewees saw SWET grants as most useful for developing the information needed for the next stages of a project.

Generate useful knowledge, even if a particular project changed course or did not proceed

Interviewees universally described "knowledge generated" as a key value of the SWET grant program. As noted above, it can be difficult to fully explore project concepts or technologies without dedicated funding—yet without that information, projects may not proceed. One interviewee noted that even in the event that a specific project did not come to fruition, the knowledge gained would make it worthwhile, so long as that information was not proprietary and was shared among a larger network so that others might benefit from it. This interviewee explained that SWET grants "enable a lot of learning that would not happen otherwise. Even if they don't work out, they likely generate quite useful knowledge for the grantee and if shared, others facing similar struggles in woody biomass." Another interviewee highlighted how important the knowledge they gained during SWET funding was despite a considerable setback when the facility at which they hoped to produce biochar closed during the grant period. Although the closure initially waylaid plans moving forward, the research and experience that the interviewee and his team gained during the grant allowed them to discover how to create and blend ideal proportions of biochar in soil amendments, and they developed a new product that is now being commercially sold.

Foster increased networks and relationships in the wood energy community

Interviewees stated that one of the highest values of the SWET grant program and the existence of the SWET itself was the networks it provided. They cited the team's meetings, and the knowledge and networks of Oregon Department of Forestry team leader Marcus Kauffman, as useful resources. As one interviewee noted, wood energy and biomass utilization at the scale of these projects are complicated. In the US West, this is not a traditional industrial sector with established systems and expertise. The expertise and skills to succeed are diverse and as one interviewee described, "we need a lot of different brains together, innovating on the different parts." Knowledge ranging from traditional forest products processing to financing to social acceptance of biomass is all considered necessary. Others also described the importance of being able to connect with and learn from others. Although most of the interviewees said that they greatly valued the network opportunities form the SWET funding, one interviewee responded that they "did not need more networking." This interviewee felt that networking was adequately covered via other means, and that finding sources of capital was a much greater need in their situation.

Provide a unique source of funding that is not readily available otherwise, and that is the "right size"

Interviewees described the SWET grant as unique, with one noting that "there is no other pre-development money out there like that," and another suggesting that the SWET grant "offers outsized value for a small investment." Some mentioned other previous bioenergy programs that were helpful such as the Pacific Bioenergy Program, and suggested that the funds and expertise available with those projects were not as readily available today as they once were. They appreciated that SWET grants helped fill this gap. Interviewees also noted that the SWET grant program was at the "right scale" for most of them. The SWET grants are considered relatively small compared to some other grants, such as those available in the energy development field more broadly. Interviewees described how other grant opportunities often require expertise such as consultants or other expenditures to apply for, and that these were not typically possible for their business. Interviewees also commented that working with Kauffman directly on grant adminis-

tration, management, and any necessary adjusting of the grants was straightforward, worked well, and did not create onerous paperwork for them. Two interviewees additionally remarked that they appreciated being interviewed for this report, as they felt that most grant paperwork "goes on a shelf" and that grant programs do not typically facilitate this type of follow-up learning to see what worked and did not work well.

Challenges

Interviewees were also asked to share any challenges that they saw for the future of wood energy projects in a broader sense, and issues that the SWET grants could not address. Some of these issues are beyond the scope of what a small state-level grant program could be expected to overcome, but they are important context for the future work of the SWET. Some of the most pressing challenges according to interviewees were:

Competitiveness of wood energy compared to traditional fuels

Several interviewees generally indicated that they see woody biomass utilization of all types as being at a "critical point." They described the current drop in oil and propane prices, as well as the enduring challenge of inexpensive hydroelectric power and natural gas, as significant barriers to further wood energy development. The low price of traditional fuels means that it takes longer for an investment in converting to wood energy to pay back in saved fuel costs, and this can greatly reduce incentives to try it. One pellet facility engaged in a SWET grant went out of business during the grant period, because it could not make biomass compete financially with other energy sources. This closure occurred despite some advantages such as a strategic geographic location close to transportation and a partnership with the area port. Further, biomass production systems can be expensive, and in the case of the closed pellet facility, this expense was not feasible for them. Other interviewees also described the upfront costs of biomass and concerns about long-term maintenance of the systems as major barriers, as other systems with lower capital costs (e.g. electricity) may be more appealing to energy users.

Funding for necessary equipment and innovation

Interviewees felt that funds were still not available for other important aspects of wood energy development, such as equipment. The pellet plant that went out of business was ultimately unable to find funding sources for facility equipment. Previously, the US Forest Service's Woody Biomass Utilization Grant program allowed for some equipment purchases, but the program no longer funds equipment purchases. One interviewee also noted that there are still no proven, portable, in-woods harvesting and processing technologies that are cost-effectiveness enough, and that access to funds for innovating such equipment was lacking.

It is an enduring challenge that there are no mechanisms for banks to loan to wood energy projects, or other means of private sector funding. Several interviewees stated that access to capital for these investments had been, and continued to be, the most significant barrier that they saw for the future of wood energy. One interviewee stated that, "It's good that the SWET provides study money but many of these projects now need capital money. We need places where we could borrow to proceed with installation. Even simple systems are very costly. It is hard for private companies."

A nascent wood energy industry

Another challenge raised by most interviewees was the small, marginal nature of the wood energy sector. One interviewee described it as "small companies, still struggling to make it a valid industry," although they also remarked that this context can often encourage innovation and creativity. Another interviewee suggested that the slow progress and grant-dependent nature of wood energy to date meant that in many cases end users and businesses involved had yet to see savings or turn a profit. Thus, grants to explore opportunities and gather information may fund consulting and engineering, but have yet to result in outcomes for the

businesses involved. Interviewees also suggested that policy for and public awareness of wood energy remains limited in the United States, and that this makes any efforts to increase incentives or develop new resources difficult. Several interviewees stated that developing wood energy projects just takes time, "grit", learning; and for businesses involved, other income streams. They recommended that involved parties exercise patience. They also cautioned against premature announcements and claims based on concepts that are not well-proven. Particularly in rural communities hoping for new businesses and jobs, these expectations can cause extensive excitement and then disappointment when they do not come to fruition. This can create cynicism and less willingness to explore wood energy in the future.

Unplanned delays that sideline projects

One final challenge was specific to the two grant projects in Harney County. The winter 2016 occupation of the Malheur National Wildlife Refuge meant that local city and county government officials had to dedicate their time to related issues, and were not available to work with the consultant on key steps. For example, the construction of a district energy system in Burns required negotiation around right of ways on city streets, but this conversation could not proceed. Tax credits for this work were also delayed as a result, but the consultant was able to extend these. In total, although the two projects in Harney County were at a standstill for two months, they are both moving forward again, and the installation of district energy has been perceived as a welcome and positive development for the community of Burns.

Future needs and considerations

Interviewees offered a range of suggestions and considerations for the Oregon SWET and for the future of wood energy in Oregon in general. These included increasing supply, sharing knowledge, building a case with policy makers, and managing expectations.

Addressing supply concerns

All interviewees expressed concern about ongoing supply, particularly from federally-owned lands. For example, one project focused on developing a juniper biofuel and lumber byproducts. Although the SWET grant allowed them to refine their processing flow and other important activities, the project partners remained concerned about a lack of supply from federal lands. They saw that since there is no major market for juniper at this time, the Bureau of Land Management was not typically including juniper removal in their environmental analysis and subsequent land management project implementation. This forces juniper users to rely on private lands only for juniper supply, which they do not think is sustainable. Interviewees familiar with this project suggested that the BLM, and where applicable, the Forest Service, include juniper removal in projects performed through stewardship contracting to help make this activity possible.

Promoting and sharing knowledge and lessons learned

Several interviewees felt that the SWET was an ideal vehicle for overcoming lack of knowledge about wood energy projects. They variously described a need for the SWET to "showcase, promote, and cheerlead" potential projects; as well as highlight successes that happen, concretely explaining the key steps and actions that contributed. One in-

terviewee suggested that a series of case studies targeted to different end user audiences (military, schools, hospitals, etc.) would be particularly useful. Despite the current challenges to wood energy, being ready with this material would allow new project development to get a head start if/when conditions improved. Another interviewee noted that the SWET can "keep spreading the word about what is happening, who is doing what, and what the known results are. Don't send out press releases and sound bytes that don't inform anything." In particular, two interviewees recommended more field tours and demonstrations that allowed farmers, loggers, and others to meet face-to-face and view actual projects have "high tire-kicking value", despite costs. Some interviewees suggested specific topics for these events, for example: the role of biochar in preventing forest erosion. Further, one interviewee suggested that the SWETs from other states communicate more frequently to share knowledge at larger scales where feasible; and another recommended that university involvement needs to continue and be supported as it can provide credibility to the SWET.

Most interviewees noted that the SWET was well-suited to such communication roles, but that it did not necessarily itself serve as a technical clearinghouse or source of extensive technical expertise—it was most valuable as a facilitator. However, one interviewee felt that the SWET could be a good resource for some financial information for facility owners who might want to pursue biomass. They suggested that the SWET could offer information on how to do financial analyses, particularly the early stage lifecycle analyses that can help identify if a project was a "go or no-go" before further investment. They recommended that the SWET help provide navigation through the potentially-confusing sets of available incentives and resources, such as New Market Tax Credits or Qualified Zone Academy Bonds.

Gaining political support

Interviewees consistently mentioned the ongoing need for political support for wood energy. One remarked that the SWET could "carry the torch of dealing with the state legislature and trying to get some [state level] incentives going." Another said that the SWET serves and should continue to serve as an intermediary who can help share success stories and opportunities with policy makers and agencies. One suggestion was that the SWET advocate, for example, for state agencies creating internal carbon policies for their food supplies or energy systems that would create major customers for biochar products and demand for wood energy.

Recommendations for future SWET activities

- Encourage use of stewardship contracting to increase supply
- Showcase potential projects
- Offer navigation of available resources and incentives
- Document concrete actions that lead to success
- Create increased political and agency support
- Help develop customers and markets

Acknowledging project facilitation capacity needs

Finally, interviewees reiterated that the SWET funds had helped them take time to build support, manage the "people aspects" of project development, and otherwise organize partners and players. One interviewee also suggested that new models for support and funding, such as local crowdsourcing, needed to be explored. They recommended that the SWET could continue to offer resources that support this "soft" yet crucial work. General networking and relationship building was also described as an ongoing need by most interviewees, although one interviewee suggested instead that anything the SWET could do to find major customers, markets, and sources of capital would be more important than more networking opportunities.

Conclusion

Oregon's State Wood Energy Team provided grants to small and startup biomass business projects across Oregon. These grants allowed investment in biomass projects that would typically be too high risk for federal granting sources. Six grants totaling $204,700 were awarded from 2013–2015; the average grant was $34,117. These relatively small investments were found to offer "outsized value." They catalyzed and accelerated projects, often by providing credible data and information that will allow businesses to take the next step in project development. Businesses will still face challenges inherent to biomass utilization including limited markets, competition from other energy sources in the West, and the generally small and nascent nature of the biomass sector to date. Entities like the SWET can continue to address these challenges by providing networking, sharing new knowledge, garnering political support, and helping businesses navigate what can be a complex financial and institutional environment.

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