Energize Oregon
Opportunities for On-Farm Clean Energy

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Executive Summary

The objective of Energize Oregon is to stimulate the development and adoption of on-farm energy projects by EQIP-eligible producers, allowing them to offset their energy use, displace fossil fuels, address the future uncertainty of energy costs, and reduce their environmental impact.

While a variety of tools and practices are available to producers, numerous barriers still exist to the widespread adoption of clean energy technologies. Furthermore, program “silos” amongst those agencies involved in on-farm energy initiatives create confusion and complexity for farmers. The Energize Oregon project will connect farmers with field experts and provide them with new tools to overcome the barriers to deploying on-farm renewable energy projects.

The Energize Oregon project was designed to speed the transition from concept to implementation by forming strategic partnerships, developing tools to overcome project development hurdles, installing systems through a group pilot, and publishing results so that others can easily replicate project successes. The project consists of three phases: program planning and strategic partnerships (October 2011 – June 2012), the pilot (April 2012 – July 2013), and reporting and replicability (July 2013 – September 2013).

Specific project goals of Energize Oregon are to:

- Establish an affordable, usable implementation model to assist agricultural producers in the adoption of energy efficiency and clean energy measures.
- Connect producers with financial and technical resources available for energy conservation and clean energy development.
- Build a collaborative model to coordinate and facilitate the work of organizations currently operating in on-farm energy and agriculture production in rural communities.
- Provide a model that is scalable and replicable for farmers and ranchers in rural communities across the country.

With these goals in mind, the objective of this report is to assess the current landscape of on-farm energy in Oregon and to identify useful implementation solutions to speed deployment of renewable energy amongst Oregon’s agricultural producers.
Background
Oregon’s farmers and ranchers are stewards of the land, employing innovative conservation techniques to help preserve Oregon’s valuable natural resources for generations to come. However, energy price volatility and the rising costs of energy inputs are making it increasingly challenging for Oregon's agricultural producers to balance land stewardship with productivity and profitability. At the same time, Oregon is committed to developing clean energy resources and is drafting a 10-year plan to do just that. These two driving forces are creating a climate in which on-farm energy projects make sense. These projects can help lower energy costs and provide a more predictable business environment for agricultural producers while helping Oregon meet its energy goals.

Energy Price Volatility
Farmers and ranchers rely heavily on energy inputs to maintain agricultural operations, ranging from crop planting to crop management, harvesting, and distribution. More than a decade of volatile energy prices has had an impact on the stability of Oregon’s agricultural landscape. This volatility has presented across the board, affecting the cost of electricity, fuel, and fertilizer—all of which are central to continued agricultural operations.

Electricity Price Volatility
Electricity is central to modern agricultural operations, providing power for irrigation, lighting, processing, cooling and ventilation, and more. Due to an abundance of hydropower, Oregon was fortunate to have some of the lowest electricity prices in the United States. However, over the past several years the region has witnessed both rising electricity costs and an increased reliance on electricity to power agricultural operations. As a result, farmers and ranchers face significantly higher utility expenses. With ongoing efforts to decommission hydropower plants in the Pacific Northwest and the general trend of rising utility rates, continued increases in electricity prices are imminent.

Fuel Price Volatility
Oregon’s farmers and ranchers rely on fuel—largely diesel fuel—to manage cropland, apply nutrients and pesticides, and transport crops and equipment. Diesel prices have risen significantly in the past decade, with a notable spike to $4.91/gallon in 2008, followed by a severe dip to $2.09/gallon in 2009 (coinciding with the onset of the economic recession). Throughout 2011, prices have fluctuated between $3.40 and $4.30/gallon, landing at roughly $4.00/gallon as of the time of this publication. This price volatility, especially within the past several years, has been a major source of instability in the agricultural business landscape.

Fertilizer Price Volatility
It is important to include a discussion of fertilizer when considering on-farm energy inputs because fertilizer production requires substantial energy use; this links fertilizer prices to natural gas prices. Due to fuel costs, fertilizer costs spiked in 2008, peaking at a 264% increase since 2002. Following subsequent price decreases throughout the economic recession, fertilizer inputs experienced yet
another dramatic price spike in 2011, similar in magnitude to that of 2008. Current trends suggest that fertilizer price volatility will continue to contribute to the energy challenges faced by Oregon’s farmers and ranchers.

**Rising Cost of Energy Inputs**

The price volatility of energy inputs has contributed to an overall rise in energy costs as a percentage of total farm expenses. Oregon’s farmers and ranchers have had to devote ever-growing resources towards covering the energy costs necessary for agricultural operations, relative to ongoing labor, maintenance, and other operational costs. Between 2002 and 2007, utility, fuel, and fertilizer expenses jumped 62% for Oregon’s farmers and ranchers, as compared to overall farm expenses which rose just 34%. Of this increase, fuel expenses represent the most significant cost increase (93%), followed by fertilizer (66%) and utility expenses (2.7%).

The general trend of increasing energy costs has made it difficult for Oregon’s farmers and ranchers to accurately forecast expenses and profits, thus reinforcing the instability of the current agricultural landscape. While this poses risks to fundamental farm operations, it also complicates the deployment of on-farm energy projects. To consider this type of long-term investment, Oregon’s agricultural producers require a more predictable trajectory of future expenses. The present lack of stability poses a serious challenge to forecasting the potential benefits of on-farm renewable energy project deployment.

**Fostering Stability through On-Farm Energy**

On-farm energy efficiency and renewable energy projects can help lower energy costs and provide a more stable business environment for Oregon’s farmers and ranchers. Despite the challenges posed by the current agricultural landscape, these projects have the potential to re-establish stability and achieve cost savings in day-to-day agricultural operations. Energy efficiency improvements have consistently proven to be one of the most cost-effective means to reduce energy expenses. When applied to the large energy appetite typical of agricultural operations, energy efficiency measures can achieve sweeping reductions in utility bills. Cost savings can be further amplified by deployment of renewable energy systems on agricultural land, allowing Oregon’s farmers and ranchers to produce energy for farm use on-site. Moreover, via mechanisms such as Oregon’s feed-in tariff, farmers and ranchers can ensure a steady, predictable income for many years through the sale of on-farm solar power production to utilities.
Barriers to On-Farm Energy Projects
Over the last decade, more than two gigawatts of installed solar and wind capacity has been developed in Oregon. The state has not, however, seen widespread deployment of on-farm energy projects even though these technologies are compatible—and often complimentary—with agricultural uses. This is largely due to the numerous barriers that still exist for project developers: lack of awareness about energy opportunities; high upfront project costs; and the complex, time-intensive transition required to take on-farm energy projects from concept to implementation.

Lack of On-Farm Energy Awareness
Research and surveys performed by Oregon’s Department of Agriculture has shown that the state’s producers face a general lack of awareness about the on-farm energy opportunities available to them. Increased outreach to farmers and ranchers will be of paramount importance to speeding the deployment of energy efficiency and renewable energy projects. Possibilities for enhanced outreach range from increasing general public knowledge to connecting farmers and ranchers with specific examples of successful on-farm energy projects.

Identifying “Low-Hanging Fruit”
Pursuing a farm-scale energy project can be a daunting task, and many of Oregon’s farmers and ranchers are simply unsure of where to start. These growers need help assessing the multitude of energy efficiency and renewable energy options available and determining which might provide most benefit to their agricultural operations. Specifically, producers need a simple, accessible means to prioritize energy improvements and identify the “low-hanging fruit” to optimize their energy investments.

Continuing Education on Incentives
Continued outreach about available incentives goes hand-in-hand with the general on-farm energy education. The sticker price for energy efficiency and renewable energy projects can be intimidating and does not necessarily reflect the broad landscape of utility, state, and federal support available to aid with project planning and construction. Oregon’s farmers and ranchers need a simple, accessible means to determine which incentives are available to them, and which types of projects would best utilize these incentives.

Connecting Growers with Real World Projects
Although deployment of on-farm energy projects has not reached its full potential in Oregon, there exist numerous projects that serve as good examples of what is possible. In addition to education on opportunities and incentives, farmers and ranchers need better access to real-world success stories of energy efficiency and renewable energy projects completed by their fellow producers. Connecting with growers that have succeeded in transitioning from concept to implementation would help others actualize the benefits of on-farm energy projects.
Building Capacity with New Technologies

Agricultural producers are more geographically dispersed than urban businesses. This relative isolation can make it difficult to get the same services. When it comes to new energy efficiency and renewable energy technology, the scarcity of technical assistance can act as a barrier. If a new pump or a solar hot water system breaks down, who is going to do the repair? Bringing someone in from a business that may be located 2 hours away is expensive and time-consuming. Providing training on these new technologies through university extension services or other agricultural assistance programs will help alleviate this burden. Further value is added by training the owners of new technologies to recognize when their systems are not functioning as they should. Capacity building will lessen the expenses faced by the owners of new technologies by minimizing repair visits and ensuring that new systems are producing or saving electricity as planned.

Prohibitive Upfront Costs

Farmers and ranchers that pursue on-farm energy projects are often stymied by the high upfront costs associated with project deployment. This hardship is further complicated by the fact that many producers are asset-rich and cash-poor, with most profits being diverted to pay for farmland, equipment, and other capital costs. Given the economic recession and its impacts, Oregon’s agricultural community is in need of upfront financial assistance to cover out-of-pocket costs now more than ever. As it currently stands, most incentives offered at the utility, state, and federal levels are only available after project construction. While these cash incentives, tax credits, and low-cost financing options will help recoup costs over time, Oregon’s farmers and ranchers need additional upfront assistance to get on-farm energy projects off the ground.

Current State Incentives

The new Energy Incentive Programs offered by the Oregon Department of Energy will provide grants for renewable generation projects and tax credits for energy conservation and transportation projects. For the biennium ending June 30, 2013, the following incentives will be available:

- $3 million in grants for renewable generation projects. Cash grants are funded through a tax credit auction and availability of the grants is subject to the sale of tax credits. Applicants for these grants will have to compete in a process outlined in Opportunity Announcements.
- $28 million in tax credits for energy conservation projects. The tax credit is 35 percent of certified costs taken over 5 years for projects with certified costs exceeding $20,000. Projects under $20,000 take the credit in one year. The Oregon Department of Energy is creating an informational filing system to streamline the process with predetermined tax credit amounts for these smaller projects. Projects not applying under the information filing system will have to compete for tax credits in a process outlined in Opportunity Announcements.
- Tax credits are also available for alternative fuel vehicle infrastructure projects.

Energy Trust of Oregon

Energy Trust of Oregon provides cash incentives to help offset the costs of energy-efficiency upgrades to buildings and equipment for dairies, nurseries, commercial farms and other agricultural
businesses. Energy Trust also offers technical assistance and cash incentives for harnessing renewable energy resources on your property, including biopower, solar electric and solar water heating, geothermal energy, and wind power.

Energy Efficiency:

- Prescriptive incentives offered to irrigators for sprinklers, gaskets, pipe repair, nozzles, drains and many more;
- Prescriptive incentives offered to nurseries for Infrared polyethylene greenhouse covers, high-efficiency boilers, thermal curtains, under-bench heating, and intelligent greenhouse controllers;
- Custom incentives of $0.25 per first year kWh saved, up to 50% of eligible project cost;
- Custom incentives of $2.00 per first year them saved, up to 50% of eligible project cost.

Solar Electric – Incentives are based on system size and are different for customers of Portland General Electric and Pacific Power. These incentives are subject to change. Check Energy Trust’s website (www.energytrust.org) for the most up to date information.

- For customers of PGE, incentives range from $0.75 to $1.25 per watt with a cap of $500,000 for a single site.
- For customers of Pacific Power, $1.00 per watt is available up to a cap of $30,000.
- In some cases, grant-writing assistance is available. This must be pre-approved by Energy Trust.

Small Wind – Incentives vary with the size of the turbine. In addition, customers are eligible for grant-writing assistance.

Federal Incentives
Federal tax incentives provide significant support to renewable energy projects, offsetting 30% of the installed cost of solar thermal, solar photovoltaic, and small wind projects at the residential and commercial levels. However, while federal incentives are an important means of recouping project costs, they do not provide upfront cash to finance projects prior to construction. Instead, they provide a tax credit to be applied after project completion. This means that agricultural producers must seek significant upfront financing to deploy on-farm energy projects, after which they will be eligible for a Commercial Investment Tax Credit (ITC) or a Residential Renewable Energy Tax Credit (RETC) from the federal government.

The ITC allows commercial, industrial, and non-public utility owners of solar and wind energy systems to take a one-time tax credit equivalent to 30% of qualified installed costs. This incentive is currently available for systems that are placed in service prior to the end of 2016, and there is no cap on the amount of the credit. Similarly, the RETC allows individuals to take a tax credit equivalent to 30% of project costs, part of which can be rolled into future tax years for those without the tax appetite to use the entire credit in one year. Like the ITC, the RETC is available for systems that are put into service by the end of 2016.
Current Green Lending Programs Available in Oregon
There are a number of green lending options currently offered in Oregon. Two key efforts are summarized below.

Clean Energy Works Oregon (CEWO) uses the following lending options:

<table>
<thead>
<tr>
<th>Lender</th>
<th>Enterprise Cascadia</th>
<th>SOFCU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Loan amount</strong></td>
<td>Maximum $30,000</td>
<td>Maximum $30,000; loan amounts up to $20,000 unsecured, loans $20-30,000 secured with DOT</td>
</tr>
<tr>
<td><strong>Loan term</strong></td>
<td>20 years</td>
<td>Up to 15 years</td>
</tr>
<tr>
<td><strong>Repayment</strong></td>
<td>On-bill utility payment</td>
<td>Payments direct to lender</td>
</tr>
<tr>
<td><strong>Interest rate</strong></td>
<td>5.99%</td>
<td>5.99% (FICO 690+) 6.99% (FICO 650-689)</td>
</tr>
<tr>
<td><strong>Credit worthiness</strong></td>
<td>Satisfactory utility bill payment history and minimum FICO score</td>
<td>D/I ratio not to exceed 45%; minimum FICO 650; verification of income</td>
</tr>
</tbody>
</table>

Weatherize Oregon Now uses the following lending options:

<table>
<thead>
<tr>
<th>Lender</th>
<th>Umpqua Bank GreenStreet Lending Program (also available for business loans)</th>
<th>Columbia Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product</strong></td>
<td>Home equity Loan</td>
<td>Variable line of credit</td>
</tr>
<tr>
<td></td>
<td>Unsecured consumer loan</td>
<td>Fixed term loan</td>
</tr>
<tr>
<td><strong>Loan Amount</strong></td>
<td>Best use $5,000-$100,000</td>
<td>Best use $5,000-$100,000</td>
</tr>
<tr>
<td></td>
<td>Best use $1,000-$50,000</td>
<td>$2,500+</td>
</tr>
<tr>
<td><strong>Loan Term</strong></td>
<td>Up to 180 months</td>
<td>Up to 300 months</td>
</tr>
<tr>
<td></td>
<td>Up to 60 months</td>
<td>One year</td>
</tr>
<tr>
<td><strong>Interest Rate</strong></td>
<td>6.50%</td>
<td>7.75-9.00%</td>
</tr>
<tr>
<td></td>
<td>8.25%</td>
<td>11.28-12.54%</td>
</tr>
</tbody>
</table>
These lending options offer new ways to finance clean energy projects, but are currently not provided by the institutions that agricultural operations typically turn to for lending. Expanding such programs within Farm Credit Services and other agricultural institutions would increase uptake of such options by producers interested in clean energy projects.

**Project Complexity**
Beyond knowledge and cost barriers, the simple fact is that on-farm energy project deployment is a complex, time-intensive process. To transition from concept to implementation, Oregon’s agricultural producers must acquire assistance, resources, and approval from a host of institutions that play a role in planning, permitting, financing, installing, and maintaining energy efficiency and renewable energy projects. The time and effort needed to navigate these requirements can act as a final barrier to farmers and growers in their efforts to develop on-farm energy projects.

**Time-Intensive Planning, Implementation, and Management**
From project planning through construction, farmers and ranchers must devote a significant amount of time to deploying on-farm energy projects. Beyond initial project implementation, growers must plan for ongoing management of the project for the duration of its productive life. Finding the necessary time to implement and maintain energy efficiency and renewable energy projects can be especially challenging for growers, who are already engaged in running an agricultural business. Thus, the planning, implementation, and management process should be simplified to the greatest extent possible to alleviate the time-intensive nature of on-farm energy deployment.

**Complex Processes for Accessing Technical Assistance and Incentives**
Oregon’s state and local agencies offer a host of resources geared towards providing technical and financial assistance for energy projects. Services provided by Oregon’s Department of Energy, USDA Rural Development, USDA NRCS, Energy Trust of Oregon, local Resource Conservation and Development Councils, Soil and Water Conservation Districts, and others cut down on the time and expense required for project planning, design, construction, management, and maintenance. However, farmers and ranchers have no “one stop” resource to help them make sense of the various forms of assistance available to them. Program silos amongst agencies create confusion and complexity for growers interested in deploying on-farm energy projects.

**Implementation Impeded by Variations in Local Rules**
In many cases, cities, counties, and utilities have instituted local rules pertaining to project siting, permitting, interconnection, and more. Variation in rules across jurisdictions adds yet another layer of complexity to project planning and implementation, and makes it difficult to offer a standardized process for energy project deployment. In some cases, these rules can be viewed as cumbersome, and may pose unnecessary costs to agricultural producers interested in pursuing on-farm energy projects. In order to move projects forward, local rules need to be streamlined and homogenized across jurisdictions to facilitate compliance and reduce complexity.
Drivers of On-Farm Energy Deployment
For Oregon’s farmers and ranchers, the choice to pursue on-farm energy projects is shaped by a unique set of interests. As business people, producers hold a vested interest in maintaining the productivity and profitability of agricultural operations to ensure financial stability. As land stewards, producers hold a vested interest in conserving resources and maintaining healthy ecosystems to ensure environmental stability. Given these interests, certain drivers will be fundamental in speeding on-farm energy project deployment amongst Oregon’s agricultural community. These requirements include ensuring a sufficient knowledge base to build project confidence, presenting tangible co-benefits inherent to project implementation, and providing enhanced financing tools to overcome high upfront costs.

Fostering a Dynamic Knowledge Base
Farmers and ranchers interested in energy efficiency and renewable energy projects will benefit immensely from connecting with others who have completed similar projects. Producers will be better positioned to analyze the operational and financial impacts of on-farm energy projects when provided with real-world examples. Moreover, those who have already been through the planning and implementation process—preferably in the same city or county—will likely possess helpful contacts and lessons learned compiled from their own experiences with farm-scale energy deployment. In essence, connecting interested growers with those that have already succeeded in transitioning from concept to implementation will drive further implementation by actualizing the benefits of on-farm energy projects, and will foster a dynamic knowledge base built on real world experiences.

Messaging the Co-Benefits of Energy Improvements
Beyond witnessing the state’s existing energy projects in action, Oregon’s farmers and ranchers need to “see” the co-benefits inherent to farm-scale energy deployment. Co-benefits are derived from the positive spillover effects of energy efficiency and renewable energy projects, and can include savings on energy costs, fuel costs, water consumption, and labor costs. Furthermore, these co-benefits demonstrate a positive convergence of growers’ dual positions as businesspeople and land stewards. Examples include:

- **Energy savings** though lighting efficiency upgrades, high-efficiency pumps, pump VFD upgrades, irrigation system change outs, high-efficiency heaters and fans, solar photovoltaic systems, solar thermal systems, wind turbines, small hydropower systems;

- **Fuel savings** through reduced or no-till farming, use of biodiesel, proper tire inflation and ballasting, reduced use of fertilizers, reduced use of herbicides and pesticides;

- **Water savings** through low-flow irrigation, pump efficiency upgrades, soil moisture monitoring.

Increased messaging of co-benefits by state and local agencies, coupled with increased awareness of co-benefits by the agricultural community, will help to drive interest in on-farm energy projects as worthwhile investments.
Increasing Feasibility through Upfront Financing

Now more than ever, farmers and ranchers need confidence that energy efficiency and renewable energy projects are financially feasible. In many cases, the high out-of-pocket expense associated with many on-farm energy projects ultimately stymies their deployment. Specifically, Oregon’s farmers and ranchers need access to financing tools that will help overcome the upfront costs associated with on-farm energy projects. This means access to financing during the project planning, design, and construction phases, which are enormously time-intensive and precede project completion. Increased access to these financing tools will drive initial project development, especially with additional completion-based assistance from utility, state, and federal incentives.
Implementation Solutions
Oregon’s farmers and ranchers have long employed innovative solutions to maintain healthy ecosystems and achieve resource conservation. However, there is much more that can be done to further engage Oregon’s agricultural community in utilizing these systems that balances productivity and profitability with land and resource stewardship. By forming strategic partnerships among agencies already involved in on-farm energy initiatives, Energize Oregon will work to speed the transition from concept to implementation by developing tools to overcome project development hurdles and establishing an affordable, usable implementation model to assist agricultural producers in the adoption of on-farm energy measures. The Energize Oregon steering committee has identified three primary areas in which to focus efforts: increasing outreach to agricultural producers; streamlining project development; and tackling upfront costs through creative financing approaches.

Increased Outreach to Agricultural Producers
A simple lack of awareness remains a persistent barrier to speedy deployment of on-farm energy projects in Oregon. Increased outreach performed by trusted sources and targeted towards the needs of producers will help to enhance general awareness about energy efficiency and renewable energy opportunities, break down perceptions of unfeasible costs, and connect growers with their counterparts who have already completed farm-scale energy projects. By ramping up outreach to Oregon’s growers and publicizing success stories, Energize Oregon will work towards increasing local interest in on-farm energy deployment.

Working through Existing Channels
When considering how best to reach Oregon’s farmers and ranchers, it will be fundamentally important to work through existing channels to help speed deployment of on-farm energy projects. Agencies like Oregon’s Department of Agriculture, USDA NRCS, Resource Conservation & Development Councils, and Soil & Water Conservation Districts already have established means of communicating with the agricultural community—whether through industry publications, direct mailings, email lists, trade shows, or other channels. Furthermore, their longtime local involvement with agricultural producers makes them trusted sources of information.

For the purposes of Energize Oregon, it would be useful to develop project fact sheets that can be distributed to farmers and ranchers by way of these on-the-ground organizations. These fact sheets could be tailored to describe the opportunities available through Energize Oregon and cater to the needs and interests of Oregon’s diverse agricultural community. Furthermore, they could direct producers to a central project site jointly hosted by members of the Energize Oregon steering committee.

Compiling a List of Relevant Case Studies
It would be advantageous to Oregon’s growers to have access to a list of existing projects to help them “see” the benefits of on-farm energy deployment. At minimum, a list of featured case studies could provide basic project type, project size, project cost, project impact, financing details, and a contact person. Ideally, these case studies could be produced with geographic proximity in mind, so
that interested farmers and ranchers might actually be able to visit nearby projects and better understand the realities of farm-scale energy production. A case study document of this sort would be a natural complement to an Energize Oregon project fact sheet, and could be distributed via the existing channels described above.

A potential extension of this idea would include sharing information on projects is through “field days.” Farmers would have a chance to visit a venue with a project and discuss their ideas with other agricultural producers and technology providers.

Streamlined Project Development
Agricultural producers looking to pursue on-farm energy projects are often stymied by the complex, disjointed process required for moving projects from concept to implementation. Oregon’s farmers and ranchers must acquire assistance, resources, and approval from a host of institutions—adding excessive confusion to an already complex process. A streamlined process will help farmers and ranchers maneuver the planning, implementation, and management required for on-farm energy development. By aggregating resources and providing a simple, informative screening tool, Energize Oregon will help simplify the process of on-farm energy deployment.

Central Resource to Provide Project Information
Current deployment of on-farm energy projects in Oregon is particularly challenging because there is no central “one stop” resource for on-farm energy planning. Rather, information, tools, and resources are spread across several different websites—including Energy Trust of Oregon, Oregon Department of Energy, Oregon Department of Agriculture, USDA Rural Development, USDA NRCS, and several utilities. Agricultural producers would benefit from one comprehensive web resource that aggregates project opportunities, technology information, available incentives, success stories, and technical assistance contacts. An information hub of this type would simplify the on-farm energy deployment process and better represent the collaborative nature of Energize Oregon—a partnership between local agencies and organizations jointly invested in a clean energy future for Oregon’s agricultural community.

Low-Cost Screening Tool
Oregon’s farmers and ranchers need help determining where to start and what technologies, incentives, and resources are available to them. As part of a joint webpage to provide project information, a low-cost web screening tool would be a good “first step” resource for growers interested in pursuing on-farm energy projects. In addition to basic screening criteria, this tool could offer several services that to help develop the project concept. For instance, it could provide standard project examples to help participants gauge farm-scale energy possibilities and identify the “low-hanging fruit.” It could also use basic screening information to act as a platform to aggregate incentives available to each participant. Finally, it could direct participants to “next step” technical and financial assistance for early project conceptualization and planning.
Creative Financing to Tackle Upfront Costs
Ultimately, on-farm energy projects will need to be financially feasible to speed deployment in Oregon’s agricultural community. While there are numerous incentives available post-construction to recoup project costs, out-of-pocket costs remain high. Following the economic instability and incentive program changes of the past several years, farmers and ranchers need access to financing that is specifically designed for energy projects—financing that will help tackle the upfront costs of project deployment without forcing agricultural producers to take on large amounts of debt. The multi-agency collaboration and strategic partnerships created by Energize Oregon mean that this project is uniquely situated to develop creative financing tools that make on-farm energy deployment more financially attractive for Oregon’s agricultural community.

New Category of Lending for Energy Projects
Lenders need more education about financing energy projects. Increased lender education should lead to the availability of financing that is designed specifically for energy projects, with interest-only payments throughout the construction period. By deferring loan payments until project completion, Oregon’s farmers and ranchers would have to spend far less out-of-pocket and could use the state, federal, and utility incentives available post-construction to cover subsequent loan payments.

On-Bill Financing for Energy Projects
Through on-bill financing, lending institutions and serving utilities could offer loans to pay for energy improvements, allowing participants to defer costs to their regular utility bill and use energy savings to pay off the loan. This would allow Oregon’s agricultural producers to avoid upfront project costs altogether. Rather, participants would simply continue paying their utility bill as usual until the loan is paid off, and from then on enjoy a significantly lower bill due to accrued energy savings.

Economies of Scale through Bulk Purchasing
Bundling projects through bulk purchasing may be an effective means to achieve upfront cost reductions on a short timeline. Bulk purchasing allows contractors to receive price breaks from manufacturers, and achieves economies of scale from an installation standpoint. Solar photovoltaic bulk purchase efforts organized under the Solarize model have witnessed impressive success in Oregon in recent years, which suggests that bulk purchasing is an option worth exploring within the context of Energize Oregon.
Current Local Efforts
Despite the present difficulties inherent to planning, financing, and deploying farm-scale energy projects in Oregon, there are several local efforts underway to speed implementation of energy efficiency and renewable energy projects. Several of these initiatives include agricultural producers. A brief survey of known energy efficiency, renewable energy, and sustainability efforts that serve the Energize Oregon project area is included below.

Oregon Association of Nurseries
The Oregon Association of Nurseries (OAN) has developed a sustainability initiative to provide members with the resources to take action on a number of fronts. In brief, the component pieces of this initiative are:

- Energy Program – The OAN has set a goal to reduce industry energy intensity by 25% in 10 years. The first step towards reaching this goal is an energy pilot that provides technical resources for audits, creation of energy management plans, grant writing and project implementation assistance.
- Climate Friendly Nurseries Project – The OAN developed a resource, “Best Management Practices for Climate Friendly Nurseries” that provides specific ways to quantify and reduce energy use and greenhouse gas emissions.
- Wholesale Nursery Certification – Food Alliance and Salmon Safe are creating a nursery certification standard. This standard will act as a barometer for any nurseries interested in evaluating their performance. OAN is providing outreach for this effort.
- NRCS Partnership – OAN is partnering with the Natural Resource Conservation Service (NRCS) to provide technical assistance on sustainability projects.

Willamette Valley Resilience Compact
The Resource Innovation Group (TRIG) is working with counties and cities in the Willamette Valley to enhance efforts to build the resilience of the Valley’s economy. This effort is led by local governments with the goal of Compact adoption by local governments across the region.

Solar Now!
The Solar Now! campaign is the product of a partnership between Solar Oregon, the Oregon Department of Energy, The Energy Trust of Oregon, and the City of Portland Bureau of Planning and Sustainability. This campaign connects the resources, incentives, and information provided by these key players to simplify the process of going solar for Oregon’s residents, communities, and businesses.
Case Studies

On-farm energy projects are not ubiquitous in Oregon, but that does not mean they are not happening. The Oregon Department of Energy and the Energy Trust of Oregon have contributed several examples of successful projects. The technologies, budgets, and motivations behind these projects vary, but they represent a broad survey of several available possibilities.

Case Study: Variable Speed Irrigation Pump

**Project Name:** Anonymous Sample Farm  
**Location:** Oregon  
**Project Type:** Conservation project (variable speed motor)  
**Project Cost:** $60,874

**Project Origins**
Sample Farm irrigates 182 acres. The current pump only ran at full speed. At full speed, this pump would process around 1,250 gallons of water per minute. It was discovered that this flow rate was only needed 25% of the time. The other 75% of the time a much lower flow rate of 750 gallons per minute was needed. The owners of this farm decided to have a variable speed drive motor installed to reduce the amount of electricity consumed each season and to conserve water.

**Project Financing**
The project received a USDA REAP grant, BETC funding, and incentives from the Energy Trust of Oregon. The remaining cost was privately financed.

**Putting the Pieces Together**

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>USDA REAP Grant</td>
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</tr>
<tr>
<td>BETC</td>
<td>$15,980</td>
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<td>Energy Trust of Oregon</td>
<td>$17,626</td>
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<td>Private Financing</td>
<td>$12,050</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td><strong>$60,874</strong></td>
</tr>
</tbody>
</table>

**Is it working?**
The project has reduced the farm’s electricity use for irrigation by more than 50%.

Case Study: Solar PV Array

**Project Name:** Steenson Farms  
**Developer:** Advanced Energy Systems  
**Location:** Salem, OR  
**Project Type:** Solar  
**Project Size:** 8 kilowatts solar PV system, estimated production 9,146 kilowatt-hours per year  
**Project Cost:** $48,429
Project Origins
David Steenson, owner of Steenson Farms, saw solar as a smart investment for his hazelnut farm. With the financial incentives available, it made sense. The system is in full sun on his shop roof.

Project financing
The project received federal funding through the Commercial ITC, BETC finding, and incentives from the Energy Trust of Oregon. The remaining cost was self-financed.

Putting the Pieces Together

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<table>
<thead>
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<tbody>
<tr>
<td>Federal ITC</td>
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<td>BETC</td>
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<td><strong>Total Cost</strong></td>
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</table>

Is it working?
According to Mr. Steenson, the project is producing the quantity of electricity predicted—more than 9,000 kilowatt-hours per year. He is pleased with the system’s performance.

Case Study: Solar PV Array

**Project Name:** Dry Hollow Family Orchards  
**Developer:** Green Home Construction  
**Location:** Hood River, Oregon  
**Project Type:** Solar  
**Project Size:** 7.35 kilowatts, estimated production 6,826 kilowatt-hours per year  
**Project Cost:** $51,850

Project financing
The farm received federal funding through the Commercial ITC and BETC funding. The remaining cost was self-financed.

Putting the Pieces Together

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<tbody>
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<td><strong>Total Cost</strong></td>
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</table>

Case Study: Small Wind Turbine

**Project Name:** Buchholz-Schmitz Farms  
**Developer:** Kardon Construction  
**Location:** Mount Angel, Oregon  
**Project Type:** Wind Turbine  
**Project Size:** 20 kilowatt wind turbine, expected production 16,000 kilowatt-hours per year  
**Project Cost:** $117,500
Project Origins
Tom and Barbara Buchholz became interested in wind after seeing other turbines installed in their area. They are interested in reducing their electric bill and they see the turbine as a means of achieving that goal.

Project Financing
The farm received federal funding through the Commercial ITC, a USDA REAP grant, and incentives from the Energy Trust of Oregon. The remaining cost was financed through an increase in the farm’s line of credit.

Putting the Pieces Together

<table>
<thead>
<tr>
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<th>Cost</th>
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Obstacles and Lessons Learned
Wind projects are sizable construction projects that require know-how. Make sure to hire a knowledgeable contractor who can handle permitting, grant-writing, agency coordination, and the multiple pieces of the installation and construction process. In Mr. Buchholz’s words, “rookies beware.”

Is it working?
So far, so good. The project is still relatively new and thus far its production has met expectations. The family says the jury is still out, however. If the system requires major repairs in coming years, payback will be severely impacted.
Resources

Oregon Department of Energy
General website: http://www.oregon.gov/ENERGY/

Oregon Department of Agriculture
General website: http://www.oregon.gov/ODA/

Energy Trust of Oregon
General website: http://energytrust.org/
Agriculture page: http://energytrust.org/industrial-and-ag/incentives/agriculture/