05/01

LEAF

Local Energy for America Fund
Pilots, Outcomes, and Lessons

U.S. Endowment
for Forestry and Communities

LEAF

Local Energy for America Fund
Pilots, Outcomes, and Lessons

CONTENTS

THIS WORK CO-FUNDED BY THE USDA FOREST SERVICE

The U.S. Endowment for Forestry & Communities, Inc. (Endowment) is a not-for-profit corporation established at the request of the governments of the United States and Canada in accordance with the terms of the Softwood Lumber Agreement 2006 (SLA) between the two countries. The Endowment is one of three entities designated to share in a one-time infusion of funds to support "meritorious initiatives" in the U.S. The Endowment received $200 million under the terms of the SLA.

U.S. Endowment for Forestry and Communities
908 E. North Street
Greenville, SC 29601
www.usendowment.org

/EXECUTIVE SUMMARY

A forest health problem—dead, dying trees and overly dense growth of low-value species—threatens America's public lands and working forests alike, but it also presents an opportunity. The thinnings from forest restoration activities could be a source of renewable energy in rural areas, and the harvesting and processing of the fiber could create rural jobs. Such an outcome presupposes the viability of wood-to-energy systems, with returns large enough to attract private investment in converting fossil fuel generators to woody biomass–fired boilers.

The U.S. Forest Service (USFS), which needs a market for woody biomass to fund restoration efforts, and the U.S. Endowment for Forestry and Communities (Endowment), which promotes economic resilience in forest-reliant rural communities, in 2010 embarked on a six-year, $7.8 million initiative to demonstrate cost-effective biomass energy technologies and encourage their commercialization. The partners later allocated $1.5 million of those funds for tests in two states designed to determine if modest amounts of seed capital could leverage greater amounts of private funds to advance wood energy conversions. The first phase of the joint venture highlighted promising technologies and identified models for wood markets and biomass energy. It also found policy disincentives and market forces that hinder wood-to-energy adoption. One barrier, however, was something the partners could attempt to address: access to capital.

In the next phase of the joint venture, the Endowment and USFS sought to facilitate market readiness and grow public-private partnerships to support community-scale wood-to-energy projects. The goal was to test models that could attract private capital to finance conversion to wood-to-energy systems. The partners' program, called Local Energy for America Fund (LEAF), initiated two pilot efforts, one in New Hampshire and one in Oregon.

The New Hampshire pilot was initially stymied by the change in biomass energy's competitive position when fuel oil prices began falling in 2014 and many wood-to-energy proposals were canceled. The pilot administrators eventually sought to help make a county thermal energy facility eligible for inclusion in the state's renewable portfolio standard for green generation. The slow pace of the county approval process was discouraging, and the high cost of the retrofit ultimately necessitated additional funding from a public source.

The Oregon pilot proceeded more smoothly. Using LEAF funding to leverage other private and public monies, it supported a wood-to-energy system for a small school and government offices in a rural county seat. The district heating system is now operational and using local biomass as its feedstock.

Although both pilot projects met the goal of using locally sourced woody biomass to generate energy, they did not achieve the outcome envisioned for LEAF: demonstrating the competitive advantages of wood-to-energy and thereby attracting private capital for larger numbers of systems that would create a biomass market big enough to address the forest health problem. Only a very large market will spur additional investment in forest restoration and increase the pace of forest treatment. Such a market may exist for torrefied wood. This "roasted" wood is an energy-rich, environmentally preferable substitute for coal that can be used in existing boilers generators—limited if any conversion required. Accordingly, the Endowment is now focusing on promoting distributed torrefaction facilities that will produce feedstock for electric utilities and/or other coal-using entities that wish to switch to a more environmentally-friendly feedstock.

/BACKGROUND

WOOD FIBER CAN BE A SOURCE OF LOCAL, GREEN ENERGY WHILE PROVIDING MARKETS FOR LOW-VALUE TREES AND CREATING JOBS IN RURAL COMMUNITIES.

Growth in the woody biomass sector over the past decade has suggested that this emerging industry can promote forest retention and health as well as rural economic development.

The biomass energy market rarely competes for timber with traditional forest products companies as in many parts of the country, forests are choked with small-diameter, low-value, and dead or dying trees—fiber in excess of what traditional forest industry can or will use. The situation is particularly acute on our national forests, where some 80 million acres need treatment but less than one million acres are treated annually, at a cost of more than $300 million a year. Without markets for low-value trees, forest landowners and public land managers have few management options, compromising forest health and productivity.

To address this problem, the U.S. Endowment for Forestry and Communities (Endowment) partnered with the U.S. Forest Service (USFS) in a six-year, $7.8 million initiative to test biomass energy technologies and push them toward commercialization. The partners later allocated $1.5 million of those funds for tests in two states designed to determine if modest amounts of seed capital could leverage greater amounts of private funds to advance wood energy conversions. A series of competitive grant and investment rounds highlighted promising technologies and identified models for wood markets and biomass energy.

/ WOOD TO ENERGY JOINT VENTURES

THE PARTNERS' WOOD-TO-ENERGY JOINT VENTURE (JV I) HAD TWO OVERARCHING GOALS:

- To take promising conversion technology from the laboratory to demonstration level, the last step before commercialization. The fund provided catalytic funding for projects to test the commercial potential of the technology: could wood-to-energy be a cost-effective energy solution that would attract commercial interest?
- To demonstrate how wood-for-energy customers might develop new wood procurement, landownership, or land management models that deliver sustained sources of woody biomass while ensuring that forests are retained in forest cover.

The JV I portfolio (two grants and six program-related investments) explored wood procurement and experimental technologies and identified four primary barriers to wood-to-energy:

- limited access to capital for woody biomass entrepreneurs;
- competition from plentiful, low-priced natural gas, as well as other marketplace factors; and
- the absence of policies to drive fledgling renewables (e.g., carbon pricing, investment incentives, renewable portfolio standards).

Altering government policies and stemming market forces were beyond the Endowment's powers, but improving access to capital was an achievable goal, and that became the focus for the next phase of the initiative, Joint Venture II.

Believing that the private sector would invest in this form of renewable energy if the public and philanthropic sectors helped de-risk the opportunity, the Endowment and USFS sought to facilitate market readiness and grow public-private partnerships to support community-scale wood-to-energy projects. JV II focused on developing a finance model and associated pilots to facilitate public-private partnerships in thermal wood-to-energy technology in regions dependent on energy sources other than natural gas. This effort dovetailed with the broader USFS strategy: strengthening coalitions to advance wood-to-energy adoption, encouraging buy-in from other USDA leaders on the value of wood-to-energy to advance an array of objectives, and potentially allocating some portion of forest restoration funding to support wood-to-energy projects.

Learnings from JV I, a wood-to-energy convening in Manchester, New Hampshire, and interviews conducted by Dovetail Partners (a Minneapolis consulting firm) all identified lack of affordable financing as perhaps the largest single bottleneck to converting generation facilities to wood-to-energy systems. The Endowment and USFS therefore committed $750,000 each for funding such projects.

The result was Local Energy for America Fund (LEAF), a state-based pilot program that would test the potential to attract private capital for thermal conversion of public or private generation facilities. To advance conversions at a scale that would aid in addressing the forest health need, private funds are needed to leverage smaller sums of existing federal, state, and philanthropic contributions. Long-term, the vision was to deploy public-private financing models to facilitate the expansion of local, renewable biomass energy.

In addressing the capital barrier issue, LEAF incorporated lessons learned from the forest industry when timber investment management organizations (TIMOs) and real estate investment trusts (REITs) became preferred strategies for forest management. By separating timberlands from manufacturing operations, previously integrated companies were able to unlock value, better focus their efforts, and yield enhanced financial returns. Both strategies (TIMOs; REITs) brought large sums of private capital to the market creating new asset classes.

Based on a range of criteria, New Hampshire and Oregon were chosen as venues for the LEAF pilots.

/LEAF–NEW HAMPSHIRE

Like most states, New Hampshire has a renewable portfolio standard (RPS) that mandates a certain amount of electricity be purchased from qualifying renewable generators. But New Hampshire is the first state to incorporate thermal energy into its RPS in a comprehensive and technology-neutral manner. The New Hampshire RPS now includes a carve-out for heat produced using biomass, solar thermal, geothermal, or other renewable technologies.

This carve-out, passed by the legislature in 2012, became effective in 2014 and could support the development of biomass thermal projects, particularly at the community scale. It gave the Endowment opportunity to test the deployment of biomass thermal energy: if the pilot wood-to-energy system could generate revenue in excess of costs, it could become a model for investment by other parties.

/ Strategy

New Hampshire electric utilities are required to support renewable generation through the purchase of renewable energy certificates (RECs). RECs arise concurrent with the generation of energy (electric or thermal) but can then be traded independently for compliance purposes. For example, a school can use the heat it generates and sell its thermal RECs, in the same way that a wind farm can sell its electricity to one customer and its RECs to another.

The structure of this performance incentive—the RECs are generated at the time the energy is produced and sold after production has been verified—has worked for electricity generation, but it is imperfect for biomass thermal. Biomass thermal competes well against fossil fuels on a heat-cost basis; in recent years wood fuels were half or less the cost per Btu of heating oil. The barrier to greater deployment of biomass systems is often the initial high planning and capital cost, compared with fossil fuel systems. Thermal RECs as then configured could not overcome the up-front challenge.

NEW HAMPSHIRE IS THE FIRST STATE TO INCORPORATE THERMAL ENERGY INTO ITS RPS IN A COMPREHENSIVE AND TECHNOLOGY-NEUTRAL MANNER

New Hampshire's LEAF program, envisioned and administered by Innovative Natural Resource Solutions LLC (INRS), was, named the T-RECs Enterprise Fund. It launched in spring 2015 and proposed converting the performance incentive into capital by purchasing a strip of RECs while a project was under development. The T-RECs Enterprise Fund would buy thermal RECs before they were generated, providing the project owner or developer with much-needed capital. When the thermal RECs were generated, the T-RECs Enterprise Fund would own the rights to them and sell them to recover the purchase price and associated expenses thus creating a sustained revolving fund to support future projects.

/LEAF–NEW HAMPSHIRE

/ Test Case

When the T-RECs Enterprise Fund was conceived, planned, and rolled out, biomass heating (chips and pellets) was cost competitive on a MMBtu basis. At that point, however, the price of heating oil was beginning to decline; it eventually dropped from $4-plus per gallon in 2014 to about $2 per gallon in spring 2016 ***(Figure 1)***. Other fossil heating fuels, including natural gas and propane, also became less expensive.

The change in the price differential between heating oil and biomass halted development of large wood-to-energy projects—those at the size that could benefit from the T-RECs Enterprise Fund. INRS entered into serious discussions with several planned biomass heating projects but never got to the stage of contracting for T-RECs purchase: projects were put on hold or suspended because of the dynamics of fuel pricing.

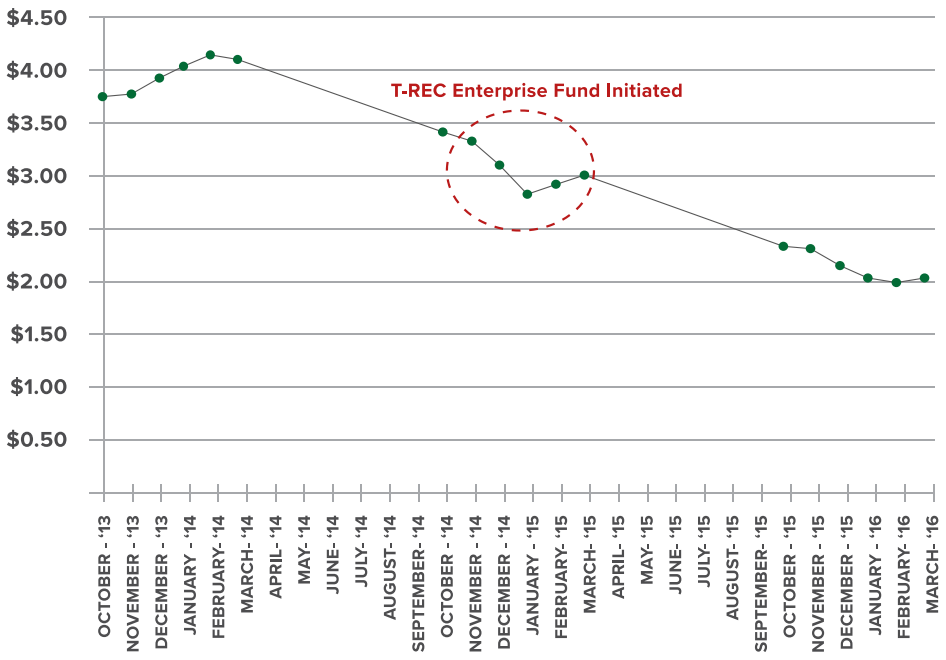


Figure 1: New England retail home heating oil price ($ per gallon)[1]

After reaching out to many potential project developers, financial institutions, equipment manufacturers, and others, INRS identified a project that was an appropriate fit for the T-RECs Enterprise Fund. Rockingham County, in southeastern New Hampshire, had installed a biomass boiler that did not meet the RPS air emissions standard. INRS met with county officials to explore the possibility of using the T-RECs Enterprise Fund to finance the installation of emissions control equipment so that the facility could qualify for T-RECs. This option was attractive to county representatives, and it met the goals of the fund.

Decisions to switch from oil (New Hampshire's most prevalent heating fuel) to biomass are based on the long-term savings that biomass can deliver. As oil prices dropped—and as biomass prices retained their historic stability—that differential shrank, and the prospects for commercial and institutional use of biomass fell accordingly (Figure 2). On a MMBtu basis, oil remains less expensive than some types of biomass fuel.

Formal inquiries to Rockingham County began in late 2015 and were met with support. However, the county has a complicated and burdensome decision-making process, involving county commissioners and the county's entire legislative delegation of 85 individuals. A term sheet was finally signed in July 2016, roughly seven months after discussions began.

[1] *U.S. Energy Information Administration. Heating Oil and Propane Update* ***https://www.eia.gov/petroleum/heatingoilpropane/*** *Accessed July 2016.*

/LEAF–NEW HAMPSHIRE

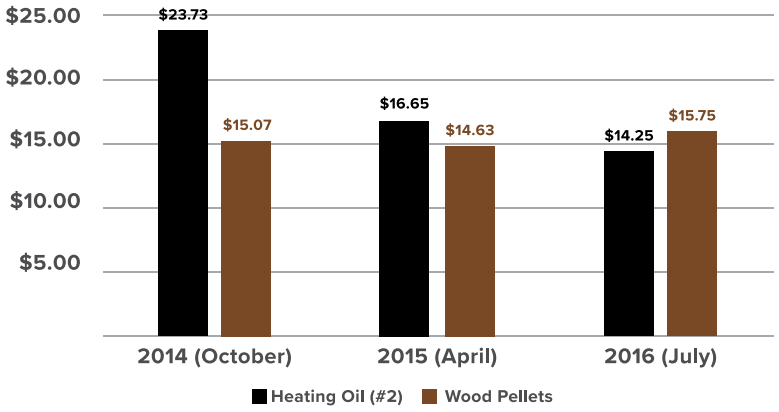


Figure 2: Home heating oil versus wood pellet prices ($ per MMBtu)[2]

To meet the higher actual project cost, INRS explored obtaining supplemental funds from New Hampshire's Community Development Finance Authority (CDFA), a nonprofit, quasi-public authority created by an act of the legislature to facilitate economic development projects. CDFA manages a well-capitalized Clean Energy Fund that had been making loans for municipal, business, and nonprofit clean energy projects for over six years.

INRS had expected that public institutions would have lengthy decision-making protocols, but the Rockingham County process showed how long a transaction can take. This is an important consideration, as many potential adopters of biomass thermal energy in New Hampshire are county institutions (nursing homes, prisons, etc.), public schools, town halls, and government buildings. This decision-making issue likely exists in other states, too.

/ Project Status

INRS continued to work with Rockingham County into fall 2016, but the actual project cost, as determined by a lengthy competitive bidding process, exceeded the funds committed by the Endowment and the financing cost approved by the county legislative delegation. The Endowment would cover the original estimated cost of the Rockingham County project but would then suspend any further consideration of new T-RECs Enterprise Fund projects.

CDFA agreed to assume full stewardship for the T-RECs Enterprise Fund, providing capital for future projects as well as the full amount needed to cover the entire Rockingham County financing. The Endowment entered into an agreement whereby administration of the fund and the Rockingham County project went to CDFA, but with the expectation of generating a modest recapture of a portion of its investment in developing and "de-risking" the project.

/ Outcomes

The Endowment's work in developing and promoting the fund attracted the attention of other lending institutions that can build on its investment in the idea. An important objective of the Endowment was to underwrite creative financing tools that could be sustained after its investment was no longer necessary. INRS remains confident this will be the outcome.

[2] *NH Office of Energy and Planning,* ***http://www.nh.gov/oep/energy/energy-nh/fuel-prices/index.htm***

/LEAF–OREGON

The LEAF-OR pilot was a public-private partnership involving the Endowment, the Office of the Governor of Oregon, and the Oregon Department of Energy (ODOE), which served as the program lead. A memorandum of understanding specified each partner's roles and responsibilities. The Endowment allocated some initial funds and helped secure additional funding, including a grant from USFS. The Governor's Office coordinated state-level efforts and helped find yet additional funding. ODOE was responsible for providing team staff, establishing a local partnership, allocating resources, completing a market assessment, conducting due diligence, and bringing projects forward for consideration.

The team was drawn from a broader stakeholder group, the Biomass Working Group, which received USFS funding that supports the State Wood Energy Team, also a pilot project designed to advance markets for woody biomass. The project team comprised leads from Oregon's Departments of Energy and Forestry, Sustainable Northwest, and local USFS and Bureau of Land Management offices.

/ Strategy

Work began with a market assessment to evaluate opportunities for facilities that could economically convert from fuel oil or other nonlocal energy sources to woody biomass. The assessment also compared the locations of these facilities with existing Collaborative Forest Landscape Restoration Program project investments and other wood energy projects, seeking a cluster of wood-to-energy projects that could help drive local demand for biomass. Oregon had already had some success with a small cluster of wood-to-energy facilities in its central and eastern regions.

The team then developed a strategy to align state and federal resources that could support small wood-to-energy projects and also provide technical and community support (Figure 3). The State Wood Energy Team makes small grants to prospective projects for feasibility analysis and development steps. Grants are limited to $50,000 per project and require a 65% local match. Grant recipients thereby become eligible to apply for USFS Wood Innovation Grants, which provide up to $250,000 for engineering and other project development needs. With funding from the Wood Innovation Grants, projects could then apply for state tax incentives, other USDA funding programs (grants, loans, guarantees), and LEAF-OR debt funding.

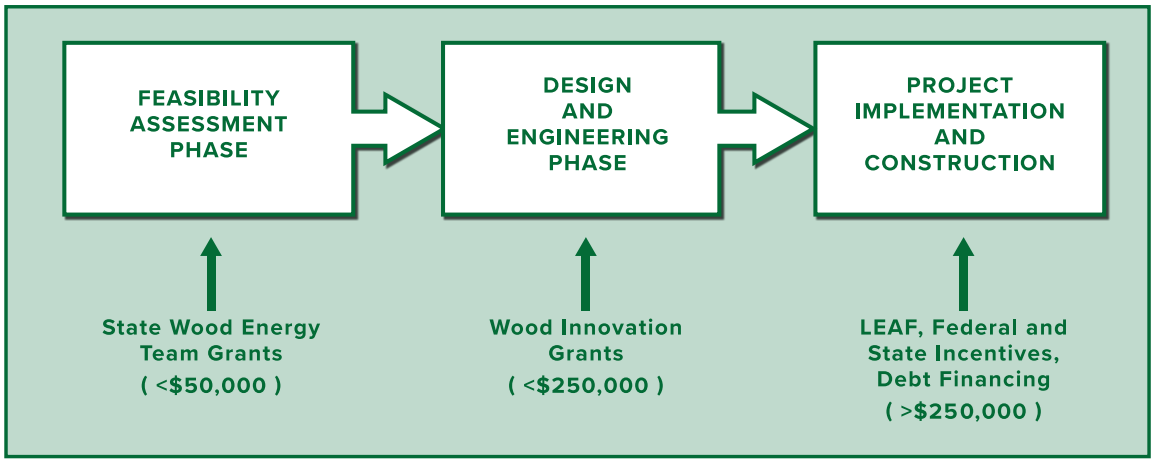


Figure 3: Funding sequence for candidate wood-to-energy projects

/LEAF–OREGON

/ Test Case

LEAF-OR's initial pipeline consisted of projects that were awarded feasibility funds or were already in the planning or development stages. Eventually, LEAF-OR supported a single project in eastern Oregon, Harney Community Energy, as a guarantor of $500,000 of a $1.4 million loan from Meyer Memorial Trust, an Oregon private foundation.

The project used a third-party ownership model to produce and deliver thermal energy from woody biomass to public institutions in Burns, Oregon (population 2,800). As a district energy system, a single boiler serves multiple buildings. One biomass boiler was installed at the elementary school along with a backup propane boiler for peak heat demand, and buried piping delivers heat to the elementary school, county courthouse, sheriff's office and jail, and a mental health facility. Tees were installed to allow for other buildings along the route to easily connect to the system in the future. Once installed and operating commercially, the assets were to be transferred to a locally owned cooperative established by the school district and county, the High Desert Biomass Coop.

The LEAF-OR investment leveraged an Oregon Wood Energy Cluster Grant ($47,700) and a Woody Biomass Utilization Grant ($250,000) via the Endowment's successful partnership with an Oregon-based foundation to generate a low-interest loan ($1,440,000) and funding from the High Desert Biomass Cooperative ($500,000), yielding a total impact value of $2,241,700. Further details are given in Attachment A.
The project is delivering the following benefits:

- It provides a market for 500 tons of wood chips annually from local restoration projects.
- It created thirty-seven part-time construction jobs, and provides less than one full time job upon completion.
- It has reduced fossil fuel energy use by over 90% for both the school and the courthouse.
- Its savings—more than $100,000 a year—free up capital to operate the project and service the debt.

The system was placed in service in August 2016.

/ Project Status

Construction was completed and the system became operational in August 2016. As planned, High Desert Biomass Cooperative assumed control of the project in October 2017. However, because of changes in the way the State of Oregon allowed recovery of energy credits, Meyer Memorial Trust extended a portion of its program-related investment to bridge the unanticipated funding gap. In 2017, Meyer Memorial Trust released the Endowment's loan guarantee.

/ Outcomes

The project was successfully structured and built and is currently operational. LEAF succeeded in leveraging outside funding by providing credibility and relationships and a creative and flexible approach to credit enhancement. Although this project succeeded, the overall vision of drawing significant private capital to help drive further investment in biomass infrastructure was not achieved. Nor was the project able to advance a more systemic approach to project planning to reduce up-front time and planning capital requirements.

/LESSONS LEARNED

Biomass heating projects, especially in public buildings, are custom projects that require substantial up-front resources. Project development timelines are therefore long, and on-site work is extensive. Soft costs constitute a substantial proportion of the total project cost. Local engagement and support are critical to project success.

Construction and operation risk for a wood energy project may be higher than for a traditional heating system, but those risks can be addressed and the technology is commercially proven. A third-party development and financial model can succeed, but without additional incentives and until fossil fuel prices increase, projects may not be economically attractive enough to draw substantial private capital—and relying on policy or government incentives to ensure project viability and success is not a sustainable approach.

Private capital partners identified a need for "cookie-cutter" projects that can be bundled—developed and ready to go simultaneously—to mitigate risks and allow the pooling of project needs to reach the tens of millions rather than hundreds of thousands of dollars. Although the projects eventually developed with LEAF support are valuable to their communities, the model did not achieve significant leverage or demonstrate sustainability sufficient to attract private capital. The limited ability to systematize local wood-to-energy conversions and the inability to amass a significant enough pool of funds thwarted the goal of de-risking these types of projects.

Given the magnitude of the forest health crisis, especially on public lands, the Endowment does not believe that these costly and time-consuming projects are the best use of its limited assets. The demand for biomass created by a single biomass thermal project, or even a cluster of projects, remains modest. Much larger markets are needed to attract additional investment in forest restoration and increase treatment levels.

BIOMASS HEATING PROJECTS, ESPECIALLY IN PUBLIC BUILDINGS, ARE CUSTOM PROJECTS THAT REQUIRE SUBSTANTIAL UP-FRONT RESOURCES

Such a market may exist for torrefied wood, however. This renewable product, obtained by roasting wood in a low-energy or high-pressure environment, is an environmentally preferable substitute for coal that can be used in existing generators; it can also be cofired with coal. Therefore, gleaning lessons from JV I and JV II, the Endowment is now focusing on creating a mass market for torrefied wood, to be supplied by distributed torrefaction facilities that will produce feedstock for electric utilities.

/ ATTACHMENT A:

ORIGINAL HARNEY COMMUNITY ENERGY OVERVIEW

/ Project Overview

Harney Community Energy (HCE) is a third-party ownership model to deliver thermal energy from biomass to institutions and businesses in Burns, Oregon. It is designed to achieve the economies of scale, customer convenience, and price stability of traditional large-scale district energy systems, while allowing the adaptability and flexibility needed to serve a community without the density needed to make a district energy system feasible.

A biomass boiler system will be installed at Slater Elementary School, serving two school buildings and the gymnasium; buried PEX piping will convey heat to the Harney County Courthouse, serving the Courthouse and the adjacent Sheriff's Office, as well as Symmetry Care, a mental health facility. In addition, tees will be installed in the piping system to enable the easy connection of future buildings along the route for future expansion. In each case the boiler will deliver metered thermal energy through a thermal energy service agreement. Once the system have been installed and reached commercial operation, the assets and all agreements will be transferred to a locally owned cooperative established by the County and school district, High Desert Biomass Cooperative. This innovative model allows biomass systems to be developed at public and other facilities without the public entities directly taking on debt and development risk.

/ Project Development and Financing

HCE is an example of a public-private partnership supported through targeted and strategic investments. Wisewood, Inc. developed the concept and received an initial grant through the Oregon Statewide Wood Energy Team pilot project (Wood Energy Cluster Project). This grant allowed feasibility analysis and early project development to be completed. The work completed under the grant allowed the project to meet the eligibility requirements to apply for a Wood Biomass Utilization Grant from US Forest Service.

These grants allowed final design and engineering to be completed and the project to be ready for financing and construction. Through the Local Energy for America Fund-Oregon initiative, the U.S. Endowment for Forestry and Communities was able to provide a limited loan guarantee to the Meyer Memorial Trust in support of a program related investment to the project. These sources of funds were matched with an equity contribution from the High Desert Biomass Cooperative and energy tax credits from the State of Oregon. The table below summarizes the sources of funding for the project.

/ HCE Sources of Funding

PROJECT DEVELOPMENT ASSISTANCE	
OREGON WOOD ENERGY CLUSTER PROJECT, 2013	$47,700
WOODY BIOMASS UTILIZATION GRANT, 2013	$250,000
PROJECT FUNDING	
HIGH DESERT BIOMASS COOPERATIVE	$500,000
MEYER MEMORIAL TRUST (PROGRAM RELATED INVESTMENT)	$1,440,000
U.S. ENDOWMENT FOR FORESTRY AND COMMUNITIES (LIMITED GUARANTEE TO MMT)	($500,000)
TOTAL PROJECT COST	$1,944,000

/ ATTACHMENT A:

ORIGINAL HARNEY COMMUNITY ENERGY OVERVIEW

/ Project Implementation

The HCE project will be implemented in two phases: a construction phase (Phase 1), and an ongoing operations phase (Phase 2).

Phase 1 – Construction

The project construction phase will be managed by Wisewood, Inc. through a special purpose limited liability company (Harney Community Energy, LLC) formed to house all project transactions during Phase 1. This phase will include boiler system construction and installment and extend up to two years from receiving the Meyer Memorial Trust (MMT) PRI loan and Endowment limited loan guarantee. This phase will encompass the first year of system operations to ensure the project is working optimally and generating income. Construction funds are supplied by a $1.444 million MMT PRI loan (with a $500,000 loan guarantee by the Endowment) and a $500,000 equity contribution from the High Desert Biomass Cooperative. Wisewood, through HCE, LLC, will be responsible for financing, construction, operations, and maintenance during Phase 1.

Phase 2 – Transfer to Cooperative Ownership

Upon completion of Phase 1 and successful operation of the system, HCE, LLC will transfer the assets and assign all agreements to the High Desert Energy Cooperative, and the cooperative will secure long-term financing. HCE will then operate under cooperative ownership and will be responsible for boiler operations, maintenance, and fuel procurement into the future.

/ Project Benefits

Biomass Utilization: The project will use over 500 tons of wood chips per year. This biomass will be sourced from local juniper removal projects, national forest treatments and private landowners.

Cost Savings: Both the school and the county courthouse is expected to reduce fossil fuel consumption by over 90%. The combined fuel cost savings are estimated to be over $100,000 per year which will be used to pay for biomass fuel, maintenance and debt service by the cooperative.

Community Economics: Money that was sent out of the community and out of the state to buy fossil fuels is now flipped and will be turned into local capital to support jobs, public institutions, and forest management activities.

Jobs: HCE will employee thirty to forty full time employees during construction and less than one permanent employee for fueling, operations, and maintenance of the equipment. Additional economic impacts will result from the use of local contractors for various tasks such as transportation of biomass and ash disposal.

In addition to these benefits the positive impact of reduced institutional fuel budget insecurity may help ensure that other facility staff may be retained or those expenses redirected toward other public benefits. HCE's third-party ownership structure will encourage future heat users in the area to convert to biomass systems and extend membership in the cooperative, supporting the community's economy. This model can be replicated in other regions.

/ Background

The Harney Community Energy (HCE) project will replace aging fossil fuel boilers at public institutions in Burns, Oregon, with state-of-the-art biomass boiler technology using locally procured biomass fuel sources.

The need for this project is twofold. First, this rural county struggles economically with one of the highest unemployment rates in the state and a persistently declining population, and is among the most isolated counties in Oregon. Because there is no access to natural gas, residents and institutions are dependent on expensive and volatilely-priced fossil fuels (oil and propane) for their heating. As old oil boilers dating back to the 1940s sink into

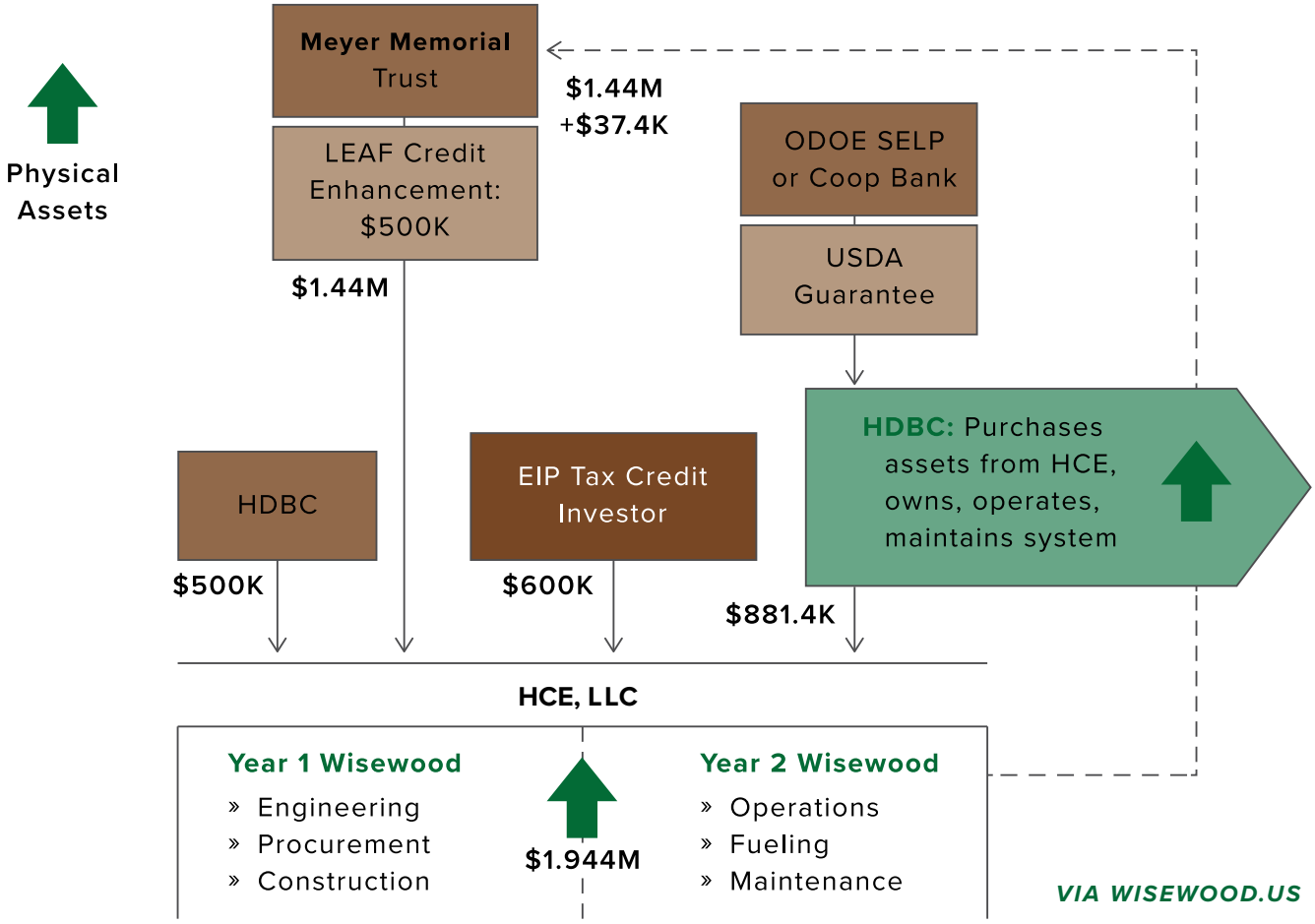
/ ATTACHMENT A:

ORIGINAL HARNEY COMMUNITY ENERGY OVERVIEW

disrepair, significant investments are necessary to maintain heat in the local elementary school, with other community institutions anticipating similar needs in the near future. Yet reinvesting in fossil fuel boilers will lock the community back into a reliance on expensive imported energy sources for the long term.

Second, 75% of the land in Harney County is publically owned, primarily by the Bureau of Land Management (BLM) and the US Forest Service (USFS). Forest stands in these dry ecosystems have become degraded over the last several decades compared to their pre-European settlement conditions. Past management practices and fire suppression have contributed to the encroachment of juniper in shrub-steppe areas and a proliferation of small-diameter understory trees in dry mixed conifer forest areas. Such conditions have substantial negative ramifications for the region's wildfire severity, water table, and wildlife habitat, with more acres burning at higher intensities than that of the historic range of fire variability. The scientific community – and, in many cases, the environmental community – has reached a general consensus that fuel reduction treatments are required to restore such ecosystems to a healthier functioning state, which involves mechanically removing juniper and small-diameter trees. However, a lack of markets for the low-value biomass material produced as a byproduct of such restoration activities stymies opportunities to conduct restoration in a cost-effective manner.

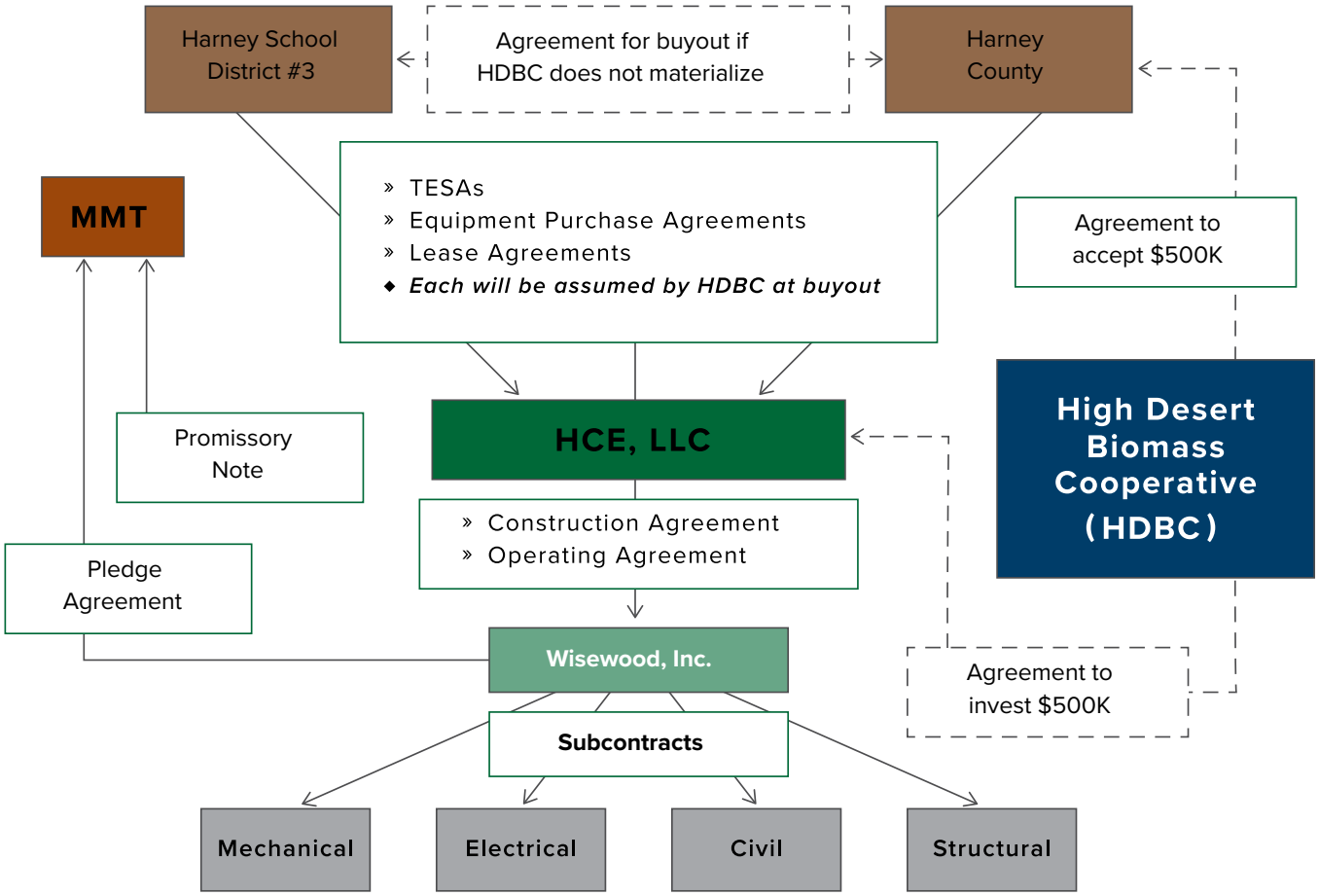
/ HCE Project Financial Structure



/ ATTACHMENT A:

ORIGINAL HARNEY COMMUNITY ENERGY OVERVIEW

/ HCE Project Financial Structure



VIA WISEWOOD.US