Partnering to Capitalize Benefits Beyond Energy
Board Learning Paper

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Energy Trust of Oregon

Preface

This paper is part of a series that describes a variety of topics identified by Energy Trust of Oregon's Board of Directors as potentially influential to the organization during the time period of its next strategic plan (2020 – 2024). This series of papers will educate and inform the Board about the potential impact of these topics enabling them to better assess risk, identify opportunity and guide the direction and goals of Energy Trust.

Remaining current on potentially significant and influential developments in the clean energy industry is critical to the fundamental role of the Board. These topics have been identified because of their potential to influence, impact or otherwise affect Energy Trust's ability to serve the ratepayers of Oregon and Southwest Washington. **These papers should not be interpreted as policy proposals or recommendations for roles in which Energy Trust intends or desires to be directly involved.**

Introduction

Energy efficiency is the cleanest, cheapest and most important resource for the utilities and ratepayers of Oregon, and Energy Trust is the prime organization delivering that resource. Energy savings and renewable generation are not the only outcomes of Energy Trust's programs, however. Benefits beyond energy can be as important and, in some cases, more important to the project owners than the energy improvements.[1] There are also benefits important to other entities like utilities, foundations, government agencies, private markets or institutional organizations. Collectively, these benefits can create opportunities for Energy Trust to leverage its funding and increase program participation.

In the energy efficiency and renewable energy fields, benefits beyond energy, also referred to as "multiple benefits," "co-benefits," "ancillary benefits," or "non-energy benefits,"[2] typically refer to an entire suite of benefits that result from the adoption of an energy-efficient or renewable energy technology. They include a variety of benefits from many different stakeholder perspectives. They could include health, security, aesthetic

or comfort improvements. They also might include water savings, carbon reduction, economic development, air quality improvements, productivity enhancements or increases to disposable income. Figure 1 illustrates some of these benefits graphically.[3]

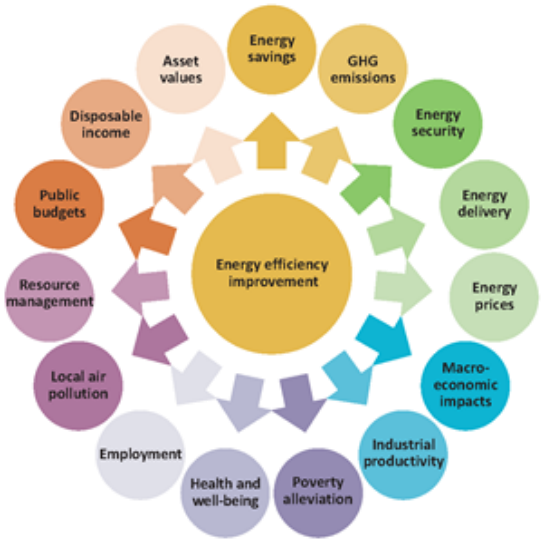


Figure 1: The multiple benefits of energy efficiency improvements

Generally, benefits fall into two categories: those that directly accrue to the end-user and those that are valued at a more societal level. The benefits that accrue directly to the consumer have been categorized in literature[4] as:

- improved indoor environment, comfort, health, and safety,
- reduced noise,
- labor and time savings,
- improved process control,
- increased amenity or convenience,
- water savings and waste minimization, and
- direct and indirect economic benefits from downsizing of equipment.

Energy Trust uses many of these consumer benefits in its program outreach, marketing messaging and promotional materials as ways to motivate customers to participate in its programs. The value of these consumer-level benefits is generally captured in an owner's decision-making process and are reflected in the cost they are willing to pay.

The other group of benefits – those valued at a more societal level – are the focus of this paper. These benefits include carbon reductions, water savings through environmental reclamation projects, economic development impacts, public health improvements etc. There are organizations, businesses, philanthropies and even entire markets that find value in these types of benefits and are willing to pay projects to

realize them. This paper will explore some specific examples of how these entities are paying to realize some of these societal benefits.

Organizations and Markets

Several organizations have long recognized societal benefits such as those associated with energy efficiency and renewable energy projects. Foundations historically have provided grant funding for programs that combat poverty, promote affordable housing or address deteriorating water resources. Government agencies regularly use taxpayer funding to promote economic development, address employment issues and implement resource management policies. Relatively recently, however, organizations have started exploring new partnerships to leverage their funding with that derived from ratepayers. That interest stems from the realization that many clean energy projects produce benefits other than energy – benefits valued by these other organizations. Three areas of benefits – water stewardship, carbon and public health – have some of the more established participants and formalized structures.

I. Water Stewardship

In the field of water resource management, the Bonneville Environmental Foundation (BEF) has been instrumental in connecting water reclamation projects and the benefits they produce with companies seeking to offset their water consumption. Through its Water Restoration Program, BEF acts as a broker to connect corporations with sustainability goals to projects that conserve water. The program's Water Restoration Certificate (WRC) is the means through which these projects are funded. BEF identifies water projects that meet the requirements of corporations who can then purchase Water Restoration Certificates (one WRC = 1,000 gallons of water restored). The funds from the purchase of certificates are then used to support the project's development.

There are numerous reasons why companies have adopted water stewardship policies. Some have formal sustainability goals. Others see reputational risks that can be offset by investment in water stewardship (for example, breweries, water bottlers, the National

Hockey League or other industries that use or are perceived to use significant amounts of water in their products). Still others have recognized real supply chain risks resulting from local water restrictions or insufficiencies that can be offset by water stewardship projects.[5] For these reasons, many companies seeking water restoration certificates express a desire to support local projects that have a direct impact on their water supplies or on the communities where they are located. BEF maintains an impressive database of water stewardship projects throughout the United States. BEF works to connect those projects to companies interested in supporting water reclamation.

BEF projects fall into four classification types[6]:

- *Water Management Agreements* where water rights holders can designate some of their water to be used for environmental benefits;
- *Irrigation Infrastructure Upgrades* where funding is provided to irrigation districts to support infrastructure modernization and water conservation;
- *Natural Hydrologic Restoration* where funding supports projects that restore physical conditions to facilitate natural flow conditions that recharge groundwater tables, replenish depleted rivers and support fish, wildlife and recreation; and
- *Information Technology Systems* such as high-tech water sensing and management systems that assist farmers with conserving water.

When it comes to water efficiency projects of the type typically found in energy efficiency projects (low-flow aerators and showerhead replacement), it is more challenging for BEF to provide support. Whereas building or homeowners realize savings in their site's water consumption (and therefore see utility savings on their water bills), it is the municipality that actually saves the water. Unless BEF can get assurances from the municipality that those water savings will remain in the natural environment (in either streams, rivers or the groundwater aquifer), it cannot issue Water Restoration Certificates and, therefore, cannot use investors' capital to support those efficiency projects. Most municipalities would use those types of water savings to support further growth of the municipality, not contribute to water restoration goals.[7]

Despite this limitation, BEF works with several companies that are eager to support municipal efficiency projects, such as showerhead, faucet and toilet retrofits to support underserved communities, reduce energy use and reduce water use. While BEF is unable to convert these projects to Water Restoration Certificates, they provide support to help develop and move these projects forward. Instead of realizing BEF's primary goal of environmental flow benefits, these projects focus on achieving other benefits such as reduced water cost for tenants or reduced energy use.[8]

II. Carbon Reduction

It is widely recognized that clean energy projects deliver co-benefits in the form of greenhouse gas (GHG) reductions. Over the last couple of decades, new markets evolved in the U.S. and internationally that place a monetary value on the reduction of GHG emissions, which contribute towards global climate change – creating new carbon capital markets. These carbon capital markets comprise both compliance and voluntary markets. Both operating in largely complementary ways with a common objective to integrate the value of carbon reductions into marketplaces to accelerate the pace of innovation needed to progress more rapidly towards a lower carbon future.

Compliance markets, such as those in California, Washington and the East Coast, assign value to carbon based on regulatory requirements. These regulations require certain larger GHG emitters to cap their emissions on a declining basis, allowing them to trade among themselves any carbon reductions that fall below the cap. Trading excess carbon reductions enables these larger emitters to meet the cap's requirements in the most cost-effective manner. For example, those who can invest in new technologies or encourage reductions among their customers can sell excess allowances to those who cannot.

These "cap and trade" compliance markets also allow capped entities to purchase carbon allowance offsets, typically taken from uncapped sectors such as forestry and agriculture, in limited volumes to meet their obligations. Offset projects must meet stringent requirements to demonstrate that GHG reductions are "beyond business as

usual" – that is they achieve GHG reductions beyond what would have occurred anyway – and that they meet integrity standards that are enforced through third-party project certifications. One such certification is California's Climate Action Reserve. This organization evaluates project eligibility and the volume of credits generated by using accredited methodologies and rules that govern how credits are evaluated and issued.

Voluntary carbon capital markets emerge when organizations purchase credits voluntarily. Examples of entities that have purchased voluntary carbon credits include companies such as Microsoft and Google, utilities such as Seattle City Light, cities from the Carbon Neutral Cities Alliance, campuses committed to Second Nature's American College & University Presidents' Climate Commitment (ACUPCC)[9] and even individuals. Many of these entities purchased credits because they aspired to achieve carbon-neutral goals or other GHG objectives.

In voluntary markets, organizations do not purchase credits because of regulatory compliance requirements. Instead, purchases are driven largely by sustainability and competitive/business interests, which credits can help secure. Carbon credit purchases thus have become an integral part of many companies' sustainable business strategies as they seek to "do well by doing good." As in compliance markets, independent certification of credits is the primary source of credibility. Organizations that provide this certification include the Verified Carbon Standard, the Gold Standard and the American Carbon Registry.

III. Public Health

For years industry experts have recognized that energy efficiency improvements also benefit the health of occupants. Tightening a home or building's exterior, thus preventing unwanted airflow, also helps minimize airborne contaminants such as smoke or pollutants. Window replacements, weather-stripping, insulation and heating system replacements or tune-ups help maintain comfortable indoor air temperatures, which can eliminate the use of fuel-based heating devices or gas ovens as a heating source

(which also are sources of carbon monoxide).[10] Properly exhausting furnaces and other heating appliances help effectively flush combustion contaminants out of the structure.

Unfortunately, these health benefits are notoriously difficult to measure and verify. Anecdotal stories abound, but hard evidence is rare. Numerous occupants of newly constructed, high-efficiency apartments or homes regularly report fewer asthma incidents in their children, or report generally improved standards of living.

However, the Green & Healthy Homes Initiative is one organization leading national efforts to measure the health benefits of energy-efficiency measures. The Green & Healthy Homes Initiative was charged by the Council on Foundations and the White House Office of Recovery to lead the national effort to integrate lead hazard control and healthy homes with weatherization and energy efficiency work. Its mission is "to break the link between unhealthy housing and unhealthy families by creating and advocating for healthy, safe and energy-efficient homes."[11]

To break this link, the Initiative is exploring a model called "Pay for Success." According to the Nonprofit Finance Fund, "Pay for Success is an approach to contracting that ties payment for service delivery to the achievement of measurable outcomes."[12] The first pay for success project launched in the U.K. in 2010, followed by the U.S. launch in 2012. The pay for success model has been used since to address a variety of social needs such as public health, childhood education, recidivism and homelessness.[13]

Under the pay for success model, there are three parties typically involved: (1) an impact investor such as a foundation, commercial entity or community-based organization that funds the efforts of (2) a service provider such as an organization that administers a health-related program or intervention and is then reimbursed by (3) a back-end payer, usually a government agency or an insurer, when outcomes are achieved.[14] Figure 2 illustrates this relationship graphically.[15]

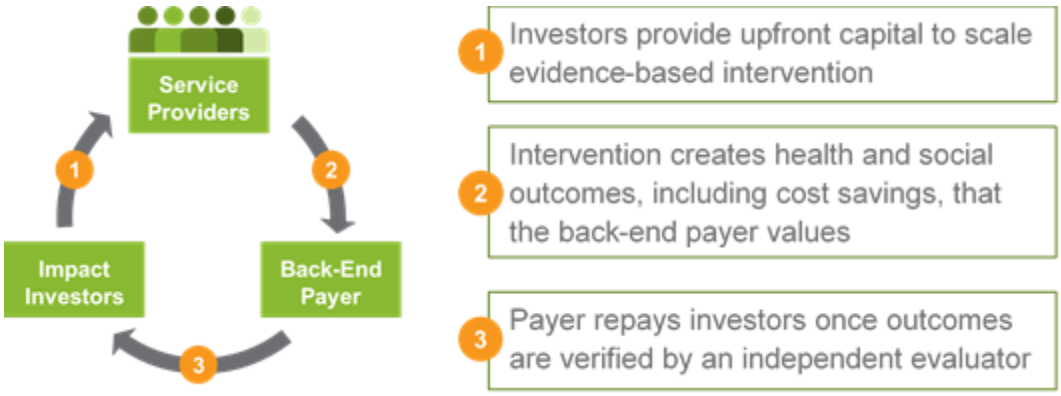


Figure 2: Pay-for-Success Model

The Green & Healthy Homes Initiative is engaged in a number of feasibility assessments across the U.S. to determine the potential for the pay for success model to address specific public health issues related to housing, such as lead poisoning and asthma. They are also working with various organizations to explore the potential to leverage the pay for success model with existing ratepayer-funded energy-efficiency programs in New York, Connecticut and the Tennessee Valley.[16]

In cases where energy efficiency programs are already addressing the energy usage of homes, the pay for success model can provide incremental funding to support various health and safety issues, such as mold remediation, that are typically not allowable under energy efficiency programs. When specific health outcomes, such as reduced asthma rates, are realized, a back-end payer such as a state health plan or Medicaid health plan pays the service provider for the health and safety work.

Case Studies

I. Bonneville Environmental Foundation and Oregon

The Bonneville Environmental Foundation has supported more than 50 water stewardship projects through its Water Restoration Program throughout the U.S. including Oregon. Oregon projects include the Middle Deschutes River water management agreement project in central Oregon and the Sevenmile Creek water

management agreement project in the Klamath Basin. The following case studies are excerpted from BEF's Water Project Portfolio.[17] While these projects specifically do not include an energy nexus, they illustrate the types of water stewardship projects that would qualify for Water Restoration Certificates.

The Middle Deschutes River Case Study from Bonneville Environmental Foundation

Photo by Robert Warren/Bonneville Environmental Foundation

The Middle Deschutes River is a 35-mile section of the iconic Deschutes River that flows between the city of Bend and Lake Billy Chinook, Oregon. In this section of the river, deep canyons and public lands comprise one of the most scenic desert canyons in the state of Oregon. Red-band trout, otters, ospreys, and myriad wildlife species inhabit this section of river and depend on clean, healthy flows of water.

However, historically most of the flow to the middle Deschutes River was diverted near the City of Bend to serve agricultural needs throughout central Oregon. Thanks to partnerships with businesses like the Portland Trail Blazers, the Deschutes River Conservancy, and local irrigation districts, new solutions have been developed to restore over 115 cubic feet per second of flow to the Middle Deschutes during the summer months BEF and our partners' purchase of Water Restoration Certificates® helps provide funding that allows the Deschutes River Conservancy to negotiate lease agreements with irrigators and keep these flows in the river, fostering a healthy ecosystem for people, plants and wildlife.

While agency-led monitoring efforts are underway to assess the positive impacts of this restored flow, fly-fishing guides and biologists who regularly visit this area continue to report improved populations of Red-Band trout.[18]

Sevenmile Creek Case Study from Bonneville Environmental Foundation

Photo by Klamath Basin Rangeland Trust

The Klamath River Basin, covering more than 12,000 square miles in southern Oregon and northern California, is considered one the most important waterfowl areas in North America. It is home to six National Wildlife Refuges and supports more than 430 species of wildlife. Extreme over allocation of water resources in the upper Klamath River Basin has resulted in inadequate stream flows and the degradation and/or loss of critical riparian and aquatic habitat.

The conflict between agricultural and ecological water needs in the basin remains one of the most significant environmental issues in the western United States. Sevenmile Creek is located upstream of the Upper Klamath National Wildlife Refuge and contains some of the best remaining stream habitat in the Upper Klamath Basin. The area is home to [a] myriad [of] species and is designated as critical habitat for threatened bull trout, native redband rainbow trout and the sensitive Oregon spotted frog. Irrigation diversions within the watershed have partially or completely dewatered critical streams, while return flows are often too warm or nutrient laden to provide adequate habitat for listed and threatened species.

Historical water use in this area has led to the diversion of the entire flow from the upper reaches of Sevenmile Creek, resulting in the complete dewatering of two miles of the stream and limiting fish access to some of the most critical, intact habitat in the stream system. This dewatering also prevents high quality, cold, clear water from flowing down the remaining 17 miles of Sevenmile Creek to areas located in the National Wildlife Refuge.

Since 2004, the Klamath Basin Rangeland Trust has tested the results of improving flows in Sevenmile Creek. Keeping water in the stream has improved habitat and provided a critical migratory corridor for endangered and threatened species. Through habitat monitoring, there has been a demonstrated linkage between keeping water flow in stream and improvements to fish habitat. With increased flows, the Oregon Department of Fish and Wildlife has reported dramatic increases in the occurrence of redband trout.

With funding provided in part through the sale of Water Restoration Certificates this project will restore approximately 1.2 billion gallons of water per year to a critical and previously dewatered stream system. The transaction will be completed on a voluntary basis with the landowner. The property will continue to be operated as an active cattle ranch with dryland grazing helping preserve the local agricultural economy while still meeting the needs of endangered species.[19]

II. Chevrolet's Campus Clean Energy Efficiency Campaign

In 2010 Chevrolet made a voluntary commitment to invest $40 million in carbon credits with the goal of retiring eight million tons of CO_2 to benefit the planet. Chevrolet's goal was to seek out credits in the clean energy and energy efficiency sectors from the U.S. voluntary market. It initially found few credits available, however, because there were no energy efficiency-based carbon methodologies to certify and issue credits. As a result, Chevrolet asked the Climate Neutral Business Network to develop a new clean energy efficiency carbon methodology in 2012, which was ultimately approved and accredited by the Verified Carbon Standard (VCS), a leading international carbon certification organization.

To be certified, energy efficiency projects needed to be able to prove that the GHG reductions they produce are additional - that they reduced GHG's on a beyond-business-as-usual basis and met other integrity standards. To evaluate beyond-business-as-usual performance, the new campus methodology established benchmarks based upon the top 15 percent of campuses' emission reduction performance. For

campus-wide projects, for example, the required benchmark performance level was an annual emission reduction of about 5 percent per year.

The methodology also provided the core foundation upon which carbon credits could be measured and verified by independent, third-party certifiers, ensuring that the resulting credits had integrity (e.g. no double counting, secure ownership, well monitored, etc.). This included accurate, conservative accounting for the resulting credit volumes. This methodology created the foundation for Chevrolet's Campus Clean Energy Efficiency Campaign.

Using this new methodology, the campaign worked with U.S. university campuses to measure GHG reductions resulting from energy efficiency improvements. Universities that received VCS certification for the GHG reductions that resulted from their projects were eligible to secure carbon credits for their efforts. Chevrolet then provided funding to purchase and retire those carbon credits. Overall, Chevrolet committed to purchase up to $5 million of these campus projects' credits, retiring them on behalf of the planet toward its carbon reduction goal. Figure 3 illustrates the relationships between each entity in this process.

Chevrolet launched the Campus Clean Energy Campaign to help invest in and promote a clean energy future, not only in its vehicles but in communities throughout the nation.[20] By creating the VCS campus energy efficiency methodology, Chevrolet not only opened up the carbon capital markets to campuses through its own credit purchases but also gave the campuses access to the broader carbon capital market and its investors. All of this new carbon capital was then accessible to help accelerate campuses' energy efficiency efforts. As a result, Professor Koester from Ball State University remarked that this was a "once in a decade" achievement.

Chevrolet and its campus partners found that carbon funding can contribute 5-25 percent of the incremental capital needed to deliver clean energy efficiency results at

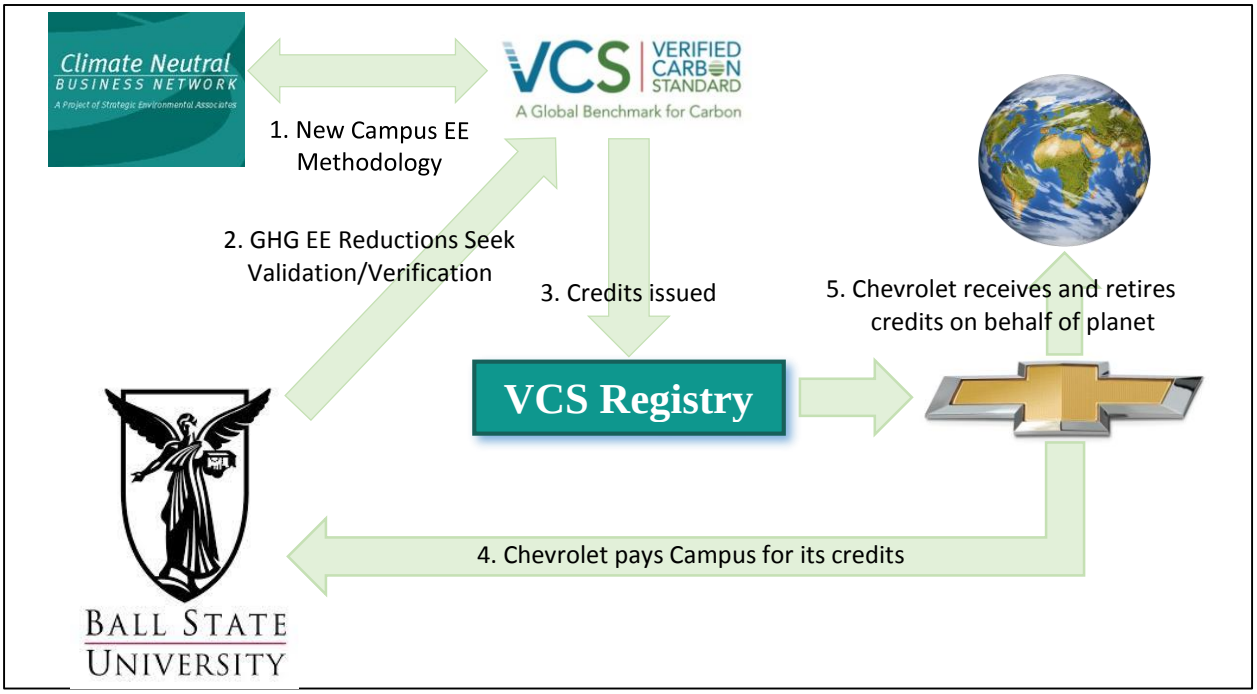


Figure 3: Chevrolet's Campus Clean Energy Campaign process

this level of campus energy efficiency leadership. The monies are designed to reward top-performing campuses and to help expand clean energy efficiency and climate performance based on a compelling business case to spur campus clean energy leadership.

Eleven Chevrolet campus partners brought forward projects whose carbon credit sales confirmed the value of this business case. These include Ball State University's geothermal campus-wide project, Valencia College, Spelman College, Boston University and Oregon-based Portland State University and Southern Oregon University. Valencia College remarked that the estimated return on incremental capital from selling carbon credits was highly positive: "At the $3 per square foot incremental cost that [U.S. Green Building Council] estimates is needed to achieve high energy efficiency performance, Valencia would achieve a 7-14 percent return on incremental capital over a 10-year span at $5-10/ton pricing for project carbon reductions."

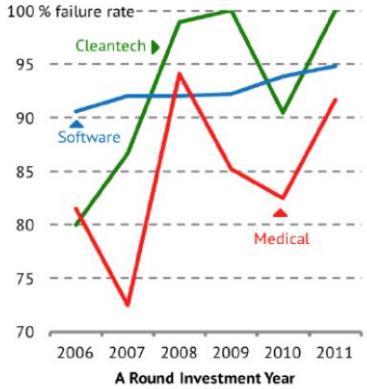
Ball State University's Professor Koester further elaborated on the long-term financial benefits that can arise for campuses if they structure the new carbon capital proceeds as an internal green revolving loan fund. He said, "The financing made available through Chevrolet can seed the creation of green revolving loan funds at colleges and universities; with such initial capitalization, colleges and universities can continue to pay forward the impact of current efficiency yields toward additional conservation and energy use reductions. This is a virtuous circle that empowers campuses to pursue deep systems-thinking efficiencies. It's a great way to find new roads to travel together towards a clean energy future."

Venture capital market experts at MIT agree with Professor Koester. They consider that clean tech investments now require access to more patient capital (that is, capital investments that do not require short or immediate returns on investment) in order to succeed. This suggests that the current private venture capital markets favor information technology and medical new venture investments, which face fewer challenges (exit barriers, duration

This New Source of Carbon Capital is a Priority Given VC CleanTech Pressures

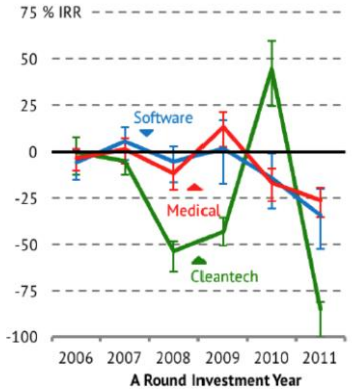
a) CleanTech companies were more likely to fail…

After 2007, over 90% of cleantech investments failed to return capital to investors.



b) …and yielded lower returns.

After 2006, cleantech investments underperformed the other sectors, with the exception of 2010, the year of Nest's A-Round.



c) The clairvoyant investor would choose software.

An investor who could pick the perfect portfolio of the ten biggest exits in each sector would choose to invest in software technology.

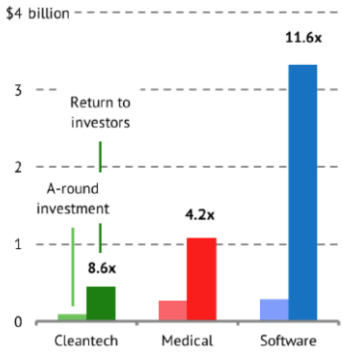


Figure 4 Cleantech Market Performance

before IPO, etc.). Figure 4 illustrates the performance of various markets compared to the cleantech market. The carbon capital markets are precisely such a source of patient innovative capital, which MIT considers as mission critical for clean tech investments whose primary benefits drive the future of the U.S.'s GHG reduction performance.

III. Green & Healthy Homes Initiative's Pay for Success Projects

In 2017, the Green & Healthy Homes Initiative conducted an analysis of the New York State Energy Research and Development Authority's (NYSERDA's) residential sector work to calculate a potential rate of return on the health benefits of its energy efficiency efforts. The analysis showed a positive rate of return and prompted a follow-up discussion with NYSERDA and various New York State health organizations to outline an approach using the pay for success model.[21]

In this case, the health organizations, such as the New York State Medicaid Program, would identify a pool of high-cost members based on a specific diagnosis code, for example, asthma. NYSERDA would then target this member pool with its residential energy efficiency program. If NYSERDA's home performance contractors discovered opportunities to remediate health issues in the homes, NYSERDA, using ratepayer funds, would provide an incremental payment to address those issues. In this adaptation of the pay for success model, NYSERDA and its ratepayer funds essentially take the place of the initial impact investor. That means that NYSERDA might provide an energy efficiency incentive of, for example, $5,000 to improve the efficiency of the home, and another $1,000, for example, to remediate the health problems.

On an annual basis, then, the State Medicaid provider would assess the costs associated with the initial pool of target members. If those costs decreased, NYSERDA would receive a share of those savings. The approach would be successful if NYSERDA's share of the savings equaled or exceeded the incentive provided per home to address the health issues.

In this particular case, attribution is not necessarily an issue. That is, the State Medicaid provider would not necessarily be concerned about whether the reduction in costs to deal with the targeted health issues were directly a result of NYSERDA's remediation efforts or a result of some other cause. This is not always the case in the more traditional pay for success model where the impact investor may want more rigorous demonstration that the efforts they funded directly resulted in the health benefits.

The Green & Healthy Homes Initiative is exploring similar energy efficiency and health models with the Connecticut Green Bank and the Tennessee Valley Authority and is engaged in discussions with Minneapolis, Chicago and Louisiana. If successful, these efforts could establish a model where ratepayer funds could leverage health care funding to deliver a more comprehensive set of benefits to energy efficiency program participants.

IV. Energy Trust and Farmers Conservation Alliance

Energy Trust has little, if any, direct experience partnering with other organizations to capitalize benefits beyond energy, but its partnership with Farmers Conservation Alliance on irrigation modernization projects has many similarities. Farmers Conservation Alliance (FCA) originally was created to market the fish screen (Farmers Screen™) that Farmers Irrigation District (FID) invented and patented in the mid 1990's. As FCA worked to move the Farmers Screen through federal approval processes, it met and worked with many irrigation districts in the region, developing the contacts that would be so important for the work it is doing now.

As FCA was moving along that course, Energy Trust began working on hydropower projects with irrigation districts like FID, Swalley, Central Oregon Irrigation District (COID), and Three Sisters Irrigation District (TSID). In 2013, Energy Trust worked with BEF to hire FCA to do a case study of the benefits that irrigation hydropower brought to the Hood River Basin.

That study demonstrated that hydropower was really more of an ancillary benefit of modernization for the water district. Importantly, hydropower provides an important revenue stream that can support additional modernization efforts. This realization led to the development of Energy Trust's current irrigation modernization program. FCA was selected through a competitive process to build out the program.

FCA provides development support, implementation oversight and assistance with finding additional sources of funding for both planning and implementation. To date, FCA has been able to help irrigation districts access approximately $25 million in federal funds and leverage an additional $6 million in state funds for piping projects, some of which are expected to begin in 2018.

FCA's ability to partner with federal and state government agencies and with Energy Trust allows irrigation districts to realize an entire suite of benefits including:

- Water savings – piping conserves water lost to seepage and evaporation – which can account for 25-60% of water flowing in a canal. The conserved water can be restored to streams and/or used to expand agricultural opportunities (often both occur).
- Energy savings – piping pressurizes gravity fed canals. In many cases, pressures are great enough that irrigation pumps can be completely eliminated across a whole irrigation district. Sometimes booster pumps are required to bring an area up to required pressures but this is usually done with a new variable frequency drive pump.
- Energy generation – excess pressure can be converted to hydropower. There is about 40MW of potential in the Deschutes basin alone.
- Drought resilience – the water savings from converting to pipe reduces the amount of water needed to be withdrawn from rivers for agriculture. During drought conditions that means farmers are able to stretch scare resources and there is more water available in stream.
- Water quality – leaving water in-stream can benefit the temperature of the stream. In addition, piping eliminates agricultural runoff into canals that have

return flows back to streams, resulting in less agricultural chemicals in those waterways.

- Habitat improvement – districts may choose to upgrade their fish screens, remove dams to provide upstream and downstream fish passage or fix streambeds that may have been channelized in the past for flood prevention or other purposes.
- Operation and maintenance savings – eliminating open canals can remove the need to have ditch walkers manually open and close canal gates to make water deliveries. Piping also eliminates problems associated with aquatic vegetation growing in canals (often treated with expensive, toxic chemicals), siltation and refuse dumping.
- Wildfire – in 2017, Farmers Irrigation District's pipes were tapped by wildland firefighters working the Eagle Creek fire in the Columbia Gorge.
- Reinvestment – pressurized water opens up new possibilities for farmers. At Three Sisters, many farms have moved to growing higher value crops and have switched on-farm irrigation technologies to save even more water. In addition, many farmers have invested in new farm tools, processing equipment and buildings.
- Jobs – infrastructure projects of this size bring a significant number of local jobs for engineers and construction companies, with multiplier effects in the local community.
- Liability – pipes eliminate the risk of canal failures, which can cause flooding. They also eliminate drowning risks.

Summary/Conclusions

Irrigation modernization is a strong example of how Energy Trust is involved with partnerships to capitalize benefits beyond energy. Other organizations are exploring similar partnerships to advance water stewardship, carbon reduction, and health improvements. These organizations have or could potentially work with many of the same companies that participate in Energy Trust programs. The decision to pursue energy efficiency is a complex one and rarely based on the energy benefits of the

project alone. It is important, therefore, that Energy Trust become aware of these efforts in order to effectively serve its customers and to deliver value to the ratepayers it serves.

About Energy Trust of Oregon

Energy Trust of Oregon is an independent nonprofit organization dedicated to helping utility customers benefit from saving energy and generating renewable power. Our services, cash incentives and energy solutions have helped participating customers of Portland General Electric, Pacific Power, NW Natural, Cascade Natural Gas and Avista save on energy bills. Our work helps keep energy costs as low as possible, creates jobs and builds a sustainable energy future.

Additional Resources

An excellent resource detailing the nexus between energy efficiency, housing and public health is the Green & Healthy Homes Initiative's report *Achieving Health and Social Equity through Housing: Understanding the Impact of Non Energy Benefits in the United States*. It can be found at http://www.greenandhealthyhomes.org/sites/default/files/AchievingHealth%26SocialEquity_final-lo_0.pdf.

There are numerous additional resources on Pay for Success at www.payforsuccess.org.

For more information on the Chevrolet Campus Clean Energy Campaign, see the article *Chevrolet Helps 11 Colleges Reduce Their Carbon Footprint* located at http://media.gm.com/media/us/en/gm/news.detail.html/content/Pages/news/us/en/2014/Nov/1118-clean-campus.html.

[1] Mills, E. and A. Rosenfeld. 1996. *Consumer Non-Energy Benefits as a Motivation for Making Energy-Efficiency Improvements*. Energy, 21 (7/8):707-720 [PDF], p. 4.201. Based on work originally published in *Proceedings of the 1994 ACEEE Summer Study on Energy Efficiency in Buildings*, pp. 4.201-4.213.

[2] © OECD/IEA 2014, *Capturing the Multiple Benefits of Energy Efficiency*, IEA Publishing. License: www.iea.org/t&c, p. 18.

[3] Note: This list is not exhaustive, but represents some of the most prominent benefits of energy efficiency identified to date. Based on IEA data from *Capturing the Multiple Benefits of Energy Efficiency* © OECD/IEA 2014, www.iea.org/statistics, License: www.iea.org/t&c.

[4] Mills, E. and A. Rosenfeld. 1996. *Consumer Non-Energy Benefits as a Motivation for Making Energy-Efficiency Improvements*. Energy, 21 (7/8):707-720 [PDF], p. 4.202 – 4.203. Based on work originally published in *Proceedings of the 1994 ACEEE Summer Study on Energy Efficiency in Buildings*, pp. 4.201-4.213.

[5] T. Reeve, Bonneville Environmental Foundation, personal communication, January, 11, 2018

[6] What are Water Restoration Certificates (WRCs)?, Retrieved from http://www.b-e-f.org/learn/what-are-water-restoration-certificates/

[7] T. Reeve, Bonneville Environmental Foundation, personal communication, January 11, 2018

[8] Ibid

[9] The American College & University Presidents' Climate Commitment established in 2006 is now the Presidents' Climate Leadership Commitments.

[10] According to the Oregon Health Authority (OHA), over 400 deaths a year occur due to unintentional carbon monoxide poisoning in the U.S. The sources of carbon monoxide include gas and oil furnaces, water heaters, fireplaces, and wood burning and gas stoves are sources in the home. The OHA specifically mentions to "never use a gas range or oven to heat a home," which, unfortunately, occurs in particularly cold weather or during power outages. (Carbon Monoxide Poisoning, retrieved from http://www.oregon.gov/oha/ph/Preparedness/CurrentHazards/Pages/carbonmonoxidepoisoning.aspx) Energy efficiency improvements like window replacements, insulation, air sealing, and heating system replacements or tune-ups can help ensure that comfortable indoor temperatures are maintained even in the coldest weather thus eliminating the need for supplemental heating from carbon monoxide producing appliances.

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[21] M. McKnight and B. Brown, Green & Healthy Homes Initiative, personal communication, February 8, 2018