The View from Here: A Utility Perspective on North American Emerging Technology Alignment

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ABSTRACT

In order to establish a strong pipeline of new, reliable energy efficiency measures that transition well to utility programs and satisfy customers, increasing numbers of utilities have established dedicated Emerging Technology (ET) assessment programs. Utility working groups and non-utility partners such as research organizations and product developers have joined forces to collaborate on ET assessments and related activities. Several respected industry organizations have begun offering services to help utilities coordinate their ET-related activities.

The benefits of strong ET coordination are myriad. However, to coordinate successfully, those involved need a solid understanding of each other's perspectives, goals, strengths, and limitations, as well as requirements for new measure adoption into energy efficiency (EE) programs. To this end, this paper offers an overview of individual and collaborative ET programs, examines how goals and capabilities vary among organizations, and proposes attributes and activities that support successful ET collaboration.

Convinced that greater alignment can lead to more useful results from limited ET funding, the authors hope to motivate additional collaboration (as has occurred after past ACEEE conferences), and encourage more utilities to focus on supporting ET assessment efforts in order to meet their short- and long-term energy efficiency goals.

Introduction

North American energy utilities and other organizations that promote products and services to increase EE are constantly scanning the horizon for the next big energy saver—an activity formalized through emerging technologies (ET) projects and programs.

ET programs scan, screen, and assess EE innovations entering the market against a variety of criteria, with the ultimate goal of moving the most promising products and services into utility EE programs to increase EE acquisition. In contrast to R&D efforts that develop and prototype new products and services, ET activities focus on the next step—validating commercially available and market-ready solutions to accelerate their uptake into programs.

Recognizing the benefits of coordinating their efforts—reduced duplication, faster outcomes, lower costs, access to more assessment sites and therefore more robust data—ET program managers have explored various forms of collaboration. One of the earliest formal ET collaboration initiatives, the Emerging Technologies Coordinating Council (ETCC), was launched in 2000 by the California investor-owned utilities (IOUs) and Public Interest Energy Research (PIER) program of the California Energy Commission (CEC). The PNW has had a

long history of EE collaborations on field demonstrations, programs, market transformation and more recently focused ET coordination.

Many other ET collaborations and initiatives have followed this ground-breaking and successful effort. Utilities have recruited numerous non-utility partners in seeking to increase the pace and impact of ET activities. By bringing together groups of utilities and other stakeholders to identify and collectively focus on the greatest ET opportunities, these initiatives create the leverage and momentum needed to engage leading industry players and transform markets.

The next step in the evolution of ET collaboration is the creation of a common North American agenda that addresses three key objectives:

- identifying key emerging EE technologies,
- defining large scale coordinated ET efforts to support collective EE savings goals, and
- establishing efficient, robust structures for cost sharing and resource sharing among partners.

This paper aims to lay the groundwork for the North American ET agenda.

Background

The following overview of the history of utility ET programs and collaboration activities provides context for understanding the value of ET coordination efforts.

Utility ET Program History

California

The California Investor-owned Utilities (IOUs)— Southern California Edison (SCE), Pacific Gas and Electric Company (PG&E), San Diego Gas and Electric Company (SDG&E), and SoCal Gas—began conducting emerging technology pilots in the late 1990s in support of market transformation—a key goal of California energy policy makers following deregulation of the California electricity market. In parallel, another aspect of deregulation called for a shift in responsibility for most EE research from the IOUs to the PIER program, managed by the California Energy Commission. In 2000, to better align their efforts for mutual benefits, IOU ET leaders joined with PIER program representatives to form the ETCC, as noted above.

The state's 2001–2002 electricity crisis led to the temporary defunding of utility ET programs—as well as termination of most market transformation activities. In response to steeply climbing energy costs, regulators and utilities shifted their focus to energy efficiency resource acquisition, aiming for immediate energy savings and demand reductions. Despite this shift and the corresponding drop in ET budgets (SCE noted a decrease from nearly $4 million in 2000 to less than $1 million in 2001), the IOU ET leaders continued some ongoing ET projects and quarterly ETCC meetings. California's ET activities achieved greater visibility in 2004 with the first ETCC-organized ET Summit in San Francisco—a conference that brought together several hundred participants from across North America to discuss advances in applied research, commercialization, policy, and investment perspectives related to energy efficient ETs.

The next significant shift came in 2005 with the Emerging Technologies Whitepaper, spearheaded by CEC Commissioner Art Rosenfeld. Regulators responded to the Whitepaper's

call for more robust utility ET programs by allocating increased funding for ET programs at the state's IOUs and reaffirming the formal standing of the ETCC.

For example, SCE saw funding for its ET program grow from $1.2 million in 2005 to over $3 million in 2006. Since then, utility ET programs in California have continued to expand and the ETCC broadened its base by inviting Sacramental Municipal Utility District (SMUD) to join as a full member, representing the California municipal utilities. The database of assessed technologies (available on the ETCC website at http://www.etcc-ca.com) numbers in the hundreds, and many assessed technologies have successfully transitioned to EE rebate programs. As of 2010, the California IOUs had invested nearly $56 million for the period of 2010 to 2012 in a wide range of ET activities, including technology performance assessments, scaled field placements, demonstration showcase projects, business incubation, and market and behavioral studies.[1]

BC Hydro

As part of BC Hydro's ramp up of its Power Smart energy conservation program in the mid-2000s, it launched the Conservation Innovation program in 2006 to focus on new technologies that reduce electricity consumption and demand. Under the leadership of Gail McBride, BC Hydro sent a Conservation Innovation delegation to the 2008 ET Summit in San Diego to discuss bi-national collaboration with a group of U.S. ET leaders. Since that time, BC Hydro's Conservation Innovation program has developed numerous successful initiatives around technologies that meet the needs of its markets and moved new technologies into programs, including advanced rotors and screens for pulp & paper refiners, adaptive streetlighting controls, and the high-profile relamping of Vancouver's Lions Gate Bridge with LED lights.

BC Hydro's Conservation Innovation group has expanded its commitment to bi-national ET collaboration by bringing together Bonneville Power Administration (BPA) and SCE to produce a systematic, easy-to-use, and rapid process for targeting heating, ventilation, and air conditioning (HVAC) energy efficiency opportunities. Like an earlier in-house initiative, the BC Hydro Lighting Applications Matrix, the jointly developed HVAC Applications Matrix combines energy consumption data for market sub-sectors and savings estimates for energy efficiency measures to target high-potential combinations of EE technologies and markets. The resulting tool has enabled each of the utility partners to apply a systems approach to identifying promising opportunities for new EE measures and programs.[2]

Pacific Northwest

The Pacific Northwest Electric Power Planning and Conservation Act of 1980 mandated the Bonneville Power Administration (BPA) to develop and acquire conservation and renewable energy resources to meet load growth in the region. The act also created the Northwest Power and Conservation Council (NWPCC) and authorized it to develop a 20-year power plan.

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[1] California Public Utilities Commission. 2010. Fact Sheet: Energy Efficiency Statewide Emerging Technologies Program (2010-2012). Accessed Feb. 27, 2012: http://www.cpuc.ca.gov/NR/rdonlyres/9B5787AB-D80F-4D1B-807B-D2163227940D/0/EE16EmergingTechnologiesPrograms1110.pdf

[2] The HVAC Applications Matrix is described in *Prospecting for Gold with the HVAC Applications Matrix*, a paper included in these proceedings.

The NWPCC's first power plan included an action plan that had over 100 separate activities needed to understand, verify and implement energy efficiency in a large scale throughout the region. To meet the new mandate, BPA conducted large-scale end-use load research, field research, and aggressive pilot programs in the 1980s that paved the way toward more efficient building codes and standards, and that informed conservation potential studies. These early ET activities included projects such as the End-Use Load and Consumer Assessment Program (ELCAP), the Hood River Conservation Project, and the Model Conservation Standards (MCS), an early market transformation effort.

These activities and EE program funding waned in the mid-1990s as retail deregulation advanced and electric loads declined. In 1996 the NWPCC, BPA and the Pacific Northwest (PNW) IOUs formed the Northwest Energy Efficiency Alliance (NEEA) to keep successful past EE efforts like the MCS from becoming stranded investments and to support future market transformation efforts. NEEA's initial ET projects ran from the late 1990s through about 2004, and included disciplined support and technology validation for CFLs and several targeted technology startups, and some technology refinement in partnership with technology developers.

BPA's EE program efforts resumed in earnest in the early 2000s. Many programs relied on the outcomes from ET and research activities dating back to the 1980s and early 1990s. In 2008, funding from BPA's Office of Technology Innovation created a dedicated EE ET function called the Energy Efficiency Emerging Technologies (E3T) program. Also in 2008 the NWPPC, BPA and PacifiCorp chaired the Northwest Energy Efficiency Taskforce (NEET) to chart a path forward for the PNW's EE efforts.

Key NEET outcomes included the decision to have BPA and NEEA to co-lead the PNW's ET efforts, the creation of the PNW Regional Emerging Technology Advisory Committee (RETAC), and the creation of a PNW regional Energy Efficiency Technology Roadmap.

Repurposing and building upon the NEEA-funded Energy Ideas Clearinghouse Product and Technology Review program and an NWPCC-funded ET scanning project, both conducted by the Washington State University Energy Program, BPA partnered with WSU to launch its own robust scanning, screening, and assessment selection process to identify the most promising efficiency technologies for field assessment and transfer to EE programs if successful. One of BPA's early innovations was development of Technical Advisory Groups (TAGs), convening subject matter experts from across North America, to assist in identifying, screening and scoring ETs in their specific fields of expertise. An on-line database was developed as a repository for results from TAGs and other ET pre-assessment efforts, and now references more than 400 ETs.

TAGs and project-specific collaborations with organizations such as NEEA, the NWPCC-based Regional Technical Forum (RTF) and Energy Trust of Oregon (ETO), as well as with BPA's more than 120 retail utility customers, have allowed BPA to achieve significant impacts with new EE measures and programs that have evolved from E3T initiatives.

BPA's E3T program team also led the collaborative effort to develop the Northwest Energy Efficiency Technology Roadmap. BPA brought together 35 leading cross-disciplinary EE experts to define promising research and market innovation paths for a half-dozen EE technology families. The Roadmap was published in 2010 and, that same year, BPA further expanded its North American collaboration activities joined NEEA and Electric Power Research Institute (EPRI) as a sponsor of the ETCC's 2010 ET Summit. Since that time, BPA has played a formative role in additional ET coordination efforts, including EPRI's early deployment initiative, and Consortium for Energy Efficiency's (CEE) Emerging Technology Collaborative.

BPA's E3T website, (http://www.bpa.gov/energy/n/emerging_technology/) provides a program overview. Recent ET projects include laboratory and field assessments for heat pump water heaters, rooftop HVAC unit improvements and measurement and verification, solid-state lighting, adaptive lighting controls, and other field demonstrations at dozens of sites throughout the northwest. The installation of 12,000 ductless heat pumps in 2011 to replace much less efficient electric resistance heating—in partnership with PNW retail utilities and NEEA—is one of the highly visible contributions of the E3T program.

History of ET Collaboration Efforts

The ETCC has expanded its role in promoting ET collaboration over the years since its startup. Other utilities and utility partners have participated in ETCC meetings, events, and other activities. Sacramento Municipal Utility District (SMUD), which already had its own ET program, was installed by the CPUC as an ETCC member in 2010 as part of the Commission's focus on involving publicly owned utilities in key statewide efficiency efforts. SMUD in turn took on responsibility for hosting the 2010 ET Summit.

The west coast is also home to a number of technology collaborations that bring together numerous players, such as the West Coast Utility Lighting Group, the Western Cooling Efficiency Center, and the California Lighting Technology Center and the PNW RETAC.

On the east coast, the New York State Energy Research and Development Authority (NYSERDA) has been a focal point of ET activities since the 1990s. NYSERDA aims to help New York meet its energy goals: reducing energy consumption, promoting the use of renewable energy sources, and protecting the environment. Because it supports both EE R&D and end-user programs across New York, it is ideally positioned to move ETs from the lab to the marketplace, and is active in many regional and national collaboration activities.

As their ET programs have grown, some utilities have retained consulting firms to conduct ET assessments and program pilots and provide the analysis needed for EE program workpapers. This need for ET program support has not gone unnoticed. Several prominent consulting firms are now stepping up to ET services around specific technologies, and other industry organizations are launching ET service offerings, as discussed in the next section.

Several of these collaborative efforts as well as a number of individual utility ET programs have developed what has become an essential element of the ET infrastructure—databases of emerging technologies. As mentioned above, ETCC maintains an extensive ET database, as does BPA's E3T program.

Technology Actor Perspectives

Utilities

As highlighted in the Introduction and Background sections, the purpose of utility ET programs is to find and qualify new products and services that can transfer into EE programs and generate energy savings and customer satisfaction. The effectiveness of ET programs can be measured against several different metrics, including the number of technologies screened and assessed, the number of new measures transitioned into EE programs, and the number of technologies eliminated from further time- and resource-consuming evaluation or premature implementation.

As new products and services are transitioning into the EE program, the program manager must deploy them via a scalable, efficient, and cost-effective program offering. This points to a more global success metric —the total market potential for energy savings adopted into EE programs from the ET pipeline.

Another ET success measure is customers' long-term satisfaction with products and services that were vetted in the ET program. This metric accounts for the ability of ET programs to minimize the potential for customer dissatisfaction with the product, and by extension customer dissatisfaction with the EE program and sponsoring utility.

This important benefit stems from the ET program's role in identifying any limitations before the utility launches a rebate measure or program. In fact, when asked to justify investments in ET programs, some industry leaders point to high monetary costs and customer dissatisfaction associated with early CFL EE programs. These offerings pre-date the launch of ET initiatives, and are noteworthy for having subsidized or given products that did not fully meet customers' performance expectations.

A related metric is ET program impacts on increasing the reliability and certainty of energy savings claims for EE products and services, which can improve EE measure realization rates.

In addition, the ET process itself must be efficient, which can be gauged by its speed and the decreased total cost to bring robust technologies to EE programs and deploy them. When measuring the speed of an ET assessment project, it is important to note that the technologies themselves can affect the time required to complete an assessment. Evaluation of HVAC technologies, for example, may require multiple seasons or years to adequately compare baseline and efficient technology performance *in situ*.

Technology Developers

Technology developers want to sell new products. In addition, they want to follow an efficient and cost-effective development path, transition products into market smoothly, and effectively grow markets for their products while continuously improving their products and marketing approaches. Participation in an ET program facilitates these goals—not only the potential for acceptance into the EE program, with associated incentives—but also information on how well the nascent product performs in relation to EE program criteria, including product performance, energy savings estimates and customer acceptance. In addition, the technology developer may receive advance notice of any issues identified in assessment projects or pilot programs, and may even qualify for product or market development support and resources. Technology developers stand to benefit from ET programs if their products and services are truly market ready.

ET Coordinators

Several respected EE industry organizations are offering combinations of ET assessments, primary and secondary research, and coordination services as part of their utility support activities. These include EPRI, CEE, and E Source, which each bring a different perspective, offering, and criteria for ET coordination success.

Since the early 1970's, EPRI has directed research and demonstration (R&D) on electricity generation, delivery, and use on behalf of its member utilities. EPRI works with its

members to identify problems that can be solved through collective R&D, manages the R&D activity with member input, and then shares the results with members. In response to requests by BPA, SCE, and other interested member utilities, EPRI is extending this business model to ET initiatives. These efforts focus on identifying and conducting research, field assessment and early deployment projects in coordination with groups of member utilities to confirm the performance of selected technologies.

Evidence for EPRI's coordination success would include increasing numbers of participating utilities, including some that had not previously engaged in ET activities; increased shared awareness of performance characteristics for technologies that were previously not well understood; development of regional or national strategies to address long-term ET issues; influence on creation and implementation of robust national EE standards and regulations; and increased appreciation within the industry of the value of EPRI's ET services. Key components in valuing EPRI's services are EPRI's cost parity with consultant-led field assessment and early deployment projects, and EPRI's role in reducing project costs and increasing quality and speed.

CEE was founded in the early 1990s to harness the combined market power of multiple utility EE programs working together to accelerate the production and market penetration of EE technologies. Modeled after the successful launch of the Super Efficient Refrigerator Program, CEE's most effective strategy has been to define specifications that are meant for use by program administrators to identify levels of efficiency that generate savings cost effectively. These tiers help the utility industry focus its collective influence on manufacturers, retailers, consumers, and other markets players to accelerate market adoption of products in progressively higher efficiency tiers. Extending this business model to ET, CEE can share information on who's doing what, develop standardized approaches for information exchange for member utilities to benefit from each other's work, and identify how best to work with CEE program committees to ensure program readiness. This last area would include offering to do research that CEE program committees need and helping to create high-level longer-term strategies.

Evidence for CEE's coordination success would include increased shared awareness of performance characteristics for targeted technologies that were previously not well understood; faster development of utility program criteria for targeted ETs by CEE program committees; faster development of shared or individual utility work papers and technical resource manuals (TRMs) for ETs; increased appreciation within the industry of the value of CEE's ET services; and ultimately, shorter time to market and increased market penetration for promising emerging technologies, as compared to the situation without CEE coordination intervention.

E Source was launched in the mid-1980s to help utilities better understand and promote energy efficiency products by collecting, analyzing, packaging, and delivering secondary research on EE technologies and markets and EE program administrations. Services to ET programs are built around secondary research coordination for issues of concern to members.

Evidence for E Source's coordination success would include increased shared awareness of performance characteristics for targeted technologies that were previously not well understood; member avoidance of potential ET performance and market pitfalls; member development or adoption of creative solutions for ET deployment; and increased appreciation within the industry of the value of E Source's ET services.

Regulators

The California Public Utilities Commission (CPUC) has strongly supported utility ET programs and activities since the early 2000s, providing ET program funding with periodic increases since that time. In their 2010 fact sheet, the CPUC describes the role of ET programs in helping the state achieve the energy policy goals outlined in the Long Term Energy Efficiency Strategic Plan,[3] stating, "By reducing both the performance uncertainties associated with new products as well as institutional barriers, the ultimate goal of these [ET] programs is to increase the probability that promising energy efficiency technologies will be commercialized."[4] The CPUC also funds extensive evaluation, measurement, and verification (EM&V) activities for ET programs, intended to validate the effectiveness of ratepayer funding of ET programs and to provide ideas on process improvements.

The CEC has championed broad adoption of targeted ETs in California via its charter for building and appliance energy code-setting as Title 24 and Title 20 requirements.

Other regulators are taking similar approaches. For instance, NYSERDA assists New York State in meeting its energy goals: reducing consumption, promoting use of renewables, and protecting the environment. Part of its funding, which comes primarily from ratepayers, supports research, development, and demonstration, including ET assessment activities that support NYSERDA's mission to "facilitate the introduction and adoption of advanced technologies that will help New Yorkers plan for and respond to uncertainties in the energy markets."[5]

Improving Alignment

Better alignment between all actors in the ET enterprise could lead to greater ET program success. This section examines current alignments between market actors and identifies some opportunities to improve alignment.

Current State of Alignment between ET Stakeholders

As shown in Table 1 on the next page, the groups involved in ET programs have many different attributes and goals, which, in some cases, may lead to gaps in alignment. For example, because of an intent focus on bringing products to market, technology developers may not take the time to understand utility EE program needs. Similarly, ET coordinators intent on delivering services may not fully appreciate EE program requirements. Gaps such as these can lead to inefficiencies or time lost on activities that do not ultimately contribute to the success of an ET initiative or program. Discussions and explorations of these gaps can be an important step toward better alignment.

In addition to gaps internal to individual ET stakeholder entities, additional challenges can arise in the process of building alignment and durable collaborations among multiple ET stakeholders. These include the administrative and financial burdens of cost sharing, the potential for project delays due to collaborative decision making requirements, management effectiveness and accountability concerns, procurement and contracting issues, and trust issues such as

[3] California Public Utilities Commission. 2011. California Energy Efficiency Strategic Plan, January 2011 Update. http://www.energy.ca.gov/ab758/documents/CAEnergyEfficiencyStrategicPlan_Jan2011.pdf
[4] CPUC 2010 fact sheet. Op. cit.
[5] About NYSERDA web page, accessed March 2, 2012. http://www.nyserda.ny.gov/About.aspx

uncertainty about access to project results. A root cause underlying several of these challenges is lack of time and resources—considerable advance planning is needed in all stages of a project for collaboration to work. Another important root cause is the lack of effective channels or venues for communication of ET opportunities. Efforts such as those described earlier may provide the needed coordination via meetings and other channels.

The following section identifies best practices that can contribute to better alignment among seasoned ET collaborators, and promote alignment among potential collaborators who are considering involvement in ET initiatives.

Table 1. Organizational Attributes and Gaps in the ET Enterprise

	ET Stakeholders			
	Utilities	**Tech Developers**	**ET Coordinators**	**Regulators**
Business goals	• Alignment with company targets and safe energy delivery • Provide valuable services to customers, such as EE programs	• Achieve successful and efficient product development and market entry • Grow revenue	• Ensure profitable service offerings to utility members / clients • Achieve recognition as industry leaders	• Ensure safe and cost-effective energy delivery to utility customers • Oversee delivery and societal benefits, such as EE programs
Organizational attributes	Influential, strategic	Innovative, autonomous, agile, influential, strategic	Influential, strategic	Autonomous, influential, strategic
Financial models	Funded by ratepayers or wholesale customers (IOU, POU, wholesale power marketer)	Investor funded, revenues generated from end-use customer sales	NGO or for-profit corporation funded by members or grants	Governmental agencies, taxpayer/ratepayer-funded
Current ET role(s)	Implementer: identifies and transfers best ETs into EE programs, administers functions cost-effectively	Potential beneficiary from favorable ET assessment outcome	Developer/aggregator for ET services	Oversight of ET program impact and cost effectiveness
Goals with regard to ET programs	• Deliver successful new measures to EE programs • Partner with key stakeholders to identify new measure opportunities • Fill the gap between long-range portfolio planning and short-range program development • Increase acquisition and accelerate adoption rates	• Gain approval for utility rebates • Obtain feedback to improve product and marketing • Build relationship with utilities	• Find and grow optimal fit between core competencies and utility ET needs • Deliver valued ET services	• Advocate for cost-effective/successful outcomes from utility ET function • Achieve recognition among peers
Potential ET success indicators	• High ET product throughput/accelerate program adoption • Increased energy/demand savings, cost-effectiveness, and customer satisfaction for ETs in EE programs	• Faster time to market • Utility incentives for product • Increased sales and customer satisfaction	• Increased understanding of ET attributes • Industry recognition of coordinator's value • Ongoing funding for future projects	• Quantified validation of ratepayer ET investment • ET program reproduced in other jurisdictions

Table 1. Organizational Attributes and Gaps in the ET Enterprise (cont'd.)

	ET Stakeholders			
	Utilities	**Tech Developers**	**ET Coordinators**	**Regulators**
Gaps	• Failure to catch performance and market issues • Duplication of efforts • Non-standard practices	• Incomplete understanding of utility business culture and ET/EE program needs • Lack of interest in EE programs	• Incomplete understanding of ET/EE program needs and performance standards • Core competencies mismatch • Duplication of efforts	• Incomplete understanding of technology development process and ET program limitations

Alignment Around Best Practices

ET initiatives can benefit from identification and standardization of best practices. Coordination at the level of establishing best practices would help utilities avoid the time and cost of developing processes around each of the various activities, help the industry assess technologies from a consensus perspective, and enable combining assessment results from different utilities to gain a broader and faster understanding of the ET being evaluated. The following best practices will provide the groundwork for a North American ET agenda.

Technology scanning, screening and assessment selection. Generally, the first step in the ET process, identification of technology gaps and targeted scanning helps pinpoint innovations that warrant further investigation and weed out technologies that appear inappropriate candidates for EE programs. BPA provides one example of a technology scanning methodology in the Northwest Energy Efficiency Technology Roadmap;[6] other organizations have pursued similar roadmaps using different processes. BPA uses a database called E3TNW as their platform for scanning, screening, and selection for assessments. Customizable guidelines around best practices would provide the industry a standard framework for judging new technologies.

Assessments. Using a standard set of procedures to evaluate technologies in the lab or in the field would provide a common basis for understanding technology performance, usability, and potential energy savings. Common procedures also allow combining results from different organizations' lab and field assessments, which is important to understanding how the technology performs under a broad range of circumstances. The current lack of such standards or lack of awareness of standards developed by non-utility entities leaves some utilities at risk of overlooking data requirements or other parameters needed to validate technologies that otherwise won't prove successful in EE programs.

Cost-sharing. Innovative cost- or burden-sharing options that enable all parties to add value to a project would to allow even smaller programs with limited resources to contribute to the collective ET assessment and reporting efforts. Cost sharing has historically proven difficult for

[6] Accessed March 6, 2012: http://www.bpa.gov/corporate/business/innovation/docs/2010/NW%20Energy%20Efficiency%20Technology%20Roadmap%20March%202010.pdf

even seasoned collaborators to handle efficiently. ET practitioners may gain insights from entities that have successfully managed collaboration in other fields, such as Utilities Service Alliance, Inc.[7] and SEMATECH[8].

Information sharing. Well-established ET programs have willingly shared their information with newer and smaller programs. Best practices that recognize the value of two-way information exchange would enable greater reciprocity and ensure that the lessons and data of a range of ET experiences are available for the benefit of all. In addition to the existing ET databases developed by ACEEE, ETCC, and BPA's E3T program, CEE intends to offer an ET catalog and U.S. DOE has proposed developing a Technology Screening Web Portal that could be valuable for ET collaboration efforts. Recent years' efforts by US DOE[9] and PNNL to provide robust, objective documentation solid state lighting performance and field trial results provide another approach to information-sharing best practices.

Transition to EE programs. The success of ET initiatives depends on moving well-documented new EE products and services into programs rapidly and cost-effectively. This may require regulatory review and approval. Standardized criteria for when and how an ET product can be included in EE programs, including uniform work paper requirements, would accelerate and reduce the cost of this critical step. In combination with ET databases, a shared work paper archive would enable an efficient, uniform approach to establishing new EE measures and programs. Another key contribution based on collaborative roadmapping or similar activities is aligning efforts throughout the commercialization / market transformation cycle, including setting near-term to mid-term (5 year) technology performance goals. This can help define and smooth hand-off processes between emerging technologies programs and marketing/incentive programs, including the timing and connection with codes and standards initiatives.

EM&V: Standardized protocols around the processes and types of data to be collected for EM&V would lead to faster, more meaningful results.

Recommendations and Topics for Further Study

This paper has highlighted areas where coordination can improve the efficiency, economics, and effectiveness of ET program operations and impacts, and examined gaps in alignment between program implementers and providers of coordination services in North America. The authors believe that the EE industry organizations already engaged should align their efforts to fill these gaps, and that additional organizations will get involved where there are unfilled opportunities to add value to North American ET endeavors.

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[7] The Utilities Service Alliance, Inc. is a private entity that provides a business platform for its members to collaborate in nuclear power plant performance and economic benefit initiatives. See http://www.usainc.org/index.html.

[8] SEMATECH is a global organization of semiconductor industry participants focused on reducing the time from innovation to manufacturing, by developing strategy, creating collaboration opportunities for members, and conducting strategic R&D. See http://www.sematech.org/corporate/.

[9] See DOE's Solid State Lighting Program at http://www1.eere.energy.gov/buildings/ssl/

The introduction to this paper identified three key ET objectives for North America:

- identifying key emerging EE technologies,
- defining large scale coordinated ET efforts to support collective EE savings goals, and
- establishing efficient, robust structures for cost sharing and resource sharing among partners.

Of these, the third objective, which covers collaborating on ET assessments as well as standardization, sharing costs, resources, and results, has proven particularly challenging and elusive for most utilities and their non-utility partners.

Utilities and other ET stakeholders have two structures available to help them achieve these objectives—assembling *ad hoc* groups such as the West Coast Utility Lighting Group or retaining coordinator organizations such as those described earlier in this paper.

Regardless of the structures and approaches selected, several important and urgent challenges remain. For instance, a key area of ET program engagement involves working with technology developers, manufacturers and vendors to accelerate the process of bringing products to market. Relatively little is known about the effectiveness of this activity.

Although this paper focuses largely on opportunities for improving alignment between utility ET programs and non-utility partners, significant opportunities remain to strengthen collaboration and alignment among utilities.

Finally, since most utility ET programs are part of EE portfolios, they are subject to evaluation, measurement and verification (EM&V). Standardizing and improving EM&V protocols for ET programs represents a significant area of opportunity for investigation and improvement. ET programs are unlike other EE programs in most respects, and require further development of specific EM&V approaches to assure timely and accurate evaluation of program processes and impacts.

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