

A Streamlined Solution for Hard-to-Reach Small Industrial and Agricultural Markets

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ABSTRACT

Crop plants often find themselves in an ironic situation. Attentive farmers provide fertilizer and water at just the right time. Consequently, phosphorus that the plants need to prosper lies within easy reach right there in the root zone. Yet, the plants don't take much of it in – a large fraction of applied phosphorus fails to fulfill its intended purpose as a plant nutrient. Why?

Because much of the phosphorus appears in a chemical form that the plants are unable to use (Schactman, Reid, and Ayling, 1998).¹ So it is with energy efficiency incentive programs among small farms and industrial customers. Incentives are available, within reach, yet they go unused.

This paper describes a solution to address “the incentive uptake issue” among small industrial and agricultural customers. The key isn't knowledge, funding, or any particular form of incentive, but organization. Can delivery be organized to meet the utility's need for reliability and cost effectiveness while realistically acknowledging constraints faced by small or rural customers? Yes! The streamlined implementation model achieves this by integrating:

- Field engineering expertise to provide “on-the-spot” identification of opportunities, analysis, and measurement and verification (M&V).
- Single-point-of-contact customer service to seamlessly facilitate customer decision-making, application, and approval.
- A quality process that assures claimed savings are there for utilities.
- Personalized outreach to vendors by the same field engineers to solicit leads and provide individualized training.

Customer touchpoints are designed to minimize hurdles and catalyze action, resulting in more participation – over 5,000 projects to date – while developing capability among local vendors and contractors to deliver more efficient systems.

¹ “In many agricultural systems in which the application of P to the soil is necessary to ensure plant productivity, the recovery of applied P by crop plants in a growing season is very low, because in the soil more than 80% of the P becomes immobile and unavailable for plant uptake because of adsorption, precipitation, or conversion to the organic form.” <http://www.plantphysiol.org/content/116/2/447.full>

Introduction

Small businesses² make up the majority of most utilities' non-residential customer base. They create approximately half of all jobs. They navigate in competitive environments. They often desire to be energy efficient, but their wherewithal to achieve efficiency varies greatly. And, as with large customers, they pay into the accounts that fund utility investment in demand side management programs.

However, smaller industrial customers and farmers tend to find utility incentive programs frustrating, if they find them at all. As one influential farm bureau director put it, "I look through the rebates on the website – I don't see much there for us." This is understandable, both from the customer standpoint and the utility perspective. Locale-specific prescriptive rebates for farms and small industry are time-consuming and expensive for utilities to develop. Of course, small customers can always look to custom incentives as do the large customers, but custom incentives are more complex to comprehend and apply for. Time is in short supply for small business managers – they drink from the proverbial firehose all day every day. And utilities find the custom project process costly to administer for small projects. The net result is our current situation among farmers and small industrials in many areas: incentives for industrial and farm equipment are on offer, yet uptake remains minimal.³

What is a utility to do about this structural dilemma of under-participation by the majority of its producer-customers?

What is a Streamlined Approach?

The authors have been experimenting for ten years now with an alternative organizational structure, currently operating in five program variants on the West Coast and in some Rocky Mountain states. Termed the "streamlined approach," the focus is not on definition of specific incentive mechanisms, but on organizational structure and management of the delivery team. Somewhat surprisingly, prescriptive incentives, often thought to be the low-cost, easy-to-administer method of inducing customer participation, play only a minor role. An adapted version of the custom incentive process is the main catalyst for participation and savings.

All the elements of a custom incentive are present – technical support, engineered savings calculations, savings-based incentives, verification framework, quality control (QC) review, incentive agreement, a role for vendors – but administration is condensed into a flat, highly

² "Small business" can be defined in a number of ways. The Small Business Administration considers firms with fewer than 500 employees as small. Another common, more restrictive view uses 50 employees as the threshold. Some utility rate schedules define an account with less than 20 kW peak demand as small. (This is truly small!) For the purpose of this paper, we regard a business as small if peak demand is less than approximately 200 kW or if annual energy usage is less than approximately 1,000,000 kWh. The theme of the paper is also applicable for smaller projects in large customer facilities. It's the size of the savings opportunity that determines relevancy for the streamlined approach, not the size of the customer or facility.

³ Participation may be minimal for non-lighting, but robust for lighting. Many excellent program innovations have effectively addressed the lighting needs of smaller customers. With "the LED revolution" upon us, most lighting suppliers are able to deliver energy savings even without making the effort to develop specialized energy expertise. This is less so for non-lighting, process-related suppliers such as refrigeration and compressed air contractors, where energy-related benefits are more ambiguous to quantify and the cost of efficient solutions is not coming down each year.

responsive team of Customer Service Engineers (CSE). Each CSE is able to engage customers and vendors, provide engineering calculations, conduct measurement and verification (M&V), and provide administrative support. Comparing the streamlined approach with a more traditional custom project approach is like comparing a paramedic crew to a hospital's emergency room team. Both seek the same outcome, both use complicated tools, and both use established processes while also exerting a high degree of judgment. But a streamlined approach involves only one or two staff in a project, and these staff proactively go to the customer – they don't wait for the customer to come to them. CSEs are cross-trained to address all the needs of an energy-saving project, including administrative, analytical, and M&V requirements. Larger projects that warrant full M&V and more elaborate documentation are referred to the standard offer program for full custom treatment. Thus, streamlined is essentially a lean organizational design delivering custom measures using a degree of M&V rigor commensurate with the size and complexity of the project.

Vendors (sometimes referred to as trade allies or trade professionals in various program contexts) typically play a significant role in the streamlined approach. By reaching out to vendors and making them aware of incentives that their customers may receive for upgrading to more efficient equipment, CSEs get introductions to customers at precisely the right time, when they are considering a change to or expansion of a system. CSEs are then positioned to proactively help both vendor and customer identify efficiency opportunities, quantify benefits, and make the upgrades happen.

The types of vendors that the CSEs seek out are those who sell and service process equipment used by industrial and agricultural customers – compressed air, agricultural and industrial pumps, refrigeration, motors and drives, chillers, fans, irrigation, and control systems. CSEs also develop relationships with industry and vendor associations (e.g., farm bureaus, the Refrigerating Engineers & Technicians Association [RETA] and government agencies (e.g., Natural Resources Conservation Service [NRCS], US Department of Agriculture Rural Development). Networking among these channels is the primary source of project leads.

There need be no formal relationship between the utility program and these vendors. The program positions itself as vendor-neutral and does not recommend, approve, or enroll vendors. CSEs will work with any vendor, so customers contract with whomever they wish to provide and install the equipment. In this way, responsibility for performance clearly remains with customers and their chosen vendors. The utility isn't "bringing in outsiders" to make improvements and then move on, leaving the customer's usual maintenance contractor to cope with the new equipment. (In practice, it seems this is a more sensitive issue with specialized process equipment and HVAC than with lighting.) At the same time, since the customer will not receive the incentive unless the new equipment is functioning and saving energy as intended, the program retains a lever to withhold payment until any performance issues have been corrected.

Streamlined Program Design

How does the streamlined approach get results? What's the difference between streamlined and a "standard offer" custom project? The first element is administrative: If prescriptive rebates are like the 1040EZ tax form, and traditional custom is like the full-meal-deal 1040 with a full complement of schedules and worksheets, streamlined administration is like the 1040A – just complex enough to be complete and reliable, but not more. The effort involved is commensurate with the small- to mid-size magnitude of the project.

The second element has to do with lead acquisition: There is a specific role for trade allies (e.g., contractors, vendors, distributors, manufacturers' reps). Relationships with trade allies produce most of the project leads. But the relationship doesn't have to be formal. You don't need a network of registered vendors and contractors, although that is an option.

A good streamlined program fully recognizes the needs of the utility while addressing realities that constrain ag and small industrial businesses. To provide funding for a savings resource, utilities and commissions need documentation from program implementers providing for such matters as:

- Confirmation of customer eligibility – correct rate schedule, sector, etc.
- Clarity about baseline definition
- Reliable savings estimate
- Some form of verification that pre-existing and post-install conditions are actually as represented on the application
- An agreement spelling out the offer and acceptance, addressing terms, conditions, protections, and remedies
- A means of paying the incentive and issuing a W-2 at year-end

Customers need insight into the benefits and costs of the proposed investment in efficiency. They often cannot generate this insight on their own. As one grower recently phrased it when asked about his top five priorities: “labor, labor, labor, pest management, and water.” Industrials would add safety, quality, and compliance in various forms. In other words, they are preoccupied. Energy efficiency is important, but less urgent than other items in the priority stack. Responsive technical assistance and crisply communicated value propositions can make the difference between participation and inaction.

In the streamlined approach, CSEs are deployed as multi-role field representatives handling outreach, engineering, and parts of administration. This may seem counterintuitive. Wouldn't it be more efficient to define specialized roles and keep the high cost staff focused on their specialty? For the program, perhaps. For the customers and their vendors, no. A technically minded program representative with the expertise to develop and maintain relationships with specialized suppliers is ideally positioned to switch hats and collect the information to do the engineering on potential project leads discovered during a site visit. Then she/he can switch hats again and start the admin process right there on the spot. This provides customers exactly what they need to participate: quality information on which to base a decision with the least amount of time expenditure and a familiar single point of contact for follow-up.

The CSEs perform three essential functions:

Outreach. CSEs elicit leads by developing personal relationships with vendors who sell into the ag and industrial markets. Through these relationships, CSEs build up the vendors' interest in energy efficiency and cultivate contact with prospective end-use customers considering an equipment upgrade. CSEs are prepared to converse in depth not only about program procedures and eligibility, but also the energy-related implications of alternative equipment choices, control algorithms and set points, and sourcing.

Analysis. With custom measures analysis is necessary to estimate savings. Field engineers are trained to understand the broad variety of systems they are likely to encounter. Analysis for measure types that appear frequently is done with an established calculator, a well-vetted Excel

file, and in some cases with Visual Basic. The analysis takes site-specific inputs (equipment ratings, load profile and duration, operating set points and conditions, estimated costs) and gives outputs for energy and demand savings, incentives, and payback. Measure opportunities that don't fit into an established calculator are analyzed on an individual basis. Inputs are derived from equipment nameplates, cutsheets, site observations, discussion with operators and managers, and in larger cases measurements and data logging.

Admin. While collecting information for the savings analysis, the other documentation identified above may be efficiently completed as well. In a single interaction, everything needed to get a project analyzed and submitted may be assembled. There is no need for subsequent appointments or referrals to other staff, nor is it necessary for the customer to do further research and read up on how to participate. The CSE deals with all of this and acts as the single point of contact.

This model is designed to identify savings opportunities on the smaller end of the size spectrum in agricultural and industrial settings, then get right to the point in a way that provides what the utility needs while acknowledging constraints faced by these customers. It concentrates expertise into individual field reps – the CSEs – so that they are positioned to address every aspect of participation in one or two visits or calls with a customer, thereby making the most effective use of customers' limited time. This is often sufficient to elicit participation where there had been little before. If the customer does subsequently go “radio silent,” the CSE proactively re-initiates contact to provide encouragement, support, and clarification.

What About Prescriptive?

Prescriptive measures are useful and welcome in a streamlined program. However, starting a program with the idea of developing a robust set of prescriptive measures for industrial and agricultural customers is a difficult, time-consuming undertaking. To define unit energy savings for a prescriptive measure, one needs to study a sample of installations that is representative of the population likely to be encountered during subsequent implementation. Among industrial and agricultural customers, such a sample typically isn't available. Compounding the difficulty, it may be necessary to differentiate savings by building type, climate zone, process type (in the case of industrial), and operating schedule (e.g., one shift vs three, seasonal operation in agriculture or industry), which renders valid sample design intractable. Even if the eventual study were sufficiently reliable, the first thing implementers typically encounter when using a new deemed measure is a situation that fails to meet eligibility criteria for one reason or another – wrong building type, horsepower outside the defined valid range, wrong climate zone – so that the application doesn't qualify and must be rejected. Imagine the impression customers are left with when their attempt to participate in a value-enhancing program fails and their time and effort go down the drain.

Rather than initially seeking to define prescriptive measures for industrial and ag applications, we suggest that utilities focus first on implementing custom measures in a streamlined manner, then use the resulting learning over time to substantiate prescriptive measure development for those measures where quantities are sufficient to warrant the development effort.

Streamlined Program Results

“Anytime you make something simpler and lower friction, you get more of it,” writes Jeff Bezos, founder of Amazon (Bezos, 2007). This was found to be the case with each successive implementation of the streamlined approach.

Energy Trust of Oregon was the first to adopt the streamlined model in 2008. Small project participation grew from less than 30 projects per year in 2007 to 700 per year in 2016, as shown in Figure 1.

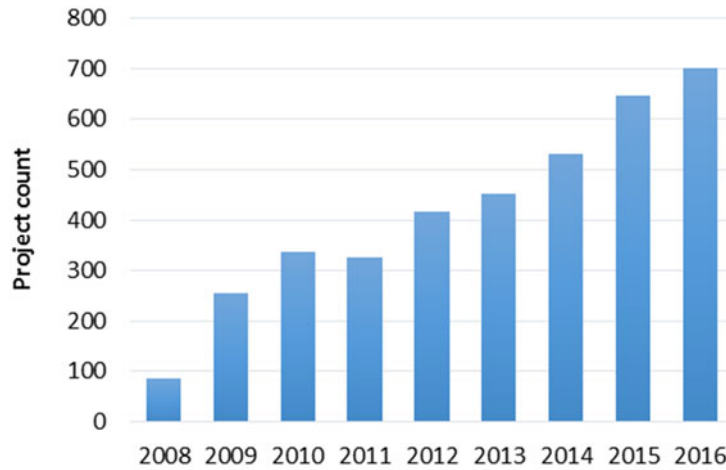


Figure 1. Streamlined program annual project count, Energy Trust of Oregon.
Source: Energy Trust 2017.

Energy savings from smaller projects grew accordingly, from under 2 million kWh/yr in 2007 to nearly 20 million kWh/yr in 2016, as shown in Figure 2. Of these savings, 75% are from custom calculations, and 25% are from prescriptive measures.

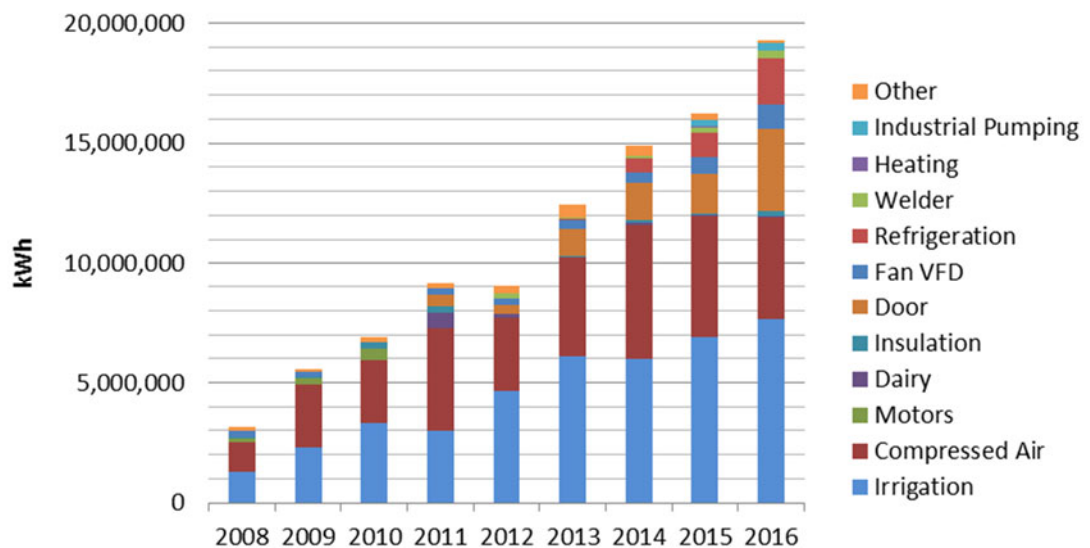


Figure 2. Streamlined program first year kWh savings, Energy Trust of Oregon.
Source: Energy Trust 2017.

These results are from measures involving industrial process and agricultural equipment and do not include savings from lighting and commercial HVAC, which are handled by other delivery mechanisms. The average custom project is in the 40,000 to 50,000 kWh range.

PacifiCorp's version of the streamlined approach began in 2011 and showed a growth pattern similar to that of Energy Trust in terms of project count and savings realization. See Figures 3 and 4 below. The 2016 results illustrates an important feature of the streamlined approach – the volume of participation can be modulated. CSEs may accelerate the rate of program growth by staying involved with the vendors in the market and engaging in proactive outreach. Or they may pull back in order to manage to a program budget limitation or a target in an Integrated Resource Plan. Because the majority of savings typically come from custom projects, the project intake rate is more immediately responsive and less subject to momentum effects that sometimes make budgets challenging to manage in a prescriptive program environment.

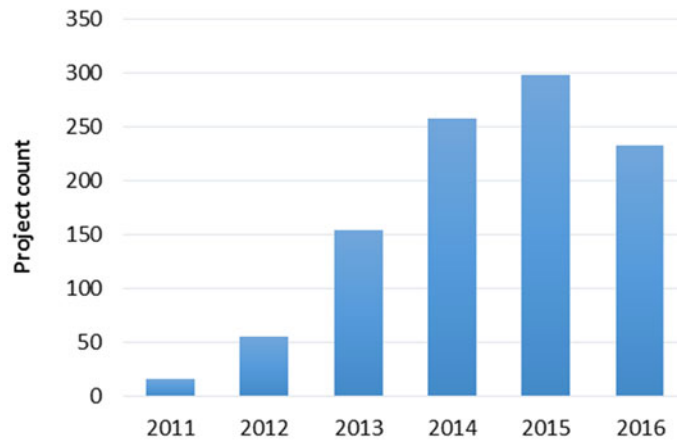


Figure 3. Streamlined program annual project count, PacifiCorp.
Source: PacifiCorp 2017.

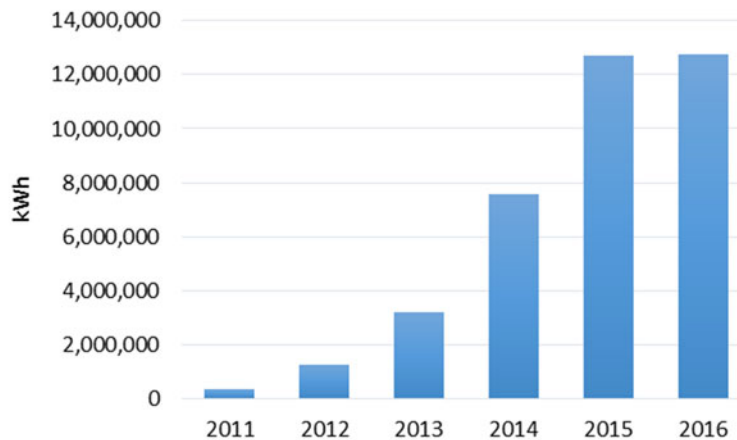


Figure 4. Streamlined program first year energy savings, PacifiCorp.
Source: PacifiCorp 2017.

Idaho Power's streamlined program has seen similar growth to over 12 million kWh/year since inception in 2014.

With Amazon, order fulfillment appears simple to the customer, but there is considerable complexity behind the system. The streamlined custom approach is a product of complexity as well.⁴ The Excel-based savings calculations used by CSEs for the various types of projects (compressed air, refrigeration, fast-acting doors, VFD applications, etc.) were developed using data collected from hundreds of larger projects over many years. During implementation, engineering background is needed to reliably evaluate a system and select appropriate inputs to the calculations. The resulting application process appears relatively simple to the customer, but it's not a simple matter to keep the system performing.

Potential Pitfalls in Streamlined Implementation

This business model is effective and adaptable if internal coherence is maintained. However, if organizational design elements get too far out of alignment, performance starts to suffer, costs increase, and the program will start to falter. Streamlined program operation is like streamlined boiler operation: you can't maintain efficient combustion if the balance between fuel, heat, and oxygen goes out of kilter. As one tunes a boiler to keep it running efficiently, one must tune a program (or for that matter, any business) to keep it running efficiently. Following are ways streamlined program operations can go awry.

Staff selection doesn't fit. The field engineers need a particular combination of training and aptitude:

- Technical background to understand a variety of systems (including safety training)
- Analytical understanding to complete energy analyses
- Sufficient experience to formulate professional judgments when evaluating alternatives
- Communication aptitude to make cold calls, train vendors, ask good questions of operators, managers, and suppliers, and report results effectively
- Initiative to stay on top of many projects simultaneously and keep them moving
- Customer service skills

Get this balance wrong and you will find that either the utility or the customer isn't getting what they need.

Neglect personal relationships with vendors. Vendors don't buy into a program until they trust you. They don't trust you until they know you. They don't know you until they gain experience dealing with you. The best way to make that happen is to show up at their office. It's personal. The fact that you exert the effort to personally show up goes a long way toward opening up receptivity to change and willingness to discuss potential efficiency opportunities with a vendor's customers, particularly if you are bringing new ideas to their business.

M&V creep. If two weeks of data is good, isn't four weeks better? If measuring current with a spot check of power factor is good, isn't measuring true power better? Sure, in a cost-free world

⁴ One is reminded of a quote from Alfred North Whitehead: "...the only simplicity to be trusted is the simplicity to be found on the far side of complexity."

where managers and engineers don't have anything of higher value to do. However, it's important not to lose sight of the fact that the streamlined model focuses specifically on smaller projects with typical savings in the 2,000 to 100,000 kWh range. Experienced judgment is usually sufficient for assessing savings. When getting an auto loan from the credit union, they don't send out an appraiser to write a report on the 2014 Ford Focus you found on Craigslist. When you take out a loan for a \$300,000 house, they do.

Squander customers' time. Customers have limited windows of time in which to evaluate a proposed efficiency upgrade. Time spent ramping up on application processes and requirements takes away from time spent learning about and deciding upon the improvement itself. If you only have a minute to make a difference, talk about things that actually make a difference and simply handle the program processes yourself instead of describing them at length. Lead with results, follow with process.

Misconstrue the logic model. Sometimes there is an impression that the streamlined method, using simple calculators on measures that recur regularly, can be streamlined even further by putting the calculators into the hands of minimally technical energy program staff or vendors. This may work for certain measures where inputs can be assessed with little energy experience and the calculator is easy to interpret. But since reliable outputs are dependent upon quality inputs, this fails where the measure at hand necessitates judgment and interpretation developed through experience with the energy aspects of, for example, refrigeration or compressed air systems.

A calculator is simply a modular version of a custom analysis. Some calculators, such as those used for lighting, are simple. Others, like the Northwest Regional Compressed Air Tool, are more subtle. The user must develop the load profile inputs by watching the system and interpreting its behavior. Assessing a system to get the right inputs is no different from what one does to set up a custom analysis and requires the same judgment.

Fuzzy thinking about the trade ally role. Vendors play different roles in different programs, ranging from connecting prospective customers with program staff on an informal basis to taking comprehensive responsibility for the entire process all the way through installation. It is important to be clear about the nature and level of involvement you expect from a vendor/trade ally/trade professional in any particular program and design the interface appropriately. Do you really need a registration arrangement? Do they derive actual value from training sessions?

Industrial and ag vendors are less numerous and more diverse than lighting and HVAC suppliers. Presenting joint training sessions for disparate trade allies may be impractical, like designing a community college class for two accountants, four nurses, an English major, and three welders. There isn't enough overlap in their areas of interest to provide content relevant for each.

In the streamlined approach, at least in the earlier stages of a program's lifecycle, the vendor relationship tends toward the less formal. Training is one-on-one during visits with vendors and customers. One doesn't systematically rely on vendors to operate calculators or collect the information needed to administer a project, but some may be very helpful as a resource where they have established a pattern of providing accurate information. In fact, some suppliers in the market may be key contributors to a program's growth and success without even realizing they are "trade allies."

Get distracted by automation. Is this a familiar phrase: “I can’t believe people still use paper applications and fax machines!” You won’t hear it from someone who works first-hand with small ag and industrial customers. Do not assume that automated work aids such as an on-line application process or a trade ally registry will make a difference in desired outcomes without first testing to see if this is in fact the case. Automation can be a great help internally. In some circumstances it can do wonders. However, exposing outside customers to automated processes designed to improve internal efficiency may, to them, merely amount to putting a coat of paint on the hurdle still holding them back. It doesn’t solve the “plant nutrient uptake problem.” Automating back office functions in a system that lacks participation only makes it lack participation faster – applying more fertilizer instead of working the underlying issue.

Conclusion

Small businesses have their hands full with market competition, labor, regulation, cash flow, and a host of other pressing issues. Equipment in industrial and ag processes is more varied than that found in commercial lighting and HVAC systems – too varied for direct-install or a purely prescriptive approach. Smaller customers appreciate incentives, but extenuating circumstances in their operating environment often lead to availability issues; existing incentives can be difficult to “take up.”

The streamlined approach represents an adaptation in organizational design to overcome these limitations. The primary design feature is the integration of technical and interpersonal expertise into a single point of contact for a program – the Customer Service Engineer – to ensure reliable savings for the utility despite the small size and variable nature of the project pool. The result is broader, more equitable participation among small industrial and ag customers, excellent savings realization rates for programs, and a specialized community of vendors more able and willing to articulate the benefits of energy efficiency to their customers.

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