

Evaluation Challenges for Generation and Transmission Companies and Electric Cooperatives

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ABSTRACT

Generation and Transmission companies (G&Ts) sell the power they generate to electric cooperatives, municipal utilities and local power companies (collectively referred to as Distributors), which are typically too small to own and operate power plants independently (i.e., self-generate).¹ In addition to generating and selling power to their members, G&Ts perform many functions at a regional level which offer significant benefits to the collective body of public power entities that they serve. Among these benefits are coordinated marketing and education campaigns, environmental programs, credit unions, and energy efficiency and demand response (EEDR) programs. An increasing number of G&Ts have developed EEDR programs that their customers – i.e., Distributor Cooperatives – can in turn offer to *their* members, the residential households and businesses that are the end users of the electricity that is sold. In addition, some Distributors design and run their own EEDR programs.

This paper discusses the challenges faced in evaluating energy efficiency and demand response programs in the complex environment of G&Ts and the Distributors that they serve. This topic is important as G&Ts increase their level of involvement in EEDR programs and face different needs for program evaluation than investor-owned utilities (IOUs).

Summary of the Findings

Key conclusions of this research are:

- G&Ts and their Distributors are effectively delivering and evaluating EEDR programs for the benefit of their end-use customers and power systems.
- G&Ts most often conduct evaluations on behalf of their Distributors due to greater staffing capacity and economies of scale.
- The fact that customer data is separate from the entity conducting the evaluations is a special challenge unique to this community that must be overcome in order for Energy Measurement & Verification (EM&V) to take place.
- Distributors employ a wide range of program data tracking systems and formats, and different billing systems that must be tapped and consolidated in order to carry out EM&V. Consistency is often lacking across Distributors served by the same G&T.
- Lower levels of EM&V rigor are often adequate for the G&T environment when there is a lack of regulatory and legislative requirements for reporting. The exception to this is when EEDR is considered a resource in the power supply mix, which would dictate a high level of EM&V rigor.
- EM&V budgets tend to represent a higher proportion of overall EEDR budgets in the G&T environment as compared to industry standards, falling in the range of 8 to 10%. This is due to the higher costs of data collection and management, lower program participation levels, and the need to coordinate and standardize information across many delivery entities.

Four areas of challenge were revealed in interviews with EM&V managers from three case study G&Ts: East Kentucky Power Cooperative (EKPC), Old Dominion Electric Cooperative

¹ There are exceptions in that some larger municipal utilities may get some of their power from a G&T while generating some on their own.

(ODEC) and the Tennessee Valley Authority (TVA). These challenges, key findings and how they are addressed by the case study entities summarized below.

Table 1. Summary of Key Findings Regarding Evaluation Challenges

Challenge and Findings	How Being Addressed
Challenge Area: Methodology or Rigor Level	
The appropriate level of EM&V rigor should be applied to fit the reporting requirements of all stakeholders to the results, including Distributors themselves, regulators, legislators, power system planners, and other outside entities such as Rural Utility Systems or the various capacity markets in which G&Ts might participate. It's important to make sure Distributors' needs for evaluation results are as important as those of other stakeholders so that the value of EM&V to them is clear.	<ul style="list-style-type: none"> • EKPC and ODEC - Due to limited resources and minimal requirements, most smaller G&Ts are able to conduct low to medium rigor EM&V processes to meet the needs of their stakeholders. • TVA and EKPC - When participating in capacity markets, or including EEDR in integrated resource planning, higher levels of rigor are needed. • All three entities communicate evaluation results in a variety of ways back to their Distributor communities.
Challenge Area: Roles and Relationships	
A good working relationship between G&Ts and their Distributors helps facilitate EM&V. Since cooperation of Distributors for everything from data collection, to customer access (for surveys) to communication of results is necessary, the relationship between the G&T and its Distributors is essential for the success of EM&V. Engaging Distributors early and often in the EM&V process is important and should be implemented. A third-party independent evaluator can often help in this process, as well as instill a sense of fairness.	<ul style="list-style-type: none"> • EKPC is small and very customer service-focused with its owner-members; conducts periodic satisfaction surveys and engages face-to-face with Distributors on a regular basis. • With its very large customer base, TVA has traditionally engaged with its Distributors through a regional association.² • TVA, EKPC and ODEC all employ varying levels of outside third-party independent EM&V support for their EEDR evaluations.
Challenge Area: Data Requirements and Consistency	
The structure and accessibility of data necessary for conducting EM&V is probably the biggest difference between the G&T and IOU environments. G&Ts often don't have direct access to end-use customer data, Distributors may employ different methods for obtaining and maintaining program data and use different billing systems – all of which must be tapped and reconciled in order to conduct program evaluation.	<ul style="list-style-type: none"> • ODEC and TVA – A third-party evaluator collects program and billing data via a secure FTP site that serves to protect customer confidentiality while facilitating data transfer • TVA – Agreements have to be reached, and signed, with each billing system provider to the Distributors in order to obtain billing data for conducting evaluations • EKPC – EKPC has a process in place whereby it obtains member billing data on a regular basis for a variety of purposes, that can also be tapped for EM&V.

² The Tennessee Valley Public Power Association represents most of the 155 local power company members of the TVA system.

Challenge Area: Costs or Budgets

The industry standard for EM&V budgeting is from 3 to 8%. Budgets for G&Ts are often slightly higher due to several reasons including 1) fixed costs being spread over a smaller number of participants, 2) the multiple layers of data collection and transfer that must take place in evaluating a program being implemented across several Distributors, and 3) inconsistencies in the manner and tools used to maintain program tracking and customer billing data that must be reconciled. It is important to show the value that Distributors are getting for participating in EM&V.

- EKPC, ODEC and TVA – In all three case studies examined, the G&Ts conduct EM&V on behalf of their Distributors since the costs of EM&V to any one Distributor would be prohibitive.
- The higher costs for adopting higher levels of evaluation rigor must be taken into consideration when thinking about participating in capacity markets (EKPC) or using EEDR as a resource (TVA).
- EM&V results impact both EKPC and TVA's settlement payment processes, a primary value to Distributors. Improvements to program tracking systems are another major side benefit of the EM&V process for all three entities.

Introduction

G&Ts and the entities they sell power to both play important roles in the delivery of energy efficiency and demand response programs to end-use customers. Historically, EEDR programs have been an attractive customer service to decrease end-users' power bills. For the G&T, well-coordinated EEDR programs can help improve resource planning and the ability to provide stable, reliable and cost-effective service to members and the energy marketplace. In addition, some cooperatives use their DR programs to reduce their share of the wholesale power bill which in turn helps reduce costs to their members.³ EEDR programs enable end-use customers to keep their energy costs under control while providing benefits back to the system. For many smaller local power companies and cooperative entities, EEDR programs are a benefit that they could most likely not provide without the collective resources of the G&T for program design, planning, contracting (if a third-party implementation vendor is used) and carrying out evaluations.

Among G&Ts and Distributors, over 96 percent have energy efficiency programs, according to the National Rural Electric Cooperative Association. NRECA's research also showed 73 percent of Cooperatives surveyed planned on significantly expanding existing efficiency programs over a two-year period (NRECA 2012).

As G&Ts and their Distributors expand EEDR program activities, they need to consider the evaluation needs for stakeholders, members/customers, legislative or regulatory mandates. Legislative, regulatory or reporting requirements (such as for borrowers of Rural Utilities Service (RUS) funds) will dictate the level of effort and sophistication (e.g. rigor) applied to EM&V.

Three G&T EM&V projects are discussed: East Kentucky Power Cooperative (EKPC) with 16 Owner-Members; Old Dominion Electric Cooperative (ODEC) with 11 Members and the Tennessee Valley Authority (TVA) and its 155 Local Power Companies (LPCs). We point out important considerations for developing an EM&V process that respects the unique roles and capacities of the G&T and its Distributors' staff to assist in evaluation while meeting both of their needs for the products of evaluation.

This paper is based upon experience conducting EM&V related research for EKPC, ODEC and TVA. The impressions of the authors are drawn from these experiences and those of other project team members. They involved internal discussions for identifying top evaluation challenges faced as compared to conducting EM&V at investor-owned utilities and other EEDR delivery entities. The second source of information for this paper involved discussions with EM&V project management at EKPC, ODEC and TVA regarding their views on the EM&V challenges faced by G&Ts. For this paper, we define key EM&V terminology as follows:

³The downside is that this strategy effectively shifts costs to the members of other Cooperatives that don't have these same capabilities.

- **Evaluation** – Examining the program as a whole including statistical determination of the overall impact across all program participants.
- **M & V** – An array of data collection and analysis activities that support estimation of net or gross impacts at the individual participant or project level.
- **Measurement** – Actual monitoring, metering, or other equipment instrumentation to calculate load and consumption to estimate savings.
- **Verification** – Visual- or customer-reported installation, plus field-tested performance verification.

EM&V Differences between G&T and IOUs

Before discussing the unique challenges of evaluating EEDR programs in a G&T environment, it is first important to consider how G&Ts differ from traditional IOUs.

Drivers for EEDR and EM&V: IOUs and third-party program administrators (e.g., New York State Energy Research and Development Authority, Energy Trust of Oregon, Vermont Energy Investment Corporation) are subject to regulatory and legislative mandates to deliver programs and conduct and report on evaluations. Public power entities including G&Ts, local power companies, and rural electric cooperatives have historically operated outside of regulatory and legislative requirements regarding the delivery of EEDR programs or the achievement of energy efficiency goals and targets. Instead, G&Ts pursue EEDR programs as a customer service for their members, for integrated resource planning purposes. In some cases, the G&Ts work to coordinate the activities of their Coops to help reduce the wholesale power costs for the system.

Access to end-use customer data: Since IOUs provide electric service to end-use customers, they have direct access to customer data on energy usage (consumption and billing data and metered and load data). G&Ts do not have access to this data, and must work with their Distribution companies to obtain the customer usage data – which essentially serves as the foundation for performing EM&V.⁴

Cost Recovery: Many IOUs have been able to obtain cost recovery from state regulators for the revenues lost as a result of EEDR programs. There is not a similar mechanism in place in the G&T environment. This is a critical issue to many Distributors, and is one that can have an effect on other aspects of EM&V. Some G&Ts mitigate this situation through making settlement payments (TVA) or transfer payments (EKPC) to pay for the savings generated by Distributor participation in the programs. While these payments do not fully enable them to recoup the costs of lost sales, they do represent an important benefit for engaging Distributors.

Primary Evaluation Audience: The primary audience for evaluation results differs between G&Ts and IOUs. For G&Ts, the primary audience is typically the Boards of Directors. For smaller G&Ts, this typically consists of significant representation by their owner-members. The primary audience for IOUs is more likely the state regulators. However, this difference may be changing as more G&Ts become impacted by state legislative and/or regulatory policies, as discussed below.

Changing Market Conditions

G&Ts are starting to fall under the EEDR requirements facing IOUs in recent years. The advent of a growing number of state Energy Efficiency Portfolio Standards and/or legislated or regulated state level targets for energy efficiency have put pressure on G&Ts and their members to step up their EEDR activities including the way they evaluate programs. Twenty four states currently have enacted long-term (3+ years) binding energy savings targets (ACEEE 2012).

Changing market conditions have caused G&Ts and their members/LPCs to (re)consider their approaches to EM&V. These include: the opportunity to bid DSM resources into the capacity markets in regional transmission organizations such as PJM, ISO-NE or the NY ISO and regional initiatives such as the Regional Greenhouse Gas Initiative (RGGI) operating in the Northeastern U.S.

⁴ The exception is that many G&Ts directly serve a few large industrial and commercial customers.

and Canada. Each of these regional entities has specific requirements regarding how the energy savings and demand reductions being bid are to be measured and verified.

As previously discussed, many G&Ts and cooperative entities have been carrying out energy conservation, energy efficiency and demand response programs for their end-use customers for years or even decades. Some G&Ts design and manage centralized programs that their members in turn offer to their end-use customers, while in some other jurisdictions, local power companies develop and offer their own programs.

Three case studies are presented below of how G&Ts conduct EM&V of their energy efficiency programs at varying levels of rigor.

Case Studies

The authors interviewed EM&V management at three G&T entities, covering a range of characteristics such as size, number of states served, number of members served, and the level of rigor being applied in the evaluation of their DSM programs. DNV KEMA Energy & Sustainability conducted EM&V projects for each of these clients in 2012 and 2013 and is familiar with the areas of commonality and difference in regard to EM&V practices and challenges. These companies are introduced below.

East Kentucky Power Cooperative: EM&V Assessment

East Kentucky Power Cooperative (EKPC), a G&T based in Winchester, Kentucky, serves 16 Owner-Members in central and eastern Kentucky. These cooperatives in turn provide electric service to some 1 million end-use customers in 87 rural and suburban counties. EKPC is regulated by the Kentucky Power Service Commission.

EKPC delivers approximately 10 EEDR programs to its 16 owner-member cooperatives. The primary impetus of DNV KEMA Energy & Sustainability's engagement was an assessment of the EM&V function and plans for EKPC to help them prepare for the likelihood of increased reporting requirements.

Old Dominion Electric Cooperative: Outsourced EM&V Function as Cost Effective Option

Old Dominion Electric Cooperative (ODEC), a G&T company, supplies wholesale power to 11 electric distribution cooperatives, which serve approximately 1.2 million customers in Maryland, Delaware, and Virginia.

Tennessee Valley Authority

The Tennessee Valley Authority (TVA) is a federal self-regulated generation and transmission corporation that provides power to 155 local power companies that range in size from 1,000 to 400,000 customers served. Its members encompass both large urban municipal utilities and many rural electric cooperatives. TVA's total generating capacity is 35,000 MW and it provides a range of energy efficiency programs to the residential, commercial and industrial end-use customers of its Local Power Companies (LPCs) under its EnergyRight® Solutions brand. TVA covers portions of seven states.

Interviews were conducted with the lead management in charge of energy efficiency program evaluation at each of the three G&T entities discussed above. The goals of the interviews were to confirm the impetus and approaches they take to conducting EM&V, and to identify evaluation challenges and issues that they face and how they are being addressed.

Major Evaluation Challenges

The three G&Ts polled offered a range of responses to the question of challenges that they face in carrying out EM&V. We have grouped the issues into four categories, Methodology and Rigor, Roles and Relationships, Data Requirements and Consistency, and Costs and Budgets, and discuss the findings regarding each below.

Challenge 1: Methodology and Rigor Levels

Regardless of the level of DSM activity or the reasons for providing them, all organizations that offer such programs want to know three fundamental things:

- Do the programs work?
- What are the programs producing in terms of impacts?
- Are the programs cost-effective?

The types of metrics and methods for measuring these outcomes may differ, but they all involve EM&V. What can vary is the level of evaluation rigor that is appropriate to each G&T depending upon the context for the evaluation. For the purposes of this paper, we define EM&V rigor in three levels as shown in Table 2.

A 2012 study on the applicability and relevance of EM&V standards being proposed by the US Department of Energy (illustrated the unique position of small electric utilities, including G&Ts and Distributors in conducting evaluations of energy efficiency programs (NRECA 2012). This study recognized the financial and staffing limitations and varying capacities of Distributors and G&Ts to undertake EM&V as compared to larger IOUs, particularly in regard to studies of high levels of rigor. The costs can often outweigh the benefits in many, but not all cases. The report commissioned by the National Rural Electric Cooperatives Association, recommended separate EM&V frameworks for these entities. For example, deemed savings under a low rigor scenario, may successfully meet the reporting needs of many small Distributors that conduct evaluation primarily to satisfy annual Rural Utilities Service (RUS) reporting requirements for those borrowing funds.

Table 2. Levels of EM&V Evaluation Rigor

Rigor	Requirements	Most Appropriate Uses
Basic	<ul style="list-style-type: none">• Numeric values of participation statistics (e.g., numbers of customers and measures installed) and applies deemed savings values to estimated energy savings.• Typically uses deemed savings values as found in state or regional Technical Resource Manuals.• May include building simulation modeling techniques for whole building programs• Verify measures through self-reported data collection, such as telephone or mail surveys.	Internal reporting to Board Members and management Resolution of claims for payment Determining program effectiveness and cost efficiency
Medium	<ul style="list-style-type: none">• Visual (on-site) verification or estimation through analysis of consumption records (e.g., billing analysis), building simulation modeling or Statistically Adjusted Engineering assumptions (SAE).• May include the results of customer surveys as part of impact modeling but does not require actual usage measurements.	State regulatory reporting Measuring achievement of savings targets
High	<ul style="list-style-type: none">• Actual measurement of energy usage through on-site or measure-level metering or other instrumentation (e.g., light loggers), and use of statistical analysis of consumption and/or load data and other sophisticated methods.• Relates to International Program Measurement and Verification Protocols (IPMVP).	Participation in capacity markets Levels of reliability required for system planning

The three case study utilities provide a good example of EM&V rigor at each of these three levels.

Company	Rigor Level	Description
EKPC	Basic	<p>DNV KEMA Energy & Sustainability's EKPC project considered regulatory, legislative and market needs for EM&V, internal and cooperative owner-member capacity to support EM&V, and best practices for enhancing its EM&V function. The project involved a series of interviews with all departments involved in delivery and analysis related to EKPC's EEDR programs, review of their past EM&V approaches and consideration of an increased level of EM&V to address capacity market and potential future regulatory or legislative requirements. The authors also interviewed each of EKPC's 16 Owner Members regarding their needs for EEDR evaluation results and capacity for providing data to support EM&V. EKPC represents a G&T that has maintained a basic level of rigor in its EM&V approach to date, but that is increasing the level of rigor applied to meet changing needs discussed below.</p> <p>EKPC's current program reporting requirements are limited and mostly center on justification of the program expenditures to the Board of Directors. Of note is that the Kentucky PSC does not require EM&V reporting for energy efficiency programs at this time. For other stakeholders (EIA and RUS) EKPC currently meets its existing EM&V requirements using a deemed savings approach augmented by program tracking data and limited building simulation analyses. This level of evaluation rigor represents the Basic level, according to the definitions offered in Table 1.</p> <p>However, since EKPC is starting to participate in the capacity markets (PJM), this evaluation approach would be inadequate. In addition, EKPC wishes to be prepared for the possibility of increased regulatory or changing market conditions that might impact the level of EM&V rigor needed in the future. DNV KEMA Energy & Sustainability conducted an assessment of EKPC's EM&V function and methods and made recommendations for enhancing its evaluation approach under scenarios that include PJM market entry and the subsequent EM&V requirements that will entail. At this time, since no further changes are anticipated to be on the horizon for regulatory action regarding energy efficiency reporting requirements, the current basic level of EM&V appeared adequate.</p>
ODEC	Medium	<p>DNV KEMA Energy & Sustainability has been involved in ODEC's evaluation activities for over ten years, and most recently has assisted the organization with pilot programs and a general enhancement of their EEDR activities. ODEC's EM&V needs and interests have changed over time and have maintained a medium level of rigor regarding its EM&V approach.</p> <p>ODEC has a suite of energy efficiency educational, audit and demand response programs, for which they conduct evaluations using a combination of deemed savings and load-research based impact analysis. Because ODEC has no program cost recovery mechanism, M&V is critical to justify continued program support to its Board of Directors. ODEC has outsourced its EM&V function</p>

		to DNV KEMA Energy & Sustainability, under a long term agreement, where the company functions as a third-party independent evaluator, with additional roles taken on over time. According to ODEC, in total, EM&V comprises approximately 10-15% of the annual total program costs.
TVA	High	TVA has a large suite of EEDR programs marketed under its EnergyRight® brand, available to all customer classes and which it implements using a variety of options through its LPCs. Evaluations at a high level of rigor of the two largest residential programs (an in-home and an on-line audit program) were completed in 2009 and other residential and commercial/industrial programs evaluations are being conducted over the next three years. This work entails intensive collaboration with internal EM&V staff, TVA customer service and program delivery field staff in the districts, and data collection from the 155 LPCs and their end-use customers across the seven-state region. The EM&V process for this entity is highly complex while also being the most rigorous of the three G&Ts discussed in this paper in terms of impact evaluation methodology. The reason for this is that, while TVA has no regulatory or legislative reporting requirements for its programs, it considers EEDR to be an essential component of its resource portfolio. Often characterized as an “energy efficiency power plant” TVA’s EEDR portfolio requires significant EM&V rigor to instill confidence in the performance of the EEDR resource.

Challenge 2: Roles and Relationships

While G&Ts may provide EEDR program support, their Distributors conduct the implementation and data collection. While this may seem like a simple point, the implications for EM&V are significant. G&Ts do not have direct access to critical customer data that is necessary for conducting impact evaluations. Logistics aside, the success of EM&V relies heavily upon the roles and relationships between the G&T and its customers – e.g., LPCs, distribution companies, members, or owner-members. G&Ts work collaboratively in setting up processes and facilitating data transfer for EM&V purposes with their Distributors and face numerous hurdles unique to the particular G&T/Distributor relationship structure, including data consistency, confidentiality concerns, and low awareness of EM&V value.⁵ The conditions that facilitate EM&V include transparency in the purposes and approaches to evaluation, adequate time for responding to data requests, education on EM&V value, and involvement in any potential changes to evaluation protocols or rigor.

Critical to the success of evaluation processes (and related to transparency) is the value of one-on-one direct contact between the G&T and its distributors at all stages of the EM&V process such that they are fully engaged as partners in the undertaking. Our research has shown across many G&T engagements that while not all distributors will engage, it is important to invite participation in EM&V planning and execution and to communicate results in a timely manner, with particular attention to metrics that mean the most to the LPC community (e.g., such as savings and customer satisfaction).

⁵ This issue is shared with statewide third-party implementation entities like NYSEERDA, VEIC and other statewide organizations that are also dependent upon others – the IOUs and other distribution utilities - to provide data on end-use customers for evaluation purposes.

Challenge 3: Data Requirements and Consistency

Data requirements for EM&V in turn require that the Distributors have staffing resources and sufficient knowledge to respond to data requests. Since many do not, the G&Ts often handle EM&V on their behalf, to the extent possible. For example, two G&Ts interviewed for this paper – ODEC and EKPC – noted that their Distributors prefer that they handle nearly all evaluation functions.

Finally, data consistency is a major concern for EM&V in the G&T environment. Distributors associated with a G&T may have different data management systems or employ different third-party providers for calculating and issuing customer bills. For example, one Distributor may have hourly interval data for their entire membership population and others may not have any hourly data, but only consumption records. Distributors served by a single G&T may have different Customer Information System platforms, ranging from paper bills to home-grown billing software to one of a number of vendor-developed systems. Evaluators have to take such differences into consideration when developing their EM&V plans and schedules. In some cases, transfer of data is fairly easily accomplished, whereas in others, there are significant concerns over privacy in how customer data is to be handled. Multiple non-disclosure agreements for data transfer may be needed to address these issues with each Distributor involved in a program evaluation. And, to protect customer confidentiality, web-based tools may need to be created for the indirect transfer of data such that it cannot be compromised over email systems nor accessed by unauthorized persons.

Once the roles and needs for data are clearly outlined and understood by all parties, the logistics for data transfer must be put in place. The range of data collection and management systems, and different levels of resources among Distributors requires that any data transfer systems be simple, and be easily accessible to all parties. Ideally, evaluators must be prepared to accept data in whatever format exists across the Distributors involved and ensure the confidentiality of the customer information. A successful strategy that has been employed by ODEC and EKPC is the development of a web-based File Transfer Protocol (FTP) site; password protected to enable each Distributor to enter and view only its customer data, plus selected aggregated information as appropriate. During the course of our research, it was identified there is increased interest among Distributors in evolving these types of data capture and management systems into more useful “dashboard” systems (e.g., giving something back) whereby Distributors can use them for account management and to quickly and easily access and view their own program progress compared to goals, their peers, the collective system or other best practice entities. In short, to the extent that EM&V data capture systems can be designed to also provide a valued service back to the Distributors, the greater likelihood of cooperation and success in obtaining the information necessary for EM&V.

Due to all of the complexities of EM&V requirements noted above, it is clear that relationship management is critical. An individual Distributor may have different perspectives or objectives for program evaluation than the G&T, and so the evaluator must ensure that the EM&V process and outcomes respect and serve multiple needs. Evaluation sponsored by G&Ts will not be successful without the cooperation and ideally full engagement of Distributors. EM&V designs must take into account the interests and capacities of the various Distributors involved in a program to determine what level of involvement are both feasible and desired. Where G&T's have a close relationship with the entities they serve, such as in the smaller cooperative environment, EM&V issues of cooperation regarding data transfer and transparency may be more easily accomplished. For larger entities with a wide range of local entities served the challenges will be greater as the variety of needs and capacities for evaluation will be greater. In both cases, however, the primary conditions for successful EM&V remain communication, cooperation and transparency. If these are in place, the logistics can be effectively managed.

Challenge 4: EEDR and EM&V Cost and Budgets

EM&V costs depend on the rigor level and vary as a proportion of total EEDR budgets between G&Ts and IOUs, and also across G&Ts. The level of expenditures on EEDR programs overall and EM&V as a component are of major concern to Distributors for at least two reasons: 1)

full cost recovery mechanisms are rare in the G&T/Distributor environment compared to IOUs; and 2) there are minimum fixed costs of EM&V that have to be borne regardless of the level of participation achieved.

EEDR programs require budgets and other resources to implement, and these costs are shared between G&Ts and their participating Distributors. Two of the G&Ts discussed in this paper offer EEDR programs provide some level of “transfer payment” or “settlement payment” to their Distributors that carry out EEDR programs based on some level of documentation as to customer participation levels, measures installed and/or savings achieved. As discussed under “Roles and Relationships,” this program activity level reporting varies by G&T and is the starting point for and foundation of EM&V. EKPC and TVA both have settlement/transfer payment mechanisms in place to enable their participating Distributors to recoup some of their program costs and/or as payment for savings delivered. Even so, few Distributors have the benefit of rate recovery for lost revenues that are the result of the lower sales of electricity from the EEDR programs. That is why it is so important for the G&T to communicate the value of EEDR savings in terms of lower overall rates, its role in integrated resource planning and in increased system reliability. At one end of the spectrum, if transfer payments are the only impetus for EM&V, then a lower level of rigor may be adequate. In the case of these broader benefits, however (EEDR as a system resource), a higher level of EM&V rigor and expense is necessary. Experience shows that while some Distributors understand and concur with these benefits to the overall system and to rates specifically, others are less convinced. In some cases such as ODEC, EEDR is viewed primarily as a customer service tool rather than a power supply resource, which is why a low to medium level of EM&V rigor is appropriate to their needs. Even so, the additional value of EEDR to the ODEC system is communicated to its membership and mitigates the lost revenue concern to some extent as a cost of doing business, while helping customers manage their bills.

Many state regulatory agencies specify DSM budgets as being set at a portion of revenues, but fewer direct how much of the total budget should be spent on EM&V. Several organizations in the EM&V industry conduct annual surveys of expenditures as a percentage of total DSM budgets. The ranges quoted in documents from ACEEE (ACEEE 2012), the U.S. DOE (Shiller 2007), and the California Public Utilities Commission (CPUC 2001) range from a low of 1% to a high above 10%. The most often-quoted range of values for EM&V budgets as a percent of total EEDR budget is 3% to 6% for investor-owned utilities. While smaller electric utilities should not spend a disproportionate share of energy efficiency budgets on EM&V, their overall percentage range is likely to be higher considering the smaller program budgets and fixed costs of evaluation that are incurred regardless of the number of participants. For G&Ts interviewed in this report, EM&V represented over 10% of a modest EEDR budget for ODEC, approximately 3% of a large EEDR budget for TVA and an unknown or “to-be-determined” percent for EKPC since they are in the process of expanding both their EEDR programs and their EM&V activity.

The increased level of complexity for obtaining the data necessary for evaluation, at a minimum, would suggest that EM&V budgets would need to be slightly higher in a G&T environment than the industry-standard 3% to 6% of EEDR budgets. At the most basic rigor level, G&Ts delivering EEDR programs carry out a minimum level of program tracking-type of reporting (e.g., numbers of participating customers, numbers and types of measures installed or audits completed), but the levels of EM&V rigor and therefore costs above the reporting minimum level vary. As noted in the NRECA study, deemed savings types of evaluation approaches are increasingly seen as providing an adequate level of EM&V rigor for many G&Ts. In cases where program participation levels are low, G&Ts and their Distributors have to consider whether the costs of more rigorous levels of EM&V are worth the anticipated measurement of savings, or whether it makes more sense to postpone higher levels of EM&V rigor until such time as the activity levels warrant such expenditures of resources and effort. For basic budgeting and planning, it appears that 8% to 10% is more in line with the needs of the G&T/Distributor requirements for EM&V.

Conclusions

This paper summarizes some of the major challenges faced by G&Ts and their Distribution company members in carrying out and conducting EM&V of their energy efficiency programs. These findings were based primarily on examination of three case studies along with the experience of the authors in conducting evaluations of other cooperative entity EEDR programs over the years. A more systematic study of the G&T and cooperative community would provide confirmation of these findings and a wider range of ways in which G&Ts and Distributors are addressing these challenges.

It is likely that various regulatory, government policy and market conditions will cause more and more G&Ts and their Distributors to increase their EEDR activities over the next decade. EM&V of these activities will therefore become a more central consideration in the EEDR planning and budgeting process as reporting requirements, market engagements and system planning needs increase. This paper has outlined a few important areas that should be considered in developing an EM&V process for G&Ts and their Distributors that recognizes the unique challenges that are inherent in this different environment, but that with strong communication and transparency, can be successfully addressed.

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Appendix A: Interview Questions

1. Why do you pursue evaluation of your EE and DR programs?
2. What do you see as the top 3 challenges you face in conducting program evaluations?
3. What level of involvement do your members or local distribution companies have in the evaluation process?
4. What is most important to keep in mind when conducting program evaluation in the G&T environment?
5. What percentage of program budgets do you typically spend on evaluation?
6. Who is the audience for evaluation results and what kind of communications do you find most effective to each?