ENERGY EFFICIENCY:
TODAY'S SILVER BULLET FOR GAS UTILITIES

For years, electric utilities have had to deliver energy efficiency (EE) programs to and for their customers, primarily for regulatory compliance. But why would a gas utility offer EE programs absent such mandates or when mandates are of a much smaller scale? The results of MCR's current work suggest three reasons:

1) **Strategic load growth** opportunities;
2) **Load retention** in the face of rising investment in electrification; and
3) **Environmental, social, and governance (ESG) momentum** that reinforces the ties among greenhouse gas reduction, financial markets, energy equity, and jurisdictional policy and regulation.

One of our clients recently made EE a strategic priority after more than five years of minimizing efforts to develop an EE initiative in response to a weak compliance mandate. Why? This client's circumstances changed, making EE a single, simultaneous path to achieve customer and load growth, defend against electrification (e.g., customer and load retention), and make progress on ESG reporting. In addition, offering gas EE products and services is a growing public policy goal in many states. Aligning business strategy with policy goals is good for a utility company's business and bottom line — especially when EE programs target low-income and underserved communities.

GAS EE AND **GROWTH**

When it comes to customer and load growth, gas utilities want as many customers and burner tips per customer as possible. If a building can be served by an existing or committed main, the gas utility wants the owners or operators of that building to choose gas. In warmer climates especially, the prized burner tips are those related to base loads, such as water heating, which avoid seasonal shut-off and turn-on workload and cost burdens. As we explained in a 2016 paper, "Gas Energy Efficiency for Strategic Load Growth & Retention," gas EE programs can support customer direct gas use for heating and water heating and can make industrial processes such as those related to steam more competitive than they otherwise would be.

Consider this example: At the time of new residential construction, providers of competing energy sources offer customers choices and incentive packages. A modest gas utility rebate to encourage selection of a 0.67 energy factor ("EF") high-efficiency 40-gallon gas water heater rather than a baseline 0.62 EF unit would result in savings of 11 therms per year for the consumer.[1] For the gas utility, these 11 therms per year could be viewed as the acquisition cost to gain 135 therms (the consumption of the 0.67 EF high-efficiency unit) of new load each year rather than lose the customer's entire potential load of 146 annual baseline water heater therms to another fuel. Similar logic can be applied to heating appliances as well.

GAS EE AND **RETENTION**

Obviously, once a building is served by gas, the local distribution company (LDC) wants to keep it that way. Today especially, however, the threat of fuel switching from gas to electric is increasing; heat pump HVAC and water heating systems are a growing problem for LDCs as state policies shift toward electrification to meet climate-related goals. Although the heat pump water heater has technical challenges in some spaces and applications and the gas-hybrid heat pump shows promise, the reality is that electric heat pumps are often a viable solution today, creating a substantial threat for the LDC. Whereas fuel switching was once prohibited by regulators or limited to switching from propane or oil to gas, now fuel switching from any fossil fuel to electricity is gaining support and is already allowed, and even encouraged or mandated, in many jurisdictions.

As shown in our "Gas Energy Efficiency for Strategic Load Growth & Retention" paper, gas EE can be a powerful tool in retaining heating and water heating loads. For example, an existing customer with a typical 0.59 EF gas water heater uses approximately 154 therms of gas per year to operate that water heater. If that customer is tempted to replace the gas water heater with a competing technology (e.g., an ultra-high-efficiency heat pump electric water heater backed by significant rebates from the electric utility and manufacturer), a gas utility rebate would likely induce the customer to stay with gas and purchase a new 0.67 EF high-efficiency water heater consuming 135 therms per year. The 19 therms per year in savings is, in reality, the LDC's customer retention cost to preserve 135 therms per year of gas load, rather than lose all 154 therms associated with the existing water heater, which may be approaching the end of its useful and expected life anyway. Similar logic can be applied to heating appliances.

GAS EE AND **ESG**

The ESG movement has real financial implications: capital markets increasingly demand evidence of greenhouse gas emissions reduction progress, and policy/regulatory implications have become a focus as energy equity and support for lower-income and underserved communities rise in importance. Unless an LDC is part of a fully integrated company engaged in gas from the wellhead to the burner tip, GHG emissions reductions related to production and transportation are of little help with respect to ESG scoring, as these efforts would be limited to addressing pipe leakage behind the city gate. LDCs need to focus on GHG emissions reductions, mainly CO2, from the combustion of gas to document progress on the climate front. Inasmuch as EE by definition means doing the same work with less fuel, gas EE programs are a way to document CO2 emissions reductions.

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[1] All consumption and savings estimates are derived from the 2016 Northeast Energy Efficiency Partnerships Mid-Atlantic Technical Reference Manual, pp. 187-189.

Furthermore, fuel switching from propane or oil to gas, or from electricity to gas in states with a "dirty" generation mix, driven by gas EE programs, can be shown to deliver significant CO2 reductions as well.

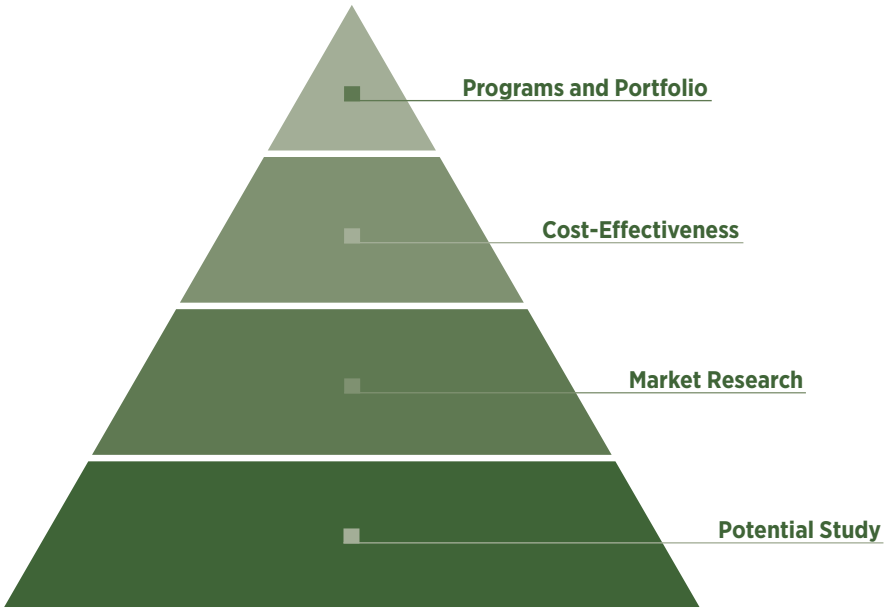
With respect to the policy-regulatory focus on energy equity, gas EE programs can contribute to documented decreases in arrearages and bad debt, reductions in customer shut-offs for nonpayment, and improvement in customer and community energy burdens. And, regulatory EE cost effectiveness requirements are generally relaxed for programs serving low-income customers or underserved communities, making them more apt to receive regulatory approval. Gas EE is a winner when it comes to ESG.

BOTTOM-UP AND **TOP-DOWN** APPROACHES TO GAS EE PLANNING

Having made the case for developing and launching gas EE programs, how should an LDC go about moving a portfolio of gas EE programs from an idea to a reality? The standard practice for gas EE planning is a bottom-up approach (see Figure 1) driven by a "potential study." These expensive, time-consuming, and largely "black box" exercises describe a utility's customer base (e.g., size, segmentation, end uses, and fuels) and identify all the potential EE measures that might be appropriate for it. The potential study includes a preliminary cost-effectiveness analysis given high-level and preliminary assumptions about measure costs, non-measure costs, and other factors. The most cost-effective measures are then considered in light of market research by the client utility in order to design and describe a set of recommended programs that, together, become an EE portfolio and action plan. The EE portfolio is typically rescreened for cost-effectiveness as programs are scaled to target budgets and savings goals.

In working with LDCs, MCR has learned that a finite number of EE measures are applicable to gas customers. Furthermore, gas is a competitive fuel, and LDCs tend to know their customers and markets well. LDCs also tend to be clear about their strategic reasons for seeking to offer EE programs (e.g., growth, retention, and/or ESG goals, as described earlier). For those reasons, LDCs often have a good idea of the EE measures and programs they are interested in before starting the EE program planning process, or they can make these decisions easily. These factors allow application of a quicker, less expensive, and more transparent approach to gas EE planning for some LDCs.

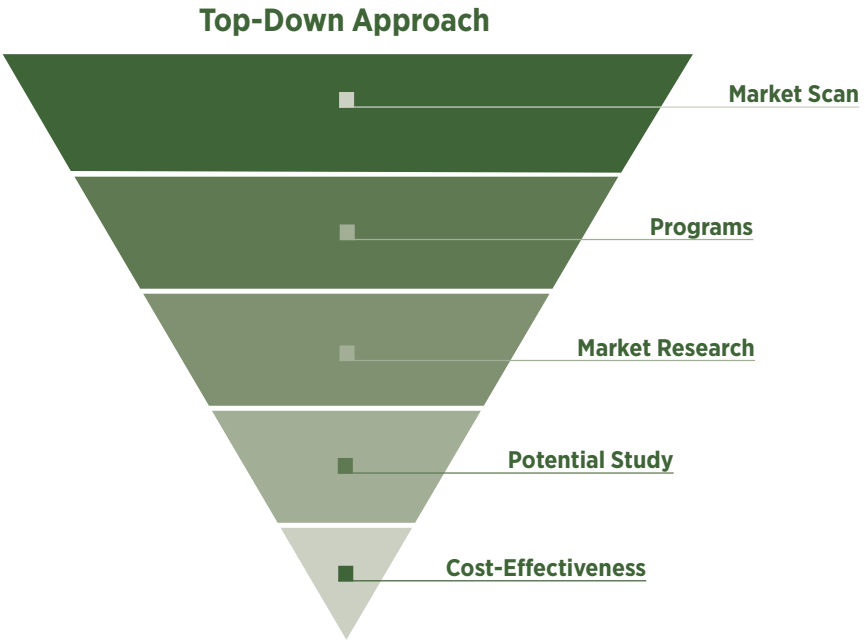
Figure 1: Bottom-Up Approach to EE Planning



Bottom-Up Approach

An alternative to bottom-up planning is a top-down approach (see Figure 2), starting with a market scan to identify available market-appropriate measures to improve customer energy efficiency and existing LDC EE programs that might be leveraged. A market scan results in a short list of programs that can be compared with the LDC's existing market research and knowledge of the customer base, and against any existing EE potential studies in the jurisdiction or neighboring jurisdictions, to yield a final list of candidate EE measures and programs. Then, the utility can quickly scale specific programs for desired budget and savings goals and conduct screening for cost-effectiveness.

Figure 2: Top-Down Approach to EE Planning

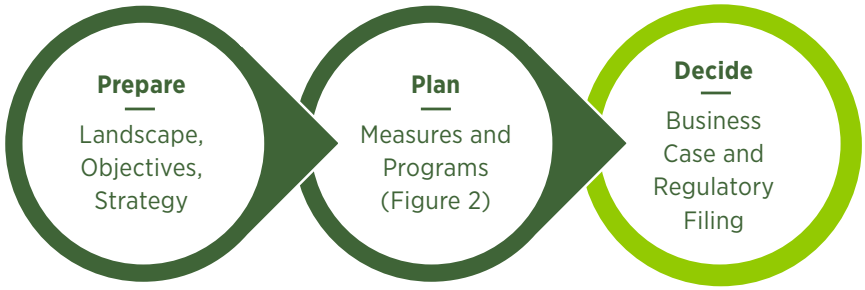


APPLICATION OF THE TOP-DOWN APPROACH

The top-down approach begins with inquiry into the possibility of pursuing gas EE programs and ends with a regulatory filing and subsequent compliance reporting and filings. In a high-level and simplified view, a three-step process allows gas utilities to develop EE programs, make a go/no decision, and file for approval of EE plans. Figure 3 summarizes this process.

Prepare

Figure 3



Gas EE has become nothing short of strategic from a core business perspective. Therefore, the first step engages senior staff, ideally senior management, in developing a gas EE strategy and then championing it throughout the utility. Research into the market, policy-regulatory, and stakeholder environments supports development of the strategy. Utility management should generate clear, measurable objectives and a guiding strategy, which consists of strategy statements, supporting actions, accountabilities and assignments, and metrics. Management should then continuously engage specific functional areas tasked with execution (e.g., cross-functional teams leading the utility's EE activities).

Plan

A thorough market scan of gas EE measures and programs offered by others will fill knowledge gaps in the planning process. However, a generic "off-the-shelf" market scan can be misleading since markets in North America vary considerably in terms of politics, stakeholders and their agendas, regulatory paradigms and priorities, and gas usage drivers, such as weather for the residential sector and business mix for the nonresidential and industrial sectors.

Moreover, the avoided cost of gas that drives traditional EE cost-effectiveness analyses varies by jurisdiction and individual distribution system. Market scans should be shaped by the specific context of each individual utility and consider the factors listed above. Table 1 offers sample results of a market scan to identify measures, incentive structures and levels, and program designs throughout North America. This MCR study discovered 37 types, or families, of gas measures currently in the field. Our study found that these measures are delivered by four types of program delivery structures: downstream, upstream, midstream, and direct install.

Table 1: Types of Gas EE Measures

- Furnace and boiler sizing, equipment and tune-ups
- Water restriction devices
- Per unit (therm, ccf, etc.) custom or performance-based incentives
- Various heating and water heating system controls
- Gas heating and water conversion
- Programmable/WiFi thermostats
- Gas-fired absorption heat pump
- Commercial kitchen equipment
- Infrared heating systems
- Water heating systems
- Various insulation and weatherization measures
- Windows

Decide

Decisions about gas EE programs are facilitated through two steps: the internal business case and the external regulatory filing. The internal business case should answer "Why?" and should do the following:

- Present the strategic context and reasons to pursue EE;
- Quantify the human and financial resource implications for the utility, including both recoverable and nonrecoverable costs;
- Lay out the financial return on investment ("ROI," noting that a positive ROI is often achieved even without EE cost recovery; and
- Describe how the EE initiative(s) will be implemented.

The internal business case leads to a decision on whether to pursue a gas EE portfolio and whether that pursuit will depend on regulatory approval and cost recovery or whether the LDC will commit to funding EE programs with existing allowed revenue.

If regulatory approval is required, or if cost recovery is sought regardless of a mandate, the regulatory filing is the last step in EE planning; it also positions the utility for subsequent compliance filings and reporting. The initial EE program and portfolio filing should reflect an overarching EE and regulatory strategy (see "Prepare" above) as it pulls together all the regulatory requirements associated with EE plan filings and approvals. A strong filing package includes the following:

- Rationale for pursuing EE programs;
- Market research, and market and measure characterization;
- Program descriptions, cost-effectiveness, budget, and production goals;
- Administration and organization design;
- Cost recovery mechanism(s);
- Evaluation, measurement, and verification plans; and
- Data systems and reporting plans.

That is, the initial regulatory filing should address why the utility is seeking to offer EE; how it has developed its plans; how it intends to manage the EE portfolio; and how it intends to track, evaluate, and report on the EE programs.

TAKING **ACTION**

Gas utilities likely already or will soon need to consider development of EE programs and an EE portfolio, whether driven by the financial community, regulatory bodies, or external stakeholders. Therefore, it is advisable to stay ahead of this movement and shape your utility's EE path rather than wait and have it largely shaped for you.

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