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Utility Combined Heat and Power Programs

Issue Brief

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Foreword

This publication was written collaboratively by the U.S. Department of Energy Advanced Manufacturing Office (AMO) staff, AMO support contractors, and Combined Heat and Power Technical Assistance Partnerships (CHP TAPs) staff. Every effort has been made to confirm the accuracy of the provided information at the time of publication.

Utility Programs for Energy Efficiency with Combined Heat and Power

In the last 10 years, utilities across the country have piloted and implemented combined heat and power (CHP) programs for their customers as a means to achieve state energy efficiency targets and other goals.[1] Today, approximately 22 utilities administer CHP incentive programs in at least 12 U.S. states.[2] These programs provide financial incentives to customers that install efficient CHP systems and may also offer technical assistance, including engineering or feasibility studies that help evaluate options and provide information about whether to proceed with a project. CHP programs can meet many needs for utilities because CHP can provide substantial energy savings or emissions reductions in targeted locations at a low cost, based on standard cost-effectiveness tests.

This issue brief provides an overview of energy efficiency portfolios offered by electric and gas utilities that include CHP incentive programs, with examples of program drivers, structures, and eligibility criteria. The document discusses best practices for designing and administering a utility CHP incentive program, including cost-effectiveness tests and market outreach strategies. The issue brief concludes with a table of all current utility CHP programs in the United States, with information on CHP incentives offered by each utility. The guidelines and strategies reviewed are intended to help utilities and their customers understand how CHP can effectively save energy through targeted utility programs.

Defining Combined Heat and Power in Energy Efficiency Policy and Programs

Energy savings derived from CHP systems may be defined as eligible contributions toward state-mandated energy efficiency targets (or portfolio standards). In so doing, state policymakers can enable utilities to offer incentives for CHP systems in their service territories. Utility CHP programs are designed to reduce the overall energy demand on the grid, and utilities can then count energy savings from CHP toward state energy savings targets. Energy savings from CHP may not currently be eligible for a given state's energy efficiency standard, but state policymakers can stimulate creation of utility CHP incentive programs by allowing CHP to count toward these targets. Similarly, utilities interested in a CHP program can seek legislative or regulatory decisions to allow CHP to be included as an eligible technology under a utility energy efficiency portfolio.[3]

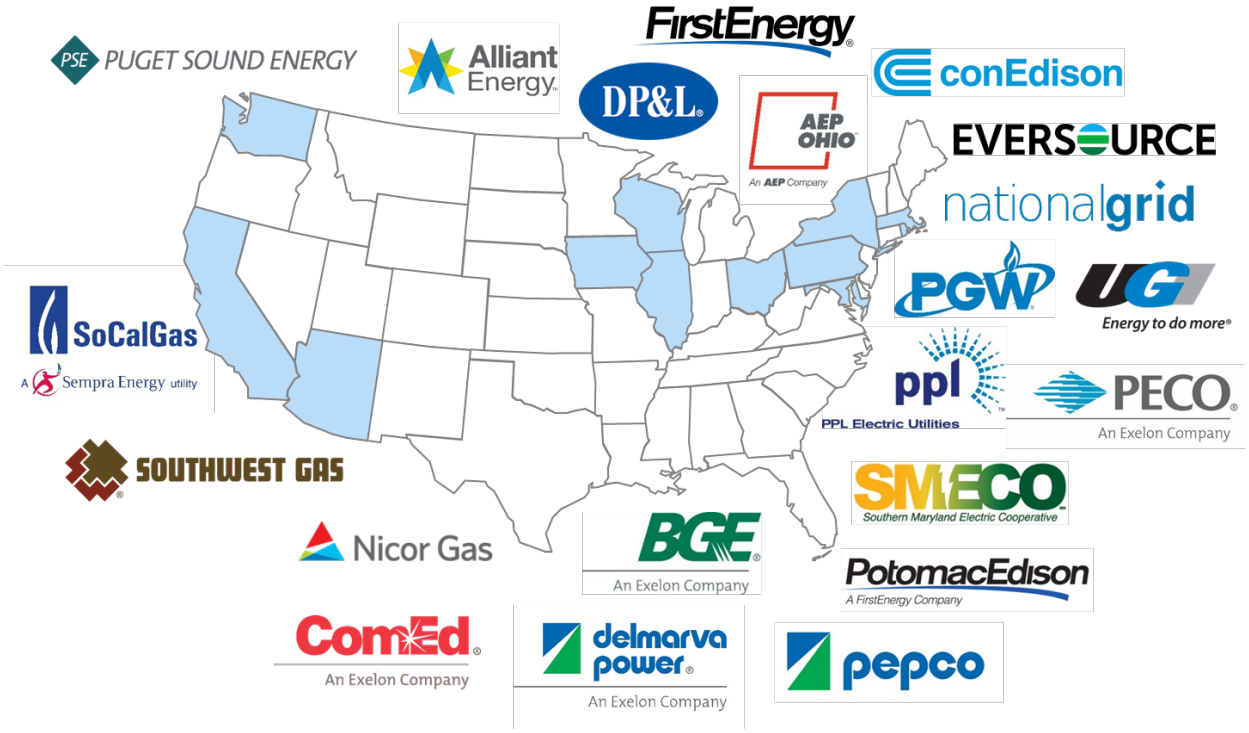
Without authorization to count energy savings toward energy efficiency targets, it can be difficult for electric utilities to justify supporting CHP or other efficiency measures that would reduce electricity sales. However, utilities may also provide CHP incentives for other reasons, including addressing broader system needs, enhancing customer resilience, reducing environmental impacts, or spurring local economic development. There can be several differences between CHP programs established to meet the targets of an energy efficiency portfolio standard and those established as independent programs. For example, CHP programs operating as

[1] In 2010, National Grid and Eversource launched some of the first utility CHP programs, which were started as part of Massachusetts's Mass Save energy efficiency program. Since then, more than 20 additional utilities have launched programs to encourage CHP.
[2] As of February 2020.
[3] In one example, a 2017 ruling by the North Carolina Court of Appeals (Decision No. COA16-1067) reversed a North Carolina Utilities Commission decision that topping cycle CHP was not an eligible energy efficiency measure, so utilities can now use CHP to meet energy efficiency targets. In another example, a 2013 bill passed in Illinois (Public Act 98-0090) that redefined "Energy Efficiency Project" as a measure that reduces the total Btus of electricity and natural gas needed to meet the end use or uses. The bill allowed utilities, including Commonwealth Edison and Nicor Gas, to create CHP incentive programs.

part of a utility's energy efficiency portfolio are typically funded with ratepayer dollars and therefore must pass cost-effectiveness tests and meet other requirements established by state regulators.

In this review, a CHP incentive program is considered a formal program if the utility explicitly and publicly offers a specific incentive for CHP installations.[4] Not included are utility programs that may potentially consider CHP but do not have established procedures or specifically indicate CHP as an eligible measure. The current programs are driven primarily by state policies that include CHP as an energy efficiency technology and allow utilities to count energy savings toward their specified targets. Of the 22 utilities that offer programs, 19 are understood to administer them as part of an energy efficiency portfolio to comply with a state energy efficiency resource standard.[5] Figure 1 shows the states and utilities that currently offer CHP incentive programs. Additional information about each of these programs is summarized as an appendix.

Figure 1. Location of utility CHP programs, 2020



Source: Map prepared by ICF. February 2020. **Note:** Shading highlights states with utilities that administer a CHP program.

While most CHP programs are administered by electric utilities, five gas utilities—Philadelphia Gas Works, Nicor Gas, Southern California Gas Company (SoCalGas), Southwest Gas, and UGI Utilities—offer incentives for CHP. It is more common for gas utilities to deliver CHP programs outside of efficiency portfolios, but these energy providers may offer incentives for CHP in states with a mandate that gas utilities meet targets under an energy efficiency portfolio (e.g., Arizona and Illinois).

[4] Other utilities may offer incentives for CHP installations on a case-by-case basis under custom incentive programs, but this review outlines only utility custom programs that explicitly promote and advertise CHP programs.
[5] Three programs are not administered as part of an energy efficiency portfolio: the Philadelphia Gas Works and UGI Utilities CHP programs are voluntary programs, and the SoCalGas CHP program is an opt-in tariff schedule available to CHP systems.

Combined Heat and Power Incentive Program Characteristics

There are different types of utility CHP programs across varying electric utilities, gas utilities, states, and energy markets. The primary differentiator is whether the program is implemented as part of a state-mandated efficiency requirement. CHP programs used to meet energy efficiency targets are usually required to follow state guidelines, while voluntary CHP incentive programs (most often offered by gas utilities) are subject to fewer regulatory requirements.

Depending on the drivers for developing a CHP incentive program, each utility makes its own choices about how best to design and implement the program, including program administration, incentive type and availability, eligibility, and evaluation. Because most utility CHP programs are used to meet state-mandated energy efficiency targets, this section focuses on different approaches, incentive structures, and eligibility criteria for these types of programs.

Program Approach

A utility typically has two options for incorporating a CHP program into its energy efficiency program portfolio: it can either design a standalone program specifically for CHP or recognize CHP as a custom measure under a pre-existing energy efficiency portfolio. The U.S. Department of Energy's (DOE's) Packaged CHP Accelerator provides utilities with tools and resources to help streamline and simplify CHP program offerings.[6] For example, the CHP eCatalog is an open-source, web-based system that hosts DOE-recognized packaged CHP systems. The system is designed to remove installation barriers, lower project costs and installation times, and reduce the perceived risk of installing CHP by offering comparable standardization of CHP systems and service agreements.[7]

Standalone CHP Programs

Approximately half of existing CHP programs are implemented as standalone incentive programs. A standalone CHP incentive program allows a utility to set aside a CHP-specific budget and staff. This enables the utility to provide a more focused and targeted program, making CHP adoption a priority. These programs target customers and end users that present the best likelihood for project lifetime success. Utilities provide specific details about the program upfront, providing end users and other stakeholders with clarity about program details such as incentive structures and levels, timing, eligibility, and documentation requirements. The information gives customers greater certainty before they begin project development.

Five Maryland utilities—Baltimore Gas and Electric (BGE), Pepco, Delmarva Power, Potomac Edison, and Southern Maryland Electric Cooperative (SMECO)—offer similar CHP incentive programs. They are established as standalone CHP incentive programs, with dedicated budgets, websites, and staff. These

DOE Packaged CHP Accelerator

The Packaged CHP Accelerator is designed to validate packaged CHP technologies and verify improved project performance, cost, and installation practices. Central to the Accelerator is the Packaged CHP eCatalog, an open-source, web-based system that hosts DOE-recognized packaged CHP systems. The Accelerator includes CHP Engagement Partners, which are utilities, states, municipalities, and federal agencies that commit to promoting packaged CHP through the use of CHP deployment or incentive programs.

[6] DOE Packaged Combined Heat and Power Accelerator: https://betterbuildingsinitiative.energy.gov/accelerators/packaged-chp.
[7] DOE Combined Heat and Power Systems eCatalog: https://chp.ecatalog.lbl.gov/.

programs are among the most successful in the country and have collectively supported the installation of more than 15 CHP systems in the state.[8] The EmPOWER Maryland Efficiency Act of 2008 set electricity savings goals for utilities, and in 2012, the Maryland Public Service Commission approved the first utility CHP incentive programs for BGE, Pepco, and Delmarva to help achieve the goals of the Act.

Custom Commercial and Industrial (C&I) Programs

Alternatively, utilities can include CHP as an eligible efficiency measure within their custom energy efficiency programs available to C&I customers. These approaches tend to provide less focused support, have competing budget needs, and may not advertise specifically to potential CHP customers. CHP is one of the more capital-intensive C&I efficiency measures, and CHP implementation also involves other upfront costs and procedures (environmental permitting, interconnection applications, feasibility assessments) that simpler measures do not require. However, for utilities with budget or administrative constraints, a broad custom C&I portfolio may be the most feasible option to incentivize CHP.

Puget Sound Energy (PSE) in Washington State provides an example of a custom program. Washington utilities, including PSE, are required to promote energy efficiency measures and technologies through a portfolio of efficiency programs. To serve the interests of PSE's customers and meet these requirements, the utility began offering a CHP program in 2017 as a measure within its broader custom energy efficiency rebate program. PSE offers a CHP incentive of $0.35/kWh for incremental savings, which is the same rate that is offered for all PSE custom energy efficiency rebates.[9]

Incentive Structure Options

Utilities will seek an incentive structure that encourages customers to adopt CHP and achieve program targets in a cost-effective manner. For standalone incentive programs, the incentive structure is typically a clear and distinct calculation or incentive level used for CHP systems. Custom incentive programs typically offer an incentive structure that is similar across all custom energy efficiency measures or determine a project-specific incentive on a case-by-case basis. Most utilities that offer CHP programs establish incentive values on system capacity (kilowatts), energy production (kilowatt-hours), or some combination of the two.

Prior to determining the appropriate incentive type and amount, utilities may assess the effect that different incentive levels will have on the market and CHP adoption. Industrial, commercial, and institutional customers have different financial requirements, and a detailed market assessment of each customer class can be used to assess CHP economics (e.g., payback period and rate of return) and estimate the impact on future market adoption. Customers that can support large CHP installations may not require as much assistance as smaller customers, thanks to economies of scale; utilities can adjust incentives to target different customer sizes. Customers tend to prefer capacity incentives that provide upfront cost reductions, but production incentives help to ensure efficient operation.

Capacity Incentives

Capacity incentives are payments awarded to eligible planned CHP systems before installation, with the amount dependent on overall system size. Incentive levels are awarded based on system size and efficiency, often regardless of whether the system will be operating at part load and full load. Capacity incentives are issued on a dollar-per-kilowatt ($/kW) basis. For current programs, capacity incentives range from as low as $75/kW to as high as $1,800/kW, usually with tiers based on system size (e.g., $1,200/kW for systems up to

[8] Kelly and Hampson. "A National Review of Combined Heat and Power Programs in Utility Energy Efficiency Portfolios." In Proceedings of the ACEEE Summer Study on Energy Efficiency in Buildings. 2018. http://www.aceee.org/files/proceedings/2018/index.html#/paper/event-data/p113.

[9] For more information, see https://chptap.lbl.gov/profile/187/PugetSoundEnergyCHPIncentives-profile.pdf

1 MW, $900/kW for systems over 1 MW) and a per-project cap (e.g., $1 million, or not to exceed 50 percent of the installed cost).[10]

This type of incentive helps address a major barrier to installation, as it reduces the initial capital a customer needs to install a CHP system. Capacity-based incentives are relatively easy for utilities to administer and easy for customers to understand. However, these incentives can run the risk of lacking long-term accountability compared to other types of incentive programs that require performance verification over time.

Production Incentives

Production incentives are payments awarded for electricity produced or energy savings achieved once the system is operational, typically for a limited time period. Production incentives are usually issued on a dollar-per-kilowatt-hour-generated basis ($/kWh), with payment timeframes in the range of 12 to 18 months after the beginning of system operation. For most utilities that offer production incentives, the incentive ranges from $0.03/kWh to $0.35/kWh.[11] This type of incentive creates accountability for installed CHP systems, requiring customers to properly design and operate the systems. However, this type of incentive does not address the installation barriers associated with high upfront costs.

PECO

PECO serves 1.6 million electric customers and over 500,000 gas customers in the Philadelphia area, making it the largest combination (gas + electricity) utility in Pennsylvania. Utilities in the state are required by Act 129 to meet energy efficiency goals. PECO uses a combination incentive structure to satisfy this requirement. The utility offers CHP incentives ranging from $75/kW to $300/kW based on system size and $0.02/kWh in the first year of system operation, for up to $2 million per project.

Combination Incentives

A combination incentive combines the aspects of a capacity incentive and a production incentive. Under this structure, the incentive is split between an upfront capacity payment (dollars per kilowatt) and later payments (dollars per kilowatt-hour) based on CHP system performance. The capacity incentive portion provides assistance with upfront costs, and the production incentive portion provides accountability to operate the CHP system efficiently and recognizes the value of energy savings, creating a balance and allowing utilities to provide incentives at various stages of CHP project development. Utilities can set incentive levels to prioritize these goals, choosing to provide higher levels either before or after system startup. For example, BGE awards its incentive at three different points during project development: upon design/project approval (10% of total incentive), after commissioning (30%), and after 12 months of operation (60%).

Support for Feasibility Studies

Providing financial support for feasibility studies is among the simplest and least expensive ways for utilities to encourage CHP adoption. These incentives typically cover a portion of the cost of initial feasibility assessments, engineering, and design support. However, they do not address other upfront capital costs or long-term operational costs. For example, Nicor Gas (in Illinois) reimburses customers 25% of CHP feasibility assessment costs up to $12,500. This type of incentive structure can help utilities to encourage CHP with minimal cost and expertise.

Eligibility Criteria

In addition to encouraging CHP adoption in general, utilities can design incentive programs to promote the adoption of high-efficiency and high-performance systems. While CHP has the potential to significantly improve the energy efficiency of providing electricity and thermal energy to a site, the systems can end up

[10] The $1,800/kW incentive offered by Con Edison under its Brooklyn Queens Demand Management (BQDM) program is higher than typical. The purpose is to encourage CHP development in a specific location where limitations exist on the distribution system. The appendix provides details about incentive amounts offered by utilities.

[11] See the appendix for details on incentive amounts offered by utilities.

operating with low part-load efficiency and limited thermal utilization if they are not properly sized to meet baseload energy requirements. In some cases, CHP will not be the best option for an end user, especially one lacking the consistent thermal loads needed to efficiently operate CHP. To ensure that systems are installed at the appropriate locations and that they are properly designed and operated, utilities can set a number of eligibility criteria for potential incentive program recipients, as discussed below.

Minimum Efficiency Levels

Utility programs often require that CHP systems meet a minimum operating efficiency if their owners are to receive an incentive. CHP system efficiency is defined as the amount of useful energy output (both electricity and thermal energy) divided by fuel input. A minimum efficiency is set to ensure that the installed system operates at a level that will provide efficiency benefits. Utility programs typically set minimum efficiencies at 60%–65% or more and clarify whether these are based on higher heating value (HHV) or lower heating value (LHV). Initial approval for a project is typically awarded based on design efficiency, while the actual payment is awarded after the system begins operation and the utility (or a third party) can evaluate the operational efficiency. However, some incentive programs, such as those offered in Maryland, may award a portion of the incentive before installation and award the rest after a post-installation evaluation. Furthermore, utilities can use system efficiency to determine tiered incentive levels, as National Grid does with its CHP programs in both Massachusetts and Rhode Island that offer higher incentives for more efficient systems.[12, 13]

National Grid

To promote energy efficiency in Rhode Island, National Grid offers a CHP program that awards incentives based on system efficiency. Incentive levels were established with higher incentives for more efficient projects:

- Tier 1: $900/net kW for efficiency >55%
- Tier 2: $1,000/net kW for efficiency ≥60%
- Tier: 3 $1,125/kW for efficiency >55% and reduced site energy consumption of at least 5%
- Tier 4: $1,250/kW for efficiency ≥60% and reduced site energy consumption of at least 5%

System Sizes

Utilities can place size limits on CHP systems for incentive eligibility. A restriction may come in the form of an absolute size limit, which disallows participation of any systems over the threshold; an incentive cutoff, in which only the system capacity (in kilowatts) below the threshold is eligible for the incentive; or a simple cap on the total incentive amount. Given program funding constraints, these limitations are implemented to prevent large customers with more favorable CHP economics from receiving large incentives to the detriment of smaller customers that require more assistance. The limits can depend on typical system sizes installed in the area, future needs in the utility's service territory (based on program goals and potential end-user applications), and the amount of funding available for the program. Additionally, to ensure proper system sizing, some programs require that the CHP system be sized to meet total efficiency requirements with no power export so that all the available electricity and thermal energy from the system is utilized onsite.

System Technologies and Fuels

Utilities may limit incentives to specific CHP system technologies and fuels. Certain technologies may be excluded simply through the establishment of a system size limit or minimum efficiency. Utilities could also choose to exclude technologies or fuels that produce relatively high emissions or limit eligibility to renewable fuels to meet state or utility emissions limits or renewable energy portfolio goals. For example, a utility (such as PSE in Washington) may allow only natural-gas-fueled systems to be eligible for its CHP program while offering support for renewable-fueled CHP systems through a separate incentive program. PSE's Distributed

[12] For more information on the Massachusetts National Grid program, see https://www.masssave.com/-/media/Files/PDFs/Business/A-Guide-to-Submitting-CHP-Applications-for-Incentives-in-Massachusetts----January-29-2017-tp.pdf?la=en&hash=EDACA6E7DB0B1482E63AD7ACE188484069EE372C.

[13] For more information on the Rhode Island National Grid program, see https://chptap.lbl.gov/profile/138/RhodeIslandNationalGridCHP-profile1.pdf.

Renewables program offers incentives for renewable-fueled CHP and is part of the utility's plan to reduce its carbon footprint 50% by 2040 and meet the state's renewable portfolio standard targets.[14]

CHP Program Administration

For a CHP program to be successful, a utility must properly manage and monitor the program and its participants, providing continuous support throughout the installation and commissioning process. This can ensure that project funds are used properly to meet targeted energy savings or other goals. State policies may specify the levels and types of monitoring required for these programs, especially when utilities are counting the energy savings from CHP programs toward state energy efficiency targets. Regardless, it is typically in the utility's interest to understand the impact of such a program by evaluating its success. Additionally, utilities will find that their programs are most successful with targeted marketing and outreach toward customers with the strongest CHP potential.

Evaluating Ratepayer Impacts

It is important, and often required by regulators, for a utility to establish a framework to assess a CHP program's cost-effectiveness. Cost-effectiveness tests are used to evaluate the program's impact on end users that choose to install CHP, the overall ratepayer base, the utilities themselves, and society as a whole. The results can then be used to inform future incentive structures and strategies. A utility administering a CHP program under a state portfolio standard is required to report the results of the program's efficacy to a state agency or utility commission, if the energy savings are to count toward energy efficiency portfolio standard goals.

Assessing Cost-Effectiveness of CHP Programs

CHP incentive programs that are funded through energy efficiency standards are required to be cost-effective, with most CHP projects achieving a total resource cost in the range of 1.3–1.7. These values vary by state and can be further increased depending on avoided grid costs considered. To assess cost-effectiveness of CHP projects, BGE requires CHP program applicants to download and submit the "Total Resource Cost (TRC) calculator." Projects must pass BGE's TRC test to be eligible for the incentive.[15, 16]

For cost-effectiveness tests that evaluate the costs and benefits associated with CHP, it is important to capture all the system's attributes, including some that may not be applicable to other energy efficiency measures. For example, recovered thermal energy from CHP reduces onsite boiler fuel consumption, so these savings must also be considered.

Regulators may require the use of one or more of several traditional cost-effectiveness tests, which include the participant cost test (PCT), utility/program administrator cost test (PACT), ratepayer impact measure test (RIM), total resource cost test (TRC), and societal cost test (SCT). While the TRC is the most commonly used, it is important for utilities to consider a range of tests to find the one(s) that work best for their program goals,

[14] Puget Sound Energy. "Carbon Reduction Plan." Accessed 2020. https://www.pse.com/press-release/details/pse-to-reduce-its-carbon-footprint-50-percent-by-2040.
[15] Hampson and Shipley. "Utility Combined Heat and Power Programs – the Hot New Trend in Efficiency." ICF. 2017. https://www.icf.com/resources/white-papers/2017/utility-combined-heat-and-power-programs-the-hot-new-trend-in-efficiency.
[16] BGE. "CHP Program Manual – BGE Smart Energy Savers Program." Accessed 2020. https://www.bgesmartenergy.com/sites/default/files/public/BGE_CHP_Program_Manual.pdf.

the benefits that the utility seeks to measure, and mandated reporting requirements.[17, 18] For more information on using cost-effectiveness tests within a CHP program, see "Using Cost-Effectiveness Tests to Design CHP Incentive Programs," which can be found at https://info.ornl.gov/sites/publications/Files/Pub51866.pdf.

Implementing Outreach Strategies

The most successful CHP programs have robust market engagement programs, including a targeted marketing and outreach strategy, customer education initiatives, and technical assistance incentives and/or opportunities for potential CHP customers. Many of the successful utility CHP programs include a budget for a dedicated campaign to attract end users and customers. General marketing increases overall awareness of the program, but specific outreach efforts conducted in partnership with existing CHP facilities and CHP project developers can attract the most appropriate and applicable end users. Outreach activities can include a variety of activities such as hosting events (educational workshops, site tours, and industry networking events), distributing education and marketing materials, and offering technical assistance to interested end users. Many successful CHP programs have shown that educating certain market sectors can provide a base level of understanding and facilitate knowledge-sharing among potential CHP end users. End users often need assistance in visualizing real projects and opportunities to talk with other system owners and vendors.

NYSERDA CHP Program

Although not a utility program, the New York State Energy Research and Development Authority (NYSERDA) CHP Program provides an illustrative example of a successful outreach strategy. The program's success was due in large part to a robust market engagement program. Efforts included distribution of educational materials such as fact sheets, case studies, and technical assistance tools, as well as site tours, expos, and workshops designed to educate potential users and connect them with qualified CHP suppliers. Through these events, customers were able to engage with other organizations that had already installed CHP, learn about the CHP development process and timeline, and interact with the CHP developer community. NYSERDA provided clear and actionable information to potential CHP customers and worked with strategic partners for a one-to-many outreach strategy.

Utilities also focus on educating and targeting specific customers that could benefit the most from CHP, such as those with high resilience needs or significant thermal demands. For example, BGE regularly conducts focused group meetings with representatives from multiple sectors: hospitality, healthcare, education, manufacturing, wastewater treatment, state or federal government, and agricultural farms. The various stakeholders are encouraged to consider CHP. Additionally, while DTE Gas in Michigan does not currently offer a specific CHP program, the utility is promoting the use of CHP through local events and outreach to large industrial and institutional customers. In 2019, the Midwest CHP Technical Assistance Partnership, Michigan Agency for Energy, GEM Energy, and DTE Gas hosted a CHP workshop that included site tours at the University of Michigan and the VA Hospital of Ann Arbor.

Technical assistance programs can also provide critical support to potential customers in the decision-making process. Some utilities offer a variety of technical assistance capabilities such as free feasibility screenings, engineering analyses, facility walk-throughs, and technical support through the project development process.

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[17] National Action Plan for Energy Efficiency (2008). Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policymakers. Energy and Environmental Economics, Inc. and Regulatory Assistance Project. November 2008. https://19january2017snapshot.epa.gov/sites/production/files/2015-08/documents/understanding_cost-effectiveness_of_energy_efficiency_programs_best_practices_technical_methods_and_emerging_issues_for_policy-makers.pdf.

[18] There are efforts under way to develop a more comprehensive framework for assessing cost-effectiveness of energy efficiency and distributed energy resources. For more information, see https://nationalefficiencyscreening.org/the-national-standard-practice-manual-for-energy-efficiency/.

For example, BGE provides prospective CHP program participants a dedicated CHP consultant that assists end users through the application process at no cost.

Summary

CHP incentive programs produce significant energy and emissions savings and help utilities reach policy goals through increased deployment of efficient CHP systems. For example, BGE's CHP program accounted for approximately 20% of the overall C&I program savings in the 2015–2017 program phase.[19] For the current program phase (2018–2020), BGE anticipates achieving more than 72,000 MWh of savings through the installation of more than 10 MW of CHP at 22 customer sites.[20] At least 22 utilities currently operate programs to encourage the adoption of CHP in their service territories. These programs are administered by electric, gas, and combination utilities, either as part of a larger energy efficiency program portfolio or to meet internal goals and objectives. Additional information about each of these programs is summarized as an appendix.

Utilities have several implementation approaches to consider when designing and administering new CHP programs. Utilities can choose whether to administer a standalone CHP program (which provides greater clarity for applicants) or include CHP as a custom measure, decide which type of incentive to offer (capacity, production, etc.), and study what incentive amounts are needed to sufficiently encourage CHP adoption in their markets and within their program budgets. Targeted outreach and technical assistance are critical program elements needed to ensure customer participation is sufficient to achieve overall programmatic goals.

In some states, CHP may not currently be an eligible resource for meeting state energy efficiency targets. Utilities in these states can pursue opportunities to work with state policymakers to address barriers to greater CHP deployment and create new pathways for capturing the benefits of CHP. Overall, implementing CHP programs can be an effective near- and long-term strategy to help utilities bring more efficient, economic, resilient, and clean power to specific customers and benefits to all users of the electric grid.

[19] Hampson and Shipley, 2017. https://www.icf.com/resources/white-papers/2017/utility-combined-heat-and-power-programs-the-hot-new-trend-in-efficiency

[20] BGE (Baltimore Gas & Electric). 2018. BGE's Semi-Annual Report for Third and Fourth Quarters – July 1 through December 2017 in Case No. 9154. Case No. 9154.

Appendix. Utility CHP Incentive Programs as of February 2020*

Utility	State	Year	Program Type	Custom or Standalone	Incentive Offered
Southwest Gas	AZ	2010	Energy Efficiency	Standalone	$400/kW, $450/kW, or $500/kW up to 50% of installed costs, depending on system efficiency
SoCalGas	CA	2013	Gas Tariff	Standalone	Opt-in tariff schedule with prices based on cost of service and payment terms arranged with customer
Alliant Energy	IA/WI	2015	Energy Efficiency	Custom	$0.10/kWh saved, $200/kW saved, and $1/therm saved
Commonwealth Edison	IL	2014	Energy Efficiency	Standalone	Production incentive of $0.07/kWh for first 12 months, capped at $2 million; prepayment of $60/kW available
Nicor Gas	IL	2014	Energy Efficiency	Standalone	25% of feasibility assessment fee, up to $12,500; production incentive of $1/therm, capped at $500,000
Eversource	MA	2010	Energy Efficiency	Custom	Incentives are the lower of $0.075–$0.12 per annual kWh saved (depending on system size and efficiency) or $800 per average co-incidental kW reduction
National Grid	MA	2010	Energy Efficiency	Custom	Incentives are the lower of $0.075–$0.12 per annual kWh saved (depending on system size and efficiency) or $800 per average co-incidental kW reduction
Baltimore Gas and Electric	MD	2012	Energy Efficiency	Standalone	$1,200/kW for systems up to 1 MW, $900/kW for systems over 1 MW, capped at $2.5 million and awarded over three project stages
Pepco	MD	2012	Energy Efficiency	Standalone	$1,200/kW for systems up to 1 MW, $900/kW for systems over 1 MW, capped at $2.5 million or 50% of total project costs and awarded over three project stages
Delmarva	MD	2012	Energy Efficiency	Standalone	$1,200/kW for systems up to 1 MW, $900/kW for systems over 1 MW, capped at $2.5 million or 50% of total project costs and awarded over three project stages
Potomac Edison	MD	2015	Energy Efficiency	Standalone	$1,200/kW for systems up to 1 MW, $900/kW for systems over 1 MW, capped at $2.5 million and awarded over three project stages
SMECO	MD	2018	Energy Efficiency	Standalone	$1,200/kW for systems up to 1 MW, $900/kW for systems over 1 MW, capped at $2.5 million and awarded over three project stages
Consolidated Edison	NY	2017	Energy Efficiency	Part of BQDM	Part of Brooklyn Queens Demand Management (BQDM) program; $1,800/kW or 100% of project cost, whichever is less
AEP Ohio**	OH	2017	Energy Efficiency	Standalone	$0.035/kWh for systems >1 MW and $0.05/kWh for systems ≤1 MW
Dayton Power & Light**	OH	2015	Energy Efficiency	Custom	Projects ≤500 kW earn $0.08/kWh from first 12 months and $100/kW, up to 50% of net total project cost; incentive is scaled based on efficiency

FirstEnergy**	OH	2017	Energy Efficiency	Standalone	$0.05/kWh for systems <1 MW and $0.035/kWh for systems ≥1 MW for the first 12 months, up to 50% of total project cost
Philadelphia Gas Works	PA	2012	Voluntary	Standalone	Financial assistance for upfront capital costs with on-bill cost recovery, determined on a case-by-case basis; also offers discounted "Cogeneration Service" gas rate
PECO	PA	2014	Energy Efficiency	Standalone	$75/kW–$300/kW capacity incentive depending on size, capped at 40% of costs; production incentive of $20/MWh during the first year; up to $2 million or 50% of total costs per project
PPL Electric Utilities	PA	2016	Energy Efficiency	Custom	$0.03/kWh, up to $500,000 or 50% of project cost
UGI Utilities	PA	2017	Voluntary	Standalone	$750/kW for complete projects (with ≥70% efficiency), up to $250,000 or 50% project cost
FirstEnergy	PA	2017	Energy Efficiency	Standalone	$0.03/kWh or 50% of project costs, whichever is less
National Grid	RI	2012	Energy Efficiency	Large Commercial Retrofit	$900–$1,250/net kW based on efficiency and site energy consumption reduction
Puget Sound Energy	WA	2017	Energy Efficiency	Custom	$0.35/kWh of first year kWh savings, up to 70% of the incremental cost compared to PSE's combined-cycle power plant system

* Utilities regularly review and alter elements of CHP programs. This list includes only utility programs that explicitly advertise a CHP program. Other utilities may offer incentives for CHP installations on a case-by-case basis under custom incentive programs. Utilities including MidAmerican, Ameren Illinois, Kansas City Power & Light, Spire Gas, People's Gas, North Shore Gas, and Duke Energy have employed this approach.

** In July 2019, the Ohio General Assembly passed HB 6, which makes significant changes to the state's renewable portfolio standard and energy efficiency resource standard targets and may affect utility CHP incentive program offerings.

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