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State Technical Assistance: Policies and Resources for CHP Deployment

Introduction

This document was written to support the establishment of state policies that encourage the deployment of combined heat and power (CHP) systems. Below we briefly discuss CHP systems and enabling policies, and provide a list of annotated resources for further guidance.

ACEEE has written at length about CHP systems, which generate useful thermal energy and electricity or mechanical power in a single, integrated system. CHP systems are much more efficient than separate generation of thermal energy and electricity because heat that is normally wasted in conventional power generation is recovered to meet existing thermal demands. CHP systems range in size from tens of kilowatts for single buildings powered by biomass or fuel cells, up to hundreds of megawatts for large industrial or commercial facilities powered by natural gas.[1]

Benefits of CHP accrue to both system owners and utilities. Benefits to owners include: lower overall energy costs, improved reliability and reduced thermal energy consumption.

Benefits to utilities and the electric system include: reduced system energy consumption and overall emissions, reduced demand and grid congestion, deferred or avoided investments in generation and distribution infrastructure, improved system reliability and diversity, and enhanced energy security.

ACEEE's 2009 State Energy Efficiency Scorecard outlines five factors that were considered in scoring states on the degree to which their policies encourage the deployment of CHP systems. Here we will add a sixth – net metering – that is not included in the Scorecard. Clicking on the links below takes the reader to sections in this paper that discuss each of these six factors in more detail. Annotated resources for even further guidance are also provided.

- Standard interconnection rules
- Net metering[2]
- CHP-friendly standby rates
- Output-based emissions regulations
- Financial incentives for CHP
- Inclusion of CHP in an EERS or RPS

Enabling CHP: Leading States

Texas: Helping to pioneer many of the regulatory policies that encourage CHP—and the state with the most installed CHP capacity in the country—Texas has also had an interconnection standard since 1999. The state has CHP-friendly standby rates, and its emissions regulations provide credit for CHP systems. CHP is also included as a key component of Texas' Energy Efficiency Goal. All of these favorable policies have enabled Texas to be a leader in CHP installation, despite limited financial incentives for CHP deployment.

Ohio: Ohio established an interconnection standard in 2007 that provides three size tiers of interconnection procedure based on system size, up to 20 MW. In May 2008 the state enacted an Alternative Energy Resource Standard that includes CHP as a qualified technology. Ohio offers financial incentives for CHP installation, including property and corporate tax exemptions for waste heat recovery systems and Advanced Energy Program Grants through the Department of Development.

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[1] EEA, Inc. 2009. Combined Heat and Power Installation Database. www.eea-inc.com/chpdata/index.html.

[2] Net metering is not included in the State Energy Efficiency Scorecard analysis, but we discuss it here because it affects the economics of small CHP systems.

General CHP Resources

ACEEE CHP website. aceee.org/chp/index.htm.

Brooks, S. et al. 2006. *Combined Heat and Power: Connecting the Gap between Markets and Utility Interconnection and Tariff Practices, Part I*. ACEEE Report #IE062. Washington, D.C.: American Council for an Energy-Efficient Economy. aceee.org/pubs/ie062.pdf.

This report includes the results of a survey of utilities in fifteen states concerning their positions towards CHP.

[DOE] Department of Energy. 2010. Industrial Distributed Energy website. eere.energy.gov/industry/distributedenergy/racs.html

In addition to providing an overview of CHP technologies and benefits, this website includes information on current CHP projects by state and Clean Energy Regional Application Centers (RACs). RACs provide region-specific market assessments, technical assistance, and education and outreach related to CHP and waste heat recovery technologies.

Eldridge, M. et al. 2009. *The 2009 Energy Efficiency Scorecard*. Report #E097. Washington, D.C.: American Council for an Energy-Efficient Economy. aceee.org/pubs/e097.htm.

This most recent edition of ACEEE's annual scorecard of state energy efficiency policies includes a section on CHP that outlines the scoring methodology and provides background on current best practices.

Elliott, R.N. and M. Spurr. 1999. Combined Heat and Power: Capturing Wasted Energy. ACEEE Report IE983. Washington, D.C.: American Council for an Energy-Efficient Economy. aceee.org/pubs/ie983.htm.

This white paper provides an overview of CHP technologies and efficiencies, a short history of their use, regulatory and market barriers to expanded CHP use, and recommendations for overcoming these barriers.

[EPA] Environmental Protection Agency. 2010. Combined Heat and Power Partnership website. epa.gov/chp/.

[ORNL] Oak Ridge National Laboratory. 2008. *Combined Heat and Power: Effective Energy Solutions for a Sustainable Future*. Oak Ridge, Tenn.: Oak Ridge National Laboratory. info.ornl.gov/sites/publications/files/Pub13655.pdf.

This report makes a case for scaling up the use of CHP to 20% of US generating capacity by 2030.

Standard Interconnection Rules

To remain economically viable, combined heat and power (CHP) systems and other distributed generation (DG) technologies rely on the ability to purchase backup power from the electric grid, and to sell excess electricity they generate back to it. The lack of a consistent standard that explicitly establishes parameters and procedures for connecting to the grid drives up both monetary and transaction costs for technology manufacturers and owners, discouraging CHP deployment.

States need not start from scratch when adopting interconnection standards; there are both technical and institutional models at the national, regional and state levels that have been successfully implemented by California, Ohio, Oregon, and other states. See the resources below for further information on standards.

Emerging interconnection best practices include:

- Coverage of all distributed generation technologies (including CHP)
- Use of existing technical standards: IEEE 1547 and UL 1741
- System capacity limits for small systems up to at least 10 MW
- Screens for complexity and size, allowing fast-track processing for smaller, less expensive, less complex systems
- Standardized interconnection agreement forms
- Transparent, uniform and accessible application information and procedures
- Prohibition of unnecessary external disconnect switches
- Prohibition of requirements for additional insurance

The Interstate Renewable Energy Council has produced a list of each state's interconnection standards. Also see the Network for New Energy Choice's 2009 version of "Freeing the Grid" for a state-by-state scorecard on interconnection and net metering standards.

Interconnection Resources

[DSIRE] Database of State Incentives for Renewables and Efficiency. 2010. Rules, Regulations & Policies for Renewable Energy website. dsireusa.org/summarytables/rrpre.cfm.

This online database provides information on current state policies related to net metering and interconnection, as well as links to applicable legislation.

[FERC] Federal Energy Regulatory Commission. 2005. *Standardization of Small Generator Interconnection Agreements and Procedures*. Order No. 2006. Washington, D.C.: Federal Energy Regulatory Commission. ferc.gov/industries/electric/indus-act/gi/small-gen.asp.

This order provided the first national standard for institutional interconnection procedures and agreements related to small generators up to 20 MW in size (larger systems are covered in FERC Order No. 2003). While the rule is an important model for state and local decision makers, it is limited to systems that fall under FERC's jurisdiction, i.e. those involved in interstate transmission of power or wholesale power transactions. Most small CHP systems have capacities smaller than 20 MW, and therefore fall under state or local jurisdiction.

[IEEE]. 2003. *1547-2003 Standard for Interconnecting Distributed Resources with Electric Power Systems*. ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=1225051.

This standard establishes criteria and requirements for interconnection of distributed resources with electric power systems. It provides requirements relevant to the performance, operation, testing, safety considerations, and maintenance of the interconnection.

[IREC] Interstate Renewable Energy Council. 2009. *Connecting to the Grid, 6th Edition*. Latham, NY: Interstate Renewable Energy Council. irecusa.org/wp-content/uploads/2009/11/Connecting-to-the-Grid-Guide-6th-edition.pdf.

This report provides a comprehensive discussion of the institutional and technical issues surrounding grid interconnection and net metering. It provides particularly thorough coverage of interconnection and net metering standards and current best practices, and addresses continuing barriers to the expansion of CHP and other distributed generation systems.

____. 2010a. *Model Interconnection Procedures*, 2009 Edition. Latham, NY: Interstate Renewable Energy Council. irecusa.org/wp-content/uploads/2010/01/IREC-Interconnection-Procedures-2010final.pdf.

This document provides model legislation for state interconnection policies, with associated explanation of key issues, including program capacity caps and treatment of net excess generation.

____. 2010b. *State Interconnection Standards for Distributed Generation*. Fact sheet produced by IREC's "Connecting to the Grid" Project. Latham, NY: Interstate Renewable Energy Council. irecusa.org/wp-content/uploads/2010/05/May_2010_IC_Table.doc.

This document details state interconnection policies, including eligible technologies, applicable sectors and utilities, limits on system capacity, and requirements for net metering and external disconnection switches.

[MADRI] Mid-Atlantic Distributed Resources Initiative. 2005. *Mid-Atlantic Distributed Resources Initiative Procedures*. sites.energetics.com/MADRI/pdfs/inter_modelsmallgen.pdf.

These procedures for grid interconnection were developed by MADRI, a group formed in 2004 by public utility commissions from mid-Atlantic states to provide regional best practices for interconnection of distributed resources. The procedures have been used as the foundation for Pennsylvania's 2005 Notice of Proposed Rulemaking for new interconnection procedures.

[NNEC] Network for New Energy Choices. 2009. *Freeing the Grid: Best and Worst Practices in State Net Metering Policies and Interconnection Procedures*. New York, NY: Network for New Energy Choices. www.newenergychoices.org/uploads/FreeingTheGrid2009.pdf.

This report provides a scorecard of state progress on net metering and interconnection policies. Both the scoring methodology and recommendations for individual state improvement are provided. It concludes with a discussion of worst and best state practices.

State of California. 2000. *Rule 21*. energy.ca.gov/distgen/interconnection/california_requirements.html.

Rule 21 was updated in 2000 by the California Public Utilities Commission to specify interconnection, metering and operating requirements for distributed generators in the state. It has served as a model for other state policies.

[UL] Underwriter's Laboratory. 2001. *1741*. ulstandardsinfonet.ul.com/scopes/scopes.asp?fn=1741.html.

This technical standard deals specifically with safety-related aspects of interconnection.

Net Metering

Although generally associated with renewable technologies, net metering is also applicable to small combined heat and power (CHP) systems. Like interconnection standards, there are many examples from which states may draw when designing net metering rules. However, not all rules are created equal.

According to the Interstate Renewable Energy Council's most recent (May 2010) review of state net metering policies, 43 states and the District of Columbia have net metering rules in place, but less than one-third of those give eligibility to small CHP systems. Those states include: Arizona, Florida, Maine, Maryland, Massachusetts, Minnesota, New Mexico, New York, North Carolina, North Dakota, Oklahoma, Pennsylvania, Utah, Vermont, Washington, Wisconsin, and the District of Columbia.

Net metering allows owners of small distributed generation systems to get credit for excess electricity that they produce on-site. Under net metering rules, the customer installs a bi-directional meter that spins backwards when electricity is being sent back to the grid, offsetting the electricity purchased at another time.

Two aspects of net metering rules particularly affect the economics of distributed generation systems: the means of compensating system owners for net excess generation (NEG), and the rules for carrying over excess generation credits from one month to the next.

Electricity produced in excess of on-site needs over a billing period is called net excess generation (NEG). Many net metering policies allow unused credits from excess generation to be carried over to the following billing period for up to 12 months, at which point any remaining kWh credits become property of the utility. However, a few leading states and the District of Columbia allow NEG to be carried over indefinitely, avoiding the risk to system owners of not being compensated for electricity they produce.

Distributed generation system owners are often compensated for excess generation either at the utility's avoided cost, or, less often, at higher retail rates. The latter is preferable, as it equally values the kilowatt-hours bought from the grid and the kilowatt-hours that distributed generation system owners sell back to it. Compensation at retail rates also decreases payback times for installed systems.

The levying of fees on net-metered systems, along with rules that set overly strict limits on individual system and aggregate capacity size, also serve as barriers to deployment of CHP and other DG systems. Net metering fees, like demand charges, add to the economic burden of CHP system owners, and are often unjustified. Limits on individual and aggregate system capacities can prevent system owners from installing the most efficient or cost-effective systems, and sometimes even prevent them from meeting on-site load requirements. Any size limits should be based only on objective engineering standards and facility load requirements.

Best practices for net-metering include:

- Eligibility for all distributed generation technologies, including CHP
- Eligibility for all customer classes
- System size limits that exceeds 2 MW
- No limit on aggregate capacity of net-metered systems as a percentage of utility peak demand
- Indefinite net excess generation carryover at the utility's retail rate
- Prohibition of special fees for net metering
- Third-party ownership and meter aggregation

The Interstate Renewable Energy Council has produced a list of each state's net metering standards. Also see the Network for New Energy Choice's 2009 version of "Freeing the Grid" for a state-by-state scorecard on interconnection and net metering standards.

Net Metering Resources

[DSIRE] Database of State Incentives for Renewables and Efficiency. 2010. Rules, Regulations & Policies for Renewable Energy website. dsireusa.org/summarytables/rrpre.cfm.

This website provides information on current state policies related to net metering and interconnection, as well as links to applicable legislation.

[IREC] Interstate Renewable Energy Council. 2009a. *Connecting to the Grid, 6th Edition*. Latham, NY: Interstate Renewable Energy Council. irecusa.org/wp-content/uploads/2009/11/Connecting-to-the-Grid-Guide-6th-edition.pdf.

See annotation in Interconnection section.

____. 2009b. *Net Metering Model Rules, 2009 Edition*. Latham, NY: Interstate Renewable Energy Council. irecusa.org/fileadmin/user_upload/ConnectDocs/IREC_NM_Model_October_2009-1.pdf.

This document provides model legislation for state net metering policies, with associated explanation of key issues, including program capacity caps and treatment of net excess generation.

____. 2010. *State and Utility Net Metering Rules for Distributed Generation*. Fact sheet produced by IREC's "Connecting to the Grid" Project. Latham, NY: Interstate Renewable Energy Council. irecusa.org/wp-content/uploads/2010/05/May_2010_NM_Table.doc.

This report documents current state and utility net metering rules, including eligible technologies, applicable sectors and utilities, limits on system and aggregate capacity, net excess generation, renewable energy credit ownership and meter aggregation.

[NNEC] Network for New Energy Choices. 2009. *Freeing the Grid: Best and Worst Practices in State Net Metering Policies and Interconnection Procedures*. New York, NY: Network for New Energy Choices. www.newenergychoices.org/uploads/FreeingTheGrid2009.pdf.

See annotation in Interconnection section.

CHP-Friendly Standby Rates

Along with clear interconnection standards, a second condition for the economic viability of CHP is that the avoided costs of purchasing electricity from the grid be greater than the capital and operating costs involved in building the facility. Excessive standby rates and other charges can upset this balance by adding to operating costs, negatively impacting the economics of CHP systems.

Standby rates are charges levied by utilities when a CHP system experiences a scheduled or emergency outage, and then must rely on power purchased from the grid. These charges are generally composed of two elements: energy charges, in $/kWh, which reflect the actual energy provided to the CHP system; and demand charges, in $/kW, which attempt to recover the costs to the utility of providing capacity to meet the peak demand of the facility using the CHP system. Utilities often argue that demand charges act as a strong incentive for CHP system owners to manage their peak demand.

Regulators typically approve demand charges on the questionable assumption that utilities must maintain capacity equivalent to a CHP facility's peak demand in the case of an outage, and that such outages are common. This view recognizes only the costs to the utility of a highly improbable emergency outage of the CHP system (Casten & Karegianes 2007). It fails to recognize the benefits that highly efficient distributed generation systems provide, including increased system reliability and power quality, and reduced distribution losses.

The use of demand charge "ratchets" further discourages CHP by maintaining a high demand charge, initially levied for a one-time outage, for a period ranging from several months to more than a year. Ratchets thus turn a charge for a one-time demand peak into a long-term fee for the CHP facility.

As noted in EPA (2009), utilities and regulators seem unprepared to forego all demand charges, but there are examples of rate tariffs favorable to CHP that include both energy and demand charges, such as Portland General Electric's Schedule 75, Partial Requirements Service.

Best practices for standby rates include:

- Rates weighted towards energy charges rather than demand charges
- Demand charges based upon the (low) probability of an emergency outage coinciding with a period of grid peak demand
- Elimination of demand ratchets; or, at worst, limiting their use to thirty days

Standby Rate Resources

[EPA] Environmental Protection Agency. 2009. *Standby Rates for Customer-Sited Resources: Issues, Considerations, and the Elements of Model Tariffs*. Washington, D.C.: US Environmental Protection Agency. www.epa.gov/chp/documents/standby_rates.pdf.

After providing a thorough introduction to the economics of distributed generation systems, this paper analyzes three utility tariffs for partial requirement electricity service typical of CHP systems, illustrating the effects of different standby rates on system economics.

____. 2010. Combined Heat and Power Partnership, Utility Rates website. www.epa.gov/chp/state-policy/utility.html.

This website provides an overview of utility ratemaking related to CHP and links to other resources.

Casten, S. and M. Karegianes. 2007. "The Legal Cast Against Standby Rates." *The Electricity Journal* 20 (9): 37-46. www.recycled-energy.com/_documents/articles/sc_electricity_journal11-07.pdf.

This article briefly outlines the benefits of distributed generation systems, including CHP, and then goes on to make a case for eliminating demand charges.

Input- vs. Output-based Emissions Regulations

Electricity generation technologies, including CHP, have traditionally been subject to input-based emissions regulations, which define limits on the amount of emissions that can be produced per unit of fuel input (e.g., pounds of sulfur dioxide per million Btu of coal).

On the other hand, output-based emissions regulations define emissions limits based on the amount of pollution produced per unit of useful output (e.g., pounds of sulfur dioxide per megawatt-hour of electricity). A major benefit of output-based emissions standards is that they encourage cost-effective, long-term pollution prevention through process efficiency. Efficient distributed production of electricity from fossil fuels reduces fuel inputs compared to conventional generation and transmission systems, and leads to fewer emissions of all pollutants, not just those limited by regulation. Output-based emissions standards thus recognize both the efficiency and pollution prevention benefits of CHP and other distributed generation systems, which is not the case with input-based standards.

Output-based emissions standards also aid regulators in comparing the emissions performance of different technologies through the use of common units for their emissions (lb/MWh) rather than the more varied units used in input-based standards (ppm, lb/MMBtu, etc.). Use of common units is particularly relevant to CHP, which combines both thermal energy and electricity production – which are traditionally measured in different units – into one integrated system.

While the inclusion of an output-based emissions standard alone constitutes a great step forward for states in encouraging CHP, an important best practice is to use an avoided emission approach. In 2003, as the result of an extensive stakeholder process, the Regulatory Assistance Project (RAP) released a national model emission rule for distributed generation systems. Increasing interest in output-based emissions regulations justified the formation of a national rule because, as we saw in our discussion of interconnection rules, a hodgepodge of inconsistent state rules for output-based emissions creates barriers for CHP and other DG developers.

The RAP rule explicitly recognizes the benefits of CHP systems' increased efficiency by taking an avoided emission approach. This approach subtracts the emissions from thermal output displaced by a CHP system's more efficient operation from the measured emission rate. More details on the rule specifics can be found in the resources.

Output-Based Emissions Resources

[EPA] Environmental Protection Agency. 2004. *Output-Based Regulations: A Handbook for Regulators.* Prepared by ICF and EEA for the EPA. Washington, D.C.: US Environmental Protection Agency. epa.gov/chp/documents/obr_final_9105.pdf.

This handbook defines output-based emissions standards, outlines their benefits in comparison to input-based standards, and provides guidance to regulators on developing an output-based standard. There is a lengthy discussion of the benefits to CHP facilities of putting such standards in place. The handbook concludes with a discussion of examples of output-based regulations.

____. 2010. Combined Heat and Power Partnership, Output-Based Regulations website. epa.gov/CHP/state-policy/output.html.

[RAP] Regulatory Assistance Project. 2003a. "Output-Based Emissions Standards for Distributed Generation." *Issuesletter*, July 2003. Montpelier, VT: Regulatory Assistance Project. raponline.org/docs/RAP_IssuesLetter-OutputBasedEmissions_2003_07.pdf.

This newsletter provides background on the model emissions rule developed by RAP, the details of which can be found in the following reference.

____. 2003b. "Model Regulations for the Output of Specified Air Emissions from Small-Scale Electric Generation Resources." Issuesletter, July 2003. Montpelier, VT: Regulatory Assistance Project. raponline.org/docs/RAP_IssuesLetter-OutputBasedEmissionInsert_2003_07.pdf.

Financial Incentives for CHP

State financial incentives are an important instrument for increasing the use of technologies that provide benefits to both residents and the state overall. The incorporation of a financial incentive can make energy efficiency investments more alluring for private and public entities. Homeowners and businesses not only save energy but also reduce pollutants, improve electric system reliability, and save significant amounts of money over the life of their investments. Financial incentives also help newer technologies, such as micro-CHP, to overcome barriers to market entry.

Financial incentives can take many forms: rebates, grants or loans for energy-efficiency improvements, direct income tax deductions for individuals and businesses, and sales tax exemptions for eligible products. The majority of financial incentives for CHP systems, however, are loans and grants; tax exemptions, grants and bonds are less commonly used. Eligibility often depends on meeting specific energy savings goals, such as a 20% reduction in facility energy use over five years. Below we will discuss specific examples of each type of incentive as they apply to CHP.[3]

Loans

States offer low-interest loans for a wide variety of energy efficiency measures. Rates and terms vary by program, though a maximum 10-year term is common. For example, **New Jersey**'s Clean Energy Solutions Capital Investment Loan/Grant Program provides interest-free loans and grants to New Jersey-based industrial, commercial or institutional entities for end-use efficiency combined heat and power projects. Loans are limited to $5 million, of which up to $2.5 million may be taken as a grant. Loans have up to a 10-year term, with optional amortization up to 20 years based on the depreciable life of the asset financed. A minimum of 50% of project costs must be financed by the project sponsor. The loan program

[3] Information about states incentives has been taken from the Database of State Incentives for Renewables & Efficiency (DSIRE), a project of the North Carolina Solar Center and Interstate Renewable Energy Council, funded by the US Department of Energy.

receives revenue from the sale of greenhouse gas emission allowances under the Regional Greenhouse Gas Initiative (RGGI).

Connecticut's Low-interest Loans for Customer-side Distributed Resources program, in effect since 2006, provides loans to customers for the installation of distributed generation systems, including CHP, with a capacity range of 50kW – 65MW. Interest rates are 1% below the customer's applicable rate, or no more than the prime rate.

The Energy Efficiency Loans for State Government Agencies program, run by Green Bank of **Kentucky**, offers three types of loans for state government agencies undertaking efficiency improvements; loan specifics and program requirements depend on the level of funding requested. The program is funded by the American Recovery and Reinvestment Act (ARRA) State Energy Program.

Grants

Most grant programs are designed primarily to offset the costs of eligible technologies, although some promote research and development or support project commercialization. For example, **Massachusetts**' Green Communities Grant Program provides funding for municipalities to pursue energy efficiency and renewable energy projects. Among the conditions for eligibility include a requirement to establish an energy use baseline and develop a plan to reduce energy use 20% below this baseline within five years. Approximately $7 million will be available for award in June 2010.

Ohio's Advanced Energy Fund Grants program offers grants up to 25% of project cost (with a maximum of $100,000) for, among other things, CHP and waste heat recovery projects up to 25 MW. Applications are evaluated according to a number of criteria, including overall system efficiency, the balance of financing committed, and project cost per kW produced.

Tax credits and exemptions

Like most property tax exemptions, **Arizona**'s Energy Equipment Property Tax Exemption program excludes the added value of eligible renewable and energy efficient systems from the valuation of the property for tax purposes. **Oregon**'s Business Energy Tax Credit provides tax credits to businesses for a wide variety of renewable and energy efficiency initiatives. A 50% tax credit is awarded to high efficiency CHP projects that achieve 20% annual energy savings.

Rebates

New York's Energy $mart New Construction Program provides technical assistance and cash rebates for the installation of energy-efficiency measures, including CHP, in new or substantially renovated buildings owned by businesses, state and local governments, not-for-profits, colleges and universities and other facilities. The program will award $53 million over the course of 2010. The state also offers a smaller scale program for existing facilities.

Bonds

The use of bonds to incentivize CHP deployment is rare. **New Mexico**'s Energy Efficiency and Renewable Energy Bond Act authorizes up to $20 million in bonds to finance energy efficiency and renewable energy improvements in state government and school buildings. State agencies of school districts may request an energy assessment from the New Mexico Energy, Minerals and Natural Resources Department to identify specific energy saving measures. Combined heat and power and waste heat recovery systems are eligible for funding. Bonds are to be paid back by realized energy savings.

Financial Incentives Resources

[DSIRE] Database of State Incentives for Renewables & Efficiency. 2010. Financial Incentives for Energy Efficiency website. dsireusa.org/incentives/index.cfm?EE=1&RE=0&SPV=0&ST=0&implementingsector=S&technology=combined_heat_power&sh=1.

The Database of State Incentives for Renewables & Efficiency (DSIRE), funded by the US Department of Energy, is the most comprehensive resource for current state, local and utility incentives for energy efficiency and renewable energy. The link above provides a sorted list of financial incentives and policies in twenty states that specifically identify combined heat and power as an eligible technology.

Inclusion of CHP in an EERS/RPS

An Energy Efficiency Resource Standard (EERS) is a quantitative, long-term energy savings target for utilities, under which they must procure a portion of their future electricity and natural gas needs using energy efficiency measures, typically equal to a specific percentage of their load or projected load growth. EERS targets slowly increase over time to stay ahead of technological and institutional innovation. Energy savings are typically achieved through customer end-use efficiency programs run by utilities or third-party program operators, sometimes with the flexibility to achieve the target through a market-based trading system. Nineteen states have an EERS in place, and three others have policies under consideration.

A similar policy mechanism to encourage renewable energy production, called a Renewable Portfolio Standard (RPS), has been adopted in 28 states and Washington, D.C. Several states that have already implemented an RPS subsequently expanded it to include energy efficiency as an eligible resource, effectively establishing an EERS. Examples of combined EERS-RPS policies are found in Nevada, Connecticut, and North Carolina.

Not only are utilities required to meet state targets, but these standards are often paired with financial incentives or support programs to implement and encourage eligible technologies. Thus, when CHP is explicitly listed as eligible for RPS or EERS credit, it creates a large incentive for deployment.

Accurately evaluating and attributing the extent of savings is critical to the success of an EERS/RPS. CHP systems receive credit to the extent that energy is saved relative to conventional generation of heat and electricity. While savings estimates for most technologies are straightforward – e.g. calculating savings from the substitution of a compact fluorescent light bulb for an incandescent one – measuring creditable savings from CHP systems can be complex. Because CHP systems produce both thermal and power from the same fuel on-site, the ratio of on-site to off-site fuel combustion and associated emissions differs from conventional generation.

The resources below provide guidance on including CHP in an EERS, and on accounting for the energy savings and avoided emissions from such systems.

Resources on Including CHP in an EERS

[ACEEE] American Council for an Energy-Efficient Economy. 2010. Energy Efficiency Resource Standard (EERS) website. aceee.org/energy/national/eers.htm.

Chittum, A., R. Elliott, D. Trombley and S. Watson. 2009. "Suggested Treatment of CHP in an EERS Context." Presented to the Industrial Energy Technology Conference, May 13, 2009, New Orleans, La. Washington, D.C.: American Council for an Energy-Efficient Economy. aceee.org/industry/Chittum_IETC_09_CHP_EERS_Treatment.pdf.

This presentation details a recommended methodology for calculating the avoided emissions from CHP systems under an EERS policy. The methodology is more fully discussed in the following resource.

Elliott, R.N., A. Chittum, D. Trombley, and S. Watson. 2009. "CHP Savings and Avoided Emissions in Portfolio Standards." Paper presented at the 2009 ACEEE Summer Study on Energy Efficiency in

Industry, Niagara Falls, N.Y., July 28-31. Washington, D.C.: American Council for an Energy-Efficient Economy. aceee.org/energy/national/SS09_paper_panel4_10.pdf.

Furrey, L. and Sarah Black. 2009. *Energy Efficiency Resource Standards: A State Model*. Washington, D.C.: American Council for an Energy-Efficient Economy. aceee.org/energy/state/eers_statemodel.pdf.

This document provides model language for state EERS policies, with explicit treatment of CHP systems.