

## Navigating the Clean Power Plan: A Template for Including Energy Efficiency Finance Programs in State Compliance Plans

### At a Glance

The Environmental Protection Agency's (EPA's) proposed Clean Power Plan establishes state-specific emissions targets for carbon dioxide emissions from existing power plants (EPA 2014a). The proposed plan allows states to use end-use energy efficiency as a primary means to comply with the emissions targets.

Emissions reductions from end-use energy efficiency can be a strong component of a state's strategy for cost effectively reducing emissions from its power sector. In a new analytical tool developed to help states evaluate their compliance options, ACEEE found that many states can meet half or more of EPA's proposed emissions targets by adopting energy efficiency programs and policies (Young and Hayes 2015). Unfortunately, the upfront costs that are often required to deploy efficiency technologies have been seen as a barrier to achieving these emission reductions. While direct subsidies, grants, and incentives can be a solution to overcoming this barrier, publicly supported energy financing programs offer another strategy. These programs have the potential to maximize the impact of public funds, leverage private investment, and expand access to typically underserved customers in the energy efficiency market.

Cities and states have implemented a variety of mechanisms for financing energy efficiency investments.<sup>1</sup> These financing programs and policies can facilitate the installation of property, equipment, and process upgrades in buildings and industrial facilities, in turn reducing greenhouse gas emissions from the power sector. This template is intended to help states document and claim emissions reductions resulting from investments facilitated by an energy efficiency financing program or policy as a compliance pathway for the Clean Power Plan. It includes:

1. A discussion of the guidance, precedent, and themes relied on to develop this template
2. A list of the elements states should address in order to claim emissions reduction credit for energy efficiency financing
3. Specific recommendations on how to address these elements
4. A hypothetical case study of a finance program that a state could include in a compliance plan<sup>2</sup>

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<sup>1</sup> For a discussion of some of these mechanisms see <http://naseo.org/data/sites/1/documents/publications/Unlocking-Demand.pdf>.

<sup>2</sup> This work product is not intended to provide an exhaustive representation of what EPA or EPA regional offices will require for the inclusion of financing in a Clean Power Plan compliance plan. Rather, it offers a conceptual framework on which to build. In drafting this document, we have relied on the provisions in the proposed rule as well as on guidance on and past precedent for the treatment of energy efficiency under other provisions of the Clean Air Act. The final rule might change, and EPA might opt to develop different processes for the treatment of energy efficiency.

## Guidance and Precedent Relied on to Develop this Document

This section of the document provides an overview of the precedent and existing guidance relied on to develop the more detailed recommendations in the later sections.<sup>3</sup> Here we briefly discuss various energy efficiency financing options and how they might be used in a state plan. We first provide an overview and brief discussion of four criteria that EPA will use to evaluate state plans and emissions reduction measures developed for compliance with the Clean Power Plan.

### EPA's Criteria for Evaluating State Plans

While EPA regional offices will likely consider a number of factors when evaluating state compliance plans, the Clean Power Plan emphasizes four criteria that we focus on here:

1. The measures contained in the plan are enforceable.
2. The plan as a whole is projected to achieve the emissions standard.
3. The emissions reductions from measures are quantifiable and verifiable.
4. Each measure has a clear process of reporting on implementation (EPA 2014a 34909).<sup>4</sup>

These four criteria are similar to the elements required in state implementation plans (SIPs) for National Ambient Air Quality Standards (NAAQS), but according to EPA, “approvability criteria for [Clean Air Act] section 111(d) plans need not be identical to approvability criteria for SIPs” (EPA 2014a, 34909). In fact, Section 111(d) compliance plans can be interpreted as less prescriptive and more flexible than SIPs.<sup>5</sup> Nevertheless, because there are similarities, the precedent of EPA’s treatment of energy efficiency in SIPs may still be informative. EPA has issued guidance on how to ensure that end-use energy efficiency is enforceable, quantifiable, and verifiable, as well as on how to project the emissions impacts of an efficiency policy and report on the implementation of that policy in the context of a SIP submission.<sup>6</sup>

ACEEE reviewed several approved SIPs to understand how states have successfully documented and obtained emissions credit for energy efficiency policies. We have relied on the guidance in the proposed rule, existing EPA guidance on documenting and crediting energy efficiency in SIPs, and successful state policies and programs to develop a recommended approach that states can use to incorporate energy efficiency financing policies and programs in their Clean Power Plan compliance plans.

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<sup>3</sup> At the time this document was developed, the Clean Power Plan was still a proposed rule offering limited guidance on what a state’s compliance plan would need to include.

<sup>4</sup> These four criteria are not the only elements that a state will likely need to address. Many additional elements, such as avoiding double counting and timing issues, are addressed in the more detailed list of elements and hypothetical case study that follow.

<sup>5</sup> See discussion of this topic at <http://www.raonline.org/featured-work/tackling-111d-compliance-planning-its-not-a-sip>.

<sup>6</sup> The previous guidance referred to here is for the incorporation of energy efficiency measures into SIPs for NAAQS found in the 2012 *Roadmap* (EPA 2012). EPA has suggested there may be some overlap between this guidance and what is applicable under the Clean Power Plan, and has requested comment on this issue.

The Clean Power Plan provides states with a great deal of flexibility, so the method outlined in this document is not the only one a state may use. We have followed EPA precedent to develop a conservative approach that may be more rigorous and complex than what is ultimately required for compliance. States may use simpler options, and EPA will likely provide additional guidance on options for them to consider.<sup>7</sup>

In the remainder of this section, we apply the established approaches and existing guidance to the four criteria above. This discussion touches on several major themes in the EPA's criteria (Section 2), specific recommendations (Section 3), and example language (Section 4). Programs and policies to finance end-use energy efficiency can vary significantly. We have focused on the programs and policies that we believe can meet EPA's criteria and be suitable elements of a state compliance plan.

*Projected achievement of emissions standard.* State compliance plans must show that included measures will reduce the emissions rates of regulated power plants to the required standard of performance within the designated timeframe. One way to ensure this is to adopt a financing measure that will have lasting effects on emissions. Programs and policies can be designed to favor funding projects with longer-term savings including those with savings that will last through 2030.

Because compliance plans are forward looking, each state will need to develop a reasonable estimate of the energy savings or avoided emissions it expects to achieve through the financing measure. These projections will vary significantly by state or city, targeted sector, and the characteristics of the financing measure. In particular, the availability of financing alone does not guarantee savings. A loan may be available, but if no one applies or no projects are approved, then there will be no new electricity savings. However financing programs and policies can be designed so that participation is more likely or even guaranteed.

One way to do this is to target government-owned assets. Another way would be for a city or state to issue a public request for proposals where financing is provided, and then the government and a private entity may enter into a private contract guaranteeing savings. A state may also require government buildings to perform an energy audit and take advantage of available financing. Another way to ensure that electricity savings occur is to couple the financing measure with a savings commitment. For example, roughly half of all states and many cities have adopted an energy savings target or have otherwise committed to reduce energy waste. Many of these commitments place responsibility for achieving a specified amount of energy savings on utilities, governments, or third parties. These commitments can ensure that a financing measure receives the support it needs to generate participation at forecasted levels. Finally, to address participation uncertainty, a state can use electricity savings forecasts that are discounted so that any shortfalls in savings due to lower-than-expected participation are already factored into the compliance plan.

*Quantifiable and verifiable emissions reductions.* State plans must detail how emissions reductions will be quantified and verified. According to SIP guidance, in order for a measure to be

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<sup>7</sup> See discussions of simpler approaches in recent publications from the Regulatory Assistance Project: <http://www.raonline.org/document/download/id/7501> and <http://www.raonline.org/document/download/id/7491>.

considered quantifiable, it must have a measureable, replicable effect on emissions (EPA 2012). The Clean Power Plan contemplates methods for quantifying the impact of an efficiency policy by measuring energy savings and converting those savings into an emissions impact. We recommend that a state identify a protocol for quantifying the electricity savings and associated emissions reduction from efficiency investments made as part of a financing measure included in its plan. Periodic reporting of electricity savings at scheduled intervals is a key to meeting this requirement. It may not be necessary to measure the exact performance of individual technologies within a project; other methods are available. For example, post-project electricity consumption can be compared to pre-project consumption and adjusted for variables such as weather in accordance with recognized measurement and verification protocols. If a program results in the installation of a set of technologies with known electricity consumption (e.g., light bulbs or refrigerators), then averaging savings across the entire program might be appropriate.<sup>8</sup>

*Process for reporting on plan progress and corrective actions.* For a measure to be deemed acceptable for inclusion in a state compliance plan, it should include a process for reporting its implementation and performance to EPA. One option for financing measures is to set up a reporting and data collection system that designates responsible parties and includes verification of reported data. As suggested above, individual projects could report measured electricity savings data back to the agency that is responsible for monitoring the implementation of the measure. Alternatively a deemed savings approach may be used whereby electricity savings are estimated based on the types of upgrades and technologies installed. These savings would later be verified based on actual consumption or site visits for a sampling of the projects. States should monitor progress (which can be done by direct measurement) and report the results to EPA biennially (EPA 2014a, 34837).

Corrective actions can take many forms, but generally they must result in the achievement of sufficient emissions reductions to make up any shortfall between actual and forecasted reductions claimed in the state's compliance plan. A state could impose a fine or penalty on parties responsible for implementing the program or on program participants if they fail to achieve expected goals. The state may also consider discounting expected credit or creating a set-aside of excess savings that can be used for credit during the compliance period. Because the availability of funding via a financing measure does not guarantee participation and investments, states may wish to include financing measures as one element in a portfolio of efficiency measures that are considered in combination. This way a shortfall in one type of efficiency compliance measure may be balanced with excess savings achieved in another.

*Enforceability.* The exact meaning of “enforceability” in the context of the Clean Power Plan is still uncertain.<sup>9</sup> Further, we were unable to find specific cases where this concept has been applied to energy efficiency financing. In spite of this lack of precedent, some general lessons are likely applicable.

In order to ensure that a financing measure is effective and achieves the emissions reductions it is supposed to, EPA requires the measure to be federally enforceable. Methods to establish that the measure is enforceable to EPA’s satisfaction (EPA 2014a, 34909) might include authority to

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<sup>8</sup> See discussion of the treatment of mobile sources in state implementation plans at <http://www.raponline.org/document/download/id/7501>.

<sup>9</sup> EPA sought comment on this issue in the Clean Power Plan (EPA 2014a, 34909).

levy penalties or force corrective action, or obligating the state to make up any shortfall in emissions reductions. Therefore if a measure is to be federally enforceable, a state would likely need to commit to evaluating its effectiveness. Establishing enforceability has historically involved demonstrating that the measure is mandatory and that legal authority has been granted by legislation or regulations to the relevant governing body (EPA 2012).

In general, a key to enforceability is a responsible party that will face penalties or find additional emissions reductions to compensate for a shortfall. A financing measure may be federally enforceable when the state or affected power plants are directly obligated by law to implement it. One option for states to consider would be to shield various actors from federal enforceability by agreeing to meet any shortfall in anticipated emissions reductions through other energy efficiency policies or measures as part of a larger portfolio. Including a diverse portfolio of measures in a state compliance plan reduces the risk of not reaching the emissions goal. While some elements of a portfolio may underperform, others may overperform, helping to safeguard states from concerns about enforceability.

This approach might be particularly well suited for financing policies and programs, which can have a variety of actors who are not otherwise regulated by the Clean Power Plan (e.g., residential customers or banks) and who often do not provide a guarantee of minimum program participation or electricity savings. Alternatively, a financing program where funds are invested into assets that the government can control (such as municipal buildings) can give the state the authority to ensure that anticipated electricity savings occur. States may consider where they want this enforceable obligation to fall and should consult the final EPA rule for additional guidance.

### Overview of Energy Efficiency Financing Programs and Policies

Energy efficiency finance policies and programs may help states deploy energy efficiency in several ways. In particular they can:

- Augment the amount of capital available for energy efficiency investments such as heating and cooling improvements in buildings and newer, better-performing technologies in homes and businesses
- Deliver capital or reduce credit risk to those entities providing capital for efficiency investments

States may consider a variety of approaches for financing energy efficiency investments. Examples include:

*Property-assessed clean energy (PACE).* State or municipal governments administer a loan program for consumers and/or businesses to put toward an energy retrofit. Loans are repaid through a special assessment that is often tied to property.

*On-bill financing.* Loans to electricity customers to reduce the amount of energy wasted in their homes are serviced by their utility and repaid through the utility bill.

*Low-interest residential loans.* A government or third-party loan program for home energy upgrades is offered at a reduced interest rate.

*Efficiency markets.* These financial markets may allow tradable credits or certificates, often aimed at valuing the multiple social goods of energy efficiency. This provides a financial incentive to invest in energy saving projects.

*Energy saving performance contracts.* These are partnerships between a commercial entity and a building owner or manager where energy upgrades are funded by the commercial entity in exchange for a payment, often based on the dollars saved through reduced energy bills.

*Loan loss reserves.* These credit enhancement mechanisms make energy efficiency projects more attractive to lenders by offering partial risk coverage.

*Revolving loan funds.* A capital pool is loaned for energy-saving projects that pay back the loans in a way that allows repaid funds to be recycled in perpetuity.

Within various financing approaches, methods for enforcement, reporting, and verifying energy savings and emissions reductions may need to vary based on what the financing measure can do. Some of these options are likely better suited to a state compliance plan than others. To make this determination, states should consider whether the financing policy or program can address the four Clean Power Plan criteria discussed above. The variety of financing approaches and programs means that states might meet some of the elements required in a compliance plan with a financing measure, but may choose to meet others by adopting a complementary policy or program to ensure that all EPA's required criteria are met. For example, a complementary policy might be a government commitment to save a fixed amount of energy in municipal buildings. This commitment could be achieved, in whole or in part, with funding from the relevant financing measure.

Table 1 below provides an example of how a state might assess some of its financing options in the context of EPA's four criteria. This table is not intended to be definitive guidance; it simply suggests one approach a state might use to weigh a variety of factors when considering financing program options.

Table 1. Compliance plan criteria to consider with various financing models

|   | Bonds  | On-bill   | PACE   | Traditional lending  |
|---|--|---|--|--|
| Type of financing program                   | Debt instruments issued by governments   | Loans repaid through utility bill   | Loans repaid through tax assessment  | Can include secured and unsecured loans with market or below-market interest rates |
| Typical function                            | Capitalize EE investments or programs  | Finance EE investments  |  |  |
| Enforceability                              | Debt is often backed by full faith and credit of the issuer, and achievement of savings may be enforceable.  | Aspects such as payment of debt may be enforceable. Enforcing achievement of energy savings is typically a function of program design rather than specific laws or regulations. When participation in these programs is voluntary, enforcing the achievement of energy savings may require a complementary policy to ensure that the investment amount will generate the planned savings. |  |  |
| Projected achievement                       | Savings can be reliably projected, though program participation is often voluntary. A complementary policy that can ensure projected savings are achieved may be useful.   |   |  |  |
| Verifiable and quantifiable                 | Yes, on a project basis  | Yes, with bill data   | Yes, on a project basis  | Yes; method depends on underwriting and program design criteria.                   |
| Process for reporting and corrective action | Reporting on energy savings can be incorporated as an upfront requirement tied to financing or contractor repayment. Corrective action can be taken for any shortfall in the number of forecasted program participants or the amount of energy savings achieved with fallback provisions in the state's plan |   |  |  |
| Complementary policy                        | An energy savings mandate or goal for the target audience can help ensure that projects are funded and bonds are issued.   | Collection and reporting of bill data are important for verifying energy savings.   | An energy savings mandate or goal for the target audience can help ensure program participation. | Credit enhancements and marketing can help ensure participation.                   |

## Template Elements to Include in State Plans

Below are the template elements that a state should consider addressing when incorporating energy efficiency finance measures in a Clean Power Plan compliance plan. Although various levels of rigor may be required depending on the compliance plan approach, ACEEE recommends that these elements be included so the plan has the best chance of being accepted by EPA. In the following sections we provide (1) guidance on filling in the template elements and (2) a hypothetical case study with sample language for a compliance plan.

### Brief Description and Overview of Financing Measure

- Description of financing policy or program, including the roles of state, local, and quasi-public agencies
- Timeline for the financing measure, effective date, and any obligated sectors (utilities, commercial, governmental)
- Role of the financing measure in the state's overall plan approach

### Discussion of How the Financing Measure Works

- History of efficiency financing in the state
- How financing measure will yield emissions reductions at affected electric generating units (EGUs)
- Key assumptions about how the financing measure will result in emissions reductions

### Quantification of Emissions Benefits Potential

- Methodology for calculating the electricity savings attributable to financing measure
- Equation for calculating electricity savings
- Assumptions and data sources
- Potential effects on emissions from implementation of financing measure

### Implementation

- Current status of financing measure in state or city
- How financing measure is implemented
- Entities involved in implementation

### Monitoring and Reporting

- Process by which electricity savings will be monitored and evaluated
- Entities responsible for measuring and monitoring success of financing measure (e.g., utility, third party, city or state agency)
- Sources of data collected from monitoring (e.g., dollars invested, electricity savings generated)
- Process for overseeing and reporting on financing measure



## Enforcement

- Entities legally responsible for compliance, failure to implement, and emissions reduction shortfall
- Entities with jurisdiction to ensure that financing measure achieves expected results
- Process for ensuring expected results from financing measure
- Corrective actions available in case of emissions reduction shortfall, and shortfall remedies

## Verification and Quantification

- Verification process for electricity savings attributable to financing measure
- Entities responsible for verifying that electricity savings have occurred
- Process for reporting verified electricity savings
- Process for quantifying energy savings and emissions reductions

## Instructions and Recommendations for Addressing Template Elements

This section contains detailed instructions and questions we recommend that states consider addressing in their compliance plans. Following this is a hypothetical where we provide example responses to these descriptions and questions based on the Greater Cincinnati Property Assessed Clean Energy (GC-PACE) program.

### Brief Overview of Financing Measure

*Description of financing measure including the roles of state agencies.* Briefly describe the financing measure for which the state is seeking credit, the process that led to the measure taking effect, the entities involved in administering the measure, and how this process may have been amended in the present context.

There are a variety of ways a financing measure may be included in a state plan. Some of the options that may be particularly well suited for this purpose are:

- As a standalone program for investing in government-owned assets
- As part of a contract where a state or city government agrees to make payments in exchange for a commitment by a third party to provide efficiency improvements
- As a complementary program or policy instituted in combination with a mandate to save energy, such as an energy savings target or energy efficiency resource standard

Other options are possible. States should evaluate the set of available options and choose a structure that meets EPA's requirements and best fits with the state's goals and resources.

*Timeline for financing measure, effective date, and obligated sectors (utilities, commercial, governmental).* Discuss when the financing measure will go into effect and electricity savings will begin to be counted. If adopting a new policy or program, include which customer class the measure targets.

*Role of financing measure in the state's overall plan approach.* Briefly describe the status of the measure in the overall plan. Include the role the measure will have in achieving the overall required emissions reductions.

Questions to consider for this section:

- What is the current status of efficiency financing in the state?
- What commitments have state or local governments made under the policy or program?
- What barriers to emissions reductions does the measure overcome?
- Does the measure address a shortage of capital for projects or delivery of capital to traditionally hard-to-reach markets?
- How might administration and enforcement need to change to ensure that the energy savings claimed are being achieved?<sup>10</sup>

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<sup>10</sup> Many of these questions are addressed above, but we list them here as well for purposes of completeness.

## Discussion of How Financing Measure Works

*History of energy efficiency financing in the state or city.* Describe existing laws, policies, and programs relevant to the financing measure. Refer to the existence of prior studies detailing historic electricity savings or emissions reductions attributable to the financing measure.

*How financing measure will yield emissions reductions at affected EGUs.* Explain the measure and how emissions reductions are expected to occur. Discuss how the measure is designed to target emissions from existing power plants and how it will result in electricity savings.

*Key assumptions about how financing measure will result in emissions reductions.* Discuss the common assumptions the state may depend on for quantification purposes. Assumptions might be related to the types of projects that will be funded, the anticipated savings from those projects, the customer classes or assets that can take advantage of the financing, and the rate at which new investments will be made. You might also describe how savings from the measure will be attributed (e.g., to the program administrator, a utility, or a third party) and document the typical energy savings associated with the implementation of similar policies and programs. If a complementary measure is used, this section may address how the state will ensure that reductions are counted only once in spite of multiple enabling policies.

Questions to consider for this section:

- Which sectors and entities does the financing measure apply to?
- What, if any, existing policies or programs are replaced?
- How will the financing measure reduce EGU emissions?
- Are there any reports or studies describing how the financing measure affects emissions in the state?

## Quantification of Emissions Benefits Potential

*Methodology used to calculate electricity savings attributable to financing measure.* Describe the emissions benefits anticipated from the financing measure and the methodology used to arrive at those estimates.

*Equation used to calculate electricity savings.* States may base the emissions benefits potential of the financing measure on an equation that encompasses (1) forecasts of new projects and (2) a baseline of what electricity consumption would have been without the implementation of the proposed program or policy. Another approach might be to rely on energy savings estimates provided by utilities, or already published estimates of potential savings in the target sector. Most states have previous experience with a variety of energy efficiency programs and may possess deemed or predetermined savings estimates for various types of efficiency investments. A simple approach would be to obtain or commission a study that includes a forecast of associated savings for compliance purposes.

If a state wishes to conduct its own calculation, we suggest the following equation:

$$\text{Electricity savings from financed investments} = a(b_1 + b_2 + b_3 + b_4 \dots)$$

Where

a = Average percentage savings expected for type of project relative to baseline<sup>11</sup>

b = Baseline electricity consumption for each project in kWh or MWh<sup>12</sup>

This exercise should be repeated for each project type and all results should be summed.

Once electricity savings are calculated, they need not be converted into tons of avoided emissions. Rather, state plans may treat these savings as a 0 lb/MWh resource by adding the MWh electricity savings to the denominator of the state's computation for achieving its required carbon dioxide emission rate.<sup>13</sup>

This is just an example, and states may consider other methodologies and equations for quantifying the emissions impacts of their programs.

*Assumptions and sources.* Include detailed assumptions and any supporting documentation. Assumptions could address values for variables such as the number of projects that will be funded, the method for estimating savings by project type, and others.

*Potential effects of financing measure on emissions.* A state's calculations should result in an estimate of the impact of the financing measure on electricity consumption and the associated EGU emissions rate (for rate-based states) or emissions (for mass-based states).

Questions to consider for this section:

- How will the state treat or make up for shortfalls in expected savings?
- What baseline forecast of energy use will be used to calculate electricity savings from the finance measure?
- What assumptions will be used to calculate the impacts of the finance measure?
- Where are data available to prepare an estimate?

## Implementation

*Current status of energy efficiency financing in city or state.* Explain the current processes for implementing the financing measure, as well as what is necessary for proper program administration. You may identify the entities responsible for administering the program,

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<sup>11</sup> This may decline over time depending on the type of investments made and life of the installed efficiency measures.

<sup>12</sup> States sometimes take different approaches to various aspects of evaluation, measurement, and verification of electricity savings including the baselines used for different policies and programs. EPA is expected to provide additional guidance on acceptable approaches in the final rule. Depending on what EPA decides, some adjustments to the approach outlined above may be needed.

<sup>13</sup> See more in the Clean Power Plan (EPA 2014a, 34912).

providing and tracking the funding, and making the efficiency upgrades. You may also identify who is responsible for reviewing applications for program eligibility, approving or denying projects, collecting spending and savings data, conducting performance evaluations, and reviewing data to ensure performance requirements are met.

*How financing measure is implemented.* Describe the existing structures for implementation of the finance measure, including the authority of various actors involved in the measure. Note whether it will be necessary to alter the structure of the existing program or policy in order to include the measure in the compliance plan submission.

*Entities involved in implementation.* List the federal, state, and local government agencies and private stakeholders involved in implementing or administering the finance measure. Describe the level of responsibility that is assigned to each entity or group.

Questions to consider for this section:

- What are the responsibilities of the parties involved?
- What structures for measure administration already exist?
- Will resources need to be allocated to improve program implementation and administration?

## Monitoring and Reporting

*Process by which electricity savings will be monitored and evaluated.* Provide specifics on the process the state will use to monitor whether electricity savings and emissions reductions are occurring. Include the protocols for monitoring and data collection. Some monitoring procedures and metering equipment may be consistent with and not additional to separate requirements. Set explicit deadlines and timeframes for reporting on investments made as a result of the finance measure.

*Entities responsible for monitoring success of financing measure and associated investments (utility, third party, city or state agency, and so on).* Identify the parties responsible for compiling relevant data on measure performance. Include the parties with the legal authority to administer the financing measure and to ensure anticipated electricity savings are occurring.

*Sources of relevant data collected from monitoring (e.g., dollars of investment, electricity savings generated, and so on).* Identify where data necessary for quantifying effects of the financing investments on electricity consumption will come from. Identify the parties who currently have access to the necessary data, and describe how the state will access and compile these data. If there are complementary policies or programs with overlapping impacts, procedures to avoid double counting electricity savings and corresponding emissions reductions will likely need to be identified.

*Process for overseeing and reporting on finance measure.* Identify process to ensure that finance measure performance is faithfully monitored. Include steps to ensure that measure participants, funders, and program administrators regularly collect and report relevant data. Describe structures for regular reporting from local and state governments to EPA, as appropriate.

Questions to consider for this section:

- What agencies or entities will be charged with the task of monitoring the implementation of the measure?
- Through what channels will reporting on implementation and enforcement take place?
- What will be the process for reviewing data?
- How will the state ensure that emission reductions are only credited once?
- What agency relationships are necessary to ensure accurate and efficient monitoring?

## Enforcement

*Entities legally responsible for compliance, failure to implement, or an emissions reduction shortfall.* Identify who is responsible for any shortfall in anticipated versus actual emissions reductions. Many financing measures do not have mandatory savings requirements, but they may be able to require performance in exchange for funds received. This stipulation might help a finance measure meet EPA's enforceability criteria. Another method might be to target investments in assets the government can control and for which it can guarantee that projects take place, such as municipal buildings. A finance measure might also be combined with a mandatory energy savings target of some kind to give it the enforcement teeth that EPA may look for.

The entities responsible for implementing the measure need not be the same as those responsible to EPA in case of an emissions reduction shortfall. For example, a state may fund third parties to make efficiency upgrades and obligate those third parties in a contractual relationship. In order to shield those entities from an additional obligation to the federal government, states may take responsibility for ensuring that the emissions reductions claimed from the financing measure actually occur and any shortfalls are addressed.

*Entities with jurisdiction to ensure that financing measure achieves expected results.* Identify the entities charged with enforcing the measure. Identify regulations or legislation empowering the enforcing entities.

*The process for ensuring expected results from the measure.* Identify the structures and processes set in place to ensure that the measure is implemented and entities subject to the measure are acting within the requirements for compliance.

*Corrective actions available in case of emissions reduction shortfall, and shortfall remedies.* Identify the actions that will be taken if the financing measure does not achieve the necessary emissions reduction. Explain how the overall plan will be reviewed and adjusted to correct the shortfall. Penalties for failure to comply might include a fee and/or a required plan for correction of noncompliance.

Questions to consider for this section:

- Who has the jurisdiction to enforce the measure?
- What will be the process for enforcing the measure?
- What corrective actions may be necessary in order to remedy a shortfall?

## Verification and Quantification

*Verification process for electricity savings attributable to financing measure.* Outline the process for verifying that the energy savings and emissions reductions potential previously quantified actually occur. Explain how annual reporting data will be used to demonstrate savings.

*Entities responsible for verifying that stated electricity savings have occurred.* Identify which entities (state agencies, EGUs, utilities, or third parties) have access to performance data and who will be responsible for measuring energy savings.

*Process for reporting verified electricity savings.* Describe the process to be used in reporting verified electricity savings to both state officials and EPA.

*Process to be used in quantifying electricity savings and emissions reductions.* Describe the process for calculating the 2030 energy savings and emissions reductions attributable to the financing measure. Identify how electricity consumption reductions will be translated into emissions reductions.<sup>14</sup>

Questions to consider for this section:

- Who will be responsible for verifying that the financing measure is resulting in forecasted electricity savings?
- How often will emissions reductions be calculated?
- How often will emissions reductions and energy savings be reported?
- How will emissions reductions be quantified?

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<sup>14</sup> Many approaches are possible, ranging from dispatch modeling at the most complex to a simple rate-based approach provided in the draft Clean Power Plan. In this example only MWh savings need be calculated, and these savings are factored into an emissions rate with no further emissions calculations needed (EPA 2014b, 7).

## Sample Case Study for Inclusion of a Financing Measure in a State Compliance Plan

For the purpose of demonstration, we have developed the following hypothetical scenario, based on the actual processes and responsible institutions of the Property Assessed Clean Energy (PACE) program in Cincinnati, Ohio, and adding hypothetical elements where necessary.<sup>15</sup> The hypothetical assumes the state is seeking credit for implementing this program in its Clean Power Plan compliance plan submission.

### Continued and Expanded Implementation of the Greater Cincinnati Property Assessed Clean Energy Program (GC-PACE)

The following represents a hypothetical submission by the state of Ohio to the United States Environmental Protection Agency (EPA) Region 5 for the crediting of energy efficiency upgrades financed through GC-PACE and specifically their reduction of greenhouse-gas emissions from electric generating units (EGUs) commensurate with the provisions enumerated in the Clean Power Plan.<sup>16</sup>

#### Description and Brief Overview of GC-PACE

The Greater Cincinnati Property Assessed Clean Energy (GC-PACE) program was established pursuant to legislation passed by the state of Ohio in 2010. The GC-PACE program is included as one of several energy efficiency measures that Ohio seeks credit for in its Section 111(d) compliance plan.

The legislation authorizing GC-PACE led to a partnership between the Port of Greater Cincinnati Development Authority and the Greater Cincinnati Energy Alliance, and allowed for the creation of Energy Special Improvement Districts (ESIDs). An ESID is a land-secured financing district created to pay for improvements in the public interest, in particular for clean energy improvements.

As part of the program, an ESID and board have been established by the City of Cincinnati as the lead sponsoring municipality. The ESID is noncontiguous and made up of only those properties that have chosen to use PACE financing. The GC-PACE program offers financing for efficiency improvements in the ESID and is authorized to continue beyond 2030.

GC-PACE can provide commercial and industrial building owners with financing for clean energy improvements to their buildings. The GC-PACE financing mechanism eliminates the upfront costs of energy improvement projects by turning them into a tax assessment that becomes tied to the property. Property owners may opt in to the program and add the financed cost of the improvements to a special property tax assessment on their property for up to 30 years. Building owners finance efficiency and renewable energy improvements through the voluntary assessment on their property tax bill, and the repayment obligation transfers

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<sup>15</sup> We focus on Cincinnati in this hypothetical, but the actual program extends throughout southwest Ohio. This is one of many differences between the actual program and our hypothetical.

<sup>16</sup> To condense this demonstration, we have omitted certain elements that may be required. Specifically, we have not included the calculations, modeling, technical support documents, and other supporting materials that may accompany a formal compliance plan submission.



automatically to the next owner if the property is sold. Capital is secured by a priority lien on the property, so long-term debt capital can be raised from the private sector.

### Discussion of How Financing Measure Works

The GC-PACE program is an open-market program, meaning that multiple sources of capital are sought to ensure the best possible terms for project owners. Bond issuance is handled by the Port of Greater Cincinnati Development Authority (the Port). The Port acts as the conduit bond financier and can source capital from any source (e.g., local or national banks, insurance companies, and individual bond investors). The funds procured through this process are disbursed to approved projects for the purpose of installing energy-efficient upgrades and technologies. In order for a project to be approved, investments relying on GC-PACE funds must reduce electricity demand within the service territory of one or more EGUs regulated under the EPA's Clean Power Plan. Electricity savings and the corresponding emissions reductions associated with the project become the property of the Ohio Environmental Protection Agency.

To date, only one project has been completed in Ohio as part of GC-PACE; \$20+ million worth of projects are in the pipeline. These anticipated projects include a variety of energy efficiency measures such as heating and cooling systems, building controls, and building envelope measures. Renewable technologies are often incorporated as well. These measures result in savings of both end-use electricity generated at power plants regulated by the Clean Power Plan (regulated EGUs) and on-site consumption of fuel such as natural gas. For compliance purposes, the state will claim only the electricity savings that reduce generation at regulated EGUs.

Because the GC-PACE program is relatively new and data are limited, forecast assumptions about the program's performance are taken from national data on the performance of similar PACE programs. A good deal of these data can be found at the website of PACENow.<sup>17</sup>

Actual program performance will be evaluated based on project-level data. The Greater Cincinnati Energy Alliance (GCEA) provides reporting on projects, which are tracked through a tool called Salesforce CRM. Under state law, PACE projects that occur within the service territory of an electric distribution utility must also be reported quarterly to that utility.<sup>18</sup>

### Quantification of Emissions Benefits Potential

Potential savings from the GC-PACE program have been calculated using national PACE data on average electricity savings per dollar invested (kWh per dollar). This number was then multiplied by the number of dollars that have been committed under the GC-PACE program for the 2015–2030 time period as follows:

<sup>17</sup> See <http://www.pacenow.org/wp-content/uploads/2013/06/Annual-report-6.18.13.pdf> and <http://www.pacenow.org/pace-data/>.

<sup>18</sup> The actual form of that report has not been established in the GC-PACE program, but details on reporting would likely need to be included in a compliance plan submission or at least established prior to submission.

Forecasted savings from GC-PACE program =  $x * y * z$

Where:

x = The number of projects of a given type

y = The national or regional average kWh-per-dollar savings for projects of the same type<sup>19</sup>

z = The number of dollars of principal that directly finance energy efficiency under the GC-PACE program for the given project type

The calculation above should be made for each major project type, and the results for all project types should be summed.

Once electricity savings are calculated, they need not be converted into tons of avoided emissions. Rather, Ohio will treat these savings as a 0 lb/MWh resource by adding the MWh electricity savings to the denominator of the state's computation for achieving its required carbon dioxide emission rate.

### Implementation

In 2010, the Ohio legislature authorized the establishment of ESIDs throughout the state. The City of Cincinnati established an ESID within its boundaries. Commercial and industrial building owners may opt in to the ESID to obtain financing for energy efficiency upgrades. Financing is provided via a partnership between the Port Authority and the Greater Cincinnati Energy Alliance. Financing can come from private-sector capital or special bond issuances.

Financed dollars can be invested in any property, device, structure, or equipment necessary for the acquisition, installation, equipping, and improvement of any real or personal property used for the purpose of creating:

- a solar photovoltaic project
- a solar thermal energy project
- a geothermal energy project
- a customer-generated energy project
- an energy efficiency improvement

These projects and improvements include HVAC, building automation systems, combined heat and power, solar and other renewables, lighting, elevator equipment, industrial equipment, building envelop measures, building data center equipment, and other qualifying energy saving measures.

### Monitoring, Reporting and Verification

Actual electricity savings from GC-PACE projects will be quantified and reported quarterly. The energy savings and investments are tracked through reporting to GCEA. The data are

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<sup>19</sup> The kWh saved by a project may decline over time depending on the measure life of the technologies installed. Since the program will operate from 2015 to 2030, savings from investments made in early years will be discounted if appropriate.

reported on a project basis and include kWh of savings relative to a pre-program baseline and adjusted for weather. Reported savings will be verified by GCEA or a state-approved third-party verifier for a sampling equal to at least 5% of projects. Data will be evaluated periodically, and any difference between the forecasted program savings and actual savings will be identified annually.

To ensure that forecasted savings estimates are achieved, the GC-PACE program will maintain a pipeline of projects awaiting funding so that if a planned activity fails to materialize, the funding can be reallocated to another project.

### Enforcement

The enforceable obligation created through this submission will remain the sole authority of the state.<sup>20</sup> Any shortfalls in forecasted emissions reductions will be enforced against the state, should EPA see fit to do so. The City of Cincinnati will maintain the authority to administer the program in accordance with established mechanisms and authorizing legislation.

If an individual project fails to obtain the energy savings anticipated from the investments, GCEA will work with the building or facility owner and the project manager to identify additional savings that could be used to make up the shortfall. This process does not create an enforceable obligation on any of these entities. Rather, the state will be responsible for any shortages in anticipated savings in the overall program as described below.

If the overall GC-PACE program fails to meet the level of savings assumed in the calculation of potential benefits contained herein, or any other lapses in implementation occur that cause the electricity savings and emission reduction attributable to the program to fall short of those claimed in this compliance plan, the City of Cincinnati, working with the Ohio Environmental Protection Agency will reevaluate the provisions contained in this submission and enact the necessary measures to make up the shortfall. Any shortfalls will be made up through additional investments in public buildings so that savings forecasts are fully met during the compliance period. Alternatively, shortfalls may be made up through electricity savings generated by other efficiency measures included in Ohio's compliance plan.

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<sup>20</sup> The provisions related to enforcement do not exist as part of the current program and are hypothetical approaches we propose for addressing EPA's enforcement requirements.

## References

- EPA (US Environmental Protection Agency). 2012. *Roadmap for Incorporating Energy Efficiency/ Renewable Energy Policies and Programs into State and Tribal Implementation Plans*. Washington, DC: EPA. <http://epa.gov/airquality/eere/manual.html>.
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