EPA EE/RE Road Map Manual and CHP

Presentation at 2013 IDEA Annual Conference

Neeharika Naik-Dhungel

U.S. EPA CHP Partnership Program

June 4, 2013

Objectives and Agenda

Objective: Provide an understanding on the Energy Efficiency (EE)/Renewable Energy (RE) State Implementation Plan (SIP) Road Map

- Describe:
  - Tools available for quantifying EE/RE benefits
  - Other energy policy and measurement resources
- Present how a State can account for CHP utilizing the SIP Road Map
- Question and answer session

Presentation Contents

- EE/RE SIP background
- What EPA has made available
- The four compliance pathways, including:
  - Decision-Making Hub with examples
- Important elements for successful incorporation of EE/RE in SIPs/TIPs
- States that may want to consider EE/RE going forward
- An illustrative CHP example
- Appendix
  - Methods for quantifying EE/RE benefits

EE/RE SIP Background

- EPA's 2004 guidance yielded few examples of EE/RE integration in SIPs
- Reasons states have not implemented the 2004 guidance
  - Perceived effort necessary not justified by SIP credit expected
  - Needed clearer EPA guidance
  - Documentation requirements perceived as burdensome
  - Not clear what emissions reduction would be achievable

Time is Right to Consider EE/RE Guidance

- Significant growth in state investments in electric EE programs to over $9 billion in 2012
- Forty-two states (and DC) have adopted some form of portfolio standards
- States need to find greater emission reductions to meet revised NAAQS
- Information on the energy and emissions impacts of EE/RE is increasingly widely available

EE/RE Road Map Manual

- Detailed and comprehensive
  - 12 individual documents – main body and 11 appendices covering a range of topics
- Accessible and easy to read
  - Written in straightforward terms with explanatory charts and figures
- Not "one size fits all" – provides options
  - Four different pathways for incorporating EE/RE policies and programs into SIPs
  - Four approaches for quantifying EE/RE emissions impacts

Four Pathways

- Baseline Emissions Projection Pathway
  - Incorporation of the impact of EE/RE policies and programs in SIP/TIP EGU emissions forecast
  - Best suited for already adopted EE/RE policies and programs
- Control strategy pathway
  - Incorporation of EE/RE policies and programs in a SIP/TIP as a control strategy
  - Best suited for new EE/RE policies adopted after emissions forecast preparation but before SIP/TIP submittal to EPA

Four Pathways

- Emerging/Voluntary Measures Pathway
  - Incorporation of the impact of EE/RE policies as emerging and/or voluntary EE/RE measures (i.e., those that are difficult to enforce and/or quantify)
  - Best suited for locally-based initiatives designed to encourage or require citizens, businesses or local government to acquire more EE/RE
- Weight of Evidence (WOE) pathway
  - Incorporation of the impact of EE/RE policies as part of a WOE demonstration that can include the impact of EE/RE policies and programs
  - Best suited for EE/RE policies and programs where modeling the impacts is either too resource intensive or not feasible

Getting Started: Decision-Making Hub

- A flow chart to help agencies navigate the decisions for how to incorporate EE/RE in SIPs
- Identifies the important questions agencies should consider when selecting pathways
  - Does the area:
    - Have EE/RE emerging or voluntary programs?
    - Want SIP credit?
    - Want a federally enforceable control strategy?
    - Have EE/RE policies and programs "on the books"?
    - Have emissions projection modeling?

Flowchart Example

- Mandatory commercial whole-building energy use disclosure at time of sale or lease
  - Is this "on the books"?
    - Yes
  - Is it emerging or voluntary?
    - Yes
  - Does the area want SIP credit?
    - Maybe

→ Emerging/voluntary measures or WOE pathway

Flowchart Example

- Is CHP an eligible resource under the State RPS
  - Is this "on the books"?
    - Yes
  - Is it emerging or voluntary?
    - No
  - Does the area want traditional, federal enforceability?
    - Maybe

Control strategy or Baseline pathway

Important Elements for Successful Incorporation of EE/RE in SIPs/TIPs

- EE/RE policies and programs
  - More aggressive state-wide policies produce greater potential emission benefits
    - For example, the higher the percentage target of a state-wide renewable portfolio standard, then the greater the potential emission benefit
    - Working regionally to combine impacts is also beneficial
- Dialogue with energy agencies
  - Establishment of strong working relationships and partnerships among energy and environmental agencies within a state or locality
    - Greater understanding of the details of relevant EE/RE policies and the associated emission benefits
    - Transfer of energy information needed for SIP documentation
    - Facilitate successful monitoring of compliance with adopted EE/RE policies

Important Elements for Incorporating EE/RE in SIPs/TIPs

- Quantification of whether and to what extent the EE/RE initiative is affecting a particular nonattainment area
  - Roadmap describes emission quantification approaches states can apply to understand the magnitude and location of EE/RE policy and program emission impacts

States that May Want to Consider EE/RE Going Forward

- Ozone Advance areas
  - To date, 36 areas in 22 states have signed up to participate in the program
  - These areas may want to consider quantifying EE/RE emissions benefits under this program
- 2008 Ozone NAAQS
  - Areas designated nonattainment that have to prepare attainment demonstrations may want to consider quantifying EE/RE emissions benefits under this program
  - Could incorporate EE/RE benefits in the upcoming SIP
- Other areas may want to plan for possible, tighter NAAQS in the future
  - Consider quantifying EE/RE emissions benefits for use in a future SIP

Examples of Potential SIP EE/RE Policies, Programs and Measures

- Energy Efficiency Resource Standards (EERS)
- State energy efficiency appliance standards
- State-mandated municipal government electricity consumption reductions
- Renewable Portfolio Standard
- Local Renewable Energy Certificate purchases

Illustrative Example: CHP eligible under a State RPS

- A state has an RPS that requires 10% of electricity generation in the state to come from qualifying renewable and energy efficient resources.
- Five percent of this target must come from CHP systems, so a total of 0.5% of electricity generated in the state must come from CHP.
- The eligibility requirements for a CHP system are that the system must be "new," meaning that it began operation on or after the effective date of the RPS program, and must meet a minimum efficiency of 60%.
- The CHP system must either use natural gas or a renewable fuel.
- Both the electric and thermal output from the CHP system are credited; the thermal output is credited using the standard conversion of 3.412 MMBtu = 1 MWh.

Illustrative Example: CHP eligible under a State RPS

- Based on U.S. Energy Information Administration (EIA) data, the average annual net electricity generation in the state is 81.8 million MWh per year.
- For this example, we assume state annual generation met by CHP to meet the RPS target will be 405,447 MWh
- We assume a single CHP system, either a large commercial or institutional system or a small industrial system, which meets the State RPS criteria and whose emissions benefits can be taken into account using the EE/RE SIP Road Map.

Illustrative Example: CHP eligible under a State RPS

- System is a new 6 MW combustion turbine CHP system using natural gas;
- System operates 6,100 hours/yr (taking into account downtime for annual maintenance) and generates 36,600 MWh/yr.
- System provides electricity and heat but does not provide absorption chilling;
- The displaced onsite thermal equipment (i.e., the boiler that would have been used instead of the CHP system) is assumed to be an 80% efficient natural gas boiler.
- The system is assumed to have a certain efficiency, power-to-heat ratio, and emissions. For the purpose of this example, we assume the default values provided in the EPA CHP Emissions Calculator (not designed for regulatory use). These defaults would be defined clearly for an actual example.

Illustrative Example: CHP eligible under a State RPS

- The EPA CHP Emissions Calculator is used to determine the emissions benefits for the state. The CHP system would be able to reduce NOx emissions by an estimated 23.4 tons per year
- The State's RPS target can be met by any qualifying CHP system. Assuming the State's CHP RPS target is met by identical systems, each with the same operating profile, eleven, six megawatt combustion turbines, would be needed to meet the state's CHP targets.
- These eleven CHP systems would provide the following emission benefits:
  - 258 tons/year in NOx reductions
  - 943 tons/year in SO_2 reductions
  - 261,004 tons/year in GHG reductions (CO_2 equivalent).

How does CHP fit into Road Map?

- How aligned are your State energy and environmental goals ?
- How prevalent is CHP use in your State?
- Under which pathways could CHP qualify?
- How would emissions reductions be taken into account?
- Other questions ?

Contact Information

- CHP Partnership
  Neeharika Naik-Dhungel
  naik-dhungel.neeharika@epa.gov
  202/343-9553

- EE/RE SIP Road Map
  Angie Shatas
  shatas.angie@epa.gov
  919/541-5454

Appendix

Initial Steps State Agencies Can Take

- Learn about:
  - Existing EPA EE/RE SIP guidance
  - EE/RE policies and programs in the jurisdiction
  - Electric energy system
  - Roles and responsibilities of key state energy-related organizations
- Determine magnitude of potential emission benefits
  - Conduct initial screening analysis to see what potential could come from a jurisdiction's EE/RE policies and programs

Additional Flowchart Example

- Proposed state or local government green power purchase agreement
  - Is this "on the books"?
    - No
  - Is it emerging or voluntary?
    - Yes
  - Does the area want SIP credit?
    - Maybe

Emerging/voluntary measures or WOE pathway

Additional Flowchart Example

- Existing state Renewable Portfolio Standard (RPS) policy with mandatory goal
  - Is this "on the books"?
    - Yes
  - Is it emerging or voluntary?
    - No
  - Does the area want traditional, federal enforceability?
    - Maybe

→ Baseline or control strategy pathway

Four Pathways: Documentation Checklist

	Identify and Describe Policies/ Programs to Include	Quantify Impacts	In Place for Planning Period	Ensure No Double Counting	Ensure Federal Enforceability
Baseline Pathway	Yes	Yes	Yes	Yes	No
Control Strategy Pathway	Yes	Quantifiable	Permanent	Surplus	Enforceable
Emerging/ Voluntary Measures Pathway	Yes	Emerging measures to receive provisional SIP credit when quantification uncertain	Permanent	Surplus	Voluntary measures ok if agency assures that emission reductions credited in the SIP/TIP occur
WOE Pathway	Yes	Yes	Yes	Yes	No

EE/RE Quantification Methods: EPA Recommendations for SIP/TIP Pathways

	Basic Approach: eGrid Emission Rates	Basic Approach: Capacity Factor Emission Rates	Midrange Approach: Historical Hourly Emission Rates	Sophisticated approach: Energy models
Baseline Pathway	No	No	Yes	Yes
Control Strategy Pathway	No	Yes	Yes	Yes
Emerging/ Voluntary Measures Pathway	No	Yes	No	No
WOE Pathway	Yes	Yes	Yes	Yes