Center for the New Energy Economy
Project Proposal for WESTAR-WRAP

Project Title: Analysis of EGU Emissions for Regional Haze Planning and Ozone Transport Contribution
Period of performance: September 15, 2018 to March 15, 2019

The Center for the New Energy Economy (CNEE) at Colorado State University will conduct an analysis of current and future air emissions from fossil-fueled electricity generating units (EGUs) in 13-Western states for the Western States Air Resources Council (WESTAR) and Western Regional Air Partnership (WRAP). WESTAR and WRAP representatives have participated in discussions with WEST Associates, a group comprised of major Western electric utilities, to develop parameters for this study, including information needed for Western regional air quality analyses and planning under the federal Clean Air Act.

Developing a comprehensive and up-to-date data set for EGU emissions has emerged as a top priority among Western state and utility officials. The information developed through this project will be used in regional analysis affecting all Western states and utilities as part of the ongoing implementation of the Regional Haze Rule and for ozone analysis and planning.

This scope of work covers Phase I of the project which has two major objectives and deliverables:

1) A comprehensive database of information on the fleet of fossil-fired EGUs in 13-Western states (circa 2014-2017) that contains information on the plants operating characteristics and emissions; and
2) A projection of future plant utilization and emissions based on expected plant closures, re-powering plans, and additional controls required under a "rules on the books" scenario that includes any controls required by permit or consent decree during the period 2014 (base year) to 2028 (target year).

(Note: A possible Phase II of this project -- which would require an additional scope of work and contract extension, and is therefore not part of this initial agreement – could be conducted to conduct a regional evaluation of the impact of fossil-fired EGUs on regional visibility at Class I areas and, where possible, options for how cost-effective controls to improve visibility might be applied.)

The data developed as part of this project will also help with an important related issue for WESTAR and WRAP members, which is quantifying how emissions transport from fossil-fired EGUs affects ozone formation at urban and rural locations across the West. This question needs to be addressed in terms of compliance with the 2015 National Ambient Air Quality Standards (NAAQS) for ozone. The contribution from EGUs is part of the regional evaluation of local versus regional sources for air quality planning, which also must address the question of uncontrollable background contribution.

Scope of Work

Task 1: Develop a comprehensive database of information on the fleet of fossil-fired EGUs in 13-Western states (circa 2014) that contains information on the plants operating characteristics and emissions

Task 1 Schedule:
Begin – September 15, 2018
Progress report and workshop presentation to states and utilities – on or about October 30, 2018
Progress report identifying any units requiring 2014-17 data adjustments and closures "on-the-books" to occur by 2028 – November 30, 2018
Final Report for Task 1 – December 31, 2018

CNEE will develop base case information utilizing publicly available data from EPA, EIA, and DOE. The data set will then be provided to utility representatives and state air agencies for review and correction. The utilities and state air agencies will also be relied upon to provide information and be responsive to queries. This includes providing information on permit conditions and control technology efficiencies that may not be readily available from other sources.

- Coverage: All fossil EGUs (25 MW or greater) in 13 Western states (WECC plus ND and SD)
- Categorize natural gas units and focus on most important gas sources in Phase 1 based on size, age, capacity factors, and emissions

Database will contain actual data for 2014-2017. CNEE will produce a trends analysis for this time period along with an explanation of changes.

Key fields to be included in the database include:
- Plant name, location, ID, owner(s) and operators
- Capacity ratings, heat rate, and operational characteristics
- Generation and capacity factors, including seasonal information as available
- Emissions and emission rates for NOx, SO2, PM, and CO2
- Pollution control technology type and efficiency by pollutant
- Applicable permit conditions, limitations, and requirements

Task 2: Project scenarios of 2028 plant utilization and emissions based on expected plant utilization and closures, re-powering plans, and additional controls required under a "rules on the books" scenario that includes any controls required by permit or consent decree during the period 2014 (base year) to 2028 (target year).

Task 2 Schedule:
Begin – December 1, 2018
Progress report and workshop presentation to states and utilities – January 31, 2019
Final Report for Task 2 – March 15, 2019

The 2028 emissions and plant utilization scenarios will rely on data reviewed and updated by the utilities and state air agencies in terms of known controls and configuration changes from the 2014 base year through 2028.

A range of future emissions estimates will be developed by factoring potential economic and load growth scenarios, including electrification of additional energy end uses (e.g., electric vehicles). Other factors include:

- Known/planned unit retirements
- Potential unit retirements
- Additional controls required by rule, permit or consent decree
- New builds
- Fuel switching
- Changes in capacity factors for coal and gas units (seasonality, cycling coal vs baseload)
- Hydro variability
- Nuclear retirements
- Growth in wind and solar generation
- Implementation of outstanding regional haze controls from existing SIPs

Other key Western regional issues that will be addressed in the forecast include

- State energy and climate policies (RPS, WCI, carbon taxes, and 2018 ballot measures)
- Projected demand trend from 2014-17 out through 2028
- Current and future state and utility energy efficiency programs
- Utility IRPs – new info will come in during the course of the study so periodic updates will be needed
- Developments in the regional wholesale electricity markets – EIM, CA–NW, RTO
- Transmission planning – new lines, capacity available on existing lines when units retire, bottlenecks/constraints (e.g., MT/Bonneville)
- Any new state (or federal) legislation
- Local energy/environmental issues that could impact generation or emissions – e.g., city sustainability goals, corporate RE purchasing, etc.
- Emerging technology – storage, demand response/DSM, distributed generation, grid modernization