



# CPRG Tools and Technical Resources – Electric Power Sector

This webpage provides a list of tools and resources that support CPRG Planning Grantees meet the sector-based requirements for the Comprehensive Climate Action Plan (CCAP) and Priority Climate Action Plan (PCAP) if it includes the power sector as a priority sector. These requirements are laid out in the Program Guidance for [States, Municipalities, and Air Pollution Control Agencies](#) and [Federally Recognized Tribes, Tribal Consortia, and U.S. Territories](#).

EPA and other federal organizations publish and maintain a variety of resources that grantees may leverage to meet these requirements, including [Electric Power Sector Emissions Data](#), [Electric Power Sector Emissions Quantification Methods and Tools](#), and on [Understanding Electric Power Sector Emission Reduction Opportunities](#). These resources are further described below.

*Note: EPA does not require the usage of a specific dataset or tool, or the inclusion of any particular measure type.*

Visit the [Greenhouse Gas \(GHG\) Inventory and Projections](#) webpage for more information on GHG inventory and projections data, methods, tools, and resources.

## Where to get started?

The resources below broadly describe electric power sector GHG emissions and strategies to reduce them. They can help grantees begin to consider approaches to reducing emissions in their jurisdiction.

- The [Wholesale Power Market Overview](#) [↗](#) from The Federal Energy Regulatory Commission (FERC) provides background information on the landscape of the nation's various Regional Transmission Organizations (RTOs), Independent System Operators (ISOs), and other power market structures, as well as its role in the regulation of these organizations' planning processes and wholesale electricity markets.
- The [EPA State Energy and Environment Guide to Action](#) offers real-world best practices to help states design and implement policies that reduce emissions associated with electricity generation and use. The guide includes multiple chapters on key utility policies to support clean energy and energy efficiency that can be used to inform the creation of PCAPs and CCAPs. Though this guide is focused on state actions, it is a helpful resource for local and tribal governments in identifying opportunity areas and areas for collaboration in the PCAP and CCAP development process.

- The 2016 [U.S. Mid-Century Strategy \(MCS\) for Deep Decarbonization](#) [↗](#) charts pathways for achieving deep GHG reduction by 2050, integrating action across the energy sector (power, transportation, buildings, and industry), lands, and non-CO2 sources. It includes three detailed chapters on decarbonizing the energy sector; storing carbon and reducing emissions on lands; and reducing non-CO2 emissions. State, local, and tribal governments can look to the overview of sector-based emissions and emission abatement strategies contained in the MCS to identify potential pathways of opportunity while developing their PCAPs and CCAPs.
- The White House’s [Long-Term Strategy of the United States](#) [↗](#) outlines potential pathways to net-zero GHG emissions by 2050. State, local, and tribal governments can utilize this resource in their planning stages to develop GHG reduction strategies in line with U.S. national ambitions.
- EPA’s Quantified Climate Action Measures Directory presents information on the quantified greenhouse gas (GHG) emission reduction measures in state and local climate action plans published between January 2018 and August 2023. Grantees may use this tool to draw inspiration for PCAP and CCAP emissions reductions measures and understand how they were quantified by states, MSAs, and tribes of similar sizes, geographies, economic conditions, etc.
  - [Access the State Quantified Measures Directory](#).
  - [Access the Local Quantified Measures Directory](#).

*Note: There are electric power sector training recordings and supplemental resources for CPRG Planning grantees located on the CPRG Technical Assistance Forum (TAF) Resource Library SharePoint site. If you are planning grantee, planning grantee partner, or TAF participant and would like access to the site, please contact [cprg.epa@endyna.com](mailto:cprg.epa@endyna.com).*

## Electric Power Sector Emissions Data

This section can help equip grantees with critical information needed to meet PCAP and CCAP requirements. The emissions data resources below can help grantees identify emission reduction opportunities and build a solid data foundation for quantifying and assessing the impact of their GHG reduction measures.

- The [U.S. Energy Information Administration \(EIA\)](#) [↗](#) collects, analyzes, and provides information on the U.S. energy sector. The EIA resources below provide users with detailed insights into U.S. electric sector infrastructure, demands, resource mix, and operations.
- The [State Energy Data System \(SEDS\)](#) [↗](#) is an interactive resource that provides historical estimates of state-level emissions of CO2, SO2, and NOX from electric power production. SEDS also provides state-level data for an array of energy and demographic metrics from electricity and fuel pricing to consumption by source and sector to population and others. SEDS also provides comparative tools and ranking for many data for many data across all states. Grantees can use the data system to understand regional variations in the power system and tailor GHG reduction measures to the specific needs and challenges of individual states and regions.
- The EIA’s annual [State Electricity Profiles](#) [↗](#) provide historical average retail prices, net summer generating capacity, net generation, total retail sales, and other electric power sector data for each state.

- The [U.S. Energy Atlas](#) provides over 150 datasets for U.S. energy infrastructure, climate, and demographic information with interactive maps and additional tools to search and display data. Its interactive maps for energy infrastructure and resources, and energy disruptions resulting from wildfires, flooding, and severe storms, may be useful for state, local, and tribal energy planners.
- Through Form [EIA-860](#), the EIA collects and makes available generator-level information for all U.S. generators over one megawatt in size. EIA-860 provides information on a generator's location, capacity, technical capabilities, ownership, fuel source, and environmental controls equipment.
- Through [EIA-923](#), the EIA collects and makes available data on electricity generation, fuel consumption, fossil fuel stocks, and receipts at the generator level on a monthly basis with annually finalized reporting.
- The EIA's [Annual Energy Outlook](#) provides long-term forecasts for the U.S. energy sector, highlighting market trends, factors, and major policies that are likely to shape the future of U.S. energy demands, supplies, and industry resource development and retirements. The annual report provides a range of modeled results for reference and sensitivity cases to illustrate potential outcomes dependent upon economic growth factors, fuel prices, and technology advancement.
- The EIA'S [Hourly Electric Grid Monitor](#) provides hourly data from U.S. balancing authorities and wholesale market operators on their electricity demands and generation by source for historical periods back to 2016 through today. Users can search for historical hourly periods and by region to see hourly electric demands, generation mix, and exchanges between neighboring regions.
- [Today in Energy](#) offers short articles from EIA experts that provide insights into topical and timely issues impacting the energy landscape.
- DOE's [State and Local Planning for Energy \(SLOPE\) Data Viewer](#) contains city-, county-, and state-level data on energy consumption and generation, renewables, efficiency, transportation, commercial buildings, and more.
  - [Webinar on SLOPE Data Viewer](#)
- The [Emissions & Generation Resource Integrated Database \(eGRID\)](#) is a comprehensive source of data from EPA's [Clean Air Markets Division](#) on the environmental characteristics of almost all electric power generated in the United States. The data includes emissions, emission rates, generation, heat input, resource mix, and many other attributes and can be used for GHG inventories, carbon footprints, emission inventories and standards, avoided emission estimates and more. This tool may help grantees document emissions associated with the electric power sector.
  - This [technical guide](#) provides a description of eGRID2021, including the methodology for developing the Excel spreadsheets for each level of aggregation and the grid gross loss calculation.
  - The [Download Data](#) page allows users to view summary-level eGRID data by region or download all data in spreadsheet form by historical year of interest.
- The [Data Explorer](#) tool allows users to search and view eGRID data in graphical forms by year, region, source and metric that they are interested in. Available metrics include emissions, generation, heat input, and emission rates by air pollutant. This tool also allows users to explore plant level data, regional resource mixes, and trends in the data over time.
- The [Power Profiler](#) provides information and graphics for regional fuel mix and emission rates.

- The [Power Plants and Neighboring Communities \(PPNC\)](#) web-based tool allows users to search and analyze eGRID emissions data with local demographic information, providing interactive maps and other graphics for assessing localized emissions impacts to low-income and disadvantaged communities (LIDACs), energy and environmental justice (EJ) communities, and other communities of interest.
- [EPA's Clean Air Power Sector Data](#) contains additional tools and resources for the power sector, including information and documentation of EPA's power sector modeling, and quarterly updates of SO<sub>2</sub>, NO<sub>x</sub>, CO<sub>2</sub>, and Hg emissions data from power plants reported through Clean Air Power Sector Programs.
  - The [Power Sector Emissions Data](#) page compiles quarterly updates of emissions data for power plants and includes tools to further understand and access the data.
- [Power Sector Modeling](#) - The EPA provides detailed documentation of its Power Sector Modeling Platform v6 Using IPM in addition to prior versions and model results for potential emission factor projections.
  - [Documentation for Post-IRA 2022 Reference Case](#) dissects the platform's assumptions and methodologies.
  - [Results using Post-IRA 2022 Reference Case](#) enables users of the tool to review outputs and visualize results easily.

# Electric Power Sector Emissions Quantification Methods and Tools

The following resources provide tools and methods for quantifying GHG emission reductions for the electric power sector. These methods and tools can be used by states, local governments, Tribes, and territories to quantify GHG reduction measures in their PCAPs and CCAPs.

## Quantification Methods

The following resource provides methodologies for quantifying GHG emission reductions for the electric power sector. These methods can be used to quantify GHG reduction measures in climate action plans.

- EPA's [Guidebook for Energy Efficiency Evaluation, Measurement and Verification](#) (*EM&V Guidebook*) helps state, local, and tribal air and energy officials—as well as key stakeholders such as utility energy efficiency implementers—learn about, establish, and refine their EM&V methods. The practices described in the *EM&V Guidebook* provide air and energy officials with a credible basis for determining whether energy efficiency activities are achieving intended levels of energy savings and emissions reductions. The *EM&V Guidebook* can also help air officials understand the basics of EM&V and engage in discussions with their counterparts in energy agencies.

## Quantification Tools

The following resources provide tools for quantifying GHG emission reductions for the electric power sector. These tools can be used to quantify GHG reduction measures in climate action plans.

- EPA's [AVoided Emissions and geneRation Tool \(AVERT\)](#) is a web or Excel-based tool used to evaluate how energy policies and programs such as energy efficiency, renewable energy, and electric vehicle deployment lead to changes in emissions of fine particulate matter, nitrogen oxides, sulfur dioxide, carbon dioxide, volatile organic compounds, and ammonia from electric power plants. It operates at the regional electricity grid level and reports results down to the county level. AVERT may be a useful tool for compiling the benefits analysis in the PCAP or CCAP.
  - [This webinar page](#) includes a recording and slides that outline the new features of the latest version of AVERT.
- [Energy Savings and Impacts Scenario Tool \(ESIST\)](#) is an Excel-based planning tool for analyzing the energy savings and costs from customer-funded energy efficiency programs, primarily on the electricity sector, and their impacts on emissions, public health, and equity for historical and forecast years between 2010-2040. ESIST allows users to select a study area based on states, utility types, specific utilities, or different customer sectors within a utility to then adjust inputs, including electricity sales growth forecasts, energy efficiency savings goals, program budgets, savings expiration schedules, discount rates, and first-year costs. ESIST may be useful to forecast the energy savings, emissions, and costs of energy efficiency programs in climate action plans.
  - [The ESIST: Pilot Gas Version](#) is focused on natural gas savings from energy efficiency or other gas-saving measures in the residential and commercial sectors.
  - [The ESIST Version 1.1 User Manual](#) describes the input process used to generate ESIST results. The manual also describes how users can generate tailored results within the optional modules and replace default values with user-specified assumptions.
  - Training for ESIST is available in the form of a [recorded webinar](#) [↗](#) with [webinar slides](#) also available.
- [GLIMPSE](#) is model-based tool designed to support coordinated air, climate, and energy planning. At the heart of GLIMPSE is the [Global Change Analysis Model \(GCAM-USA\)](#) [↗](#), an open-source human-Earth system model with state-level resolution. GLIMPSE simulates the co-evolution of the energy, agriculture, water, land, economic, and climate systems, tracking technology and fuel use, as well as the resulting GHG and air pollutant emissions. GLIMPSE's has multi-sector, multi-pollutant coverage over the time period of 2015 through 2100 in 5-year increments. One of its strengths is in simulating the interactions among sectors; however, GLIMPSE has less sectoral detail than many sector-specific models. GLIMPSE may be useful for activities such as developing emission projections, identifying strategies for meeting specific GHG reduction targets, and quantifying the long-term emission impacts of specific mitigation measures or of bundles of measures. For power sector analyses, GLIMPSE allows users to specify measures such as Renewable Portfolio Standards, Clean Energy Standards, and offshore wind targets, evaluating their impacts on capacity expansion and GHG and air pollutant emissions. GLIMPSE can also be used to explore the impacts of measures implemented in combination, such as pairing an electric vehicle sales target or electrification of buildings with a Clean Energy Standard.

- The [GLIMPSE Users Guide](#) provides instructions and guidance for state, local, and tribal air and energy officials.
- The [GLIMPSE webpage](#) will announce of upcoming information sessions and training opportunities. Interested grantees may email [glimpse@epa.gov](mailto:glimpse@epa.gov) to obtain a link to the GLIMPSE download folder, which also includes videos of training sessions.

# Understanding Electric Power Sector Emission Reduction Opportunities

The resources below focus on areas of the electric power sector where opportunities for GHG emissions reductions might be found. The resources can help grantees refine emissions reduction strategies and select measures to implement their strategies in their PCAP and CCAP.

Key strategies to reduce emissions from the electric power sector are increasing penetrations of renewable and other low- or zero-emitting electric generating resources and implementing energy efficiency and cross-sector emissions reductions strategies. In addition to resources provided above, such as those listed under [EIA](#) and [EPA](#), the scenarios and data sources below help to provide an understanding of resource potential, technology improvement trends, and future planning environments.

- The [NREL Annual Technology Baseline \(ATB\)](#) provides generation technology-specific cost and performance data and projections for a range of technological advancement scenarios, resource characteristics, and other assumptions through 2050. This tool can support grantees in the development of GHG reduction measures that align with evolving technologies.
- The [NREL Electrification Futures Study \(EFS\)](#) provides multiple scenarios and simulations on the impacts to electric demand resulting from the electrification of energy demands from other sectors with point source emissions, and electric efficiency measures.
- [Utility Integrated Resource Plans \(IRPs\)](#) are often required by states for electric utilities to provide detailed information on their historic and forecasted electric demands, and investment and retirement plans for their generation, transmission, and distribution assets and contracts. Grantees can research utilities relevant to a specific region to understand electricity trends in developing their PCAPs and CCAPs.
- State and Regional Energy Planning Processes are valuable sources of information on the planning process, policies, and operations of the electric systems for states and regional energy planning organizations, such as organized wholesale energy markets. Examples of these resources would include state public utility commissions and environmental agencies, and regional ISOs and RTOs (e.g., [PJM](#), [CAISO](#), [MISO](#), [SPP](#), [NYISO](#), and [ISO-NE](#)).
- EPA's [Green Power Partnership Toolbox for Renewable Energy Project Development](#) identifies economic and administrative barriers in the deployment of on-site renewable energy projects. This Toolbox examines six key issues that have important implications for developing on-site solar projects.
- The [Local Government Climate and Energy Strategy Series](#) gives a straightforward overview of GHG emission reduction strategies that local governments can use to achieve economic, environmental, social, and human health benefits. The series covers energy efficiency, transportation, community planning and design, solid waste and materials management, and renewable energy. While



developing PCAPs and CCAPs, state governments can also look to this series to identify potential areas of collaboration with local governments.

- EPA's [Renewable Energy on Contaminated Lands](#) initiative encourages renewable energy development on current and formerly contaminated lands, landfills, and mine sites when such development is aligned with the community's vision for the site. It may aid state, local, and tribal governments identify sites.

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