CleanEnergy States Alliance

EPA Tools to Support States:

Quantifying Emissions Reductions and the Health and Economic Co-Benefits of Clean Energy Policies

August 27, 2024

Celebrating 20 Years of State Leadership

CleanEnergy States Alliance

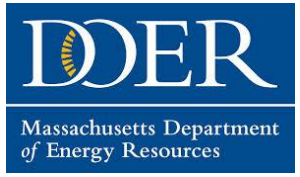
The Clean Energy States Alliance (CESA) is a national, nonprofit coalition of public agencies and organizations working together to advance clean energy.

CESA members—mostly state agencies—include many of the most innovative, successful, and influential public funders of clean energy initiatives in the country.

www.cesa.org

Clean Energy States Alliance

www.cesa.org



100% Clean Energy Collaborative

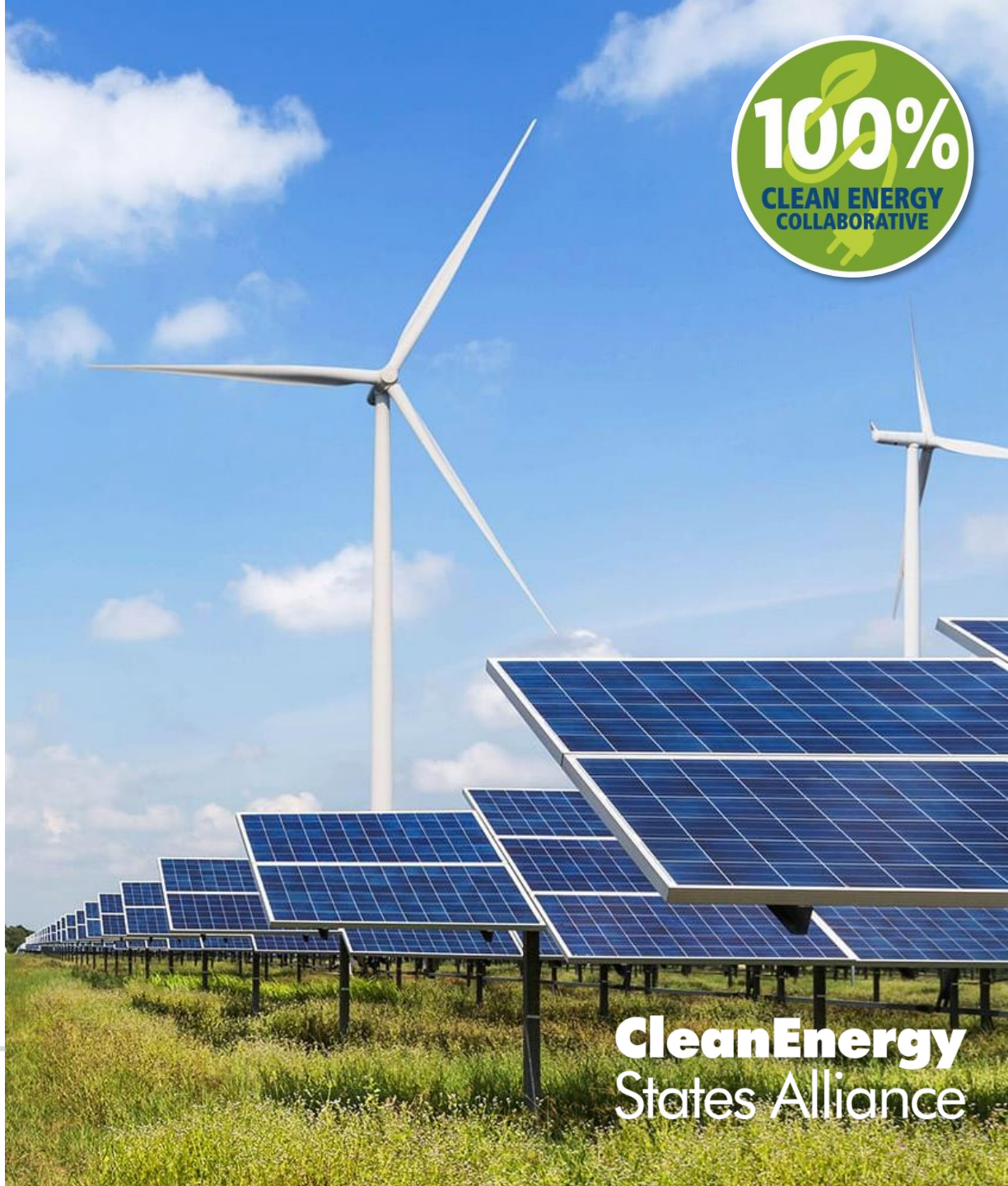
Assisting the 22 states (plus DC and Puerto Rico) that have 100% clean energy goals by providing knowledge-sharing activities and analysis so that together they can address program challenges and opportunities.

Resources include a monthly newsletter; a web-based *Guide to 100% Clean Energy States*; frequent public and private webinars; and numerous reports.

CleanEnergy States Alliance

UNITED STATES CLIMATE ALLIANCE

www.cesa.org/100



IRA & BIL Implementation

Helping states navigate opportunities surrounding the Inflation Reduction Act and the Bipartisan Infrastructure Law.

Providing states with information, tailored guidance, and opportunities for collaboration to capitalize on billions of dollars in federal clean energy opportunities.

www.cesa.org/projects/ira-bil-implementation

Webinar Speakers

David Tancabel
Senior Utility Policy Analyst
US Environmental Protection Agency

Warren Leon
Executive Director
Clean Energy States Alliance

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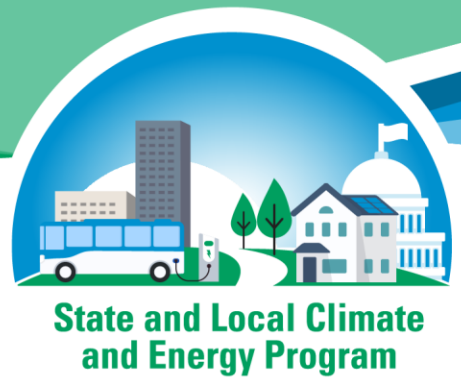


EPA Tools to Support States: Quantifying Emissions Reductions and the Health and Economic Co-Benefits of Clean Energy Poilicies

David Tancabel

August 27, 2024

State and Local Climate and Energy Program

Our Tools and Resources Support State, Local and Tribal Stakeholders on Climate and Energy

Develop Inventories and Set Goals

State Inventory and Projection Tool
Develop and update inventories for 11 sectors. Forecast emissions through 2050

Local Inventory Tool
Develop community-wide inventories or inventories of local government operations only

Tribal Inventory Tool
Develop community-wide inventories or inventories of tribal government operations only

Design, Compare, or Evaluate Policy

AVoided Emissions and geneRation Tool
Evaluate changes in power plant emissions from energy policy

Co-Benefits Risk Assessment Health Impacts Screening and Mapping Tool
Quantify and monetize health impacts of reducing emissions

Health Benefits per kWh
Estimate the health benefits per kWh of clean energy

Energy Savings and Impacts Scenario Tool
Analyze energy savings, costs, and multiple benefits from energy efficiency programs

Communicate and Support Policy Implementation

Greenhouse Gas Equivalencies Calculator
Convert a unit of energy to the equivalent amount of CO_2 emissions from using that amount

Heat Island Reduction Program
Resources to implement heat island mitigation policies and projects

Technical Support
Provide 1-1 technical support for state, local and tribal stakeholders

Convene Stakeholders
Engage state, local and tribal decision-makers

Local Action Framework:
A Guide to Help Communities Achieve Energy and Environmental Goals

State Energy and Environment Guide to Action:
A best practices guide to help states design and implement policies that reduce emissions from electricity generation and energy consumption

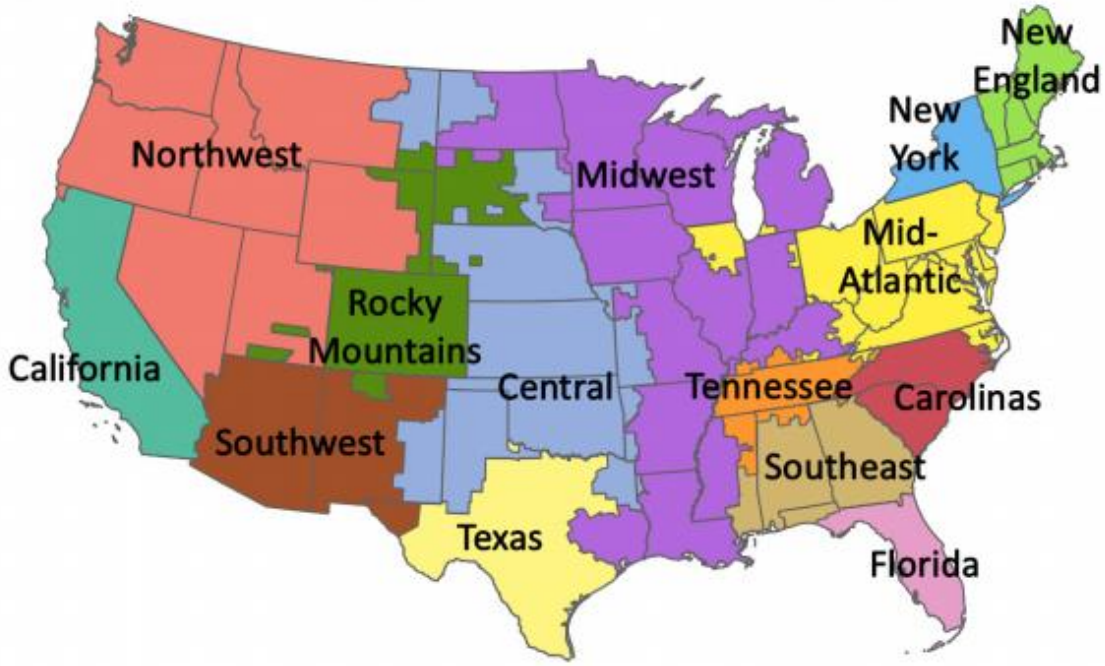
Quantifying the Multiple Benefits of Energy Efficiency and Renewable Energy:
A Guide for State and Local Governments

Clean Energy Financing Toolkit:
A resource to help state and local decisionmakers understand the basics of financing strategies across multiple sectors

Local Government Climate and Energy Strategy Series:
A Guide to Developing and Implementing Greenhouse Gas Reduction Programs

AVERT Overview

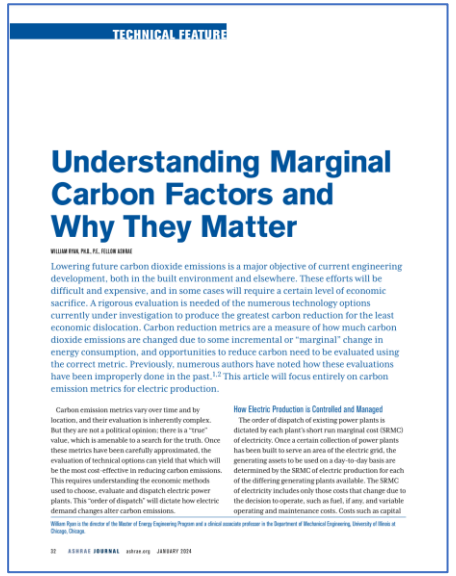
- Free, easy to use:
  - Policy, program, and project analysis
- Scenario analysis
  - EE/RE/ES+
- Excel & Web Editions
- Produces hourly marginal emissions: CO_2, NO_x, SO_2, $PM_{2.5}$, VOCs, NH_3
- Data updated annually



For more info: https://www.epa.gov/avert

AVERT can be used for different types of analyses

- Model the impacts of EE/RE, energy storage, and EVs deployed in a given, near-term year
  - GHG and criteria pollutant emissions analysis
  - Policy analysis
- Easy, fast to use and modify


TECHNICAL FEATURE

Understanding Marginal Carbon Factors and Why They Matter

WILLIAM RYAN, PH.D., P.E., FELLOW ASHRAE

Lowering future carbon dioxide emissions is a major objective of current engineering development, both in the built environment and elsewhere. These efforts will be difficult and expensive, and in some cases will require a certain level of economic sacrifice. A rigorous evaluation is needed of the numerous technology options currently under investigation to produce the greatest carbon reduction for the least economic dislocation. Carbon reduction metrics are a measure of how much carbon dioxide emissions are changed due to some incremental or "marginal" change in energy consumption, and opportunities to reduce carbon need to be evaluated using the correct metric. Previously, numerous authors have noted how these evaluations have been improperly done in the past.[1,2] This article will focus entirely on carbon emission metrics for electric production.

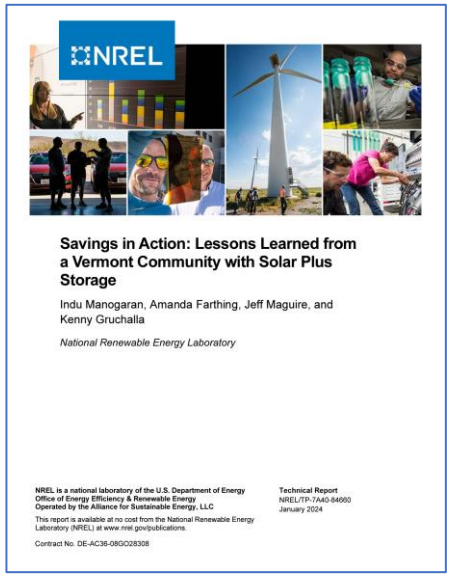
Carbon emission metrics vary over time and by location, and their evaluation is inherently complex. But they are not a political opinion; there is a "true" value, which is amenable to a search for the truth. Once these metrics have been carefully approximated, the evaluation of technical options can yield that which will be the most cost-effective in reducing carbon emissions. This requires understanding the economic methods used to choose, evaluate and dispatch electric power plants. This "order of dispatch" will dictate how electric demand changes alter carbon emissions.

William Ryan is the director of the Master of Energy Engineering Program and a clinical associate professor in the Department of Mechanical Engineering, University of Illinois at Chicago, Chicago.

How Electric Production is Controlled and Managed

The order of dispatch of existing power plants is dictated by each plant's short run marginal cost (SRMC) of electricity. Once a certain collection of power plants has been built to serve an area of the electric grid, the generating assets to be used on a day-to-day basis are determined by the SRMC of electric production for each of the differing generating plants available. The SRMC of electricity includes only those costs that change due to the decision to operate, such as fuel, if any, and variable operating and maintenance costs. Costs such as capital

32 ASHRAE JOURNAL ashrae.org JANUARY 2024


NREL

Savings in Action: Lessons Learned from a Vermont Community with Solar Plus Storage

Indu Manogaran, Amanda Farthing, Jeff Maguire, and Kenny Gruchalla

National Renewable Energy Laboratory

NREL is a national laboratory of the U.S. Department of Energy Office of Energy Efficiency & Renewable Energy Operated by the Alliance for Sustainable Energy, LLC

This report is available at no cost from the National Renewable Energy Laboratory (NREL) at www.nrel.gov/publications.

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Technical Report NREL/TP-7A40-84660 January 2024


PLOS CLIMATE

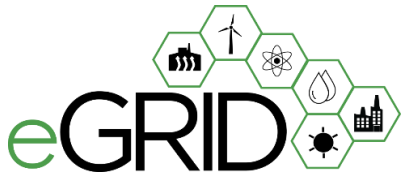
RESEARCH ARTICLE

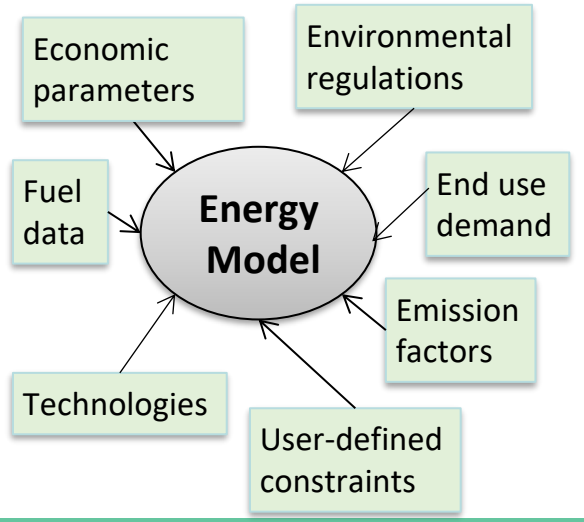
Emissions redistribution and environmental justice implications of California's clean vehicle rebate project

Jaye Mejía-Duwan[1*], Miyuki Hino[2,3], Katharine J. Mach[4,5]

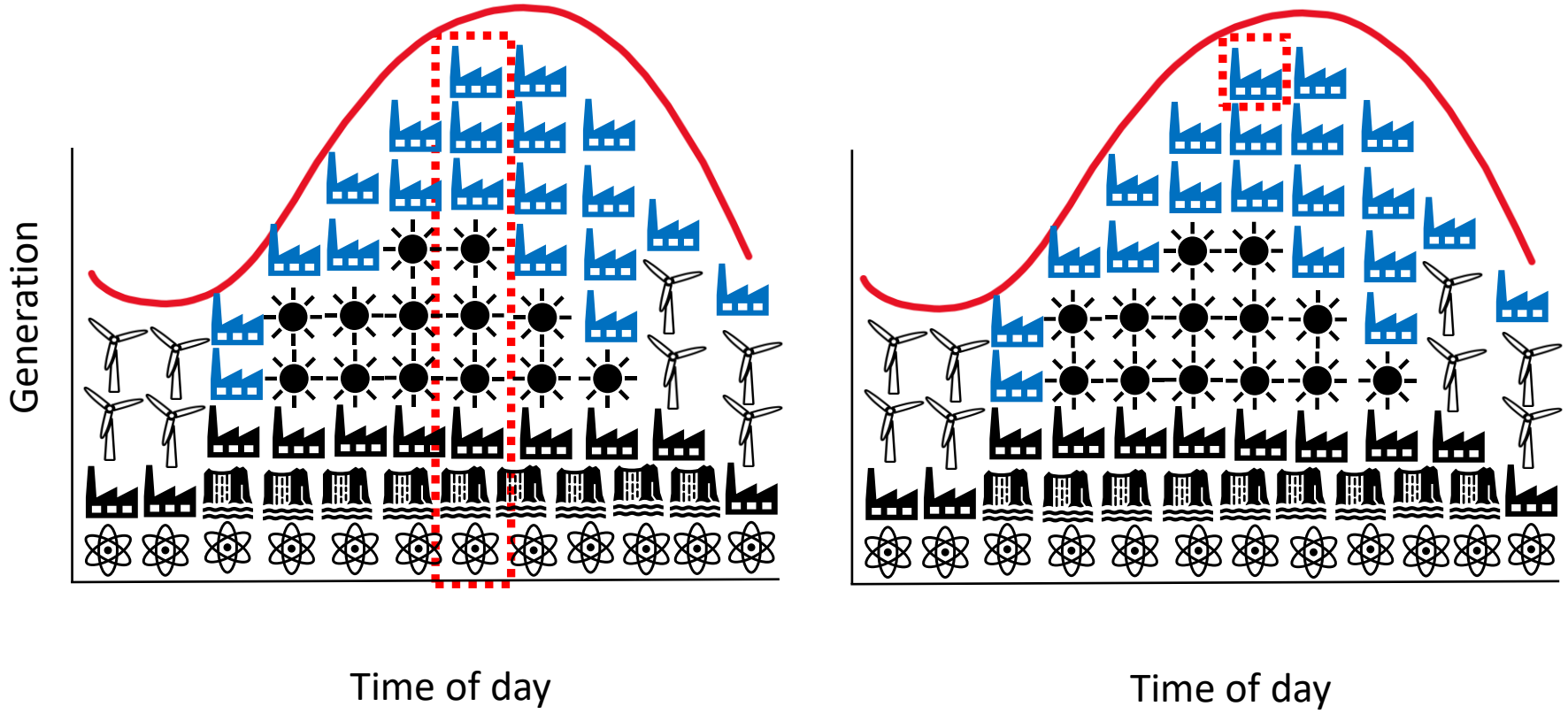
Power Sector Emission Quantification Methods: Basic to Sophisticated

Basic Method	Intermediate Method	Sophisticated Method
eGRID region non-baseload emission rates	Historical hourly emission rates	Energy modeling; dispatch or capacity expansion

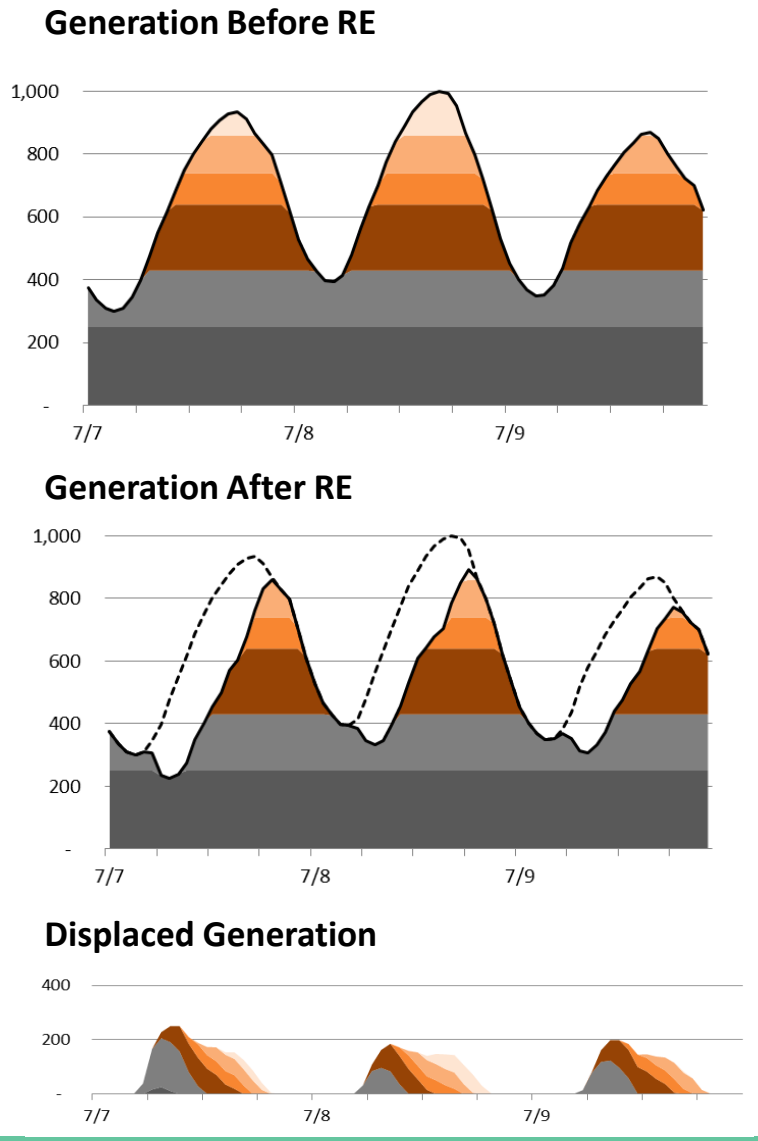




Average vs. Marginal Emissions



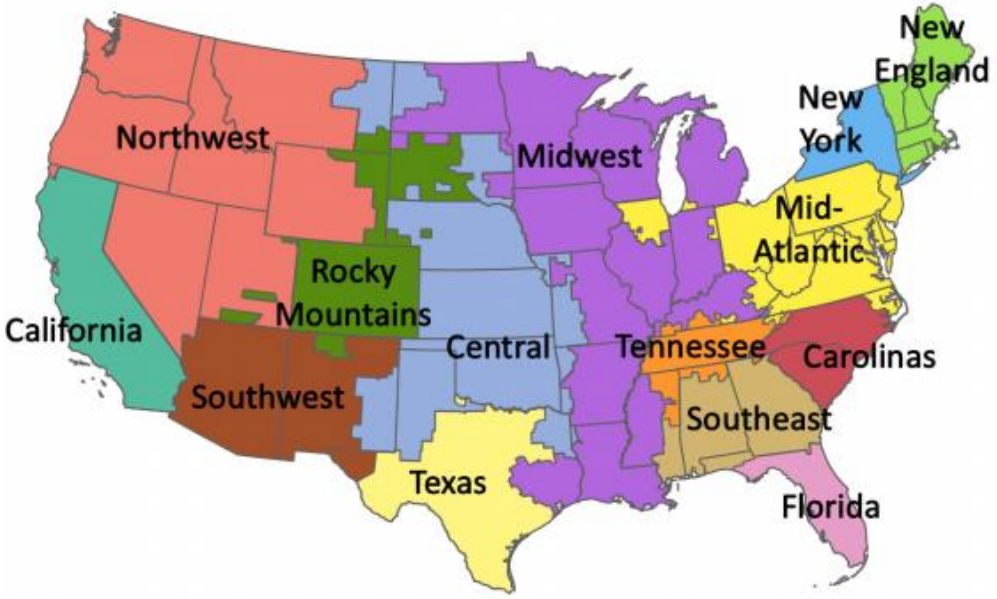
How AVERT Works: Loading Order and Displacement

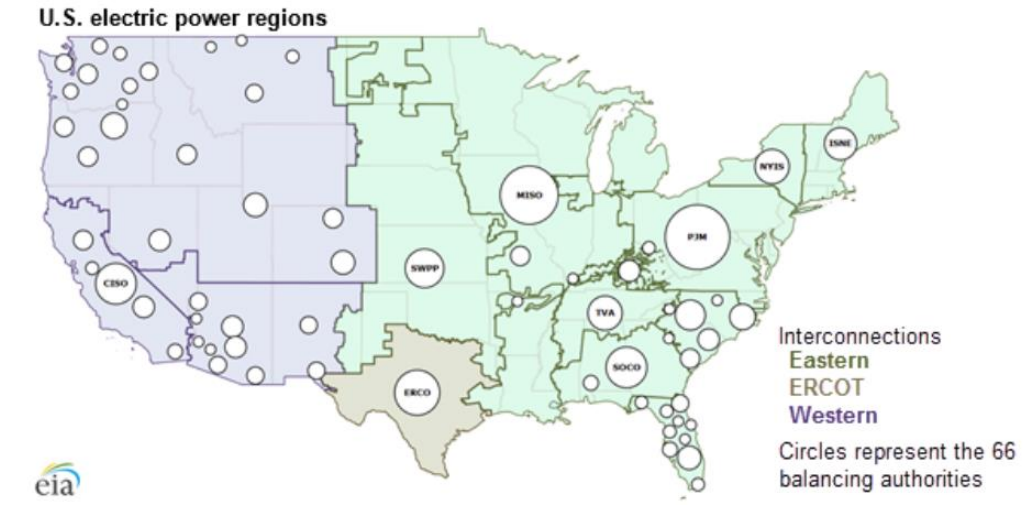


- AVERT is an **operational** simulation model.
- Conceptually, generation is dispatched in a **loading order**, least expensive generators first
- EE/RE (generally) reduces requirement for fossil generation
- Reduced generation = reduced emissions

AVERT Regions

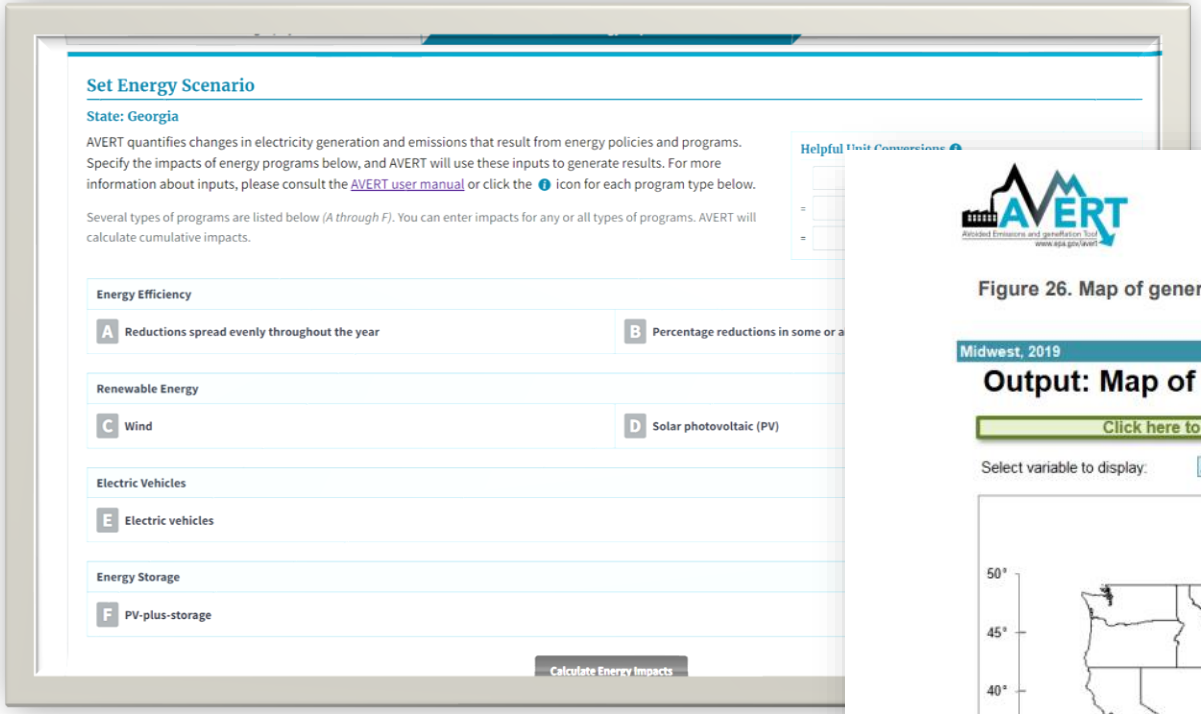
- Based on electric grid balancing authorities
- Each AVERT region operates as an island
- Each county is assigned an AVERT region
- Each fossil power plant is assigned a region

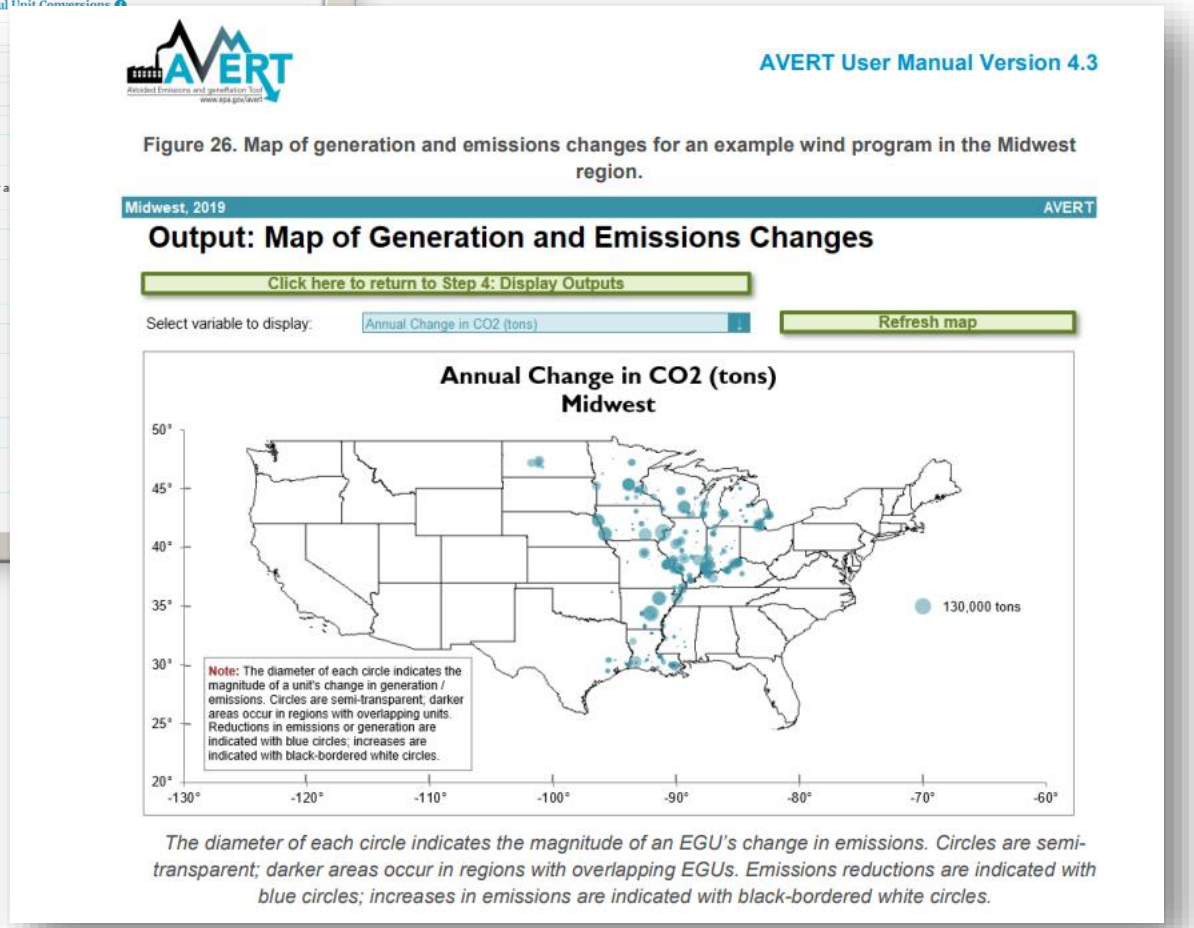




Source: U.S. Energy Information Administration

AVERT


Set Energy Scenario
State: Georgia
AVERT quantifies changes in electricity generation and emissions that result from energy policies and programs. Specify the impacts of energy programs below, and AVERT will use these inputs to generate results. For more information about inputs, please consult the AVERT user manual or click the icon for each program type below.
Several types of programs are listed below (A through F). You can enter impacts for any or all types of programs. AVERT will calculate cumulative impacts.
Helpful Unit Conversions
Energy Efficiency
A Reductions spread evenly throughout the year
B Percentage reductions in some or a
Renewable Energy
C Wind
D Solar photovoltaic (PV)
Electric Vehicles
E Electric vehicles
Energy Storage
F PV-plus-storage
Calculate Energy Impacts


AVERT User Manual Version 4.3
Figure 26. Map of generation and emissions changes for an example wind program in the Midwest region.
Midwest, 2019
AVERT
Output: Map of Generation and Emissions Changes
Click here to return to Step 4: Display Outputs
Select variable to display:
Annual Change in CO2 (tons)
Refresh map
Annual Change in CO2 (tons)
Midwest
50°
45°
40°
35°
30°
25°
20°
-130°
-120°
-110°
-100°
-90°
-80°
-70°
-60°
130,000 tons
Note: The diameter of each circle indicates the magnitude of a unit's change in generation / emissions. Circles are semi-transparent; darker areas occur in regions with overlapping units. Reductions in emissions or generation are indicated with blue circles; increases are indicated with black-bordered white circles.
The diameter of each circle indicates the magnitude of an EGU's change in emissions. Circles are semi-transparent; darker areas occur in regions with overlapping EGUs. Emissions reductions are indicated with blue circles; increases in emissions are indicated with black-bordered white circles.

Limitations of AVERT

- General:
  - Near-term time horizon (~5 years)
  - Not for analyzing very large load changes
  - Not suitable for mobile source regulatory analyses, including state implementation plans (SIP) and transportation conformity analyses
- Energy storage:
  - Maximum 12-hour discharge profile
  - Not for analyzing grid services, congestion reduction
  - AVERT Web Edition is a streamlined version

COBRA (Co-Benefits Risk Assessment) Health Screening and Mapping Tool

- Estimates and maps air quality and health impacts of EE and RE policies
- Provides health benefits down to the county-level and monetizes their economic value
- Ability to directly import AVERT output files

COBRA Output

We calculated absolute emissions reductions of Michigan's renewable portfolio standard of 10%.

COBRA (1) converted emissions reductions into air quality improvements, and (2) estimated annual adverse health impacts avoided.

COBRA monetized the value or benefits of the avoided adverse health effects.

Annual Emission Reductions (short tons)

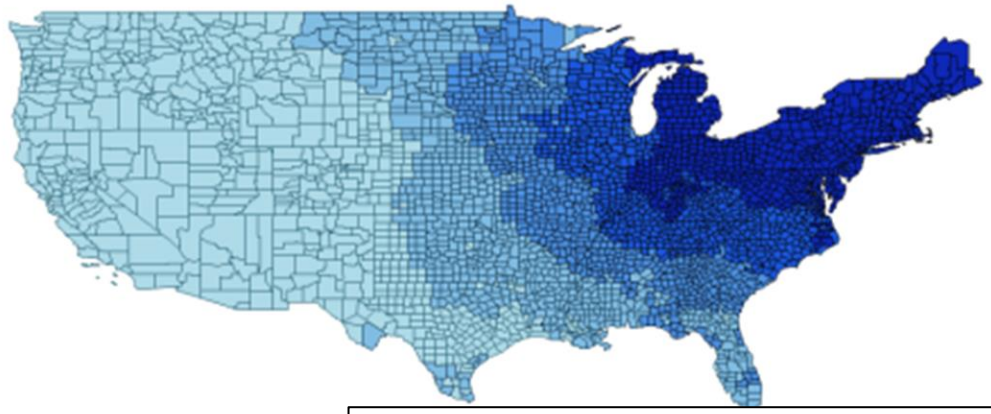
Pollutant	Amount
Sulfur Dioxide (SO_2)	6,600
Nitrogen Oxides (NO_x)	2,400

Annual Adverse Health Impacts Avoided

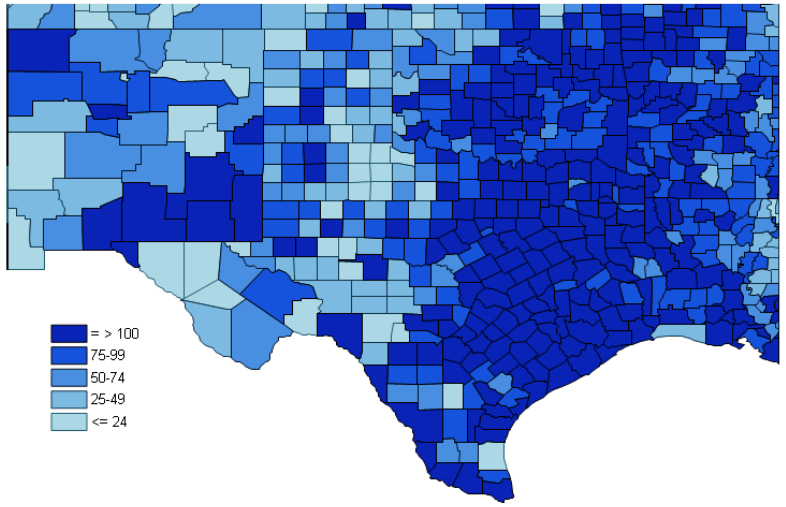
Outcome	Number
Mortality	25.5 – 57.7
Asthma Exacerbations	625
Heart Attacks	3.3 – 31.0
Hospital Admissions	17.4
Acute Bronchitis	33.1
Respiratory Symptoms	1,027
Asthma ER Visits	13.0
Minor Restricted Activity Days	16,600
Work Days Lost	2,800
total	

Annual Benefits (2017, $1,000s)

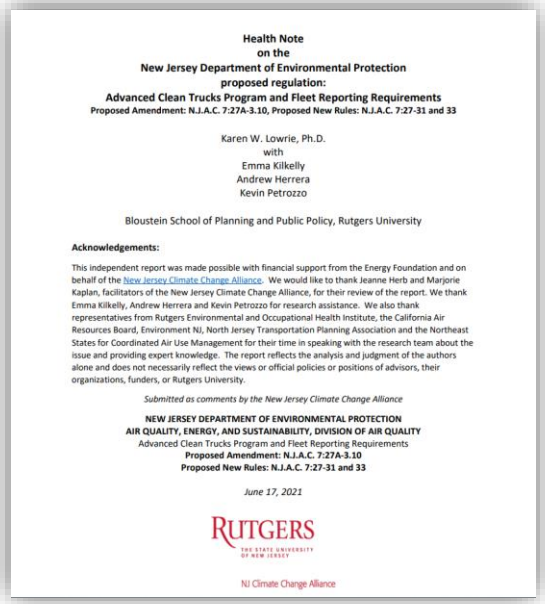
Dollar Value
$254,000 – $574,000
$40.9
$445– $4,140
$659
$18.0
$32.8
$6.21
$1,290
$502
$257,000 - $581,000



Number of Asthma Exacerbations Avoided



COBRA Citations and Use Cases:



Health Note
on the
New Jersey Department of Environmental Protection
proposed regulation:
Advanced Clean Trucks Program and Fleet Reporting Requirements
Proposed Amendment: N.J.A.C. 7:27A-3.10, Proposed New Rules: N.J.A.C. 7:27-31 and 33

Karen W. Lowrie, Ph.D.
with
Emma Kilkelly
Andrew Herrera
Kevin Petrozzo

Bloustein School of Planning and Public Policy, Rutgers University

Acknowledgements:

This independent report was made possible with financial support from the Energy Foundation and on behalf of the New Jersey Climate Change Alliance. We would like to thank Jeanne Herb and Marjorie Kaplan, facilitators of the New Jersey Climate Change Alliance, for their review of the report. We thank Emma Kilkelly, Andrew Herrera and Kevin Petrozzo for research assistance. We also thank representatives from Rutgers Environmental and Occupational Health Institute, the California Air Resources Board, Environment NJ, North Jersey Transportation Planning Association and the Northeast States for Coordinated Air Use Management for their time in speaking with the research team about the issue and providing expert knowledge. The report reflects the analysis and judgment of the authors alone and does not necessarily reflect the views or official policies or positions of advisors, their organizations, funders, or Rutgers University.

Submitted as comments by the New Jersey Climate Change Alliance

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
AIR QUALITY, ENERGY, AND SUSTAINABILITY, DIVISION OF AIR QUALITY
Advanced Clean Trucks Program and Fleet Reporting Requirements
Proposed Amendment: N.J.A.C. 7:27A-3.10
Proposed New Rules: N.J.A.C. 7:27-31 and 33

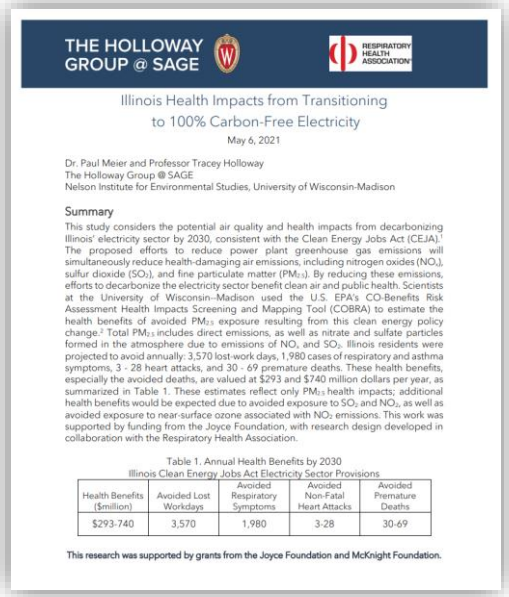
June 17, 2021

RUTGERS
THE STATE UNIVERSITY OF NEW JERSEY

NJ Climate Change Alliance

- Uses COBRA to calculate health benefits under New Jersey's proposal to adopt California's Advanced Clean Trucks Program. Estimates total health benefits between $288 - $648 million. (NJCCA and Rutgers University)

https://njadapt.rutgers.edu/images/NJ_Climate_Change_Alliance_comments_on_ACT_Rule_2_1.pdf



THE HOLLOWAY GROUP @ SAGE
RESPIRATORY HEALTH ASSOCIATION

Illinois Health Impacts from Transitioning to 100% Carbon-Free Electricity

May 6, 2021

Dr. Paul Meier and Professor Tracey Holloway
The Holloway Group @ SAGE
Nelson Institute for Environmental Studies, University of Wisconsin-Madison

Summary

This study considers the potential air quality and health impacts from decarbonizing Illinois' electricity sector by 2030, consistent with the Clean Energy Jobs Act (CEJA).[1] The proposed efforts to reduce power plant greenhouse gas emissions will simultaneously reduce health-damaging air emissions, including nitrogen oxides (NO_x), sulfur dioxide (SO_2), and fine particulate matter ($PM_{2.5}$). By reducing these emissions, efforts to decarbonize the electricity sector benefit clean air and public health. Scientists at the University of Wisconsin–Madison used the U.S. EPA's CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA) to estimate the health benefits of avoided $PM_{2.5}$ exposure resulting from this clean energy policy change.[2] Total $PM_{2.5}$ includes direct emissions, as well as nitrate and sulfate particles formed in the atmosphere due to emissions of NO_x and SO_2. Illinois residents were projected to avoid annually: 3,570 lost-work days, 1,980 cases of respiratory and asthma symptoms, 3 - 28 heart attacks, and 30 - 69 premature deaths. These health benefits, especially the avoided deaths, are valued at $293 and $740 million dollars per year, as summarized in Table 1. These estimates reflect only $PM_{2.5}$ health impacts; additional health benefits would be expected due to avoided exposure to SO_2 and NO_x, as well as avoided exposure to near-surface ozone associated with NO_x emissions. This work was supported by funding from the Joyce Foundation, with research design developed in collaboration with the Respiratory Health Association.

Table 1. Annual Health Benefits by 2030
Illinois Clean Energy Jobs Act Electricity Sector Provisions

Health Benefits ($million)	Avoided Lost Workdays	Avoided Respiratory Symptoms	Avoided Non-Fatal Heart Attacks	Avoided Premature Deaths
$293-740	3,570	1,980	3-28	30-69

This research was supported by grants from the Joyce Foundation and McKnight Foundation.

- Uses COBRA to estimate the health benefits from decarbonizing Illinois' electricity sector by 2030. Estimates annual health benefits of $293 - $740 million. (Respiratory Health Association and University of WI)

https://resphealth.org/wp-content/uploads/2021/05/Health-Benefits-from-Carbon-Free-Electricity.pdf

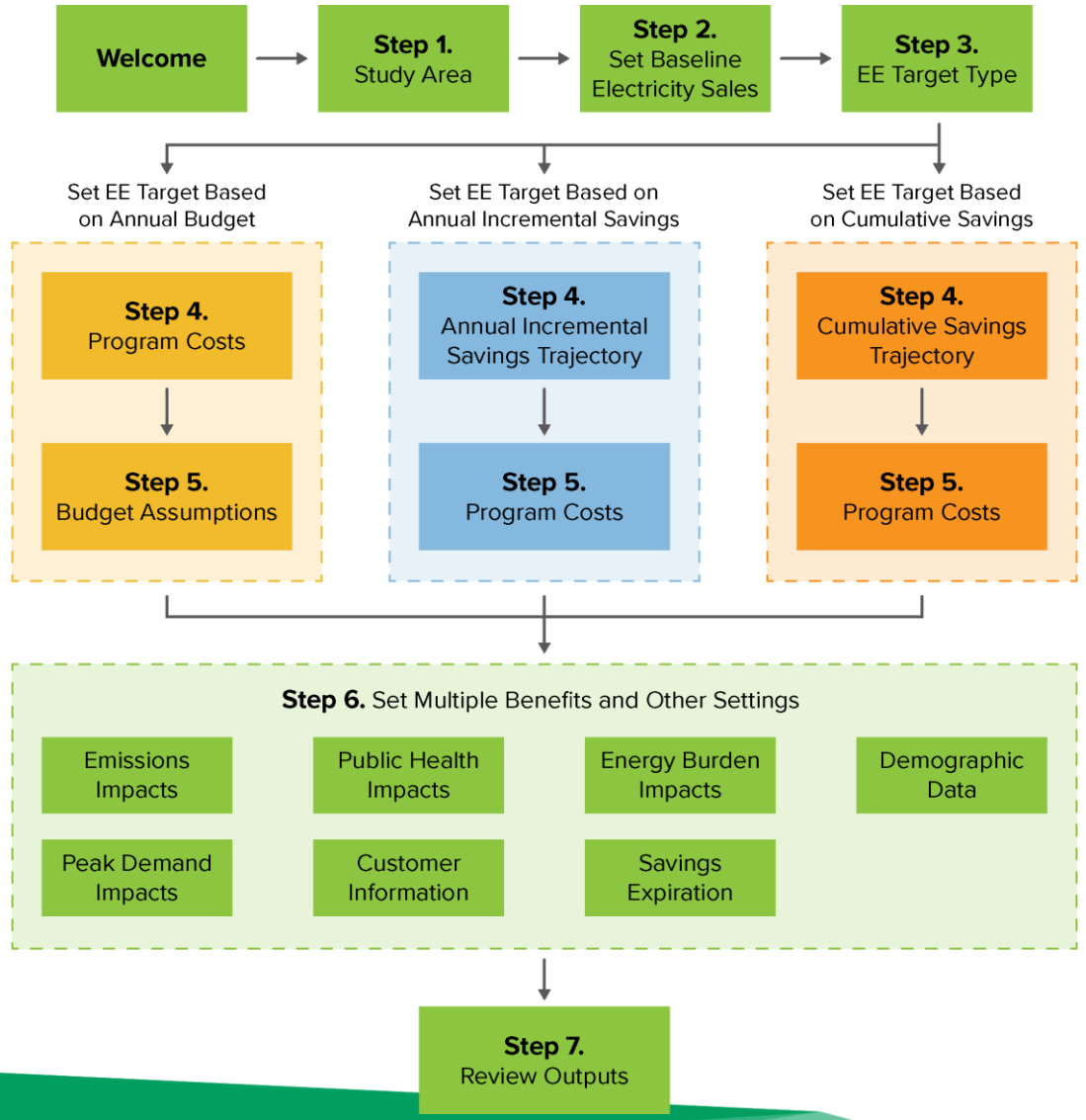
- Annual EV report by American Lung Association.

https://www.lung.org/clean-air/electric-vehicle-report

Energy Savings and Impacts Scenario Tool (ESIST)

- Analyze the energy savings and costs from electric customer-funded energy efficiency programs and their impacts on emissions, public health, and equity from 2010-2040.
- State, utility type, specific utility, or customer class level
- Outputs:
    - energy savings,
    - energy efficiency program costs,
    - avoided emissions,
    - monetized public health impacts,
    - energy burden impacts,
    - demographic data, and
    - peak demand impacts

ESIST


Welcome
Step 1. Study Area
Step 2. Set Baseline Electricity Sales
Step 3. EE Target Type
Set EE Target Based on Annual Budget
Set EE Target Based on Annual Incremental Savings
Set EE Target Based on Cumulative Savings
Step 4. Program Costs
Step 5. Budget Assumptions
Step 4. Annual Incremental Savings Trajectory
Step 5. Program Costs
Step 4. Cumulative Savings Trajectory
Step 5. Program Costs
Step 6. Set Multiple Benefits and Other Settings
Emissions Impacts
Public Health Impacts
Energy Burden Impacts
Demographic Data
Peak Demand Impacts
Customer Information
Savings Expiration
Step 7. Review Outputs

Step 7. Review Outputs

Click here to jump to future years

Review outputs from all steps, including information on annual incremental sa

Sales and Savings	View charts	2023	2024	2025	2026	2027	2028	2029	2030	203
Baseline sales	MWh	25,533,315	25,724,037	25,916,184	26,109,766	26,304,794	26,501,279	26,699,231	26,898,663	27,09
Annual incremental savings	MWh	224,850	225,561	226,630	227,970	229,854	231,839	234,001	236,037	238,
Annual incremental savings	%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.0
Expiring savings	MWh	106,654	141,669	168,537	222,786	233,248	251,621	239,635	245,446	251,
Net cumulative savings	MWh	2,977,166	3,061,059	3,119,151	3,124,335	3,120,941	3,101,159	3,095,526	3,086,117	3,072
Net cumulative savings	%	11.7%	11.9%	12.0%	12.0%	11.9%	11.7%	11.6%	11.5%	11.
Sales after EE	MWh	22,556,149	22,662,979	22,797,033	22,985,431	23,183,853	23,400,120	23,603,706	23,812,546	24,02

Costs	View charts	2023	2024	2025	2026	2027	2028	2029	2030	203
Total annual costs	2020 $ M	$32	$32	$32	$32	$33	$33	$33	$34	$3
Annual utility costs	2020 $ M	$17	$17	$17	$18	$18	$18	$18	$18	$1
Annual participant costs	2020 $ M	$15	$15	$15	$15	$15	$15	$15	$15	$1
First-year utility cost of saved energy	2020 ¢/kWh	8	8	8	8	8	8	8	8	8
Levelized utility cost of saved energy	2020 $/MWh	$7	$7	$7	$7	$7	$7	$7	$7	$7

Emissions Impacts	View charts	2023	2024	2025	2026	2027	2028	2029	2030	203
Avoided carbon dioxide (CO_2)	thousand short tons	2,675	2,670	2,640	2,562	2,478	2,381	2,296	2,208	2,1
Avoided fine particulate matter ($PM_{2.5}$)	short tons	298	352	405	453	498	541	587	631	67
Avoided sulfur dioxide (SO_2)	short tons	2,177	2,177	2,155	2,095	2,029	1,954	1,887	1,819	1,7
Avoided nitrogen oxides (NO_x)	short tons	1,708	1,693	1,661	1,599	1,533	1,459	1,392	1,324	1,2

Public Health Impacts	View charts	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Fine particulate matter ($PM_{2.5}$) benefits	2020 $ million	$221	$226	$230	$233	$236	$238	$241	$243	$246	$249	$252	$255	$259	$263	$268	$272	$276	$281
Ozone benefits	2020 $ million	$5	$5	$5	$5	$5	$5	$5	$5	$5	$5	$5	$5	$4	$4	$4	$4	$4	$4
Total benefits	2020 $ million	$226	$231	$235	$238	$241	$243	$246	$248	$251	$253	$256	$260	$264	$268	$272	$276	$281	$285

Energy Burden Impacts	View charts	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Net cumulative low-income (LI) savings	MWh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual EE program spending	2020 $ M	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual EE and monetary assistance spend	2020 $ M	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
LI EE program spending rel. to residential	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
% of LI households reached by program	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Electricity burden	%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Energy burden	%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%

Peak Demand Impacts	View charts	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
System peak demand	MW	5,934	5,978	6,023	6,068	6,113	6,159	6,205	6,251	6,298	6,345	6,393	6,440	6,488	6,537	6,586	6,635	6,684	6,734
Cumulative peak savings	MW	546	562	572	573	573	569	568	566	564	563	561	562	564	567	571	575	579	583
System peak demand, post-EE	MW	5,388	5,417	5,451	5,495	5,541	5,590	5,637	5,685	5,734	5,782	5,831	5,879	5,925	5,970	6,015	6,060	6,106	6,151

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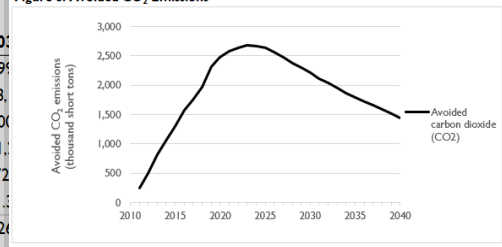
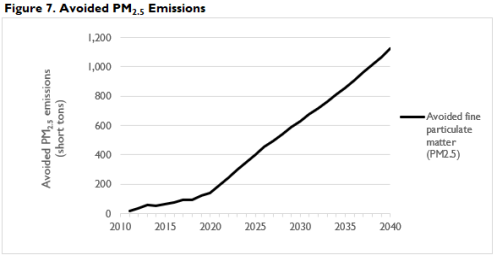
Emissions Impacts

Figure 6. Avoided CO_2 Emissions



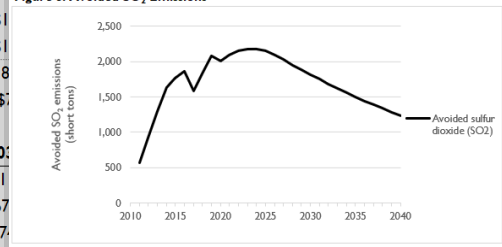
Total avoided CO_2 emissions (2010–2040): 56,815 thousand short tons

Figure 7. Avoided $PM_{2.5}$ Emissions



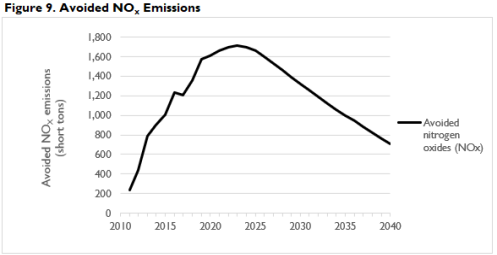
Total avoided $PM_{2.5}$ emissions (2010–2040): 13,853 short tons

Figure 8. Avoided SO_2 Emissions



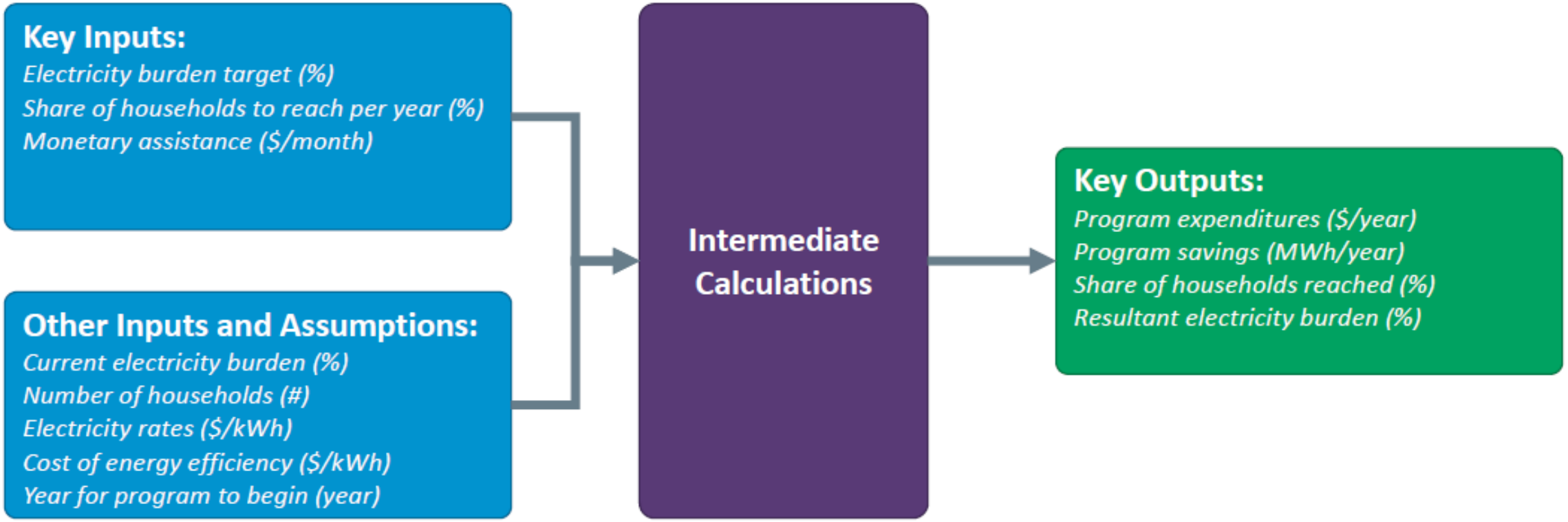
Total avoided SO_2 emissions (2010–2040): 50,855 short tons

Figure 9. Avoided NO_x Emissions



Total avoided NO_x emissions (2010–2040): 35,830 short tons

ESIST Energy Burdens Module



Quantified Climate Action Measures Directory

- Analysis of state and local climate action plans from 2018-2024
- Separate directories for state and local plans

- Information provided includes:
  - Measure type (e.g., clean and renewable energy, energy efficiency, electrification, etc.)
  - Tool(s) used to quantify the mitigation measure;
  - State or local jurisdiction with references to the state or local documents.

- https://www.epa.gov/statelocalenergy/quantified-climate-action-measures-directory

State, Local, and Tribal Newsletters

- State and Local Climate and Energy News
  - “Funding Opportunities Newsletter”
- Webinar Series Update
- Heat Island Newsletter

- https://www.epa.gov/statelocalenergy/state-local-tribal-energy-newsletters

Funding Opportunities Newsletter

These funding and technical assistance opportunities from the US Environmental Protection Agency and other federal agencies support state, local, and tribal initiatives on: climate, energy, air quality, environmental justice, economic development, sustainable communities, green infrastructure, and water infrastructure. Information related to the Inflation Reduction Act of 2022 is provided as it becomes available, including Requests for Information (RFIs).

EPA Clean Heavy-Duty Vehicles Grant Program - $932 million

Deadline: July 25, 2024 Eligible entities: State, local, tribal, and territorial governments

No-Cost Technical Assistance Opportunities

Below are several technical assistance opportunities that may provide project and program assistance at no cost to governments, communities, organizations, and tribes.

EPA Environmental Justice Thriving Communities Technical Assistance Centers Program

EPA has selected 16 Environmental Justice Thriving Communities Technical Assistance Centers (EJ TCTACs) to help underserved and overburdened communities across the country. Each of the technical assistance centers will receive at least $10 million to remove barriers and improve accessibility for communities with environmental justice concerns.

EPA Equitable Resilience Technical Assistance for Community Change Grants

EPA is launching a technical assistance program that will help eligible entities in disaster prone areas prepare to apply for Community Change Grants to benefit disadvantaged communities. This technical assistance will consist of free design and project development assistance, community engagement, and partnership development workshops.

Other opportunities:

- America's Federal Funding Opportunities and Resources for Decarbonization (AFFORD)
- Bipartisan Infrastructure Law Technical Assistance Guide
- Justice40Accelerator
- DOE Tribal Nation Offshore Wind Transmission Technical Assistance
- DOE Low-Income Communities Bonus Credit program
- DOE Energy Transitions Initiative Partnership Project Community Technical Assistance
- DOE Energy Savings Performance Contracting Campaign
- DOE Clean Energy on Mine Land Program Technical Assistance
- DOE National Community Solar Partnership (NCSP) States Collaborative
- EPA Technical Assistance to Brownfields Communities Program
- On-Request Technical Assistance from DOE Office of Indian Energy
- DOE Clean Cities Coalition Network Technical Assistance
- DOE Clean Energy to Communities Program: In-Depth Partnerships
- DOE Clean Energy to Communities Program: Expert Match
- DOE Onsite Energy Technical Assistance Partnerships
- DOE State Technical Assistance Program
- NREL Waste-to-Energy Technical Assistance for State, Local, and Tribal Governments

Grant Writing Resources

Review the following grant resources below to learn how to apply.

- Interagency Working Group Funding Opportunities Web Tool
- Grant Writing Basics Blog Series

State and Local Climate and Energy Program

Our Tools and Resources Support State, Local and Tribal Stakeholders on Climate and Energy

Develop Inventories and Set Goals

State Inventory and Projection Tool
Develop and update inventories for 11 sectors. Forecast emissions through 2050

Local Inventory Tool
Develop community-wide inventories or inventories of local government operations only

Tribal Inventory Tool
Develop community-wide inventories or inventories of tribal government operations only

Design, Compare, or Evaluate Policy

AVoided Emissions and geneRation Tool
Evaluate changes in power plant emissions from energy policy

Co-Benefits Risk Assessment Health Impacts Screening and Mapping Tool
Quantify and monetize health impacts of reducing emissions

Health Benefits per kWh
Estimate the health benefits per kWh of clean energy

Energy Savings and Impacts Scenario Tool
Analyze energy savings, costs, and multiple benefits from energy efficiency programs

Communicate and Support Policy Implementation

Greenhouse Gas Equivalencies Calculator
Convert a unit of energy to the equivalent amount of CO_2 emissions from using that amount

Heat Island Reduction Program
Resources to implement heat island mitigation policies and projects

Technical Support
Provide 1-1 technical support for state, local and tribal stakeholders

Convene Stakeholders
Engage state, local and tribal decision-makers

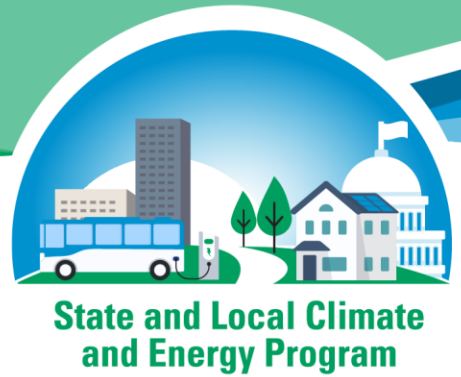
Local Action Framework:
A Guide to Help Communities Achieve Energy and Environmental Goals

State Energy and Environment Guide to Action:
A best practices guide to help states design and implement policies that reduce emissions from electricity generation and energy consumption

Quantifying the Multiple Benefits of Energy Efficiency and Renewable Energy:
A Guide for State and Local Governments

Clean Energy Financing Toolkit:
A resource to help state and local decisionmakers understand the basics of financing strategies across multiple sectors

Local Government Climate and Energy Strategy Series:
A Guide to Developing and Implementing Greenhouse Gas Reduction Programs



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Thank You

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Upcoming Webinars

State CES implementation and analysis: How state policy design affects clean energy deployment and emissions reductions (9/6)

Batteries 101, Part 4: Municipal Considerations for Battery Energy Storage in Massachusetts (9/12)

Using Community Solar to Cut Energy Burdens in Manufactured Mobile Home Communities (9/18)

An Introduction to Solar+Storage (9/19)

Massachusetts' Accelerating Clean Transportation (ACT) School Bus Program (9/24)

Emerging Public Health Needs for Climate Smart Technology in Connecticut Affordable Housing (10/1)

Read more and register at

www.cesa.org/webinars