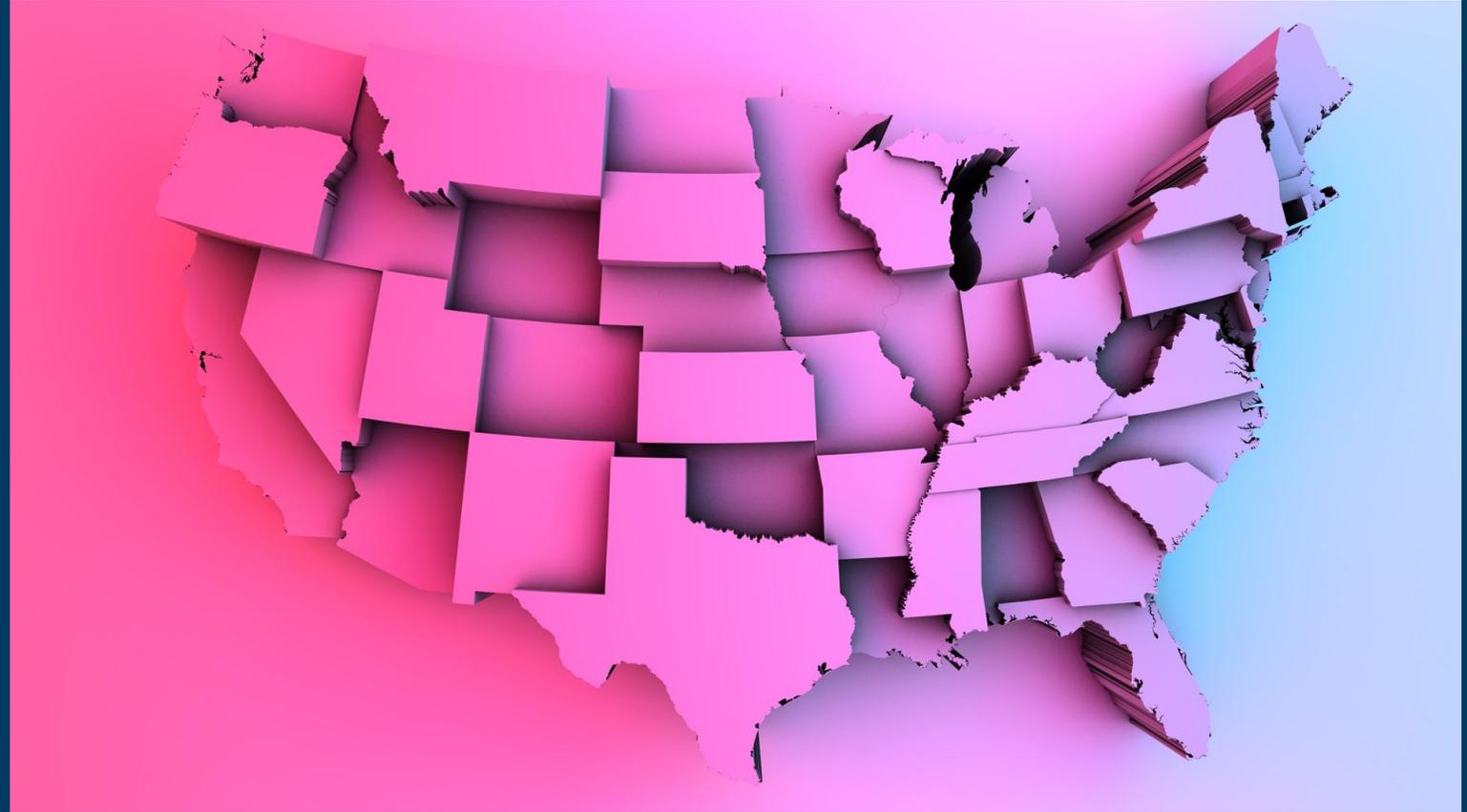# State-Level Energy Policy Analysis in the Era of the Inflation Reduction Act

September 18, 2024

The Energy Policy Simulator helps users…

Understand impacts of energy and environmental policies

Find the best way to meet their climate, financial, and other goals

Make policy decisions that are unbiased and data-supported

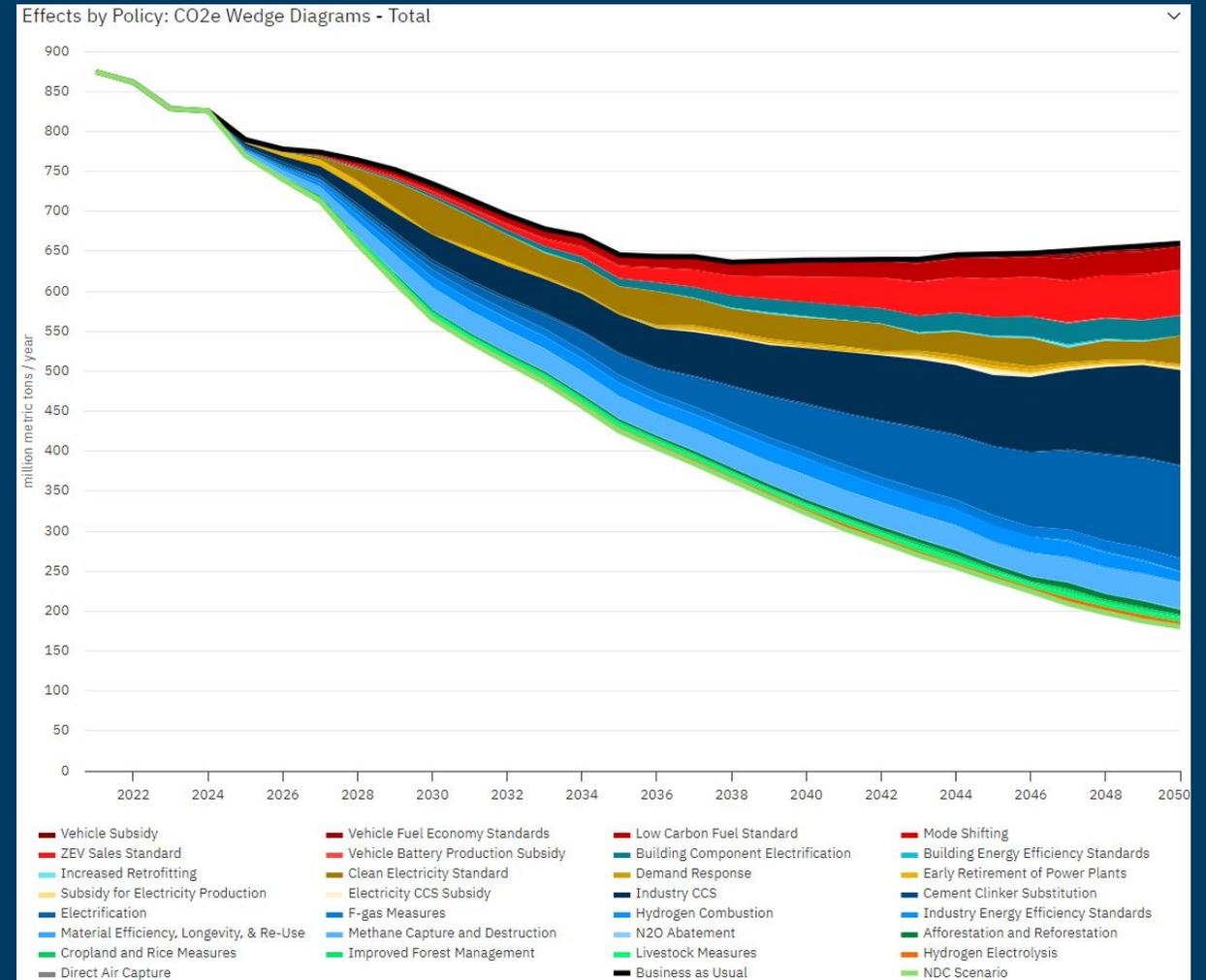# What is the Energy Policy Simulator (EPS)?

A real-time model of emissions/economic impacts

- Users can build scenarios by combining policies

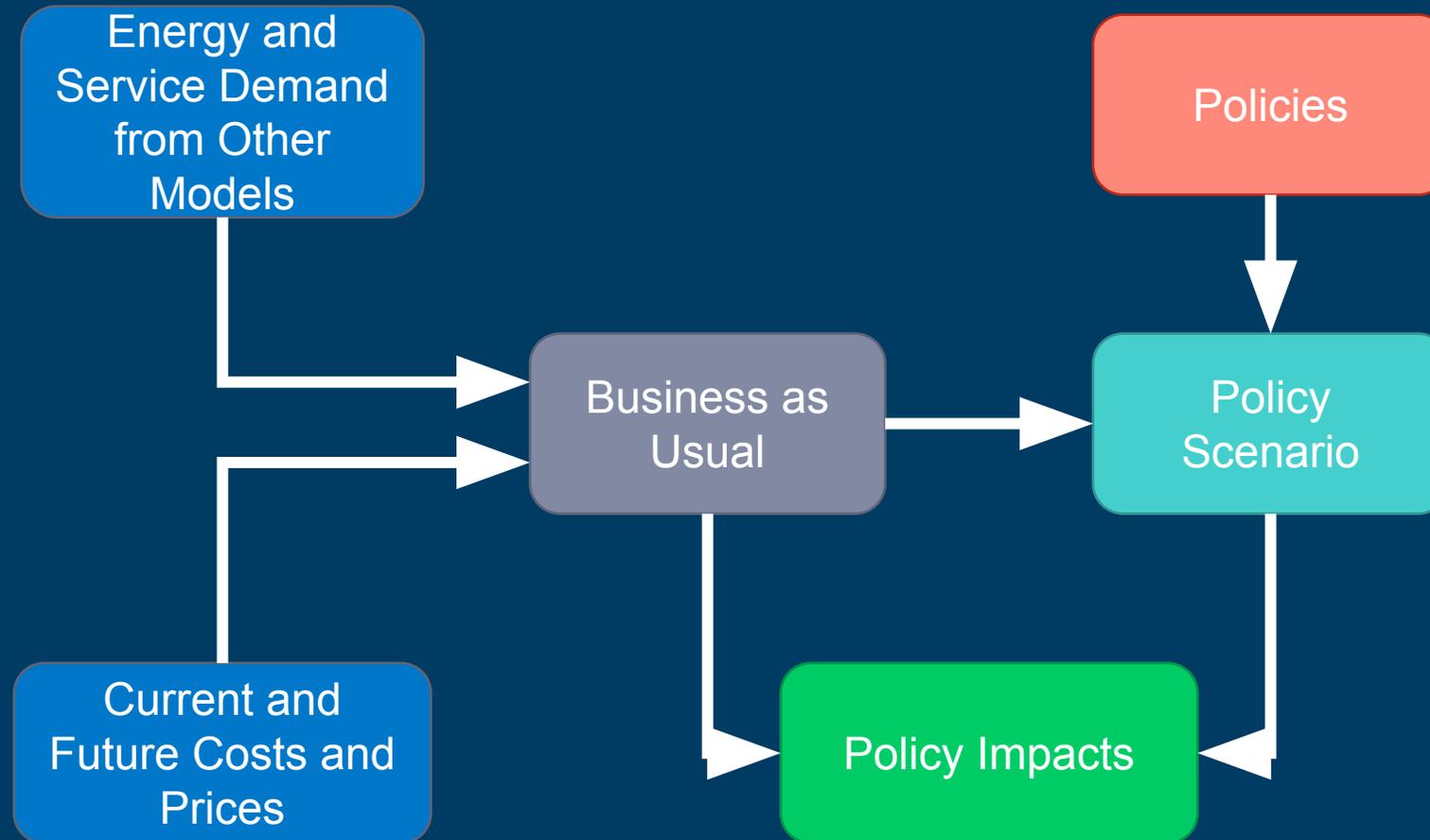- Measures the impact of individual policies and *policy interactions*

Free, public, open-source, and easy to use

- Based on publicly available data

- Peer-reviewed and transparent methodologies

Effects by Policy: CO2e Wedge Diagrams - Total

million metric tons / year

Legend:
- Vehicle Subsidy
- Vehicle Fuel Economy Standards
- Low Carbon Fuel Standard
- Mode Shifting
- ZEV Sales Standard
- Vehicle Battery Production Subsidy
- Building Component Electrification
- Building Energy Efficiency Standards
- Increased Retrofitting
- Clean Electricity Standard
- Demand Response
- Early Retirement of Power Plants
- Subsidy for Electricity Production
- Electricity CCS Subsidy
- Industry CCS
- Cement Clinker Substitution
- Electrification
- F-gas Measures
- Hydrogen Combustion
- Industry Energy Efficiency Standards
- Material Efficiency, Longevity, & Re-Use
- Methane Capture and Destruction
- N2O Abatement
- Afforestation and Reforestation
- Cropland and Rice Measures
- Improved Forest Management
- Livestock Measures
- Hydrogen Electrolysis
- Direct Air Capture
- Business as Usual
- NDC Scenario

How does the EPS work?

EPS is a system-dynamics model

A system dynamics model lets us visualize the combined effects of policy packages

Policy interactions can **amplify** effects…

1 + 1 > 2

Policy interactions can **dampen** effects…

1 + 1 < 2

Updated model structure

Modeling the Inflation Reduction Act (IRA) required new methods

Vehicle prices and batteries

CCS tax credits

New hydrogen production pathways

Overhaul electricity sector to better represent incentives

How is Version 4.0 different?

Reflects the latest available data

- Values have been updated across the national and 48 state models
- Updated with 2021 historical data from EIA and EPA
- Updated growth forecasts from 2023 Annual Energy Outlook
- Updated power plant cost data from NREL ATB 2024
- Includes major state policies: Clean Electricity Standards, Clean Vehicles Standards (e.g. Advanced Clean Cars & Trucks), carbon pricing, and EV subsidies

Includes IRA and IIJA policies

- Integrates policies into businesses-as-usual
- IRA investment and production tax credits
- IIJA investments

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New features in electricity

- **Moved from annual to hourly electricity demand and dispatch**
  - 6 time slices
- **Cost driven**
  - Capacity expansion
  - Retrofits
  - Retirements
  - Battery deployment
- **New plant types**
  - **Retail electricity prices**

Electricity: Hourly Dispatch - 2050, Average Summer Day
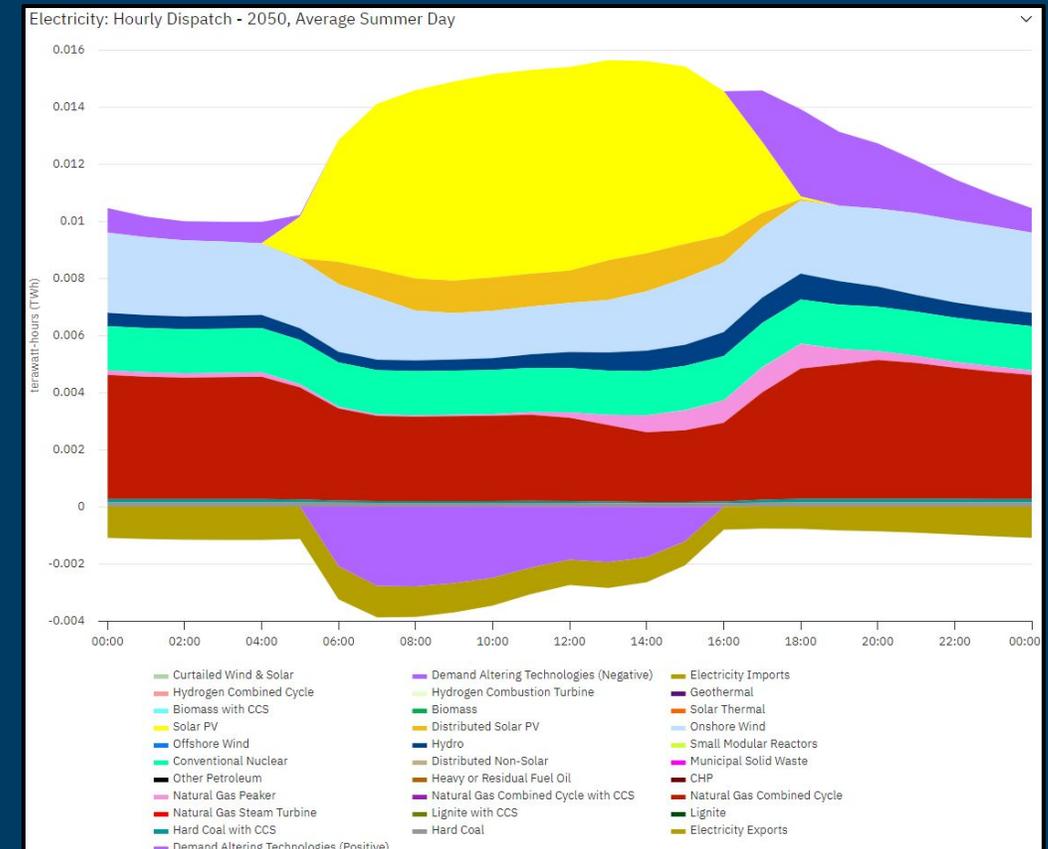
Accessing old model versions

- You can access the old (3.4.3) version of the state models in the documentation
- Saved scenarios still available in 4.0 version of EPS

Arkansas Energy Policy Simulator

The Arkansas Energy Policy Simulator (EPS) is a free and open-source computer model created by Energ is adapted from software originally created by Energy Innovation LLC.

Model Download

The Arkansas Energy Policy Simulator may be used on this website through your web browser, or the full to your computer by clicking the button below. Note that you will need to go through the steps explained order to install the required software and make use of the downloadable version of the model.

Download the Arkansas Energy Policy Simulator

Click here for access to the previous version of the public model, including access to saved scenarios.

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EPS can support state-level implementation of IRA programs

The Climate Pollution Reduction Grants (CPRG) program, authorized by the IRA, supports states with both planning and implementation grants for curbing greenhouse gas emissions.

State program applicants are required to complete a "Comprehensive Climate Action Plan" to quantify emissions reductions measures by mid-2025.

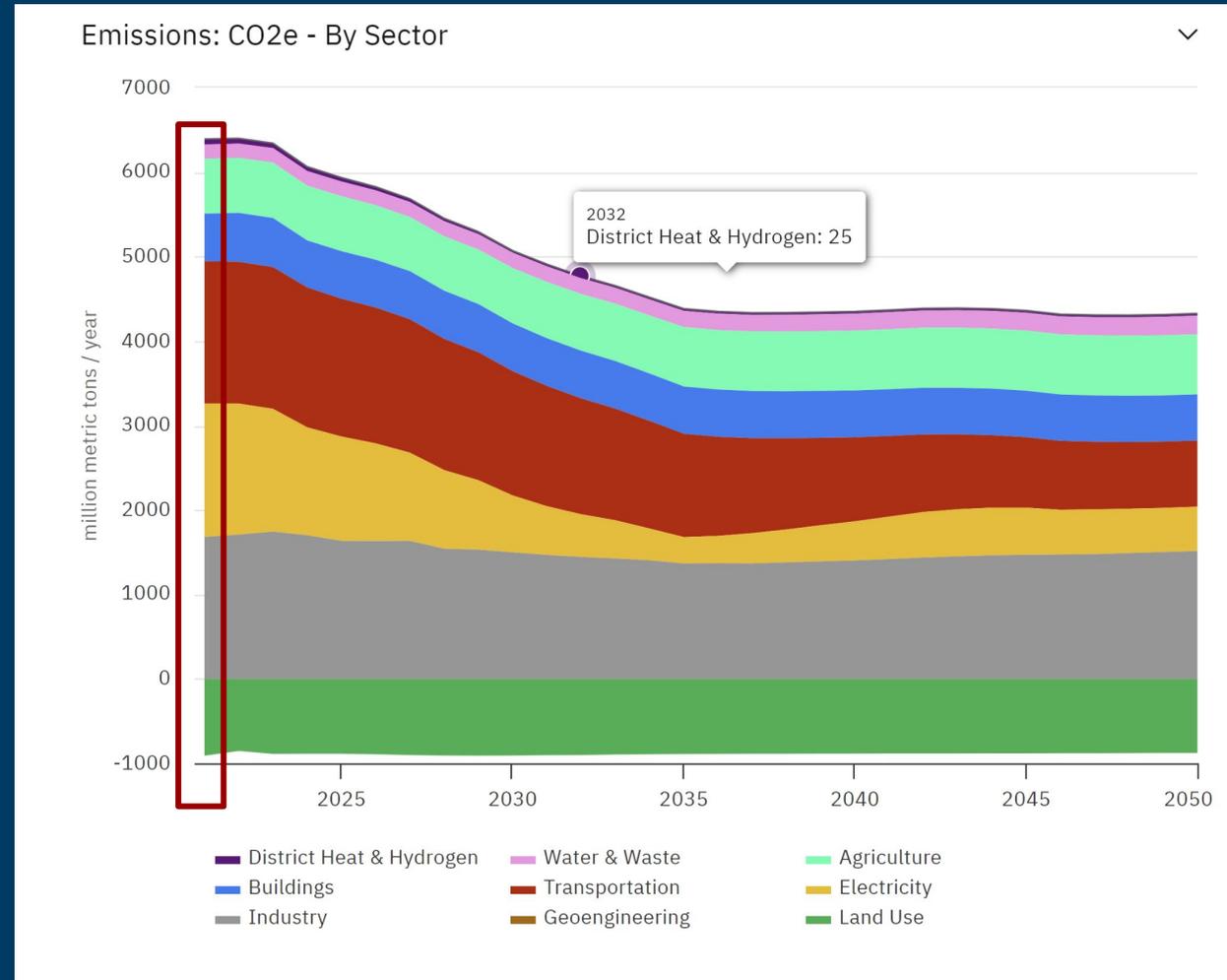Each Comprehensive Climate Action Plan (CCAP) submitted for this program must include specific elements.

That's where the EPS comes in…

Requirements for the CCAP Deliverable

CCAP Plan Element	Required by the EPA?	Supported by the EPS?
GHG Inventory	Required	Yes
GHG Emissions Projections	Required	Yes
GHG Reduction Targets	Required	Yes
Quantified GHG Reduction Measures	Required	Yes
Benefits Analysis	Required	Yes
Low Income/Disadvantaged Communities Benefits Analysis	Required	No
Review of Authority to Implement	Required	No
Intersection with Other Funding Availability	Required	No
Workforce Planning Analysis	Required	No

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GHG Inventory and Projections by Sector

EPS 4.0 uses the latest data from the EPA, EIA, and NREL to construct the greenhouse gas emissions inventory for 2021 for each state and provide sectoral breakdowns.

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Translating Targets into Action Plans

Emissions: CO2e - Total (includes land use)

million metric tons / year

2030 Nationally Determined Contribution (NDC)

Legend:
- Business as Usual (black)
- NDC Scenario (green)
- Pre-IRA Baseline Emissions (red dashed)
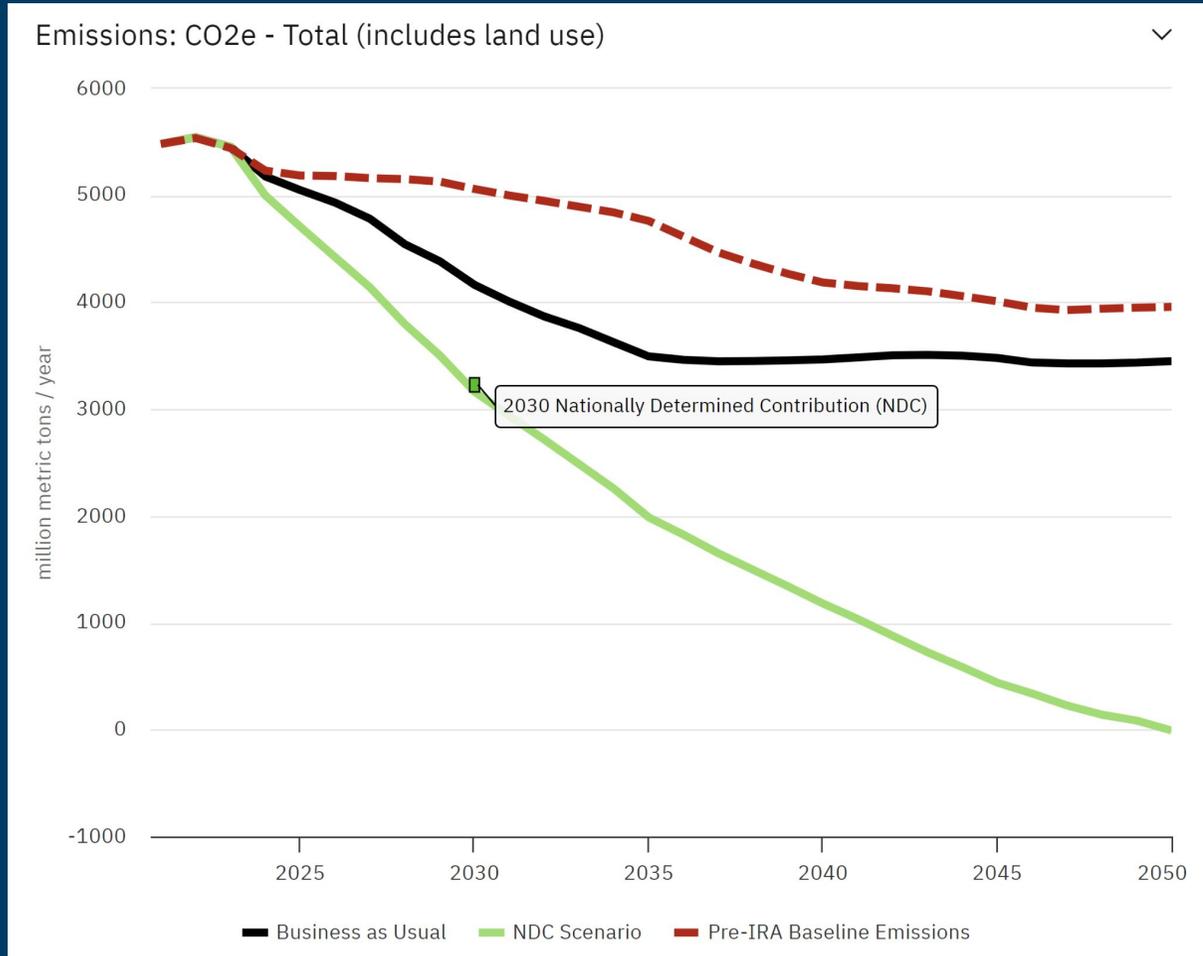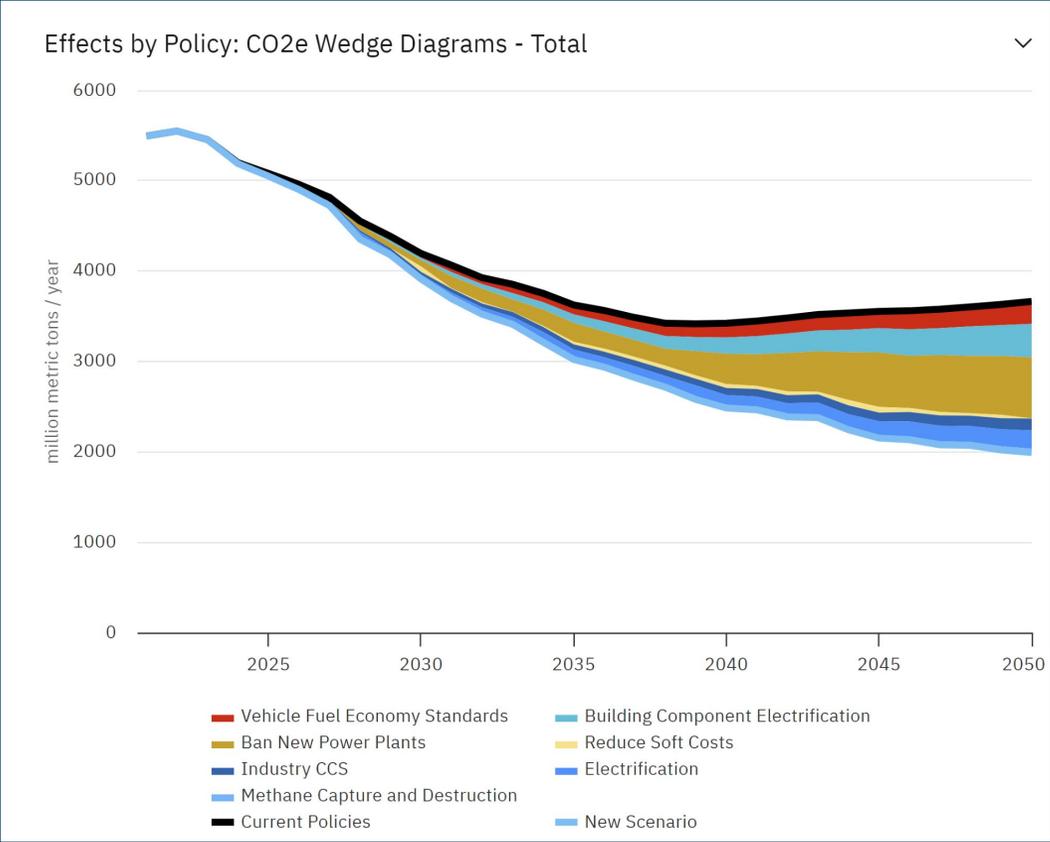
Many state leaders, advocates, and policies include specific emissions targets - the EPS can help users convert these targets into actionable roadmaps and calibrate ambition across sectors.

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Identify Top Strategies for Emissions Reduction by States

Effects by Policy: CO2e Wedge Diagrams - Total

State	Strategy #1	Strategy #2	Strategy #3
AR	Clean Power to Displace Dirty Fuels	Industrial Methane Abatement	Building Electrification + Efficiency
AZ	Clean Power to Displace Dirty Fuels	Afforestation + Reforestation	EV Sales
CO	Industrial Electrification + Hydrogen	Clean Power to Displace Dirty Fuels	Industrial Methane Abatement
FL	Clean Power to Displace Dirty Fuels	Improved Vehicle Fuel Economy	EV Sales
GA	Clean Power to Displace Dirty Fuels	Building Electrification + Efficiency	Industrial Electrification + Hydrogen
IA	Clean Power to Displace Dirty Fuels	Industrial Electrification + Hydrogen	Building Electrification + Efficiency
IL	Building Electrification + Efficiency	Industrial Electrification + Hydrogen	Industrial Methane Abatement

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EPS data can be foundational to analyze economic opportunity

- **RMI used EPS scenarios to calculate federal funding potential for cleantech deployment by state and by sector**
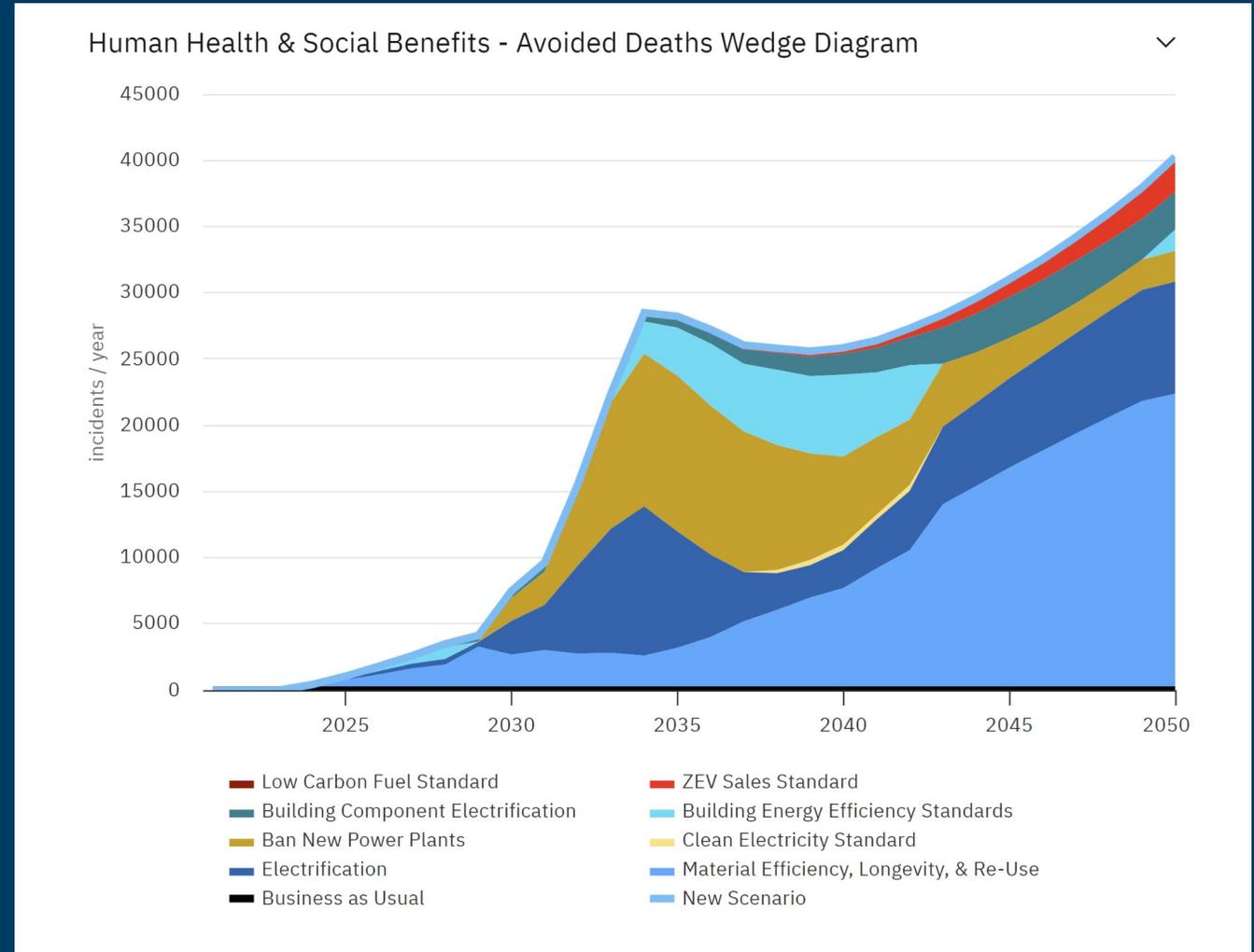

IRA Funding by Sector according to RMI's Full Potential Scenario from 2023 to 2031

Legend: ■ Electricity ■ Industry ■ Transportation ■ Buildings ■ Other and Multiple Sectors

State	Electricity	Industry	Transportation	Buildings	Other and Multiple Sectors	Total
Alabama	63%	11%	15%			$27 B
Arkansas	19%	22%	24%	12%	22%	$8 B
Arizona	47%	26%		11%	11%	$17 B
California	21%	18%	22%	30%	8%	$121 B
Colorado	48%	11%	20%	9%	12%	$19 B
Connecticut	20%	7%	41%	19%	13%	$6 B
Delaware	26%	39%	19%	9%	7%	$4 B
Florida	56%		23%	9%	8%	$59 B
Georgia	21%	13%	37%	15%	14%	$18 B
Iowa	46%	10%	31%		10%	$33 B
Idaho	13%	12%	30%	14%	31%	$4 B
Illinois	26%	30%	26%	9%	9%	$45 B
Indiana	9%	39%	32%	9%	11%	$21 B
Kansas	30%	31%	17%	16%		$18 B
Kentucky	17%	34%	27%	10%	12%	$13 B
Louisiana	81%			10%		$47 B

Benefits analysis

The EPS includes estimates of human health, social, and economic benefits expected from modeled policies.

States can use these metrics to select priority measures and build support among stakeholders.

Human Health & Social Benefits - Avoided Deaths Wedge Diagram

Legend:
- Low Carbon Fuel Standard
- ZEV Sales Standard
- Building Component Electrification
- Building Energy Efficiency Standards
- Ban New Power Plants
- Clean Electricity Standard
- Electrification
- Material Efficiency, Longevity, & Re-Use
- Business as Usual
- New Scenario

EPS Demo

Questions?

Accelerating a clean future with the EPS

The improved research platform allows users to develop insights that drive change through:

Preparing for rapid response

Equipping advocates with critical information

Uncovering pathways to achieve climate goals

APPENDIX

Electricity model

Electricity Demand

- Electricity demand by sector
- Hourly load factors
- Imports and exports allocated by hour
- Economic deployment of demand altering technology

→ Hourly electricity demand

Capacity Additions, Retrofits, Retirements

- Revenues for existing power plants
- Revenues for new power plants

- Policy mandated capacity additions
- Economic retirements
- Cost effective CCS retrofits
- Cost effective new plants
- Policy driven and planned retirements
- Capacity additions to meet RPS/CES
- Reliability additions

→ Capacity

Electricity Dispatch

- Guaranteed dispatch
- RPS/CES dispatch
- Zero cost dispatch
- Least cost dispatch

→ Generation

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