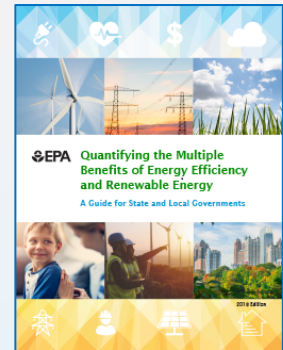


EPA Tools and Resources to Quantify the Emissions and Health Impacts of Energy Efficiency

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Health, Environment and Energy
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EPA offers capacity building, decision-support resources, and analytic tools



State and Local
Energy and Environment Program

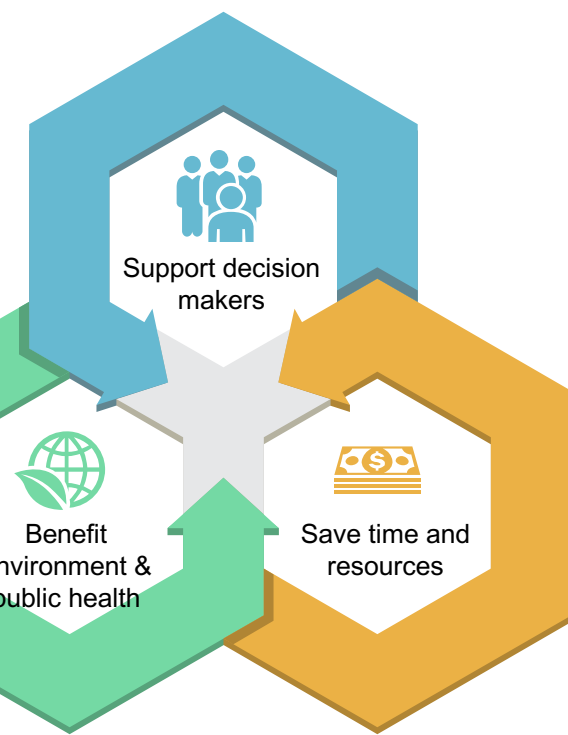
Provide **tools and information resources** about EE, RE and emerging strategies



Help meet their CAA air quality goals

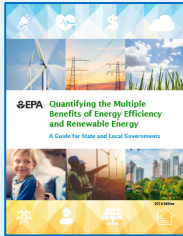


Help S&Ls achieve their emissions, energy, economic and public health goals

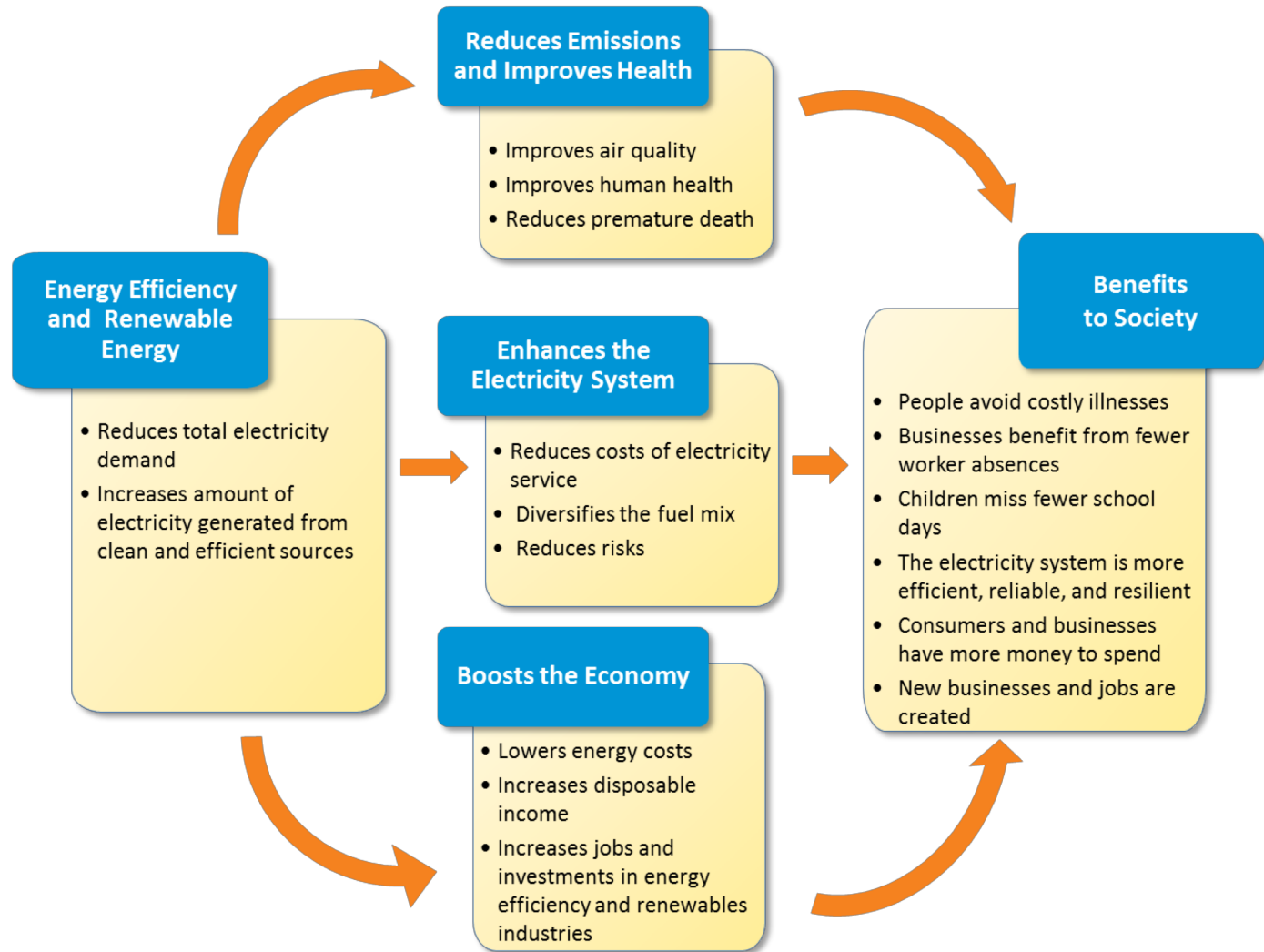
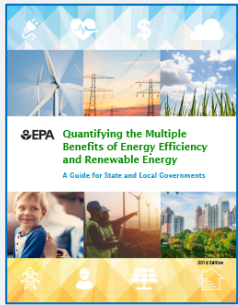


EPA Resources and Tools for Quantifying Emissions & Health Impacts of EE/RE

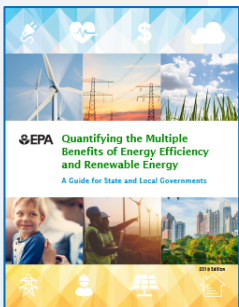
- ***Quantifying the Multiple Benefits of EE and RE: A Guide for State and Local Governments***
 - Straightforward information to support policy makers
 - How-to framework for analysis plus a range of basic-to-sophisticated methods, tips, tools, and examples
- ***AVERT (Avoided Emissions and geneRation Tool)***
 - Quantifies the emissions benefits of EE/RE
 - Enables analysts to assess contribution of EE/RE to meeting their air and energy goals
 - *Newly launched in cloud.gov* to facilitate greater accessibility and to link outputs to COBRA (next slide)
- ***COBRA Health Impacts Screening and Mapping Tool***
 - Estimates and maps the air quality and health impacts of EE/RE
 - Users can compare economic value of health benefits to program costs
 - *Recently updated* to enable AVERT-COBRA emissions-health linkages



How Does EE/RE Lead to Multiple Benefits?



Analytic Framework: How to Quantify Multiple Benefits?



Step 1



Determine Scope of and Strategy for the Analysis

Key Considerations

- Identifying the purpose, priorities, and constraints
- Understanding the characterization of analytic methods
- Mapping out the strategy for the analysis

Step 2



Determine Direct Electricity Impacts

Step 3



Quantify the Multiple Benefits From Direct Electricity Impacts

```
graph LR; A["Electricity System Benefits  
• Primary electricity system benefits  
• Secondary electricity system benefits"] --> B["Emissions and Health Benefits  
• Air pollutant, GHG emissions benefits  
• Air quality benefits  
• Human health benefits"]; B --> C["Economic Benefits  
• Direct economic benefits  
• Indirect economic benefits"]; A --> C;
```

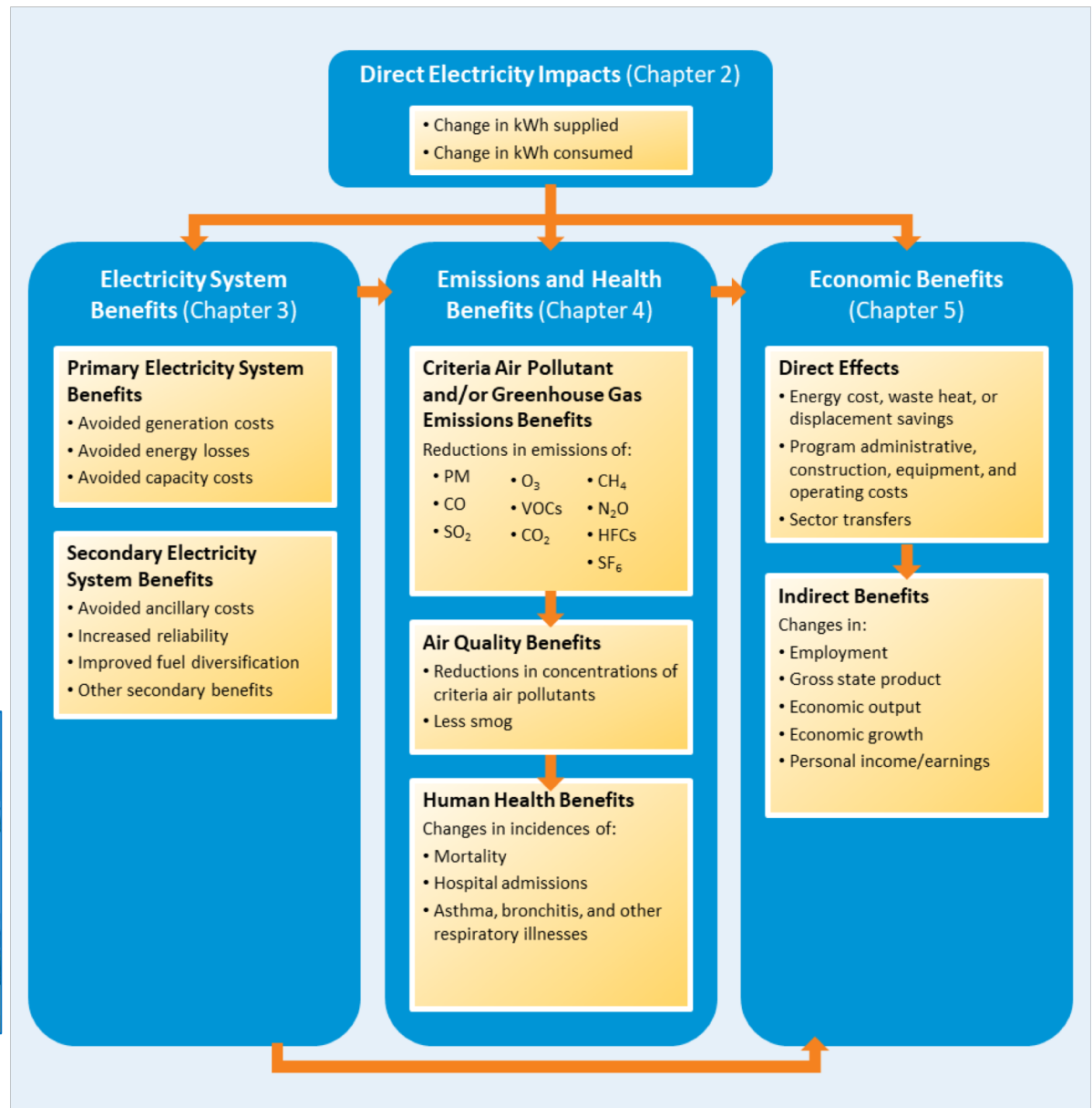
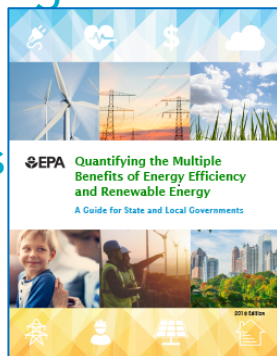
Step 4

Use Benefits Information to Support Informed Decision-Making

Map Out What Benefits to Quantify & How

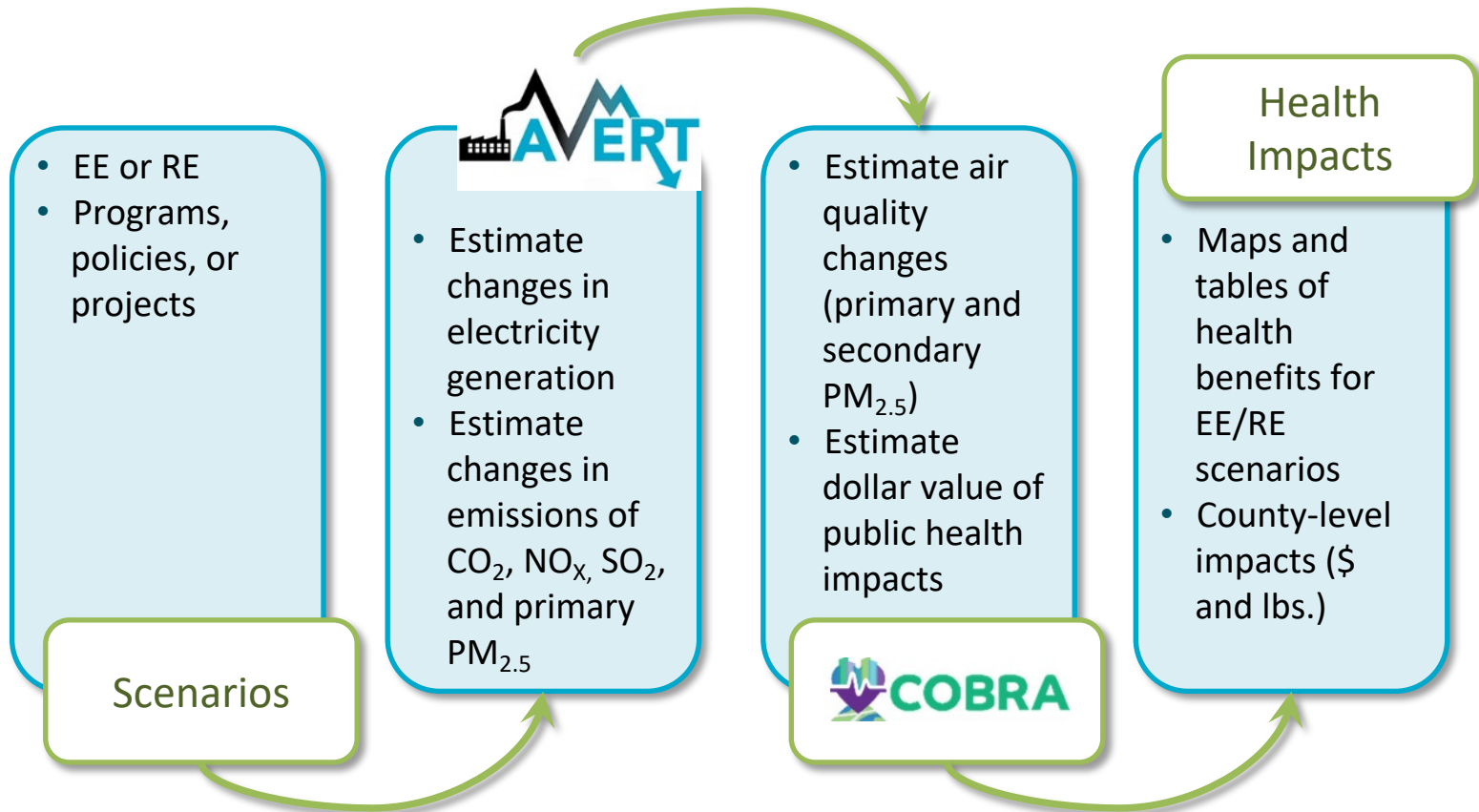
Part Two of the Guide Provides Information About Quantifying Each Benefit including:

- Overview
- Approaches
- Case Studies
- Tools
- Resources

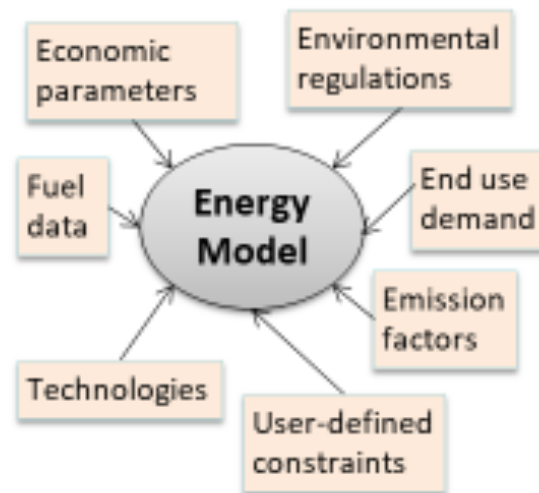
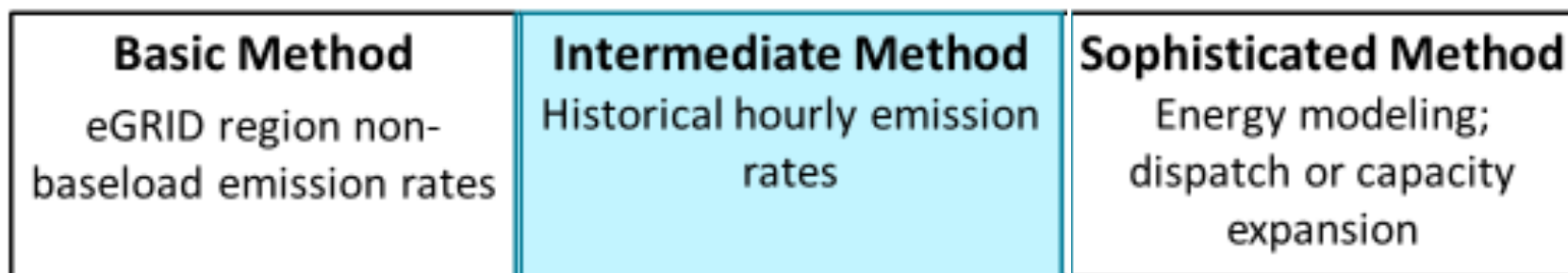


Tools and Resources for Quantifying Emissions and Health Impacts of EE/RE

Analysts can use EPA's AVERT and COBRA models to credibly quantify the emissions and monetized health impacts of energy efficiency and renewable energy programs, policies, and scenarios.



Quantifying Emissions Impacts of EE/RE: Basic to Sophisticated Methods





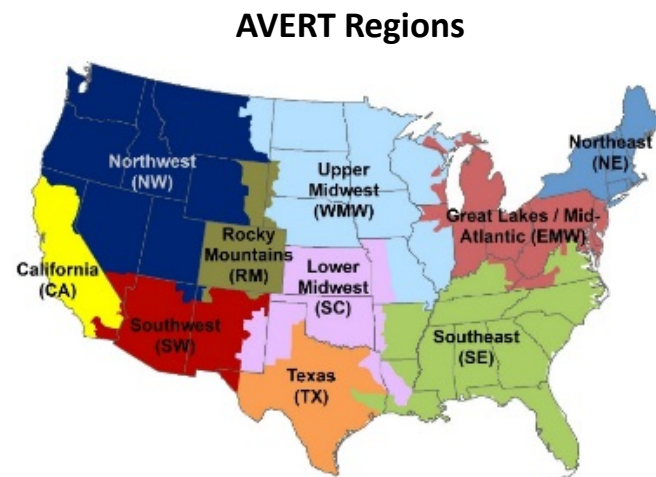
AVERT Overview

AVERT was built to:

- Overcome quantification barriers
- Translate EE/RE programs to avoided NO_x, SO₂, PM_{2.5}, and CO₂ emissions impact
- Use publicly available data 2007-2017
- Be user friendly, transparent, and credible

To use:

- Locate your AVERT region
- Obtain energy saved (MWh) for EE programs, or the capacity of wind and solar installation (MW)
 - Multiple options are built into the tool
- Run the model



Tool and training available at
<https://www.epa.gov/avert>

AVERT 2.0: Web-Based Main Module



- Users can choose between AVERT's Excel-based version or the web edition
- In 2018, EPA released AVERT's web-based version
 - Allows users to quickly estimate EE/RE program impacts using current year dataset (2017)
 - Users can enter standard EE/RE settings
 - Results are shown in graphical form and savable formats

AVERT Web Edition

Select Region Set EE/RE Impacts Get Results

Select Region

AVERT splits the contiguous 48 states into 10 regions. AVERT regions are aggregated based on EPA's eGRID subregions. Select a region for analysis by either using the dropdown menu or clicking the map. Selecting a region loads the power plants operating within each region and region-specific wind and solar capacity data.

Select Region ▾

The online version of AVERT can run analyses using 2015 emissions and generation data. The Excel version of AVERT (available for download [here](#)) allows analyses for years 2007–2015 or for a future year scenario.

Set EE/RE Impacts ▶

www.epa.gov/statelocalenergy/avert-web-edition

Quantifying Health Impacts with EPA's COBRA¹ Screening Model



USER INPUTS= Change in 2017 or 2025 Emissions
- PM2.5, SO2, NOx, NH3, VOCs



Quantifies Changes in Air Quality
(Specifically, particulate matter)



Calculates Change in Health Outcomes
(Resulting from particulate matter changes)²



Calculates Monetary Value of Health Outcomes



OUTPUTS = Tables and maps of illness cases and deaths avoided as well as the related economic value.

¹COBRA is a peer-reviewed screening model that based on rigorous methods used by EPA health benefits assessments as described in the User Manual.

² COBRA estimates only particulate matter-related benefits and may be conservative in that respect.



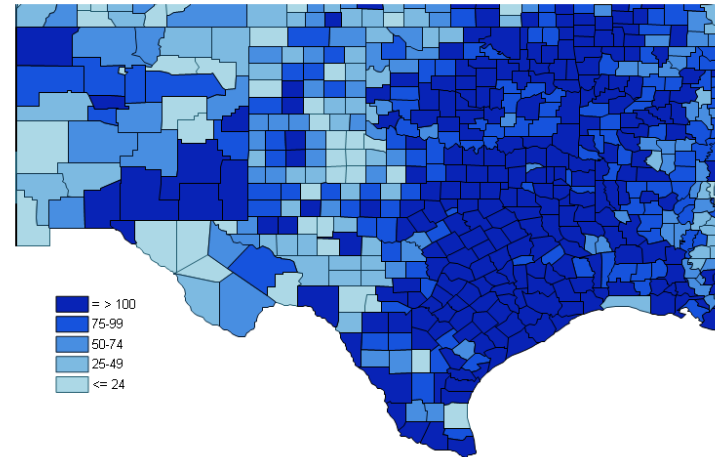


COBRA Outputs

Health Effects include:

- Adult Mortality
- Infant Mortality
- Non-fatal Heart Attacks
- Respiratory Hospital Admissions
- Cardiovascular-related Hospital Admissions
- Acute Bronchitis
- Upper Respiratory Symptoms
- Lower Respiratory Symptoms
- Asthma Exacerbations (attacks, shortness of breath, & wheezing)
- Asthma Emergency Room visits
- Minor Restricted Activity Days
- Work Loss Days

Number of Asthma Exacerbations Avoided



**EPA's CO-Benefits Risk Assessment
Health Impact and Screening Model
(COBRA) is available at**

<https://www.epa.gov/COBRA>

For More Information

Find Tools and Resources on EPA's website:

- Quantifying the Multiple Benefits of Energy Efficiency and Renewable Energy: A Guide for State and Local Governments: <https://www.epa.gov/statelocalenergy/quantifying-multiple-benefits-energy-efficiency-and-renewable-energy-guide-state>
- EPA's AVERT Model: www.epa.gov/AVERT
- EPA's COBRA Model: www.epa.gov/COBRA
- Additional tools and resources at www.epa.gov/statelocalenergy

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