

BITES

Explore and create
energy scenarios...

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BUILDINGS

INDUSTRY

TRANSPORTATION

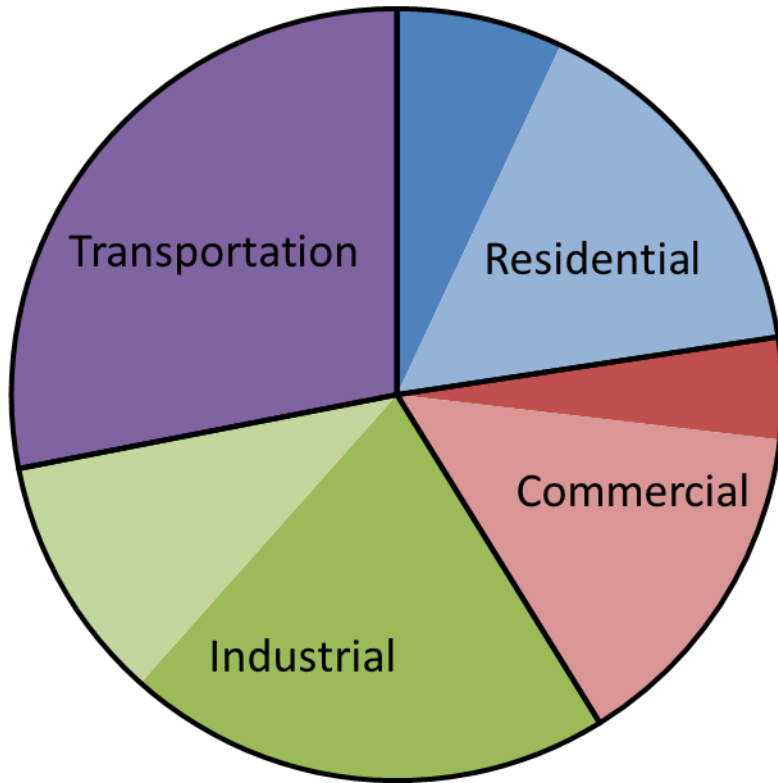
ELECTRICITY

Outline

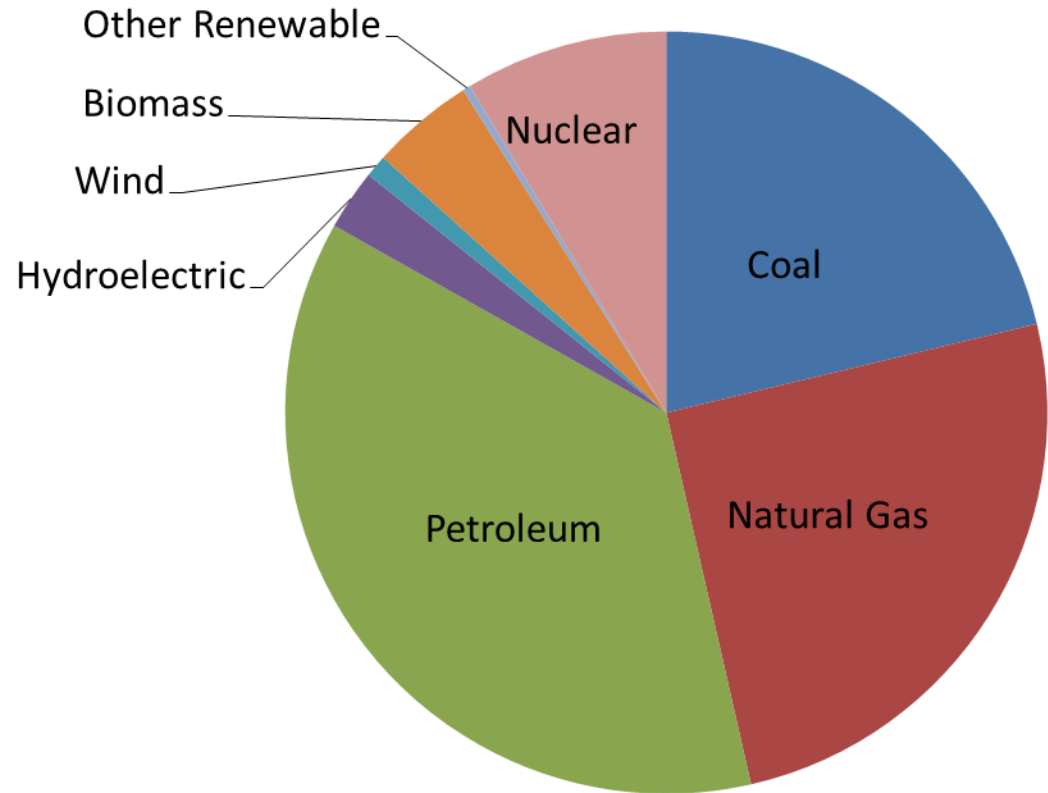
- 5 minutes: overview and history
- 10 minutes: quick demo
- 5 minutes: ways to get involved
- Discussion and questions.

Energy Use in the United States

Primary Energy Use by Sector



Total Primary Energy Use by Source

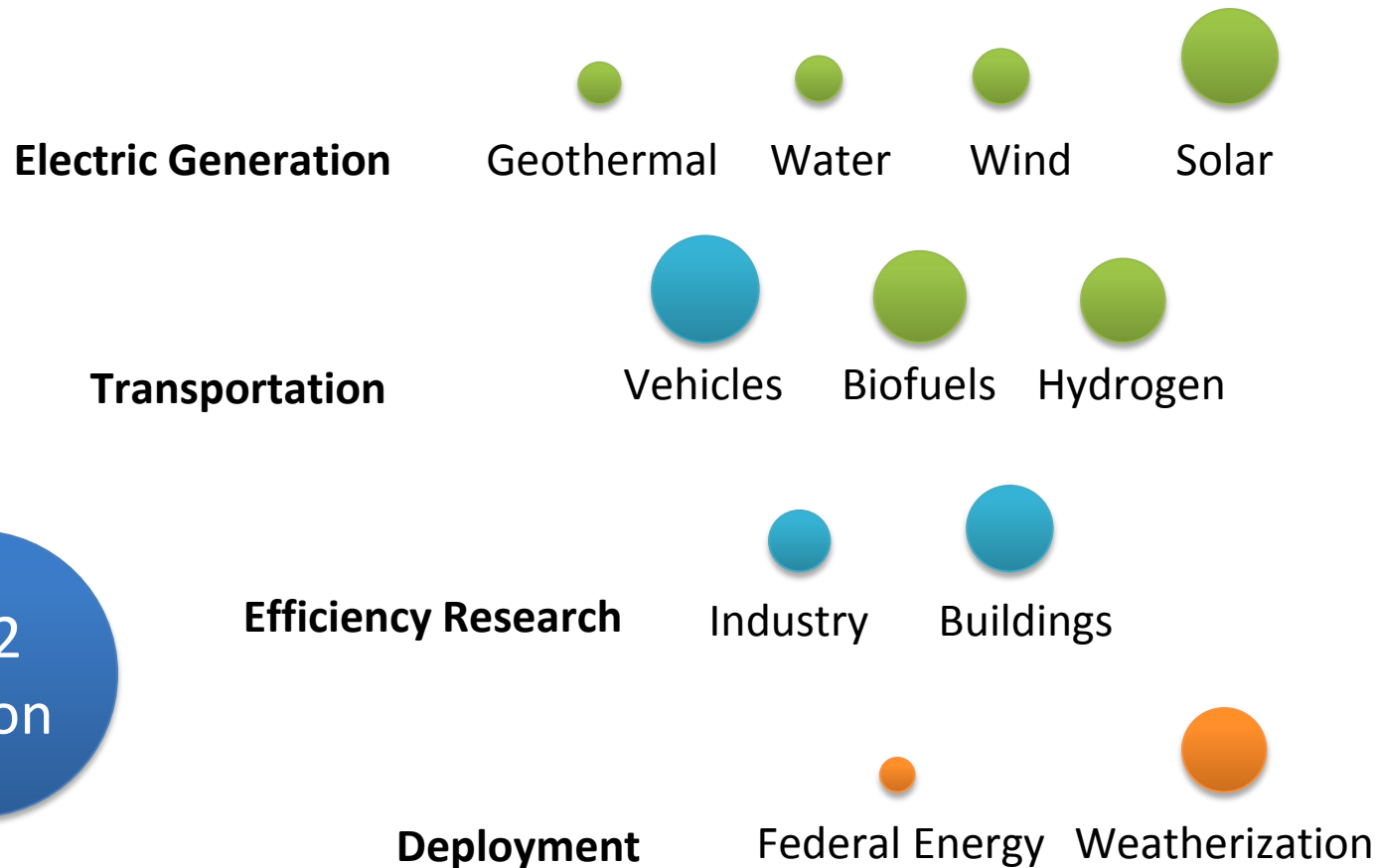


Total Energy Use = 98 quadrillion Btu
(in left chart, lighter shade is energy for electricity used in that sector)

Background

- Energy use is intrinsic to the whole economy
- We use a wide variety of different sources of energy for different services
- The media and other sources are inundated with pros and cons for many energy options
- Learning about and comparing the impact of various options is important, but with such a complex system, it is extremely challenging.

The Office of **Energy Efficiency** and **Renewable Energy** (EERE): Multiple Goals and a Diverse Portfolio



Blue dots are energy efficiency, Green dots are renewable energy, and orange dots are deployment. Dot size proportional to program budget

EERE Goals and Related Tools

- EERE has diverse goals (environmental, economic, energy security) and various programs on the supply and demand sides of energy
- Strategic Analysis developed tools to combine the impacts of technology development and deployment in all these EERE areas
- These tools were instructive for the team, so we developed a version for the web.

Four Sectors in BITES



Buildings

- Building Codes
- Retrofits
- Appliance Efficiency



Industry

- Industrial Efficiency
- Fuel Switching



Transportation

- Light-duty Vehicle Efficiency
- Heavy-duty Vehicle Efficiency
- Renewable Fuels
- Demand (Miles Driven)



Electricity

- Natural Gas
- Renewables
- Nuclear
- Carbon Capture and Sequestration

Demonstration

Buildings Industry Transportation & Electricity Scenarios



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Goals for Education

- Learn where we get energy and where we use energy in the U.S., as well as the associated emissions
- Experiment with options to change the energy future of the U.S.
- Explore the trade-offs between sectors and individual technologies
- Generate a realistic cross-sector scenario that meets or approaches energy and carbon emission targets
- Share learning by discussing, comparing, and justifying selected scenarios

Example Workshop

- Developed and piloted a draft curriculum
- Workshop timeline (approximately three class time hours, 10 minute break in the middle):
 - *Introduction (30 minutes)*: covers U.S. energy use, the prospects for clean energy, and societal context
 - *BITES demo (10 minutes)*: run through the features of the tool
 - *Sector exercises (45 minutes)*: student groups attempt to meet energy and emissions goals by implementing changes in one sector each (buildings, transportation, industry, electricity)
 - *Group exercises (45 minutes)*: redistribute students among different groups so each group has at least one representative from each sector to be an ‘expert’; focus on developing a combined scenario to meet goals
 - *Presentation, discussion of scenarios, and class consensus scenario (40 minutes)*: constructive discussion of the plausibility of scenario components.
- Optional: pre-lesson readings (45 minutes – 1hour, suggested pages and links provided).

Groups

1st groups: by sector

Buildings	1	2	3	4
Industry	5	6	7	8
Transportation	9	10	11	12
Buildings	13	14	15	16
	1	2	3	4

2nd groups: whole system

How to Get Involved

- Join our 'educators' group
- Volunteer to run or host pilot workshops
- Use the tool in other ways, and let us know how
- Feedback on curriculum
 - Big or small changes?
 - Continue to develop one version, or split into different lengths and expertise levels?
- Feedback on overall site (usability, etc.).

Questions?

- Beta version: <https://bites.nrel.gov/>.
- Educational materials:
<https://bites.nrel.gov/education.php>
- For more information:
austin.brown@nrel.gov.

Appendix

(Some screenshots from the demo just in case)



The banner features a blue background with a grid pattern. On the left, the word "BITES" is written in large, white, bold letters. To its right, the text "Explore and create energy scenarios..." is displayed above an orange "Get Started" button. On the right side, there is a navigation bar with "Login" and "Register" links circled in red, and a "Contact Us" link. Below the navigation bar, a vertical strip shows four categories: "BUILDINGS", "INDUSTRY", "TRANSPORTATION", and "ELECTRICITY", each with a corresponding image. At the bottom left, a horizontal menu includes "Home", "Scenarios", "About", "For Educators", "Help", and "FAQ". At the bottom right, there are social media icons for "Like" and "Tweet".

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BUILDINGS
INDUSTRY
TRANSPORTATION
ELECTRICITY

Welcome to the BITES Tool - Beta

The Buildings Industry Transportation Electricity Scenarios (BITES) Tool is a scenario-based tool for analyzing how changes in energy demand and supply by economic sector can impact carbon dioxide emissions. BITES permits the rapid screening and exploration of energy options and technologies that can lead to major reductions in greenhouse gas emissions and reductions in oil dependence.



BITES

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Featured Scenarios

	Scenario Name	Description	Mode	Shared?
  	TEF Scenario	Based on the Transportation Energy Futures study as presented at the World Renewable ...	Advanced	Public

My Scenarios

	Scenario Name	Description	Mode	Shared?
   	scenario 1	[New Scenario Description]	Basic	Private
   	Intro Video	The scenario described in the BITES introduction video	Basic	Public
   	SCU Workshop	SCU Consensus	Basic	Private

Shared Scenarios

	Scenario Name	Description	Mode	Shared?
  	AEO 2010 Base Case	Advanced mode inputs using 2010 AEO reference data	Advanced	Reference

[New Scenario](#)**Create New Scenario**

Name:

Quick Demo

Input Mode:

- ☒ Basic
☐ Advanced

Base Data:

AEO 2011

Description:

[New Scenario Description]

Create**Cancel**

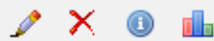
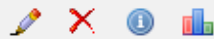
Featured Scenario

Scenario

[TEF Sce](#)

My Scenarios

Scenario

[scenario](#)[Intro Vide](#)[SCU Wo](#)

Shared Scenarios

Scenario Name

Description

Mode

Shared?

[AEO 2010 Base Case](#)Advanced mode inputs using 2010 AEO
reference data

Advanced

Reference

[Buildings](#)[Industry](#)[Transportation](#)[Electricity](#)[User Comments](#)

Click on the link below to
post a comment to this
scenario.

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Quick Demo (AEO 2011 Base Case)

**Buildings****Industry****Transportation****Electricity**

Improvements to New Buildings in 2030

30%

(30 to 75)

Percent of Existing Buildings Retrofitted by 2050

0%

(0 to 100)

Percent Efficiency Improvement of Building
Retrofits in 2050

15%

(0 to 39)

Heating, Cooling and Appliance Efficiency
Improvement in 2050

0%

(0 to 35)

Fuel Switching in 2050

0%

(0 to 100)

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Summary

Summary Info

Total Emissions by End Use Sector

Total Emissions by Sector

Delivered Energy

Primary Energy

Primary Energy by Source

Oil Consumption

Biomass Consumption

Electric Demand

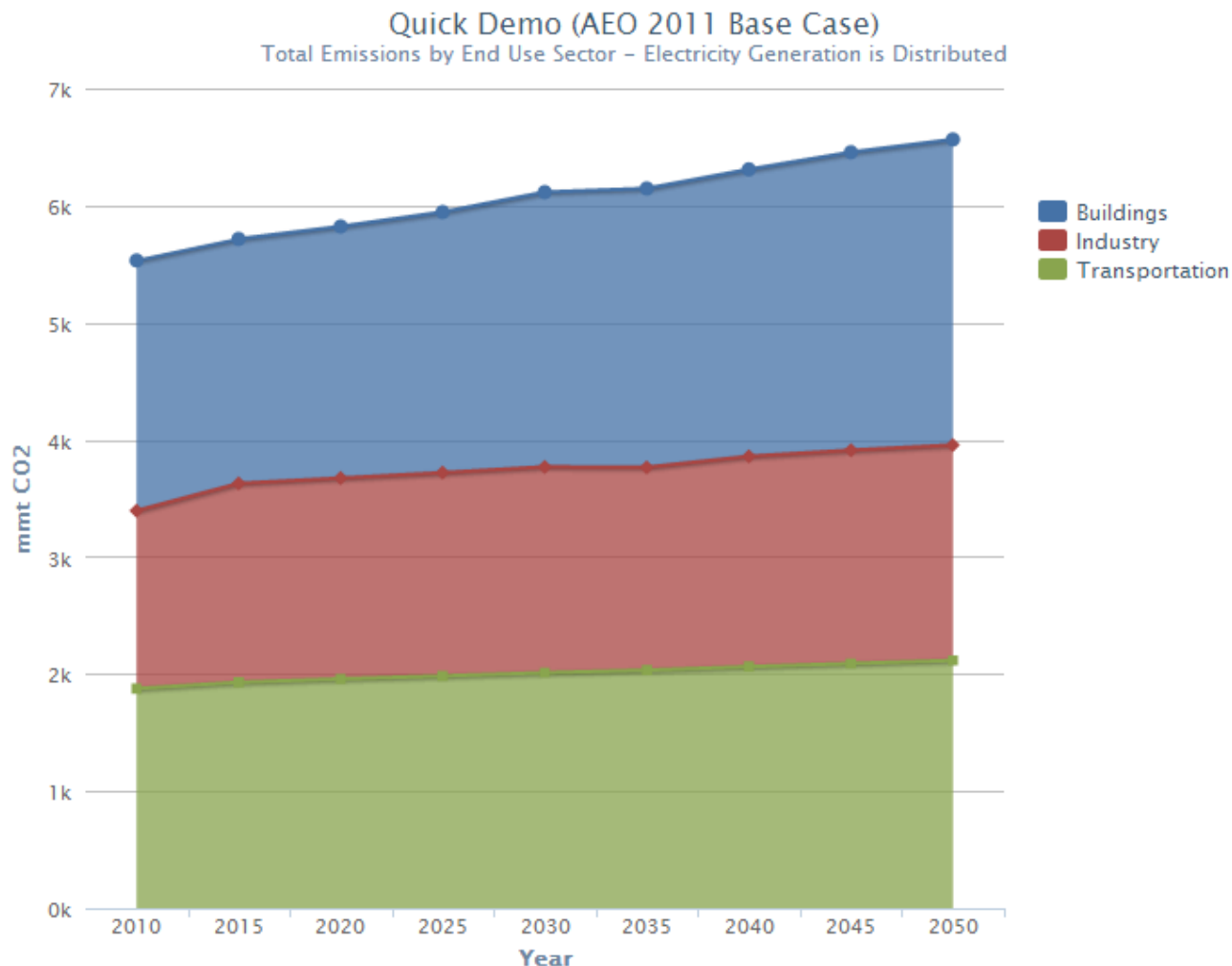
Buildings

Industry

Transportation

Electricity

Benchmarking



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

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Quick Demo (AEO 2011 Base Case)



Buildings



Industry



Transportation



Electricity

Light Duty Vehicle Fleet Miles Per Gallon in 2050

38

mpg (38 to 75)

Non-Light Duty Vehicle Efficiency in 2050

0%

Covering all non-LDVs (0 to 60)

Gallons of Biofuels by 2050 (in billions)

34

billion gallons (34 to 65)

Vehicle Miles Traveled per Light Duty Vehicle in
2050

13500

(10000 to 15000)

20

BITES

- Buildings
- Industry
- Transportation
- Electricity
- User Comments

Click on the link below to post a comment to this scenario.

Post A Comment

Quick Demo (AEO 2011 Base Case)



Light Duty Vehicle Fleet Miles Per Gallon in 2050	60 mpg (38 to 75)
Non-Light Duty Vehicle Efficiency in 2050	20% Covering all non-LDVs (0 to 60)
Gallons of Biofuels by 2050 (in billions)	34 billion gallons (34 to 65)
Vehicle Miles Traveled per Light Duty Vehicle in 2050	13500 (10000 to 15000)

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Quick Demo (AEO 2011 Base Case)



Buildings



Industry



Transportation



Electricity

Electricity Generation Mix in 2050

10%

Coal (0 to 68)

24%

Natural Gas (2 to 70)

16%

Nuclear (16 to 84)

50%

Renewables (14 to 82)

Percent Fossil Fuel Carbon Capture and Sequestration in 2050

2%

(0 to 100)

22

Summary

Summary Info

Total Emissions by End Use Sector

Total Emissions by Sector

Delivered Energy

Primary Energy

Primary Energy by Source

Oil Consumption

Biomass Consumption

Electric Demand

Buildings

Industry

Transportation

Electricity

Benchmarking

Quick Demo (AEO 2011 Base Case)

Summary Info

Emissions Reduction by
2050
(from base case)

39.5%

Energy Use Reduction
by 2050
(from base case)

9.2%

Oil Use Reduction by
2050
(from base case)

28.9%

Name: Quick Demo

Description: [New Scenario Description]

Input Mode: Basic

Base Case: AEO 2011 Base Case

Author: abrown

Created: Mon Nov 19 2012

Last Update: Mon Nov 19 2012

Close

Summary

Summary Info

Total Emissions by End Use Sector

Total Emissions by Sector

Delivered Energy

Primary Energy

Primary Energy by Source

Oil Consumption

Biomass Consumption

Electric Demand

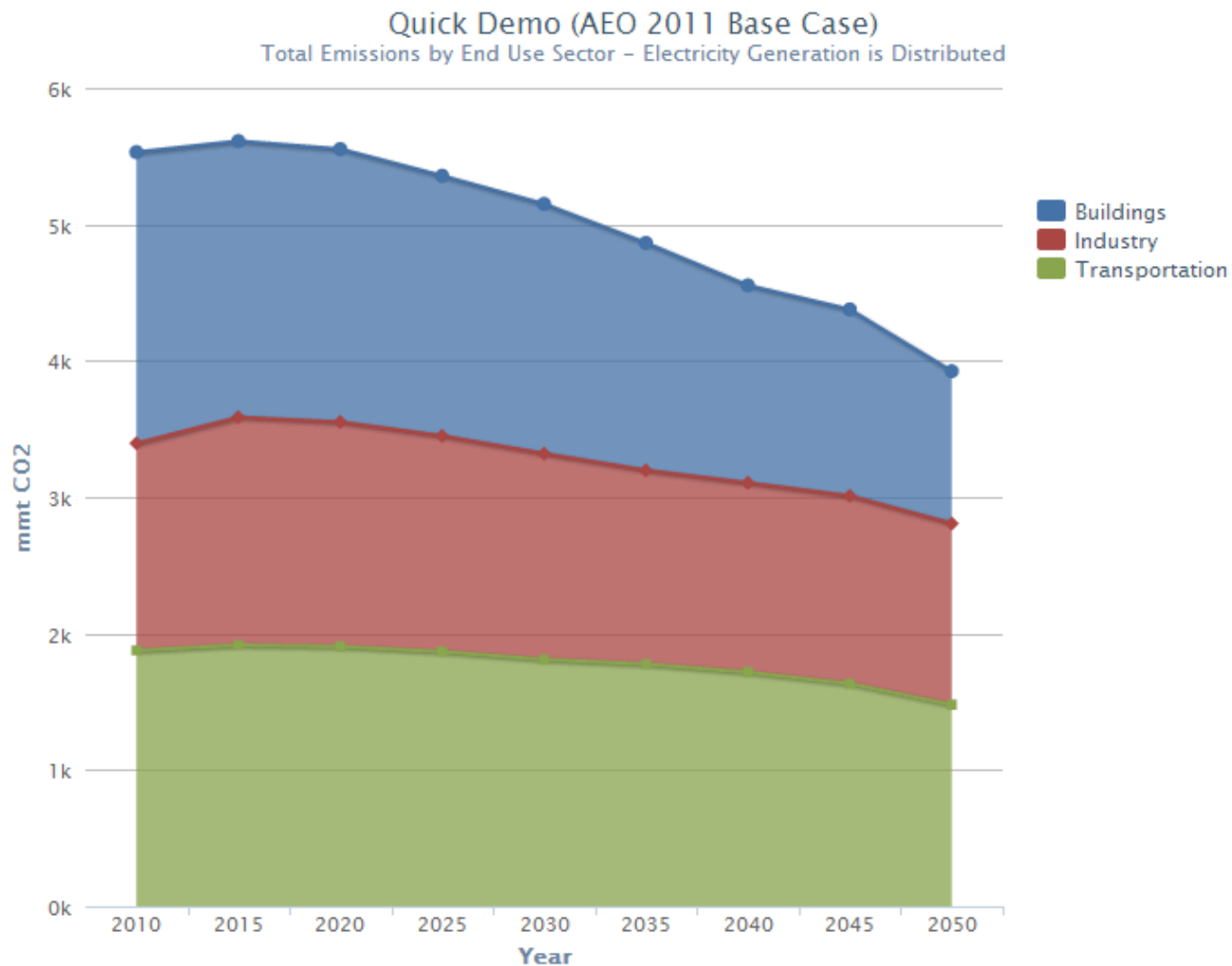
Buildings

Industry

Transportation

Electricity

Benchmarking



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Summary

Buildings

Industry

Transportation

Electricity

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Total Emissions

Transportation Emissions

Buildings Emissions

Industry Emissions

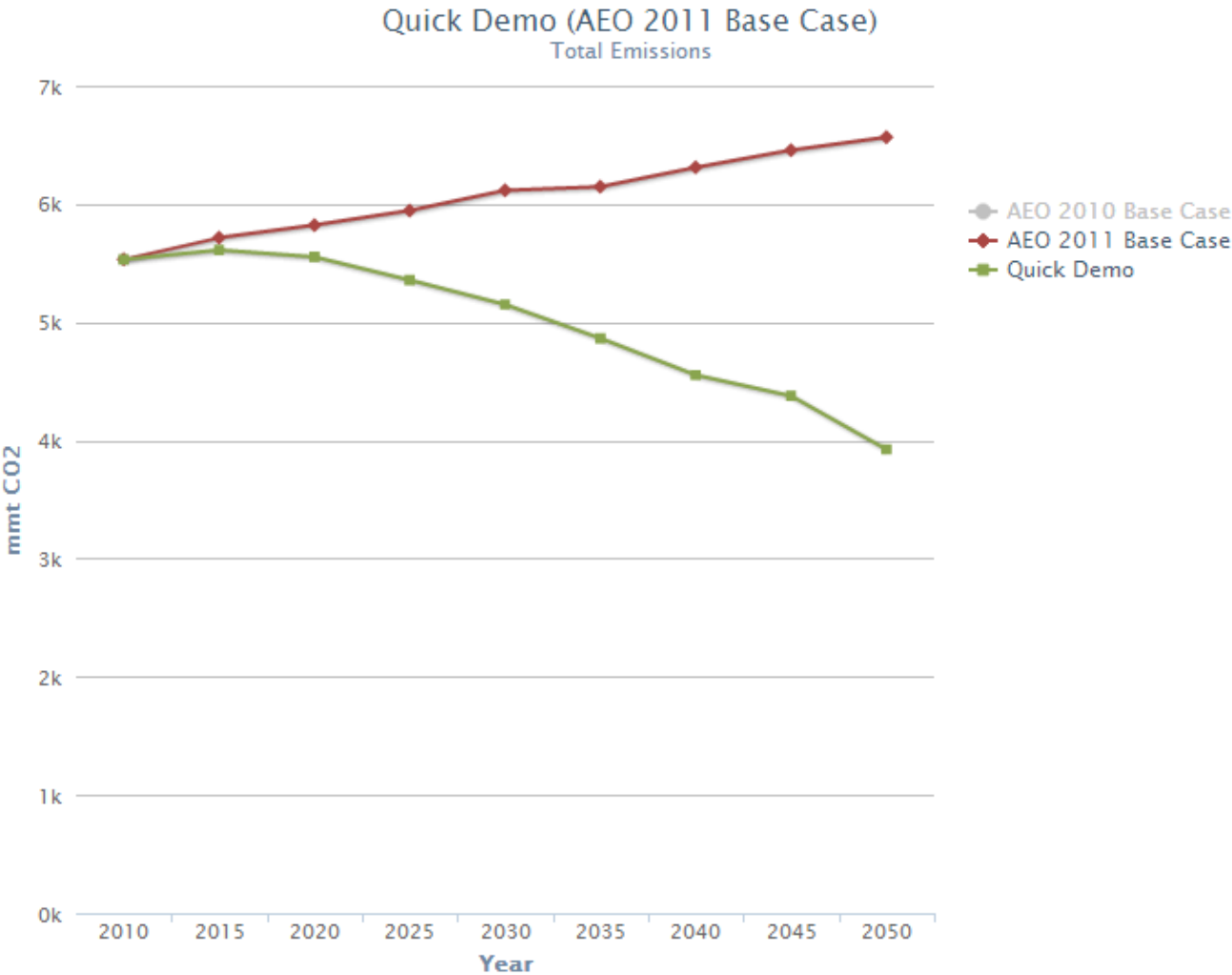
Electricity Emissions

Energy Consumption

Petroleum Consumption

Biomass Consumption

Electric Demand



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