Buildings Industry Transportation & Electricity Scenarios

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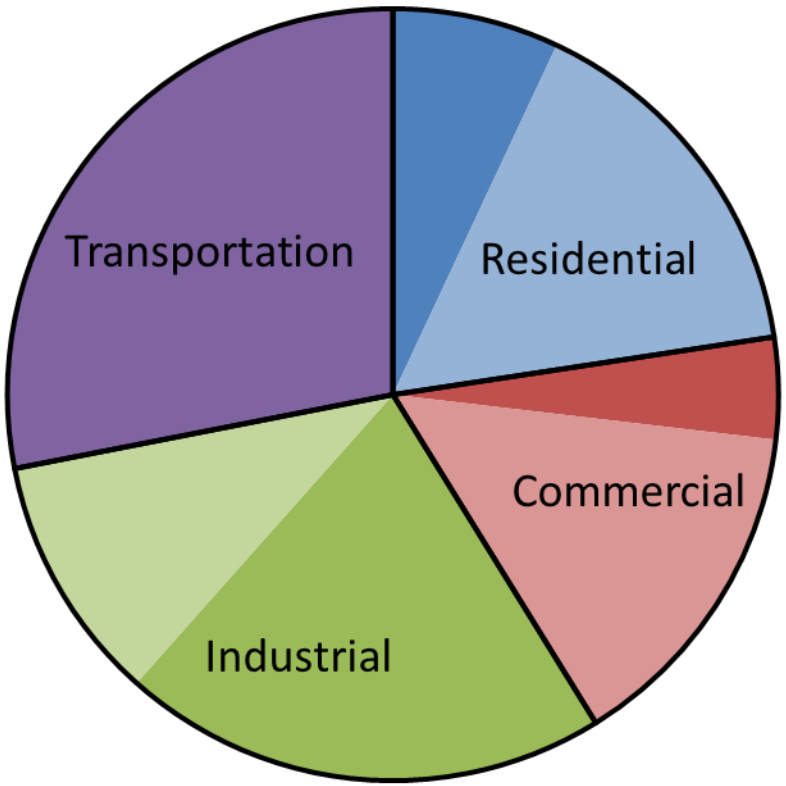
Outline

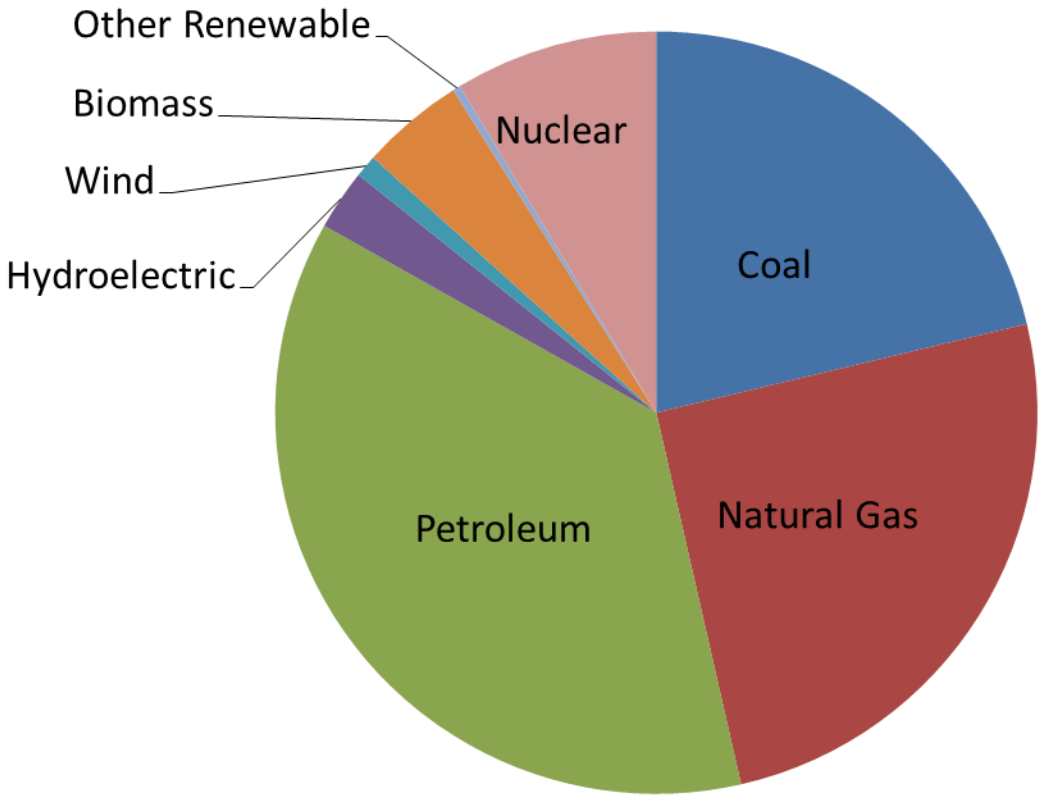
- 5 minutes: overview and history
- 10 minutes: quick demo
- 5 minutes: ways to get involved
- Discussion and questions.

Energy Use in the United States

Primary Energy Use by Sector



Total Primary Energy Use by Source

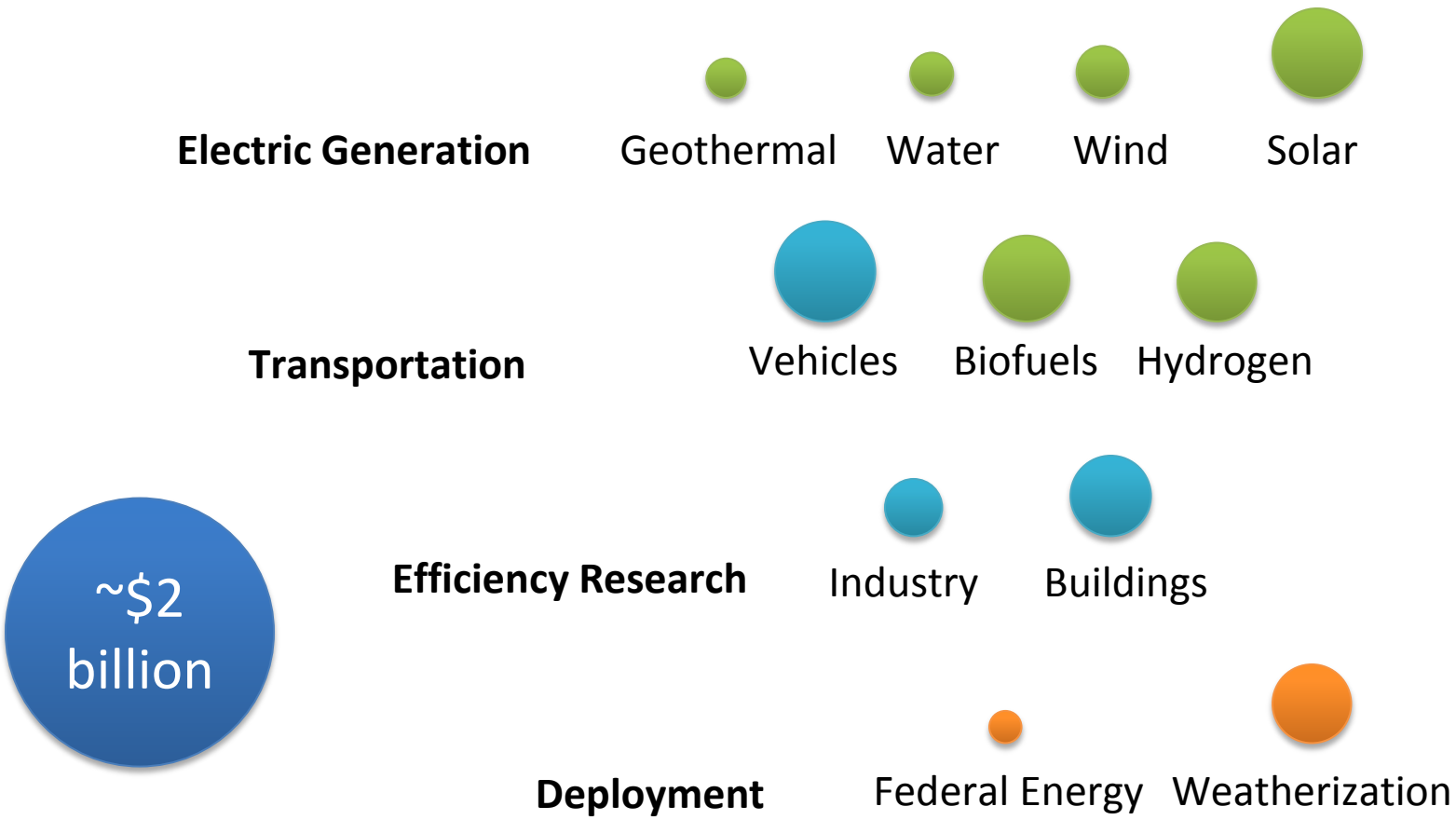


Total Energy Use = 98 quadrillion Btu
(in left chart, lighter shade is energy for electricity used in that sector)

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



EERE Goals and Related Tools

- EERE has diverse goals (environmental, economic, energy security) and various programs on the supply and demand sides of energy
- We 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

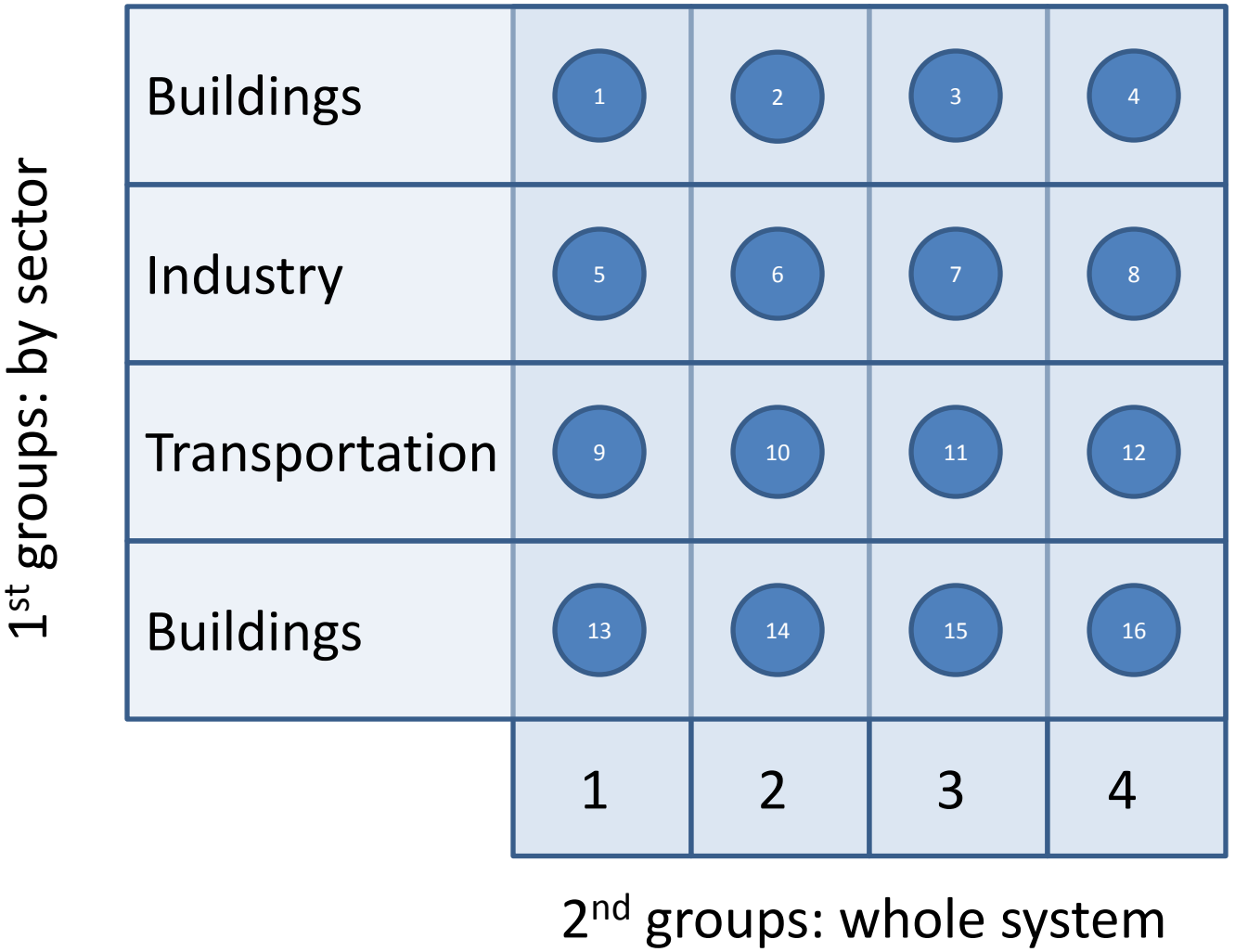
Goals for Education

- 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
Industry
Transportation
Buildings
1
2
3
4
5
6
7
8
9
10
11
12
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
- 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)

Buildings Industry Transportation & Electricity Scenarios

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BITES

Explore and create
energy scenarios...

Get Started

BUILDINGS INDUSTRY TRANSPORTATION ELECTRICITY

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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.

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New Scenario

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

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New Scenario

Featured Scenario

	Scenario	ode	Shared?
	TEF Scer	dvanced	Public

My Scenarios

	Scenario	ode	Shared?
	scenario	asic	Private
	Intro Vide	asic	Public
	SCU Wo	asic	Private

Shared Scenarios

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

Create New Scenario

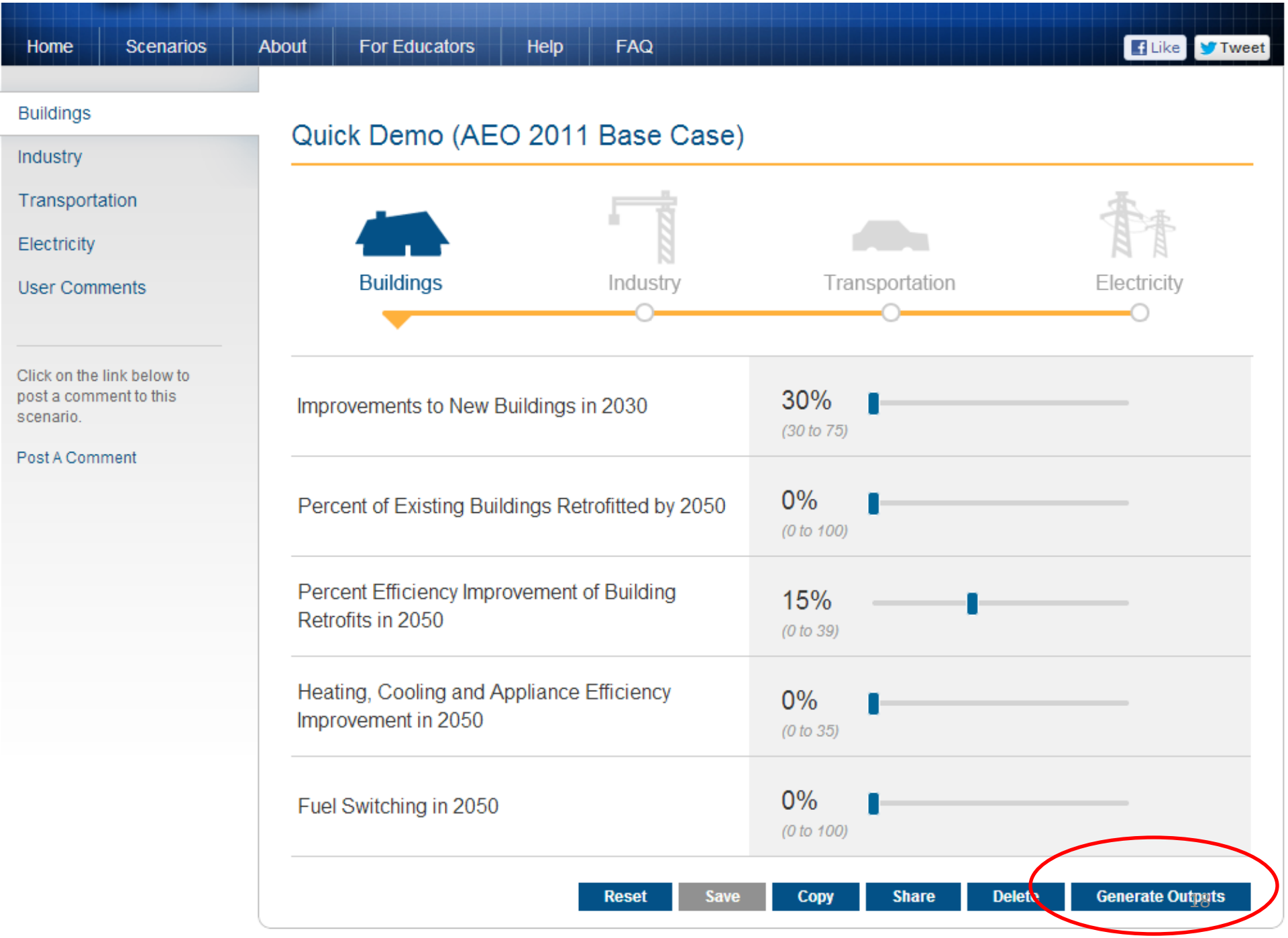
Name:
Quick Demo

Input Mode:
- (•) Basic
- ( ) Advanced

Base Data:
AEO 2011

Description:
[New Scenario Description]

Create | Cancel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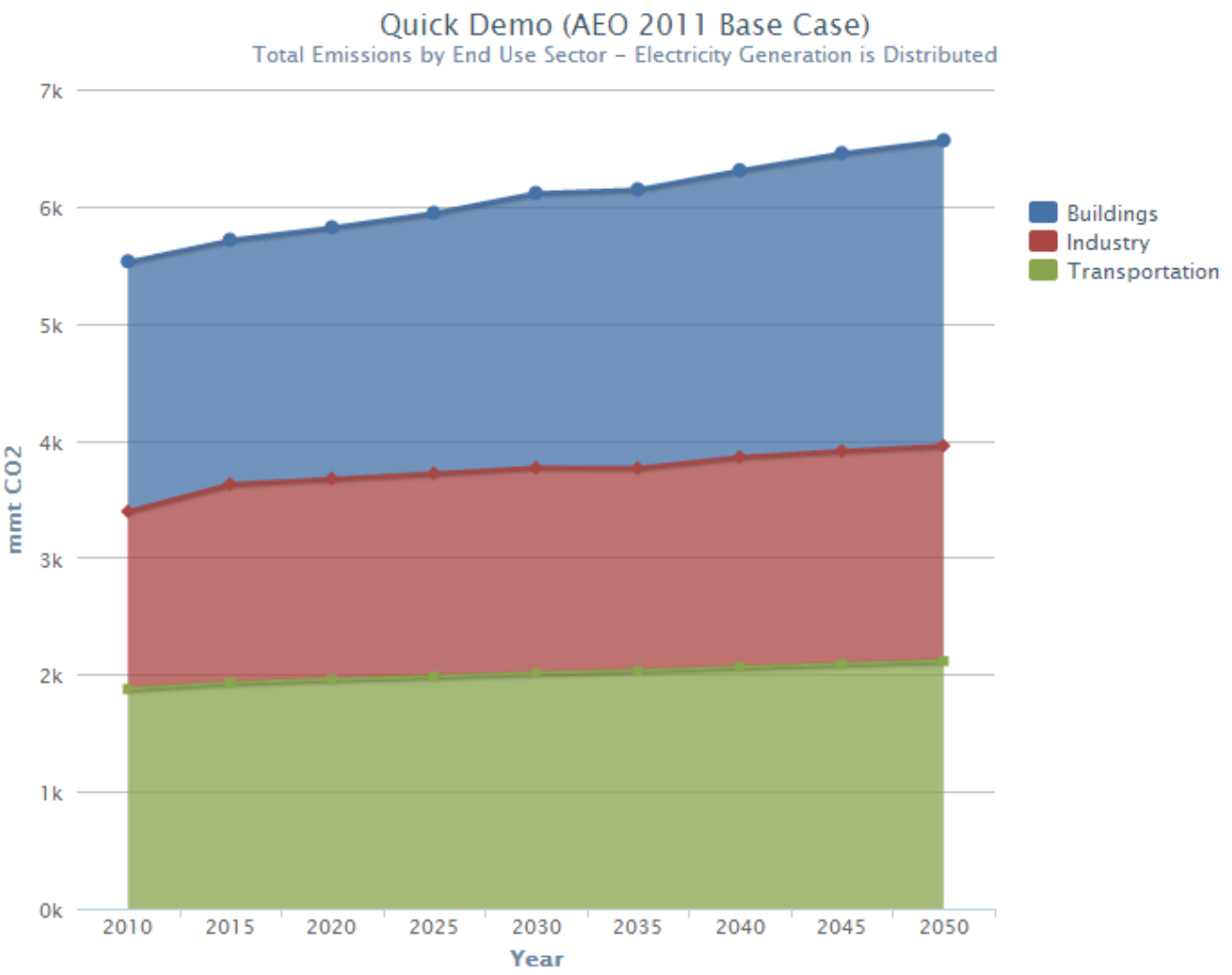
Transportation
Electricity
User Comments
Click on the link below to post a comment to this scenario.
Post A Comment
Quick Demo (AEO 2011 Base Case)
Buildings
Industry
Transportation
Electricity
Improvements to New Buildings in 2030
30%
(30 to 75)
Percent of Existing Buildings Retrofitted by 2050
0%
(0 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)
Reset
Save
Copy
Share
Delete
Generate Outputs

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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- Electricity
- User Comments

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

Post A Comment

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)*

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Quick Demo (AEO 2011 Base Case)

Buildings | Industry | **Transportation** | Electricity

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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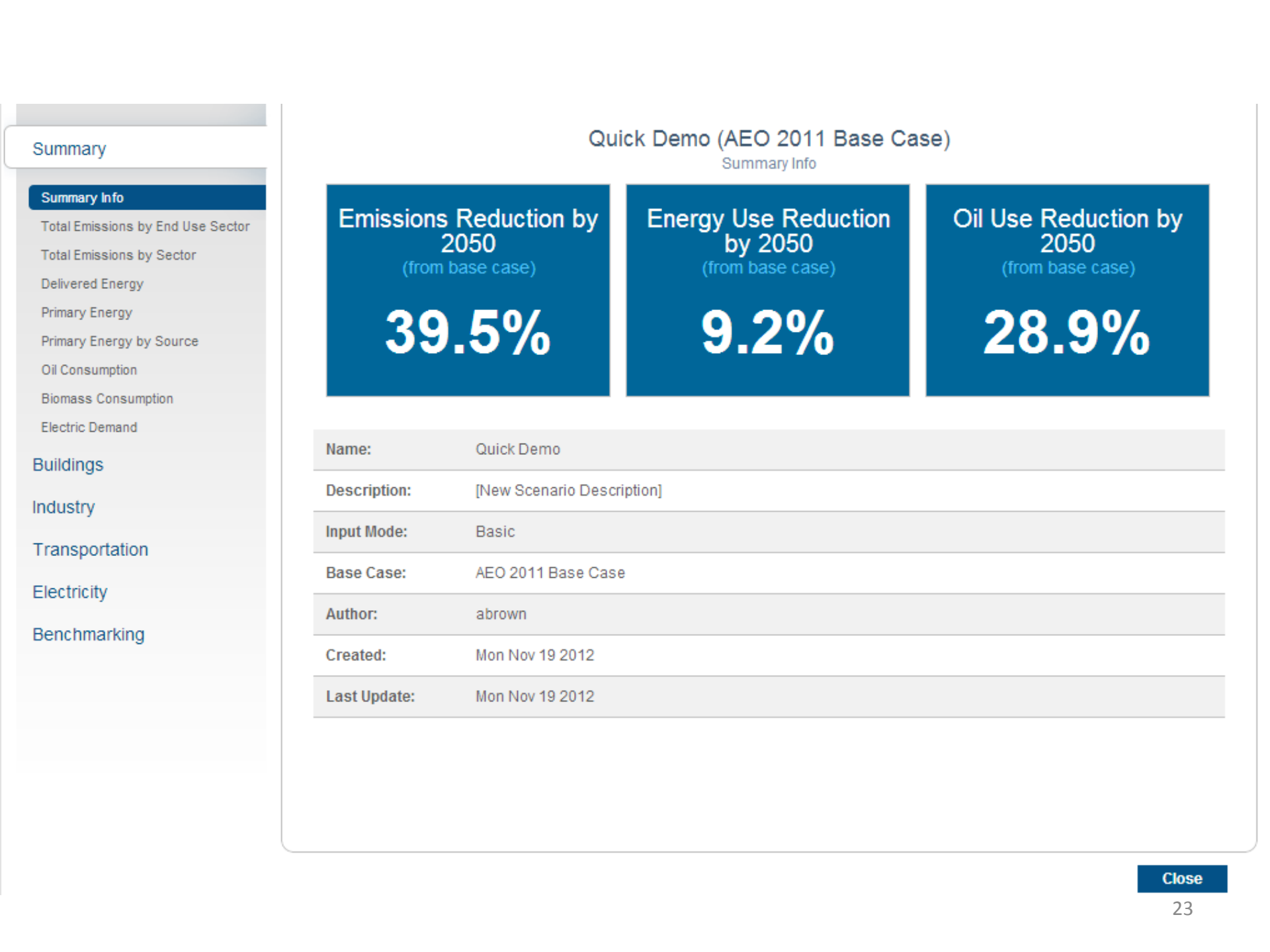
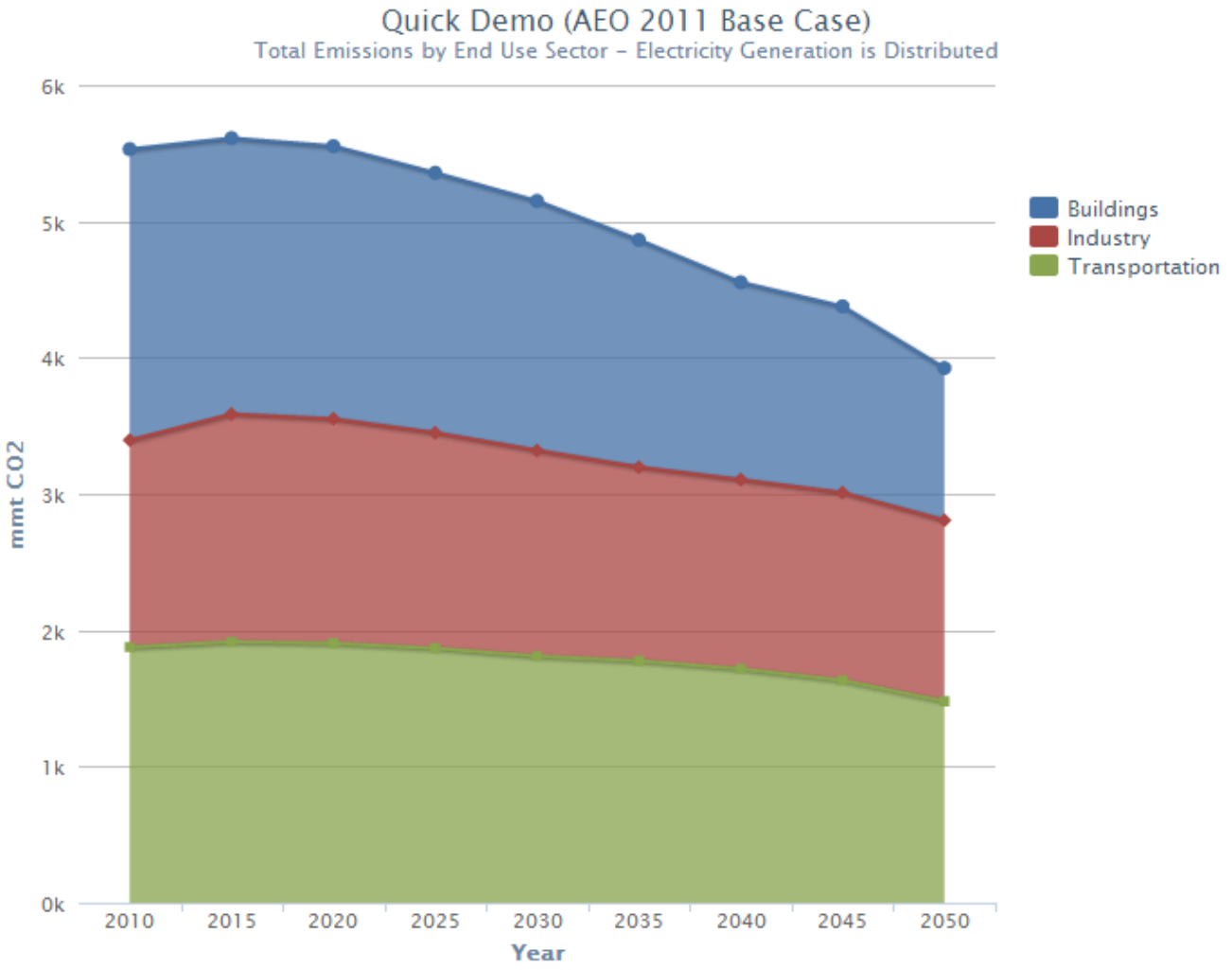
Quick Demo (AEO 2011 Base Case)

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)*


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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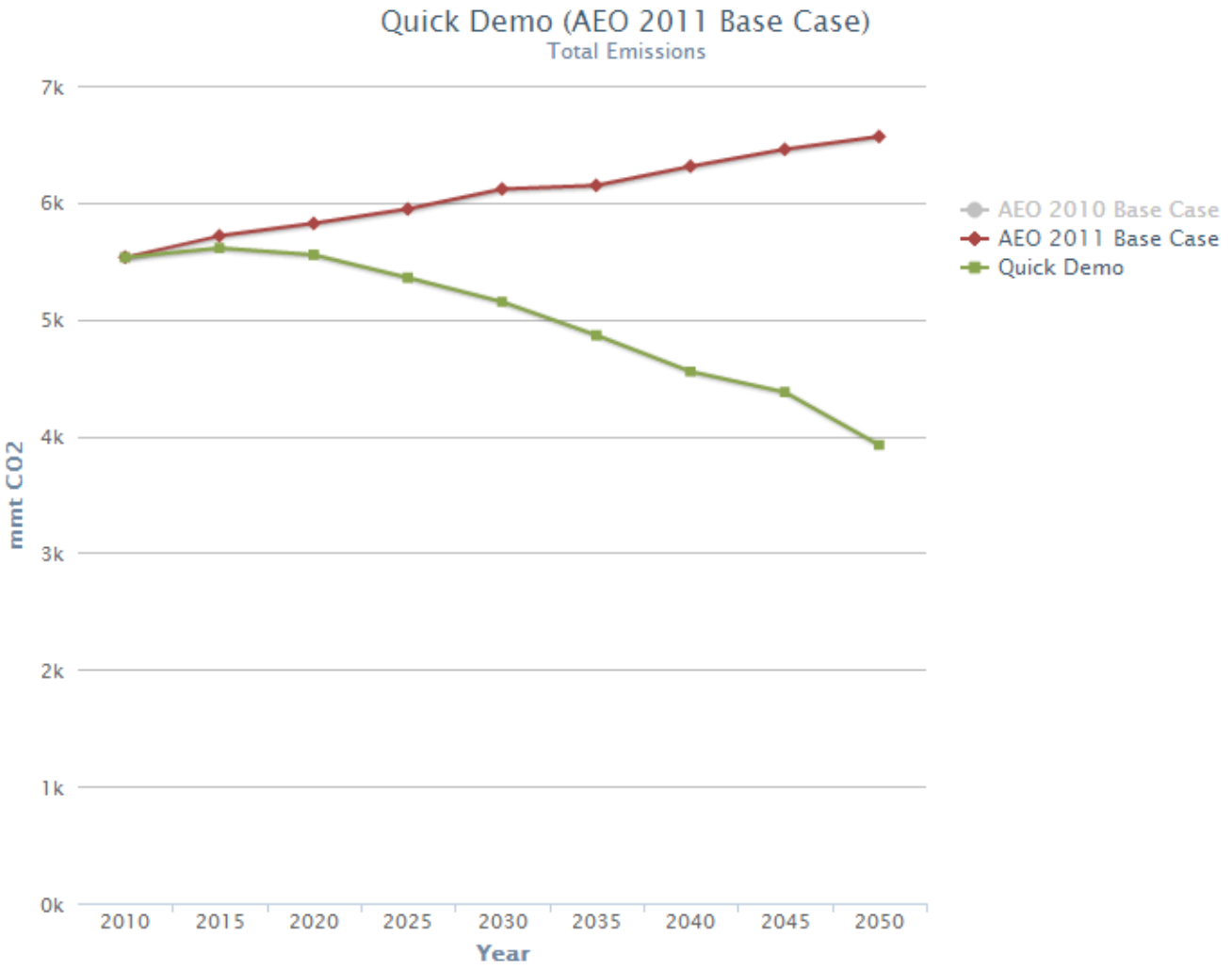
- Summary
- Buildings
- Industry
- Transportation
- Electricity
- Benchmarking

Total Emissions

- Transportation Emissions
- Buildings Emissions
- Industry Emissions
- Electricity Emissions
- Energy Consumption
- Petroleum Consumption
- Biomass Consumption
- Electric Demand



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