

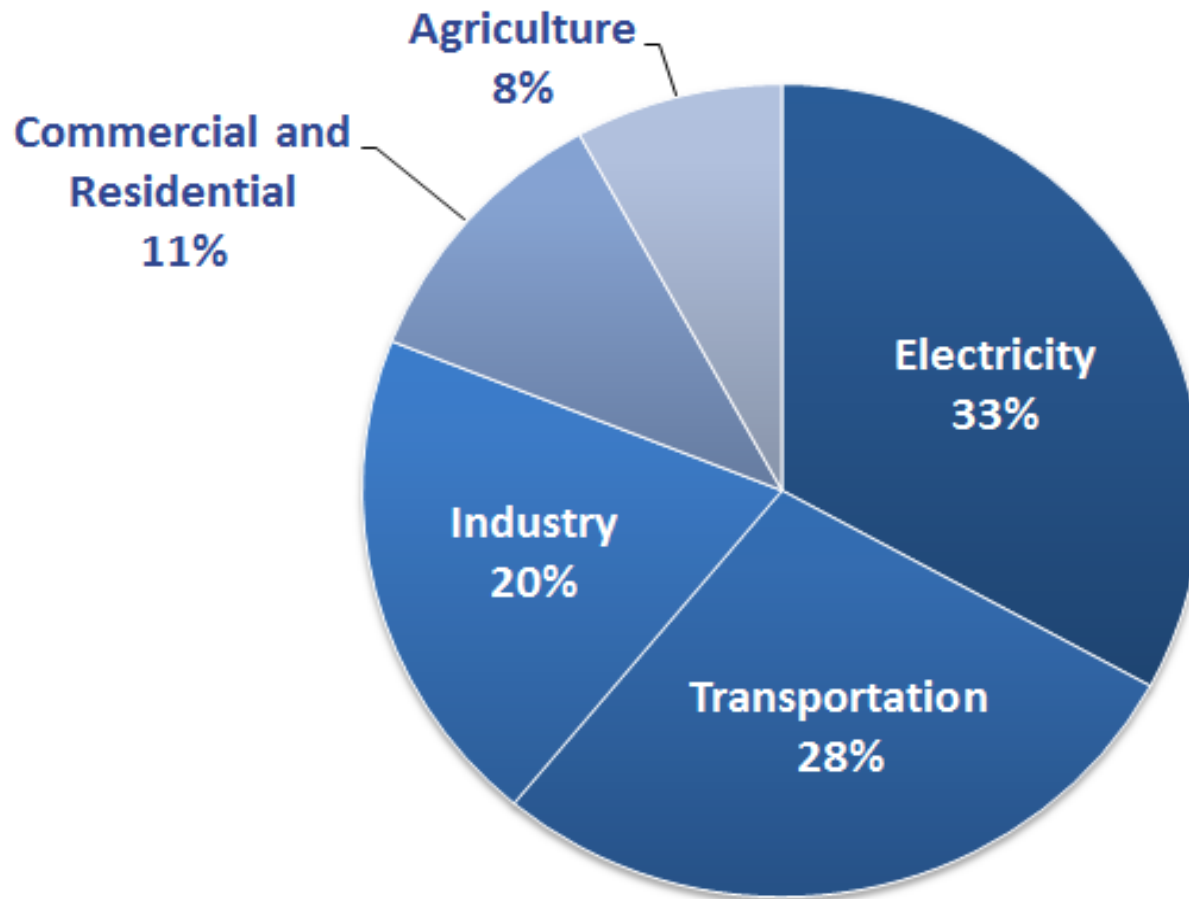


US Near Term Climate Policy: A Mixed Strategies Approach

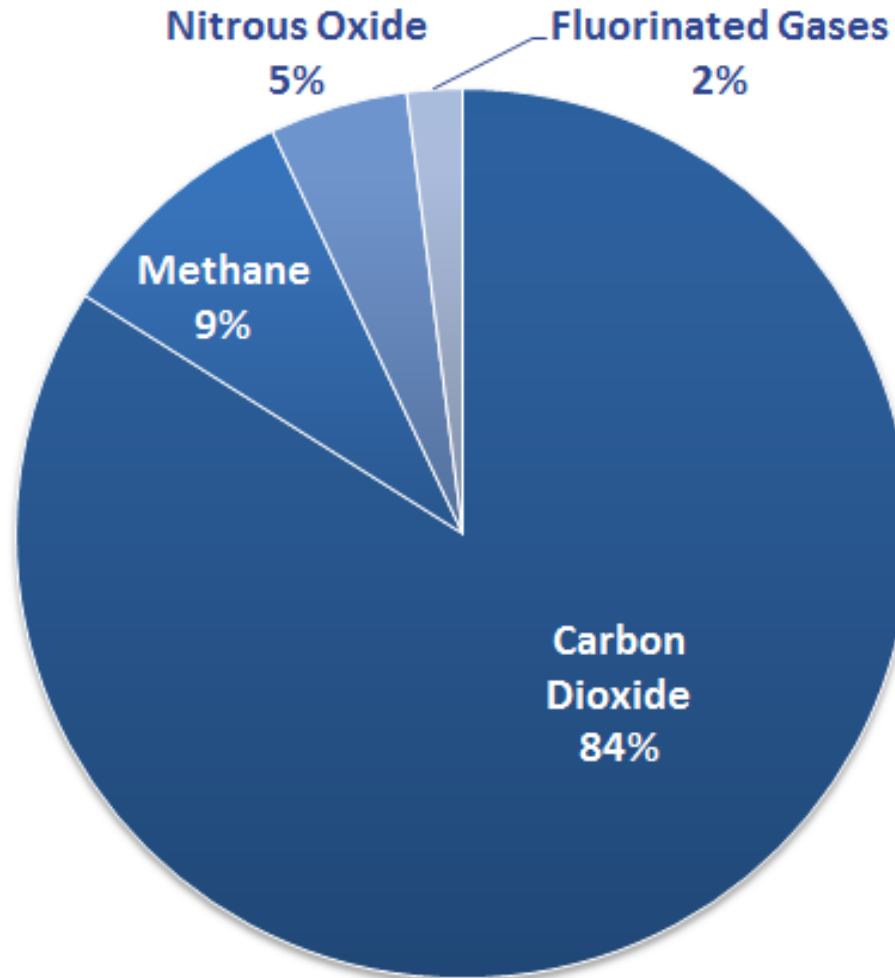
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Resources for the Future*

Sources of US Emissions



Composition of US Emissions



US Policies and Legal Frameworks to Reduce GHG Emissions

- Emitting Sectors
 - Agriculture and forestry
 - Residential
 - Commercial
 - Electricity Generation
 - Transportation
 - Industrial

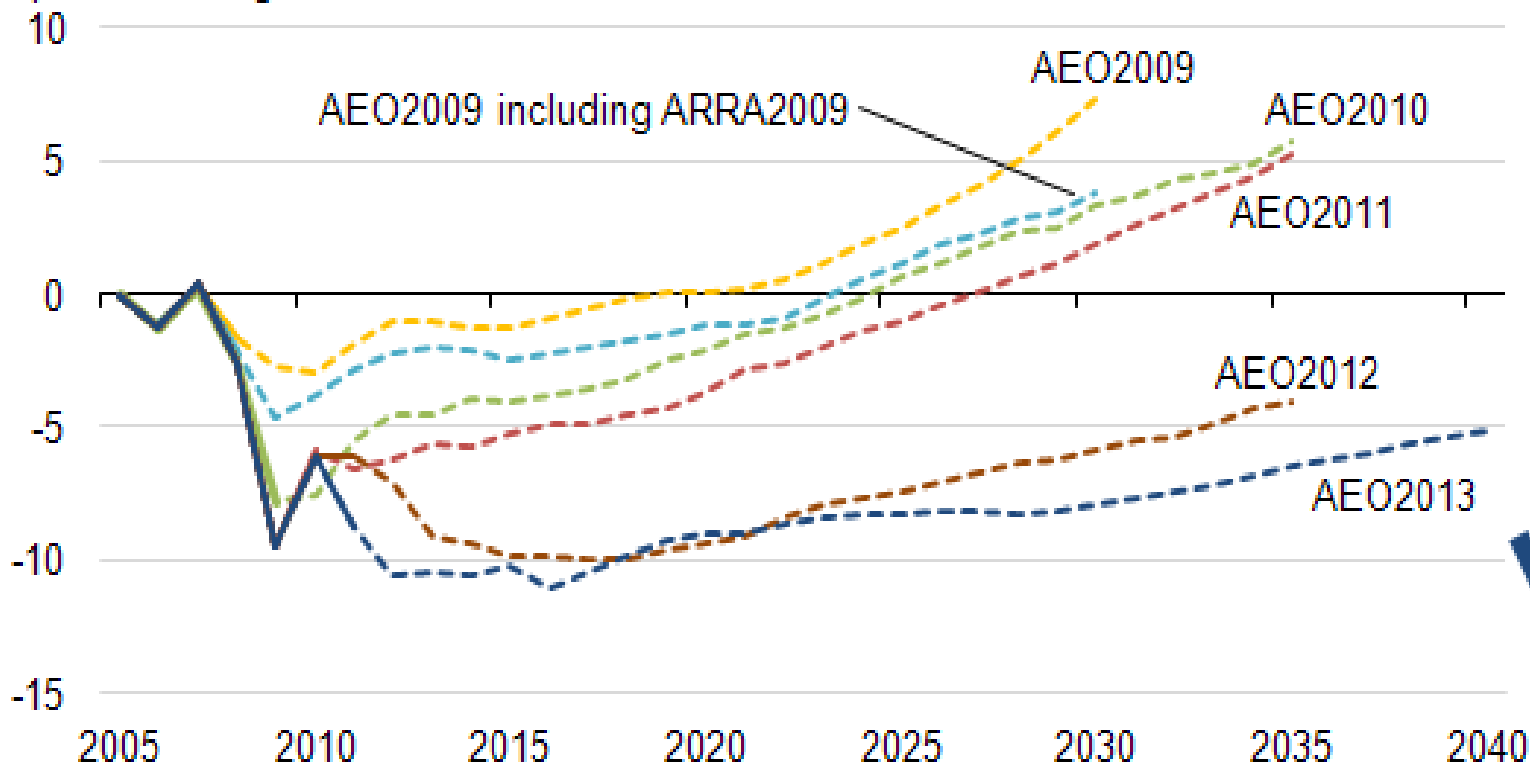
US Policies and Legal Frameworks to Reduce GHG Emissions

- Emitting Sectors
- Agriculture and forestry
- Residential
- Commercial
- **Electricity Generation**
- **Transportation**
- **Industrial**

US Copenhagen Commitment

17 percent below 2005 levels by 2020

U.S. energy-related carbon dioxide emissions in recent AEO reference cases
percent change from 2005



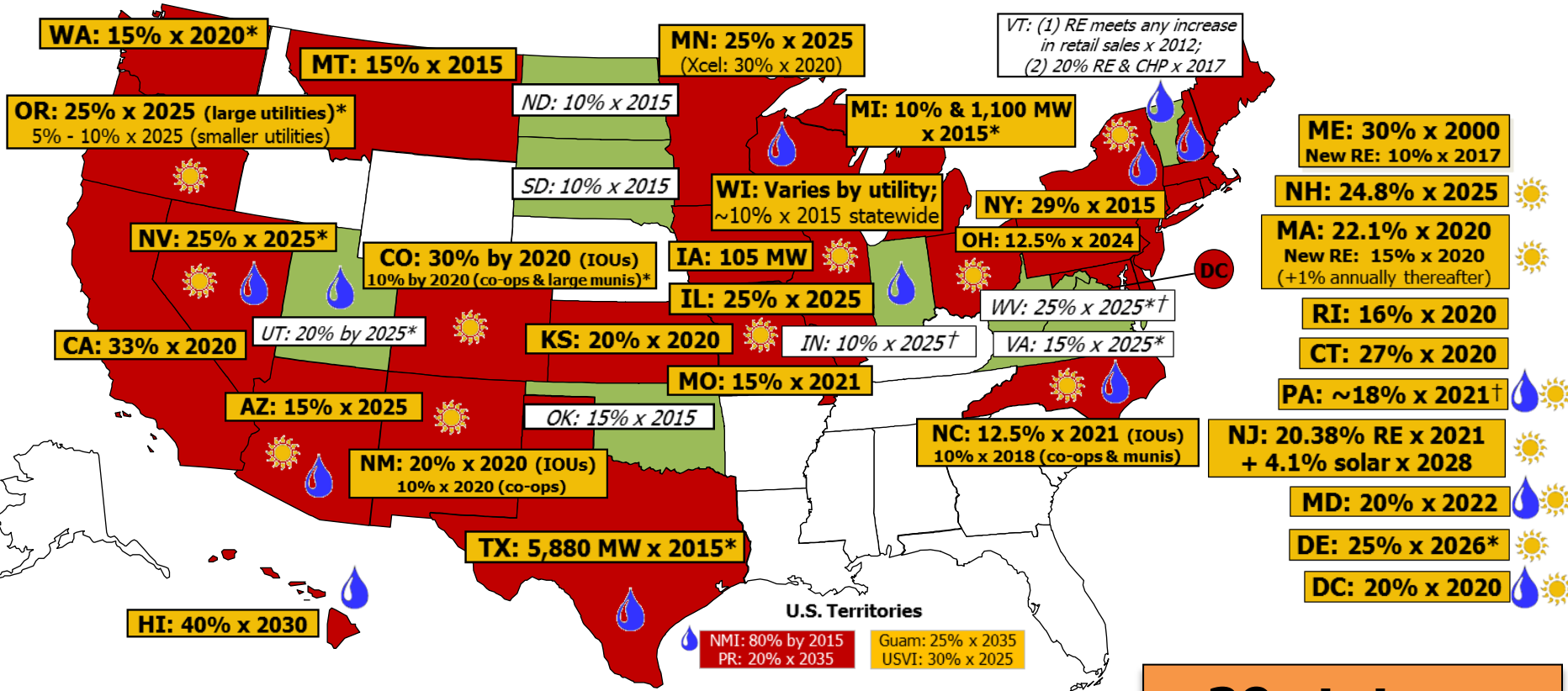
US Policies and Frameworks: Electricity Sector

- Legally binding emission reduction goals
 - Regional Greenhouse gas Initiative (RGGI)
 - Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont
 - RGGI allowances sold in December @ \$3/ton
 - California AB32 Goals
 - Considerably more restrictive than RGGI
 - AB32 allowances sold in November @ \$11.50/ton

Electricity Sector

Renewable Portfolio Standard Policies

March 2013

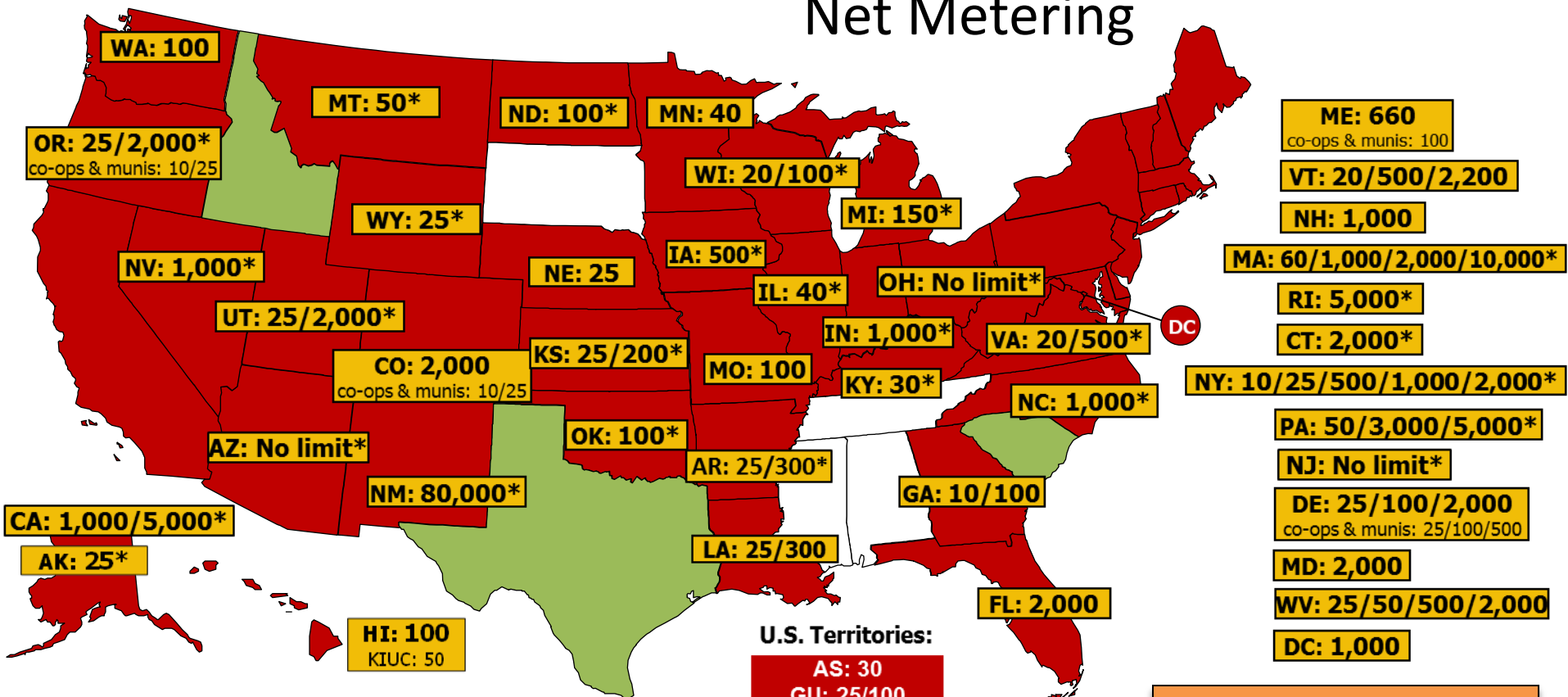


Source: www.dsireusa.org

- Renewable portfolio standard
- Renewable portfolio goal
- 💧 Solar water heating eligible
- ☀️ Minimum solar or customer-sited requirement
- ✳️ Extra credit for solar or customer-sited renewables
- + Includes non-renewable alternative resources

29 states + Washington DC and 2 territories have Renewable Portfolio Standards
(8 states and 2 territories have renewable portfolio goals)

Electricity Sector Net Metering



State policy

Voluntary utility program(s) only

* State policy applies to certain utility types only (e.g., investor-owned utilities)

July 2013

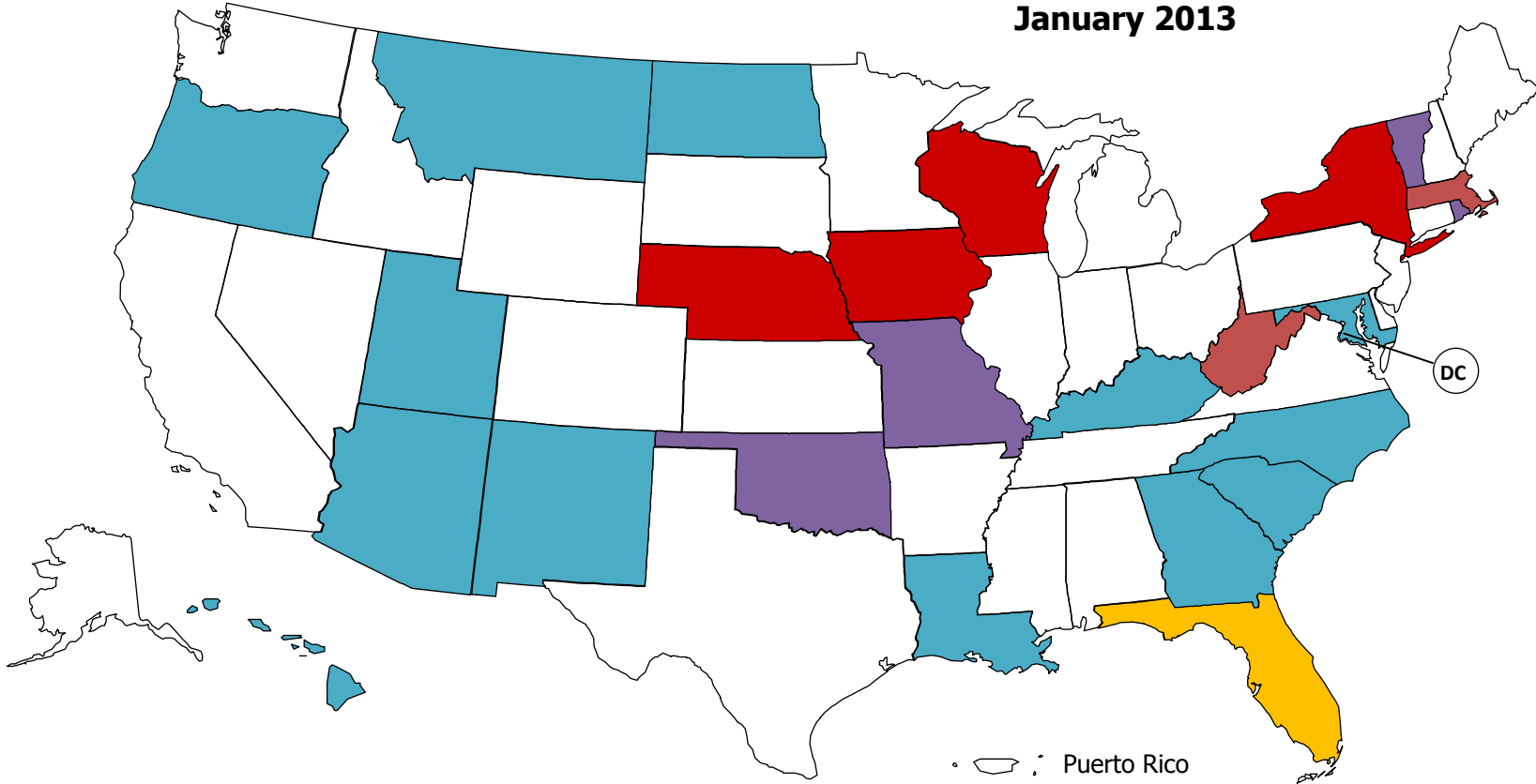
**43 states
+ Washington DC
& 4 territories have
adopted a net
metering policy**

Source: www.dsireusa.org

Electricity Sector

Tax Credits for Renewables

January 2013



Source: www.dsireusa.org

24 states
offer tax
credits for
renewables

Electricity Sector

Financial Incentives for Renewable Energy

Federal = State = Utility = Local = Non-Profit =

State	Personal Tax	Corporate Tax	Sales Tax	Property Tax	Rebates	Grants	Loans	Industry Support	Bonds	Performance-Based Incentive
Federal	3	4	0	0	0	4	6	1	0	0
Alabama	1				1		2 2			2
Alaska				1		1	3			1
Arizona	4	2	1	2	10 1		1	1		
Arkansas					1		1 1	1		
California			1	1	7 47 2		3 1 7	1		1 2 1
Colorado			2 1	3	19 2	1	2 1 2			3
Connecticut			3	2	2 2	3	7 1	2		4
Delaware					2 3					2
Florida		1	1	1	22 2		1 6 3	1		2
Georgia	1	1	1		15	1	1 2 1 1			3
Hawaii	1	1		1	1 1		3 1 2		1	1
Idaho	1			1	3	1	1 1		1	
Illinois			1	2	2 14	4 1 1	2		1	1 1
Indiana	1		1	1	34	1	1			1
Iowa	3	3	1	3	24		3 2			1
Kansas				1	1			1		
Kentucky	1	2	1		1 11	1	2 2 2 1	1		2
Louisiana	1	1		1	1		2 1			
Maine							2 1			1
Maryland	2	2	4	4 9	5 5		4			1
Massachusetts	1	2	1	1	6 10 1	5	1 1	2		1
Michigan				2	7	1 1	4 2 2	4		1
Minnesota			2	1	1 76	2	6 2			3 1
Mississippi					6		1 2	1		2

Electricity Sector - Summary

- Natural gas prices are expected to remain low and further displace coal
- RPS mandates are beginning to bind and will accelerate the deployment of renewables
- Wind and solar capital costs continue to decline
- The US is slowly becoming more energy efficient slowing its demand for electric power. The amount of electricity used in the average household has fallen to 2001 levels.
- The US has a reasonably good chance of meeting its Copenhagen pledge

US Transport Sector

- Accounts for almost a 1/3 of US CO₂ emissions
- Has been notoriously fuel inefficient
- Government fuel efficiency standards have been in place since the oil embargoes of the mid-70s, but for political reasons were rarely updated to increase efficiency
- In 2007 the US Supreme Court issued the most important US court decision with respect to Climate change in the case known as *Massachusetts v. Environmental Protection Agency*
 - The Court found that EPA has existing authority under the nation's 1970 Clean Air Act (CAA) to regulate greenhouse gases.
- In 2010 EPA set forth new fuel economy standards for the transport sector under the CAA to regulate vehicle CO₂ emissions

Projected Fleet-Wide Emissions 2012-2016

	2012	2014	2016
Passenger Cars (grams CO2/m)	263	247	225
Light Trucks (g/m)	346	326	298
Combined Cars & Trucks (g/m)	295	276	250
Passenger Cars (mpg)	33.8	36.0	39.5
Light Trucks (mpg)	25.7	27.3	29.8
Combined Cars & Trucks (mpg)	30.1	32.2	35.5

Source: Office of Transportation and Air Quality, EPA-420-F-10-014, April 2010

Projected Fleet-Wide Emissions 2016-2025

	2016	2020	2025
Passenger Cars (g/m)	225	182	143
Light Trucks (g/m)	298	269	203
Combined Cars & Trucks (g/m)	250	213	163
Combined Cars & Trucks (mpg)	35.5	41.7	54.5

Source: Office of Transportation and Air Quality, EPA-420-F-10-014, April 2010

US Emissions Post 2020

- The legal authorities, policies and programs already in place will continue to drive down emissions
- Federal CO2 pricing policies (e.g., cap and trade or CO2 tax) may re-emerge, but are not likely in the near term
- In the near term US domestic climate policy will be driven by continued state-level programs and the CAA
- The pattern of CO2 regulation under the Act for transport (termed – *mobile sources*) is clear to 2025
- EPA is now beginning the process of CO2 regulation for *stationery sources* – power plants, refineries, factories, etc.

Stationery Source Regulations: Electricity Generation

- Regulatory structure – performance standard
- Much like the mobile source regulation (grams of CO₂ per mile) the standard for electricity generation will be tons of CO₂ per megawatt hour of generation
- Standards are set for new sources (New Source Performance Standards - NSPS) and for existing sources (ESPS)
- The NSPS have been proposed and for all practical purposes the regulations prohibit new coal fired generation
 - Since little new coal generation was planned, these regulations have little impact on the electric utilities

Electricity Generation- ESPS

- The ESPS regulations for electric utilities are due to be proposed in mid 2014
 - These regulations will likely be transformative for the sector
- Once the performance standards are proposed states have the obligation to develop plans to implement the regulations
- It is expected EPA will give states a great deal of flexibility in designing the implementation plans

Types of State Implementation Plans (SIPs)

- Tradeable performance standards – within state and cross-state.
- Performance standard to mass standard conversion
 - Enables states like CA and RGGI to use their existing cap and trade program structures
 - Enables other states to join CA or the RGGI programs or create new programs
- Mass standard to tax
 - Enables states to develop CO2 tax regimes
- Many other variants are possible
- Major unanswered question
 - How stringent will the performance standard be?

Other Sources After Electricity Generation

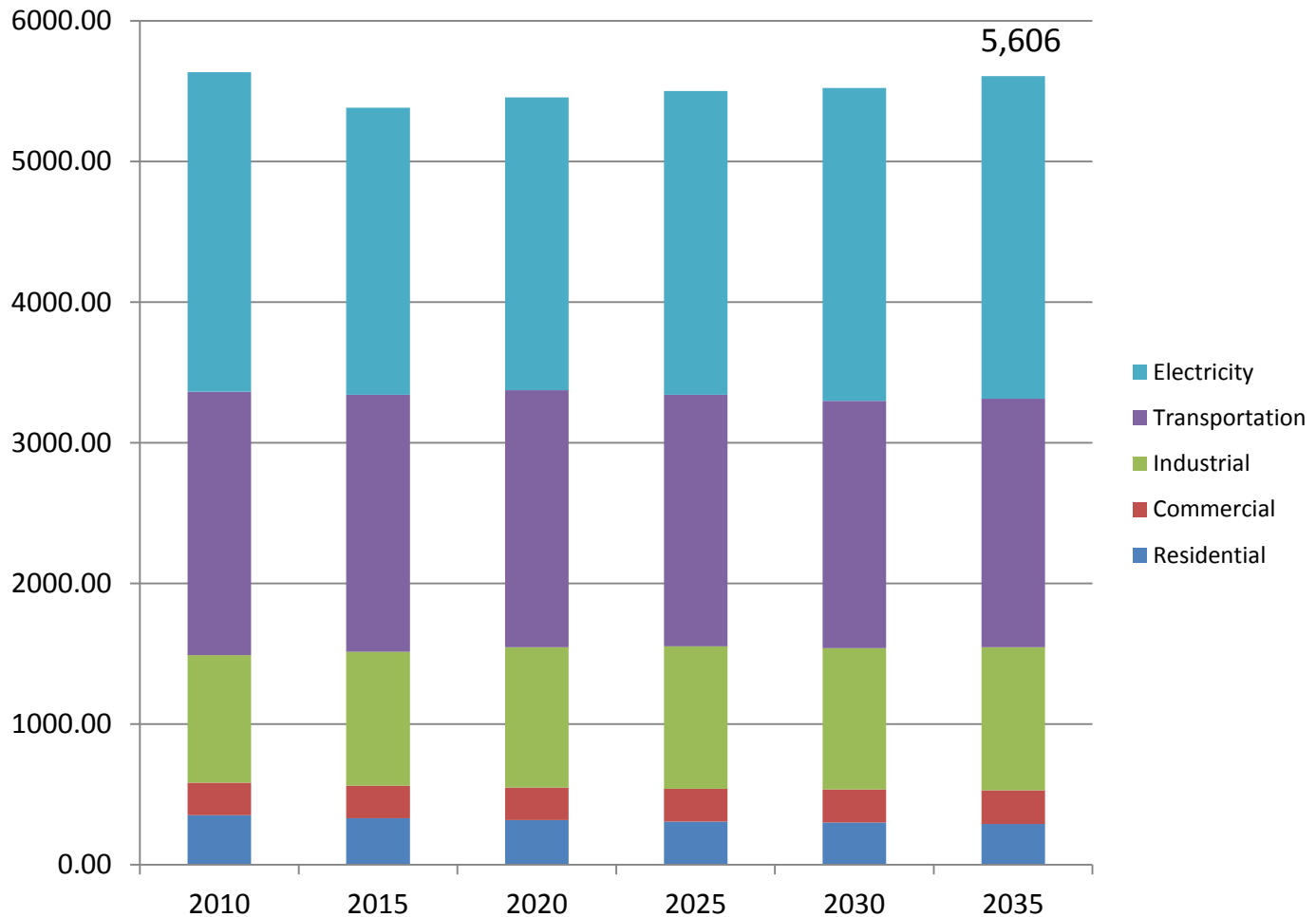
- Large industrial/commercial/institutional boilers
- Pulp and paper
- Cement
- Iron and steel
- Refineries
- Nitric acid plants
- Landfills

Post 2020

- Can the US pledge to reduce emissions 83 percent by midcentury as contained in the rejected cap & trade legislation of 2009?
 - technically possible.
- Will the US UNFCCC 2015 pledge be based in part on the 83% reduction by 2050 contained in the rejected legislation?
 - Unlikely

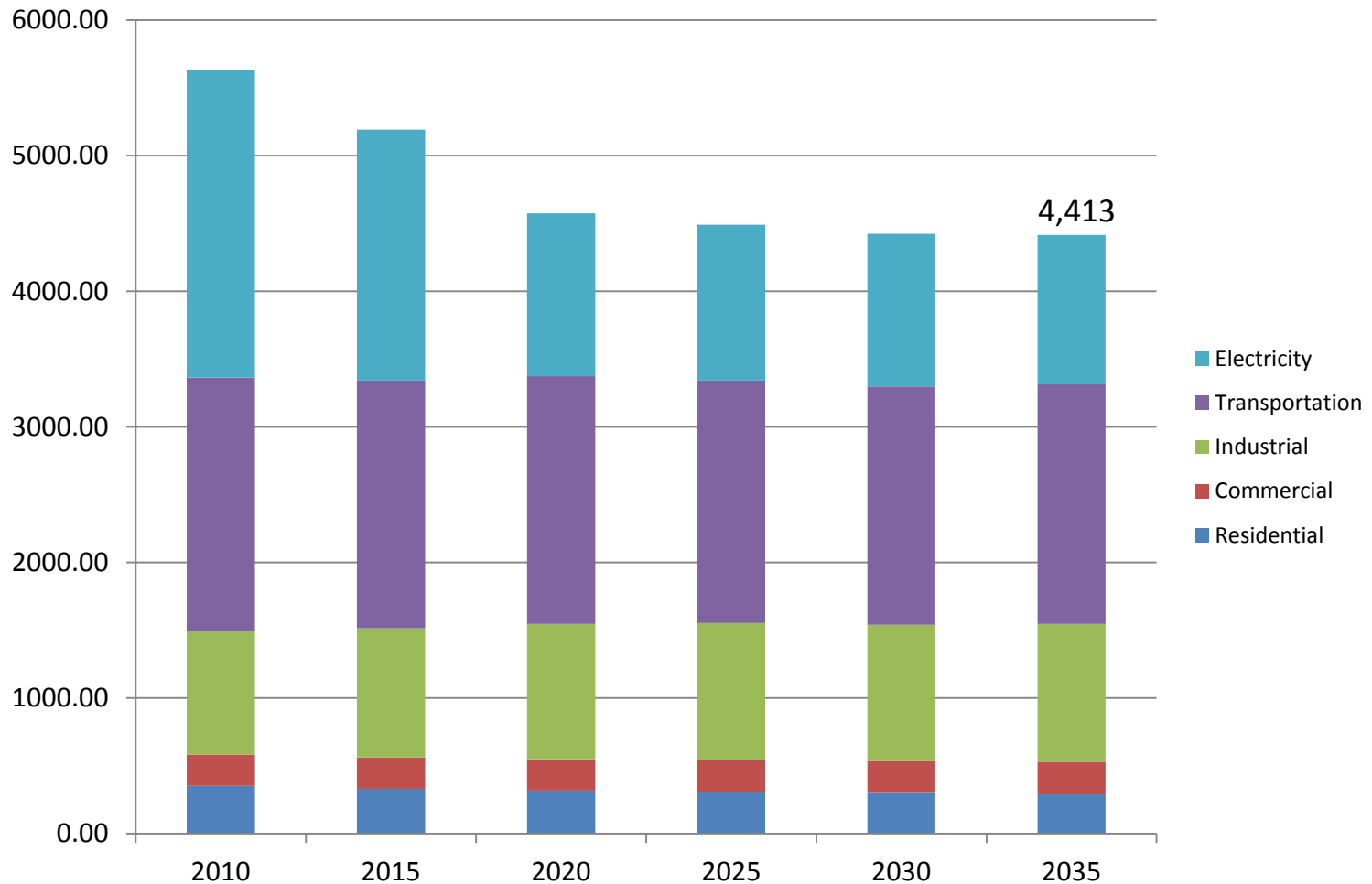
US Commitment 2015-2035

EIA Emissions Forecast (million metric tons CO2)



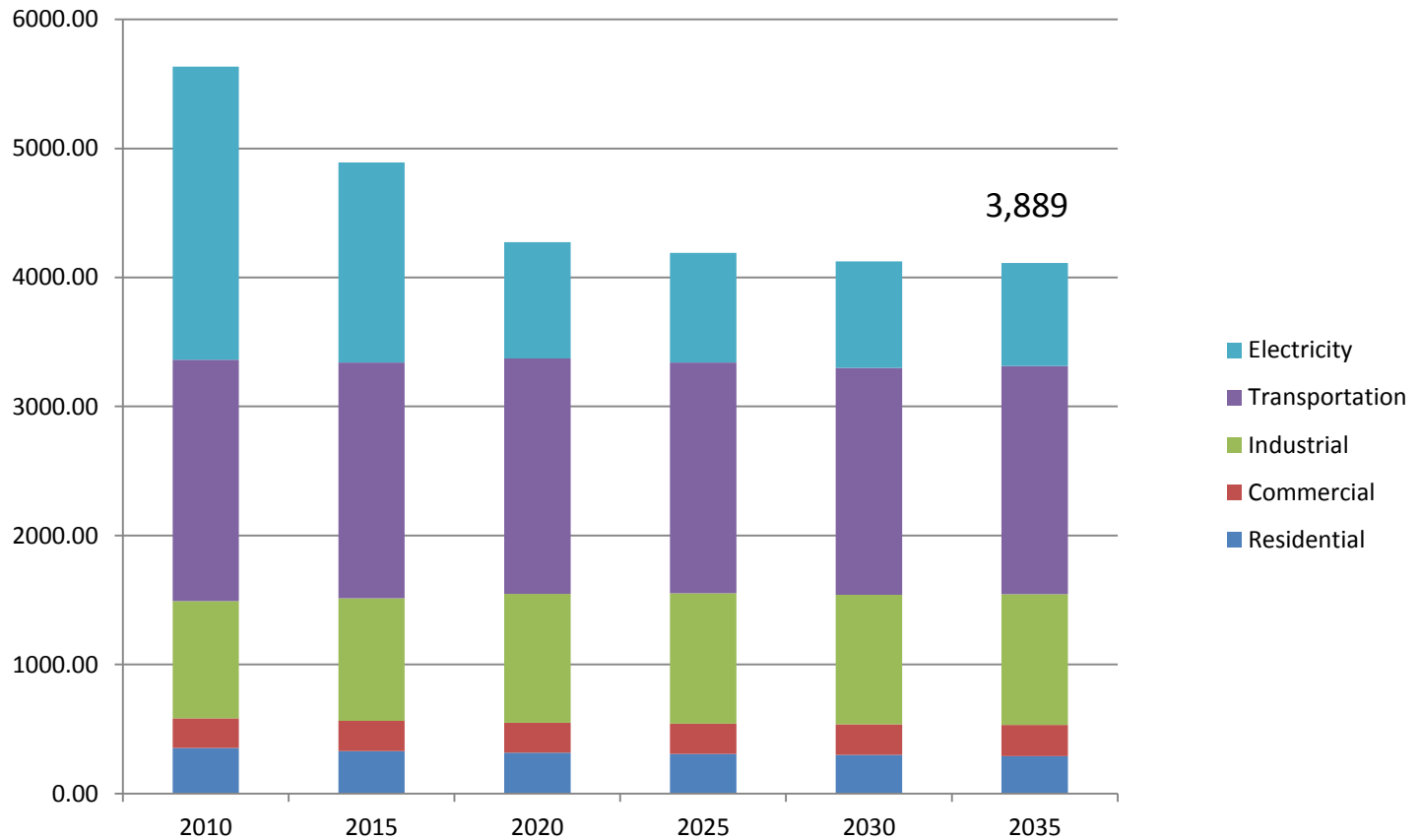
2015-2035 Commitment

With Electricity Sector Controls (SCC @ \$43/ton in 2015)



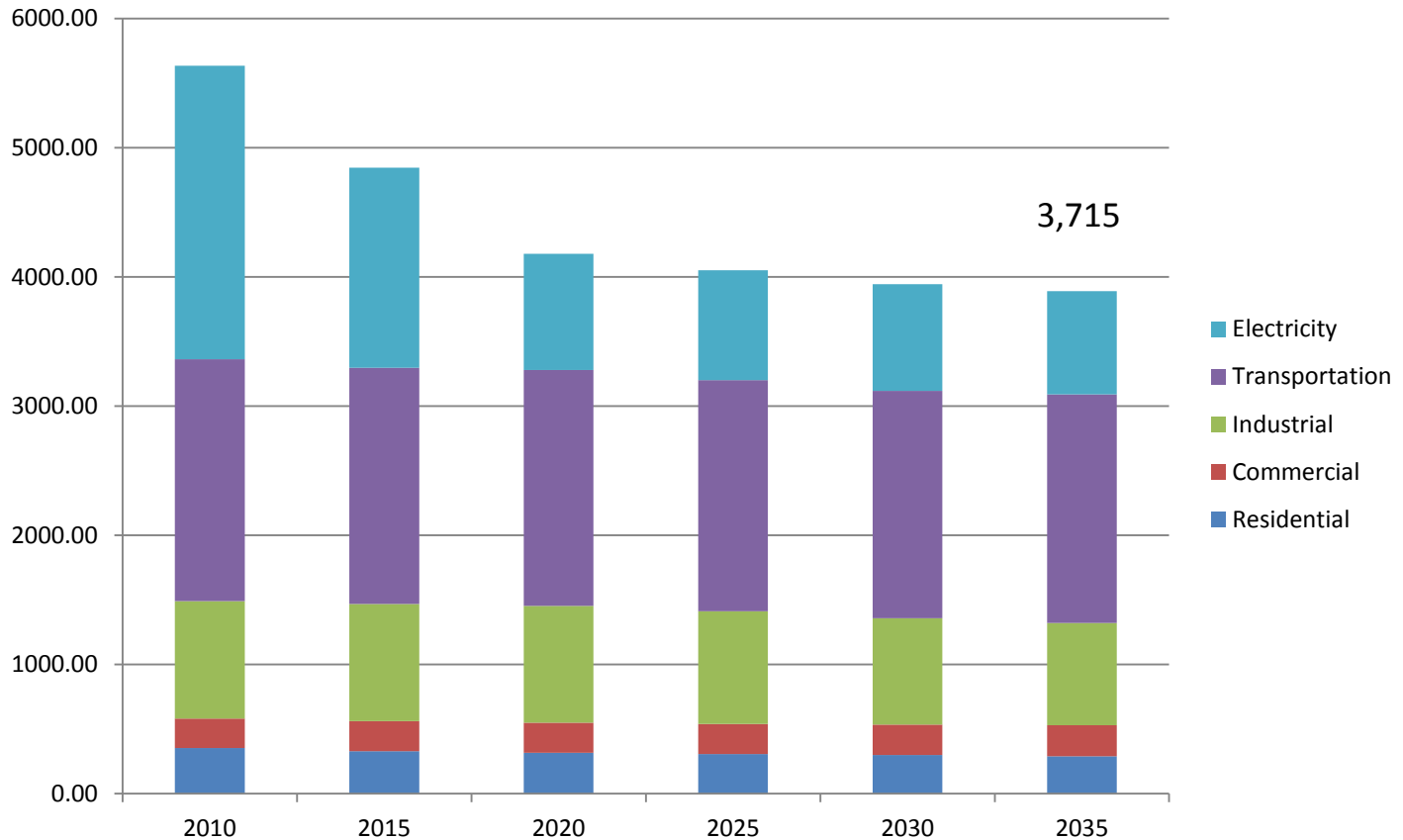
2015-2035 Commitment

With Electricity Sector Controls (SCC @ \$66/ton in 2015)



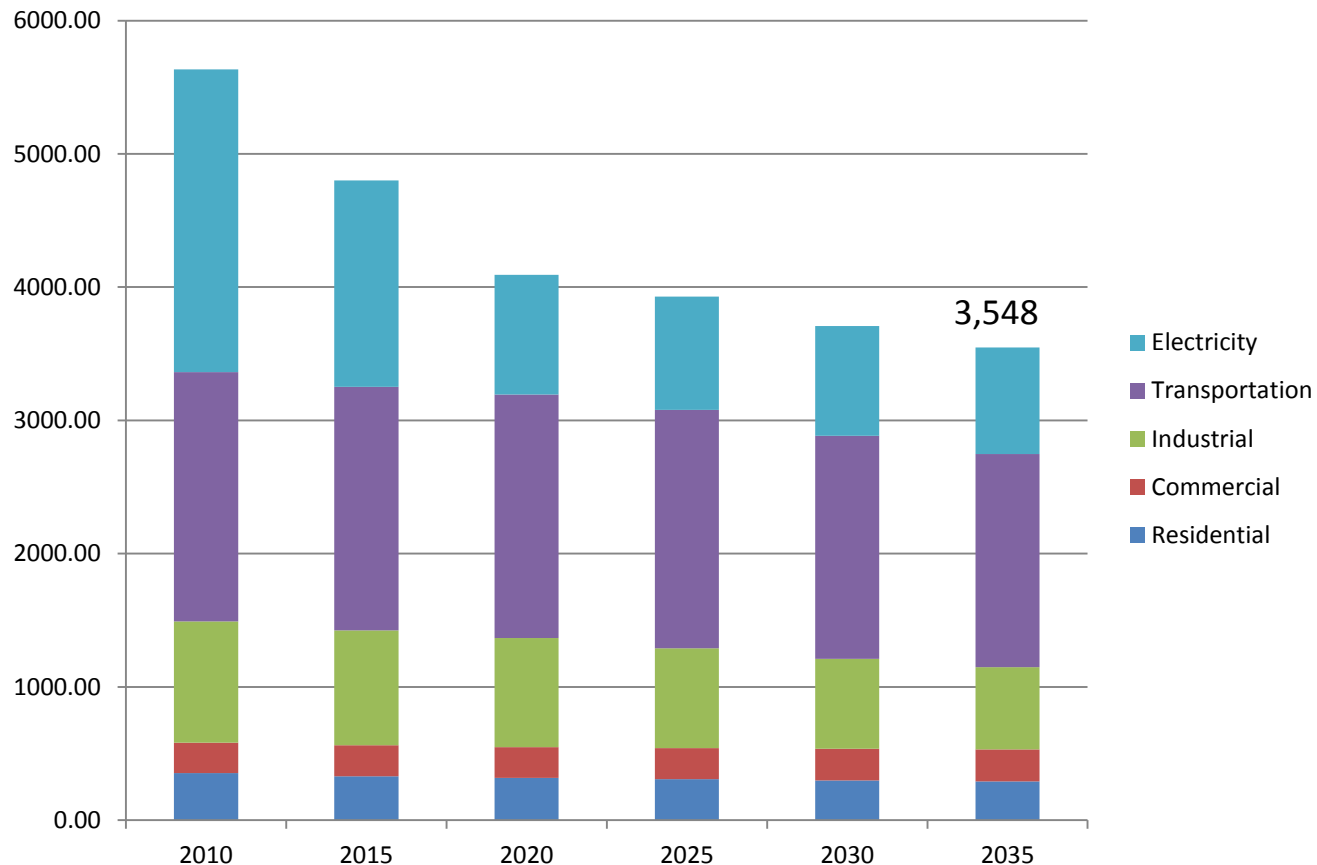
2015-2035 Commitment

With Electricity Sector Controls (SCC @ \$66/ton) and 1% Industrial Sector Emission Improvement



2015-2035 Commitment

With Electricity Sector Controls (SCC @ \$66/ton) and 1% Industrial Sector Emission Improvement and 1% Fuel Economy Improvement from 2025-2035



2015-2035 Commitment

Percent Reductions from Baseline in 2035

