

# NOC & SWC of A&WMA Fall All-Ohio Technical Conference

Waxman-Markey Legislation Panel  
CAP & TRADE Mechanism  
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# Presentation Issues

- How Cap & Trade Would Work
  - Kerry-Boxer Comparison
- **CAP** & Trade v. **Tax** & Trade
- **Carbon** CAP & Trade v. **Sulfur** CAP & Trade
- **Natural Gas** v. **Coal** & **Oil**

# CAP & TRADE Concepts

- CAP applies only to “**Covered Entities**”
- **Baseline** = “Economy-Wide” CO<sub>2</sub>e emissions(2005)
- CAP = “**economy-wide**” reduction of Baseline
- **Emission Allowance** (EA) = 1 (metric) ton CO<sub>2</sub>e
- **CO<sub>2</sub>e** (CO<sub>2</sub> =1) (CAA§ 712)
  - Methane = 25
  - Nitrous oxide = 298
  - HFC = 124 to 14,800
  - CF<sub>n</sub> = 7,390 to 12,200
  - SF<sub>4</sub> = 22,800
  - NF<sub>3</sub> = 17,200

# Covered Entities (CAA §722)

- Covered in 2012 (68.2%)
  - Electricity sources, fuel & industrial gas producers & importers,  $\text{NF}_3$  sources, Sequestration sites
- Covered in 2014 (7.0%)
  - Industrial combustion & non-combustion sources
- Covered in 2016 (9.3%)
  - Local distribution companies
- Total covered of 2005 Baseline (84.5%)
- EA required by April 1 of following year

# CAA§721 - Emission Allowances

<u>Yr</u>	<u>%base</u>	<u>CO<sub>2</sub>e</u>	<u>Covered</u>	<u>EA</u>
2005	100%	7,206	<u>Entities</u>	
		(mil-tons CO <sub>2</sub> e)		(mil-tons CO <sub>2</sub> e)
2012	97%	6,994	68.2%	4,770
2013	95%	6,842	68.2%	4,666
2014	93%	6,682	75.7%	5,058
2015	91%	6,528	75.7%	4,942
2016	89%	6,380	84.5%	5,391
2017	86%	6,226	84.5%	5,261
2018	84%	6,073	84.5%	5,132
2019	82%	5,920	84.5%	5,002
2020	80%	5,767	84.5%	4,873

# CAA§782 - Emission Allocations

Sec	Rebates to Ratepayers	Percent-2016
a	Electricity Consumers	35%
b	Natural Gas Consumers	9%
c	Home Heating Oil & Propane Consumers	1%
	<b>TOTAL</b>	<b>45%</b>

# CAA§782 - Emission Allocations

Sec	Assistance to Vulnerable Classes	Percent-2016
d	Low Income Consumers	15%
s	Trade Vulnerable Industries	2%
	<b>TOTAL</b>	<b>17%</b>

# CAA§782 - Emission Allocations

Sec	Research, Deployment & Incentives for Green Technologies	Percent-2016
f	Deployment of Carbon Capture & Sequestration	1.75%
g	Energy Efficiency, Building Codes & Retrofits	10%
h	Energy Innovation Hubs & Advanced Energy Research	1.5%
i	Clean Vehicle Technology	3%
j	Domestic Fuel Production & Small Domestic Refiners	2.25%
k	Investment in Workers (Green Job retraining)	0.5%
U	Agriculture & renewable Energy	0.3%
	<b>TOTAL</b>	<b>16%</b>

# CAA§782 - Emission Allocations

Sec	Adaptation for Climate Change	Percent - 2016
l-1	Domestic (Environmental) Adaptation	0.9%
l-2	Public Health Adaptation	0.1%
m-1	State Natural Resources Adaptation	0.385%
m-2	Natural Resources Adaptation	0.615%
	<b>TOTAL</b>	<b>2%</b>

# CAA§782 - Emission Allocations

Sec	International Programs	Percent-2016
n	International Adaptation	1%
o	International Clean Technology Transfer	1%
	Strategic Reserve (International Deforestation)	1%
	<b>TOTAL</b>	<b>3%</b>

# CAA§782 - Emission Allocations

SUMMARY	Percent - 2016
Rebates to Consumers	45.5%
Relief for Those Hurt by Cap & Trade	28.4%
Research, Deployment, Incentives for Green Technologies	16.3%
Adaptation for Climate Change	2%
International Programs	3%
<b>TOTAL</b>	<b>95.2%</b>
Unallocated Emission Allowances = Deficit Reduction (thru 2025)	
Unallocated Emission Allowances = Consumer Refund (thru 2025)	

# Kerry-Boxer: Emission Allocations

	Distribution of All Emission Allocations (CAA §771)	Percent
	Deficit Reductions (lock box)	Min 25%
	Relief for Those Hurt by Cap & Trade	(f)*
	Research, Deployment, Incentives for Green Technologies	(f)*
	Adaptation for Climate Change	(f)*
	International Programs	(f)*
	<b>Consumers – Balance of above, pro rata</b>	
	Consumer Energy Efficiency Programs	50%
	Consumer Rebates	50%
*	<b>No Apparent Caps</b> (Many of the programs are the same as in the Waxman-Markey bill, but most of the W-M programs that did not directly relate to Energy Efficiency or Carbon Cap & Tax were apparently eliminated, 821 pp down from 1428 pp.)	

# Carbon Cap or Carbon Tax?

- CAP = Annual EA, economy-wide.
- No CE has a cap.
  - Each CE must buy EA for the each CO<sub>2</sub>e emitted.
- EPA auctions EA
  - or awards them to those who qualify for programs the government wants, who then auction them.
- Result: CE buy EA to fund gov'n't programs
  - Costs passed through to ratepayers
- Tax: CE pay gov'n't directly to fund programs

# Carbon v. Sulfur Cap & Trade

Carbon Cap & Trade (CAA Title VI)	Sulfur Dioxide Cap & Trade (Title IV)
No cap on CE individually	Cap on individual power plant (PP)
Trade for EA for all CO <sub>2e</sub>	Trade for credits to cover deficits only
EA trades fund government program	Government gets no money
Govn't programs to negate the negative economic impacts of cap & trade	Minimal pass through of control costs or trade costs to ratepayers
Energy-intensive industry to countries without carbon programs and with inefficient power production, causing a net increase of CO <sub>2e</sub> for each transfer.	Reduces SO <sub>2</sub> emissions effectively without appreciable transfer of industry for energy reasons.
Alternative energy time-lines much longer than Cap time-lines	Technology Forcing where SO <sub>2</sub> controls were available or imminent
Coal mining, iron & steel among loses	No lost industries due to program

# Is Natural Gas Favored?

Electricity Generation	Natural Gas	Coal	Oil
<b><u>Assumptions</u></b>			
AP-42 Fuel Input Units	mmcf	tons	1000-gal
AP-42 CO <sub>2</sub> Emission Factor-lbs/fuel units	1.2 x 10 <sup>5</sup>	5.7 x 10 <sup>3</sup>	2.2 x 10 <sup>4</sup>
Heat Content – btu / mil-fuel units	26	1,050	145
Conversion: btu/kWh	3413	3413	3413
Assumed Ratio: Electricity / heat input	45%	35%	40%
<b><u>Calculation</u></b>			
CO <sub>2</sub> emission - kg / electric output - MWh	80	118	94
Relative EA cost per N.G. electricity unit	1.0	1.5	1.2
<b>Is Ohio disfavored?</b>			