

# RGGI Leakage Workshop Presentation

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# Presentation Objectives

- Provide an overview of ISO New England
  - Physical characteristics
  - Transfer limits and historical flows
  - Leakage from New England RGGI cap
- Comments on Leakage

# Introduction

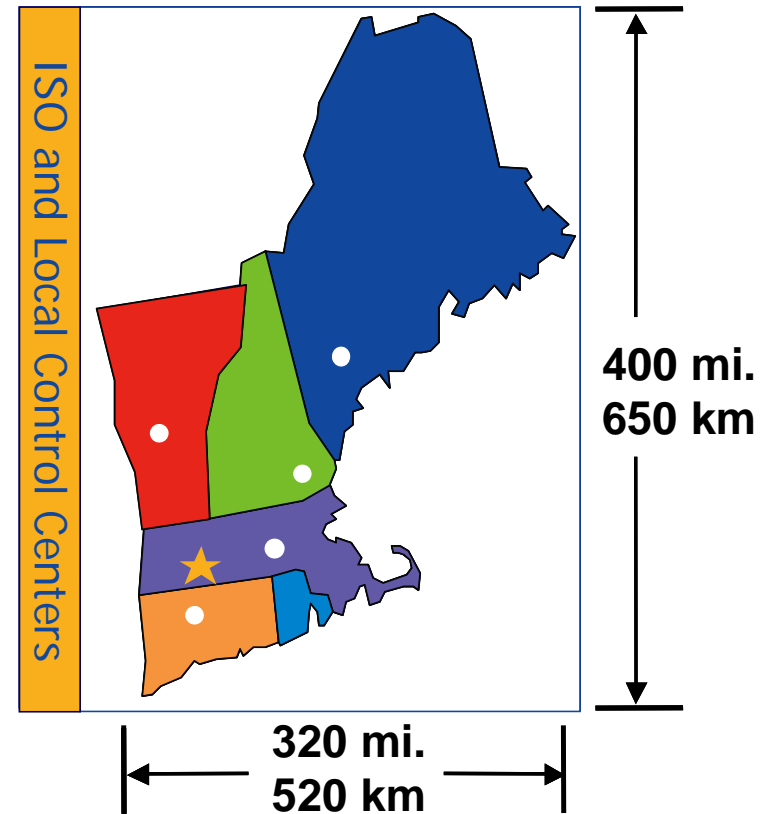
- ISO New England supports environmental objectives in the draft Model Rule
- However ISO New England has concerns
  - How leakage will be resolved
  - Need for offsets

# Leakage Guidelines

- Should be easily administrated
- Should not impact system reliability or market efficiency
- Other CO<sub>2</sub> regulations outside of RGGI will tend to dampen leakage
  - Canada's Kyoto compliance
  - MA 7.29 regs
- Leakage is not energy from hydro, biomass, wind or fossil plants with CO<sub>2</sub> offset credits

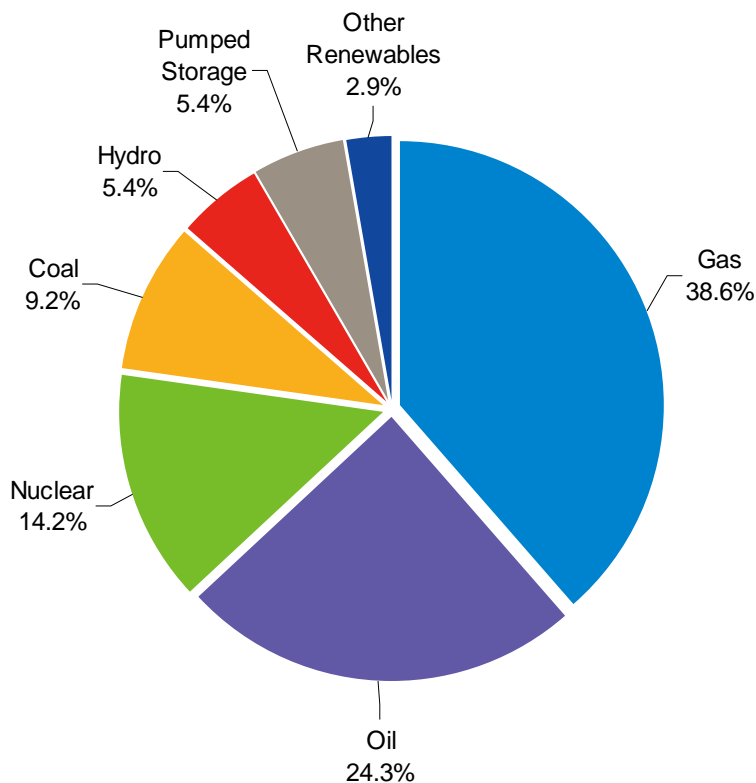
# New England's Electric Power System

- 14 million people; 6.5 million households and businesses
- 350+ generators/power plants
- 8,000+ miles of transmission lines
- 12 interconnections to neighboring systems
- 32,000 MW total supply
- All-time peak demand: ~26,885 MW on 7/27/05
- Eight (8) Pricing Zones

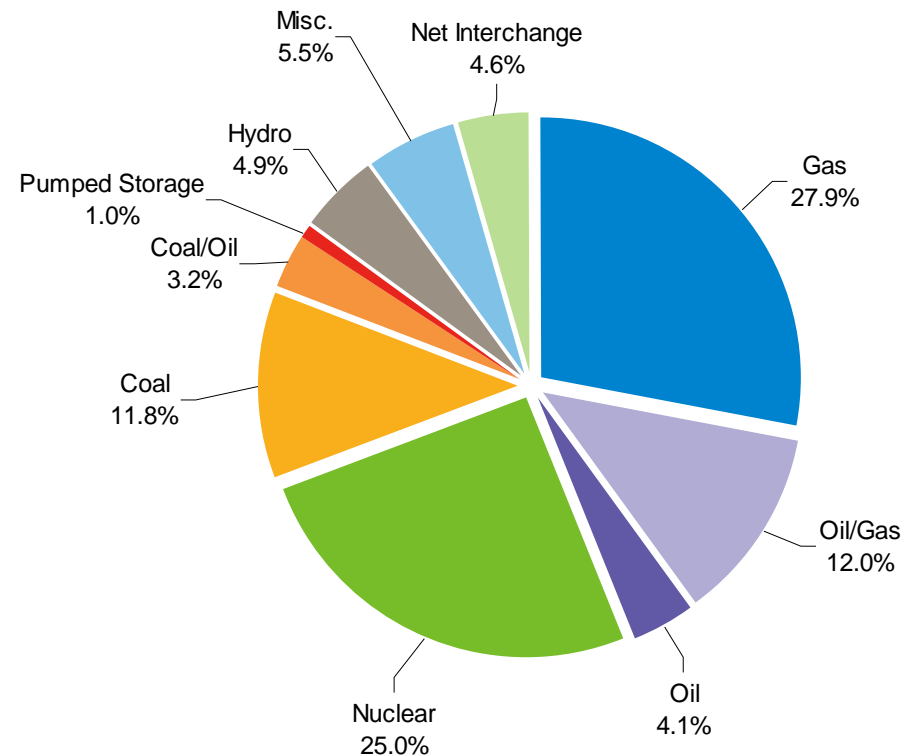


# 2005 Capacity & Energy in New England

**Summer Capacity: 30,940 MW**

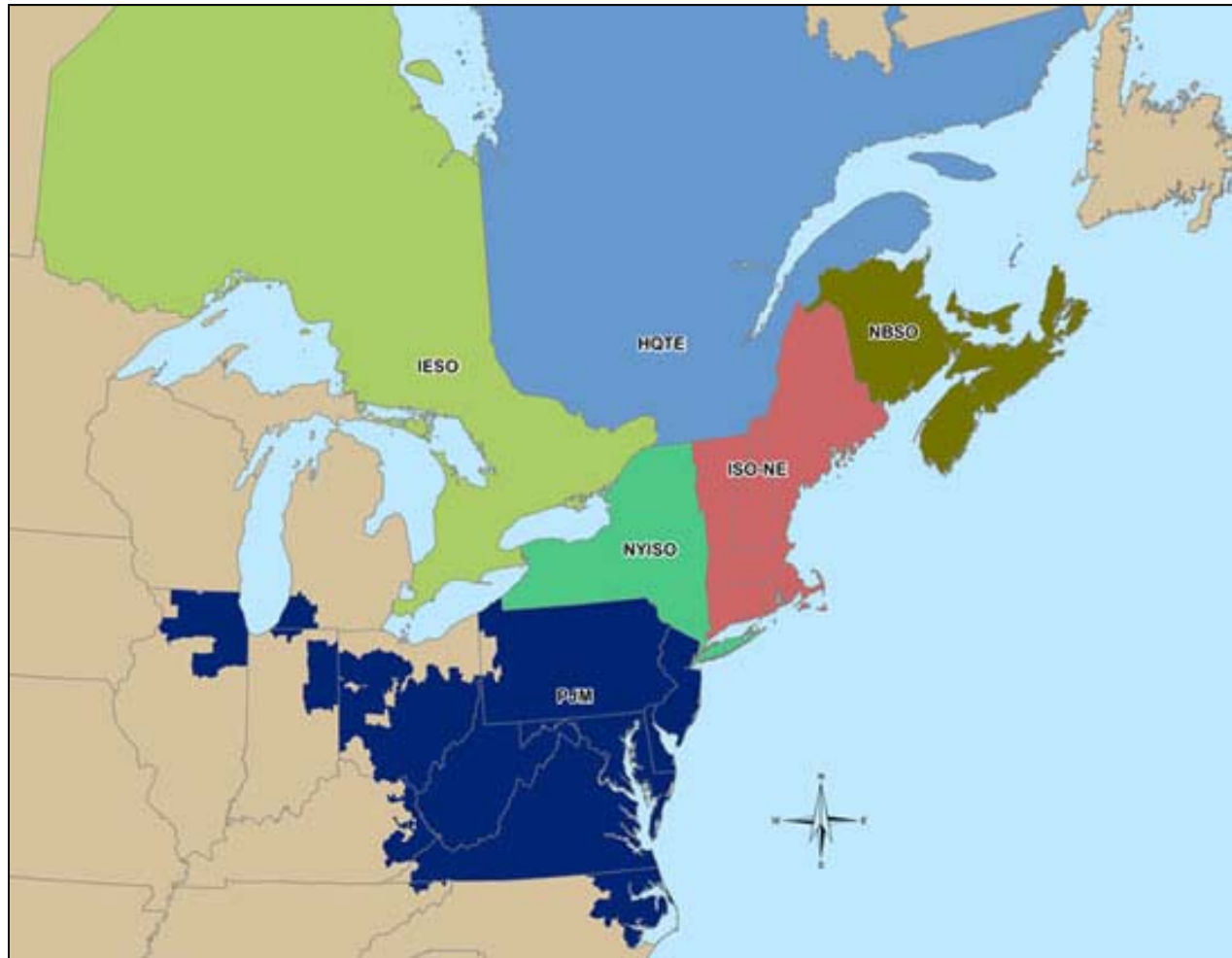


**Energy: 138,195 GWh**



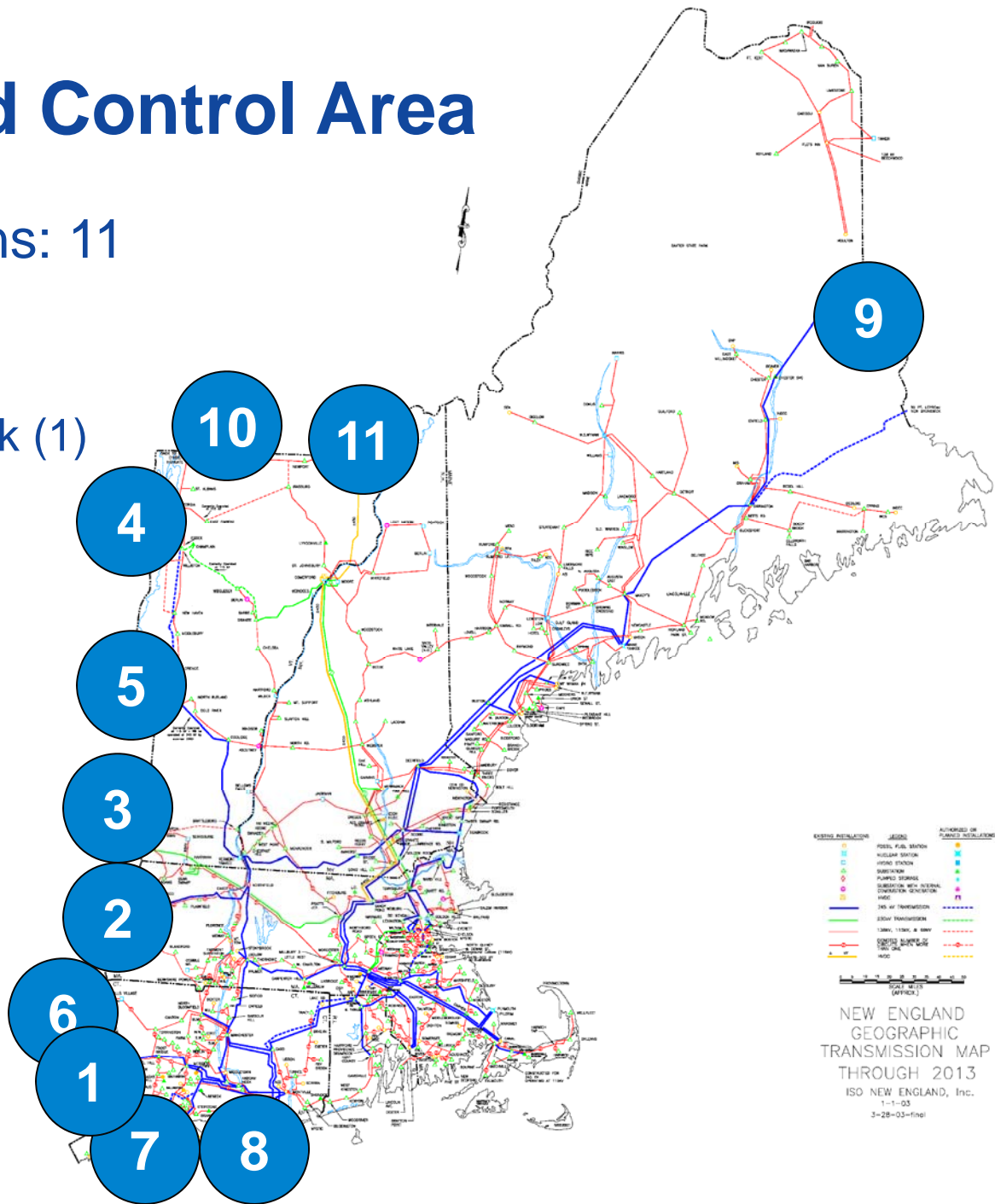
Note: Units in the "Misc." category include Other Renewables (biomass, landfill gas, refuse and wind) and Settlement Only Generators. Energy includes pumping energy.

# ISO New England's Interconnected World



# New England Control Area

- Interconnections: 11
  - New York (8)
  - Québec (2)
  - New Brunswick (1)



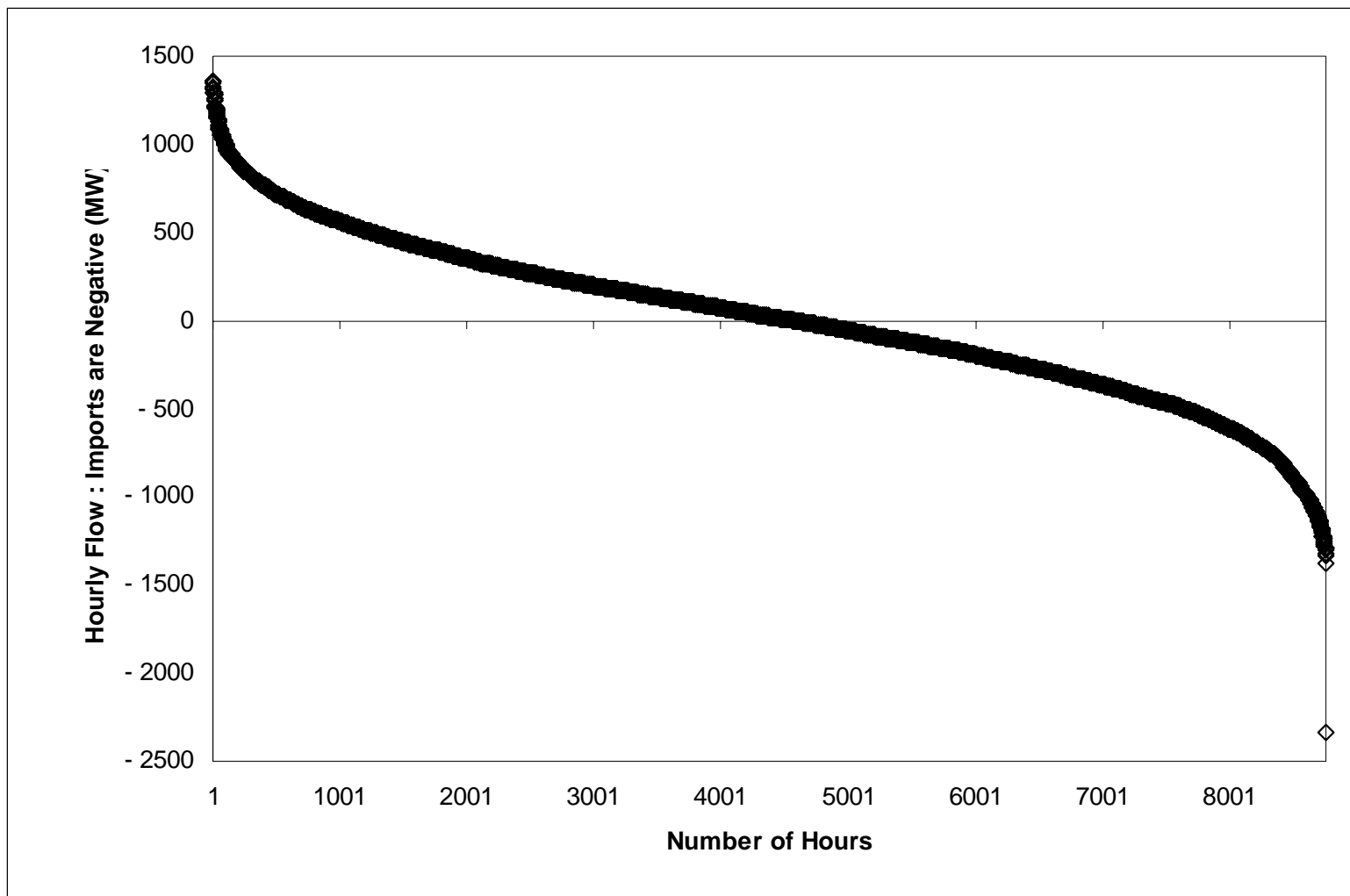


# ISO New England External Transfer Limits

Map Number	Interface	Transfer Limit – MW
9	New Brunswick	700 (1,000 in 2008)
11	Hydro Quebec Comerford/Sandy Pond	1200 – 2000 (Varies with System Conditions)
10	Hydro Quebec – Highgate	200
1 – 7	New York w/o Cross Sound Cable	1175/1150 (in/out)
8	Cross Sound Cable	346/330 (in/out)

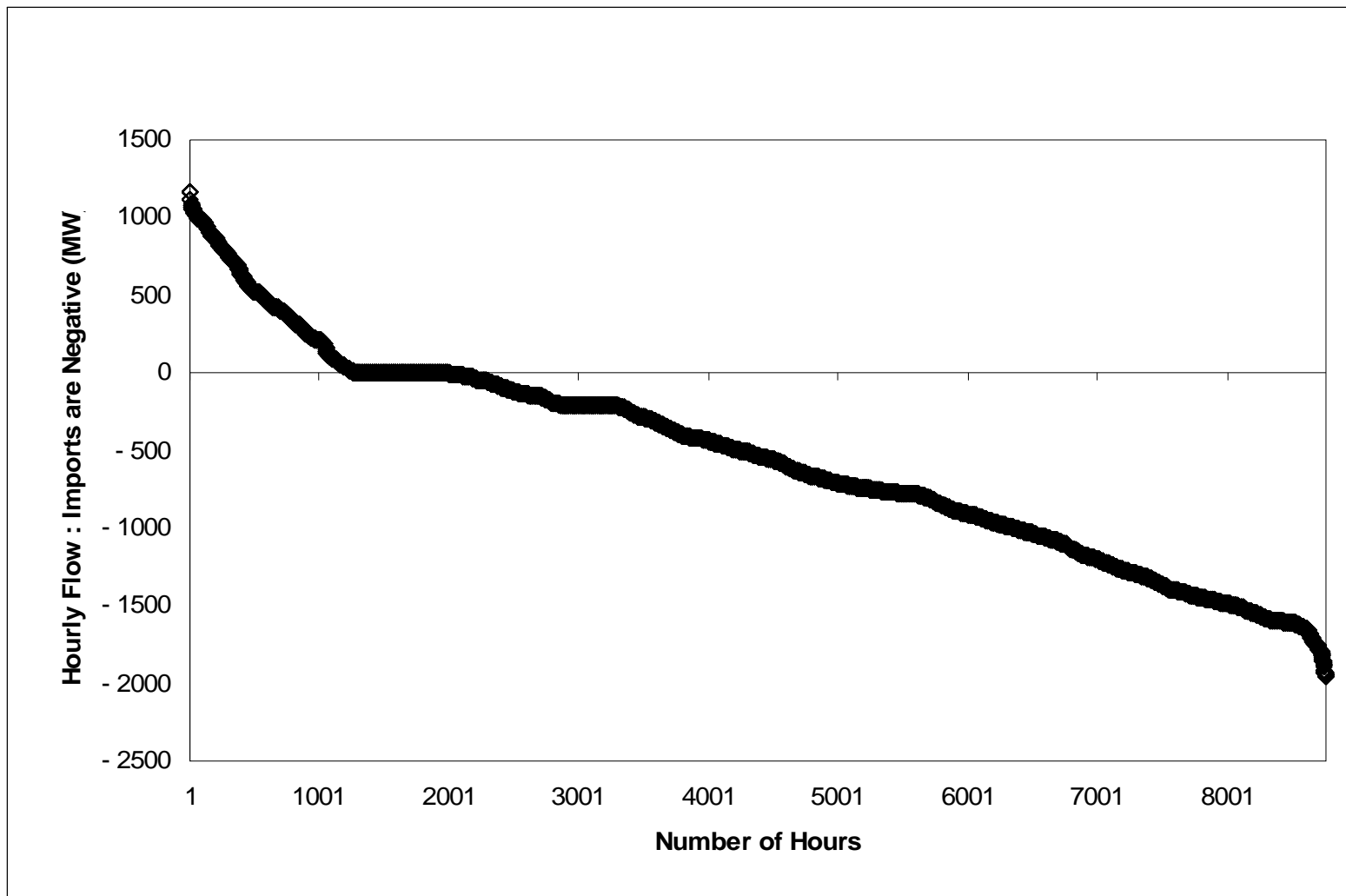
# New England - New York

## Net Tie Flows – 2005



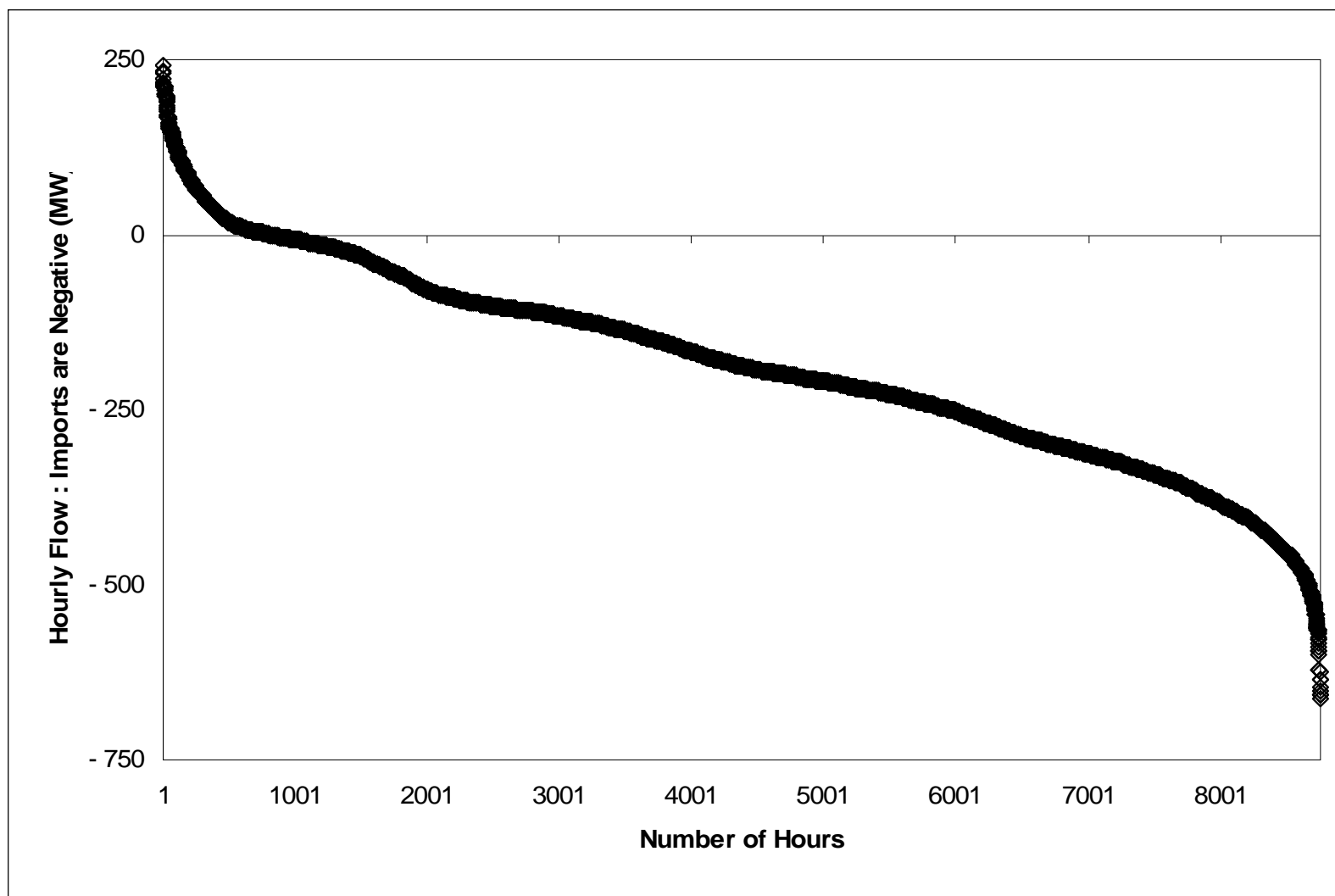
# New England - Hydro Quebec

## Tie Flows – 2005



# New England - New Brunswick

## Tie Flows – 2005



# Seven RGGI States and NE Generation



State	Total Gen MW	RGGI Gen MW
ME	3,268	2,466
NH	4,055	2,158
VT	827	107
MA	12,138	0
RI	3,147	0
CT	7,506	4,800
<b>Total</b>	<b>30,941</b>	<b>9,531</b>

# RGGI State CO<sub>2</sub> Caps (Allowances)

State	CO <sub>2</sub> Cap Million (Short) Tons	26.5
Connecticut	10.70	
Maine	5.95	
New Hampshire	8.62	
Vermont	1.23	
New York	64.31	
New Jersey	22.89	
Delaware	7.56	26.5
<b>Total</b>	<b>121.25</b>	

# Typical Generator Emission Cost Adders: SO<sub>2</sub>, NO<sub>x</sub> and CO<sub>2</sub>

CO<sub>2</sub> allowance cost does not appear to change  
the relative dispatch order of typical fossil plants

New  
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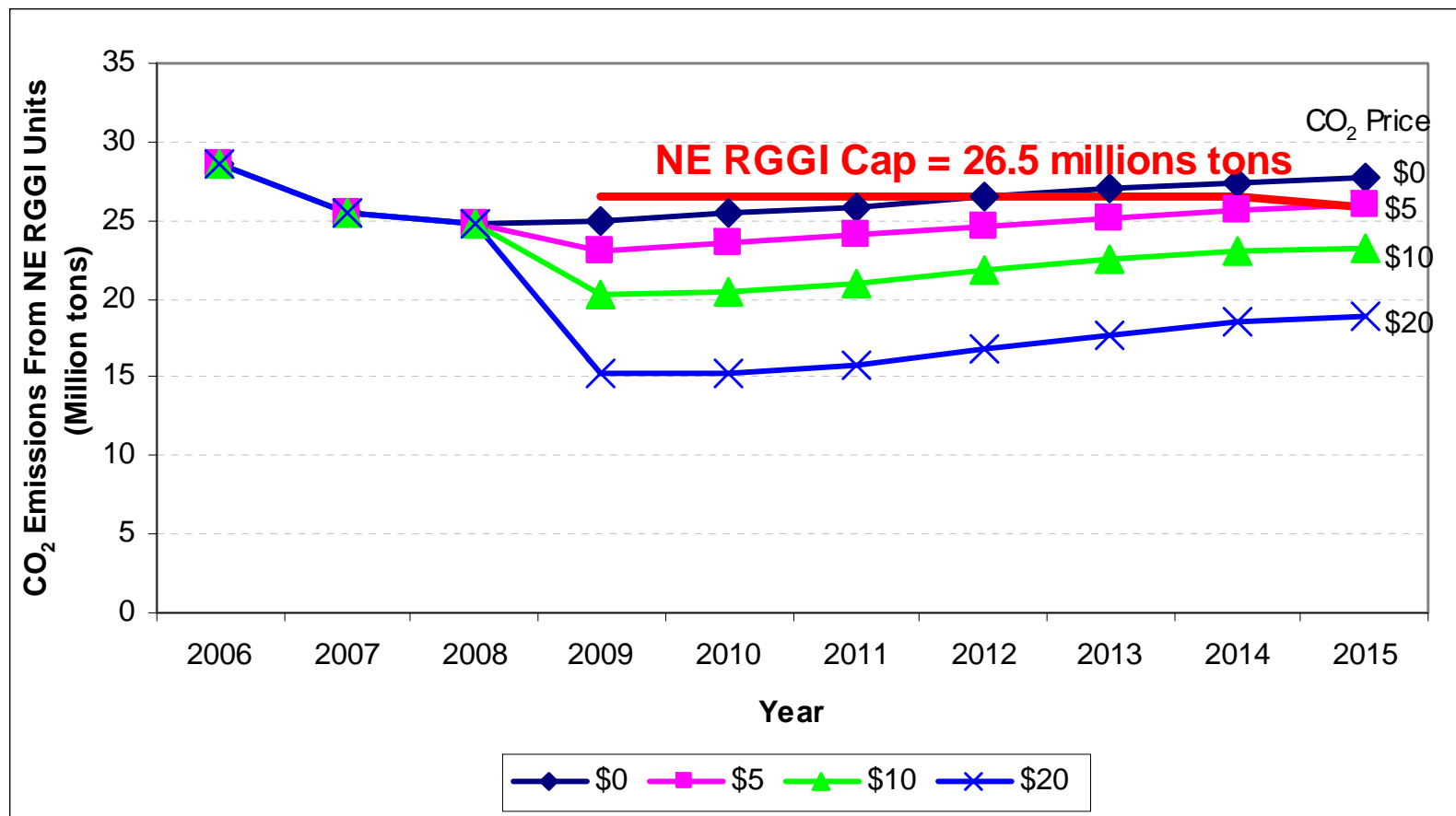
Typical Plant	Fuel Cost (\$/MMBtu)	Heat Rate (Btu/kWh)	CO2 Content (Lb/Btu)	CO2 Allowance Price (\$/ton)	Costs \$/MWh					
					Fuel	SO <sub>2</sub>	NO <sub>x</sub>	CO <sub>2</sub>	Total w/o CO <sub>2</sub>	Total w/ CO <sub>2</sub>
Combined Cycle – Gas	7.00	7,000	120	5	49.0	0.0	0.1	2.1	49.1	51.2
Peaking Steam – Oil	7.00	10,500	160	5	73.5	11.5	4.4	4.2	89.4	93.6
Base Load Steam – Coal	2.25	8,889	210	5	20.0	4.7	4.4	4.7	29.1	33.8

Fuel Prices (\$/MBtu): Gas & Oil 7; Coal 2.25

Allowance prices (\$/ton): SO<sub>2</sub> 1,085; NO<sub>x</sub> 2,800; CO<sub>2</sub> 10

# ISO New England RGGI Study Results Vary Allowance Prices

New England RGGI Units CO<sub>2</sub> Emissions vs. CO<sub>2</sub> Allowance Price  
Assumes No Resource Additions and Allows Leakage

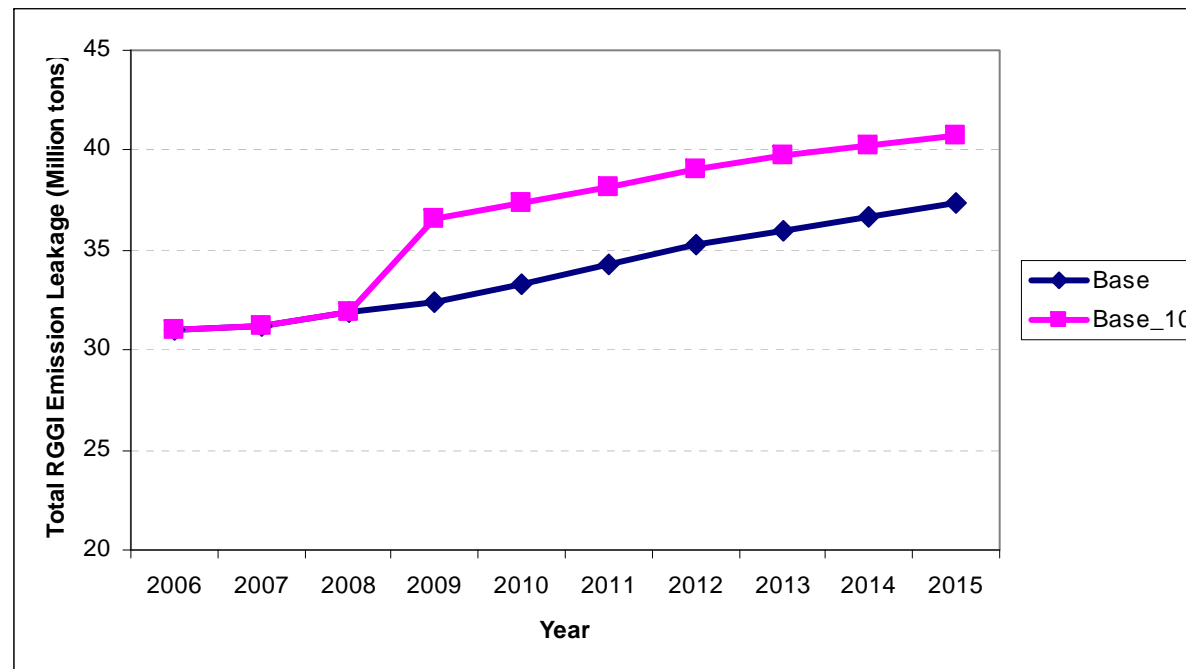




# ISO New England RGGI Study Results

## Leakage

- Leakage: CO<sub>2</sub> emissions from small units in RGGI States and units in non-RGGI States
- For an allowance cost of \$10/ton, the RGGI cap causes total CO<sub>2</sub> leakage in 2015 from non-RGGI units in New England of over 3 million tons

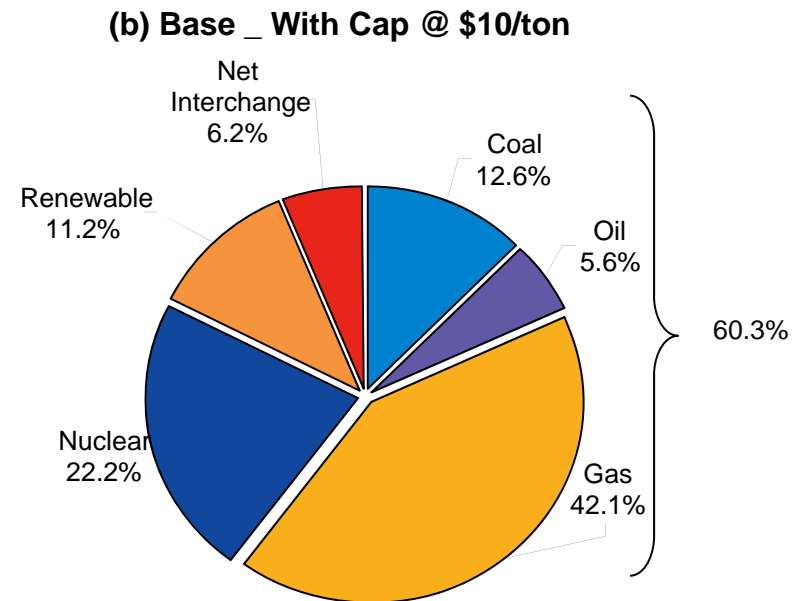
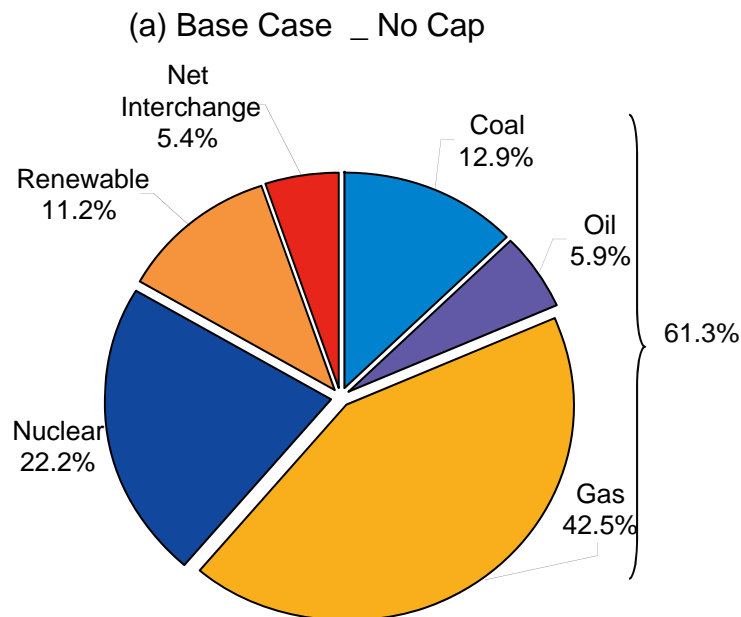


# ISO New England RGGI Study Results

## New England's Sources of Energy

- Assuming \$0 cost for CO<sub>2</sub> produced by imports and non-RGGI units
- HQ and NB modeled as price sensitive sources
- RGGI cap increases the imports and decreases the percentage of fossil fuel usage — coal, oil, and gas

**Energy Production for All New England Generators – 2015**



# ISO New England RGGI Study Results

## Leakage

- ISO New England Study shows CO<sub>2</sub> leakage in MA and RI increases by 3.4 million tons at an allowance price of \$10/ton.
- With RGGI cap, net CO<sub>2</sub> reduction in all of NE is about 1 million tons
- Net Energy Interchange increases from 5.4% to 6.2%

# ISO New England Comments on Leakage

- ISO New England cannot determine the emissions of imported power from non-RGGI regions
- Leakage mechanisms should recognize non-RGGI CO<sub>2</sub> regulations
  - Allow leakage from Canada and MA?
  - Allow RPS imports?
- A practical solution is to use average system emission rates times energy from the importing area

# ISO New England Comments on Leakage

(cont.)

- Leakage controls should not affect power flows so as to impede electric system reliability and market efficiency
- Leakage controls could be done through financial mechanisms, e.g., allowances to cover emissions
- RGGI should use existing ISO/RTO information and settlement systems