Air Pollution Policy:

Czech Republic vs. New York City

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Why the Czech Republic & NYC?

- Similar Population Sizes
  - New York: 8.6 million
  - Czech Republic: 10.6 million

- We are able to compare city regulations of New York to the national regulations of the Czech Republic

Czech Republic: **Global Regulation**

- Regulation began with the Kyoto Protocol, which mandated an 8% reduction in annual emissions
- Adopted in 1997, enforced in 2005, first commitment period was from 2008-2012

Table 1
The Czech Republic's total greenhouse gas emissions, initial assigned amount, base year emissions and quantified emission limitation or reduction commitment for the first commitment period of the Kyoto Protocol

Key parameters	*Values*
Total greenhouse gas emissions in the first commitment period (t CO_2 eq)	680 149 966
Assigned amount established in accordance with Article 3, paragraphs 7 and 8, of the Kyoto Protocol (t CO_2 eq)	893 541 801
Base year greenhouse gas emissions[a] (t CO_2 eq)	194 248 218
Quantified emission limitation or reduction commitment for the first commitment period – Annex B (% of base year level)	92.0

Czech Republic: **Global Regulation**

EU ETS

- Phase I (2005-2007)
  - Surplus of allowances into the market → price of allowances went to near-zero
  - Low incentive for efficiency

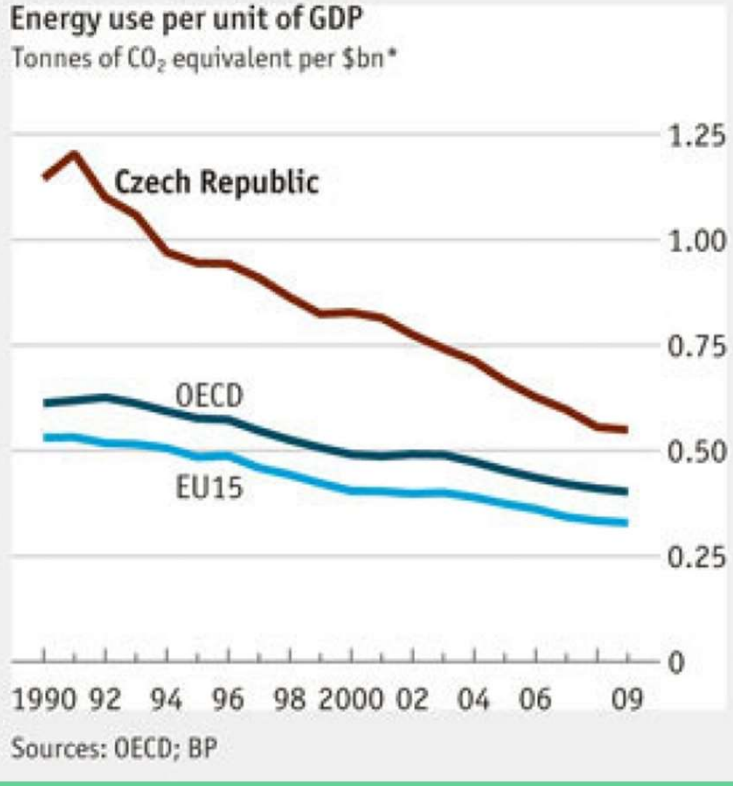
- Phase II (2008-2012)
  - Stronger incentives to improve efficiency
  - Set cap on Kyoto Credits
  - Required budget cuts

Czech Republic: **Emissions**

- Historically, the Czech Republic had been one of the highest emitting countries per capita
- In 1990, emissions of ~16 metric tons CO_2 eq per capita
  - 35% greater than the EU average

Dukovany Nuclear Power Plant, built 1974

Energy in the Czech Republic



Sources: OECD; BP

Czech Republic: **Emissions**

- Greenhouse Gas Emission breakdown:
  - **Energy Sector - 40%**
  - Industry - 32%
  - Transportation - 12%
  - Fossil Fuel Combustion in Buildings - 8%
  - Agriculture - 6%
  - Waste Management - 2%

Temelin Power plant, Built 1981

Czech Republic: **Local Regulation**

Peaceful Utilisation of Nuclear Energy and Ionising Radiation (The Atomic Act 1997)

This Act regulates:

a) the method of utilising nuclear energy and ionising radiation, and conditions for the performance of practices related to nuclear energy utilisation and radiation activities;

b) the system for protection of people and the environment from undesirable effects of ionising radiation;

c) obligations during preparation for and implementation of intervention intended to reduce exposures to natural sources and exposures due to radiation accidents;

d) specific requirements for civil liability in the case of nuclear damage,

e) conditions for safe management of radioactive waste;

f) performance of State administration and supervision within nuclear energy utilisation, within radiation activities and over nuclear items.

Czech Republic: **Local Regulation**

National Emission Reduction Program (2007)

4. Targets of the Program

The global target of the Program consists in reduction, with emphasis on promotion of new environmentally friendly technologies and utilization of potential energy savings, **burdening of the environment** by substances damaging ecosystems and vegetation **and creation of preconditions for recovery of the affected components** of the environment **and for reducing risks for human health** following from air pollution, and thus to contribute to implementation of the strategic targets of the Environmental Pillars of the Strategy of Sustainable Development in the Czech Republic.

Specific targets of the Program are as follows:

- by a certain deadline (2010), attain the set values of the national emission ceilings for sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia,
- contribute to reduction of air pollution by PM_{10} below the valid pollution limit values,
- contribute to reduction of the level of air pollution by benzo(a)pyrene below the valid target pollution limit value.

Czech Republic: **Local Regulation**

National Emission Reduction Program (2007)

- "**more than 90% of the operators of air pollution sources have no difficulties in complying with emission limits**"
  - 400/4500 given fines

- "current legislative requirements on air pollution sources is not sufficient to ensure general compliance with all the set permissible levels of air pollution. These levels are substantially exceeded particularly for **PM10 and benzo(a)pyrene.**"

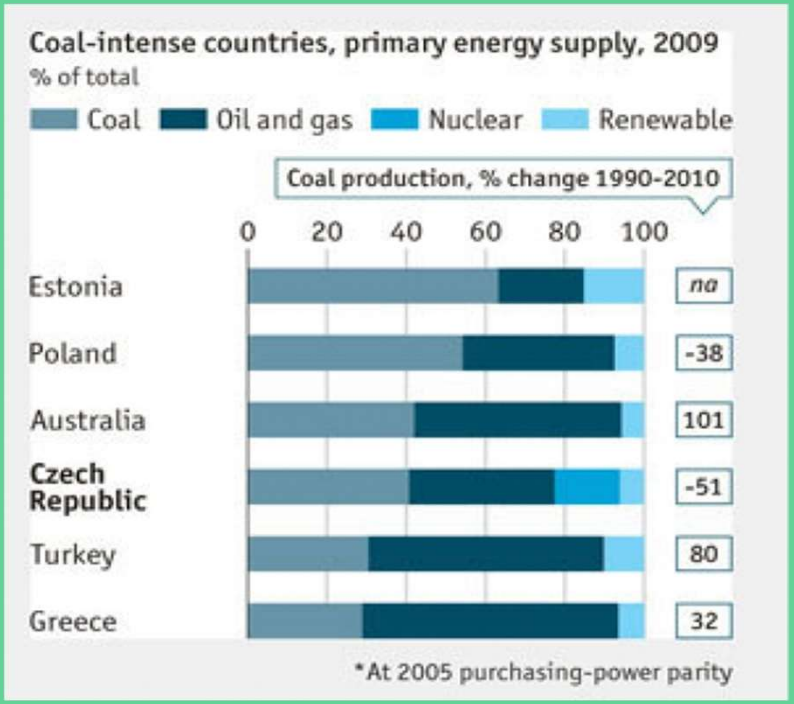
Czech Republic: **Local Regulation**

Climate Protection Policy of the Czech Republic (2009)

- Primary Targets:
  - developing the combined heat and power generation (CHP),
  - **increasing the primary energy sources efficiency,**
  - use of renewable energy sources for electricity, heat and CHP production,
  - **construction of combined cycle gas turbine (CCGT) power plants,**
  - **increasing the energy effectivity of buildings,**
  - **increased use of wood in the building industry,**
  - reducing of energy intensity of industry – heat, electricity,
  - changes in the fuel mix,
  - **better transportation planning and management,**
  - **development of environmentally friendly transportation with the emphasis on transport in cities,**
  - reduction of methane production in livestock breeding and capturing gas from biomass fermentation processes,
  - improving functioning of agricultural land as a carbon sink – increasing absorption capacity for storing carbon in the soil.

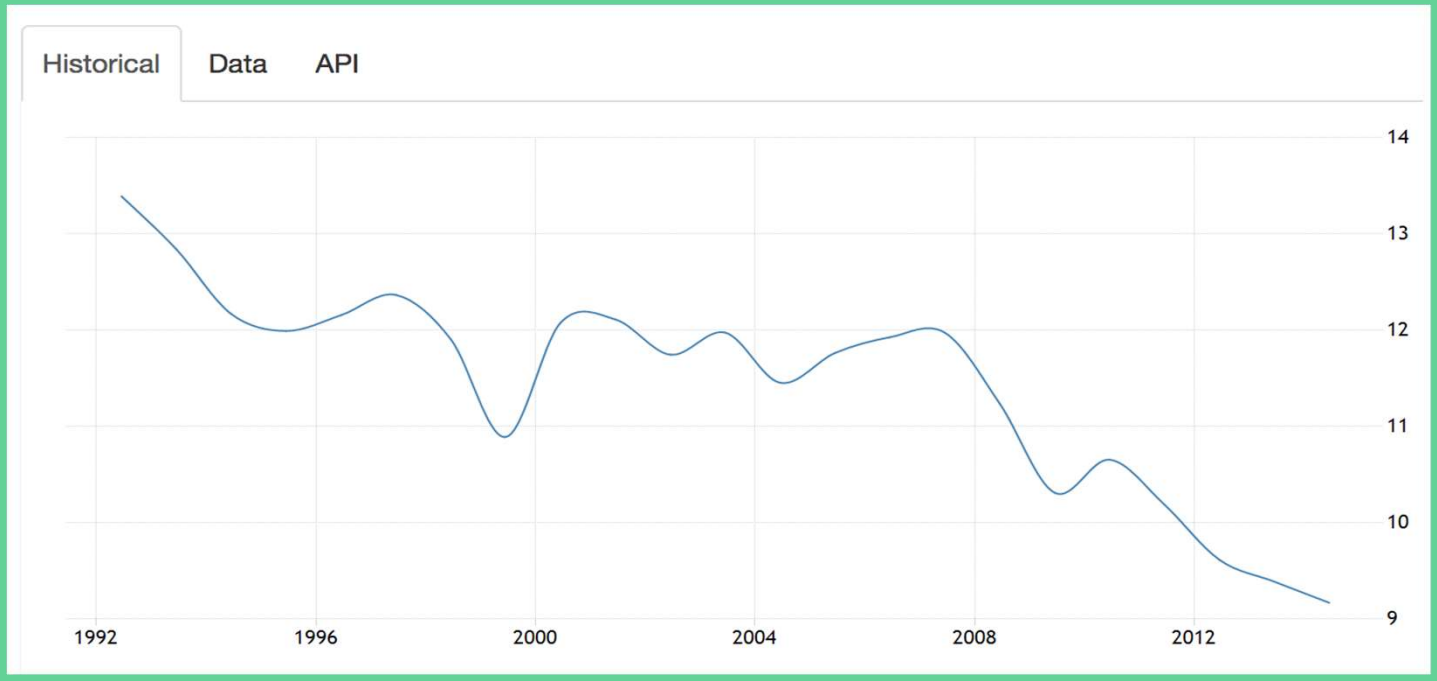
Czech Republic: **Results**

- Policies proved to be successful in:
  - Reducing Emissions
    - Reduction of over 30% vs. Kyoto requirement of 8%
  - Shifting the dynamic of the energy sector
    - Coal → nuclear



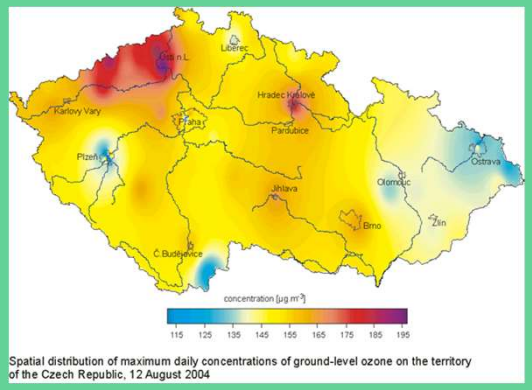
Czech Republic: **Results**

CO2 eq emissions (metric tons per capita)



Czech Republic: **Other Problems/Concerns**

- Health Concerns
  - In 2013, 55% of Czechs were still being exposed to above-average levels of the toxic chemical Benzopyrene
  - Heating plants were found to account for 41% of dangerous PM10 particulate matter being inhaled by Czechs
  - ~1,600 people died from conditions derived from bad air quality



Spatial distribution of maximum daily concentrations of ground-level ozone on the territory of the Czech Republic, 12 August 2004

Czech Republic: **Other Problems/Concerns**

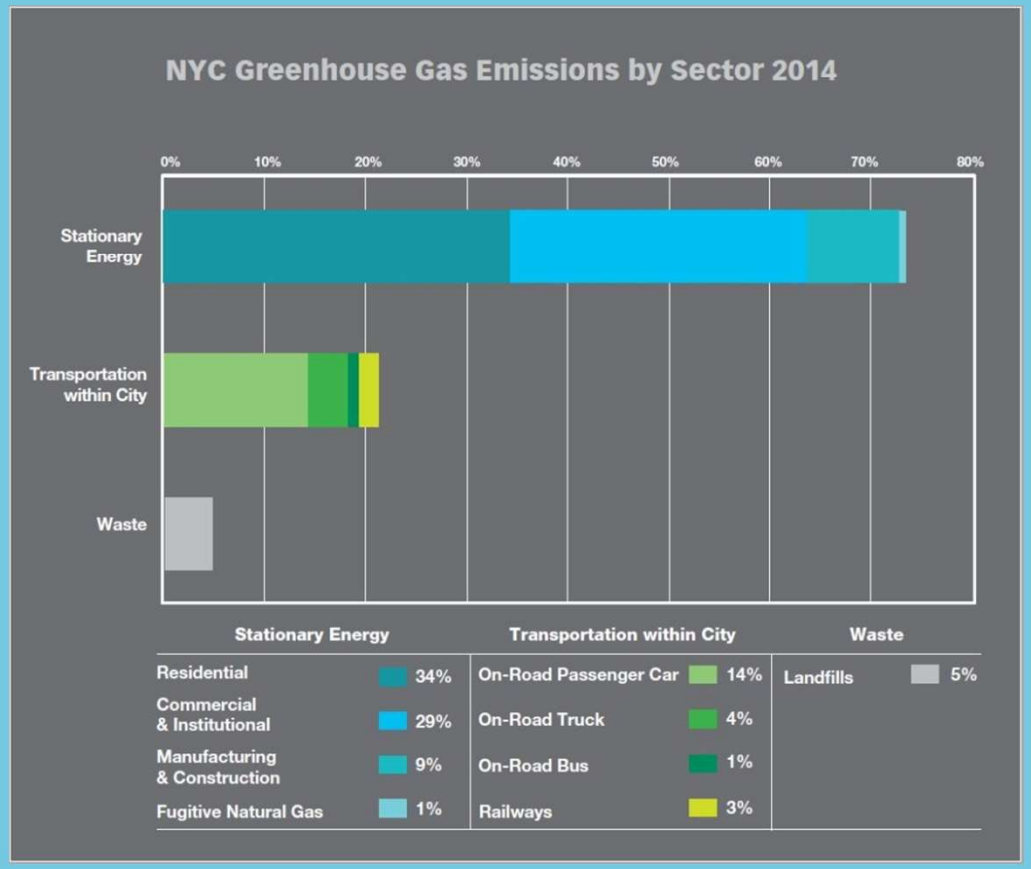
- Fixing the Wrong Problem?
  - Vojtěch Kotecký , Czech environmental analyst says the problem is not from emissions but from meteorological conditions
  - “The biggest problem… is suspended particles and benzopyrenes. They come most from localised heating of households, from traffic and partly from energy plants and other industrial sources”
  - Problem could not be fixed until Air Protection Act of 2012, which mandates households to have new boilers by 2022
    - Plans on innovative new boilers to heat homes by burning biomass

New York: **Air Quality**

Goal: reduce greenhouse gas emissions by 30% by 2030

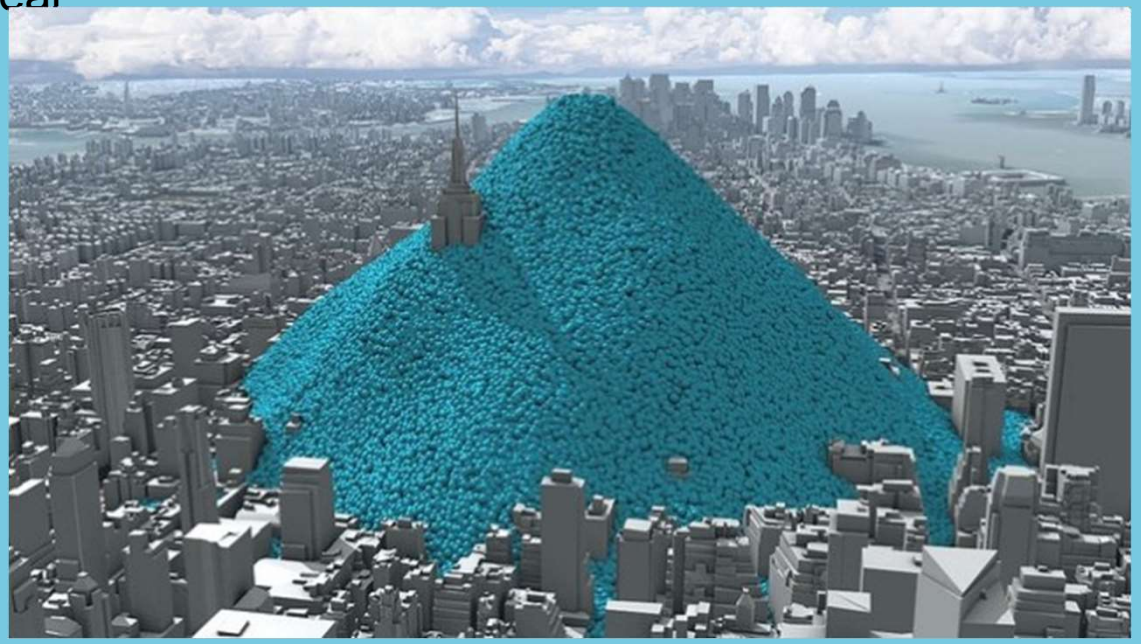
Method:

1. Avoid urban sprawl (car dependency) by improving public works
2. Improve the City's electricity supply
3. Reduce energy consumption in buildings
    a. Currently, buildings account for 69% of the City's emissions, compared to 32% nationally
4. Enhance New York City's transportation systems
    a. Roughly 25% of the City's emissions come from transportation, 70% of that is from private vehicles.


NYC Greenhouse Gas Emissions by Sector 2014
0%
10%
20%
30%
40%
50%
60%
70%
80%
Stationary Energy
Transportation within City
Waste
Stationary Energy
Residential 34%
Commercial & Institutional 29%
Manufacturing & Construction 9%
Fugitive Natural Gas 1%
Transportation within City
On-Road Passenger Car 14%
On-Road Truck 4%
On-Road Bus 1%
Railways 3%
Waste
Landfills 5%

New York: **Air Quality**

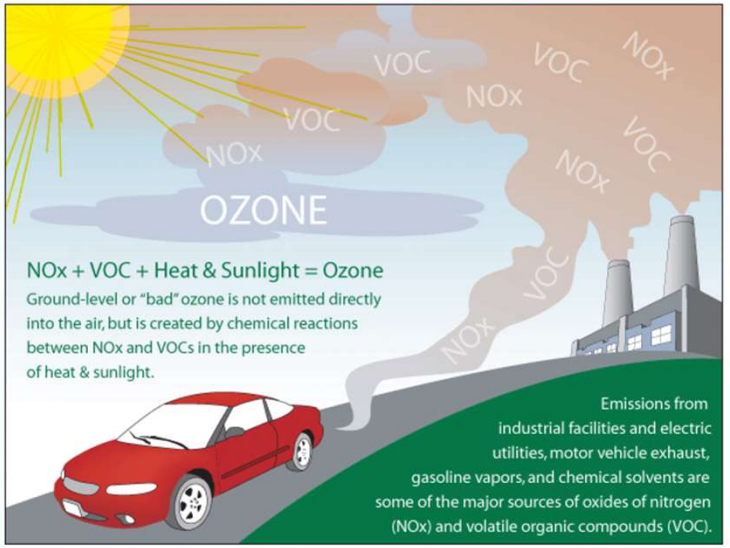
Potential Results: prevent over 300 premature deaths and over 700 emergency department visits and hospitalizations for respiratory or cardiovascular causes each year



NYC emitted over 54 million tons of CO_2 in 2010. To imagine this number, every sphere here represents 1 ton of CO_2 at the average surface temperature and pressure.

New York: **Ground Level Ozone**

- Harmful effects on both people's health and the environment
  - Damages a person's respiratory system
  - Damages foliage during growing season
- Public health officials advise to avoid outdoor activity during problem times
  - Spring & Summer during the day time



New York: **Ground Level Ozone**

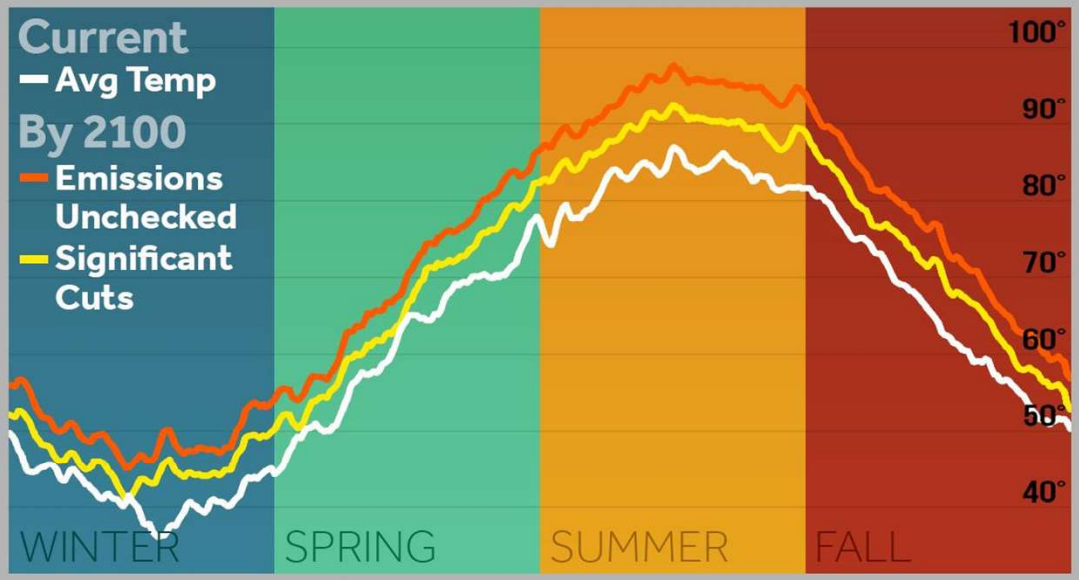
- Each individual can help
  - Decrease car usage
  - Use safe paints and cleaning products
  - Conserve electricity
- NY government submitted revision to amend Ozone season trading program
  - Allow DEC to allocate CSAPR allowances to regulated entities in NY
- NYC not always up to the national standard
  - NY DEC requested non-attainment for the new EPA 8-hour standard of .07 parts per million

New York: **Biofuel Sustainability**

- Renewable clean-burning diesel replacement fuel made from mix of resources
- Reduces carbon emissions, and other harmful pollutants making NYC's air healthier to breathe
- Sept 28th 2016: Legislation passed that will displace 20% of heating oil sold within NYC with biofuel by 2034
- Current 2% level to 5% Oct 1 2017, 10% in 2025, 15% in 2030, 20% in 2034
- The increase to 20% is the equivalent to taking more than 250,000 cars off the road

Today's Emissions, Tomorrow's Warming

New York City



Year of Average High Temperatures

20-year average of daily maximum temperature

Source: Projections RCP 4.5 & 8.5 - CMIP5, Oak Ridge National Lab; Current - ACIS.org

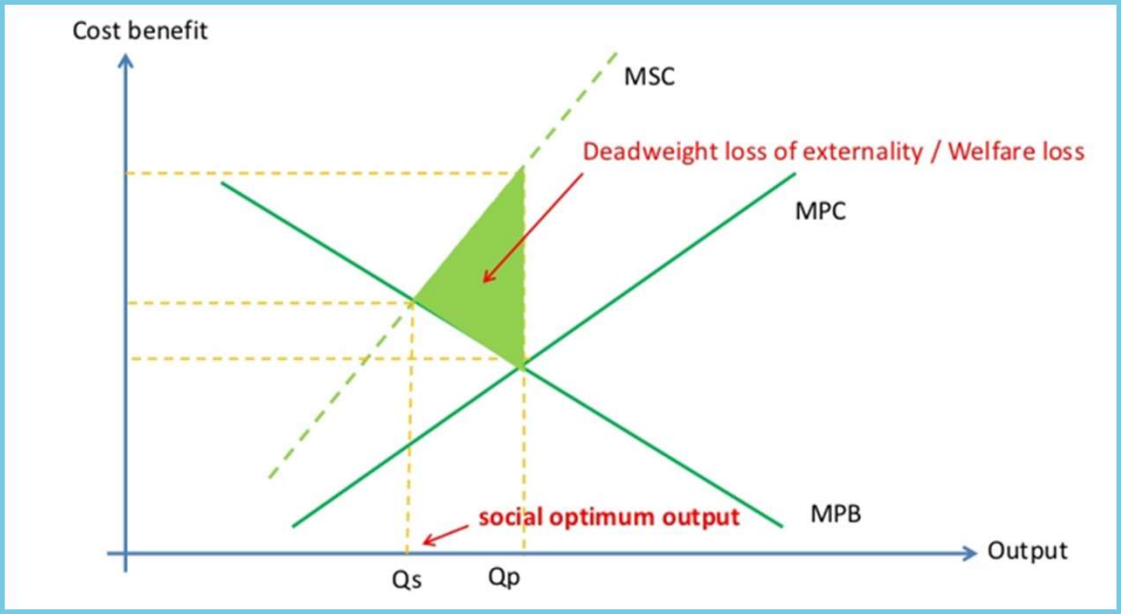
CLIMATE CENTRAL

New York: **Air Code Penalty Schedule**

- Part of the Schedule below shows increasing cost per violation

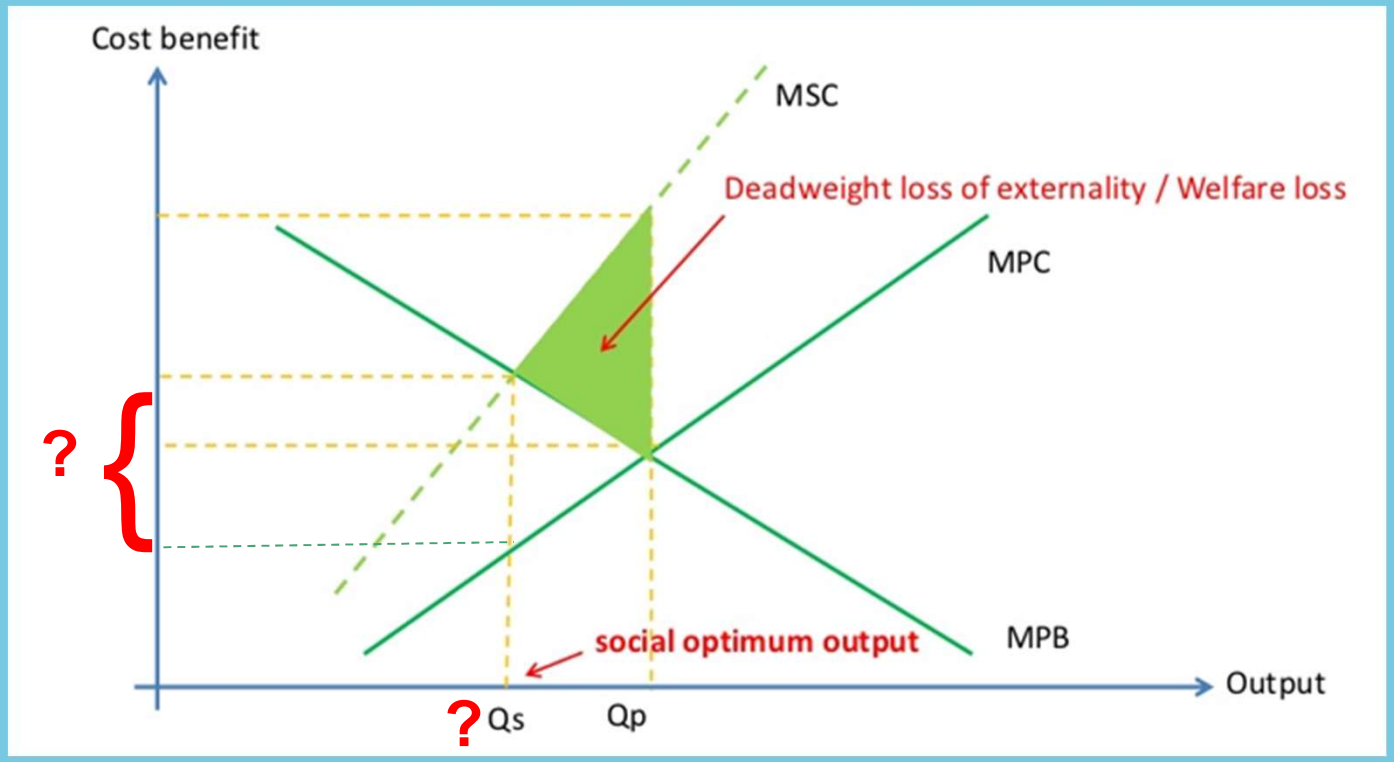
Section	Description	1st Offense	1st Stipulation	2nd / 3rd & Subsquent Offense	2nd / 3rd & Subsquent Stipulation	Default
24-146(a)	Particulate matter allowed to become airborne	700	700	1,085	1,085	1,750
24-146(b)	Asbestos spraying w/out permit	4,800	No	7,440	No	12,000
24-146(c)	Particulate emissions from construction activity	700	700	1,085	1,085	1,750
24-146(d)	Particulate emissions from untreated open areas	560	560	870	870	1,400
24-146(e)	Spraying of insulation material w/o proper required precaution	700	700	870	870	1,750
24-146(f)	Failure to take required precautions during demolition	1,200	1,200	1,860	1,860	3,000
24-147	Emission of air contaminant nitrogen oxides from boiler	1,400	1,400	2,170	2,170	3,500

New York: **Economic Approach**



- New York penalty schedule shows increasing marginal harm
- Realistic economic approach to pollution
- However, how did they decide the fine amount?

New York: **Economic Approach**



Conclusions

- New York has historically been better about keeping emissions (per capita) low and enforcing regulations
  - Providing stronger incentives with monetary fines to reduce GHG's
- Going forward, the Czech Republic has better policies in place in terms of incentivizing efficient technologies