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AERIS

AERIS: The Policy Context for Air Pollutants and Greenhouse Gases

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What are the Emissions of Concern?

Criteria Pollutants

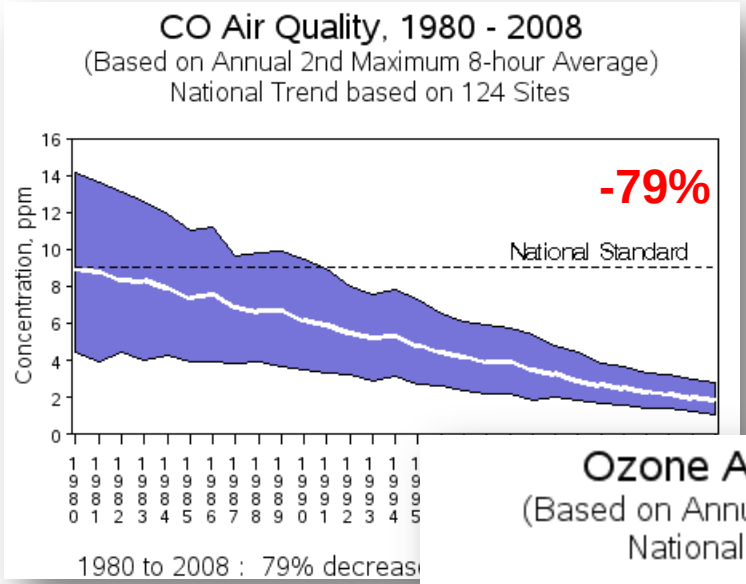
- Ozone (NOx & VOCs), Particulate Matter, Carbon Monoxide (CO)

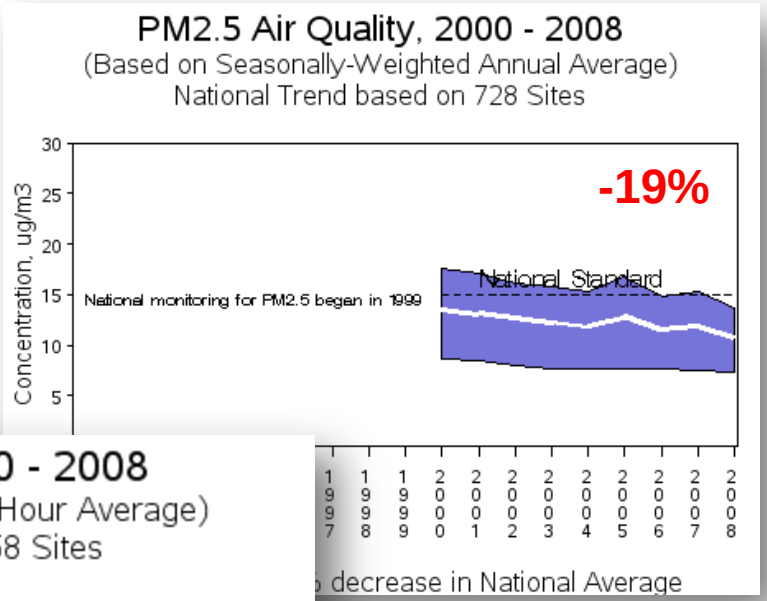
Air Toxics

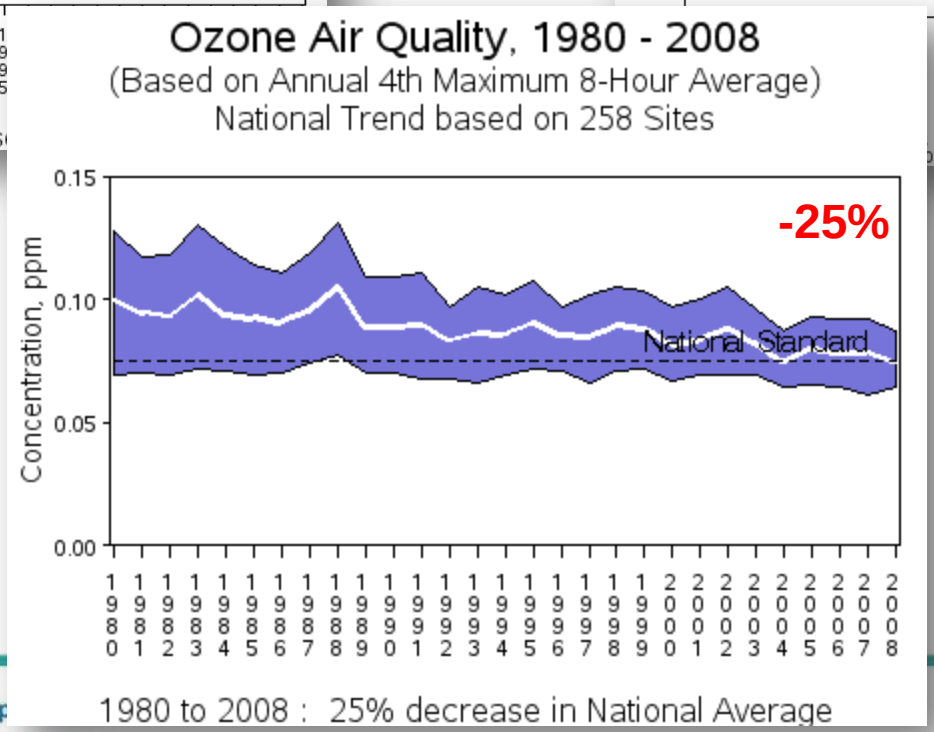
- Diesel Particulate Matter, Benzene, Acetaldehyde, Butadiene, Formaldehyde, Acrolein, Naphthalene, Polycyclic Organic Matter

Greenhouse Gases

Criteria Pollutants are Declining







Characteristics of Criteria Pollutants

Geographic scale

- Microscale (“hotspots”)
- Regional (“metropolitan”)

Time Frame

- Duration of events – hours to days
- 20-Year Planning horizon

Climate Impacts are Significant

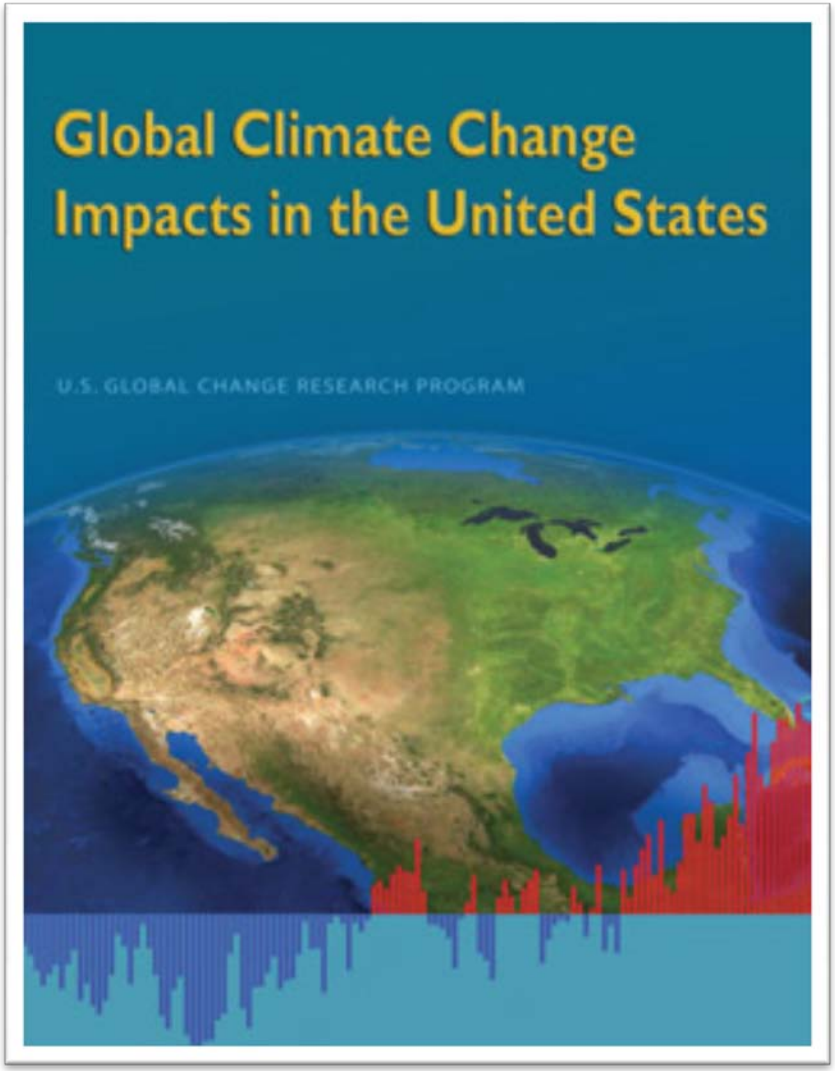
Average global temperature to rise 2 to 11.5 degrees Fahrenheit by 2100

Sea-level to rise 3-4 feet by 2100

Impacts in US:

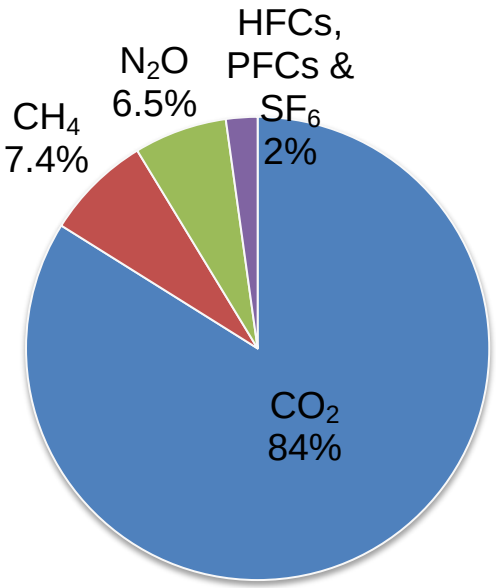
- Increase in severity of storms, draughts, floods, heat waves

Widespread climate impacts are occurring now and expected to increase

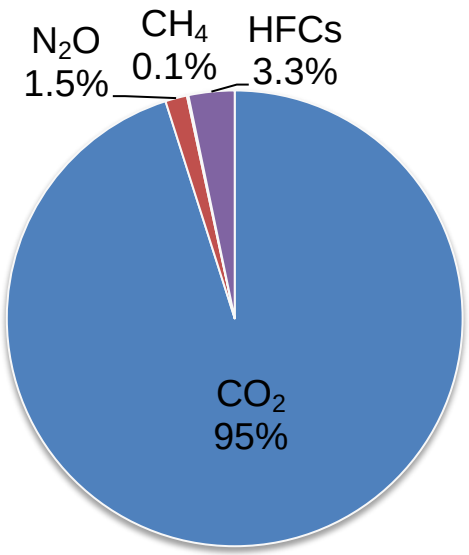


CO2 is the Predominant Greenhouse Gas (GHG)

All U.S. Sources



Transportation



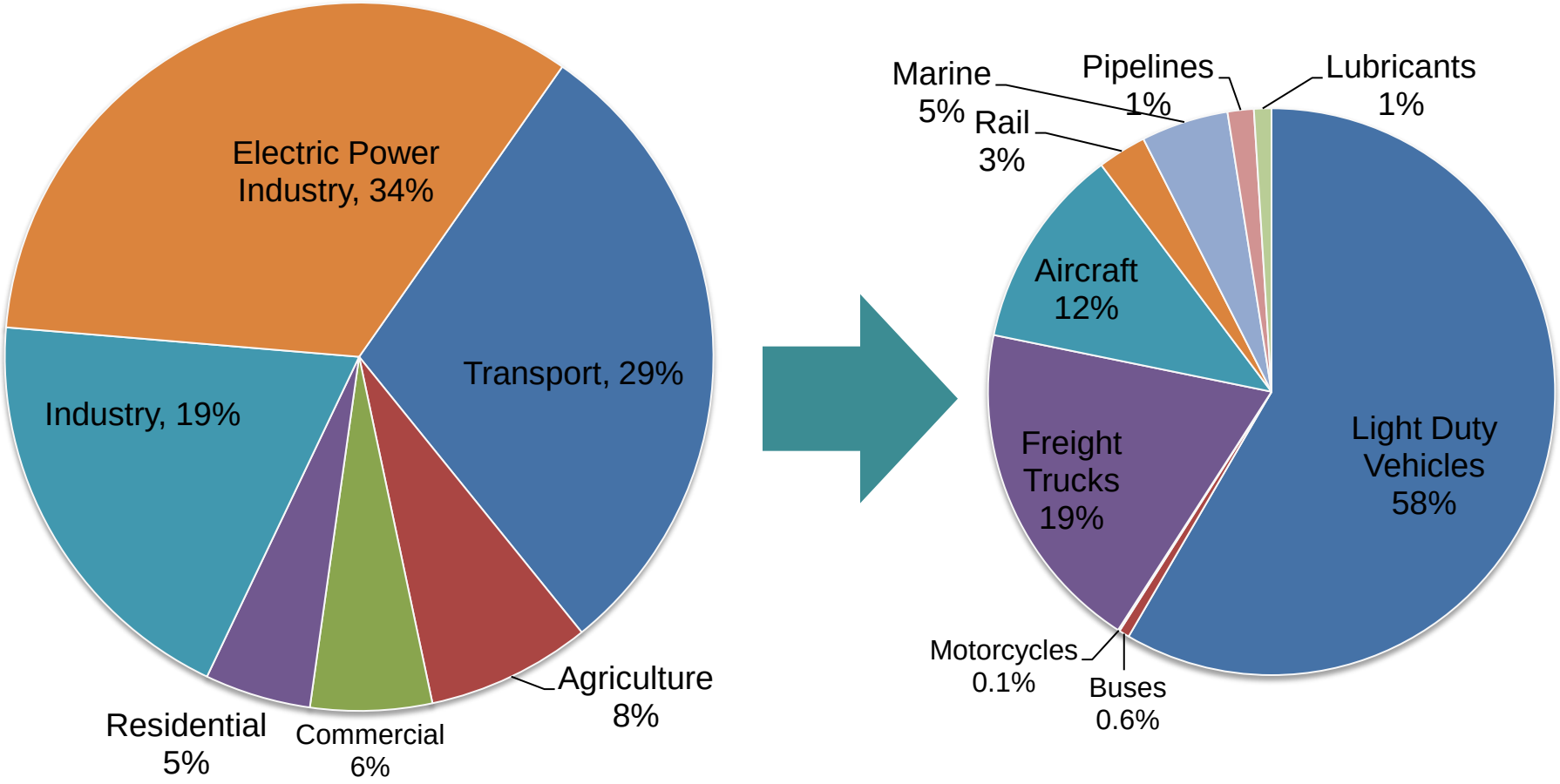
Weighted by Global Warming Potential (GWP)

Not Included in Official Inventories:

Tropospheric Ozone Black Carbon

Source: EPA. *Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990 to 2006.* 2008.

On Road Sources are the Largest Share



Source: EPA. *Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990 to 2006.* 2008.
Note: Above figures include international bunker fuels purchased in the U.S.

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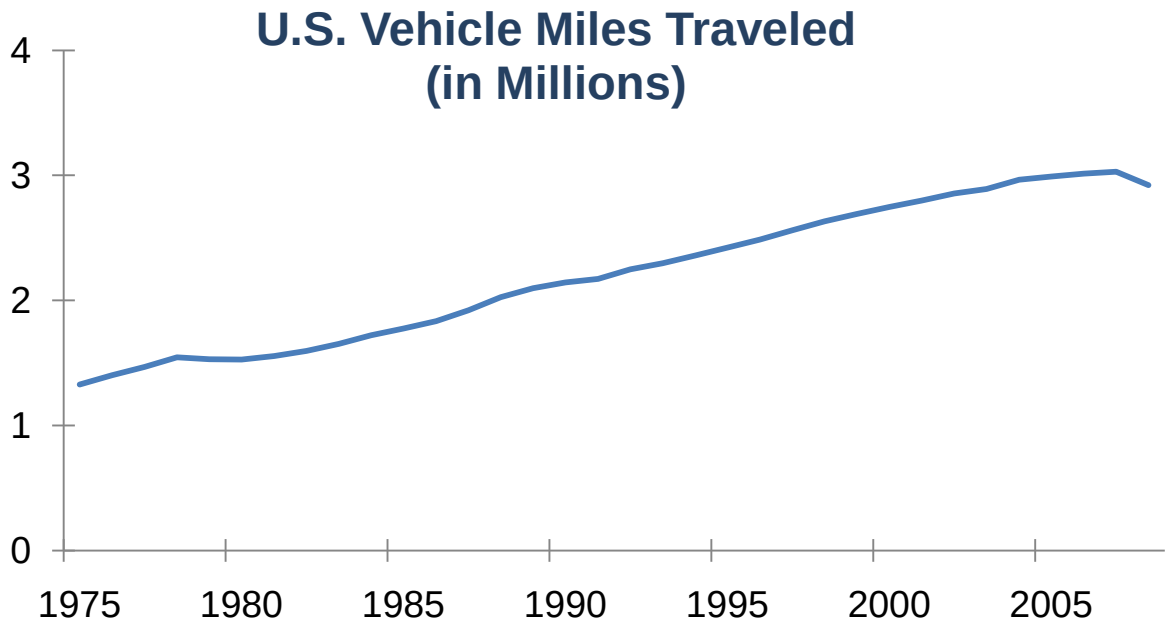
GHG Emissions Trends: 1990-2006

Light duty emissions have increased by 24%

But emissions from freight trucks have increased 77%



Source: Bureau of Transportation Statistics. National Transportation Statistics.

Characteristics of GHGs

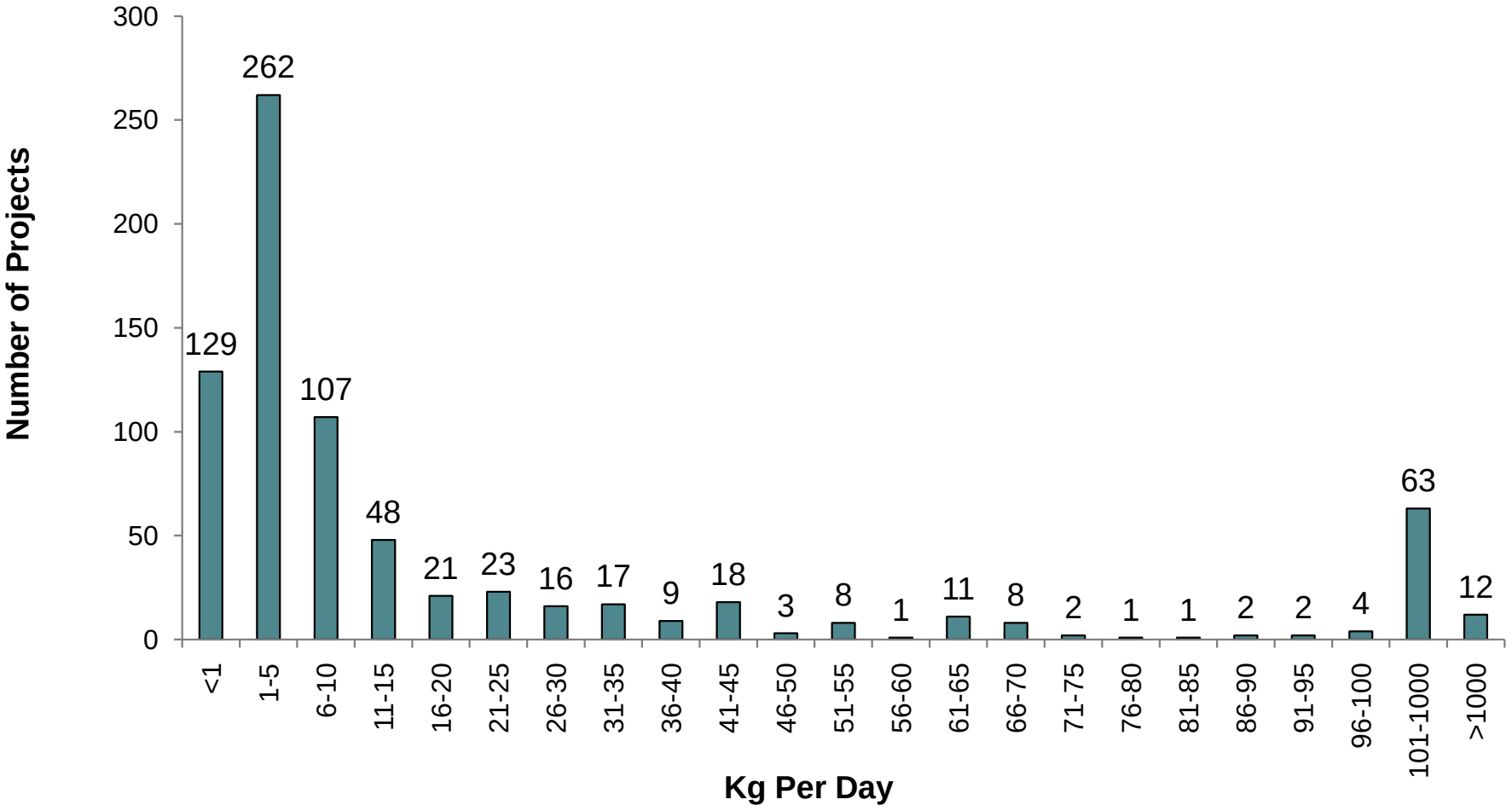
Geographic Scale

- Global, but national “targets”

Time Frame

- Cumulative process, CO2 stays in the atmosphere ~ 100 years
- Major climate change effects realized over 50 – 100 year period
- But “short” (e.g. 10-15 year) term reductions needed

What do we know? Typical emissions benefits (VOC) under CMAQ are small



Results from *Moving Cooler*

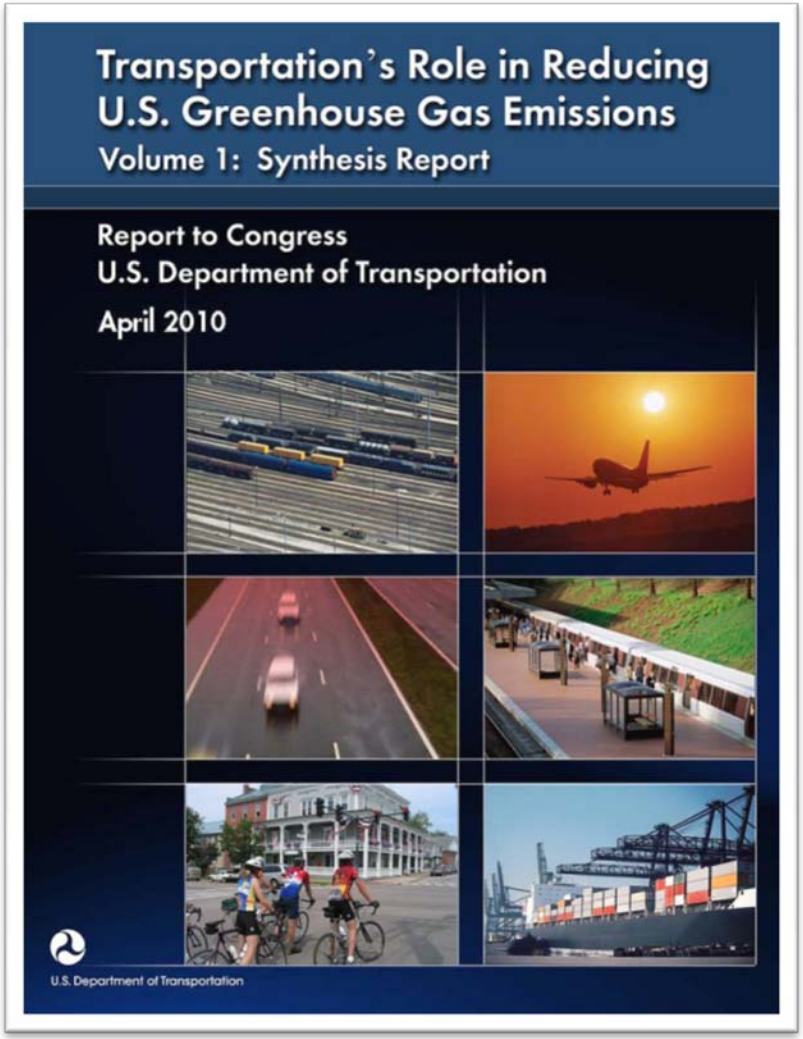
	2030 GHG Reduction	Key Assumptions
Traffic management	<0.1-0.5%	Signal coordination, faster clearance of incidents, ramp metering
Real-time traveler information	<0.1%	Electronic message boards, 511, web
Cumulative TSM strategies	0.6%	

US DOT Report to Congress, 2010

Optimize design, construction, operation, and use of transportation networks

Benefits:

- Reduced congestion
- Reduced travel time
- Reduced travel costs
- Economic benefits



System Efficiency | Combined 3-6% GHG ↓

	2030 GHG Reduction	Key Assumptions
Highway bottleneck relief	<0.1-0.3%	Improve top 100-200 bottlenecks by 2030
Reduced speed limits	1.1-1.8%	55mph national speed limit
Truck idling reduction	0.1-0.2%	26-100% of sleeper cabs with one board idle reduction tech
Freight rail and marine operations	0.1-0.5%	Reduce rail chokepoints, shore-side power for ships, reduce VMT in intermodal terminal, limited modal diversion
Air traffic operations	0.3-0.7%	Airport efficiency, direct routing, reduced separation, continuous descents
Construction materials	0.7-0.8%**	Recycled material in cement, low temp asphalt
Other	0.3%	Truck size and weight, freight urban consolidation centers, transportation agency energy efficient buildings, alt fuel fleet and construction vehicles
Combined Strategies	3-6%	Includes strategies not shown

Travel Activity | Combined 5-17% GHG ↓

	2030 Reduction	Key Assumptions
Pay as you drive insurance	1.1-3.5%	Require states to allow (low) Require companies to offer (high)
Congestion pricing	0.4–1.6%	LOS D on all roads (avg 65c/mi for 29% of urban and 7% of rural VMT)
Public transportation	0.2-0.9%	2.4-4.6% annual increase in service
Non-motorized travel	0.2-0.6%	Comprehensive urban bike/ped improvements 2010-2025
Land use	1.2-3.9%	60-90% of new urban growth in approx. >5 units/acre
Parking management	0.2%	Downtown workers pay for parking ($5/day avg. for those not already paying)
Commuter / worksite trip reduction	0.1-0.6%	Widespread employer outreach and alternative mode support
Telework / compressed work week	0.5-0.7%	Doubling of current levels
Individualized marketing	0.3-0.4%	Reaches 10% of population
Eco-driving	0.8-4.3%	10-50% of drivers reached, half implement
Combined Strategies	5-17%	Does not include interactive effects. Includes induced demand.
VMT fee (not included above)	1.1-3.5%	2 to 5 cents per mile

What Does it All Mean?

Greenhouse gases are NOT the same as criteria pollutants

- Difference in geographic scales
- Different time frames

Baseline development will be crucial

Critical for strategy development & evaluation

Limited effectiveness at the project level

Need for transformational strategies

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