



U.S. Department of Transportation
Federal Highway Administration

An Overview of Energy Related Emissions and Criteria Pollutants

TRB Workshop 1011

A Marriage of Convenience: Partnering Greenhouse Gas and Air Quality Management, Lessons Learned and Future Research Needs

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ATMOSPHERIC DIFFERENCES

Criteria Pollutants / Mobile Source Air Toxics*

- Short-lived in the atmosphere (days to weeks)
- Impacts are local / regional

*Criteria pollutant emissions are subject to ambient air quality standards, while MSATs are not



Photo credit: USEPA

CO2

- Long lived in the atmosphere (years to millennia)
- Result in increased global atmospheric concentrations regardless of when or where they occur
- **Concentrations will tend to increase, even if emissions decrease**
- Impacts are inherently global



Photo credit: NASA



PROCESSES TO CONSIDER WHEN ANALYZING EMISSIONS

Criteria Pollutants

Direct emissions of pollutants and precursors

- On-road activity
 - Tailpipe emissions
 - Evaporative emissions
 - Break wear and tire wear
 - Road dust
- Construction equipment / vehicles (on-site)

CO2

Direct emissions *and* certain upstream activities (in bold)

- On-road activity
 - Tailpipe emissions
 - **Upstream fuel cycle**
 - **Extraction of fuel feedstock, transport, refining, etc.)**
 - **Electricity used by Electric Vehicles**
- Transportation infrastructure
 - Construction equipment / vehicles (on-site)
 - **Off-site Construction materials (extraction, materials production, fuel production)**
- **Vehicle cycle emissions – sometimes relevant (raw materials, manufacture, transport)**



TIMEFRAME OF EMISSIONS ANALYSIS

Criteria Pollutants

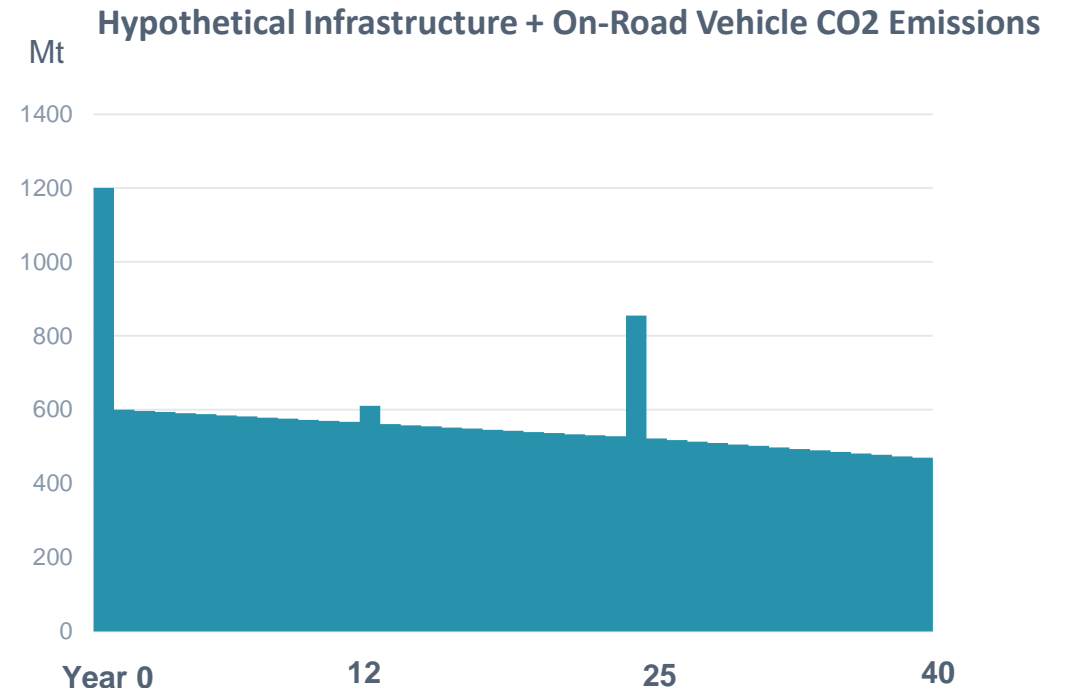
- Analysis timeframe is based on National Ambient Air Quality Standards

Select Transportation-Related Criteria Pollutants

Pollutant	Primary / Secondary	Averaging Time	Level	Form
O3	Primary and Secondary	8 hours	0.070 ppm	Annual fourth-highest daily maximum, averaged over 3 years
PM2.5	Primary	1 year	12.0 µg/m ³	Annual mean, averaged over 3 years
	Secondary	1 year	15.0 µg/m ³	Annual mean, averaged over 3 years
	Primary and Secondary	24 hours	35 µg/m ³	98 th percentile, averaged over 3 years
PM10	Primary and Secondary	24 hours	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years

Energy-related emissions

- Cumulative emissions over a relevant analysis timeframe
- Various professional perspectives on analysis horizon year



Questions?

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