Lecture – 23A&23B

Energy Resources, Economics and Environment

Energy Policy

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What is an energy policy?

What is a policy?

A **policy** is a principle or protocol to guide decisions and achieve rational outcomes (Wiki)

Framework

- Decisions
- Stakeholders
- Policies
- Goals
- Criteria
- Analysis

Energy Goals

- Increase Energy Access
- Develop capacities for energy transitions
- Enhance Energy Security
- Manage Energy Related Market Power
- Manage Energy Resource Endowments
- Reduce Environmental and Human Health Impacts
- Accelerate Energy related Technological change
- Co-ordinate and implement international energy related policies

Deciding Energy Policies

Scope

- IIT Campus
- Powai
- Village
- Block
- Mumbai
- Maharashtra
- India
- Global

Elements

- Decide Goals
- List out Policy instruments
- List out challenges
- Existing Institutions and roles
- Time Horizon
- Analytical framework

Framework for policy

Consider real life examples that you are familiar with

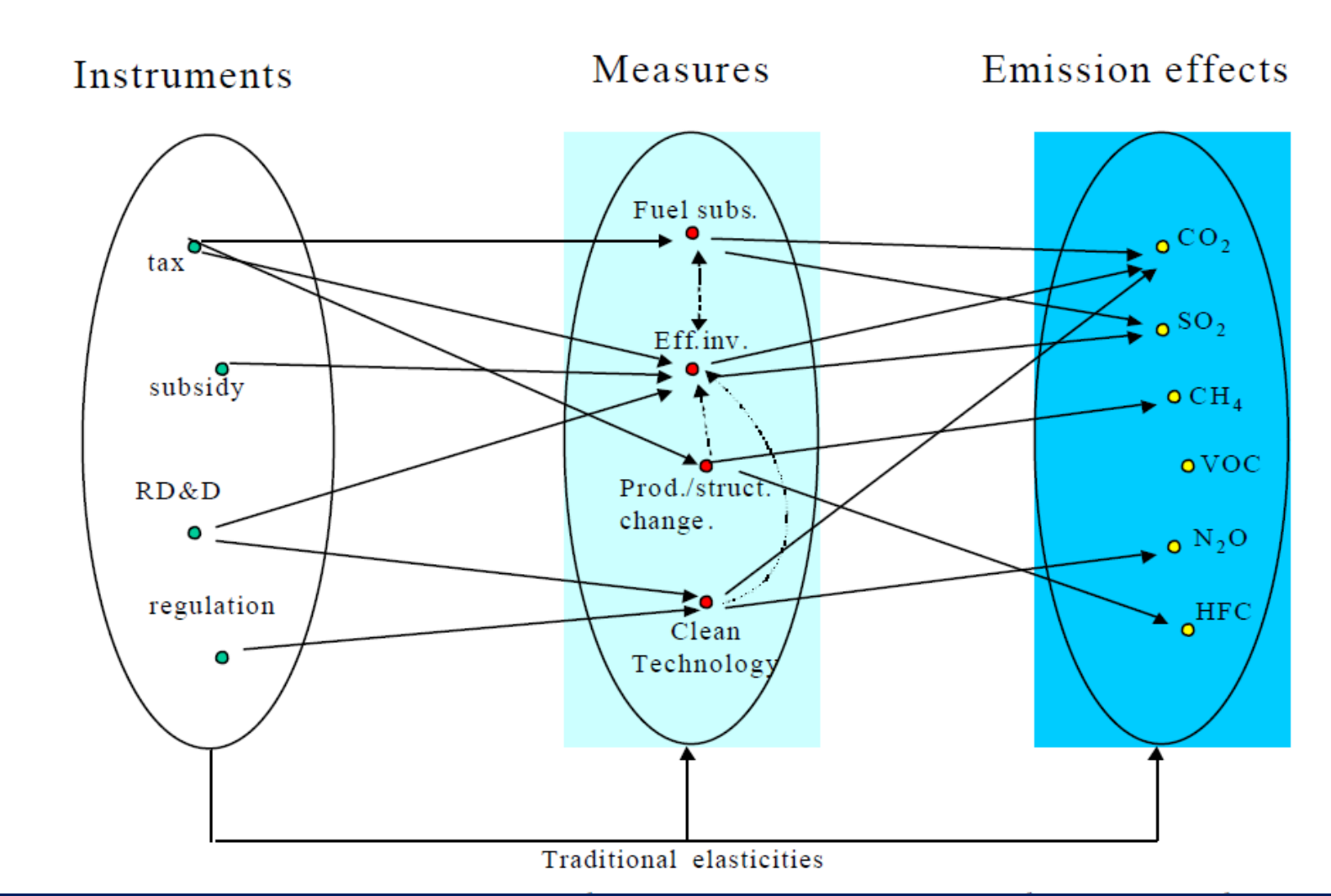
Describe a framework for policy formulation, analysis. Specify the stakeholders, policy goals, criteria, institutions, type of analysis. Comment on the existing policies vis-à-vis different stakeholders (Be as specific as possible)

Classification of policy Instruments

- Regulating instruments
  - Rationing – emission quotas, mandatory technology
  - Performance standards, benchmarks
- Implied Deregulation-
  - Emission Permit Trading, Green Certificates
  - Voluntary Agreements
- Fiscal and Financial Instruments- Taxes, subsidies or grants
- Supportive Actions
  - Improvement knowledge, market transparency
  - Dissemination
  - Reduce Transaction costs

Perrels, IPCC, 2001

Impact of Policy Instruments



Perrels, IPCC, 2001

India -Policy Documents

- Five Year Plans
- Integrated Energy Policy, 2008
- National Action Plan on Climate Change – JNNSM and NMEEE
- Electricity Regulation Commission Act 1998
- Electricity Act 2003
- UMPP 2005
- Rural Electrification Policy 2006
- INDC 2015

Policy options

- Market or Government (Mandate/ Legislate)
- Regulation

Criteria to Analyse Policy

- Effectiveness
- Economic efficiency
- Administrative feasibility
- Equity
- Political acceptability
- Policy robustness
- Policy consistency

Source: GEA Chapter 22

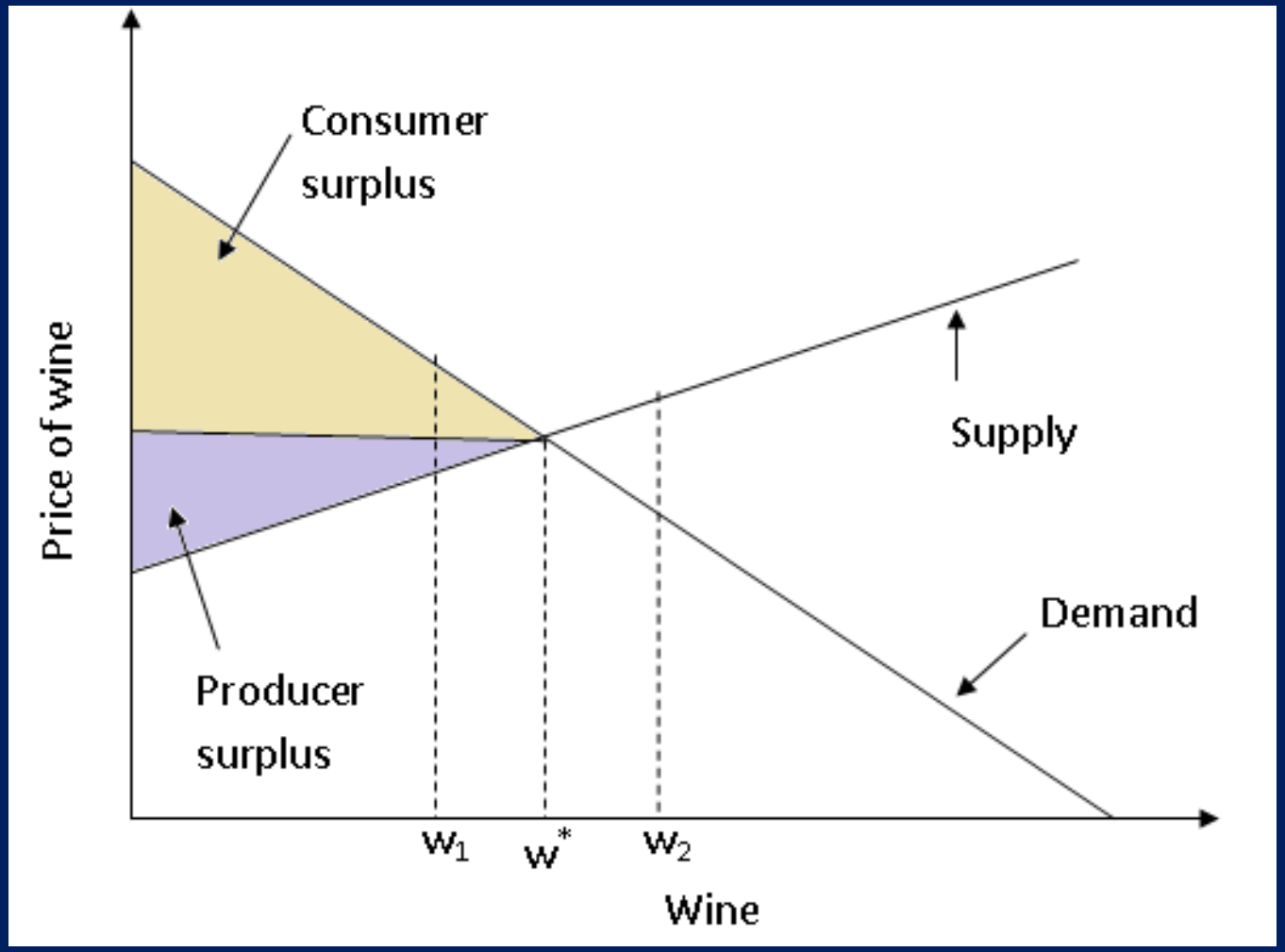
Typical Energy Decisions

- World- International agreements – GHG, CFC
- Nation- Energy policy, pricing, technology development
- State – Taxes/Incentives, fund allocation to districts
- District – Fund Allocation to blocks, Mouza electrification, Industrial devpt., Coal – elect., fuel / ration shops Sanctions.
- Block– Fund Allocation to GPs, Kerosene allocation, industry promotion, marketing support.
- Gram Panchayat – Agriculture / irrigation schemes, Co-op industry, request for fuel/ration shop, electricity.
- Household – Fuel choice, Device choice.

Energy Policies

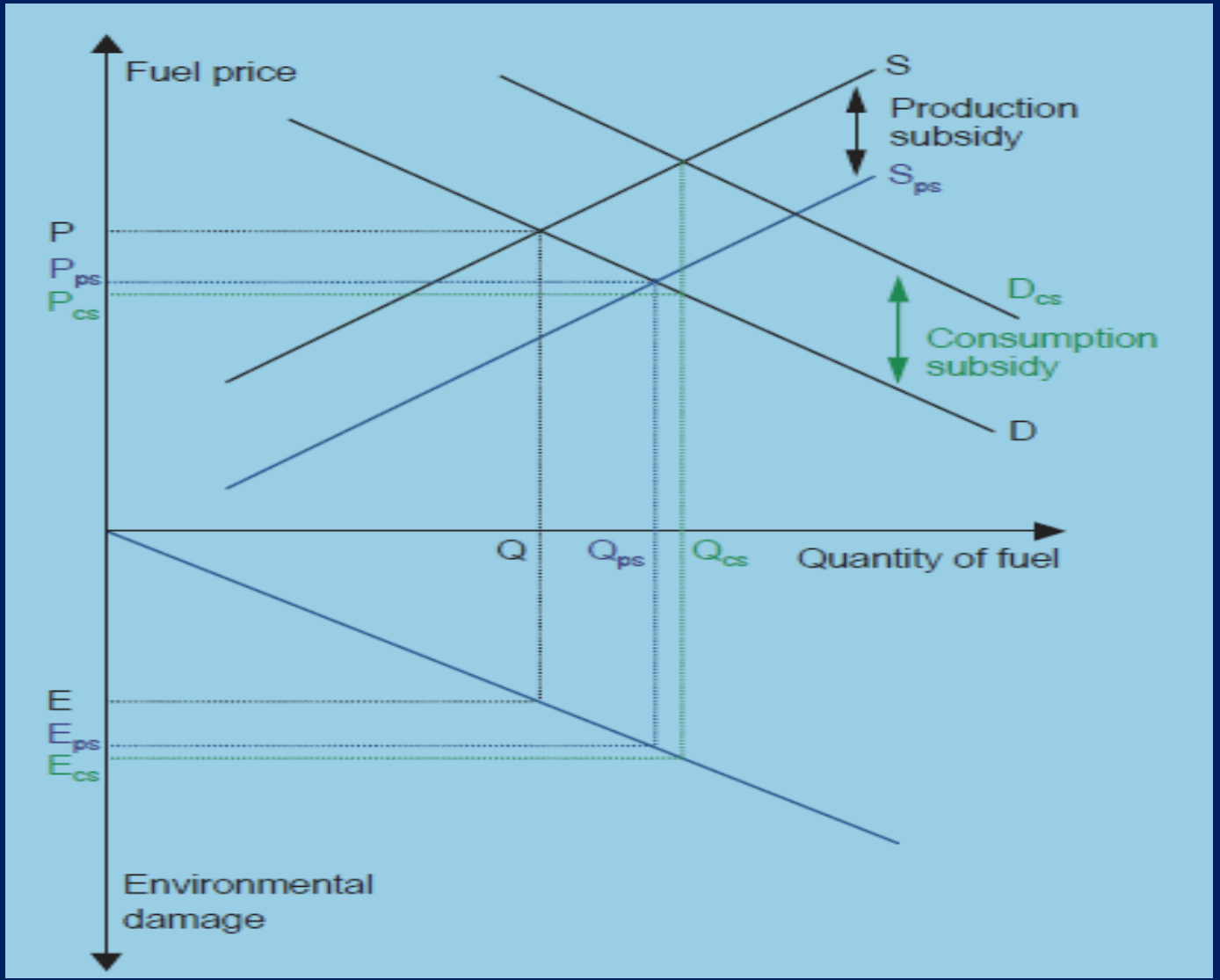
- Building Codes
- Standards and Labelling
- Preferential Tariffs
- Subsidies, Soft Loans
- Carbon Tax
- Renewable Energy Certificates, CERs, Certificates and Trading

Consumer/ Producer Surplus



Source: Kolstad, 1999

Impact of Subsidy



Source: UNEP, 2008

Policy Framework

- Institution- Delhi Government
- Police
- CPCB
- Analysis – Changes in number of vehicles, PM2.5 levels at different locations, Inconvenience

- Goal: To improve air quality in Delhi during winter
- Stakeholders – Urban residents
  - Commuters
  - Vehicle Manufacturers
  - Taxis
  - Public Transport
  - Offices,Commercial
  - Police
- Mandate- Command and Control

Policy Framework

- Institution- Delhi Government
  Police
  CPCB
- Analysis – Changes in number of vehicles,
  PM2.5 levels at different locations,
  Inconvenience

Odd - Even

Table : Snapshot of Delhi's Odd – even traffic experiment

Issues	Phase I	Phase II
Effective period	January 1-15 , 2016	April 15 – 30, 2016
Duration	15 days	16 days
Period	8 am to 8 pm	8 am to 8 pm
Days applicable	Monday to Saturday	Monday to Saturday
Sundays	No restrictions	

EPIC study

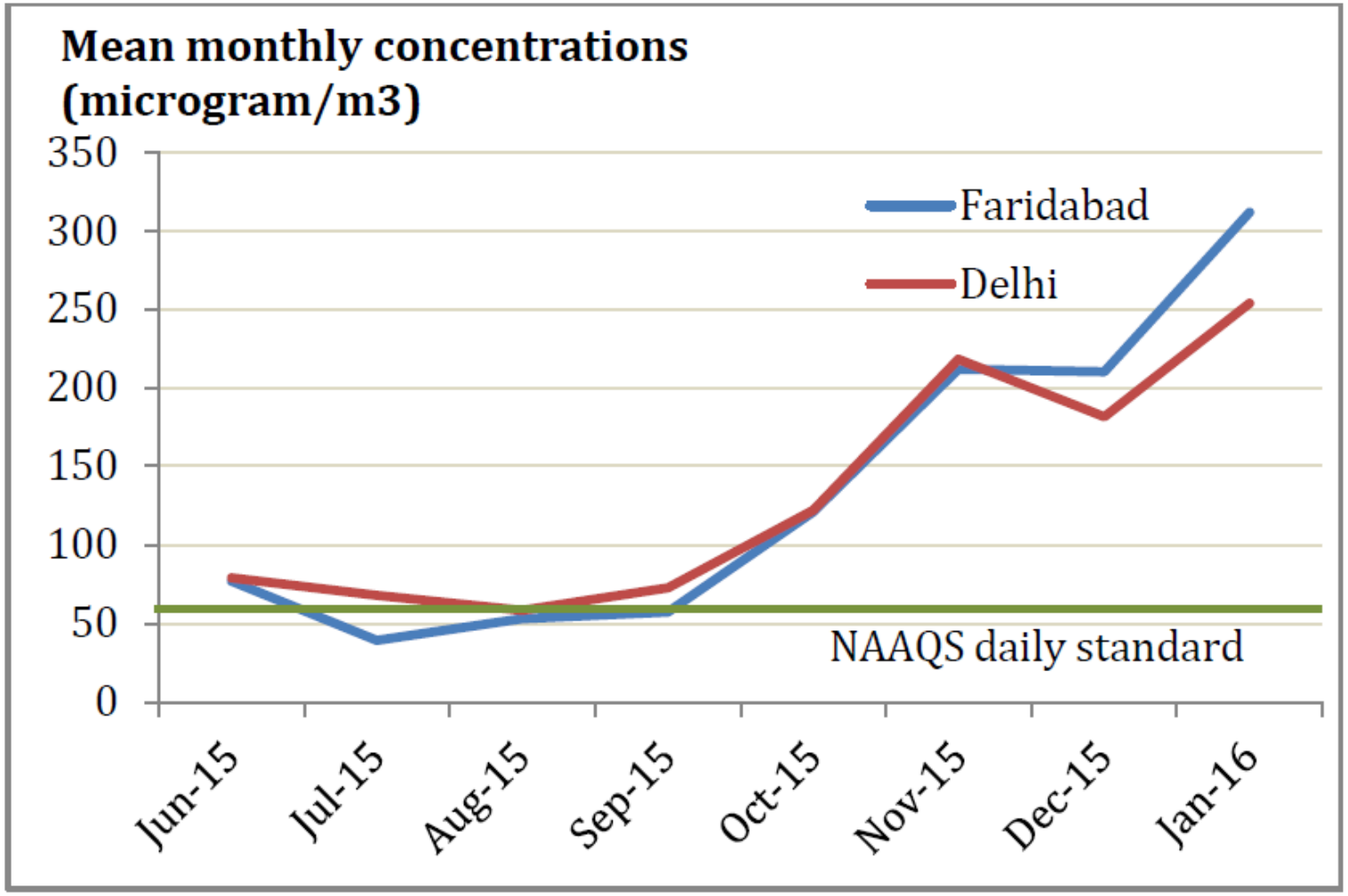
Differential analysis

	Before Program	After Program	Change during the time where program is implemented
Area with program	B1	A1	(A1-B1)
Area without program	B2	A2	(A2-B2)

Change due to program in the area where program is implemented	**(A1-B1) – (A2-B2)**

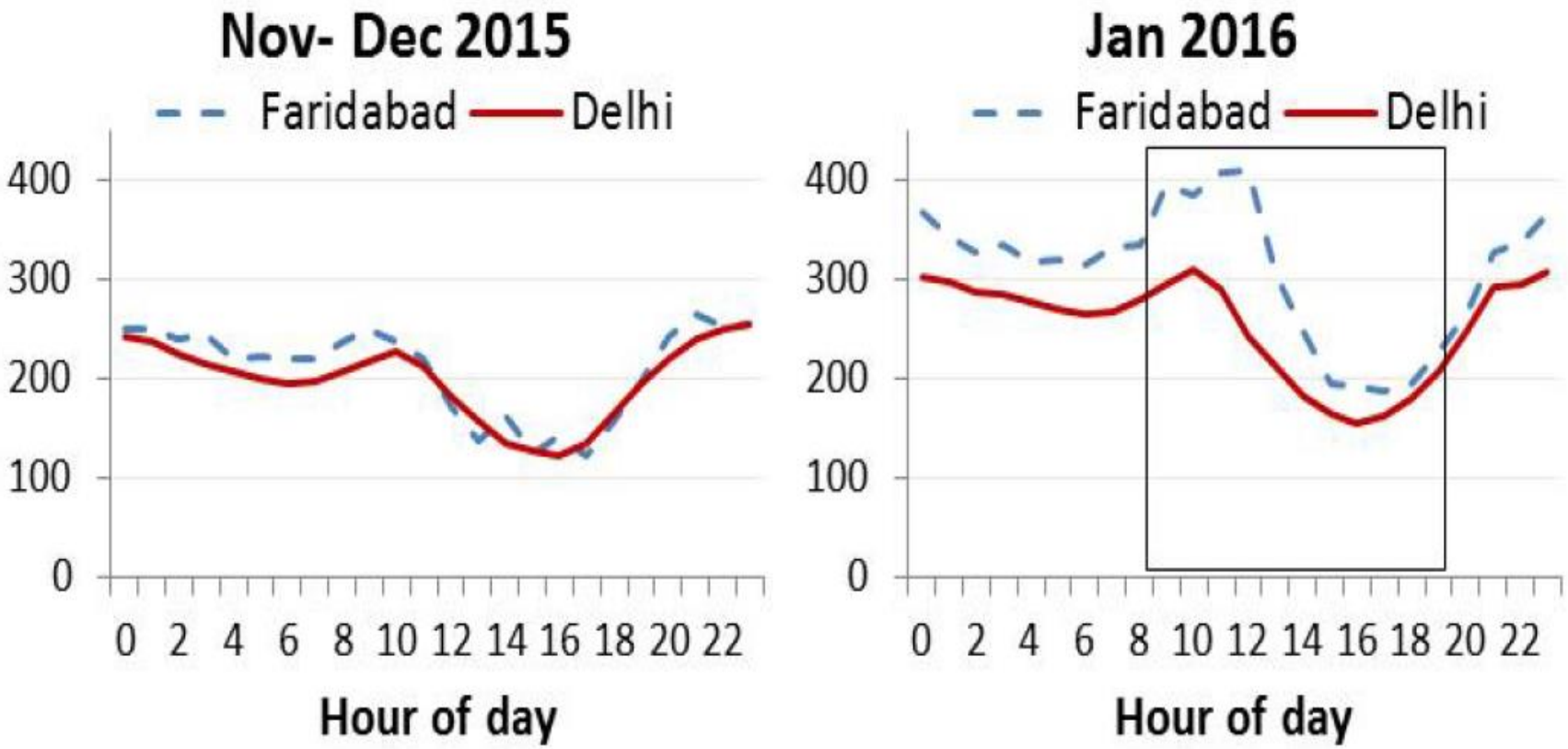
EPIC study

Comparative data



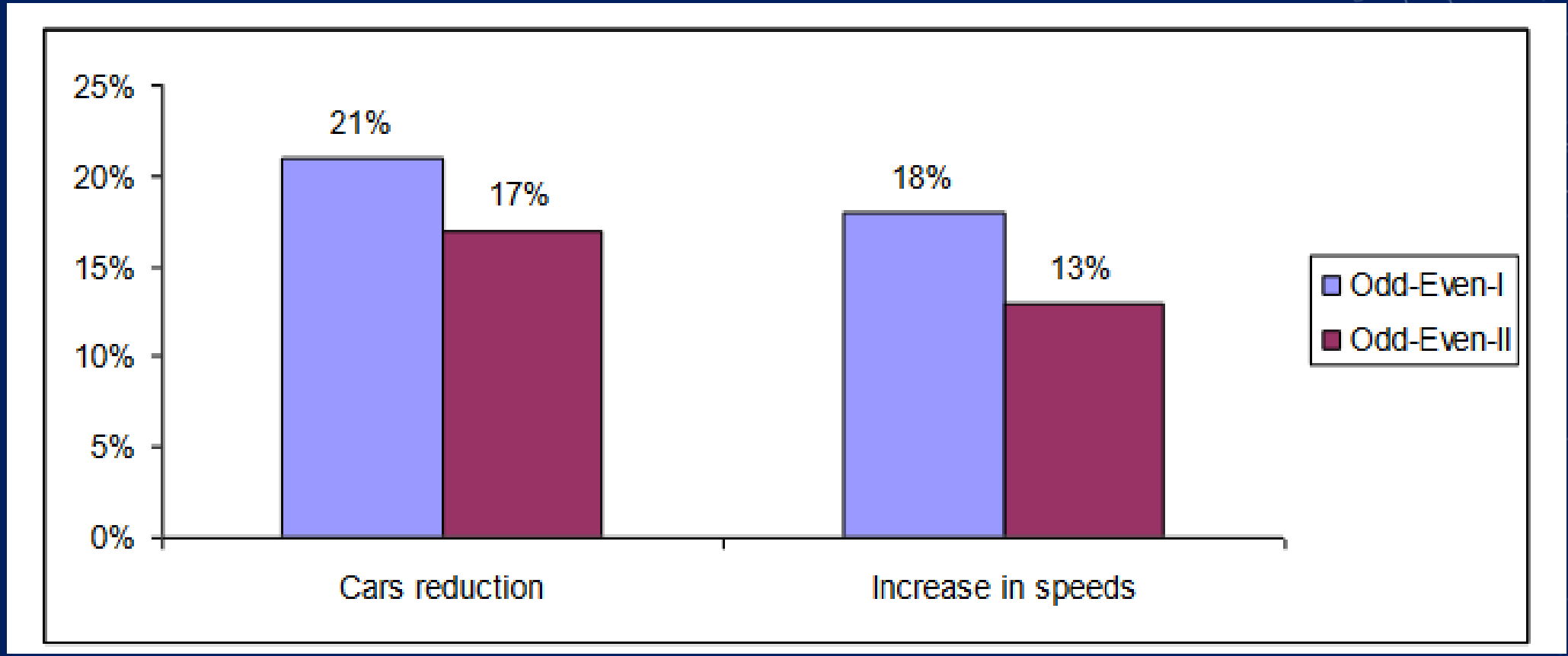
EPIC study

Comparative data PM2.5



EPIC study

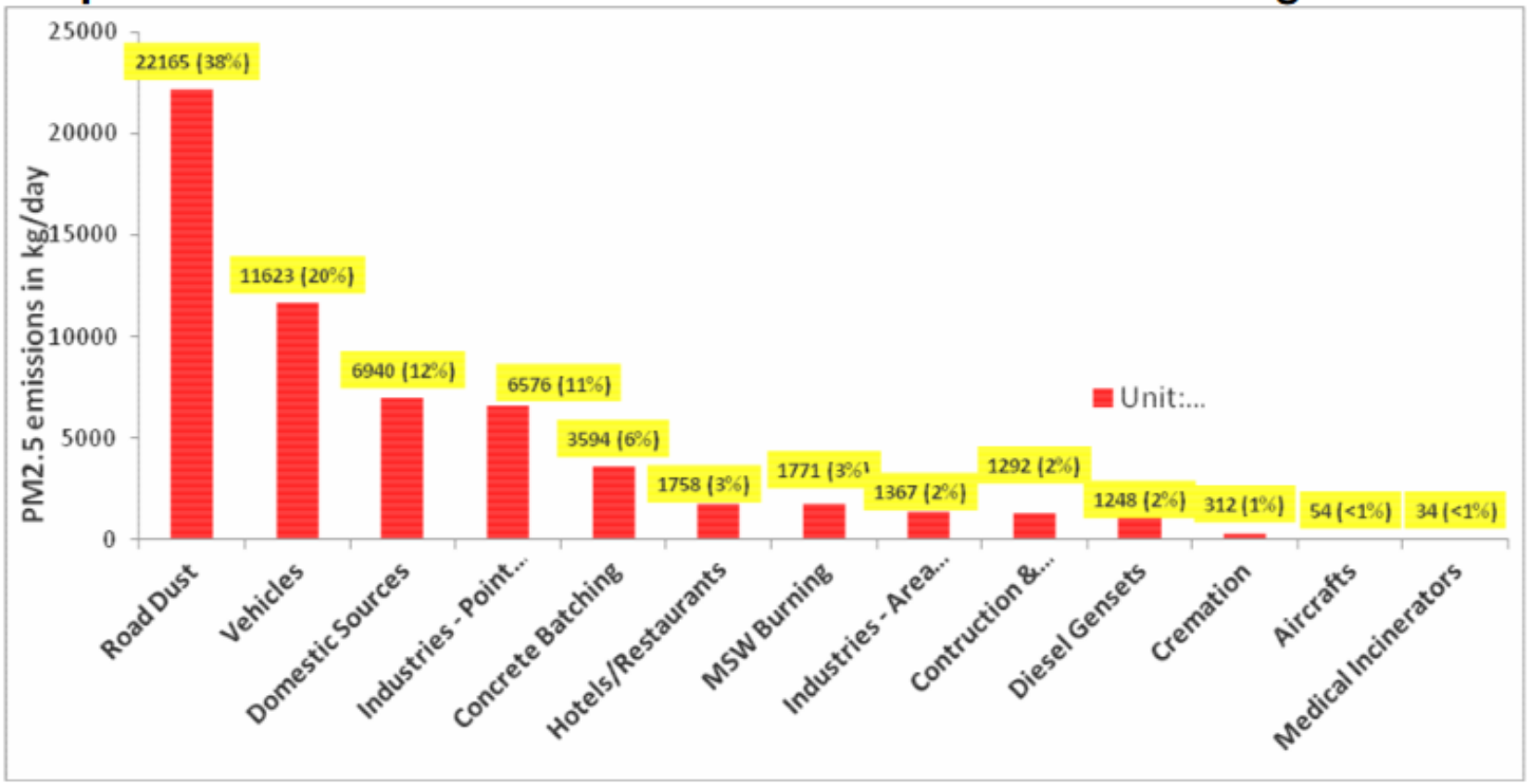
Delhi- Phase 1, 2 comparison



TERI study

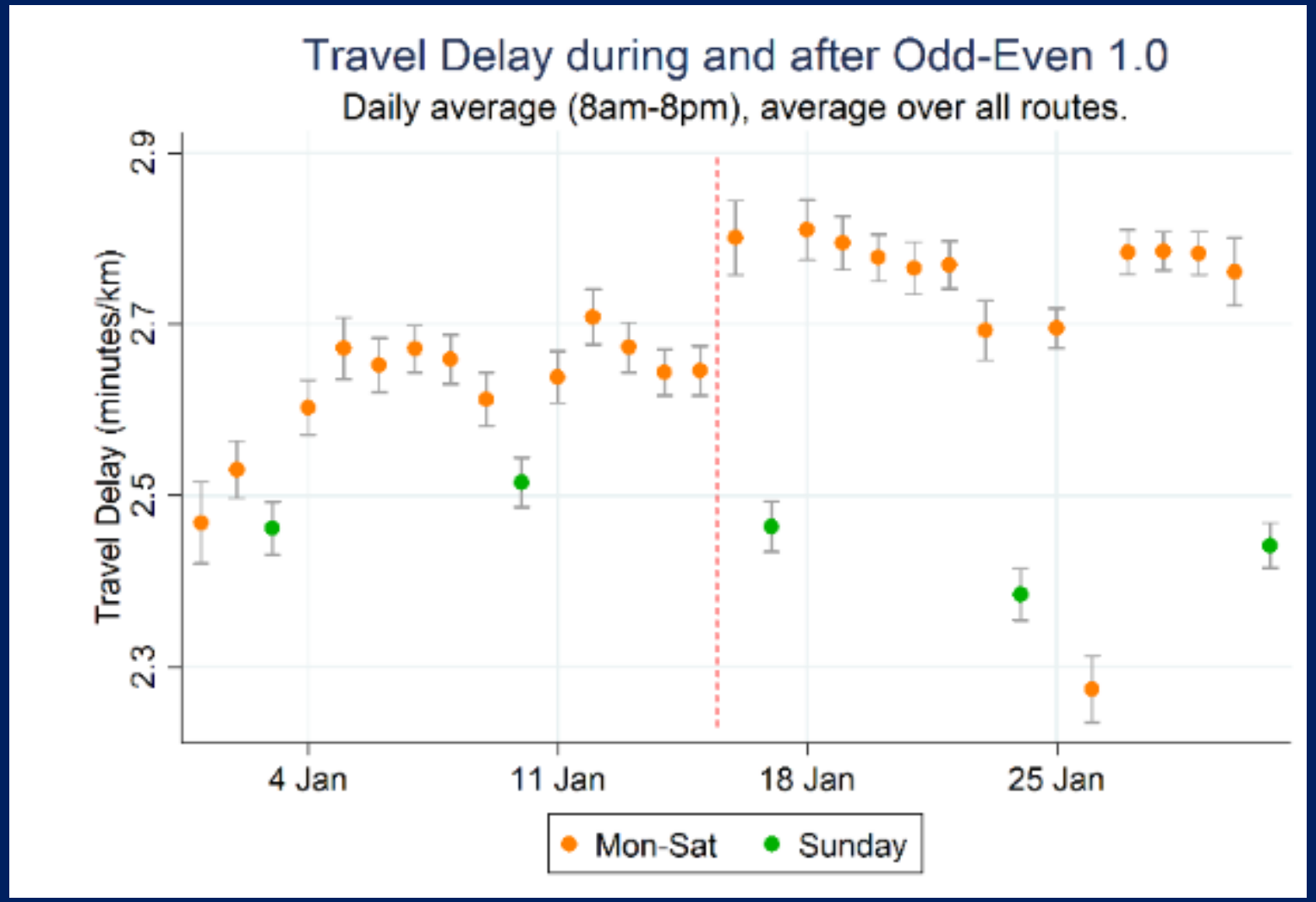
Source Apportionment

Graph 5: Sources of PM2.5 in Delhi: Vehicles are second highest



Source: IIT Kanpur's Comprehensive Study on Air Pollution and Green House Gases (GHGs) in Delhi (Draft Report: Air Pollution)

Travel Delays



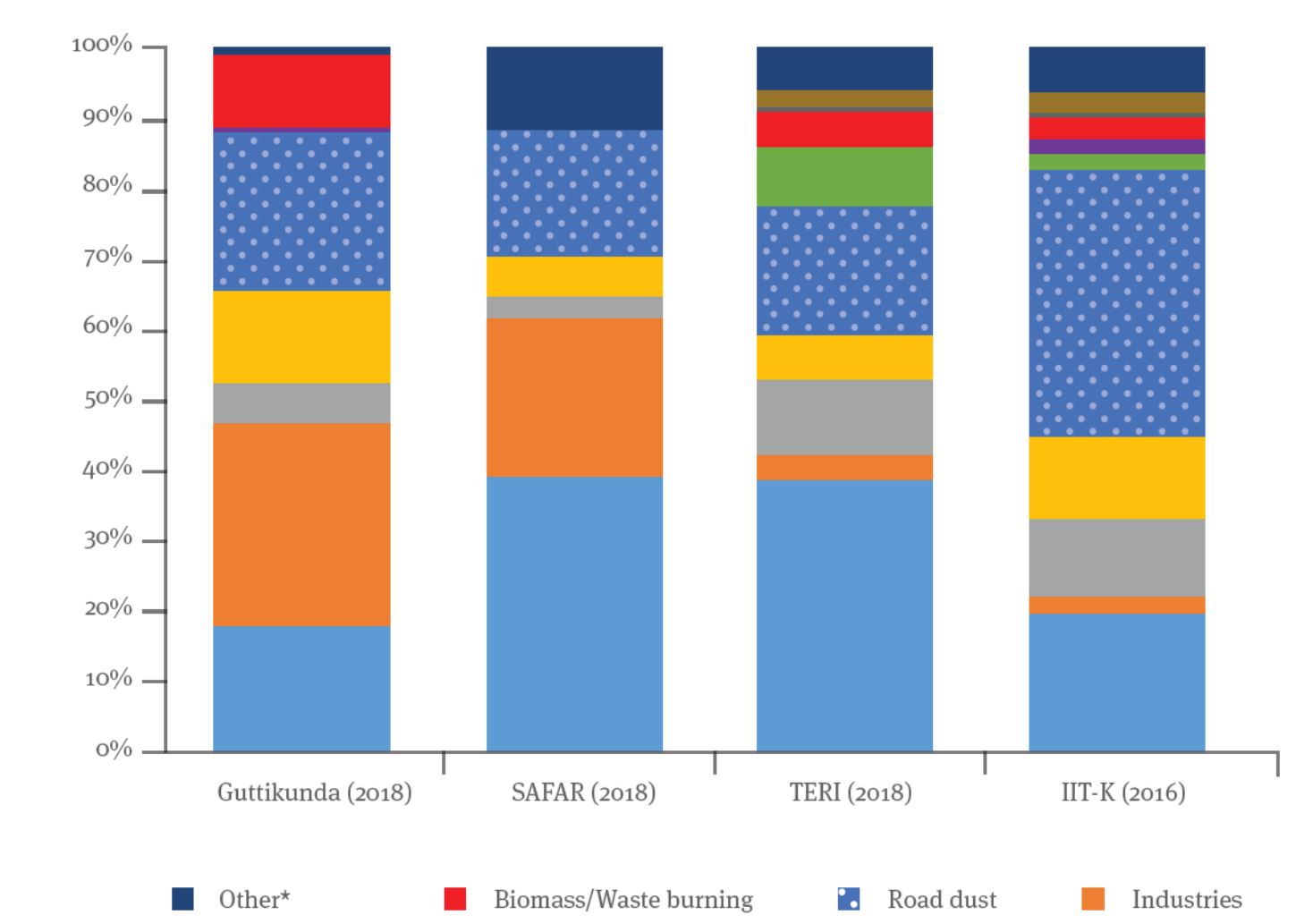
https://economics.mit.edu/files/13621

Table 2. Driver Survey Descriptive Statistics

	(1) Mean	(2) Observations that satisfy condition	(3) Total Observations
Panel A. Number of Respondents			
Respondents reached during phone surveys		956	
Phone surveys		4178	
Panel B. Demographics			
Age			
18-29 years old	41.5%	397	956
30-49 years old	53.6%	512	956
over 50 years old	4.9%	47	956
College degree	69.4%	663	956
Occupation			
Private employment	39.0%	373	956
Self-employed	41.8%	400	956
Government employee	6.0%	57	956
Student	8.3%	79	956
Other	3.9%	37	956
Panel C. Vehicle ownership			
Primary car has odd license plate	48.8%	467	956
Primary car age (years)	5.2	-	312
Household has another car	33.6%	321	956
Household has motorcycle	52.0%	496	953
Believes Odd-Even policy is good or very good for Delhi	69%	381	554

Table Notes. This table reports sample descriptive statistics from the baseline (recruiting) survey and the follow-up (phone) survey. More detailed information on response rates is available in Appendix Table 3.

Delhi- Source Apportionment



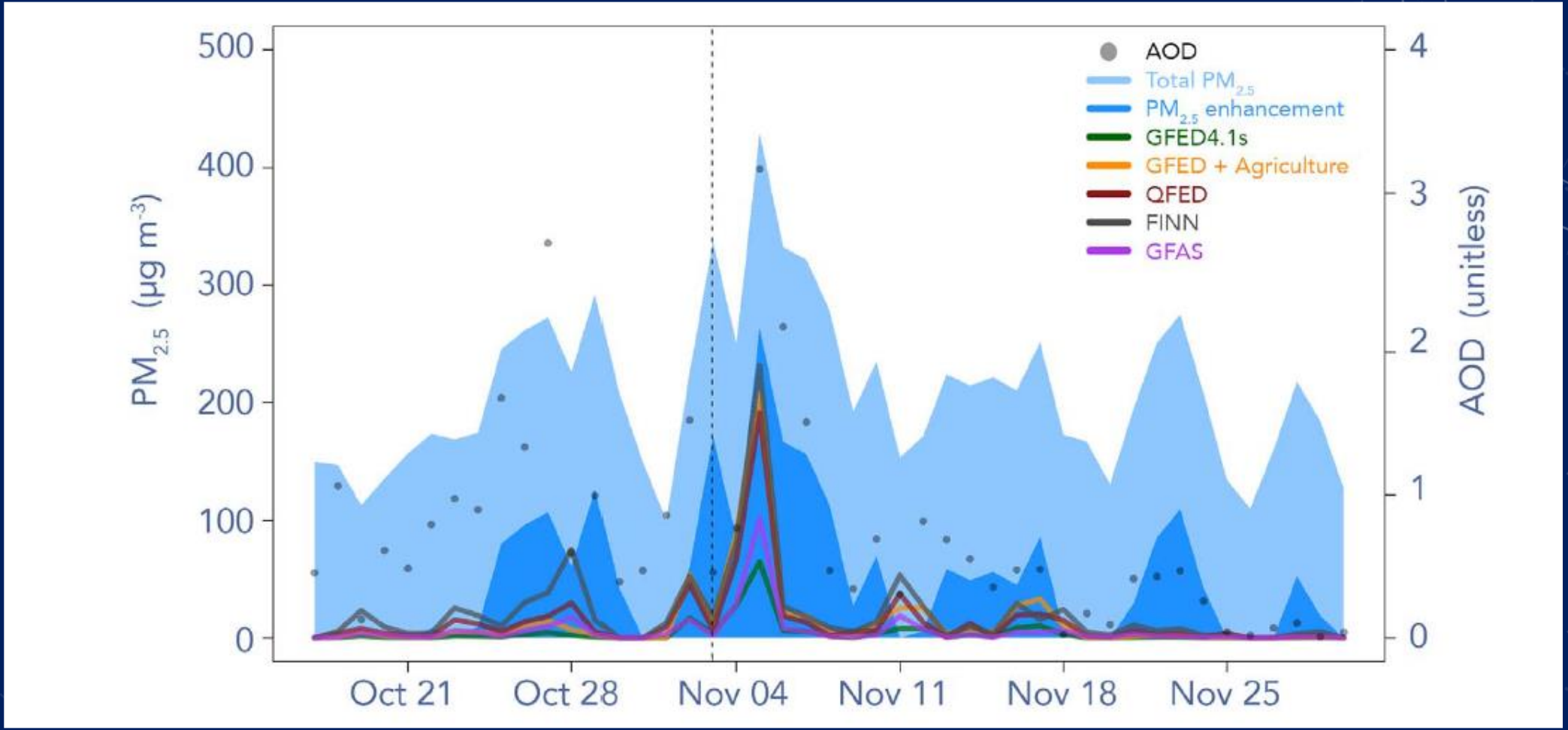
CEEW study , 2019

Delhi- Source Apportionment

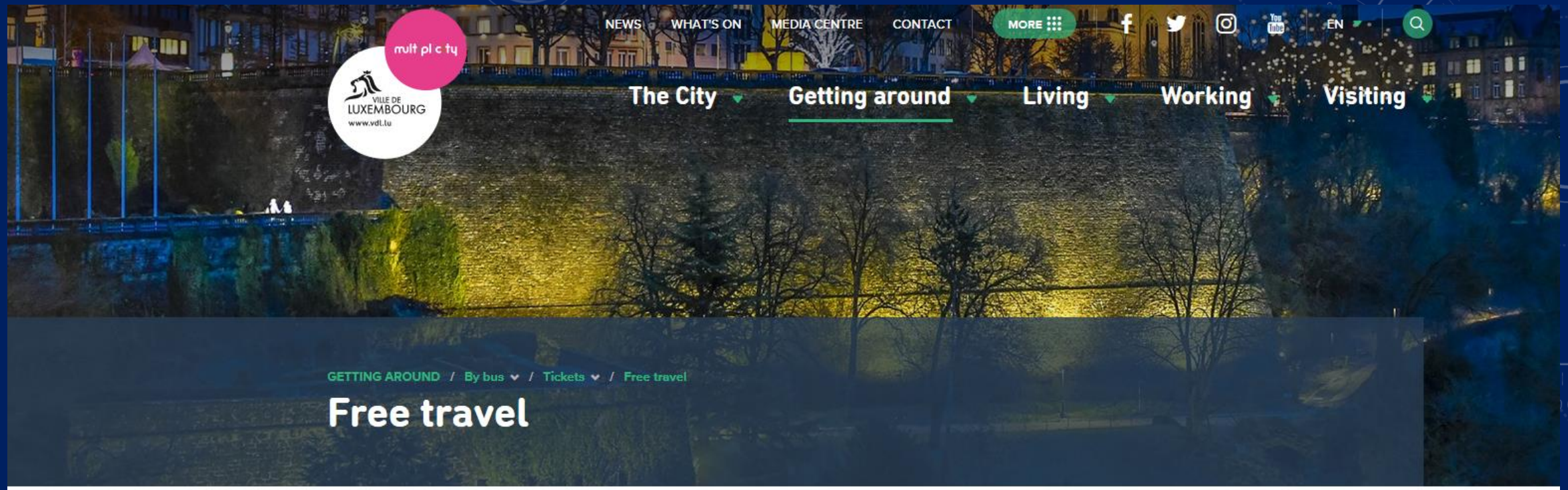
Sector	Variation	
	PM_{10} (%)	$PM_{2.5}$ (%)
Transport	5.5-19.0	17.9-39.2
Industries	1.3-18.3	2.3-28.9
Power plants	2.5-17.0	3.1-11.0
Road dust	35.6-65.9	18.1-37.8
Construction	3.6-21.0	2.2-8.4

CEEW study , 2019

PM 2.5 Variability



Daniel H Cusworth et al 2018



LISTEN SHARE PRINT

- Introduction of free public transport in Luxembourg
- Children and young people
- People on low income

Introduction of free public transport in Luxembourg

From 1 March 2020, public transport will be free in Luxembourg.

Users are advised that, due to the introduction of free public transport on 1 March 2020, annual passes purchased on or after 1 March 2019 will not cover the entire 1-year period.

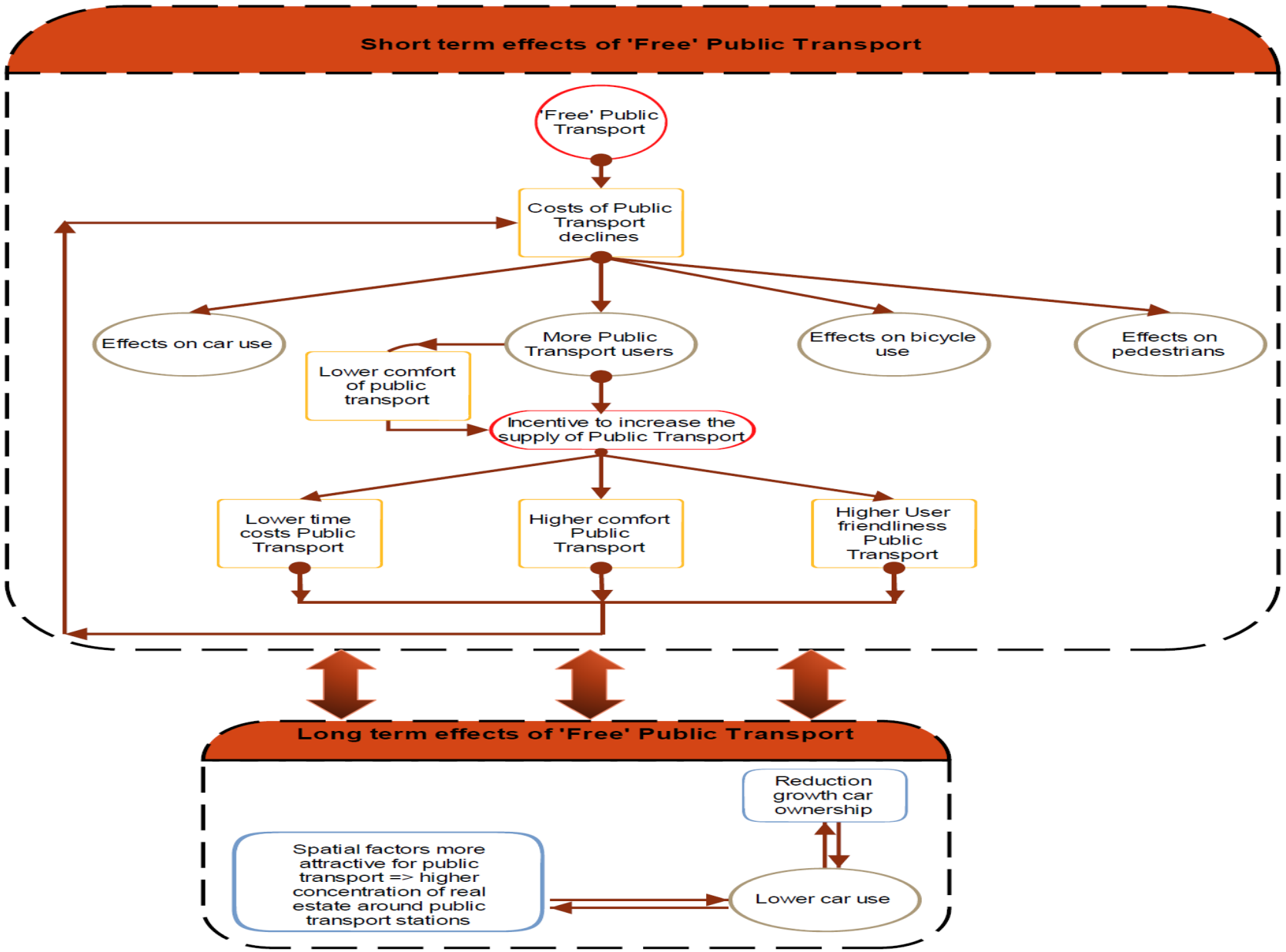


Figure 3.1: Short and long term effects of 'free' public transport (source: own elaboration).

Source: MS thesis 2009
Erasmus Univ Rotterdam

INDC

- Goal: To limit global temperature rise to less than 2 C, to compel global consensus and limit CO2 emissions. To provide a voluntary response from India
- Instruments- Variety
- Institutions- MOEF, MNRE, IPCC
- Stakeholders- Government, People, Fossil Energy industry, Renewable Energy Industry, Financing Institutions

INDC - Introduction

INDIA'S INTENDED NATIONALLY DETERMINED CONTRIBUTION:

WORKING TOWARDS CLIMATE JUSTICE

ॐ द्यौः शान्तिरन्तरिक्षं शान्तिः

पृथिवी शान्तिरापः शान्तिरोषधयः शान्तिः ।

"Om dyauh śāntir antariksam śāntih prithvi śāntih āpah śāntih osadhayah śāntih"

-- Yajur Veda 36.17

{{Unto Heaven be Peace, Unto the Sky and the Earth be Peace, Peace be unto the Water, Unto the Herbs and Trees be Peace}}

https://nmhs.org.in/pdf/INDIAINDCTOUNFCCC.pdf

INDC –Future scenario

Indicator	India in 2014	India in 2030
Population (billion) [a]	1.2	1.5
Urban population (million) [b]	377 (2011)	609
GDP at 2011-12 prices (in trillion) [c]	INR 106.44 (USD 1.69)	INR 397.35 (USD 6.31)
Per capita GDP in USD (nominal) [c]	1408	4205
Electricity demand (TWh) [c]	776(2012)	2499

Source: a: Population Foundation of India; b: UN World Urbanization Prospects, 2014; c:

https://nmhs.org.in/pdf/INDIAINDCTOUNFCCC.pdf

INDC

- Reduce Carbon Intensity of GDP by 33-35% of 2005 level in 2030
- Create 40% cumulative non fossil power by installed capacity by 2030 (using finance from Green Climate Fund)
- create an additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent through additional tree cover and forest

https://nmhs.org.in/pdf/INDIAINDCTOUNFCCC.pdf

http://envfor.nic.in/sites/default/files/press-releases/revised PPT Press Conference INDC v5.pdf

What does the carbon intensity of the economy depend upon?

Metrics

- Carbon intensity -2030 vs 2005
- Energy Intensity- 2030 vs 2005
- Equity impact
- Impact on jobs
- Impact on investments
- Share of non-fossil by installed capacity, by generation
- Costs of transition
- Carbon sink

Policies-INDC

- National Environment Policy 2006
- NAPCC, SAPCC(32 states)
- Energy Conservation Act
- National Electricity Policy
- National Policy for farmers
- Integrated Energy Policy
- PAT
- REC,RPO

Policies - INDC

- 25 Solar Parks, Ultra Mega Solar Power
- National Smart Grid Mission, Green Energy Corridor
- NMEEE
- Standards and Labelling
- Partial Risk Guarantee Fund for Energy Efficiency
- Venture Capital Fund for Energy Efficiency
- ECBC/Griha
- Smart Cities Mission, Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and National Heritage City Development and Augmentation Yojana (HRIDAY) + many more

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