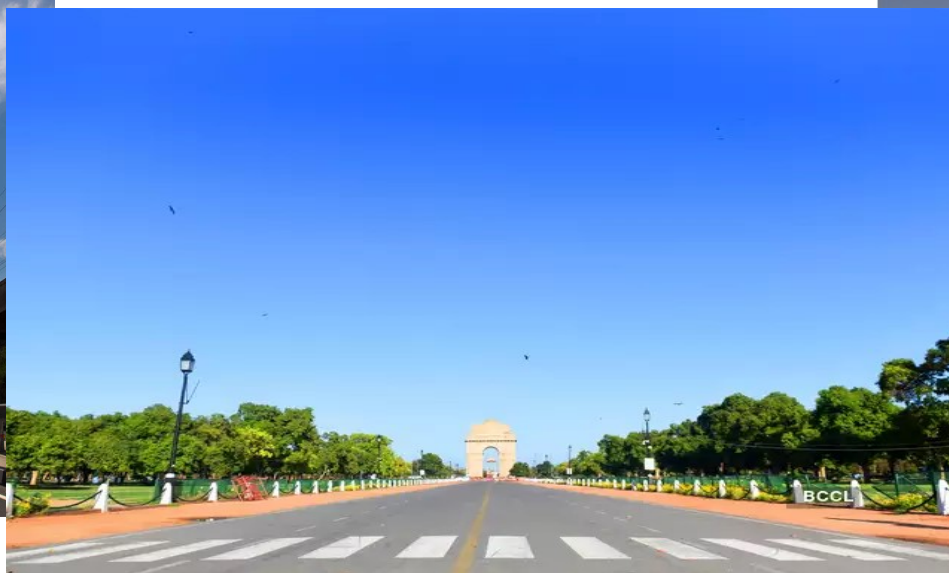


Blue sky; No traffic: **Surreal?**



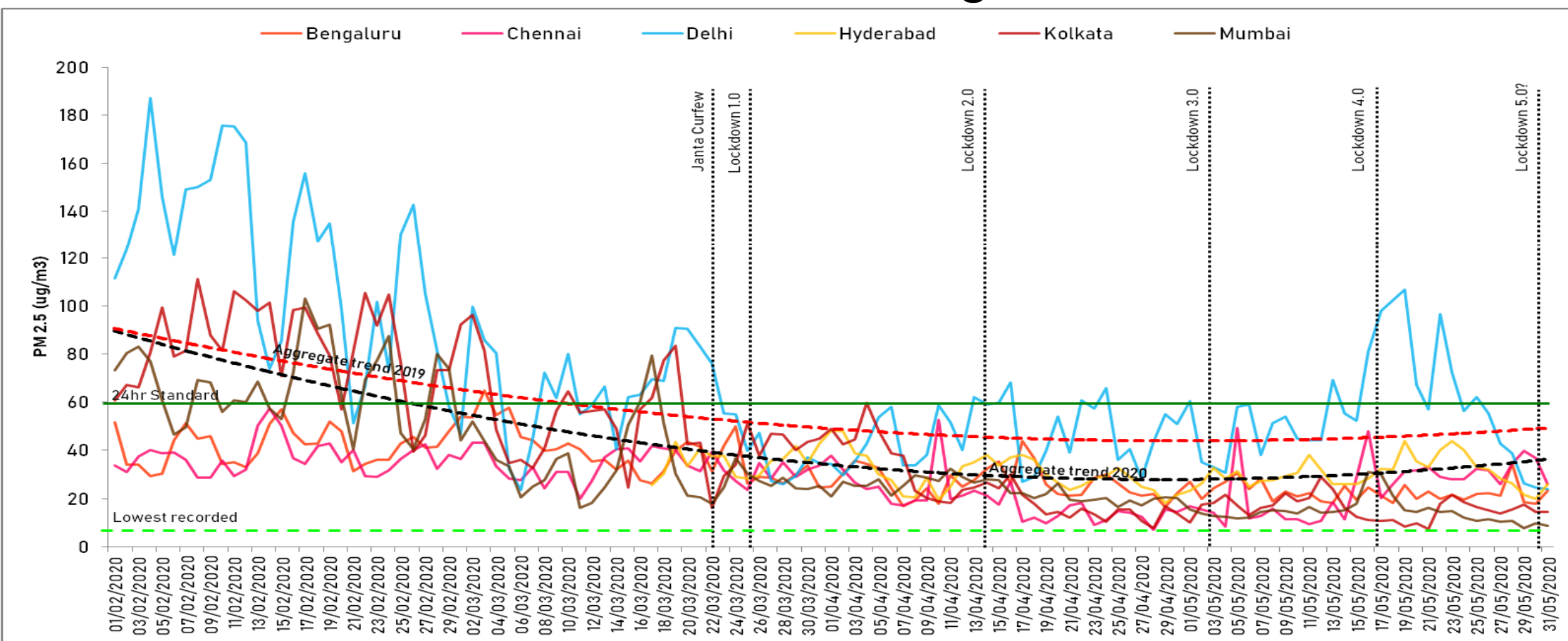
View of the Himalayas from Saharanpur. Photo Courtesy: Twitter/@rameshpandeyifs





PM2.5 levels in six mega cities

45-88% drop across six mega cities; But 2-6 times increase during lockdown 4

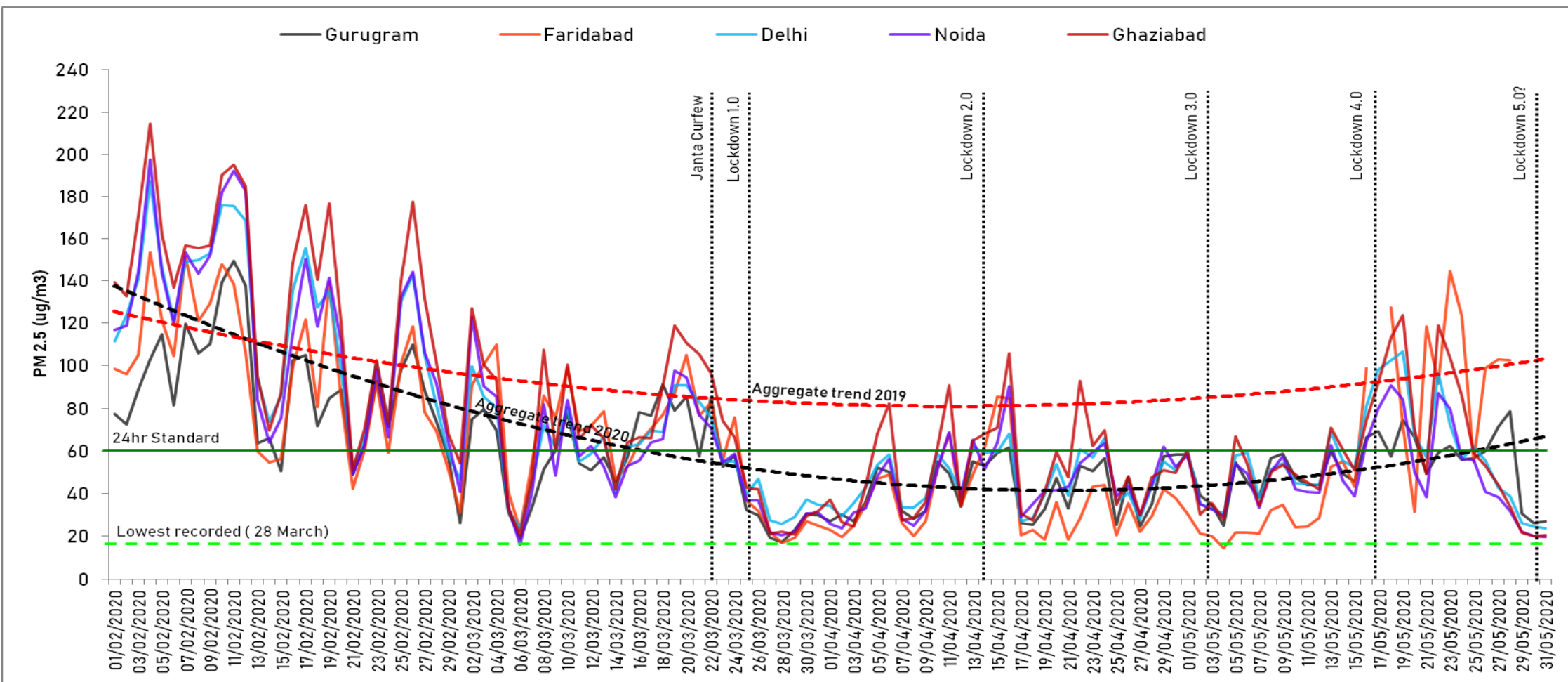


Source: CSE analysis based on real time data accessed from CPCB portal



Delhi – NCR

**PM2.5 levels drop across Delhi-NCR by 66-79%;
But 4-8 times increase during lockdown 4**

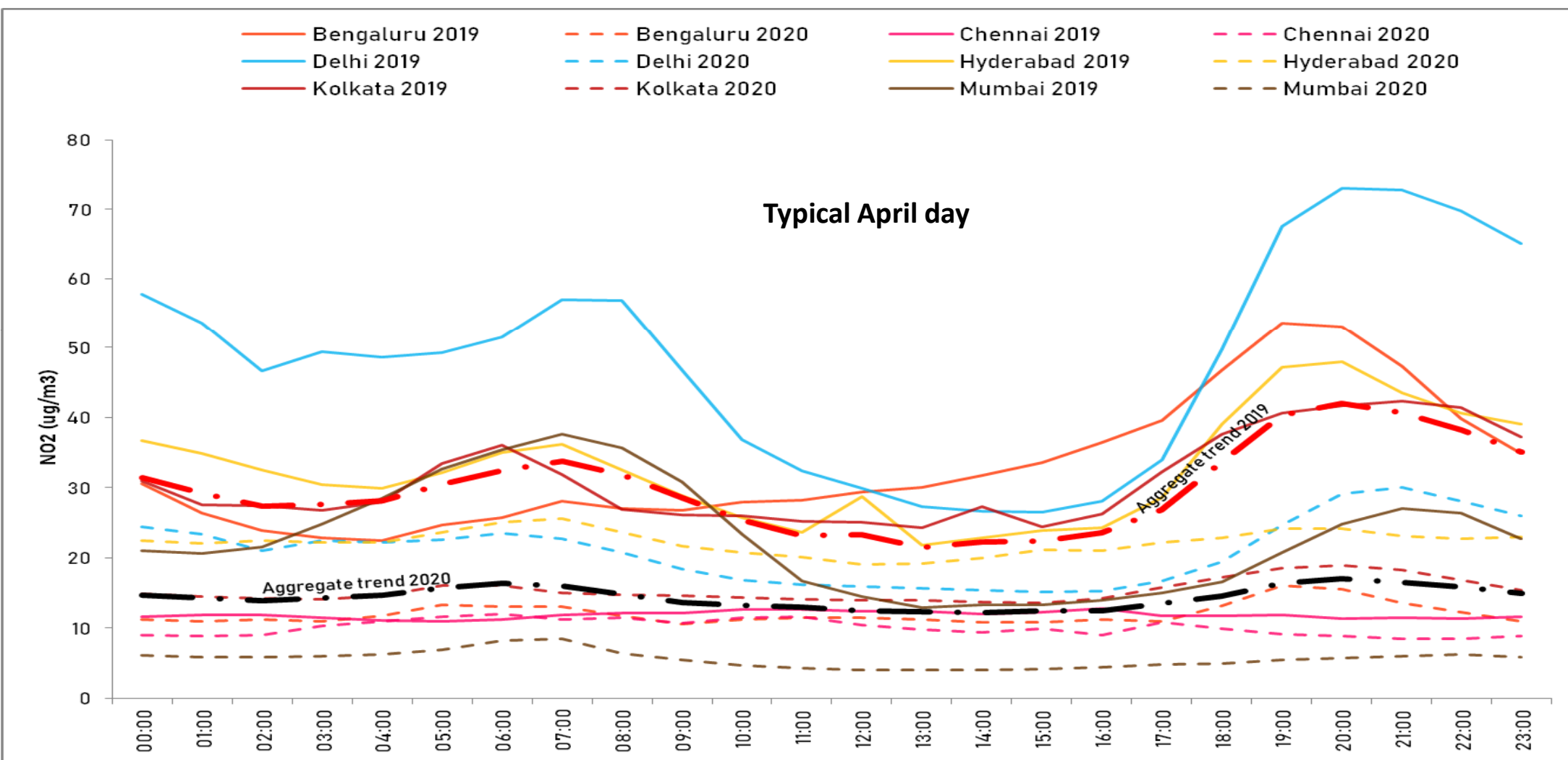


Source: CSE analysis based on real time data accessed from CPCB portal



Daily NO₂ curve flattens as traffic stops

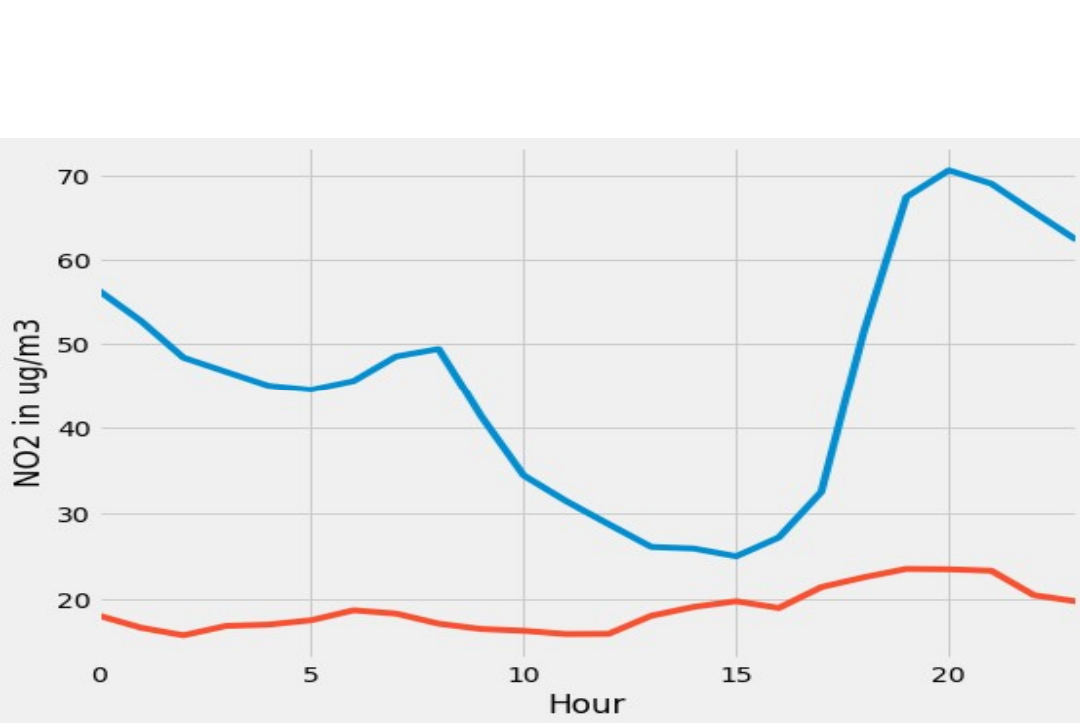
April 2019 vs April 2020



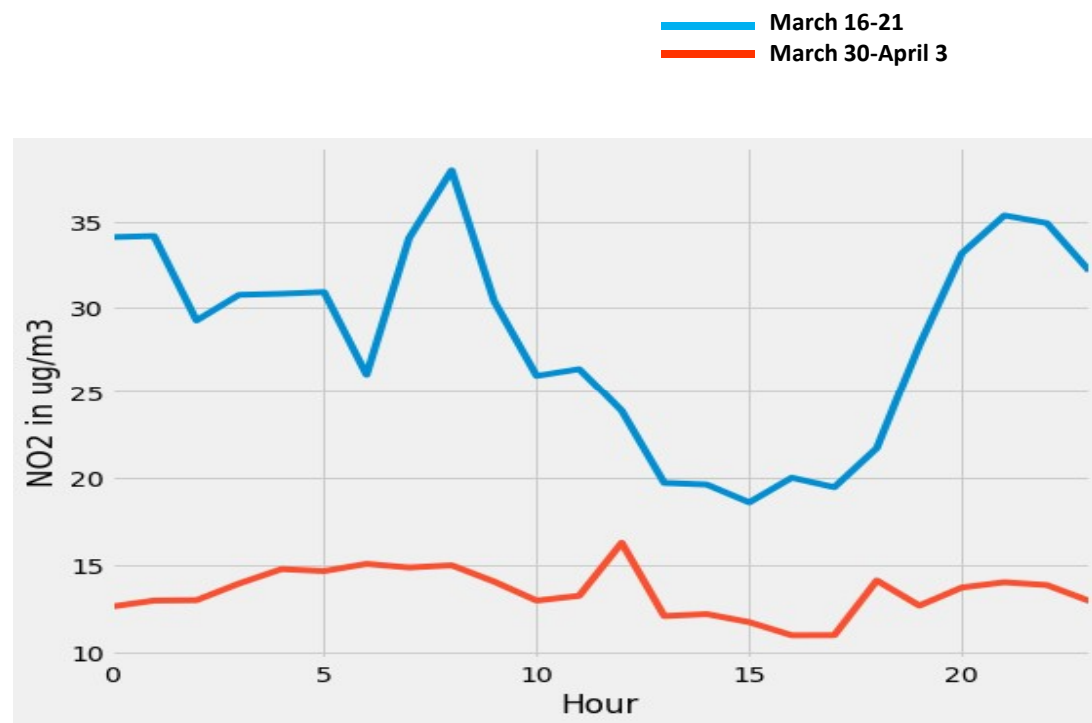
Source: CSE analysis based on real time data accessed from CPCB portal



NO₂: Daily peak pollution flattens in Delhi NCR



Delhi
(March 16-21 vs March 30-April 3)

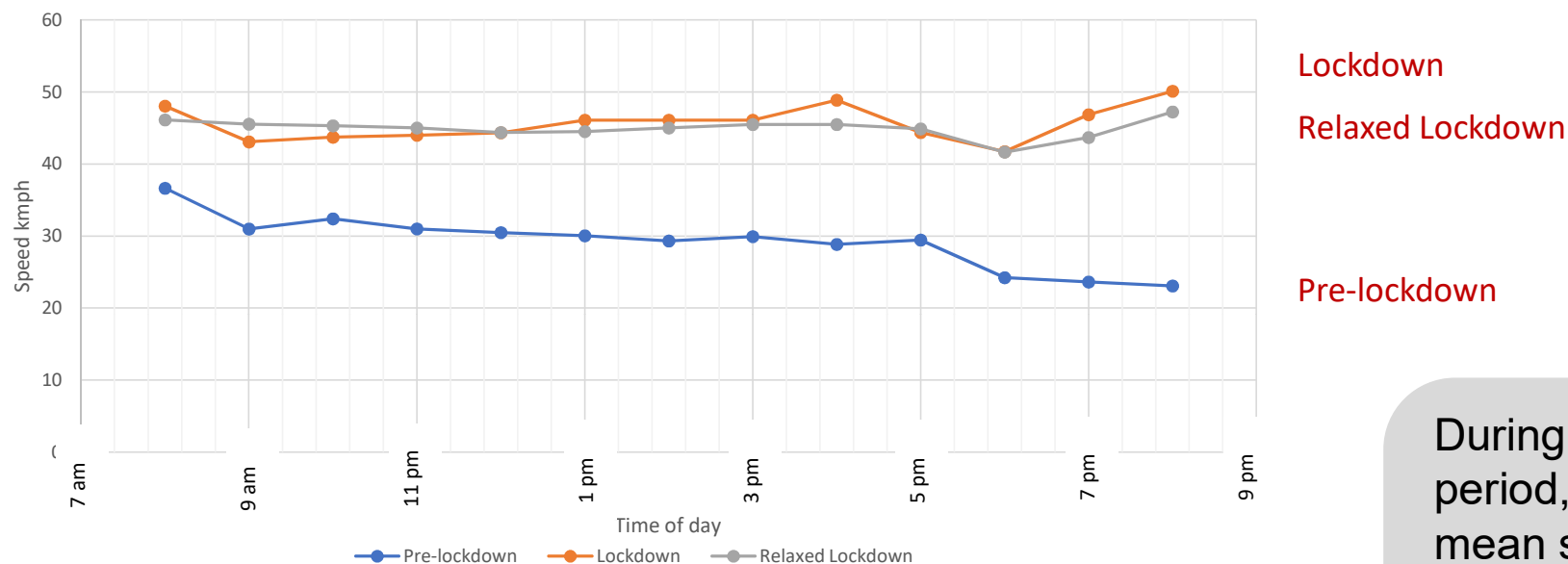


Gurugram
(March 16-21 vs March 30-April 3)



Delhi: Congestion down during lockdown

Speed profile of two weeks including pre-lockdown, during lockdown and relaxed lockdown



Speed table

| | Mean Speed (kmph) | Peak hr (kmph) | Off peak hour (kmph) |
|------------------|-------------------|----------------|----------------------|
| Pre-lockdown | 27 | 28 | 30 |
| Lockdown | 42 | 44 | 47 |
| Relaxed Lockdown | 42 | 44 | 45 |

During lockdown period, overall mean speed on Delhi roads increased by 15 kmph



Summer is also better than winter; but this lock-down made it sublime

Share of PM2.5 in PM10 during winter (December 1 -- January 31) and Summer (April 1-- May 31)

Delhi

Winter: PM2.5 is 65% of PM10

Lockdown: PM2.5 - 41% of PM10

Bengaluru

Winter: PM2.5 - 47% of PM10

Lockdown: PM2.5 -- 44% of PM10 i

Hyderabad

Winter: PM2.5 -- 52% of PM10

Lockdown: PM2.5 -- 43% of PM10

Kolkata

Winter: PM2.5 -- 50% of PM10

Lockdown: PM2.5 -- 44% of PM10

Mumbai

Winter: PM2.5 -- 48% of PM10

Lockdown: PM2.5 -- 30% of PM10





We did not feel the farm fires during lockdown: wind and clean air made smoke disappear

Farm Fire – April: 2019 vs 2020

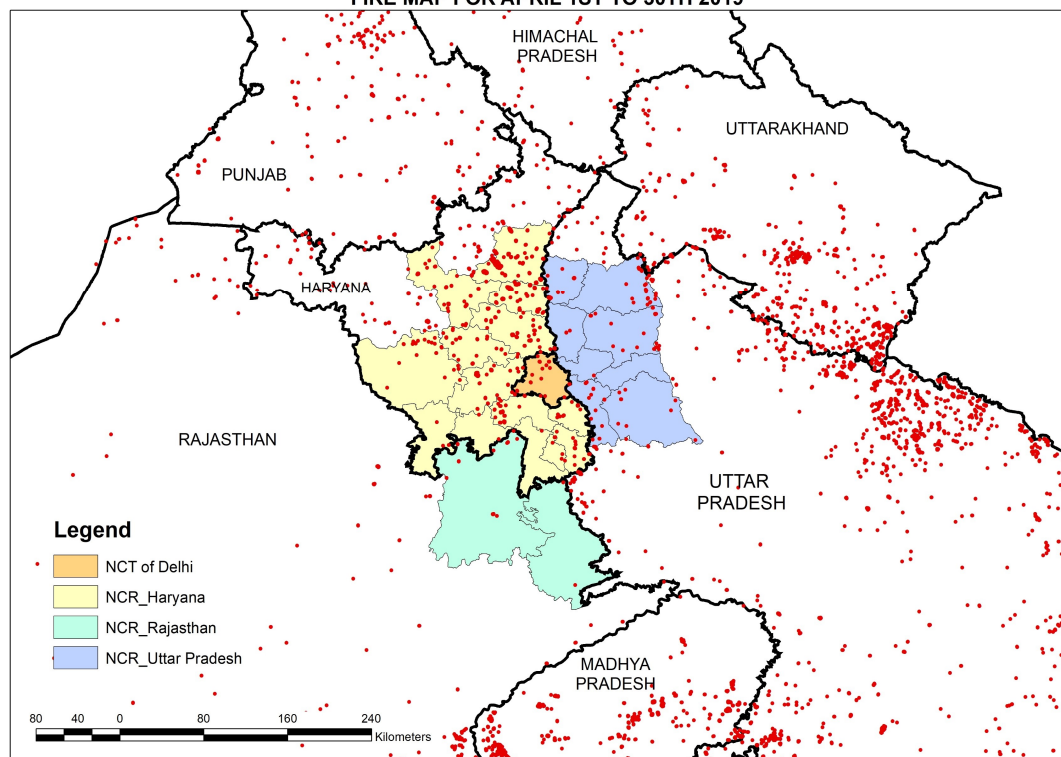
2019: NCR and beyond

(Cumulative for the month)

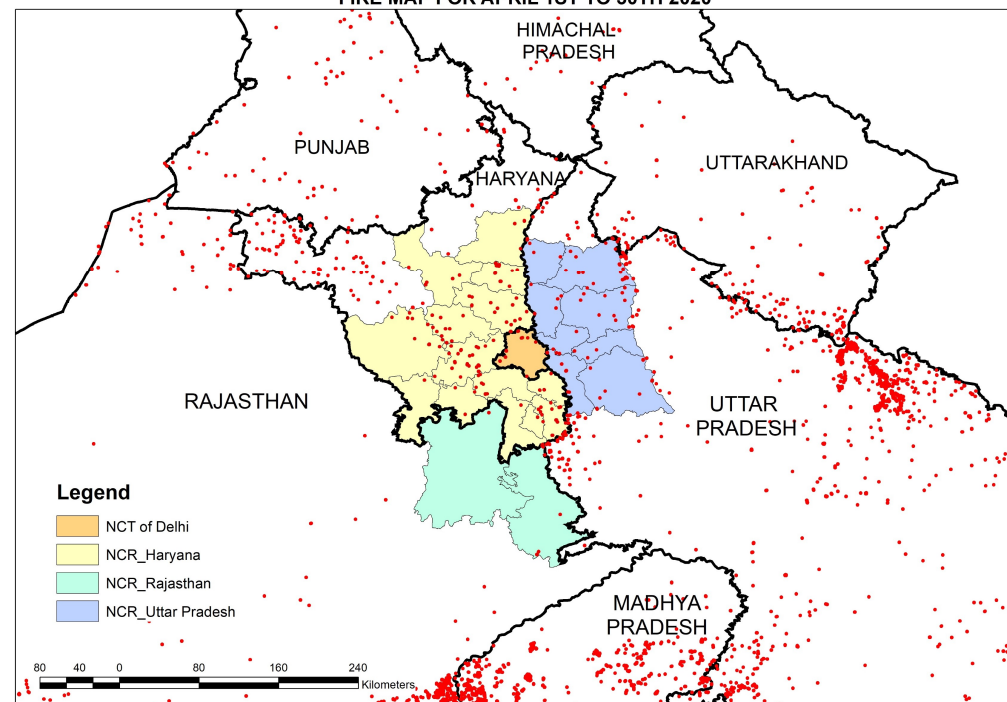
2020: NCR and

beyond

FIRE MAP FOR APRIL 1ST TO 30TH 2019



FIRE MAP FOR APRIL 1ST TO 30TH 2020



Data Source: NASA Fire Map (FIIRMS): <https://firms.modaps.eosdis.nasa.gov/map/#d:2020-05-09..2020-05-10;@71.1,7.8,3z>



What made the difference? No debate now of the sources of pollution

What stopped? Vehicles, Industry, Construction

What continued? Power plants, waste burning, solid fuels for cooking and dust

Delhi: What contributed to the decline in Delhi? (CPCB study, April 2020)

- During lockdown 1: PM10 and PM2.5 levels reduced by 35 to 40%,
- Reduction from industries -- ~10%;
- Transport -- ~15%;
- Dust -- ~10-15%; (because of reduced road traffic, dust re-circulation was lower)
- Some reduction from other activities such as refuse burning, airport, etc. as well.



Lessons from this air quality during lock-down

- 1. Improvement required full lock-down; no cars; no industry. Needed such massive scale of intervention to get change in air quality**
- 2. No question now what are the sources of pollution – vehicles and combustion from industry**



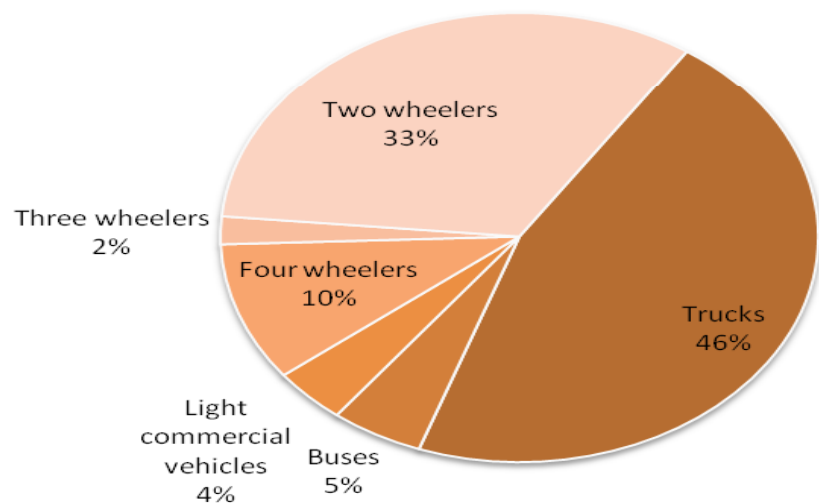
Agenda: What needs to be done to keep the clean air benefits

- 1. For vehicles
- 2. For industry
- 3. For power plants

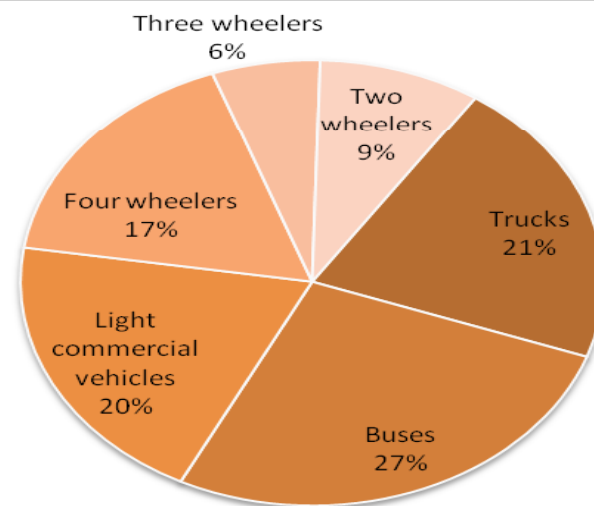


Contribution of different vehicle segments to pollution load

Contribution of each vehicle segment to particulate load in Delhi.



Contribution of each vehicle segment to NOx load in Delhi.



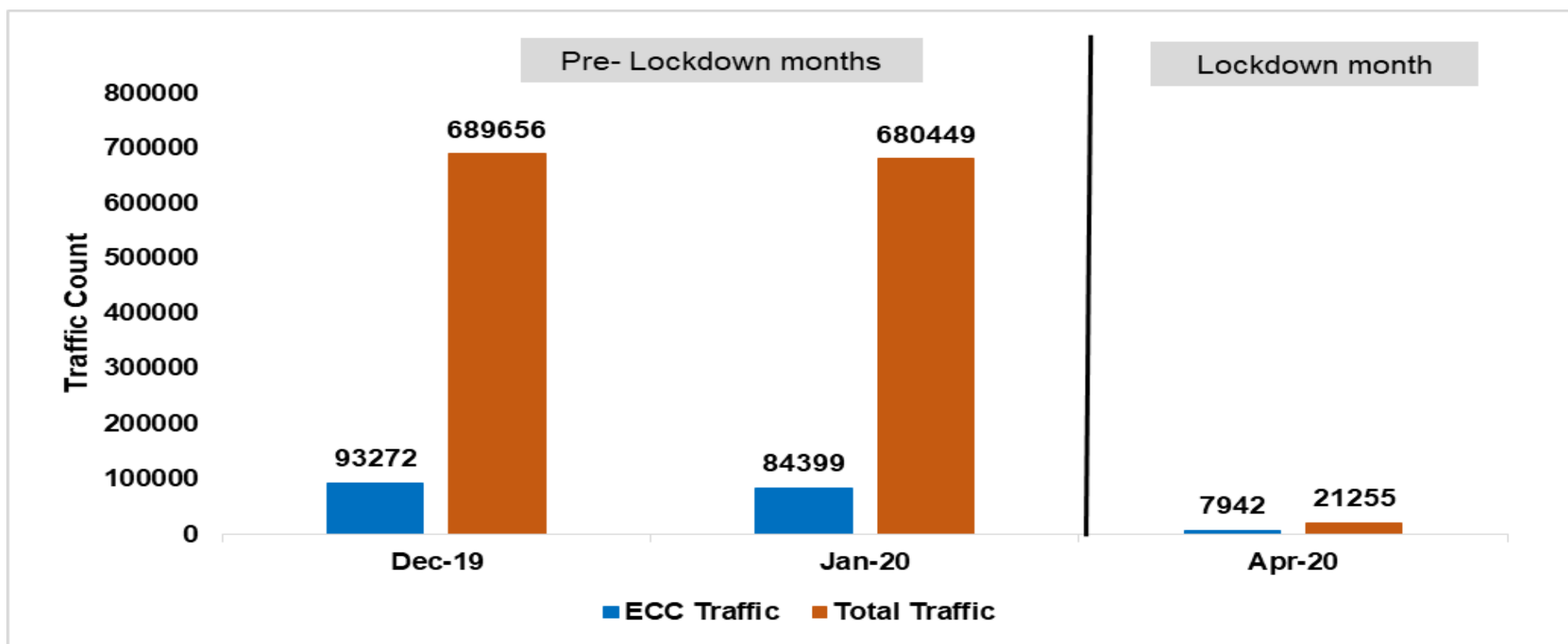
Source: IIT Kanpur 2016, Comprehensive Study on Air Pollution and Green House Gases (GHGs) in Delhi, Submitted to Department of Environment Government of National Capital Territory of Delhi,

<https://cerca.iitd.ac.in/uploads/Reports/1576211826iitk.pdf>



Heavy duty impact

91% drop in trucks and commercial vehicles entering Delhi during April compared to December-January

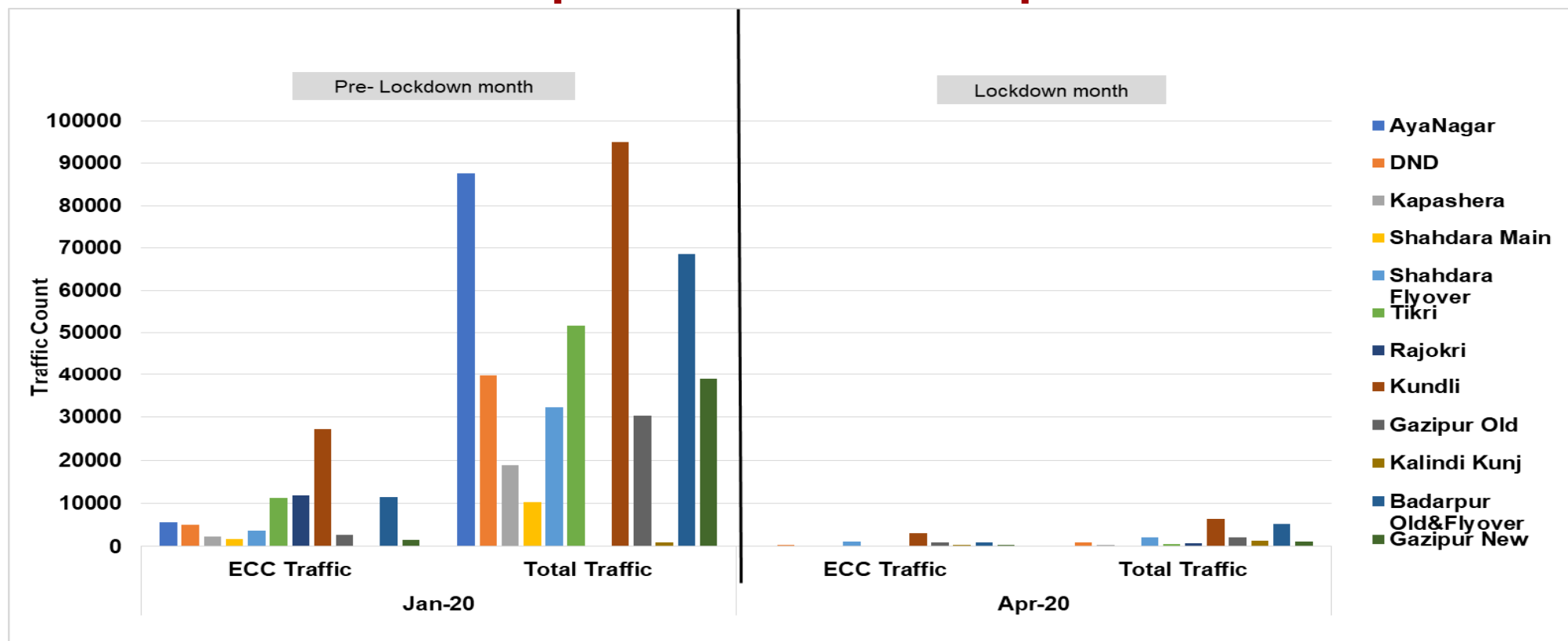


Source: Data submitted by SDMC to EPCA

- Total traffic is down by 97% during April from the pre-lockdown months of December and January₁₃



Toll gate wise commercial vehicle entry during pre- and lockdown period



Source: Data submitted by SDMC to EPCA

- Except Kalindi Kunj, all other locations have seen a massive drop in ECC and total traffic during the lockdown April month compared to January, 2020
- Decline varies from 66% in Gazipur old to approx. 100 percent in Aya Nagar
- Decline in total traffic varies from 92 percent in Badarpur Old&Flyover to approx. 100 percent in Aya Nagar



Agenda 1: Reduce pollution from heavy-duty vehicles post-lockdown

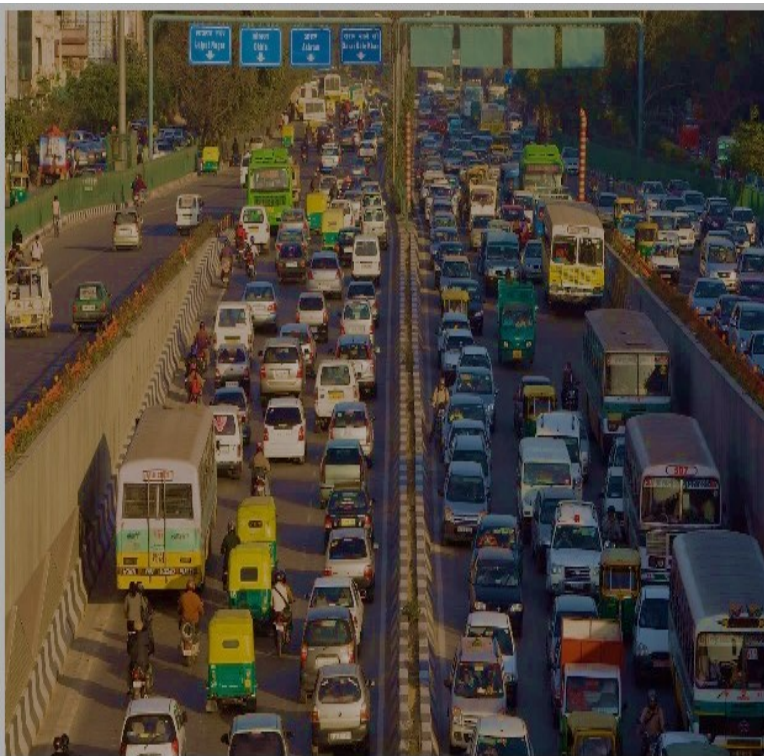
- Post-lockdown number of trucks will go back to 'normal'
- Therefore, pollution will also go back to 'normal'
- To avoid this, we need to urgently do the following
- BS VI diesel trucks/heavy duty vehicles are 90% less polluting than BSIV
- Opportunity for win-win
- Government should use financial stimulus to scrap old trucks and replace them with BS VI
- Will give economy/auto-industry a boost; will keep the clean air benefits
- But scrappage must be planned well so that old vehicles do not turn up in other cities/regions



Agenda 2: Clean vehicles switch: **an opportunity**

- Battery-power vehicles (e-vehicles) are cleaner (cleanest when there is clean electricity) – Link this with economic stimulus
- H-CNG vehicles will also be cleaner (opportunity to move towards Hydrogen)
- Mandate switch to cleaner vehicles in the priority segments – which travel highest – autorickshaw; taxi and bus
- Use the financial stimulus to provide funds for switch over to cleanest vehicles – change this quickly and at scale to provide both benefits to industry and for clean air

Mobility: back to normal means back to pollution



Lockdown period: What nearly stopped? Vehicles and travel

DELHI

Approx. no of Registered
Vehicles:
(in 2020)

12.1 millions

Total No of Tips per day:
(in 2020)

41.4 millions

Total No of Private vehicle
trips:
(in 2020)

4.6 millions
(53.0 millions km)



1.0 millions
(14.4 millions km)



3.6 millions
(38.6 millions km)



MUMBAI

3.8 millions

40.3 millions

1.9 millions
(17.7 millions km)

0.5 millions
(7.4 millions km)

1.4 millions
(10.3 millions km)



KOLKATA

1 million

23.5 millions

1.7 millions
(7.9 millions km)

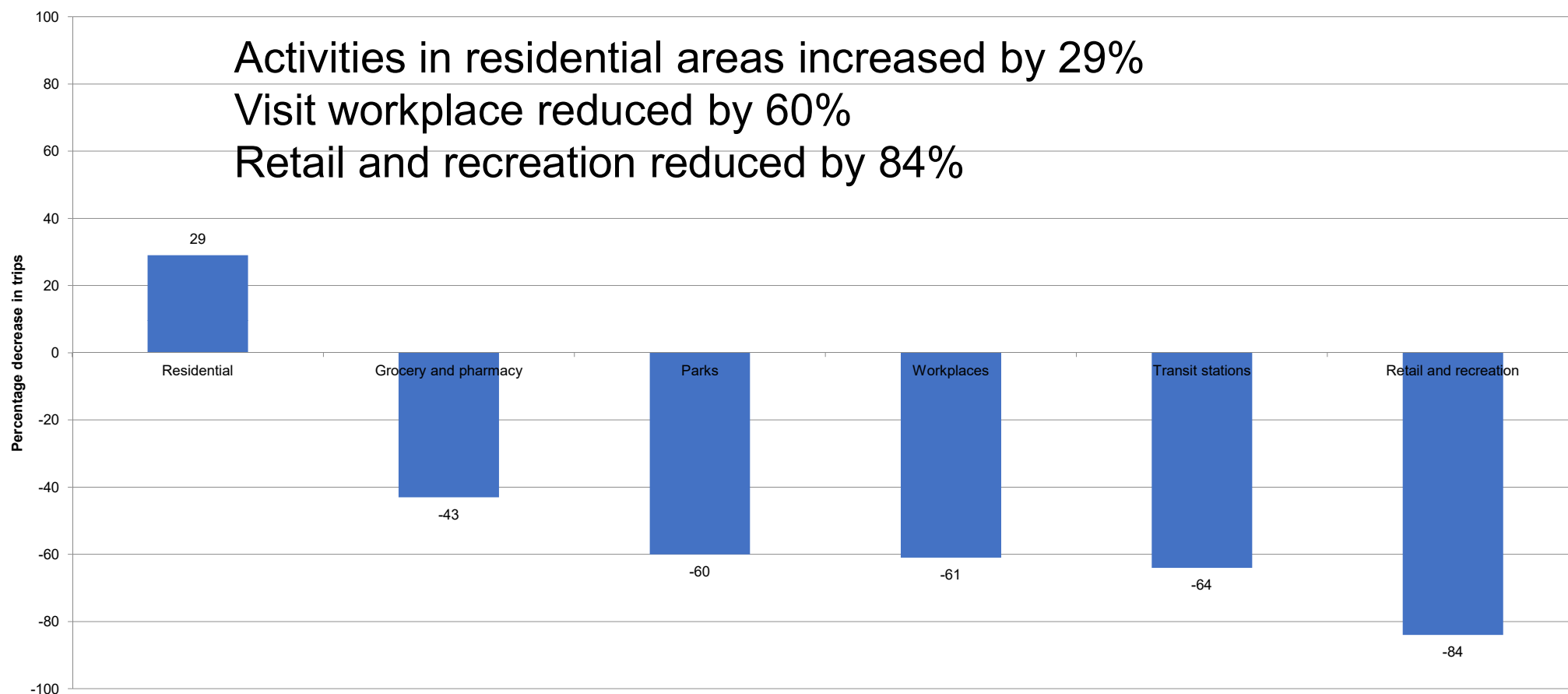
1.0 millions
(5.1 millions km)

0.7 million
(2.8 millions km)





Lockdown period: Massive change in activity pattern in India



Source: CSE analysis Google Mobility Data (from 15th Feb'2020 to 16th May'2020)



Massive drop in visits to metro/bus stations in India

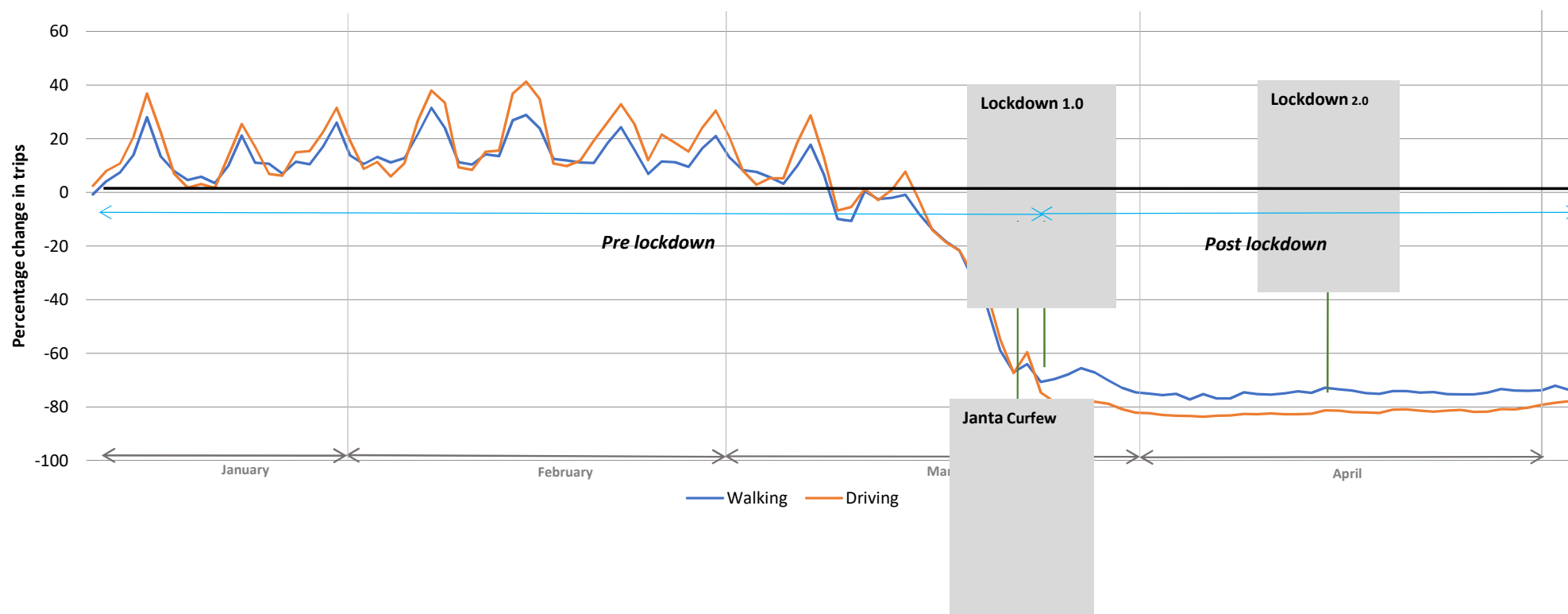


Source: CSE analysis Google Mobility Data (from 15th Feb'2020 to 16th May'2020)



During lockdown walk trips exceeded driving trips in India

Post lockdown all trips reduced drastically; But walk trips increased and exceeded motorised trips



Source: CSE analysis of Apple Mobility Trends Report (from January 13th, 2020 till April 30th, 2020)



Agenda: Reinvent mobility: move people and not cars

- Today we are re-opening without any plan to keep the clean air benefits of the lockdown
- It is made even worse because public transport is not allowed – so more cars; more two-wheelers; more taxis – on road
- We expect the ‘new normal’ to be the ‘old normal’ very soon
- **This is where we must do things differently**
- A. Learn from best practices globally and re-start public transport so that it ensures safety
- B. Massively augment public transport and quickly so that we can take a train; bus; walk and cycle



Reopening amidst crisis

Hygiene and sanitization

- Guidelines on hygiene and sanitization
- Social distancing protocols -- reduced occupancy, cashless transaction, boarding alighting norms, health check up and communication. Staff protection and management protocols
- Bangalore implementing bus priority lanes
- Digital data in maintaining safety protocol and mobility
- No financial package yet for rebuilding systems

Challenge of low occupancy bus -- A quick estimate for Delhi -- Pre-lockdown : 5400 buses with total service capacity of 741.6 lakhs km per day. With physical distancing norm service capacity to reduce to 211.9 lakhs km per day. To regain the service capacity at pre-lockdown level Delhi needs additional **13,243** buses. With protected bus lanes this can be reduced to **10049** buses. Ultimate solution – augment fleet and service. (CSE)

Intermediate transport and shared mobility – repurposing for deliveries groceries or essentials door-to-door; emergency services to take people to/ from hospitals courier service; fixed route service



Waiting for a bus

Need stringent enforcement

18 passengers
Face covered
Conductor near rear gate
Passengers boarding from both gates



Passengers are alighting from bus.

Gramin Seva –
7 people inside
excluding the driver.

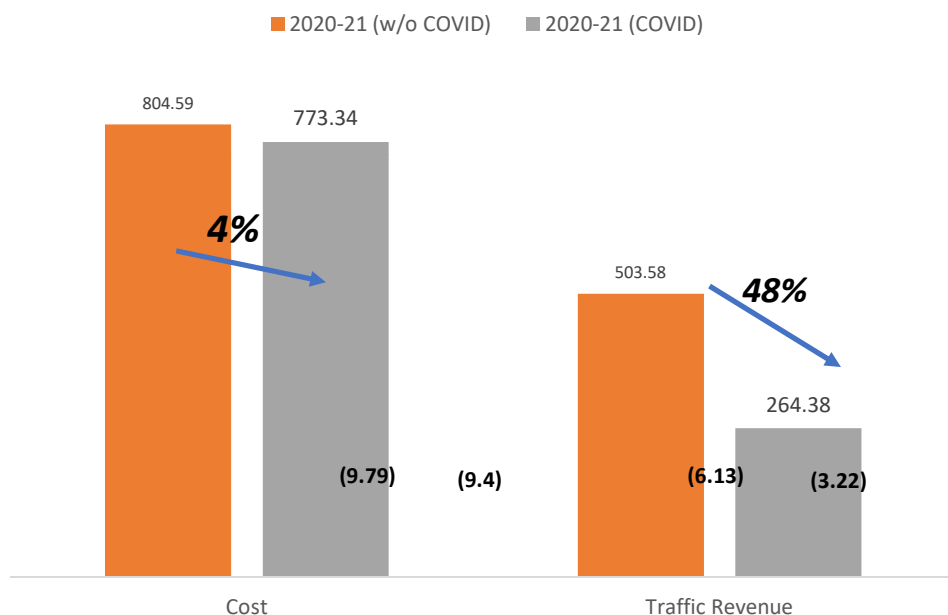


Source: CSE photo documentation, May 2020

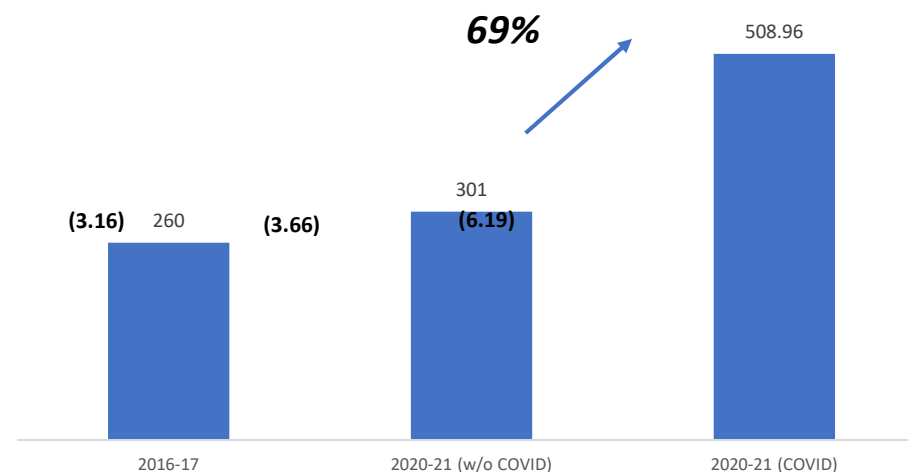


No financial relief for this essential service: Economic impact of lockdown on bus transport in India

Impact of COVID-19 lock down on total cost and traffic revenue compared to Normal operations (in INR Billion)- 2020-21



Impact of COVID-19 lock down on Annual VGF requirement* (In INR Billion) in 2020 values- 2020-21



When the cost reduced by 4%, the traffic revenue reduced by 48%.

This created a 69% increase in the annual VGF requirement of bus transport agencies in India

* Estimated for period from March 2020 to February 2021 considering regular operations from May 2020

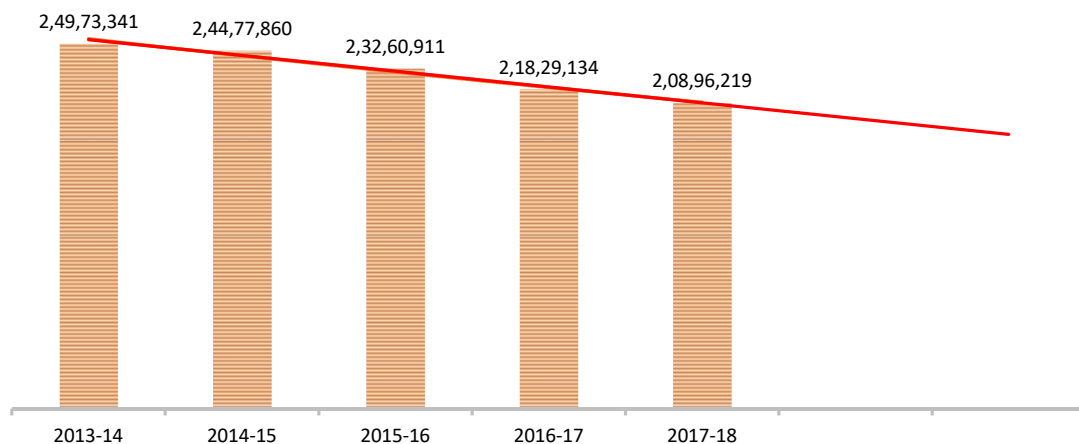
Source: GIZ



How to build scale?

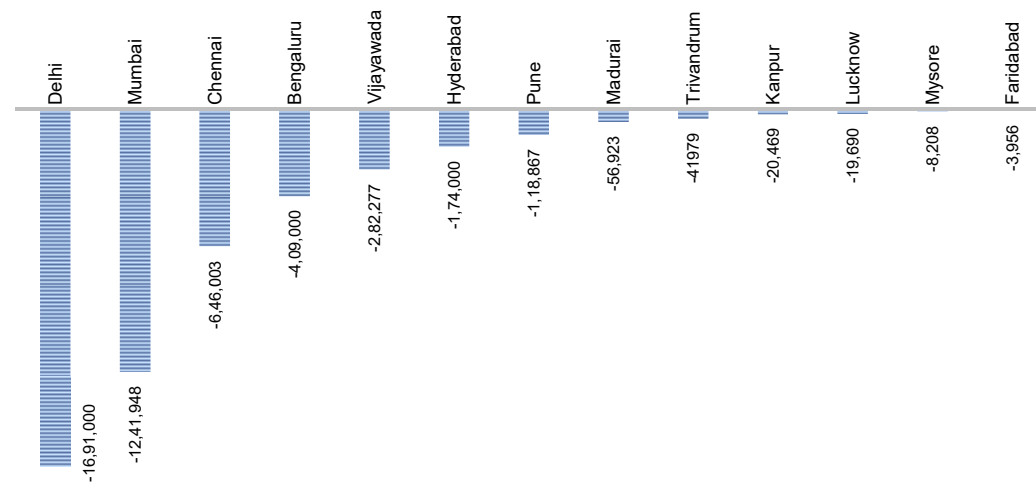
Bus ridership and fleet declining in major cities of India

Combined Daily Bus Ridership in Indian Cities
(Ridership of 17 major cities in India)



Source: RTI filed by CSE, 2019

Ridership loss in between 2013-18



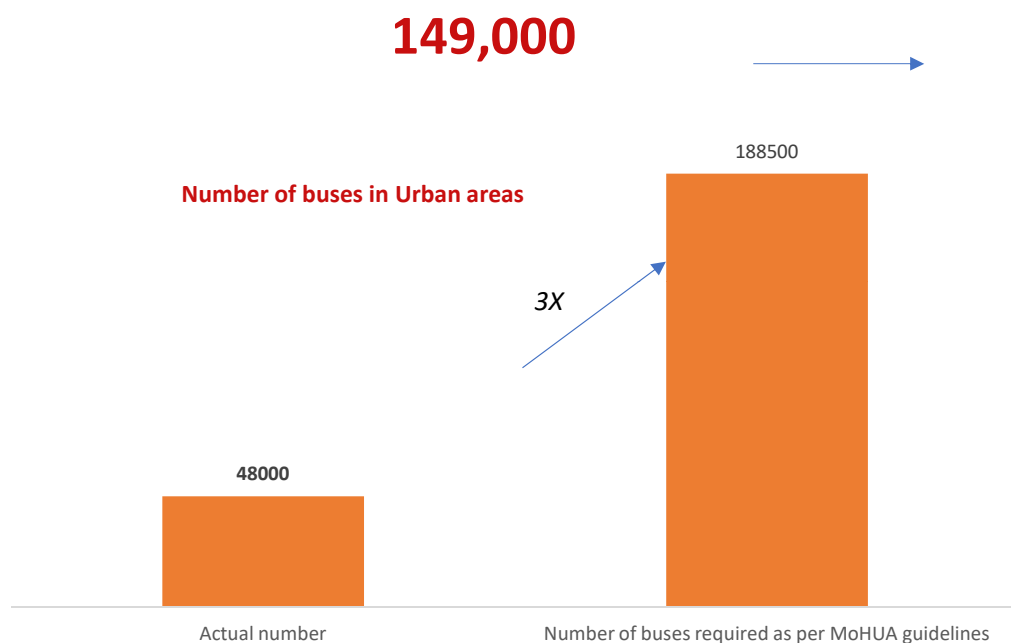
Source: RTI filed by CSE, 2019

Between 2013 - 18, 12 cities have lost combined ridership of 40.8 lakhs
NTDPC report: Passenger traffic will grow by 15-16 times over a economic growth of 7-9% per annually;
India needs to invest 8-10% of GDP in transport infrastructure



Buses required in Urban India

Public Buses



Served by **52** Govt. owned state transport undertakings and special purpose companies

25.01 Billion*

Passengers
served in
2016-17

586.61 Billion*

Passenger kms
served in
2016-17

Bus transport in India is already deficit in supply to meet the demand and is incurring financial losses continuously

Source: Road Transport Year Book, MoRTH; Performance of STUs, CIRT; Efficient and sustainable city bus services, SUTP

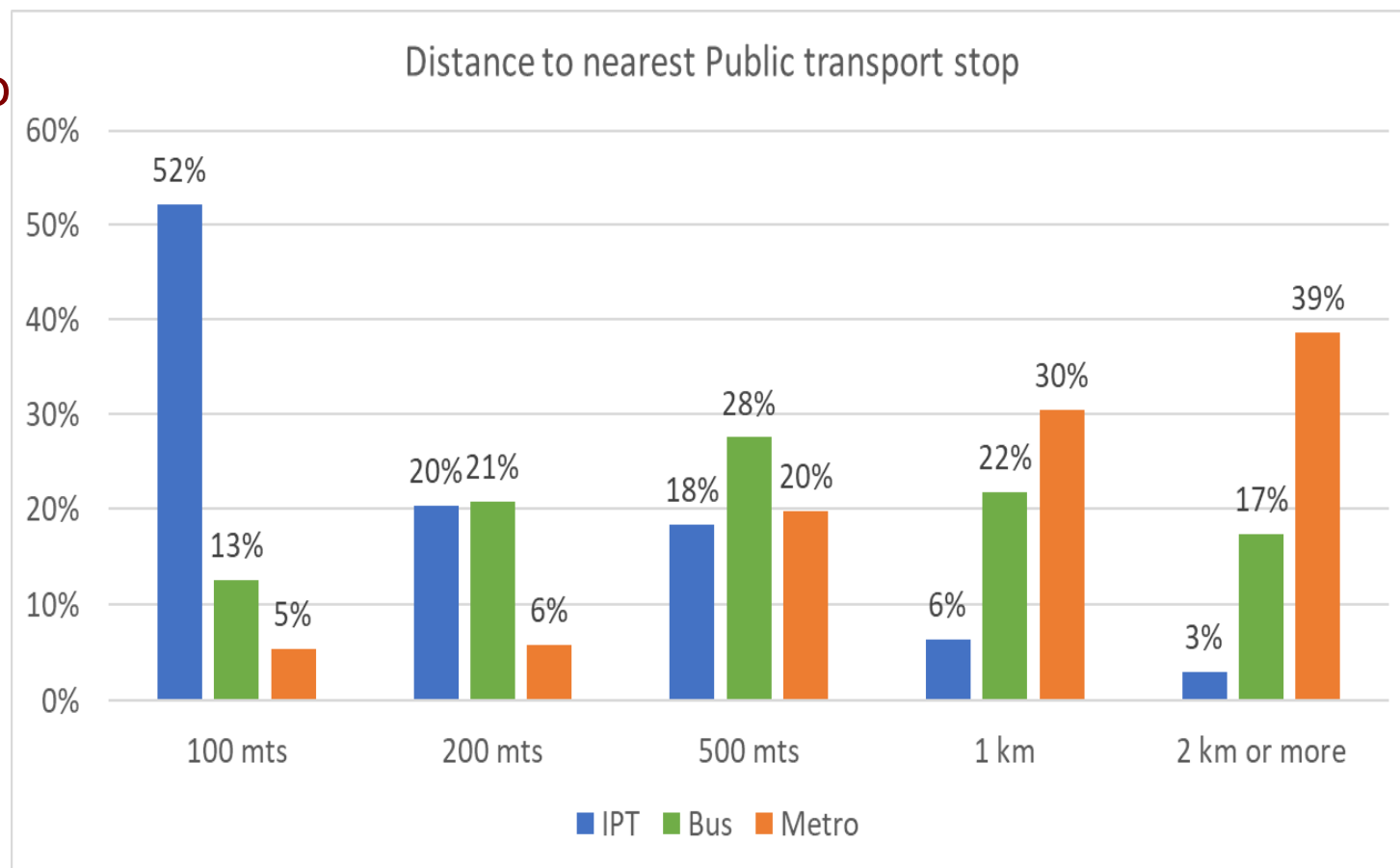
Source: Data from 41 reporting STUs for the year 2016-17, compiled by GIZ, Laghu Parashar



Delhi-NCR: Need access to buses and metro

CSE survey: Accessibility to public transport a challenge

- 40% do not have access to bus stops within 500 mt
- 69% do not have metro within 500 mt
- 34% have access to a bus stop within 200 mts
- 11 % have access to metro within 200 mts
- IPT is most accessible

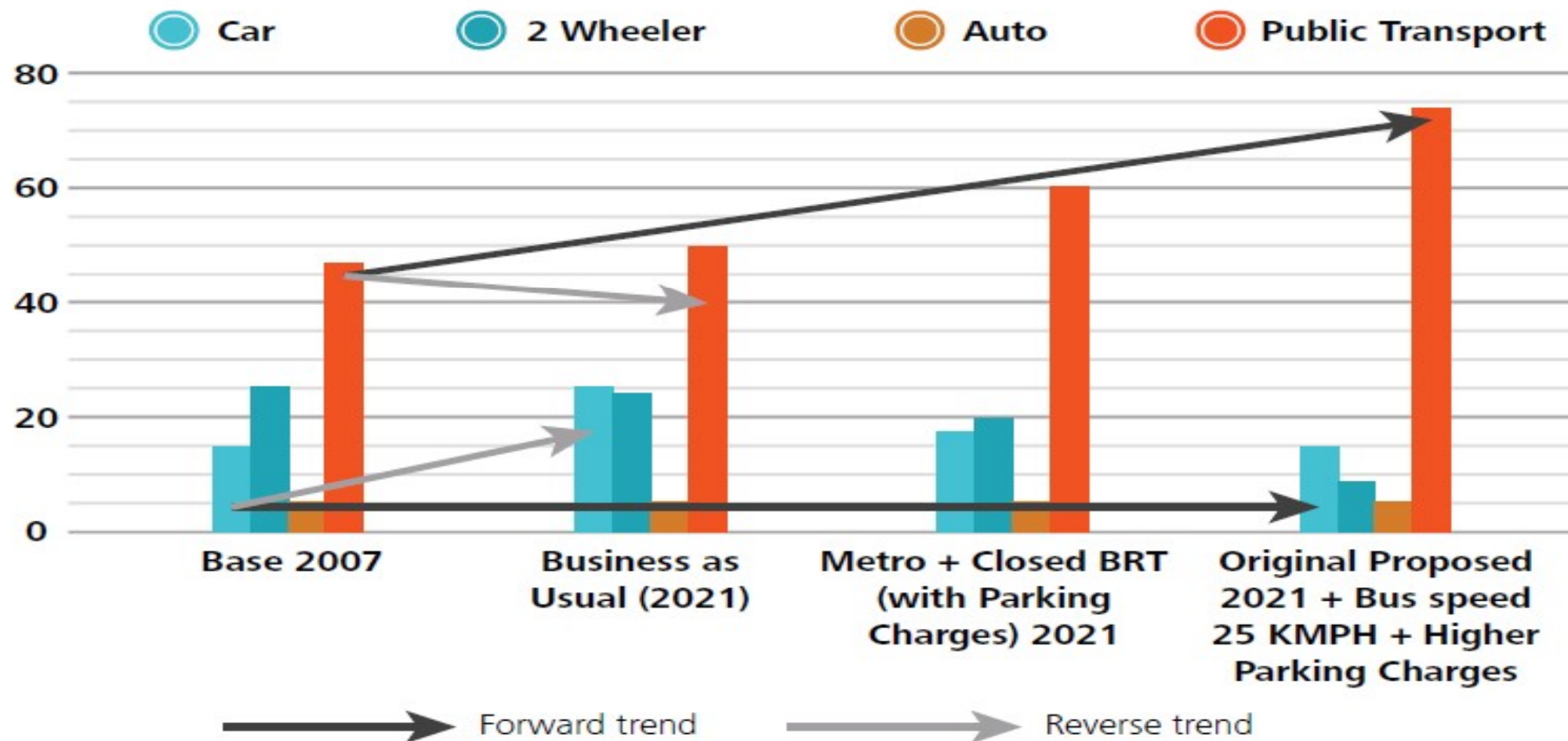


Note: Data is perception based as reported by respondent; Includes NCR towns

Source: CSE Survey



Delhi Decongestion Report: How to achieve target and scale?





Reinvent walking and cycling

CSE Survey during lockdown

Below 5km distance

- Walk and cycling – Increased from 14% to 43%;
- Car use reduced from 23% to 16% ;
- Metro reduce from 16% to 5%

An opportunity to shift short trips to walking and cycling

- **Implement cycling network plan** -- Preference for contact free travel increasing among all income classes -- 53% of all trips in urban India and 48% in Delhi NCR are below 5km
- **Develop infrastructure** to support cycling and walking e.g. bicycle lanes, expansion or repair of sidewalks, etc.
- **Safe street design**
- **Public amenities and public parks within neighbourhoods** to enhance the experience.

India's inherent advantage





Global action walking and cycling during pandemic

Rapid increase in demand for contact free walking and cycling

London: 10 fold increase in cycling and 5 fold increase in walking during pandemic -- Pop up temporary bike lanes

Proposed to increase congestion charging from June 22 (increase from 11.50 UK pounds to 15 UK pounds). **Promote work from home and related strategies.**

City bike count increased by 74% to 470% (Melbourne, New York, Philadelphia, Chicago, Shenzhen, Edinburgh, Glasgow, Manchester, and Wuhan).

Increased use and sale of bicycle (UK , European countries, and the US).

Big investment planned to create bike lanes Australia, California, France, etc); --- New York - ambitious plan to reconfigure road space for walking and cycling:

Pop up bike lanes





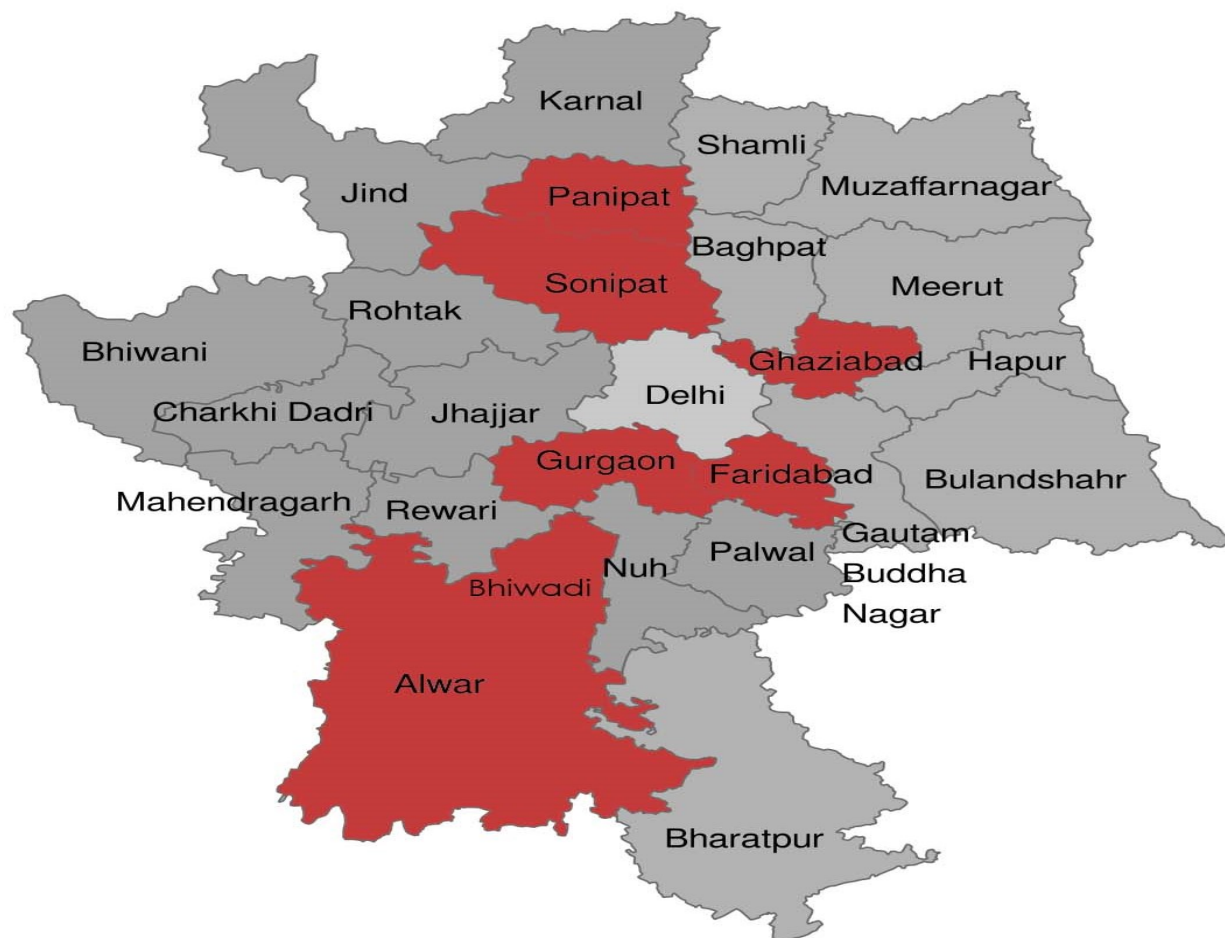
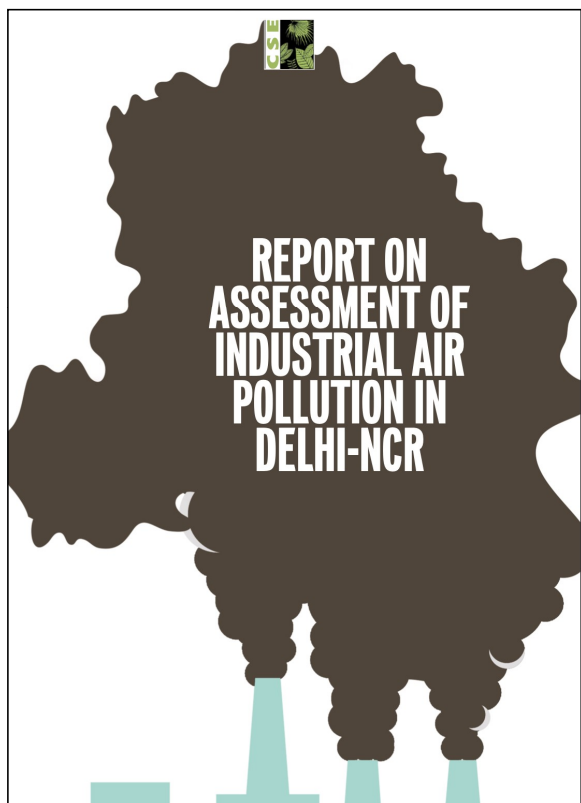
Agenda 3: Start public transport and augment

- 1. We know how critical public transport is for the city to run; it is time we recognised this and made it part of our first-plan**
- 2. Must re-start public transport**
- 3. Must augment it fast**
- 4. Must plan to do everything to also reduce travel needs – work from home to staggered times**
- 5. Must plan/implement cycle-walk for our cities**

This agenda cannot wait anymore. It is long-term, but change must start now



Agenda: Industry has huge contribution to pollution

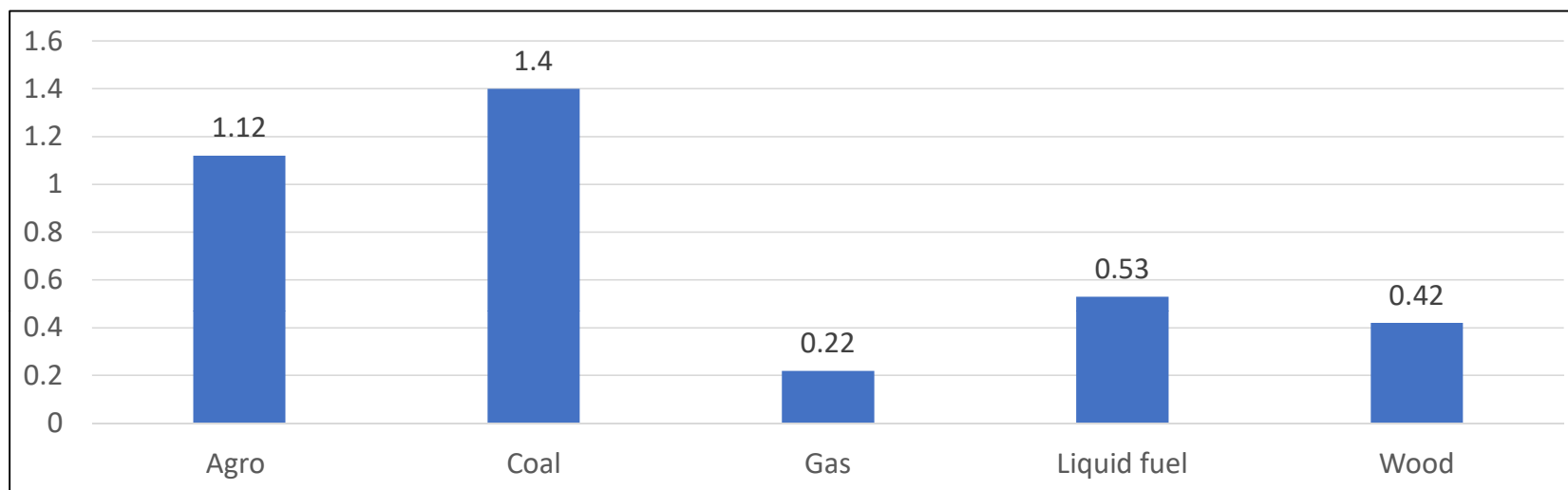


Source: CSE Report on Assessment of Industrial Air Pollution in Delhi-NCR, 2020



Coal dominates industrial fuels

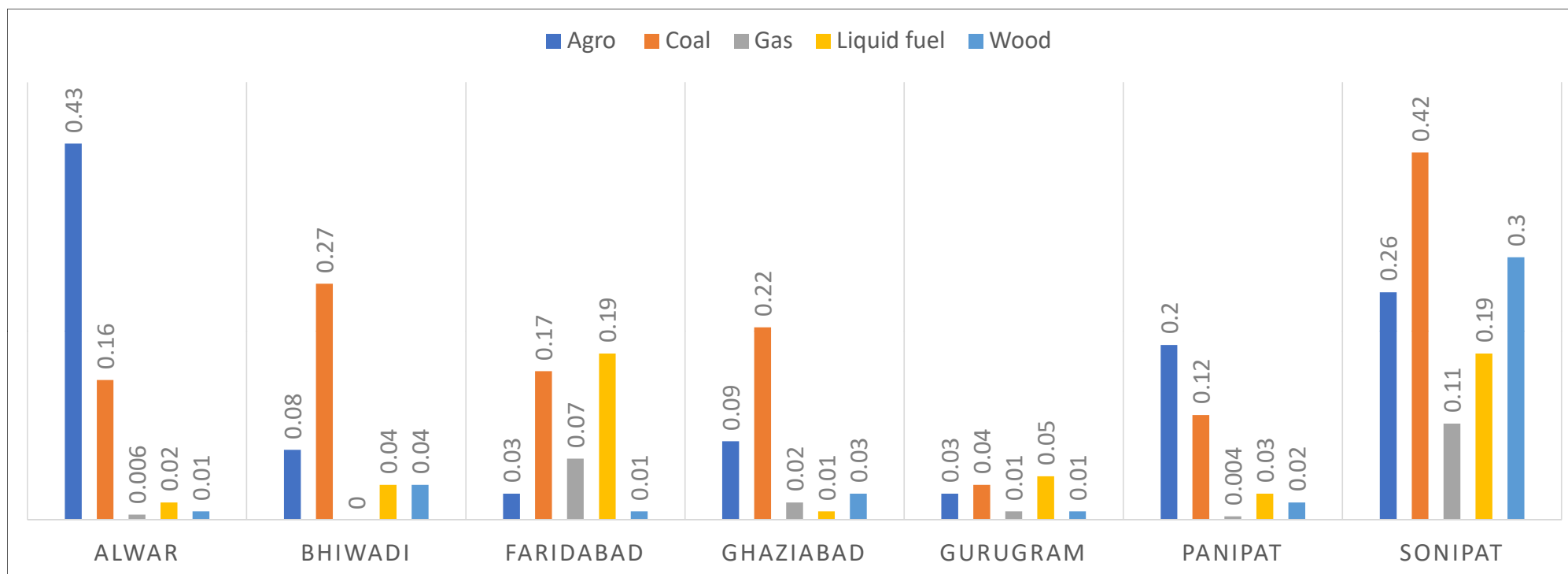
Total Annual Fuel Consumption
(in million tonnes per year)



Total 1.41 million tonnes of coal is consumed annually in the six districts: this contributes massively to the pollution load

Source: CSE Report on Assessment of Industrial Air Pollution in Delhi-NCR, 2020

District-wise Annual Fuel Consumption (in million tonnes per year)

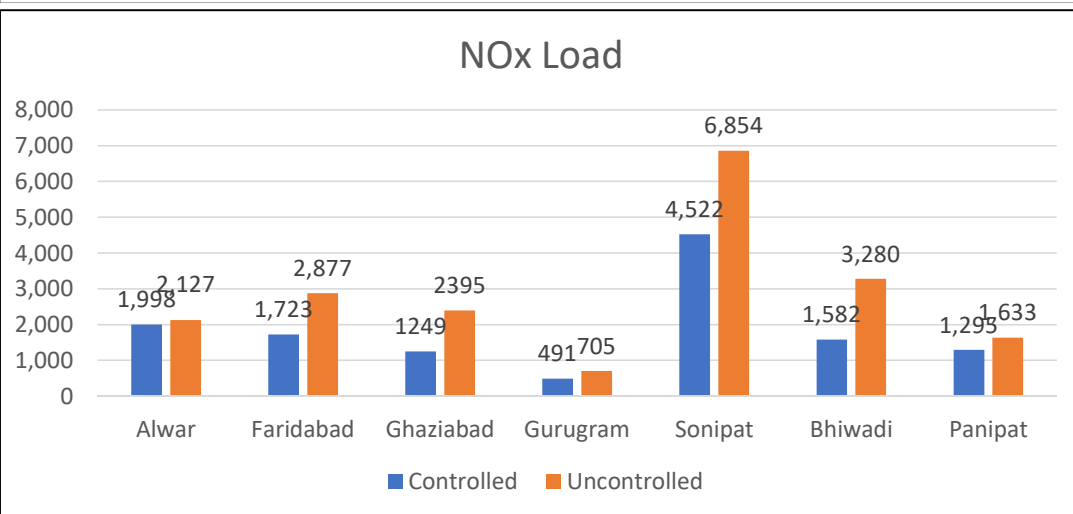
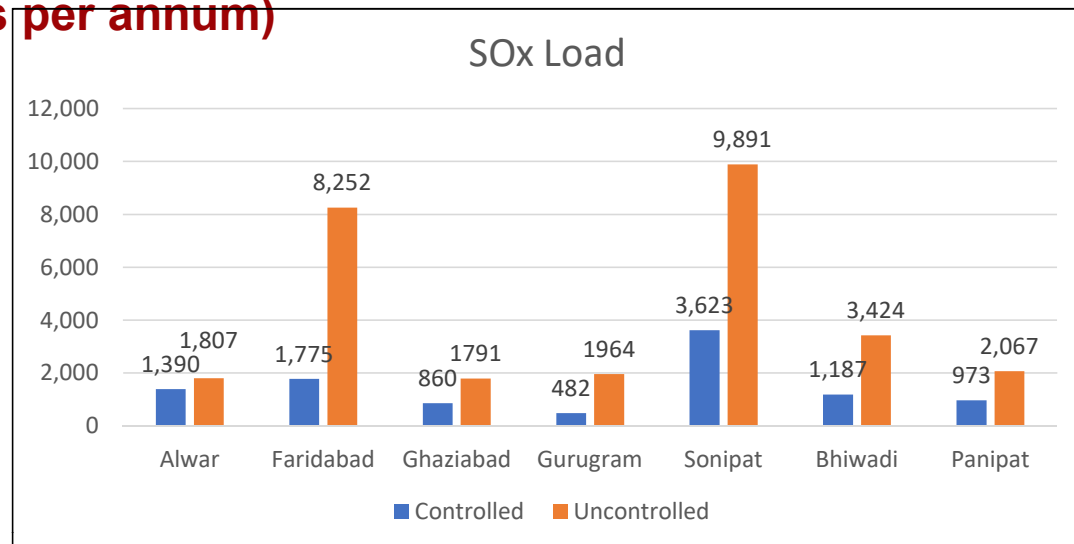
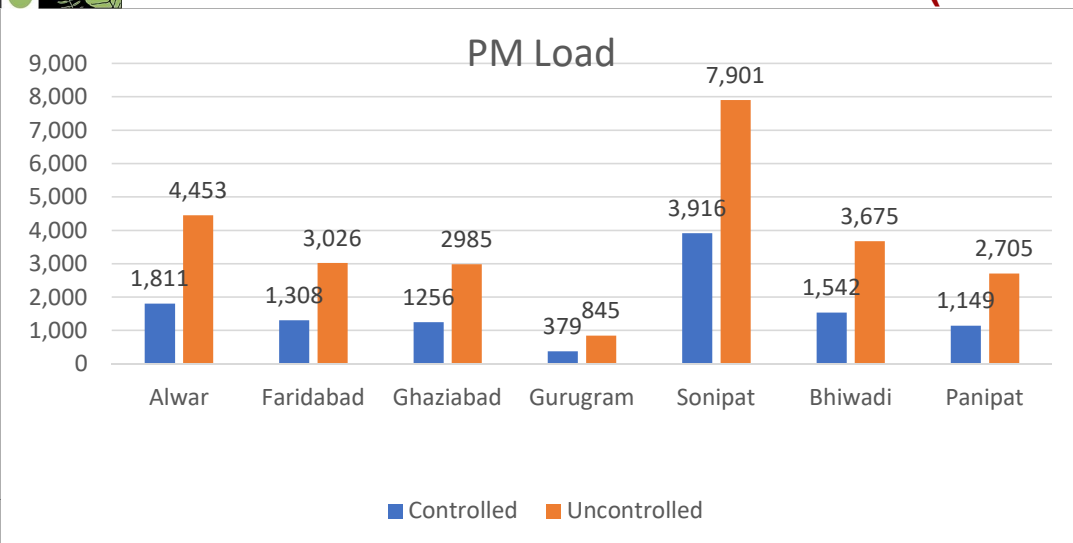


- **Maximum annual coal consumption in Sonipat district followed by Bhiwadi**
- **Sonipat also consumes highest amount of gas fuel among all districts. Shows scope for fuel switch**
- **Alwar district is the biggest consumer of agro based fuel**

Source: CSE Report on Assessment of Industrial Air Pollution in Delhi-NCR, 2020



District-wise Pollution Load (in tonnes per annum)



- **Sonipat district:** Highest controlled and uncontrolled pollution load for PM, SOx and NOx.
- **Alwar district:** Second highest controlled and uncontrolled load for PM
- **Faridabad:** Second highest controlled and uncontrolled load for SOx
- **Bhiwadi Region:** Second highest controlled load for NOx

Source: CSE Report on Assessment of Industrial Air Pollution in Delhi-NCR, 2020



Findings

- **1.41 million tonnes of coal is still being used** in these districts which is far above 0.22 tonnes of gas being consumed as a fuel.
- **Sonipat district is the largest coal consuming district** and has the **highest overall pollution load** amongst all the other 6 regions.
- Industries are small scale; difficult to monitor and enforce pollution norms
- The **major hotspot areas contribute between 35 to 80%** of the pollution load of that district. Priority action



Agenda 4: **The 2nd Natural gas transition**

- This time for industry; not just vehicles
- In 2000, Delhi cleaned up air by moving to clean gas fuel
- Now we need natural gas for combustion in industries across NCR
- But the problem is not supply
- The problem is price – dirty fuel coal is under GST so tax is lower and industries get credit; under OGL – so can be imported.
- But clean fuel – gas – is heavily taxed – over 40% tax
- For CNG the policy was keep dirty fuel (diesel) cost higher than clean fuel – **we need this now**



Agenda 5: 'clean' power is critical

Delhi has closed all coal power plants

All other power plants need to meet the new standards by 2022

- But our recent report finds that many power plants in NCR will did not meet the 2019 deadline; will not even meet the 2022 deadline
- Unacceptable
- We want a first-run policy – only those plants that meet the emission notification should be allowed to sell power
- We also need a affordable-reliable power policy as industry needs to switch for dirty fuel to cleaner fuel – power plants that meet 2015 standards; gas power or renewable power



The agenda for ‘New Normal**’:
Post-lockdown to keep the gains of
blue skies and clear lungs**



Agenda: urgent and action at scale

- 1. Do not delay the BS6 emission norms for vehicles; instead use this opportunity for a double-win strategy – **scrap heavy vehicles and replace them with BS6**: financial stimulus and clean air
- 2. Move at scale to **introduce cleaner battery vehicles** for paratransit and public transport – **mandate and pay for** the change starting with autorickshaws; taxi (where CNG is not available); bus and tram
- 3. **Start public transport** with all global best experience of ensuring safety
- 4. Use financial stimulus to **augment public transport** in cities – bus, metro and light-rail – do this at scale and speed
- 5. **Cycle and walk must be part of the ‘new-normal’** – incentivize people to reduce travel; take cycles to work



Agenda for clean air post-lockdown

- 6. Bring natural gas under GST to reduce tax burden and to incentivize clean fuel over dirty
- 7. Remove coal from OGL – so that imports can be regulated and use can be monitored
- 8. Ensure power plants across the country meet 2015 emission standards – introduce First-Run policy so that only clean power can sell electricity

Bottomline: do this all at scale and speed to match the disruption of the lock-down