



National Automotive Test Tracks

Opportunities / Viability for Retro-fitment with Alternative Fuels as an Alternative to Scrappage of Old Vehicles

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NATIONAL AUTOMOTIVE TEST TRACKS



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- Alternative Fuels and the Role of CNG
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- CNG Adoption Across Vehicle Categories
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ABOUT NATRAX

NATRAX is one of the state-of the-art automotive testing and certification center under National Automotive Board (formerly known as NATRIP Implementation Society) and a flagship project of Ministry of Heavy Industry.



TRACKS - 14



**INSTRUMENTATION
FACILITY**



LABS - 5

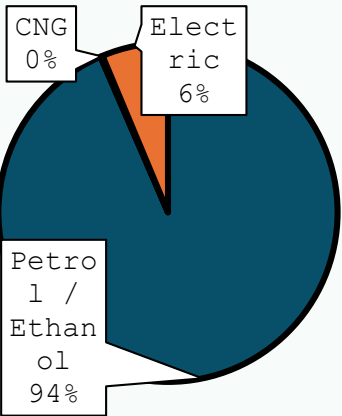


LAND AREA 3000 ACRES



Alternative Fuels and the Role of CNG

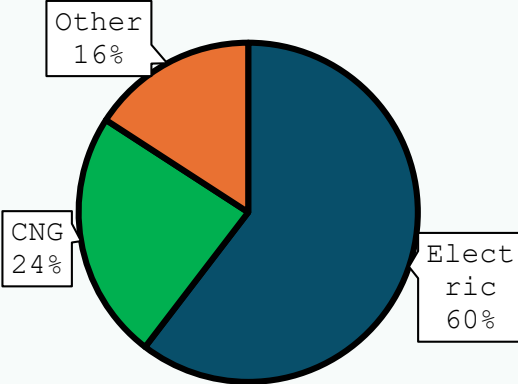
2-WHEELER



- Petrol / Ethanol (93.49%)
- Electric (6.31%)
- CNG/LPG (0.21%)

CNG 0.21 %

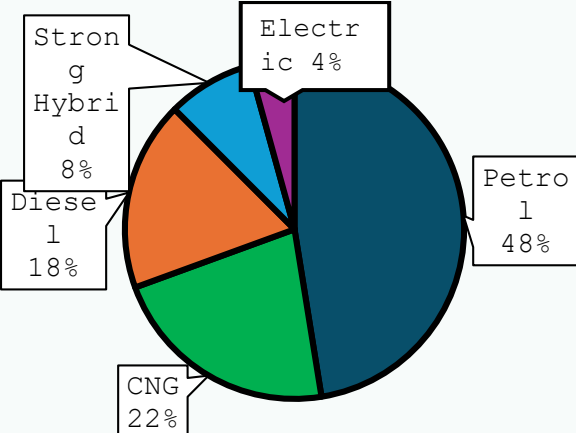
3-WHEELER



- Electric Dominates 3W (61%)
- Fastest EV Transition
- Strong CNG Presence (24%)
- ICE Declining

CNG 24 %

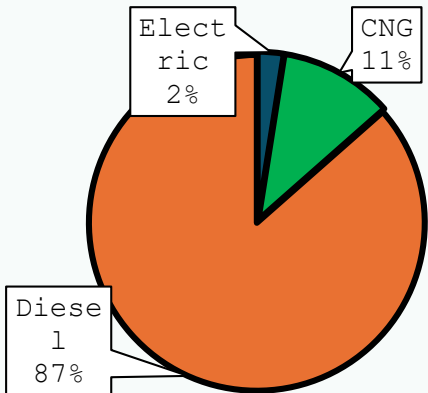
4-WHEELER
(PASSENGER VEHICLE)



- Petrol Leads Passenger Segment
- CNG Adoption Growing (22%)
- EVs Gaining Traction (4.3%)
- Diesel Share Declining (18.1%)

CNG 22 %

COMMERCIAL VEHICLE (CV)



- Diesel Remains Dominant (86.5%)
- Critical for Heavy CVs
- CNG Growth in LCVs (11%)
- Early Stage EV Adoption (2.5%)

CNG 11 %

CNG been considered as a mainstream fuel and seen potential growth in all segments

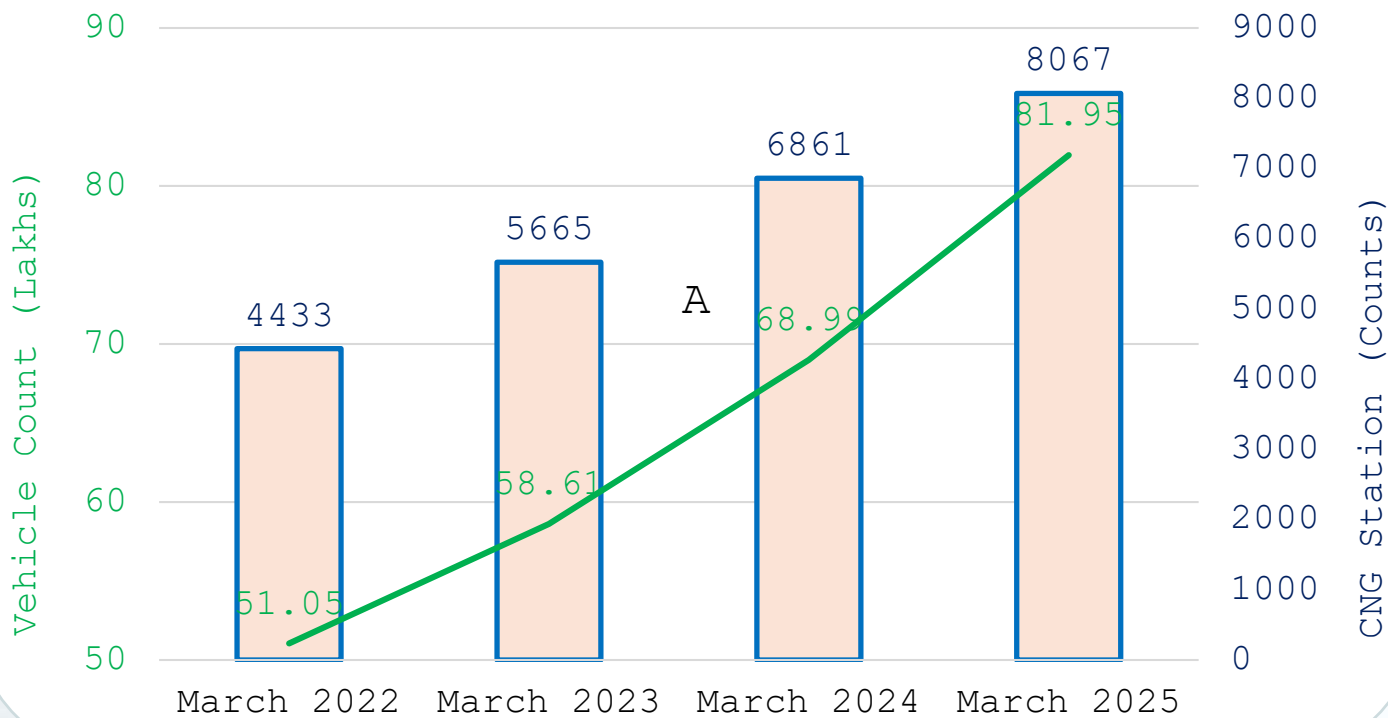


CNG Growth in India

FROM POLICY-LED ADOPTION TO A NATIONWIDE CITY GAS DISTRIBUTION ECOSYSTEM

CNG VEHICLE FLEET

Cumulative vehicles, lakh – March each year



THE CNG PATHWAY

Policy → infrastructure → adoption → new segments

- **2000-01** **Delhi bus transition**
Supreme Court directions accelerated large-scale CNG adoption.
- **2015** **1,009 stations | 25.5 lakh vehicles**
PPAC Ready Reckoner
- **2022-25** **51.05 → 81.95 lakh vehicles**
Rapid expansion of both fleet and CNG infrastructure.
- **2025-26** **8,067 → 9,096 stations**
Nationwide network continues to expand; 9,096 stations by Jul-2026.

The story is no longer only about a fuel – it is about a growing mobility ecosystem.

Sources: PNGRB CGD data / eBook (2022-25); PNGRB MIS & July-2026 dashboard; NITI Aayog; Supreme Court CNG directions; PPAC Ready Reckoner 2015 (as used in draft).



CNG Adoption Across Vehicle Category

VAHAN RECORDS, 2016 – 2026 (2026 PARTIAL YEAR)

~20.5 Crore

Cumulative **Petrol** Vehicles

~0.8 Crore

Cumulative **CNG** Vehicles

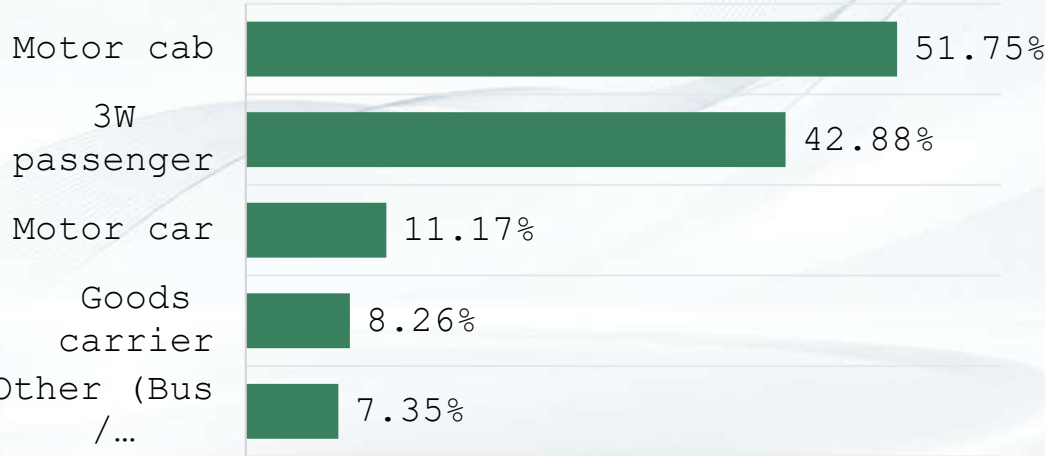
~3.16%

CNG Share across all Fuels

Volume in Selected Vehicle
Classes (Lakh)

Vehicle class	Petrol	CNG
Motor cab	3.15	10.49
3W passenger	1.48	22.02
Motor car	208.53	40.95
Goods carrier	2.73	6.77
Other (Bus / Motorcycle / scooter)	1,840.79	0.41

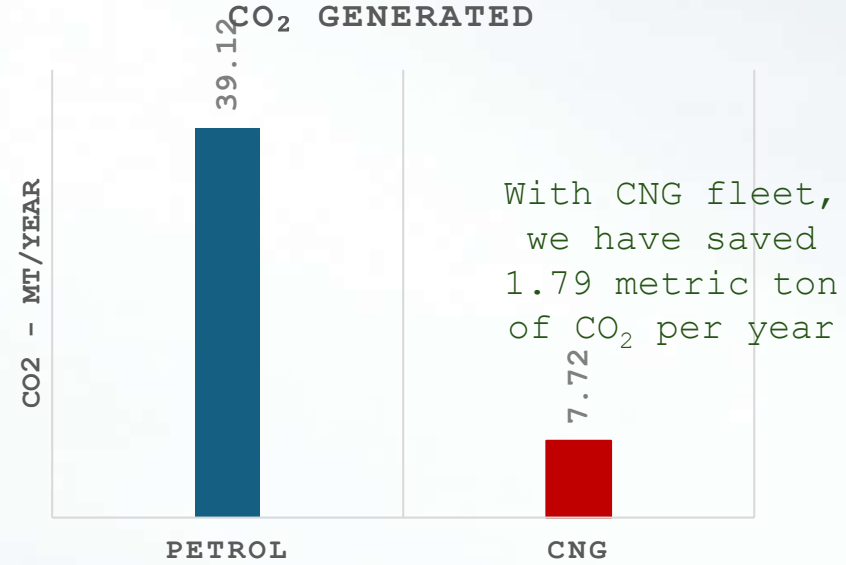
CNG Share within each Class



Petrol Motor cab/cars ~ 2.1 Cr been considered for further analysis on savings if have been migrated to CNG fleet

Source: VAHAN Portal.

Illustrative annual tailpipe CO₂ comparison



Petrol Case

15 km/litre → 800 litres/year
800 × 2.31 kg CO₂/litre = 1,848 kg

~~CNG Case~~

22 km/kg → 545.5 kg/year
545.5 × 2.75 kg CO₂/kg ≈ 1,500 kg

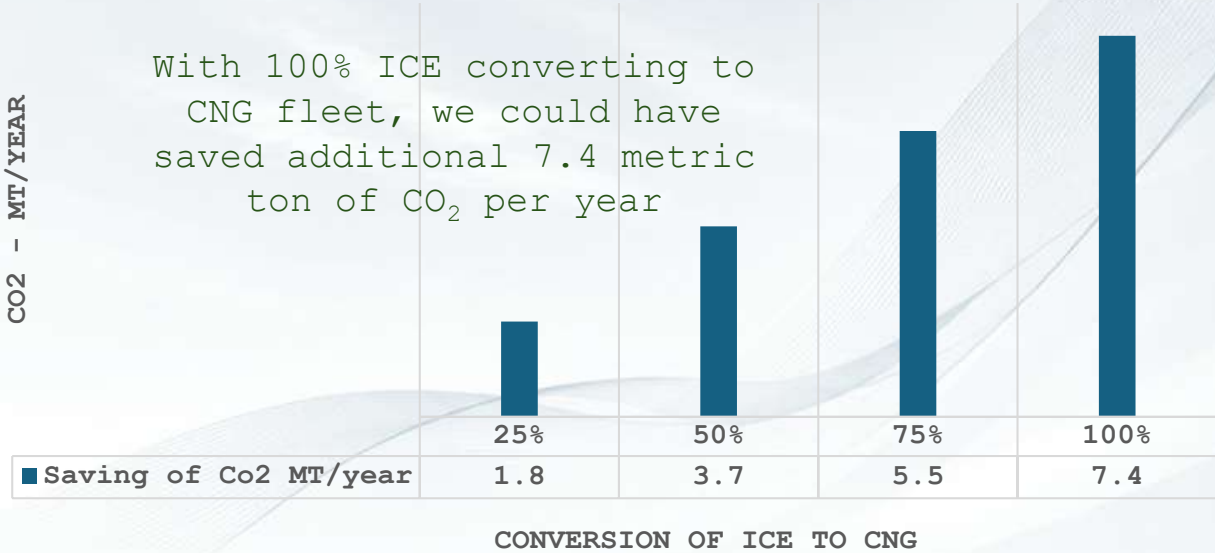
CO₂/year

Annual tailpipe CO₂ reduction per car = 348 kg, ≈18.8% reduction per vehicle

~ 7.4 metric tones of CO₂ potentially could have been saved if considered CNG fleet as 100%

Fleet scale multiplies the potential CO₂ benefit

ICE TO CNG CONVERSION & SAVINGS OF CO₂ MT/YEAR



Volume in Selected Vehicle Classes

Motor Cab / Car ~ 2.1 Cr Petrol cars

Motor Cab / Car ~ 0.5 Cr CNG cars



ESTIMATED CO₂ & COST REDUCTION THROUGH CNG ADOPTION



OPTION A | CNG RETROFIT

Existing 15-year-old sedan

TOTAL 5-YR SPEND

₹3.20
lakh

NET CO₂*

~8.0
Ton

Retrofit kit & installation	₹55,000
Kit manufacturing footprint	0.2 t CO ₂
RTO / fitness	₹5,000
CNG fuel over 60,000 km	₹2.60 lakh
CNG tailpipe CO ₂	7.8 t

Illustrated total: ₹3.20 lakh •
8.0 t CO₂

OPTION B | SCRAP + REPLACE

Purchase a new petrol sedan

TOTAL 5-YR SPEND

₹13.53
lakh

NET CO₂*

~17.4
Ton

New sedan (net outflow)	₹8.75 lakh
New-car manufacturing	8.5 t CO ₂
Petrol fuel over 60,000 km	₹5.00 lakh
Petrol tailpipe CO ₂	10.7 t
Old-car scrap credit	-1.8 t CO ₂
	₹12k tax concession* + ₹10k OEM discount**
	-₹0.22 lakh

Illustrated total: ₹13.53 lakh •
17.4 t CO₂

5-YEAR COMPARISON

Using supplied scenario values

LOWER SPEND WITH RETROFIT

₹10.33 lakh

LOWER NET CO₂ WITH RETROFIT

~9.4 Tons

Illustrative values; assumptions and boundaries require validation.

TAKEAWAY | In this 5-year scenario, CNG retrofit costs less and has lower estimated net CO₂ than scrappage + replacement.



India's Scrappage Policy and ELV Challenge

INDIA HAS ~1 CRORE 15-YEAR-OLD CARS

EXTENDING THEIR LIFE BY 5 YEARS COULD SAVE ~₹10.33 LAKH Cr



EXPANDING LIFE SPAN OF A 15-YEAR-OLD CAR



REPLACE IT – OR EXTEND ITS VALUE?

Two pathways for a privately owned ICE vehicle – subject to roadworthiness, fitness, approvals and applicable law.

15 YEARS | DECISION POINT

PATH A | SCRAP & REPLACE



₹ CASH OUT

OUTCOME

New asset + warranty; high upfront capital

1

Scrap vehicle → obtain scrap proceeds

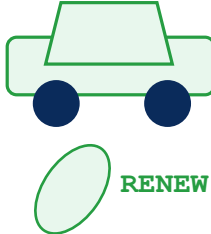
2

Apply eligible CoD / scrappage benefits

3

Fund a new vehicle + on-road costs

PATH B | RETAIN & RENEW IF ELIGIBLE



RENEW

OUTCOME

Targeted spending; defer replacement and retain liquidity

1

Inspect; repair / refurbish as needed

2

Optional approved CNG / compliant retrofit

3

Meet fitness, approvals & renewal rules

THE FINANCIAL QUESTION

REPLACE NOW

New vehicle price + on-road costs - scrap proceeds - eligible benefits

EXTEND IF ELIGIBLE

Inspection + repairs + retrofit + testing / approvals / renewal

VALUE FROM CONTINUED USE: personal use • rural / lower-mileage duty • taxi or fleet service

Potential life extension is conditional – only roadworthy, technically suitable vehicles that meet applicable fitness, approval and renewal requirements qualify.

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INDIA'S END-OF-LIFE VEHICLE CHALLENGE

WHAT IF EVERY OLD VEHICLE DOES NOT HAVE TO END AS A SCRAP?



SCRAP



Loss of Resources

Environmental Burden

Economic Loss

Our Question:

RETROFIT & EVALUATE

Give suitable vehicles a second



CNG / LPG Retro fitment

Emission s Real Driving Performanc e

Lab-based evaluation On-road RDE testing Power and drivability

Can certified CNG / LPG retro-fitment improve emissions, real-world performance and durability enough to keep suitable vehicles in service?

PROJECTED END-OF-LIFE VEHICLES (ELVs)

23 MILLION • 2025 50 MILLION • 2030

Source: NITI Aayog, as cited in the supplied reference



Can Retro-fitment
be an Alternative Pathway?

REDUCING CARBON EMISSION WHILE PRESERVING USEFUL LIFE



A typical passenger car emits about 400 grams of CO₂ per mile (roughly 120 to 200 grams per kilometer), adding up to about 4.6 metric tons of CO₂ per year



Vehicle Reaches it's end of Life, but vehicle mechanical condition is good



Vehicle is retrofitted and working as it works previously and generates less carbon emissions.

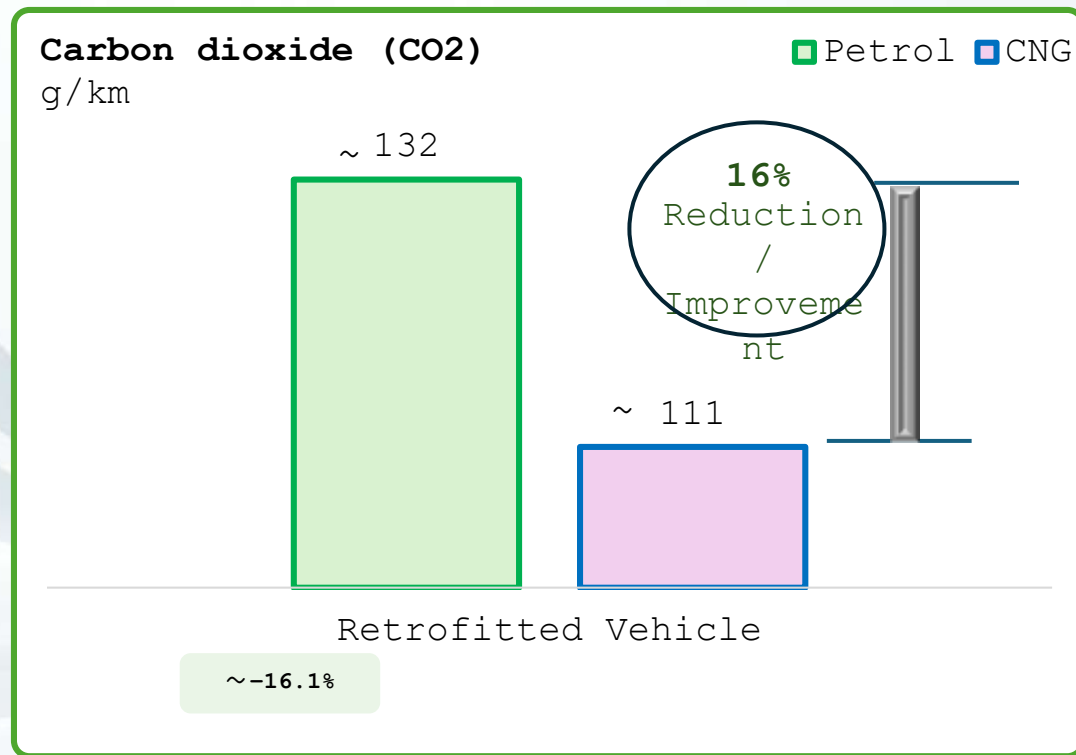


NATRAX Studies on Petrol v/s CNG

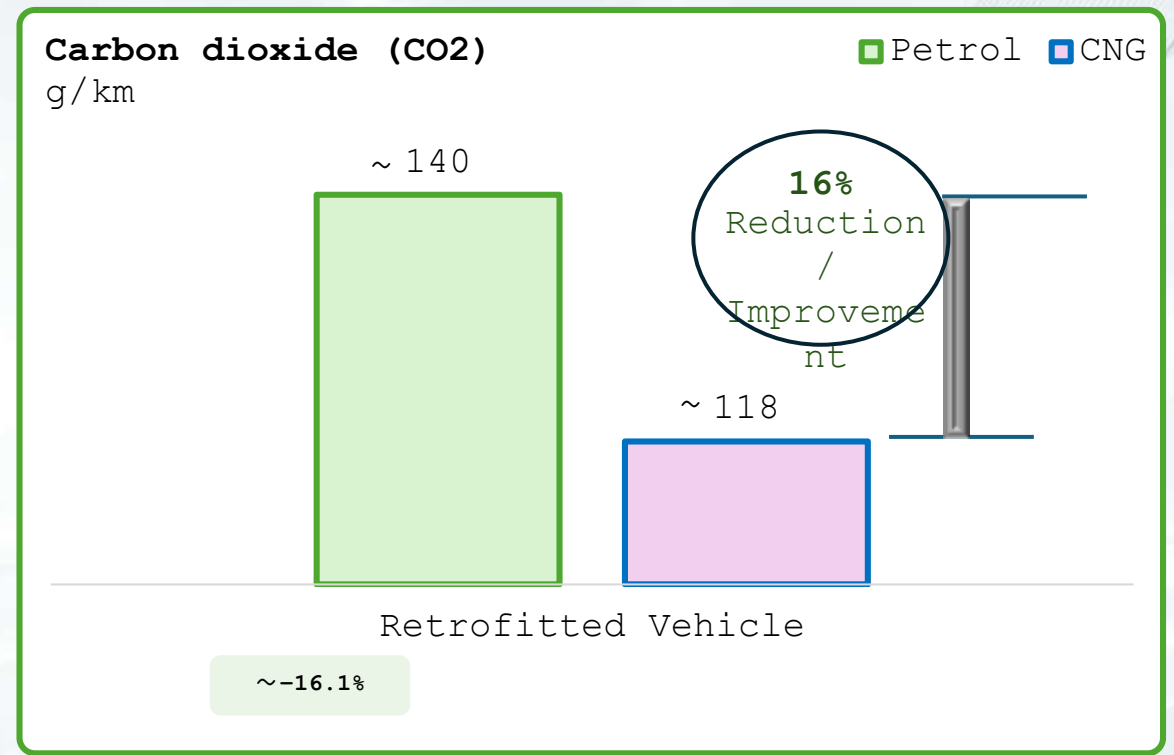
REAL DRIVE EMISSION OUTPUT AND LAB RESULTS OF TEST VEHICLE WITH DIFFERENT FUELS

- RDE results show a mixed impact of CNG retro-fitment on emissions.
- The results highlight the importance of retrofit calibration and integration with the vehicle's emission-control system.
- We have conducted multiple test over the test vehicle and found an average value of test results which is listed in below graphs.

LAB MASS EMISSION



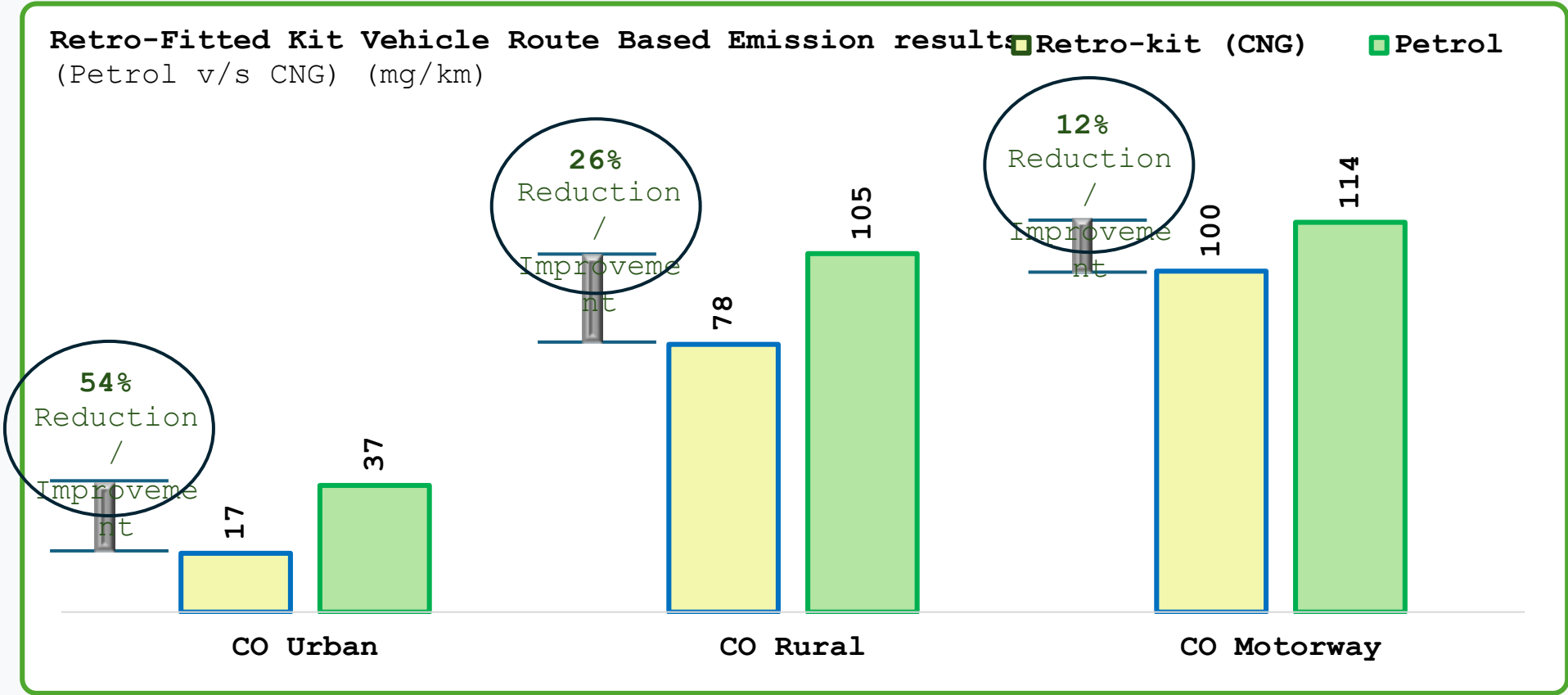
REAL DRIVE EMISSION



CO₂ reduced by
16.1%

EMISSION RESULTS DURING RDE TESTING ON ROUTE – BASED EVALUATION

- Retrofit CNG reduced CO across urban, rural and motorway phases





Conclusion

<p>1. Reduced CO₂ Emissions</p> <p>Converting suitable petrol vehicles to CNG can lower tailpipe CO₂ emissions during their remaining service life.</p> 	<p>2. Extended Useful Vehicle Life</p> <p>Retains vehicles that remain mechanically sound, safe and legally eligible for continued operation.</p> 	<p>3. Reduced Premature Scrappage</p> <p>Avoids discarding serviceable vehicles solely because their original fuel technology is less efficient.</p> 
<p>4. Potential Resource Conservation</p> <p>Reuses existing vehicle structures and components, potentially avoiding some manufacturing-related material demand.</p> 	<p>5. Economic Benefits</p> <p>Retro-fitment may be more affordable than purchasing a new vehicle, depending on conversion costs and remaining vehicle life.</p> 	<p>6. Alternative-Fuel Transition</p> <p>Enables existing vehicles to participate in the transition toward cleaner propulsion without immediate full replacement.</p> 

CNG RETROFITMENT : A POTENTIAL PATHWAY FOR SUITABLE IN-USE VEHICLES

MEASURED RESULT

~16%

**Tailpipe CO₂
reduction with CNG vs
petrol**

Observed in both
laboratory and RDE
testing of the
evaluated vehicle.

**Vehicle-specific
finding**

WHAT THIS MEANS

01

A credible option to assess

Certified CNG retro fitment may extend the useful life of vehicles that remain technically fit.

02

Not a blanket substitute for scrappage

Vehicles that fail fitness, safety or applicable emission requirements should not be retained through retro fitment alone.

03

Adoption must be evidence-led

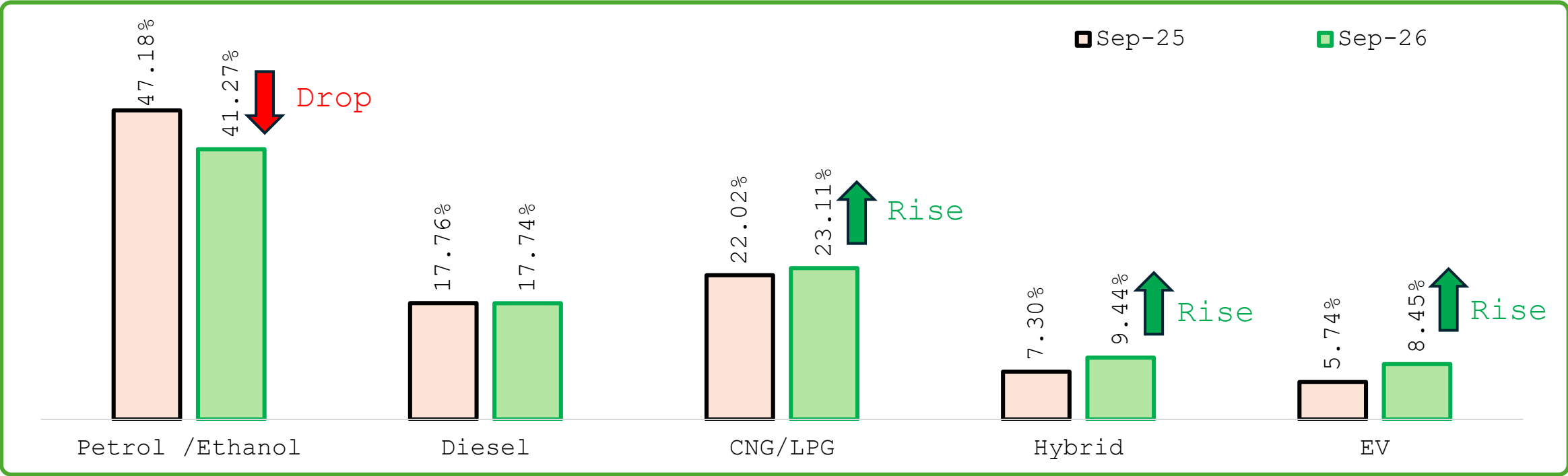
Fitness, regulatory compliance, installation quality, cost and continued performance all matter.

Retrofit suitable vehicles; retire those that cannot meet fitness and compliance requirements.

NATRAX • Findings limited to the vehicle and test conditions evaluated

PETROL IS LOSING SHARE, ICE IS NOT DISAPPEARING

• INDIA PASSENGER VEHICLE, SEPTEMBER 2026



41.00%

OF PASSENGER VEHICLE SALES ARE NOW
CNG + HYBRID + EV

India is Diversifying Powertrains, not Abandoning engines.

• Source: FADA, September 2026 PV retail registrations

Thank you