ऊर्जा दक्षता ब्यूरो
(भारत सरकार, विद्युत मंत्रालय)
BUREAU OF ENERGY EFFICIENCY
(Government of India, Ministry of Power)

आज़ादी का अमृत महोत्सव

BEE/Transport/HDV/24/ 2635

28 जुलाई 2025

कार्यालय ज्ञापन/ Office Memorandum

विषय: एचडीवी, एमडीवी और एलडीवी के लिए भविष्य के ईंधन दक्षता मानदंडों के मसौदा प्रस्ताव पर टिप्पणियां आमंत्रित करने के सम्बन्ध में / Inviting Comments on the Draft Proposal for Future Fuel Efficiency Norms for HDVs, MDVs & LDVs.

The Ministry of Power, in consultation with the Bureau of Energy Efficiency (BEE), introduced Constant Speed Fuel Efficiency (CSFC) norms for M3 and N3 vehicle categories in 2017, followed by the expansion of these norms to include M2, M3, and N2 categories in 2019.

In continuation of this initiative, BEE has undertaken a revision of the existing CSFC norms for these categories, with a view to update and strengthening the regulatory framework. To support this process, a study was commissioned through TERI in 2022. Based on the findings of this study, BEE has prepared a draft proposal containing the following key elements:

a. Methodology for establishing new fuel consumption baselines.
b. Expansion of coverage to include all fuel types used in commercial vehicles (beyond diesel).
c. Inclusion of the N1 category of vehicles, which were previously excluded.

A copy of the draft proposal is enclosed at **Annexure-1**.

All concerned stakeholders, industry representatives, experts, and members of the public are invited to review the draft proposal and submit comments and suggestions within 30 days from the date of publication of this Office Order through spandita@beeindia.gov.in, deepak.suri@beeindia.gov.in

यह सक्षम प्राधिकारी के अनुमोदन से जारी किया गया है।

सादर,

समीर पंडिता

(समीर पंडिता)
निदेशक

Copy for information to:

1. Sr. PPS to Secretary, Ministry of Heavy Industry
2. Sr.PPS to Secretary, Ministry of Power
3. Sr.PPS to Secretary, Ministry of Road Transport and Highways
4. PS to CEO, NITI Aayog
5. Staff Officer to Principal Scientific Adviser

संलग्न : उपरोक्त अनुसार

चौथा तल, सेवा भवन, आर० के० पुरम, नई दिल्ली-110066, वेबसाईट / Website : www.beeindia.gov.in
4th Floor, Sewa Bhawan, R.K. Puram, New Delhi-110 066, दूरभाष / Tel. : 91 (11) 26766700, फैक्स / Fax : 91 (11) 20867402

Annexure-1

Proposal for Future Fuel Efficiency Norms for HDVs, MDVs & LDVs

1.0 Background

The transport sector in India accounts for the third-highest share of greenhouse gas (GHG) emissions (~300 Mt CO_2 in 2019), following the electricity and heat production sector and the industrial sector. In the absence of ambitious and effective fuel efficiency strategies, these emissions are projected to increase fourfold, reaching approximately 1,200 MtCO_2 by 2050. India remains heavily dependent on imported crude oil to meet its fossil fuel requirements, with imports accounting for over 80% of total fossil fuel consumption. Crude oil has consistently been the single largest contributor to India's trade deficit. The transport sector alone accounted for 47% of the total final energy consumption of oil products in 2018. Enhancing fuel efficiency in the transport sector presents a significant opportunity not only to reduce GHG emissions but also to curb the country's import dependency.

Fuel efficiency norms are among the most effective policy instruments to reduce GHG emissions from the transport sector. They also contribute to moderating the growing oil import bill, generating monetary savings for vehicle owners, and improving urban air quality.

2.0 Policy Developments

In April 2022, the Ministry of Power, Government of India, implemented:

- Phase II of the Corporate Average Fuel Economy (CAFÉ) Norms for passenger cars, and
- Phase I of Fuel Economy Norms for Light and Medium Commercial Vehicles (LMCVs) and Heavy-Duty Vehicles (HDVs).

The Ministry of Power, in consultation with the Bureau of Energy Efficiency (BEE), has introduced the following fuel efficiency measures:

1. In August 2017, finalized fuel efficiency norms for commercial vehicles (CVs) with a gross vehicle weight (GVW) of 12 tonnes and above.

2. Ministry of Road Transport and Highways (MoRTH) revised the safe axle weight limits, necessitating an amendment to the HDV fuel consumption norms. This amendment was notified vide S.O. 3215(E) dated 21st September 2020, aligning the standards with the revised GVW ranges.

3. For BS-VI compliant vehicles, a correction factor was introduced to adjust the normative values. This was notified vide S.O. 1465(E) dated 29th March 2022.

4. Further, vide S.O. 2540(E) dated 16th July 2019, fuel consumption standards was introduced for light and medium commercial vehicles falling under categories M2, M3, and N2, with GVW ranging from 3.5 tonnes to 12 tonnes, to be effective from 1st April 2020. Thereafter a notification vide S.O. 1464(E) was issued revising the effective date of implementation of first phase of these fuel consumption norms to 1st April 2022.

3.0 Future Fuel Economy Norms for M2, M3, N1, N2, N3

Given the rapid technological evolution and the emergence of new propulsion technologies, it is strongly recommended that the process for developing fuel economy norms for the upcoming phases of heavy-duty vehicles be initiate.

Extensive deliberations were carried out by BEE (Bureau of Energy Efficiency) with relevant stakeholders, including representatives from original equipment manufacturers (OEMs) operating in the Indian market, MoRTH, SIAM, testing agencies (ARAI, ICAT, NATRIP), and leading think tanks. Based on these discussions, a draft proposal has been prepared to develop future Fuel Efficiency norms for LDV, MDV & HDV category vehicles.

1. **Proposal for N1 Category**

Passenger cars (M1 Category) are regulated under CAFE standards, but LCVs (<3,500 kg GVW) remain unregulated. Regulating LCVs will aid decarbonization and reduce fuel costs for small businesses. Most N1 vehicles have a kerb weight ranging between 1,000-2,000 kg.

b. A baseline equation was proposed by BEE for N1 category, proposing a 22% target reduction based on MIDC. A 16% conversion factor from MIDC to WLTP for this category is currently assumed and shall be revised with more data availability from the OEMs.

Volume and CO2 derogation factors were proposed are similar to M1 category vehicles.

S.No	Parameters	N1CAFE 1
1.	Effective year	2027-2032
2.	Slope (a)	0.0026
3.	Average kerb weight (kg) (b)	1325
4.	Average fuel consumption (litres/100 km) (c) MIDC	<4.84
5.	CO_2 emissions (grams of CO_2/km) : MIDC	<115
6.	CO_2 emissions (grams of CO_2/km) : WLTC 16% stringent	<133.4
7.	Average fuel consumption (litres/100 km) (c) WLTC 16% stringent	<5.62

S.No	Vehicle Type	Proposed Volume Credits for N1CAFE 1
		2027-2032
1	FCEV	5
2	BEV	4 ,4,3,3,2
3	REEV / PHEV (Battery Pack > 7 kW)	2
4	Strong Hybrid electric Vehicle	1.2

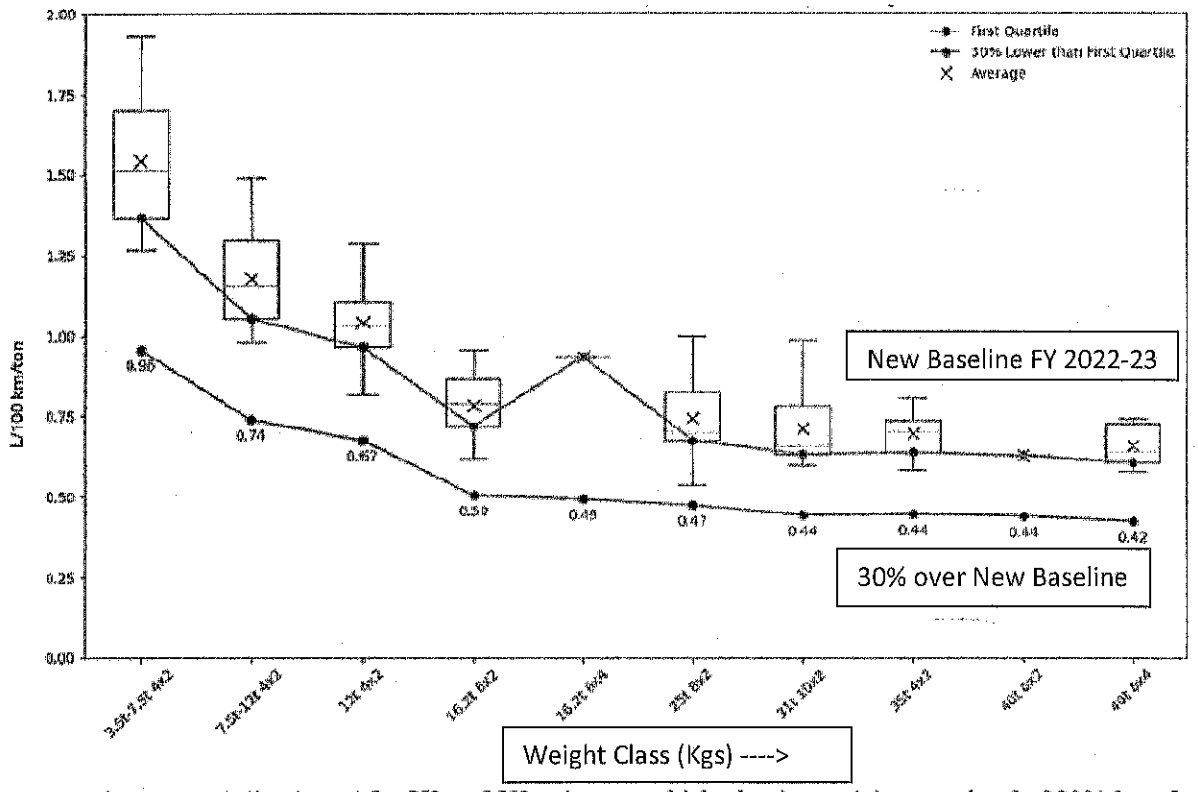
S.no	CO_2 Reducing Technologies	Proposed N1CAFE 1
		2027-2032
1	Technologies proposed by SIAM, Factor for CO_2 reducing technologies shall be as per AIS 137	0.98
2		0.98
3		0.98

Tailpipe emissions from EVs is proposed to be considered as Zero.

2. Proposal for M2,M3,N2,N3 (3.5T to 55T)

Re-defining the Baseline: Considering FY 2022-23 dataset a box plot was plotted for different axle configurations and lowest, values in 1st Quartile was chosen to establish new baseline.

Box Plot is shown below:



A representative target for N2 and N3 category vehicles having a stringency level of 30% based on the best 25% of fleet

New Targets proposed by BEE are 30% below the new baseline.

Attribute	Proposal
Method	Fleet Average CO2 Target based on technology potential
Timeline	Implementation over a period of 5 years for Phase 2 (2027-2032)
Stringency for Phase 2	30% over the new Baseline derived from FY 2022-23
Super Credit (Multiplier)	Annual diminishing Super Credit multiplier starting from 4 in 2027

3. Methodology proposed:

1. Testing Standards: Fuel consumption data must be derived from standardized tests at 40 km/h and 60 km/h to ensure consistency.
2. Flexibility: The methodology accounts for nine truck groups as listed in Table 1 with axle configurations and GVW, allowing manufacturers to optimize their fleets accordingly.
3. CAFE Credits: Sales of battery electric or hydrogen-powered trucks will receive super credits, boosting compliance score by factoring in these zero-emission technologies. Attributed volume super credits are mentioned in Table 2

Table 1. The nine truck groups considered for CAFE norms.

	GVW (ton)	Axle configuration
Rigid axle	12	4x2
	16.2	6x2
	16.2	6x4
	25	8x2
	25	8x4
	31	10x2
Tractor trailer	35.2	4x2
	40.2	6x2
	40.2	6x4

4. Overview of the Regulatory Framework:

The regulations introduce a normalized efficiency metric and a fleet-wide compliance mechanism to account for the diversity of truck models and their usage. The key focus is on reducing fuel consumption per unit of payload, encouraging the adoption of efficient technologies, and meeting CAFE targets. The methodology is broken down into six steps, detailed below.

Step-by-Step Methodology (Proposed)

Step 1: Normalized Efficiency Metric (Fi)

The foundation of the regulation is the normalized fuel efficiency metric, Fi, measured in liters of fuel per 100 km per ton of payload. This metric accounts for the efficiency of each truck model relative to its payload capacity. It is calculated as:

$$F_i = \frac{\frac{CSFC_{40} + CSFC_{60}}{2}}{\text{Payload}_i}$$

Where,
Fi: Liters of fuel per 100 km per ton of payload, a normalized efficiency metric
Payload$_i$: Payload of models in each truck group i

Step 2: Fleet Average Fuel Consumption for Truck Groups (Ai)

The fleet average fuel consumption for each truck group i is determined by aggregating data across individual models within that group. This is calculated as:

$$A_i = \frac{\sum_{j=1}^{n_i}(F_{ij} * V_{ij})}{\sum_{j=1}^{n_i} V_{ij}}$$

Where,
Ai : Fleet average fuel consumption for truck group i
i : Index for the nine truck groups
j : Index for individual models within truck group i
ni : Total number of models in group i
Fij: Average fuel consumption of model j (based on 40 km/h and 60 km/h tests) normalized by payload (L/100 km/ton)
Vij: Vehicle sales volume for model j in group i

Step 3: Manufacturer-Specific Consumption (MSC)

The manufacturer-specific consumption is derived by weighting the fleet average consumption of each truck group by its total sales. This is expressed as:

$$\text{Manufacturer specific consumption} = \sum_{i=1}^{9}(Ni * Ai)/Z$$

Where,
Ni: Total sales in truck group i for the manufacturer
Z : Total sales of all the truck groups for the manufacturer
Ai : Fleet average consumption for truck group i

Step 4: Manufacturer-Specific Target (MST)

A BEE-specified target is assigned for each truck group, which is adjusted by sales volume of the manufacturer. The target is calculated as:

$$\text{Manufacturer Specific Target} = \frac{\sum_{i=1}^{n}(N_i \cdot T_i)}{Z}$$

Where,
Ni: Total sales in truck group i for the manufacturer
Ti: BEE specified target for each truck group i
Z : Total sales of all the truck groups for the manufacturer
n: Nine truck groups

Step 5: Fleet Average Payload (P_{fleet})

The manufacturer-specific fleet average payload is calculated to account for the payload distribution across your sales:

$$P_{\text{fleet}} = \frac{\sum_{i=1}^{n}(N_i \cdot P_{\text{fleet},i})}{Z}$$

Where,
Ni: Total sales in truck group i for the manufacturer
Z : Total sales of all the truck groups for the manufacturer
P_{fleet}: Manufacturer specific fleet average payload

Step 6: Compliance Assessment (Δ)

Compliance is assessed by comparing the manufacturer-specific consumption (MSC) against the manufacturer-specific target (MST), adjusted by the fleet average payload (P_{fleet}). The deviation (Δ) is calculated as:

$$\Delta = (\text{MSC} - \text{MST}) \times P_{\text{fleet}}$$

Where,
MSC: Manufacturer specific consumption
MST: Manufacturer specific target
P_{fleet}: Manufacturer specific fleet average payload

For the purpose of penalty calculation, a positive value indicates non-compliance and will be penalized by multiplying the value with the applicable penalty amount, whereas a negative value for a manufacturer indicates compliance with excess credits.

For the purpose of establishing actual fuel consumption in petrol equivalent for diesel, LPG, CNG, & electricity driven HDVs, MDVs & LDVs kindly refer **Para 2 sub para (3) (ii) (c) of S.O 1072 dated 23rd April, 2015.**

Table 2. Super credits for battery electric trucks and hydrogen based trucks

Technology	Axle configuration	Super credit
Battery electric truck	≥12t (4x2)	2
	≥16.2t (6x2)	2
	≥16.2t (6x4)	2
	≥25t (8x2)	2
	≥25t (8x4)	2
	≥31t (10x2)	3
	≥35.2t (4x2)	3
	≥40.2t (6x2)	3
	≥40.2t (6x4)	3
Hydrogen technology	≥12t (4x2)	4
	≥16.2t (6x2)	4
	≥16.2t (6x4)	4
	≥25t (8x2)	4
	≥25t (8x4)	4
	≥31t (10x2)	4
	≥35.2t (4x2)	4
	≥40.2t (6x2)	4
	≥40.2t (6x4)	4