



Indian Diesel Engine Manufacturers' Association

Off-Road Engines: India Emission Landscape

Prashanth Ravi, PhD

Vice-Chair, Technical Committee, IDEMA

&

Engineering Manager, Global Engine Development - India,
Caterpillar India Private Limited

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Indian Diesel Engine Manufacturers' Association

- Diesel Engine manufacture started in India in 1947, IDEMA started in 1967.
- It is affiliated to Confederation of Indian Industries (CII)
- IDEMA represents - non-road stationary and mobile use Internal Combustion Engine (ICE) Industry.
- IDEMA works proactively with government to develop legislation on emission, safety, fuel efficiency, and such matters.



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Mission

To be the acknowledged voice of the Internal Combustion Engine industry in India, and thereby, be called upon by regulatory agencies and user industry for open and fair dialogue. And, be the credible source of information, affecting ICE industry.

Members

32 ICE manufacturers, 15 Small manufacturers and 4 major importers

Pro-active Approach

IDEMA works proactively with government to develop legislation on emission, safety, fuel efficiency, and such.









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Proactive initiatives (Approach) of IDEMA for developing Regulations:

1. There should be 10- Year road map available
2. Align / Harmonize with existing international regulations
3. Future norms should be known well in advance - 4 years - This will help for product development, switch-over, certification tests etc.
4. Norms should last for minimum four years
5. Fuel Specifications : Fuel specifications should be decided and the same should be available at least one year in advance, *across* the country.

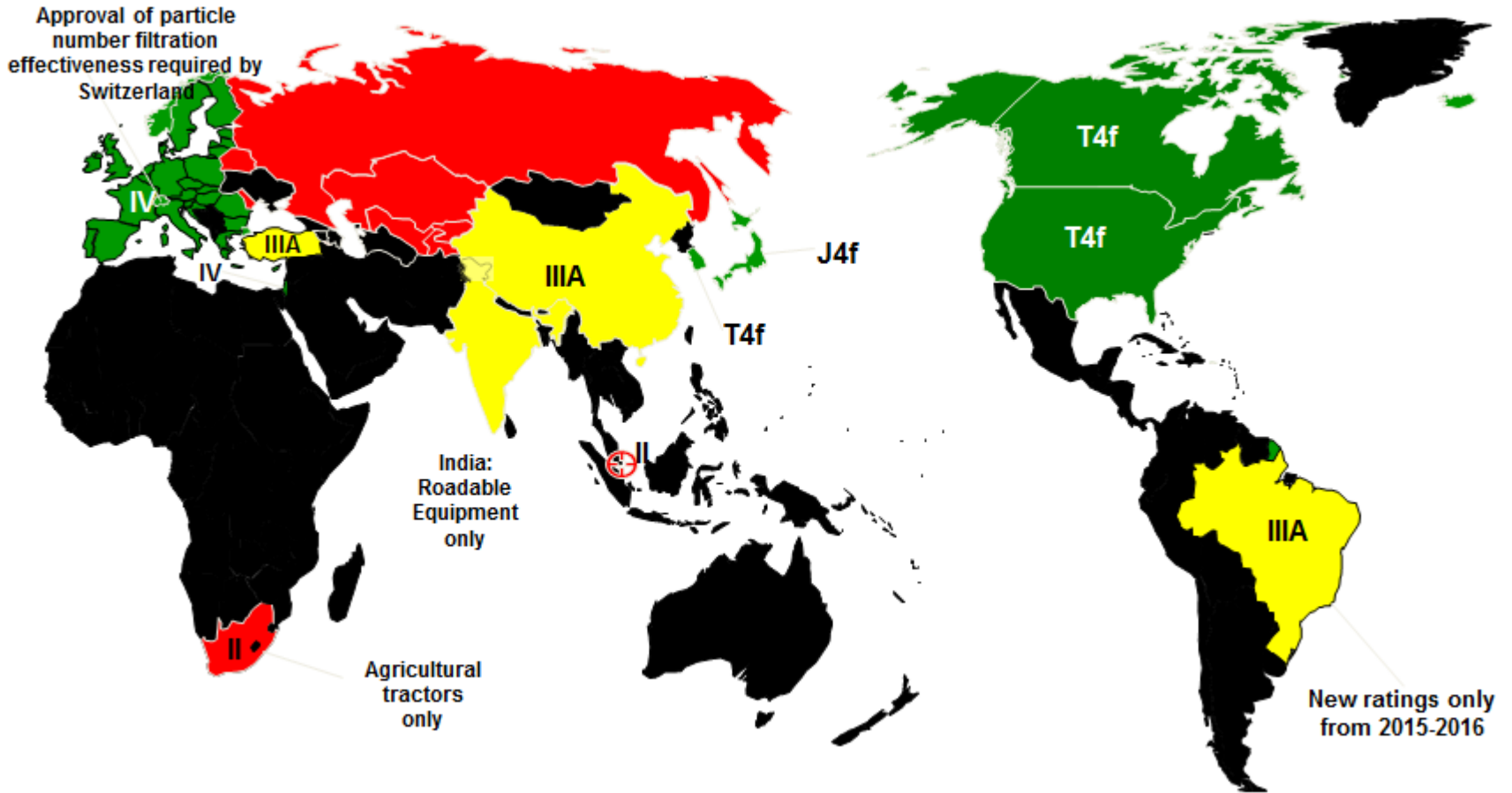


Indian Diesel Engine Manufacturers' Association Current Emission Regulation Summary

Application	Current Emission Norms	Controlling Body
	In select Cities : BS IV In rest India : BS III	MoRTH
	CPCB 2 (Upto 800 kW)	CPCB / MoEF
	CPCB Stack 3 (Above 800 kW)	CPCB / MoEF
No norms for Mining, Locomotives, Non-roadable construction equipment, Inland marine engines , Water pumps etc.		
	TREM III A	MoRTH
	TREM III	MoRTH
	TIER II	IMO



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Unregulated	
T1 / I	US Tier 1 / EU Stage I
T2 / II / J2	US Tier 2 / EU Stage II / Japan 2001
T3 / IIIA / J3	US Tier 3 / EU Stage IIIA/ Japan 2006
T4i / IIIB / J4i	US Tier 4i / EU Stage IIIB/ Japan 2011
T4f / IV / J4f	US Tier 4f / EU Stage IV / Japan 2014
V	EU Stage V



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Future Emission regulations

- CEV and Tractor

Table 1
(Bharat (Non-road) Stage IV)
Applicable emission limit for NRSC and NRTC test cycle

	Applicable with effect from	CO	HC	NOx	PM	Test Cycle*
Category, kW		g/ kWh				
$37 \leq P < 56$	[1st April, 20----]	5.0	4.7 (HC+NOx)		0.025	NRSC & NRTC
$56 \leq P < 130$	[1st April, 20---]	5.0	0.19	0.4	0.025	
$130 \leq P < 560$	[1st April, 20---]	3.5	0.19	0.4	0.025	

Skipping EU Stage IIIB to Stage IV equivalent norms

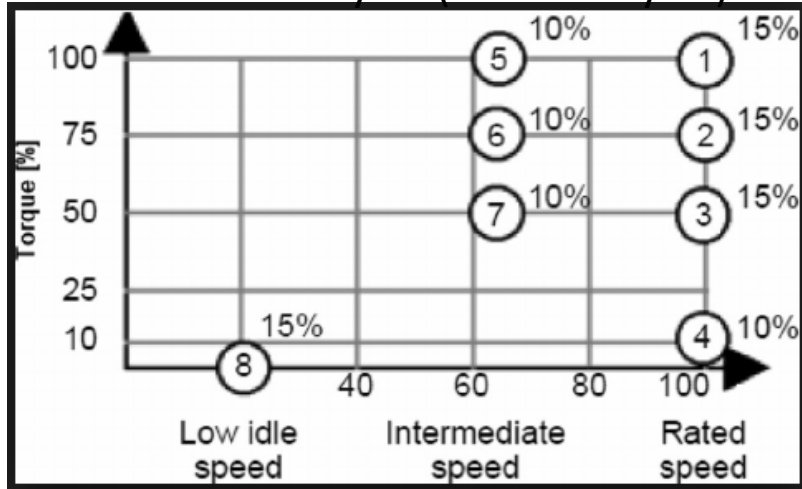


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Test Cycles

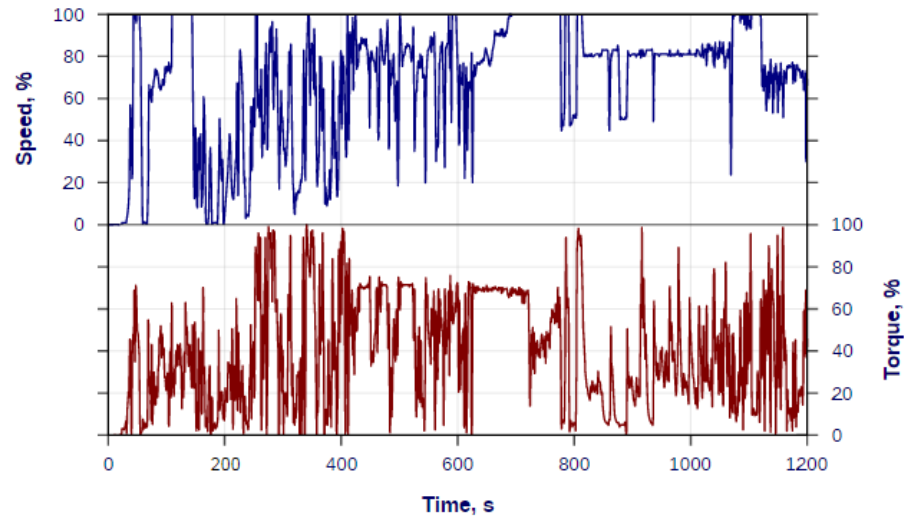
Current

ISO 8178 Cycle (8 Mode Cycle)



Future

Non Road Transient Cycle (NRTC)



Emissions = 10% Cold NRTC + 90 % Hot NRTC

Also includes a hot RMC 8 Mode



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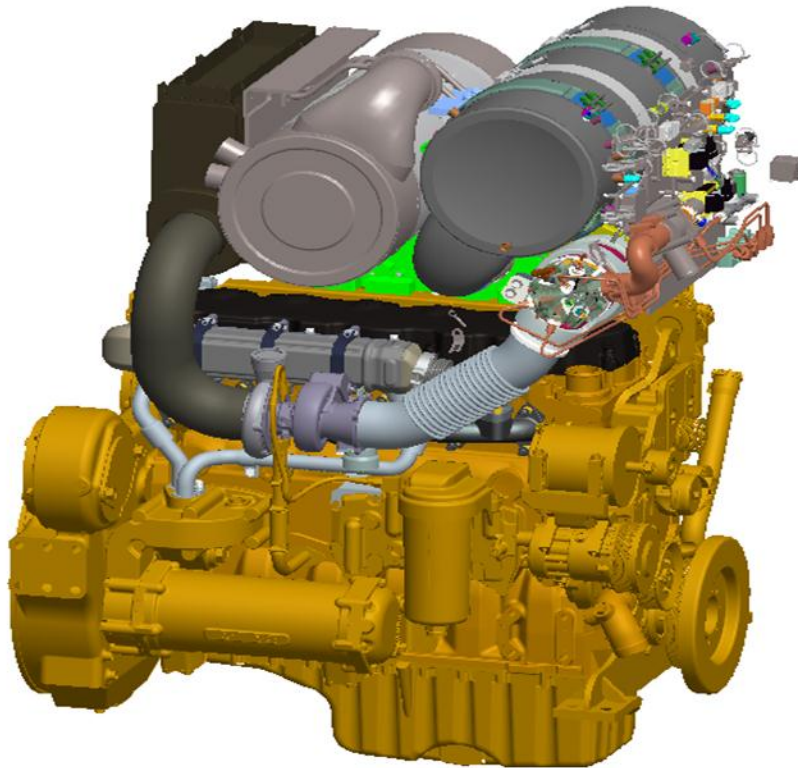
Early discussions on Future Regulations

- Non-CEV applications
- CPCB-III regulations for Generator sets
- Water Pumps



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CEV BS4 and CPCB-III Challenges



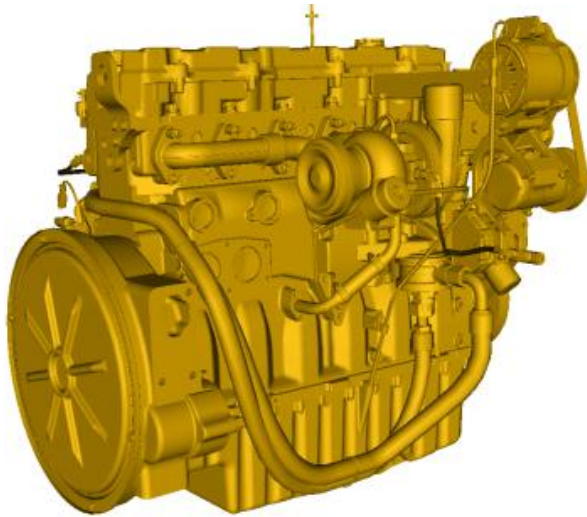
- Further Emissions Reductions
- Increased Power Density
- Competitive Cost
- Fuel (Fluid) Economy
-



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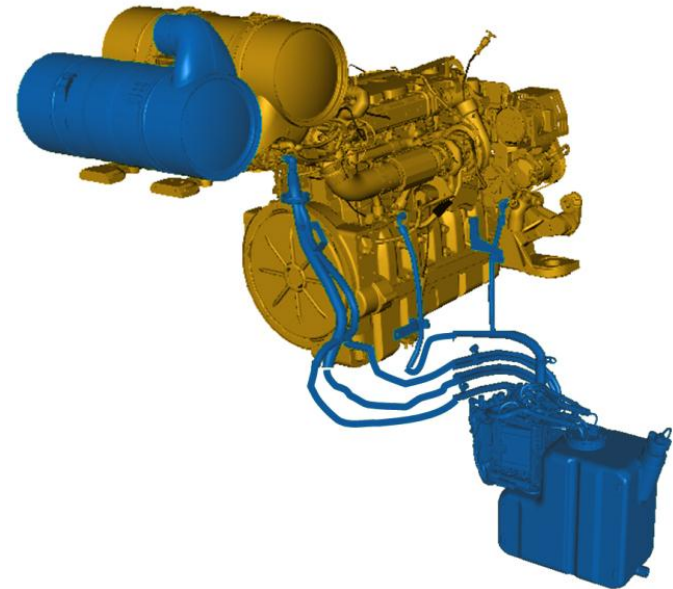
Stage IV Engine Technology

BS III



- Low Sulfur Diesel (500 ppm)

BS-IV



- Ultra Low Sulfur Diesel (10 ppm)
- NOx reduction (EGR)
- PM aftertreatment (DOC/DPF)
- SCR NOx reduction
 - Diesel Exhaust Fluid (DEF) Tank



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India Market Readiness

- Fluid Availability
 - Fuel, Lube, DEF
- Ease of operation
- Cost/Value
- Dealer Readiness and Maintenance
- Operator Training
- Equipment migration plans
 - Details need to be managed



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Thanks