Decarbonizing India's Agriculture Tractors

Regulation, Electrification and Growth

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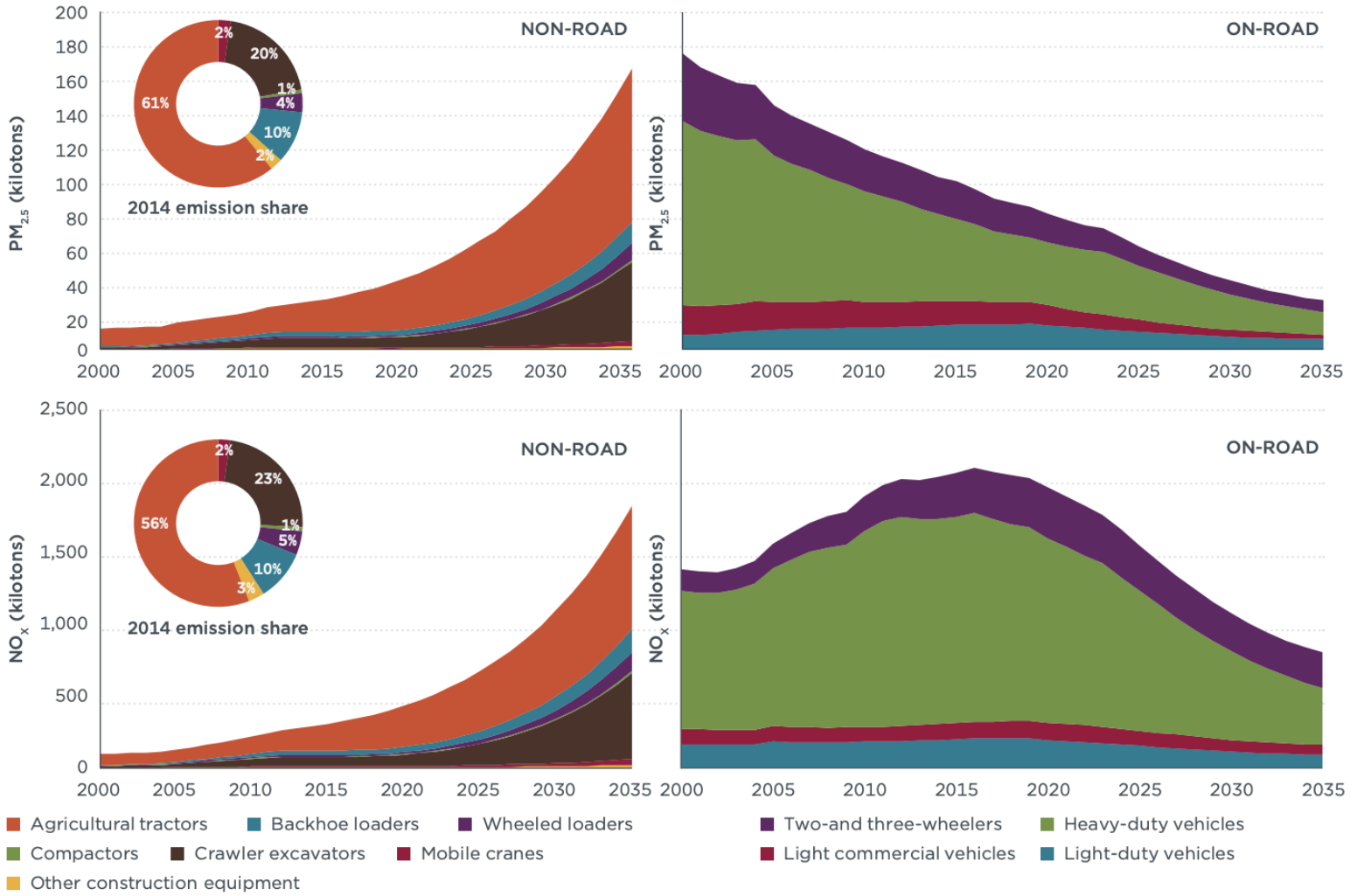
26 / August / 2025
New Delhi, India

icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Emissions from non-road will exceed on-road by 2030



More than **50%** of PM2.5 and NOx emissions from **non-road sources** are from agriculture tractors.

More than **70%** of agriculture tractors (<37 kW) still comply to **TREM Stage III standards**

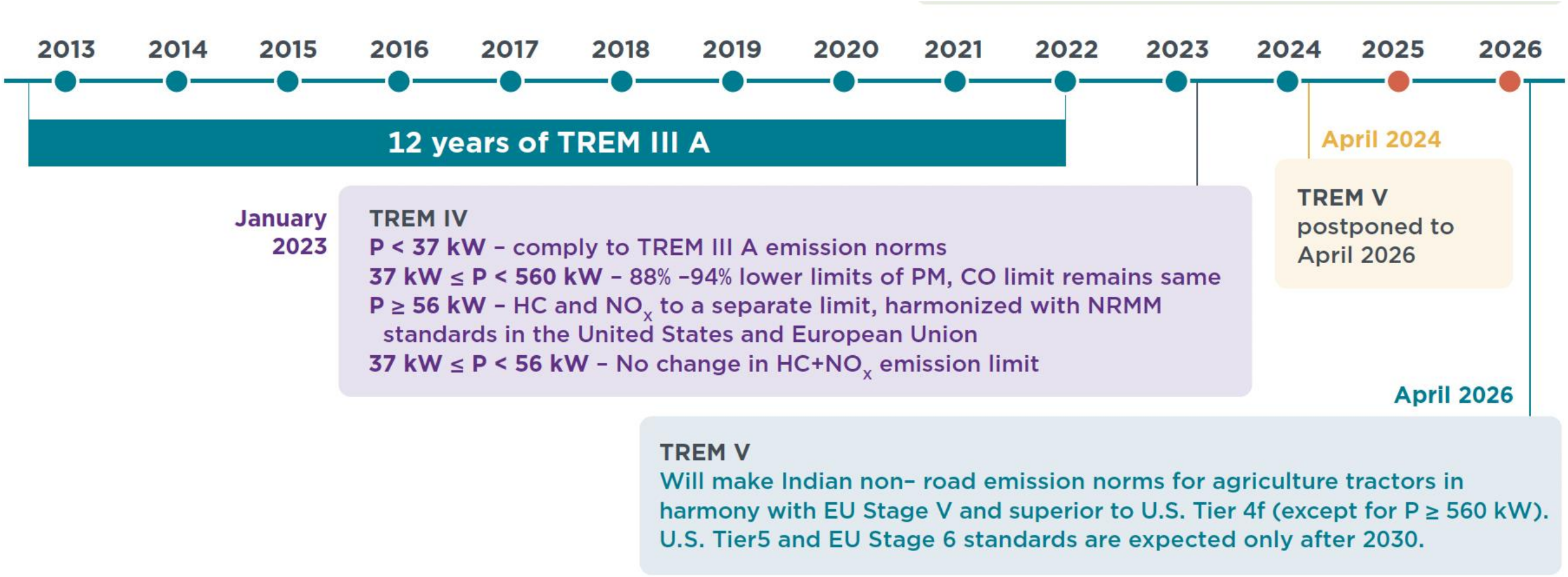
Two Solutions

- Stricter Standards
- Cleaner technology

Source: Zhenying Shao, An emissions inventory for agricultural tractors and construction equipment in India (ICCT: Washington DC, 2016). http:// www.theicct.org/non-road-emissions-inventory-india

Tractor Emissions Regulation in India

Indian emission standards will match global standards by 2026



Indian emission standards will match global standards by 2026

TREM IV and TREM V emission standards relative to U.S. Tier 4f and EU Stage V standards

		TREM IV (Since January 2023)			TREM V (April 2026 onwards)		
		CO	$HC+NO_x$	PM	CO	$HC+NO_x$	PM
P < 8 kW	US Tier 4f	69%	113%	200%	100%	100%	100%
	EU Stage V	69%	113%	200%	100%	100%	100%
8 kW < = P < 19 kW	US Tier 4f	83%	113%	200%	100%	100%	100%
	EU Stage V	83%	113%	200%	100%	100%	100%
19 kW< = P < 37 kW	US Tier 4f	100%	160%	2000%	91%	100%	50%
	EU Stage V	110%	160%	4000%	100%	100%	100%
37 kW < = P < 56 kW	US Tier 4f	91%	100%	83%	91%	100%	50%
	EU Stage V	100%	100%	167%	100%	100%	100%

Indian emission standards will match global standards by 2026

TREM IV and TREM V emission standards relative to U.S. Tier 4f and EU Stage V standards

		CO	HC	NO_x	PM	CO	HC	NO_x	PM
56 kW < = P < 75 kW	US Tier 4f	100%	100%	100%	125%	100%	100%	100%	75%
	EU Stage V	100%	100%	100%	167%	100%	100%	100%	100%
75 kW < = P < 130 kW	US Tier 4f	100%	100%	100%	125%	100%	100%	100%	75%
	EU Stage V	100%	100%	100%	167%	100%	100%	100%	100%
130 kW < = P < 560 kW	US Tier 4f	100%	100%	100%	125%	100%	100%	100%	75%
	EU Stage V	100%	100%	100%	167%	100%	100%	100%	100%
P > =560 kW	US Tier 4f	*NA*				100%	100%	100%	113%
	EU Stage V					100%	100%	875%	100%

Electrification of Agriculture Tractors

States are leading the way for incentivizing Electric Tractors

State	Year	Initiative
Maharashtra	2025	**15%** up to **INR 1.5 lakhs** of ex-factory cost for **1000** e-agricultural tractors and combined harvestors
Madhya Pradesh	2025	**100%** exemption of **motor vehicle tax and registration fees** for e-tractors
Andhra Pradesh	2024	Subsidy of **5%** on the cost of an e-tractor costing **INR 8 Lakhs** or below.
Haryana	2022	First **1000 units** purchased and registered in the state shall receive purchase incentive of **50%** up to **INR 5.00 lakh** of the ex-showroom price of vehicle.
Telangana	2020	**100%** exemption of **road tax & registration fee** shall be applicable for electric tractors purchased and registered in the state of Telangana

**However, not a single electric tractor was registered in FY 2024-25.*

Sources: *Haryana EV Policy 2022*; *Telangana EV and energy storage policy 2020-2030; Maharashtra EV Policy 2025-2030; New Andhra Pradesh Sustainable Electric Mobility Policy (4.0) 2024-29; Madhya Pradesh EV Policy 2025*

There are only 3 e-tractor manufacturers with CMVR certification

AIS 168 - Specific Requirements for A6 and A7 Category Electric Power Train Agricultural Tractors
Enforced on January 2021 by

सड़क परिवहन और राजमार्ग मंत्रालय
Ministry of Road Transport and Highways

E-tractor Models with CMVR AIS 168 (A7) Certification issued by ARAI/ICAT		
Model	**OEM**	**Rated Power**
X45H2 AutoNxt	AutoNxt Automation	45 HP
Marut e-tractor 3.0	Sree Marut e-Agrotech	28 HP
Montra E-tractor	TI Clean Mobility	27 HP

Rated Power Category	Manufacturer	Location
>30 HP	Moonrider	Karnataka
	AutoNxt Automation	Maharashtra
	Bullwork Mobility	Karnataka
18 HP < P <30 HP	Sree Marut e-Agrotech	Gujarat
	Escorts Kubota	Haryana
	TI Clean Mobility	Tamil Nadu
18 hp or lower	Cygnus motors	Gujarat
	Sukoon Solutions	Uttar Pradesh
	Sonalika	Punjab
	CSIR CMERI	West Bengal

Source: *https://auto.economictimes.indiatimes.com/news/automotive/the-rise-of-electric-tractors-in-india-challenges-and-opportunities/121477048*

ICCT is studying real world energy savings from electric tractors, in Haryana

Left: Marut E-aggrotech's **28 HP** tractor being used for **transportation** of animal fodder, Yamuna Nagar, Haryana

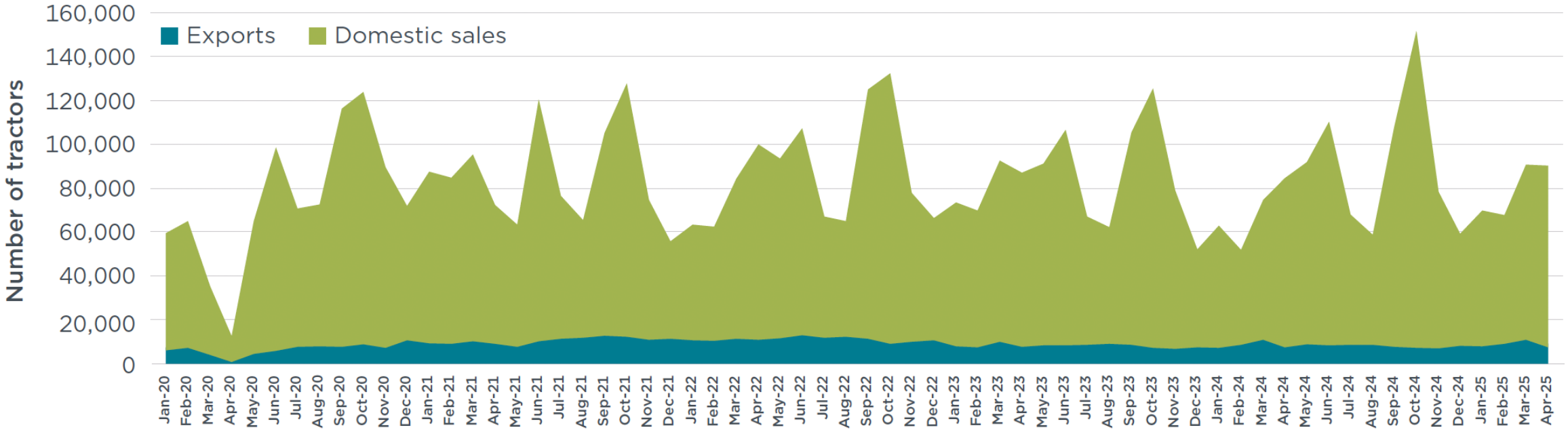
Right: AutoNxt Automation's **45 HP** tractor being used to prepare soil for paddy using a **cultivator,** Karnal, Haryana

Source: Images from ICCT's ongoing electric tractor pilot in Haryana

Tractor Exports Growth

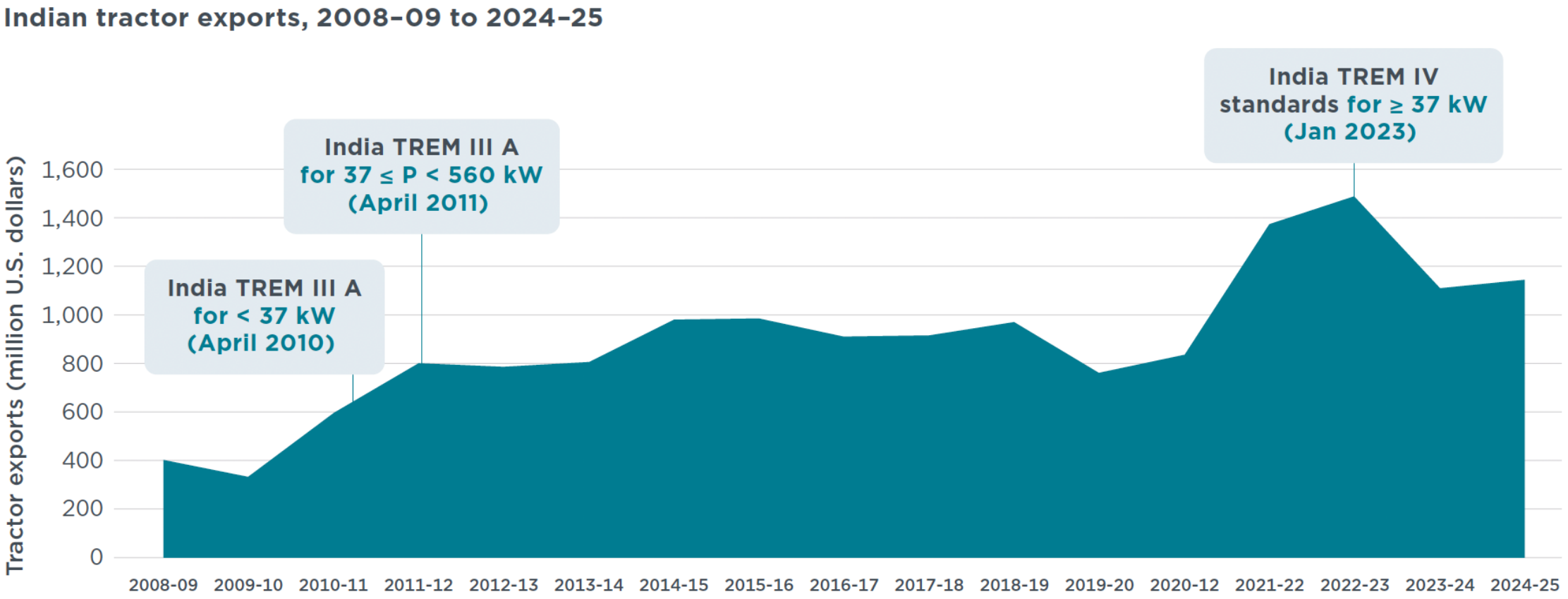
India produces a million tractors and exports ~15% of them

India's monthly tractor production, January 2020 to April 2025

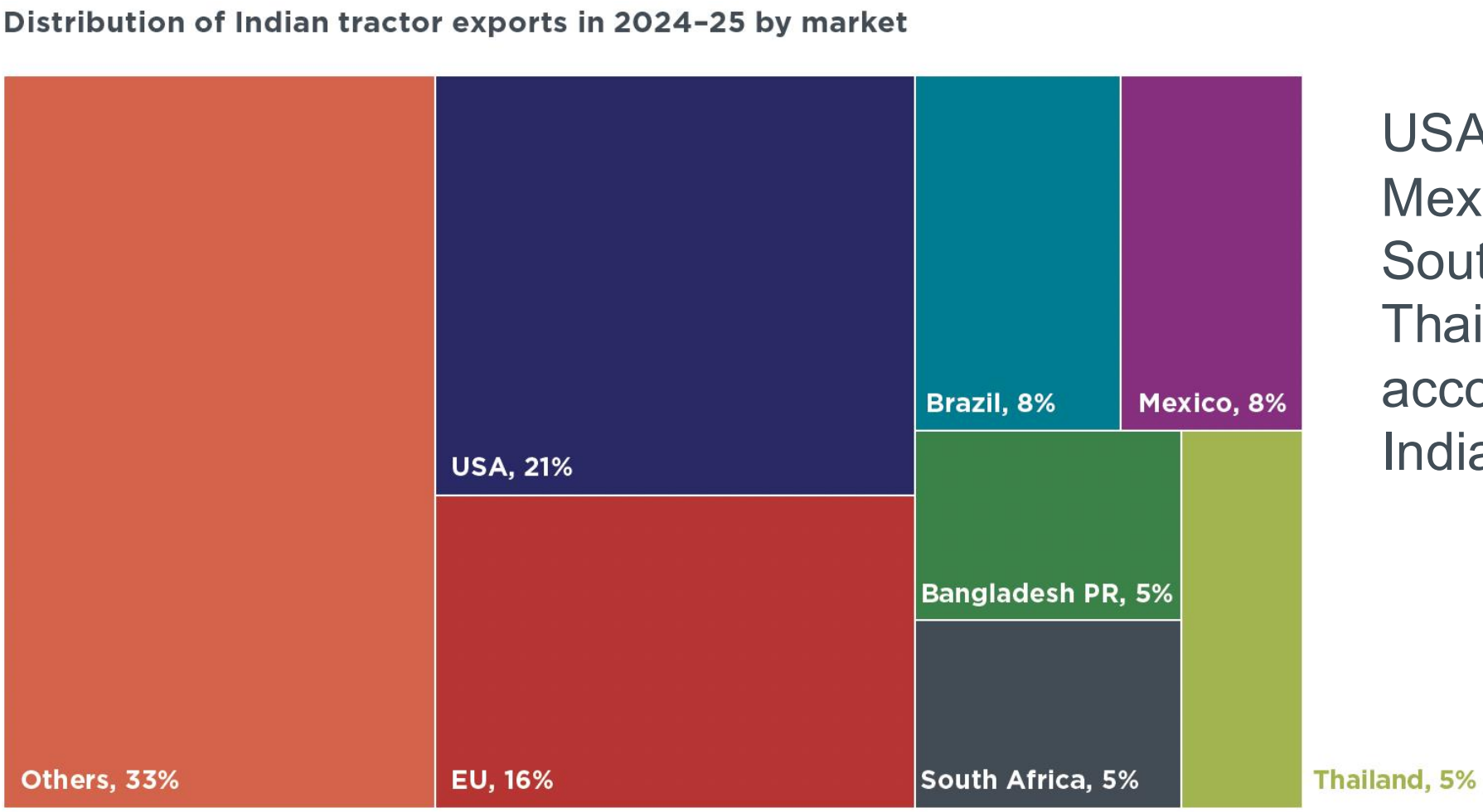


Source: Tractor Manufacturer's Association (2025)

Indian tractor exports have increased with 7% CAGR from 2008–09 to 2024–25

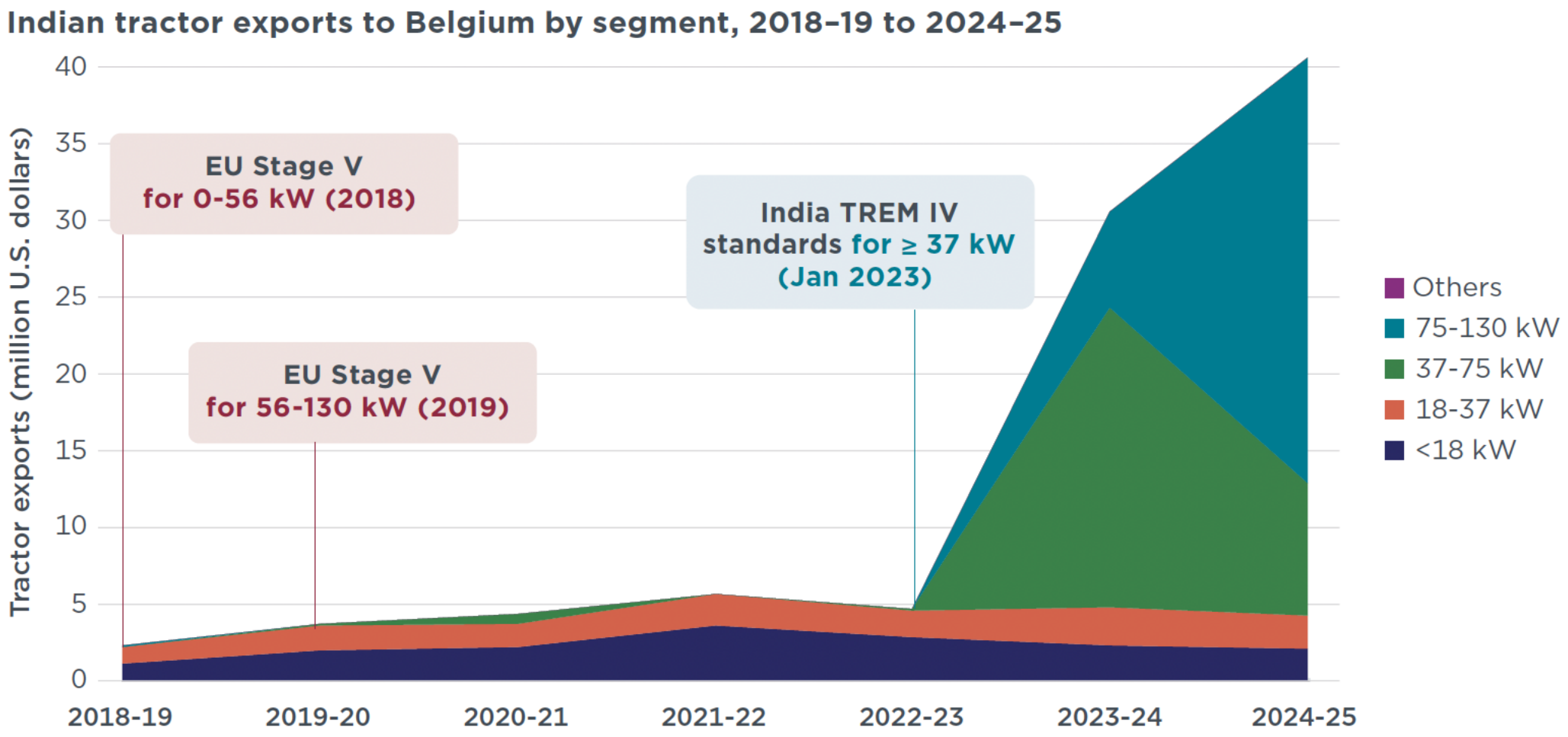


India exports tractors to 162 countries but there are a handful of big markets

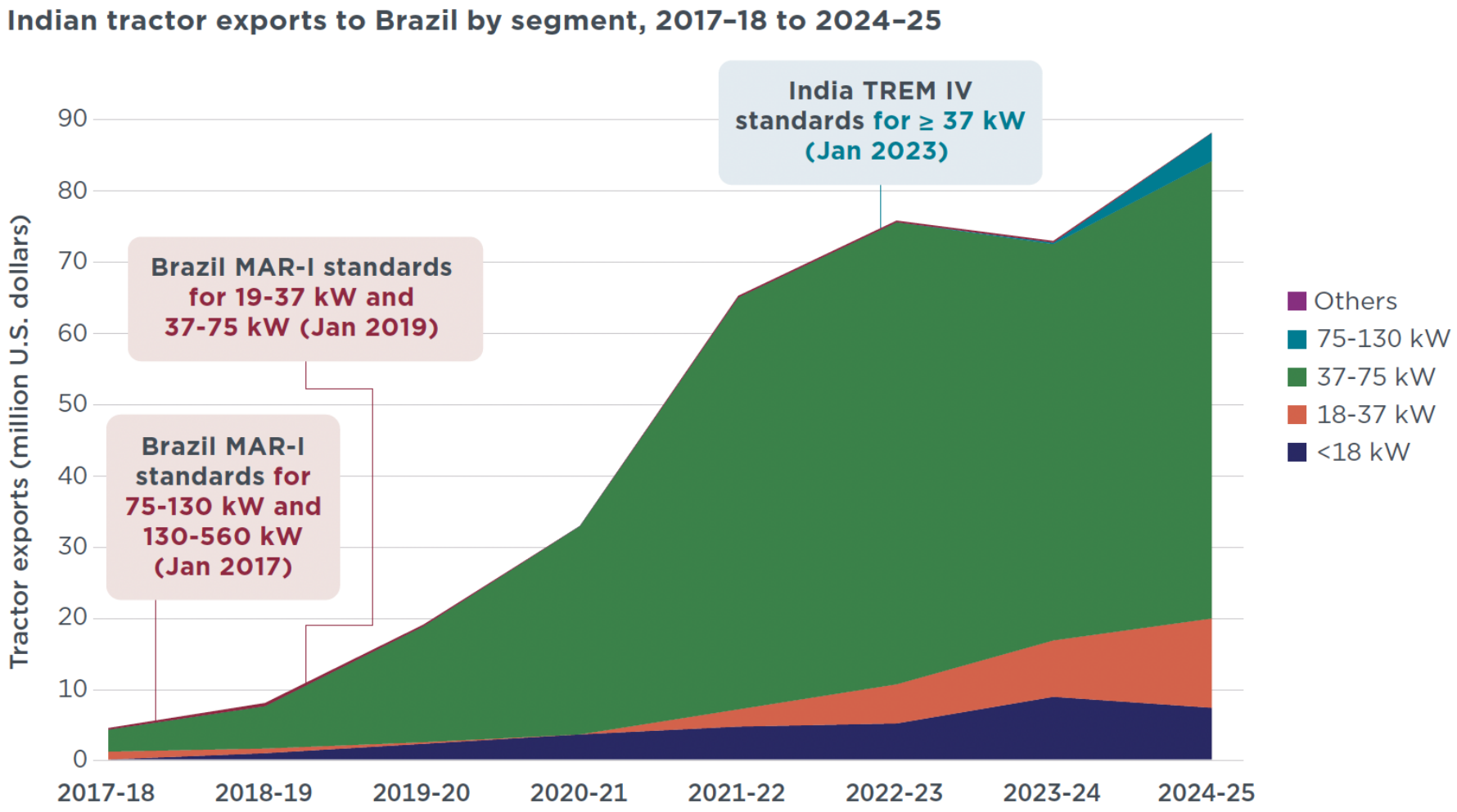


USA, EU, Brazil, Mexico, Bangladesh, South Africa and Thailand together account for **67%** of India's tractor exports

Exports to Belgium increased by 8 times after India enforced TREM IV



Exports to Brazil increased by 10 times after Brazil enforced MAR-I



Policy recommendations for decarbonizing tractors

Electric transition

- National level incentives
- Agri-transport policy integration
- Electric tractors pilots in Agriculture

Regulation

- Stick to TREM V enforcement from April 2026

Thank You

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