

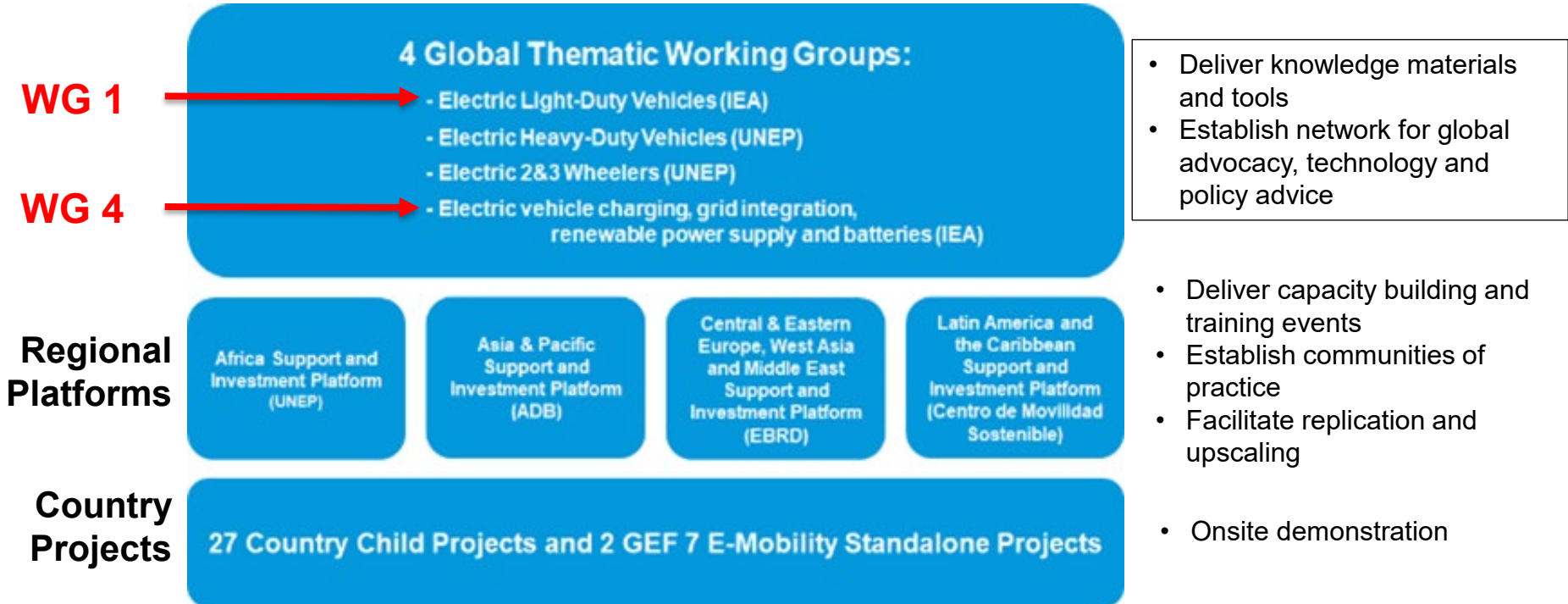


Comparison of LCA tools for Passenger LDV BEV

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The GEF Global Programme to Support Countries with the Shift to Electric Mobility



- 1.1: *The Global Thematic Working Group on 4-wheeled electric light duty vehicles* is operational and information exchange and network opportunities created between countries and global regional experts.
 - D 1.1.1: **Secretariat** of the Working Group established
 - D 1.1.2: **Bi-annual** (at least) Working Group **meetings** held during the first two years, reduced to annual meetings in the 3rd year
 - D 1.2.3: **Networking** between *GEF, EVI, PSF, and SOLUTIONSplus project partners* and beyond **facilitated**
 - D 1.2.4: **Webinars for country** projects implemented
- 1.2: A **toolbox** for *4-wheeled electric LDVs* is developed and training materials for use in the Support and Investment Platforms are prepared
 - D 1.2.1: **Status update** on light-duty vehicle deployment across regions and countries (including technical, operational and financial aspects where relevant)
 - D 1.2.2: **Market characterisation and model availability** for different regions established
 - D.1.2.3: **Best-practice policy briefs** for electric light-duty vehicles deployment developed
 - D.1.2.4 Interactive tool to estimate and compare **total cost of ownership** developed
 - D.1.2.5 Interactive tool to estimate **well-to-wheel and/or lifecycle emissions** of various light-duty vehicles developed

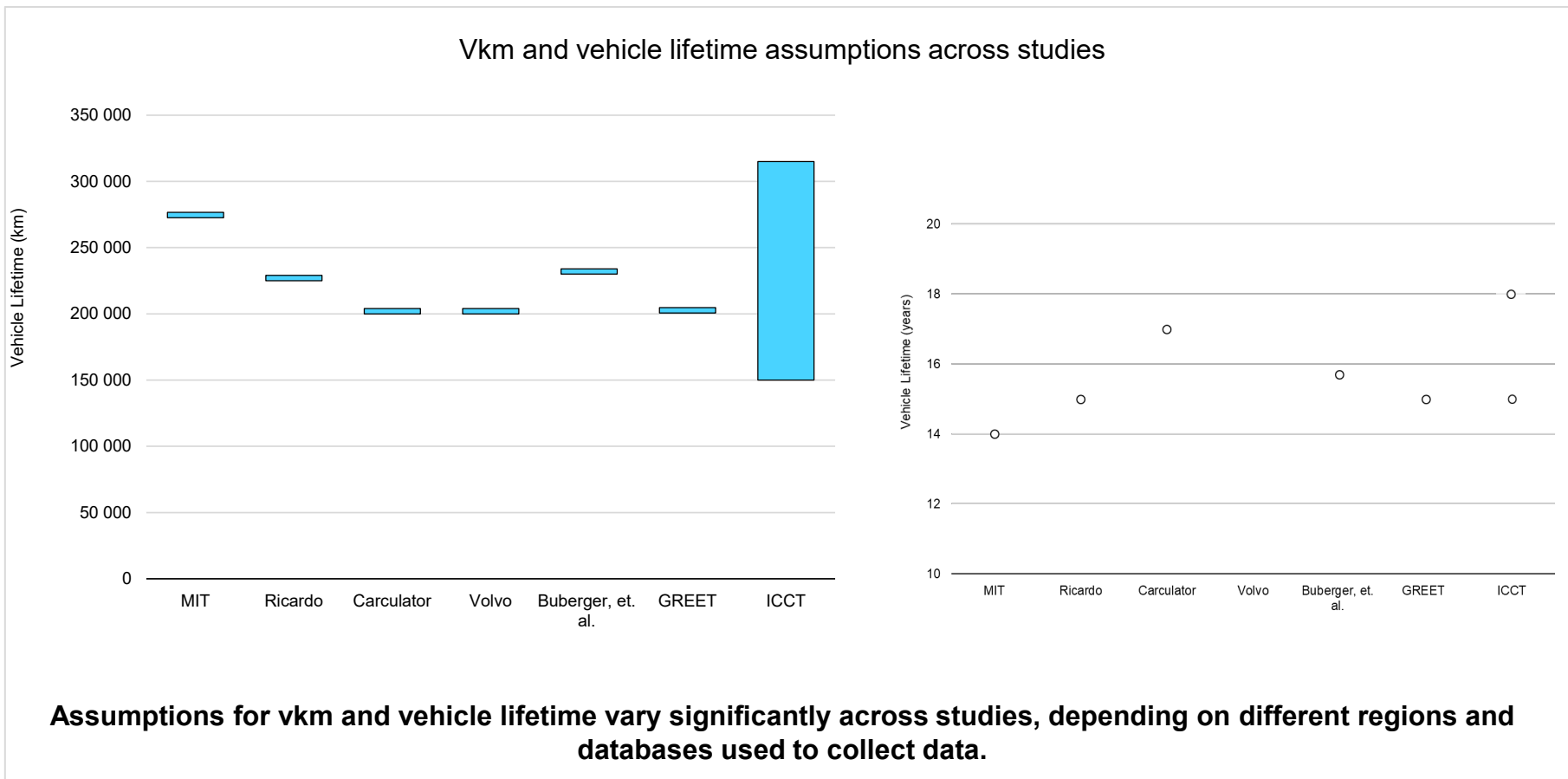
List of Tools and Studies

Source	Publication Date	Geographies	Vehicle Modes (ICE, BEV, PHEV)	Fleet Analysis	Interactive Tool	Projections
Argonne National Lab (GREET)	2021	USA, Individual States	Passenger mid-size car, pick-up truck, light commercial truck	No	No	Yes
Carbon Counter (MIT)	2016 - 2020	USA	125 LDV models in 2020 either a car, SUV, pickup	Partial	Yes	Yes
Ricardo	2020	EU27 + UK, plus individual countries	L/HDV, ICE: all major powertrain types Two cars (lower medium, large SUV), LCV, small rigid lorry, large articulated lorry, urban bus, coach	No	No	Yes

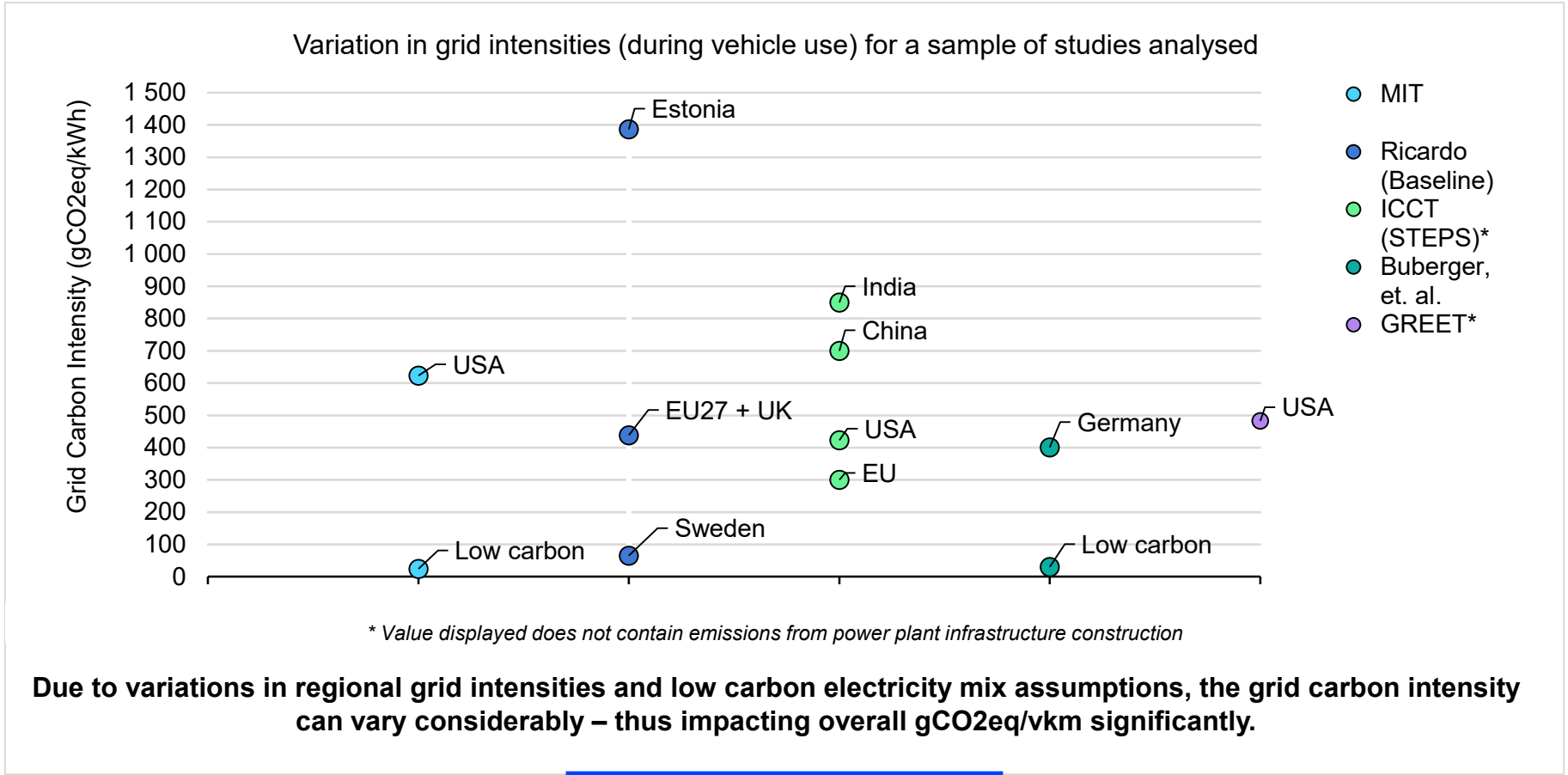
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Source	Publication Date	Geographies	Vehicle Modes (ICE, BEV, PHEV)	Fleet Analysis	Interactive Tool	Projections
ICCT	2021	Europe, USA, China, India	Mid-size car (ICE, HEV, PHEV, BEV, FCEV)	No	No	Yes
Carculator	2022	Europe, USA, China, India, Brazil, Chile, Africa	Micro, Mini, Small, Lower medium, Medium, Large, Medium SUV, Large SUV and Van	No	Yes	Yes
Volvo	2020	Global, EU28	XC40 ICE (petrol) and XC40 Recharge	No	No	No
Buberger, et. al.	2022	Germany	Multiple passenger cars, trucks and SUV	No	No	No

Assumptions on vkm and vehicle lifetime impact, mid-size car



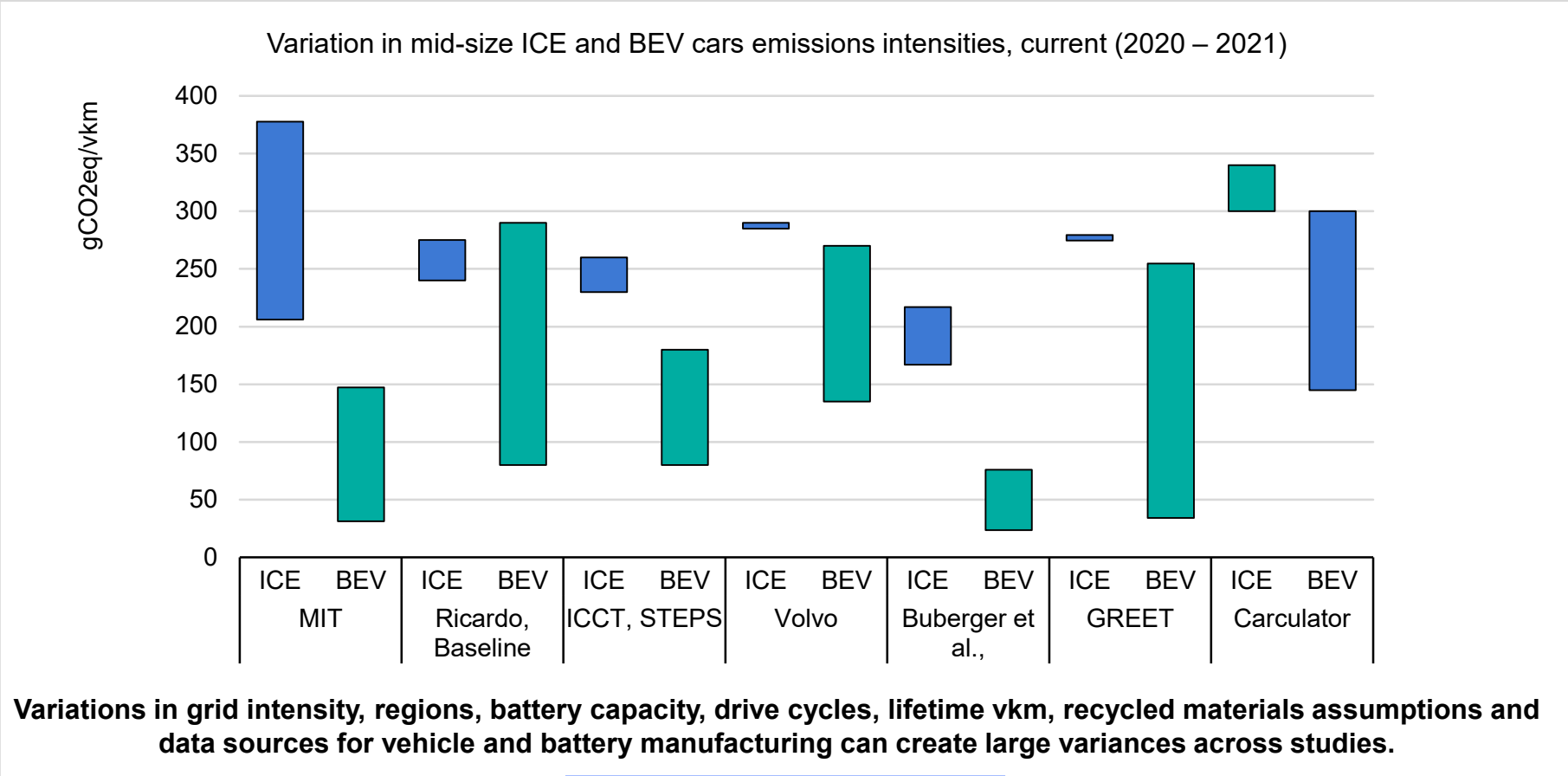
Assumptions on grid intensity (vehicle use) vary, 2020



Other Key Assumptions

Study Name	Drive Cycle	Database/Model	Battery Capacity (kWh)
MIT	EPA	GREET	38 - 75
Ricardo	WLTP, real-world adjustment factor	Ecoinvent, GREET	58
ICCT	Regional (incl. NEDC), real-world adjustment factor	GREET, IEA WEM, literature, real-world public usage data	45 (Europe), 70 (USA), 52.9 (China), 23 (India)
Carculator	WLTP, NEDC, CADC	Ecoinvent	45
Volvo	WLTP	Ecoinvent, GaBi, Volvo manufacturing data	71-78
Buberger, et. al.	WLTP	Literature, public manufacturer data	58
GREET	EPA, real-world adjustment	GREET 2020	64 – 84 (depending on material lightweighting)

LCA of Mid-Size ICE and BEV Cars Across Studies



- Assumptions and methodology greatly impact the range of emissions for BEV
 - Biggest impact (per vkm): total mileage (km, year, decay function), grid emissions intensity, grid emissions intensity reductions over vehicle lifetime
- Develop a WTW tool for e-LDV, particularly for low and middle income countries
- Harmonisation as a potential goal, transparency in data sources, methods and assumptions as a minimum for comparison
- Determine important inputs and parameters for the tool design (Q3 2023)

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