



Electric Vehicle Impact on Vietnam Power System



September 2023





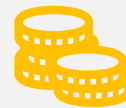
Impacts of Viet Nam's Transition to Electric Vehicles



Environmental Impact



Social Impacts



Economic Impacts



Power Impacts



Government Policies

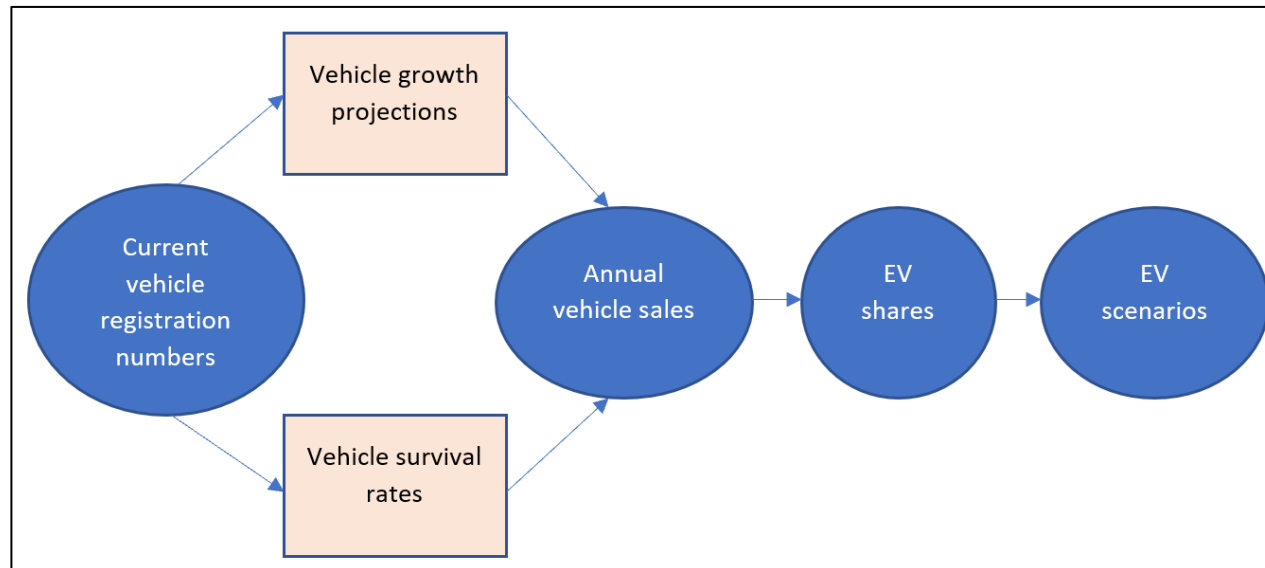
Article	Relevant part
Art. 1, I.2.a.	Net zero GHG emissions by 2050
Art. 1, I.3.a.	By 2050 100% of motorized vehicles (...) shall be electric or green energy units
Art. 1, I.3.e.	By 2025 100% of urban buses to be replaced shall be electric or green energy units
Art. 1, I.3.e.	By 2030 50% of all urban vehicles operating shall be electric or green energy units
Art. 1, I.3.e.	By 2030 100% of taxis to be replaced shall be electric or green energy
Art. 1, I.3.e.	By 2050 100% of operating urban buses and taxis shall be electric or green energy units

Source: Decision 876/QD-TTg dated 22.07.2022: Action Program on Green Energy Transformation, Reduction of Carbon and Methane Emissions of the Transportation Industry



Framework

- Vehicle categories assessed: cars, taxis, motorcycles, buses
- Only battery electric vehicles
- Timeframe to 2050
- Modelling approach with 2 electric vehicle share scenarios





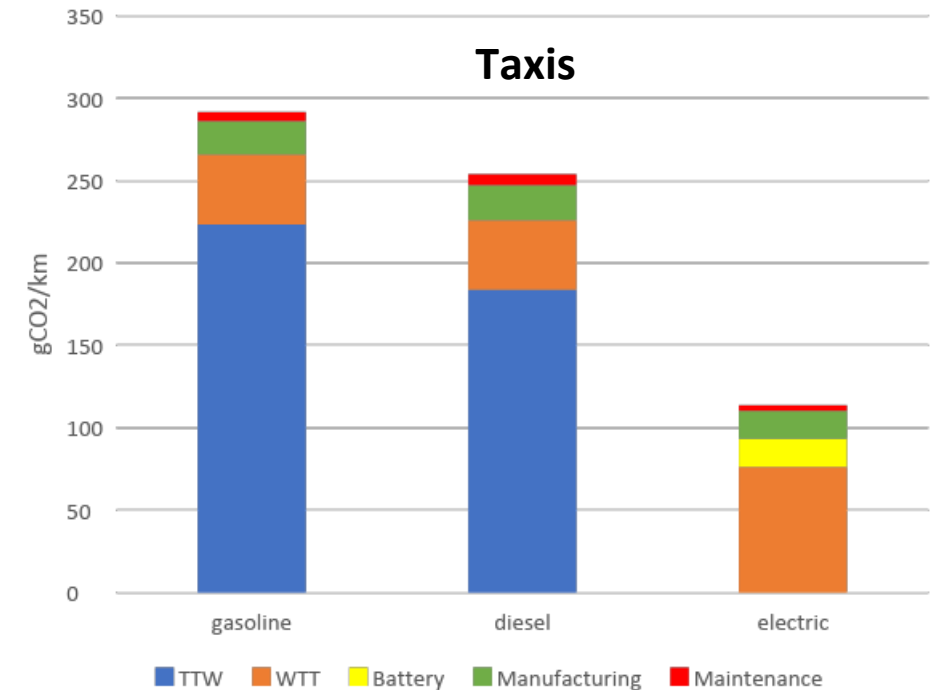
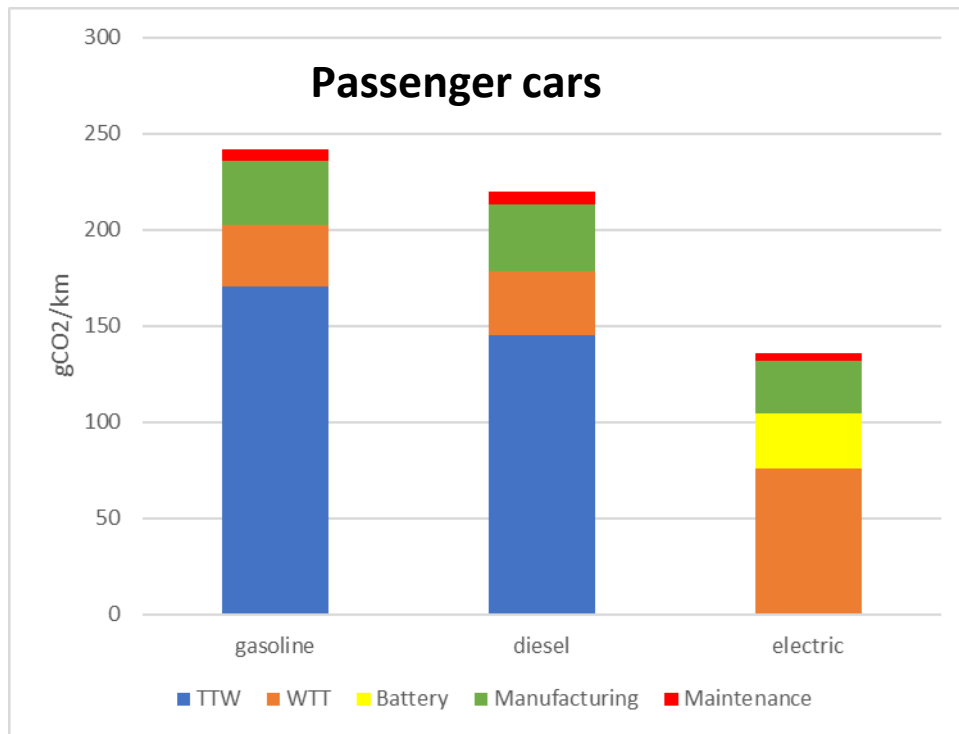
Modelling and Scenarios

- **Modelling** is made for the time period 2022 to 2050. Vietnam has set a net zero greenhouse gas target by 2050 in the National Climate Change Strategy to 2050.
- **Scenarios:**
 - Baseline scenario without EVs
 - EV “moderate” deployment scenario
 - EV “accelerated” deployment scenario



GHG Emissions. Viet Nam 2022

- Combustion emissions (TTW)
- direct + indirect emissions (WTT)
- life-cycle emissions

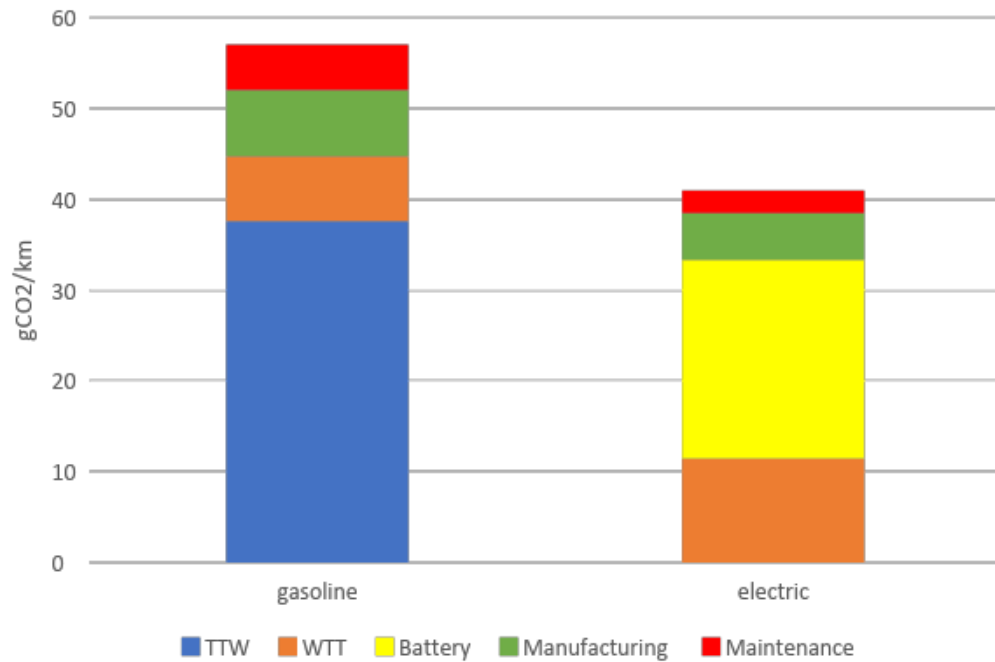


TTW = tank-to-wheel; WTT = well-to-tank

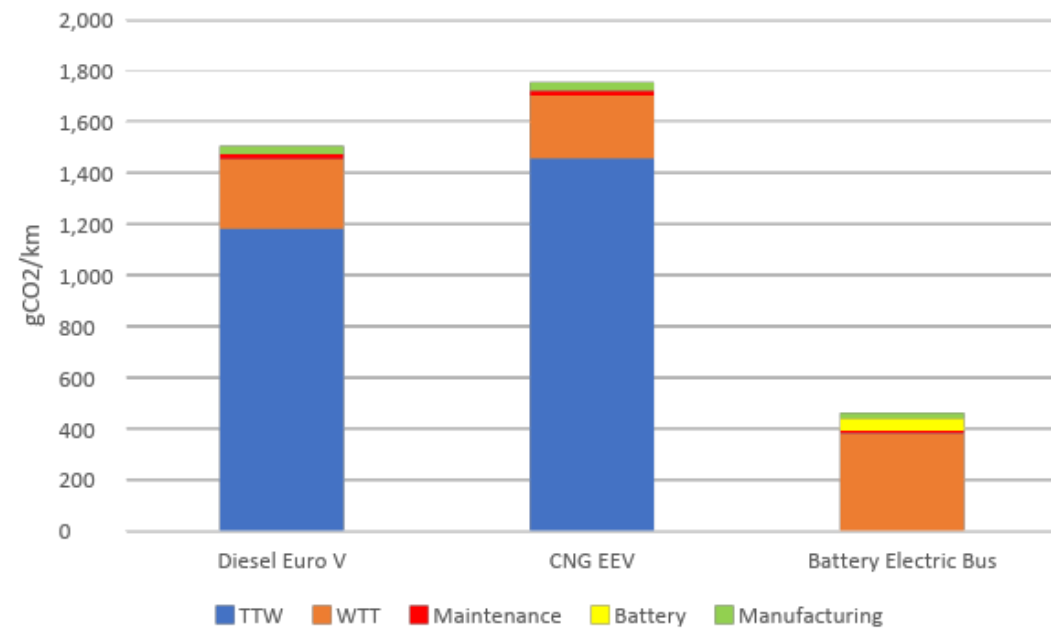


GHG Emissions. Viet Nam 2022

Motorcycles



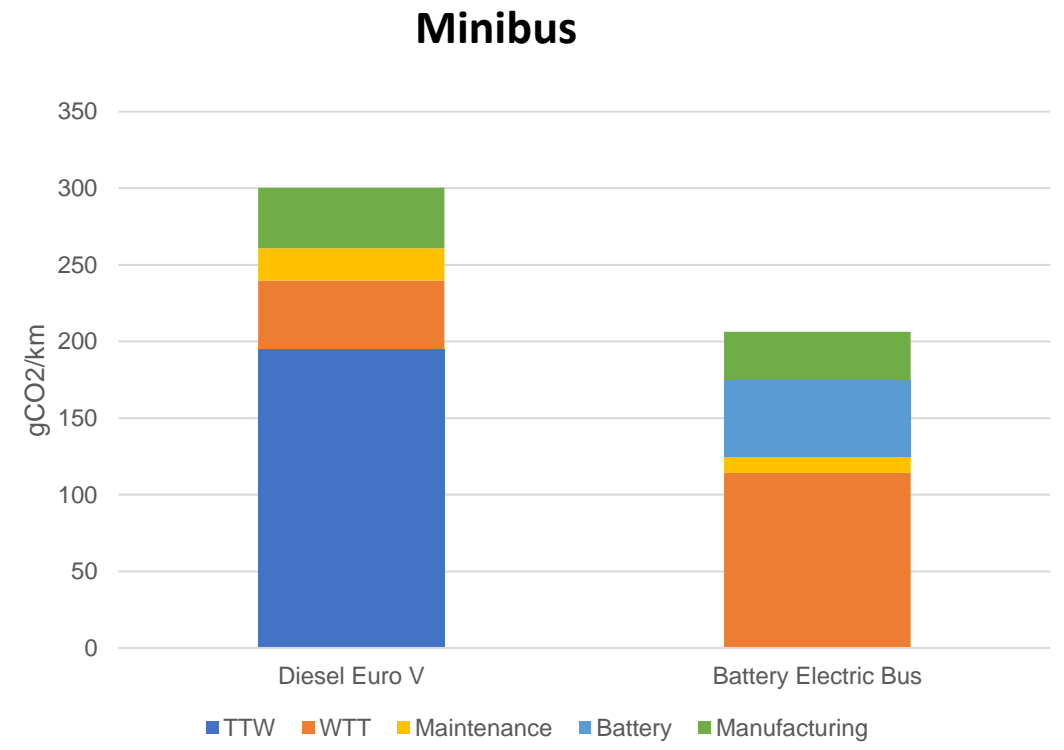
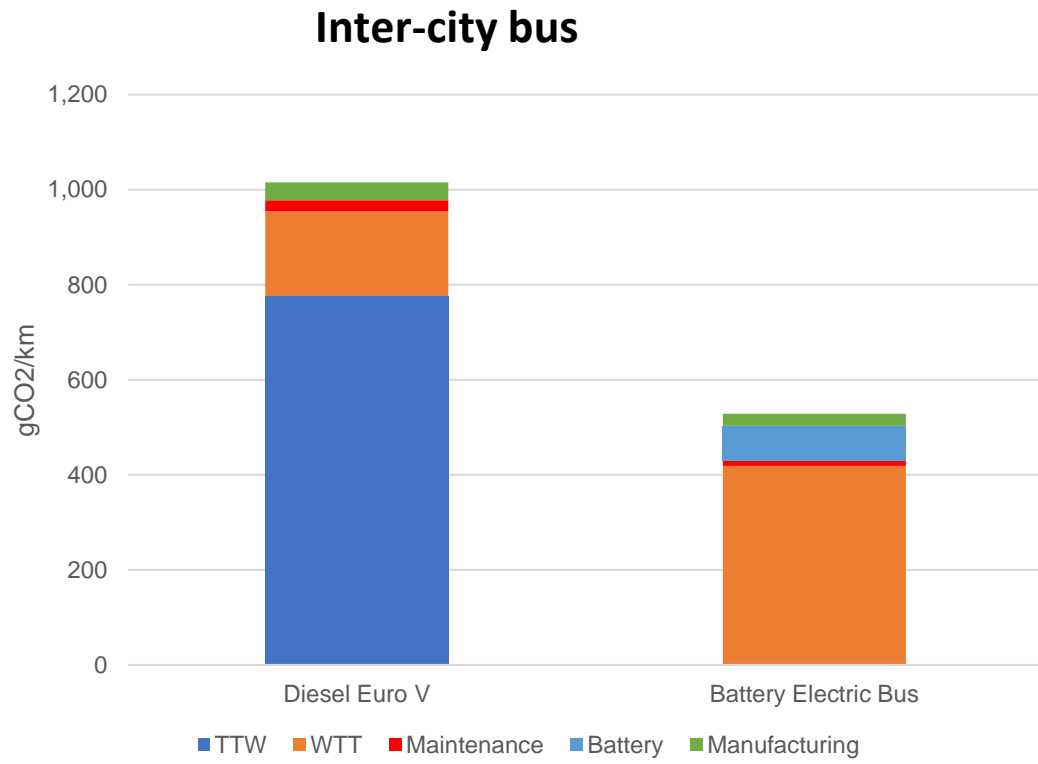
Urban bus



TTW = tank-to-wheel; WTT = well-to-tank



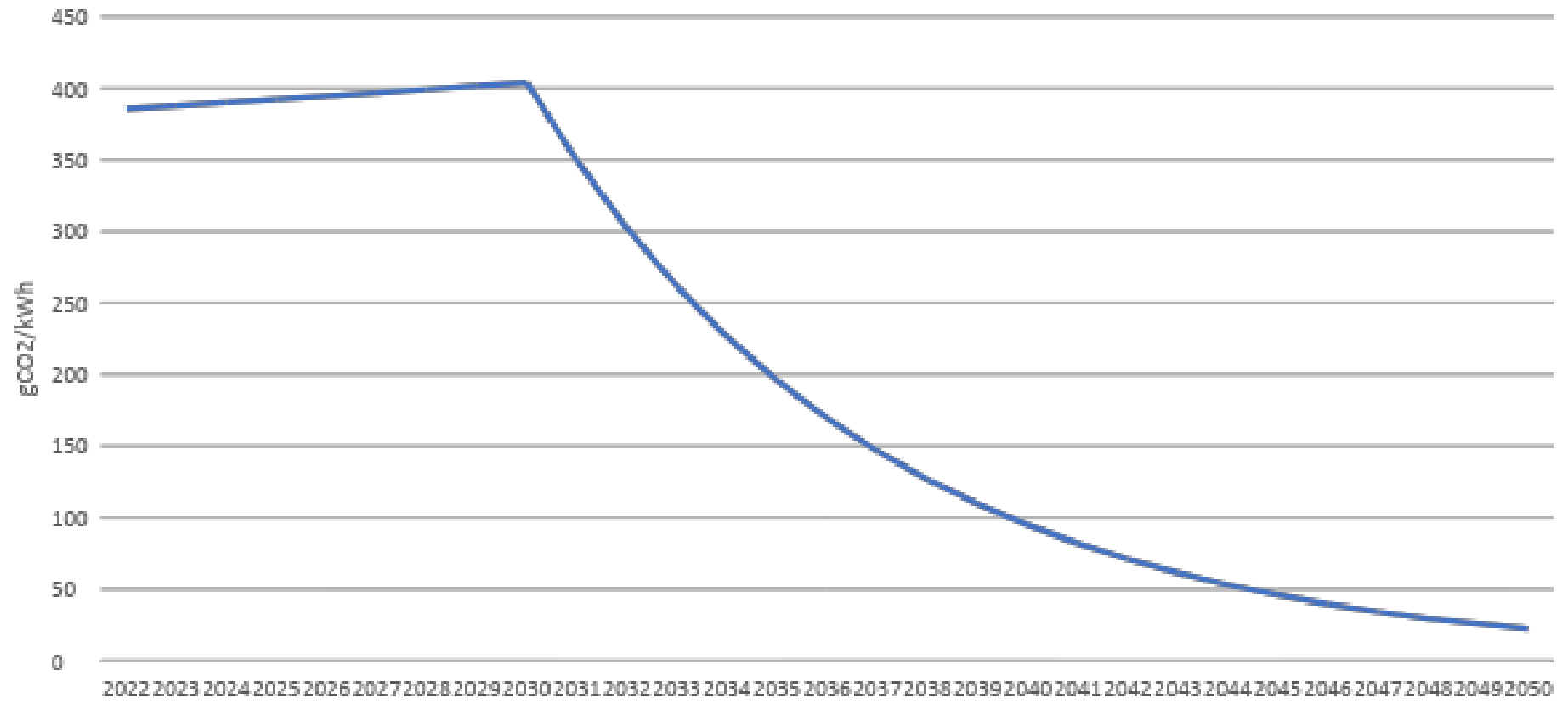
GHG Emissions. Viet Nam 2022



TTW = tank-to-wheel; WTT = well-to-tank



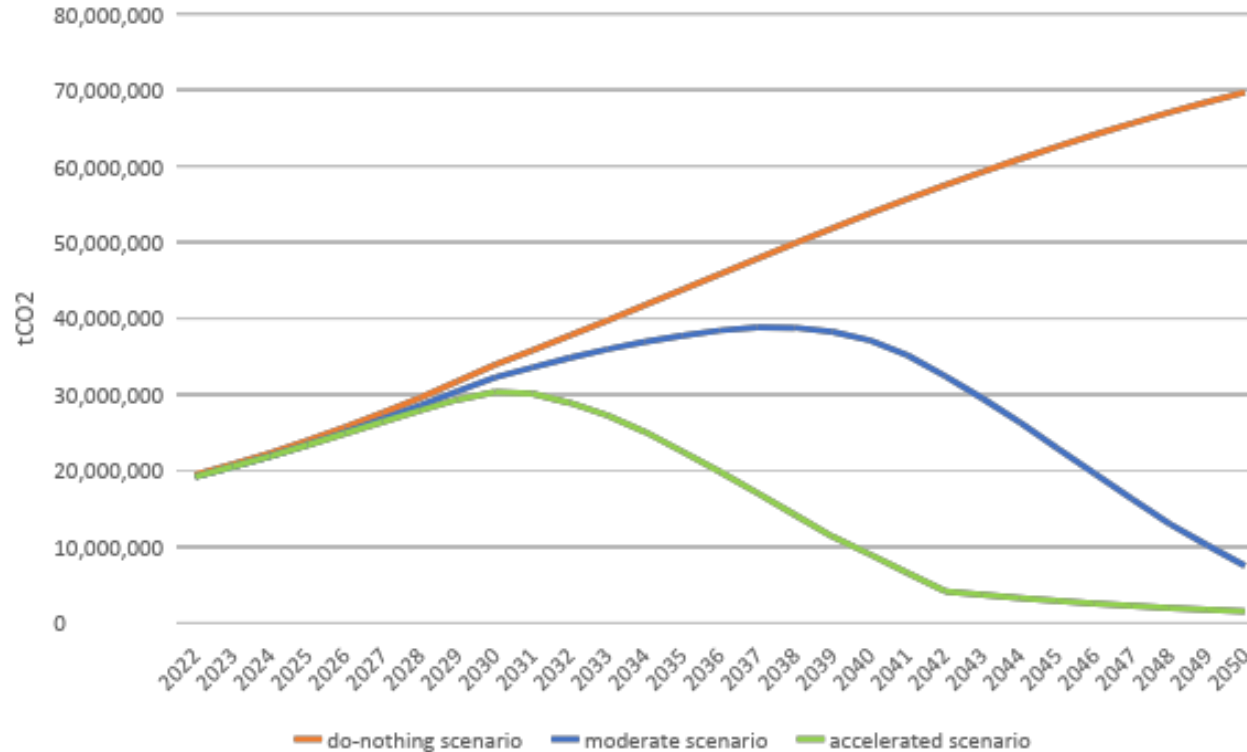
Carbon Grid Factor Vietnam



Source: Grutter Consulting based on data from Decision No. 500/QD-TTg dated 15/05/2023



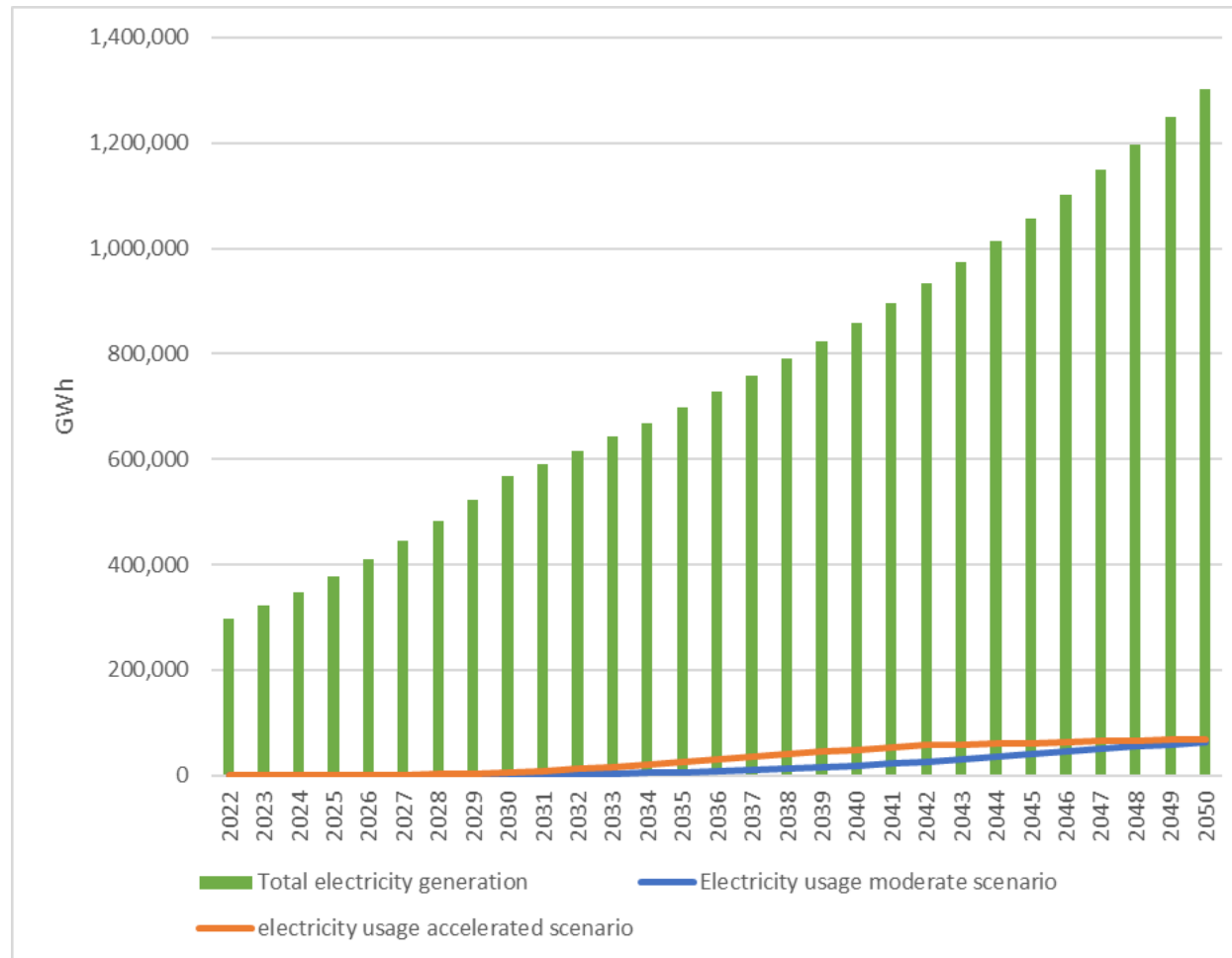
Well-to-Wheel GHG Impact



- The moderate scenario is in general based on government targets;
- The accelerated scenario as well as the moderate scenario are in line with the net zero target 2050



Electricity Consumption of EVs, Viet Nam 2022-2050

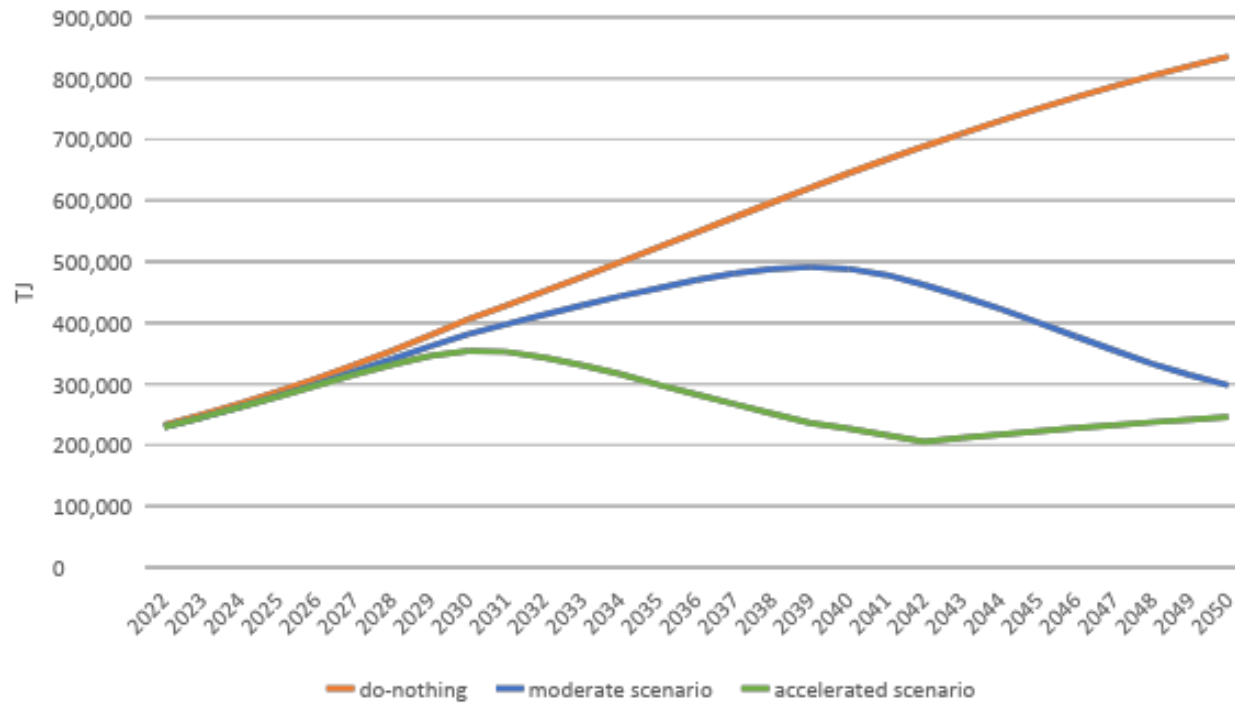


Share of Electricity Consumption of EVs of total Electricity Generation in Viet Nam

	2030	2040	2050
Moderate scenario	0.3%	2.1%	4.8%
Accelerated scenario	1.0%	5.7%	5.2%



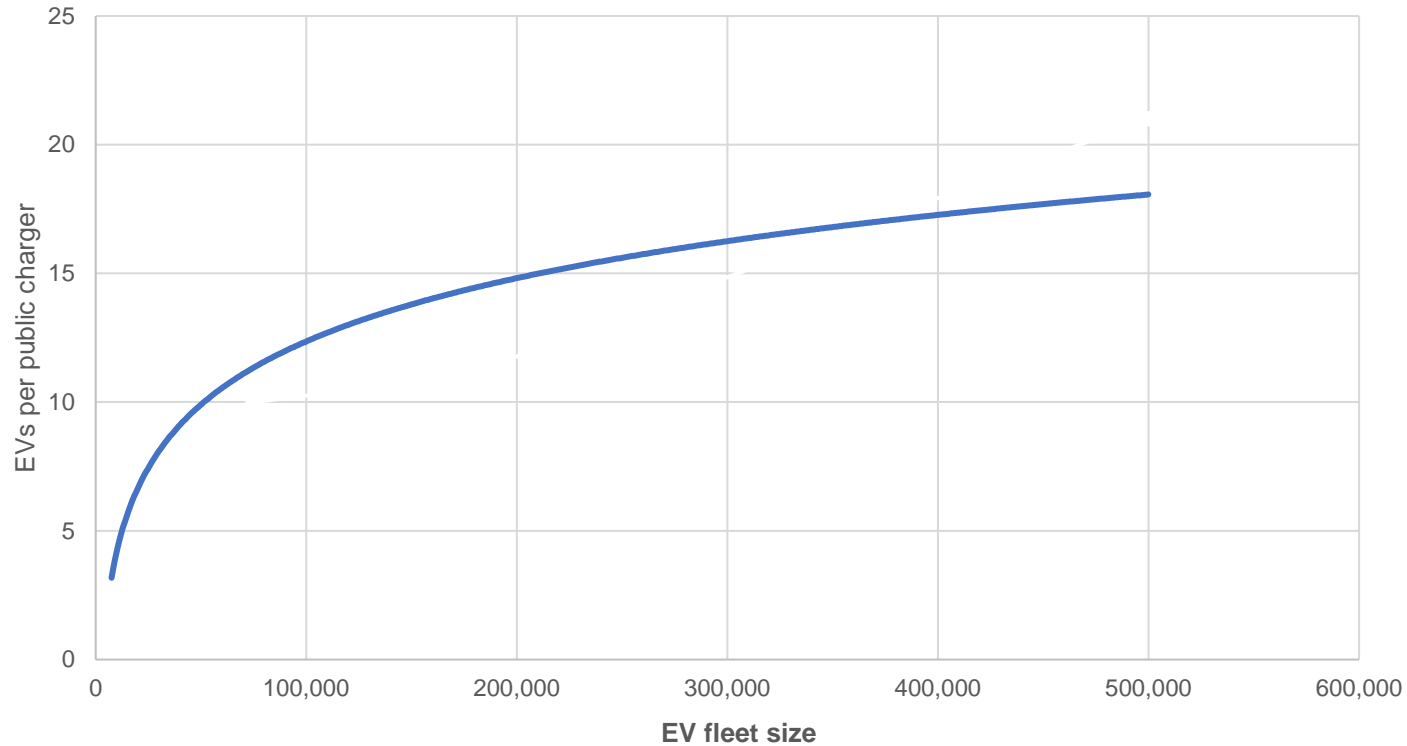
Energy Usage for Vehicle Traction



	2030	2040	2050
Gasoline saved (million liters)	800-1,800	6-17,000	21-23,000
Diesel saved (million liters)	200-300	1-2,000	2,000
Energy saved (TJ)	24-52,000	190-420,000	540-590,000



Projected Number of EVs per Public Charger



Parameter	2030	2040	2050
<i>Moderate scenario</i>			
Electric cars incl. taxis	260,000	3,600,000	15,500,000
Public chargers	17,000	140,000	510,000
<i>Accelerated scenario</i>			
Electric cars incl. taxis	1,010,000	11,300,000	17,500,000
Public chargers	49,000	390,000	570,000



Power Sector Impact

- Absolute electricity usage is limited but is amplified through increasing electricity usage of households and industry;
- The impact on the required *peak capacity* of the power system may be larger;
- Charging sites with many and larger capacity chargers such as bus depots are more likely to require grid extensions such as feeder and probably more transformer capacity in the feeding high voltage (110 kV) substations and 110 kV grid;
- Smart charging or managed charging may mitigate the impact of EV charging on the grid by taking advantage of the margin between needed charging time and actual stationary time of a vehicle.



General EV Policies

- A general policy recommendation is to not simply follow the pathways of leading EV countries such as Norway;
- Financial incentives should be fiscally neutral manner with exception potentially of the promotion of urban electric urban buses;
- ICE phase out targets are very effective as they send clear signals to markets;
- Formulate targets based on vehicle sales and not based on the vehicle stock;
- **Provide incentives for public charging infrastructure including home charging e.g. through the establishment of building codes, lamppost / roadside low powered chargers and high-powered fast chargers along inter-urban roads;**



More information....

Report will be published by ADB