



# The need for monitoring upstream emissions of electric vehicles

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Online Workshop on Real-Time Upstream Emissions of Electric Vehicles During Recharge



## Global EV Outlook 2020

Entering the decade of electric drive?



<https://www.iea.org/reports/global-ev-outlook-2020>



### Electric Vehicle and Power System Integration: Key insights and policy messages from four CEM workstreams



Developed jointly by four CEM workstreams: 21st Century Power Partnership Initiative (21CPP), Electric Vehicles Initiative (EVI), International Smart Grid Action Network Initiative (ISGAN) and Power System Flexibility campaign (PSF)

*This report was prepared for the 11<sup>th</sup> Clean Energy Ministerial (CEM11), September 2020.*



<http://www.cleanenergyministerial.org/publications-clean-energy-ministerial/electric-vehicle-and-power-system-integration-key-insights>

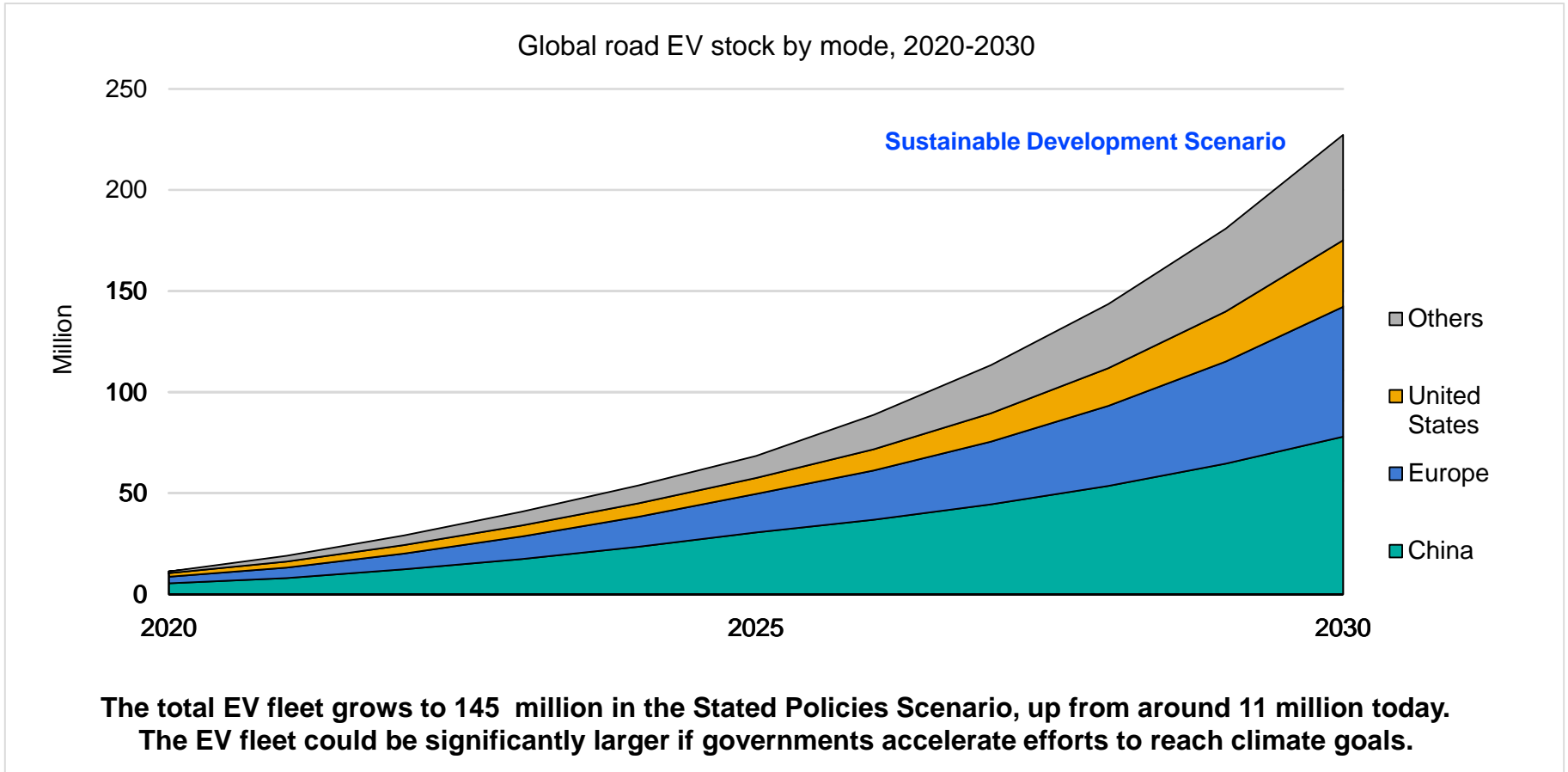
## Global EV Outlook 2021



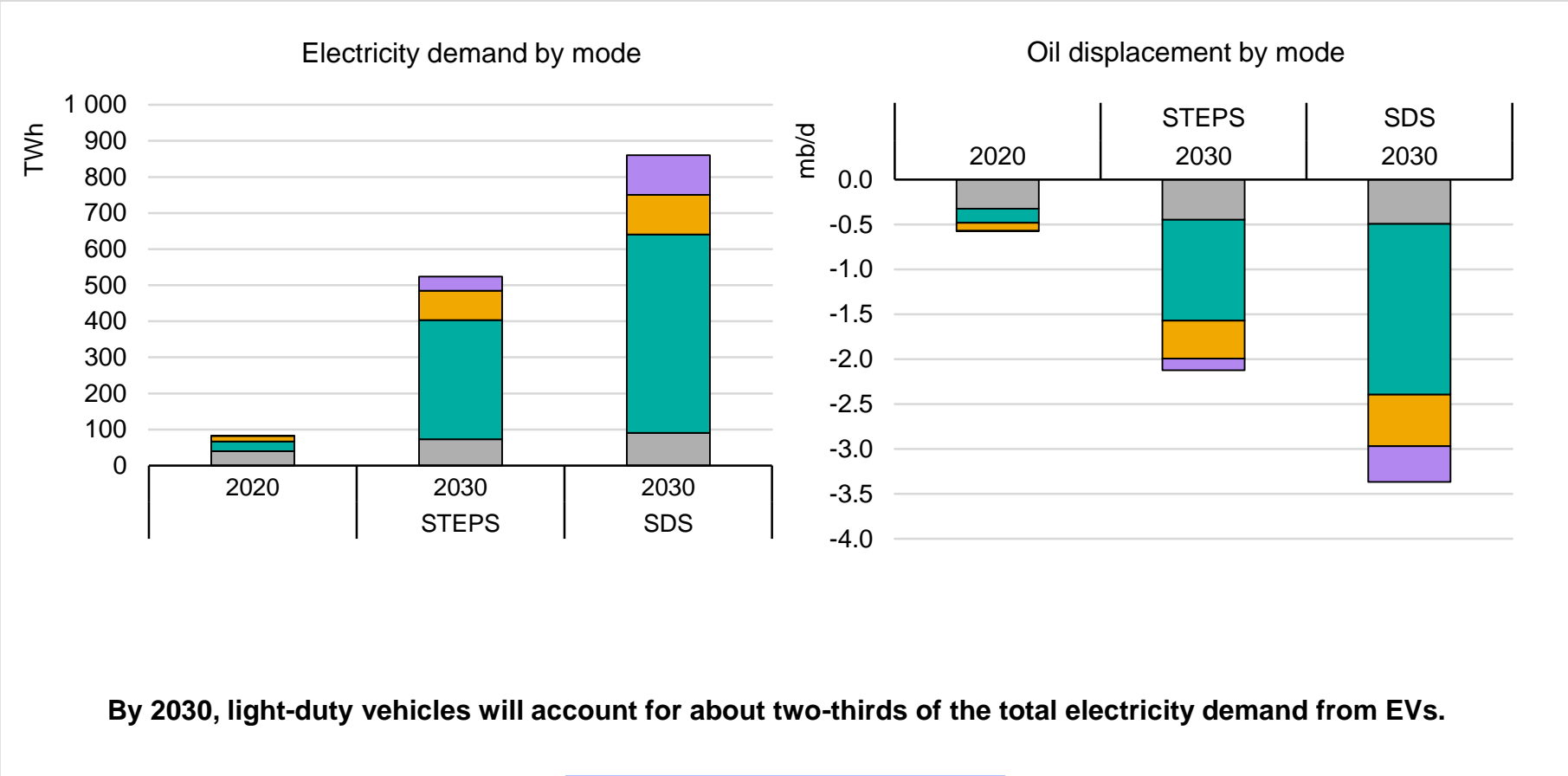
<https://www.iea.org/reports/global-ev-outlook-2021>

# 1. The need for monitoring EV upstream emissions

# The EV stock needs to increase across all road transport modes

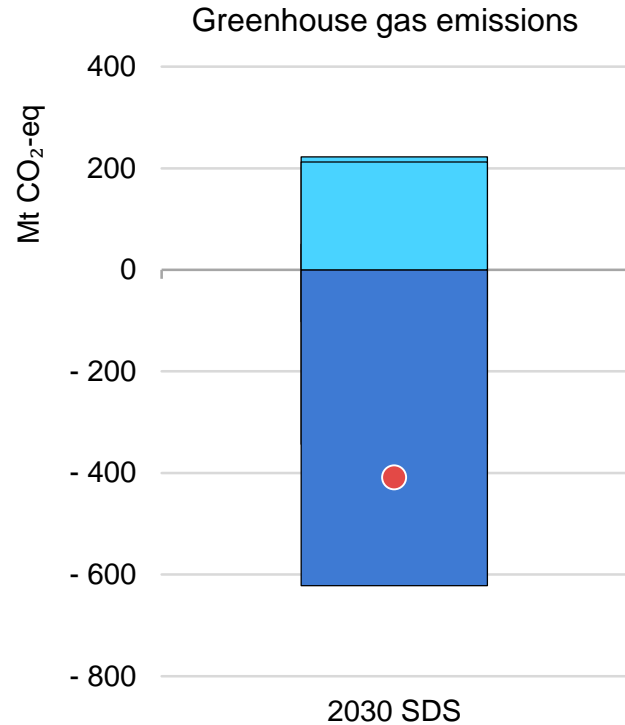


# Electricity demand will grow as a result of fossil fuel displacement



**By 2030, light-duty vehicles will account for about two-thirds of the total electricity demand from EVs.**

# EVs could support climate goals

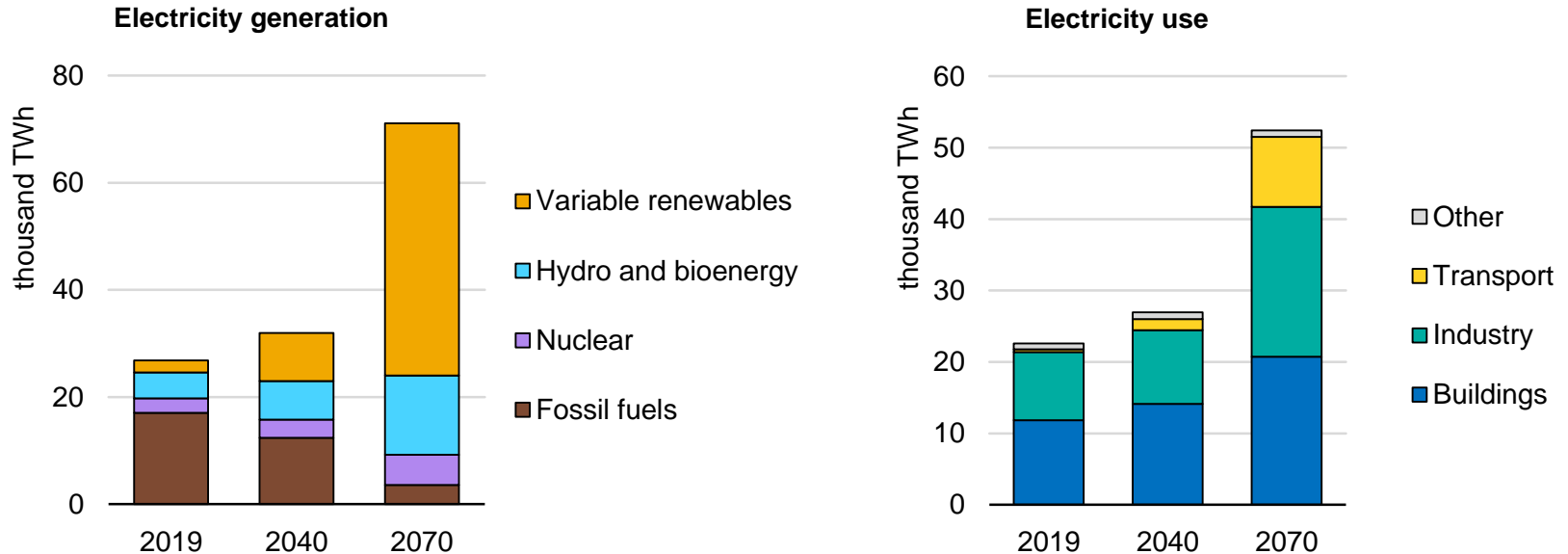


**EVs will continue contributing to net reductions in GHG emissions, especially as the electric grid decarbonises.**

## **2. Opportunities to reduce upstream emissions of Evs**

# 1. Decarbonising the power sector

Global electricity use and generation in the Sustainable Development Scenario, 2019-70

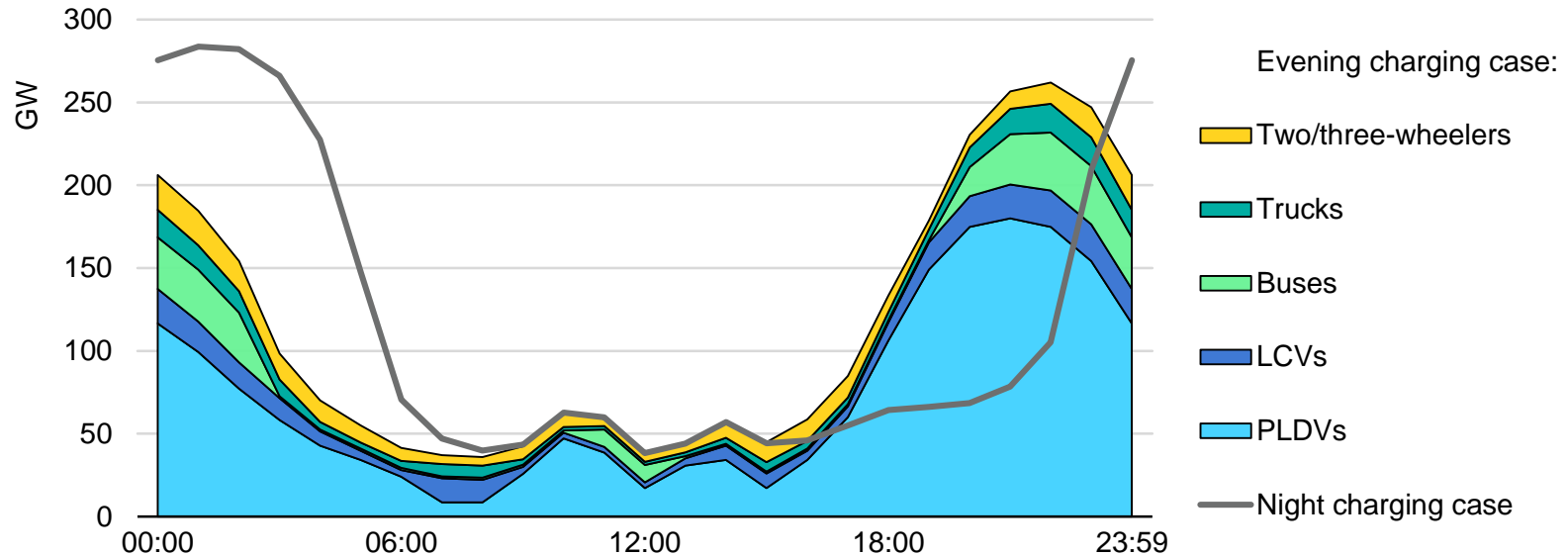


Variable renewables dominate the electricity generation mix in 2070 as emissions reach net-zero. At net-zero emissions, electric vehicles hold the potential and responsibility to charge when variable renewables are in excess.



## 2. Charging at predefined periods of the day

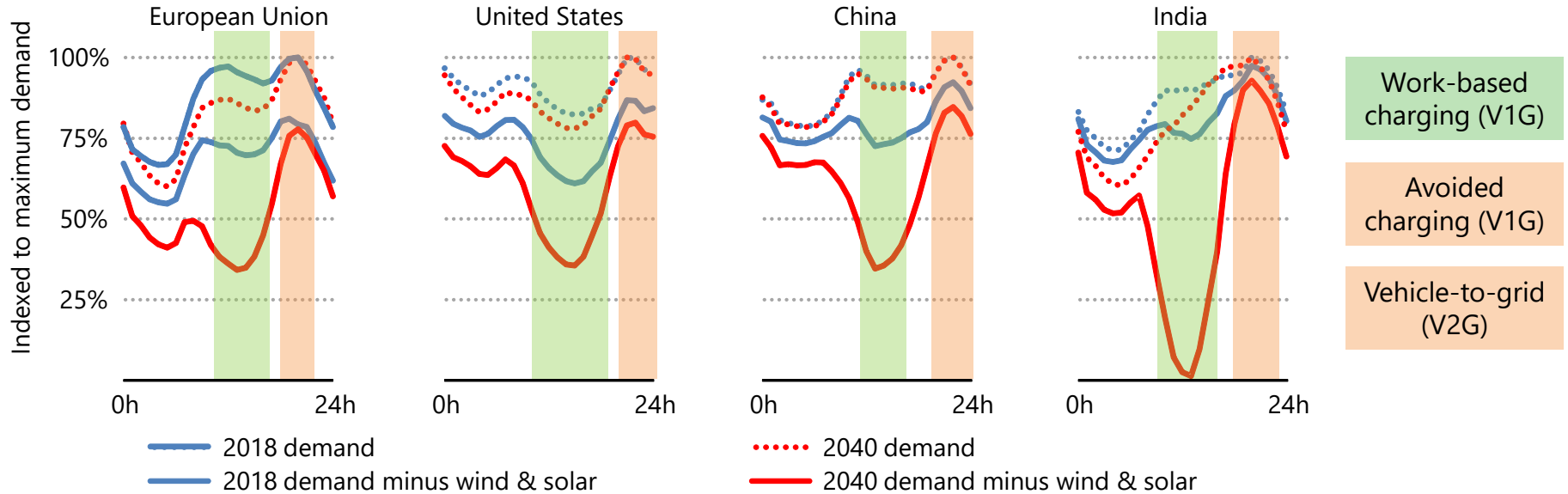
Unmanaged global average load profiles by vehicle type, 2030  
(EV deployment of the Sustainable Development Scenario)



Unmanaged charging results in a high evening charging peak, but static off-peak tariffs could reduce the contribution of EVs to peak demand to less than 5%, and therefore mitigate their indirect emissions.

### 3. Managing EV charging patterns in real-time (V1G)

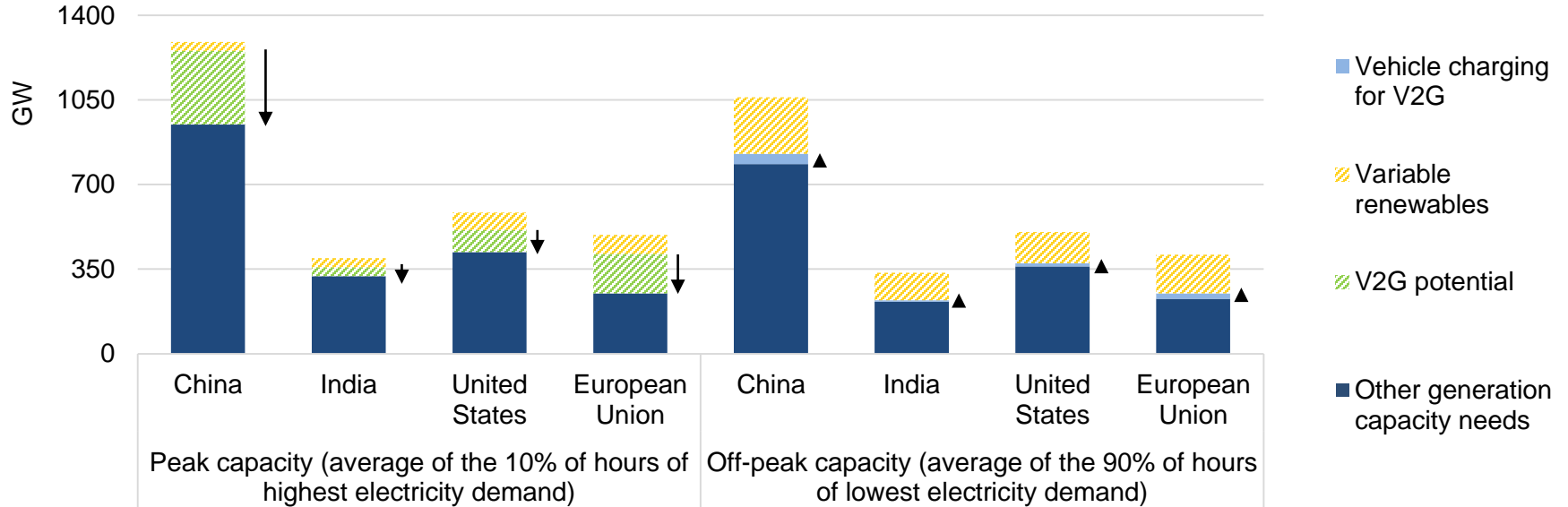
Hourly electricity demand and residual demand for a sample day



Changing power systems will create new business opportunities for electric vehicles, including work-based charging and vehicle-to-grid, both at the net benefit of the energy system.

# 4. Making EVs grid service providers using V2G

Vehicle-to-grid potential relative to total generation capacity, 2030  
(EV deployment of the Sustainable Development Scenario)



Vehicle-to-grid services could unlock up to 600 GW of flexible capacity in 2030 (distributed across EV markets). 600 GW represents nearly half of current hydropower capacity.



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