Sri Lankan Energy Transition to Net Zero : Challenges and Opportunities

Mudith Witharama

Asst. Lecturer, University of Moratuwa

Sri Lankan Carbon Emission Scenario

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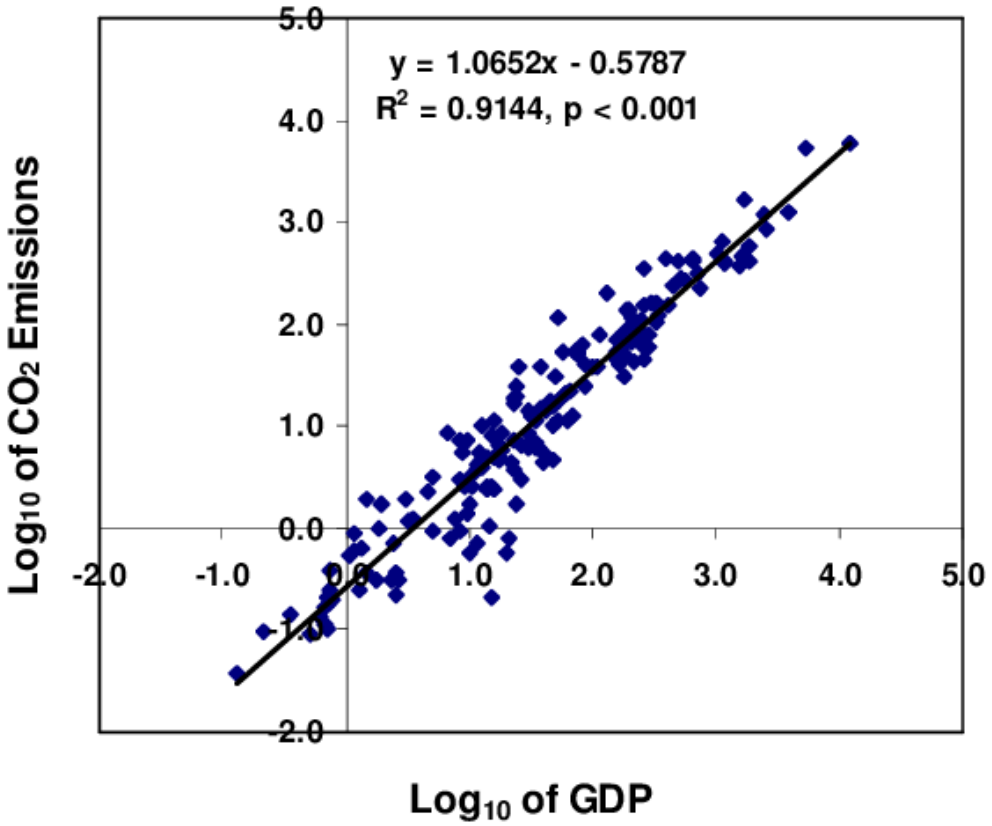
Correlation of CO2 Emission and GDP



Per Capita CO2 Emission Sri Lanka and World

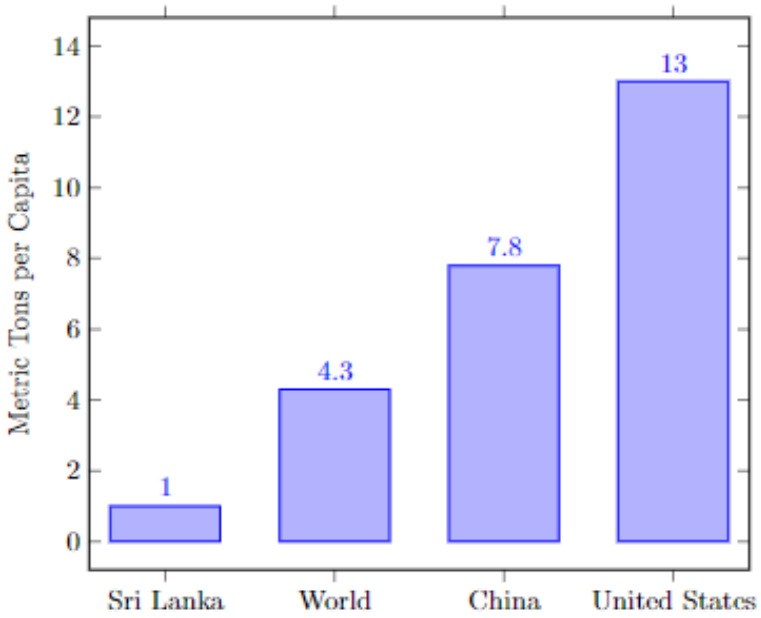
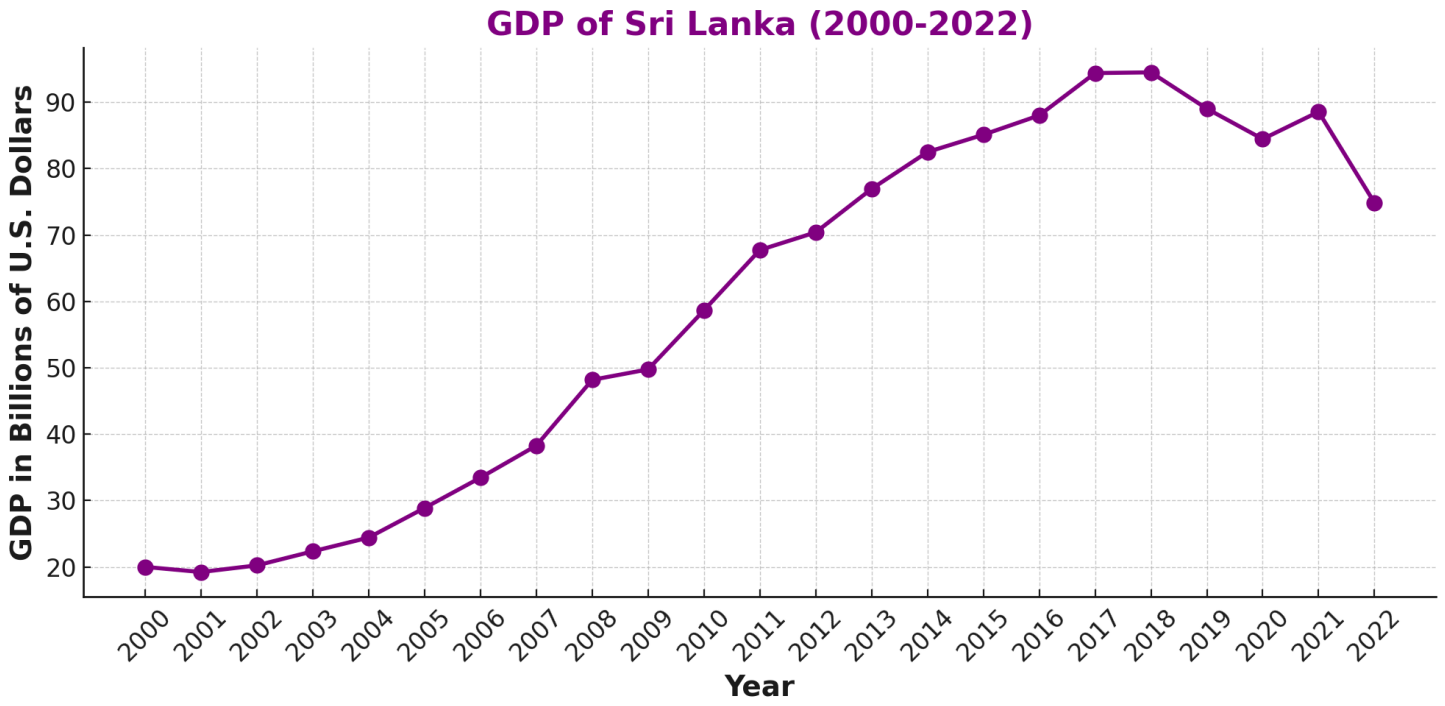


Figure 1: Per Capita CO2 Emissions in 2022

A. Bowen, P. Forster, A. Gouldson, H. Klaus, R. Martin, O. Neill, A. Rap, and J. Rydge, "The implications of the economic slowdown for greenhouse gas emissions and targets," IEEE

Sri Lankan Economy



Source : World Bank

GDP $ 75 Bn (2023)

Total Government Debt
$87.6 Bn

External Debt
$ 36.4 Bn

Domestic Debt
$ 51.2 Bn

Opportunities for Sri Lankan Economy

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Sectors of Carbon Emission

- Industry & Waste (6.6%)
- Electricity (13%)
- Transport (51%)
- Agriculture(30%)

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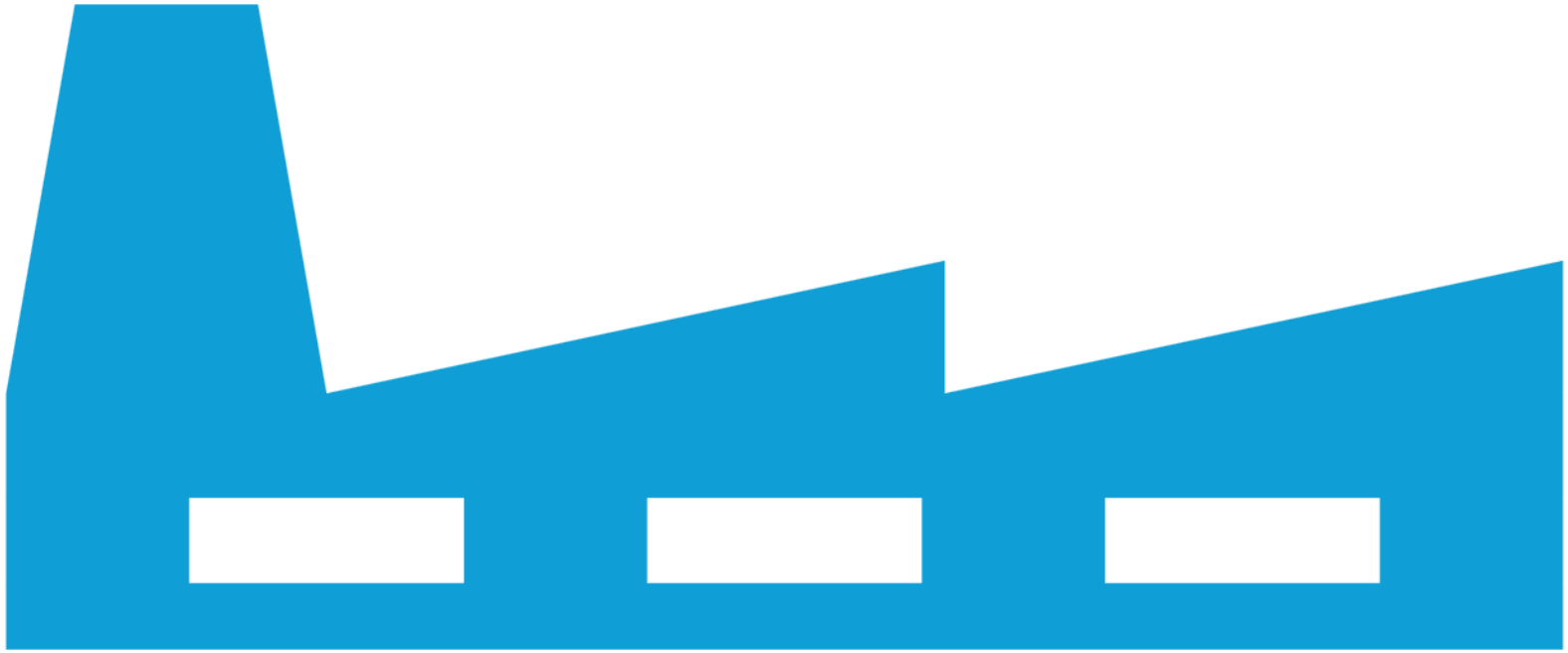
Industry



Industry (6.6%)

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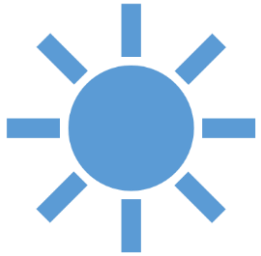
Apple 2030 Carbon Net Zero Policy

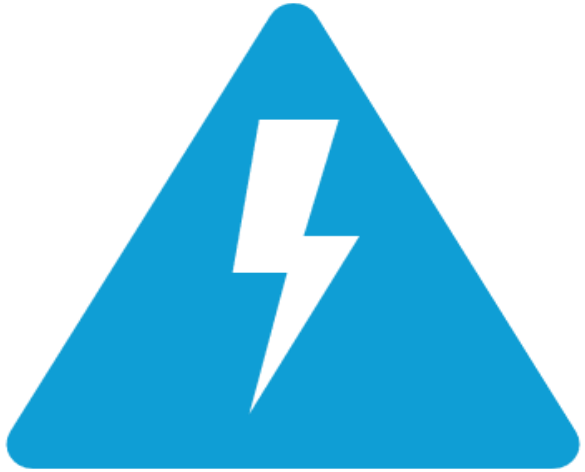
How Sri Lankan Industry can Claim C Neutrality?



Offgrid solar systems

Power Wheeling

Electricity



Electricity (13%)

Country's Maximum Demand

2.8 GW

Total Capacity

5 GW

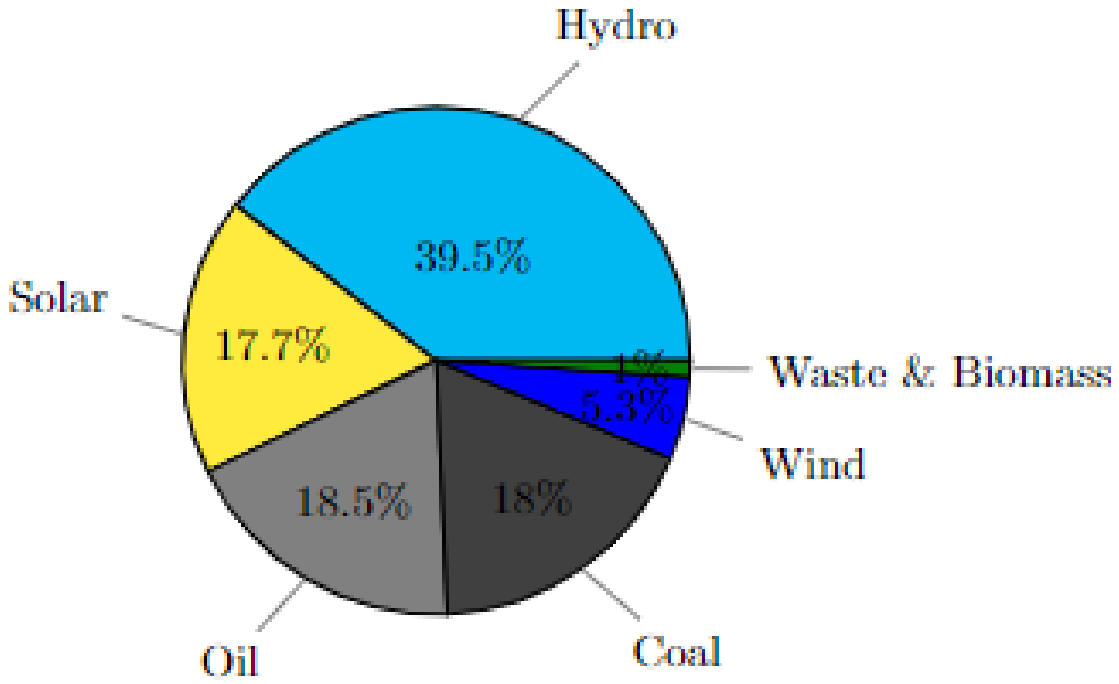


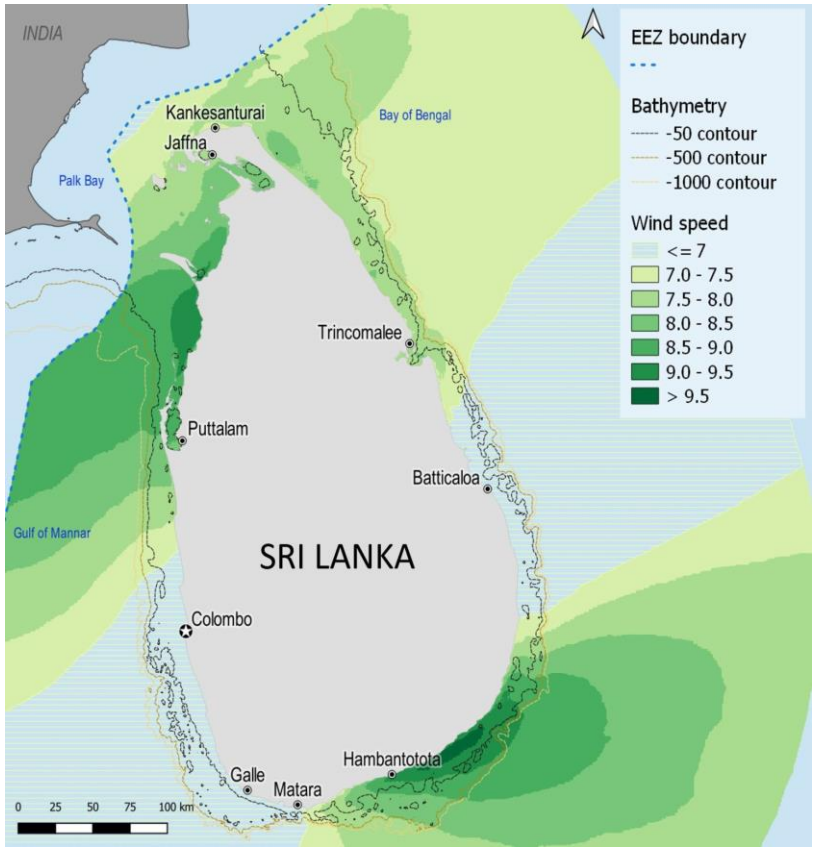
Figure 1: Source-wise Installed Capacity

Wind Power Potential

Country's Maximum Demand 2.8 GW

Wind Potential

- Onshore (Source :- NREL)
  - 55 GW -> units billion/million
- Offshore (Source :- WB)
  - Fixed 55 GW
  - Floating 37 GW



Source : https://www.nrel.gov/docs/fy03osti/34518.pdf
https://documents1.worldbank.org/curated/en/828731586850081077/pdf/Technical-Potential-for-Offshore-Wind-in-Sri-Lanka-Map.pdf

Solar Power Potential of Sri Lanka

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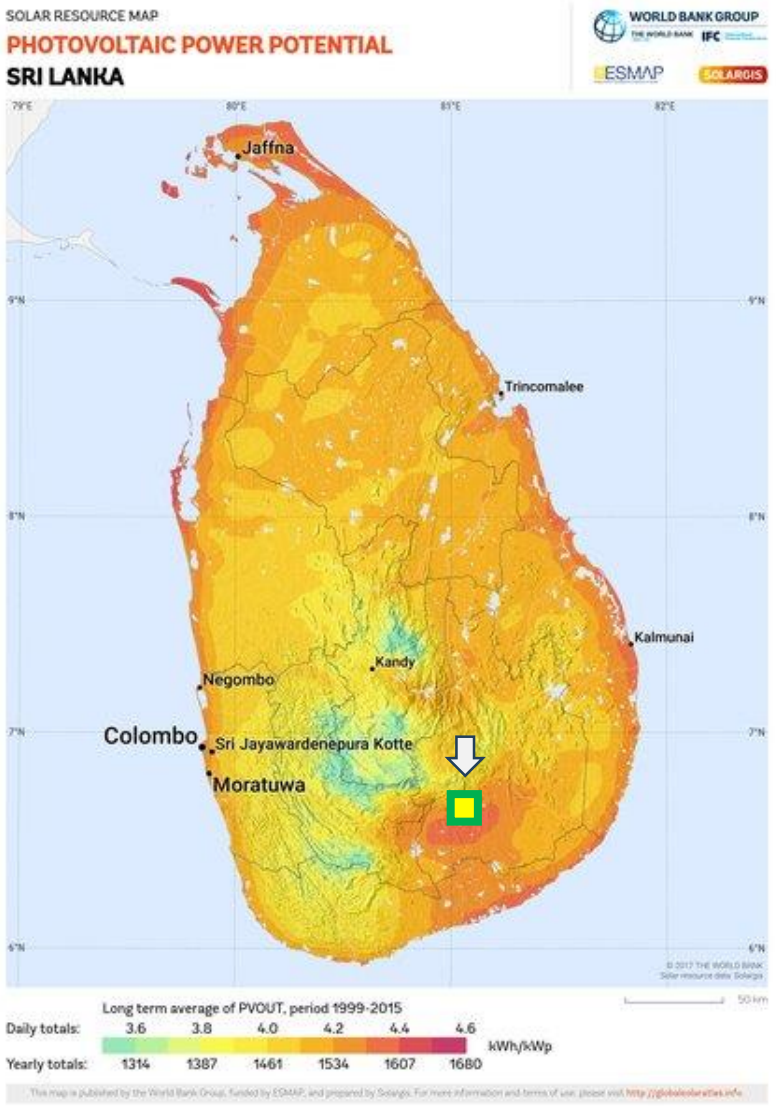
Solar Irradiance

- 4 kWh/m2/day in dry zones

Annual Electricity Consumption

- 16TWh = 16 bn KWh
- 100km2 land area (PF 16%,60% coverage)

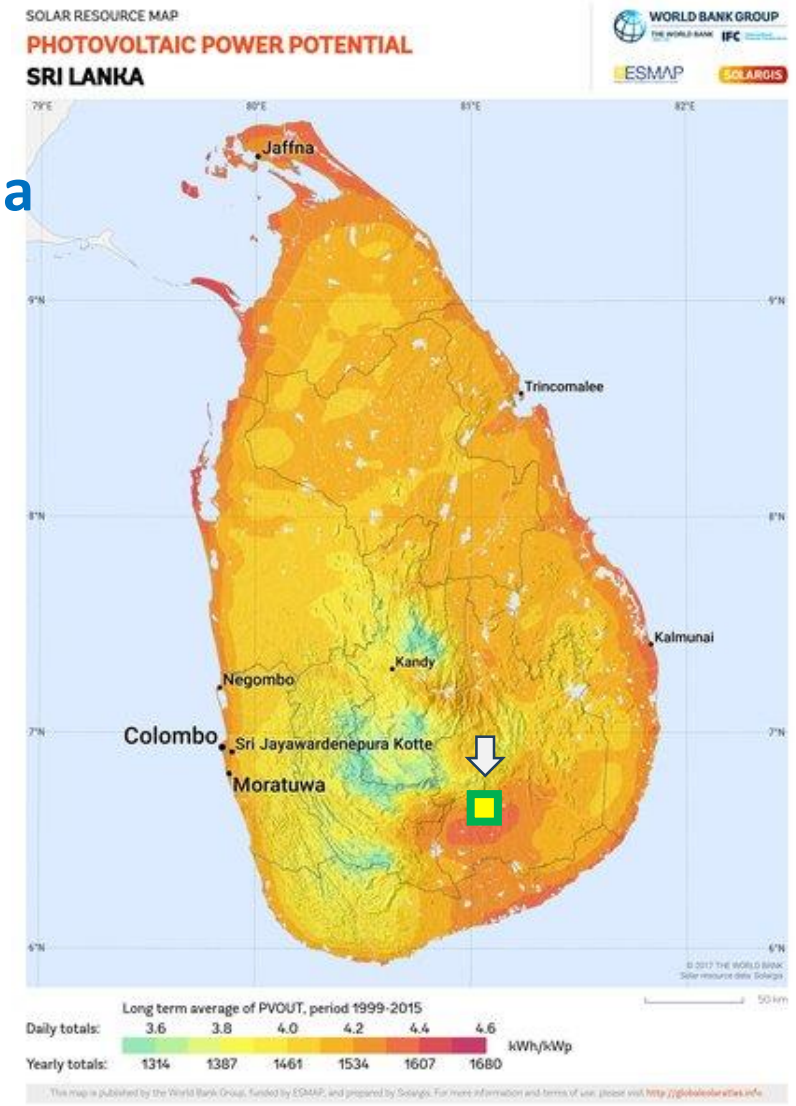
0.15% of country's land area(66610km2)



Floating Solar

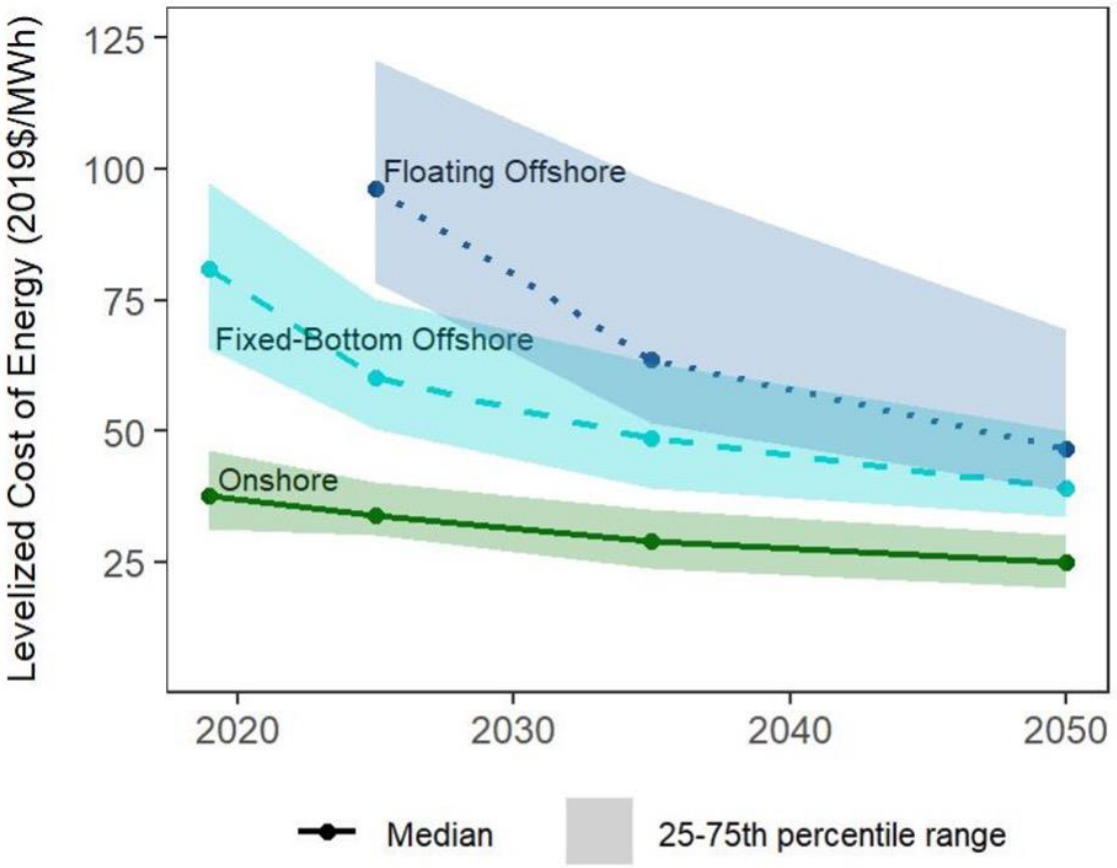
- **Solar panels mounted on a structure that floats on a body of water, typically a lake or reservoir.**

- **Advantages**
  - Land Conservation
  - Water Conservation
  - Improved Efficiency
  - Water Quality Improvement
  - Ease of Deployment
  - Synergy with Hydroelectric Power

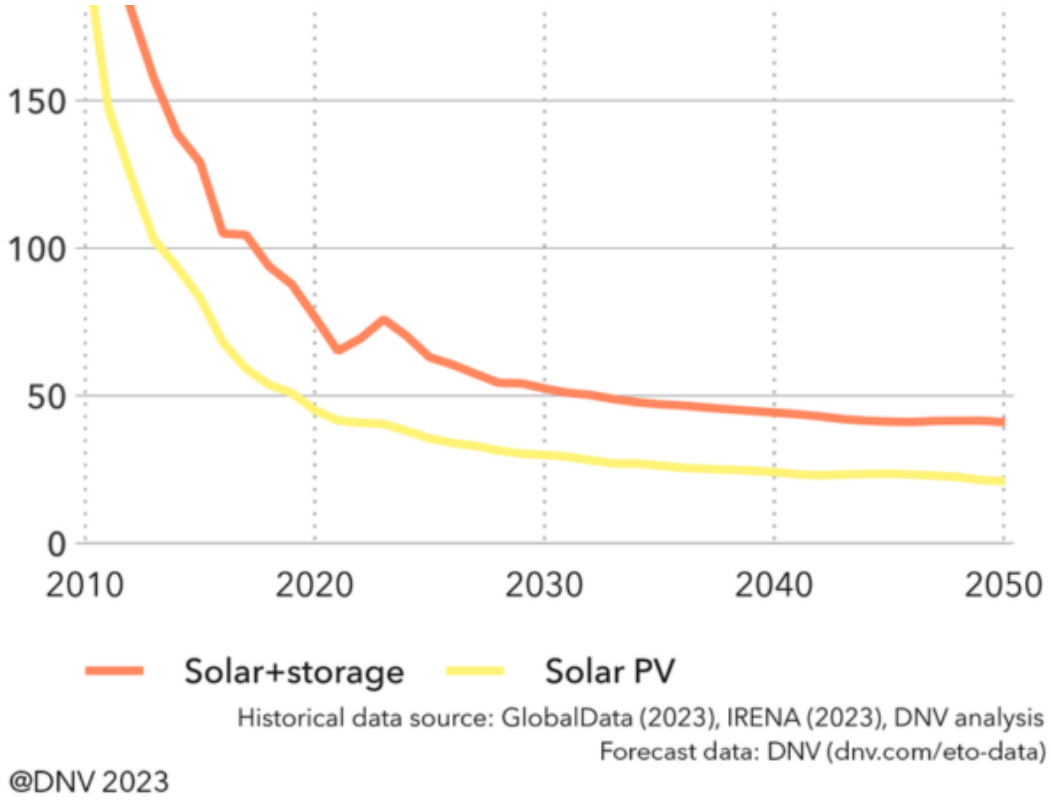


LCOE- Levelized Cost of Energy

LCOE – Wind Forecast



LCOE – Solar Forecast



Why have we not made use of this RE?

RE is intermittent

Investment

Authorities say our grid cannot absorb high volumes of RE?

Why have we not made use of this RE?

Requirements

Implement Competitive Bidding for Dollar-Linked International Investments in Large-Scale Renewable Energy Projects

Curtail Rooftop Solar in Distribution Lines ! -> Rewire Distribution Lines

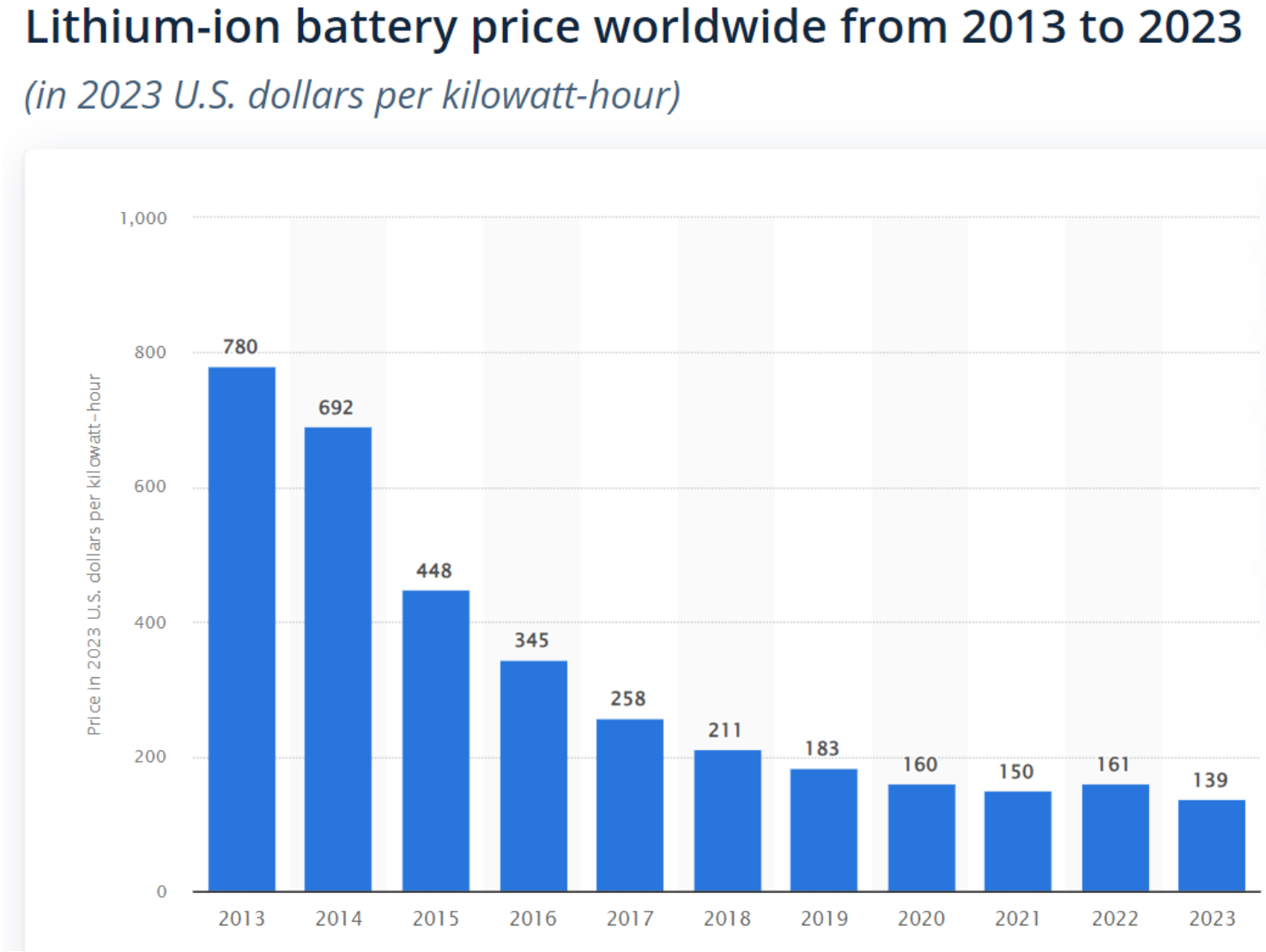
Upgrade the Transmission System and Substations to Support Renewable Energy Capacities

Energy Storage and Interconnected Grids

Intermittency of Renewable Energy Sources

Energy Storage Technologies

- ❖Green Hydrogen
- ❖Pumped Hydro
- ❖High-rate batteries



Source : Statistica

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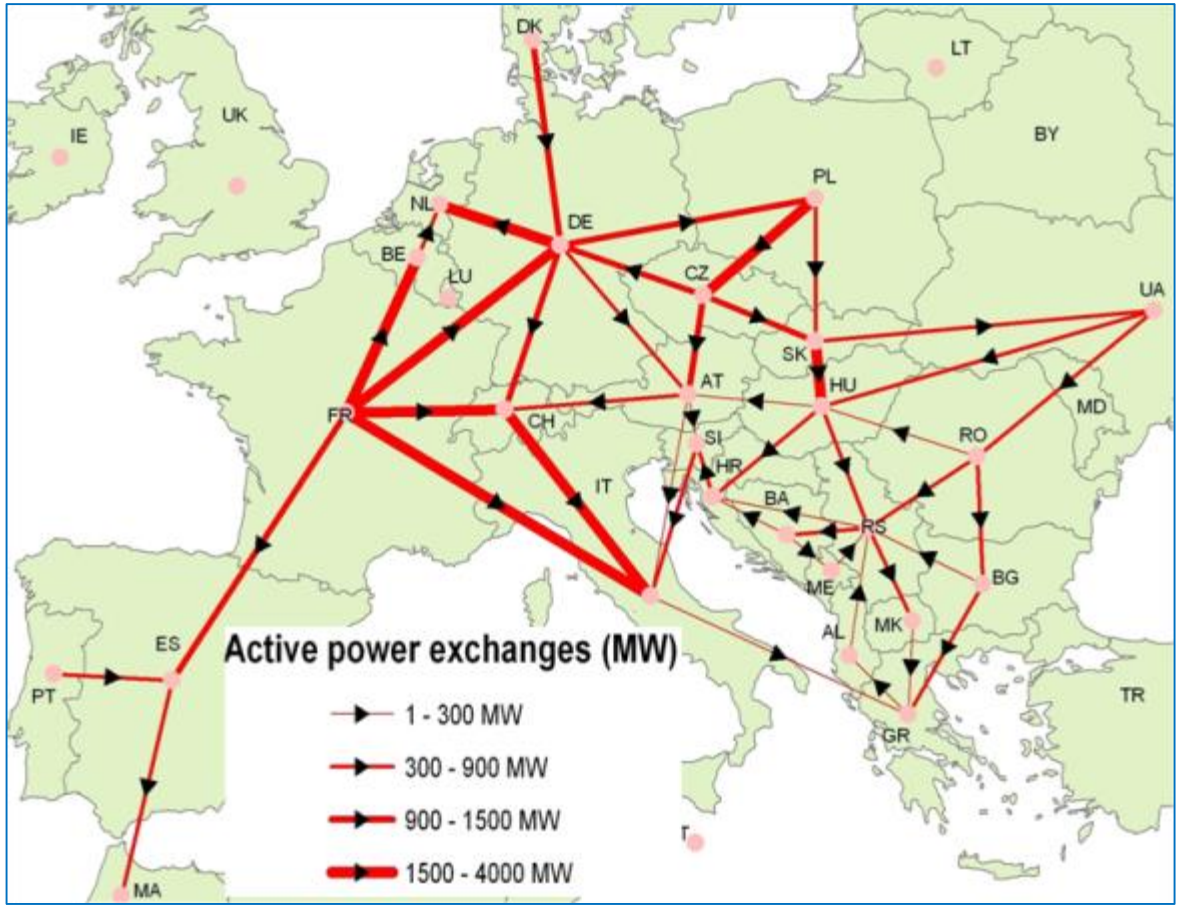
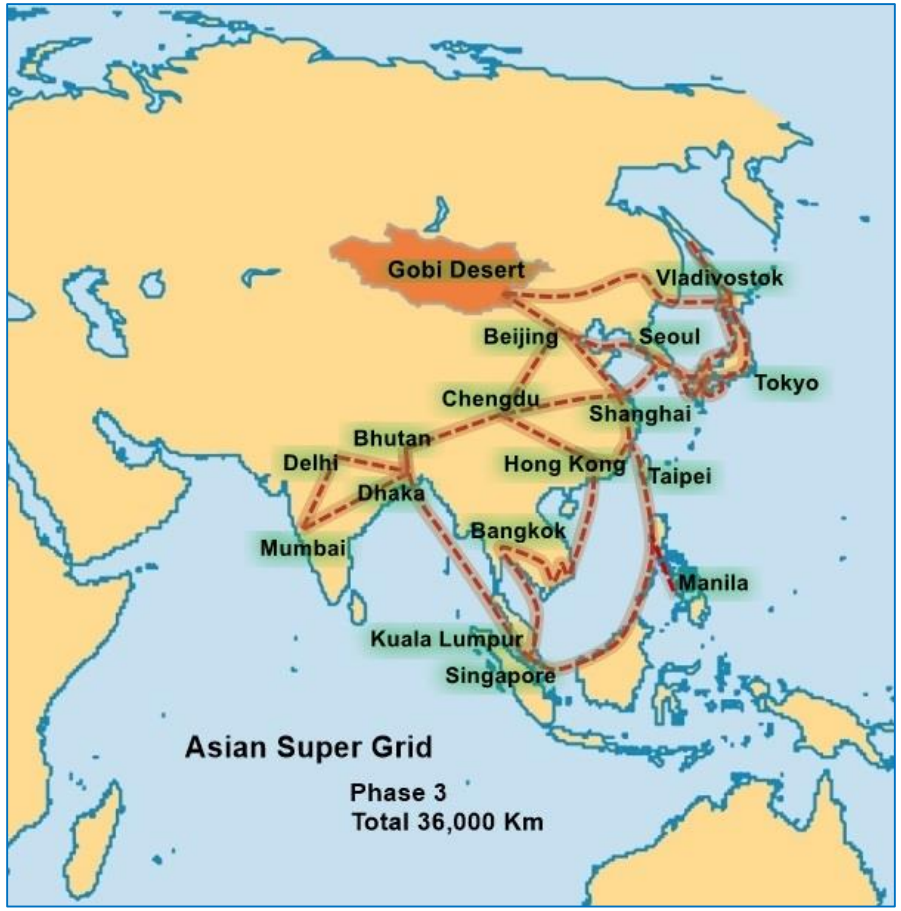
European Interconnected Grid



Asian Interconnected Grid



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Transport Sector

Automotive Industry

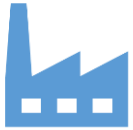
BESS development

Range is increasing

Charging times are dropping

EV battery cost

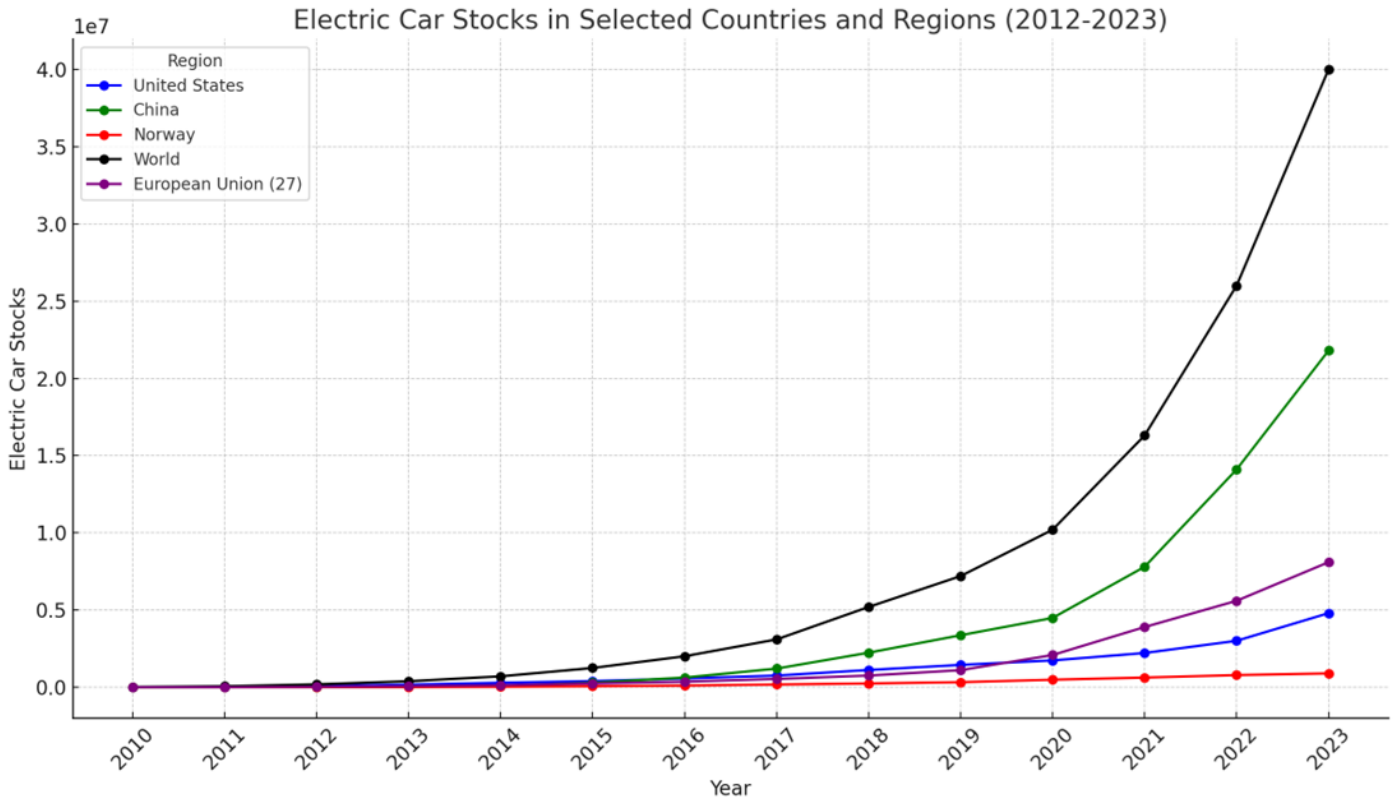
EV vehicle cost



EV production and sale

Sales growth

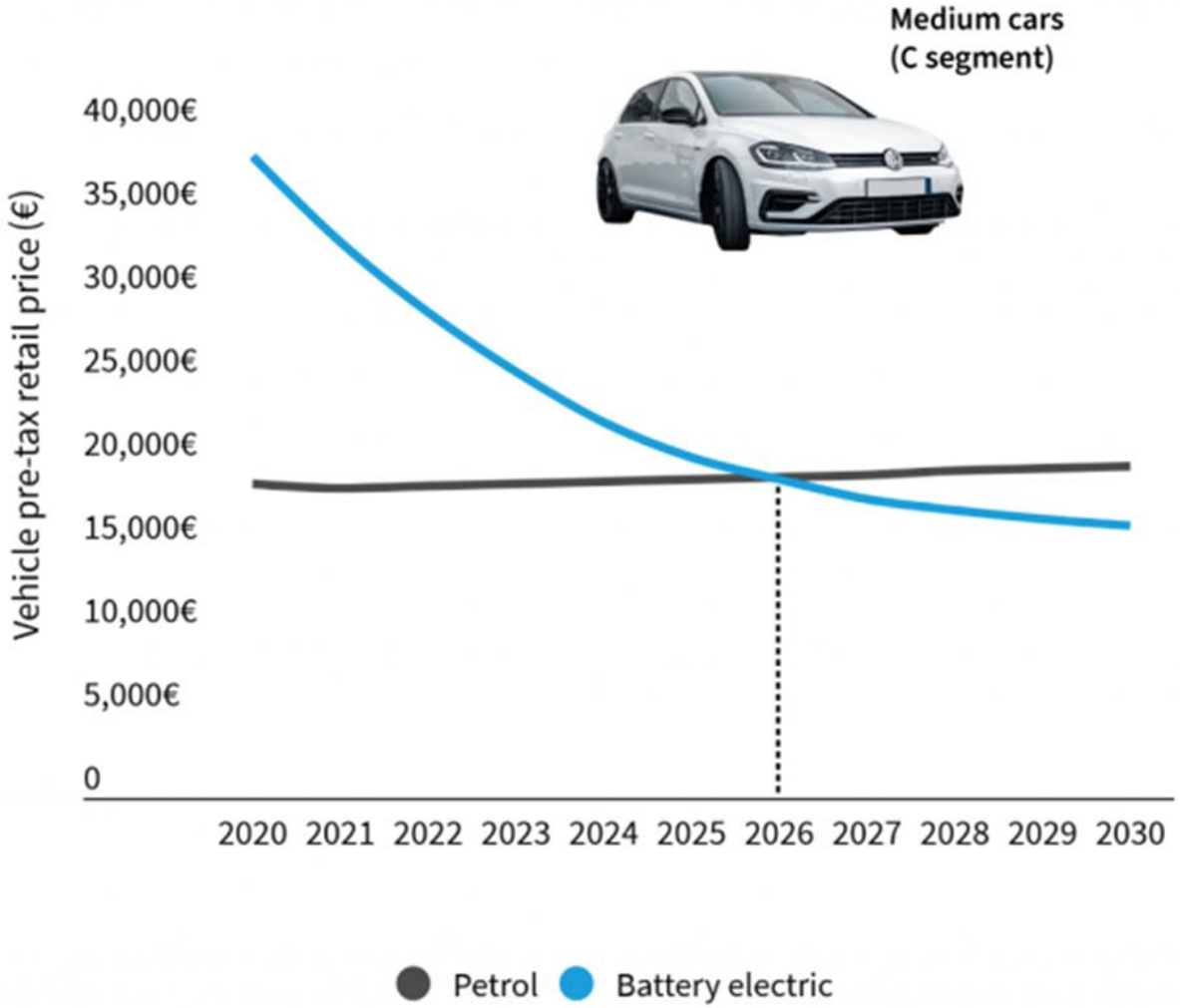
Global Sales and Sales Growth of electric Cars, 2012-2023



Source International Energy Agency

BEVs - BYD Dolphin
CIF $ 15,000- $ 20,000
400 km range

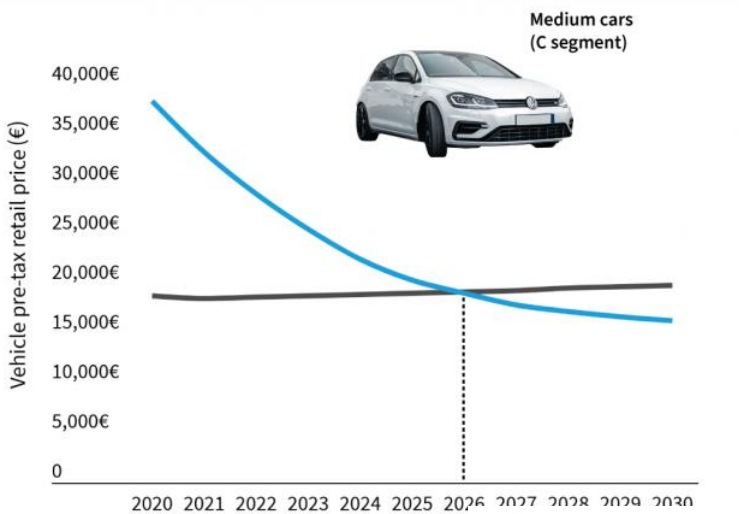
Why BEV - BEVs will be cheaper than ICEs in 2026



DROP IN BEV PRICES

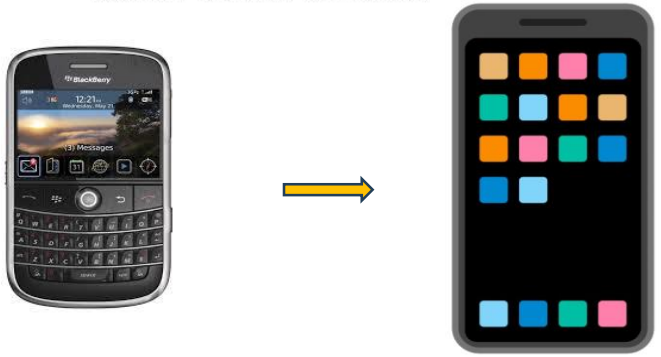
Source : Bloomberg NEF, Hitting the EV Inflection Point

Market Disruption?

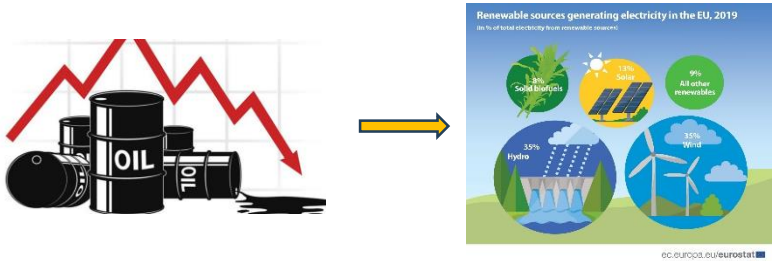


EVs after 2026

- Range ↑
- Purchase Price ↓
- Running Cost ↓
- Maintenance Cost ↓



Current Market Share is **25%** of new car registrations



Decarbonization - Opportunities for Industry

EV Charging Infrastructure

Green H2 Production – Ships, Aircrafts

EV Assembly

H2 based Industries

Green H2 Applications

- Ships and Aircrafts
- Ammonia Production for Fertilizers
- Hydrogen in Oil Refining
- Steel Manufacturing

Decarbonization - Opportunities to the Economy

- Cost of electricity ⬇
- Cost of transportation ⬇
- Potential for EV local assembly
- Growth of GDP ⬆
- Reduce forex for fuel ($ 5 Bn/year)

Way Forward

"Maximize the Advantages of Key Renewable Energy Resources for National Benefit."

- Implement **large-scale RE projects**, including floating solar and offshore wind.
- Local/Foreign Investments in renewable energy through **competitive bidding.**
- **Rewire transmission lines** to support high renewable energy capacity and **expand grid substation capacities**.
- **Electrify transportation** to reduce dependence on fossil fuels.
- Connect Sri Lanka to the **South Asian Interconnected Grid** and export excess electricity.
- Lower the cost of electricity and energy to help drive economic growth.
- Promote youth entrepreneurship in **green businesses**.

Thank You!

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Thank You!