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Challenges and Opportunities in ERMT

SEC Webinar

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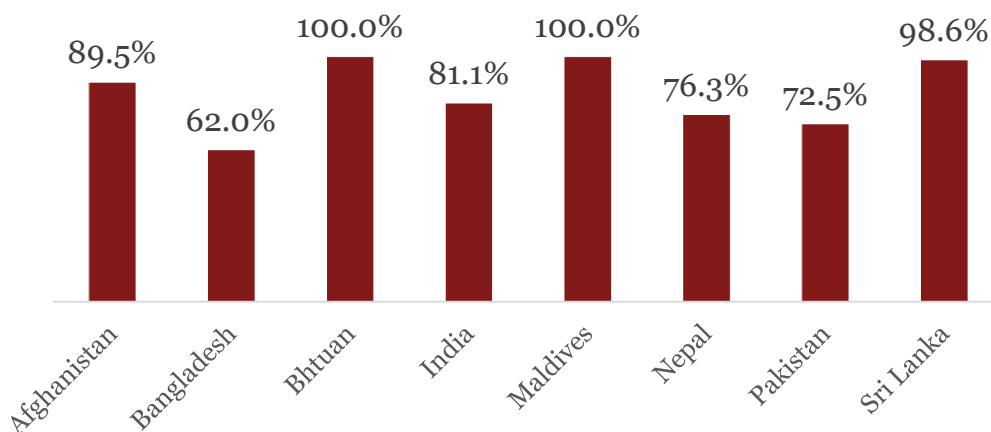
Challenges in ERMT Deployment

Major Challenges in Deploying ERMT in SAARC Region

- 1** *Lack of Electricity Network*
- 2** *Insufficient Road and Charging Infrastructure*
- 3** *Requirement of High Initial Capital Outlay*
- 4** *Political Instability*

Providing Electricity is amongst the biggest challenges in SAARC Member States

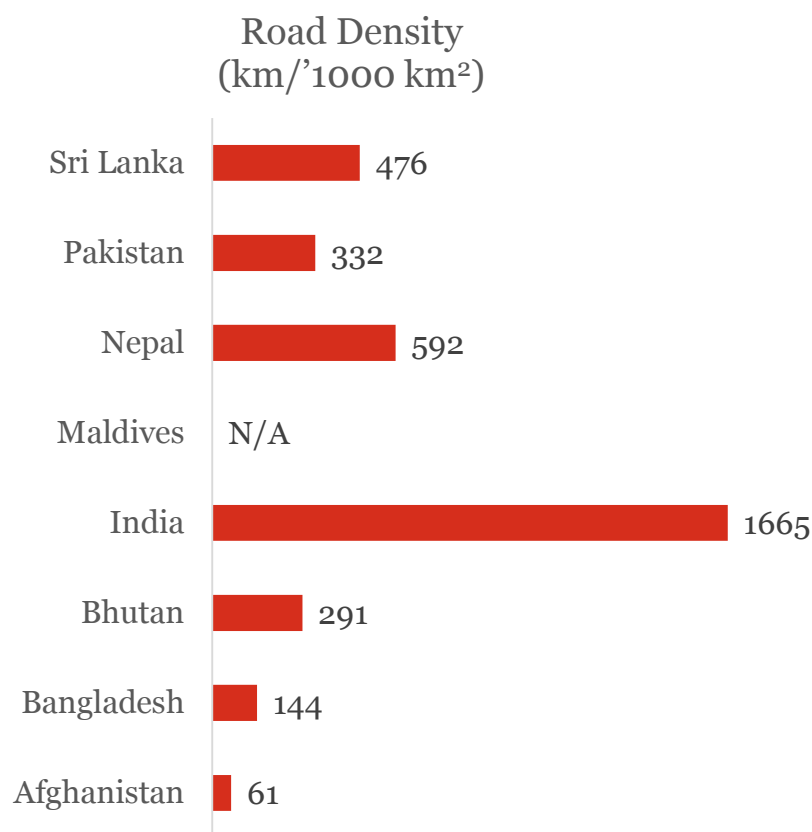
National Electrification Rate



- SAARC nations face electricity shortage – Expect for Bhutan, Sri, Lanka, Maldives and Pakistan other countries import electricity
- Countries have plans of investments in improving generation capacities
- Parallel investment in charging infrastructure need to be planned
 - Use of TOD concept at charging infrastructure – Improves grid stability ; Support Battery Swapping

Countries	Generation Targets
Afghanistan	~100 MW worth of RE projects open for investments. Require USD 326 million.
Bangladesh	Plans to increase its generation capacity to 39 GW by 2030 (7 % from RE).
Bhutan	Increase electricity generation from 1.6 GW(2016) to 5 GW by 2020.
India	Targets energy production to 523 GW by FY 2021-22. (33.5% from RE).
Maldives	Maldives to attain carbon neutrality by 2020 with focus on RE.
Nepal	Targets of 12 GW hydro and 2.1 GW solar by 2030. Also aims 220 MW bioenergy.
Pakistan	Aims to add 5.77 GW of electricity to its national grid by 2018.
Sri Lanka	100% RE generation by 2050 (Target of 34.3 GW).

Lack of sufficient Road Infrastructure and Charging Infrastructure deters private players



Benchmark Road Density for OECD Countries – 1,516 km/'000 km²

- Usefulness and economic viability of ERMT would be hindered due to lack of roads.
 - SAARC Member States do have plans to increase connectivity
- *Charging infrastructure is also absent in most SAARC nations.*
 - Only Bhutan, India, Nepal and Sri Lanka have some presence across key cities to support EVs.
 - *A good benchmarking standard can be China's 2020 target of **1 charging station for 6.25 Electric Vehicles***
 - Support in terms of investments plan, getting clearances (RoW) for setup and standardization of the charging infrastructure need to be taken up for faster implementation

ERMT requires High Initial Capital Outlay for implementation

Pricing (USD)	Diesel Bus	Hybrid Bus	Battery Electric Bus	Trolley bus
Bus	78,000 – 110,000	170,000 – 235,000	375,000 – 450,000	250,000
Charging Infra	-	30,000 (fast DC Charger)	30,000 (fast DC Charger)	47,232.5/km (Overhead Wire)
Operation Cost for 1 st year of operation (Including fuel expenses)	43,362	39,804	15,719	18,548

- Unlike Diesel Buses almost half of Total Lifetime Cost of Battery Electric Buses and Trolley Buses is the initial Capital Cost.
- The Higher Initial Capital outlay when procured through loans, results in interest payments, adding to the total expense.
- As most SAARC countries having gaping Current Account Deficits, affording the initial capital becomes difficult.
- Procurement mix of hybrid and total completely electric buses can be looked at initial stages
- While comparing costs, countries must also consider social and environmental benefits
- Innovative PPP models to be looked at for procurement and charging infrastructure setup

Political Instability

- Like most investments in transportation and infrastructure, *ERMT is a long term investment.*
- It requires long and *continuous support from the governments* both at Central as well as at the State/Provincial levels.
- Some SAARC Member States have had historical precedents of unstable governments.
- This can hamper sustained efforts and investments that are required for ERMT implementation.
- Initial investments in implementing ERMT are higher than those in expanding existing infrastructure which indeed would lead to a longer gestation period.

Enabling Conditions to mitigate the challenges

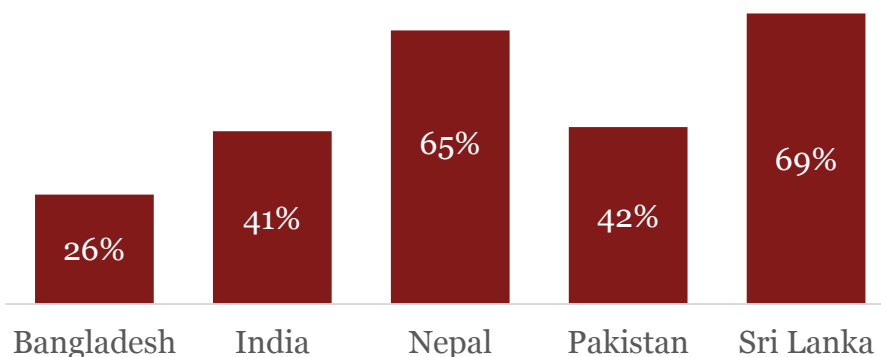
Enabling Conditions



Government needs to drive the investments in ERMT

- A shift to electric mode of transportation would lead to reduced dependency on oil imports and curb down their fiscal deficits as oil consumption by the transport sector is ~40% of the total oil consumption.

% Oil Consumption by Transportation Sector



- The government may consider the investment to reap the long-term benefits of a healthier environment.

- In all success stories of mass EV adoption and ERMT implementation, **Government support is a key factor.**
- These can be either through central government or local governments.
- Subsidies can be either direct or indirect:
 - **Direct Subsidies** : tax credits, state rebates or a bonus-malus systems
 - **Indirect Subsidies:** subsidized loans, preferred parking spots or special-lane access
- Governments need to take onus of installing charging infrastructure.

Private Sector Investments can help reduce government's burden

- **Private sector involvement could lead to innovative business models to fund the programmes, smooth implementation and sustainability of operations.**
- In Japan (2014), a consortium of domestic vehicle manufacturers (Nissan, Toyota, Honda and Mitsubishi) together with the Development Bank of Japan, developed a mechanism to fund charging infrastructure. They charged owners of electric vehicles for usage of their stations through membership cards allocated at the time of purchase.
- Ola, a ride hailing company in India, recently started its fleet of Electric Vehicles in Nagpur, India. The company together with ACME Group installed charging infrastructure (run by solar panels at the location) for its fleet of 200 EVs. Facilities of battery swapping were also installed. Also, the station is open for use by general public.
- This prevents governments from bearing the complete burden of implementation of ERMT.
- **To attract private sector investments, the government has to ensure:**
 - Existing traction of the market through policy formulation and pilot projects
 - Evidence of sustained investments in the domain
 - Incentives making the sector attractive

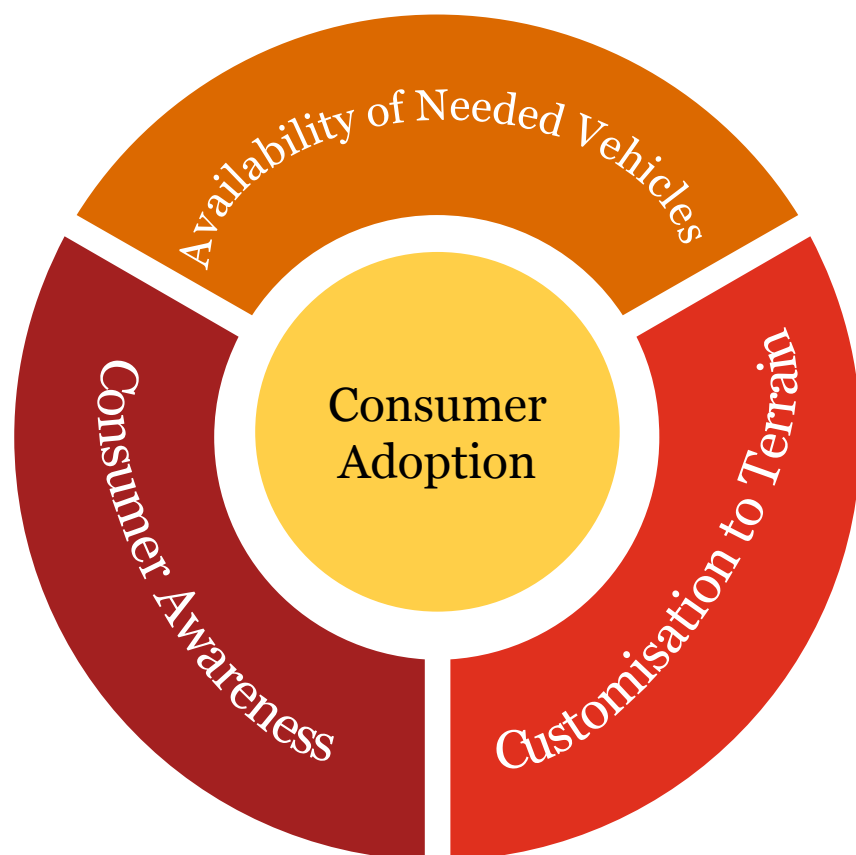
Incentives and Subsidies in Manufacturing and R&D will help attract Private Investments

- As EVs struggle to obtain a decent share in sales, manufacturers are hesitant towards investing in technology. Government needs to provide subsidies and ***incentives to boost confidence***.
- Manufacturing units will also lead to ***job creation*** and enhancement of demand for raw materials, thereby having multi-levelled impact on the growth of economy.
- The incentives can include direct subsidies on vehicles or manufacturing parts, tax credits or cheaper landed prices. Unmonitored granting of subsidies may be vulnerable to exploitation.
- **Government has to monitor the distribution of subsidies and regulate them to reflect improvement in technology and changes in demand.**

Government Support Examples in selected countries

Financial Support	In China, Electric Bus Manufacturers get subsidy of ~USD 77,000
	In Denmark, EVs were exempted from vehicle registration taxes
	France provides 6,300 Euros (USD 7,430) grant for EVs and an additional diesel car scrappage grant of up to 3,700 Euros (5,900 USD).
Non-Financial Incentives	Denmark provides designated free parking to EV owners
	In France, high polluting vehicles are banned from city streets on weekdays
EVSE Support	French government provides tax credit equivalent to 30% for installation
	In Norway, public funding is provided for fast charging every 50 km

Consumer Adoption can attract investments and lower need for subsidies



- Bus manufacturers need to bring more variants in markets that suit local needs instead of simply importing.
- More variants will allow customers to choose their need-based buses
- SAARC countries have varied terrains ranging from deserts to mountains.
 - Electric Buses need to be customised to meet these challenges.
- For consumer awareness, governments need to focus on advertising the benefits of electric buses
 - Convince citizens of their benefits and ensure sustained support for the same.

Summary: SWOT Analysis of ERMT in SAARC region

Strength

- No Pipe tail Emission of Harmful Gases
- Better Tank-to-Wheel Efficiency
- Reduced Noise Pollution
- Less maintenance

Weakness

- High cost of batteries
- Range Concerns
- Requirement for Charging Infrastructure

Opportunities

- Reduces Oil Consumption
- Reduction in emissions
- Meeting the SDG targets

Threats

- Electricity Shortage
- Improper and insufficient Charging Infrastructure
- Political Instability



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