The Global automobile industry is on the cusp of a paradigm shift from internal combustion engine vehicles to zero emission vehicles. This is on account of depleting air quality and rising greenhouse gas emissions. As such, for the Bangladesh automotive industry, the EV transition is a quintessential strategy to continue to retain its foothold and gain additional ground. Automakers need to act fast and join the EV revolution in order to stay relevant. Regulatory support would play a key role in EV adoption. A combination of both fiscal and non-fiscal incentives is critical in the medium term. In terms of charging infrastructure, a mix of plug-in charging and battery swapping models has to be carefully deployed based on the dynamics of various vehicle segments.
EV ecosystem pulse check: Bangladesh’s transport sector set to experience a paradigm shift

With efforts aligned towards improving fuel economy, reducing harmful gas emissions, and promoting a sustainable and environment friendly national vehicle policy, Bangladesh’s mobility paradigm is set to shift at a rapid pace. As with any other developing nation, Bangladesh’s electric mobility landscape is dominated by last mile connectivity vehicles, comprising majorly of electric bikes and rickshaws.

Current state of affairs: Conducive federal policies are expected to accelerate EV growth

- **Legalizing electric vehicles**: Bangladesh Road Transport Authority (BRTA) has issued draft guidelines on the electric vehicles, making registration, fitness certificate and tax token mandatory. The draft policy also specifies the life-span of various modes of electric mobility — two wheelers, three-wheelers, and light and heavy-duty vehicles.

- **Tax incentives**: Recently, government has been promoting hybrid vehicles by providing substantial tax incentives, apart from having various tax exemptions for electric two wheelers and three wheelers.

- **Promoting sustainable charging infrastructure**: Bangladesh Energy Regulatory Commission (BERC) has introduced a new tariff category for charging stations — setting energy charge of 7.70 Tk./KWh along with an additional demand charge of 40 Tk./KW/month. In addition, Bangladesh Rural Electrification Board (BREB) is installing solar-powered charging stations, hence promoting renewable energy for EV charging stations.

Future growth scenario: What would be the ‘silver bullet’?

**Short term**
- Setting realistic EV sales and penetration targets, and formulating associated policy and regulations
- Installing charging infrastructure at important locations to boost investor confidence
- Developing proof of concept case studies by creating electric mobility pilots
- Provide policy clarity on governmental initiatives along with fiscal and non-fiscal incentives

**Medium term**
- Continue provision of fiscal incentives for light and medium duty vehicles
- Implementing supportive policy measures for import/production of Li-ion batteries
- Attracting private participation to set-up charging infrastructure under PPP mode
- Procuring large EV fleet for government fleets and public transport utility services
- Provide special EV driving lanes, parking spots

**Long term**
- Promoting local manufacturing of EVs, charging infrastructure and batteries
- Applying ‘polluter pays’ principle by putting in place CO₂ based vehicle taxation system
- Deploying renewable energy based charging stations, thereby increasing the use of renewable energy for EV charging
- Explore Time-of-Day tariff structure for promoting charging at off-peak hours

Source: EY Analysis
Stakeholders need to align and drive the EV momentum. Two-wheeler (2W) and three-wheelers (3Ws) would be the early adopters, followed by inter and intra-city buses, corporate cabs and government fleet.

To achieve steady growth of an electric mobility ecosystem over short to medium term, it is imperative for various stakeholders groups – regulators, mass transport utilities, and fleet operators, to identify and define EV adoptability pattern. EY’s experience in electric mobility across various emerging economies, suggests that shared mobility along with state transport utilities (buses) are the first ones to adopt electric mobility, followed by last mile connectivity vehicles, and small commercial vehicles and private consumers.

To accelerate EV adoption over short to medium term, stakeholders should align their focus on uppermost elements of adoptability hierarchy pyramid.

**Shared mobility aggregators**
Ride sharing is one of the fastest growing segment, with ~8 players existing in the market. Led by positive policy stimulus, ride sharing is swiftly emerging on the new mobility paradigm, and is expected to lead the transition towards e-mobility.

Leading mobility service provider, Uber, recognizes Bangladesh as one of the fastest growing market mobility market and is increasingly investing in the region. In 2019, Uber’s Bangladeshi market is expected to contribute to 25% of the company’s growth in the region.

**Buses and last mile connectivity (LMC) vehicles**
Paratransit vehicles comprising of e-rickshaws and other last mile connectivity solutions is the leading segment, accounting for ~25% of the market share, followed by microbus and start transport buses.

Owing to attractive market proposition, many new companies are eyeing Bangladesh’s bus and LMC vehicles market, with electric bus manufacturer, Goldstone Infratech, announcing its plans to export e-buses to Bangladesh.

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*yearly market size

**comprises of Paratransit vehicles, minibus and microbus
A combination of both fiscal and non-fiscal incentives is critical to drive adoption in the medium term

In the start of 2018, globally the number of operational EVs crossed the 2 million mark. Subsequently, the number of available public chargers were one sixth the number of electric vehicles. The number of publicly available chargers saw a 70% increase by the start of year 2018. There has been a rapid increase in the number of fast chargers due to the rapid deployment in mature markets such as China. This rapid deployment of the electric vehicle charging infrastructure has been made possible due to various policy and regulatory level initiatives of the governments.

Market assessment of countries such as United States, China, Japan, Norway, Germany, United Kingdom and India has shown that apart from the subsidy support, various fiscal and non-fiscal incentives have played a defining role in the proliferation of the electric mobility ecosystem in the respective countries. The charging infrastructure markets in these countries have been driven by power utilities and network service providers.

- In California, a region having regulated market structure, utilities are responsible for deploying grid infrastructure and billing the consumers. Expenditure for installing the requisite infrastructure is recovered through the electricity tariff.
- In Germany, a region having unregulated power market, power retailers charge the charging point operators (CPOs) for supplying electricity. CPOs bill using smart meters and are free to choose the retailer for procuring power.

The cloud service providers have been instrumental in providing real time information such as nearest stations, service charge and expected waiting time to EV owners and visibility to electricity distribution utilities to implement demand response and time-of-use based tariff regimes.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Actionable elements</th>
<th>China</th>
<th>Germany</th>
<th>Japan</th>
<th>Norway</th>
<th>UK</th>
<th>USA</th>
<th>India</th>
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<tbody>
<tr>
<td><strong>Vehicle manufacturer</strong></td>
<td>R&amp;D support</td>
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<td>Long-term efficiency standards</td>
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<td>Incentives linked to efficiency</td>
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<td><strong>Consumer purchase</strong></td>
<td>Purchase subsidy (rebate)</td>
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<td>Purchase tax exemption</td>
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<td>Government fleet vehicle</td>
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<td><strong>Consumer use</strong></td>
<td>Annual vehicle fee exemption</td>
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<td>Discounted/free charging</td>
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<td>Preferential lane access</td>
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<td>Reduced roadway tax</td>
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<tr>
<td><strong>Charging Infrastructure provider</strong></td>
<td>Carbon pricing scheme</td>
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<td>Home charging tax incentives</td>
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In addition to the fiscal and non-fiscal incentives, the governments in countries having high EV usage, have played a facilitative role in the creation of a sustainable electric mobility ecosystem, hence, taking initiatives to foster setting up of infrastructure first (i.e charging infrastructure and battery swapping systems) and then facilitating growth in demand.

Source: EY Analysis, IEA Global EV Outlook 2018
Building a sustainable electric mobility ecosystem would require cross-sectoral collaboration among multiple stakeholders

A sustainable ecosystem for electric mobility would require cross-sectoral collaboration among multiple stakeholders. It is imperative for these stakeholders (e.g., regulators, city municipal utilities, transport utilities, power utilities and fleet operators) to plan a comprehensive roadmap for EV adoption. The convergence of electric mobility and renewable energy could further accelerate energy access and transition towards a more sustainable transportation system.

Apart from the subsidy support, various fiscal and non-fiscal initiatives are being undertaken by government, cities and funding institutions to develop a sustainable electric mobility ecosystem. However, the public and private stakeholders face the following challenges in developing a sustainable EV ecosystem:

- Urban Utilities (i.e. city municipal corporations) are finding it difficult to re-plan the city to incorporate deployment of charging infrastructure at accessible and affordable spaces
- Power Utilities are unable to plan for grid augmentation requirements due to lack of clarity on expected peak demand
- Vehicle and Charging Infrastructure OEMs are unable to plan on expansion plans due to lack of demand, absence of clarity on governmental initiatives and dilemma on the expected demand
- Absence of real-time digitally integrated infrastructure to determine real-time operational efficiency of electric transport systems in Bangladesh’s environmental conditions

The deployment of charging infrastructure is imperative to growth of EVs, but also requires cohesive and effective assessments. EY suggests a 6-phased integrated and bite-sized approach spanning pre-assessments, to deployment to integrating managed services for proliferation of electric mobility ecosystem in the cities of Bangladesh.
Net positive impact of EV charging infrastructure on the Power & Utilities value chain

To create a sustainable electric mobility ecosystem, Bangladesh needs to bolster its initiatives on the infrastructure front. This directly impacts the issue of range anxiety and has a direct impact on the EV adoption. The Government of Bangladesh needs to create an investor-friendly environment to push the adoption of EVs, creation of EV charging infrastructure and launch of various schemes to promote electric mobility. We expect the Government to take active measures to streamline regulatory challenges and provide further policy impetus to drive uptake of EVs.

EVs and the electric mobility ecosystem is still evolving in the Bangladesh context, with home/private charging inevitably emerging as the primary option mainly due to the lack of public charging facilities. We expect the share of public charging to grow; however, home charging would still continue to be the dominant source with a share of nearly 70-80% in 2030. Both short-term and medium-term overviews of this are given in the adjoining table.

<table>
<thead>
<tr>
<th>Category</th>
<th>Segment</th>
<th>Short term (2019-21)</th>
<th>Medium term (2021-23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3Ws (e-rickshaw and e-auto)</td>
<td>Fleet</td>
<td>[diagram]</td>
<td>[diagram]</td>
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<tr>
<td>Buses, High capacity trucks</td>
<td>Fleet</td>
<td>[diagram]</td>
<td>[diagram]</td>
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<tr>
<td>4Ws (Cars, Low capacity trucks, Vans)</td>
<td>Private</td>
<td>[diagram]</td>
<td>[diagram]</td>
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<tr>
<td>2W (Bikes, Cycles)</td>
<td>Private</td>
<td>[diagram]</td>
<td>[diagram]</td>
</tr>
</tbody>
</table>

Growing EV penetration is likely to have a varied impact on different players in the power and utilities value chain. An EV (assuming 15kWh battery and having 120km range) with a daily commuting distance of 40 km will need an energy of 5 kWh, which is equivalent to daily power needs of a small household. This presents unique challenges for electrical utilities, where the shift from fuel to electricity requires an increase in electrical production, and resolve the problem of clustered charging, which can create a localized problem for the grid.

The risk of overloading distribution transformers is particularly high during peak hours, when all EV owners in the neighbourhood decide to charge their EVs at the same time. Utilities across the globe are looking to modify customers’ demand by offering EV owners discounted rates for charging their vehicles during off-peak hours.

Managed charging, also known as smart or intelligent charging, entails a combination of infrastructure and communication signals sent directly to a vehicle or via a charger to influence the driver’s decision on when to charge the car.

Source: EY Analysis
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