



**ACF Dialogues on Sustainable Mobility
6th-13th August, 2021**

In August 2021, Asian Century Foundation conducted the third session of its signature dialogues series, **ACF Dialogues**, in partnership with **World Resource Institute (WRI) India Ross Center**. ACF Dialogues is a virtual platform for policymakers, academics, and practitioners from India, East and Southeast Asia to discuss and share their views on key socio-economic developmental priorities. This initiative provides a well-curated opportunity for experts in their respective fields to connect with their peers, learn through exchanges of diverse perspectives, and build a network for further collaboration and interaction. The third edition of ACF Dialogues on **Sustainable Mobility** was comprised of 3 different sessions covering 3 topics critical to the sector. The first session took place on 6th August, on the topic, **‘Electrification of Public Transport,’** the second on 9th August on **‘Policy and Financing Support for Electric Vehicles,’** and the third on 13th August, on **‘Citizen Engagement to Accelerate EV Adoption.’** The discussions were moderated virtual panels with an open invitation to policy practitioners, researchers, academics and private sector players across Asia. Over the course of the three sessions, around **22 experts from 10 countries participated in the panels, with almost 180 viewers** in attendance.

The following brief outlines the discussions that took place over the each 2-hour session. The aim of the brief is not to detail the conversations; rather, it provides a qualitative overview of the discussion in key points.

Sustainable Mobility - Dialogue 1: Electrification of Public Transport

Highlights

- Improving the cost competitiveness of EVs vis-à-vis Internal Combustion Engines (ICE) is vital to develop the electric vehicle market.
- Targeted, small-scale pilot programs reveal technological and operational nuances that are critical as programs are applied at a large-scale.
- Charging infrastructure is a key consideration with a variety of aspects to consider such as appropriate siting, the benefits of fast charging versus overnight charging, and choice of connector, among others.
- Along with incentives to encourage electrification, there should be disincentives towards use of ICE vehicles.
- Strong regulations through court interventions are required to bring about appropriate emissions standards.

Introduction

The electrification of public transport is widely seen as an important consideration for sustainable mobility. With the transportation sector contributing to 74% of global Co2 emissions, there is a need to view all forms of transportation – especially public transport – through the lens of sustainability. However, it is not a simple task. From considerations of cost parity with ICE vehicles, running target pilots to understand technology, and building the appropriate charging infrastructure and capacity, the electrification of public transport is faced with multiple complexities. In the first session, the panelists contributed perspectives and solutions to the various technical challenges that come with electrification.

Bringing About Cost Parity with ICEs is Critical

In general, ICE vehicles require low capital expenditures and high operational expenditures; whereas EVs require high capital expenditures and low operational expenditures. In order for it to be economically viable for the market to adopt 2-Wheeler (2W), 3-Wheeler (3-W) EVs and e-buses, measures need to be taken to bring the cost of these batteries at par with that of ICEs. During the dialogue, the cities of Bogota and Santiago in Latin America were discussed as good examples of cities where this cost competitiveness is being achieved to speed along adoption of EVs. In Jakarta, Indonesia, the operational cost of buses is about 60% cheaper, but the bus price itself is about 2-3 times higher. Therefore, sufficient incentives were needed to encourage operators to purchase electric buses. Waiving of import duties and title transfer fees, and attractive tariff rates were some of the key incentives discussed in the context of Jakarta. The lifecycle cost of operating electric buses, 2Ws and 3Ws are at par with that of ICEs, but this is not true in the case of cars. China's experience revealed that there were significant subsidies given upfront for both industry development and to incentivize

adoption. However, this model is not applicable in the Indian context due to the country's low fiscal capacity and GDP relative to China. In India, alternative models are being explored to capitalize on the lifecycle cost saving. For instance, the Government of India has considered an upfront capital subsidy to lower the required capital expenditures and make e-buses competitive with ICE buses. Another model is for the city to undertake capital expenditure costs and take ownership of buses, and only charge operators for the operational expenditures.

Apart from incentivizing EVs, it is also important to disincentivize ICEs. One way of doing this is through better emissions standards (which increase the cost of running ICEs). However, there is a strong private lobby against this. To bring about upgraded emissions standards, there needs to be significant court intervention and lobbying.

Running Targeted Pilots Reveal Many Operational Nuances that Cannot be Planned

In order to build confidence among operators, it is necessary to start the adoption of e-mobility solutions with a pilot before scaling up. In Santiago, the capital city of Chile, the government issued tenders for ten buses in order to understand the operational and technical requirements. Through this program, city officials learned that the operational savings were much better than expected, the marginal cost of bringing more buses to the city was small, and the benefits in terms of pollution reduction were significant. Through a Public-Private Partnership (PPP) model, Santiago officials involved private electric companies from China and created new markets in three domains – bus leasing, charging infrastructure, and electricity provision. Connecting charging stations to the grid, making the entire operational system reliable, and training operators to perform maintenance are some of the other challenges that the government is currently trying to solve. Similar pilots from Jakarta provided lessons on the power usage of electric buses. The pilots revealed that after 17 hours of travel, buses still had 46% battery life remaining. The Jakarta government is currently building substations and distribution networks for charging.

Charging Infrastructure: A Complex yet Vital Task for Electrification of Buses

Building charging infrastructure is a complex task. The general trend is to put charging stations where public land is available. However, placing these charging stations in wrong locations leads to low utilization and can lead to the stations becoming a stranded asset. The aim is to find the optimal location for charging infrastructure to maximize utilization. Some of the questions that should be considered before deciding on the charging location are: Are these chargers serving a specific vehicle segment? Do we expect high traffic footfall? Is it a destination site or an origin site? What is the size of the land? What are the utilities available? Is there any underground cabling?

Sustainable Mobility - Dialogue 2: Policy and Financing Support for EVs

Highlights

- EV adoption requires combining a long-term vision of public transport, along with diverse policies in manufacturing, public awareness, and infrastructure.
- Different segments of borrowers have different financing needs. Tailored, innovative financing mechanisms should be provided for each segment.
- Budget-neutral, sustainably implementable taxation policies are an impactful way to improve fuel efficiency of vehicles and accelerate deployment of EVs.
- There needs to be a parallel shift towards using renewable energy for electricity generation alongside the shift to EVs.
- Battery swapping is an efficient alternative charging solution for 2W, 3W and fleet operation vehicle segments.
- Battery management practices make a difference to the battery life, which therefore influences the cost of owning EVs.

Introduction

A combination of enabling policies and available financing is essential to encourage the adoption of EVs. In India, out of 40 lakh vehicles sold, about 75% are purchased on finance, while only 25% are purchased outright. This gap is even bigger in the case of EVs. For example, only 5% of EV 2Ws are currently financed compared to 60% of ICE 2Ws. This gap exists due to a number of demand and supply side challenges faced by financiers. On the demand side, there are challenges such as high interest rates, low loan-to-value ratio, short repayment periods, and other operational challenges including lack of charging infrastructure and quality service centers. On the supply side, there are issues such as uncertainty around the commercial viability of EVs, high default risks, and a generally small market size in which investors do not find it worthwhile to make investments. In this context, multiple policy measures are required to break this cycle and make financing available for EVs. Measures such as purchase subsidies, interest rate subventions, regulation of minimum repayment period, and product quality regulations are being considered. In the second session, the panelists discuss various innovative financing mechanisms and policy measures that try to meet this end.

Subsidies Have Been Key to Push Electric Vehicles to Center Stage

China has been successful in creating supply and demand side industrial policies to enable EV adoption in the country. It spent a significant amount of money on R&D subsidies, demonstrations on EV features and benefits, and purchase subsidies. Effectively, around 35% of an electric vehicle's capital expenditure was subsidized via government programs and other incentives. China also focused on developing the local capacity for the manufacturing of component and auto parts for electric vehicles and the maintenance, servicing and operation of these vehicles. Significant market formation subsidies

were a key component in enabling this industry. Industrial guidance funds – public-private investment funds with the dual mandate of generating financial returns and furthering the state’s industrial policy goals - were also set up to boost adoption of electric vehicles. Through these guidance funds, China acted as an entrepreneurial state which was willing to take risks and lose money. Despite losing money, China managed to create a few globally successful companies, giving them a strategic productivity advantage, the benefits of which are said to outweigh the cost. India has multiple fiscal and non-fiscal incentives under the Faster Adoption and Manufacturing of Hybrid and Electric vehicles in India [FAME] policy, along with various state level policies that include subsidies, waiving road taxes and registration fees, charging infrastructure campaigns, and focus on specific EV job creation targets in some states.

Different Vehicle Segments Require Tailored Financing Mechanisms

In India, for the e-mobility sector to attract the estimated investments of USD 260 billion by 2030, policies need to ensure the entire ecosystem, from manufacturing to a resale market, is developed. To understand debt financing for EVs, potential borrowers are categorized into four segments: Vehicle Manufacturing/OEM segment, charging and infrastructure provider, automobile dealers, and customers/buyers. Each of these segments face different challenges and have different financing needs, and therefore require their own innovative financing mechanisms.

ITO Motor set up an innovative financing mechanism which involved a scheme to charge a fixed rate per day to the fleet operators, and provided the vehicles to them. They signed an agreement with Uber to onboard these vehicles onto the Uber platform and run them for a certain number of hours per day. This example reveals how usage and service contracts, where the OEMs provide the vehicle and driver on a fixed charge basis to commercial taxi operators, can facilitate a minimum surety of cash flow to meet debt obligations.

In their approach towards public transport, the city of Shenzhen, China used a business model where they purchased the vehicle from the manufacturer, but left ownership of the battery to the charging infrastructure company. The charging infrastructure company owned the battery, the manufacturers sold the rest of the vehicle, and the whole vehicle itself was owned by the bank that leased out the vehicle to the transport corporations. Therefore, the infrastructure company had an incentive to ensure that their technology does not degrade the battery. Effectively, the risk of new technology was transferred to manufacturers and infrastructure providers.

Taxation Policy Can Make EVs Cost Competitive

Designing innovative taxation policies can help countries improve fuel efficiency of vehicles and accelerate deployment of EVs. One such taxation policy is to make users of high emission vehicles subsidize the cost of EVs in a budget neutral and sustainably implementable manner. Out of 18 Asian-Pacific countries, 14 have different taxation policies around EVs, but only 7 are capable of making EVs cost competitive through these policies. Only 5 out of these 18 countries have adopted taxation that is determined by the fuel consumption or emissions of vehicles (Japan, Thailand, Singapore, Israel and

Australia). Singapore has launched a scheme that offers rebate or surcharge based on Co2 and other emissions. By providing taxation benefits to low emission vehicles, taxation policies can create a significant tax difference between less efficient vehicles and zero emission vehicles.

Shifting towards Electricity Generation from Renewable Energy Sources is Important

There is a concern that electricity generated by coal may lead to further air pollution. Panelists agreed that a parallel shift to using renewable energy for electricity generation, and not just a shift from ICE to EVs, is required. In any case, battery EVs have lower carbon emissions than ICEs and hybrid vehicles. In Indonesia, 60% of electricity generation comes from coal, but the government plans to shift to more renewable sources of electricity.

Battery Swapping Can be Considered for Particular Vehicle Segments

Battery swapping is an alternative to charging stations in certain vehicle segments. Specifically, there are opportunities in the 2W and 3W segments in Asian countries. It is also applicable to fleet operations and vehicles used for commercial delivery purposes. Batteries can be changed within one or two minutes at battery swapping stations. The main challenge with battery swapping is the standardization of the battery specifications to be used for each segment so that swapping stations become a viable option.

Battery Quality and Management Practices Make a Difference to Cost Considerations

The lifetime of a battery is an important consideration in calculating the lifecycle cost of owning an EV as there is a need to account for the additional cost of batteries. Charging practices also make a difference to costs because fast charging can degrade the quality of the battery and reduce its life. Therefore, when using fast charging solutions, there is a trade-off between battery life and charging time. As battery replacement costs tend to be high, alternative solutions have been considered such as Lithium batteries. Conventional Hybrid EVs are also attractive alternatives in the short run due to their longer battery life. In general, Hybrid EVs currently have better battery management systems and in the short run, can act as a bridge towards greater EV adoption.

Sustainable Mobility - Dialogue 3: Citizen Engagement to Accelerate EV Adoption

Highlights

- Key barriers to EV adoption include high capital costs, lack of suitable models, lack of charging infrastructure, and lack of awareness and sensitization.
- Behaviour change can be brought about by sparking public awareness through the design and implementation of public outreach and communications campaigns focused on driving awareness regarding the benefits of adopting Electric Vehicles and key elements of the policy (For example, Switch Delhi Campaign).
- Outdoor ads, print ads, TV ads, dealership branding, social media and PR plans can target different segments such as youth and corporate segments to encourage adoption.
- Giving users exposure to and experience with electric vehicles can lower weariness and induce demand.
- The cost of EVs, lack of charging infrastructure, and service centers being located far away, have also created weariness and hesitance among consumers. Before tackling awareness, policies addressing these factors need to be put in place so there is clear action plan which can be communicated to citizens regarding EVs and EV infrastructure.

Introduction

Despite the adoption of EV policies around the world, there is still a significant amount of weariness and hesitance from the consumers when it comes to actually making the switch to EVs. This is particularly true in Asia, where the EV market in many countries is still developing and policies have not been fully implemented yet. The benefits of switching to EVs can be realized at scale only if a larger share of the market agrees to make the switch. In this context, increasing public awareness through citizen engagement campaigns are important to inspire confidence among consumers of every vehicle segment regarding the benefits of using EVs. In the third session of ACF Dialogues, various such campaigns and initiatives were discussed to highlight the importance of citizen engagement.

A Variety of Outreach Campaigns Can Spur Behaviour Change

In Delhi, the Switch Delhi campaign is focused on driving awareness regarding the benefits of EV adoption and key elements of India's FAME policy. Some of the initiatives undertaken involved sensitization drives, digital engagements, various civic engagements (such as wall paintings), webinars, organizing EV forums, op-eds, and a dedicated EV knowledge portal. The Dialogue and Development Commission noted that the share of EVs increased to 3.3% over the period of August 2020 to July 2021. Over the same time period, the number of e-2W vehicles in Delhi have doubled and adoption of e-cars has grown by 20%.

Vietnam uses cultural marketing strategies such as leveraging of K-pop fan bases to excite consumers about EV technologies. This is based on the premise that owning a vehicle in general is also an

emotional, sensory response and not only a rational choice based on cost and benefit. Moreover, as a city with a low car ownership-to-population ratio, there is great potential in introducing new vehicle-owners to the idea of EVs, rather than ICE vehicles.

A dedicated website or portal can be very useful in helping consumers compare the benefits and cost of different EVs against the benefits and costs of ICE vehicles. This will make the benefits of EVs salient to the consumer and nudge them towards adoption.

Providing Users with Tangible Experiences and Results Inspires Confidence

BluSmart Mobility, an electric taxi service, was highlighted as one sustainable urban mobility solution that actually provides an experience to the users. By allowing users to experience and interact with the operation of EVs, they become more comfortable with the idea of using one regularly. This creates an induced demand for EVs.

Bringing Electric Vehicles into high visibility zones is another interesting way of bringing about citizen engagement. For example, by introducing 2W and 3W EVs into zones that are tourist attractions - and hence, high visibility –the experience of EVs is brought to a wide variety of users even if it is for a short period of time.

To make people understand the larger need of sustainable mobility and help them experience it, campaigns that promote walking, cycling and the use of public transport can complement initiatives that encourage e-mobility. Raahgiri Day, a weekly road event in Gurgaon, is a good example of this.

Governments Can Set an Example for Consumers

The government plays a crucial role in encouraging adoption. One way is to publicly procure EVs and sell it at a subsidized rate, which can help to solve for the cost factor. Another way to inspire confidence among consumers is to introduce more publicly owned EVs on the road, although this comes with its own considerations of charging infrastructure and other kinds of financial support to make it economically viable.

Complementary Policies and Infrastructure

While the importance of citizen outreach and engagement is a core aspect of this discussion, it was also agreed that there need to be a number of policies that translate increased awareness regarding the benefits of EVs into actual adoption. These policies need to aim at making the operation of EVs economically viable and convenient for different consumer segments. Complementary considerations were highlighted, such as subsidies and taxation policy to reduce capital costs of owning EVs, developing appropriate and optimally placed charging infrastructure solutions for different consumer segments, focus on skill development to provide a higher supply of skilled individuals capable of making repairs and servicing for EVs, and ensuring service centers are optimally located so that consumers do not have to travel large distances to make repairs.

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About Asian Century Foundation

As the global centre of gravity shifts towards Asia, the Asian Century Foundation's aim is to help deliver the promise of this century by increasing mutual understanding amongst countries to leverage each other's knowledge and experience in socioeconomic development. We aspire to achieve this by creating avenues for collaboration and knowledge sharing among academia – scholars, practitioners, and policymakers. Our work is divided into three streams, Education, Knowledge & Policy, and Culture. We primarily focus on India, China, and select countries of ASEAN.



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