



EVCONNECT

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by *David Stringer, Bloomberg*

FROM THE CEO'S DESK

Dear Friends,

I am delighted to present to you the eighteenth issue of EVConnect.

In this edition of EVConnect, we bring to you a conversation with Mr. AK Saseendran, Transport Minister, Government of Kerala, who discusses the implementation of Kerala's electric vehicle policy. We also bring a host of news updates from national and global frontiers. Collectively, they emphasise balancing affordability and innovation in technologies to grow an electric mobility ecosystem – from fast charging buses and battery re-purposing to swapping, to name a few. We have also curated a feature on how retired batteries will reduce the costs of power storage. Moving away from fossil-fuel societies rests to a large extent on battery storage – for both energy efficient and clean transport systems, and for cranking up the share of renewables in the energy mix.

New developments are taking place at a very rapid pace, and it is often difficult to keep up with them. These are reported through multiple media channels and are hard to track. This newsletter seeks to bring together several of these developments into one accessible document. We hope this curated and compiled content will come in handy to those who are seeking the latest information on electric mobility.

We hope you find this edition of the newsletter beneficial and share your thoughts so that we can improve further.



Sincerely,

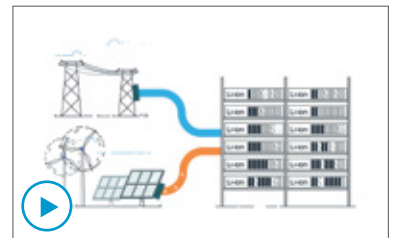
Dr. OP Agarwal
CEO, WRI India

WATCH

Presenting the monthly EV Connect Powertalk interviews exclusively discussing insights from EV experts. We also present one hand picked video to showcase EV innovations from across the world.



Power Talk with Mr AK Saseendran,
Minister for Transport,
Government of Kerala, India



Sparking a second life for EV batteries by McKinsey and Company



WATCH the full interview [here](#)

“It is with this background that the Kerala state government decided to bring about the strengthening of the electric vehicle infrastructure in the state. By 2022, 1 million EVs are expected to be on the roads.”

“It is the industry forces, which needs to actively come forth in this domain. As discussed earlier, Kerala Automobiles Limited has started manufacturing electric autorickshaws.”

POWERTALK

IN CONVERSATION WITH MR AK SASEENDRAN,

MINISTER FOR TRANSPORT, GOVERNMENT OF KERALA, INDIA

Interview taken by Aparna Vijaykumar, WRI India (Translated from Malayalam)

Interviewer: Kerala has finalised its EV policy. What is your plan for implementation on the ground?

Mr Saseendran: It is well known that transport emissions contribute to air pollution, in cities like Delhi, which in turn leads to larger issues like global warming. The seriousness of this issue, coupled with the uncertainty over crude oil, has resulted in a pressing need to turn to low cost and clean fuel options.

That’s how the Government of Kerala turned to e-mobility which has zero emissions and is also low on noise pollution. A phase-wise transition of a fossil fuel-driven transport sector to CNG/LNG/electricity is the focus of this standpoint. This will not only reduce atmospheric pollution, it will also reduce consumers’ operating costs. This will be particularly helpful to public transport operators considering petrol and diesel costs are increasing day-by-day.

It is with this background that the Kerala state government decided to bring about the strengthening of the electric vehicle infrastructure in the state. By 2022, 1 million EVs are expected to be on the roads.

The Kerala State Water Transport Department has successfully tested India’s 1st solar boat. The boat was found to be completely noise free and did not cause water pollution thereby protecting our pristine lakes and rivers. We are therefore taking steps to incorporate solar energy in motorboats to improve our motor fleet.

Interviewer: Electric mobility implementation needs the cooperation of diverse stakeholders such as the power sector, manufacturing, transport and local planning departments. How are you planning to bring all these stakeholders together to further Kerala’s electric mobility ambitions?

Mr Saseendran: An e-mobility policy cannot be implemented in a state by the transport department alone. Indeed, various stakeholders do need to work together. Firstly, we need to ensure consistent availability of electricity and that needs a good understanding and coordination with the Kerala State Electricity Board which by the way, is showing great interest. They have taken initial actions to install battery charging stations at prominent locations across Kerala.

In the same vein, we need to ensure the availability of electric vehicles. Prominent OEMs have come forth to this sector earnestly. The most promising of them is the government undertaking Kerala Automobiles Limited which is already marketing electric auto rickshaws and the feedback has been most encouraging. Obviously, town planning is a crucial aspect in e-mobility which requires cooperation from urban local bodies. Mobility needs to be a seamless experience. It's not about suddenly making all vehicles electric, rather, much planning is need to ensure a smooth transition.

Realising that town planning plays a key role, in 2019, the Kerala state legislature passed the Kerala Metropolitan Transport Authority Act. When we came forward with creating this legislation and started thinking of how to bring this to fruition, the select committee searched for case studies which could be taken up for our research. However, there were no models in other states. And in a first for the Kerala state legislative assembly, the select committee did not rely on other states for this legislation. So, instead, we got inputs from experts working in the field of urban mobility, traffic officials, private bus operators and owners, civil society, etc. Such consultations have helped in creating this legislation.

I am explaining this because, it is only through bringing together multiple stakeholders and proper planning that any policy can be rolled out in our state. Under the Metropolitan Transport Authority, we have initiated the process of forming city level authorities.

Interviewer: Keeping the background of the MTA, what are the steps being taken to promote low emission and shared mobility systems?

Mr Saseendran: A model effort is being undertaken in Kochi. About 1000 private city buses plying in Kochi and double that number of auto rickshaws are providing services in conjunction with the Kochi Metro Rail Ltd. We have introduced a one card system for users of these three systems which means using one card, you can travel in an auto, a bus and the metro. The water metro system, which is being currently constructed, will also be part of the same one card system.

We are trying to make mobility a seamless experience for someone to travel from point A to point B. We will add GPS within the same system and the user will be able to comfortably use the most convenient mode of transport using journey planner facilities that will throw up the available and best mobility options.

In Alappuzha district, we are rolling out water taxi facilities called 'See Kuttanad.' We are linking water transport to the larger mobility fabric by considering each district, city or even locality as a single unit and taking the requisite steps to ensure seamless public transport. As technology improves, our strategy will get updated and we will incorporate new innovations.

Interviewer: What is your vision on catalysing EV manufacturing sector in the state?

Mr Saseendran: It is the industry forces, which needs to actively come forth in this domain. As discussed earlier, Kerala Automobiles Limited has started manufacturing electric autorickshaws. But there is also scope in battery pack assembly, battery management, electric motors, component manufacturing, power electronics, IT, R&D, etc and such entities need to come together for the sustainable progress and growth of electric mobility in Kerala.

A key step in this process is our visit to Japan with the Hon'ble Chief Minister. We discussed the possibility of jointly setting up electric battery units in Kerala and the technology sharing of the same was also discussed. We have already signed an Expression of Interest and Investigation Letter for taking this forward. We have also provided them an invitation letter and they have expressed interest in the same. Once the detailed project reports are prepared, we will investigate whether or not their technology is apt for Kerala.

The Kerala government will take forward only those initiatives that are ideal for the state. We will not protect any particular business interest; our plan is to develop the intellectual infrastructure to implement the EV Policy which is most suited to conditions in Kerala. That is why we did not sign an MoU in these initial stages.

Interviewer: What is your opinion on the role of skilling and workforce creation for an EV ecosystem in the state?

Mr Saseendran: That's a very relevant aspect, and how to effectively equip our manpower to adapt to this technology overhaul is crucial to us. We have taken a stand to create diverse manpower in our state. We need to improve basic facilities as well as facilities for research. We have technical universities, premier engineering colleges, and globally acclaimed IT firms; and we will explore engagements with these institutes to modernise and skill our manpower, thereby boosting the job market.

Higher education departments and universities are crucial stakeholder to be integrated as this is where we shape experts in engineering, IT, etc. And hence, during our trip to Japan, we made agreements with international universities there for knowledge exchange as well as student exchange programmes. This was basis discussions between our Principal Secretary, the Kerala higher education department and their counterparts there, and we reached an agreement regarding the same.

It is with a comprehensive perspective that we take forward e-mobility in the state. It is not a propaganda or a gimmick. Therefore the Government of Kerala is taking all steps to create legislative backing, select experts, coordinate and so on to make this a reality.

Interviewer: As the share of EVs grows in the state, the demand for electricity will rise. What would be Kerala's strategy to manage this additional demand?

Mr Saseendran: It is very important to ensure availability of energy. In general Kerala is an electricity deficit state. But there are times when we don't use electricity. We don't produce electricity at non-peak hours. We need to structure battery charging according to peak demand times. By doing that we can ensure electricity availability.

The Kerala State Electricity Board is making good progress. The decades long uncertainty over connectivity and drawing lines to get electricity from *Kudankulam* has been resolved and we are now able to use the line to avail electricity from *Kudankulam*.

As we strengthen our electricity infrastructure, including solar as well, we will encourage battery charging during non-peak hours and bring in a time-of-day mechanism. We can seamlessly take this forward is our understanding. But there is another apprehension, vis-a-vis current vehicle owners, especially autorickshaw drivers or vehicle owners. We are not turning a blind eye to their anxiety and we understand their concerns.

Therefore, how can we incentivise their transition into electric vehicles in a phased manner will be earnestly explored by the government. This anxiety is temporary and once this gets practical, it will be profitable for everyone. We realise a sudden transition would not be financially feasible and the Kerala government is committed to providing support to them at this stage.

***Interviewer:* How sustainable is providing financial incentives?**

Mr Saseendran: The government is providing a one-time support, in the form of electric mobility subsidies, on purchase of electric autorickshaws. This is only in the autorickshaw sector but other vehicle manufacturers and dealers, etc. will have similar concerns, so what can we do?

That's why we need to engage with large scale motor vehicle manufacturers, and they need to innovate their factories and manufacturing units to produce electric vehicles. The Central Government has taken a stand to promote e-mobility in the country. As part of that policy, the Central Government can intervene with the industry – for example, vehicle manufacturers need to be provided with attractive offers to convert their diesel/ petrol vehicles to EVs.

Such decisions are required to be taken keeping in mind global warming and subsequent climate change and I am confident such issues will come up on the global stage where such environmental concerns are discussed.



UPDATES FROM THE WORLD

New US building codes will make every home ready for electric cars | *Strategy and Market Development*

The International Council for Codes (ICC) has approved amends to existing building codes in the United States in consideration of a future where each house will have at least one electric vehicle. These are voluntary guidelines which will help make all new homes built in the US 'EV-ready'. This is a substantial change as homes in the US are typically built with wiring for only a few 240-volt outlets in the garage. These new codes will make EV charging points as standard as having a point to plug in a washing machine. By issuing these standards, it is expected that building owners will save money in the long-term while also allaying their range anxiety. Retrofitting sites with EV charging equipment, such as electrical panels and pre-wiring, is more costly than adding it at the construction stage - amounting to 3,550 USD versus 920 USD as per one study.

Takeaway for India: This article underscores the important role of both residential and commercial buildings in facilitating EV charging. Certain building amendments, to integrate EV charging, have been issued by the Ministry of Housing and Urban Affairs (MoHUA). New building construction should be encouraged to include EV charging equipment so that charging vehicles proves both economical and convenient for residents. [Read more](#)

Cutting battery industry's reliance on Cobalt will be an uphill task | *Strategy and Market Development*

The demand for Cobalt, used to make cathodes in lithium-ion batteries, is soaring with the growing share of electric vehicles and electronic goods manufacturing. Extracting Cobalt from its reserves, a third of which are in the Democratic Republic of Congo, entails child labour and other exploitative forms of labour practices. While some manufacturers have pledged for responsible supply chains, such as by committing to the Responsible Sourcing Network, more stringent standards are needed. Furthermore, Cobalt-reduction plans are needed for controlling the consumption of this finite mineral.

Takeaway for India: Recognising the unintended social consequences of extracting battery raw materials will make India's resource efficiency plans globally responsible. In this case, the vehicle and battery manufacturers (coming up) in India will have a consequential role to play by committing to responsible sourcing methods. [Read more](#)



China looks to make it easier for electric car drivers to swap batteries on the move | *Policy and Market Development*

The Government of China is developing standards for battery swapping systems for electric vehicles so that consumers can rent batteries instead of outright purchasing them. Charging batteries is time consuming, in comparison to swapping, and plays a large role in discouraging consumers from switching to electric. Purchasing electric cars, accounting for 30-40% of the capital costs without batteries, also reduces its price tag. China's Ministry of Industry and Information Technology will be promoting swapping technology, through demonstrations, and will simultaneously develop common standards.

Takeaway for India: Battery swapping holds multiple promises within the Indian context such as reduced vehicle costs, quicker re-fuelling, conditioned and supervised battery charging to preserve battery health to name a few. However, the swapping systems are not well-known in India, although state governments have evinced interest in the same. More demonstration projects could be a vital tool in convincing stakeholders. [Read more](#)

Kozhikode to get 26 electric vehicle charging stations | *Policy and Strategy*

The Kerala State Electricity Board (KSEB) is setting up 26 charging stations in partnership with empanelled agencies and utilities in Kozhikode. The plan is to have charging stations, every 4 kms, in the city. Out of the 26 stations, 14 will be operated by KSEB empanelled agencies, 6 by KSEB and the rest by private agencies. Each station will have an exclusive transformer and sub-station, and 14X7 metres of open space to accommodate vehicles. [Read more](#)

Government approves 2636 EV charging stations under FAME India scheme phase II | *Strategy and Market*

The Department of Heavy Industries has sanctioned 2636 charging stations, in 62 cities across 24 States/UTs, under the FAME 2 scheme. The department will ensure the availability of land for charging stations and the signing of necessary agreements/MoU with concerned partner organisations such as city municipal corporations, DISCOMs and oil companies, before sending sanctioning letters to selected entities. Thereafter, each selected public entity is required to initiate a time-bound procurement process for charging stations. [Read more](#)

Ashok Leyland, ABB join hands to launch buses with quick charge batteries | *Market Development and Technology*

Ashoka Leyland will be making buses using ABB's flash-charging technology (TOSA) which can charge buses within minutes. This technology will not disturb the bus schedule and will increase the operational viability of the fleet. Quick charging technology does not require buses to be taken out of service, for re-charging the batteries, every few hours; and can be set up at any bus stop. A flash-charge of 600 kW can be supplied to a bus within just 15 seconds.

[Read more](#)



EV @ WRI

A Webinar on 'Sustainable Financial Mechanisms and Innovative Business Models for Electric Vehicles in India'

WRI India's Electric Mobility Forum, an initiative supported by Shakti Foundation, conducted a webinar on financial mechanisms for deploying electric vehicles. This webinar threw light on:

- How should we look at transitioning from vehicle-centric finance to an ecosystem finance?
- How can electric mobility lower credit risk?
- What is the role of micro-project finance and its use in financing electric mobility projects (moving away from archaic asset credit to a cashflow based model)?
- The influence of new consumer groups such as millennials in vehicle finance schemes.



EV FEATURE

Old Electric Car Batteries May Help Cut Costs of Storing Power

by David Stringer, Bloomberg | January 2020

As major players jostle for market share in large-scale power storage, American Electric Power and Nissan Motor Co. are testing new technology that re-uses old electric vehicle batteries to slash costs.

The pilot study in Ohio will road test technology that could lower system costs by about a half and extend the life of lithium-ion batteries by about a third, according to its Australian developer.

Costs of energy storage systems are falling globally on technology improvements, larger manufacturing volumes, increased competition between suppliers and as the sector adds more expertise, BloombergNEF said in an October report. That's driving an expansion in investment in projects to store power, with as much as \$5 billion worth of deals possible this year for systems paired with renewable energy, according to the forecaster.

American Electric's Ohio study is using expired Nissan Leaf car batteries and is intended to test the innovations at scale after laboratory work in Australia and Japan. Results so far appear promising, Ram Sastry, American Electric's vice president, innovation and technology, said by phone. "It's in a facility that we own, but connected to the real grid," he said.

The technology is developed by Melbourne-based Relectrify and uses old, or second-life, vehicle batteries and reduces the number of components needed, the company said Friday in a statement. That can reduce costs for key parts of typical industrial or grid storage systems to about \$150 per kilowatt hour, it said. That compares with a current average price for similar technology using new batteries of \$289 a kilowatt hour, according to the BloombergNEF 2019 Energy Storage System Costs Survey.

Companies like BMW AG and Toyota Motor Corp. are already putting re-used cells to work in applications including renewable energy storage, electric vehicle charging, and to power street lights and homes. About three-quarters of vehicle batteries are eventually likely to be reused, according to London-based researcher Circular Energy Storage.

Cheaper energy storage with batteries could provide an alternative to adding more capacity at electricity substations, or building more transformers. It could also be harnessed to provide backup power and bolster reliability for consumers, according to American Electric's Sastry.

“There are many use cases that we have for batteries that are predicated on the cost,” he said. “If the battery goes lower in cost, it can compete with the wires.”

Yet even as the price of lithium-ion battery cells has fallen, it's been difficult to reduce costs of components such as inverters. “The inverter is the Achilles heel of energy storage,” said Bradley Smith, president of Covington, Louisiana-based Beauvoir Consulting Services and previously an executive developing second-life battery products at Nissan.

Relectrify's system reduces the need for separate electronics for both the inverter and battery management system, lowering costs, Smith said.

The technology can also extend the lifespan of either reused or new batteries by offering more precise management of individual cells, according to Valentin Muenzel, CEO of Relectrify, a 14-person firm launched in 2015 that's collaborated with companies including Volkswagen AG and International Business Machines Corp.

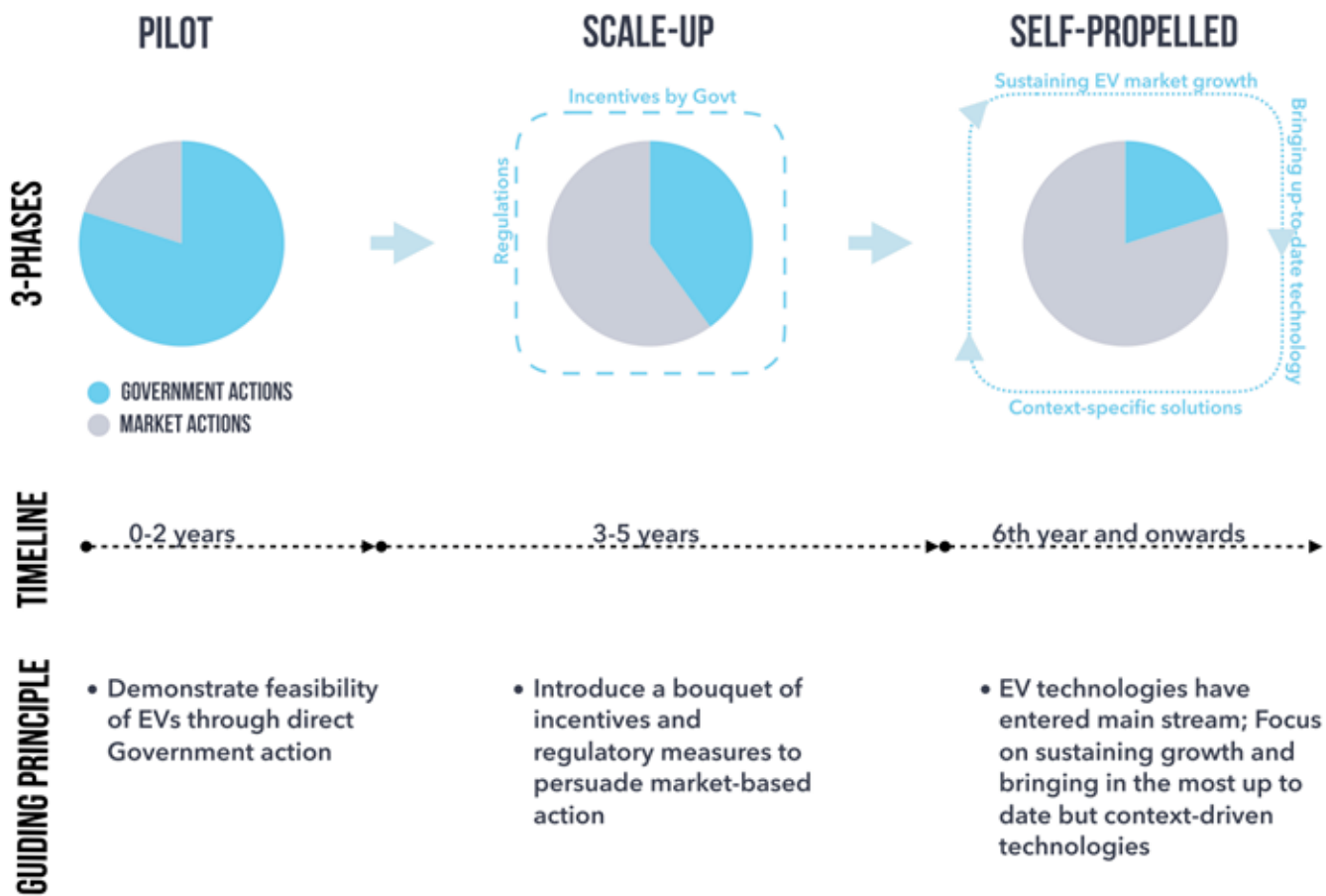
Some potential end users remain wary of re-using lithium-ion batteries over concerns about their longevity and costs of re-purposing cells, according to BNEF's head of clean power Logan Goldie-Scot.

“Many customers are not yet comfortable with second-life batteries even at a steep discount,” he said. Tesla Inc. has in the past suggested it will favor recycling spent packs from vehicles to recover raw materials, rather than seek to re-use the cells first.

Relectrify, which is holding talks with battery manufacturers and distributors, sees potential to eventually help improve performance of batteries for the auto sector, in addition to energy storage.

“We see stationary storage as the low hanging fruit” Muenzel said. “We're already getting demand for use in some mobility applications and we expect that is an area that will continue to grow with time.”

A 3-PHASE ROADMAP TO IMPLEMENT ELECTRIC MOBILITY IN A SMART CITY



Source: WRI India, 2019. Electric Mobility Roadmap for Smart Cities in India.
 Prepared by WRI India for the Smart Cities Mission of the Ministry of Housing and Urban Affairs of India.

COURTESY FOR THE ARTICLES

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