



EVCONNECT

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FROM THE CEO'S DESK

Dear Friends,

I present to you the 21st issue of EVConnect.

Many questions on how to continue the progress made on electric mobility, in the new normal, is coming to the fore. We reached out to Dr. Anthony Eggert of ClimateWorks Foundation, USA, who emphasized on why it makes eminent sense to push for electric transport. In addition, we bring to you our take on how sustainable transport, including electric mobility, can help cities in the Coronavirus pandemic recovery phase. In addition, many updates from international and national frontiers indicate progress – such as electric vehicle batteries being suitable candidates for solar farms, the important role of electric two-wheelers and the discovery of sensor-based technologies that help improve battery performance.

New developments in electric mobility are often difficult to keep pace with. 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 our curated and compiled edition of EVConnect – Edition 21 will come in handy to those who are seeking the latest information on electric mobility.

We hope you find this edition 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 Anthony Eggert,
Director - Transportation, ClimateWorks Foundation, USA



Why Tesla is building city-sized batteries
by Verge Science



POWERTALK

IN CONVERSATION WITH ANTHONY EGGERT,

DIRECTOR - TRANSPORTATION, CLIMATEWORKS FOUNDATION, USA

Interview taken by Amit Bhatt, WRI India

“The biggest piece in this is the shift from oil-combustion to clean electric drive across the board, for all modes of transport, including 2-wheelers, cars, trucks, buses etc.”

“Electric vehicles (EVs) can provide a flexible load to the power system that can help integrate renewable generation, make renewables more valuable and make the grid more resilient.”

Interviewer: Could you please tell us briefly about yourself, what ClimateWorks Foundation does and its linkage to the electric mobility space?

Anthony: ClimateWorks Foundation is a philanthropic organization working to address climate challenge and ensuring a prosperous future. We are looking to reduce carbon pollution at a speed and scale that is consistent with the current climate challenge, and to do so in a manner that enhances economic prosperity and gives people cleaner air, better mobility, better jobs etc. Regarding the transportation program specifically, historically we have invested in the efficiency of the way people move and have supported shifting from fossil-based energy systems to renewables. This dramatically reduces greenhouse gas emissions and other pollution. The biggest piece in this is the shift from oil-combustion to clean electric drive across the board, for all modes of transport, including 2-wheelers, cars, trucks, buses etc.

Interviewer: People often question electric mobility, especially in a country like India where 65% of the energy comes from non-renewable sources. How do you react to such questions?

Anthony: If we are going to address climate challenge, we need to transform both — the ways we generate power and the way we use it — and we must increasingly move towards cleaner sources such as solar and wind. It is encouraging to see that India is taking leadership and following its increasingly bold goals for renewable generation. That is the core pillar of what we are trying to achieve. Shifting the power generation sector is by far the biggest investment. The transport sector needs a system almost entirely fed by renewable based fuels. If we have any hope of growing the share of electric mobility, to meet climate challenge, we need the shift to renewables to happen parallelly. We can't sequence them and wait for one to start the other. The good news is that they are self-reinforcing — they can actually help each other. Electric vehicles (EVs) can provide a flexible load to the power system that can help integrate renewable generation, make renewables more valuable and make the grid more resilient. In my home state of California there is a very strong collaboration between utilities and power generators and

transportation providers (especially EVs). Lots of innovative ideas such as smart charging, integrating vehicles in demand response programs, using specialized rates to encourage consumers to shift to slots when there is prevalence of solar power for example — we are just getting started — but the potential for a very strong synergy between those two markets definitely exists.

Even today, electric vehicles on fossil-based grids are cleaner. That's because the power train of an electric vehicle is significantly more efficient, in terms of tank to wheel emissions, than an internal combustion engine-based (ICE) vehicle, even after including upstream emissions. Electric vehicles are one of the only products that become cleaner over time as you clean up the grid. So, you have an opportunity to deploy vehicles which will get cleaner over time unlike ICE vehicles which get dirtier over time.

"Electric vehicles are one of the only products that become cleaner over time as you clean up the grid. So, you have an opportunity to deploy vehicles which will get cleaner over time unlike ICE vehicles which get dirtier over time."

"In countries that have established robust recycling programs, you will find recycling rates well in excess of 90%. This stems from basic policies, such as battery recycling requirements, financial incentives and infrastructure, which take time to build."

Interviewer: A lot of people point out that EV numbers are not high in terms of absolute numbers. Do you think there is still time before they become a mainstream form of mobility?

Anthony: The current global number of EVs isn't many millions. But we are approaching the tipping point in terms of market adoption. If you look at past successful adoption of technologies, like cell-phones, they go through an S-Curve of adoption. They started out relatively slow. Back in the 80s there was very low adoption of cell phones as they were quite expensive. But as the technology improved, and they started to achieve a level of performance and cost in the 90s and 2000s, adoption grew. We are approaching that tipping point for electric vehicles. That's why you see that some countries have set very bold goals including a complete ban on internal combustion engines by the mid-century. Companies are shifting their procurement priorities. These are indicators that we are on the cusp of a market opportunity.

Interviewer: Taking the analogy of cell-phones, we still haven't fully figured out what to do with cell-phone batteries. Now imagine EVs coming in millions. How should the conundrum of EV battery recycling be resolved?

Anthony: I will use a slightly different analogy. Every internal combustion vehicle has a lead acid battery which serves a starter. In countries that have established robust recycling programs, you will find recycling rates well in excess of 90%. This stems from basic policies, such as battery recycling requirements, financial incentives and infrastructure, which take time to build. There is a dual role to be played here with government policies and industry innovations facilitating this. It will also take collaboration. The other opportunity here is that when a battery is retired from a car it has quite a bit of useful capacity left in it — so some companies are re-using batteries in their second life for grid storage and load balancing.

Interviewer: How do you see the current COVID-19 crises and plummeting oil prices impact the growth of the EV market globally?

Anthony: First off, in most markets that we have looked at, even with the decrease in the price of oil, electric is still cheaper. If you do a mile-to-mile comparison of a dollar of oil versus a dollar of electricity – you get more miles out of electricity, which shows the advantage we have. To your point about sudden drop in oil prices, we need policies and that includes incentives and infrastructure deployment. We think this will be necessary for about five years or so until EVs become cheaper than conventional vehicles and then we anticipate a big jump in EV numbers.

Certainly, the demand-drop from COVID-19 is significant, but if you look back in history, we have gone through this a number of times. In 2014 we went from \$100 per barrel to \$20. Similar market changes took place in the early 2000s and in 2008. We don't know how oil prices will look in the future but if history is a guide, it is going to be volatile. Electricity prices historically are much more stable which makes managing transportation costs, with EVs, a safer bet.

Interviewer: A lot of the times when we talk about EVs, we talk about fancy cars or buses. In India, 80% of the vehicle share is two-wheelers. Is that a form factor that can be electrified?

Anthony: Arguably, the two-wheelers were the first to go electric, especially in China, since 1997, when many cities prohibited ICE two-wheelers as they were polluting the air. Even five years ago there about 200 million electric two-wheelers operating in China and over 1000+ electric two-wheeler manufacturers. That was with very little policy support. India is seeing similar trends in electric three-wheelers. Electrification is scalable – lithium cells can be easily stacked from 1 kWh to 100s of kWh, motors can also be scaled and of course, form factors vary for a car versus a bus. So, the short answer to your question is yes.

Interviewer: In short to medium term how optimistic are you regarding EV uptake?

Anthony: Only EVs in 2030 is quite optimistic but only EVs by 2035 is actually quite plausible. Relatedly, the UK government announced that passenger vehicles are going to be all-electric by 2035. Other jurisdictions are also looking at the 2035 timeframe – again as a reasonable and a plausible goal to shift 100% to electric vehicles. In terms of first movers – I would say it is going to be two-wheelers, three-wheelers, cars and buses. I would even add commercial delivery to this list. For example, Shenzhen in China, which is known for its electric bus fleet, has 60,000 zero emissions electric drive delivery vehicles. Those segments could grow very fast by 2035. Long haul trucks may take a bit longer. While predicting the future is difficult, we can shape the future. It needs government leadership, key ministries and key countries to take steps in this direction – all this can help in pulling this time frame closer.



UPDATES FROM THE WORLD

Solar energy farms could offer second life for electric vehicle batteries | *Technology*

A new study shows that electric vehicle batteries could still have a useful and profitable second life as backup storage for grid-scale solar photovoltaic installations, where they could perform for more than a decade in this less demanding role. The study, published in the journal *Applied Energy*, included a test case, in which the researchers studied the details of a hypothetical grid-scale solar farm in California. In particular, they studied the economics of several scenarios: i.e. building a 2.5-megawatt solar farm alone; building the same array along with a new lithium-ion battery storage system and building it with a battery array made of repurposed EV batteries that had declined to 80% of their original capacity — the point at which they are considered too weak for continued vehicle use. [Read more](#)

Ultrasensitive fuel gauges could improve electric vehicle batteries | *Technology*

Scientists from U.S. and Germany are developing detectors that could remove some of the mysteries, and hazards, of using large lithium-ion batteries to power vehicles and store renewable energy. The potential solution relies on “ultrasensitive new detectors, specialized magnetometers, that can produce an image of the magnetic field of a given battery revealing whether they have defects and showing exactly how much electric charge is left.” [Read more](#)

ABB hooking up ASKO to electrify delivery trucks | *Market Development*

Norway’s largest grocery retailer, ASKO, plans to work with ABB to get power cables for its electric delivery trucks’ daily recharging needs. Currently, ASKO sends out 600 electric trucks to deliver food around Norway. ABB ultrafast chargers (150 kW ABB HVC 150C chargers) are already being used by ABB for two Scania electric trucks in Oslo (trucks with payload of 10 metric tons and a range of 120 km). If all goes well, the company plans to get 55 Scania electric trucks in the near future. [Read more](#)



UPDATES FROM INDIA

BHEL calls Global OEMs to set up solar and energy storage manufacturing units in India |

Market Development and Strategy

Bharat Heavy Electrical Limited (BHEL) is inviting global companies as partners. The companies being considered are global original equipment manufacturers (OEMs) who are seeking to establish or expand their supply chains or manufacturing base in India. Setting up of up to 5 MW capacity lithium-ion cell manufacturing facilities for all types of electric vehicles and energy storage, solar value chains, heavy electrical equipment and manufacturing of various goods are some of the businesses being considered. The selected partners can leverage BHEL's facilities to establish a manufacturing base in India. [Read more](#)

Ola Electric to launch global electric two-wheeler; buys Dutch scooter firm | *Market Development*

Ola Electric Mobility has acquired Etergo BV, an Amsterdam-based electric scooter manufacturer, last valued at \$90 million. This strategic acquisition sees Ola entering the electric two-wheeler market in India and globally with the company aiming to launch its electric two-wheeler in India by 2021. [Read more](#)



EV @ WRI

A Webinar on "Disruptive Potential of Fuel Cell Technology in the Indian Transportation Sector"

Listen to the full webinar [here](#)

In this webinar, Prof. Prakash Ghosh from Indian Institute of Technology (IIT), Mumbai addressed the following points:

- What is the current status and understanding of fuel cell technology for the transport sector in India?
- What are the fuel options for fuel cell vehicles in India?
- What are the potential challenges of hydrogen and fuel cell technology?
- What are the techno-economic challenges in the commercialization of fuel cell technology?
- What is the potential of early adoption of fuel cell technology by different vehicle segments, specifically for India?



EV FEATURE

Urban mobility post lockdown: How to get people back on public transport

by Dr. OP Agarwal, CEO, WRI India | May 2020 | This opinion piece first appeared in [News18](#)

The post Covid19 world will have one constant that is the social distancing norm. This implies that transport system must be so designed that passengers are at a safe enough distance from each other. Does it mean people must travel henceforth by their own vehicle? What will happen to those who do not afford such luxury? What will happen to the present mode of public transport remains the major challenge to be addressed.

In 1960, a seminal report titled 'Traffic in Towns' was presented to the Government of UK by a committee of experts, led by the Scottish town planner Sir Colin Buchanan. For the first time, this report recognized that building newer roads to accommodate all the cars, is not a practical or a feasible solution for cities. Public transport was important.

Over the past 60 years, country after country has been trying to adopt policies that promote the use of public transport over personal motor-vehicles. National policies like UK's New Deal for Transport in 1997, US's Urban Mass Transportation Act in 1964, China's State Council Directive 64 in 2012, and India's National Urban Transport Policy in 2006, have continuously focused on prioritizing public transport. These policies have resulted in many mass-transit systems coming up and bus-based systems getting a fillip. In India, more than 10 cities have invested in metro rails today, at a cost of nearly Rs. 300 crore per kilometre, indicating the importance our cities are giving to policies favouring public transport. In the post-Covid world do we deviate from this well-planned policy?

In a country like India, where owning and driving a private vehicle is often a matter of status symbol, governments, mobility experts and environmentalists alike have long struggled to change the people's perception and initiate a shift towards non-polluting, more efficient transport choices. Efforts to fine-tune policies, improve vehicle designs, offer multiple options (like door-to-door connectivity, confirmed seats, app-based services) have consistently been focused on encouraging private cars users to move to public transport. Constant urban struggles with traffic congestion, vehicular pollution, parking problems, have validated the need for this shift. The key issue is that the Covid-19 pandemic is threatening to reverse the persistent and meticulous effort by the government and the proponents of public transport. The situation now warrants a quick the corrective action.

First, these systems have been at a standstill for over a month now. They have been incurring almost 60% of their expenses (on salaries and maintenance) during this period but are receiving no revenue. These public utilities are inherently loss-making, but they are expected to serve a larger public purpose than to be profit making. Given this context their finances are already strained. The month long standstill, with the added uncertainty around when the systems would resume, will put them into a downward financial spiral.

Secondly, the emergence of several effective communication platforms during the lockdown has shown that it is possible for many office employees to work from home. Online shopping for groceries, goods, essentials have been tailored to suit the people's needs, and is bound to only become more popular in the years to come, resulting in a further reduction in the intra-city travel demand. This reduction in the overall travel demand maybe good to reduce traffic congestion and air pollution in our cities, but spells bad news for the public transport.

Finally, as mentioned, the need for social distancing will drive people's choice of travel modes towards vehicles with fewer passengers, at least in the immediate future. In the course of time, as we gradually overcome the pandemic, our concern about social proximity might begin to get diluted, but looming fears will dominate our lives and commuting patterns for months to come.

All these factors will impact the patronage of public transport systems, especially the high-end, mass-transit systems like India's metro rails. People using the Metro, are typically the ones who have access to and can afford an auto rickshaw or a shared on-demand taxi, or even the newly emerging app-based mini-buses. On the other hand, standard city buses might just weather the storm, as they carry fewer passengers and are used by the section of people who cannot afford personal or private transport.

In the post-Covid scenario, when the lockdown lifts and restrictions relax, it is important for public policies to evolve quickly and efficiently, to arrest a possible and overwhelming demand on personal motor-vehicles again. Such a rebound will lead to gridlock on the streets and adversely impact economic recovery.

Some measures can ease the post-lockdown transition and enhance the stability and dependence on public transport: Ensure that public transport systems receive quick and adequate compensation for the losses they have incurred during the lockdown and are able to restart operations soon. This will be important for enabling safe mobility and a quick revival of the economy.

Enhance the supply of premium bus services, which may charge more than the standard buses, but offer a higher quality of service – such as assured seating, easy booking and no crowding. App-based mini-buses that have emerged in the market will be one among such premium services. However, today they face regulatory barriers to increased supply. These barriers are outdated and need to be removed.

Increase the supply and the frequency of standard city buses, so that passengers can adhere to social distancing norms while commuting. Encourage new micro-mobility options, like shared bikes and electric mopeds, for short trips as they are cleaner and can also enhance access to metro rail systems.

At this juncture, it is important for us to recognize that urban mobility systems will be fundamental to ensure a quick recovery of our economy. They enable people to access their jobs, children to access their schools and goods to access their markets. The economy cannot revive unless mobility systems function smoothly.

India has orchestrated a move towards public transport, very systematically and deliberately over the last 60 years. Today, it is time to reassess and create a network meeting the challenges posed by the pandemic. The sooner we design a robust and quickly adaptable route to moving people efficiently, the faster will be the road for economic recovery.

COURTESY FOR THE ARTICLES

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VIDEO CREDIT

Why Tesla is building city-sized batteries: <https://youtu.be/8ge3ah1G8ok>

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