



# EVCONNECT

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NEWSLETTER

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### EV Feature

Batteries can power sustainable development. Here's how by *World Economic Forum*

## FROM THE CEO'S DESK

Dear Friends,

I am excited to share with you the seventh issue of WRI India's electric mobility newsletter, **EV Connect**.

Electric mobility has important benefits for India. Majority leaders, scientists and businesses together agree that a massive shift in the automobile industry is imminent, and that to use it to foster clean mobility, curb transport emissions and slow global warming, multiple actors and sectors need to unite. Proactively re-aligning the capabilities of India's EV industry would enable the country to retain its leadership in the auto sector. Similarly, electric vehicles offer an opportunity for India to substantially curb local pollution and greenhouse gas emissions. In India, many policy frameworks of central and state government have been released recently – on charging infrastructure, key vehicle segments, and how to grow the adoption of electric vehicles in cities through the combined efforts of public and private sector.

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 hard to track. This newsletter seeks to bring together several of these developments into one document. We hope that over time, this curated and compiled content will come handy to those who are seeking the latest information on electric mobility.

This edition of the newsletter includes a conversation with world renowned mobility expert, Dr. Dario Hidalgo from Bogota, Colombia. It also features a piece on how EV batteries can promote sustainable development.

We hope you find this edition of the newsletter beneficial and share your thoughts to improve this.



Sincerely,

**Dr. OP Agarwal**  
CEO, WRI India



# POWERTALK

## IN CONVERSATION WITH DR. DARIO HIDALGO

EXECUTIVE DIRECTOR OF FUNDACION DESPACIO, BOGOTA, COLOMBIA  
& SENIOR MOBILITY CONSULTANT, WRI ROSS CENTER

*Interview taken by Amit Bhatt, Director, Integrated Transport, WRI India.  
(Copy-edited for the print version)*

“Concerns around health and the environment makes this a good opportunity to advance and it is also very good politically, i.e. in terms of the political economy. A mayor announcing a fleet of electric buses is a hero for a lot of people. So, there is this combination of need, health impacts, environmental impacts and the political economy.”

“I do believe that in India, one of the biggest opportunities is in Intermediate Public Transport (IPT) – autorickshaws which are so important for last mile connectivity and even for short trips in many Indian cities.”

**Interviewer:** First of all, thanks a lot for talking with the EVConnect newsletter. Let me start by saying that there is a lot of interest in electric vehicles from around the world. What has been the experience in Latin-America?

**Dario:** Well actually, Latin America is moving quite fast in terms of electrification. There are 200 buses that are recently launching in the city of Santiago, Chile with the support of a power company, Enel, which is an international company working worldwide. It purchases the buses and is now renting them to private operators in Santiago, which is amazing. Colombia is just buying 64 conventional electric buses for the bus system and they will expect these buses to be delivered by BYD from China in the next four months. So, it is very interesting. The City of Cali in Colombia just bought 26 buses and is expecting another 100 buses from a tender that is already being floated and will be awarded in the next month. So, as you see, Chile and Columbia are doing really well.

There are also trials of electric buses in Buenos Aires and there is big interest. In Latin America, bus transport is really important and also the problem of air pollution that cities are facing is getting attention. So, moving to electric vehicles is an important policy. They need more support from national governments and enabling policies. They still have the same barriers as any other place in the world – high capital costs and lack of knowledge on the operational side of buses along with issues around the lifecycle, autonomy and recharging infrastructure. But these cities are very bold. They are really trying new things and leapfrogging. Hybrid buses are no longer talked about in Latin America. Actually, there were plenty of hybrid buses in both Bogota and Mexico city but there is no talk about hybrid buses anymore; cities are moving fast to EVs.

**Interviewer:** Any reason why cities in Latin America are choosing buses as a form of electrification?

**Dario:** Well, buses are a very important part of mobility in cities and they are also a big contributor to the problem of air pollution -- not just ambient pollution, but for the people who are inside the buses who are

exposed to diesel fumes more than many, many times the recommended levels of WHO. So, concerns around health and the environment makes this a good opportunity to advance and it is also very good politically, i.e. in terms of the political economy. A mayor announcing a fleet of electric buses is a hero for a lot of people. So, there is this combination of need, health impacts, environmental impacts and the political economy. Fortunately, the buses are now competitive.

It is not that the cities need much more in terms of capital plus operational costs in the lifecycle of the bus. The manufacturers are really competitive. Manufacturers from China, Europe and from North America are putting competitive products in the market which are helpful. Where we are having a little bit of trouble is in the larger buses which are not used in other parts of the world but are very important for bus rapid transit systems, i.e. the articulated and re articulated buses. The manufacturers are not there yet and these buses are not yet competitive. But I'm sure it won't take much time. There are big discussions on how you charge the bus; for instance, if you charge at the bus depot with a big battery or you charge opportunistically at terminals. There are also discussions on non-continuous trolley buses, which is a very exciting technology that is now available. These discussions keep taking place, but I do believe that the industry is trying to meet the needs of the cities and this will continue working very well.

*Interviewer:* How do you respond to the perception that people have that electric buses are very costly and they come at the cost of conventional buses?

*Dario:* Actually, the buses are more expensive with their batteries right now in terms the capital costs but they have great savings in terms of operational costs. So what needs to be done is not just look at the capital costs but look at the full costs of operation. A big benefit of this type of technology are the positive externalities in terms of health. These are never accounted for by transit companies and go to other accounting. Actually, cities are heavily polluted even if the power source is somewhere else and if it's renewable it is a very important contribution to public health on one side, and to greenhouse gas abatement on the other.

*Interviewer:* You have worked a lot in India as well. In your opinion, what should be the electrification strategy for India; what mode should we prioritize for electrification?

*Dario:* It is a tough question even though I am familiar with the conditions in India. It is easier to go with buses since the ownership of buses is under big state-owned companies who are able to push it. You would see that the fleet of BEST in Mumbai or BMTC in Bengaluru or DMTC in Delhi – they are very large companies that may have the muscle and support of the government to be able to do it. Even with private operators in the Indian markets, it is possible to do it because you don't buy one by one but you purchase a fleet. So, I believe buses is a good idea because of these institutional conditions. I do believe that in India, one of the biggest opportunities is in Intermediate Public Transport (IPT) – autorickshaws which are so important for last mile connectivity and even for short trips in many Indian cities. I don't see any reason why these light duty vehicles that are so important for so many people can use batteries. They are light vehicles and they are safe because they are not that fast. I do think there is a market for electrification of IPT in Indian cities.



## UPDATES FROM THE WORLD

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### **5 kinds of people California wants to put in electric vehicles** | *Policy and Market Development*

Officials of California Energy Commission are now targeting a diversified audience group to accelerate the adoption of electric vehicles in the state. So far, the state has focused on early adopters, but now the officials will focus on getting a more diverse population of drivers. The plan is to use a number of incentives, specifically in the following groups: 1) Young 20 year olds who are about to buy their first vehicles, 2) Women who are primary decision makers in about 85% car buying decisions, 3) Home renters, as half of Californians rent a house instead of owning, 4) low and moderate income families, and 5) Used car buyers.

*Takeaway for India:* India could benefit from a granular understanding of potential consumers of electric vehicles. Identifying such groups will allow both policymakers and auto-businesses to align incentives and product offerings respectively, as per the psychographic and demographic needs of the selected group. [Read more](#)

### **China is winning the electric vehicle race** | *Policy and OEMs*

The global EV market has grown six-fold since 2013 and has doubled since 2015. In China, demand for new energy vehicles (including plug-in and plug-in hybrids) increased by 69% in 2017, registering a sale of 1.3 million new energy vehicles in the country. The Chinese government is pursuing ambitious targets in the sale of electric passenger cars, with the intention of making it 10% of conventional vehicles. Not only have these targets made the country a world leader, they are attracting business investments in China. For instance, Tesla's Gigafactory 3, which will manufacture cars for local consumers. The Chinese government has expressed a desire to completely phase out conventional vehicles.

*Takeaway for India:* China's success story demonstrates that ambitious economic and environmental reforms that augment the share of electric vehicles are not just beneficial for addressing local environmental concerns such as air pollution, they may also position the country as a global leader in electric technology and industrial innovation.

[Read more](#)

## **Putting electric vehicles on the fast track** | *Strategy*

This article emphasizes the instrumental role of philanthropy in raising the profile of electric vehicles and acquiring further investments in clean energy technologies. It further highlights a framework – with four key milestones – that philanthropic groups can help achieve. Firstly, by lowering the upfront costs of the electric vehicles and scaling up innovation and secondly, by retaining convenience for consumers as they transition from conventional to electric vehicles. Unlike conventional vehicles which are re-energized at fuel stations, electric vehicles need charging and/or swapping of batteries at home or at public facilities. The third milestone is making consumers aware of the low operational costs and environmental health benefits of electric vehicles and finally, instilling commitment in stakeholders in political and business domains.

*Takeaway for India:* Electric vehicles have obvious benefits for business and society in India. Philanthropies have an important role in encouraging research projects and the on-ground implementation of pilot projects that demonstrate the benefits to stakeholders across the aisle. The four-point framework described above could be a good filtering mechanism for philanthropic investors looking to promote electric mobility in India. [Read more](#)

## **China's ride-hailing giant is getting into the electric-car business** | *Policy and Technology*

Didi Chuxing, China's ride hailing giant is partnering with state-owned car maker BJEV, to work on projects such as ride hailing, big data, and the operation of new energy vehicles such as fuel cell and hybrid cars. This joint venture will allow Didi to combine the power of its ride sharing platform with that of its car making partner, which will supply high quality electric cars and build battery swapping stations. This way, BJEV will also be able to expand into the fleet business. The joint venture is also benefiting from policy moves such as those in Shenzhen, according to which new ride hailing drivers only get a license for battery operated vehicles.

*Takeaway for India:* The above partnership demonstrates that in India too, such partnerships between ride hailing services and vehicle manufacturers can allow businesses to benefit from each other's assets and strengths. A few such partnerships have recently shaped up in the country. Even more beneficial could be policy decisions that work in favor of such partnerships. [Read more](#)

## **Honda secures battery supply contract for about 1 million electric vehicles with CATL** | *OEM and Technology*

As part of a new deal, Honda will be getting a supply of nearly 56 GWh lithium-ion EV batteries by 2027 from CATL in its units across the world. This will allow Honda to produce 1 million electric vehicles and make a substantial start in the electric mobility space. CATL is primarily making LFP and NMC cells. So far their batteries have focused on electric buses and hybrids, but they are now diversifying their offerings.

*Takeaway for India:* Indian auto businesses could formulate partnerships with battery making companies to have an assured supply of batteries. This will be beneficial for new entrants in this vertical. [Read more](#)



## UPDATES FROM INDIA

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### **Andhra Pradesh to deploy 10 lakh electric vehicles and 1 lakh charging station by 2024** |

#### *Policy and Market Development*

Andhra Pradesh recently rolled out its EV policy with the aim of having 10 lakh electric vehicles across all segments and 1 lakh charging stations in next 5 years. The state also plans to achieve 100% electrification in public fleet. This policy would require ₹30,000 crore investments and 60,000 jobs. The policy would not allow the new registration of petrol and diesel cars; however, government is yet to provide the timeline. [Read more](#)

### **Buildings will have to allot 20% parking space for EV charging: Govt** | *Policy*

According to the Ministry of Housing and Urban Development, residential and commercial complexes will have to allot 20% of their parking space for electric vehicle charging facilities. Additionally, the building premises have to have an additional power load equivalent to the power of all charging points operated simultaneously. For residential and institutional buildings, metering and payment will be linked to the house owner's monthly maintenance bills with metered units credited to their smart card which is plugged during charging. [Read more](#)

### **Centre lowers import duty on parts of electric vehicles** | *Policy and Market Development*

The Central Board of Indirect Taxes and Customs (CBIC) has carved out a separate category for parts and components of the electric vehicle, for which customs duty has been lowered to 10-15 percent. The duty changes, effective January 30, have been done with the intent to promote the domestic assembling of electric vehicles. CBIC has also removed customs duty exemption for battery packs for electric vehicles. Electrically operated motor cars and other motor vehicles will attract 100 percent duty if the cost, insurance and freight is over \$40,000 and 60 percent duty for a value lower than \$40,000. [Read more](#)



## Government to buy 2,000 electric buses with German aid | *Technology and Policy*

TN state government will purchase 2,000 battery operated vehicles as part of adopting environment-friendly fuel-efficient public transport systems. The government was planning to avail a loan at 2% interest rate from KfW, the German government owned development bank. This decision was taken in the backdrop of Chennai city being the first in the country to join a global network of cities committed to combat climate change. [Read more](#)



## EV @ WRI

### How Santiago de Chile Became a Global Leader on Electric Buses

*by Jone Orbea - December 18, 2018*

The electrification of transport has taken off around the globe. Cities and transit agencies are experimenting with the latest trends and innovations, spanning the gamut from cars to buses, scooters and bikes. We have seen China lead on electric vehicles (EVs) in recent years, like the city of Shenzhen, which became the first to electrify its entire public bus fleet this year. But a new EV leader is now emerging: Santiago, Chile. [Read more](#)



# EV FEATURE

## BATTERIES CAN POWER SUSTAINABLE DEVELOPMENT. HERE'S HOW

By Benedikt Sobotka, Chief Executive Officer, Eurasian Resources Group and Martin Bruder Müller, Chairman of the Board of Executive Directors and Chief Technology Officer, BASF

22 Jan 2019 | *This article is part of the World Economic Forum Annual Meeting*

“Looking beyond transport, the entire energy system is undergoing a systemic transformation. By 2050, wind and solar energy are expected to account for 50% of global power generation, while in 2017 fossil fuels made up 85% of the global energy system.”

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There is a growing need for mobility – worldwide. By 2025, there will be approximately 1.5 billion cars on the roads. Electromobility, especially in combination with renewable energy, is an important contribution towards addressing global mobility needs. For this, we need the development of a sustainable and low-carbon value chain for batteries in order to contribute to the implementation of the 2015 Paris Climate Agreement. Batteries power electric vehicles, portable electronics devices and back up renewable energy in homes, businesses and national grids. They are a key enabler of global efforts to curb climate change, and market developments reflect this.

The global battery market is surging. By 2040 the global energy storage market is projected to attract \$620 billion of investment. Over the past decade, the rechargeable lithium-ion battery market doubled on average every three years.

Batteries are a core technology underpinning the shift to energy decarbonization and transport systems, and could be a game changer in efforts to curb climate change. Historically, portable electronics have been the primary driver of growth in the battery market; however, today the growth in demand comes from electric vehicles.

The International Energy Agency projects that by 2030 a stock of 130 million electric vehicles could be on the world's roads. While scenarios vary, significant investments in electric vehicle and battery production are well underway. They are also fuelled by national and international targets to support climate action, while several cities and governments have announced their intentions to ban internal combustion engines.

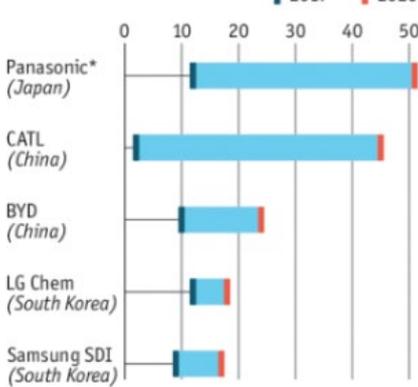
Looking beyond transport, the entire energy system is undergoing a systemic transformation. By 2050, wind and solar energy are expected to account for 50% of global power generation, while in 2017 fossil fuels made up 85% of the global energy system. Beside the fact that batteries are the basis for future mobility, they are key as they ensure energy availability when the wind is not blowing and the sun is not shining.

However, without deliberate intervention, the potential of batteries to support sustainable development and climate change mitigation risks being undermined by its own value chain.

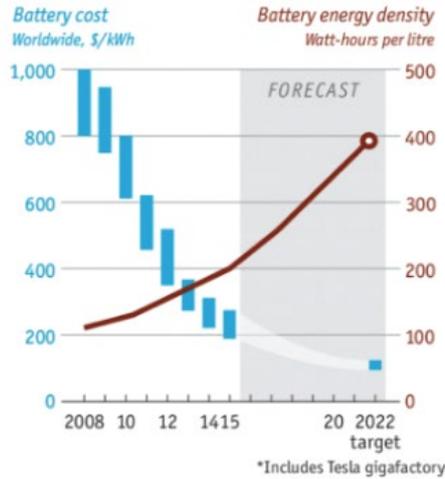
Firstly, the extraction of raw materials used in batteries can come at a significant social and environmental cost. About two-thirds of the world's cobalt, for example, comes from the Democratic Republic of the Congo and about 20% is estimated to come from sources that can be linked to unsafe working conditions and child labour. Secondly, battery production carries a large carbon footprint. Thirdly, a lack of coordination and effective financing schemes across the value chain appear to be hampering the deployment of batteries to bring affordable, clean energy to low-and middle-income countries.

## Electric dreams

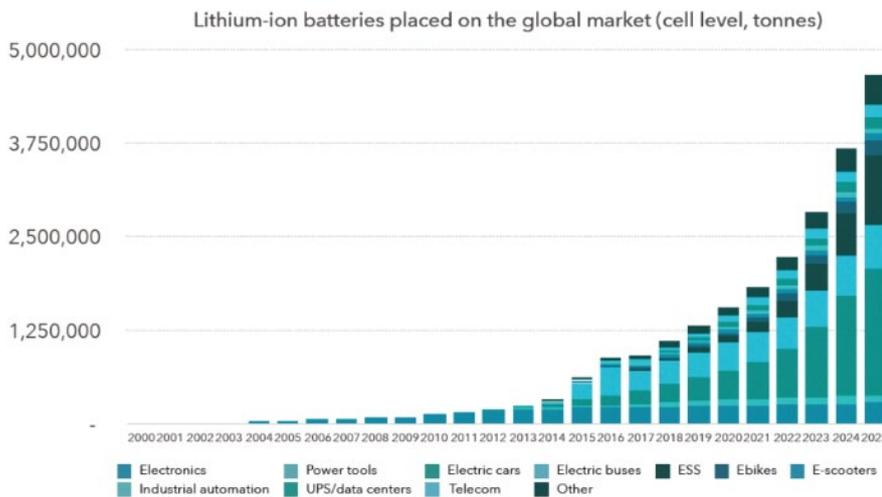
Manufacturing capacity  
Gigawatt-hours per year



Sources: Cairn ERA; US Department of Energy



The cost of batteries is set to decline as manufacturing output and efficiency rise  
Image: The Economist



Global battery output is predicted to more than triple by 2025  
Image: Circular Energy Storage 2018

How can we achieve these three core objectives?

- We need clear and firm commitments and coalitions of public, private and civil society organisations agreeing to align investments. The target is to develop and endorse standards for responsible, sustainable sourcing of cobalt and lithium supply chains.
- We need to assess the opportunities associated with a circular economy for batteries. Multiple action partnerships have to be formed to define sustainability criteria for battery design, and lower transaction costs in electric vehicle battery reuse and recycling.
- We need to support existing commitments to boost battery storage and the electrification of transport in low and middle-income countries.

All these efforts are being taken up by the World Economic Forum's Global Battery Alliance, which is co-chaired by the authors of this article. The Global Battery Alliance is a unique public-private partnership and collaboration platform whose aim is to accelerate public-private action towards the aforementioned goals. It brings together businesses along the value chain with governments, international organizations and civil society to coordinate and boost the many good efforts that are already underway.

This year, we must build on the momentum already generated - by the World Bank's \$1 billion investment in battery storage, for example, or the Global Battery Alliance's mission to build responsible global battery supply chains. Realising these goals will take us a big step closer to a world in which batteries power sustainable development.

Fundamental improvements to the full battery value chain are needed to allow batteries to power sustainable development and climate change mitigation. Collaborative action is required today to develop a sustainable backbone for the energy and transport systems of tomorrow. This requires the realization of three core objectives:

First, stable and transparent raw material supply chains must be built, characterized by good working conditions and providing shared prosperity. This includes alignment on standards and assurance frameworks as well as the mobilization of blended finance at scale to tackle challenges such as child labour.

Second, a circular, low-carbon and pollution-free value chain must be created to unlock the potential for batteries to contribute to the realization of the 2015 Paris Agreement.

Third, the full potential of batteries must be unlocked to bring electricity and productivity enhancements to one billion people in low and middle-income countries.

## COURTESY FOR THE ARTICLES

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