

Accelerating the Transition to Electric Vehicles

The Role of Green Skills and Robust Charging Infrastructure

Key insights

- **The global transition to EVs is being powered by green skills:** Labor market data from LinkedIn suggests vehicle electrification is being enabled by the green skilling of auto workers across many countries. Sweden, the U.K., and Germany lead the way in terms of the share of auto workers with EV skills (8.14%, 7.31% and 6.14%, respectively).
- **Expanding industry expertise in charging infrastructure will unlock further EV adoption:** Charging infrastructure is key to EV adoption and uptake, and labor market trends can serve as leading indicators of these long-term infrastructure developments. Even though there were broad-based increases in infrastructure professionals with EV skills as measured by average annualized growth from 2017-2023, there were year-over-year (2022-2023) decreases in the share of this talent in Germany (-2.6%), Spain (-1.4%), and the US (-0.06%).
- **Strong momentum to green in commercial transportation:** Data suggests an increasing share of EV skilled employees at heavy vehicle (trucks, buses etc.) companies, and large two-wheeler manufacturers which is a promising development as the world advances towards the greening of all transportation, not just cars.

Akash Kaura

Staff Data Scientist

Economic Graph

Research Institute

akaura@linkedin.com

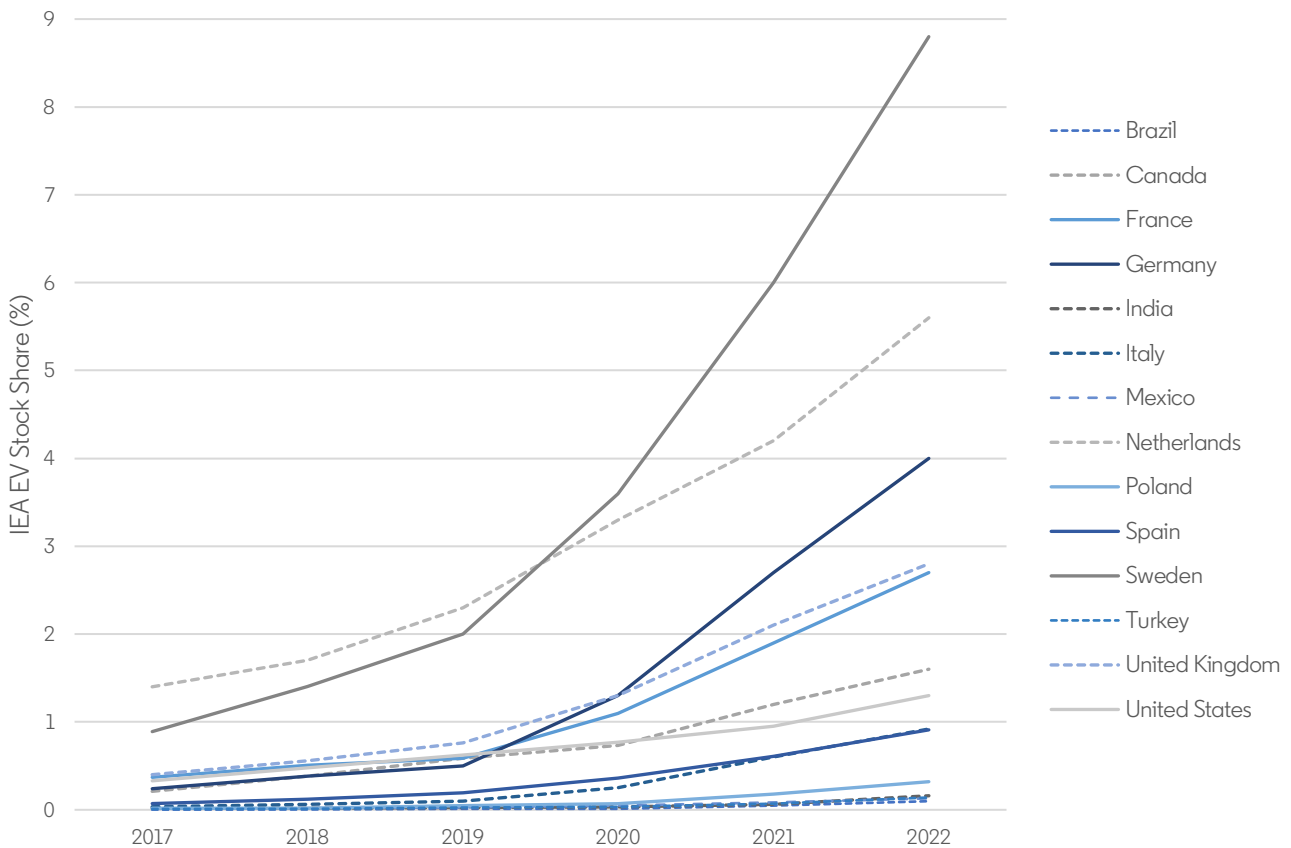
Accelerating the Transition to Electric Vehicles

The global transition to EVs is being powered by green skills

The race to green our transportation systems is on, and the transition to electric vehicles (EVs) in the automotive industry is one of the most exciting frontiers of this transition. The latest [Global EV Outlook Report from the International Energy Agency \(IEA\)](#) states that EV sales exceeded 10 million in 2022 with 14% of all new cars sold being electric in 2022, up from around 9% in 2021 and less than 5% in 2020.

The growth in the stock share of EV cars is an encouraging sign, and through Economic Graph data, we are observing evidence that the proliferation of EV skills in the labor market is accompanying this transition:

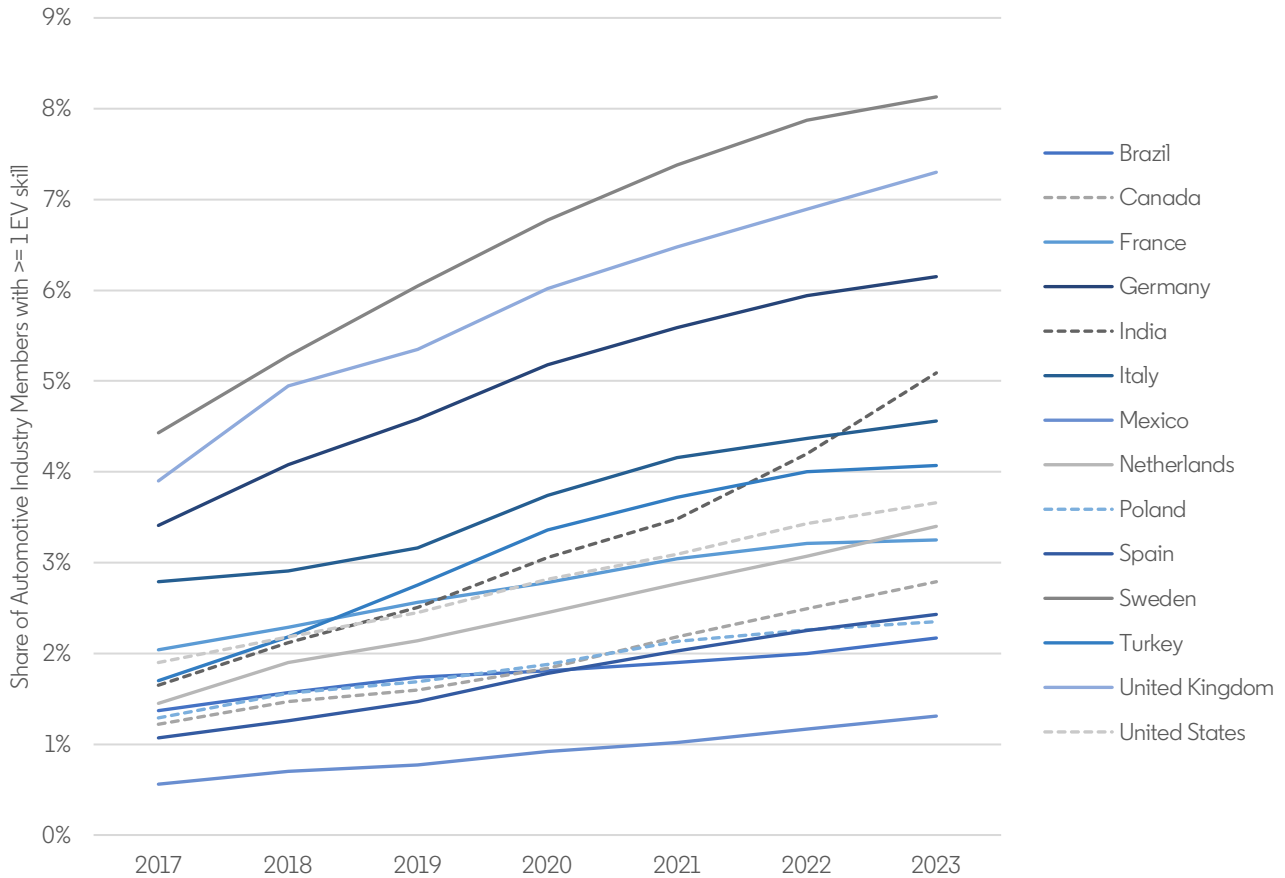
IEA EV stock share by country (cars only)



Source: International Energy Agency Global EV Outlook Report 2023

Accelerating the Transition to Electric Vehicles

Share of automotive industry LinkedIn members with >= 1 EV skill



Source: LinkedIn Economic Graph

Akin to IEA data, we are seeing Sweden’s automotive industry lead the way in employing members with EV skills with nearly one out of every 12 automotive workers in the country possessing at least one EV related skill. As EVs gain popularity, other countries are also making up ground - there was 12% year-over-year increase from 2022 to 2023, in the share of EV Skilled Workforce in the automotive industry in Canada. Between 2017 and 2023, India has seen the highest average yearly increase in its EV Skilled automotive workforce, increasing by 21% each year from 1.7% in 2017 to over 5% in 2023. With the [Mercedes-Benz Research and Development facility in India set to hire nearly 1K engineers in 2023](#) we can expect to see India solidify its position as a crucial technology hub in the transition to EVs.

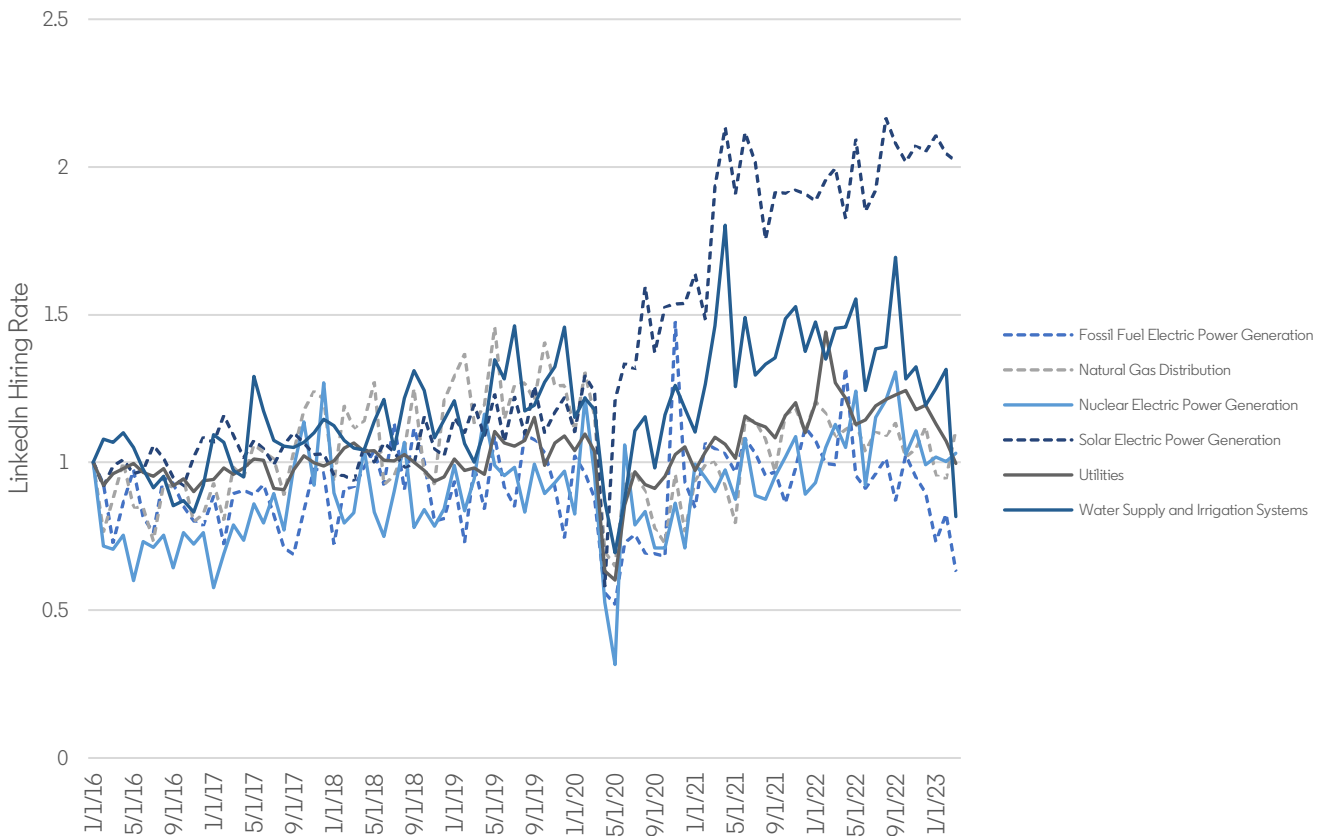
It must be remembered that the stock of EV cars is growing from a low base, often from less than 1% in most countries. However, the growth in both the stock of such cars as well as the members with skills required to produce them is on an upward trend point to an accelerating transition. This is borne out in the data with typical (median) yearly increases of 62% for stock share of EVs and 11.3% for EV Skilled automotive members (annualized average) amongst the countries we analyzed.

Accelerating the Transition to Electric Vehicles

Expanding industry expertise in charging infrastructure will unlock further EV adoption

Gone are the days when buying an EV meant that your consumption was still downstream of electricity derived from fossil fuels. The fact that renewable electricity is now the cheapest form of energy in most places around the world only serves to accelerate the transition to electric. This is also apparent in LinkedIn data with Solar Electric Power Generation growing from strength to strength in the United States. There has been an average annual increase of 10.8% between 2016 and 2023 in Solar hiring, the highest amongst all utility sector industries.

LinkedIn Hiring Rate for Utility sector industries in the United States

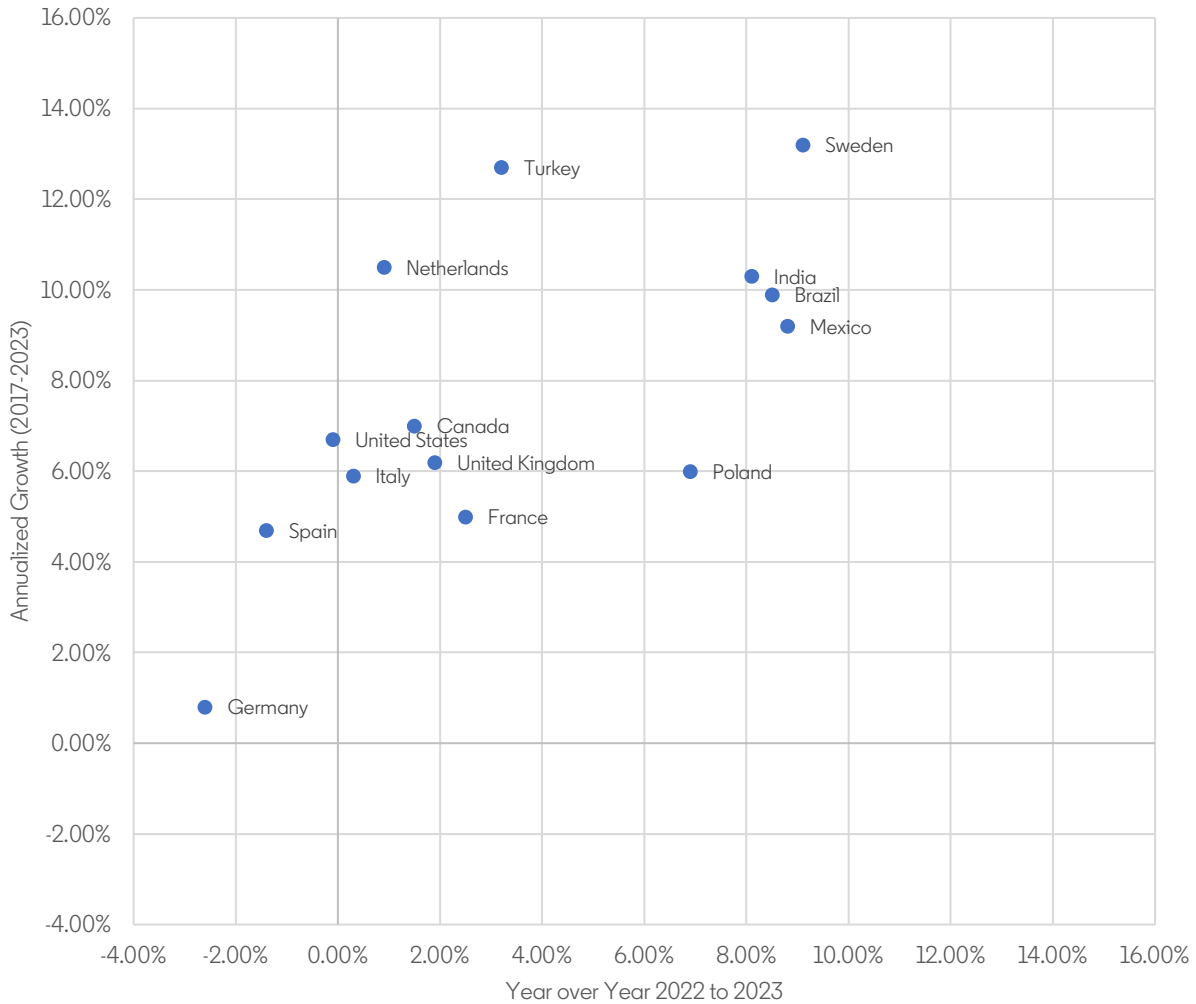


Source: LinkedIn Economic Graph | Seasonally adjusted. LinkedIn Hire Rate is indexed to January 2016, which is set to 1.

However, the IEA estimates that currently most charging needs for EVs are being met by home charging, and [public charging infrastructure is “a key enabler for EV adoption.”](#) LinkedIn data allows us to measure the advent of EV related skills in the industries involved in providing charging infrastructure namely, Electric Power Generation; Electric Power Transmission, Control, and Distribution; and Utilities to take stock of where we stand while keeping an eye on where we need to go.

Accelerating the Transition to Electric Vehicles

Growth in share of infrastructure professionals with ≥ 1 EV skill (2017–2023)



Source: LinkedIn Economic Graph

The largest gains in year over year terms have been made in Sweden (9.1%), Mexico (8.8%), and Brazil (8.5%), while the most consistent gains over the 2017 to 2023 period in the EV Skilled Workforce in infrastructure industries have been made in Sweden (13.2%), Turkey (12.7%), and Netherlands (10.6%). Even though there were broad-based increases in infrastructure professionals with EV skills as measured by average annualized growth from 2017-2023, there were year-over-year (2022-2023) decreases in the share of this talent in Germany (-2.6%), Spain (-1.4%), and the [US \(-0.06%\)](#). This indicates that infrastructure industries at large grew faster than EV skilled talent employed therein. This should warrant special attention to ensure the transition to EVs is not stymied due to lack of EV related skills and expertise required to develop robust charging infrastructure.

Accelerating the Transition to Electric Vehicles

Large automotive manufacturers concentrate the most on specialized EV talent

To understand the role of large automotive manufacturers, we considered the “EV-fication” of their workforce and products in two different ways:

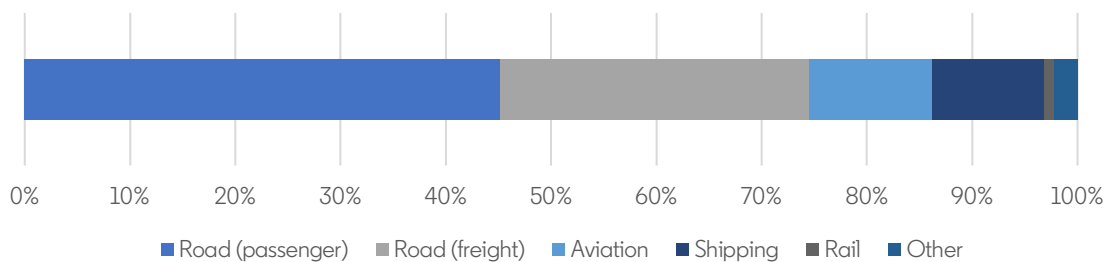
1. The share of EV-skilled members at large automotive manufacturers vs. other companies in the industry which allows us to measure the extent to which these companies are monopolizing EV related talent that is critical to the aforementioned transition.
2. The percent of the workforce of large automotive manufacturers that is EV skilled, which allows us to understand the extent to which large companies are dedicating resources towards the transition to EVs.

While large automakers employ 18% of all automotive professionals on our platform, they employ 26% of EV skilled professionals indicating that they are highly focused on this transformation. In the United States, 31% of all EV Skilled members in the automotive industry work at a large automotive manufacturer. In Germany, this share is slightly lower at 27% with over 70% of EV Skilled automotive industry professionals working at a smaller company.

Strong momentum to green commercial transportation

Both in the United States and Germany, we also see heavy vehicle (trucks, buses etc.) companies employing EV skilled professionals. This is important because while converting cars to electric will reduce emissions, [a non-trivial portion of emissions comes from freight, shipping, and aviation](#). Reducing these emissions will move us closer to making carbon-neutral transportation a reality.

Global CO₂ emissions from transport



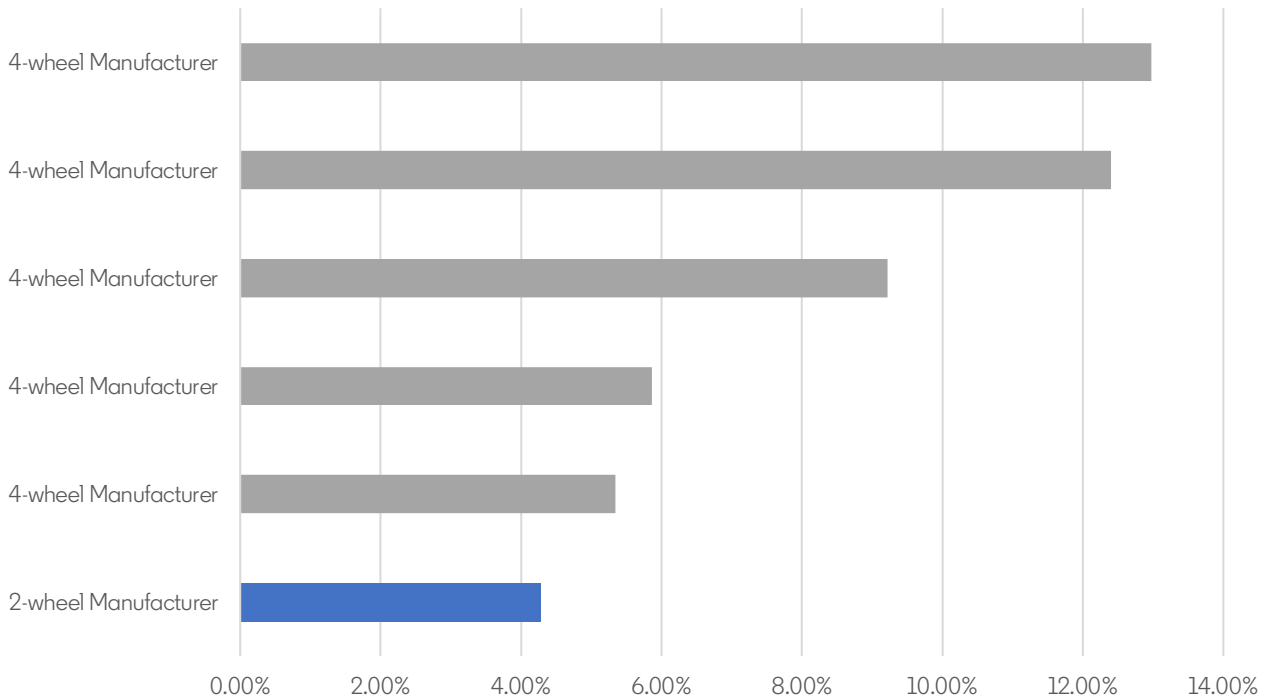
Source: Our World in Data based on International Energy Agency (IEA) and International Council on Clean Transportation (ICCT) 2018

Passenger transport is not just limited to electric cars. India, for example, has 210 million registered two-wheeler vehicles (motorcycles, scooters etc.) contributing to passenger emissions of which only 545K are electric. In contrast only 70M registered vehicles in India are four-wheelers and above categories (cars,

Accelerating the Transition to Electric Vehicles

buses etc.).¹ Seeing the increasing share of EV skilled employees at large two-wheeler manufacturers is a promising trend that policymakers and business leaders can and should continue to capitalize on.

Large automakers and the share of their workforce with ≥ 1 EV skill (India) in 2023



Source: LinkedIn Economic Graph

The start of an exciting but long journey

While the transition to EVs is clearly underway, and has strong momentum, it is important to recognize that EV-skilled workers make up a fraction of the automotive industry even in leading nations like Sweden, the UK, and Germany. It will take continued skill-development to ensure a timely green transition of our transportation sector. We are excited to share our fine-grained data through this report, and with other partners in the near future to enable a real-time look at this evolving landscape.

¹ Hindustan Times Auto Desk: [India has over 21 crore two-wheelers, nearly 7 crore four-wheelers registered](#)

Accelerating the Transition to Electric Vehicles

Methodology

1. This body of work represents the world seen through LinkedIn data, drawn from the anonymized and aggregated profile information of LinkedIn's 950+ million members around the world. As such, it is influenced by how members choose to use the platform, which can vary based on professional, social and regional culture, as well as overall site availability and accessibility. In publishing these insights from LinkedIn's Economic Graph, we want to provide accurate statistics while ensuring our members' privacy. As a result, all data show aggregated information for the corresponding period following strict data quality thresholds that prevent disclosing any information about specific individuals.
2. To select relevant countries for our analysis, we start by subsetting countries which make up ~80% of all automotive member profiles on LinkedIn and individually, have more than 1% of global automotive industry members profiles. Further, we only surface results for countries where at least 1K members are actively employed in the automotive industry. The selected list of countries is as follows:
 1. Brazil
 2. Canada
 3. France
 4. Germany
 5. India
 6. Italy
 7. Mexico
 8. Netherlands
 9. Poland
 10. Spain
 11. Sweden
 12. Turkey
 13. United Kingdom
 14. United States
 15. Note that we have excluded China from all aspects of this analysis. This is the [result of the de-ramp of the localized version of LinkedIn and launch of jobs app](#) which limits our confidence in insights derived from that data.
3. Skills are the main building blocks of the insights in this report. They are sourced from LinkedIn members (skills explicitly listed on member profiles, or inferred from other aspects of members' profiles, such as job titles, fields of study, etc.) or from job postings. Skill names are standardized by expert taxonomists into approximately 38,000 skills, categorized into 249 skill groups.
4. When discussing the EV Skilled Workforce in automotive or otherwise, we refer to the following skills from our Economic Graph skills taxonomy: 'Electric Vehicles', 'Battery Charger', 'Battery Electric Vehicle (BEV)', 'Battery Management Systems', 'Battery Testing', 'Hybrid Electric Vehicles', 'Electric Cars', 'Electric Motors', 'Electric Power', 'Electric Propulsion', 'Electric Transmission', 'Electric Utility', 'Batteries', 'Lithium-ion Batteries', 'Lithium Batteries', 'Nickel', 'Cobalt', 'Lithium', 'Manganese', 'Graphite', 'Automotive Electrical Systems', 'Automotive Design', 'Automotive Engineering', 'Automotive Technology', 'Automotive Electronics', 'Fuel Cells', 'Powertrain', 'Energy

Accelerating the Transition to Electric Vehicles

Efficiency', 'Charging', 'Environmental Compliance', 'Environmental Policy', 'Energy Policy', 'Smart Grid', 'Electricity Markets', 'Power Systems', 'Power Transmission', 'Power Generation', 'Power Distribution'.

5. To differentiate large automotive manufacturers from other automotive companies, we have relied on input from our partners at [IFO](#). We strive to provide the most accurate mappings and the pertinent sections may be refined over time to account for the way in which companies choose to represent themselves on our platform.
6. Data on EV car stock, sales etc. comes from the International Energy Agency's Global EV Outlook Report 2023 ([data explorer](#)).
7. Industry specific insights are derived primarily from company specified industry and the taxonomy for industry can be viewed in detail [here](#). Our industry codes v2 are designed to have [corresponding NAICS codes](#).
8. The LinkedIn Hiring Rate is the count of hires (LinkedIn members in each industry who added a new employer to their profile in the same month the new job began), divided by the total number of LinkedIn members in the US. By only analyzing the timeliest data, we can make accurate month-to-month comparisons and account for any potential lags in members updating their profiles. This number is indexed to the average month in 2016 for each industry; for example, an index of 1.05 indicates a hiring rate that is 5% higher than the average month in 2016.