5 EV Charging Myths – Busted!

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Electric Vehicle ownership is on the rise – EVs are the darlings of green-minded consumers around the world and are increasingly viewed as a practical transportation option. But purchasing and operating an EV still raise eyebrows among ICE vehicle owners and even some self-styled environmentalists. While EVs become increasingly mainstream, a series of myths continue to pervade the public conversation:

Myth 1: EVs are not really green because they increase demand for energy generated by legacy fossil-fuel power plants

BUSTED: There's no denying that EVs are drawing increasing amounts of power from existing electrical supply grids. In the past, those grids were mostly supplied by power plants burning fossil fuels.   Today, the same national and local power grids draw from a mix of sources, including a growing proportion of renewable-based generation, making EVs much greener.

Today, in the U.S., 30% of power generation comes from renewable sources, By 2030, renewables will collectively surpass natural gas as the predominant source of generation. Across Europe, renewable power accounts for 35% of current generation; the Nordic countries lead the continent, today generating 77% from renewables.

Focusing on the EV charging process, the contribution of renewables is even greater. CPOs increasingly leverage smart energy management to incorporate energy from onsite renewables, especially solar panels, further reducing EV carbon footprint. Moreover, smart energy management can reduce demand on the grid by ensuring that EVs charge only during off-peak times. During peak times, charging can draw from a mix of local solar, onsite storage and even push power back to the grid using V2G (vehicle-to-grid) technology.

MYTH 2: EV drivers suffer from range anxiety

BUSTED: "Range anxiety" – worrying about your EV running out of power before reaching your destination – while not a relic of the past, no longer plagues EV drivers. Multiple models of modern EVs easily surpass 350 miles (583 km) on a single charge, with some models boasting ranges of 500-600 miles (833-1,000 km).

EV drivers can still face "charging anxiety" – concerns about finding an available, operational charger, on a network they can use. This type of anxiety is quieted by three factors: charge point status available from charging network apps, technologies that maximize EV charging network uptime, and the growth in available charging stations.

Mobile EV charging apps provide real-time data on charging station status, availability, connector type, charging speed and pricing. Some apps take a different approach, crowd-sourcing charging station feedback to help users plan trips and charging stops.

Today, in the U.S. there are 61,000 public EV charging stations and 64% of Americans live within two miles of a station. Moreover, public and private entities alike are investing to add new charging capacity. The U.S. *Bipartisan Infrastructure Law* (passed in 2021) allocates US$7.5 billion for EV charging infrastructure to support continued expansion. In the UK, the *Powering Up Britain* initiative and *The Rapid Charging Fund* promise to make EV charging reliable, ubiquitous and fast. Comparable programs and strategic investment in EV charging are occurring around the world: in China, the government aims to meet the charging needs of over 20 million cars by 2025.

Mitigating charging anxiety also occurs "behind the scenes", where charging management software work to optimize all operational aspects of EV charging. These advanced platforms maintain the stability and availability of charging networks to deliver a superior charging experience to EV owners and operators.

MYTH 3: As more people buy EVs, utilities won't be able to supply enough power to buildings or neighborhoods and homes for EV charging

BUSTED: A number of facts and factors combine to offset the growing load on the U.S. power grid from EV charging and debunk this myth:

- Fact – EV charging consumes less electricity than water heating and air conditioning.
- Fact – EV charging today consumes less than 1% of electricity generated in the U.S. and will account for no more than 5% by 2030.
- Off-peak Charging – EV charging can be programmed to occur at off-peak times (e.g., overnight), when grid loading and utility rates are lower. Public charging sites pursue these same economies by charging local storage batteries during off-peak times and supplementing or supplanting grid sources with solar and batteries during peak hours.
- Smart Energy Management – EV charging networks increasingly employ Smart Energy Management to balance their charging activity across grid and local sources, to optimize charging costs and reduce grid loading. In some regions, smart management is required by government regulators, as in the UK, Scotland and Wales.
- EV adoption is gradual – as more EVs hit the road, more generation capacity is reaching the grid, especially from renewable sources
- Grid Build-out – the rate of electric grid buildout in the U.S. and elsewhere is accelerating significantly due primarily to government initiatives. These programs aim to increase existing transmission capacity by 1-3% annually.

MYTH 4: EV total cost of ownership (TCO) is higher than for ICE vehicles

BUSTED: A decade ago, ICE vehicles were provably cheaper to own and operate than EVs. Market evolution and economies of scale have since leveled the playing field and today tilt the ground in favor of EVs.

Let's break down TCO to see how EVs and ICE vehicles really compare:

- **Power** – comparing the cost of fuel to fill conventional tanks vs. the cost electricity hands an easy win to electric vehicles – **more than 4X cheaper**:
  - **Fuel**: The cost of gasoline varies greatly by region and market. In the U.S, it's around $3.44 per gallon as of June 2024. ICE vehicles average about 25 miles per gallon, yielding approximately US$0.14/mile ($3.44/gallon ÷ 25 miles/gallon). For Europe during the same period, (including Russia and Belarus with fuel subsidies), gasoline averages US$6.44 per gallon, yielding US$0.26/mile.
  - **Electricity**: The cost of electricity also varies by locale; on average, the cost per kilowatt-hour (kWh) in the U.S. is US$0.13. EVs typically consume around 0.35 kWh per mile. Thus, the cost per mile is roughly $0.04 ($0.13/kWh * 0.3 kWh/mile). In Europe, cost per kWh is somewhat higher, averaging US$0.20/kWh, yielding US$0.06 per mile.

- **Acquisition Cost** – the cost to buy or lease an EV has fallen dramatically over the last decade but remains higher than ICE principally due to battery cost. As new battery technologies and manufacturing capacity comes on line, as new manufacturers (principally in Asia) enter the EV market, and as legacy OEMs shift production from ICEs to EVs, prices for the two competing technologies are slated to reach parity by the end of this decade or even sooner.

- **Maintenance** – EVs, with far fewer parts to break, have an undisputed maintenance advantage over ICE vehicles. One comparison highlights how EVs have an average of 15,000 components, vs. 30,000+ parts in an ICE vehicle. And because fewer EV components are actually moving parts, EVs boast a much longer MTBF (mean time between failures). Other factors that reduce maintenance cost and frequency for EVs are no need to change engine oil and filters, transmission fluid, fan belts and serpentines, and spark plugs; and use of advanced long-lived LI cells vs. lead-acid batteries in ICE vehicles.
- **Tax Breaks and Subsidies** – in this domain, EVs have an unfair advantage. State and regional governments continue to subsidize EV purchase with tax breaks and other incentives

MYTH 5: EVs are bad for the environment due to battery manufacturing and disposal

BUSTED: When EVs began entering the market, they were accompanied by dire predictions of energy-intensive and environmentally destructive battery manufacturing, and of landfills overflowing with EV batteries at the end of their useful lifetimes. On the supply side, LI batteries do require significant energy for material transport and manufacturing processes; however, EVs still use much less energy and generate fewer polluting emissions over their lifetimes than comparable ICE vehicles, by a factor of more than 2X.

At end of life for EVs themselves (typically 8-10 years), it turns out that EV batteries can have a “second life”. At a minimum, Lithium is too scarce, too valuable (and too polluting) to dump back into the environment. Instead, nearly all EV batteries get recycled. This recycling can either involve extraction of Li and other valuable elements from the EV cells for use in new batteries, or re-use of entire batteries as part of energy storage systems, as with Sparkion Second Life applications.