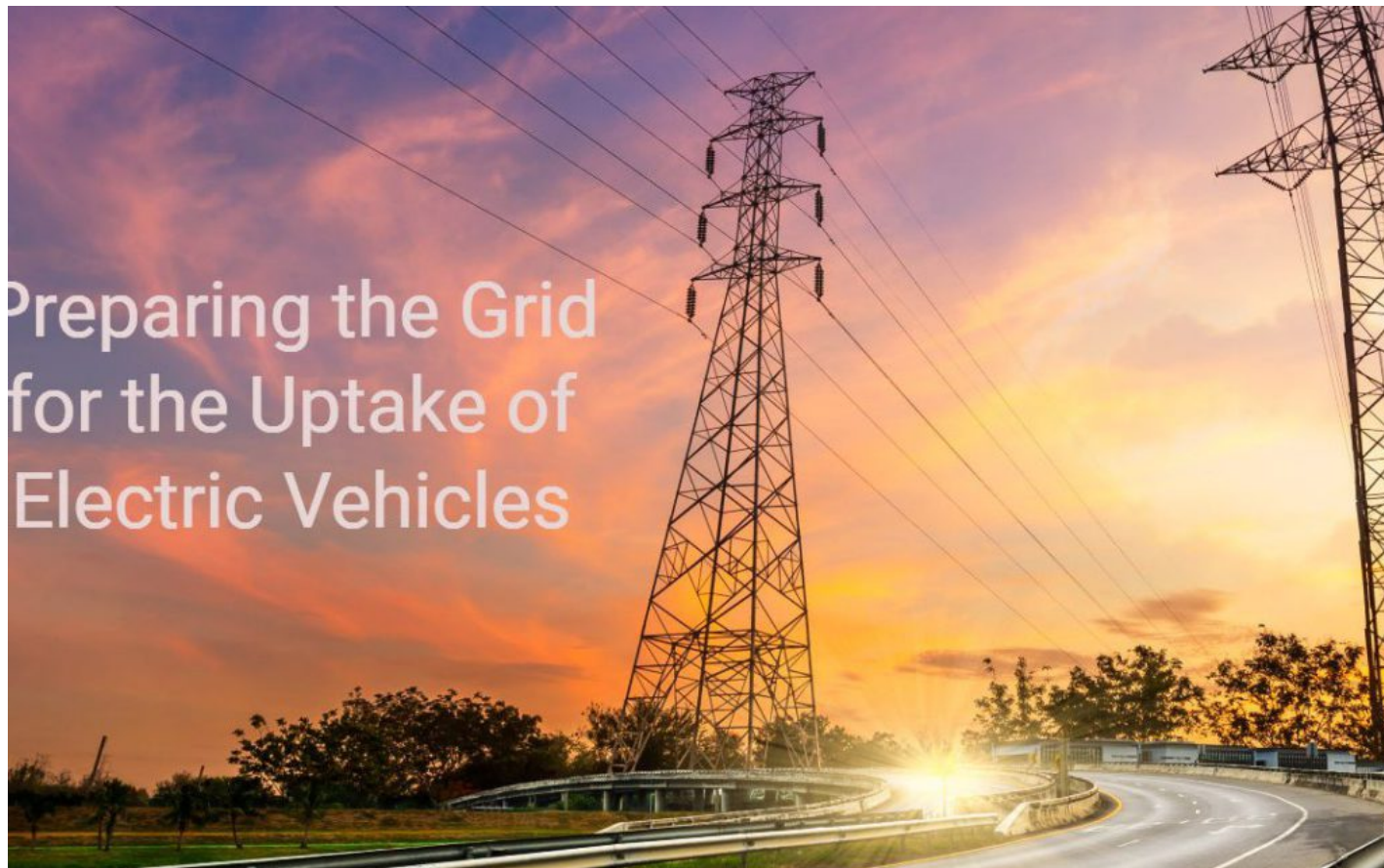


Research: Preparing The Grid For EVs

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New Research Finds Utilities Need to Prepare Their Networks for Mass EV Adoption Now to Avoid Unpredictable Grids

BRISBANE, AUSTRALIA, November 21, 2018 – The growing demand for energy driven from the uptake of electric vehicles (EVs) could lead to greater unpredictability in electrical grids unless utilities take a proactive approach to planning their future networks, according to a joint study from L.E.K. Consulting, a global management consulting firm, and Australian EV charging infrastructure company Tritium.

The study highlights statistics around sales of EVs which show that there is a 'clustering' effect, where some suburbs, streets, and locations have a higher proportion of EV ownership [\[1\]](#). This has the potential to overload local electricity infrastructure, especially the feeder lines (i.e. "poles and wires" down a street).

"There are significant opportunities for network owners, operators and energy retailers as EVs are one of the few growth drivers for many developed energy markets, and also enable the opportunity for utilities to build closer customer relationships," says Natasha Santha, principal at L.E.K. Consulting. "But utilities need to be proactive in planning for a future scenario of significant EV adoption, especially in a world where spending capex on additional infrastructure at the cost of the consumer is no longer a palatable response".

"The real challenge for utilities is managing the peak demand increase and greater unpredictability that comes with greater EV adoption," says Santha. "EV charging has an element of randomness that needs to be managed, this can stress local infrastructure and heighten the need for increased network investment". "The good news is that we have time to prepare in Australia. Given the expected pace of adoption, and time it will take to turn over the car parc, grid owners have sufficient time to prepare for the change."

While EV uptake in Australia is still in its infancy, it is growing, and networks need to prepare for this now. As the need for the deployment of public fast chargers is required in Australia, utilities will need to be ready to turn around new connections quickly."

Among other findings, the study found that:

- The expected increase in overall energy demand is relatively modest in the short to medium term. In 2017, the estimated electricity demand from all EVs was 54 TWh equating to just 0.3% of global electricity demand. With a predicted 125m EVs on the road in 2030, (for simplicity, assuming a similar level of battery energy efficiency as today), the overall EV share of energy demand would increase to only 6.3%.
- However, owning an EV will increase a household's electricity consumption by about 50% [\[2\]](#). If multiple houses on a single street decide to charge simultaneously, there may be insufficient capacity in the feeder lines to deliver the required level of power. For example, assuming utilities make no changes to their infrastructure and EV charging is unmanaged, and EVs owners mostly charge at the end of the traditional workday when they return home, overlaying the impact of EV charging on a local network (with 50% EV adoption) would drive peak demand up by c.30%.
- As the demand for EVs increases, there will be a growing requirement for charging infrastructure. The IEA estimates that by 2030 the number of charging stations required will exceed 130 million units, which is close to 30 times the current installed base.
- Further, the study found the development of high-power charging infrastructure may have a more manageable initial impact for network operators. High power chargers, up to 350kw each, are typically installed in a park or group of chargers. While these groups of high-power chargers equate to very large (1MW+) connections, the charger owners will deploy the appropriate infrastructure adjacent to the charging equipment at the time of installation.

The study outlined five measures utilities should consider, both to stabilise future grid behaviour and ensure the rise of electric vehicles maintains its pace:

1. **Design tariffs and demand response programs:** Utilities need to begin preparing incentive structures to manage residential chargers, such as time of use EV tariffs that can shift customer charging behaviour alleviating local feeder stress. They could glean lessons from South Australian and Queensland networks, which are trialling new tariffs to encourage households with electric hot water systems to heat them in off-peak periods.
2. **Utilise smart software:** Managed charging, uses software to schedule home charging throughout the night avoiding the risk of EV owners all plugging in during the evening peak, using lessons gleaned from such measures as air conditioning incentive programs.
3. **Improve grid information:** Provide clear and detailed information publicly to businesses and entrepreneurs looking to invest in and install public charging infrastructure. For example, PG&E a Californian utility has created an interactive mapping tool for network capacity highlighting the locations on their network where existing equipment has the capacity and is ready to be utilised for EV charging [\[3\]](#).
4. **Assess adjacent opportunities from charging infrastructure:** Utilities should begin to explore if there are other opportunities that arise from the deployment of charging infrastructure, such as stationary battery storage, to reduce grid augmentation costs and enable charger deployment in areas of the network that would otherwise be prohibitive.

5. **Trial, test, and work with charging manufacturers:** Collaboration and joint research will enable utilities to be at the forefront of emerging vehicle, charging, and grid integration technologies.

"Across the world we're beginning to see measures that will only further foster the uptake of EVs such as [IN MADRID, WHERE PETROL AND DIESEL-FUELLED CARS WILL BE BANNED](#) from driving through the city during the day and parking on the road in the city at any time from the end of November this year," said David Finn, Chief Executive Officer and co-founder, Tritium. "Governments all over the world are seeing the benefits of an e-mobility future and utilities have a tremendous opportunity to drive growth in their businesses – but they have to be prepared for it and that means putting the right infrastructure in place to manage an increase in energy demand."

You can download the full study [HERE](#).

Get in touch with Tritium [HERE](#)

About L.E.K. Consulting

L.E.K. Consulting is a global management consulting firm that uses deep industry expertise and rigorous analysis to help business leaders achieve practical results with real impact. We are uncompromising in our approach to helping clients consistently make better decisions, deliver improved business performance, and create greater shareholder returns. The firm advises and supports global companies that are leaders in their industries — including the largest private and public-sector organizations, private equity firms and emerging entrepreneurial businesses. Founded in 1983, L.E.K. employs more than 1,400 professionals across the Americas, Asia-Pacific and Europe. For more information, go to [WWW.LEK.COM](http://www.lek.com).

About Tritium

Brisbane-based Tritium is a technology company specialising in the design and manufacture of DC fast-charging solutions for electric vehicles (EV). Established in 2001, to provide power-electronic systems and battery energy-storage applications, it has, since the launch of its first DC fast charger in 2014, become one of Australia's fastest-growing companies. In just four years Tritium has developed into a leading global DC fast charging supplier, with installations in 26 countries, and it currently holds around 50% of the Norwegian market and around 15% of the wider European market for 50kW fast chargers. In 2016, the Queensland Government invested AU\$2.5m in Tritium – the first company to receive investment under a Business Development Fund scheme established to encourage innovative business – and it invested a further AU\$2.5m in 2018. Customers include Charge.net.nz, EDF Lumins, Fortum, Grønn Kontakt, IONITY, Proterra and Stromnetz. Tritium's HQ and main manufacturing plant is in Brisbane, with additional sales and manufacturing facilities in its two key markets of Europe and the US. [TRIDIUM.COM.AU](http://tridium.com.au)

[1] [HTTP://WWW.NATURE.COM/ARTICLES/S41560-017-0074-Z](http://www.nature.com/articles/S41560-017-0074-Z)

[2] Assumes average household using 5,700 kWh of electricity per year, and the average EV consumers c 3000 kWh electricity per year driving c. 15,000km per year

[3] Site information for electric vehicle Direct Current Fast Chargers, PG&E ([HTTPS://WWW.PGE.COM/EN_US/ABOUT-PGE/ENVIRONMENT/WHAT-WE-ARE-DOING/ELECTRIC-PROGRAM-INVESTMENT-CHARGE/DIRECT-CURRENT-ELECTRIC-VEHICLE-FAST-CHARGERS.PAGE](https://www.pge.com/en_us/about-pge/environment/what-we-are-doing/electric-program-investment-charge/direct-current-electric-vehicle-fast-chargers.page))