

EV Charger Establishment and Expansion in Queensland Status Analysis and Tender Participation

Electric vehicles (EVs) as an environmentally friendly alternative to petrol cars have become popular both overseas and in Australia. The practical aspects of day to day use can still present some challenges especially regarding the underdeveloped charging infrastructure. To improve it or to build an EV charging network, suitable EV chargers have to be available. Today the driving range of an EV ranges from 100 up to 150 km and the car has to be charged every 50 to 100 km. However, automobile companies are developing EVs with increasing battery capacities. This trend of development requires different EV chargers to reduce the charging time. For the future DC chargers with high charging power and voltage range are needed.

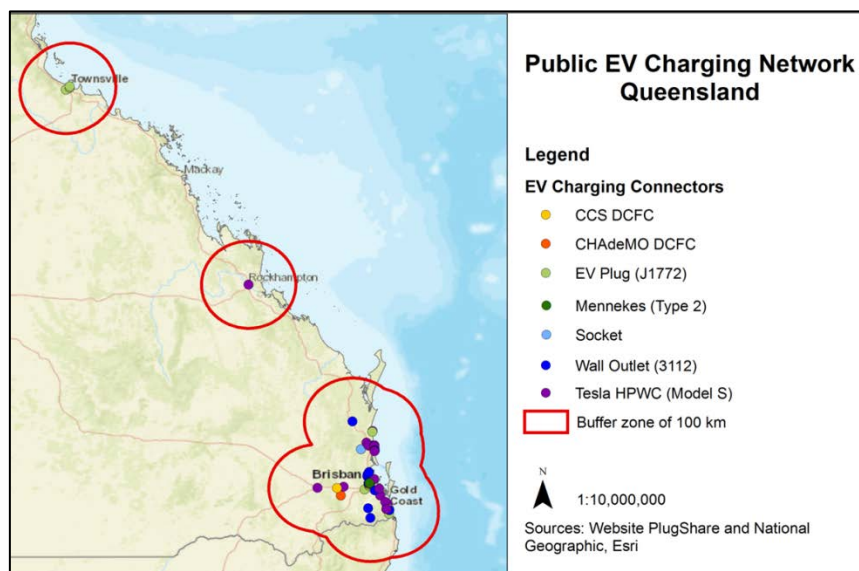
Delta Energy Systems provides EV infrastructure, which should be established and expand in Australia. Regarding to a current electric vehicle charging infrastructure tender process in Queensland, it is appropriate to use Queensland as a test area.

The main objective of this research project is to explore the EV charger market for the establishment of the Delta's EV DC ultra-fast charger and DC wallbox charger as well as the expansion of Delta's EV DC quick charger and AC mini charger in Queensland.

EV charger	Charging connectors	Output voltage range, max. charge current and power	Level
EV DC ultra-fast charger	CCS up to 120 kW CHAdeMO up to 62.6 kW - Upgradeable to support up to 120 kW Type 2 plug 43 kW Type 2 socket 22 kW	170 – 500 V, 300 A max, 120 kW max 170 – 500 V, 300 A max, 120 kW max 3 x 63 A max, 43 kW max 3 x 32 A max, 22 kW max	4
EV DC quick charger	IEC 62196 CCS Combo 2 Type 2 CHAdeMO/IEC 61851/SAE J1772	200-500 V, 125 A max, 50kW max 50-500 V, 125 A max, 50 kW max	3
EV DC wallbox charger	SAE or IEC CCS CHAdeMO	200 – 500 V, 62 A max, 25 kW max 50 – 500 V, 62 A max, 25 kW max	2
EV AC mini charger	IEC 62196-2 Type 2 compliant socket	208-240V, 30 A or 40 A max, 7.2 kW, 9.6 kW max	2

There are two different ways to do it: quantitative and qualitative research. For the quantitative research, a status analysis of the EV chargers market in Queensland will be done. This analysis provides data of the amount of charging stations, the charging connectors and their locations. The qualitative market research can be done within a tender process. Delta Energy systems offers four of their chargers to Ergon Energy Corporation Limited (Ergon Energy), a Distribution Network Service Provider (DNSP) in Queensland. The participation of the tender process provides information about the suitability of the EV chargers in Queensland.

In Queensland, 54 public charging stations with 80 connectors are available. The connectors are divided into seven different connector types. The connectors occurring most often are Tesla HPWC outlets, EV plug (J1772) and wall outlets. The connector types Mennekes (Type 2), CCS, CHAdeMO and socket cover only a small share of the total amount. Most of the charging



locations are located on the coast of Queensland. The already existing EV charging location basis and the distribution along the coast can be seen as a potential to establish and expand EV charging stations. According to a 100 km buffer around the charging locations, there is one big conurbation of EV charging locations

and two much smaller charging location areas. These areas are not connected with each other, which shows that an EV charging network is still lacking. Furthermore, the current charging infrastructure in Queensland consists of only three DC fast chargers. For a roll out of an EV charging network, it will be necessary to install more DC fast or rather ultra-fast chargers. The huge EV charging network potential on the coast of Queensland is backed up by the electricity network, which is almost congruent with highways on the coast side and also is an important requirement to install EV charging infrastructure.

The results of the tender participation are an important added value for the market research. Postponed deadlines of the process steps limited us from getting any information of the tender participation. The tender participation shows how difficult it could be to handle a relatively new issue in Australia. It is the first EV infrastructure tender for Ergon Energy. Due to this, it is difficult to estimate the number of contenders and define a clear concept for the tender process and a further business model.

The market research shows a huge potential, but also some formal difficulties to establish and expand Deltas EV chargers. Despite these formal difficulties of the tender process, it is efficient and beneficial to introduce EV chargers into the EV infrastructure market of Queensland at this time. Building an EV charging network which meets current standards and also focuses on future requirements, especially the EV DC chargers of Delta Energy Systems, are definitely very meaningful to establish or expand.