* Balance – supply, demand, and storage
* Reduce peaks in demand from EV charging
* Predict optimum charging and discharging times for EV’S
* Allows discharging back to the grid and dynamic storage of excess capacity (from renewables)
* We have constructed a platform to allow for end to end communication for all types of EV customers

Problem statement:

With the anticipated increase in adoption of electric vehicles, and particularly considering the government directive to end all fossil fuelled car sales by, at the latest, 2040. The existing electrical grid will need to be sufficiently prepared and efficient to take the shift from fossil fuelled propulsion to electrical.

This increase in electrical vehicles will certainly increase load across the whole grid, and with a view to reducing overall reliance on fossil fuels and increasing the renewable share. We need to become smarter in managing energy demand.

Energy drawdown will change from the current model of drivers refuelling cars at service stations to a model where nearly all refuelling will be electrical at home or at centralised depots.

This will be likely to have effects similar to the ‘insert name of half-time cup of tea’ effect, for short periods of time pumped storage can be released to relieve stress on the grid and over longer period, gas fired generation can be brought online to satisfy demand. These are relatively expensive interventions and ideally should be kept to a minimum.

The greater proliferation of electric vehicles will mean that not only will there be a greater demand for electricity, but also a great distributed battery to store energy, future demands peaks could therefore be handled from the discharge of electric vehicle batteries rather than pumped storage as a first resort. This same approach would also allow large scale storage of excess capacity from renewable energy (wind/tidal/solar)

The power circuitry of electrical vehicles can adjust to fast or trickle charging, and a vehicle can charge to full in as little as (x) hours(reference)

This means that being able to choose when a vehicle is recharged can play an active role in reducing volatility of demand, flatten the curve and increase efficiency of the network.

Lifecycle is a system to manage the distributed storage, charge and discharge of the electrical network. Taking advantage of the unique characteristics of electrical vehicles.

Lifecycle predicts future electrical demand on a grid level and manages the charging and discharging cycles of tethered electrical vehicles to maximise utilisation, reduce cost and store excess energy.

Cars generally have a marginal utilisation of 5-10% and we will expect large spikes in electrical demand after the working day when people return home and want to charge their vehicle, however there isn’t necessarily a need to have that vehicle fully charged until the next day. The Lifeycle M2M API allows cars to talk to the network and determine what times, and what amperages are suitable to recharge the vehicle for the next needed use. It also determines whether the vehicle should feed its battery capacity back into the grid to satisfy an increase in demand.

Car journey histories are profiled probabilistically to determine safe ranges of discharge, so owners won’t be left with flat batteries when they need them while also being able to reduce overall energy costs using the feed-in tariff.

Lifecycle also matches excess generation, funnelling it into EV batteries, modelled on vehicles which later can feed that energy back into the grid.

Overall:

* Reduce stress on supply by smoothing grid loads for charging of vehicles, and to that extension any time-independent electricals
* Increase storage by selectively charging network battery capacity
* Respond to demand by discharging stored capacity to the places it’s needed the most.

Shift to electrical vehicles and cutoff to switch to EVs by 2040 electricity