

# 2023 Nudgeathon

## University of New South Wales (UNSW)

### *Engaging Households with Vehicle-to-Grid (V-2-G) Technologies*

#### Background

Demand for electric vehicles in Australia far exceeds the supply, with sales in 2022 close to doubling that of 2021's sales (Visontay, E. 2023). Forecasts predict that by 2050, electricity will fuel 92% to 99% of all transportation vehicles, and it is Australia's ambition to ensure that clean and renewable sources of energy constitute such fuel. Vehicle-to-Grid (V2G) technologies assist in this transition through its bi-directional capabilities, allowing individuals to take advantage of the energy market by selling stored energy back into the grid. The capabilities and value of this technology, however, have been overlooked due to three key barriers. As more and more Australians engage in electric vehicles, our intervention seeks to address these barriers and nudge Australians in becoming aware of V2G, understanding V2G and adopting V2G within their homes.

#### Challenges

##### **Lack of Awareness**

A key barrier to the uptake of V2G is the lack of awareness of the Australian public with this technology. V2G technologies and services are very much in their infancy in the Australian market (Australian Renewable Energy Agency 2023), but with EV's projected to make up 92-99% of all vehicles by 2050 (AEMO 2022), there is huge potential for growth in this technology. To effectively raise awareness and establish potential V2G benefits, we propose various marketing nudges that leverage V2G's proximity to EV's and the benefits it could have for the energy market.



##### **Perception of risks**

Kahneman and Tversky's prospect theory identifies the phenomenon of loss aversion, which manifests itself in the general population through avoidance of potential risks. Regarding V2G, research has identified perceived risks regarding vehicle range, scheduling of charging and battery degradation. To communicate the validity of these concerns and weigh them against potential benefits, our solution focuses on an app that uses personalized insights, reiterated information, and contrast effects to put these issues into perspective. The app could also be utilized to engage with V2G users by incorporating feedback from V2G trials, smoothing the transition to V2G.



##### **Financial concern**

Significant concerns are often raised regarding the upfront costs associated with the purchase and installation of a V2G smart charger. We propose the use of scheduled payment plans to transfer present costs to future periods, which may be more appealing due to hyperbolic discounting.



## Solutions

### Marketing Nudges to raise awareness

- Communicate potential savings on electricity bills  
This intervention could aim to build upon the “Better Bills” initiative of BETA, by sending reminders and eliciting social comparison to motivate action.
- Advertising at public charging stations and using QR codes to link further information, stickers on cars  
“Be rewarded by contributing to our grid”; develop system 1 association between EV and V2G, draw upon a sense of social responsibility and utilize positive framing
- partnering with EV sales  
Ultimately a successful V2G rollout will establish its’ status as a complement to EVs, further driving adoption via the bandwagon effect and status quo bias

### Mobile Application

To dispel perceived risks, communicate personal benefits, and incorporate V2G trial feedback, we propose the use of a mobile application targeted to EV owners. This application could be promoted via the aforementioned awareness nudges, as a way to “realise how **you** can benefit from V2G **today**”. The app could potentially connect to real world data from users’ EV battery, or simply display patterns for a typical user. This ultimately aims to demonstrate the feasibility of V2G to the individual.

To address perceptions of accelerated battery degradation, the app could display real time indicators and weekly reports of battery health, and communicate the financial gains that could be realised through V2G before the battery degrades. This could reframe battery degradation as a possibility for financial gain, as opposed to an unnecessary risk.

For concerns regarding range and scheduling anxiety, it is important to note that EV users typically use single digit proportions of their battery capacity per day. This cognitive dissonance may be effectively addressed via visualisations that employ the contrast effect. The usage of an app format allows for the use of notifications to ingrain this knowledge via the reiteration effect.

Finally, the app could incorporate V2G trial feedback to ensure a seamless transition from awareness to adoption of this technology. Responses from V2G trial participants demonstrate desires for clear communication of their current battery charge, when their vehicle is being discharged, and the ability to set minimum charge limits for their vehicle. An app provides a platform both for the communication and implementation of feedback, as V2G becomes more widely available.

### Scheduled payment plans

Hyperbolic discounting captures our tendency to exhibit time inconsistent preferences, culminating in the form of a “present bias”. This makes the large upfront costs associated with a V2G smart charger extremely daunting. Finally, we propose the use of scheduled payment plans as an alternative, which may be more appealing as they better accommodate these consumer preferences.

