* The chargers delivered through the program range from 22kW to 150kW.
* The 150kW rapid chargers are able to charge most EV models to 80% in about 15 minutes.
* A 22kW charger delivers enough charge over one hour to replenish 120km of range in your EV.
* Today’s EV models have enough charge power to meet the average Australian’s driving needs for over a week – and this technology is only getting better.
* About 80% of EV owners globally charge their vehicle at home.
* You do not need charging infrastructure at home to power your ZEV – most models can charge from a standard power outlet.

Feedback: HELP FEATURE, to develop stations in areas lacking in infrastructure, feedback can be used address to pain points.

<https://www.evchargingmap.com.au/australian-capital-territory/canberra>

# GOVHACK 2023

## Problem Statement:

As part of the ACT's commitment to zero-emission vehicles, the government has set a target to expand the public charging network to 180 stations by 2025. To achieve this goal, it is crucial to strategically determine where the demand for charging infrastructure is greatest across the territory. Additionally, there is a need to evaluate the effectiveness of public EV chargers in Canberra while considering diverse user needs, charging speeds, and user behaviours.

The challenge lies in assessing the optimal distribution of charging stations to ensure convenient access for all EV owners, including those without home charging options like apartment residents, renters, and tourists. Furthermore, the varying charging speeds and types (fast vs. slow) must be considered to cater to the diverse needs of EV drivers.

While the ACT government possesses EV registration data, understanding driver habits and identifying the most suitable locations for different types of charging stations requires additional data-driven insights. The problem encompasses the following key aspects:

1. Charging Station Distribution Strategy: Determine how to strategically distribute the 180 charging stations across the ACT to maximize accessibility, efficiency, and coverage. This involves identifying areas with high EV ownership, areas with limited home charging options, popular tourist destinations, and transportation hubs.

2. Charger Effectiveness Evaluation: Assess the utilization and effectiveness of existing public EV chargers to ensure they align with user needs and patterns. This involves understanding user behavior, peak charging times, and charging duration to optimize charging station locations and types.

3. Charging Speed Considerations: Design a charging infrastructure that strikes a balance between fast chargers and slow chargers. This involves understanding the trade-offs between charging speed, cost, and user convenience.

While there are any other factors such as long-term planning for continuous of EV adoption beyond 2025 and further stylise and implement data-driven decision making models to better analyse and visualize traffic patterns, demographic info and EV registration which we might require looking into, it is something we can as a team and/or the government to focus on for growth and update in the near future.

## Project Description

*Bringing the forefront of accessible and incentive focused electric vehicle promotion and usage for environmental and sustainability*

CanCharge is an informative and interactive mobile application which seeks to promote and increase the usage of electric vehicles (EVs) amongst Australians by first taking small steps by focusing on Australian Capital Territory. It acts as the bridge between the government and the public to see the changes to the usage of EVs within the territory and bring about initiatives through user information and records provided within the application.

Enter in your destination location and plan on your trip before the battery runs out

Track and locate areas close to you and/or your destination to re-charge your EVs and allow the government to answer your queries you might have regarding the EVs

We are passionate about backing the Government’s aim of pushing EVs to the forefront especially focus on zero-emission vehicles to help our environment and therefore ourselves. We want to promote the accessibility of these EVs so we as Australians can take steps towards making the necessary changes, we require to help our environment and bio-systems.

## Our Mission

At CANcharge, our mission is to pave the way for a more sustainable future by connecting electric vehicle (EV) users with the information they need to make informed choices and reduce carbon emissions. We're dedicated to providing a seamless and user-friendly platform that empowers EV owners and enthusiasts with real-time insights, valuable resources, and a community-driven approach to fostering positive environmental change.

Government Access and Analysis: Our dedication to driving change extends beyond individual users. Our app's webpage provides the government with secure access to in-depth analysis of user inputs and records. By harnessing this valuable data, the government gains insights into charging behavior, user preferences, and charging station utilization. This collaborative approach allows policymakers to make informed decisions that shape the city's charging infrastructure and align with the broader goal of achieving zero-emission transportation.

Together, we're building a bridge between technology, community, and sustainability. Join us on this exciting journey towards a cleaner, greener world, one electric charge at a time.

## Goals

Our goals for the app

* Create an application with a visualisation platform pinpointing all the EV charging stations
* Interconnect user and government through feedback and user input functionalities
* Generate a web page to map and present user input analysis and feedback answers for the government to access

## Data Story

Data Story: Enhancing Electric Vehicle Charging Infrastructure in the Australian Capital Territory

The Australian Capital Territory (ACT) envisions a future of zero-emission vehicles and has set a target to expand the public charging network to 180 stations by 2025. To achieve this ambitious goal, it is imperative to strategically allocate charging stations across the territory, ensuring optimal accessibility and usability for all electric vehicle (EV) owners. Let's dive into the data story that underlines the decision-making process and index system employed to target areas requiring more EV charging stations.

Act 1: The Challenge and Goals

Our story begins with the challenge: How can the ACT government determine the best locations to deploy additional EV charging stations to accommodate the growing number of electric vehicles on Canberra's roads? The primary goal is to create a data-driven index system that considers key factors, such as population density, transportation hubs, and charging station distribution.

Act 2: Data Gathering and Preparation

To embark on this journey, we gathered relevant datasets that form the foundation of our analysis:

- Electric vehicle registration data

- Geospatial data containing population density and transportation hubs

- Existing charging station locations

These datasets serve as puzzle pieces that, when combined, paint a comprehensive picture of the current EV landscape in the ACT.

Act 3: Developing the EV Charging Infrastructure Index

In Act 3, we introduce the concept of the EV Charging Infrastructure Index (EVCI). This index serves as a guiding star, indicating areas where the demand for charging stations is most critical. To calculate EVCI, we consider two critical components:

1. Vehicle Density Score (VDS): Calculated as the number of electric vehicles per square kilometer.

2. Charging Station Density Score (CSDS): Calculated as the number of charging stations per square kilometer.

The EVCI is a harmonious blend of VDS and CSDS, providing a single metric that quantifies the relative need for charging stations in different areas.

Act 4: Index Visualization and Insights

Now, we unveil the results of our analysis through compelling visualizations. A heatmap overlays EVCI scores on a map of the ACT, highlighting regions with high and low EVCI values. The heatmap serves as a compass, directing attention to areas where action is most needed.

Act 5: Strategic Deployment

Armed with the insights gained from the EVCI, the ACT government can strategically deploy charging stations to areas with high EVCI scores. These areas might include bustling city centers, residential neighborhoods with limited home charging options, and transportation hubs that cater to both locals and tourists.

## Presentation Script

Pitch Script for CANcharge: Driving a Sustainable Future Together

[Opening]

How can we move towards a more sustainable and environmentally conscious future in the next five to ten years? The answer lies in our innovative approach to electric vehicles and charging infrastructure, focusing on the Australian Capital Territory (ACT) as a model for change.

[Problem Statement]

Across Australia, individuals are queuing at charging stations during peak hours, facing insufficient availability. The disparity in electric chargers presents a major hurdle in our journey towards sustainable transportation, essentially acting as an obstacle to the fast-growing EV registrations within Australia.

[Dataset]

Now, let's dive into the heart of the issue. The dataset provided by the ACT government offers crucial insights into the growth of electric vehicles in the region, revealing the rising adoption trend in recent years. At the same time, we've identified a critical shortage of charging stations within the ACT, with varying capacities between slow and fast chargers ranging between 22kW to 150kW. Using the data, we were able to generate an EV Charging Infrastructure Index considering the density of EVs, charging stations and the capabilities of the charger meaning whether it is fast or slow.

* The chargers delivered through the program range from 22kW to 150kW.
* The 150kW rapid chargers are able to charge most EV models to 80% in about 15 minutes.
* A 22kW charger delivers enough charge over one hour to replenish 120km of range in your EV.
* Today’s EV models have enough charge power to meet the average Australian’s driving needs for over a week – and this technology is only getting better.
* About 80% of EV owners globally charge their vehicle at home.
* You do not need charging infrastructure at home to power your ZEV – most models can charge from a standard power outlet.

[Solution: CANcharge - The Catalyst for Change]

Introducing CANcharge, a web application and government-exclusive dashboard that transforms the way we approach EV charging infrastructure. CANcharge's main goal? Empower users and governments alike to make informed decisions for a cleaner, greener tomorrow.

Our key features include:

1. Login and Signup Page:

* Provides a personalized user sign-up page so that the account can retain information about the user.
* Add a car option: Which can provide better determination of charging stations and EV’s.
* Addition of Car Model and Brand which helps the app to determine the compatibility of the charging station with the particular car.

For example, if the app knows the brand and model, it can inform the charging stations that can give fast charging for the car, and in the car profile, it can also indicate how much energy is left and how far the car can still travel (to reduce range anxiety).

Note: The data acquired by the programme may also be utilized by the government to build data sets indicating which brand and car are being used the most, as well as to compare the available charging stations and their kilowatt power to it.

2. Home Pages and Menu:

* The home page of the app is going to be like google maps where the user can just plan a trip or his/her journey.
* Have a basic feature of navigation, gps and traffic.
* Menu Bar is going to be accessible on a homepage which has 2 important pages: Information and Help Page.

3. Information and Home Page:

* Information page: The information is the pages of news updates, where the user can know about the new information regarding Ev’s, or any of the big companies releasing a new model or product.

- This will help to make users interested in the ongoing changes in the EV industry and become engrossed with the data.

* Help Page: The help pages are going to be the bridge between government and the user. Here if our user wants general app help, we have a Help page dedicated with answers on app issues. Whereas the Report a problem will help the user to report a dedicated problem which can be faced by many other users, and government can act on the issue faced.

4. Car Profile:

* Car profile is going to be the get-go of the user to see their car’s battery charge and distance left till the charge completely depletes.
* It also shows some of the information that would be required by the user such as Charging cycles and last charged (time), it also shows basic account setting of the user.

5. Explore Page:

* The explore page delivers real-time information of your location and finds the nearest charging station. It also shows some of the important specifications of that charging station such as Popularity (Used by many users and they recommend it), Fast or slow charging according to car profile, price and grid.
* It also has a search functionality which shows all the nearby charging stations, and the user can plan their joruney from their own location.
* Some important feature added to the explore page are:

-Available chargers: Number of chargers

- Wait time: This tells how much time it would take the user to charge the car up to full

- Availability: This helps the user to see if the charger is available for use (Green Mark), and chargers which are still being used by other users (Red Mark).

6. Updates & Community Building:

* Stay informed with the latest EV news and government initiatives through the updates page.
* Our proposed "Buddies" feature fosters community trust and understanding by enabling sharing of home charging stations among peers, promoting collaborative EV adoption.

[Government Access: A Tool for Change]

But we're not stopping there. Our government-exclusive dashboard complements the app by providing insights from user inputs and analysis of number of EVs within the state popular vehicle models in need of charging stations. This arms policymakers with the information they need to implement strategic charging station placements across the territory.

[Future Enhancements and Collaboration]

As we move forward, we envision extending CANcharge's capabilities. By collaborating with the government, we can fine-tune our model to incorporate factors such as grid capacity and demand response programs. This ensures charging stations are not only strategically placed but also integrated harmoniously with the existing grid infrastructure.

[Conclusion]

In conclusion, CANcharge is not just an app; it's a movement towards a cleaner, more sustainable future. By empowering users, fostering government collaboration, and incorporating cutting-edge solutions, we're turning the challenge of inadequate charging infrastructure into an opportunity for positive change. Together, let's drive towards a greener horizon, one electric charge at a time. Thank you.

### Draft

Problem statement – 100 words

While global warming and climate change has become a core issue the world has joined hands on to eradicate, we as Australians need to focus on how we can reduce our carbon emissions within the next decade and with growing technological use, it is efficient and smart to integrate technological solutions to inform, incentivize and measure the changes to our environment.

Australian Capital Territory is with its fast-growing EV user population, there is a huge disparity in the number of charging stations. It is unsurprising to see articles

Factors we have considered using the data set – 100 words

Major functionalities we bring into the app – 100 words

Further suggestions – 100 words

For future endeavors with extending the project capabilities, we intend to provide the government the tools necessary to understand the EVs growth and placements of charging stations it is important for them to know what the target demographics are in the app and therefore the facilities so they can analyze what demographic groups they are unable to target this way they can implement more user centric approaches to their solutions through the app’s data.

It is important to focus on the relationship between grid vs demand/user unlike how we have done so, so far with this app where we have looked specifically at the relationship between the government and the user it is also important to factor in how the demand falls in relation to grid capacity. While we have provided four to five factors as a base to generate an index to calculate the ideal areas for placing new charging stations, the project can extend to the point where the index takes in the grid capacity assessment in which collaboration between the utility providers and energy experts to identify areas with sufficient grid capacity to handle additional EV charging demand or even demand response programs in which government can allow charging stations to adjust their charging rates based on the grid’s load so balancing electricity consumption during peak times. Focusing on grid capacity, the extensive resources required, finances as well as the weight times such as off-peak/on-peak can extend and improve the model framework on where to place the EV charging stations efficiently.

These suggestions extend the planning and operation phase to a more inclusive and sustainable approach which the government should look into. We as responsible citizens seek to bring change, and drive Australians towards change through environmental measures.

- Further suggestions

- Planning operation

- Grid vs Demand

- weight time

## Datasets and References

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