Service Innovation Project

The Future of Mobile E-Charging

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Problem Statement

As the market of e-cars is growing at a fast rate, there are currently a number of challenges related to accessibility and availability of e-charging infrastructures that need to be addressed.

Scenario 2020

1 battery full charge lasts between 250 and 350km. On average people in Switzerland travel 40km/day

Most e-car users charge their car once a day so to have 100% charged battery

There are currently two systems to charge e-cars: slow charging systems (private) and fast charging systems (public)

There are currently 27’000 e-cars in Switzerland (0.6% of population)

Not all users have the chance to install a charging station at home

Opportunity Area

Creating a service which uses mobility for e-charging, to bring e-loading for cars close to the customer, and not the customer to the charger.

The goal is to save time and energy for the customer so he does not have to think about when and where their e-car should be charged.

Service Concept

Cavin – The Mobile & Autonomous E-Car Charging System

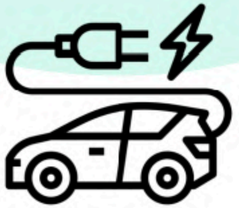
Scenario 2040

Artificial Intelligence and increased use of robots

Sharing economy: moving away from ownership of goods

Electricity will be mainly produced by renewable energy sources

Oil as an increasingly scarce source; rising oil prices



High demand for electric cars

Key User's Wants & Needs

Does not want to be bothered with charging his car

Wants convenient e-charging while doing other things meanwhile

Wants to partake in a responsible use of resources

Wants to be able to drive far distances without fear of running out of energy

Wants no maintanance of e-chaging system and user-friendly customer support

Service Concept Description

What

- Mobile e-charging service Cavin whose mobility is solar-powered
- Autonomous robot Cavin (AI, GPS, sensors)
- Cavin app (service request, charging time, cost overview)
- Home base (storage and charging of Cavin and charging units)

How

- Cavin senses e-cars low on battery
- Via Cavin app sends a charging request to owner
- Owner can set the charging time/deny request/order charging
- Charging approval: Cavin moves to e-car and connects the charging unit
- After completed charging Cavin unplugs charging unit and returns it to home base

Service Features

Fast charging, long lasting battery performance

Cavin is available all over Switzerland and bordering countries

Cavin comes to the user and not the user to Cavin

Cavin sensors low energy e-cars and sends charging requests

Maintenance for e-charging and easy customer support

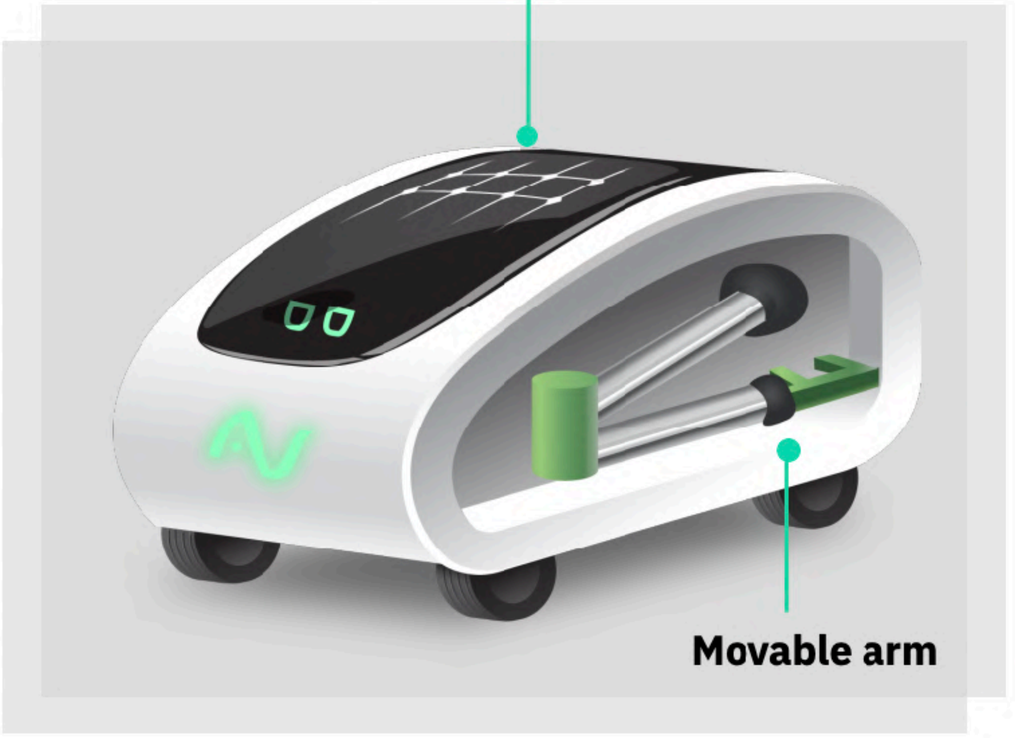
No need for home instalment of e-charging device

Cavin Device – Technologies & Properties

Key Properties

Autonomous robot device Cavin

Charging unit, home base and app



Technologies

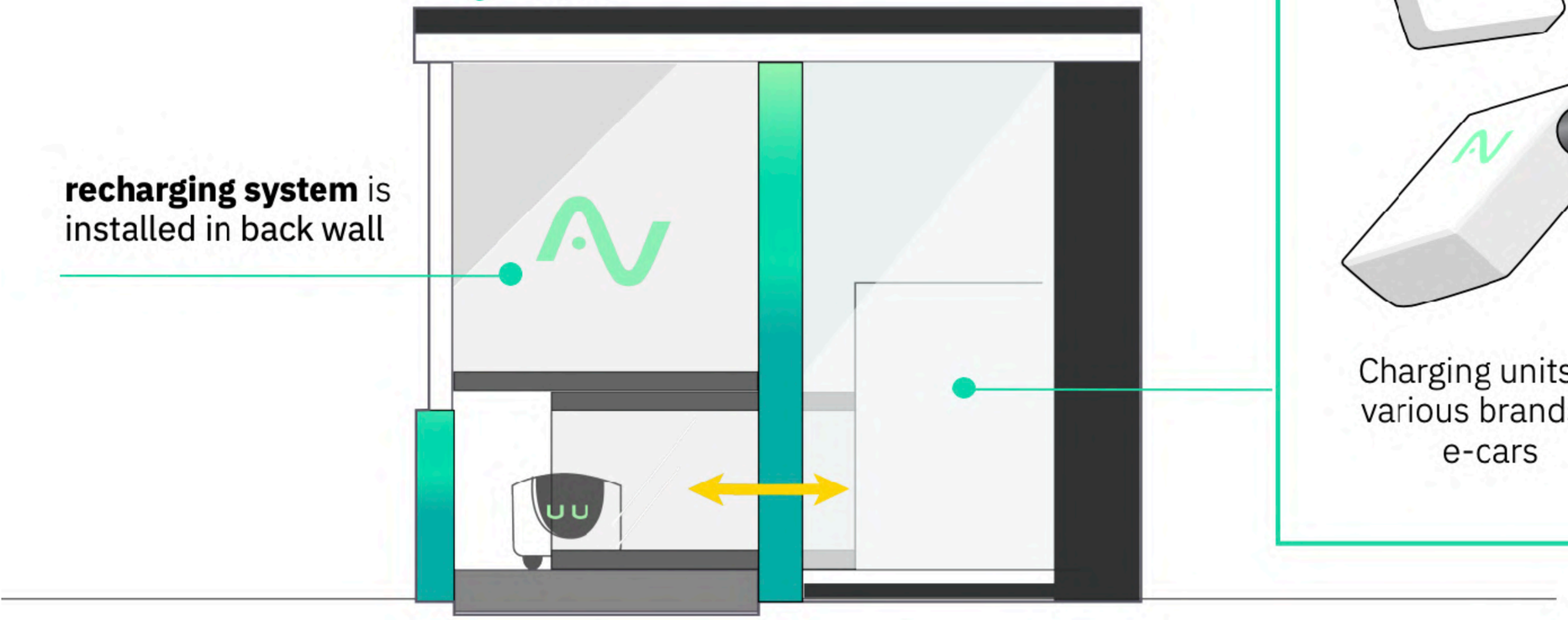
Navigational system/GPS

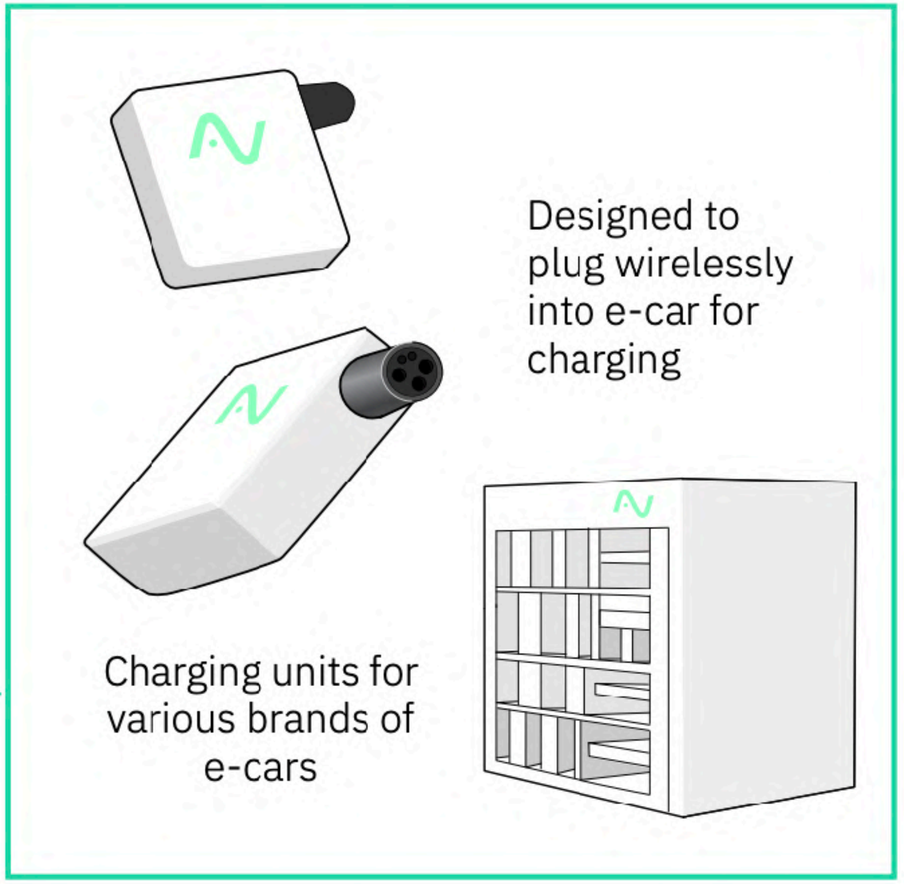
High-technology sensor

AI software

Solar panel
is used to recharge
Cavin

recharging system is
installed in back wall



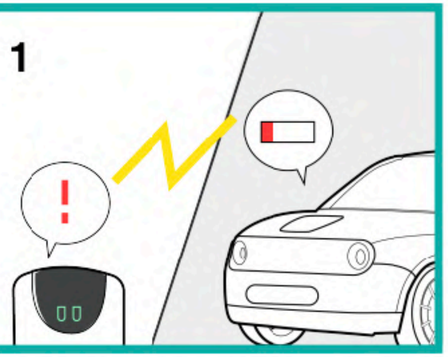


Designed to
plug wirelessly
into e-car for
charging

Charging units for
various brands of
e-cars

Automatic door
allows only robots to in

1



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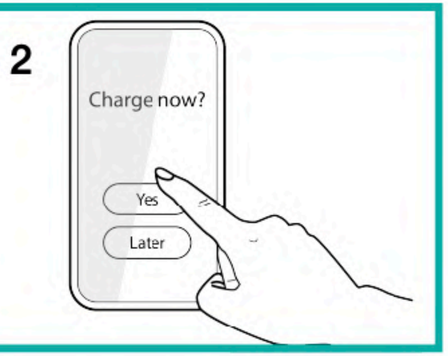

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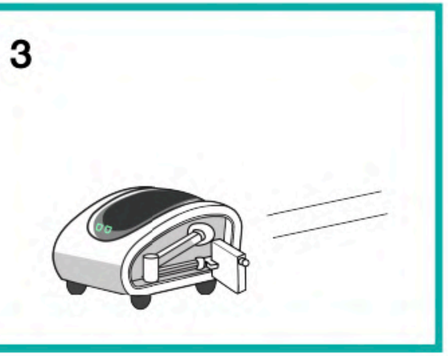

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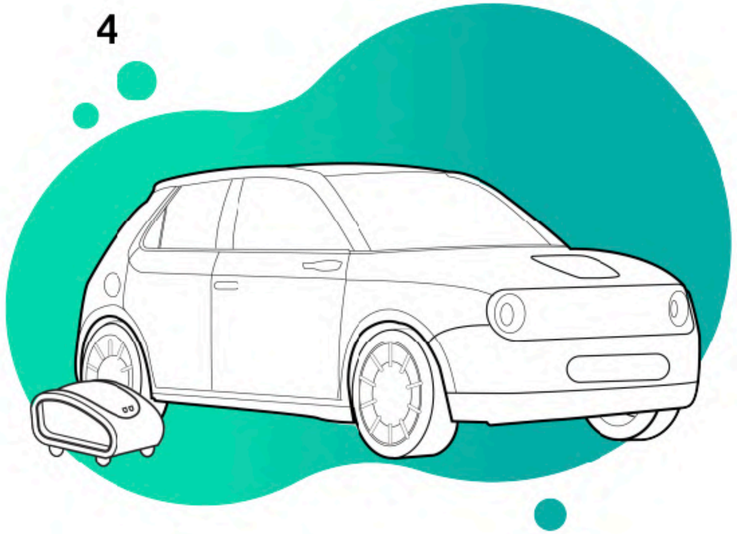

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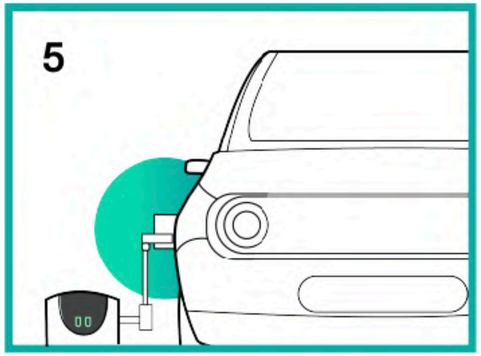

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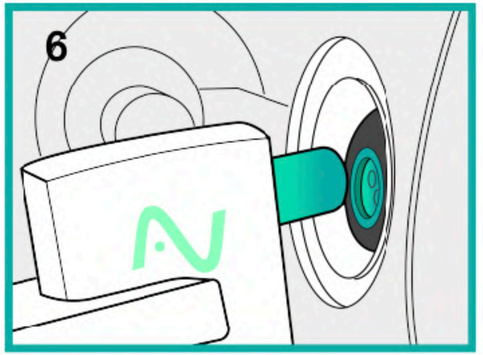

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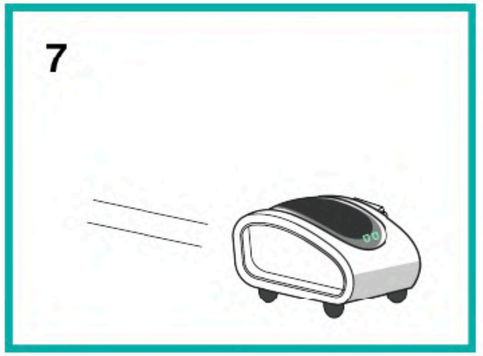
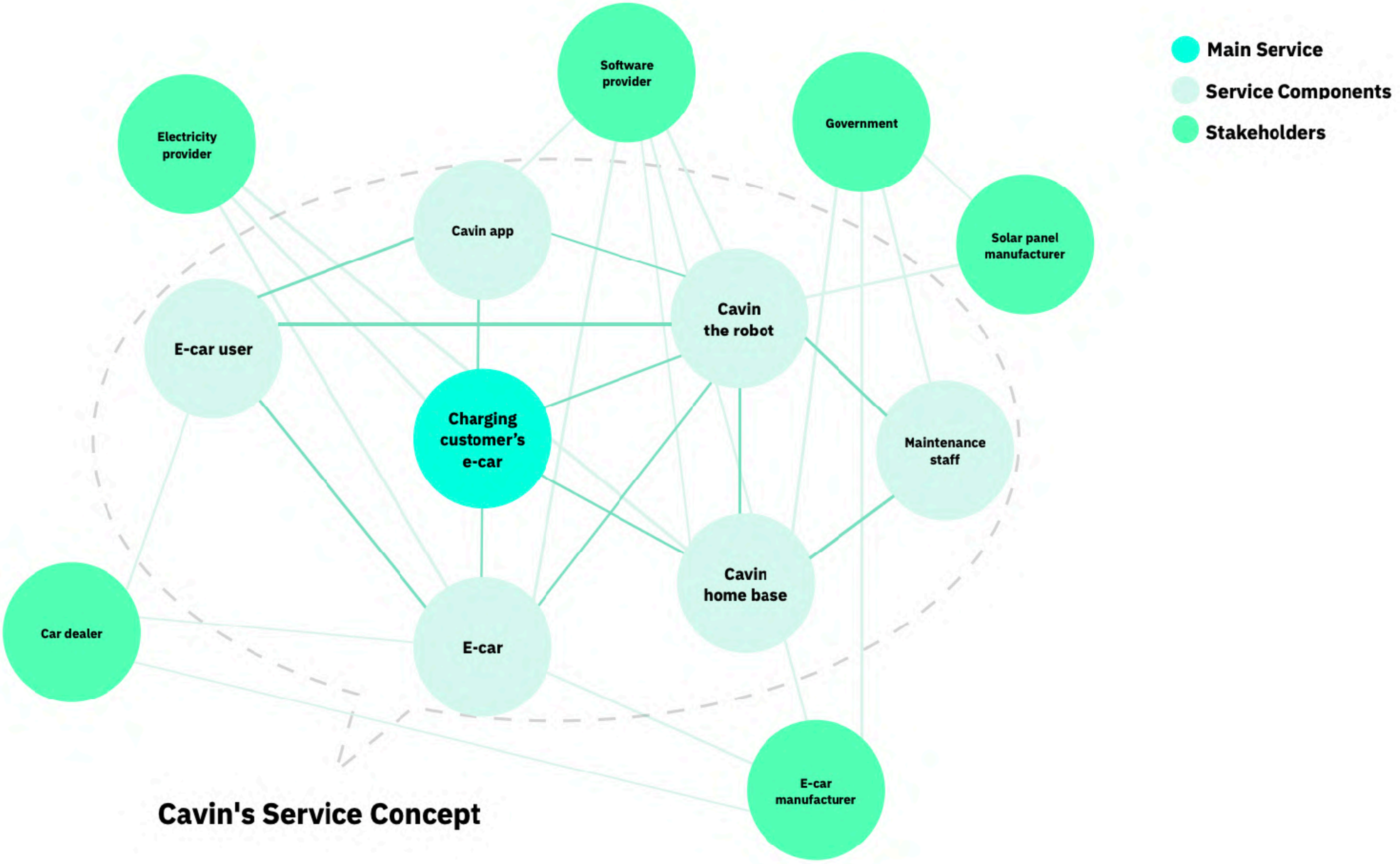


Customer Value Constellation



Cavin's Service Concept

Cavin Service Flow Chart

Cavin action

User action

Start

Cavin

Placed in Home base

Analyze user pattern and annual/ monthly charge

E-car needs to be charged

Cavin sensors low energy e-car

Cavin sends alert via app

X

User denies alert

End

User makes a reservation for later

End

O

User accepts alert and chooses charging time

Cavin leaves home base to reach the e-car

User goes off to do his task

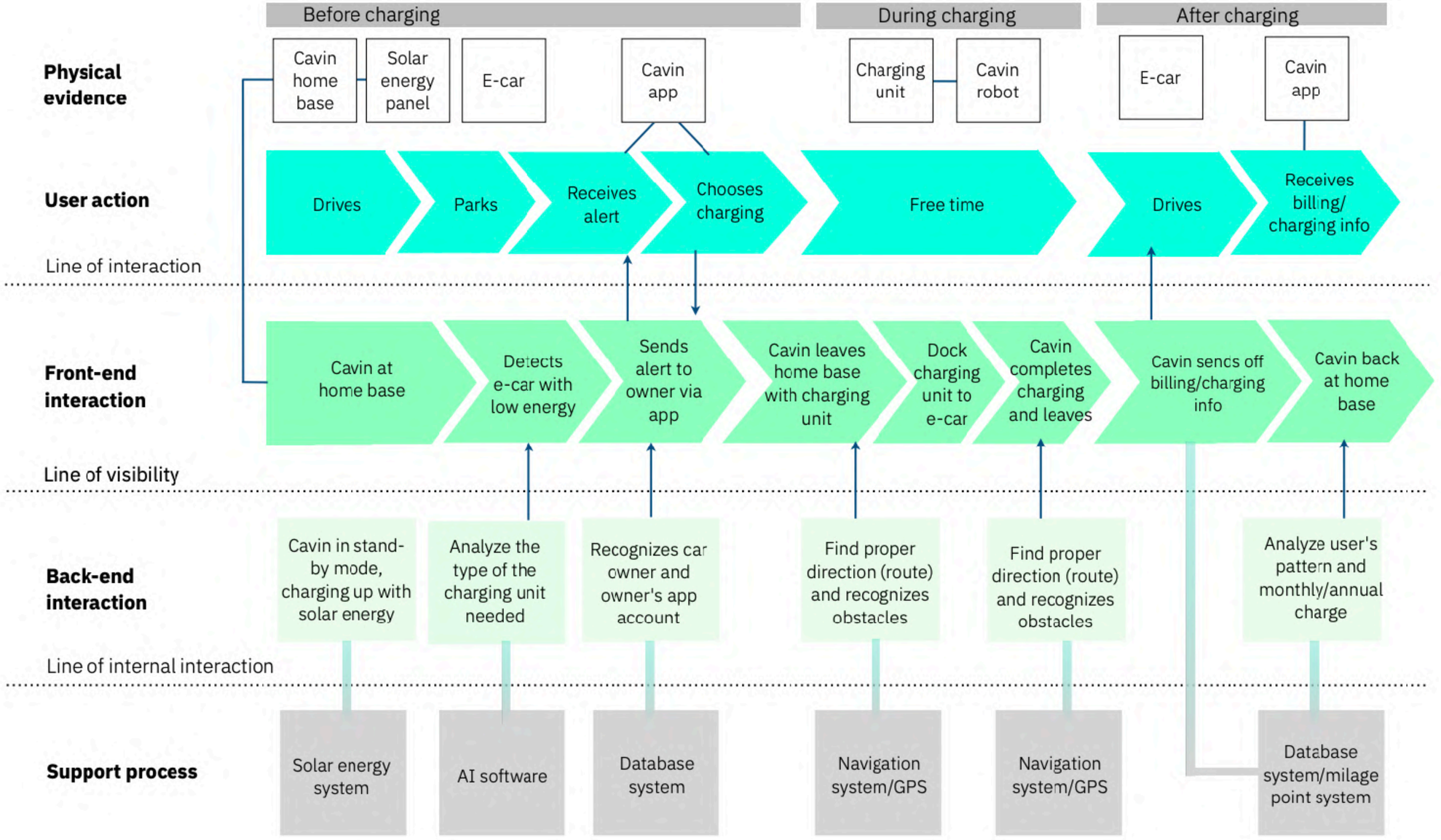
Cavin arrives and starts charging

Cavin completes charging and leaves

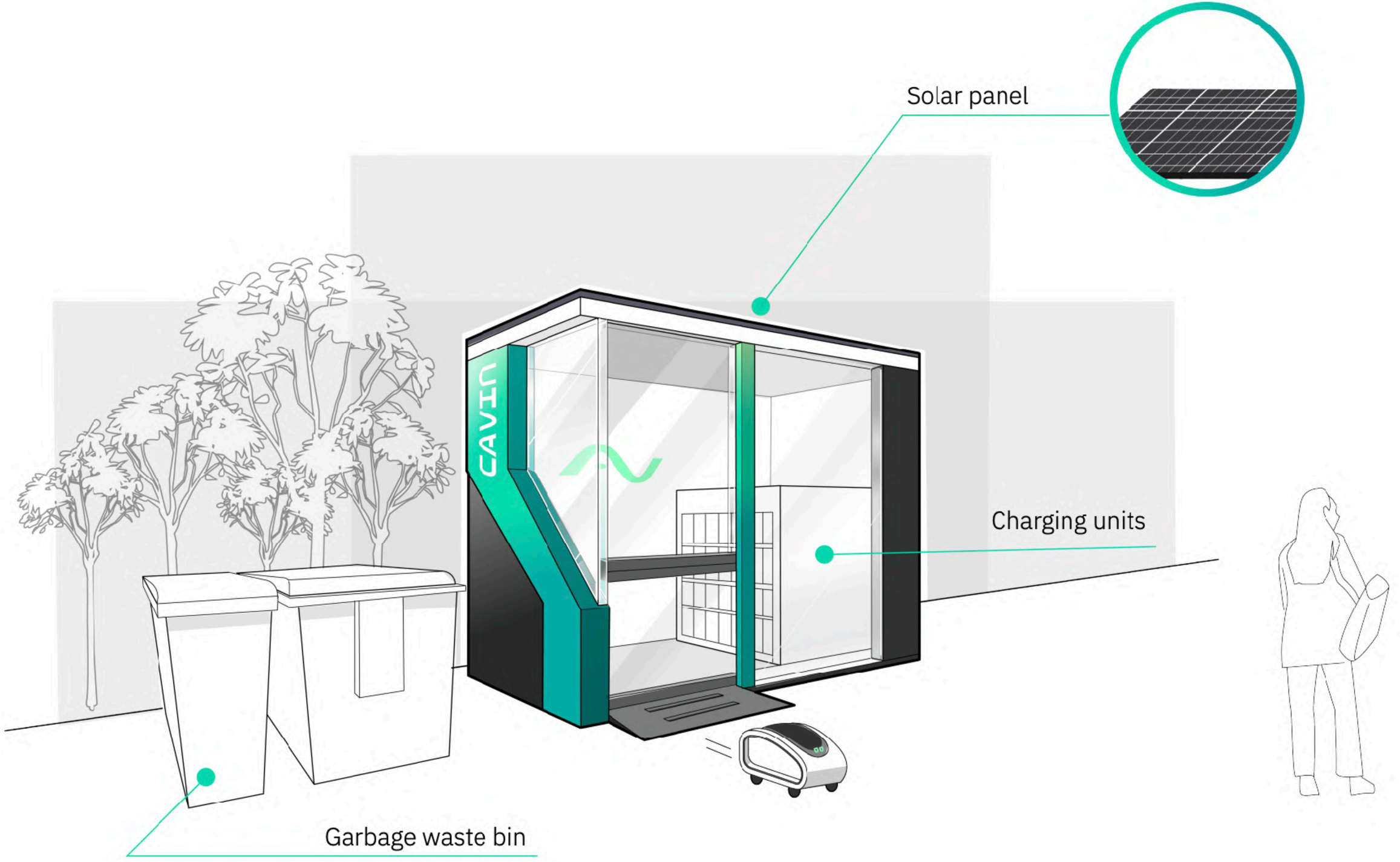
User gets to e-car, drives off and receives billing/ charging info

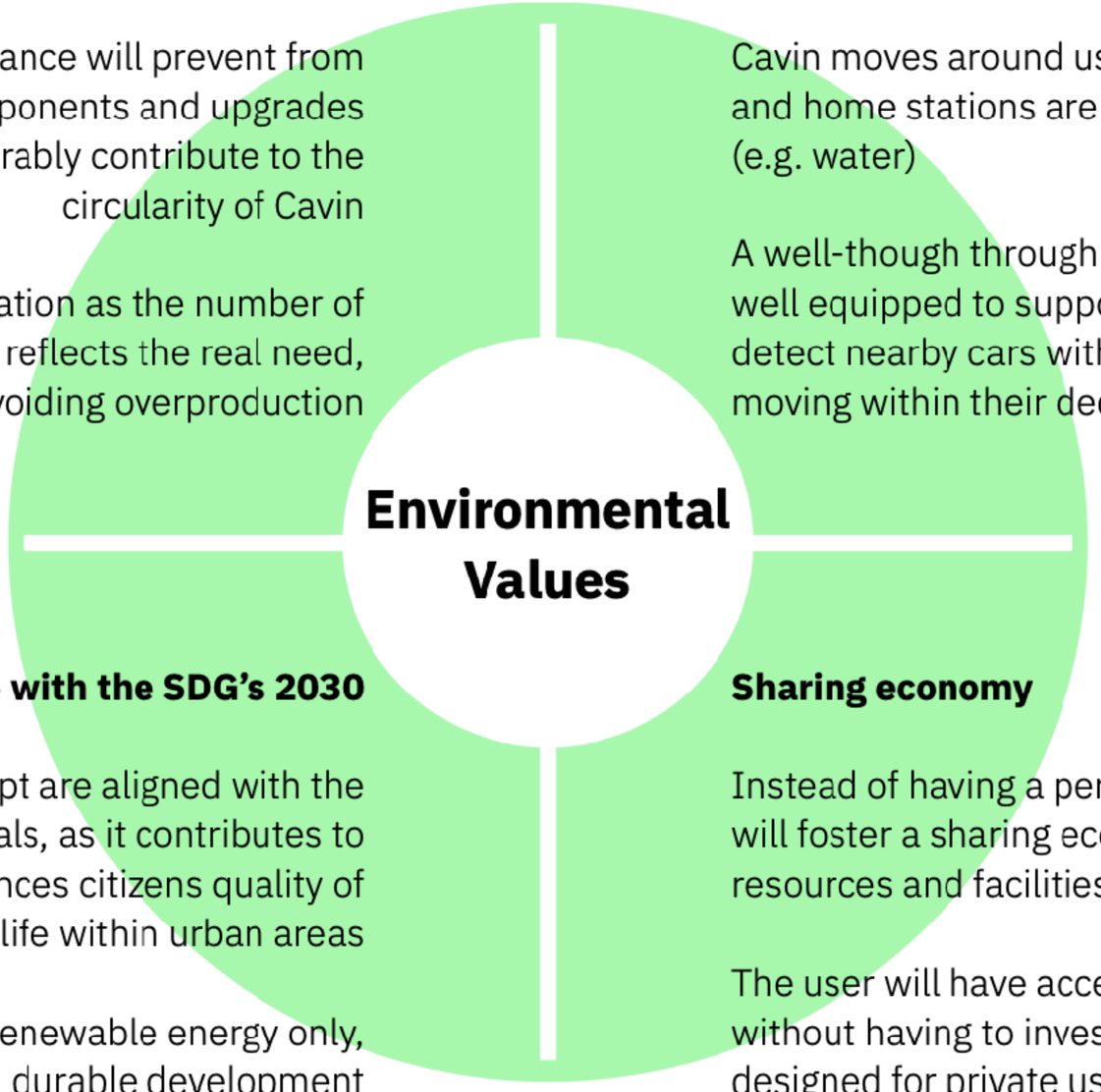
End

Cavin Service Blueprint



Impact & added Value


Solar panel
CAVIN
Charging units
Garbage waste bin



Promote circularity

Continuous maintenance will prevent from disposal. Reuse of components and upgrades of software will considerably contribute to the circularity of Cavin

No resources exploitation as the number of Cavin produced reflects the real need, avoiding overproduction

Efficient use of energy

Cavin moves around using only solar energy, while batteries and home stations are powered 100% by renewable energy (e.g. water)

A well-though through plan will make sure that key areas are well equipped to support e-cars. Sensors will enable Cavin to detect nearby cars with low battery and go into action, moving within their dedicated area

In-line with the SDG's 2030

Cavin's technology and concept are aligned with the Sustainable Development Goals, as it contributes to decreasing CO2 emissions and enhances citizens quality of life within urban areas

The system will be powered by renewable energy only, ensuring a sustainable and durable development

Sharing economy

Instead of having a personal charging system per user, we will foster a sharing economy to ensure more efficient use of resources and facilities

The user will have access to a high-quality charging system without having to invest in less performant techniques designed for private users

Implementation

Service Timeline

Service Phase	Launch & Introdcution within 0-5 Years	Increase & Growth within 5-15 Years	Prime & Maturity within 15-20 years
Estimated Market Demand	Slowly growing e-car private usage	Fast growing e-car private usage	High demand & sharing economy
Service Availability	Cavin introduced at **gas stations** all over Switzerland	Cavin emerges in **neighborhood areas** all over Switzerland	Cavin evolved into a mature service and is available in **suburbs, towns and cities** all over Switzerland & bordering countries
Service Expansion	Cavin is available only by request	Cavin sensors close by e-car also witouth request	Cavin sensors far distanced e-car and can be ordered by request

Business Value Proposition

Create successful story

Contribute to build a sustainable, green network between cities and regions all over Switzerland

Strict cooperation with the Swiss government and the cantons to ensure better life quality and a durable development (e.g. subsidies)

Develop key technology

Establish long-term cooperation with e-cars manufacturers and e-charging station providers to co-create a seamless, unified and more accessible service

The performance of e-car batteries will increase and therefore our service will be developed accordingly (reach further distances)

Operational efficiency

Cavin will make sure that the growing demand will be satisfied: once the technology is developed, scalability of production will ensure an efficient use of resources during the manufacturing process and in later stages

No risk to run out of electrified parking lots, even if the number of e-cars will increase

Quality and outcomes

A quality service with simple and easy interactions will attract more customers

Ability to show flexibility and high adaptability to this fast-growing market

Please now consult our Gigamap, thank you.