Feasibility study template

WP2 A1

Interreg
North Sea

Co-funded by
the European Union

Super Smart Charging Hubs

Sources

[1] Over.Morgen. (2022, August). *Feasibility Study: Super Smart Charging Hub Vlissingen* [PowerPoint slides].

[2] Goncearuc, A., De Cauwer, C., Sapountzoglou, N., Kriekinge, G. V., Huber, D., Messagie, M., & Coosemans, T. (2024). The barriers to widespread adoption of vehicle-to-grid: A comprehensive review. *Energy Reports*, *12*, 27–41. https://doi.org/10.1016/j.egyr.2024.05.075

[3] Van Kriekinge, G.; De Cauwer, C.; Sapountzoglou, N.; Coosemans, T.; Messagie, M. Peak shaving and cost minimization using model predictive control for uni- and bi-directional charging of electric vehicles. Energy Reports 2021, 7, 8760–8771. Publisher: Elsevier Ltd, 394,https://doi.org/10.1016/j.egyr.2021.11.207

[4] Langenhuizen, S., van Sambeek, Zweistra, M., van der Wilt, S., & Christiaens, W. (2022, November). *D1.2: Stakeholder analysis report*. https://scale- horizon.eu/publications/

[5] Van den Hoed, R., Van der Hoogt, J., Jablonska, B., Van Bergen, E., Prateek, R., Putrus, G., Kotter, R., Das, R., & Wang, Y. (2019, May). *Lessons Learnt—A cross-case analysis of six real-time Smart Charging and V2X Operational Pilots in the North Sea Region*. 32nd Electric Vehicle Symposium, Lyon. https://www.researchgate.net/publication/332319790_Lessons_Learnt_-A_cross-case_analysis_of_six_real-time_Smart_Charging_and_V2X_Operational_Pilots_in_the_North_Sea_Region

[6] Elia. (2025, September 18). *Electric Vehicles | Flexibility case studies*. How Much Can You Save on EV Charging? https://www.wattshappening.be/case-studies/electric-vehicles

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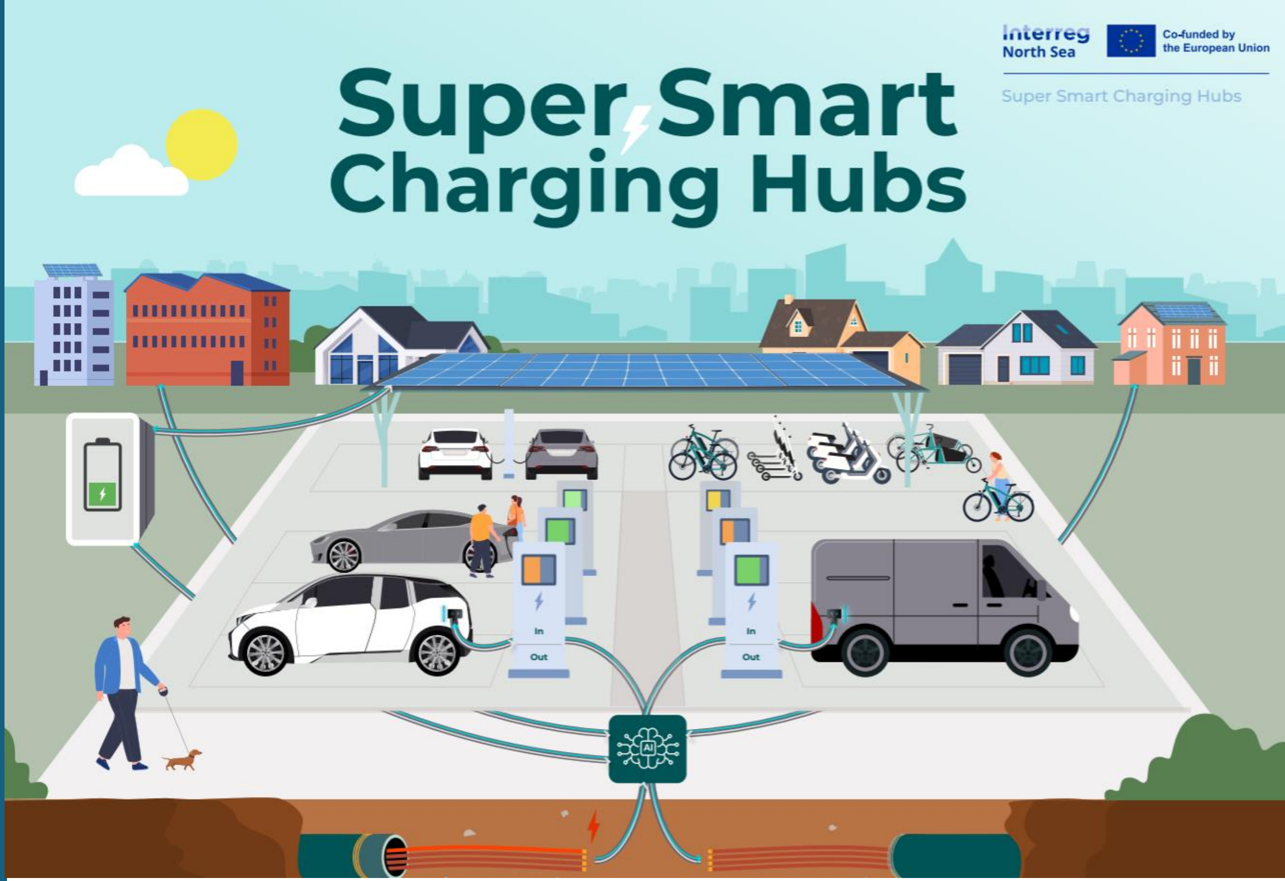

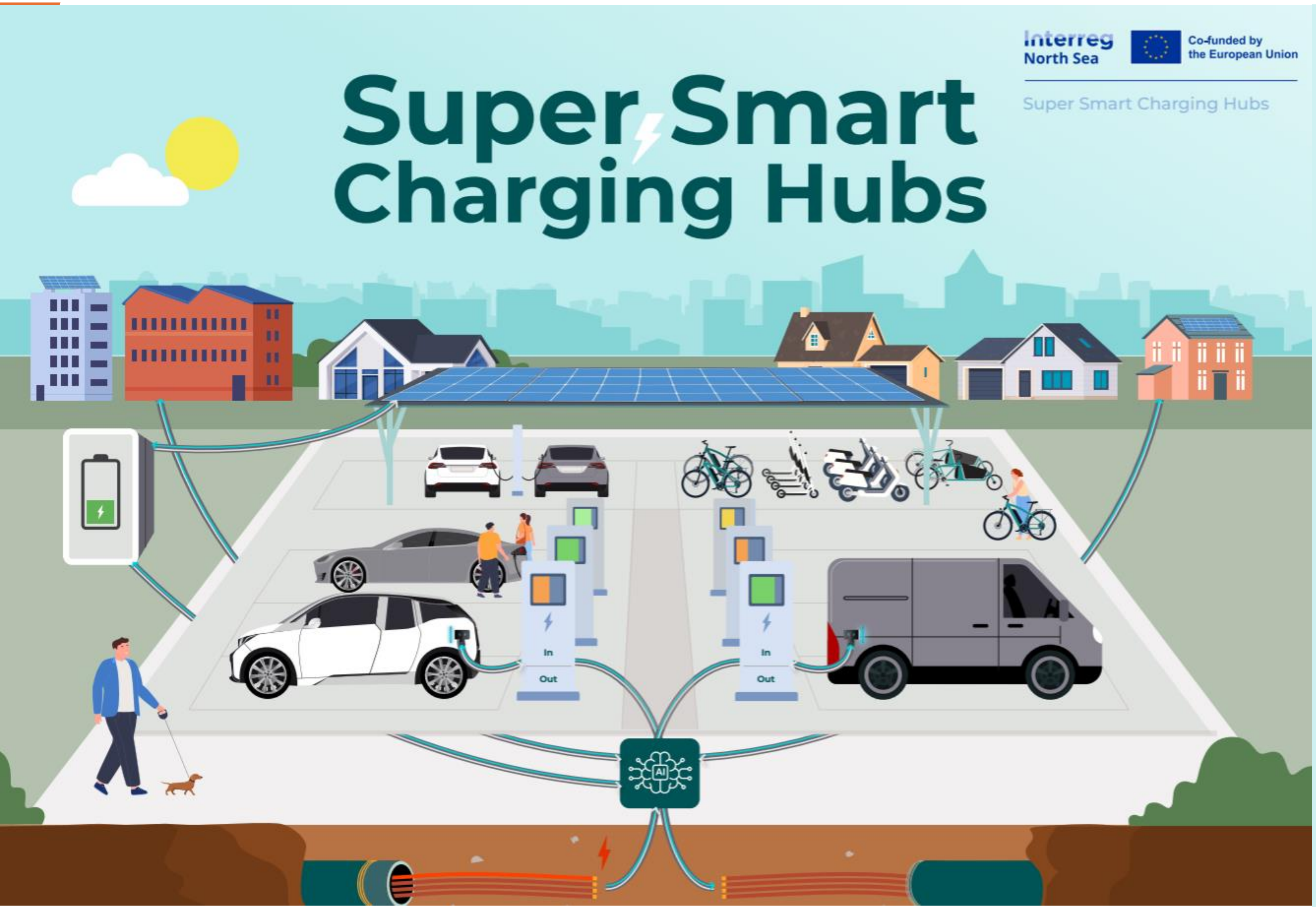

Introduction

This feasibility study is set-up in the context of the European Super Smart Charging Hubs project.

A Super Smart Charging Hub is a multi-charger site dedicated to Vehicle2Grid (V2G) vehicles. An SSCH integrates locally produced renewable energy, optional stationary batteries, has an Energy Management System (EMS) and Virtual Power Plant (VPP) aggregation, serving private and shared cars, vans and light electric vehicles. The SSCH project has multiple Living Labs in the North Sea Region (NSR).

This feasibility study focuses on the preconditions for a super smart charging hub in general and then zooms in on the specific case.

Introduction

Interreg North Sea

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*EU electricity demand for Battery Electric Vehicles (BEV) is increasing **from 9TWh in 2021 to 165TWh in 2030**. At the same time, the sustainable energy supply increases.*

This requires yearly grid reinforcement investments of € 69 billion. To limit these investments, experiments started with ‘smart charging hubs’ balancing the grid: a combination of sustainable (local) energy generation and storage (batteries, Vehicle to Grid). This provides an opportunity for businesses.

However, innovations in this domain do not develop fast enough to market and integrating them into one system is challenging. Demand and technology for smart charging hub solutions are latent (public authorities do not tender for it) and the business case is unproven.

The ’Super Smart Charging Hubs’ (SSCH) project addresses this challenge by supporting at least 25 SMEs to develop innovative solutions for these hubs and taking away / aligning regulatory hurdles, leading to new products and services.

This will result in more charging infrastructure and a reduced need for energy grid investments by operators and society.

Reading guide

To confirm the feasibility of a Super Smart Charging Hub, it is important that the components described in this introduction can be realised and form a solid business case. This includes a business case for sufficient charging requirements, generation potential, storage potential and super smart services for the SSCH. These elements must come together in an integrated business case.

The first part of the business case will look at these different components and determine which preconditions are important for each component. These conditions need to be in order to ensure a conclusive business case and thus to realise a feasible SSCH.

After defining the general preconditions, this work will zoom in on the feasibility of a particular SSCH. This is the second section. Different scenarios are worked out based on the local situation and the general preconditions.

In the last chapter, the feasibility of the particular SSCH is concluded.

SSCH Context

Generic – for all sites/pilots

Definition Super Smart Charging Hub

A Super Smart Charging Hub (SSCH) is:

- A charging hub with multiple bi-directional smartcharging stations.
- A SSCH provides charging infrastructure for V2X enabled electric vehicles (these could be shared cars, private cars and vans and possibly also light electric vehicles).
- The SSCH is connected to the electricity grid and makes use of locally produced renewable energy sources. It consists of an energy management system for load balancing and optionally also energy storage capabilities (next to the V2X EV's).
- The SSCH includes a 'virtual power plant' (VPP) that solves the business case as it aggregates energy within a portfolio of grid access points.
- The SSCH interacts directly with the community and the grid operator, using a smart energy management system to optimize the energy flows in the SSCH (charging, discharging, utilization of locally produced electricity, etc.). This will reduce strain and have a positive impact on the grid, often allowing for a smaller connection to that grid.
- The SSCH will be able to provide energy for other energy users, for instance, public or private offices and residential buildings.

Concept smart charging

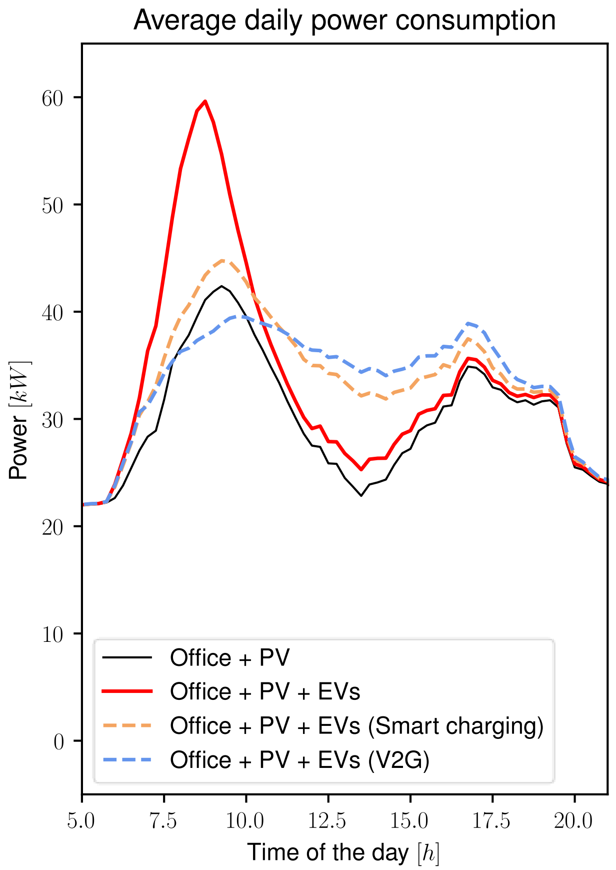
Smart charging is an essential part of the Super Smart Charging Hubs, as it is designed to optimise the charging process of BEVs and to deal with the lack of concurrence of production and consumption. Essentially, smart charging is coordinated/controlled charging. From the moment control is taken for any reason, one can claim smart charging. In principle, all BEVs can be smart-charged as the control is done via the charger or a vehicle control application.

Smart charging can be achieved by controlling for certain indicators:

- **Minimising CO_2 emissions**
- **Local production or consumption:** reducing strain on the grid
- **Reducing grid connection needs**
- **Energy cost:** charging when dynamic pricing is low
- **User needs:** temporarily faster charging and/or 'cut & divide', prediction
- **Vehicle characteristics**

The benefits of smart charging are significant:

It can reduce overall energy consumption, minimise peak consumption, guarantee self-consumption, lower CO_2 emissions, ensure lower grid connection needs and/or provide cost savings to EV users.



[3] Van Kriekinge et al, 2021

Concept smart charging

A prerequisite for smart charging is a charger which allows to control or coordinate the energy flow. Additionally, by not relying on a single control outcome (e.g. reducing CO_2 emissions or user needs), we can avoid undesirable effects on peak loads and/or increased grid investment. Financially, smart charging potentially yields about €50 per EV per year [1,6]. This is especially interesting for the users.

Grid services

Providing grid services (whereby energy is injected in the grid at certain conditions and following certain agreements) is possible through either bidirectional charging with electric vehicles or any other form of stationary energy storage or production unit (local battery system, thermal, mechanical, gravitational and/or chemical energy storage or production unit). In this context, a local electric battery system is the most relevant.

The business cases for grid services are highly uncertain due to various reasons:

- Grid injection to prevent grid congestion requires compensation from grid operators to establish a business case. Important to note that grid injection can be penalized if done at an incorrect time.
- Grid injection for energy trading (e.g. secondary reserves or EPEX Spot market) could become a potential revenue model at a sufficient scale but can not independently sustain an entire business case.
- Grid injection for the balancing market
- For grid services, the capacity must be large enough to be of any relevance in the energy market.

Bidirectional charging

With bidirectional charging, electric vehicles can be an additional asset that would allow a hub to provide grid services. BEVs can feed energy back to the power grid, nearby buildings, a home, an external load, other vehicles or stationary storage systems at the charging hub. This is meant by Vehicle to X (V2X), whereby the X can be any or multiple of the aforementioned. This is possible with some vehicle models already (e.g. Renault, Nissan, KIA, Polestar, Volkswagen, Volvo, Mitsubishi). However, the share of bidirectional cars is still very limited and is expected to increase in the coming years.

Concept of smart charging

A key condition for effective smart charging is that it cannot depend on a single steering signal (such as CO_2 reduction). Relying on just one parameter may unintentionally create demand peaks or drive the need for costly grid upgrades.

From a financial perspective, controlled charging can generate around €50 per vehicle per year, offering direct benefits for EV users.

When it comes to feeding energy back into the grid, however, the economic prospects are still unclear.

- Using grid injection to ease congestion requires compensation schemes from grid operators in order to be viable.
- Participation in energy markets (e.g., secondary reserves or the EPEX Spot market) may deliver additional revenues if deployed at scale, but on its own does not provide a solid standalone business case.

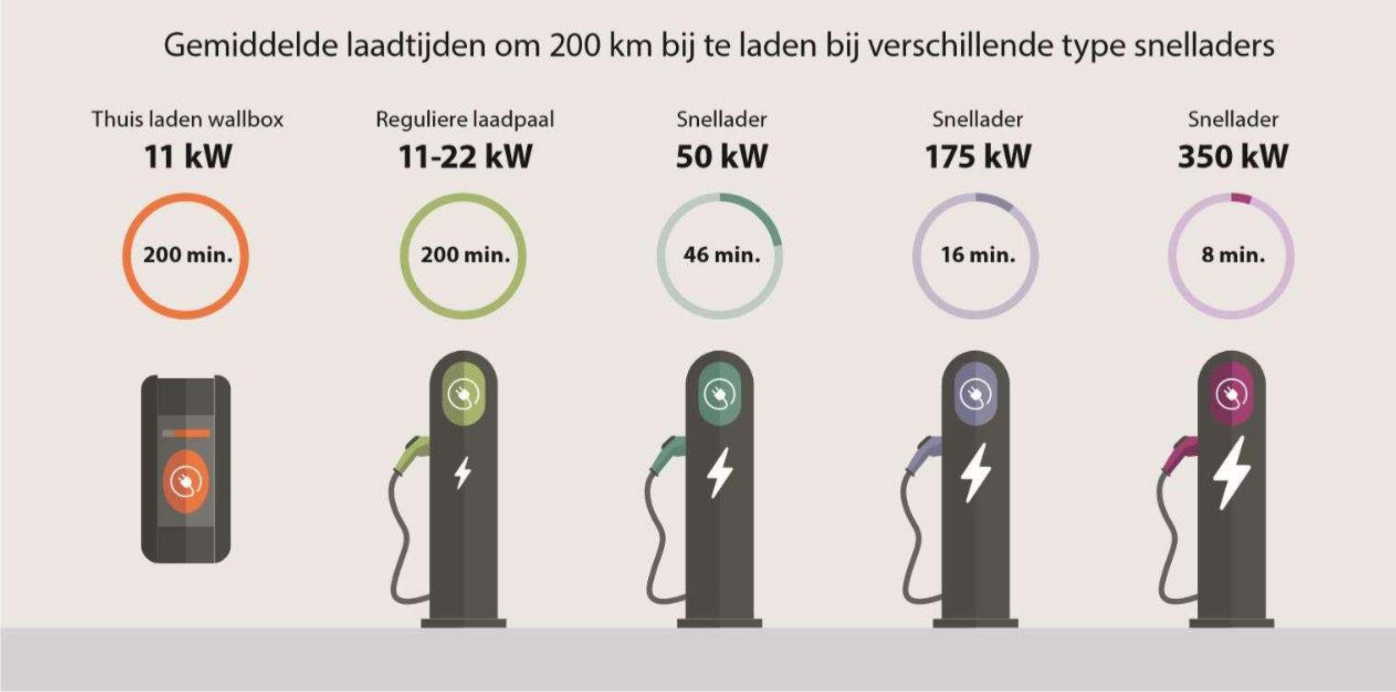
Charging requirements

Types of charging stations

In order to assess future charging needs, it is essential to forecast the growth of electric vehicles. Such projections provide an estimate of how many charging points will be required by 2025 and 2030.

Depending on local demand, super smart charging hubs can be equipped with different types of chargers. For passenger cars, public chargers typically deliver between 11 and 22 kilowatts (kW). Fast chargers supply higher power levels, allowing batteries to be recharged more quickly.

Heavy-duty vehicles, such as buses and trucks, have larger batteries and therefore require more energy; They also often need rapid charging solutions, which calls for high-capacity charging infrastructure. At the same time, the electricity grid must be able to accommodate these higher loads.



Stakeholder groups

Stakeholder engagement is essential in the process of building up an SSCH.

Without their participation, construction might be delayed, the built installation might not meet the user requirements, the necessary permit may not be obtained from landowners, the municipality/city/government agencies or DSO, the project may conflict with master plans, long-term visions or mobility and/or climate ambitions. It is therefore important to identify the wishes and needs of all stakeholders and to integrate them in the most appropriate way possible into the design and implementation of an SSCH.

Tasks that will need to be undertaken:

⇒ Stakeholder mapping

⇒ Attributing importance to each stakeholder in accordance with the envisioned situation

⇒ Build a baseline scenario

⇒ Identifying essential stakeholders (go/no-go) and getting their agreement/permits to build

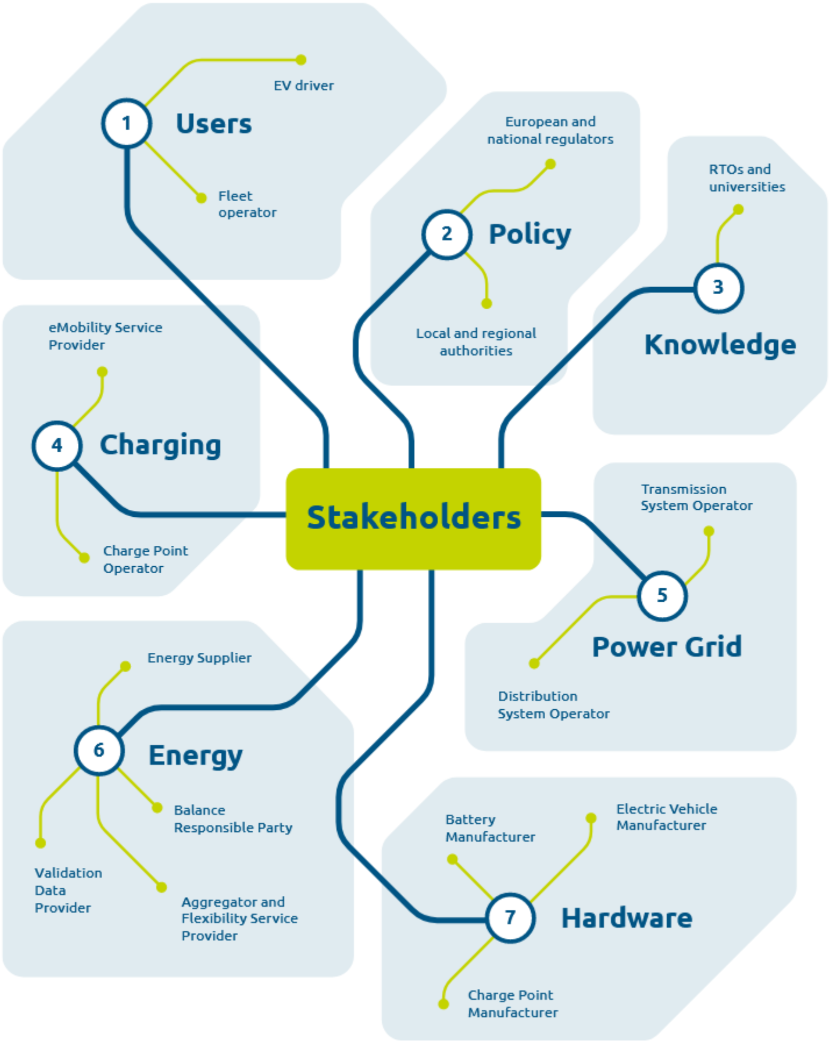
⇒ Administrative preparatory process

⇒ Stakeholder workshop on identifying end-user needs

Stakeholder groups

Stakeholders essential to the project

- Investors
- Landowners
- Policy makers
  - Local & national governmental bodies
  - European and national regulators
- Grid operator (DSO/TSO)
- End-user groups
  - EV drivers
  - Non-EV drivers
  - Fleet operators
  - Shared mobility organisations
- Surrounding businesses & organisations
- Fire department
- Charging infrastructure operators
  - eMobility Service Providers
  - Charge Point Operators
  - Parking operators
- Knowledge centres
- Energy related stakeholders
  - Energy suppliers
  - Balance Responsible Party
  - Aggregator & Flexibility Provider
  - Validation Data Provider
- Hardware stakeholders
  - Battery manufacturer
  - EV manufacturer
  - Charge Point manufacturer



Overview of Stakeholders Identified in Horizon SCALE Project (Langenhuizen et al., 2022)

Energy: local sustainable production

In an SSCH, the energy ideally comes from local sustainable sources, minimising the strain on the grid and the CO_2 emissions.

- Local production can be PV on roofs, PV on land or wind turbines, but other options are also available, such as tide turbines and salinity gradient power.
- Most SSCHs will however cover their parking spots with a solar roof or make use of existing PV installations to charge their EVs.
- Important in this case is to match local production with local demand (i.e. the charging needs)
  - To do so, some options are available => concurrency, load balancing, bidirectional charging & stationary batteries & virtual power plant (vpp)

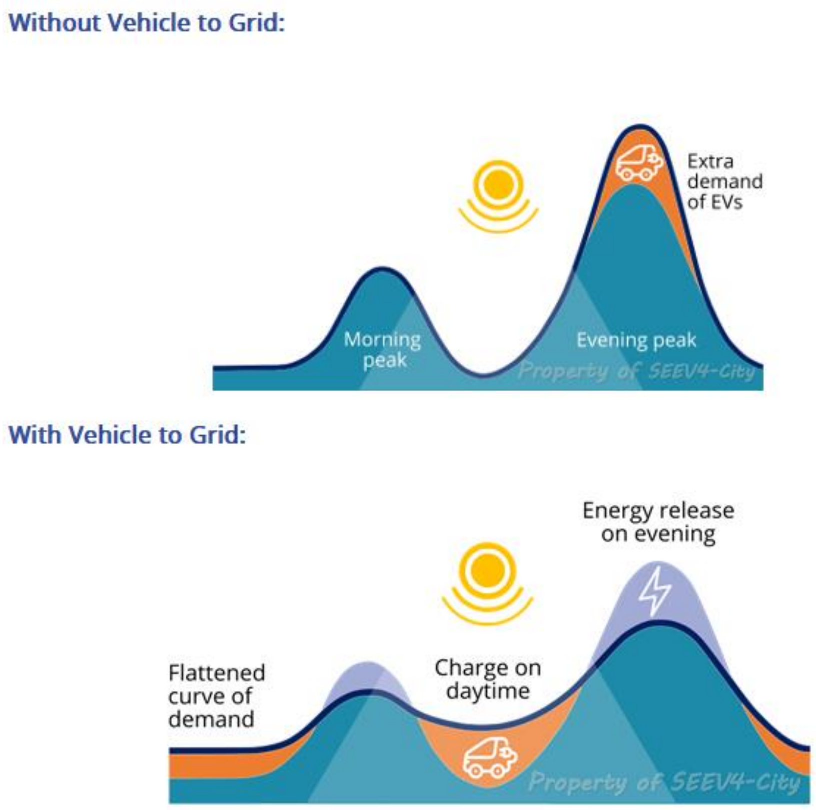
Energy: concurrence

Local generation & charging needs are not always concurrent.

Without a smart link between the time of charging and the power generation, a lot of energy would be demanded from the grid at one moment and injected into the grid at another. A smart solution would link both.

A super smart solution would allow for bidirectional charging, in response to differences in tariffs throughout the day and the shifting of the demand and generation peak. This is shown in the figure to the right. It would allow to return of energy from the EV back to the grid during favourable periods. This can help to reduce peak demand out of either financial interest (capacity tariff) or in the interest of allowing a larger capacity where the installed grid facilities physically do not allow it. It might also generate income by benefiting from price differences.

A range of technologies is available to enable such connections. Dependent on the local circumstances and constraints, some solutions can be either energetically, environmentally or financially interesting.



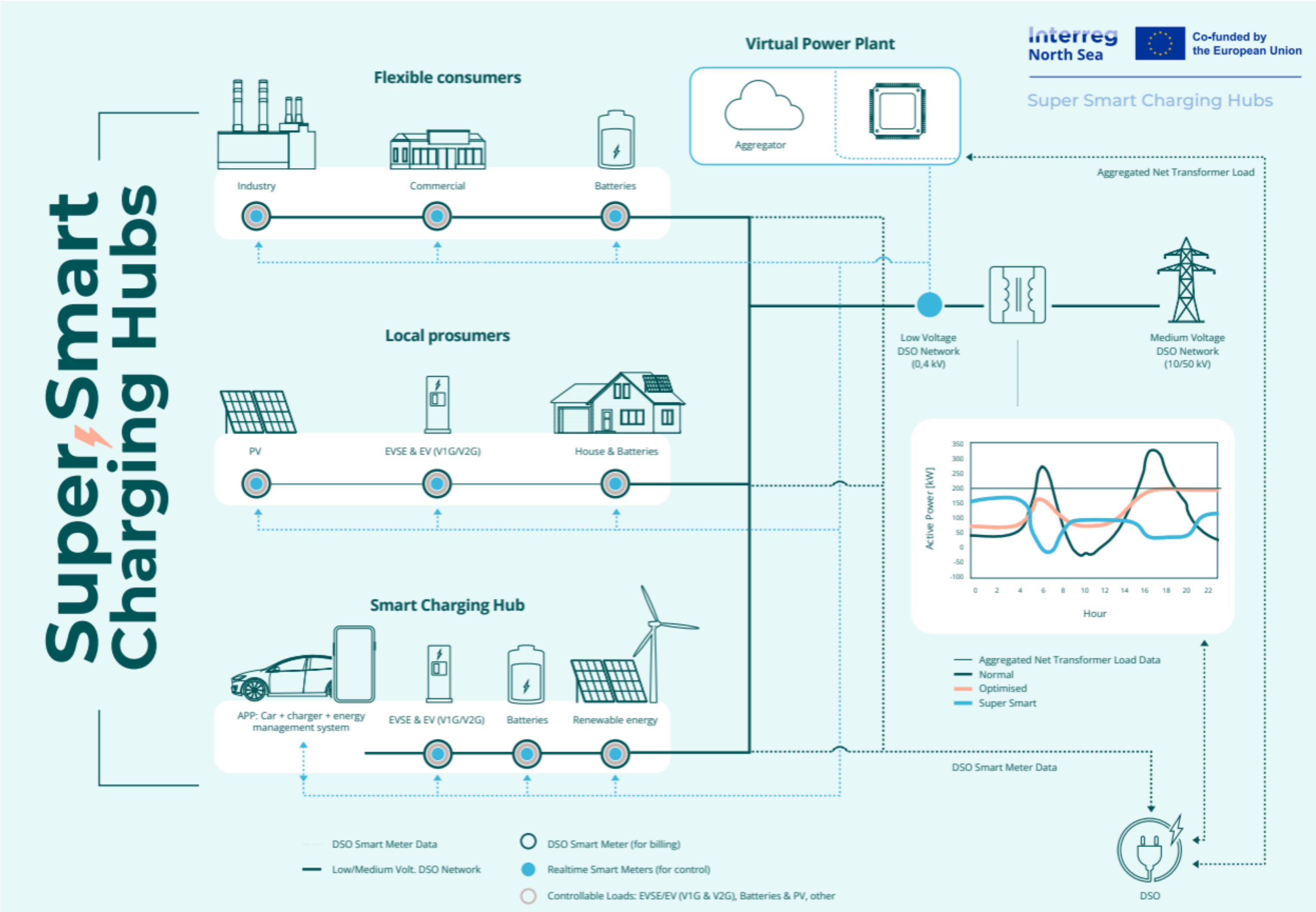
Charging demand

The charging demand is strongly influenced by the characteristics of the end users. When estimating charging demand, it is important to take into account:

- **Number of users**: including the potential market share and the relative importance/size of each customer segment.
- **Charging capabilities:** such as battery size, bi-directional functionality, AC/DC charging, and access to fast charging.
- **Charging profiles:** predictable patterns of when, how much (in kWh), how fast (in kW), how frequently charging occurs and whether charging reservations is possible.
- **Specific charging needs:** depending on the end user, the type of vehicle and operational requirements.
- **Metadata**

Business case: opportunities & prerequisites

The SSCH not only contributes to sustainable mobility and grid stability, but also opens up new business opportunities. The following slides show which SSCH components show opportunities for the business case, which uncover potential value streams, conditions for profitability, and the prerequisites for system components.



Opportunities for the business case

Load balancing

Load balancing is a type of smart charging that focuses on managing and limiting power use. Multiple charging stations are connected to one central Energy Management System (EMS), which ensures that the overall load remains balanced. The needs of the EV driver remain a priority. Users can set their preferences, for instance via an app, before charging begins. By dynamically adjusting the charging load:

- More charging stations can be installed to the same grid connection.
- Peak demand can be reduced by charging vehicles more slowly when capacity allows, keeping consumption below the contract limit.
- The charging station operator can give priority to certain users, such as public transport fleets (e.g., buses or taxis), ensuring they receive power first when needed.

Advantages that can be achieved with this:

- Lower grid connection costs: When applying for a new connection, a smaller capacity requirement leads to reduced installation and recurring costs, as both are partly based on contracted capacity.
- Higher self-consumption of renewable energy: Using self-generated electricity eliminates purchase costs, and since feeding surplus power back to the grid is typically less profitable, this increases overall efficiency.

This approach allows for a flexible setup combining AC and DC charging stations (fast charging and regular charging stations). Nearly all charging infrastructure providers now offer systems capable of load-balancing.

Opportunities for the business case

Bidirectional charging & stationary battery

Bidirectional charging of shared cars or cars that are stationary for a long duration offers further possibilities to balance the total power demanded. At times when the charging demand of the regular charging threatens to become too high, in addition to reregulating the charging capacity, it can also be decided to unload the stationary and/or shared cars partially. Of course, the expected use of these cars must be taken into account, preferably via a reservation system or charging application. This allows an additional revenue model to be developed. In addition to the services as described above, there is one additional service that can be provided:

- Adjustment based on market prices: By using the batteries in the cars as a volume that can be adjusted, in combination with a stationary battery, it is possible to charge at times of low prices and discharge during times of high prices. The difference between the two prizes is the profit that can be made with this. In order to capitalise on this, a dynamic energy tariff is needed.

To move generated energy to moments of demand, energy can be stored in batteries. The business case for a stationary battery does depend on the provision of various services: local services, providing imbalance services, and market services. The local services include the reduction of the connection to the grid, compensation of reactive power and increased self-consumption. The imbalance services include FCR, aFRR and local congestion management. The participation in the electricity markets includes imbalance optimization, intraday continuous and interday auction market and day-ahead market.

Parking management

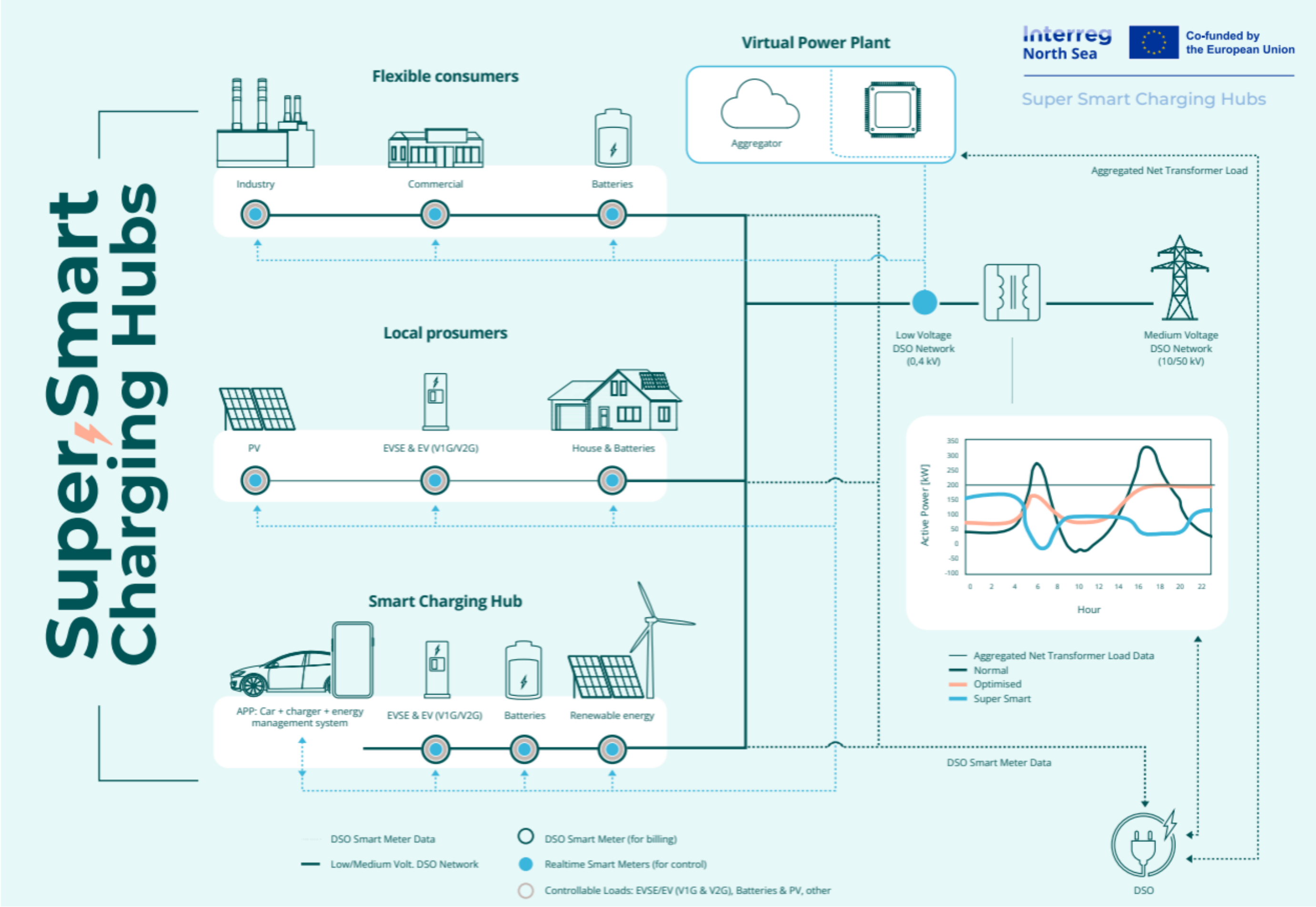
Load balancing and bidirectional charging can also create new value streams in parking management. Charge point operators or parking owners may incentivise users to free up charging spots once a full charge is reached. This is particularly relevant in the current transition phase, where not all electric vehicles are yet equipped with Vehicle-to-Grid (V2G) capabilities, making smart charging behaviour an essential source of flexibility. Incentives to motivate users to free up charging spaces could involve incentives or discounts to move when they are fully charged up but could also include fees for the parking spot. In turn, vehicles with V2G capabilities could receive incentives to leave their car plugged in. In the short term, this could mean that V2G capable cars would be favoured, and other cars are subsequently placed at a disadvantage. Smart charging (by extension bi-directional charging) and parking for charging (i.e. CPO wants to get as much charging sessions as possible) are conflicting business models. A balance between mobility, energy and financial interests should be found.

Opportunities for the business case

Virtual power plant

A virtual power plant makes it possible to aggregate energy within a portfolio. It is not a requirement that all assets, or components, of a system are geographically close to each other. By adding a virtual layer, parts of such a portfolio can exchange energy with each other. For example, solar energy from one location can be shared with another location. The deficit or surplus that cannot be traded with each other is bought or sold directly on the energy market. The advantages of this are that self-consumption can be increased and delivery costs can be reduced.

In addition energy services can be provided by smartly controlling flexible parts of the system, such as charging stations for electric vehicles. A battery can be part of a VPP to offer more flexibility. The battery can also be controlled (independently) as a component.



Prerequisites for a Super Smart Charging Hub

Charging requirement

- Super smart charging requires multiple control signals, which take into account the needs of the users, besides the financial and energy efficiency factors.
- V2G requires ISO15118-20. This protocol is not yet a market standard, but it is currently being tested. Full market launch is expected in soon.
- In order to generate a business case for bidirectional charging, the grid operator must be willing to offer compensation for the prevention of grid congestion.
- In order to achieve bidirectional charging, there must be guaranteed parties that want to place bidirectional vehicles at the SSCH, and the infrastructure needs to be compatible with those vehicles.
- To provide parking spots for specific end user groups, there must be an agreement with that specific stakeholder group (e.g., taxi company, shared mobility, fleet owners, …)
- Willingnes of the EV (fleet) owner to allow for smart charging and/or V2G

Mobility requirement

- The charging infrastructure should provide charging for (shared) cars, vans and possibly light electric vehicles.
- The SSCH must accommodate varied users and different use cases with different charging profiles.
- There must be sufficient parking capacity with regular turnover to accommodate the dynamic balancing of loads.
- There must be user interaction and clear communication to end users about pricing, availability and charging status via an application.

Final business case

Scale of Investment

The realization of a Super Smart Charging Hub involves a considerable investment. Some of these investments are so-called fixed costs and do not scale with the size of the project. The size of the renewables, the battery and the charging infrastructure will determine the investment cost, but also the revenue potential.

Ratio generated energy/charging infrastructure

Being able to supply the generated electricity directly to the charging infrastructure is an important driver within the business case of an SSCH. To make this possible, the number of charging points must be in proportion to the energy production at the SSCH. Installing one (AC) charge point per 5 kWp installed PV power is a good rule of thumb for a cost-effective case. Our financial analysis shows that adding a fast charger to the charging plaza basically has a budget-neutral effect on the business case (with a purchase of approximately 30,000 kWh per year). This is mainly due to the relatively high investments involved.

Charging infrastructure

In addition to the scale of the project and the ratio of the number of charging points to the installed PV capacity, the occupancy rate of the charging infrastructure has a major impact on the feasibility of the project. It is a precondition that at least 7,000 kWh per (AC) charging point per year is expected to be purchased at a chosen location by 2030. If fast chargers are also installed, it must be plausible that at least 30,000 kWh per fast charger per year will be purchased at the chosen location by 2030.

Pricing & services

Pricing and services are essential to the final business case. Dependent on the scale of the pilot, the variety of end user profiles and the mix of technical components, the SSCH will be able to provide certain grid services, charge and recharge at different energy prices, inject into the grid at favourable pricing and receive additional parking revenue from connected non-charging EVs or increase charging revenue by avoiding connected non-charging EVs through incentives.

Case study: Living Lab ASTER Flanders

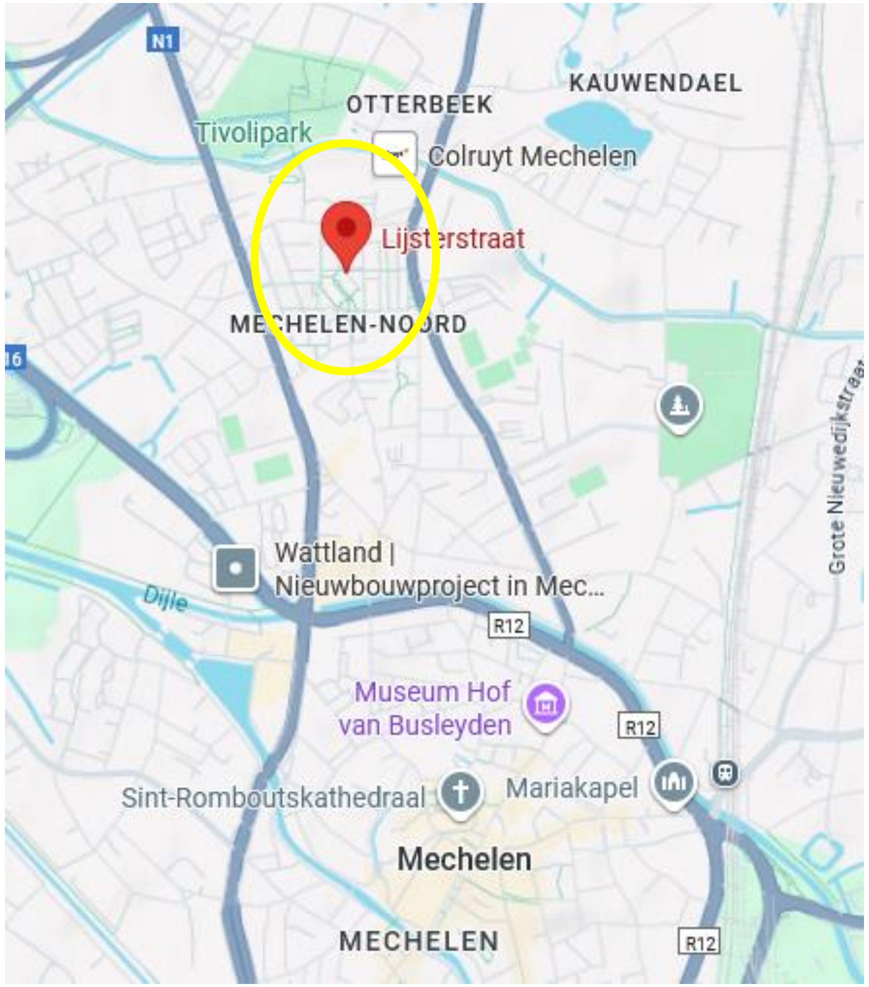
Current situation on site

After consultation with various social housing companies and local authorities, it was decided to realise the SSCH Living Lab Flanders in Mechelen.

Mechelen is the sixth largest city in Flanders and the second largest city in the province of Antwerp. The selected location is situated in the northern part of the city.

At this location, the office building of social housing company Woonmaatschappij Rivierenland (Woonland) is situated, in the middle of a densely populated social neighbourhood.

Next to the selected location is a local public service center, De Schijf, situated with a day care program and a social restaurant.



Current situation on site

The roof of Woonland's office building (green circle) has space for 32 solar panels, each with a capacity of 435 Wp. This results in a total capacity of 13.92 kWp.

The City of Mechelen has indicated that it intends to fully invest in installing solar panels on municipal buildings in the coming years.

The local service center, located adjacent to the social housing corporation's office building, is part of Zorgbedrijf Rivierenland.

Discussions with representatives of the local service center revealed considerable interest in installing solar panels on the roof of the local service center.

The roof of the local service center (yellow circle) has space for 200 solar panels of 435 Wp, for a total capacity of 87 kWp.

Together with the solar panels that can be installed on the roof of the office building, the total potential capacity is approximately 90 kWp.

This feasibility study involves various calculations based on different possible scenarios.

Charging needs – stakeholder groups

- The main stakeholders of the SSCH will be the employees of the social housing company, but also visitors and suppliers of both the social housing company and the public service centre next to the office building will be able to use the six V2G charging stations that will be installed. Currently, the parking spaces are still privately owned, but the social housing company has committed to making them semi-public outside of office hours.
- The social housing company clearly indicated during the preparatory discussions that it does not have the financial resources to build and operate an SSCH at its office building. ASTER will cover all investment and operational costs not financed under the Interreg North Sea program. ASTER believes that the construction and operation of the Living Lab Flanders will provide the necessary insights to possibly build a SSCH at other locations in Flanders in the near future.
- ASTER has already discussed several scenarios with the housing association, which owns the building (roof area, technical room, parking spaces), in which ASTER would fully own the electricity generated by the solar panels on the housing association's roof. In return for using the housing association's facilities, ASTER will charge the housing association a reduced cost price for the direct consumption of the solar power in the office building.
- In addition, ASTER will provide a favourable charging rate for the housing association's electric vehicles. Other users of the installed charging points will pay a market-based charging rate to ASTER.

Setting the scene – simulation parameters

In this feasibility study a number of assumptions is made to calculate the optimal scenario:

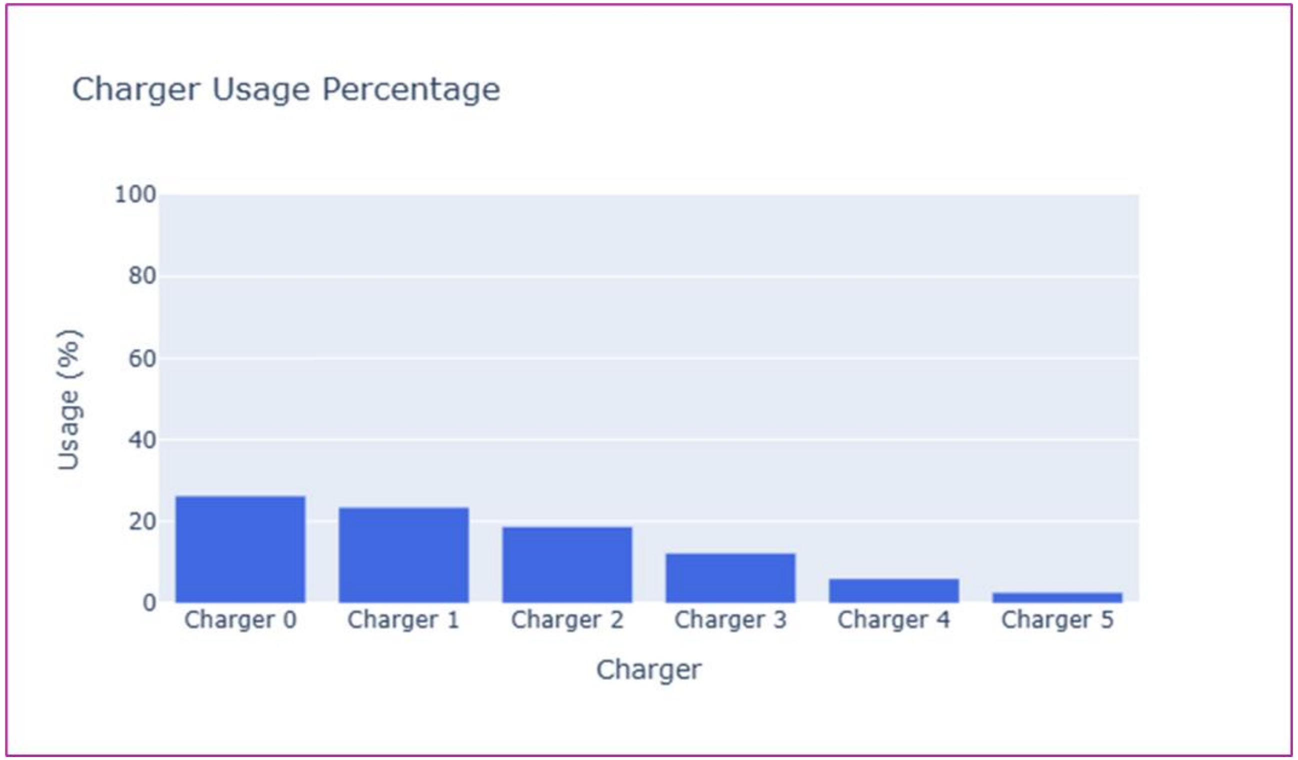
- Office building (45 people)
  - Estimated yearly consumption of 62 MWh
- Solar potential of 93 kWp
  - Planned: 15 kWp (small PV in simulations, yellow indication)
  - Potential: 93 kWp (big PV in simulations, orange indication)
  - Curtailment is not activated
  - Capex: 918 EUR/kWp
- Simulation for the year 2024
  - Electricity prices + weather parameters + office building SLP

Setting the scene – simulation parameters

- Grid costs and other related costs
  - Distribution cost: 0.03 EUR/kWh
  - Monthly peak cost: 45 EUR/kW/year
  - Grid capacity reservation cost: 28 EUR/kW/year
- Charging point installation cost: 2,500 EUR/unit (6,500 EUR/unit including the EMS)
- Charging session revenue: 0.5 EUR/kWh

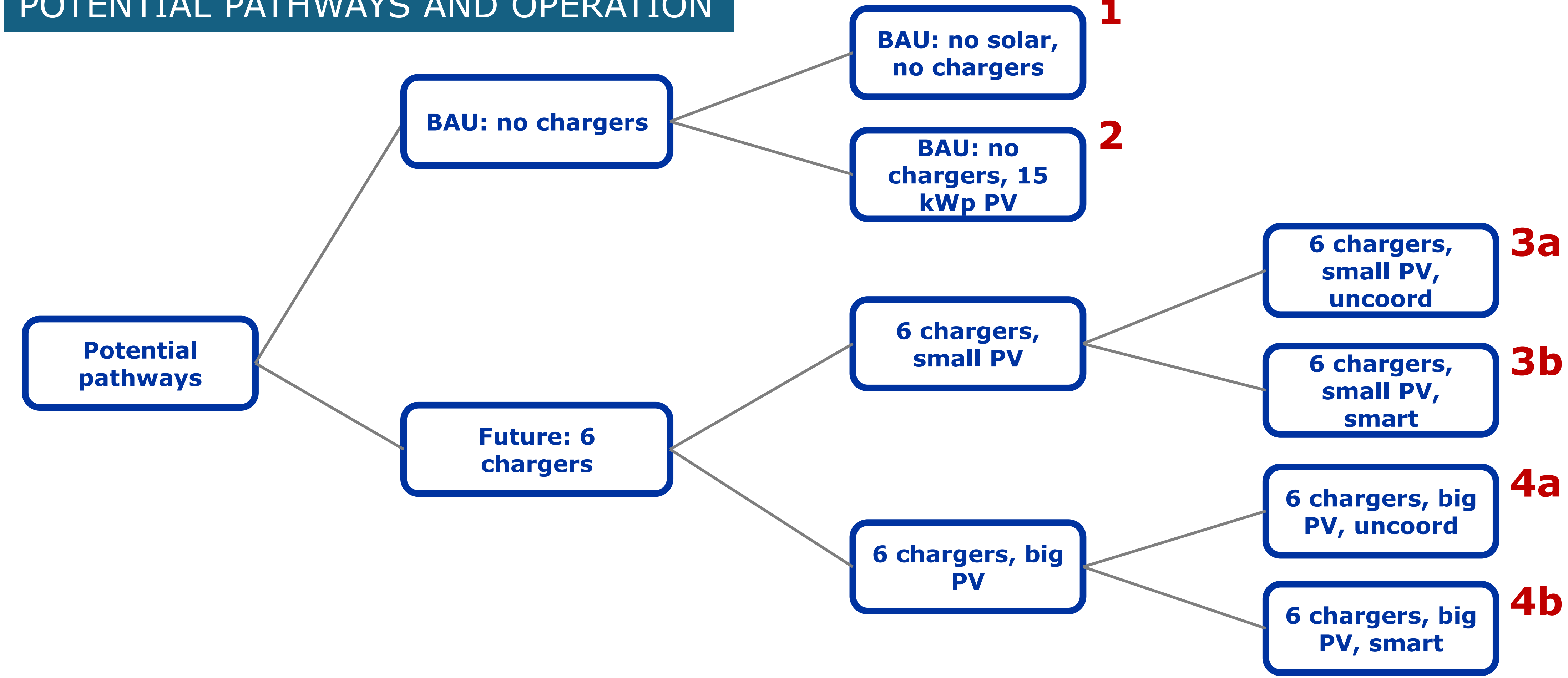
Setting the scene – simulation parameters

- 6 chargers
  - Medium occupation scenario
  - Weekdays only (predominantly morning arrival and long stay)
  - +/- 968 charging sessions/year
  - Chargers will be used at a ratio of 0,62 charging sessions/weekday
  - Total energy offtake: 13.2 MWh
- Charging sessions simulation
  - 25% of employees have an electric car
  - Yearly driven distance of 12000 km
  - Around 50% of energy needs is charged at work
  - Chargings sessions spread out over day
    - Earliest arrival at chargers: 6h
    - Latest depart at chargers: 20h



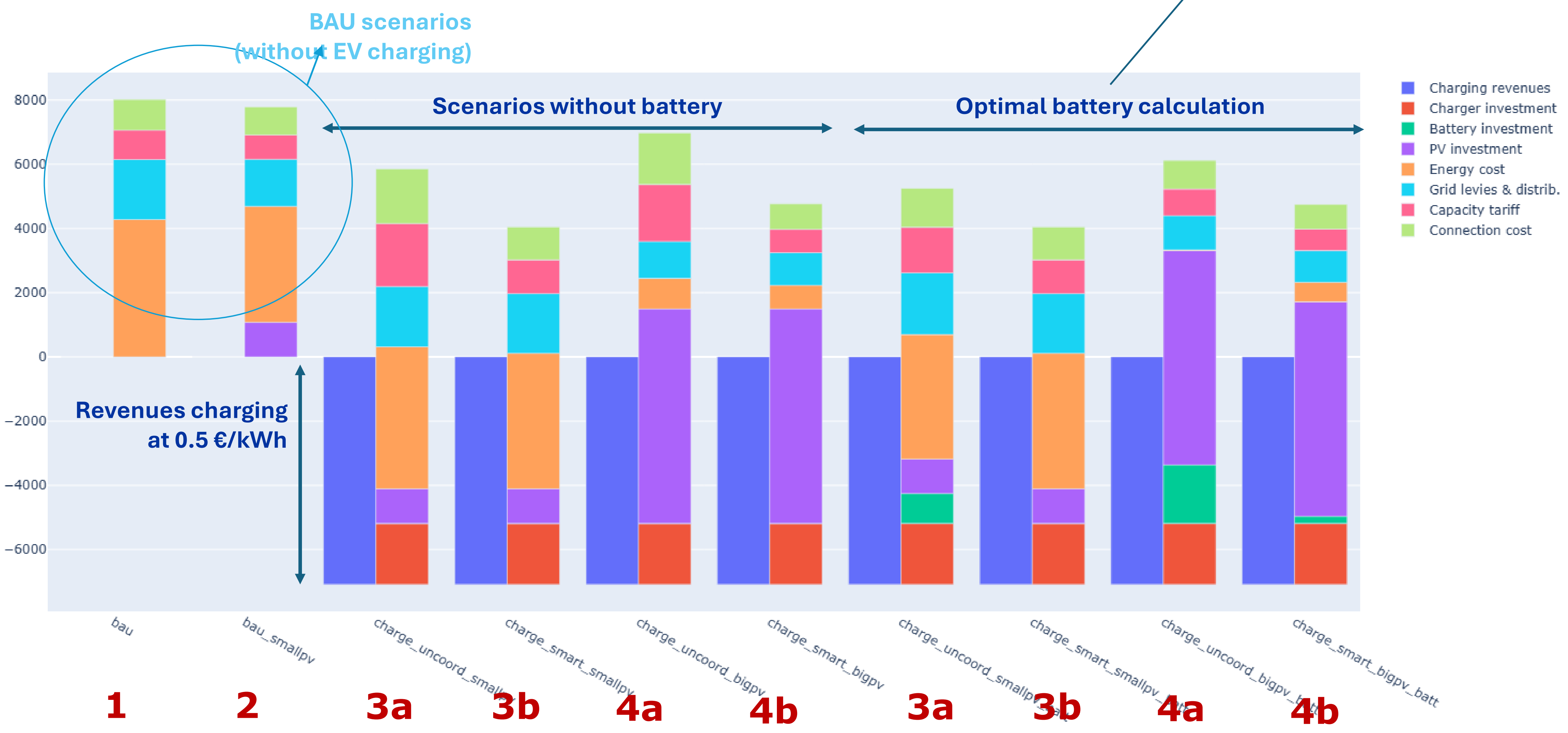
Future reference schenarios

POTENTIAL PATHWAYS AND OPERATION

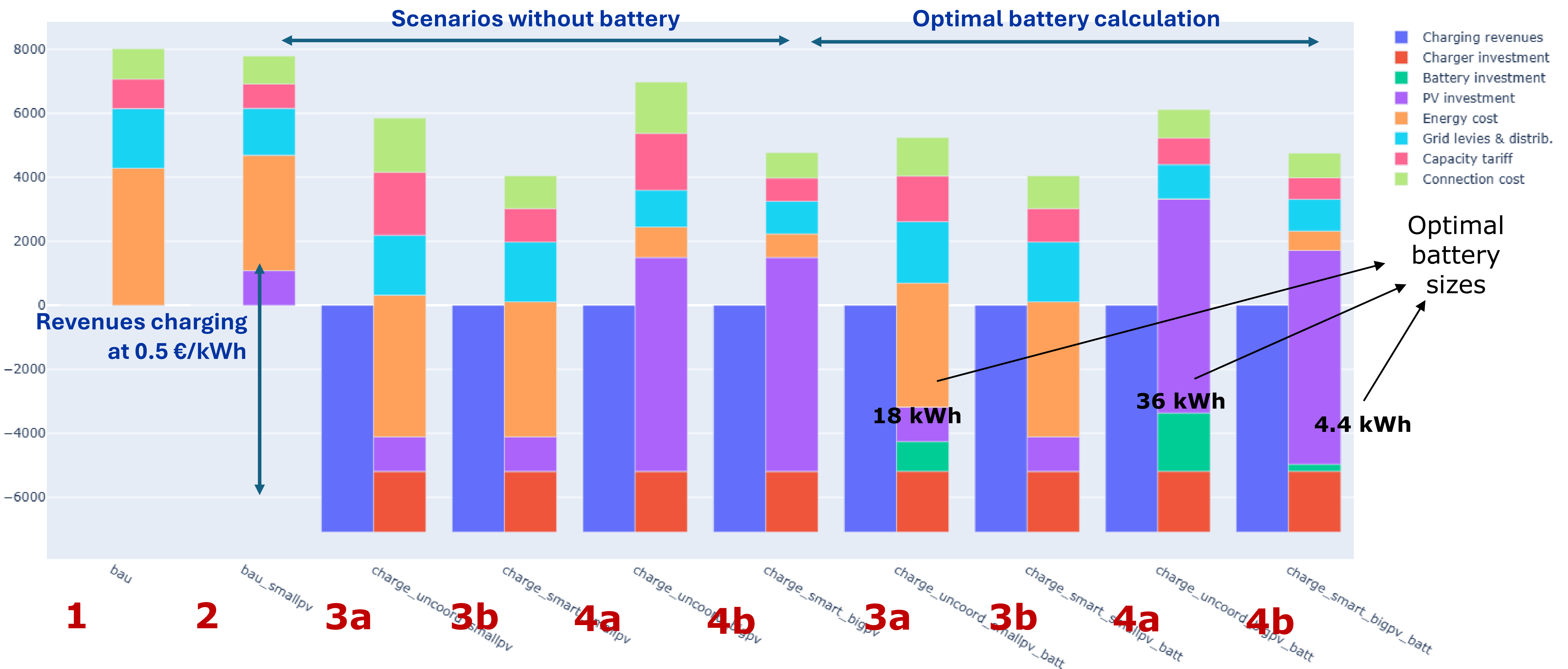


Annualised cost calculation per scenario

*For scenario 3a, 3b, 4a & 4b, the size of a battery is optimised for a battery capex of 300 €/kWh



Annualised cost calculation per scenario



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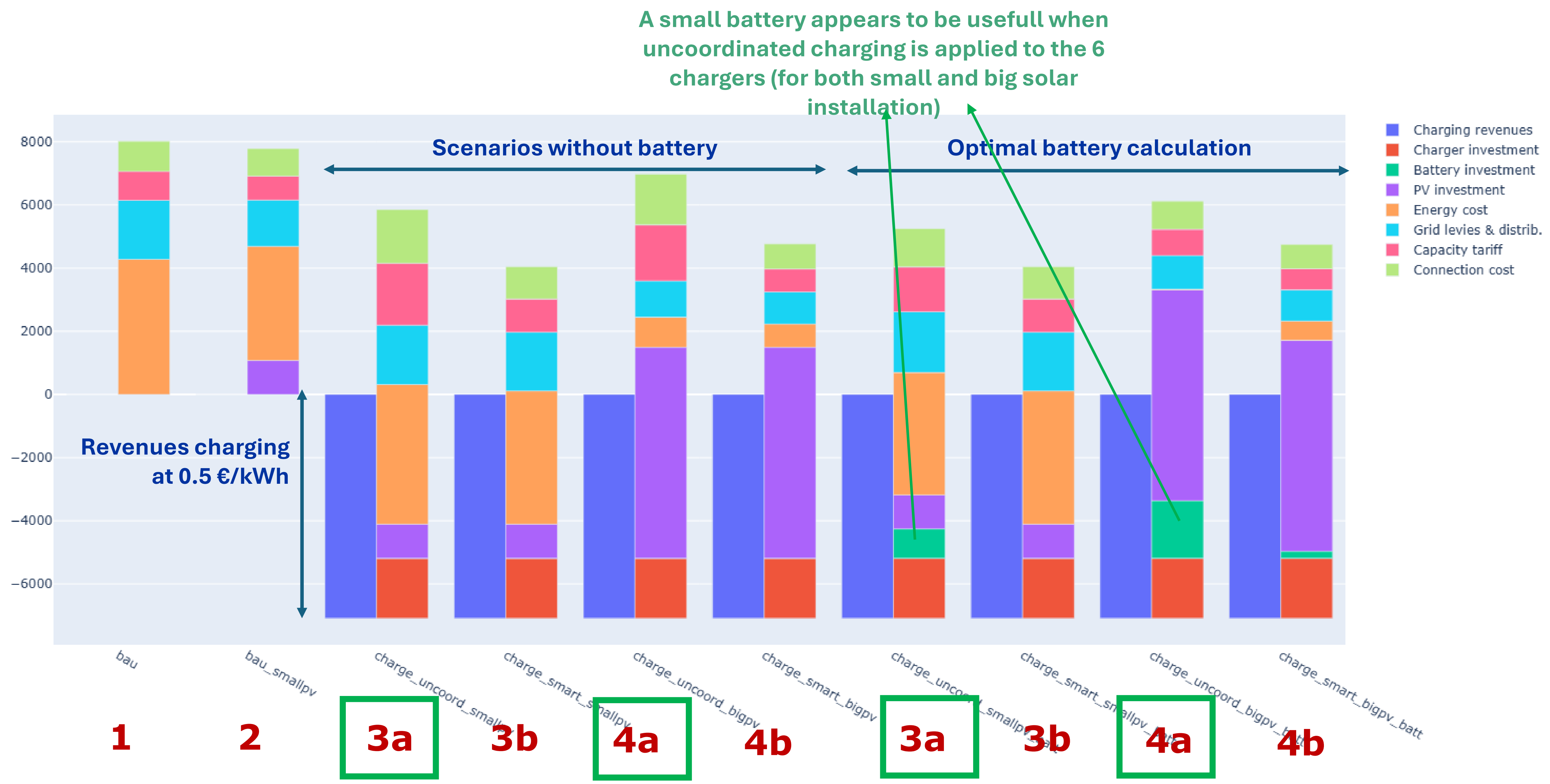

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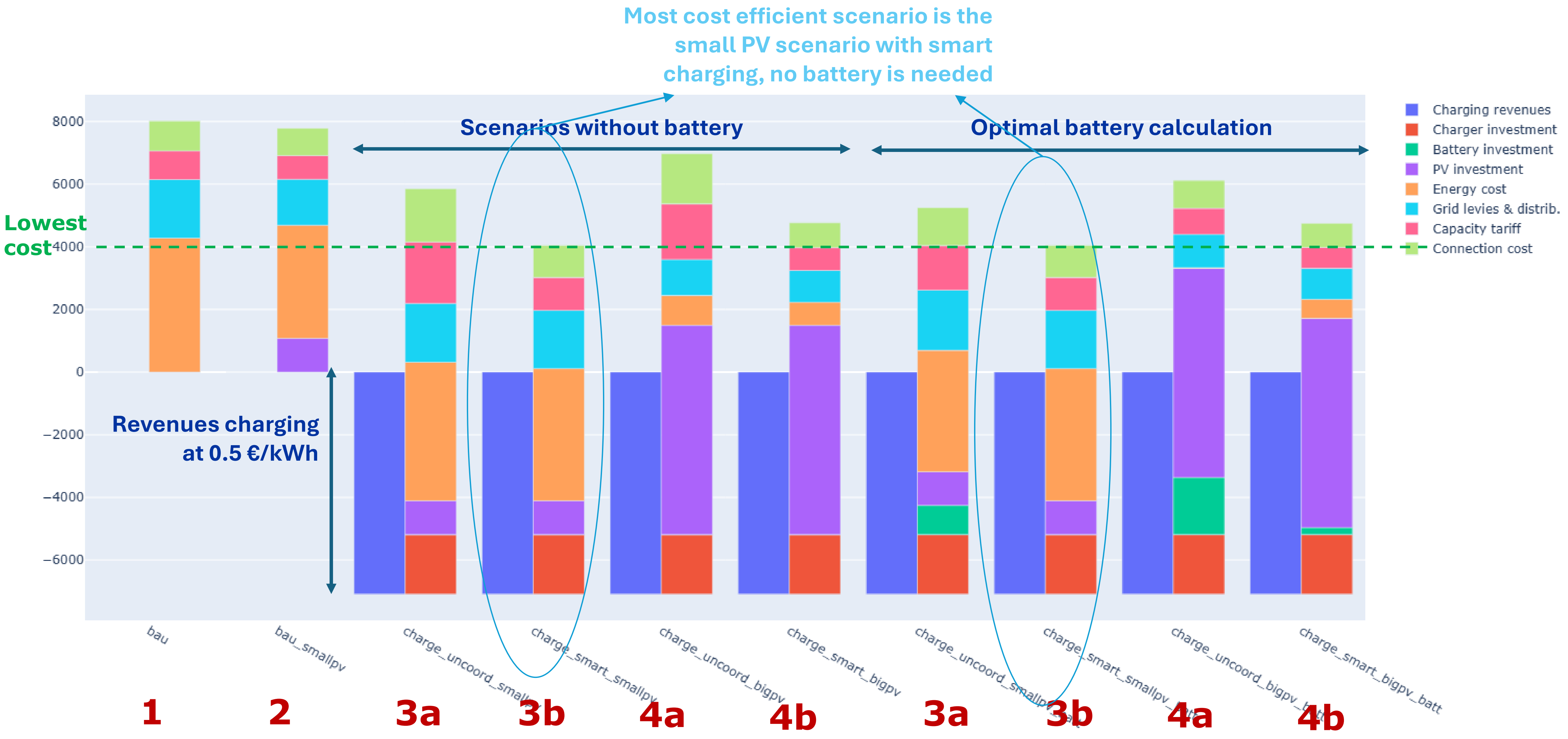
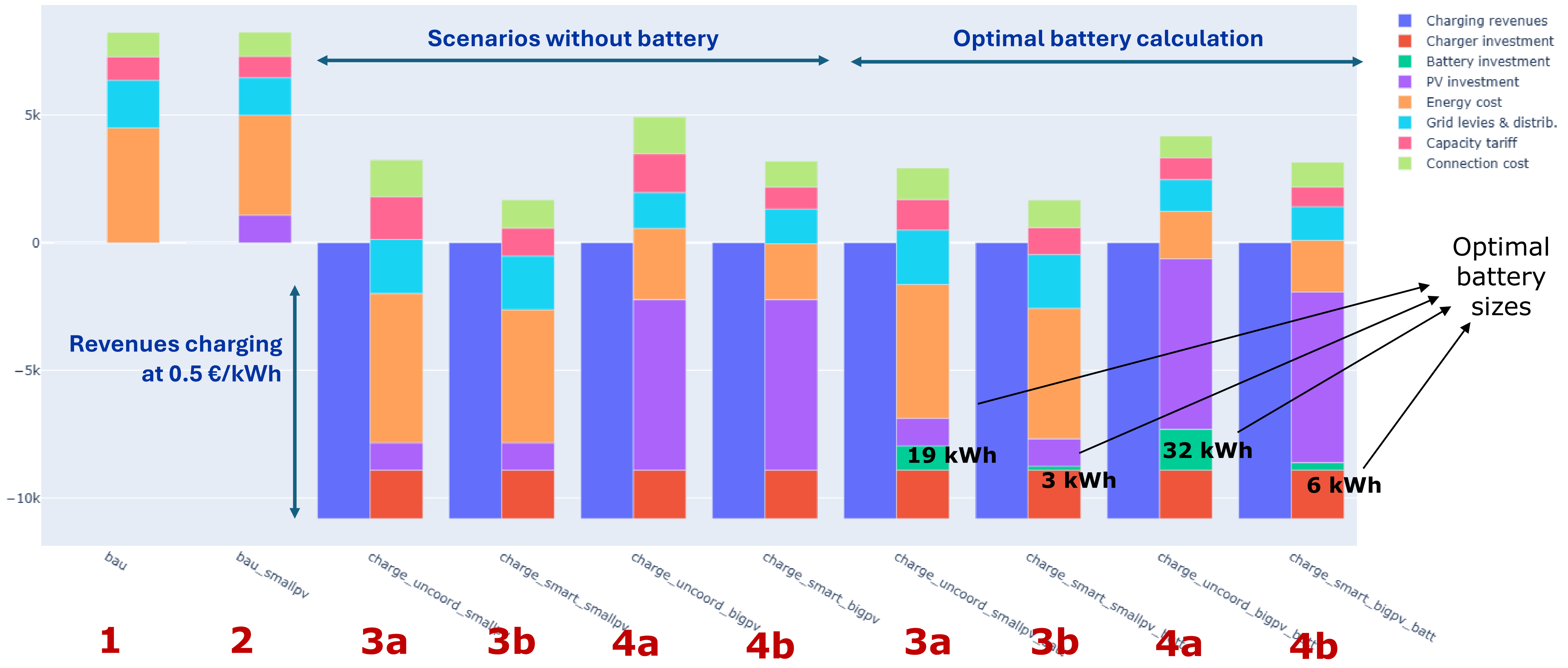


Annualised cost calculation per scenario



Envisioned situation on site

According to the different simulations that have been made the most cost-efficient scenario is the so-called small-scale PV-scenario with smart charging (scenario 3b). This scenario includes the installation of:

- 13.92 kWp of solar panels
- 6 V2G-charging points
- No EMS
- No battery storage

Envisioned situation on site

Since it is very likely that in the near future the PV-capacity will be extended to 93 kWp, however, scenario 3b will no longer apply, but scenario 4 b, large-scale solar with smart charging, will.

This scenario includes the installation of:

- 93 kWp of solar panels
- 6 V2G ready-charging points

Right now it is not really clear to which extent in the very near future super smart charging with V2G-vehicules will be possible super smart. For this reason, there has been opted for a phased approach to battery storage capacity.

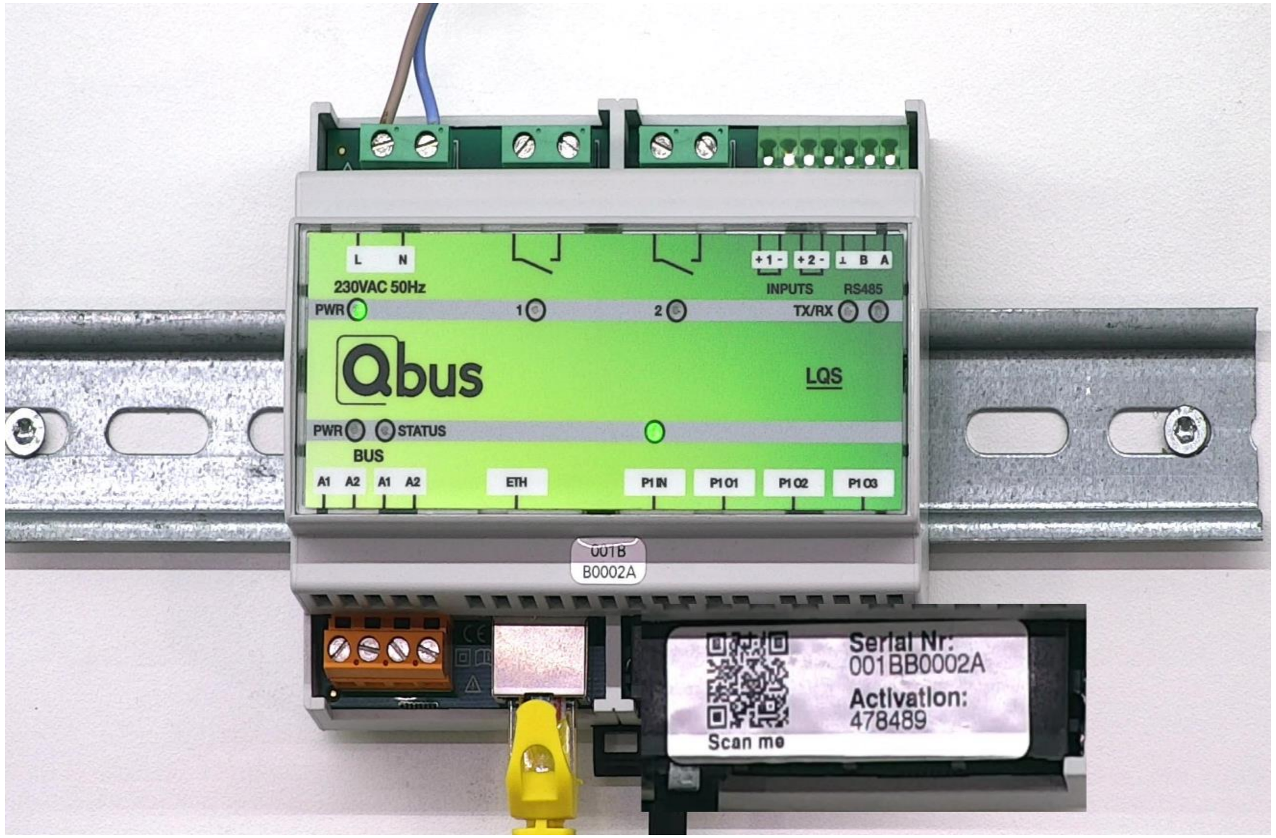
In a first phase a 10-kWh battery will be installed. If desired, the battery storage capacity can be modularly expanded to 30 or 40 kWh.

Envisioned situation on site

To control and monitor the different hardware assets of the Super Smart Chargin Hub a Qbus Luqas Energy Management System will be used.

The Luqas Charging Hub can dynamically control up to 20 charging stations based on the available power and the demand per station. The energy management system ensures a reliable and safe power supply to each charging station. This is done locally, without cloud dependency. The Luqas Charging Hub Module is also equipped with triple load protection thanks to its connection to various Modbus kWh meters. The meters can be purchased separately. Thanks to the real-time reading of locally produced energy, the available power to the charging stations will also be automatically adjusted. Surplus solar energy can also be converted to thermal storage.

Finally, the module receives regular updates to keep up with market changes.



Envisioned situation on site

- The SSCH Living Lab Flanders will consist of:
- 32 solar panels (Risen n-type TOPCon High Performance Dual Glass Module) of 435 Wp with a total capacity of 13,920 kWp on the part of the roof owned by the social housing company
- An inverter of 13,20 kVa (Solax X3-MIC G2 three-phase) in the technical room of the social housing company
- A production meter (KWHIQ 0304100MEGR01+D smart three phase direct connected meter) in the technical room of the social housing company
- Battery (10 kWh, to be extended to 30 or 40 kWh)
- 3 Alphen Eve Double Pro-line, 3 phase, 2x socket Type 2, single feeder charging points at the private parkings spaces owned by the social housing company
- Qbus Luqas charging hub EMS

Conclusion

- This feasibility study shows that developing a solid business case will not be easy. The main reason is that only a limited number of charging points (6) can be provided at the location. Consequently, the investment costs for the EMS can only be averaged across a limited number of charging points, which in turn increases the cost per kWh.
- This is an experimental setup where it is important to understand not only the financial aspects but also the technical aspects of installing a Super Smart Charging Hub. Therefore, it is important to build the Flemish Super Smart Charging Hub in Mechelen.