Sharging

Publik rapport

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Innehållsförteckning

1   Sammanfattning

Sharging är ett projekt som haft som ambition att titta på hur en bristande laddningsinfrastruktur i glesbygden så som Norrland skulle kunna dra nytta av en tjänst där individuella hushåll erbjuder laddningsmöjligheter till förbipasserande elbilar att vid behov kunna ladda. Och hur en affär ska kunna byggas upp på det.

Arbetet har gjorts genom en iterativ process där initiala Value Proposition Canvas och Business Model Canvas låg till grund för användarstudier genom intervjuer och service safari. Resultaten från dessa studier gick därefter vidare in i nästa arbetspaket som handlade om att vidare iterera och utveckla Value Proposition Canvas och Business Model Canvas.

Resultaten av projektet blev ett initialt ekosystem av organisationer som behöver agera i samarbete för att projektet Sharging ska kunna gå in i nästa fas. Under november genomfördes tre avslutande workshops för att iterera hur ett ekosystem av affärsmodeller skulle passa in i varandra.

I arbetet med att utveckla en Business Model Canvas är utmaningen med att välja rätt perspektiv alltid närvarande – vem skapar Value Proposition och vem har en Value Expectation? I projektet Sharging har behovet av att förstå detta utvecklats kontinuerligt. För att vidare förstå detta har Ecosystem Business Model Canvas (Blanco och Esmaeilzadeh, 2020) framtagen bland annat via projektet Sharging, använts för att definiera facilitator, integrator, operatör och användare. Samt att att balansera detta med teknik, infrastruktur och reglering.

När vi tittar på hållbarhet har vi ofta perspektivet miljö och för projektet är detta en självklar del, likaväl som en hållbar affär. Men vi ser också att en social hållbarhet är viktig att ha med och därför designades en workshop ihop med Skatteverket. Den huvudsakliga slutsatsen som kom fram var att det fanns ett större intresse att dela, snarare än att sälja, eftersom husägarna såg detta som att stödja övergången till elbilar och som ett sätt för sig själva att öka deras hållbara påverkan.

Det ska också nämnas att detta projekt genomfördes 2020, Coronaåret, och vad det innebar var att de olika arbetspaketägarna hade en utmaning att arbeta nära och kontinuerligt tillsammans.

2   Executive summary in English

The results of this project is an initial ecosystem of organizations that need to act in collaboration in order for this to be rolled out. Two workshops have been performed to iterated a joint ecosystem of business models would align with each other.

When looking at business model canvases as a way to prototype a new business the perspective of the business is always that which has a big impact on the canvas. Who is the one having a value expectation and who is the one with the value proposition? And how does the value chain connect?

In this particular project the need to understand this has developed continuously. The model that has been developed by Halmstad University then helped us in mapping this out defining who is the facilitator, the integrator, the operator and the user. Balancing this with technology, infrastructure and policy and regulation.

This was based on the interviews that were performed by RISE earlier in the project when the results were pointing towards people not being overly interested or willing to share their electricity, or at least not in an enthusiastic way. It became apparent that this would generate more value to smaller businesses than individual households and that this would be for added value to the business rather

than a business in itself. For example a way to show the business' work within the field of sustainability.

In our workshop with Skatteverket the main conclusion that we found was that there was more of an interest to share, rather than sell, because the house owners saw this as supporting the transition to EVs and as a way for themselves to increase their sustainable impact. Again supporting the idea of the smaller businesses and their need to show their work within sustainability.

It needs to be mentioned that this project was run in 2020, the year of Corona and what that meant was that the different work package owners had a challenge in working closely together.

3 Background

During the spring of 2019 a qualitative user study was performed investigating the thoughts that potential customers had around owning an electric vehicle. Range anxiety was one of their biggest concerns. Compared to driving a fossil fuelled car, electric cars lack an infrastructure of gas stations. This becomes especially evident in rural areas with less developed charging infrastructure, and where it is less likely that OEMs will invest in networks of charging stations. Another aspect of range anxiety was the cold climate that will drain the battery "in the blink of an eye".

Given these circumstances, new approaches to setting up infrastructures for charging must be developed to enable a transition to electric vehicles. Feeling the security of a charging infrastructure will then support the transition even of the most reluctant consumers. The sharing economy in combination with service design, has emerged as a promising approach to infrastructure development based on users sharing private assets in such a way that they will form a shared resource.

With both Uber and Airbnb at the top of our minds, sharing one's most private spaces to strangers has become mainstream. The business models are different, but have in common that available assets are connected in new and innovative ways to create value for all stakeholders: the company does not have to invest in hotel buildings or taxi cars, they are already available and become assets in a new type of infrastructure; people who own an asset can benefit from it, e.g. as a separate income. Unfortunately, this can also create a shadow business; an economy where people are exploited, or a defunct tax system. It is obvious that business models must be developed carefully to drive the development towards as sustainable future.

Polestar is an electric high-performance vehicle with its first fully electric cars coming out 2020. Polestar's vision is to steer car buyers into choosing the eco-friendly option of electric cars over petrol/diesel cars. However, the development of diverse charging infrastructure remains a challenge. Polestar's vision is to enable charging services for all users in such a way that already existing infrastructure can contribute to the creation of a good network of charging stations, thus supporting the transition of existing fossil-fuelled car owners to electric cars, and in addition to connecting to the existing infrastructure already publicly available also developing a platform based on a sharing economy approach.

This innovation will not compete with existing charging infrastructure, it will complement it. Where it has not been already developed there can still be houses that can provide. While we recognize the importance of developing the charging infrastructure, for Polestar building a worldwide network of our own charging infrastructure is not an option, as similar as to us not heavily investing in gas stations. For Tesla this was a way to ignite the market and break the charging anxiety. For Volkswagen their investment in the charging network in the US was a way to pay back for wrongly calculating their emissions for diesel cars. From a Polestar perspective we want to be part of further increasing the accessibility for the charging stations across the country without building the infrastructure from the ground up. A more sustainable solution is to identify the service design, user

motivation and business model innovation needed to build on existing electricity infrastructures available in all homes, shops, and offices as a potential for sharing resources and creating a flexible charging infrastructure that can meet changing requirements and generate incitements for citizens to contribute to sustainable electrified transport.

4   Aim and method

The aim of the project is to

- Explore what the challenges and opportunities of a sharing economy brings.
- Explore what the general mindset in regard to sharing electricity from households with EV owners is.
- Explore what different types of value propositions and business models are interesting and relevant.

The method has been an iterative approach and continuous investigation via:

- General research on charging infrastructure primarily in Sweden.
- Interviews with EV owners and wallbox owners.
- Workshops with relevant organizations and businesses outside of the project.
- Workshops with project partner organizations.

5   Goal

The project had four clear goals: 1) Validate the hypothesis that people are willing to share their electricity and offer charging in their private homes to by passers driving electric vehicles. 2) Based on user studies develop viable business models for Polestar's return on investment. 3) Develop a mock service and test it with users to verify the business models. 4) Explore how to make sharing economy socially sustainable.

The goals of the project changed during the project mainly for number 3 and that was to expand to an ecosystem of businesses rather than just focusing on Polestar. This is more deeply described below in section 6.3.

6   Results and goal completion

6.1   Work package 1

Work package was driven by Polestar and the results of this is apart from this report trying to keep all the project participants moving in the same direction and making sure that the results from each of the different work was aligned. In the first

Half of the project this work was the primary work and both initial value proposition canvases and business model canvases were created based on earlier user research and general knowledge collected. These then created the initial results which the next work packages iterated and developed.

A service safari was also done as a part of this work package doing a drive from Gothenburg to Storforsen in Norrbotten and back to get a tangible understanding of the charging infrastructure. The

results of this was that there was no real challenge in the context of summer and driving along the bigger roads such as E4. [1]

In the second half of the project the there was a clear impact of the Corona year and how the workload increased, and the alignment between the project parts decreased.

6.2 Work package 2

In work package 2 was driven by RISE Piteå with the focus was to do user research on wallbox owners and EV owners, and to match this to the initial value proposition canvases. The user research was done with interviews and the results of this was a list of needs for a service:
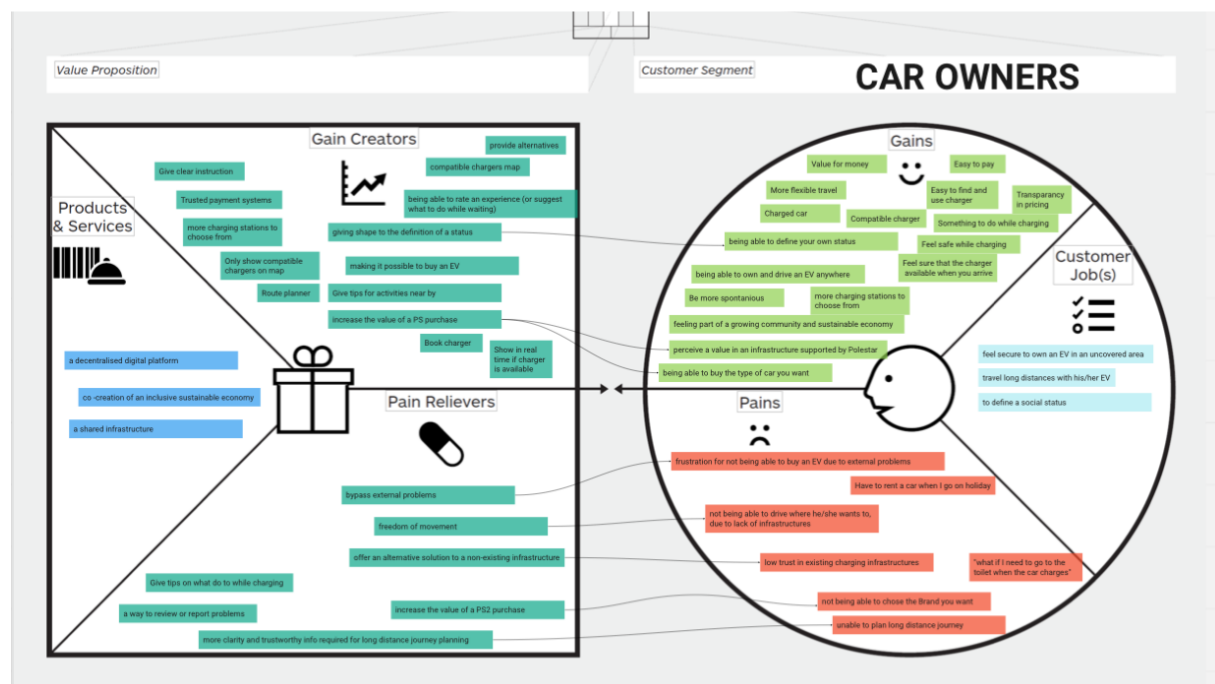
EV owners

Figure 1. Value Proposition Canvas for EV owners created in the initial phase of the Sharging Project

- This service should support a more spontaneous travelling.
- Paying for the service should not be difficult.
- An EV owner need to know for sure that the "sharge point" is available.
- Knowing that the infrastructure is in place will help in the decision to transfer over to an EV.
- Good if there is WiFi and restrooms available, easier for a business perhaps.
- The cost of the sharging should not be more than any other charge point.
- There is no real perceived issue about feeling safe when sharging.
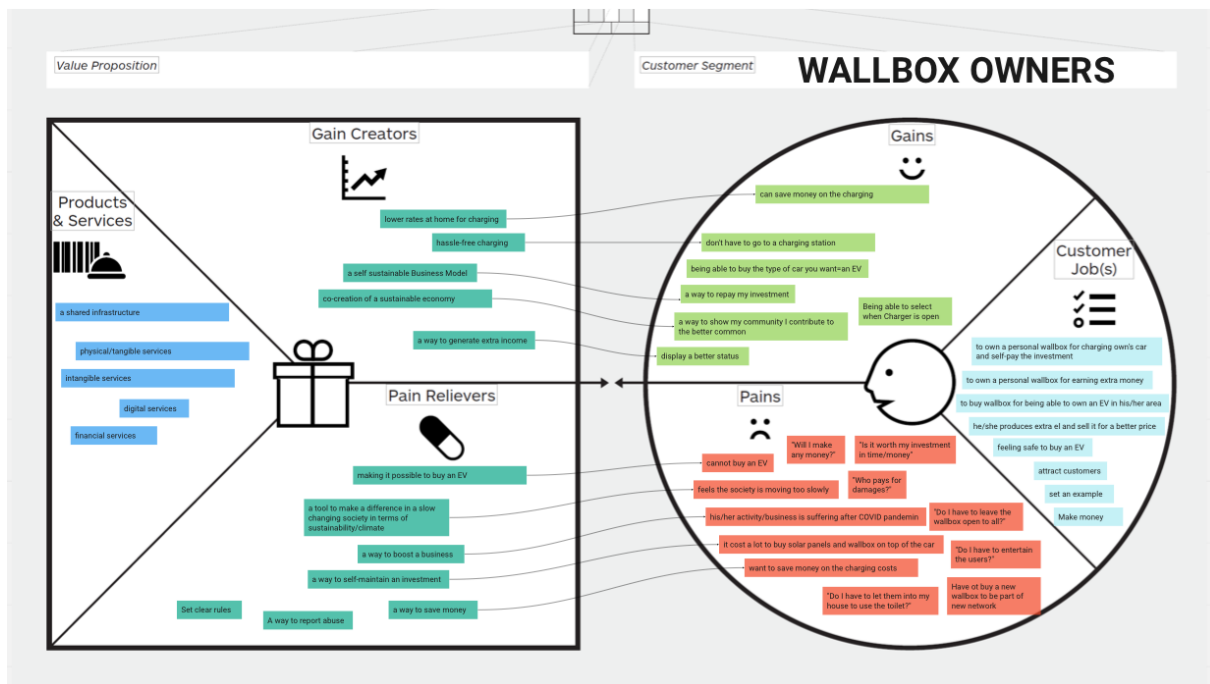
Wallbox owners

Figure 2. Value Proposition Canvas for Wallbos owners created in the initial phase of the Sharging Project

- All of the defined pains and gains around how to finance an EV and a wallbox was confirmed in the interviews.
- Also the pains in relation to integrity of the private households as opposed to the businesses who instead saw the opportunities. But the type of business is of course important so that there is no conflict.
- For businesses the aspect of a sustainable work was important as a part of the overall work around this.
- Solar panels were of interest in order to further develop the area around sustainability.
- One interviewee thought that the state should take responsibility of this rather than individuals.
- For businesses this was seen more as a way to get more customers than to make a business.
- Worry around support and maintenance came up.
- It was mentioned that networking and contacts through social media would help in establishing new services.
- The potential seemed bigger for smaller businesses than for the private households.
- The EV should plan and support the driver with where to charge / sharge.
- The EV should keep track on the consumption and the cost of it.
- Support in how to pay should be built into services.

6.3   Work package 3

The aim with this Work Package was to better understand how the different business models will have an effect on the outcome. The work aimed to explore possible business models from a Polestar perspective, on their own but also together with strategic partners. This WP included creating

necessary assets to see the interest in the service. The overall deliverable was decided to generate a description and a recommendation of the possible business models and what challenges and opportunities that they carry.

A deviation from the original plan was done concerning 3.4. The initial goal was set to develop a mock web for signing up to a service and possibly social media campaigns in order to see the interest in the service. During the project we decided that it was more valuable for the outcome of the project to do a series of workshops with companies to identify value generation in the future Sharging network, in collaboration with potential partners in the implementation of the future Sharging ecosystem network. The output of 3.4 was therefore reconfigured from Perform test of business models using a mock, into the activity Perform test of developed ecosystem approach to business model innovation with companies.
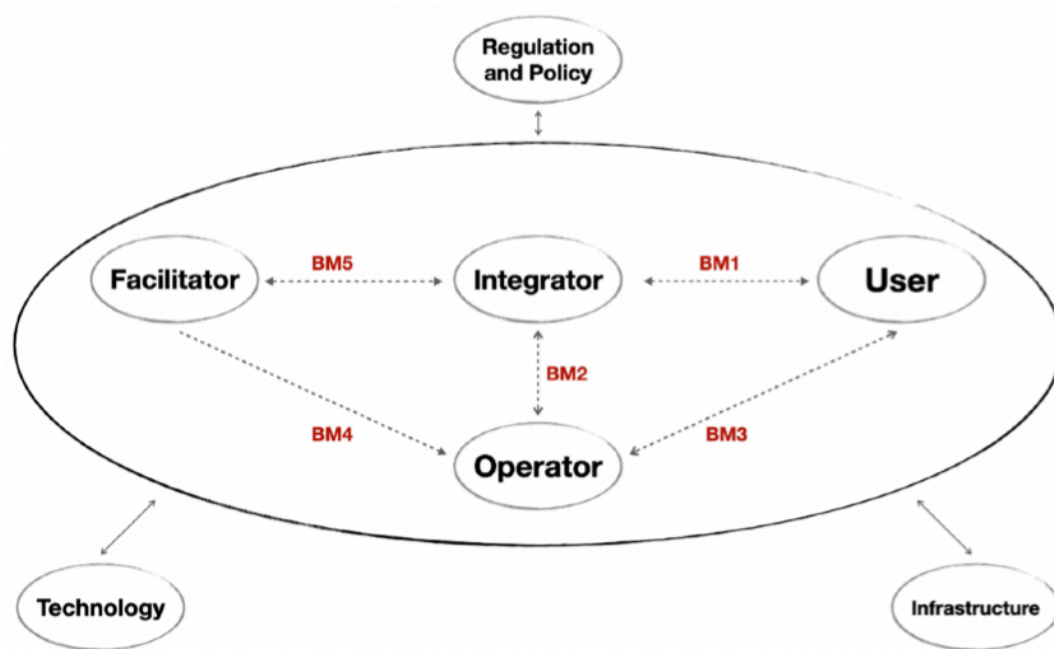

Figure 3. The developed Ecosystem Business Model Canvas. Blanco and Esmaeilzadeh (2020).

Potential roles and business models for Polestar in the ecosystem

- Integrator: Polestar owns the platform and builds a service and e.g. takes a percentage for allowing all actors in the ecosystem to use the platform
- Integrator: Polestar owns the platform and offers it for free. This creates a strategically important position in the EV and charging ecosystem. The service can be provided to only Polestar/Volvo owners, or could be opened to all OEMs. Polestar is branded as a leading provider of integration services to promote sustainable transport
- Facilitator: Polestar offers financial solutions to engage more wall-box owners in areas that particularly would benefit from increased access to charging stations. A challenge here is if it should be offered to Polestars owners only (exclusivity) or to all existing and future wall-box owners to facilitate the development of charging infrastructure
- Facilitator: The platform is developed and owned by an Integrator and included in the Polestar Android platform
- Operator: Polestar takes the role of being an electricity provider or teams up with an electricity provider and/or infrastructure owner and gets fees from transactions. Can offer a packaged deal to Polestar owners to attract car owners

- Technology: Polestar uses the car as a platform to gather data about charging behavior (combine data from cars with platform owner data)

Polestar value generation

In addition, other aspects of Polestar value generation was taken into account by interviewing Polestar personell (November 4, 2020):

- Sustainability in all different aspects (environment, society, business)
- Openness: we do not create our own products. we want to cooperate with specialists (Wall boxes, payments, taxes, platform, etc)
- Our intent is to be incubators and then let other stakeholders take over
- Hypothesis driven and data driven way of working
- Inclusion: the idea is to create a community with the same ideals where profit is not the focus. Anyway, small businesses seem the more viable solution. the platform could attract more customers, display an environmentally friendly approach, etc.
- Sharging as a further way to accelerate change
- Sharging to lead our community towards different behaviors

Sharging service Mock-up

A digital solution for a mockup was initially designed according to the layout of WP 3.4 (but later abandoned, see Introduction). Design requirements were:

- Wall-box should be accompanied with service-package
- An app to manage both for the seller and for the buyers
- A digital map where stations light up green currently available for charging (disappears when a person is a way)
- View both charging stations and private individuals (all brands)
- Existing solution with planning route on map with charging stations marked (and trip planned including charging)

3.4 Perform test of developed ecosystem approach to business model innovation with companies

As part of testing and validating the Ecosystem Business Model Canvas, and to identify a Sharging consortium for the next step of the project, to activities where conducted:

- We identified cases of existing ecosystem solutions within mobility and analyzed them using the canvas. As an example we used the General Motors: Building an EV Ecosystem and All- Electric Future case.[2] The case describes General Motors' launch of an ecosystems approach to change the entire mobility and energy ecosystem to work together toward a single goal – a zero-emissions, all-electric future, by uniting and exploring solutions across every facet of the EV ecosystem (charging, ride-sharing, infrastructure, battery and vehicle development). The analysis of the case identified the different roles in the ecosystem taken by the actors (General Motors, Nikola, Ultium, Evgo, LG Chem, Honda, Qmerit).
- As a next step companies were invited to further develop and validate the Ecosystem Business Model Canvas. We did three workshops where in total 18 people representing 11 companies and organizations participated during three workshops (Bee, Diadrom Holding AB, Easypark, Göteborg Energi, Länsförsäkringar, P-air AB, Polestar, RISE, Semcon AB,

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[2] *https://www.gm.com/electric-vehicles/ev-ecosystem-collaboration.html*

Volvo Cars, WirelessCar).[3] The first workshop was an information meeting, the second was the main workshop, and a third activity aimed at setting up the Sharging consortium. The output of the workshop was a validation of the Ecosystem Business Model Canvas (Figure 3), and an invitation to become part of the Sharging ecosystem.
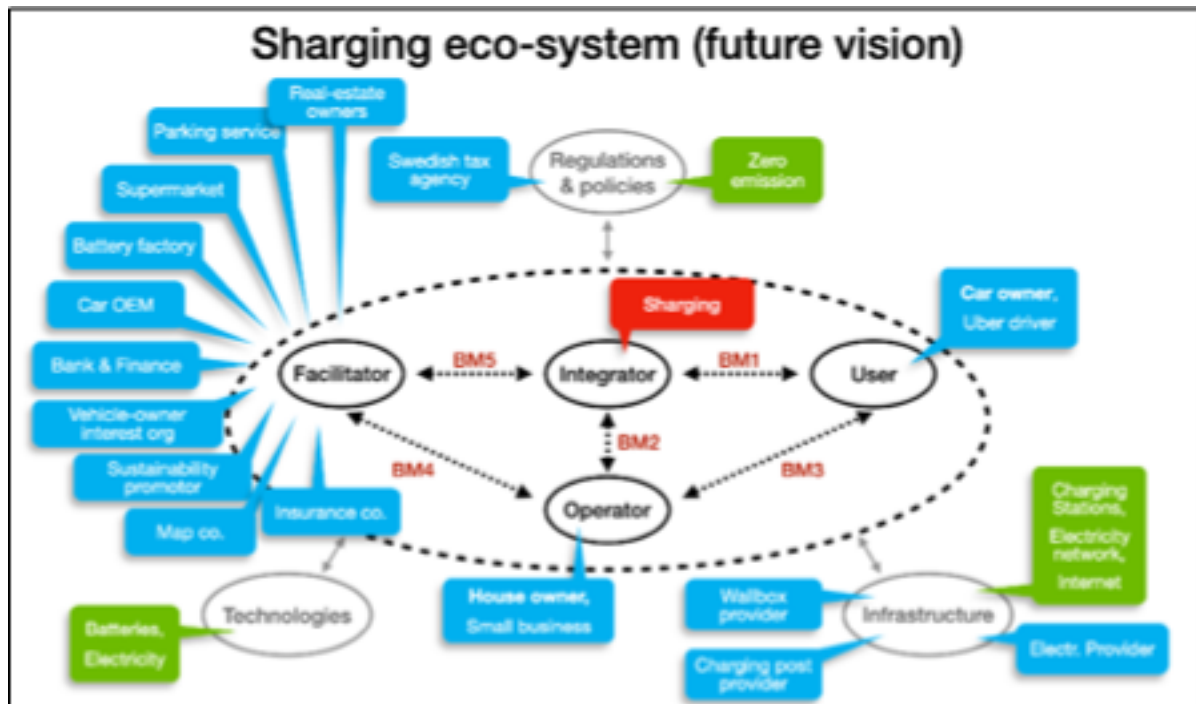

Figure 4. Output of company workshop where the Ecosystem Business Model Canvas was applied on the Sharging case.

3.5 Compare and analyze results

Finally, the WP met with the other WPs to share results and prepare for project roundup and report writing. An important input to WP 3 has been the results from Rise interview study with potential wall-box owners/providers, as reflected in Figure 4.

6.4 Work package 3

In work package 3 a workshop facilitated by Unicornsulting with participants from Skatteverket and from all three parts of the project. This was more about getting to know one another and to establish a contact that would help in the continuous work with the Sharging project in order to make sure that there is an aspect of social sustainability added.

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[3] *All stakeholders did not take active part in all three activities*

7   Spridning och publicering

7.1   Kunskaps- och resultatspridning

Hur har/planeras projektresultatet att användas och spridas?	Markera med X	Kommentar
Öka kunskapen inom området	x	This project is used as a way to better understand the challenges of overcoming range anxiety and through that be better equipped in taking on the discussion around the need of infrastructure.
Föras vidare till andra avancerade tekniska utvecklingsprojekt		
Föras vidare till produktutvecklingsprojekt		
Introduceras på marknaden		
Användas i utredningar/regelverk/ tillståndsärenden/ politiska beslut	x	ibid

7.2   Publikationer

In this project the publications have only been in the channels owned by the three organizations participating in the project:

Polestar Performance:
https://www.polestar.com/uk/news/research-project-sharging/
https://www.polestar.com/uk/news/boden-and-back-in-the-polestar-2/

Halmstad University:
https://www.hh.se/english/research/research-environments/embedded-and-intelligent-systems-eis/technology-area-digital-service-innovation/research-projects-within-digital-service-innovation/sharging.html

RISE
https://www.ri.se/sv/vad-vi-gor/projekt/sharging

8   Conclusions and next steps

Next steps in the project Sharging need to focus on the ecosystem of organisations and business that were defined in work package 3 in the project. Further exploring how the different business models can align and co-exist. Also more deeply investigate each of those value proposition and balancing towards the value expectations. Today we find that these two are not aligned based on the model presented.

9   Participants and contact details

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