Addressing the Barriers to Regional Electric Vehicle Projects through Stakeholder Engagement

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Abstract: The transport sector is making slow progress towards sustainability, particularly given the urgency and scale of the sustainability challenges associated with the sector and the number of solutions that exist. This thesis uses a three-phase research methodology to identify and provide guidance to help address the barriers preventing the expansion of one of the most rapidly growing transportation alternatives: electric vehicles. The engagement of stakeholders can act as a strategic point of intervention to address these barriers and facilitate the regional market introduction of the technology. A process was therefore developed to help project management in the pre-project planning phase to address the key challenges to engagement that are commonly experienced on electric vehicle projects. The process combines a Strategic Sustainable Development approach with Best Practice for Engagement. Information was sourced from literature and interviews with experts in electric vehicles, stakeholder engagement and Strategic Sustainable Development. Initial feedback from testing the process on an electric vehicle project indicates that this guidance is timely and likely to become widely applicable on similar projects in the future.

Keywords: Stakeholder Engagement, Best Practice, Electric Vehicle Projects, Framework for Strategic Sustainable Development, Systems Perspective, Project Management
Statement of Contribution

This thesis evolved from a shared interest in stakeholder engagement, a concern around the contribution of the transport sector to the sustainability challenge, and a desire to create practical and tangible guidance for project managers to use to facilitate the market introduction of EVs. Each group member brought their own individual strengths and expertise to the thesis process. Kareisa has knowledge and experience of working in the electric vehicle industry, combined with her previous knowledge of sustainability. Her natural project management skills have helped the group stay on track of their goals to succeed in this thesis. Nathalie has experience in multi-stakeholder engagement, project management and working for several years in the field of sustainability. The research was also shaped by her avid interest in facilitating cross-sector collaboration to share best practice and develop integrated solutions to help move society towards a sustainable future. Mary has a background in business and also has an interest in value creation.

Over the course of this thesis, the group has been challenged to overcome a number of obstacles. We are grateful for the experiences and opportunities that we have been fortunate to gain through the duration of this thesis. It provided a steep learning curve and equipped us with a set of invaluable skills that we will take forward with us on future endeavours.

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Executive Summary

Introduction
Society in the twenty-first century faces a number of complex, interconnected sustainability challenges, such as climate change, poverty and deforestation. This complexity requires new, whole-system approaches, integrated solutions and cross-sector collaboration to address them.

The transport sector contributes significantly to today’s sustainability challenges, particularly when considering the impact of greenhouse gas (GHG) emissions (linked to climate change), widespread and destructive land-use, and toxicity from the accumulation of linearly processed materials (Kahn Ribeiro et al. 2007). The need is therefore widely recognized to transition to more sustainable alternatives. Electric vehicles (EVs) form a solution to one part of the transport challenge, mainly with respect to the reduction of GHG emissions. They therefore play a role in bridging the gap from today to fully sustainable transport solutions in the future. However, there are still a number of barriers related to the technology, such as the cost and limited range of the vehicles (battery), and EVs do not yet provide a fully sustainable solution. Early exploratory research led the authors to conclude that the effective engagement of project stakeholders could act as a key point of intervention to help address the barriers that currently prevent the wider introduction of EV systems, which are referred to in this document as the ‘external barriers to EVs’. This is because the uncertainty and risk related to these external barriers cause mental blocks that prevent potential stakeholders from engaging which, in turn, reinforces the barriers to EVs. Stakeholders in the pre-project phases are likely to include municipalities, the project management and key decision makers, research bodies, the media, energy agencies, key funders, and perhaps the charging infrastructure and vehicle suppliers and manufacturers, transport authorities, regional government, politicians and local businesses. The users and general public are less engaged in the early stages.

Aim and Approach
The aim was therefore to identify the key challenges to the engagement of stakeholders on EV projects and develop guidance that combines a Strategic Sustainable Development (SSD) approach with what is identified through research as Best Practice for Engagement. The purpose is to help project management in the pre-project planning phase of EV projects to be more effective at addressing the engagement challenges that might
otherwise threaten the success of the project and regional introduction of EVs. An SSD approach was chosen as it is designed to facilitate planning and decision-making in complex systems. The Framework for Strategic Sustainable Development (FSSD) is a tool that offers a way to organise and analyse intricate information, and can help build a shared mental model to enhance understanding and cooperation between stakeholders.

**Research Questions:**

1. **How can the key challenges to engagement on EV projects be addressed using an SSD approach combined with Best Practice for Engagement?**
   
a) Through the lens of FSSD and Best Practice for Engagement, how do EV projects currently engage stakeholders?
   
b) From an FSSD, Best Practice and EV project management perspective, what are the key challenges when engaging stakeholders?
   
c) How can an SSD approach be combined with Best Practice for Engagement to provide guidance to help EV project managers address these engagement challenges?

**Methodology**

The methodology comprises one pre-phase and three main phases. The pre-phase was to develop the research scope and aim. Phase 1 was to review current engagement practices against an *ideal* that was created using the authors’ knowledge of SSD and Best Practice for Engagement. This was to answer Research Question (RQ) 1a. Phase 2 identified key challenges to engagement on EV projects to answer RQ 1b. Phase 3 was to develop, test and refine an Engagement Building Process (EBP) to answer RQ 1c. The data was primarily collected through semi-structured interviews, open and closed survey questions, expert feedback, testing the process on stakeholders of an EV project, and reviews of literature and the stakeholder engagement strategies gained from existing project contacts. 17 survey responses were received and 18 EV experts were interviewed (project managers, stakeholders and consultants) with diverse experience on EV projects around the world. 12 multi-stakeholder engagement experts and 7 FSSD practitioners were also interviewed to inform the EBP. The process was tested for its practical application on an EV project in Sweden and gained feedback from 5 experts in the field of EVs, transport, multi-stakeholder engagement and FSSD. Data was analysed using open coding and checked for validity throughout.
Results
Key findings from the review of current engagement practices against what is defined by the authors as an ideal from a Best Practice and Strategic Sustainable Development perspective, were that EV project management and stakeholders overall lack a long-term, whole systems perspective and a sense of shared purpose. Very few mentioned sustainability in their definition of success and there was little awareness of EVs and the project goal (e.g. carbon neutrality by 2030) being a stepping-stone towards sustainability. Instead, many believed EVs to be a fully sustainable solution and commonly measured success based on profit margins, the number of stakeholders involved and the amount of media attention projects can attract. Project stakeholders have diverse and at times divergent and conflicting mental models and motivations leading to challenges to collaboration and engagement. At the strategic level, there was evidence of backcasting from the project goal. This involves envisioning a desired outcome and then planning strategic steps to reach it. However, the choice of actions and tools was largely uncoordinated from a Strategic Sustainable Development perspective, as they were not selected based on strategic guidelines to navigate the project towards success that includes sustainability. Nonetheless, project management acknowledges the need for a collaborative, whole systems approach to stakeholder engagement and many expressed an interest to create an integrated stakeholder “ecosystem”.

From the results of answering Research Question 1a, the following key challenges to engagement were distilled, based on the perspective of EV project management and the authors analysis from an Strategic Sustainable Development and Best Practice perspective: 1) The external barriers to EVs, such as the cost and range of the vehicles; 2) The lack of long term perspective i.e. planning and thinking short-term; 3) The lack of a whole systems perspective (not a full overview of the complexity and interconnectedness of the project or sustainability challenge); 4) Competition between stakeholders, reducing cooperation and collaboration; 5. Having the right people at right time involved; 6) The lack of a common goal and shared purpose; 7) Divergent (at times conflicting) interests; 8) The lack of a shared mental model (shared knowledge and experience). Furthermore, it became apparent that engagement around EVs is a particular challenge as it involves the adoption of a complex blend of new technology and transition to new regional-scale infrastructure. This requires both changes in mind-set and behaviour to overcome the perception of risk
and uncertainty associated with the technology, as well as new forms of cross-sector and cross-functional collaboration between stakeholders that have little existing experience communicating with each other.

To effectively address these challenges, the need was identified for systematic guidance that is tailored specifically to both the engagement challenges that are unique to the context of EV projects and to audiences with limited prior experience of Strategic Sustainable Development or sustainability. As a result, a 3-Phase Engagement Building Process (EBP) was created to fill the need. Phase 1 aims to: a) create a shared conceptual framework (mental model) between the Core Group members; b) build the foundation for the project by defining the initial core values, terms of engagement and vision for the project; d) begin to remove the mental blocks caused by the external barriers to EVs that are preventing engagement; and e) assemble the Steering Group in preparation for Phase 2. To address the challenge of not having the right people engaged at the right time, EV project management also received Recommendations for Strategic Engagement. This predominantly provides guidance for strategic planning as to which stakeholder groups engage at different stages of an EV project. The purpose of Phase 2 is to: a) disseminate this shared mental model to the selected Steering Group, b) help them overcome the mental barriers that restrict engagement; c) build relationships and align stakeholder interests; d) co-create and solidify the project vision, core values and terms of engagement. In Phase 3 the Steering Group presents the outcomes of Phase 2 to the wider stakeholder network (Working Group) to further disseminate this shared conceptual model and promote full understanding, agreement and engagement among all project stakeholders.

**Discussion**

From the results, five key findings were identified: 1) There is a vicious cycle between the engagement of stakeholders and the other external barriers to EVs, which suggest that engagement can act as a key point of intervention to help break this cycle to facilitate the market introduction of EVs; 2) The challenges to engagement are interconnected and can reinforce each other; 3) Engagement in the context of EV projects is particularly complex and problematic and there are challenges that are unique to the context of EVs; 4) While project management realise the need to take a collaborative, whole systems approach to stakeholder engagement on EV projects and express a desire to create a stakeholder “ecosystem”, a value-action gap was identified as there was little evidence from projects that suggested a participatory, systems approach; 5) Only a fraction of EV
project management and stakeholders are motivated by a deeper desire to move the transport system towards sustainability.

The combination of an Strategic Sustainable Development approach integrated with Best Practice allowed for the development of a process that effectively addresses all the engagement challenges identified on EV projects. It does so by building a shared understanding and collective purpose, aligning stakeholder interests, creating agreed values and terms, and breaking down the mental blocks caused by the external barriers to EVs. The research for this thesis contributes to the field of SSD by applying the approach and providing guidance (in the form of a process) that is tailored to build stakeholder engagement specifically in the new, largely unexplored field of EVs. New information is added from the analysis of current engagement practices about how EV projects: currently understand the system (EV projects as part of society in the biosphere); define success; and are strategic when planning to reach project goal within a sustainable transport system.

**Conclusion**

The need to shift to more sustainable transport solutions is being recognised today more than ever before, as the impacts of the sector grow in scale and significance. This is particularly given the expansion of individual mobility in emerging economies. It therefore becomes increasingly important to address the barriers to electric vehicles to help facilitate their introduction as one solution to that challenge. As outlined above, a critical starting point, or pre-requisite, is through the engagement of stakeholders. As there is currently no clear, context-specific guidance to support project management with this, a process to address this gap was developed. From initial feedback, there is confidence that the findings and guidance will help address the engagement challenges on EV projects to help break the vicious cycle between engagement and the external barriers that prevent the wider introduction of EVs. The need is recognised to simultaneously invest in enhancing the sustainability of electric vehicle technology, including the social conditions throughout electric vehicle supply chains. This is therefore recommended for future research, along with studies of how to promote the adoption of EVs, how to address the external barriers directly, and how to convert the Engagement Building Process into a web tool that can be tailored to individual users.
Glossary

ABCD strategic planning process: A process to implement the conceptual Framework for Strategic Sustainable Development in an organisational context to facilitate backcasting from sustainability principles. The letters represent the following steps:

A – Gain awareness of the system (your organisation or project within the wider ecological and social systems) based on an understanding of the sustainability principles (SPs).
B – Conduct a baseline assessment of today’s current situation reviewing the organisation’s strengths and weaknesses, including where it contributes to unsustainability (misalignment with the SPs) and sustainability (compliance with SPs).
C – Brainstorm creative solutions to the issues discovered in Step B without consideration of technological, political or other constraints.
D – Prioritise the actions developed during Step C by asking: whether or not the action moves us in the right direction (toward alignment with the SPs)? Is this action a flexible platform for future improvement? Does this action provide a return on investment (socially, economically or financially)?

Backcasting: A method in which a successful outcome in the future is imagined and steps are defined to reach that vision of success in the future.

Backcasting from Sustainability Principles: As above but ensuring that the vision includes complying with the four sustainability principles so the goal being worked towards is feasible in a sustainable society (Holmberg and Robèrt 2000)

Best Practice (for engagement): Practices and principles that have proven to lead to the effective engagement of stakeholders from the experience of project managers on electric vehicle projects and multi-stakeholder engagement experts, and that are additionally informed by a Strategic Sustainable Development approach, such as taking a systems perspective.

Ecosystem: A complex community of living beings interacting and functioning as a unit within a system.

Effective (engagement): Engagement that is transparent, inclusive, participatory and all stakeholders are interested, involved and have their
needs met while being in line with both SSD and Best Practice.

**Engagement (of project stakeholders):** The process of involving stakeholders by keeping them openly informed and participating.

**External Barriers to Electric Vehicles:** Barriers that are inhibiting the market introduction of electric vehicles, such as the limited range and cost of the vehicles and the lack of standardised infrastructure.

**Framework for Strategic Sustainable Development (FSSD):** A framework for planning in complex systems that helps societal transformation towards a sustainable future.

**Long-term perspective:** Looking and planning past the goal of the project by focusing on greater success of achieving sustainability.

**Mental Models:** The assumptions and generalisations based on an individual’s previous knowledge and experience of a topic and the world.

**Pre-project planning phase:** This is in most cases after the project has been formally approved and the initial funding has been secured. At this stage the mission statement (and perhaps a basic, initial project vision) will usually have been created to secure funding.

**Stakeholder:** A group or individual that has an stake or interest in a project and is affected by or influences the project activities.

**Stakeholder Ecosystem:** A value network of interdependent, non-competing partners that cooperate responsibly to seek mutually-beneficial outcomes.

**Strategic:** Using strategic guidelines to select and prioritise tools and actions that help reach success within a sustainable society. From the perspective of project management on EV projects, strategic means acting and planning intentionally in a premeditated, coordinated and tactical manner towards a set goal.

**Strategic Planning:** A systematic, forward-thinking process whereby organisations plan their future direction and define the strategic steps towards their set goal.
Strategic Sustainable Development (SSD): Development and strategic planning based on first-order principles for sustainability (TNS 2012).

Sustainability: A state in which society does not systematically undermine natural or social systems within the biosphere.

Sustainability Principles: Principles that are meant to be used in order to achieve sustainability, Therefore in a sustainable society, nature is not subject to systematically increasing:

1. Concentrations of substances extracted from the Earth’s crust
2. Concentration of substances produced by society
3. Degradation by physical means

And in that society:
4. People are not subject to conditions that systematically undermine their capacity to meet their needs. (Holmberg 1995, Broman et al. 2000, Ny et al. 2006).

Terms of Engagement: Terms that outline how project stakeholders have agreed to interact with each other. For example, having transparent decision making processes.

The 5-level Framework (5LF): A generic framework for planning and decision making in complex systems, consisting of 5 distinct, non-overlapping levels: Systems, Success, Strategic, Actions and Tools Levels.

Vision: A long-term view that envisages a desired future and concentrates on what an organization wants to be, or how it wants the world in which it operates to operate. It is comprised of core ideology (core purpose and values) and an envisioned future (strategic goals and vivid description of the desired future).

Whole–Systems Perspective: A complete overview of a system (the project and all its stakeholders and its role within society and the biosphere) as well as the connections and interactions between the system’s parts.
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1 Introduction

1.1 Sustainability Challenge

Today, there is an increasing consensus that society in the twenty-first century faces a number of growing sustainability challenges that include climate change, resource depletion, pollution, deforestation, water shortages, inequality and poverty (Rockström 2009, Kahn Ribeiro et al. 2007). A way to visualise these challenges is by using the metaphor of a funnel, shown in Figure 1.1. It illustrates the declining potential of the planet to sustain humanity and other species as the pressure humans place on resources and ecosystem services increases. It is the systematic\(^1\) nature of the pressure as a result of the way society is structured (Boisvert et al. 2009). This is largely because the economic model relies on continuous growth which has required the exploitation of large volumes of natural resources that are processed in a linear fashion, creating the scale of challenges that are reducing the capacity for society to adapt (Porritt 2005).

\[\text{Figure 1.1 Funnel Metaphor (Boisvert et al. 2009, vii)}\]

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\(^1\) Increasing deviation from the *natural* (pre-industrial) levels.
The important question that Figure 1.1 attempts to illustrate is whether society can reduce its contribution to unsustainability fast enough to prevent the walls of the funnel closing, which would lead to potentially irreversible consequences such as a shift in climate or mass starvation (Robèrt et al. 2002). In a sustainable society, resources are not over-utilised, natural systems are not degraded and polluting substances are not produced at a rate that exceeds nature’s ability to replenish or process them, and humans are not prevented from meeting their needs\(^2\) (Hitchcock and Willard 2009, 19-20).

The sustainability challenges outlined above are complex, systemic issues that are interconnected and interdependent (Capra 1990, 64, Fiksel 2006). Systems have nested hierarchies, emergent properties, multidimensional interactions and feedback loops that make impacts non-linear and difficult to predict (see Nordhaus and Shellenberger 2007, Rammel et al. 2007) for a more detailed explanation). This complexity requires new, whole-system\(^3\) approaches, integrated solutions and cross-sector collaboration to address the challenges (Bojer 2008, Hjorth and Bagheri 2006). As the different sectors of the world today are so interconnected, the success of one sector is dependent on numerous other sectors. The transportation system, for example, cannot operate sustainably in an unsustainable society. It relies on the cooperation of and changes within sectors such as energy, spatial planning, technology and manufacturing. Their success also depends on policy changes, such as favourable taxes and incentives, and shifts in public perception and behaviour (Jones 2011).

### 1.2 Transport Sector and Sustainability

The transport sector has played an important role in societal development and has enabled the level of globalisation, trade and mobility that is experienced around the world today (Kahn Ribeiro et al. 2007, World Business Council for Sustainable Development 2002). However, the current

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\(^2\) As defined by Max Neef (1991): subsistence, freedom, creativity, understanding, participation, idleness, identity, affection and protection.

\(^3\) Approaches that study systems as a whole with consideration of the full complexity and interconnectedness of the different parts of the system and their interaction, rather than an approach that uses linear, mechanic thinking and breaks systems into parts to be study separately (Hjorth and Bagheri 2006).
fossil-fuel dominant transport system was constructed prior to the known effects of the anthropogenic impacts of the industrial revolution, such as ozone depletion and climate change (Kahn Ribeiro et al. 2007). Today, this transport system that was developed based on very mechanistic thinking and linear forms of processing materials is out-dated and remains unsustainable in a world where the global population continues to expand (Dietz et al. 2007, Kahn Ribeiro et al. 2007). The structure of the system has led to the sector contributing to a number of sustainability challenges (Chapman 2007, Jackson 2011). These include the physical destruction of ecosystems through deforestation and mining to build the necessary infrastructure and mine the required metals, minerals and fuels. This, in turn, causes both localised and more widespread health and environmental impacts related to water, air and noise pollution, biodiversity loss and secondary impacts such as acid rain and ocean acidification (Rockström 2009). The displacement of communities, poor working conditions and human rights abuses related to the mining of metals are also a serious consequence (Marker et al. 2005, 96-97).

However, two of the most cited and significant contributions of the sector to the sustainability challenge are climate change, caused largely by anthropogenic greenhouse gas (GHG) emissions, and the linear processing of large material flows used to build the vehicles and required infrastructure (World Energy Council 2011). The combustion of fossil fuels has risen drastically since the industrial revolution in the nineteenth century and is today the largest cause of anthropogenic GHG emissions. The transport sector is responsible for 23% of global GHG emissions (OECD 2008), which represents around 10% of the total human-caused emissions each year (Fuglestvedt et al. 2007). Furthermore, it is predicted that the demand for fuel for transportation will rise by an additional 40% by 2035 (International Energy Agency 2011, 10). These GHG emissions contribute to the rise in global average temperatures and climate variability caused by the Greenhouse Effect. This leads to a number of complex, interconnected sustainability challenges, such as rising sea levels and desertification (Solomon et al. 2007).

At the same time, the transport sector creates significant material flows (metals and minerals from the Earth’s crust). This makes the sector very unsustainable as resources are depleted at a rate that exceeds the ability of ecosystems to replenish them. At the same time, waste material accumulates in the biosphere at a rate that cannot be processed by nature,
creating a toxic and polluting effect. As these impacts increase, the biosphere and society are increasingly restricted as they come closer to the shrinking walls of the funnel, as shown in Figure 1.1. As a result, there is a need to transition to more sustainable alternatives (Whitmash and Nykvist 2008, Skinner et al. 2010, Wakeford 2011, Jackson 2011).

1.3 Alternative Transport Solutions

To address the challenges described above, a combination of these two approaches could help us transition from our current fossil-fuel driven, high mobility transport system to a sustainable one:

a) Dematerialisation: Reduce demand for energy-based transport services. For example through online services (teleconferences, webinars, teleworking and online shopping). However these also do not present fully sustainable solutions by themselves due to their associated carbon footprint the resources required for the production and transportation of materials such as computers, and the social conditions within supply chains (Boccaletti et al. 2008). Carpooling, education campaigns, the development of cycle routes and smarter spatial planning to reduce travel distances and the development of cycle routes (Kane 2010, 102) are just a few of the other possible solutions.

b) Substitution: Develop alternative transport models and systems. For example, car leasing, mobility services, integrated public transport systems, and alternative fuel vehicles such as biogas, bioethanol, biodiesel, hydrogen, compressed natural gas and electric vehicles (Kane 2010). However, it is important to acknowledge that there are also challenges associated with bio-fuels such as competing with agricultural land, as outlined in Doornbosch and Steenblik (2008).

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4 Meeting the same need (providing the same product or service) with less material and energy consumption (Ausubel and Waggoner 2008).
5 To meet the same need with a different product or service. In other words: a replacement.
1.4 Electric Vehicles (EVs)

While the technology has been around since the nineteenth century (Stichting Natuur en Milieu and c,mm,n 2.0 2009, 7), mass production and expansion of EV systems as an alternative to fossil fuel vehicles only began on a significant scale in the 2000s (Sperling and Gordan 2009, Husain 2011). Numerous studies outline the progress and regional expansion of the technology to date (Scott 2011, Chan 2002, Offer et al. 2009, Eberle and von Helmolt 2010, SMMT 2010, Narich et al. 2011, The International Cleantech Network 2011, and Tsang et al. 2012). The technology is expanding rapidly and is set to rise significantly over the next 2-5 years (Atomic Energy Authority Technology 2009, Narich et al. 2011). Some of the global leaders in the field include Denmark, the United States, the United Kingdom, the Netherlands, Singapore, Canada, France, Sweden, Australia and Israel. Electric vehicles form a solution to one part of the transport challenge in relation to sustainability. This is mainly through their potential to reduce fossil fuel consumption, and therefore GHG emissions; by as much as 90% if they are using renewable, local energy sources (Stichting Natuur en Milieu and c,mm,n 2.0 2009, 7). EVs therefore also have the potential to reduce air, water and noise pollution (Nigro 2011), which in turn decrease public health issues and ecosystem damage (The Center for Climate and Energy Solutions 2012, Kahn Ribeiro et al. 2007). EVs therefore play a role in bridging the gap from the current unsustainable transport systems to future fully sustainable solutions (Nigro 2011, Ernst & Young 2011) and meeting the IPCC-recommended 80-95% reduction in CO₂ emissions from 1990 levels by 2050 (Stichting Natuur en Milieu and c,mm,n 2.0 2009, 7).

However, even with the potential for electric vehicles to contribute to sustainability, their primary source of energy remains coal, gas or nuclear power (Wang and DeLuchi 2003). These are not sustainable solutions themselves. Another obstacle to overcome the concerns are the elements that are currently used to manufacture the vehicles and the batteries. For example, For example, current Lithium resources will not be sufficient if the world’s fleets turn to EVs with lithium-based battery technology (ETH 2011). As such, it is pertinent to underline that the current technology in the field of EVs remains imperfect, and that it does not yet provide a fully sustainable solution to the challenges related to the transport system (Kahn Ribeiro et al. 2007). There is growing demand for knowledge and guidance to overcome the barriers to EVs (Soylu 2011). From a combination of
interviews with EV experts and practitioners (shown in Appendix B) and an extensive literature review (outlined above), ten main barriers to the expansion of electric vehicles have been identified.

| 1.) The cost of the vehicle (related partly to the cost, weight, size and materials used for the battery) | 6.) Institutional barriers and unsupportive legislation (taxation of charging posts and lack of incentives) |
| 2.) The charging time of the battery | 7.) Safety concerns (related to the vehicle and the materials used) |
| 3.) The range of the vehicles (currently mainly short distances within a reasonable price range) | 8.) The perceived risk of investing in EVs due to the uncertainties around the adoption of new technology (consumer value-action gap\(^6\)) |
| 4.) Lack of standardised infrastructure (charging infrastructure and payment systems) | 9.) Sustainability challenges still associated with the technology (material flows, GHG emissions, physical destruction through mining and road construction, poor working conditions, accidents) |
| 5.) Weak business case (insufficient return on investment) | 10.) Challenges with the engagement and collaboration of stakeholders. |

**Figure 1.2 Barriers to Electric Vehicles (EVs).**

On closer examination and analysis of the barriers to electric vehicles and after conversations with multiple experts in the field (found in Appendix B), it was concluded that the engagement of stakeholders could act as a strategic point of intervention to help address the other wider barriers to EVs, such as the limited range of the vehicles and the insufficient business case for the technology. Throughout this paper barriers 1-9 in Figure 1.2 will be referred to as “external barriers to EVs”. This is because the external barriers cannot be addressed without engagement from stakeholders.

\(^6\) An apparent ‘discrepancy’ between stated beliefs (and values) and behaviour (Flynn et al. 2009, 159).
1.5 Stakeholder Engagement and EV Projects

Through further research it was identified that literature supports that engagement and cooperation between stakeholders is both a key challenge and a key enabler to the expansion of electric vehicles. The outcome of a series of executive roundtables with experts and key stakeholders in the field of EVs, for example concluded that the effective collaboration and cooperation of the different stakeholders is critical to ensure the wider expansion of EV technology at this pivotal point in its development (Ernst & Young 2010 & 2011). Without engagement there is no demand (California Public Utilities Commission 2009) and so it becomes important to connect stakeholders and promote cooperation (The Center for Climate and Energy Solutions 2012). The Smart Cities Dynamics publication (2012) state that it is not smart technologies but instead “smart dynamics, i.e. governance and cooperation among local actors” that are the “most fundamental success factor” in smart cities, which include EV systems.

1.6 A Strategic Sustainable Development (SSD) Approach

Strategic Sustainable Development is an approach that is specifically designed for strategic planning and decision-making in complex systems without being reductionist. This makes it ideal for environments that are as complex as the multi-stakeholder projects that not only involve diverse interests, but also the adoption of new technologies and the transition to new regional infrastructures, which require societal shifts in behaviour (Chan 2002). It helps guide strategic planning towards a vision (an ideal or long-term goal) so the project (or societal) goal is achieved in a way that moves the project (or society) towards sustainability. The different components of SSD are the sustainability principles (SPs), backcasting from the SPs, the Framework for Strategic Development (FSSD) and the ABCD strategic planning process; all in context of the sustainability challenge. An overview of the different components is outlined below.
1.6.1 The Sustainability Principles (SPs)

The SPs are four basic, scientifically-derived principles\(^7\) that serve as the constraints within which society can operate sustainably, as described in Ny et al. (2006). In other words, organisations\(^8\) are flexible to determine their own goals and strategies to reach them as long as they, and other organisations, comply with the below-outlined principles. The first three principles are related to nature and the fourth is related to the functioning of the social system.

In a sustainable society, nature is not subject to systematically increasing…

I. concentrations of substances extracted from the Earth’s crust;
II. concentrations of substances produced by society;
III. degradation by physical means;

And in that society…

IV. people are not subject to conditions that systematically undermine their capacity to meet their needs.


1.6.2 Backcasting from Sustainability Principles (SPs)

The SPs form the basis for backcasting from a principled definition of sustainability (Ny et al. 2006, 63). Backcasting is a planning methodology, illustrated in Figure 1.3, which was first developed by Robinson (1990) and involves envisioning a desired future scenario and planning steps in the short, medium and long-term to help reach that outcome. When used in the context of planning towards sustainability, backcasting from SPs can facilitate addressing ecologically complex issues in a strategic and systematic manner (Holmberg and Robèrt 2000).

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\(^7\) Principles that need to be met in order for a system to be maintained in its current state
\(^8\) This can be anything from an individual, to a company, to society at large.
1.6.3 Framework for Strategic Sustainable Development (FSSD)

The FSSD is a holistic, unifying framework that can complement other organisational tools and is designed to facilitate strategic planning and decision-making in complex systems. It provides a means to structure and organise information and create a shared language and mental model between individuals. The framework has five levels: systems, success, strategic, actions, tools, that are closely interconnected and interdependent (Robért et al. 2002, 198-205). An example in the context of EVs can be found in Appendix A. The five levels are:

(i) **Systems level**: Outlines the overall system that is relevant to the set goal or topic in study. For example, all the different components of a project including its stakeholders and also the project in context of the wider society within the biosphere. This includes all the function, knowledge of stocks, flows, biogeochemical cycles, biodiversity, resilience, and the basic relationships between human practices and their impacts. The description must be sufficient to inform the subsequent levels and relevant to the goal in question. To apply an analogy, in chess, the systems level contains the game rules, the pieces, the playing board, and the players.

(ii) **Success level**: Success means meeting the goal of the project within the system while complying with the four sustainability principles (SPs).

(iii) **Strategic level**: Strategic guidelines that are used to decide on which actions to take to ensure the success of the project. This can be aided by
using three prioritization questions: 1) Is this a step (action) in the right direction towards the success? 2) Is it a flexible platform towards future improvements? 3) Will it provide a sufficient return on investment?

(iv) Actions level: The actions that can be taken immediately to move towards the goal or vision (the low hanging fruit), and the medium and longer-term actions that might not be technologically feasible or financially viable today. The choice of actions must be informed by the strategic outlined above guidelines.

(v) Tools level: Tools that are used to support the planning and implementation of the actions that selected using strategic guidelines to reach success that is informed by the systems level.

1.6.4 The ABCD Planning Process

The ABCD Strategic Planning Process provides a practical way for organisations to implement the FSSD. The process is not linear and should be iterative and repeated at intervals. Each step is described below.

Step A – Gain a shared awareness of the planning process, the organisation, and the ecological and social systems they operate within, based on an understanding of the SPs. From this understanding, create a vision of what your organisation would look like if it operated within these principles;

Step B – Undertake a baseline assessment of the current reality of the organisation and its context. Note where the organisation misaligns with the SPs and identify organisational assets, including those that align with them;

Step C – Create a list of all possible brainstormed solutions to the issues discovered in the B-step without technological, financial, political or other constraints. Be creative and imagine measures to achieve these.

Step D – Prioritise the actions that were created in the C-step using the three prioritisation questions: i) Does this action move us in the right direction? ii) Is this action a flexible platform for future improvements iii) Does this action bring a positive return on investment socially, financially or economically? (Ny 2009, 8)
1.7 Aim of the Thesis

The aim was therefore to identify the key challenges to the engagement of stakeholders on EV projects and develop guidance that combines a Strategic Sustainable Development (SSD) approach with what is identified through research as Best Practice for Engagement. The purpose is to help project management in the pre-project planning phase of EV projects to be more effective at addressing the engagement challenges that might otherwise threaten the success of the project and regional introduction of EVs. An SSD approach was chosen as it is designed to facilitate planning and decision-making in complex systems. The Framework for Strategic Sustainable Development (FSSD) is a tool that offers a way to organise and analyse intricate information, and can help build a shared mental model to enhance understanding and cooperation between stakeholders.

1.8 Research Questions:

1. How can the key challenges to engagement on EV projects be addressed using a Strategic Sustainable Development approach combined with Best Practice for Engagement?

   a) Through the lens of the FSSD and Best Practice for Engagement, how do EV projects currently engage stakeholders?
   b) From an FSSD, Best Practice and EV project management perspective, what are the key challenges when engaging stakeholders?
   c) How can an SSD approach be combined with Best Practice for Engagement to provide guidance to help EV project management address these engagement challenges?

1.9 Scope

The process provided can help inform a stakeholder engagement plan in the pre-project planning phase of the project. This phase typically occurs after the formal approval and initial funding have been secured, when initial stakeholder groups have been identified, but prior to the official project launch. It is designed for project management on EV projects only as it is very context specific and has not been tested in other contexts. Additionally, extensive knowledge of sustainability or SSD concepts is not a pre-requisite.
2 Methodology

A three-phase research methodology was used to answer the research questions. Each phase corresponds with the research sub-questions. Interviews that were conducted were all semi-structured and a full list of interviewees for all phases is outlined in Appendix B. The surveys all included open and closed questions and were created with Survey Monkey and sent out through email and various social media sites such as Facebook and LinkedIn.

2.1 Pre-Phase to Develop Research Design, Scope and Aim

2.1.1 Mapping and Scoping Phase

The Framework for Strategic Sustainable Development was used to design, structure and scope the topic, narrative and research approach. This helped focus the literature review, identify appropriate interviewees and later design the survey and interview questions in a way that directly answered the research questions. The outcome (the topic structured under the five levels of the FSSD) is shown in Appendix A.

2.1.2 Identify the Barriers to Electric Vehicles

The barriers to EVs were identified as part of the exploratory research to develop the research aim and questions. The information was gained through a review of literature and conducting exploratory interviews with EV and transport experts and practitioners via Skype and over the telephone. The list of identified barriers is outlined in section 1.4.

2.2 Phase 1: Gap Analysis

The purpose of Phase 1 was to undertake a gap analysis between current stakeholder engagement practices on EV projects and an ideal that is created from our knowledge of FSSD and Best Practice. This was to answer research question 1a: “Through the lens of FSSD and Best Practice for Engagement, how do EV projects currently engage stakeholders?”.
2.2.1 Creating the **Ideal for Engagement Practices**

Best practice for Engagement was identified firstly to help develop an *ideal* for engagement practices in order to undertake a gap analysis. Secondly, to later integrate Best Practice with an SSD approach to feed into the development of the Engagement Building Process to answer Research Question 1c. The knowledge of Best Practice was gained from a combination of reviewing stakeholder engagement manuals, guidebooks and wider literature, and through conducting interviews with experts and practitioners in both strategic and multi-stakeholder engagement. EV project management and consultants were also interviewed to identify from their experience what has worked well in projects in the past and which practices that led to effective engagement. The knowledge of Best Practice was combined with knowledge of FSSD to create an *ideal* for engagement at each of the five levels of the FSSD. The ideal is outlined in italics under each of the levels in Results Section 3.1.

2.2.2 Review of Current Engagement Practices (Using 5LF)

A baseline understanding of how project management currently engages stakeholders on EV projects was gained and captured using a generic Five Level Framework (5LF). This enabled us to see how project management currently define success and what strategies they use (*not* from an SSD perspective specifically). The information was gained from online case studies, literature and a combination of surveys and interviews that were conducted in-person, via telephone and Skype with EV project management, consultants and EV stakeholders that have experience and knowledge of engagement practices. The literature review included online case studies, review of journal articles, and analysis of stakeholder engagement strategies from current EV projects that were gained through the contacts made throughout the research. Interviewees were selected through contacts on current projects, referrals through interviewees, and previous conferences.

2.2.3 Gap Analysis (Current Engagement Compared with the Ideal)

The results of current engagement practices were then assessed against the *ideal* and the findings of the gap analysis are outlined in Results Section 3.1
2.3 Phase 2: Identify Engagement Challenges

To answer Research Question 1b: “From an FSSD, Best Practice and EV project management perspective, what are the key challenges when engaging stakeholders?”. The key challenges, from an EV project management perspective, were identified through open and closed survey questions and semi-structured interviews with EV project management. The list of interviewees is shown in Appendix B and interview questions are shown in Appendix K. Additional challenges were selected by the authors from their knowledge of FSSD and Best Practice (identified in Phase 2.2.1). The findings were used to analyse these results and create a full list of challenges that are summarised in Results Section 3.2.

2.4 Phase 3: Develop Guidance

To answer sub-research Question 1c: “How can an SSD approach be combined with Best Practice for Engagement to provide guidance to help EV project management address these engagement challenges?”

2.4.1 Develop an Engagement Building Process

Interviews were conducted with FSSD practitioners and the knowledge gained from these interviews was then analysed and combined with the results from Phase 1 and 2 to produce a 3-phase process to help EV project management address the engagement challenges on EV projects. The process is outlined in Results Section 3.3 and the analysis of how an SSD approach could help build engagement in Appendix J.

2.4.2 Gaining Feedback, Testing, and Refining the Engagement Building Process

Once the process was developed, it was reviewed by FSSD, EV (project managers and consultants) and other professionals for its practical application (see Appendix C for a list of experts). The purpose was to gain an international and diverse perspective on feedback, so that the process can be more widely applicable (outside of Sweden). Phase 1 and parts of phase 2 of the EBP were also tested with the stakeholders of a regional EV project in south-eastern Sweden. The aim was to identify if the Engagement Building Process was comprehensible and of use in an actual project context by project management without extensive knowledge of
sustainability or SSD. Phase 1 was tested using a half-day workshop with the four core group members of the project and parts of Phase 2 stage 4 was tested as part of the regional project launch event. It was in the form of an afternoon workshop with 13 Steering Group representatives, including the Energy Agency Southeast of Sweden, multiple municipalities, local politicians, and energy and infrastructure suppliers. Both the feedback from the experts and the workshops was used to refine the EBP to make it more understandable, user-friendly and appropriate for the context. See Appendix E for the summary of the case study and Results Section 3.4 for a summary of the feedback.

2.5 Data Analysis

Open coding was used for data analysis (Berg 1989). All interviews were transcribed and read by all three authors to identify emerging patterns and themes. These patterns and themes were then clustered and categorised according to the research questions. To support this, a list of key words was also brainstormed to help extract the relevant information to answer the research questions. An agreed colour code scheme was developed and coded all transcripts. The same coding scheme was used for the document analysis when coding literature, project planning documents, and stakeholder engagement strategies and case studies. Excel sheets allowed for the division, ranking and graphic representation of the results.

2.6 Validity

Prior to commencing research any assumptions were surfaced that might be made in order to avoid them and were consciously aware of the lens from which the data was being reviewed. The data collected was triangulated to increase the validity by ensuring that the findings were supported by as many different sources to avoid bias as much as practically possible (Maxwell 2005). Primary information was gained from interviews, surveys and informal conversations from a range of sources, including EV project managers, stakeholders and consultants, transport experts, multi-stakeholder engagement experts and FSSD practitioners. The information was gained through a range of different channels, including via Skype, email, LinkedIn, Twitter, Facebook and in person to ensure a sample was reached that is as representative as possible. Experts were interviewed and surveyed from around the world to ensure a broad perspective and range of
experience. Primary data was supported by literature that was obtained from a range of sources, including journals, newspapers, websites, databases, project plans and stakeholder engagement strategies that were sent from project managers on EV projects. To further validate the findings, all three authors coded all interviews and the results were compared and agreed upon. Lastly, the guidance was tested and sent to experts for review of its practical application and refinements were made based on their feedback.
3 Results

This section contains the findings from the research. They are structured in the same way the research questions are presented and in the order that was described in the methods section. The overriding aim is to answer the main research question: “How can the key challenges to engagement on EV projects be addressed using an Strategic Sustainable Development approach combined with Best Practice for Engagement?”. This is done by answering the three research sub-questions (1a, 1b and 1c). In Section 3.1 current engagement practices on EV projects are reviewed against what was defined as ideal engagement practice from an SSD and Best Practice perspective to answer RQ1a. From the analysis of the results, the most common challenges to engagement are subsequently identified and outlined in Section 3.2, along with a review of why engagement in the context of EVs is a particular challenge (to answer RQ1b). The information from answering RQ 1a and b is then used to develop, test and refine an Engagement Building Process (EBP) tailored to address the engagement challenges identified in the context of EVs (to answer RQ 1c). This information is shown in section 3.3 and 3.4. The results are shown below. SR refers to Survey Respondent, for example SR1, as all respondents were anonymous.

3.1 Engagement on Electric Vehicle Projects through the Lens of the FSSD and Best Practice for Engagement (RQ1a)

An ideal for engagement practices on EV projects was created from our knowledge of Strategic Sustainable Development and what is described in the Methods Section as Best Practice for Engagement. This ideal is outlined in italics at each of the levels of the FSSD in the section below. The purpose of gaining a baseline understanding of how project management currently approaches engagement in relation to what is described as ideal engagement, is to answer Research Question 1a) “Through the lens of the FSSD and Best Practice for Engagement, how do EV projects currently engage stakeholders?”. The ideal in this case is in reference to engagement but also extends to the project success more widely. This is because engagement cannot be separated from project success and, as the thesis demonstrates, it is factors such as a shared understanding of the project
purpose and viewing the project in context of the wider system that help build stronger engagement. Probing questions were used at each level of the FSSD to help structure the results and extract the relevant information from the transcripts. The highlights of the result are summarised below.

### 3.1.1 Systems

At the systems level, ideal engagement includes: EV project management take a whole-systems perspective to engagement with an awareness of and consideration for all stakeholder needs and interests; all stakeholders have a shared understanding of 1) the project: the different stakeholders and interests involved, the terms of engagement and processes in place (e.g. the communication plan); 2) society in the biosphere; 3) the sustainability challenge in relation to the constraints of the biosphere and anthropogenic impacts; 4) EV systems, the transport sector and the role of EVs as a solution to one part of the transport-sector related to the sustainability challenges.

- **Do stakeholders have a systems perspective, by demonstrating an overview and shared understanding of electric vehicles in the context of the wider transport sector and the biosphere, in relation to other sectors, and an understanding of their role in moving towards sustainability?**

The findings suggest that respondents indicated a lack of long-term perspective and generally did not plan past the end of the project (including Elvmarker, Frech, Lindström 2012). There seemed to be no connection between the projects and the wider goal of achieving a sustainable society within the biosphere. However, Curtis (2012) does acknowledge that EV technology is “still in the pioneering phase and clever solutions will certainly come”, demonstrating a long-term perspective. Respondents overall also demonstrated a lack of a full systems perspective (Capra 2002, Heft 2006, Meadows 2008). Respondents were all aware that the transport sector was dependent on other sectors, such as energy, which showed a degree of systems perspective. However, they did not show an awareness of the level of complexity and interconnectedness of the transport system with

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1 Due to a rich data set we could only provide an overview and not include all responses.
sub-systems outside of the direct sphere of the sector. For example, only 9% recognised deforestation to be linked to the sector. Furthermore, while all of them did acknowledge the connection between the transport sector and the sustainability challenge at a meta-level, in particular its contribution to climate change, less than 20% mentioned the linear processing of material flows as a sustainability challenge related to EVs (with the exception of Watkinson, Oldmark, Borén, Noon, Belaieff 2012).

However, when prompted, this rose to 71% of respondents acknowledging the contribution of EV-related material flows to the sustainability challenge. Elvmarker, for example, said “there is much more to it than just where the electricity comes from” and pointed out that “the raw materials used are also a significant problem” (Elvmarker 2012).

However, a lack of a systems view from a sustainability perspective was not recognized by respondents as one of the most prevalent challenges to the engagement of stakeholders. Instead, it was the lack of common goal and competing interests that lead project management to state that a lack of systems perspective was a common problem on EV projects. The lack of systems perspective from a sustainability point of view was analysed based on knowledge of Strategic Sustainable Development.

Do project stakeholders demonstrate an overview and shared understanding of the project, including its goal, the plans for engagement and the different stakeholders and interests involved?

The findings suggest that stakeholders on EV projects have very diverse and different types and levels of understanding and experience, as stated by Watkinson, Oldmark, and Claesson (2012). Supporting this, the majority of the stakeholders interviewed were often unclear about both their own contribution and the role and interests of the other stakeholders involved. They were very focused on their own niche area. For example, the attention of Volvo Bus Corporation was on the coordination of public bus infrastructure, with much less emphasis on collaboration with the other interest groups to develop a stakeholder ecosystem. This is partially because stakeholders are all experts in their own field, such as engineering, business, government and academia, and therefore all have their own practices and priorities, and “the level of knowledge is very random” (Oldmark 2012).
Does project management take a systems approach to engagement?

There is evidence that project management realises the need to take a collaborative, whole systems approach to stakeholder engagement on EV projects. For example, one interviewee acknowledged that EV projects are “part of a bigger system” and highlights that it is important to “get stakeholders to understand this in order to get the bigger perspective in a very simple way” (Lööf 2012). Furthermore, there was reference in both literature and interviews to a need to create a “collaborative stakeholder ecosystem and an environment of openness and cooperation” and Claesson stresses it is “a priority for Green Charge” (Claesson 2012). Similarly, Ernst & Young (2012) said: “at this critical stage for the EV industry, manufacturers, integrators, battery makers, utilities and infrastructure developers must work together to bridge gaps in the value chain and forge creative partnerships to create a sustainable EV ecosystem”. Part of their eleven key recommendations for the wider adoption of EVs is therefore to “engage the whole ecosystem” (Ernst & Young 2012). However, a gap was identified as none of them had a clear idea of how this is done in practice and expressed that there “is a lack of guidance and Best Practice when it comes to electric vehicle projects ... as they are a relatively new phenomena and there is little experience to draw from and no follow up of lessons learned” (Lööf 2012).

3.1.2 Success

At the success level, the ideal case included: Electric Vehicle experts (consultants, project management and stakeholders) have a shared definition of success; they include sustainability in their definition of success; they have a shared understanding of the goal and purpose of the project, (the project vision, the core values of project team and the terms of engagement). As EV projects are part of society, they comply with the four sustainability principles. Directly related to engagement, this includes not having any practices structurally in place that create conditions that prevent any stakeholders from meeting their needs² (such as participation and understanding). At the same time, success is in alignment with the Best Practice criteria outlined in Results Section 3.1.

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² As defined by Max-Neef (1991).
How do electric vehicle project managers and stakeholders currently define success?

The results indicate that the majority do not define success outside of the project goal, such as the installation of 800 public charging stations by 2030. They commonly measure success by the number of stakeholders involved, the amount of media attention the project attracts and profit margins. Only 6% showed evidence of taking long-term perspective by connecting the goal of their project to a larger goal beyond the project, such as achieving global sustainability, when describing success. A second important success criterion that all respondents highlighted is the effective cooperation, collaboration and engagement of stakeholders. SR6, for example, believes that success is “all about stakeholder and partnership working”. Lööf and several others add that success is largely defined by the level of interest in the project and the participation of all stakeholders, including the users, funders, energy suppliers, manufacturers, municipalities and the media (Lööf 2012). Lööf therefore emphasises that “knowing the interests of the different stakeholders is really vital to help the project be successful”. He says project management “have the initial interest from their side (commercial interests) but don’t really know what product or service will be the outcome in the system and where the project will be in the future” (Lööf 2012).

Do electric vehicle project management and stakeholders include sustainability\(^3\) when they define success?

Less than 5% mentioned sustainability specifically in their definition of success. When cited, a few of the interviewees defined sustainability simply as economic, environmental, and social factors (Elvmarker 2012), where others had mentioned definitions such as “we live and use resources today and our grandchildren have to pay” (Gustafsson 2012). Only 9% said it was one of the key motivators for them (SR1, Willis, Noon 2012). Nonetheless, most (89%) acknowledged that sustainability will become a growing motivation to participate in projects in future. There was also little awareness of EVs and the project goal, being a stepping-stone towards

\[3\] As none of the respondents were familiar with the sustainability principles, questions were asked to act as proxy, for example: In relation to the linear processing of materials.
sustainability. Instead, many believed EVs to be a fully sustainable solution in itself. When asked more specifically if they include sustainability in their measure of success, on average the respondents believed that around a quarter do in theory, but only a fraction do in practice. Vermie believes that closer to "50% of stakeholders state an interest in sustainability, but only around 1% (maximum 5%) will really do it in practice" (Vermie 2012). Supporting this, SR1 states that although "20% of the companies would like to take part in EVs if not too expensive ... not more than 1% of the population will buy a personal EV within the next 2-3 years". Vermie said that a reason for this is that “a lot of people are a bit sustainability tired” (Vermie 2012). So he says “for a broad expansion [of EVs] you really need more emphasis on other side effects of the EV in order to create the willingness”. As an example, Vermie says in their “Electric Vehicle Centre, fun is the first priority and future thinking the second one, with the positive effect on sustainability as a bonus”. However, SR3 said that that “it really does depend where you are: in Fort McMurray, Alberta, 1%; in Sodermalm, Stockholm 80% will show an interest in sustainability”.

Gardner (2012) adds that it is “hard to know what the 'genuine interest' of many stakeholders is; many are driven by commercial targets as their primary focus and others by the imperative to tackle climate change”. In SR19’s view “most companies are interested in improving their profits; either directly or through improved image”. Building on this SR6 agrees that the number is "very low" and adds that, even if they show an interest in sustainability, "the key drivers for this are PR purposes to demonstrate their green credentials and potentially draw in new customers". Elvmarker, on the other hand, believes that “all strategy [on EV projects] is towards a sustainable future” (Elvmarker 2012). She says even though stakeholders may not realise that they are talking about sustainability, the project goals usually revolve around sustainability and so EV projects are naturally a stepping-stone towards a sustainable future.

**Do stakeholders have a common definition of success (a collective purpose and common goal)?**

Evidence suggests that there is a very mixed understanding of success and success means different things to different stakeholders depending on their vested interests. For example, an energy supplier’s understanding of success might be to sell their energy in all of the regions that are participating in the project, whereas success for a municipality might be to
coordinate funding for the project or create new jobs in the region (Frech 2012). Kalb (2012) said that this is a particular issue in the context of EVs as the roles and responsibilities within EV projects are still poorly defined and understood, which leads to “many questions and few answers”.

However, while 71% of EV experts said, that "having the same goal and commonality is really important for the success of projects” they also stated that “finding a common purpose is also a key challenge” (Frech 2012). SR20 believes that this is a particular challenge on electric vehicle projects, saying “Automakers, utilities, charging station manufacturers and network administrators do not always have the same goal - expanding EV usage - at the same time”. The cross-sectoral nature of EV projects result in diverse projects teams and each stakeholder group has to adhere to their own practices, policies and organisational mind-sets and have very different priorities and motivations for being involved in the project. SR12 adds “even within our own municipal organisation, which has formulated a hard goal for the use of EVs in the own fleet, it is already a fight to get the colleagues really acting in conformity with this goal. This goes even more for organisations outside our span of control”. 67% of respondents agreed that this was a common problem on EV projects that negatively affected cooperation and engagement (including Willis, Watkinson, Claesson, Lindstrom, Grondelle 2012).

However, it appears that when you explore deeper, respondents said that all stakeholders are essentially part of the project for much of the same reason, for example to help create a carbon neutral fleet by 2030, even if their reasons for reaching this goal differs. Frech and Lööf (2012) said that because stakeholders often do not realize this, it can significantly threaten the success of the project as there is no cohesion and it is being driven in different directions. Considering this fact, however, little evidence was found that suggested project management invests time to co-create a shared sense of purpose between stakeholders of the project in order to promote greater alignment and sense of ownership (Grondelle 2012). Oldmark (2012) said that creating a trusting and supportive environment is important to overcome these challenges, and Claesson (2012) believes getting stakeholders to see the bigger picture will help align their interests in a better way.
Is there evidence that stakeholders cooperate and work transparently and effectively together to ensure all needs are met? Are all stakeholders interested, involved and participating, in line with Best Practice and uninhibited by the external barriers to electric vehicles?

An observation is that most stakeholders do cooperate and work together to meet the project target. However, the overall response was that it varies. For example, SR6 said: “It’s hard to say. It varies between organisations and is affected by the person representing an organisation too. Now when EVs are hot the interest should be quite large as everyone wants to join the race, to some extent at least. No one really wants to say that they are not interested at all. I would say they are all interested 100 %, but not all are motivated”. Vermie adds: “For the general public it’s a different case and will also depend on other developments regarding for example, the difference between car-ownership and car-sharing (in whatever sort of system)” (Vermie 2012). There is also evidence that suggests stakeholders are not engaging as they are unsure of their role and level of participation (Lööf, Claesson and Kalb 2012). This is partially as a result of the uncertainty of the rate and scale of expansion of electric vehicles according to Frech (2012).

Furthermore, even when stakeholders are motivated and engaged, it is often not for the same reasons. For example the politicians might want to create more jobs for their region (Elvmarker 2012), while the car manufacturers want to sell their cars (Lööf 2012), and the energy suppliers want to increase their revenue (Noon 2012). However, this is without commitment or agreement of how to collaborate towards mutually beneficial outcomes where all stakeholders’ interests and needs are met.

One key challenge is the competitive nature of EV project environments as competing interests can be a significant hindrance to the success of these projects (Frech 2012). Noon (2012) said that “obviously there are competing objectives and they can conflict, because the way you maximize your revenue is not the way you maximize your patronage”. Kalb (2012), adds that “there are constraints to projects due to conflicting competitive positions and investment strategies and tactics”. Claesson builds on this stating, “When it comes to business, everybody would like to get the biggest share as much as it is possible”. They mentioned that this is in part due to
the difficulty of creating and maintaining a common, shared purpose when stakeholders are in competition with each other (Noon 2012).

Furthermore, several respondents also said that there are cases where the hidden agendas of stakeholders affect the project outcome (Johnson, Claesson, Lööf, Oldmark 2012). Sunnerstedt, for example states, “You need to know why stakeholders are involved. Whether it’s because they just want to install the charging stations or they are there to brand themselves because their motivation is going to affect the engagement during the whole project process if it’s a hidden agenda” (Sunnerstedt 2012). “The challenge is to design a process that allows people to remain motivated and engaged (i.e. see it as relevant to their interest) while also taking an approach that reflects the common priority of securing a sustainable transport system” (Gardner 2012).

**Does project management maintain engagement among stakeholders throughout the project?**

Respondents indicated that maintaining engagement of stakeholders is a key challenge and it is rarely maintained throughout the duration of the project. Lööf said that for Green Charge Southeast⁴, just as with any other EV project, “how to maintain stakeholder engagement, cooperation and collaboration throughout the project are the main issues” (Lööf 2012). This was cited as a particular problem if a project continues for a number of years (Willis 2012). However, results suggest that the degree of engagement varies significantly between different stakeholder groups and at different stages of the project (Kimmins 2012). There will be “some stakeholders that never really start engaging and others that stay committed and determined to the very end” (Hidy 2012). At the same time stakeholders can all be engaged but motivated by different interest and therefore are not aligned and driving the project in different directions (Hidy 2012).

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⁴ The case study that we worked closely with in south-eastern Sweden and where our guidance was tested (see Appendix D for case study summary).
3.1.3 Strategic

At a strategic level, EV projects ideally provide a flexible platform (stepping stone) and move in the right direction towards: 1) compliance with all four sustainability principles (in particular not creating conditions that prevent any stakeholders from meeting their needs), and 2) compliance with Best Practice for Engagement, such as transparency and inclusiveness (Appendix E). There is evidence that EV projects backcast from success that is aligned with strategic guidelines and informed by the systems level and projects ensure sufficient return on investment to sustain the project and reach success.

Under each of the questions below, an outline of how EV projects are currently being strategic in engaging stakeholders is shown. The overall conclusion and the responses below show some evidence of this in terms of carefully planning which stakeholders to engage at different times of the project and launching events to strategically coincide with EV success stories in the news, for example. However, there is no evidence from the findings (in the results outlined below) that indicate that projects are being strategic from an FSSD perspective, as described in section 1.9.

❖ Is there evidence that project management and stakeholders backcast from success (as described at the success level)?

There is evidence that the majority backcast from the success of the project goal. This usually begins outside of the planning phase of a project when a detailed plan is outlined for how the project will be executed in order for the application to be approved (Frech, Willis 2012, Office of Government Commerce 2009). However, there is no evidence in the results that project management use strategic guidelines to backcast from principles or scenarios, in this case, a vision of transport within a sustainable society as described in section 1.8.

5 In a way that is calculated, and planned towards a set goal. Not strategic as defined by the third level of the FSSD i.e. using strategic guidelines and prioritization questions to select tools and actions that help reach success that is informed by the systems level.
Is project management strategic about who they engage and when they engage different stakeholder (interest) groups at different stages of a project?

All stakeholders emphasised the importance of engaging the right people at the right time throughout the project to ensure it is successful. For example, involving the individuals and organisations that have greatest interest in and influence on the project first (Noon, Claesson, Sunnerstedt, Watkinson, Lööf 2012), and then later extending the engagement out to those that currently have less interest in the project but might realise the benefits at a later stage (Grondelle 2012). Armstrong (2012) adds that it is important to “make sure stakeholders are also the right level because sometimes you can have really senior people who are disconnected from the running of the day-to-day business, and equally if you go to junior they don’t always have the necessary level of authority or the same passion; so striking the balance is important”. Furthermore, there was also general agreement that having the wrong people involved can be of equal hindrance to project success (Claesson, Sunnerstedt 2012).

However, over 71% of respondents said that “finding the right stakeholders and enticing them all to participate” (Jackson 2012) is a key challenge that often compromises the success of the projects. EV experts admitted that they were generally less good at being strategic about which stakeholders to engage at different stages of the project (Watkinson, Frech 2012). When we asked who the key stakeholders are that need to be involved are and who the next group of stakeholders to be successfully engaged would be, there was no clear response and the most common answer was simply “you need to find the key people in different interest groups” (Sunnerstedt 2012). However, few had a clear idea of who these were, which highlighted the importance of integrating guidance on this into the process that is later developed to help build engagement.

Some project managers did, however, show a strategic approach. Vermie (2012), for example, said that it is important “not to engage all the stakeholders at the same time” and “strongly believes in a step by step approach; so first engaging car lease companies, then other fleet owners and public bodies (e.g. municipalities), and only in the later stage engaging the general public”. Furthermore, the findings do suggest that all respondents are being strategic in engaging municipalities early in the process (i.e. in the pre-project phase) as they are identified by all EV
experts as key influencers and a leverage point to the introduction of EVs - including for support and funding. This is supported by Malcolm Harbour, Chair of the IMCO Committee and host of the 2012 ElectroMobility Pilot Project Launch event at the European Parliament on 8th February, who stated that “It is of vital importance to engage all stakeholders but especially municipalities in order to integrate these technologies in transport systems” (Malcolm Harbour 2012). The media is also often a group that is engaged quite strategically, for example, by having launch events and press releases planned to coincide with events such as Earth Day as a way to increase awareness and engagement (Belaieff, Willis 2012).

- **Is project management currently strategic about how they engage different stakeholder groups at different stages?**

There is some evidence of strategic engagement. For example, around 89% of respondents mentioned that they ensure they engage in person (face-to-face), particularly at the early project stages in order to build trust and relationships that will help maintain engagement (Willis, Watkinson, Kimmins, Grondelle, Frech, Sunnerstedt 2012). Sunnerstedt and Kimmins (2012) highlight that the frequency of meetings must also be tailored depending on the stage of the project. For example, Kimmins says: “in the early stages of a project you will have frequent meetings and most will be in person. Then as trust improves between stakeholders and they get a better understanding of the project ... it is possible to have them less frequently, and over the phone or Skype” (Kimmins 2012). Lastly, there is evidence that the type of event and the timing are chosen strategically in many cases. For example organising a public event involving an electric race track prior to the project launch where different electric vehicles from different car manufacturers compete in a race to see which car can go around the track the most times, as a way to create awareness and interest around EVs prior to the launch (Claesson 2012).

- **Does project management tailor engagement to different stakeholder interests to be strategic about engagement and in line with Best Practice?**

Eighty-six percent recognised the importance and value of tailoring engagement to different interest groups among stakeholders, for example by having separate mailing lists, and meetings for different groups. Sunnerstedt and Watkinson (2012) said that if stakeholders are
overwhelmed with information and meetings that are not of direct benefit, interest or relevance to them, they will stop being engaged. SR7 agrees, emphasizing that it is important to “be very specific about the stakeholders own needs and wishes”. SR3 supports this saying that “you need to address people's own priorities. If we knew how to engage people on global issues, we would be doing a lot more to address climate change. A key advantage of EVs is that they provide individual benefits (freedom and operational savings) while addressing global issues”. SR3 suggests that EV project managers “take advantage of that duality. It should be easier to sell than other things like recycling that don't really benefit the individual”. So when making a case for EVs SR3 states that “a generic argument won't work” and it is important to “make a variety of cases tailored to the various audiences” saying “here is what's in it for you, and for you, and for you”. However, Curtis (2012) admits that this is a “massive process [as you have] to understand the market, the drivers, the issues regarding behaviour change for business and the individual”. SR4 agrees stating that “you need to tune into stakeholders on an individual basis and there is no quick and easy win”.

3.1.4 Actions

Actions (tangible steps) that are chosen utilising strategic guidelines that help move engagement practices and the projects towards success (as defined by compliance with the sustainability principles and Best Practice for Engagement).

- What actions do project management currently undertake that are guided by strategic guidelines that help move engagement practices and the projects towards success (in other words, that are in line with Best Practice - e.g. that promote cooperation and transparency - and that comply with the sustainability principles e.g. that help stakeholders meet their needs of participation and understanding)?

The findings confirm that all project managers interviewed take a variety of different actions that are commonly used on projects more generally to engage stakeholders. For example, all respondents mentioned creating newsletters and websites to maintain interest and organising events to build relationships and get stakeholders “on the same page” (Armstrong 2012). Project launch events were used by all respondents to create engagement.
For example, Transport for London launched their project by initiating an bi-annual event called “London Electric Vehicle Partnership (LEVP)” and consistently has over 70 stakeholders at each event (Watkinson 2012). There is evidence that some of these actions are strategic. For example, posting EV success stories in the local paper prior to the project launch (Claesson 2012) and stakeholder mapping and analysis to determine which stakeholders are strategic to engage and to identify their motivations (Jackson, Lööf, Sunnerstedt, Watkinson, Willis 2012). However, the results indicate that actions are often uncoordinated from an FSSD perspective as they are not selected based on strategic guidelines (including the three prioritisation questions at the strategic level of the FSSD) towards success that is informed by the systems level.

3.1.5 Tools

*Techniques, measurements, monitoring, management and implementation tools and approaches selected strategically (using strategic guidelines) to support actions to help move the project and engagement practices towards success (as defined above), informed by the systems level.*

- Do project management on electric vehicle projects use any tools to help reach success with relation to the project goal and effective stakeholder engagement, as described in the ideal?

Similar to the Actions level outlined above, there is evidence that project management employ a number of tools as part of their stakeholder engagement plan, such as the use of websites and workshops to enhance understanding and collaboration between stakeholders. A number of tools are also employed in a strategic manner. For example, newsletters were tailored to the interests of different stakeholder groups by using separate mailing lists and stakeholder maps and matrices were used to be strategic about which stakeholders to engage (Sunnerstedt, Armstrong, Watkinson,

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6 Used in a way that is calculated, tactical and planned towards a set goal
7 1) is the action a flexible platform and 2) in the right direction (towards success) with 3) sufficient return on investment to reach success, that is informed by the systems level
8 Used in a way that is calculated, planned and thought through. Not strategic as defined by the third level of the FSSD i.e. selected using strategic guidelines to reach success that is informed by the systems level.
Elvmarker, Kimmins, Frech 2012). However, the level of detail of analysis varied widely. Some project managers undertook in-depth analysis over weeks, involved a large number of the project team and fed the information into a detailed stakeholder engagement strategy (Willis 2012). Others, for example Sunnerstedt, said that she did it mentally, stating: “I personally did the mapping myself and asked: who do I need to have by my side?”. Other strategic tools were launch events and press releases planned at strategic times to stimulate interest. There was also evidence that most projects used action plans that outline information such as key responsibilities, budgets and timelines (Claesson, Willis, Frech, Lööf, Watkinson, Curtis 2012). However, the tools are again not being selected based on strategic guidelines to move the engagement and project towards success in line with Best Practice and the FSSD.

3.2 Challenges to Engagement on Electric Vehicle Projects (RQ1b)

3.2.1 Overall Engagement Challenges

The purpose of this section is to answer Research Question 1b: “From an FSSD, Best Practice and EV project management perspective, what are the key challenges when engaging stakeholders?”. From the responses of EV project management and stakeholders, and from an analysis of current engagement practices from an FSSD and Best Practice perspective, the following seven key challenges were identified on EV projects: 1) The external barriers to EVs (e.g. standardisation of technology, battery cost, vehicle range); 2) Lack of a long-term perspective and planning horizon (planning only short-term and not thinking far into the future); 3) Divergent (at times conflicting) interests; 4) Diverse mental models (levels and types of understanding, background and organisational culture); 5) Competitive environment (competition between stakeholders9); 6) Lack of a whole systems perspective; 7) Lack of common goal and shared purpose;

9 Competition can be a positive attribute, by driving innovation for example. In this thesis competition is referred to as a challenge because in the context of EVs it can reduce cooperation and collaboration between stakeholders that hinders resolving issues such as the standardization of infrastructure
8) Having the right people at the right time (being strategic and successful at engaging certain stakeholder groups at different times of the project).

The key challenges above were selected on the basis that they were cited by 70% or more of the respondents or identified as significant from an FSSD or Best Practice perspective. The results are summarised in Figure 3.1.

![Challenges to Engagement on EV projects]

**Figure 3.1:** The eight key challenges to engagement on EV projects from the perspective of EC project management and stakeholders

### 3.2.2 Additional Challenges to Engagement in the Context of Electric Vehicles

The challenges mentioned above are likely to be common to any multi-stakeholder environment and not necessarily unique to EV projects. However, exploratory investigations indicated early in the research process that engagement in the context of EVs is a particular challenge and there is not much experience or follow up on how to most effectively address the context-specific challenges. A literature review and interviews with EV experts (outlined in Appendix B) revealed the below-outlined five reasons that make EV projects a unique and particularly difficult environment to generate engagement. While several of the below-mentioned reasons, such as the adoption of new technology are not unique to EV contexts either, it is
the combination of all the below challenges add to the difficulties. The results are summarised below.

I. Risks and uncertainties: 100% of respondents believed that the external barriers to EVs, outlined in the introduction, are a significant contributor to the lack of engagement in the context of EVs. SR15 goes as far as to say that if you could overcome all the external barriers to EVs, the challenges to engagement could easily be overcome. According to SR4 it is the “risks that are putting lots of stakeholders off getting involved. It is very hard to sell a risky concept to stakeholders/businesses”. Claesson agrees that this perception of risk and uncertainty around the technology causes a mental block that prevents engagement (Claesson 2012), that prevent anyone from making the first move (Lööf 2012).

The lack of business case and sufficient return on investment was cited by all respondents as a particularly significant barrier. For example, in relation to the installation of public charging posts, Watkinson (2012) stated “one of the reasons people have not gotten involved is because they don’t want to lose their revenue”. SR6 goes on to say that:

“The vehicles are very expensive to buy and that is a clear barrier. Lower operational costs do not quite make up for that. Incentives could if you get benefits like free parking, no congestion charging and so on: the equation could be better and event positive. A positive economic picture would be beneficial. As for infrastructure there is no clear business model at all. No one is making money on putting up normal or fast charging; so who has the interest and who will do it? There is a limited need for public charging but in this early stage they sure could do with some public facilities. But the business case is not there”.

SR4 adds that:

“The limited range of electric vehicles is also a significant deterrent to investing in vehicles, as is the higher cost of purchasing an electric vehicle. If stakeholders and businesses are not seeing many electric vehicles on the road, and therefore low demand for charge points, there is clearly a weak case for them investing in the market at the current time.

There is evidence that favourable legislation could help act as an enabler of EVs, for example through incentives and the taxation of fossil fuels (Tsang et al. 2012). “In Denmark electrical cars are the same price as traditional petrol cars because they don’t put the extra taxation on top, so [EVs are
expanding] faster there than in Sweden” (Claesson 2012). However, legislation was also identified as a current barrier to EVs in some contexts (Afshar, Elvmarker 2012). Furthermore, Claesson continued to say that the introduction of EVs in Sweden is proving much more challenging than in countries such as Denmark and the Netherlands due to a decentralised energy market. It has over two hundred energy companies as opposed to the twelve in Denmark. This is supported in the literature Robèrt and Jonsson (2006).

The above examples of barriers are exacerbated by “a poor understanding of electric vehicles amongst the general public and the business community, and no/very little media coverage to counteract this”, which means that people “don’t believe it's conceived as a reliable form of transport at the moment” (SR4). According to SR4 “These are real barriers as people won't buy into something they don't understand or perceive as a real option” (SR4). However, SR5 believes that the “problem is perception and not fact” and SR3 thinks this can be resolved “by giving sufficient information and by changing the mindset”.

2. The Diversity of stakeholders and New forms of collaboration: The value chain for EVs is particularly complex as “the electro mobility system of actors not only comprises the usual stakeholders involved in individual mobility, such as car manufacturers and drivers, but also electricity suppliers, service providers and above all public authorities. With the rising number of actors concerned, the electro-mobility system will require greater coordination and closer cooperation between existing and new, developing stakeholders than is currently the case” (Sadeghian et al. 2011). Jefferies (2012) agrees EVs are a “massive, big-ticket game involving car multi-nationals, energy players, oil producing and consuming economies, environmental issues (CO2, greening the industry, etc.) and massively expanding markets, particularly non-OECD”. Furthermore, according to Frech and Belaieff (2012), the multiple, diverse stakeholders taking part in EV projects requires a new form of collaboration and experts will have to interact that currently have limited past experience communicating with each other. Belaieff (2012) believes that for engagement to be successful “everybody involved needs to step out from their comfort zone and also maybe step outside of their jurisdiction because the jurisdiction of this players is different ... People need to be talking to different levels at same times”.

34
3. Transition to new, regional-scale infrastructures: As explored in more detail in Haxeltine et al. (2008), dominant regimes such as today’s fossil fuel driven transport sector are held in place by the current PESTLE (Political, Economic, Social, Technological, Legal, Environmental) landscape, which includes the dominant institutions, practices and mental models (Systems Thinker 2006, Smith and Sterling 2008). SR16 says that in relation to EVs transition is very challenging because “the oil companies are very powerful” and fossil fuel is being heavily subsidized and prices are low. This is supported by Svensson and Malmqvist (2002), Claesson (2012) and Oldmark (2012). This is because “many of the most significant participants in the existing transportation infrastructure have huge stakes in maintaining the status quo” (Sovacool and Hirsh, 2009, 1102). “To protect their businesses, these industries seek to influence policy makers and the public to maintain the status quo” (Tsang et al. 2012, 17), making it very challenging for new comers to compete with big brands (Svensson and Malmqvist 2002). Even once these hurdles are overcome, integrating the infrastructure into the current electric grid systems will pose an additional challenge (Hidy 2012).

4. Adoption of new technology: There is an additional complexity and challenge around the adoption of new technologies (Rogers 2003), which requires societal shifts in behaviours (Noon 2012). There is a lot of scepticism (Frech 2012) and Hidy believes that this is largely because electric vehicle projects involve "working with new technology and not knowing how it will work in the future", which is preventing anyone from “making the first move” (Hidy 2012). According to Kalb (2012), “the biggest issue is that [EVs are] a brand new model and no industry best practices exist yet”. Frech (2012) added that “the behaviour change of using an electric car and the way we use it is different from using a traditional car and so there is a lot of learning that the consumer must do”. He said “a smart, step by step introduction of innovation is therefore important”.

5. Complex blend of technology: an electric vehicle system “encompasses ‘hard infrastructure’ such as recharging technologies, smart grids, and transport systems along with ‘soft infrastructure’ such as regulation, business models, skills and community engagement” (IEA 2011). Integrating this diverse mix of technologies and services into cities requires alignment between the many stakeholders (IEA 2011), which the research findings suggest is a real challenge.
3.3 Engagement Building Process (EBP) for Electric Vehicle Projects (RQ1c)

Once an understanding was gained of: 1) the current engagement challenges on EV projects, 2) the elements that make engagement in the context of EVs a particular challenge, and 3) the gaps in current engagement practices on electric vehicle projects, an Engagement Building Process (EBP) was developed to provide guidance tailored specifically to help project management address these gaps and challenges. This section answers research question 1c) How can an SSD approach be combined with Best Practice for Engagement to provide guidance to help EV project management address these engagement challenges?

3.3.1 Process Overview

It consists of three phases that are broken down into several stages. Figure 3.2 illustrates the sequence of the phases and Figure 3.3 provides an overview of the purpose and output from the phases. Phase 1 involves the creation of the Core Group and should ideally only occur once over the course of a project, unless project management changes hands. The rest of the process is iterative and Phase 2 (co-creation with the Steering Group) and Phase 3 (dissemination to the wider Working Group) need to be repeated at intervals (either bi-annually or annually), as new stakeholders join the project. This is to maintain the shared mental model, agreement and goal of the project throughout its implementation. The process will require the FSSD practitioner to facilitate Phase 1 (and Phase 2 if the project manager is not confident to do so at this stage).

Disclaimer: It is important to note that the list of challenges is not exhaustive. The process aims to provide guidance to help address only the challenges that were identified during this research as being most common and significant to EV projects from an FSSD, Best Practice and EV project management perspective. It should be integrated into the stakeholder engagement strategy as part of the project plan and used in conjunction with supporting engagement practices and project management tools.
Below is a summary table of the process, including the purpose of each phase and the deliverables (outputs):

<table>
<thead>
<tr>
<th>Phase</th>
<th>Who</th>
<th>Purpose (of phase)</th>
<th>Deliverable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Core Group</td>
<td>- Create a shared mental model between stakeholders</td>
<td>- PESTLE Analysis of risks and opportunities of involvement in the project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Promote a systems and long-term perspective</td>
<td>- Sustainability Principle Analysis of EV systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Gain baseline of Core Group’s understanding of the project and sustainability</td>
<td>- Initial Core values</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Address the mental blocks to engagement caused by the external barriers to EVs</td>
<td>- Initial Terms of Engagement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Select Steering Group members</td>
<td>- Initial list of definitions of terms (glossary)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Define initial list of terminology</td>
<td>- Stakeholder Map and Analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Agree initial terms of engagement</td>
<td>- List of stakeholder issues and motivations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Create initial core values</td>
<td>- Signed written agreement of the above</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Promote openness, transparency and cooperation within the Group</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Steering Group (and</td>
<td>- All of the above, this time co-created and finalised with the Core Group from the</td>
<td>- Final project vision</td>
</tr>
<tr>
<td></td>
<td>Core Group)</td>
<td>initial structure generated by the Core Group</td>
<td>- Final core values</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Reach agreement and sign approval to all of the above</td>
<td>- Final terms of engagement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Build relationships between Steering Group and Core Group</td>
<td>- Final list of agreed terminology</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Updated list of stakeholder issues</td>
</tr>
<tr>
<td>3.</td>
<td>Working Group (and</td>
<td>- Expand the mental model and shared understanding to the Working Group (WG)</td>
<td>- Updated PESTLE and SP Analysis</td>
</tr>
<tr>
<td></td>
<td>Core Group) (and</td>
<td>- WG to address barriers to EVs</td>
<td>- Refined agreement signed by all Steering Group and Core Group members</td>
</tr>
<tr>
<td></td>
<td>Steering Group)</td>
<td>- WG to sign off that they understand, share and agree with all terms, conditions</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>and definitions</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 3.3: Engagement Building Process Overview*
### 3.3.2 Phase 1: Initial Structure

<table>
<thead>
<tr>
<th>Aim</th>
<th>To create and agree upon a shared understanding between the Core Group members, to create the initial framework for engagement (such as core values, terms of engagement and project vision) and assemble a Steering Group in preparation for Phase 2.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>The duration will depend on factors such as the total number of the project management involved, the time availability of the stakeholders and the depth of the stakeholder analysis. A minimum of one day is recommended for stages 2-6.</td>
</tr>
<tr>
<td>Format</td>
<td>Stages 2-6 can be undertaken in a workshop setting in one session or be broken into separate smaller steps. It is strongly recommended that interviews are undertaken in person wherever feasible to help build relationships.</td>
</tr>
<tr>
<td>Who</td>
<td>The core group</td>
</tr>
<tr>
<td># Stages</td>
<td>8 (and a pre-stage)</td>
</tr>
</tbody>
</table>

**Pre-Stage: Recommendations for Strategic Engagement: To be Reviewed by a Project Lead:** Prior to Stage 1 of the process, the project manager, or individual that is responsible for overseeing the engagement of stakeholders on the project, is advised to first read the below-outlined recommendations. They aim to provide broad guidance for project management to advise on the stakeholders to engage at different stages of the project in order to be strategic when planning engagement. This is in support of the process to follow and is aimed to address the engagement challenge of “not having the right people engaged at the right time” (identified in Results Section 3.2). The following recommendations are in no particular order:

- **Ensure you identify and engage all relevant stakeholders to ensure an effective stakeholder ecosystem**

The typology of stakeholders (Figure 3.4) can act as a guide to ensure all stakeholders are involved or kept informed. This is important as missing key stakeholders can have negative impacts on the project. As EVs are a relatively new field and not all project management will have knowledge of all the stakeholders to engage, the typology provides a useful starting point. The list is not exhaustive and should merely be used as an initial guide to stimulate the stakeholder mapping process in Phase 1 Stage 8.
Be strategic about which stakeholders to engage at different stages of the project (from the pre-project to project closure phases)

Ensuring that the right people are involved at the right time is important to the success of the introduction of EVs to a region. Using the metaphor of an onion, you begin with the first layer, in other words those individuals or organisations that already realise the benefits for taking part in the project and adopting EVs. This might include short-distance drivers and

### Figure 3.4: Typology of typical EV stakeholders (adapted from Sadeghian et al. 2011)

<table>
<thead>
<tr>
<th>Group of Actors</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand-side actors</td>
<td></td>
</tr>
<tr>
<td>Users</td>
<td>Residential</td>
</tr>
<tr>
<td></td>
<td>Business</td>
</tr>
<tr>
<td>Transport operators</td>
<td>Public transport operators</td>
</tr>
<tr>
<td></td>
<td>Taxi companies</td>
</tr>
<tr>
<td></td>
<td>Car share companies</td>
</tr>
<tr>
<td></td>
<td>Vehicle rental firms</td>
</tr>
<tr>
<td>Supply-side actors</td>
<td></td>
</tr>
<tr>
<td>Existing infrastructure operators who must adapt to electric mobility</td>
<td>Motorway operators</td>
</tr>
<tr>
<td></td>
<td>Car park operators</td>
</tr>
<tr>
<td></td>
<td>Petrol companies</td>
</tr>
<tr>
<td>Existing actors, on the vehicle side who must adapt to electric mobility</td>
<td>Vehicle manufacturers</td>
</tr>
<tr>
<td></td>
<td>Service providers</td>
</tr>
<tr>
<td></td>
<td>Insurance companies</td>
</tr>
<tr>
<td>New suppliers, on the vehicle side</td>
<td>Battery suppliers</td>
</tr>
<tr>
<td></td>
<td>Suppliers of information systems</td>
</tr>
<tr>
<td>New suppliers, on the charging infrastructure side</td>
<td>Electricity Suppliers</td>
</tr>
<tr>
<td></td>
<td>Charging point suppliers</td>
</tr>
<tr>
<td></td>
<td>Property developers</td>
</tr>
<tr>
<td></td>
<td>Property managers</td>
</tr>
<tr>
<td>Regulatory actors</td>
<td></td>
</tr>
<tr>
<td>The authorities</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>Local Authorities</td>
</tr>
<tr>
<td></td>
<td>Transport authorities</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Media</td>
</tr>
<tr>
<td></td>
<td>NGO’s</td>
</tr>
<tr>
<td></td>
<td>Research bodies</td>
</tr>
</tbody>
</table>
environmentally conscious consumers. Regional EV projects in particular are advised to also engage municipalities early as they are identified as key influencer and leverage point in the introduction of EVs. The aim is to gain their political and financial support, as they often have as a key role in decision-making, such as the placement charging infrastructures, as well as their link to the national government.

Once you have successfully engaged the early adopters, you can then peel back the next layer, so to speak. The next layer are the stakeholders that see some of the benefits but are hesitant to take a risk on a new technology at the early stages. However, they may be persuaded as the business model becomes more viable or they see electric vehicles being discussed, shown more at the media and driven locally. The next layer after that are the stakeholders that do not really see the benefits and are not willing to take the risk today, but would nonetheless be willing to listen to the reasons for how they might benefit from joining the project. The last layer are the stakeholders that have no desire to be a part of this project and are not open-minded to the possibility. It is recommended that minimal energy is invested to engage this layer in the early stages, as they are likely to become more open to EVs as the technology becomes more widespread, socially accepted and financially viable. By engaging the stakeholders that want to participate in the project first, it optimises resources and begins the process of peeling back the next layers to hopefully unfold all parts and have society at large participating and engaging around electric vehicles.

Lastly, it is recommended that the media be engaged throughout the project. Running positive articles in the press about electric vehicles prior to a project launch, for example, informs the stakeholders and the general public of the benefits of EVs and their role in transitioning to a sustainable transport system, and therefore engenders greater interest from potential stakeholders in the project. It can also be a strategic way to enhance the commitment of stakeholders that have declared their involvement and planned contribution to the project, as it holds them accountable. Lastly, it helps build excitement and maintain momentum around the project and encourages more stakeholders to get involved. Figure 3.5 aims to give some guidance on the different layers (stakeholder groups) in relation to their willingness to engage. However, the list is not exhaustive and is likely to vary from context to context.
Align stakeholder interests with the vision beyond the project

It became clear through the interviews that not enough stakeholders were thinking past the project goal to a sustainable society. This means that stakeholders only had the goal of the project in mind and did not think about the long-term effects past that. This guideline is meant to strategically shift away from individualistic and potentially conflicting or divergent interests to improve cooperation and efficiency as all stakeholders are moving collectively towards a same goal with a shared purpose. The below process provides a practical way to do this.
**Stage 1**  
Form a Core Group  
This should consist of the project manager(s) and key decision makers. The group should consist of five members or less (Hidy 2012).

**Stage 2**  
Project Overview  
Core group to discuss the project details known to date, including the overall goal and any sub-targets, the mission statement, timelines and key dates, funding sources, budgets, roles and responsibilities and project phases (see the international project management standard: Office of Government Commerce (2009) for guidance on other topics). The aim is to achieve a shared understanding to enhance transparency and communication.

**Stage 3**  
Shared Understanding of Sustainability  

a) **Baseline Definition of Sustainability**: Core team members to share their definition and understanding of sustainability to gain baseline data on the different levels of understanding of the Core Group to prepare for the next steps in Stage 3.

b) **Relation to Transport Sector**: Core Group to brainstorm the relationship of the transport sector to the sustainability challenge. This is 1) to promote members to take a systems perspective and realise the interconnected nature of the sustainability challenge and the role of EVs in being part of the solution, and 2) to realise the importance of cross-sectoral cooperation through understanding how the transport sector both relies on and affects other sectors. An example of how this exercise would look is shown below.

c) **Role of EVs**: Core Group to brainstorm how EVs help address the sustainability challenge and how they continue to contribute to the
challenges. This is done using a tool called an SP Analysis\textsuperscript{10}. An example of some of the possible brainstormed responses is outlined in the SP Analysis in Appendix G.

It encourages members to view EV projects as a flexible platform and a step in the right direction, towards achieving a transport system that can operate in a sustainable society. Lastly, it helps members gain an understanding of the SPs by putting them into context in preparation for the next step in the process.

d) **Shared Definition of Sustainability:** Agree as a group that it makes sense to use the above-mentioned Sustainability Principles (SPs) to guide the planning and decision-making processes within the project as they provide the overall constraints within which the project can operate sustainably. Compliance with the principles can therefore provide an accurate definition of sustainability. More information can be found in The Natural Step’s *Sustainability Primer* (Baxter et al. 2009).

e) **Risk and opportunities of involvement in EV projects:** Core Group to brainstorm the risks and opportunities of involvement in the EV project. The aim is to flush out any concerns that might need to be addressed while, at the same time, getting the group engaged and motivated by the opportunities. This includes the social and environmental risks and opportunities. This can be used using a SWOT analysis and/or PESTLE analysis to ensure a broad spectrum of risks and opportunities are identified. A template and example can be found in Appendix H. Willard (2005) and Hitchcock and Willard (2010) provide a comprehensive overview of the business benefits of operating sustainably.

f) **Desired Situation: Envisioning a Transport sector in a sustainable society:** Core Group to brainstorm what a transport system in a sustainable society might look like and how it would operate. This exercise aims to help the group think creatively outside the constraints of today’s systems about a future that they would like to see. It encourages them to step out of their everyday work to imagine

\textsuperscript{10}Comparing EVs address the sustainability challenge and how they continue to contribute to the challenges against the four sustainability principles.
different scenarios. This is to help them think about EVs and whether they will have a role in such a society and to prepare the group for creating the project vision in Stage 4.

**Tip:** It can be powerful to invite the group initially to close their eyes and ask the following (or similar) guiding questions to help prompt them: In a sustainable society:

- How will people be travelling around? Will children still go to school? To what extent will adults travel to work and will people attend conferences and events in person? Or will most people learn through webinars, work via teleworking, and watch speakers via webcasts?
- Will individual car ownership still exist? Or will ownership be replaced by mobility and leasing services such as carpooling, integrated public transport solutions and alternatives to physical travel?
- Where will energy sources come from to run the system?
- What will vehicles look like? How will they be produced?
- How will their full lifecycle be different from today?

### Stage 4

Create Project Vision

Core Group to create a project vision. This includes identifying the core purpose of the project and the core values that the group would like all stakeholders to uphold throughout the project (such as transparency and inclusiveness). This will also involve setting Big Hairy Audacious Goals (BHAGs) and strategic goals, as outlined by Collins and Porras (1996). The ABCD-planning process (outlined in section 1.10) can help create this tension to realise the vision.

### Stage 5

Define Terms of Engagement and Terminology

Core Group to discuss and agree terminology (key definitions) to be used throughout the project process and how they want to interact with each other and the stakeholders. This is to avoid miscommunication or disagreement during the project.
Core team to undertake an exercise that takes them through an ABCD strategic planning process to begin to address each external barrier to EVs that they can identify. First brainstorm a list of all the external barriers that they feel are preventing stakeholders from getting engaged in the project. Then use the template provided in Appendix I to ask stimulating questions to help open up the discussion and to guide the process of brainstorming how the obstacles could be removed in the short, medium and long-term. This includes who would have to be involved, what legislation would need to be in place, and what can be done right now to begin to address each barrier. The exercise helps the group gain a clearer understanding of what is creating and would need to be in place to solve each barrier. It helps generate creative tension from the gap between today’s situation and an ideal where solutions have been found and therefore stimulates them to open their minds to solutions for the next step. It also promotes the group to take a long-term perspective, to make them realise that solutions to all barriers do not need to be in place today to get engaged around EVs, and invites them to be part of the solution. The four steps are as follows:

**The Ideal Situation (Step A):** This represents the vision or ideal situation that would need to exist for the barrier to not to be in place. The over-arching question asked is: *What would need to happen or be in place for the barrier not to exist?*. From that a series of questions have been created to stimulate the debate.

**The Current Reality (Step B):** The second involves a review of the current situation and explores the barrier in more detail as it exists today. For example, what legislation or practices exist and what people are involved that are keeping the barrier in place and hindering the market introduction of EVs? Which ones are facilitating the introduction and helping to overcome the barrier?

**Creating a list of actions (Step C):** Once the group has discussed what the barrier looks like today, and then thought about how they would want it to look like in the future, the group is now able to come up with a list of actions that could help to address that barrier.
**Prioritising the actions (Step D):** Now that the actions have been listed, the core group then starts to prioritise the actions based on the ones that can be achieved first (low-hanging fruit), and also by asking three prioritisation questions (Robèrt et al. 2002, 204):

- Does the action lead in the right direction?
- Does the action serve as a flexible platform for future improvement?
- Will the action provide a return on investment?

The responses should be recorded and circulated in the group for motivational purposes and in preparation for Phase 2 where the exercise is repeated with the Steering group, once they have been identified.

### Stage 7  
Create a Written Contract

Core Group to create a written contract that outlines all of the above, including: the project vision (core values, core purpose, strategic goals and BHAGs, terms of engagement, terminology, definition of success (the project objectives within the boundaries of the SPs), and that sustainability (defined by compliance with SPs). To be signed by all members to show their approval and agreement.

### Stage 8  
Steering Group Identification and Analysis

To prepare for Phase 2 and begin expanding the project team and identify the different interest groups:

**a) Core Group maps the different stakeholder groups** i.e. any individual or organisation that might influence, be affected by, or be involved in the project and its activities. This list will need updating as the project evolves and new groups become evident.

**b) Core Group assembles a Steering Group**¹¹: Identify a key contact from each organisation or to represent each interest group that will be

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¹¹ The size of the core team will depend on factors such as the size, scale and geographical range of the project, the number of stakeholder groups involved, and the level of maturity (stage of development) of the project planning.
part of the Steering Group to have greater involvement in decision making and project processes.

c) **Core Group invites Steering Group and then sends out relevant project information** once the group has been formed and has committed to be part of the project. This is to give them a project overview and inform them of the project status. This may include information on the project target, mission statement, timelines and key dates, expected outcomes, benefits of involvement, commitment requested from stakeholders. We recommend that all Steering Group members sign a Statement of Intent that outlined their commitment to help reach the project target.

d) **Core Group conducts semi-structured interviews (discussions) with each Steering Group representative** to understand 1) the motivations, interests, expectations, issues, needs and planned contributions of the stakeholders they represent, and 2) their level of understanding of the project and sustainability, in preparation for Phase 2. See Appendix F for a template of core questions to ask. However, these can be tailored to the needs of the specific project.

e) **Core Group analyses interview results** to cluster related issues, interests and needs to inform and plan for Phase 2.

f) **Update and Sign Agreement:** Names of Steering Group members and the different interest clusters are added to the agreement and it is signed by all Core Group members. Phase 2: Alignment with Steering Group.

### 3.3.3 Phase 2: Alignment with Steering Group

| Aim | Phase 2 involves: 1) disseminating the mental model (created in Phase 1 Stages 2 & 3) to the Steering Group, 2) co-creating and solidifying the project vision with the Core Group, 3) agreeing all terms and conditions, outlined in Phase 1, and 4) building relationships between the Core Group and the Steering Group. |
|Duration | The length of this phase could be completed in one to two days depending on how much time is allotted. However, the steps can be undertaken in separate stages if this is not feasible. |

12 The importance and value of understanding stakeholder is widely cited in literature (Global Environmental Management Initiative 2004, 24, Accountability 2005)
Format
Any appropriate format can be selected. A workshop setting is recommended, but the sessions can be split into a number of smaller sessions.

Who
Steering Group and Core Group members

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### Stage 1 Recap

Core Group explains the purpose of the session (and agenda) and provides a summary of the planned project and the current pre-project planning phase.

### Stage 2 Check-In

Project Manager leads a check-in exercise to help create an open, trusting environment, break the ice and begin to build relationships in the group.

### Stage 3 Trust & Relationship Building Exercise

A Core Group member or external facilitator runs an exercise to further enhance openness and cooperation in the project group in preparation for the steps to follow.¹³

### Stage 4 Identify Stakeholder Issues, Needs and Interests

A Core Group member facilitates an exercise that encourages Steering Group and Core Group members to raise the issues, interests and needs of the group they represent. This can be done in a workshop setting, brainstormed in smaller, informal groups around tables, or discussed as a collective group. We recommend using a Pro-Action Café (Holman et al.

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2007) and several topics can be pre-determined based on the analysis of the interviews the Core Group undertook with the Steering Group members in Phase 1. The aim is to increase transparency, surface any issues, enhance understanding and collaboration between stakeholders, and manage expectations in later stages.

<table>
<thead>
<tr>
<th>Stage 5</th>
<th>Repeat Phase 1 Stages 2-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core team present an overview of the stages and then co-create the project vision and terms of engagement etc. with the Steering Group. They use the initial information generated from Phase 1 as a basis to facilitate the process and invite input from the Steering Group.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage 6</th>
<th>Refine Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>The agreement created in Phase 1 Stage 8 is updated with the new information from the Stage above and signed by all Core Group and Steering Group members to show their approval, understanding and agreement of the core values, list of agreed terminology, sustainability principles as constraints to the project operations, terms of engagement and project vision.</td>
<td></td>
</tr>
</tbody>
</table>

### 3.3.4 Phase 3: Dissemination to the Working Group

<table>
<thead>
<tr>
<th>Aim</th>
<th>To disseminate the shared mental model and gain agreement from the Working Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>Varies: Can be a half- or full-day workshop or be broken into stages</td>
</tr>
<tr>
<td>Who</td>
<td>The Steering Group representative and the Working Group they represent</td>
</tr>
</tbody>
</table>
Stage 1  Summary and Purpose of the Process

The agenda and purpose of the session is explained to the Working Group.

Stage 2  Provide Overview of Phase 2 Stage 5

The outcome of Phase 2 is presented to the Working Group and they are briefly taken through Stage 5 of Phase 2. This is to enhance transparency and to promote a shared understanding and reach agreement in the wider project team. This time it is less intended to receive input from the Working Group (as occurred in Phase 2) and more to generate a shared understanding (of the project vision and sustainability etc.).

Stage 3  Sign-off and Finalise Agreement

The Working Group sign the agreement to show that they understand, approve of and agree to all terms and conditions (including the core values, terms of engagement, sustainability principles as constraints to operations). If there is disagreement this is raised by the Steering Group to the Core Group and amendments are considered prior to all stakeholders signing the final agreement.

3.4 Feedback from Testing the EBP and Review by Experts

Two measures were taken to gain feedback on the practical applicability of the EBP in the context of electric vehicle projects. The process was sent to EV experts for review and Phase 1 and parts of phase 2 were tested with the stakeholders of a regional EV project in south-eastern Sweden (Green Charge Southeast), as outlined in Methods Section 2.4.2. Two interesting observations were that: 1) the core values exercise (Phase 1, stage 4) was considered as important by stakeholders and the pillars to the project, and 2) the stakeholders acknowledged the importance of the sustainability principles and understood the reason they act as the boundaries to the project.
Overall, the feedback was that the EBP is understandable and easy to follow and the process could be used in real project settings. All feedback was considered in detail and incorporated into the final version of the EBP. Refinements were mainly made to add clarity to the stages, for example, to make the sustainability principles easier to understand. Some recommendations for exercises, for example to build trust, were also added to provide additional support to the user. More specific changes to the different process stages based on feedback included:

1. Expanding the PESTLE analysis from only brainstorming the PESTLE\(^{14}\) benefits of moving towards sustainability, to identifying the risks and opportunities of being involved in an EV project more generally. The opportunities that can be seized and the risks that can be mitigated by operating sustainably can still be identified under social and environmental aspects of the analysis. This change stimulated much more discussion and interest and led to a greater level of understanding and engagement from the stakeholders when testing the process.

2. A recommendation that the Core Group develop some pre-defined categories for the exercise that allows stakeholders to share their interests in Stage 4 of Phase 2 was added to make the process more manageable. The categories can be generated from the interviews with the Steering Group members in Phase 1 Stage 8.

3. Expanding the visioning exercise (in Phase 1, Stage 4 and Phase 2 Stage 5) to include a stage that involves the development of a full project vision. This was after learning that the visioning process acts as a powerful means to both motivate stakeholders and help them to think outside the constraints and the barriers of EV systems today. This change was important for the preparation of the ABCD strategic planning exercise to help address the external barriers to EVs.

4. Integrating a stage that involves brainstorming the business benefits (the risks that can be mitigated and the opportunities seized) of operating sustainably prior to introducing the sustainability principles as overall constraints to the project vision. This made the stakeholders more open to acknowledging the logic and benefits of this.

\(^{14}\) Political, Economic, Social, Technological, Legal and Environmental.
4 Discussion

4.1 Key Findings

Overall the data set collected was rich, from which a number of key findings could be extracted. One of the main findings is that an existing vicious cycle was identified between effective engagement and the external barriers to EVs, as illustrated in Figure 4.1. It is the external barriers that largely prevent potential stakeholders from engaging. At the same time it is the lack of engagement that contributes to reinforcing the external barriers. For example, the cost of the vehicles is partially dependent upon the supply-and-demand ratio. However, if demand does not increase because potential users are discouraged by the uncertainties and challenges associated with the technology, then the cost of the vehicles will remain high and continue to hinder engagement. This finding helped firstly identify the engagement of the stakeholders as a strategic point of intervention to address the other (external) barriers to EVs. Secondly, it informed the development of the engagement building process by integrating a stage that attempts to overcome the mental blocks that commonly prevent engagement around EVs.

![Figure 4.1: Vicious cycle between external barriers to EVs and challenges to stakeholder engagement on EV projects](image)

A second finding is that there is an evident overlap and noticeable interconnectedness observed between the different challenges to engagement on EV projects. For example, the fact that stakeholders often do not have a systems perspective and a shared mental model (understanding, terminology, practices, organisational culture), contributes to the existence of divergent interests and a lack of common goal (shared
purpose) on projects. This in turn contributes to the creation of a competitive environment, which reduces trust and feeds uncertainty within the project team. This uncertainty meanwhile reduces the cooperation and level of engagement that is needed to overcome the external barriers that are preventing the market introduction of electric vehicles.

While many of the identified challenges to engagement were not unique to the context of EV projects, the third finding was the discovery that engagement is particularly complex and problematic in the context of EV projects. This is largely a result of the context-specific external barriers, the level of complexity related to the technology and the number and diversity of stakeholders, the shift to new regional-scale infrastructure and the adoption of new technology. The value and need for guidance tailored specifically to address this complexity and these context-specific engagement challenges was recognised early in the research process.

A fourth key observation was that project management realise the need to take a collaborative, whole systems approach to stakeholder engagement on EV projects, as outlined in results section 3.1. The term stakeholder “ecosystem” was commonly used, both by EV experts and practitioners and in EV-related literature. This finding was unexpected as there was no evidence that, when interviewed, the stakeholders themselves took a systems perspective. They did not show an overview of the complexity of the sustainability challenges related to the transport sector or an understanding of the other stakeholders and their needs or interests, which reduced cooperation and the seeking mutually-beneficial outcomes. This suggests a “value-action gap”\(^1\) in the engagement of stakeholders. While the need for a stakeholder ecosystem and collaboration was identified by project management, there was no evidence of a strategic\(^2\), coordinated, whole-systems approach to engagement on EV projects. Several expressed that this was because they were unsure how to create the conditions for this type of engagement. The EBP developed is designed to bridge this gap.

\(^1\) An apparent ‘discrepancy’ between stated beliefs (and values) and behaviour (Flynn et al. 2009, 159).
\(^2\) Use of strategic guidelines to select actions and tools to reach success that includes moving towards sustainability.
A final observation was that only a very small number of electric vehicles project managers or stakeholders were involved in the project and motivated by a deeper desire to move the transport system towards sustainability. There was a broad awareness about the sustainability challenges related to the transport sector, in particular the contribution to climate change impacts through vehicle emissions, and the role of electric vehicles in contributing to addressing the challenge. However, none of the respondents stated that contributing to the transition to a sustainable transport sector was their primary motivator. Despite this, most acknowledged that sustainability is and will become increasingly important; even if merely from a commercial perspective. These two last findings highlighted the importance of integrating a stage into the EBP that involves brainstorming the opportunities of operating sustainably and the risks that can be mitigated in doing so, as outlined below.

4.2 Addressing the Challenges to Engagement Using an SSD Approach & Integrating Best Practice

As the process aimed to build engagement, it was important to integrate Best Practice, as well as a Strategic Sustainable Development approach, to make the process robust and of practical value. Best Practice was integrated in a number of ways. For example, the Recommendations for Strategic Engagement (the Pre-Stage of Phase 1) advise project management to carefully plan the stakeholders they engage at different stages of the project and to tailor engagement to different interest groups.

Appendix J summarizes how this thesis uses an Strategic Sustainable Development approach to develop the EBP and how the approach was adapted to address the EV specific engagement challenges identified. The Framework for Strategic Sustainable Development (FSSD) helped structure information to gain a clear and thorough overview of EV systems at each of the levels. It also helped identify and articulate the gap between current engagement practices and ideal engagement, by highlighting the practices that posed challenges from an SSD perspective. This information fed into the final list of challenges that were addressed in the process.

On reflection and from initial feedback and testing the process, the combination of SSD and Best Practice enabled the development of an effective EBP that can effectively address the engagement challenges
specific to the context of electric vehicles projects. Firstly, the process addresses the challenge of having different mental models caused in part by different types of expertise and different levels of understanding. It does so by integrating stages that help build a shared (and agreed) understanding between all stakeholders of: 1) the project (e.g. its goal and the stakeholders involved); 2) the sustainability challenge and its role in moving society towards sustainability; 3) the terms of engagement and core values upheld by all stakeholders during the project; 4) the different stakeholder needs, interests, expectations, priorities and planned contributions, and 5) terminology (shared language) to be used, which includes a shared definition of sustainability.

The EBP also encourages stakeholders to take both a systems and long-term perspective. For example, it facilitates understanding of: 1) the interconnectedness of the sustainability challenges; 2) their relation to the transport sector; 3) the role of EVs in moving society towards sustainability; 4) the dependence and shared interest of the transport sector on other sectors; and 5) the inter-dependence of the stakeholders on the project. Supporting this, the PESTLE exercise encourages stakeholders to realise the benefits of being part of the project and its role (and value) in moving towards a sustainable transport system. The exercise of visioning the transport sector in a sustainable society then helps stakeholders visualise a sustainable transport system as an end goal, which facilitates an understanding of the project in the context of the wider system.

Promoting a systems and long term perspective in turn helps shift the focus of stakeholders away from individualistic, self-motivated objectives, towards mutually-beneficial outcomes for all parties involved. Combined with the exercises that build trust and encourage stakeholders to share their interests and needs, this further promotes cooperation and contributes to addressing the challenges of a lack of shared purpose and divergent or conflicting stakeholder interests. The outcome is that expectations can be better managed and the greater transparency is achieved within the team, which increases cooperation and addresses the issue of electric vehicles projects being competitive work environments. The exercise that involves the co-creation of the project vision between the Core Group and Steering Group also serves to motivate stakeholders to work towards a shared purpose that they collectively find engaging and meaningful.
Lastly, identifying the vicious cycle between engagement and the *external* barriers to electric vehicles enabled the development of an EBP that helps break this cycle. A stage was developed that enables stakeholders to collectively create a preliminary action plan (using the ABCD strategic planning methodology outlined in the glossary) to gain a clearer understanding of what is creating each barrier and how it can be overcome in the short, medium and long-term. Initial feedback after testing the EBP suggests that the exercise is an effective and powerful way to reduce the challenge to engagement posed by the *external* barriers by helping to break down the perceptions and fears of risk and uncertainty associated with today’s electric vehicles technology that prevent engagement. The exercise encourages stakeholders to consider EVs in the long-term and realise that not all solutions need to be in place today and will unfold over time if people become more engaged. Providing a detailed break-down of questions tailored to each barrier was said to be exceptionally valuable to support project management in facilitating the discussion between Steering Group and Core Group members.

### 4.3 Contribution and Relation to the Field of Strategic Sustainable Development

#### 4.3.1 Contributions to SSD

The research for this thesis contributes to the field of SSD by applying the approach in the new, largely unexplored field of EVs. This has enabled the identification for how SSD can facilitate the introduction of EVs by addressing the current barriers to more widespread adoption. The wider system of EVs and more specifically, engagement practices on EV projects were explored and baseline information was gained of their understanding of the system; how they measure success; how they are currently being strategic; and the actions and tools they are presently using to strategically engage stakeholders in a way that the project ensures it is contributing to moving the transport system (and therefore society) towards sustainability.

#### 4.3.2 Relations to Other SSD Research

There has been other SSD-related research on the transportation sector (Robèrt and Jonsson 2006, Ahmed et al. 2009, Borén et al. 2010, Jing et al. 2010, Robért et al. 2009) that broadly supports the findings in this thesis.
However, to the authors’ knowledge, there have been no contributions to the field of SSD with regard to electric vehicles specifically.

There has also been research around Strategic Sustainable Development and engagement (Belaieff et al. 2007, Jackson et al. 2011) and the SSD and collaboration (Archer et al. 2009). *The Weave*, a guidance document produced as part of a thesis on the Masters in Strategic Leadership towards Sustainability, compliments findings of this thesis. Cretney et al. (2011) provide guidance on engagement in order to move towards a sustainable future and also found similar enablers to engagement such as engaging the right people at the right time. However, their guidance is designed for FSSD practitioners and integrates the Framework for Strategic Sustainable Development with strategic process design principles and dialogue-based methodologies, rather than using an SSD approach to help overcome barriers to engagement specific to electric vehicles.

### 4.4 Research Strengths and Limitations

#### 4.4.1 Strengths

One of the key strengths of the present research is the amount and quality of the data we collected. Many experts in the field and project managers from most of the leading EV projects in the sector were consulted. Access was also gained to stakeholder engagement plans and strategies from a number of the project managers, which helped inform the EBP. This gave an extremely rich and valuable data set that enabled a stronger conclusion to be drawn. The results are deemed to reflect a sample size large enough and with sufficient range of projects around the world to provide appropriate recommendations that will be of benefit to project management on future projects. A second key strength was the opportunity to test both Phase 1 and parts of Phase 2 with stakeholders of an existing project and gain feedback from experts around the world. This helped identify whether the EBP was more widely applicable it was: a) easy to understand and to follow; b) useful, relevant and appropriate in the context of EV projects; c) would be considered for use by them as EV project managers; and d) whether they have any recommendations for what could be added, deleted or amended to make it more effective at building engagement on EV projects and addressing the barriers to EVs. The process was subsequently amended from the feedback gained and it was felt that this greatly increased the validity of the research and the value that could be added in the field.
Lastly, a third strength is the contribution of knowledge to the field of Strategic Sustainable Development by undertaking research in an area that has not been explored in any depth: the introduction of electric vehicles.

4.4.2 Research Limitations

The most significant limitations were the inability to test Phase 3 of the engagement building process or to test the process in contexts outside of Sweden. The third limitation was the lack of available literature from sources such as journals to strengthen the findings. This is because large-scale, regional electric vehicles systems are still a relatively new phenomena and in the early stages of development. There has therefore been little follow up or review of best practice (what works well) and the enablers and challenges to the engagement of stakeholders on electric vehicles projects. Time constraints also provided restrictions on the number of experts that could be interviewed and surveyed and also limited the depth and breadth of literature that could be reviewed.
5 Conclusion

5.1 Main Findings

Through this research a clearer understanding was gained of both the main barriers that are preventing the wider introduction of EVs and the ways that addressing the most commonly experienced challenges to engagement could help overcome them. The results suggest a strong connection between the wider barriers to EVs and stakeholder engagement. The external obstacles are a significant contributor to the lack of engagement around EVs and the lack of engagement, in turn, reinforces the barriers. Therefore, it has been identified that engagement acts as a potential strategic point of intervention to enable the successful market introduction of EVs. Through further research, engagement was identified as a particular challenge on EV projects and found a number of difficulties unique to this context. This solidified the need a tailored engagement building process that addresses the specific challenges unique to EV projects.

The research findings add to the body of knowledge needed to bridge the gap identified in relation to the lack of follow up from EV projects to identify lessons learned in terms of what works well and where challenges remain in the engagement of stakeholders on EV projects. To date there is no evidence of documentation to inform and guide current and future EV project management with regard to how to most effectively engage stakeholders in this context, particularly not in a way that is strategic and takes a whole-systems approach to avoid blind alleys. Feedback gained from testing the process with the stakeholders on a regional EV project in Sweden and having it reviewed by a range of experts for its practical applicability, makes us confident that the process is of considerable value in the field and suggests that it can be used on EV projects in other contexts.

Lastly, this thesis is contributing to the field of Strategic Sustainable Development by applying the concepts in a new, largely unexplored context of EVs, where it is needed more than ever. This is given the recent and predicted surge of EV projects, the gaps identified in the current engagement practices from an SSD and Best Practice perspective, and the lack of sector-specific guidance tailored to addressing the complex and context specific challenges around electric vehicles.
5.2 Next Steps and Further Research Recommendations

While parts of the Engagement Building Process were tested, Phase 3 was unable to be tested due to time constraints. Therefore, a next step would be to test the process in its entirety in order to identify its full practical applicability. It is also recommended that the process is tested in geographical context outside of Sweden, such as the United Kingdom and the United States, to again ensure its wider applicability. If this is successful, it could always be tested in other cultural, social, political and economic contexts such as Asia, Africa and Latin America.

A second recommendation is to conduct research that addresses the external barriers that we identified directly. For example, undertaking research into how to improve the range of the vehicles, reduce the cost of the battery or build a stronger business case for the technology. There could be a metrics study, for example to attempt to put financial value on the return of investment for different stakeholder groups. Further research into the psychology, shifts in behaviour and both the internal and external motivators (Pink 2009) that will promote the adoption of the technology would also provide valuable insight to facilitate the market introduction of EVs and support the engagement building process.

As the scope focused heavily on the environmental and technical aspects of sustainability and electric vehicles technology, it is recommend that future research on social sustainability around EVs be conducted. For example, through analysis of the EV supply chain, which could include research around the working conditions or health implications related to the metal mines.

Lastly, it would be considered valuable to develop an interactive, online tool that enables project management to input data so that the process is tailored to their needs based, for example, on the size of the project, the budget, the timescales and the number of stakeholders involved. This would also make the process more easily accessible and convenient and therefore support its wider distribution. Similarly, other tools could be developed to further support the engagement building process we developed for this thesis.
References


Ernst & Young. 2011. Beyond the plug: finding value in the emerging electric vehicle charging ecosystem.


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## Appendices

### Appendix A: FSSD to Structure the Research Scope and Aim (Described in Methodology Phase 1)

<table>
<thead>
<tr>
<th>Level of FSSD</th>
<th>Scoping of the Topic</th>
</tr>
</thead>
</table>
| SYSTEMS       | **Sustainability Challenge**: Outline of the sustainability challenge (including climate change, pollution and deforestation), representation of challenges using funnel metaphor, understanding of the complexity and interconnectedness of the challenges and society within the biosphere (interaction with ecosystems)  
**Transport Sector**: Technical description: Outline of the transport system within the biosphere and the way it is run today i.e. fossil fuel dominant sources. Key facts, figures and trends relating to the role and impact of the sector. How it currently contributes to sustainability and unsustainability, the different sectors it relies on e.g. energy and construction, and the diversity of stakeholders involved. An overview of the various solutions and sustainable alternatives.  
**EVs**: Overview of electric vehicle systems and the technology, for example the different types of electric vehicle. How EVs act as a stepping stone to help bridge the gap to fully sustainable solutions i.e. how they contribute to sustainability. Outline the key barriers and challenges that remain with the technology and how they are not yet a fully sustainable solution (contribute to unsustainability). Outline the key stakeholders that need to be involved to successfully introduce EV technology, such as local government authorities, urban planners, businesses, universities/research bodies, users).  
**Engagement**: Engagement practices and principles. The different elements involved, such as creating a shared mental model, a shared understanding of the system, shared values, common goals etc. |
| SUCCESS | **Sustainability Challenge**: A sustainable society that complies with the fours sustainability principles 4SPs)  
**Transport System**: A sustainable transport system that operates within the 4SPs, has sufficient ROI to maintain itself, and meets the needs and purpose it is designed for  
**EVs**: Towards compliance with SPs, strategic toward/in line the vision/sustainability - for example running from renewable, local energy and using materials processed in closed loops, complementing other solutions needed for a sustainable transport system, successful engagement and cooperation of all the stakeholders  
**Engagement**: cooperation, shared by all stakeholders and maintained throughout the project, meaningful and has sustainability (compliance with SPs as part of it). Create shared understanding (mental model), contribute to stakeholders meeting their needs, Suspend “ego” – Self-interest, assumptions, shared definition of success, shared understanding of the goal of the project, in live with Best Practices for engagement. |
| STRATEGIC | **Sustainability challenge**: From the ideal or vision i.e. the success level, review where society is at now and then select actions and tools that strategically move society towards success. In other words backcasting from principles, using the three Prioritization questions described in the Strategic Sustainable Development Section of the Introduction.  
**Transport Sector**: Strategic guidelines to ensure actions are chosen that have sufficient return on investment and provide flexible platforms for future improvements and move towards a transport system that can operate within a sustainable society.  
**EVs**: as above  
**Engagement**: Strategic guidelines and the use of the three prioritisation questions to ensure that actions and tools are selected that ensure engagement practices move towards full compliance with the four sustainability principles, have sufficient return on investment to sustain future engagement efforts and are a flexible platform for future improvements. This involves backcasting from the vision of ideal engagement (from the perspective of FSSD and Best Practice for Engagement) and asking: “What can and needs to be done today to move towards having effective engagement on EV projects that is in line with the FSSD and Best Practice, such as taking long term, whole systems perspective and ensuring transparency, openness and cooperation?” And “What are the medium and longer term actions that will move engagement towards success?” |
### ACTIONS

**Sustainability Challenge:** Actions that help move society strategically towards sustainability e.g. resource management programmes

**Transport Sector:** Transition to renewable energy supplies, introduce sustainable vehicle systems, reduce travel (IT - telecommunications, working from home), organise behaviour change campaigns and press releases, set up stakeholder networks and roundtables, incentivise through policy changes

**EVs:** Install the infrastructure (charging and payment systems), increase public awareness (marketing campaigns and press releases), educate the users, organise pilot/test opportunities for the public and businesses, incentivise through policy changes

**Engagement:** align stakeholder interests, run workshops to create collective purpose and improve relationships, identify and chart stakeholder issues, needs and motivations, map and analyse stakeholders, build capacity for trust and understanding, send newsletters to keep stakeholders engaged

### TOOLS

**Sustainable challenge:** Tools that support efforts (actions level) to reach global sustainability, as defined by compliance with the 4SPs

**Transport sector:** Project management tools, stakeholder engagement tools, Communication tools, tools for implementation, regulatory tools, Surveys, solution prototypes and pilots, roundtables, Behaviour change campaigns etc.

**EVs:** as above

**Engagement:** Stakeholder maps, stakeholder analysis matrices, ABCD strategic planning process, communication tools, trust building exercises
### Appendix B: List of Interviewees

#### List of Electric Vehicle Experts

<table>
<thead>
<tr>
<th>Interviewee Name</th>
<th>Company/Organization</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antoine Belaieff</td>
<td>No company</td>
<td>Toronto, Canada</td>
</tr>
<tr>
<td>Anthony Vermie</td>
<td>Municipality of Rotterdam</td>
<td>Rotterdam, The Netherlands</td>
</tr>
<tr>
<td>*Bengt-Åke Claesson</td>
<td>Logica Sweden</td>
<td>Karlskrona, Sweden</td>
</tr>
<tr>
<td>*Camille Delepierre</td>
<td>Energy Agency for Southeast Sweden</td>
<td>Karlskrona, Sweden</td>
</tr>
<tr>
<td>Claude Willis</td>
<td>Greater Washington Region Clean Cities Coalition</td>
<td>Washington DC, USA</td>
</tr>
<tr>
<td>Eva Sunnerstedt</td>
<td>Miljöbilar I Stockholm</td>
<td>Stockholm, Sweden</td>
</tr>
<tr>
<td>*Fredrik Hansson</td>
<td>Volvo Bus Corporation</td>
<td>Gothenburg, Sweden</td>
</tr>
<tr>
<td>*Helen Elvmarker</td>
<td>Volvo Bus Corporation</td>
<td>Gothenburg, Sweden</td>
</tr>
<tr>
<td>Heather Watkinson</td>
<td>Transport for London</td>
<td>London, UK</td>
</tr>
<tr>
<td>Jim Frech</td>
<td>Pathfinder Consultants, LLC</td>
<td>Washington DC, USA</td>
</tr>
<tr>
<td>John Curtis</td>
<td>The Scottish Government</td>
<td>Edinburgh, Scotland</td>
</tr>
<tr>
<td>John Kalb</td>
<td>EV Charging Pros</td>
<td>California, USA</td>
</tr>
<tr>
<td>Magnus Lindström</td>
<td>Logica Sweden</td>
<td>Karlskrona, Sweden</td>
</tr>
<tr>
<td>Matthew Noon</td>
<td>Cross River Partnership</td>
<td>London, England</td>
</tr>
<tr>
<td>Sam Gardner</td>
<td>World Wildlife Fund</td>
<td>Dunkeld, Scotland</td>
</tr>
<tr>
<td>*Ulf Gustafsson</td>
<td>Volvo Bus Corporation</td>
<td>Gothenburg, Sweden</td>
</tr>
<tr>
<td>Willem- Jan Grondelle</td>
<td>Natuur &amp; Milieu</td>
<td>Utrecht, The Netherlands</td>
</tr>
</tbody>
</table>
### List of FSSD Experts and Practitioners Interviewed

<table>
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<tr>
<th>Interviewee Name</th>
<th>Company/Organization</th>
<th>Location</th>
</tr>
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<tr>
<td>*Eric Ezechieli</td>
<td>The Natural Step</td>
<td>Milan, Italy</td>
</tr>
<tr>
<td>*Jonas Oldmark</td>
<td>The Natural Step</td>
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</tr>
<tr>
<td>*Karen Miller</td>
<td>The Natural Step</td>
<td>Ottawa, Canada</td>
</tr>
<tr>
<td>*Pierre Johnson</td>
<td>Bleking Institute of Technology</td>
<td>Karlskrona, Sweden</td>
</tr>
<tr>
<td>*Sarah Brooks</td>
<td>The Natural Step</td>
<td>Ottawa, Canada</td>
</tr>
<tr>
<td>Sven Borén</td>
<td>Eco Pilots</td>
<td>Karlskrona, Sweden</td>
</tr>
<tr>
<td>*Henrik Ny</td>
<td>Bleking Institute of Technology</td>
<td>Karlskrona, Sweden</td>
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</table>

### List of Green Charge Southeast Project Stakeholders Interviewed

<table>
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<th>Interviewee Name</th>
<th>Company/Organization</th>
<th>Location</th>
</tr>
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<td>*Bengt-Åke Claesson</td>
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<td>Karlskrona, Sweden</td>
</tr>
<tr>
<td>*Camille Delepierre</td>
<td>Energy Agency for Southeast Sweden</td>
<td>Karlskrona, Sweden</td>
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<td>*Fredrik Hansson</td>
<td>Volvo Bus Corporation</td>
<td>Gothenburg, Sweden</td>
</tr>
<tr>
<td>*Helen Elvmarker</td>
<td>Volvo Bus Corporation</td>
<td>Gothenburg, Sweden</td>
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<tr>
<td>*Henrik Ny</td>
<td>Bleking Institute of Technology</td>
<td>Karlskrona, Sweden</td>
</tr>
<tr>
<td>Jonas Lööf</td>
<td>Miljöfordon Syd</td>
<td>Karlskrona, Sweden</td>
</tr>
<tr>
<td>Ulf Gustafsson</td>
<td>Volvo Bus Corporation</td>
<td>Gothenburg, Sweden</td>
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### List of Multi-Stakeholder Engagement Experts Interviewed

<table>
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<th>Interviewee Name</th>
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<tr>
<td>Ali Shariat</td>
<td>Volvo Co. Iran Branch</td>
<td>Tehran, Iran</td>
</tr>
<tr>
<td>Bob Willard</td>
<td>No Company</td>
<td>Toronto, Canada</td>
</tr>
<tr>
<td>Charles Jackson</td>
<td>Stakeholder Research Associates</td>
<td>London, UK</td>
</tr>
<tr>
<td>*Eric Ezechieli</td>
<td>The Natural Step</td>
<td>Milan, Italy</td>
</tr>
<tr>
<td>George Hidy</td>
<td>Pathfinder Consultants, LLC</td>
<td>Washington DC, USA</td>
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<tr>
<td>*Jonas Oldmark</td>
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<td>Stockholm, Sweden</td>
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<td>*Karen Miller</td>
<td>The Natural Step</td>
<td>Ottawa, Canada</td>
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<tr>
<td>Louise Armstrong</td>
<td>Forum for the Future</td>
<td>London, UK</td>
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<tr>
<td>*Pierre Johnson</td>
<td>Bleking Institute of Technology</td>
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<tr>
<td>Sam Kimmins</td>
<td>Forum for the Future</td>
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<tr>
<td>*Sarah Brooks</td>
<td>The Natural Step</td>
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<tr>
<td>Siavash Sid Afshar</td>
<td>Sunfield Development, LLC</td>
<td>San Francisco CA, USA</td>
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Appendix C: List of Experts that Provided Feedback on the EBP

<table>
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<tr>
<th>Interviewee Name</th>
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<th>Location</th>
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<td>Bob Willard</td>
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<td>George Hidy</td>
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<td>Henrik Ny</td>
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<td>Karlskrona- Sweden</td>
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<td>Jonas Oldmark</td>
<td>The Natural Step</td>
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</tr>
<tr>
<td>Sven Borén</td>
<td>Eco Pilots</td>
<td>Karlskrona- Sweden</td>
</tr>
</tbody>
</table>
Appendix D: Green Charge Southeast Case Study

The Green Charge Southeast project looks to ensure the adoption of more energy efficient transport systems in the region of Småland, Blekinge and Skåne. It officially begins in July 2012 and will last through December 2014. The goal is to get users, 20+ pilot municipalities, regional authorities, companies and academia together and create the best conditions so that the region will be able to lead the way towards a sustainable transport sector in line with the Government's target of a vehicle fleet independent of fossil fuels by 2030. This will be done through facilitation of the market introduction of electric vehicles that are run on local, renewable energy. Blekinge Institute of Technology is the lead institution for the project and Energy Agency Southeast is responsible for the independent project management. The project research will provide support for the business models and the electric vehicle system to be built up as well as the economic, social and environmental impact this may have. Ultimately, the project will result in a regional roadmap for how electric vehicles and charging infrastructure in a sustainable way can contribute to a regional vehicle fleet independent of fossil fuels by 2030.
Appendix E: Best Practice for Engagement

Best Practice for Engagement was found through interviews with engagement experts (see Appendix B) and through literature (AccountAbility 2005, AccountAbility 2008, SustainAbility 2007, Office of Government Commerce 2009, The Australian Department of Immigration and Citizenship 2008, Chartered Institute of Personnel and Development 2010a, 2010b and 2011, Jeffery 2009). The below list provides an overview of best practices and is not an exhaustive list:

- Invest time to understand the needs, concerns, issues, expectations and planned contributions of stakeholders
- Invest time to build trust and relationships with stakeholders, particularly in the pre-project and early-project phases
- Communicate openly and transparently
- Agree and be transparent about decision-making processes
- Be inclusive and promote both stakeholder input and participation wherever feasible (financially and time-wise)
- Set and communicate clear project roles and responsibilities
- Set or co-create a clear, shared and desirable project vision
- Agree terms of engagement and core values for the project team
- Tailor both information and engagement to different stakeholder groups
- Be strategic about which stakeholders are best to engage at different stages in the project
- Invite regular input and feedback from stakeholders and communicate how and when it will be integrated into the project
- Be accountable at all times
- Take a long-term perspective to engagement by thinking ahead about who to strategically engage in the future and planning resources and time respectively
Appendix F: Interview Questions: Green Charge South East Project Stakeholder Interview Questions

Project knowledge:
- What information do you have about the project?:
  - the project goal (purpose), e.g. its vision and mission statement
  - the key phases and timelines
  - the plan for communication between stakeholders and the project team (such as the number of planned meetings)
- What information do you feel you are missing or would like more on?
- What do you think the key challenges and barriers are that may compromise project success?
- What do you think the key challenges and barriers are that may compromise project success?

Stakeholders:
- What is your knowledge of the different stakeholders involved in the project e.g. their interests and issues?
- Do you think anyone needs to be involved that currently is not? i.e. who are the key stakeholders that need to be involved for the successful market introduction of EV infrastructure?
- Do you currently have existing relationships with other stakeholders on this project? If so, which ones and what kind of relationship?
- Do you see there being any conflicting or competing interests between the stakeholders on the Green Charge project?
- Do you see anyone in the region opposing the project?

Sustainability:
- Can you provide us with your personal definition of sustainability?
- Do you see the following as being a sustainability challenge. Please answer yes or no to the following list:
  - climate change
  - material flows
  - air pollution
  - water pollution
• resource depletion
• energy security
• deforestation
  • Can you list any others?

• Do you see these issues (addressing unsustainability) as being urgent?
• Are there any sustainability challenges you see being directly or indirectly associated with the transport sector? Please elaborate?
• What do you think a vehicle transport system will look like in a sustainable society?
  - how will people be moving around?
  - will people still own individual vehicles?
  - will people travel less or differently?
• What do you think is the return on investment are of a sustainable (vehicle) transport system: socially, environmentally and financially?
• Do you think EVs are a fully sustainable solution? If so/not, why/how?

Stakeholder Motivations, Expectations & Needs:
• What are your motivations for being part of the project i.e. what benefits do you expect/hope to gain from the project?
• What are your personal objectives and goals for the project i.e. what do you want to achieve and how do you wish/plan to contribute?
• What do you need from the project i.e. what are your expectations of what the project can or will provide?
• How can the project ensure that these needs and expectations are met?

Issues:
• What are your organisation’s key issues and priorities in relation to the project?
• How can the project help address your key issues?
• Do you perceive any risks for your organisation by working on the project or by working with any of the stakeholders?

Project contribution/priority/outcome:
• What parts of the project do you want to be involved in and to what level (and in what ways) do you want to be involved in the project
• In what ways do you hope or plan to contribute to the project?

Engagement preferences and expectations:
• What do you think the rules of engagement should be for the project?
e.g.: how engagement will be between stakeholders, like “we all agree to cooperate and communicate effectively, maintain an open mind”
• What do you think the key challenges might be in effectively engaging all the different stakeholder groups on this project?
• Are there any lessons or experiences (positive or negative) that you have learned related to the engagement, collaboration or communication between stakeholders that you would like to share (that Green Charge southeast can learn from)? - what works well and what not when engaging stakeholders with diverse interests
• What would you like to be kept informed about during the project and how would you like to be kept informed (e.g. email, in-person meetings, newsletter, project-wide event that include all stakeholders)?

Decision making:
• To what extent/level would you like to be actively involved in decision making during the project? For example, would you like to be consulted for all major decisions or just informed of the outcome, for example?

Closing questions:
• What do you see your involvement as being post-project (after 2014)? Would you be interested in further engagement post project?
• What do you think the 2030 (fossil fuel independence) target is a stepping stone towards?
Appendix G: Example of SP (Sustainability Principles) Analysis for Electric Vehicles

<table>
<thead>
<tr>
<th>Sustainability Principle</th>
<th>How electric vehicles are one part of the solution</th>
<th>How they are a flexible platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-Reduces fossil fuel consumption</td>
<td>-Material flows (car manufacture)</td>
</tr>
<tr>
<td></td>
<td>-Promotes renewable energy</td>
<td>-Fossil fuel extraction if energy is not renewable and locally sourced</td>
</tr>
<tr>
<td>2</td>
<td>-Reduces GHG emissions</td>
<td>-GHG/CO2 emissions from transport and mining and if the electricity is not from renewable sources</td>
</tr>
<tr>
<td></td>
<td>-Reduces noise pollution</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>-Reduces mining (for fossil fuels)</td>
<td>-Building of roads (still a necessity)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Mining minerals and metals for car manufacture</td>
</tr>
<tr>
<td>4</td>
<td>-Reduces public health issues (reduced pollution of noise and air)</td>
<td>-Still expensive for users to afford</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Not sufficient for long distances (mileage shortage)</td>
</tr>
</tbody>
</table>
## Appendix H: PESTLE Analysis for Electric Vehicles

<table>
<thead>
<tr>
<th></th>
<th>Risks</th>
<th>Opportunities</th>
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</thead>
<tbody>
<tr>
<td><strong>Political</strong></td>
<td>- Association with one political party</td>
<td>- Leverage for funding</td>
</tr>
<tr>
<td></td>
<td>- Financially driven</td>
<td>- Price of Oil being high</td>
</tr>
<tr>
<td></td>
<td>- Timeline with political terms</td>
<td></td>
</tr>
<tr>
<td><strong>Economic</strong></td>
<td>- Cost of Batteries</td>
<td>- New business model</td>
</tr>
<tr>
<td></td>
<td>- Business case</td>
<td>- Based on new market</td>
</tr>
<tr>
<td></td>
<td>- Ensure enough finance for the project</td>
<td>- Large Number of funders</td>
</tr>
<tr>
<td></td>
<td>- Global financial situation</td>
<td>- Global finance situation</td>
</tr>
<tr>
<td></td>
<td>- Small funding contributions</td>
<td></td>
</tr>
<tr>
<td><strong>Social</strong></td>
<td>- Behaviour change</td>
<td>- New generation to buy the vehicles</td>
</tr>
<tr>
<td></td>
<td>- Mindset (shift)</td>
<td>- Social media</td>
</tr>
<tr>
<td><strong>Technical</strong></td>
<td>- Technological feasibility</td>
<td>- “First Mover” Advantage with a new technology</td>
</tr>
<tr>
<td></td>
<td>- Range</td>
<td>- Leader in a new market</td>
</tr>
<tr>
<td></td>
<td>- Battery charging time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Standardization of charging posts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Intellectual Property Rights (IPR)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- “First Mover”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Leader in a new market</td>
<td></td>
</tr>
<tr>
<td><strong>Legal</strong></td>
<td>- Taxation and rules</td>
<td>- Ahead of taxation / regulations</td>
</tr>
<tr>
<td></td>
<td>- Unpredictability of future change</td>
<td></td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
<td>- Using energy from a non-renewable source</td>
<td>- Emission reductions</td>
</tr>
<tr>
<td></td>
<td>- Increasing the use of raw materials for making the battery and parts of the car</td>
<td>- Cheaper energy costs</td>
</tr>
</tbody>
</table>
## Appendix I: ABCD Barrier Exercise

<table>
<thead>
<tr>
<th>A: In an ideal scenario (The Vision)</th>
<th>B: The situation today (Current Reality)</th>
<th>C: List of Actions</th>
<th>D: Prioritisation of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardisation of Infrastructure (payment &amp; charging)</td>
<td>1) How could infrastructures be operated? 2) Who could operate the infrastructure? 3) What are options for payment and vehicle charging? 4) To what extent is infrastructure standardised? 5) What are the main barriers to the standardisation of infrastructure? 6) What people, legislation or practices could facilitate standardisation?</td>
<td>1) How are infrastructures currently being operated today? 2) Who currently operates the infrastructure? 3) What are options for payment and vehicle charging currently? 4) To what extent is infrastructure standardised today? 5) What are the main barriers to the standardisation of infrastructure today? 6) What people, legislation or practices currently facilitate standardisation?</td>
<td>1) What are some actions (practical steps, legislative changes, investments etc.) that can be held create a standardised vehicle charging and payment systems (infrastructure), irrespective of any technological, financial, political or other constraints that exist today?</td>
</tr>
<tr>
<td>Cost of Vehicle (Battery)</td>
<td>1) What could be the average cost of the vehicle (battery)? 2) What makes up the cost (why is it that price)? 3) What could be the main barriers to a reduction in cost? 4) What people, legislation or practices could facilitate the reduction of cost?</td>
<td>1) What is the current average cost of the vehicle (battery)? 2) What makes up the current cost (why is it that price)? 3) What are the main barriers to a reduction in cost today? 4) What people, legislation or practices currently facilitate the reduction of cost?</td>
<td>(Same as above)</td>
</tr>
<tr>
<td>Adoption of New Technology</td>
<td>1) What could be the range vehicles can travel (i.e. how long can the vehicle be driven before the battery needs charging again)? 2) What people, legislation or practices facilitate improving the range of the vehicles? 3) What are the barriers preventing</td>
<td>1) What is the current range vehicles can travel today (i.e. how long can the vehicle be driven before the battery needs charging again)? 2) What current people, legislation or practices facilitate improving the range of the vehicles? 3) What are the current barriers preventing</td>
<td>(Same as above)</td>
</tr>
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88
<table>
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<tr>
<th>Category</th>
<th>Question 1</th>
<th>Question 2</th>
<th>Question 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range of Electric Vehicle</td>
<td>1) What is the range of electric vehicles that can travel (i.e. how long can the vehicle be driven before the battery needs charging again)?</td>
<td>1) What is the current range of electric vehicles that can travel today (i.e. how long can the vehicle be driven before the battery needs charging again)?</td>
<td>2) What current legislation, policies, or practices facilitate improving the range of the vehicles?</td>
</tr>
<tr>
<td></td>
<td>2) What people, legislation, or policies facilitate improving the range of the vehicles?</td>
<td>2) What current legislation, policies, or practices facilitate improving the range of the vehicles?</td>
<td>3) What are the barriers preventing improvements in vehicle range?</td>
</tr>
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<td></td>
<td>3) What are the barriers preventing improvements in vehicle range?</td>
<td>3) What are the barriers preventing improvements in vehicle range?</td>
<td>(Same as above)</td>
</tr>
<tr>
<td>Lack of Business Model</td>
<td>1) Why is there not a sufficient business model (what makes the business model insufficient)?</td>
<td>1) Why is there not a sufficient business model (what makes the business model insufficient)?</td>
<td>(Same as above)</td>
</tr>
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<td></td>
<td>2) What could facilitate improvements to the business model (what is facilitating greater returns on investment)?</td>
<td>2) What currently facilitates improvements to the business model (what is currently facilitating greater returns on investment)?</td>
<td>(Same as above)</td>
</tr>
<tr>
<td>Institutional Barriers</td>
<td>1) What are the main institutional barriers?</td>
<td>1) What are the main institutional barriers today?</td>
<td>(Same as above)</td>
</tr>
<tr>
<td></td>
<td>2) What people, legislation, or practices reinforce and contribute to maintaining these barriers?</td>
<td>2) What people, legislation, or practices currently reinforce and contribute to maintaining these barriers?</td>
<td>(Same as above)</td>
</tr>
<tr>
<td></td>
<td>3) What people, legislation, or practices currently facilitate removal of these barriers?</td>
<td>3) What people, legislation, or practices currently facilitate removal of these barriers?</td>
<td>(Same as above)</td>
</tr>
<tr>
<td>Materials to manufacture vehicle (unsustainable)</td>
<td>1) What materials are used in the manufacture of vehicles today?</td>
<td>1) What materials are used in the manufacture of vehicles today?</td>
<td>(Same as above)</td>
</tr>
<tr>
<td></td>
<td>2) Which of these materials are sustainable (non-toxic and do not systematically accumulate in nature)?</td>
<td>2) Which of these materials are sustainable (non-toxic and do not systematically accumulate in nature)?</td>
<td>(Same as above)</td>
</tr>
<tr>
<td></td>
<td>3) Which materials are unsustainable (toxic,</td>
<td>3) Which materials are unsustainable (toxic,</td>
<td>(Same as above)</td>
</tr>
<tr>
<td>Safety Concerns</td>
<td>1) What are the safety concerns around the vehicles today (i.e. what is making them unsafe)? 2) What developments, practices, incentives and people are helping to improve the vehicle safety?</td>
<td>1) What are the safety concerns around the vehicles today (i.e. what is making them unsafe)? 2) What developments, practices, incentives and people are helping to improve the vehicle safety?</td>
<td>(Same as above)</td>
</tr>
<tr>
<td>Charging time of battery (vehicle)</td>
<td>1) What is the average charging time of vehicles? 2) What (people, legislation, technological developments, practices) facilitate a reduction in charging time? 3) What are the main barriers to reducing the charging time?</td>
<td>1) What is the current average charging time of vehicles? 2) What (people, legislation, technological developments, practices) currently facilitate a reduction in charging time? 3) What are currently the main barriers to reducing the charging time?</td>
<td>(Same as above)</td>
</tr>
</tbody>
</table>
Appendix J: How a Strategic Sustainable Development Approach was Taken

| FSSD | We used the FSSD in a number of ways:  
1. To scope and structure our research approach and literature during our mapping phase to avoid getting inundated with information and ensure we have a good structure and flow between the different sections of our paper that strongly links the system, success and strategic levels of the FSSD in particular;  
2. To outline what ideal stakeholder engagement would look like and then to capture how project management currently engages on EV projects (the current reality of the engagement process). For example, we would ask “Do project managers currently take a whole systems perspective to engaging stakeholders?” (systems level), or “How do they currently measure success? Do they include sustainability in their measure of success?”. This enabled us to undertake a gap analysis to identify how engagement could be improved to move projects towards sustainability and assist in the introduction of EVs. The results were used to inform the engagement building process we developed to address the gap;  
3. We use the information at each of the levels to inform the final guidance |
| SPs | SPs are used as part of our engagement building process and guidelines for EV project management.  
1) during the exercise of doing an SP analysis of EVs.  
2) during the exercise where a shared definition of sustainability (defined by compliance with SPs) is agreed  
3) as boundaries to the project vision |
| SP analysis of EVs | In our process we undertake an SP analysis of EVs and then link this to the risks and opportunities that the “contributions” or “violations” to SPs present for the project. This is to promote stakeholders to take a systems perspective and realise both the role of EVs in moving the transport sector towards sustainability and how EVs are not a fully sustainable solution yet. This also has the purpose of motivating stakeholders to embrace the SPs as boundaries to the project vision and creating tension from today’s technology to fully sustainable solutions in future. |
| Backcasting from principles | We use backcasting from principles as a planning method that uses principles of engagement and sustainability to define success. We firstly incorporate a visioning exercise as part of our engagement building process to encourage stakeholders to think long-term, outside of the constraints of today, about how a transport system in a sustainable society might look like (complying with SPs). And also the role EVs might play either in it or to help reach it. This is to help them link the project to the wider goal of moving towards sustainability to engage them. We additionally provide the project manager with guidelines and a SLF for what “ideal” engagement might look like (that complies with SPs and the “success elements” of engagement that were informed from our research (interviews and literature review). This is both for guidance and as a basis to energise stakeholders to move from the present to a vision of effective engagement & cooperation. |
| Vision | The vision (constrained by SPs) will be used as part of our engagement building process. It is very powerful in building engagement as the BHAGs, the strategic goals and the creative tension caused by the gap between the current reality and the vision (goals) is very energising and motivating. Part of our engagement building process is also an exercise for stakeholders to begin to break down the wider barriers to electric vehicles (e.g. the cost and range of the vehicles) that are preventing their engagement. |
| Strategic guidelines | We provide recommendations for strategic engagement from the information we gained from interviews and from our own analysis of SSD and engagement principles. For example, engaging those that already realise the benefits of EVs first e.g. short distance drivers and engaging municipalities early. The three prioritisation questions are used as part of our ABCD described below (in the D-step) to help address the barriers to EVs. |
| ABCD strategic planning process | The ABCD is used as a means to implement the conceptual framework of the FSSD in an EV project context. We use it as part of our engagement building process to encourage stakeholders to think through and begin the strategic planning process for how the key barriers to electric vehicles could be addressed in the short, medium and long term. It aims to help stakeholders on EV projects to begin to break down the wider barriers to electric vehicles (e.g. the cost and range of the vehicles) that are preventing their engagement. We do this by guiding them through questions tailored to each step. |
Appendix K: Interview Questions: Electric Vehicle Project Management

Opening Question:
- Are you responsible for the engagement of stakeholders on this project and are you happy to answer questions about the engagement process?

Project knowledge:
- Can you please provide some background about the project?
  - the project goal (purpose), e.g. its vision and mission statement
  - the key phases, the number of stakeholders involved etc.
  - the plan for communication between stakeholders and the project team (such as the number of planned meetings)
- What information was shared with the stakeholders and how have they been kept informed?
- What do you think the key challenges and barriers are that may compromise project success?
- Do you see anyone in the region opposing the project?
- Do you think any of the following are key barriers to the expansion of electric vehicles?
  - Battery charging Time
  - Range of vehicles (distance)
  - Lack of standardised infrastructure (charging stations and payment systems)
  - Non-supportive legislation (taxation of charging posts and lack of incentives)
  - Weak business case (insufficient return on investment)
  - Cost of the vehicle/battery
  - Concern around the environmental sustainability of the vehicles and green washing
  - Concern that electric vehicles won’t “take off” (challenge of adoption of new technology)
  - The effective engagement and collaboration of stakeholders
  - No or other (Please Specify)
• Do you think the previously-listed wider barriers to electric vehicles (such as the range of the vehicle and the cost of the batter) are a key reason for lack of engagement around EVs and preventing their wider introduction?

Sustainability:
• Can you provide us with your personal definition of sustainability?
• Do you think there is a sustainability challenge?
• Can you list any others?
• What do you see the impacts being (if any)?
• Do you see these issues (addressing unsustainability) as being urgent?
• Are there any sustainability challenges you see being directly or indirectly associated with the transport sector? Please elaborate?
• What do you think a vehicle transport system will look like in a sustainable society?
  - how will people be moving around?
  - will people still own individual vehicles?
  - will people travel less or differently?
• What do you think the Return on Investment - socially, environmentally and financially - are of a sustainable (vehicle) transport system?
• Do you think EVs are a fully sustainable solution? If so/not, why/how?

Stakeholder Engagement:
• What is the engagement strategy/plan for the project: how do you plan to engage?
• Who is responsible for planning the engagement and for maintaining engagement throughout the process?
• What tools or framework are you using, if any, to engage stakeholders?
• What is your knowledge of the different stakeholder interests, issues, needs and expected involvement?
• Was there a formal process in place to identify the above?
• Was there an action plan with responsibilities to ensure that the interests and needs of the stakeholders are met?
• Do you think that all stakeholders that should be involved (i.e. all those that influence the project and are affected by it) are currently involved?
• Do you think that the effective engagement of all the diverse stakeholders involved in EV projects is a key challenge to the successful introduction of electric vehicles in regions?
• Do you think the following are common challenges to the engagement of stakeholders on electric vehicle projects? Do you think any are unique to electric vehicle projects?
  o Having the right people in the room at the right time?
  o Being strategic about which stakeholders to engage at what stage of the project?
  o Competition between stakeholders?
  o Divergent (or conflicting) interests?
  o Lack of long-term thinking (or planning)
  o Not taking a whole systems perspective to engagement?
  o Lack of a shared common goal (or purpose)?
  o Different mental models and level of understanding?
  o Lack of shared expertise (everyone is an expert in their own field)
  o Poor or non-transparent communication?
  o Lack of inter-stakeholder trust?
• How, if at all, do you think that engagement on electric vehicle projects (or around electric vehicles) is different from other projects involving diverse stakeholder groups?
• Do you think that any of the following add an additional challenge to the engagement of stakeholders in the context of EV projects?
  o The behaviour and lifestyle changes involved in transitioning to new regional infrastructure?
  o The adoption of new technology (electric vehicles)
  o The uncertainties and risks associated with EVs (for example the weak business case, the range of the vehicles, or the cost and charging time of the battery?)
• What percentage of stakeholders do you think are motivated to be part of electric vehicle projects through a genuine interest to make the transport system more sustainable?
• Do you think that dialogue around sustainability could be an effective way to engage stakeholders by helping them take a longer-term, whole systems perspective and focus them away from more individualistic, self-motivated and potentially competing goals towards mutual benefits and cooperation?
• What measures are you taking to ensure that everyone is involved that needs to be?
• Do you currently have existing relationships with the stakeholders on this project?
• Is there a plan in place to build trust and relationships between stakeholders? What kinds of activity does this involve?
• Do you see there being any conflicting or competing interests between the stakeholders on the project?
• Have you established terms/principles of engagement and core values within the project team?
• To what degree do you invite input and participation from stakeholders? For example, do they co-create the project vision or is this in place when they join?
• From your experience, what do you think the key challenges are in effectively engaging all the different stakeholder groups on this project?
• Have you found that divergent interests or conflicting motivations and a resulted to be a problem?
• Do you think that stakeholders on the project have a shared sense of purpose and are working towards a common goal?
  • Are there any lessons or experiences (positive or negative) that you have learned related to the engagement, collaboration or communication between stakeholders that you would like to share from your experience? What works well and what not when engaging with diverse interests?
  • Do you review engagement practices for their success, either during or after the project?

**Decision making:**
• To what extent/level do you actively involve stakeholders in decision making during the project? For example, do you consult them on major decisions or just keep them informed of the outcome, for example?

**Closing questions:**
• What are the next steps after the project?
• What do you see your involvement being post-project?
• Is the project goal a stepping stone towards a bigger goal or vision?
• Can we send any follow up questions we might have via email?