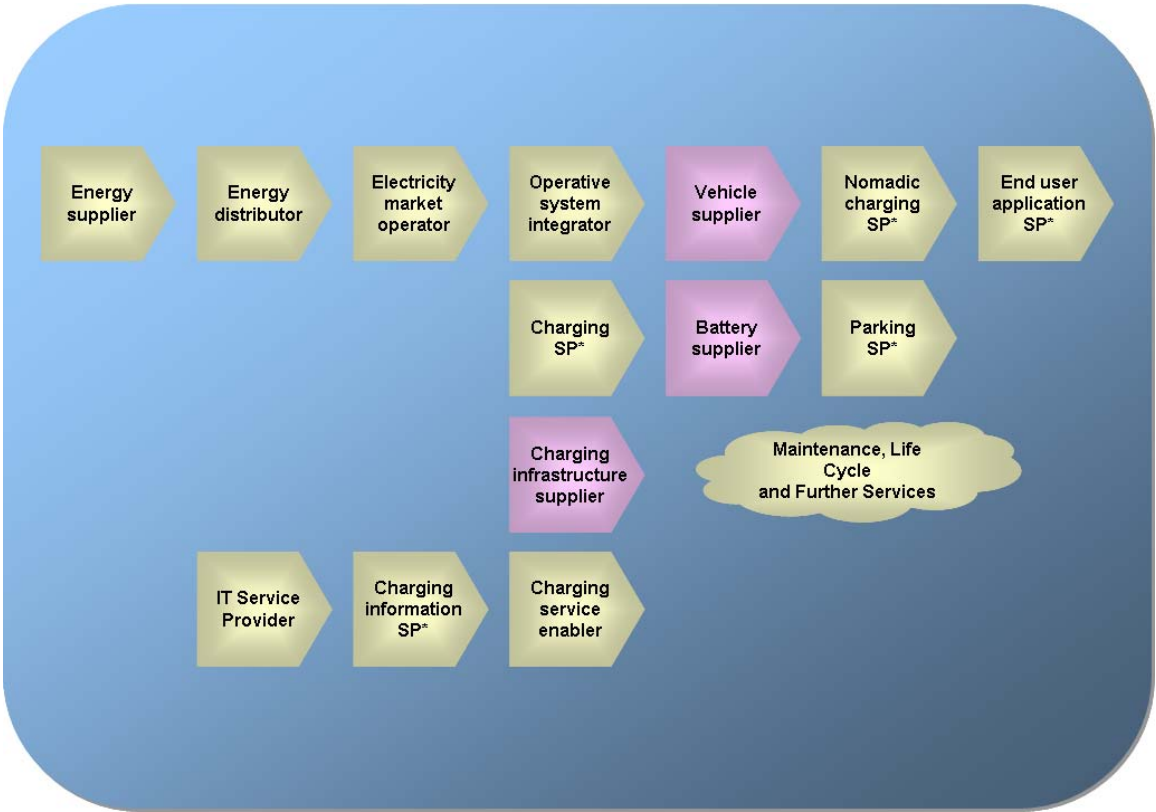


## D1.2 Business Models For Electric Mobility

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## Executive Summary

This document *D1.2 Business Models* is a deliverable of SIMBe, which is a multidisciplinary research project funded by the Tekes Sustainable Community programme. For more details about SIMBe see [www.simbe.fi](http://www.simbe.fi). This document answers the question *what are the emerging value propositions in the electric mobility value chain* and provides a general picture of emerging business models in the field of electric mobility.

In this document the objective is to analyse the emerging business of electric mobility by:

- Exploring companies business models related to electric mobility by using Osterwalder's and Pigneur's (2010) business model canvas as a framework and map
- Integrating the various stakeholders' business models related to electric mobility into the industrial e-mobility value chain
- Identifying the gaps of the offerings and the value propositions in the e-mobility value chain and finding examples to fill those gaps

The major findings of this document are:

- Not all SIMBe companies' business models are mature: there are clearly different levels in the maturity of the e-mobility business models
- There are several gaps in the e-mobility value chain, Finnish companies within and outside of the SIMBe consortium do not yet have value propositions in all of the links in the e-mobility value chain
- Key partners are defined but sometimes only in one direction: co-operation is not yet fully established. Some key partners are missing in SIMBe, probably even in Finland
- Value chains and networks evolve over time when the business map is becoming more mature

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## 1. Introduction

### 1.1. Target group

This document is SIMBe consortium internal. It is targeted for an audience those interested in business aspects related to electric mobility. Particularly this document targeted to industry representatives in the field as well as academic and other researchers in SIMBe.

### 1.2. Objectives

Core objective of this document is to integrate the various stakeholders' business models related to electric mobility into the e-mobility value chain. Particularly the value propositions have been mapped into the e-mobility value chain. A further objective is to enable different stakeholders to thoroughly understand other actors' views and expectations related to electric mobility business models.

### 1.3. Scope of this document

This document is a deliverable of the Tekes research project SIMBe = Smart Infrastructures for Electric Mobility in Built Environments (see [www.simbe.fi](http://www.simbe.fi)). Thus the scope of this document is within the scope of the project.

Main scope of the document are the business models in the field of electric mobility. Electric mobility can be understood as wide range of means of transport propelled by an electric motor. In this document the term EV is understood as battery electric vehicle, plug-in hybrid electric vehicle and extended range electric vehicle. The scope of this document covers only business models related to vehicles which have a possibility to charge their batteries from the electricity supply network.

### 1.4. Research questions, approach and methodology

The major research question of this document is: *what are the emerging value propositions in the electric mobility value chain?*

The following sub questions can be derived from the major question:

- How are the value propositions mapped into the electric mobility value chain?
- Who of the actors will take the integrator role in the electric mobility value chain?

Methods used are:

- action research as proposed by McKay and Marshall (2001), emphasizing good planning and continuous reflection between the researcher and the informants
- semi-structured interviews and workshop type exercises of describing companies' business models in the field of e-mobility
- literature review
- qualitative data gathering
- re-analysis of data following the first synthesis of data

Osterwalder's and Pigneur's (2010) business model canvas is used as a framework and map in the workshops and interviews, and as a tool of value creation analysis, too. This business model canvas part of the action research was carried out as a *multiple case study* (Yin 2003)

## 2. Theoretical background

### 2.1. Business Model Theory

The origin of the term Business Model is in the 1970's and it was used in the context of data and process modelling by e.g. Konczal (1975) and Dottore (1977). The use of the business model concept increased substantially during the rise of the dot-com era in the 1990s when companies were seeking new ways to do business. At that time the term started to change its meaning and was adopted in business discussion more generally. In the year 2000 Eriksson and Penker introduced a list of five purposes where the business model thinking is beneficial:

1. To better understand the key mechanisms of an existing business
2. To act as a basis for improving the current business structure and operations
3. To show the structure of an innovated business
4. To experiment with a new business concept or to copy or study a concept used by a competitive company (e.g. benchmarking on the model level)
5. To identify outsourcing opportunities

Following this business model theory has become largely accepted and the early connotation that a business model is related to ICT was lost (Stähler, 2002).

Later on it was discovered by George & Block (2009) that six broad themes emerged in business model discussion; these themes are introduced in table 1. As well the discourse analysis reveals that in practice the underlying components of business models incorporate both resource and transactive structures as shown in figure 1.

As the business model theory evolves ***the relationship between business model analysis and corporate strategy comes under investigation***. There have been different views how strategy and business models interact. See for instance figures 2 and 3. It is also relevant to understand business models in the context of organisational development as shown in the figure 6. A further interesting approach was when Zott & Amit (2008) made a comparison between product market strategy and business model. The result, provided in table 2, was that business model and product market strategy are complements, not substitutes.

The approach of Osterwalder & Pigneur is the most practical and easy to utilise. Thus it was chosen here, in this research, to be the dominant theory:

***“The Business Model is like a blueprint for a strategy to be implemented through organizational structures, processes, and systems. “***

***“A business model describes the rationale of how an organization creates, delivers, and captures value” Osterwalder & Pigneur (2010)***

In their book *Business Model Generation* they provide a Business Model Canvas which was selected for use as a framework for this study.

Table 1. Thematic Summary of Business Model Literature. Source: George & Bock, 2009

Theme	Sample publications	Summary	Representative definition
Design	Slywotzky, 1999; Timmers, 1998	Agent-driven or emergent configuration of firm characteristics	“A business model is an architecture for product, service and information flows, including a description of the various business actors and their roles” (Timmers, 1998, p. 4).
RBV	Mangematin et al., 2003; Winter & Szulanski, 2001	Organizational structure codeterminant and coevolving with firm’s asset stock or core activity set.	“Each business model has its own development logic which is coherent with the needed resources—customer and supplier relations, a set of competencies within the firm, a mode of financing its business, and a certain structure of shareholding” (Mangematin et al., 2003, p. 624).
Narrative	Magretta, 2002	Subjective, descriptive, emergent story or logic of key drivers of organizational outcomes.	“[Business models] are, at heart, stories—stories that explain how enterprises work” (Magretta, 2002, p. 87).
Innovation	Chesbrough & Rosenbloom, 2002	Processual configuration linked to evolution or application of firm technology	“The business model provides a coherent framework that takes technological characteristics and potentials as inputs and converts them through customers and markets into economic outputs” (Chesbrough & Rosenbloom, 2002, p. 532).
Transactive	Amit & Zott, 2001; Zott & Amit, 2007, 2008	Configuration of boundary-spanning transactions	“A business model depicts the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities” (Amit & Zott, 2001, p. 493).
Opportunity	Afuah, 2003; Downing, 2005; Markides, 2008	Enactment and implementation tied to an opportunity landscape	“[The business model] is a set of expectations about how the business will be successful in its environment” (Downing, 2005, p. 186).

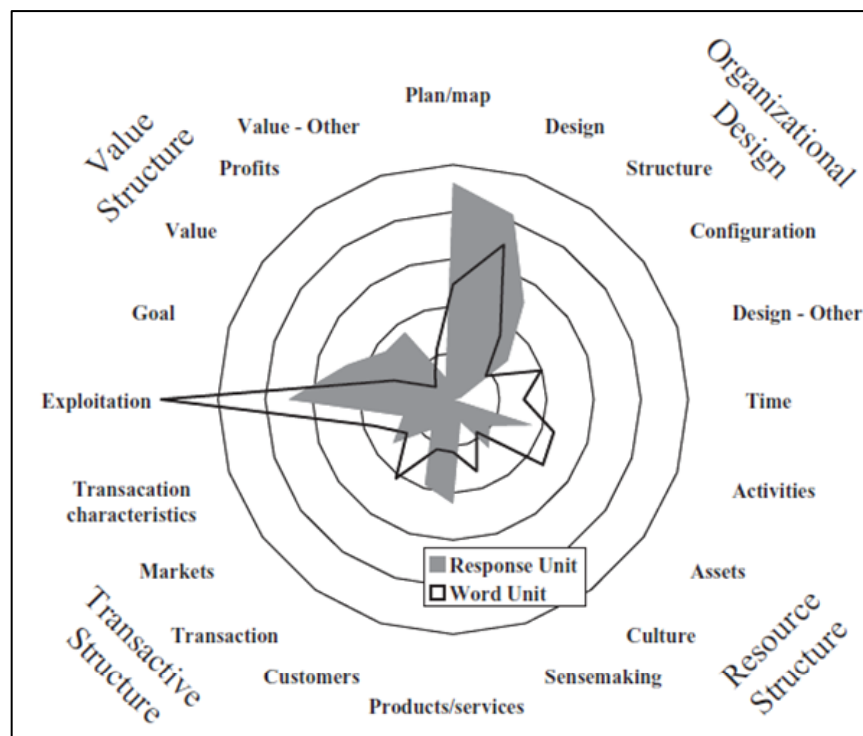


Figure 1. Business Model Subcategory Themes by Level of Analysis. Source: George & Bock, 2009

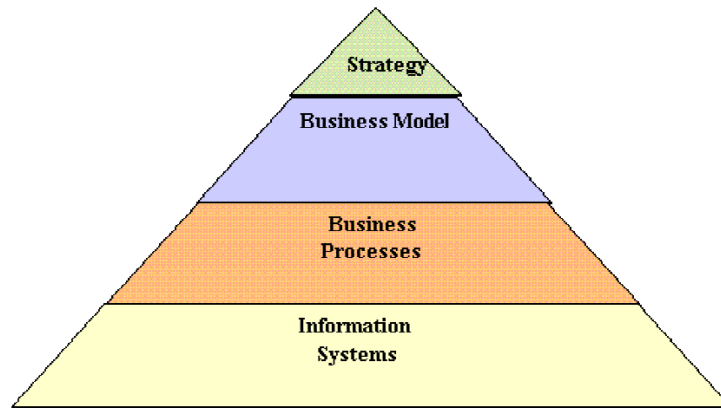


Figure 2. Business Model Definition Framework. Source: Pateli 2003

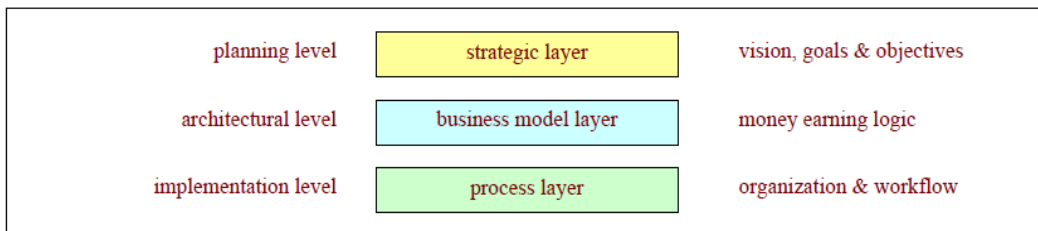


Figure 3. Business layers. Source: Osterwalder 2004

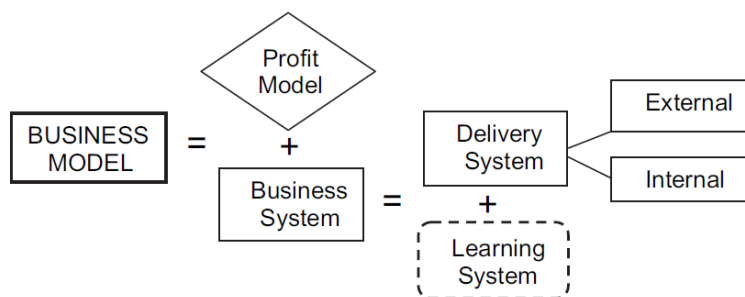


Figure 4. Business Model in Organization. Source: Itami & Nishino 2010



Table 2. Business model and product market strategy. Source: Zott & Amit 2008

	Business model	Product market strategy
Definition	A structural template of how a focal firm transacts with customers, partners, and vendors. It captures the pattern of the firm's boundary spanning connections with factor and product markets	Pattern of managerial actions that explains how a firm achieves and maintains competitive advantage through positioning in product markets
Main questions addressed	<p>How to connect with factor and product markets</p> <p>Which parties to bring together to exploit a business opportunity, and how to link them to the focal firm to enable transactions (i.e., what exchange mechanisms to adopt?)</p> <p>What information or goods to exchange among the parties, and what resources and capabilities to deploy to enable the exchanges?</p> <p>How to control the transactions between the parties, and what incentives to adopt for the parties?</p>	<p>What positioning to adopt against rivals</p> <p>What kind of generic strategy to adopt (i.e., cost leadership and/or differentiation)?</p> <p>When to enter the market?</p> <p>What products to sell?*</p> <p>What customers to serve?*</p> <p>Which geographic markets to address?*</p>
Unit of analysis	Focal firm and its exchange partners	Firm
Focus	Externally oriented: focus on firm's exchanges with others	Internally/externally oriented: focus on firm's activities and actions in light of competition

## 2.2. Electric mobility value chain

The concept of value chain is widely used in business management in various contexts and it has been applied to many perspectives. Porter's (1985) traditional value chain analysis has evolved but the basic idea behind Porter's value chain analysis has not changed. The key thought in value chain analysis is how the elements in the chain and the management of the linkages between the chain elements add value for the entity.

The *generic industrial e-mobility value chain* as defined by Pirhonen et al. (2010) shown in figure 6 provides a framework to identify needed actors and their roles in the field of e-mobility.

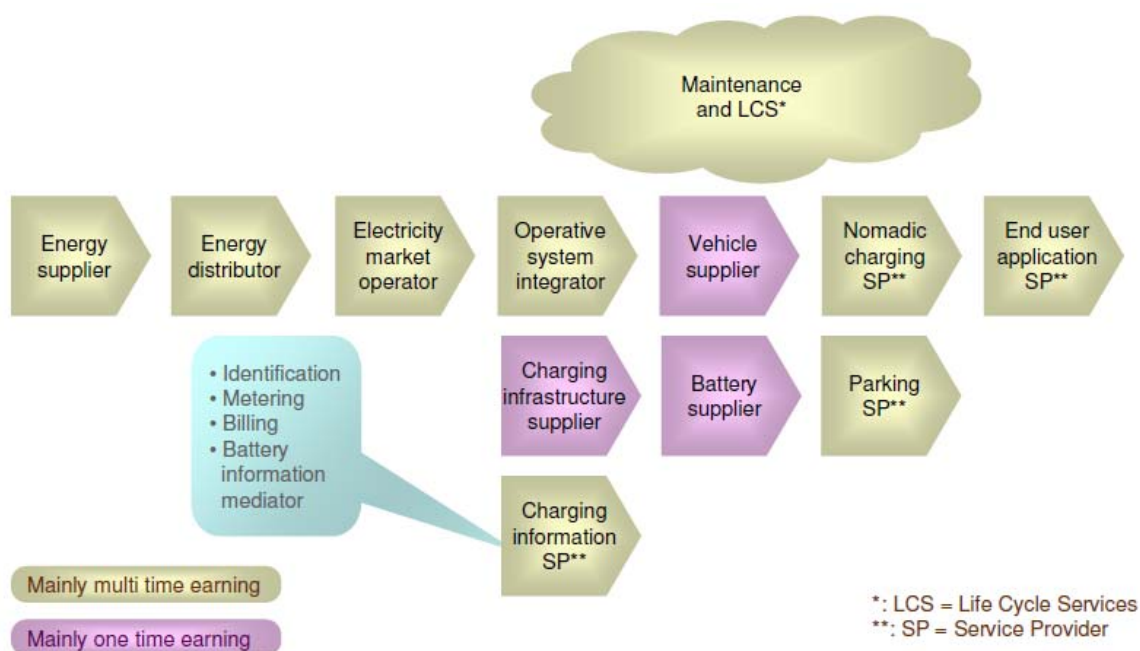


Figure 5. Generic industrial e-mobility value chain. Source: Pirhonen et al. 2010

## 2.3. The Business Model Canvas

The Business Model Canvas by Osterwalder and Pigneur (2010), shown in figure 5, is derived from the business model ontology by Osterwalder, Pigneur and Tucci (2005).

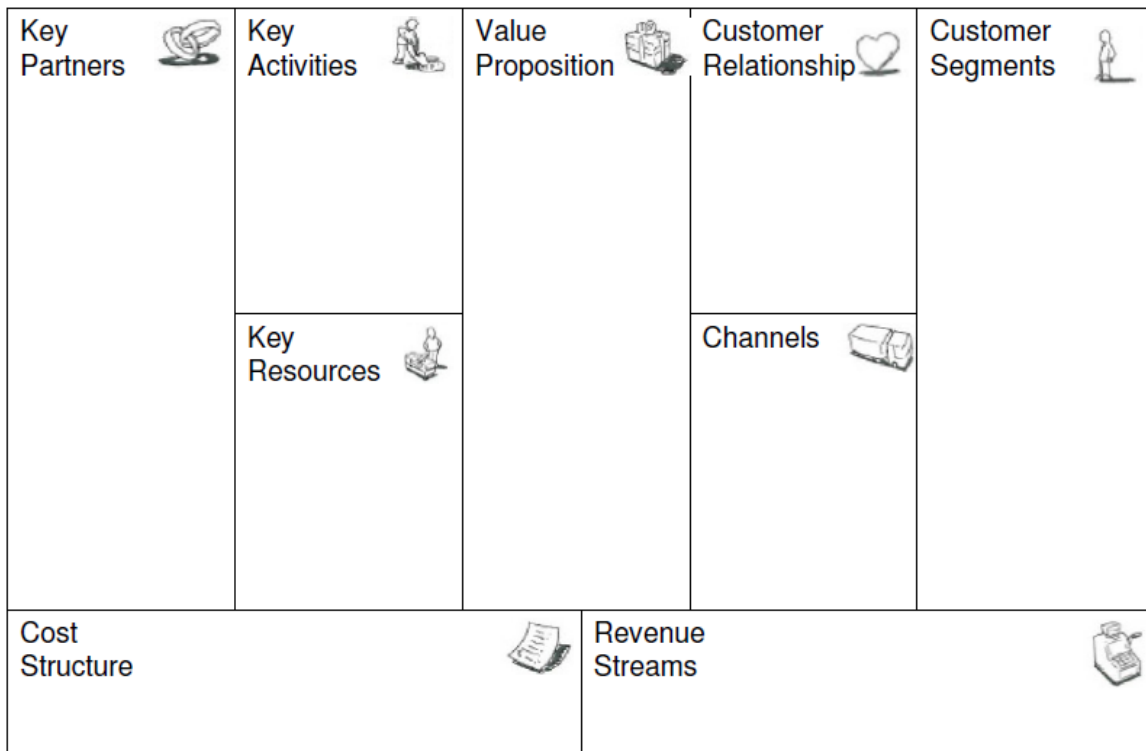


Figure 6. Business Model Canvas. Source: Osterwalder and Pigneur. 2010

The canvas examines the business logic of a firm from nine viewpoints that act as building blocks constituting firms business model. Source: Osterwalder and Pigneur. 2010:

- The **Value Propositions** describes the products and services that create value for the customer.
- The **Key Partners** describes the network of suppliers and partners that make the business model work
- The **Key Activities** describes the most essential actions an organization perform to make its business model work
- The **Key Resources** describes organizations most important assets to make a business model work
- The **Customer Relationship** describes the types of relationships an organization establishes with the customer
- The **Channels** describes how on organization communicates and reaches its customers to deliver a Value Proposition
- The **Customer Segments** defines the different groups an organization aims to reach and serve
- The **Cost Structure** describes all costs incurred to operate a business model.
- The **Revenue Streams** represents the cash flow generated from the customers.

### 3. Summary of the business model canvases

This chapter presents the first synthesis of the business model canvas exercises. The research was designed on the theoretical ground of business model theory, business model canvas and the value chain approach. Using the theory to conduct the methodology presented in chapter 1.4 we worked together with all SIMBe companies and explored their business models related to e-mobility. The first results are the respective individual business model canvases per company which are confidential between Aalto University SIMBe researchers and the respective company and thus cannot be presented here. However, the companies agreed on a presentation of all nine canvas building blocks. These are presented next.

#### 3.1. Value Propositions

Figure 7 shows the value propositions as identified in the SIMBe companies' business model canvases.

See appendix 1 for a full scale representation!

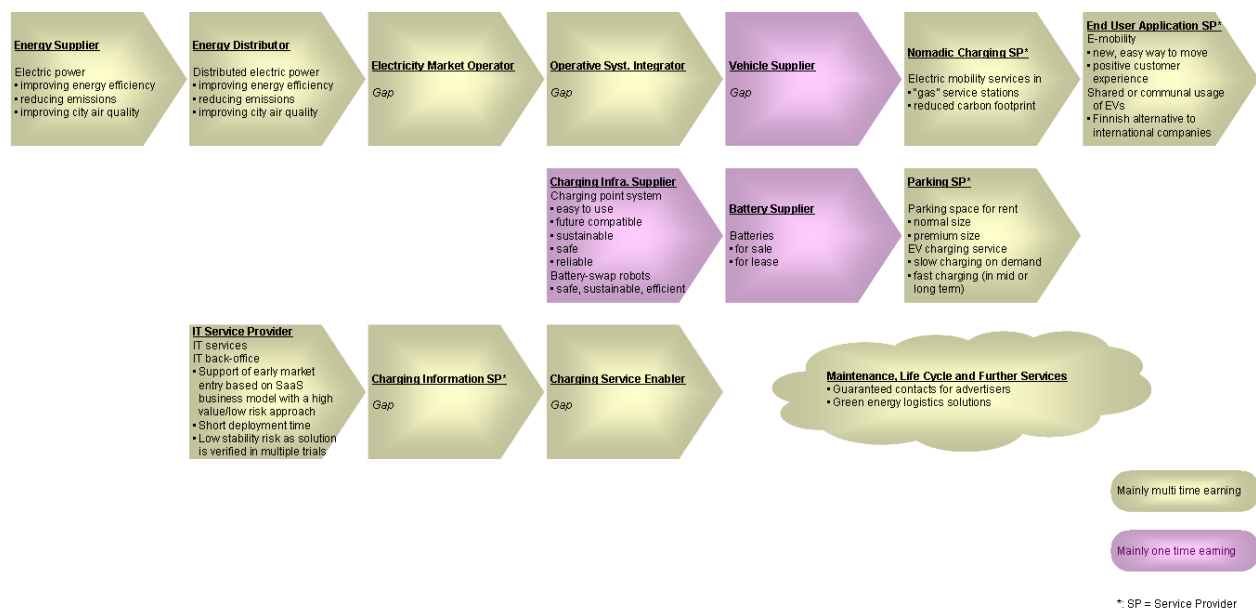


Figure 7. Value propositions as identified in the SIMBe companies' business model canvases

As can be noticed from figure 7, the value chain has been modified to accommodate the roles the SIMBe companies are willing to take. The new roles are:

1. Charging Service enabler
2. IT Service Provider

Additionally, the role "Maintenance and Life Cycle Services" has been updated to "Maintenance, Life Cycle and Further Services".

Key finding here is that SIMBe companies do not offer value propositions within the following roles:

- Electricity Market Operator
- Operative System Integrator
- Charging Information Service Provider
- Charging Service Enabler
- Vehicle Supplier

### 3.2. Key Partners And Their Networks

In table 3 we provide a first overview of the key partners mentioned by SIMBe companies.

Table 3. Key Partners

Already in SIMBe	Non SIMBe
<ul style="list-style-type: none"> <li>• Energy companies</li> <li>• Charging technology suppliers</li> <li>• Networking technology suppliers</li> <li>• IT service providers</li> <li>• Parking service providers</li> <li>• Battery manufacturers / battery management system providers</li> </ul>	<ul style="list-style-type: none"> <li>• Car manufacturers / importers</li> <li>• Charging system providers</li> <li>• IT service companies</li> <li>• Operators between the car and the grid</li> <li>• Maintenance providers</li> </ul>

The network between SIMBe partners and external actors has been visualised in figure 8.

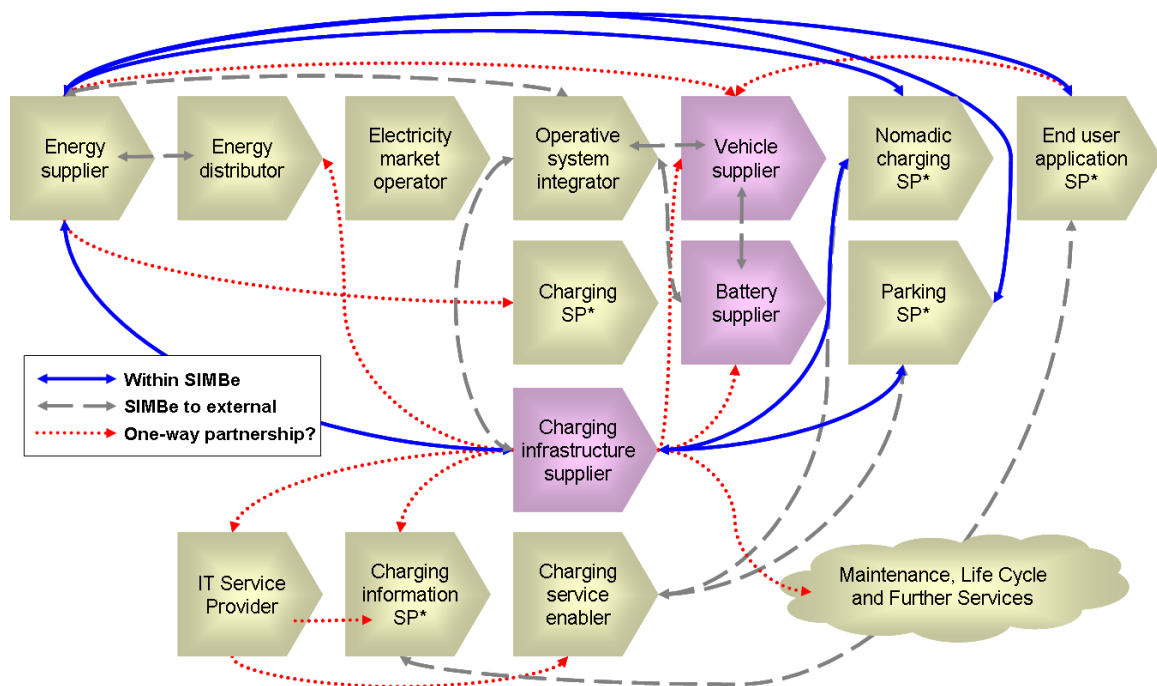


Figure 8. Key partnership requests between SIMBe partners and external actors

As can be noticed from figure 8, the value chain has once again been modified, now to accommodate the key partner roles the SIMBe companies mentioned. The new role is "Charging Service Provider".

Key finding here is that SIMBe companies assumed key partners are not always replying the request for partnership. For instance company A regards company B as key partner, but B does not regard A in the same way.

### 3.3. Key Activities

Table 4. Key Activities

Related to E-mobility services	Related to charging systems
<ul style="list-style-type: none"> <li>• Research</li> <li>• Design</li> <li>• Development</li> <li>• Marketing</li> </ul>	<ul style="list-style-type: none"> <li>• Research</li> <li>• Design</li> <li>• Engineering</li> <li>• Manufacturing</li> <li>• IT platform development</li> <li>• Networking technology development</li> </ul>

### 3.4. Key Resources

- Human resources
- Experience and high level know-how in
  - Design
  - Engineering
  - Manufacturing
  - Software and technology
  - Branding
  - Marketing
  - Sales
  - Energy markets

### 3.5. Customer Relationship

- Deep customer relationship
- Committed customer relationship
- Easy to use experience
- Pioneer for early adopters

### 3.6. Channels

- Own channels
- Whole seller
- Local distributor in target market
- www and other media

### 3.7. Customer Segments

Table 5. Customer Segments – both Business to Business and Business to Customer

B 2 B	B 2 C
<ul style="list-style-type: none"> <li>• Charging system providers</li> <li>• Advertisers</li> <li>• Companies as e-car users</li> <li>• Service providers:                             <ul style="list-style-type: none"> <li>○ Car sharing</li> <li>○ Parking service providers</li> <li>○ Local entities e.g. airports</li> <li>○ Real estate companies</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Trendsetters and early adopters</li> <li>• Eventually all e-car user segments</li> </ul>

### 3.8. Cost Structure

Table 6. Cost Structure divided into operational and capital expenditure

Operational expenditure	Capital expenditure
Human resources e.g. : <ul style="list-style-type: none"> <li>• R&amp;D</li> <li>• Service delivery</li> </ul>	Facilities <ul style="list-style-type: none"> <li>• Procured technology and know-how</li> <li>• Infrastructure investments</li> </ul>

### 3.9. Revenue Streams

- Artefacts
  - Charging technology
  - Cross-selling for e-mobility customers
  - Electricity
  - Vehicle sales
- Services
  - Networking technology e.g. identification, metering, billing, charging event booking / car sharing booking system
- Advertisement
- Car rental / car sharing

## 4. Results

### 4.1. Second synthesis of the business model canvas exercises

The following five key issues have been identified:

1. Not all SIMBe companies' business models are mature: there are clearly different levels in the maturity of the e-mobility business models
2. "Production elements", such as key activities are rather clear
3. Key partners are defined but sometimes only in one direction: co-operation is not yet fully established. Some key partners are missing in SIMBe, probably even in Finland
4. The value propositions in the e-mobility value chain are incomplete, but new roles have been identified
5. All actors need the understanding of charging networking technology

These five key issues encouraged us to perform two additional research steps, which have not been planned in the outline of this document:

1. Reverse engineering of possible actors' business canvases
2. Provision of a "complete" value proposition map.

The results of this additional analysis is documented in the following chapters.

### 4.2. Reverse engineering of possible actors' business canvases

We reverse engineered from their publicly available data and assumed (possible) offerings and internal processes business model canvases for several actors as shown below. The companies used as examples were Coulomb, Better Place, Ecotality, mobi-e, San Diego Gas & Electric and Duke Energy.

These are their Canvases:

*...continued on next page*

### 4.2.1. Electricity Market Operator

<b>Key Partners</b> <ul style="list-style-type: none"> <li>• Energy Companies</li> <li>• Energy distributor</li> <li>• System integrators</li> <li>• Charging information service providers</li> <li>• IT service providers</li> </ul>	<b>Key Activities</b> <ul style="list-style-type: none"> <li>• R&amp;D</li> <li>• Networking</li> <li>• System integration</li> <li>• Information management</li> </ul>	<b>Value Proposition</b> <ul style="list-style-type: none"> <li>• Provides services to manage the transactions and electricity flows between electricity market, distribution, charging service provider and the EV user</li> </ul>	<b>Customer Relationship</b> <ul style="list-style-type: none"> <li>• Deep knowledge of customers</li> <li>• Committed</li> <li>• High switching costs</li> </ul>	<b>Customer Segments</b> <ul style="list-style-type: none"> <li>• Charging service providers</li> <li>• Energy companies</li> <li>• EV users: individuals and companies</li> </ul>
<b>Cost Structure</b> <ul style="list-style-type: none"> <li>• R&amp;D (OPEX)</li> <li>• Application hosting (OPEX &amp; CAPEX)</li> <li>• Service delivery (OPEX)</li> </ul>	<b>Key Resources</b> <ul style="list-style-type: none"> <li>• Personnel</li> <li>• Energy market expertise</li> <li>• Good network</li> </ul>		<b>Channels</b> <ul style="list-style-type: none"> <li>• Own network</li> <li>• End users through charging service providers and utilities</li> </ul>	
	<b>Revenue Streams</b> <ul style="list-style-type: none"> <li>• Annual service subscription fee</li> <li>• Volume based service usage fee</li> </ul>			

### 4.2.2. Charging Service Enabler

<b>Key Partners</b> <ul style="list-style-type: none"> <li>• IT service provider</li> <li>• Utilities</li> <li>• Charging information service provider</li> <li>• Electricity market operator</li> <li>• Operative system integrators</li> <li>• Charging infrastructure provider</li> </ul>	<b>Key Activities</b> <ul style="list-style-type: none"> <li>• R&amp;D</li> <li>• Networking</li> <li>• System integration</li> </ul>	<b>Value Proposition</b> <ul style="list-style-type: none"> <li>• Provides Information and Communication Technology and services for charging service providers to integrate charging systems fully</li> </ul>	<b>Customer Relationship</b> <ul style="list-style-type: none"> <li>• Deep knowledge of customers</li> <li>• Committed</li> <li>• High switching costs</li> </ul>	<b>Customer Segments</b> <ul style="list-style-type: none"> <li>• Charging service providers</li> <li>• System integrators</li> <li>• Utilities</li> <li>• Parking service providers</li> </ul>
<b>Cost Structure</b> <ul style="list-style-type: none"> <li>• R&amp;D (OPEX)</li> <li>• Application hosting (OPEX &amp; CAPEX)</li> <li>• Service delivery (OPEX)</li> </ul>	<b>Key Resources</b> <ul style="list-style-type: none"> <li>• Personnel</li> <li>• Software and technology know-how</li> <li>• Networks</li> </ul>		<b>Channels</b> <ul style="list-style-type: none"> <li>• Own network</li> <li>• Own sales</li> </ul>	
	<b>Revenue Streams</b> <ul style="list-style-type: none"> <li>• Annual service subscription fee</li> <li>• Volume based service usage fee</li> </ul>			



### 4.2.3. Charging Service Provider

<p><b>Key Partners</b> </p> <ul style="list-style-type: none"> <li>• IT service provider</li> <li>• Utilities</li> <li>• Charging information service provider</li> <li>• Electricity market operator</li> <li>• Operative system integrators</li> <li>• Charging infrastructure provider</li> </ul>	<p><b>Key Activities</b> </p> <ul style="list-style-type: none"> <li>• R&amp;D</li> <li>• Networking</li> <li>• System integration</li> </ul>	<p><b>Value Proposition</b> </p> <ul style="list-style-type: none"> <li>• Provides charging services for electric vehicles</li> </ul> <p>Indirect</p> <ul style="list-style-type: none"> <li>• Reduced carbon footprint</li> </ul>	<p><b>Customer Relationship</b> </p> <ul style="list-style-type: none"> <li>• Deep knowledge of customers</li> <li>• Committed</li> <li>• High switching costs</li> </ul>	<p><b>Customer Segments</b> </p> <ul style="list-style-type: none"> <li>• Companies to offer employee workplace charging</li> <li>• End users for home charging</li> <li>• Actors to offer charging services e.g. cities, supermarkets, parking service providers etc.</li> </ul>
<p><b>Cost Structure</b> </p> <ul style="list-style-type: none"> <li>• R&amp;D (OPEX)</li> <li>• Application hosting (OPEX &amp; CAPEX)</li> <li>• Service delivery (OPEX)</li> </ul>	<p><b>Revenue Streams</b> </p> <ul style="list-style-type: none"> <li>• Annual service subscription fee</li> <li>• Volume based service usage fee</li> </ul>			

### 4.2.4. Operative System Integrator (largely based on Better Place)

<p><b>Key Partners</b> </p> <ul style="list-style-type: none"> <li>• OEM's (e.g. Renault-Nissan Alliance)</li> <li>• Governments (e.g. Israel, Denmark)</li> <li>• Battery manufacturers (A123 Systems)</li> <li>• General Electric</li> <li>• Investors (e.g. Morgan Stanley)</li> <li>• Utility companies</li> </ul>	<p><b>Key Activities</b> </p> <ul style="list-style-type: none"> <li>• R&amp;D</li> <li>• Networking</li> <li>• System integration</li> <li>• Building and operating charging and battery switching infrastructure</li> </ul>	<p><b>Value Proposition</b> </p> <ul style="list-style-type: none"> <li>• System integration</li> <li>• Provides electric vehicle owners with a full-service network that allows for full-mobility and the same amount of freedom as combustion engine cars through a combined network of charge spots and battery switch stations and systems for energy management</li> </ul>	<p><b>Customer Relationship</b> </p> <ul style="list-style-type: none"> <li>• Committed</li> <li>• High switching costs</li> </ul>	<p><b>Customer Segments</b> </p> <ul style="list-style-type: none"> <li>• Fleet owners e.g. Taxi, companies</li> <li>• All end users</li> </ul>
<p><b>Cost Structure</b> </p> <ul style="list-style-type: none"> <li>• Capex, e.g. infrastructure investments</li> <li>• Opex, e.g. R&amp;D, electricity, personnel</li> </ul>	<p><b>Revenue Streams</b> </p> <ul style="list-style-type: none"> <li>• Annual fee for 'energy management'</li> <li>• Use based fee for electricity and battery switching service</li> </ul>			

### 4.3. The “complete” value propositions map in the e-mobility field

The last analysis step, synthesis number three, was to add the new, assumed, value propositions into the map as presented in figure 7. Of course, also all new roles have been added in the value chain.

Figure 9 shows the “completely” filled map.

See appendix 2 for a full scale representation!

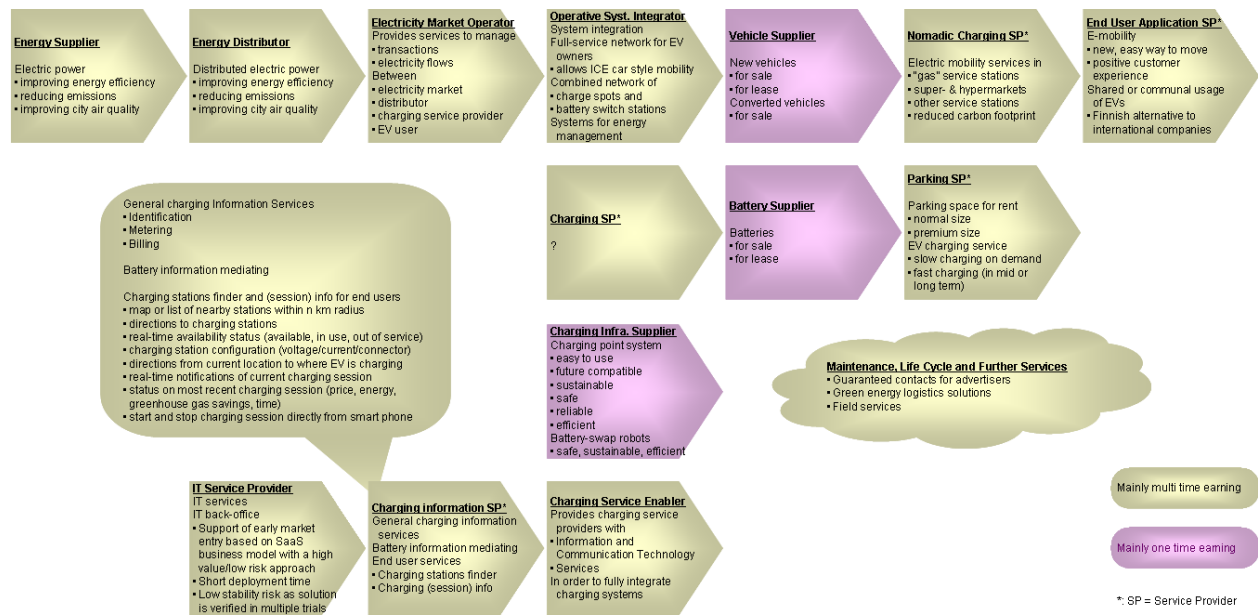


Figure 9. Value Propositions in the E-mobility Value Chain, including SIMBe external actors

This map will be used for intensive discussion with and further reflection by SIMBe companies in order to enhance their business models and strategies, an enhancement which will doubtlessly lead to a new, revised version of the value proposition map.

## 5. Conclusion

The industrial value chain around electric mobility is evolving and slowly starts to take its shape. The actors in this field are starting to structure their business models related to e-mobility but there is divergence between the maturity statuses of different actors. In general the individual value propositions are rather clear. However there is an atmosphere of light uncertainty in the background originating from e.g. scarcity of EVs, low EV production plans of large car manufacturers and lack of government actions promoting the adoption of EVs. This uncertainty reflects also, naturally, on the strategic planning and implementation of the companies.

In the industrial e-mobility value chain there are several gaps. It is possible to find examples to some of these gaps from around the world but the business environment differs to some extent thus these examples can not be implemented straight in the Finnish ecosystem. In addition many actors need to establish tighter partner networks before they can deliver their value propositions. It also seems some of the business models can not be designed to their full extent before there are more end user experiments and dialog with the end users.

The major findings of this document are:

- There are several gaps in the e-mobility value chain, Finnish companies within and outside of SIMBe consortium do not yet have value propositions in all of the links in the e-mobility value chain
- Not all SIMBe companies' business models are mature: there are clearly different levels in the maturity of the e-mobility business models
- Key partners are defined but sometimes only in one direction: co-operation is not yet fully established. Some key partners are missing in SIMBe, probably even in Finland
- Value chains and networks evolve over time when the business map is developing more mature

## 6. Discussion

### 6.1. Limitations

During this work it became clear that the industrial e-mobility value chain is not yet ready to be implemented and continuous follow up of the progress is needed. This limitation of the analysis is related to the nature of emerging businesses: the information available can be quickly outdated. This limitation was attempted to be tackled by continuous discussions between different actors but remains a challenge in this type of action research.

Another limitation in this study is the partly missing links between SIMBe companies' strategies and business models. Due to the confidentiality of the companies' strategies the authors do not have access to this information and the companies' ideas of the future strategy developments. The relevant strategies in this respect are technology strategy, product and service strategies, business strategy as well as competence development strategy. These strategies are certainly not completely defined for all of the companies at this stage of the emerging new business area. The work to be done in the next phase of this work package – focusing on technology and business roadmaps of e-mobility – will hopefully support the companies to define the relationships between their strategies and business opportunities as part of the e-mobility value chain.

However, the **major** limitation is the absence of EV fleets and the absence of e-mobility infrastructure and services in daily use: the absence of **practical experiences** in the e-mobility field.

## 6.2. Further Research

The current limitations will be overcome when the first Finnish EV fleets and the first large scale infrastructure, along with e-mobility services, will be gradually introduced within the years 2012 and 2013. Thus further research is needed on how companies' perceptions – yet based largely on theory – will change once the first practical experiences are gained. All canvases need to be updated and synthesised time and again until the e-mobility value chain in Finland is sound and successful. The eSINi project proposal covers this research.

Additionally, and independent from the further business model related research, two more individual tracks of research can be started already:

1. Research on technology and business roadmaps of e-mobility
2. Research on the management in/with uncertainty in the Finnish e-mobility field
3. Research on the needed organisational development in the SIMBe key companies

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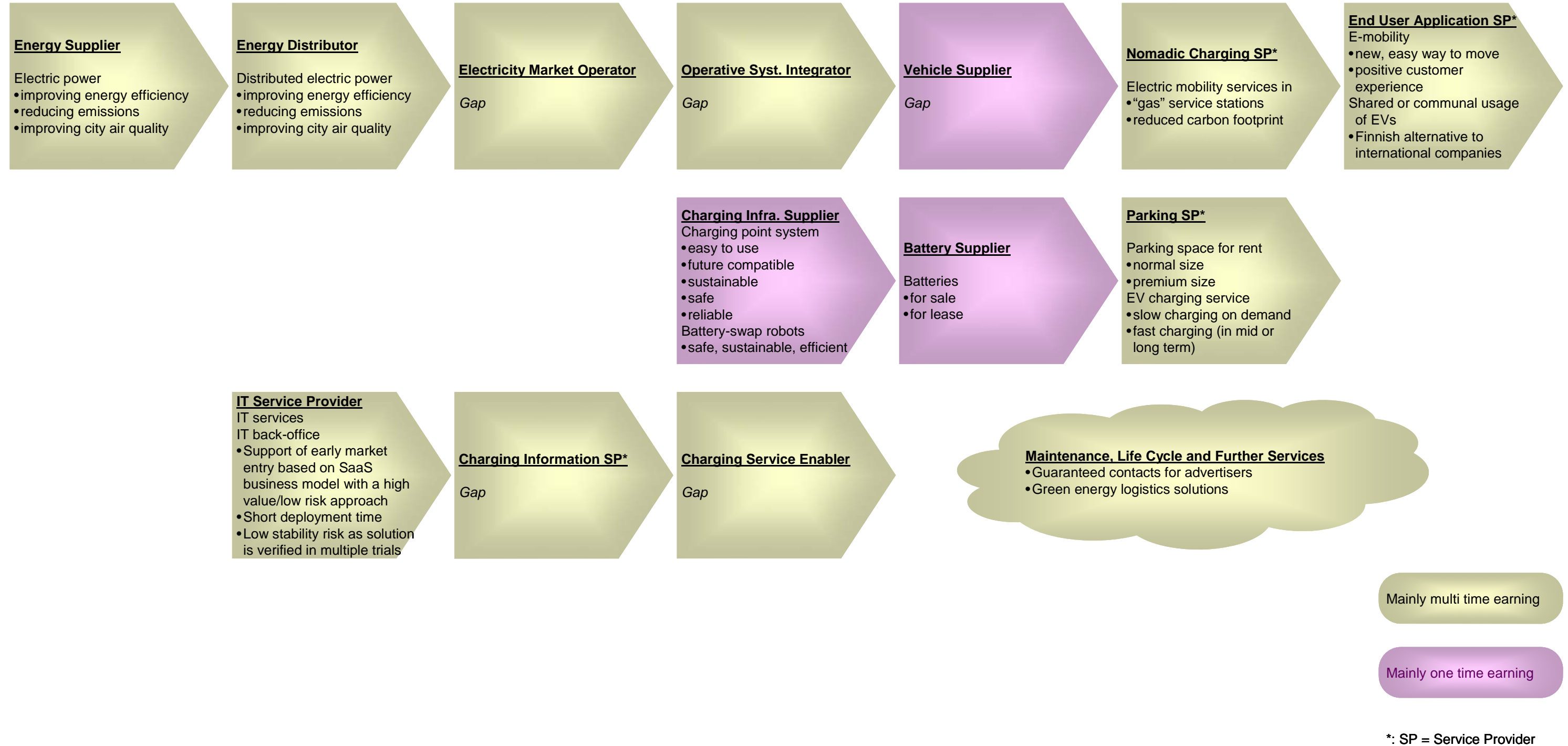
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**Appendices**

**Appendix 1: Value propositions as in SIMBe companies' business model canvases**



**Appendix 2: Value Propositions in the E-mobility Value Chain, incl. SIMBe external actors**

