

NORTH SEA REGION ELECTRIC MOBILITY NETWORK

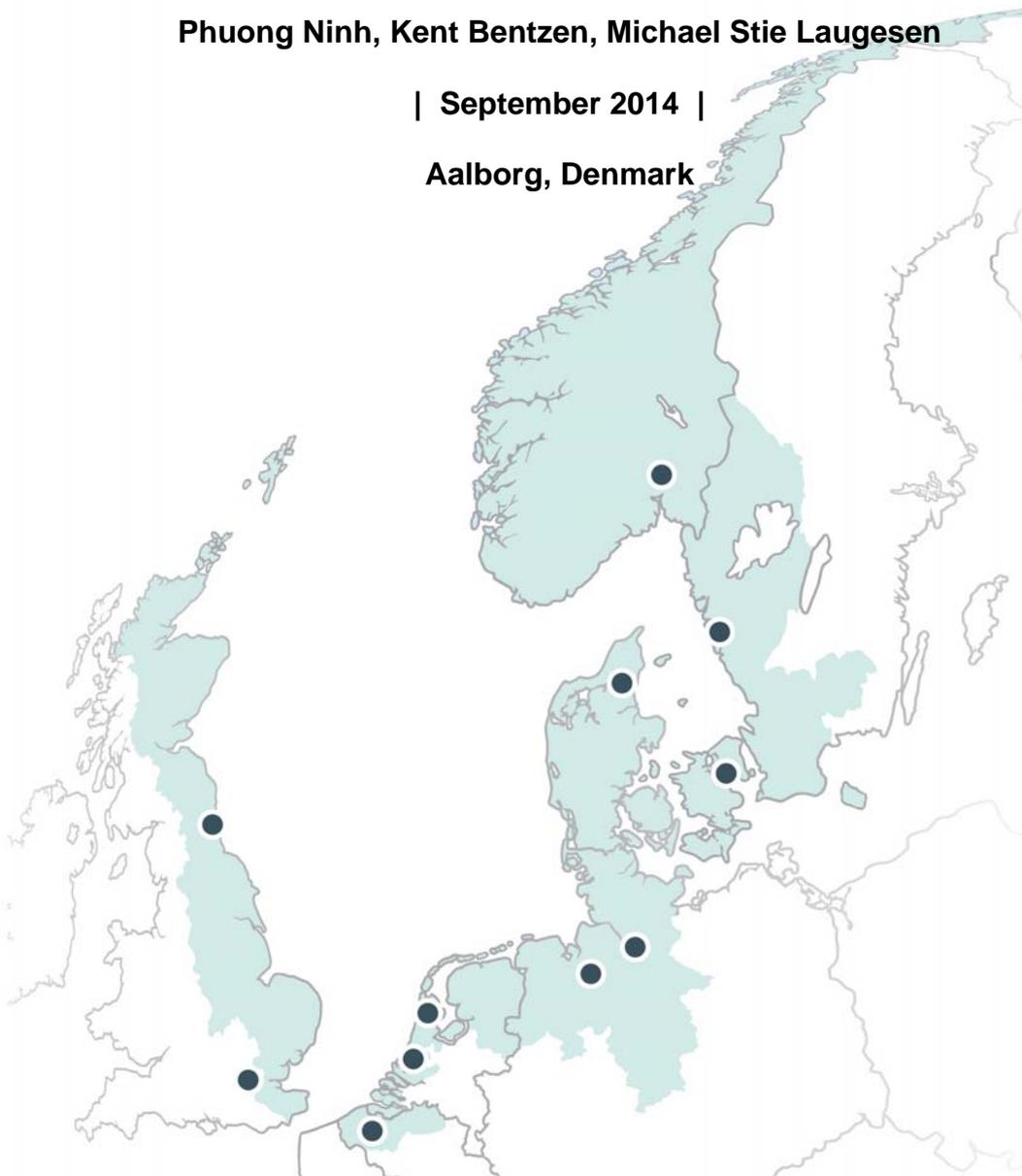
e-mobility NSR

Why should transportation companies join Public Private Partnership (PPP) proposed by the public sector to support the implementation process of Freight Electric Vehicles (FEVs) in Copenhagen Municipality

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Executive summary:

The aim of this report is to answer the question: **‘Why should transportation companies join Public Private Partnership (PPP) proposed by the public sector to support the implementation process of Freight Electric Vehicles (FEVs) in Copenhagen municipality’**. This report is conducted with a motivation to find a solution to encourage transportation companies to purchase and use Freight Electric Vehicles (FEVs), in order to protect the environment. The system approach and interview method has been used to make research in this report. Both primary and secondary data were collected. The three interviewed companies are: UPS, Post Danmark A/S and Danske Fragtmænd A/S. The interviews with these companies were conducted to gain knowledge about their challenges in urban distribution and their attitudes to the environment and green image of the business’ brand.

PPP’s is argued as a tool to create a relationship between the public sector (the Danish government and Copenhagen municipality) and the private sector (transportation companies). The PPP supporting the implementation process of FEVs in Copenhagen municipality is illustrated including 3 main partners: the public sector (the Danish government and Copenhagen municipality), the administration department and transportation companies potentially using FEVs. In this PPP model, it is expected that the public sector will support the companies with subsidence and law changes. By doing so, the total cost of ownership (TCO) of FEVs will be reduced, which encourages companies to further use FEVs. It is argued that the transportation companies should join the PPP to get advantage of finance, policy, knowledge of EVs and FEVs. Through such PPP transportation companies can promote themselves as ‘green’ companies.

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I. Introduction:

1. *An overview of Electric Vehicle:*

Electric Vehicle (EV) is referring to a vehicle that is propelled by one or more electric motors, rather than by an internal-combustion engine (Faiz et.al, 1996). The EV technology has been further developed on a background that the population of the world has been and will be increasing dramatically and the number of vehicles is also raising a lot (Chan & Chau, 2001). If Internal Combustion Engine Vehicle (ICEs) (gasoline/ diesel fueled vehicles) is the only type of vehicle that will be used permanently, world resources of oil will run out. In Europe, the dependence on imported oil in transportation has become a serious problem. *“The European supply of oil depends to a large degree on politically unstable regions raising security of supply concerns. Price hikes driven by speculation on the impact of oil supply disruptions have cost the European economy an additional 50 billion Euro per year over the last four years” (European Commission, 2013).* Therefore, many scientists and original equipment manufacturers (OEMs) have been studying and developing EV’s, a new type of vehicle that can help us to cut down emissions and reduce the global warming. EV’s are developed with goals of using renewable electric power, minimizing urban emission such as noise and pollution. *‘Apart from the fact that battery-powered EVs can exploit renewable energy, they also have a very high energy efficiency so they can further reduce CO₂ emissions. Electric cars also contribute to improving the urban environment with less noise and no harmful emissions into the air’ (Danish Energy Agency, 2014).*

With the current power production in the North Sea Region countries, EVs seldom run totally on renewable electric power. However, in some countries, plans are already made to increase the renewable power to reduce emissions. In Germany, the electric share of solar is increasing and in Denmark, the public sector has settled on an agreement for green energy and carbon reduction targets for 2020. One of the main aims of this plan is to supply 35% of total energy from renewable sources, where half of the electricity is produced by wind farms (Business green, 2012). Despite of the environmental benefits that EVs bring, it has been argued that batteries used for EVs are not environmental friendly. It is a fact that the manufacturing of batteries requires mining and processing of various materials, which create emissions. However, it is proved that the greenhouse warming potential and several other emissions indicators are less severe for EVs than for ICEs (Notter et.al, 2010).

2. *Overview of Freight Electric Vehicle and its impact on the environment:*

An urban freight vehicle is a type of vehicle that carries goods into, out of and within urban areas (DG Move, EC, 2012). Hence, Freight Electric Vehicle (FEV) is a type of EV, which is used to carry goods into, out of and within urban areas. As a type of EV, FEV is produced to use renewable energy sources, reduce emissions and pollutions to the cities. According to European surveys, the share of emissions of freight vehicles is between

20% and 30% of the total urban traffic emission (DG Move, EC, 2012). In addition, urban freight vehicles produce more pollution than long-distance vehicles. The reason is that fuel consumption increases sharply if vehicles make frequent stops, because of traffic jams. Beside air pollutions (CO₂, NO₂, SO₂, etc.), greenhouse gas and noise pollution are also parts of the environmental pollution. Especially, the urban freight transport is a significant generator of greenhouse gas emissions. Delivering in urban areas during the day contributes to congestions, but delivering during the nights disturbs the residents' sleep. For this reason, night delivery is banned in many cities (DG Move, EC, 2012).

3. Overview of projects which support the development of EVs (including FEVs):

Assessing the future of EVs, many countries have put efforts to support the development and implementation of EVs. The European Union (EU) is addressing better conditions to deploy EVs to the market, not only private electric cars, but also transportation freight vehicles: vans, trucks, and also passenger vehicles such as electric buses. EU plans to build a competitive transport system in its member countries, so that mobility will be increased and major barriers in key areas will be removed. This plan will help EU countries to reduce greatly the amount of imported oil and cut down carbon emissions in transport by 60% by 2050 (White paper, 2011). To be more specific, EU plans that by 2050:

- No more conventionally-fuelled cars in cities.
- 40% use of sustainable low carbon fuels in aviation; at least 40% cut in shipping emissions.
- A 50% shift of medium distance intercity passenger and freight journeys from road to rail and waterborne transport.
- All of which will contribute to a 60% cut in transport emissions by the middle of the century

(White paper, 2011)

On top of that, the Europe 2020 strategy identifies a plan for a smart, sustainable and inclusive growth until 2020:

- Smart growth – developing an economy based on knowledge and innovation
- Sustainable growth – promoting a more resource efficient, greener and more competitive economy
- Inclusive growth – fostering a high-employment economy delivering economic, social and territorial cohesion

(EU2020, 2010)

4. Motivation for conducting this project:

EVs are considered as a great solution to decrease the emission and pollution for creating a better urban environment. However, there are a lot of problems to implement EVs or FEVs in practice. First of all, the purchase price of a FEV is too high: approximately 150-200% the price of a similar Internal Combustion Engine Freight Vehicle (ICE Freight Vehicle). Second of all, the payload of FEVs is limited compared to a similar conventional driven vehicle. In Denmark, the standard payload of FEVs is below 3.5 tons (equal to ICE vans), while the common payload of ICE Freight Vehicles used by transportation companies are between 5 to 7.5 tons and even higher in some companies. Thirdly, the batteries weight of FEV is heavy, which makes the carrying capacity of a FEV lower than a similar ICE Freight Vehicle. Fourth, FEV can only travel for a short distance, more or less 100 km and after that distance, the vehicle has to be re-charged. When a FEV is breaking down, it costs a lot to fix it, because the technology is not broadly developed. These disadvantages and problems on FEVs will be discussed further in this project.

It can be seen that there are many problems of FEV, making it sometimes difficult to use in practice. Concerning the environmental issues and fast technology development, there is still a hope that one day in the very near future, FEV can be implemented broadly in many countries. Until then, a way to encourage private companies to implement FEVs to their fleets is needed. It is obvious that it is not easy to do so, because of high prices and many technical problems caused by FEVs. The interest of private companies is to gain financial profit. Therefore, it would be very hard for them to invest in FEVs, taking the current selection and charging infrastructure into consideration. Nowadays, many companies are though trying to build green images to their brands, because they also care about the environment and they want to create a significant different image for their companies. Thus, they might want to use FEVs as an action to show their attitude towards green environment and promote their brands.

II. Problem formulation:

In order to match the companies' interest of profit and green environment attitude with FEVs, it is necessary to find a business model, a tool, a type of programme or anything like that, to motivate private companies to purchase and use FEVs. That is the reason why Public Private Partnerships (PPPs) is introduced as part of the action plan in the E-mobility project and will be introduced and discussed in this project with the focus to promote and support the implementation of FEVs in Copenhagen municipality.

Research question:

Why should transportation companies join Public Private Partnership (PPP) proposed by the public sector to support the implementation process of Freight Electric Vehicles in Copenhagen municipality?

Sub-question:

Why and how can PPPs support the implementation process of FEVs?

This sub-question will help to understand the nature of PPPs: what it is about, what types of PPPs are available, who are involved in PPPs, how to use PPPs, what is needed to be considered when applying PPPs. Then, it will be argued why PPPs can support the implementation process of FEVs. As a result of this report, there will be a suggestion of how a PPP model should look like (which type of PPPs) to be used to support the implementation of FEVs in Copenhagen. Also, this report will identify advantages for the transport companies to join this PPP and point out disadvantages and potentially suggest solutions to reduce the risks when forming a recommended PPP for supporting the implementation process of FEVs in Copenhagen municipality.

III. Methodological chapter:

1. *Choice of research method in this project:*

This report is made using the qualitative research method. Interviews will be conducted using semi-structured questions. The aim of interviews is to research on challenges for urban transportation, which might be solved by switching ICE trucks to FEVs. The interviews are semi-structured, because the interviewees are expected to raise issues about challenges on the urban transportation, barriers in using FEVs and what they think about financial and legal support from the municipality and cooperating with the public sector. All interviews will be conducted via telephone. The questionnaires are sent to the interviewees before the interviews. This allows the interviewees to fill in answers for some questions that will help to reduce the time of interview for some basic questions. By this way, there will be more time during the interview for more questions in the areas, which are difficult to understand and explain.

2. *Data collecting method:*

In this report, there will be used both primary and secondary data. The interviews with companies will bring primary data to the investigation. On the other hand, the secondary data will be collected by using earlier reports, articles, literatures and books, which are under the topic focused on in this report.

3. *Limitations:*

The limitation part presents what this report does not cover, due to availability of data. One of the limitations of this project is that the PPP model is created with the assumption that the public sector will join and make support via financing and policies. There was a lack of information from the public sector to suggest a concrete structure of the PPP model. In future research, it would be good to get interviews with the public sector to see what they think about PPP and whether they are willing to support the private sector with subsidence and changes in policy. Thus, this report only focuses on arguing why the private sector should join PPP. Another limitation is that the companies who were chosen to be interviewed do not represent the viewpoints of all transport companies, which potentially can switch ICEs to FEVs.

IV. Literature review:

1. *Public term:*

The public term or public sector in a PPP concept can be referred to as a ‘*set of institutions, which exercise legitimate authority over populations, for the most part within a given geographical area*’ (Osborne, 2000, p. 37). The public sector interests falls under social responsibility and environmental awareness (Rosenau, 1999 - United nations Development Programme, 1998). The public sector is good at openness to public scrutiny, employment concern, policy management, regulation, ensuring equity, preventing discrimination or exploitation, ensuring continuity and stability of services, and ensuring social cohesion (Rosenau, 1999 – Osborne & Gaebler, 1992).

2. *Private term:*

The private term or private sector is referred to as ‘*all institutions other than those of the state*’ (Osborne, 2000, p. 37). One can refer the private term to private business, private non-profit organization, and private non-governmental organization. This report will only focus to the private business sector. Osborne (2000) defines the term business as organizations, whose major aim is to generate profits for their owners. The profit generated by the private sector is understood as financial profit or any other type of profit, which brings financial profit at the bottom line.

3. *Partnership term:*

Partnership is a term, which is discussed widely in literature. Wildridge, et.al (2004) claim that in a global society, ‘*it is no longer effective for organizations to work alone*’. ‘*Working in partnership has become central in effort to address complex environmental, social, economic and technologic problems*’ (Horton et al, 2010, p.1). In all sectors including public, private and voluntary, ‘*the need for partnership working, often cross-sectoral working or working beyond the boundaries, is recognized as a vital component of success*’ (Wildridge et, al. 2004, p.3).

The partnership definitions are various. There is no agreed definition of what exactly is meant by partnership. ‘*There is no universally accepted definition of partnership or that it is rare to find one*’ (Wildrige et, al. 2004, p. 3). ‘*Authors working in different fields define partnership in different ways*’ (Horton et al, 2010, p.2). From the historical point of view, partnership is ‘*a legal entity formed by the association of two or more persons*’ (Drake, 1917 - Parsons, 1893).

Another definition of partnership can be found as: *'where two or more organizations make a commitment to work together on something that concerns them both, develop a shared sense of purpose and agenda, and generate joined action towards agreed target'* (Boydell, 2007, p.3 – Health Education Board, 2001). Compared with the historical definition, one can see that this definition narrows down the meaning of the partnership, showing that a partnership should have an agreed target. It means that partners should have one or more common goals to work together. One can view partnership as an organizations in which partners are members or employees somehow. In any organization, there must be at least a goal, so that members or employees know what they need to achieve and it should be clear on how to achieve that goal. The same with the partnership term, if there is no common goal, the partnership cannot work efficiently, because partners do not know what the results expected are.

Stern and Green (2005) provide a pragmatic definition of partnership as *'a programme that has a high level of commitment, mutual trust, equal ownership and the achievement of a common goal'* (Boydell, 2007, p. 3 – Stern and Green, 2005). With this definition, the partnership is not understood as individual partners but it is a programme where all partners join in. This partnership should involve commitments, because partners have to take their responsibility for tasks that they agree to do. Importantly, a partnership should be built from mutual trust. Not only do Stern and Green (2005) include mutual trust in their definition of partnership but Boydell (2007) also argues that being trusted and being trustworthy are important attributes. It is because a partnership cannot last for long if partners are too opportunistic and become kind of competitors instead of working together. On top of that, equal ownership is mentioned to emphasize that partners should receive equal benefit for equal effort, which they put into a partnership programme. Under the partnership definition by Stern and Green (2005), a partnership is different to a network, which is created only for sharing information or other resources, but not for the explicit purpose of joint working (Boydell, 2007).

Another definition given by Osborne refers to a partnership as *'cooperative ventures that rely upon agreement between actors in return for some positive outcome for each participant, which could be some economic or social goal or potentials for synergy'* (Osborne, 2000, p. 37). This definition of the partnership also mentions about commitment, in the way that there should be agreement between partners of what they should do or should not do. It can be about the finance investment and human resource arranged for the joint work. Especially, the outcome of the partnership should be positive for partners so that they have motivation to give their best effort to the joint work.

From above mentioned definitions from different researchers under different study purposes, one can argue that the partnership involve cooperation between actors, because they have to work or act together. The partnership should be built up based on commitments, trusts, equal ownerships, common goals and positive outcomes.

When studying partnership, it is needed to make researches on the type of partnership. Glendinning (2003) argue that partnership can be divided to three levels: *'(1) macro level – the national level, (2) micro level – local service level and (3) individual services users level'* (Wildridge et al, 2004, p. 5 – Glendinning, 2003). These levels can be seen as horizontal dimension of cooperation, where the activities occur on the same level of the process (Wildridge et al, 2004, p. 5). In the meanwhile, other researchers study the type of partnership by looking into behaviors. Thus, the partnership can be divided to: competition, co-operation, co-ordination and co-evolution (Wildridge et al, 2004). One can claim that in some cases, a partnership between some actors can even start from a competitive condition. It can move to co-operation, which can be defined as informal arrangements to achieve reciprocity, to co-ordination which is a formal institutionalized relationship and finally to co-evolution stage of partnership, where partners develop and grow together. A partnership can start from a competitive condition, because companies want to strengthen their position in the market. Since the companies as individuals are not strong enough to do so, they might cooperate to combine their strengths to compete with other competitors. This type of partnership is well-known as alliances.

Besides, some researchers choose to categorize partnership according to the sectors involved. Powell and Glendinning (2002) suggest the following categories of partnership: public-private, public-public, public-voluntary and public-community partnerships (Boydell, 2007, p. 6 - Powell and Glendinning, 2002). Here, it can be noticed that the private-private partnership is not in the categories, because the main focus of Boydell, Powell and Glendinning in these papers is about public goods. The private-private partnership, in some extent, can be a supplement in process to achieve public goods. However, it is not directly relevant and in most cases the statutory sector takes the lead in the process (Boydell, 2007). Thus, private-private partnership is excluded in the categories of partnership suggested by Powell and Glendinning.

To summarize, it can be argued that a partnership in any area can include cooperation and interaction between partners. It means that partners should work together towards a common goal and positive outcomes. Commitments and trusts are considered as key elements to create a strong partnership, where partners agree what to do, what partners expect from each other and give their best effort for mutual benefits.

Based on the knowledge of public term, private term and partnership, PPPs will be described in the following part. The types of PPPs including here might not be the exact way of how to create a PPP model to support the implementation of FEVs in the Copenhagen municipality. However, the review of PPPs will give a better understanding of PPPs, how they are used in some industries and what the strengths and weaknesses are.

4. Public private partnerships (PPPs)

4.1 Overview:

The concept of PPPs became fashionable over 25 years ago and it has been strongly contested (Bovaird, 2004). Traditionally, projects for communities such as dams, highways, bridges and schools are financed by public fundings. Since the 1980s, more infrastructure projects have begun to have private sector participation in construction processes. *'The PPP has become a valuable asset for communities to revitalize their economic marketability and aid with needed social, housing, infrastructure and employment programs'* (Jacobson and Choi, 2008 – Nikkamp et al., 2002; Shatkin, 2007).

The same as the partnership term, there is no common definition for PPPs. One can understand PPPs as *'cooperative institutional arrangements between public and private sector actors'* (Hodge and Greve, 2007, p. 545). One can connect this definition of PPPs to the legality definition of partnership, where partnership is considered as *'a legal entity formed by the association of two or more person'* (Draken, 1917 - Parsons, 1893). It can be argued that the above definition of partnership does not give any idea of how the partners should work together, but it just simply state that the partnership should be legally formed. Giving definition of PPPs, Hodge and Greve (2007) state clearly that there should be cooperative arrangements, meaning that partners of PPPs should cooperate to work together. Similarity, Osborne (2000) claims that *'PPPs are agreed, cooperative ventures that involve at least one public and one private sector institution as partners'* (Osborne, 2000, p.37). He argues that this definition is broad enough to cover all types of partnership between the public and private sector and circumstances, in which they arise (Osborne, 2000).

Under the view of public management perspective, PPP is understood as *'the formation of cooperative relationships between government, profit-making firms and non-profit private organizations to fulfill a policy function'* (Linder and Rosenau 2000, p.5). Here, the cooperation is also mentioned, but with a better explanation of who is involved in the partnership. One can claim that under this definition, the public sector is the leader of the partnership and it seems like the public sector will get the most benefit. It is because the policy function is emphasized, which the partnership's work has to fulfill.

Commenting on the PPPs' definition by Linder and Rosenau (2000), some researchers state that *'this understanding of PPPs covers a wide variety of potential cooperative arrangements'* (Borzal and Risse, 2002, p.4). There is possibility for variety of potential co-operations, because only the type of sectors is mentioned. The degree of involvement of different sectors is missing here. Depending on the nature of the joint work and agreement between partners, the role of partners in a partnership will be created variously. Therefore, many types of partnerships can be assumed to appear under the definition stated by Linder and Rosenau (2000).

Under the infrastructure field, PPPs can be defined as *'a range of possible relationships among public and private entities in the context of infrastructure and other services'* (Felsing et al., 2008, p.7) Again, one can see the possibility of various connections between public and private sector in this definition. Compared with Linder and Rosenau (2000), Felsing et al., (2008) understand PPPs as relationships rather than arrangements. It means that partners should be kind of friends, who understand and trust each other, rather than working together because there is a written-down-contract. With the emphasis on relationships, one can claim that definition of PPPs stated by Felsing et al., 2008 gives researchers an understanding that PPPs should be a long term period, where partners create a connection and upgrade it to a relationship. This relationship gives partners motivations and encouragements to work together to archive a common goal. Anyway, it should be cleared that this understanding of PPPs is elaborated in a PPP Handbook, which is designed for the staff of the Asian Development Bank and its developing member countries clients. Although the handbook is made with a special focus on the infrastructure industry, it can be seen as one of the most complete document of PPPs, because there is a description and explanation of what PPPs are, who are involved in PPPs, types of PPPs, requirements of PPPs projects, etc. Thus, this handbook will be used in this project specifically to understand types of PPPs and stakeholders involved. Based on that, a PPP model will be designed for cooperation between the private and public sector to promote and support the implementation of FEVs in Copenhagen.

Following to the uses of PPPs in the infrastructure area, many researchers defines PPPs as a new way to handle infrastructure projects, such as building tunnels and renewing harbors (Hodge and Greve, 2007 – Savas 2000). In the infrastructure industry, PPPs are financial models that *'enable the public sector to make use of private finance capital in a way that enhances the possibilities of both the elected government and the private company'* (Hodge and Greve, 2007, p. 546). Recently, PPPs have been used in many other sectors than infrastructure i.e public health, power generation and distribution, transportation, etc. (Felsing et al., 2008). Thus, many researchers have seen PPPs as *'a new way of managing governing organizations that produce public services'* (Hodge and Greve, 2007, p. 545). In the process of making public service, history has shown that *'there has always been some degree of cooperation between the public sector and the private sector'* (Hodge and Greve, 2007 – Wettenhall 2003, 2005). Hodge and Greve (2007) emphasize that the government nowadays starts to involve in long-term business relationship with the private sector *'under more sophisticated and far-reaching contracts than ever before'* (Hodge and Greve, 2007, p. 546). The reason why PPPs are becoming more and more well known is that they can benefit both the public and private sectors. *'They have specific qualities, and if those qualities are combined, the end result will be better for all'* (Hodge and Greve, 2007 – Vaillancourt Rosenau, 2000).

Despite the fact that PPPs have been used the most for infrastructure projects, Grimsey and Lewis (2002) claim that it can potentially be used in many type of services, which are created to benefit the citizens. Considering service as a core, it is argued that *'there are no core functions that cannot be undertaken by the private sector'*

and no activities for which public provision is infeasible. Not all public services provided to the community are necessarily core in the sense that government needs to provide these services itself' (Grimsey and Lewis, 2002, p. 249). This argument opens opportunities for PPP to be used in many other industries than the infrastructure, covering technology, power, transportation, environmental policy, education, health, welfare law enforcement and community activities (Grimsey and Lewis, 2002 – Rosenau, 2000). Similar to Felsing et al., 2008, Grimsey and Lewis also argue that PPP should be based on long-term contracts and that trust relationship is a key element to make PPPs work. 'A short-term contract for the provision of goods or service is presumably not a partnership'. 'Partnership is a trust relationship.' (Grimsey and Lewis, 2002, p.247). Further, they argue that PPP is a risk-sharing relationship, where public and private sectors have something to lose if the partnership underperforms. The risks and uncertainties under PPPs will be discussed further in the criticism part.

4.2 Stakeholders in the PPPs

Stakeholders in the PPPs are about to be explained and discussed in this report as an important part when studying PPPs. It is because they are the main players and one of the main causes for successes or failures of PPPs projects.

There are obviously two types of stakeholders in a PPP contract: the public and private partners. However, it is not simply just a public authority and a private company who can enter into a PPP. Stakeholders in PPP can be named as:

- political makers or government/ public authority
- company management and staff
- consumers
- investors and strategic consultants (Felsing et al.,2008).

The policy makers can be understood as the authority, community, government. It is clear that the policy makers are representatives for the public sector. They establish goals, objectives and quality standards for the project. They also approve the recommendation for the PPPs, regulatory and legal framework. Their interests are to improve public welfare, attract investors, promote fair competition in different industries and maximize revenue (Felsing et al.,2008). One can claim that in most cases, the policy maker is the lead partner in PPPs projects. It is because they have the power to decide whether or not the project should start and how it should work. Though, it is not to deny the involvement of the private sector in the process of PPP projects. They can be investors or the company management and staffs, which will be described in the following. Investors can be private or public partners, because both sectors can invest financial capital to PPP projects. The public investor belongs to the public sector, who can also be the policy makers and are interested in creating social benefit and public welfare;

whereas the private investors are private companies, who find PPPs projects promising and interesting to invest in.

The company management and staff can be seen as employees/human resources involved in operation and management of the PPP projects. In some cases, it is both the public and the private sector, which work under a joint venture company. This joint venture company can be established for some special PPP projects to ensure fair treatment of present employees, provide career opportunities, improve productivity, efficiency and morale (Felsing et al., 2008, p. 22).

Consumers are regularly the citizens. They are users of public goods and services, which are created by PPPs. They express their needs for using the services, giving recommendations on quality and level of services. They also evaluate the strengths and weaknesses of the services. They are representative of service users, who can complain about low quality or high prices of the public services. It is because their interests are having fair pricing of public services and high public welfare.

Strategic consultants are those, who can act as intermediaries to support the PPPs projects in general and support the cooperation among other stakeholders.

4.3 Types of PPPs:

There are no universal type of PPPs shown in literature reviews. Under different industries, there might be different ways to create PPPs. One of the reasons is that the stakeholders involved are different, even though they are mainly from the public and private sector. Sometimes, non-profit private sector organisations can also be involved in PPPs. In the Public-Private Partnership handbook made by the Asian Development Bank, Felsing et al. claims that there are six PPP options available for consideration and each of them present different characteristics to be assessed against the sector reform objectives (Felsing et al., 2008). The six PPP options are:

- Service contract
- Management contract
- Afterimage or lease contract
- Concessions
- Build-operate-transfer (BOT) and similar arrangements
- Joint Ventures

The PPPs' option characteristics are presented in the table below:

| | SERVICE CONTRACTS | MANAGEMENT CONTRACTS | LEASE CONTRACTS | CONCESSIONS | BOT |
|---|--|---|---|--|---|
| Scope | Multiple contracts for a variety of support services such as meter reading, billing, etc. | Management of entire operation or a major component | Responsibility for management, operations, and specific renewals | Responsibility for all operations and for financing and execution of specific investments | Investment in and operation of a specific major component, such as a treatment plant |
| Asset Ownership | Public | Public | Public | Public/Private | Public/Private |
| Duration | 1–3 years | 2–5 years | 10–15 years | 25–30 years | Varies |
| O&M Responsibility | Public | Private | Private | Private | Private |
| Capital Investment | Public | Public | Public | Private | Private |
| Commercial Risk | Public | Public | Shared | Private | Private |
| Overall Level of Risk Assumed by Private Sector | Minimal | Minimal/moderate | Moderate | High | High |
| Compensation Terms | Unit prices | Fixed fee, preferably with performance incentives | Portion of tariff revenues | All or part of tariff revenues | Mostly fixed, part variable related to production parameters |
| Competition | Intense and ongoing | One time only; contracts not usually renewed | Initial contract only; subsequent contracts usually negotiated | Initial contract only; subsequent contracts usually negotiated | One time only; often negotiated without direct competition |
| Special Features | Useful as part of strategy for improving efficiency of public company; Promotes local private sector development | Interim solution during preparation for more intense private participation | Improves operational and commercial efficiency; Develops local staff | Improves operational and commercial efficiency; Mobilizes investment finance; Develops local staff | Mobilizes investment finance; Develops local staff |
| Problems and Challenges | Requires ability to administer multiple contracts and strong enforcement of contract laws | Management may not have adequate control over key elements, such as budgetary resources, staff policy, etc. | Potential conflicts between public body which is responsible for investments and the private operator | How to compensate investments and ensure good maintenance during last 5–10 years of contract | Does not necessarily improve efficiency of ongoing operations; May require guarantees |

BOT = build–operate–transfer, O&M = operation and maintenance.
Source: Heather Skilling and Kathleen Booth. 2007.

Table 1: Summary of key features of the basic forms of PPP; Source: Felsing et al., 2008, p. 28

As can be seen in Table 1 the private sector invests the least in the partnership in service contracts and the most in the BOT option. It means that private partner takes more risk if they involve in PPP type in the right side of the table. The duration of the partnership also increase towards BOT type of PPPs. The table also presents the competition level of all PPPs options, special features to consider as well as problems and challenges. Next, each type of PPP shown in Table 1 will be described.

4.3.1 Service contract:

Service contract is a type of PPP, in which the private sector invests the least, compared to others PPPs types. Under the service contract, the public client simply hires a private company to carry out one or more specific tasks for a short period, typically one to three years. The private company has to perform the task with an agreed price at a standard set by the public client. In this type, the public sector would normally open a bid to choose a private company, who can show the ability to perform the best job at the most reasonable price. We can see the service contract a lot in the infrastructure maintenance industry and technical assistances in all sectors i.e. social development, health, civil society, etc. Applying the service contract, the public authority will pay a predetermined fee to the private company to do tasks that has to meet required standards. If the company can reduce its operating cost, it will increase its profit (Felsing et al, 2008). In this case, the private company does

not interact with consumers. When the agreed task is done and approved by the public authority, the private partner does not involve any more on further expansion or improvement of the product or service.

The advantage of this option is that the private company does not need to invest financial capital in the project. In most cases, the public authority invests 100% of financial capital by paying for a service made by the chosen company. The tasks that fall under the service contract are clearly defined in the contract and quality standards are also clarified. It makes it is easy for the private company to understand what exactly it has to do and how to do it, in order to meet the standard requirements. Moreover, the duration of a service contract is rather short, which '*allows for repeated competition in the sector*' (Felsing et al, p. 29). It means that private companies in the same field have to increase their quality of work and reduce their fee to be able to compete with the others. This is a great advantage for the public authority to make public goods within a reasonable price. There are though several disadvantages of this PPP option. One of them is that a service contract is '*unsuitable if the main objective is to attract capital investment*' (Felsing et al. 2008, p.30). In many cases, the public authority does not have enough financial capital to invest in a potential project. Thus, the public authority needs to call for investment from private companies. Because the nature of the service contract type is that the public authority invests 100% on the service made by private partner, it would not be the choice for the public authority to get investment from the private sector.

4.3.2 Management contract:

Management contract is an expanded version of the service contract. Under this type, the private partner does not only make the task, which is agreed with public authority, but it also involves in the management. It means that daily working processes during the contracting period has to be transferred between the public and private partners. Alternatively, the public authority may require the private sector to manage and operate the public services, which are used by the citizens. Figure 2 shows a typical structure of a management contract:

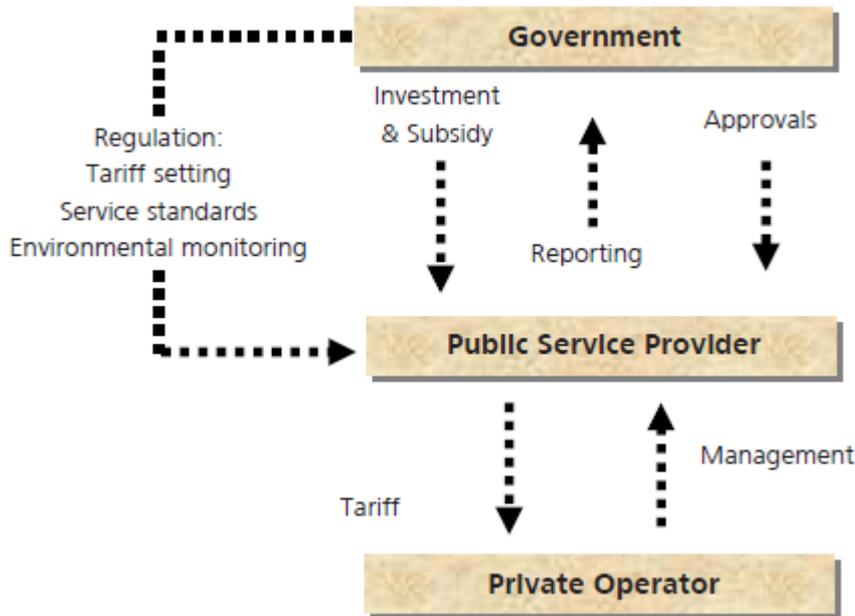


Figure 1: Structure of management contract; Source: Felsing et al., 2008, p. 31

One can see from the figure above that there are links between the government, the public service provider and the private operator. The public service provider is owned by the public authority, but receive management support from the private sector. The labour rate will be paid out to the private company from the public sector. In some cases, a part of the profit can be shared to the private company because it interacts directly with the customers.

Felsing claims the key advantage of this option is that the public sector can gain a great result by the presence of the private sector, without transferring the assets to them. Human resources for management projects are taken care off by the private sector with approval from the public sector, which save time and might be able to reduce costs for the public sector.

The potential weakness of this option is that it can be tricky to split between the obligation for service, management and expansion planning. The reason is that the private sector only do the management work, but does not have the authority to expand or improve the project in financial aspect to achieve deep and lasting changes. The project extension has to be discussed and agreed with the public sector, which might take longer time and is more difficult to start. As mentioned, the private sector can get a share of the profit or given an incentive payment to encourage them to get involved in the management.

4.3.3 Affermage or lease contracts:

Under a lease contract, the private sector is responsible for all services and takes obligations related to services and quality standards (Felsing et al 2008). It means the public sector will only make investments for new and for replacement projects. Any other types of fees such as reparations or improvements have to be paid by the lessee (the private sector). By this way, the private sector takes all risk related to the operation and maintenance of the project. If the project cannot gain any profit or the consumers are not able to pay their debts, the private sector takes responsibility for this and offset loss. The duration for this type of contract is from 10 to 20 years. Figure 3 shows how a typical lease contracts looks like:

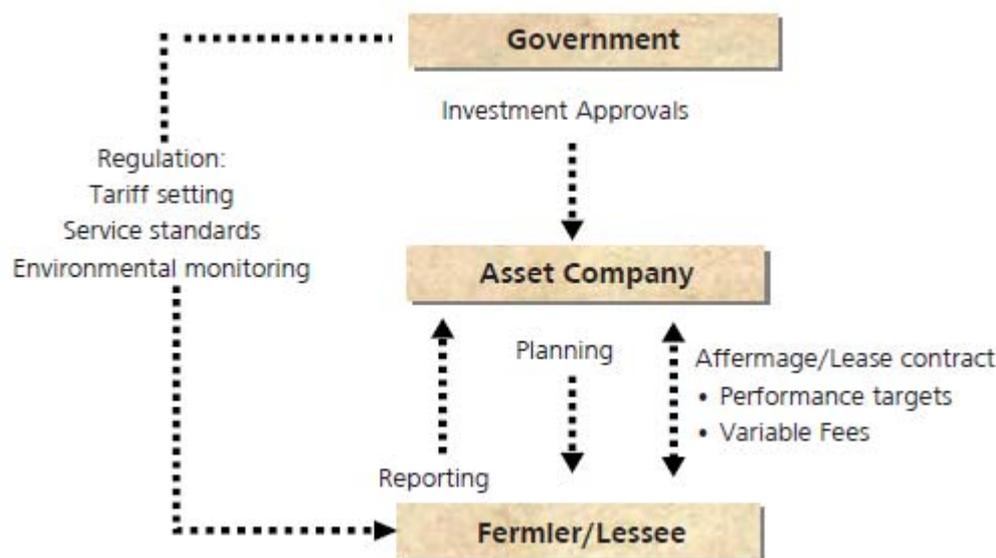


Figure 2: Structure of lease contract; Source: Felsing et al., 2008, p. 33

An affermage is similar to a lease contract but not the same. Under a lease contract, the private sector retains revenue collected from customers and makes a specific lease payment to the public sector. Under an affermage contract, the private sector collects turnover from operating and management of the service and pay a specific lease fee to the authority. Then, the private sector keeps the remaining revenue after it pays an affermage fee to the public sector. 'An affermage allows the private sector to collect revenue from the customers, pays the contracting authority an affermage fee, and retains the remaining revenue' (Felsing et al 2008, p.33). This type of PPPs could be more interesting for the private sector than the lease contract type, because it carries less risk. The private sector is able to use the revenue from customers' payments to recover operation and management fees. The lease fee paid to the public authority is typically an agreed rate per every unit sold (Felsing et al 2008, p.33).

The affermage and lease contract have some positive elements. Firstly, the private partner's profit depends on the sales and costs on operation and managing projects. Thus, the private partner has to do its best to make good services and reduce cost. Therefore the consumers, mostly the citizens will get very good service for a

reasonable price. By this way, the public sector can be sure that the private sector works effectively and efficiently.

However, the weakness of this PPP option is that the private sector have to pay a leasing fee to the public authority no matter if they are earning profit or not. The leasing fee is though also very difficult for both sectors to agree on. On the other hand, the investment capital to start up the project still remains on the public sector, but not yet mobilized from the private sector.

4.3.4 Concessions:

Figure 4 show the concessions PPP option.

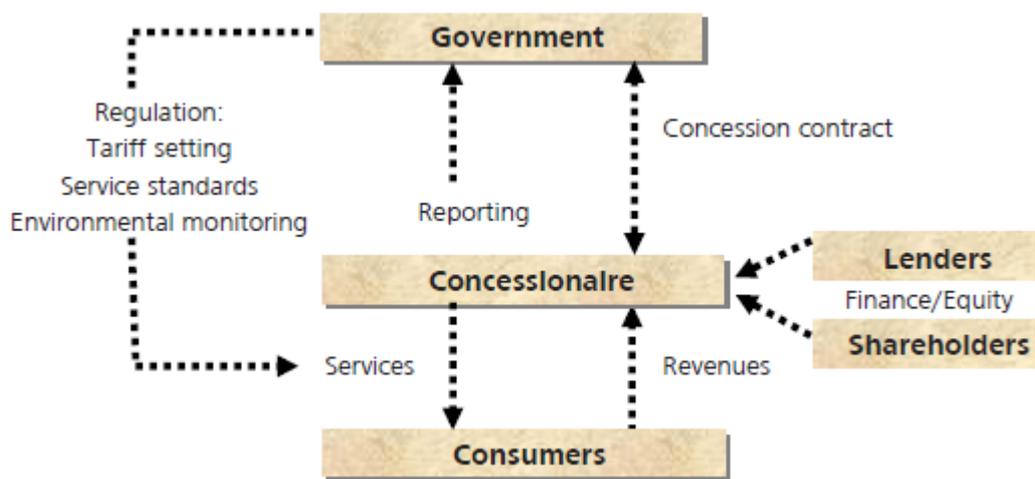


Figure 3: Structure of concession contract; Source: Felsing et al., 2008, p. 36

First of all, it needs to be noticed that under a concession, the private sector is now responsible for the total financial investments. Besides, the private sector also works in full delivery of service, operation, maintenance, collection, management and construction and rehabilitation of the system (Felsing et al 2008, p.34). Although the private sector invest fully in the project, it is important to emphasize that in most cases, the assets are still owned by the public sector. The public sector takes responsibility to establish performance and quality standard of assets and services. The concessionaire or the private sector earns from fees of services paid by the users. The fee rate is agreed with the public sector in the concession contract. This type of PPPs model is normally lasting over a period of 25 to 30 years. Due to a very long period contract, it can be agreed to adjust the fee rate after a certain period during the concession. In a few cases, when the concessionaire is not able to invest during this process, the public sector may give financial support. Otherwise the private sector has to take responsibility for any type of investment for building assets, maintenances, improvements and expansions of the project. The long period of concession contract gives opportunity for the private sector to have enough time to recover investment capital and earn profit on the project.

It is pointed out that the advantage of the concession is about private investment capital. With this type of PPPs, the public sector mobilized a great amount of money from the private sector to build public assets. On the other hand, the private sector involves a lot in the project, which give them opportunity to have a better understanding and controlling the project. This help the private sector to make its own decision on any change or improvement of the project, where they find it needed.

The disadvantage of the concession is that the contract requires a definition of the operator’s activities (Felsing et al 2008, p.36). It may happen that the private sector only invests and focuses on some parts of the project, where they find the opportunity to earn profit. However, public goods are contracted not only for profit, but also for bringing benefit to the citizens. Thus, a detailed contract has to be agreed between the public authority and the private sector to point out what the private sector is responsible for. Many things can happen and change during the contract period such as changes in economics, politics, environment, etc. Thus, the contract might need to be reviewed once or more during the concession period. Another disadvantage of the concession is that it does not create a great competition between companies because normally there are only a few big companies, which fulfils the requirements to bid for such a big and long-term project.

4.3.5 Build-Operate-Transfer (BOT) and similar arrangements

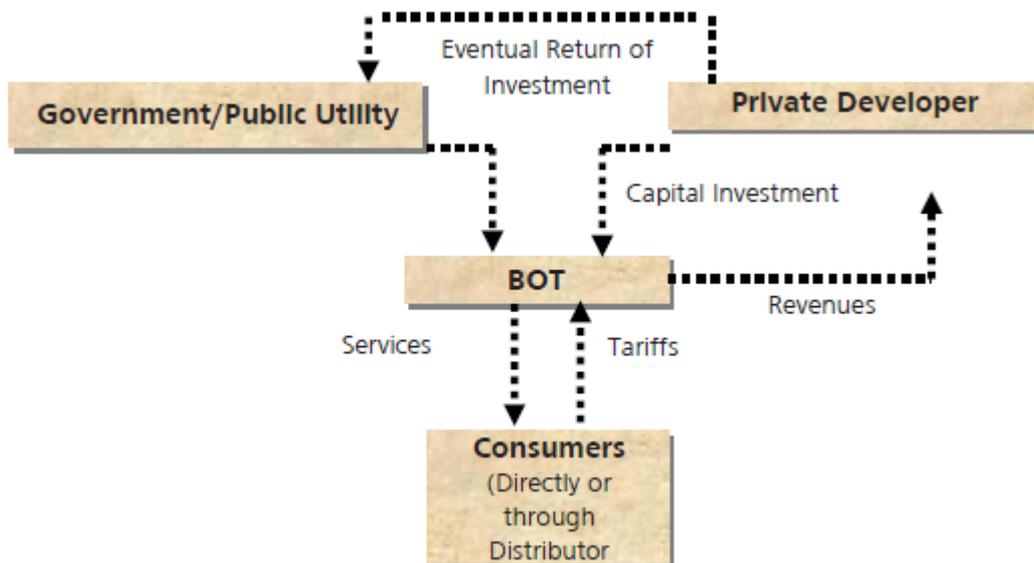


Figure 4: Structure of a BOT contract; Source: Felsing et al., 2008, p. 37

BOT and similar arrangement are a kind of specialized concession in which a private firm or consortium finances and develops a new infrastructure project or a major component according to performance standards set by the government’ (Felsing et. al, 2008, p.37).

Under BOT, the private sector fully invests the financial capital needed for the project from the starting point until the building up of assets is finalized and the services are used by the citizen. Felsing et al, (2008) emphasize that under BOT, the private sector might own the assets for a period stated in the contract. It is an opportunity for the private sector to invest in infrastructure and services so that they can recover cost through fees paid by users. Besides, the public sector might consider purchasing some outputs produced so that the private sector can recover parts of the financial investment during the BOT contract. At the end of the BOT contract, the public sector have choices to either take over the ownership and operate itself, or contract the operating responsibility to a private operator.

The main difference between the BOT and the concession option is that the concession contract mostly involves extensions and operation of existing systems, while the BOT involves a much larger investment, because the project start with totally new facilities and assets. Therefore, it is very important and necessary that the public sector can mobilize financial capital from the private sector. The time of transfer assets under the BOT type from the private sector to the public sector depends on local laws as well as financial issues. With a BOT contract, the public sector is able to call for investments from the private sector to the construction or renovation of the infrastructures. Felsing claims that BOT reduces the commercial risk for the private sector, because there is only a customer who buys the project at the end: the government, although the citizens are the end-users of the services. As mentioned, the private sector has to invest a lot in this type of contract. The main source to recover cost is from service fees paid by the users. A part of the cost can be also recovered from government support. From the public sector point of view, BOT is a difficult PPP type, because they have to design a very long-term contract, which needs to be reviewed during the contract time.

4.3.6 Joint venture:

This type of PPPs is not listed in table 1, because it is quite different compared to other PPP types, which were discussed earlier in this report. Under the joint venture, the public and private sector seem to be more equal. The assets are owned and operated by both sectors. The public and private sector can form a joint venture company together to work with a specific project and this company may be listed on the stock market. One of the key elements for success in this PPP type is a good corporate governance. Especially, the private sector must have the ability to maintain the jobs independently, because the public sector might only enrol to the company's business to achieve political goals. The structure of a joint venture PPP is illustrated in figure 6. The joint venture type of PPP is considered as a '*real partnership of the public and private sectors that match the advantages of the private sector with the social concerns and local knowledge of the public sector*' (Felsing et al., 2008, p. 42). Under a joint venture, both the public and the private sector share the investing capital, ownership and responsibility to make the project work efficiently. However, it should be noticed that the equal role of government with the private sector can lead to conflicts of interest.

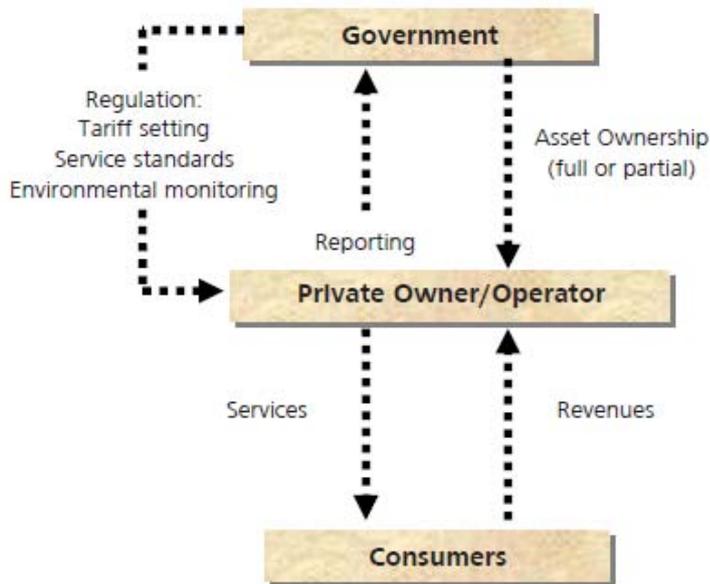


Figure 5: Structure of joint venture contract; Source: Felsing et al., 2008, p. 42

To sum up, typical types of PPPs presented above are just suggestions by Felsing et al (2008) for the infrastructure industry. They argue that the public and private sector can combine those options and adjust the structure to fit in a specific project. It is important to consider elements of specific markets and requirement of the sector based on characteristics of the system, commercial, financial factors, as well as legal aspects and regulations.

Example of a successful PPP project in Denmark:

Project description:

The Project is dealing with the Private Public Partnership (PPP) model and consists of the 25 km long newly built motorway M51 between Kliplev and Sonderborg, going east-west and connecting to the existing E45 at Kliplev. The 30-year project involves the funding, design, construction, operation and maintenance of 25 km of new dual carriageway, including approximately 60 bridges of which 19 are longer over- and underpasses.

Project information:

- 26 km greenfield project, incl. 18 km of secondary roads
- 7 interchanges
- dual carriage way with emergency lane
- Construction period: Feb 2010 – Mar 2012
- Total Invest: approximately 1,1 billion DKK = 147 million €

Source: Folketingets hjemmeside (ft.dk)



Project status:

- Opening in Time in March 2012
- Operations as planned
- Smooth Winter Services

Source: FCP homepage (fcp.at), Folketingets hjemmeside (ft.dk)

4.4 Criticism:

Despite many definitions and explanations, many potential users still claim that it is difficult to understand what a PPP really is. One of the reasons is that theoretical reviews on the relationship between public and private sector seem too broad and too uncritical (Jacobson and Choi, 2008). As mentioned earlier, some authors claim themselves that their definitions are broad and can cover all types of possible arrangements between the public and private sectors. On one hand, it is good that the definition is broad, so users can have an overview of what a PPP possibly is. On the other hand, when potential users want to learn deeply about PPP, they find it is hard to have a clear picture of PPP, because PPP is still something new and very disputable. Nowadays, PPPs is mainly used in the infrastructure industry, so the understanding of PPPs in this industry seems to be clearer. There has been some fine literature review on PPPs used in other sectors, such as health, education, etc., but a category of universal types of PPP is still missing. Potential users, who want to learn about PPPs and apply it to specific cases, have to be flexible to use the broad understanding of PPPs to create their own understanding of PPP's, which possibly suit to a specific case.

V. Other frameworks consideration in this project:

1. PESTEL framework:

The PESTEL framework is about to be described here as a tool to argue why PPP can support the implementation process of FEVs in Copenhagen municipality. PESTEL stands for Political, Economic, Social, Technological, Environmental and Legal factors (Henry, 2008). Originally, the Environment and Legal factors were not included but later on, they were added to extend the theory. Regularly, this framework is used to analyse external factors (e.g. for a market analysis), where a company wants to introduce a new product. It can also be used as a tool to help the company to define its strategic planning and decision making in a specific market. In this report, the PESTEL analysis is used to analyse briefly the Danish market, in order to understand in which extent the market is ready to start the implementation of FEVs. Based on that, it is possible to consider a strategy to make it is easier for FEVs to be implemented in the Danish market, particular in Copenhagen municipality. In the following, each factor of the PESTEL framework will be described.

The Political factor is referring to government policies through laws and regulations. It can also be referring to the stability of a government (Henry, 2008). One can claim that in some Western countries, the issue of government's stability is not relevant. In other countries, where the government and its political system are changing all the time, it is really important to take into consideration, if it is safe to send people there to work and if it is worth to invest for introducing new products there. Furthermore, law and regulation of a government are relevant to discuss under the political factor, because it can encourage foreign firms to invest in the country. For some products, the government might impose special laws, such as tax exemptions to make it easier for foreign firms to enter the market. Regularly, these products are friendly with the environment or products that the country is in lack of, due to low developed technology or low material resources.

The Economic factor includes everything related to a country's economic situation, such as GDP, inflation, unemployment rate, export and import, etc. It is necessary to scan the economic factor, before making decision on deploying a new product to a country. It is because the economy of a country is not always strong enough to purchase new products, especially those, which are very expensive, such as new and highly developed technology products. In some cases, the economy of a country is good enough so that the government or the public sector can make financial support to some sectors or some products, which are beneficial for the country in the future.

The Social factor can be understood as culture and social trends of a country. It is included in the framework, because the society is the end-user of most products. If the society is not open to accept a product, it will be out of the market very fast. In some countries, their culture would not accept products, which are not in line with

their religion and beliefs. However, it is not always the culture, which decides whether to accept a new product or not. In some cases, it is possible that a global trend of user behaviour affects traditional habits of the society and makes changes on that.

The Technological factor is the level of technological development of a country. It is about how well the country adopts new technology and makes it as an advantage in the industry. Regularly, a very highly developed technological product would not be able to survive in a country with very low technological development. It is because the country is not able to give technical support and therefore it is very expensive for the firm to bring it forth and back to another country to repair. It is also cheaper to purchase a high technical product in a country where the technology is well developed because it allows the firm to deliver services and make reparation in the same market.

The Environmental factor is added to the traditional PEST analysis, because people in the global market start to care more and more about the environment. It can be argued that any product in the market should be made with consideration of protecting the environment. Nowadays many companies are creating their green images by making their value chain more and more environmental friendly. On the other hand, more and more consumers start to require from their suppliers the ability to protect the environment in their manufacturing processes.

The Legal factor is actually subsumed within the Political factor, because it also refers to laws and regulations. The difference is that the Legal factor emphasizes on whether it is legal or illegal to do something in a country, for example some products are legal to sell in one country, but might be illegal to sell in another. The Legal factor can also appear in one or more processes of the value chain, such as marketing activities. In some countries, there are special regulations of how the advertisement should be. If the company does not follow the rules, the government will make judgment on whether the marketing activity is illegal. Thus, it is necessary to scan for legal factors before adopting new products to a country.

All factors in the PESTEL framework were described individually, but one can argue that there are connections between them. The Social and Environmental factors have strong connections to each other, because human behaviours have large impact on the environment. To make it happen, the government might want to change some regulations to push the society to take more care of the environment. Furthermore, financial support for particular industries or products cannot be applied, if there is no change in the political factor. As pointed out, the Political factor also involves in the Legal factor to make something legal become illegal and the other way around.

The PESTAL framework is argued as a great tool to apply before a product is introduced in a new market or country. However, there are some limitations of this theory. One of them is that the PESTEL framework only

emphasizes on individual factors, but ignores the relationship between them. In fact, the company should analyse the relationship between all factors. The PESTEL can be used as the starting point to scan the most important factors in new market or country, where product is supposed to be introduced.

2. *The SWOT method:*

The SWOT (Strengths, Weaknesses, Opportunities and Threats) is a tool to evaluate the internal and external environment of a company. The theory is well-known for its simplicity and practicality (Pickton and Wright, 1998). It can be used by business managers to define a strategy formulation, followed by managerial decision-making and action.

Strengths and Weaknesses are factors about the internal environment of a company. The Strengths and Weaknesses cover all internal factors of a company such as finance, human resource, material resource, equipment, products, places, business model, etc. The business should try to increase its strengths and use these to its advantage to compete with others. At the meanwhile, the weakness factors needs to be reduced as much as possible. In fact, a company does not only analyse its own Strengths and Weaknesses, but also use this tool to analyse its competitors. The purpose is to find the competitors' Weaknesses to turn it into advantages for oneself, and find the Strengths of the competitors to learn from them.

The external factors of the SWOT analysis are Opportunities and Threats. These are key '*macro environmental forces (demographic – economic, natural, technological, political – legal and social – cultural) and significant micro environment actors (customers, competitors, suppliers, distrutors, dealers)*', which affect its ability to earn profits (Kotler and Keller, 2006, p. 52). The Opportunities can be defined as trends, forces, events or ideas that the company or unit can capitalize on (Pahl and Richter, 2009). On the other hand, the Threats can be understood as risks and forces, which are out of the company's control. Both macro and micro factors mentioned above can be opportunities or threats to a company.

Although SWOT is used commonly, because of its simplicity, users should consider the criticisms of this method. One of the most important criticisms is that the SWOT '*tends to persuade companies to compile lists rather than think about what is really important to their businesses*' (Pickton and Wright, 1998). Also, the theory only presents the list of factors, but ignore the relationship between factors (Pahl and Richter, 2009). It means that the company lists all factors under the SWOT theory, but forgets to analyse and find the relationship between them. In fact, the Strengths and Opportunities of a company have a strong relationship to each other. It is because Opportunities bring advantages to the company. The company then makes these advantages as its Strengths to compete with the others. In the other way around, Strengths make it is easier for the company to obtain the Opportunities. Similarity, the company who has many Weaknesses is more afraid of Threats, because

they will not be able to handle them. Further, Threats bring disadvantages to the company and make it weaker. The SWOT is also criticized that *'it presents the resulting lists uncritically, without clear prioritization, for example weak opportunities may appear to balance strong threats'* (Pickton and Wright, 1998). Thus, the manager or marketing person who makes a SWOT analysis should have knowledge to define whether a factor is important to consider or not. After making the SWOT analysis, the manager should define a strategy on how to turn the Weaknesses of the company to Strengths and how to make Threats become Opportunities.

VI. Introduction of stakeholders interviewed:

In this report, three companies are chosen for interviews: Post Danmark A/S, UPS (United Parcel Service Inc.) and Danske Fragtmænd A/S. Post Danmark is chosen, because the company is known for owning the highest number of EVs in Denmark. The type of vans, which the company uses for delivering letters and light-weight goods, is believed to be capable of being switched to EVs. UPS is chosen to be interviewed, because it is a global company, who already owns some EVs in a few markets. It could be interesting to hear the company's experience in using EVs and the reason why the company has not deployed EVs in their Danish market. Danske Fragtmænd is presented in this report, because it is one of the largest transport companies in Denmark, and because of the fact that the company transports big volumes of goods in and out of the inner city every day. It is interesting to hear what the company thinks about switching their trucks to smaller sized EVs. The interviews with these companies are expected to provide inputs on what their biggest concerns about EVs are and what they think about cooperating with the public sector to implement FEVs in Copenhagen municipality.

Post Danmark A/S:

Post Danmark A/S is a logistics and distribution company, which was established in 1995. Post Danmark delivers letters, parcels and pallets to customers in Denmark. The Post law "Postloven", which was established by the Danish government in 2010 with start in 2011, is securing free competition, which then secure that all post services, which cost money, should take place within Post Danmark, not a third party. The company works from Monday to Saturday, gathering and sorting about 7 million letters and packages every week, these are delivered to about 2.7 million houses and 225.000 companies. The company employs 15.000 workers, spread out on 700 post houses and/or post stores. The company also owns 300 lorries, 300 small lorries (4 pallets), 1200 big vans (13 m³) and 2000 small vans (3-5 m³). In 2011, three electric vans were purchased by self-financed of Post Danmark and tested in Bornholm, Denmark. The test was to examine the functions of the e-vans for mail delivery purpose. It was a successful test, which brought bright future of EVs in the company. In January 2013, the company purchased 50 new Mercedes-Benz Vito E-Cell electric vans with a payload of 900 kg. These vehicles are expected to cut CO₂ emissions by 116 tonnes a year compared to the equivalent diesel power. Post Danmark also owns 1000 e-scooters and 1800 e-bicycles. Post Danmark is the single company that owns the most EVs in Denmark (CPH Post).

UPS (United Parcel Service Inc.):

Since the establishment as delivery company in USA, 1907, UPS has grown into a multi-billion company, which focus on providing the global market with packages to companies, shops and private customers. The company delivers any non-restricted goods, business to business, business to customers (i.e. internet shopping). The company operates every day in more than 200 countries all over the world. UPS started with delivery by cars, then small planes, to bigger planes and continuing into the globalized IT network. In 1975, UPS grew

internationally, starting with their neighbour market in Toronto (Canada). Hereafter, the company moved into Germany to do activities there, before in the mid of the 80's, it really started to take off into becoming a global market mover. UPS is committed to operate their business in a socially, environmentally and economically responsible manner (UPS homepage). In the greater Copenhagen area, UPS operates 60 package cars and vans and delivers 11.000 – 12.000 packages every day. UPS is using EVs in the US and some countries in EU: England, Germany and Amsterdam, but not yet in Denmark.

Danske Fragtmænd A/S:

Danske Fragtmænd offers a complete area of logistics solutions mainly to the Danish market. Danske Fragtmænd has 3.000 workers, 1.600 trucks, 9.1 million annual deliveries, 25 terminals, 20 stock-hotels and 40.000 business customers. The ground stone to the business that developed into being Danske Fragtmænd was laid more than 100 years ago. It was when the first fruit routes were established in Denmark, which went from store to store. It should be mentioned that in this period, all transportation went with either horse wagon or train. Nowadays, the company delivers everywhere in Denmark from day-to-day endeavours optimal guidance and assistance to its customers and perform maximum gentle handling of goods. Danske Fragtmænd has been looking into EVs in the past 10 years, but have not yet purchased EVs because of the high price and the limitations in payload.

VII. Analysis chapter:

1. PESTEL analysis:

As pointed out, the PESTEL framework is regularly used to analyse a new market in order to shape a strategy for a new product coming into that market. In this report, it will not be used in the traditional way as a concept, but rather as a context to analyse the possibility of faster market uptake for a product – Freight Electric Vehicles. The context of PESTEL analysis argues why there should be a relationship and cooperation between the public and private sector. In fact, FEVs are already in the Danish market. The problem is that even though the product is on the market, the technology and its concept is still quite new to people, not just in Denmark, but also in other countries. Hence, it is needed to use the context of the PESTEL theory to exam how much the market is aware of this product. It means that the PESTEL analysis will be carried out, by using data that is most relevant to FEVs. Based on that, it is possible to define a kind of generic strategy to help on the implementation process on FEVs.

Firstly, the Political factor should be discussed. In this case, the focus are current laws and regulations of the Danish government and Copenhagen city authority for EVs and FEVs, as well as the Danish general strategy on protecting the environment. Laws and regulations for EVs are also mentioned here because a FEV is just a larger EV. In Denmark, all vehicles purchased have to pay registration tax. One of the Danish government support measures for EVs and FEVs is that there is no registration tax for EVs up until end of 2015, to encourage people to purchase EVs. For vans, the registration fee normally is 50% of the purchase value above 16.900 DKK. For trucks it is 30% of the purchase value above 34.100 DKK (SKAT, 2014). It can be claimed that registration taxes in Denmark are very high compared to other countries. Thus, this exemption on the purchasing price of FEVs is a great help for companies, since the price of FEVs is already very high. Moreover, a few Danish cities among Odense and Frederiksberg municipality allow EVs to park for free (FDT, 2012). Copenhagen city also exempted EVs from parking fee until December 2011. Unfortunately, the exemption is no longer available, because there is no such a legal for exempting electric cars from payment within the payment area (København Kommune, 2014). Besides, the Danish government and Copenhagen municipality have launched several projects to support EVs and FEVs. One of them is the “City logistik projekt – København” (The City Logistic Project in Copenhagen). There are 17 participants in this project, including the Copenhagen municipality, committees, shipping and freight associations, universities, etc. The aim of this project is to ‘create an innovative and green transportation and logistics services that reduce noise pollution, greenhouse gas emissions and air pollution, as well as improve road safety and create a better urban environment by reducing the heavy traffic in the inner city’ (City Logistik KBH, 2014). Regarding EVs, the City Logistik Projekt focuses on optimizing the distribution planning of the EV resources. It is considered as one of the ways to create a sustainable solution for green city distribution.

The Economical factor is usually discussed based on GDP, inflation, currency exchanges, etc. of a country. In spite of that, in this report, the Economical factor refers to how much the public sector has put out for projects, which aims on protecting the environment in general, and to support EVs in particular. The Copenhagen Climate Plan for 2025 was published in 2012. This plan contains overall plans and strategies for how to save energy and reduce CO₂, in order to make Copenhagen a green and smart city (City of Copenhagen homepage). The needed financial investment for this plan up to 2025 is expected to be around 2.7 billion DKK (Copenhagen Climate Plan). This amount will be divided in many different areas such as energy, green mobility (including EVs), city administration initiative, etc. The Danish public sector has been putting effort on testing EVs by giving financial support for companies and private users to use and test EVs. Totally about 35 million DKK from 2008 to 2012 have been allocated by the Ministry of Energy to do the tests. The EVs tested includes cars, vans, minibuses and lorries. This support is not only for purchasing the vehicles, but also for additional cost to operating EVs such as charging, consultancy fees for analysis, monitoring, documentation and general knowledge building. On one hand, the tests are expected to find out advantages and disadvantages of using EVs in practice. On the other hand, it is to gain knowledge and experience of driving EVs (Danish Energy Agency). The transport and logistics companies involved in these projects were Peter Skafte Aps (1.000.000 DKK subsidence), SEAS-NVE (169.000 DKK subsidence) and TRE-FOR A/S (339.907 DKK subsidence). In line with the environmental area, Low Emission Zones were established in some big cities in Denmark: Copenhagen, Frederiksberg, Aarhus, Aalborg and Odense. In these zones, particulate filters on diesel vehicles, which are over 3,5 tons, were required. These vehicles have to be fitted with an environmental zone mark, before they can drive in the zone. Exemption of particulate filters is applied for vehicles from defence, police and rescue services. To control this law, the police is requested to monitor and enforce that vehicles over 3,5 tons have a valid green zone mark if they are driving within the environmental zones (miljozone.dk).

The Social factor can be referring to many elements, but in this report, it refers to how the Danish society (i.e. the companies and the citizens) think about EVs. It is common that EVs are mentioned as a 'green' type of vehicle, which is environmental friendly. Many people and companies invest in EVs because of its low impact to the environment. In this social factor, it is focused on finding whether the Danish society invest on EVs because of other reasons than the environmental factor. In fact, EVs and FEVs are developed not only to be friendly for the environment, but also to be comfortable to drive and more or less soundless at low speeds. It is confirmed by Post Danmark after the test in Bornholm that the vehicles are comfortable to drive in, where the seat and steer is adjustable (Compilation report, E-mobility NSR, 2013). Post Danmark expresses that besides the environmental aspect, the sound of the vehicles is also important, which makes the vehicles able to be used for night deliveries. So, it can be understood that besides its impact on the environment, it is important for the companies that FEVs should be easy and comfortable to drive, because they are used as transportation vehicles in the companies' business. Nevertheless, it is important to mention here that FEVs are still very expensive. This factor affects the

buying behaviour of the society and especially of the companies, who always want to reduce investment cost to increase profit.

The Technological factor in this report can be understood as technological developments, which can provide support to the green growth of the country/city and especially to support EVs. One can claim that the green growth of Copenhagen City is rising dramatically. As mentioned earlier, it is planned to make Copenhagen the world's first carbon neutral city. This plan will be done with strong support from green solution technologies (e.g. wind power), which Denmark is well known for. Concerning EVs, the development of EVs technology in Denmark started in 1985, where an engineer, Steen V. Jensen presented the very first electric car in this country to the public. After that, an electric car factory was established in Randers, Denmark under a continuous project on EVs with the investment of the private sector of approximately 90 million DKK (Danish Electronic Cars Committee). Unfortunately, the factory was closed and production was moved to Germany. However, it cannot be denied that the EVs' technology in Denmark has begun long time ago. Nowadays, Denmark is still very active in research and development activities for the EVs technology via different projects and programmes, both in national level and international level (e.g. ERA-NET Electro mobility, the Interreg IVB North Sea Region Programme, FP7, EUDP, etc). It should be stressed that the EVs technology is not only covering the technology that are used to produce the EVs, but also the development and implementation of EVs charging infrastructure should be considered under the technological factor. There are already several companies, which have invested in this area - one of them is Better Place. The biggest European launch of Battery Swap Station took place in Denmark (FDT, 2013). The 30 biggest cities in Denmark have been chosen by Better Place to install charging points in public space. Unfortunately Better Place had to file in for bankruptcy in May 2013 after a very tough start on the Danish market, with 264 vehicles sold, compared to a goal of 5.000 the first year. The charging points, after the bankruptcy of Better Place, have been overtaken by the German energy company E.ON, and are located near places such as shopping centres, parks, amusement parks, hotels, etc.

The Environmental factor in this report refers to what the Danish society think towards protecting the environment and what they think about using EVs to do so. In fact, Denmark is one of the most active countries in protecting the environment. In December 2009, the United Nations Climate Change Conference was held in Copenhagen. In this conference, it is underlined that climate change is one of the greatest challenges of our time. Everyone needs to give a hand to protect the environment and rich countries should provide funds to help developing countries to cut down CO₂ emission. As one of results of the conference, Climate Consortium Denmark was established, as a Public Private Partnership programme to promote the Danish clean-tech solutions to the climate challenges. Moreover, The Environmental Protection Agency is established under the Danish Ministry of Environment. The missions of this agency are: advising the government on environmental initiatives, developing and administering rules nationally and internationally, dialogue with the public and companies, concerning environment protection, and finally collating and disseminating knowledge about the environment

(The Danish Ministry of the Environment/ Environmental Protection Agency homepage). As mentioned, the Copenhagen Climate plan 2025 is a clear evidence for serious consideration of protecting the environment in Denmark, especially in Copenhagen. According to the plan, Copenhagen should be carbon neutral by 2025. The total CO₂ reductions will be 1.2 million tons, as result of the Copenhagen Climate Plan. Energy production is planned to be the biggest area to drop down CO₂ produced – in total 74% of the total CO₂ reduction. CO₂ reduction in the green mobility (including EVs) is planned to cover 11% of the total cut, followed by energy consumption, new initiatives and city administration initiatives. Concerning the green mobility area, it is planned to continue developing Copenhagen as City of Cyclists, using new fuels in the transport sector, developing public transports and implementing Intelligent Traffic Systems and traffic information. The detailed goals for 2025 within the Green mobility in Copenhagen are: *‘75% of journeys are done on foot, by bikes or by public transports, 50% of all journeys to work or education are done by bikes, 20% more passengers using public transports compare to 2009, 20-30% of all light vehicles and 30-40% of all heavy vehicles using new fuels (electric power, hydrogen, biofuels)’* (Copenhagen Climate Plan).

From the private sector point of view, all three companies interviewed said that the environment is a very important element to consider nowadays. UPS’s acknowledge that a green and sustainable profile of a company is necessary in the global market. A lot of customers have attitude to protect the environment and they are looking for partners, who can support their initiatives in this field. UPS expresses that EVs are very important for the company in the global market and they are becoming a bigger part of their organization. The company believes that 20% of their overall routes can be carried out by EVs. Likewise, Post Danmark plans for a 40% reduction of the company’s CO₂ emission by 2020. The company puts many efforts on testing FEVs, even without financial support from the Danish public sector. Until 2013, Post Danmark purchased 50 FEVs, 1000 e-scooters and 1800 e-bicycles. Fragtmand has been looking into EVs for the past 10 years to find the way to reduce CO₂, but the company did not purchase any EVs due to the high price. So, it looks like not only the public sector – the government and city municipality, but also the companies and probably the citizen in Denmark and Copenhagen have been thinking towards the importance of protecting the environment nowadays.

In this report, the Legal factor is subsumed to discuss in the political factor.

In summary, the green environment is considered seriously in Denmark. Many plans, projects and investments have been implemented to promote and develop green technology solutions, to reduce CO₂ and to increase awareness for the citizen about the importance of protecting the environment. There are concrete laws and regulations supporting the climate change plan and specifically to support EVs. The EV technology deployment in Denmark is not among the best in Europe, but the country has great advantage in clean technology solutions. The high attitude towards green environment of Denmark is a very strong motivation for investors to bring their ideas, knowledge, technologies and capital to invest into this country. This is a good strategy to boost up the

process to achieve goals of the climate change plan. It is important to note that the government and the city administration are not the only players in this process. The private sectors/investors, who are business companies and the citizen, are also involved. Therefore, it is necessary that all players work together to achieve a common goal: a green and smart city. As a part of the green mobility, the implementation of EVs also needs a cooperation/partnership between the public and private sector to contribute to a faster market uptake. This is the argument for why PPP has been chosen as the main topic to discuss in this report, as a part of the implementation of FEVs in Copenhagen.

2. Risks of using FEVs and difficulties to implement FEVs:

In order to answer the question: ‘*How can PPP support the implementation process of FEVs in Copenhagen*’, the risks of using FEVs and difficulties to implement FEVs to practice will be elaborated. This is the basis to design a PPP model, which can help to reduce those risks and difficulties. A PPP model will be illustrated and explained. The construct of this model is also based on types of PPPs discussed in the literature review.

Risk and difficulty of finance:

It has been mentioned several times in this report that the purchase cost of FEVs is very high. It can be claimed as the most difficult barrier for companies to purchase FEVs. Not just that, cost of repairing FEVs is also very high, because EVs technique is not as well developed as ICEs and still only very few people are trained and educated to repair EVs. It has the consequence that the price of companies’ services or products will be increased, in order to be balanced with the investment and running cost. This is a problem for many companies, because their customers would not be willing to pay more for the same service’s quality, even though it is more ‘green’. Elaborating on this issue, Danske Fragtmænd said that the company has been looking into EVs over the past 10 years, but no EVs were purchased, because it is still too expensive. About 98% of its customers are looking at the price and delivery service. So if price is a bit higher, because the company is driving FEVs, very few customers would be interested in this. In the interview, UPS’s representative also expresses his concern about the high price of FEVs. It is mentioned that UPS owns about 2.000 electric vehicles but none of them are purchased and used in Denmark. The reason is that the Danish government, other than the tax exception, does not really give other financial or legislative support for companies using EVs. UPS receives funding from the government in England and the Netherland so that the company can afford to purchase EVs. UPS agrees with Danske Fragtmænd and mention that the company does not want to increase the service cost, because customers would not want to pay extra for the services. For UPS, it would not be a good idea to share investment cost to the customers by increasing the service price. Thus, the company hopes for financial supports from the Danish public sector for purchasing and using EVs.

In fact, there are several companies in Denmark, who have very strong attitude on protecting the environment and have strong financial capitals enough to purchase FEVs on their own (e.g. Post Danmark), because the company sees FEVs as promising vehicles to invest in, and to be the first mover. Others might be interested in FEVs if there is financial subsidence to support them, meaning that they want to share risks on financing the vehicles together with the public sector.

Risk on technique issues:

As mentioned, the FEV's concept is great but the technologies of batteries, range and weight of the vehicles are not the best at the moment. It is claimed that the battery range cannot last for the whole working day. Additionally, the average operating range is only 130-150 km (FDT, 2012). For transportation companies, this range is not viable to drive between cities, so FEVs can only be used inside the inner city. In order to do this, the company has to unload goods from ICE trucks at a consolidation centre and then transfer goods to FEVs. From that, FEVs can be used to distribute in the inner city. Beside the time consuming to unload and re-load goods, a problem might occur that the company does not have enough volume to gain benefits from switching to FEVs to drive to the inner city. It means that FEVs can be used very little, compared to how much money the company has to invest on this. For big companies, whose trucks have to run in and out the city many times a day, the FEVs' operating range is not possible for them to make all trips using the same FEVs, because the vehicles cannot be driven more than 150 km and the battery cannot last the whole day. Hereby the vehicle cannot go into a 24 hour circle of operation. Another problem is referring to the heating system of the FEVs. It is not all types of FEVs, which has the criticism that the heating system does not work well together with the battery capacity, but it happens at least to Mercedes-Benz (FDT, 2012). It is a disadvantage for transportation companies because the winter in Denmark can be very cold. The low temperatures can also increase the consuming of battery capacity, which gives an extra risk for the companies in the winter. Concerning the general technology of FEVs, it normally takes long time to repair FEVs, because there are only some garages, where they know technical specification of FEVs in order to fix them. The time consumed to repair FEVs is in worst cases claimed to take up to 4 months in a test in Copenhagen with Fiat vans. This time consuming is obviously too much for transportation companies, especially if there is not only one truck broken down. Due to the limited of technology, cost of fixing FEVs are very high, which adds to the financial risk. Not just that, it happened in a test in Frederiksberg that the technical error of battery was not corrected satisfactory. In some cases, the technical error reparation fee is covered by the manufacturers, but sometimes it is very hard to define in the contract about who should pay for this, because FEV is a new product for the manufacturers. Thus, they are not well prepared for potential technique errors, which might occur. Moreover, the infrastructure for EVs as well as FEVs is not developed fast enough so that a huge amount of FEVs can be deployed right now. The public charging points are invested and have been installed in the 30 largest cities in Denmark, but they are not yet everywhere so that it is convenient for users to charge. In case that a company wants to use many FEVs, it is probably more convenient to own their charging station so the vehicles can be charged in the night or in any time where it is not in use (e.g.

lunch break). Then, it again creates problems about cost of installing extra chargers, which the company also will have to pay for. Another difficulty to drive in FEVs, which falls under the technical factor, is that a FEV is very heavy. If a vehicle is over 12 tons, it is not allowed to enter to the Copenhagen city area (interview with Danske Fragtmænd). Even if parcels are not heavy, the carrying capacity of an FEV is in most cases smaller, than for an ICE vehicle. In the Danish market, the typical size of FEVs is less than 3.5 tons. With that size, transportation companies might have to travel more rounds in a day, meaning that the labour cost will increase. In some companies, FEVs might fit well in their business, because they deliver small parcels and use small ICE vans anyway. Then, it would not be a big problem for them to switch to FEVs with the same size. For bigger companies, which transport large amounts of goods every day to the inner city, it would be hard for them to pay more for the labour cost in order to switch to smaller vehicles.

It can be seen that there are barriers in finance and there are a lot of technical issues, which make FEVs difficult to use in practice. However, FEVs or EVs in general are claimed as promising vehicles, because it is expected that in the future, cost of using EVs will be cheaper than ICE vehicles, even without any subsidies. The EV technology is also expected to be improved so that they will be as comfortable and easy to use and repair, as ICE vehicles. Until then, EVs including FEVs should be promoted broadly so that companies and the society are aware of the benefits EVs can bring to the environment. It is not easy to convince the private sector to invest in such a new type of vehicles, as it contains many risks for the companies at the moment. Thus, the PPP should be designed so that the public sector can share risks with the companies. The PPP model should bring mutual benefits for both sectors and they should work together to achieve a common goal: reduce emission to protect the environment.

3. PPP model suggestion:

As described in the literature review, there should be a product, service or asset created under a PPP programme. The ‘task’ which has to be made concerning this concrete PPP, is to encourage the transportation companies to purchase more FEVs to use in their business. This task is in line with the plan from the Copenhagen 2025 Climate Plan: to increase the number of green fuels vehicles in Copenhagen.

Concerning the Political factor of the PESTEL analysis, it can be noticed that the Danish government already exempted EVs for registration tax. It means that the government is aware and accepting that there is a need for laws changes in order to encourage people to purchase and use EVs. The PPP programme will be designed so that the private sector has more opportunities to propose changes in laws and regulations to the public sector, in order to get more advantages when transportation companies deploy FEVs to their fleets. It was also mentioned in the Political analysis that a few projects supporting EVs in Denmark have been funded by the public sector. It shows that the Danish public sector might be willing to give financial support in PPP programme as well. Thus,

the PPP programme should be structured in the way that the private sector should also bring some benefits to the public sector, in order to make the public sector more interested in investing to support EVs. It is also mentioned in the economic analysis part that the needed financial investment to make Copenhagen a green and smart city is expected to be about 2.7 billion DKK. It shows that the Danish public sector is aware that there should be financial investment to reach to the goal of cutting CO₂ emission, where green mobility is a part of this plan.

The technological factor from the PESTEL analysis shows that the EV technology should and will be developed further in the future. Therefore, the PPP programme should connect stakeholders with the EVs manufacturers and those, who provide charging infrastructure. Transportation companies should be updated with new technologies related to FEVs and infrastructures that support the development and deployment of FEVs. Information should be transferred between stakeholders and actors, who are involved in the EVs industry. As it was discussed in the social analysis, it is important for transportation companies that FEVs should be comfortable to drive in and it is an advantage that the vehicles are silent. Also, the high price is one of the biggest barriers for FEVs to be implemented on the market. So, the PPP programme should give opportunities for transportation companies to decrease the purchase price of FEVs.

Looking at the environmental factor, it can be argued that the Danish government and the Copenhagen municipality seriously consider the climate change and the importance of protecting the environment. There is a detailed plan on how the emission should be reduced and how the journeys in Copenhagen should be changed from private vehicles to public transports and use of bikes and walking. Therefore, it is believed that the public sector in Denmark will be interested in joining a programme, where the private sector acts as main player to help the public sector to uptake the goals of the Copenhagen climate plan. The PPP programme will be designed to create a relationship between the public and the private sector to combine their interests towards green environment and strengths in finance, knowledge, power and network. An illustration of PPP model suggested to support the implementation of FEVs in Copenhagen is showed in figure 6.

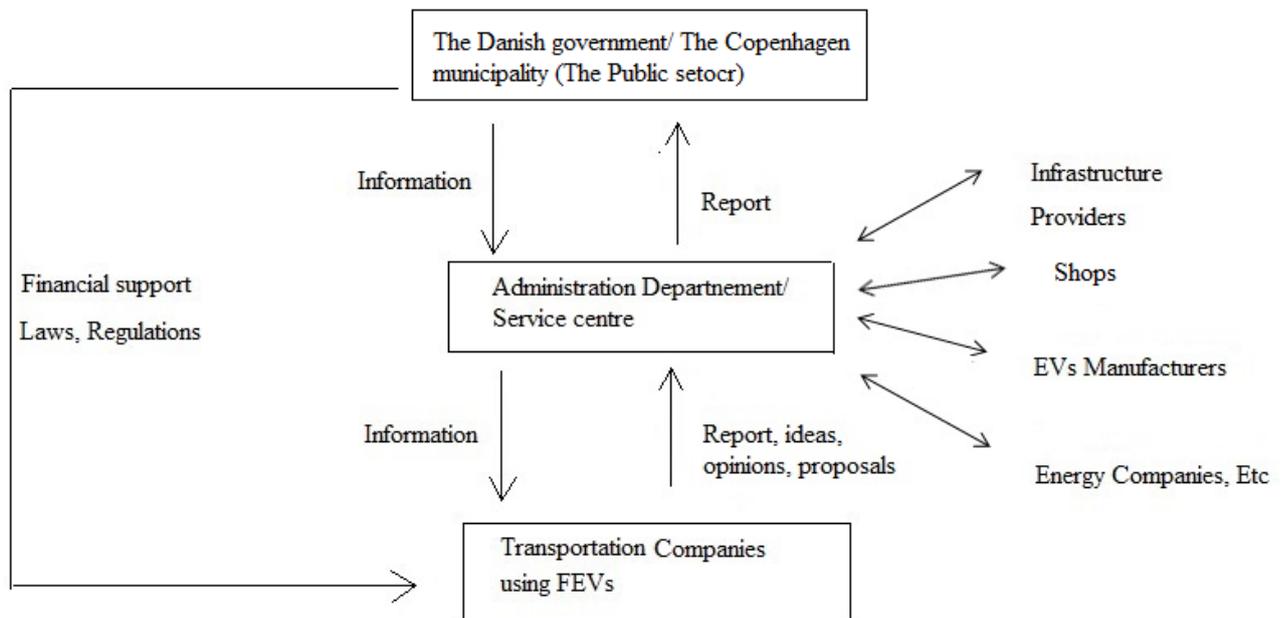


Figure 6: PPP model, own creation

From figure 6, it can be seen that there are three main partners involved in the PPP. They are the Danish Government, Copenhagen municipality (administration department) and the transportation companies (users). The Danish government and Copenhagen municipality are under the public sector. The government is the policy maker, who can change laws and regulations so that they give opportunities and advantages for FEVs and for the companies, who use FEVs. There are several potential regulations, which can increase the interests of FEVs from companies, for instance FEVs can run in bus lanes, free parking places in the city, enabling of FEVs to deliver goods during the night or very early in the morning, establishing of centrally located urban consolidation centres for FEVs, etc. Moreover, the Danish Government and Copenhagen municipality are also the investors in this PPP. From the interviews with three transportation companies and also from the secondary data researched, it seems as if the price of FEVs is the biggest issue, when a company wants to invest. Therefore, there is a need of financial support from the public sector on the purchase price of FEVs. Potentially, the financial support in the purchase price can come from the Copenhagen municipality, because this PPP is focused to implement FEVs in Copenhagen municipality area. In this case, the Copenhagen municipality becomes an investor under the PPP programme. As mentioned earlier, the removal of registration tax for EVs is available at least until end of 2015. There is not yet information on whether this regulation will be extended after 2015. As long as this regulation is available during the period where the PPP programme is implemented, the Danish government can be considered as an investor. As investors, there is an option that the government or Copenhagen municipality purchases many FEVs and rent them out to companies. However, this method is not considered because the meaning of this report tends to encourage companies to purchase and own the vehicles so that the financial risk is shared between the public and the private sector.

The next partners involved in this PPP programme are the users. In this case, users are not the citizens, but the transport companies, who do transport business in the city. The companies might transport goods to business consumers or private customers or both. These companies can be categorized under the private sector. Although there are some transportation companies, which are partly owned by the government, they are still under the private sector, if their bottom line is to gain financial profit. The size of the company is not important to include here, because any transportation company uses trucks/vans, which are possible to switch to FEVs, can join the PPP. The main concern about these companies is that they must be interested in protecting the environment and wish to support in creating a green and smart city. On the other hand, their financial capitals should be big enough so that they are able to invest in FEVs, which, even with financial supports from the public sector, can be more expensive than ICE vehicles. These companies might apply for funds, implement FEVs to their fleets and potentially make reports to the administration department. Besides, they can join exhibitions and events together with the administration department, where information on EVs usage is introduced to the public. In this way, the company does not just promote its brand, but also help the public sector to promote EVs to the society.

The last partner, who stays between the public sector and the users, is the administration department. It is established especially for the PPP programme in this report. It can be understood as a connection, to help the public sector and the users to work better together in this PPP. This department can be established under and financed by the public sector or a combination of the public and private sector. In the administration department, information about FEVs and potentially other type of EVs is collected. It is a place, where companies and private users can get information about EVs (e.g. how long they can drive, how long time it takes to charge, special functions of the vehicles, the price, technical issue, etc.). All relevant information of EVs should be able to gather in one department. Potentially, this department can hold information days about EVs at exhibitions. It is necessary to do at the beginning of the implementation process of FEVs, because not all companies and people are aware of EVs and the benefits EVs can bring. Obviously, they can come to the producers or sellers to ask questions and collect information about EVs. However, an information department as such can help to create better awareness of EVs to the society. This is to promote EVs and that EVs/FEVs are on the process to be implemented in the Danish market. Beside the general information of EVs and FEVs, the administration department is responsible for choosing companies to join this PPP with the public sector. It is similar to the bidding process in a regular PPP project. The difference is that there will be more than one company chosen. It is because the meaning of this PPP is not that there will be only one company purchasing FEVs, but many should do so, to increase the number of FEVs driven in the streets, to reduce emission and gasoline consumed. If the available funding allocated from the public sector for this PPP programme is big enough, all companies who are interested in purchasing FEVs can receive financial support from the PPP funds. In case the available funding is not big enough, there should be some criteria to choose, which companies will be given financial support. One of potential criteria can be that the company has to make reports and give feedbacks about FEVs. The reports might contain analysis of total cost of ownership (TCO) of FEVs, problems and advantages of using the vehicles. This

report can be used by the public sector to promote FEVs (i.e. if the TCO of FEVs are lower compared to ICE vehicles or there are other advantages of FEVs tested by users in practice). On the other hand, problems of using FEVs can be collected from the reports, so both the public and private sector can work together to find solutions to solve or to improve barriers of using FEVs. In this way, it can be ensured that companies do not just take the financial support and purchase FEVs for promotion purposes. They have to implement FEVs to their fleets and make reports. The quality of these reports can be evaluated by the administration department. This department is also responsible to report all detailed issues during the PPP period to the Danish public sector. It can be the feedbacks and reports from companies about FEVs, technical barriers, infrastructure issues, bidding process to choose companies to receive financial support, etc.

The reason why the administration department is mentioned as a combination of the public and private sector is that many areas and tasks under this department can be carried by both sectors: collecting information about FEVs, checking the quality of reports, etc. However, some tasks are believed to be done better by the private sector (e.g. technical support). On the other hand, the public sector is better to be involved in other tasks such as introducing the list of criteria used to choose companies to receive the funding. Further, an administration department, where both public and private sectors involve can present and ensure the benefit for both sectors. Through this department, information about changes in laws and regulations related to EVs and FEVs can be transferred to the private stakeholders. In the meantime, the administration department can help the private partners to bring to the public sector their proposals concerning financial support and opinions on how laws should be adapted or changed. Moreover, the administration department can help to build relationship between the two sectors, so that they cooperate better not just in this PPP programme designed for implementation of FEVs in Copenhagen, but also other PPP projects in the future.

Beside the public sector, the administration department and the transportation companies, it can be seen in figure 6 that there are other actors, who are also involved in the EVs sector (e.g. infrastructure providers, shops, EV manufacturers). These actors play an important role in the PPP programme, because the infrastructure providers bring the needed infrastructure of EVs, the shops are customers of the transportation companies and the EVs manufacturers develop the EVs technologies. However, despite their potential important role as customers or service providers, these actors are not described and discussed here, as the target of this report is the transportation companies. It is needed to notice that, the administration department has a function to connect these relevant actors to the public sector and the transportation company, so they can exchange information and create a better network under the PPP programme.

To sum up, the PPP model suggested in this report looks quite similar to the management contract type of PPP described in the literature review. There are three main players involved, which are the public sector (the Danish government and Copenhagen municipality), the administration department and the private sector (users). The

administration department can be understood as service providers somehow, because it gives information about EVs to the society and provides reports and feedback to the public sector. From the management contract type of PPP described earlier, it can be seen that the public sector make changes in regulations and give investments to support EV deployment. In this report, the public investment is revised so that the public sector only invests partly in the product (FEVs) and the private sector invests the main part of it. In this report, there are also included management activities between the private sector (users) and service provider (administration provider). However, it has to be stressed the meaning of PPP in this report is not the same as the management contract, although the model looks similar. Assets under the management contract are owned by the public sector, while FEVs in this report are owned by the private sector (transportation companies). With the suggested PPP model in this report, it is expected that the FEVs will be promoted to the society through the information centre, with strong support from the administration department. It will be easier for companies and for everyone to learn about EVs and their benefits to the environment. It is expected to get financial and policy supports from the public sector. Under this PPP framework, FEVs have more opportunities to be implemented in the market, because companies get financial supports from the public sector. It is also expected that under this PPP model, the public sector will get feedbacks from the companies about policies, which can create more advantages for those who uses FEVs.

Example of the Copenhagen Capital Region electric vehicle secretariat in Denmark

About electric car Secretariat:

- The Secretariat was established on 1st May 2013 and consists of three consultants and a secretariat manager, who will help to realize the potentials of electric vehicles.
- The Regional electric car Secretariat “Copenhagen Electric” works to ensure visibility and objective information on electric vehicles.
- Copenhagen Electric collects and disseminates relevant materials, concrete information and practical guidance to help the region's municipalities, businesses and citizens to make decisions about electric cars on an objective and informed basis.

Making visible the benefits of electric cars:

- Copenhagen Capital Region sees electric cars as a key element in the transition to a greener society independent of fossil fuels
- Copenhagen electric must develop and implement activities and campaigns in the capital region, creating visibility and demonstrate potential of electric vehicles.

Source: <http://www.regionh.dk>

4. SWOT analysis on companies who join PPP proposed by public sector to support the implementation process of EVs in Copenhagen municipality:

In order to answer the question: ‘Why should transportation companies join the PPP proposed by the public sector to support the implementation process of FEVs in Copenhagen’, the context of the SWOT method will be used. As pointed out in the theory description, the SWOT analysis is used to evaluate the internal and external environment of a company. It can be seen that in this report there is no single case study of one company included. The three companies were interviewed to get information and gain knowledge about urban challenges, their attitude towards the green images and the environmental issues. Analysing these companies individually is not in the focus of this report. The SWOT method is going to be applied to evaluate potential Strengths, Weaknesses, Opportunities and Threats, when a company joins the PPP proposed by the public sector to support the implementation process of FEVs’ in Copenhagen. It should be understood as a broad and general evaluation, because it does not focus on any company specific case. In practice, there are many more factors related to a specific company, which can affect the evaluation, but at least in this report, the evaluation is carried out, in order to convince all types of transportation companies to join the PPP programme. This PPP programme is only a suggestion and it is not yet deployed in practice. Thus, it can be assumed that Strengths and Opportunities are the same, because Opportunities are potential factors, which can become Strengths in the future. Similarity, Weaknesses and Threats will be discussed together, because potential Threats are Weaknesses.

Strengths and Opportunities

Strengths or Opportunities are the potential advantages, which a company gets, when it joins this PPP. As mentioned, a partnership with the public sector will give resource advantages to the private company. Resources are some of the key factors, which create competitive advantages for a company. In the PPP model proposed for implementation of FEVs, there are three types of resources the company can get: financial, political and knowledge. It is clear that companies get financial advantages if they receive financial support for purchasing FEVs. As it is now, all companies who purchase new FEVs do not pay the registration tax, which is already an advantage. Additional financial support for the purchase price e.g. a lump sum of 20.000 or 50.000 DKK would be a factor, which could make companies more interested in FEVs and in joining a PPP. In case the financial funding is not big enough to support all companies to buy FEVs, the ones who fulfil criteria to join the PPP could gain a financial advantage over the others, because it can purchase FEVs at lower prices.

The policy support from the government is also what companies can take as a resource advantage. Potential laws to encourage the use of FEVs could be that FEVs can park free in the inner city, drive in bus lanes and they are allowed to deliver goods in the city during night (typically from 10pm to 7am), etc. The night delivery is a promising solution to benefit the city and the transportation companies. It decreases congestions because there

are fewer vehicles running on the streets. Also, it decreases the emission produced in the day time. The night delivery reduces the delays of deliveries, because it can use free roads' capacity in the night (NICHES Consortium). Thus, time consuming for transportation companies to deliver goods to their customers will be reduced. Moreover, road safety will be increased by the night delivery because there will be less vehicles running on the roads during the day. One of the problems to deploy night delivery to a real life context is that it requires transportation companies to have quiet vehicles and loading equipment (NICHES Consortium). However, FEV is considered a quiet vehicle (FDT, 2012), so it can be used for night deliveries. Transportation companies, who join PPPs, have opportunities to bring their suggestions on how regulations should be changed to provide support to FEVs. It is because under PPP programme, companies work closely together with each other to solve common problems, which all face (e.g. traffic jams, finding nearby parking places, delivery windows, etc.). The administration department can arrange meetings, where relevant actors have opportunities to meet and discuss about FEVs. It would be more efficient than each individual actor trying to solve problems on their own, when others are experiencing the same problems. They should be gathered under one organization, in this case, it is up to the administration department of the PPP, to improve FEV and make it a comfortable type of vehicles to use.

Furthermore, knowledge of FEVs is what companies can gain in this PPP programme. This knowledge refers to experiences from using FEVs. Even though information about FEVs is available on the Internet and other sources, it would be easier and more convenient for companies to get tailored knowledge through the administration department of PPP programme.

According to the Copenhagen climate change plan, the goal of the city is to switch diesel vehicles to alternatively fuelled vehicles. It seems like sooner or later, but still in the far future, alternative fuelled vehicles will be used by everyone, due to stricter legislation on transportation in the cities. Therefore, companies will gain a knowledge advantage, if they put efforts in promoting and using FEVs from now, to learn and get experience with it. By implementation FEVs already from now, companies will be the first movers, not just in knowledge, but also in experience and technology of the future vehicles in the logistics industry. Under this PPP, information and knowledge are expected to be transferred between the users, which are transportation companies and the public sector, including other actors, who are involved in technique and infrastructure supports to FEVs.

Another advantage, which companies will benefit from if joining this PPP is that FEVs can support the promotion of the companies' brand. The green image of a company - how much it cares for the environment, the planet and the people, has become a marketing trend for a lot of companies. The theory Cooperate Social Responsibility (CSR) mentioned in many companies' year reports is an evidence of how important it is that companies have to take care of the environment in their business. The triple bottom line theory also supports this trend that beside profit, companies are responsible for the planet and the people. Hence, it can be seen that more

and more companies nowadays are trying to build green images for their brands and products. Since FEV is built to be friendly to the environment, it can be used to support the company's marketing campaign to promote that it puts effort to protect the environment. In some cases, customers are the ones who care a lot about the environment. Thus, the suppliers or the companies have to be able to show that they do care about the environment, too. It is one of the ways to create a sustainable business, which is encouraged strongly in many countries nowadays. The transportation companies, who join the PPP programme will also have opportunities to participate in conferences or exhibitions, which can be held by the public sector to promote EVs and FEVs. By this, the companies also promote themselves to the society.

Weaknesses and Threats

As discussed earlier, financial risk is the highest concern for companies when purchasing a FEV. That is the reason why the financial support from the public sector is included in the PPP model to share financial risk with the private sector. It is absolutely a great advantage for companies to join the PPP to reduce the investment costs. However, it is not sure how big that financial support should be. If the support does not make the price of a FEV equal to the price of an ICE truck, transportation companies still have to pay an additional cost, when they switch from ICE vehicles to FEVs. This additional amount can be a potential threat for them, especially for those, who do not have big financial capital. For those companies, who have exuberant capital and are prepared to invest in FEVs, the additional cost for buying FEVs should not be a big risk. For those small companies, investing in a FEV can harm their capital if they do not prepare well for this investment. So, concerning the financial aspect, the PPP can bring both Strengths and Threat for companies.

As pointed out, the financial factor can be a risk if financial support from the public sector is not big enough and if the companies' capital is not ready for this investment. Technical risk can be improved and minimized by the cooperation between different sectors under the PPP programme, as well as from supportive actors who involve in the EV sector: including EV manufactures, infrastructure providers, auto shops, etc. Also, prices of FEVs are expected to drop down, because technology for EVs will be further developed. However, it is not yet know how fast the EVs technology will be developed. Thus, there is an uncertainty about the technology risk and price in the future.

Besides the risk concerning FEVs, risk of being partners with the public sector should be discussed as well. In the literature review, one of the PPP risks is that partners have different interests and purposes to join the PPP programme. In this report, both the public and private sectors try to achieve a goal: to deploy FEVs. In spite of that, the purpose behind that effort might be different between the public and private sectors. For the public sector, the most important output of the PPP programme is to protect the environment, because FEVs produce fewer emissions: CO₂, noise and other pollutions. In the meanwhile, the private sector is expected to focus the most on financial profit. As mentioned, Danske Fragtmænd has been researching about EVs for the past 10

years, but still the company did not purchase any EV. The reason is that it would make the company's service become more expensive and it might risk losing customers, because the price of services is the highest concern of the customers. Danske Fragtmænd expresses that it is very fine to have a green image as company brand. It is, for sure, customers will be happy for that as well. But, the final concern is still the price, and of course the quality of services. In this case, PPP will only work, if the subsidies from the public sector make the TCO of FEVs more or less the same as ICE trucks/vans. Concerning the political factors, this PPP model suggests several ideas to support FEVs (e.g. night distribution, urban logistics centres, free parking place for FEVs, etc). It is also suggested that companies should work together to solve problems which, still remains with FEVs. Other options could be to suggest laws changes to the government in order to make FEVs advantageous to use over ICE vehicles. However, the changes in law still depend mostly in the government and the city authority. It means that the public sector has much stronger power than the private sector in relation to the political aspect, but via the PPP they can join forces on making supportive legislation. As it looks now in the Copenhagen Climate Plan, the Danish public sector has made a serious plan to increase the usage of alternative fuelled vehicles. Though, it can be argued that there are still some risks related to the political factor, because of the potential stop of tax exemption for EVs after 2015 in Denmark.

Looking at the structure of the PPP model suggested in this report, there are only three main partners in the illustrative figure. In practice, the structure of PPP is more complex than that. It is because the administration department can connect to other actors in the FEVs industry (e.g. for instance infrastructure producers, FEVs manufacturers, etc). The PPP's structure is simplified in this report because the main purpose is to encourage transportation companies to purchase FEVs and convince them to join PPP. Therefore, the involvement of other actors has not been discussed a lot here, but they will potentially add value to the PPP programme. Hence, a bigger PPP model can be designed to involve more relevant actors. So, the companies have to be aware that a PPP programme would be much more complex than the one illustrated in this report. The complexity of PPP would create more risks, opportunities, different interests, powers and the ability of managing the programme from the public sector and the administration department.

From the literature review of PPP, it is showed that this concept is quite new and ambiguous. It has mainly been used in the infrastructure industry. The application of PPP in this report is already a risk for both the public and private sectors. This risk includes lack of knowledge and experience of PPP, the ability of managing the complexity. In Denmark, there are already projects, where the government gives financial supports for some companies to test FEVs. However, this kind of project is not yet a PPP. A true PPP project involves more relationships between the public and the private sector. If a PPP is implemented in real life, it is suggested to run at least until 2025, the same as the Copenhagen Climate Change plan. It would make it is easier to evaluate the success of PPP programme, to see if the goal of reducing CO₂ in green mobility is reached and draw lessons on PPPs for both the public and the private sectors.

To conclude this sub-chapter, the context of SWOT theory has been used to point out the potential Strengths/Opportunities and the potential Weakness/Threats when transportation companies join the suggested PPP programme designed in this report. The main competitive resources, which company get when joining this PPP programme are finance, policy and knowledge. It is also an advantage for them to build green images and promote their brands through the deployment of FEVs. The advertising of brands can also be done in the way that companies join activities to promote FEVs, which are arranged by the public sector or the administration department of the PPP. This will bring the companies' brands to the society and be recognized by the customers as first movers in using FEVs with the purpose of protecting the environment.

In this PPP programme, the companies have opportunities to:

- Receive financial support,
- Propose needed policies to support EVs and
- Create networks to connect with other actors, who are also involved in the FEVs industry.

However, there are risks that transportation companies should be aware of, before they join this sort of PPP programme. These are: conflict of interests between partners, the complexity of the programme and lack of knowledge, as well as experience in PPP at national and industry level. Despite of these risks, it can be seen that more and more companies in the market nowadays have strong attitude in protecting the environment, so the conflict of interests can be reduced. According to the Copenhagen climate plan, reducing CO₂ is considered seriously from the Danish government and Copenhagen municipality. Thus, it is expected that the public sector will give supports in one or the other way to encourage companies to use FEVs. As it is a promising type of vehicle for the future, transportation companies should also consider it seriously. Since PPP is a cooperate programme, which is proposed by the public sector to give support to transportation companies to purchase and deploy FEVs, the companies should take this opportunity to be first movers in this area.

VIII. Conclusion:

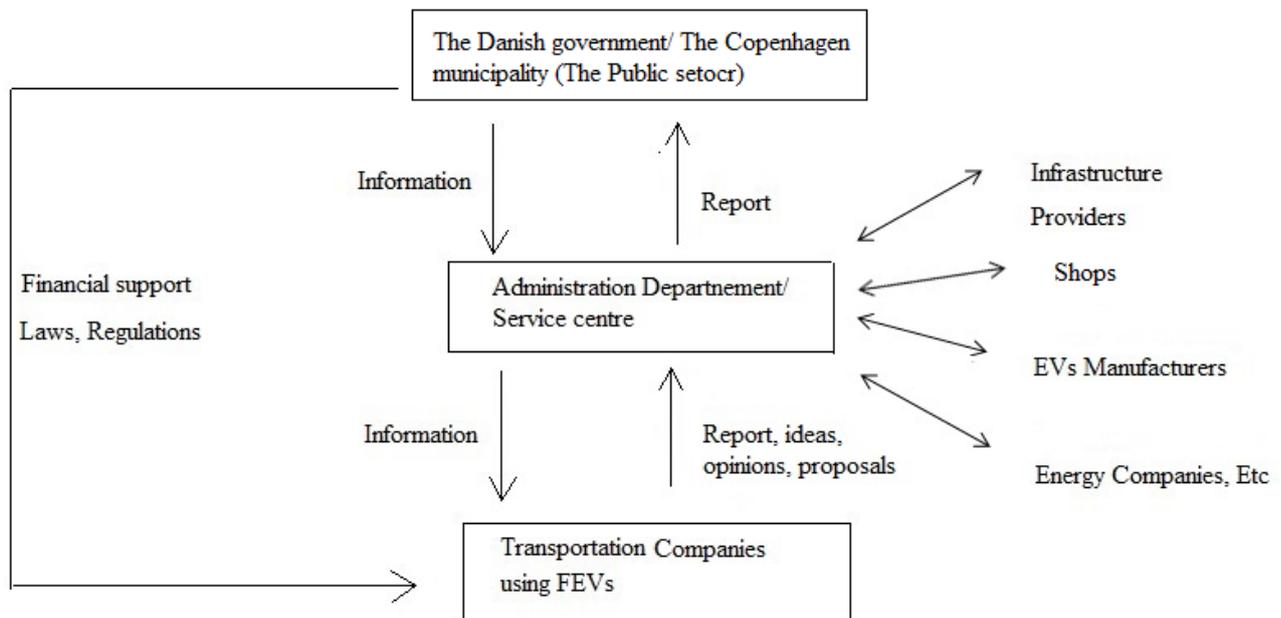
From the current situation that environmental issues have become a hot topic to discuss nowadays in many forums, conferences and in the society, this report is conducted to find a way to support the implementation process of FEVs in Copenhagen municipality. EVs and FEVs bring great benefits to the environment, because they are quiet and produce less emission than ICE vehicles. Thus, an EV is a new promising vehicle' type to be used by everyone in the future, especially when it comes to urban transportation of goods and people. However, there are many problems regarding high purchase prices and technical problems of FEVs, which makes it difficult for private transportation companies to implement FEVs in their fleets. Therefore, it is necessary to create a programme, which can encourage more companies to purchase FEVs and also, to create awareness in the society of EVs and FEVs benefits and potentials.

Why can PPP support the implementation process of FEVs in Copenhagen Municipality?

In this report Political, Economic, Social, Technological, Environmental and Legal factors in Copenhagen, Denmark towards the attitude of protecting the environment and usage of EVs has been analysed. It shows that the Danish government and Copenhagen municipality are very active in protecting the environment. The Copenhagen Climate Plan is made with the goal to make Copenhagen a green, smart and carbon neutral city. There have been some part-funded projects by the Danish public sector to test EVs, in order to find out the advantages and disadvantage of EVs in practice. The general technology of EVs in Denmark is not well developed compared to other countries, but Denmark is very good at renewable energy technology, which can support a part of EVs' technology in clean energy. Many companies in Denmark have strong attitudes in protecting the environment. Some of them have been testing FEVs by using their own financial investments. It means that the public sector and a part of the Danish society have serious considerations of using EVs, in order to reduce pollution and emissions. Therefore, it is important to connect the public and private sectors and create relationship between them to increase the number of EVs and FEVs running. PPP is suggested in this report as a solution to do so, because the PPP concept is about creating a partnership between the public and the private sector. The PPP is expected to bring great benefits to the private sector to encourage them to purchase and use FEVs in their business.

How can PPP support the implementation process of FEVs in Copenhagen Municipality?

A PPP model is illustrated in this report in order to support the implementation process of FEVs in Copenhagen Municipality.



There are three main partners in this model:

- The public sector, which includes the Danish Government and Copenhagen municipality
- The administration department
- The transportation companies that use FEVs

It was explained that the Danish Government and Copenhagen municipality are under the public sector. They are the policy makers and also the investors. They have the power to change laws and regulations in a way that EVs gets greater advantages than ICE vehicles (e.g. free parking places, driving in bus lane, night delivery opportunities, etc). Also, it is expected that the public sector will make financial support to companies, who purchase FEVs to implement in their fleets. Because of this, the public sector becomes the investors under the PPP programme.

The Administration department is created in this PPP model, in order to connect the public and private sector. It was explained that there is big gap between the two sectors due to different interests and bottom goals. Hence, the administration department is expected to bring proposal of potential laws changes and proposals for financial support from the companies to the public sector. On the other hand, the information and regulations about EVs from the public sector can be transferred to the private sector through the administration department. This department can also act as an information centre to give information about EVs to everyone to create the awareness of EVs and promote this new type of vehicle to the society. Further, the administration department is expected to connect the public sector and transportation companies with other actors, who are also involved in the EVs industry (e.g. infrastructure investors, EVs manufacture, receivers of goods, etc).

The transportation companies in this PPP are those, who purchase EVs either by their own financial capital or with subsidies from the public sector. They are expected to make reports about FEVs, potentially including data on Total Cost of Ownership, advantages and disadvantages of the FEVs that they are using.

This report can hopefully be used by potential administration departments and the public sector to promote FEVs and to find further strategies to encourage more companies to purchase FEVs.

Why should private transportation companies join PPP proposed by the public sector to support the implementation process of FEVs in Copenhagen municipality?

By joining the PPP programme suggested in this report, the transportation companies have opportunities to increase their advantages in finance, policy and knowledge about EVs/FEVs. Potentially, the companies get financial supports from the public sector to purchase and maintain FEVs. It is expected that changing in laws will be made so that the users of FEVs have more advantages to overcome some of the current urban distribution challenges (e.g traffic jams, environmental zones, limitations in the delivery window, etc). By joining the PPP programme, the companies stay closer to the public sector, which creates opportunities for them to propose policy changes to support FEVs even more. Besides, the companies gain the best knowledge of FEVs through the administration department, not only general information of FEVs, but also technical issues and the development of infrastructures to support the development of EVs and FEVs. Moreover, the transport companies have opportunities to join exhibitions and conferences, where EVs are promoted. In this way, the companies can promote their brands by showing to the customers that they are using EVs and hereby are responsible to the environment and the living standards of the citizens. Despite of those advantages, there are risks and uncertainties, when transportation companies join this PPP programme. There are still financial risks, even though the companies get subsidies from the public sector. There is also risk about technical issues, because the EVs technology is not well developed yet. The risk remains for the managing ability of partners in the PPP, to make sure that the programme achieves the common goal. However, it can be seen that climate change has become an urgent issue globally. It is very important that 'green' products such as EVs or FEVs are used by the society to reduce pollution and emissions. It is clearly stated in the Copenhagen Climate Plan that in the future, alternative fuelled vehicles will replace ICE vehicles. Therefore, transportation companies should consider joining the PPP proposed by the public sector, in order to be the first movers in this area.

IX. Reflection:

For future researches, a further enrolment of the public sector to approach the PPP models is suggested. In this report, there have been interviews and researches on what the companies expect from the public sector under a PPP. It would be interesting to learn more on what the public sector expect from the private sector. It would require further interviews with the Danish government and Copenhagen municipality, the Danish Environment Agency or Danish Energy Agency, etc. It would be interesting to know what the public sector think about PPPs and how financial support can be proved to support the companies in deploying EVs. Also, it would be helpful to learn which laws and regulations the public sector could make changes to support a faster market uptake of EVs and FEVs. Moreover, an extended PPP could be structured so that other relevant actors (e.g. the shops, the infrastructure providers, the EVs manufacturers) are included in the programme, because they could bring potential added value to the cooperation between the public and private sectors, in order to support the market uptake of EVs and FEVs.

X. References:

Articles, Papers and Books:

- Arbnor and Bjerke, 1996: Methodology for Creating Business Knowledge, 2nd Edition, Sage Publications, Thousand Oaks, London, New Delhi, 1996
- Agarwal, Grassl and Pahl, 2012: Meta-SWOT: Introducing a new strategic planning Tool
- Bovaird, 2004: International Review of Administrative Sciences: Public-Private Partnership: From contested concepts to prevalent practice
- Bryman and Bell, 2003: Business Research Methods, Oxford University Press, Oxford, New York
- Börzel and Risse, 2002: Public-Private Partnerships: Effective and Legitimate Tolls of International Governance
- Brinkerhoff and Brinkerhoff, 2011: Public-Private Partnerships: Perspectives on Purposes, Publicness, And Good Governance
- Boydell, 2007: Partnerships: A literature review, published by The institute of Public Health in Ireland, 2007.
- Borzal and Risse, 2002: Public-private partnership: Effective and legitimate tools of international governance?, Tanja A. Borzel and Thomas Risse, Institute for social Sciences, Humboldt university of Berlin, 2002
- Baster et.al, 2012: Comparative analysis of European examples of Scheme for freight EVs, Compilation report, Denmark, 2012.
- Business green, 2012: Denmark aims to get 50% of all electricity from wind power, Business green, Guardian.co.uk, 2012
- Chan & Chau, 2001: Modern electric vihicels techonology, C.C. Chan and K.T. Chau, Oexford science publications, New York, 2001.
- Copenhagen Climate Plan 2025: a green, smart and carbon neutral city by 2025
- DG Move, EC, 2012: DG Move European Commission: Study on Urban Freight transport, Final report by MDS Transmodal Limited, April 2012.
- Drake, 1917 - Parsons, 1893: Partnership Entity and Tenancy in Partnership, The Michigan Law Review Association, 1917
- Edwards and Shaoul, 2003: Partnerships: for better or worse?
- EU2020, 2010 - A strategy for smart, sustainable and inclusive growth
- Faiz et.al, 1996: Air pollution from motor vehicles, Asif Faiz, Christopher S.Weaver, Micheal P.Walsh, the International Bank for Reconstruction and Development/ The World Bank, USA, 1996
- Felsingier et al, 2008: Asian Development Bank, Handbook on Public-Private Partnerships, ADB, Publication stock No: 071107, 2008 Public-Private Partnerships Handbook
- FDT, 2012: Comparative Analysis Of European Examples of Schemes for Freight EVs Compilation report ,TU Delft, ZERO, HAW Hamburg and FDT, 2012 Aalborg, Denmark
- Grimsey and Lweis, 2002: Accounting for Public Private Partnership

- Hodge and Greve, 2007: Public-private partnerships: an international performance review, Graeme A.Hodge and Carsten Greve, Public administration review, 2007
- Horton et al, 2010: Perspectives on partnership: highlights of a literature review, Douglas Horton, Gordon Prain and Graham Thiele, April 2010.
- Hollensen 2007: Global Marketing, Svend Hollensen, published by Prentice Hall, 4th edition, 2007
- Horton, Prain and Thiele, 2009: Perspectives on Partnership: Highlights of a Literature Review
- Harmer and Buse, 2006: Seven habits of highly effective global public-private health partnerships: Practice and Potential
- Hodge, Greve, 2007: Public-Private Partnerships: an International Performance Review
- Hedman, Lind, Forsgren and Albinsson, 2008: Business Models for Public Private Partnership: The 3P Framework
- Jin and Doloi, 2010: Interpreting risk allocation mechanism in public-private partnership projects: an empirical study in a transaction cost economics perspective, Xiao-Hua Jin and Hemanta Doloi, Faculty of Architecture Building and Planning, University of Melbourne, 2010
- Jacobson and Choi, 2008: Success factors: public works and public-private partnerships, Carol Jacobson and Sang Ok Choi, International Journal of Public Sector Management, 2008
- Jin, Dolou, 2001: Construction Management and Economics – Interpreting risk allocation mechanism in public-private partnership projects: and empirical study in a transaction cost economics perspective
- Koppenjan and Enserink, 2009: Public-Private Partnerships in urban infrastructures: Reconciling private sector participation and sustainability
- Kotler, 2006: Marketing management, Philip Kotler and Kevin Lane Keller, published by Pearson Education, 12th edition, 2006.
- Kuada. J, 2009: Paradigms in International Business, Research -Classifications and Applications
- Kuada. J, 2011: Research Methodology, A Project Guide for University Students
- Laughlin and Broadbent, 2003: Public private partnerships: an introduction
- Linder and Rosenau 2000: Mapping the Terrain of the Public-Private Policy Partner-ship. In Public-Private Policy Partnerships, edited by Pauline Vaillancourt Rosenau
- Malmborg, 2003: Conditions for regional public-private partnerships for sustainable development – Swedish Perspectives
- Osborne, 2000: Public-Private Partnerships, Theory and practice in international perspective, Edited by Stephen P. Osborne, 2000.
- Pahl and Richter, 2009: SWOT analysis – Idea, methodology and a practical approach, [Nadine Pahl](#) and [Anne Richter](#), 2009
- Spackman, 2002: Public-private partnerships: lessons from the British approach
- Sage, 1999: American Behavioral Scientists: Introduction: The Strengths and Weaknesses of Public-Private Policy Partnerships

Thinking behind: Partnership behind the social marketing

The Institute of Public Health in Ireland, 2007: Partnerships: A Literature Review

Wright and Pickton, 1998: What's Swot in Strategic Analysis?

Wildridge et al, 2004: How to create successful partnership – a review of the literature

White paper, 2011: Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system, European strategy, White paper 2011

Zhang and ASCE, 2005: Critical Success Factors for Public-Private Partnerships in Infrastructure Development

Zhang 2005: Critical success factors for public-private partnerships in infrastructure development, Xueqing Zang, Journal of construction engineering and management, 2005

Websites, homepages:

CPH Post: <http://cphpost.dk/news/national/post-danmark-delivers-%E2%80%98green%E2%80%99-mail>, last view on 01.09.2013

Danish energy agency: <http://www.ens.dk/en/climate-co2/test-scheme-electric-vehicles>, lasted view on 04.09.2013

Danske Fragtmænd A/S: <http://www.fragt.dk/wps/wcm/connect/DFWeb/Fragt/Forside>, last view on 04.09.2013

European Strategies, 2011: http://ec.europa.eu/transport/themes/strategies/2011_white_paper_en.htm, last view on 02.09.2013

E-mobility NSR homepage: <http://e-mobility-nsr.eu>, last view on 30.08.2013

København kommune: <http://www.kk.dk/da/om-kommunen/forvaltninger/teknik-og-miljoeforvaltning/organisation/center-for-parkering/regler/elbiler>, last view on 30.08.2013

North Sea Region: <http://www.northsearegion.eu/ivb/content/show/&tid=75>, last view on 30.08.2013

Post Danmark homepage: <http://postdanmark.dk/da/Sider/Post-Danmark.aspx>, last view on 04.09.2013

UPS homepage: <http://www.ups.com/dk>, last view on 04.09.2013 at 02:10

XI. Annexes:

Questionnaires for interviews

QUESTIONNAIRE FOR COMPANIES NOT USING EVS

I. COMPANY PROFILE (description of current business)

1. Type of business
2. Type of goods
3. Size: transport performance (shipments/tonnes), fleet size
4. Fleet characteristics (own vs. lease, type and size of vehicles)
5. Typical distance ranges in Copenhagen Municipality/Denmark (most preferably in Copenhagen Municipality if data available)¹
6. Type of customers and their requirements, e.g. frequency and time of deliveries, in Copenhagen Municipality/Denmark
7. Logistic chain processes in Copenhagen Municipality/Denmark: characteristics of freight bundling (direct vs. Urban Consolidation Centres), indication of number of shipments/stops in tours, etc.

II. COMPANY CHALLENGES AND STRATEGIES

1. What are the company challenges² regarding urban freight distribution?
2. What are the company strategies³ regarding urban freight distribution?
3. Are you potentially interested in night distribution solution? What are the conditions?
4. Are you potentially interested in urban consolidation centres solution? What are the conditions?

III. POSSIBLE ROLE OF GREEN BUSINESS

1. Did you consider building a green image of your company?
2. If you did, then what was the purpose to build a green image of your company?

¹ In some questions we ask for information concerning your transport activity within area of Copenhagen Municipality. If you are not able to provide us with information about this area, please do it for whole Denmark (average data for your transport operation in Denmark).

² Challenges reflect the (changing) conditions the company is faced with regarding its transport and logistical operations. They can relate to the regulatory framework, but also to increasing operational costs of deliveries (.e.g. fuel or labour costs) or changing customer requirements (e.g. growth of home delivery market).

³ Strategies reflect the way the company is (going to) dealing with these challenges. They may include night hour deliveries, urban consolidation centres, but also other distribution concepts.

3. Which way do you build a green image?
4. Which types of environmental friendly vehicles have been considered?
5. Did it give you a competitive advantage/ a positive effect on your profit to have a green image?
6. If it did not, can you think about potential reasons for that?

IV. PERCEIVED BARRIERS FOR USING ELECTRIC VEHICLES

1. Did you consider buying electric vehicles for your business?
2. Why the company did not deploy EVs yet?

V. CONDITIONS NEEDED TO DEPLOY ELECTRIC VEHICLES

1. What would support decision on deployment of electric vehicles by your company? Please use the list below and rank the factors from 1 to 5, where 1 is highly undesirable, 3 is irrelevant and 5 is highly desirable.

| Reduction of total costs for ownership and deployment of electric vehicles | | Relevance |
|--|---|-----------|
| 1. | Decrease of investment costs | |
| 2. | Decrease of fix costs | |
| 3. | Decrease of maintenance cost | |
| 4. | Decrease of fuel costs | |
| 5. | Decrease of labour cost | |
| 6. | Exempt EVs from city toll for vehicles | |
| 7. | Increase price of emission certificates | |
| 8. | Leasing of an electric vehicle is available (how much higher leasing of electric vehicle compared to conventional could be to be still considered by your company?) | |
| 9. | Other | |

| Increase of business opportunities for electric freight vehicles | | Relevance |
|--|--|-----------|
| 1. | Enhanced temporal or spatial access right for EVs | |
| 2. | Allow entrance into restricted (pedestrian) areas | |
| 3. | Allow night time delivery (if restricted) | |
| 4. | Support consignees to receive freight outside of rush hours/business hours/at night with EVs | |
| 5. | Enhance delivery speed | |
| 6. | Reserved lots for parking / loading / unloading EVs | |
| 7. | Usage of bus lanes | |
| 8. | Allow 50 km/h at night instead of 30 km/h, (i.e.) | |
| 9. | Award sustainability label | |
| 10. | Other | |

QUESTIONNAIRE FOR COMPANIES ALREADY USING EVS

I. COMPANY PROFILE (description of current business)

1. Type of business
2. Type of goods
3. Size: transport performance (shipments/tonnes), fleet size
4. Fleet characteristics (own vs. lease, type and size of vehicles)
5. Typical distance ranges in Copenhagen Municipality/Denmark (most preferably in Copenhagen Municipality if data available)
6. Type of customers and their requirements, e.g. frequency and time of deliveries, in Copenhagen Municipality/Denmark
7. Logistic chain processes in Copenhagen Municipality/Denmark: characteristics of freight bundling (direct vs. Urban Consolidation Centres), indication of number of shipments/stops in tours, etc

II. COMPANY CHALLENGES AND STRATEGIES

1. What are the company challenges regarding urban freight distribution?
2. What are the company strategies regarding urban freight distribution?
3. Are you potentially interested in night distribution solution? What are the conditions?
4. Are you potentially interested in urban consolidation centres solution? What are the conditions?

III. POSSIBLE ROLE OF GREEN BUSINESS AND ELECTRIC VEHICLES

1. Did you consider building a green image of your company?
2. If you did, then what was the purpose to build a green image of your company?
3. Which way do you build a green image?
4. Which types of environmental friendly vehicles have been considered
5. Did it give you a competitive advantage/ a positive effect on your profit to have a green image?
6. If it did not, can you think about potential reasons for that?

IV. CONDITIONS NEEDED TO DEPLOY ELECTRIC VEHICLES

1. What would support decision on deployment of more electric vehicles by your company? Please use the list below and rank the factors from 1 to 5, where **1 is highly undesirable, 3 is irrelevant and 5 is highly desirable**.

| Reduction of total costs for ownership and deployment of electric vehicles | | Relevance |
|--|--|-----------|
| 1. | Decrease of investment costs | |
| 2. | Decrease of fix costs (e.g. warehousing costs) | |
| 3. | Decrease of maintenance cost | |
| 4. | Decrease of fuel costs | |
| 5. | Decrease of labour cost | |
| 6. | Exempt EVs from city toll for vehicles | |
| 7. | Increase price of emission certificates | |
| 8. | Leasing of an electric vehicle is available (how much higher leasing of electric vehicle compared to conventional could be to be still considered by your company?) | |
| 9. | Decrease cost of additional charging infrastructure establishment. | |
| 10. | Deduct weight of Battery from gross vehicle weight for drivers' license requirements (so that licence C is not needed for electric vehicle which weights above 3.5 tonnes) | |
| 11. | Other | |

| Increase of business opportunities for electric freight vehicles | | Relevance |
|--|--|-----------|
| 1. | Enhanced temporal or spatial access right for EVs | |
| 2. | Allow entrance into restricted (pedestrian) areas | |
| 3. | Allow night time delivery (if restricted) | |
| 4. | Support consignees to receive freight outside of rush hours/business hours/at night with EVs | |
| 5. | Enhance delivery speed | |
| 6. | Reserved lots for parking / loading / unloading EVs | |
| 7. | Usage of bus lanes | |
| 8. | Allow 50 km/h at night instead of 30 km/h, (i.e.) | |
| 9. | Award sustainability label | |
| 10. | Other reliability | |



NORTH SEA REGION ELECTRIC MOBILITY NETWORK

e-mobility NSR

About E-Mobility NSR

The Interreg North Sea Region project North Sea Electric Mobility Network (E-Mobility NSR) will help to create favorable conditions to promote the common development of e-mobility in the North Sea Region. Transnational support structures in the shape of a network and virtual routes are envisaged as part of the project, striving towards improving accessibility and the wider use of e-mobility in the North Sea Region countries.

www.e-mobility-nsr.eu

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