



LUND UNIVERSITY

Public procurement of electric vehicles as a way to support a market

Examples from Sweden

Palm, Jenny; Backman, Fredrik

Published in:

International Journal of Electric and Hybrid Vehicles

DOI:

[10.1504/IJEHV.2017.087587](https://doi.org/10.1504/IJEHV.2017.087587)

2017

[Link to publication](#)

Citation for published version (APA):

Palm, J., & Backman, F. (2017). Public procurement of electric vehicles as a way to support a market: Examples from Sweden. *International Journal of Electric and Hybrid Vehicles*, 9(3), 253-268.
<https://doi.org/10.1504/IJEHV.2017.087587>

Total number of authors:

2

General rights

Unless other specific re-use rights are stated the following general rights apply:

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

Public procurement of Electric Vehicles as a way to support a market: examples from Sweden

Authors Jenny Palm and Fredrik Backman

Address: Jenny Palm, Linköping University, Department of Thematic studies - Technology and Social Change, SE-581 83 LINKÖPING; and
Lund University, International Institute for Industrial Environmental Economics (IIIEE),
Box 196
SE- 221 00 LUND , Phone: +46 46 2220242, Jenny.palm@iiiee.lu.se

Fredrik Backman, Linköping University, Department of Thematic studies - Technology and Social Change, SE-581 83 LINKÖPING, Phone: +4613285645;
fredrik.backman@liu.se

Abstract: Electric vehicles (EV) are increasingly seen as a desirable sustainable solution for the transport sector, and public procurement is often highlighted as one tool to stimulate a market. In this article we analyze the role of Swedish municipalities in relation to public procurement and especially whether and in such case how municipalities in Sweden use public procurement as an instrument to enhance a market for EVs. The strategy in both municipalities was to let the municipal organization act as role models, create buying power and develop a second-hand market for EVs. The strategy to speed up diffusion within the municipal organization was through information and test-driving and in dialogue with the administration solve problems that arise. A potential improvement of the diffusion process would be to find ways to share the extra cost of an EV.

Keywords: Electrical vehicle (EV); public procurement; sustainable public procurement; municipalities, barriers

Reference to this paper should be made as follows: Author. (xxxx) 'Title', *Int. J. xxxxxxxxxxx xxxxxxxxxxx*,

Biographical notes: Jenny Palm is Professor at International Institute for Industrial Environmental Economics (IIIEE), Lund University, Sweden and Professor in Technology and Social Change at Linköping University, Sweden. Her research area is energy systems where she conducts interdisciplinary research combining STS theory with analysis of planning process, governance, innovation diffusion and end-users. Objects of study are urban infrastructure such as transportation and energy systems. Making these infrastructure systems more sustainable is put in a broader socio-cultural, planning and governance context.

Fredrik Backman is a PhD student at Linköping University. His research concerns how municipalities can work through policy means and networks to contribute to a sustainable transition of energy and transportation systems.

1 Introduction

Transport systems perform important functions in society but cannot today be considered 'sustainable' (Kemp et al., 1998; Wietschel and Doll, 2009; Whitmarsh and Köhler, 2010). Road transport is one of the largest contributors to the emission of greenhouse gases with the highest growth rate of emissions compared to other sectors (Köhler, 2006). Many difficult problems such as polluting emissions, noise, accidents, and resource depletion are associated with the current means of transport. Transport is also a major energy consumer and contributor to global warming (Kemp and Rotmans, 2004). Developing a society where the environmental impact of transport is low will require fundamental changes to current transport systems (Köhler, 2006). Given the slow progress towards a more sustainable mobility system, more innovative solutions are needed. Studies show that we need both technological and institutional changes (electric and fuel cell vehicles and customized mobility) to achieve a radical change of transport systems for more sustainable solutions (Barkenbus, 2009). Electric vehicles (EV) are now considered an increasingly desirable sustainable solution for the transport sector and are seen by many EU countries as a way to decarbonize the private transport sector and fulfill their vision of combating climate change (Zubaryeva et al., 2012; Shepherd et al., 2012).

In this context public procurement is often highlighted as an important tool to stimulate the entrance to the market. Local and regional actors are becoming more and more involved and important for public procurement and procurement of technology (Dale-Clough, 2015). In this article we are interested in the role of Swedish municipalities in relation to public procurement, and especially whether and in such case how municipalities in Sweden use public procurement as an instrument to enhance a market for EVs.

The electric car market is slowly maturing and has a viable chance of sustaining growth (Villareal, 2011). The increased trend is acknowledged in interviews with experts from several EV market-related fields (such as automotive manufacturers, the research community, energy utilities and public authorities). They have confidence that different types of electric vehicles will reach a sustained market deployment by 2030 and have a geographically increasing market distribution from 2020 to 2030 (Zubaryeva et al., 2012; Villareal, 2011). For example in Germany, with 3.5 million vehicles sold per year, it is predicted that of all potential buyers, 5% will buy electric cars of some type. This percentage will result in annual sales of over 175,000 EVs in Germany, which is in line with governmental expectations (Lieven et al., 2011). In Japan the government has supported both R&D and artificially created niche markets, helping ease the way for technologies by means of legislation and standards. For example, the recent market success of the hybrid electric vehicle (HEV) can to some extent be attributed to the government's long-time support through experience (the electric drivetrain) and building markets (Åhman, 2006; Åhman and Nilsson, 2008). In relation to population Norway stands out as a forerunner when it comes to EVs. At the end of 2015 Norway had 74,000 EVs in a population of 5 million. Norway also offers the widest range of incentives to stimulate EV uptake in the world. They have e.g. exemption from sales tax and 25% VAT charge, a reduced yearly circulation tax fee for EVs, free access to all of Norway's toll roads, access to bus lanes and exemption from municipal parking fees (Harrysson et al., 2015; Aasness and Odeck, 2015).

In comparison Sweden had 14,300 EVs with a population of 9.6 million. Sweden also does not have that many incentives in place. There are exemptions from yearly

Title

circulation tax for five years, there is a rebate for super green cars, which includes EVs, and discount on company car tax for employees. One tool to enhance the market is to use public procurement, something that the capital, Stockholm and other cities have done. Stockholm has experimented with EVs since the 1980s (Nykvist and Nilsson, 2015) and in the last decade this has been in a bigger scale. The city of Stockholm and the energy company Vattenfall, with support from the Swedish Energy Agency, have developed a large contract with agency agreements for both passenger cars and trucks, including both electric vehicles (EV) and plug-in hybrids. This contract has received a lot of attention in Sweden and goes under the name “EV procurement” (Elbilsupphandlingen). Through this EV procurement, over 300 public authorities, mainly municipalities, have signed up to buy and lease electric vehicles and plug-in hybrids. When this EV procurement started in 2010 there were only a few hundred electric cars on Swedish roads and in 2015 there were over 14,000. The barriers and enablers experienced in Stockholm have been discussed in earlier research and we will come back to Stockholm’s experiences below.

1.1. Aim and organization of the article

The aim with this article is to achieve a more in-depth knowledge of whether and in such case how municipalities in Sweden use public procurement as an instrument to enhance a market for EVs. We analyze how the municipalities discuss local authorities taking a lead in EV diffusion and which factors public procurement officials highlight as important for an increased use of EVs. This will be analyzed through two case studies in Sweden.

The article is organized as follows. First we will give a background of earlier research on technology and sustainable public procurement and public procurement of EVs. After this we discuss methods, followed by the results from the case studies, where we start by giving a short introduction to the two municipalities. Then we present how the municipalities have used public procurement as an instrument to develop a market, the use of networking and lastly what barriers and enablers are identified locally. The article ends with a discussion and conclusions.

2 Technology and Sustainable Public Procurement

In Europe, public authorities consume 16% of the EU’s GDP, meaning that the public sector holds both great influence and buying power but can also take a leading role in the area of innovations (OECD, 2009; OECD, 2011; European Commission, 2011). In recent decades EU policy has increasingly emphasized the role of public procurement to be used as a demand-side innovation policy instrument (European Commission SEC(2007) 280, 2007; European Commission COM(2007) 799; Edler et al., 2005; Rolfstam, 2009; Rolfstam, 2012a). One reason for the interest in public procurement is due to the fact that there are large sums of money involved in procurement processes. Public procurement accounts for around 15-20% of European GDP. This amount includes public spending on all goods and services, ranging from medical equipment to construction of roads and hospitals. Several application areas, or grand challenges, have been identified where demand-side policies could be used to a larger extent, for example Health, Pharmaceuticals, Energy, Environment, Transport and Logistics, Security and Digital Content (Edler et al., 2005).

Author

When a public organization buys a product (a good or a service or a combination of the two) with public funds it is called public procurement (Edquist and Hommen, 2000; Swedish Competition Authority, 2013). Often 'procurement' and 'purchasing' are used interchangeably but procurement should be seen to encompass purchasing, having a strategic connotation. (Murray, 2009). Recently sustainable public procurement (SPP) or green procurement has been in focus. Sustainable Public Procurement (SPP) can be defined as:

the process used to secure the acquisition of goods and services ('products') in a way that ensures that there is the least impact on society and the environment throughout the full life cycle of the product (Meehan and Bryde, 2011).

The concept of using public procurement as a tool to stimulate the entrance of sustainable products on the market is not new; already in the 1980s a handbook was published on the subject. This inspired initiatives to be taken by institutions, governments, companies and municipalities (Günther and Scheibe, 2006). In 2002 the World Summit on Sustainable Development (2002) also made a call to 'promote PP policies that encourage development and diffusion of environmentally sound goods and services'. The European Commission (2004) addressed SPP procurement as a way to save money if the costs are looked at from a life-cycle perspective, for example by saving materials and energy, reducing waste and pollution, and encouraging sustainable pattern behaviour. However, the belief that it costs more and takes a longer time to carry out purchasing when environmental requirements are included is often identified as a barrier to SPP (Guenther et al., 2013; Preuss, 2007; Brammer and Walker, 2011; Walker and Brammer, 2009).

As mentioned above, evidence points to local and regional actors becoming more and more involved in projects that emphasize sustainable procurement or procurement of innovation. Due to their closeness to its citizens they will most likely be the first to come in contact with unmet needs and can therefore be enablers of innovative measures (Dale-Clough, 2015). Overall, knowledge seems however to remain limited regarding what effect this involvement has (Lember et al., 2011). Municipalities have however increasingly become responsible, through privatization, for procuring contracts for various services. This change, in combination with an emphasis on sustainability concerns and stricter control, have contributed to public procurement in general becoming more complex and resource-demanding. This development has had important ramifications for municipalities when using public procurement (Rolfstam, 2012b). Most notably, it has created a need to consider the roles of all the actors involved in the procurement process, not only in enabling the adoption and diffusion of new technologies but also in developing cost-efficient technologies that serve the needs of the end-users (Phillips et al., 2007).

Identified reasons for why SPP is not used to its full potential in municipalities are for example that goals, created by unrealistic or unclear policies, were often in conflict with each other, creating uncertainty in the procurement process (Sporrong and Kadefors, 2014). It is also important to attach more weight to environmental aspects in the prequalification and/or final selection of suppliers (Michelsen and de Boer, 2009). Michelsen & de Boer (2009) state that one problem is that the information gathered to put forward environmental demands is often not used in the final selection of suppliers. Half of the interviewed municipalities in the study answered that they have never prioritised environmental arguments over the lowest tender.

Title

A weakness seen in the procurement department is the lack of guidance from clear definition of sustainability in the selection of criteria, where the competence in working groups is not broad enough to cover strategic sustainable thinking (Bratt et al., 2013). More collaboration is therefore needed between purchasers and people knowledgeable in environmental questions. There is also a need for more, easier to use tools such as concrete help to formulate and identify criteria as well as better training for purchasers provided by someone with the right background and expertise (von Oelreich and Philp, 2013).

One key to the procurement process has also been identified as the ability of public authorities to re-think how they work with procurement and how they are organized. The public procurement processes need to be addressed within the organization. This challenge will most likely be harder for smaller local authorities, like municipalities, since they usually lack the correct resources to develop internal administrative processes (Knutsson and Thomasson, 2014).

2.1 Public procurement of innovation with a focus on electric vehicles (EVs)

Research is being done on electric cars, specifically within the area of battery improvement in order to increase range. The adaptation to electrically charged vehicles will most likely not happen by itself and it is with the use of cooperation and coordination between many actors that countries can become highly proficient within this area. Public authorities are central enablers when it comes to electric cars and must take a proactive role in the development of technology and markets (van Rijnsoever et al., 2013). Municipalities can use several financial instruments that are under its area of responsibility: parking, driving lanes, environmental zones and charging infrastructure. With the use of public procurement they are also important customers for electric vehicles. To create significant buying power, several municipalities and other branches of government may choose to combine their procurement procedures. This combined buying power could result in direct economies of scale such as lower vehicle prices, economies of scope in the form of more models to choose from, and more efficient procurement and vehicle assessment procedures (Bakker and Jacob Trip, 2013; Elbilsupphandlingen, 2015).

A report made by the interest organization for 'Green Motorists' (Gröna Bilister) (2012) regarding coordinated national Swedish procurement of electric vehicles is generally positive towards collective procurement. This has the potential to speed up market adoption, lower prices, and help smaller municipalities with the procurement process (Gröna Bilister 2012).

In order to increase understanding and the size of the electric car market, information regarding EVs is important. Here municipalities have a role to play since they are often seen as objective sources of information and can reach their citizens more easily than other actors (Elbilsupphandlingen, 2015; Bakker and Jacob Trip, 2013). Municipalities can also work proactively by providing leadership, facilitating the emergence of a shared vision of the future, forming important networks among the key actors, and creating platforms for interaction and learning (Vergragt and Brown, 2007). The importance of a champion or policy entrepreneur has also been discussed earlier by Wikström et al. (2015a).

Author

It is found both in literature and in interviews with experts that support by public authorities and private parties has a large impact on faster adoption, formation, and ongoing stability of early adopter markets (Zubaryeva et al., 2012; Fligstein, 1996). Public authorities are no longer described as neutral parties operating on a higher level than companies. Instead they should be constantly interacting with actors involved, while how this is done is a matter of context (Fligstein, 1996). For example, by including them in their vehicle fleets, they can support the continued development and commercialization of electric vehicles (Sierzchula et al., 2012; Wikström et al., 2014; van Rijnsoever et al., 2013).

In their study about Stockholm's EV market Nykvist and Nilsson (2015) conclude that economic incentives and charging infrastructure are not enough for promoting EVs, but they must be supported by other measures. They argue e.g. that there is a need to expose different actors to test EVs, enable funding for local initiatives, and send stronger policy signals. They also conclude that if the goal of a fossil-fuel free vehicle fleet by 2030 is to be achieved there is a need to accelerate the penetration of EVs by policy measures. The EV procurement in Stockholm mentioned above has similarly shown that there are several factors that affect the development of electric vehicles (Wikström et al., 2015b):

- Knowledge regarding electric vehicles - Information and test-driving is important
- Access to recharging - At home, work or public places (both normal and fast charging)
- Cost of the car - High prices are a deterrent
- Signals from society - Public authorities but also companies can be role models. Here public procurement is an important part
- Electric vehicle development and performance - Longer range is a priority

Wikström et al. (2015b) found that a majority of electric car users became more positive about them after having the opportunity to test the car (compare also Heyvaert et al., 2015). This led to the users being more positive about EVs in their workplace, and the experiences gained by using EVs in the workplace have influenced the users to think about their own private vehicle in the future. Whatever barriers may exist, they are not necessarily the technical specifications, but can be social factors instead. Data shows that a large share of the battery capacity is redundant due to the fact that inexperienced drivers exhibit 'range anxiety' leading to a sub-optimal use of the battery (Wikström et al., 2015b; Tran et al., 2013).

In the analysis we will examine how public procurement officers active in two municipalities reason about their role in promoting EVs. We will focus on three aspects recognized in earlier research:

- how public procurement officials perceive public procurement as a policy tool,
- how local authorities work proactively by providing leadership on a market and forming important networks,
- and lastly, factors that are highlighted by the respondents as important for an increased use of EVs.

3 Method

We have done case studies in two Swedish municipalities: Malmö and Östersund. Malmö in Skåne county and Östersund in Jämtland county have been chosen as cases because of their differences. Skåne and Malmö have worked proactively with public procurement. Jämtland and Östersund are examples of a mid-sized region where ambitions are high regarding renewable fuels and developing a market for EVs. Östersund is part of the EU 'Green Highway' project with the purpose to create a fossil-fuel-free corridor between Sundsvall, Östersund and Trondheim in Norway (Östersund municipality, 2014). Östersund and Jämtland have however not used public procurement as proactively as for example Skåne has. With these differences in mind we were interested in finding out how the public purchasing officers view using public procurement as a strategic tool to support the development of a market.

We started to read existing policy documents concerning transportation goals and public procurement of vehicles in both municipalities. We conducted 11 semi-structured interviews with purchasers of EVs in Malmö and Östersund municipality and also officials at the regional level that support the municipalities in public procurement and also have their own experiences of public procurement within public transportation. We also conducted one interview with the official responsible for public procurement of EVs at the national level at the Swedish Association of Local Authorities and Regions to have their view on public procurement as a tool at the local and regional level.

We used an interview guide asking about the interviewee's background and role in the public procurement process, the EV policy, the strategic role of public procurement, the requirements when procuring vehicles, the public procurement organization, collaborations, barriers and drivers for developing an EV market.

The interviews were recorded and transcribed. The interviews were analyzed using meaning condensation, that is, each transcript was read through, and then passages from it were condensed into shorter statements. These statements could then be thematically sorted into thematic descriptions of identities (Kvale and Brinkmann, 2009). We then analyzed the statements in relation to how public procurement was perceived and used as a tool for enhancing an EV market.

4 Public procurement of EV in Östersund and Malmö

Malmö is the third largest city in Sweden with a population of around 300,000. Malmö is located in Skåne county in the south of Sweden. Our second municipality, Östersund, is located in an urban area in Jämtland county in the middle of Sweden. Östersund has a population of around 44,000 which makes it the 24th most populous city in Sweden.

In November 2015 Malmö had 372 and Östersund 127 plug-in-hybrids. The Green Motorist association elected Malmö as the best EV city in 2013. Östersund got the same nomination in 2011. The motivation was similar for both municipalities: they had ambitious goals, developed information campaigns, and had ongoing projects.

Malmö has decided on an eco-car strategy saying that of Malmö's light vehicle fleet 80% would be gas, electric, plug-in hybrid or hydrogen vehicles. The remaining 20% is allowed to be green vehicles fueled with gasoline or diesel (Decision Malmö Technical Committee, 4 Nov 2015). In Östersund the municipal administration must purchase green

Author

vehicles that run on renewable fuels or electric power. Passengers cars must also meet the definition of an environmental car as stated in the government regulations (Decision in the Municipality Management Group, 5 October 2001, revision 19 March 2013). This decision is followed up every year in the annual environmental report.

In Östersund eight municipalities cooperate on the procurement of EVs through the procurement office called Green Traffic (Grön Trafik) which is also a joint municipal board for the eight municipalities. In Malmö the municipal company VISAB procures vehicles for the whole municipal administration.

4.1 Public procurement as way to support the development of a local market

Both municipalities have a wish to influence the market and to contribute to an increase of EVs in their municipalities. This was part of a political strategy to be in the forefront for reducing greenhouse emissions and to have a fossil-free vehicle fleet in 2030. In Östersund one of the procurement officers thought that one consequence of the fact that the municipality started to procure EVs was that the market would see that the demand was bigger than they had calculated. In Malmö they also thought that the municipalities had an important role for creating a market. The environmental strategist said:

Yes, I believe it really matters that we as a city show that we take a lead in this, partly through our own vehicles and partly just because we actively monitor the EV development /.../ This is how we think, that we as cities should be role models and push the market initially, to later on, hand it over to others.

It was seen that the public sector has 'a role to push the market forward' (Regional environmental strategist). Another informant thought that the municipalities needed to take the lead in developing a market and asked rhetorically: Who else would do that? (Regional project coordinator). One effect that several of the informants return to, as an important effect of the public procurement of EVs, was that a secondary market for EVs was created. The second-hand market for EVs is not as good as for cars that run on petrol or gas. The municipalities need to take a greater loss from selling an EV than other cars, but are prepared to do this, because they think that this is an important way to create a demand from private users, which in the long run is important for increasing the rate of EVs in the fleet (Municipal public procurement officer 1, Municipal environmental strategist, Regional project coordinator).

Yes, it is more expensive with green cars, e.g. a gas car is 15% more expensive compared to a gasoline-powered car. And we also get less when selling the car. Because the second hand market is still a little bit cooler (Municipal public procurement officer 1)

There was also an agreement among the respondents that it was worth this financial loss, because in the long run it was a benefit for the environment. And the environmental argument made it possible for the municipalities to run a process that was not economically beneficial for the citizens.

Another expected effect from the public procurement of EVs was that because a municipal organization is so diversified and contains many different activities, people in general could see that EVs could be used for many different kinds of transport, i.e., that EVs were more diversified than people in general expected. That was a very concrete way for the municipalities to contribute to the creation of a market for EVs (Regional project coordinator).

Title

4.2 Proactive work though taking lead and networking

As mentioned above earlier studies have shown that it is much more problematic for small public organisations to use public procurement as an instrument to encourage a certain innovation or sustainable technology. One way to overcome this barrier is to collaborate with others to create a bigger organization for the purpose of making joint procurements. In Östersund they had tried this and collaborated with seven other municipalities. This way they could put together a group of experts with the main focus to manage the procurement of EVs. The former manager for public procurement in Östersund meant that it was necessary to work through a group made up of people with different expertise:

Because the purchaser, he or she knows the legislation and regulations, the entire commercial part. But not much about the product or service to be purchased /.../ For that you need other actors. (Municipal public procurement officer 2)

In these groups they can have a discussion with the different local authorities about their demands and what is important when they will invest in a new EV. The joint municipal Green Traffic committee has their own representative in these groups, which was one way to ensure that political demands and wishes were also regarded in the expert group. This group was also a way to handle what were seen as unnecessary requirements from the administration:

The group is a good counterpart. It is better when you have experts that question the need of an SUV rather than when we do it. (Municipal public procurement officer 3)

Cooperation was also seen as an important tool for the small municipalities in the county to increase their knowledge and be able to act as a player on the EV market. A problem that occurs is however for the eight municipalities to come to an agreement. The municipalities differ in size and some of the municipalities consist mostly of rural areas which results in different demands than more urban municipalities. In rural areas they preferred diesel cars because of lack of charging stations. The agreement in the joint committee is that the procurement should benefit environmental vehicles, in accordance with the demand from the Swedish state. But it does not have to be an EV if that is not suitable in that municipality.

Malmö, despite being the third biggest city in Sweden, also emphasized the importance of collaboration between municipalities. The problem of having competence in different areas was a recurring issue during the interviews in both Malmö and Östersund and a main reason for increased collaboration. The procurement officers are generalists and not expert on EVs. They need to collaborate with different actors to collect knowledge on EVs, and not only other public actors. The association 'Green Motorists' is mentioned as an important partner in these issues.

Malmö is part of a network that meets regularly and the environmental strategist thought that exchange of experiences is the most important benefit of this cooperation (Municipal environmental strategist). The procurement company in Malmö, VISAB, also emphasized the importance of sharing experiences with others in networks. They had e.g. done study visits to Norway to see how they have organised their activities and met both politicians and officials.

How do they organize their work and what can we bring back to Malmö? /.../ It is important that not every actor needs to reinvent the wheel all over again and

Author

you cannot have knowledge and capacity in all areas (Municipal public procurement officer 1)

Norway has been successful in developing policy incentives that have benefited the diffusion of EVs. But the Swedish municipalities are at the same time reluctant to copy Norway's measures with e.g. free parking and that EVs can use the bus lane. The project coordinator in Malmö said e.g. that they want to reduce the numbers of cars in the city centre and want to promote public transportation and these kind of policy measures would contradict those targets. So, it is not always that easy to implement other municipalities' solutions.

4.3 Factors highlighted as important for an increased use of EVs

The interviewees describe public procurement as a way to put policy goals into practice. The politicians set a goal that, at least in theory, is implemented through the requirements in the public procurement document. But in relation to the goal to increase EVs locally, by increasing the number of EVs in the municipal vehicle fleet, this will not be enough for implementation. When procurement takes place, the result is a list of cars that meet the demands set by the contract. It is then up to each administration, each unit within the municipal administration, to select from this list any car to be purchased. It is thus the administrations that ultimately determine whether an electric car will be purchased or not, and also pay the cost of the car. Problems with acceptance of EVs in different administrations within a municipality were well known. In general it can also be difficult for the local administration to choose an EV simply because it is more expensive compared to other alternatives.

It is problematic for a municipality where school, health and social care also need a lot of resources. So the cost is a difficult question that I have respect for. It is not that simple to just state how it should be... you need to reason and see if you can enrol some, even if not all participate (Regional project coordinator).

When the different political committees will choose cars, the selection criteria can be different from the one the purchasers have. Then the price, together with how far the car runs before it needs to be refuelled/recharged is given high priority.

The committee decides, but then... afterward you hear that the manager of the administration reasoned that the car is expensive and that it only can drive 100 kilometers a day, which makes them choose another car before EVs. This even though in general they don't need to go more than 100 kilometers. But they don't look to the real need (Municipal public procurement officer 3).

The officials in the administration are also skeptical as to whether the EVs will manage to meet all requirements that e.g. the home care service has.

We have been in several negotiations with home care service about their needs. And this is really difficult because if you choose an EV then you don't have the range they need. At least not for the vehicles that can take several passengers and have a low floor and adjustable rear end (Regional project coordinator).

There are many real practical barriers that need to be overcome for diffusion of EVs in the administration. There are also mental barriers that need to be faced. Earlier negative experiences from driving EVs are common and difficult to deal with:

Especially among men, older men, that just state that this is not good enough. Then you ask when they drove a EV last time. 'Yeah it was in the 90s' they respond... Yes, but come on... (Municipal public procurement officer 3).

Title

It is also much easier for the administrative units to choose a technology that they are used to:

We have a policy in Malmö that the single units should follow, but it is their choice in the end. And then it is very easy for them to choose a traditional car that they are used to (Municipal environmental strategist).

EVs are also seen as something that is more complex to own, not least because there is a lack of infrastructure. One example mentioned was that local managers felt that it was complicated that each EV needed a charger. The purchaser organisations tried however to support them and facilitate not only how to purchase a charger, but also to find a suitable financing model. In relation to that the working time needed to charge the EV, around 30 minutes, must also be paid by someone and the units have no interest in paying for that (Regional project coordinator). The procurement organisation tries to facilitate and help the municipalities with these practical problems that can occur, so that the employees can see beyond the problems and see all the beneficial aspects.

When the different administrations get to try out an EV the response was usually very positive. There is a notion that the EV will bring with it a lot of problems such as that they will run out of electricity and that you will be stuck somewhere without the possibility to recharge the battery. But when they have had the possibility to try an EV most employees change their opinion. Both in Malmö and Östersund they let the administration try out EVs for a time to influence their attitudes. But this is a slow process and there is still some resistance in the organisations to EVs. Clear political guidance is seen as important for a widespread diffusion of EVs in the administration. The procurement process is seen as a powerful tool for the diffusion of EVs. But in the end it all comes back to the fact that it is up to the managers in the administration to make the choice and to understand why they should buy an EVs that will be more expensive:

But again, it is down in the administration... it is the managers that need to understand this or get a stick or a carrot to choose an EV (Municipal public procurement officer 3).

The first time EVs were procured in Malmö, the company VISAB chose to subsidise the EVs and paid 75% of the extra cost for the EVs (Regional public procurement officer 1). The municipalities are however diversified organisations where different activities as well as opinions and prioritisations are gathered. Some for example thought that a better choice would be to subsidise bus tickets for the public. This can make it difficult to implement an incentive structure that benefit EVs. Dialogue with the different administrations are seen as vital, both to hear out what their demands are but also to be able to influence their actions.

5 Conclusions

Both municipalities emphasise the role of public procurement for development of a market for EVs. SPP is seen e.g. by the EU as a way to save money, but that is not the main reason put forward by our respondents. That Malmö and Östersund prioritize EVs in their procurement is mainly because they see it as the responsibility for the municipalities to develop a market and diffuse EVs. It is rather a financial loss for the municipal organisation, a cost that is pushed out to the different units. That it costs more is a well-known barrier in the SPP literature and that is also confirmed in our study. A

Author

difference with earlier studies (Michelsen and de Boer, 2009) is that in our municipalities it was obvious that the environmental argument was prioritized over the lowest offer, at least in the public procurement process.

Sporrong and Kadefors (2014) found that a barrier to create an efficient public procurement process was unclear policies and/or policies that were in conflict with each other. In our cases the policy was clear and it was emphasised that EVs should be prioritized. The problems were rather connected to the fact that the administration had to bear the extra cost. The politicians had not given any financial incentives for the administration to buy EVs, but trusted that the units would follow the policy anyway.

A weakness seen in earlier studies is lack of competence and that actors did not collaborate around public procurement (Bratt et al., 2013; von Oelreich and Philp, 2013; Knutsson and Thomasson, 2014). Lack of competence was also an issue in our municipalities, including Malmö, even if they are big from a Swedish perspective. Both municipalities however emphasised the importance of collaboration and Östersund had even formalised the collaboration in a joint political committee with other municipalities in the county. Both counties also have active regional support organisations that try to facilitate public procurement.

A problem not much discussed in earlier studies is however the problems related to collaboration around public procurement. The involved actors need to agree on common requirements, priorities and needs to fulfil, which is not so easy. Different municipalities face different challenges and the requirements of a rural municipality are different from an urban one. This might hollow out the procurement process and end in a procurement document formulated too generally. That every municipality in some sense is unique was also highlighted when the possibilities to take good ideas from others home to your own municipality were discussed. To be informed about good examples was identified by all as important, while at the same time it was acknowledged that it was hard to simply copy another municipality's solution.

None of the municipalities had used financial instruments to enable EV diffusion such as free parking or letting EVs use bus lanes. Their strategy was rather to create buying power and develop a second-hand market for EVs. They also tried to act as role models and emphasized the importance that their own organisations used EVs or at least environmental cars. To diffuse EVs within the administration was however not an easy task. It was clear that it was difficult to enrol all key persons needed in the administration. For the procurement officer it was obvious that EVs were to be chosen, but for the managers who in the end did choose what car to buy many other values overruled the EV policy. There is a lack of access to recharging in both counties which was an obvious barrier. The cost of the car was another barrier not really dealt with. For some units like the home service it was simply not realistic to choose a car that needed to be recharged during work time. For others the barrier was rather related to a conception of what an EV was and that it could not fulfil their expectations of what a car should deliver. The strategy to speed up diffusion instead concerned information and test-driving and in dialogue with the administration solving problems that arise. As seen in earlier studies (Wikström et al., 2015b), the experience in Malmö and Östersund was also that test drivers of EVs became more positive after they had had the opportunity to try out the car.

Our two cases show that policy making and the public procurement process work quite satisfactorily, if the purpose is to speed up the diffusion of EVs and if we relate the cases to recommendations from earlier studies. The problems identified in our municipalities are more related to implementation, when the managers in the

Title

administration choose what car to buy. Then other priorities come into play and the knowledge and experience from the public procurement group has a hard time travelling to other units in the municipality. The lack of carrots and sticks in both Östersund and Malmö also slowed down the diffusion. A potential improvement of the diffusion process would be to find ways to share the extra cost of an EV. Another improvement would be to put more pressure on the administrative units to also prioritize environment before low costs, in the same way as is done in the procurement process.

A final reflection is that municipal procurement can to a certain degree contribute to a market, but as a single policy means it is not that powerful. The public procurement in Malmö and Östersund contribute to increase the market, but not by any substantial numbers. The public procurement of vehicles accounts for a quite small share of the total market. The municipalities' role must in this perspective be seen as forerunners and role models rather than creators of a market. The public procurement needs to be complemented by other policy means on the local level and perhaps even more importantly on a national level.

References

- Aasness MA and Odeck J. (2015) The increase of electric vehicle usage in Norway—incentives and adverse effects. *European Transport Research Review* 7(4).
- Bakker S and Jacob Trip J. (2013) Policy options to support the adoption of electric vehicles in the urban environment. *Transportation Research Part D: Transport and Environment* 25: 18-23.
- Barkenbus J. (2009) Our electric automotive future: CO2 savings through a disruptive technology. *Policy and Society* 27(4): 399-410.
- Brammer S and Walker H. (2011) Sustainable procurement in the public sector: An international comparative study. *International Journal of Operations and Production Management* 31(4): 452-476.
- Bratt C, Hallstedt S, Robèrt KH, et al. (2013) Assessment of criteria development for public procurement from a strategic sustainability perspective. *Journal of Cleaner Production* 52: 309-316.
- Dale-Clough L. (2015) Public procurement of innovation and local authority procurement: procurement modes and framework conditions in three European cities. *Innovation* 28(3): 220-242.
- Edler J, Hommen L, Papadokou M, et al. (2005) Innovation and Public Procurement. Review of Issues at Stake, Study for the European Commission, Final Report. Karlsruhe: ISI Fraunhofer Institute Systems and Innovation Research.
- Edquist C and Hommen L. (2000) *Public technology procurement and innovation*: Springer Science & Business Media.
- Elbilsupphandlingen. (2015) På väg mot fler elbilar i Sverige: Slutrapport för Elbilsupphandlingen.
- European Commission. (2004) *Buying green! : a handbook on environmental public procurement*, Luxembourg: Office for Official Publications of the European Communities.
- European Commission. (2011) Public Procurement Indicators 2010. http://ec.europa.eu/internal_market/publicprocurement/docs/indicators2010_en.pdf.
- European Commission COM(2007) 799. Procurement, Pre-commercial: Driving innovation to ensure sustainable high quality public services in Europe, Brussels, 14.12. 2007, COM (2007) 799 final.
- European Commission SEC(2007) 280. (2007) Guide on Dealing with Innovative Solutions in Public Procurement: 10 elements of good practice.

Author

- Fligstein N. (1996) Markets as politics: A political-cultural approach to market institutions. *American Sociological Review* 61(4): 656-673.
- Gröna Bilister (2012) Elbilsupphandlingen granskad: Riktlinjer för offentlig sektor som vill kunna välja marknadens bästa elbilar och laddhybrider. , www.gronabilister.se/rappporter.
- Guenther E, Hueske AK, Stechemesser K, et al. (2013) The 'Why Not'-Perspective of Green Purchasing: A Multilevel Case Study Analysis. *Journal of Change Management* 13(4): 407-423.
- Günther E and Scheibe L. (2006) The hurdle analysis. A self-evaluation tool for municipalities to identify, analyse and overcome hurdles to green procurement. *Corporate Social Responsibility and Environmental Management* 13(2): 61-77.
- Harrysson S, Ulmefors M and Kazlova A. (2015) Overview and analysis of electrical vehicle incentives applied across eigh selected country markets Karlskrona: Blekinge Institute of Technology, 19.
- Heyvaert S, Coosemans T, Van Mierlo J, et al. (2015) Electric vehicle attitudes and purchase intention: A Flemish case study. *International Journal of Electric and Hybrid Vehicles* 7(1): 83-100.
- Kemp R and Rotmans J. (2004) Managing the transition to sustainable mobility. In: Elzen B, Geels F and Green K (eds) *System Innovation and the Transition to Sustainability: Theory, Evidence and Policy*. Northhampton, M.A, USA: Edward Elgar Publishing, 137-167.
- Kemp R, Schot J and Hoogma R. (1998) Regime shifts to sustainability through processes of niche formation: The approach of strategic niche management. *Technology Analysis and Strategic Management* 10(2): 175-195.
- Knutsson H and Thomasson A. (2014) Innovation in the Public Procurement Process: A study of the creation of innovation-friendly public procurement. *Public Management Review* 16(2): 242-255.
- Kvale S and Brinkmann S. (2009) *InterViews : learning the craft of qualitative research interviewing*, Los Angeles: Sage Publications.
- Köhler J. (2006) Transport and the environment: The need for policy for long-term radical change. *IEE Proceedings: Intelligent Transport Systems* 153(4).
- Lember V, Kalvet T and Kattel R. (2011) Urban competitiveness and public procurement for innovation. *Urban Studies* 48(7): 1373-1395.
- Lieven T, Mühlmeier S, Henkel S, et al. (2011) Who will buy electric cars? An empirical study in Germany. *Transportation Research Part D: Transport and Environment* 16(3): 236-243.
- Michelsen O and de Boer L. (2009) Green procurement in Norway; a survey of practices at the municipal and county level. *Journal of Environmental Management* 91(1): 160-167.
- Murray JG. (2009) Towards a common understanding of the differences between purchasing, procurement and commissioning in the UK public sector. *Journal of Purchasing and Supply Management* 15(3): 198-202.
- Nykvist B and Nilsson M. (2015) The EV paradox - A multilevel study of why Stockholm is not a leader in electric vehicles. *Environmental Innovation and Societal Transitions* 14: 26-44.
- OECD. (2009) Available at: <http://www.oecd.org/innovation/inno/43726748.pdf>.
- OECD. (2011) Available at: http://www.keepeek.com/Digital-Asset-Management/oecd/science-and-technology/demand-side-innovation-policies_9789264098886-en#page12.
- Phillips W, Knight L, Caldwell N, et al. (2007) Policy through procurement—The introduction of digital signal process (DSP) hearing aids into the English NHS. *Health policy* 80(1): 77-85.
- Preuss L. (2007) Buying into our future: Sustainability initiatives in local government procurement. *Business Strategy and the Environment* 16(5): 354-365.
- Rolfstam M. (2009) Public procurement as an innovation policy tool: The role of institutions. *Science and Public Policy* 36(5): 349-360.
- Rolfstam M. (2012a) Good rules or bad rules in public procurement of innovation: but is it really the (right) question? *Halduskultur–Administrative Culture* 13(2): 109-129.

Title

- Rolfstam M. (2012b) An institutional approach to research on public procurement of innovation. *Innovation* 25(3): 303-321.
- Shepherd S, Bonsall P and Harrison G. (2012) Factors affecting future demand for electric vehicles: A model based study. *Transport Policy* 20: 62-74.
- Sierzechula W, Bakker S, Maat K, et al. (2012) The competitive environment of electric vehicles: An analysis of prototype and production models. *Environmental Innovation and Societal Transitions* 2: 49-65.
- Sporrong J and Kadefors A. (2014) Municipal consultancy procurement: New roles and practices. *Building Research and Information* 42(5): 616-628.
- Swedish Competition Authority. (2013) Siffror och fakta om offentlig upphandling–Statistik om upphandlingar som genomförts under 2012. Konkurrensverkets rapportserie.
- Tran M, Banister D, Bishop JDK, et al. (2013) Simulating early adoption of alternative fuel vehicles for sustainability. *Technological Forecasting and Social Change* 80(5): 865-875.
- Walker H and Brammer S. (2009) Sustainable procurement in the United Kingdom public sector. *Supply Chain Management* 14(2): 128-137.
- van Rijnsoever FJ, Hagen P and Willems M. (2013) Preferences for alternative fuel vehicles by Dutch local governments. *Transportation Research Part D: Transport and Environment* 20: 15-20.
- Vergragt PJ and Brown HS. (2007) Sustainable mobility: from technological innovation to societal learning. *Journal of Cleaner Production* 15(11-12): 1104-1115.
- Whitmarsh L and Köhler J. (2010) Climate change and cars in the EU: The roles of auto firms, consumers, and policy in responding to global environmental change. *Cambridge Journal of Regions, Economy and Society* 3(3): 427-441.
- Wietschel M and Doll C. (2009) Sustainable transport visions: The role of hydrogen and fuel-cell vehicle technologies. *The Hydrogen Economy: Opportunities and Challenges*. 563-598.
- Wikström M, Eriksson L and Hansson L. (2015a) Introducing plug-in electric vehicles in public authorities. *Research in Transportation Business and Management*.
- Wikström M, Hansson L and Alvfors P. (2014) Socio-technical experiences from electric vehicle utilisation in commercial fleets. *Applied Energy* 123: 82-93.
- Wikström M, Hansson L and Alvfors P. (2015b) An End has a Start-Investigating the Usage of Electric Vehicles in Commercial Fleets. *Energy Procedia*. 1932-1937.
- Villareal A. (2011) The social construction of the market for electric cars in France: Politics coming to the aid of economics. *International Journal of Automotive Technology and Management* 11(4): 326-339.
- von Oelreich K and Philp M. (2013) Green public procurement - A tool for achieving national environmental quality objectives. http://msr.se/Documents/rapporter/ex/ex_Green_Public_Procurement_2006.pdf.
- Zubaryeva A, Thiel C, Barbone E, et al. (2012) Assessing factors for the identification of potential lead markets for electrified vehicles in Europe: Expert opinion elicitation. *Technological Forecasting and Social Change* 79(9): 1622-1637.
- Åhman M. (2006) Government policy and the development of electric vehicles in Japan. *Energy Policy* 34(4): 433-443.
- Åhman M and Nilsson LJ. (2008) Path dependency and the future of advanced vehicles and biofuels. *Utilities Policy* 16(2): 80-89.
- Östersund municipality. (2014) *Östersund 2040 översiktsplan*.