

Title

*The use of the Milieubarometer in Denmark-
A qualitative analysis*

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Abstract

Public Private Academic Partnerships are becoming more popular in Denmark to guide companies in becoming more sustainable. The strength is in the interrelationship between the public, private and academic partner in which they interdependently make efforts on reducing their impact on the environment. However, not all the PPAPs in Denmark can show how they are actually achieving this. It is proposed in this research that an environmental impacts calculator like the Milieubarometer could show the member's achievements in reducing their environmental impacts from direct consumption (i.e. electricity, fuels, water and waste). Interviews are conducted with five companies and the municipality to find out if and how the Milieubarometer can be used among the members of the PPAP. Three of the six interviewees provided data to enter in the Milieubarometer or entered the data in the tool themselves. Due to this, some adjustments for the Milieubarometer are proposed to make it feasible for the members to use. For the PPAP as a whole, the Milieubarometer is proposed as a tool to support internal discussions among the members to show the reductions made in their production related emissions (and with that in the financial costs) and/or to incite competitiveness among each other in reducing their CO₂ emissions. Next to that, the Milieubarometer can be used to disclose the effectivity of joint organised environmental impact reduction programs, like a water consumption reduction plan. The Milieubarometer is seen as a way to communicate about environmental achievements, which is necessary for a good interrelationship between the partners of the PPAP as well as to external partners to show how important PPAPs are in reducing the impacts on the environment while still encouraging modernization among the partners.

Preface

This thesis is the final report of Mandy van Leeuwen within the Master of Science Program of Environmental Management and Sustainability Science, Aalborg University. At the forehand, this thesis is written for Aalborg University. However, the main focus point of this thesis is the Dutch Milieubarometer, developed by the Foundation Stimular.

The topic of this thesis is chosen in collaboration with Stimular as well as with Aalborg University. The thesis is a follow up on the internship project of van Leeuwen (2014) conducted from August to December 2014. The knowledge which was already gained during the internship, provided essential information for the background of this report. In the research of van Leeuwen (2014) it is stated that there are parties in Denmark interested in the Milieubarometer. The research in front of you will find out how the Milieubarometer can be used among these parties. The researcher has conducted this thesis independently with help of Stimular for in-depth knowledge of the Milieubarometer and with scientific guidance from Aalborg University.

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- General manager, Royal Thermo Trae
- Energy manager of the public buildings, AAK Bygninger
- Environmental Engineer, GetWasted
- Environmental Administrator, Aalborg Kommune
- Annie Lauridsen, Key2Green
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- And all other persons I repeatedly called and e-mailed to ask for answers on my questions

Next to the essential input of these persons, I would like to thank the consultants of Stimular for supporting me with relevant advices during my thesis. In the end, I would give special thanks to Carla Smink for her supervision throughout the project which was really important for me to keep focused on the content and not taking all by-topics into consideration as well. Her interest in the topic of my thesis kept me enthusiastic especially when working on my own.

Reading guide

This thesis is initially written for Aalborg University and so discloses scientific report for a practical case like the use of the Milieubarometer in Denmark. In addition, the thesis provides recommendations for Stimular on adjustments in the Milieubarometer and next to that it provides recommendation for the actors in NBE and other PPAPs on how to encourage the reduction of environmental impacts among each other. Furthermore it provides recommendations for NBE as a network on how to use the Milieubarometer. This reading guide will provide which chapters are relevant for which interested parties to read.

At first, the introduction is interesting for every partner to read to understand the background of the research and to know what the content of the thesis will be. The introduction provides background on the Milieubarometer (chapter 1.1 and chapter 1.2) which will not be new information for Stimular, but is very important for other parties to understand what the tool is and how the tool is used in the Netherlands. It also elaborated on earlier research (chapter 1.3) to show on which base this thesis continues. The problem statement and research design provide why the research is relevant to conduct.

The methodology will be interesting for every partner to read to understand how the information is obtained. It is mainly written for the reader who wants to know how the interviews are conducted or for the reader who wants to conduct the research again.

The third chapter provides an understanding and appliance of the used theory. This thesis is based on the Ecological Modernization Theory to show that the student *'has the ability to structure a field of investigation, to work in a systematic manner, and to independently draw theoretical and practical insights from research data'* (module description EMSS 4th semester). For Stimular this chapter will not be as important to read as the analysis or the appendix, since this chapter is mainly theoretical and does not give hands-on advices. For readers who are interested in the appliance of the Ecological Modernization Theory in relation to PPAPs, for them the theory chapter will be relevant. This is the same for chapter four, where this interrelation is elaborated on further. This chapter goes into the concept PPAP and the appliance of the term in Denmark and in the Netherlands. Danish readers can get new information from the Dutch example (chapter 4.3) and Dutch readers can get new information from the Danish example (chapter 4.4).

Chapter 5 is the most important chapter in this thesis. It elaborates on how the Milieubarometer can be used for internal and external communication in Danish PPAPs and why PPAPs are so important to overcome environmental deterioration. This chapter provides recommendations for the actors involved in PPAPs in Denmark (mainly in NBE) and for Stimular. However, the actual adjustments that should be made in the Milieubarometer when introducing the tool on the Danish market are elaborated on in Appendix 2, since this is mainly interesting for Stimular to read.

The conclusion is relevant to read for a quick overview of the thesis and the discussion is important for readers who want to conduct this research again or for readers who are interested in the reliability and verifiability of this research.

Appendix 4 is interesting for Danish readers to know more about the CO₂ performance ladder in the Netherlands that incites companies to voluntarily reduce their CO₂ impacts to get financial reductions on a tender. Appendix 6 is interesting for NBE to understand how the Milieubarometer can be used in internal reduction programs among their members. Appendix 7 provides the arguments on why the Milieubarometer and the Plastberegner should work together to develop a tool that not only helps companies, but also improves both tools.

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Abbreviations list

MB	Milieubarometer
EM	Ecological Modernization
LCA	Life Cycle Analysis
LCM	Life Cycle Management
NBE	Nordjylland Bæredygtighed Erhvervsnetværk
PPP	Public-Private Partnership
PPAP	Public-Private-Academic Partnership

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1. Introduction

Policy makers have become more and more interested in technological solutions to upcoming or current environmental problems in the last decades (O'Brien, 2014). Where the debates in the 60's and 70's focused on radically changing the institutions which caused the environmental problems, the debates in the 80's focused on a more nuanced approach which assumed that modernization with new technological solutions for the existing institutions was the eventual answer to ecological deterioration (Hajer, 1995; Mol, 1995; Mol & Spaargaren, 2000). This latter view is covered in the Ecological Modernization Theory, which *'aims at relieving the welfare state of some of its tasks in environmental management, so it can concentrate on the remaining environmental tasks that cannot be transferred'* (Mol, 1995). Such a shift of tasks led to the cooperation between public and private actors in developing plans for integrating the environment in the current institutions in which the state has a steering role and stimulates social self-regulation, for example via economic mechanisms (Ibid). An example of such a self-regulating economic mechanism with a steering role from the state are Public Private Partnerships (PPP). PPPs as used in this research, are defined as networks providing certain public goods to tackle environmental degradation (Elsig, 2008). In which 'public goods' cover the knowledge for the members in the PPPs about how to integrate the environment in their operational management system. The goal in such a partnership is providing this public good to all members and with that, influencing the institutions broader than the partnership in conquering the 'global' environmental degradation. For example, the companies in the PPPs are encouraged to produce more environmental friendly products, what gives customers the chance to choose those environmental friendly products. In this way, such a PPP can influence the broader institutions.

Public-Private Partnerships do not solely have to include public and private partners. It can also be relevant to have an academic partner included in the PPP. *'Universities may play a role as mediators and translators of new ideas and concepts not only "bringing these to the people", but in the very same move they change these as they are fitted in the local context'* (Lehmann, 2008, p. 51). An academic partner does not only have to figure as such translators or mediators of new ideas, they can also be the 'external' third partner who provides accountability and mediates decision making in the governing process in PPPs (Hodge & Greve, 2010). Because the governing field of public and private partners differs so much (Morth, 2009), a mediating role from an academic partner can be a fruitful contribution to such a partnership. However, to make a partnership with three different partners with different perspectives sustain, an enhanced division of roles needs to be clear. Anderson et al (2012) made a figure (Figure 1) to show the different inputs and outputs of the three partners in a PPAP.

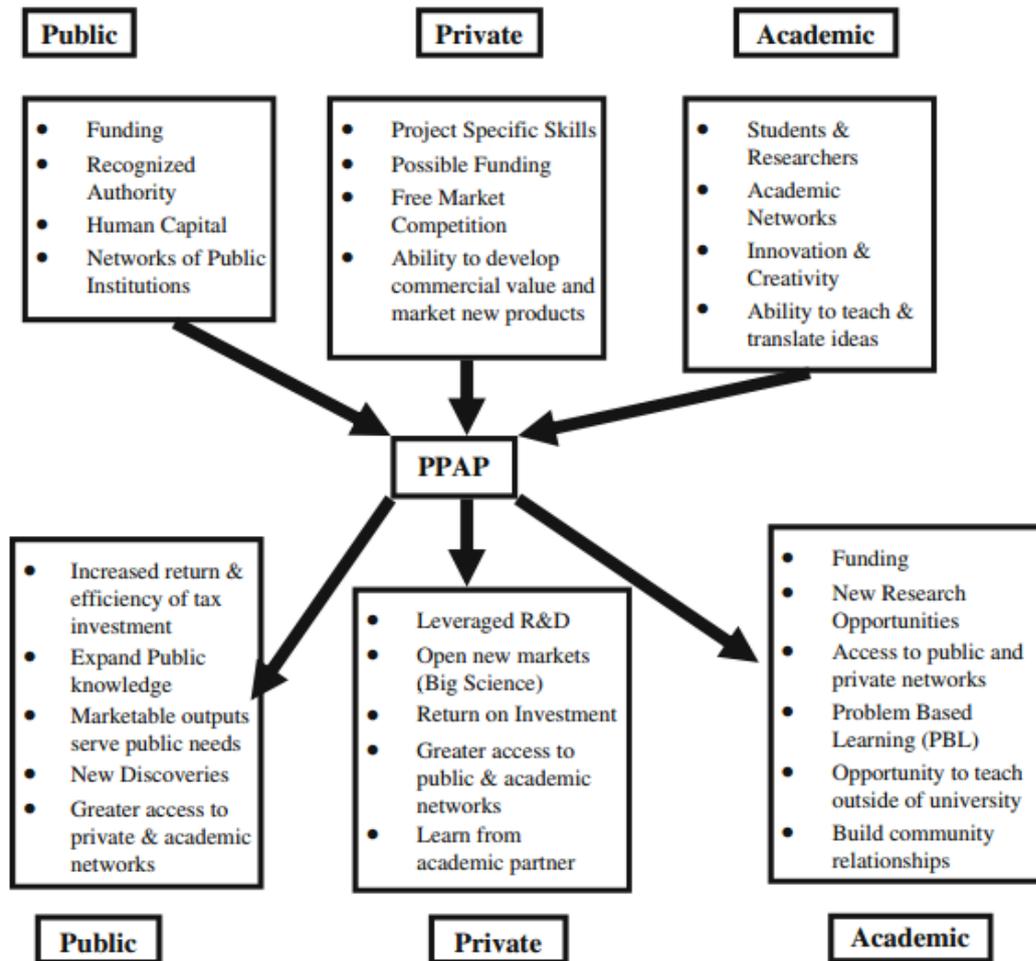


Figure 1: *Flow of resources through a PPAP* (Anderson et al, 2012)

This figure shows the inputs the different partners give to a PPAP and the outputs they receive from a PPAP. With this it is seen that the academic partners not only provide innovation and the ability to teach and translate ideas, but they also provide academic networks which can be interesting for public and private partners to broaden their networks in another field than their own public or private field. This research will continue with PPAP in Denmark, because such PPAP (like Green Network and NBE) are thoroughly examined in literature (see for example Lehmann, 2006 or Hansen and Lehmann, 2006).

The PPAP which will be mainly elaborated on in this research is Nordjyllands Bæredygtighed Erhvervsnetværk (NBE) in Denmark. In this PPAP, (public) organizations and companies are collaborating with each other to strengthen the participating companies' competitiveness through targeted efforts towards environmental sustainability (NBE website, 2015). The members get help from the consultants in the PP(A)Ps with developing an environmental or sustainability report and they can discuss with each other how they engage the environment in their operational management (Ibid). Research from van Leeuwen (2014) showed that to be transparent to external interested parties (like the government), this PPAP would like to see how the companies' environmental performances are

decreasing due to their membership to the partnership. However, van Leeuwen (2014) also showed, that the Danish PPAPs miss a certain visibility to show how much the environmental performances are decreasing. To give an example of how such a visibility can be displayed, a Dutch PPP¹ called Blauwzaam is presented. This network of companies and municipalities in the region Vijfheerenlanden/Alblasserwaard² has set a goal in an Energy Covenant for all the partners to jointly reduce the CO₂ impact or energy consumption by 10 % in 3-5 years. Blauwzaam already started for the fifth time in a row (where the partners themselves jointly decide on the goal in the next 3-5 years), which shows the successfulness of the network. To keep track of their energy or CO₂ reduction, the partners³ need to use an environmental management software tool, the Milieubarometer. Such a tool could answer on the demand of NBE to provide more visible data in reaching environmental goals together. To see if the companies in Denmark would be interested in using such a tool for disclosing visual environmental data as well, earlier research (van Leeuwen, 2014) is conducted which showed that Green Network in Vejle⁴ and NBE were interested in such clear reporting that came out of the Milieubarometer. This thesis will continue on this, by analysing the actual usage of the Milieubarometer in these networks. This introduction will present the Milieubarometer and the usage of it in the Netherlands, which will provide a background for the analysis if the Milieubarometer can be used among PPAPs in Denmark. This will be analysed by asking the main research question: *'To what extent can the Milieubarometer be a help for Public-Private-Academic Partnerships in Denmark to improve the internal and external communication about their environmental achievements?'*

1.1 Milieubarometer

The Milieubarometer is used in the private and public sector in the Netherlands to map their environmental impacts and CO₂ emissions, to show their reduction in environmental impacts and CO₂ emissions and to be transparent about their CO₂ footprint. For this, the user needs to enter their data

¹ the Dutch PPP, Blauwzaam, which will be worked with in this research has no academic partner like a university. However, it is not stated that an academic partner needs to be a university. Academic is referred to: *'belonging or relating to a place of learning, especially a college, university, or academy'* (thefreedictionary.com, 2015). Blauwzaam has besides the public and private partners also Stimular as a partner. Stimular is a non-profit foundation which collaborates closely with the research institution on law and regulations in the environmental field 'Infomil'. Next to that is the methodology behind the, by them developed Milieubarometer, reviewed by scientists from four different research institutions (Korteland, 2010). Therefore, Stimular can be seen as an academic partner in Blauwzaam. However, because the mentioned academic partner in Denmark (Aalborg University) differs from the academic partner in the Netherlands, this research will refer to PPPs mainly in regards to the Dutch example and PPAP in regards to the Danish example. Even though both examples do not include the same sort academic partner, it will become clear in chapter 4 that Stimular has the same position in Blauwzaam as Aalborg University has in the Danish PPAP.

² The geographical location of this region in the Netherlands can be found in Appendix 1

³ Among the partners are construction companies, schools, a bakery, ICT companies, three municipalities, a fitness club, logistic companies and installation companies

⁴ Green Network Vejle is a PPAP where public organizations, companies and the university collaborate to provide companies the knowledge and tools to become more sustainable, with a focus on Corporate Social Responsibility and competitive benefits in sustainable entrepreneurship (Green Network website, 2015).

about electricity, fuels, water, waste, hazardous waste, commuter traffic, business traffic, corporate traffic, freight transport, office paper and other resources (which are called the ‘themes’) after which the Milieubarometer calculates the results⁵. The results present the total environmental impact, the CO₂-equivalent emissions of these data and the total financial costs. Figure 2 shows the process of entering data about electricity, leading to the results visualized in a graph.

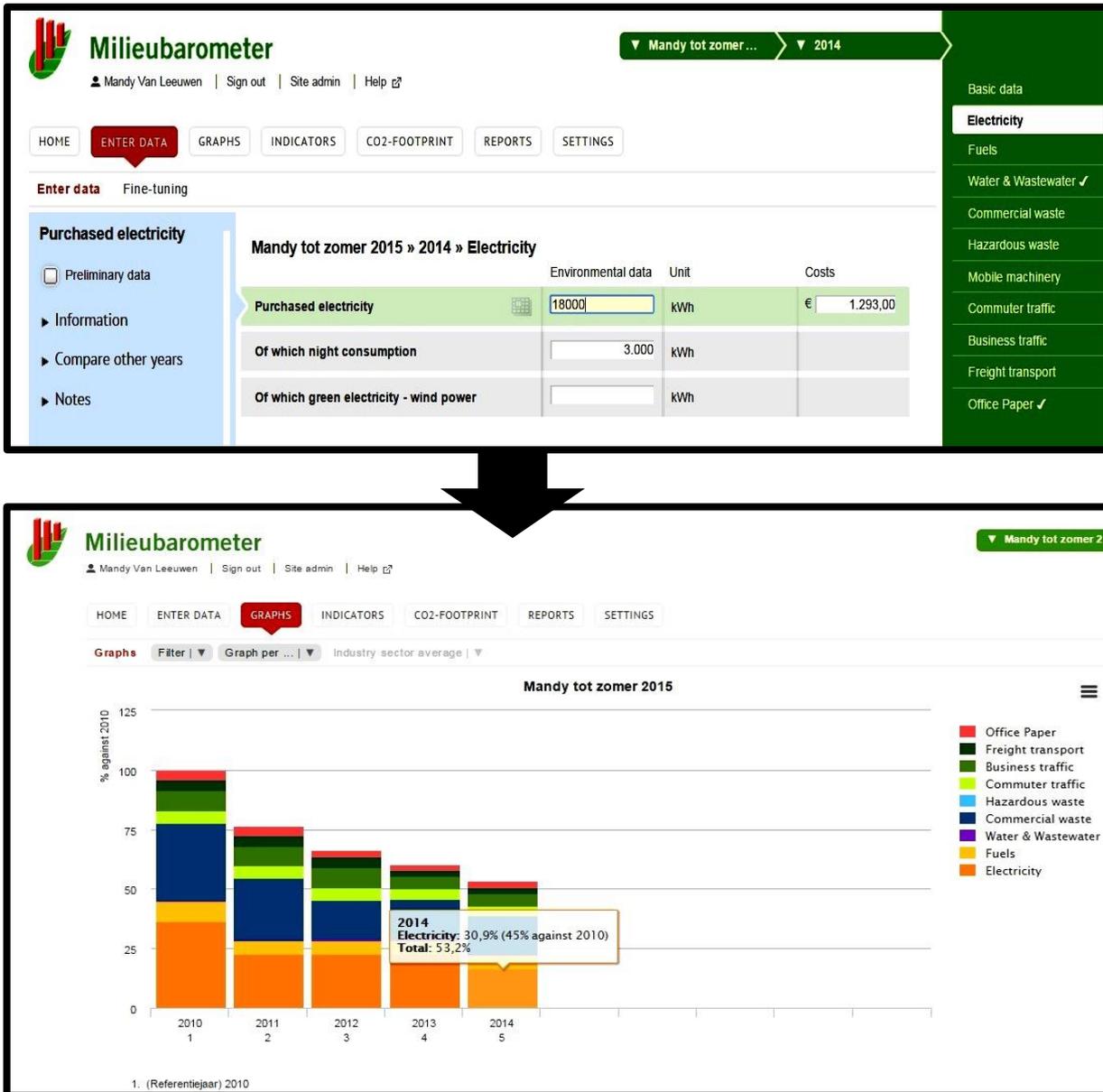


Figure 2: The process in the Milieubarometer (these graphs are from an imaginary company with the purpose of showing how the graphs in the Milieubarometer can turn out on the screen) (online.milieubarometer.nl) Figure 2 shows that the environmental impact of electricity can be viewed

⁵ The methodology behind these calculations and especially the adjustment of the methodology to the Danish situation) is an important aspect in the introduction of the Milieubarometer in Denmark, therefore there are several adjustments recommended in appendix 3, based on the use of the Milieubarometer among four Danish companies.

as a percentage of the total bar of that year (30,9 %) as well as it can be seen as a percentage of the reference year (45% against 2010) This reference year is the first year when the Milieubarometer is filled in, so the user can analyse if the environmental impacts will reduce against this reference year. Next to that, the Milieubarometer develops a CO₂ footprint. These graphs can be outlined in a report where the company can write about their plans and show their already achieved reductions. This can be used for communication towards both external (shareholders, customers, auditors) and internal stakeholders (employees, management etc.).

This basic explanation of using the Milieubarometer derives from the experience with the Milieubarometer in the Netherlands. To analyse if the Milieubarometer can be used in Denmark in the same way as it is used in the Netherlands, a brief overview will be given about the more extensive ways in which the Milieubarometer is used in the Netherlands.

1.2 The use of the Milieubarometer in the Netherlands

At this moment, the Milieubarometer is used by companies in the Netherlands in several sectors: the car sector (dealer + garage), retail, printing companies, trade & distribution, offices, agriculture, metal electro companies, construction companies & contractors, recreation (hotels, restaurants etc.), sport locations (swimming pools) and the food-industry. The Milieubarometer is also in use by theatres and cultural centres owned by the government, care centres/hospitals, schools and veterinaries (Stimular, 2014). So both the public and private sector are users of the Milieubarometer. Where a company mainly uses it for external and internal environmental reporting towards their stakeholders, municipalities use the Milieubarometer to map, analyse and benchmark the environmental impacts of their own public buildings or they provide the Milieubarometer for free to all companies in their municipal area. The latter is mainly interesting for municipalities when they need to enforce the EU legislation⁶ issued on the environmental transparency of Dutch companies.

For the reasons of benchmarking and enforcing this legislation, also sector organizations provide the Milieubarometer to the companies in their sector. For benchmarking the graphs (and the indicators behind the graphs) averages are available for sectors with the main users, which are inter alia the graphic sector, offices, the construction sector, the retail sector and the public care sector (Milieubarometer website, 2015). When more companies in a certain sector use the Milieubarometer, an average can be developed and enhanced. Figure 3 shows the averages in the graphic sector. Companies can use this

⁶ IP/13/330: Disclosure of non-financial and diversity information by large companies and groups

average to see their environmental score against the sector average.

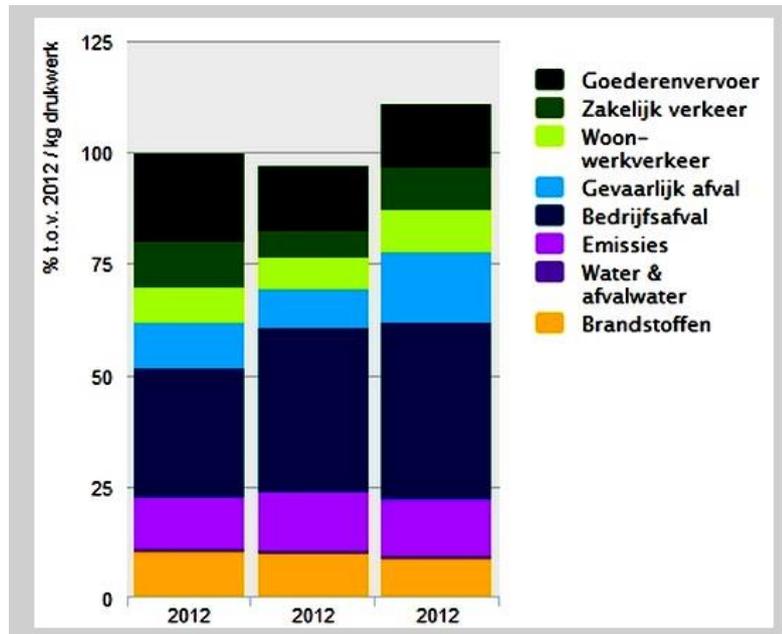


Figure 3: The offset and rotation graphic companies are benchmarked per kg printer matter. The graphics show the relevance of the different environmental theme's in these offset and rotation graphic companies. The first bar represents 18 small graphic companies, the second bar 14 graphic companies of medium size and the third bar represents the average of 14 big graphic companies ([website Milieubarometer](#)).

To see if the successful use of the Milieubarometer in the Netherlands can be expanded to other countries, a previous research (van Leeuwen, 2014) was conducted to the potentials of the Milieubarometer in Denmark. Denmark was chosen, because it was one of the first countries that adopted mandatory legislation on corporate environmental reporting (Holgaard, 2005). Next to that, a cross cultural management theory showed that the culture gave several potential situations for the Milieubarometer to anticipate on (van Leeuwen, 2014). The next paragraph will show which came out to be the potential users of the Milieubarometer in Denmark and what they will mean for this thesis.

1.3 Potential users in Denmark

In research of van Leeuwen (2014) it was analysed who could be the possible users of the Milieubarometer in Denmark. Through expert interviews and focus groups it was disclosed that Aalborg Municipality, the Danish Environmental Protection Agency (MST) and the PPAPs were interested in the Milieubarometer. Aalborg Municipality was interested to use it for their public buildings and in the schooling project as used in the Netherlands⁷.

⁷ A project established in three municipalities in the Netherlands, where scholars will fill in the Milieubarometer of companies. This has two positive sides: the scholars learn about the environmental impacts of companies, while the companies save time with entering data in the Milieubarometer (Stimular, 2014).

MST showed interest in the Milieubarometer as a potential help for the revision of the Green Accounts⁸. Companies can use the Milieubarometer where the graphics and the CO₂-footprint will provide the ‘report about the environmental performances of the companies’.

Furthermore, in the research of van Leeuwen (2014) it was suggested that the biggest potential user of the Milieubarometer are the PPAPs, falling under the Key2Green networks. These PPAPs showed interest in using the Milieubarometer as a tool for external communication about the PPAPs environmental achievements. Key2Green is an umbrella network for all the sustainability driven PPAPs in Denmark, inter alia Green Network Vejle and NBE. As mentioned before, these two networks were interested in the Milieubarometer especially for using it in the same manner as Blauwzaam in the Netherlands, i.e. providing it to companies to reach a reduction goal in CO₂ levels or environmental impacts. Nonetheless, both networks saw different barriers when introducing the Milieubarometer in Denmark. Green Network elaborated on the barriers in adjusting the methodology behind it to the Danish situation, which is now based on Dutch conversion factors⁹. NBE on the other hand saw problems in the feasibility of the tool among SMEs, especially the current way of entering the data in the tool manually instead of automatically. Still both PPAPs were interested in providing the Milieubarometer to its members to research the feasibility of the tool among the members. Therefore, the actual usage of the Milieubarometer in these networks is the important subject in this research. However, it is chosen to only focus on NBE, because the network is located in Aalborg Municipality so member companies could be visited on regular base. Together with NBE, it is analysed to what extent the Milieubarometer can be of help in PPAPs and to what extent it can help companies and the PPAP to make their environmental performances more understandable and transparent for external communication.

This thesis will focus on the use of the Milieubarometer among PPAPs in their internal and external communication. This is showed in the blue surrounded part of the next table. The other part of the table shows that the Milieubarometer could be helpful as well for the individual members in the PPAP. However this will not get the focus in this research since this research is focused on PPAPs as a new

⁸ The Green Accounts oblige the 1000 biggest companies in Denmark to report about their environmental impacts. However, due to inconsistent reporting and reporting about insufficient data while still getting a Green Account, the credibility of the law came to a low point (Holgaard, 2005). Therefore the Green Accounts are in revision at this moment. The law will be rewritten in which ‘*larger companies (1100 of the bigger ones) will have to write something about their environmental issues*

⁹ The Milieubarometer is based on a shadow price methodology. This methodology puts ‘*artificial prices for goods and production indicators which cannot be sold on the market*’ (Bruyn de, 2010). The artificial prices are calculated on a summation of two pricing methodologies, the prevention costs and the damage costs. The prevention costs are the costs of the most expensive equipment to become compliant to national environmental regulations. The damage costs are estimated costs of damage on the environment caused by emissions or pollution. The estimation of these damage costs is based on the willingness-to-pay of European citizens to not damage the environment (Bruyn de, 2010) For more information see: Bruyn de, S. e.a. (2010) *Shadow Prices Handbook: Valuation and weighting of emissions and environmental impacts* Delft, CE Delft

collaborative way to overcome environmental problems by still making economic growth and not on companies by themselves.

	PPAP	Members
Internal communication	Knowledge exchange among member companies	Knowledge exchange among employers and the different units on environmental management
External communication	Qualitative data report for external stakeholders	Qualitative data report for external stakeholders

Due to their demand for a qualitative data report for external stakeholders but also for internal knowledge exchange and competitive incentives, the hypothesis is that the Milieubarometer can be of valuable use in the PPAP. To know if the Milieubarometer can be used in the PPAPs first the member companies are interviewed about their interest in the Milieubarometer to see if they are willing and are able to use the tool. Since the member companies will be the actual users it is important to hear their input about the feasibility of the tool. When the member companies use the Milieubarometer, the PPAPs can benchmark the outcomes and show to their external stakeholders what achievements the companies make when they are engaged to such a partnership. Next to that, when the companies have filled in the Milieubarometer, the PPAP can use it to stimulate competitiveness among the companies in reducing their environmental performance. On the other hand it can also be used to back up discussions among companies on how to reduce environmental performances by providing the actual reductions a company made. Furthermore, it could be an idea to use the outcomes of the Milieubarometer as a tool for clarification on outputs of the companies for initiating industrial symbiosis in the PPAP. Therefore this thesis will focus on the internal and external communication of the PPAP rather than the internal and external communication of solely the companies.

1.4 Problem statement

At this moment NBE cannot show nor measure what the companies' quantitative achievements are towards the environment when they become a member of NBE. Especially because NBE has different company-members of different sizes, which will probably mean they will contain different levels of environmental management. In order to understand if the collaboration between public, private and academic partners in a PPAP as NBE is as efficient as thought, a consistent environmental benchmarking of the companies should be shown. A tool that calculates the environmental impacts of all the companies in a simple way so it can be easily used by companies, as well as a tool that can be used for communicating about companies' environmental efforts should bring the answer to this demand. The Milieubarometer figures as such a tool. Therefore this research will analyse if the Milieubarometer can be used by the member-companies in PPAPs, if the tool can help Danish companies to become aware

of their environmental impacts in a simple way and if the tool can be used as communication method between the three partners in order to help to reduce the environmental impacts of the companies together. Next to that, it will also analyse that the Milieubarometer, when used by the member-companies of PPAPs, can contribute to a more enhanced external communication program that displays the member's achievements in environmentally driven PPAPs.

Research question:

To what extent can the Milieubarometer be a help for Public-Private-Academic Partnerships in Denmark to improve the internal and external communication about their environmental achievements?

Sub-questions:

- *How do Dutch and Danish PP(A)Ps currently communicate about their efforts towards environmental impact reduction among their members?*
- *How can the Milieubarometer support the different actors in the networks and how can the tool be beneficial for the internal affiliation?*
- *How can the Milieubarometer be used for external communication for PPAPs?*

These questions will be answered with the help of the Ecological Modernization Theory. The hypothesis is that this theory can show that approaching environmental problems with a focus on the entrepreneurial relation between public, academic and private actors will be an important contribution for the debate on how to tackle environmental degradation.

1.5 Research design

To research the use of the Milieubarometer in PPAPs, interviews are conducted in order to get input from the members in these partnerships about the Milieubarometer. The member companies figure as cases to test the Milieubarometer. The used methodologies will be elaborated on in chapter 2.

Chapter 3 of this research analyses the 'Ecological Modernization' theory, which is an integrated part of this research. The theory is applied with the assumption that to overcome ecological deterioration, the state needs to work together with the market by '*introducing collective self-obligations for economic sectors via discursive interest mediation*' (Mol, 1995, pp. 46-47). The PP(A)Ps which are introduced in this research include such self-obligations with a common goal towards decreasing environmental impacts where state and market cooperate closely to reach the goal. Therefore Ecological Modernization and the link with PP(A)Ps is made to show the importance of PP(A)Ps in diminishing the harm on the environment for all actors.

In order to analyse if the Milieubarometer can be introduced in PPAPs, it is researched what a PP(A)P actually is and how the concept is applied in Denmark and in the Netherlands. By knowing how it is applied in the Netherlands and how the Milieubarometer is used to support the sustainable goals of the PP(A)Ps, it can be analysed if the Milieubarometer can be used in the same way in the Danish PPAPs

as well. Next to that, it can analyse if the barriers with the use of the Milieubarometer which are seen by Danish PPAPs are realistic. And if they are realistic, how they can be overcome. Moreover, this chapter will elaborate on the roles of municipalities, companies and the university in a PPAP.

Chapter 5 analyses the use of the Milieubarometer among the companies in NBE. The proposed barriers and opportunities with the Milieubarometer given by the interviewees are elaborated on in this chapter. With the proposed barriers and opportunities it is seen if the Milieubarometer can be a help in the communication between the academic, public and private partners of the PPAP. Relating to this, if the companies are willing to use the Milieubarometer, it is investigated if the Milieubarometer can be used as an overall external communication tool for NBE.

The conclusion will finally answer on the question if the Milieubarometer can be a support for the communication towards external and internal stakeholders from the PPAPs and subsequently if the tool can support the thought that PPAPs are the new collaborative way of overcoming ecological deterioration through modernization as assumed by the Ecological Modernization Theory.

2. Methodology

The methods used to analyse the hypothesis that PPAP can be the new way of approaching the EM theory, are mainly literature review and interviews. Literature studies are used for the first part of the thesis. This part includes the analysis of the Ecological Modernization Theory and the relation with Public Private (Academic) Partnerships. The second part of the thesis goes into the real life cases where it will be investigated what PPAPs are doing to act against environmental degradation and so if they are compliant to the EM Theory. For this, two interviews are conducted with respectively the project leader Lene Nielsen from NBE and Annie Lauridsen, project leader of Key2Green. The interview with Lene Nielsen was conducted in the beginning of the research to investigate if a tool like the Milieubarometer could help the network with their efforts towards environmental impact reduction. In this interview it was seen that the Milieubarometer could be beneficial for the external communication of the network to advertise about their environmental achievements. Also in the telephone interview with Annie Lauridsen from Key2Green it became clear that this external communication method was missing. Therefore the research continued on the use of the Milieubarometer among the member-companies of NBE to ensure the use of this tool in the network. Five face-to-face interviews are conducted with four companies and with the department of public buildings from the municipality (a list of the interviews can be found in the end of the bibliography). This was relevant for the thesis, because the actual experiences and opinions of the interviewees could show if the Milieubarometer will be helpful for the companies and the municipality. Eventually, what was not expected before, presenting the Milieubarometer to the companies led to discussions on why companies do or do not want to be transparent about their environmental impacts. This eventually gave insights in how companies need to be approached to help them reducing their environmental impacts and still enhance economic growth, which is covered by the EM theory.

The interviews with the companies and the municipality mainly consisted of a presentation of the Milieubarometer, after which the interviewees could give their opinion on the tool. After this, the researcher took the question list and asked questions which were not answered during the presentation and the feedback discussion yet. In this case, the interviews were based on a structured overview, however if the interviewee had interesting insights from his point of view, the interview could derive a bit more in that direction. These face-to-face interviews can also be called semi-structured: open ended, but it follows a certain script and covers all the topics that are written down on the list (Russel Bernhard, 2006). Still, in this case with a few outlines from the script to improve the understanding of the side of the interviewee. This is seen as important, because the interviewee's view is a view that the researcher is not known with. To enter this 'world', the researcher need to go beyond his/her own questions to understand the interviewees view. For example in the interview with Royal Thermo Trae the content was not so much about the Milieubarometer, because the manager had many other interesting

‘entrepreneurial’ insights on why companies are willing or not willing to focus on their environmental impacts. Because the interviews were not meant to ‘sell’ the Milieubarometer, it was good to have an insight in why companies are not (yet) willing to use the tool.

Furthermore, it is important to elaborate a bit on the language. The interviews are conducted in English, which is neither the mother tongue of the researcher nor it is of the interviewees. Therefore, some answers the interviewees gave, could be interpreted differently by the researcher. The researcher tried to overcome such inconveniences by repeating the answer and asking if he means what the researcher thought. However, during the transcription it also became clear that some answers were not understood in the right way by the researcher on the forehand. Nonetheless, because of the transcribing the researcher came to know the actual meaning of such answers. In this case, the researcher had missed to ask related questions. In some cases the researcher needed elaboration on answers, which was gotten through e-mail contact. In the end, the researcher sent all the interviewees the report with cited parts from the recorded interviews to which they could comment if they were okay with it or if they wanted to add something. With this, the researcher wanted to make sure that she understood these parts correctly from the interview and if the interviewees were okay with publishing this data. The researcher has seen that this was very important to be sure she had the facts straight and to keep in good contact with the interviewees.

3. Theory

When analysing if PP(A)Ps are important to overcome environmental problems, it is important to scientifically analyse if the interrelationship of public and private actors can be a contribution to overcome environmental degradation. To analyse this, the Ecological Modernization (EM) theory is chosen. Basically this theory *'is a social theory providing (or claiming to provide) a coherent and consistent set of specific concepts and ideas for analysing the way modern society reacts on and tries to cope with one of its most serious contemporary problems: the ecological crisis'* (Mol, 1995, p.49). The theory assumes that environmental problems will be tackled with solutions that encourage (economic) growth, however without boosting the growth of negative environmental impacts, also called eco-efficiency¹⁰. If encouraging economic growth or encouraging modernization without harming the environment could be the solution for environmental degradation, then it should be investigated how this 'eco-efficiency' can be reached in the most effective way. The hypothesis in this thesis considers that the interrelationship between private and public actors should be the most effective way in encouraging modernization without putting harm on the environment which should even lead to the solution to overcome environmental degradation. As Mol (1995, p.58) suggests: *'private economic actors and economic and market mechanisms play an increasingly important role in processes of ecological restructuring, while the role of the state agencies changes from bureaucratic, top-down dirigisme to 'negotiated rulemaking' and the creation of favourable conditions for such transformation processes'*

First this chapter will go into the thoughts behind EM and how these thoughts can be related to the growing importance in the interrelationship between public and private partners. After that it shows how the EM theory can support the role of PP(A)Ps in approaching environmental problems, leading to the idea of how PP(A)Ps can be the new mode of 'modernization' to overcome environmental degradation.

EM originates from the environmental debates and the dominant movements in environmental sociology in the 1970's and 1980's. These debates and later debates on the environment were important for the theory to be established and developed (Mol & Spaargaren, 2000). The main influence on the origins of the theory was based on a criticism against demodernization (or deindustrialization). Demodernization ideas suggested that *'a fundamental reorganization of the core institution of modern society (the industrialized production system, the capitalist organization of the economy and the centralized state) was essential in entering a part of long term sustainable development'* (Ibid). Hence, demodernization assumes that growth should lay in less modernization. The EM theory on the other hand, acknowledges there was a need for fundamental *transformations* to repair some of the faults made during

¹⁰ *'Eco-efficiency is achieved by the delivery of competitively-priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life-cycle to a level at least in line with the earth's estimated carrying capacity'* (WBCSD, 2000).

‘modernization’ which eventually had caused environmental destruction. Such transformations do not need to take away the already established institutions¹¹ (Ibid), but the environment should become a part of these institutions. In addition to this, the EM Theory underlines the fact that the environment should be integrated in the *economic* institutions. It states that re-embedding of environment in contemporary economic practices with the aim of respecting ecological limits cannot be a reversal of the historical disembedding¹² practices (Mol, 1995). The environment should be institutionalized in the social practices and institutions of production and consumption (Ibid). In this way, ecological deterioration could be diminished. The environment should not only become a part of public institutions, but also private parties needed to become engaged with environment to find solutions for ecological deterioration. This is in contrary to the, at that time also central to ecological debates, Risk Society Theory (Beck, 1992). This theory assumed that *‘the complex of the conglomerate of problems that we lump together under the heading of the ecological crisis show the structural deficit of the institutions of industrial society. It digs his own grave, since institutions increasingly show their inability to handle the dangers it itself produces’* (Hajer, 1995, p.280). Hajer encounters this theory in a discourse analysis¹³ way. He shows that Risk Society actually is a discourse of ‘self-confrontation’, which means that it reconsiders the already established institutional practices. This is in contrary to EM where the discourse can be seen as ‘self-adaptation’: society adapts to the new environmental problems with innovative solutions. An example to this can be the way in which society tries to adapt to the global greenhouse effect. In this, both regulations as well as business try to react on the greenhouse effect by reducing CO₂-levels¹⁴. Hence, private and public actors adapt to the changing environmental situation in the world by transforming their own behaviour. However, this does not mean that society suddenly collectively decided to adapt to the new environmental problems with just one new solution. *‘Society is still seeking, disembedding and re-embedding new practices which all still have uncertain outcomes’* (Hajer, 1995, p. 263)

These assumptions for ‘solutions’ drive the debates around EM, because what is actually the best solution for humankind to overcome environmental problems? The debates that try to answer this

¹¹ Institutions are systems of established and prevalent social rules that structure social behavior (Hodgson, 2006). In this way institutions can be a lot of things and therefore it cannot be said that institutions are just one thing, but institutions exist in an interrelationship with each other. For example money can be an institution, but does sincerely exist as an institution when interrelated with the law and/or the market of supply and demand. Also the environment can be an institution but become more known as such when related to the market of supply and demand or to language or law. In this case, institutions are not seen as apart in this research but as an interrelationship with each other that eventually structure social behavior.

¹² In the process of disembedding are social relations lifted out of their local and traditional structures and contexts and are rearranged across time and space distances (Giddens, 1990;1991).

¹³ With discourse analysis is meant ‘the examination of argumentative structure in documents and other written or spoken statements, as well as the practices through which these utterances were made’(Hajer, 2005) or in other words how the definition of a political (or in this case environmental problem) relates to the particular narrative in which it is discussed.

¹⁴ Methane and nitrous oxide are also highly influential for the global warming, however because CO₂ is mostly elaborated on regarding global warming, this is given as an example.

question were mainly focused on the contrast natural vs. economic (Mol & Spaargaren, 2000). Mol & Spaargaren clarify in their article why such debates are not relevant anymore since 15 years, due to changes in the moving context around the theory. The contrast natural vs. economic shows one of the fundamental ideas behind the EM theory. It bases on the idea that capitalism plays an important role in environmental deterioration. However, this view has nuanced in time since it is seen that capitalism is not one solid concept, but it changes constantly and one of the main triggers to this change is related to environmental concerns (Ibid). As Mol & Spaargaren (2000) argue: *'the environment becomes relatively independent (now from economy), ultimately having as a consequence that a capitalist or rather market-based system of production and consumption does not necessarily contradict significant environmental improvements and reforms in any fundamental way'*. This basically assumes that economic growth does not immediately cause environmental deterioration anymore. In addition to that, green production and consumption under capitalism is possible under different 'relations of production' (such as circular economy) in which each mode of production requires its own environmental reform program (Ibid, p. 22-23). Such a reform program can be developed together with public actors. A simple example of this reform program is Miljøgodkendelsesbekendtgørelsen in Denmark. This law demands companies with a bigger production area than 1000 m² to report on their environmental impacts. This contains inter alia the amount and level of emissions emitted by the company, applied Best-Available-Techniques (BAT) and the conclusions on the achievements of the BAT and a list of hazardous chemicals (BEK nr 669 af 18/06/2014). Such a program incites companies to reduce their emissions and hazardous chemicals at the production area.

Hence, market and state should both be involved in environmental policy and should not be viewed as something distinct anymore (Mol & Spaargaren, 2000). This is precisely what happens in a PP(A)P with a focus on sustainability. A sustainability driven PP(A)P brings public and private actors together to motivate the private actors to incorporate green production, while the private actors help the government with enforcing regulations regarding the environment. For example in NBE, the importance of accounting about the environmental performances in companies' management is focused on. This will give more competitive benefits for the member companies over other companies, and next to that it enhances the law (LOV nr 1403 af 27/12/2008) that demands companies to account for their social responsibility. A PP(A)P therefore bridges the gap between private and public in approaching environmental problems.

However, in order to show the importance of a PP(A)P in bringing the public and private partners together to overcome environmental problems, the PP(A)P should make transparent to the outside world what their achievements are. In this way, external stakeholders can see that the collaboration between private and public actors can be fruitful to reduce environmental impacts at companies with help of the public actors like municipalities. It will display the answers on questions like: how are they approaching

environmental problems together and how do they make their members aware of their environmental impacts?

In the EM Theory it is extremely important for actors to become aware of their environmental performances. The EM theory lays relevance on the *change* of central institutions in industrial society in their confrontation with the emerging ecological crisis (Mol, 1995). However in order to change, society, or in this case a company, must first know *what* their initial (harmful) behavior is that needs to be changed. Coming back to the ‘self-adaptation’: a company first needs to become aware of their performances which can negatively affect the environment, after which they can adapt themselves and change their performances to ones that do not or less affect the environment. Relating this to the PP(A)Ps, the member companies first need to become aware of what their environmental performance is before they can reduce their harm on the environment. For this it will be analysed in this thesis to what extent the Milieubarometer can fill in this gap. The Milieubarometer can be used because it provides an overview of the direct environmental impacts for the user, so the company or organization knows what and where to reduce. Eventually the disclosure of the efforts they made over a year in reducing their direct environmental impacts can be used for communication towards external partners. The PP(A)P can show that their members reduce their environmental impacts while still producing and making profit. This integrating of environmental aspects in the private market and the importance of it to public regulations is also covered by Hajer’s (1995) way of seeing EM. He shows, by analysing the decreasing impact of environmental-political discourses in the political impulse for environmental policy reforms, that economic expansion, growth of capital and capital-intensive technological change will eventually *compromise* the ability of states to ensure a better environment (Buttel 2000, Hajer, 1995).

With this, this thesis will contribute to the perspective of the theory where it implies that the EM theory is not only relevant in theories of politics and state (Buttel, 2000), but is also an *applicable* theory in the private sector. It demonstrates how the relation between the public and private sector is important in approaching and overcoming environmental problems. And most importantly, it will show how relevant the Milieubarometer is in setting the baseline for companies and organizations to become aware of their environmental performances so they can adapt their current operations to less harmful operations, which eventually will lead to reductions in their environmental performances. In this way the Milieubarometer is used both for members of the PPAPs to become aware of their environmental performances, as well as for communication towards the external stakeholders that the PPAP is effective in approaching and reducing environmental problems.

4. Public Private (Academic) Partnerships in Practice

4.1 Public Private (Academic) Partnerships

Following the EM theory since the last 20 years, PP(A)Ps should be an important factor in the fight against ecological deterioration instead of a firm state enforcement: *‘The state will have to widen the competence of civil law in environmental policy, focus more on steering via economic mechanisms and change in its management strategy by **introducing collective self-obligations for economic sectors via discursive interest mediation**’* (Mol, 1995, pp.46-47). The state should, according to Mol, transfer the responsibilities and tasks from the state to the market, because the market is considered to be more efficient for coordinating the tackling of environmental problems than the state is. This does not mean that the state needs to withdraw, but rather that state and market should work together in which the state stimulates social ‘self-regulation’ (Ibid) for example via economic mechanisms (like fiscal benefits for the PP(A)P). This shows that PP(A)Ps are becoming more and more important in conquering the ecological deterioration and therefore this research will focus on PP(A)P.

To understand how PP(A)Ps can approach environmental problems, two examples of PP(A)Ps will be given: one from the Netherlands and one from Denmark. Both PP(A)Ps have a focus on raising awareness among their members about their environmental problems and help with the reduction of their environmental impacts. First this chapter will go into the different roles and the importance of academic parties, private parties and public parties in networks to approach environmental problems. The collaboration of these three actors can all give another contribution in approaching environmental problems from their perspective. To give a more practical elaboration on this, the next chapter 4.2 continues with describing the two examples of PP(A)Ps. At last, this chapter will show how the Milieubarometer is used in the PPP in the Netherlands and if it can be used in Denmark in the same way.

4.2 Roles in PP(A)Ps

This thesis will focus itself on PP(A)Ps with a goal towards sustainability. *‘Sustainability driven partnerships are being catalysed by a perfect storm of consumer / citizen awareness, transparency-enabling technologies, emerging market-power shift, increasing NGO openness to business and an increasingly compelling business case that CEOs can no longer ignore’* (Bulloch et al , 2011 in: Hicks, 2012). Sustainability is a complex concept which theoretically needs to cover the Triple Bottom Line, but is hard to practically apply in business operations, regulatory contexts and also just in everyday life. Therefore, continual science in collaboration with practical actors is needed to apply such a theoretical concept. The practical actors will be elaborated on in this sector. In the two PPAPs which will be used as practical examples in this thesis, the company is the main subject by which the other partners try to guide the companies towards the sustainability goal. Such a structure is displayed by Figure 4.

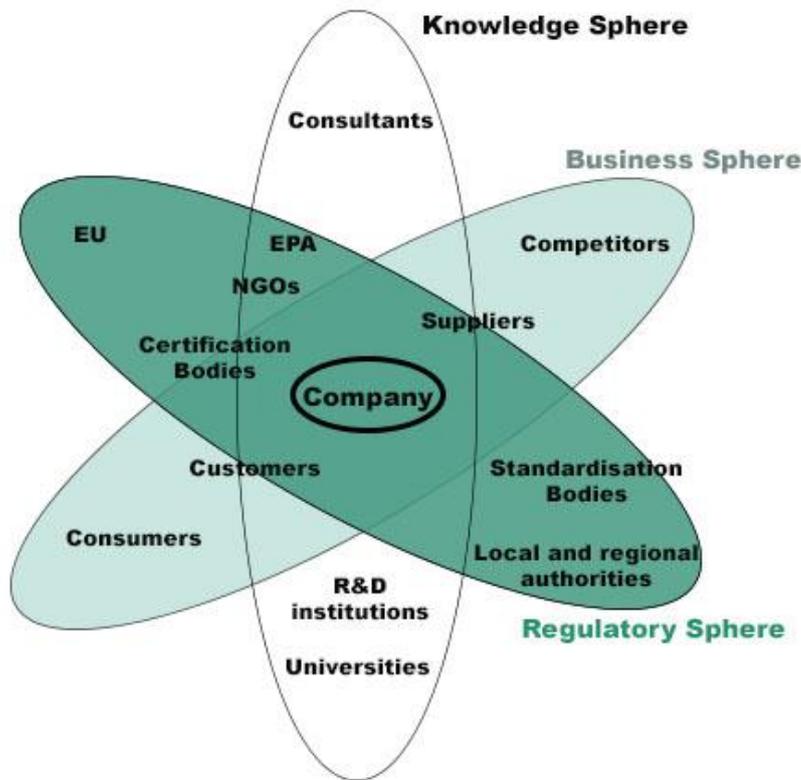


Figure 4 *Company's networks relations- selected networks which are of importance to the company's environmental commercial space* (adapted from Søndergaard et al., 1997 in: Lehmann, 2008)

This image shows how stakeholders in a company's network are interrelated and how they can interact and co-operate in a given content (Lehmann, 2008 & Holm, 1997). Stakeholders in this context are defined as 'any group or individual who can affect or is affected by the achievements of the company's objectives' (Freeman, 1984, p. 46). This figure categorizes on the knowledge sphere, business sphere and the regulatory sphere.

The image shows that the focus does not lay in the individual relations but on the entire structure. For example it can be seen that the customers and suppliers are fitted in all the pillars together. This interrelation supports the idea that 'together there should be interaction between the relations which determines the development of the company and its changing potential' (translated from: Holm, 1997). Hence, a company can be influenced by different stakeholders coming from different 'contexts' with different demands on the companies. Relating this to the PPAP, there the regulatory sphere (public actors), knowledge sphere (universities) and business sphere (private actors) are engaged to develop plans for reducing the environmental impacts of the companies. The companies become the main focus point of the PPAP.

However, the state needs to stay the authorizer or steering wheel in the PPAP. *‘In other words, actions or decision-making are coordinated using pre-determined operational rules or behavioural norms, potentially being prescribed either by organisational rules or government policy’* (McAllister, 2015, p. 87). This is also covered in the EM theory, where it is assumed that the existing institutions (in this way the regulatory state) should not be changed radically, but the state (as a stakeholder in the regulatory sphere) should overcome its bureaucratic deficiencies in twofold. First, they should shift their environmental policy from reactive to preventive (Mol, 1995), meaning that a policy should create favourable conditions and contexts for environmental practices coming from the business sphere. Second, the state should transfer its responsibilities towards the market (or the business sphere). Mol (1995) reasons for this: *‘the market is considered to be a more efficient and effective mechanism for coordinating the tackling of some environmental problems than the state’*. However, what is missed in Ecological Modernization is the importance of the ‘knowledge sphere’ in the conquering of ecological deterioration. In PPAPs universities become more important, also seen in the upcoming use of the word PPAPs instead of PPPs. However, EM does not represent this yet. The analysis will show why it is important to include the academic partner when practising the EM theory.

In the end, when analysing the PPAPs in Denmark and finding ways to involve the Milieubarometer in these networks, it is important that the Milieubarometer can be a help for the interrelationship between the different spheres and the stakeholders in the spheres as shown in Figure 4. To understand how the Milieubarometer is already engaged in stakeholder relationships and directed and monitored towards goals like this, chapter 4.2 will explain the use of the Milieubarometer in the networks in the Netherlands and the way the tool supports the relationship between the different stakeholders. When understanding this, it can be an example for Denmark to show how the Milieubarometer can be used in these stakeholder relationships in order to make the tool useful and feasible for the members of the PPAPs.

4.3 PPP in the Netherlands

In the Netherlands, the Milieubarometer is, as earlier mentioned, used by the PPP called Blauwzaam in the region Alblasserwaard/Vijfheerenlanden. Blauwzaam is a PPP where the partners¹⁵ all focus themselves on sustainable entrepreneurship. They see themselves as the *‘mediary between various public, private and semi-public parties’* (spokesman Blauwzaam, 11-5-2015). Among the partners are construction companies, schools, a bakery, ICT companies, 3 municipalities, a fitnessclub, logistic companies and installation companies. These partners come together a couple of times per year to participate in knowledge sessions, symposia and working groups (Blauwzaam.nl, 2015). To become a partner of the PPP, the company or public partner needs to pay a sponsorship fee of 250 euro’s (excluded VAT) per year. This money will be used to maintain the PPP with organizing events, secure the brand,

¹⁵ Blauwzaam does not have members. It has partners that dedicate themselves to the Energy Covenant (spokesperson Blauwzaam, 11-5-2015).

communication costs and provide helpful tools like the Milieubarometer.

Blauwzaam supports itself by saying that with becoming a member the partner gets a more exclusive status due to its relatedness to a PPP which encourages sustainable entrepreneurship. The partner shows that it takes responsibility for sustainable thinking and doing in the regional area. Next to that, the partner has access to the growing network of companies and organizations with sustainable ambitions.

In Blauwzaam it is seen that the Milieubarometer helps the members to map and analyse the origins of their scope 1 and 2 CO₂ emissions and how to reduce them. Personal advices from Stimular's consultant are crucial to this. Without the Milieubarometer it would be harder for Blauwzaam to map the CO₂ emissions of the companies. When all the companies used different tools to map their CO₂ emissions, the outcomes could not be benchmarked since they all used different calculators. Therefore one tool makes the credibility of the efforts towards the goal more visible. However the actual knowledge sessions and symposia are also crucial to the effectiveness of the partnership to give the partners the sufficient knowledge from experts. Next to that, the share of knowledge among the partners is important to get experiences from the practical field where only the private sector knows about. In Blauwzaam the role of the public partner is more or less the same as the companies: they commit themselves to the Energy Covenant to reduce their direct CO₂ emissions. In this way they figure as a role model for other partners. Next to that, they can easily come in contact with the companies in their region (spokesperson Blauwzaam, 11-5-2015). Hence, the interrelationship of the public partners, private partners and Stimular as consultant makes Blauwzaam effective in reducing the direct environmental impacts of the private and public members.

4.4 PPAP in Denmark

In the introduction is explained that PPAP stands for Public Private Academic Partnerships. Martin Lehmann (2007) explains that the academic partner in PPAPs shall not bring the 'truth' but rather help with and stimulate learning activities towards sustainability. Next to that, when universities co-operate closely with other actors like companies and the government they will provide better applicable research directed towards these actors and they can prepare their students to fill the future positions in these sectors. Especially in the case of Aalborg, where Problem-Based Learning at Aalborg University operates closely with actors outside of the academic world, it is important to specify the academic actors in the PPPs. To show how these PPAPs are established, an example of a PPAP in Denmark will be elaborated on.

Netværk for Bæredygtig Erhvervsudvikling NordDanmark (NBE) is a forum especially focused on companies, where the companies learn, debate and get assistance in sustainable entrepreneurship (NBE website, 2015). The PPAP is operable in Aalborg and Hjørring in the region Nordjylland. The aim of the PPAP is to strengthen the participating companies' competitiveness by enhancing environmental sustainability in their operations. To become a member, companies should commit themselves to

integrate sustainability targets into their business strategy and must also draw up a sustainability action plan (NBE, 2015). Companies can get their operations and products scanned by consultants in the network to analyse what their environmental impact is and how to reduce that. Next to that, the private and public members have ‘network meetings’ to discuss topics related to sustainability where companies can be inspired by each other’s efforts towards this topic.

4.4.1 Why can the Milieubarometer presumably be a help for NBE?

In order to understand more about the approach of PPAPs, Martin Lehmann provided a model with a structure of the PPAPs in Green Network, which is also an example for NBE. Figure 5 shows this model:

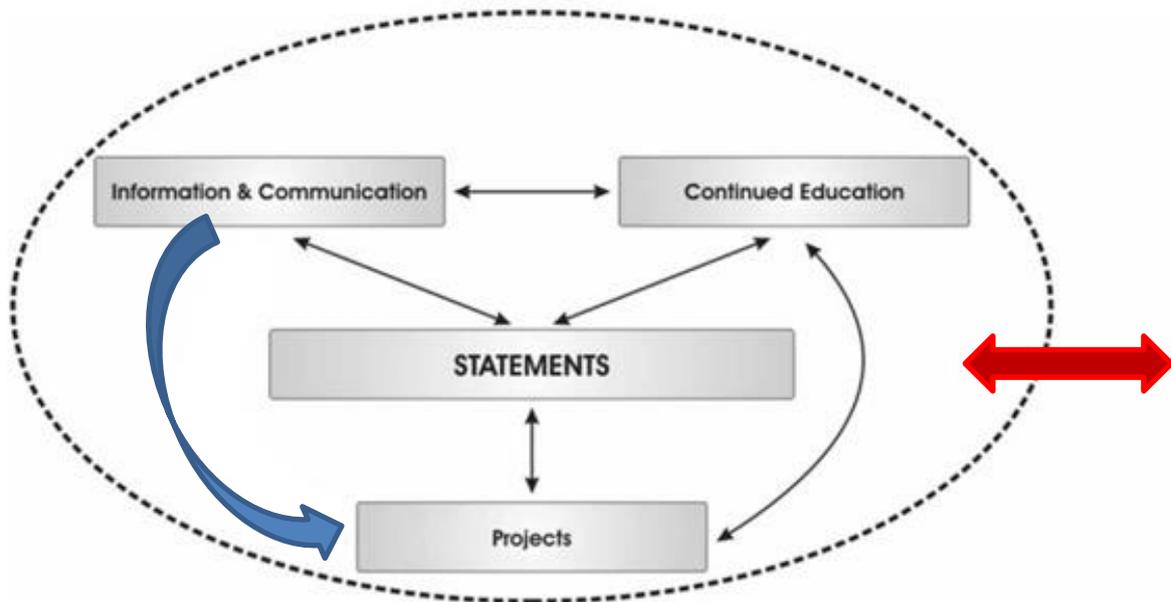


Figure 5: Major activity categories in the Green Network and their relation to each other (Lehmann, 2006)

This image shows the four main topics which are placed in the boxes, the arrows figure as the activities which relate the topics to each other. These arrows are not only connectors between the topics, but they are activities that bind other activities together or they act as an input to the topics that creates additional value of that topic and supports its innovation (Lehmann, 2006). For example information& communication together with the projects has as activity (and so the left blue arrow) the information available on the website about the different projects. The red arrow on the right side shows that these networks can have influence on institutions outside the network and vice versa. They organize activities like information evenings or information on the website about their network to influence the broader institutions about how sustainability can be incorporated in companies’ daily operations. This influencing of the institutions by the networks can be covered by the EM theory. The cooperation of the market and the state in these networks should bring new ways for companies to reduce their

environmental impacts while still keeping economic growth. When the companies get more support in this, the companies can provide more environmental friendly products or services to their customers which gives more sustainable products or services to choose for the customers. In this way, modernization is encouraged, however with decoupling of the environmental impacts. In other words, companies can still make profit while showing that they can reduce their environmental impacts. For informing the institutions outside the network, the Milieubarometer can be used as a “scientific” support for the disclosure of environmental data of the members. When the environmental data of all the companies in the network are measured in the same way, the disclosed environmental data will be more reliable which will eventually enhance the credibility of the partnerships. The same is done by Blauwzaam in which the Milieubarometer is seen as an ‘*external body that measures and objectively exhorts and encourages entrepreneurs*’ (Spokesperson Blauwzaam, 11-5-2015). Next to that, the partnerships can show with this tool if the companies are actually keeping track of their environmental impacts.

In Green Network this outside arrow is covered by the ISO 14001 certificates of their members. This PPAP demands for this certificate to show to the outside stakeholders (the outside arrow) that their members are trying to reduce their environmental impacts. NBE in the contrary, does not have such a demand and so they cannot show to the outside world with a certain certificate that their members are dealing with environmental problems. They write about the individual efforts their members make to become aware of their environmental performances. However they do not have ‘statistical’ data to show this. Quantitative external communication about their member’s dedication to the environment is needed (Lene Nielsen, NBE, 2015). For this it could be a possibility to use the Milieubarometer in order to show external stakeholders (like customers, the government or the EU) if all the members are aware of their environmental impacts and how they are trying to reduce these impacts. Next to that, disclosing the outcomes of the Milieubarometer can show to other companies how much they can reduce their environmental impacts when becoming a member of the PPAP. This can especially be displayed by measuring the tool’s outcomes per turnover which shows that a company can maybe even make profit when reducing their environmental impacts. In this way, the Milieubarometer can even be used to attract new members for the PPAP.

Nonetheless, the Milieubarometer as a possible solution for the missing quantitative external communication is still a hypothesis and needs to be tested in order to really state this idea. Therefore, the analysis will examine the first usage of the Milieubarometer by members in NBE to see if the Milieubarometer will be a useful tool for the member-companies to strengthen their awareness about their environmental performances. If the companies are willing to use the tool, then NBE can actually show that PPAPs like them are a perfect way of approaching the EM theory, stating the reduction of environmental impacts while still encouraging economic growth.

5. Analysis

If PPAPs are the new way of approaching the EM theory, then it should be analysed how the public, private and academic partner in this partnership can overcome ecological deterioration. More importantly, how the relation between these partners can contribute to less ecological deterioration decoupled from economic growth. The first section of this analysis will go into the role of companies in decoupling economic growth from environmental impacts. For this, the Milieubarometer is proposed as a help. Interviews are conducted with five member companies to hear their approaches towards environmental impact reduction and if the Milieubarometer can be a help in that. After that, paragraph 5.1.2 will go into the role of the public partner. What should the (local) government do to encourage environmental impact reduction at companies? Chapter 5.1.3 will firstly analyse how the Milieubarometer can be a help for the internal communication between the companies itself. Second, it will analyse how the Milieubarometer can be a help in the communication between the companies and the public actors in NBE in order to jointly overcome environmental deterioration. In this subsection the importance of the role of the academic partner in NBE will be explained as well, although this partner is not enclosed as an important part of the EM theory (yet).

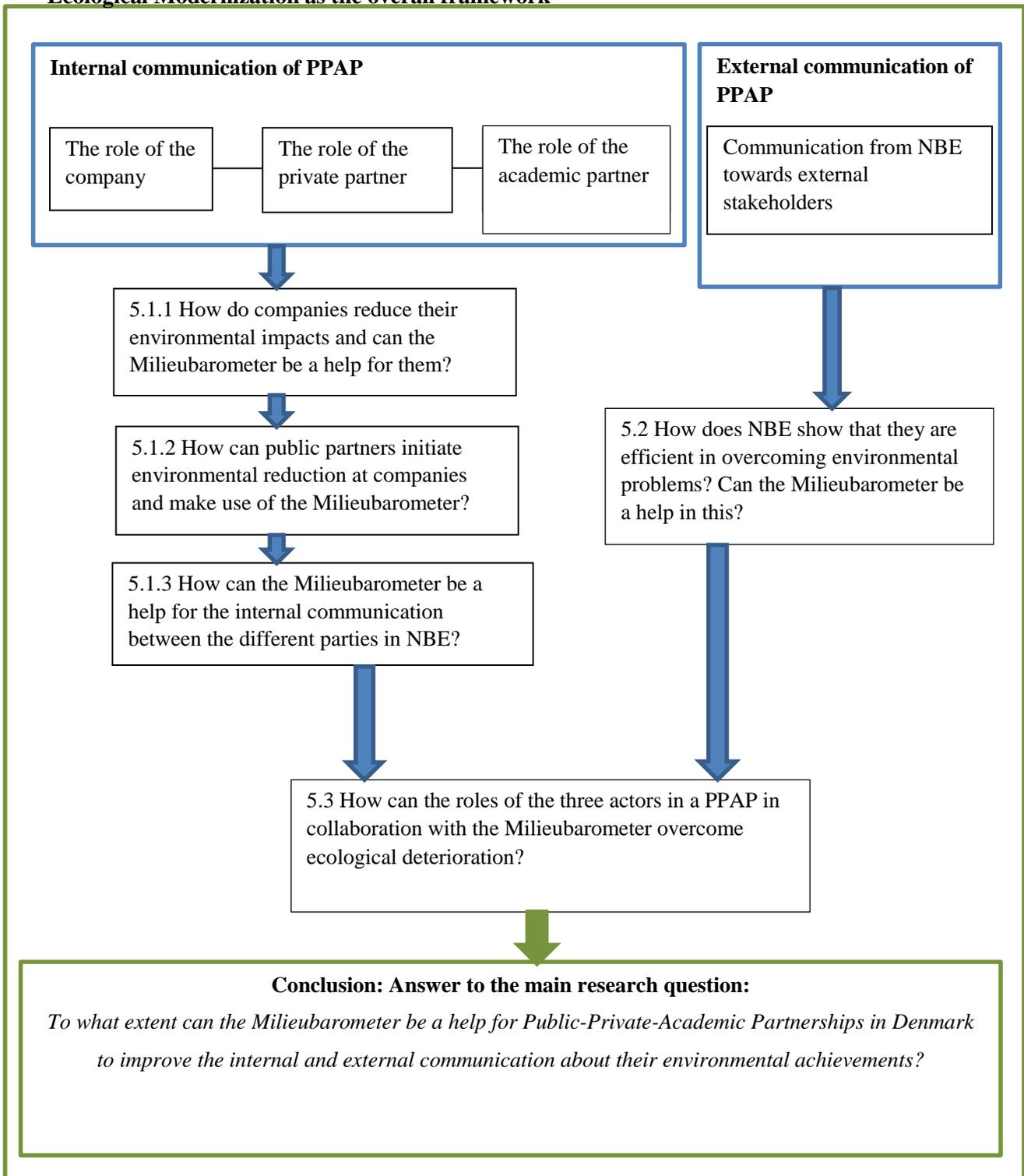
The second section of chapter 5 will go into the joint use of the Milieubarometer in a PPAP like NBE as a whole. How can NBE approach reduction of environmental impacts among their companies while still encouraging economic growth with the use of the Milieubarometer for their external communication?

In the end, all the answers come together and will answer the question: How can the roles of the three actors in a PPAP in collaboration with the Milieubarometer overcome ecological deterioration?

The answer to the main research question: *'To what extent can the Milieubarometer be a help for Public-Private-Academic Partnerships in Denmark to improve the internal and external communication about their environmental achievements?',* for which the answer is based on the findings in this analysis, will be given in the conclusion.

The framework for the analysis can be found on the next page.

Ecological Modernization as the overall framework



5.1 Internal communication of PPAP

5.1.1 How companies map their direct environmental impacts?

To see if PPAPs are a new approach to the EM theory, first the role of the private partner in overcoming environmental problems needs to be analysed. Are the companies aware of their environmental impacts? Which environmental impacts get their attention? How do they map them and reduce them? And is the Milieubarometer a helpful tool to become aware of their environmental impacts? In order to understand this, interviews were conducted with 5 companies. These companies got a presentation on Milieubarometer in order to find out if the company is already using a tool like this or if the tool was interesting for them to use. In addition, the researcher came to know if the company was aware of the environmental impacts from their direct consumption. This section will go into the opinions of the companies about the Milieubarometer and their experiences with mapping and reducing their direct environmental impacts. Next to that, three out of the five companies supplied their data for the researcher to enter in the Milieubarometer. This was important to find out if the tool technically can be applied in Denmark. The Milieubarometer is based on Dutch conversion factors for calculating the environmental impacts and the entering of the data in the tool is mainly directed to the Dutch companies. Therefore, entering consumption data from Danish companies could give a first insight in what should be adjusted when the tool will be used in Denmark. Although this entering of data is usually done by the company itself, for this research it was done by the researcher for three of the five companies. The advantage to this was that the company did not have to spend time on entering the data in the Milieubarometer. Another advantage was that the researcher knew more about the tool, so she could immediately see if some data could not be entered or if adjustments were needed. A disadvantage on entering the data on behalf of a company was that the company could not see how to enter data in the tool, consequently they could not give any first reactions on the feasibility of entering the data. However this was reduced by giving a license to the company so it could look at the entered data afterwards. Due to feedback given by the company afterwards on the tool and the outcomes of the tool, it is seen that the companies actually did take a look at the tool. Next to that, one out of the five companies entered the data himself. The company's characteristics are supplied in the next table:

Company	Characteristics
Port of Aalborg	Port of Aalborg handles the various services that the Port of Aalborg offers, like logistics, and different ways of handling cargo (AalborgHavn.dk, 2015). The company figures as a terminal for the ships and the overlay to traffic on land. The company already keeps track of the environmental impacts of the consumptions inside their company in an elaborative way. This consumption is focused on the electricity, water, fuel use and waste supply. The fuel consumption of the ships is not

	incorporated in this, since these ships are not part of the company (interview Port of Aalborg, 11-3-2015).
Fibertex Personal Care	Fibertex Personal Care supplies three different non-woven products for inter alia diapers, feminine hygiene and incontinence care products (fibertextpersonalcare.com, 2015). They produce a large number of different products (more than a hundred varieties) mainly for the three mentioned applications. It delivers to customers all over the world, with the main customers located in Europe (though some have headquarters in the US, they mainly supply to the European production sites) (e-mail contact Senior Scientist Fibertex, 26-5-2015). Fibertex Personal Care already measures the environmental impacts from the consumption inside the company. These environmental impacts can be neglected against the environmental impacts of their raw material use for their products for which they assess LCAs and from their electricity consumption (Fibertex Personal Care interview, 2015).
Royal Thermo Trae	Royal Thermo Trae supplies FSC wood impregnated with linoil which makes the wood more sustainable and more isolating (royaltrae.dk, 2015). These products are mainly delivered for construction of buildings and houses. Customers are for example NCC and Rambøll. They do not yet keep track of the environmental impacts of their environmental consumptions inside the company. However, they are focused on sustainable products and sustainable producing for which they retrieved the Nordic EcoLabel ¹⁶ (Royal Thermo Trae interview, 20-4-2015).
Ergonomic Solutions	Ergonomic solutions designs, manufactures and supplies ergonomically advanced mounting and security solutions for a wide range of static and mobile technology hardware (ergonomic-solutions.net, 2015). They supply products like the standards for payment machines in supermarkets. Ergonomic Solutions keeps track of their consumption already in an Excel and have entered data in the Climate Compass. At this moment, they are interested in the Milieubarometer because they need to supply their company related environmental data to the municipality since their production area is larger than 1000m ² (also called Miljøgodkendelsesbekendtgørelsen) (according the Danish Environmental Protection Act, Environmental Consolidation Act. nr. 879 of 26. June 2010) (interview Ergonomic Solutions, 27-4-2015).

¹⁶ 'Nordic Ecolabel is the official Ecolabel of the Nordic countries and was established in 1989 by the Nordic Council of Ministers. The purpose of the Ecolabel is to contribute to sustainable consumption and production, and our vision is a sustainable society. The Nordic Ecolabel is a voluntary ecolabelling scheme that evaluates a product's impact on the environment throughout the whole life cycle. The label guarantees among other things that climate requirements are taken into account, and that CO₂ emissions (and other harmful gasses) are limited - where it is most relevant' (<http://www.nordic-ecolabel.org/>, 2015).

GetWasted	GetWasted is a new start-up company that supplies 8kg tables from high quality waste i.e. recycled foam and recycles fiberglass (getwasted.dk, 2015). They do not produce the tables themselves. Because the company just started and does not have so much to tell about their environmental data yet, they provided answers to some questions by email.
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First, Aalborg Havn was interviewed. During the meeting, the environmental coordinator from Aalborg Havn, gave an insight in the outcomes of their own Excel tool (appendix 2, **Fout! Verwijzingsbron niet gevonden.**). In this Excel sheet, it was seen that they already keep track of the use of electricity, fuel, water and waste. This is mainly done in order to achieve and retain the ISO 14001 certificate. Next to that, they use this tool for internal communication, especially to inform the overall management about their achievements. By comparing the outcomes of Aalborg Havn's own tool with the outcomes of the Milieubarometer and looking at the feasibility of entering their data in the Milieubarometer, it was seen that some changes in the Milieubarometer should be made to make the tool more usable for Aalborg Havn.

The Excel tool of Aalborg Havn did not include the financial costs of the direct environmental consumption. These financial costs are included in the Milieubarometer, which caught the attention of Aalborg Havn. The environmental coordinator explained that such a feature could show the management that reductions in electricity, water, fuel and waste use could actually save them money. Such a feature could make it more interesting for the management to focus on the reduction of their direct environmental consumptions.

Moreover, when looking at the Milieubarometer's graphs, there were some surprises for Aalborg Havn. Aalborg Havn's Excel graphs mainly focused on the electricity use, heat use and waste output. However, it became clear through the Milieubarometer that the use of Diesel for Mobile Machinery had a much higher environmental impact than the use of electricity in the buildings (even when the environmental impacts of the electricity mix is based on the Dutch mix¹⁷). With this, it is seen that the Milieubarometer could even surprise a company which already keeps track of their environmental impacts. It includes themes that companies initially do not see as important, while after entering the data for such a theme, it is seen that it actually can have the highest environmental impact.

The second interview was conducted with Fibertex Personal Care where the two interviewees offered their input on the positive and negative points on the feasibility of the tool based on the experiences with

¹⁷ The Dutch mix of electricity has 19 % coals, 39 % of natural gas and 35 % of renewables in 2011 (see appendix 3, **Fout! Verwijzingsbron niet gevonden.**). The Danish mix has in 2013 a share of 9,7 % of natural gas and 46,7 % of renewables in 2013 (see appendix 3, **Fout! Verwijzingsbron niet gevonden.**). Therefore, the Dutch electricity mix will probably have a higher environmental impact in the Milieubarometer due to less use of renewables in the electricity mix in contrary to Denmark's electricity mix.

their own tool. The environmental coordinator and senior scientist's overall view was that the tool could surely be used among SMEs, but their company, which is not an SME, already has a tool like this. Fibertex already maps its environmental impacts in a self-made Excel tool and in a tool called EcoDesk¹⁸. The self-made Excel tool is only used for tracking and for year to year comparisons. Next to this they use EcoDesk, because one of their bigger customers (P&G) is demanding from Fibertex that they keep track of their environmental data through this tool. When all the suppliers of P&G use the same tool, then P&G can easily access supplier's data for e.g. year to year comparisons, so they can score suppliers based on the improvements they made regarding their environmental impacts (e-mail contact Senior Scientist Fibertex, 26-5-2015). Inter alia for this reason, Fibertex will not be interested in using another tool. Second, their own Excel tool together with calculations in SimaPro (also used as a basis for an external validated LCA) showed that Fibertex' carbon footprint from the company related emissions would be too minimal to consider against the environmental impacts from the raw materials and their energy consumption (e-mail contact Senior Scientist Fibertex, 26-5-2015). The energy consumption can be measured by the Milieubarometer, when the electricity mix will be adjusted to the Danish situation. However, since the Milieubarometer is mainly focused on direct and partly indirect emissions but not specifically on the use of raw materials for production which is the other main actor in their carbon footprint, they do not see benefits in using the tool. Fibertex would thus be more interested in a tool, which also considers the environmental impacts from the raw materials than a tool that 'only' includes the direct emissions.

This disclosure of the environmental impacts of the raw materials was also elaborated on in the third interview with the manager of Royal Thermo Trae. During the interview, a discussion was held about the motivation of him as a company manager to integrate the environment in the company's operations and his opinion on the dis-interest or minimal interest of other companies in this¹⁹.

It became clear that the manager was interested in the Milieubarometer but not as much as he was in a tool that supplied a simple LCA for his products. With this tool he would like to show that the wood he uses is more sustainable than other wood sources, due to the lifetime of the tree (interview manager Royal Thermo Trae 20-4-2015). Next to that, the manager suggested that tools like the Milieubarometer should be multifunctional, i.e. the tool should be acceptable to use for more systems (like ISO or labels like FSC). *'I needed to have an FSC, PFC, Nordic Ecolabel, Nordic Miljofyrtn, but every time I do it, it costs 50- to 100000 Danish Kroner or even more. And next to that, I need a hell lot of administration. If I enter into the office and saying, now we need another label, then he kills me, because he knows how much administration is following'*. It can thus be the case, that when companies acknowledge that the tool can be used for for instance several ISO standards, as is also done in the Netherlands, then the

¹⁸ More information can be found at: <https://www.ecodesk.com/>

¹⁹ The manager could not provide the data for the Milieubarometer on time before the deadline of this thesis.

demand for the tool could become higher. Hence, it is seen that receiving recognized certificates is important for this company to become more dedicated to environmental impact reduction.

In the end, a small e-mail conversation was conducted with GetWasted. GetWasted is a new start up and they could not retrieve their direct environmental consumption yet. Next to that, they do not produce the products they deliver themselves, so they supposed the tool could not be useful for them right now. Therefore they could not directly react on the Milieubarometer. However, although their focus was not on their direct environmental impacts, like measured in the Milieubarometer, still they saw a great importance in reporting about the environmental impacts of their products, like done in a LCA. GetWasted even sees conducting LCAs for their products as a strategy to penetrate the market: *'We want to establish ourselves on the niche market of recycled and environmentally neutral design furniture market. LCAs are therefore needed to determine the environmental impacts of our products and compensate for them'*.

Including this LCA aspect in a tool like the Milieubarometer can be interesting for Stimular, since more companies will ask for this in the future²⁰. Although the amount of raw materials in products can be entered in the Milieubarometer, it will not calculate the environmental impacts as it does for other indicators. This is due to the facts that the environmental impacts of raw materials are dependent of so many factors in e.g. the extraction-, transport- and production phase, for which every raw material should need its own LCA. Stimular is researching at this moment how such environmental impacts can be included and if a simple calculation will fulfil. An example for this can be the Plastberegner (www.plastberegner.dk) which is used by some Danish companies (it has 350 users, but because the tool is free to use it cannot be seen if they are all using it frequently). This tool is developed by LCA 2.-0 consultants and transparently calculates the scope 3 emissions of the GHG Protocol. *'In the tool it is possible to create own LCA activities and to link to activities in a database. The database contains pre-calculated life cycle emissions for a large number of LCA activities, e.g. electricity, transport, raw materials etc.'* (Schmidt, 2012 p. 7). The tool was initially developed for plastic converters, however right now it can be used by basically any industry (e-mail contact Jannick Schmidt, 11-5-2015).²¹ This research will only supply small propositions for making such a feature in the Milieubarometer (Appendix 7), however these propositions are limited due to the fact that this is outside the research' scope. However, it is important for Stimular and other interested parties to know that there is a demand for a (simple) tool that helps companies to calculate the environmental impacts of raw materials used for production.

²⁰ According to Stimular, this is also seen in the Netherlands. Companies mainly do want to disclose part of their scope 3 emissions for the CO2-performanceladder.

²¹ More information about the Plastberegner can be found on: http://plastberegner.dk/LCA-report_20121008.pdf

As said before, because the Milieubarometer is made for Dutch data, it is interesting to see if Danish companies like the mentioned companies use the same data and if some adjustments need to be made in the tool to comply with the Danish situation. An elaborative analysis on the changes in the Milieubarometer with help of Fibertex Personal Care A/S, Port of Aalborg, Ergonomic Solutions and Aalborg Municipality can be found in appendix 2.

5.1.1.2 The level of environmental management related to the use of the Milieubarometer

The barriers and possibilities with the Milieubarometer, proposed by the companies, are important for the Milieubarometer to function in Denmark in order to see if the tool can be helpful for companies to become aware of their environmental impacts and reduce them. However, it is also important to take a look at the level of environmental management in the companies to see if the Milieubarometer can be applied to their current level of environmental management. For example: if a company is just at the beginning of starting up (like GetWasted), then they do not have the data available yet to enter in the Milieubarometer. In the contrary, if a company is already mapping and reducing their environmental impacts for several years (like Fibertex), then it can be the case that the Milieubarometer cannot give any additional help to this company. To analyse this level of environmental management, the ladder approach of Remmen (Figure 6) will be used. This figure shows the different steps Danish companies have made regarding their responsibility towards the environment (Remmen, 2003). These steps made use during the interviews to understand in which ‘level of environmental management’ the company is. Moreover, these steps or in this thesis also called ‘level of environmental management’ can be related to the use of the Milieubarometer.

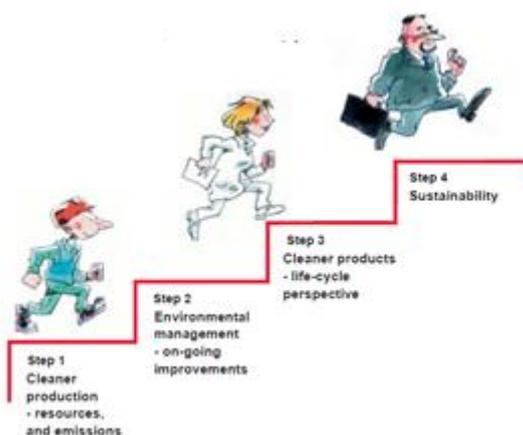


Figure 6: Various approaches to life-cycle-based environmental initiatives (Remmen, 2003)

The Milieubarometer is most helpful in step 1 and 2. Step 1 optimises the production in a company by reducing water and energy consumption and other production related emissions (Remmen, 2003). Keeping track of the environmental impacts attached to the consumption of electricity, water and fuels is important in this, which is the main purpose of the Milieubarometer. Step 2 demands for continual

improvements, which is the next phase in the Milieubarometer: continuous reduction of the environmental impacts. Relating this to the interviewed companies, it is seen that the steps where the Milieubarometer is the most helpful in, that these steps are skipped in some cases. The environmental vision of companies become more product focused (step 3) instead of company focused (step 1). A company like Fibertex has already moved from step 2 to step 3. In the case of Royal Thermo Trae and GetWasted it can be the case that they jumped from the ground to step 3, because they do not keep track of all the company-related emissions however they already do focus on cleaner products. One reason for this can be that when a company starts up with sustainable products, the focus should lay on the products, since these products need to be sold. This indicates that customers are demanding for cleaner products, as the manager of Royal Thermo Trae also told: *‘right now we have so much traffic on our new (sustainable) products. We thought it would be an okay business, but it has been an astonishing business. We had an expectation that our Nordic Ecolabel products (the sustainable wooden products) would be between hopefully 20-25% of our turnover, right now it slides on 80 %’*. GetWasted even focuses on the market where customers will demand for environmental transparent products by means of LCA: *‘We expect our customers (individual and companies) to react to it. We do not think they will expect it, but we think it will give the furniture a plus if we have it, since it is often perceived as a sign of transparency vis-a-vis the customers.’* However, the question is if it is possible to jump over the first two steps, since all departments must contribute to cleaner products, so including the production. In order for a company to understand this, a tool like the Milieubarometer should be provided to understand for a company where to begin when trying to improve the environmental characteristics of a product.

However, when a company has passed the first two steps and focuses on step 3, then the Milieubarometer cannot be such a big help anymore since the tool does not take the emissions of suppliers and consumers into consideration. For this step a simple LCA tool should be helpful for companies to map and analyse their product related environmental impacts. Such a LCA tool can for example be a mixture of the Plastberegner with the usability of the Milieubarometer. Arguments for this mixture can be found in Appendix 7.

This simple LCA tool can be a new way to approach environmental problems with a demand for it from the companies themselves. When analysing new ways to approach environmental problems by decoupling them from economic growth according the EM theory, then it is important to take a look at the companies’ demand on ways how to reduce their environmental impacts. Their ideas should be taken seriously, because it can mean a new way of approaching the EM theory by considering that the economy can grow and still reduce the impacts on the environment by for example less unsustainable exploitation of resources and less use of harmful pollutants (Buttel, 2000; Mol & Sonnenfeld, 2000). Hence, companies should be considered as a key figure in decoupling economic growth from environmental impacts. Companies’ demand for reducing the product related impacts can eventually mean less

unsustainable resource exploitation and less use of harmful pollutants in their products. Therefore the demand for simple tools on how to reduce product related impacts needs to be considered in future research, as a way to practice the EM theory in real life.

Next to the companies, the Milieubarometer could of great help for the public members in the PP(A)P as well.

5.1.2 The role of the public partner in reducing the environmental impacts of companies?

In accordance to Figure 1 (Chapter 1), the public partner supplies inter alia recognized authority and funding to a PPAP. In Blauwzaam the public partner also engaged itself to the Energy Covenant which can make them figure as a role model for other partners like the companies (spokesperson Blauwzaam, 11-5-2015). Aalborg Municipality tries to be this role model as well in NBE. The spokesmen of AAK Bygninger (the public buildings) explained that the municipality is trying to reduce their CO₂ level of their buildings by 2 % every year. Nonetheless the buildings only cover 2 % of the overall consumption in Aalborg: *‘So 50 % CO₂ reduction in 2050 for the buildings of the Kommune (municipality) is not enough, we also need to have the private companies and the consumers and the industrial consumers to do the same. And that is not so easy* (spokesperson AAK Bygninger, 12-5-2015). This subsection will analyse what the public partner needs to do in a PPAP in order to incite environmental impact reduction behaviour among the member-companies. For this, the presentation of the Milieubarometer is used to raise the discussion on the role of a public partner in encouraging companies to map and reduce their environmental impacts. To strengthen the use of an environmental impact tool like the Milieubarometer among companies in Denmark, Annie Lauridsen of Key2Green underlined that companies really must know why they should use it. Mainly small companies cannot see the importance of such tools, due to no demands for environmental disclosure from their stakeholders (Key2Green telephone interview, 16-3-2015). She mentions that there are many tools on the market in Denmark, however many small companies do not understand why they should use it. Furthermore, she mentioned that if small companies see the benefits of such a tool, they are too much ‘spoiled’ with free tools, so they are maybe not willing to pay for a tool. Moreover, big companies in the networks have their own tools or hire consultancy firms to map their environmental impacts. SMEs do not have the money, nor do they have the labour capacity to work on environmental issues (Ibid). Additionally, SMEs do not see the relevance of disclosing environmental data as much as big companies do (Miles at all., 1999). When introducing a tool like the Milieubarometer on the market it is important to find an incentive from which also small companies can see that mapping and disclosing their data is important for e.g. competitive benefits and receiving new customers who are interested in an environmental dedicated company. Such incentives can be policy regulations like EU’s Green Public Procurement²², or regulations, which demand for

²² This directive asks public authorities to choose environmentally friendly goods, services and work, to make a contribution to sustainable consumption and production (European Commission website, 2015).

environmental disclosure from small companies in a certain sector. The manager from Royal Thermo Trae experienced that there is no such a regulation yet in Denmark, but there is something like the voluntary Green Procurement Protocol in Sweden. However, in Sweden the law obliges public offices to buy green. According to Royal Thermo Trae, such a law should exist in Denmark as well.

As is seen by Ergonomic Solutions, they suddenly found the urge to be transparent about their environmental performances because of the law that demands for environmental transparency at companies with a bigger production floor than 1000 m² (Ergonomic Solutions Interview, 27-4-2014). Because of this, they thought that something like the Milieubarometer could be helpful to use for supplying their environmental data for the municipality to comply with the law. With this example, it is seen that a law can incite a company to become more open and aware of their environmental performances for which they will look for the best solutions for them to comply with this law²³. Ergonomic Solutions also has all the data to be compliant for a voluntary agreement like the ISO certificates 14001 and 9001, but they are not willing to actually buy the certificates when their customers do not demand for it. They are one of the leading suppliers in a niche market in which there is not yet a big interest for the environment (in contrary to Fibertex, who is also leading on a niche market, but in this market there is a big interest for the environment). Due to this, they are not willing to have such certificates yet. When their customers demand for these certificates or when they see their competitors will have such certificates, then Ergonomic Solutions would be willing to buy them (Interview Environmental Manager, 27-4-2015).

Furthermore Key2Green sees that there is not much interest from the companies in the disclosure of their CO₂ emissions, also because of no incentives that demand the transparency of CO₂ emissions from companies. In the Netherlands such an incentive is for example the CO₂ performanceladder. This incentive gives companies certificates when they map their CO₂ emissions and act towards reduction in these emissions. These certificates give an award advantage when the company calls for a tender for a certain project. The more the company acts towards CO₂ reduction, the higher it comes on the ladder and the higher it is on the ladder, the more award advantages it gets (SKAO, n.d.)²⁴. Such a ladder brings financial benefits for companies who reduce their CO₂ emissions. With this, the benefits for companies to map and reduce their CO₂ emissions will be clear. This incentive is also an outcome of a partnership between public and private partners. Such an incentive can be a solution to incite companies in Denmark to become aware of and reduce their CO₂ emissions. This incentive also reflects the way Mol (1995) says that the public partner should make policies that create favourable conditions and contexts for environmental practices coming from the business sphere.

²³ In which the public partner will be the actor that enhances the law among the companies (as is done in the Danish law called 'Miljøgodkendelsesbekendtgørelsen')

²⁴ Appendix 4 shows the CO₂ performance ladder.

With this it is seen that an obligatory law could actually be more important to incite companies, however when keeping it voluntary then market incentives should be developed to incite competitiveness among companies in environmental transparency. A close collaboration between the public actor in a PPAP and the companies should be the initial step in developing such an incentive.

5.1.3. How can the Milieubarometer be used to improve the internal communication of NBE?

With above sections it is tried to raise the discussion on why companies are willing to invest in environmental impact reductions by making use of the Milieubarometer as an example to do this. The proposed barriers and opportunities for the Milieubarometer can be seen as a step forward to make a tool more compliant to the will of the companies. However, the tool can also be used to incite the discussion between the private actors in a PPAP in order to share experiences about how to reduce corporate environmental impacts. This subsection gives an answer to how the Milieubarometer can be used in internal communication in a PPAP between the companies, since the companies are the ones who should be able to reduce their environmental impacts while still growing economically. The use of the Milieubarometer for this communication between the companies is proposed in the following three ways.

The first idea can be brought back to the use of a summarized report where the Milieubarometer data from all the member companies is presented, as is done by Blauwzaam in the Netherlands (a part of this booklet report can be found in the appendix 5). When the companies get a report from all the companies' environmental impacts and the reductions they achieved, it can incite competition between the companies. This competition can instigate a company to reduce their environmental impacts more than another company. Undoubtedly the impacts depend on the sector of the company. However, the Milieubarometer can measure the costs by turnover, so different companies from different sectors can be compared with each other on their turnover. In this way the Milieubarometer could also incite competitiveness between companies from different sectors. Moreover, such a report could show to the public partner, for instance Aalborg Municipality, what environmental achievements the companies make.

Second, it is seen that companies rather hear other companies' experiences with certain environmental impact reducing investments and if these investments reduced their financial costs, instead of hearing advices from consultancy companies (Bogdana, 2011). *'Working in a group with other similar businesses, offers SMEs the chance to benefit from the experience of their peers in dealing with similar problems'* (Ibid, p. 144). The manager of Royal Thermo Trae agrees that this internal knowledge distribution is important for companies to share knowledge and to know that you are not the only company trying to reduce your emissions. According to him they do this already in the Nordic Ecolabel network: *'when we help each other we get a lot stronger network. We get a lot better turnover. And in*

the end it is the turnover and the profit from that, that should help us to invest money on the things that we believe in'. Ergonomic Solutions saw this already happening at NBE: 'We have those meetings where you get in contact with other companies, because at that point we were deciding should we go for full environmental approval like ISO 14001, or shall we just go with something less? But then again, when I had this talk with my boss, I needed to have some input from other companies on ISO 14001 experiences. And that is why the NBE is good for me to meet some other companies who are maybe in the same situation as we are. So to get some sparring in Danish, some feedback on it.' The Milieubarometer could support such discussions with showing the reductions the companies made in for example their energy consumption, after they invested in certain energy reductions like LED. It can also be the case that the company did not invest at all and just focused on the low hanging fruits like making employees aware, where the Milieubarometer shows if these low-hanging fruits reduced their energy, water and fuel consumption. Therefore, the Milieubarometer can be used with internal discussions in the network as a backup for companies to show if their investments worked out well. It can also be used by companies to discuss how to reduce their highest impacts, as shown by the Milieubarometer. Seiffert (2008) underpins this thought with assuming that a cooperative approach of companies with an open culture towards each other can be a great contribution. Not only because of the environmental benchmarking that can be done, but also the sharing of experiences that improves the organizational learning of all the companies (Ibid). GetWasted underpins this by explaining the benefits of being a member in NBE: *'It keeps us aware of each other's progress in terms of cleaner production and environmentally minded products in the Aalborg area... There are companies with different core activities and agendas and we get to learn about those'*.

At last, the idea of industrial symbiosis can be a good example for communication between companies in a network. The first step in starting industrial symbiosis in a network of companies is communicating about the inputs and outputs of the companies. If this first step of industrial symbiosis can be incorporated in the Milieubarometer, it could be a good tool to incite industrial symbiosis among companies. However, Stimular thinks this goes beyond the purpose of the Milieubarometer, which is meant for mapping and analysing environmental impacts. Still, when using the waste of one company by another company, this waste does not have environmental impacts (from for example incineration) for this company anymore, but becomes a resource for another company. Hence, this will affect the environmental impacts of the company. Nonetheless, when staying close to the purpose of the Milieubarometer and trying to keep the tool simple, it is recommended to not include industrial symbiosis. However, the idea of companies communicating about their resource demand and waste output is interesting for developing a specific 'Industrial Symbiosis tool' and needs further research.

With the example of developing an 'Industrial Symbiosis tool', the role of the academic partner comes in. The collaboration between the public and private partner in a PPAP is shown to be important, both

by the examples proposed in this research as by the Ecological Modernization (EM) Theory. Although the EM theory does not provide elaborative research on the role of the academic partner, when seeing PPAPs as a new way to approach the theory, then the academic partner is definitely seen as an important figure. As said before, the academic partner *inter alia* provides new knowledge and man-power in the form of students and research (Lehmann, 2008). In relation to the Industrial Symbiosis tool, as well as the earlier mentioned LCA tool, academic knowledge is required to develop such tools. In this case, the companies are the main focus on overcoming environmental deterioration when still encouraging economic growth. When the companies try to act towards this, it is important to listen to their requirements for them to reach their environmental goals. Public actors as well as academic partners should react on that, since NBE is mainly targeted towards environmental reduction at the company-members, as mentioned before. The public actors should offer policy adjustments or new (market) incentives for the companies to get administrative help in reducing their environmental impacts. Academic partners should research and provide new tools for companies to work with in order for them to make it easier to become aware of their environmental impacts and eventually reduce these impacts.

5.2 External communication of PPAP: The use of the Milieubarometer by NBE

After examining if and how companies are mapping their environmental impacts through presenting the Milieubarometer as a helpful tool for this, it is considered how NBE can use the Milieubarometer as a collective external communication tool. In this way, the Milieubarometer can be used to inform external stakeholders about the accomplished environmental achievements in NBE.

To understand if there is a demand for this, the researcher collaborated with NBE. Lene Nielsen, project leader of NBE, already showed interest in the Milieubarometer before (van Leeuwen, 2014). As said before, NBE missed quantitative disclosure about the environmental achievements of their members, which the Milieubarometer could provide. When in the interviews was asked what the companies still missed in NBE, GetWasted mentioned the same thing: *'It would be nice to have some concrete cases on how companies got to reduce their environmental footprint, concretely speaking. We have been seeing a lot of sustainable/branding speeches with no figures and no technical insights. But a company presenting its LCA or the progress achieved through their EMS would be great'*.

The external communication is elaborated on by Royal Thermo Trae as well. The manager mentions he is not so much incorporated in NBE because it is not recognized by external partners, in contrary to for example Nordic Ecolabel (next to a label, it also provides a sustainability network). He explains that Nordic Ecolabel provides more profit, because the label is known by customers. Relating this to NBE, in order for the network to bring more profit to their members, it should develop a more known picture among customers and other companies. Such a recognized image should be gained by a better external communication program. Next to that, making it obligatory for member-companies to use a tool like the Milieubarometer would make the network more credible, since the environmental impacts are assessed in a quantitative and transparent way in which companies can be benchmarked. This could again enhance the competitiveness between the member-companies but also incite other companies to use this tool to compare their environmental impacts to other companies in the same sector. In this way, companies can obtain the most important parts of the markets, because it will help its customers to achieve their objectives directed to the environment (Bataineh, 2006). It will improve their position in the eyes of the customer because they will buy their environmental products instead of the products of the same kind of company which is not trying to diminish their impacts on the environment (Ibid). In order to instigate this, customers should become more interested in more environmental friendly companies. How to instigate this is part of another discussion. Perhaps the employment of the Green Agent in the beginning of 2015 is the first step in making customers in Aalborg more interested in greener products. He is responsible for consulting the citizens of Aalborg on how to incorporate sustainability in their daily life (greencities.dk, 19-5-2015). A close collaboration with the Green Agent could be interesting for NBE in order to relate customers and companies to each other to encourage the sustainable way of doing business.

Another example of using the Milieubarometer for external communication is through collectively arranged reduction programs. For example, NBE starts up a big campaign in all the member companies to reduce their water use through awareness campaigns among the employees. NBE helps the companies with setting up the campaigns and with maintaining the new behaviour in the company (an example of such a campaign with the help of the Milieubarometer can be found in appendix 6). At this moment they cannot show from all the companies together what such a big action achieves in the companies' water usage. However, the Milieubarometer could show what the water consumption was before the campaign and how it reduced during the year of the campaign. With this, the Milieubarometer backs up the actions carried out by NBE. During an interview with Key2Green Annie Lauridsen, this lack of disclosure of quantitative back up was mentioned as well. Annie agreed that they miss this and such outputs from a tool like the Milieubarometer could make the achievements of the members in the networks more understandable and verifiable.

Concluding, it is seen that the highest possibility of using the Milieubarometer would lie within PPAPs like NBE, mainly as a help for external communication. Individual companies are, regarding Annie from Key2Green, not likely to use it, unless they see the benefits of mapping and disclosing their data for policy regulations or competitive benefits. An idea for this can be to use the Milieubarometer in the networks with a focus on the financial costs savings due to savings in energy, water and fuel consumption. If NBE discloses this data and underpins the fact that the companies have saved so much financial costs individually and so much financial costs together, then it becomes clear what the advantage of the use of the Milieubarometer is and what the benefits are of becoming a member. Therefore supplying the Milieubarometer through PPAPs (for free²⁵) or through municipalities or sector organizations would be a good opportunity and additionally demand for this disclosure by law (obligatory) or with incentives (voluntary). In this way, the Milieubarometer could incite other companies to become a member of NBE and become engaged to the environment, while NBE can show that the Milieubarometer can be a good opportunity for companies to become aware of their consumptions and the costs, which can be saved by reducing their consumptions.

²⁵ By for example increasing the tuition fee or more financial support from the government (which also helped Green Network when they wanted to stay 'alive' after losing the competition from the national Agency for Trade & Industry in 1992-1994 (Lehmann, 2008, p. 22).

5.3 How can the roles of the three actors in a PPAP in collaboration with the Milieubarometer overcome ecological deterioration?

The use of the Milieubarometer in NBE is proposed as shown in Figure 7.

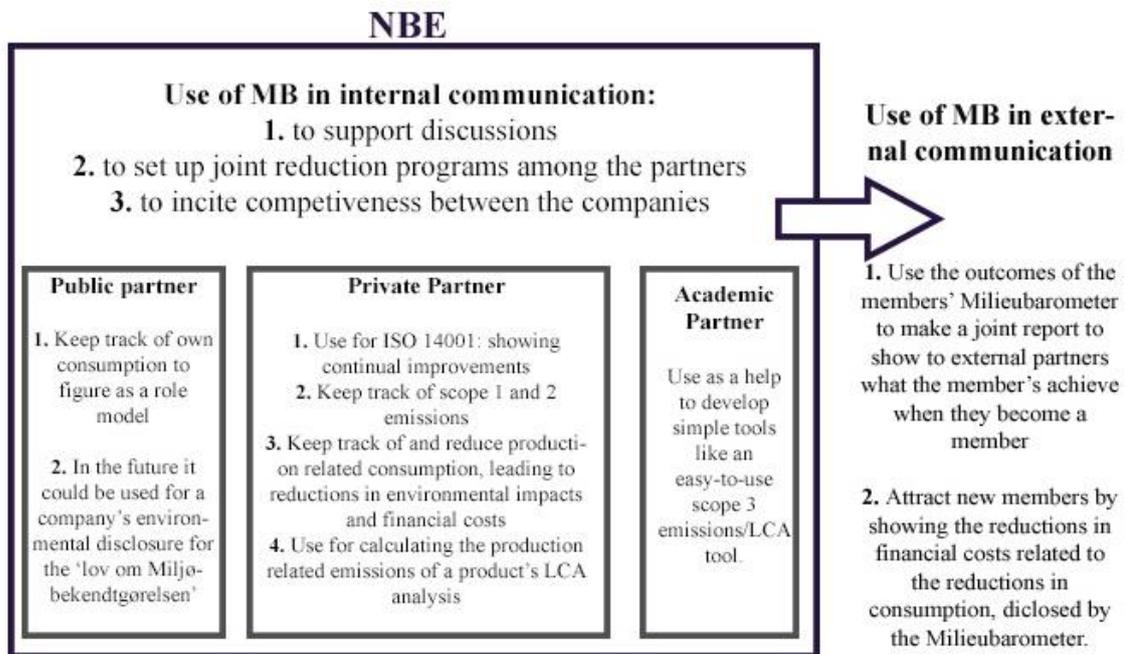


Figure 7: The use of the Milieubarometer by NBE as a network and by the members within NBE

With this the question remains: why is the use of the MB by these member's so important to overcome environmental deterioration as a PPAP? For this, the answer lays in the relationship between the different members. The communication between the members in a 'sustainability driven' PPAP like NBE can be referred to as the internal communication. This communication is important with such diverse perceptions of such diverse members, especially when approaching environmental problems from a public, private and academic perspective. To bring all these efforts from all the different partners together, the partners should communicate with each other to see if they actually reach the organization goal together. The Milieubarometer is offered as a tool for the members to communicate about their efforts towards the goal. The Milieubarometer shows the efforts made by the members towards the goal (i.e. the reduction in environmental impacts) while it can show the competitive benefits the company members have over not-members (less financial costs and a lower CO₂-footprint). Next to that, the Milieubarometer can be used for communication between the different partners. The public partner knows what the environmental achievements are of the companies in NBE, so it will save time when demanding for compliance to for example the 'Miljøgodkendelsesbekendtgørelsen' law. Furthermore, the academic partner can see which consumption (electricity, waste, water etc.) is hardest to reduce at

both the companies and the public partners. With this they can find solutions on making it easier to reduce this consumption. Next to that, the academic partner can act as the mediator in developing new policies for and with the public and private partner based on the problems they find when trying to reduce their environmental impacts. The Milieubarometer therefore improves the communication among the different partners while they all try to act towards the common goal of NBE: trying to diminish the impacts on the environment while staying within the perceptions and operating field of a company. This improved internal communication between the partners directed to the common goal is a practical example of Mol's (1995) idea to overcome ecological deterioration. The state should, according to Mol, transfer the responsibilities and tasks from the state to the market, because the market is considered to be more efficient for coordinating the tackling of environmental problems than the state is. This does not mean that the state needs to withdraw, but rather that state and market should work together in which the state stimulates social 'self-regulation' (Ibid) for example via economic mechanisms. Such social self-regulation is provided by NBE with discussions between the different partners and with guidance from experts. However, to develop more 'economic mechanisms', a better understanding is needed of all the member's efforts and the problems they experience when trying to reduce their environmental impacts. This better understanding is proposed via the Milieubarometer, to make all the efforts of the members visible. This can lead to better joint efforts, because the partners know from each other how much they are targeted towards the goal and how to join forces to provide more or better 'economic mechanisms' to overcome ecological deterioration.

6. Conclusion

'The way forward for EM is not to emphasize the empirical debates over the potentials and limits of environmental engineering and industrial ecology, but rather to deepen the links to political-sociological literatures which will suggest new research problems and hypotheses' (Buttel, 2000, 64)

This thesis has tried to answer the research question: *'To what extent can the Milieubarometer be a help for Public-Private-Academic Partnerships in Denmark to improve the internal and external communication about their environmental achievements?'* with assistance of the Ecological Modernization Theory. Although literature mainly covers public private partnerships with only the public and private partners, practice shows that academic partners are even as important for such partnerships in order to provide new knowledge and be the mediator between the other parties (Lehmann, 2008). In this research it is analysed how the interrelationship between these three partners could lead to reducing environmental deterioration while still enhancing economic growth. This is done with the help of an environmental impacts calculator, the Milieubarometer. It is seen that by presenting the Milieubarometer in interviews with companies and Aalborg municipality, they became aware of what they are actually doing on the mapping and analysing of their direct environmental impacts. During the interviews it was found out that the Milieubarometer could help companies in the first levels of environmental management to become aware of their direct environmental impacts and reduce them. However companies at a higher level of environmental management were more interested in a tool that looks into the impacts of the products they produce and deliver. This outcome is interesting for the EM theory, because it shows where the demand of the companies goes in order to reduce their environmental performance and hence tackle environmental problems. However, the question remains: should you only focus on the companies when trying to follow the EM theory? This thesis mainly focused on NBE, which is a sustainability driven PPAP that tries to strengthen the member companies competitive benefits through targeted efforts towards sustainability (NBE website, 2015). In order to sustain economic growth while trying to reduce environmental impacts, this thesis focused on these company members in the same way as NBE does: through targeted efforts towards sustainability. Therefore, this thesis focused on the use of the MB at companies and how public and academic partners can incite this. This does not mean that the university or the public partner cannot use the tool. As mentioned in paragraph 5.1.2, the public partner can use the tool to be a role model for companies. Universities can use the tool in the same way and next to that see what problems the public and private partners encounter when reducing their environmental impacts. Following, the Milieubarometer supports the efforts all the partners make when trying to be compliant to NBE's goal. This answered to how the Milieubarometer could be a help for PPAPs in Denmark for the internal communication. Moreover it is researched if the Milieubarometer could be a help for the external communication in NBE as the example PPAP. It is proposed that the Milieubarometer could provide more quantitative disclosure about the members'

achievements in reducing their environmental impacts. In this way, NBE can show their efforts in reducing the companies' environmental impacts and provide publicity for the sustainability efforts of the companies which can strengthen their competitive benefits.

Regarding the statement of Buttel (2000) this research shows that the new way forward for EM is indeed not to emphasize the debates on the potentials or limits of environmental engineering, but rather to explore the ways of political and sociological practices in actually supplying new research hypotheses that underpin the importance of EM.

Future research should focus more on the content of practicing EM theory with concrete examples on how to tackle environmental problems instead of analysing the theory in itself. 'We should not dwell so much on studying ecological modernization as a normative discourse by itself, or as a political rhetoric proclaimed by governments, but rather increase our efforts in scrutinizing its alleged virtues and problems in practice, for example, by looking for empirical cases where ecological modernization has really resulted in the decoupling of economic and material flows' (Lidskog, 2012, p.424).

This research has shown that to tackle environmental problems in the business sphere it is important for companies, maybe even the main trigger, to stimulate economic growth and still reduce environmental impacts. Sustainable PPAPs like NBE are focused on this way of approaching environmental problems and with the help of the Milieubarometer it could show that companies can even achieve economic growth and still decouple it from impact on the environment. Let the introduction of the Milieubarometer in NBE be the initial case of analysing the EM theory with real life cases in order to show that companies need a voice in confronting environmental problems instead of confronting the companies themselves.

7. Discussion

This research is set up to find out how the Milieubarometer can be used in Denmark. Quite early it became clear that the Milieubarometer could be of relevant help for NBE. However, during the analysis it became evident that the companies were not as interested in the Milieubarometer as NBE was. Although it is tried to stay as objective as possible, it can be possible that the researcher is sometimes subjective because she believes that the tool can help NBE and companies based on experiences in the Netherlands. However, due to the interviews it became clear that actually a more advanced tool was required by three out of five companies. This of course is an interesting outcome and the researcher is open for new ideas on how to adjust the Milieubarometer. However, the Milieubarometer has its strength in its simplicity and the researcher needed to set limits to what is actually possible in adjusting the tool to the demands of the companies and what not.

Additionally, the Milieubarometer does not focus on the future plans, it is just reactive on what reductions are made. The proactive goals are missed, like demanded by ISO 14001. Making these proactive goals is important for approaching environmental problems by companies to ensure ongoing improvements towards a better environment. This should not be forgotten and therefore framing proactive goals should be as important as measuring the achievements made towards the goals.

Furthermore, this research focused mainly on the use of the Milieubarometer as a way to improve the PPAPs external and internal communication. However, it is not researched how the actual stakeholders receive the outcomes of the Milieubarometer. Do they understand what it states? What are they going to do with the outcomes? Does it incite them to demand for less environmental impacts of the company? Will a Milieubarometer label, when up scaled, be important for them to choose a company with less environmental impacts? Such questions are important for companies to know in order to see the importance of such a tool. These questions need further research and some will perhaps only get answers when the Milieubarometer is used by more companies in Denmark.

Moreover, the target group needs to be elaborated on. Mainly the companies that were interviewed were companies who are already more or less engaged to the environment since they are a member of NBE. Therefore the outcomes of this target group cannot be generalized for all the companies in Denmark. Because this research is focused on member companies of networks, NBE taken as the experimental group, the target group can still be seen as relevant for this thesis. However it can be the case that companies whom are not members of networks like NBE will have less engagement to the environment as the companies in this research. When trying to use the Milieubarometer among general companies in Denmark, another target group should be interviewed and analysed, preferably not being a member of networks like NBE. Additionally, when the research was also conducted in another network like the Green Network in Vejle, it would have been better to see different opinions from both networks and the

members of both networks. However, doing these interviews in the same way as is done by NBE requires more time which could not be reached in the time limit of this research.

Concluding, this thesis is structured around the Milieubarometer, because it already is used by PPPs in the Netherlands as an effective way to make the member companies aware of their environmental impacts and give them suggestions on how to reduce these impacts. However, this does not mean that other tools cannot be as effective as this tool. It is suggested that when a tool can calculate environmental impacts in a reliable and transparent way but rather is as simple as the Milieubarometer is so companies and mainly SMEs are able to understand the tool, then such another tool would be a relevant substitute as well. Additional to this, a new research hypothesis in regards to the EM theory could be: *‘how can environmental impact calculators help companies to reduce their environmental impacts and therefore support the EM theory?’*.

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Conducted interviews:

Date	Company	Present
25-2-2015	NBE	Lene Nielsen
6-3-2015	Fibertex Personal Care A/S	Environmental manager & Senior Scientist
11-3-2015	Aalborg Havn	Environmental manager
20-4-2015	Royal Thermo Trae	General manager
27-4-2015	Ergonomic Solutions	QHAS manager
12-5-2015	AAK Bygninger	Energy manager of the public buildings

E-mail interview:

Date	Company/Partner	Person
30-4-2015	GetWasted	Environmental Engineer
5-5-2015	Aalborg Kommune	Environmental Administrator
11-5-2015	Blauwzaam	Rolia Wiggelinkhuijsen

Help through e-mail contact:

Date	Partner	Person
10-4-2015	Aalborg Varme Forsyning	Bjarne Holm
11-5-2015	2.-0 LCA Consultants	Jannick Schmidt
27-4-2015	Aalborg Kloak Forsyning	Jesper Pedersen

Telephone Interview:

Date	Company	Person
16-3-2015	Key2Green	Annie Lauridsen