

# Process Analysis of the Amsterdam Communal Heating Project



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# Abstract

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This report provides an advice to the Waternet foundation concerning the process of the CO<sub>2</sub>-reduction/Energy-goals projects of Amsterdam, of which in particular the 'small ring' of the communal heating system is a part. The used tools to analyse the data of the process are a stakeholder analysis, a SWOT analysis and a process assessment. With these tools a strategic advice is formed for the process of the Amsterdam Energy-goals project, with the 'small-ring' communal heating project as a subproject. From the process analysis can be concluded that the scope of the project should be broadened in order to find a solution for the set energy goals of the city and to find a solution for the 'small-ring' project in particular. Furthermore the strategic advice to solve the process related problems are described in the process design of this report. The report's advice is to create a multi-issue decision making environment in order to prevent dead-lock situations and create possibilities and incentives to come up with solutions. It is advised to look at multi-sourcing (heat) options for the network as well, this could however be influencing the future cooperation between the Municipality and NUON. Furthermore the involvement of environmental groups and more involvement of the Municipality of Amsterdam are advised in order to come to solutions for the Amsterdam energy and CO<sub>2</sub> goals.

*Keywords: Amsterdam, Waternet, communal heat system, CO<sub>2</sub> goals, process management, stakeholder analysis, SWOT analysis, process assessment, process design, NUON/Vattenfall.*

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# 1. Introduction

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This report was created for the course SPM8001. The course Process Management is a compulsory course for 3TU students in Construction Management & Engineering and an elective course for students from other master studies. Since process management has been considered to be the key element in current and future construction projects and because we are all highly interested in complex projects, this course is a major part of the CME program and an important addition to the Real Estate & Housing program.

The main goal of the SPM8001 course is to become more familiar with the process management approach and to understand the differences with project management. Different strategies, tools and arrangements are discussed in the lectures to enable students to analyze new information and to develop ideas and apply new strategies to a real time case. Making the exam will be the individual theoretical part of this course; while the hereby presented report is a combined effort of the group one students concerning an existing project to show our gained knowledge applied to a real case.

The case is to investigate the communal heating system in Amsterdam. The Waternet Foundation wants to connect two separate heat- and electricity networks with a so-called 'small ring', because they consider it to be sustainable and future-proof. Our goal is to investigate whether involved parties are enthusiastic about the small ring and what extra actions are needed to convince them to participate in this project. This brings us to the following research question:

## ***How can actors be activated to participate in the small ring project?***

The research question is separated in four sub questions, which will subsequently answer the main question:

- *Which parties are involved in this issue and what are their stakes?*
- *Which results can be found by performing a SWOT analysis on this project?*
- *Which possible solutions and strategies can be found?*
- *Which recommendations can be done for the Waternet Foundation?*

In the different chapters of this report all the sub-questions will be handled in different chapters, and finally conclusions are drawn and the research question will be answered, to finish with an advice to the Waternet Foundation about the process and the future development of this project.

To conclude, we would like to thank some people for their contribution. At first we want to thank mister Leijten for the information, the appealing classes and the professional guidance throughout the process. In addition to this we would like to thank the employees of the Waternet Foundation, the municipality of Amsterdam and NUON/Vattenfall, especially the interviewees, because of their invested time in the project and the new insights they provided us with.

## 2. The Project

In this report the communal heating system of Amsterdam is investigated. The research, which has been set up by the governmental organization Waternet, encompasses the feasibility of the enlargement of the current communal heating infrastructure. The Waternet Foundation wants to connect two separate heat- and electricity networks with a so-called ‘small ring’, because this is considered to be sustainable and future-proof. In the figure below the location of the communal heating network and the planned ‘small ring’ is shown. The ‘small ring’ is located in the South of Amsterdam and covers a length of 2 to 3 km. (Atsma, 2011)



Figure 1: Small Ring

The project is based on Amsterdam’s energy strategy for 2040: Energy has to be reliable, payable and sustainable in the future. The Waternet Foundation, a combination of the water section from the municipality of Amsterdam and Water Board Amstel, Gooi and Vecht, is the appropriate party to realize those implementations that are planned in 2010-2014. (R. Kemmeren, 2011)

The major stakeholders in this project are the Waternet Foundation, the municipality of Amsterdam and energy company NUON. NUON, owned by Vattenfall, is involved because it owns the largest part (90%) of the network, and as a private party this company has other motivations for future developments than the public parties; The costs for connecting the networks by the small ring are estimated on 10 million euro and because no new connections with households will be made, NUON will only make costs without any future gains, which is financially unattractive. The public parties are more enthusiastic about the closed ring because they look at a broader range of benefits, namely the sustainability aspects and the higher reliability of the heat- and electricity network. (R. Kemmeren, 2011)

## 3. Research Approach

### 3.1 Research question

The usefulness and necessity of a closed ‘small ring’ with respect to sustainability, energy and financing will be investigated in this report, in order to give the Waternet Foundation a good advice about the further development process of this project. Therefore, the following research question and sub-questions are distilled:

#### ***How can actors be activated to participate in the small ring project?***

In order to answer this question, some relevant sub questions are formulated:

- *Which parties are involved in this issue and what are their stakes?*
- *Which results can be found by performing a SWOT analysis on this project?*
- *Which possible solutions and strategies can be found?*
- *Which recommendations can be made for the Waternet Foundation?*

These sub-questions are handling all the relevant issues in different chapters of this report in order to finally answer the main research question.

### 3.2 Process Set-Up

It is important to determine the structure of the process set up, because it creates insight in the development of the project. The structure of the process set-up can be hierarchical or they have a network structure. By identifying the characteristics, the right form can be found. The features and their argumentations are described in the scheme below:

<i>Hierarchy</i>	<i>Network</i>	<i>Argumentation</i>
Uniformity	Variety	Many different actors, interests, products, means of power, etc.
Unilateral dependencies	Mutual dependencies	Actors need each other’s involvement because of ownership matters and politic support
Openness/receptiveness to hierarchical signals	Closeness to hierarchical signals	Equal communication and commitment of the involved parties leads to small power distance
Stability	Dynamic	The network is always in motion. New ideas attract new parties to participate and others to resign from the project.

Table 1: Hierarchy vs. Network

Our focus is on the process management part of the development, because this project has all characteristics of a network.

### 3.3 Information gathering

We have used several means to gather the relevant information, e.g.: interviews, scientific contributions and the Internet. The most valuable information is gathered from field experience, so by interviewing representatives of the most important stakeholders. This information contains many opinions and people can decide what they want to tell and what they want to keep for themselves, so it is important to check the gained information with objective knowledge before using it. Different websites, articles and documents were used to find some background information about the project, techniques and the stakeholders. By using internet sources, it is important to keep in mind that these sources can be somewhat coloured. Since we have been using it to find stakes and opinions, it has been used in a proper way. The scientific contributions can be found in the literature in books and articles and the slides during the course, this objective information is used to give the report a scientific character.

### 3.4 Conclusions and recommendations

Finally, the results of the analysis and answers to the research questions are written down in order to provide a good advice to the Waternet Foundation about the realization of the small ring project by using process management.

## 4. Stakeholder Analysis

### 4.1 General overview

In order to create a good project setup, one of the major aspects is performing research on the stakeholders by means of a stakeholder analysis. Identifying and categorizing their goals, interests and powers are essential in the management process, because it provides insight in possible future conflicts.

For the Amsterdam Communal Heating Project three governmental institutions can be identified: The municipality of Amsterdam, which is the facilitating city, the Waternet Foundation: a combination of the water section of the municipality of Amsterdam and the Water Board Amstel, Gooi & Vecht, because they are responsible for the realization of this project. The third party is the Waste Energy Company, this is an incineration plant combined with a power plant, belonging to the municipality.

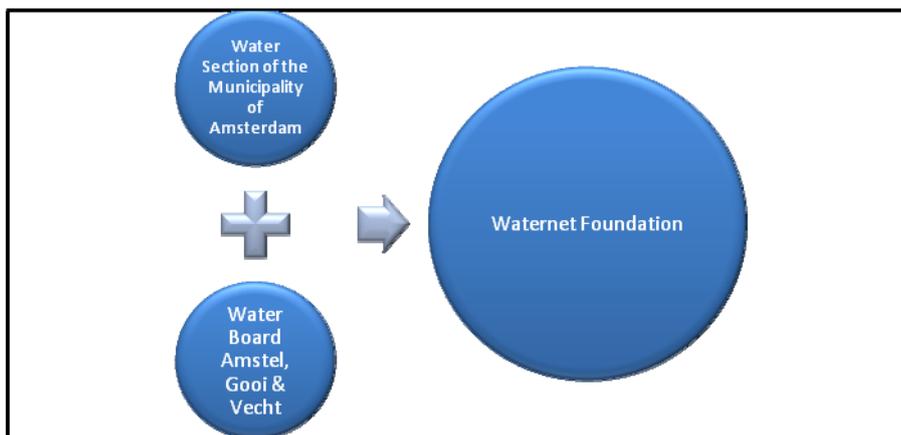


Figure 2: Involved Parties Waternet

There is one major private party involved in this project: NUON, which is an energy company. NUON has recently been taken over by the Swedish energy giant Vattenfall. NUON/Vattenfall owns about 90% of the energy infrastructure in Amsterdam regarding the communal heating, so it is an obligatory partner to realize this plan. The municipality is the owner of the residual 10% of the communal heating infrastructure. In addition to this, surrounding companies, institutions and residents are selected as stakeholders, because they are situated in the vicinity of the project.

## 4.2 Goals, Interests and Powers

The goals, interests and power of the stakeholders are schematized in the table below:

Party	Goal	Interests	Power
Municipality of Amsterdam	- CO <sub>2</sub> reduction for a more sustainable city.	- Meet the citizen's wishes; - Meet the sustainability targets.	- Legal framework; - Decision power; - Financial power.
Waternet Foundation	- Creation of the 'Small Ring' (Connecting 3 heat areas, sources and future district heating extensions with each other).	- Maximize the utilization of residual heat; - Enable expansion into new and existing construction; - Increase the robustness of the delivery system.	- Decision power; - Knowledge power.
Waste Energy Company (AEB)	- Continuing operation of the plant.	- Earnings from residual heat.	Ownership plant.
NUON/Vattenfall	- Optimize financial result.	- Increasing the delivering capacity; - Good cost prices of energy.	- Financial power; - Ownership network & two plants.
Surrounding companies and institutions	- Decreasing energy costs.	- Earnings from delivery; - Cheaper energy.	- Blocking power.
Residents	- Decreasing energy costs.	- Earnings from delivery; - Cheaper energy.	- Blocking power.
National Government	- CO <sub>2</sub> reduction for more sustainable Netherland	- Keep energy affordable for everyone: NMDA law	- Legal framework; - Financial power.
Environmental interest groups	- Nature preservation	- Environmental affects of the project should not turn out to be negative for the environment	- Blocking power.

Table 2: Stakeholder Analysis

Now the interests and powers have been determined, it is important to categorize the stakeholders in a so-called power interest grid. Waternet has the highest interest, because it is the initiator in this project. It is a player, but with average power since they are dependent on the municipality, this is the reason the municipality has the highest power. Because they are a general body for the whole city of Amsterdam, their interest is smaller, only their water section has a high focus on this project. NUON/Vattenfall is also a very important stakeholder, it has a high commercial interest and because it owns a big part of the network it also scores high on power. Another reason why NUON/Vattenfall is a very important stakeholder, is that they have the financial means to enlarge the network. This gives the party financial power.

The AEB has an average interest and power in this project, because it is depending on the municipality. The residents and companies in the direct surroundings of the project are mainly important for the project because of their potential blocking power. Being located in the vicinity, they have the right to lodge appeal against decisions on the project organization. Furthermore, their interests and power are rather small. Residents have more interest since they are truly living there. Companies have more power because they have a higher potentially added value than the residents to the project: They can subtract or deliver more energy to the system.

The national government has an interest because this project could improve the national balance regarding CO<sub>2</sub> reduction. The power the national government has lies in the fact that the national government has legal power and financial power. The national government could subsidise this project and with the help of the "warmtewet" they are able to enforce legal power onto all stakeholders in the project. Environmental interest groups are mostly interested in nature preservation. Within such a project it is never sure when they will step in, but if they decide to become a stakeholder they have blocking (delaying) power.

### 4.3 Stakeholder categorization with power grids

#### Power-Interest grid orientation round:

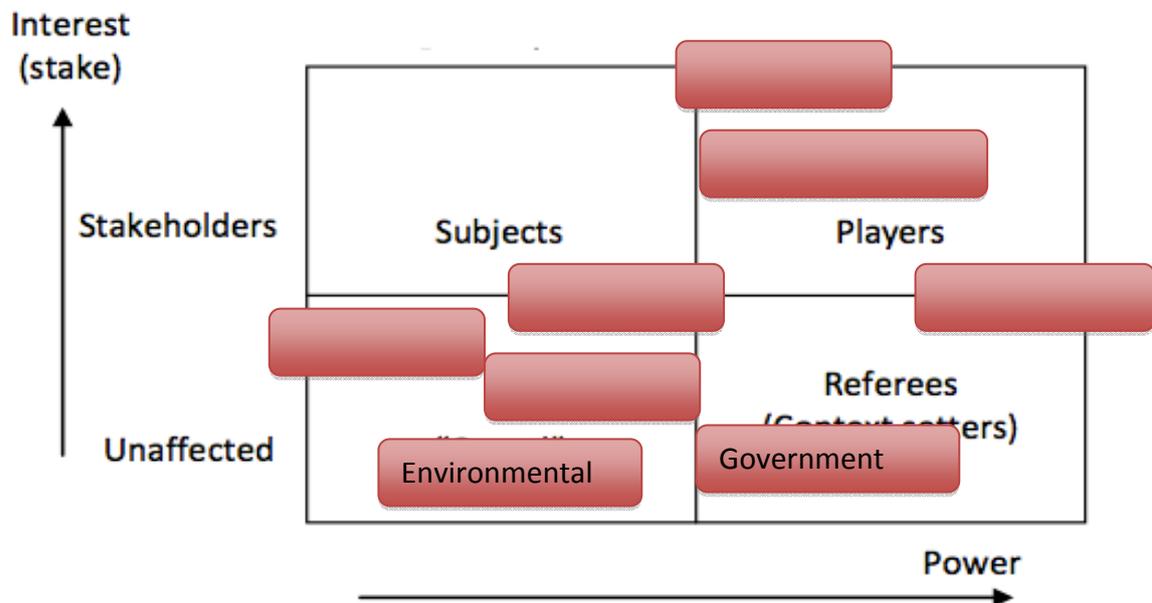
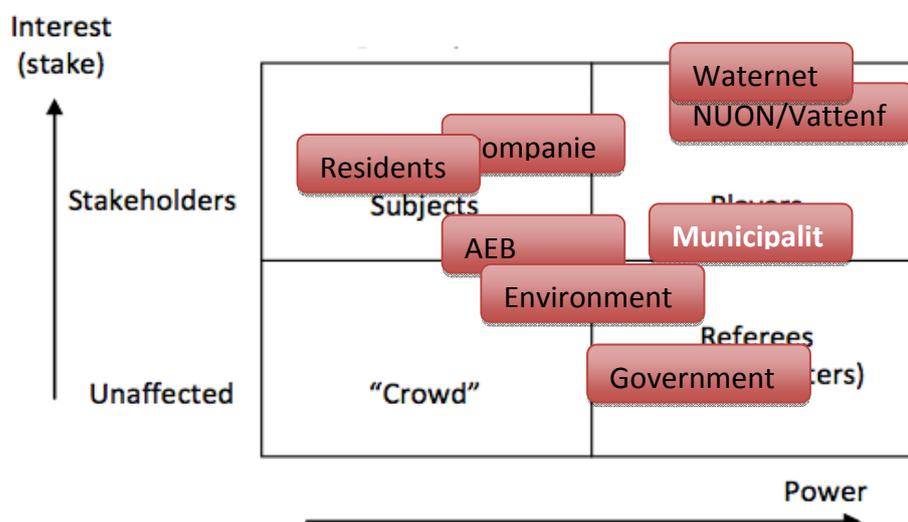


Figure 3: Power Interest Grid for the orientation round

The interest grid above is the interest grid for this particular round in this project. This round could be described as the orientation round. This round is about identifying the different stakeholders and investigating their interests for the project. The desired outcome for this round is a well-documented decision about whether to start the subsequent round.

The subsequent round would be the design round. This round is about finding the right process approach, partnerships, framework and set up. This setting should contribute to the solution of the known issues. The desired outcome for this round is that all stakeholders agree upon the decision whether to start the subsequent round.

#### Power-Interest grid design round:





To analyse which stakeholder is, and which stakeholder is not a critical actor the scheme below provides insight in these relations. Looking at the substitutability, dependency and their important resources makes it possible to determine the critical actors. In the scheme below we find all the stakeholders and their scores on the different aspects.

The municipality of Amsterdam is a critical actor because of the fact that it is not easy to replace and its dependency is moderate. Besides these aspects it provides the legal framework, has decision power and financial power.

The Waternet foundation is a critical actor because of the fact that it is not easy to replace and its dependency is moderate. Besides these aspects it provides the process with knowledge and has decision power.

Besides these stakeholders the national government is also a critical actor. Not so much for its financial power, but mostly for the legal framework it could provide.

The Waste Energy Company (AEB) is the owner of the power plant that will provide the energy. Its replace ability is low, but possible. This means that it is not a critical actor, but a semi critical actor. The process could go on without this stakeholder, but it would smooth out the process if it participates.

The non-critical stakeholders are the surrounding companies, the residents and the environmental interests groups. For the surrounding companies and the residents this means that they are “replaceable”, not in a sense that they just could be replaced physically. However, their diversification is very high and it can be assumed that they are not united. Consequently they don’t have demands in relation to the qualitative elements of heating provisioning; only in relation to the quantitative means of heating provisioning. In other words: They are only interested by the fact that they will have access to sufficient heating. They don’t care about the way this happens. The only thing that could hinder them is the constructional activities (this will only be temporary). They do have blocking power, but in reality this would be more like delaying power. In addition, some companies could benefit from deliveries to the system. The environmental interest group is also not a critical actor because of the fact they only have blocking power and probably will not actively demonstrate against the idea of reducing the CO<sub>2</sub> reduction. Although they could have problems with the fact that this method is still based on fossil fuels, it would not be strategically smart for them to demonstrate, considering their message to the public (demonstrating against a CO<sub>2</sub> reduction).

Actor	Important Resources	Replace ability	Dependency	Critical actor
Municipality of Amsterdam	Legal framework; Decision power; Financial power.	Low	Moderate	Yes
Waternet Foundation	Decision power; Knowledge power.	Low	Moderate	Yes
Waste Energy Company (AEB)	Ownership plant.	Low	Moderate	Semi
NUON/Vattenfall	Financial power; Ownership network & 2 plants.	Low	Low	Yes
Surrounding companies and institutions	Blocking power	High	High	No
Residents	Blocking power	High	High	No
National Government	Financial Power; Legal Framework	Low	Moderate	Yes
Environmental interest groups	Blocking power	Low	High	No

Table 3: Actor specifications

The scheme below shows how the critical and non-critical actors from the scheme above are divided in dedicated, non-dedicated vs. perception, interests and goals. In this scheme we see that the National Government, the Municipality of Amsterdam and the Waternet Foundation who are all critical actors, share the same perception, interests and goals for the project and are dedicated to the project. NUON/Vattenfall, also a dedicated and critical actor does have a different perception, interest and goal for this project. This could be explained by the fact that NUON/Vattenfall is a private party and the other actors in this column are public parties. NUON/Vattenfall wants to see clearer advantages from the closed ring than is currently shown.

Other dedicated actors are the surrounding companies. They share the interest of CO<sub>2</sub> reduction with the public actors. The reason they share this interest is to profit from tax reduction, gain money from delivering to the network and create a green image for them.

The environmental interest groups would be dedicated to this project because it would reduce the CO<sub>2</sub> emission, but besides this issue they have more interests: the environment should not suffer from this project.

The waste energy company (AEB) is a semi critical actor. It does not share the interests of the public actors, but is willing to participate in order to reduce the CO<sub>2</sub>-emission and to make a profit for the delivery of energy to the network. It acts like the companies and institutions in this scheme.

The residents may not support the project at all. They could be afraid that prices will rise and that there is no choice about the preferred energy company. This group that exists of many different people will have different opinions within the group. There will be resident dedicated and residents not dedicated residents who share the perception, interests and goals of the project and residents that do not share the perception, interests and goals of this project. You could actually find the resident in every non-critical part of this scheme.

	Dedicated actors		Non-dedicated actors	
	Critical actors	Non-critical actors	Critical actors	Non-critical actors
Actors with same perception, interests and goals	National Government Municipality of Amsterdam Waternet Foundation	Surrounding companies and institutions Waste Energy Company (AEB) Residents		Residents
Actors with different perception, interest and goals	NUON/Vattenfall	Environmental interest groups Residents		Residents

Table 4: Actor dedication

When the scheme above would be combined with the stakeholder’s power the result could be seen in the scheme below. Here we can see the stakeholder’s power on the horizontal axes and their opposition or support on the vertical axes. This scheme shows that there is one major strong opponent for this project, namely NUON/Vattenfall. At this moment, they do not see the added value from a closed ring. In addition to this, There are also some weak supporters and weak opponents, but these actors are not critical stakeholders. The most powerful actors are Waternet and NUON/Vattenfall, these actors are the real players in this project and they are having conflicting views. Since they are having the power and the ambition, together they are able, if they can overcome their difference in opinion, interests and goals, to make this project succeed.

### Power-Position grid

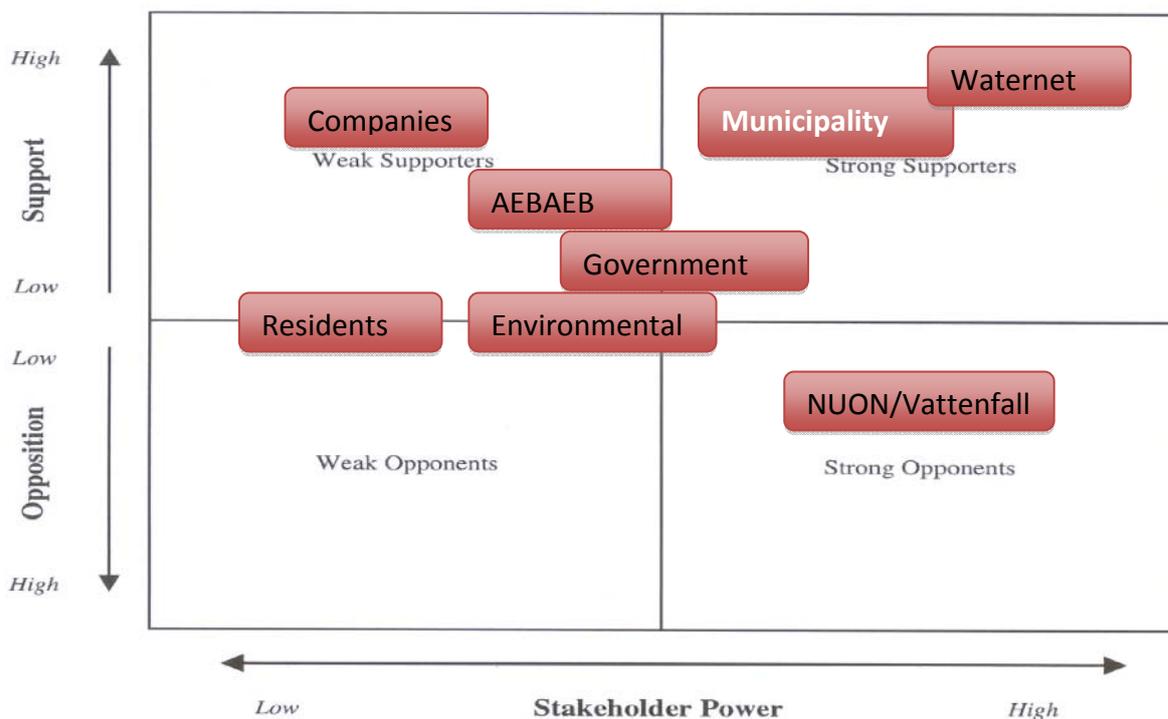


Figure 7: Power/Position grid

The scheme below shows the attractiveness of the project for the different stakeholders and their capacity to implement plans, proposals and policies. In this scheme we can see that the project's players are highly attracted to the plans and are able to implement these plans. The other non-critical stakeholders have less power to implement their plans and are less attracted to the project. This does not affect the project, since the players basically have all the power.

### Power-Attractiveness grid

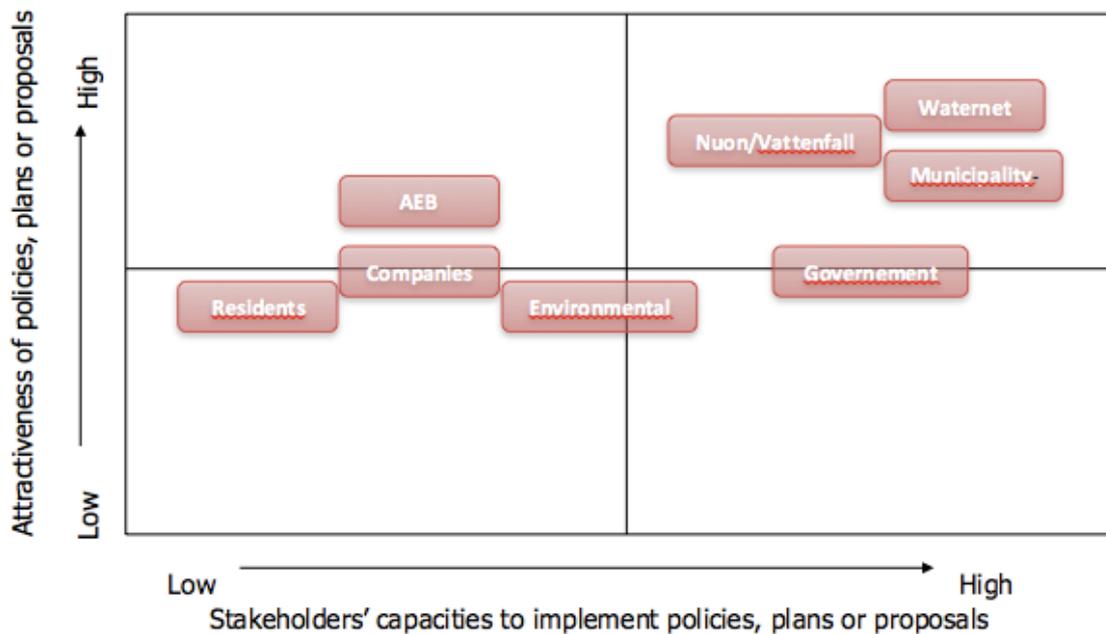


Figure 8: Power/Attractiveness grid

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## 4.4 Conclusion

After identifying all the stakeholders and categorizing them in different analysis, a lot of knowledge about the different stakeholders has been gained. The most important stakeholders, the Waternet Foundation and NUON/Vattenfall, are the stakeholders with the most interest in the project. They show the highest dedication to the project and are players in all fields of the analysis. The Waternet Foundation is, as initiator of the project, the biggest proponent, while NUON/Vattenfall is, as a private organization, the most important opponent. These stakeholders together are having the power to realize the project.

The players within this project depend on other stakeholders, stakeholders with less power and interest, to actually realize the project. The project needs support from all actors, because if not all actors are pointing in the same direction it could harm the project. The project could be realized without the support of these actors but the project could face delays and thus extra costs.

Stakeholders who are mentioned in the analysis and who are not that critical are the residents. This group is incalculable for its reaction towards the project. It could very well be that they ignore the project, never step in as a stakeholder or a very likely possibility: They will not act as a group, but as individuals. This means that it is unclear when, or even whether, they will become a stakeholder. If a single resident, acting as a stakeholder, is in favour of this project, another resident could step in and become a non-supporting stakeholder towards this project. In addition, as mentioned earlier, the residents generally don't care about the way they get heating.

The residents, as a stakeholder group within this project, are incalculable and thus are their reaction towards the project unclear. To manage this group it would be wise to keep them informed about the project and keep the benefits for this stakeholder collective in sight. Dealing with the residents in this way will prevent them from being not informed and will avoid the feeling of not being noticed by the players.

## 5. SWOT-Analysis

In the previous chapter a stakeholder analysis was conducted, this analysis is used in this chapter because it forms the base of the SWOT analysis. A SWOT analysis is a kind of analysis, which focuses on mapping Strengths, Weaknesses, Opportunities, and Threats (DORATLI). In this case, this was done regarding both the process and the individual stakeholders involved. A SWOT analysis can form the base of a strategic process to couple actors with mutual opportunities for example.

The SWOT is used in the early stages of the process to gain insight in the process by creating a picture of the current external environment and the internal situation. The purpose is to safeguard the process to be able to defend the process against its threats and eliminate weaknesses. Strengths must be taken advantage of to smooth out the process. Opportunities must be exploited to try and gain the most overall benefits out of the process and consequently create win-win situations.

The SWOT analysis on the individual actors gives an insight in the positions of the different actors. This will help to understand the network structure these actors are involved in.

The final result of a SWOT analysis (in this case together with the other analyses) will be strategies, which are focussed on mobilizing and activating actors to come to a common problem perception and some recommendations.

### 5.1 Process SWOT Analysis

The table below shows a general and overall SWOT- analysis of the process. This process involves multiple actors. Therefore to be able to combine these all, the analysis is executed broadly regarding the process as a whole and not into dept regarding the different actors. The physical environment and the socio-economic environment are analyzed for all stakeholders on the process (DORATLI).

Strengths	Opportunities
A lot of information amongst the actors	Unilateral interference by the government (shadow of the law)
A multi-actor network environment	The project gets a green
Mutual dependent actors	Gains for all the actors (win-win situation)
Weaknesses	Threats
Hardly any direct financial gains	Capriciousness of actors
Sluggishness because of the lack of hierarchy	Economic decline
Complexity of the project	Change of the Alderman and the Municipal Council
	Unilateral interference by the government (shadow of the law)

Table 5 SWOT: process

### 5.2 Strategies

Benefitting of the SWOT analysis, strategies can be conducted by linking different elements:

- Link strengths with opportunities
- Use strengths to fight threats
- Link elimination of weaknesses with fighting threats

#### One clear strategy can be distilled:

Because multiple actors are involved, there are higher chances that some parties will gain by the process. The threat that comes with this is that winning by some parties could mean losing by others. This issue can then be tackled by making use of the mutual dependencies between the different actors.

### 5.3 SWOT Tables per Actor

The involved parties are deducted from the earlier conducted stakeholder analysis:

- Municipality of Amsterdam
- Waternet Foundation
- Waste Energy Company (AEB)
- NUON/Vattenfall
- Surrounding companies and institutions
- Residents
- Housing corporations
- Environmental parties

### 5.4 SWOT- Tables

To gain insight into the different positions and chances cooperation, the above mentioned actors are worked out in different SWOT-tables.

This SWOT analysis is repeated for each stakeholder, as each stakeholder within this process is likely to have different strengths, weaknesses, opportunities and threats. In addition, stakeholders can have conflicting SWOT's. Opportunities for one stakeholder may be perceived as threats by some actors, on the other hand threats may be perceived as opportunities by some actors. By making a SWOT analysis, it is also possible to create synergy by discovering that someone's strength is someone else's opportunity. Those parties could then be linked to work together.

The tables below are created keeping in mind that it should only cover the project's process. Some inputs will appear more than once.

#### Municipality of Amsterdam

Strengths	Opportunities
Decision power	Reducing CO <sub>2</sub> emissions in Amsterdam
Co-determine the energy rates	Maximize use of residual heat
Environmental policy making	Expansion network to new and existing buildings
Providing permits	Achieving one city-wide communal heating network
Weaknesses	Threats
Small stake in the ownership of the network (10%)	Complexity of the project
No Financial benefits from project	Increase of CO <sub>2</sub> concentrations
	Investors retreating from the project

Table 6: SWOT: Municipality of Amsterdam

#### Waternet Foundation

Strengths	Opportunities
In-house knowledge of the communal heating	Increasing the reliability of the network
Project's communication body	Increase the robustness of the network
Weaknesses	Threats
Project's initiator without significant financial power	Parties retreat from the project
	Complexity of the project

Table 7: SWOT: Waternet Foundation

### Waste Energy Company (AEB)

Strengths		Opportunities	
Ownership of a plant	Increase delivery capacity by expanding the plant	Connecting the two separated communal heating lines will increase the heat delivery capacity of the plant.	
Monopoly position on part of the network			
Weaknesses		Threats	
Not the largest provider (small compared to NUON)		Complexity of the project	
		Competition with NUON by connecting the networks	

Table 8: SWOT: Waste Energy Company

### NUON/Vattenfall

Strengths		Opportunities	
Ownership of the network (90%)	Monopoly position large part of Amsterdam	New investors/ subsidies	
		Connection of additional (heat delivering) companies to the network	
		Additional potential demand	
		Increase the image of the company	
Weaknesses		Threats	
Low return for high investment		Complexity of the project	
Huge mother company		New players in the field	

Table 9: SWOT: NUON Vattenfall

### Surrounding companies

Strengths		Opportunities	
Demand of heating capacity	Delivery of excess heating capacity	Be connected to the network (to deliver/abstract heat)	
Weaknesses		Threats	
No unity among companies, individual goals		Complexity of the network	
		Requirements for delivery	

Table 10: SWOT: Surrounding Companies

### Residents

Strengths		Opportunities	
Demand of heating capacity		Connection to the network: Cost reduction	
		Cleaner environment	
Weaknesses		Threats	
No unity		Construction hindrance	

Table 11: SWOT: Residents

### Environmental Parties

Strengths		Opportunities	
		Cleaner environment by more efficient use of gas	
Weaknesses		Threats	
Supporting project based on gas-burning		Not being involved in the project	

Table 12: SWOT: Environmental Parties

## Housing Corporations

Strengths	Opportunities
Reducing energy losses in their dilapidated houses	Connection to the network: offering low cost heating
Weaknesses	Threats
Having too many energy efficient houses: no further gains can be made	System failure

Table 13: SWOT: Housing Corporations

Note that the project's complexity is shown as a threat. It could also be considered as a weakness, because it is part of the process and created by existence of all the actors. However, the actors individually have little influence on the complexity. It is assumed that the complexity originates from the developed environment and current state of society: external.

## 5.5 Conclusions SWOT-analysis

Now that these SWOT tables are created, what can be done to make a beginning in useful strategy development? The different results for the different actors should be compared. This can be for example done by asking oneself the following questions (Doralti):

- How can the strengths be utilized in order to take advantage of the opportunities that have been identified?
- How can these strengths be utilized to overcome the threats identified?
- How can the weaknesses be minimized to overcome the identified threats?

### 5.5.1 Linking Strengths with Opportunities

Except from NUON, the AEB is owner of a power plant too. All the other parties could benefit from a connection to the network and the extension of the network as a body. So generally we could assume that these parties all have the opportunity "connection to the network", while especially NUON has this as strength. Here, the possibilities for the project's success are centralized. This is the start of the search of a win-win situation, in which all parties must get a positive profit and loss account (De Bruin & Ten Heuvelhof).

### 5.5.2 Using strengths to fight threats

Municipality of Amsterdam has an increase of CO<sub>2</sub> as a threat. The power plants together with the heat providing companies can lower this by using the excess heat to heat Amsterdam.

### 5.5.3 Linking elimination of weaknesses with fighting threats

The weakness of low return for NUON is that their investment could imply that they would retreat from the project. Retreating parties are the threat of the Municipality and Waternet. So by eliminating the weakness of NUON, a large part of the threat of the municipality and Waternet would be fought. This could be one of the major issues to be solved to make this project successful. The other weakness of NUON (that it has a large mother company) is also important here. This could cause a difficult and slow elimination of the first weakness, because the communication and decision making is difficult as it happens far from the project's roots.

These conclusions form an important part of the development of the strategies in next chapter

## 6. Strategies

The conclusion from the SWOT analysis is that several coalitions can exist. These ‘teams’ can possibly take care of threats of other actors in the network also a cooperation has more resources (knowledge and a network) which can be activated to help with the problem.

Threats amongst actors can cause players to leave the process. Taking care of these threats will have a positive effect on the process.

From the SWOT analysis, strategies can be deducted to activate actors and to stimulate cooperation amongst them, this will be done together with the strategies which are available for the individual actors. These strategies are worked out in this chapter. With these strategies Waternet can try to influence the process by triggering actors on their interests.

The goal for this chapter is to investigate which strategies can be used by Waternet to activate actors and to see where involved parties meet each other's interests and problems.

Position in the process	Actors with production power	Actors with blocking power	Actors with a diffuse power position
<b>Proponents</b>	Waternet foundation	Municipality of Amsterdam, National Government	AEB
<b>Actors with production power</b>	Actors with production power	Actors with production power	Actors with production power
<b>Fence sitters</b>		Residents	

Table 14: Power position of the actors

### 6.1 Actors and the process

Every actor will be worked out individually. At the end the parties that have the most common perceptions and strategies will be grouped into coalitions that will have a chance of success because of the mutual similarities. A first strategy is used in this case by identifying different issues by different actors and putting those issues 'on the table'.

<b>NUON/Vattenfall</b>
<p><b>Interest:</b></p> <ul style="list-style-type: none"> <li>No direct visible gains</li> </ul>
<p><b>Window of opportunity</b></p> <ul style="list-style-type: none"> <li>Within short period (approximately 3 years), otherwise not financial feasible</li> </ul>
<p><b>Possible strategy</b></p> <ul style="list-style-type: none"> <li>Decrease the initial investment or,</li> <li>A financial incentive</li> </ul>

Table 15: The interest, opportunity and strategy of NUON/Vattenfall

<b>Municipality of Amsterdam</b>
<p><b>Interest:</b></p> <ul style="list-style-type: none"> <li>• CO<sub>2</sub> reduction goals have been set to reach in 2040, these must be reached.</li> </ul>
<p><b>Window of opportunity</b></p> <ul style="list-style-type: none"> <li>• Sustainability debate is high on the political agenda</li> <li>• Residents will profit in material (financial) or in immaterial (health) way</li> </ul>
<p><b>Possible strategy</b></p> <ul style="list-style-type: none"> <li>• Make stricter laws that enforce measures to make use of excessive heat more than is currently the case. (Shadow of hierarchy)</li> <li>• Increase tax for generating heat and with generating CO<sub>2</sub> emission (Shadow of hierarchy)</li> <li>• Give (more) subsidies for external heat usage (Shadow of hierarchy)</li> </ul>

Table 16: The interest, opportunity and strategy of Municipality of Amsterdam

<b>Waste Energy Company (AEB)</b>
<p><b>Interest:</b></p> <ul style="list-style-type: none"> <li>• Producing and selling heat to the residents of Amsterdam</li> </ul>
<p><b>Window of Opportunity:</b></p> <ul style="list-style-type: none"> <li>• In times of the sustainability debate is going on</li> <li>• A number of energy waste production companies are active (synergy?)</li> <li>• Financial incentives are present for the realization of a warm water pipeline</li> </ul>
<p><b>Possible Strategy:</b></p> <ul style="list-style-type: none"> <li>• Increase the production to increase profits</li> <li>• Activate the municipality of Amsterdam</li> </ul>

Table 17: The interest, opportunity and strategy of AEB

<b>Residents</b>
<p><b>Interest:</b></p> <ul style="list-style-type: none"> <li>• The residents just want a reliable and affordable heating system.</li> </ul>
<p><b>Window of Opportunity:</b></p> <ul style="list-style-type: none"> <li>• Sustainability debate is going on which makes innovations possible</li> </ul>
<p><b>Possible strategy:</b></p> <ul style="list-style-type: none"> <li>• The get the residents on their side, Waternet will only have to prove that a solution is more reliable or costs less.</li> </ul>

Table 18: The interest, opportunity and strategy of residents of Amsterdam

## Environmental Interest Groups

**Interest:**

- The use of fossil in generating power creates CO<sub>2</sub> emission and that effects the environment, while the technology and means is present to do it with less to no emission.

**Window of opportunity:**

- Providing warm water isn't produced with 100% green energy
- Stakeholders are perceived to be energy polluters
- Stakeholders profit from sustainability flaws

**Possible Strategy:**

- Revolt against polluting energy users and make use of the public opinion to increase the content and effect of the message
- Participate in environmental research and give cooperation
- Increase of public awareness of the effects of energy polluters to isolate them'
- Participate in power polluters research to alternative means

Table 19: The interest, opportunity and strategy of environmental interest groups

## 6.2 Influencing Problem Perception

In the table below the possible problem perception tactics are mentioned and with a relation to the parties in the project that are able to use them. The following tactics can be used by the stakeholders as an excuse for non competition in the project: data assumptions are contestable; other problems compete for attention; cost visible and benefits not; no strategy available; and strategic use of information. It will be useful for Waternet in construction a possible strategy in which the stakeholders are brought together and profit and loss account is positive for each party.

	Data assumptions are contestable	Other Problems that compete for attention	Cost Problem visible → Benefits are less visible	No simple strategy available	Strategic use of information
<b>NUON/Vattenfall</b>	X		X	X	X
<b>Municipality of Amsterdam</b>		X			
<b>Waternet Foundation</b>	X				X
<b>AEB</b>					X
<b>Residents</b>		X			
<b>Environmental Interest groups</b>	X		X		

Table 20: Influencing the problem perception of the stakeholders as argument for non-compliance

### 6.2.1 Conclusion

A conclusion that can be drawn from the table above is that NUON has far the most strategies available to block the process. This is not strange, because they are spider in the web and the biggest opponent. Another conclusion can be that the most popular problem perception tactics have to do with the use of facts. This is also not really strange because it depends on the party how information is perceived. This has to do with the cognitive power which will filter certain information from a certain fact, whereas another party doesn't filter but registers it. In this specific project there is a lot of confident and specialized data, which only one or a few parties have access to it. NUON is in this field a specialist and will not share specialized information because this can endanger their market interest and profits.

### 6.3 Sustainable relations

In the lower table the durable relations are mentioned between the different participants and stakeholders in the project. The names that are mentioned in the vertical bar are the parties that initiate to make contact with the parties that are mentioned in the horizontal bar. The relations between the different parties are unilateral. So, in this specific case this means that NUON wants a durable relation with its residents, but the residents don't need a durable relation with NUON. Residents have a relation with NUON because they offer a good product (power), but if the situation occurs that there is a better power supplier, they will change. There is no gain of a durable relation of the residents, but NUON will have more guaranty of stable income when the number of residents stays stable and will increase.

Durable Relation	Municipality of Amsterdam	NUON/Vattenfall	Waste Energy Company (AEB)	Waternet Foundation	Residents	Environmental Interest Groups	Housing Corporation
Municipality of Amsterdam		X			X	X	
NUON/Vattenfall	X				X		X
Waste Energy Company (AEB)	X	X					
Waternet Foundation	X	X			X		
Residents	X						X
Environmental Interest Groups		X	X				
Housing Corporation	X			X			

Table 21: Desirability of durable relations of the stakeholders in the project

#### 6.3.1 Conclusion

A conclusion that can be drawn on the statistics of the table is that the municipality and NUON are key players of the entire network. Municipality and NUON are the two parties who are mentioned the most in the horizontal list of players which who a durable relations wants to be made. Almost every party (except for housing corporation with NUON), wants a sustainable with the Municipality of Amsterdam and NUON.

Besides key players, it can be concluded that there are a number of parties who are mutual dependent. The most important mutual dependency is the relation between the municipality and NUON. Municipality needs NUON because of their big stake in the piping network and their power supply. NUON on their turn are dependent because of the municipality's legislative power and operational possibilities in the future.

Another mutual relation is that of the residents and the municipality. The residents need the municipality because they have the legislative power to realize their needs and wishes. The municipality on the other hand needs the residents because of their voting rights and the blocking power that they possess.

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## 7. Recommended Strategies

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Now all the analyses are executed, the final recommendations to Waternet can be made. All recommendations follow logically from earlier made conclusions and analyses.

### 7.1 Broadening the problem description of the project

By broadening the scope of the project, more can be negotiated and there is more space for actors to gain in the project. Space to manoeuvre plays an important role here. The solution to close the small ring is indeed one possible solution. However, if the scope of the problem is broader, other solutions could also become possible and thus be considered. Everybody's problem perception should be negotiable. Otherwise, it wouldn't be a process and the final solution would be sub-optimal, leaving several losing parties.

### 7.2 Creating a multi-issue decision making environment

If the process concerning the problem is approaching a deadlock situation, if parties can't come up with agreements, it might be wise to put more issues on the agenda. Make sure that there are enough interesting issues for each party on the agenda, which makes it attractive for these actors to participate in the decision making process. This will result in more room for giving and taking: the actors can lose something in one issue if there are gains in other situations. Additionally, it will provide incentives for cooperative behaviour. Especially regarding the possible opponents of the project. It will be clear that in this case, NUON is aiming for that. Parties can be activated by this strategy.

Therefore, NUON could be activated, creating a multi-issue decision making environment. The main idea is that NUON gets its benefits early in the process instead of a late return of its investments. The benefits should appear early in the process. However, Waternet has not got many opportunities to do so as follows from *table 21*. Though, NUON has a mutual dependent relationship with the Municipality of Amsterdam. So the Municipality could create the desirable multi-issues that should be negotiable. The next recommended strategy follows from this.

An example for a multi-issue decision making environment could be the creation of a positive public imago. By closing the ring a positive sustainable image can be created towards the public of the Netherlands. The positive image could on its turn lead into more customers who want to purchase power from NUON.

### 7.3 Municipality involvement

#### 7.3.1 Involving the municipality by dilemma sharing

Waternet could be seen as department of the municipality. The municipality is hierarchically connected to Waternet by giving it orders. Waternet performs the tasks that are assigned by the municipality, but cannot give orders, only advice. By involving the Municipality it can be committed to the project. An important strategy, in this case, is including the "superior" Municipality by dilemma sharing. This means presenting the progress of the process in the form of dilemma's (De Bruin & Ten Heuvelhof). The Municipality can be unfrozen by this strategy and become active actor, which contributes to the negotiation process. The Municipality has the power to compensate NUON in other issues. NUON probably will need the Municipality in future negotiations for the realization of other projects, which could be inserted on the multi-issue agenda.

In short, the Municipality should be involved, because its blocking power will vanish. If it is committed it can be used to commit NUON, by using its mutual dependency with NUON. An example for this kind of tactic could be that the municipality will compensate NUON for their effort in closing the ring. The costs for the realization of the ring could be shared between NUON and the municipality. In that manner the municipality is realizing the durable interest for which public means can be used. By doing that, they also enlarge their share in the communal heating infrastructure, which in turn gives them more decision power when it comes to the exploitation of the network. This will also give the municipality the opportunity to supervise the development of the rates paid for the use of communal heating by their citizens. NUON on their turn invests in a sustainable project which is beneficial for their image towards the public, and have a longer period in which the small ring will be profitable, as a result of less investment costs.

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### 7.3.2 Shadow of Hierarchy

This is another, harder, strategy involving the Municipality. If the Municipality is committed, Waternet can use their power to force NUON indirectly. By threatening with new legislation, which could lead negative effects for NUON regarding current and future projects, NUON can be committed. Of course, it is not possible to use strategy 3a in combination with 3b; it's either the one or the other. In our opinion "a" is preferred upon b. A possibility of the Municipality to use legislative power to motivate NUON is the redefinition of the small polluting particle emission law. In the present situation NUON isn't directly affected, because they don't cross the maximum values. In the future however, the maximum amount of PM10 and PM2,5 in exhaust gasses will be sharpened. By committing to the closure of the ring, it could be possible for NUON to get some kind of compensation in answering the future sharpened maximum values of PM10 and PM2,5.

## 7.4 Multiple Sourcing

If there is one critical party with production power the entire network will depend on this actor. In this case the network is owned by NUON for 90% and they also have the financial means to invest. When it's possible to find another actor that has the same sort of production power, this will increase the chance of success for the project from the point of view of the initiator. This is not desirable for NUON because then the possibility is created that their organization is bypassed in the future. For the network it will be nearly impossible to find a third party, but there are options for the production of heated water.

The AEB is already involved in the network and they are able to produce heat for the network and can take care of the heat needs if NUON decides to turn down the production.

Because NUON already invested in the network, they are dependent on suppliers and on the municipality to make use of this piece of infrastructure. This mutual dependency ensures cooperation.

## 7.5 Involve Environmental Interest group

Although it is not probable that Environmental Interest groups will form a strong opposition, the risk of opposition by one party can easily be mitigated. If one or two of such parties are involved in the project and listened to, the others will not be able to protest if the project is performed. This would be unwise to do for them creating a diffuse message to the public.

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