

Final Thesis

**--- Design an integrated system with more cooperation
between Park Lingezegen and Agro-Park Bergerden in
sustainable development**



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Abbreviations

VHL	Van Hall Larenstein
Ha	Hectare
PPP	Profit, People, Planet
NBZ	National Buffer Zone
WUR	Wageningen University and Research Center
SAUL	Sustainable & accessible urban landscapes
DHV	Dwars, Heederik en Verhey



Acknowledgement

Our final thesis is the last chance to perform our achievements in last 2 years studying in VHL, Velp, The Netherlands. It provides the opportunity to visit a real natural park called Park Lingezen and Agro-park Bergerden. This term took over 4 months to find more possible cooperations between them and new opportunities in ecology, people and economic, reflecting the fact sustainable development is becoming a world issue.

Holland, as the one of most developed countries in the field of agriculture and environment. It owns plenty of high level knowledge and large investments on doing researches, due to its special low-land location and part of European economic union. According to this term, we have known much more about horticulture: their concept, water use system, energy supply etc, especially, in this top-technique owner country.

We done a study trip in Park Bergerden, we talked to several people there and saw their work. We knew that it is a complete park with own water system, energy system; We knew the basic construction of a success agro-park; We knew that the sustainable development we are talking about everyday which can be built like that great etc. All from this term we met will provide us a more wide sights on the future world and must be fresh shock on our mind.

Here we would like to thank and acknowledge:

The people who we met in study trip in Bergerden. They kindly share their knowledge and experience with us and provide us much useful information. Especially, Kamar Plants company, Mr Bert Langelaan and Mr Glenn Langelaan.

Our tutor Hans Van Den Dool, who teach us how to make plan and help us when we face problems.

Our supervisor: Mr. Vincent Kuypers, who works in Alterra, WUR. He guides us to do this project and gives us lots of advices in our research.

Mrs. Efrosyni Antoniou, she gave us a presentation about future city and let us know the top view of our pilot area.

Mr Karel van der Vegt, who is the Project employee in Park Lingezen. He accepted our interview by E-mail, and sent related documents to us.

Mr Peter Smeets, who is the expert in the field of agroparks and metropolitan agriculture in Alterra, WUR. He gave us much more detail information and advises in our project.

Chapter 1 Program

Guide to read

The content of this report contains a general introduction of this project in chapter 1. It will show the pilot area where it is and short description. The establishment of program is presented in chapter 2. It includes the problem analysis and methodology. In chapter 3, it will show the field trip in our research area and interviews. Chapter 4 is the part for producing ideas, here we show the opportunities which possible can bring to the system more benefits and developments. Chapter 5 will build a preliminary conclusion, it will show the group discussion and the way we made the design.

This research was approved by Van Hall Larenstein and Alterra research center in WUR. The report will be admitted to all of participants. The audiences include enamors in Van Hall Larenstein, Mr. Vincent Kuypers in Alterra, WUR, Manager of Park Lingezegen, Local Water board.

Introduction of Research

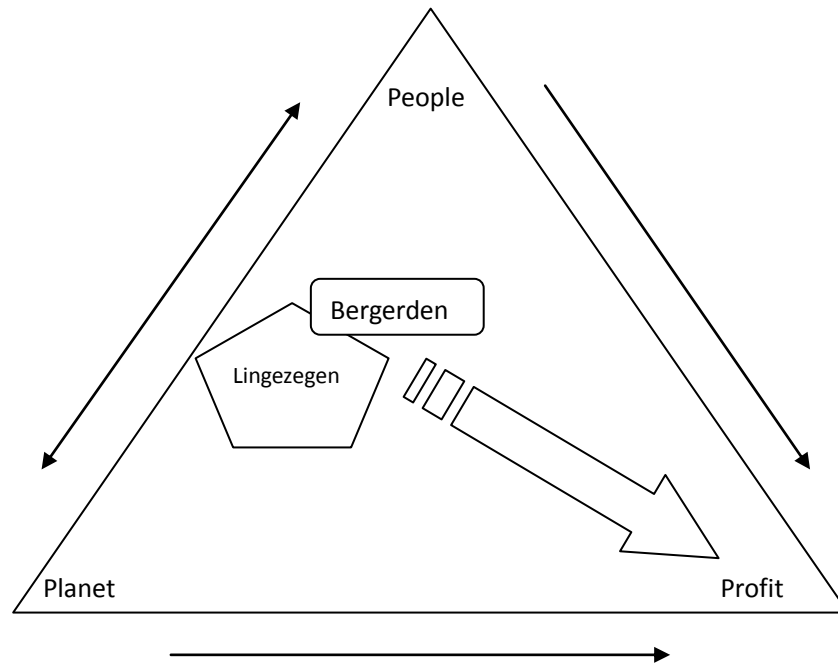
The research areas are called Park Lingezegen and Agro Park Bergerden, between Arnhem and Nijmegen. Agro Park Bergerden is trying to grow larger to make more profit. This assignment is focused on new economical opportunities in Agro-park Bergerden. Currently, there is a new plan which is Agro-park Bergerden will be expanded by following the Project “Future City-Urban Networks To Face The Climate Change”, which aims at making city regions in Northwest Europe fit to cope with the predicted climate change impacts. Obviously, the complete cycle of this agro-park will be reopened and the quantity and quality of elements will be filled in. Our work is to do research in sustainable development by following **Sustainable Development in “People, Profit, Planet” system**.

Concept

The **“People, Profit, Planet” system** means expanding the traditional reporting framework to take into account ecological and social performance in addition to financial performance. Similar the PPP-system applies to natural capital and human capital measurement to assist in measurements required by the ecological. And the goal is to achieve sustainability.

Problem analysis

Recently, the sustainability components were developed as **Graph 2.1** shows in Park Lingezen and Agro Park Bergerden. In these two parks, we try to find more chances to contribute into **PPP-system** and make it more cooperative and profitable.



(Graph 1.1: PPP-system in Park Lingezen and Agro Park Bergerden)

In **Graph 2.1**, each peak stands for **People**, **Planet** and **Profit**. They each represent social networks, ecological networks and economic networks. The whole area including Lingezen and Bergerden is now leaning to social and ecological parts, the economic part will be developed with expansion of Agro-park. “How to transfer the power from people and planet to profit?” is the concept.

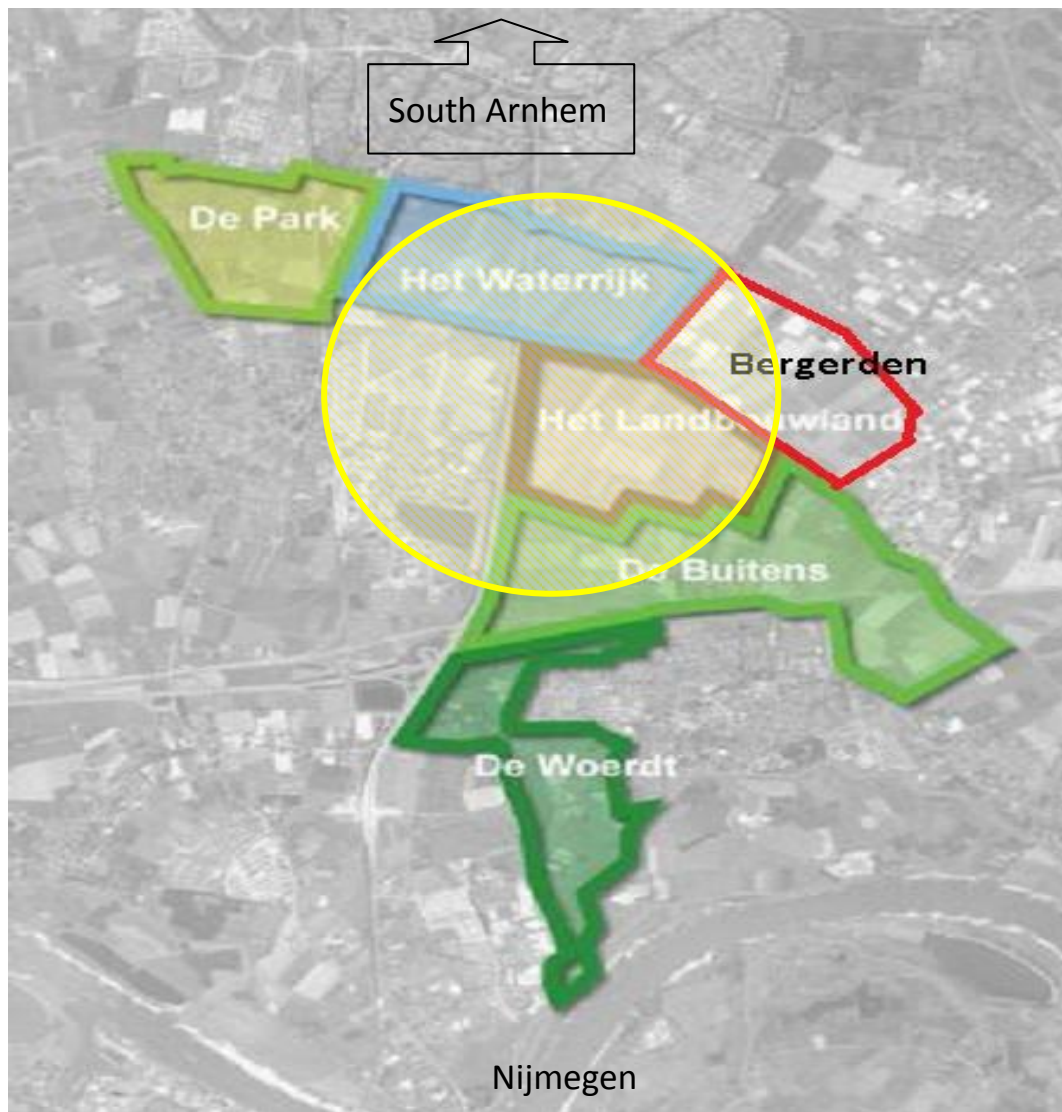
Luckily Lingezen has a good foundation to make profit. Climate change is changing the hydrological and soil system, the law is stricter than before to prevent ecological system worse. Thus it will result in more costs in sustainable system. The people in surrounding villages have a relatively high living standard, they would pay for high quality of life and good living environment. In this image, the economic networks is developed, the infrastructure also can be improved. The local inhabitants pay for the money to achieve better living conditions. Steadily, Lingezen will achieve sustainable urbanization, the future city will be prosperous.

To design an integrated system with more cooperation between Bergerden Agro Park and Park Lingezen, we have to consider the change of water and energy facts and their effect. It will be an issue that what kind of opportunities will take place in water

and energy supply, economical development, recreation, infrastructure etc. So we come up with a main research question and several sub-questions (See appendix 1 for Plan of approach).

Background

The research area is located in a city region between Arnhem and Nijmegen. During summer time, there is large water consumption in agricultural production and greenery in Agro Park Bergerden. In Park Lingezen, there are five parts, DePark, Het Waterrijk, Het Landbouwland, De Buitens and De Woerdt. Het Waterrijk and Het Landbouwland are close to Agro Park Bergerden. Het Waterrijk is an area for storing water. Het Landbouwland is open agricultural land. The pilot area shows in area. (See Map 1.1)



(Map 1.1: Pilot area- Het Waterrijk, Her Landbouwland and Agro park Bergerden)(Een park van format: Park Lingezen naar realisatie, 2007.03)

Bergerden

Over the last decade, the towns of Nijmegen and Arnhem have developed many surrounding horticultural areas in order to meet the need for new housing. Consequently, a new location has been sought in recent years for horticulture. So the Bergerden horticultural zone was born (*Batenburg Beheer, 2006*). Agro-park Bergerden is one of the ten development sites for large-scale horticulture in the Netherlands. This horticultural cluster is between Arnhem and Nijmegen (See Map 1.1). The location provides a good guarantee for having environmental benefits. This horticultural zone has approximately 350 ha which will be comprised by 40 horticultural businesses in few years.

Agro-Park Bergerden owns series of service for attracting investments. It owns a completely producing network with water supply, energy and logistic chain. At present, it has 15 companies which do business here and above 50% of land not used yet (*Langelaan, 2010*)(see Map 1.2).



(Map 1.2: information of land use in Agro-Park Bergerden)(Hoogendoorn E-NEWS,2004)

To see the map, this area is separated by net-style canals. There is a reservoir inside with 20 meters deep. It plays an important role in the irrigation system. Each separated spot is individual and connected to whole network by the canals. Due to

this land situation, each spot can work immediately when new arrivals (i.e. new companies) connect the pipes and canals.

Park Lingezegen

Park Lingezegen is a new NBZ (National Buffer Zone) between Arnhem and Nijmegen. The park aims to be developed as a “green lung” with Agricultural land, nature and open water for the inhabitants of Park Lingezegen. This area has a substantial growth of population and there will be above 160,000 people live here in 10 year. It will provide plenty of opportunities on people daily life.

What are National Buffer Zones?

NBZ are open green areas located between cities occupied by agriculture and nature. They serve two important purposes: they preserve the open landscape and provide recreational space. This open landscape acts as a buffer and prevents cities from expanding to the point where they interconnect. They also offer city dwellers a place to enjoy the open landscape, relax and spend their free time.

Here Park Lingezegen is divided into 5 areas with totally 1500 ha. Each area has own character and the sequence is De Park, Het Waterrijk, Het Landbouwwand, De Buitens and De Woerdt from North to South (Appendix 2). Two of them are in Park Lingezegen and described as follow:

Wetland (Het Waterrijk)

Het Waterrijk is primarily a landscape park. The low-lying basin area will be adapted to make room for water storage, new watercourses and nature development (See Map 1.3). The Linge River will be much more attractive, with a broader course and nature-friendly banks. The aim is to give the Linge a free run. Het Waterrijk looks natural and has ample room for recreation. The new watercourses are suitable for water sports and other water-based activities, including rowing, canoeing, fishing and skating. (Unie van Waterschappen, 2008)



(Map 1.3: Het Waterrijk)(www.parklingezegen.nl)

There are opportunities for surfing, swimming, sunbathing and picnicking. Nature lovers can go bird-spotting among the reed beds and willow woods. The purifying

action of the marsh vegetation increases water quality (*Unie van Waterschappen, 2008*).

Agricultural land (Het Landbouwland)

Het Landbouwland is an open farming region. The farmers here mainly work on plant vegetables (See Map 1.4). Because of law, high building is not allowed to be build here, thus no greenhouse, just simple open farming. They have cooperation with Bergerden area for dealing their wastes what can be reuse by high-tech in Bergerden.

This area is attractive because of its new bike and walking paths. And there are good links with Het Waterrijk and De Buitens. Now it is expected that the relationship between farm-dweller can be strengthened through new forms of farm business, such as farm shop, fitness activities, care farms and much more. All these activities ensure that city dwellers return to farm and take note of the important work of farmers.(*Park Lingezegen naar realisatie, 2007*)



(Map 1.4: Her Landbouwland)(www.parklingezegen.nl)

Chapter 2 Methodology and Strategy

Desk Study

-Literature

The documents related Lingezen area and Agropark Bergerden are needed to research. We found lots of information from internet, it includes many PDF documents and official websites of two parks. But there is a limit which is some of the documents are in Dutch Language, we only can use Google Translate Tool to work them. Not only use the GTT, but some important selected information was checked and translated by our Dutch friend and Vincent Kuypers, which can prove the resources correctly.

Also, our supervisor Vincent Kuypers introduced several projects to us with some digital documents. We learned and found some useful and up to date information.

-Discussion

Discussion is a main method in our progress. Lots of information needs to be analyzed and concluded from interviews, documents, case study etc. So we met Vincent Kuypers several times for discussion of information which we got from literatures, interviews and excursion. He guided us the correct and professional way to go and answer the questions what took place in study progress.

And on the other hand, our study tutor Han Van Den Dool helps us to come out the report. As students, we need to report our research in paper and presentation in the end. Hans guided us to know the research methods and report building.

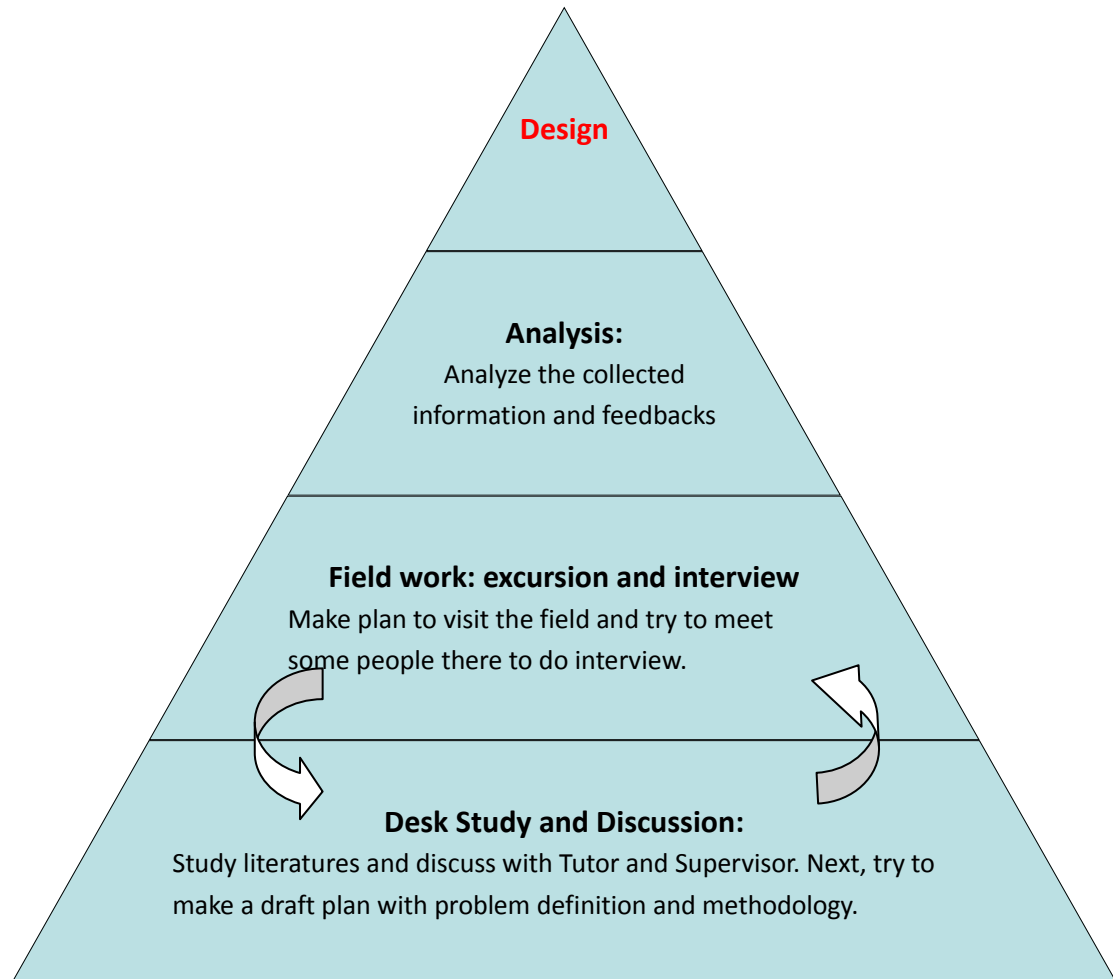
Field work: Excursion and Interview

The real situation was discovered during field trip and interviews. This is the best way to show us the real situation there and their interests of this plan. Firstly, we will define our stakeholders, for example: inhabitants, agro-park manager, project manager from Province of GLD etc. Then, we did an excursion on field and several interviews to take a look on working environment there and prepare the questions and interview our stakeholders. After interviews, we kept them on track for possible second interview for additional information.

We supposed to invite several stakeholders and hold a workshop on June in the beginning. But It's the pity that some of stakeholders like park manager, project manager are very busy or started their holiday, so we lost this chance to collect more information.

Strategy:

We expect to design an integrated plan to show more cooperation in our research area. The strategy of this project shows as follows (Graph 2.1):



(Graph 2.1: Strategy of project)

Chapter 3 Current water and energy supply system in production by field study on Agro Park Bergerden

Introduction:

As one of the top-ten development sites for large-scale horticulture in the Netherlands, Agro Park Bergerden is full complete cycle in produce progress which is one of the most curious points to research deeply. On 21st May, our group went to Bergerden for collecting more information and expected to interview some people there.

During field trip, we saw plenty of green houses are built there and which are surrounded by canals. There is a pure horticultural produce base. We also were accepted to visit one of green house and interview it, their water and energy system left us a deep impression.

Field Study

Agro Park Bergerden includes over 15 horticulture companies and logistical sites currently. The 90 % of the house area is green house, it looks like a “green house forest” (Picture 3.1).



(Picture 3.1: Green Houses in Agro park Bergerden)

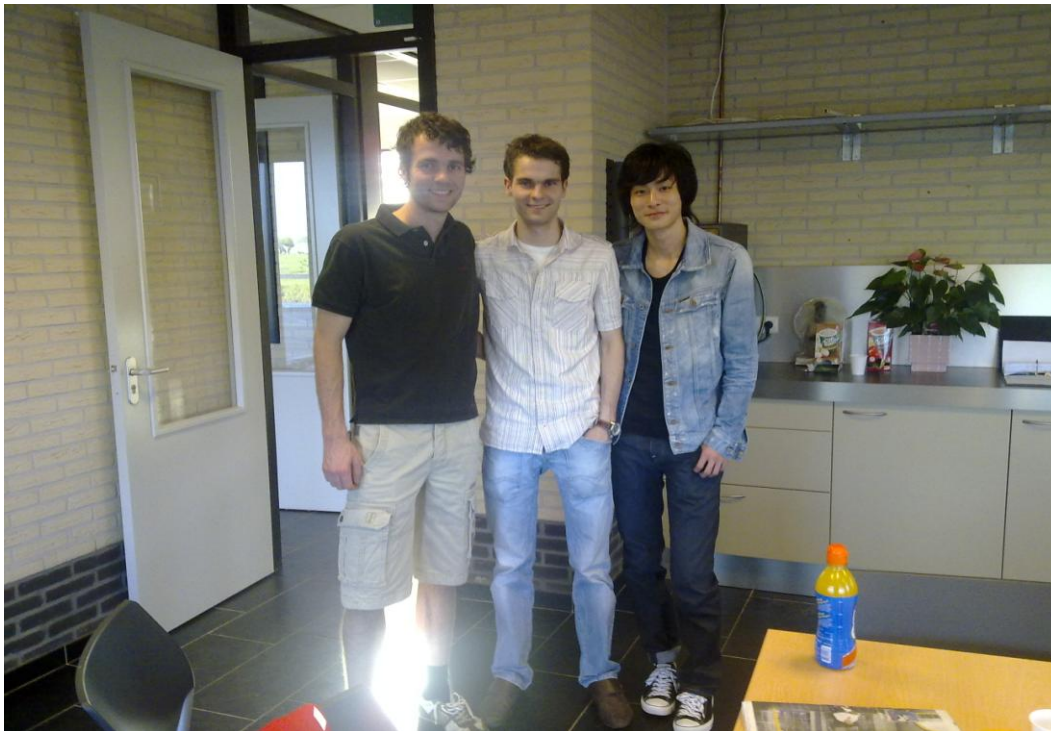
From Picture 3.1, plenty of green houses lay on the sides of street and canals are surrounding them. It is clear to see through the glass that almost all of them were producing horticultural products. Next, we saw a reservoir in this area and connect

the canals (Picture 3.2).



(Picture 3.2: shows a reservoir in Agro Park Bergerden and it connects canals)

Obviously, this reservoir was built for collecting water and controlling the water level in canals. The whole area is separated by canal nets.



(Picture 3.3: interview with Bert Langelaan and Glenn Langelaan in Karma Plants)

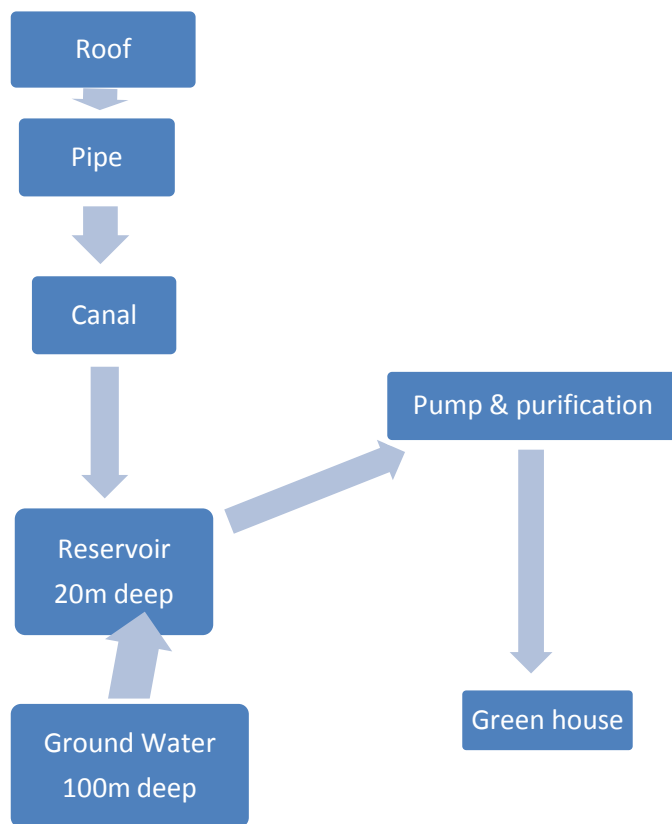
There it is not allowed to enter the greenhouse without permission, we have to ask each company which we passed. Unfortunately, most of companies show low interests to us, only one of them give us the permission to visit. It is an Anthurium supply company, called Karma Plants¹. They'd like to receive interview from us and kindly to introduce this park to us (Picture 3.3).

¹ Karma Plants: Karma Plants built in 2000 as a modern nursery. Its specialty is to produce high quality potanthuriums in different pot sizes and colors. The company slogan is to be 'The Anthurium Supplier'.

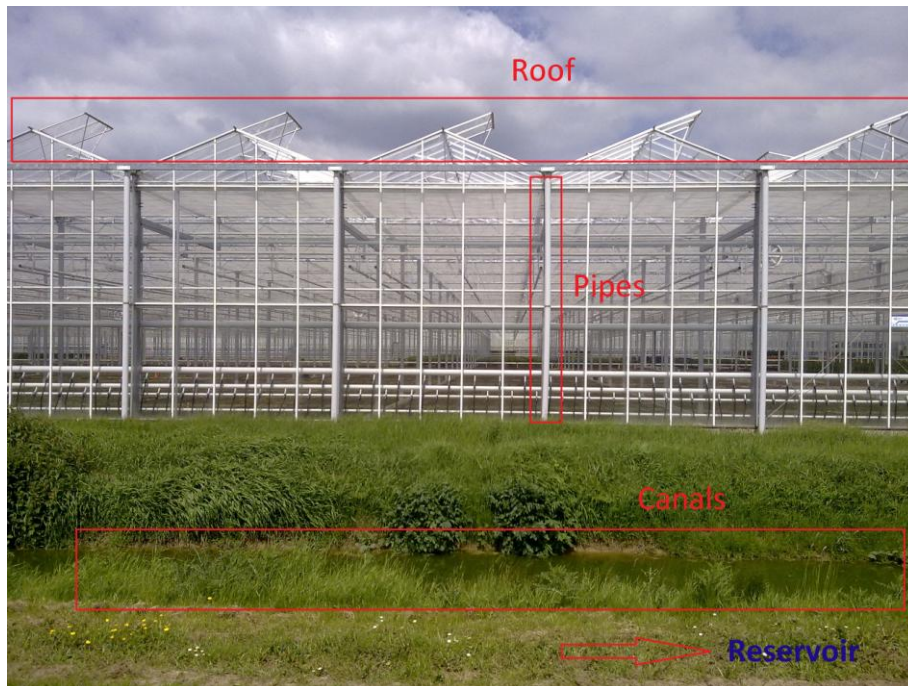
Rain Water collecting system and Energy Supply system

According to interview Karma Plants, Mr Bert Langelaan and Mr Glenn Langelaan kindly told us much information about their work. In their mind, the water and energy system are quite good and efficient to them and also they introduced these 2 systems to us.

Rain Water collecting system



(Graph 3.1: Rain Water collecting system in Agro park Bergerden)



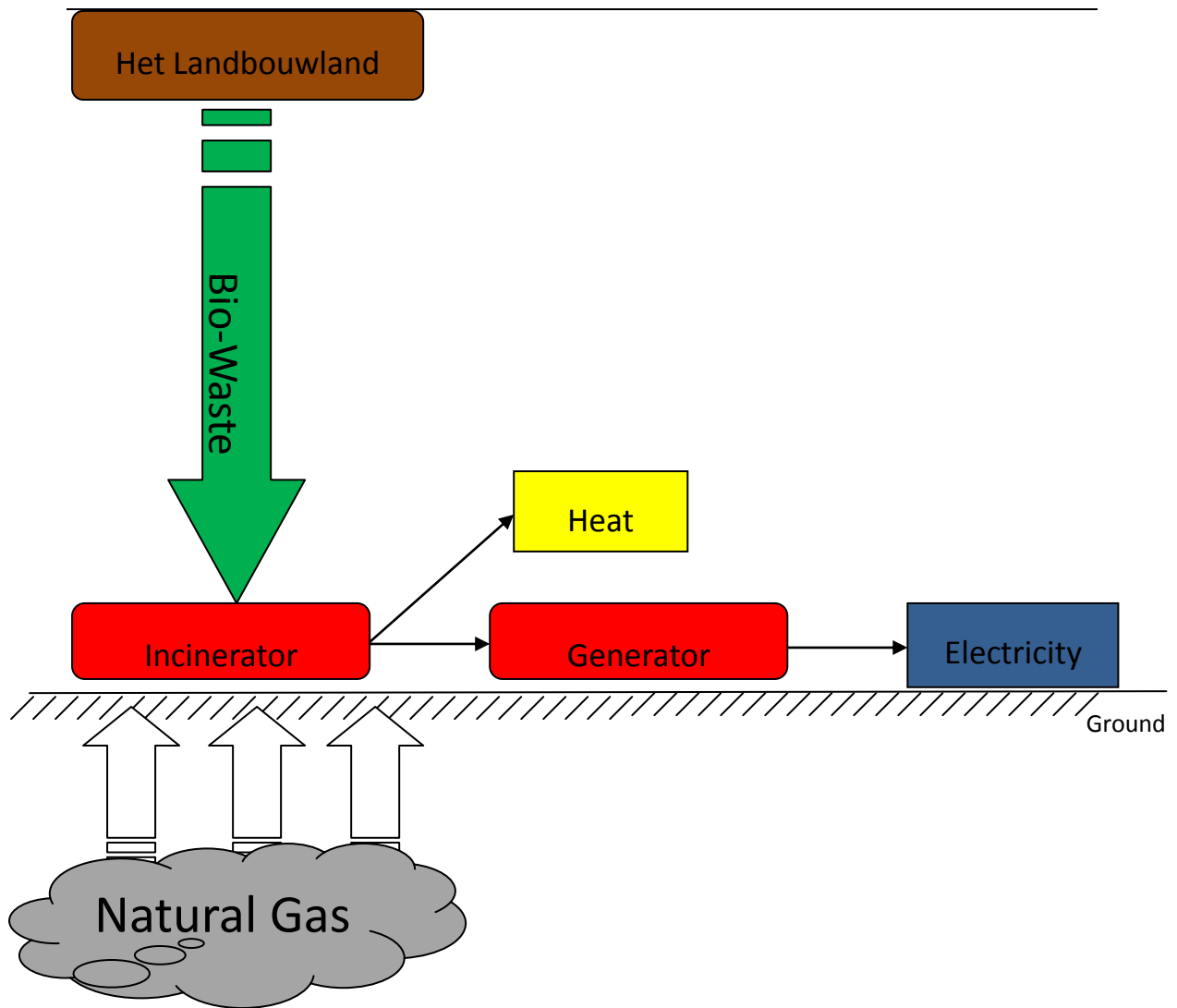
(Picture 3.4: Part of rain water collecting system. Roof, pipes and canals)

The rain water collecting system is very thorough (See Graph 3.1). When it is raining, rainwater falls on the roof, flows down through the vertical pipes attached to the wall, into the canals. Finally the water runs in to a reservoir (See Picture 3.4). The reservoir is 20m deep. During dry season, if there is not enough rain, there is ground water feed. When the greenhouse needs water, the water is pumped up and treated at 48⁰C for 3 minutes by heat, to make sure the quality reaches the standard. Then water can be used in the greenhouse.

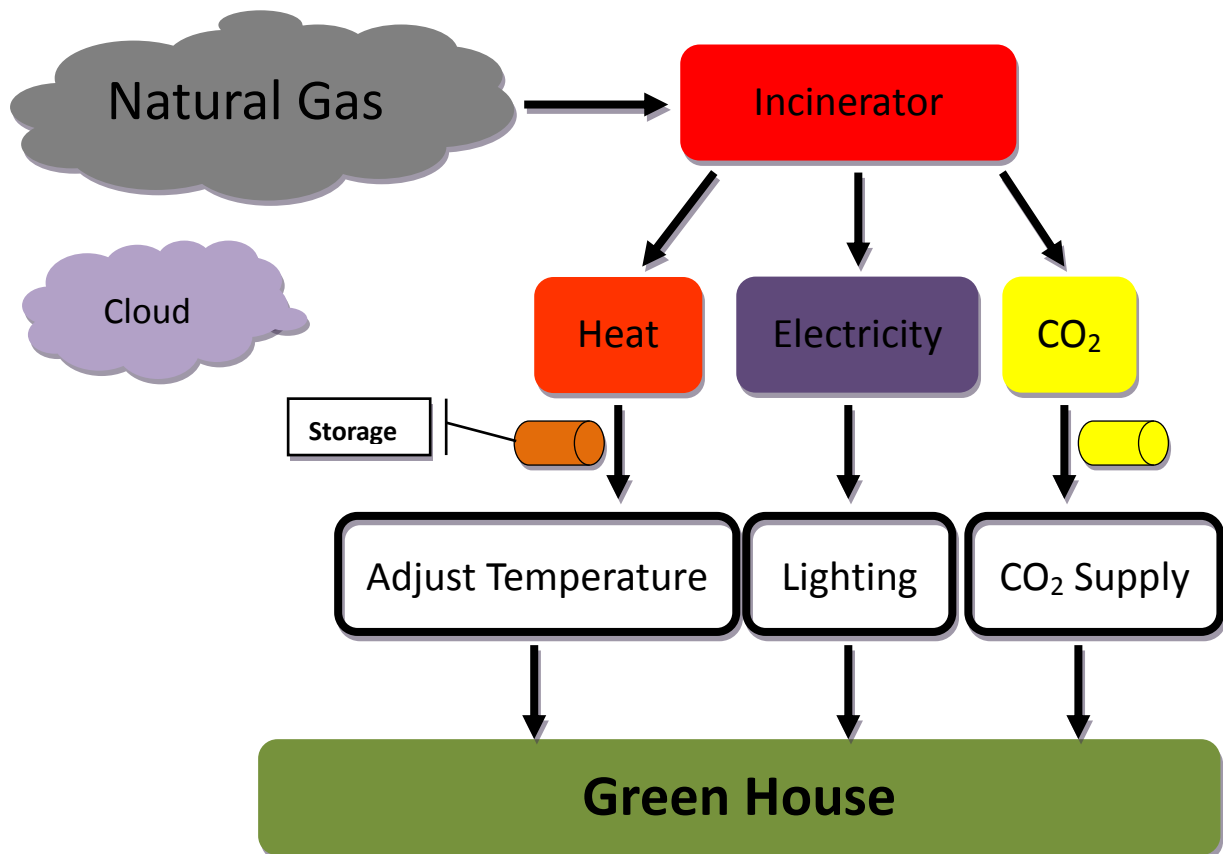
There are canals and pipes ready in the empty area. if new companies start business, they can connect their pipes to the system. Every company in Bergerden is part of the system, they need to agree on the treaty and pay a certain amount of money for each cubic meter of water.

Energy Supply System

The main energy resource is natural gas which takes place under the Bergerden area. Specially, Het Landbouwland in the west does supply a large amount of bio-waste, especially after harvest. Het Landbouwland treat the bio-waste is costing money. They transfer the bio-waste to Bergerden, to incinerate the bio-waste. The heat can be used by Bergerden. Part of the heat is directly used for control the temperature in greenhouses. The major part of the heat is used to drive the generator to generate electricity. The extra electricity is send to the public electricity network. (See graph 3.2)

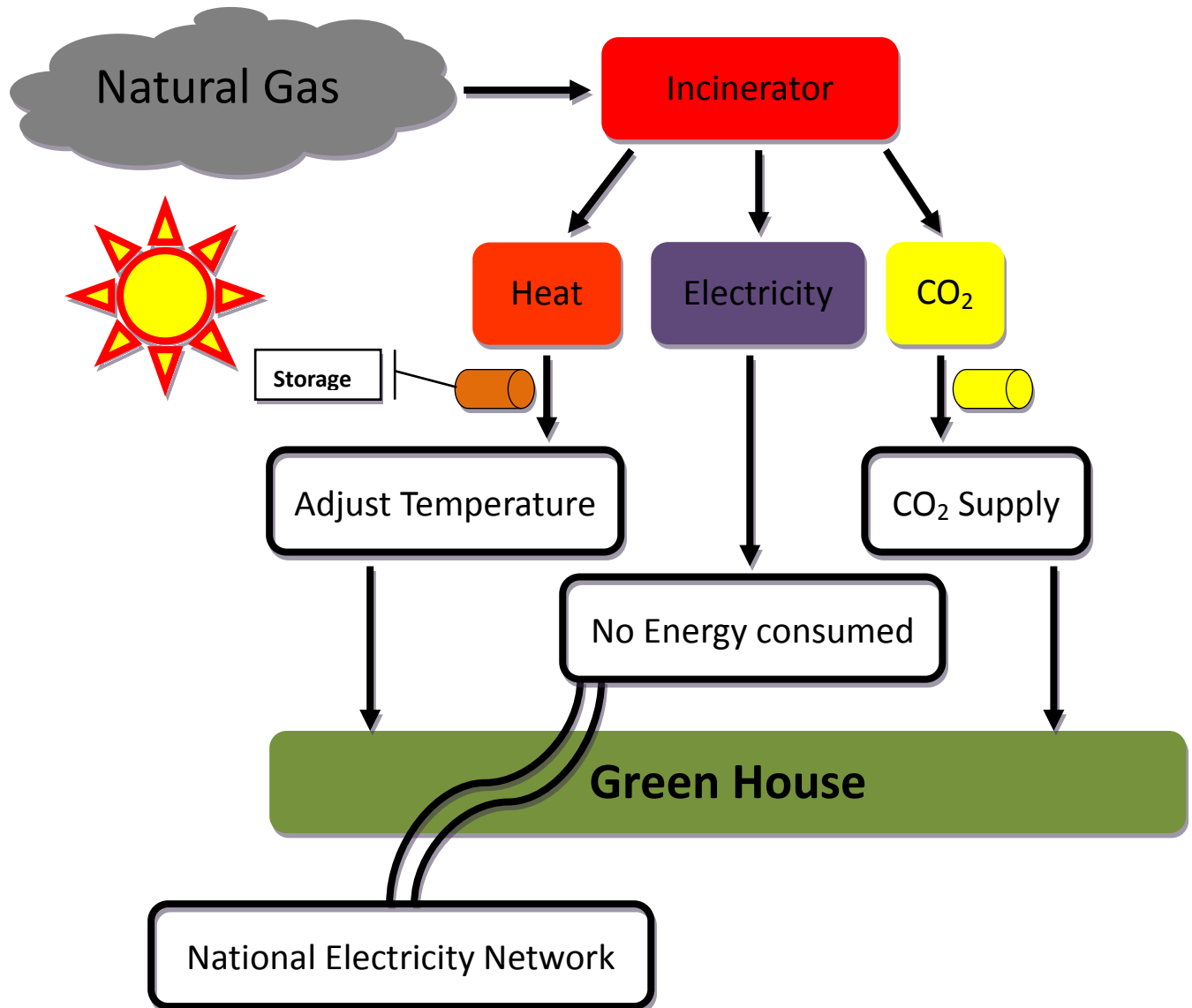


(Graph 3.2: Energy supply system in Agro Park Bergerden)



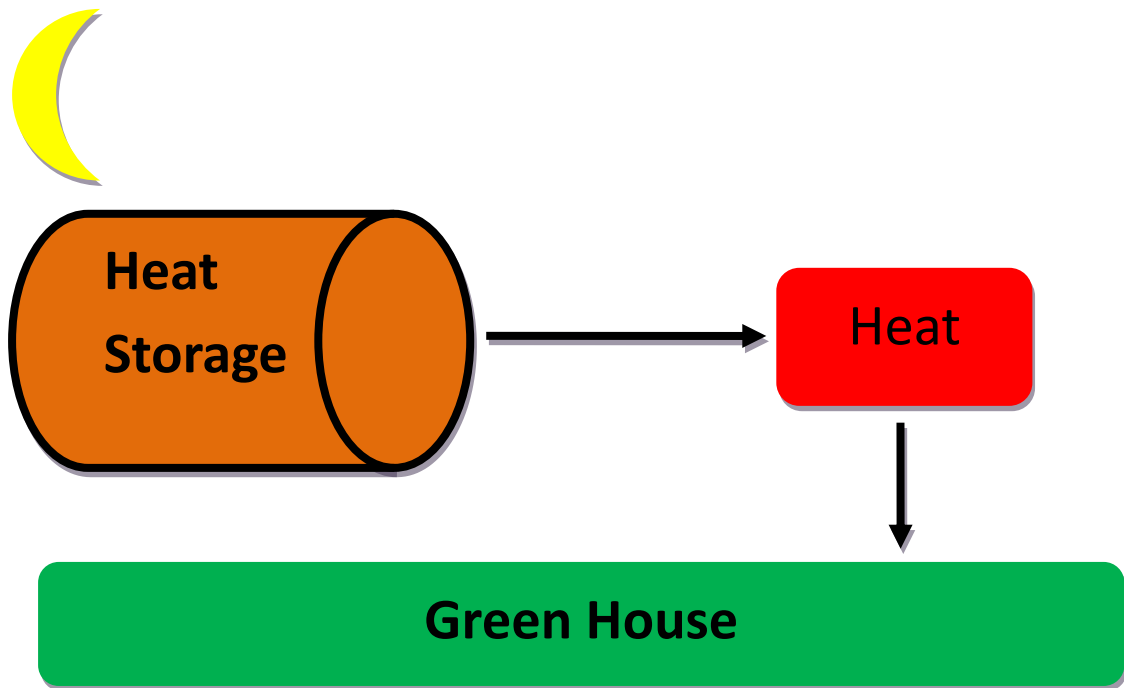
(Graph 3.3: Energy flow during dark periods(cloudy, rainy, etc.)

All the energy from natural gas is divided into 3 parts, the heat and CO₂ can be stored. When the greenhouses need to be warmed up or CO₂ needs to be recharged, the storage can supply. The electricity is used to lighting up the greenhouse during dark periods.



(Graph 3.4: Energy flow during Sunshine periods)

The energy flow stays almost the same on CO₂ and heat. The electricity is not consumed by the greenhouse, it directly flows to the national electricity network.(See Graph 3.4)



(Graph 3.4: Energy flow during night periods)

During nights, the heat storage can releases the heat to warm up the greenhouses.
(Concept from P. Smeets, Alterra Wageningen,2010.06)

Chapter 4 Opportunities

Introduction

According series of research we did, the information and feedbacks will be discussed and analyzed by group meeting. In this Chapter, the opportunities which will be listed and illustrated

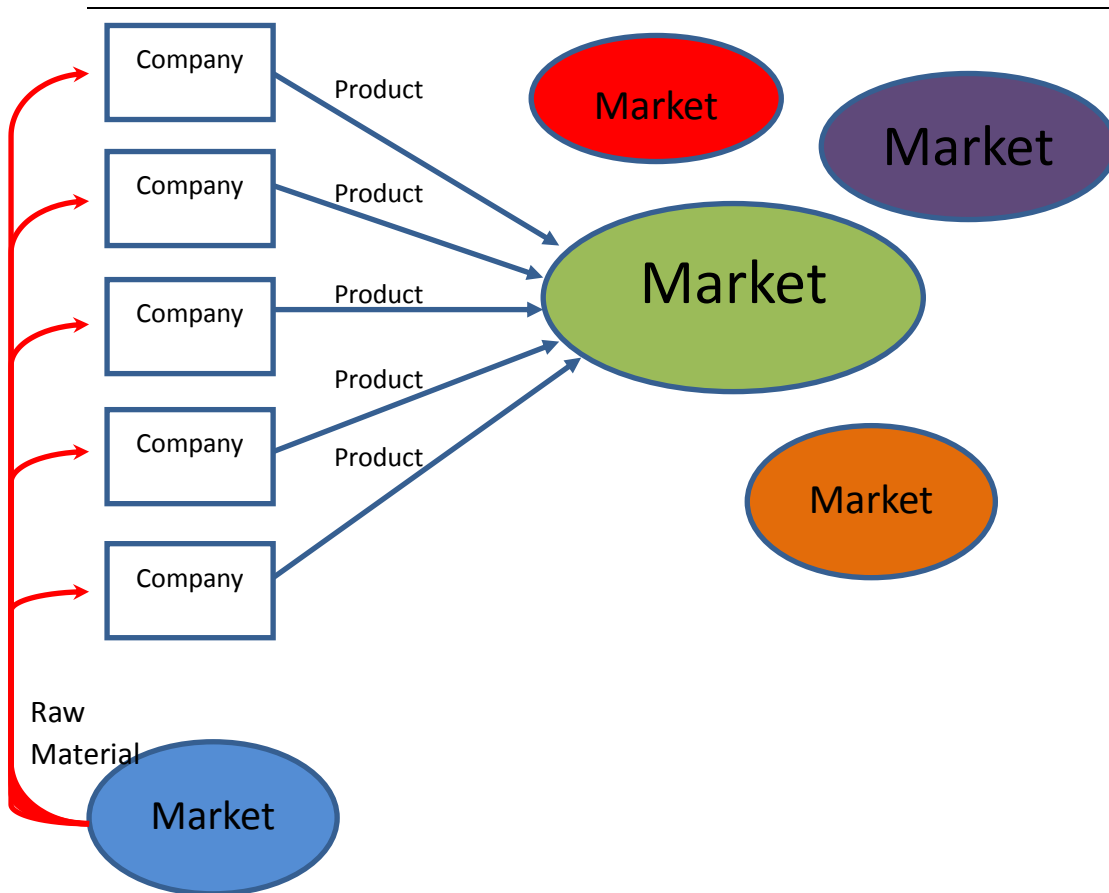
The concept for new, more integrated and optimized agro park at Bergerden is creating the greatest possible benefits for environment, landscape, people and animals.

Opportunities

Opportunity 1: Enhance the variety of products

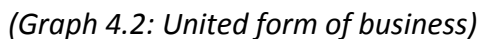
With study literatures and field, we found out that the product variety and cooperation among companies inside the Agro Park Bergerden are quite simple now; one market oriented. Here it could be a chance to expand economical scale in this design.

The products from Bergerden are parallel, actually the companies are competing with each other roughly in the same market, and they are just staying in the same place to do similar production activities. In the future Bergerden may induce or attract more companies with different products, to make the product for different markets, among others products could be consumed inside the Agro Park (local food restaurant). Thus, transportation cost will be much less. Agro Park Bergerden can bridge the gap between producers and consumers and prevent the unwanted growth of traffic around the Agro Park. (Graph 4.1, Graph 4.2)



(Graph 4.1: Parallel form of business)

The companies buy the raw material from the same market, do the same production activities, sell the same product to the same type of customer. This lead to the competition inside Bergerden intense.



Intake more type of business, the companies can be form markets inside Bergerden. The market and production structure is more complex. Loosen the competition among the companies.

Opportunity 2: Development of research institutions

Bergerden can also introduce some research institutions. Now Bergerden is equipped with perfect closed water, CO₂ and energy systems. These conditions are suitable for doing experiments, e.g. breeding new greenhouse products, while optimizing the use of water, energy and CO₂ also outside the Agro Park. For example, the new seed can be supplied to surrounding areas such as Het Landbouwwand.

Opportunity 3: Expansion of green houses in Argo Park Bergerden

The limits of growth form Bergerden are now planological. The expansion of greenhouses is not feasible. However if space within the Argo Park can be used for greenhouses, while an exchange with Park Lingezen can be made with water and energy storage (that could well fit in the planological framework). Both

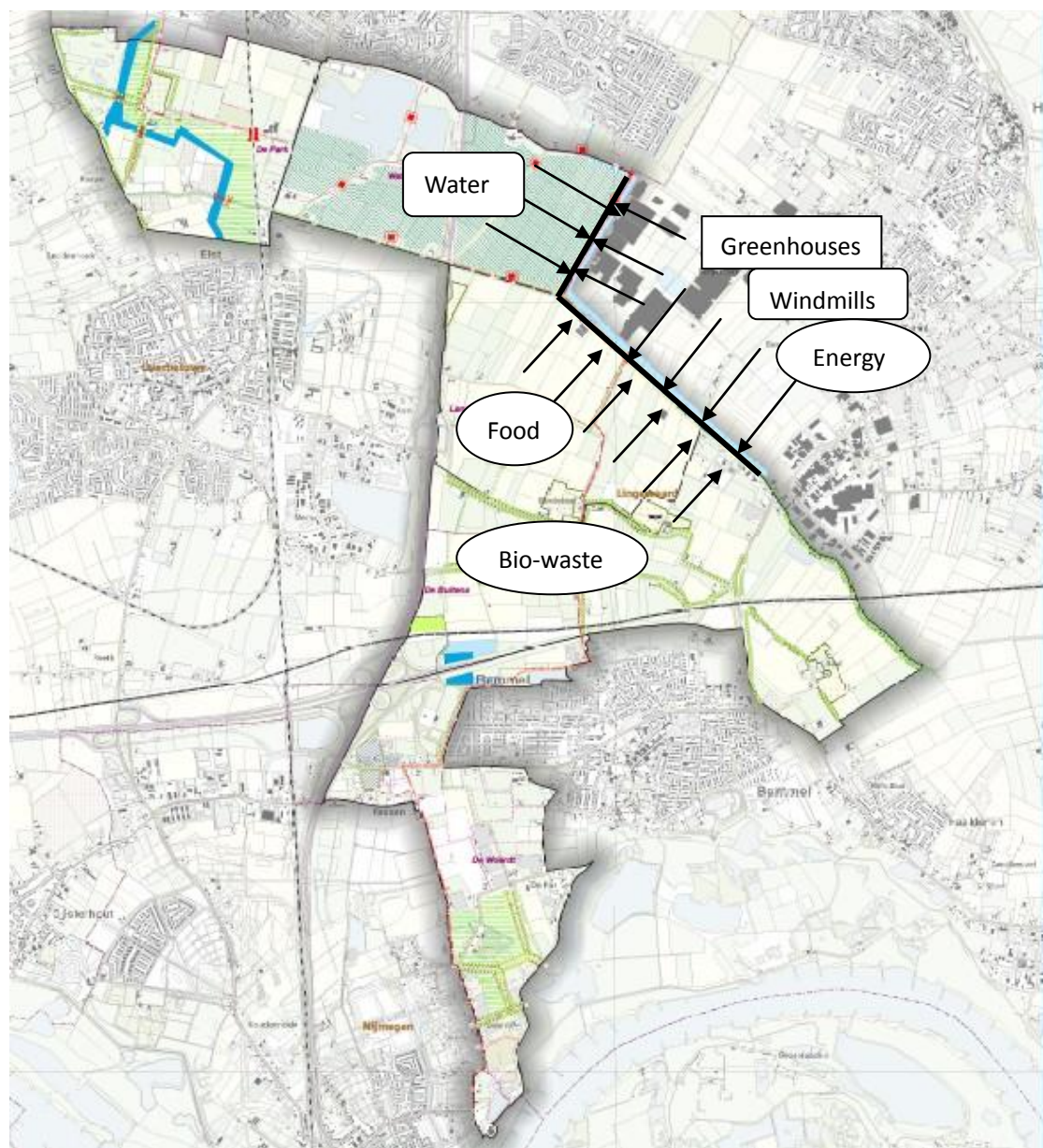
Bergerden and the Lingezen Park could benefit. Whereas the village of Huissen could use much more cold / heat produced at Bergerden.

Opportunity 4: Improve links between Bergerden and Lingezen

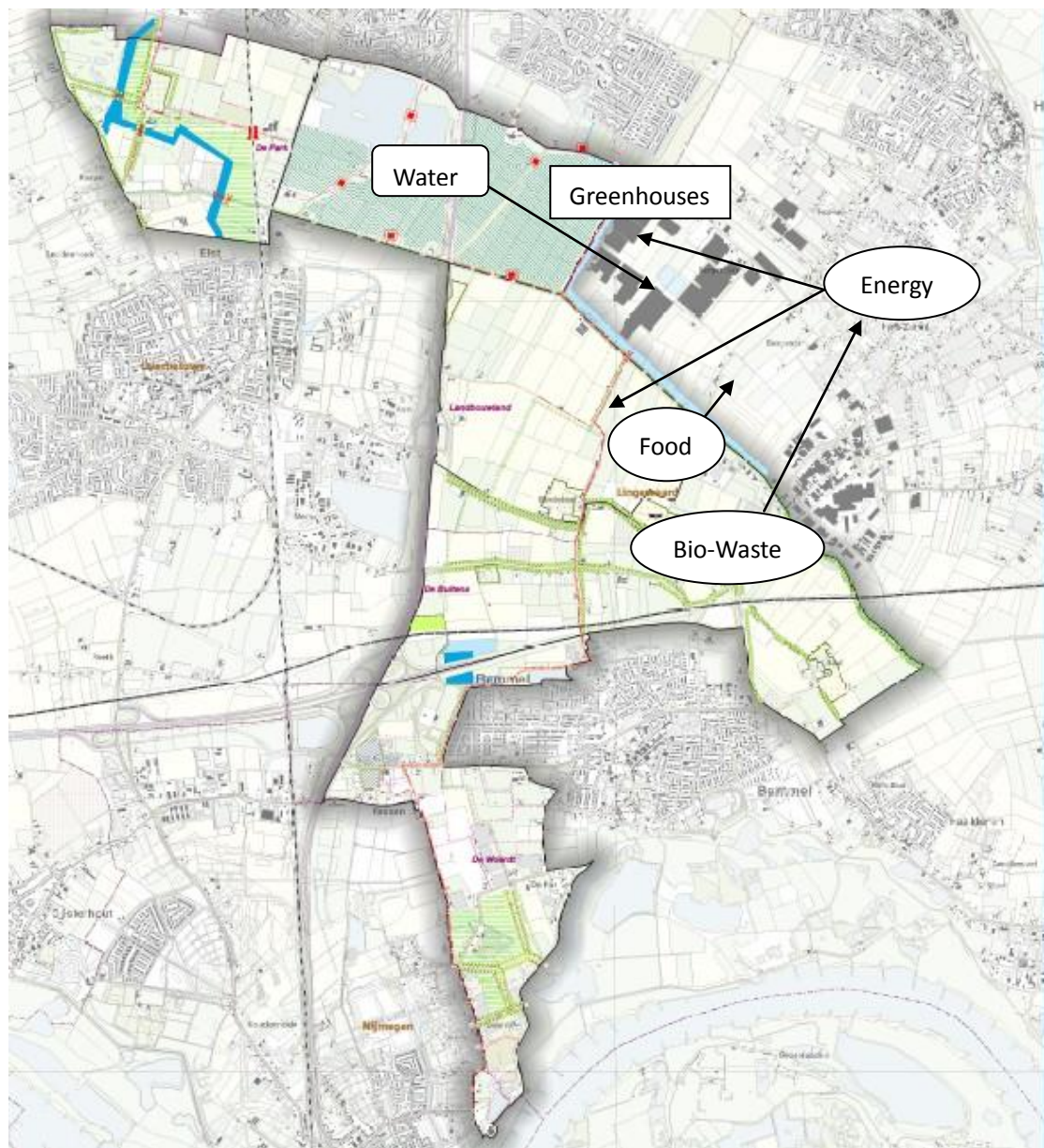
We can imagine that visitors to Bergerden and park Lingezen are the same people – both for recreational or agri–business purposes. A synergy between the two parks could be the local restaurant with local food, but can also be a climate machine (CO₂, Water & energy) that links both parks.

Opportunity 5: Break the border to create more opportunities

Looking at needs of the greater Arnhem-Nijmegen Region, a mixed zone between the two parks is a far better opportunity to attract new clients, customers and day trip tourists, than the now created formal straight border between the two parks (only for planological segregation such as greenhouse buildings and windmills and exploitative segregation) Even these reasons come from well thought ideas and dreams, they now hamper both economic and ecological optimization and in the end it is the surrounding people / villages that suffer.(See Map 4.1, Map 4.2)



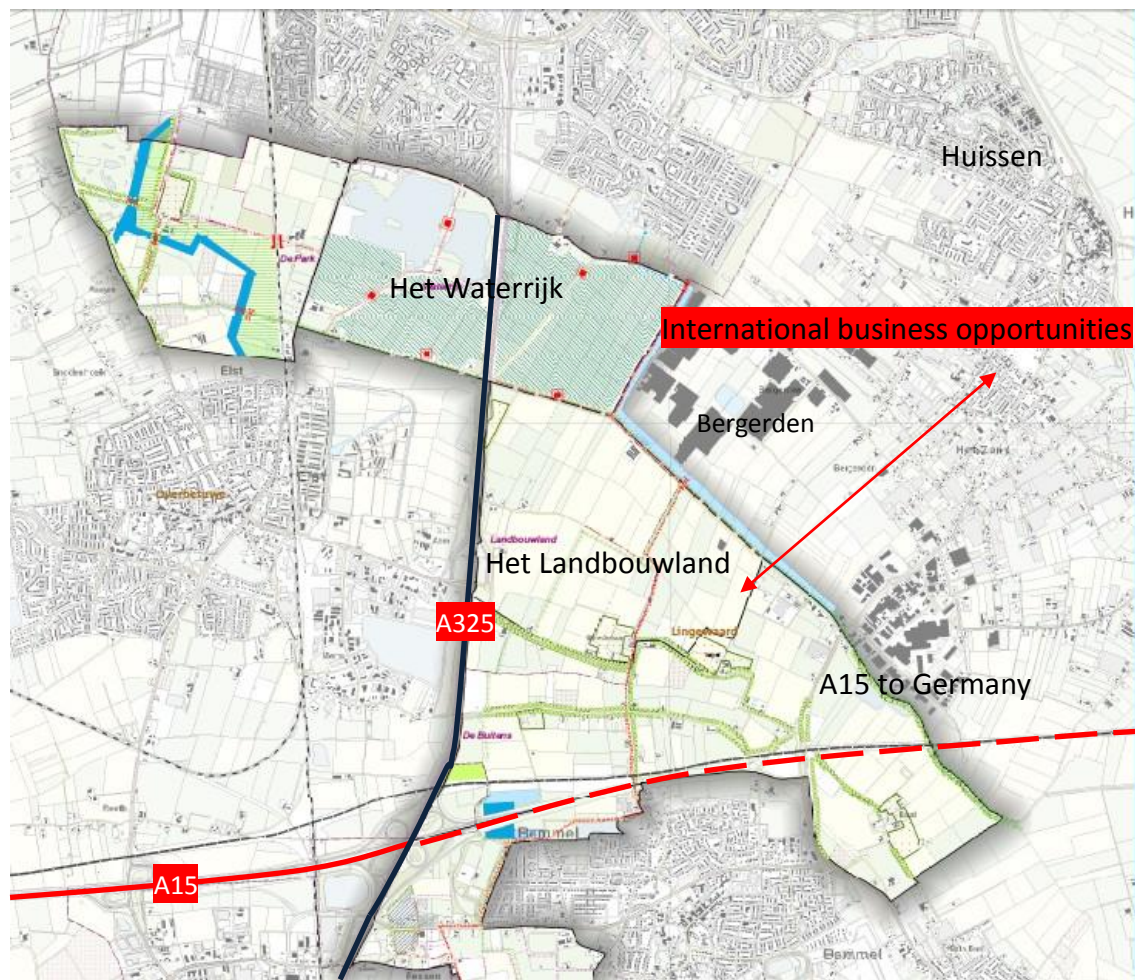
(Map 4.1: Border blocked the development of each area and exchange of advantages and opportunities of cooperation)



(Map 4.2: Break the border to make more chance for bringing the advantages of each area into play and cooperation)

Opportunity 6: Improve infrastructures

Finally: One of the reasons for redesigning Highways around the region (e.g. A15 prolongation) is to reduce local (agro logistic) traffic in the villages. The A15 now looks more like a threat to the locals, while it should be an opportunity – just as on a larger scale the whole region would benefit from A15 straight to Germany



(Map 4.3: The A15 Highway is going to be constructed connect the border of Germany, it brings the threats of landscape breaking, but also brings the easier way on transportation. It is an advantage for profitable purpose)

Chapter 5 Conclusion

This chapter is built to conclude the information what we found and analyzed during 4 months. It answers the research question and summarizes the main conclusion.

How to design an integrated system with more cooperation between Agropark Bergerden and Park Lingezegen, and what new cooperative opportunities can be created?

To sum up the opportunities, all of them can be combined in to a comprehensive design of the whole area. Each part of this area contains different functions, and they are all combined with each other on spatial, economical, cultural and system aspects. Not only the hard combination can be seen on the **Map 5.1**, but also the soft connection is ongoing. This is a preliminary design base on considering all of opportunities we find. This project is a real large matter now, it will last much long time to make it complete and come true. This is our limit.

Here there are 5 branches of soft connection will be listed and illustrated as follows:

5 branches of soft connection:

Water: Het Waterrijk has the largest capacity on water storage. Equip Het Waterrijk with water purification system and water quality control system. Het Waterrijk can act as the water supplier of the whole area.

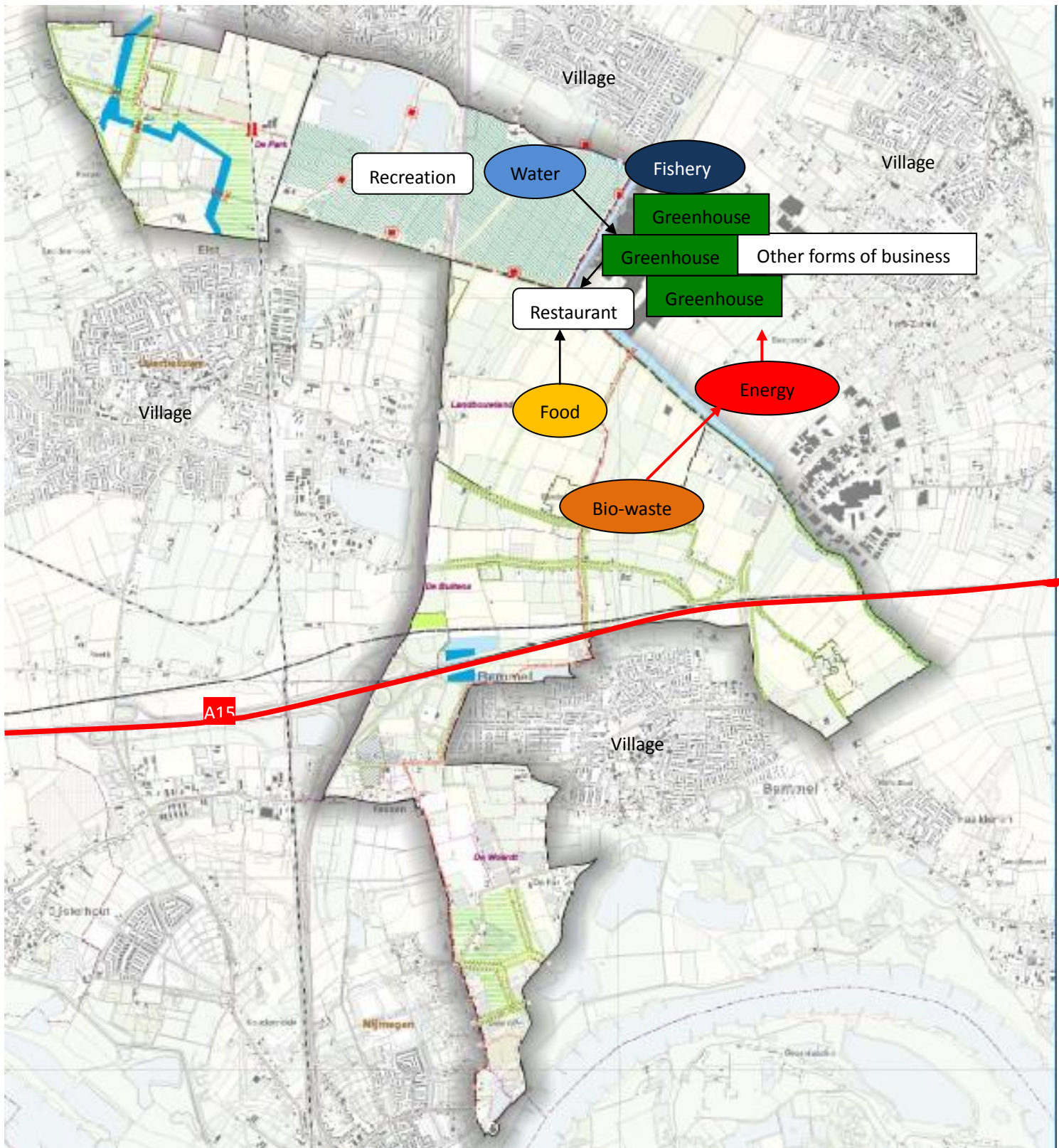
Energy flow: Combine the Het Landbouwland and Bergerden. The power plant inside Bergerden can provide clean energy. The burnable waste from agricultural land and side products of companies can be consumed by the incinerator.

Economy (Production & Recreation): Combined with logistic chain, this advantage will attract much more other forms companies and investments. Also the convenient traffic will attract more tourist come to visit.

Cultural development (Village development): Combined with the recreation. The villagers of surrounding areas can organize some kinds of open market in the recreation part, to sell their native product,

Logistic flow (Road): Improve infrastructure will help the transportation. The product can be transferred faster and more efficient. More companies will be attracted enter Bergerden, thus evaluate development of economics.

The design



(Map 5.1: Preliminary comprehensive design)

The idea is each area develops its preponderant aspect, not overall development. Then there is significance to connect each area's advantages. Thus, although the different areas are doing their own business, they have their own connection to the outside clients or customers, Park Lingezegen and Agro Park Bergerden can as one unit to serve the surrounding villages.

Recommendations for further study

This study is to show the overview of new possible cooperation between Park Lingezegen and Agro Park Bergerden. In this research some issues were addressed generally due to the limits of knowledge, so they could be developed further.

First, Economic aspect can be investigated deeper for sure. In our research, we just mentioned the economics can be grown in the new integrated system. But it still needs more figures and researches to show that **how much the economics can develop and what other kinds of economic related aspects can be found out.**

Second, the logistic flow was unclear. From this research, we knew where the A15 goes. It will connect another road in Holland. But it still needs more information about **what kinds of opportunities this new channel can bring to this area.** So the logistic aspect can go deeper.

Third, Park Lingezegen is a New Buffer Zone, this research focus on two parts (Het Waterrijk and Het Landbouwland). Because of time limit and missing contact with Park Manager, the future plan of Park Lingezegen was uncertain, and some laws of Het Waterrijk and Het Landbouwland were unclear. Our information which related Park Lingezegen was mainly come from interviews and literatures. In order to improve, more researches are needed to know **what the Park Lingezegen's future plan and policy making is.** It will help to find more cooperation in correct way.

Reference

1. Climate change and Dutch water management; Unie van Waterschappen, the Netherlands; 2008.12
2. Energy producing greenhouse; Gabriëlle Rossing
3. The power to collaborate: How judicious use of power accelerates the strategic capacity of regions in the Netherlands; Nadav Haran; 2010
4. Vital urban landscape: the final report of the SAUL extension project; the SAUL partnership; 2008
5. Verslag/ impressie werkbijeenkomst Bergerden-Lingezege; Staatsbosbeheer; 2007.08
6. Park Lingezege: Voortoets Natuurbeschermingswet; DHV; 2009.11
7. Uitvoeringsprogramma, Park lingezege; Dienst Landelijk Gebied, Regio Oost; 2008.07
8. Een park van format: Park Lingezege naar realisatie; Communicatiebureau de Lynx, Wageningen; 2007.03
9. Volop ruimte voor uw plannen; Projectbureau Bergerden, Glastuinbouwproject Bergerden.
10. Program and Abstracts of the fourth international academic conference on planning, law and property rights; Ben Davy, Thomas Hartmann, Heinz Kobs, Kathrina Schmidt, Gabi Zimmermann; 2010
11. Uitgangspunten Organisatie en Beheer Park Lingezege; Park Lingezege; 2008.07
12. Park Lingezege: Recreatiestrip, waterrijk; Veenbos en bosch landschapsarchitecten; 2010.02
13. Batenburg Beheer NV annual report; 2006
14. Urban Agriculture: to identify how sustainable urban agriculture can benefit the quality of life of Australian communities; David Mason; 2006
15. Hoogendoorn: E-News, Annual 2, no.6; 2005.04

16. Rapportage Subsidieregeling demonstratie-en kennisoverdrachtprojecten duurzame landbouw Tender energiebesparing; Cooperatiever Vereniging Bergerden u.a.te Bemmel; 2006.07
17. Development situation and analysis of domestic metropolitan Agropark(Draft Only);Wageningen UR, DHV,Greenport Caofeidian;2010.03.31
18. Official website of Park Lingezegen: www.parklingezegen.nl
19. Official website of Bergerden: www.bergerden.nl
20. SAUL project website: www.saulproject.net
21. Website of Karma Plants: www.karmaplants.com
22. Website of Google Translate: <http://translate.google.com/>

Appendix

Appendix 1 Plan of Approach

Plan of Approach


**VHL University of Applied Sciences
Velp, the Netherlands
Major IWM**

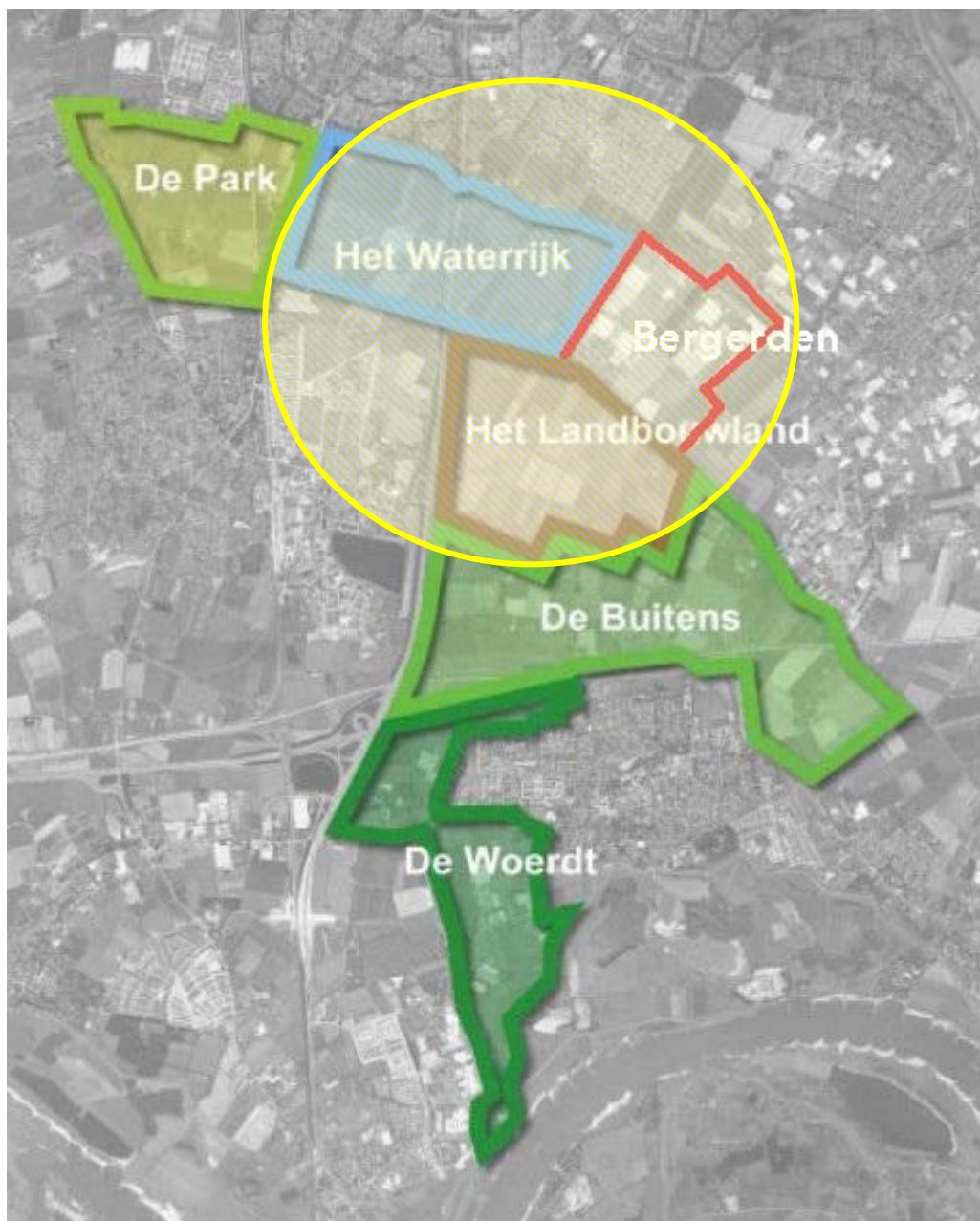
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Introduction

The research regions are called Park Lingezen and Agropark Bergerden, between Arnhem and Nijmegen. During summer time, there is large water consumption in agricultural production and greenery in Agropark Bergerden. In Park Lingezen, there are five parts, DePark, Het Waterrijk, Het Landbouwland, De Buitens and De Woerdt. Het Waterrijk and Het Landbouwland closed to Agropark Bergerden. Het Waterrijk is an area for storing water. Het Landbouwland is open agricultural land. The pilot area shows in  area.(See Graph 1)

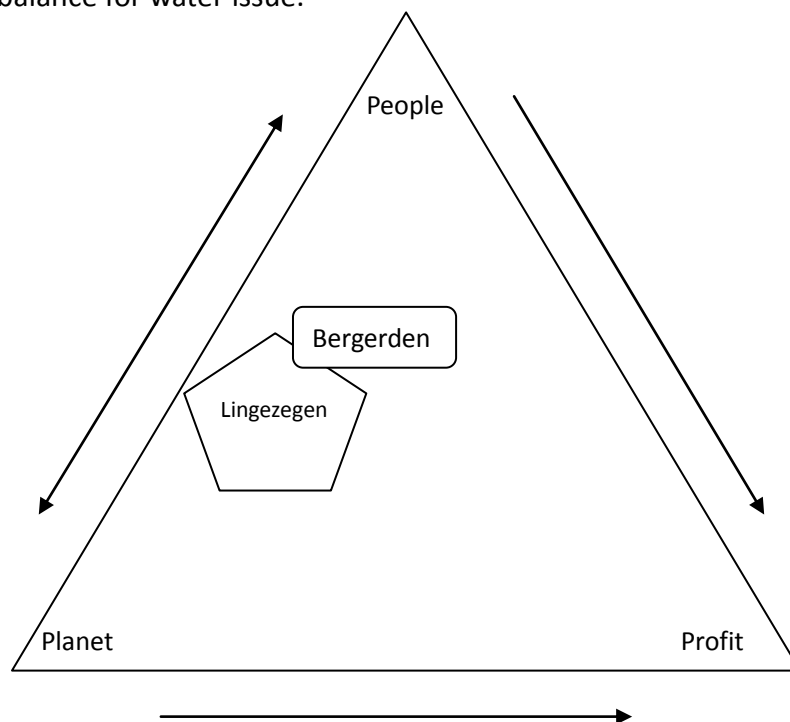


(Graph 1: Pilot area- Het Waterrijk, Her Landbouwland and Agropark Bergenden)

Agropark Bergerden is trying to grow larger to make more profit. This assignment is focused on new water balance in Agro-park Bergerden. Currently, there is a new plan which is Agro-park Bergerden will be expanded by following the Project “Future City-Urban Networks To Face The Climate Change”, which aims at making city regions in Northwest Europe fit to cope with the predicted climate change impacts. Obviously, the complete cycle of this agro-park will be reopened and the quantity and quality of elements will be filled in. Our work is to do research in water sustainable development by following **Sustainable Development in “People, Profit, Planet” system**.

-Concept: The “People, Profit, Planet” system means expanding the traditional reporting framework to take into account ecological and social performance in addition to financial performance. And the goal is to achieve sustainability.

Recently, the sustainability components were developed as **Graph 2** shows in Park Lingezegen. In this park, we got chances to contribute into **PPP-system** and make it more balance for water issue.



(Graph 2: PPP-system in Park Lingezegen and Agropark Bergerden)

In **Graph 2**, each peak stands for **People**, **Planet** and **Profit**. They each represent social networks, ecological networks and economic networks. The whole area includes Lingezegen and Bergerden is now leaning to social and ecological parts, the economic part will be developed with expansion of Agro-park. “How to transfer the power from people and planet to profit to make a balance?” is the concept. Luckily lingezegen has a good foundation to make profit. Climate change is changing the

hydrological and soil system, it is stricter than before to make ecological system worse. Thus it will result in more costs in sustainable system. The people in surrounding villages have a relatively high living standard, they would pay for high quality of life and good living environment. In this image, the economic networks is developed, the infrastructure also can be improved. The local inhabitants pay for the money to achieve better living conditions. Steadily, Lingezen will achieve sustainable urbanization, the future city will be prosperous.

Research questions

To design an integrated system with more cooperation between Bergerden Agro Park and Park Lingezen, we have to consider the change of water and energy facts and their effect. It will be an issue that what kind of opportunities will take place in water and energy supply, economic development, recreation, infrastructure etc. So we come up with a main research question and several sub-questions

Main research question:

How to design an integrated system with more cooperation between Agropark Bergerden and Park Lingezen, and what new cooperative opportunities will be created?

Sub-questions

1. Which groups of people can be the stakeholders?
2. What are the components of water used and energy supply by Bergerden, how are the water and energy system work?
3. What are the new benefits and opportunities by researching and how will they are guided to plan in the whole system?

Methodology

Desk Study

-Literature

The documents related Lingezen area and Agropark Bergerden are needed to

research. We still need to get more general knowledge about agro-park and greenery from reports, books, internet, etc. Also, we will research several cases from Mr. Vincent who will do some excursions in Holland.

-Discussion

Discussion is a main method in our progress. Lots of information needs to be analyzed and concluded from interviews, documents, case study etc. And we will present a presentation to our stakeholders in the end, which will have a chance to discuss in detail and receive feedbacks.

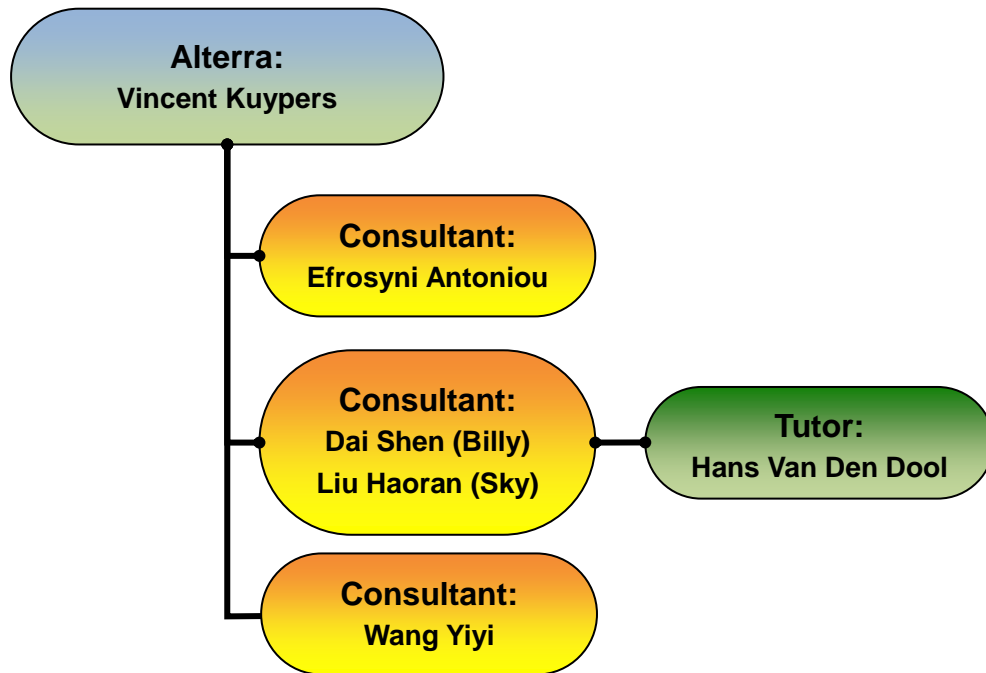
Field work: Excursion and Interview

The real situation will be discovered in this way. This is the best way to show us the real situation there and their interests of this plan. Firstly, we will define our stakeholders: inhabitants, agro-park manager, project manager from Province of GLD etc. Then, we will do an excursion on real field, to take a look on working environment there and prepare the questions and interview our stakeholders. After interviews, we still keep them on track for possible second interview for additional information.

Time schedule

	February	March	April	May	June
Preparation for final internship					
Desk Study(Literature, case study, discussion)					
Interview(Preparation, field study, interviews)					
Presentations					
Reporting					

Organization:



Appendix 2 Map of Park Lingezegen

