Climate change not a threat but an opportunity
"Green Airport development as an engine for carbon free urban development"

1. Introduction
The climate is not the climate we know anymore. There is more and more proof we are on the verge of a big change in climate on a global scale. Rising temperatures because of the increasing levels of carbon dioxide and other greenhouse gases in the atmosphere and because of that more intense rainfall in some area's, intensive droughts in others and rising sea levels worldwide, give need for carbon free (spatial) development. Both the metropolitan area and the airport (mainport) need to change their own and shared urban fabric, in order to become carbon free. This change in the way of developing airports and urban region's is considered very costly and because of that by some considered a threat. But to be honest, is this really the case or offers climate change a great opportunity for the airport city and the metropolitan area to work together for a carbon free airport city and metropolitan area?

This article will try to provide an insight in how the airport city (Schiphol) and the metropolitan area (Amsterdam) can benefit from each other in using the imminent climate change as an engine for carbon free urban development which can benefit both. How will for instance strategic planning be one of the key's for cooperation and why are flexible and robust measures needed to maintain and increase the hub status of Schiphol and in the same time of course maintain and strengthen the metropolitan character of Amsterdam and the Randstad. But most of all this article tries to present a (little bit) more positive view on the consequences of climate change and how the needed measures maybe can be used to our advantage and benefit.

Firstly we will take a look on the climate change itself and how it relates to and has effect on the airport city and the metropolitan area. Secondly we will give a short description on the future development of and the relationship between the Schiphol-area and the surrounding metropolitan area. With the help of the previous mentioned information we will be able to construct a scenario based on a *"cause-and-effect diagram"*. This diagram will form the framework on which to construct one possible scenario in which it will be clear that Green airport development can be the engine for a carbon free urban development.

2. Climate change
Up until the 20th century the earth experienced cycles of glacial and interglacial periods in which long periods of cold were interrupted by smaller periods of warmer weather. During the colder periods the polar ice caps and the glaciers in the world grew and during the warmer periods they shrank again. Research shows that the global temperature is on the rise since the start of the industrial revolution in the mid-19th century and is rising up until now, in an ever increasing pace. It has bin proven that the human civilization through the combustion of fossil fuels, which pump carbon dioxide into the atmosphere, affect the climate in a great deal. As shown in the graphs below.
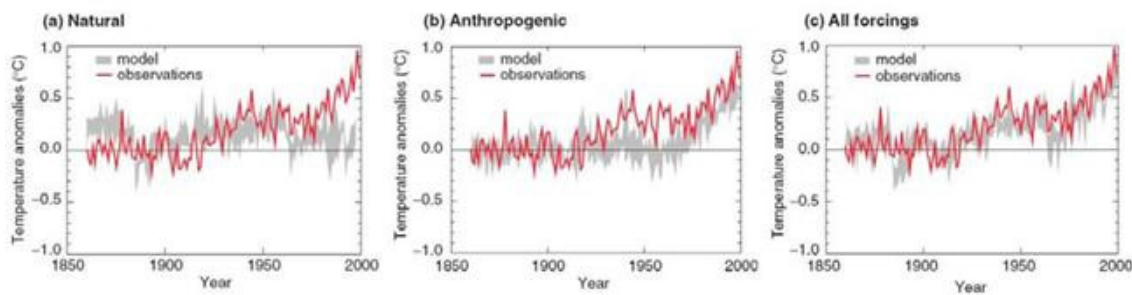
Natural, anthropogenic and combined mean surface temperature. (Source: "Climate Change Futures, The Centre for Health and the Environment & Harvard Medical School, September 2006)

Simulations have proven that the temperature rise by natural means (solar variation and volcanic activity) and the temperature rise by anthropogenic (greenhouse gases and sulphate aerosols) factors doesn't follow the pattern as predicted in the simulations. Only the third graph, when both natural and anthropogenic factors, are combined provide a match to the predicted annual global mean surface temperature over time.

Because of the rise of greenhouse gases, particularly carbon dioxide, the natural temperature operating system of the earth doesn't work anymore as it should be working. The increase in carbon dioxide in the atmosphere leads to an increase of carbon dioxide absorbed by the oceans of the world. This results in more acid ocean water with the result that the oceans absorb less carbon dioxide. In the mean time the increase in temperature also results in less absorption capability for the oceans. This results in an vicious cycle of increasing levels of greenhouse gases in the atmosphere and increasing temperature levels because we keep pumping more and more greenhouse gases in the atmosphere and the oceans of the world are increasingly less able to absorb the gases.

As a result of the global increase in temperature the oceans get warmer, ice melts and atmospheric water increases. As a result the ocean level will rise and there will be more frequently, more intense tropical-like downpours leading to more flooding. The urban fabric is not designed to deal with a rise in sealevel combined with an increase in intense rainfall, and therefore climate change is a threat to cultures, civilizations and economics. ("Climate Change Futures, The Centre for Health and the Environment & Harvard Medical School, September 2006)

2.1 The climate, airport and metropolitan area in the Netherlands
Nowadays the airplane is the primary means for long range transportation. The increase in the amount of greenhouse gases in the atmosphere is for the most part caused by the burning of fossil fuel. The airplane not only burns fossil fuel, but burns this fuel in the higher parts of the atmosphere also called stratosphere. It is believed that the increase in temperature, caused by the greenhouse effect, is for a large(r) proportion caused by the increase in airtravel the world experienced the last couple of decades. Because airplanes fly at higher altitudes, where the emission of greenhouse gases has more influence on climate change then at lower altitudes, they contribute more to the change in climate that seams imminent.

The metropolitan area is basically a collection of different urban centres which together form the urban fabric that constitutes the polycentric metropolitan area. (Castells, Manuel 1996 "The rise of the networked society", Oxford , Blackwell Publishers) The metropolitan area constitutes of a large build surface. Roads, buildings, houses and other parts of the constructed environment lead to an incredible amount of surface area where rain cannot penetrate the earth. The water system needs to transport rain away from the metropolitan area in order to avoid flooding and other problems caused by the sudden increase in water during rainfall. Also if we look at the metropolitan area as a single entity, it generates a lot of greenhouse gases by itself, which are emitted by its populace using modern transportation methods, like car, train and other modes of transportation.

Schiphol airport is located in the periphery of the city of Amsterdam and in the periphery of the metropolitan region in the Netherlands called the Randstad. The Netherlands are also know as the low-countries because a large part is located below sealevel. Most of the country is part of a river delta called the Rhine delta (named after the main river called the Rhine). Because Schiphol and the surrounding region (Amsterdam and the Randstad) are located below sea level the possible effects of climate change are more imminent. Furthermore the change in the climate will cause the intensity of and the frequency of rainfall to increase. This will challenge the water system in the Netherlands, especially the lower

parts of the country. This system was designed to deal with rain intensity as we have known over the last decades. But because of the increase in intensity and frequency the system will no longer be able to deal with all the water in the future. Secondly the sea level will most likely rise in the future. Because the Netherlands, and especially the Randstad, are located below sea level it will be more difficult to transport the water away from the country towards the ocean.
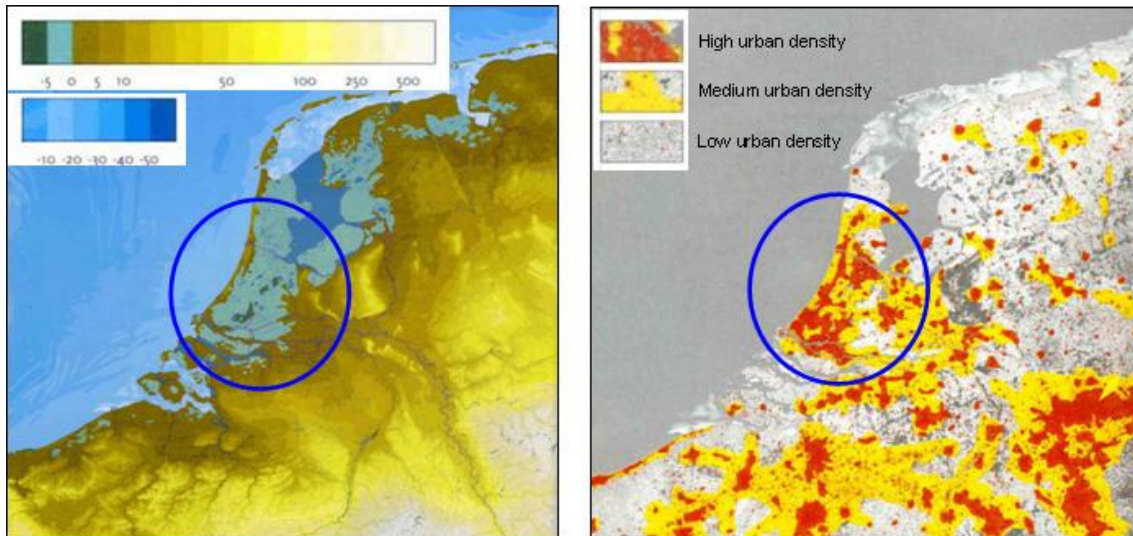
Metropolitan area Randstad and Height of the Netherlands compared to sealevel (Source: Vijfde Nota over de Ruimtelijke Ordening 2000-2020, Ministry of Housing, Spatial Planning and the Environment 15 December 2000.

Because the Randstad and Schiphol are both located in the lower parts of the Netherlands and are both facing the heretofore mentioned problems they both have a direct and imminent interest in green development. Trying to avoid the cause of the problems they face is much cheaper than dealing with the consequences. The only way for the Netherlands, Schiphol and the metropolitan area Randstad to deal with the result of climate change is a massive expenditure in keeping the country save from the rising sea level by raising more and higher dikes and by redesigning the water system to deal with the intensified rainfall. Therefore both Schiphol and Amsterdam (and the whole Randstad) want to contribute, by green development, in avoiding the change of the climate by reducing the emission of greenhouse gasses. Schiphol stated in 2008 their goal of becoming a carbon dioxide neutral airport by 2012. (Source: www.schiphol.nl) Furthermore it wants to be able to produce 20% of their yearly energy need by themselves. The city of Amsterdam has set the goal to reduce the carbon dioxide by 40% in 2025. (Source: www.amsterdam.nl)

This desired reduction in emissions can only be achieved by massive investments in both the urban and airport fabric. This massive investment is still only a proportion of the needed investments to protect the country and the metropolitan region from the effects of the climate change when becomes irreversible.

The need for investments is clear but it's the amount of investments which causes the development to proceed really slowly. But maybe the common cause can be an accelerator to speed up the process. The common cause is absolutely clear but what about the common benefits? Is it possible that both Schiphol and the Randstad can benefit from the measures needed to cut back on the emission of greenhouse gases? Before we are able to answer these questions we first need to take a look at the position of the 21th century airport and metropolitan area and the relationship between them.

3. Mainports and metropolitan region's of the Netherlands
The airport Schiphol is one of two mainports in the Netherlands, the other being the Port of Rotterdam. Although the home market for Schiphol is relatively small (the Netherlands only have about 17 million inhabitants), it managed to develop into one of the top-5 airports in Europe. In the past Schiphol and the Dutch government recognised the constraints the small home market offered Schiphol in regard to the possibilities for expansion and growth. This also hindered the possibilities for growth for the national carrier KLM, which is based at Schiphol. But the Dutch government was very successful in negotiating bilateral agreements with many foreign governments concerning landing rights for the KLM. Over the years this led to about 130 bilateral agreements concerning landing- and transportation rights for the KLM. And in 1992 the Dutch government was one of the first to close an open-skies agreement with the United States of America. This development allowed both Schiphol and the KLM to grow into the mainport and international carrier as we know them today. (Gent van H & Wit de J, 1996, "Economie en transport", Utrecht, uitgeverij Lemma b.v.)

In the early 19th century, like in most countries, the urban fabric of the Netherlands consisted of more or less individual villages and cities. Inside this fabric the cities of Rotterdam and Amsterdam occupied a special position inside this fabric. The first being the major Dutch harbour and the latter being the capital and the cultural centre of the Netherlands. Over the years the western part of the Netherlands increasingly became urbanised. Both cities and the towns and villages in between grew rapidly and the (infrastructural) connectivity between all of them increased likewise. Nowadays the heavily urbanised region of the Netherlands is known as the Randstad, the metropolitan area in the western part of the country. In this metropolitan area you can distinguish clearly a northern and southern flank were the first is dominated by Rotterdam and its mainport Port of Rotterdam. The latter is dominated by Amsterdam and the mainport Schiphol.

One of the main reasons for the emergence of mainports is the rise of the networked society, also known as globalization. What influence does this change have on the role of the airport Schiphol in the world and in the Netherlands in particular? Airports of the 21st century are no more just transporters of goods and people. Nowadays they are the most important transportation infrastructure in the metropolitan region. Because of the enormous amount of investments in the metropolitan region (the landside of the airport) the airports transformed into the hub that connects (the airside of the airport) the metropolitan region with other (metropolitan) regions, all over the world. De airport transformed itself into the engine for development of the entire metropolitan region in which she is located: the modern airport has become an airport city. (Guller & Guller, 2003, "From airport to Airport City, Barcelona, Gustavo Gili SA)

At the start of the 19th century the railways, as we know them today, were born. The train station was a hub offering connectivity and exchange of goods, people, money and information. The cities in those days had great attraction on and offered perfect locations for the train stations. In the 19th century the shape and form of the city was influenced by the railway stations, just like the airport influences the shape and form of the metropolitan region in modern times.

The metropolitan region is more and more showing a polycentric structure, multiple centres that are connected with each other. This also is a direct consequence of the

> **Land- and airside of an airport**
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> *The airside of an airport is part of the core business of an airport, that being passenger and freight transport and related commercial activities. This side of the airport is constantly changing and upgraded and improved and it's the domain of the management of the airport itself. The bigger the airport the more complicated the handling of the different flows.*
>
> *The landside consists of the land based connections and the catchment area of the airport. This side is the domain of the (local) government. The traffic connections with the airport are constantly under pressure therefore there is a need to develop different modes of transport with an emphasise on the development of public transport.* (Guller & Guller, 2003, "From airport to Airport City, Barcelona, Gustavo Gili SA)

increasingly networked society. The cities of today are no more the separated, individual entities of old, but together they form and each one of them is part of the metropolitan area. It's the location inside this infrastructure network that's the most important location factor and not the nearness of the city. The reason for the existence of a location is derived from the position its occupies in the metropolitan infrastructure network, also called "space of place" (Castells 1996, The rise of the network society, Oxford Blackwell Publishers). This gave room for the development of different kinds of centres other than the traditional city centres. As a result the area between the different centres, the periphery, has grown strongly over the years. The modern airport is on of the clearest examples of this development. She has become the engine for the development of the entire metropolitan region just like the train stations were for the cities in the 19th century. The airport redirected the focal point of the economy away from the city centre and towards the periphery, between the city and the airport. Especially those area's were different modes of transportation are readily available.

In the 19th century the economy was focused on the city centre. The airport changed this focus away from the city centre towards the periphery of the city. It's those specific area's, between the city and the airport with different modes of transportation available, that are showing the highest economic growth. To the south of Amsterdam you can find such an area, there we can find a bundle of different modes of transportation (train, car and tram) and it is conveniently located between the city of Amsterdam and Schiphol. The focus of the city Amsterdam is nowadays strongly focused on its southern periphery. The project Zuid-as, the huge development of offices, houses and cultural functions is a clear example of this shift in focus.

The rise of the networked society increased the importance of the airport for the development of the metropolitan area. This growing importance is caused by the ever improving infrastructural connectivity of the airport and the nearness of big economical centre's. Because of these developments the airport region is more and more attractive for non-aviation functions. Functions that used to belong to the city centre are now more than happy to settle near major airports or in the periphery between the city and the airport. This progress is progressing so fast that the traditional spatial planning and policy making has difficulty to keep up with the developments. Anticipating these developments and future developments is even harder. The reason for this is that the two sides of an airport, land- and airside, both have their own speed by witch developments will proceed. (Guller & Guller, 2003, "From airport to Airport City, Barcelona, Gustavo Gili SA)

The dynamics of the airside of an airport are progressing much faster than the dynamics on the landside of the airport. Governments and such have increasingly experienced problems keeping up with the high dynamic of an airport. Also the airport is showing more and more characteristics of a city, both in organisation and operational. "In order to live up to the demands, airport are showing an ever increasing ambivalent relation with their hometown" (Graham and Marvin, 2001, "Splintering urbanism, networked infrastructures, technological mobilities and the urban condition, New York, Routledge). Traditionally the management of the airport deals with the airside and the local and national governments deal with the landside of the airport. But because of the increased competition between airports and airport regions there is a desire to link the airport to as much transportation modes as possible. The faster the specific mode the more substitution between air and other transportation methods will occur. Substitution will release slots on the airport that can be used for new and better connections, thereby increasing both the competitiveness and the catchment area of the airport. Secondly the airports are forced to operate in a increasingly more commercial way on the landside because governments stop subsidizing and the revenues on the airside are not enough to maintain, improve and expand airport infrastructure. The modern airport is dealing with increasingly more non-aviation related businesses, like real-estate and selling concessions for parts of their terrain. The modern airport is a place where you can visit congresses, do business or go shopping. There airport

has transformed itself to an Airport City. (Guller & Guller, 2003, "From airport to Airport City, Barcelona, Gustavo Gili SA)

These developments have changed the organisation of the management of a airport, it looks more and more like the organisation of a local government including a department of spatial planning, international relations and real-estate development. The modern airport accomplishes the public task of facilitating air transport and in the same time also creates the conditions for the spatial development of the region. This brings the airport into conflict with the government because its more and more intervening with the landside development, traditionally the task and responsibility of the government. This conflict is even intensified because the government and policymakers are not able to keep up with the dynamic of the airside. The emergence of the modern airport is the direct result of changes in society as described in the theory "Space of Flows and Space of Place" (Castells, Manuel 1996 "The rise of the networked society", Oxford , Blackwell Publishers). The modern airport is the product and physical result of the rise of the networked society.

4 Space of Flows and Space of Place
The theory "Space of Flows and Space of Place" Manuell Castells describes a new social theory concerning the rise of the networked society. Modern society consists of different flows. These flows concern the transportation of information, capital, people and goods. Together they form the building blocks of our modern society, together they form the networks also known as globalisation. As a direct result of these networks the urban fabric is more and more constructed in such a way it can facilitate these flows. Manuell Castells calls these places the "Space of Flows". The exchange and interaction between the different flows increasingly influence the spatial planning of the different related functions. In other words space used to be planned according to functionality but increasingly its planned to accommodate and making possible the different flows. "In this process of flow, movement and exchange the cities and regions form the hubs in this network". (Graham and Marvin, 2001, "Splintering urbanism, networked infrastructures, technological mobilities and the urban condition, New York, Routledge)

In order to understand the theory fully and to be able to translate is to reality we will describe "Space of Flows" by describing its three layers. The "Space of Flows" is the physical support of the dominant processes and functions in the present information age. The first layer consists of electronic impulses, for instance information, telecommunication and fast infrastructural networks. A location alone doesn't have a reason for existence but a location gets the reason for its existence from the position it occupies in the network of flows. For example: most big companies like to settle on those locations that are near as much different modes of transportation as possible. The development of real-estate project in the southern periphery of Amsterdam is such an example. Before the start of the project there were already an railway, multiple highways, metro and tram connections close by. And in about 15 minutes you are at either Schiphol or at the train station Amsterdam-central. The availability of all those different modes of transport gave the southern periphery of Amsterdam a really good position inside the network of flows.

The second layer consists a network of hubs, nodes and spokes. The "Space of Flows" is not without a location but its based on this network. This network connects locations to the different flows and its on those connecting point were hubs and nodes can develop. Inside the network the hub functions as the place were exchange takes place and the node functions as a location with a more specialized role. For example: if some main offices decide to settle in a certain location they most likely will attract more businesses from the same branch. This is how the southern periphery of Amsterdam became the financial district for the Netherlands.
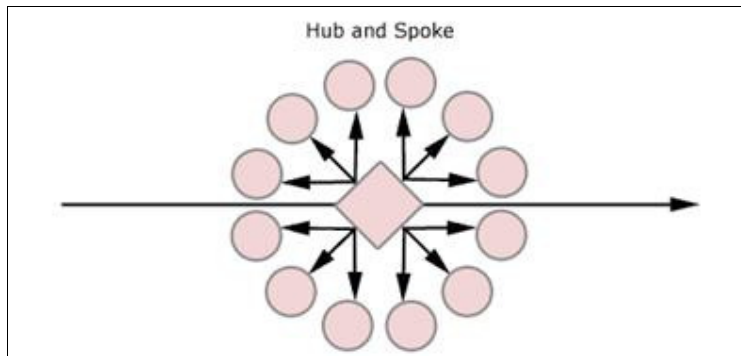
(Source: www.academy.smc.edu)

The third and final layer of "Space of Flows" is the spatial organisation of the management elite. Different flow of information, capital, people and goods are managed by a relative small group of people. Their goal is to maximise their connectivity and the connectivity of their compagnys with the network of (infrastructural) connections.

The three layers form the basis on which the mainport and the metropolitan area were able to develop. The mainport and the metropolitan area are the result of the increasingly networked society. The fist layer consists of the fast infrastructural connections, like high speed trains (landside) and of course airplanes (airside). The second layer consists of hubs, nodes and spokes. In this framework the airport and the metropolitan area are the hubs, the connections between the two and with the rest of the world are the spokes and the southern periphery of Amsterdam is a specialised node. All these flows are exchanging people, capital, knowledge and information between each other. The last and third layer consists of the management of Schiphol and the companies in the southern periphery and the government officials in the region whose task and goal is to maximise their connectivity.

The emergence of the mainport and the metropolitan region as we know today is a direct consequence of the rise of the networked society. The networked society is based on locations were different flows come together and are able to exchange. There is a strong relation between the hubs Schiphol and Amsterdam, their location inside the network of flows is based on their closeness. They benefit from each other and therefore take up a better position inside the network "space of flows".

4. Constructing the scenario
Now the relationship between the airport Schiphol and the city of Amsterdam (and the Randstad) is clear, its time to look how Schiphol can become the engine for carbon free development? Before we can answer this question, we have to take an even closer look at the relation between the mainport and the surrounding metropolitan region (mainly Amsterdam). This relation is much more complex and difficult to understand than maybe the previous chapters made believe. To understand the different relations between the two fully we can construct a "possible" future with the central theme: "Green airport development". Of course any future is insecure and there are of course multiple futures possible. But for the benefit of this discourse we will only construct one possible scenario. Firstly we will construct a "*causal-diagram*" which will clarify the complex relations between the airport and the region.

Next we will be able to construct a "*cause-and-effect diagram*" in order to establish the effect of the chosen starting point. By constructing a scenario based on a "*cause-and-effect diagram*" we will be able to establish if and why Schiphol can be the engine for carbon free development in the metropolitan area Randstad as a whole and Amsterdam in particular. Again I state that the constructed scenario is only one of the many possible futures possible. With the help of the information provided by the framework it is possible to construct different

kinds of scenario's. In this case we choose to construct a qualitative and descriptive scenario because this type of scenario is very well suited to serve as a framework for testing and discussion. (Kropman, Niels 2005, Regeren is vooruitzien, Amsterdam, Universiteit van Amsterdam)

The fist step in building the *"causaal-diagram"* is to establish the different variables that need to be in the diagram. Over time these variables can increase, decline or don't change at all. The variables consist of those factors that influence the future of the airport as well as the future of the metropolitan region. Secondly the relationships between the different variables need to be established. With the help of some assumptions the *"causal-diagram"* can be put together. The diagram shows the relations between the different factors that influence the airport and the metropolitan area. The relations are graphically represented by direct single relations and by feedbackloops. The last one is a more complicated version were there is a multiple connection between the different elements.
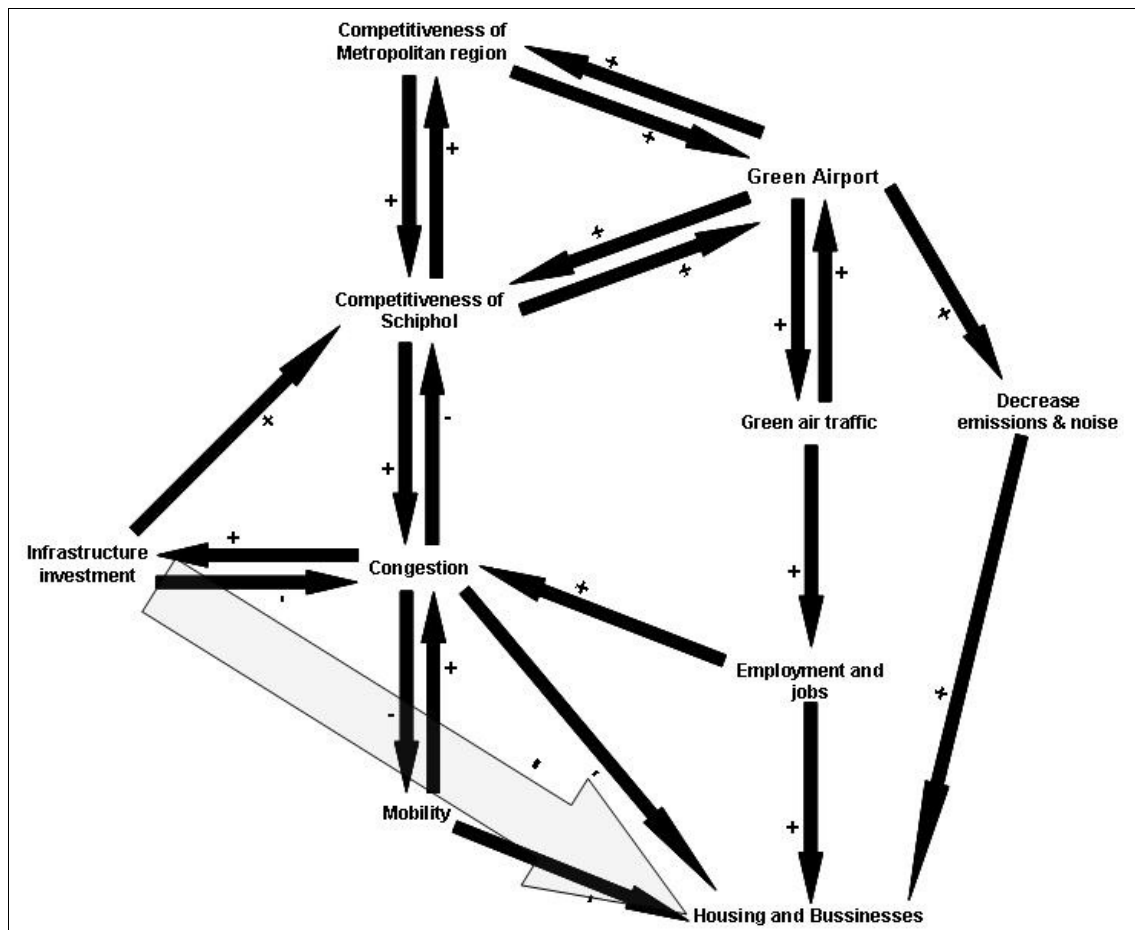
Causal-diagram of the relations between different factors

There are two possible direct single relations possible: positive (+) and negative (-). A positive relation indicates that when the causevariable increases the effectvariable also increases. With a negative variable the increase of the causevariable causes the effectvariable to decrease. Furthermore there are the more complicated relations, called feedbackloops. In the case of a positive feedbackloop both variables strengthen each other and in the case of a negative feedbackloop both variables they weaken each other. Lastly there is the balancing feedbackloop. In this case the causevariable has a positive effect or negative effect on the effectvariable. The effectvariable has the complete opposite effect on

the causevariable. This relation will eventually lead to a balance. Only external influences can change this balance.

With the help of the *"causal-diagram"* and the starting point "Carbonfree airport development" we can start building one of the possible futures. By filling up the *"causal-diagram"* the different *"cause-and-effect relations"* will become clear and a scenario can be written. Also it will make clear where in the relation-framework an intervention can take place which will change the outcome of the scenario.

5. The scenario: "Carbon free airport development"
Schiphol started the transformation towards a "green" and carbon-free airport at the start of the 21st century. After years of investing and developing the airport succeeded in becoming a zero-emission airport, being self-sufficient in energy and is actively banning noisy aircrafts from its runways. As a result the government regulations regarding the amount of generated emissions and produced noise by the airport are no longer hindering the growth of the airport Schiphol. Because of the zero-emission and noise reducing development and policy of the airport there is room to grow within the regulations. Over the years Schiphol has bin able to increase its connectivity and number of yearly flights arriving and departing from the airport. All this without hindering the surrounding region. Because of the growth of the airport on the airside the number of airport related jobs has increased, the bigger the airport the more jobs in the region and on the airports itself. In the same time the decrease in emissions and noise pollution made it possible to develop a lot more locations in the region for housing and business parks. As a result of this the airport and the metropolitan region have become more competitive in regard to other airport regions and metropolitan regions. There is a strong increase in companies who want to (re)locate to the metropolitan region of Amsterdam and the airport region.
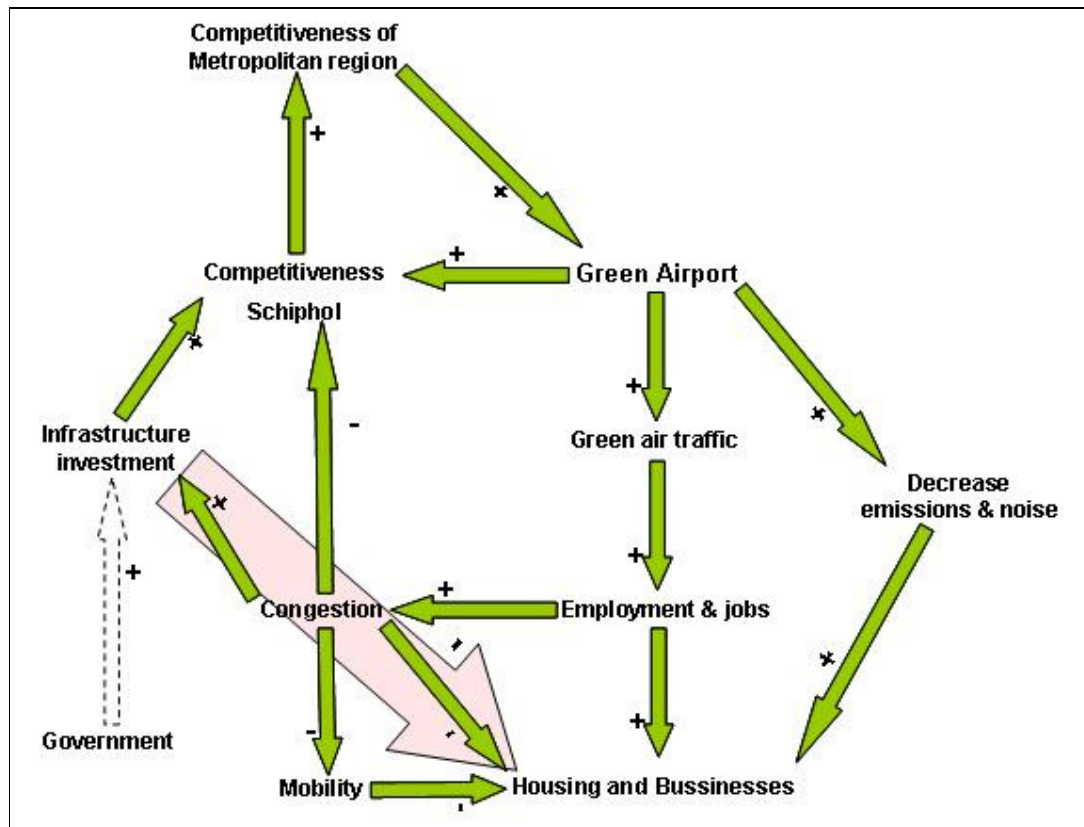
"Cause–and–effect diagram"

But the increase in jobs and because of that an increase in number of businesses and housing that settled in the region, has led to a strong increase in congestion on both roads and on rail connections (and other landbased modes of transport). Invariably this increase in congestion leads to a decrease in mobility and connectivity. Resulting in a less attractive metropolitan and airport region for the settlement of companies and their employees. Which in time will lead towards a decrease in employment and will eventually hinder further development and growth of Schiphol and the metropolitan region. To counter this trend the Dutch government has increased spending into developing a better landbased infrastructure network consisting of extra road and rail connections. This in order to counter the problem of the increasing congestion because of the economic growth of the region and the growth of the airport. These investments solve the problem of congesting and improve the connectivity of the airport region and the metropolitan region again. They even result in substitution, where the increasing speed of specific landbased infrastructural networks (for instance high-speed trains) will replace certain airside connections. The freed up connections or better said "slots" can then be replaced by other connections and as such they will increase the overall connectivity of the airport and the competiveness of both the region and the airport. But there is a problem: while the infrastructural investments improves the competitiveness of the airport and therefore of the whole region, the lack of "green" infrastructural investments and "green" infrastructural development still leads to an increase in environmental constraints. Because the newly developed infrastructural connections are "old-fashioned" and therefore cause an increase in greenhouse gas emission in the region, basically they counter at least partially the effect of the "green" and emissionfree airport. As a result the overall competitiveness of the metropolitan region and the airport region is again in decline or at best not improving as it should be. This particular *"cause-and-effect relation"* is illustrated by the big arrow in both diagrams.

It is precisely this effect that proves that the airport Schiphol, or for that matter every "green" of "carbonfree" airport can function as the engine for carbon free development and innovation. Because of the earlier described difference between the airside and landside, regarding the speed by which they develop and innovate, it is evident that the airport can be and should be the engine of carbon free urban development. Because innovations are implemented and used much faster on the airside of an airport, they can show the government the positive effects these measures can have on the metropolitan region and economy as a whole. In order to maintain the economical growth, without increasing the emission of greenhouse gases, the government needs to implement their own "green" measures on the landside of the airport. The government needs to follow the example of the airport and needs to innovate and extend the landbased infrastructure on a durable and green base. But the reason why Schiphol can be the engine of innovation and "green" development is also the problem. Traditionally the government cannot keep up with the speed on the airside and as a result of which the landside is always lagging behind. Therefore the government should make extra effort by using strategic planning to improve the connectivity of the landbased infrastructure regarding green and zero-emission free development. By using robust and/or flexible measures the government can guarantee that its plans and measures are able to deal with the speed of development an innovation on the airside.

6. Conclusion
Climate change is of course a threat towards the way of life as we know it. If we don't reverse this process, the Netherlands and lots of other locations in the world, will be flooded by the rising sealevel. Its still a fact that the majority of the people on the planet lives in cities with direct access or close by the oceans of the world. But in our effort to counter the process of climate change and guaranteeing our way of life for the future generations the threat can also lead to something positive.

The landbased and airbased infrastructure networks both operate, develop and innovate at different speed. Therefore, as we have seen in the scenario, development of the airside will outpace the development of the landside. But because of the strong relationships and dependency between Schiphol and the surrounding metropolitan area it is possible that the development of a "green" airport will influence the region in a positive way. To maintain the resulting increase in competiveness and economic growth the government will be stimulated to develop "green" landbased infrastructure. In order to keep pace with the airside of the airport the government needs to develop robust and/or flexible solutions in order to keep u with the speed of development on the airside.

The much needed measures to avoid the climate change can also lead to positive side effects, regarding the development of both the airport and the surrounding metropolitan from an economically point of view. For the first time there maybe is a possibility for economical growth without all the negative side effects. Therefore: "climate change is a threat but also an opportunity!".