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Den grønne økonomi er i de seneste 5-10 år skudt i vejret med forbløffende fart. Vækstraterne leder tankerne hen på Kina og Indien snarere end et kriseram Danmark.

Det viser en ny analyse, som vi her har fornøjelsen at sende til dig. Analysen er bestilt af Københavns Kommune i samarbejde med Mandag Morgen, DONG Energy og RealDania og er udarbejdet af konsulentvirksomheden Damvad efter en ny og avanceret statistik metode, som er beskrevet i rapporten.

Skal vi finde en vej ud af krisen og finansiere velfærden på langt sigt, er højere omsætning, eksport og produktivitet afgørende byggesten. Alle tre dele kan det grønne erhvervsliv sætte hak ved, dokumenterer rapporten:

- Omsætningen er vokset med 55 pct. fra 2004 til 2009.
- Eksporten er vokset med 77 pct. i samme periode
- Produktiviteten er vokset med 45 pct. på de fem år

Især det sidste punkt er vigtigt i lyset af, at OECD i slutningen af januar pegede på netop lav vækst i produktiviteten, som et grundlæggende problem for dansk økonomi. Det er også vigtigt at bemærke, at ingen af de tre tendenser er blevet ændret væsentligt af den økonomiske krise. Det viser rapporten tydeligt.

I Københavns Kommune har vi allerede draget de politiske konklusioner. Vi vil hæve vores ambitioner på det grønne område yderligere. Vi vil fortsætte med at gøre København grøn for at skabe et stærkt hjemmemarked, som kan fostre endnu flere stærke vækstvirksomheder. Vi vil gøre det i samarbejde med virksomhederne, universiteterne, iværksættermiljøet i København og borgerne. Sammen kan vi gøre København til en grønnere, smartere og sundere by.

God fornøjelse med rapporten!

Med venlig hilsen

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DAMVAD



Green Growth in Copenhagen



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Indhold

1	Summary	4
1.1	Detailed conclusions	5
2	Introduction	9
3	Defining Green Growth as an industry sector	11
3.1	Green Sector companies in the Greater Copenhagen Area	15
4	Methodology	18
5	Mapping companies	20
5.1	Green Growth is an substantial sector	20
5.2	25.000 Green jobs in the Greater Copenhagen Area	24
5.3	DKK 24 bn. turnover from green solutions in the City of Copenhagen	25
5.4	Most green growth activity is within manufacturing	25
5.5	Green Growth means 40 per cent higher productivity than the average company	26
5.6	R&D investments	27
5.7	Educational level	29
5.8	Activities addressed by water and waste	29
6	Green is Growth in Copenhagen	32
6.1	Growth in turnover outperforms other sectors	32
6.2	Growth in exports outperform other sectors	33
6.3	Moderate employment effect	34
6.4	Strong growth in productivity	35
6.5	Slightly increase in the educational level	36
6.6	Strong growth in R&D	37
6.7	Water is an area of growth	38
7	Global position of strength	42
7.1	International expansion of Green Growth	42
7.2	The Green Sector in the global markets	43
7.3	Concentration of exports from Green Growth solutions	44
	Appendix	46

1 Summary

Green solutions and environmental technology hold extensive commercial opportunities. The potential emerge from an increasing global acknowledgement regarding the need for actions to handle the consequences of global warming and other environmental changes as well as a global rise in costs for resources and materials. As such there is already a global demand for solutions that can meet these challenges. To meet this demand there is a need for large investments and innovations. In the EU these investments and innovation will create up to 1.5 million jobs¹. And as such there is coherence between a green focus and growth.

The City of Copenhagen has the aim of generating a 4 per cent growth in productivity each year as well as making Copenhagen carbon neutral by 2025. This report analyses the magnitude and development among Green Growth companies in the Greater Copenhagen Area. The report is the first of its kind that attempts to measure the impact of Green Growth on the economy enabling a separation of green activities and other activities in companies and – at the same time – measure the green activity in all companies in a given area.

The main conclusions are:

1. **The Green Sector is substantial and accounts for more than 25.000 employees in the Greater Copenhagen Area.** More than 6.000 companies have substantial activities within green solutions. Especially companies within the areas of water and waste as environmental challenges are contributors in making Green Growth a substantial sector in Greater Copenhagen Area.
2. **Green Growth is a competitive sector.** With a labour productivity that is 40 per cent higher than the average company, companies in this sector are highly competitive.
3. **The growth in the Green Sector is substantially higher than in other sectors in Copenhagen and Denmark.** The average yearly growth in productivity for the sector is 8 per cent. In Denmark the yearly growth rate within the last 20 years has been around 1.1 per cent. The sector can be part of the solution to ensure future growth in Denmark, since turnover, productivity and exports is substantially higher in the Green Sector compared to other sectors in the economy.
4. **The City of Copenhagen is an epicentre for green growth** in the Greater Copenhagen Area in terms of volume as well as growth rate. E.g. there are more than 10.000 green jobs in Copenhagen. Hence Green Growth is important for the City in order to meet the political goals concerning growth and competitiveness in Copenhagen.
5. **Green Sector is driving Danish exports to the BRIC countries.** Green Growth opens the Danish access to some of the large global growing markets, where Danish companies in general are underperforming compared to other countries. 41 per cent of the export of green solutions goes to countries outside the EU27. On average 33 per cent of the exports is to countries outside of the EU. Non-EU countries, in particular the BRIC-countries, are demanding green solutions, and companies from the Greater Copenhagen Area are to meet these demands.

The cornerstone of the analysis is to statistically define a sector that covers Green Growth companies in Denmark. By establishing a Green Sector based on statistics and register data from Statistics

¹ European Commission (2011): A Roadmap for Moving to a Competitive Low Carbon Economy in 2050.

Denmark it is possible to compare the sector with other sectors in Denmark as well as internationally. Furthermore, a clear definition of the Green Sector enables time series analysis. The definition of Green Growth is based both on the work of Berkeley Roundtable on the International Economy (BRIE) and the OECD stating respectively that Green Growth is:

- **BRIE:** "Job creation or GDP growth (are) compatible with or driven by actions to reduce greenhouse gasses".
- **OECD:** "Green Growth means fostering economic growth and development while ensuring that national assets continue to provide the resources and environmental services on which our well-being relies. To do this it must catalyse investment and innovation which underpin sustained growth and give rise to new economic opportunities."

The focus of this report is two geographical areas:

- **Greater Copenhagen Area:** This geographical area is delimited by the boundaries of the administrative region the Capital Region of Denmark.
- **City of Copenhagen:** This geographical area is delimited by the Municipality of Copenhagen.

1.1 Detailed conclusions

The Green Sector is substantial and accounts for almost 25,000 employees in the Greater Copenhagen Area.

The Green Sector plays a significant role in the Capital Region of Denmark. In the table below it is shown that the Green Sector encounters almost 25,000 employees in 2009, two and a half times the size of that of Welfare Technology, which has been identified as a growth industry in Denmark, and more than one third of the Manufacturing sector. Additionally, more than 6,000 companies have substantial activities within Green Growth.

Green Growth also contributes to the overall exports in the Greater Copenhagen Area with an export intensity of 36 per cent. This outperforms the average export intensity of 25 per cent in the Greater Copenhagen Area.

Green Growth is a highly competitive sector.

The analysis shows that the labour productivity is 40 per cent above the average company in the Greater Copenhagen Area. The results imply that Green Growth is a high productivity sector which is an important finding regarding Danish competitiveness.

TABLE 1.1

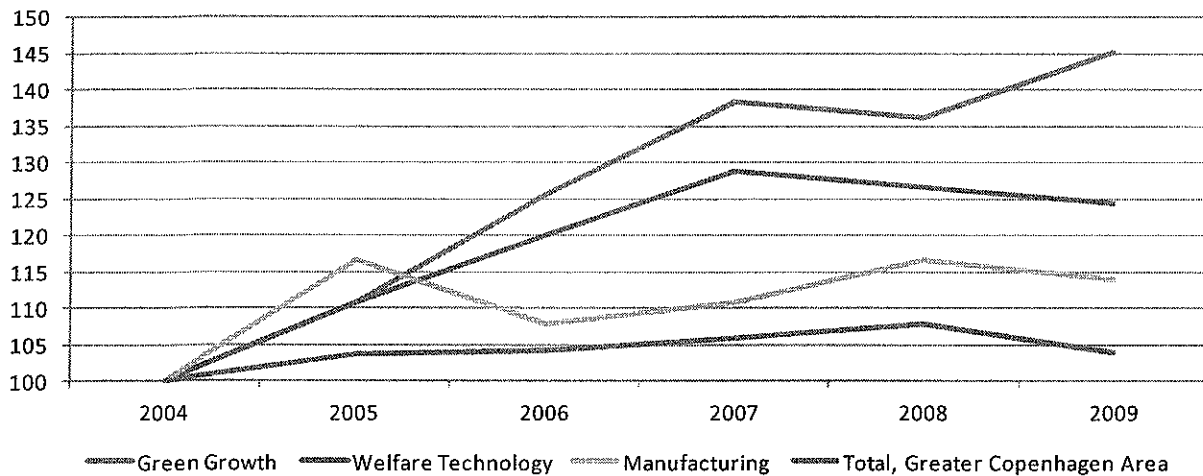
Key figures of the Green Growth in the Greater Copenhagen Area, year 2009.

	Green Growth	Welfare Technology	Manufacturing	Greater Copenhagen Area in total	Green Growth in Denmark
Turnover (in million DKK)	50,992	15,590	113,613	1,459,708	153,745
Employment	24,674	9,798	64,137	987,870	76,076
Exports (in million DKK)	18,565	7,049	77,508	361,421	76,998
Export Intensity (%)	36 %	45 %	68 %	25 %	50 %

Source: Statistics Denmark, Table REGN4, REGN8 and own calculations

FIGURE 1.1

Productivity growth in key sectors compared to the Capital Region as a whole



Source: DAMVAD 2011, own calculation based on Statistics Denmark.

Green Growth is driving growth in the economy in Copenhagen and Denmark in general.

The productivity growth seen in the Green Sector has been significant in recent years. Despite the financial crisis, productivity in the sector amounts to 8 per cent per year, clearly exceeding the Danish average in productivity growth of 1.1 per cent over the last 20 years. The figure below shows the development in labour productivity since 2004.

Labour productivity is a measure for the value added per full time equivalent contributes with.

The growth stems from an ever increasing turnover and export and a more restrained and moderate

increase in employment. In other words the companies are able to increase their sales with a moderate increase in employment.

The municipality of Copenhagen is an epicentre for green growth.

With almost half of all activities of the Green Sector in the Greater Copenhagen Area taking place in the City of Copenhagen, the city must be characterised as a crucial player in determining the performance of the Green Sector in the capital region. The table below shows almost half of the turnover in Green Growth in Greater Copenhagen Area is generated from activities taking place in the City of Copenhagen. Furthermore, 43 per cent of the em-

TABLE 1.2

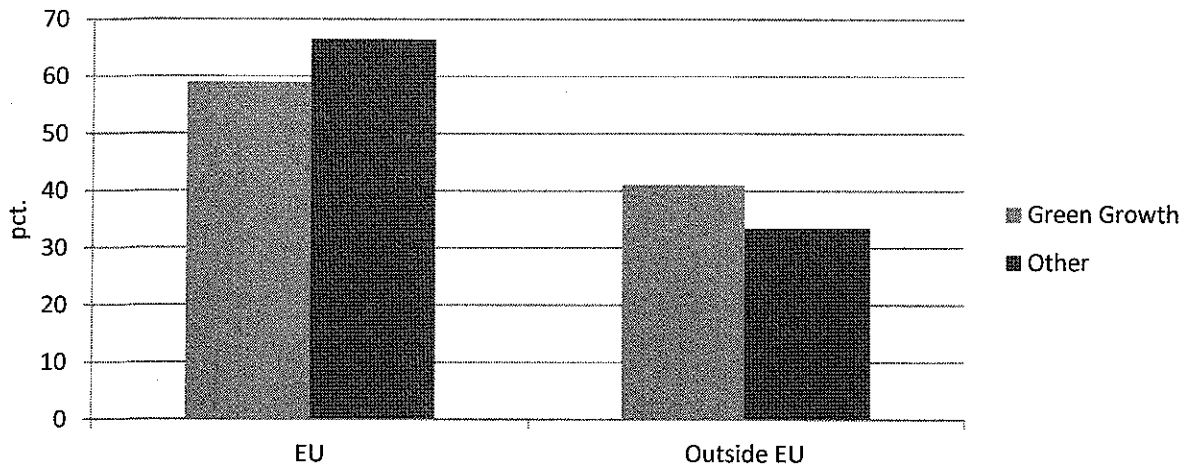
Green Growth in the City of Copenhagen the Greater Copenhagen Area and in Denmark, year 2009

	City of Copenhagen	Greater Copenhagen Area	Denmark
Turnover (in million DKK)	23,803	50,992	153,745
Employment	10,677	24,674	76,076
Exports (in million DKK)	10,475	18,565	76,998
Export Intensity (%)	44 %	36 %	50 %

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

FIGURE 1.2

Exports of Green solutions and other products to the EU and outside the EU.



Source: DAMVAD 2011, own calculation of international trade of goods based on DAMVAD Trade Model.

ployment and 56 per cent of exports are concentrated in the City of Copenhagen. The export intensity of the Green Sector in Copenhagen is also well above the intensity in the Capital Region as a whole.

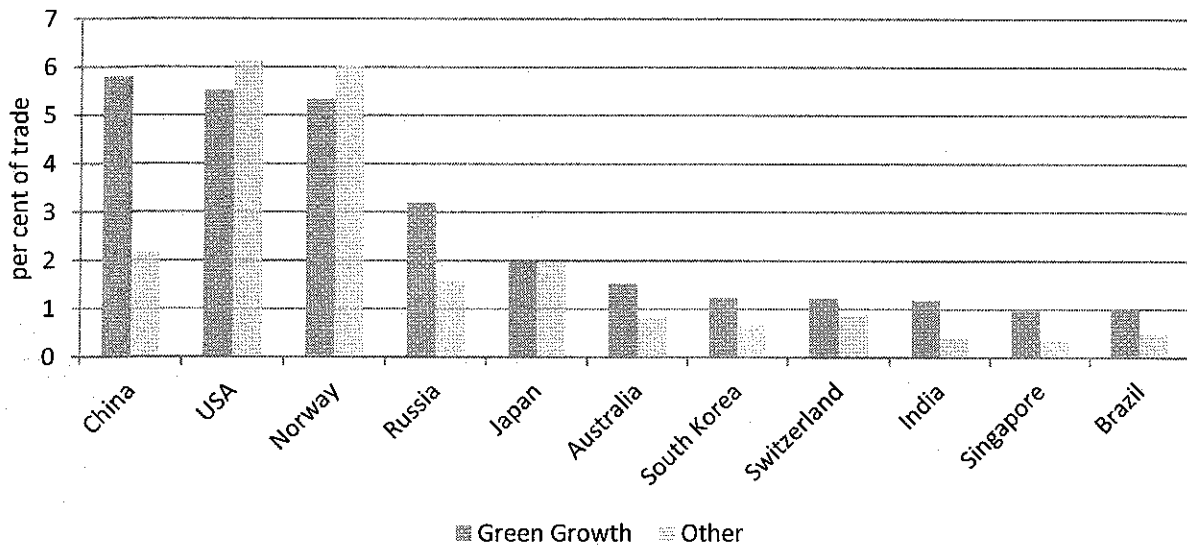
Green Growth is driving Danish exports to the

BRIC countries.

Green Growth as an industry is characterized by being more present in global markets outside the EU compared to other industries in Denmark (See figure below). Thus, 41 per cent of the export of the Green Sector is destined countries outside the EU. Correspondingly, only 33 per cent of the ex-

FIGURE 1.3

Exports of Danish Green Growth outside the EU, 2010.



Source: DAMVAD 2011, own calculation of international trade of goods based on DAMVAD Trade Model.

port of other Danish sectors is destined markets outside the EU.

Growth in exports of green solutions has gone up with almost 80 per cent from the year 2004 to 2009. The analysis shows that growth in exports to countries outside the EU has passed growth in exports within the EU.

In fact Green Growth is considerably more present in the BRIC countries compared to other Danish companies, see figure below. China is accounting for almost 6 per cent of the exports from Green Growth. In comparison China only accounts for around 2 of exports from other sectors. A similar picture emerges for Russia, India and Brazil, whereas there seem to be no significant difference among traditional trade partners such as the U.S. and Norway.

2 Introduction

Green solutions and environmental technology potentially hold extensive commercial opportunities. The potential emerge from an increasing global acknowledgement regarding the need for actions to oblige the consequences of global warming and other environmental changes. These environmental challenges have both human and economic consequences, e.g. a single 2hrs. heavy rain shower in Copenhagen this summer caused massive damage for more than 4 bn. DKK and a lot of frustration and huge distress for the affected citizens. As such there has been an increasing focus on the necessity to carry out investments and develop new solutions that can help soften the human impact on the environment and thus reduce the consequences of global warming.

Climate and sustainability are often seen as elements that are not consistent with growth. Often a focus on climate and sustainability is costly for those involved, because of higher production costs and higher costs of semi-conductors and semi-manufactures. As such the perception has been, that Green and Growth where not consistent.

Thus a study recently presented different perspectives on Green Growth. They have identified three different arguments linking a green focus with economic growth²:

1. That green solutions achieved by reasonable policy pose a very little threat to economic growth or job creation.
2. Investment in green solutions could create jobs during economic recession and provide the foundation for job growth in the long run.
3. Green innovation and investments can fuel a new wave of productivity and export

growth, driving real gains in GDP through capturing new markets and improving production efficiency.

Taking the latter into consideration green focus can enhance economic growth. In the EU these investments and innovation will sum up to €175 million and create up to 1.5 million jobs. And as such there is coherence between a green focus and growth.

This report analyses the magnitude and development among Green Growth companies in the Greater Copenhagen Area. The report is **the first of its kind** that attempts to measure the impact of Green Growth on the economy enabling a separation of green activities and other activities in companies and – at the same time – measure green activity in all companies in a given area.

Geographically the report focuses on the City of Copenhagen and the Greater Copenhagen area. In this report the City of Copenhagen is delimited by the Municipality of Copenhagen. The Greater Copenhagen Area is delimited by the administrative Capital Region of Denmark.

The cornerstone of the analysis is a statistical definition of an industry that covers Green Growth companies in Denmark. With a statistical delimitation Green Growth can be established and based on statistics and register data from Statistics Denmark it is possible to do compare the industry with other industries in Denmark and internationally. Furthermore, a clear definition of Green Growth enables time series analyses making it possible to investigate developments over time.

This analysis focuses on Green Growth as a industry in line with the manufacturing or the ICT indus-

² BRIE (2011): Shaping the Green Growth Economy

tries. By doing so it is possible to statistically analyse the industry focusing on:

- Whether Green Growth is just “green” or if there is a growth aspect to the industry as well?
- Whether Green Growth is a significant industry in a Danish context?
- What is the turnover, the export, the employment and the value added related to Green Growth?
- Does the Greater Copenhagen Area have a global position of strength?

3 Defining Green Growth as an industry sector

Several attempts have been made in order to define Green Growth as an industry; however no standard definition exists to date. Some of these rely on a more narrow definition with emphasis solely on greenhouse gas emissions whereas others are very broad and encompass more or less all aspects of impact on environmental issues. Three different arguments have emerged reflecting different ambitions in order to link green solutions and economic growth³:

1. Emission reduction achieved by reasonable policy comprises a very small threat to economic growth and job creation.
2. Investments in low-emission technology and energy efficiency *could* create jobs during economic recession and provide foundation for new jobs in the long run.
3. Green investment and innovation can fuel a new wave of productivity and export growth, driving *real* gains to GDP through capturing new markets and improving production efficiency.

The latter reflects the definitions of green growth which this report builds upon. Our approach to the analyses builds upon the definition from the Berkeley Roundtable on the International Economy (BRIE):

"Job creation or GDP growth (are) compatible with or driven by actions to reduce greenhouse gasses".

Source: BRIE, Shaping the Green Growth Economy

This definition is narrow in the sense that it mainly focuses on greenhouse gas emissions. Therefore, this report also builds upon a definition from OECD addressing a wider understanding of green growth including other environmental issues:

³ BRIE, Shaping the Green Growth Economy

"Green Growth means fostering economic growth and development while ensuring that national assets continue to provide the resources and environmental services on which our well-being relies. To do this it must catalyse investment and innovation which underpin sustained growth and give rise to new economic opportunities."

Source: OECD, "Towards Green Growth, report meeting of the Council at ministerial level, 25-26 May 2011.

The concept and definitions in this report build upon almost 15 years of work accomplished in the OECD and EUROSTAT. The resulting description of the industry forms a base for how green products and solutions can be operationalised. These definitions build upon the work by OECD and EUROSTAT focusing on **environmental protection** and **resource management/optimal use of resources**, respectively.

In order to define an area of business, which could be denoted "Green Growth"; we define a set of products and services that are delimiting the industry. This set of products and services are defined by a set of criteria.

Defining Green Growth as an industry

According to the work accomplished in the OECD and EUROSTAT, Green Growth consists of a group of producers and suppliers of technologies, products and services which⁴:

- Measure, control, rebuild, prevent, treat, minimize, conduct research in and recover envi-

⁴ E.g. EUROSTAT (2009), "Handbook on Data Collection on Environmental Goods and Services". The definition is an add on from the OECD definition from the 1999-report: "The Environmental Goods and Services Industry – Manual for Data Collection and Analysis".

ronmental damages on air, water and soil as well as handle problems with waste, noise, biodiversity and landscapes. This entails cleaner technologies, products and services preventing or reducing pollution.

- Measure, control, rebuild, prevent, treat, minimize, conduct research in and recover resource exploitation. This results primarily in resource-optimizing technologies, products and services, minimizing the usage of natural resources.

Groups of products and services

Based on this definition it is possible to define a set of criterion determining how green technologies, products or services must have environmental protection or resource management as their primary goal. This makes it possible to divide them into two groups. The different groups of products and services include both end-user solutions and sub-assembly's that are included in later end-user solutions. Both groups include administrative activities, education, tuition, activities related to information and communication as well as research and development.

- **Environmental Protection:** This group includes technologies, products and services of preventative or improving character relating to prevention, reduction, elimination or cleaning of emissions, waste and sewage, soil- and groundwater pollution, noise and vibration in addition to radiation. On top of this, environmental protection covers prevention, reduction and elimination of soil erosion and content of salt along with other types of destruction and erosion, preservation of biodiversity and landscapes besides monitoring and controlling the quality of the environment and waste.
- **Resource Management:** Consists of technologies and products to control and/or protect

the natural resources against exploitation both through preventive and regenerating activities as well as through surveillance and control of the level along with the use of these resources.

The coherence between the three levels of defining the sector is presented in figure 3.1 and is described in detail below.

Green technologies, products and services

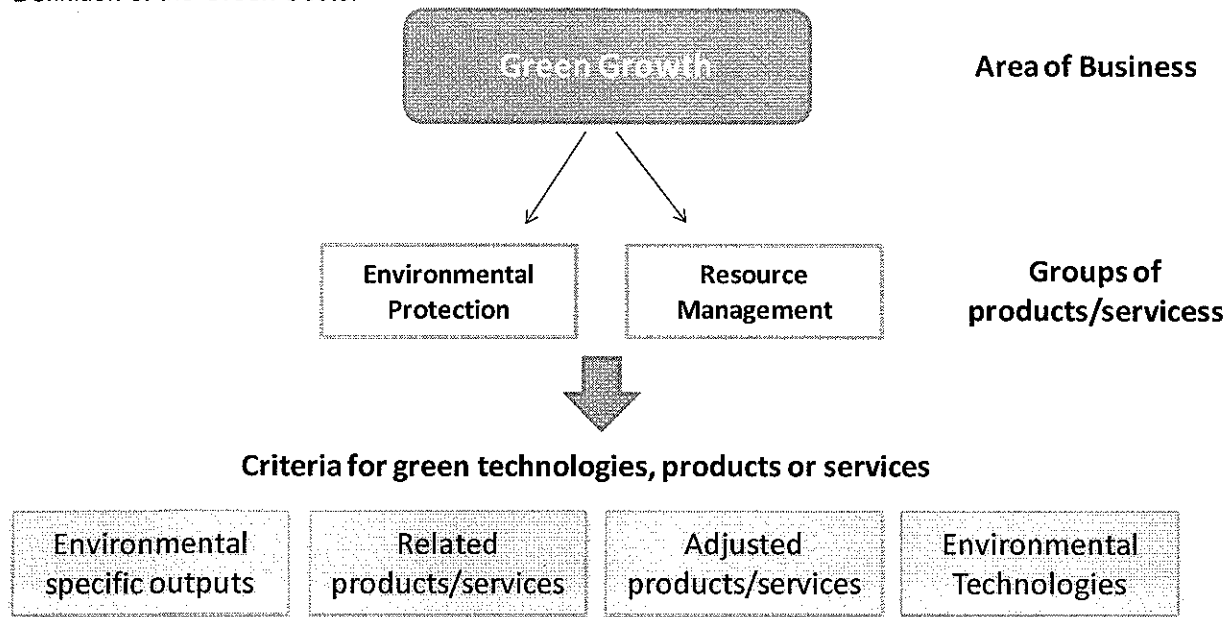
Apart from the criteria of purpose, it can show useful to decide on a range of criteria to be fulfilled by green technologies, products and solutions. Accordingly, OECD and EUROSTAT work with the following 4 categories defining the criteria for green technologies, products and solutions:

1. Environmental Specific Outputs
2. Related Products and Services
3. Adjusted Products and Services
4. Environmental Technologies
 - a. End-of-pipe products and technologies
 - b. Integrated technologies

The four categories and their criteria will be described more in detail in the following.

FIGURE 3.1

Definition of the Green Sector



Source: DAMVAD, 2011

Environmental specific outputs

Consist of the output of the activities related to environmental protection or resource management activities. Depending on their specific purpose, the solutions and products can be divided into the following:

- **Products and solutions related to environmental protection** where the purpose is targeted towards pollution or elimination of pollution among others. This can include surveillance, administration, education etc.
- **Resource management** where focus is on exhaustion of resources including prevention, reduction, surveillance, administration and education.

Related products and solutions

These are associated to the environmental specific products and solutions and can be divided as follows:

- **Services and products related to environmental protection** covering e.g. waste bin bags, septic tanks, services to maintenance of septic tanks, equipment to measure and monitor particles polluting the air, cleaning filters

and other components used specifically to environmental protection technologies.

- **Resource management** such as equipment to monitor and control the ground water, installation and maintenance of solar cells, windmills and the like.

Adjusted products and services

These are less polluting or utilize resources in a more optimal manner compared to similar products. They are a result of a reformulation or a redesign of existing products and services with the specific goal to reduce pollution and minimize the usage of resources. Adjusted products and services should not be divided into environmental protection or resource management, but in the following categories instead:

- **Cleaner products and services** which are contributing to prevent pollution or degradation of the environment since they are less polluting or require a smaller usage of resources in their production compared to other similar products and services.
- **Resource optimizing products or services** which help ensure that the resources do not become depleted.

TABEL 3.1

Green growth categories and examples of technological areas

	Environmental Protection	Resource management
Environmental specific products and services	<ul style="list-style-type: none"> • Handling of waste or sewage • Improved sanitation 	<ul style="list-style-type: none"> • Energy and water saving activities • Bio Fuel • Wind power • Solar Power • Ship paint reducing friction • Low Energy windows
Related products	<ul style="list-style-type: none"> • Septic tanks and services for maintenance • Bio gas plants • Equipment to measure air polluting particles 	<ul style="list-style-type: none"> • Equipment to groundwater control • Installation and service of solar panels, windmills etc. • Systems to monitor energy usage

	Cleaner goods	Resource optimizing goods
Adapted products	<ul style="list-style-type: none"> • Batteries without mercury • Cars with lower CO₂ emissions 	<ul style="list-style-type: none"> • Recycled paper • Heat pumps

	"End-of-pipe" technologies	Integrated technologies
Environmental Technologies	<ul style="list-style-type: none"> • Filters for water cleaning • Combustion or recycling technologies • Separation plants • Collection of methane 	<ul style="list-style-type: none"> • Dry ovens to produce cement • Livestock facilities

Source: DAMVAD, 2011

Environmental Technologies

These cover technical processes, installations or equipment (products) along with methods and knowledge (services), where the technical purpose is environmental improvements. Environmental technologies can be divided into two groups:

- **"End of pipe" technologies**, which are technological installations or equipment to gauge, control or reduce or mitigate pollution, environmental stress and resource exploitation.
- **Integrated technologies** which are technical processes, method and knowledge within e.g. processes of production being less polluting or

which improve the optimal use of resources.

As such we are dealing with cleaner technologies or with resource optimizing technologies.

The following will provide an overview of more specific examples of technologies, products and services:

3.1 Green Sector companies in the Greater Copenhagen Area

Based on the criterion in the previous chapter it has been possible to identify companies that produce solutions or have a green profile. The chart below shows the geographical location of these companies.

The companies are the following:

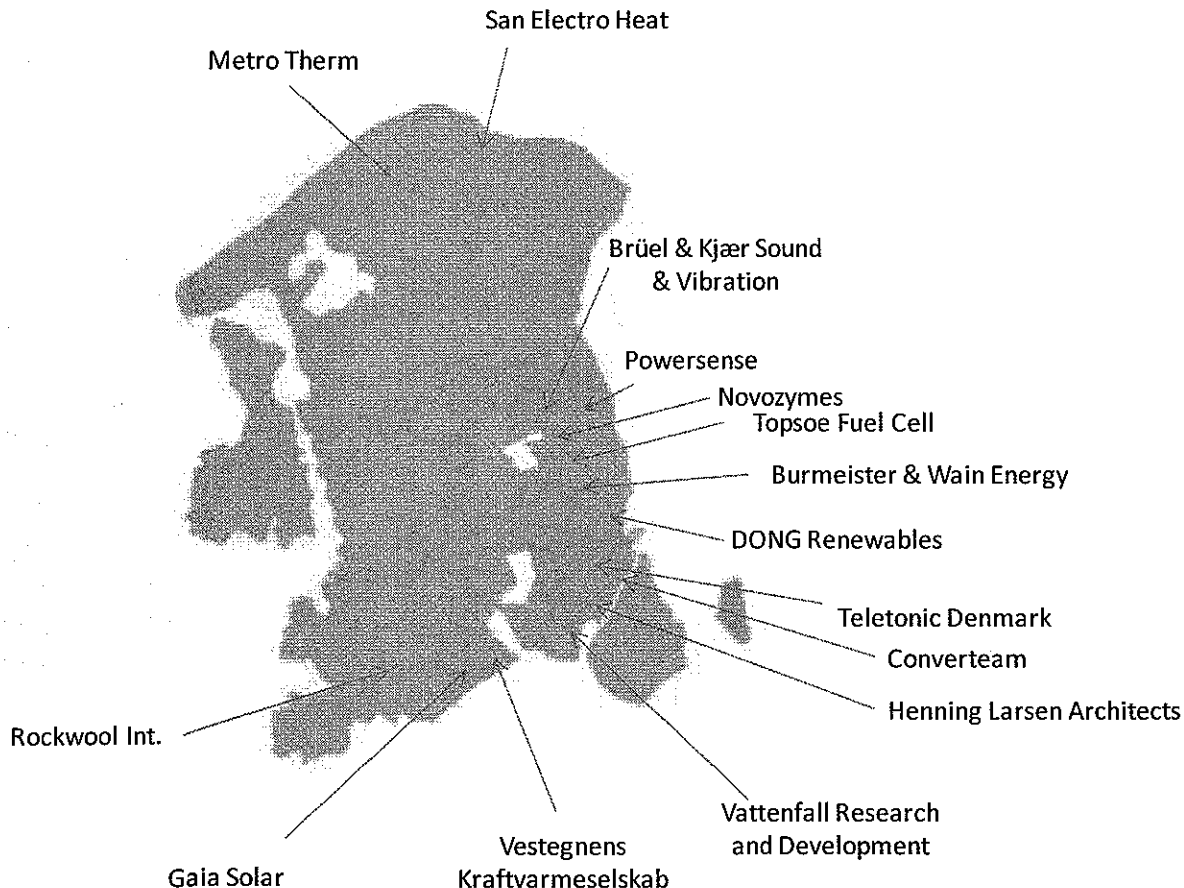
- **DONG Renewables**, With more than 20 years experience of offshore wind farm development DONG Energy is the current market leader in offshore wind power. The main focus of DONG Renewables is to maintain and develop DONG Energy's leading market position within offshore wind power in North-West Europe. They develop, build and run wind farms and are well on the way to reaching the target of a minimum wind capacity of 3,000 MW in 2020.
 - **Converteam** is a worldwide specialist in Power Conversion engineering with the clear mission to improve and secure customers' process performance while lowering environmental impact.
 - **Teletonic Denmark** develops and produces TELELOG wireless dataloggers for surveillance and gathering of data, and radio modems for remote control in e.g. sewers, watercourses, water drilling and solar plants.
 - **Rockwool International** is leading in insulation of buildings. Their products are rated as A and A+ construction materials by the English BRE *Global Green Guide to Specification*.
 - **Novozymes**, driving the world toward sustainability means addressing social, environmental and economic challenges. Examples are better utilization of the world's resources and meeting people's needs for, among other things, food and consumables.
- With Novozymes biotechnology it is possible to rethink industrial processes and lower the environmental impact throughout value chains.
- **Metro Therm**, producing solar plans and pumps for geothermal energy.
 - **Henning Larsens Architects**, Henning Larsen Architects attaches great importance to designing environmentally friendly and integrated, energy-efficient solutions.
 - **San Electro**, Their main business areas are technical electric heating for wind turbines, complete switch point heating systems with control for the railway sector, heating for the process industry and finally electrical heating cables for any possible purpose.
 - **Brüel & Kjær Sound and Vibration**, Industrialization, dense urbanisation and the increasing transportation needs of people and goods put sound and vibration issues at the top of the environmental agenda. The solutions from Brüel & Kjær Sound and Vibration oblige the environmental hazards from noise and vibration.
 - **Powersense**, the Powersense product range has been designed to fulfill the needs of the power companies and the MV grid owners worldwide. The product line has been designed to withstand the harsh environmental requirements set out by the customers and to have a superior lifetime performance.
 - **Topsoe Fuel Cell**, Topsoe Fuel Cell focuses on solid oxide fuel cell technology - SOFC - which is the most efficient fuel cell technology available.
 - **Burmeister & Wain Energy** is an international Hi-Tech company which has specialized in design of Ultra Super Critical (USC) steam boilers for utility power stations.
 - **Vattenfall Research and development** develops tomorrow's energy system, which must be able to support sustainable development in

society, and not compromise the quality of life of future generations.

- **Gaia Solar** is Scandinavia's largest company within the field of building integrated solar modules that produce electricity. Gaia Solar has more than 300 completed projects since 1996 in building integration of complete solar power systems BIPV (Building Integrated PhotoVoltaic).
- **Vestegnens Kraftvarmeselskab (VEKS)**, is a transmission company supplying heat to 19 local district heating companies at Vestegnen. Utilizing surplus heat means a drastic reduction in fuel consumption, with the environment ending up as the major winner. Without VEKS, Vestegnen would have used approximately 3 times more fuel had the heat, as in the old days, been generated in oil-fired boilers of the local district heating companies.

FIGURE 3.1

Fifteen companies with green solutions in the Greater Copenhagen Area



Case: What cities can do to exploit the potential of green growth

The case of district heating:

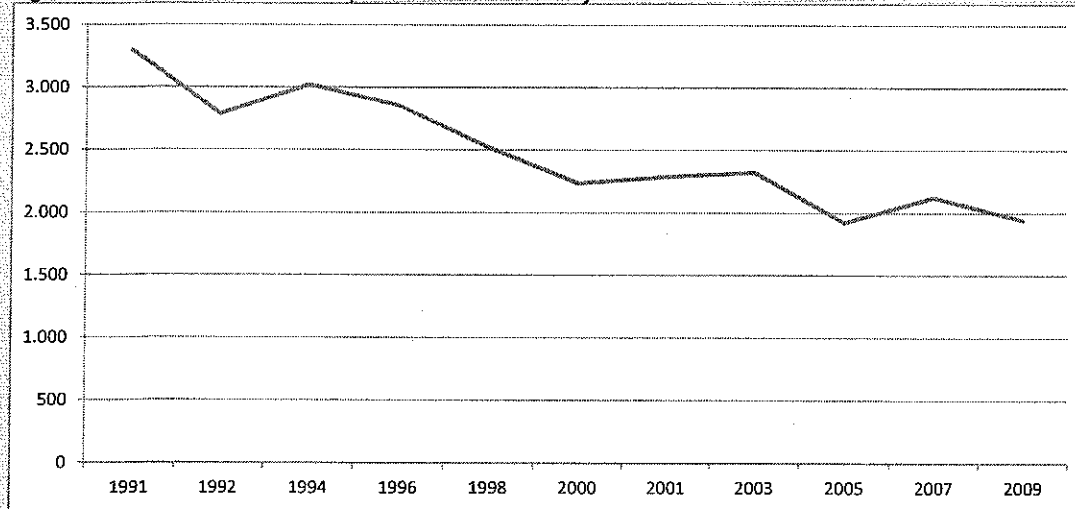
In Copenhagen 98 per cent of the heat requirement is covered through district heating corresponding to an energy quantity of 33,000 TJ. The high penetration rate is primarily due to the fact, that connection to the district heating network is obligatory in many areas. However, there is also an economic incentive for district heating. Thus with district heating a saving of 45 per cent with oil-fired burner and 56 per cent with natural gas is achieved on a standard house of 130 sq. m.

Significance in relation to CO₂ emission

District heating in Copenhagen is produced at some of the most energy efficient power plants in the world. Combined with high connection this implies a substantial environmental gain.

The CO₂ emission is thus reduced considerably compared to in the beginning of the 1990'es. Below figure shows CO₂ emission in tons, resulting from the production of heat and electricity. It appears that there has been a significant reduction of 40 per cent, which among other things is caused by the above mentioned actions as well as effective production methods

Figure: CO₂ emission from the production of electricity and heat



Source: DAMVAD based on data from The Municipality of Copenhagen

4 Methodology

Green Growth is not identified in official registers and databases. Therefore, previous studies have tried to address the industry by using surveys to determine the size of the industry. However, this raises issues concerning the ability to include all relevant companies in the study, but also to be able to separate green activities in a company from other activities as well as assuring consistent answers year after year. Finally surveys are a general burden to companies.

Therefore, this project employs a brand new and highly sophisticated method for measuring Green Growth. The method enables us to statistically define the industry, by the actual Green growth-activities in all individual companies in Denmark. It is **the first of its kind** which attempts to measure the impact of Green Growth on the economy which enables a separation of green activities and other activities in companies.

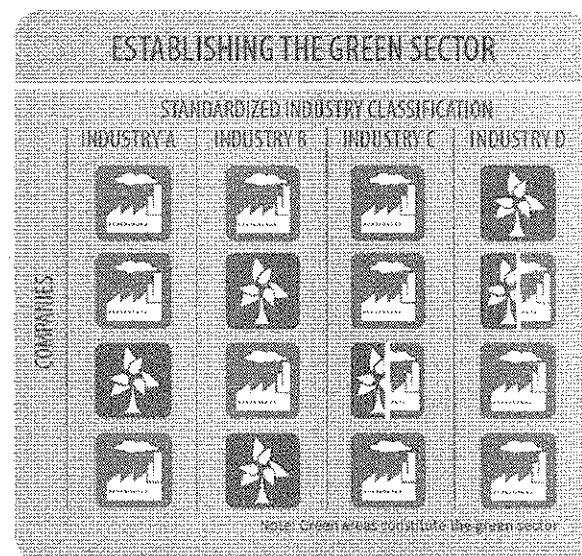
In an analytical context this gives us unique advantages compared to existing analyses regarding Green Growth. The new methodology enables solid comparison over time providing information regarding the evolvement of Green Growth on a broad range of statistical indicators⁵. Further this makes it possible to compare with other sectors in the economy and thus enables the analyst to conclude on the magnitude and development of Green Growth. Finally, the methodology enables international comparisons, e.g. analysing global positions of strength.

The sticking point is that the measurement is based on the individual company rather than general industry classifications. The method makes it

⁵ Statistical indicators include information regarding turnover, export, employment, productivity, level of competence, investments in R&D and more.

possible to isolate the activities associated with the production of environmental or green solutions in each company. This is more accurate than previous methods, as it cuts across common industry classifications as well as activities in each company, which is exemplified in figure 4.1 below. The figure shows how a company in industry C is only 50 per cent green and how three companies in industry C are black – that is 0 per cent green. The identification of companies is based on internationally recognized listings of environmental goods from e.g. OECD, EUROSTAT and national resources.

FIGURE 4.1
Measuring the Green Sector



Source: DAMVAD, 2011.

By starting with companies that actually produce environmental goods, it is possible to identify a new green industry independent of common industry classification. The environmental goods are categorized by the Harmonized commodity System, which is an internationally standardized system for classifying traded products, making it possible to conduct comparable analyses in other cities and countries.

By differentiating the companies it is possible to give a solid estimate of the turnover, exports, employment and productivity that stems from green growth. Thus it is possible to provide information about the economic significance of the Green Sector industry in the Greater Copenhagen Area.

The division, categorization and weighting of companies are done in both a quantitative and qualitative way. The quantitative approach is focusing on the solutions that each Danish company is buying and selling. This is done by dividing the products from the Combined Nomenclature into green and non-green products. Based on thorough register analysis among company registers at Statistics Denmark, this division makes it is possible to calculate how many of the activities in each company that stems from green products.

Based on this knowledge, it is possible to identify specific industries at the highest disaggregated level of NACE-codes. The Danish business sector is divided into 825 industries. The qualitative approach is focusing on the companies in the industries identified as having green activities through the quantitative approach. The homepages of the identified companies are thoroughly analysed, and the individual company is given a weight corresponding to the level of green activity. The individual weights are aggregated to the highest disaggregated level of NACE-codes and compared to those of the quantitative analysis of the sector. In most instances, two out of three, the qualitative and the quantitative weigh are very close, that is within 20 per cent difference. Where there is discrepancy, the industry is subject to a closer analysis and discussion with experts. In this particular report we have analysed approximately 1,000 homepages from Danish companies within 130 industries.

The quantitative and qualitative approach has provided us with weights at 6-digit NACE-code level. Now it is possible to combine these two and calculate a common weight for the companies based on the quantitative and qualitative weights.

5 Mapping companies

The purpose of this chapter is to give a thorough description of Green Growth companies in the Greater Copenhagen Area.

5.1 Green Growth is an substantial sector

Initially the figure 5.1 below shows the number of companies that to a greater or lesser extent have activities related to green growth. The companies are grouped by the share of green growth activities within the industry they belong to:

- **The core group of companies** belong to industries where it is found that more than one third or 33 per cent of the industry activities are related to green growth.
- **The intermediate group of companies** belong to industries where it is found that between one third (33 per cent) and one

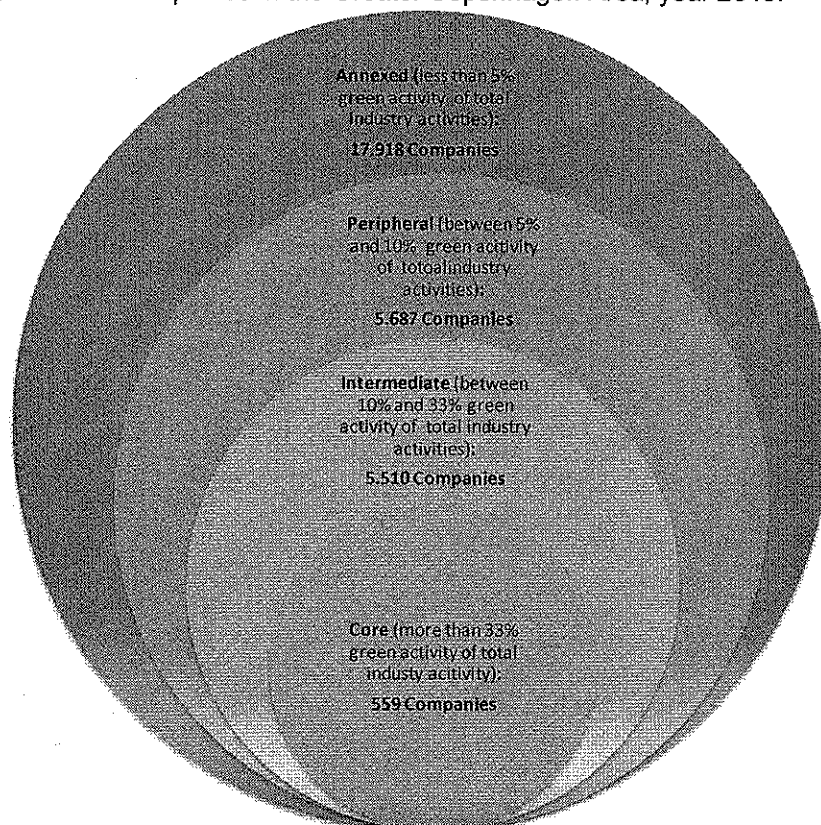
tenth (10 per cent) of the industry activities are related to green growth.

- **The core group of companies** belong to industries where it is found that between one tenth (10 per cent) and one twentieth (5 per cent) of the industry activities are related to green growth.
- **The core group of companies** belongs to industries where it is found that less than one twentieth (5 per cent) of the industry activities are related to green growth.

The core group of companies in the Greater Copenhagen Area covers 559 companies. The intermediate group is significantly bigger with 5.510 companies. Among the more peripheral companies with less than 10 per cent of their activities related to Green Growth the number of companies are almost the same at 5.687 companies. Finally, the

FIGURE 5.1

Number of Green Growth companies in the Greater Copenhagen Area, year 2010.



Source: DAMVAD 2011, retrieval from Experian, based on the industry weights calculated from the register data from Statistics Denmark.

TABLE 5.1

Distribution of Green Growth companies in Denmark, by region, year 2010

	Core	Intermediate	Peripheral	Annexed	All companies in Denmark
The Greater Copenhagen Area	16 %	37 %	42 %	23 %	29 %
The Central Region of Denmark	31 %	21 %	20 %	26 %	23 %
The Region of Southern Denmark	23 %	17 %	17 %	23 %	21 %
Region Zealand	12 %	15 %	14 %	15 %	15 %
The North Denmark Region	19 %	9 %	8 %	13 %	11 %
Total	3,417	15,027	13,592	78,889	300,058

Source: DAMVAD 2011, retrieval from Experian, based on the industry weights calculated from the register data from Statistics Denmark.

companies with less than 5 percent of their activities related to Green Growth are referred to as annexed, and in this category we find 17.918 companies.

Likewise table 5.1 shows the distribution of green growth companies on the four activity categories. The table shows the distribution on five Danish regions and compares this with the general distribution of companies in Denmark.

The table shows that core companies are underrepresented in the Greater Copenhagen Area. Conversely, the intermediate and peripheral companies are overrepresented in the Greater Copenhagen Area. The figures fairly well covers the business structure with a heavy focus on wind generation in the Central Region of Denmark, whereas more intermediate industries within construction, contractors and architects are placed in The Greater Copenhagen Area.

Table 5.2 shows the distribution of Green Growth companies of different industries. The table shows that core companies are within the manufacturing sector. The intermediate sector is more divided. Thus, with a vast majority on knowledge intensive business service (KIBS) and construction. The peripheral sector is strongly represented in the ICT sector whereas the annexed is a bit of everything.

TABLE 5.2

Distribution of Green Growth companies in The Greater Copenhagen Area, by sector, year 2010

	Core		Intermediate		Peripheral		Annexed	
	#	%	#	%	#	%	#	%
Manufacturing	559	100 %	404	7 %	345	6 %	1,230	7 %
Construction	0	0 %	1,410	26 %	162	3 %	2,379	13 %
Trade and transportation	0	0 %	0	0 %	310	5 %	854	5 %
ICT	0	0 %	0	0 %	4,282	75 %	4,161	23 %
KIBS	0	0 %	3,640	66 %	570	10 %	6,762	38 %
Other	0	0 %	56	1 %	18	0 %	2,532	14 %
Total	559	100 %	5,510	100 %	5,687	100 %	17,918	100 %

Source: DAMVAD 2011, retrieval from Experian, based on the industry weights calculated from the register data from Statistics Denmark.

Note: Other compiles of farmer, mining, oil and gas, finance, real estate and public companies

Table 5.3 below compares the industry distribution of core and intermediate Green Growth companies in selected regions. It shows little difference between the distributions of the core companies who

all fall into the industry sector. As for the intermediate companies there are some differences. The KIBS is more present in the Greater Copenhagen Area, where two thirds of the companies are, than in the other regions.

TABLE 5.3

Distribution of Green Growth companies in selected regions, by sector, year 2010

	Greater Copenhagen Area		Central Region of Denmark		Southern Region of Denmark	
	Core	Intermed.	Core	Intermed.	Core	Intermed.
Industry	100 %	7 %	100 %	15 %	100 %	13 %
Construction	0 %	26 %	0 %	31 %	0 %	33 %
Trade and transportation	0 %	0 %	0 %	0 %	0 %	0 %
ICT	0 %	0 %	0 %	0 %	0 %	0 %
KIBS	0 %	66 %	0 %	48 %	0 %	50 %
Other	0 %	1 %	0 %	6 %	0 %	4 %
Total	100 %	100 %	100 %	100 %	100 %	100 %

Source: DAMVAD 2011, retrieval from Experian, based on the industry weights calculated from the register data from Statistics Denmark.

Note: Other compiles of farmer, mining, oil and gas, finance, real estate and public companies

Table 5.4 shows the distribution of companies in the Green Sector by number of employees compared to the distribution in all sectors in general. For Denmark as a whole there seem to be no significant difference in distribution between the Green Sector and all sectors in total. Nonetheless when turning to Copenhagen and the Greater Copenhagen Area it is apparent that the City of Copenhagen has a slightly smaller share of Green companies with 1 to 9 employees compared to the Green Sector in Denmark as a whole. On the other hand, 11 per cent of the Green companies in Copenhagen have more than 20 employees whereas this number is only 8.5 per cent for the Green Sector as a whole. This suggests that Copenhagen has more medium and large firms working with issues related to the Green Sector compared to Denmark as a whole.

activities compared to larger firms, and thus the small firms can be crucial in preserving Danish jobs.

Number of employees in a firm is interesting when it comes to future job opportunities and growth potentials of the region. Small and medium scale firms are expected to be less likely to outsource

TABLE 5.4

The number of Green Growth companies by number of employees compared to all sectors, year 2008

	City of Copenhagen		Greater Copenhagen Area		Denmark		All Sectors in Denmark	
	#	%	#	%	#	%	#	%
1 to 9 employees	5,074	79.4 %	16,388	80.1 %	58,120	82.0 %	117,855	82.1 %
9 to 19 employees	613	9.6 %	1,937	9.5 %	6,370	9.0 %	13,086	9.1 %
20 to 49 employees	392	6.1 %	1,264	6.2 %	3,980	5.6 %	7,912	5.5 %
50 to 99 employees	141	2.2 %	420	2.1 %	1,280	1.8 %	2,479	1.7 %
100+ employees	170	2.7 %	442	1.2 %	1,153	1.1 %	2,176	1.5 %

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

Why focusing on Welfare Technology?

Welfare technology is defined solutions that can help people with disabilities to be more independent.

In Denmark the Welfare Technology Sector is a new statistical delimited sector and as such it is comparable with the Green Sector.

In a Danish context Welfare Technology has been identified as high growth sector with huge global potential, see e.g. the statistical report: <http://velfaerdsteknologi.nu/nyheder/analyser/velfaerdsteknologi-som-ressourceomraade> (in Danish) or a series of articles in Monday Morning, among others: <https://www.mm.dk/velf%C3%A6rdsteknologi-er-et-h%C3%B8jproduktivt-v%C3%A6ksterhverv> (in Danish).

Source : DAMVAD, 2011

5.2 25.000 Green jobs in the Greater Copenhagen Area

The Green Sector plays a significant role in the Greater Copenhagen Area. In table 5.5 below we see that the turnover of the sector amounted to DKK 50 bn. in 2009, this corresponds to three times the size of that of Welfare Technology and almost one half of the Manufacturing sector. In the context of the Greater Copenhagen Area as a whole, the turnover of the Green Sector contributes to nearly 4 per cent of total turnover in the region.

Furthermore, with an export amounting to DKK 18.5 bn. the Green Sector contributes extensively to the overall export of the Greater Copenhagen

Area, and the export intensity lies well above the average of the area as a whole. Thus, the Green Sector is responsible for almost 6 per cent of total exports of the region, whereas Welfare technology and Manufacturing account for about 2 and 22 per cent respectively. In actual numbers, the export within the Green Sector was more than twice the size of Welfare Technology and about one fifth of Manufacturing.

Looking at employment, the numbers reveal that there are 25,000 so called "green" jobs in the Greater Copenhagen Area, which is more than twice as many as in the Welfare Technology industry. Consequently, the Green Sector represents almost 3 per cent of the overall number of jobs in the Greater Copenhagen Area. Manufacturing is still by far the most important industry of the three

TABLE 5.5

Key figures of the Green Sector in the Greater Copenhagen Area, year 2009

	Green Growth	Welfare Technology*	Manufacturing	Greater Copenhagen Area in total
Turnover (in million DKK)	50,992	15,590	113,613	1,459,708
Employment	24,674	9,798	64,137	987,870
Exports (in million DKK)	18,565	7,049	77,508	361,421
Export Intensity (%)	36 %	45 %	68 %	25 %

Source: Statistics Denmark, Table REGN4, REGN8 and own calculations. * The figures are based on an estimate.

in terms of number of employees and turnover.

5.3 DKK 24 bn. turnover from green solutions in the City of Copenhagen

The following section focuses solely on the City of Copenhagen. With almost half of all activities of the Green Sector taking place in Copenhagen, the city must be characterised as a crucial player in determining the performance of the Green Sector in the Greater Copenhagen Area.

Table 5.6 below shows how a large share of the activities in The Green Sector can be ascribed to activities in the City of Copenhagen. Almost half of the turnover in The Green Sector in the Greater Copenhagen Area is generated by activities taking place the City of Copenhagen and 43 per cent of the employment and 56 per cent of exports are concentrated in Copenhagen. The export intensity of The Green Sector in Copenhagen is also well above the intensity in the Greater Copenhagen Area as a whole. Further the turnover in the City of Copenhagen encounters one sixth of the total turnover from The Green Sector in Denmark. As such a large share of The Green Sector activities can be ascribed to the City of Copenhagen.

Compared to The Green Sector in the Greater Copenhagen Area the turnover-employment ratio is

higher in the City of Copenhagen. In the City the ratio is 2.2 million DKK whereas in the Greater Copenhagen Area the ratio is 2.0 million DKK. Thus, green companies within the city create a 10 per cent higher turnover per employee than green companies in the great Greater Copenhagen Area.

5.4 Most green growth activity is within manufacturing

Table 5.7 splits The Green Sector by industry. In the first column we see that Industry constitutes half of the turnover of total the Green Sector as a whole, and Construction and KIBS about 20 per cent each. Trade and Transportation and ICT contribute only to a very small extent. The Green Sector-manufacturing turnover corresponds to almost 23 per cent of the total turnover in the manufacturing sector in the Greater Copenhagen Area.

Turning to employment in column two, the picture is more or less the same: The major contributors continuous to be Manufacturing, Construction and KIBS. Manufacturing is responsible for about 40 per cent of total employment in The Green Sector, Construction 15 per cent and KIBS almost 30 per cent. Compared to the 66.740 employees in manufacturing in the Greater Copenhagen Area the employment from The Green Sector corresponds to 16 per cent of employment in the manufacturing

TABLE 5.6
The Green Sector in the City of Copenhagen, year 2009

	City of Copenhagen	Greater Copenhagen Area	Green Growth in Denmark
Turnover (in million DKK)	23,803	50,992	153,745
Employment	10,677	24,674	76,076
Exports (in million DKK)	10,475	18,565	76,998
Export Intensity (%)	44 %	36 %	50 %

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE 5.7

The Green Sector in the Greater Copenhagen Area divided by industry, year 2009

	Turnover (In million Dkk)	Employment	Exports (In million DKK)
Manufacturing	30.927	10.904	13.904
Construction	10.910	3.989	206
Trade and transportation	5.113	2.604	419
ICT	1.765	1.090	192
KIBS	12.399	7.298	5.012
Other	82	1.033	2

Source: DAMVAD 2011, own calculation based on Statistics Denmark.
 Note: Other compiles of farmer, mining, oil and gas, finance, real estate and public companies

sector.

In the last column we see the figures for exports, where Manufacturing is still the major contributor accountable for 70 per cent of exports in The Green Sector. KIBS comes in second with 25 per cent, implying that the other sectors do not contribute significantly.

5.5 Green Growth means 40 per cent higher productivity than the average company

The Green Sector performs impressively when it comes to growth rates in productivity. The productivity per employee in The Green Sector is 40 per cent higher than for the average company in the Greater Copenhagen Area, and clearly outperforms Manufacturing: This is despite the fact that productivity in The Green Sector is still a little bit below the productivity of the Welfare Technology industry.

"This report defines productivity as the value added per full time equivalent. Another often used definition is total factor productivity (TFP). Labour productivity is chosen because it is easier to interpret as oppose to TFP and it is easier to compare between different industries simply because it is simpler. This is due to the fact that TFP is defined differently depending on how you define capital inputs. Are the capital input defined solely by the capital stock or should you include intermediate inputs such as energy, services and other intermediate goods? And how would you price investments in R&D, technology and innovation, which should also be included in the TFP. Further the capital stock of labour in Denmark ranges between 70 and 75 per cent of the total capital stock. As such labour input is by far the most important input factor."

TABLE 5.8

Labour Productivity in key sectors compared to the Greater Copenhagen Area, year 2009

	Labour productivity in DKK per FTE
The Green Sector in the City of Copenhagen	635,505
The Green Sector in the Greater Copenhagen Area	709,312
The Green Sector in Denmark	697,069
Welfare Technology in the Greater Copenhagen Area*	714,314
Manufacturing in the Greater Copenhagen Area	509,256
The Greater Copenhagen Area in total	493,982

Source: DAMVAD 2011, own calculation based on Statistics Denmark.
 Note: * Welfare Technology is based on an estimate

The results imply that The Green Sector is a high-productivity sector and performs on level with other high-productivity sectors. These findings are highly relevant for the Danish companies needs productivity in order to compete internationally. Moreover, productivity is also crucial when considering the challenges Denmark face only a few years from now. With a decreasing labour force, human capital will become a scarce resource, which is already seen in several knowledge-intensive sectors, and this will further increase the demand for high productivity employees.

When looking into how each industry contributes to

TABLE 5.9

The Green Sector Labour Productivity divided by industry, year 2009

	Labour productivity in DKK per FTE
Manufacturing	718,614
Construction	555,247
Trade and transportation	442,126
ICT	760,961
KIBS	615,626
Other	732,175

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

the overall productivity of The Green Sector as whole in table. 5.9, we see that Manufacturing and ICT are the two sectors contributing positively to the average. KIBS is very close to the average of the sector, whereas the remaining sectors are well below. Especially Trade and Transportation have a negative influence of the average, however from the previous tables we know that these sectors are less important when it comes to turnover, exports and number of employees.

5.6 R&D investments

R&D has proven to be a great driver of productivity and growth. A recent study has shown that the return of investment in R&D is as high as 66 per cent. That means 1 additional euro invested in R&D has a return of 66 cents⁶.

The Greater Copenhagen Area is a central player in terms of Green R&D investments and jobs. Green R&D in the Greater Copenhagen Area is responsible for about half of the Green R&D in-

⁶ See:

http://www.damvad.com/media/20677/english_summary_effects_of_rd_and_innovation_in_denmark130910.pdf

TABLE 5.10
R&D-investments in Green Growth compared to total investments, year 2008

R&D-investments in million DKK	Green Growth R&D	Manufacturing	Total Danish R&D
City of Copenhagen	892	N/A	N/A
Greater Copenhagen Area	1,846	10,779	23,042
Denmark	3,858	15,118	34,743

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

vestments in Denmark as a whole, and more than half of employment. Furthermore, R&D investments in Green Growth constitute a considerable share of overall R&D both in terms of investments and in terms of number of employed. In table 5.10 below we see that in the Greater Copenhagen Area, 8 per cent of the investments in R&D happens within The Green Sector and on a national scale The Green Sector is responsible for 11 per cent of all R&D investments.

The numbers in the table above suggest that the Greater Copenhagen Area plays a very important role for R&D in the Green Sector as a whole, with almost half of the total amount of Green R&D in Denmark. However, when comparing the share of investments in Green R&D in the Greater Copenhagen Area to general R&D in Denmark as a whole we see that the former share is smaller. This implies that there could be an area for improvements in the future. One should thus bear in mind that the total level of R&D investments in the Greater Copenhagen Area is highly driven by the

extensive amount of R&D invested in the pharmaceutical sector. In companies like Novo Nordic, Lundbeck and Bavarian Nordic the R&D investments add up to more than DKK 10bn.

Table 5.11 shows the number of people employed with Green Growth R&D as well as in R&D in general. The numbers are consistent with table 5.8 i.e. 8 per cent of the overall employment in R&D in the Greater Copenhagen Area is associated with the Green Sector. For Denmark as a whole, the number of employed in Green R&D is 9 per cent of the total number of employees in R&D. However, more than half of the people employed within Green R&D work in the Greater Copenhagen Area. This number is even more impressive when looking at total number of people employed in R&D as 64 per cent of these work in the Greater Copenhagen Area, again as a result of the pharmaceutical sector.

As such the Greater Copenhagen Areas is highly important both in terms of share of Green R&D-

TABLE 5.11
R&D FTE in the Green Sector compared to R&D FTE in all sectors, year 2008

R&D-personnel measured in FTE	Green Growth R&D-personnel	Total Danish R&D-personnel
City of Copenhagen	807	N/A
Greater Copenhagen Area	1,749	22,866
Denmark	3,345	35,552

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

investments as well as in terms of number of people employed in total R&D. However, the investments in R&D seem to be marginally lower in Green R&D in the Greater Copenhagen Area than on a National level.

5.7 Educational level

In the following the overall educational level among employees in selected sector is compared. Education and the general competence level is said to have an impact on productivity. As such a higher educational level within the Green Sector could be one of the reasons for a higher productivity.

The educational level among employees in the Green Sector seems to be slightly above the level in Manufacturing and in the Greater Copenhagen Area as a whole. In general there are a little less unskilled and skilled employees in the Green Sector compared to Manufacturing and the rest of the Greater Copenhagen Area, whereas the picture is reversed when we look at higher education. That is, 61 per cent of the workers employed in the Green Sector are unskilled or skilled, while this number is 65 for Manufacturing and 70 per cent for the Greater Copenhagen Area as a whole. Fur-

thermore, one third of the employees in the Green Sector have a medium or long-cycle higher education whereas this is only true for 25 per cent of the employees in Manufacturing and 23 per cent in the Greater Copenhagen Area as a whole.

5.8 Activities addressed by water and waste

Green Growth is fairly broad and associated with activities in several industries. Hence, this subsection divides the Green Sector according to the environmental challenge it is related to. Eight environmental challenges have been identified, and the following will entail a short description of each:

- **General climate challenges** are among others the reduction of CO₂-emissions.
- **Air pollution** is the treatment and/or removal of exhaust gases and particulate matter.
- **Water** is both the focus on waste water management and the focus on reducing the use of water.
- **Bio diversity** focuses on sustainable agriculture, forestry and fisheries.
- **Chemical** is among other less use of chemicals in production.

TABLE 5.12

Level of education in the Greater Copenhagen Area divided by sector, year 2008

	Green Growth	Manufacturing	All companies in the Greater Copenhagen Area
Unskilled	27%	28%	35%
Skilled	34%	37%	35%
Short-cycle HE	7%	9%	6%
Medium-length HE	17%	10%	8%
Long-cycle HE	16%	15%	15%

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE 5.13

Division of activities in the Greater Copenhagen Area according to Environmental challenges, year 2008

	Turnover	Employment	Export
General Climate challenges	531	1.078	82
Air pollution	6.279	3.460	1.521
Water	28.980	12.171	11.058
Bio diversity	135	62	84
Chemicals	3.967	1.761	817
Soil	3.832	1.700	733
Waste	13.113	8.281	3.554
The use of raw materials	135	62	84

Source: DAMVAD 2011, own calculation based on Statistics Denmark.
 Note: The division of the environmental challenges is based on previous work from EUROSTAT and the OECD.

- **Soil** is among others the clean-up of soil.
- **Waste** is waste management, recycling and cleaning-up systems.
- **The use of raw materials** is the focus on reducing the use of raw materials, i.e. oil, wood and others.

From the above definitions we see that there seem to be an overlap of several challenges, implying that some of the activities are counting in more than one sector. This obviously influences the totals and when adding the numbers we thus see totals exceeding the real values for the sector in table 5.5.

In table 5.13 is seen how turnover, employment and exports are divided according to each of the 8 environmental challenges⁷. The total does not correspond with the totals in table 5.5. There are two reasons for this. First of all the different products

⁷ The eight environment challenges are based on the previous work done by EUROSTAT and the OECD. They have divided different products and solutions into different environmental challenges and this is thus the foundation of these categories.

and solutions correspond with multiple environmental challenges. Secondly, not all of the activities can be categorized into these different environmental challenges.

As the table makes clear, the greatest part of turnover comes from activities associated with Water management (51 per cent) and Waste (23 per cent). Activities associated with air pollution amounts to 11 per cent of the total turnover within The Green Sector whereas Chemicals and Soil amounts to 7 per cent each. The remaining sectors, Climate, Bio Diversity and the use of Raw Materials have little influence.

Focusing on employment Water and Waste are still the industries of most importance with 43 and 29 per cent of all employees respectively, whereas climate with 4 per cent seems to play a greater role compared to what was the case with turnover. 6 per cent of all employees in The Green Sector work with issues related to Chemicals, and another 6 work with issues related to Soil.

Case: What cities can do to exploit the potential of green growth

The case of waste:

Today, in Copenhagen only 1.8 per cent of the waste is disposed, whereas over 40 per cent was disposed in 1988. This has clear positive consequences in terms of environmental benefits and of aesthetic and economic character. However, Denmark is the country in Europe disposing the lowest amount of biodegradable waste at landfills because Denmark chooses to burn most of the waste.

Among the environmental gains are less methane emission, which occurs in the process of fermentation in waste disposal. Thus, the emission from landfills is the source of only 1.5 per cent of Denmark's total greenhouse gas emission.

Among the economic effects are that waste disposals have a substantial negative impact on housing prices in the local area. Studies from England show that the greatest loss of value occurs in a distance of maximum 400 meters from and to the landfill i.e. the neighbours which have the worst nuisances in relation to smell and aesthetics.

In addition, waste deposition is a somewhat more expensive form of disposal than combustion which typically is used in Copenhagen. This is caused by the fact that deposition is subject to higher charges than combustion.

Below table shows the economic benefit of combustion for waste in Copenhagen compared to deposition of waste. It appears that waste disposals are yearly DKK 30,300,000 more expensive than combustion and in that calculation the effects in relation to district heating and electricity production are not included.

Table: Economic gains of combustion compared to waste disposal

Units	
Depositing price per ton in DKK	637.5
Combustion price per ton in DKK	562.5
Difference in DKK per ton	75
Volume of waste at Amager Combustion in tons	404,000
Price of combustion in DKK	227,250,000
Price of depositing in DKK	257,550,000
Saving per combustion in DKK	30,300,000

Note: Prices include both tariffs and rates

Source: DAMVAD based on "Costs in the waste sector" – benchmarking 2008

In the last column of table 5.13 we see how each of the environmental challenges is associated with exports. Activities related to water are accountable for more than 60 per cent of exports, and activities related to Waste for 20 per cent. Air pollution, Chemicals and Soil are responsible for 8, 5 and 4 per cent respectively.

On this background we can conclude that of the activities associated with the environmental challenges, Water and Waste, are the main challenges in terms of turnover, employment and export. Air pollution, Chemicals and Soil are also relatively

important, whereas the challenges related to Climate, Bio Diversity and Raw materials seem to play a less important role.

6 Green is Growth in Copenhagen

The following section focuses on the growth rates of Green Growth companies in the Greater Copenhagen Area. The actual and absolute numbers behind the figures can be found in the appendix. Thus note that the absolute numbers are in fixed prices and as such the figures for the year 2009 does not correspond to the figures in chapter 5.

The Green Sector as a whole experiences impressive growth rates when it comes to turnover, export and productivity. The growth rates of the sector are close to the ones we see in China and India and the sector thus outperforms other such as Welfare Technology and Manufacturing:

- The Green Sector experiences a growth in turnover of about 55 per cent over a 5-year period, which is significantly more than what is seen in other sectors.
- Growth is even more impressive in exports, with an increase of about 80 per cent over a 5-year period

- Productivity growth amounts to 8 per cent per year, clearly exceeding the Danish average of 1.1 per cent over the last 20 years.

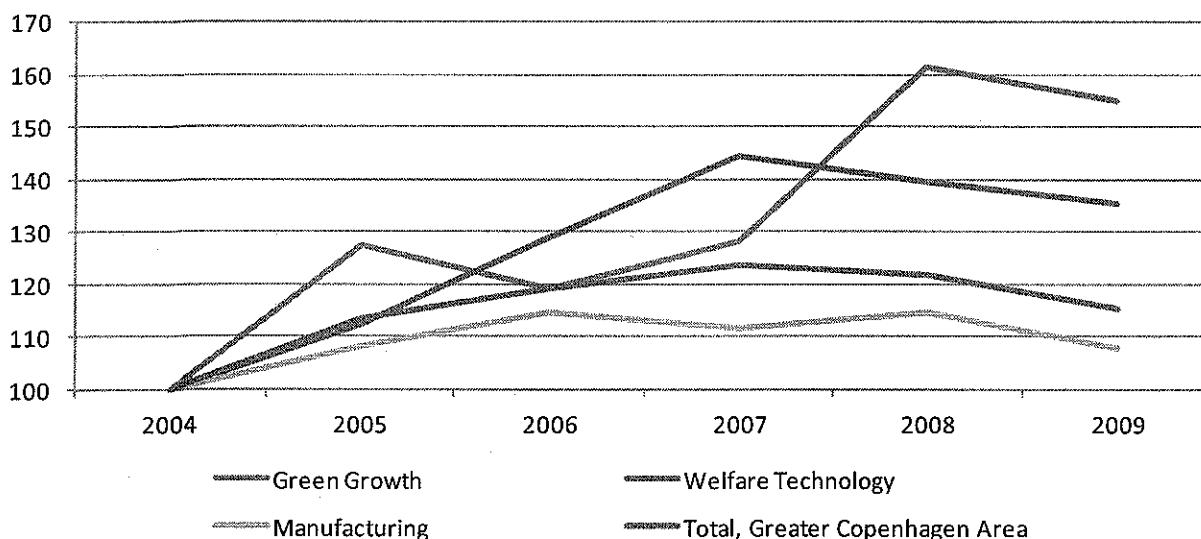
Keeping in mind the results from section 5, these growth rates suggest that Green Growth plays not only a significant but also an increasingly important role for the Greater Copenhagen Area. The figures indicate that the sector has the potential to significantly affect the development as well as the possibilities of the region in the future.

The following sections will dig deeper into the issues raised above.

6.1 Growth in turnover outperforms other sectors

The turnover of the Green Sector has increased tremendously in recent years. In figure 6.1 below it is seen that before the financial crisis, that is, in the period 2004 to 2008, turnover of the Green Sector

FIGURE 6.1
Growth rates of turnover in key industries compared to the Greater Copenhagen Area as a whole



Source: DAMVAD 2011, own calculation based on Statistics Denmark

has increased by more than 60 per cent, which is remarkable even when compared to other high growth sectors such as Welfare Technology which experienced growth rates just below 40 per cent. Comparing to Manufacturing these figures are impressive, since growth in the manufacturing industry has only been around 15 per cent in the relevant period. Furthermore, it should be noted that where we see a minor decline in the growth of Welfare Technology from 2007 to 2008, the Green Sector has increased considerably since 2006.

Turning to the time after the financial crisis we see a clear drop in growth rates of turnover in all industries, with Manufacturing close to the level from 2004. Despite the decrease, the Green Sector seems to handle the crisis notably well and growth in this industry has still been more than 50 per cent since 2004.

The impressive growth rates of turnover are

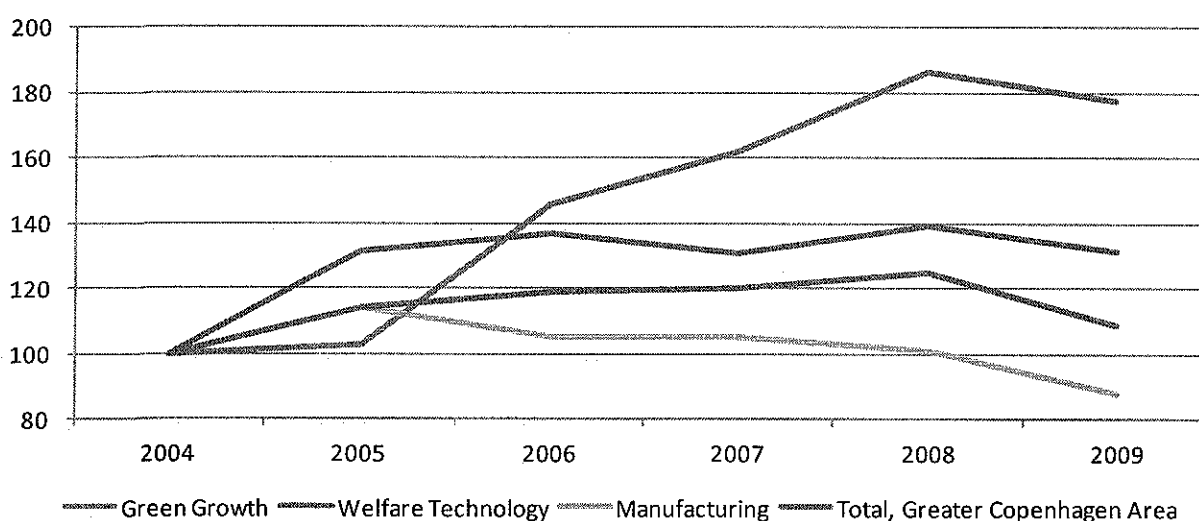
probably a result of an increase in demand. Green solutions are generally high on the agenda, leading to a rise in demand for green products and solutions related to this sector, and potentially also an increase in the volume of the market. The latter could be a consequence of an increase in the number of products and solutions sold or a result of higher prices per unit, as well as a combination of the two. In general the Green Sector contributes positively to the average growth rates of turnover of the sectors in the Greater Copenhagen Area.

6.2 Growth in exports outperform other sectors

Export of Green Growth has experienced a rapid growth over the 5-year period. Figure 6.2 clearly shows how export of the sector has increased remarkably relative to the two other sectors considered, as well as relative to the Greater Copenhagen Area as a whole. Despite the fact that exports

FIGURE 6.2

Export growth of key sectors compared to the Greater Copenhagen Area as a whole



Source: DAMVAD 2011, own calculation based on Statistics Denmark.

decreased in all the sectors as a consequence of the financial crisis, Green exports have increased with an exceptional 77 per cent, and thus the sector significantly outperforms the industries of Welfare Technologies and Manufacturing. Manufacturing even experience a negative growth after the financial crisis and exports in this sector in 2009 was below those of 2004. The Welfare Technology industry has experienced a more stable development in exports over the whole period, and ends up with a growth of just above 30 per cent, although this is still much below what is seen in the Green Sector. Overall growth of exports in the Greater Copenhagen Area increased steadily in the beginning of the period, but was hit severely by the crisis and increased only 8 per cent over the whole period.

The extraordinary growth in the export of the Green Sector is most likely a result of an increase in the international demand. As was true for turn-

exports as well as the volume of the market.

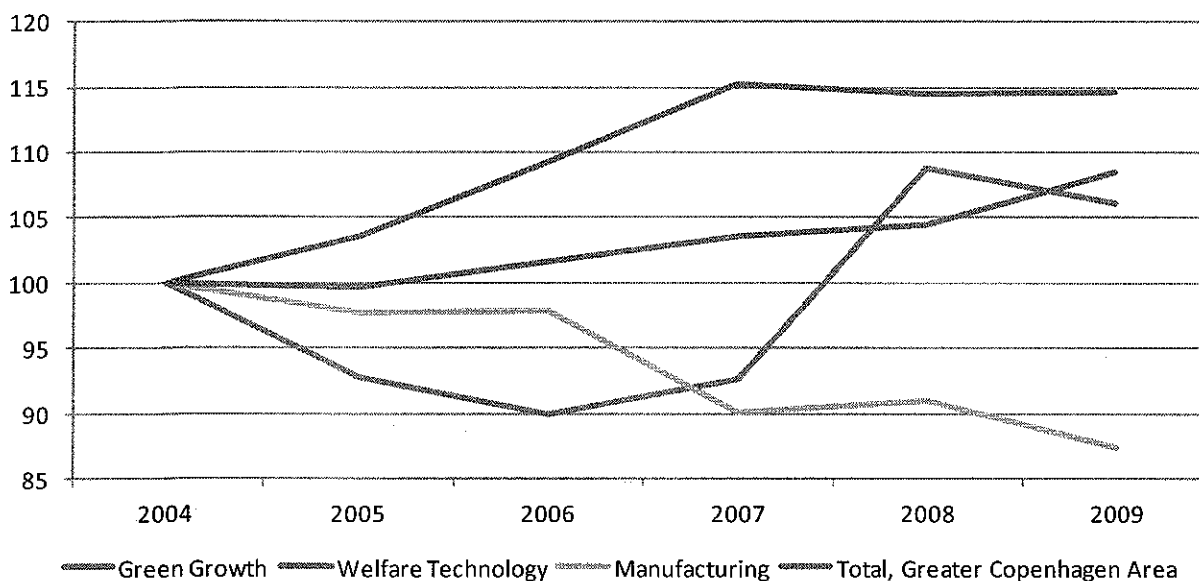
The high growth rates only adds to the picture of the Green Sector being a highly important industry for the Greater Copenhagen Area containing considerable potential as a major player in affecting the growth of the region in the future.

6.3 Moderate employment effect

Growth of employment in the Green Sector has been negative in most of the period considered. Figure 6.3 shows the development of employment within the three industries compared to the Greater Copenhagen Area as a whole, and the picture is significantly different from what was seen in the previous figures. The most important thing to notice is that employment in the industry actually *decreased* in the most of the period, whereas it increased in the other sectors and in Greater Capital

FIGURE 6.3

Growth in employment in key sectors compared to the Greater Copenhagen Area as a whole



Source: DAMVAD 2011, own calculation based on Statistics Denmark.

over in the previous section, the improved focus on green products and solutions positively influence

Area. As such, the number of people employed in the Green Sector declined from 2004 all the way

up to the first half of 2007, where employment started to rise again. On the other hand, employment in Welfare Technology increased with around 15 per cent and almost 10 per cent for the Greater Copenhagen Area as a whole. Turning to Manufacturing we see a steady decline over the whole period, and employment in this sector is thus more than 10 per cent below the level of 2004.

A rise in productivity is closely connected to the moderate development in employment. This is supported by the considerable increase in turnover and export seen in the previous subsections. Increased productivity could be due to rising investments in new technologies or that companies ensure more capital for each employee to work with. Additionally, higher turnover per employee could both be due to an increase in prices per unit or the fact that more units are sold.

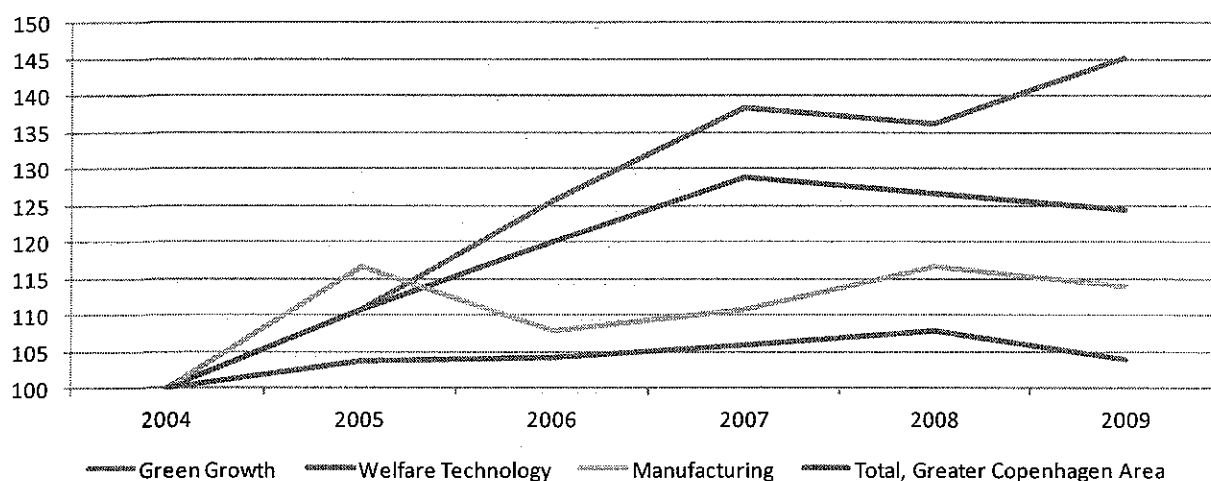
6.4 Strong growth in productivity

The productivity growth seen in the Green Sector

has been quite significant in recent years. Despite the financial crisis, productivity in the sector amounts to 8 per cent per year, clearly exceeding the Danish average of 1.1 per cent over the last 20 years. Figure 6.4 shows the development of productivity in the Green Sector, Manufacturing and Welfare Technology compared to the average productivity in the Greater Copenhagen Area as a whole.

The numbers show that since 2004 the productivity in the Green Sector has increased with more than 40 per cent which is considerably more than what is seen in the two other sectors. Furthermore, productivity in the Green Sector has even increased during the crisis, opposite to what have been the case for the two other sectors and the average for the Greater Copenhagen Area, which only adds to importance of the industry. As such Welfare Technology has experienced an increase of around 25 per cent whereas the increase has been just below 15 per cent in manufacturing. Compared to the average productivity in the Greater Copenhagen

FIGURE 6.4
Productivity growth in key sectors compared to the Greater Copenhagen Area as a whole



Source: DAMVAD 2011, own calculation based on Statistics Denmark.

Area as a whole the growth rates of productivity in these three sectors are significantly above.

Growth rates of productivity within the Green Sector are significantly above the average growth rates of the Western World. In the period considered, average growth rates in the Green Sector was around 8 per cent per year, which is almost speculative when comparing to the average Danish productivity of about 1.1 per cent seen in the previous 20 years. Regular growth rates in the Western part of the World are about 2 per cent per year, implying that the Green Sector falls into the high-growth industry category. The figures suggest that the Green Sector has huge potential when it comes to raising the average value added per employee in the region.

6.5 Slightly increase in the educational level

What is causing growth in productivity? This issue has been widely debated, but a consensus is

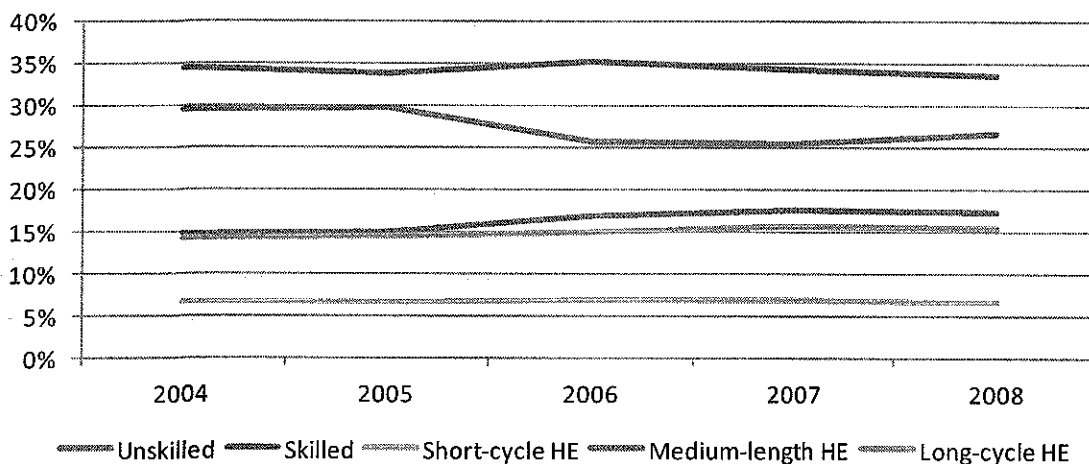
whether there has been a change in the educational level in Green companies.

On the overall level there is no significant change in the composition of the level of education among employees in the Green Sector from 2004 to 2008. This is clear from figure 6.5, which shows how the composition of education level of employees has changed over the period. The share of unskilled workers has decreased slightly whereas there seems to be a small increase in employees with medium-length or long-cycle higher education. Number of employees with a short cycle higher education seems to be more or less constant.

All in all over the 5 year period there have been no significant changes in the composition of the level of education among employees in the Green Sector.

FIGURE 6.5

Level of employment in the Greater Copenhagen Area among employees in the Green Sector



Source: DAMVAD 2011, own calculation based on Statistics Denmark.

emerging that higher educational level is associated with higher productivity. The following analyse

6.6 Strong growth in R&D

Increasing investments in R&D have proven to have both a significant and positive effect on productivity in Danish companies. The following investigates whether R&D investments can be a possible explanation for the increased productivity.

R&D plays a significant role in terms of growth of Green Growth. Figure 6.6 shows the growth of R&D-investments in the Green Sector compared to growth of overall R&D investments. It is clear from the figure that in general the Green Sector outperforms growth in total R&D investments in Denmark. Furthermore, from the table we see that with a growth in green R&D investments of 200 per cent, green R&D-investments in the City of Copenhagen are substantially higher than in Denmark as a whole. The City of Copenhagen thus seems to attract a substantial share of green R&D-investments. On the other hand, there seem to be

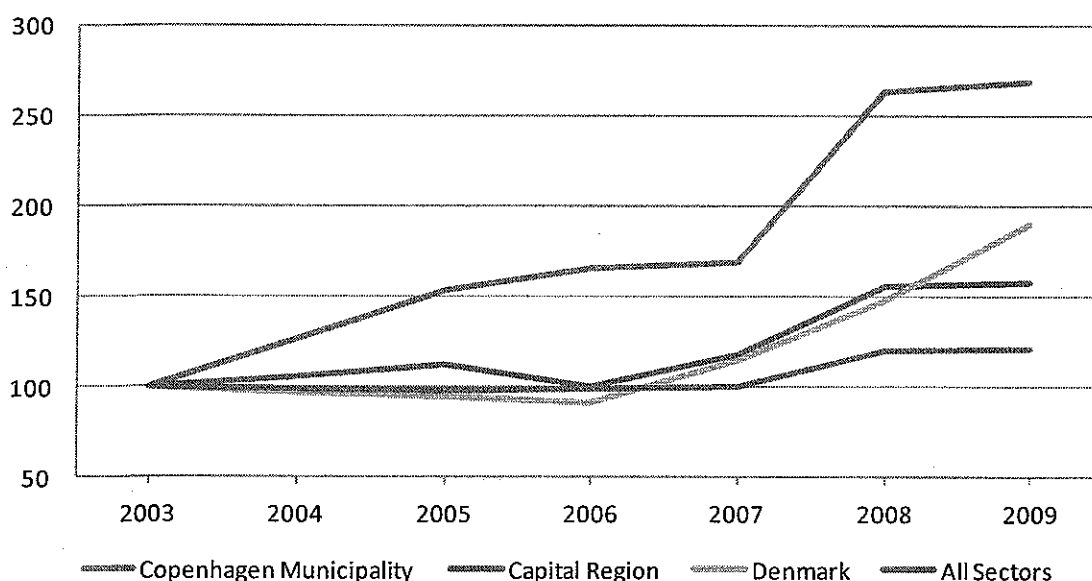
no noteworthy difference between growth of investments in the Greater Copenhagen Area and Denmark as a whole. It is also worth noticing that with a growth in green R&D investments of at least 50 per cent, growth of investments in the Green Sector is well above the total Danish average of about 20 per cent.

In terms of growth in R&D-investments The Green Sector significantly contributes to heightening the overall Danish growth in investments within this field, and with the importance of innovation and development of new technologies in mind this sector is believed to play a crucial role in the future, especially in the City of Copenhagen.

Turning to growth of green R&D-employment, figure 6.7 shows that growth in this industry compared to other industries in total is slightly higher for Denmark in general and for the Greater Copenhagen Area, whereas the numbers for the City

FIGURE 6.6

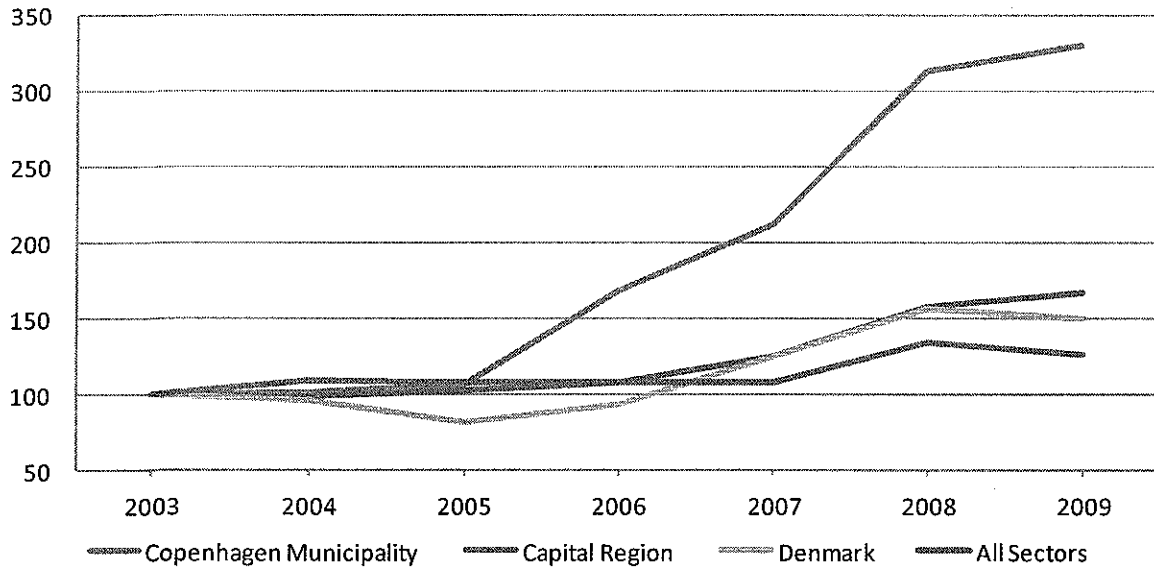
Growth in R&D investments within the Green Sector by location compared to R&D investments in all sectors



Source: DAMVAD 2011, own calculation based on Statistics Denmark

FIGURE 6.7

Growth in R&D employees within the Green Sector by location compared to R&D employees in all sectors



Source: DAMVAD 2011, own calculation based on Statistics Denmark.

of Copenhagen speak for themselves: The Green Sector has experienced an increase in growth of green R&D-employees of more than 300 per cent since 2003, which is very impressive.

According to the figure above, green R&D-employment in the City of Copenhagen is growing to a much larger extent than other areas of Denmark, whereas the growth of green R&D-employees in the Greater Copenhagen Area is more moderate and follows that of Denmark as a whole.

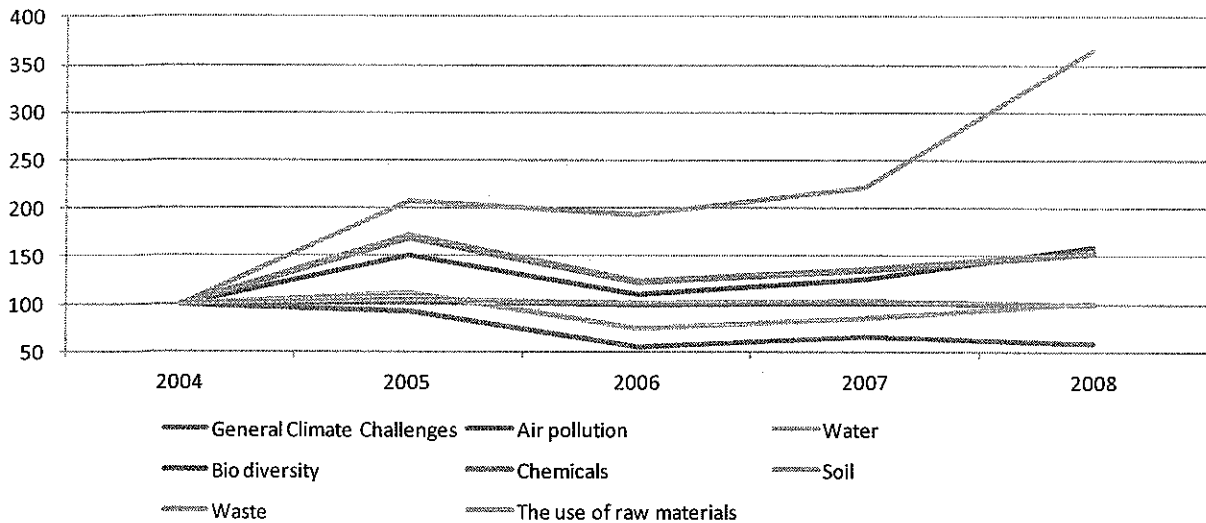
6.7 Water is an area of growth

The largest growth rates of environmental challenge activities related to Green Growth is primarily seen in activities associated with water management. Figure 6.8 shows turnover growth split by the 8 environmental challenges and with a growth rate of more than 250 per cent over the period, activities associated with water by far exceeds the

growth rates of the others. We also experience substantial growth rates in activities related to Air Pollution and Soil, which have doubled over the 5 years considered. Use of Raw materials and Waste management were at the same level in 2008 as they were in 2004, while activities related to Climate has seen a decline in their turnover growth rates.

FIGURE 6.8

Development of turnover divided by environmental challenge in the Greater Copenhagen Area



Source: DAMVAD 2011, own calculation based on Statistics Denmark.

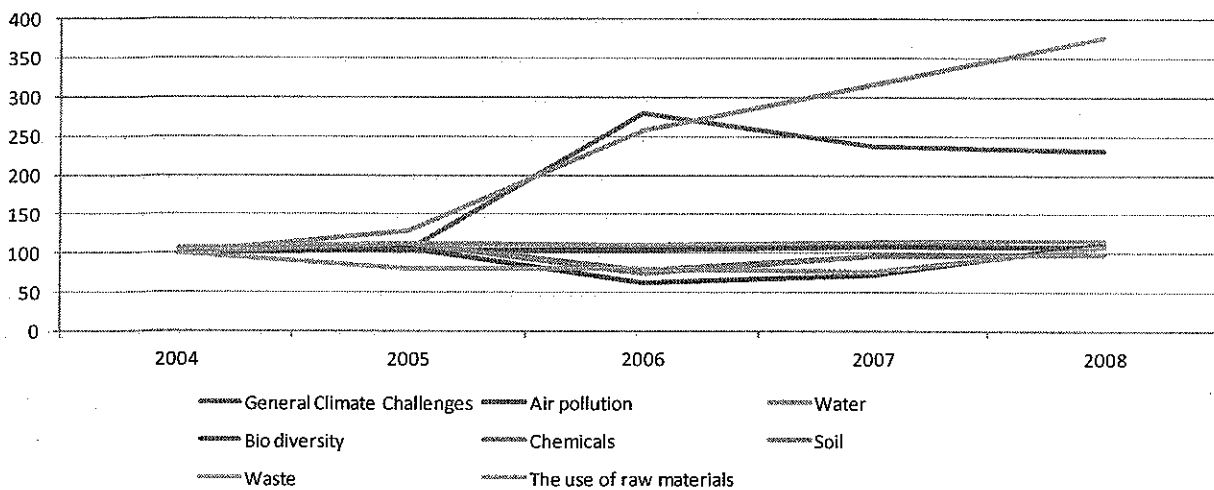
Turning to exports in figure 6.9 water again experienced the largest growth with an increase of more than 250 per cent from 2004 to 2008. Slightly behind is climate with a growth rate of more than 200 per cent. The exports in 2008 of the remaining sectors are more or less the same as in 2004.

water management saw a large increase in their productivity from 2004 to 2007 with a slight decline from 2007 to 2008. Despite this fact, water still grew by more than 40 per cent over the period, which is the same as Air Pollution, with the latter showing a more constant growth rate over the period. Soil, Climate and Waste all experienced a growth of a bit more than 10 per cent over the 5 year period, whereas the productivity of the activities related to Climate and the use of Raw Materi-

In figure 6.10 it is shown how growth rates of productivity divided by the different challenges has developed. Again, the activities associated with

FIGURE 6.9

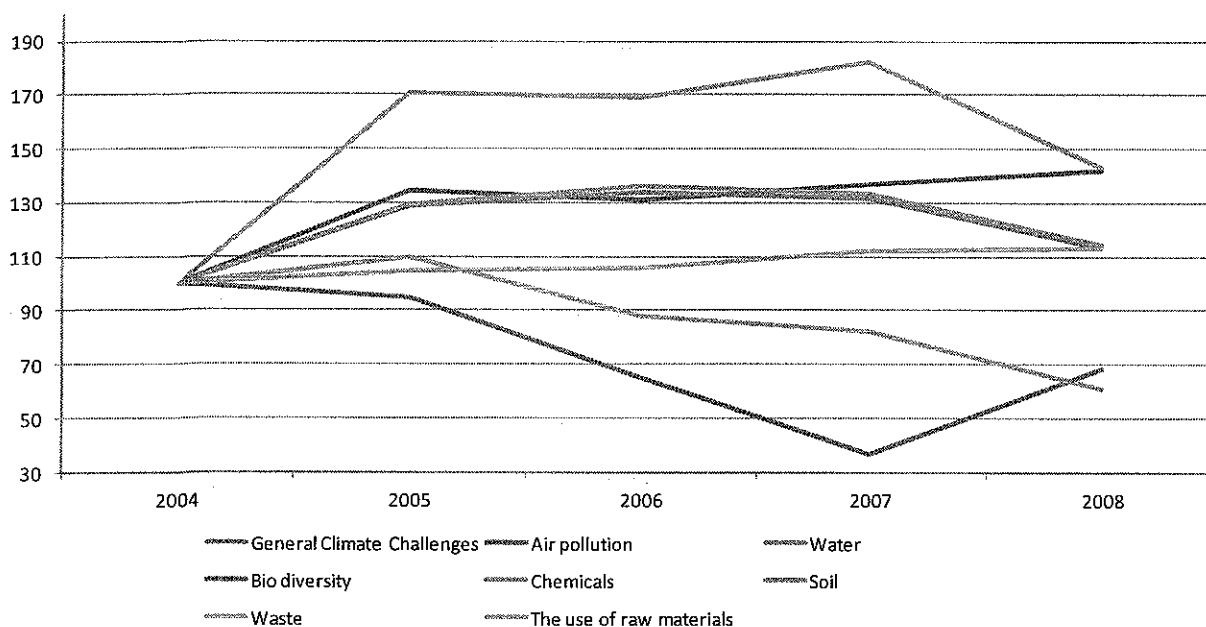
Development of exports divided by environmental challenge in the Greater Copenhagen Area



Source: DAMVAD 2011, own calculation based on Statistics Denmark.

als encounter a considerable decline and in 2008 ends up with productivity about 40 per cent below the level in 2004.

FIGURE 6.10
Development of Value added per FTE divided by environmental challenge



Source: DAMVAD 2011, own calculation based on Statistics Denmark.

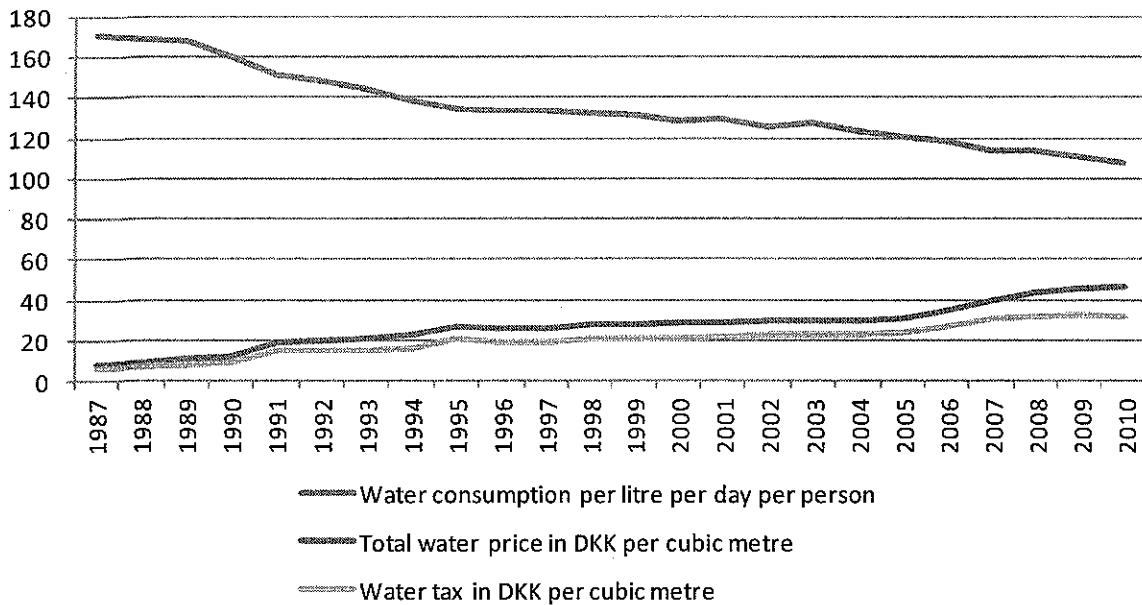
The case of water:

The City of Copenhagen is by far the largest municipality based on inhabitants, meaning that the water consumption in the municipality is very high. Since clean water is a resource which is both important and scarce, focus has been on reducing the consumption of clean water for a long period of time.

Below figure shows the gradual reduction, taking place in water consumption in Copenhagen. The figure shows the development in water consumption per litre per day and it appears that this has been reduced from 171 litres per person per day in 1987 to just 108 litres per person per day in 2010.

A significant part of the explanation of reduced water consumption can be found in the levy system introduced in Denmark, which also makes the water more expensive. Below figure shows the development of daily water consumption per person compared with the development in the total price for water and the development in tariffs for water. It appears that the reduction in water consumption corresponds to an upward price on water which most of all is driven by tariffs. Thereby the effects of tariffs can be said to have a meaningful development.

FIGURE: Development in water consumption, the prices on water and water rates.



Source: DAMVAD based on data from Statistics Denmark.

The table below shows savings in water in DKK. It appears that each person saves DKK 846 per year by reducing the water consumption from an average of 171 litres per day to 108 litres per day. This gives a total saving for all residents in Copenhagen of 456 million a year.

TABLE: Savings of water and money

Population	539,542
Water consumption per inhabitant 2010 day/person	108 L
Saved water consumption compared to 1987 per inhabitant/person/day	63 L
M ³ price on water 2011	DKK 36,8
Yearly saving per person compared to the consumption in 1987	DKK 846
Yearly saving for all inhabitants in the City of Copenhagen compared to the consumption in 1987	DKK 456,569,073

Note: The calculation is based on the counterfactual situation that the water consumption was not reduced in the period and the extra cost by having one day's consumption per person on 171 litres, at 2011-prices on water. Any changes in water consumption are not considered due to the introduction of or changes in water rates. Thereby the reasons for the water reduction are not investigated in the table above, only the value of the

result

Source: DAMVAD based on data from Copenhagen Energy and Statistics Denmark.

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7 Global position of strength

This section focuses on international trade of Green Growth solutions and Danish performance on global markets. The main conclusions are:

- Increasing exports from the Green Sector is an international phenomenon. Both Denmark and the rest of Europe experience substantial increases in international demands.
- Exports from the Green Sector in the EU are increasing slightly faster than in Denmark, suggesting a minor fall in Danish market shares. This is most likely due to the extraordinary high capacity utilisation in the Danish economy from 2006 to 2008.
- The Danish the Green Sector is characterized by being more present in global markets outside the EU compared to other sectors in Denmark. In fact, the Green Sector in Denmark is considerably more present in Brazil, Russia, India and China.
- Exports of Green Growth in Denmark are con-

centrated in products with cellulosic material, chemical products, base metals and plastic and rubber.

This section focuses exclusively on international trade of goods. The methods and data used are the same as described in section 4. However, this section does not include trade in services due to data restrictions.

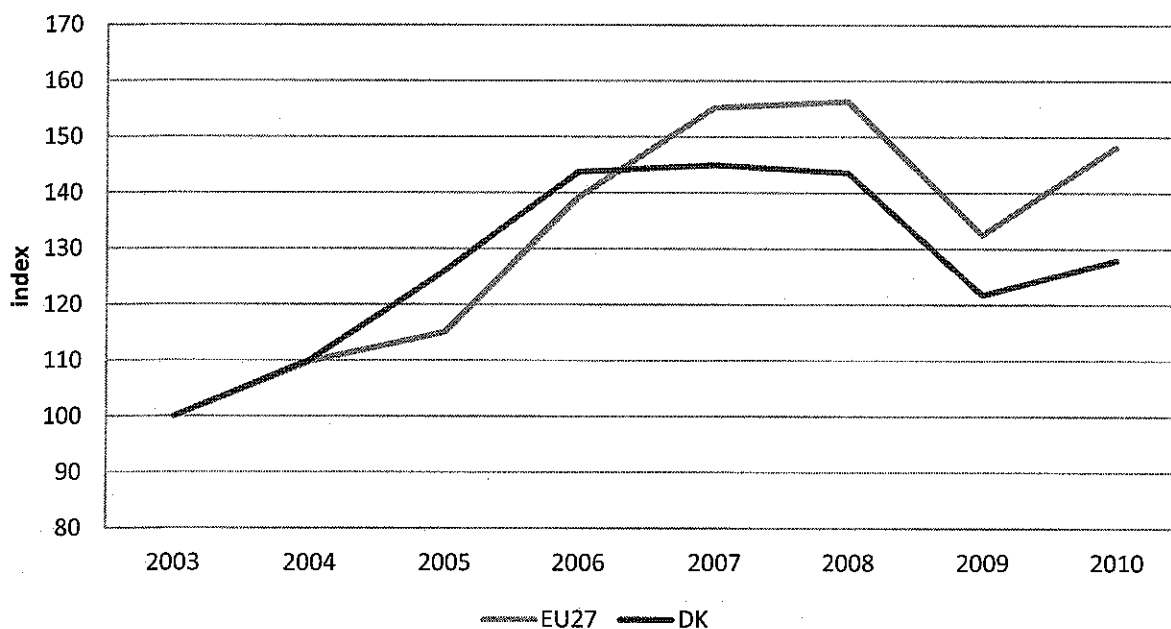
The following sections will dig deeper into the issues raised above.

7.1 International expansion of Green Growth

Exports from the Green Sector in Denmark have risen substantially within the last years as shown in section 6.2. This development is not unique to Denmark. EU-countries have collectively seen a growth in line with Denmark. However, EU exports from 2003 to 2008 increased faster than in Den-

FIGURE 7.1

Exports of Green Growth solutions in Denmark and EU



Source: DAMVAD 2011, own calculation of international trade of goods based on DAMVAD Trade Model
Note: 2003-prices (EU-harmonized price index)

mark, see Figure 7.1.

Surplus growth of export in the EU compared to Denmark suggests that the export performance of the Green Sector has decreased slightly. This is most likely due to the extraordinary high capacity utilisation in Denmark in 2006 to 2008, which did weaken the competitiveness of the Danish economy.

In Denmark as well as in the EU exports of Green Growth solutions dropped rapidly in the wake of the financial crisis starting in 2008. But growth rates pick up quickly and in 2010 the sector again experienced positive growth at a time of sluggish world trade growth in general.

7.2 The Green Sector in the global markets

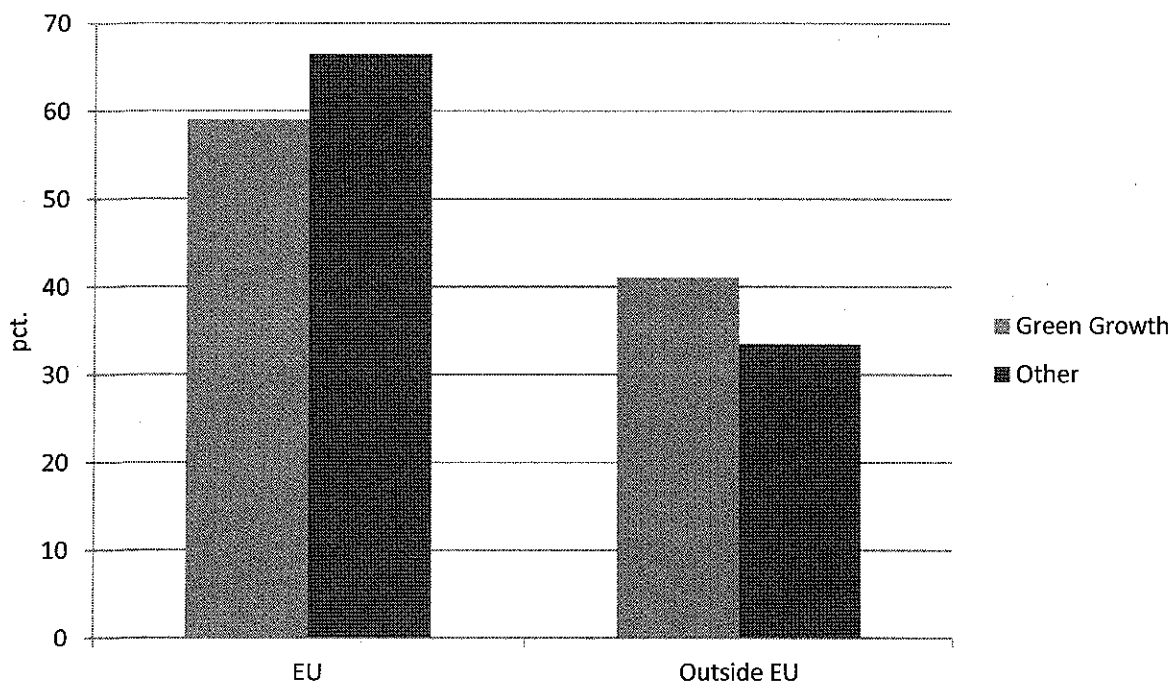
Green Growth is characterized by being more pre-

sent in global markets outside the EU compared with the other sectors in Denmark, see Figure 7.2. Thus 41 per cent of the export of the Green Sector is destined countries outside the EU. Corresponding only 33 per cent of the export of other sectors is destined markets outside the EU.

This is interesting for two reasons. First, future growth is expected to occur mainly in markets outside the EU. The OECD Development Centre forecasts that by 2030 non-OECD economies will account for almost 60 per cent of global GDP. And several emerging and developing countries, such as Brazil, Russia, India and China (the BRIC countries), already have significant purchasing power. Second, it is well known that Danish companies in general have a weak footing in markets outside the EU – especially in the BRIC countries. This seems not to be the case for the Green Sector.

FIGURE 7.2

Exports of the Danish Green Growth and other products to the EU and outside the EU, 2010.



Source: DAMVAD 2011, own calculation of international trade of goods based on DAMVAD Trade Model

In fact, the Green Sector is considerably more present in the BRIC countries compared to other Danish companies, see Figure 7.3. China is accounting for almost 6 per cent of the exports from the Green Sector. In comparison China only accounts for around 2 of export from other industries. A similar picture emerges for Russia, India and Brazil, whereas there is no significant difference among traditional trade partners such as the U.S. and Norway.

As noted above exports from the Green Sector dropped in the wake of the financial crisis starting in 2008. This applies to both markets inside and outside the EU. But whereas export growth before the crisis was mainly driven by EU countries, in 2010 it is the markets outside the EU that draws growth. This is illustrated in Figure 7.4.

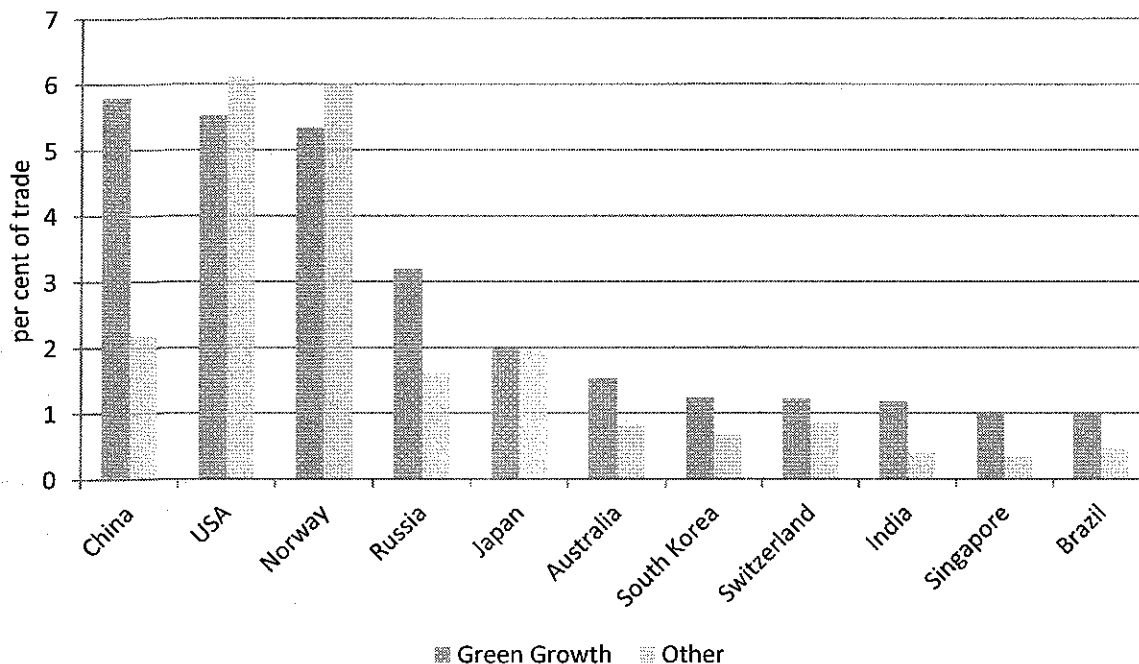
7.3 Concentration of exports from Green Growth solutions

The Danish exports from Green Growth solutions are mainly products within base metals, transport equipment and chemical products. These products are both products for final use and as input in production in other countries. Products in this section are categorized by the Harmonized commodity System, which is an internationally standardized system for classifying traded products.

Green Growth solutions are compared to the EU concentrated in products with cellulosic material, chemical products, base metals and plastic and rubber, see Figure 7.5.

The index of export concentration is measure by taking the share of Danish exports within one product group and dividing it by the corresponding

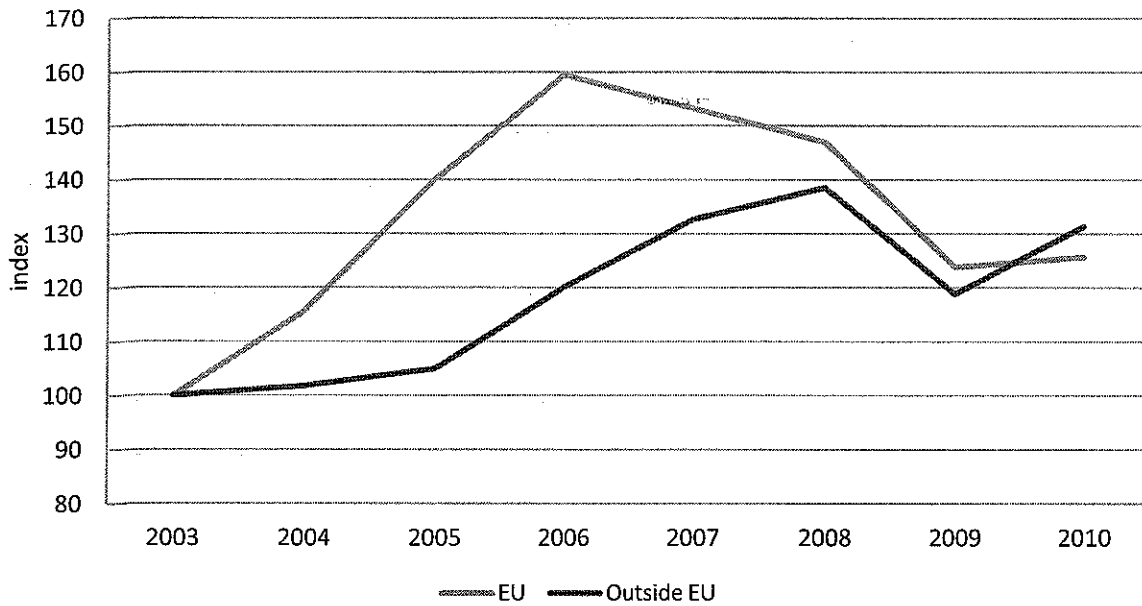
FIGURE 7.3
Exports of Danish Green Growth solutions outside the EU, 2010.



Source: DAMVAD 2011, own calculation of international trade of goods based on DAMVAD Trade Model

FIGURE 7.4

Exports of Danish Green Growth solutions, 2003-2010

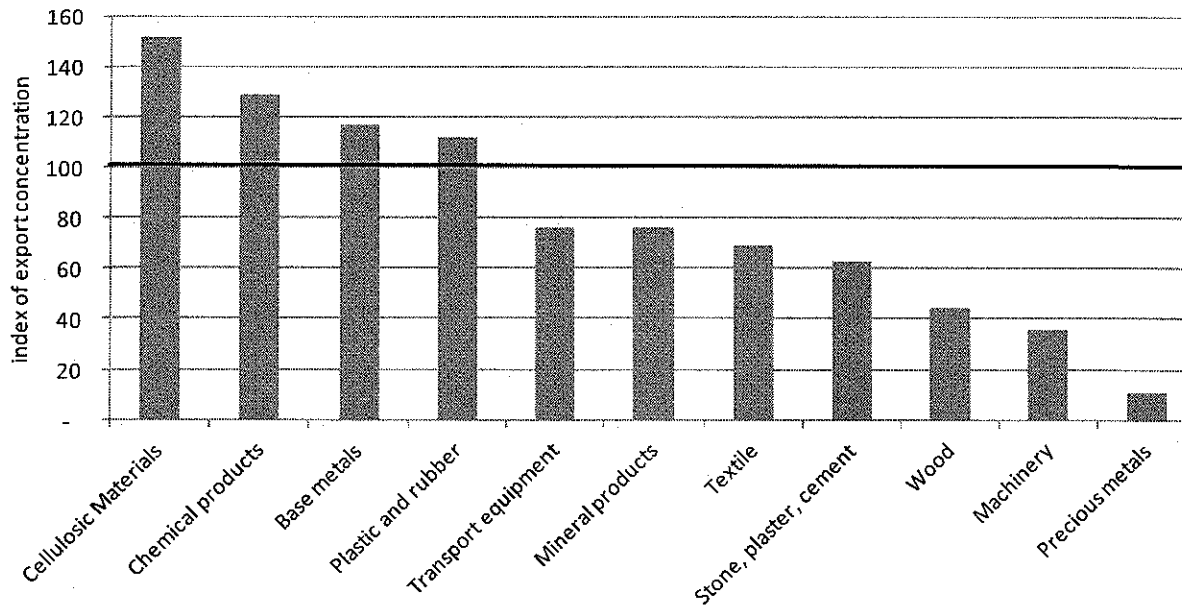


Source: DAMVAD 2011, own calculation of international trade of goods based on DAMVAD Trade Model
 Note: 2003-prices (EU-harmonized price index)

figure for the EU. Hence, an index above 100 indicates the Danish export is concentrated within this group whereas an index below 100 indicates the opposite.

FIGURE 7.5

Concentration of exports from Danish Green Growth solutions



Source: DAMVAD 2011, own calculation of international trade of goods based on DAMVAD Trade Model.

Appendix

TABLE A.1

Growth in turnover (related to figure 6.1), index in the Greater Copenhagen Area

Index	2004	2005	2006	2007	2008	2009
Green Growth	100	127	119	128	162	155
Welfare Technology	100	112	129	145	139	135
Manufacturing	100	108	115	111	115	108
Greater Copenhagen Area	100	114	119	124	122	116

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.2

Growth in turnover, (related to figure 6.1), absolute values in the Greater Copenhagen Area, fixed 2004-prices

Mio DKK	2004	2005	2006	2007	2008	2009
Green Growth	33,397	42,568	39,809	42,776	53,976	51,748
Welfare Technology	11,548	12,683	14,323	15,806	14,739	14,059
Manufacturing	117,766	127,384	134,984	131,296	134,932	127,246
Greater Copenhagen Area	1,144,855	1,329,563	1,418,349	1,506,367	1,522,115	1,459,708

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.3

The Green Sector turnover divided by sector in the Greater Copenhagen Area, fixed 2003-prices

Mio DKK	2003	2004	2005	2006	2007	2008	2009
Manufacturing	9,159	9,053	8,454	13,538	14,807	23,724	19,945
Construction	10,203	9,986	10,985	9,958	10,034	9,919	18,339
Trade & Transportation	7,790	8,314	8,954	4,469	4,634	4,648	3,908
ICT	2,029	2,076	2,218	1,483	1,577	1,604	1,349
KIBS	7,315	8,139	8,552	8,080	9,319	11,115	9,344

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.4

Growth in exports (related to figure 6.2) in the Greater Copenhagen Area, index

	2004	2005	2006	2007	2008	2009
Green Growth	100	103	146	162	186	177
Welfare Technology	100	131	137	131	139	131
Manufacturing	100	114	105	105	101	88
Greater Copenhagen Area	100	114	119	120	125	108

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.5

Growth in exports (related to figure 6.2) in the Greater Copenhagen Area, absolute values, fixed 2004-prices

Mio DKK	2004	2005	2006	2007	2008	2009
Green Growth	9,587	9,843	13,970	15,501	17,877	16,990
Welfare Technology	5,381	6,912	7,091	6,654	6,868	6,357
Manufacturing	89,104	101,866	93,689	93,520	90,126	78,284
Greater Copenhagen	302,006	351,457	372,704	385,747	411,641	361,421
Green Growth Denmark	31,716	40,848	50,921	57,155	74,129	68,510

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.6

The Green Sector exports divided by sector in the Greater Copenhagen Area, absolute values, fixed 2003-prices

Mio DKK	2003	2004	2005	2006	2007	2008	2009
Manufacturing	5,036	4,900	4,445	9,848	10,668	11,775	10,883
Construction	376	325	299	296	223	188	174
Trade & Transportation	686	654	579	425	415	381	352
ICT	332	366	390	163	196	175	162
KIBS	2,562	3,524	3,367	3,062	3,640	4,547	4,203
Other	61	70	995	227	473	876	809

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.7

Growth in employment (related to figure 6.3) in the Greater Copenhagen Area, index

	2004	2005	2006	2007	2008	2009
Green Growth	100	93	90	93	109	106
Welfare Technology	100	104	109	115	114	115
Manufacturing	100	98	98	90	91	87
Greater Copenhagen	100	100	102	104	104	109

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.8

Employment (related to figure 6.3) in the Greater Copenhagen Area, absolute values

	2004	2005	2006	2007	2008	2009
Green Growth	23,240	21,551	20,916	21,522	25,281	24,674
Welfare Technology	8,520	8,861	9,287	9,798	9,713	9,798
Manufacturing	73,399	71,717	71,831	66,161	66,740	64,137
Greater Copenhagen	910,013	906,801	924,708	942,451	950,789	987,870

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.9

The Green Sector employment in the Greater Copenhagen Area divided by sector, absolute values

	2003	2004	2005	2006	2007	2008	2009
Manufacturing	5,412	6,142	4,582	6,481	6,424	9,173	8,793
Construction	5,098	4,867	4,995	3,872	3,828	3,626	3,476
Trade & Transportation	3,966	4,051	3,931	2,625	2,615	2,368	2,270
ICT	1,402	1,375	1,388	987	985	991	950
KIBS	6,763	6,941	6,651	5,969	6,137	6,554	6,282
Other	2,414	2,666	2,299	1,624	1,758	1,762	1,689

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.10

Growth in productivity (related to figure 6.4) in the Greater Copenhagen Area, index

	2004	2005	2006	2007	2008	2009
Green Growth	100	111	126	138	136	145
Welfare Technology	100	111	120	129	127	125
Manufacturing	100	117	108	111	117	114
Greater Copenhagen	100	104	104	106	108	104

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.11

Productivity (related to figure 6.4) in the Greater Copenhagen Area, absolute values, fixed 2004-prices

	2004	2005	2006	2007	2008	2009
Green Growth	488,760	535,806	595,873	643,688	621,403	644,829
Welfare Technology	567,450	617,639	654,999	690,963	661,698	639,647
Manufacturing	446,956	516,007	467,907	471,930	487,429	462,960
Greater Copenhagen	492,477	507,389	501,937	498,874	496,949	449,075

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.12

The Green Sector productivity in the Greater Copenhagen Area divided by sector, absolute numbers, fixed 2003-prices

	2003	2004	2005	2006	2007	2008	2009
Manufacturing	599,303	575,376	692,128	766,008	821,354	642,404	672,087
Construction	483,904	502,078	526,297	538,414	513,660	517,986	541,921
Trade & Transportation	382,765	530,463	512,402	523,042	501,143	412,457	431,515
ICT	636,484	674,392	688,317	671,245	694,151	709,896	742,698
KIBS	408,532	464,488	495,446	510,728	538,985	574,314	600,851
Other	165,195	153,013	...	659,124	522,720	683,042	714,603

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.13

Growth in the level of education in the Green Sector in the Greater Copenhagen Area (related to figure 6.5), index

	2003	2005	2006	2007	2008	2009
Unskilled	30%	30%	30%	26%	25%	27%
Skilled	36%	35%	34%	35%	34%	34%
Short-cycle HE	6%	7%	7%	7%	7%	7%
Medium-length HE	14%	15%	15%	17%	18%	17%
Long-cycle HE	13%	14%	15%	15%	16%	16%

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.14

Education level in the Green Sector in the Greater Copenhagen Area (related to figure 6.5), absolute values, fixed 2004-prices

	2004	2005	2006	2007	2008	2009
Unskilled	4,626	4,908	4,917	3,389	3,410	4,497
Skilled	5,409	5,724	5,597	4,633	4,595	5,652
Short-cycle HE	989	1,101	1,091	905	939	1,136
Medium-length HE	2,178	2,443	2,472	2,236	2,357	2,933
Long-cycle HE	2,033	2,363	2,395	1,990	2,115	2,609

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.15

The Green Sector growth in R&D investments (related to figure 6.6), index

	2003	2004	2005	2006	2007	2008	2009
Copenhagen	100	127	154	166	169	264	269
Greater Copenhagen Area	100	106	113	100	118	156	159
Denmark	100	97	94	92	115	149	190
All Sectors	100	99	98	99	101	121	121

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.16

The Green Sector R&D investments (related to figure 6.6), absolute values, fixed 2003-prices

Mio DKK	2003	2004	2005	2006	2007	2008	2009
Copenhagen	296	376	456	490	500	782	796
Greater Copenhagen Area	1,111	1,181	1,252	1,115	1,313	1,732	1,764
Denmark	1,994	1,938	1,883	1,833	2,297	2,965	3,789
All Sectors	25,626	25,458	25,153	25,495	25,836	30,982	31,021

Source: DAMVAD 2011, own calculation based on Statistics Denmark. Note: Due to lack of data, 2004 numbers are estimates for "Copenhagen Municipality", "Greater Copenhagen Area" and "Denmark" and 2006 numbers are estimates for "All Sectors"

TABLE A.17

The Green Sector growth in R&D employment (related to figure 6.7), index

	2003	2004	2005	2006	2007	2008	2009
Copenhagen	100	101	107	169	212	313	331
Greater Copen- hagen Area	100	99	103	108	125	158	167
Denmark	100	96	82	93	125	156	150
All Sectors	100	110	107	108	108	134	126

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.6.18

The Green Sector R&D employment (related to figure 6.7), absolute values, fixed 2003-prices

	2003	2004	2005	2006	2007	2008	2009
Copenhagen	244	246	261	413	516	763	807
Greater Copen- hagen Area	1,049	1,041	1,081	1,139	1,316	1,659	1,749
Denmark	2,229	2,135	1,824	2,077	2,782	3,480	3,345
All Sectors	36,718	40,348	39,443	39,621	39,799	49,326	46,167

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.6.19

The Green Sector growth in turnover divided by climate change in the Greater Copenhagen Area (related to figure 6.8), index

	2004	2005	2006	2007	2008
General climate challenge	100	92	55	65	58
Air pollution	100	151	109	125	159
Water	100	207	193	222	365
Bio diversity	100	102	100	102	98
Chemicals	100	168	122	134	152
Soil	100	172	124	136	155
Waste	100	112	74	86	101
The use of raw materials	100	102	100	102	98

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.6.20

The Green Sector turnover divided by climate change in the Greater Copenhagen Area (related to figure 6.8), absolute values, fixed 2004-prices

	2004	2005	2006	2007	2008
General climate challenge	877	915	840	502	597
Air pollution	3,952	3,959	5,990	4,326	4,958
Water	7,748	7,938	16,456	15,339	17,642
Bio diversity	135	137	140	137	140
Chemicals	2,561	2,611	4,390	3,196	3,509
Soil	2,426	2,474	4,250	3,059	3,369
Waste	1,2127	1,2920	1,4477	9,576	11,048
The use of raw materials	135	137	140	137	140

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.6.21

The Green Sector growth in exports divided by climate change in the Greater Copenhagen Area (related to figure 6.9), index

	2004	2005	2006	2007	2008
General climate challenge	100	105	279	238	231
Air pollution	100	107	61	73	112
Water	100	129	258	317	376
Bio diversity	100	105	104	108	109
Chemicals	100	111	77	97	99
Soil	100	112	75	96	98
Waste	100	79	80	77	109
The use of raw materials	100	105	279	238	231

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.6.22

The Green Sector exports divided by climate change in the Greater Copenhagen Area (related to figure 6.9), absolute values, fixed 2004-prices

	2004	2005	2006	2007	2008
General climate challenge	31	36	38	100	85
Air pollution	1,260	1,358	1,456	830	990
Water	2,848	2,943	3,796	7,586	9,324
Bio diversity	73	77	81	80	84
Chemicals	789	825	919	638	802
Soil	716	748	838	558	718
Waste	2930	3271	2600	2604	2506
The use of raw materials	73	77	81	80	84

Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.6.23

The Green Sector development of Value added per FTE divided by environmental challenge in the Greater Copenhagen Area (related to figure 6.10), index

	2004	2005	2006	2007	2008
General climate challenge	100	95	65	37	69
Air pollution	100	135	131	137	142
Water	100	171	169	182	143
Bio diversity	100	110	88	82	61
Chemicals	100	129	134	132	113
Soil	100	129	136	134	115
Waste	100	105	106	112	113
The use of raw materials	100	110	88	82	61

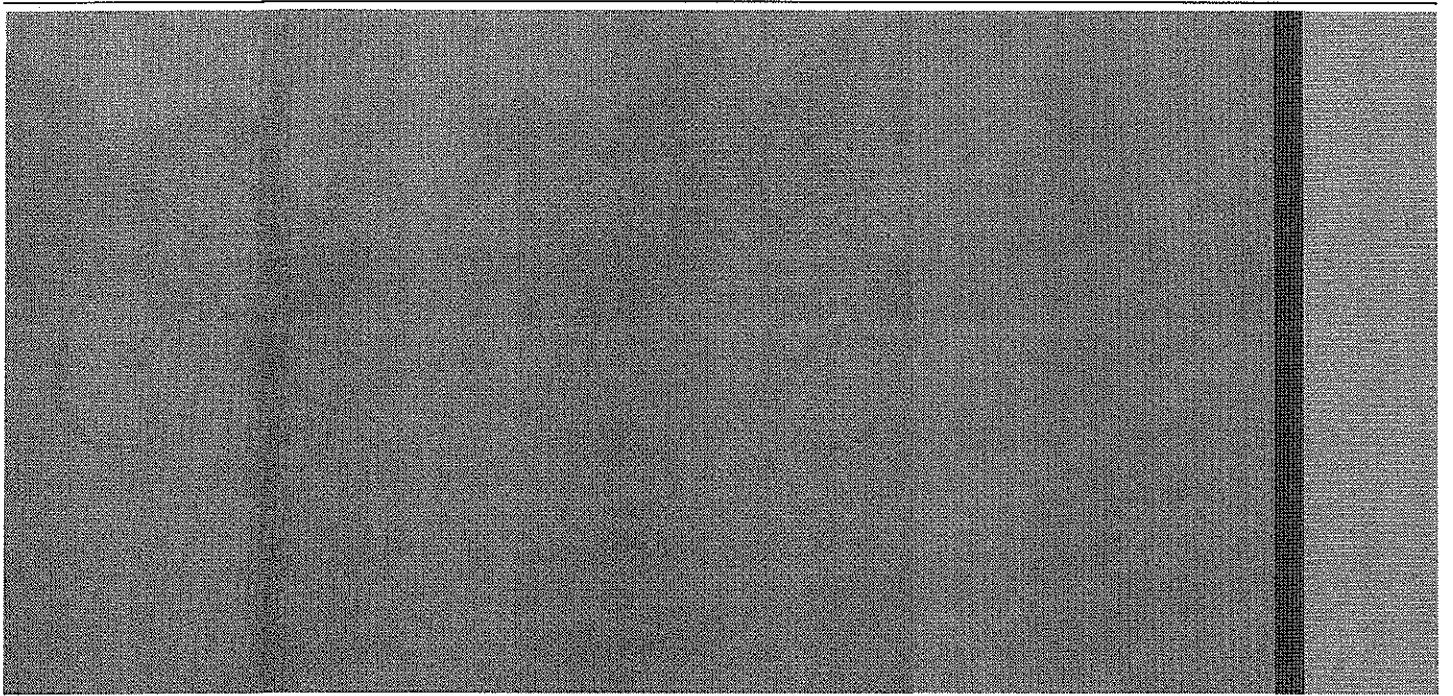
Source: DAMVAD 2011, own calculation based on Statistics Denmark.

TABLE A.6.24

The Green Sector value added per FTE divided by environmental challenge in the Greater Copenhagen Area (related to figure 6.10), absolute values, fixed 2004-prices

	2004	2005	2006	2007	2008
General climate challenge	252,000	279,000	265,000	182,000	103,000
Air pollution	393,000	390,000	526,000	510,000	533,000
Water	378,000	407,000	697,000	689,000	742,000
Bio diversity	405,000	422,000	463,000	372,000	348,000
Chemicals	552,000	563,000	726,000	755,000	742,000
Soil	557,000	568,000	734,000	773,000	759,000
Waste	474,000	500,000	523,000	529,000	561,000
The use of raw materials	405,000	422,000	463,000	372,000	348,000

Source: DAMVAD 2011, own calculation based on Statistics Denmark.



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