





# Benefits of Green Public Procurement

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## **Benefits of Green Public Procurement**

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# Content

Preface.....	7
Summary .....	9
1. Environmental Impact of Public Procurement.....	13
1.1 Product groups with high PP value.....	13
1.2 Environmental impact of product groups .....	15
1.3 Identification of product groups for further assessment .....	17
References .....	20
2. Nordic Regulatory Instruments.....	21
2.1 Analysis of coach services.....	22
2.2 Analysis of taxi operations .....	25
2.3 Analysis of computers and related services.....	29
2.4 Analysis of cleaning products/services.....	33
2.5 General conclusions on regulatory instruments .....	35
3. Advantages and challenges of GPP and other instruments .....	37
3.1 Environmental importance of GPP.....	37
3.2 Other GPP advantages .....	38
3.3 Challenges of GPP .....	42
3.4 Summary of advantages and challenges of GPP.....	43
3.5 Methodology discussion.....	44
References .....	45
4. Criteria for Efficient GPP .....	51
4.1 GPP assessment model.....	53
5. Consequences of GPP-Cases .....	55
5.1 New Server Centre in City of Copenhagen .....	55
5.2 Green procurement in Paratransit Service in City of Stockholm .....	58
References .....	60
6. Conclusions and recommendations .....	61
References .....	62
Sammenfatning på dansk.....	65
Appendix 1: LCA data and procurement volume .....	69



# Preface

There is political agreement in the Nordic countries that public procurement can play a significant role in efforts to influence the private sector towards more sustainable products and services. Public procurement constitutes 16 % of GNP in the Nordic countries and for certain product groups the public sector is the most significant purchaser. Among products with a large turnover and a significant environmental impact are construction works, IT products, cleaning agents, transport services and vehicles.

While several studies have shown that public procurement often aims to live up to a certain environmental standard, it is unclear in which areas the largest environmental results can be obtained with the lowest cost. This challenge is dealt with in a recent OECD report, highlighting two areas with scope for improvement:

- Introduce measures targeting goods and services with the largest potential environmental returns, not just those that are easiest to target;
- Identify and address barriers to the use of measures which are most economically efficient and environmentally effective, and not just those for which resistance to their introduction is weakest.

*The aim of this project is to identify product groups for which green public procurement is an effective regulatory instrument, and to illustrate the potential impact of green public procurement.*

The project has included the following elements:

- Assessment of environmental importance of public procurement.
- Review of product related regulatory instruments in Nordic environmental regulation.
- Review of where and when green procurement is an effective regulatory instrument.
- Account of examples on environmental impact of green procurement.

The study has been initiated and supervised by The Working Group on Environment and Economics and the Working Group for Sustainable Consumption and Production under the Nordic Council of Ministers. The project has been accomplished by *Bjørn Bauer* (Project manager<sup>1</sup>), *Jens Christensen*, *Karen Kristensen*, *Tue Dyekjær-Hansen* and *Ida Bode*, PlanMiljø ApS, Denmark, 2008-2009.

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<sup>1</sup> The authors are responsible for this report, including findings and conclusions.



# Summary

There is general political agreement in the Nordic countries that public procurement can play a significant a role in efforts to influence the private sector towards more sustainable products and services.

Public procurement constitutes 16% of GNP in the Nordic countries and for certain product groups the public sector is the most significant purchaser. However, it has not been clarified so far in which areas public procurement is most efficient, in other words where the largest environmental result can be obtained with the lowest cost.

The present project has been initiated to identify product groups for which green public procurement is an effective regulatory instrument, and to illustrate the potential impact of GPP.

The consultants first carried out an assessment of total environmental impact of public procurement (PP). This was done by correlating the value of PP broken down on product groups with the environmental impact of these product groups, resulting in a list of nine product groups with a high PP value and a significant environmental impact. These product groups have a good potential for efficient Green Public Procurement GPP, and a further screening – including the innovative potential within the product group, existing legislation's impact on product groups, and the complexity of the product groups – led to final identification of three product groups within which cost-effective GPP should be possible: Taxi and coach services; Computers and related services; and Cleaning products<sup>2</sup>.

In a second phase these three product groups were analysed in relation to regulatory instruments used in the Nordic countries. In addition to GPP, legal and economic instruments were reviewed. The analysis showed that GPP is generally a good alternative where legal and economic instruments are not applied for one reason or another, especially when the PP share of a product group is relatively large.

It is discussed how GPP can be a driver for market development, adding indirect benefits of promoting a greener market on top of direct environmental impact reductions. In the same line of thoughts, GPP can be used for promoting eco-innovation by closing the “innovative gap”. It is well known that industries have an economic challenge in the move from product development to up-scaling and commercialisation of a product, and the public sector may play an active “greening” role in this respect.

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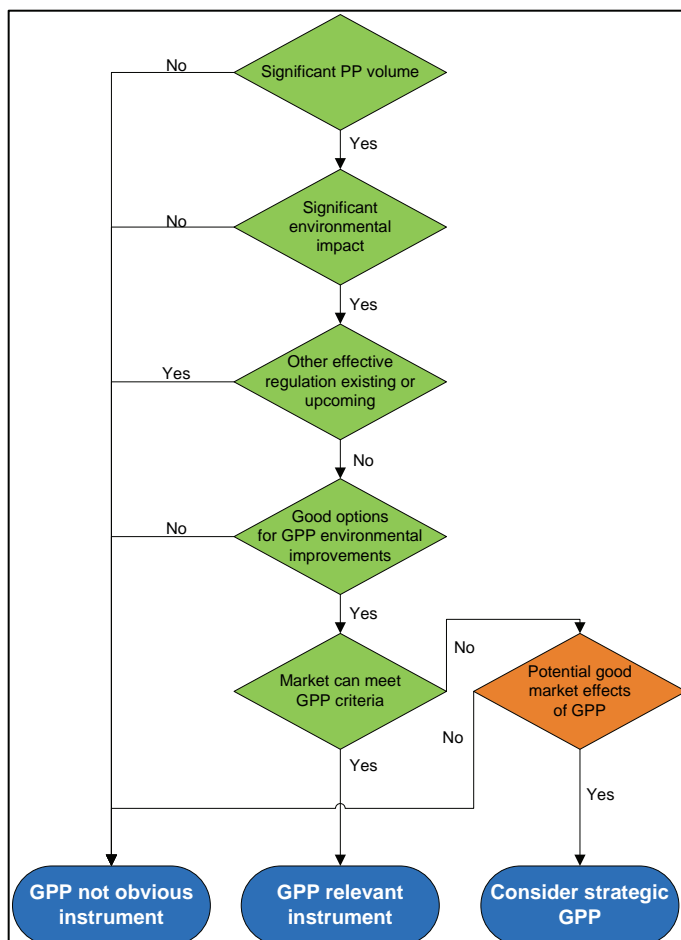
<sup>2</sup> Other product groups also embrace promising potentials but have been excluded due to the budgetary frame of the project.

Finally, the softer and more dynamic implementation of GPP compared with legal and economic instruments is identified as a major advantage.

The local aspect is a significant feature of GPP, being both an advantage and a challenge. With GPP local authorities can demonstrate a green profile and creating local commitment to the environment. However, doing so successfully requires strong leadership and visions. It also takes qualified, sufficient staff resources with solid knowledge of markets, tendering, environmental aspects and law – and related systems. This challenge can, however, be mitigated at national level by strengthening visions and strategies for GPP and supporting education, guidelines, and consultancy available to local authorities.

Other challenges of GPP are market structures and legislation, which in some cases work against the use of GPP. Also these challenges must be met at national or even EU level.

The investigations and discussions lead to a road map for implementation of efficient GPP through the analysis of six parameters, condensed into a flowchart recommended for use in the decision of when, where and how to use GPP. The model is designed for regulators at the national level but may also inspire decentralised organisations, depending of local circumstances and the knowledge available.



To illustrate the benefits of GPP two examples are finally given: Procurement of a new server centre in the City of Copenhagen and procurement of transportation for disabled and elderly people in the City of Stockholm. These examples demonstrate how dedicated and ambitious (local) authorities can make a significant difference for the environment without too heavy budgetary consequences.

The general conclusions of this report are that GPP is a supplementary tool to the hard core regulative tools – legislation and economic instruments – and in some cases the only tool for regulation. The strengths are

- Soft and more flexible introduction
- Impact markets in a dynamic way, acceptable for consumers and producers
- Inclusion of local context in requirements

The weaknesses are

- The relative magnitude of public procurement is often too small for GPP to be used as a significant regulatory instrument
- Slower speed of environmental improvements
- Leadership and visions are required at all levels

Lack of precise economic and environmental data is the reason for applying a semi quantitative methodology in the project. The Consultant has sought to ensure the validity of findings, conclusions and recommendations through uncertainty reflections.

The Consultant recommend on the basis of the work:

- Expand knowledge and use of the LCC (Life Cycle Costs) methodology in the public sector.
- At central level prioritize GPP as tool, strengthen visions, strategies, systems and education – and address barriers.
- Share good examples and documentation, such as the Copenhagen IT example and the Stockholm transport example, to expand the use of GPP and reduce costs of green procurement.
- Carry out more studies, for example a detailed study in the complex field of public construction and housing.



# 1. Environmental Impact of Public Procurement

Public procurement (PP) constitutes a significant part of GNP in the Nordic countries and thus also results in considerable environmental impact. In order to assess the environmental importance of public procurement, this section has a double aim: To provide a picture of the environmental impact from PP in the Nordic countries, and to identify three to five environmentally important product groups for further assessment.

A three-step methodology has been applied:

1. Identification of product groups with high PP value.
2. Identification of product groups with substantial environmental impact.
3. Correlation of these two lists resulting in identification of product groups with substantial potential for achievement of environmental benefits through Green Public Procurement (GPP).

## 1.1 Product groups with high PP value

The main product groups in Nordic public procurement are identified by analysing Eurostat input-output<sup>3</sup> data and listed in Table 1.1<sup>4</sup>.

National input-output tables are by default divided into 59 product groups (referring to NACE codes). However, these 59 main product groups defined by NACE codes contain many different sub-services and sub-products and it is difficult to assess precisely what products and services are included in the NACE codes. For example, the first product group “Other business services” constitutes diverse subgroups such as accounting, legal activity, consulting engineers and cleaning services.

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<sup>3</sup> This section is based on the ongoing project “Innovative Green Public Procurement” initiated by the NMRIPP (Nordisk MinisterRåds Integrated Product Policy group), carried out by PlanMiljø 2008–2009.

<sup>4</sup> Eurostat input-output data are produced with uniform methods across Europe and are used for studying structural changes in the national economy and evaluating the impact of the changes on e.g. production, imports, inflation and employment. The input-output tables also provide information on the product groups’ input to the public sector. Relevant groups with connection to public procurement have been identified in close cooperation with the Danish and Swedish statistical bureaus.

**Table 1.1: Nordic public procurement from 18 most procured product groups (NACE Rev 1.1)\***

Nordic public procurement (million Euro)	
Industry	Million Euro
Other business services	10879
Real estate services	9386
Construction work	5580
Post and telecommunication services	4466
Computer and related services	3538
Printed matter and recorded media	3291
Land transport; transport via pipeline services	3135
Wholesale trade and commission trade services, except of motor vehicles and motorcycles	3020
Public administration and defence services; compulsory social security services	2946
Chemicals, chemical products and man-made fibres	2799
Recreational, cultural and sporting services	2569
Electrical energy, gas, steam and hot water	2560
Hotel and restaurant services	2468
Trade, maintenance and repair services of motor vehicles and motorcycles; retail sale of automotive fuel	2314
Health and social work services	2073
Financial intermediation services, except insurance and pension funding services	1760
Machinery and equipment n.e.c.	1736
Food products and beverages	1635
Total	66156

\* *Exclusive procurement data from Iceland. Based on Eurostat data: <http://epp.eurostat.ec.europa.eu>.*

To be able to compare and focus on specific environmental impacts, a more precise account of the content of the NACE codes is required. Such information is not available from the Eurostat data; instead a division of the NACE product groups into more detailed subgroups has been made based on the Danish input-output table consisting of public procurement data and several other economic activity data<sup>5</sup>.

The Danish inventory of PP contains 130 subgroups. To quantify the value of Nordic procurement at subgroup level, the Danish subgroups' relative part of the main group has been calculated and these figures are used as a basis for scaling into Nordic level<sup>6</sup>. The 20 most procured subgroups<sup>7</sup> are shown in Table 1.2.

<sup>5</sup> Peter Rørmose, Statistics Denmark, 2008. For each Level 1 group the most important subgroups have been identified and the procurement value calculated.

<sup>6</sup> This methodology has been developed in cooperation with Statistics Denmark and is found the best (however not perfect) way of identifying sub-groups in Nordic PP.

<sup>7</sup> There is a variation in the numbers of subgroups shown in the table and some groups will appear as main groups.

**Table 1.2: Nordic public procurement divided into subgroups, calculated on the basis of distribution of Danish PP**

Nordic public procurement, subgroups		
NACE	Industry	Million Euro
702040	Letting of non-residential buildings	9317
748009	Other business activities	4876
640000	Post and telecommunications	4466
510000	Wholesale and commis. trade, exc. of m. vehicles	3020
920001	Recreational, cultural, sporting activities (market)	2553
450003	Civil engineering	2548
747000	Industrial cleaning	2348
722000	Software consultancy and supply	2176
222009	Printing activities etc.	2078
244000	Mfr. of pharmaceuticals etc.	1965
742009	Consulting engineers, architects etc.	1916
450002	Repair and maintenance of buildings	1849
551009	Hotels etc.	1642
502000	Repair and maintenance of motor vehicles	1583
330000	Mfr. of medical and optical instrum. etc.	1548
752000	Provision of services to the community	1408
602223	Taxi operation and coach services	1398
721009	Computer activities exc. software consultancy and supply	1362
403000	Steam and hot water supply	1252
851209	Medical, dental, veterinary activities etc.	1247
651000	Monetary intermediation	1238

The calculation is subject to some uncertainty and does not reflect differences in the way data are accounted for in the Nordic countries. However, for the purpose of providing an overview of the most significant product groups with regard to PP, the above table is found adequate.

## 1.2 Environmental impact of product groups

It is a very complex task to assess the environmental impact of a product. The impact depends on the specific materials, processes, value chain and geographic characteristics of the individual product. Following the project document, the following impact figures are therefore based on an existing report in which the environmental impact from product groups has been assessed based on an LCA approach<sup>8</sup>.

### *LCA methodology*

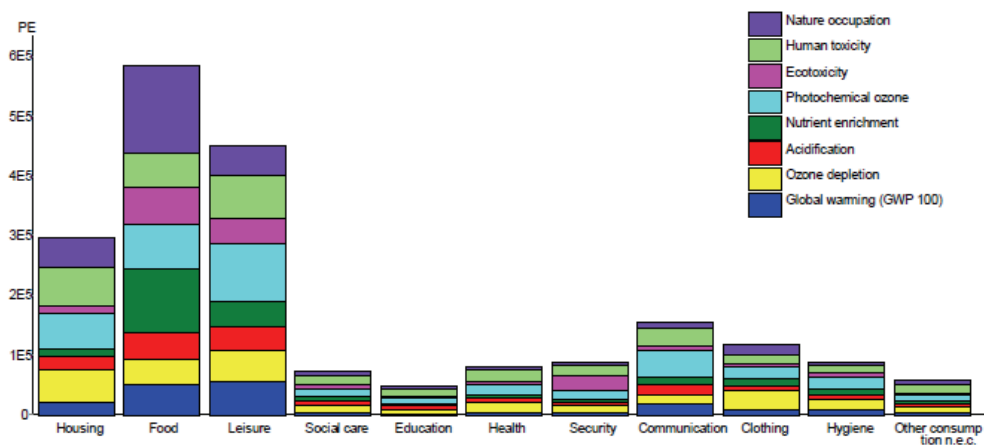
The LCA approach applied in the source report looks into seven environmental impact categories:

- Global warming
- Ozone depletion
- Acidification
- Nutrient enrichment

<sup>8</sup> Weidema et. al: Prioritisation within the integrated product policy; Danish Ministry of the Environment, 2005.

- Eco-toxicity
- Photochemical ozone formation
- Human toxicity

The categories are not prioritised but considered of equal importance (and can therefore be summarised in the following table). Units of environmental categories are based on Danish Person Equivalent (PE) from 1999. Product groups are evaluated in the unit PE/DKK 1,000. The report presents the ten product groups with the largest impact on each of the seven environmental categories.



Weidema et al, 2005

Product groups with a high environmental impact in one or more of the environmental categories and/or with a high volume of PP (according to Section 1.1) have been assessed, all in all nine product groups. A summary of the results is presented in Table 1.3 below.

**Table 1.3: Environmental impact of Nordic PP, selected product groups. \*PE for the various environmental factors (Weidema et al 2005) are summarised**

	Environmental Impact (PE/1000 €)	Volume of Public Procurement (Million €)	Total Environmental Impact (PE)
Taxi and coach services	275	1,398	390,000
Energy for heating	201	1,252	260,000
Construction materials	194	1,183	230,000
Electricity use	209	1,074	145,000
Cleaning products	223	656	145,000
Computers and services	60	2,317	140,000
Post and telecom	29	4,466	130,000
Meat purchase	432	203	88,000
Pharmaceuticals	37	1,965	75,000

Except for “Post and Telecommunication” all these product groups are found on the EU priority list<sup>9</sup> of the ten most important sectors with regard to GPP.

The above data and calculations are subject to some uncertainty. Data used are from 1999, and there can be a discrepancy in the product groups from Table 1.2 and LCA data from the report Weidema et al. Furthermore, LCA is a difficult discipline that continuously evolves and is more indicative than precise. Hence, the above figures should not be considered exact values but rather a picture of the relative environmental impact of the product groups<sup>10</sup>.

### 1.3 Identification of product groups for further assessment

Aiming at identifying important product groups in terms of Nordic PP with a good potential for environmental improvements, the nine product groups of Table 1.3 are screened including the important parameters:

- Potential for reducing the environmental impact
- Probability that the public sector can influence the market through regulatory instruments, including GPP
- PP rate of total procurement of product group (based on NACE codes).
- Homogeneity of product group.

<sup>9</sup> COM(2008) 400, 18 July 2008.

<sup>10</sup> The inclusion of data from Weidema et al. has been discussed with the key author, Bo Weidema.

Table 1.4: Screening of product groups for GPP relevance

Product group	TEIPE	Environment	Regulatory instrument	Relevance
Taxi and coach services	390.000	A relatively high environmental impact on most environmental factors. Has the highest contribution of all to acidification with 13,000 tonnes of SO <sub>2</sub> and with 2.5 million tonnes of CO <sub>2</sub> to global warming. Problems related to particles and NOx. Very good potential for reductions by for example alternative fuel or better km/l. Electric cars would make an enormous impact.	The public sector obviously has a very good potential for influencing public transport. Transport can also be influenced by other means, for example by physical planning and traffic zones. It seems possible to stimulate the market for greener vehicles by GPP.	It is an obvious choice for further assessment.
Energy for heating	260.000	The highest impact on global warming, a calculated CO <sub>2</sub> contribution of 4.8 million tonnes. The second highest on acidification with 10,000 tonnes of SO <sub>2</sub> . Problems related to particles and NOx. Good potential for reducing impact by insulation of houses and alternative forms of heating.	Highly regulated through energy policy.	Due to the heavy regulation through energy policy this product group is not considered relevant for further GPP assessment
Construction materials	230.000	High impact on human toxicity. Problems related to the use of resources and waste. Potential for reducing impact is difficult to estimate since it is a relatively diffuse group with many different products. The life cycle can have a very long time span.	Hard to control this group since it is very diverse consisting of, for examples, windows, insulation material, metal and wood. This makes it less applicable for a general assessment. Some possibilities to regulate how the materials are produced with regard to sustainability.	Very relevant for assessment from a life cycle point of view. Due to the complexity of materials, different groups of building owners and lack of good examples this product is not included in the study
Electricity use	150.000	Electricity use is high in the global warming scheme. However, it is estimated that the result is biased by the fact that Danish PE values are used. In Denmark, energy generation is generally based on less environmentally friendly methods compared to other Nordic countries where hydropower and nuclear power are used.	Electricity generation and use are normally heavily regulated through energy policy. It is hard to influence electricity use through PP, even though buying sustainable electricity could stimulate the market.	Electricity use is not considered relevant for further assessment, although it might be relevant in a Danish perspective.

Product group	TEIPE	Environment	Regulatory instrument	Relevance
Computer and related services	150.000	The highest impact on human toxicity of all. This is however, the only parameter in top 10. There is a potential for reduction within electricity consumption. There is some potential within larger server systems.	PP has some impact on the environment by creating a market for greener products. However, the Nordic public sector's impact is limited due to a global market with a few producers that are not very influenced by Nordic PP. Means for influencing the environment on single products are mainly through EU regulation. PP can influence green IT servers and configurations significantly	Relevant for further assessment on IT servers and configurations.
Cleaning products	150.000	High impact on most parameters except global warming and human toxicity. With its broad impact there seems to be very good potential for reduction of the environmental impact.	PP seems to be able to set requirements that can change product contents considerably, for example through eco-labels. The use of chemicals is heavily regulated in relation to working environment.	Relevant for further assessment. PP might be higher since outsourced cleaning services are not included.
Post and telecommunication	120.000	Only total PE figures available, the lowest of the nine product groups. The product group is very broad and includes activities that have very different environmental impacts. Within 'telecommunication' the environmental load is limited.	It is a diverse group that is difficult to analyse as one with regard to regulatory instruments.	Not relevant for further assessment.
Meat	88.000	The highest impact of all on nutrient enrichment and high on ecotoxicology. Difficult to reduce impact by substitution. An alternative is to change to more organic production.	Public sector could stimulate the 'green' market by PP. Public sector only constitutes 6 % of the market.	Not relevant for further assessment due to the low PP and questionable possibilities for environmental impact reduction.
Pharmaceuticals	80.000	It has only high impact on ozone depletion Potential for reduction is questionable.	Difficult to change the impact through PP since pharmaceuticals already are an extremely regulated product group with regard to health. It is rich in patents and monopoly which the public sector cannot easily influence.	Not relevant for further assessment.

Based on this analysis three product groups have been selected for further assessment with regard to regulatory instruments and GPP<sup>11</sup>:

- Taxi and coach services
- Computers and related services
- Cleaning products

## References

Eurostat data: <http://epp.eurostat.ec.europa.eu>.

Peter Rørmoste, Statistics Denmark, (2008).

Weidema et. Al., Danish Ministry of the Environment (2005).

*Persons interviewed :*

Bo P. Weidema, Senior consultant, 2.-0 LCA consultants, Denmark

Peter Rørmoste, Statistics Denmark

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<sup>11</sup> Corresponding with GPP experience of the Nordic countries the selected product groups represent areas with cases and practical experience, interesting for this study. Other product groups also display interesting characteristics, not least construction and housing that is heavy in terms of PP and environmental impact. However, the complexity of the product group hinders inclusion requires analyses beyond the resources of this project, and the procurement concepts are dominated by tradition why only limited practical experience exists.

## 2. Nordic Regulatory Instruments

This chapter aims at analysing how various regulatory instruments used in the Nordic countries influence the environmental impact of the three product groups identified in Phase 1. The purpose of the analysis is to identify for which product groups and under which conditions GPP appears to be an effective regulatory instrument.

The analysis includes:

- Regulatory instruments used today
- Combined effects of the applied regulatory instruments
- Regulatory instruments' efficiency in terms of obtaining their objectives
- Challenges, problems and barriers for implementing relevant regulatory instruments

Regulatory instruments can be defined as “*Means by which policy objectives are pursued*”<sup>12</sup>. For the purpose of this project, regulatory instruments are divided into three groups with different characteristics:

- Green Public Procurement
- Legal instruments (Environmental legislation)
- Economic instruments

All Nordic countries have endorsed national policies for GPP with the following key characteristics:

- Governments in all the Nordic countries and other central stakeholders have focus on GPP and strategies, legislation and action plans have been adopted.
- GPP considerations are in general obligatory for government entities. Other public organisations, such as local authorities, are not directly obliged to apply GPP practices but are strongly recommended to do so, and it is part of the National Strategy Plans to include all public organisations.
- The actual level of GPP varies much between the countries, both with regard to implementation of GPP in the administrative units and with regard to product groups included.

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<sup>12</sup> From Government of Canada (2008), “Assessing, Selecting, and Implementing instruments for Government Action”.

- Large local authorities with substantial procurement are committed to GPP. In all countries it is a complicated and long process to get GPP fully adopted in local authorities.

## 2.1 Analysis of coach services

In the Nordic countries bus services are generally a public responsibility. Typically they are organised by a local or regional public company responsible for traffic plans and tendering, but not owning buses or running actual bus operation. In this sense the public sector has very good bargaining power as in reality it has a monopoly regarding bus operation. All operating costs are handled by the operator within the tender economy. The bus operator is traditionally paid a fixed amount per bus line plus operating costs related to hours of driving.

### 2.1.1 Legal instruments

Legal instruments related to the procurement of new buses are found at EU level. This means that new buses procured in the EU must comply with certain requirements with regard to emission of particles to protect the local environment. CO<sub>2</sub> is not yet a factor, but should be so soon. These requirements are renewed every three to five years and today EURO IV, EURO V and EURO VI are relevant<sup>13</sup>.

In *Denmark*, a legal framework for environmental zones in major cities has been introduced. This means that major cities are allowed to define environmental zones – and Copenhagen did so starting September 2008. In the environmental zones increased requirements apply to particle filters fitted on buses and trucks. Otherwise, the Nordic countries do not have legal requirements besides EU legislation.

Legal instruments work quite efficiently at EU level for emission performance of buses. The market is important enough for the producers to react and the approach of milestones for continuous improvements is pushing environmental development. But the legislation has a quite narrow scope, since it is only related to emissions from diesel motors.

Current legislation has not yet motivated into using alternative types of fuel.

### 2.1.2 Economic instruments

No economic instruments are designed especially for coach services, but taxes on fuel can influence the operators' motivation for buying greener buses.

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<sup>13</sup> Euro 4 (2005) for any vehicle – 98/69/EC (& 2002/80/EC) – Euro 5 (2008/9) and Euro 6 (2014) for light passenger and commercial vehicles – 2007/715/EC[13].

From an environmental point of view, it is interesting that no economic instruments have been introduced to influence the sector in the form of lower tax on alternative and less polluting fuel or bus types. In the existing market, alternative fuels are more expensive and so are the vehicles using them.

It could be argued that the tax on fuel is an incentive to use electric vehicles, and so it is in theory. However, with the present technological and economic state, electric buses are not competitive with regard to distance, reliability and price

For a period of time an electric trolley bus line was established in Copenhagen, supported by EU funding. But it was discontinued for technical and economic reasons when the funding period ran out.

### 2.1.3 GPP instruments

GPP instruments are used with different intensity in the Nordic countries.

In *Denmark*, bus services are run by private operators. Green aspects count approximately 5% in tenders and are coming increasingly in focus. The largest public bus service company, Movia<sup>14</sup>, uses green requirements in their tenders and accepts that it can be slightly more expensive as long as it does not compromise their service obligations<sup>15</sup>. The policy for “green” tendering has been stated in the “strategy plan for tendering” made by Movia. The company board consists of politicians of the owner municipalities and the strategy plan is as such politically supported.

The price is a barrier since green coaches are more expensive and operating costs are higher. If other fuel types were to be used, the price would have to be competitive by using economic instruments to lower the price for alternative fuel. As focus is on price, this would be a good incentive according to Movia.

In *Finland* the situation is somewhat similar. Environmental requirements are used to some extent; mainly related to fuel consumption<sup>16</sup> and eco-driving. However, in Finland pilot projects with gas buses and hydrogen buses have been or are being carried out.

In *Sweden* work with the environment and GPP within bus driving has been quite systematic over the last decade. The result is that almost all tenders made today have some kind of environmental requirements. The requirements are typically related to the use of bio-fuel, i.e. bio-gas and ethanol (in Stockholm). Even though the price might be a little higher it is not an issue that is discussed much. The green requirements are politically decided at a local level and accepted by the public at large<sup>17</sup>.

A related GPP instrument used in *Sweden* is to make incentive tenders/contracts with the operator to increase the number of passengers

<sup>14</sup> Movia is a major bus operator for public bus transport in greater Copenhagen.

<sup>15</sup> Ref.: Jesper Petersen, Movia.

<sup>16</sup> Ref.: Satu Hyrkkänen, FCG.

<sup>17</sup> Ref.: Lars Annerberg, Bussbrannschen.

using public transport. The idea is that instead of the operator getting a fixed price per bus route, he gets a bonus for increasing the number of passengers. The result from such methods has been quite positive for instance in Helsingborg where the number of passengers has risen by 18% in the period 2004–2006<sup>18</sup>.

Hence, GPP instruments are used at very different levels in the Nordic countries, ranging from having great success in Sweden to being less in use in Denmark.

Experience, especially from Sweden, shows that GPP instruments are efficient regulatory instruments for a variety of aims, including environmental improvements. However, it needs to be politically decided as it can be expensive to implement, especially in the early phases where new vehicles are necessary.

Another advantage related to GPP instruments is that they can be relatively quickly implemented by a decision in a local political forum. In the long term, GPP is dependent on maintenance and distribution among GPP institutions to compare with legislation and taxation in efficiency.

In a short-term perspective there seems to be no alternative to GPP.

#### *2.1.4 Summary*

Analysis highlights are as follows:

- The public sector has good bargaining power with regard to green requirements in tendering.
- Green criteria often lead to increased prices; the acceptance of such is a political issue.
- There are already effective legal instruments in use at EU level for bus pollution emission standards and at local level for environmental zones in cities.
- There seems to be a good potential to improve the environmental impact both with regard to equipment and fuel economy. This could be made through GPP.
- With regard to alternative fuels regulatory instruments are not yet motivating. Also, economic instruments are not favouring alternative fuels so far and funding support has not shown to be sustainable.
- GPP has been carried out with success and to the largest extent in Sweden. The challenge is mainly to get political backing for extra costs and infrastructure.
- In a longer term perspective, legal instruments could also be considered relevant; as could use of economic instruments related to lower tax on alternative fuels.

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<sup>18</sup> Ref.: Politiken and Swedish Bus & Coach Federation.

The following table summarises the efficiency of the various analysed regulatory instruments for coach services.

**Table 2.1: Regulatory instruments used for coach services**

Instrument	Goal fulfilment/ efficiency	Costs	Other aspects
Legal	The EURO Norm-setting dynamic emission limits is effective for vehicles	Limited if not contrary for operators and society because of less fuel consumption	Legislation does not yet favour alternative energy. Environmental zones in cities support coaches with good environmental performance in relation to exhaust gases
Economic	The general tax on diesel has some impact on the operators for better fuel efficiency	Raises the costs for services	The tax system does not favour alternative fuels
GPP	Bus services are in the hands of public organisations and GPP has shown to be an effective instrument	Vary, depending on vehicle type, fuels requirements etc. But in general alternative fuel is more expensive and so are the vehicles. Incentives for more passengers are economic as well as environmentally friendly	At the moment the only instrument for pushing development in environmentally friendly direction, besides the EU regulation for emission standard for vehicles

## 2.2 Analysis of taxi operations

### 2.2.1 Legal instruments

Legal instruments are in general not used to influence the environmental state of the taxi sector in any of the Nordic countries. But the balance between regulation and liberalisation of the system is diverse with a quite liberal system in Sweden compared to the other countries. This regulation has influence on the possibilities of influencing the system in an environmental direction.

### 2.2.2 Economic instruments

The general high taxes on fuel influence the coach owner, since fuel economy influences operating costs directly and thereby the choice of coach. But for the owner running costs on fuel are only one aspect, since the most important matter is reliability of the coach.

In *Denmark* and *Finland* there are no economic instruments designed especially with regard to the environment.

In *Norway* the tax on taxis is proportional to CO<sub>2</sub> emissions. Hence, there is an incentive to procure greener cars. This has some impact on taxi owners even though focus is on other parameters such as operation

and space. But the most CO<sub>2</sub> polluting vehicles will probably not be selected due to the higher price<sup>19</sup>.

Economic instruments are used in a marginal way in *Sweden*. For example, green taxis do not pay the fee for driving into Stockholm; on the other hand it is more expensive to use the E85 fuel<sup>20</sup> (fuel consisting of 85% bio-ethanol).

While the general price on cars is taxed with up to 180% in *Denmark*, coach owners only pay 7%. Hence, they do not have the same economic incentive as others to buy less expensive cars which normally have better fuel economy. Also they have a good profit reselling the cars after use and this business favours more expensive cars. In short, the high tax on fuel is an incentive to buy fuel economic coaches but the low tax on cars is not an incentive to buy smaller and more economic cars.

Overall, economic instruments are used in two ways. The first is related to the general tax on fuel. And the second is a tax related to vehicles' CO<sub>2</sub> emission. They have the marginal effect that the most inefficient cars are avoided.

### 2.2.3 GPP instruments

GPP instruments have been used very differently in the Nordic countries.

In *Denmark* GPP is not an effective regulatory instrument. Recently several public organisations pooled together and made an ambitious green tender concerning coach driving. The price counted 60% while the environment counted 40%. Environmental requirements included that drivers should have been on eco-driving courses and that a specific rate of the taxis should have some improved green features.

However, none of the calling offices made a bid on the tender. The reason for this was, according to the taxi association<sup>21</sup>, that the bidder is the calling office. As this office can make no environmental requirements to the independent taxi owners (that have the right to be affiliated without any requirements being made), the calling office was in reality not in a position to bid as it cannot promise to comply with the environmental requirements. Furthermore, the offices are obliged to treat members equally. Hence, a customer cannot call and order a "green" taxi as this would result in the affiliated taxis not being treated equally. This structure of the taxi sector makes it very difficult to make environmental requirements using GPP instruments in *Denmark*<sup>22</sup>. It is possible, however, to make lower requirements. One small local authority required that the taxis have special particle filters and the taxi companies complied with this requirement.

The failed process of procuring green taxi services did however influence political opinions in Denmark. A law review has now passed the

<sup>19</sup> Ref.: Jørn Berthelsen, Head of Development Department, Taxi Association in Norway.

<sup>20</sup> Ref.: Anders Berge, Juridik & Miljö, Taxi association in Sweden.

<sup>21</sup> Ref.: Trine Wollenberg, Director in Taxi Association in Denmark.

<sup>22</sup> Ref.: Søren Jensen, Procurement Centre, Ministry of Environment i Denmark.

Parliament, valid from 2010, only allowing new taxis with good environmental performance.

In *Finland* there is no tradition for the public sector to tender taxi operation except when related to transport of elderly and disabled persons. There is not much experience with using GPP in the tenders made<sup>23</sup>.

In *Norway* some action has been taken with regard to GPP and it is used more and more by the public sector. Typical requirements relate to eco-driving or “green” cars. The taxi owner organisation is preparing standard requirements that can be used when considering GPP<sup>24</sup>.

*Sweden* has in general come a long way using GPP with regard to introduction of green taxis. At the national level the rate of green taxis is 10% and in Stockholm it is 20–25%. Most green taxis use E85.

The reason for GPP being more successful in *Sweden* is that the public sector has a very strong GPP policy within taxi driving and is ready to use the necessary resources to implement the policy. For instance, the City of Stockholm use green taxis as much as possible and “Färdtjänsten Stockholm” even pays a higher price for green taxis, even though the normal tariff is not higher, just to support green taxis using E85<sup>25</sup>.

Typical GPP criteria relate to the rate of company taxis that have to be green, typically 10–20%, and requirements for the companies having an environmental policy, strategy etc. As public taxi transport constitutes approx. 50% of the market, public actions have great influence on developing a greener market within the taxi business.

The fact that Sweden has already greener fuel in their infrastructure is obviously helpful.

Hence, GPP instruments are used at very different levels in the Nordic countries ranging from great success in Sweden to almost non-existing in Denmark. The main reason for the problems in Denmark is related to the national taxi regulation that limits the possibility of introducing GPP.

Experience from Sweden shows that GPP instruments are efficient instruments for environmental improvements, when legal and general economic tools have not been introduced.

#### 2.2.4 Summary

Analysis highlights are as follows:

- Present regulatory instruments related to environmental legislation and economy do not influence the market significantly
- The public sector has good bargaining power with regard to making green requirements in tendering

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<sup>23</sup> Ref.: Satu Hyrkkanen, FCG.

<sup>24</sup> Ref.: Jørn Berthelsen, Head of Development Department, Taxi Association in Norway.

<sup>25</sup> Ref.: Anders Berge, Juridik & Miljö, Svenska Taxiförbundet.

- At a Nordic level there seems to be a good potential to improve the environmental impact. This can be made through GPP
- Comfort and reliability are most important factors for taxi owners
- The fuel price and tax system can have some influence on the choice of cars, mainly related to excluding highly polluting vehicles
- Electric cars are not considered relevant at the moment at a larger scale. Costs, reliability and infrastructure (flexibility) seem to be the main problems
- Using alternative fuel is more expensive with the present tax systems. For combustible fuel to be relevant political and economic backing is necessary
- The public sector is in general interested in using GPP and environmental measures, including obligatory eco-driving courses
- The Danish example shows that the structure of the sector can be a serious barrier to introducing efficient GPP
- Barriers for GPP can impact use of other regulatory instruments.

The following table summarises the efficiency of the various analysed regulatory instruments for taxi operation.

**Table 2.2: Regulatory instruments used for Taxi operation**

Instrument	Goal fulfilment/efficiency	Costs	Other aspects
Legal	Until 2010 there are no legal instruments used that are environmentally founded. If the taxi operation is heavily regulated it seems to be working against GPP. In 2010 mandatory environmental requirements for new taxis will come in force	The new DK regulation will exclude use of big and luxury taxi cars	Regulation hampers green taxis. A deregulated market, as in Sweden, improves greatly the number of green taxis allowing GPP flexibility. The new general regulation in DK appears environmentally promising and cost effective
Economic	The tax on diesel and other fuel has some impact on the operators and taxation according to CO <sub>2</sub> performance encourages climate friendly development. The tax reduction system for new taxis counteracts fuel savings in cars in DK until 2010, when the system will be turned around.	Fuel taxes increase costs of transport. Tax reduction system for new taxi cars lowers tax income and supports expensive quality cars.	The tax system does not favour alternative to diesel.
GPP	Good, if legal and structural barriers are removed, but not as effective as legal and economic means, when used effectively.	This will vary depending on vehicle type and fuel type and the market situation for environmentally friendly cars.	Seems to be a good instrument for introducing alternative fuel and good environmental transport performance and for breaking barriers for legal and economic regulation.

## 2.3 Analysis of computers and related services

The product group includes a wide range of products and services:

- Standard hardware (computers, printers, copy machines, etc.)
- Servers
- Software
- Solutions (typically a mix of hardware and software to solve a specific challenge).

### 2.3.1 Legal instruments

The EU has introduced a series of directives aiming at reducing the environmental impact of electronic and electrical products. The RoHS directive<sup>26</sup> restricts the use of hazardous substances in electrical and electronic equipment, and the WEEE directive<sup>27</sup> promotes collection and recycling. Norway has similar legislation albeit not a member of the EU. Furthermore, EU legislation states that governmental organisations must comply with the ENERGY STAR<sup>28</sup> requirements.

Apart from EU legislation, the Nordic countries have not introduced legal instruments of special relevance to IT products. According to key market players in the IT sector, national legislation from the relatively small Nordic countries will probably have very limited effect on the large, multinational manufacturers.

### 2.3.2 Economic instruments

Economic instruments are not used for IT equipment directly, but taxes on electricity can influence procurement since operating costs are directly related to consumption of electricity. This is especially relevant for server systems where electricity is used for both operation of the equipment and for cooling. However, the traditional decoupling between procurement and operating costs in the public sector hinders the full environmental effect of taxes on electricity. With the present electricity price and procurement practices often ignoring life cycle costs of products, energy saving equipment is not always the preferred choice.

For major server systems economic instruments are somewhat effective since electricity is a major expense. However, while electricity consumption has been in focus in the private sector, the change to more en-

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<sup>26</sup> Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

<sup>27</sup> Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment.

<sup>28</sup> The EU ENERGY STAR programme follows an Agreement between the Government of the US and the European Community (EU) to co-ordinate energy labeling of office equipment. It is managed by the European Commission.

ergy efficient methods (e.g. virtualisation<sup>29</sup>) in the public sector is lagging behind, except for the largest units/municipalities.

### 2.3.3 *Green Public Procurement*

In *Denmark*, central government and several local authorities have policies regarding GPP for IT. It is relatively easy for the public sector to buy green IT equipment since the national procurement organisations SKI<sup>30</sup> and (to some degree) SI<sup>31</sup> have green products in their framework contracts. In practice, GPP of IT is normally based on existing eco-labels.

In *Norway*, the Minister of IT is strongly recommending GPP of IT products and green criteria are available from DIFI<sup>32</sup>. Several central and local administrative units have adopted GPP practices with varying methods and substance since there are no central arrangements. At several occasions local authorities have pooled their purchasing to share resources and harvest joint advantages from GPP.

Also *Finland* and *Sweden* have green criteria for IT equipment that can be used by public procurement officers.

Compared to the private sector, local authorities appear hesitating in adopting GPP practices for IT, in defiance of the fact that GPP of IT very often entails both environmental and economic benefits due to the lower electricity consumption<sup>33</sup>.

Outsourcing of server operations to large private server providers and virtualisation are receiving increased attention due to considerable economic savings that primarily occur from the suppliers' better control of energy consumption for operation and cooling.

The GPP instrument can provide additional benefits within areas where legislation and economic instruments are not working efficiently. GPP could focus on energy consumption for hardware where there is an economic advantage, and potentially also on collection and recycling where there is a potential environmental gain.

Within certain areas GPP instruments can be easily applied without much cost since eco-labels are available.

The public sector often has strong bargaining power to introduce and implement new IT solutions. A good example is the requirement in *Denmark* that governmental organisations only accept electronic invoices. Such an IT solution has a high impact on paper use and mail transport.

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<sup>29</sup> Inefficient decentralised servers are centralised to a few large efficient servers.

<sup>30</sup> Statens og Kommunernes Indkøbs Service (Engl.: National Procurement Ltd. – Denmark)

<sup>31</sup> Statens Indkøbscentral. (Engl.: National Procurement Central)

<sup>32</sup> Direktoratet for forvaltning og IKT (Engl.: The Agency for Public Management and eGovernment).

<sup>33</sup> According to Danish IT suppliers.

### *2.3.4 Summary*

Analysis highlights are as follows:

- EU legislation is adopted in all countries with regard to hazardous substances, recycling and energy consumption
- For standard hardware, EU legislation prevents the most environmentally harmful products
- National legislation has not been used as a regulatory instrument and would probably not be very effective
- Economic instruments are not used directly but taxes on electricity can influence procurement when life cycle costs are considered
- IT is a priority area within GPP for all Nordic countries. It is mainly based on eco-labelling
- With the present tax on electricity and present legislation GPP can play an important role with considerable environmental and economic effects
- The applied regulatory instruments generally work in the same direction, especially with regard to electricity consumption.

For IT solutions environmental issues related to the product are relevant as well as the solution itself or the processes it changes. For example, video conferences can reduce the need for travels and thus have strong climate impacts.

The following tables summarise the efficiency of the various analysed regulatory instruments for hardware and IT solutions.

**Table 2.3: Regulatory instruments used for IT (hardware)**

Instrument	Goal fulfilment/ efficiency	Costs	Other aspects
Legal	EU legislation is quite efficient with regard to reducing environmentally harmful substances in IT equipment and to some degree avoid the least energy-effective computers in governmental procurement	Green IT products are rarely much more expensive and typically have a lower LCC. Costs are often transferred to the producers, e.g. WEEE. Producers' costs are presumably transferred to the user	EU legislation has a huge impact on manufacturers and products, while national legislation is less effective in terms of influencing manufacturing.
Economic	Tax on electricity is not a very effective environmental regulatory instrument with regard to standard hardware, but to some extent with regard to server systems with high electricity consumption	For server systems costs related to the price (tax) on electricity are considerable. This is reflected in increased attention on energy consumption in the procurement process.	Changing the tax on electricity does not only impact the IT sector but all activities in society – a complicated instrument for environmental purposes.
GPP	For IT equipment and especially for server systems GPP is a relevant regulatory instrument saving electricity consumption and reducing CO <sub>2</sub> emissions	Extra costs are low and return of investment is very short. LCC on IT would favour GPP economically and environmentally. Some resources are needed in the beginning to train and inform procurement officers	There might be a need to change procurement procedures and maybe the organisational set-up. Hence, political will is required.

**Table 2.4: Regulatory instruments used for IT solutions**

Instrument	Goal fulfilment/ efficiency	Costs	Other aspects
Legal	Can be very effective if government makes requirements for environmentally friendly solutions, i.e. the Danish example with electronic invoices	Will vary much. But IT solutions are normally made to save money or improve efficiency of a work process	Will often have a dynamic effect and promote innovation for the private sector when the solution is developed and in use.
Economic	Electricity taxes are incentives for energy efficiency and budget restrictions in public sector promote innovation of more cost effective solutions	Will vary much. But IT solutions are normally made to save money in the long run or improve efficiency of a work process	IT solutions can probably be impacted weakly in general through economic instruments
GPP	Good, because designing of IT solutions is a matter of local context and local decision	New IT solutions are driven by better cost benefit ratio totally, so investment costs are compensated by lower operating costs.	Green procurement should often not be related to the product itself but to the green effects of the solution. Out-of-the-box thinking is needed to develop new solutions.

## 2.4 Analysis of cleaning products/services

### 2.4.1 Legal instruments

Cleaning products are quite intensively regulated within the legal framework. The following relevant EU regulation is in place, implemented in national legislation and focusing on environmental and occupational health issues relating to cleaning products:

- REACH<sup>34</sup>
- Detergent regulation<sup>35</sup>
- Classification, packaging and labelling of dangerous preparations<sup>36</sup>

Hence, legal instruments are very much in use focussing on occupational health. This has a certain effect on the environment as well; especially with regard to recipients and the requirements for non toxicity and aerobical degradability. Energy and climate change impact has not yet been in the focus of regulation.

Overall, legal instruments are widely in use influencing production heavily.

### 2.4.2 Economic instruments

There are no economic instruments in use for this product group. This does not mean that they could not be effective. However, there seems to be a tradition for using general binding legal instruments with good results.

Eco-labelling and voluntary product environmental information system for consumers, which are common for cleaning products, could be used for differentiated taxation, but this has not been the case in the Nordic countries so far.

### 2.4.3 GPP instruments

With regard to GPP instruments this is one of the priority areas in *Norway* and criteria to be used by governmental institutions have been introduced. In *Finland* and *Sweden* recommendations are available<sup>37,38</sup>. It is a

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<sup>34</sup> REACH is a European Community Regulation on chemicals and their safe use (EC No 1907/2006). It deals with the Registration, Evaluation, Authorisation and Restriction of Chemical substances. The aim of REACH is to improve the protection of human health and the environment through better and earlier identification of the intrinsic properties of chemical substances. The Regulation also calls for the progressive substitution of the most dangerous chemicals when suitable alternatives have been identified.

<sup>35</sup> According to EU Detergent Regulation ((EC) No 648/2004) products must be aerobically degradable.

<sup>36</sup> Directive 1999/45/EC relates to classification, packaging and labelling of dangerous preparations and makes requirements for labelling of toxic components.

<sup>37</sup> Ref.: Satu Hyrkkänen, FCG.

<sup>38</sup> Ref.: Miljöstyrmingsrådets (<http://www.msr.se/sv/Upphandling/Kriterier/Stad-och-rengoring/>).

relatively easily accessible product group with regard to GPP due to the wide use of eco-labels and producers used to working with environmental considerations. Using eco-labelled products ensures good environmental standard of products, but it is difficult to estimate the actual environmental benefits, because also non-labelled products may live up to the same criteria<sup>39</sup>. Furthermore energy saving and climate change prevention have not been a parameter of assessment so far<sup>40</sup>.

#### *Information and education*

Information is used within chemicals as stated by Directive 1999/45/EC.

One of the main problems related to the environment is over-dosage of cleaning products and this has negative influence on the environment. Industry<sup>41</sup> is already doing much to inform about this problem and some companies only sell products after introduction, and guidelines are required. Industry is, according to SPT<sup>41</sup>, using resources on information itself (or instead).

#### *2.4.4 Summary*

The following points summarise the analyses:

- The main regulatory instrument is legislation and the sector is heavily regulated with regard to use of chemicals
- Economic instruments are not used
- Eco-labels are available and widely used. The precise environmental benefit is difficult to estimate
- GPP has good potential where legislation is not in place and within climate impact, which is not covered by eco-labels
- GPP will go well in hand with legal instruments

The following table summarises the efficiency of the various analysed regulatory instruments for cleaning products/services.

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<sup>39</sup> SPT, Denmark, 2009.

<sup>40</sup> Ref.: Trine Pedersen, Ecolabelling Denmark.

<sup>41</sup> Ref.: Jakob Zeuthen, SPT (Brancheforeningen for sæbe, parfume og teknisk/kemiske artikler)

**Table 2.5: Regulatory instruments used for cleaning products/Services**

Instrument	Goal fulfilment/efficiency	Costs	Other aspects
Legal	Legal instruments are used very efficiently at EU level. They are mainly related to occupational health	Mainly related to the producer	Not related to CO <sub>2</sub> reduction
Economic	Not used.	NA	Eco-labelling could be used for environmentally friendly taxation
GPP	Good, where there is no legislation in place	Costs are related to the extra costs of eco-labelled products. These are normally low when eco-products become standard	Is applicable on the basis of LCA criteria as other instruments are not used

## 2.5 General conclusions on regulatory instruments

In the following, a number of common observations and conclusions are made across the three product groups analysed in detail above.

The general conclusion from this chapter is that GPP is generally an alternative where other regulatory instruments are not applied. This is also in line with the findings from the report “Environmental Considerations in Public Procurement”. This indicates that regulatory instruments related to economy and legislation in general are better if applied. Two reasons can at least be identified.

- The instruments are centralised, hence everybody uses the same instrument, and
- The instruments are mandatory for everybody nationwide

GPP is used when the two hard core regulators does not cover.

The fact that GPP is often made at a local level based on political initiative exposes four interesting points with regard to GPP as a regulatory instrument:

- GPP is a dynamic tool compared with traditional regulatory instruments. GPP can be introduced within a short time span compared to other regulatory instruments that will normally require longer political negotiations and preparations, sometimes even at EU level. Furthermore there are more dynamics in the criteria setting.
- GPP can help solve immanent local environmental problems that would not be solved by a national strategy in due time.
- GPP gives local ownership and commitment to initiatives for environmental action which is very important for implementation of environmental strategies.

- GPP introduced at a local level will not necessarily be part of a coherent national environmental strategy, but is based on local priorities, interest or ideas.

The latter point can be mitigated by having or implementing an obligatory national strategy for imposing GPP with public (or private) organisations. However, this is rarely seen.

The main reason is political opposition against such an intervention in the autonomy of public organisations, especially with regard to local authorities. Green procurement is for many products more expensive and to force such an increase in costs on the organisation's expenses is difficult and could be met by claims of compensation or a necessity to reduce other tasks. Such a move might not be popular and is not easily done.

Secondly, defining and supervising GPP is problematic. GPP is not a well defined concept and it is difficult to set specific common standards and targets for its use and implementation. As to supervision and follow up, this would require institutional development and this has not been seen in the Nordic countries yet.

Information and education does not seem to be a significant regulatory instrument in general, but can be used best in conjunction with the other more effective instruments to raise awareness. If very specific groups are to be reached information may be effective. No substantial education initiatives have been identified during the study, except for education and instruction of use of cleaning products.

Table 2.6 gives an overview of advantages and disadvantages of regulatory instruments on four parameters.

**Table 2.6: Regulatory instruments comparison**

Instrument	Legal	Economic	GPP
Cost effectiveness	Questionable	Good	Unknown – Very good
Regulatory effect	Good and predictable	Is predictable with some uncertainty	Not predictable, limited
Instrument dynamics	Weak	Middle	Very good
Implementation	Difficult	Difficult	Easy
Local commitment	None	None	Good
Innovation	Low	Good	Good

### 3. Advantages and challenges of GPP and other instruments

Benefits and impacts of regulatory instruments are related to direct environmental effects and indirect market effects, while disadvantages (including costs) are related to introduction of the instrument and the use over a life time.

No specific data on advantages and disadvantages of the regulatory instruments have previously been compiled in the Nordic countries, and the approach in this study was interviews with Nordic key persons dealing with GPP.

#### 3.1 Environmental importance of GPP

Whereas in Chapter 1 the potential environmental impact of GPP is calculated, the environmental importance of GPP can only be estimated since the impact varies significantly between product groups and countries, dependent on volume and extent of GPP. A recent study<sup>42</sup> in seven EU countries has investigated the achieved results of GPP in terms of life cycle cost (LCC) and CO<sub>2</sub> reduction.

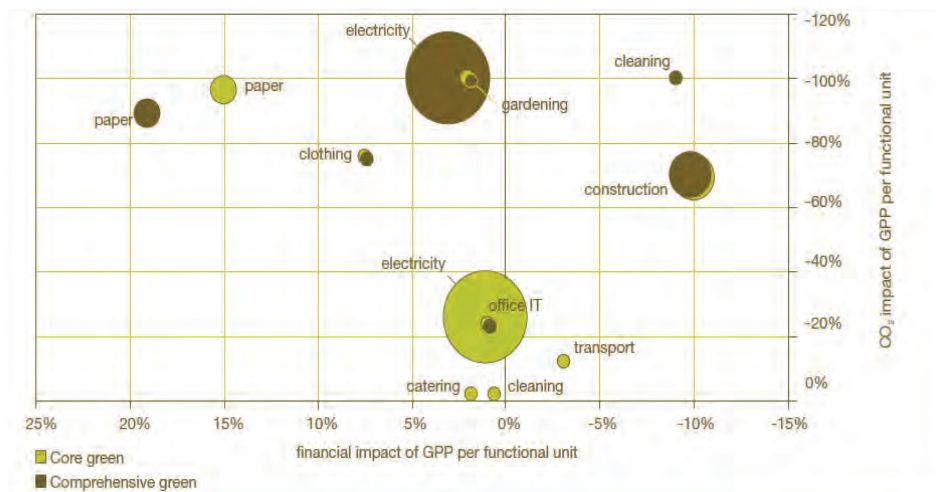


Figure 3.1: CO<sub>2</sub> impact and financial impact of GPP per functional unit. Negative values on the horizontal axis indicate lower costs. Negative values on the vertical axis imply lower CO<sub>2</sub> emissions. A position in the upper, right corner indicates lower costs and lower emissions. The size of a bubble indicates the relative CO<sub>2</sub> emissions of a product group.

<sup>42</sup> Collection of statistical information on Green Public Procurement in the EU. Report on data collection results, PricewaterhouseCoopers, Significant and Ecofys.

The figure shows that GPP within transport may give rise to 3–4% cost savings and 10–15% reduction in CO<sub>2</sub> emission. For office IT in general the study shows similar cost level and a CO<sub>2</sub> reduction of 20% (the environmental impact is probably higher for server systems with significant energy consumption).

For cleaning products the result depends on how specific the requirements are. Basic GPP requirements mean similar price level and CO<sub>2</sub> emission, whereas ambitious GPP criteria lead to around 9% decrease in costs and almost 100% CO<sub>2</sub> reduction (as these cleaning agents function with use of cold water).

The study documents that GPP has led to considerable reductions in CO<sub>2</sub> emission in parallel with (minimal) cost savings. This punctures the myth that GPP is much more expensive than traditional PP.

The direct environmental importance of GPP is relatively simply equal to the volume of public procurement within product groups multiplied with the environmental reduction reached by GPP within the respective product groups.

Obviously, as a national or supra-national regulatory instrument GPP is potentially most effective within product groups in which PP plays a major role. Achievement of a 50% improvement within a product group through GPP is relatively unimportant if the public procurement accumulates to only 2% of the total trade of a product.

*For GPP to be an effective regulatory instrument the PP share of a product group should be relatively large.*

The following table indicates where the public sector has a large relative procurement value:

**Table 3.2: Average relative procurement values per product group**<sup>43</sup>

Product group	Relative procurement value
Construction	57%
Electricity	17%
Office IT equipment	10%
Cleaning services	6%
Transport	4%

### 3.2 Other GPP advantages

GPP entails other potential benefits than the positive cost-effectiveness ratio illustrated above, including:

- Increasing local ownership
- Dynamic but limited market effects

<sup>43</sup> Collection of statistical information on Green Public Procurement in the EU. Report on data collection results, PricewaterhouseCoopers, Significant and Ecofys.

- Supporting innovation
- Easy implementation

### 3.2.1 GPP as driver for market development

On top of contributing to environmental improvements, GPP facilitates the development of green products and services in a wider perspective. GPP at a larger scale will motivate enterprises to develop greener products that will become the new standard on the market. New demands for green products will lead to repetition of this cycle and again lead to more demand for the greener product. This is illustrated in the figure below. Hence, in theory the public sector can initiate an overall greener market.

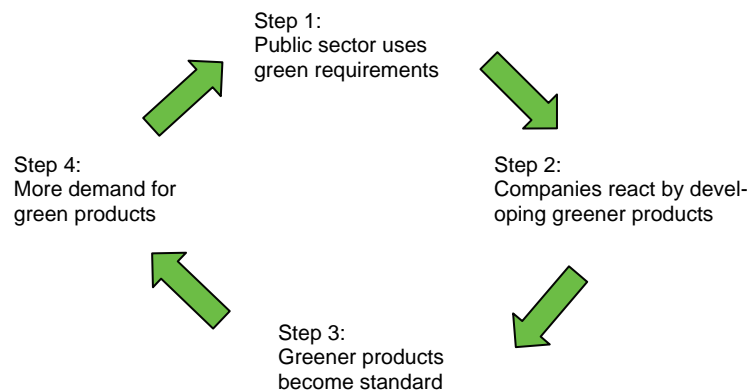


Figure 3.3: How GPP stimulates greener products and services

The importance of the market effect is supported by the recent report “How Central authorities can support eco-design<sup>44</sup>”, where it is concluded that: “The study showed clearly that the main incentive for developing new products is increased sales, as well as maintained or increased market share”.

When greener products have been developed and procured, these will often become standard (step 3). A specific example of this mechanism is given in the City of Copenhagen IT example presented below. Based on the environmental tender evaluation, the supplier has incorporated a new product/service whereby the CO<sub>2</sub> emission was offset by planting a tree. This product is a direct spin-off of the specific GPP project, and is now a standard product.

A related mechanism is that GPP can facilitate introduction of a green technology that is burdened with large introduction costs or substantial demands to infrastructure – as in the Swedish bio-fuel case in which several public organisations supported the introduction of bio-fuel which would otherwise not have had the same success.

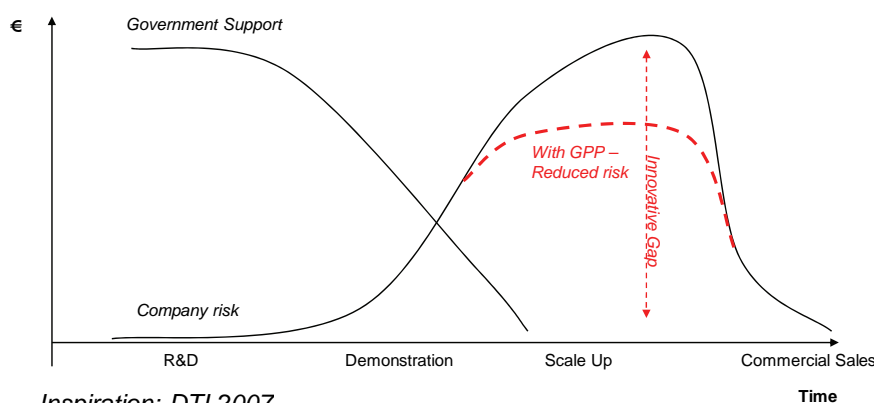
<sup>44</sup> Nordic Council of Ministers, 2008.

GPP in general also has a dynamic effect on the market. A legislative intervention will often only help to remove the least green products when the market has shown that substitutes are available. GPP maintains the dynamic effect, since requirements can be set at the cutting edge for every new procurement process. Therefore GPP can be seen as a dynamic tool in environmental policy and in certain cases a frontrunner instrument for national regulation, breaking barriers for overall implementation. The market effects can be studied in real life testing and the market can be developed in a smooth way.

### 3.2.2 Innovation

GPP has a good potential for promoting eco-innovation by supporting the demand side<sup>45</sup> and helping closing the “innovative gap” illustrated figure 3.4 below. It is often difficult getting new innovative products on the market because the developing company is awaiting the demand while at the same time the potential buyer is awaiting market introduction of the product. GPP can close this gap because the public demand is large and the public institutions may accept a higher price – within reasonable limits – for a greener product. This mechanism can support the manufacturer moving from the demonstration phase to the scale up phase, reducing some of the company’s risk in the introduction phase.

#### *Risk profile for innovation processes*



*Inspiration: DTI 2007*

Figure 3.4: The innovative gap

One example is the bio-fuel taxis in Sweden. They were only reintroduced by Volvo after sufficient demand was expressed by public procurers.

Innovation can go further and in special cases GPP can create green products, not yet developed<sup>46</sup>. This will probably be done in partnership

<sup>45</sup> European Commission report: “Bridging the Valley of Death: public support for commercialisation of eco-innovation, may 2009”.

<sup>46</sup> This is known as Technology Procurement or Pre-competitive Tendering. Refer to Bauer & Bode: Technology Procurement, Nordic Council of Ministers 2007.

between public institutions and private companies ensuring high degree of certainty for procurement to cover development costs and minimize the risk for companies.

In the Norwegian GPP Strategy<sup>47</sup> there is a point directly related to innovation drivers: NOK 245 million is dedicated to green innovation through GPP. In the Finnish document “Sustainable public procurement, Public sector becomes a pioneer in sustainable procurement” it is written, “*Public procurement can promote environmental innovations. However, new openings are not created unless risk-taking and attempting new ideas are encouraged*”. Development and innovation was also an important argument stressed in the interviews with the experts from Denmark and Norway. But the effect is difficult to measure.

In prolongation of the dynamic market effects GPP supports innovation through its focus on superior products. The decentralised structure of GPP allows local institutions to find new opportunities to specify their wishes and procure products and services. This means a variety of experience that is valuable for development. For example procurement of coach and taxi services allows new ways to reduce fuel consumption for transport by setting goals and introducing new measures, e.g. training of drivers.

GPP as driver for innovation has to be combined with fundamental conditions for innovation, technical options, production capacity, market situation etc.<sup>48</sup>

### 3.2.3 Easy implementation

GPP does not require the same process and procedures in its implementation as economic or legal regulatory instruments. Environmental legislation is normally decided at national or supra-national level, this is indeed often a long and complicated process. In comparison GPP is a quick and effective way of improving environmental aspects with a more limited scope. However simple to introduce in terms of regulation, GPP implies considerable technical challenges in terms of setting reasonable and adaptable requirements in procurement tenders for products.

### 3.2.4 Local commitment

GPP is being used when overall legislation or economic regulation is not ensuring procurement of products and services matching an institution’s (whether national or local) environmental policy. By this, GPP has the potential of supporting commitment and ownership in implementing the environmental policy at all levels.

To be effectively carried out, GPP requires vision, leadership and strategies implemented by dedicated staff of the individual institution.

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<sup>47</sup> Miljø-og samfunnsansvar i offentlige anskaffelser, Handlingsplan (2007-2008), see ref.

<sup>48</sup> GPP is a weaker driver than the overall national means like regulation and economic incentives.

This supports the decentralised commitment. GPP procurement is adopted to local conditions and to local context and can therefore only be implemented through local efforts.

When GPP is being decided at local level and GPP actions are part of local environmental strategies, GPP can be considered an important symbolic action. It demonstrates that administrations take the environment seriously and act accordingly, and it brands local institutions positively.

### 3.3 Challenges of GPP

#### *3.3.1 Leadership and vision*

GPP needs – as any other institutional tool – leadership and commitment from top management. When implemented efficiently in local organisations this normally is the case, but when used at decentralised level GPP needs support at the national level to be more efficient.

This is only seen sporadically at the national level. GPP is mentioned in national strategy plans in the Nordic countries, but is not on top of the political agenda for promotion and dissemination. Sometimes procurement officers are fighting against only short term economic thinking in other departments, a conflict which can only be solved efficiently by overall leadership.

No one is responsible for leadership at the national level, except the government as a whole or the prime minister. Often the responsibility is vested with the minister of environment, the ministers of finance or industry or a combination.

Leadership is connected to a simple and common vision, communicated efficiently by powerful and visible persons. One challenge of GPP is to accept higher costs for procurement in the investment phase based on the vision that these costs will be outweighed by long term returns.

A good example is the growth of the Danish windmill industry. It was supported – and still is – by subsidies and tax reduction for decades. But the industry has developed, reduced costs for construction and is now accountable for around 20% of Danish electricity consumption, a rate which is still growing. The Danish wind mill industry is now one the largest industry and export sectors in Denmark with a significant further potential.

GPP has played a role in this success, showing how good leadership by governments during decades and clear visions can promote environmentally friendly development with a huge market potential. This good example may be duplicated for other product groups, e.g. transport driven by alternative fuels, electric cars etc.

### 3.3.2 Structure and legislation

Structure and legislation can be a challenge for GPP as an easy and efficient tool.

An example is the Danish taxi structure, when all taxis are operated from a calling office, which must call the nearest taxi and not distinguish between more or less green taxis.

Legislation is not always supporting GPP in an easy way, for example it is not allowed according to EU legislation to require EMAS certification of suppliers in a public procurement tender, only to set corresponding material criteria.

Positively a structure for GPP nationwide is dependant at voluntary initiatives. In Denmark local institutions are urged to support GPP, but only weak instruments for supervision and follow up exist.

### 3.3.3 Staff resources

One challenge of GPP is the issue of local resources for implementation of GPP, necessary knowledge about the market, environmental aspects, development potential, tendering etc. However this challenge can be mitigated by guidelines and consultancy made available for decentralised organisations.

Furthermore it might be considered at national level to strengthen capacity of procurement education and training in basic education and post graduate courses.

### 3.3.4 Lack of environmental documentation methods and support tools

There seems to be a need for methods describing the potential positive market effects of GPP initiatives in economic and environmental terms to improve the basis for GPP decisions at national and sub-national levels.

## 3.4 Summary of advantages and challenges of GPP

- It is very flexible and dynamic compared to other regulatory instruments
- It works on market conditions (demand side) which is much better accepted by industry than legislation and taxes
- It is not as irreversible as other regulatory instruments
- It can work outside the national borders
- Specific requirements can be made in tenders, so the result is known.
- For complex products or services it might be the only viable method

The following challenges can be stated for GPP:

- The relative magnitude of public procurement is often too small for it to be used as a significant regulatory instrument
- The often higher procurement costs for green products constitute a barrier in itself and are not always fully balanced by lower life cycle costs.
- Leadership and visions are required at all levels
- It is crucial to address structural and legislative barriers to GPP
- It requires special competences by public procurement officers. This is in opposition to legislation and taxes, where the knowledge of the handling the consequences is often moved to industry.

### 3.5 Methodology discussion

The project has followed the initially proposed four-step methodology:

- Analysis of amount of GPP and environmental impact as basis for selection of three important product groups – based on existing statistical information and existing LCA studies.
- Description of means of regulation for the selected product groups in the Nordic countries – based on interviews with key stakeholders in all countries and review of documents identified through stakeholders. A semi-quantitative approach has been applied.
- Analysis of criteria for use of GPP – based on interviews with stakeholders and review of documents.
- Consequences of GPP demonstrated in two case stories – identified through key stakeholders.

The statement of environmental benefits of GPP is based on (the best and) relevant references, whereas it has not been possible to identify relevant references for the assessment of the (potential) impact of existing and optional regulation, including GPP. The project's analysis of these aspects is therefore mainly theoretical and qualitative, based on interviews and considerations of principles and the theoretical cons and pros connected to each regulatory instrument.

## References

- PricewaterhouseCoopers, Significant and Ecofys (2009), Collection of statistical information on Green Public Procurement in the EU Report on data collection results.
- Nathaniel O. Keohane, Richard L. Revesz, Robert N. Stavins (1998), The choice of Regulatory Instrument in Environmental Policy, Harvard Environmental Law Review vol 22.
- Sofia Lundberg, Per-Olov Marklund, Runar Brännlund (2009), Miljöensyn i offentlig upphandling. Samhällsekonomisk effektivitet och konkurrensbegränsande överväganden.
- Miljöverndepartementet, Fornyings- og Administrasjonsdepartementet, Barne- og Likestillingsdepartementet (2007).
- European Commission, Secretariat-General (2007), A Sustainable future in Our hands.
- Miljø- og samfunnsansvar i offentlige anskaffelser, Handlingsplan 2007–2008.
- Anna-Karin Jönbrink, Hans Eric Melin (2008), How Central Authorities can support Ecodesign, Company perspectives, TemaNord 2008:560
- Tomas Sander Poulsen, Bjørn Bauer, PlanMiljø: Innovative Green Public Procurement in the Nordic countries (Final draft), Nordic Council of Ministers, 2009.
- Bjørn Bauer, Ida Bode, PlanMiljø: Technology Procurement. Nordic Council of Ministers, 2007.
- Vinnova (2008), Offentlig upphandling som drivkraft för innovation och förnyelse, Vinnova Policy VP 2008:02.



## 4. Criteria for Efficient GPP

The perspectives of GPP can be unfolded when GPP is implemented as a strategic tool based on a specific analysis of the potential outcome of the regulation.

The following road map for implementation of efficient GPP is based on the analyses in the previous sections. The road map comprises the following steps/considerations:

1. Identification of product groups with considerable public procurement
2. Environmental impact of the product group
3. Potential for reduction through legal or economic instruments
4. Potential for reduction through GPP, including barrier assessment
5. Possibility for setting environmental criteria
6. Potential market effect and innovative effects of GPP

### *1) Volume of public procurement*

The volume of public procurement has a decisive influence on the potential environmental benefit of GPP – the larger the volume, the larger potential impact reduction through GPP. On top of this, a larger procurement volume also opens for GPP impact on the market and manufacturing processes.

### *2) Assessment of product groups' environmental impact*

Environmental regulation of products should focus on product groups that have a considerable impact on the environment as otherwise resources may be more efficiently utilised on other environmental initiatives. This goes also for GPP – why an environmental assessment of the major product groups is necessary.

### *3) Regulatory effect of other instruments*

The traditional legal and economic instruments are characterised by providing a predictable, comprehensible and quicker environmental effect and are in this aspect preferable when dealing with serious environmental impacts<sup>49</sup>. If such instruments are (or will be) implemented, GPP may still play a role utilising the dynamics of the market for additional environmental benefits<sup>50</sup>.

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<sup>49</sup> As described in Sofia Lundberg et al. (2009).

<sup>50</sup> For example: For buses, legal requirements are made continuously at EU level (Euronorm) and bus manufacturers continuously improve to meet these standards. On top of this, GPP may increase focus on alternative fuels or environmentally friendly driving techniques.

The analysis of regulatory instruments entails two angles:

- Is the product area regulated (or going to be regulated) by legal or economic instruments that provide the environmental benefits in a more efficient manner, and
- Do specific circumstances (e.g., market conditions, public interest) speak for GPP as a preferred regulatory instrument?

GPP is especially interesting in areas where other regulations are not suitable and criteria for GPP are fulfilled, e.g. when complexity of certain product areas hamper introduction of legal or economic instruments. Within IT, product requirements can be set for individual products, but when dealing with complete IT configurations for a public institution, or large server installations, the local context and local decisions determine the limits for energy requirements to the complete solution.

#### *4) Analysis of options for environmental improvements*

The relevant product groups for GPP have a significant environmental impact *and* realistic options for realising considerable impact reductions through GPP. A product group might have an extensive impact but if it cannot be reduced it is less relevant for operational GPP. The potential for achieving environmental benefits from GPP is determined based on a review of product alternatives, technological options for improvements, and costs associated with alternatives and improvements. If no alternatives are on the market, it may at the strategic level be relevant to consider dynamic and innovative procurement processes<sup>51</sup>.

#### *5) Possibility for setting environmental criteria*

Effective GPP is based on qualified criteria requiring an understanding of both environmental criteria in general, procurement practices, and the product's environmental impact. Green criteria prepared by central organisations can be very helpful for local procurement officers – along with eco-labels.

#### *6) Potential market effect of GPP*

From a national point of view the market effects of GPP are interesting in several aspects: Will GPP requirements be met by more than one supplier? Will GPP requirements lead to innovation and product development? How will GPP influence the structure of manufacturing sectors/suppliers?

From a local point of view the market issue is simpler: Is an environmental product or service available at a reasonable price?

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<sup>51</sup> As described in 'Technology Procurement', Bauer et al, Nordic Council of Ministers 2007.

## 4.1 GPP assessment model

Assessment of the above parameters is essential for the decision on use of GPP or not. The assessment depends on the specific case and the level of decision, strategic or operational.

The flowchart below suggests the sequence of evaluating the parameters from the point of view of a governmental GPP policy maker. The model can however serve to inspire decentralised organisations, depending of local circumstances and the knowledge available.

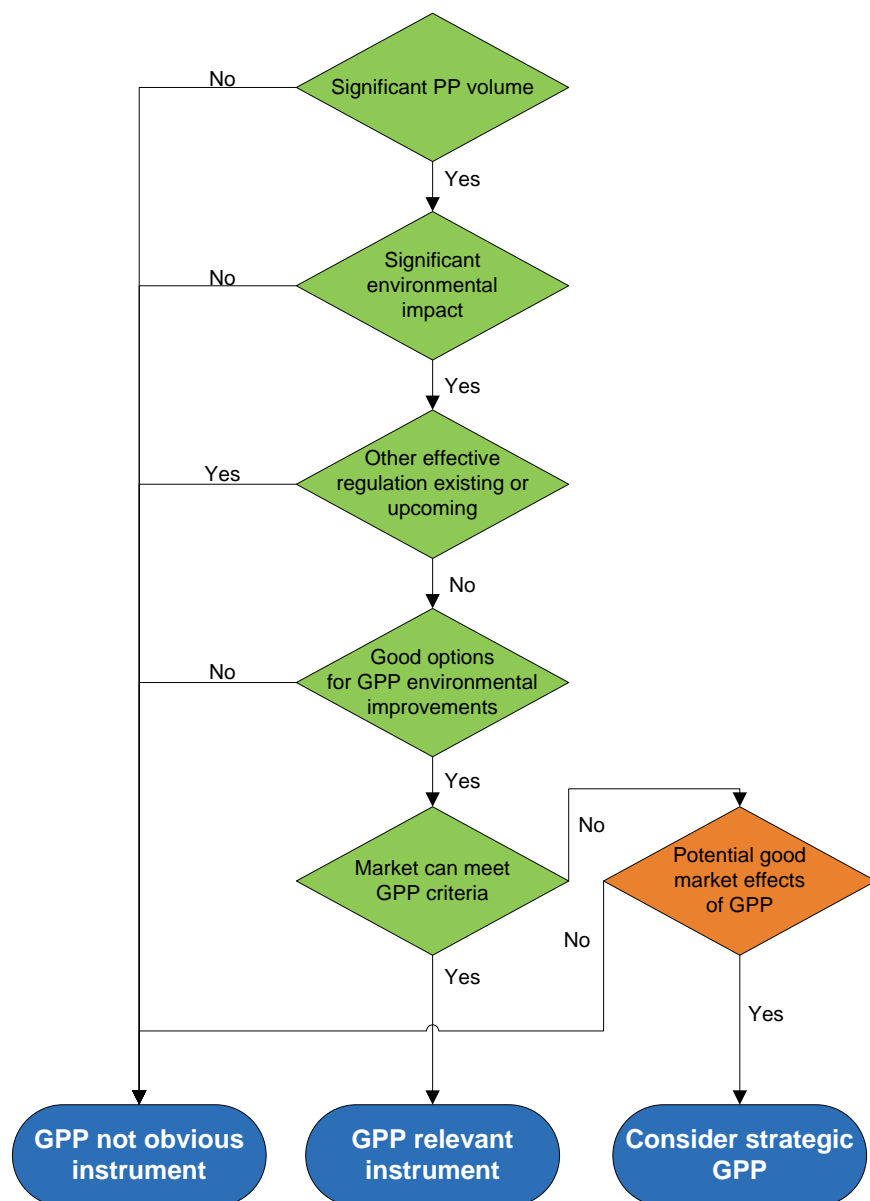


Figure 4.1: Flowchart for GPP assessment



## 5. Consequences of GPP-Cases

In this chapter two cases of GPP within two of the studied product groups are presented. They are chosen as two different and well documented examples recommended by key GPP persons in Denmark and Sweden. The case stories clearly demonstrate the potential of GPP when used expediently.

### 5.1 New Server Centre in City of Copenhagen

#### *Background*

The City of Copenhagen, Denmark's largest municipality, which provides day-to-day services to more than 500,000 people in Copenhagen, wanted to save money and reduce its carbon footprint. The City's seven administrations each had their own IT service centre, which made the IT infrastructure fragmented and disparate. The seven IT service centres ran a total of 15 server rooms with 700 machines, as well as seven separate storage systems, which were underutilised. The IT teams struggled to provide end users with a guaranteed level of uptime. And it was difficult to deliver any kind of service level agreement because resources were stretched.

#### *Process*

The City took the first step towards simplifying the infrastructure by establishing a shared service centre, bringing together a string of functions, including IT, which had previously been handled separately by the seven administrations. Next, the City turned its attention to the server/storage infrastructure and decided to replace the 15 server rooms with two data centres, based on a virtualization solution, which would be easier to manage, less expensive to run, and more environmentally friendly.

According to the City, the new infrastructure had to be designed to cope with an approximate doubling of the City administration end-users from 25,000 to 46,000 in the years ahead. It also had to be scalable enough to take on a number of IT services, which the municipality had outsourced to external providers. Andreas Hare, project manager at the City of Copenhagen, says: "Basically, we needed an IT infrastructure that was easy to scale in the future as our IT demands grew."

The IT team invited ten IT suppliers to make proposals for its virtualization solution and chose Dell as supplier because the company's proposal met the specific demands outlined in the tender documents, and because Dell showed great understanding for the City's situation. Dell's consultants showed the City of Copenhagen that it was able to reduce 638 servers to 32 servers, even though the City administration thought 64 physical machines would be the minimum<sup>52</sup>. This was the largest virtualization exercise undertaken by a public organisation in Denmark.

Cutting power costs and carbon emissions by approximately 77% the City of Copenhagen hopes to reap significant environmental and financial benefits from its new IT infrastructure over the next five years.

#### *Environmental and financial effects*

The City's estimates show that the previous infrastructure would have cost approximately DKK 11 million in power over the next five years, whereas the new solution would cost approximately DKK 2.5 million. Over the same period, the City estimates its carbon emissions will be 951 tonnes, as opposed to 4,201 tonnes with the previous infrastructure.

The expected 77% reduction in the City's IT carbon footprint comes at a time when it is committing to major overall cuts in emissions. "Through its Climate Vision, the City of Copenhagen aims to cut CO<sub>2</sub> emissions by a minimum of 20% before 2015".

Offering further support to the City's green agenda, Dell – working with its Plant a Tree for Me project – is making the solution CO<sub>2</sub> neutral by offsetting the remaining 951 tonnes of CO<sub>2</sub> emissions from the Dell infrastructure by planting 500 trees.

The infrastructure is much easier to manage, so the municipality can save money on administration. Andreas Hare believes the saving will be approximately DKK 15 million over the next five years. For the 18 server/storage support staff, the solution is expected to create a better and more exciting working environment. With just two data centres and simplified, automated management of the servers, the IT team can accomplish more with the same staff resources.

With less hardware to run, repair and replace, the City of Copenhagen expects the network's total cost of ownership (TCO) to fall. "Over the next five years, including the savings on power and administration costs, we estimate that the TCO will be 40% less than that of our previous infrastructure," says Hare.

The total estimated savings are DKK 20–30 million over a five year period. The precise procurement cost is not available for competitive reasons but is in the area of DKK 30–40 million.

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<sup>52</sup> Refer to [http://www.dell.com/downloads/global/casestudies/Kom\\_Copenhagen\\_csEng\\_100209.pdf](http://www.dell.com/downloads/global/casestudies/Kom_Copenhagen_csEng_100209.pdf).

**Table 5.1: Savings over a five year period**

Item	Savings 5 years
Infrastructure – power	DKK 8.5 million
Administration	DKK 15 million
CO <sub>2</sub>	3,250 tonnes

*Innovative effects*

There has been a specific introduction of a new product due to this GPP project. To make the server system CO<sub>2</sub> neutral Dell offered to plant trees to offset the total carbon emission of the servers. This “Plant a Tree for Me” concept is now a standard offer that every customer can apply to offset the CO<sub>2</sub> emission of the purchased IT-equipment. The development of this project was a spin-off directly related to the serious focus that the City of Copenhagen put on environmental criteria.

The fact that such a significant public tender was won based on green criteria and a green profile has not gone unnoticed in the organisation. According to Christian Møhl there is now more focus on the green aspects of servers in general, also in the international development organisation. Hence, the GPP is influencing the market towards a greener understanding.

*Perspective*

In a recent NCM eco-innovation project<sup>53</sup> an assessment was made of the potential of green IT for servers systems. The result showed that for large server rooms the financial effects were that if environmentally friendly server rooms were made the costs were EUR 16,909 less/year with a CO<sub>2</sub> reduction of 6,000 tonnes<sup>54</sup>. There are an estimated 4,000 of these centres in the Nordic countries.

There is again a very strong correlation between economic and environmental benefit by using the LCC perspective.

The example shows the potential for larger organisations that can manage a central IT unit with authority and knowledge. For smaller organisations this approach may be more difficult to implement and the strong centralisation of the IT service in an organisation may itself cause problems that are not dealt with in this case story.

<sup>53</sup> Innovative Green Public Procurement in Nordic Countries, PlanMiljø for the Nordic Council, 2009.

<sup>54</sup> The results have been calculated using Danish emission factors. As a consequence results are only directly representative for Denmark. Especially CO<sub>2</sub> emissions will differ between the Nordic countries due to large differences in energy production and associated average CO<sub>2</sub> emission factor.

## 5.2 Green procurement in Paratransit Service in City of Stockholm

Paratransit Service in the City of Stockholm uses green procurement to help increase the market share of green transportation in Stockholm and pays an additional fee to help cover the extra expenses for the contractor.

Paratransit Service provides transportation for disabled and elderly people unable to use regular public transport. It is a large transportation procurer and buys every year between 7,000 and 12,000 taxi trips. In 2008 contractors drove about 44 million kilometres for Paratransit Service. The service gives possibilities to travel all over the City of Stockholm for a reasonable fee.

It is the main goal for Paratransit Service that regular public transport reaches a quality level where all customers including disabled people can utilize it. But since taxi riding still plays a major role as a means of transportation for disabled people it is a goal to get as many of the trips on bio-fuel as possible. To stimulate the market and the transition into bio-fuel, Paratransit Service pays SEK 4.5 extra per 10 kilometres for a taxi on bio-fuel compared to a regular taxi<sup>55</sup>.

### *Innovation*

In Sweden the tax exemption for green fuels has made it possible for public procurers, such as Paratransit Service, to stimulate and speed up green developments. The demand for transportation with green taxis helps push forward additional products in the chain of sub-suppliers such as car manufacturers, gas stations etc. In this particular case the demand for special cars for bio-fuel led taxi companies to demand a certain technology from Volvo, which made Volvo re-launch a bio-fuel car, earlier taken off the market. Likewise the demand for driving on bio-fuel has pushed the development of a steady supply, a good distribution and more gas stations with the supply of bio-fuels<sup>56</sup>.

### *Environmental benefits*

In 2008 Paratransit Services has driven 10 million km by green taxis<sup>57</sup>. A normal car has a CO<sub>2</sub> emission of 120–150 g/km, whereas a car on bio-fuel has an emission on 8–15 g/km<sup>58</sup>. In 2008 Paratransit Services saved the environment for between 1,120 and 1,350 tonnes of CO<sub>2</sub>.

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<sup>55</sup> SEK 9 when green taxis were introduced.

<sup>56</sup> Anders Berge, Taxiforbundet, Sweden.

<sup>57</sup> Per Junesjö, Färdtjänsten.

<sup>58</sup> Børsen Klima d. 15.6.09.

### *Economic issues*

The extra expenses Paratransit Service voluntarily has chosen to spend on green taxis amount to SEK 450,000 in 2008<sup>59</sup>.

The economic benefits for the contractors from changing their fuel have varied depending on the type. Bio ethanol is the least profitable. The extra resources from Paratransit Service cannot cover the extra expenses on about 50% that the taxi companies have been facing<sup>60</sup>. Still 18% has chosen to change into bio ethanol. It is now more attractive for many to change into bio-fuel, which is 20–30% cheaper than regular diesel<sup>61</sup>, but distribution problems have hampered developments.

Despite these problems a large number of taxi companies have changed into green fuel, and new numbers show a development from 0% bio-fuel in 2004 to almost 34% in 2009<sup>62</sup>, a development that is expected to continue and be stimulated by the taxi organisations. Not only Paratransit Services has helped pushing the development in a greener direction, also other public institutions and companies such as the City of Stockholm, the Swedish Parliament, Arlanda Airport, railway stations etc. help stimulate developments by prioritising green taxis.

*“It is important to understand in this case that when more parties drive towards the same goal the effect is much larger. In this case when several procurers as school-transport, hospital, airports, hotel etc. demand green transport you get a much larger effect.” (Per Junesjö, Paratransit Service).*

Apart from green public procurement, political tools such as tax exemptions for bio-fuel and for paying toll in the Stockholm downtown toll zone have helped make green taxis a success and made a difference in the speed of transition.

### *Further perspectives*

The above-cited project “Innovative Green Public Procurement” also calculated the environmental potential of a situation where large Mercedes taxis were substituted with more efficient cars.

A Mercedes-Benz C 200 CDI aut. emits 171 g/km while a Toyota Yaris 1,4 D-4D 5-door aut. emits 119 g/km. In 2006 and 2007 Danish taxi transport amounted to 408 million person-km ([www.statistikbanken.dk](http://www.statistikbanken.dk)). If 25% of the transport could be made by a smaller car it amounts to 100 million km or a CO<sub>2</sub> saving of 100 million times (171–119 g/km) equal to 5,200 tonnes of CO<sub>2</sub>.

<sup>59</sup> SEK 4.5 /km. (10,000 km in 2008).

<sup>60</sup> Market prices 24 June 2009: Ethanol: SEK 15/10 km. Diesel: SEK 10./10 km (Anders Berge, Taxiförbundet).

<sup>61</sup> Børsen Klima d. 15.6.09.

<sup>62</sup> Branschläget 2009, Svenska Taxiförbundet.

### *Electric taxis*

In the project “Innovative green public procurement”, a calculation referring to electric taxis was made. The result showed that the emission from an electric car was approximately 20% of that of a diesel taxi. However, the procurement price between the electric taxi and the diesel taxi was very significant for the financial result. If the electric taxi was more than 50% more expensive, costs favoured the diesel taxi. This shows that economic instruments will probably be effective for promotion of electric cars.

### *Discussion*

The example shows how greening can be pushed by a combination of a central initiative – tax exemption for green public procurement – and an organisational follow up. It also shows that even though environmental benefits are coming on slowly the process is preparing the market and producers for the future in a smooth way.

## References

PlanMiljø for the NMRIPP, (2009): Innovative Green Public Procurement in the Nordic countries.

### *Persons contacted:*

Andreas Hare, IT Project Manager, City of  
Copenhagen, Denmark  
Christian Møhl, Dell Denmark  
Anders Berge, Taxiforbundet, Sweden  
Per Junesjö, Färdtjänsten, Sweden

## 6. Conclusions and recommendations

The aim of this project is to identify under which conditions GPP can be the most useful instrument for obtaining environmental improvement.

The key strengths of traditional regulatory mechanisms as legislation and economic instruments are their overall coverage and effects, effectively impacting environment, society, and manufacturers as a whole. Their key weak points are the long decision making process required and that general regulation does not fit well to manage complex local conditions.

GPP is a supplementary tool and in some cases the only tool for regulation. The strengths of GPP are:

- Soft and more flexible introduction and promotion of environmentally better standards and improvements
- Impact on markets in a dynamic way, acceptable for consumers and manufacturers
- Inclusion of local context requirements that cannot be regulated at the national level
- Encouragement of local commitment in environmental politics and environmental actions.

The weaknesses are

- The relative magnitude of public procurement is often too small for GPP to become a relevant regulatory instrument with significant environmental impacts
- Slower speed of environmental improvements
- Leadership and visions are required at all levels
- It is crucial to address structural and legislative barriers to GPP.

LCC (Life Cycle Cost assessments) has shown to be a useful instrument assessing costs of GPP over the life time of products and services.

“Computers and related services” is an obvious product group for GPP because products with the lowest LCC generally also has the lowest CO<sub>2</sub> emission. Hence, there are both economic and environmental benefits. Another relevant product group is construction. Transport is an example of GPP where environmental benefits and costs in the short run are in reverse ratio. For other product groups the picture is less clear, but GPP is also useful for cleaning products and perhaps even more in the future, including LCC aspects for cleaning water temperature.

*Recommendations*

- Use the flowchart to decide when to use GPP. GPP seems suitable within IT, transport, construction and cleaning products – but also other product groups may qualify for intense GPP efforts.
- Expand knowledge and use of the LCC methodology in the public sector.
- At central level prioritize GPP as tool, strengthen visions, leadership, strategies, systems and education – and address barriers
- Share good examples and documentation, such as the Copenhagen IT example and the Stockholm transport example, to expand the use of and reduce costs of GPP.
- Carry out more studies, for example a detailed study in the field of public construction and housing to analyze GPP barriers and make proposals for improvement. This field imply good potential benefits due to the big PP market share and the obviously relevant use of using LCC methods for financial calculations the buildings are in operation for decades after construction

**References***Reports*

- Anna-Karin Jönbrink, Hans Eric Melin : How Central Authorities can support Ecodesign, Company perspectives, TemaNord 2008:560 (2008).
- European Commission Report: “Bridging the Valley of Death: Public support for commercialisation of eco-innovation, may 2009”
- Government of Canada “Assessing, Selecting, and Implementing instruments for Government Action” (2008)
- Miljöstyrningsrådet Sweden: (<http://www.ms.r.se/sv/Upphandling/Kriterier/Stad-och-rengoring/>)
- Miljøverndepartementet, Fornyings- og Administrasjonsdepartementet, Barne- og Likestillingsdepartementet (2007), Miljø- og samfunnsansvar i offentlige anskaffelser, Handlingsplan 2007–2008.
- Nathaniel O. Keohane, Richard L. Revesz, Robert N. Stavins, The choice of Regulatory Instrument in Environmental Policy, Harvard Environmental Law Review vol 22. (1998)
- Nordic Council of Ministers: How Central authorities can support eco design (2008)
- OECD: Improving the Environmental Performance of Public Procurement: Report on Implementation of the Council Recommendation (2007)
- Planmiljø for Nordic Council of Ministers: Innovative Green Public Procurement in Nordic Countries, 2009
- Planmiljø for Nordic Council of Ministers: Technology Procurement, 2007.
- PricewaterhouseCoopers, Significant and Ecofys: Collection of statistical information on Green Public Procurement in the EU. Report on data collection results (2009)
- Sofia Lundberg, Per-Olov Marklund, Runar Brännlund, Miljøhensyn i offentlig opphandling. Samhøllsekonomisk effektivitet og konkurransbegrænsende øvervæganen. (2009)
- Vinnova: Offentlig opphandling som drivkraft for innovation och förnyelse, Vinnova Policy VP 2008:02. (2008),
- Weidema et. al: Prioritisation within the integrated product policy (2005) Danish Ministry of the Environment, 2005.

*Persons interviewed*

Anders Berge, Juridik & Miljö, Taxi Association Sweden  
Annika Löfgren, Ministry of Environment Sweden  
Berit Mathiesen, Local Government Denmark  
Bjørn Strandli, Leader of the Norwegian GPP panel  
Heidi Larsen, Greater Copenhagen Region  
Jakob Zeuthen, SPT (Branch Association for sob, perfume and technical/chemical articles)  
Jesper Petersen, Movia  
Jørn Berthelsen, Head of Development Department, Taxi Association in Norway  
Lars Annerberg, Buss Association Sweden  
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Markus Ukkola, Public Procurement Advisory Services Finland  
Martin Standley, Agency for Public Management and eGovernment Norway  
Mette Lise Jensen, Environmental Protection Agency Denmark  
Nikula Taina, Ministry of the Environment Finland  
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Peter Nohrstedt, Swedish Environmental Management Council Sweden  
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# Sammenfatning på dansk

Der er politisk enighed i de nordiske lande om, at grønt offentligt indkøb – GPP – kan spille en væsentlig rolle i bestræbelserne på at påvirke den private sektor i retning af mere bæredygtige produkter og tjenester.

Offentligt indkøb udgør 16 % af BNP i EU-landene og for visse produktgrupper er den offentlige sektor den vigtigste aftager. Det har imidlertid ikke været analyseret, på hvilke områder GPP kan få særlig effekt som styringsmiddel. Dette projekt sigter på at identificere produktgrupper, for hvilke grønne offentlige indkøb er et effektivt reguleringsinstrument, og på at identificere fordele og ulemper ved GPP som styringsmiddel.

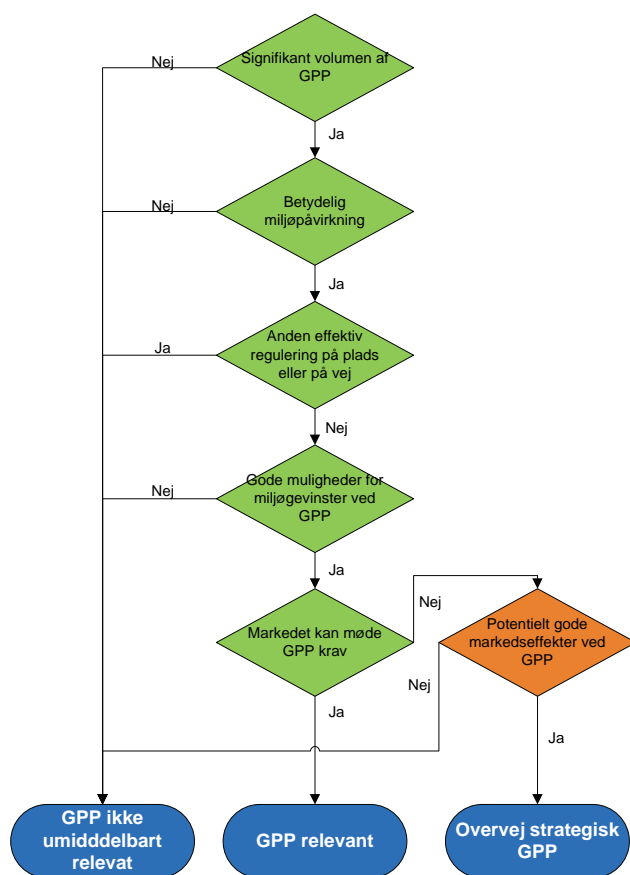
I projektets første fase er den samlede miljøpåvirkning af offentligt indkøb opgjort ved hjælp af statistiske data vedr. indkøb og eksisterende analyser af produktgruppers miljøpåvirkning. Baseret på en analyse af miljømæssige og øvrige perspektiver ved GPP: Taxi- og busstrafik, computere og relaterede ydelser, og rengøringsmidler. De tre produktgrupper dækker områder, hvor miljøpåvirkningen er signifikant og grønne offentlige indkøb er muligt med rimelige omkostninger.

I anden fase blev de tre varegrupper analyseret i forhold til de lovgivningsmæssige og økonomiske instrumenter, der anvendes i de nordiske lande. Analysen viste, at GPP kan være et godt alternativ, hvor mere gennemgribende juridiske og økonomiske instrumenter ikke findes egnet.

Mere generelt findes GPP i fase tre egnet som styringsmiddel særligt inden for produktgrupper, hvor offentligt indkøb udgør en relativt stor andel af det samlede indkøb, og hvor der er et betydeligt miljøinnovativt potentiale. GPP kan anvendes til at fremme miljøinnovation ved at lukke det „innovative hul”, som opstår hvor industrien har en særlig stor økonomisk udfordring i overgangen fra produktudvikling til opskalering og kommercialisering af et produkt.

GPP fungerer i praksis som et blødere og mere dynamisk styringsmiddel end de traditionelle juridiske og økonomiske styringsmidler. Samtidig giver GPP særlige muligheder for lokal profilering i sammenhæng med en stærk lokal miljøpolitik. Effektiv anvendelse af GPP som styringsmiddel kræver lederskab og visioner, ligesom der er behov for kvalificerede og tilstrækkelige medarbejderressourcer med solid viden om markeder, udbud, miljøforhold og lovgivning.

Analysen fører til en model for vurdering af, om GPP er et egnet styringsmiddel inden for bestemte produktgrupper. Modellen er konstrueret til lovgivere på centralt plan (i de nordiske lande), men kan også give inspiration og input til sub-nationale organisationer.



Fordelene ved GPP er afsluttende demonstreret ved gennemgang af to eksempler: Indkøb af servere til Københavns Kommune og indkøb af transport for handicappede og ældre mennesker i Stockholm. Eksemplerne viser tydeligt, hvorledes en dedikeret og ambitiøs (lokale) organisation kan gøre en væsentlig forskel for miljøet med overskuelige eller ligefrem økonomiske konsekvenser.

Rapporten konkluderer, at grønt offentligt indkøb er et supplerende redskab til traditionelle og mere gennemgribende legale og økonomiske styringsmidler.

De stærke sider ved GPP er:

- Blødere, mere fleksibel styring
- Påvirker markeder på en dynamisk måde, acceptabelt for forbrugerne og producenterne
- Giver mulighed for krav udsprunget af lokal kontekst.

De svage sider er:

- Den relative størrelse af offentligt indkøb er ofte for lille til at opnå effektivt GPP
- Langsommere hastighed af miljøforbedringer
- Lederskab, visioner, kompetencer og systemer er nødvendige på alle niveauer.

Den anvendte metode er semikvantitativ, begrænset af omfanget af eksisterende studier og analyser, særligt på det økonomiske område.

Konsulenterne anbefaler på grundlag af arbejdet, blandt andet:

- At udvide kendskabet til og brugen af LCC (Life Cycle Costs) metoden i den offentlige sektor med henblik på at indkalkulere driftsøkonomi i indkøbsbeslutninger
- På centralt plan at prioritere GPP som redskab ved at styrke visioner, strategier, systemer og uddannelse og identificere barrierer
- At dele gode eksempler og dokumentation med henblik på at udvide brugen af og at reducere omkostningerne ved GPP
- At foretage flere undersøgelser, særligt en detaljeret undersøgelse af det komplicerede, men løfterige område „offentligt byggeri”



# Appendix 1: LCA data and procurement volume

Område	Unit	Taxi and coach services	Energy for heating	Construction materials	Electricity use	Computer and related services	Cleaning products	Post and telecommunication	Meat purchase	Pharmaceuticals
Public spending	mill euro	1398	1252	1183	1074	2317	656	4466	203	1965
PE parameter										
Global warming	PE/kDKK	7,0E-03	1,5E-02		1,4E-02				5,6E-03	
Ozone depletion	PE/kDKK	5,4E-03					7,8E-03			5,4E-03
Acidification	PE/kDKK	6,5E-03	5,3E-03		4,4E-03		3,5E-03		1,1E-02	
Nutrient enrichment	PE/kDKK						5,4E-03		3,0E-02	
Photochemical ozone formation	PE/kDKK	5,6E-03	7,1E-03	1,2E-02			8,5E-03			
Ecotoxicity	PE/kDKK	5,2E-03					4,4E-03		1,1E-02	
Human toxicity	PE/kDKK	7,3E-03		1,4E-02		8,4E-03				
<b>Total</b>	PE/kDKK	3,7E-02	2,7E-02	2,6E-02	1,8E-02	8,4E-03	3,0E-02	3,6E-03	5,8E-02	5,4E-03
Global warming	ton CO2	2,5E+06	4,8E+06		3,9E+06				2,9E+05	
Ozone depletion	ton cfc	2,2E+00					1,5E+00			3,1E+00
Acidification	ton SO2	1,3E+04	9,9E+03		7,0E+03		3,4E+03		3,3E+03	
Nutrient enrichment	ton NO3						1,5E+04		2,6E+04	
Photochemical ozone formation	ton C2H4	2,7E+03	3,1E+03	4,9E+03			1,9E+03			
Ecotoxicity	M3 Vand	2,0E+11								
Human toxicity	m3 air	3,4E+14		5,5E+14		6,4E+14			6,1E+10	
<b>Total</b>	PE	3,9E+05	2,6E+05	2,3E+05	1,5E+05	1,5E+05	1,5E+05	1,2E+05	8,8E+04	8,0E+04