ENGLISH SUMMARY

The present report from the Chairmen of the Danish Council of Environmental Economics contains five chapters. In chapter I the costs of the ambitious renewable energy targets in Denmark are analysed. This is followed by two shorter chapters about the Danish Resource Strategy and about the Danish management of invasive alien species. Chapter IV presents an analysis of the recreational value of natural areas and urban green spaces in Denmark. The last chapter reviews the organisation and regulation of public transport in Denmark.

Chapter I: Costs of Renewable Energy Targets

Denmark has chosen to pursue an energy policy that is more ambitious in some areas than is required by international obligations. For example, the EU target for Denmark is a share of 30 per cent of energy consumption from renewable energy by 2020, while the current Danish energy policy targets a renewable energy share of around 35 per cent. The chapter examines the costs of this ambitious Danish renewable energy policy.

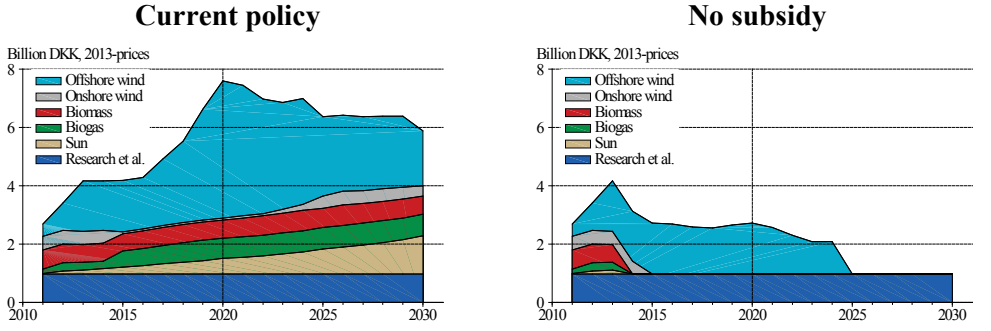
Most of the renewable energy in Denmark is used for the production of electricity and district heating, and thus concerns the part of the economy covered by the EU Emissions Trading System (EU ETS) which limits the greenhouse gas emissions in these sectors. Therefore, subsidies for the use of renewable energy instead of fossil fuels in electricity and heat production do not lead to lower CO_2 emissions at the European level, but merely shift the emissions to other firms or sectors regulated by the EU ETS.

The use of renewable energy, such as wind and wood pellets, is generally more expensive than fossil fuels, even when taking into account the CO_2 tax and quota requirements for CO_2 emissions. To promote the use of renewable

Kapitlet er færdigredigeret den 3. februar 2014.

energy beyond the level resulting from this regulation, Denmark has chosen to subsidize renewable energy. Model calculations indicate that the support of renewable energy in electricity production in 2020 will amount to more than DKK 7 billion (in 2013 prices), see figure A. This subsidy is financed through a PSO tariff (Public Service Obligation) that is added to electricity bills, and which is estimated to amount to just over DKK 0.20 per kWh (EUR 27 per MWh) by 2020. More wind power leads to lower electricity prices on the spot market, but financing costs by the PSO more than outweighs this gain.

Figure A *Subsidies to electricity from renewable energy with the current policy and the alternative with no subsidies*



Note: In the scenario "No subsidy" it is assumed that there are no subsidies for use of renewable energy in the production of electricity (except for existing wind turbines during the contract period).

Source: EA Energianalyse and own calculations.

The scenario *Current policy* is an updated version of the energy projection from *Økonomi og Miljø 2013* and is based on the energy policy as laid out in the Danish Energy Agreement 2012 (Energiaftale 2012). The most significant change is an update of the CO_2 quota price to bring it into line with the now lower price from the IEA (International Energy Agency) in their New Policy Scenario. In the scenario *No subsidy*, all direct subsidies to production of electricity from renewable energy are discontinued from 2014 and forward. Existing wind turbines receive support until the end of their support contract.

Calculations indicate that Denmark would be very close to fulfilling its EU target for a renewable energy share of 30 per cent by 2020, even if all subsidies for new wind turbines and direct subsidies for solar cells and the use of biogas and biomass in electricity generation were repealed. In such a situation no more wind turbines would be built, and the consumption of biomass and gas in power production would be significantly reduced. Overall, this would lead to a renewable energy share of just under 30 per cent in 2020. It would also reduce the PSO payment significantly, implying a saving for Danish firms and households of around DKK 3½ billion in 2020 (in 2013-prices). This would be expected to have a positive impact on employment of around 5,000 more jobs over a 2-3 year period.

Support for offshore wind turbines is particularly large when measured per kWh. Therefore, it is appropriate to reconsider the decision to build the two offshore farms, Horns Rev 3 and Krieger's Flak, or, at least, only build them if and when it can be done with a much smaller subsidy compared to the existing offshore wind farms. As a result of technological development, it is likely that offshore wind turbines will produce electricity at a lower cost in the future. At the same time there is an expectation of a rising spot price of electricity. Both changes would reduce the need for future support for offshore wind turbines, which further justifies postponing the construction of the two new offshore wind farms.

Whether one chooses to reduce subsidies to renewable energy or not, the funding should be changed. The burden of the current funding through PSO tariffs on electricity bill falls on a narrow tax base, which weakens the ability of firms to minimise costs, thus reducing their productivity. The welfare economic costs of renewable energy subsidies will be reduced if the subsidies are financed through general income tax.

The European Commission has just presented a proposal for climate targets for 2030. This includes the goal of reducing greenhouse gas emissions by 40 per cent by 2030 compared to 1990 emissions. In contrast to the EU 2020 targets, the

new targets are not set for each country per se, but stress that countries should be able to make reductions as cheaply as possible. It is encouraging that the EU has set targets for greenhouse gas reductions for 2030, and it is appropriate that the focus is on reducing greenhouse gas emissions and not on milestones as shares for renewable energy. The Danish energy and climate policy must, of course, comply with international agreements. If Denmark wants to be more ambitious, efforts should be put where they actually reduce the total emissions, namely in the form of domestic reductions in the non-ETS covered emissions of greenhouse gases.

Chapter II: The Danish Resource Strategy

In 2013, the government launched a new Resource Strategy for public waste management called *Denmark without waste*.[1] The main focus of the strategy is to increase waste recycling and, thereby, reduce the amount of waste that is incinerated. Since the 1990s, incineration has played an important role in Danish waste management. In 2011, 41 per cent of the waste was incinerated, 53 per cent was recycled and only 6 per cent went to landfill.[2] The chapter contains a critical review of the target to increase recycling of waste and the economic reasoning behind this target.

The strategy is partly motivated by a concern about increasing resource prices, which is used as an argument for increased public support for recycling, e.g. supporting innovation in recycling technologies. However, increasing prices will improve the profitability of recycling and resource efficiency and, thereby, decrease the pressure on the primary resource itself. This is also the case when increasing prices on primary resources are caused by monopoly power or trade barriers in countries outside the

1) An English version of the Strategy can be downloaded here: http://www.mst.dk/English/Waste/waste_strategy_and_waste_prevention/waste_strategy_and_waste_prevention.htm.

2) Not including construction and demolition waste.

EU. Therefore, increasing resource prices do not necessitate policy measures in themselves.

The strategy includes measures to improve the recycling of 1) phosphate in sewage sludge and 2) critical raw materials found in e-waste. In both cases, it is concluded in the strategy, that recycling is not profitable at the current price level and that cheaper technology therefore has to be developed with public support. However, supporting new technologies is not an appropriate use of public funds unless the aim is to correct for market failures. In the above cases there exist no market failures that could support the need for public support. Instead, an increase in resource prices would, in itself, lead to the development of new recycling technologies. It should, therefore, be left to private companies.

The Resource Strategy includes a target for the recycling rates of different materials from household waste: paper, cardboard, glass, metal, plastic, bio waste and wood. This is to be achieved by increasing the households' efforts in sorting household waste. Currently, most of this type of household waste is incinerated and only 22 per cent is recycled.

It is only optimal to increase recycling if the welfare economic costs of recycling are lower than the welfare economic costs of incineration. To investigate the welfare economic costs and benefits of increased recycling, the government has carried out a cost-benefit analysis of different waste management policies that would potentially increase the recycling rates.[3] The analysis showed little difference between the various scenarios, see table A. The conclusion was that the welfare economic costs of increased recycling were on par with the welfare economic costs of continued incineration of household waste.

3) For more details on the analysis please refer to the English summary in Miljøstyrelsen (2013): Miljø- og samfundsøkonomisk vurdering af muligheder for øget genanvendelse af papir, pap, plast, metal og organisk affald fra dagrenovation, Miljøprojekt nr. 1458.

Table A Welfare economic costs of increased recycling of household waste

	Base-scenario 1	Scenario 3A	Scenario 6A	Scenario 7
	---------- DKK per tonne waste ----------			
Waste management costs	2,339	2,423	2,211	2,144
Revenues from sales	-755	-690	-758	-778
National environmental effects [a)]	-78	-60	-56	-63
International environmental effects[a)]	-235	-363	-365	-362
Total	**1,282**	**1,325**	**1,062**	**971**

a) All scenarios have environmental benefits (negative environmental costs). The environmental benefits primarily originate from lower levels of production of primary resources abroad.

Note: The scenario numbers refer to the original report. For simplicity, only four out of thirteen scenarios are included her. The chosen scenarios differ with regard to types of materials for recycling and technological aspects.

Source: Miljøstyrelsen (2013): Miljø- og samfundsøkonomisk vurdering af muligheder for øget genanvendelse af papir, pap, plast, metal og organisk affald fra dagrenovation, Miljøprojekt nr. 1458.

Based on the analysis, it is also noticed that increased recycling does not create national environmental benefits compared to continued incineration. When recycling is increased, air pollution and emission of greenhouse gases also increases since the recycled materials are transported for longer distances than household waste that is incinerated. At the same time, incineration has to live up to strong emission targets in Denmark for air pollutants and emissions are therefore low. Hence, there are no clear environmental arguments for increased recycling for this type of waste.

Further, the original cost-benefit analysis makes use of a number of problematic assumptions. This leads to an overestimation of the cost of incineration and an underestimation of the cost of increased recycling. The main problematic assumptions are as follows:

- Diverging assumptions regarding waste collection costs in the base scenario and the alternative scenarios

- Not taking the households' time use into account when estimating the cost of increased sorting of household waste
- Including international environmental benefits of increased recycling while disregarding the environmental cost.

When the cost-benefit analysis is adjusted to take account of additional welfare economic costs and benefits, which were excluded in the original analysis, the welfare economic cost of increased recycling of household waste was DKK 600 to DKK 1,000 per tonne of waste higher than the base scenario, see table B. Therefore, increased recycling of household waste cannot be recommended based on the cost-benefit analysis.

Table B *Adjusted welfare economic costs of increased recycling of household waste*

	Base-scenario 1	**Scenario 3A**	**Scenario 6A**	**Scenario 7**
	---------- DKK per ton waste ----------			
Total cost in original analysis	1,282	1,325	1,062	971
Adjustment: identical assumptions regarding waste collection costs	981	1,325	1,062	971
Further adjustment: including household time costs	981	1,845	1,581	1,489
Further adjustment: excluding international environmental costs	1,216	2,208	1,946	1,851

Note: The table shows the consequences for the total welfare economic cost of correcting for three problematic assumptions in the original analysis.

Source: Own calculations.

Chapter III: Invasive Alien Species

Invasive alien species are considered to be the second largest threat to global biodiversity after habitat loss, and recently the European Commission has proposed regulations for the prevention and management of invasive alien species. Since 2009 Denmark has had a national action plan dealing with this subject.

According to the Convention on Biological Diversity, an invasive alien species is defined as a species that is introduced outside its natural range, and that might survive and subsequently reproduce and threaten biological diversity.

Damage costs of invasive alien species include the effects on native nature (biodiversity), health effects (allergy, rash), economic effects (output loss) as well as damage to buildings and infrastructure. Effort costs are linked to measures that limit the distribution of invasive alien species or prevent them from being introduced, and thus reduce damage costs. Based on an assessment of potential damage and effort costs of invasive alien species, a cost estimate for Denmark could be almost DKK 1 billion a year. However, this would be an underestimate, particularly because the values of biodiversity effects are not recognized. This estimate shows that there are potentially significant costs associated with invasive alien species in Denmark.

Denmark is obliged to control invasive alien species, but the current administration seems not to be sufficiently supported by legislative incentives. The Danish action plan for invasive alien species presents many useful principles, but the effort, in practice, does not seem to fulfil these intentions.

The control of invasive alien species in Denmark is carried out by multiple stakeholders; among them are private households, private land owners (forests and farms), municipalities and the state. Except for some invasive alien species such as the raccoon dog, total effort in Denmark is not coordinated and can be very diverse between individual

stakeholders. This leads to an inefficient effort because invasive alien species is a cross-border challenge. For example, a lack of effort in one municipality will lead to efforts in the neighboring municipality becoming less effective. Efforts aimed at the worst invasive alien species should be prioritized and managed on a national level and should be supported by legislative initiatives that specify the tasks and responsibilities of the individual stakeholders.

The characteristics and uncertainties associated with invasive alien species mean that command and control regulation (if necessary in combination with subsidies) often will be preferred over economic incentives. For many species, waiting to take action until the species is fully established in an area may be associated with high costs. Thus, using the precautionary principle is relevant, and it can be further justified by the fact that some invasive alien species lead to irreversible environmental impacts.

Invasive alien species spread across borders, often as a result of international trade, so international policy cooperation is therefore important. Sharing knowledge about the damage effects, control methods and control costs, and collaborating on "early warning systems" may be key areas for such cooperation.

Chapter IV: Recreational Values Generated by Natural Areas and Urban Green Spaces

Natural areas provide a range of ecosystem services, one being the possibility to pursue outdoor recreation. Recreational value can represent a major part of the total economic value generated by natural areas. Chapter IV provides an assessment of the recreational value derived from natural areas and city parks across Denmark.

The assessment is based on a two stage multiple-site travel cost model, which combines spatial data on recreational trips, demographics and socioeconomics for the Danish population and the location and characteristics of Danish

recreational areas. In the first stage, the probability of visiting a given site is modelled as a function of the characteristics of the destination site and all other possible sites (including travel costs, habitat type, size of areas etc.). The sites included in the study consist of a variety of habitats, such as forests, open areas (e.g. heather, meadows, bogs etc.) and beaches. In the model's second stage, the demand for trips is modelled as the expected number of trips per year as a function of socioeconomic characteristics and the availability and quality of recreational sites. The model is partly based on data collected through a web-based survey where interactive maps were used in order to obtain coordinates on the outset and destination for each respondent's last recreational trip. The travel cost model was developed in cooperation with the Department of Environmental Science, Aarhus University.

The model was used to estimate the annual number of visits by the adult Danish population and the recreational value of the different recreational sites. The analysis shows, that a natural area can generate substantial recreational value, but it can also generate a value close to zero. The average annual recreational value per ha for a natural area is approximately DKK 8,000 per ha, but the value ranges from less than DKK 1,000 per ha and up to over DKK 700,000 per ha. City parks in the major cities are found to generate even higher values.

The natural areas with the highest recreational value are those with a high density of potential users within close proximity. This suggests that new areas should be placed on the outskirts of cities. This is in line with the findings of other Danish studies, but this study is the first to control for the access to green spaces within the cities as well. The conclusion is that, even when controlling for access to outdoor recreation within the major cities, a natural area still generates the highest recreational value if it is situated close to the major cities.

Location is important, but recreational value also depends on the quality of the site. The analysis indicates that people prefer sites with a combination of forest, lakes and streams

and close proximity to the sea, and areas included in the Natura 2000 framework, which, in general, are areas with high natural value. State-owned forests are preferred over privately owned forests, which could be due to different management schemes or that access rules for the public are less restrictive in state-owned forests.

In the context of outdoor recreation, forest is an important habitat. The Danish Government is pursuing an ambitious afforestation plan to double the forest area in Denmark over the next 80-100 years. This objective entails that 20-25 per cent of Denmark will be covered by forest landscapes by 2090. In order to achieve this objective the state plants new forests and offers subsidies for afforestation.

An assessment of the recreational value generated by new state-owned forests using the travel cost model, shows that the average annual recreational value is approximately DKK 37,000 per ha. This is a higher recreational value than the one found for the majority of the existing natural areas. A likely reason for these higher values is that the state, when choosing where to locate new forests, prefers locations close to cities. Still the recreational value found for the new state forests varies, with some forests generating a recreational value per ha nearly 15 times higher than others. This indicates that some of these new forests could have been located more favourably elsewhere and then generated higher recreational values than they will be able to generate at their current location.

Given that the recreational value of a new state forest depends heavily on location, and that the state expects to carry out more afforestation projects, society could benefit from the state implementing a more systematic approach when choosing where to locate its new forests. It is therefore recommended that a systematic planning process becomes part of the new national outdoor policy. When planning new infrastructure projects, economic analysis and ranking of different potential projects are a part of the decision process. A similar approach should be adopted for state afforestation projects.

Outdoor recreation is only one out of multiple ecosystem services generated by forests. Afforestation leads to carbon storage and by converting farmland into forests, the negative environmental impact from agriculture, caused by pesticide use and emission of ammonia and other nitrogen compounds, is reduced. The study indicates that the benefits of outdoor recreation are considerably higher than the benefits generated by carbon storage and reductions in ammonia, etc. Based on these findings, the decision on where to locate new forests should, to a large extent, be driven by potential recreational values. It should be noted that the value of some ecosystem services is unknown and, e.g., the benefit generated by avoiding pesticide contamination of drinking water, a benefit heavily dependent on location as well, is not included.

Afforestation by private landowners is subsidised by the state in order to increase forest cover. The new forests are generally located in municipalities where the recreational value of the existing recreational sites is low, probably due to a high density of substitute sites and a low population density. Based on the distribution of forests across municipalities, it is estimated that the recreational value of the new private forests is less than one tenth of that generated by new state forests.

It is recommended that the subsidy scheme is adjusted so that it increases the incentives for landowners with farmland close to the cities, where the potential number of forest users is the highest, to participate, and thereby generating new forests with higher recreational values. The subsidy scheme should, of course, include incentives for producing other non-marketed ecosystem services as well, but this study indicates that the location is paramount for recreational value and that the recreational value constitutes a major part of the total economic value of the forest.

The purpose of both state afforestation and the subsidies for private afforestation is to achieve a doubling of forest cover in Denmark. The benefits generated from recreation depend on the location of the forest and doubling the area covered by forest can both result in areas with high recreational

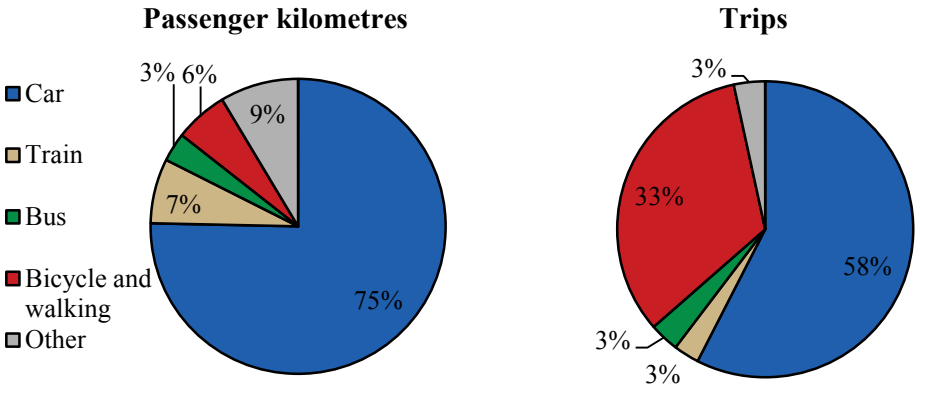
values or areas with little recreational value. Therefore, afforestation should be perceived as an instrument that can be used to obtain recreational value and not an objective in itself.

Chapter V: Public Transport

Effective passenger transportation is of great importance for economic development. Effective transportation systems enable consumers to find the desired goods at lowest cost and to carry out their preferred leisure time activities. For producers, effective transportation enables recruitment of employees from a larger area, thereby increasing the probability of a good match, which will increase productivity. Transportations is, however, also connected with negative external effects, such as congestion, traffic accidents and pollution, both in the form of CO_2 and other forms of air pollution.

In Denmark, car transport accounts for about 75 per cent of total passenger transport in passenger kilometres, while public transport accounts for about 10 per cent, see figure B. The remainder consists mainly of bicycle transport, walking and transport in other vehicles such as vans and trucks. Of public transport, buses and trains account for about an equal number of trips, but as train trips are longer, on average, than bus trips, train transport measured in passenger kilometres covers about 70 per cent of all public transport. Public transport in Denmark increased by about 25 per cent over the period 1990-2010, while car transport increased by about 14 per cent over the same period. The increase in public transport is, to a large extent, driven by the Great Belt Fixed Link connecting the western and eastern parts of Denmark, which opened in 1997, and the Øresund Link connecting Denmark and Sweden, which opened in 2000.

Figure B Passenger kilometres and number of trips, 2012



Notes: Other includes transport in e.g. vans, trucks, on motorcycles and mopeds.
Source: DTU Transport.

Train transport on state-owned railways accounts for about 97 per cent of total train transport, with the remaining 3 per cent taking place on so-called private railways. All passenger train transport is public service traffic under contract with the Danish Ministry of Transportation. The incumbent state-owned railway company, DSB, is the main train operating company, covering about 88 per cent of passenger transport. DSB operates on a direct contract with the Ministry of Transportation. The remaining 12 per cent of train passenger transport has been tendered. Bus transport is the responsibility of six regional transport authorities. Virtually all bus transport is tendered.

In 2012, the total subsidy to public transport was about DKK 8.5 billion. A little over half of this is state funding for train traffic on state-owned railways, while the remainder is funding of bus traffic by municipalities and regions. Subsidies cover approximately 50 per cent of total public transport revenue.

In the chapter on public transportation, an assessment is given of several elements of Danish policy concerning public transportation. Recently, goals for increasing the use of public transportation have been set, and major investments, especially in rail infrastructure, have been

announced. The chapter gives an overview and assessment of the goals and investments. Public transport receives a subsidy totalling about DKK 8.5 billion. An analysis seeks to determine whether current subsidy levels for public transport in the Greater Copenhagen Area can be justified on economic grounds. Furthermore, competition and possibilities for increased cost effectiveness in bus and train services are assessed.

Policy goals and investments

Both passenger and freight transport are expected to increase in the period up to 2030. Increased mobility leads to private and social gains. However, without additional measures, the increase in transport will also lead to increased congestion, traffic accidents and pollution. Transport policy should therefore be devised such that the positive effects are realized taking into account the negative effects. Measures can consist of investments in transportation infrastructure, and incentives to the consumer, through charges and subsidies, to choose those levels of transportation and those travel modes that are most appropriate from a societal view.

The optimal policy mix would include road pricing that reflects the externalities connected with transportation. This would reduce congestion and pollution. Another element would be subsidies to public transportation that reflect the economies of scale within these transportation modes. Investments in infrastructure are needed to enable the private and social gains from increased mobility.

The main goals for transport policy in Denmark were laid down in the political agreement "A Green Transport Policy" from 2009. With respect to public transportation, the main goal is that the largest part of future passenger traffic growth is to take place in public transport. This was operationalised as a doubling of train transport and a 50 per cent increase in bus transport measured in passenger kilometres between 2009 and 2030. Other goals include a reduction in CO_2 emissions from the transport sector and a reliable, secure and top modern railway system.

To attain these and other goals laid down in the agreement, investments totalling DKK 130 billion are planned, of which about half is to be used for financing investments in public transport infrastructure. The main investment projects in public transport infrastructure are the electrification of main railroad lines and the so-called "Hour Model". The Hour Model implies a travel time of one hour between the major cities in Denmark. Other projects include light rail lines in Copenhagen, Aarhus and Odense and upgrading and extension of regional rail lines.

There are no analyses showing why it would be optimal for the largest part of future passenger traffic growth to take place in public transport. The same holds for the more specific goals of a doubling of train transport and a 50 per cent increase in bus transport.

At the same time, the investments in railroad infrastructure and the plans for an Hour Model can be seen as an overall strategy for reaching the goals for the railroad sector. However, no such strategy exists for how the goal of a 50 per cent increase in bus transport is to be achieved.

In general, there seems to be no strategy for transportation as a whole. Investments in the transport sector need to be based on an overall strategy for how and where investments in infrastructure can accommodate the expected increase in traffic best, taking negative external effects such as congestion and pollution into account.

Analysis of subsidy level in Greater Copenhagen Area

The chapter contains an analysis of the level of public transport subsidy in the Greater Copenhagen Area. Economic theory points to several reasons for subsidising public transport. Economies of scale are pervasive in public transportation, implying that the marginal cost of providing one additional passenger kilometre is lower than the average cost. From an economic point of view, the price of a product should equal the marginal costs. With economies of scale, the operator would incur a loss at this price level.

Therefore, economies of scale are a rationale for government subsidies to public transport.

Transport is generally associated with externalities such as congestion, traffic accidents and pollution. The level of externalities differs between transport modes, with public transport generally generating fewer externalities than car transport. Optimally, externalities should be reflected in the price of transport, e.g. though road pricing or other charges or taxes. In general, however, externalities are not reflected in transport prices. In that case, total externalities from transportation can be lowered if car drivers would switch to public transport, which could be furthered by subsidising public transit. Hence, in the absence of road pricing, differences in the level of externalities between car transport and public transport is a reason for subsidising public transport.

Finally, passengers using public transport incur wait costs, at both the initial access points and at the transfer points between routes and transport modes. Wait costs can be reduced by increasing the number of buses or trains on a given route, commonly known as the Mohring effect. Increased scale of operation through increased frequency would imply higher costs for the operator, but lower wait costs for passengers. As the gains from the increase in operation do not fall fully on the operator, frequency will be lower than optimal. Therefore, the Mohring effect is an economic rationale for subsidising public transportation.

The analysis seeks to determine whether current subsidy levels for public transport in the Greater Copenhagen Area can be justified on the three grounds given above. The main conclusion is that peak hour subsidies for both bus and train services are approximately at the right level, while there presumably would be gains from increasing subsidy levels at off-peak periods for both bus and train services.

The main reason for this result is that higher subsidies will lead to a reduction in wait costs for passengers. An increase in subsidies will attract more passengers to public transport. In the model, it is assumed that operators react to this by

increasing the number of buses and trains on the given route network, thereby increasing frequency and lowering wait costs for all passengers. Wait costs in off-peak periods are high in the Greater Copenhagen Area, both because of the low initial frequency in these periods and because of the high value of wait time. Increased subsidies should, therefore, preferably be used to increase frequency in public transport.

Lower fares will only attract car drivers and passengers to public transport to a limited degree. Increased subsidies will, therefore, only have a small effect on road congestion and pollution.

Public bus transportation

Virtually all public bus transportation is franchised. Franchising started in the 1990s and has led to cost reductions of about 15 to 20 per cent. Competition on the market for bus franchises is deemed to be sufficient so that efficiency gains can be sustained.

No VAT is charged on public transport tickets, while operators have to pay VAT on products and services bought from other firms. This makes it more attractive for operators to produce goods and services in-house, as no VAT will be charged on this production, instead of purchasing them from specialized suppliers. This limits efficiency and competition in the sector, and therefore, the possibility of levying VAT on public transport services should be investigated.

Railway transport

The Danish state-owned railway company, DSB, was the sole provider of railway transport on the national railway lines until 2003. In that year, Arriva started services on several connected lines in Central and Western Jutland after winning the franchise. In 2009 DSBFirst, a consortium of DSB and the Scottish First Group, started services on the line between Elsinore and Malmö. Thereby, about 19 per cent of all train services, measured in train kilometres has been franchised.

Recently, DSB has experienced economic difficulties, with a deficit of about DKK 700 million in 2011 being the low point. At the same time, reports point to a potential for cost savings in DSB's Danish operations of about DKK 1,000 million, which represents about 20 per cent of total costs. The European Commission has also indicated that the subsidies paid to DSB are too high. Both the Danish and foreign experiences with franchising of railway services, especially in Germany, Sweden and the Netherlands, also point to the possibility of reducing costs by about 20 per cent relative to the current situation.

DSB has embarked on a program to increase the efficiency of its operations, thereby reducing costs. The aim is to reduce costs and improve profits by about DKK 1,000 million. It is rather unclear how the goal of this program can be compared to the above mentioned potential for cost savings in DSB's Danish operations of about DKK 1,000 million. Calculations indicate that, notwithstanding the cost savings program put in place by DSB, there is still an additional cost saving potential in DSB. In order to reap this potential and to sustain it in the future, the government should franchise more of railway services than is currently the case.

At the same time, the government should consider transferring responsibility for regional rail services to the regional transportation authorities, who already are responsible for bus transportation. Experiences from Sweden, Germany and the Netherlands show that this can lead to substantial improvements in integration of bus and train services, leading to an increase in demand for regional public transport.