

De Økonomiske Råd 
Formandskabet

**ECONOMY AND
ENVIRONMENT 2021
SUMMARY AND
RECOMMENDATIONS**

SUMMARY AND RECOMMENDATIONS

This report by the Chairmanship of the Environmental Economic Council contains a follow up of the 2020 report on the costs of meeting the Climate Act's 70 percent emissions target.

Chapter I analyses a comprehensive reform of the taxation of private cars that targets both greenhouse gas emissions and other negative external effects of private motoring, including congestion, accidents, air pollution, noise and wear and tear of infrastructure. The results show that there are major net benefits from the reform.

Chapter II sheds light on the employment changes that are expected to occur as a result of uniform greenhouse gas taxation. The analyses show that, even within sectors, there are significant differences in how different businesses, and thus their employees, are affected. The results also show that the reduction in employment mainly takes place in the western parts of Denmark and that the level of education among employees in the vulnerable jobs is lower than the average for Denmark.

SUMMARY AND RECOMMENDATIONS

The last report analysed the costs of meeting the 70% target by 2030

The Chairmanship's last report, *Economy and Environment 2020* (*Økonomi og Miljø 2020*, in Danish with an English summary), analysed the expected costs of meeting the target of reducing greenhouse gas emissions by 70 percent by 2030. The results showed that this could be expected to involve a welfare loss of almost DKK 4 billion annually if the necessary reductions were achieved through uniform taxation of greenhouse gas emissions.

The 70% target can be achieved with a uniform greenhouse gas tax of DKK 1,200 per tonne of CO₂

The analyses were based on a reduction requirement of DKK 16 million tonnes of CO₂e by 2030 and showed that the 70 percent target could be achieved with a uniform tax of around DKK 1,200 per tonne CO₂e on all net emissions. Since then, broad political agreements have been reached on the green conversion of road transport, economic stimulus packages for a green economic recovery, green tax reforms, and green conversion of agriculture, and new projections for the required reduction have been undertaken. These agreements and the new projections mean that the government now estimates that the required reduction by 2030 is DKK 10 million tonnes of CO₂e, see *Klimaprogram 2021* (in Danish only). Due to the changed projections, a tax other than DKK 1,200 per tonne of CO₂e may be needed to achieve the 70 percent target by 2030. The analyses in this report are, however, based on a uniform tax of DKK 1,200 per tonne CO₂e.

As they stand, the agreements will increase the costs of meeting the 70% target

With the exception of the agreement on green tax reforms, the measures in the political agreements are expected to increase the social costs of achieving the 70 percent target, as the agreements are based on subsidies and other measures rather than on a uniform tax on all greenhouse gas emissions.

This report follows up on two areas

This report focuses on two factors that were not included in the analyses in the last economy and environment report but that are directly related.

Chapter I: Taxation of private cars with a focus on climate and other externalities

The first chapter provides an analysis of a comprehensive reform of the taxation of private cars. The chapter highlights the benefits of targeting the taxation of private cars at both greenhouse gas emissions and the other negative externalities that result from private motoring, including congestion, accidents, air pollution, noise, and wear and tear of infrastructure. The analysis in the chapter uses a model that is able to quantify the size and distributional consequences of a reform that

targets taxation of private car use and introduces road pricing. The model uses Danish data and takes into account how car ownership and use at the household level would be affected by changes in congestion and the introduction of geographically and temporally differentiated road pricing. The results show that there would be significant net benefits from such a reorganisation, and that the expected gains far exceed the expected costs of meeting the 2030 target cost effectively.

**Chapter II:
Distribution of
employment effects**

The second chapter sheds light on the employment changes that are expected to result from the introduction of a uniform greenhouse gas tax. The chapter seeks to identify the jobs in the agricultural and industrial sectors that would be vulnerable to such a greenhouse gas tax, as well as the people who hold these jobs today. The chapter supplements the Chairmanship's last report by highlighting some of the adjustments in employment that would follow from the structural changes in the economy that will be necessary if the climate goal is to be met.

CHAPTER I: TAXATION OF PRIVATE MOTORING

**Transportation
generates both
costs and benefits**

Transport of both goods and people is crucial for production, consumption and interaction in society. However, transport also generates costs to society in the form of negative externalities. In addition to CO₂ emissions, these costs include congestion, accidents, air pollution, noise, and wear and tear of infrastructure. Congestion and accidents constitute the most significant external costs of private car use, totalling approximately five times the cost of the CO₂ emissions from private motoring.

**Current taxation of
private cars is not
targeted at car use**

Private motorists today pay approximately DKK 30 billion in tax per year, primarily through the car registration tax, the ownership tax and fuel taxes. The chapter shows that taxation of cars is not targeted at the externalities created by car traffic. The majority of the current taxation of private cars is on car purchases and car ownership – neither of which directly give rise to externalities. Conversely, there is no taxation of driving that targets the negative externalities that cause the greatest disutility for residents and other road users, which typically occurs in cities during rush hours. This means that there are significant untapped opportunities to reduce car use in places where, and at times when, the externalities arising from car driving are significantly greater than the disutility motorists would suffer by reducing their driving. If these opportunities were to be exploited, however, motorists would need a targeted incentive to limit their driving in places and at times when the externalities, in the form of congestion, accidents, noise and air pollution, are greatest. This could be achieved by imposing a tax

per kilometre driven that depends on where and when the driving occurs. Furthermore, it is shown that, on average, taxation per kilometre driven is currently slightly lower than the average externality arising from driving one kilometre more.

Taxation prevents some households from owning a car

Furthermore, the current forms of taxation make car ownership unnecessarily expensive outside of the cities, where the externalities arising from driving are limited. This means that some households currently refrain from buying a car. The current forms of taxation also mean that households often drive in older and smaller cars than they would otherwise do. Lower registration and ownership taxes combined with the introduction of road pricing would, therefore, be able to provide significant welfare benefits for motorists without causing major disutility to others as a result of their driving.

Taxation should instead depend on driving

A reform of the taxation of private cars that targets the negative externalities arising from private motoring could be done by:

- Introducing road pricing that reflects the costs of congestion, accidents, noise, wear and tear of infrastructure and air pollution. The taxes would be high in cities during rush hours, when the externalities from driving are greatest, and low outside these times and in the countryside where the externalities are less.
- Reducing car registration and ownership taxes significantly
- Targeting fuel taxes at CO₂ emissions

The chapter contributes a national analysis of distributional effects

Several earlier studies have looked at the feasibility of introducing road pricing in Denmark. The most recent one was carried out by the Commission for the green conversion of passenger cars, which, among other things, assesses the cost of a GPS-based road-pricing system and recommends that pilot projects be initiated along with follow-up analyses of these projects. This chapter contributes with an analysis that quantifies the size and distributional consequences of a reform that targets taxation of private car use and introduces road pricing.

Reforms give a socio-economic gain

The results of the analyses in the chapter show that, when fully phased in, such a reform is expected to give an annual net benefit of approximately DKK 20 billion in 2030. The analyses also show that motorists outside the cities and those with the lowest incomes would be winners under such a reform, while motorists in the cities and with higher incomes are the losers. Although urban motorists would pay significantly more in car-related taxes after the reform, their total losses would be limited because they would also experience less congestion on the

roads, and larger and newer cars would become more affordable. Furthermore, the public sector would receive additional revenue of almost DKK 15 billion, which, depending on how it was used, could limit the losses of some drivers or lead to gains for others. Finally, residents and businesses in the larger cities would experience gains of just over DKK 6 billion as a result of the use of private cars being restricted there.

The Chairmanship recommends reforming taxation of cars in favour of road pricing

The conclusion of the analyses in the chapter is that there would be significant social gains from such a reform. Therefore, the Chairmanship recommends that taxation of cars be reoriented towards road pricing. However, such a sweeping reform of the system is complex; thus, the Chairmanship supports the Commission for the green conversion of passenger cars in its recommendation that major pilot road pricing projects be implemented. The complexity is partly due to the need for a new integrated system for capturing the driving data and handling the payments, and partly because the existing car taxation system, which is based heavily on registration fees, has to be abolished. The latter change may have distributional implications in the transition phase, as current car owners would suffer a capital loss because their current car would be less valuable in the used car market. Before the taxation of private cars can be reformed, a number of technical and other transitional problems need to be investigated and solved. However, the benefits of the reforms are so great that, on this basis, the Chairmanship recommends that they be implemented.

Ambition for 1 million low and zero emission cars

As part of the green conversion of car traffic, the broad political agreement on the green conversion of road transport contains an ambition for there to be 1 million low- and zero-emission cars by 2030. The Ministry of Taxation has analysed the effects of exempting low- and zero-emission cars from registration and ownership taxes. These exemptions would not in themselves generate 1 million green cars by 2030. To achieve this ambition, a subsidy of DKK 1,000 annually could be introduced for all green cars regardless of age. This would create an incentive for households to buy a 1 million green cars.

Subsidies are an expensive way to achieve CO₂ reductions

Analyses in the chapter show that, seen in isolation, achieving the target of 1 million electric cars in this way would provide a net benefit of just over DKK 5 billion relative to the current car taxes. This is because part of the highly distorting registration tax is removed. However, subsidising electric cars over other cars is an expensive way to achieve reductions in CO₂ emissions from private motoring. This is partly because the amount of driving would increase, which would thus increase all other externalities associated with driving, which would have detrimental effects. Furthermore, the share of electric cars would be greater than what would be most cost-effective.

CO₂ reductions from driving are more expensive than CO₂ reductions in other parts of the economy

The size of the CO₂ reductions from targeted taxation of private motoring would result in lower reductions than the government's stated ambitions. This is because CO₂ reductions from less car use are not as cost effective as CO₂ reductions from other parts of the economy. Therefore, the social costs of reaching the 70 percent target would be lower if a smaller share of the reductions in CO₂ were to come from private motoring than the government's ambition stipulates, and a larger were to come from other parts of the economy. If one wants a larger share of the CO₂ reductions to come from private motoring, the cost of the green transition would be increased.

CO₂ reductions are achieved most cheaply through increased fuel taxes

An increased CO₂ reduction target for cars is achieved most cost-effectively by increasing fuel taxes on petrol and diesel, as these taxes are directly targeted at CO₂ emissions. A tax on CO₂ via fuel taxes would, like a tax advantage for electric cars, provide an incentive for people to buy more electric cars. However, it would also create the incentive to buy fewer conventional cars and to drive less. This reduces CO₂ emissions in a cost-effective way. The analyses in the chapter show that a CO₂ reduction target corresponding to 1 million electric cars could be achieved with the introduction of road pricing and a CO₂ tax of DKK 1,800 per tonne of CO₂. Even with a CO₂ tax at this level, a shift in taxation of cars to road pricing would yield a high social return.

CHAPTER II: EMPLOYMENT EFFECTS OF GREENHOUSE GAS TAXATION

Uniform greenhouse gas taxation creates a structural change in employment

The analyses in *Economics and the Environment 2020* show that a uniform greenhouse gas tax of around DKK 1,200 per tonne of CO₂e in 2030 would not significantly affect total employment, but that there would be a change in employment across sectors. The calculations indicate that employment in agriculture would fall by approximately 25 percent by 2030 relative to the base scenario, corresponding to 11,000 man-years. Employment in the food industry would fall by approximately 9 percent, or 3,600 man-years. On the other hand, employment would rise in the service sector and in the other manufacturing industries.

Mismatch between jobs that disappear and jobs that emerge increases costs

The model used to calculate the costs does not, however, include all types of adjustment costs, i.e., temporary costs, which are higher the faster a change has to take place. For example, costs of adjusting the labour force to the new sectoral structure are not included. These costs include productivity losses and periods of unemployment. If the geographical location or skills needed for the jobs that disappear are significantly different from the jobs that emerge, these costs must be expected to be higher.

The chapter sheds light on the vulnerable jobs in agriculture and manufacturing

The chapter sheds light on which jobs in agriculture and manufacturing would be vulnerable to the introduction of uniform greenhouse gas taxation, and who holds those jobs today. The analyses in the chapter are based on register data for firms and their employees and on assumptions and results from the general equilibrium model in *Economics and the Environment 2020*.

Large heterogeneity between businesses in the manufacturing sector

The calculations indicate that, even within sectors, there are significant differences in how different businesses, and thus their employees, would be affected by a uniform greenhouse gas tax of DKK 1,200 per tonne of CO_{2e} by 2030. As the most greenhouse gas intensive industries, cement and tile production pay less than 10% of their production costs in greenhouse gas taxes. For the vast majority of the other manufacturing industries, greenhouse gas taxes are less than 2% of their total production costs. The significant heterogeneity between the businesses suggests that any deviations from a uniform greenhouse gas tax, for example, in the form of a deduction for the tax due to greenhouse gas leakage, must be made on the basis of the individual business rather than on industry averages.

Employment falls in few firms in the manufacturing sector, ...

The results of the analyses show that, by 2030, a uniform greenhouse gas tax would have reduced employment by approximately 15 percent in the manufacturing sector compared to the baseline scenario. In most firms, employment would be unchanged or would increase because of a compensating reduction in the wages. The 20 businesses where employment would fall the most account for approximately 82 percent of the total reduction in employment in manufacturing. Reductions in employment would disproportionately large in meat processing plants and dairies.

... but falls across the whole of the agricultural sector

The calculations indicate that there would be large falls in employment across farm types and the agricultural areas of the country. Dairy farms are the most greenhouse gas intensive, and here employment would fall by 31-38 percent. Employment would fall by 19-29 percent for pig producers, who are more exposed to international competition, and by 27-35 percent for grain producers that supply inputs for livestock production. Poultry farms are less greenhouse gas intensive, and here employment would fall by 12-20 percent.

The vulnerable jobs are concentrated in western Denmark...

The falls in employment in agriculture and industry would mainly occur in the westerly part of Denmark. Measured relative to total employment in individual municipalities, the falls in agricultural employment would be greatest in Tønder, Varde, Morsø and Vesthimmerland municipalities. Employment falls in industry would greatest in Vejen and Ringkøbing-Skjern municipalities. The concentration of vulnerable jobs in

western Denmark could increase the adjustment costs to the extent that the new jobs emerge primarily in the service sector and mainly located in cities across the entire country.

... and held, to a certain extent, by foreign labour

A quarter and a sixth of the vulnerable jobs in agriculture and manufacturing, respectively, are held by foreign workers. Presumably some of these people would leave the country as a result of a uniform greenhouse gas tax if they could not find other similar employment in Denmark. All else equal, the high proportion of foreign labour reduces the total adjustment costs for Danish citizens.

The skills needed for the vulnerable jobs and the emerging jobs are different

The adjustment costs resulting from a uniform greenhouse gas tax will be greater if the type of the work changes than if it does not change. The calculations indicate that the skills required for many of the jobs that disappear are expected to be different from those needed for the jobs that emerge. First, the analyses indicate that employment in the manufacturing sector would increase in the pharmaceutical industry in particular, and the job content in this industry must be expected to be different from that in the agricultural sector and the food production industry. Second, the qualifications for the jobs that would disappear are lower than for the jobs that would emerge. The wage earners of Danish origin who hold the vulnerable jobs in agriculture are relatively young and are characterised by a level of education that is lower than that of wage earners in general in Denmark. This mismatch in the qualification requirements between jobs that disappear and jobs that emerge puts demands on education, training and upskilling measures that would be needed to reduce the adjustment costs of uniform greenhouse gas taxation.

An early announcement of climate policy can reduce adjustment costs

Approximately every third vulnerable job in agriculture is held by the owner of the farm or by his or her family. Approximately 30 percent of the people in this group will have reached retirement age by 2030. This indicates that, going towards 2030, there is potential for a transition in employment through natural attrition of older people and reduced entry of young people into agriculture, rather than an earlier exit of the existing self-employed farmers and their family workers. However, this requires that a uniform greenhouse gas tax be announced as soon as possible, so that uncertainty about future conditions is reduced.

Structural changes in employment could be reduced with an output-based tax deduction

The costs associated with adjustment of the labour force could be reduced by compensating businesses for the greenhouse gas tax via an output-based tax deduction. However, the results of the modelling in *Economics and the Environment 2020* indicate that a deduction of 80 percent of the tax payment would increase the welfare loss (excluding adjustment costs) by DKK 0.5-0.8 million annually per man-year that does not move sectors. Adjustment costs in the event of a change of

industry in the form of, among other things, search costs, preferences for being in the previous industry and loss of productivity must, therefore, be very large before there would be an overall welfare gain from an output-based deduction.

