How will GNSS based road use charges change the cost for people and the income for the government?

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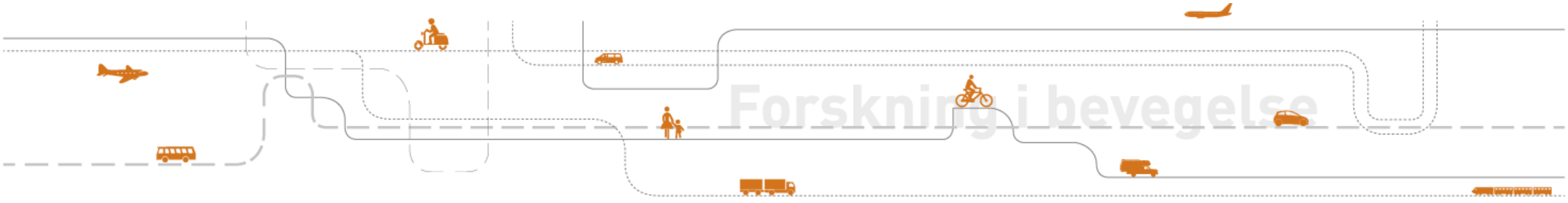


First a little context

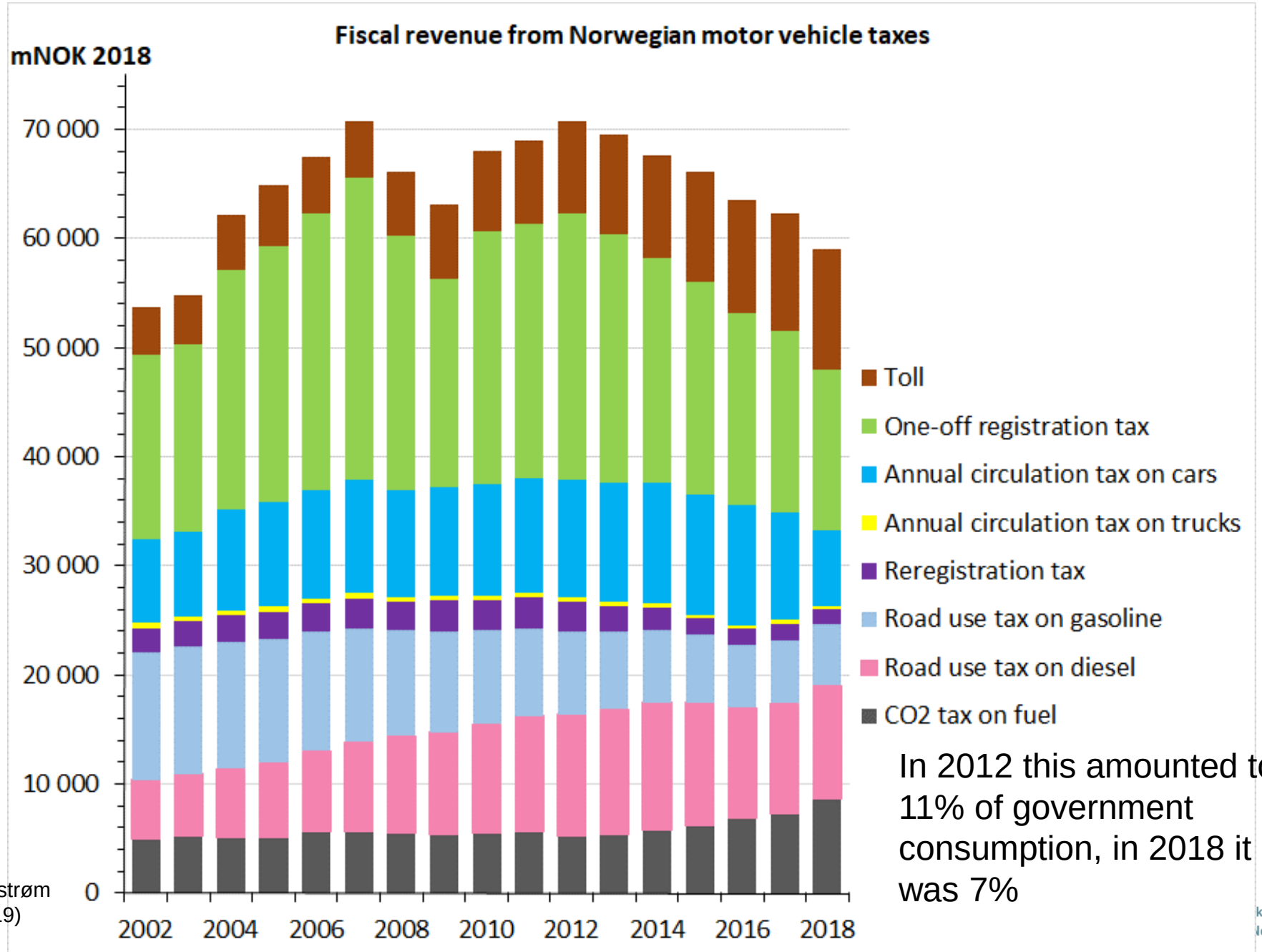
Recent developments in Norway

«design the tax system such that it is fair and contributes to cutting carbon emissions, and consider solutions that could <u>replace road tolls</u> in the future»

Policy processes that has led up to this point

- Both the Labour Party and the Center Party included «road pricing» in their party platforms of 2017
- Proposal from Parliament to study the potential for road pricing to replace road tolls in 2018
- Parliament decision in 2019
- Ministry of Finance and Ministry of Transport gave the order to the Norwegian Public Roads Administration and the Norwegian Tax Administration to do the study in 2021
- Ongoing concept selcetion study (KVU) for road pricing

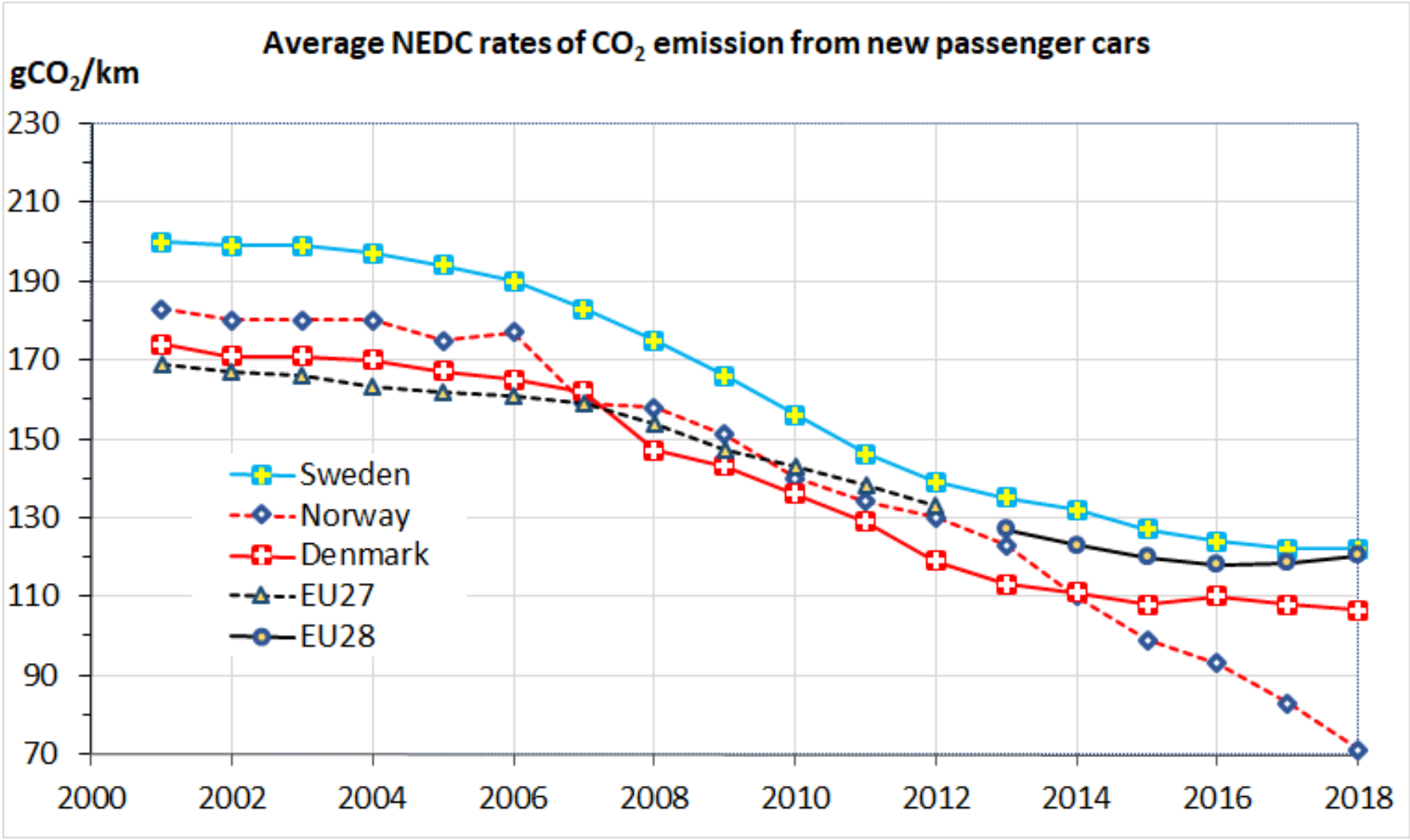
Context: Vehicle tax revenue is high, but dwindling



In 2012 this amounted to 11% of government consumption, in 2018 it was 7%

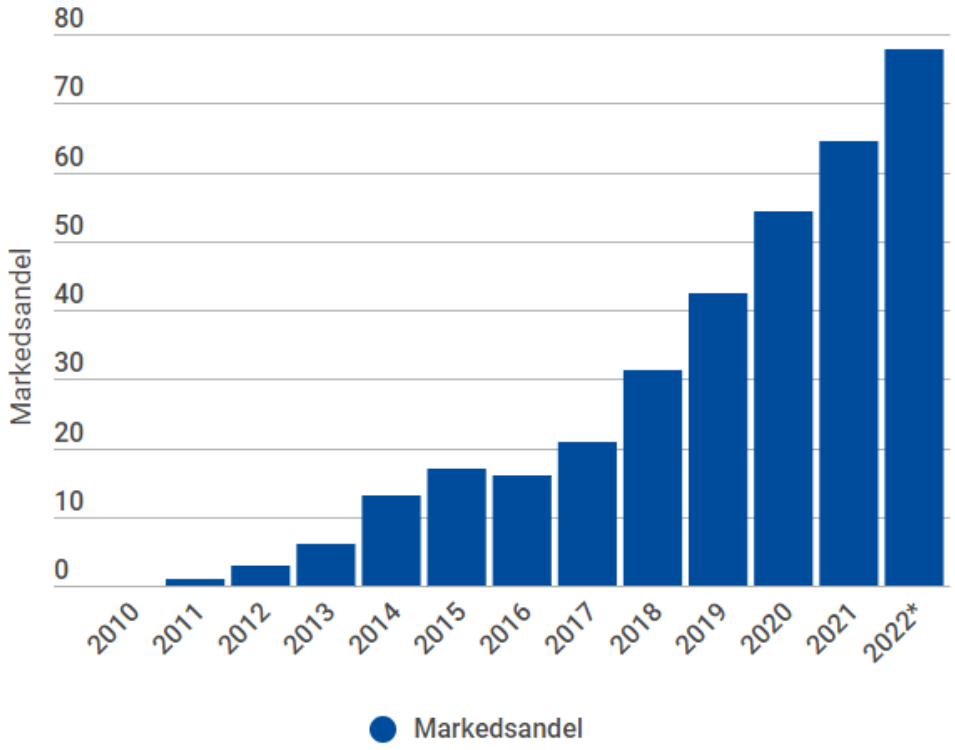
Fridstrøm (2019)

It’s dwindling because of rapidly declining CO2-emissions and fuel use per km



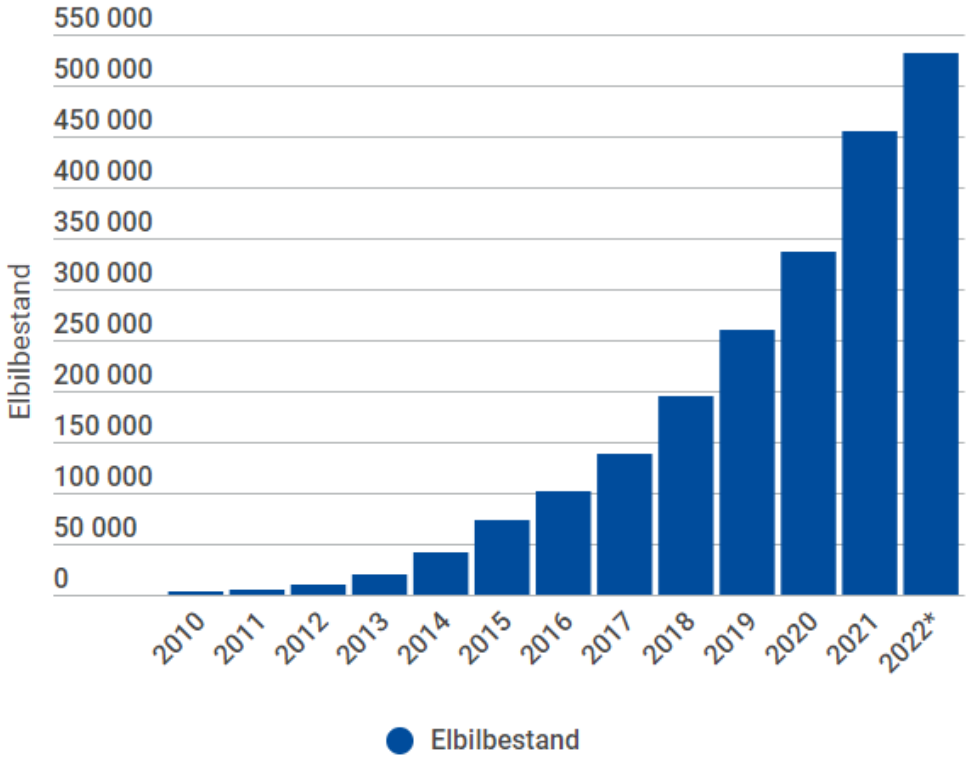
Source: Fridstrøm (2019), ICCT (2018), ofv.no

Emissions and fuel use per km are declining through a policy driven growth in the electric vehicle share



Totalt antall registrerte elektriske personbiler, og tilhørende markedsandel av nybilsalget.

*Sist oppdatert 30.09.2022
Kilde: Motorvognregisteret og Opplysningsrådet for veitrafikken.



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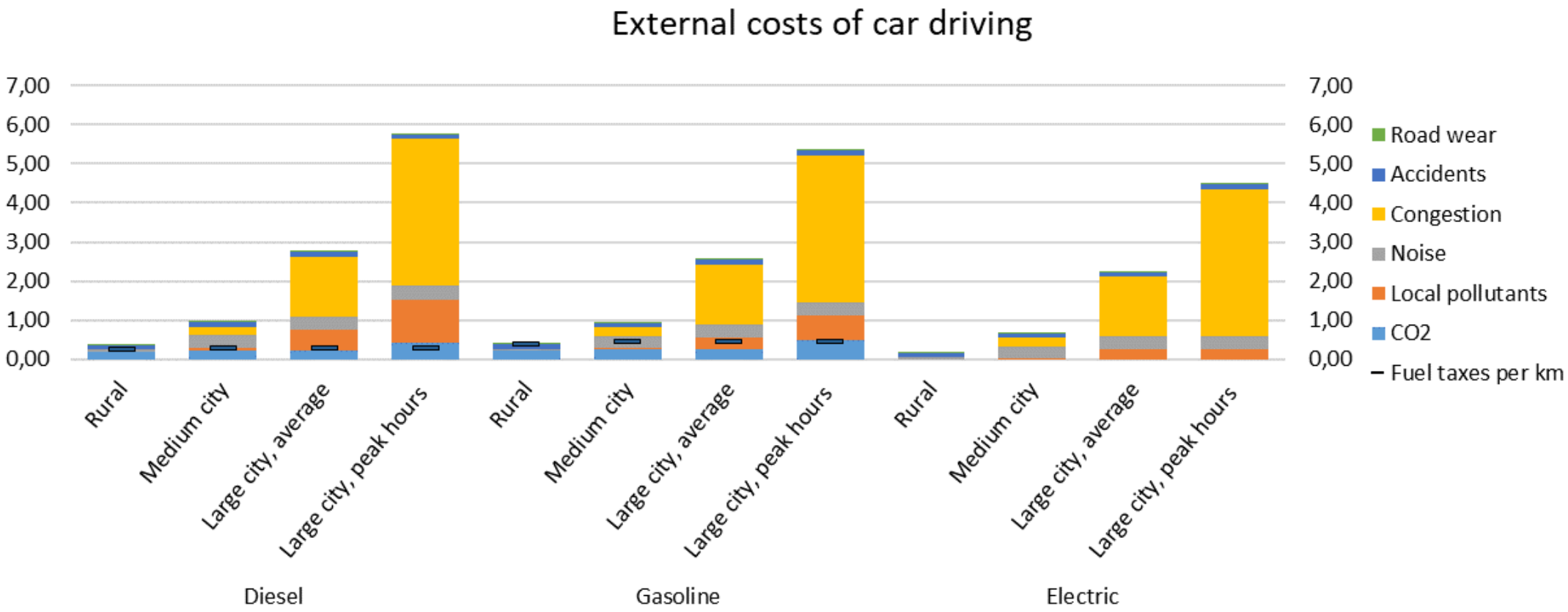
Figures sourced from Norsk elbilforening

A question of revenue, but also a question of matching taxes with the social costs of driving in different circumstances



Source: Rødseth et al (2020)

Costs and revenues

To answer the question I was given

- How will GNSS based road use charges change the cost for people and the income for the government?
- That depends
  - *(Apologies, I am an economist)*
- Revenue target
- Pricing structure

Total road user charges paid will depend on whatever revenue target the government sets

- Decision makers may land on widely different revenue targets, for example:
- Precisely matching the tax per km with estimated marginal damage costs per km, no more no less
- Simply recovering the current fuel-based road user charges
- Recovering current fuel-based road user charges and tolling revenue
- Replacing current revenue from:
  - *Fuel based road user charges*
  - *Registration tax*
  - *Annual circulation tax*
  - *Tolls*

The annual bill for a car owner paying road user charges will depend on the revenue target and the pricing structure

- The RUC could be set at a flat rate per km
  - *Easiest to implement and monitor, but will do a poor job at making drivers internalizing the social cost of driving*

- The RUC could be set to match the estimated marginal damage costs per km to vary by car (emission standard), area (urban vs rural) and time of day (peak hours vs off-peak hours)
  - *Best job at making drivers internalize the social cost of driving, but could get technically, legally and privacy-wise complicated as it requires sophisticated technology and detailed monitoring*

- The RUC could be set to reach a revenue target, with rates adjusted *in proportion* to some measure of social cost per km
  - *Not as simple as flat rate, not as efficient as rates matching marginal social cost*

Let us discuss some of these options

Simply recovering fuel-based road user charges with a flat rate

- Annual revenue of **14-16 bn NOK** in the period 2015-2021
- Average revenue per km: **ca. 40 øre** for passenger cars
- Compared to today, drivers of BEVs will pay more
- Would such a scheme also replace the RUC at the pump?
- If the km-rate is unrelated to fuel usage, then *less efficient ICEVs would pay less* than they do today
- More efficent ICEVs would pay more

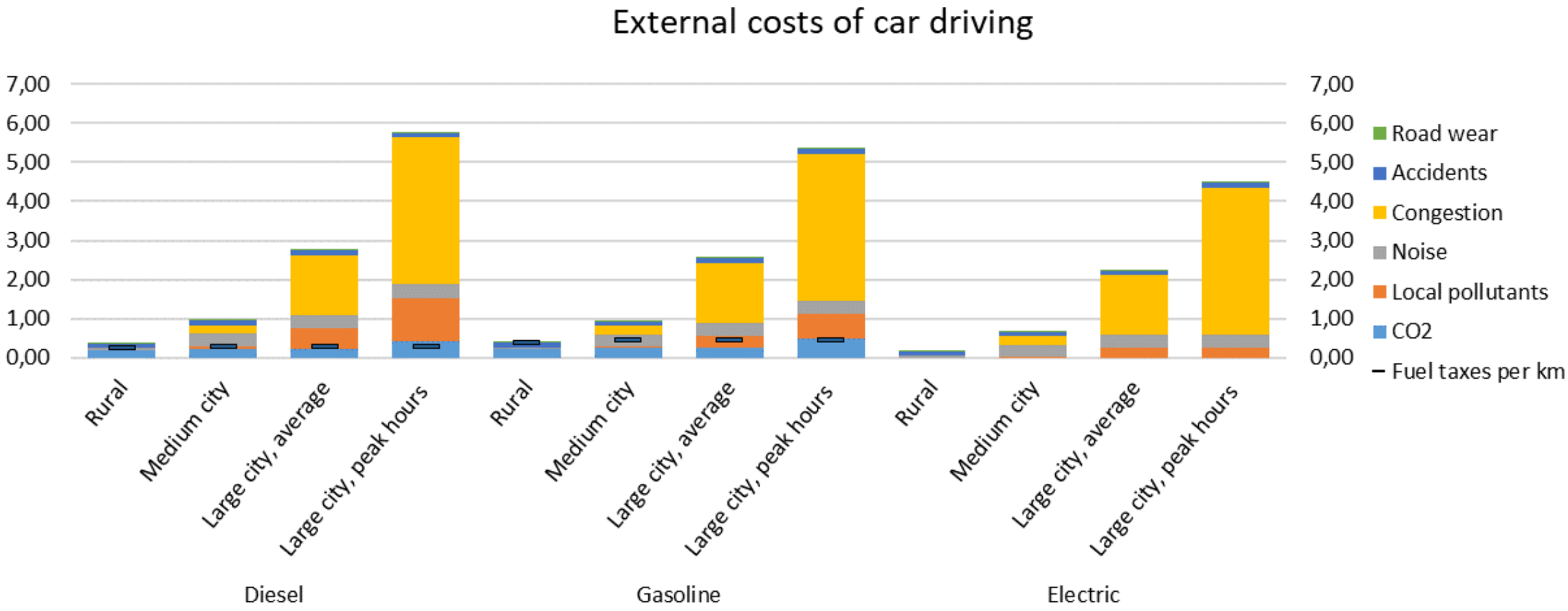
Recovering current fuel-based road user charges and tolling revenue with a flat rate

- Annual revenue of **25-27 bn NOK** in the period 2015-2021
- The change away from fuel based road user charges would have effects in the direction discussed on the previous slide
- But if the toll revenue is linked to financing of road projects or city development packages, how would you implement the km-based toll component?
- Moving from point based to km-based tolls:
- Those who drive more pay more
- Less arbitrary payment, as large effects of being just outside or just inside a tolling point are avvoided

Using a flat RUC to replace current revenue from Fuel based road user charges, Registration tax, Annual circulation tax and Tolls

- Annual revenue of **45-55 bn NOK** in the period 2015-2020
- The change away from fuel based road user charges and tolls would have effects in the direction discussed on the previous slide
- Replacing registration tax and circulation tax would require more than 20 bn NOK in extra revenue
- Substantially cheaper to buy new cars, but those who drive more pay a lot more
- All drivers pay more per km
- Obvious winners: future multi-car households
- Obvious losers: people with cars where the registration tax has already been paid
- We can also expect fundamental changes in the composition of new car sales

Precisely matching the tax per km with estimated marginal damage costs per km, no more no less



Precisely matching the tax per km with estimated marginal damage costs per km, no more no less

- Extremely **rough calculations** indicate revenues of **ca. 50 bn NOK** before equlibrium adjustments
- This number is reduced as drivers adapt
  - *Less driving in cities, in particular during peak hours*
  - *Perhaps somewhat more driving in rural areas*
- Many of those who drive mostly in rural areas will gain due to cheaper kms
- Many of those who drive a lot in cities will lose out due to more expensive kms
- Some city drivers with a high value of their time will gain, due to curbed congestion
- People vulnerable to pollution will gain
- In sum, society is expected to gain, even if the revenue is simply given back equally among citizens

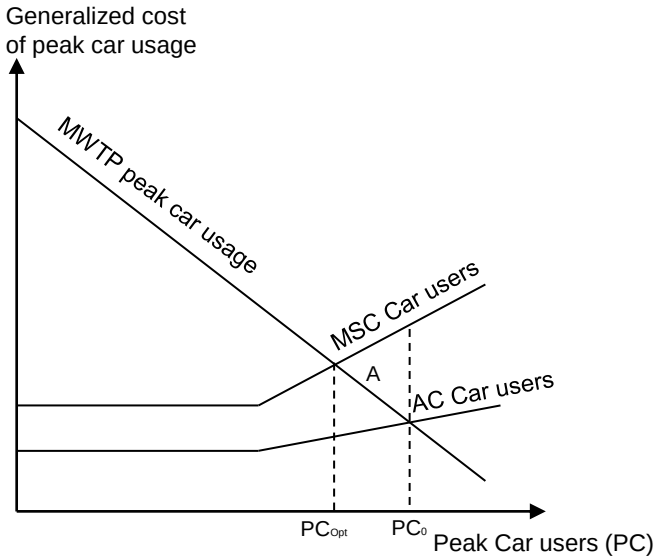
The inbetween – aiming for a revenue target but scaling the km-rates proportionally to estimates of external costs

- Not as simple as flat rate, not as efficient as rates matching marginal social cost
- The optimization problem changes to “how to raise revenue at lowest social cost” and would require specified transport modeling to find reasonable solutions

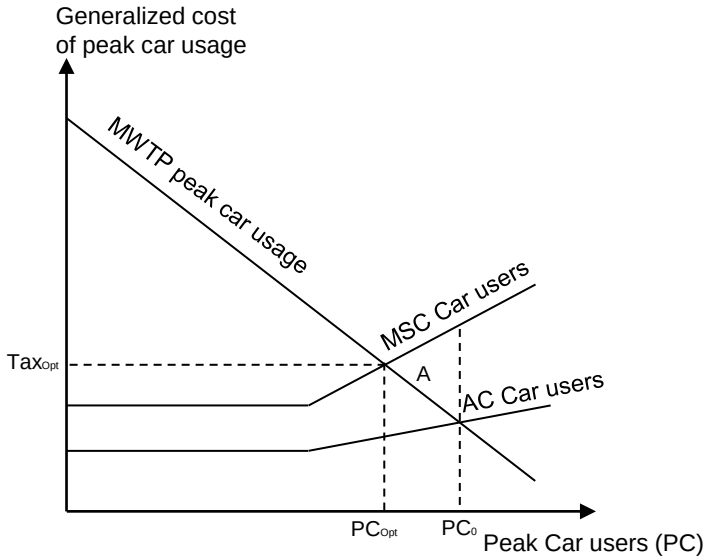
Why transport economists love distance-based road pricing based on marginal social cost

Economics 101 – tax externalities according to their marginal cost, and the social surplus is maximized!

A social loss of triangle A if car use is not taxed



Set the right tax, and social surplus is maximized!



What characterizes this socal optimum?

- The social costs of driving and the private costs are aligned
- There will still be plenty of driving, and there will still be some congestion and pollution, but we avoid those car trips that cost the most and give the lowest benefits
- Trips with the lowest benefit-cost ratio are priced out
- The transport volumes have been right-sized
- The policies are beneficial even if the revenue is delivered as a lump sum back to citizens, but additional benefits can be made if is part of a broader tax reform

Which taxes should road pricing replace?

- Road pricing based on external costs would give substantial revenues
- Could replace several vehicle-related taxes
  - *Road use component of diesel and gasoline tax ("veibruksavgift")*
  - *Road tolls*
  - *Part of the traffic insurance tax ("trafikkforsikringsavgift" aka."årsavgift")*
  - *Annual weight tax on heavy vehicles ("vektårsavgift")*
  - *Annual environmental tax on heavy vehicles ("miljødifferensiert årsavgift")*
  - *Ferry tickets*
- Should not replace the CO_2 component of diesel and gasoline taxes
- Purchase taxes probably still important as a climate policy instrument

Benefits to the private sector

- Stable and predictable transport costs
- More precise tax system → higher revenues at a lower cost
- Everyone pays, no competitive disadvantage
- Revenues can be used to reduce other taxes
- High and arbitrary road tolls in rural areas bad for commuters and freight transport
- Time lost in congestion is particularly costly for professional transport

Foto: Lastebil.no

How to get there

- It is off to a good start will a well-planned KVU!
- Do not let the best be the enemy of the good
- Even if it is not optimal now, it can get closer to optimal later
- Avoid the Dutch case

A taste of the Dutch case – it looked so promising

- Road pricing has been on the agenda since the 80s
- In 2005 the Nouwen-commission started investigating possible improvements to the transport system
- They recommended distance-based road pricing, differentiated according to the cars' emission standard and times and places of congestion
- In 2007 the new government initiated the project «Anders Betalen voor Mobiliteit» for GPS-based road pricing
- Several cost-benefit-analyses concluded that the project had positive and substantial expected net benefits

….and then it failed

- November 2009: Project proposal sent for discussion in the Lower House
- February 2010: The governement fell after the government coalition broke down over disagreement on Dutch engagement in Afghanistan
- March 2010: The Lower House declares the project «controversial»
- June 2010: New election and large changes on party composition in the parliament
- November 2010: The new government withdraws the Dutch Road Pricing Act

Concluding remarks

How will GNSS based road use charges change the cost for people and the income for the government?

- Our public officials can choose from a broad range of revenue targets
- The transport economic literature would tend to recommend focusing on «getting the prices right» – the revenue target is secondary
- The biggest change related to «getting the prices right» is that driving in rural areas will be come somewhat cheaper, and driving in urban areas will in most cases become more expensive
- «Getting the prices right» will improve efficency
- «Getting the prices right» will improve fairness in some dimensions, but may need supplementary policies if there is worry about the welfare of certain groups

Thank you for your attention!

Questions? Comments?

I can be reached at pbw@toi.no

Paying more for using the road more is on average a progressive policy

Figur 2. Kjørelengder per voksen, etter inntektskvartil og fylke. Kilometer. 2021