

From fuel tax and toll to electronic road pricing

1130 Lunch

1200 Welcome. By *Director Gunnar Lindberg, TØI*

1215 Why do we need a new road tax system? By *Lasse Fridstrøm, TØI*

1245 Challenges in the implementation of road pricing in Norway. By *Trond Foss, SINTEF*

1315 Pricing kilometres in the Netherlands. By *Henk Meurs, Radboud Universiteit/MuConsult*

1400 Coffee

1415 Comments invited from government agencies

1445 The proposed road charging system for heavy freight vehicles in Sweden. By *Jan-Eric Nilsson, VTI*

1515 Ambitions and opportunities for Norwegian technology providers. By *Roar Norvik, SINTEF*

1530 General discussion, with comments invited from stakeholders

1615 Conclusion

1630 End

Why do we need a new road tax system?

Lasse Fridstrøm

Institute of Transport Economics (TØI)

Oslo Science Park, October 19, 2017



Research in motion

Outline

1. The stupidity of road toll
2. The shortcomings of the fuel tax
3. The blessings of the vehicle purchase tax
4. The menace of greening transport
5. The fata morgana of marginal cost road pricing



1. The stupidity of road toll



Jules DUPUIT

De la mesure de l'utilité des travaux publics (1844)

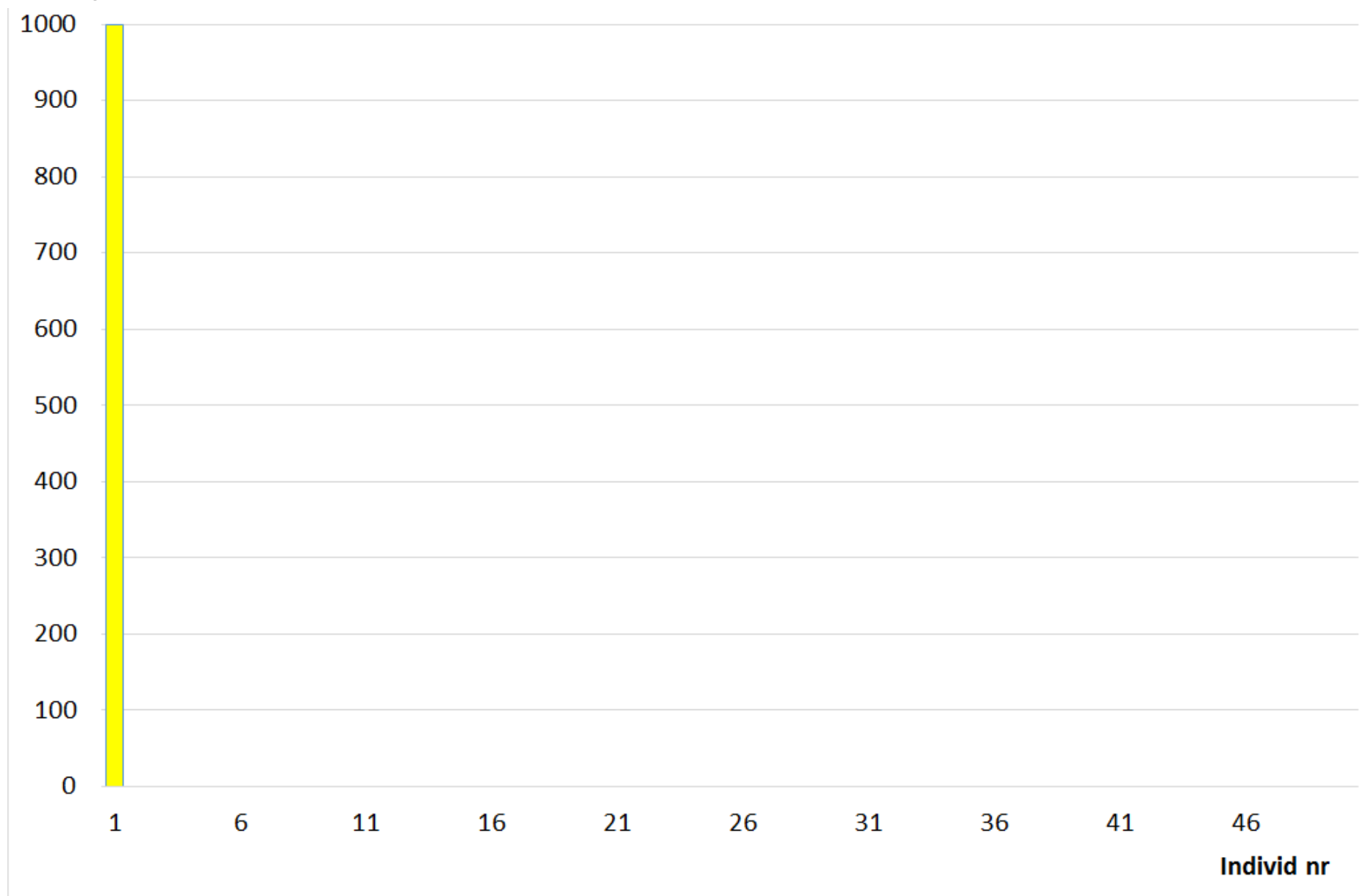
Jules Dupuit (1804-1866)
French civil engineer working for
Corps de ponts et chaussées



Le législateur a prescrit les formalités nécessaires pour que certains travaux puissent être déclarés d'utilité publique; l'économie politique n'a pas encore défini d'une manière précise les conditions que ces travaux doivent remplir pour être réellement utiles; du moins les idées qui ont été émises à ce sujet nous paraissent vagues, incomplètes et souvent inexactes. Cependant cette dernière question est plus importante que la première; des enquêtes plus ou moins multipliées, des lois, des ordonnances ne feront pas qu'une route, un chemin de fer, un canal soient utiles, s'il ne le sont pas réellement. La loi ne devrait, pour ainsi dire, que consacrer

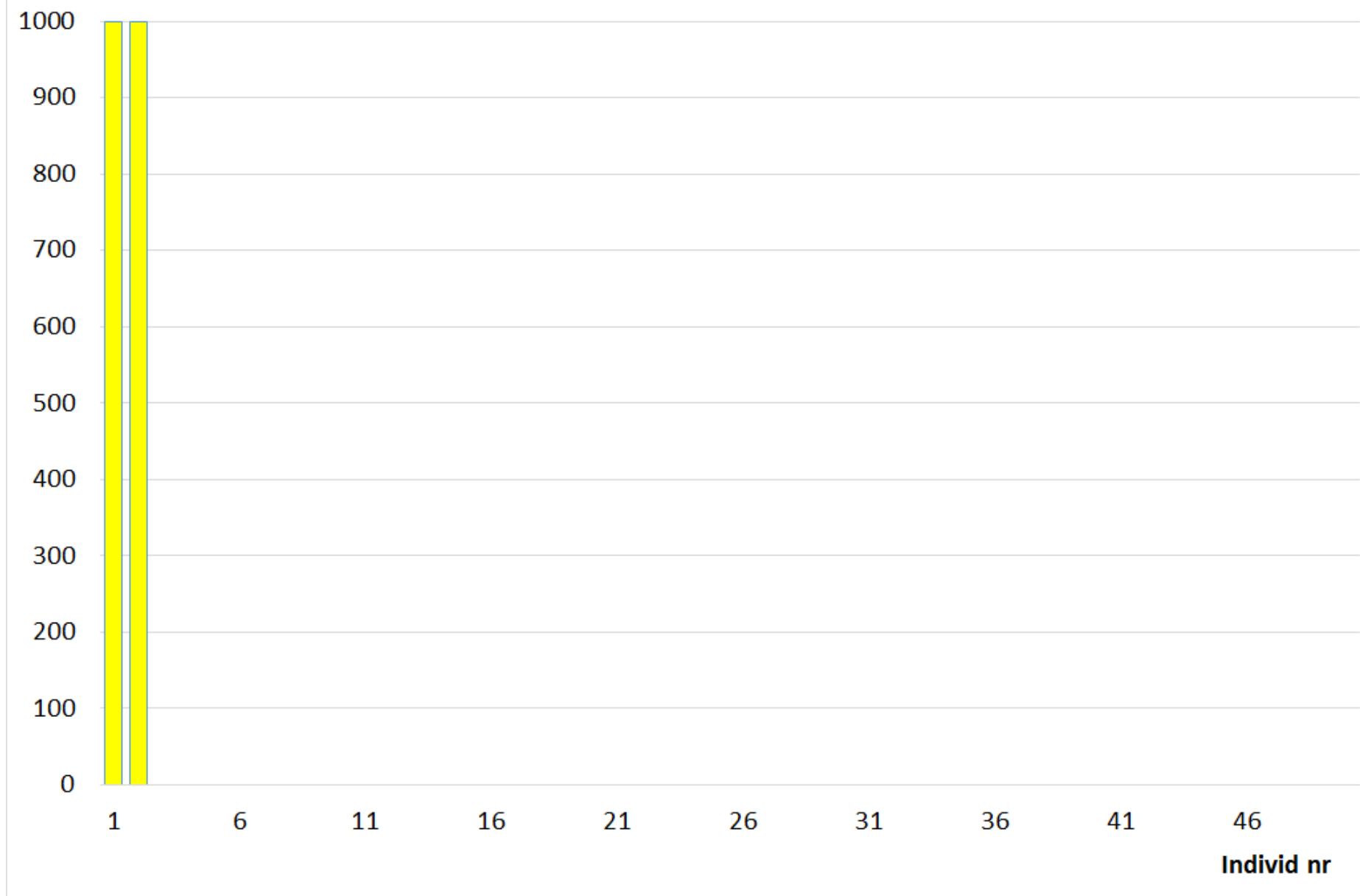


Willingness-to-pay



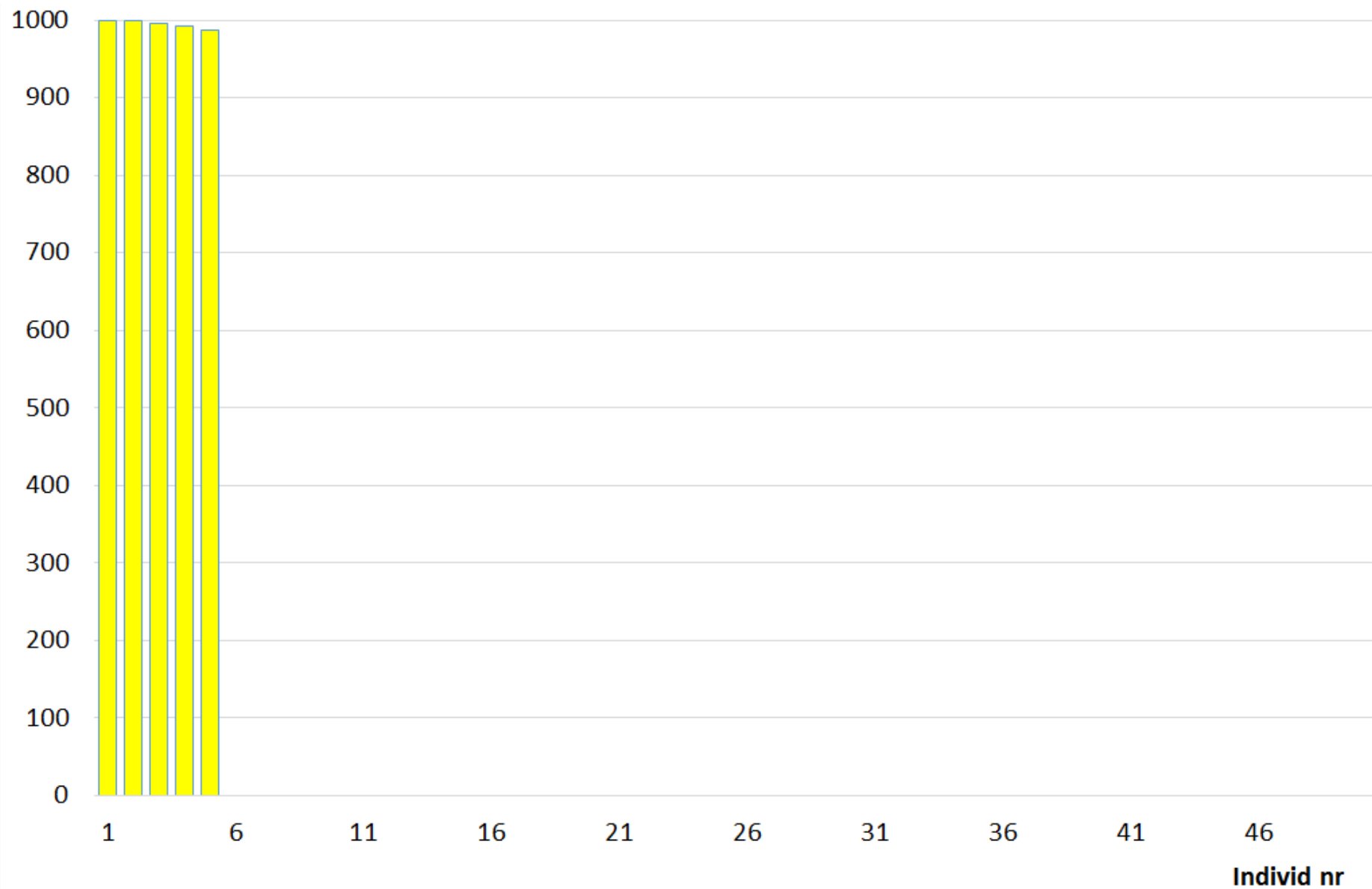


Betalingsvillighet



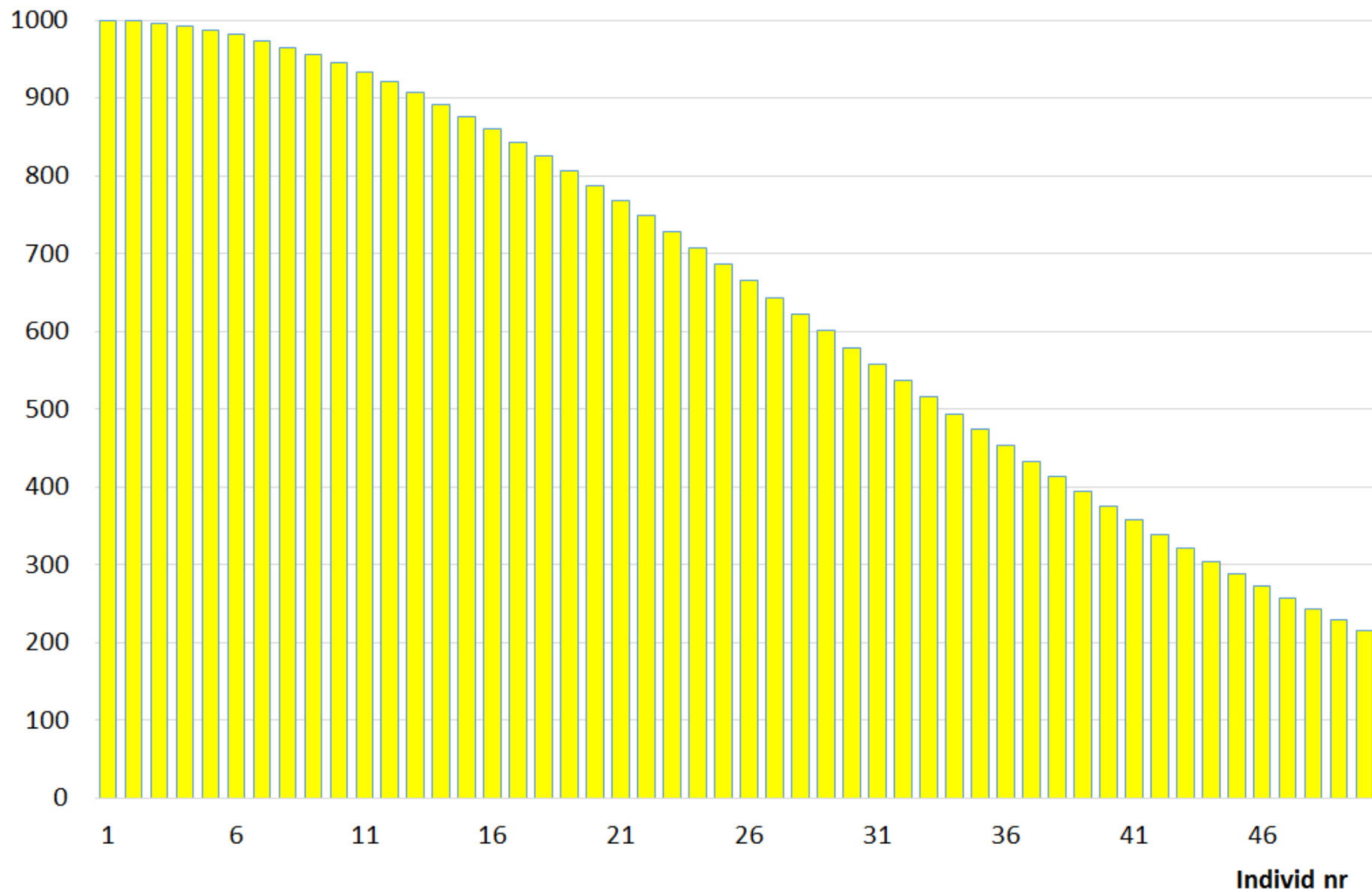


Willingness-to-pay





Betalingsvillighet

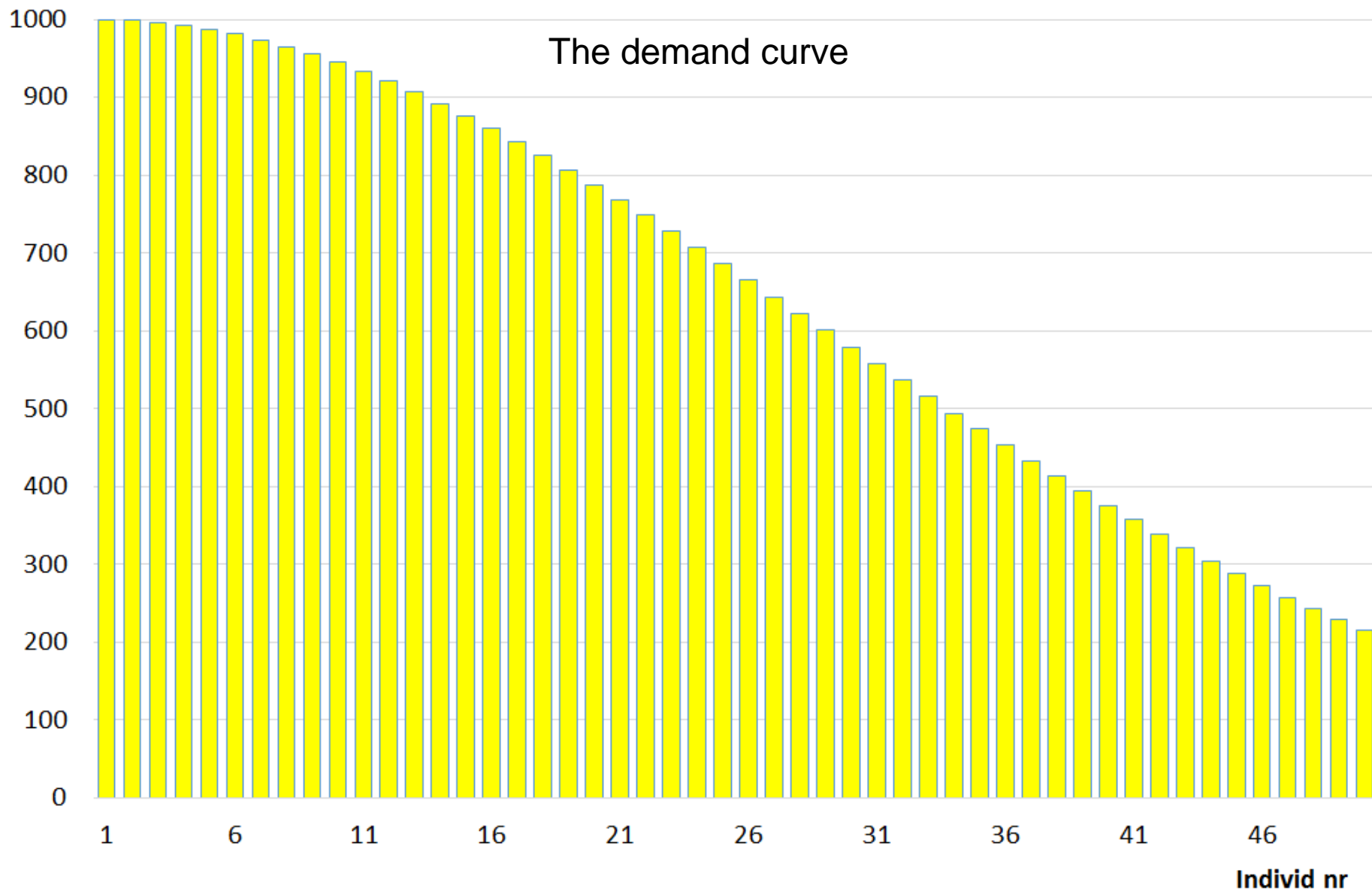




Willingness-to-pay

Etterspørselskurven

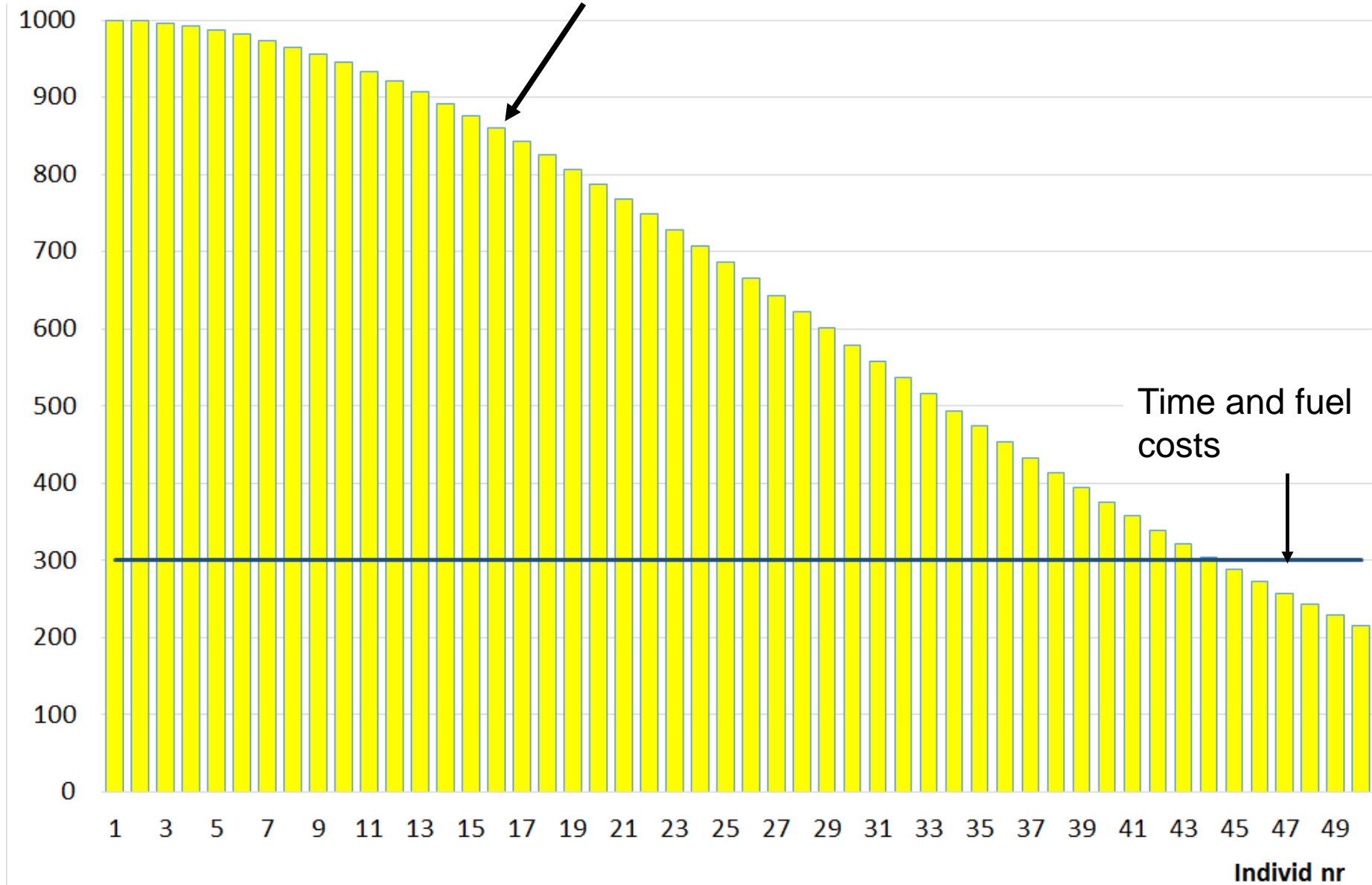
The demand curve

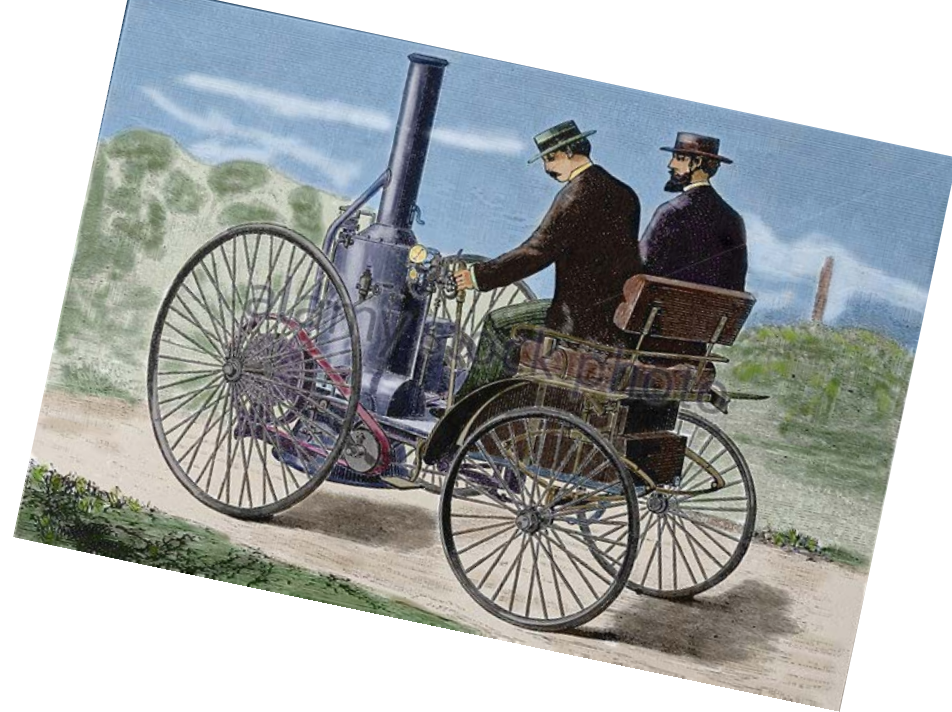
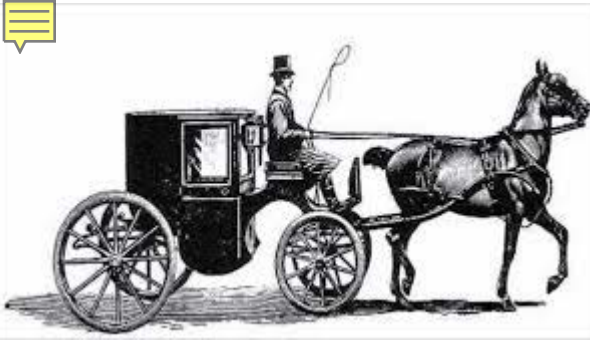




Willingness-to-pay

The demand curve





AGRICULTURAL HALL ISLINGTON
 START AT 1 A.M. FINISHING AT 10.30 P.M.
 DAY, JUNE 16th SATURDAY FOLLOWING
 1879

INTERNATIONAL PEDESTRIAN MATCH

PETITORS
 LES ROWELL
 R OF THE BELT
 ION OF THE WORLD
 N ENNIS.
 (ALLENGER)
 ION OF AMERICA
 ER BROWN.
 (ON OF ENGLAND)
 HARDING
 LY YOUNG WATERMAN
 & WESTON.
 IE EDITOR
 OF THE
 TING LIFE
 HE STAKES & WILL
 RATE AS REFEREE.

CONDITIO
 THE ONE W
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 HALF THE GATE R
 THE BELT.
 THE GIFT OF SIR J. L. AS
 WAS FIRST WON BY O
 AGRICULTURAL HALL
 MARCH, 1878
 AND ROWELL BEAT
 NEW YORK, APRIL
 & BROUGHT THE BELT BA
 IT REMAINS TO BE SE
 ENNIS
 CAN BEAT OUI

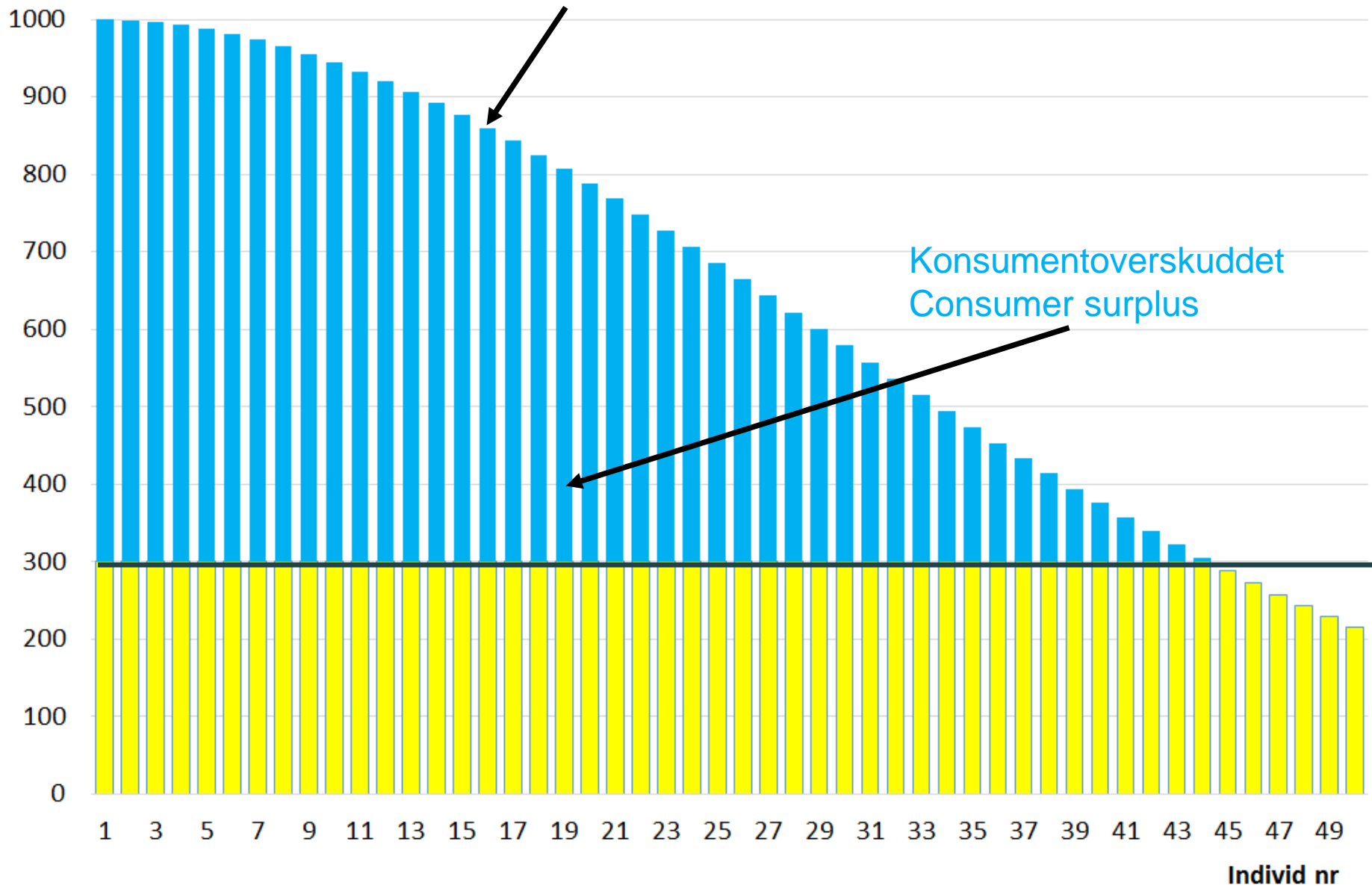
WESTON HARDING BLOWER BROWN ENNIS ROWELL

CHAMPIONSHIP OF THE WORLD
 MISSION // - A FAIR FIELD AND NO FAVOUR, THE BEST MAN TO WIN. FULL MILITARY



Willingness-to-pay

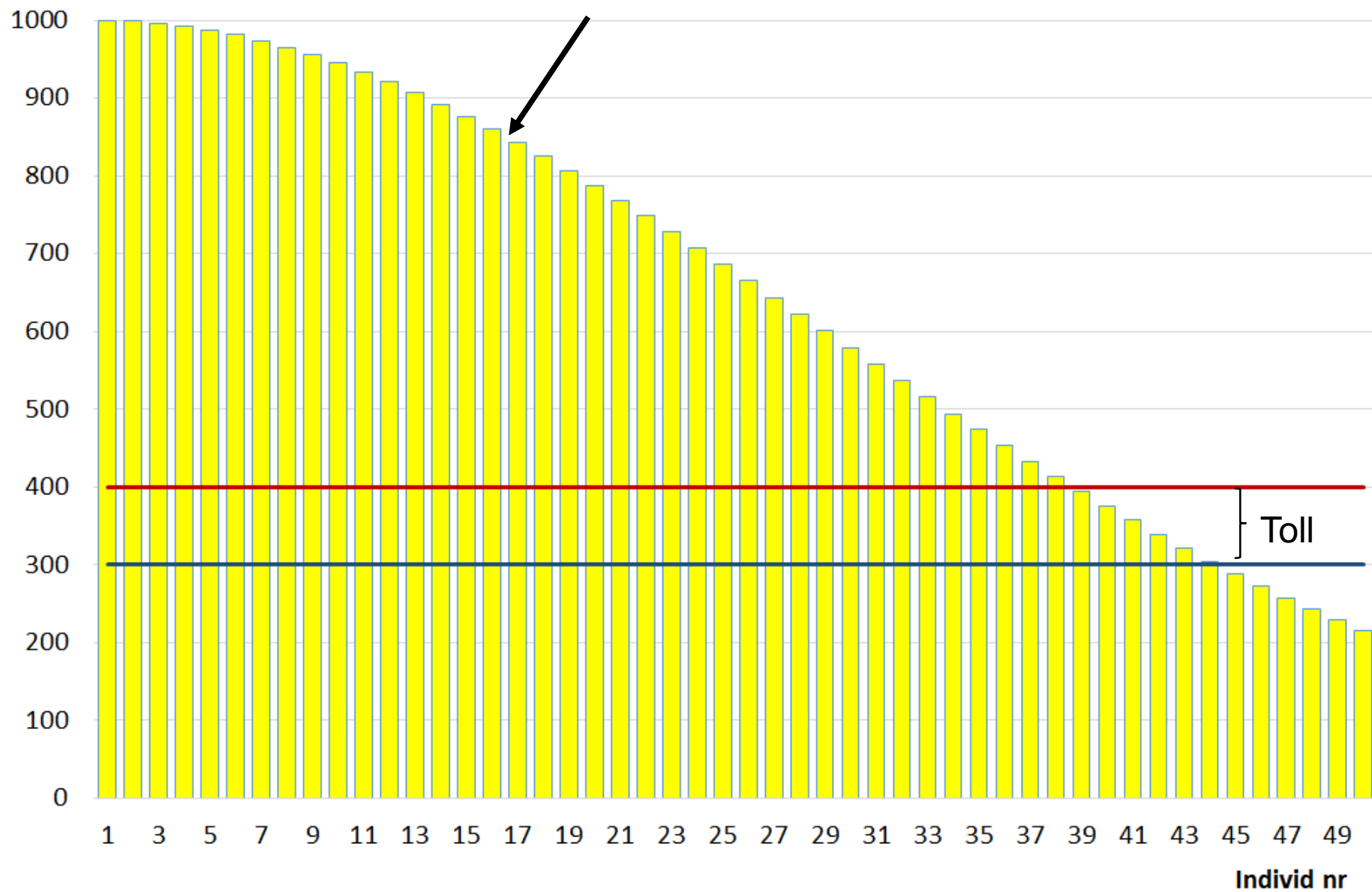
The demand curve





Willingness-to-pay

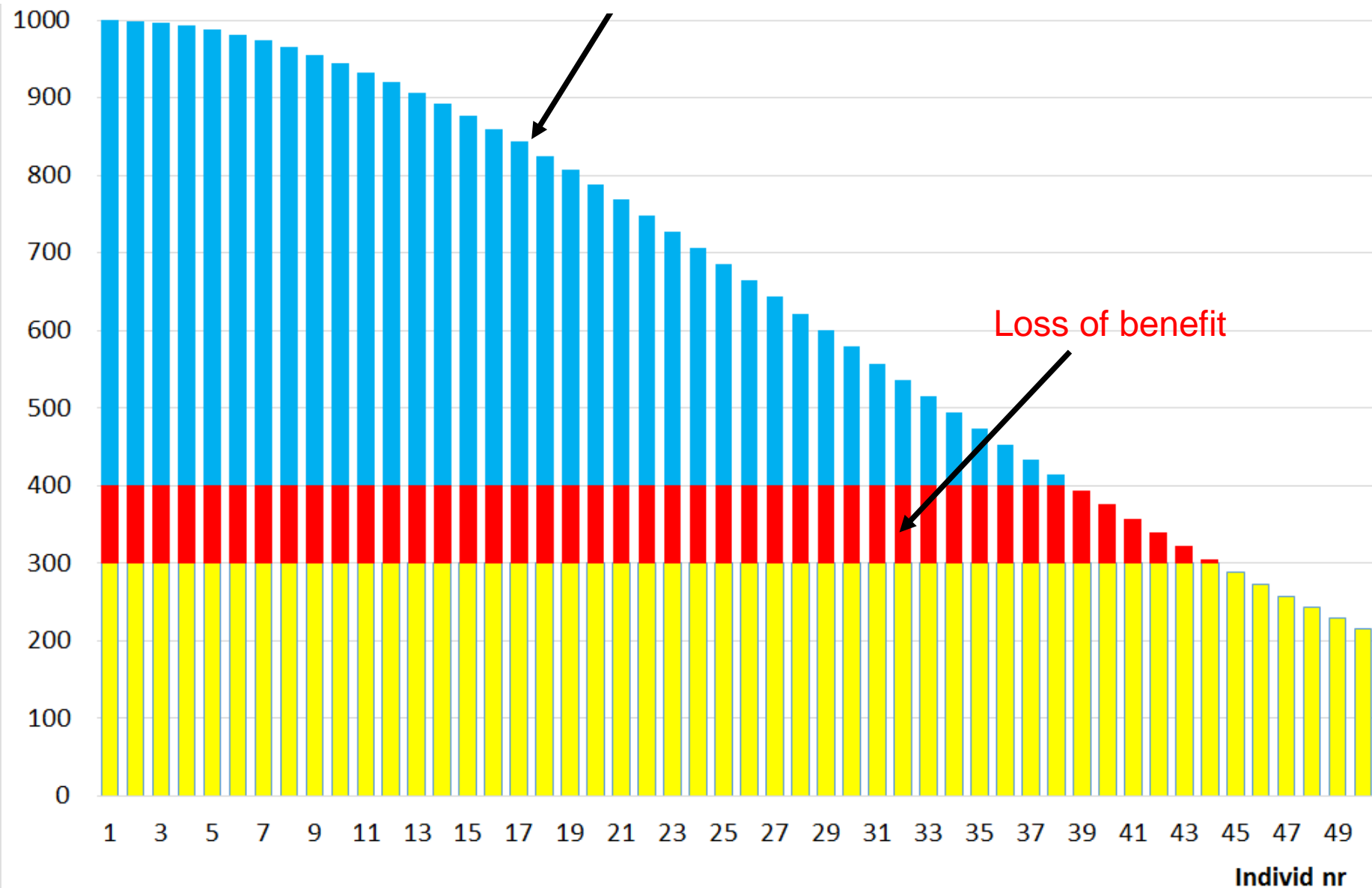
The demand curve





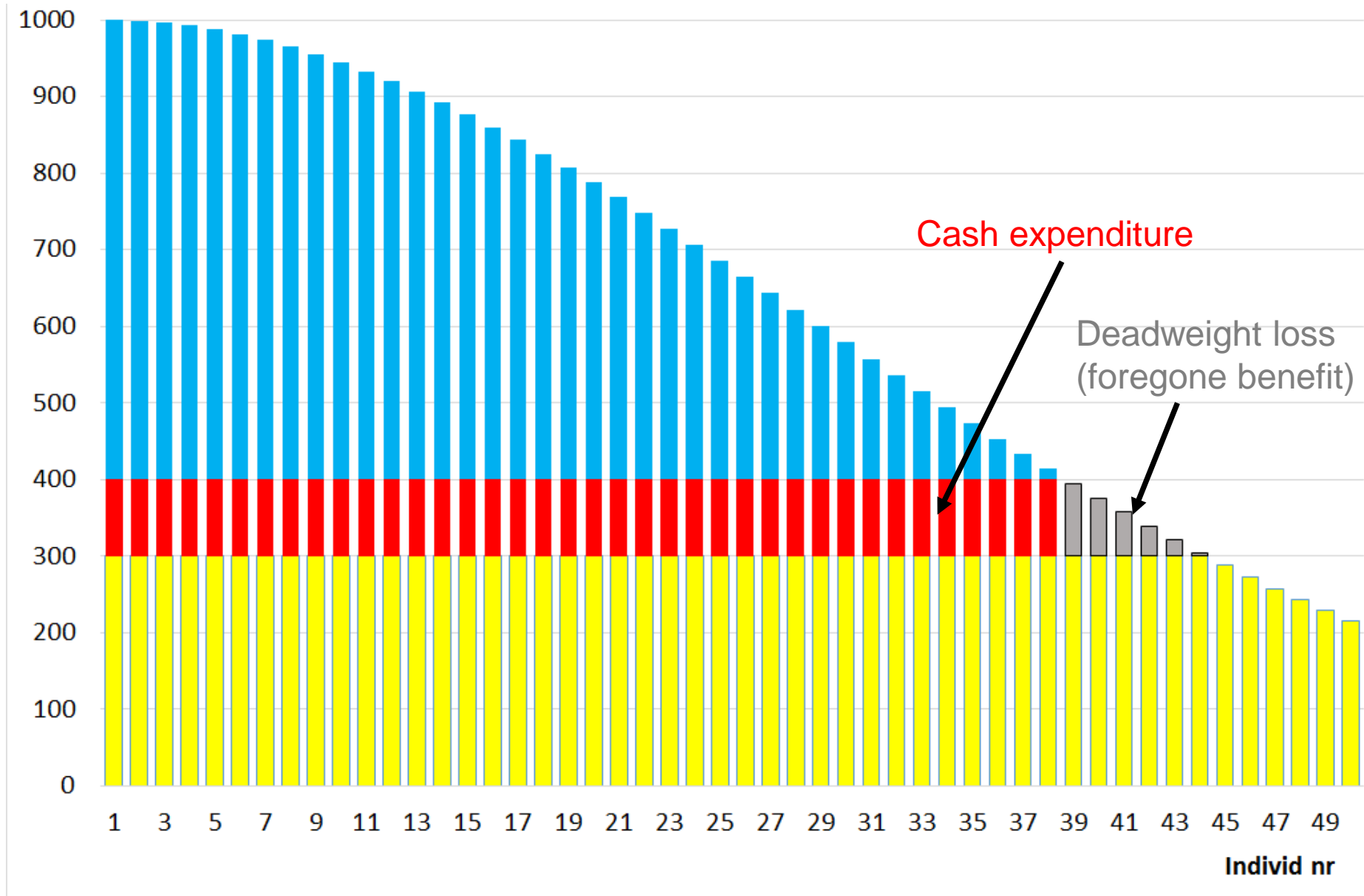
Willingness-to-pay

The demand curve





Willingness-to-pay

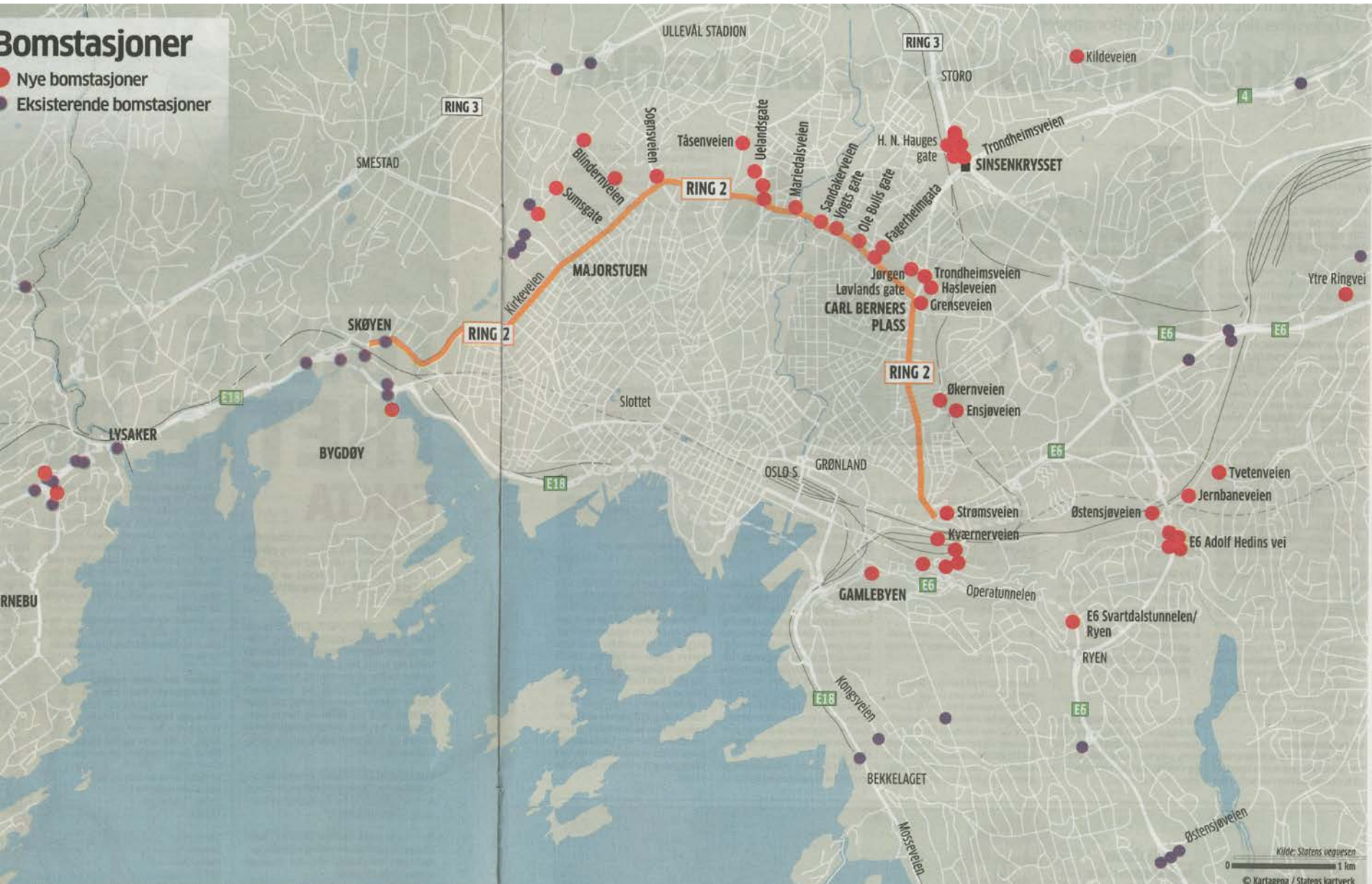


A fairly flat learning curve

- When we charge a toll on a road or bridge or tunnel with free-flowing traffic, we reduce its benefit to society and hence its social profitability. **We waste part of the project's dividend.**
- This insight from Dupuit (1844) has had **173 years** to seep into the minds of Norwegian planners and policy makers.
- **Annual road toll revenue** in Norway amounts to more than NOK 10 billion > € 1 billion. It is increasing and **will soon surpass the fuel tax revenue.**
- Why **waste part of the benefit** from new roads?
Aren't Norwegian roads unprofitable enough?
- In addition to the utility loss, some 10 per cent of the revenue is lost to **toll collection costs and administration.**



Do we need 79 tolling **points** in and around Oslo...?



... or some 40-50 in rural Norway?

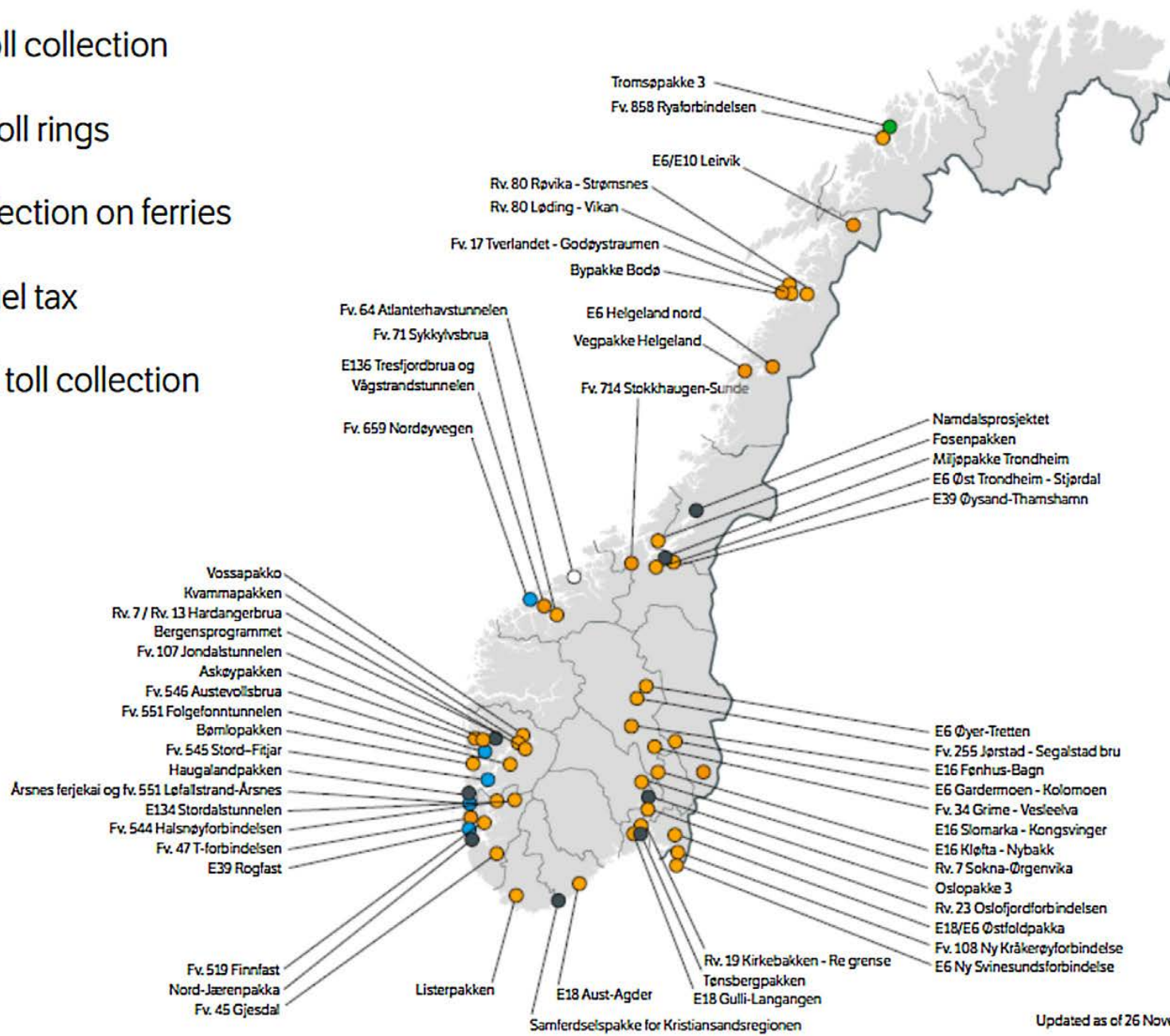
● Road toll collection

● Urban toll rings

● Toll collection on ferries

● Local fuel tax

○ Manual toll collection





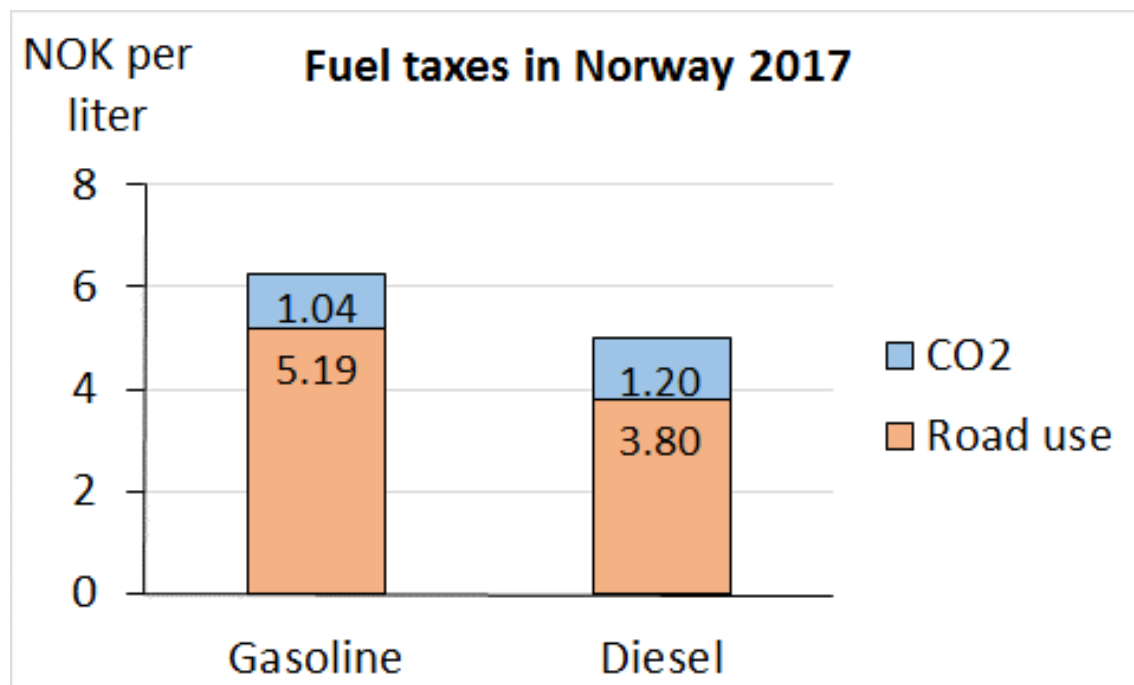
2. The shortcomings of the fuel tax



The purpose of fuel tax...

...is to internalise marginal external costs,
i. e. to make the **polluter pay**.

Ifølge særavgiftsutvalget (NOU 2007:8) er **drivstoffavgiftene** 'bruksavhengige motorvognsavgifter som skal prise samfunnsøkonomiske kostnader ved bruk av kjøretøy'.

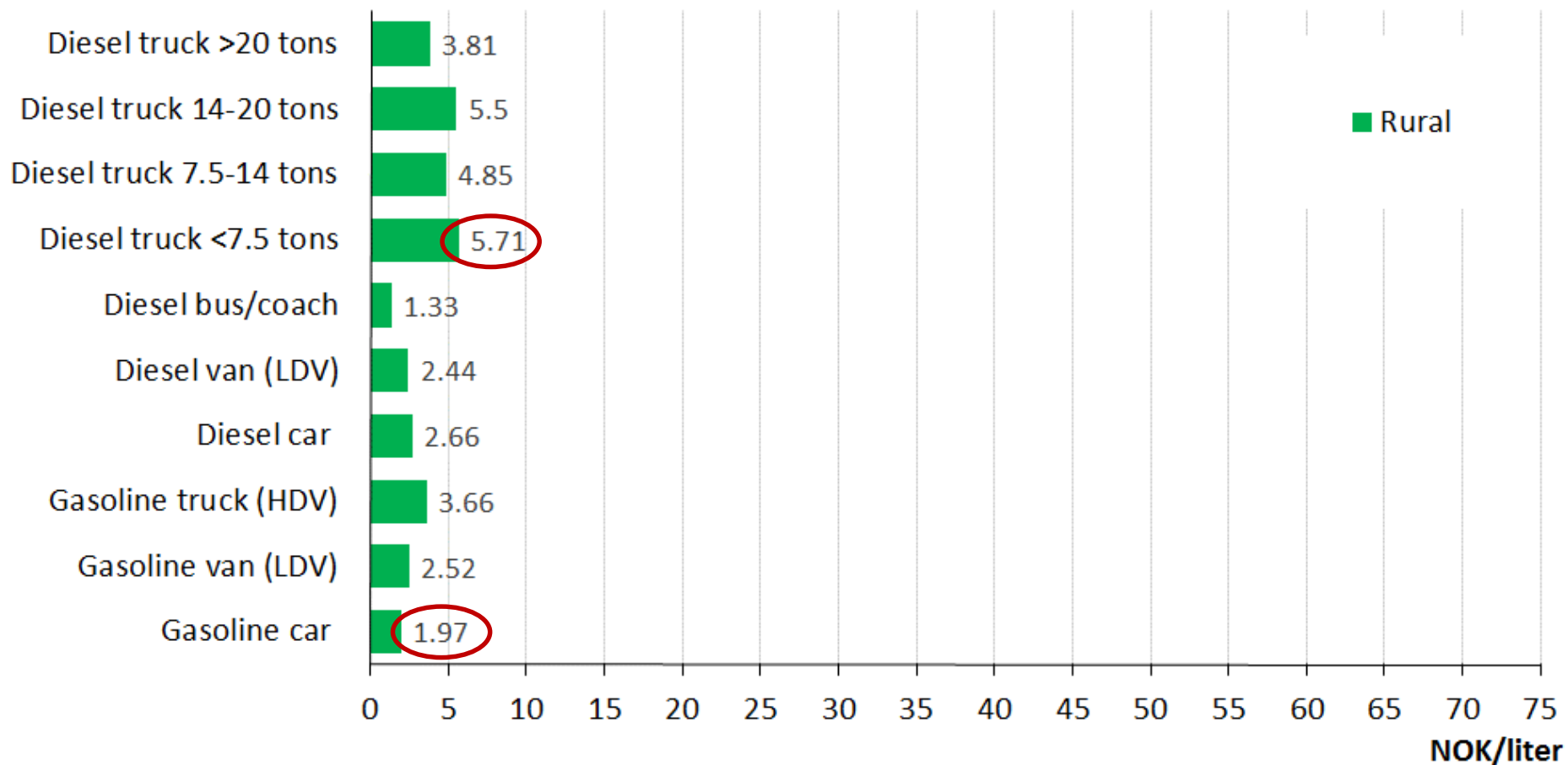


€1 = NOK 9.35



External costs of road wear, accidents, noise, local pollution, snow clearance and congestion

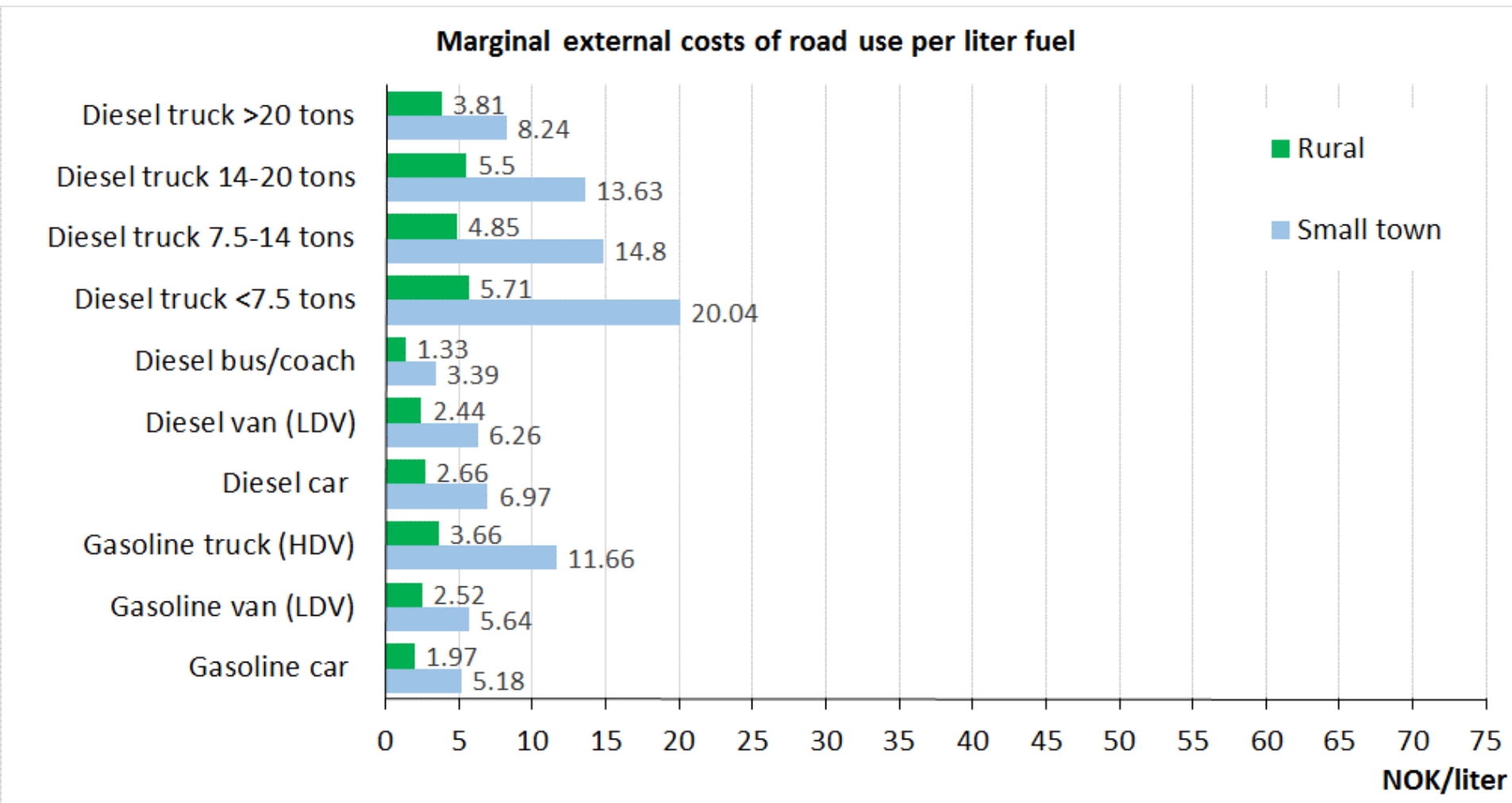
Marginal external costs of road use per liter fuel



Source: Thune-Larsen, Klæboe, Veisten & Rødseth (2016) (TØI report 1307)



External costs of road wear, accidents, noise, local pollution, snow clearance and congestion

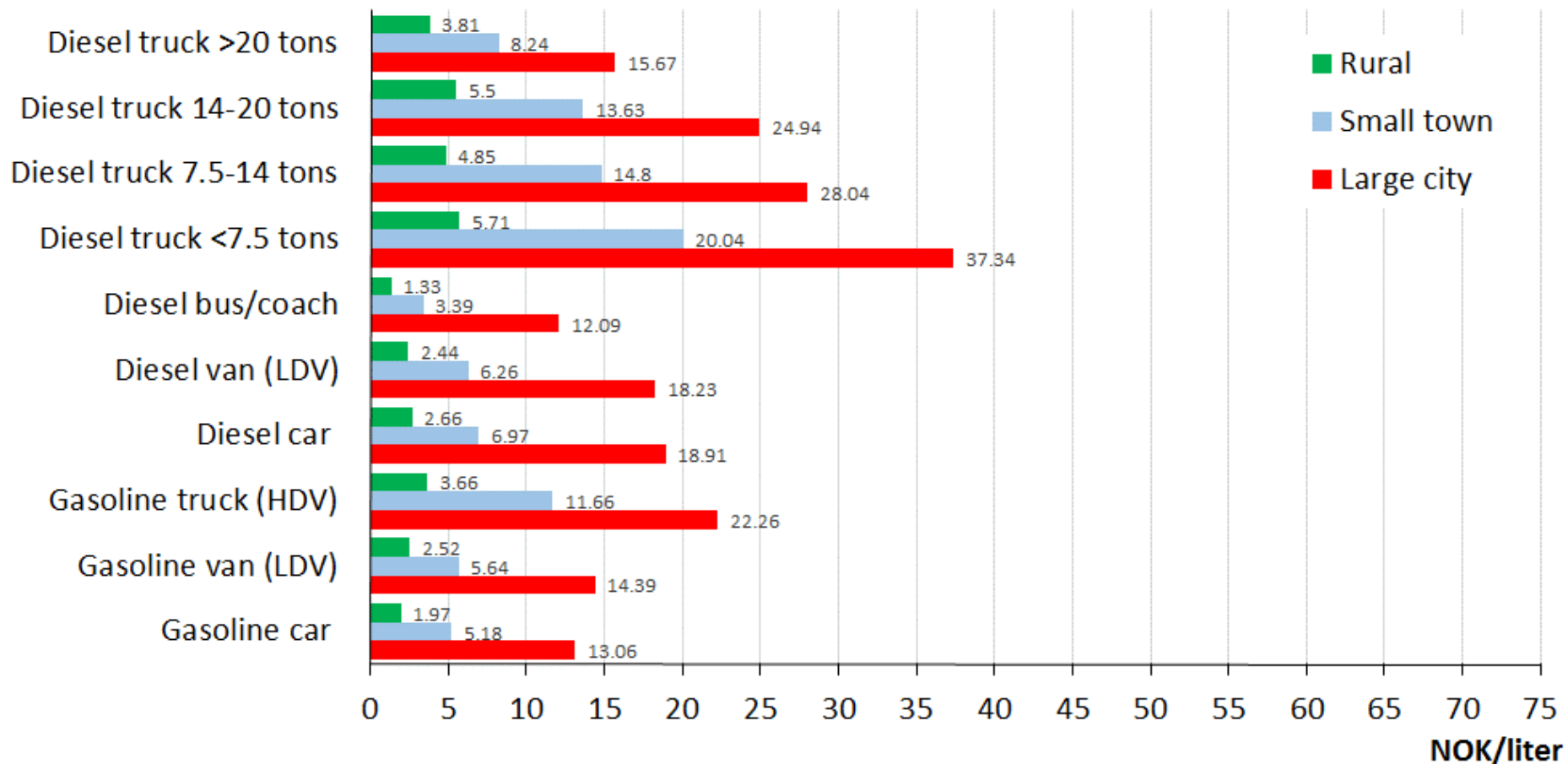


Source: Thune-Larsen et al. (2016) (TØI report 1307)



External costs of road wear, accidents, noise, local pollution, snow clearance and congestion

Marginal external costs of road use per liter fuel

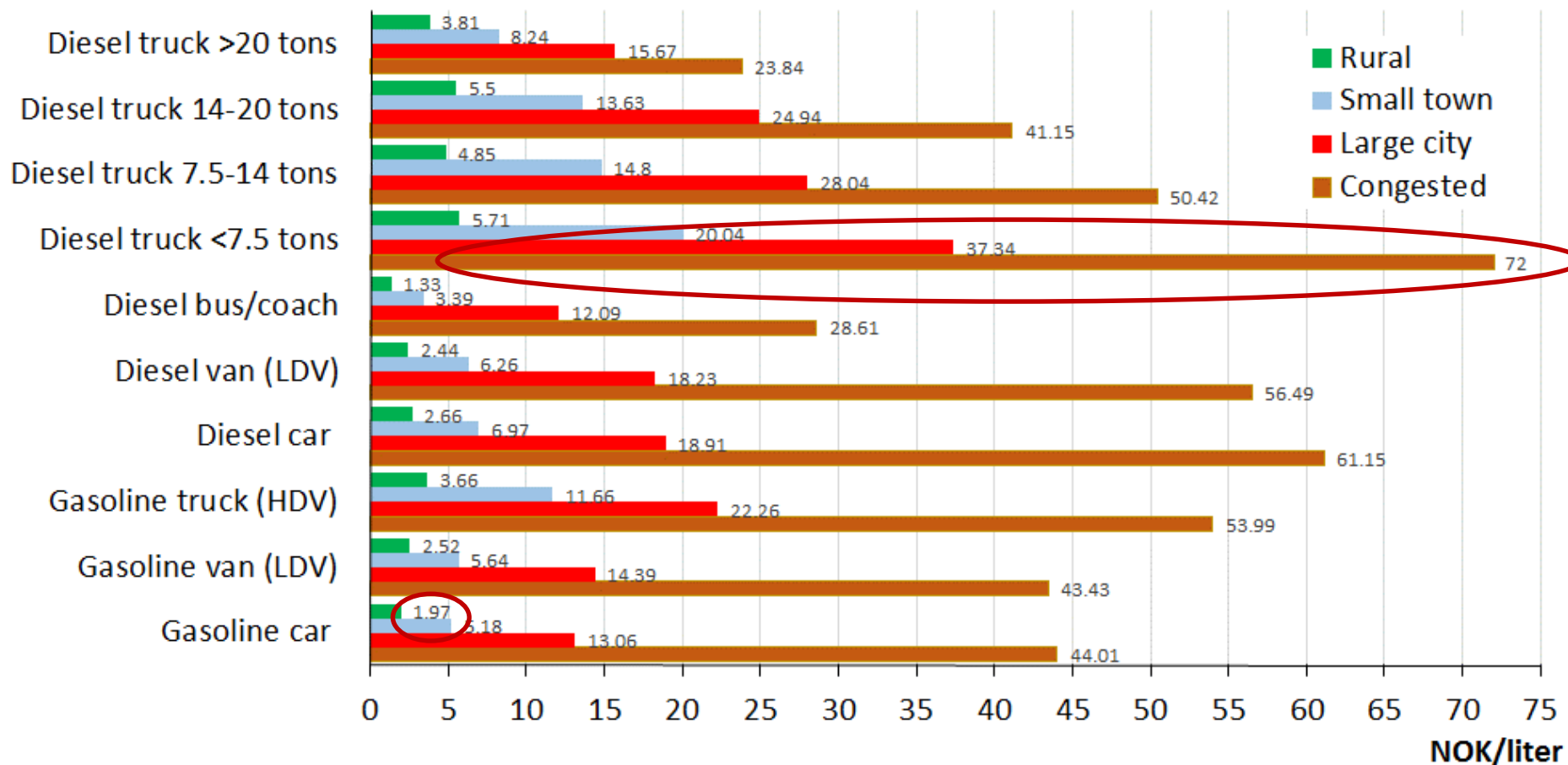


Source: Thune-Larsen et al. (2016) (TØI report 1307)



External costs of road wear, accidents, noise, local pollution, snow clearance and congestion

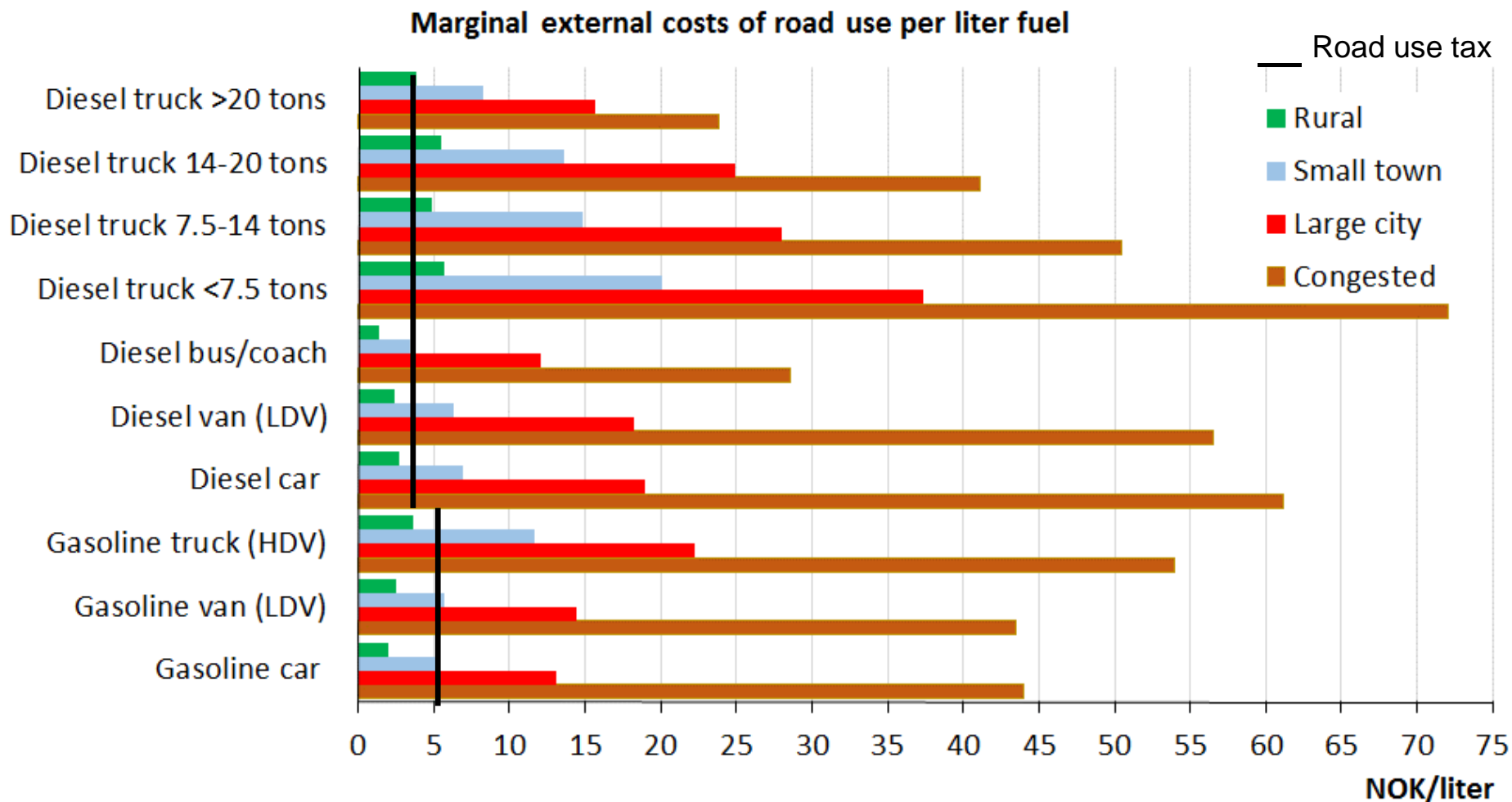
Marginal external costs of road use per liter fuel



Source: Thune-Larsen et al. (2016) (TØI report 1307)



External costs of road wear, accidents, noise, local pollution, snow clearance and congestion



Source: Thune-Larsen et al. (2016) (TØI report 1307)

External costs local pollution

ts, noise,
congestion

Diesel truck
Diesel truck 1
Diesel truck 7.5-
Diesel truck <7.
Diesel bus/co
Diesel van (LD
Diesel car
Gasoline truck (HDV)
Gasoline van (LDV)
Gasoline car

0

Bulletin of the European Union
Supplement 2/96
European Commission
Toward... and efficient pricing
in trans...
Policy options... internalizing...
external costs... transport in...
European Union

— Road use tax

- Rural
- Small town
- Large city
- Congested

5 70 75
NOK/liter



3. The argument for ‘engangsavgiften’ – the one-off purchase/registration tax)

Retail price in Norway 2015: € 418 000,
of which € 59 291 value added tax (VAT)
€ 121 841 purchase tax



The purpose of the one-off vehicle purchase tax...

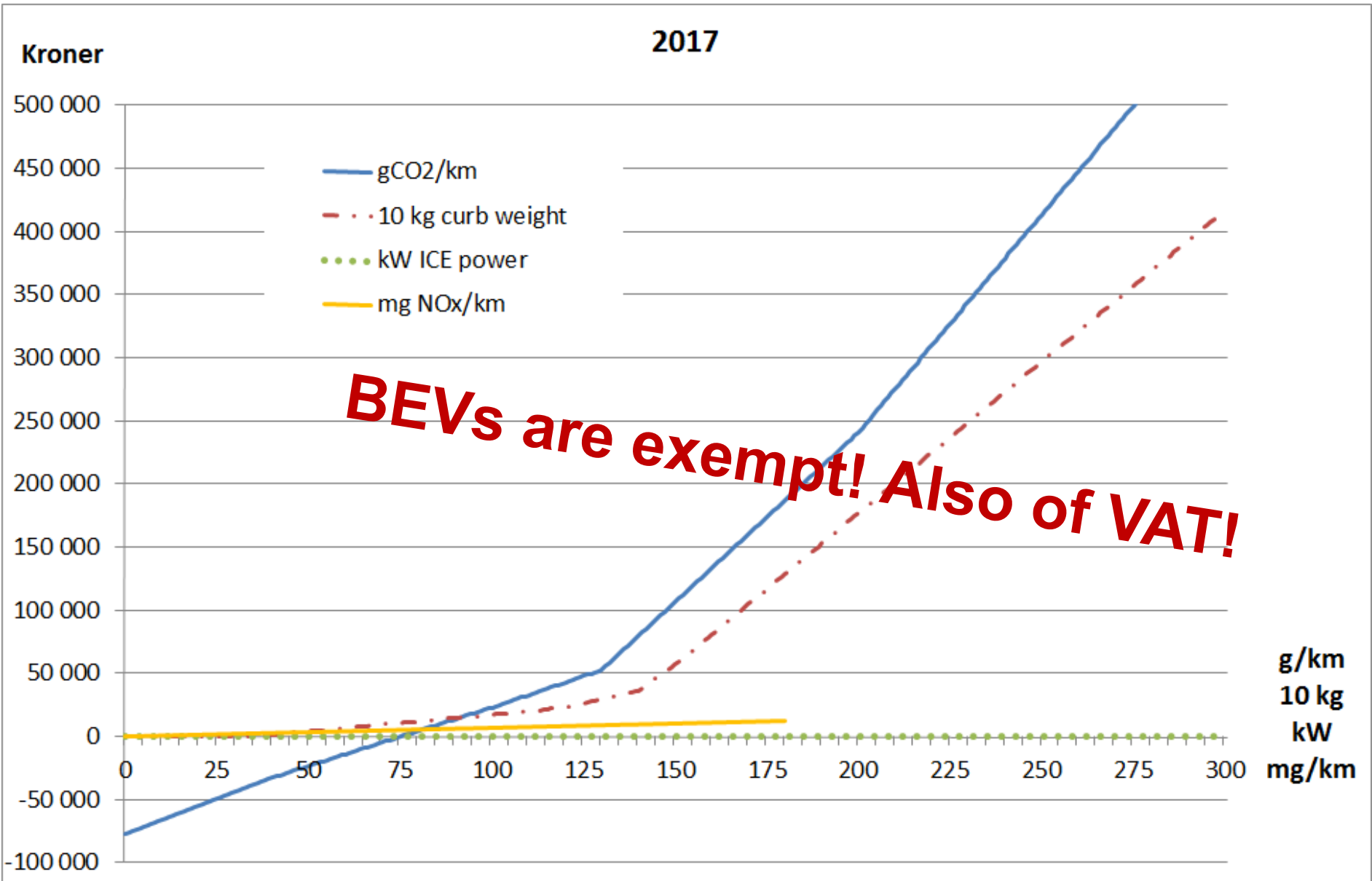
...is to collect revenue for the government, while also taking into account environmental, safety and equity effects.

Ifølge særavgiftsutvalget (NOU 2007:8) har

‘Engangsavgiften [...] først og fremst til formål å skaffe staten inntekter. Avgiften skal imidlertid også ivareta hensynet til miljø og sikkerhet. Gjennom en progressiv satsstruktur er det videre lagt vekt på fordelingshensyn.’



Purchase tax on new passenger cars in Norway 2017



As of October 12, 2017, € 1 = NOK 9.35.

Tax ownership or use?

In favor of taxing **use**:

- **No external costs** arise when car is parked (?)
- External costs **increase with mileage and fuel use.**

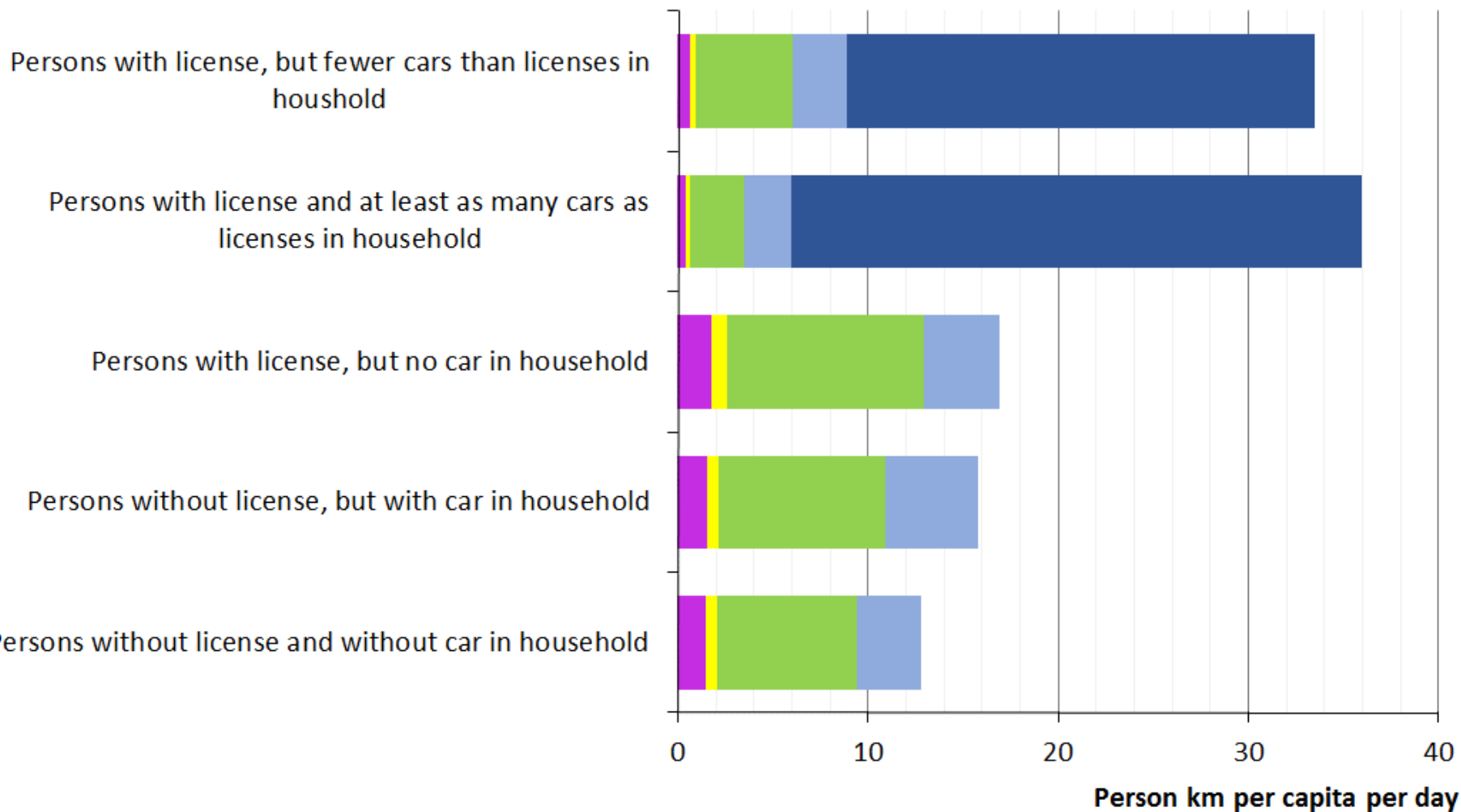
In favor of taxing **ownership/purchase**:

- Choice of car model determines **emissions 15-20 years ahead**, no matter who later owns the car.
- Decision (not) to own a car determines family members' **trip frequency, destination choice and mode choice**:
The **most basic decision** regarding household travel behavior and climate footprint.

Car ownership and use: two sides of the same coin

Short trips in and around Oslo

Walking Bicycle Public transport Car passenger Car driver



Tax ownership or use?

Use:

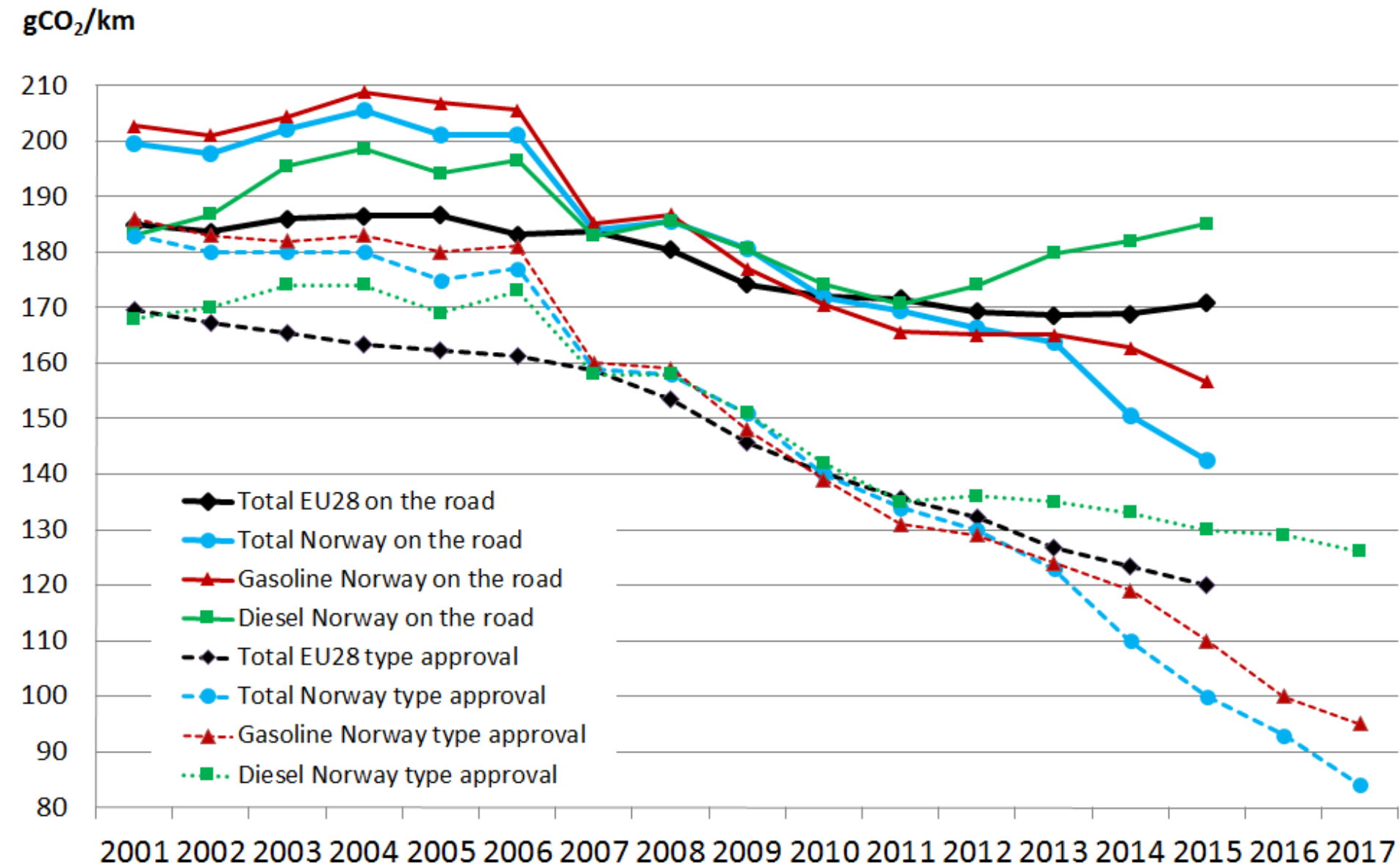
- No external costs arise when car is parked (?)
- Marginal external costs increase with mileage and fuel use.

Ownership/purchase:

- Choice of car model determines emissions 15-20 years ahead.
- Decision (not) to own a car determines family members' trip frequency, destination choice and mode choice:
The overarching decision bearing on household travel behavior and climate footprint.
- It works! Consumers care more about **large, upfront cash expenditures** than about smaller, future annual costs.



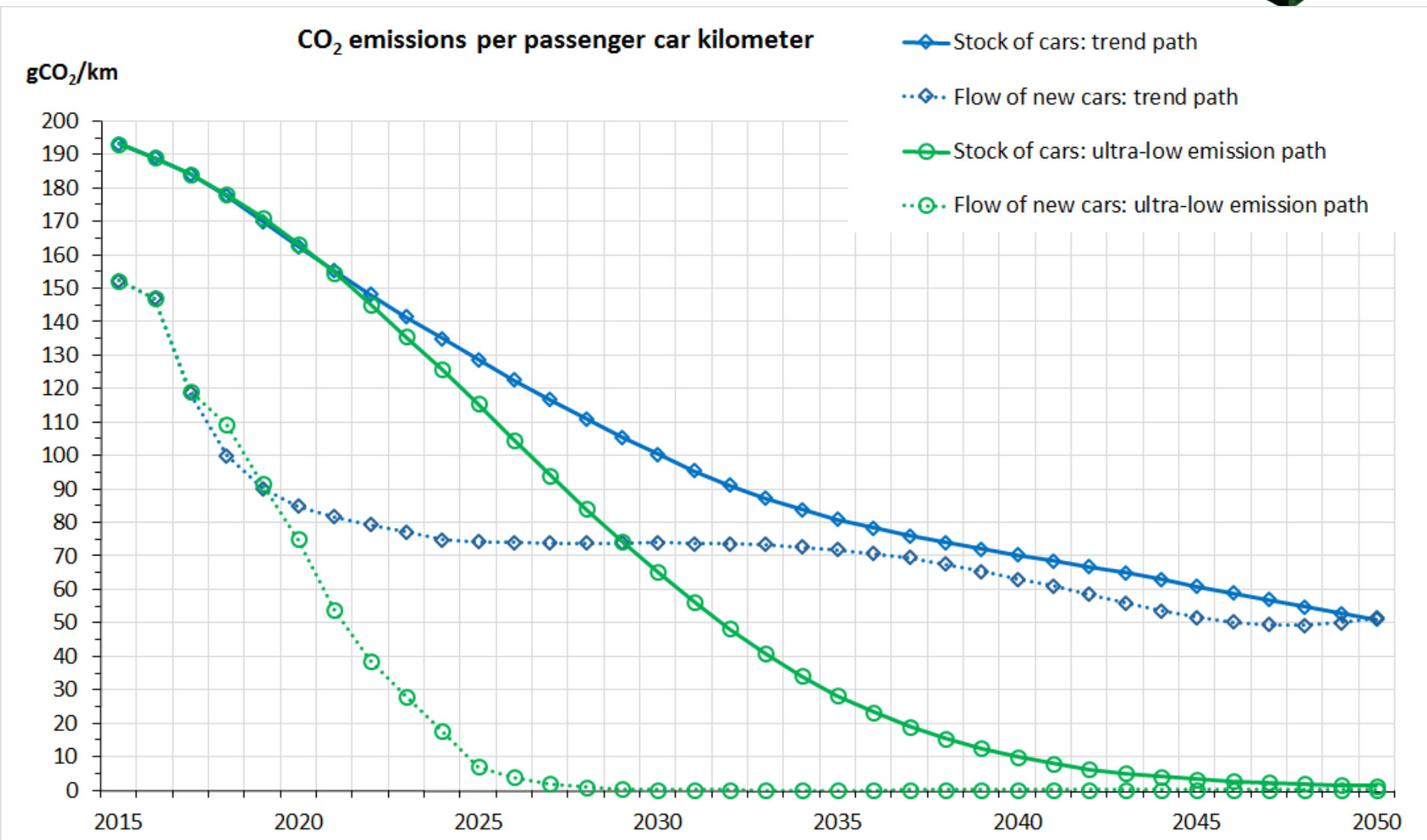
Type approval (NEDC) and real-world emissions from new cars





Average on-the-road emissions – passenger cars

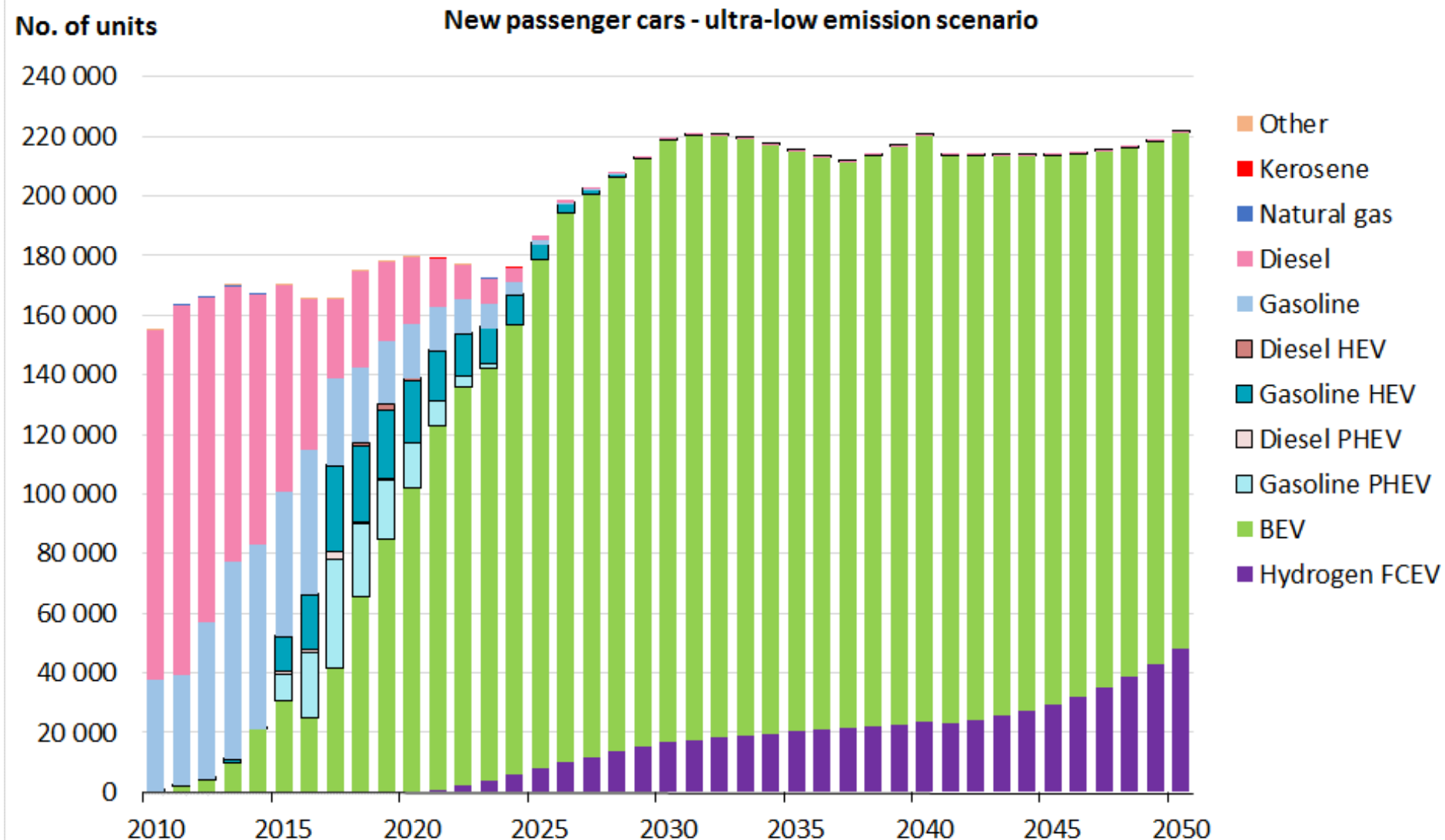
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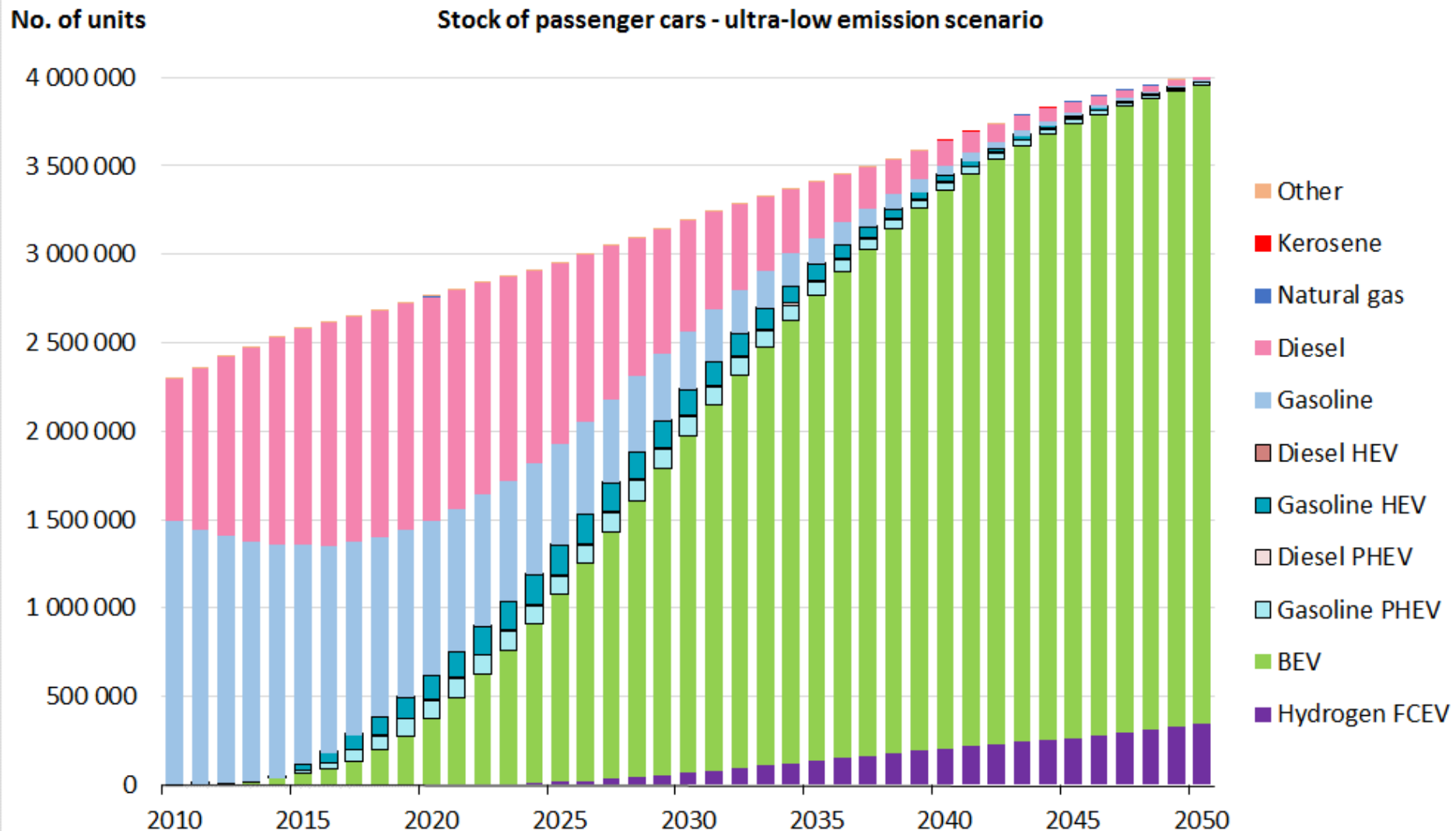
4. The menace of dwindling tax revenue



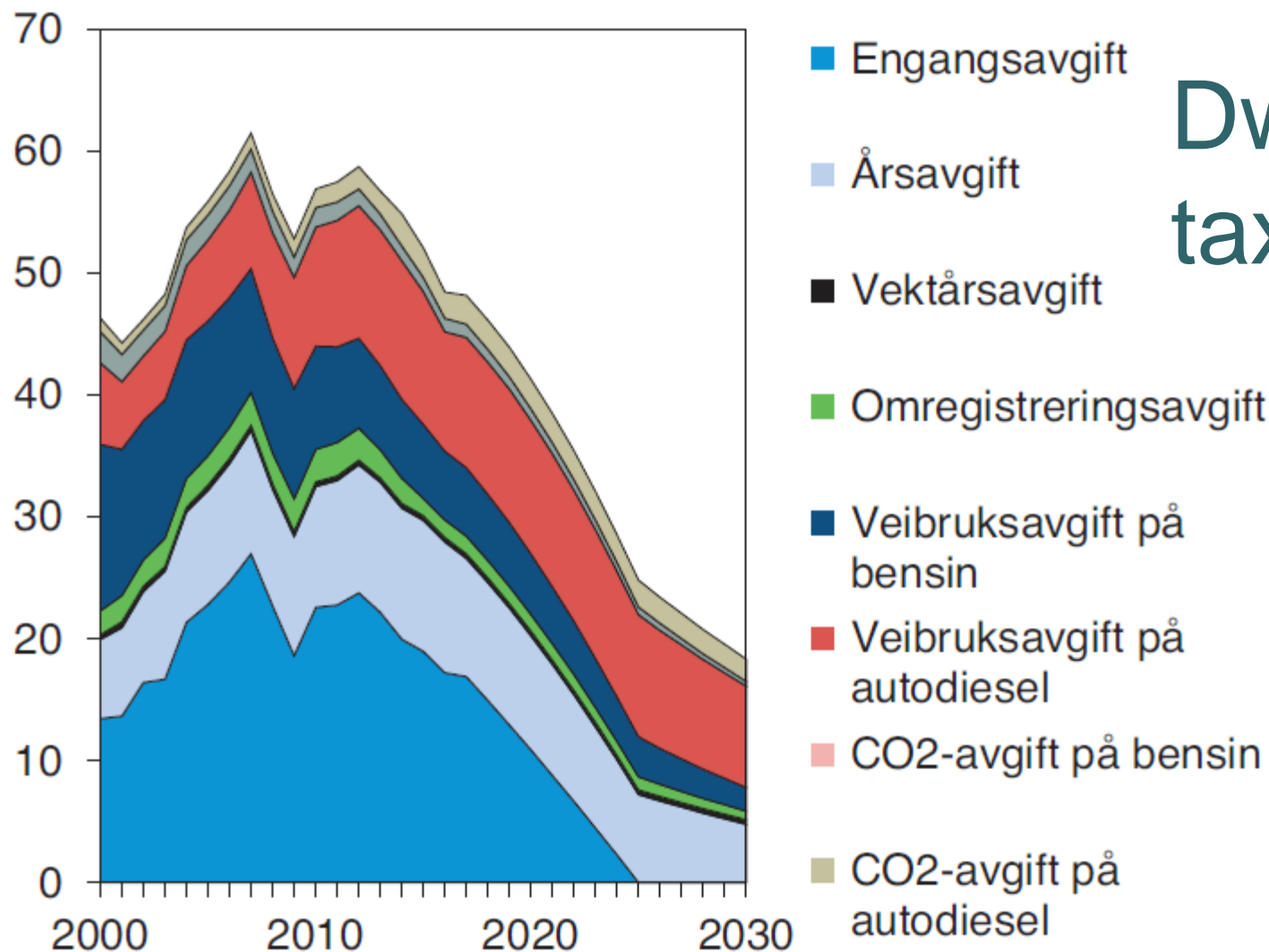
Policy goal: 'disruptive' ultra-low emission (ULE) scenario



Stock of passenger cars – ‘disruptive’ ultra-low emissions scenario



B. Bilrelaterte avgifter forutsatt at alle nye personbiler er nullutslippsbiler fra og med 2025. Mrd. 2017-kroner



Dwindling
tax revenue

Source: Meld. St. 29 (2016-2017) (Perspektivmeldingen 2017)

Miljøvennlige elbiler gir glede, men også et stort hull i statskassen.

Staten taper milliarder på alle elbilene

ØKONOMI

SIGURD BJØRNESTAD

Omlegging av avgiftene har endret bilparken og senket statens inntekter med 25 milliarder på ti år.

Avgiftsinntektene fra biler har sunket fra 70 milliarder kroner i 2007 til et anslag på drøyt 44 milliarder kroner neste år, regnet i 2018-kroner.

– Dette har for flere regjeringer vært en villet utvikling. En del av klimapolitikken er å bytte ut bilparken for å få ned utslippene, sier direktør Øyvind Solberg Thorsen i Opplysningsrådet for Veitrafikken (OFV).

Regnet pr. kjøretøy er fallet enda større. Tallet på kjøretøyer har steget med 20 prosent fra 2007 til i

fjor, inklusive lastebiler, varebiler og busser. Regnet som et gjennomsnitt pr. kjøretøy har det derfor vært bortimot en halvering av inntektene fra bilavgifter.

Nybil-avgiften trekker ned

Inntektene fra tre av de bilrelaterte avgiftstypene har falt siden 2007. Unntaket er inntektene fra CO₂-avgiftene, som har steget litt de siste ti årene. Den største delen av fallet er kommet i «avgift på kjøp av bil». Her har statens inntekter sunket fra 34 milliarder kroner i 2007 til 17,4 milliarder kroner neste år, regnet i 2018-kroner.

I forslaget til statsbudsjett for 2018 skriver Regjeringen at det de senere år er «gjennomført en betydelig omlegging av engangsavgiften for å stimulere til en bilpark med lavere utslipp». Bilkjøperne har sagt ja takk til omleggingen.

Dermed synker både utslippene og statens inntekter.

Særlig har elbilene fått store lettelser. Det ligger an til at nesten hver femte nye personbil i år er en bil med null utslipp. Tilbake i 2010 var andelen nær null.

Alle elbilene, sammen med bensinbiler og dieslbiler som er blitt mer gjerrige på drivstoff, har ført til at CO₂-utslippet fra nye personbiler har sunket fra 180 gram/km tidlig på 2000-tallet til 93 gram/km i fjor. I første halvår i år ligger gjennomsnittlig utslipp enda lavere.

Men samtidig stiger antall kjørte kilometer år for år. Klimautslippene fra veitrafikk har derfor vært stabilt de siste ti årene.

Elbiler og hybridbiler har tatt store jafs av bilmarkedet de siste fem årene.

Vekk med diesel

I 2012 utgjorde elbilen og hybridbilene rundt 7 prosent av de nye førstegangsregistrerte personbilene. I 2017 ligger det an til at denne andelen er 50 prosent.

Thorsen tror ikke de store fordelene for elbilene varer evig.

– Etter 2020 blir nok fordelene vurdert på nytt. Men da kan elbilene ha blitt så konkurransedyktige på pris og drift at de ikke trenger fordeler, sier han.

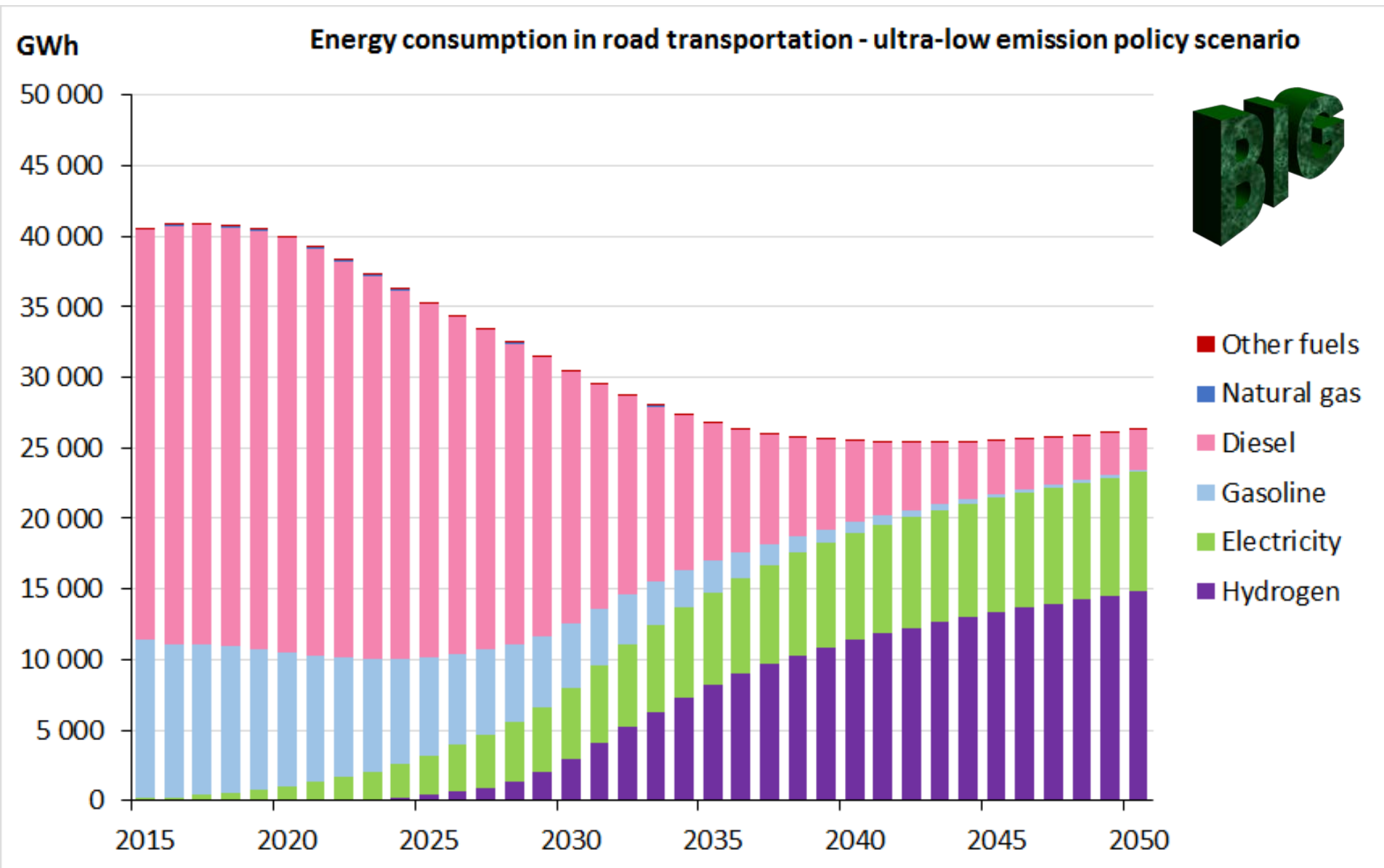
Den store taperen er dieslbilene. Diesel tok smellen da elbilene kom for alvor.

– Dieslbiler har fått økte avgifter, og denne typer biler er blitt dyrere å bruke i de store byene. I tillegg har mulighetene for kjøreforbud og soner for nullutslipp skremt vekk mange kjøpere, sier Thorsen.



ILLUSTRASJON:
SHUTTERSTOCK,
NTB SCANPIX

Ultra-low emissions path: Fossil fuel use shrinks

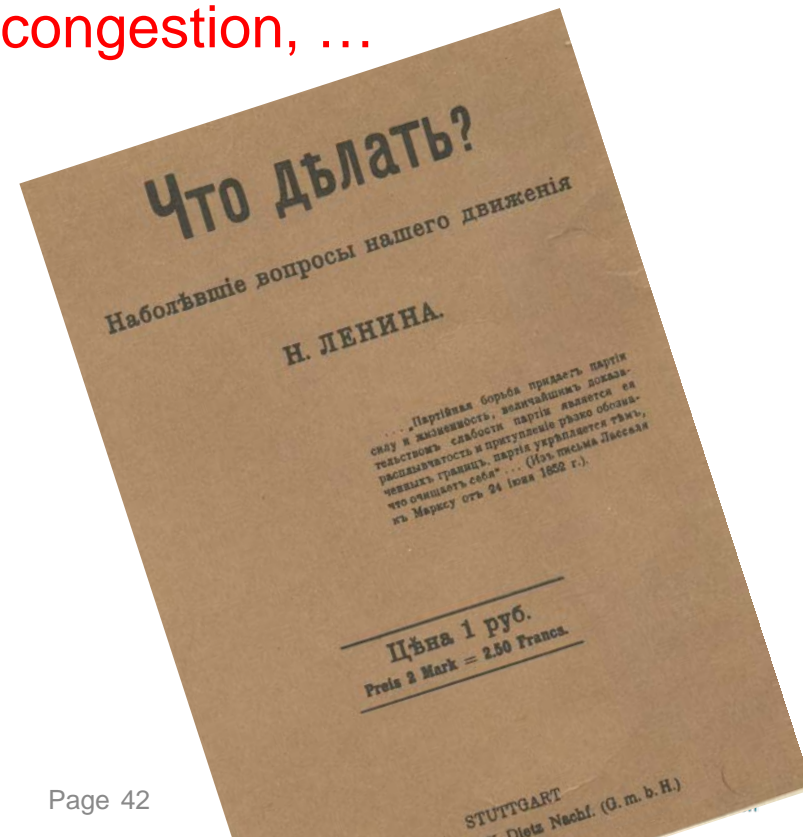


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The great tax paradox

- The purpose of the **fuel tax** is to internalise the external costs of road use, i. e. to **make the polluter pay**. It is doing **miserable job**. But **it brings in a lot of revenue**!
- The **one-off registration tax** is meant to **raise revenue for the government**. Its performance is **fast deteriorating**. But it does a wonderful job in **bringing down GHG emissions**!
- In this process, **it undercuts the fuel tax** and paves the ground for **cheaper road use, more traffic, more congestion, ...**

What is to be done?



5. Fata morgana



A near-optimal road pricing system

Motorists are charged **everywhere** per km driven, at a rate depending on **time**, **place** and **vehicle**, close to the **marginal external cost**

- higher during **rush hour** in **cities**, lower **at night**, during **weekends** and on **rural roads**
 - **rate must be predictable!**
- vehicle weight
- CO₂ emissions per km
- NO_x emissions per km
- particulate matter emissions
- safety equipment/standard

One tolling station:



Thank you for listening!

