# **Taxing SUVs and tolling trucks**

### National Infrastructure Summit, Dublin 16 May 2023

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**T&E: 26** Countries 63 Members **O**National experts



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- SUV sales continue to rise
- Energy & resource issues
- SUVs' higher injury severity
- How SUVs squeeze others out
- Regulatory options
- Worked example of taxing SUVs
- Application / implementation



### Trucks

- Truck emissions are high but don't get much attention
- How to clean up trucks?
- Truck toll reform has a key role
- Toll reductions for cleaner trucks
- Revenue recycling



### NEW CARS IN THE EU BY SEGMENT



#### In million units, % share / 2010 - 2021

Ireland: SUVs made up **58% of new sales** in 2022

Image: Car / SUV sales in the EU (ACEA)

SOURCE INS MARKIT

# Carmakers' strategy is relentless & global

Relentless marketing: **ad spend of ~€2,300 per SUV sold** (2019 data for France)

Based on designs that are often aggressive and intimidating, SUVs marketing sells no-limits individualism - exactly the opposite of what's needed to equitably reduce emissions, and the use of energy & resources





# We should regulate SUVs out of existence

They're not only awful for the climate, they're also killing pedestrians, including children in driveways



## Los Angeles Times

Editorial: Hulking SUVs and trucks are deadly to pedestrians. Why aren't regulators pushing for safer models?

BY THE TIMES EDITORIAL BOARD APRIL 4, 2023 5 AM PT

#### f 🗾 🖈

American car buyers' love of big SUVs and trucks is <u>one reason</u> pedestrian deaths have hit a 40-year high.

The heavier, taller vehicles now make up 80% of car sales in the U.S., and a growing body of research shows they are <u>more deadly</u> when drivers hit pedestrians and cyclists. The mass of SUVs and trucks means they take longer to stop and strike with more force.

They also have larger blind spots than smaller cars. With reduced visibility, drivers turning at an intersection are more likely to hit pedestrians, according to <u>one study</u>. Drivers are also less likely to see small children directly in front of the vehicle. With a higher profile, when a SUV or truck crashes into a person, the front hits the chest and head for more traumatic injuries.



A 2020 Ford F-150 Raptor pickup truck in the Ford display space at the San Diego International Auto Show. (Howard Lipin / San Diego Union-Tribune)

### lea

### Global SUV sales set another record in 2021, setting back efforts to reduce emissions

Laura Cozzi. Chief Energy Modeller Apostolos Petropoulos. Energy Modeller Commentary – 21 December 2021



...

 In Ireland SUVs made up <u>58%</u> of new registrations in 2022 (61,000 out of 105,000)

 "If there's a climate emergency, you don't sell SUVs" - Professor Kevin Anderson

The size of new cars continues to grow too: SUV sales growing strongly, wiping out environmental gains from more efficient motors.

TCD Prof Brian Caulfield: "Ever-increasing sales of SUVs are cancelling out the emissions benefits of EVs, contributing to transport emissions rising just when they should be going down" (Irish Examiner, 3.5.2023)

# SUVs waste energy & resources

- SUVs use far **more energy** than medium-sized cars:
- Fossil SUVs consume ~20% more oil (IEA global average))
   Electric SUVs use more electricity (generally >10%, but can be much higher (60%))
- Electric SUVs also require **more critical raw materials** (larger batteries), plus more steel, plastic, rubber etc
- Since more power is needed, re-charging electric SUVs adds to electricity consumption



Sources: Ricardo LCA modelling, January 2023.

Cumulative Energy Demand (CED): over their full life, large SUVs use 63% more energy than lower medium (LM) sized cars.

Source: European Parliament TRAN Committee, March 2023

## **SUV**isation through EVs

### Kia's all-electric colossus SUV is on its way to Ireland

The big box SUV will comfortably seat seven adults and claims a range of up to 541kms

X Expand



Kis reckons this big all-electric SUV is going to "reshape the way we move".

Michael McAleer Tue Mar 28 2023 - 22:25







- 6% of electric models offered in 2014 were SUVs; today it's 42% (data for France)
- The larger the SUV, the more materials are used, e.g. battery (and the higher the cost), reducing EV accessibility & affordability across income levels
- Pushing ever-higher
   SUVisation via EVs may also threaten public acceptance for the electrification of passenger vehicles



## SUVs are involved in more law-breaking; why?

Vienna study of ~49,000 cars / SUVs found law-breaking is "**significantly higher in SUV drivers** than in normal passenger car drivers" (Wallner et al, 2017)

- But is it the drivers or the vehicles?

A Canadian simulator study got **the same drivers** to drive at high (SUV) and low eye height:

- "drivers choose to **drive faster** when they view the road from an eye height that is **representative of a large SUV**"
- At high (SUV) eye height they also drove "with more variability, and were less able to maintain a consistent position within the lane"

The Effect of Driver Eye Height on Speed Choice, Lane-Keeping, and Car-Following Behavior: Results of Two Driving Simulator Studies

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January 2007 · <u>Traffic Injury Prevention</u> 7(4):365-72
DOI:<u>10.1080/15389580600851927</u>
Source · <u>PubMed</u>
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Authors:



Christina M Rudin-Brown Human Factors North



# Higher point of impact makes SUV crashes more dangerous for cyclists

April 13, 2023

US study compares SUVs and regular cars in real-world cyclist crashes (Insurance Institute for Highway Safety 2023):

"SUVs were disproportionately **likely to throw bicyclists forward onto the ground** and ... inflict injury by running them over".



- Size and shape of SUV front grill most responsible for differences in injury severity
- Severe head injuries typical in SUV crashes. With cars, more distributed & less severe injuries

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# New study suggests today's SUVs are more lethal to pedestrians than cars

June 16, 2020

IIHS (2020) found higher injury severity for pedestrians hit by SUVs:

"The taller front end of SUVs strike pedestrians **above their centers of gravity** rather than below them (as in the case of car impacts), which results in **pedestrians being thrown forward and down**". *Right*: the **large blind zone** is a separate problem, but also stems from frontal height.

High grill prevents SUV drivers from seeing children, who they then run over



Image: John Legge

### *"Grill growth"*: US term summing up the increasing height of passenger vehicle fronts

# Move on: Massive vehicles are making the roads more dangerous

We feel safer inside large vehicles, but when is the grille growth going to stop?

Heather Drugge Apr 14, 2021 11:09 AM





# **Higher injury severity**

Car

Large SUV

Large van

- Greater risks from higher grills documented in the US for 20+ years
- Gabler & Lefler (2003 paper, right): "one way to **reduce** head injuries from SUV impacts would be to **replace** the blunt front end with a sloping, more aerodynamic one, making them more car-like"
- Injury severity data is generally US, but EU data starting to emerge



#### Pedestrian fatalities

### NewScientist



Newsletters Podcasts Video Comment Culture Crossword Technology Environment Mind Humans Life Mathematics

#### Technology

SUVs double pedestrians' risk of death

By Paul Marks H 12 December 2003

### EU data emerging (slowly)

Heavy, powerful passenger vehicles are more likely to cause fatal injuries than less powerful, lighter models (Vias [formerly Belgian Road Safety Institute] 2022)

 Conclusions for SUVs are indirect (to date just 0.7% of collisions in the Belgian dataset have involved large and very large SUVs)

Source: Vias (2022), Impact des caractéristiques des véhicules sur la gravité des blessures des usagers vulnérables de la route

### The Brussels Times

### Heavy vehicles twice as deadly for cyclists and pedestrians

Tuesday, 31 May 2022 By Lauren Walker





## Greater width of SUVs squeezes out cycling - and walking



Images: Michael O Baoigheallain (left) and Cllr Saskia Heijltjes (above)

### **Possible regulatory responses**

- Ban SUVs
- Ban SUV advertising In France it will be unlawful to advertise SUVs / cars that emit more than 123g CO2/km from 2028.
- Tax / regulate them out of existence



# Calls Increase for SUV Ban to be Introduced in Cities

The popularity of SUVs is being called into question, as campaigners are petitioning for a ban on 4x4 vehicles in city centres following recent deaths in Germany.

#### Image: Winns solrs (2019)

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3-part tax on newly-registered passenger vehicles applied **when thresholds for weight, width and height are exceeded**:

**Proposed tax reform** 

Weight: threshold of 1600 kg for fossil vehicles, 1900 kg for EVs

- 29% of 2021 sales above threshold (in practice heaviest ~20% targeted)
- Higher EV threshold until 2030

Width: 1.73m (excluding mirrors)

- Typical on-street parking space is ~1.8m wide
- 1.8m leaves enough room to get out in multi-storey car parks (where spaces are ~2.3m wide)

Height: 1.43m (measured to highest point of roof)

• This is the typical height of a regular car (which ~20% of adult women don't see over, a figure which rises with vehicle height)

#### SUVs targeted in new French 'weight tax'







# Mini-simulation (WWH tax)

Weight tax thresh	holds (kgs)
ICE & hybrids	1600
BEV	1900

	Width (mm)	Weight (kg)	Height (mm)	Width (€)	Weight (€)	Height (€)	
Thresholds & <u>rates above</u> <u>threshold</u> (€ per mm / kg)	1730	1600 / 1900; see right	1430	<u>10</u>	<u>10</u>	2.5	
	Vehicle data			Application of ta	pplication of tax		
	Width (mm)	Weight (kg)	Height (mm)	Width tax (€)	Weight tax (€)	Height tax (€)	<u>Sum payable</u>
Renault ZOE	1730	1577	1562	0		330	330
VW ID3	1809	1810	1568	790		345	1135
Tesla Model 3	1849	1870	1443	1190		32.5	1223
Tesla Model Y	1921	2003	1624	1910	1030	485	3425
Ford Focus	1823	1368	1469	930		97.5	1028
Audi A5	1846	1598	1399	1160			1160
Audi A6 PHEV	1874	2085	1455	1440	4850	62.5	6353
Volvo XC 40	1863	1664	1652	1330	640	555	2525
JLR Range Rover PHEV	1990	2660	1888	2600	10600	1145	14345
Porsche Cayenne	1995	2408	1696	2650	8080	665	11395

### For larger families, 3 and 4-child seats are available





- **3-seater option** (right) fits **compact cars** including Fiat 500, Ford Ka and Renault Clio
- **4-seater option** (above) fits Audi A6, BMW 5 Series, Citroen C4 Picasso, Volvo V70, etc
- **Rear-facing baby seat** available. Seats also rated for adult use

Many brands exist; Multimac shown here (installers in Armagh, Cork & Meath)

### 5 children?

- It's suggested that vehicle length is **not taxed**
- A station wagon with a third row of seating can avoid all three tax thresholds proposed

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### **Proposed scope & exemptions**

- Commercial registrations are not in scope. This excludes commercial vans, farm jeeps, and all other vehicles registered to commercial users
- Certain exemptions should be granted from the tax, e.g. medical reasons (where a doctor certifies that an elevated seating position is required)



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### **Political context & application**

# Climate action requires measures to reverse the growth in energy use and size of vehicles

### Implementation

- Update the vehicle registration system as necessary to require weight, width & height to be inputted upon registration
- Levy the **WWT surcharge within VRT** upon registration, the same as Ireland's **VRT NOx surcharge** (in force since 2020; see right)

#### Table 19: VRT NOx Surcharge

Thresholds mg/km)	(NOx	Rate per mg/km
0-40		€5.00
41-80		€15.00
81+		€25.00

Image: Department of Finance (2022), Climate Action and Tax Paper



# Other regulatory 'options'



### **Tolling trucks**

### Heavy goods vehicles = 2nd biggest CO2 source in



Truck emissions (19%) are slightly less than half those of cars / SUVs (42%)

Image: Energy use in transport, SEAI

# How to decarbonise trucking?

- Apply network-wide truck tolling per kilometre
- Vary the toll by weight and emissions, with a strong toll reduction (50 - 75%) to trucks with zero emissions from the tailpipe (ZE vehicles), in practice full electric

Gov's already directly tolling trucks per km: Austria, Belgium, Bulgaria, Czechia, Germany, Hungary, Poland, Slovakia and Slovenia. Low cost implementation of gov-directed truck tolling now possible due to tech developments.



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Sources: European Commission (2017 and 2022), Government of the Netherlands (2022), Government of Finland (2021), Vinetki.bg (2021).

## Reduce tolls for ZE trucks to help roll-out

- 100% toll reduction for ZE trucks applied in **Germany** and **Czechia** (before going to 75% in 2026)
- 75% toll reduction for ZE in place in Austria, and planned in Denmark (2025) and the Netherlands (2026)

Ireland's e-truck roll-out is half the EU average (0.3% of new sales v. 0.6%)

	ELECTRIC	1=
	2022	
Austria	-	
Belgium	24	
Croatia	0	
Cyprus	0	
Czech Republic	4	
Denmark	89	
Estonia	1	
Finland	15	
France	166	
Germany	829	
Greece	1	
Hungary	4	
Ireland	7	
Italy	17	
Latvia	0	
Lithuania	0	
Luxembourg	2	
Netherlands	145	
Poland	6	
Portugal	2	
Romania	5	
Slovakia	2	
Slovenia	1	
Spain	160	
Sweden	176	
EUROPEAN UNION	N 1,656	
Iceland	1	
Norway	364	
Switzerland	178	
EFTA	543	
United Kingdom	809	
EU + EFTA + UK	3,008	

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Image: ACEA

# Truck tolling in Ireland is currently very inconsistent

 Truck travelling from north Dublin to Shannon pays 3 tolls (M50, N7 Laois, and Limerick tunnel)

Total payment: €19.10

• Truck travelling from **south Dublin to Rosslare** is not tolled at all (none of this route forms a PPP)

Similar inconsistencies for trucks travelling between Cork & Galway and Dublin (multiple tolls also levied on these routes)



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# Time is ripe for truck toll reform

### Follow Austria, Belgium, Germany, etc **apply a network-wide per-km toll, varied by weight & emissions**

- Offer existing PPPs an opt-in (paying them the contract rate) until expiry
- Consider including roads with more than 500 truck movements a day, and **give flexibility to add other roads** to tackle any diversion (e.g. ministerial order)
- Motorway/dual carriageway rate should be higher than 2-lane road (e.g. Poland applies ~70% of the motorway rate to certain trunk roads)



### **Recycle revenue to support going greener**

- Investment is needed to put truck / bus recharging approx every ~60 km along major routes
- Ireland is supporting e-truck purchasing, but needs to give a higher level of support to smaller companies (like NL)
- Support is needed to install charging in depots (see right)

Image: Overview of national infrastructure subsidies for ZE trucks (T&E 2022)

	Country	Program	Total budget	Per charger*	Type of infrastructure	Running time
-	Austria	Emissionsfreie Nutzfahrzeuge und Infrastruktur	€62 mil.	40% of costs (max. 30.000€ for >100kW)	🥖 /H2	2020-26
	Belgium	Ecologiepremie+	€3mil./ year	30% of costs (min. 50kW)	≠ / H2	N/A
=	Croatia	none	N/A	N/A	N/A	N/A
	Czech Republic	Call No. 3/2022: Ecomobility	N/A	50% of the costs (max. ~€41.000)	*	2022-23
	Denmark	Udmøntning af pulje til grøn transport	DKK 72 mil.	Coming soon	🧲 / H2	2021-24
	France	Advenir	€127 mil.	60% of costs (max. €960.000 for >4.000 kVA)	*	2021-22
۲	Finland	Decree under Act on Discretionary Government Transfers	€13.2 mil.	Coming soon	🤌 / H2/ 😹	2022-25
	Germany	Klimaschonende Nutzfahrzeuge und Infrastructure	€5 bil.	80% of costs		2021-24
	Ireland	none	N/A	N/A	N/A	N/A

### Summing up

**SUVs** now make up approx 60% of new sales but

- use more energy and resources
- squeeze out other road users, and
- injure and kill more than regular cars.

Tax reform can be implemented swiftly (Budget 2024), delivering key goals including on climate action, active travel & public health, improved air quality and road safety.

The case for reform is **compelling and pressing**.

**Trucks** account for around 20% of transport emissions, but get comparatively little attention.

Truck tolling in Ireland is inconsistent. A **national tolling system** can cover all routes with significant truck movement. Applied **per km**, the toll should be **varied for weight, with reductions for cleaner trucks.** 

Revenue needs to be recycled, in particular to help **smaller players secure vehicles and charging**.

Truck toll reform is key to **getting electric trucks on the road**, and cutting road freight emissions.



# Thank you



### **Annex slides**



Cartoon by Fabian Todorovic Karmelic

"When you're accustomed to privilege, any demand for more equality feels like oppression" - comment by Marco Te Brömmelstroet





INFRASTRUCTURE APR. 21, 2023

# Heavier Vehicles in Aging Parking Garages Are a Recipe for Disaster

By Alissa Walker, a Curbed senior writer 🗸

