SO YOU THINK YOU'RE GREEN?

FOCUS ON MOBILITY

NOVEMBER 17 2020 | WEBINAR

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Fonds National de la Recherche Luxembourg

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LIVE POLL !

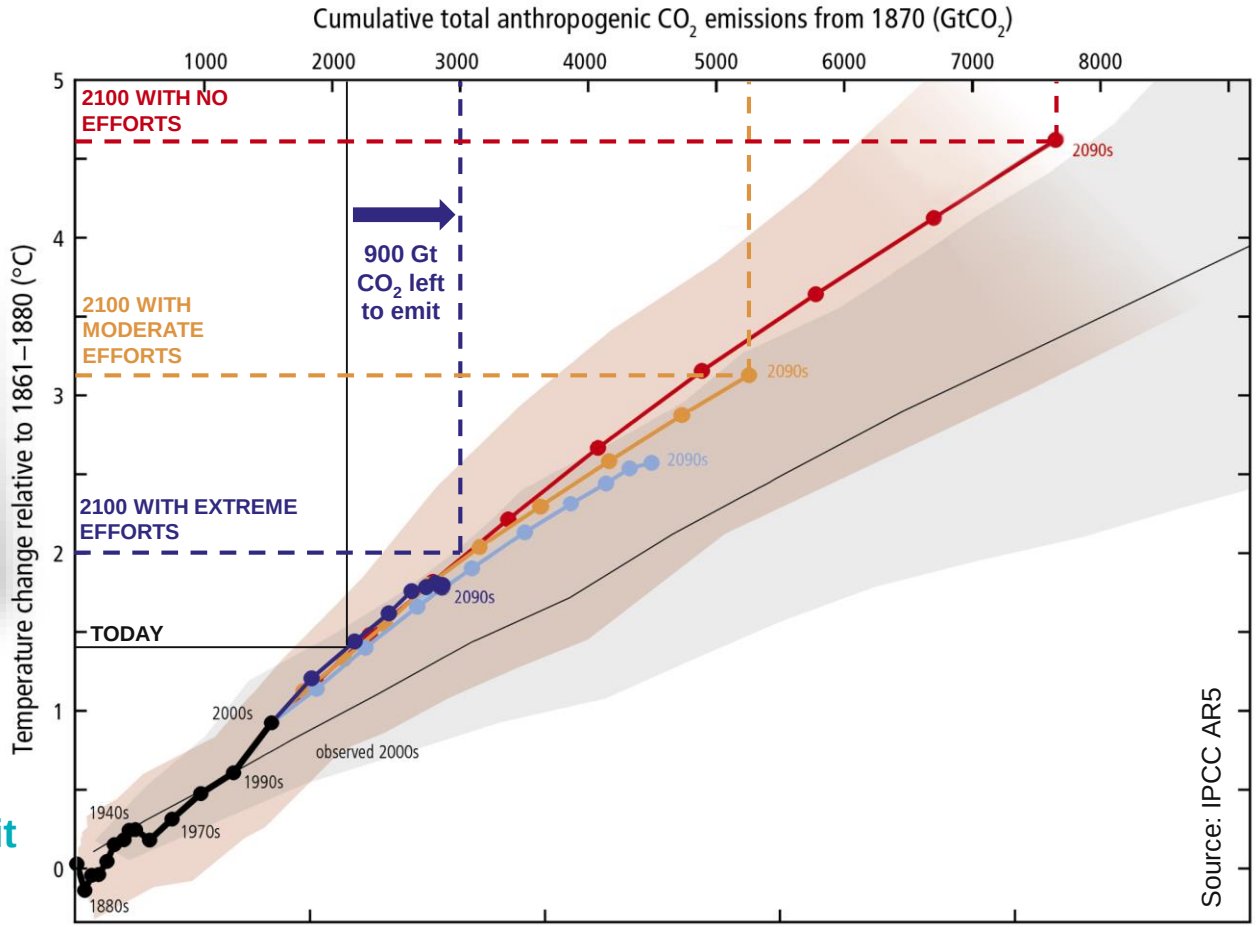
1. CARBON FOOTPRINT

Temperature and CO_2 emissions?

Carbon footprint

The **Paris agreement** is a pledge to remain under **2°C of warming**

This translates roughly into an additional **800-1000 Gt CO_2 left to emit**



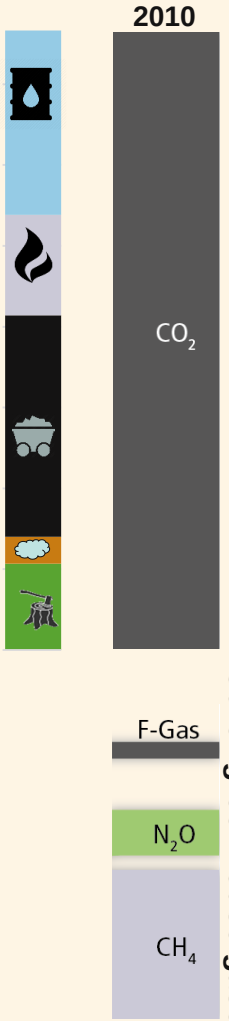
Carbon footprint

Carbon dioxide (1 kg = **1** kg CO_2 eq.)

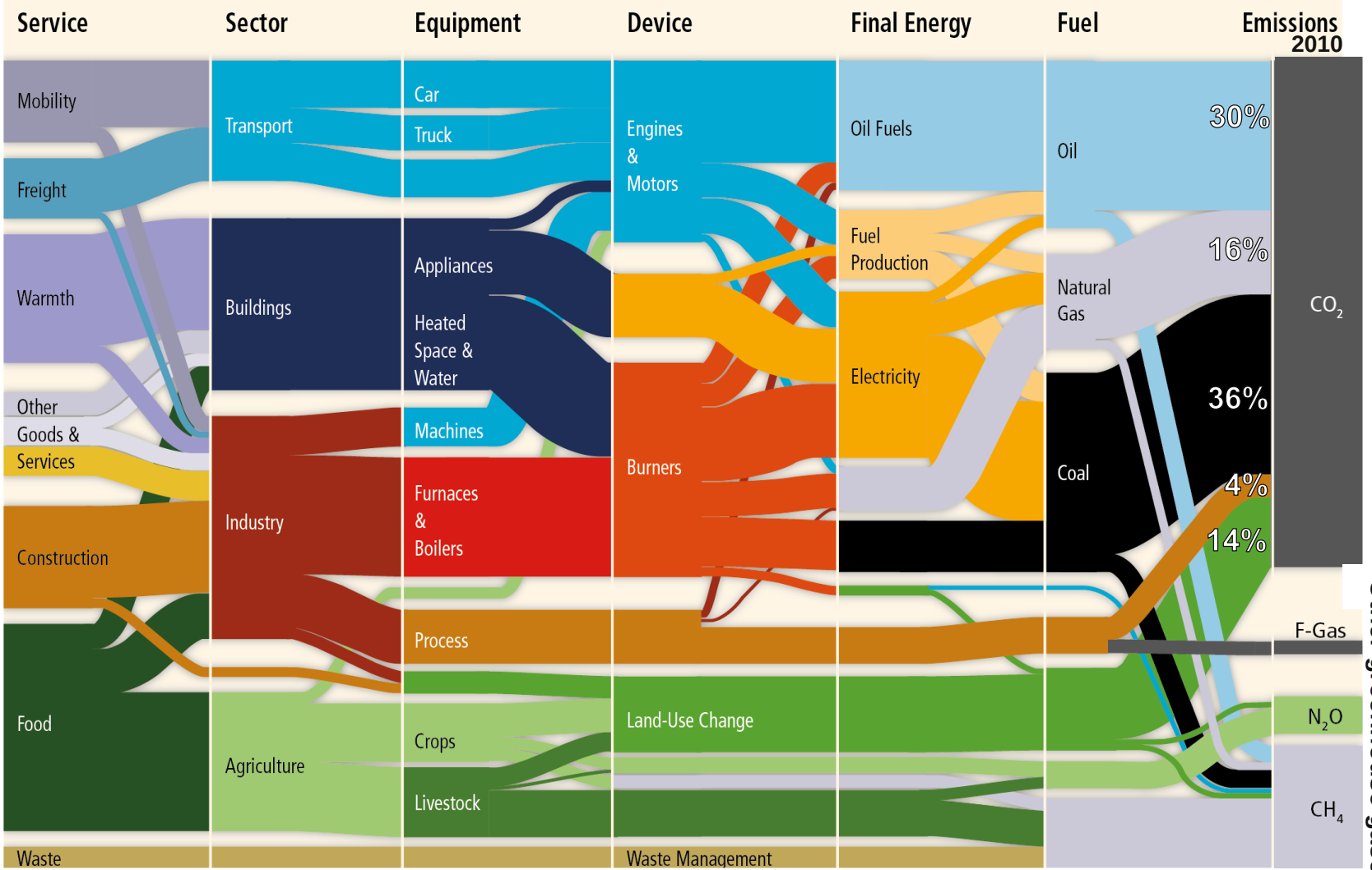
Fluorinated gases (1 kg = **8000-23000** kg CO_2 eq.)

Dinitrogen monoxide (1 kg = **300** kg CO_2 eq.)

Methane (1 kg = **25** kg CO_2 eq.)

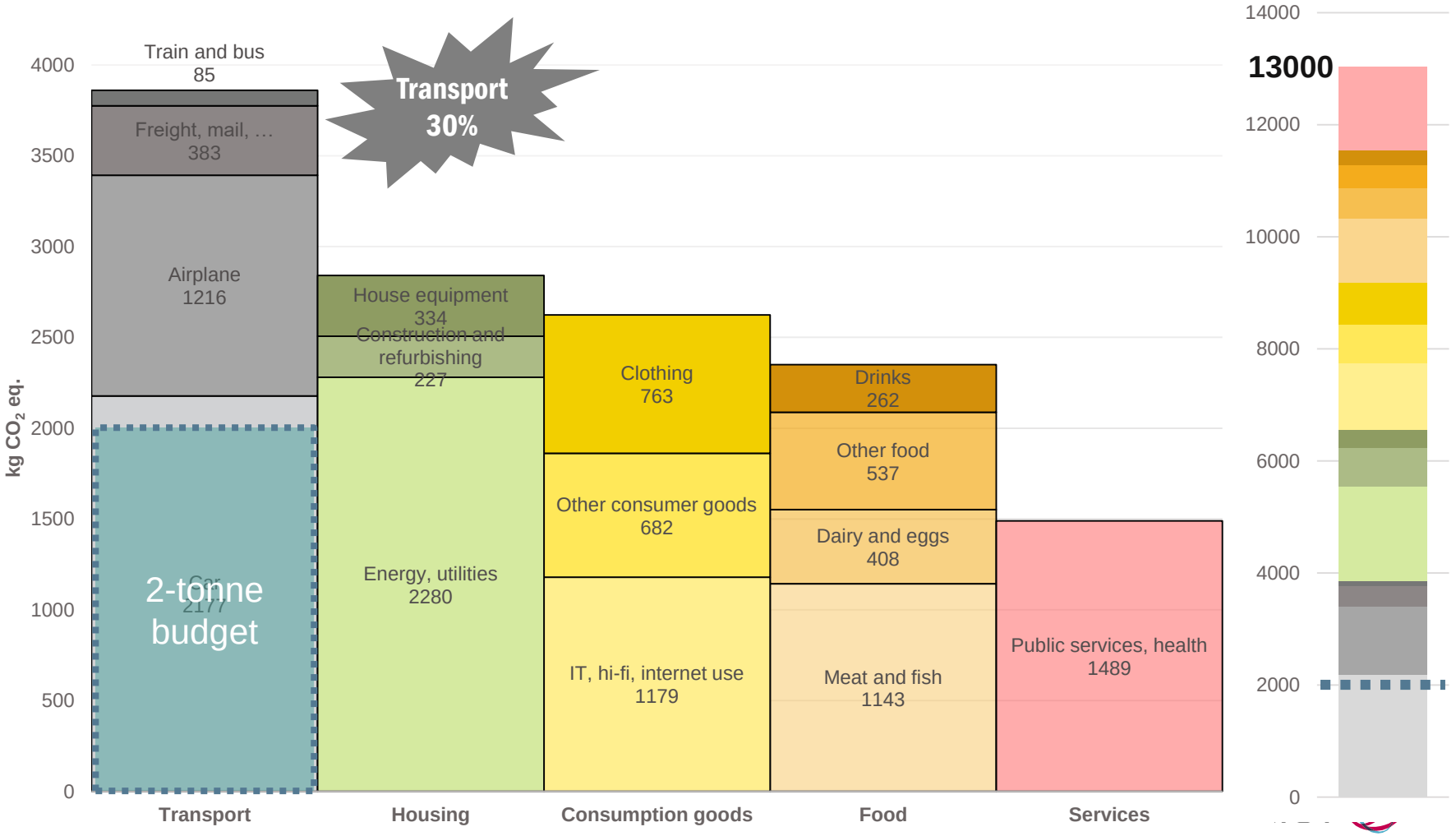


Carbon footprint



LIVE POLL !

Carbon footprint



Outline

1. CARBON FOOTPRINT
2. PLANE TRAVELS
3. COMMUTING
4. CARS COMPARISON
5. ELECTRICITY SUPPLY

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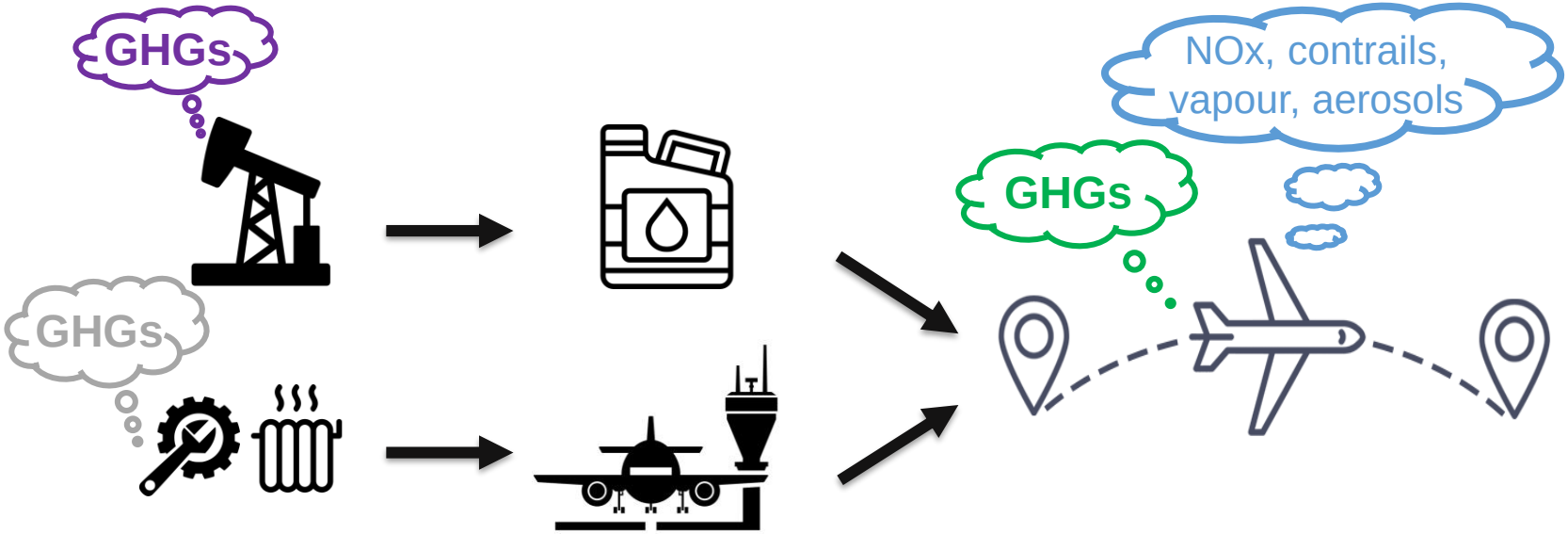
1. CARBON FOOTPRINT

2. PLANE TRAVELS

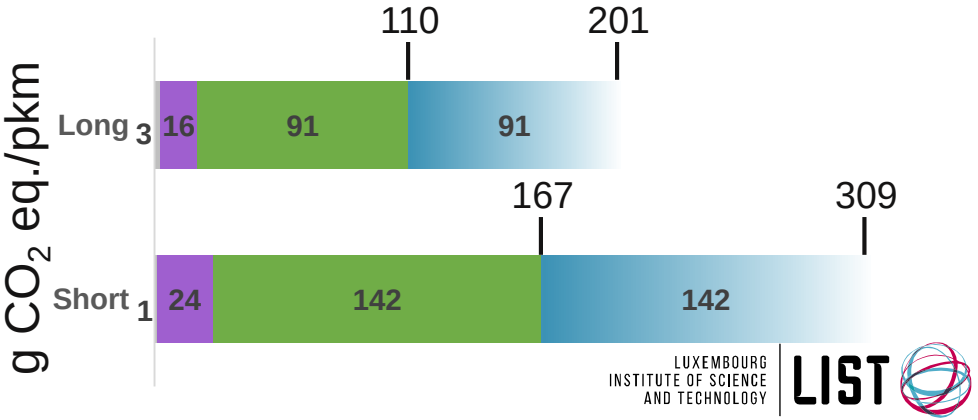
LIVE POLL !

Plane travels



Kerosene consumption:

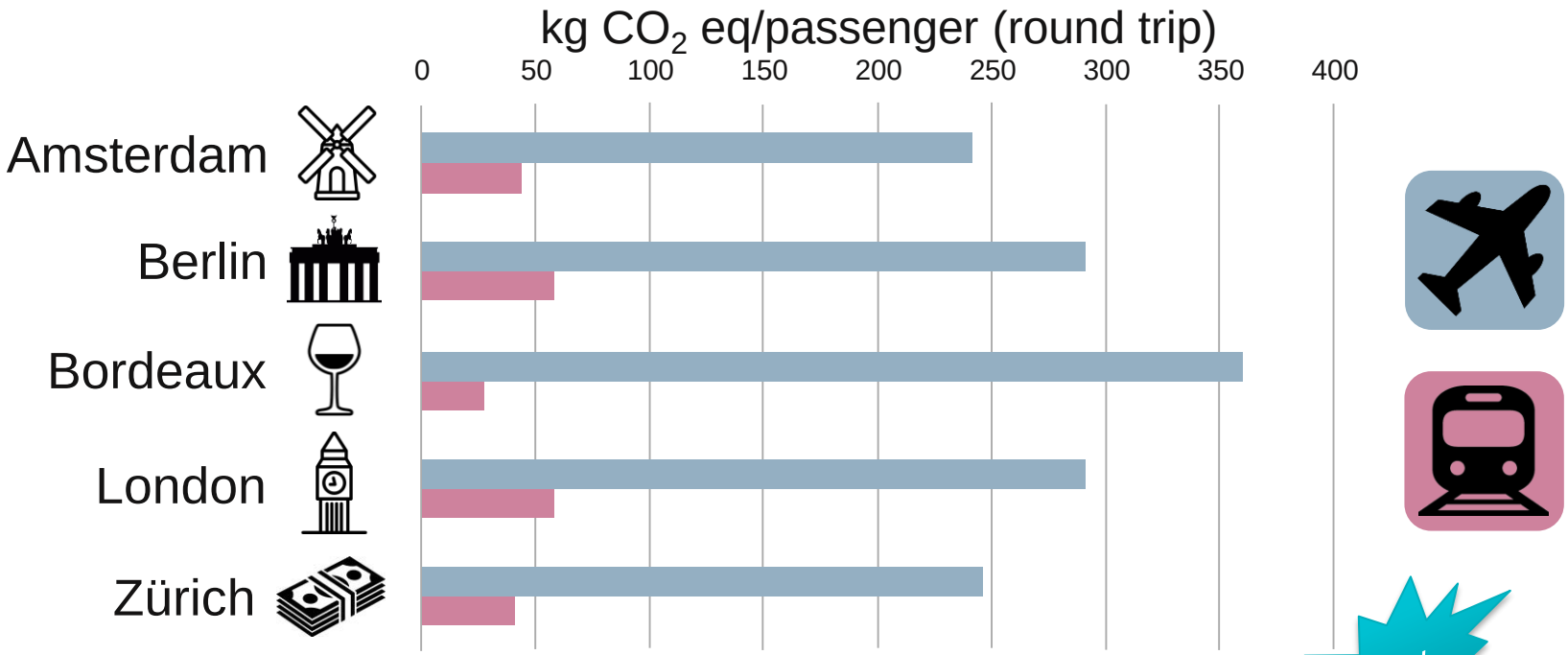
- Long: ~3.6 L/100 km/passenger
- Short: ~5.6 L/100 km/passenger



Source: ecoinvent database, myclimate

Let’s go to…

Plane travels



All: 1.5 tons CO_2 eq vs. 0.2 tons CO_2 eq

16 hours vs. 31 hours

-80%

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1. CARBON FOOTPRINT

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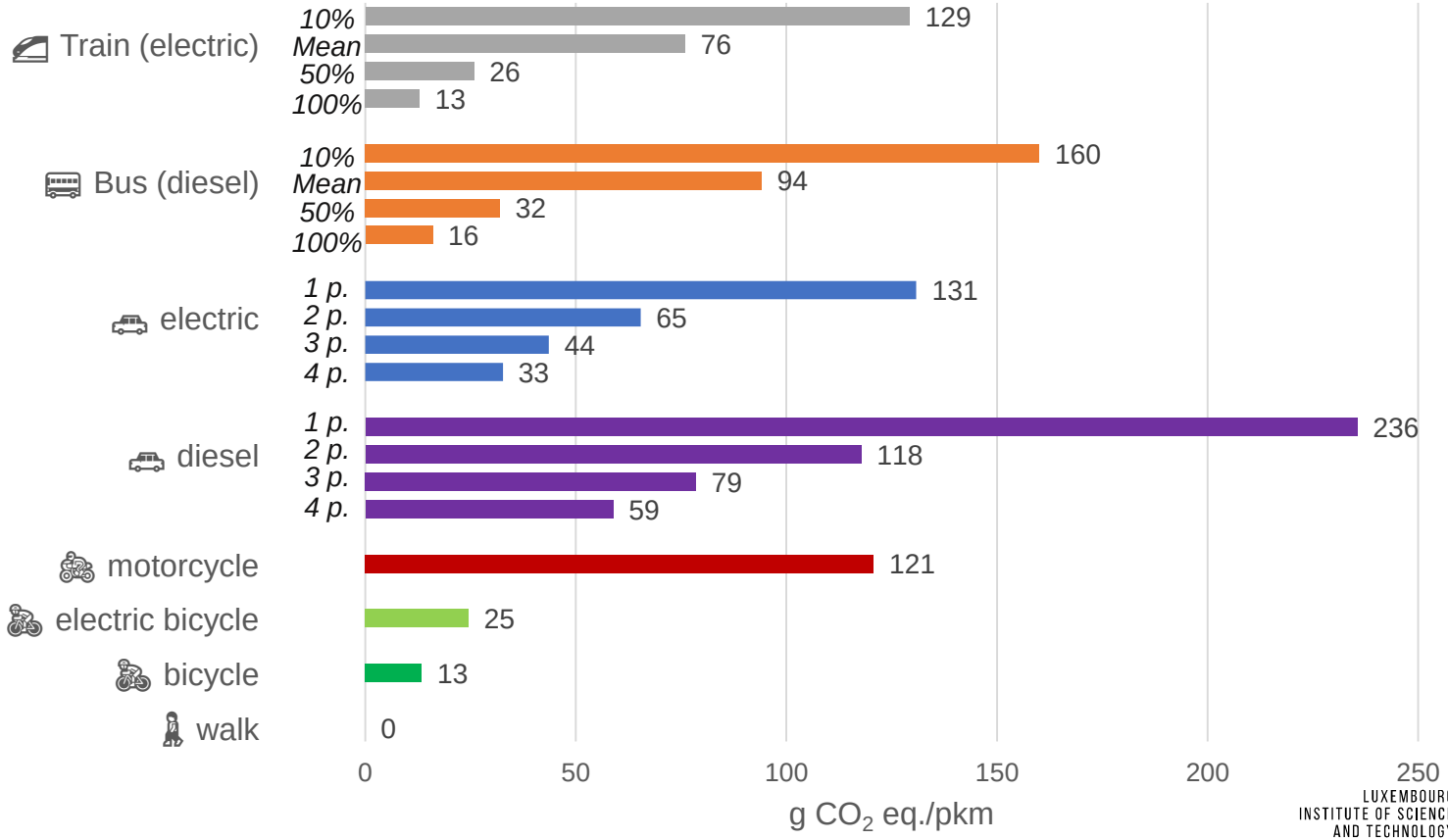
3. COMMUTING

LIVE POLL !

Which transportation means?

Commuting



Source: ecoinvent database; Hill et al. (2020); Nordelöf et al. (2019)

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LIST

What about teleworking?

Example:

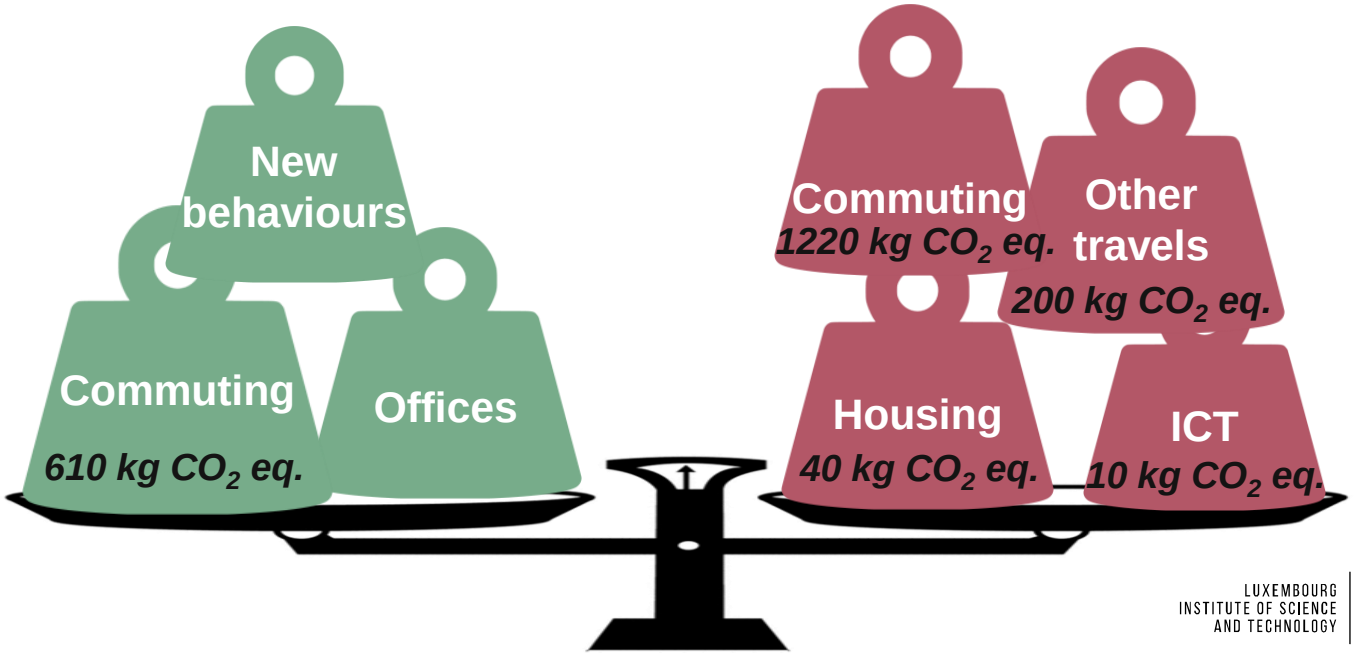
- *2 days teleworking*
- *Commuting distance: 15 km*
- *Kids to school: 5 km*

-360 kg CO_2 eq./yr

Let's move (35 km) !

+860 kg CO_2 eq./yr

Commuting



Source: ADEME (2020)

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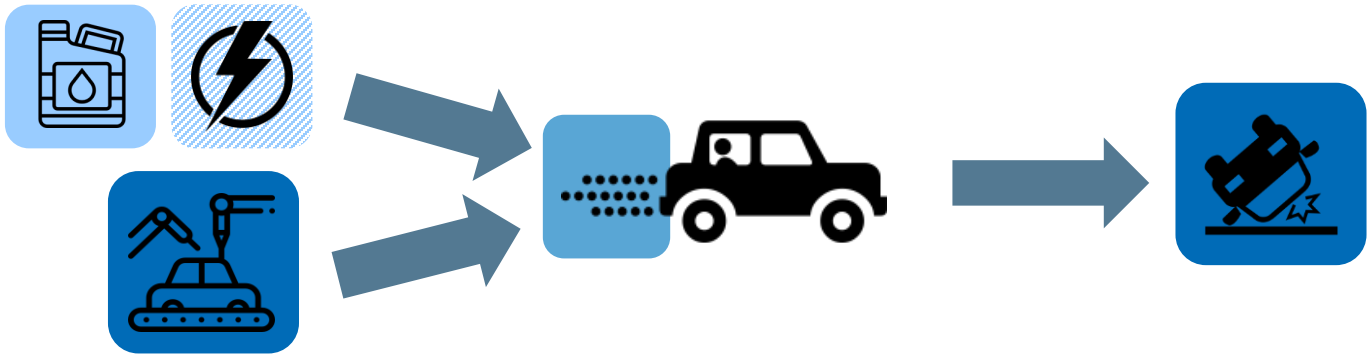
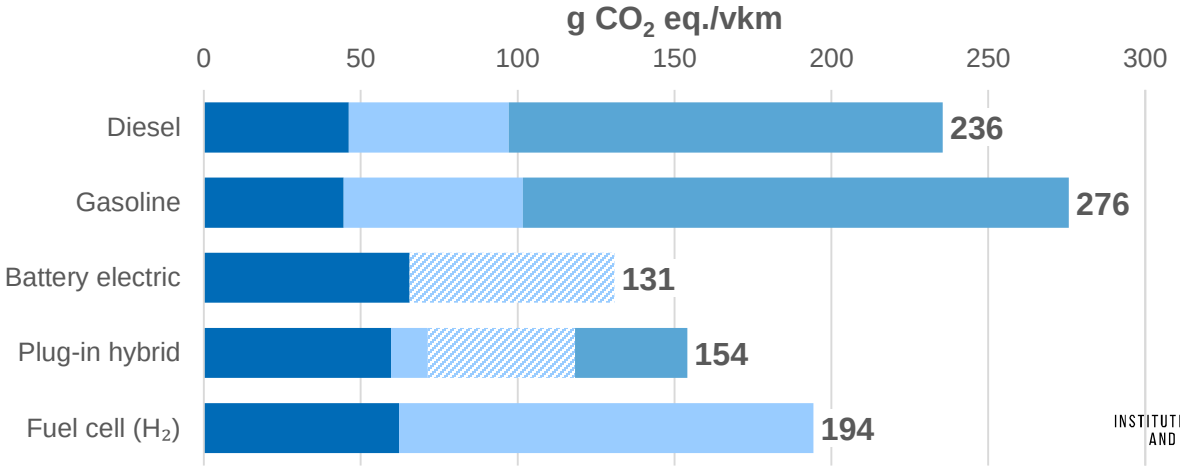
1. CARBON FOOTPRINT
2. PLANE TRAVELS
3. COMMUTING

4. CARS COMPARISON

Which engine?

Car mobility





Source: Hill et al. (2020); https://climobil.connecting-project.lu/

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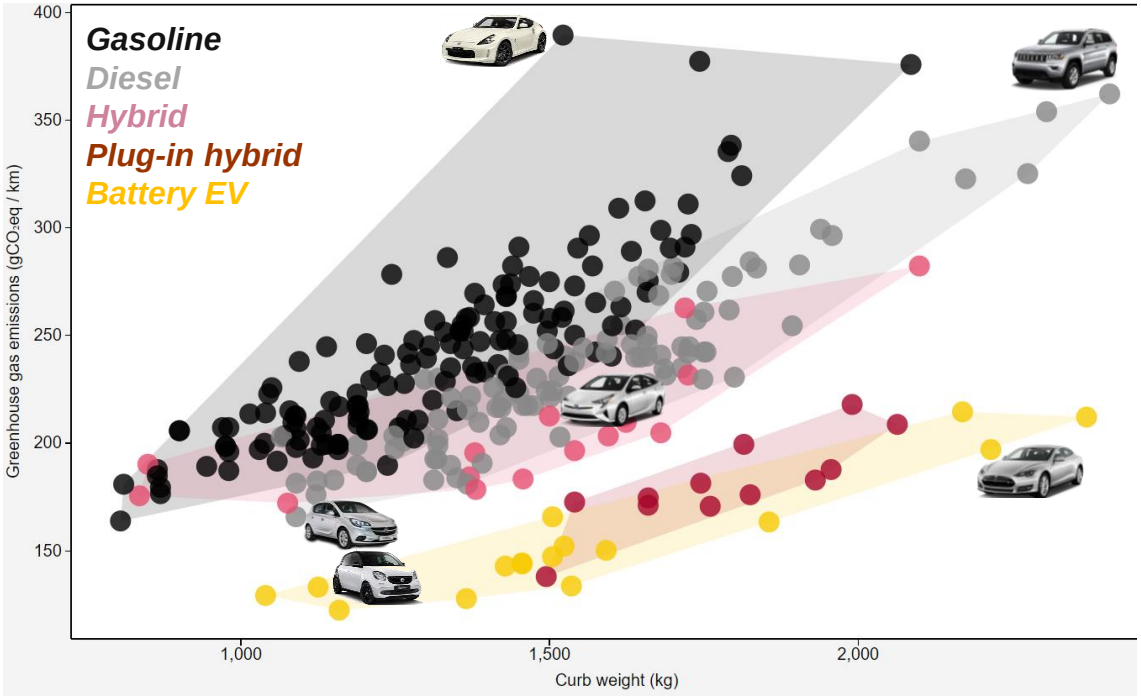
How can I decrease the carbon footprint of driving?

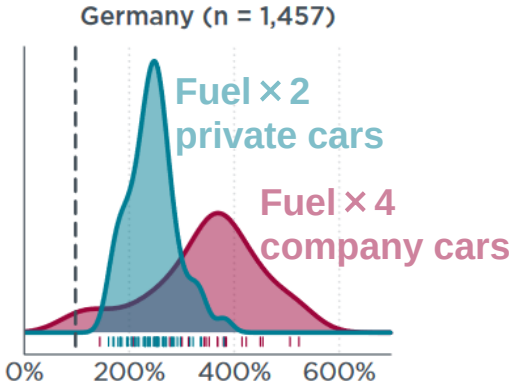
Car mobility

✓Smaller cars ✓No accessories ✓Eco-driving ✓↘ AC/heating



Charging behaviours for plug-in hybrid cars



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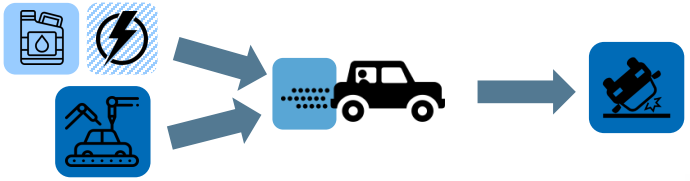
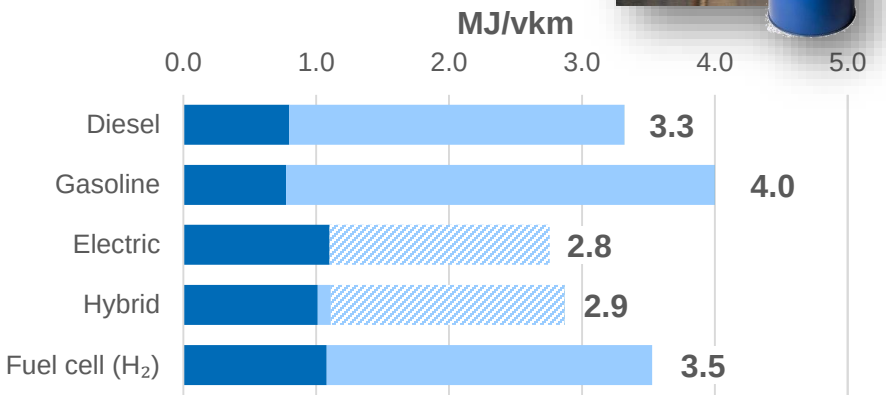
Source: ; www.carboncounter.lu ; ICCT (2020)

Other impacts?
Resources



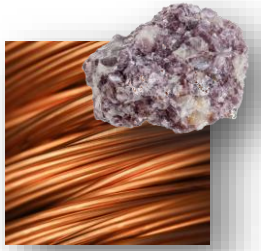
Car mobility

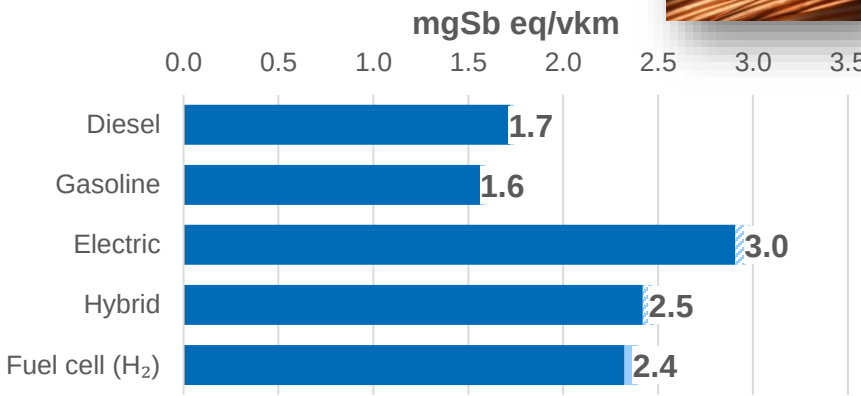
Fossil resources



Fuel cell (hydrogen) vehicles use as much primary energy as diesel

Metal and mineral resources

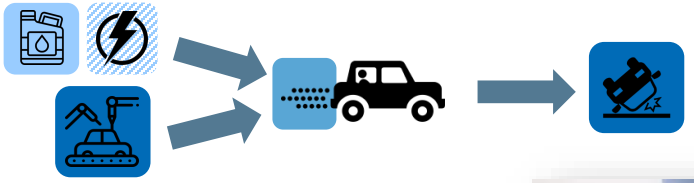




Battery-electric vehicles use the most minerals and metals

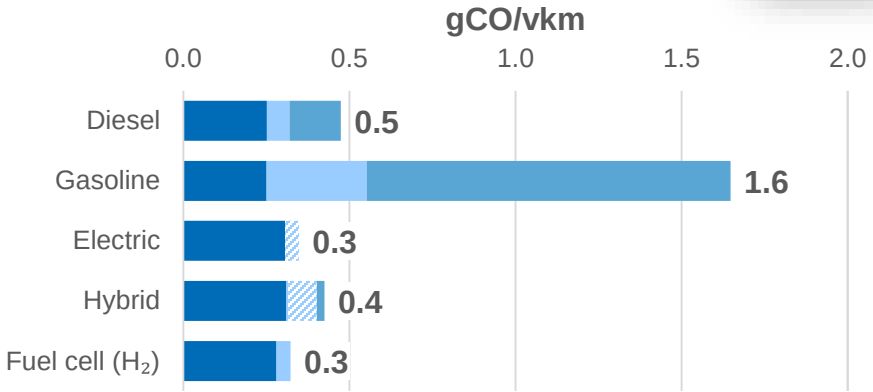
Source: Hill et al. (2020)

Other impacts?
Air emissions



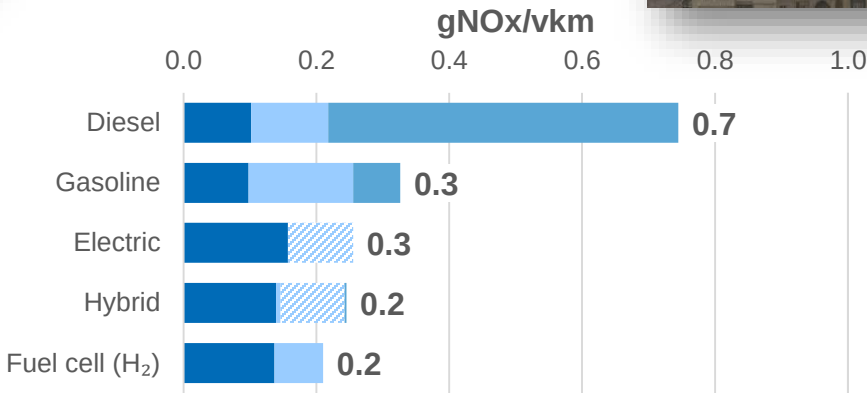
Car mobility

Carbon monoxide emissions



Gasoline emits the most carbon monoxide (incomplete combustion)

Nitrogen oxide emissions

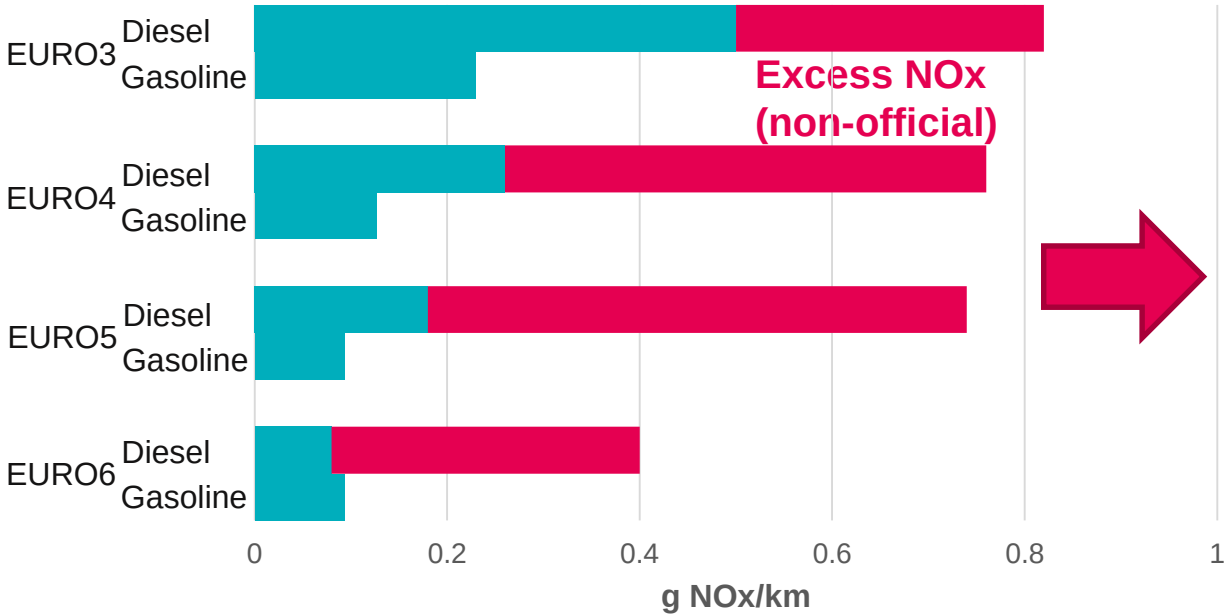


Diesel emits the most nitrogen oxides

Source: Hill et al. (2020)

Diesel not more impacting than gasoline?

Car mobility



+11000 premature deaths in EU due to on-road NOx excess (2015)

+65%

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Source: Brand (2016); Anenberg et al. (2017)

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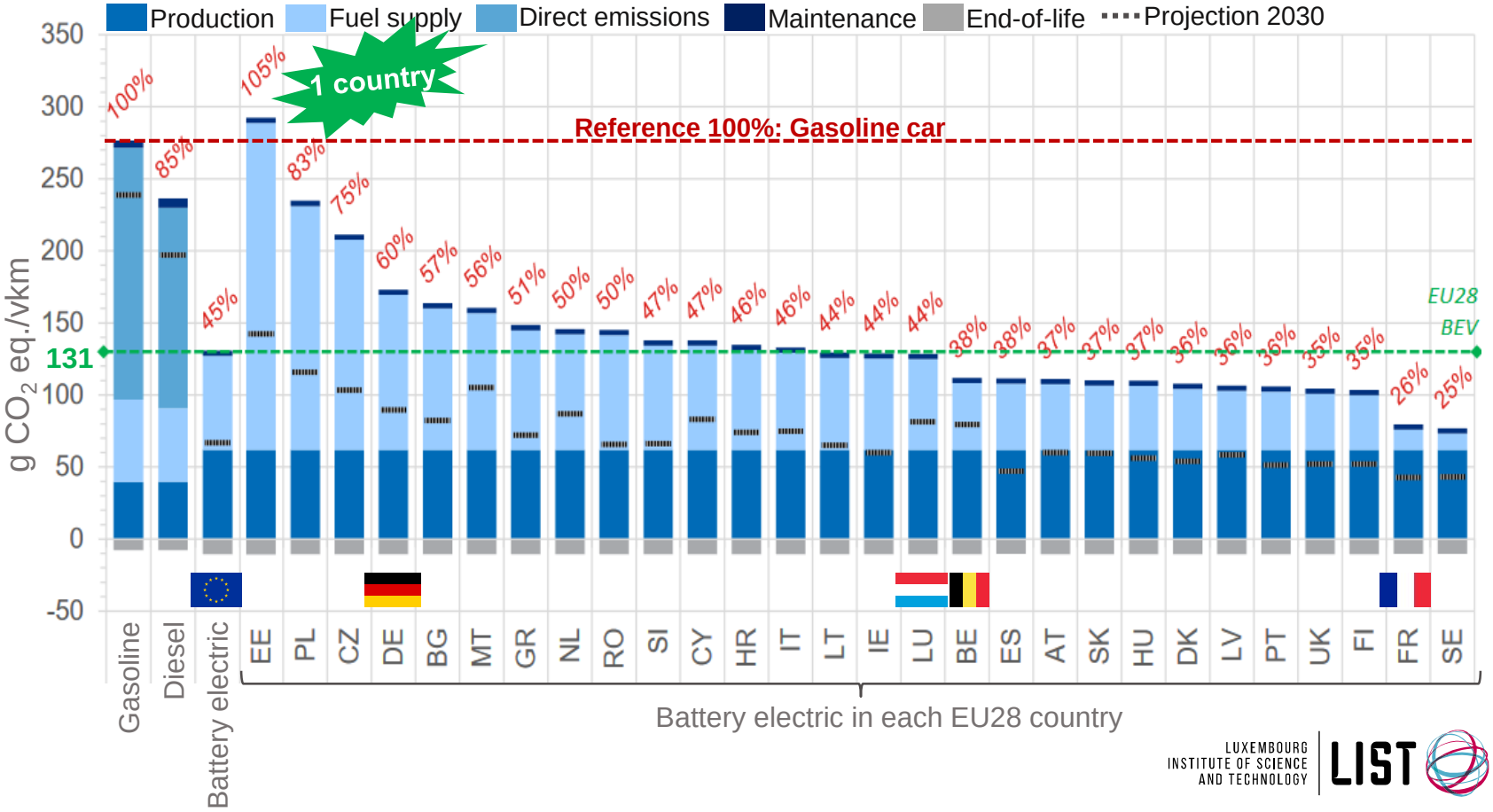
5. ELECTRICITY SUPPLY

LIVE POLL !

Electric vehicles are as low-carbon as the electricity they use

Electric mobility



Source: Hill et al. (2020)

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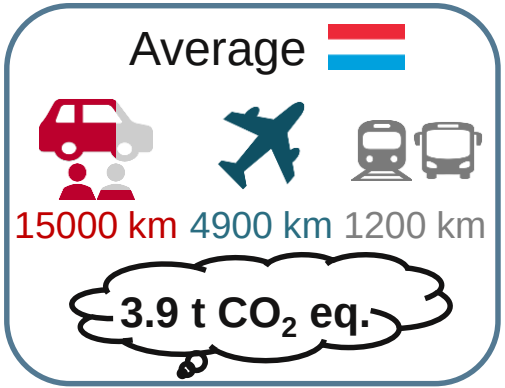
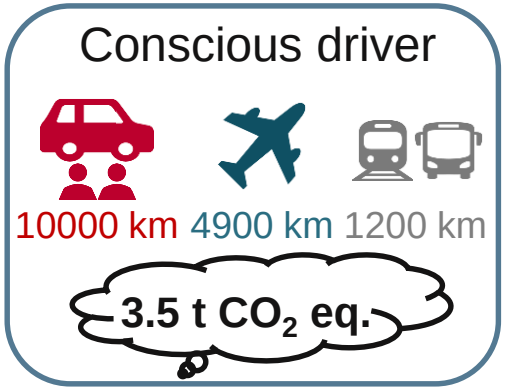
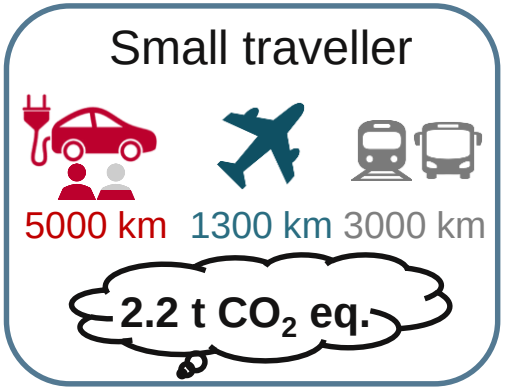
6. TAKE-AWAY MESSAGES

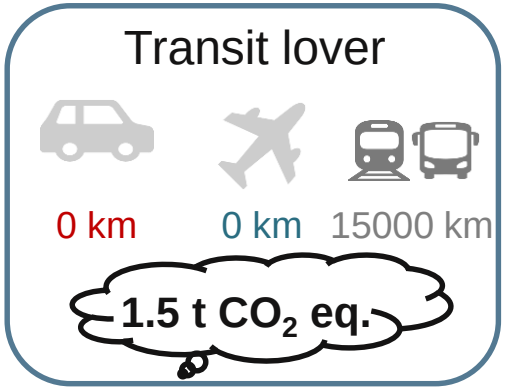
Which profile are you?

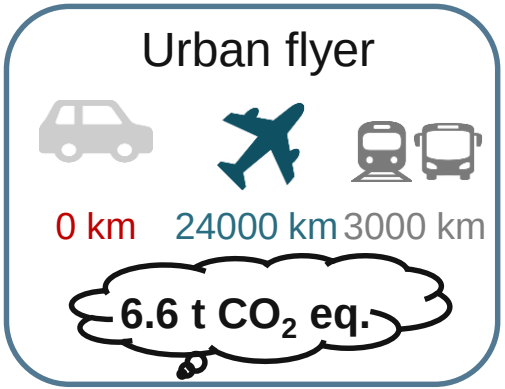
Take-away messages











Conclusion

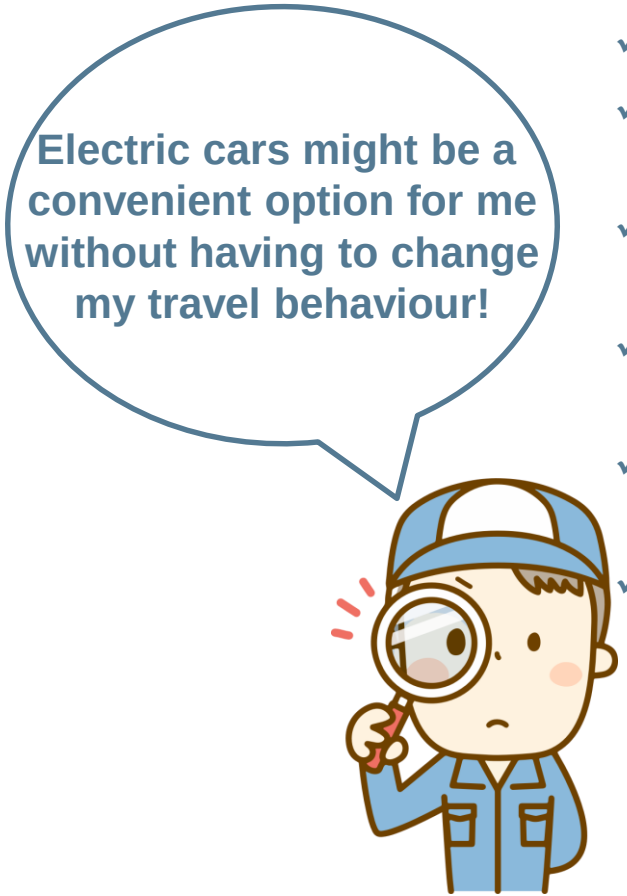
Take-away messages

Transport is a very relevant contributor to my carbon footprint! My choices can really matter!

- ✓ Transport accounts for **30%** of my carbon footprint
- ✓ Significant decrease by using **public transport** instead of flying or driving (>50% reduction)
- ✓ Teleworking would lead to more marginal reductions but beware of **rebound effects**

Conclusion

Take-away messages



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- ✓ Electro-mobility induces carbon benefits in **almost every European countries**
- ✓ There are nevertheless **trade-offs**, in particular due to the larger use of scarce materials
- ✓ There still remain many challenges to consider electric vehicles fully "green", such as achieving the **energy transition**

Conclusion

Take-away messages

We hope you enjoyed the presentation, we look forward to your questions!

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