Transport – Technologies and Policies

UCD NESC Workshop on GHG Reductions

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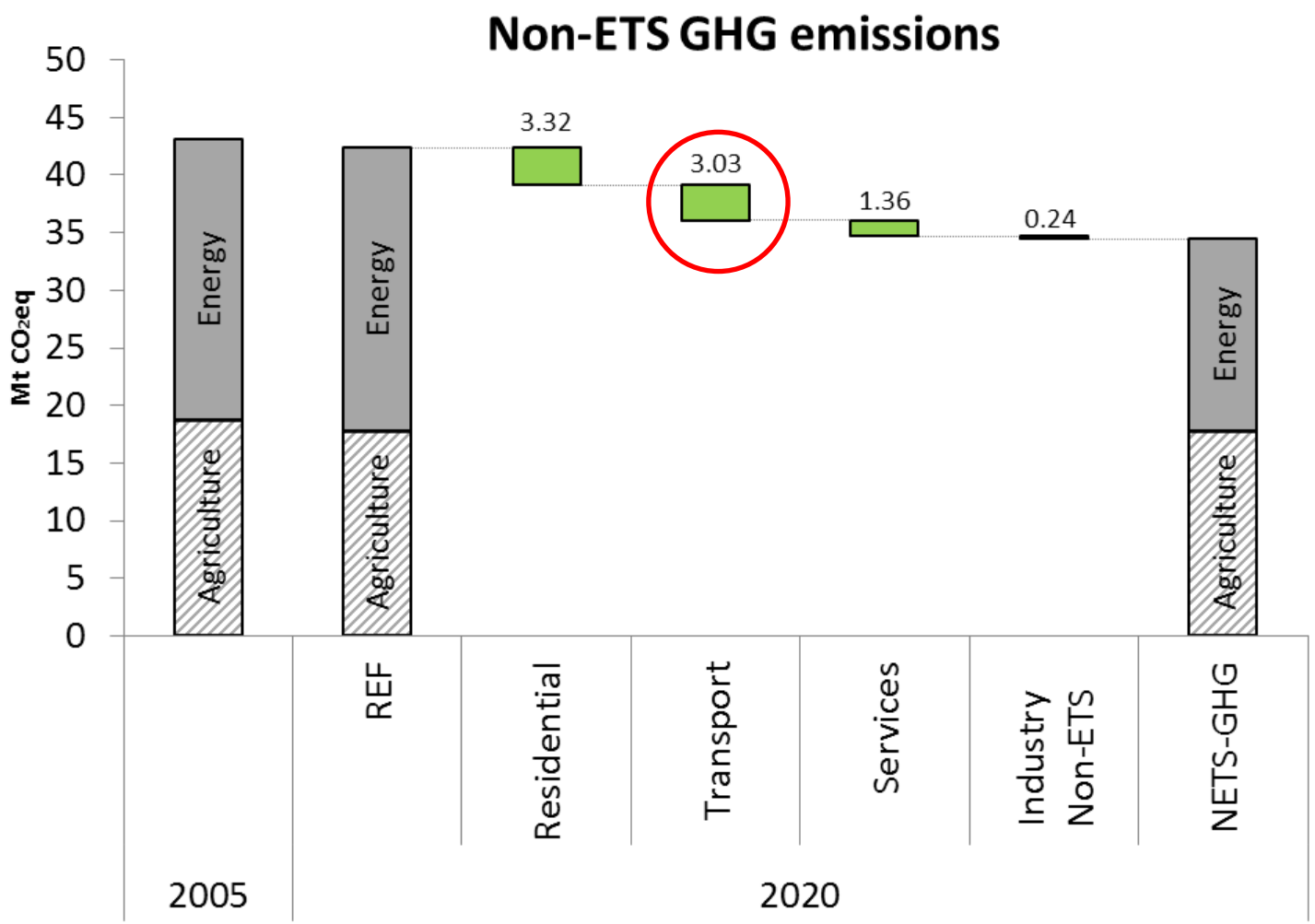
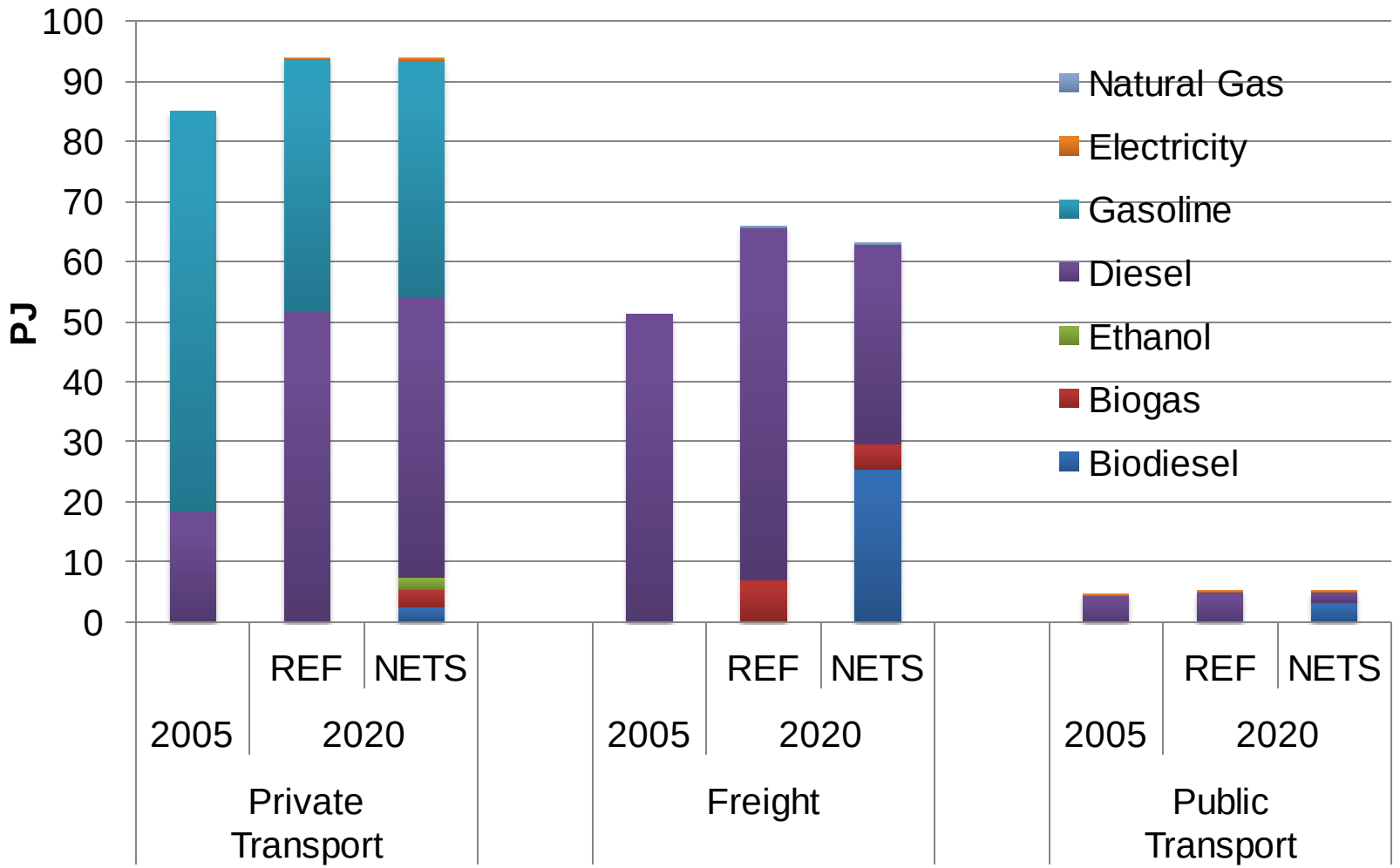
Overview

- TIMES least-cost pathways for transport
- Car transport
  - background & historic trends
  - 2008 car tax change
- Policies & measures
  - Overview
  - Car stock model
  - Results
- Conclusions

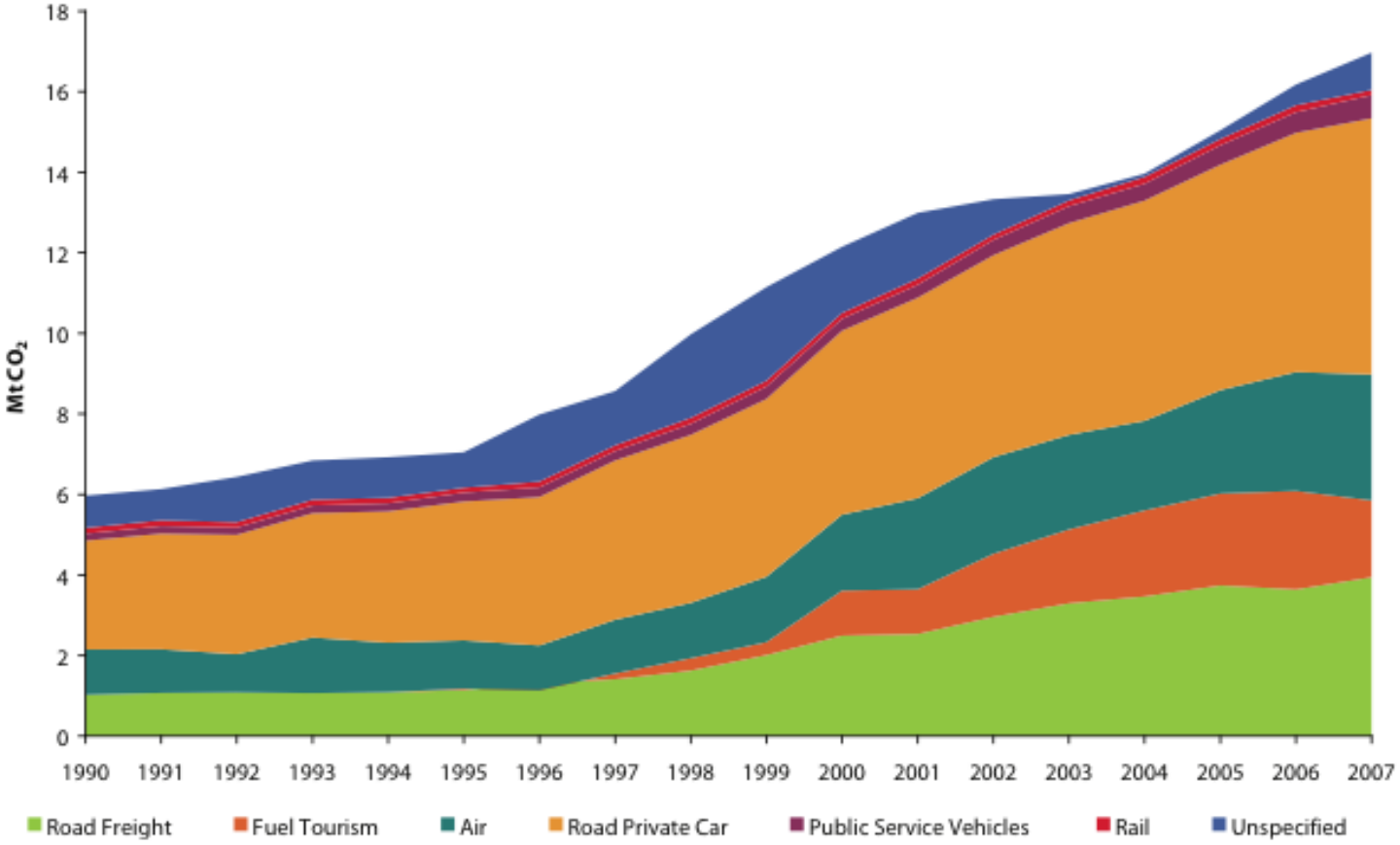
Least-cost pathways



Least-cost pathways

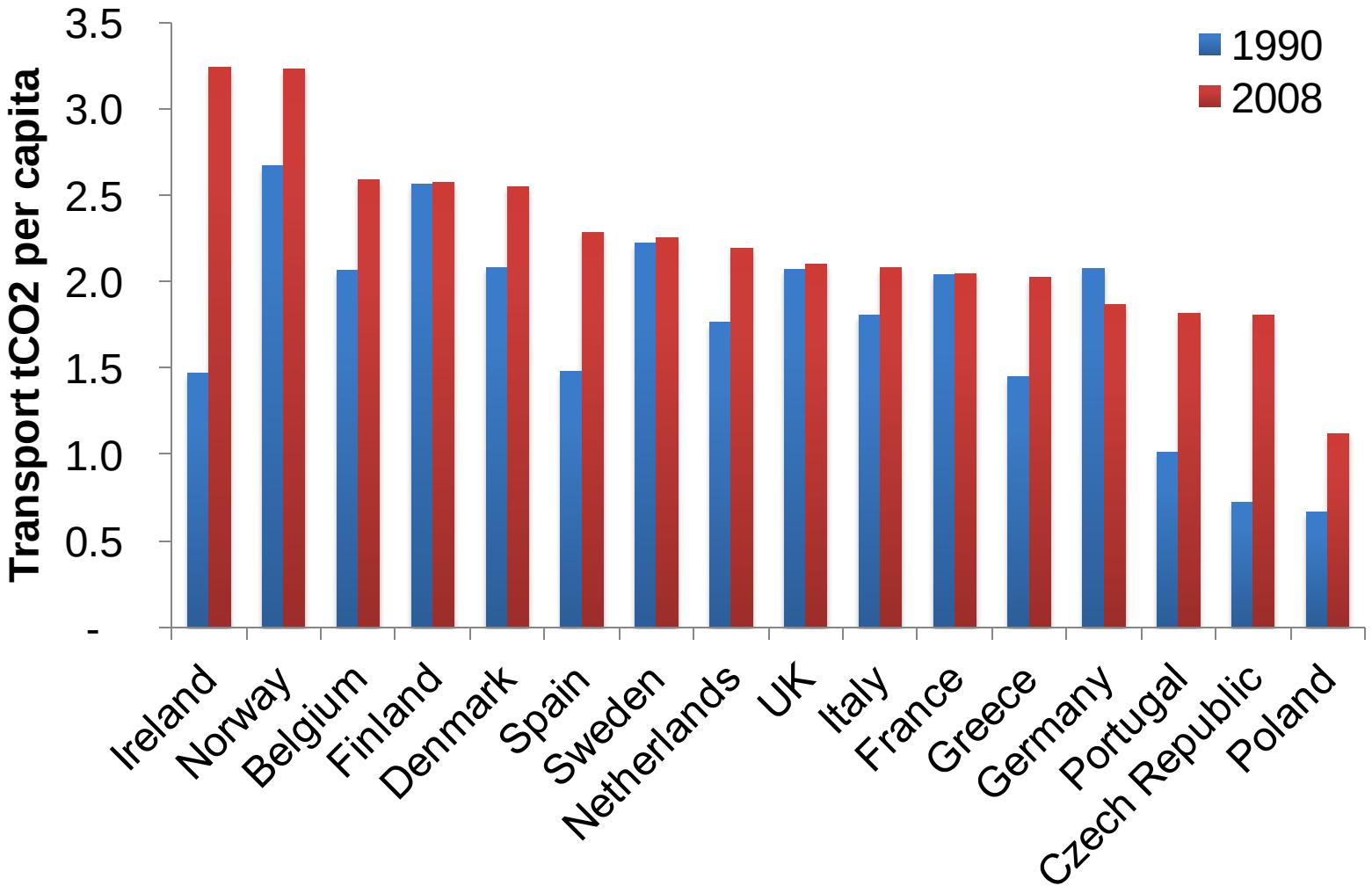


Context



Source: SEI

Context

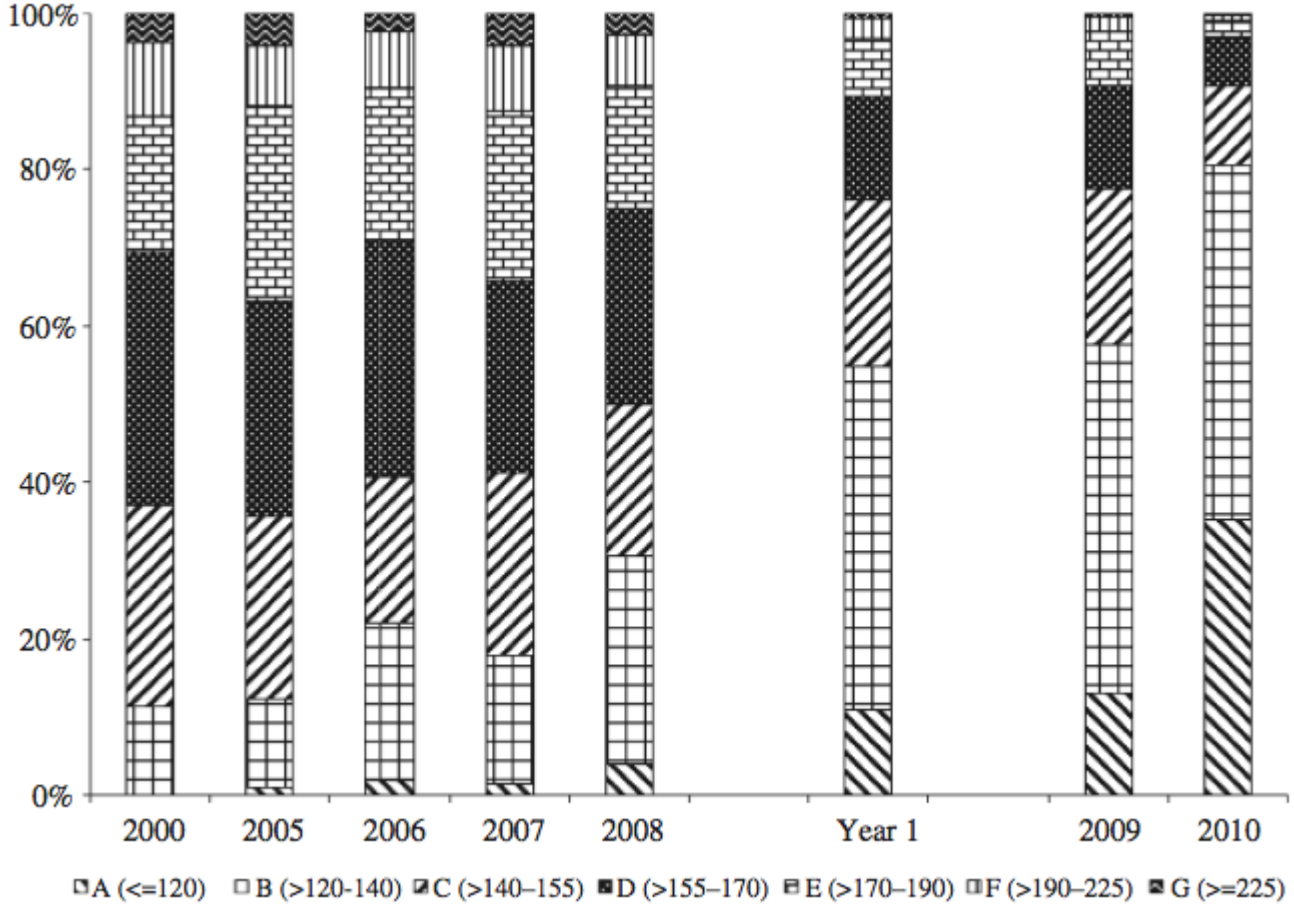

Transport tCO2 per capita
3.5
3.0
2.5
2.0
1.5
1.0
0.5
-
1990
2008
Ireland
Norway
Belgium
Finland
Denmark
Spain
Sweden
Netherlands
UK
Italy
France
Greece
Germany
Portugal
Czech Republic
Poland

Context

- Efficiency has been offset by increase in activity & car ownership
- Private car CO_2 -- 37% growth 2000-2008
  - 38% growth in activity
  - 75% growth in large car activity
  - Ageing of fleet
  - Almost no overall efficiency improvement

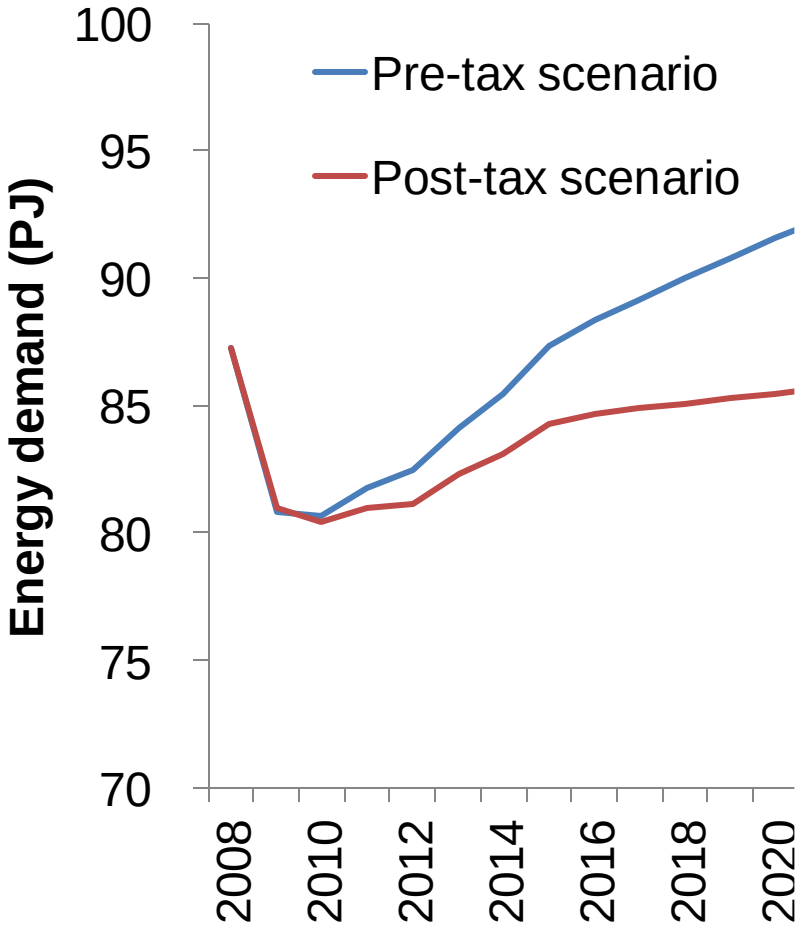
2008 car tax change

Share of private car sales by CO_2 band, pre and post tax change



Rogan et. al. (2011)

2008 car tax change



- Post-tax scenario gives 7% energy saving – 6.12 PJ – in 2020
- 0.42 Mt CO_2 saving in 2020 compared with pre tax scenario
- Dieselisation of the car fleet – impact on NOx emissions

Policies & measures

- Efficiency
  - EU-average passenger car emissions
    - Obligation on car manufacturers
    - Not for individual countries => Ireland must legislate
    - 130gCO_2/km by 2015 obligation – Likely to be exceeded in Ireland
    - 95gCO_2/km by 2020 target
    - 70gCO_2/km by 2025 – speculative
- Alternative fuels 2020 targets
  - 10% vehicle fleet electrified
  - 10% CNG vehicles + biomethane in grid

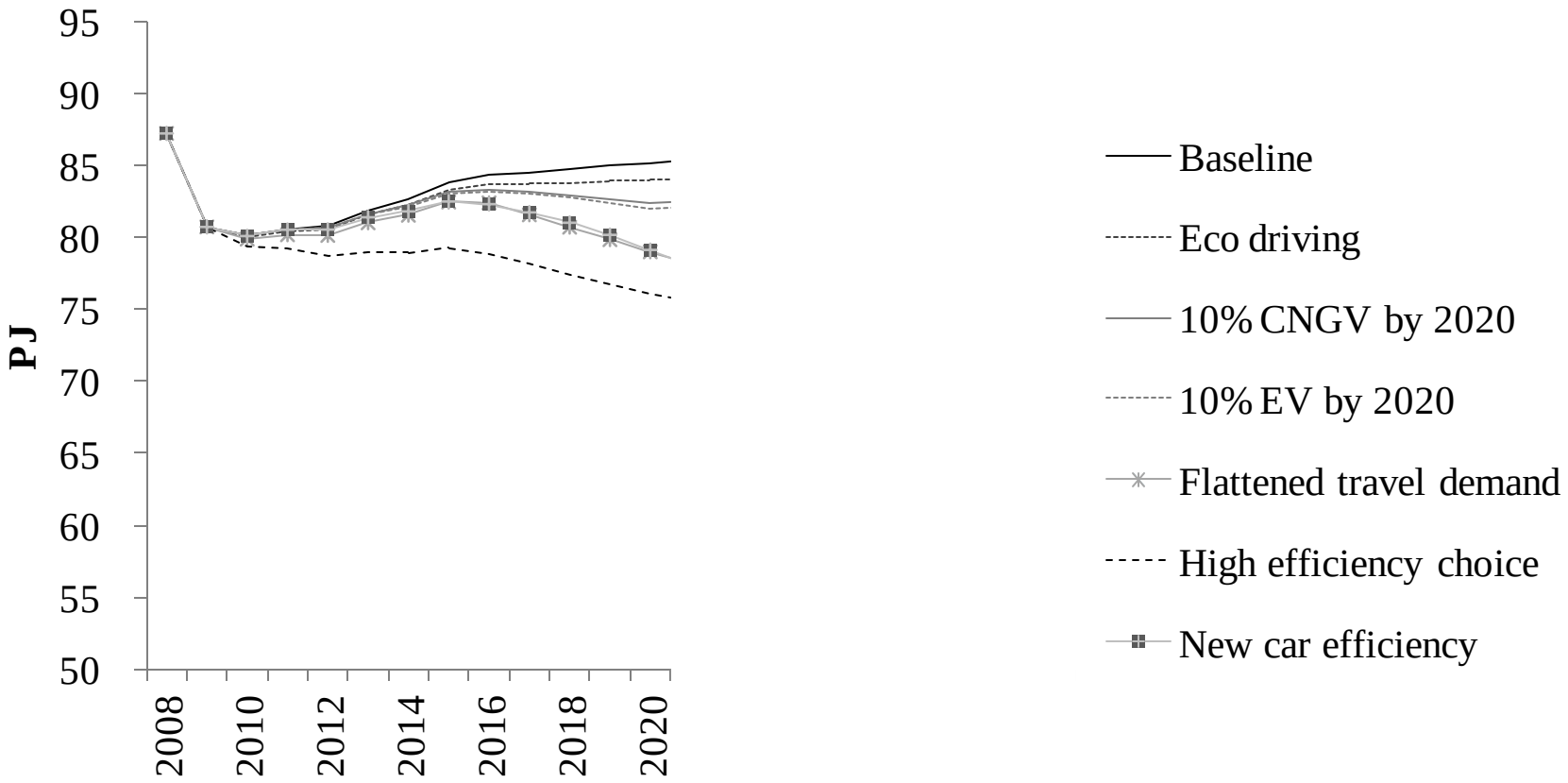
Policies & measures

- Behaviour & Travel Demand
  - *Smarter Travel* – aspirational targets
    - No increase in private car travel from 2008
      - E-working, car sharing, public transport, cycling etc
    - Eco-driving
  - "High efficiency choice" scenario
    - Same engine sizes purchased, but people choose to buy most efficient car in class

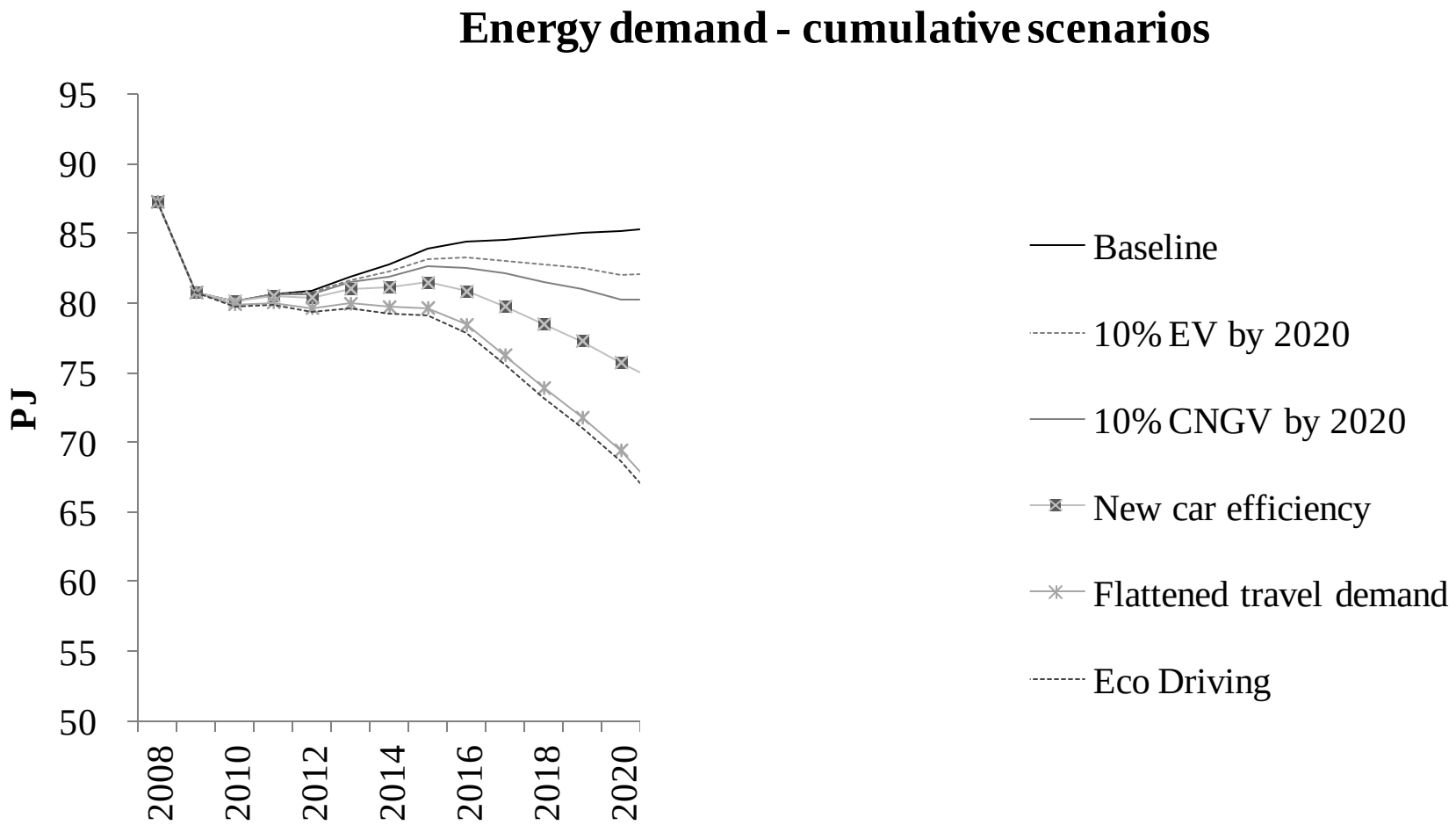
Policy simulation model

- Model of the car stock
  - Technologies explicitly modelled
  - Scrappage and sales rates simulated
  - Income and fuel price generate car activity

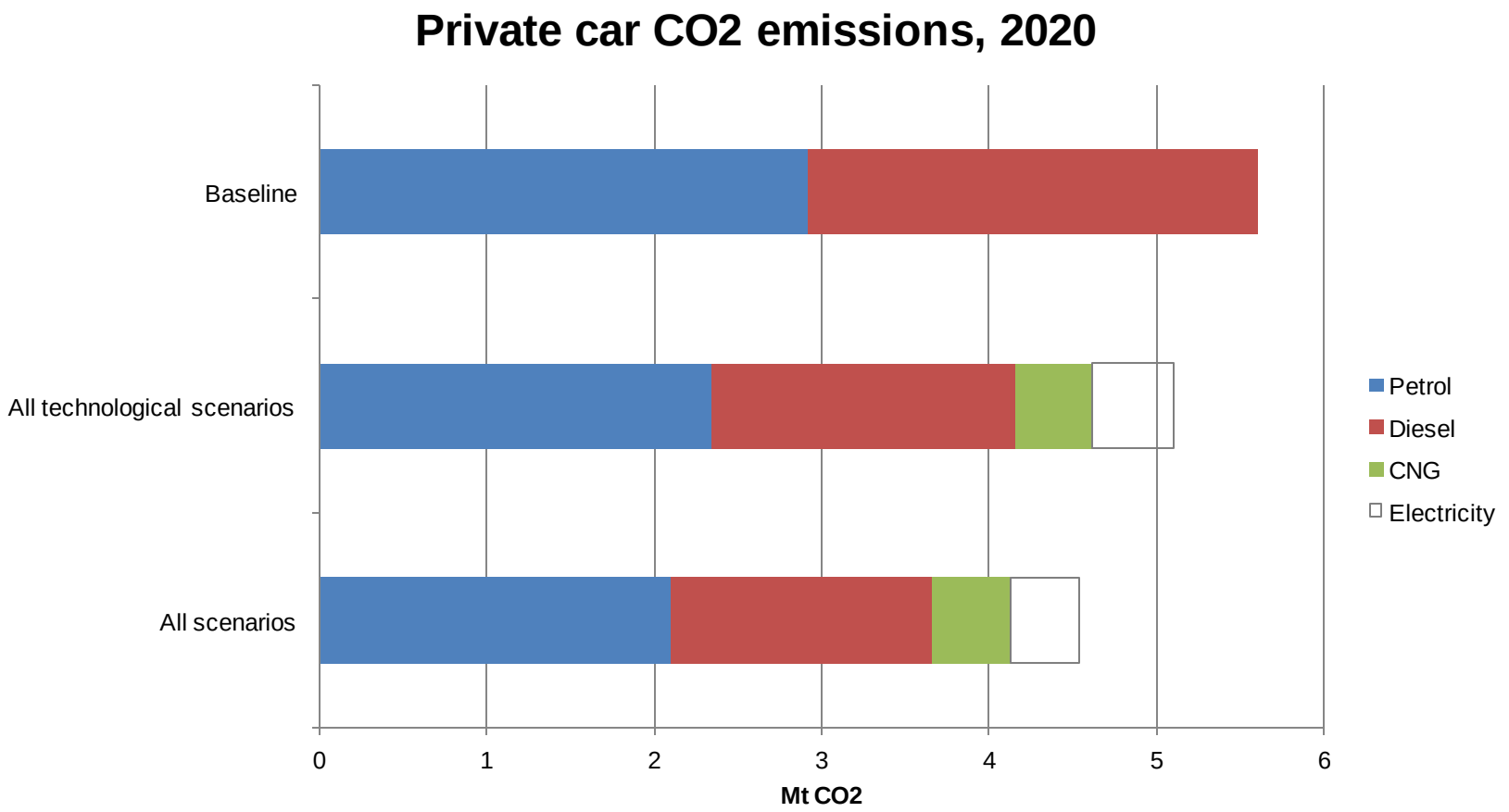
Policy simulation model



Policy simulation model



Policy simulation model



Policy conclusions

- Efficiency
  - Individual efficiency of engine types improving
  - But structural change negated savings 2000-2008
  - 2008 tax change addressed this
  - 95gCO_2/km overall target for EU likely, but won't necessarily effect Irish fleet without Irish legislation
  - CO_2 bands must be restructured to push emissions down
    - – 92% of new cars bought are A & B band
  - Rebound effect

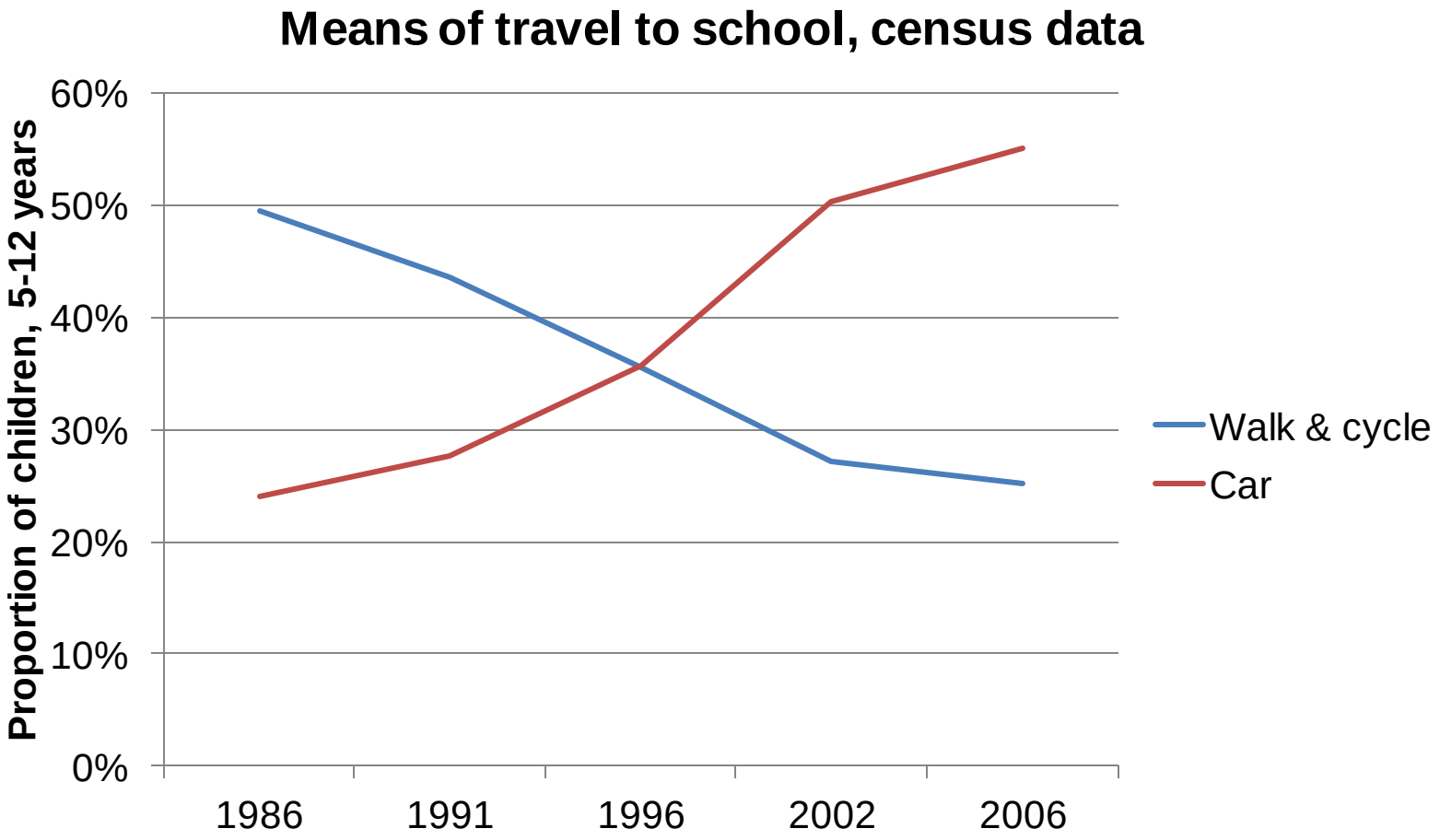
Policy conclusions

- Electric vehicles
  - Moves energy to ETS
  - How much displaced depends on
    - Technology displaced
    - Vehicle activity (battery technology)
    - Achieving the target
- CNG vehicles
  - Higher efficiency, bi-fuel, no range anxiety
  - Proven technology – 15 million cars worldwide
  - Can use biomethane (national target) – RES-T
  - Gas infrastructure well developed

Conclusions

- Reducing travel demand
  - 2000-2008 activity growth contributed more CO_2 than all efficiency measures modelled here offset
  - Emissions *only stabilise* in future scenarios with demand management
  - Efficiency rebound effect of 35%
  - Planning/urbanisation – traffic & road speeds
  - National Travel Survey – needs to be continued
  - National travel model recommended

Conclusions



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