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The GB National Transport Model

Demands and Uncertainty in Road Transport Energy Forecasts

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The GB National Transport Model

Demand & Uncertainty in Road Transport Energy Forecasts

Overview

- Background
- The National Transport Model (NTM)
  - What it is and how it works
  - Main data sources and model uses
- A time of Change
  - Stakeholder Challenges on Credibility
  - New Approach to Scenarios
- Latest 2015 Traffic Forecasts
  - Traffic and CO2 Emissions
- How we estimate Fuel/Carbon/Energy
- Future Plans
- Questions

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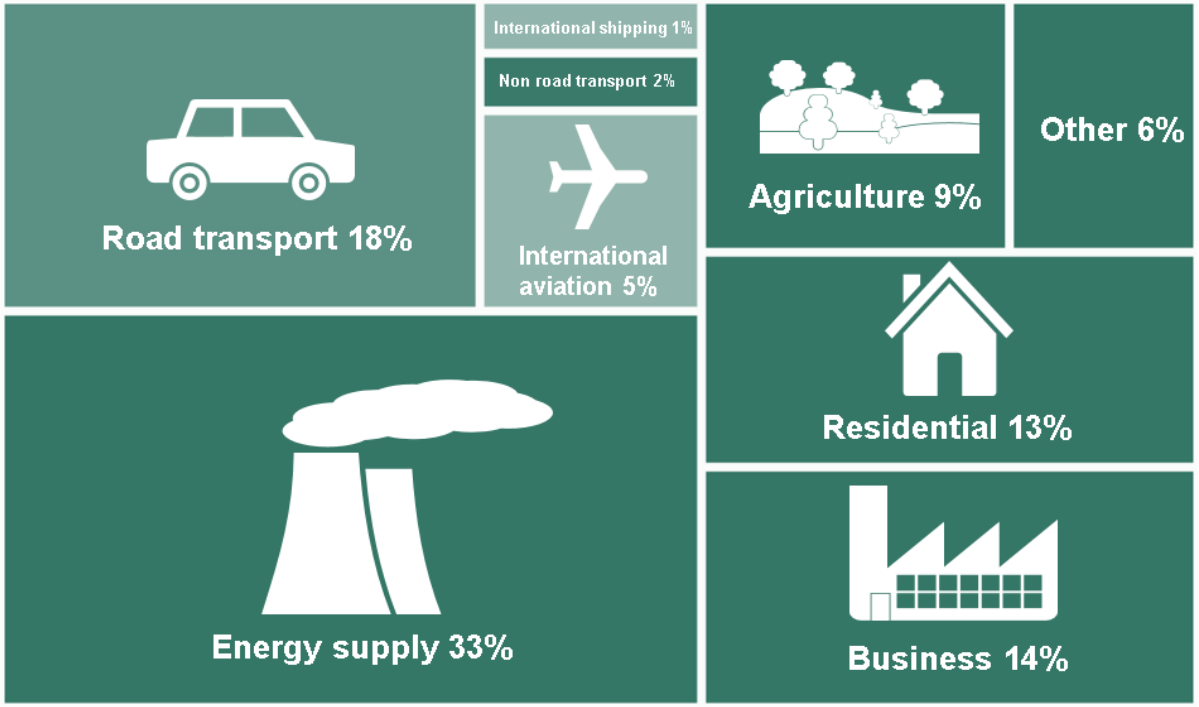
25% of UK total greenhouse gas (GHG) emissions come from transport

- In 2013, domestic transport GHG emissions were 19% of total UK GHG emissions, up from 15% in 1990.
- International aviation and shipping GHG emissions accounted for roughly 7% (up from 3% in 1990), bringing transport's share of the total to more than 25%.



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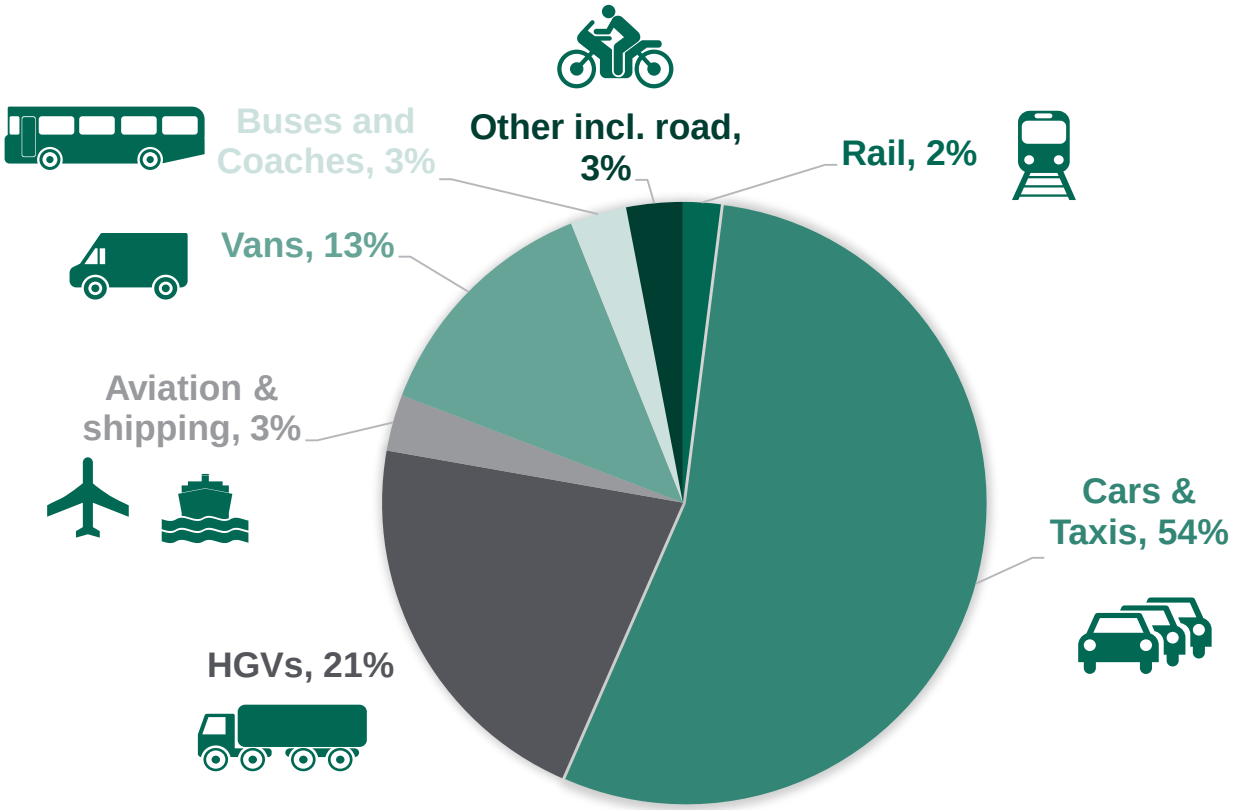
Transport emissions are dominated (>90%) by emissions from road vehicles

While a strategy exists for low emission vehicles, this does not cover HGVs, which contribute a disproportionately high level of emissions.



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The National Transport Model
What is It?

- Multi-modal model of land-based transport in GB (6 modes)
- Four-stage behavioural modelling approach to forecast the demand for travel, from the bottom up:
  1) Estimates the total number of trips
  2) Allocates trips to journeys between origins and destinations
  3) Allocates journeys to modes
  4) Allocates journeys via a particular mode to routes across the transport network
- Founded on concept of Generalised Cost or actually Time
- Better at modelling travel behaviour than top-down approaches
- Includes 19 different time periods which cover the entire week and therefore captures important congestion (speed) impacts.
- Chiefly used for road based forecasts of traffic demand and emissions to 2040
- Includes Cars, Vans, HGVs, PSV's (but not Motor Cycles)
- Excludes domestic aviation and shipping
- The NTM Includes policy impacts from other modes but,
- Department has other mode specific models for rail and bus forecasts

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What is it Based On?

- Behavioural aspects founded on Departments National Travel Survey Dataset
  - Long Running data series recording details of numbers of trips for different purposes by different sorts of people
  - Validated by traffic count data collected from automatic & manual counts
- Wide range of Licensing Statistics and Vehicle Fuel Consumption Data

What is it Used For?

- Roads Transport Traffic and Emissions Forecasts
- Strategic Roads based Policy Analysis
  - Road Pricing Impacts
  - Congestion Targets
  - Speed Limits Analysis – Motorways and HGV's
  - Road Capacity Impacts – Managed (Smart) Motorways
  - Analysis behind National Networks National Policy Statement
  - 2014 Roads Investment Strategy (RIS)
  - Carbon Budgets

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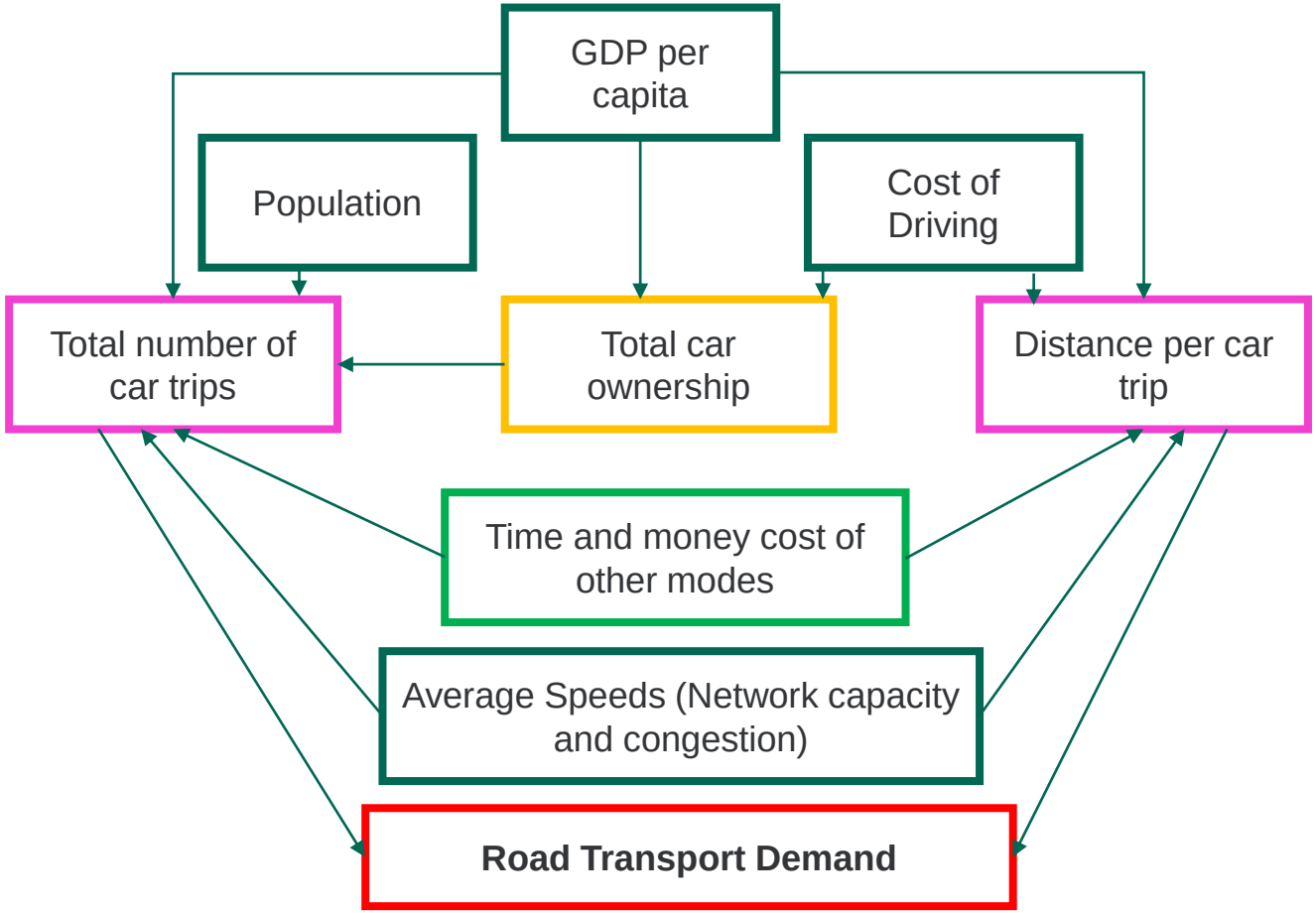
What Drives It?

Key Drivers of Traffic Demand are Population, Fuel Costs and GDP



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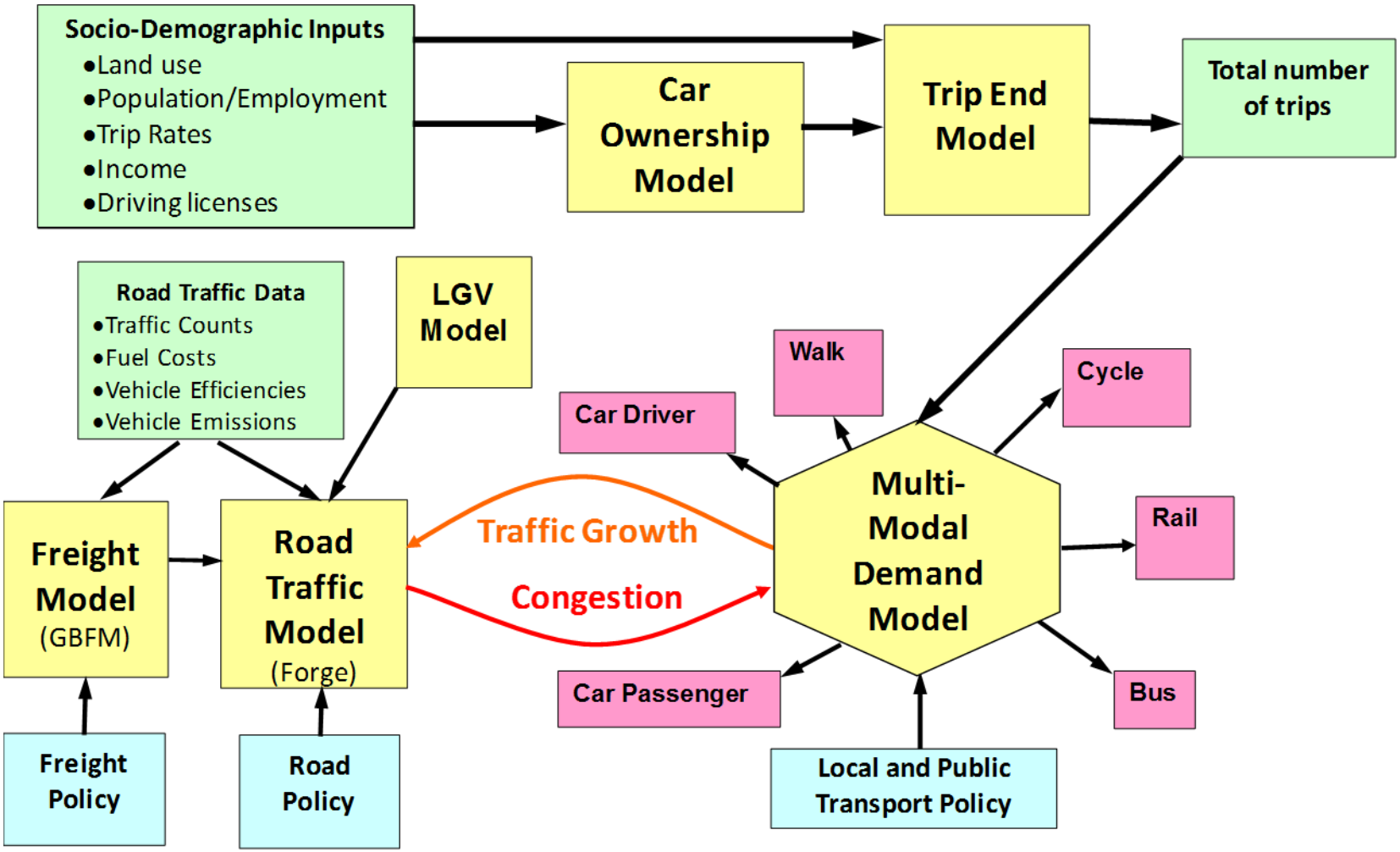
The National Transport Model
A series of Iterating Models



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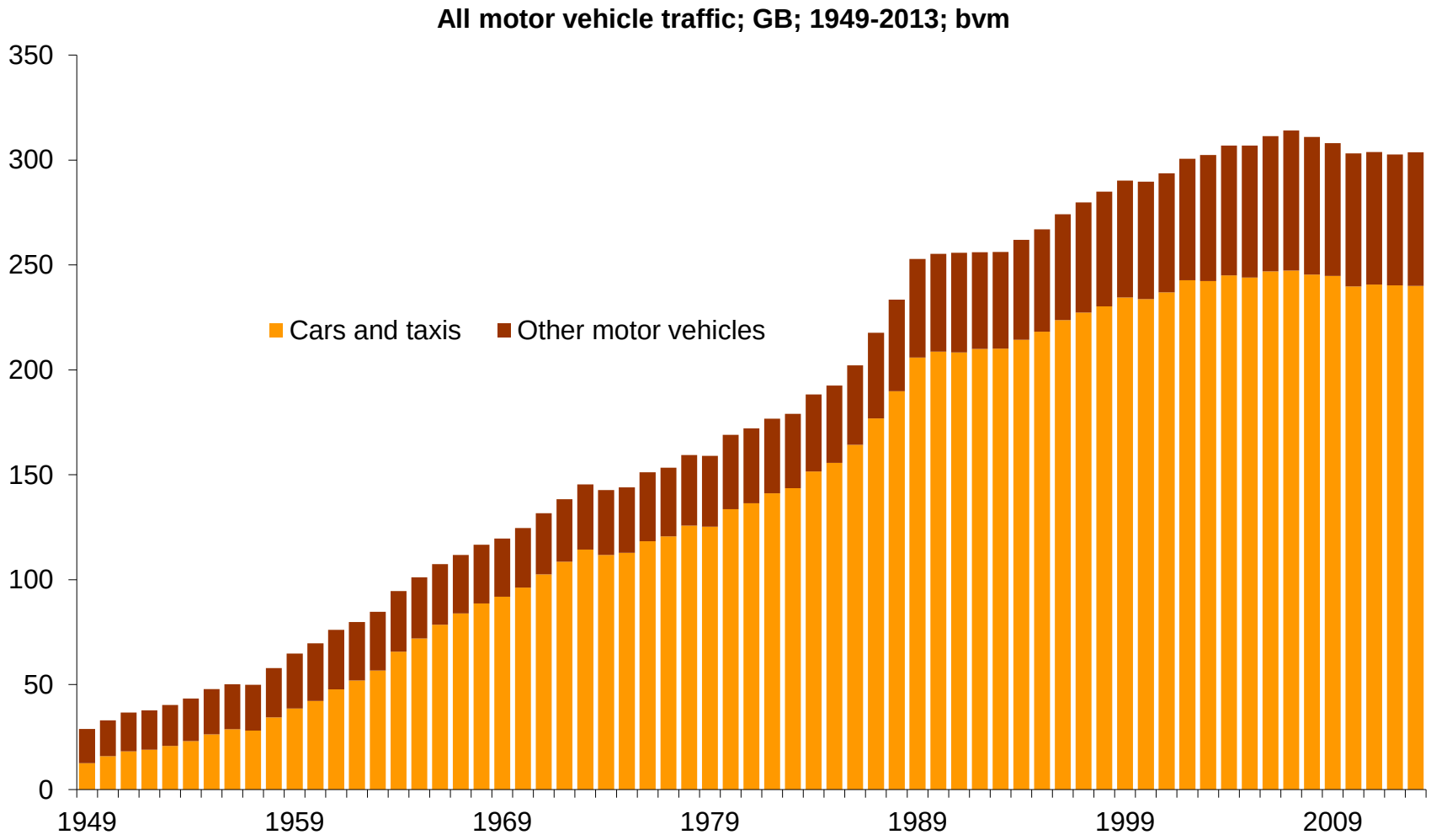
A Time Of Change?



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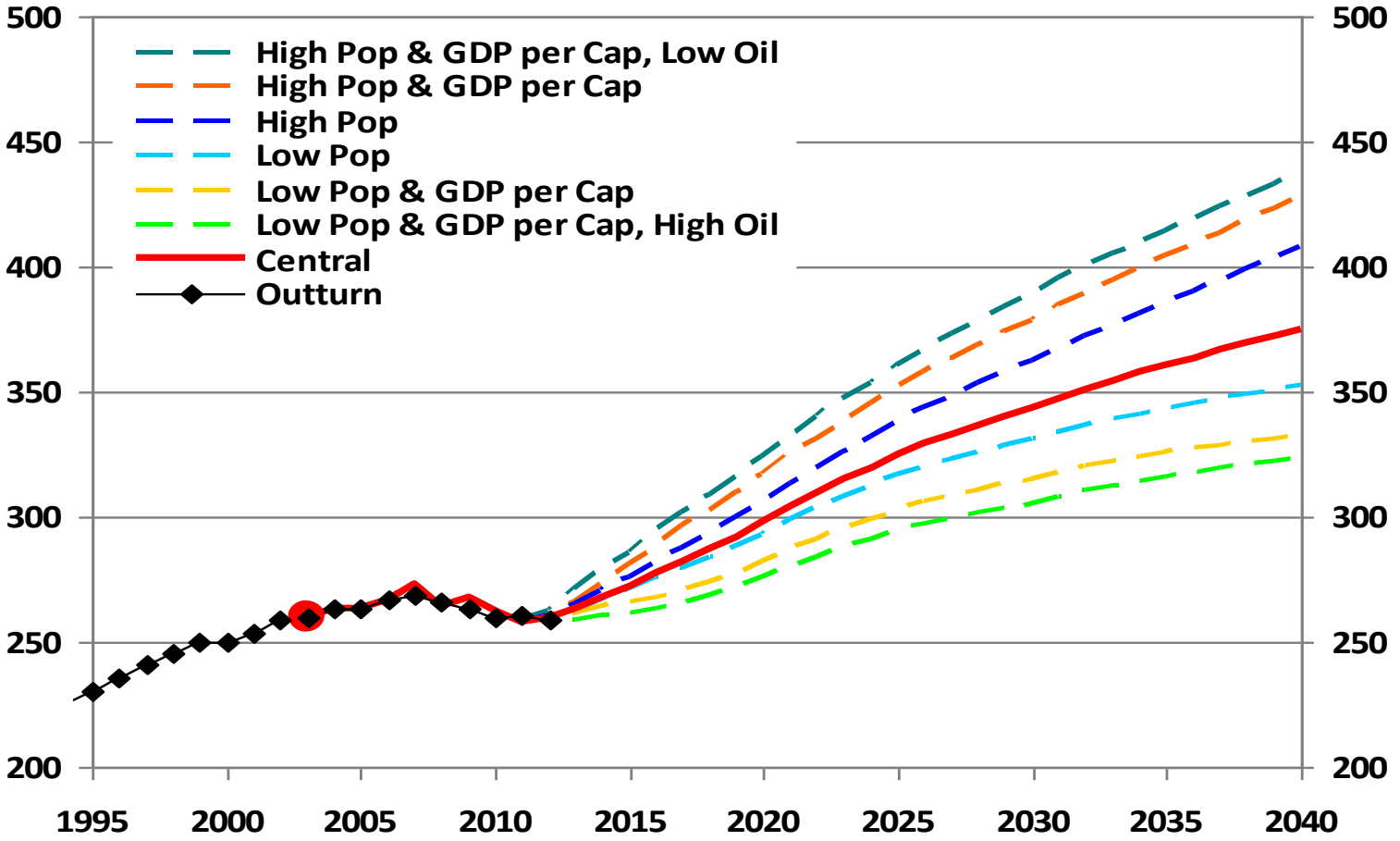
Credibility Problem For Model and Policies
Traffic down, forecast up?

Traditional Forecast Approach Relied on Sensitivities



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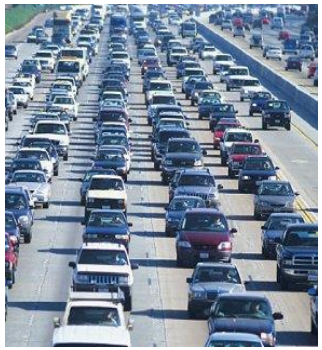
Recent Trends & What is Peak Car?

Nationally, car traffic has broadly been flat for the last 15 years, but it hasn't levelled off for all groups – the RAC Foundation's report *On the Move* found **car travel per person outside London continued to grow up to the start of the recession**.

There are likely to be a range of factors (demographic, economic, technological, social, etc.) contributing to the **different trends amongst different groups**.

The Department does not believe the existing evidence supports the Peak Car hypothesis.



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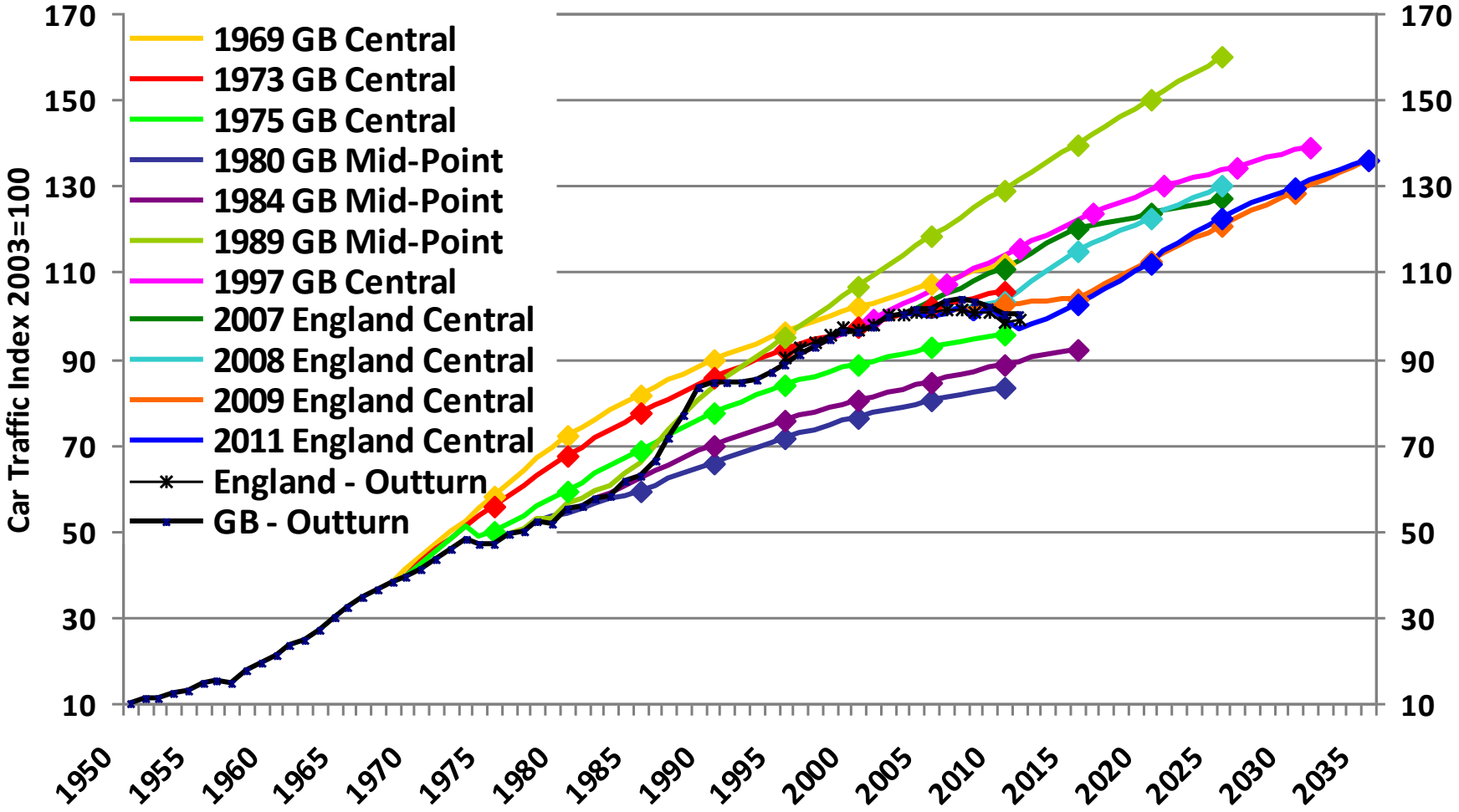
Do we over forecast?



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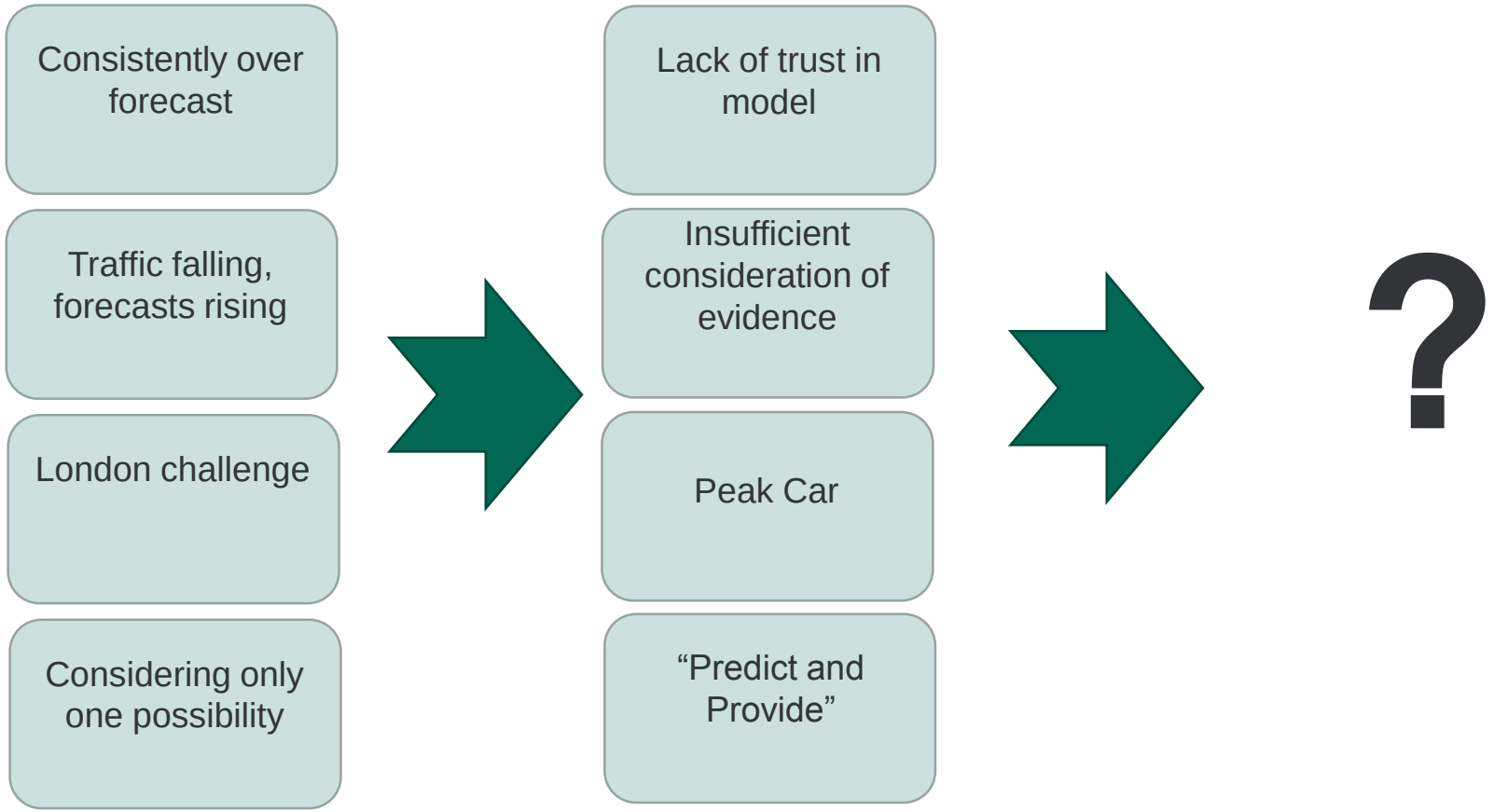
Challenges



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Solution – forecasting scenarios

Explored variations of some of emerging uncertainties

Table 1.1: Summary of variations between forecast scenarios

	Trip rates	Income relationship	Macroeconomic
Scenario 1	Historic average	Positive and declining	Central
Scenario 2	Historic average	Zero	Central
Scenario 3	Extrapolated trend	Positive and declining	Central
Scenario 4	Historic average	Positive and declining	High oil, low GDP
Scenario 5	Historic average	Positive and declining	Low oil, high GDP

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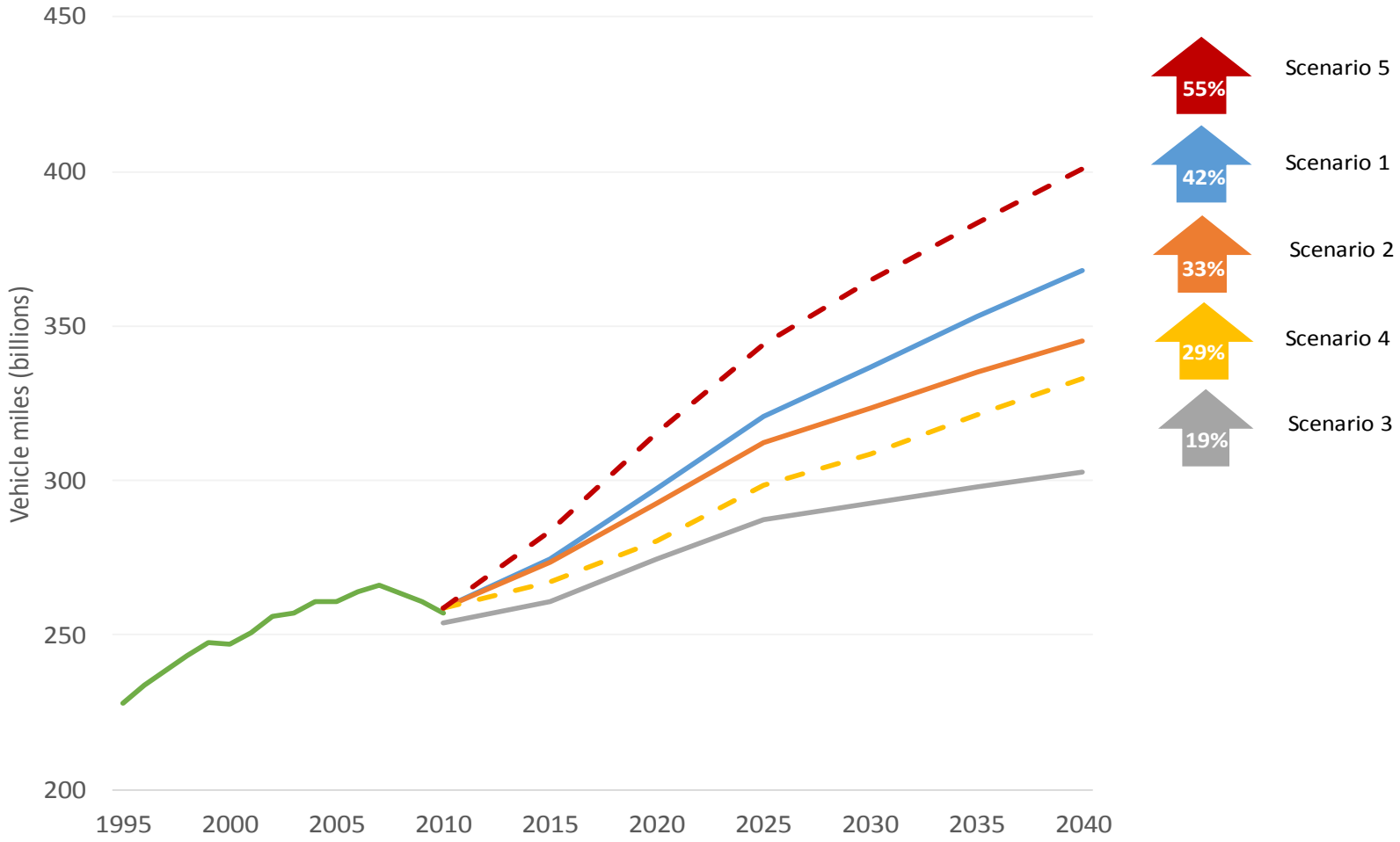
Traffic Forecasts 2010 – 2040
England all vehicles



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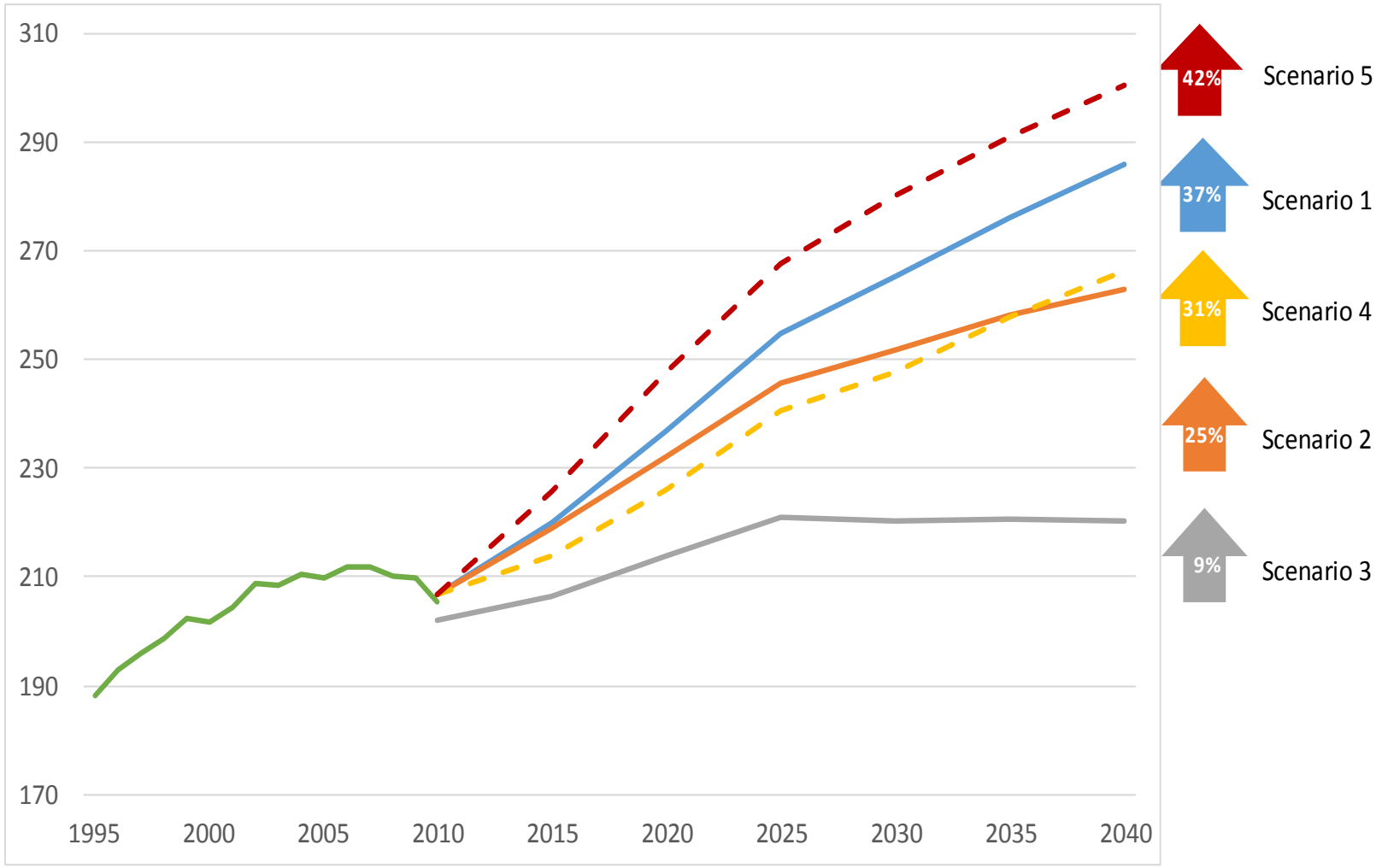
Cars, 2010 – 2040, England



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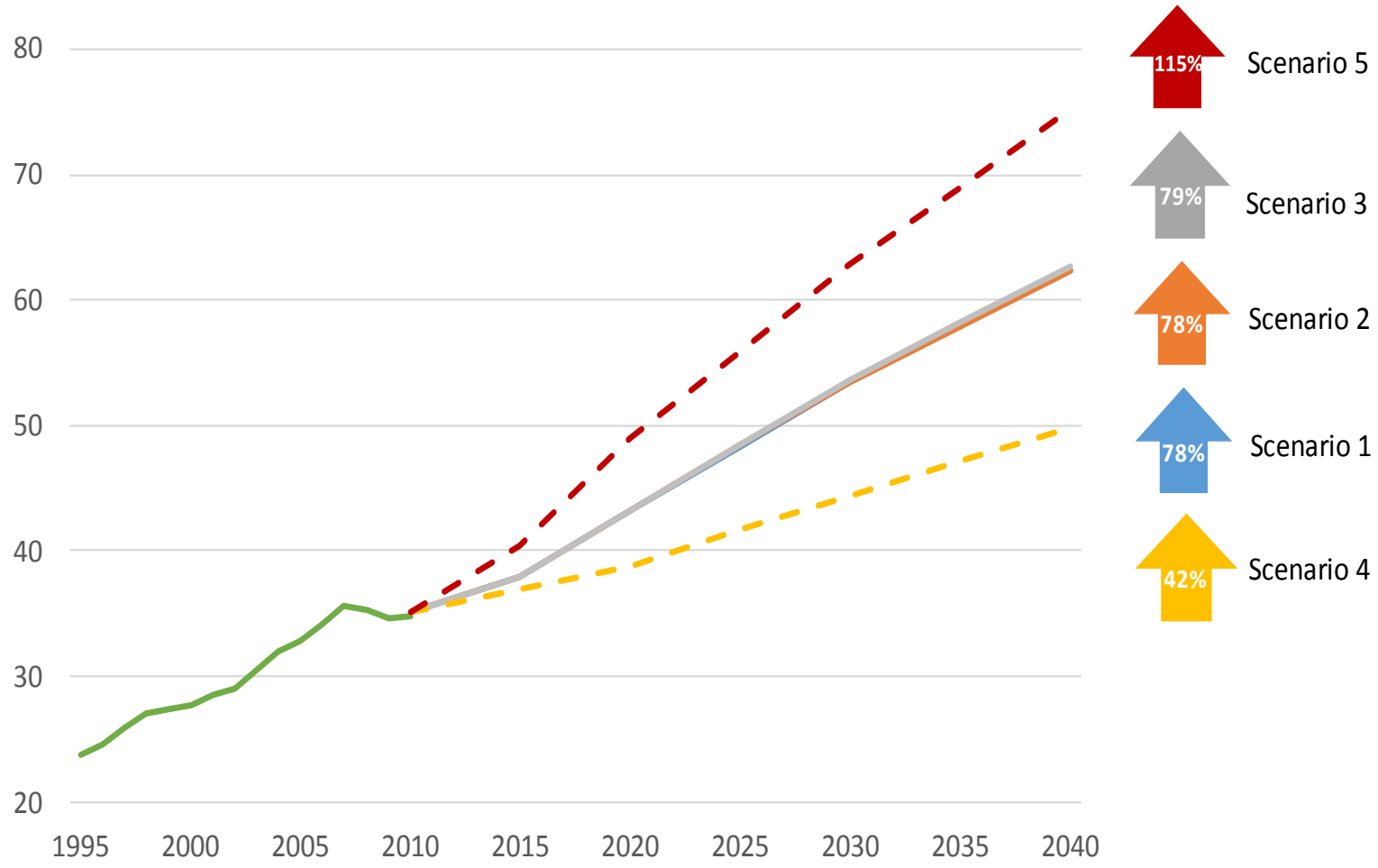
LGVs 2010 – 2040, England



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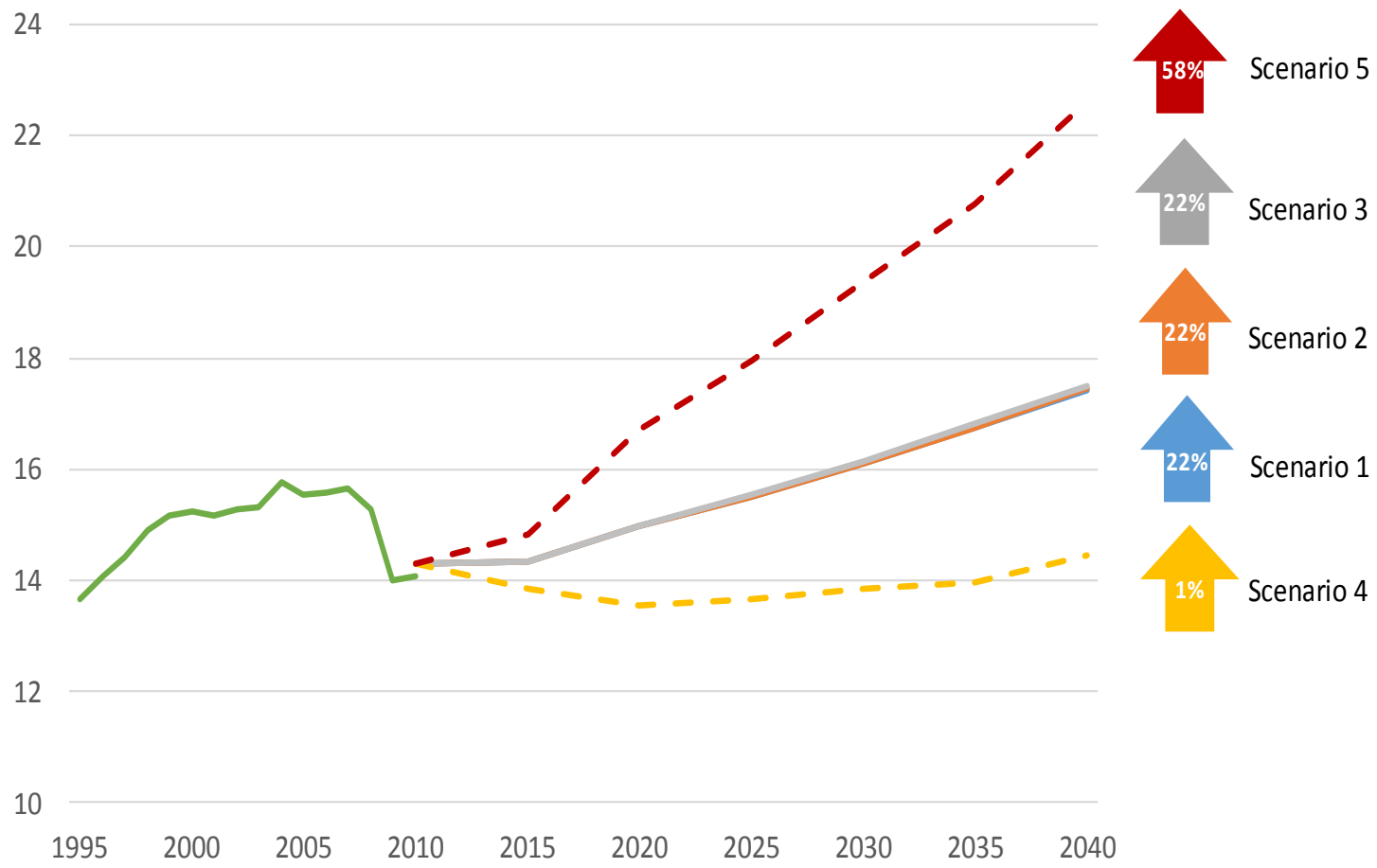
HGVs 2010 – 2040, England



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For the first time, a genuine, open, honest, and transparent 'scenario' approach has been adopted

The underlying strength of your colleagues work has enabled me to … raise the whole roads and transport context …

The inclusion of a number of scenarios is a welcome innovation for the DfT's regular road traffic forecasting exercise.

A worthy response to the criticism that has come your way … about not capturing the significant changes in many aspects of car ownership and travel behaviours over the last decade

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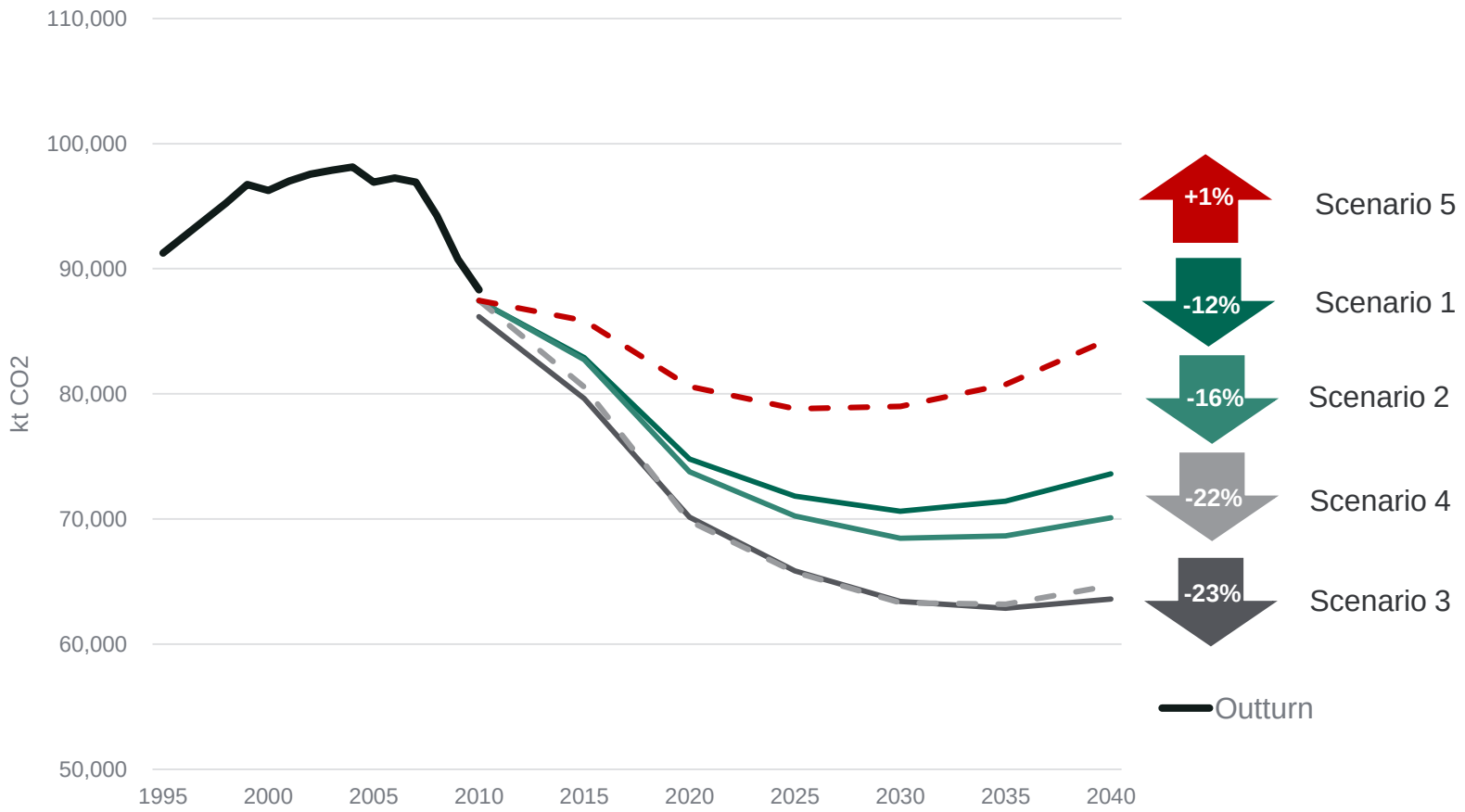
What About Carbon (Energy)



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How Do We Model Fuel?

Two Key Relationships

- Speed Flow Curves for each Road/Area Type
  - These Provide Speeds
- Speed Emission Curves
  - Provide the Emissions Gm/Km & hence fuel/CO2
  - For each Vehicle or Fuel Type combination

- Also, fleet models cover scrappage and the promulgation of latest Euro standard vehicles throughout the different vehicle fleets and modify the speed emission relationships over time.

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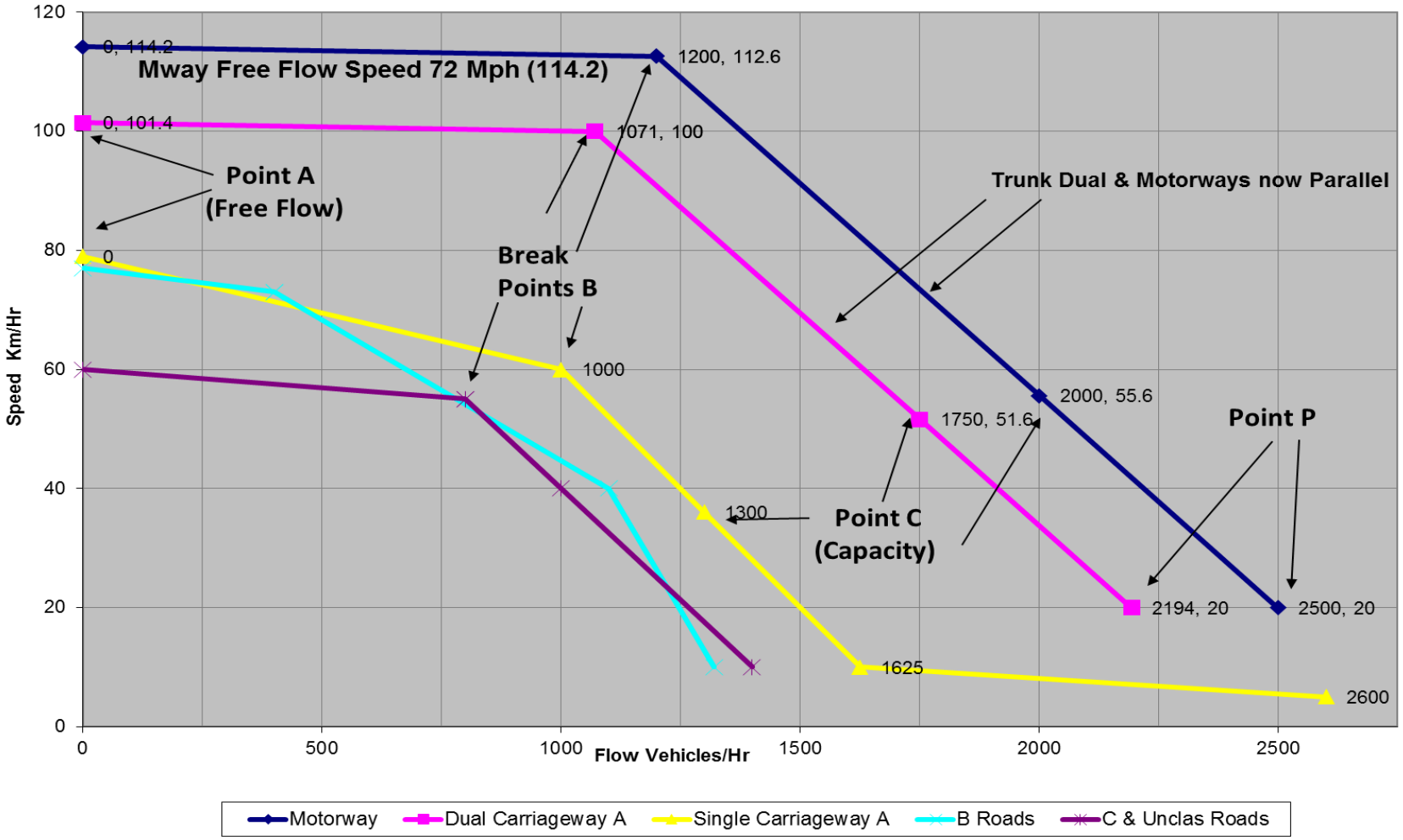
Rural Road Speed Flow Curves



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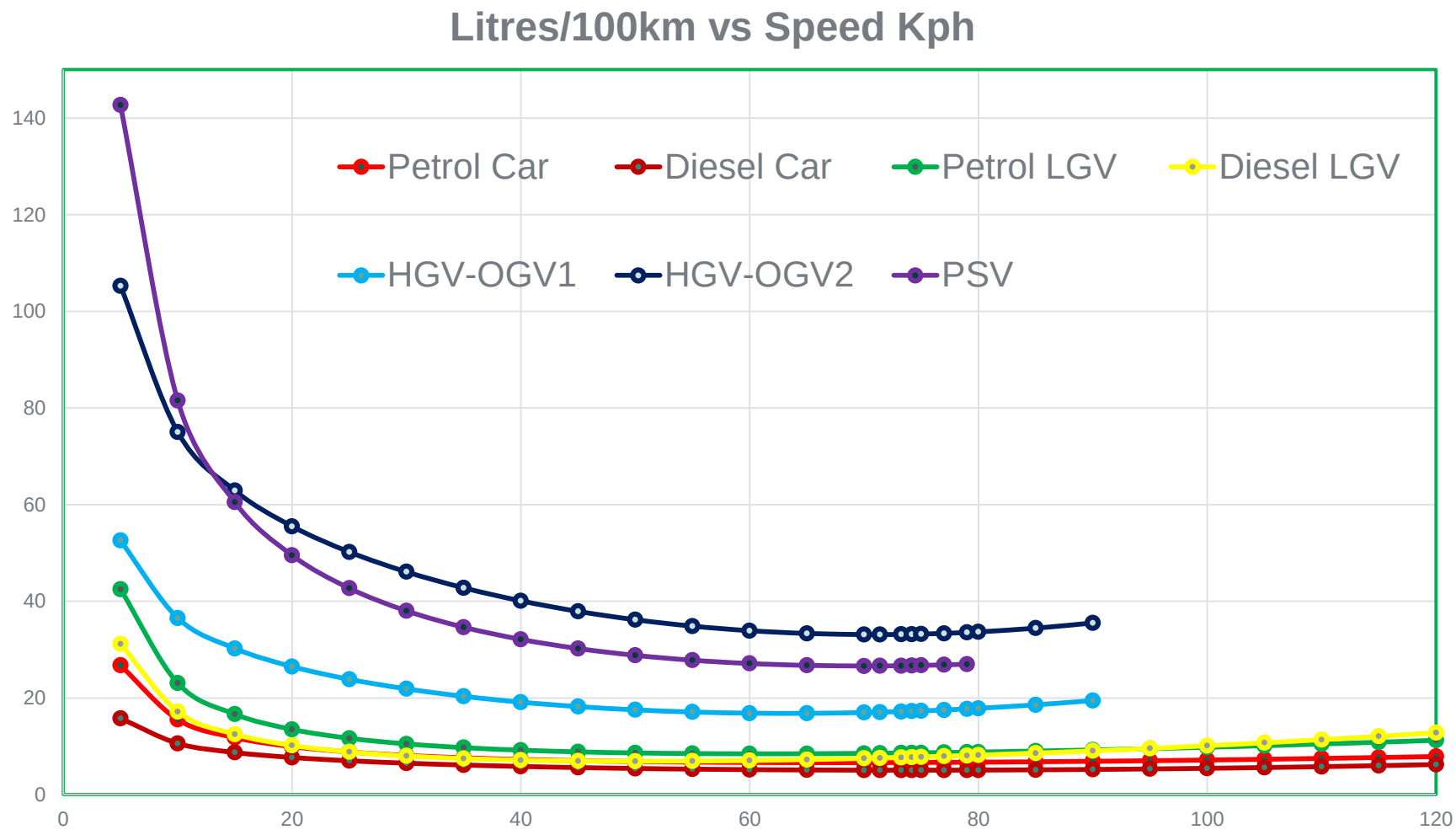
Speed Emission (CO2) Curves



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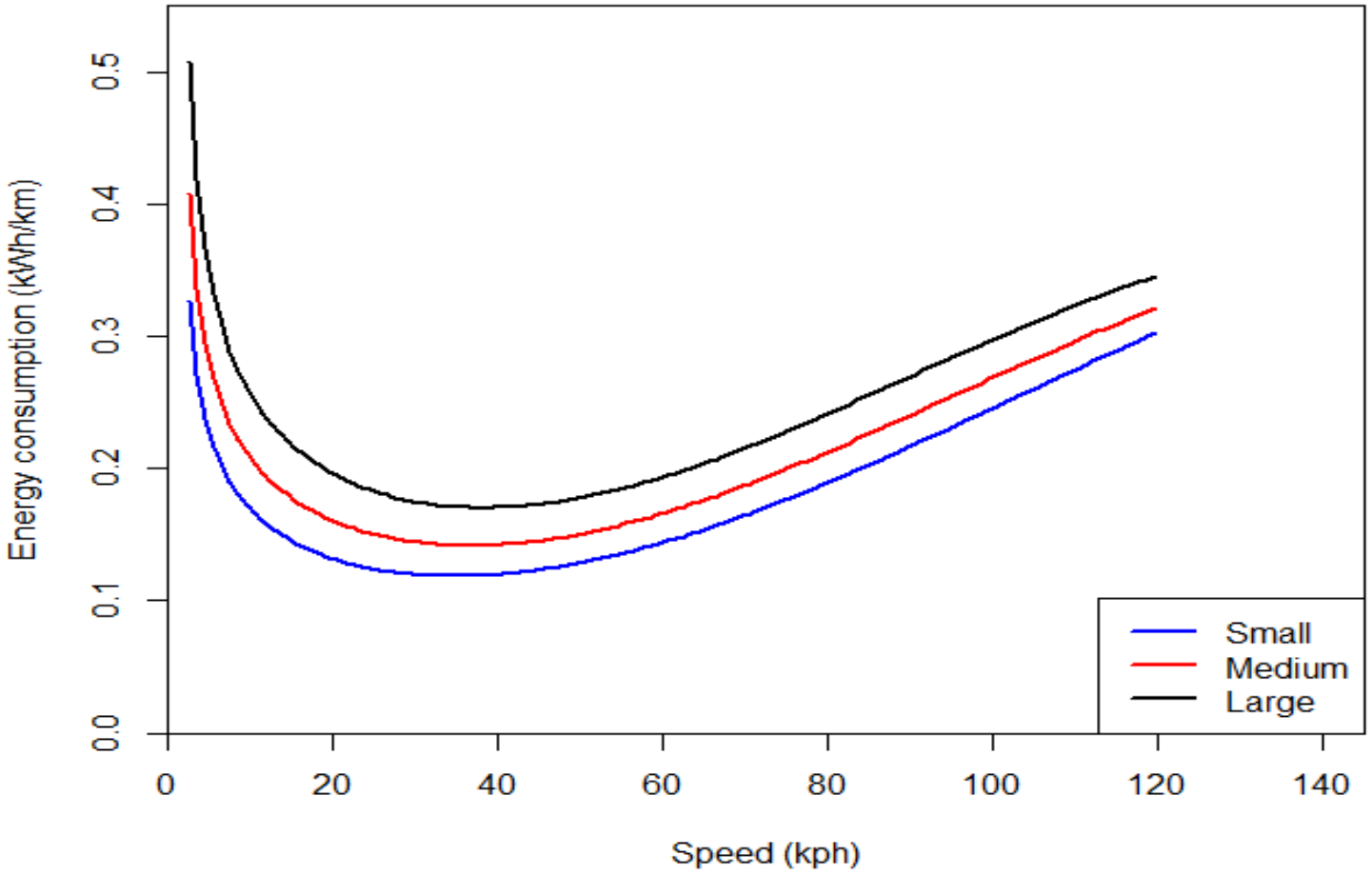
New ULEV Research Will Give Us Energy

Speed Energy curves for BEV's



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What next?

- Further development of the scenario analysis
  - Broader range of uncertainty capture (& quantified) Eg, Autonomous Vehicles
  - Narrative approach to scenarios – urbanisation/London
- Gap analysis
  - Freight
  - Urban/Rural Travel trends
  - Finalising econometric analysis of travel trends
- Update of NTM – trip rates, car ownership, Futures Project (New model)
- Incorporation of latest research – Nox Curves, ULEV research
- Transparency/Opening up of the NTM to stakeholders

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Any Questions?