

Total costs of ownership for low carbon cars in the 2020s

Clean Mobility in Lithuania
Conference

19th October 2018

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Study Objectives

Context

- Strong decarbonisation of light vehicles needed in the 2020s
- Wide range of technologies likely to play a part in delivering these emissions reductions
- Important to understand potential impacts on end users

This study aims to:

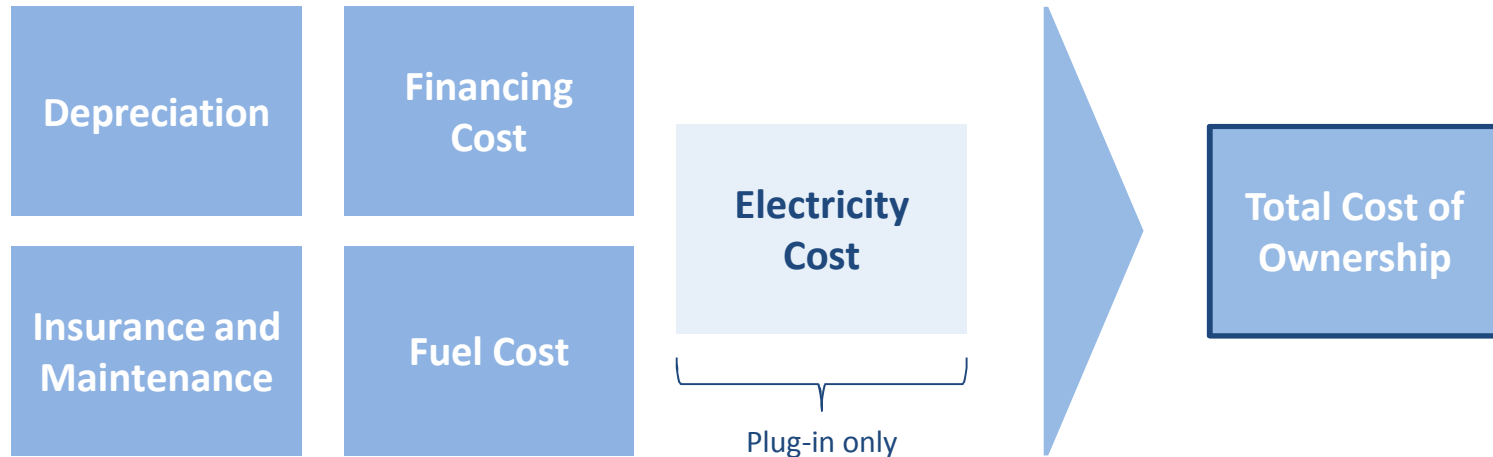
1. Combine the latest evidence to estimate future costs and performance of new petrol & diesel cars and ultra-low & zero emission powertrains
2. Develop robust assumptions covering the other cost components of car ownership
3. Forecast the changes in Total Cost of Ownership for each powertrain over first, second and third owners between 2015 and 2030
4. Draw conclusions on the implications for post-2020 policy mechanisms to drive down vehicle emissions

Wherever possible data was drawn from established sources for maximum transparency

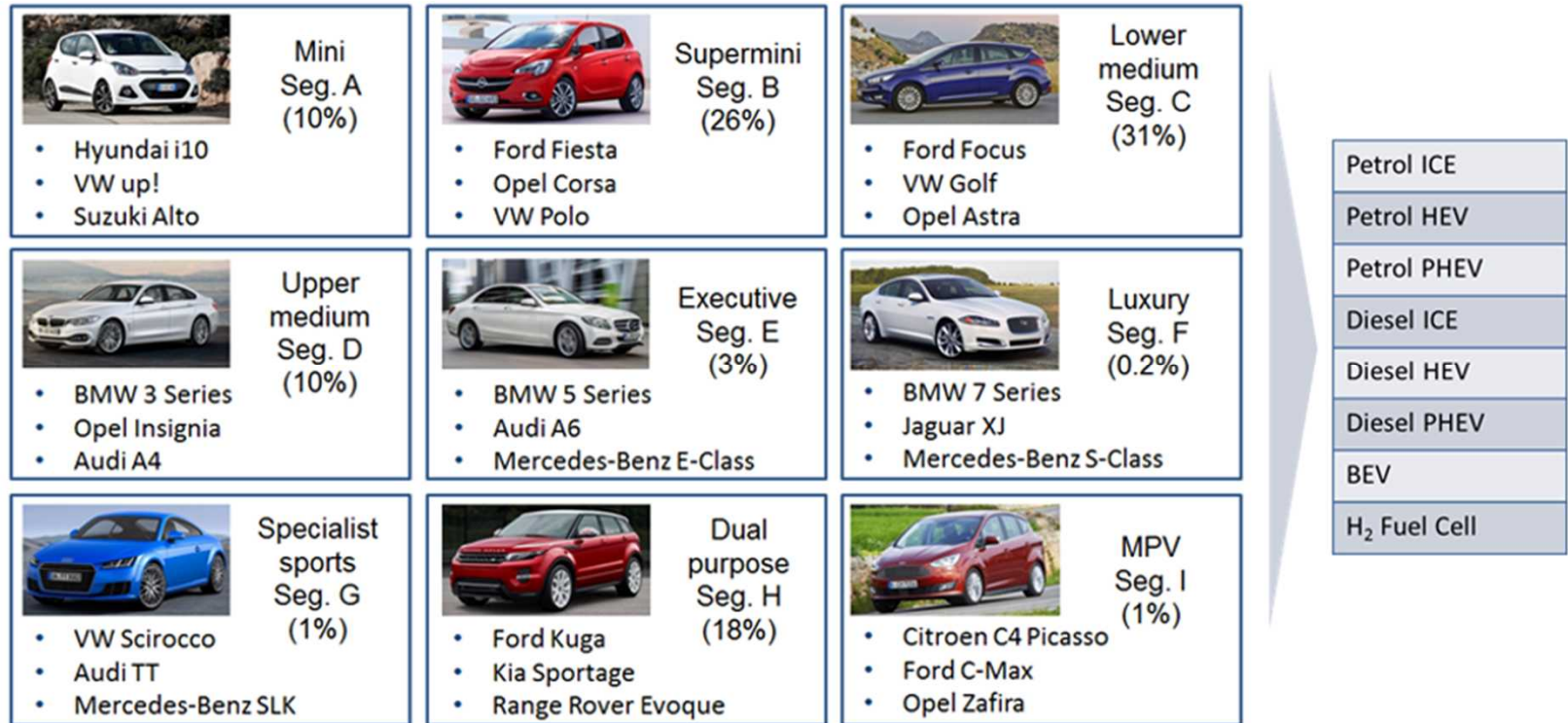
Key data sources:

- Cost and efficiency gains of **vehicle efficiency measures** from European Commission cost curves
- **Battery costs** from Element Energy's cost model
- **Fuel prices** calculated from **IEA's World Energy Outlook 2015** central oil price forecast
- Domestic **electricity price** forecast from **Eurostat**
- Real world **emissions gap** from **ICCT's 2015 study**

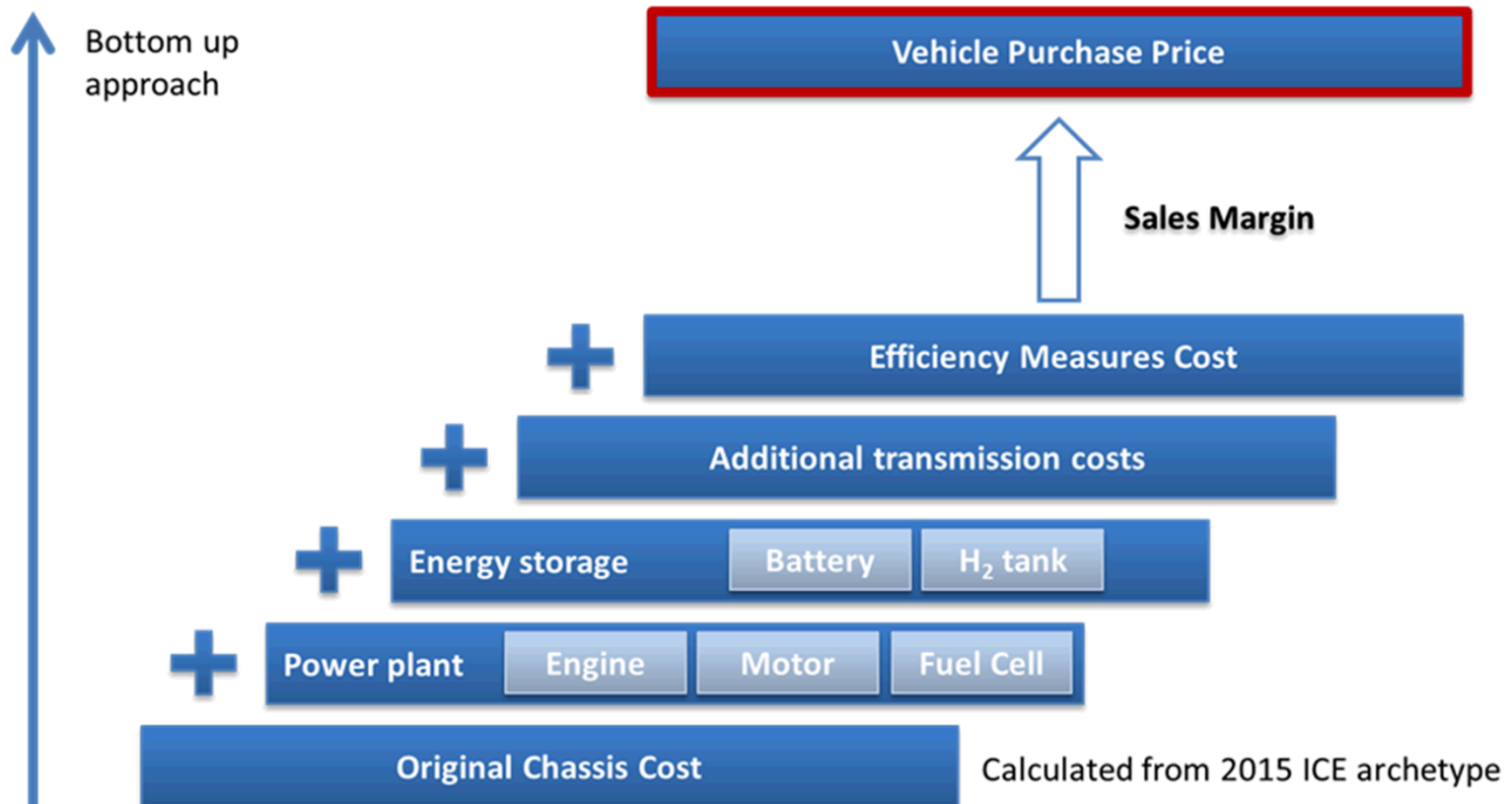
TCO Composition



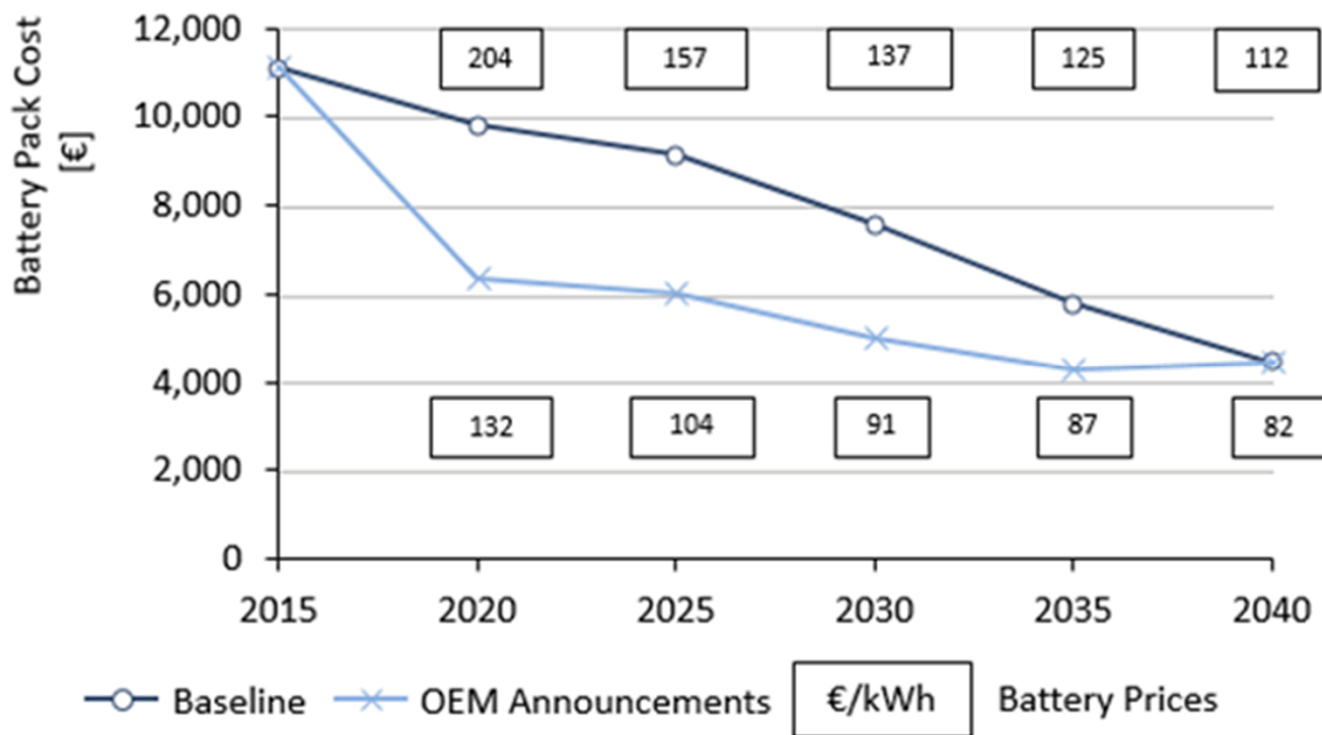
Our Lithuanian case study focused on Superminis, Lower Medium and Dual Purpose passenger cars



We considered the costs of all components for each powertrain, including costs of future efficiency improvements due to CO2 targets

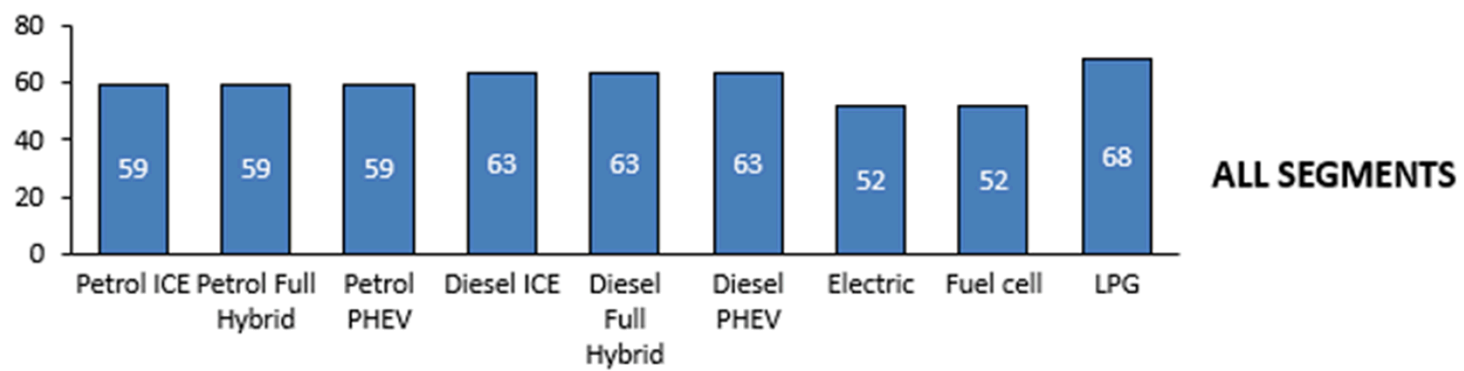


Battery costs are a key assumption in the study; two scenarios are used based on the latest evidence of cost trends

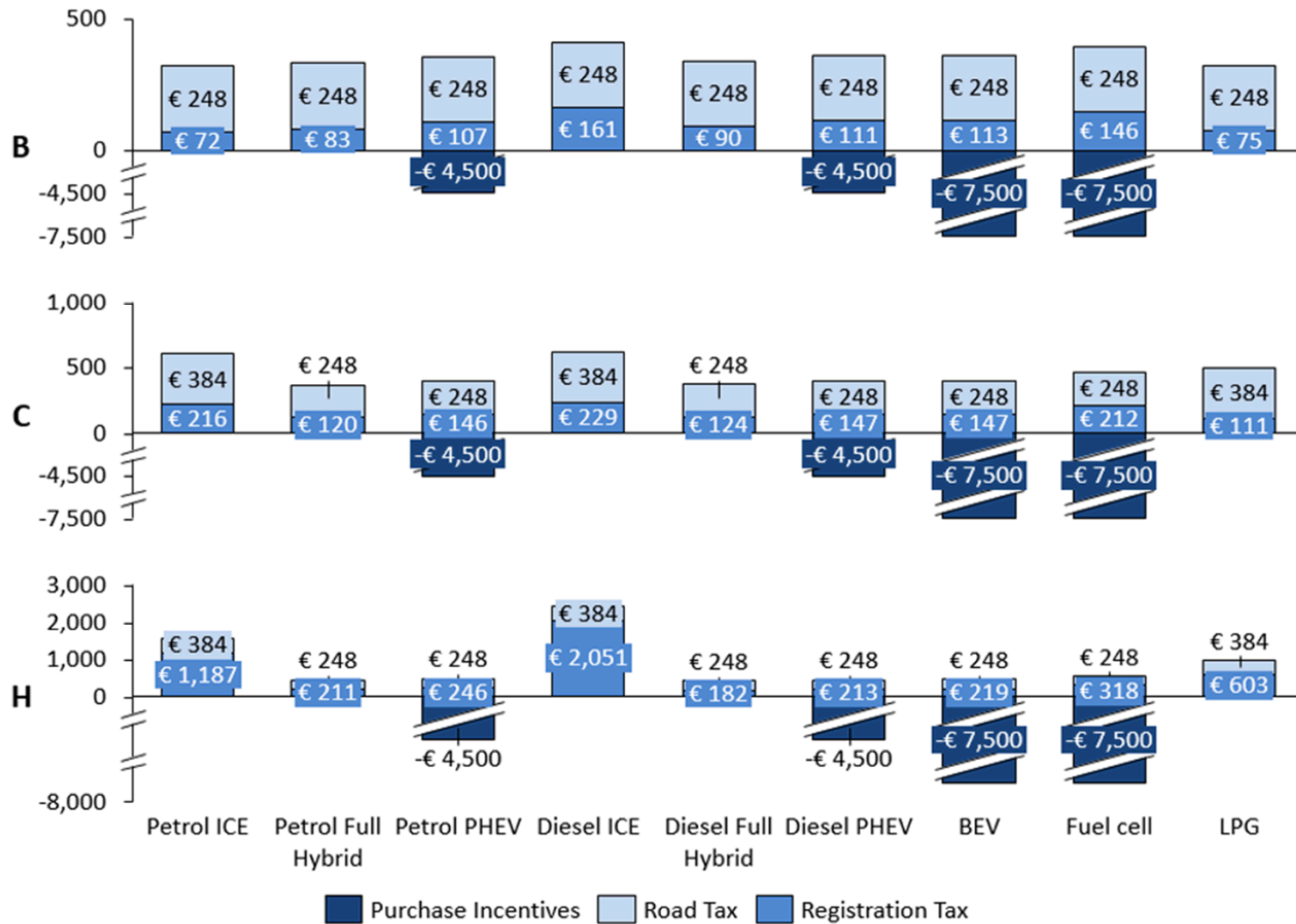


Vehicle taxes in Lithuania are very low compared with other EU countries and have a minimal impact on vehicle ownership costs

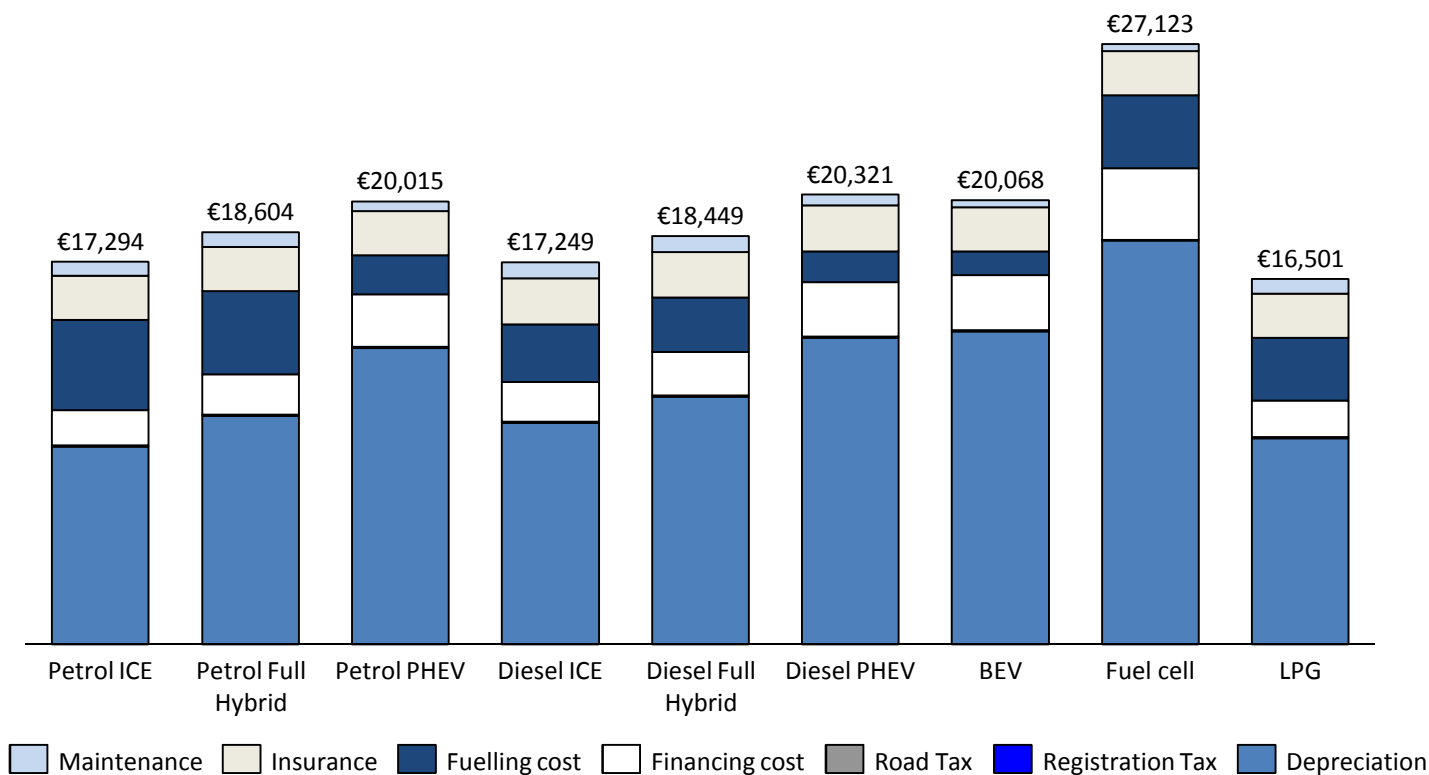
Fee Category	Amount Payable [€]	Powertrain	Fee [€]
Registration fee	14.48 for 1 st hand 12.45 for 2 nd hand	Petrol	14.48
Vehicle identity check	15.35	Diesel	18.2
Number Plates	15.06	LPG	23.4
		Electric	6.62
		H2	6.62



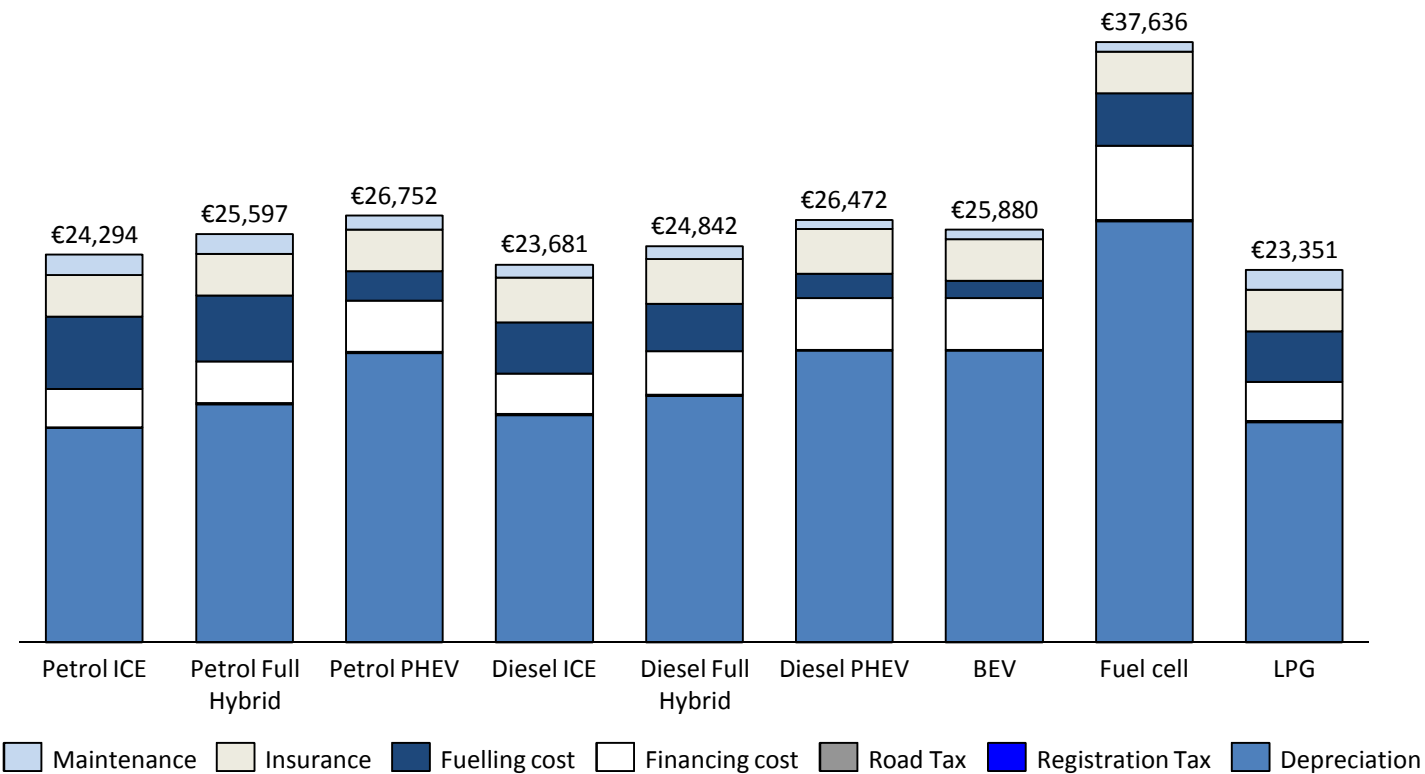
ALCO requested the simulation of the Slovenian tax regime for the case of Lithuania



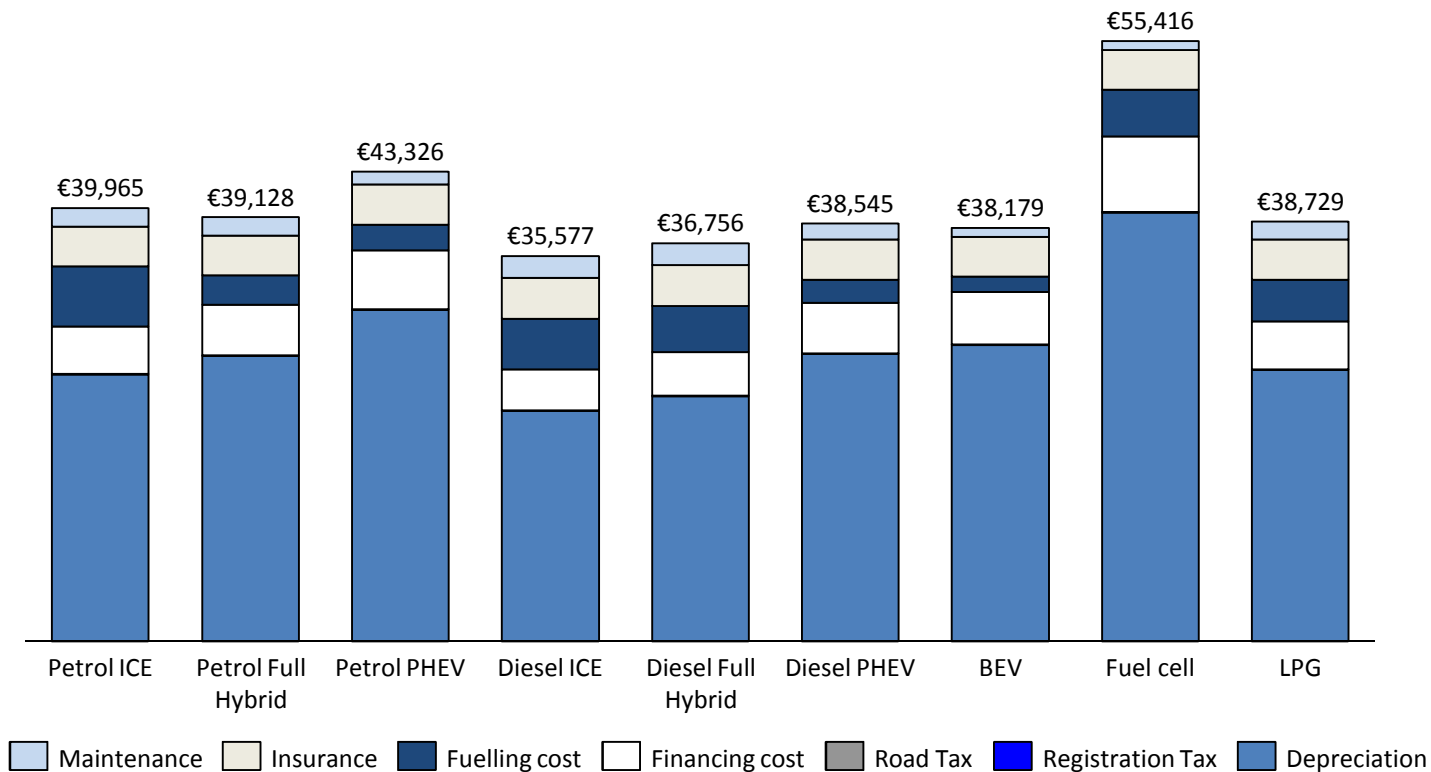
Under current Lithuanian policy, petrol and diesel cars currently have the lowest TCOs for first owners in the B segment



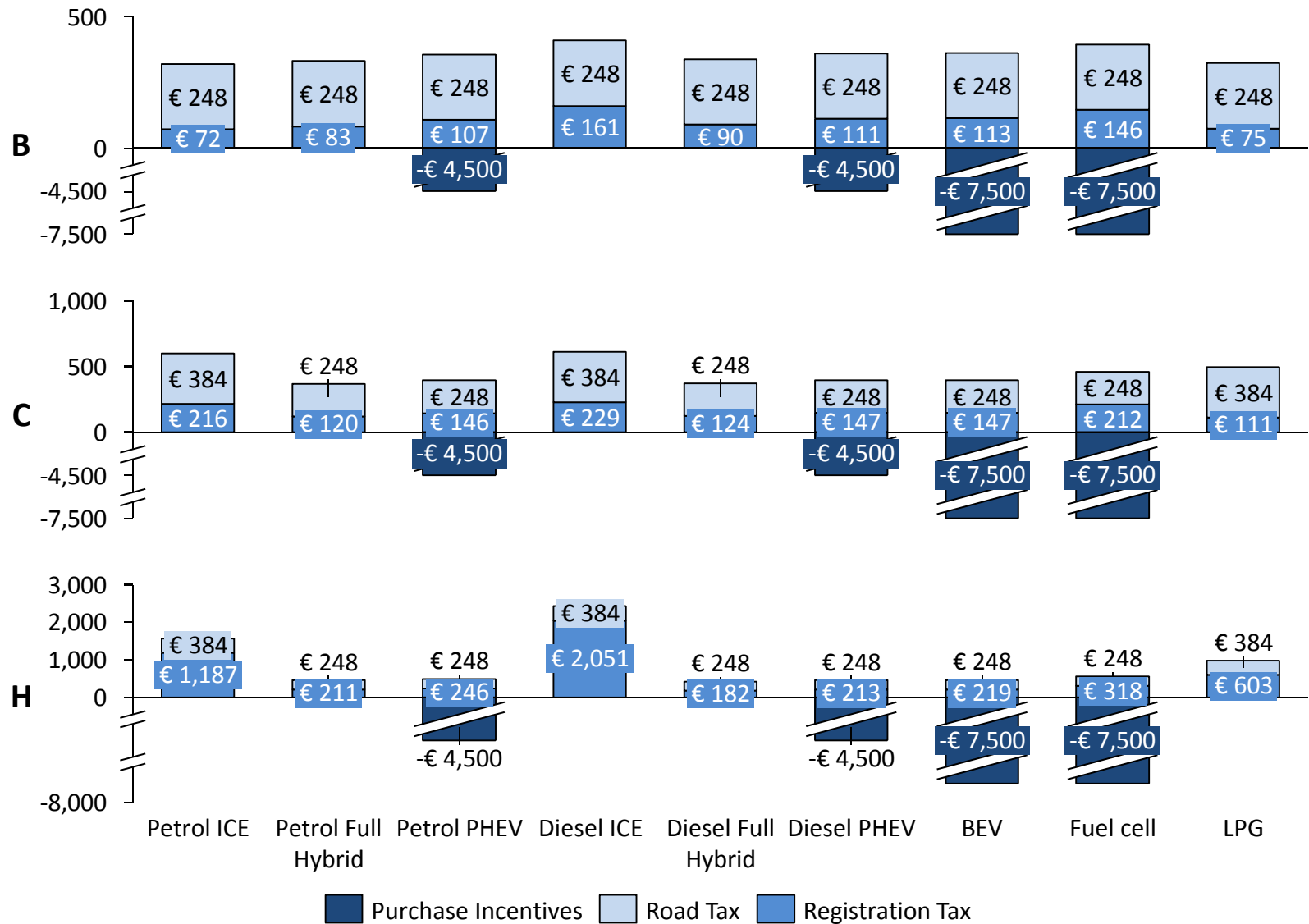
Petrol and diesel cars remain cheapest in the B segment, but the TCO gap for first owners is c. 2 000€



Petrol and diesel cars remain the cheapest in the largest vehicle segment, as higher battery costs for big vehicles are not outweighed by fuel savings

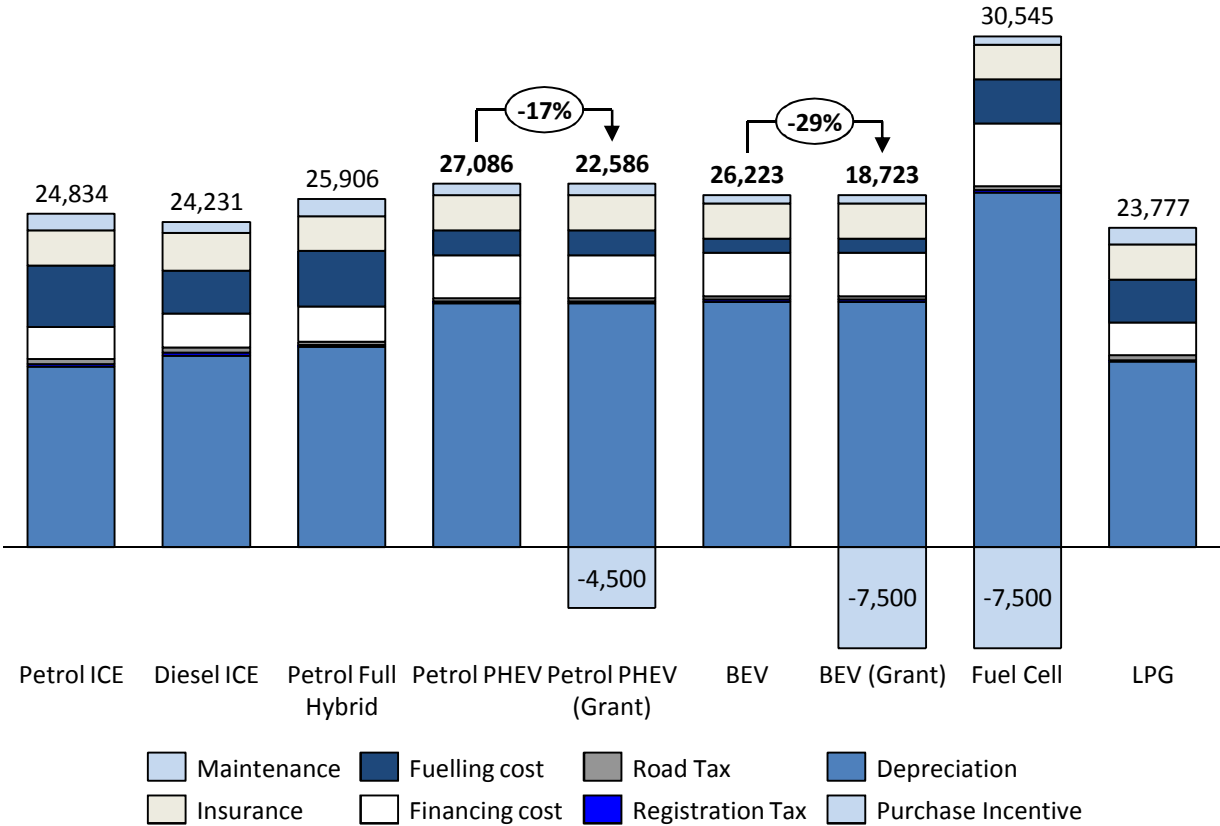


The simulated Slovenian tax system places high registration tax on the most polluting vehicles, as well as offering incentives to ultra-low emission cars

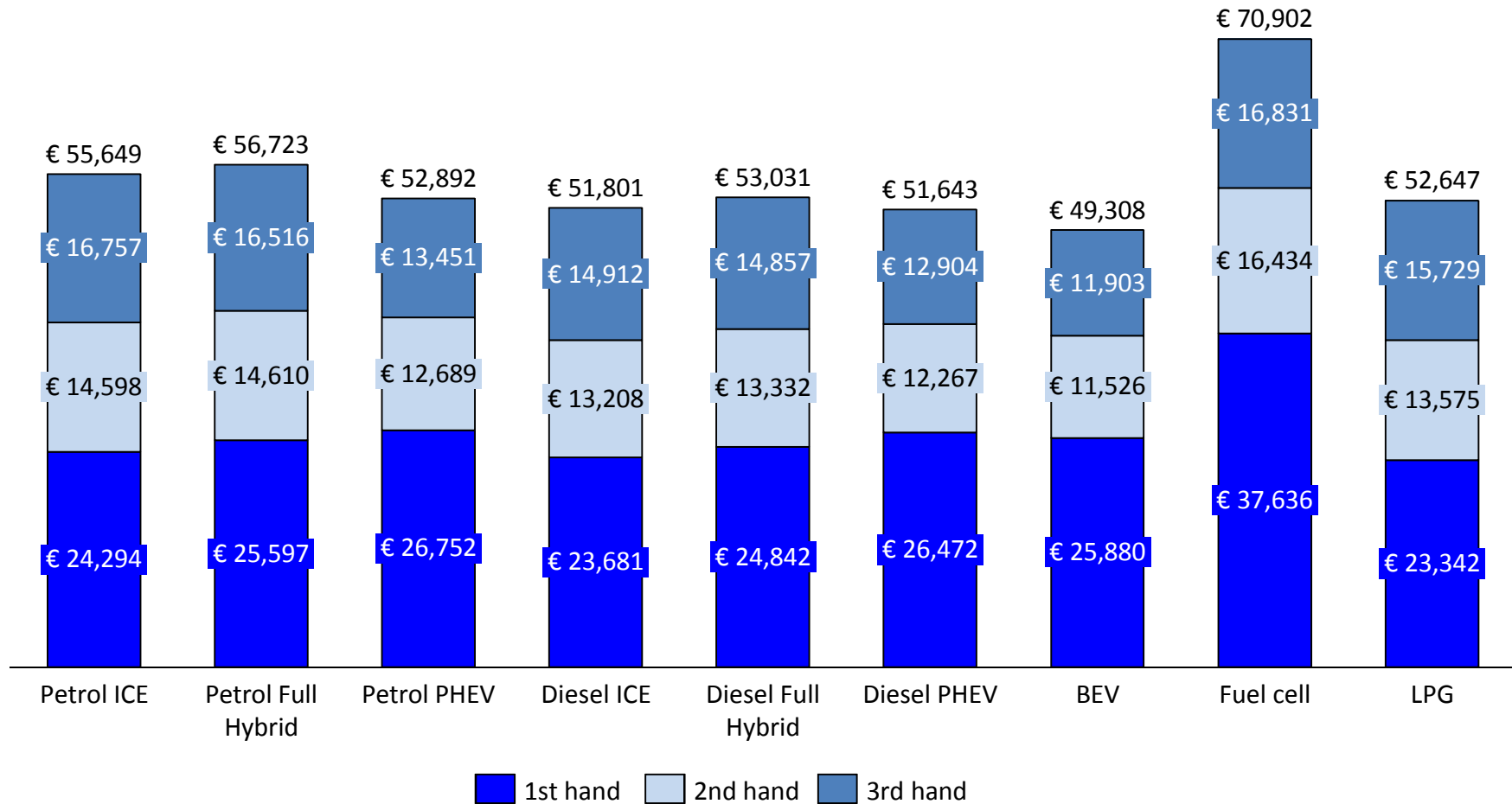


Simulation of the Slovenian purchase grants immediately make PHEVs/BEVs the most cost-effective powertrain choice by a large margin

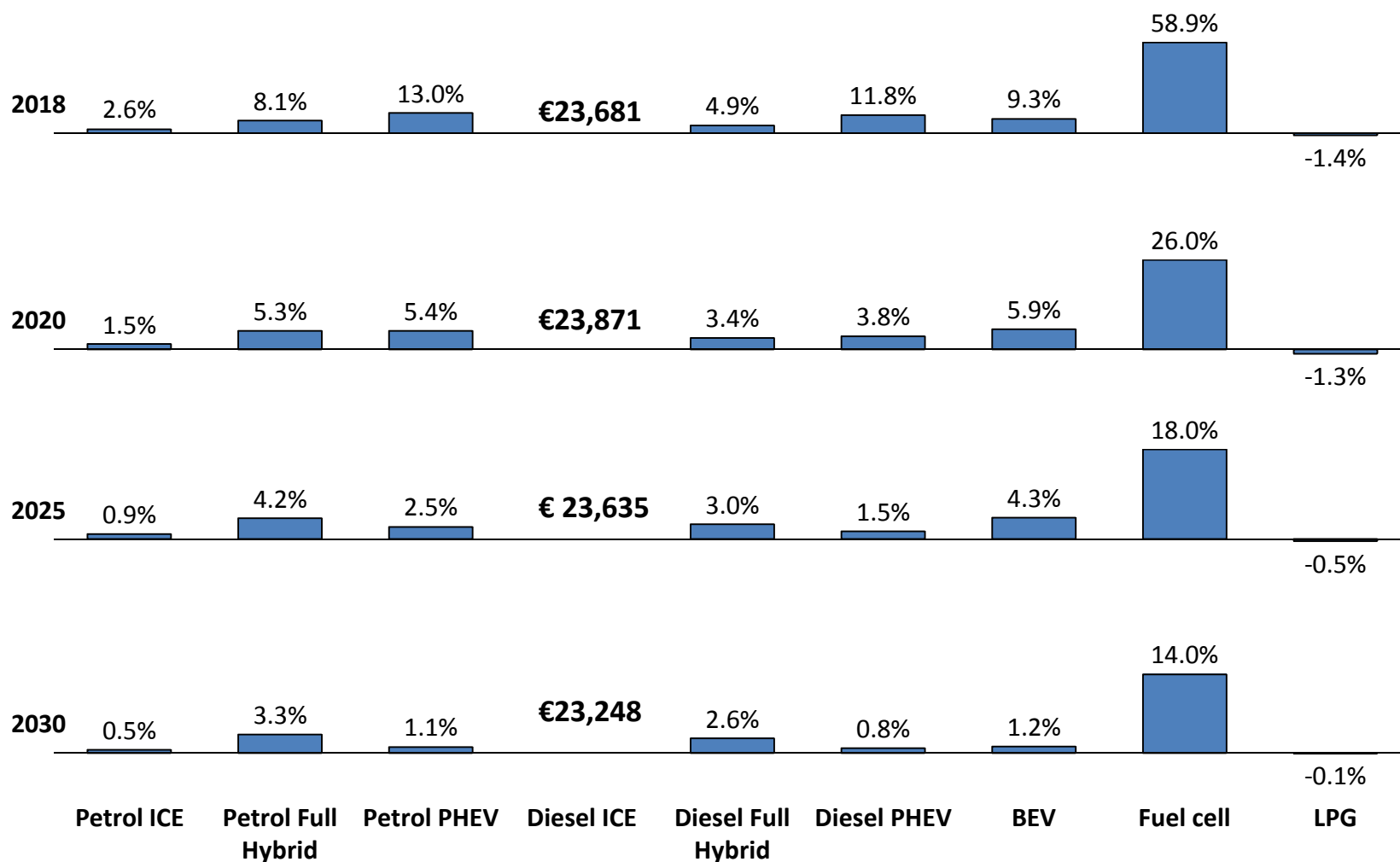
C segment – Slovenian taxes



Over the whole vehicle life, the BEV is the cheapest powertrain even in 2018 with the current low car taxes in Lithuania



Strong falls in battery costs reduce the TCO gap between conventional and low emission cars even in the absence of future policy, though a TCO gap remains until 2030 in this case



- By 2030 the 1st hand TCO of a C-segment BEVs is almost at parity with an equivalent Diesel ICE vehicle

Key findings and implications for policy makers

1

Continued improvement in efficiency makes car ownership cheaper for the consumer

- Total costs of ownership for first, second and third hand owners are forecast to decrease for all powertrains, even under a backdrop of rising fuel and electricity prices
- More efficient conventional ICEs continue to offer TCO savings even down to emissions of $\sim 70 \text{ gCO}_2/\text{km}$ (NEDC)

2

The total costs of ownership for ULEVs continue to converge with conventional vehicles and become highly competitive when considered over the whole vehicle life

- BEVs will become cheaper to own than Petrol ICEs over the first 4 years during the 2020s, and become the cheapest powertrain of all by 2020 when considered over a 16-year technical life
- Uncertainty remains over whether additional cost of battery replacement (if needed) and charge points will offset some of this TCO advantage

3

Converging ultra-low emission costs provide opportunities for ambitious CO₂ reductions without risk of adverse impact on vehicle users

- Convergence of ULEV TCOs suggests transition away from ICEs is possible without increasing consumer costs. Action is necessary to improve access to charging infrastructure (particularly in cities) and remove uncertainty around battery degradation
- Policies should be aligned with local level efforts to include air quality