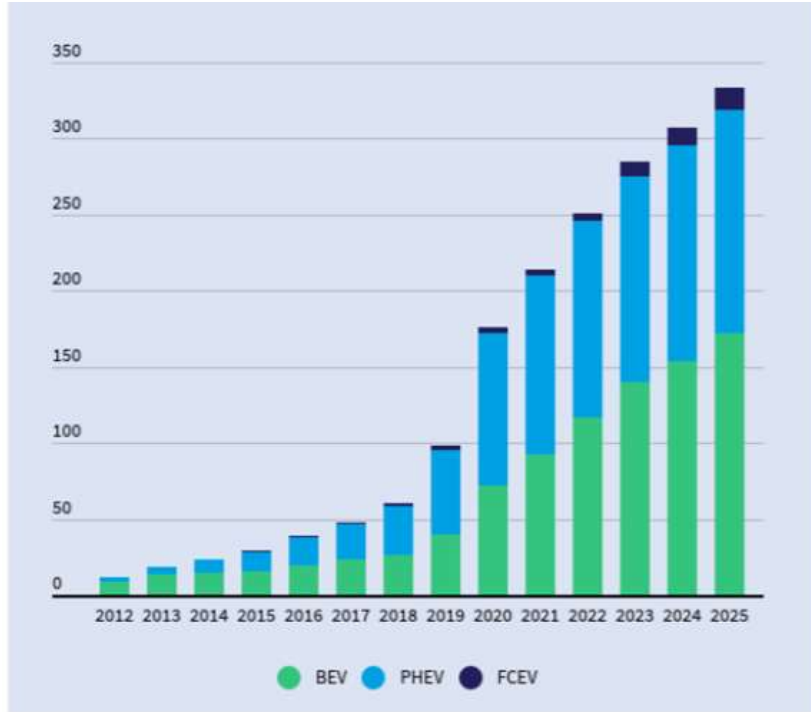


# Rola wodoru w dekarbonizacji sektora transportowego w UE - analiza T&E

Rafał Bajczuk

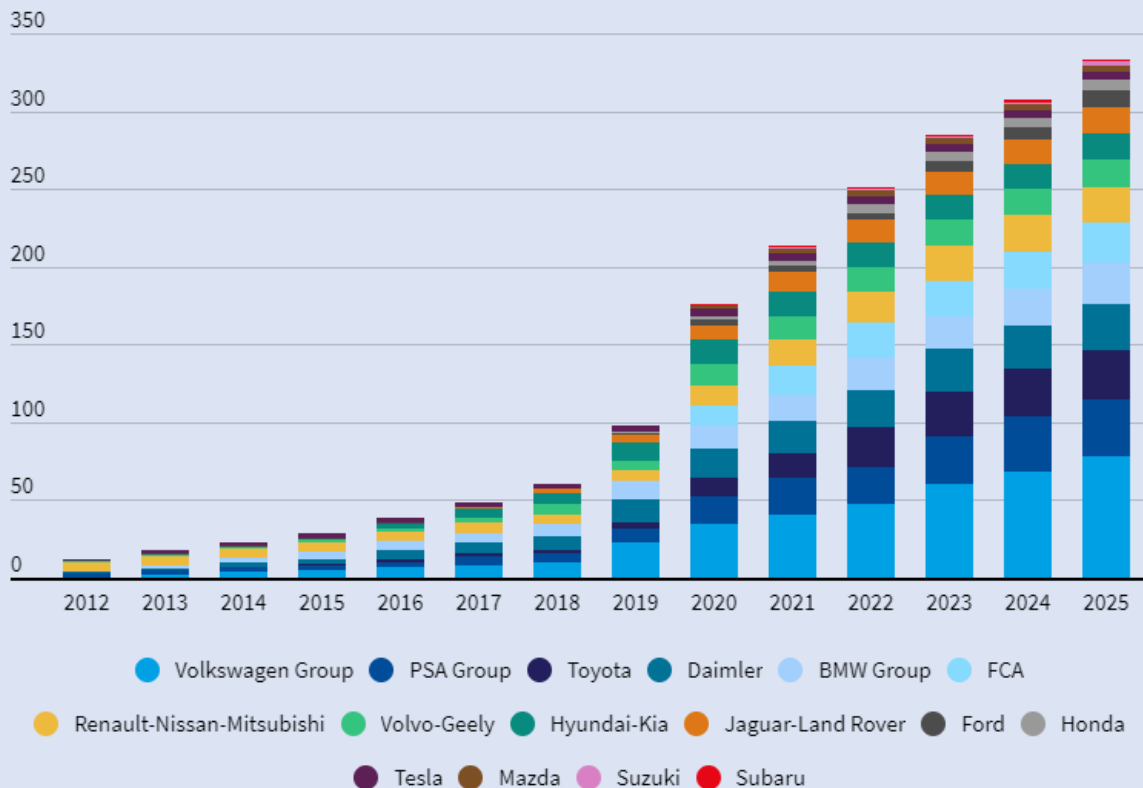


**Figure 10: Total number of available EV models on the market in Europe**

**Producenci samochodów nie wierzą w wodór**



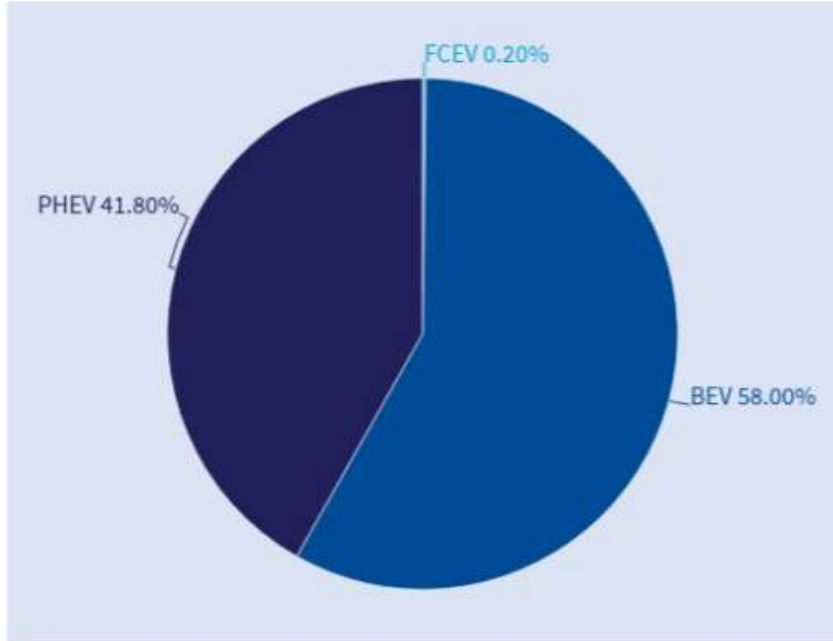
## Electric car models coming to market in Europe 2019 - 2025



Source: Transport & Environment

# Realizują za to wielkie inwestycje w samochody bateryjne

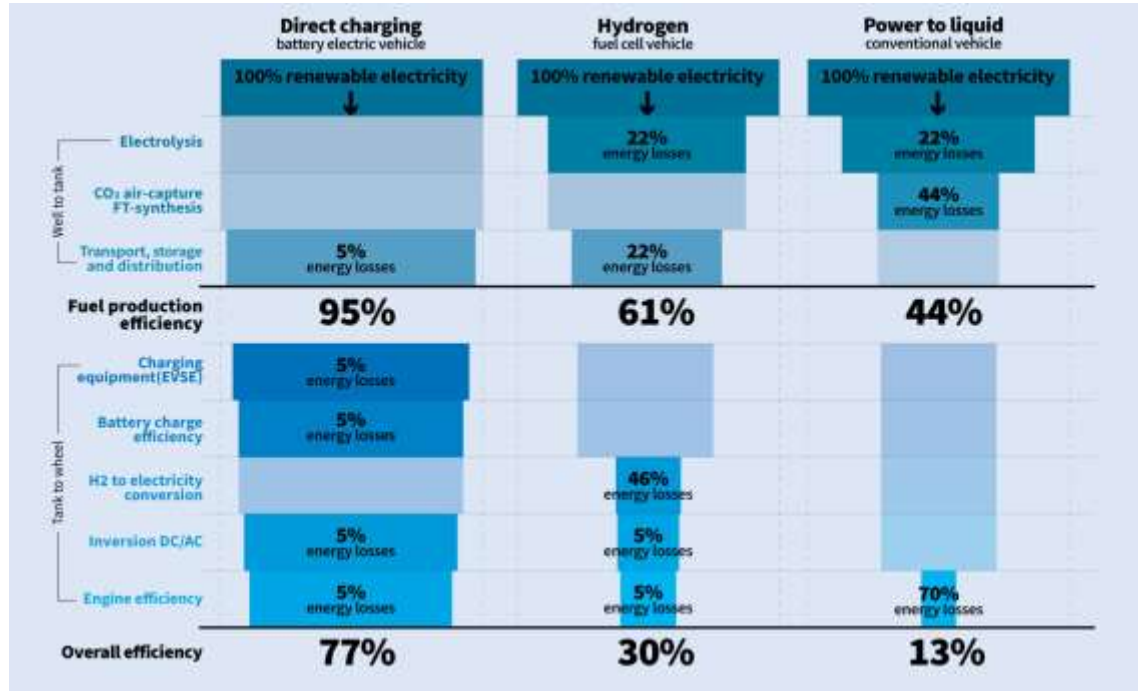




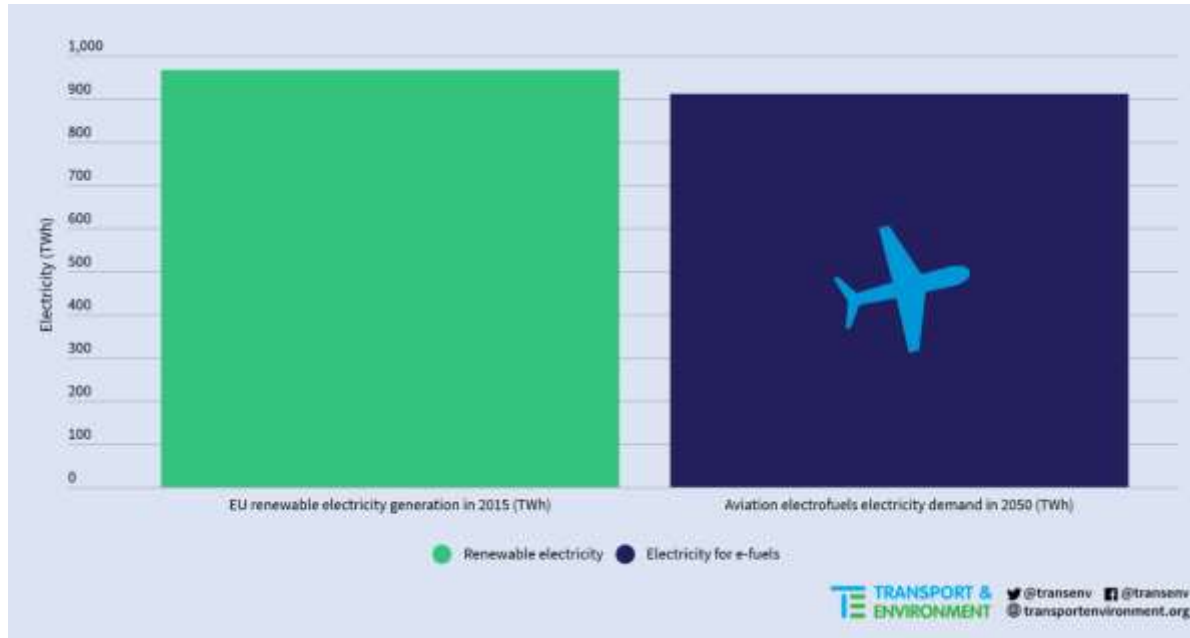
**Figure 13 – Forecasted European production of EV per type in 2025 (Source: IHS Markit)**

**Europejscy producenci planują produkcję tylko 5500 samochodów wodorowych rocznie (= 0.2% produkcji samochodów elektrycznych)**

# Efficiency first = Direct use of electricity preferable





# Aviation (and shipping!) will require huge rollout of renewable electricity for H2 and PTL



# Race between BETs and FCETs is more relevant for transport decarbonisation than than H<sub>2</sub> in cars

## Hydrogen vs battery electric trucks - Long haul

Trips up to 800 km (75% of EU truck activity)

Parameters	Fuel cell electric truck	Battery electric truck
	 H <sub>2</sub> O <sub>2</sub>	
<b>Total cost of ownership over first 5-year user period (based on France)</b>	<b>€ 459 k</b>	<b>€ 393 k</b>
Vehicle purchase costs	€ 139 k	€ 167 k
Annual renewable fuel costs <sup>1</sup>	€ 38 k	€ 22 k
Cost parity with diesel without subsidies	Mid 2040s	Early 2030s
Economies of scale with cars	Low	High
Max range without refuelling / recharging	1200 km	800 km
Refuelling / recharging time (full)	10-20 minutes	8 hours (overnight) 60 minutes (opportunity)
Net payload loss (weight)	None	None

<sup>1</sup> Renewable fuel costs are incl. taxes, levies and charges, transport and distribution costs for electricity and fuel, assuming renewable hydrogen cost for the end user of € 5.40/kg (2030) and renewable electricity cost for the end user of € cent 15.26/kWh (2030).

<sup>2</sup> Additional weight from the onboard battery pack (assumed energy density of 110 Wh/kg in 2030) of 4.2 t is compensated for by the additional ZEV weight allowance (2 t) under the EU/Weights & Dimensions Directive and net savings from replacing a conventional with an electric drivetrain (2.4 t).



- Car manufacturers are not choosing FCEV to meet EU CO2 standards. EU institutions also do not see a role for hydrogen in passenger cars.
- Direct charging of BEVs is most energy efficient. Hydrogen will be in high demand in transport sectors like aviation and shipping.
- Hydrogen may play a role in heavy-duty freight. Let the energy carriers compete under Zero Emission Mandate for trucks!