



Meeting the unique needs of heavy duty engines: the next steps for heavy duty engine oils

Dr. Alan Henderson, Afton Chemical

Global trends in a few words

THERE FOR THE
LONGHAUL



End users and OEMs want improved fuel economy



An OEM with **20% share** of sales missing the EU CO₂ target by **1%** could face a fine of **€25 million per month***

* based on June 2022 EU new vehicle commercial registrations >3.5t and missing EU 2025 target by 0.63 gCO₂/tKM

A fleet of **100 trucks** using an **SAE 5W-30** oil and covering an average of **120K km per year** will **save €90 000 in fuel per year*** versus the same fleet using an **SAE 10W-40** oil

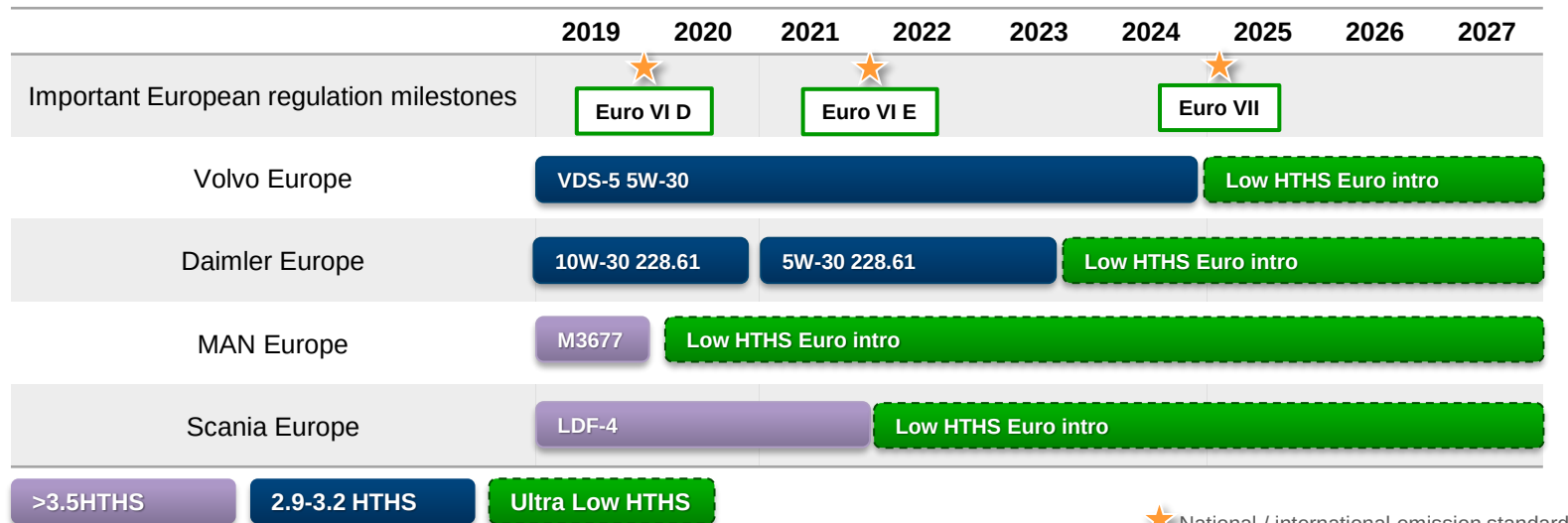
* based on average fuel consumption of 35L/100Km, fuel price of €1.90 per Litre



Fleet owners desire for improved fuel economy is well aligned to OEM need to reduce CO₂ emissions to avoid strict EU penalties

OEMs have a clear route to reduce CO₂

Moving to Low HTHS oils

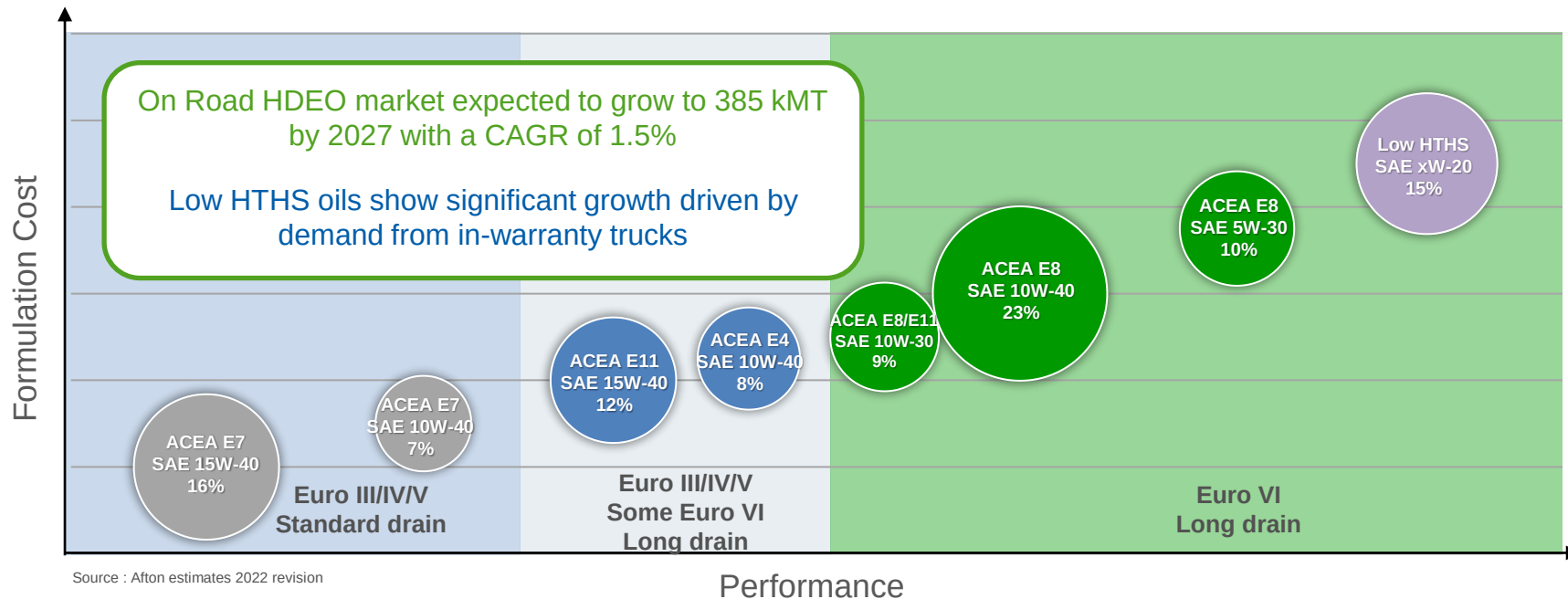


★ National / international emission standard

European OEMs are well advanced with the move to low HTHS but need to ensure they maintain **engine durability** through **careful balancing of the formulation**

ACEA Heavy Duty Engine Oil segmentation

Europe 2027 forecast for On Road



Low HTS fuel economy products will account for 15% of the On Road market in 5 years

Oil Marketers need to be ready to embrace this new segment

What about Off Road?

Is there alignment between end users and OEMs?



- ▲ Fuel economy valued by end users
 - ▲ Off Road is not immune from fuel cost increases
- ▲ Emissions targets in Off Road do not include CO₂ reduction
 - ▲ Less incentive for OEMs to target fuel economy improvements
- ▲ Durability is a key concern for Off Road applications for OEMs and end users
 - ▲ Minimising down time more important than fuel economy?
 - ▲ Different segments may have different priorities

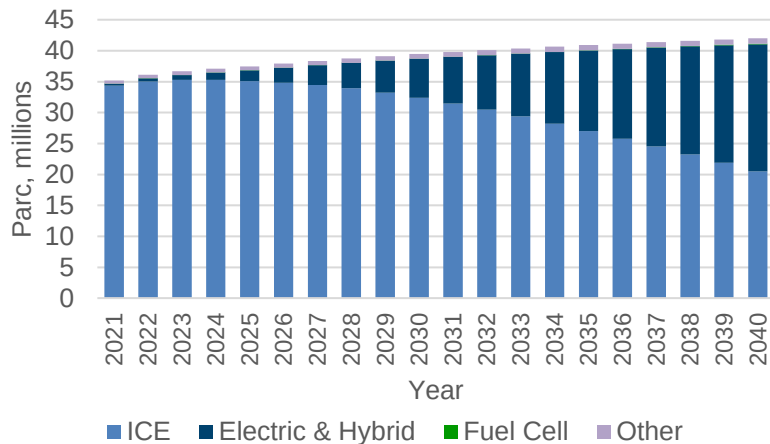
Current On Road Top Tier SAE 5W-30 oils
offer the **right balance** between **fuel economy**
saving and **durability**

Beyond the next step

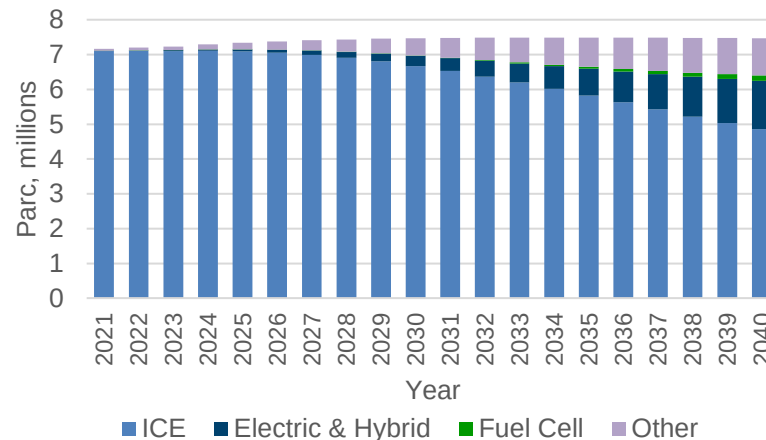
Penetration of alternative powertrains is slow



Light Commercial Vehicles, <3.5T



Medium and Heavy Commercial Vehicles, >3.5T

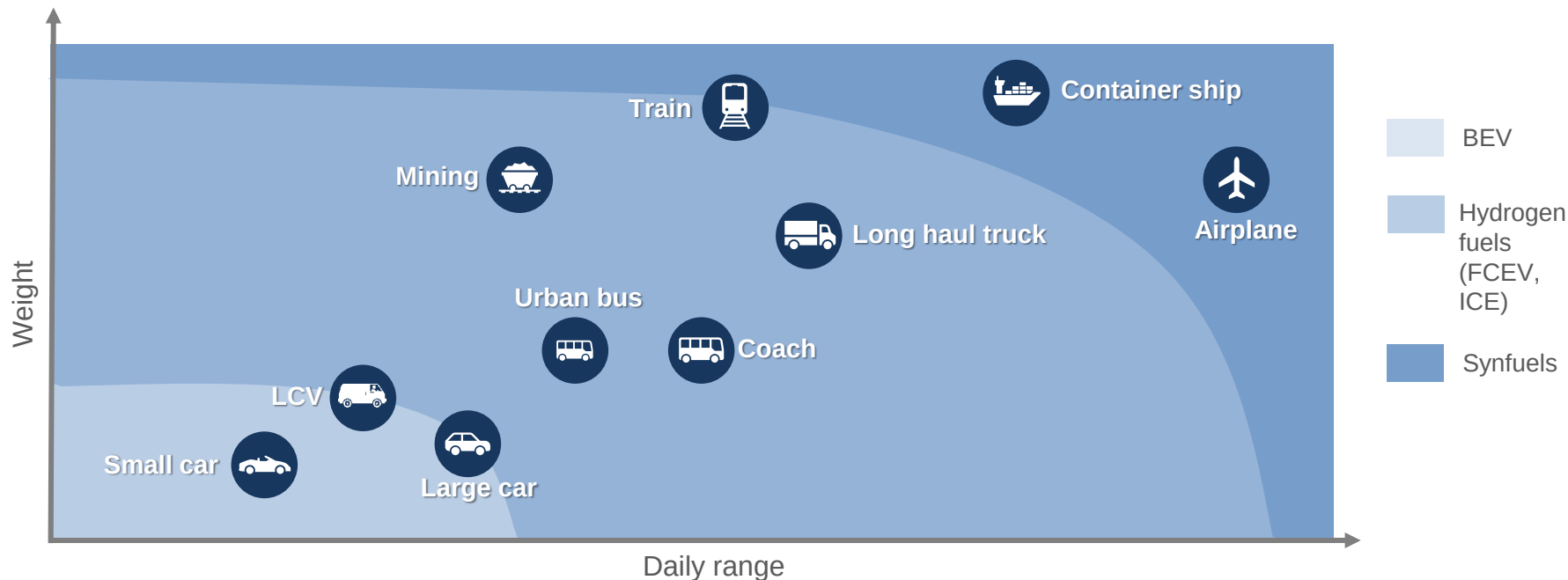


Source: Bloomberg New Energy Foundation (BNEF), "Electric Vehicle Outlook 2020", Data covers France, Germany, UK and Rest of Europe

OEMs need alternative powertrains to meet more stringent EU 2030 emissions reduction on sales
ICE share of Parc remains strong beyond 2040 particularly in M/HCV sector

Likely deployment of alternative powertrains

Motivation for hydrogen powertrains



Source: iAV 06/2021

With the increasing weight and / or daily range, it makes more sense to use a hydrogen powertrain, up to the border of very heavy vehicles

Questions?

THERE FOR THE
LONG HAUL





Thank you