

Track 2: What is the Next Generation of Solutions for Hybrid & Electric Vehicles?

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What is driving change?



Next generation fluids

Higher efficiency
Lower wear



Other considerations

Intrinsic fluid properties

What is driving change?



Climate neutrality & decarbonisation
(Scope 1, 2 & 3)



Product carbon footprint
(raw materials, supply chain)



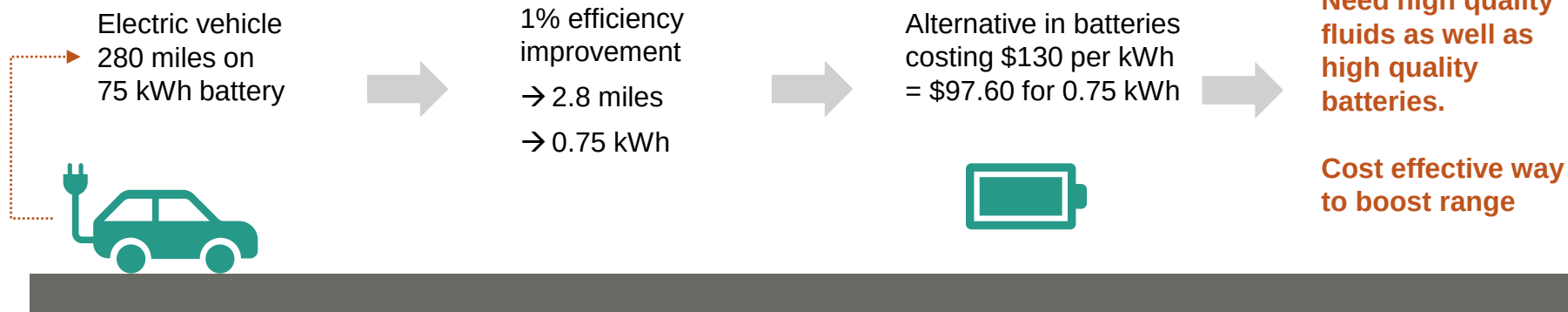
Product carbon handprint
(Performance and benefits in-use)



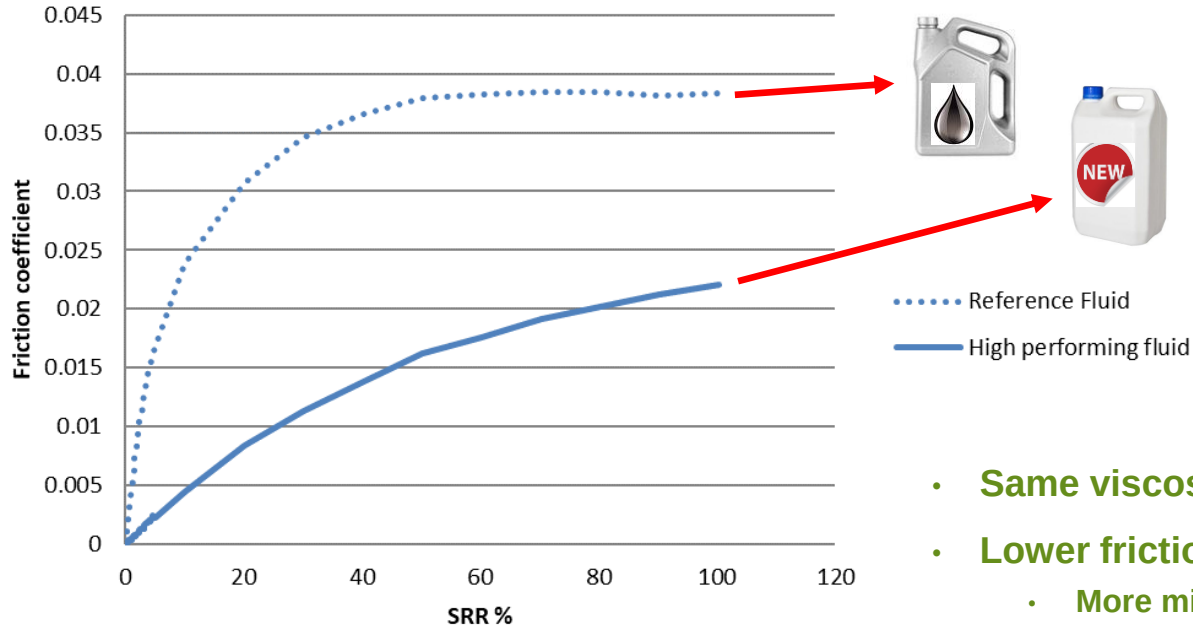
Electric vehicles – why do we want to improve?

2020 Global Auto Consumer Study												
In your opinion, what is the greatest concern regarding all battery-powered electric vehicles?	FRANCE		GERMANY		ITALY		UK		CHINA		US	
	2018	2020	2018	2020	2018	2020	2018	2020	2018	2020	2018	2020
	Driving range	31%	28%	35%	33%	4%	27%	26%	22%	25%	22%	24%

To increase range means an increase in cost!



Efficiency gains – benchtop testing



- **Same viscosity fluid – Very different traction**
- **Lower friction translates to higher efficiency**
 - **More miles on a single charge**
 - **Helps improve range anxiety**

Wear gains – FZG A10/16.6R/90

*Accepted test variability is ± 1 load stage

Oil	Load stage*	Torque / Nm	Weight loss / mg
Group IV	7	183.4	160
20% Ester in Group IV (PAO)	6	135.5	27
20% Ester + 5% traction reducer in Group IV	9	302	71
Group V ester blend	6	135.5	35

- A10/16.6R/90
 - Harsher modification of ASTM D5182
 - Thinner gear teeth = higher contact pressure
 - Reverse mode
- Traction reducer **improves FZG rating by 2 stages** – SAPS free additive
 - Made from Carbon, Hydrogen, Oxygen only
- **No adverse effect** of esters

Other considerations



**Climate neutrality &
decarbonisation**
(Scope 1, 2 & 3)



**Product carbon
footprint**
(raw materials, supply chain)



**Product carbon
handprint**
(Performance and benefits in-use)



Maximising sustainability across the fluid lifecycle



- Intrinsic considerations include **raw materials**, **responsible sourcing** and **processing**



- We strive to increase use of **biobased raw materials** to help drive down carbon footprints



Helping the world *thrive*