What on Earth…

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New Energy World IG
fuel cells & hydrogen for sustainability

VANHOOL

VAN HOOL BREE, BELGIUM
VAN HOOL SCOPJE, MACEDONIA
VAN HOOL LIER, BELGIUM

Bus Range

CNG

Trolley

Fuel cell Electric Hybrid

ExQui.City Hybrid

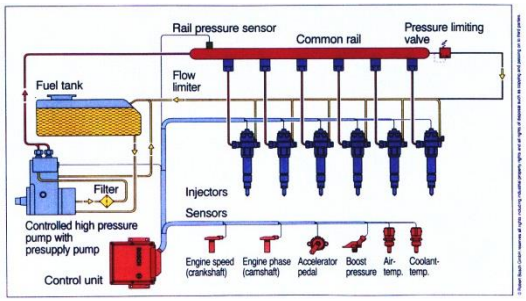
Diesel-electric hybrid

VANHOOL

Turbo

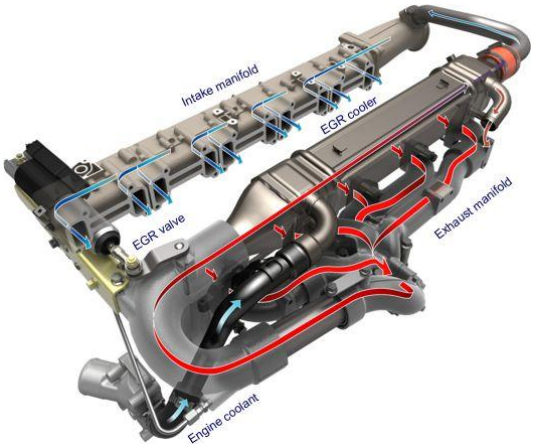
Injection Technologies

- High Pressure
- Common Rail Systems



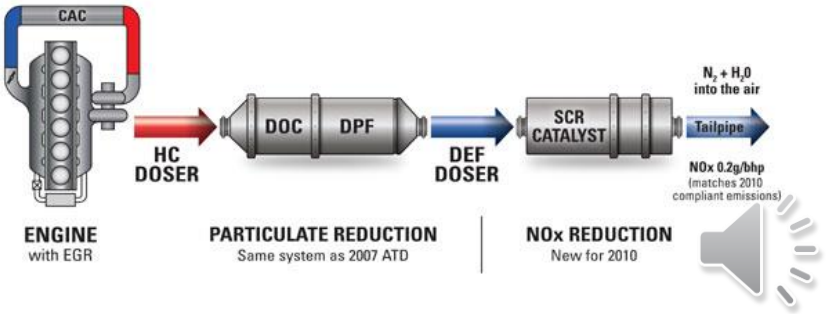
Turbo Intercooling

- Low Flow Cooling (LFC)
- Air Injection (Lufteinblasung)
- EGR (Exhaust Gas Recirculation)
- NT Cooling (Niedertermperatur)

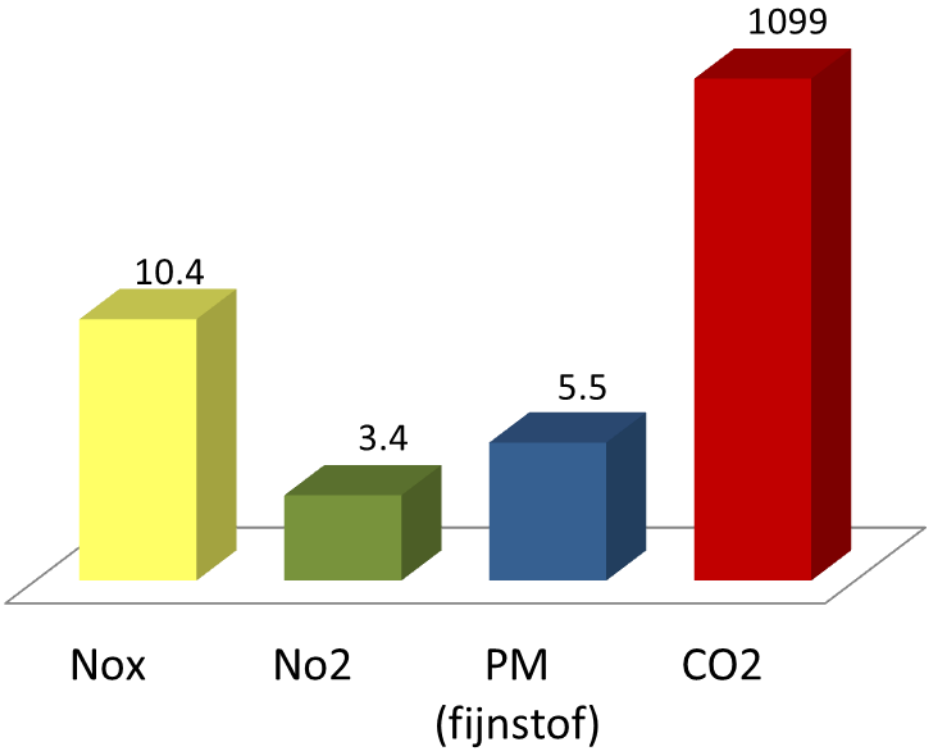


Aftertreatment

- CRT (Continuous Generation Trap)
- DOC (Denox Oxydation Catalyst)
- SCR (Selective Catalytic Reduction
- EGR + SCR + CRT



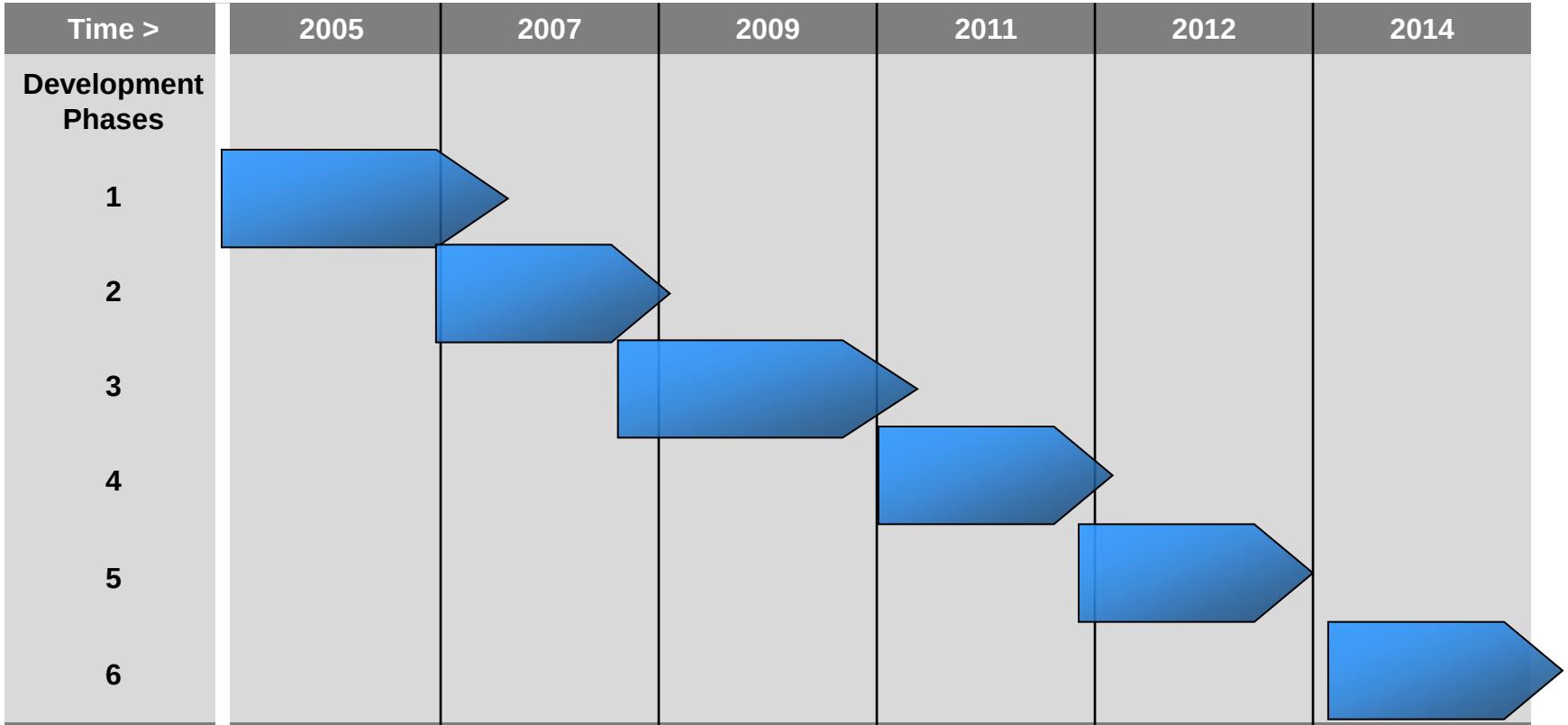
Emissions in Tons – SORT Cycle (800k Km)



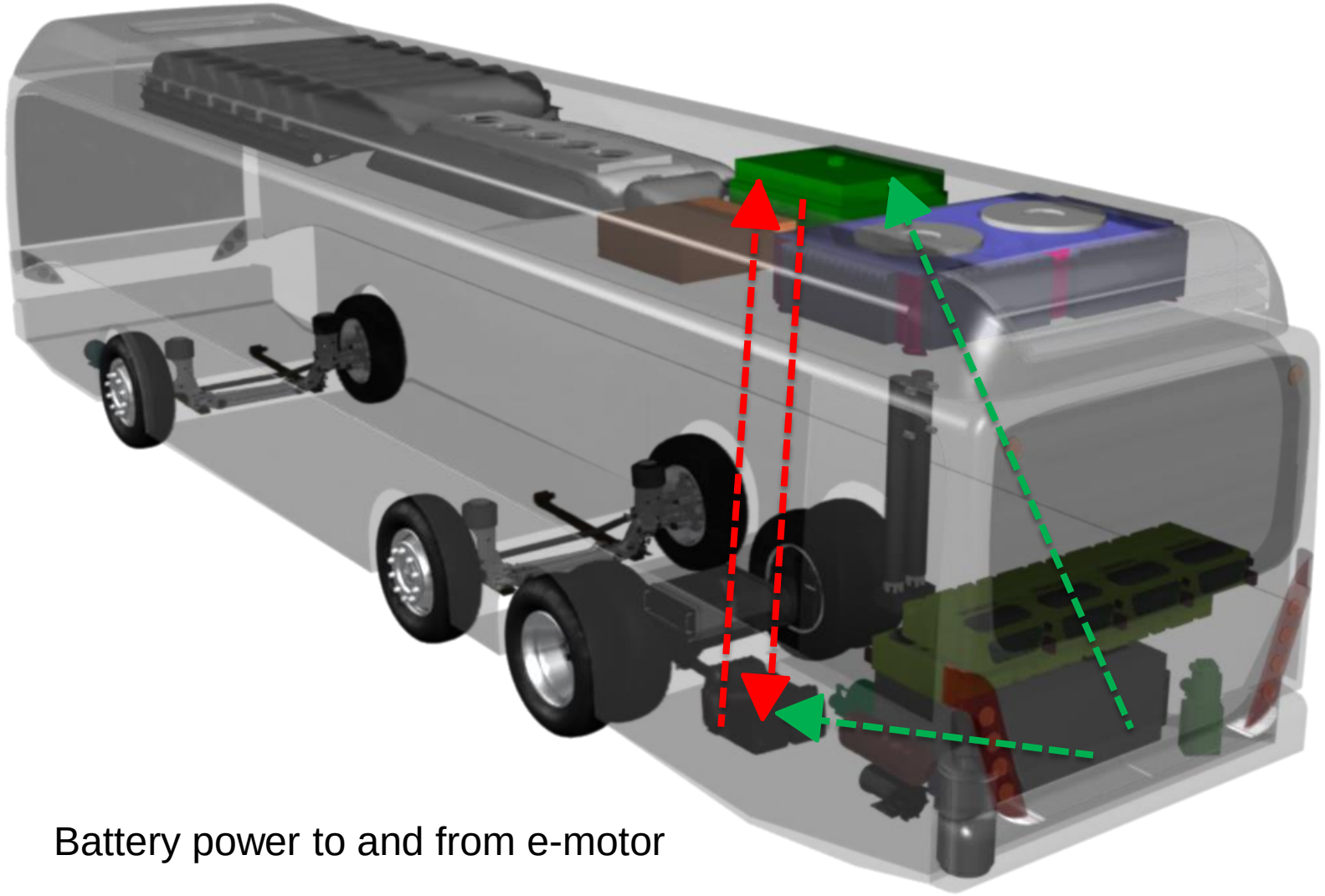
Tilt test 28° – European Whole Vehicle Type Approval

FMEA Study (Failure Mode and Effect Analasys – TÜV)

Hybrid Fuel Cell Buses



Time >	2005	2007	2009	2011	2012	2014
Development Phases						
1						
2						
3						
4						
5						
6						
Number >	5	1	16	1	5	22
FC >	UTC Power 1. gen.	UTC Power 1. gen.	UTC Power 2. gen.	Ballard 6. gen.	Ballard 6. gen.	Ballard 6. gen -
Batteries >	Ni-C-Cl	Ni-M-H	Li-Ion	Li-Ion	Li-Ion	Lithium
Motors >	Elfa I	Elfa I	Elfa II	Elfa II	Elfa II	Elfa II



Battery power to and from e-motor

Fuel cell power to batteries and e-motor

Hybrid bus experience

First Generation 2005

Fuel Cell bus , Golden Gate

5 x CALIFORNIA

2 x 2 GENERATIONS

USA (2 axle)

Europe (3 axle)

10 x ABERDEEN (High VLOCity + HyTransit)

ABERDEEN
CITY COUNCIL

VANHOOL

Fuel cell bus markets

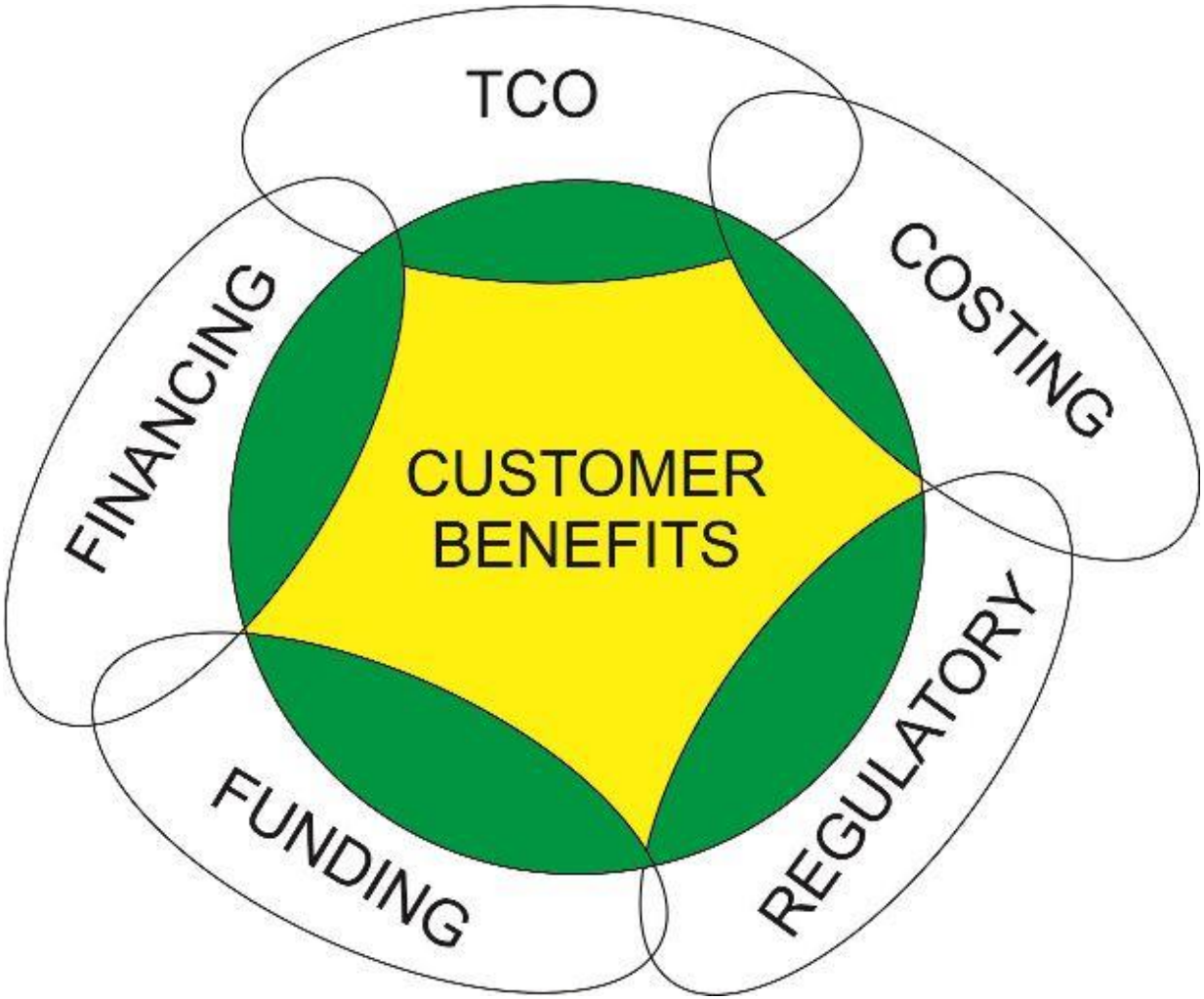
22 x USA

10 x Aberdeen
5 x Oslo
5 x Antwerpen
5 x Sanremo
2 x Cologne
2 x Rotterdam
4 x South Holland
5 x Rome
5 x Cherbourg
2 x TfL London

TOTAL : 70

More to come ! ?

Customer Value Proposition



TO DO LIST

1. For the BUS OEM's
2. For the INFRASTRUCTURE PROVIDERS
3. For the ENERGY PROVIDERS
4. For the OPERATORS
5. For the FUNDING AGENCIES
6. For the REGULATORY BODIES
7. For the POLITICIANS

Thank You

for your attention