

**08
JUNE
2023**



DECARBONISATION
SUSTAINABILITY
DAY

**Bergerat
Monnoyeur**



Eneria 

Decarbonisation & Sustainability Day

Thursday 8th of June 2023

AGENDA SLIDE

Let's talk about hydrogen !



01

Back to School

Some Chemistry

02

Fuelcel

How is it working?

03

EODEV Hydrogen genset

Meet and great

04

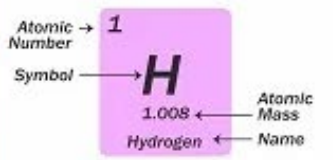
Safety and demonstration

Don't get killed

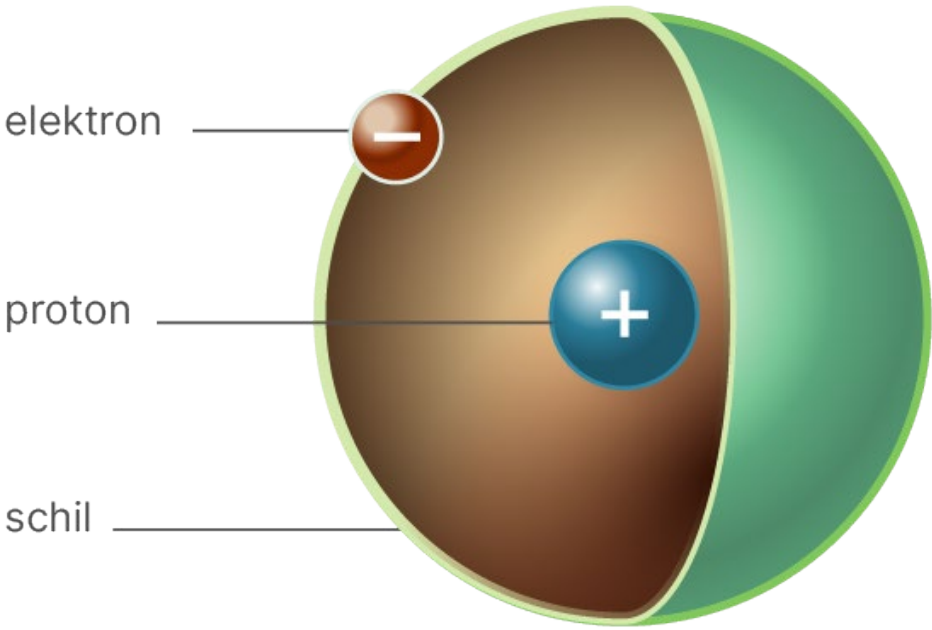
Some Basic Chemistry



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	1 H 1.008 Hydrogen					Metals							Nonmetals						2 He 4.0026 Helium
2	3 Li 6.94 Lithium	4 Be 9.0122 Beryllium				Lanthanide		Actinoids			Other Nonmetal						10 Ne 20.180 Neon		
3	11 Na 22.990 Sodium	12 Mg 24.305 Magnesium				Alkali Metal		Transition Metal			Halogen						18 Ar 39.948 Argon		
4	19 K 39.098 Potassium	20 Ca 40.078 Calcium				Alkaline Earth		Post-Transition Metals			Noble Gas						36 Kr 83.798 Krypton		
5	37 Rb 85.468 Rubidium	38 Sr 87.62 Strontium											31 Ga 69.723 Gallium	32 Ge 72.630 Germanium	33 As 74.922 Arsenic	34 Se 78.971 Selenium	35 Br 79.904 Bromine	36 Kr 83.798 Krypton	
6	55 Cs 132.91 Caesium	56 Ba 137.33 Barium	57 La 138.905 Lanthanum	71 Lu 174.967 Lutetium	72 Hf 178.49 Hafnium	73 Ta 180.95 Tantalum	74 W 183.84 Tungsten	75 Re 186.21 Rhenium	76 Os 190.23 Osmium	77 Ir 192.22 Iridium	78 Pt 195.08 Platinum	79 Au 196.97 Gold	80 Hg 200.59 Mercury	81 Tl 204.38 Thallium	82 Pb 207.2 Lead	83 Bi 208.98 Bismuth	84 Po 209 Polonium	85 At 210 Astatine	86 Rn 222 Radon
7	87 Fr 223 Francium	88 Ra 226 Radium	89 Ac 227 Actinium	103 Lr 260 Lawrencium	104 Rf 261 Rutherfordium	105 Db 262 Dubnium	106 Sg 263 Seaborgium	107 Bh 264 Bohrium	108 Hs 265 Hassium	109 Mt 266 Meitnerium	110 Ds 267 Darmstadtium	111 Rg 268 Roentgenium	112 Cn 269 Copernicium	113 Nh 270 Nihonium	114 Fl 271 Flerovium	115 Mc 272 Moscovium	116 Lv 273 Livermorium	117 Ts 274 Tennessine	118 Og 276 Oganesson



Close Up – Hydrogen Atom & Molecule



Physics Hydrogen

Title

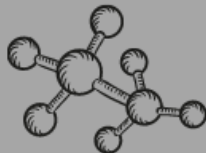
- 1kg H₂ = 11m³ at atmospheric pressure → Compression needed !!
- Boiling point : -253°C (liquid – Gas transition)
- Melting point : -259 °C (solid – liquid transition)
- Energy density: 1 kg H₂ = 4 kg diesel = 16 kWh electricity
- « Never » as a free molecule → has to be produced
 - Color code depending on manufacturing procedure



Grey Hydrogen

Process:
Steam Reforming

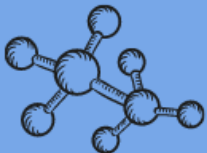
Source:
Natural Gas



Blue Hydrogen

Process:
Steam Reforming
With Carbon Capture


Source:
Natural Gas



Green Hydrogen

Process:
Electrolysis


Source:
Renewable
Energies



Black Hydrogen

Process:
Gasification


Source:
Coal



Pink Hydrogen

Process:
Electrolysis

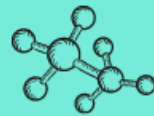
Source:
Nuclear
Energy



Turquoise Hydrogen

Process:
Pyrolysis


Source:
Natural
Gas



Yellow Hydrogen

Process:
Electrolysis

Source:
Solar
Energy



AGENDA SLIDE

Let's talk about hydrogen !



01

Back to School

Some Chemistry

02

Fuelcel

How is it working?

03

EODEV Hydrogen genset

Meet and great

04

Safety and demonstration

Don't get killed

Physics Hydrogen

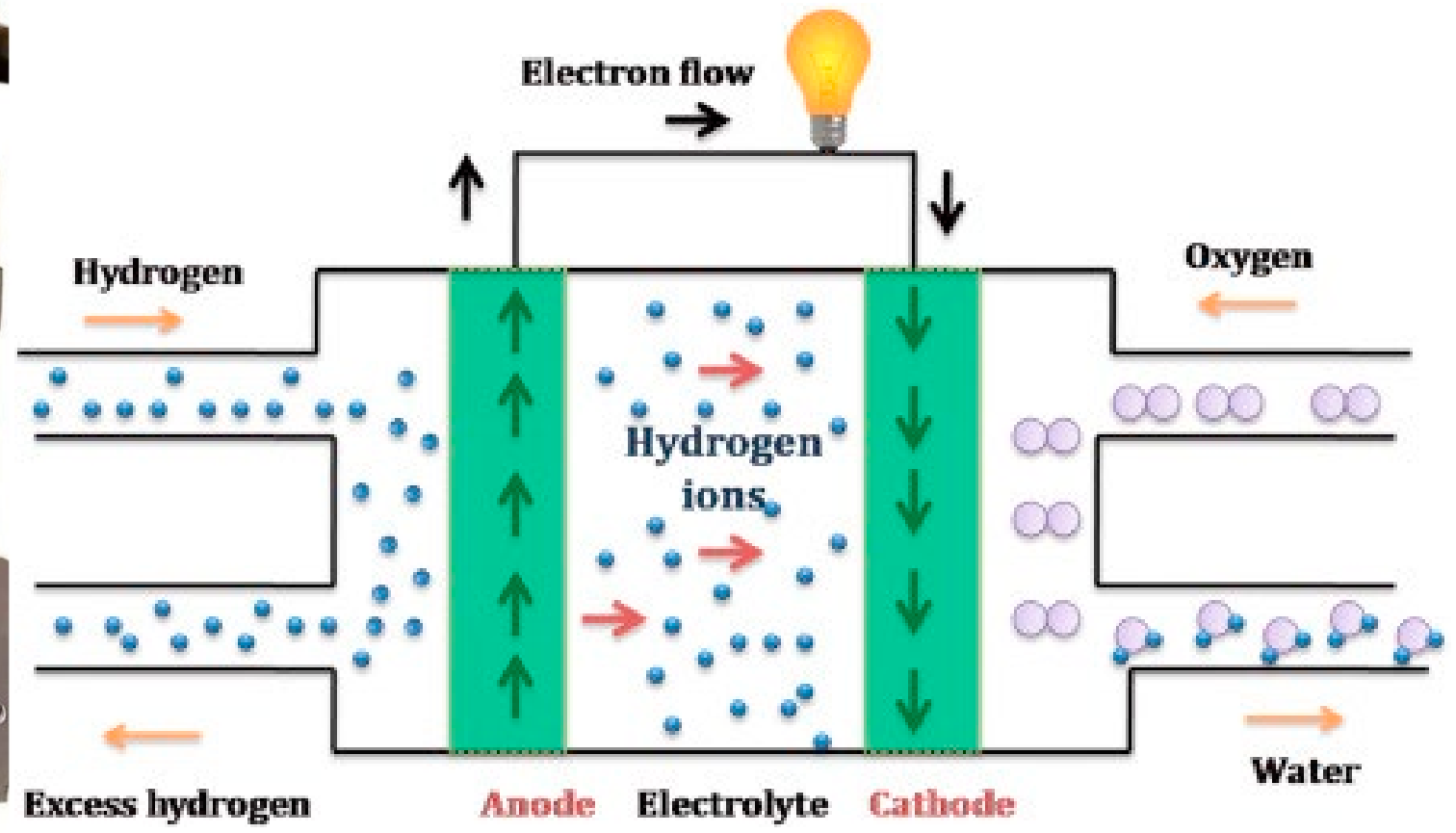
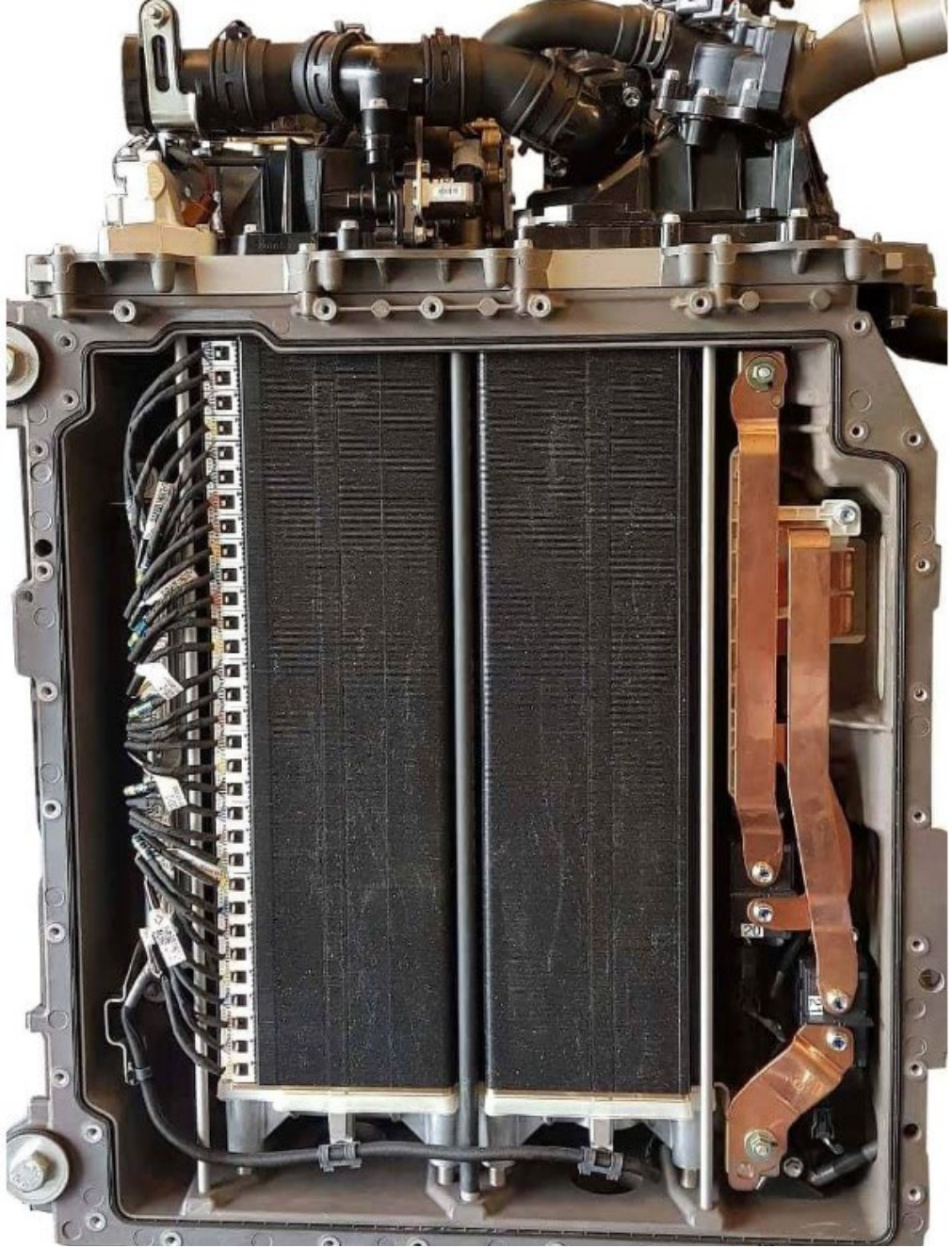
Title

- Fuel cell vs Combustion
- Quiet
- No emissions (except water)
- Fuel cell from Toyota
- 100% green when using green Hydrogen



Fuelcel Working principles

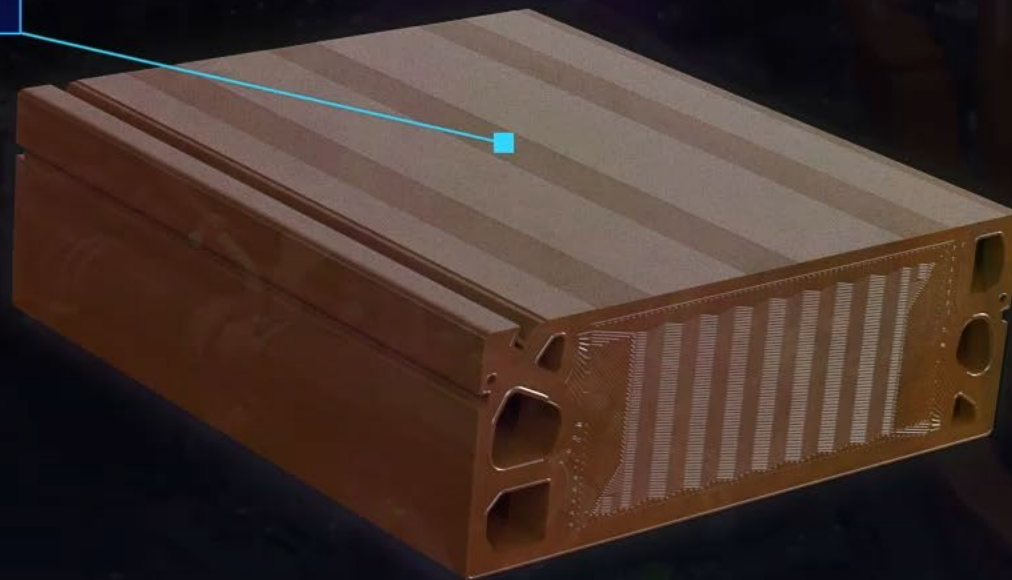
Title



How it works

Hydrogen combines with Oxygen within Fuel Cell

Fuel Cell



Prototype shown. Production model to be introduced in your region and country may vary.



AGENDA SLIDE

Let's talk about hydrogen !

01

Back to School

Some Chemistry

02

Fuelcel

How is it working?

03

EODEV Hydrogen genset

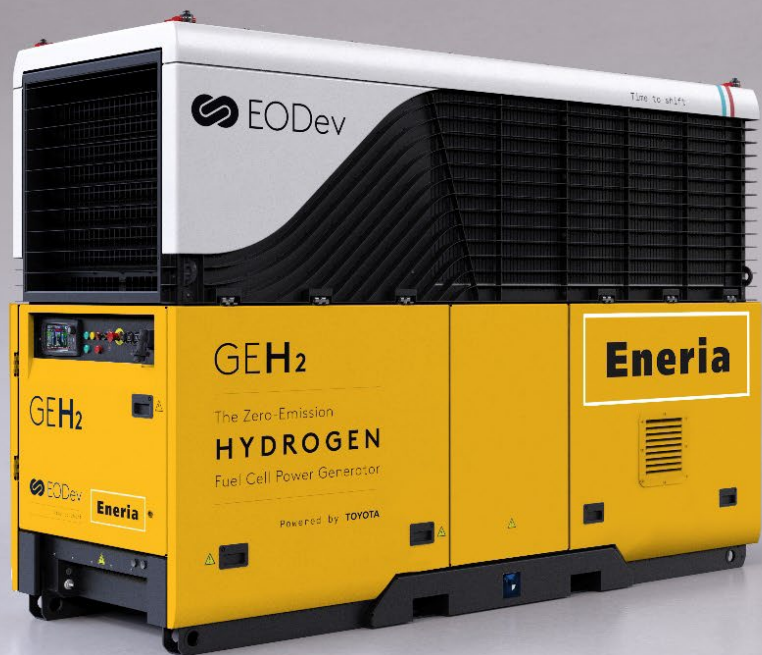
Meet and great

04

Safety and demonstration

Don't get killed

EODev



Shareholders of EODev

TOYOTA

MONNOYEUR

thelem
assurances

ACCOR

Strategic partners of EODev

TOYOTA

EVE
SYSTEM

Eneria

Sales and aftermarket for EODev products

Eneria

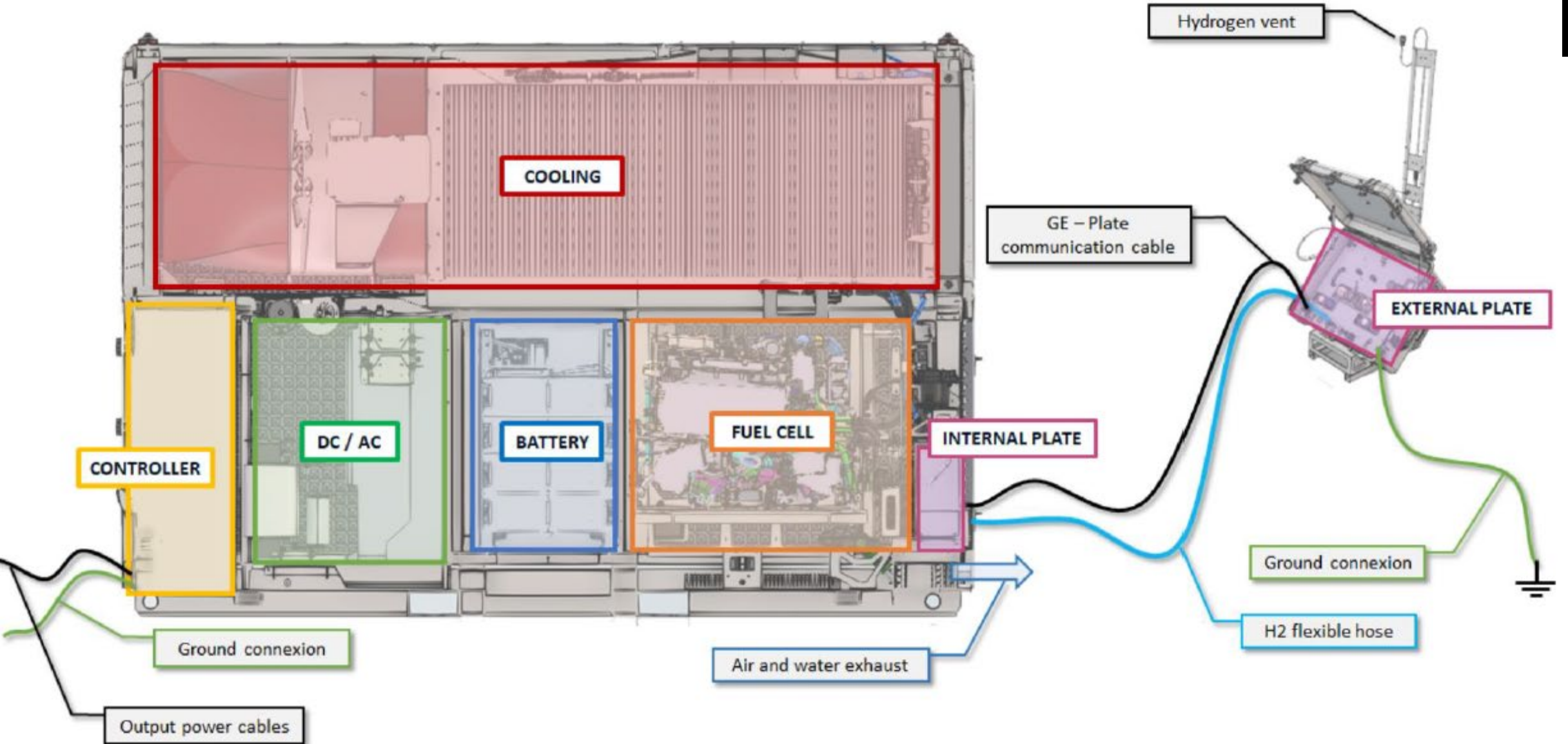
EODEV H2 genset

Title

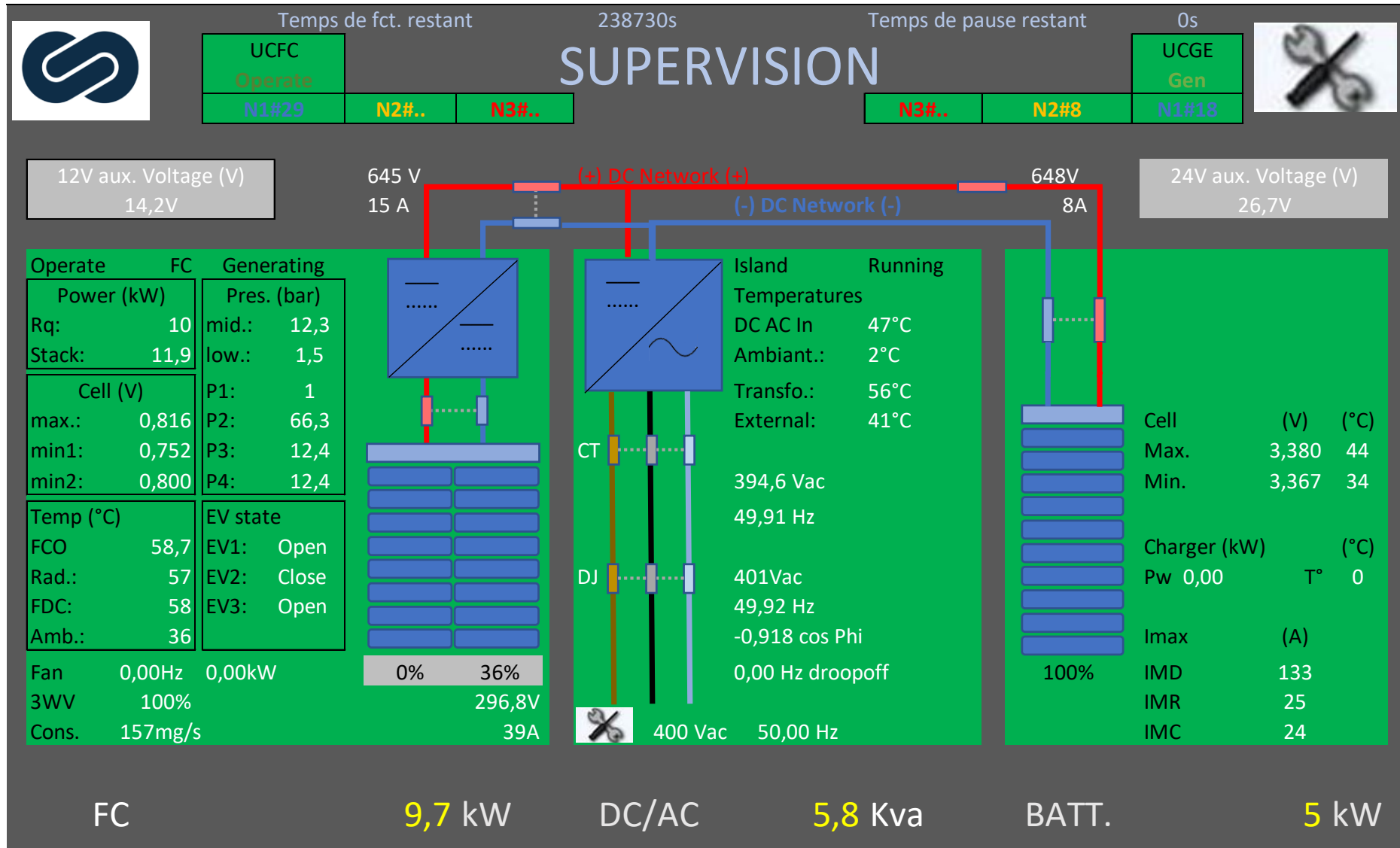
- Prime power 100 kVA
- 230V / 400volt
- Can work parrallel for more power
- Price genset 230.000 € excl vat
- Sales and service through Eneria
- Eneria is shareholder from EoDev
- Hydrogen from Linde or Airliquide (330€ / gasrack 200bar 16 bottles)



Close Up – Genset



Close Up – Genset Control Screen



AGENDA SLIDE

Let's talk about hydrogen !



01

Back to School

Some Chemistry

02

Fuelcel

How is it working?

03

EODEV Hydrogen genset

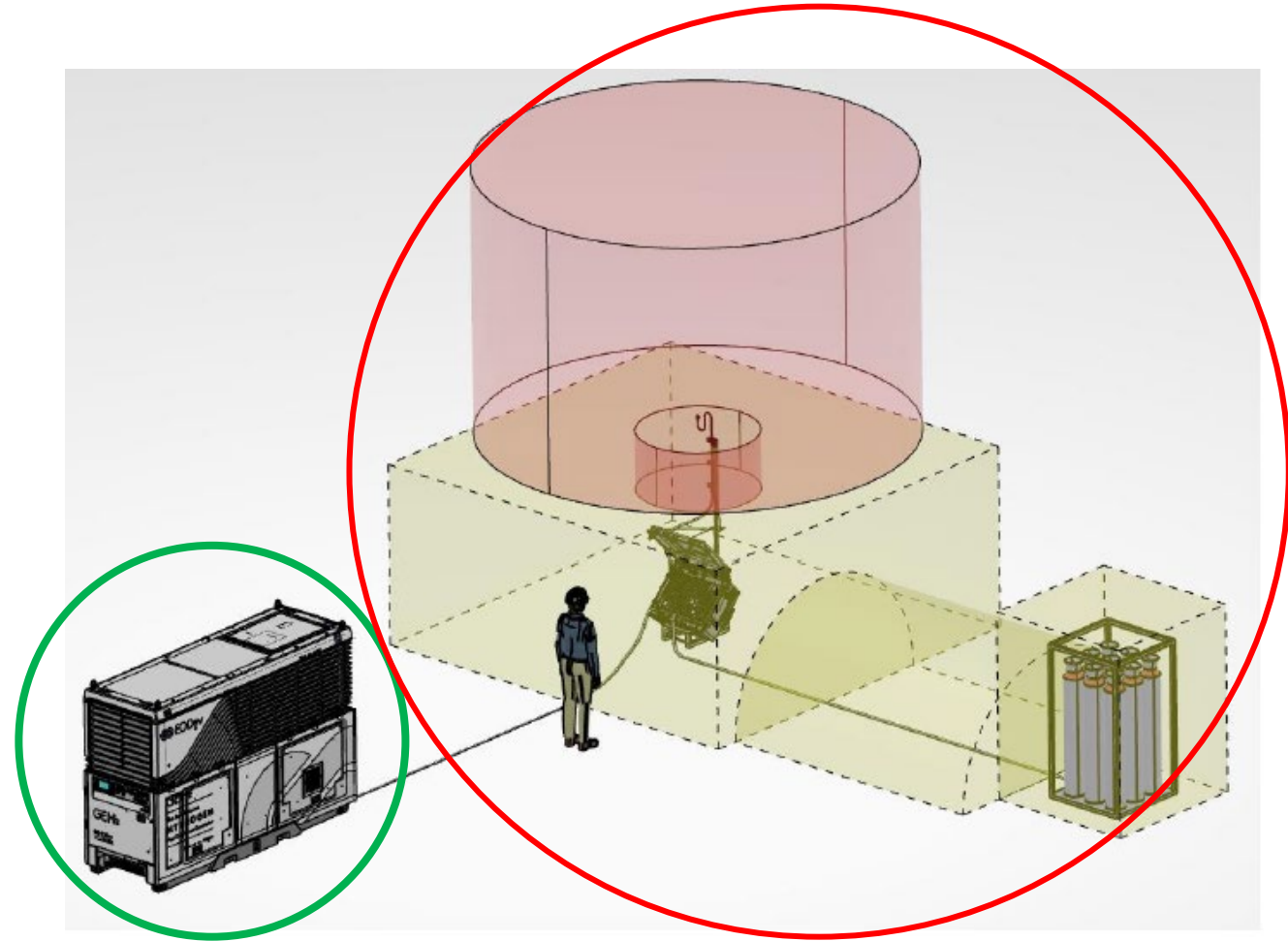
Meet and great

04

Safety and demonstration

Don't get killed

SOME SAY H2 IS DANGEROUS... ATEX ZONE?



Walk around and Demonstration

Title

- Safety briefing / ATEX zone
- 2 Gensets feeding a supercharger station for electric cars

Let's go outside !

