

Green Car Development

Continuous supply of sustainable energy - **Hydrogen**

Who are we?



国 [guó]

is the Chinese word for “Nation” and phonetically in English sounds like the imperative: GO !

际 [jì]

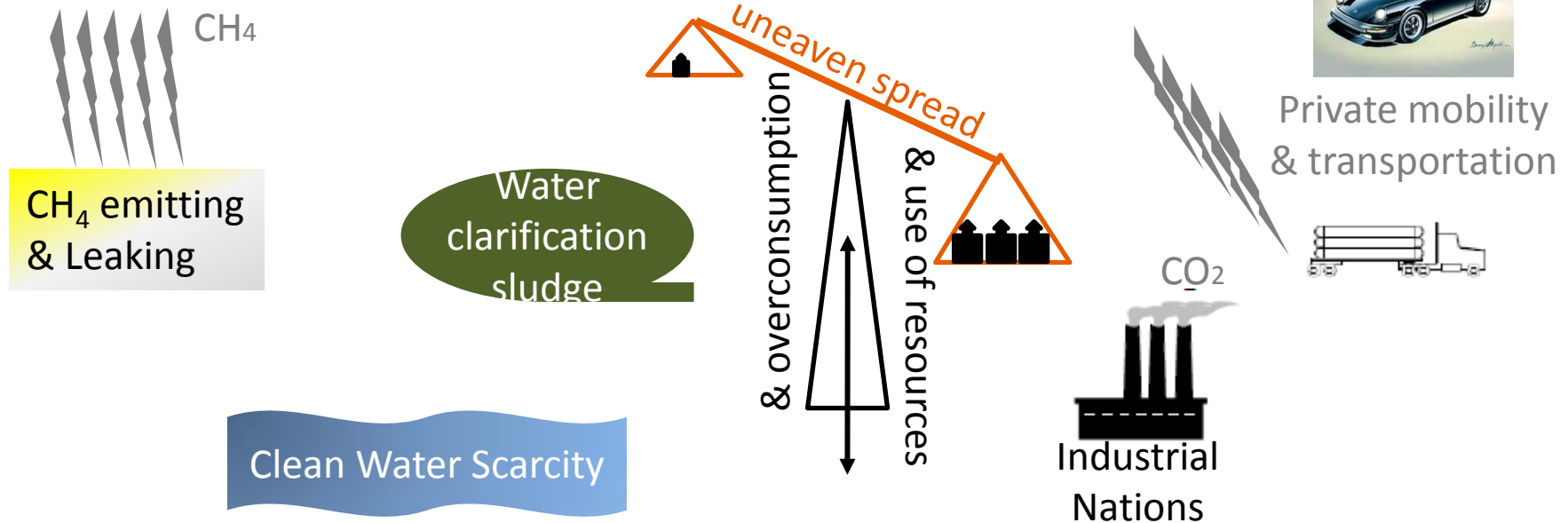
is the Chinese word for “Border”; so we have to cross the border!

- Over 25 years of Business Development on **Thermo Management Solutions and Temperature managed processes**,
- More than 10 years of **nano carbon** fabrication experience and application co-development with industrial and scientific partners and
- Extensive working experience in Europe, USA, Hong Kong, China, Malaysia and Australia

Modern Societies major Challenges

how to break-up the vicious circles ?

Potential Climate Change



Electric Vehicles [EV] remarkable milestone



Ferdinand Porsche's „Semper Vivus“ Horseless Carriage design

1898

1970

1997

2004

2007

2010



Toyota Prius went on sale in Japan and making it the first mass-produced hybrid vehicle



Geneva Motor Show, Ferrari unveiled a hybrid version of their flagship 599



NASA's Lunar Rover for the Moon's mission



first highway-capable EV in serial production, and sale in 2008



H₂ vehicle uses a fuel cell to produce electricity

Is your “Green car” really green ?

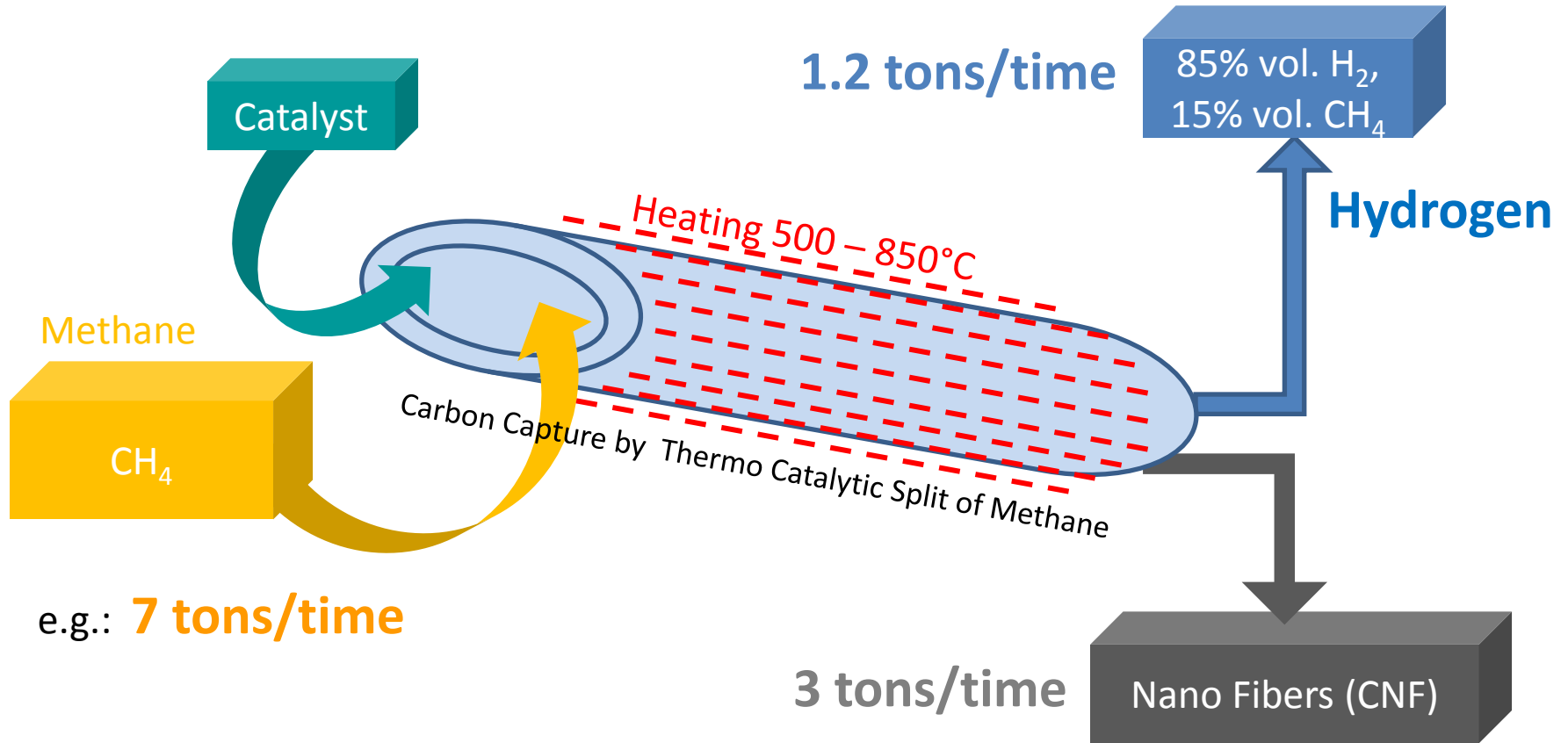
In 100 km driving comparison

	Gasoline V	HEV	FCV	BEV
Powertrain	Gasoline	Hybrid	H-Fuel cell	Li ⁺ Battery (24kWh/90kW)
Engine/Motor	115hp(86kW)	98hp(73kW)@5000rpm 84hp (63kW)@1200rpm	134hp(100kW) @3000rpm	110hp (80kW)
Energy consumption (100km)	9.12L gasoline	4.74L gasoline	1.11kg H ₂	21.28kWh
Fuel Cost/100km	HK\$145.9 ^a	HK\$75.8	HK\$39.0 ^b	HK\$63.8 ^c
Total Fuel Cost over lifetime ^d	HK\$291,800	HK\$151,600	HK\$78,000	HK\$127,600
CO ₂ (kg) /100km	21.2kg	11kg ^e	31.87kg	9.40kg

a) assume gasoline price: HK\$16/L ; b) US\$4.5/kg ; c) HK\$3/kWh; d) 200,000 km equivalence; e) electricity feed to grid

Innovation and novelty

Continuous Chemical Vapor Deposition (Patented)



Our perspective



- ❑ Today's direct World Hydrogen Production: **50mill tons (metric) per year** (5千万吨) and 90% from fossil fuel (化石燃料)
- ❑ World fuel consumption for transportation (600 million vehicle) today is requires **150bill gallon (1千5百亿加仑)** of gasoline
→150bill gallon of gasoline could be replaced by **75mill tons (metric) of Hydrogen** (7千5百万吨氢气)
- ❑ **Anthropogenic Methane (人为释放的甲烷)** from landfills, rice farms and palm oil mills, i.e. 450 mill tons could generate **76.5mill tons of Hydrogen**
- ❑ **Get rid of the above three items and regenerate Hydrogen and high grade nanomaterials**

Is your “Green car” really green ?

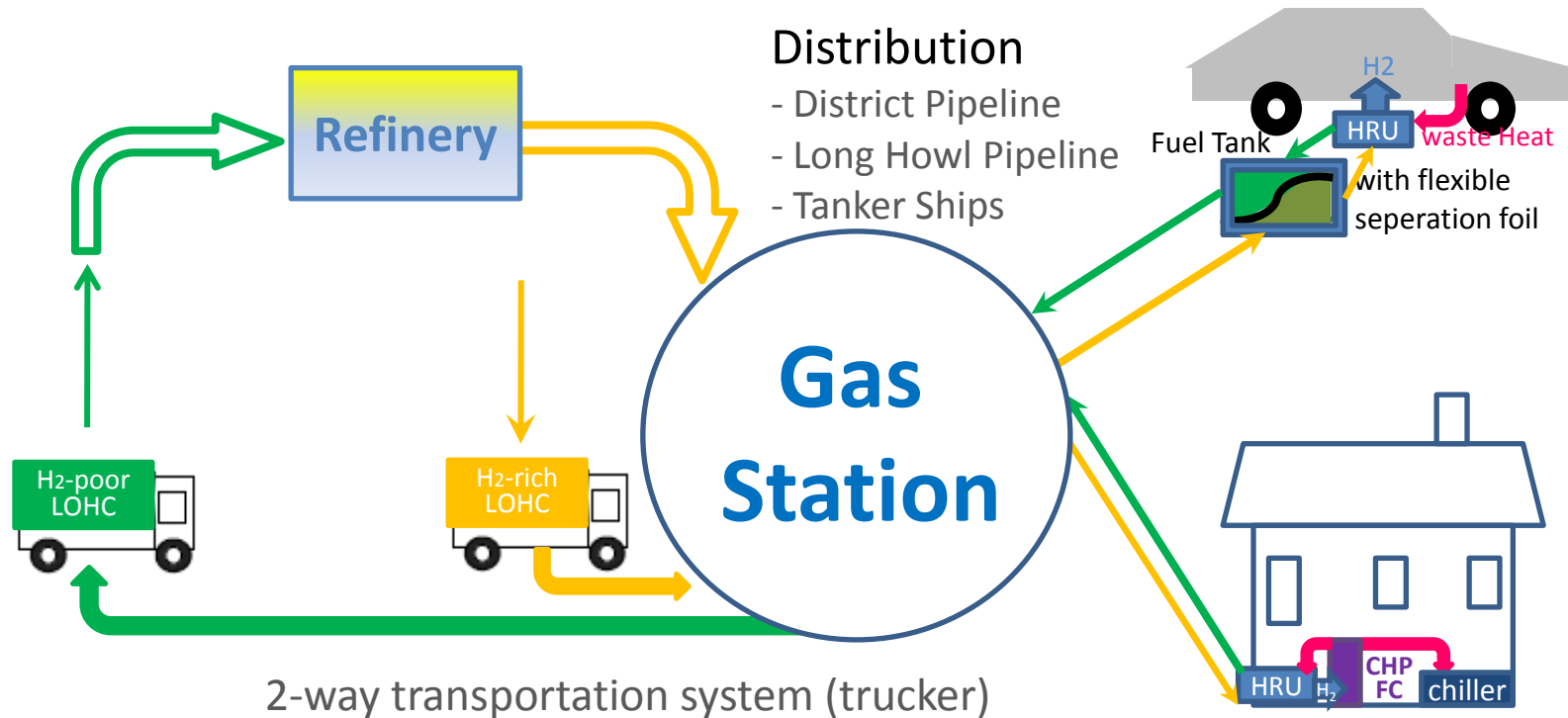
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Innovation and novelty

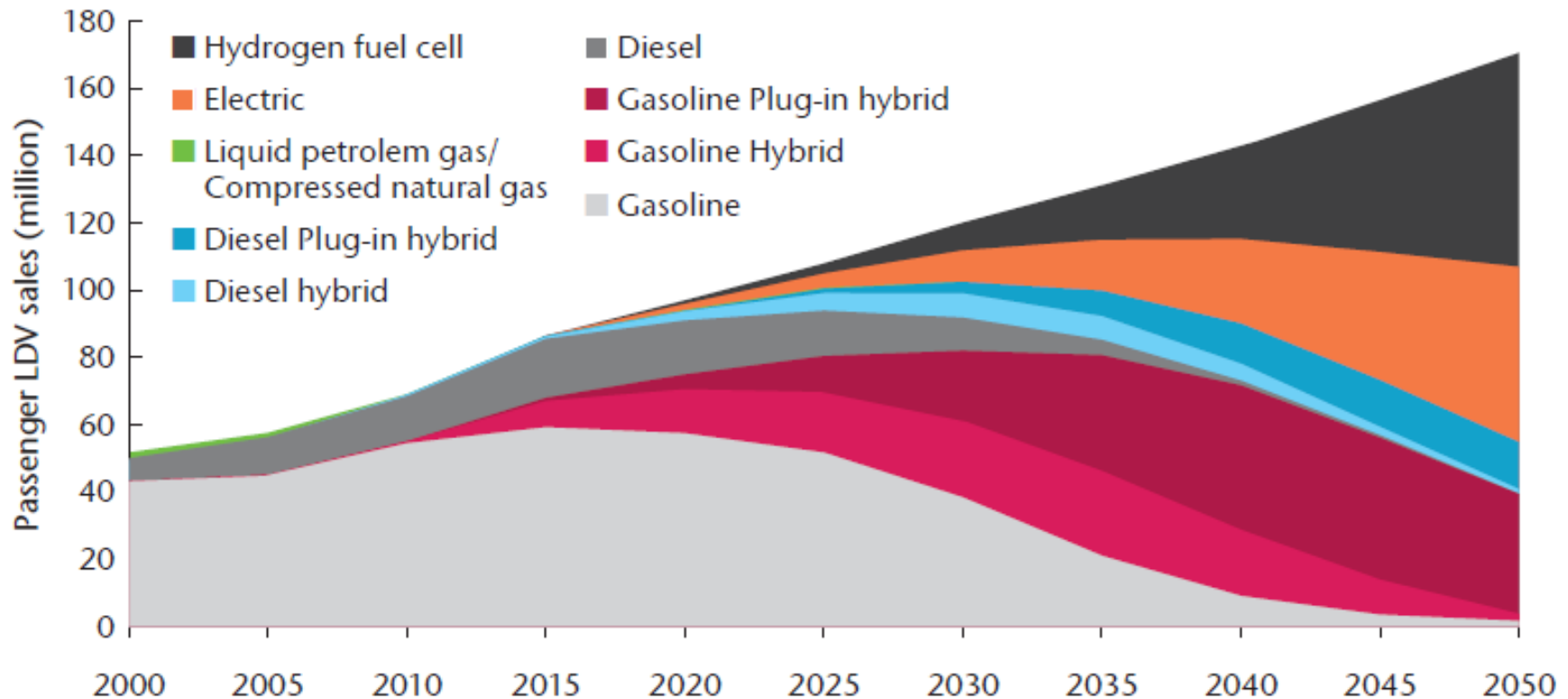
Update on novel Hydrogen Technologies at proven concept stage



- Japan and California are putting LOHC Hydrogen infrastructure into development over the next few years, i.e. HySUT Program

Worth an Initiative

Figure 2: Annual light-duty vehicle sales by technology type, BLUE Map scenario



“The future is something that most of the time already happens before we anticipate it”

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