EICS, October 5, 2023
RPF-24-23
Delegate presentation from Jim Thomson

Green Fleet Strategy

RPF-24-23

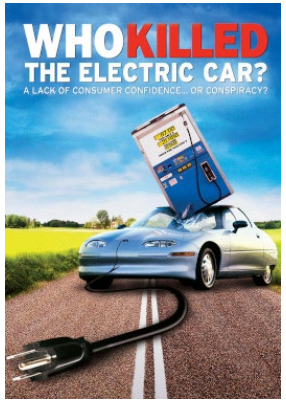
To : EICS Committee

October 05, 2023

The Time Frame is Too Long.

- The time for study is over it’s time to take action.

For a livable climate:
Net-zero commitments must be backed by credible action



In The 1990's The EV1 had a Range of< 100 mi

Hydrogen fuel cell vs battery electric cars

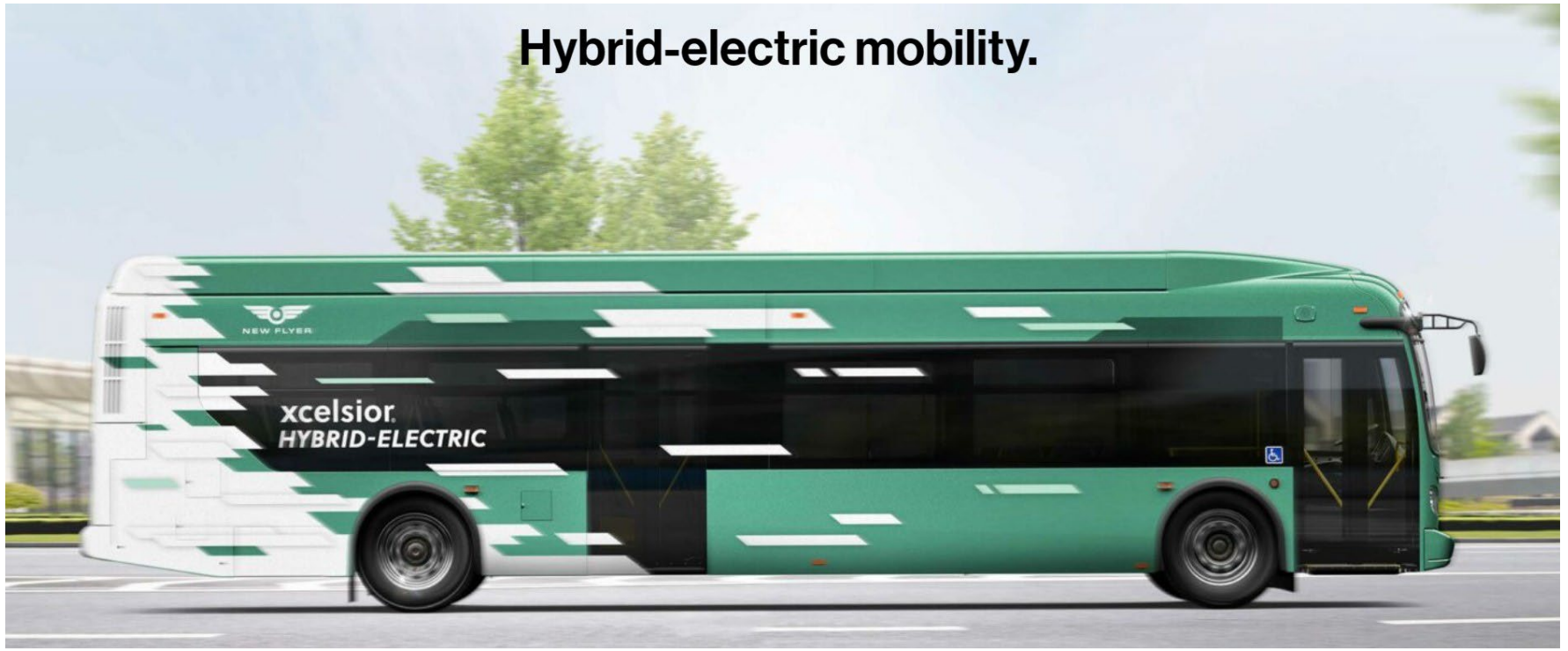
Liebreich Associates

	Tesla Model 3 Long Range AWD	Toyota Mirai 2
		
Price	$46,900	$49,500/ $66,000
Curb weight	1,844 kg	1,930 kg
Range	353 miles	402 miles
Number of seats	5	5
Luggage/cargo space (cubic feet)	15 ft^3 (~43 ft^3 with seats down)	9.6 ft^3 (seats don't fold down)
Acceleration 0-60mph, top speed	4.2 seconds, 145 mph	9.0 seconds, 111mph
Refuel time, petrol station	250 miles (10%-80%): 20 minutes	402 miles: 5 minutes
Refuel time, home, office, mall	< 1 minute to plug in	Not possible
Drive train moving parts	17	> 200
Wind-to-wheel efficiency	> 61%	< 32 %

Images: Tesla; Toyota; Source: Liebreich Associates

Buses Hybrid

Toronto 2022 336 no more after 2024.



Buses BEV

- Toronto up to 1162

Diesel Conversion

MTB ZEV Clean Power demonstration bus (left) and Milton Transit bus 1701, Canada's first diesel to electric conversion in front of the Milton Velodrome prior to conversion.

Fire Truck in Service in LA

Fire Trucks Toronto and Varennes

Heavy Duty BEV used by Pepsi Range up to 450 miles.

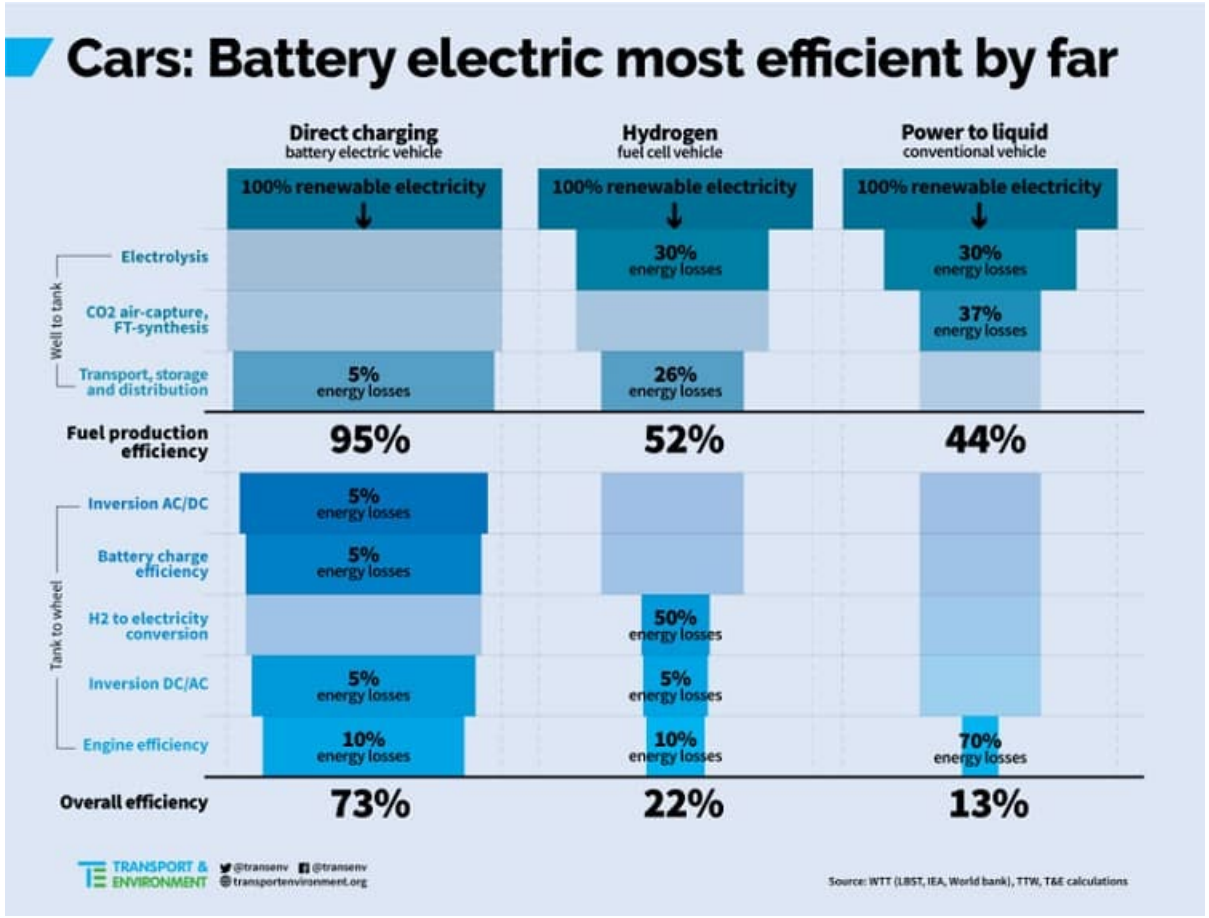
Cummins Introduces Diesel, Hybrid-Electric Innovations

Cummins PowerDrive hybrid truck. (Cummins)

Edison Motors Hybrid Truck

Chace Barber of Edison Motors stands with the company's hybrid truck, in Toronto, on Sept. 27. He says the hybrid electric truck can operate for 12 hours using one tenth of the fossil fuels compared to motored trucks and, aside from the compressor and the brakes, the truck is completely silent.

Fuel Cells = Fool Sells Elon Musk



Clean Hydrogen Swiss Army Knife

Liebreich Associates

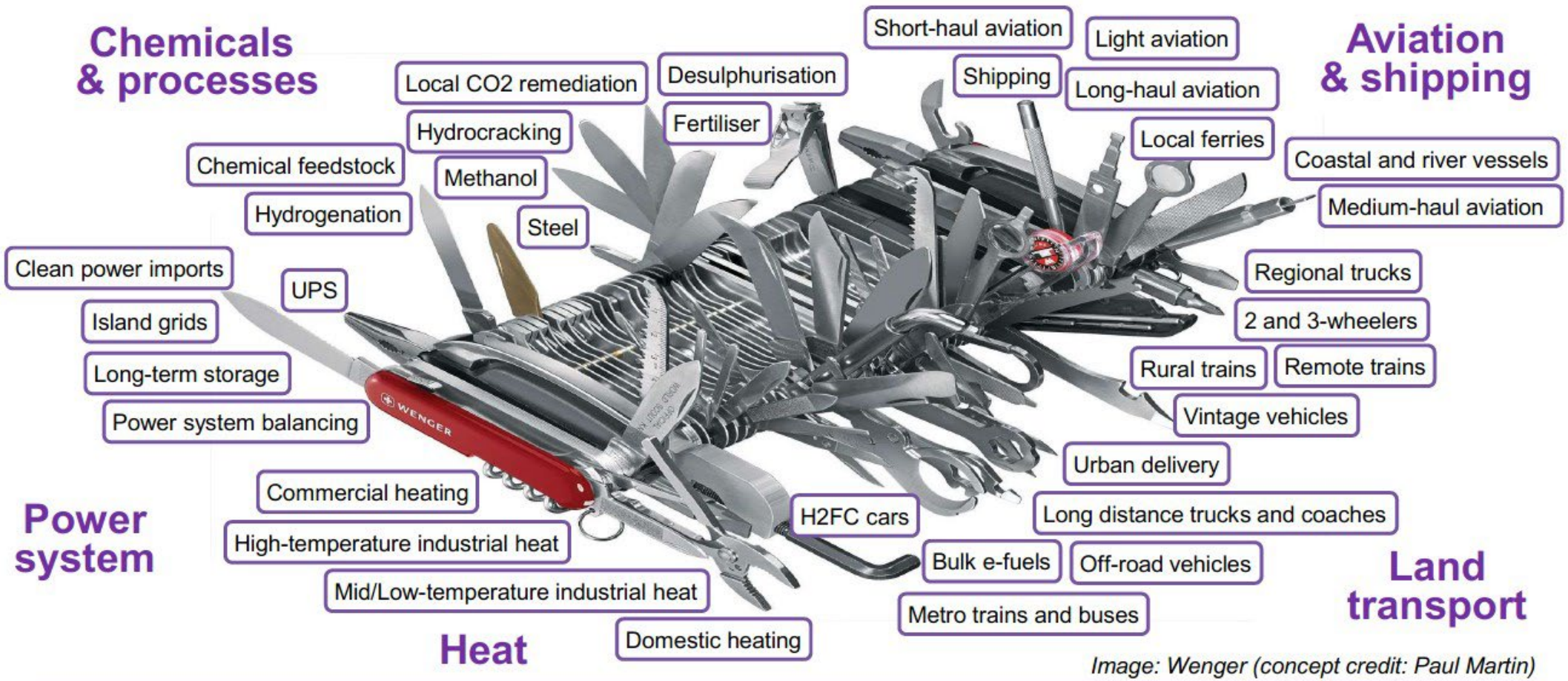
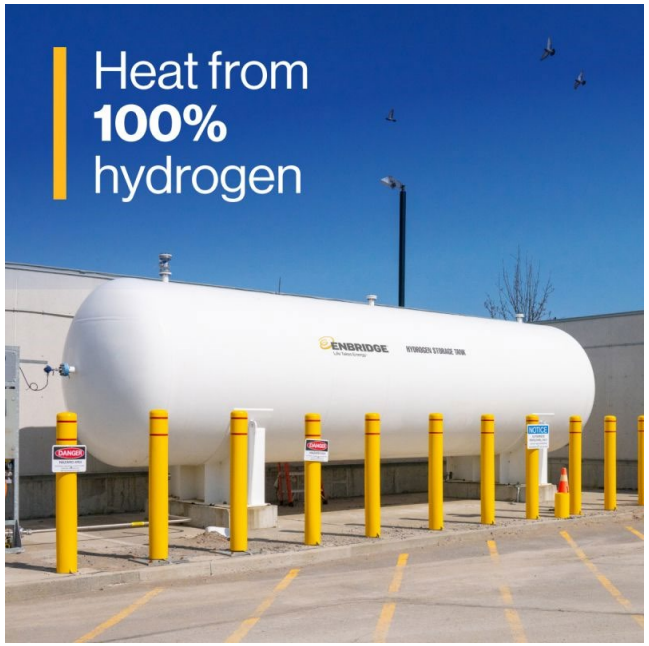


Image: Wenger (concept credit: Paul Martin)

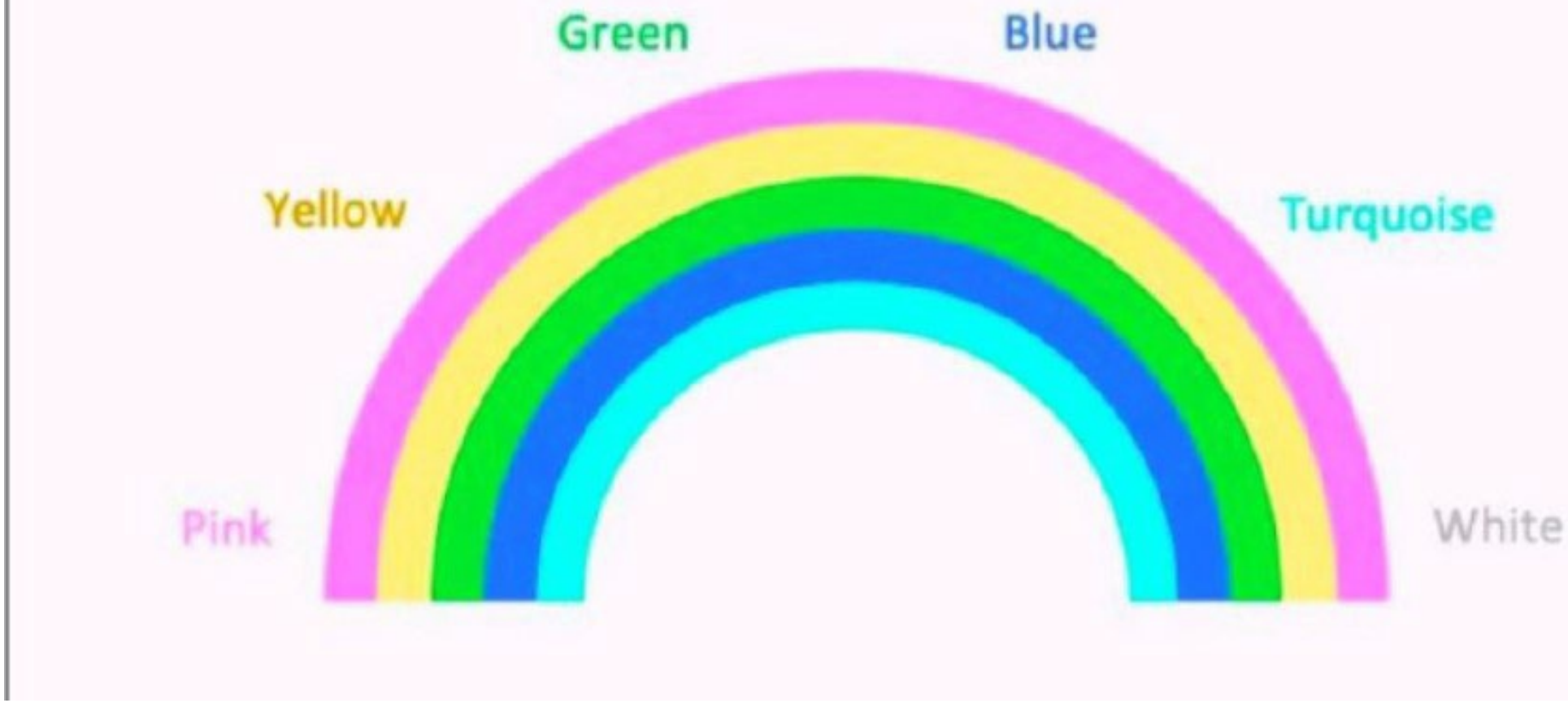
Green Washing by Big Oil and Gas
The Hydrogen Fall Campaign



Edmonton H2 Bus Alberta Produces 2.5MT

Hydrogen hype

A rainbow of low emissions possibilities



THE COLORS OF HYDROGEN

GREEN

Hydrogen produced by electrolysis of water, using electricity from renewable sources like wind or solar. Zero CO_2 emissions are produced.

BLUE

Hydrogen produced from fossil fuels (i.e., grey, black, or brown hydrogen) where CO_2 is captured and either stored or repurposed.

GREY

Hydrogen extracted from natural gas using steam-methane reforming. This is the most common form of hydrogen production in the world today.

PURPLE/PINK

Hydrogen produced by electrolysis using nuclear power.

TURQUOISE

Hydrogen produced by thermal splitting of methane (methane pyrolysis). Instead of CO_2, solid carbon is produced.

BROWN/BLACK

Hydrogen extracted from coal using gasification.

YELLOW

Hydrogen produced by electrolysis using grid electricity from various sources (i.e., renewables and fossil fuels).

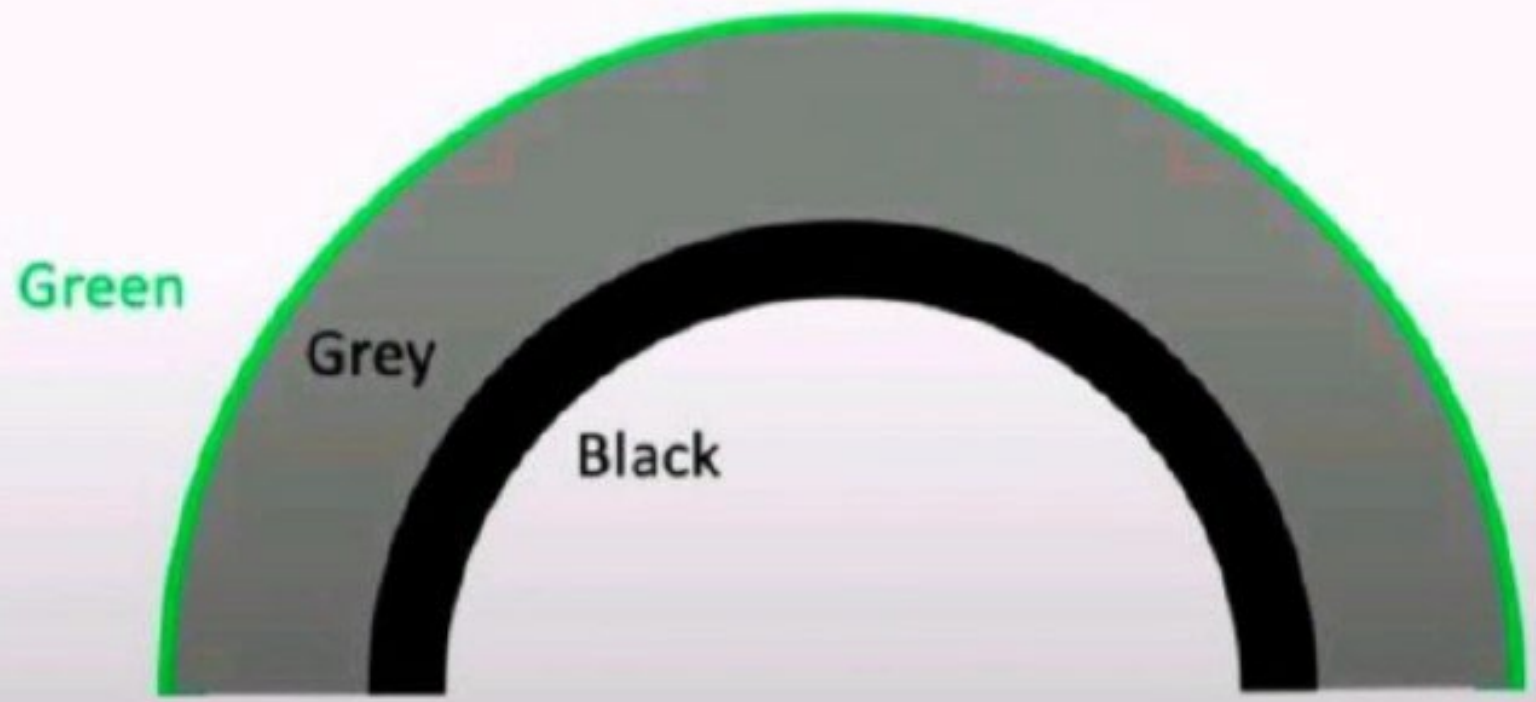
WHITE

Hydrogen produced as a byproduct of industrial processes. Also refers to hydrogen occurring in its (rare) natural form.

Applied Economics Clinic

Hydrogen reality

How hydrogen is actually made



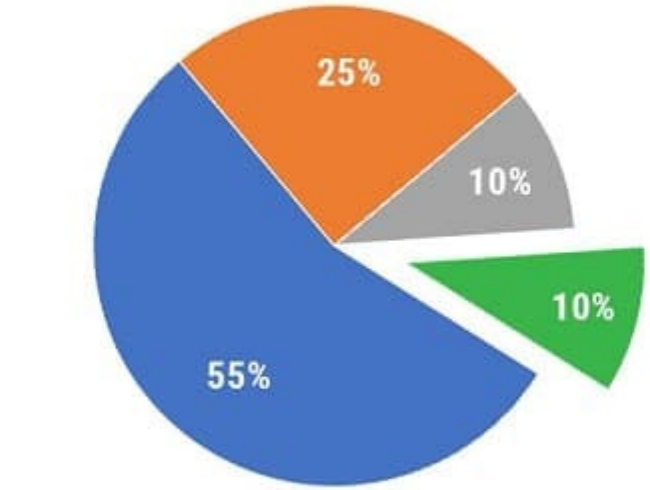
Sources: Liebreich Associates, IEA

@gavinmooney

87 Million Tonnes Produced in 2020
Less than 1% Green

Petroleum Refining
25%

Ammonia Production
55%



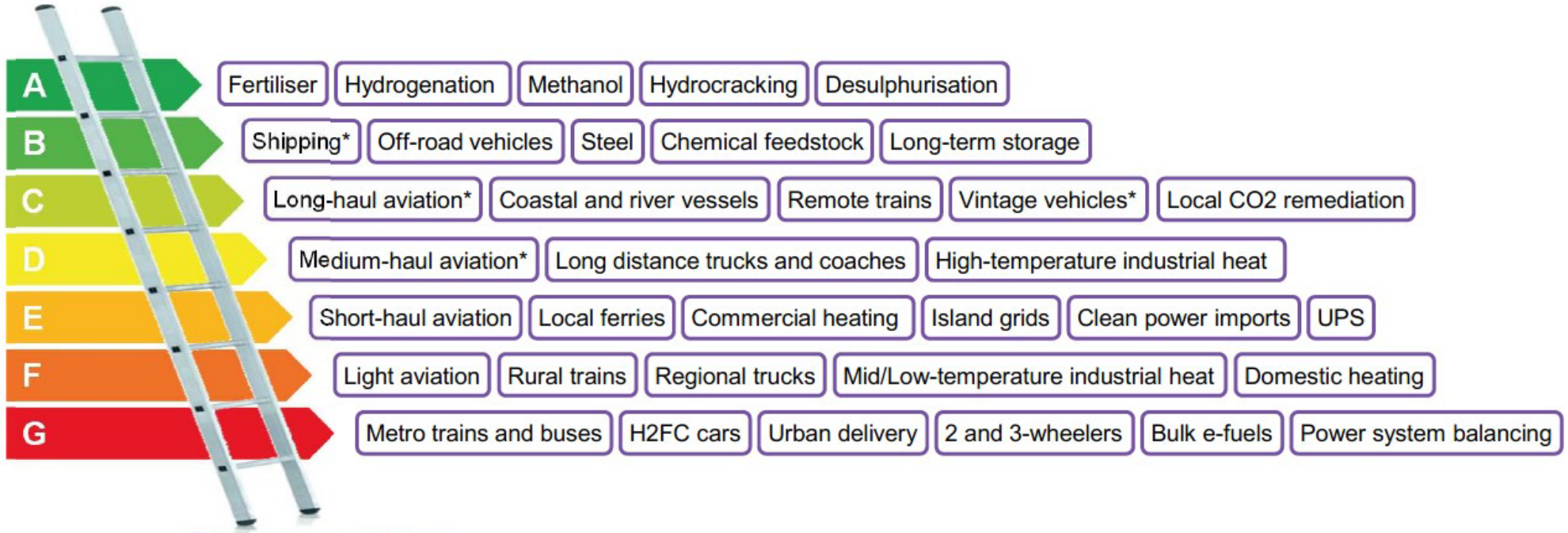
Methanol Production
10%

Other
10%

Clean Hydrogen Ladder

Liebreich Associates

Unavoidable



Uncompetitive

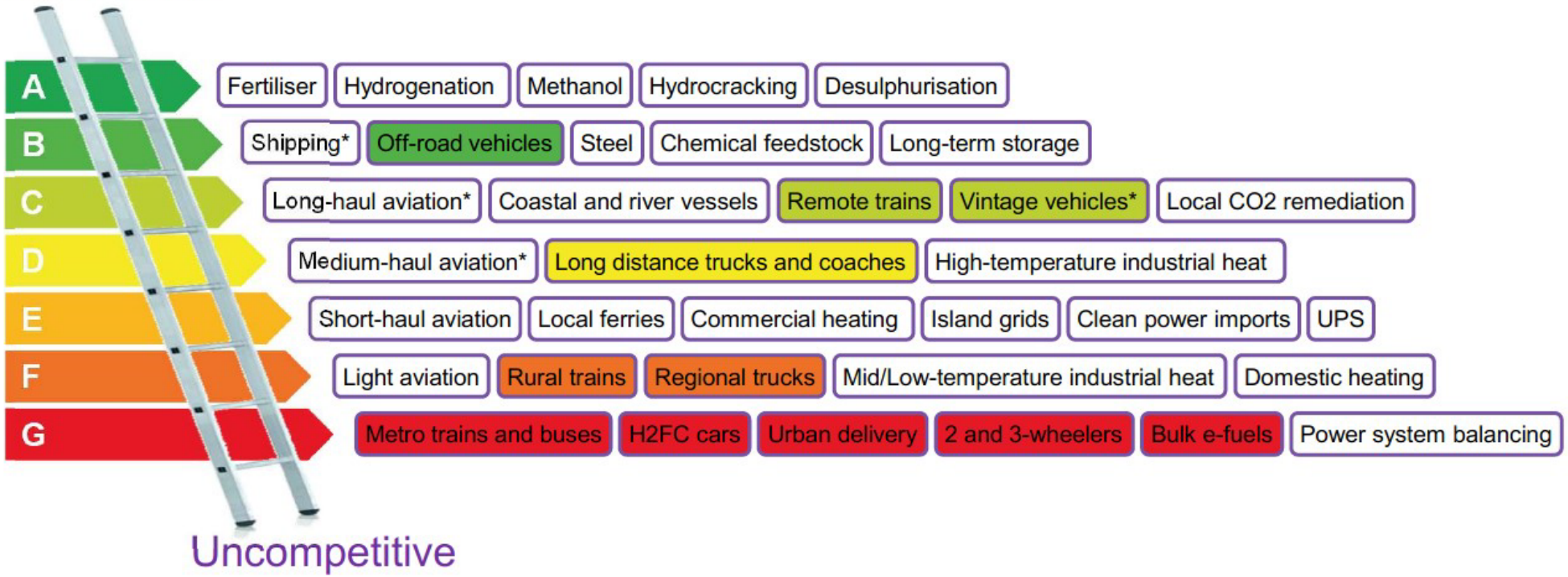
** Via ammonia or e-fuel rather than H2 gas or liquid*

Source: Liebreich Associates (concept credit: Adrian Hiel/Energy Cities)

Clean Hydrogen Ladder: Land transportation

Liebreich Associates

Unavoidable



Uncompetitive

** Via ammonia or e-fuel rather than H2 gas or liquid*

Source: Liebreich Associates (concept credit: Adrian Hiel/Energy Cities)

Conclusion

- Council should be directing a switch to hybrid-electric for all vehicles ASAP
- BEV is preferable where it is available eg. Buses
- Reduction now is better than 20 years from now.
- Hydrogen shouldn’t be considered at all. The infrastructure doesn’t exist and won’t for many years.
- Consider that the Hydrogen Trains in Saxony shut down after 1 year of operation and that Shell is shutting their Hydrogen Fueling stations in California.