



# System Integration Aspects and GenCell's Technology Approach

February 2022

Jan-Hendrik ERNST



**100% ZERO CO<sub>2</sub> EMISSIONS ENERGY WITH PROVEN HYDROGEN TECHNOLOGY**



# ENABLING ALKALINE FUEL CELLS TECHNOLOGY ACCESSIBLE TO ALL



## A BRIEF HISTORY OF FUEL CELLS

1839

Invention of the first fuel cell by William Grove



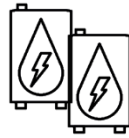
1889

The term "Fuel Cell" set by Ludwig Mond and Carl Langer

**Fuel Cell**

1932

The first fuel cell to operate using alkaline electrolyte and low-cost nickel electrodes



1958

Improvements and inventions in the field of fuel cells by Pratt & Whitney and others



1965-2020

First commercial use in space programs to provide electricity, heat and water to astronauts, and today, also transportation



2011

GenCell founded to make fuel cell technology accessible to the general public





# Our Company



GenCell (GNCL)  
trades on TASE



>120 employees -  
18 PhDs and veterans  
of NASA and MIR  
space programs



24 Patents  
100s of Trade Secrets  
1,250 man-years R&D



Develops innovative  
Fuel Cell & Green  
Ammonia technology



Reliable and cost-effective backup  
and primary power solutions



Deployed in  
22 countries

## Markets:

Telecom



Utilities



Oil & Gas



EV



Industry



# Demand for Hydrogen & Fuel Cells Soars



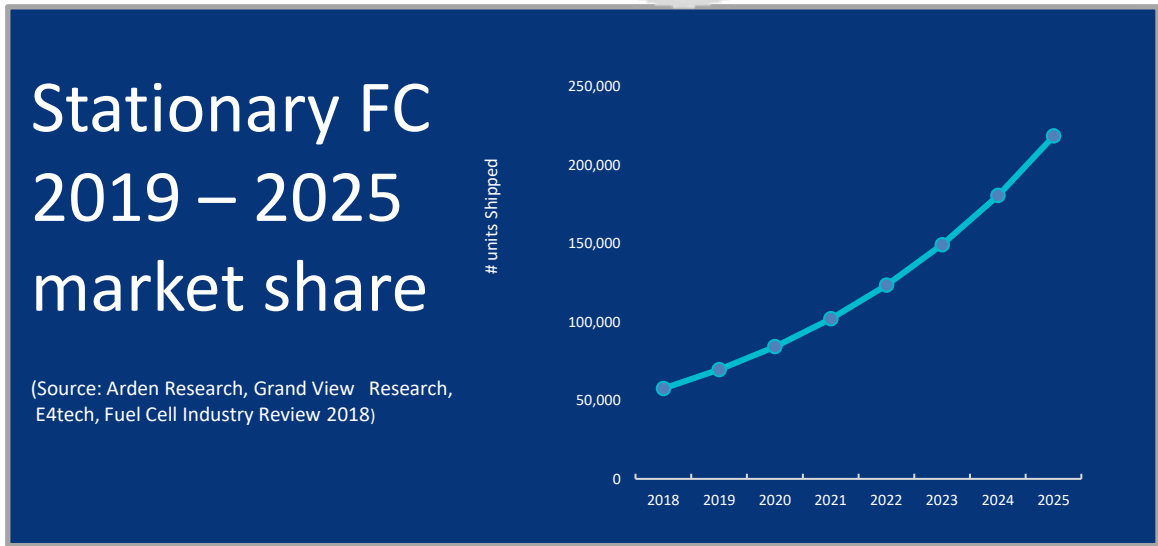
Global fuel cell market  
**15.5% CAGR to  
 US\$33.09 bn  
 by 2027**  
(source: Grand View Research)



Stationary fuel cell market  
**Over 22% CAGR  
 during 2018-2022**  
(source: Technavio)



**HYDROGEN**  
**18%**  
 of final energy demand by 2050  
**550m tons**  
 annual increase in H<sub>2</sub> demand  
**\$2.5 trillion**  
 of industry revenues globally  
(Source: Hydrogen Council)



- €7 Billion
- €2 Billion
- \$19.2 Billion
- ITC Tax Benefits

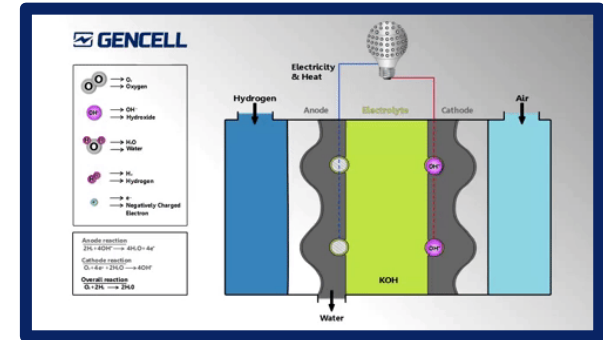
**€750 billion**  
 European Commission recovery  
 fund to support clean hydrogen  
(Source: Energy Industry Review Hydrogen Europe)



# GenCell's Core Technology

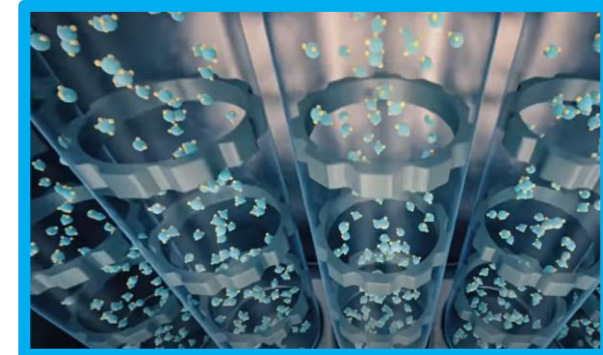
## Hydrogen to Power

- Alkaline fuel cells achieve the **highest electrochemical efficiency** among known fuel cell types
- **Highest resiliency** - resistance to extreme weather conditions
- **Non-noble catalysts** enable cost-efficient fuel cell solutions



## Ammonia to Power

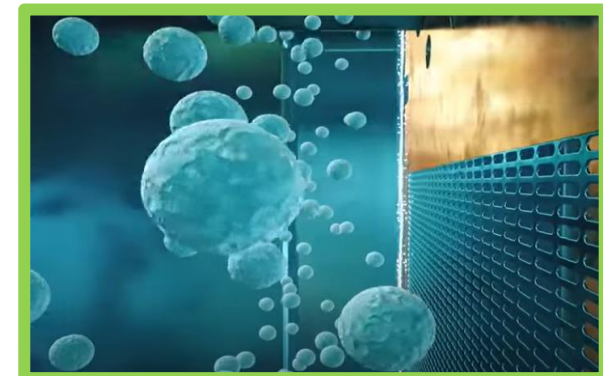
- **Ammonia cracking** - extracts hydrogen from liquid ammonia – a highly efficient carrier, reducing H2 transport & storage costs.
- **Cost effective:** total cost for primary power is 30-50% less than diesel.



## Green Ammonia to Power\*

- **Local and clean production of Ammonia** from sun, air and water
- Zero green-house gas emissions, offering **total green solution**
- **Self-sustained circular economy enabling electrification anywhere**

\* Development stage



# GenCell's Products and Markets



## Hydrogen to Power

## Ammonia to Power

## Green Ammonia to Power



### GenCell BOX™

Long Duration Backup Solution

GenCell core IP, designed for telecom, critical infrastructure, healthcare & EV charging needs



### GenCell G5rx™

Utility Backup Power Solution

Designed to meet substations' energy profiles & safety standards



### GenCell A5™

Off-Grid Power Solution

An independent "nano power plant"  
Designed to replace diesel generators  
More affordable than diesel

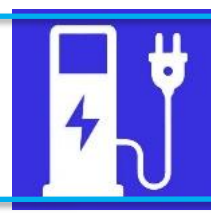
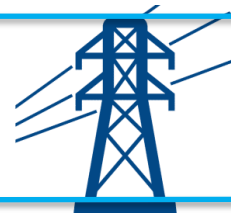


### GenCell Green Fuel

Green Ammonia Generator\*

Designed to synthesize green ammonia at point of consumption, **enabling green energy everywhere**

\* In development stage

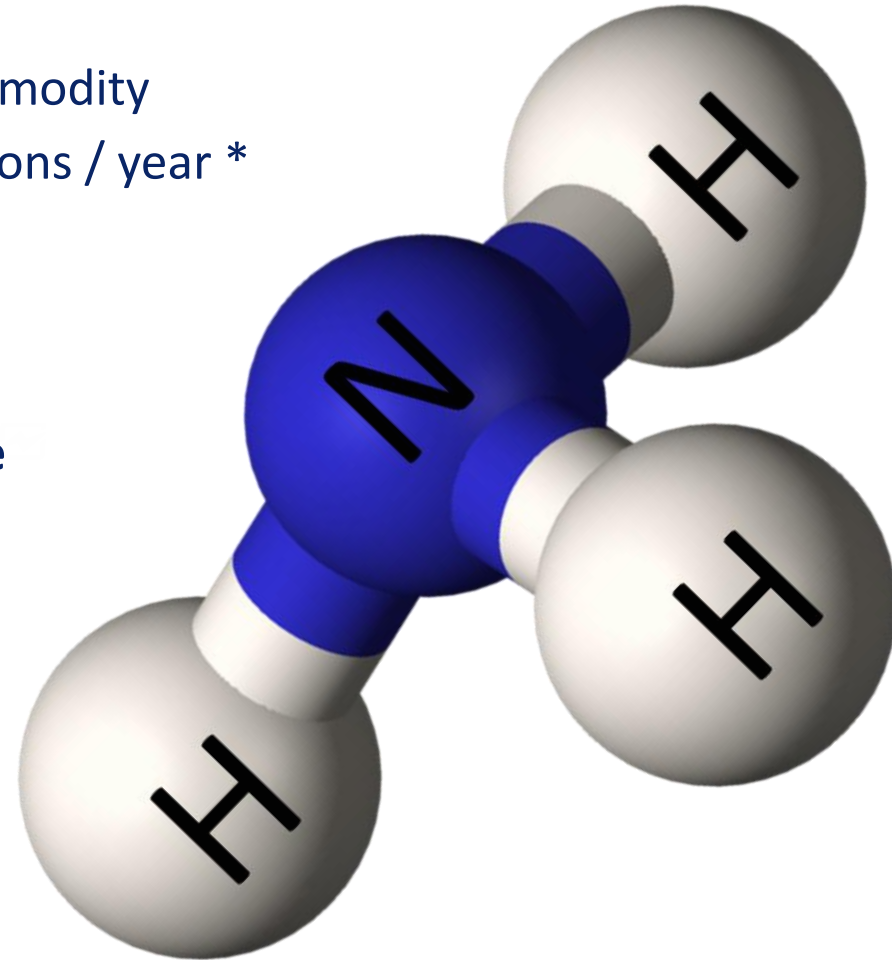




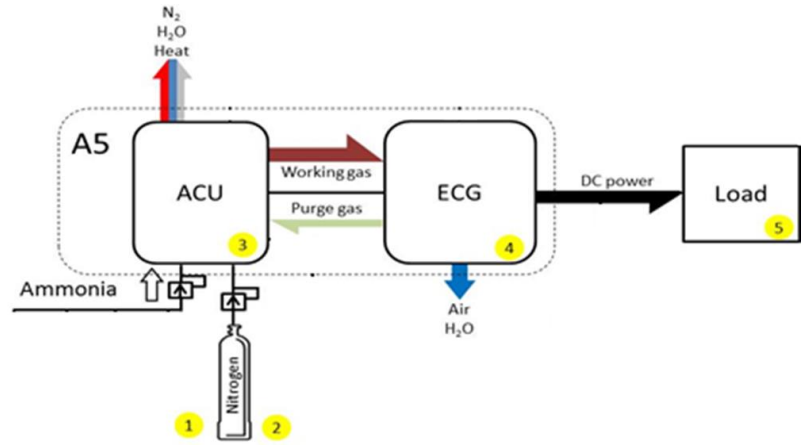
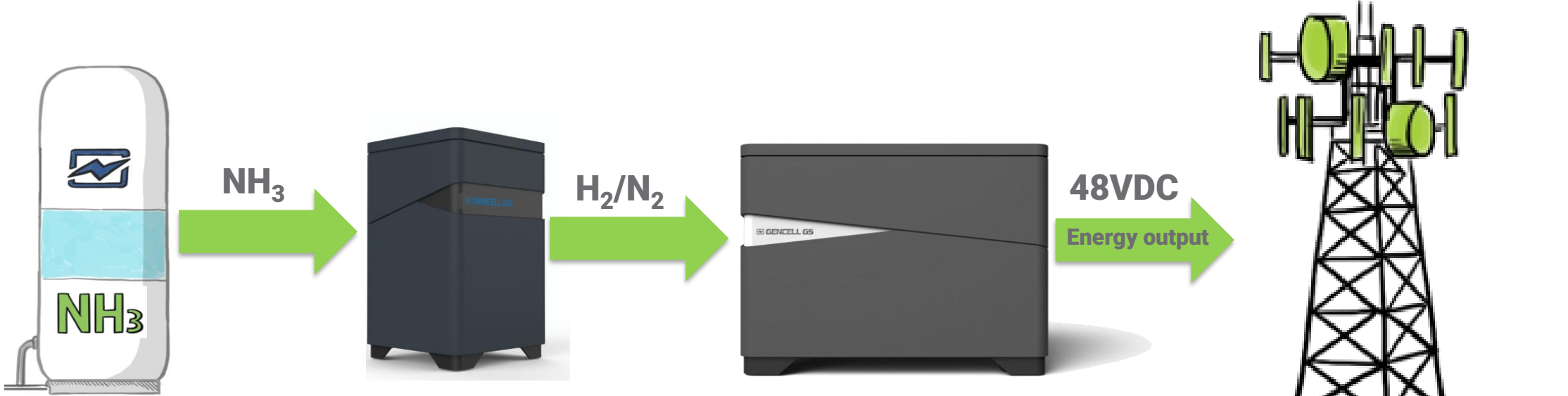
# AMMONIA AS A HYDROGEN CARRIER



- **Availability** – second-most-widely produced commodity chemical globally – production volume of 230m tons / year \*
- Chemical **compatibility**
- Highest hydrogen density and has **zero carbon**
- Liquid at room temperature, **easily transportable**
- **Affordability** – More economical than diesel fuel



# GenCell 24/7 Off – Grid Power Solution





# GREEN FUEL PRODUCTION COMPLEMENTS FUEL CELL TECHNOLOGY FOR TOTAL GREEN LIFECYCLE



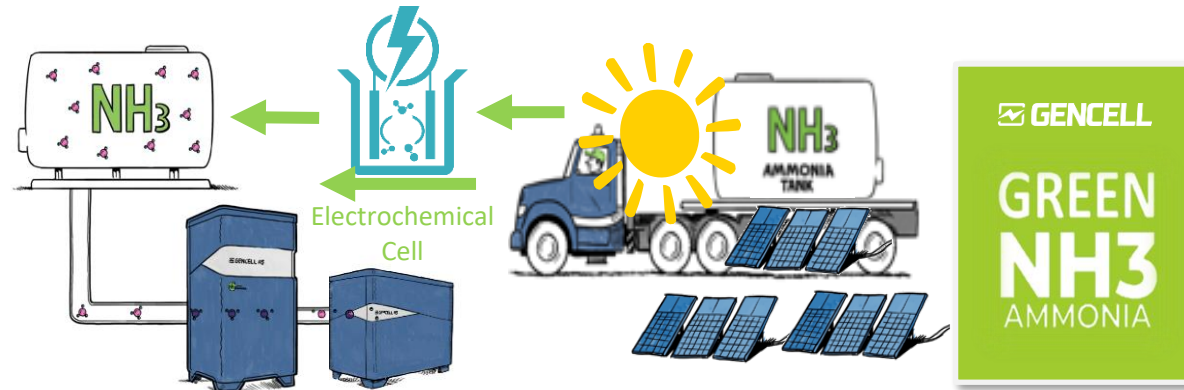
GenCell A5 Off-grid Power Solution

## Our next milestone:

The production of the fuel needed to operate GenCell's alkaline fuel cells **to generate clean electricity from fuel that is produced on-site, regardless of infrastructure**



Self-sustained circular economy  
green source of power to the site  
where the power is to be consumed,  
enabling electrification anywhere



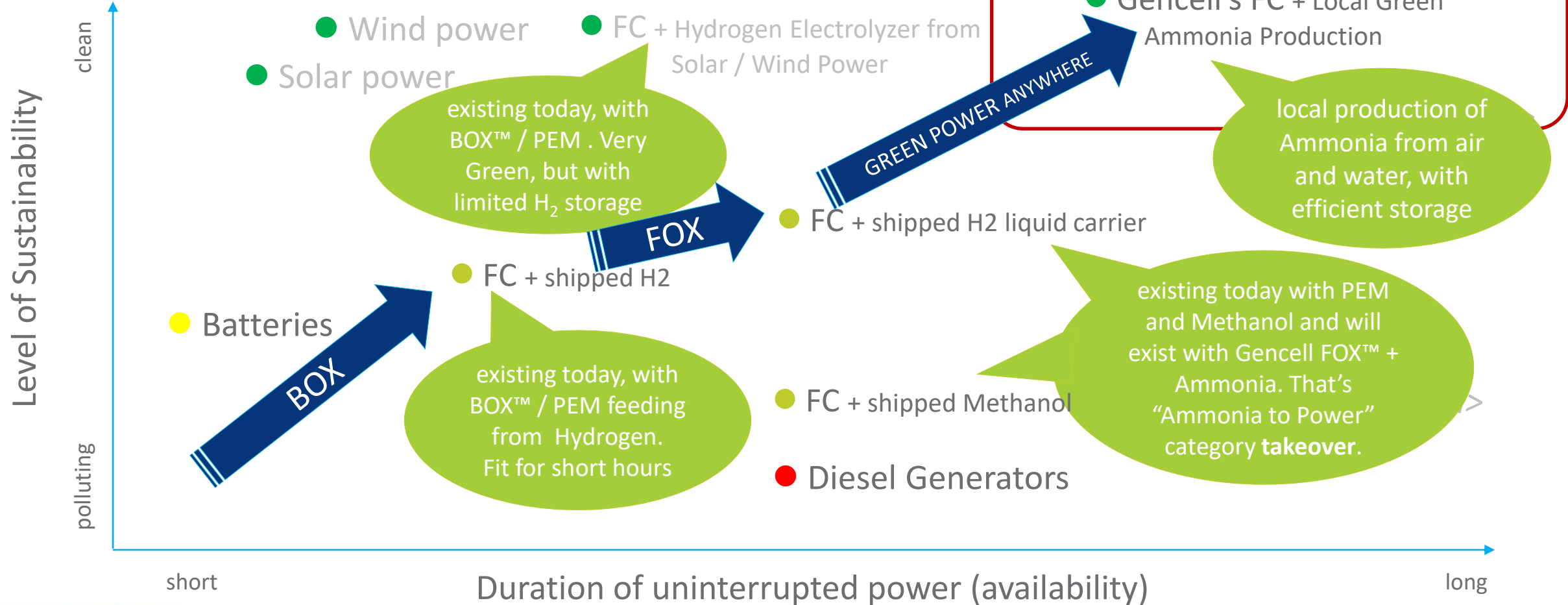
## STRATEGIC PARTNERSHIP FOR GREEN AMMONIA PROJECT

# New Category of Energy

Small stationary energy Categories

GenCell sets a new category: "Long-duration Green Power Anywhere"

Light gray = availability depend on location  
Red to Green = level of greenness

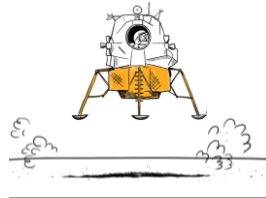




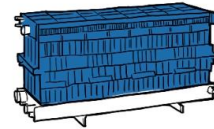
# The Road to Green Energy Everywhere



1839



2011



GenCell Fuel Stack  
2015



GenCell REX  
2019

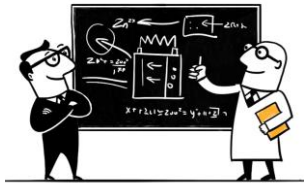


GenCell BOX  
2021



GenCell G10  
2023

1958



1969



1990

2014



Non-platinum Catalyst

2018



GenCell G5



2022-3



GenCell FOX



\*2024



Green Ammonia



\*Technological feasibility



# Summary

- Fuel cell technology another brick in the wall of the Energy Transition
- Technology is available with different approaches
- Ammonia removes barrier to hydrogen usage.



# KEEP RUNNING. WITH FUEL CELL POWER SOLUTIONS



SAY NO TO DIESEL