





# Delivering Affordable 100% Clean Energy with Proven Hydrogen Technology

December 2020



KEEP RUNNING. NO MATTER WHAT.™





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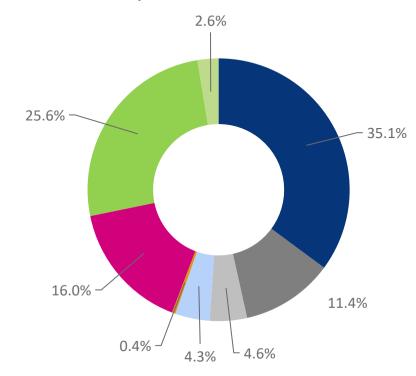
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### **About GenCell**

- GenCell develops unique fuel cell solutions that offer clean power for humanity
- Using innovative and reliable fuel cell technology, GenCell provides affordable, clean backup power for telecom, homeland security, healthcare and automated industries in 18 countries around the world
- GenCell has developed a revolutionary process that allows us to create hydrogen-on-demand from anhydrous ammonia (NH3), enabling our fuel cells to provide a primary power solution for offgrid and poor-grid sites as well as for rural electrification
- The company employs 80 persons including fuel cell specialists from space and submarine programs. The company is headquartered in Israel with a worldwide distribution and support network
- GenCell has unique intellectual property including patents, trade secrets and know-how

#### **Key Shareholders**







## **Highly Dedicated and Experienced Management Team**



Mr. Levy served as CEO of Orbotech from 2013 to 2019, where he oversaw its acquisition by KLA-Tencor for \$3.4B. Prior to that, Mr. Levy held positions at Dun & Bradstreet, Apple and DEC. Holding a Bachelor's degree in Industrial Engineering and Management from Ben-Gurion University and an MBA from Tel Aviv University, Mr. Levy is also a graduate of the Advanced Management Program at Harvard Business School. Mr. Levy serves as Active Chairman of Landa Digital Printing and NSO.







Yossi Salomon CFO



Amit Ashkenazi **VP Global Sales** 



Rami Reshef CEO

Mr. Reshef has a proven executive management track record with over 25 years experience driving sales growth in the technology industry.

He has founded a number of startups with solutions for mobile, social networking and virtual reality, which include Moked Or Ltd, Virtual One and Clip in Touch Int.



Gil Shavit Chief Business Development



Tal Sacharov **Head of Marketing** 



Haim Moshe **VP Customer Support** 



## A fuel cell runs an extremely reliable electrochemical process that combines two gases - hydrogen and oxygen - to generate 100% green energy.

#### 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

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

1969-2020

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

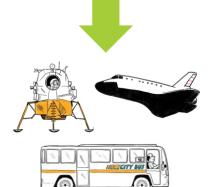
















## **Innovative Patented Technology**

Challenge

Solution

# Platinum 195.084





Reduce CAPEX of

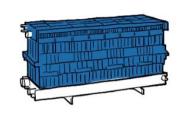
fuel cell stacks

Patent app no 15/548.217 Patent app no 62/916.837

#### **CAPEX**

Mass produce cathodes & anodes

Build backup power solution



Industrial cathode & anode production

Trade secret



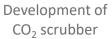
Trade secret

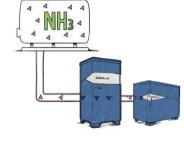
#### **OPEX**

Mitigate CO2 poisoning of fuel cell

Reduce OPFX for rural electrification







Development of ammonia cracker

Patent app no 15/311,310

Patent app no 15/746.085









Patents across key technologies & wide trade secret portfolio create high barriers to entry

## **GenCell's Alkaline Fuel Cell Technology Advantages**

- Highest electrochemical efficiencies among the known fuel cell types
- Resistance to extreme weather conditions
- Non-noble catalyst
- Regenerative CO<sub>2</sub> scrubber technology
- Use of ammonia as a low-cost source of hydrogen
- Ammonia cracking and catalyst technologies
- Eliminates the logistics issues of hydrogen by using ammonia as a renewable energy production source



## **GenCell Technical Expertise**

- Full in-house R&D and engineering team
- Fuel cell module assembly technologies
- Catalysts for the anode and cathode technologies
- Electrode production of roll-to-roll technologies
- Ammonia cracking technology development











### GenCell's Core Product Portfolio

#### **Backup Power**

G5 Long-**Duration UPS** 



**G5rx Utility Utility Backup Power Solution** 



#### **Primary Power**

A5 Off-Grid **Power Solution** 



Key **Points** 

- 5kW instant power with extended run-time and capacity to handle dynamic loads
- Designed for extreme climates

What Customers are Saying



Markets

HLS, Data Centers, Healthcare & Automated Industries

- Extends battery backup time from 4 to 40 hours and more
- Meets substation energy profiles & safety standards
- IEEE 693 seismic compliance for substations

G5rx at SDG&E



Utilities' substations

- Designed to replace diesel generators
- "Virtual nano-power plant" that operates fully independently of the grid
- Clean, reliable, weather-independent and more affordable than diesel

Off-Grid Power with A5



Primary power for Rural Electrification



**GenCell IoT Remote Manager** 

- · Remote management, monitoring and analysis of hundreds of units
- Remote maintenance reduces the total cost of ownership









## **Worldwide Backup Installations**

- Unique alkaline fuel cell solutions already proven and leveraging our patented IP
- Our products have been successfully deployed at customer sites in the field over the past 3 years





**Key customers** and partners:















## **GenCell A5<sup>™</sup> Off-Grid Power Solution**



## GenCell A5<sup>TM</sup> Off Grid Power Product - Background

#### The Problem:

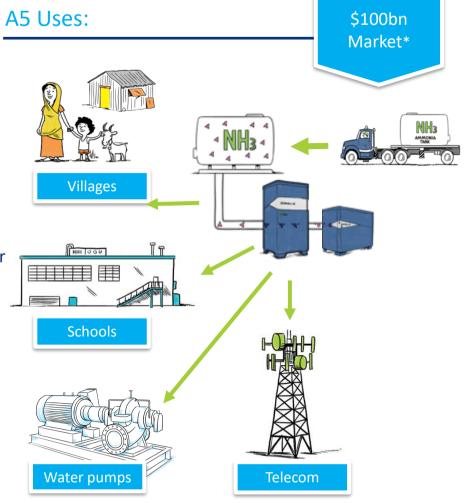
#### **Population**

• 1 billion\*\* people lack electricity for lighting, telecom, cooking, clean water & economic development



#### A5 Solution:

- The GenCell A5 off-grid power solution provides the benefits of green fuel cell energy with an inexpensive and easily accessible liquid fuel - anhydrous ammonia
- A single 12–15-ton tank of ammonia provides enough fuel for a year of 24/7 operation
- This makes the GenCell A5 solution ideal for use in remote locations that lack grid access or where the grid is not stable and independent power generation is frequently required



\*Source: IDTechEx \*\*Source: www.iea.org

## **Telecom Market**

\$12bn Market\*



#### A5 Off-Grid Power Solution





- Designed to replace diesel generators
- "Nano-power plant" that operates fully independently of the grid

A5 - Clean Power for Humanity



#### Why Telecom Towers

\$20B yearly expense\* on diesel fuel

The GSMA estimates that 1,200,000\* telecom towers are in off-grid and poor-grid locations

- Powering these towers is a complex and expensive challenge met today by diesel generators, batteries and solar
- In addition, governmental and environmental regulations are increasingly restrictive on the use of diesel
- GenCell A5 is a greener, cheaper and more reliable solution compared to other power solutions





<sup>\*</sup> Source: Green Power for Mobile, GSMA.

## **Industry Highlights**

Global fuel cell market

15.5% CAGR to US\$33.09 bn by 2027

(source: Grand View Research)

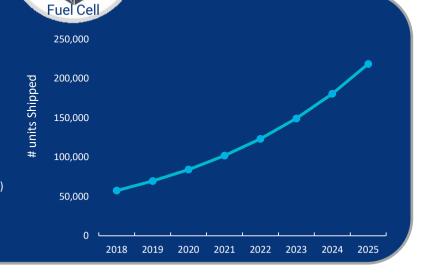
Stationary fuel cell market

Over 22% CAGR during 2018-2022

(source: Technavio)

Stationary FC 2019 - 2025market share

(Source: Arden Research, Grand View Research, E4tech, Fuel Cell Industry Review 2018)



## **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)



## €750 billion

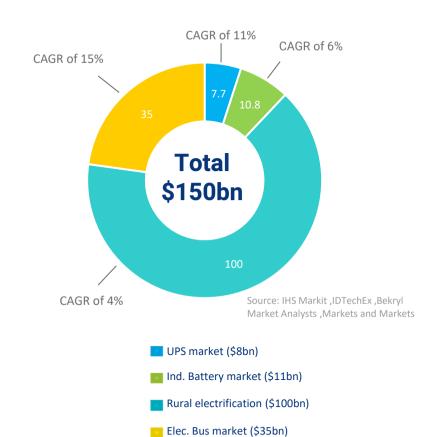
**European Commission recovery** fund to support clean hydrogen (Source: Energy Industry Review Hydrogen Europe)



## **Our Market Landscape**

#### altergy **BALLARD** GENERAC HYDROG(E)NICS POWERCELL WACKER NEUSON Horizon Low Temperature HIMOINSA **Fuel Cells** Diesel Gensets Atlas Copco. **☑ GENCELL Power** MICROTEK engie EMERSON LG Chem riello ups SUNVERGE stem **BOSCH** Invented for life NEC Schneider JLM ENERGY sonnen GS YUASA **C**LG Chem SAMSUNG Green Ammonia ( HITACHI SAMSUNG SDI **Industrial UPS** Energy Storage Industrial **Batteries**

## **Market Opportunity**



\* Chart doesn't include US\$70b Green Ammonia Market

(source: cleantech)

## **Future Product Roadmap**







## **GenCell T30 Transportation Power Solution**



Challenge

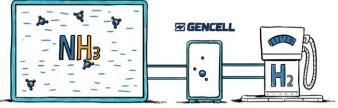
Solution

**Markets** 













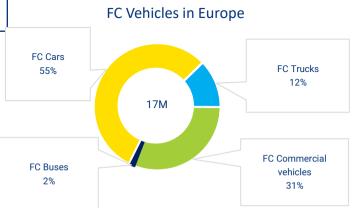


- · Li-Ion buses have limited range and long recharging time
- H2 infrastructure will cost billions (\$)

- Crack ammonia to create H2
- Bypass the H2 infrastructure

Pump H2 into buses and trucks

\*\*2040 forecast FC Vehicles in Europe



The combination of electric battery and fuel cell vehicles will drive an irreversible transformation of the mobility sector, to the extent we've not seen since Henry Ford pushed the 'Model T' upon the horse and carriage market in 1908.

- Source: Bekryl Market Analysts, 2018
- \*\*Source: Rethink Energy, 2020

Ammonia to H<sub>2</sub> for Fuel Cell Buses

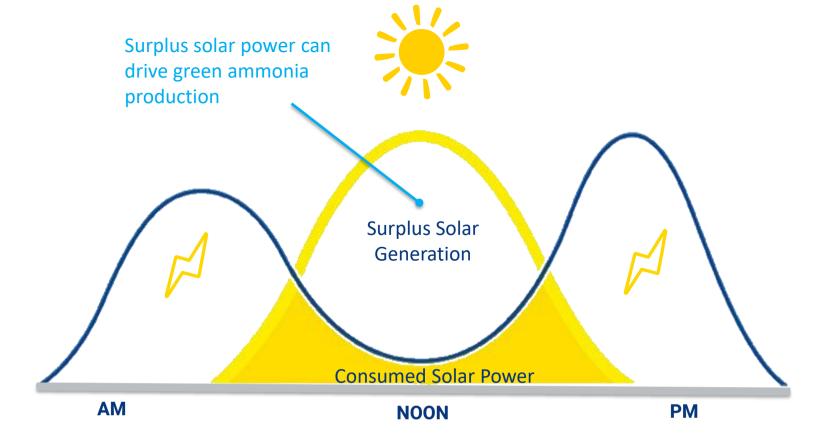


15% of solar (PV) energy produced is not stored. GenCell plans to store this energy chemically, as a source for green ammonia production, within a market of \$70 billion .

Solar (PV) Power Consumption vs. **Power Demand** 

Typical Power Demand

Solar Power Generated

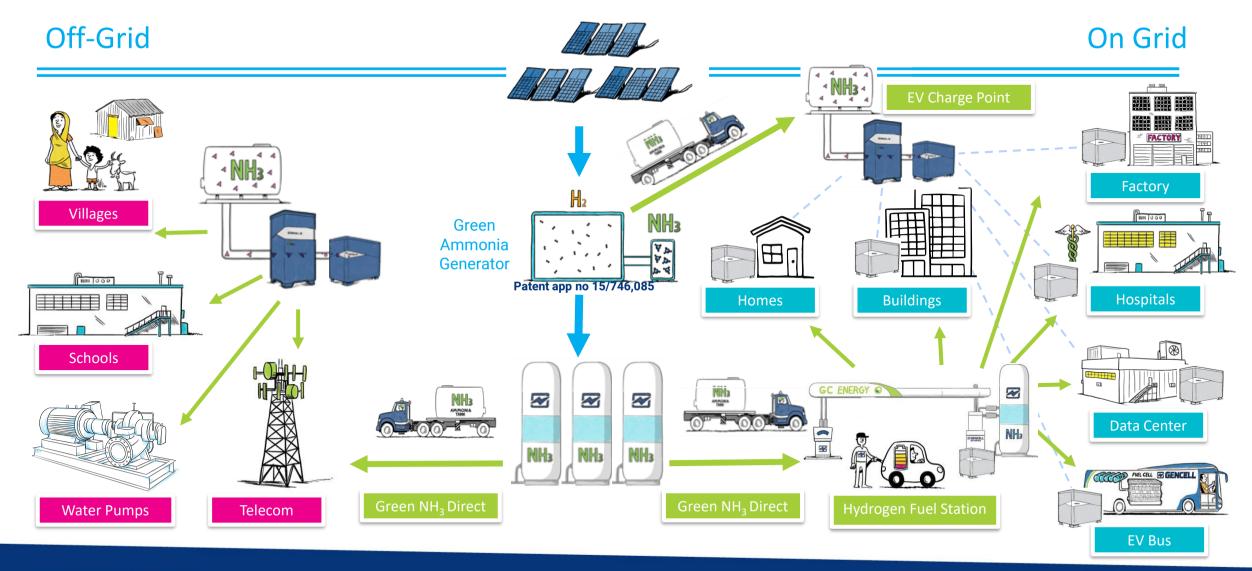




www.latimes.com/projects/la-fi-electricity-solar

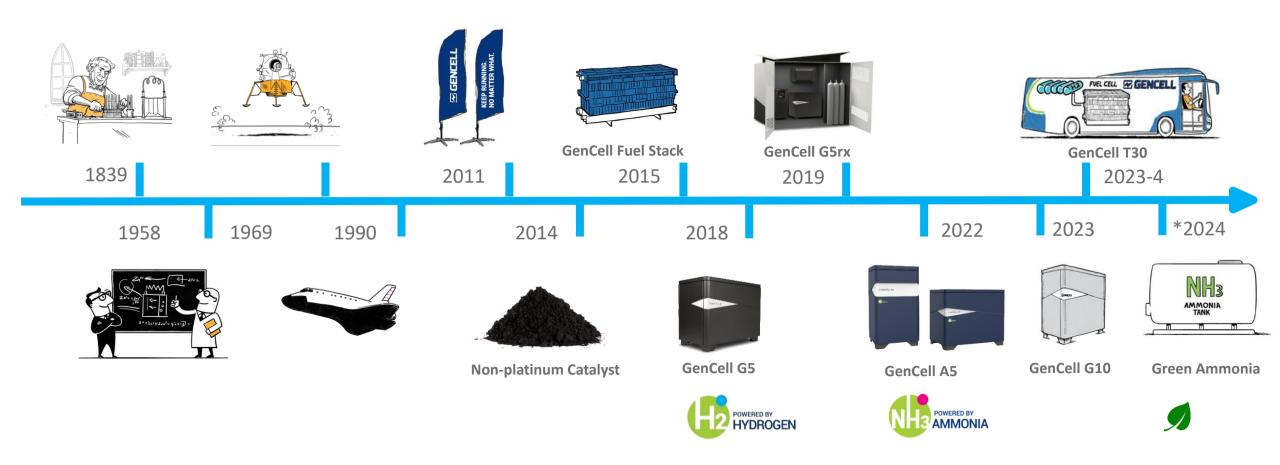
www.caiso.com/documents/curtailmentfastfacts.pdf

### Our Vision: Green Ammonia Drives Off-Grid & On-Grid Power





## The Road to Distributed Clean Power



\*Technological feasibility



## A Paradigm Shift is Underway - Ride the Tide!

Easter morning 1900: 5th Ave, New York City. Spot the automobile.



NOW IS THE TIME

Easter morning 1913: 5th Ave, New York City. Spot the horse.



Source: George Grantham Bain Collection.

Source: US National Archives.



## Thank you!





