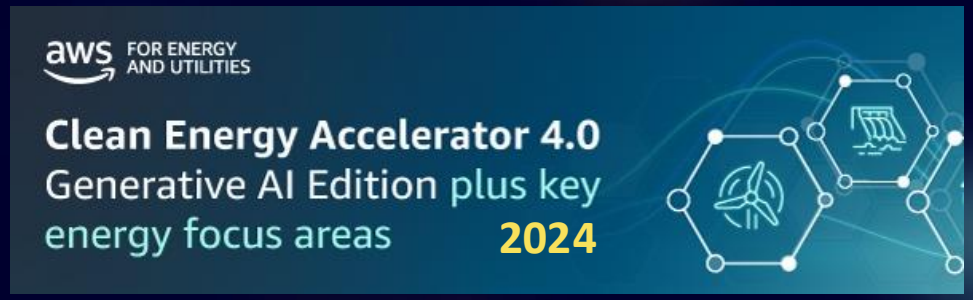
Electriq



Hydrogen Energy Solution for Critical Infrastructure

TEMASEK FOUNDATION
Disruptive Decarbonization Prize 2024

January 2025

The Energy Transition requires Non-diesel massive power generation for off-grid applications

1

Energy Mix

By 2050, **60%** of global energy consumption should be in the form of **renewable fuel** (while 40% as electricity)

2

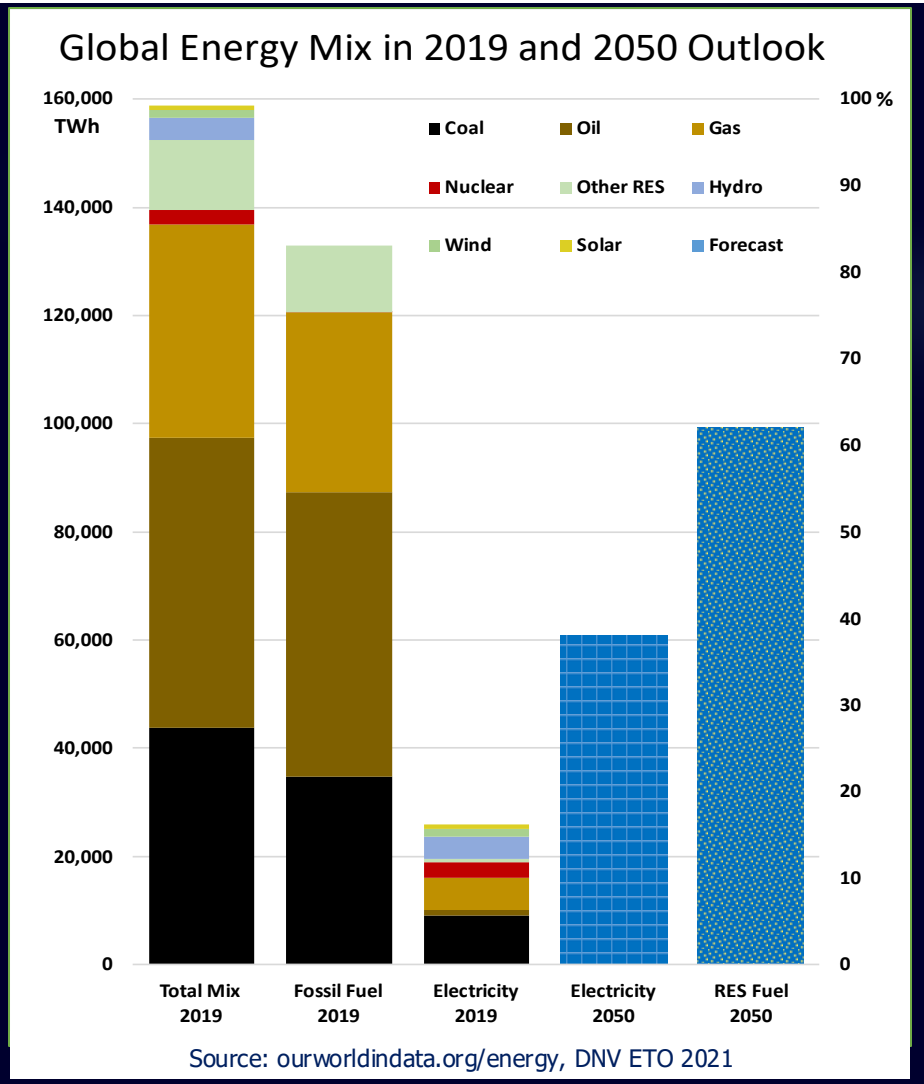
Transition Phase

Growing interest in **alternatives to diesel** power.

3

Future Goal

Hydrogen emerges as a potential successor to diesel.



Current hydrogen storage & transportation methods

Compressed Hydrogen

- Directly usable to feed fuel cells
- 1.3 KWH/L at 700 Bars
- Industrial feedstock, mobility applications

Liquefied Hydrogen

- Requires gazification & compression before use
- 2.4 KWH/L at -253°c
- Hydrogen storage and transportation mainstream

Ammonia

- Requires cracking before use
- 3.8 KWH/L at -33°c
- Potential hydrogen carrier, eventually combusted

All these forms present severe safety hazards and are subject to stringent regulations.

Are Hydrogen Fuels usable for Green Gensets?

Commercially available candidate are inadequate for long-term large storage without degradation

H2, compressed/liquefied (Physically Contained)

Ammonia (Chemical Consumable)

Severe safety hazards in storing large amounts of Hydrogen

Impractical for infrequent use applications, Regulation limitation

Which features are required for green fuels for large scale green gensets?

- Safe / inert
- Easy to handle and use
- High energy density
- Zero losses
- UHT Hydrogen

Hydrogen Powder features – excellent fit

- Safe / inert
- Easy to handle and use
- High energy density: 3.6 KWH/L
- Zero losses
- UHT Hydrogen - No Expiry Date

A single 40 ft container powder payload

16 ton ➔ 40* MWh

Equivalent to 2.4 ton of H_2

* Considering fuel cell efficiency of 50%

Our Circular Solution

Powder production & Recycling

Electriq Powder is safe for transportation and storage; inert and non-flammable

Powder Transport & Storage

Spent Fuel for recycling

Release System

Low temperature, low pressure release system optimal for off-grid applications

End to End IP Coverage

Powder Production and Recycling, Hydrogen Release System and the Catalyst

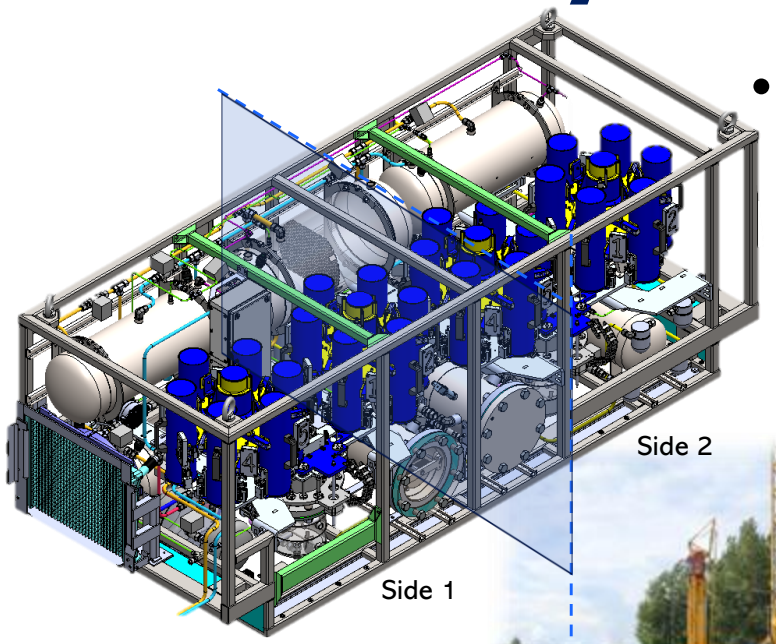
How the Electriq genset works

Powder to Power – Demonstrated in NL

3 kW system

- More than 1,500 working cycles
- Serves Electriq's lab since 2021

8 kW system



- First field demonstration late 2022

- Onsite at RKB in in Ridderkerk, Rotterdam

Power to Powder manufacturing Plant

- First plant planned in cooperation with Sunoco LP in Amsterdam, to be opened in 2028
- Green Power and Hydrogen based on Renewable Electricity from Sunoco's Wind Turbines
- Innovative IP-protected production process
- MOU signed
- Grant of €1.1m received from Netherlands Enterprise Agency for basic engineering work
- Final permit scan report by Royal Haskoning received, providing a green light to proceed with basic engineering

600
Metric Tons
Annual production capacity

4,000
Sq. Meter
Facility Area

Electriq – from R&D to Market

R&D

Brown-Schlesinger
300kWh
413 gr_{CO_2}/MJ
$5.7/kWh

Alkaliq
150kWh
$3.4/kWh

KBH_4 Production energy invested in order to release 1Kg of H2

$2.12/kWh

Boriq
80kWh
<77 gr_{CO_2}/MJ
$1.06/kWh

2018
Powder

2021
Moses 3kW

2022
Joshua 8kW

2024
Alkaliq

2028
Genesis
1MW

2030
Commercial
Plant

Low Hanging Fruit Opportunity: 700 Units for Backup Power for Traffic Continuity – Israel Roads

- **The blackout challenge - functional continuity of traffic lights in emergency situations**
- National transportation infrastructure companies have to ensure traffic continuity both during routine operations and in
- This is crucial in all emergency scenarios, including blackouts—planned or forced power outages in multiple areas lasting at least five days.
- Requires 700W emergency power capable of operating continuously 48h to 120h.

Use Case: Emergency power for Traffic Continuity
Power demand: 1 kW, 120h

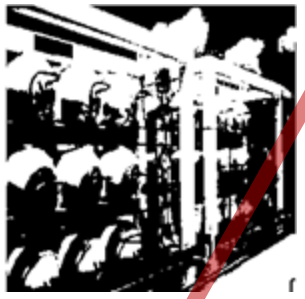
	DIESEL Hybrid	Li-Ion	Electriq's powder
			
Backup power storage:	120 hr	120 hr	120 hr
System weight:	2000 Kg	700 Kg	220 Kg
Refuelling	Continuous, During operation	Recharging from grid	Continuous, During operation
Storage area footprint:	2.81 m^2	~ 4 m^2	~ 1.08 m^2
Remarks:	Combined Diesel and LiFePO4	On case of Complete discharge, the unit has to be replaced	Most compact solution

Use Case: Datacenters need Massive Power Solutions for Power Backup

- The AI industry's explosive growth leads to data centers consuming as much power as modest-sized cities.
- They are obliged to transition to renewable energy.
- With more volatile energy sources, the need for massive backup is pressing, and cost is not the main decision criteria.

Use Case: backup power for Data Center
Power demand: 4.6 MW, 24h

100% green hydrogen backup power

	DIESEL	H_2 350 bar	Electriq's powder
			
Backup power storage:	24 hr	24 hr	24 hr
Fuel storage mass:	82 ton	8.64 ton	60 ton
Fuel storage volume:	120 m^3	372 m^3	90 m^3
Storage area footprint:	100 m^2	~ 900 m^2	< 100 m^2
Regulatory & safety:	Medium		Minimal
Remarks:	Can be completely removed from site	Installation of 372 m^3 of CH2 is not feasible due to the regulatory restrictions	Same storage capacity at a reduced footprint and regulatory demand

Datacenter Hydrogen Backup – Liquid vs Powder

- Large data centre composed of 28 racks
- Each rack requires 3MWh backup power, taking up:
  - 500 m^2 Storage area with Liquefied Cryogenic Hydrogen (LH2),

    or
  - 30 m^2 storage area with two stacked 40ft containers full of Electriq Powder

14,000 m^2

Storage footprint using liquefied hydrogen for 28 racks

v.s.

840 m^2.

Storage Footprint using Electriq Powder

-94%

Electriq in a nutshell

Powder production & recycling
Target CAPEX $6,000/Ton

Electriq Powder

Powder transport & storage

Release System
Target CAPEX $500/kW

Spent fuel for recycling

$27M
Invested To Date

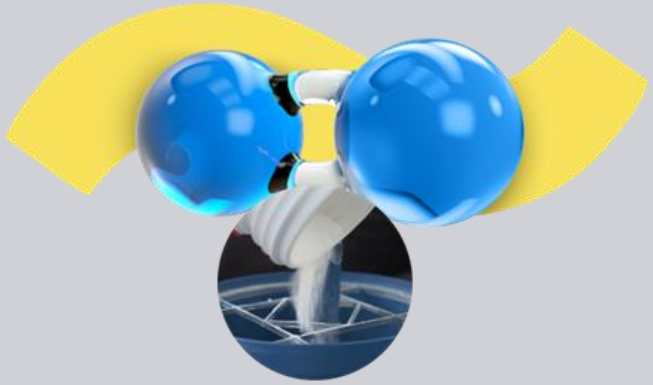
13
Patent Families

SAFE!
Hydrogen Carrier

PROVEN!
- 2 working PoC Gensets
- KBH_4 production breakthroughs

$20B-$37B
TAM of Large Backup Gensets (diesel) from 2023 to 2032

Business model Pillars:



Capital Equipment - Hydrogen Release Systems

- Powder to electricity
- Powder to hydrogen
- Service (recurring)

Electriq Powder

- Consumable-based business model
- High growth potential, consistent demand

Electriq

Q & A