

REPOWER POLAND

Hydrogen Tech

Speaker: Dr Jacek Gliniak



2022

Our Company

focuses on the **R&D of hydrogen technologies and fuel cell**. The team is dedicated to improve our environment, and to **bring the new technologies to daily life** looking **to improve the air quality and energy efficiency**.



“Hydrogen is Power to Revolutionize the World”



WAR

**CLIMATE
CHANGE**

**SUSTAINABLE
INDUSTRY**

**REDUCTION
OF CO₂ EMISSION**

ENERGY USE - 70%

RENEWABLE ENERGY

BIOGAS

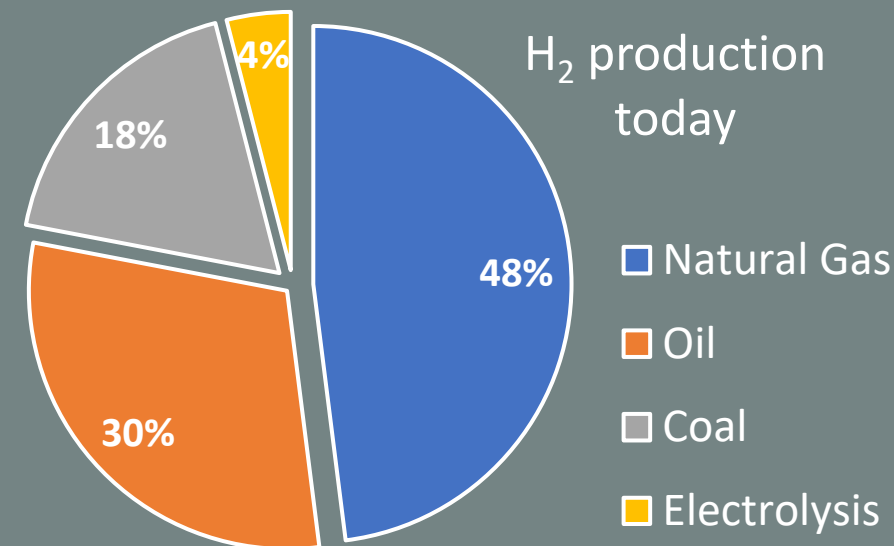
HYDROGEN

- Ammonia production
- Methanol production
- Metallurgic industry
- Semiconductor industry
- Pharmaceutical industry

disruption of natural gas supply



- ❑ In 2020 90 million tons of H₂ worldwide produced
- ❑ 96% of H₂ is produced from fossil fuels
- ❑ For every 1 kg of H₂ we produce 7 kg of CO₂
- ❑ 3% of global CO₂ emission comes from H₂ production



BIOGAS

gas separation

- biogas upgrading
- Cryogenics
 - liquifying gases (LNG)

CO₂ capturing

- Methanol production
- Ethanol production
- Green CO₂ production
- cogeneration

HYDROGEN

Hydrogen storage

- Compression
- Refueling stations

Fuel Cells

Electrolyzers

- photovoltaics
- photocatalysis

BIOGAS PLANTS		
	POLAND	GERMANY
Current no. biogas plants	128	9706
Poland Energy Strategy: 2500 biogas plants by 2030		

ACTION



European
Commission



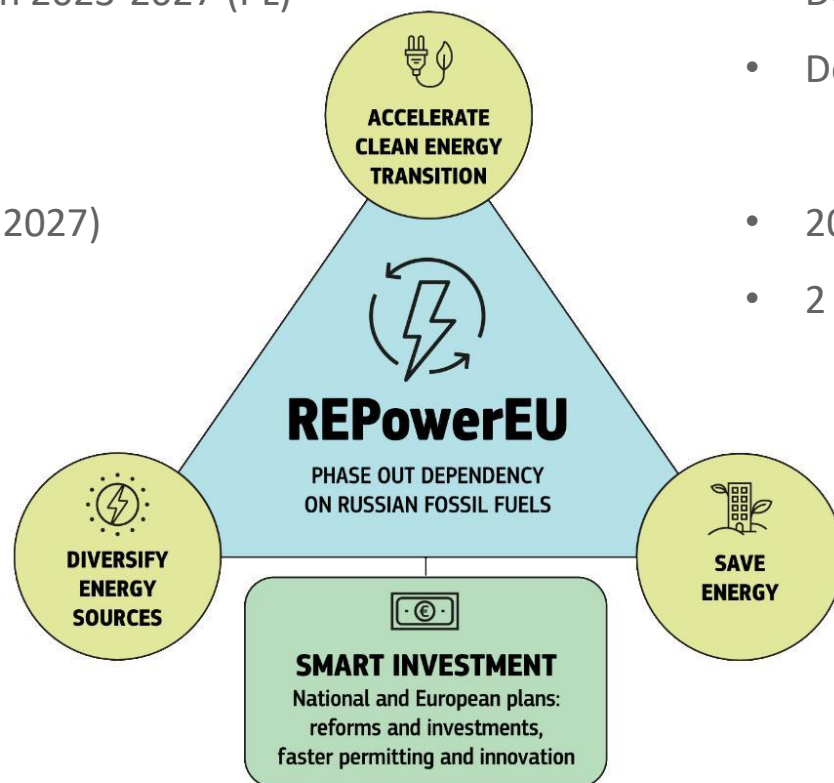
Poland



European Green Deal

"everything has to be green"

- National Reconstruction Plan 2023-2027 (PL)
- Regional EU Funds
- Innovation Fund
- REPowerEU (€210 billion to 2027)



Polish Hydrogen Strategy

- Development of H₂ tech in Poland
- Decarbonization of energy, industry, and transportation
- 2000 H₂ buses by 2030
- 2 GW electrolyzers → 0.3 million tons of H₂ per year

Products



mGen



methanol powered fuel cell

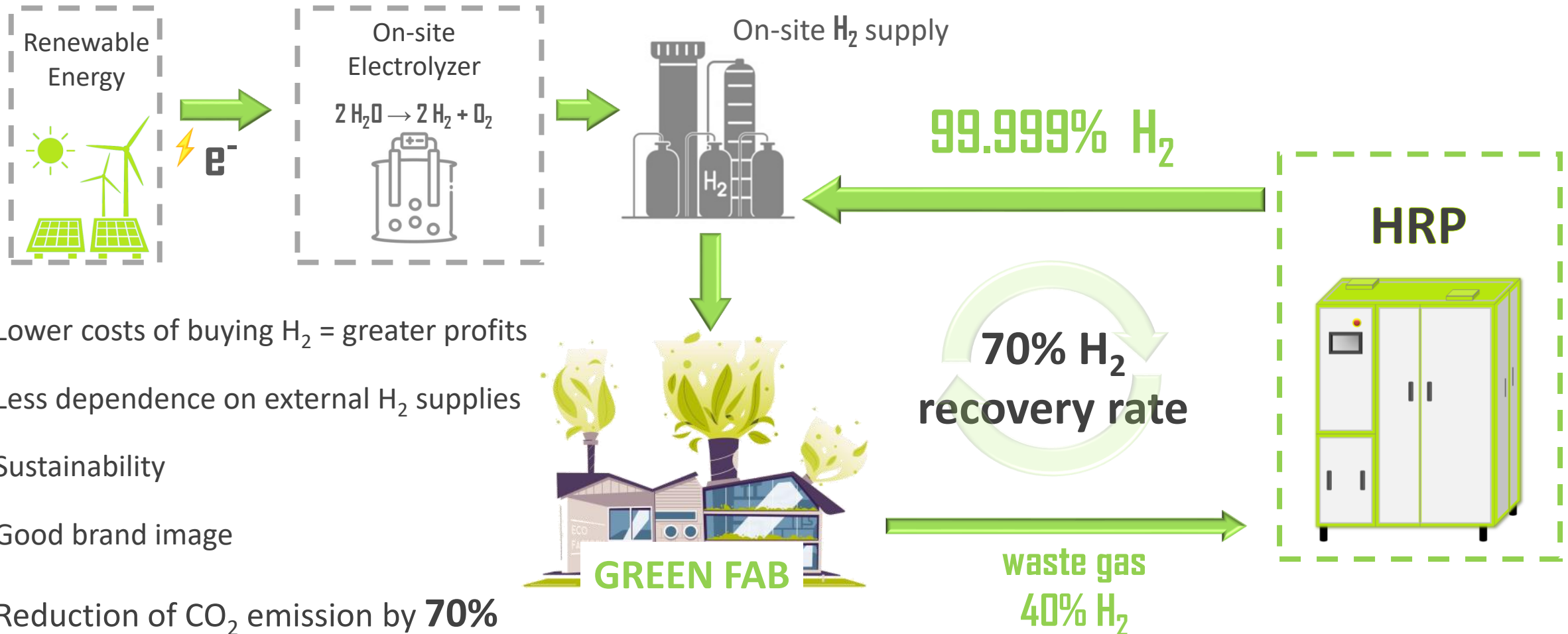
HRP



H₂ recycle and purification



H₂ smart economy - OUR VISION



- ❑ Lower costs of buying H₂ = greater profits
- ❑ Less dependence on external H₂ supplies
- ❑ Sustainability
- ❑ Good brand image
- ❑ Reduction of CO₂ emission by **70%**

mGen: a cleaner power by methanol

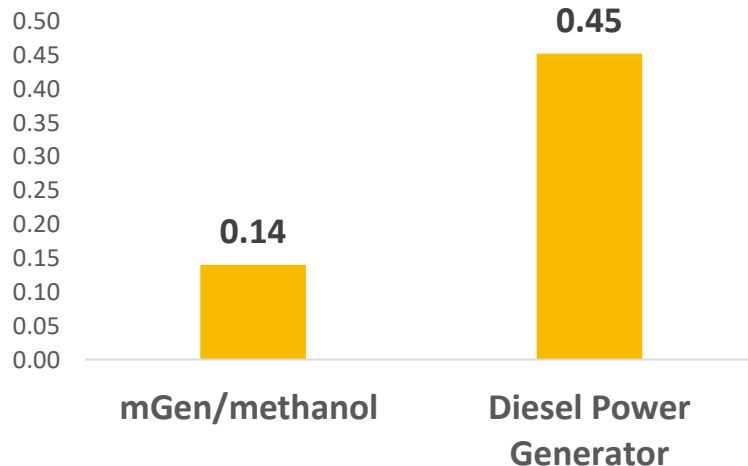


Input Methanol/
water solution



Power output
(Charging)

Cost (EUR/kWh)

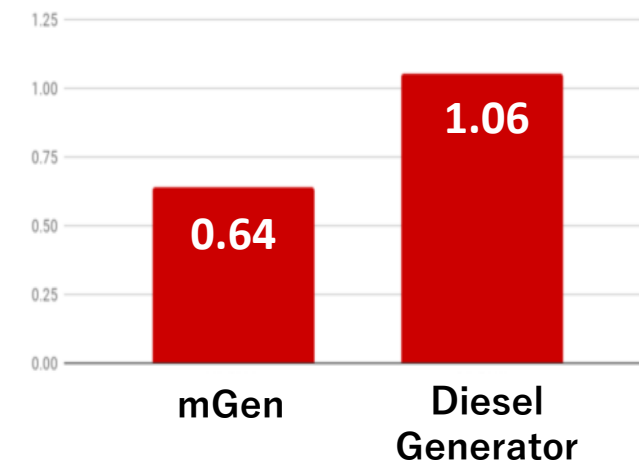


Our liquid fuel is **easier to handle** and store in comparison with gaseous hydrogen. **12% less expensive** than diesel.

We **reduce CO₂ emission by 40%** per kWh energy in comparison to diesel generator

	mGen - 5	mGen - 10	mGen - 15	mGen - 30
ELECTRIC POWER	5 kW	10 kW	15 kW	30 kW
HEAT POWER	4 kW	8 kW	12 kW	24 kW
TOTAL POWER	9 kW	18 kW	27 kW	54 kW

CO₂ emissions (kg/kWh) @ Full Load
Fuel Cell vs Diesel Genset



CHARACTERISTICS

- ✓ No hazardous gas produced (NO_x, SO_x, or PM_{2.5})
- ✓ Reduced up to 40% CO₂ emission compared to diesel generator
- ✓ Low noise and vibration
- ✓ Best fit for intermittent renewable, pairing with photovoltaic is able to power 24/7 for restricted region

PROBLEMS SOLVED

High impact of weather uncertainty to the efficiency of renewable power generation

1. **Renewable energy instability**
2. **The necessity of energy storage in renewable energy**
3. **Replacing dirty and noisy diesel generators.**

mGen: a cleaner power by methanol



Mobile EV charger + Energy storage (Power Cube)



Mobile 24kW EV DC fast charger (15kW mGen)
fuel: 100L (~100kWh)



10kW PV + 60 kWh energy storage + EV charger
(micro grid and energy storage)

DREAM TEAM



HYDROGEN IS POWER



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Justin
CEO

PhD in Technology Management
Master of Material Science



簡調源
Ethan
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Master of Advanced Energy



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