2024 – Business Development | Energy

Agenda

- Who are Hynamics
- Hynamics ambitions
- H2 cost fundamentals
- Case studies

EDF Group is accelerating in Hydrogen

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RESEARCH AND DEVELOPMENT IN HYDROGEN FOR 20 YEARS

EDF R&D & EIFER

€50 million investment

2017

INVESTMENT CAPACITY WITH EDF PULSE VENTURES

More than €270 million invested in start-ups with innovative solutions, including hydrogen.

2019

CREATION OF HYNAMICS

The subsidiary dedicated to the production and commercialization of low-carbon and renewable hydrogen

2021

INAUGURATION OF THE AUXHYGEN STATION

Largest hydrogen production station in France

2022

LE PLAN HYDROGÈNE

LAUNCH OF THE HYDROGEN PLAN

European leader in 100% low-carbon hydrogen production by 2030 3 GW gross by 2030 worldwide 2 to 3 billion € of investments

LE PLAN HYDROGÈNE

Hydrogen Plan of the EDF group

Develop **3 GW gross** of projects for low-carbon hydrogen production by 2030 across the globe

Be a European leader for the production of **100 % low carbon** hydrogen by 2030

2 to 3 Bns € of investments co-financed through industrial partnerships and with national and European support mechanisms

Our 2024 Data

"COMMITTED TO LOW-CARBON HYDROGEN TO INVENT AND BUILD A SUSTAINABLE FUTURE".

01 **100% SUBSIDIARY OF THE EDF GROUP**

02 **3 MARKETS ADDRESSED**

INDUSTRY MOBILITY E-FUELS

the largest CO_2 emitters

03 **100 EMPLOYEES**

04 **PRESENT IN 3 COUNTRIES**

2019 Creation of Hynamics

2020 Creation of Hynamics Deutschland

2021 First projects in the United Kingdom

05 **60 PROJECTS IN DEVELOPMENT**

More than 1 GW of electrolysis

06 **MANY PARTNERS**

ALSTOM, ABB, GENVIA — **To innovate**

VICAT, DOMO, BOREALIS — **To develop projects**

Provider of turnkey hydrogen solutions for both the transport and industrial markets

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Ecosystem Identification → Development → Investment → Construction → Operations Maintenance

Who are Hynamics? EDF's low-carbon electrolytic hydrogen offering in the UK Leveraging the strengths of EDF Renewables, EDF Energy and Hynamics

- **Hynamics team: over 100 employees**
- Business development divided into **2 sectors - industry and mobility** - to meet customer needs
- **Supported by the whole EDF Group**

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Hynamics: One of Europe's leading low-carbon hydrogen producers

- **Provider of turnkey hydrogen solutions for both the transport and industrial markets**
  - Development, design, investment, construction, operations / maintenance
- **Full value-chain hydrogen company, with a 70+ team and growing**
- **Global exposure with developed projects in Germany and France, and activity across eight countries**

EDF Renewables: Leading UK and Irish renewables developer and operator

EDF renewables

- **Uniquely working across offshore, onshore wind, solar and large-scale energy storage in the UK and Ireland**
- **1.5 GW operational and under construction, with a 4GW secured pipeline in UK and Ireland**
  - Part of EDF Renouvables global group delivering 50GW of renewables by 2030
- **Involved with several early-stage green hydrogen & ammonia projects in the UK and Ireland, across a variety of markets and customers**

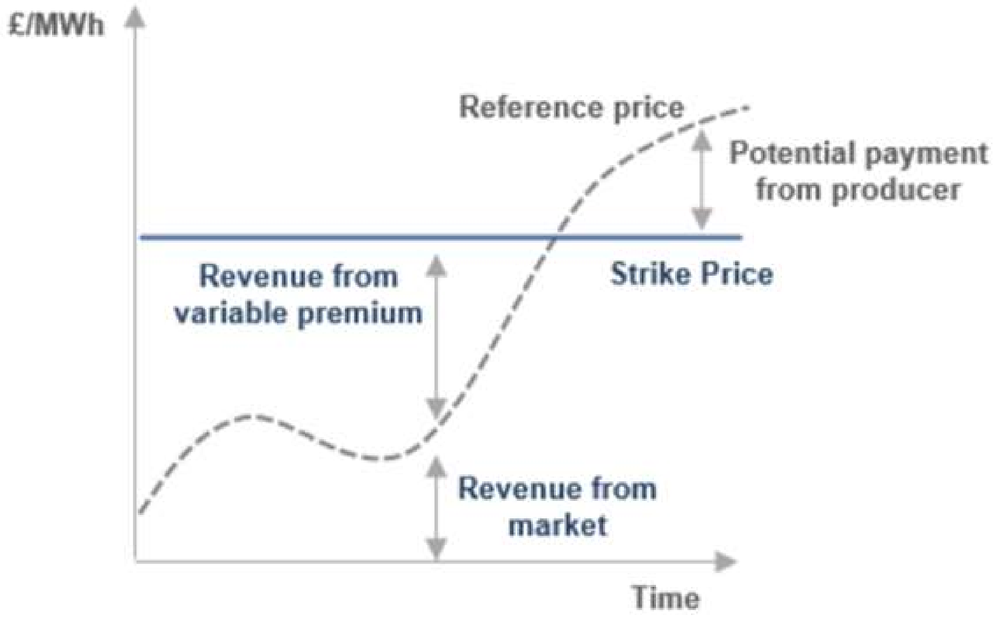
EDF: The UK's largest low carbon producer and supplier

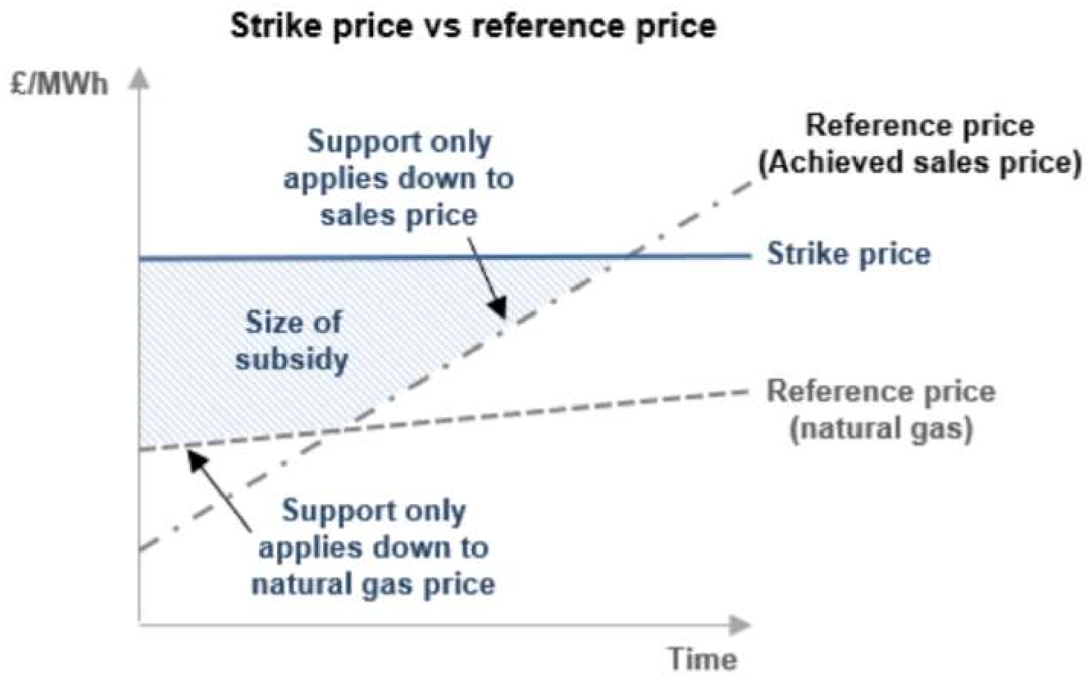
EDF

- The UK's nuclear operator and builder of new nuclear
- **Large I&C customer base**, including strategic customers across the emerging hydrogen space, including Network Rail
- Dedicated R&D department to support hydrogen across the value chain – **excellent relationships with BEIS and UK Government**
- **Extensive policy and regulation expertise** across the entire electricity sector. We can help tailor policy to support new low-carbon, electrolytic hydrogen production

H2 cost fundamentals

- Power price = >50% of cost
- Transportation
- Subsidies e.g. Hydrogen Business Model





Project Experience

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EDF GROUP

Project experience

Les Renardières – first of a kind in the EU

Location
- Paris (France)

Capacity
- 1 MW

Demand Use
- R&D (Mobility and Industry)

Stage
- Operational since 2020

Project experience

AuxHYGen – one of the only operational, commercial projects in the EU

Location

- Auxerre (France)

Capacity

- Stage 1 (2021) : 1 MW – 400 kg/d
- Stage 2 (2025) : 3 MW – 1200 kg/d

Demand Use

- Mobility (buses via dispenser)

Stage

- Stage 1 : Operation (since 2021)
- Stage 2 : FEED

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Project experience

Teesside Green Hydrogen – on track for FID

Location
- Teesside (United Kingdom)

Capacity
- Stage 1 (2026) : 7,5 MW – 3 000 kg/d
- Stage 2 (2028) : 100 MW – 40,000 kg/d
- Stage 3 (2030) : 200 MW + e-Methanol

Demand Use
- Mobility & Industry
- PD Ports, NGN, British Steal

Stage
- Stage 1 : FID – Q4 2023

Project experience

Holyhead Hydrogen Hub – on track for FID

Location

- Holyhead (Wales)

Capacity

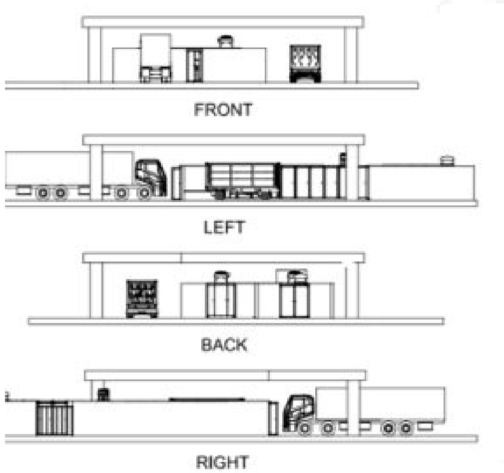
- Stage 1 (2026) : 5 / 7,5 MW – 2 000 / 3 000 kg/d

Demand Use

- Mobility

Stage

- Stage 1 : FID – Q4 2023



Project experience

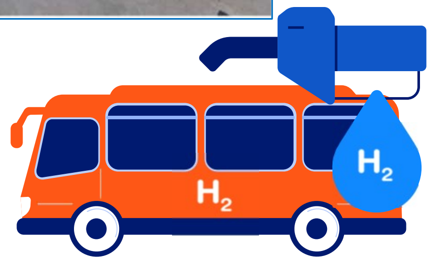
Great Belfort – under construction and operational in 2023

Location
- Belfort (France)

Capacity
- Stage 1 (2023) : 1 MW – 400 kg/d
- Stage 2 (2025) : 2 MW – 800 kg/d

Demand Use
- Mobility (buses)

Stage
- Construction
- COD : end of 2023



Project experience

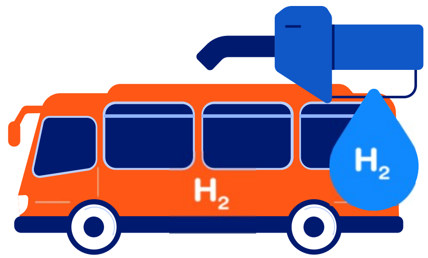
SHYMED – our 4th project to reach FID

Location
- Dunkerque (France)

Capacity
- 1,25 MW – 540 kg/d

Demand Use
- Mobility (buses via dispenser)

Stage
- Past-FID
- COD : 2024



Project experience

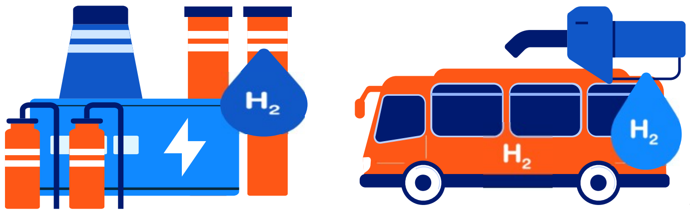
LH2 – learning lessons, improving our developments, increasing scale

Location
- Le Havre (France)

Capacity
- Stage 1 (2025) : 2 MW – 800 kg/d
- Stage 2 (2028) : 4 MW – 1600 kg/d
- Stage 3 (2030) : 6 MW – 2400 kg/d

Demand Use
- Mobility (buses via HRS tube trailer)
- Industry (port uses)

Stage
- In targeting (FID expected in July 2023)
- COD (stage 1) : 2025



Project experience

ABC Ottmarshein – the most advanced industrial project in the EU

Location

- Ottmarshein (France)

Capacity

- 50 MW – 36 000 tonnes of low-carbon amomonia produced per year

Demand Use

- Industry (ammonia production)

Stage

- In targeting (FID expected at the end of 2023)
- COD : 2026

Project experience

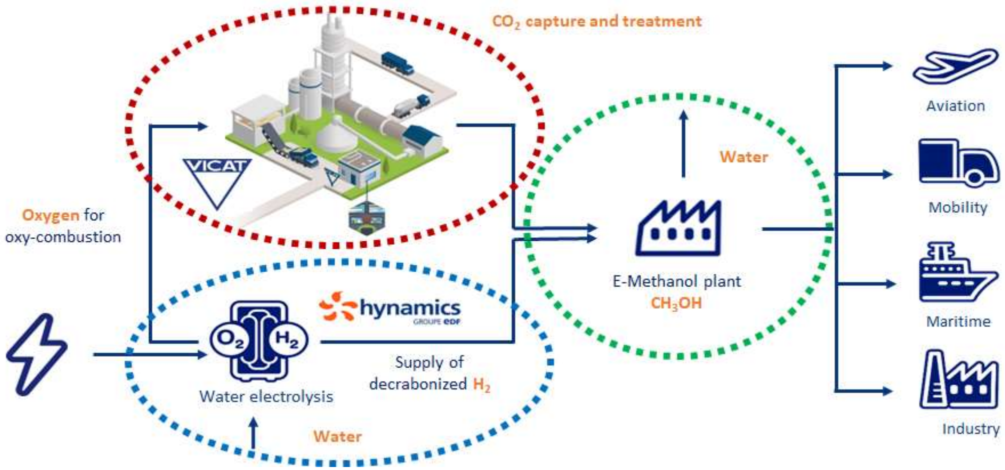
HyNovi – the most advanced E-Methanol project in Europe

Location
- Montalieu-Vercieu (France)

Capacity
- 200 MW
- 125 000 tonnes of methanol/year

Demand Use
- Industry (methanol production)

Stage
- In targeting (FID expected at the end of 2023)
- COD : 2028



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Project experience

HyDom – innovation for the chemical industry

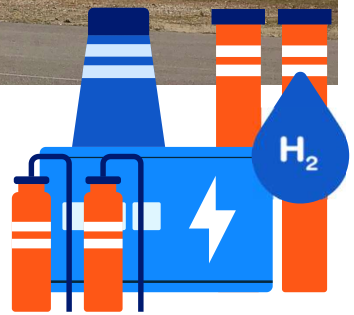
Location
- Saint-Fons (French Vallée de la Chimie "Chemistry Valley")

Capacity
- 85 MW – 11,000 metric tons low-carbon hydrogen per year

Demand Use
- Industry (chemicals - polyamide)

Stage
- In targeting (FID expected mid-2024)
- COD : 2026

DOMO



Project experience

Barry Port – decarbonising industry in Wales

Location

- Barry Port (Wales)

Capacity

- 20 MW – 8,000 kg/d low-carbon hydrogen

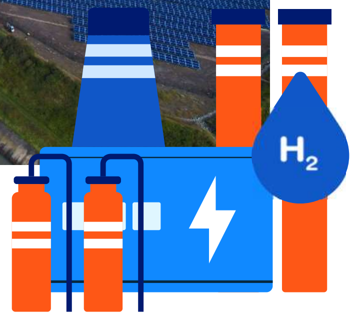
Demand Use

- Industry (grey H_2 & LNG replacement)

Stage

- In development (FID expected 2025/6)
- COD : 2027

ASSOCIATED BRITISH PORTS



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E-FUELS : OUR PROJECTS IN DEVELOPMENT

« Take-Kair»
- **200 MW**
- 35kt e-kerosene
- Partnership Holcim, Hynamics
- Target commisionning ≈ 2030

« HyNoVi »
- **Phase 1 - 50 MW**
- 35 kt e-methanol for maritime usage
- Partnership Hynamics/Vicat
- Target commisionning ≈ 2029-2030

Confidential Project
- E-methanol production

UK e-fuel projects

- **Teeside : 7,5MW** under development – devex grant secured
- Other opportunities under review

« HySCALE 100 »
- E-methanol production

Note:

Mostly e-methanol projects to date

Other e-methanol and ammonia projects in prospection in and outside EU with EDF Group

Hydrogen knowledge

Active monitoring of various suppliers and emerging technologies:

In order to optimise its fleet and offer the best hydrogen power plants, Hynamics carries out a commercial and technological watch. This monitoring, combined with regular exchanges with companies in the sector, ensures that the best existing technologies are considered and integrated into each project.

In the last 6 months the Hynamics Engineering & Procurement Team have conducted vists across the globe to audit electrolyser, compressor and hydrogen refuelling manufacturers and this will continue as standard to ensure we are always **fully in control of our supply chain costs** and safety of our sites

A referencing of suppliers and companies to ensure the reliability of procurement of the various materials.

Hynamics has developed a referencing system to ensure the reliability of the installed equipment in terms of costs, deadlines and quality.

This involves regular technical exchanges with numerous suppliers, visits to production and demonstration sites, and compliance with various criteria (capability, experience, sustainability, QHSE, etc.).

This reference concerns all types of equipment present on the sites (ELY, HRS, ...).

EDF in the UK

BRITAIN'S BIGGEST GENERATOR OF ZERO CARBON ELECTRICTY

01 EDF RENEWABLES - WIND

37 onshore farms
2 major **offshore** developments
22 turbine at Garn Fach in Wales

02 EDF RENEWABLES - SOLAR

Gridscale farm at Sutton Bridge, will be **139 hectacres**
Plans for **major solar farm & battery storage project** at Longfield, Essex
Installing solar PV on I&C customer roofs

03 NUCLEAR

In 2021 **our current fleet** generated ~1/5 of UK's electricity
Hinkley Point C, 6m homes & 1,000s of jobs
Sizewell C could save 9m T CO2/yr

04 EDF CUSTOMERS

One of **largest suppliers** of energy to **UK business** with **>250k customers**.

Leading UK buyer of PPAs and provider of structuring services

05 PRESENT GLOBALLY

EDF renewables — **20 countries**

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hynamics GROUPE EDF — **8 countries**

06 >2,000 EMPLOYEES

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R&D **THROUGHOUT THE WORLD**

With 3 centres in France and 6 abroad, EDF conducts research both nationally and at international level