Orsted

Creating a world that runs entirely on green energy

Renewable Gas 360 Conference 2020



World's most sustainable company



Corporate Anights



Ørsted at a glance

C) Offshore Wind

- Develop, own, build & operate offshore wind farms
- 5.6 GW operational capacity
- 4.3 GW build -out plan towards 2022
- Ambition of 15 GW installed capacity by 2025



Onshore Wind & Solar

- Onshore wind farms, solar PV, energy storage
- 1,017 MW US onshore wind operational capacity
- 4.6 GW under development
- 20MW battery storage



Markets & Bioenergy

- Route-to-market services for partners
- Market trading operations to optimize hedging contracts
- Business Innovation includes bioenergy &renewable gas

Orstec

• Management of gas storage facilities

Ørsted launching renewable hydrogen production in Denmark



- Together with six partners, Orsted is building a 2 MW electrolysis plant including hydrogen storage.
- Ørsted is the managing partner for the project, which will be powered by two 3.6MW wind turbines
- Daily hydrogen production is expected to total around 600kg

Ørsted including renewable hydrogen production in offshore tenders



- Ørsted included green hydrogen production as part of new offshore wind farm tenders in Netherlands
- Renewable hydrogen could be used help decarbonize sectors such as heavy industries and transportation
- Selling green hydrogen to large industrial customers would make project economics more competitive

Ørsted advancing Gigastack Feasibility Study for Hydrogen in the UK







Department for Business, Energy & Industrial Strategy

- Project participants:
- Phased project to investigate the delivery of bulk, low

-cost and zero -carbon hydrogen

• Goal is to accelerate and scale up the development of technology & low carbon hydrogen supply solutions



Other Real World Examples of Electrofuels



• Project participants:



• Reclaims CO ₂, from an integrated capture system with hydrogen - 5 mil

- 5 million liters production capacity

• Hydrogen generated from water electrolysis using geothermal power to produce methanol

Hydrogen injected into the gas grid via

Elecrolysis in Denmark





- This is a 2 year test of the natural gas system to handle up to 15% blended hydrogen
- Test includes lifetime testing of critical components in both electrolyser and Meter & Regulator stations

UK carbon capture, hydrogen supply & hydrogen transport opportunities



• Project partners:



- Project shows how electro, bio and reformed gas can co-exist in dedicated and blended pipelines
- Clustering of demand centers supports dedicated pipe while blended H2 serves distributed customers

Hydrogen can address some of the hardest abatement challenges



- International maritime shipping accounts for approximately 800 million tonnes of CO ₂ emissions a year
- The equivalent to being the 6th biggest country
- Adopting renewable energy like offshore wind to produce green hydrogen from electrolysis at scale is an enabler to Electrofuels like Ammonia & Methanol
- Electrofuels bring synergies to biogas and biofuel which could feasibly deliver a global source of clean bunker
- California could be an exporter of locally produced Renewable Hydrogen fuel into the Asian market



Electrifying the gas grid - an extension of California's renewable electrification objectives

Deploying renewable generation toward electrolytic hydrogen production and injecting that hydrogen into the gas grid could accomplish the following:

- ✓ More robust system higher security of supply
- ✓ Less disruptive lower cost to industries, buildings and homes
- ✓ Better integration of renewables;
- Improves long term storage and peak handling abilities;
- ✓ Faster achievement of greenhouse gas emission reduction targets
- ✓ Enable renewable energy into sectors where substantial amounts of energy are required
 - and no obvious green alternatives exists (heavy transport, aviation, maritime etc.)



