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The Republic of Ireland National Hydrogen Strategy Policy Note

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Ireland's National Hydrogen Strategy sets high-level priorities for the hydrogen economy, but lacks clarity on specific measures

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The DECC National Hydrogen Strategy Summary

- **End-uses** of renewable hydrogen are prioritised in the following order:

1. Existing hydrogen demand
2. Power generation and LDES[1]
3. Large energy users and energy parks
4. Industrial process heat
5. Transport sector
6. Export

- By 2050, the above offtakers are estimated to **demand** between 19.8TWh and 74.6TWh of hydrogen per year.
- Hydrogen will initially be produced from **grid-connected electrolysers using surplus power from renewables**. Post-2030, production will be scaled up using co-located electrolysers, with a **2GW offshore-wind-to-hydrogen target by 2030.**
- **Regulatory gaps** across the hydrogen value chain will be addressed by alignment with EU standards and the adoption of the **EU Hydrogen and Decarbonised Gas Package**, which sets out regulatory market rules for scaling up the hydrogen economy.
- Hydrogen will **not** play a role in **domestic heating**.

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The Ireland Hydrogen Strategy does not provide enough policy support to kick-start the renewable hydrogen economy in Ireland

- The strategy has set some quantitative targets, such as electrolyser capacity deployment, and can further solidify the foundation for a hydrogen economy by proposing support measures for hydrogen production, trading, transport, storage or use i.e., new subsidy mechanisms.
- Taking lessons from existing and evolving EU policy, the strategy has an opportunity to go beyond developing a domestic certification scheme and structure domestic regulation on hydrogen.
- For the power sector, the impact of the strategy is limited. Further details on the future interplay between the hydrogen economy and the power sector are said to be published in the second version of Shaping Our Electricity Future, in Q3 or Q4 2023, an Eirgrid and SONI publication.

Hydrogen infrastructure development

Near-term

Regional clusters around high priority demand centres: on-site electrolysis and storage; inter-cluster transport by truck

Expand and link

Long-term

National hydrogen network: connected by pipelines; employing geological storage; utilising GB interconnection

1) Long Duration Energy Storage.

Source: Government of Ireland National Hydrogen Strategy

Find out more, get in touch with Rebecca Cabrera

Demand-side priorities out to to 2040 span eleven end-use applications, specifically targeting hard-to-abate sectors

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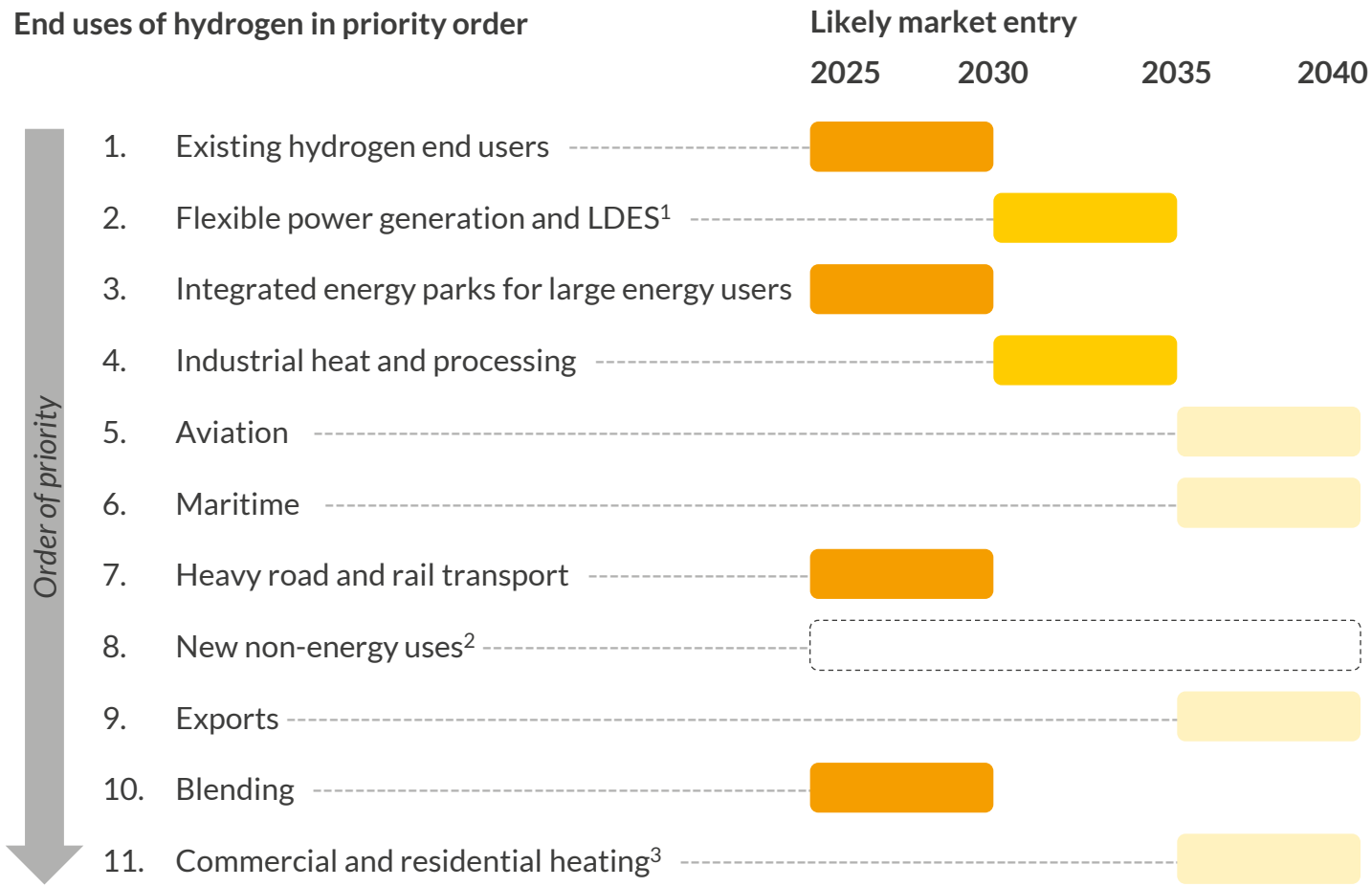
End uses of hydrogen in priority order



Total renewable hydrogen demand in **2050**[4] is expected to be between 20TWh and 75TWh

The strategy for hydrogen deployment focuses on applications where electrification is not feasible

- Renewable hydrogen will play a significant role in inter-seasonal **energy storage** and in **power generation**, with hydrogen-fuelled generation expected to be online by 2030.
- In line with Ireland's plan to develop **energy parks**, Moneypoint will be converted to a clean energy hub including hydrogen and ammonia production facilities.
- High temperature **industrial heat** accounts for 25% of Ireland's industrial energy demand. A future roadmap on the decarbonisation of industrial heat is expected to provide further clarity, with hydrogen expected to play a key role in decarbonising this sector.
- While EU regulation requires Ireland to deliver a minimum number of hydrogen refuelling stations[5], specific domestic targets for **hydrogen in transport** will only be set by 2030. However, the Strategy has already clarified that **no role for hydrogen** is foreseen in the passenger car fleet.
- Hydrogen **exports** will require offshore power generation and are thus not envisaged before the mid-2030s.
- The natural gas network could act as a near-term 'offtaker of last resort', but **blending** is not a long-term priority.

1) Long Duration Energy Storage. 2) Includes fertiliser production and other chemical processes not currently produced in Ireland. Market entry timeframe not specified. 3) Limited to niche applications where electrification and district heating are not feasible. 4) Including non-domestic energy uses. 5) The EU Alternative Fuels Infrastructure Regulation is expected in Q1 2024. The refuelling stations must be constructed along the Trans-European Transport Network.

Source: Government of Ireland National Hydrogen Strategy

The strategy focuses on using surplus renewable generation and curtailed volumes for hydrogen production in the short-term

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Newly announced in the strategy

Strategic targets for hydrogen production

- Prior to 2030, hydrogen will be produced by grid-connected electrolysis from surplus renewable electricity**, reducing curtailment.**
- Estimated **2-4 TWh hydrogen produced by 2030** if target of 80% RES-E achieved.
- **2GW offshore wind-to-hydrogen** deployed between 2031 and 2035.
- Offshore wind target of 20GW by 2040 and 37GW by 2050 will assist in achieving **90% RES-E penetration required** for grid-connected electrolysers to produce EU-compliant green hydrogen in the long-term.

Legislating for the supply of renewable hydrogen

- Individual electrolyser projects are required to comply with the **Water Framework Directive.**
- Grid electrolysers must comply with **European Commission regulations** for their hydrogen to be considered renewable, but **a certification system** is yet to be established.

Resourcing the production of renewable hydrogen

- 41% electricity demand increase already predicted over the next 10 years. To **avoid a constrained system**, excess generation at times of curtailment will be the focus of hydrogen generation.
- 37 GW of offshore wind equates to approximately 150 TWh; meaning that the resource potential of offshore wind **exceeds Ireland's indigenous needs.**
- Deployment of 2GW of offshore wind dedicated to hydrogen by 2035, with this capacity predicted to use <1% of Ireland's total water resource including leakages.

Drivers of a renewable hydrogen economy in Ireland

- Ireland is estimated to have some of the highest curtailment volumes in Europe by **2030 at 16%**, making hydrogen electrolysis well-positioned to capture excess green power; electrolyser **capex is predicted to half by 2030** and drop to **one third by 2050** according to the strategy.
- Ability to produce excess renewable hydrogen provides the opportunity to become a **net exporter of renewable hydrogen** in the long-term.

2023	2030	2031 ~ 2035	2040	2050
National Hydrogen Strategy published	2-4TWh hydrogen production from surplus renewables by 2030	2GW offshore wind-to-hydrogen deployed	20GW target for offshore wind deployment	37GW target for offshore wind deployment

Sources: Government of Ireland National Hydrogen Strategy, IEA

Find out more, get in touch with Rebecca Cabrera

The strategy outlines further measures to develop the hydrogen economy, but many rely on future publications or EU policy

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Transportation and infrastructure

- Demand-side research has identified **20% hydrogen grid blending** is feasible for domestic end-users without further modifications, although long-term blending is not considered desirable.
- Adhering to **EU's Renewable Energy Directive**, requiring a minimum 1% of transport demand to be supplied by Renewable Fuels of Non-Biological Origin (RFNBOs), which translates to 0.5TWh of hydrogen to be produced for transport by 2030.

Research, funding and cooperation

- **Over €40 million funding** allocated to a range of research programs across higher education institutions and SMEs to facilitate technology developments, innovation and insights such as the HyLight Project[1].
- **Declaration of Intent** signed between Ireland and **Germany** to initiate cooperation on research and development, as well as to explore the establishment of a joint pilot project on potential renewable hydrogen cross-border value chains.
- Work is underway to create a **Memorandum of Understanding** between the **Republic of Ireland** and the **United Kingdom**, covering a variety of energy topics, including the use of hydrogen in both energy systems.

Infrastructure roll-out and timelines

- Hydrogen infrastructure will first deploy across **regional clusters** (areas where production, high priority demand and large-scale storage are co-located), similar to hydrogen clusters outlined in GB hydrogen policy.
- Subsequent expansion and linking of clusters into a **national hydrogen network** that is aimed for roll out between **2038 and 2050.**
- The development of a hydrogen network will be partially driven by when the United Kingdom adds hydrogen to their gas network (**Project Union**) sending blended gas through the gas interconnectors to Ireland.

Certification of renewable hydrogen

- A **national certification** process for aligning with EU guidelines is yet to be structured for renewable hydrogen projects in the Republic of Ireland.
- **PPAs** can be used to produce renewable hydrogen provided they are aligned with EU regulation and definition of renewable hydrogen.
- The DECC plans to scope the possibility of using **Guarantees of Origin** schemes to support the hydrogen economy.

1) https://www.marei.ie/project/hylight.

Sources: Government of Ireland National Hydrogen Strategy, National Gas

Find out more, get in touch with Rebecca Cabrera

Financial support mechanisms are present in neighbouring regions, but the strategy lacks direct support for producers and off-takers

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When compared to neighbouring regions like GB, the Irish Hydrogen Strategy is far less detailed and offers fewer quantitative targets

National Hydrogen Strategies side-by-side

	Ireland	GB
Supply Support	Yet to implement concrete support for supply side projects	Net-Zero Hydrogen Fund and Hydrogen Production Business Model[1] offer capex and revenue support for hydrogen projects
Demand Support	Investigating end use compatibility of hydrogen with industrial and domestic end-users	Renewable Transport Fuel Obligation (RTFO) scheme: increasing share of transport making use of biofuels and hydrogen
Connecting supply & demand	Investigating gas grid readiness for hydrogen blending	Project Union: 100% hydrogen transmission network rollout, aiming for 25% in the early 2030s

The introduction of clear financial incentives similar to those of neighbouring regions are lacking despite examples of support in GB and mainland Europe

Supply-side measures in other regions

- Financial support and revenue certainty can help initiate supply side hydrogen projects:

GB

GB's Hydrogen Production Business Model introduces revenue certainty for developers through a two-way CfD with a reference price (price at which a producer sells their hydrogen) and fixed strike price[2].

Demand-side measures in other regions:

- Mandatory hydrogen blending in gas networks buoys hydrogen demand for producers:

Portugal

Portugal's renewable gas blending obligation requires gas suppliers with total capacity exceeding 2TWh/year to incorporate at least 1% biomethane or green hydrogen into the natural gas supplied to customers and increase this to 15% by 2030.

Conclusion

The DECC National Hydrogen Strategy lays the foundation for hydrogen policy in the I-SEM and demonstrates the government's intention to develop a long-term and large-scale hydrogen economy, but greater specificity is required to outline both upstream and downstream support measures for supply- and demand-side participants.

1) The GB Net Zero Hydrogen Fund offers CAPEX subsidies, and the Hydrogen Business Model offers revenue support for new low carbon hydrogen production to de-risk investment through a CfD mechanism. 2) Reflective of the producer's unit cost of production and negotiated on a project-by-project basis.

Sources: Department for Energy Security and Net Zero

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- **Forecast of imbalance costs** for each technology

Find out more, get in touch with Rebecca Cabrera

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