



Mercury

FIRLOUGH WIND FARM
&
GREEN HYDROGEN

May 2022

Executive Summary

This document has been prepared by Mercury Renewables for information purposes as we continue our public consultation process and community engagement.



- The purpose of this document is to provide people in the local community with further information about:
 - the process of producing green hydrogen;
 - Our commitment to health and safety and the measures we're taking now in design, that will ensure optimal safety is adhered to
 - The location of the Original and Alternative sites and what the buildings will look like once completed;
 - How community engagement is directly informing our development decisions
 - The positive impact of the project for local community and West of Ireland region through low-cost heating and transport fuel, job creation and broader community development funding
- Mercury Renewables has been developing the Firlough Wind Farm (previously known as the Carrowleagh-Kilbride Wind Farm) since 2009.
- Planning was granted by An Bord Pleánala in 2013. However, due to improvements in wind turbine technology, Mercury is seeking new planning to reduce the number of turbines to be installed at the site.
- In 2020 Mercury began exploring the feasibility of producing hydrogen using the renewable energy produced by the Firlough Wind Farm in order to reduce carbon emissions in industries beyond electricity such as transport and agriculture.
- We announced our ambitions to produce hydrogen in the West of Ireland in December 2021 and began a public engagement process. Through this process, we received feedback regarding the production and transportation of hydrogen.
- Through in person meetings, telephone calls and online meetings with local residents and local politicians, we've taken on board the feedback and began exploring alternative sites for the production of the hydrogen.
- As of May 2022, we believe we have found a suitable alternative site and are currently completing onsite feasibility studies as well as investigating the environmental impact as part of our wider environmental impact assessment report.

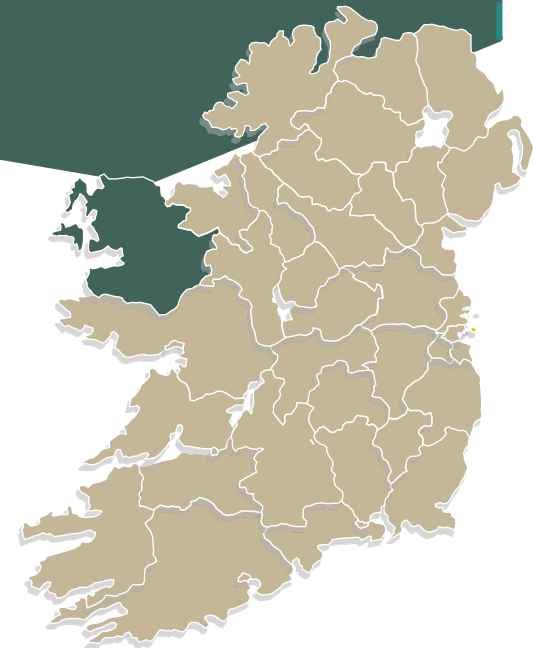
Mercury Renewables

West of Ireland focused renewable energy developer with strong connections to the region.



History

- 2009**
 - Development at Carrowleagh (Kilbride) Bog commences
 - Mercury narrowly misses out on gate 3 grid connection
- 2013**
 - An Bord Pleanála grants planning for 21 WTG site
- 2018**
 - Firlough Wind Farm awarded 48.3MW MEC grid connection
- 2019**
 - Redevelopment works commence for more efficient turbines
- 2020**
 - MaREI, DCU and Mercury conduct green hydrogen feasibility study
 - Firlough awarded further 27.3MW MEC grid connection
- 2021**
 - US engineering firm, Black & Veatch engaged to support green hydrogen development
 - Public consultation commences through online virtual platform
- 2022**
 - Local community engagement efforts increase to discuss possible transportation routes for hydrogen
 - Potential Alternative Hydrogen Production Site identified and preliminary feasibility studies commenced
 - Engagement with Sligo County Council regarding positioning of the hydrogen production



Frequently Asked Questions

Through our public consultation and community engagement the following questions have been asked on more than one occasion.



FAQs

- **How many houses will be located on the transportation route from the Potential Alternative Production Site to the N59?** One single house is located on the route. This house is owned by Padraic Brennan who also owns the land where the Potential Alternative Production Site is located
- **Has the position of the production facility moved within Mr. Brennan's land?** No, the Potential Alternative Production Site is still on the eastern most parcel of Mr. Brennan's land. Recent test water drill sites have located west of the Potential Alternative Production Site.
- **How big will the hydrogen facility be?** Based on our initial design drawings, we expect the agricultural building that will contain the hydrogen electrolyzer to be approximately 3.5 acres.
- **How will the renewable energy from the wind farm at Carrowleagh (Kilbride) bog get to the Potential Alternative Production Site?** The electricity will travel via underground cable laid beneath the public road. This is the way most wind farms in Ireland connect to the electricity network. It is an established technology that does not spoil agricultural land and is widely accepted by local Councils as an acceptable method of transporting electricity.
- **How much water is required?** At full capacity, we expect to require 250m³ a day.
- **Where will the water for the hydrogen production come from?** We have recently commenced drilling on the adjacent lands to the Potential Alternative Production Site owned by Mr. Brennan. Should the flow rate, quality and environmental impact be acceptable, we intend to source the water onsite. We will also harvest rainwater captured from the roof of the building housing the production facility.
- **Will the hydrogen production be drying out neighbouring rivers and waterways?** No. As part of the water surveys currently underway we will be testing the water flow rates, assessing sources and tributaries, to ensure the extraction of water at the site does not have an excessive impact on natural watercourses and aquifers.

Frequently Asked Questions Continued

Through our public consultation and community engagement the following questions have been asked on more than one occasion.



FAQs Continued

- **Are there any examples of heating homes with hydrogen?** Yes, Northern Gas Networks in the U.K. has built a show home in Gateshead, complete with a hydrogen boiler and appliances to demonstrate the similarities between traditional gas boilers and appliances and the zero-carbon hydrogen equivalents.
- **Is an Environmental Impact Assessment being conducted?** Yes, in 2019 Jennings O'Donovan commenced studies and activities that will ultimately be included within an Environmental Impact Assessment Report to be submitted to An Bord Pleánala during the second half of 2022.
- **What byproducts are created in producing green hydrogen?** Green hydrogen is produced by splitting water into hydrogen and oxygen. The water required to produce hydrogen must meet certain purity standards. The purification of brackish water sourced from local aquifers will result in certain byproducts. These are the only byproducts resulting from the process and are naturally occurring elements and compounds which present no harm to the environment from which they came. Through ongoing testing of the water quality at site, we will be able to determine the type of byproducts and therefore the most appropriate method of disposal.
- **Why didn't the public consultation scheduled for May take place?** The second public consultation has been postponed whilst we seek to address feedback provided by local residents in relation to movements of hydrogen by truck on local road networks. We are looking at rescheduling the public consultation for July or August once feasibility studies on both the Original and Potential Alternative Hydrogen Production Sites have been completed.
- **What is happening with the temporary road laid at Mr. Brennan's property?** The road was installed in order to allow for water drilling equipment to safely access the site. Mercury began the removal of the road on Monday 23 May 2022 following completion of the initial drilling test sites.
- **What happens to the commitments made if John Duffy or Mercury Renewables is no longer involved in the project?** Conditions contained with planning applications regarding health and safety, hours of operations etc. and commitments made within legal documents will bind the project or owners of the project to satisfy conditions or honour commitments.

Green Hydrogen Production Overview

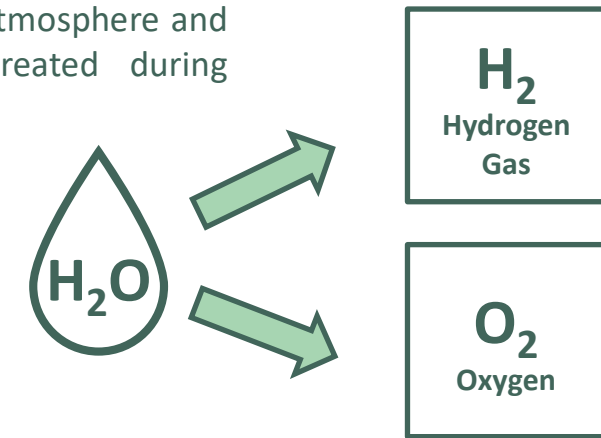
The production of hydrogen from water is a well established and safe technology. Mercury is conducting extensive environmental impact assessments to ensure the project adheres to strict guidelines.



- Renewable Energy produced at the Firlough Wind Farm will be transported via underground cable to the hydrogen production site.



- The renewable energy is passed through water in a process known as “electrolysis”, splitting the water into Hydrogen and Oxygen.
- Oxygen is harmlessly vented into the atmosphere and there are no other by-products created during electrolysis.



- The electrical cables will be placed underneath public roads. This is the typical way of connecting a wind farm to the national electricity grid and does not impact local farming or agricultural land.
- Water is sourced from local aquifers via onsite bore holes. The brackish water must be purified to be used in producing hydrogen.
- The impurities taken from the water are naturally occurring compounds and will be disposed of either back into the watercourse from which they have been extracted or taken offsite.
- Mercury is currently conducting surveys to determine:
 - Volume of available water, ensuring existing users of the aquifers are not impacted
 - Quality of the water and purification requirements
 - Appropriate water impurity disposal and other environmental impact assessments

Green Hydrogen Transportation and Use Overview



Following feedback received from the local community regarding truck movements, Mercury's Potential Alternative Production Site will significantly reduce the number of houses impacted enroute to the N 59.

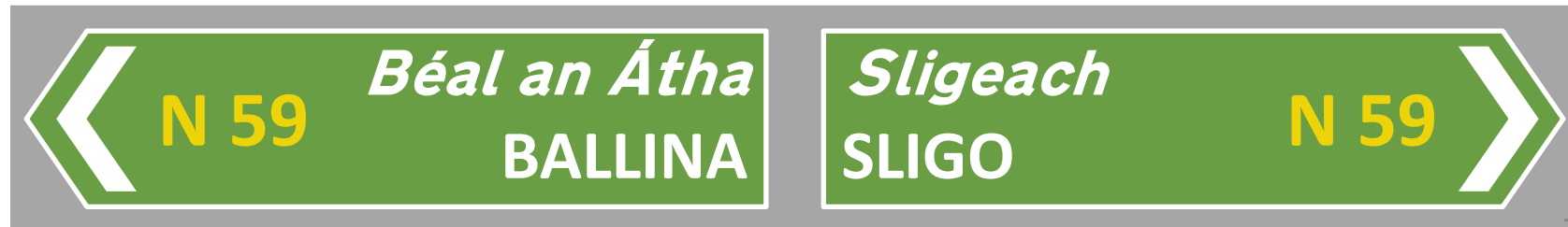
- The green hydrogen produced at our Potential Alternative Production Site (see over page) will pass one single house on the way to the N59.
- The single home on the proposed new transportation route is owned by Mr. Padraic Brennan, who also owns the land where the Potential Alternative Production Site is located.



- We intend to supply our green hydrogen to fuel local heavy goods vehicles, agricultural machinery, buses and provide green heating fuel for local homes. Helping the West of Ireland remain green.
- Hydrogen is already transported by road across Ireland, mainly for use in manufacturing computer chips. The technology used to safely transport hydrogen is well established and is already in use across Europe. Please see the Kittybrewster Refuelling Station example at the back of this presentation.



- Our transportation trucks will run on the green hydrogen we produce making them quieter than traditional diesel trucks and running with zero emissions.



Green Hydrogen for Home Heating

Produced locally using renewable energy and water, the green hydrogen produced by Mercury will be made available to all houses within Mayo and Sligo for 15 years at a discounted, fixed price for heating and cooking.



Our Commitment

- We will provide households in Mayo and Sligo with **discounted, fixed price green hydrogen for 15 years**
- We will work with local community to help retro-fit hydrogen capable boilers, stoves and cookers in their houses.
- We believe that those people living within the local community should benefit from the green hydrogen that is produced using the natural resources from the region.

What's involved

- Hydrogen boilers, cookers and other appliances are used in exactly the same way as current gas appliances.
- However, hydrogen works slightly differently to traditional methane gas used in existing boilers. New hydrogen compliant boilers will be required to be installed.
- SEAI has a number of retro-fitting grants and we're working on including hydrogen boilers for future grant funding.

Helpful Online Resources

- <https://h21.green/>
- <https://www.northerngasnetworks.co.uk/current-business-plan/our-hydrogen-home-welcome-to-green-gas/>
- <https://www.britishgas.co.uk/the-source/greener-living/hydrogen-boilers.html>

Example hydrogen gas boiler



Community Fund

The Bonniconlon and Castleconor communities will benefit from annual funding from Mercury Renewables. Part of committed funding will be allocated towards potential re-location of hydrogen production.



EUR 500,000 committed funding annually

Energy Efficiency and Zero Carbon Heating



- Support in retro-fitting of hydrogen boilers for home heating.
- Mercury will provide 15-year, discounted fixed price, green hydrogen fuel for all houses in County Mayo and County Sligo.
- High efficiency window retro-fitting.



- Administered by an independent committee, the community fund shall be used to enhance local amenities, promote local business and in general improve the utility of the local community.

Higher Education Funding



- Funding shall be made available for those people looking to pursue higher education in fields related to sustainability, climate change and renewable energy.

Local Jobs and Apprenticeships



- Where possible, Mercury shall source tradesmen locally during development, construction and operations.
- An apprenticeship program will be developed to give access to technical jobs in the emerging hydrogen economy.

Public Consultation and Engagement

Mercury Renewables is committed to act as a responsible member of the West of Ireland community. We operate in a transparent and open manner and welcome community feedback.



Community Engagement

- During December 2021, Mercury announced its plans to produce green hydrogen using power from the Firlough Wind Farm. The announcement included regional and national press coverage as well as an interview on Mid West Radio.
- Immediately following the announcement, Mercury opened a Virtual Public Consultation providing further information about the Wind Farm and hydrogen in general, with a specific focus on hydrogen health and safety.
- At the same time, a leaflet drop of more than 500 leaflets was carried out by two Mercury Renewables community liaison officers within approximately 5km of the Wind Farm. The purpose of the drop was to encourage local residents to visit the virtual public consultation.
- As part of a detailed Environmental Impact Assessment, several potential sites near the Wind Farm were considered to locate the electrolyzer. In March 2022, upon selection of the preferred Original Hydrogen Production Site, Mercury engaged with residents along transportation routes that were being considered to transport the hydrogen.
- Through that engagement, we received feedback from community members regarding the safety of transporting hydrogen along rural roads and in close proximity to houses, as well as queries regarding increased traffic movements.
- John Duffy, owner of Mercury Renewables, has made himself available to speak with individuals and representatives of community groups in relation to all submissions received through the various channels open to the public.
- These engagements are currently ongoing and will continue throughout development, construction and into operations.
- We are planning a 2-day in person public consultation during July / August 2022 once feasibility works have been complete on the Potential Alternative Production Site. Further details will be advertised in advance of the consultation.

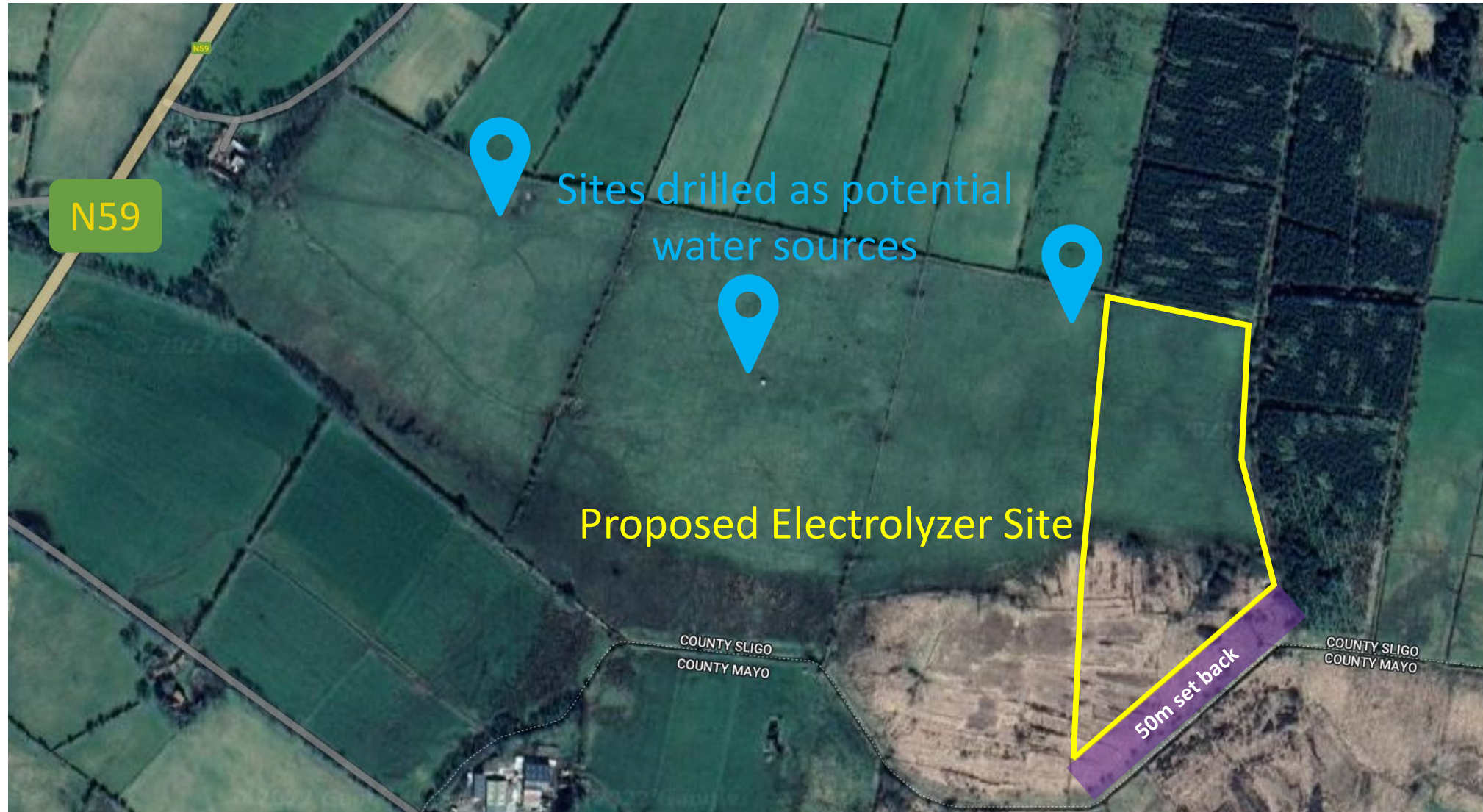
Siting Considerations

Original site co-located with wind farm. Potential Site located ~5.5km from wind farm to reduce truck movements on local road network.



Potential Site

Three potential water sources have been identified through preliminary drilling. These will provide water to the proposed electrolyzer site to the south-east of the property.



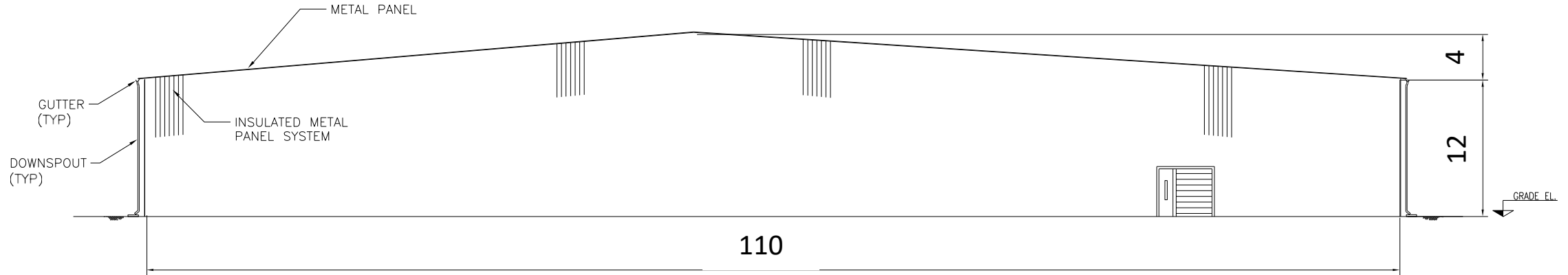
Electrolyzer Building Examples

The below picture is intended as an example only. The final dimensions, colour, door placements, etc are subject to planning permission.

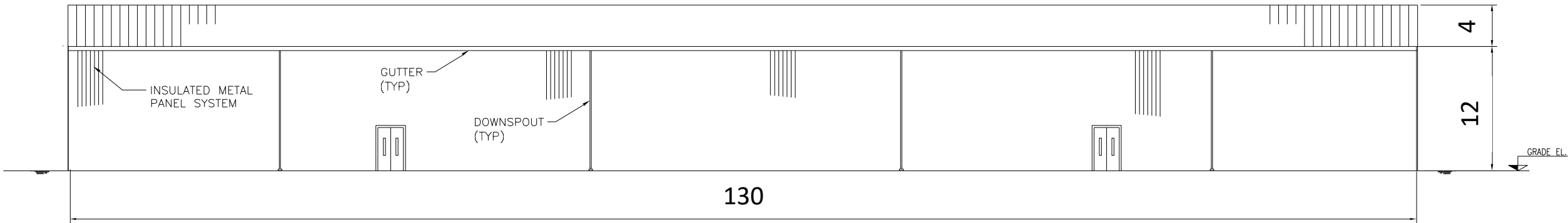


Electrolyzer Building Elevations

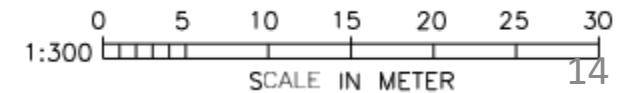
The electrolyzer componentry will be housed within a building sympathetic to the agricultural surroundings in which it would be located.



BUILDING NORTH ELEVATION



BUILDING WEST ELEVATION



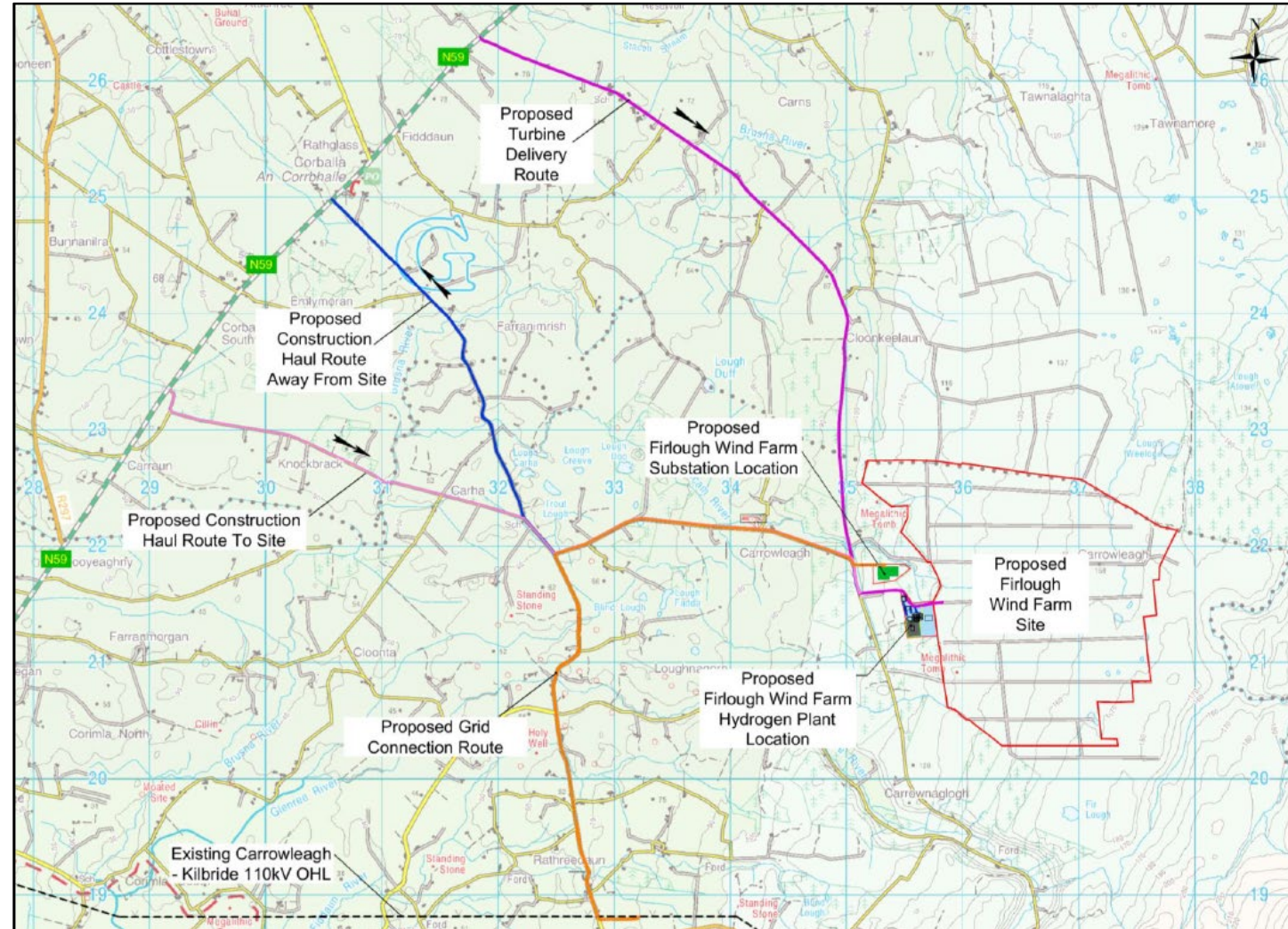
Planning

Ongoing engagement with Mayo and Sligo County Councils as well as An Bord Pleanála.
Hydrogen transportation and road infrastructure impact ongoing.



Transport Routes To and From Site

- Mercury has engaged with Mayo and Sligo County Councils regarding the proposed development and will continue to do so until planning is submitted and beyond.
- Several pre-planning meetings have been held with An Bord Pleanála to discuss the proposed development and provide an overview of the engagement with local authorities and wider bodies such as National Parks and Wildlife.
- In addition to exploring alternative sites for the hydrogen electrolyzer, Mercury is reviewing potential transportation routes for the delivery of equipment during the construction of the wind farm.



Map shows original hydrogen production site without proposed alternative production site currently under consideration

Health and Safety

Mercury's top priority is to ensure the development, design, construction and operation of the project is conducted to the highest health and safety standards.



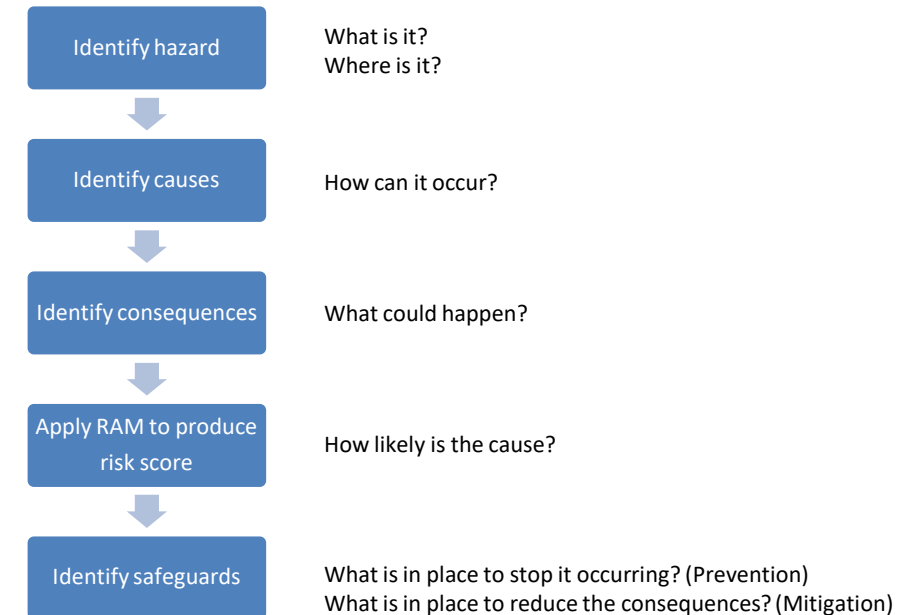
Standards

- Mercury has engaged US engineering consultancy Black & Veatch who have a deep and global track record in hydrogen design and development.
- Risktec, a U.K. based subsidiary of German group TÜV Rheinland has prepared a detailed risk assessment matrix specifically for the Firlough Wind Farm and Green Hydrogen Project.
- Mercury along with Sligo based consulting engineers Jennings O'Donovan, are engaging with the Health and Safety Authority of Ireland in relation to the risk matrix as well as relevant health and safety standards required specifically in Ireland.
- Black & Veatch have prepared a feasibility study identifying the relevant European Directives along with ISO and NFPA design standards and codes to ensure the siting and design of the hydrogen electrolyzer follows best practice and is fully compliant.



Risk Assessment Methodology

- The below diagram shows the risk assessment methodology employed by Risktec in preparing their risk assessment matrix



Producing hydrogen from water and filling vehicles is a well known and established technology. It has been safely deployed around the world in close proximity to houses, an example of which can be seen on the following slide.

EXAMPLE: Kittybrewster Refuelling Station



Located in suburban Aberdeen, the Kittybrewster project is an example of an electrolyzer and refuelling station located in close proximity (50 metres) to residential houses.

Safety Considerations

- The developer worked with local council to implement key safety measures from the outset.
- A thorough risk assessment was undertaken by TÜV Rhineland and shared with the public.
- Through the risk assessment, safety measures such as continuous leak monitoring have been implemented.
- As part of the EU funded HyTransit project, the final report into the operation of the refuelling station indicated no major safety concerns and public acceptance of the station and hydrogen buses has been very good.
- Pressure ratings of 300 – 700 bar have been safely and successfully used in a residential setting.
- The study concluded that customers accept hydrogen as a safe, zero-emission alternative to diesel buses

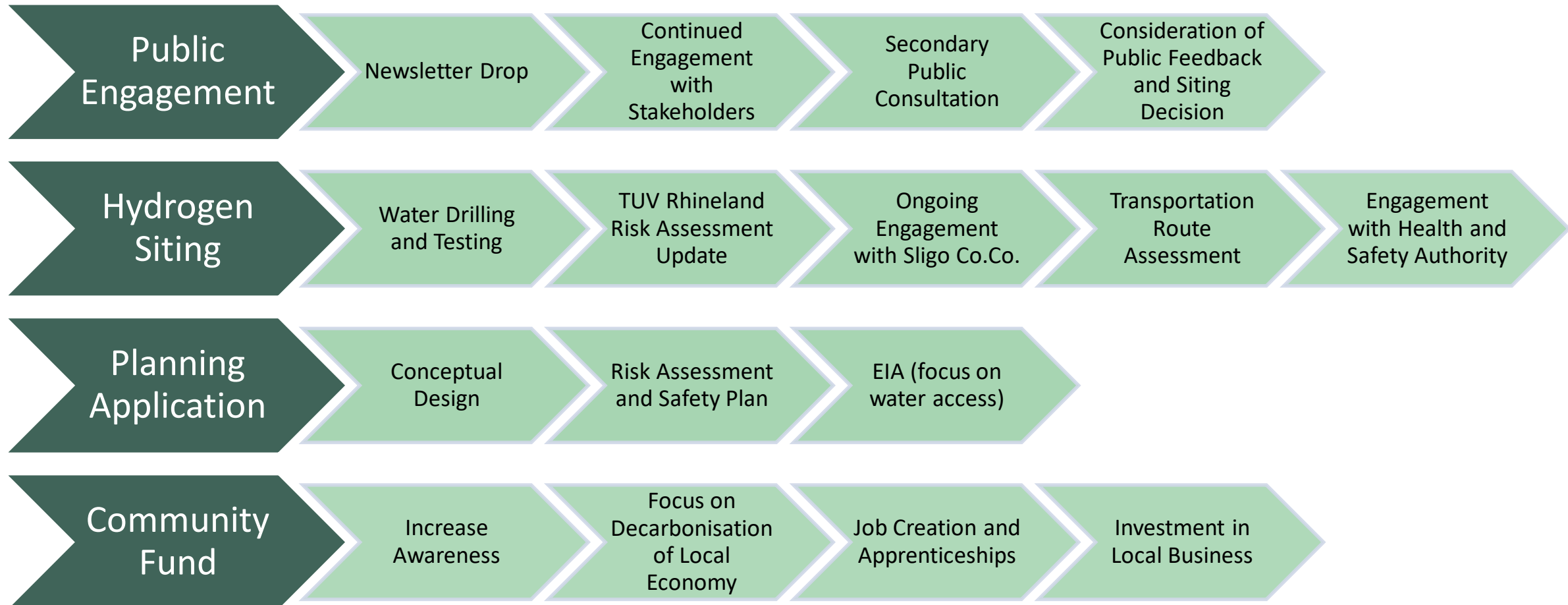


Timeline Looking Forward

Planning Submission targeted for second half of 2022.



Main Workstreams to Planning Submission





 info@mercuryrenewables.ie

 www.mercuryrenewables.ie