Interreg North-West Europe GenComm

European Regional Development Fund

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Overview of the GenComm project

The €9.39 million GenComm project funded by Interreg North West Europe aims to address the energy sustainability challenges of NWE, by technically and commercially validating renewable hydrogen technologies. The project will develop three pilot plants, in Northern Ireland (wind power), Scotland (bioenergy) and Germany (solar power), linking the three main renewable sources, Solar Power, Wind Power and Bioenergy, with energy storage and the main forms of demand - heat, power and transportation fuels. Based on the pilot plants, technical and financial models will be developed, with the overall aim of developing a Decision Support Tool (DST). This DST will then provide a roadmap for communities to transition to renewable, hydrogen-based energy.

GenComm partner Energia delighted to partner Translink on hydrogen public transport project

Belfast will receive the first ever hydrogen-powered double decker buses in Ireland before the end of 2020 in the first major step to de-carbonise Northern Ireland's public transport to zero emissions by 2040.

The announcement was made on Wednesday 29th January 2020, by Translink, the Energia Group, (GenComm partner) and Wrightbus with support from the Department for Infrastructure and the Office for Low Emission Vehicles (OLEV).

Translink have signed a contract with the Energia Group for the supply of renewably sourced hydrogen fuel from an on-shore North Antrim windfarm and a contract with Wrightbus who will supply three new sustainable fuel cell electric double-decker buses powered by hydrogen. The overall capital investment represents around £4 million. The pilot project will also deliver the first ever Hydrogen refueling station of its kind in Ireland.

Speaking at the contract signing in Translink's Milewater Service Centre, Minister for Infrastructure Nichola Mallon said: "My role as Infrastructure Minister is to transform people's lives, better connect communities across the island, ensure we have a thriving balanced economy and play our part in tackling the climate emergency. We cannot do that without changing how we as individuals travel and in government focusing on a low carbon future where we make low emission public transport accessible to people and communities across Northern Ireland.

Along with other Executive Colleagues, I have a responsibility to this generation of young people and the next generation who will live with the consequences of the climate crisis. That means taking action now, being ambitious despite the challenges we face and working together across the government and private sector to drive the innovative solutions that will be needed. That is exactly what this exciting pilot does. It represents a significant first step to tackling the climate emergency we face and demonstrates how working together and as individuals we can play our part in delivering the ambitions of the Northern Ireland Executive to reduce greenhouse gas emissions and improve air quality."

Pictured at the Translink media event from left, Energia Group Energy Services Manager Mark Welsh, Minister for Infrastructure Nichola Mallon and GenComm Project Manager Paul Mc Cormack.

Translink Group Chief Executive Chris Conway said: "Today's announcement marks a major milestone in our efforts to transform public transport and reflects our climate commitment to reduce carbon emissions. This innovative collaboration will not only reduce

carbon emissions but will also generate much wider environmental, economic and social benefits for Northern Ireland.

The time for action is now and, with a record 84.5m passenger journeys on Translink services last year, making public transport your first choice for travel is the single greatest way to reduce your personal carbon footprint and one of the most immediate.

We would like to thank OLEV and the Department for Infrastructure for essential project funding and look forward to working with Energia Group and local manufacturer Wrightbus to deliver this new era for public transport in Northern Ireland."

Energia Group Energy Services Manager Mark Welsh, said: "Energia Group through the Interreg NWE GENCOMM Project is the first energy company on the island of Ireland to produce hydrogen from renewable sources. It will be produced at one of our wind farms in North Antrim and we are delighted to announce we have signed a long-term contract with our partners, Translink to supply the Hydrogen for three Fuel Cell Double Deck Buses.

Under Energia's £3 billion Positive Energy programme, we intend to make additional multi-billion investments in diverse renewable energy infrastructure, including the production of hydrogen - adding to our renewable energy portfolio across the island already comprising our 15 onshore wind farms, which generate over 300MW of green electricity, and an additional 900MW through off-take agreements with other windfarms.

As a leading energy utility, we are fully engaged in developing innovative solutions for its customers to help them engage more actively in transport decarbonisation, and in turn make a meaningful contribution to meeting local climate change and air quality objectives.

We are delighted to partner with Translink on this renewable hydrogen project which brings together both public and private sector investment and innovation. The project will also be an important enabler for the development of the skills and capabilities of local companies, such as Wrightbus, so that export opportunities in the global hydrogen economy can be realised."

Wrightbus Chairman Jo Bamford said: "As Wrightbus embark on an exciting new era to revolutionise public transport we are delighted to be able to partner Translink with these fantastic world leading Fuel Cell Electric Vehicles. This order helps further cement and develop our valued relationship and further proves that Northern Ireland can be at the front of the world stage when pioneering solutions which deliver zero emissions in our towns and cities throughout the UK and Ireland and the rest of the world whilst helping our local environment and economy."

Pictured at the Translink media event are from left, Ian Thom, CEO, Energia Group, Jo Bamford, Wrightbus Chairman, Minister for Infrastructure Nichola Mallon and Chris Conway, Translink Group Chief Executive

GenComm partner to give presentation at the World Hydrogen Energy Conference

Tubagus Aryandi Gunawan, NUIG PhD research student is presenting at the 23rd World Hydrogen Energy Conference (WHEC) in Istanbul, Turkey from 5th to 9th July 2020. Tubagus tells H2go News about the event:

It is one of the most well-known conferences in the hydrogen energy system. International communities who work in the hydrogen field are expected to share their experience and expertise in the development and deployment of hydrogen as a carbon-free energy carrier for a sustainable energy system. As the GenComm project progressively works in renewable hydrogen, the WHEC can be the strategic place to communicate the developed techno-economic model, which has been adopted as the Decision Support Tool (DST).

The DST is one of the essential deliverables from the National University of Ireland Galway (NUIG) as the lead partner of the long term effect work package in GenComm project. NUIG is scheduled to participate in giving an oral presentation at the WHEC. At the conference, NUIG is committed to disseminate its latest work on the potential of the integration of wind and solar energy to produce fully renewable hydrogen for the decarbonisation of public city buses.

NUIG is also keen to gain more knowledge in recent hydrogen technologies from other international researchers during the conference.

Tubagus Aryandi Gunawan, PhD research student in mechanical engineering, NUIG

Pictured at the CH2F launch from left, Paul Mc Cormack, GenComm Programme Manager, Rita Mc Garvey, National Contact Point, (Ireland) Interreg North West Europe, VB Programme 2014-2020, Eva Clymans, Interreg North West Europe Project Officer, Dr Rory Monaghan, NUIG , and Tubagus Aryandi Gunawan, PHD student, NUIG

Hydrogen Powered Trains journey continues in Germany

Through the GENCOMM project the capability of personal FCEVs to become a reliable alternative for fossil fuels will be tested and examined. However, public transportation must also begin moving towards being powered by more renewable means.

There have been experiments in Hydrogen powered buses for several decades and small fleets are already located in countries around the world, such as Scotland and Japan. Now Germany and France are leading the way in the implementation of Hydrogen powered trains.

Manufactured by the French company Alstom and launched in Lower Saxony, Germany in 2018, the Coradia iLint was the first Hydrogen powered train to enter service. Able to travel up to 140 km per hour and operating on a 100 km line it services the locations of Cuxhaven, Bremerhaven, Bremervorde, and Buxtehude. Alstom has stated that it will deliver another 14 Hydrogen powered models to lower Saxony by 2021 and other countries, such as France and Italy, have also expressed interest in Hydrogen trains.

The Coradia is more expensive than an ICE train of a similar size but a Hydrogen train is cheaper to operate. In 2017 railway travel in the EU amounted to 470 billion passenger kilometres, or 6.8% of all transport and 24.4% of public transport, showing a definite need for a zero emissions option.

Being a major mode of transportation in most countries there is certainly a market for Hydrogen trains but by 2017 54% of the EU28 railway fleet was already electrified. Meaning that much of the fleet is already running on potentially green energy depending on how the power is supplied. There is still a need for alternatively powered trains as some lines are either simply not electrified or can't be electrified and the use of Hydrogen powered trains with partial line electrification would work in most areas.

Dr Bodo Groß, Samuel Yarnall, IZES gGmbH.

Hamburg Police add Hydrogen Fuel Cell Patrol car to fleet

The German hydrogen transport story continues with the news that the Hamburg police have added a hydrogen fuel cell patrol car to their fleet. This is the world's first F Cell service. At a ceremony in Hamburg, Commissioner for Police, Ralf Martin Meyer and Thomas Krumm, Head of Vehicle Fleet Management received the environment friendly patrol car.

The patrol car is a Mercedes Benz GLC F Cell. The vehicle is powered by hydrogen and it will be refuelled at one of the three public hydrogen refuelling stations in Hamburg. The Mercedes Benz GLC F Cell has a range of about 400 kilometers. According to the police, the car is the world's first police car that simultaneously has a fuel cell and a battery drive.

The Mercedes Benz GLC F Cell (Weighted hydrogen consumption 0.91 kg/100km, weighed CO2 emissions: 0 g/km, weighted power consumption: 18kWh/100km)1 is in service with the Hamburg police. The SUV is a long distance, all electric vehicle with zero CO2 emissions while driving. Intelligent interplay between battery and fuel cell, long range and short refuelling times make the GLC F Cell a vehicle of high everyday practicality and also suitable for long and short distances.

With the acquisition of alternative drives for patrol cars, the course is set for an environmentally friendly, future proof Hamburg police. The figures for hydrogen consumption, electrical consumption, and CO2 emissions have been determined in accordance with the prescribed measuring method according to Directive 692/2008/EC; N253.

Meanwhile in Brussels on 25-26 March 2020 there is a Hydrogen and Fuel Cells for Heavy Duty Transport Conference, taking place. The event will bring together major stakeholders from industry and academia in order to discuss the latest advancements in this sector. HFC applications for buses, trucks, trains, ships and planes will be discussed. Among the topics being covered are the EU regulatory framework and hydrogen roadmap, onboard hydrogen technologies and high capacity hydrogen refueling stations.

Hamburg Police Officers alongside their new hydrogen fuel cell patrol car

Is Ireland ready for renewable hydrogen by 2020 ?

Dr Rory Monaghan from GenComm partner NUIG explains how hydrogen use can lead to a future decarbonised electricity system and how it can also enable the connection of Ireland's vast renewable energy potential with the country's energy system.

Interconnection will help, but curtailment, constraint and the need for long-term storage will come into sharp focus. Despite this, it is probable that electricity will be the easiest sector to decarbonise. Electrification of transport and heating is underway, but the pace is slow, and many energy end uses are unsuitable for electrification.

Transportation, especially in heavy, long-distance, marine and aviation applications, and heating, especially in high-temperature industries, are unlikely to see significant electrification in the foreseeable future. In its report 'Mission Possible: Reaching net-zero carbon emissions from harder-to-abate sectors by mid-century', the Energy Transitions Commission highlighted the major role for hydrogen in deep decarbonisation of these "harder-to-abate" sectors by 2050. It emphasised the potential for hydrogen not only to offset fossil fuel use within each sector, but also to "sector couple" between them and a future decarbonised electricity system.

How can hydrogen achieve this? Hydrogen is found in hydrocarbons and in water but needs significant amounts of energy to be liberated. The cheapest and most widespread way to do this is by steam methane reforming (SMR) of natural gas, which releases CO2. A small but growing portion of global hydrogen now comes from electrolysis, the use of electricity to split water into hydrogen and oxygen.

While currently more expensive than SMR, electrolysis produces hydrogen that is as renewable as the electricity that runs the process. This renewable hydrogen can subsequently be trucked or piped to where it can be burned in pure or blended states, used in a fuel cell to directly produce power or supplied to an industrial process.

In high RES-E scenarios, this enables long-term energy storage, grid balancing, reductions in curtailment and constraint, and sector coupling to the gas grid and the harder-to-abate sectors. Hydrogen could also enable large-scale connection of Ireland's vast offshore renewable energy potential with the country's energy system. It is worth noting that a single 1.2-metre diameter hydrogen pipeline could transport energy at the same rate as eight high-voltage transmission lines.

So when will all of this happen? The answer is right now. Commercially available hydrogen fuel cell buses ply routes from Aberdeen to Tokyo with zero air-polluting emissions, as well as longer ranges and shorter charging times than electric counterparts. Hydrogen-powered trains are undergoing trials in Germany and the UK on regional lines unsuited to electrification. The H21 project will convert the gas grid of Leeds first, then the entire north of England, to 100 per cent hydrogen supplied by SMR with carbon capture and storage in depleted gas fields. The north Netherlands will become a "Hydrogen Valley" that will demonstrate most aspects of a hydrogen economy, including electrolysis powered by offshore wind, gas grid injection, underground storage, hydrogen-fired domestic and industrial heating, and even a hydrogen-fuelled ocean-going ship.

Hydrogen is becoming a reality in Ireland too. As part of the €9 million EU-backed GENCOMM project, Energia will produce the island's first renewable hydrogen in County Antrim to supply new fuel cell buses in Belfast. Communities are also leading on hydrogen. In concert with the EU-backed GENCOMM, SEAFUEL and HUGE projects, energy cooperatives on Valentia Island, Rathlin Island and the Aran Islands are working with researchers to explore how hydrogen can maximise energy security, stimulate new industries and restore economic and social vitality to proud communities. These initiatives have led to the creation of Hydrogen Ireland, the Community Hydrogen Forum and Hydrogen Mobility Ireland, all of which are dedicated to the promotion of hydrogen. The technology is here. The research community is ready. Will you rise to the challenge and grasp the hydrogen opportunity?

Dr Rory Monaghan, NUIG

This piece first appeared in the 'Renewable Energy Magazine, Issue 9' (https://www.energyireland.ie/renewable-hydrogen-is-ready-for-take-off-will-ireland-be-onboard/)

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