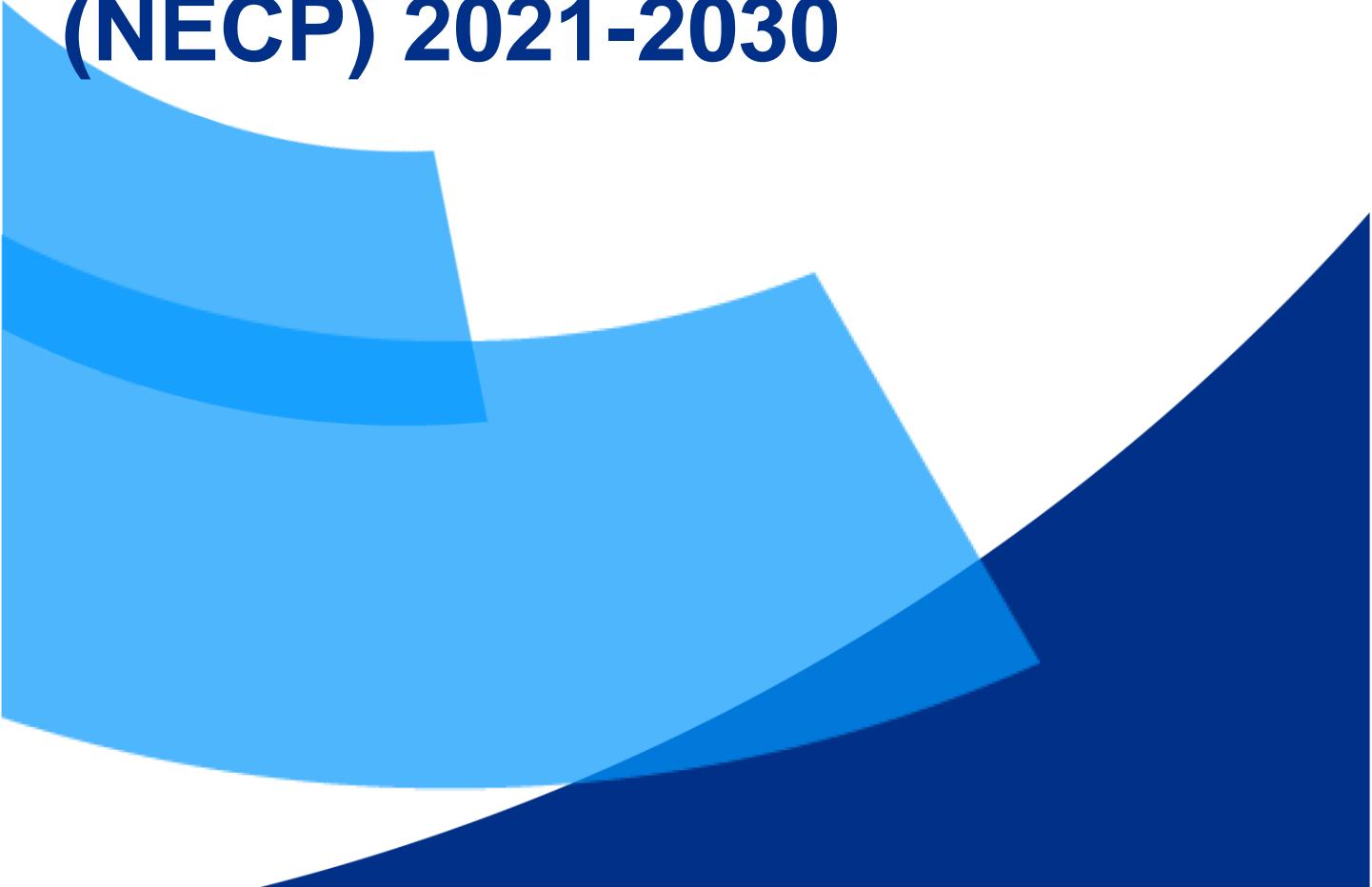


Ervia's response to Ireland's Draft National Energy & Climate Plan (NECP) 2021-2030



February 2019

Introduction to Ervia

Ervia is a commercial semi-state company with responsibility for the delivery of gas and water infrastructure and services in Ireland, through Gas Networks Ireland and Irish Water. It also provides dark fibre broadband infrastructure through its business Aurora Telecom.

Gas Networks Ireland develops, operates and maintains the natural gas transmission and distribution networks in Ireland, consisting of 14,172km of gas pipelines. Gas Networks Ireland provides gas transportation services to all gas suppliers and shippers.

Irish Water is the national water utility responsible for providing safe, clean and affordable water and wastewater services to 1.7 million customers in the Republic of Ireland. Irish Water is responsible for the operation of all public water and wastewater services.

These national gas and water utilities underpin the social and economic development of Ireland and will play strategic roles in the transition of Ireland to a low carbon, climate resistant and sustainable economy by 2050.

Overview / Executive Summary

Ervia welcomes the opportunity to respond to the consultation issued by the Department of Communications, Climate Action & Environment on Ireland's Draft National Energy & Climate Plan (NECP) 2021-2030. Our key points are summarised below:

- Modelling of the least cost pathway to national decarbonisation should be carried out to inform Ireland's energy future.
- The gas network can be carbon neutral by 2050.
- Biomethane is the least cost solution for decarbonising half the homes in Ireland:
 - The NECP should put measures in place to transition to gas those homes which are currently using oil and located close to the gas network.
 - By further utilising the gas network to deliver carbon neutral Biomethane or Hydrogen, Ireland and its citizens could avoid over €40bn in expenditure on deep retrofits for home heat decarbonisation.
- Ireland cannot afford to 'Deep Retrofit' every home. The gas network offers a decarbonisation solution for c.1 million homes.
 - Hydrogen shows potential to decarbonise heat in Ireland
 - UK evidence no longer supports full electrification
- Natural Gas fired generation provides flexibility and stability to the electricity grid, allowing a higher level of intermittent renewable electricity.
 - CCS is a proven technology which can be used to provide clean, dispatchable electricity
 - There are no credible alternatives to CCS for Ireland
- Compressed Natural Gas and Hydrogen offer solutions for decarbonising transport in Ireland.

Modelling of the least cost pathway to decarbonisation should be carried out to inform Ireland's energy future

To minimise the financial burden on our citizens, Ireland must optimise its investments in climate change solutions. As a first step, Ireland should identify the least-cost solution to meeting our 2050 decarbonisation targets. Each higher cost alternative should only be considered, in turn, where the least-cost solution is not technically feasible. The least-cost option should determine the long-term roadmap to climate change mitigation.

Such national modelling could be split by sector and detailed, action driven roadmaps developed for each. For example, a model could be developed to determine the least cost method of decarbonising the residential heat sector in Ireland.

The gas network can be carbon neutral by 2050

- The gas network could be used to reduce Ireland's emissions by at least 17.5 million tonnes per annum. The NECP modelling should be updated to reflect the decarbonisation potential of the gas network.

The Irish gas network is a state asset owned by the public and should be utilised to its maximum potential to help deliver emission reductions at the lowest possible cost to Ireland's citizens. Ervia strongly believes that the gas network can become carbon neutral by 2050, and therefore be a key enabler of decarbonisation in Ireland.

Ervia has recently developed a vision that shows the decarbonisation potential of the current gas network. This is set out below in Figure 1. If this is achieved, the gas network could be responsible for reducing emissions in Ireland by over 17.5 million tonnes of CO₂ per annum by 2050, when compared with 2016 levels. Imperative to achieving these CO₂ reductions for Ireland are technologies such as Biomethane, CNG vehicles, Carbon Capture and Storage (CCS) and Hydrogen. Ervia has been actively working on initiatives

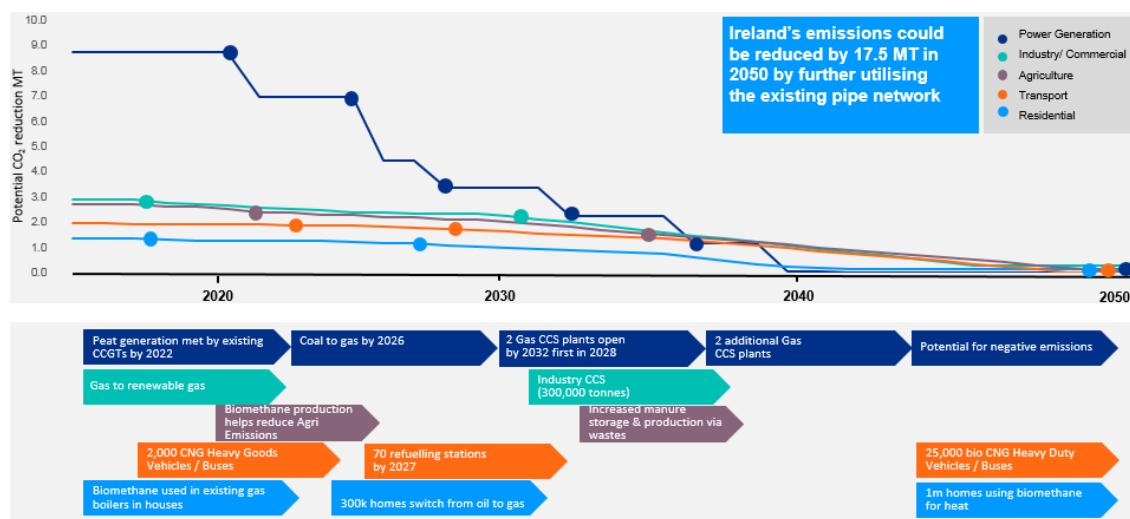


Figure 1 Decarbonisation potential of the gas network shown across the different sectors

across all of these areas over the past number of years and is a strong advocate of their capability to help Ireland achieve its climate targets. The current modelling (NECP 1-4) shows that Ireland will miss its climate targets by a significant margin. Ervia therefore recommends that the technologies included in its decarbonisation roadmap be included in this modelling in order to help Ireland achieve its climate targets.

Heat Decarbonisation

- The least cost and least disruptive method to decarbonise approximately half the homes in Ireland is to inject renewable gas into the gas network - together with an economic level of home retrofit.
- The NECP should put measures in place to transition to gas those homes which are currently using oil and located close to the gas network.
- The level of ambition for renewable gas (Biomethane) in Ireland should be included in updated modelling for the NECP.

Biomethane is the least cost solution for decarbonising half the homes in Ireland

The residential sector accounts for a quarter of the energy used in Ireland and is also responsible for a quarter of the energy-related CO₂ emissions. Analysis by KPMG¹ has shown that the least cost and least disruptive method to decarbonise the 1 million homes on or close to the gas network is to inject renewable gas into the gas network, together with an economic level of retrofit in those homes. This would provide a decarbonisation solution for approximately half of the homes in Ireland.

Based on publicly available information, Ervia has also assessed the different costs of decarbonising oil homes near the gas network, based on the expenditure (€) required to save (i.e. abate) 1 tonne of CO₂ emissions. This analysis is summarised in the graph below.

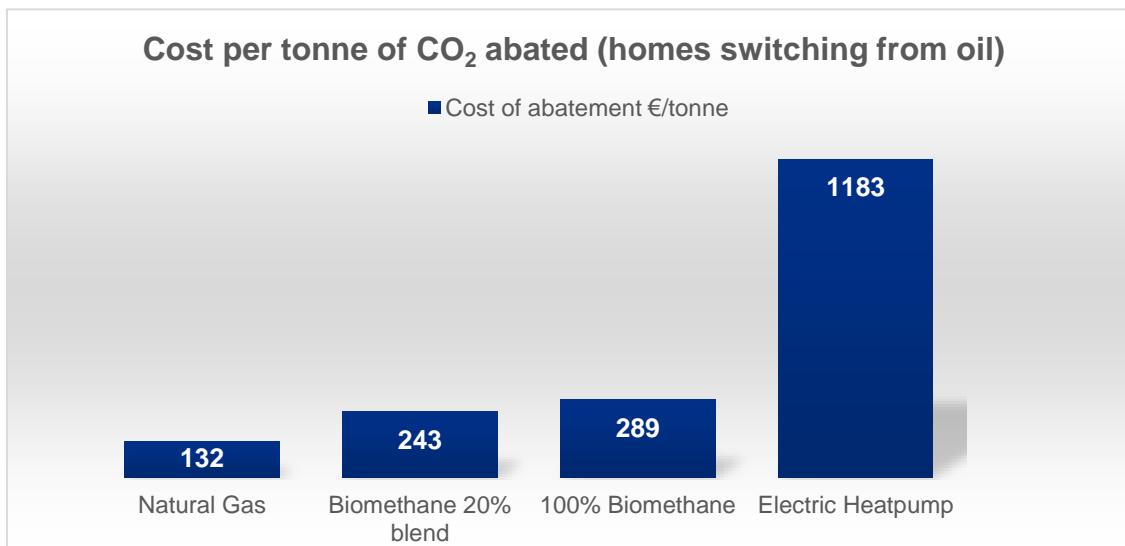
Heat pumps will have a significant role to play in Ireland's decarbonisation journey and should be considered for homes that are not close to the gas network. However, as demonstrated by the analysis below, the cost of abatement using heat pumps³ is very high in comparison to gas alternatives (including 100% renewable gas).

¹ [Decarbonising Domestic Heating in Ireland – KPMG 2018 report](#)

³ When all costs are considered, including the cost of deep retrofit necessary for effective heat pump operation.

This analysis indicates that for one-off houses, the focus should be on deep retrofits and heat pumps. For urban based housing, the best solution is a combination of an economic retrofit and converting any house located near the gas network to natural gas and then in time to Biomethane. Ervia therefore recommends that the NECP should put measures in place to transition to gas those homes which are located in proximity to the gas network and currently using oil or solid fuels.

As noted previously, the gas network can be fully decarbonised by 2050 at the latest with renewable gas. This level of ambition for renewable gas (Biomethane) in Ireland should also be included in updated modelling for the NECP.



Analysis carried out by Ervia Feb 2019 – information from SEAI; Gas Networks Ireland; ESB

Ireland cannot afford to ‘Deep Retrofit’ every home. The gas network offers a decarbonisation solution for c.1 million homes

- By further utilising the gas network to deliver carbon neutral Biomethane or Hydrogen, Ireland and its citizens could avoid over €40bn in expenditure on deep retrofits for home heat decarbonisation.
- The NECP should use total system cost as the basis for recommendations on decarbonised heating technologies and should consider the level of expenditure required by citizens of Ireland.

Electrification of heating via heat pumps is commonly cited as the most appropriate way to decarbonise homes. However, in order for a heat pump to work effectively, most houses in Ireland today would require a deep retrofit. The cost of these deep retrofit

works has been estimated at an average of c. €50,000 per house⁴. For the c.1 million homes which are currently on or close to the gas network, decarbonisation through heat pumps would require the owners to spend c. €50 billion on deep retrofits.

Considering the high level of national debt, the State will not be in a position to fund these deep retrofits. Minister Richard Bruton confirmed this position in response to a written question in the Dáil on 24th January 2019 when he stated:

"What is clear is that the Exchequer will not be able to fund the scale of deep retrofit that needs to happen".

Ireland already has one of the highest levels of national debt per capita in the world and therefore it is also clear that the majority of Irish citizens will not be able to personally fund the scale of deep retrofit that is needed.

Ervia believes that the majority of this expenditure is unnecessary as such homes can be fully decarbonised using renewable gas in existing gas boilers, and by switching from oil to gas. As set out in the KPMG 2018 report⁵, these homes could avail of a much lower cost retrofit to significantly reduce their heating demands. Such measures would include increasing attic insulation to required levels, draught proofing the house, replacing windows and doors, and insulating cavity walls.

Hydrogen shows potential to decarbonise heat in Ireland

Hydrogen produces zero emissions when combusted. Much like natural gas, Hydrogen can be used for heating, transport, and power generation. Hydrogen can be produced by electrolysis (splitting water using electricity) with no emissions arising during production. It can also be produced by steam reformation of methane (conversion of natural gas to Hydrogen using high temperature steam) which produces CO₂ emissions which can be stored with CCS.

In a recent European report⁶, it is stated that "*achieving the energy transition in the EU will require hydrogen at large scale & without it, the EU would miss its decarbonisation objective*".

The UK is also seriously considering Hydrogen as a heating fuel after the costs and disruption of full electrification of the heat sector were realised⁷.

"The expectation that electric heat pumps will be the primary technology, as proposed by the 2013 Heat Strategy, is being challenged, as the expense and practicalities of deploying them are being realised".

Also in the UK document 'Transforming Heating'⁸ it is outlined that:

"From our review of the evidence so far, technologies using electricity, hydrogen and bioenergy all have the potential to make important contributions to the transition to low carbon heating".

⁴ John Fitzgerald – Committee on Climate Change at the Joint Oireachtas Committee

⁵ Decarbonising Domestic Heating in Ireland

⁶ Hydrogen Roadmap Europe

⁷ Transition to Low Carbon Heat – Energy Research Partnership

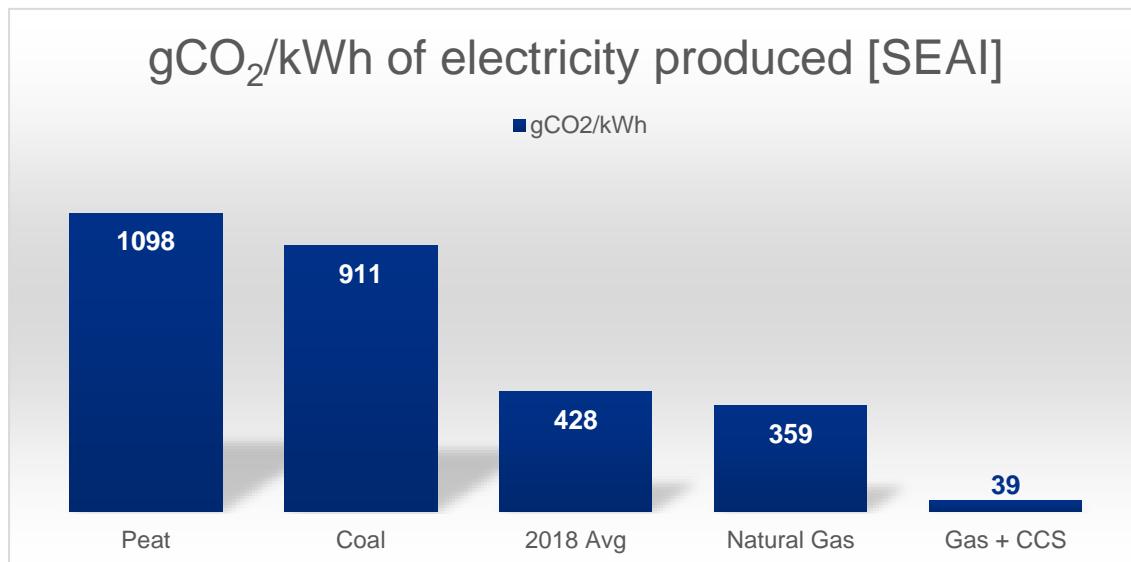
⁸ Transforming Heating – Clean Growth Overview of Current Evidence

It is clear from the UK evidence that full electrification of heat is no longer seen as a feasible solution and that a mix of different technologies will be required to deliver a decarbonised heating sector at least cost. In this context, Ervia is currently monitoring the potential for Hydrogen in Ireland and welcomes its inclusion in the draft NECP.

Power Generation decarbonisation

Natural Gas fired generation provides flexibility and stability to the electricity grid, allowing a higher level of intermittent renewable electricity.

Natural gas fired power generation provides flexibility and grid stability which complements the high level of intermittent renewable generation on the system. It is also the cleanest burning fuel for thermal power generators and emits significantly lower amounts of air pollutants when compared to coal or peat, as evidenced in the graph below.



Ervia notes that in two of the four models carried out for the NECP, coal and peat are still producing electricity as late as 2030. Ervia believes that the transition away from coal and peat in the electricity generation sector should happen as soon as possible in order to significantly decarbonise the sector. As evidenced during a sustained outage in 2018⁹, Moneypoint is no longer always needed on the system. Ervia's view is that coal and peat should only be a back-up option, until 2025 at the latest, which could be made available for extended periods of high electricity demand or very low wind generation. Ervia also recommends that a full electricity system model should be carried out to assess the least cost future decarbonised electricity system.

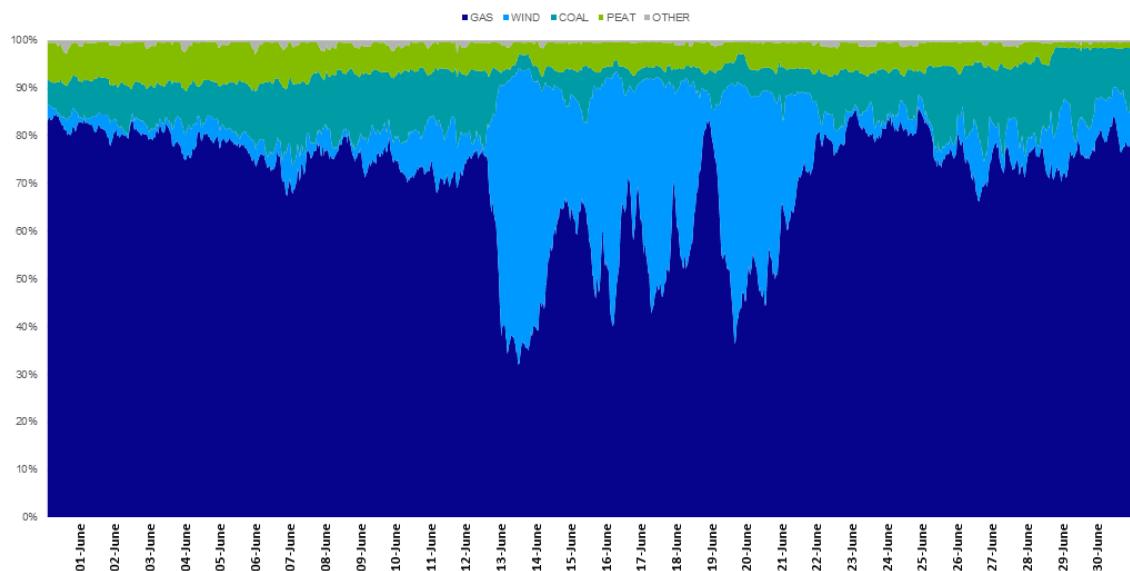
⁹ [Moneypoint out of action for three months](#)

CCS is a proven technology which can be used to provide clean, dispatchable electricity

- CCS is the solution to decarbonising existing or future gas fired power generators in Ireland
- Ertia welcomes the reference to the Cork CCS feasibility study in the NECP and will continue to progress this initiative throughout 2019.

CCS can capture over 90% of the CO₂ from the exhaust stream of existing CCGTs in Ireland. This means the benefits of gas fired generation, such as flexibility and stability, can be retained while producing electricity output which is almost entirely carbon free.

Gas fired CCGTs provide the flexibility which has allowed Ireland to integrate so much intermittent wind power onto the electricity system. The chart below from June 2018 show the degree to which gas fired power generation provides the backbone of the Irish electricity system; there was a 10 day period in when wind produced less than 5% of electricity demand. There have been many periods in recent years when the gas network has been responsible for keeping the lights on, due to low output from variable wind generators.

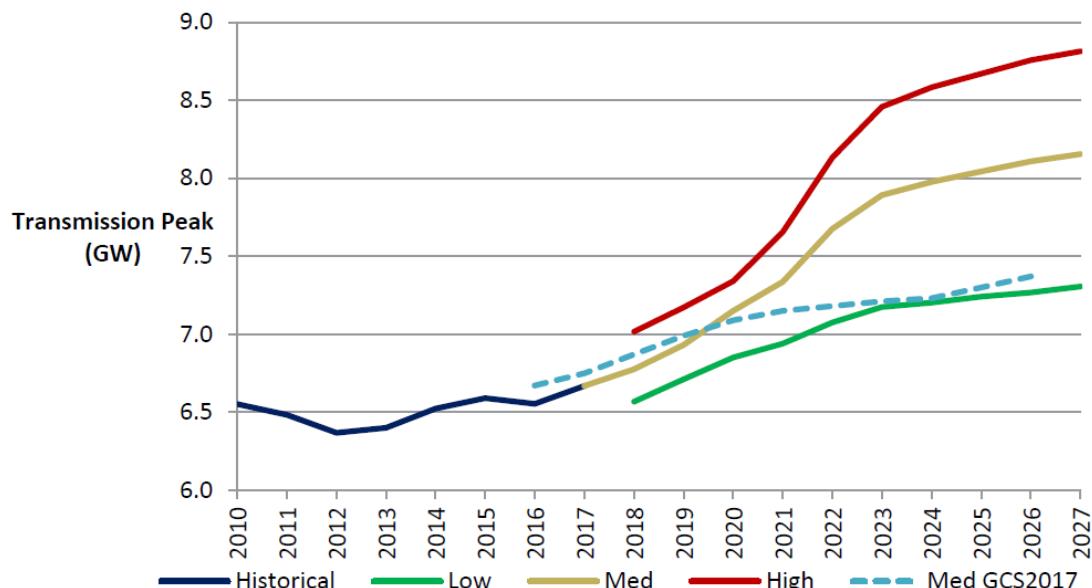


It is critical for Ireland's electricity system and decarbonisation goals that this gas fired generation: (1) remains on the system to provide the system services and back up for renewables, and (2) is decarbonised so that Ireland can meet its climate targets.

As demonstrated in the chart below¹¹, Ireland's peak demand is expected to rise considerably over the coming years due to increased population, more housing, electric vehicles, electric heating (for homes not close to the gas network), and data centres among other drivers. In order to ensure a stable electricity system in the future, and to

¹¹ [EirGrid's Generation Capacity Statement 2018](#)

meet peak electricity demands at times of low renewable energy output, Ireland must have a secure and flexible decarbonised form of electricity. Ervia believes this can be provided through CCGTs coupled with CCS.



There is no credible alternative to CCS for Ireland

Ireland lacks any credible alternative to CCGT+CCS to provide clean, dispatchable and reliable power at scale. Alternatives which may be considered to provide long-term security of supply and flexibility all have significant shortcomings:

- **Hydropower:** Ireland has all but exhausted its hydropower resource at ~2% of demand.
- **Nuclear:** This option is not socially acceptable in Ireland and its development would require a significant shift in both policy and expertise. It is also extremely expensive and complex as can be seen with recent difficulties in developing the next generation of nuclear in the UK.
- **Biomass:** Increasingly viewed as unsustainable considering the large deforestation required, particularly to supply power generation. Biomass burning is also leading to poor air quality in Ireland¹³ and the scale of wood burning required to run a power station would exacerbate this. The UK's Committee on Climate Change has already outlined its concerns with biomass in power generation and has suggested that the UK should utilise its biomass resource in a more efficient manner than power generation¹⁴.
- **Batteries:** These have been suggested as a potential solution to store renewable electricity and utilise it when the wind is not blowing or the sun is not shining. However, batteries are generally viewed as only suitable for short term storage (hourly) and fast response and are still extremely expensive. Ervia has calculated

¹³ Green heating fuels leading to 'extreme levels of air pollution'

¹⁴ Committee on Climate Change UK – Report on biomass in a low carbon economy

the cost of Tesla's Australian 'Mega Battery' to store one day of average electricity demand in Ireland to be €34 billion.

- **Electrical interconnectors:** These will have a role to play in enabling trading with Europe but should not be relied upon for security of supply. Electrical interconnectors have demonstrated a poor level of reliability over the past few years. It is also not clear that there will be electricity available, at reasonable cost, on the other side of electrical interconnectors when it is needed most in Ireland for security of supply reasons. Electrical interconnectors are also expensive capital projects. For example, the East West Interconnector, EWIC, cost more than twice as much as the most recent gas interconnector, even though the gas interconnector can carry 31 times the amount of energy.

Ervia is progressing a feasibility study into CCS for Ireland

- NECP national modelling should be updated to include CCS in the power generation sector.
- Ervia supports the formation of a government led CCS working group to continue assessing the potential for CCS in Ireland.

Ervia is assessing the potential for large-scale CCS at the near depleted Kinsale gas field off the coast of Co Cork. This would provide the potential to capture the CO₂ from a number of gas-fired CCGT power plants in the area, enabling them to provide low-carbon electricity.

A feasibility study is currently investigating the opportunity to reutilise infrastructure near the Kinsale Gas Field, the optimum way to decommission the existing offshore infrastructure, how to improve confidence in the field as a storage site for Ireland, and the potential for exporting CO₂ to other possible storage sites in Europe, the UK and Norway.

Ervia welcomes the inclusion of CCS in Ireland's NECP but recommends that the modelling should be updated to include CCS in the power generation sector. Ervia also supports the formation of a government led working group to continue assessing the potential for CCS in Ireland. It is worth noting that Ervia is considering the possibility of European Grant funding for a potential CCS project in Ireland, which would require support from the State.

Decarbonising Transport

Compressed Natural Gas (CNG)

- CNG powered vehicles could receive similar supports to EV vehicles and a reduced toll charge on tolled roads.
- The State could mandate a switch of its HGV / Bus / Truck fleet to CNG. A target of 20% by 2021 could be achieved.
- Commercial vehicles using CNG should face a lower road tax bill for their reduced emissions.

Ervia welcomes the inclusion of CNG in the NECP, however greater emphasis is warranted on a solution which can immediately achieve a reduction in CO₂ emissions in the heavy goods and buses transport sector. If the State mandated a switch of its HGV / Bus / Truck fleet to CNG, a target of 20% by 2021 could be achieved. Further State supports would also have a positive impact on transport decarbonisation. There is a strong argument for CNG vehicles receiving similar supports to those provided to electric vehicles, including reduced toll charges and lower road tax CNG commercial vehicles.

Hydrogen for transport

Ervia notes the reference in the NECP draft to the Alternative Fuels Framework and the point that "*Hydrogen use is also anticipated to increase its penetration across the entire fleet spectrum in the coming decades but not in the short-term.*" Ervia wishes to draw attention to increased research and activity in the Hydrogen transport sector which suggests that it may grow at a faster rate than currently anticipated.

- Germany launched the first two Hydrogen trains late last year¹⁵, running between cities with a total range of 1000km on a single tank of Hydrogen. Hydrogen trains are ready for commercial production and Ervia recommends that Ireland should evaluate/trial the technology before committing to expensive electrification of all train lines.
- The UK has operated Hydrogen vehicles in London for a number of years. Currently there are 13 publically supported Hydrogen vehicles in operation in the city.
- In another boost to the zero emission automotive sector, the UK recently selected five refuelling projects and 106 vehicles to be supported with funding of £14m¹⁶.
- Dublin Bus is also trialling Hydrogen as a potential decarbonised fuel for its buses¹⁷.

¹⁵ [Germany launches world's first hydrogen powered trains](#)

¹⁶ [UK Government selects hydrogen projects for £14m funding](#)

¹⁷ [Launch of low emissions bus trial](#)

Specific comments on the draft NECP

- Ervia, Gas Networks Ireland and Irish Water wish to be included as state bodies involved in the administrative structure of implementing national energy and climate policies.

- On page 40 of the draft NECP, Ervia notes that the ‘administrative structure of implementing national energy and climate policies’ omits reference to Ervia, Gas Networks Ireland and Irish Water – who will all play a key role in Ireland’s decarbonisation. Ervia recommends that all three companies be included as state actors in Ireland’s decarbonisation journey to 2050.
- Ervia recommends that the share of Biomethane (renewable gas) should be increased in the modelling of the estimated trajectories of renewable energies. This would reflect the ambition of Gas Networks Ireland’s goal of 20% of current gas demand being renewable by 2030 (equivalent to approx. 11TWh).
- Gas Networks Ireland and EirGrid recently completed a resilience study which showed that LNG is the most cost effective way to increase Ireland’s security of supply of gas, however renewable indigenous Biomethane production also shows potential.

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