

# DÁIL ÉIREANN

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## AN COMHCHOISTE UM CHUMARSÁID, GNÍOMHÚ AR SON NA HAERÁIDE AGUS COMHSHAOL

## JOINT COMMITTEE ON COMMUNICATIONS, CLIMATE ACTION AND EN- VIRONMENT

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*Dé Máirt, 15 Deireadh Fómhair 2019*

*Tuesday, 15 October 2019*

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The Joint Committee met at 3 p.m.

Comhaltaí a bhí i láthair/Members present:

David Cullinane,	Tim Lombard,
Timmy Dooley,	Michael McDowell,
Michael Lowry,	Joe O'Reilly.
Eamon Ryan,	
Bríd Smith.	

I láthair/In attendance: Deputy Michael Fitzmaurice.

Teachta//Deputy Hildegarde Naughton sa Chathaoir/in the Chair.

*The joint committee met in private session until 3.25 p.m.*

### **Scrutiny of EU Legislative Proposals**

**Chairman:** We resume to deal with scrutiny of EU legislative proposal, COM (2019) 427. It is proposed that this proposal does not require further scrutiny. Is that agreed? Agreed.

### **Gas Networks Ireland's Vision 2050: Discussion**

**Chairman:** I welcome Mr. Denis O'Sullivan, managing director of Gas Networks Ireland, GNI, and Mr. Brendan Murphy, commercial and regulatory director with Ervia.

By virtue of section 17(2)(l) of the Defamation Act 2009, witnesses are protected by absolute privilege in respect of the evidence they give to the committee. However, if they are directed by the Chairman to cease giving evidence in relation to a particular matter and they continue to do so, they are entitled thereafter only to a qualified privilege in respect of their evidence. Witnesses are directed that only evidence connected with the subject matter of these proceedings is to be given. They are asked to respect the parliamentary practice to the effect that where possible they should not comment on, criticise or make charges against a person, persons or entity by name or in such a way as to make him, her or it identifiable. I also advise them that their submissions and opening statements made to the committee will be published on the committee website after this meeting.

I remind members of the long-standing parliamentary practice to the effect that members should not comment on, criticise or make charges against a person outside the Houses or an official by name or in such a way as to make him or her or it identifiable. I ask that members and witnesses turn off their mobile phones or switch them onto flight mode.

I now invite Mr. O'Sullivan to make his opening statement.

**Mr. Denis O'Sullivan:** I thank the Chairman and members for the invitation to present an outline of our Vision 2050 strategy.

Addressing climate change is a key priority for our business. Ireland's natural gas network can play a major role in decarbonising our society, while still maintaining the security and cost-effectiveness of our energy supply. While natural gas emits nearly one sixth of Ireland's emissions, through a combination of technologies, we will create a carbon-neutral gas network and reduce Ireland's total CO<sub>2</sub> emissions by one third across key sectors, including electricity, industry, heat, transport and agriculture. This will be achieved by using proven technologies such as renewable gas, compressed natural gas, CNG, carbon capture and storage, CCS, and hydrogen. Our goal is that by 2050 half of the gas on Ireland's gas network will be renewable gas and hydrogen. The other half will be abated gas, which is where carbon dioxide has been removed through the CCS process, preventing emissions from entering the atmosphere.

We have been on a journey developing a range of initiatives to reduce Ireland's carbon footprint and to ensure that Ireland has indigenous and sustainable energy solutions for a number of years. This decarbonisation journey has become even more significant with the publication of the Government's climate action plan, which sets out an ambitious trajectory to address climate

disruption over the coming years. We have started delivering on our vision. Renewable gas, for example, was successfully injected into our network for the first time earlier this year. Planning for the first full-scale renewable gas facility in Mitchelstown, Co. Cork, is under way. This project will provide renewable gas for 56,000 homes or 8% of Ireland's residential gas demand.

The opening of Ireland's first public CNG refuelling station in December 2018 marked another important milestone in our plan. CNG offers an immediate reduction of more than 20% in CO<sub>2</sub> emissions when compared to diesel and will facilitate the introduction of renewable gas into transport, offering a fully decarbonised transport fuel. With a further six CNG stations currently in construction and development, our ambition is to ultimately have a network of 172 public and private stations.

We are fulfilling our role under the climate action plan to explore the feasibility of CCS in Ireland. We are providing key support to the Government's CCS steering group and we recently signed a memorandum of understanding with CCS technology leaders Equinor in Norway to explore carbon export and storage options. Hydrogen, the fourth pillar of Vision 2050, is fast becoming the decarbonisation fuel of choice around the world. With zero emissions, hydrogen is an extremely flexible energy source that can be deployed across transport, heating and electricity generation. We see hydrogen as an exciting opportunity for Ireland, especially in light of its potential to act as an energy store to maximise the utilisation of renewable electricity. The Irish State has invested more than €2.6 billion in Ireland's gas network, which is one of the safest and most modern gas networks in the world. The network has effectively no capacity constraints and it can be used to facilitate renewable energies, including renewable gas and hydrogen. We believe that the gas network has a long-term role to play in meeting our nation's energy demand and that Ireland cannot achieve its climate ambitions without it. As an energy source, natural gas is of key strategic importance to Ireland, representing 30% of our country's primary energy mix. Importantly, approximately 50% of Ireland's electricity is generated by natural gas. The Climate Change Advisory Council's recent statement to the Government highlighted the importance of natural gas. If we are to decarbonise the Irish economy by 2050, there will be a need for significant deployment of carbon capture and storage, CCS, with natural gas as a component of Ireland's energy system. This view is aligned with Vision 2050.

We are strong advocates of renewable energy and believe that climate action and future energy policy will require a suite of technologies and renewable solutions. A move to a 70% reliance on renewable sources such as wind and solar for electricity generation is planned by 2030 as part of ambitious national climate action targets. However, while Ireland has excellent renewable energy sources and potential, including wind and solar sources, this renewable energy is intermittent and needs the reliability of gas to facilitate its development. Achieving these targets will require a significant reliance on gas-powered electricity generation to provide the balance of requirements and to ensure Ireland has a secure energy supply at all times. Our vision is a carbon-neutral gas network and it is through CCS and other technologies that this will be achieved.

In conclusion, Vision 2050 outlines the role that the gas network and key technologies such as renewable gas, compressed natural gas, CCS and hydrogen will play in tackling climate change, while also ensuring that Ireland has a sustainable, affordable and secure energy future. The combination of these technologies will result in a carbon-neutral gas network by 2050 and the reduction in Ireland's overall CO<sub>2</sub> emissions by one third. We are committed to working with Government and policymakers across all sectors to ensure we maximise the contribution this State-owned asset can make to reducing Ireland's greenhouse gas emissions while also

maintaining sustainable energy solutions in the least disruptive and most cost-effective way. I look forward to the committee's questions.

**Chairman:** I thank Mr. O'Sullivan. He stated that Gas Networks Ireland's goal is for half of the gas in Ireland's network to be renewable gas or hydrogen by 2050. Can he go into more detail? What stage have Gas Networks Ireland's plans reached? When can we expect to see more substantial figures on the usage of hydrogen? What stage of development has carbon capture and storage reached in light of Gas Networks Ireland's plans?

**Mr. Denis O'Sullivan:** As I answer the questions my colleague will also contribute. As I mentioned, the plan has four pillars. I will start with compressed natural gas, CNG. We have rolled out the first station and at present, four stations are operating in the country. Another public station on the M7 motorway will open in the coming weeks. A further six stations are in development and there is a pipeline of about 40 stations at the moment, with a trajectory towards the complement of 176 that I mentioned. There is significant demand on the part of haulage companies for us to take up this technology. To develop the industry we made available a grant fund which is part funded by the European Commission to support the transition from diesel-powered trucks and buses to CNG. When that was deployed, it was immediately taken up and sourced. Those trucks are now coming into use. Just last week our first international haulage firm, a Cavan-based company called Virginia International Logistics, which has been at the forefront in rolling out this technology, made the first delivery to France using CNG technology fuelled here and in France.

We have developed all the regulatory and safety frameworks required for renewable gas. We have also developed a renewable gas certification scheme, which is an important element in the development of renewable gas. We have injected the first renewable gas from an initial plant we built in Cush in County Kildare.

Moving on from that, our plan is to have several anaerobic digester plants directly connected to the network, while also grouping them into a centralised injection facility. The first centralised injection facility is currently being considered under Cork County Council's planning process. A decision on this is imminent. I will defer to Mr. Murphy on carbon capture and storage.

**Dr. Brendan Murphy:** We have done a lot of work on carbon capture and storage in the last couple of years. We are looking at two different models. The first would involve using the Kinsale field, which will soon be depleted. We have done a lot of work to examine both onshore and offshore infrastructure to see what parts we should keep. We now have a very good sense of exactly what parts of that infrastructure we want to keep. We also have a lot of data about the field itself. We have done a lot of work to understand the field's compatibility with the storage of CO<sub>2</sub>. The challenge will concern the wells that have been drilled into the field.

We have also done a lot of work with the European Union. Several grant funds for CCS work are available in Europe. In particular, I refer to the emissions trading system, ETS, innovation fund, which is worth €11 billion. Its administrators are planning to offer up to 60% funding for CCS projects in Europe. We have done a lot of work with the EU and we are very much on its radar at this point.

That is the position with the Kinsale field. The other model we are looking at is the export model. As Mr. O'Sullivan mentioned, we have signed a memorandum of understanding with Equinor, a Norwegian company. Equinor is developing a bespoke field north of Norway where

it will store up to 5 million tonnes of CO<sub>2</sub> per annum. We have signed a memorandum of understanding with that firm to explore the potential for us to ship CO<sub>2</sub> to the field off the coast of Norway. We have more work to do in that regard.

Hydrogen is still in the early stages although it is gaining huge momentum and is being spoken about much more. The UK's Committee on Climate Change has talked a lot about the need for hydrogen as part of an overall zero-carbon model. In the past few weeks the German Chancellor has said that a national hydrogen strategy should be in place by the end of 2019, while the Austrian Chancellor has said that hydrogen is the fuel of the future. There is a lot of momentum behind it, but it is still at a relatively early stage.

**Deputy Timmy Dooley:** I thank the witnesses for the presentation. Mr. O'Sullivan spoke about Gas Networks Ireland's strategy for 2030 and 2050. Has that been costed and independently assessed? Carbon capture and storage is phenomenally expensive. Given where we are going, I wonder why Gas Networks Ireland is not putting a greater emphasis on hydrogen. There is a sustainability issue with carbon capture and storage. Planning permission is also a concern. The nuts and bolts of telling people in that region that we are going pump CO<sub>2</sub> into the nearby caverns will not be straightforward. There are issues there. Since we are a small country in the scheme of things, I would have thought we should really push towards the hydrogen mix as a solution. Can the witnesses comment on that?

This committee has discussed the liquefied natural gas, LNG, facility planned for Ballylongford. Gas Networks Ireland is to some extent responsible for energy security. Its representatives can take my previous remarks in that context. Based on Gas Networks Ireland's long-term planning, is an LNG facility necessary from an energy security point of view?

Turning to decarbonisation generally, we all recognise that gas has to be a transition fuel. However, Gas Networks Ireland's strategy seems to be absolutely dependent on making carbon capture and storage operational by 2050 in order to achieve carbon-neutral status. Some might argue that this is not the best way to go, and that we should reduce our dependence on gas as part of that transition. When we talk about gas as a transition fuel, it is not a replacement for other fossil fuels. It is a way for us to make greater use of renewables. I note that Gas Networks Ireland has done a lot of work on renewable gas from the agricultural sector, which is helpful, but at the end of the day that does produce emissions. There is a significant hole in the strategy if carbon capture and storage does not become financially feasible. Will our guests comment on that?

**Mr. Denis O'Sullivan:** We have costed the overall plan and I will break it down into its component parts. We have not sought any form of support for the roll-out of CNG or related infrastructure, which we will do on a commercial basis. We advocate for supports to be put in place for the uptake of CNG vehicles. Similar to what has been done in the case of electric vehicles, when haulage and bus companies wish to transfer from diesel to CNG, and to renewable gas via CNG, a support mechanism will be required, although we will do our costing on a purely commercial basis.

On renewable gas, like any other renewable technology, a support is required for the industry. To develop it, we advocate along the lines of what the Government announced in the recent budget, namely, that carbon tax placed on natural gas should be used to decarbonise gas. Doing so will cover the cost of developing the industry. We have set out a trajectory for year-by-year volumes, costs and so on in that regard. The support is not a support for GNI. We will not produce the gas and, in fact, we are prohibited from doing so under legislation, as part of the third

energy directive. The support will go directly to rural communities where anaerobic digestion plants are constructed and where the feedstock comes from. We will facilitate it coming onto the network, as we do in the case of natural gas.

Mr. Murphy might comment on the carbon capture and storage, CCS, costs.

On LNG, any additional source will provide additional security of supply. Nevertheless, I remind the committee of our proposal in Vision 2050. Our dependence on natural gas will decrease as we increase the level of renewable gas and hydrogen on the network. While we would like to bring hydrogen forward, sufficient work simply has not been done to develop the technologies needed for hydrogen. We are rolling out a project to verify and test our network and to ensure that will meet all the regulatory requirements as we increase the level of hydrogen on the network. We are also considering-----

**Deputy Timmy Dooley:** Do our guests envisage a scenario where GNI will inject hydrogen into the network?

**Mr. Denis O’Sullivan:** Initially, at least, blending hydrogen into the network will be part of the solution. In due course, we will examine dedicated hydrogen networks to justify it as the volume increases. In the UK, especially, much work has been done on hydrogen and heating, while in Japan, for example, a great deal of work has been done to bring hydrogen into the transport sector. Hydrogen is the fastest growing source of transport fuel in that part of the world and certainly has a bright future in that regard. We hope we can expedite that, and advocate for doing so, but we currently consider the timelines we have set out to be realistic.

**Deputy Timmy Dooley:** I am somewhat concerned that Gas Networks Ireland aims to build 170 CNG plants. Such infrastructure will force the continued use of CNG. Can the plants be easily adapted to use hydrogen at a later stage if it comes online more quickly?

**Mr. Denis O’Sullivan:** The way we approach the matter is there is no one fuel and we should not be dependent on any one technology for our transport needs. There should be a suite of technologies. CNG is readily available and there are extensive gas networks in Ireland and other European countries. Even for cross-jurisdiction transport requirements, CNG makes an awful lot of sense. There has not yet been the desired level of uptake of hydrogen, even though there is much talk of it and much work being undertaken. It will be post 2030 before there will be a significant development of it. Even then, with the development of hydrogen and hydrogen being brought into the transport space, there will be a requirement for more than one solution. We should not hang our hat on one technology.

**Mr. Brendan Murphy:** On CCS, there is a perception that it is expensive but we do not agree. For clean, dispatchable power, it is just what we need. While we need wind, we also need dispatchable power for when the wind does not blow or the sun does not shine. By any measure, the cheapest way of providing that is with CCS and it is not just us who say that. The International Energy Agency has predicted that the cost of decarbonising the power sector will be \$3.5 trillion more without CCS, while the European Commission has estimated that it will cost €1.2 trillion more to do the same in Europe. The UK Committee on Climate Change recently published a report on achieving net zero carbon emissions for the UK that found that CCS is a “necessity not an option”. The UK Department of Energy recently launched a consultation on how to incentivise CCS for power, industry and so on. It indicated that the cost of power would be between £70 and £77 sterling per MW/h for clean, dispatchable power, which is a cheap price by any measure. There is much evidence that CCS will be very cheap and com-

petitive compared with any alternative dispatchable power, which is crucial.

There are two ways of producing hydrogen. One, which is often called blue hydrogen, involves splitting natural gas into hydrogen and CO<sub>2</sub>, after which the latter is stored. In that case, CCS will nonetheless be needed to store the CO<sub>2</sub> and it is likely to be much cheaper than the alternative, namely, green hydrogen, although in the long term, that will be an important part of the mix. It involves, for example, using wind turbines to produce electricity or using electrolysis to make hydrogen. In the long term, that is, after 2100, it will doubtless become an essential part of the economy. It is a matter of timing. I would like to think that over the next 20 to 50 years, the switch will be from blue to green hydrogen. All the evidence suggests that to increase scale in the next 20 years, blue hydrogen will have to be used. We will have to split natural gas into CO<sub>2</sub> and hydrogen, which means-----

**Deputy Timmy Dooley:** Is that because of the cost?

**Mr. Brendan Murphy:** Yes, because of the cost and the mobility. The number of wind turbines required to replace the natural gas used even for Ireland's power generation is enormous. It is doable but it will take decades.

**Senator Tim Lombard:** I welcome our guests. I return to the matter of CCS. Many members sat on the Joint Committee on Climate Action. CCS was discussed in detail and we heard a slightly different version of how CCS fitted into the pyramid. While I was pushing a point, the guests appearing before that committee raised the issue of how we needed to change how we generate electricity, and many other issues, before we examined CCS.

What Gas Networks Ireland indicated is slightly different. It stated it will be part of the mix in the future, which is different from what we heard three or four months ago from the academics in the field. Will our guests outline the timeline? The Kinsale gas field could be depleted in the next 18 months to two years. The infrastructure is in place. Will there come a time when GNI will have to take a commercial decision on whether the infrastructure will have to be changed or removed? Will a decision on whether the Kinsale gas field will be a viable CCS base have to be taken in the next two or three years, or do our guests envisage a timeline whereby it can leave the infrastructure in place, given that is what makes the field so valuable, and realise that scenario in a decade? Will our guests outline the timeline for the decision to be made on the Kinsale gas field?

**Mr. Brendan Murphy:** To maximise the level of wind that the system needs and can withstand, there will have to be back-up dispatchable plans. It is about having the two sources working together. Maximising wind will require gas-fired power stations, while to decarbonise the emissions, CCS will have to be used. They work well together, although that is not just my opinion but also that of the UK Committee on Climate Change. We envisage them working in harmony.

On the Kinsale field, as I mentioned, we have done a lot of work on the parts of the infrastructure we want to keep. We want to keep the onshore and offshore pipelines but do not want to keep the platforms. We have looked at the matter very carefully and said we do not need to keep them. In fact, the decommissioning plan would maintain the onshore and offshore pipes for a number of years to come. There is not a burning decision to be made to do this in the next year or two. It might be different if we needed the platforms, but we do not. Therefore, the decision does not have to be made in the next year or two.

**Senator Tim Lombard:** What is the timeline to lift the infrastructure from the seabed? Will it take a decade to do it?

**Mr. Brendan Murphy:** They are talking about and seeking approval for all of that work in Kinsale and a regime that will allow them to leave the pipeline offshore for a number of years.

**Senator Tim Lombard:** A project happened in conjunction with the chamber of commerce in Cork last March that involved the first ever bus to use biomethane, a form of biogas, other than compressed natural gas. The city of Cork is so compact and, given its bus infrastructure, would be the perfect option for a pilot project to run a bus network using compressed natural gas. The chamber of commerce has consistently mentioned that we should be looking at that scenario. Has there been any contact with Gas Networks Ireland about the possibility, or credibility, of having such a project?

**Mr. Denis O’Sullivan:** We have undertaken a number of trials with compressed natural gas, CNG, buses, including the one to which the Deputy referred. CNG buses can be deployed in any area, whether it be an urban or intercity service. In fact, the intercity service is perhaps the obvious one with which to start. We will be rolling out the infrastructure in Cork and work on a number of CNG refuelling stations is in train. We have also been in discussions with Bus Éireann and private bus operators which are undertaking their own studies of various technologies and so on. The refuelling infrastructure will certainly be in place in due course.

**Deputy David Cullinane:** I welcome Mr. O’Sullivan and Mr. Murphy. Last week, for the hearing on the use of liquefied natural gas, LNG, there were a number of environmental experts before the committee who made the general point that we were swimming against the tide with the policy on the use of gas. There is an urgent need to address the issue of climate action and reduce carbon emissions. Obviously, therefore, fossil fuels are front and centre. In his opening statement Mr. O’Sullivan talked about CNG as an alternative to diesel and petrol for transport. Is it the case that CNG still emits up to 80% of the level of CO<sub>2</sub> produced by diesel?

**Mr. Denis O’Sullivan:** I am not quite sure I understand the question, but, if I understand what the Deputy means, “Yes” is the answer. There is a saving of 20% in using natural gas instead of diesel. That is the immediate saving in switching. As we have outlined in Vision 2050, in due course we want to transition from natural gas to renewable gas which, in turn, will result in the use of a fuel that is fully carbon neutral in the transport fleet.

**Deputy David Cullinane:** Is Mr. O’Sullivan essentially saying natural gas is a bridge to renewable gas?

**Mr. Denis O’Sullivan:** It is for transport. A saving of 20% in a sector where 4% of vehicles produce 30% of emissions is critical. There is not a viable technology available that can do it other than CNG.

**Deputy David Cullinane:** We are here to put the hard questions to our guests who are here to justify policy and investments the State might make. Why should the State invest in and support the use of either LNG or CNG when the debate and policy are shifting at EU level? Why should there be continued policy and investment support for a sector or an area which is obviously not seen as part of the solution, according to the environmental experts. How do our guests respond to the position those groups are taking?

**Mr. Denis O’Sullivan:** CNG and LNG are very different. In the case of CNG, one is taking gas from the network and compressing it in order that it will fit into a storage vessel that

can be attached to a truck similar to its diesel tank. The benefits of CNG are quite obvious. In deploying it we do not need capital or any other support because we can do it on a commercial basis and it will immediately deliver a 20% reduction in emissions. As important, it provides a pathway to the use of renewable gas in transport. The argument on the use of CNG is extremely clear.

**Deputy David Cullinane:** My point is that the concept that gas is a clean energy is being challenged by the environmental experts who are saying we must take much more urgent action to reduce carbon emissions. Today the European Investment Bank postponed a decision on whether to divest from gas. My point is that policy is moving in an obvious direction and it is not in favour of increased investment in gas production of any type. Are our guests aware that the European Investment Bank has decided to postpone a decision on whether to divest from gas? Do they see it as a vote of no confidence in the use of gas as an alternative fuel?

**Mr. Denis O'Sullivan:** I was aware that the European Investment Bank was considering, as part of its regular review of policy, its ongoing investment in certain gas infrastructure. We engaged extensively with it. In fact, quite recently we closed off significant funding for our own infrastructure from it. We see the use of CNG as an extremely important pathway to the use of renewable gas in transport. It gives the transport sector an option that it does not have to use a carbon neutral fuel source. We should not dismiss the benefits of a 20% reduction in carbon emissions that would occur in moving from diesel to natural gas. It could be an interim step on our way to using renewable gas.

**Deputy David Cullinane:** What I am putting to our guests is what the environmental experts are saying. They are saying 20% is not enough and that there are other alternatives on which we should be focused. My point is that the debate is changing, not just in this state but in the European Union also.

I move to carbon capture and storage, on which there has been a discussion. Deputy Dooley talked about the planning and infrastructure challenges presented. The Minister for Housing, Planning and Local Government, Deputy Eoghan Murphy, has said there is evidence to substantiate the claim that carbon capture and storage are cheap and competitive. Will our guests present the evidence which I have not seen to the committee? Can it be produced in written form because I do not think they will have time to present it here? Will they present the evidence that they are cheap and competitive? Does the process of carbon capture lead to a reduction in carbon emissions and, if so, how? Our guests might answer that question first and then, if they can, provide more detailed responses to the assertion that it is a cheap and competitive alternative.

**Mr. Brendan Murphy:** I will come back to the Deputy on that point. I strongly believe that it is cheaper, but my opinion is not important. The point I have made is that the International Energy Agency, IEA; the Intergovernmental Panel on Climate Change, IPCC; the European Commission; the UK Government and the UK Committee on Climate Change are all stating decarbonising the power sector will be much more expensive without carbon capture and storage. It is not just me who is saying it; all of those bodies are stating it. The numbers are very big. That is the evidence I can provide straightaway.

There is no question that we need to maximise the use of wind energy. The other question is how can we decarbonise the other 30% in meeting our energy needs. Of all the options available, the only one that will have a meaningful impact is using gas-fired power plants and carbon capture and storage. That is my overall point. We can come back to the Deputy with more

information and particular numbers, if he wants.

How the process works is simple and it can be done in several ways. For a gas-fired power station, emissions are captured and put through a chemical process that strips out the CO<sub>2</sub>, cleans and compresses it. It is then either shipped to an offshore field - in the case of Kinsale, it is shipped 56 km offshore - or compressed into liquid form and shipped out for processing. In the example of Equinor ASA, it would be brought by ship to Norway and injected into a field designed specifically for that purpose. Depending on exactly how it is done, up to 100% of the CO<sub>2</sub> emissions from a power station can be captured by that process. It is happening around the world. None of the technology for carbon capture and strategy is new; it is proven technology. The issue up to now has been economics, specifically cost and who owns the associated risk. The process is without question technically feasible. The question is whether it is economically feasible.

It is crucial to note that one cannot simply compare wind energy production with a CCS power plant. We should, of course, maximise wind energy generation. However, when wind does not blow, there has to be a back-up, the cost of which will be more than the cost of the power produced when the wind is blowing. Taking that into account, dispatchable CCS power is significantly cheaper than any alternative.

**Deputy David Cullinane:** The witnesses might provide the follow-up information we discussed to the committee. I thank them for their responses.

**Deputy Bríd Smith:** I thank the witnesses for their presentation. Did they watch or read the exchanges last week at the Joint Committee on Climate Action with two scientists on the subject of gas as a transition fuel and, in particular, fracked gas from the United States?

**Mr. Denis O'Sullivan:** Yes, I saw the presentations.

**Deputy Bríd Smith:** Does Mr. O'Sullivan take issue with any of what was said or does he agree broadly with Professors McMullin and Howarth?

**Mr. Denis O'Sullivan:** There was reference to methane being 100 times more damaging than CO<sub>2</sub>, which is contrary to the Intergovernmental Panel on Climate Change, IPCC, figures. Notwithstanding that question, we have to look at this in the context of our role in the supply chain of gas. We support the security of energy supply in the country, and different sources of gas are required to do that. It is a matter for policymakers and regulators to decide whether a particular source of gas is appropriate. We do not get involved in either supporting or not supporting any particular source. Once it comes onto our network or is presented, we treat all forms of gas in the same manner.

**Deputy Bríd Smith:** The reason I am asking this is that Professor Howarth, who joined us by video link from New York, has done the most advanced and recent research on methane and the damage it is doing in terms of the increase in global temperatures. He pointed out that we should be taking cognisance of upstream emissions. If we import fracked gas into Shannon, we should not ignore what was done in the course of fracking it. We all share the same atmosphere as inhabitants of the planet. Does GNI take upstream emissions into account as a policy matter?

**Mr. Denis O'Sullivan:** We do. Gas in Ireland comes either from the indigenous source in the Corrib field or via the interconnector, with a small volume still coming from Kinsale. According to the European Environment Agency, the rate of leakage from methane in gas production in Europe is 0.6% from well to wheel. We are very conscious of this and continue to

monitor it on our own network. It is a relatively new network in a European context and our leakage figure is approximately 0.1%. In the overall context, it is an extremely small volume of leakage from the sources of gas we have.

**Deputy Bríd Smith:** Fair enough. Mr. O’Sullivan is probably right on that figure and I do not mean to correct him. However, we discussed specifically last week the emissions from fracked gas from North America, which is what Shannon LNG intends to import. The evidence Professor Howarth gave seems to contradict what Mr. O’Sullivan is saying. The professor indicated that emissions are extremely high and that the fracking process in North America probably accounts for more than 30% of all methane emissions across the planet. In its Vision 2050 document, did GNI take account of the project of common interest, PCI, listed project for fracked gas in Shannon? Have the witnesses thought about that and factored it into their graph of how things might look in 2050?

**Mr. Denis O’Sullivan:** No, we would not factor it in until such time as we know that an LNG terminal is going to be built. We did factor in our existing sources of gas, plus the renewable gas and hydrogen that we refer to in Vision 2050.

**Deputy Bríd Smith:** Another point the Professor explored was that a target date of 2050 is way too late and we need to move faster to bring the levels down significantly by 2035. Gas Networks Ireland has been politically mandated to produce its strategy for 2050. If it had a political mandate tomorrow to provide a vision for 2035, would it be able to do so?

**Mr. Denis O’Sullivan:** Certainly. Within the Vision 2050 document, we have set out targets not just for 2050 but also for 2030, in line with and complementary to the climate action plan. We have been open in our view that with the correct supports in place, 20% of the gas on our network could be from renewable sources by 2030. There is a trajectory and profile required to get us there but, given the research we have done, the availability of feedstocks and the level of interest in the industry on both the production and the demand sides, we are confident that this is an achievable target.

**Deputy Bríd Smith:** Gas Networks Ireland’s prediction of abated natural gas accounting for 50% of total gas production by 2050 is totally reliant on carbon capture and storage. The witnesses are saying that the technology is proven, well established and being used to great effect elsewhere. I have seen evidence to the contrary. Are we making ourselves reliant on a technology that has been achieved or one that may be achieved somewhere in the future?

**Mr. Brendan Murphy:** The technology is proven. As I said earlier, the scale of implementation is still fairly low, with some 18 plants operational across the world, another 20 or 25 in development and lots more planned. There has not been a massive roll-out of the infrastructure at this stage but the technology is proven. There is nothing about the technology that is difficult to do. The challenge has been in getting the numbers to work and the economics of it all.

**Deputy Bríd Smith:** Does Mr. Murphy agree that there is a low rate of success at the moment?

**Mr. Brendan Murphy:** There has been a lower rate of success in Europe than elsewhere, but it is starting to take off now. In the UK, for example, the Department for Business, Energy and Industrial Strategy launched a consultation over the summer seeking to have one full-chain carbon capture and storage plant operational by the mid-2020s and a mainstream large implementation from 2030 onward. It is about overcoming the obstacles that have thus far prevented

such developments in Europe. Those obstacles are not technical but are much more about the legal frameworks and who owns the risk.

**Deputy Bríd Smith:** Nevertheless, this framework is based on our having faith in future technological development rather than something on which we know we can rely.

**Mr. Brendan Murphy:** It is not reliant on technological development but, rather, on getting the right framework in place so that the proven technology can be implemented at scale. In fact, the consultation the UK Department for Business, Energy and Industrial Strategy has undertaken focuses precisely on that point, namely, the type of regime that should be put in place to incentivise the completion of large volumes of carbon capture and storage. It is a legal regulatory framework issue, not a technology issue.

**Deputy Bríd Smith:** Can the witnesses say for sure that what is envisaged in Vision 2050 and everything that happens in the meantime will keep us in line with our Paris targets?

**Mr. Denis O’Sullivan:** Yes, if it is done in combination with other technologies. We are fully supportive of the roll-out of wind and solar energy and all the other renewable energies, but we must bear in mind that electricity currently represents 20% of our energy demand, with the potential to go up to 30% through increases in electricity usage in transport and heating. That leaves 70% of our energy requirements today essentially not being addressed. This is the area on which we are focusing. Our view is that in combination with the other technologies, including wind and solar, we can play a significant role. We have given a figure based on calculations which assume that we will roll out the level of renewable gas we have spoken about, including CNG, CCS, and hydrogen, which can take it further again. We believe that we can contribute to a 30% reduction, which is very significant. Ireland’s natural gas is 30% of Ireland’s primary energy mix. If, by 2050, we can have 50% of that provided by renewable gas and hydrogen, with the other 50% abated-----

**Deputy Bríd Smith:** Depending on carbon capture and storage working.

**Mr. Denis O’Sullivan:** The first 50% is renewable gas and hydrogen. The second 50% is dependent on CCS technology.

**Deputy Bríd Smith:** Somebody from Gas Networks Ireland gave evidence at the scrutiny of the Petroleum and Other Minerals Development (Amendment) (Climate Emergency Measures) Bill 2018, which was to stop the exploration of gas and oil. That person said that we have about 12 years left at Corrib. I heard a figure mentioned last night of five years. Does Mr. O’Sullivan have any idea of how long we have left in Corrib?

**Mr. Denis O’Sullivan:** Our figures are updated annually. Our current view is that it is probably between 12 years and 15 years.

**Deputy Bríd Smith:** I thank Mr. O’Sullivan.

**Senator Michael McDowell:** I thank the witnesses for coming in. Can we return to the hydrogen issue? I know that the technology is developing. Is our network capable of dealing with hydrogen? Is it fully polyethylene-lined?

**Mr. Denis O’Sullivan:** Yes. As I mentioned earlier, we are in quite a good position with hydrogen in our network. There is already a certain amount of hydrogen as part of the natural gas in our network.

**Senator Michael McDowell:** As a component of the natural gas?

**Mr. Denis O'Sullivan:** As a component but also separate. There would normally be up to 2% hydrogen in the network. Our distribution network is predominantly polyethylene, as the Senator mentioned. That element of the distribution network can take 100% hydrogen. There are some components which would need to be replaced. Almost everything that is underground is already hydrogen-proofed. We are undertaking studies and tests on the material that is above ground to verify what percentage of hydrogen it could take or what we would have to do to make that 100% hydrogen-compatible. Our transmission network is a high pressure steel network. That can take a significantly higher percentage of hydrogen than is currently in the network but it cannot take hydrogen to the same degree as the polyethylene network because of the technical restrictions on metal and hydrogen mixing.

**Senator Michael McDowell:** Does Mr. O'Sullivan have a budget, even notionally, for making the network fully hydrogen capable?

**Mr. Denis O'Sullivan:** Not at present. We will need to complete those studies. We expect that transitioning the distribution network, which feeds the majority of our residential and commercial customers, with the exception of power generation which is fed directly off the transmission network, will need very little by way of changes to facilitate hydrogen.

**Senator Michael McDowell:** Will Mr. O'Sullivan explain in simple terms how he envisages the hydrogen being generated for distribution? How many generation plants would be required? What kind of plants would they be? Would they be big or small? I presume that they would be electricity-driven in the end?

**Mr. Denis O'Sullivan:** There are two options to produce hydrogen. The first option is through electrolysis, using renewable electricity. As we increase the level of penetration of renewable electricity, we will have occasions where that electricity is curtailed because we have too much. That is even the case today at times. One can use that electricity for electrolysis to produce hydrogen and inject that into the network. That is for green hydrogen. Blue hydrogen is produced by taking natural gas and, through a process of steam methane reforming, we split the natural gas into its component parts, hydrogen and carbon dioxide. We use CCS technology to store the carbon dioxide and we inject the hydrogen. That process can be done at scale. One, two or three plants may produce a significant volume of hydrogen. Green hydrogen, using renewable electricity-----

**Senator Michael McDowell:** So for blue hydrogen, natural gas is brought in and split into two components. Is that right?

**Mr. Denis O'Sullivan:** Yes.

**Senator Michael McDowell:** One of the components is put underground.

**Mr. Denis O'Sullivan:** The principle of CCS is that one takes the energy out of the fuel and puts the carbon back into the ground.

**Senator Michael McDowell:** Mr. O'Sullivan thinks that two or three stations would be enough to do this.

**Mr. Denis O'Sullivan:** That could vary depending on the roll-out of hydrogen. If there is a view that we should have dedicated hydrogen networks on the distribution system, we would

put a unit there to produce that hydrogen, but that would be done at scale. There would not be many of those hydrogen plants. I am saying without giving a definitive answer, because it needs to be designed, that it would involve a small number of plants.

**Senator Michael McDowell:** Going back to Deputy Smith's point, where would all that gas come from? Is it shale gas or from the Middle East?

**Mr. Denis O'Sullivan:** Our plans under Vision 2050 are to reduce our dependence on natural gas by 50% by 2050 or thereabouts. That gas would continue to be sourced as we source it today. Our preference is for indigenous sources of gas because it is the best way to ensure security of supply.

**Senator Michael McDowell:** Is it biogas?

**Mr. Denis O'Sullivan:** Biogas and indigenous natural gas, including fields such as the Corrib. We will also have natural gas coming through the interconnectors.

**Senator Michael McDowell:** To be clear, Mr. O'Sullivan's vision involves continued prospecting for indigenous fields such as Corrib up to 2050?

**Mr. Denis O'Sullivan:** Yes. We would continue to do that.

**Senator Michael McDowell:** I am with Mr. O'Sullivan. I am not hostile at all.

**Deputy Eamon Ryan:** On that last point, how do we keep exploring for gas in 2050 when all the science says that we already have known reserves sufficient to blow the planet's climate?

**Mr. Denis O'Sullivan:** We are saying that if there are indigenous sources of gas, the preferred option should be to use that gas first and then gas from our interconnector.

**Deputy Eamon Ryan:** The fundamental difference here is that the climate community says we have to stop exploring for gas everywhere. I do not think that one type of gas is better than another. Any additional gas is a problem in my mind. Mr. Murphy referred to English plans for CCS. I have been hearing about them for almost two decades. He said there was a plan for a demonstration project by the end of the next decade, with a commercial project in the early 2030s.

**Mr. Brendan Murphy:** The UK's Department for Business, Energy and Industrial Strategy has said this. It had a consultation about how to structure the market to incentivise carbon capture and storage. It talked about how it wants to have a full project, not just a demonstration project, in place by the mid-2020s, with a large roll-out of carbon capture and storage in the 2030s.

**Deputy Eamon Ryan:** So the first commercial project might be in 2026 or 2027.

**Mr. Brendan Murphy:** The department referred to the mid-2020s. There is a two year or three year build time and investment decision time. That means making a decision very soon, in the next year or so.

**Deputy Eamon Ryan:** Mr. Murphy said earlier that we would not be making a decision on the Kinsale pipeline for the next few years, but his 2050 vision sees us introducing CCS in 2026 or 2027.

**Mr. Brendan Murphy:** We are looking at carbon capture and storage in two ways. One is

the Kinsale field and the other is the export model. I said that we could wait. We decided that we do not need to keep the platforms and only want to keep the pipeline. We can wait for up to five years before we make a decision. That does not mean that we could not make it much earlier. We could decide on it next year if we were ready. In the Kinsale model, we will be ready for 2025 or 2026. The alternative model is an export model which would probably be faster, so one would not have to worry about the field at all. One would basically need to have the CO<sub>2</sub> liquefied at the port in order for the ship to take it to Norway.

**Deputy Eamon Ryan:** I presumed we would have a new combined-cycle gas plant in Cork with a carbon capture and storage, CCS, bolt-on facility. One has the pipeline structure there and one would run it straight out to Kinsale. Would that not be much cheaper than shipping it to Norway?

**Mr. Brendan Murphy:** It will come down to those sort of decisions. With trading off, in particular, there is a cost issue. To be fair, the field Equinor is developing in Norway is supported by the Norwegian Government. That could be a very cheap means of storing CO<sub>2</sub>. The big element of carbon capture and storage is not the storage of the gas but the capture of the CO<sub>2</sub>. One has that cost either way, so it might not be a key component.

The other point is that if one decides to export it, one is not left with residual risk, which is one of the big issues for CCS. In an answer to Deputy Bríd Smith earlier question, one of the main reasons is the legacy risk of CO<sub>2</sub> escaping the field, even though all the science shows that would be extremely remote. There is obviously still a legacy risk in that regard. The question is whether the country would be happy with that risk being on its balance sheet.

**Deputy Eamon Ryan:** If it is stored in Norway, to which country does the carbon credit attach?

**Mr. Brendan Murphy:** That is one the questions that has to be ironed out. We will work that through as part of the memorandum of understanding, MoU, with Equinor. Clearly, we want to get a credit for it as it makes no sense for us.

**Deputy Eamon Ryan:** Is the Cork pipeline made of steel?

**Mr. Brendan Murphy:** It is steel.

**Deputy Eamon Ryan:** Mr. Murphy said it might be available for a certain number of years. It is 40 years old already. Do we have an estimate as to how long steel pipeline lasts?

**Mr. Brendan Murphy:** We have had a full study done on that pipeline and the expert view is that pipeline can last certainly for another 20 years plus. It is certainly usable at low pressure, which is the plan. The beauty of the Kinsale field is that it is a low-pressure field. The CO<sub>2</sub> can be kept in gas form, which is much cheaper from a capex and opex point of view.

**Deputy Eamon Ryan:** I am not opposed to CCS in principle, and I am not trying to catch the witness out. I would just like to know the details. If the pipeline lasts another 20 years, we will not be using it for ten years at least, from what I have heard here. That would give it a ten-year lifespan. A power plant has a 30 year to 40 year lifespan.

**Mr. Brendan Murphy:** I meant 20 years from when we use it. There is a long lead-time left on it.

**Deputy Eamon Ryan:** It is owned by Petronas.

**Mr. Brendan Murphy:** Yes.

**Deputy Eamon Ryan:** We would have to pay it.

**Mr. Brendan Murphy:** No. One is into the issue with Petronas then. It has to alternatively decommission that pipeline. It is down to a commercial discussion about how that would work.

**Deputy Eamon Ryan:** One of the concerns we have - I believe I have heard other Deputies say it - is that we seem to be holding back on the hydrogen. I suppose a gas networks company is used to using natural gas. The witness made a point that one would need large volumes of wind, which we already have. We are planning to have 70% renewables, which will be largely made up of wind, by 2030. I think the curtailment on our wind network is already 7% to 8%. We are wasting, or not using, 7% to 8% of the resources we have. Is that not an immediate really low-cost power supply for us - to go stronger on hydrogen more quickly?

**Mr. Brendan Murphy:** We are keen on supporting hydrogen in any way we can. We are talking about some pilot projects using electrolysis from renewable energy to inject hydrogen into the networks. We are very much in favour of that and want it to happen as much as we can. The point I was making earlier was that the scale of the energy provided by gas into Ireland is so huge that one needs a vast amount of wind to make a real dent in the numbers. Wind should be used to generate hydrogen, but it is still small until one has dedicated fields for it.

**Deputy Eamon Ryan:** The Norwegians are also building floating offshore wind. We are thinking of 20 GW over the next decade, and somebody the other day told me 70 GW of offshore wind off the west coast of Ireland. In the timelines we are talking about, would that not set our course to say we have this massive wind resource, particularly the potential from floating wind off the west? We have the infrastructure in Moneypoint and elsewhere, should we not use offshore wind and start planning for that?

**Mr. Brendan Murphy:** Yes. We really favour the idea of moving towards green hydrogen and it makes an awful lot of sense. The issue is the cost and the timeline involved in making that happen. Some 70 GW would be an enormous amount of capex to invest. The unfortunate reality is that green hydrogen right now is much more expensive than blue hydrogen. There is both an economic and deliverability issue. By 2100, that would be the case for sure. The question is: how long will it take to get there?

**Deputy Eamon Ryan:** If it is a choice between importing fracked gas from the United States, where there is a real problem, or importing offshore wind, I know which I would be betting on if I was on the board of Gas Networks Ireland, GNI, or was the responsible Minister.

On the question of costs, the other main component of Gas Networks Ireland, GNI, development is the development of biomethane from Irish agriculture. From waste, it would be 3% of our needs. We are all agreed on doing that as quickly as we can. I start to run into problems with GNI's other plans. I refer to the use of grass or other gasification technologies. I support the power to gas proposition but I mention the other two. I read the Sustainable Energy Authority of Energy Ireland's assessment of costs and benefits of biogas and methane in Ireland. In looking at its cost assessments of some of those other feedstocks, one is looking at a cost of €750 per tonne in carbon abatement, as per its projections. This seems incredibly expensive for either the gasification or the grass-based systems.

**Mr. Denis O'Sullivan:** The figure the Deputy referenced is not for agricultural-based anaerobic digestion, AD.

**Deputy Eamon Ryan:** It is for gasification.

**Mr. Denis O’Sullivan:** It is for gasification. The other one used in AD. There is a table there that shows the different ones and the waste streams we have spoken about. Food waste and other wastes are straightforward but producing it from agricultural waste, slurries and grass, is a far cheaper way, with lower abatement costs than what the Deputy referenced.

**Deputy Eamon Ryan:** I have been to UCC and it has done significant work over the years but I have not seen it advance. What I have seen advance is major concern about nitrous oxides and ammonia. In the Dáil today, one Deputy after another stood up to say that we had an agricultural crisis because it had been raining for several weeks in Kerry and people did not know where to put the slurry on their land. A real environmental biodiversity disaster as well as a climate disaster would be to just turn our land into an industrial production machine to produce grass and wood pulp for biomethane. The land-use requirements for that level of grass in a country where on two occasions in the last three years we have not been able to provide fodder for our national herd and have had to import fodder would require massive application of fertilisers with massive implications for biodiversity on the land. At first base, we need a real honest assessment of how much land is needed to do this and what are the biodiversity and environmental consequences of one doing this.

**Mr. Denis O’Sullivan:** We have undertaken extensive studies on this. On fertiliser, there is no requirement for chemical fertiliser in the process we have outlined. The digestate coming from the AD process goes back in as the fertiliser to grow the grass so there is no requirement for chemical fertiliser.

On the volume question, the targets we have set out for renewal gas would require something in the order of 15% to 20% of the amount of slurry that goes into storage every year, that is, the slurry the Deputy spoke about where there are issues with weather conditions and trying to spread it. It provides a solution in that regard. It also prevents the emission of methane from the land-spreading of that slurry by containing it and putting it through an anaerobic digestion process, by stripping out the methane as an energy source.

**Deputy Eamon Ryan:** Gas Networks Ireland will not be using ryegrass, *per se*. Mr. O’Sullivan believes the fertilisers from the digester would be sufficient to get these ryegrass monocultures that we have working. We are still left with ryegrass monoculture.

I have one other point on this, and I apologise to the Chair for taking up so much time. I refer to the SEAI’s assessment that the new European directives on how much greenhouse abatement gas one has to have from that process. It says that none of the current grass-growing systems would meet these new European targets. Is it wrong or right?

**Mr. Denis O’Sullivan:** Is the Deputy talking about the Renewable Energy Directive? To meet the requirements and the sustainability criteria under the current Renewable Energy Directive, one needs a one third slurry to two thirds grass combination. Under the Renewable Energy Directive, RED 2, those criteria have changed and have become onerous in terms of the combination but can still be met. All it does is that it changes the ratios of slurry to grass. Given that the targets we have set are realistic, we can absorb that variation in the mix. We are the only country in the European Union that does not have a biogas industry based on agricultural waste and being an island that is so dependent on agriculture and agricultural output-----

**Deputy Eamon Ryan:** I fully agree and am in support on the use of waste and having a

biogas element. However, I am highly sceptical about the 20% target or indeed about increasing it beyond that with the gasification and other mechanisms that are being suggested. I would love to see the scientific analysis of how much land is required, the whole cycle, the detailed information as to how that figure is arrived at and the implications for agriculture, water quality, ammonia, nitrogen and how we show this for certain. The SEAI tells me it is sceptical about our ability to meet the new renewable energy directive targets. I would love to see a really detailed scientific analysis of how that is thought to be possible. If Mr. O’Sullivan could provide the papers separately I would really appreciate it.

**Mr. Denis O’Sullivan:** I would be happy to do so. We have done the research and have engaged with the experts in this area, including Teagasc and other agencies in terms of the feedstock and feedstock availability. In terms of the volume, the SEAI itself has a higher figure than ours as to the potential for renewable gas in Ireland. The European Commission conducted its own assessment and pointed to Ireland as having the highest potential in Europe for renewable gas production from agriculture.

**Deputy Eamon Ryan:** We just might have no nature left.

**Senator Joe O’Reilly:** I welcome our guests. As for the section of their presentation on the use of compressed natural gas, I reiterate how proud we are in my area of Virginia International Logistics, the Cole family transport company which has converted its trucks to compressed natural gas, CNG and went to the Continent recently using CNG. It is a great breakthrough and I congratulate the firm on its initiative. In their presentation, the witnesses made the point that the first CNG refuelling station was opened in 2018. They stated that:

CNG offers an immediate reduction of over 20% in CO<sub>2</sub> emissions [which would be extremely important] when compared to diesel and will facilitate the introduction of renewable gas into transport, offering a fully carbon neutral transport fuel. With a further six CNG stations currently in construction and development, our ambition is to ultimately have a network of 172 public and private stations.

That is a great ambition around which I want to ask some questions. For the regular, small transport companies that dot our country and on which we depend so much, margins are quite tight as the witnesses are aware anecdotally if not otherwise. How financially realistic is it for them to make this conversion? What level of support exists at present? From Mr. O’Sullivan’s knowledge, which is quite deep, obviously, of CNG and conversion to its use, what kind of grant aid or support should exist that does not currently exist? Is that level of grant aid realistic in terms of the national climate change plan and the overall economics around the climate change agenda? Is it a realistic option? I would like to believe that it is but I would like the witnesses’ clarification there. Is there a question of economies of scale in this regard? Is it really the big fleets that can do it? How do we manage the popularisation or the spreading of it?

**Mr. Denis O’Sullivan:** I thank the Senator. If I have not got all of his points he might please flag them to me. I might just make one clarification on the CNG station that was opened in 2018 in Dublin Port. It was the first publicly accessible CNG station. In fact, the company the Senator referenced, Virginia International Logistics, has been utilising CNG for a number of years and was one of the pioneers of CNG as a fuel. In terms the viability of CNG for smaller operators, it is certainly viable. At the moment there is no support mechanism other than the grant support that GNI provides, which is a limited grant, part funded through the European Union, for the uptake of vehicles. Our intention is to roll out a suite of publicly accessible

stations, essentially refuelling forecourts, which will allow operators who have one vehicle or multiple vehicles to refuel at those points. Our view is that we will have a combination of private and public stations in the 172 stations. Many of the large haulage companies at the moment, including the one the Senator referenced, have their own refuelling infrastructure. We want to accommodate them as well as the smaller operators in private stations. In terms of its viability, we advocate that some supports need to be put in place to support the transition from a diesel vehicle to a CNG vehicle for all operators. In terms of cost of abatement of CO<sub>2</sub>, it is a low cost of abatement and one we believe should be supported for truck, bus or commercial vehicle operators.

**Senator Joe O'Reilly:** What roughly is the cost per truck of conversion to CNG?

**Mr. Denis O'Sullivan:** For a large heavy goods vehicle, there is a differential of approximately €15,000 and the payback on that for obviously depends on utilisation. Some haulage companies have a very high level-----

**Senator Joe O'Reilly:** Assuming a high level of utilisation.

**Mr. Denis O'Sullivan:** There is another factor, namely, whether they are refuelling privately or at a forecourt. We are talking about somewhere between one and two years. For the private stations it is less than that again.

**Senator Joe O'Reilly:** Mr. O'Sullivan would argue that it is a viable, realistic and profitable exercise in the medium term, over a four or five-year period.

**Mr. Denis O'Sullivan:** Absolutely. However, we have to factor in that the truck owner or haulage company has to come up with the initial capital investment to buy a new vehicle. There is a new vehicle requirement; it is not just the €15,000. It is moving from whatever value is on the current vehicle to the cost of the new vehicle. That can be a hindrance to enter the market and that is where we believe some supports are needed. I should acknowledge that there is one mechanism in place, namely, excise duty. The excise duty on CNG is much lower than diesel. That was introduced in the budget two years ago and runs for a period of eight years. Other than that, there is no incentive for people to move.

**Senator Joe O'Reilly:** Moving to the area of anaerobic digesters, this is a real question for rural Ireland. Can Mr. O'Sullivan give us an assessment of how we could protect our stocking levels with the use of digesters? Could we protect existing stocking levels? Certainly in the case of our smaller farmers, were they to have to reduce stocking levels, in many instances it would make the holdings absolutely unviable. Sadly, several small farms are quite challenged without this but were they to have a mandatory reduction of stock that would create huge problems. To what degree can the anaerobic digesters be used as a solution? Could Mr. O'Sullivan comment on their economics too?

**Chairman:** Does the Senator have any more questions on anaerobic digesters?

**Senator Joe O'Reilly:** No, I am interested in how the witnesses see them being rolled out but more particularly in their impact on rural Ireland and their capacity to allow small farms remain viable.

**Mr. Denis O'Sullivan:** Ireland has significant additional capacity to grow grass. Dairy and beef farmers generally produce only the amount of fodder they believe they will require for the following year. That is down to cashflow and the business requirements. Anaerobic digestion,

AD, rolled out in Ireland could provide a means whereby additional revenue can be sourced from the production of grass for AD plants. We believe that can be done separately from the existing herd, without impacting on the herd or any form of food production. The roll-out of farm-based AD will require support and subvention. We believe the carbon tax collected from natural gas should go towards decarbonising the gas network and part of that is the development of a renewable gas industry.

**Deputy Michael Fitzmaurice:** Is there one CNG depot in Dublin?

**Mr. Denis O’Sullivan:** Yes there is one public station.

**Deputy Michael Fitzmaurice:** What about in the west of Ireland?

**Mr. Denis O’Sullivan:** There is none at the moment.

**Deputy Michael Fitzmaurice:** If some guy decides to move to gas, how much would it cost a small operator to buy a lorry that works on gas, to store it in his own depot or yard? Mr. O’Sullivan said GNI can bring it to him.

**Mr. Denis O’Sullivan:** I do not think private CNG stations are viable for one or two truck operators.

**Deputy Michael Fitzmaurice:** Is Mr. O’Sullivan saying that unless a person is living near Dublin, working full-time in the west or in the south, it would not be viable for someone with one or two trucks until there was a CNG station?

**Mr. Denis O’Sullivan:** No, I am saying that those operators would use forecourt refuelling as many do today. We will roll out both, a forecourt refuelling network and a private network. The private network generally speaking will be for large operators who can justify spending that much capital on putting a CNG refuelling station into their depots.

**Deputy Michael Fitzmaurice:** I understand it costs between €18,000 and €20,000 to change a lorry over.

**Mr. Denis O’Sullivan:** The figures vary depending on the type of vehicle, the manufacture and so on but we see approximately €15,000 in the market.

**Deputy Michael Fitzmaurice:** Have the witnesses compared the Euro 8 diesel engine with the gas? My understanding is that the carbon emissions from them were much the same. Is that right?

**Mr. Denis O’Sullivan:** No, the carbon emissions would be lower from natural gas. The plan is to get vehicles to move to natural gas on a pathway to renewable gas as that becomes available on the network.

**Deputy Michael Fitzmaurice:** How come the diesel hybrid puts out 2,212 g of CO<sub>2</sub> per mile whereas natural gas puts out 2,364, according to the tests?

**Mr. Denis O’Sullivan:** We have conducted our own tests and we have several hundred thousand kilometres clocked up in trials. Senator O’Reilly referred to the figures for a company that has switched to CNG. The figures vary depending on the type of operation and routes the trucks take but we are seeing lower figures than that.

**Deputy Michael Fitzmaurice:** Is GNI involved in setting up some anaerobic digesters

down south?

**Mr. Denis O’Sullivan:** In Mitchelstown, County Cork, we are developing a centralised injection point that would accommodate taking the gas from farm-based AD plants and injecting it into the gas network.

**Deputy Michael Fitzmaurice:** Would I be correct in saying that a person needs 1,500 acres to run a medium to large one?

**Mr. Denis O’Sullivan:** It depends on the mix of slurry and grass that is being used but a large-scale AD plant would require that amount of land.

**Deputy Michael Fitzmaurice:** Some say it is not possible or economically viable where slurry is being used and brought to the processor and put into the anaerobic digester to pellet it down, which makes it good for water quality. Is GNI going down that route?

**Mr. Denis O’Sullivan:** No, because we believe it adds costs. Our view is that the gas should be produced as close as possible to the source of the feedstocks, particularly the slurry, because there is such a high percentage of water in it. That is why we are considering developing centralised injection points.

If water is taken out of the slurry before putting it into the anaerobic digester water will have to be added.

**Deputy Michael Fitzmaurice:** I am talking about afterwards, when the digestion is finished.

**Mr. Denis O’Sullivan:** Water would have to be added as part of the digestion process. It is not possible to digest a dry product. It must have a degree of moisture. A pelletised slurry would not be suitable for-----

**Deputy Michael Fitzmaurice:** I may have said it but Mr. O’Sullivan did not understand me. After slurry and grass are mixed in the anaerobic digester or the two tanks some people take the slurry out again and go away to a field with it. Is that correct?

**Mr. Denis O’Sullivan:** The digestate, yes correct.

**Deputy Michael Fitzmaurice:** Can we not reduce that digestate – I know there is an argument about its economic viability – to be pelleted and reduce it by 60% or 70% to be put out like a fertiliser and that would be good for water quality?

**Mr. Denis O’Sullivan:** Yes it can be done but the uptake of nutrients from direct land spreading of slurry is quite low and the uptake from digestate spreading is quite high and quick. There may be applications in sensitive areas where there are water tables and so on where the pelletised option would be appropriate.

**Deputy Michael Fitzmaurice:** Would Mr. O’Sullivan agree that this will not come about unless there is a feed-in tariff? I have been to Banbridge to look at an AD system. I have done a fair bit of research on this. If there is no feed-in tariff there is nothing. Am I right in saying green grass is better than silage?

**Mr. Denis O’Sullivan:** The grass would have to be converted into silage and then go into the digester.

**Deputy Michael Fitzmaurice:** We are getting information now that there is a new AD coming in. I spoke to a guy who was in Germany for six months and tests have been done there that show the green grass is working out better.

**Mr. Denis O'Sullivan:** Green grass can be digested. It is a more difficult process and a relatively new technology does that. The difficulty is that there is not a supply of that grass all year round, hence the slurry. There are different technologies which will work better on different applications.

**Deputy Michael Fitzmaurice:** My understanding was that GNI had earmarked three parts of the country where it would have feed-in to the gas system. Am I right in saying that it is considering Athenry or somewhere similar in the west of Ireland to put in a point where the gas can be fed in?

**Mr. Denis O'Sullivan:** Yes we are looking at points on the transmission network, anywhere from Mayo down to Galway and across the midlands. The location will depend on demand and where the renewable gas will be produced.

**Deputy Michael Fitzmaurice:** For the sake of argument, would it not better to use grass? Is it correct to say the carbon that can be extracted from grass could be used in producing a pint, for example, or other drinks? It could perhaps be sold to the drinks companies that might buy it.

**Mr. Denis O'Sullivan:** Yes, that is possible. It is actually being done in Northern Ireland at an anaerobic digestion plant. There is another plant in County Donegal that is feeding renewable gas into Northern Ireland.

**Chairman:** I thank Mr. O'Sullivan and Mr. Murphy for coming before the committee.

The joint committee adjourned at 4.50 p.m. until 3 p.m. on Tuesday, 12 November 2019.