

DÁIL ÉIREANN

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

JOINT COMMITTEE ON COMMUNICATIONS, CLIMATE ACTION AND ENVI- RONMENT

Dé Máirt, 3 Iúil 2018

Tuesday, 3 July 2018

The Joint Committee met at 3 p.m.

MEMBERS PRESENT:

| | |
|-----------------------|-----------------------|
| Deputy Timmy Dooley, | Senator Tim Lombard, |
| Deputy James Lawless, | Senator Joe O'Reilly. |
| Deputy Michael Lowry, | |
| Deputy Eamon Ryan, | |
| Deputy Bríd Smith, | |
| Deputy Brian Stanley, | |

In attendance: Deputy Gino Kenny and Senators Rose Conway-Walsh and Gerry Horkan.

DEPUTY HILDEGARDE NAUGHTON IN THE CHAIR.

The joint committee met in private session until 3.15 p.m.

Deputy James Lawless took the Chair.

Scrutiny of Petroleum and Other Mineral Development (Amendment) (Climate Emergency Measures) Bill 2018: Discussion

Vice Chairman: I thank the witnesses for attending and welcome those in the Gallery who are here to view the proceedings today. As Vice Chair of the committee, I am standing in temporarily for the Chair, Deputy Naughton, who has gone to the Dáil Chamber for a related item, so I will take the start of the session.

I wish to advise the witnesses that by virtue of section 17(2)(l) of the Defamation Act 2009, they are protected by absolute privilege in respect of their evidence to this committee. If witnesses are directed by this committee 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 and they are asked to respect the parliamentary practice to the effect that where possible, they should not criticise or make charges against any person, persons or entity by name, or in such a way as to make him, her or it identifiable. Any submission or opening statements made to the committee will be published on the committee website after this meeting, and will also be contained in the video recording which will be online afterwards. Members are reminded of the long-standing parliamentary practice to the effect that they 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 identifiable.

I remind members and witnesses to turn off their mobile phones or switch them to flight mode. Mobile phones interfere with the sound system and make it difficult for parliamentary reporters to report the meeting. Television coverage and web streaming can also be adversely affected.

I welcome the witnesses to the meeting today to engage with the joint committee in the detailed scrutiny of the Private Member's Bill. Deputy Bríd Smith, a sponsor of the Bill, is joined by her adviser, Mr. Owen McCormack, who is very welcome to the committee. Deputy Smith and the main witnesses shall speak for approximately seven to ten minutes each, and we will then have a question and answer session. Each member may ask a question of not more than three minutes.

Deputy Bríd Smith: I will do my best to be brief and deal with the main issues, as I see them, around passing this Bill and instituting a ban on fossil fuel exploration in Ireland. First, I will say a few words on why I believe this Bill is needed. We have witnessed here in Ireland and globally the effects of rising CO₂ levels on our climate. The rise in the number of extreme weather events, deadly heatwaves, prolonged droughts and record-breaking rain, are well documented. Records are broken routinely. The five warmest years in the global record have all come in the 2010s. Globally we are 1.0 Celsius above the pre-industrial average temperature and heading fast to 1.5 Celsius. Climate change is creating millions of climate refugees globally and impacting with devastating consequences on the lives of millions more. It is also threatening the earth's biodiversity and accelerating the sixth great extinction event in the history of our planet.

I have been struck that in this debate opponents of this measure have not sought to cast any doubt on the issue of climate change. On one level this is welcome. There are few climate change deniers who will publicly challenge the scientific consensus on the cause and effects of climate change. I note that the submissions from IBEC, the Irish Offshore Operators' Association, IOOA, and others all talk of the need to take action. They all accept the fact that our climate is changing, that the future of energy production must be renewable and that we must reduce our emissions. However, I can take little comfort from this widespread acceptance because there is a disconnect between accepting the science and the facts, and the unwillingness to take the steps needed.

We will hear today from Professor John Sweeney and Dr. Amanda Slevin, who will put the climate emergency into some context, and will look at our licensing regime. Next week, the witnesses will look at the feasibility of renewable energy replacing fossil fuels on the scale needed and in the time necessary. The message from these witnesses is that radical action is possible and such radical action and policies are necessary. The numbers do not add up for those advocates of continuing fossil fuel exploration. We cannot burn the proved reserves of oil, gas or coal globally and hope to reach the Paris targets of rises of under 2° Celsius from pre-industrial levels. This Bill is the first step but only the first. It does not pretend to solve the crisis or reduce emissions by itself but it sends a clear signal that Ireland is part of a global movement that is prepared to take action and deal with the use of fossil fuels.

We can look at the provisions of the Bill and what it seeks to do. Once CO₂ emissions globally are above 350 parts per million, this Bill will ensure that the Minister does not issue any licences, undertakings or leases for the exploration or extraction of fossil fuels in Ireland. This Bill would place Ireland at the front of a global movement to tackle climate change. The continued use of fossil fuels at the levels currently being used globally will mean we will use the global carbon budget within decades and fail to limit temp increases to under 2° Celsius. This would be a death sentence for large parts of humanity and large sections of the Earth's biodiversity. If this does not constitute an emergency, I do not know what the definition of an emergency should be. In acknowledging this, the Bill puts down a clear marker that the future cannot be based on fossil fuels if we wish to make the planet a habitable site for humanity and other species.

I will deal briefly with some of the criticisms and arguments against this measure. The first is that it will harm energy security, undermine jobs in the industry and make us reliant on Russian gas in a volatile political climate. I do not accept that there is any security, in the context of energy or otherwise, on a planet that will be 2° Celsius warmer than the pre-industrial level and which is heading, on the basis of current trajectories, to being 3° Celsius or 4° Celsius warmer within the next generation or two. However, let us be honest about our licensing regime as it stands and about our current and predicted use of gas and other fuels. If there is a significant find in Irish waters, which is unlikely, it would come under existing licences issued under the 1992, 2007 or 2014 licensing terms. Under those terms, companies are not required to sell resources back to State or use Ireland as a base for servicing. The State will receive no royalties on any such find and our tax regime is acknowledged by all, including the Department, as among the most generous for companies anywhere in the world.

We do not use Russian gas, nor will we in the future even under current demand trends. We meet over 50% of our gas needs from indigenous resources at Corrib and Kinsale. The balance of our natural gas requirement is imported from Britain and our gas from Britain comes via a system of sub-sea pipelines from Scotland. Britain has four main sources of gas, including its

own offshore North Sea natural gas, which provides 35% of the gas; the Norwegian North Sea natural gas, which provides 38% of the supply; continental natural gas, which provides 15% of the supply; and imported liquified natural gas, which is 12% of the total. The sources of our gas are therefore secure and safe and this bill will do nothing to change that. The energy security argument is a red herring to try to justify continued exploration and use of fossil fuels.

If there was a large oil or gas find, we would be looking at a minimum of 15 to 20 years for that find to be used. That source would last another 20-plus years. Effectively, by continuing to explore for oil and gas, we are saying we will lock our energy and electricity systems into continued domination by fossil fuels and continued high levels of emissions. Last year Providence Resources suggested it might find some 5 billion barrels of oil in our oceans; it did not but we can hypothesise that it did. When burned, those 5 billion barrels would have resulted in approximately 1.5 billion tonnes of CO₂. The Druid and Drombeg field alone could, therefore, potentially have produced the equivalent of all Ireland's greenhouse gas emissions at 2016 levels for at least the next quarter of a century. That would have been a boon to the shareholders of a few companies but it would have simply added to the total levels of CO₂ in the atmosphere and undermined the switch to renewables and the needed investment in alternative policies to achieve that. It would not have replaced Russian, Norwegian or North American gas but simply have added to them. Is anyone seriously suggesting that we should keep looking for new sources of carbon while expecting or hoping that those areas with already proved reserves will just leave them in the ground? That is not a serious proposition. We need to leave 80% of known reserves of fossil fuels in the ground as searching for more will not aid our energy security.

The opponents of the Bill argue we need and will want more gas. They say it is a transitional fuel, low in carbon emissions and can help us move to a carbon-neutral energy policy. It is true that gas may emit less CO₂ than coal but it is not an environmentally or climate-friendly fuel. It is a fuel with high emissions of CO₂ and a large-scale switch to gas is not a solution to climate change. It is simply a way of the postponing the kind of radical action we need and continuing the fossil fuel infrastructure that is propelling us to catastrophic climate change. I urge committee members to give serious consideration to the submission from Dr. John Broderick of Manchester University. He and his colleague, Professor Kevin Anderson, who is one of world's leading climate scientists in the world, have argued that current levels of emissions will use up the EU's 2° Celsius carbon budget in under nine years; that fossil fuels, including natural gas, have no substantial role in an EU 2° Celsius energy system beyond 2035; and that within two decades fossil fuel use, including gas, must have all but ceased, with complete decarbonisation following soon after. There is no room here for a substantial gas sector post 2035 but some submissions to the committee pretend otherwise. If we are still extracting gas post-2035, exploring for it in the next decade and planning for it post 2050, we are saying goodbye to the Paris agreement and any hopes of achieving temperature rises under 2° Celsius. We would be admitting that we cannot stop catastrophic climate change.

Let us not pretend that gas is a solution to climate change when we know it is part of the problem. Global trickery and pretence have largely been the hallmark of the response to climate change. Carbon credits, offsets and capture and storage have all been used to avoid actually reducing fossil fuel use. In the words of Bob Dylan, let us not talk falsely now for the hour is getting late. We can falsify accounts for CO₂ emissions all we like but the ultimate and accurate measure is the global level in the atmosphere. We cannot fool nature. Last year, the levels of CO₂ reached 411 parts per million, the highest in our history on the planet and the highest in perhaps over 2 million years. Last year, we emitted the largest amounts of CO₂ from human sources in history after some 30 years of knowing the science and facts on climate change and

carbon use. It is time to stop the pretence and the falsehoods. I put it to the committee that all these arguments on energy security, gas as a bridging fuel, the possibility of new technology capturing and storing carbon are simply attempts to put off taking the necessary action to tackle climate change.

I will conclude by saying that we in People Before Profit are open to working with all Deputies and Senators. We are open to amendments that will strengthen the provisions of the Bill and ensure it does what it seeks to, which is to ban the exploration for fossil fuels in Ireland. Finally, there is a small drafting error here that will need to be addressed. The Bill refers to Part 3 of the Principal Act and it should refer to Part 2. We are open to and welcome discussion that will see Ireland move from being a laggard, as described by the Taoiseach, to a leader in the fight against climate change.

Vice Chairman: I thank the Deputy for the overview of the Bill. The next to speak is the witness from the Department of Communications, Climate Action and Environment, who is joined by Mr. Bill Morrissey and Mr. Martin Finucane.

Mr. Matthew Collins: I express our appreciation for being invited today to take part in this debate. The Paris Agreement aims to hold the increase in the global average temperature to well below 2° Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5° Celsius. The Paris Agreement does not specify that particular fossil fuels or other fuels must be either used or discontinued. Its focus is on reducing greenhouse gas emissions. According to the Intergovernmental Panel on Climate Change, IPCC, mitigation can be cost-effective if an integrated approach is used that includes measures to reduce the energy use and the greenhouse gas intensity of end-use sectors and to decarbonise energy supply. Most 2° Celsius or less scenarios involve the majority of primary energy being supplied by low-carbon sources, such as renewable energy, biomass and nuclear fuel by 2050. These scenarios also indicate declining use of oil and a wide range of usage of natural gas by 2050.

In this context, the IPCC also identified a key role for natural gas power generation as a bridge technology because energy supply greenhouse gas emissions can be reduced significantly by replacing coal-fired power plants with modern, highly efficient natural gas power plants. The IPCC has not recommended a policy of prohibiting exploration for fossil fuels but it does advise that fugitive emissions from natural gas extraction and supply should be low or mitigated. The committee will also recall last week's presentation by the International Energy Agency, IEA, which outlined its sustainable development scenario. This scenario, which is consistent with the Paris Agreement, outlined the future growth in renewables, nuclear and natural gas in the global primary energy demand. This scenario sees a need for continued investment in oil and gas projects to meet energy demand, even in deep decarbonisation scenarios. It also identified a continuing and growing need for oil and gas as non-energy raw materials for many products.

The European Union has pursued an energy and climate strategy that is in line with the IPCC's advice on cost-effective mitigation. It is a combined approach of reducing emissions, improving energy efficiency and decarbonising electricity generation. The EU is committed to reducing its emissions by 80 to 95% of 1990 levels by 2050 as part of a collective effort by developed countries. Cost-effective ways of achieving reductions on this scale are described in the European Commission's roadmap for a low-carbon economy in 2050. Under a range of scenarios in the roadmap, renewables reach 41% to 60% of primary energy by 2050. At the same time, the oil and gas share of EU primary energy declines to a range of 33% to 41% of primary energy by 2050.

Nationally, Ireland has a long-term commitment to reduce carbon dioxide emissions by at least 80% by 2050, compared with 1990 levels, across the electricity generation, built environment and transport sectors and, in parallel, to pursue an approach to carbon neutrality in the agriculture and land-use sector, including forestry, which does not compromise capacity for sustainable food production. Our 2015 energy White Paper on Ireland's transition to a low-carbon energy future sets out a vision of a low-carbon energy system where emissions from the energy sector will be reduced by between 80% and 95% by 2050. The reduction will require a significant increase in the share of renewables in primary energy supply. However, fossil fuels will still make a significant but progressively smaller contribution to Ireland's fuel mix. Nonetheless, in this low-CO₂ energy system scenario, oil and gas will account for around 24% to 48% of Ireland's primary energy supply in 2050.

In light of the ongoing and future requirement for oil and gas, the energy security objective remains important. Between 1995 and 2015, the EU 28's dependence on oil imports increased from 74% to 89%. The EU's dependence on natural gas imports increased from 43% to 69% over the same time. Ireland has had one of the higher energy imports dependencies within the EU - for example, Ireland is 100% dependent on imports for oil. However, the development of the Corrib gas field in 2015 demonstrates the positive impact that indigenous supplies can have on Ireland's import dependency. Ireland went from an energy import dependency of 88% in 2015 to 69% in 2016. In addition, this helped to lower our annual energy import bill from €4.6 billion to €3.4 billion in 2016. However, gas production from the Corrib field has peaked and will decline from now on.

The clear message, as we transition to a low-carbon energy system compatible with the Paris Agreement, is that natural gas and oil will be significant but progressively smaller components in Europe's and Ireland's energy mix and that there will also be increasing non-energy uses for oil and gas. The proposed ban on oil and gas exploration in Ireland can be evaluated in that context as well as against the three energy objectives of security, accessibility and sustainability. The proposed exploration ban represents a poor policy choice for Ireland for a number of reasons. A ban on Irish exploration fails to recognise that even as Ireland and Europe transition to a low-carbon, Paris Agreement-compatible energy system, we will still use oil and gas, most likely for aviation, marine and heavy goods transportation and for cleaner electricity, first without and later with carbon capture and storage.

Significantly, the proposed ban on exploration in Ireland would not reduce Ireland's greenhouse gas emissions. If the ban had already been law, it would not help Ireland reach its 2020 emissions and energy targets. The proposed ban will not help Ireland reach its 2030 targets or the 2050 emissions reduction goal. The proposal does not promote the decarbonisation of electricity generation as it does not encourage the use of renewable energy. Countries with active petroleum exploration and production can also have high shares of renewable energy. The proposed legislation would not support improved energy efficiency in any way. A ban on Irish exploration also fails to recognise that oil and gas will continue to be used as raw materials for many useful products, such as agricultural fertiliser and pesticides, manufacturing materials, pharmaceutical and medical products and others. In addition to the absence of any climate and energy benefits, the proposed legislation would worsen Ireland's energy security when the Corrib gas field goes into decline and leave Ireland more energy import dependent. If an exploration ban had prevented the development of the Corrib gas field, Ireland would have spent an additional €600 million on energy imports in 2016.

Ireland has been criticised for its lack of progress towards its 2020 targets. However, this

Bill offers nothing to reduce emissions, increase renewables, improve efficiency, increase energy security or keep our economy competitive. In contrast, energy efficiency and renewable energy measures make essential contributions to all of the major objectives of climate and energy policies, including improved competitiveness, security of supply, sustainability and the transition to a low carbon economy. Members will be aware that the Citizens' Assembly recently agreed a thought-provoking set of 13 recommendations to tackle climate change. However, it was particularly notable that the Citizens' Assembly did not recommend a ban on Irish exploration for gas and oil. Nonetheless, there is more that Ireland can do. The national mitigation plan, the national development plan and Project Ireland 2040 represent a step-change in our approach to meeting the climate challenge. Project Ireland 2040 sets out a €22 billion climate focused investment plan over the next decade. Actions will include a major expansion of renewable energy to produce 55% of our electricity, the removal of coal and peat fuels from electricity generation by 2030, and energy efficiency upgrades in homes, public buildings and commercial premises.

Finally, the Department looks forward to further consideration by the committee of achieving climate and energy objectives, including improved competitiveness, security of supply, sustainability, and the transition to a low carbon economy.

Vice Chairman: Our second witness is Professor Pat Shannon from the Irish Offshore Operators Association, IOOA. He is joined by Dr. John Conroy.

Professor Pat Shannon: I thank the committee for the invitation to present and discuss our views on the Bill. I am chairman of the IOOA, a role I took up four years ago when I retired as professor of geology at UCD. I am joined by my colleague Dr. John Conroy. Dr. Conroy is project manager at Providence Resources and chair of IOOA's safety sub-committee. IOOA's members are a mix of large, medium and small international and Irish companies. They have delivered four gas fields offshore of Ireland which have helped economic growth and jobs by providing the security of affordable energy over a long period. It should be noted that exploration and production is carried out with no financial risk or exposure to the State.

Our detailed documentation has been circulated to members of the committee. I will highlight some key points from that documentation which are particularly pertinent to today's discussion. The IOOA recognises the need to move to a lower carbon future. However, we believe, as is reflected in national policy, that this transition must be realistic, carefully planned and fully costed, and that gas and oil will play an important role in energy supply throughout that transition. Overall, we believe the Bill, which proposes banning the granting of any further licences, undertakings or leases off Ireland's shores, would have no positive impact on Ireland's greenhouse gas emissions.

As a global backdrop, oil and gas provide 57% of the world's energy. Forecasts suggest that by 2040, oil, gas, coal and the non-fossil fuels will each contribute approximately 25% of global energy. In Ireland, the reality is we are hugely dependent on imported fuel resources. The Bill would further increase our dependence on imported oil and gas and would threaten the security of Ireland's energy supply. Its geographical location at the very edge of Europe makes Ireland extremely vulnerable to potential interruptions in energy supplies. Some members of the committee may remember the impact the 1973 and 1979 oil shortages had on Ireland, with long queues for petrol and difficulties transporting goods. The 2009 Russia-Ukraine gas dispute cut off gas supplies to south-eastern Europe for 13 days. The risk has been highlighted in recent times by political instability and increasing uncertainty in both the Middle East and Russia, as well as by Brexit. It is vital that we keep open all available energy supply options,

especially indigenous oil and gas supplies, a view also recommended by the International Energy Agency. Some 45% of our gas supplies is imported and this figure will rise if we do not find more gas. The potential for gas supply interruptions will further increase when the United Kingdom which is a net oil and gas importer leaves the European Union. During the cold spell earlier this year the United Kingdom, our only external source of natural gas via the gas interconnector came close to being unable to meet its own demand for gas. Europe imports three quarters of its oil supplies and half of its gas requirements, with one third coming from Russia. Interruptions of these supplies would be extremely damaging and costly for Ireland. The Economic and Social Research Institute, ESRI, estimates in a report that the cost of losing one day of gas-fired electricity in Ireland could be up to €1 billion. The cost of losing three months of gas-fired power could be up to €80 billion, or 50% of Ireland's GDP. These effects would be felt in all homes, schools, hospitals and throughout industry.

The Kinsale Head gas field which has stored strategic gas supplies will be decommissioned soon and Ireland will then hold no contingency gas reserves, further increasing the exposure to supply interruptions. This highlights the vital role of an active exploration sector to provide indigenous supplies. If the Bill proceeds, Ireland would lose the opportunity to have a significant revenue stream that could be used to support energy transition and job-creating opportunities in rural and maritime parts of the country. It would undermine industry confidence in Ireland, both within and beyond the oil sector. The use of Irish natural gas has transformed the energy and economic landscape of Ireland, being the catalyst for the creation of the national gas grid and making major contributions to regional and local economies. Approximately €30 million annually is spent in the local Cork economy as a result of the Kinsale Head gas field. During the worst period of the recession in Ireland, the Corrib gas project provided more than 1,000 full-time jobs, while over €1 billion was spent directly with over 300 Irish contracting companies.

Petroleum exploration and production can bring substantial benefits, foreign direct investment, jobs and income, to coastal regions away from the main urban centres. Banning exploration will not lower greenhouse gas emissions, either in Ireland or globally. They will probably rise owing to the need to import oil and gas from other countries, mostly outside the European Union. Indigenous and European oil and gas resources emit 30% less CO₂ than oil and gas imported from outside Europe owing to a combination of greater production efficiency and lower transport energy costs. For Ireland, replacing such imports with indigenous gas and oil resources could result in significant emissions reductions. The Irish Offshore Operators' Association, IOOA, believes it would be foolhardy to ban exploration when we have no realistic and reliable alternatives to the use of gas and oil. Annual gas demand in Ireland is rising by approximately 10%, with gas being supplied to more than 26,000 businesses and over 650,000 homes throughout Ireland. Many renewable energy forms such as wave energy are at an early stage of development, while some such as wind energy are inherently intermittent and must be supplemented by more reliable forms such as gas and oil. Globally and in Ireland, there is clearly a requirement to replace high greenhouse gas emitting fuels such as coal with a range of cleaner natural resources and renewable energy forms, together with the deployment of technologies such as carbon capture and storage, CCS, to capture greenhouse gas emissions on a large scale. Natural gas, in particular, has a major role to play in substituting for higher greenhouse gas emitting energy forms, while oil will continue to be important for international transport, including aviation, shipping and haulage, and in non-burning uses such as petrochemicals and feedstocks.

It is essential for Ireland which has a small and relatively isolated energy system to identify the appropriate energy mix that will guarantee reliability, security and affordability, while

minimising damage to the economy or society. Natural gas and oil will be required to play a key role in the security of affordable energy supplies, in addition to providing the necessary base load backup for intermittent renewable energy sources. We are best placed to do this with indigenous gas and oil resources. We often look for examples of countries from which we can learn to do things better. Norway has one of the lowest low carbon economies in the world. It is a good example of how to embrace a low carbon society, while also continuing to explore for and develop its own offshore oil and gas resources. Revenues from oil and gas resources have played a crucial role in creating a modern Norwegian society which is a world leader in electric car sales, with continuous and significant investment in hydropower generation.

At a time when the outlook for Irish offshore exploration is excellent, with real momentum in investment in exploration, the IOOA believes that, by enacting this Bill, Ireland would be turning its back on the potential to have energy independence. We would be embarking on a policy that would increasingly make us isolated from our European neighbours and more dependent on politically less stable countries to supply a significant proportion of our energy needs for the foreseeable future, in all likelihood causing an increase in greenhouse gas emissions by forgoing the opportunity to find and develop Irish natural resources to replace imports. As Ireland's gas reserves deplete, it makes no sense to stop exploration and the opportunities and benefits that come with it. Instead of banning exploration, we should, like Norway, encourage and support it.

Vice Chairman: I thank Professor Shannon. From IBEC we have Mr. Conor Minogue and Dr. Neil Walker. I invite Mr. Minogue to make his presentation.

Mr. Conor Minogue: I thank the joint committee for its invitation. I am here with Dr. Neil Walker. We are with the business group IBEC which is Ireland's largest business group. It represents 7,000 members across a range of sectors that make up 70% of the private sector workforce in Ireland. Its member companies are big, small, indigenous and international. The one thing they all have in common is that they need access to a secure, affordable and sustainable energy supply. I understand a copy of our submission has been circulated. I will briefly talk through key concerns and why, in our view, this Bill will not have the intended environmental outcome. It would not reduce fossil fuel consumption and could instead undermine national energy security. We will be happy to take a questions later.

A failure to address climate change and its main driver, increasing greenhouse gas emissions, will put the environment, our society and economic well-being at great risk. A failure to decarbonise the energy system will lead to a continued over-reliance on energy imports. For these reasons, IBEC fully supports the delivery of a low-carbon economy by 2050 and the transformation of the energy system. In practice, this will mean a complete change in how we run businesses, how we get from A to B, how we heat our homes and factories and how we power the electricity system. How we meet this objective with a growing economy and increasing population while also addressing concerns about energy security and affordability will be one of the biggest challenges of our time. The Bill would be disruptive and affect all sectors and communities. It is incumbent on us as a society to follow the most cost-effective route towards decarbonisation and prioritise evidence-based policy.

In Ireland we have access to world class energy and climate modelling in University College Cork which could give us an insight into how our future energy needs can be met within an increasingly constrained carbon budget, which is in keeping with the Paris Agreement and our obligations. It is imperative that we use this resource and evidence base when making policy decisions. I refer to the graphs on page 3 of our submission. One can clearly see that in the

modelling done to date, there is a role for natural gas in the transition and in a 2050 scenario. Our key concern is that the Bill overlooks the important role natural gas plays today in the transition and the 2050 timeline. It is used by over 800,000 households and businesses on the island of Ireland. It is the primary fuel for electricity generation and also recognised as a transition fuel, both by the European Commission and the Intergovernmental Panel on Climate Change. That is because, while natural gas is a fossil fuel, it is the cleanest fossil fuel available. It has application for the heat, transport and power generation sectors. Due to its negligible levels of nitrous oxide and particulate matter, is an obvious bridging fuel for the transport sector, particularly for freight and heavy goods vehicles that make up 20% of our emissions in the transport sector, on which we have made very little progress, and particularly for vehicles and transport modes where electrification is not an option.

In Ireland, natural gas plays an especially important role in electricity generation and ensuring that our electricity grid remains secure and safe. As an island nation located on the periphery of Europe with no nuclear power generation, the flexible generation that gas provides is needed to supplement and accommodate the growing level of renewables, and intermittent renewables like solar and wind power, that we are bringing onstream. At present there is no other obvious solution to this problem. EirGrid has acknowledged that fact in its planning framework entitled Tomorrow's Energy Scenarios 2017 and UCC has acknowledged the same in its modelling work.

We need to maintain secure supplies of natural gas. The existing Moffat interconnectors have been extremely reliable in giving us affordable natural gas. The Corrib gas field has also given us great respite in terms of our over-reliance on imports. However, when the Corrib field is exhausted and domestic sources cannot be used then we will have to rely on imports again. That is a growing concern especially when we will have to increasingly look further afield for imports from non-EU and non-OECD country, particularly in a worsening geopolitical climate.

As has been mentioned, the enactment of the Bill could lead to a net increase in global emissions because piped gas, which must travel long distances, and liquified natural gas have a higher carbon footprint than domestically produced gas.

In summation, the security of our energy system is not just a matter for big business but is a matter for everybody as it affects local hospitals, schools, cafés and libraries. We must all bear this in mind and I ask the committee members to bear this fact in mind when considering the Bill. Today, Ireland continues to have a worrying over-dependence on imported fossil fuels. The delivery of a low carbon economy will help us to address both climate change and our over-reliance on imports. During this transition the security of our natural gas supply still needs to be prioritised. That is why we recommend that the Bill is not progressed at this time. We ask the committee members to keep in mind the evidence and modelling that has been done when considering the Bill.

Vice Chairman: I call our fourth witness who is Emeritus Professor John Sweeney from the Irish Climate Analysis and Research Unit in Maynooth University, County Kildare. Professor Sweeney is very welcome.

Professor John Sweeney: We have heard a great deal of noble aspirations here today but time has moved on. Aspirations no longer cut the mustard, in terms of our international obligations.

As members can see, the first diagram in my presentation that is displayed on screen shows

the way in which Ireland's position on transitioning to a low carbon economy has lost international credibility. This is the second of two reports. The first report places Ireland at the lowest level, in terms of its performance in achieving its climate objectives. The second report, which is more recent, ranked Ireland 28th out of 29 countries in Europe and just one place ahead of Poland. These reports are important because it is quite clear that these criteria are an indication of our failure to meet the obligations that we freely entered into in 2008. As members can see from reading what is written below the second diagram, Ireland received overwhelming support from all of the political parties represented in the European Parliament when the obligations were made.

The Bill can help restore Ireland's credentials as well as make a significant contribution to the next hurdle, which is a very detailed national energy and climate plan. The plan must be submitted to the Commission in draft form by the end of this year. It is important that we consider the way in which Ireland's international reputation is at stake. This is a litmus test. If we want support from our European colleagues for other areas like Brexit, like a seat on the United Nations Security Council and even future relief from climate catastrophes then we must consider whether we are pulling our own weight.

The Bill makes a positive contribution to national and international climate obligations, some of which we have undertaken off our own bat and not at the behest of anybody else. The national policy position is to have an aggregate reduction in carbon dioxide emissions by 2020 of at least 80% compared with 1990 levels. That is our national target and is one which must guide our policy.

Ireland's position is guided by our international obligations under the Paris Agreement. The agreement has the status of an international treaty and we are obliged to conform with the objectives of the Paris obligations such as to keep warming below 2° centigrade. The diagram on the next page shows that we must have 50% global decarbonisation by the 2030s and we must move to 100% decarbonisation around the middle of this century. Of course the Bill will not in itself achieve these goals. Nevertheless, I believe that the Bill will encourage energy security based on renewable energy technologies. I do not buy the arguments that we are moving into more energy and security than we had in the 1970s. In fact, I believe that we have sufficient energy security from our existing gas field and also from the secure sources that we have in the three pipelines that connect us to the North Sea European Gas Transmission Network.

The Corrib gas field has a lifetime of between 15 and 20 years. We will still be producing Corrib gas in the early 2030s and, possibly, in the late 2030s. It is worth pointing out that North Sea oil and gas production, which we thought was depleting very quickly, has increased for the past three years. There is a history of oil fields and gas fields having a much longer life when it comes to the crunch. New fossil gas is incompatible with the plans to decarbonise the energy sector in Ireland. However, it inhibits the development of new wind and solar energy. For a while last Saturday, the UK generated the highest amount of its electricity demand from solar energy. That is where we should be going energy wise rather than trying to return to the past. Claims that gas supports renewable energy development are also not vindicated. The cheapest gas generation technology is for baseload operation and not for intermittent peaking.

The Bill will position Ireland as an early mover in this area. That stance is very important internationally for our credibility and reputation. Ireland is no longer the fourth country after France, Belize and Costa Rica and is now the fifth because New Zealand has now joined that list of countries.

It is quite clear that coal and gas fields currently in production, without any new exploration or development, are enough to exceed our climate goals. Therefore, we do not need to worry about new gas and oil if we want to stay below 2° centigrade. As members can see from perusing the next diagram, burning the reserves currently in operation, in terms of operating oil and gas fields alone, even without further coal combustion, will warm the world above the 1.5° centigrade threshold that we are obliged to make efforts to remain below, under the Paris treaty organisation.

The exploration cycle has been mentioned here. The Corrib gas field was discovered in 1996 or 22 years ago. Therefore, we have a long cycle of exploration, development and production. We are tying ourselves in to a very long period of continued fossil fuel extraction should we not pass this particular Bill. There is a list of phases starting with exploration, appraisal, development, production and, finally, an abandonment phase. Do we really think we can lock ourselves into these until the middle of the present century?

The global imperative of tackling climate change means that continued investment in fossil fuel runs the risk of creating stranded assets. Investors are increasingly nervous about companies, in terms of how they will evolve to tackle the warming limit of 2° centigrade for their business. Financial regulators have endorsed the importance of the scenarios analysis for assessing climate risk. I wish to draw the attention of members to a statement. Mark Carney, the Governor of the Bank of England, stated that a carbon budget consistent with a 2° Celsius target would render the vast majority of reserves stranded, meaning oil, gas and coal will be literally unburnable without expensive carbon capture technology. We have no feasible carbon capture technology at the moment and we have had no demonstrable successes in that area. We have very limited choices. If we continue building fossil fuel extraction and have some success in limiting emissions, around which the noose will tighten fairly quickly, we will have only two ways out, that is, with stranded assets or climate chaos. I would argue that managed decline is the best option in that regard.

The Bill will further accelerate trends which are emerging in society at a very fast rate in terms of divestment in fossil fuels, on which topic a Bill is going through these Houses. The trend encompasses universities and foundations, including the Rockefeller Brothers Fund, faith-based groups, pension funds, governmental organisations and NGOs. It will mushroom in the next few years and we can be caught on the wrong side of history if we do not acknowledge it now. In my submission, members will also see a statement from Bishop Tutu in which he talks about the urgent need to tackle this climate emergency.

Ireland spends €386 million each year on fossil fuel subsidies, and this money could be much better spent on renewable technologies. The Danish Parliament voted recently to go for 100% renewable power by 2030 and it is trying to export renewable energy. That is very ambitious but Denmark is, in many respects, comparable to Ireland. I will not have time to go into the details of clean air or safety, although members will see pictures of some of the problems oil and gas exploration has created in the past. I urge the committee to seriously consider not just talking the talk but walking the walk towards a low-carbon society, as that will be the litmus test.

Vice Chairman: Our fifth witness is Dr. Amanda Slevin from Queens University Belfast.

Dr. Amanda Slevin: My research focuses on society-environment interactions and my PhD was the first academic study of the Irish State's management of gas and oil. Subsequent publication and further research led to my book Gas, Oil and the Irish State. I have conducted exten-

sive research on Irish State hydrocarbon management, which has allowed me to develop a deep understanding of how things work in Ireland and the flaws in the State's approach.

Before focusing on hydrocarbon management, I wish to situate the Irish approach in the wider context of climate change and environmental degradation, which Professor Sweeney highlighted. Research tells us that human activities, particularly the consumption of fossil fuels, are responsible for climate change through dangerous levels of greenhouse gas emissions. Policies and legislation at international, European and national level seek to reduce greenhouse gas emissions and to transition to a more sustainable future but is this enough? Data on Ireland suggest not. Ireland has the third highest *per capita* greenhouse gas emissions in EU. This is based on 2013 figures but Professor Sweeney's submission suggests the performance is actually declining. At the rate we are going we will be lucky to achieve a 1% reduction in greenhouse gas emissions by 2020, let alone the 20% to which we are committed. Radical action is needed and role models for Ireland include France, New Zealand, Belize and Costa Rica, who are leading the way by banning oil and gas exploration on environmental grounds.

My written submission looks at the wider context to enable us to understand Irish hydrocarbon management and why it is problematic. I will highlight some key features. The State's approach has evolved since 1959 and has been shaped by a variety of social, economic, political ideological forces. Four different fiscal systems apply to oil and gas exploitation, each with varying returns to the State. The licensing system is similar that in fewer than half of the countries which have hydrocarbon exploitation globally. This results in the privatisation of publicly owned resources in exchange for low rates of taxation. These issues are compounded by flaws in licensing, policy and planning frameworks which cause social conflicts as so clearly demonstrated by the Corrib gas conflict.

I have provided a list of current authorisations. Members will see there is an issue related to the length of time submissions are held by companies without bringing the resource into production. The latest report shows that the authorisation for the Barryroe oil find remains a standard exploration licence with no reference to plans to transfer the authorisation to a petroleum lease or a lease undertaking. That allows a private company, Providence, to maintain control over Irish resources without having expressed any plans to bring the resource into production. Of the 18 significant discoveries identified by the Joint Committee on Communications, Natural Resources and Agriculture in 2012, 15 are currently under licence and only four in production. Of the 11 remaining authorisations or discoveries, Providence holds authorisations for seven.

These are small issues in comparison to some of the key issues surrounding the State's management of gas and oil. The first big problem is Ireland's choice of regime. The State, which owns the gas and oil, grants licences to and authorises oil companies to conduct exploration and production activities. If hydrocarbons are discovered and produced, ownership of these resources are transferred from the State to companies in exchange for a pre-agreed return. The licensing systems reflect the overall ideology toward privatisation of resources and shows a relaxed attitude towards State management and regulation.

Ireland's regime is at odds with those of other countries, which use production sharing and service contracts. These represent the most popular approach to resource management globally. Production sharing contracts and service contracts ensure strong State control and that the State retains full ownership while permitting companies to undertake exploitation as a service to the State, for which they are remunerated.

Some of the benefits of production sharing contracts include a higher share of taxes, roy-

alties, associated onshore and offshore activities, and guaranteed supply. These are benefits which Justin Keating sought to achieve in 1975 but are benefits which Norway sought from the very start of its approach to gas and oil management, when it refused to allow the transfer of State assets to private companies with very limited benefit. Under Ireland's regime, companies are under no obligation to sell produced gas and oil back to the State and if they choose to do so it is at full market prices. The Irish licensing regime for gas and oil does not guarantee security of supply. If oil is produced offshore, the oil can be transported in tankers to other countries. Similarly, plans for the Shannon liquid natural gas processing plant may mean gas supplies are exported to other countries without benefit to the State in terms of access to indigenous gas.

Security of supply fallacies need to be challenged, with recognition given to the weak position the State is in relating to gas and oil. Globally, states are increasingly asserting stronger control and ownership of resources with national oil and gas companies bearing responsibility for production. The Irish State should also reassert control over its resources, with the goal of keeping them unproduced on environmental grounds following the example of France, New Zealand, Belize and Costa Rica, particularly as the fiscal returns to the Irish State from hydrocarbon exploitation are among the lowest anywhere in the world.

The second issue with gas and oil management is the uniquely low tax terms. The 1992 licensing terms apply to the Corrib and Seven Heads petroleum leases, six frontier exploration licences and two standard exploration licences. Hydrocarbons produced through these authorisations are subject to a 25% tax rate against which all costs are offset. This rate of taxation is one of the world's lowest. Johnston's study of 45 fiscal regimes put Ireland's terms at the bottom of the list with the nearest terms resulting in 40% tax. Following public outcry about these low tax rates, the 2007 terms were introduced. These also apply a 25% tax rate with an additional between profit resource and tax of 5% to 15% which is applied to larger fields after costs have been offset. There are two lease undertakings, 12 frontier exploration licences and four standard exploration licences which are subject to the 2007 terms. A further two lease undertakings are also being considered on these terms and have been under consideration for a lengthy period as illustrated in the table provided.

In an international study of government take, which is the revenue states receive from their resources, I examined research on 153 fiscal systems and found that Ireland had the second lowest rate of return of the countries studied. Of the countries studied, 79% demanded government take of at least 50%, which is twice the rate applied in the 1992 licensing terms and higher than the returns demanded under the 2007 terms. The generosity of the State to oil companies is evidenced in a report of the Oireachtas Library and Research Service from 2011 which found that Ireland had the most generous tax and royalty regime. A review of Ireland's regime in 2014 resulted in an increase of taxation for authorisations granted after 2014. The 25% corporate tax regime rate remains joined by a petroleum production tax which can result in taxation up to 55% after costs have been accrued. One frontier exploration licence, 31 licensing options and 18 petroleum prospecting licenses have been granted under those terms. We have 79 outstanding authorisations at varying rates of take up to a complete maximum of 55% after costs have been offset. That is not 55% of the value of the oil and gas, it is 55% potential tax. Johnston estimated government take globally at approximately 70%, which is nearly three times the rate of government take under the 1992 terms and significantly higher than the 2007 and 2014 modifications. The tax terms for Irish hydrocarbons remain low by international standards and eliminate the economic benefits from hydrocarbon exploitation. As such, they cannot be used to justify continued hydrocarbon exploitation, in particular when one considers the environmental damage caused by hydrocarbon exploitation. In the interests of sustainability, resources

should be invested in renewable energy sources that would support Ireland's transition to a low-carbon economy. Such changes must take place sooner rather than later if Ireland is to have any hope of meeting greenhouse gas reduction targets.

A third key issue involves the flaws in licensing policy and the planning framework. Flaws in the Irish model of hydrocarbon management are further compounded by weaknesses in the licensing policy and planning frameworks as violently articulated through the Corrib gas conflict. Deficiencies in Ireland's licensing policy and planning frameworks include a disjointed approach to sustainability, the facilitation of project splitting, the exclusion of communities from decision-making and the prioritisation of short-term economic interest over long-term societal and economic well-being. A further issue surrounds the contradictory roles of the Department of Communications, Climate Action and Environment, which is tasked with promoting hydrocarbon exploitation, managing hydro-carbon activity, functioning as a resource owner and also, somehow, environmental protection in circumstances in which the production and consumption of hydrocarbon are associated with environmental degradation and contribute to climate change. In other words, the State body responsible for responding to climate change also promotes hydrocarbon exploitation and transfers public resources to private interests, undertaking conflicting roles which do not correspond to any notion of sustainability.

My submission demonstrates that there are a range of interconnected issues surrounding hydrocarbon exploitation, consumption and climate change. Given these interconnections, we must choose a pathway which is conducive to long-term sustainability. That will involve complex topics and challenging decisions. Ultimately, long-term sustainability will entail structural change. In addition to the issues I have articulated in my written submission, decision makers must be cognisant of carbon lock-in which will make decarbonisation more difficult and, possibly, more expensive in the long term. Indeed, some estimates suggest that continuing to invest in carbon-intensive technologies could increase long-term investment fourfold. We are at an important crossroads and we need to take radical action to create a sustainable and healthy society for this and future generations. Current production and consumption patterns cannot be sustained. I have outlined in the table provided some of the interconnections to which I refer and will not go into detail on them. I want to touch on a few brief issues before I conclude.

Vice Chairman: We are over time so Dr. Slevin might move to the wrap-up.

Dr. Amanda Slevin: Absolutely. I have challenged security of supply arguments. They should not be used to justify the State's approach. We have to question how we manage resources as the economic benefits are outweighed by the environmental damage. The climate emergency measures Bill is essential as it can play a decisive role in the reduction of hydrocarbon production and consumption and encourage the redirection of investment towards renewable energy. The Bill is complementary to and advances current climate change mitigation strategies and policies. There is no second chance when it comes to climate change. We must act now and we must act decisively. Action must include banning further hydrocarbon exploitation, reducing energy consumption and properly resourcing the transition to renewable energy in a manner which is acceptable to all stakeholders.

Vice Chairman: I thank Dr. Slevin. That concludes the initial testimony of witnesses so we will move to questions from members. Members who are not members of the committee are in attendance and are very welcome, but we will take questions from members of the committee first. Deputy Stanley was first to raise his hand.

Deputy Brian Stanley: I thank our guests for their presentations. I apologise for having to

leave earlier but I had to speak in the Dáil on the establishment of the climate action committee. There is broad agreement now that we face a serious situation with regard to climate action and our use of fossil fuels. With a few notable exceptions in south Kerry and the White House, we are all on board in recognising that we have a problem, which is good. At this stage, it is about what to do. The debate around fossil fuels and their extraction is one we have to face head on. The approach of my party, which I have advocated, is that we have to change very quickly. The disappointing thing is that we have not been putting the renewable industries in place to deal with this. We have not been creating the new industries. When I say “we”, I refer to the State, private industry and the various sectors of the economy. That is where we need to move to. I have a question on alternatives to fossil fuel which the Department’s representatives might like to answer. It is about alternatives to fossil fuel in other areas like fertilisers. Mr. Collins or one of his colleagues might address that.

Professor Sweeney highlighted that we may go into the 2030s with Corrib. We are at least looking at 12 to 15 years of gas. As such, we do not have security of supply there. Of fossil fuels, it is possibly the best option in terms of current use but we need to move away from all fossil fuels. Surely, our oversized agriculture sector and the problem we have with farm waste, food waste and other forms of waste are putting us in breach of EU regulations along with bad environmental practices. As such, should we not be moving quickly towards biogas and biomass? Do we know what potential there is in any oil or gas reserves off our shores? Should we not recognise the potential of offshore wind? I accept it is intermittent but it could be married with biogas and other renewable sources such as wave, wind and solar.

I heard the outline of IBEC’s position and I have read its submission. What concerns does IBEC have about being behind the curve in terms of not moving quickly enough into new industries, particularly with regard to stranded assets? In other words, in a short period of time assets that are invested in old, dirty industries may not have a great value. In fact, it might be hard to get people to invest in them as the smart investors see that the new game in town is renewables.

My last question is for Dr. Slevin. She said in her presentation that gas exploration companies are under no obligation to sell the gas back to the State and that it is sold at full market price. Obviously, there is the security of supply issue, which was highlighted by another speaker as well. The suggestion is that we have security of supply because we have private companies drilling, but the reality is that they can sell it to whoever they wish on the world market. How big an issue is that in terms of moving away from fossil fuels? How much of a drag is it in moving industry and policymakers away from fossil fuels?

Deputy Hildegard Naughton resumed the Chair.

Chairman: I call Deputy Eamon Ryan next. The witnesses can take a record of the questions and I will come back to them.

Deputy Eamon Ryan: I was hoping for a little delay.

Chairman: Do you want me to call you later?

Deputy Eamon Ryan: No, I will put my questions now, although I might intervene again later. Like Deputy Stanley, I must apologise for my absence. It was due to an unfortunate timing circumstance as the motion on the climate committee had to be discussed and agreed in the Dáil. It is related to the debate here. I have been frantically reading some of the submissions

to prepare my questions. I regret missing the presentations but I have a fair idea of the views after reading some of the material.

I will start with a few technical questions. Perhaps Professor Shannon and Dr. Walker, who I know very well, or Mr. Collins from the Department will be able to help me. Most of our oil and gas options, the licensed exploration locations, are in further distant waters. Is that a fair summary? My understanding is that we have searched every pocket in the Irish Sea and Celtic Sea and found nothing aside from Kinsale and another pocket below. Other than that most of our exploration is in the Porcupine and in deep distant waters. Where do we think we will find oil and gas? People were talking for years about how we have €600 billion worth of oil and gas offshore but fortunately or unfortunately, and one can pick which is the right word, I do not believe we will strike oil or gas. Relying on it as a security strategy is like relying on a gambler who is putting the last €5 in the slot machines in Las Vegas. That is the territory we are in. Where do the witnesses think oil and gas might be found? From which field will we get this great security? If I were to offer the witnesses €500 million to invest in offshore wind off the west coast or offshore oil and gas, in all honesty which economic investment would they make?

I have another question for the oil industry experts. What is the estimated cost - I realise this depends on the field but it is possible to aggregate and estimate it - of a barrel of oil from the Atlantic? What does the price need to be for it to come ashore? We had an incredible demonstration from the International Energy Agency, a cheerleader for the oil and gas industry. It mentioned figures such as \$40 per barrel for shale gas in the United States. I was amazed when the agency said it believed the cost of offshore was coming down so one could get oil or gas from the Gulf of Mexico or from Brazil for \$30 or \$40 per barrel. What is the estimated cost of a barrel of oil from Irish waters? What is the business projection of what that would have to be?

I have a final technical question. I read IBEC's analysis in which it quotes the ESRI and UCC projection for natural gas consumption to remain steady out to 2050. In the course of my research I was reading some of the other experts' projections for the future, an impossible task. To take one example, the energy scenarios of Bloomberg New Energy Finance would be as good as any and are recognised by the industry as probably among the best. Its wording refers to a dramatic fall in European gas production between now and 2050, and that is before we develop new battery technologies and take into account the ongoing contraction in the price of renewables. However, its best summary analysis is a dramatic reduction in demand for European gas. Why does IBEC think the ESRI and UCC are more accurate in terms of projecting that gas will continue at current levels? That would shoot us through any climate targets we might have. Why does it believe UCC and the ESRI versus the wider analysis? I can cite some other examples. An organisation in London, E3G, has done a great deal of work for the European Union examining projected gas demand. It recognises that a massive overcapacity in gas infrastructure networks is likely, even with existing investment plans. I can cite numerous reports showing overinvestment in gas. In those circumstances I question the Department's analysis that gas is good. It is bizarre that we have a climate action Department cheering on gas.

Deputy Timmy Dooley: Like Deputy Ryan, I must apologise. We had to be in the Dáil because we were speaking on the establishment of the climate change committee, which links in nicely to what we are discussing here. I have read the documentation the witnesses provided in advance. Perhaps they could help us understand the size of the oil and gas industry here. How many people are employed directly in it?

Ireland is not part of a major oil and gas exploration industry. Would the witnesses accept that if we are to set a standard in moving towards green energy we should be making a defini-

tive statement that we are moving away from exploration for oil and gas? The Department and others will suggest that transitioning over a prolonged period will still require the usage of a certain amount of gas as a base energy provider. Is it not the case that a small country such as this, which has not really been involved in the exploration sector and notwithstanding the fact that we will have to import gas for a considerable amount of time into future, should be setting a standard in moving away completely from the use of fossil fuels? Accepting that there is a transition period and that we will have to import gas, do the witnesses accept that making such a statement will force investment in the energy sector towards green energy in this country and the delivery of electricity in a far cleaner way?

The suggestion put forward by the industry and by some in the Department is that we will continue to use oil and gas for a prolonged period in any case and, therefore, we should not cut off that supply and access to energy security. It must be accepted that we have never had enough oil or gas for security. What we are extracting at present does not give us long-term security. The information available to me does not lead me to believe that we are on the cusp of a major find that will ensure our security over the period to 2050, during which period everybody accepts we will still be using gas. Would we not just be better off deciding here and now that, although we will still have to use fossil fuels as an energy source to an extent, we will move away from the exploration of fossil fuels in our waters? This would force the investment sector to look to other greener technologies where we have an abundance of resources. I am particularly taken by the research I have looked at on the potential to invest significantly in the capture of wind off our western shore. For sure it is at an early stage and the technology is not yet there but it will never be there while we continue to focus on what looks like a less expensive and more easily accessible energy source. As Deputy Eamon Ryan said, fossil fuel exploration is highly speculative. The one thing we are sure of is that there is wind and that is likely to continue. Let us set a standard that tells the investment community the State is up for this and wants to participate in developing green technologies.

There will be opportunities. As we know, Statoil has invested significantly in other jurisdictions in capturing wind. Given that the companies get it, why does the State not send a message that it is open to this type of investment and will support companies if they talk to us and tell us what they will need to get through the first phase of the considerable risk associated with developing offshore wind technology. Let us look to ways the State can provide the grid. For those in the renewable sector, including those attempting to develop offshore wind, the big question is how long access to the grid will take. The State is a big participant in the development and provision of the grid.

I listened to the Minister tell us what great changes we have made in terms of climate change because we were the first in the world to state all cars would be electric by 2045. I am not part of the Government, so I could make a prediction that if I am ever a Minister we will not have certain things in 2045. For the current Minister to make this type of commitment is meaningless. What we need is real action that will encourage the investment sector and community to develop green technologies. One of the best ways to signal this particular opportunity would be to say we will get out of fossil fuel exploration, and that as soon as the current crop of extraction has reached its natural life we will draw it to a close.

Deputy James Lawless: I have a couple of comments to follow up on what has already been said. For me, the stand-out figure from Professor Sweeney's presentation is that we come 28th out of 29 countries on climate change, which is a pretty poor position to be in. That is pretty damning and it says a lot. To follow what Deputy Dooley said, there appears to be a

view in Government that it is better to engage in damage mitigation and manage fines than take radical steps to be proactive in addressing the substantive issue. This approach is of concern.

The Irish Offshore Operators Association mentioned that Norway has renewables and fossil fuel exploration. I am curious because if we juxtapose this with Sweden, my understanding is that Sweden has made a fairly radical departure and will go fossil fuel free in the very near future. Sweden has access to great fossil fuel reserves in the North Sea but it will choose not to use them. Other members of the committee and I recently visited Denmark, a country with a long-standing tradition in renewables. What is Norway doing differently from Sweden and why did it go down that route? Why does it not follow its neighbours in embracing a more renewable approach?

My next question is to Dr. Slaven, who has written a book that I have not read. I will try to read it, however, so she has made a sale today. Dr. Slaven made a very impressive presentation. Something I have never understood during the many years I have studied this issue, and I was an observer long before I entered the Oireachtas, is how we have had three different reviews since 1992 but royalties from fossil fuels have been zero and State participation in these activities has been zero. There are many other metrics we might have used to get some benefit for the State from all of these activities but we have not done so. This has not been down to one particular Government or party. We have had three successive reviews under three different Governments. I have never been able to fathom this. This is going a little bit against the grain with regard to renewables and supporting the Bill, but I am curious about it. I know we cannot interfere with contracts that are assigned, but before it is too late is there anything that could or should be done in this regard?

I must confess to Professor Sweeney that I am a little biased because he teaches at my local university in Maynooth and my wife, who was one of his geography students some years ago, speaks very highly of him. He spoke about stranded assets, which I thought was very interesting. That is a type of financial penalty. Funds do not make decisions that do not have good fiscal rewards and I understand they are beginning to distance themselves from fossil fuel-type funds. I presume this is because of the risk that they may be stranded if the return is cut off and they will not drive a yield in five, ten or 15 years' time. I ask Professor Sweeney to elaborate on that point because it is an interesting line of argument.

Deputy Gino Kenny: I apologise for being late. This issue is of interest to most people here and much of it is scientific. My first question is to ask the officials from the Department to make a comment on seismic testing. I did not have much knowledge of seismic testing until I started to read about it. What it does in seeking to find the precious resources of this country is damning. Licences and the history of oil exploration in this country, if I may be excused the pun, are a very murky business. Communities have been superseded by vested interests. I ask the witnesses from the Department to comment on this.

Why are the detractors of the Bill against it? The vast majority of people here and globally know oil production and consumption are unsustainable. The way capitalism consumes natural resources is unsustainable. Alarm bells ring with regard to companies involved in oil exploration. It could be a cliché, but there are many vested interests and a great deal of money to be made in oil and natural resources. The wealth and profit from these natural resources do not normally go back to working people. They are usually creamed off by 1% of these companies. Why are people against a Bill that puts the environment before profits?

Chairman: I will go back to the witnesses, starting with the officials from the Department.

Members may contribute again if there are unanswered questions.

Deputy Timmy Dooley: I have to leave but I will read the responses in the report.

Mr. Matthew Collins: I will try to cover all of the questions raised by the Deputies. To answer Deputy Stanley's question I will have to refer to some technical experts on fossil fuel replacements for the fertiliser industry. On the more general point he made about recognising the potential for offshore wind, wave energy and other renewable energies, what is important about the approach the Department is taking is we want to see a portfolio of technologies. We would not advocate that one technology should be excluded or is a failure. There are many emerging technologies in the renewable area which we hope would have great potential as well. The model suggests that we will need a range of different types of energy sources and the uses of different technology to deliver on the 1.5° Celsius objectives. It is not a case of either-or or one or the other. What we need to do is develop a mixture of options.

There was a query about the renewable energy sector as well. The point made in that regard was a good one. One thing that we are working on in terms of the renewable energy systems, RES, policy is to help diversify the range of renewable options that can be brought into the system. It is an important point that has been raised. We are in the process of changing the policy in that area to encourage that.

Reference was also made to biomass, which was identified by University College Cork, UCC, as a potential energy source. It is interesting because UCC is the only one to have looked at the local energy system in terms of the Irish energy system in the future, going forward to 2020 and 2050, so its work is particularly informative from that perspective because it is directly applicable to Ireland whereas many of the studies apply to regions or take a global perspective. In recent years UCC has carried out quite a bit of work in that area which is very informative for the committee. It has included biomass in long-term, ambitious scenarios that are compliant with the Paris Agreement. Biomass is definitely another optional energy source for the future. What we want to ensure is that we have a portfolio mix that provides resilience for the supply of energy in Ireland going forward.

Deputy Eamon Ryan asked about prospectivity and whether there is any oil or gas out there. He mentioned the Celtic Sea. It is important to recognise that there are ongoing exploration activities taking place in the Atlantic, the Celtic Sea and the north west, in the Slyne region near where the Corrib field is. There are a number of regions in Ireland that are considered to have prospectivity in terms of future reserves. We cannot predict where the reserves are going to be. That is the risk that is borne by the exploration companies, not the State.

Deputy Eamon Ryan: The reason I asked the question is because I was looking at the map that Ms Slevin kindly provided, which one can get online as well, and one can see the yellow coloured area is the frontier licence and the blue area corresponds to the area of exploration. I am not sure about the technical terms. If I am correct, it is effectively a rim around the continental shelf. It is quite a distance away. Is it accurate to say it is approximately between approximately 100 miles and 200 miles or more in terms of how far out they are?

Mr. Matthew Collins: I think that is what it is but I have not seen the map Ms Slevin has provided.

Deputy Eamon Ryan: It is the Department's map showing where people are looking. It is all quite far out.

Mr. Matthew Collins: I do not think that is the only place people are looking. I think people are still exploring in the Celtic Sea and also in the north west.

Deputy Eamon Ryan: The Celtic Sea is like a pincushion at this stage. We must have gone into the Celtic Sea 100 times. The best geologist I know, Colin Campbell, lives in west Cork and he worked for BP. He is an old man now but he worked at the height of the exploration industry here. They thought they were going to find all sorts of everything but he said we are just geologically unlucky because, unfortunately, we do not have the formation they have in the North Sea. It is all a gamble. All the talk about the great prospects there usually come from people who are trying to raise money to spend and get a good cut for themselves in the process. I am not saying that about the Department, but he is the best geologist I have ever heard and he says, unfortunately, there is nothing out there.

Chairman: I will let Mr. Collins reply and then I will allow Deputy Eamon Ryan to speak later.

Mr. Matthew Collins: On that, what one is looking at there is research and surveying work that was carried out a very long time ago so the data for the Celtic Sea would probably be much older, and whether that is the most accurate and up-to-date picture is difficult to say. There is probably scope there for a more modern interpretation and data to be provided in those basins.

Regarding the Atlantic margin, what has stimulated the exploration in that area is the successful exploration that has taken place in the Atlantic, whether one is looking off the coast of Africa or South America, as well as the discoveries and production taking place off the east coast of America. The new understanding that has emerged with these discoveries and the production that has taken place have stimulated a greater level of interest in terms of prospectivity and possible reserves off the west coast and in the deeper areas to which Deputy Eamon Ryan referred.

The particular parallel that one finds in the map described by Deputy Eamon Ryan and the companies that are in that area correspond to Newfoundland and Labrador. The geologists have identified parallels between the east coast of Newfoundland and Labrador and the Porcupine region off the Irish coast. That is the focus of identifying the potential in the area.

I mentioned UCC and why its research is of interest to many stakeholders in the area in terms of the data it provided. I would not say that the Department cheers on gas. We are talking about a wide range of technologies and the transition from the existing fossil fuel dominated energy system to a much more diversified system. We are going to have increased emphasis on energy efficiency, and a much greater role for renewable energies, but within that context there will be a role for fossil fuel and there are new technologies that will be emerging in that space as well. It is important to put that in context. If that is the future we are looking at in 2050, where different scenarios will exist and where there is an element of fossil fuel, we should be conscious of that when we are making the decision that we are not going to look for our own reserves in that area.

Another issue that has been raised is whether we are going to encourage renewable energy investment and the ability of Ireland to make a statement in terms of our commitment to a long-term transition change and investment in renewable energies. Reference was made to Ireland being ranked 28th, but the difficulty with the Bill is that it would not have any impact on the rankings. It would leave Ireland in the same position because it would not change our consumption of energy. The real actions that are going to demonstrate Ireland's long-term com-

mitment to climate change include improving our efficiency, reducing our energy demand and increasing renewable energies.

If one thinks about some of the countries that have been ranked high, I understand Denmark is in the top ten, and while it is the second largest oil producer in the European Union, it is also one of the most ambitious countries in Europe for wind energy. It is a country that sees that a portfolio of options is the best way forward. It is exploring and producing in its offshore region and at the same time it is making commitments to achieve more renewables. More than 50% of its electricity is generated from renewable energy. Similarly, Portugal was ranked second or third in that list. It is a country that has a very high ranking but it also has an active exploration policy while at the same time making significant investment in renewable energy. Each country is responding to its own circumstances to achieve the transition to a low-carbon economy.

Deputy Eamon Ryan: The reason we are so low in the rankings is because of Government policy and the positions we are taking on European policy issues rather than performance specifically in the economy. What the Climate Action Network said explicitly is that if this Bill is passed, it would significantly change how we are seen on a policy basis and that is why it is significant.

Chairman: Mr. Collins might conclude.

Mr. Matthew Collins: Seismic activity is subject to environmental review and assessment by the Department. As part of the exploration process, it is subject to the environmental impact assessment directive and is assessed under the habitats and birds directives. Like other industrial activities, it is subject to all requisite environmental regulations and controls.

Chairman: I will invite Professor Shannon of the IOOA to address those questions.

Professor Pat Shannon: I will answer some of the questions on geology and the policies of various countries. I might then address some of the technical issues as well as the question of why we feel this Bill is not appropriate.

Norway is going down the route of continuing to explore for and produce oil and gas, but Sweden is not. This is largely down to geology. The prospectivity in the Swedish area is not deemed to be anything like that in the Norwegian area. That is often the case with individual countries. Many will take a stand and go down this or that route depending on their geology or other resources.

A number of countries have been mentioned. France produces 50% of its total energy, and 75% of its electricity, through nuclear sources. It is relatively easy and does not do much harm to the energy system for France to say that it will not explore for any further oil and gas when its oil and gas prospectivity is not great in any event. There is no oil and gas production in Costa Rica and there have been few, if any, exploration wells. Some 80% of its electricity comes from hydroelectric sources and 14% comes from geothermal energy, accounting for 94% of its electricity. It is easy for Costa Rica to say that it does not need to explore for oil or gas. In New Zealand, 57% of electricity generation comes from hydro power while 13% comes from geothermal sources. It is one of the world's leading countries in terms of geothermal energy and was the second country ever to produce it. It has a significant prospectivity for the production of energy in that regard. As such, it is relatively easy for New Zealand to say it will not explore for anything further.

In many instances, existing resources and geology are factors. I will stick with geology,

then go through prospectivity and ideas. Deputy Eamon Ryan asked whether the Celtic Sea had been gone through with a fine-tooth comb. My answer is “No” because ideas and data change. We have new seismic data that cause us to view prospectivity in a different way. This kind of thing has happened in many parts of the world. For example, very little exploration took place in particular parts of the geological column of the North Sea because it was believed at the time that there could be no prospectivity there. In fact, there is significant prospectivity.

Deputy Eamon Ryan: With the Chairman’s indulgence, I will ask a technical question. Providence Resources discovered oil in the Celtic Sea.

Professor Pat Shannon: A discovery was made in the Celtic Sea in the 1970s by Marathon Petroleum. That is now licensed by Providence Resources.

Deputy Eamon Ryan: Approximately seven years ago, Providence Resources resized the potential. Why has that not come ashore?

Professor Pat Shannon: The oil price was extremely low until recently, but that licence has been reinvigorated. Perhaps Dr. Conroy will comment on the issue.

Dr. John Conroy: An appraisal well was drilled using better technology in the 2012-13 period and the reserves were re-examined. That is in the process of being revisited in terms of further appraisal drilling. Should a positive outcome come out the other side, it could go to production in an existing field.

Deputy Eamon Ryan: I remember newspaper headlines all over the world at the time about the luck of the Irish, leprechaun gold at the end of the rainbow and how we were going to have a bonanza. It has not come ashore because it is not economical. Operating in deep waters is expensive. The Celtic Sea is not even that deep. Indeed, its waters are fairly shallow. Every year we are promised that it is about to be sold out or a partner is about to buy into it. It has been seven years and we are still waiting. It is all a speculative bubble.

Chairman: How many exploration or production licences have been granted and, of those, how many are active?

Professor Pat Shannon: The Department is the one that issues the licences. It can comment on that.

Chairman: My understanding is that several licences have been granted. Some have started and some have remained inactive for years. If they have been inactive, is there any significant need for exploration? If there is, why is it not happening?

Professor Pat Shannon: I would like to address the issue of exploration.

Chairman: I will let Professor Shannon finish.

Professor Pat Shannon: In all instances of a licence being granted, certain conditions set by the Department must be satisfied. They are staged. Various of the licences require that a well be drilled at a particular time. If that does not happen, the licence reverts. It is not correct to say that licences are sitting there and there is no activity. There will be exploration drilling next year, including almost certainly in the west and south of Ireland. All of those exploration options and licences are active and exploration is taking place.

I will answer the technical question on break-even costs. It is a little difficult to be certain of

break-even costs, but it is probably realistic to assume that they will be in the order of \$50 per barrel even in Ireland's deep offshore waters. While these are figures that have been produced by various companies, that is probably the order of magnitude. It is not as high as \$100 per barrel.

We should oppose the Bill because it will increase emissions. The facts are that, if Ireland produces oil and gas, we will substitute those for oil and gas that would be imported, leading to a net saving of 30% in emissions, which is significant.

The entire debate on fossil fuels versus renewables is probably not the appropriate way to go. We are all in this together and should work together. There is a role for the oil and gas industry and the renewables industry to work together in the same way as there is a role for the Government and Opposition to work collectively. It is really about team Ireland tackling this issue.

I have probably dealt with a number of the points raised. I might revert to others.

Chairman: Yes. I invite Deputy Smith to contribute.

Deputy Bríd Smith: I want to ask Professor Shannon some questions. What he has just said, namely, that the Bill will lead to emissions increasing rather than reducing, negates what is being attempted. I take his claim extraordinarily seriously. I presume that he has evidence of this, which I ask him to provide. By how much exactly will the Bill increase emissions? How much more CO₂ will be forced into the atmosphere? By how much will the temperature of the Earth increase as a result? Will it be 0.5° Celsius? Professor Shannon needs to show us the science behind his claim instead of making a sweeping declaration about what might happen.

May I ask the Department a few questions after I get answers from Professor Shannon?

Chairman: Yes.

Professor Pat Shannon: The figures show that indigenous and European oil and gas emit 30% less CO₂ than gas and oil that are produced outside of the EU. These are facts that come from the International Association of Oil and Gas Producers, IOGP, which is effectively a worldwide organisation. The figure is 30% less emissions for European and indigenous oil and gas. That is largely due to greater production efficiency and lower transport costs. In bringing energy from Siberia to Ireland, we are losing a significant amount of energy. That is the saving. We are shopping local, as it were.

Deputy Bríd Smith: Will all due respect, that is very disingenuous. We do not bring energy from Siberia to Ireland. That just does not happen. Most of our energy comes from the connectors with Britain coming mostly from Norway and the North Sea. Putting that to one side, the premise of the Bill is that this is not just the responsibility of a little island on the edge of the Atlantic. This is a global responsibility. As was mentioned by two of the scientists who have contributed today, five countries have created a ban on the exploration of fossil fuel. I tried to emphasise that a big part of what we are doing here is to be a contributor to that global movement that says we should wake up, smell the coffee, and leave it in the ground. The opponents of this Bill are saying we must keep drilling and producing more despite the fact that 80% of known fossil fuels has to remain in the ground. They have not disputed that science. Nonetheless, they are saying we should get more out of the ground and calling for a suite of measures to complement it with renewables. We have tried to show today that even if we found the 5 billion barrels or whatever Providence boasted it might get last year, it would take between 25 and 40

years to be able to use it, which brings us right up to the middle of the century at which point we are supposed to be bringing our carbon emissions right down. While Mr. Shannon has addressed one aspect, I would like him to try to address the holistic aspect also. It is not a matter of seeing emissions for Ireland, Norway and Siberia as completely separate. This is a planet.

Professor Pat Shannon: I did acknowledge at the outset that we certainly recognise the need to move to a lower carbon future. I would like to come back to some of the facts. Europe imports three quarters of its oil and 50% of its gas. A certain amount of that comes from Norway but a third of Europe's gas comes from Russia. The UK is an importer so when we import gas into Ireland, one way or another gas is being imported from outside of the EU.

Deputy Bríd Smith: Professor Shannon has just said that Europe imports gas from Russia. We import our gas from Britain. Britain may import a small amount of that from Europe, but we are looking at an ever-decreasing percentage of it potentially coming from Russia. We do not know that for a fact. What we do know is that more than 50% of our gas needs are met indigenously through Kinsale and Corrib and we hope that will continue up to the point at which we need to be completely reducing our emissions. Would Professor Shannon not acknowledge that?

Professor Pat Shannon: I would acknowledge that the UK is a net importer of both oil and gas at present. In fact, its import dependency is at 36% and it is anticipated that it will reach 55% by 2030, as is stated in our submission. Our submission also addresses the 80% issue. I will not go into that at the moment because there are various other issues but it is in the documentation.

Chairman: I will allow Mr. Matthew Collins to come in briefly.

Mr. Matthew Collins: To make a clarification, in terms of licences and whether operators sit on licences, it is important to note that we have about 56 licences issued at different stages. Each licence is subject to a work programme and that is part of the regulatory process. There are work activities that all operators or licenceholders must carry out as a condition of retaining that licence. There may not be drilling on a particular licence but other activities will be taking place.

Chairman: There is an argument that if we had this reserve of oil and gas, why has it not been discovered in recent decades. I will bring in Mr. Minogue of IBEC.

Mr. Conor Minogue: To address Deputy Eamon Ryan's question first, the reason we refer to the UCC modelling is that it is tailored for the Irish situation and Ireland's specific energy needs. The other models that were referenced are on a more regional and global level. The UCC study is highly respected and funded from the European Environmental Protection Agency.

Deputy Eamon Ryan: I think the UCC analysis is deeply flawed on the use of biomass. I do not think, however, that anyone sees it as sustainable for us to burn biomass in power generation. As I recall with regard to gas, the study indicated that if we were burning gas, it would require carbon capture and storage, CCS, technology to be in place.

Mr. Conor Minogue: It proposes that natural gas would be used in the residential sector, which obviously would be without CCS. In the electricity power generation sector, it would be without CCS for a period and would be with CCS in the future.

Deputy Eamon Ryan: We do not have any commercial CCS developments or any indica-

tion that it is going to be viable at this point.

Mr. Conor Minogue: No. There are clearly challenges with CCS. It is a new technology. Although it is a proven technology, it has not been commercially tested yet. At the moment there is no obvious alternative to gas with CCS for providing that flexible generation in our electricity system.

Deputy Stanley asked about the stranded assets and the impact on the economy. That is something we are quite concerned about. I understand that the ESRI is doing a new model at the moment to measure the impact that decarbonisation will have on the Irish economy and on individual sectors. From our members, there is an appetite for looking at renewable technologies and moving away from fossil fuels. We need supports from Government and that is why in our budget submission this year we made a number of recommendations which I think are being discussed in the committee room next door. We are looking at supports for renewable heat to help companies move away from fossil fuels. The scheme is long overdue and we would like to see funding for it increased in 2019. For renewable electricity, we made a detailed submission last year on the renewable electricity support scheme. We see growth in renewable electricity but ideally with Exchequer funding to support premium cost technologies. We would also like to see supports for low emissions and electric vehicles. These are all part of the equation and businesses are looking for the supports to move away from fossil fuels.

Dr. Neil Walker: My doctorate is in climate policy. I want to come back on Deputy Eamon Ryan's question about why we would view one set of forecasts as more accurate than another. All forecasts are wrong, almost by definition. We tend to use the word "projections". We project under business as usual and then constrain it. Depending on the assumptions we make, the model will throw up different least-cost solutions. We can tell it we want a reduction of 8% or 95%. We can make assumptions on the roll-out of electrification of heat, deep retrofit, transport decarbonisation through electrification or gas fuel prices and the model will come up with different answers. Generally, they run the model numerous times and identify the no-regrets measures. Gas-fired generation is a no-regrets measure.

There is no obvious alternative. It is worth pointing out, though, that even if we were somehow able to achieve 100% wind power generation on the system, which would fall over on day one when the winds start blowing, it would be very difficult to get beyond 50%. We are leading the world in going up to 70% for short periods, but to get 50% on average through the year is an extraordinary technical achievement. Denmark is hugely interconnected to Germany so it can produce a lot more because it is relying on fossil generation, indeed, coal-fired generation, from Germany to keep the lights on when the wind stops blowing.

One of the points about renewable heat is that it is grossly underfunded. In recent years, we have spent €300 million to €350 per annum on renewable energy sources for electricity, RES-E, but almost nothing on renewable heat or transport. That reflects policy measures that have been in place since Deputy Eamon Ryan was Minister. The emphasis has been on renewable electricity which, unfortunately, makes no contribution to our national target. Our 20% target excludes the power sector and was not intended to be met through domestic effort. The European Commission ran a model which determined the most cost-effective approach. It then weighted that because Ireland was regarded as a rich country - it was before the collapse of the economy. Three years later, in 2012, the Commission realised the sums were incorrect and re-ran the model to determine what each country's cost-efficient effort would be if there were no boundaries in Europe and everything was done cost-effectively in the effort-sharing sector. For Ireland, that would imply no reduction but we had a 20% target, with the implication that

we would do whatever possible in terms of cost efficiency but would then have a significant shortfall and need to buy international credits.

Four or five years ago, it seemed likely that we would get at least halfway to the 20% target. However, the economy has since boomed, more cars are being driven, more houses are being built and we are consuming more energy but do not have the renewable heat and transport incentives which should have been in place ten years ago. We have strongly advocated for a significant increase in that expenditure. There was a very cordial exchange at the national economic dialogue in the past week or so and there is a general understanding among many NGOs, the business community and even the farming community about what needs to be done to reduce emissions.

On the issue raised by Deputy Bríd Smith, I cannot comment on the figure of 30% less emissions for European and indigenous oil and gas but, because I used to advise the Commission for Energy Regulation on natural gas, I am aware of the very big compressors in Moffat which pump gas from Scotland to Ireland. For every 100 therms that are shipped, approximately one to 1.5 therms must be burned. That is a small amount but the gas only needs to travel 200 miles. Proportionately more would have to be burned if the gas was travelling a far longer distance and far more so in the case of liquified natural gas, LNG.

Several years ago, the Economic and Social Research Institute pointed out the catastrophic consequences of a loss in gas, as might be caused by an issue at the connection point in Moffat, and welcomed the possibility of a backup source. In the absence of piped gas from an indigenous field as a backup, it was determined that an LNG terminal would probably be needed. LNG has a far bigger carbon footprint because the gas which comes out of the ground must be compressed in order to liquify it, which is very energy intensive. It must then be transported, stored and evaporated, all of which uses energy. The laws of physics mean that the production and delivery of LNG will always be more energy intensive than that of gas delivered through a long-distance pipeline. That is why LNG is more expensive and the reason a terminal has not been built in Ireland. Such a terminal would probably require a subsidy but the Department or regulator may decide that is what we need. There is a premium on having diversity or security of supply.

In terms of whether we are importing Russian, Norwegian or British gas, one must identify which would be the marginal producer if we were consuming one more therm of gas. Would Norway produce the extra therm or be producing flat out or constrained by the pipe? Britain may have untapped supplies or the gas may come from the Continent. If the additional therm of gas came from the Continent, one must seek its origin. In the case of a country at the end of the pipe which is consuming more because less is being produced domestically, one must ask which marginal producer will cover the shortfall. Russia may be that producer. I have never investigated that issue but I suspect the gas probably originates in eastern Europe or beyond.

Deputy Eamon Ryan: It works the other way. The Corrib gas field is connected to the east and some of our gas is probably consumed in Vladivostok. Following the Russian gas dispute in 2008-09, the entire European gas system was changed to a two-way flow system and, similar to the oil market, a fungible market. Ultimately, the argument being made by Dr. Walker is based on security. However, as it is unlikely that an indigenous gas field will be found, relying on it for security is an incredibly risky strategy. To a certain extent, our only option is to rely on the United Kingdom and European system for gas. I have not heard anything to suggest that we will not be able to continue to rely on it. The senior British Brexit negotiators have stated that they wish to maintain energy co-operation no matter what happens. Does Dr. Walker have

reason to doubt that? How do we get greater security by looking for gas that is unlikely to be found and saying the other routes are insecure? If they are not secure, they are not secure.

Dr. Neil Walker: I am talking about physical or contractual insecurity. We hope that Brexit will be orderly and that mutual co-operation will survive but if not, we will be relying on a treaty. We do not know if Britain will stand over treaties which predate the Single Market rules. A significant amount of money is being spent twinning the pipes from Scotland but the gas comes off the Transco system at one point: Moffat. If something were to happen there - God forbid - we would be in serious trouble because that is the route which currently supplies 60% of our gas and will supply 100% of it in the future.

Deputy Eamon Ryan: That argument suggests we need another connection to the United Kingdom rather than betting everything on a gas field being found 200 miles out in the Atlantic.

Dr. Neil Walker: If one does not think it will ever come ashore, one need not ban it.

On the issue raised by Deputy Eamon Ryan in regard to being behind the curve and attracting new industries, we agree that it is very important to attract industries in the knowledge economy and intellectual property. We launched a Better Lives, Better Business campaign less than two weeks ago which makes the point that the quality of life of our citizens is a crucial issue for business because investment follows talent and those with talent wish to live in a clean environment. The physical infrastructure and sustainability in terms of air quality, water quality, greenhouse gas reduction and litter are key. I am very happy to further discuss that issue with members.

Chairman: I call Professor Sweeney, to be followed by Dr. Slevin.

Professor John Sweeney: I wish to return to the University College Cork, UCC, modelling which has been advanced as - and is - an excellent least cost model. I very much admire the work of Professor Ó Gallachóir. However, Dr. Walker made a couple of points regarding outputs which I wish to address. The two scenarios chosen by IBEC, one of which is based on the research of Dr. Alessandro Chiodi and others, are non-Paris-compliant scenarios. However, the model is very sensitive to the input assumptions which are made. As Dr. Walker stated, one will get different answers depending on the weapons one chooses as inputs. Under those scenarios, Ireland's CO2 emissions would have to be reduced by 16% by 2020 and 44% by 2030 in order to comply with the model pathway which is required. I note Dr. Walker is not very keen on the 20% target for 2020 and I suspect he would not be very happy about a 44% target for 2030. However, a reference which is not included the IBEC submission and is a Paris-compliant scenario confirms Ireland would exceed its Paris requirements in terms of the quota referenced elsewhere of 766 million tonnes of CO2 by 2033. It is disingenuous to begin picking solutions without looking closely at the assumptions concerned.

Chairman: Dr. Walker may respond later.

Dr. Neil Walker: I refute the accusation that I have acted disingenuously. We cut and pasted tables from the summary report. We do not have a target for 2033. In fact, we do not yet have a confirmed target for 2030, although it is moving towards agreement. I would be very happy for Professor Sweeney to withdraw the suggestion that IBEC has tried to be disingenuous.

Professor John Sweeney: In various parts of the ECC literature, a fair Paris requirement of 766 million tonnes of CO2 is specified. If one looks at the projections for Paris compliance in the recent publication, "Technical support on developing low-carbon energy roadmaps for

Ireland”, which deals with zero carbon energy pathways for Ireland consistent with the Paris Agreement climate policy, it is confirmed at pages 1 to 13 that they are producing a scenario which would exceed the Paris fair requirement by 2033. I am not talking about targets.

Dr. Neil Walker: Does Dr. Sweeney withdraw his suggestion that I have been disingenuous; yes or no?

Professor John Sweeney: I say Dr. Walker has been selective in choosing the literature. I think that is fine.

Chairman: We will let Dr. Sweeney continue.

Professor John Sweeney: Deputy Dooley asked for further clarification on aspects of stranded assets and divestment. For the record, the idea of stranded assets emerged initially from a growing movement for divestment which started with Professor Bill McKibben in Vermont in 2010. Since then, the universities have taken up the challenge, including Stanford and Georgetown. The first UK university was Glasgow and the first Irish university was Maynooth, which has now been followed by Trinity College.

I point also to the foundations. The Norwegian sovereign wealth fund is divesting. Given what we have heard about the investment of oil revenues in Norway, that is very significant. Of the total divestment, 26% has come from faith-based groups. The Church of Ireland announced a divestment policy recently while the Catholic Church is also undertaking a rigorous investigation and will probably announce a divestment policy in advance of the papal visit. The movement is accelerating and it is being driven by young people who see the writing on the wall in terms of intergenerational equity. They see that if we continue on the path of “drill, baby, drill”, we will disenfranchise and disadvantage the next generation. There is an issue of equity which we must recognise in what is proposed in the continuation of a fossil-fuel economy. I agree that we are looking at reductions over time, but those reductions are certainly not happening quickly enough.

Dr. Amanda Slevin: I respond first to Deputy Stanley’s question on delays or drags on the transition of companies to renewable energy development. There does not seem to be a drag on companies like Statoil which has announced that it will move to more renewable energy development. We see massive international companies announcing these plans and smaller ones are acting too. Statoil is a semi-state company and there is an impetus for Norway to move to renewable energy. The state faces contradictions in that it is very dependent on oil and gas production. Nevertheless, there is a recognition that it wants to move in a more sustainable direction.

There is little impetus in Ireland for oil companies operating here to move given the largely supportive policy framework. The Bill would change that and companies would be obliged to move to renewable energy or at least consider it more deeply. They are not forced to do it now as there is a great deal of leniency around authorisations and there is a great deal of support from the State. To encourage companies to move towards renewable energy development, changes in supports are needed for both companies and communities. One of things hampering renewable energy development has been the policy framework excluding communities from decision-making. That has exacerbated conflicts and caused communities to resist renewable energy developments. We need to look at how we properly resource renewable energy development and how we ensure that communities are part of the decision-making. That must be the core approach. It will involve changes to planning legislation. It is not enough simply to change

guidelines for companies. There must be a statutory obligation to involve communities in the process. What is stopping companies is that they are not forced to do that in Ireland. They are not made to move towards renewable energy and our planning process creates conflict.

Deputy Lawless asked why we still do not have any royalties after three reviews of licensing terms nor do we have any State participation. He asked if there was anything that could be done. There is a great deal that could be done. However, we need to go back to where this started. In 1959, we had an authorisation which granted all rights to Irish territory, onshore and offshore, to an American oil company for £500. In 1962, a different American company went to the Norwegian state and said it wanted all rights to a particular acreage offshore. It offered \$200,000 but the Norwegian state said it would not do it because the resources belonged to its people. Norway said that decisions around oil and gas exploitation would be made in such a way as to maximise the benefit for the state.

The issue with the Irish approach is ideological in that resources are not seen as belonging to the people, despite what the Constitution says. Policy decisions have not reflected that provision. We have also had a strong influence from the oil industry historically in its resistance to change. Justin Keating's 1975 terms went against that. He introduced royalties and State participation. He saw oil and gas exploitation as a matter for the State for the benefit of the people. That was successfully changed by the State in subsequent reviews.

We have a problem with the influence of the oil industry on decision-making and we have a problem with ideology which does not see resources as the property of the State. That can be changed. If we were to have hydrocarbon exploitation in future, we could place the licensing regime on a production-sharing footing. Norway developed its approach on the basis of production sharing with the state placing an obligation on oil companies to carry the state's costs. That allowed the state to develop activity offshore while maximising its benefits. There are plenty of lessons to learn from Norway, including how to manage resources to maximise benefits for our State.

Deputy Bríd Smith: I want to address a question Deputy Gino Kenny asked. He was trying to get at something with the Department which was not directly answered. He asked about seismic testing having read the recent report of the Marine Institute on the worrying impact of seismic testing on the mortality rate among zoo plankton. That has also led to a recent set of statements by the fishing industry as to its concerns about the impact on marine biology. It is grave. Deputy Kenny would like the Department to have said whether it had ever carried out an environmental impact assessment or forced a company to carry one out in respect of its exploration at sea. Has the Department carried out an environmental impact assessment on any oil exploration company project at sea?

While the Department is here, I want to ask about something Deputy Lawless touched on, namely, the ownership of the various exploration licences, leases and undertakings. Looking at the statistics presented by Dr. Slevin, why are some of these leases and undertakings being sat on for years and, sometimes, decades on end? Can the Department provide the committee with an explanation for that?

Chairman: If anyone else wants to come in, please indicate. I will bring in Deputy Ryan in a moment.

Mr. Matthew Collins: I am grateful for the clarification of what the question was about. Deputy Smith raised a broad set of issues. She is quite correct when she says this is not just

about Ireland. Ireland's energy policy and climate policy is grounded within European Union policy. In the context of European emissions reductions of the order of 80% to 95%, the scenarios indicate that approximately one third of primary energy within the EU will be oil and gas in 2050. As such, a solution must be found to meet that requirement. That is in the context of significant emissions reductions. Europe as a whole faces energy security issues. These issues have been discussed at ministerial level and policy has been developed. The EU dependence on imported natural gas is almost 70%. Security at a European level is important and we are part of that market.

The Deputy referred to a seismic testing study. The scientific view is that it is a limited study. I believe six samples were carried out daily over two days. It was conducted in an estuary in Australia in an area of about 30 m. Seismic activity takes place in deeper areas in Ireland so the data are not usefully comparable. Further research would have to be done and further academic studies carried out in that area. It does not tell us much about the impact of seismic surveys in the area because of the different circumstances and the limited nature of that one study undertaken.

All the licensed activity that happens in Ireland is subject to the application of the environmental impact assessment directive and the implementation of the birds and habitats directives. As with any industrial activity, proposals must set out the impacts in accordance with the European legislation and the determinations are made in each case. Those determinations are made public, there is a public feedback period and that informs the Minister's decision on whether to grant an approval.

Deputy Bríd Smith: My question was whether the Department has ever carried out an environmental impact study on the companies that have been licensed for seismic testing on our shore.

Mr. Matthew Collins: Under the European legislation for developments, the developer must carry out those assessments and provide that information.

Deputy Bríd Smith: Therefore the Department has never undertaken any testing.

Mr. Matthew Collins: No, the Department does not carry that out because we do not develop any projects.

Chairman: If the company or developer undertakes that assessment, who oversees it?

Mr. Matthew Collins: We review the assessment in accordance with the criteria of the European legislation. We also consult with the National Parks and Wildlife Service and use specific ecological and habitats expertise to assist us in evaluating the proposals.

Chairman: Is the Department evaluating the environmental impact studies?

Mr. Matthew Collins: We are evaluating their submissions in accordance with the environmental impact assessment legislation.

Chairman: The Deputy's question refers to whether there is any oversight by the Department when the company or developer carries out an environmental impact study.

Mr. Matthew Collins: We have to review it and be satisfied with the description of the issues that they have identified in any mitigation actions they are taking.

Deputy Bríd Smith: What I am getting at is that there is plenty of evidence, apart from the Australian study such as that by the Marine Institute in Galway, that seismic testing has a serious impact on zooplankton and dolphin and whale life of the ocean. That, combined with what Mr. Collins has just told us, means that there is light-touch regulation of the companies that are carrying out this testing and that have found so little gas or oil. Does Mr. Collins feel the Department is being in any way negligent in allowing it to happen without proper oversight of these companies?

Mr. Matthew Collins: No, all our activities and decisions are compliant with our obligations under European legislation and the environmental impact assessment, as well as the birds and habitats directives.

I do not want to speak for the Marine Institute, but I am not aware of them having taken a view on that single study from Australia. My understanding is that the broader scientific community would, at most, say that it requires further research.

The Department has supported and invested in one of the major habitats and ecological studies undertaken, the ObSERVE programme. It is to provide a baseline and satisfy ourselves that any impacts on habitats and birds, dolphins in particular, are mitigated and that we can control it. The ObSERVE study is one of the largest programmes of its kind globally. It is world class. The other bodies involved, the National Parks and Wildlife Service, it will provide a base for ecological data for researchers for many years to come. It is important work in providing robust baseline ecological habitats data for environmental assessments.

Deputy Bríd Smith: Will Mr. Collins answer the other question, please? I am not trying to be provocative but I would like an answer to why, for example, the lease undertaking application of Island Expro, which discovered gas in 2007 during the Schull discovery, has been under consideration since 2011, which is seven years. Why is it taking so long? In the course of that seven years, will that company have tenancy or ownership of that section offshore, so that nobody else can go in, touch it, explore it or ask any questions. That case is almost seven years and others have been almost longer. Decisions on undertakings of lease applications have taken so long. Is taking so long convenient for the companies and the Department?

Mr. Matthew Collins: The time that a lease exists will be largely dependent on the circumstances of the particular lease. All leases contain a work programme to which they are subject. That work programme comprises the conditions the Department sets the licence holder to carry out. There may be some circumstances, climate or a commercial investment decision that impact on the operator in carrying out a particular activity in a particular timeframe, and we review that to ensure it is acceptable. The Deputy referred to it taking seven years. Each project is unique, for example, the extension of the Kinsale gas field. In that case an appraisal well was put in place and it went into production within two to three years. It depends on the circumstances on the investment that is taking place and the activities that are required. However, it is important to note that people do not sit on them. We review what they are carrying out. We actively engage with companies to ensure all work programmes are carried out. It is right to point out where a company is slow in carrying out its activities but we also have 60 other licences where good progress has been made on the licence conditions and the work programme.

Deputy Bríd Smith: If it takes seven or 11 years for a company's application to be completed, either for an undertaking or a lease, how does it fit into the premise that we must gradually wean ourselves off CO2 emissions and a reliance on carbon fuels? As Professor John Sweeney demonstrated so well in his presentation, the period from when the licence is first

issued through the various stages until the carbon fuel is useable is 25 to 40 years. If companies or the Department are sitting on licences for another decade on top of that, that effectively means ignoring the Paris Agreement and the idea that we have to move to carbon-free energy by 2050 meaning the planet will burn up and there will be destruction of habitats and humans. That is what I am trying to tease out. The approach is one of burying one's head in the sand and pretending that it is not happening and going on as though it is business as usual. That is why this Bill is before the House. It can no longer be business as usual. We must wake up and smell the coffee, and get away from our addiction to carbon fuel.

Chairman: ----

Deputy Eamon Ryan: Mr. Collins referred to the ObSERVE programme. I had the great privilege of visiting High Island of the west coast, near Clifden where they were monitoring Manx shearwater, but it is the same with the puffin population or any other sea birds. They had to fly out hundreds of miles to their feeding grounds. It is complex. It may be changing because of climate or overfishing, for instance, but the ecologists and biologists who spoke to me described a crisis in the north Atlantic. Those birds are a very good indicator of what is happening. Real alarm was raised about the distances they had to fly just to get food.

I want to ask technical questions around the exploration. The issue of climate is one thing, but I want to focus on the issue of security. I was involved for many years in the Corrib project, and was told at the time that it was an ecological fluke. It was explained that there was a particular salt deposit that acted as a cap, that it was a constrained geological formation and that it was a relatively small field, which is why we were lucky with it. There was one other prospective field nearby, which was drilled in 2010 or 2011. Everyone expected that it would be the same as the first but it was completely dry. Perhaps new discoveries have been made in the field of geology, but I believe it is much more likely that because all of the easy to reach stuff has been found we are now looking for the really hard to reach stuff.

Deep water is hard to work in, especially in the north Atlantic, and the costs are higher. If it is a massive field, perhaps providing 50 barrels, an investment might be justified. From memory though, when I asked during the Corrib gas exploration how gas would be brought ashore if it was found further out to sea, I was told that it is quite difficult to pipe gas ashore. Floating storage technology could be used; perhaps Professor Shannon could indicate if that is likely. I was told at the time that there was nothing like the Corrib field anywhere nearby and that we would have to go 100 miles or more further out to start looking for other such fields. If we found a gas field 200 miles out, in deep water, with no other existing field or pipeline, does the Professor believe that floating collection technology could be used rather than running a pipeline for 200 km? It would serve a single field only, and does not compare to the North Sea, where one could link up to an existing massive network of infrastructure. At a first exploration of a 100 to one shot field in the North Atlantic, for example, would the Professor think it preferable to use a mobile floating collection system instead of running a pipeline all the way to the west coast of Ireland? Would that not make more economic sense? If that was done, where is the security? Why would one bring it to shore in Ireland, instead of to Norway or the Shetland Islands, wherever the gas could be treated?

Professor Pat Shannon: The Deputy has asked a number of questions. One concerned discoveries and geological thinking. There have been major advances in geological thinking over the past decade or so. That has been backed up by new ways of thinking about how oil and gas are generated and trapped. New data has allowed us to see some of the sub-surface in three dimensions. For many years companies tried to find analogues to discoveries in the North Sea. It

was mentioned earlier in the debate that in recent years people have begun to think that perhaps the real comparators are on the other side of the Atlantic, off the Jeanne D'arc and the Flemish Pass basins, where new discoveries have been made. Our thinking has changed radically. It is not true to say that everything has been looked for. Evidence for that is that in the last licensing round a significant number of new, major companies came to Ireland for the first time. A number of those have been involved in exploration off the Canadian coast. That suggests that there is real prospectivity and a new way of geological thinking that is actually quite different.

Deputy Eamon Ryan: We are really in much deeper trouble than we thought we were. The International Energy Agency acknowledged that for the Paris Agreement we might have to consume 500 plus gigatons, and on known existing reserves there were 3,000 gigatons of fossil fuels accessible to us. In countries such as Venezuela, Canada and the US we know shale gas is extractable at \$40 a barrel. The Professor is now saying that the north Atlantic has massive new potential. It must be more expensive to exploit that resource than the 3,000 gigatons we already know about and which has already been discovered. Where does this stop? When do we stop exploring for oil and gas? Are we just going to cook the planet?

Professor Pat Shannon: If we can substitute indigenous oil and gas for imported oil and gas there will be a saving, and-----

Deputy Eamon Ryan: The atmosphere cannot tell where the gas comes from.

Professor Pat Shannon: -----some of the other reserves that are out there may become stranded. It may be more efficient and it may be better for the environment to produce oil and gas closer to shore instead of importing.

Deputy Eamon Ryan: If a gas field was found out in the Porcupine Ridge - not Slyne, because I am told there is nothing close to that - how would it be brought to shore? Would it be brought via a pipeline or on board a ship?

Professor Pat Shannon: It depends on whether oil or gas was found. It is unlikely that a floating system would be used for gas. However, technology is developing all the time. It is more likely that a pipeline would be used.

Deputy Eamon Ryan: I have asked producers how a pipeline would work economically if it was that far out, and have been told that it would not be economic. If it was oil brought ashore on a ship, where would it go?

Professor Pat Shannon: It very much depends on where the discovery is made and the demand for it. It also depends on the permission of the Minister as to where it ends up, as well as the terms and conditions of the licence.

Deputy Eamon Ryan: There is no guarantee it would land here. I understand that Whitegate takes very light crude. Is that the case?

Professor Pat Shannon: The types of crude oil that refineries can deal with can change as the market and the supply demands.

Mr. Matthew Collins: I want to provide some clarification to Deputy Bríd Smith, who asked about project development timelines and questioned why are we chasing projects that take seven or eight years to develop. Last week the IEA outlined how Europe would have a deficit of 80% of its gas needs by 2040. In the context of meeting the obligations of the Paris

Agreement, there will still be a need within Europe for gas and oil, which will carry on beyond 2050. While the projects will come on stream before that, there will be an ongoing need for the provision of fossil fuels, both within the energy system and for feed stock. It is important that we do not ignore what the models and scenarios are indicating to us. When we make plans we expect to see a level of need for those energy sources. The project timelines are consistent with that.

I thank Deputy Ryan for his appreciation of the ObSERVE programme. It is quite a major programme. A number of queries were raised about the energy needs of Ireland in the future. I do not want to speak on behalf of University College Cork, UCC, but it would probably benefit the committee to have UCC respond to some of the questions raised, in terms of whether its scenarios are compliant with the Paris Agreement. It could address that important question. It provides a lot of information about how we we can develop our energy system in a manner compliant with the Paris Agreement obligations, which is very informative. It is important to remember, when we are talking about the Paris Agreement commitments, that the agreement does not seek to prohibit fossil fuels. It has a temperature objective, and the focus is on reducing greenhouse gas emissions. The aim is not to eliminate fossil fuels, but rather to eliminate the emissions of greenhouse gases that have an impact on the temperature objective.

Chairman: Dr. Slevin may have already answered this question. A number of witnesses have said that banning exploration would be a threat to our energy security. Will the witnesses expand on that and on the effect an outright ban would have on our energy security?

Dr. Amanda Slevin: There is an issue with the level of control and ownership the State maintains over its gas and oil. Through our licensing system we effectively transfer all ownership and control of State resources to private companies. The companies are not obliged to sell those resources back to us. If they do so, it is at full market prices. In my submission, I contested the actual concept of energy security arising from our gas and oil because the companies do not have to sell it back to us. It is an issue to think about. As Professor Shannon said, if oil is found it could be taken anywhere across the world because the companies are not obliged to sell it to us. If gas is found in these deep finds, the technology is evolving and it could also be shipped elsewhere. If the LNG plant at Shannon is given the go-ahead gas could also be shipped away. Therefore, we do not actually have security of supply at the moment. Through the consumption and production of hydrocarbons we are causing immense environmental damage. That needs to take precedence when we are discussing these issues. We also need to look at how to make transitions effectively.

Dr. Neil Walker: I would just like to clarify one point. With regard to the LNG terminal envisaged on the Shannon and in Cork Harbour, liquified natural gas would be imported and evaporated. There is no proposal whatsoever to produce liquified natural gas for export. That is a totally different technology. One has to be somewhere like Abu Dhabi, Qatar or Texas - in other words, a major surplus producer with no local markets in order to make LNG. I just wanted to clarify that.

Deputy Bríd Smith: We just heard from Professor Shannon that LNG is extremely damaging and that it creates more CO₂ emissions than other forms of natural gas.

Dr. Neil Walker: Exactly. Very few LNG plants have been built in Europe in the last decade because they are more expensive. They cannot compete with piped gas. The proposal for an LNG terminal on the Shannon has had full planning permission and all the consents for years. There is one reason it has not proceeded, which is that it would lose money because it

not competitive with piped gas because of all the energy costs associated with it.

Deputy Bríd Smith: Dr. Walker has just let the cat out of the bag. The reason it has not proceeded is because it would not make money, not because it would be extremely damaging to the environment. This is where priorities are being skewed. They are skewed towards the companies that want to make a load of money from oil and gas instead of towards the limitation of damage to the environment and planet that would occur if our Bill was passed.

Dr. Neil Walker: I am sorry. I do not follow the argument. Does the Deputy think the State should-----

Deputy Bríd Smith: Why would Dr. Walker want to bring LNG into the country if it is more damaging to the environment?

Dr. Neil Walker: I do not.

Deputy Bríd Smith: Dr. Walker just said that the reason it is not being done is that it would not make enough money. The priority of those proposing it is to make money, not to look after the environment.

Dr. Neil Walker: I am sorry. I did not make myself sufficiently clear. If we go back to reliance on a single source, which comes through Britain, a decision may be made as a result of regulatory issues or of the Department that public support in the form of a public service obligation, PSO, levy would apply in order to make LNG viable in order to reduce the risk of a catastrophic loss of supply. There are different economic issues. Huge investment costs are involved in land-based terminals, which are not viable. There is a new technology called floating storage in which a ship containing liquified gas is brought in and just parked in Cork Harbour. They have used this in Israel for a number of years. The investment costs are somewhat less. It may not even be shipped ashore. It might be brought into the harbour and be allowed sit there in case of a failure. There are different technologies but the point is that LNG has to be produced and then compressed with huge compressors in order to liquify and refrigerate it. It then has to be stored, perhaps for weeks and weeks. Small amounts may escape unless it can be recompressed. This results in methane which has a higher potential for global warming. Finally, when it is desirable to use it, it has to be brought back up to room temperature, which also consumes energy. It is a less environmentally friendly fuel because it starts with piped gas and then all of these things have to be done to it. It is costlier and has a higher carbon footprint, but it is better than the lights going out.

Deputy Bríd Smith: That implies that IBEC would be opposed the LNG terminal at Shannon.

Dr. Neil Walker: We are not opposed to any particular project. As a principle, we generally comment on projects that are of significance to national or regional policy. We have never commented on the LNG terminal in Shannon as a commercial project. Shannon is not an IBEC member. We have never commented on the proposal for floating LNG storage in the harbour. As and when the regulator says that, because the gas is running out in Corrib - and we are going to be very exposed in that situation as per previous advice from the ESRI - a PSO levy of tens or hundreds of millions of euros a year may have to be applied to make something that is more expensive commercially viable which would be passed onto consumers, we may then have a comment as to whether we think it is good value for money. That time is not now because we still have two sources of gas; the domestic and the overseas. I hope I will be retired before it

3 JULY 2018

comes to that, but we will have to wait and see.

Chairman: Does anyone have any final comments before we wrap up? Does Deputy Smith want to wrap up?

Deputy Bríd Smith: I have learned a lot here today. Although I suspected, from reading about it and from the various submissions, that the representatives and captains of the oil and gas industry have their heads in the sand and do not really get that the environment and planet is in serious trouble and that we therefore have to move rapidly and decisively to change the way we do business, the questioning and back and forth here this evening has really proven that to be the case. They do not get it. They want to continue with business as usual and they are prepared to put the profits their companies make before the interests of the planet and its people.

Chairman: I am going to leave it there. I thank all of our witnesses for coming in here this afternoon and for their contributions. It is proposed that the committee will publish the opening statements and submissions received on our website. Is that agreed? Agreed.

The joint committee adjourned at 6 p.m. until 4.45 p.m. on Wednesday, 4 July 2018.