DÁIL ÉIREANN

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AN COMHCHOISTE UM CHOMHSHAOL AGUS GHNÍOMHÚ AR SON NA HAERÁIDE

JOINT COMMITTEE ON ENVIRONMENT AND CLIMATE ACTION

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Dé Máirt, 28 Meán Fómhair 2021

Tuesday, 28 September 2021

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Tháinig an Comhchoiste le chéile ag 12.30 p.m.

The Joint Committee met at 12.30 p.m.

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Comhaltaí a bhí i láthair / Members present:

Teachtaí Dála / Deputies	Seanadóirí / Senators
Richard Bruton,	Lynn Boylan,
Réada Cronin,	Alice-Mary Higgins,
Darren O'Rourke,	Pauline O'Reilly.
Christopher O'Sullivan.	

Teachta / Deputy Brian Leddin sa Chathaoir / in the Chair.

Energy Charter Treaty, Energy Security, Liquefied Natural Gas and Data Centres: Discussion

Chairman: Apologies have been received from Deputy Alan Farrell. On behalf of the committee, I welcome Dr. Kyla Tienhaara from Queen's University in Ontario, Canada, Dr. Patrick Bresnihan from Maynooth University and Dr. James Carton from Dublin City University, DCU, and thank them for coming before us to share their expertise. The purpose of this meeting is to have a discussion on issues relating to the energy charter treaty, ECT, energy security and other issues such as the growth of data centres in Ireland and liquefied natural gas, LNG.

I remind our guests of the long-standing parliamentary practice that they should not criticise or make charges against any person or entity by name or in such a way as to make him, her or it identifiable or otherwise engage in speech that might be regarded as damaging to the good name of the person or entity. Therefore, if their statements are potentially defamatory in relation to an identifiable person or entity they will be directed to discontinue their remarks. It is imperative that that comply with any such direction. For witnesses who are attending remotely outside of the Leinster House campus, there are some limitations to parliamentary privilege and, as such, they may not benefit from same level of immunity from legal proceedings as a witness who is physically present does.

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 either by name or in such a way as to make him or her identifiable. I also remind members that they are only allowed to participate in this meeting if they are physically located on the Leinster House complex. In this regard, I ask all members, prior to making their contributions, to confirm that they are indeed on the grounds of the Leinster House campus.

For anyone who is watching the proceedings online, Oireachtas Members and witnesses are accessing this meeting remotely for the most part. Only I, as Chair, two members of the committee and necessary staff who are essential to the running of the meeting are physically present in the committee room. Due to these circumstances and the large number of people who are attending the meeting remotely, I ask that everyone bear with us should any technical issues arise. I now call on Dr. Tienhaara to make her opening statement.

Dr. Kyla Tienhaara: I am Canadian research chair in economy and environment and assistant professor in environmental studies and global development studies at Queen's University in Kingston, Ontario. I thank the committee for the opportunity to address to it today.

My main areas of expertise are environmental governance and investor state dispute settlement, ISDS. My opening remarks will focus on my concerns about the ECT and the obstacles it potentially poses to Government action on climate change. My remarks are premised on the notion that if we are going to keep within 1.5°C to 2°C of warming, as is the ambition of the Paris Agreement, governments will have to take measures to keep a certain portion of known fossil fuel reserves in the ground. Increasingly, there is an understanding that demand-side policies such as carbon pricing are not moving us towards net-zero emissions quickly enough. As representatives from Costa Rica and Denmark, which are both leading the new Beyond Oil and Gas Alliance noted, we need to cut with both hands of the scissors, addressing demand and supply simultaneously.

In 2015, two researchers, Christophe McGlade and Paul Ekins, estimated that to meet the

2°C temperature goal, which is the upper end of the Paris Agreement temperature range and is now generally considered too high, we would have to leave 82% of known coal reserves, 49% of gas reserves and 33% of oil reserves in the ground. These numbers were very recently updated for a 1.5°C goal in an article in *Nature* by Welsby *et al*. The amount that needs to be left on the ground rises to 89% for coal, 59% for gas and 58% for oil. How does this relate to the ECT? My concern is that government measures that have direct impacts on foreign investors in the fossil fuel sector, such as measures to limit the extraction, transportation and combustion of coal, oil and gas, are very likely to be challenged in ISDS cases. One contemporary example is the cancellation of the Keystone XL pipeline, a project would have transported oil from the Canadian tar sands to the United States. It was cancelled by President Biden earlier this year and is now the subject of an ISDS case, with the company seeking $15 billion in compensation. This may seem to be a very large sum for compensation for a pipeline that has not been built. However, it is important to note that under the ECT and other investment treaties, investors can seek not only compensation for their sunk costs but also for so-called lost future profits. For example, when Italy banned offshore oil off its coastline, the UK company Rockhopper launched an ISDS case under the ECT. The company is reportedly claiming damages of $200 million to $300 million which is many times more than what it had spent on its project prior to the ban.

There are many problems with the lost future profits model of compensation. Leaving aside the question of whether fossil fuel companies should be compensated when governments strand their assets, there are practical difficulties for calculating the amount that is owed. Oil prices, for example, are highly volatile and predicting what the value of reserves going to be next year, let alone in 20 or 30 years into the future, is far from straightforward. There is also an important question about whether investment arbitrators are going to factor in how government actions to combat climate change will impact the price of oil and other fossil fuels. Thus far, they have awarded compensation with the assumption that prices and profits will continue to rise indefinitely.

Bringing this all back to how it could impact climate governance, there are two main issues that I would like to discuss. The first is what is known as regulatory chill. This is the idea that governments, when threatened with an ISDS case, will reverse course or at least delay action because they are concerned about the cost of defending their policy in arbitration and the possibility of having to pay an investor a large award. Importantly, due to the nature of climate change as a global issue regulatory chill can also occur across borders. For example, a government can look at what is happening in the Netherlands, where the government is being sued over a phase-out of coal power, and decide that a rapid phase-out of coal could result in it facing similar ISDS cases. The government may then decide to wait and see what the outcome of an ISDS case is before developing legislation. This is exactly what occurred in the area of tobacco labelling in New Zealand. The government saw that Phillip Morris had brought a very large claim against Australia for mandating plain packaging of cigarettes and decided to delay the introduction of similar legislation. We cannot afford these kinds of delays in the climate policy realm.

The second concern I have is that when governments follow through with fossil fuel phase-out policies they will end up compensating investors more than they otherwise would have either because they are forced to do so by an arbitral tribunal or because they are negotiating with investors under the shadow of ISDS. There have been some speculation that concerns about ISDS influenced the very large compensation package that a Germany provided to coal investors in its phase-out plan. When compensation is higher, we have a diversion of public money to fossil fuel investors that should have been spent on ensuring a clean and just energy transition

for everyone. I thank the committee for its attention and welcome questions.

Chairman: I thank Dr. Tienhaara. I call Dr. Bresnihan to make his opening statement.

Dr. Patrick Bresnihan: I thank the committee for inviting me. I am here to talk about data centres. There are 70 data centres operating in Ireland, which is an increase of 25% compared with 2020. Most of these are concentrated around Dublin, which has become the largest data centre hub in Europe and which accounted for 25% of the overall European industry market share at the end of 2018, with the nearest competitor, London, recording a market share of 24%. The 70 operational data centres have connection agreements for more than 1,800 MW, with up to 2,000 MW of additional requests received by EirGrid. Approximately 1,000 MW of this has been received within the past year. Over the past four years, there has been an annual increase in demand usage of around 600 GW from data centres alone, which is equivalent to the addition of 140,000 households to the power system each year. An average data centre with a load of 60 MW would be comparable with the usage of a large town or small city such as Kilkenny.

Data centres currently account for 11% of grid capacity, but EirGrid estimates that this will be 28% by 2030 on the basis of existing connections. If all proposed data centre projects were connected, this figure could be as high as 70% of grid capacity by 2030. This is compared with 2% of electricity consumed by data centres worldwide.

Data centres are currently responsible for 1.58% of Ireland's carbon emissions. Data centres are reliant on the national electricity grid, which remains largely powered by fossil fuels. The major component of this is gas, which represented more than half of electricity generation last year. As well as this, data centres require their own installed power generation or energy storage capacity as back-up. This back-up generation tends to be gas-fired. Natural gas is a fossil fuel and contributes to Ireland's emissions. Over 2020, data centres saw a 27% increase in gas demand.

Ireland is committed to achieving 70% renewable electricity by 2030. Even at this early stage, however, that looks overly ambitious. As the main source of this renewable energy, which is onshore and offshore wind, is intermittent, there will likely be a need to have other sources of energy generation available. In the short to medium term, that is likely to be natural gas. Achieving ambitious emissions and renewables targets by 2030 will undoubtedly be far more difficult with the addition of more data centres to the grid.

Data centres also require large quantities of water. The average data centre uses a lower estimate of 500,000 litres per day. This figure has the potential to rise to 5 million l per day, although this is rare - for example, during the recent heatwave in the summer of 2021. This is particularly significant in light of the weak security of water supplies in parts of the country, particularly the greater Dublin region.

At the same time, Ireland faces more immediate challenges relating to security of energy supply. Two amber alerts have been issued this month alone and we have yet to enter the winter season. As energy supplies, particularly those relating to natural gas, are limited or in high demand, prices have increased. Recent estimates suggest an increase in the average household electricity and gas bill of €400 this winter. While the drivers of these current energy shortages and price increases may be contingent on quite specific conditions, there is no doubt the energy demands of data centres exacerbate the problem and will continue to do so if they are allowed to develop further.

In this context, serious concerns about the energy demands of data centres have been raised by EirGrid and the Commission for Regulation of Utilities, CRU. One proposal by the CRU is for a moratorium on the development of any new data centres in Ireland. There are also two Bills going forward to the Dáil in the coming weeks calling for such a moratorium, one from Deputy Bríd Smith of People Before Profit and one from Deputy Jennifer Whitmore of the Social Democrats. Ireland would not be the first country to do this. Singapore introduced a moratorium on data centres two years ago. Similarly placed as a tech and digital hub, with ambitious climate and renewable energy targets, the Singapore Government took the decision in 2019. The Singapore Government states that the moratorium will be lifted when renewable energy capacity and-or data storage technologies develop enough to reduce emissions and the energy burden they represent. In 2014, according to the most recent figures available, data centres represented 7% of Singapore's grid capacity compared with the projected 28% by 2030 in Ireland.

From these figures, it is evident that Ireland shoulders more than a fair share of the energy and water burden of global digital activities. What is less evident is what this concentration of data centres contributes in terms of long-term employment or regional economic development. At this stage, the prospects of energy insecurity, and even brownouts or blackouts, may carry greater reputational and economic damage than a moratorium on data centre development. Further down the line, there is also the reputational damage and potential financial penalties if Ireland fails to meet its 2030 climate and renewable energy targets.

There is an important wider context to this debate which also needs to be considered. Ireland is committed to a just transition under the Paris Agreement on climate. This means that the Irish State must ensure the fair distribution of costs and benefits associated with large-scale decarbonisation efforts. In a context where households are facing increasing energy bills and carbon taxes, the continued granting of planning permission to energy-intensive data centres is already being perceived as an unfair distribution of costs and benefits. Objections to onshore wind farms, for example, have been articulated in terms of the perceived benefit of these projects to energy companies and large-end users, that is, tech companies, rather than to the public or action on climate. As more attention focuses on data centres and their energy and water usage, it may be harder to gain the support of the Irish population for decarbonisation efforts. There is a danger that the public will perceive climate action as serving the interests of a few, with the burden carried by the majority.

Chairman: Thank you. I call Dr. James Carton.

Dr. James Carton: Good afternoon. I thank the committee for the opportunity to address it on energy security, LNG and data centres. I am assistant professor in sustainable energy and hydrogen technology at the School of Mechanical and Manufacturing Engineering in Dublin City University and a Science Foundation Ireland MaREI Research Centre-funded investigator. I am a World Energy Council FEL alumnus, chair of Hydrogen Ireland Association, academic adviser to Hydrogen Mobility Ireland and hydrogen task force expert to the United Nations Economic Commission for Europe.

Fossil fuels dominate Ireland's energy system and yet, today, as we emerge from Covid-19, impacted by geopolitical forces and seeing energy prices fluctuate, our reliance on fossil fuels is not diminishing, although it must. We know unequivocally the damage fossil fuels are doing to our planet, our environment and our island, supported by the most recent Intergovernmental Panel on Climate Change, IPCC, report on climate change. Our nation and society have seen the benefits of electrification since the Shannon scheme and the rural electrification scheme

in the 1920s and 1940s. Electrification, interconnection, efficiency, heat pumps and battery-electric vehicles are key pillars to decarbonisation, low energy prices and social cohesion, but electricity only accounts for 20% of Ireland's energy system and 60% of electricity is reliant on fossil fuels. The other 80%, which includes most heating and transport, is difficult to decarbonise and difficult, expensive and slow to fully electrify.

Pathways to decarbonisation require not just electrons but also molecules working together. Therefore, hydrogen is a key component to decarbonising. It sector-couples renewable energy with heat, transport and industry, key strategic points presented in the EU's decarbonisation plans, as well as the UK's recently released hydrogen strategy. At this moment, many EU countries and countries worldwide are beginning to embrace hydrogen, rolling out heavy transport, co-firing gas turbines, decarbonising industries, developing ships to move hydrogen by sea and developing platforms to produce hydrogen offshore, while also preparing the groundwork for global hydrogen hubs and long-term energy storage. Ireland must follow this lead. We must produce green hydrogen at a useful scale and deploy it in suitable mature applications, such as heavy transport, industry and even data centre power generation or back-up. We must test and build confidence by deploying hydrogen in satellite gas grids and co-firing, scaling it up in the 2020s to be in a position in the 2030s to build the infrastructure and the electricity grid for seasonal balancing.

DCU has modelled the required storage needed to balance out a 100% renewable energy system. The number is between 6 terawatt hours, TWh, and 10 TWh, well beyond battery technology but feasible for hydrogen. Ireland is not a fossil fuel-rich country. In 2021, we do not want or need to be. We have vast natural, sustainable resources to support tremendous renewable energy deployment, specifically wind. We have an opportunity to build out renewables and ensure their ability to provide energy security for Ireland. Hydrogen can enable this. Ireland can even become a green hydrogen exporter in place of a fossil fuel-LNG importer.

In Ireland we need to accelerate hydrogen deployment. The impetus should not only be for indigenous energy. It is not about independence but energy security, creating jobs and enterprise and copper-fastening our climate objectives by ensuring a cost effective just transition.

This summer, Science Foundation Ireland and 25 industry partners have come together to fund a project called HyLIGHT, that I lead. HyLIGHT has an advisory group comprising 30 partners representing organisations, associations and government representatives from the North and South of the island. The aim is to effectively scrutinise the role for hydrogen in decarbonising Ireland's energy system. Excitingly, many of the industry partners want to develop hydrogen in Ireland sooner rather than later.

We stand on the precipice of a new economy. Thousands of jobs that do not exist today will emerge from the development of a hydrogen economy, particularly as many understand it to be necessary in order to fully decarbonise our energy system, working hand in hand and even supporting our clean, secure electricity supply. We are in a climate emergency. That fact was declared by Ireland in 2019. This emergency requires us to act and decarbonise 100% of our system. Green, Irish hydrogen can enable this.

I thank the committee for allowing me this time and opportunity to speak. I am happy to take questions.

Chairman: I thank Dr. Carton. The meeting is confined to a maximum of two hours. I propose each member be given two minutes to address questions to the witnesses to ensure all

members get an opportunity to pose questions. Is that agreed? Agreed. If we have time, we will go back for a second round of questions.

Deputy Richard Bruton: I thank our speakers. The sum total of their contributions vividly illustrates the long-term opportunity Ireland has and the short-term difficulties it has to overcome.

What is the best location for date centres from a European perspective? The need for data centres is clear, but we are trying to deliver them in an environmentally effective way. Some argue that Ireland is well located for that. As Dr. Carton stated, we have substantial long-term opportunities to build at scale in renewables and producing hydrogen but in the short term we have some tightness. I am interested to hear from Dr. Carton and others about the best way to design a path to this. Dr. Bresnihan said there could be a reaction against large-scale wind farms. On the hand other, if we are to fulfil the ambition relating to hydrogen to which he referred, we will have to deliver at scale. I am trying to understand the pathway to do this effectively. In an ideal world, we would have no fossil fuel reliance. Until we have either storage or hydrogen production, however, I presume we are somewhat dependent on specially designed gas to be available when the wind does not blow and the sun does not shine.

I am interested in another matter a couple of speakers touched on. What role ought carbon pricing play in the future? The Government has committed to increasing it progressively. Others question that but I struggle to see how we can deliver our ambitions without carbon prices rising.

Dr. James Carton: It is clear that we need to do a couple of things in parallel. The first thing to do regarding data centres, given the number of them locating here, is to manage the situation. A fair share of data centres is not a bad idea. We have a good climate for data centres, at a consistent temperature across the seasons. We have to think socially in terms of the requirement for data centres and managing and deleting our data. There is concern about what is housed in data centres and the reason they exist. We have to manage that with so many connected devices coming on line over the next decade and beyond.

At the moment, we have a huge reliance on natural gas. At times, 60% or above of our electricity system and the majority of our heating system and industrial applications run on natural gas. That will be with us for the next decade but we need to set the foundations to move away from that. We cannot have that situation in 15 or 20 years' time. It is about moving the dial so we understand our reliance and move towards medium-term change. Those developments must occur now.

In the short term, there is no hydrogen available and no market. We see this with renewable offshore wind energy as well. The build-out of that will take a number of years to get the scale of offshore wind for our energy system. Hydrogen could come in parallel with that. The key is getting many things in parallel, managing our energy use and the location of energy loads on our system and building resilience and planning for offshore wind, electro-fuels and hydrogen to work hand in hand with our future energy system.

Chairman: I think there was a question for Dr. Bresnihan.

Dr. Patrick Bresnihan: I am not sure what the question was for me, but I can respond on the more general point that was made. It is important that we do not fall into the trap one can trace in climate negotiations going back to the early 1990s. That is the idea you can put

off action now in the belief that in the future there will be technologies or economic or social transformations that will clean up the mess. At the heart of the idea around data centres is that at some point in the near-, medium- or long-term future, Ireland will have a large renewable energy capacity which will fulfil the energy needs of the data centre industry. That is dangerous and unrealistic. The target for offshore wind is 5 GW by 2030, but Wind Energy Ireland recently produced a report in which and then held a conference at which it indicated that it is not at all confident that this will be possible. Without that large-scale wind energy, we will not have large-scale green hydrogen.

As to where action can be taken, it is important to think about where there is expanding demand. Data centres with new and constantly increasing applications make a huge drawdown on our energy system. It is within the committee's power to say we are not going to increase that drawdown and we will not give any more planning permissions. It is much simpler. Maybe at some point in the future, similar to what the Singapore Government has said, when we have that capacity and those technologies, we can then rethink our approach to data centres. That is my response to that issue.

Senator Timmy Dooley: I will take up what Dr. Bresnihan said about the moratorium. I can understand where he is coming from but the reality is climate change and carbon emissions are global in nature. From his knowledge, will he point us in the direction of some other region of the globe that would be better suited to data centres? It is okay to say "let us not do it" or "not in our backyard right now", but we need to recognise the demand for data centres is there.

I take Dr. Carton's point that we need to be better globally about what data we retain, but that is not emerging right now either. Are we effectively saying "no" to something that may be of long-term benefit to us? We all recognise the pressures and constraints on our grid. I have listened to what EirGrid has to say and it certainly does not paint the pessimistic position the witnesses have. It is talking about 20% by 2030 as opposed to what was alluded to, which is the potential for up to 70% of the demand being required by data centres. I ask for the witnesses' views on that.

Not to ignore what has been said, but it might be useful to have EirGrid and the regulator come before us at the earliest opportunity to see where they are on this particular issue.

Chairman: For members' information, the Commission for Regulation of Utilities and EirGrid have been invited to appear before the committee. Their representatives are due to appear next week.

Dr. Patrick Bresnihan: Those figures are from EirGrid. The figure of 28% by 2030 is its figure and 70%, potentially, is also its figure based on existing applications. The point EirGrid made and its concern was - this was in the letter it sent to the Commission for Regulation of Utilities and its consultation document that came out approximately a month or two ago - there is no policy in place if it gives the green light to all these applications where the grid capacity would be 70%, which is too much.

There are two points on the question of whether we are the place for data centres. These things are not easy and it is not as if they can be easily solved, but it is about Dr. Carton's point on whether we accept unquestioningly that data demand and data usage will expand exponentially and ineluctably forever. Do we accept that point or do we think about data like we think about single use plastic, oil or emissions? There have been strong environmental and public awareness campaigns that have shifted views away from this idea that oil can continue to be

taken out of the ground and burned. That has taken time; it has taken 20 or 30 years. I can see something similar needing to happen, or possibly happening, around data. It is the same kind of thing, which is that our consumption of data is not natural and inevitable. Our consumption of data is very much linked to the business models and activities of online platforms such as Netflix, Twitter and Instagram. Those business models are geared towards us consuming more data. The same kinds of points can be made about plastics companies, chemical companies and petroleum companies. That is a bigger point but it is a very important one to make.

On whether it is up to Ireland since this is a global issue, you could flip say that and say that Ireland could become a leader. There is talk about Ireland not being a laggard and that we have fallen behind, at least in Europe. If we did something about data centres and made a point about their energy consumption, particularly as it relates to carbon emissions, it could be a way of saying Ireland is taking a lead and a responsibility. That could be the message that goes out. It is a more positive way of pitching that.

Deputy Timmy Dooley: I will take issue with that. I would have thought that if Ireland is to take a lead, it would be in greening our generation of energy. We are doing that with the ambition the ESB put forward to capture offshore wind and it plays into what Dr. Carton said about the generation of hydrogen at the old Moneypoint facility. That is what I would like to see us do. Whether we are a laggard or a leader when it comes to the use of data, we are such a small country it is unlikely we will convince the rest of the world about the continued demand in the medium term, I would have thought, for the storage of data.

We should consider the recent agenda of greater digitisation of economies. That will require greater capture and storage of data. The digitising of economies will effectively decarbonise to a much greater extent because it removes the necessity for transportation and much more. There was a gap, to some extent, in the presentation in respect of the benefits associated with the storage of data and the enabling of the digital economy, which is in itself positive from an environmental perspective. That is not to take at all from the immediacy of what has been said but if you look at it in wider terms, the benefits outweigh the short-term difficulties in getting us to a point where we are generating electricity in a more environmentally friendly way.

Deputy Christopher O'Sullivan: I will launch straight into questions because I have quite a number of them and only two minutes. I will ask Dr. Tienhaara about the figures she quoted in terms of keeping within the Paris Agreement targets, which mean leaving 89% of coal, 59% of gas and 58% of oil in the ground. The strategy and policy in Ireland are to switch towards greener renewable energy but also to have an element of back-up for the next couple of decades, using gas in particular. Is it possible to stay within the target of leaving those amounts of fuels in the ground but also use them as a back-up? On ISDS cases, Dr. Tienhaara referenced many claims but how many of them have been successful? What is her view on the position in Ireland whereby we have strongly stated that Irish law will supersede international law in those cases?

For Dr. Bresnihan, I will pick up from where Senator Dooley left off. At the moment, 11% of grid capacity to supply data centres is too much and 28% by 2030 will be too much. These are targets we have to seek to reduce but, surely, quoting a figure of 70% grid capacity, which is 42% above EirGrid's estimate of what it will be, seems to suit a moratorium agenda? I am surprised to see that because I do not believe it will be the case. I want to cover that issue again because, as we said, 28% is too much but to say it is 70% is an overstatement, to say the least.

If the policy adopted by this country is to continue to grant applications for data centres, surely we should have a conversation around mitigation measures and planning conditions. I

agree we cannot continue on the trajectory we are on at the moment in approving applications, but we are a centre of IT excellence and data centres are part of that IT environment. For the purposes of this conversation, let us assume we will continue to grant permissions for data centres. In that context, what kind of mitigation measures can we look at? Can we look at water harvesting? Dr. Bresnihan mentioned the water figures. Can we look at district heating to be used by communities? Can we look at procuring renewable energy and using the huge financial power?

I have one final question for Dr. Carton. He mentioned that EU countries are already moving towards hydrogen power for transport. How far advanced are they? Are there any examples of countries that are converting wind to hydrogen and rolling it out into their national grids?

Dr. Kyla Tienhaara: I thank the Deputy for his questions. I will focus mainly on the ISDS part because that is my area of expertise but I will say that it is widely accepted that gas is not the bridging fuel it has been claimed to be. Depending on the source of the gas, it can actually be worse for climate outcomes than coal. If it is fracked, large amounts of methane can be leaked. I would say that it really depends on what the focus is. If one is focusing on economic growth and not worrying about demand for energy, one will probably keep replying on gas. I applaud the comments about also trying to think about ways to decrease demand on the grid, especially if there are things that are not essential for a just transition, such as data centres. That is not my area of expertise but I wanted to say that I agree with some of the comments that have been made about trying to reduce demand in addition to greening supply.

The Deputy asked about the number of successful cases. Most of the climate cases are very new. Some of the ones that are relevant have been going on for a very long time but still have not finished. There is a case in Quebec where Canada was sued for a ban on gas fracking. That case has been going on for a decade. There are some particular reasons it has taken so long but these cases just do take a long time. I cannot point the committee to the success rates for fossil fuel companies on climate-specific cases. There is widespread use of ISDS for a variety of different issues of public interest and there are high success rates generally for investors. It is also important to note that states can only not lose; they cannot win. These cases are only brought by investors. The system is unbalanced so, on the whole, it only benefits the investors. No benefits come out of the process for states, in actual fact. The original premise was that it would help countries to attract investment but that has been debunked in the literature. Of course, for countries such as Ireland that have excellent court systems, there is no need for ISDS to exist.

The Deputy made comments about the supersession of Irish law. There have been interesting developments recently with the Energy Charter Treaty, in particular. The European Court of Justice ruled that intra-EU disputes, that is, cases brought by European investors against European states, are not legal under European rules. The problem is that the decision about intra-European disputes was made a few years ago and arbitrators have been generally ignoring the ruling. There is already discussion about how they can get around the judgment by having the seat of arbitration outside the EU. That means the award could be enforced against Ireland in a court outside Ireland. Where the seat of arbitration is outside the EU, an investor could go to the court and ask it to seize the assets that Ireland has in the country in order to pay a reward. It is great that Ireland has made a strong statement that Irish jurisdiction supersedes these arbitration panels, but that is not accepted by those panels so Ireland is not going to be able to completely avoid any repercussions from these types of disputes.

Dr. Patrick Bresnihan: I will speak about the figures. This is the second time I have been challenged on the figures, which is not great. The figures I have are from EirGrid, the semi-

State utility that manages the grid. According to its figures, on a high-usage day in Ireland, the whole country uses approximately 5,500 MW. If the current proposals for new data centres, added to existing data centres, were given the green light, that would mean 3,800 MW, which equates to 70% of peak demand.

Deputy Christopher O'Sullivan: To qualify that, does Dr. Bresnihan believe that data centres will use 70% of grid capacity by 2030?

Dr. Patrick Bresnihan: At the moment, because there is not a clear policy on planning permission, I do not see why a lot of those centres will not be given planning permission. Why would they not be given it? If they are given planning permission, it will amount to that 70%.

Deputy Christopher O'Sullivan: Planning permission was refused in Clare recently.

Dr. Patrick Bresnihan: I am echoing the concern that was raised by EirGrid on that point. I agree with the broader point the Deputy made that 11% is too much and 28% is too much.

The second point is about the benefits that data centres bring. This is the other part of it. It is not only about whether Ireland can meet the energy and electricity demands. There is another question about the benefits that data centres bring. I understand that Ireland is a digital hub. Our foreign direct investment has, since the 1980s, been based around the tech, manufacturing, digital and software sectors. However, in terms of long-term employment and regional development, it is not clear, beyond construction, what data centres bring. Intel recently made an announcement that there might be concerns over energy security with the expansion of its plant. There is a major anchor industry in the tech sector that provides many jobs. In the broader scheme of things, we should consider this from a cost-benefit point of view. There are questions about brownouts and blackouts, and the kind of damage they can do in terms of reputation and attracting industries to provide jobs and long-term investment. That is the point I am raising.

I also agree with the point about mitigation. The case in Singapore was about putting a pause on the development of data centres so that adequate, realistic mitigation strategies, including renewable energy, district heating and all sorts of other things, could be put in place to make sure that data centre development was more sustainable. That would be the line I would take. The idea is not to stop them forever but to have a moratorium to give enough space for there to be adequate research into the costs and benefits of data centres and into the kinds of technologies and infrastructures that could be developed with the tech industry. It is important that the tech industry takes more responsibility for these challenges.

Dr. James Carton: I think the Deputy's question was asking in which countries in Europe these projects using hydrogen are located. There are a number of those countries. We did a study with the World Energy Council in 2018 and 2019. We found 120-odd hydrogen projects, about 70% of which were coming from renewable sources. Since then, there has been an updated report on 250 projects in total, so there have been an additional number of projects. Many of them are developed at reasonable scale.

Closer to home, there is a wind farm in the North of Ireland producing hydrogen from a wind farm. That hydrogen is then trucked to the Belfast hydrogen buses. That is currently working. In Mayo, planning permission has been granted for an electrolyser on a wind-solar park. In Dublin, there are three hydrogen double-deck Bus Éireann buses on the roads. That hydrogen is certified green by the west Dublin BOC site. There is a mix in how hydrogen is produced depending on what country or region we are talking about. Hydrogen can be pro-

duced with renewables. Switzerland produces much of its hydrogen for approximately 500 trucks from hydro energy because that is what it has. In Germany, the hydrogen is produced through solar and wind energy. A lot of industry hydrogen that has been required for industry across Europe in recent decades is grey hydrogen from fossil fuels. The technology has proved itself mature to produce hydrogen from renewables at scale all across Europe and many other countries throughout the world. Does the Deputy have any follow-up questions?

Deputy Christopher O'Sullivan: No. That answers my question perfectly. I thank the witnesses.

Deputy Jennifer Whitmore: I thank the witnesses for their presentations. I wish to focus on the issue of data centres. I absolutely agree with Deputy O'Sullivan that we cannot continue on the trajectory that we are on in relation to data centre permissions. We need to put mitigation measures in place. That is precisely why the Social Democrats are bringing forward a motion tomorrow calling for a moratorium on the granting of permissions for data centres. We want to give the Government the space to rethink how we plan for data centres. Currently, no information is available in respect of jobs. The Department for Enterprise, Trade and Employment does not collect that information. The Department of the Environment, Climate and Communications does not know how many data centres are out there and does not collection that information, including the conditions imposed on them and how much energy they use. There is an obvious information gap in the oversight of the Government in relation to the issue. The moratorium is the best way of addressing that. It will allow for proper planning to take place, and for conditions to be placed on data centres to ensure that mitigation measures are in place.

There is one argument that keeps coming back to me, which I believe Deputy Bruton raised. According to the argument, Ireland is best-placed to have data centres located here, and a moratorium on permissions is very much a type NIMBYism, in that we are not taking responsibility for having data centres located here. What does Dr. Bresnihan think is the fair share when it comes to data centres? Have we hit the tipping point? Is there any other country in the world that has the number of data centres that we have and the resultant energy demand from those data centres? He mentioned the 28% figure, and potential figure of 70% of electricity usage. That is the reality. That is the trajectory we are on through granting those permissions. Is there any other country that has as many data centres as we do?

Another issue that we are facing is the idea that the consumption of data is resource-neutral and there is no impact on resources from it. The reality is that that is not correct. There is water resource usage and energy usage, albeit fossil fuel usage, currently. Even the use of renewable energy will have impact on resources. There could potentially be biodiversity impacts. There are also amenity and construction impacts. How do we move from the current mindset where we hear people say that data are free from constraints and we should be able to use as much as we want? How do we move from that to a place where people acknowledge, and are aware of, the costs of that consumption? Also, do we need to move towards the introduction of a data centre levy? Could that be one of the solutions?

Dr. Patrick Bresnihan: In answer to the first question on whether there are other countries with more data centres, I guess it depends on how you break it down. At the opening of that statement, I had in mind that Dublin is the data centre hub for Europe. It has 25% of the overall European industry market share, according to Host in Ireland, which is the industry representative group for data centres. That figure is from 2018, so it is outdated. However, my understanding is that the percentage can only have increased between 2018 and now because of the number of new data centres that have been built. My answer to the Deputy's question would be

that there is a reason Dublin and Ireland are understood as the data centre hub because we have the most *per capita*. I do not know how the Deputy wants it broken down. Perhaps the most salient figure would be in relation to our energy supply. I do not know exactly how to break it down, but there are more data centres here than anywhere in terms of it being a small country.

In terms of what would be a fair share of date centres and storage services, it is a difficult question. Deputy Bruton made the point about us reaching a point where we have large-scale, off-shore energy, including wind energy, in particular, wave energy and green hydrogen. If they were built out to the extent that the projections have said there is potential energy, and if it was done in a sustainable way, there could be more data centres here. I do not see why not. That is what it really boils down to. However, the point at which we will have that much renewable generation is quite a far bit down the line. Currently, the market share of data centres that we have is not fair and not sustainable.

On the Deputy's question about how we get people to know about the resourcing-intensive nature of data, it is a tricky one. It is really difficult. I made the point earlier that it took so long for there to be awareness and public concern around emissions. Data, in a way, are even more intangible. They are more out of our immediate experience, whereas issues like plastic pollution or other kinds of physical pollution are easier to mobilise people around or raise concern. The only point I can make is that it would be about greater public education. It would be about the role that environmental NGOs and schools play. Certainly, when I teach in college, students are always startled to learn that their use of Twitter and so on has this effect.

One other thing that is interesting about data is that there are lots of debates around the role of tech industries in society and the economy, whether it is around security, surveillance or tax. There is another debate, which is gaining more prominence, around the environmental footprint and impact of tech. The more those kinds of conversations are linked up, the better. These things are related and perhaps we should be joining up the dots a bit more. That might be helpful. It is a very big question, but education is definitely needed in multiple ways and forums.

Deputy Jennifer Whitmore: On my final question in relation to the data centre levy, is that something we should be considering?

Dr. Patrick Bresnihan: It is not something that I have particularly thought about, but yes. Engineers Ireland estimated that the cost of energy infrastructures for servicing data centres would be €9 billion at some point, perhaps by the end of this decade. Obviously, that is not a cost that is completely on the State; it is partly paid by the developments. However, given the fact that there is such a pressure on public infrastructures, grids and resources by these developments, I feel that there should be some kind of tax associated with that.

Senator Pauline O'Reilly: I thank all of our guests today. I have a few specific questions.

On the issue of the levy and the tax, ultimately, the end user of the data service would be paying for that. Therefore, I would have a concern there around a tax for which ordinary people will end up footing the bill. However, social responsibility comes into it. Both Dr. Bresnihan and Dr. Carton have spoken about that social element and the need to educate the public in relation to the use of data. I think there has been some conflation here in referring to plastics and the overconsumption of plastics. As an environmentalist, it is important to point out that it is something very different from data. Plastics are made from fossil fuels. Ultimately, they do not break down, so they have a cost at both ends, whereas it seems to me that the real issue around data centres is where the energy for those centres is coming from, and whether we can

keep pace with the energy demand.

I ask for the witnesses' views on the following matters. In an ideal world, we could ensure the energy was renewable, and perhaps we could look at some of the other concerns around water, as mentioned by Deputy Christopher O'Sullivan, such as rainwater harvesting. We should be doing that on a grand scale across the island anyway. If we address those issues, the concerns would not be there to the same extent.

I am from the west of Ireland and I know Senator Dooley and Deputy Leddin are from there as well. What we have is a difficulty with people not wanting to produce energy in the west because of the lack of population. We must look at bringing in industry that can promote and support energy in order to serve the wider population. Is there a place for that and how is it envisaged that this can be achieved? Yesterday, Bord na Móna announced an energy park for the midlands. It is a co-location of renewable energy with business. I presume that business will comprise heavy energy users in order to do exactly as I have described and ensure energy can be created on the basis that there is a consumer in business and it can be distributed to the wider community as well.

I have had a concern for a long time around trade deals and negotiations, particularly from the European Union perspective and trade deals being a European competency. Much of the early negotiations for trade deals happen before they are discussed by MEPs or come before the European Parliament for decision. Does Dr. Tienhaara have any thoughts about how we can change that to be more transparent? To be fair, anything that comes before an investor-state dispute settlement process is based on the terms of the individual contract and trade deals. There is not a widespread ability to make determinations outside those contracts. The wording in the trade deals is important.

Dr. Patrick Bresnihan: There were a few points and I do not know if I will get to all of them. The first concerned an analogy with single-use plastics. As mentioned, plastic is made from fossil fuels but data are currently made from fossil fuels, for the most part, in that the energy used in those centres comes from fossil fuels. Data could be made from energy generated from sources other than fossil fuels, although one could say the same about plastic. There is much effort to make plastic from biodegradable materials but for the most part it is still a by-product of the petrochemical industry. The analogy is fine but it is harder to conceive because data does not seem material but instead is like information on the screen. If we understood the concept as fundamentally as we do fossil fuels, and where it is produced from fossil fuels, perhaps it would bring a shift in how people think about data and its environmental costs.

There was a second point about regional development in data centres. This is where most of my work has been in the past year or two. That is certainly one of the proposals put forward by EirGrid and CRU because of the concentration of data centres in Dublin, which is causing a security of supply issue. If the data centres were moved to other parts of the country, where they could be closer to generation and there would not be the same demand on the grid, it would work from an energy or electricity perspective in terms of security of supply. As has been mentioned, it might also help spread the development. There is no doubt there may be benefits, although it all depends on how these things are done.

This goes back to the point about the benefits of data centres and the kinds of jobs or localised development they provide beyond construction. As an example, I have done some work in Killala, where efforts are under way by Mayo County Council to bring a data centre to the site where Asahi used to be. Asahi was a Japanese company that came to Ireland in the 1970s and

at the time that was one of the largest investments by a Japanese company overseas. It was in Killala in north Mayo for maybe 30 years and left in the 1990s, after 25 years. It provided many jobs and transformed that area. That site has basically been empty of industry since the mid-1990s. Data centres are seen as a kind of possible replacement but even in talking to people involved with those plans, they recognise there will not really be many jobs beyond construction. These matters are complicated but there is a sense that because data centres are large industrial installations and infrastructure, there is not much else possible. We will not get a company like Asahi to locate in Killala again. There is a sense that we are grasping at this but will this really bring the kinds of employment opportunities and long-term employment in these places that has been promised? I am not sure.

It could happen if those centres were associated with some energy projects, such as biomass or biogas. There are many ways they could be developed, as per Deputy Christy O'Sullivan's point. Again, it comes down to trying to plan such measures and ensuring there are requirements or elements added to the data centre development to ensure they are good for these areas. It is not a given that they would be. The Bord na Móna project can also be seen in the post-industrial context. It is by no means sure that it will create the jobs that Bord na Móna once had.

Dr. Kyla Tienhaara: I thank the Senator for the question. I completely agree on the point about transparency and it is very disturbing that these deals are essentially made behind closed doors. The issue with transparency is not just that policymakers and the public do not know what is going on but that some people are invited to the room early on who influence the outcomes. There is pressure put on by industry groups to have certain provisions, including investor-state dispute settlement. I understand there are certain problems in the EU context with that extra layer but this is a problem across the board with all trade agreement negotiations. Some efforts are being made in some places to have special committees, for example, that can see documents early on and which try to give expert input. The problem is these committees are usually skewed towards industry and not so much from the perspective of public interest groups around the environment, health and so forth.

Increasing transparency in these deals is definitely important. The point was also made about the provisions in these deals defining how case outcomes occur but I would quibble with that a bit. There has been effort to reform investment provisions in recent years. We are seeing that arbitrators are finding ways to get around this and lawyers are finding creative ways to ignore these provisions. There was a very recent case concerning a mining company. Despite the fact there was an explicit exception for environmental provisions, this did not mean the states did not still have to compensate the investors.

These tribunals have far too much power to be able to interpret these matters in the way they see fit. It is really based more on ideology than the actual terms in agreements. I see transparency having value but ultimately the reform effort appears worthwhile. This goes back to the point that these treaties have no public benefit nor do they do anything of value for the public. There is no reason for the public to have to accept the risks associated with them.

Very briefly I can step out of my investor-state dispute settlement role and put on my global development studies professor hat in order to comment on the more general discussion ongoing about renewable energy. I plead for everyone to think not only about how clean renewable energy is within Ireland but the impact that it has on other countries, where earth minerals and so forth are extracted, sometimes under really horrible conditions that have human rights or environmental implications. I definitely want everyone to move to 100% renewable energy. We also have to think about ways to reduce our energy usage. We cannot just constantly try to

have more and more renewable energy *ad infinitum*. Thinking about whether we need things like data centres has to be part of the conversation. We should not just be talking about getting to 100% renewable energy.

Senator Pauline O'Reilly: Dr. Carton had his hand up so perhaps he would like to speak about data centres and their location and co-location in particular.

Dr. James Carton: The social responsibility aspect of data centres - energy distribution, etc. - is key and it echoes the comments we have been making. The west of Ireland has an opportunity for renewable energy and jobs and to match renewable production and energy loads. This has positive implications for the electricity grid in the constraint and curtailment that happens due to bottlenecks on the way to Dublin. If there are a number of fair share conditions to be put on data centres, their geographic location could be one of them. The impact of jobs and business hubs is something to think about as well as the data centres' energy source and supporting that with renewables. Hopefully, that ties together Senator O'Reilly's comments.

Deputy Darren O'Rourke: I might ask Dr. Tienhaara about the ECT. In her most recent contribution she said there is no positive benefit for the public from the ECT. If that is the case, I wonder what she would suggest if she was advising the Government or the Minister on it. A number of European colleagues have called on the European Union to withdraw from the treaty. Is that something Dr. Tienhaara would support or is there another way around it, be it reform or something else? I would be interested in her opinion on that.

I have another question for Dr. Bresnihan and Dr. Carton. It appears that there is a significant information deficit on data centres and the call for a moratorium makes sense to me. There are a number of scientific, technological, political and ethical considerations, and it is as if there is an information deficit in respect of almost every one of them. I want to ask about mitigation because that has been argued for from some quarters. What are the witnesses' experiences of the type of mitigation measures that could be used? There are conditions for offsetting and generation; do they work well elsewhere and is there potential in this? Is it possible, as has been said to me before, that these data centres could be net contributors to the grid if their uninterruptible power supply, UPS, or backup storage could be tapped into? Is there international experience of this or is that fanciful?

Dr. Kyla Tienhaara: As the Deputy notes, there are several countries, including France, Spain and Poland, that are leading the pack and other countries that are interested in exiting the ECT. They are pushing for a co-ordinated exit for the European Union. I would advocate that Ireland join in that push. The one complicating factor with treaties such as the ECT is that they have a sunset or survival clause. Basically, this means that if a country unilaterally exits the treaty, it will still apply to that country for 20 years. That is a problem Italy is having to deal with; it exited the treaty and it is still having to deal with these cases. The way to get around that is for a co-ordinated exit that involves a neutralisation of the sunset clause. As many countries as possible should get involved. The European Union is the largest part of the ECT so a European Union exit where they all agree to nullify the sunset clause would eliminate a substantial percentage of possible ISDS cases under the treaty. That seems to be the clearest path forward. Modernisation talks are taking place this week but so far they have not produced anything. They are taking a long time. Going back to the original point, there is no real need to keep the treaty because it is not providing any benefit. I would definitely advocate for the exit option.

Dr. Patrick Bresnihan: On mitigation, things have been proposed and there are initiatives and projects under way, such as the district heating scheme in Tallaght involving Amazon. In

other cities, particularly Denmark, district heating has been pursued at a larger scale with more data centre developments. The other part of it would be renewable energy and getting data centres to build renewable energy developments. Those schemes, not just in Ireland but also in places like Denmark, have tended to be relatively small. They are like pilot schemes and one could cynically say they are just greenwashing because they get a lot of attention but the extent to which they or renewable energy investments offset or account for the huge energy demands of data centres is minimal.

There are technical solutions. One part of it is where the emphasis lies and who is responsible. In the case of data centres, if they are locating here they should be required to do certain things such as providing their own energy or developing district heating systems. That is not in place and it would need to be put in place because if it is voluntary, it will not happen.

I am glad that Dr. Tienhaara made this point but there cannot constantly be this emphasis on technological solutions. Technological solutions create other problems. Even if we only focus on things like emissions, renewable energy carries its own burdens, whether it is lithium for battery storage or building wind turbines on peat bogs which are not adequate. We need to look at technological and technical solutions but we also have to be aware that they have social and environmental implications and that they are always bound up with questions of who is responsible.

Dr. James Carton: I will come at this from the sustainability side. I agree completely with Dr. Bresnihan and Dr. Tienhaara on the sustainability of anything, whether it is plastic production, agriculture or data centres. Certified green electricity is one technical solution that is being rolled out. As Dr. Bresnihan said, there are a lot of small projects with UPS systems which are more sustainable such as batteries and even small deployments of green hydrogen. Scale is big for these data centres and a lot of the new data centres are coming with open cycle gas turbines as their backup to the system. There is waste heat that could potentially be used for district heating. Again, this is large scale. It needs to be deployed on the current data centres and could be a part of the planning regime for future data centres.

If we continue with what we are doing now and rely on natural gas, we are just exacerbating the problem of satisfying our Paris Agreement commitments and the commitments in the climate Bill that are to be achieved by 2030. One technical solution would be to open an auction and state that, by a particular year, data centres must be backed up by sustainable and renewable energy. That could bring in opportunities for biomethane and green hydrogen. It would certainly bring in opportunities for certified green electricity.

Deputy Bruton mentioned carbon emission taxes. Carbon pricing must be a part of this. As another Deputy mentioned, that cost should not be pushed back onto the customer. There are many solutions but it is a complex situation and we need to act now to get some of this stuff in place.

Senator Alice-Mary Higgins: Those were interesting presentations. The data piece struck me. We have focused a lot on energy production but to drill down into the question on demand, the fact is that all data are not the same, as we know. We know from the general data protection regulation, GDPR, that different kinds of data are treated differently. We know there is currently an artificial intelligence, AI, regulation moving through the European system about what algorithmic uses might be legitimate or otherwise. It is worth noting that training algorithms has measurable costs equivalent to numerous transatlantic flights. There are certain uses of data. I worry sometimes when we say that we want the connectivity, public services and all the

other great uses for data because part of the drilling down is not only around the energy usage but is also around drilling down on the demand side and into what are efficient uses of data and what are redundant uses of data simply to maximise profit. The mining of cryptocurrency would be an example of the latter. Is that something anyone can afford in terms of energy anywhere in the world?

I am sympathetic to the idea of a moratorium until we put in place a clear picture of the regulations we are going to have around responsible data usage. What prioritisation will we have if we have energy crunches and how will that apply to particular data usages? When we are considering building data centres, we really need to keep the policy space for regulating how they are used. It is easier to do that before hostages to fortune have been created by effectively giving blank-slate planning permission. There are strong arguments for the moratorium, including the mitigation measures that others have mentioned and the need for an intersection of environmental and ethical data regulation.

Good and necessary data uses can be a cover for unnecessary uses. In a similar way, perhaps we need to stop saying "hydrogen" and either say "green hydrogen" or "grey hydrogen". I worry that green hydrogen, which is still a very small portion of the big picture - and perhaps we can clarify that - is used as a cover for grey hydrogen, which ultimately means fossil fuels and can serve as an accelerant in terms of heating.

I wish to ask about the Energy Charter Treaty.

Chairman: I call on the Senator to be brief because we are against the clock.

Senator Alice-Mary Higgins: I will be brief. I will ask about the Energy Charter Treaty and the exit from it. If we need to be in a different place in 15 years, how much do we need to accelerate the exit process? Russia was able to exit with a six-month clause, whereas Italy had a 20-year clause. How foolish would we be to sign up to new ISDS mechanisms which also have a 20-year exit clause? I know that Dr. Tienhaara is a professor in Canada and one of the concerns about the EU-Canada Comprehensive Economic and Trade Agreement, CETA, relates to the fact that provisional application allows a speedy exit, whereas full ratification ties us to a 20-year clause.

There is an issue with intra-European incompatibility with climate action, as we saw from the European Court of Justice case to which Dr. Tienhaara referred. There is a need to ensure we give the policy space to developing countries, such as Uganda, where we have Irish companies and large oil extraction companies. If we are to stop digging and while we are dismantling ISDS, how important is it to give developing countries the policy space they need to take responsible action on energy extraction and being free to change their minds on stuff?

Dr. Patrick Bresnihan: I do not know if there was a question. I completely agree with the point the Senator made about different types of data. That is important. It comes back to the education piece and research. One of the things that is coming out of this session is that there are unknowns. There are questions and things about which it would be good to know more, including what data are stored here, where they come from and so on. I agree with that.

Dr. James Carton: I agree that all data are not equal. I have emails I need to delete because they are on a data centre somewhere. All data are definitely not equal.

The Senator made a comment about green hydrogen and grey hydrogen or blue hydrogen. For clarity, as I think everyone knows, I mean green hydrogen whenever I say "hydrogen".

Ireland has an opportunity and will almost exclusively go down the route of green hydrogen. I think that will come out in the climate action plan. Other countries, such as our neighbours in the UK, will probably move towards grey hydrogen and hope to move to blue hydrogen in the future. We have the ultimate opportunity to move to green hydrogen. That has significant implications in its application. That will be quality hydrogen and there will be an opportunity to export it to the likes of Germany etc. Green hydrogen must be built into the foundations of anything we do with our energy transition. I hope that answers the Senator's question.

Dr. Kyla Tienhaara: There was a bunch of excellent questions there. The Senator is correct in what she said about the ability of Russia and Italy to exit the Energy Charter Treaty. Russia was not a full member and was, therefore, able to exit fairly quickly.

The Senator also mentioned CETA. I made a submission on CETA to a different committee. My position was that while there have been some modifications and so-called improvements to the language in CETA compared to other treaties, there are still loopholes there. The creativity of investment lawyers cannot be overestimated. There is still risk attached to CETA in that respect. It also addresses investment courts versus the investor-State *ad hoc* tribunals. There are some improvements as to how accountable the arbitrators are and so forth but I just do not think that system fundamentally fixes the big problems with the system, particularly the fact that it is so unbalanced. It only allows investors and no one else to bring cases.

I absolutely want to comment on the Senator's broader question about developing countries. I have long been arguing that investor-State dispute settlement is the biggest problem in developing countries because they lack the capacity to respond to these types of cases and are, therefore, more likely to be chilled and to be more likely to backtrack on their proposed plans. In the early 2000s, I looked at cases in places such as Indonesia, which had plans to ban open-pit mining. It held off and reversed course because of threats it would be sued. We hope we will be able to get people in the developed world to care about cases relating to climate in the developing world because we need everyone, everywhere to be acting. Last year, I did a report with the Institute for Environment and Development in the UK where we mapped the coal plants in the world that need to be phased out in order for us to keep within the 1.5°C goal in the Paris Agreement. It is no surprise that a large majority of them are in the global south. They are in countries such as Indonesia and other parts of Southeast Asia. Since these plants are relatively new and further behind on coal transition, there is a lot of value still in them. Therefore, there is great potential for awards if a country is going to phase out coal power in the near future, as we want. To give an example of the sort of hypocrisy associated with countries having to pay awards against them, Pakistan has had an award against it of almost $5 billion in respect of a mine that was never actually built, thus bringing up the lost future profit issue. Almost at the exact same time, Pakistan was being offered a $6 billion loan from the IMF. We are talking about the international community loaning a country a huge amount of money and then saying it actually needs to pay it all back to an investor. This is a huge contradiction within global economic governance, and it has serious implications when talking about battling climate change at global level.

Deputy Réada Cronin: I am aware that three-hour committee meetings are imminent. It is a pity that is not the case for this meeting because it has been so interesting. My questions for Dr. Tienhaara have already been asked and answered. However, I thank her very much for her contribution. CETA is very much in the news in Ireland. It has been great to hear Dr. Tienhaara debunk a lot of what we have heard.

My first question is for Dr. Carton. I was glad to hear emergency times and emergency

measures mentioned in the same sentence because, in so many aspects of how we are dealing with the climate, the two just do not add up. It is like saying, "Lord make me good, but not yet." Green hydrogen presents a great opportunity for us. If we were to talk about blank-cheque territory, not only about money but also about imagination, thought, courage and commitment, what would Dr. Carton need from us, as legislators, to make what is required happen?

I have a question for Dr. Bresnihan. I am from Maynooth as well. He is very welcome to the committee. I noted the kickback he was getting on data centres. It is a bit like some politicians still negotiating home rule and discussing the Free State when the rest of us are talking about a united Ireland. Sadly, the thinking on climate change and the position taken on it politically seem to be worlds apart. The data centre issue is important in respect of social cohesion and what is headed our way owing to climate change. I am referring to people's experience of higher costs and possible energy shortages. If they see that energy for data centres is put ahead of energy for the public, we could be entering very dangerous territory. For communities, it exposes the paradox of priorities, economic and social, when we are very vulnerable.

On just transition, does Dr. Bresnihan believe the issue of data centres presents an opportunity for society to have the essential conversation? It has been interesting to learn that all data is not equal. What constitutes progress and sound economics? Data centres show the trouble we are in, how grossly unsustainable the circumstances are and the urgent need for radical change, which I do not believe will be comfortable at all.

Dr. James Carton: I thank Deputy Cronin. It is not too often that people ask me about blank cheques but I am happy to discuss the matter. On Deputy Christopher O'Sullivan's comment on what is going on, there are many developments in green hydrogen in Ireland and across the world but if we continue at our current pace in Ireland, we will probably have solutions and infrastructure ready for 2060 or 2070. That is way too late.

On the HyLIGHT project, through research across MaREI, NUIG, UCD and DCU and research by our colleagues in the North, we are doing a lot of the groundwork to pull the strands together. Effectively, however, there is a stepping process. We need to get the industry, regulators and infrastructure, in addition to the likes of the ESB and EirGrid, up to date on the technology and capability. These are mature in other countries but we need to learn about them here.

One recommendation from a Hydrogen Mobility Ireland report, certainly on vehicles and heavy-duty transport, which would be the focus, is to have supports similar to those for battery electric vehicles. This should be kicked off sooner rather than later. An interesting point on that is that it ends up being the resident tenant, as we call it in shopping centre terms, to allow other applications to grow. One of the applications, which we could discuss in respect of data centres, involves co-firing green hydrogen in backup open-cycle gas turbines. The infrastructure is available and has been paid for. The systems have lives of 15 to 20 years, or longer. We do not want to be burning natural gas in 20 to 30 years; we want to be burning something cleaner. We need to build up the capability. What I note from the industry is that the technology for and capacity to produce hydrogen at a relatively large scale are probably issues concerning the planning regime. I am referring to a planning application and to infrastructure deployment. It will be within this decade, or within the next five or six years.

What is missing from policy is a focus on creating and supporting demand, be it through fuelling stations for heavy transport, auctions, decarbonising or moratoriums. If backup power has to be 100% green and it is open as to how it is produced – it could be biomethane, hydrogen or whatever factories want – the market can solidify on the best solution and timeframe.

Hydrogen power probably needs Government support, moratorium support, in the initial stages but it is less than what we have asked for in respect of battery electric vehicles since they were launched in the mid-2010s.

Demand and achieving it are important. It is a question of starting off slowly and speeding up quickly. As I said in my opening statement, we can have a huge amount of experience under our belts by 2030 and build out vast resources in the 2030s so as not to have this happening in the 2070s. I will be well retired by then. I hope that answers the Deputy's question.

Chairman: I thank Professor Carton. We will all be well retired by then, I believe. Was there a question for Dr. Bresnihan?

Deputy Réada Cronin: Yes.

Dr. Patrick Bresnihan: It was a big question but I am aware that we do not have that much time. The question was interesting in respect of what Deputy Cronin called "social cohesion". I agree with her. That is why I referred in my opening statement to the different dynamics that will be at play, whereby there will be increasing energy costs and carbon taxes affecting consumers, people in their homes. In addition to opposition to these, there will be opposition to developments such as wind farms and energy infrastructure, whether that involves data centres or upgraded grid. Whether it is offshore or onshore, grid and physical infrastructure will be built. The more there is an understanding that this kind of transition is happening to benefit, for example, tech companies and other large end users rather than citizens, the more that could be a recipe for trouble. We have seen that elsewhere with things like the *gilets jaunes* movement and the big protest about carbon taxes in Peru. Even in Ireland, one could say that there was something similar with water charges. That is the kind of flip side. Just transition gets a great deal of air time but the flip side of that is the concept of "eco-austerity" that has been coined in the past number of years. The latter is this idea of transition where the burden of the is placed on the poorest, most vulnerable and so on. That is the bigger picture. It is important to bear that in mind in decisions relating to data centre development.

Another point was made about a debate on wider issues and more systemic things. That is a very significant point but one thing that has come up in our conversation so far is the exponential growth of data and its consumption. I would be very hesitant in trying to talk about individual behavioural responsibility, namely, the idea of being on Netflix or whatever a bit less. It is important to recognise that the need for data centres is driven by a business model which is about driving more data consumption. The comparison that I often give to students - I teach a class in geography - on waste is that in the 50s and 60s there were many advertisements that one would see from plastics companies which were about encouraging housewives to use more disposable plastic because it would make their lives easier, they would not have to wash things up and could just throw it away. These are advertisements that now seem appalling and are hard to imagine, but it is the idea of disposability, of getting people to use more, which is exactly what is built into everything, from lights to Netflix.

Chairman: I am going to have to cut across Dr. Breshihan.

Dr. Patrick Bresnihan: That is just the broader point on the disposability of data - fast data, one might call it - which it is important to raise..

Chairman: My apologies for cutting across Dr. Bresnihan. I am just mindful that there are four members who are due to come in the next 18 minutes. I call Senator Boylan.

Senator Lynn Boylan: I was not expecting to get in. My first point, building on what Dr. Bresnihan was talking about, is on getting the buy-in from the population and obtaining a cost-benefit analysis in respect of these data centres. There is a KPMG report which states that 60% to 80% of the capital costs of data centres can be written off against taxes. The Minister for Finance, Deputy Donohoe, was not able to say how much has actually been lost to the taxpayer as a result of these write-offs. If one takes the €7 billion that is being invested by the data industry in Ireland, this could be up to €5 billion that taxpayers have been denied by these data centres. If one also looks at the public service obligation, PSO, and how it is levied, it means that households are disproportionately subsidising data centres. This is because the PSO is levied on peak demand. We know that data centres do not use much peak demand but have a steady demand. It is very important that we have the necessary conversations in respect of cost-benefit analysis and how much those data centres are costing us for the jobs we get in return.

I also wish to debunk the industry-led report. That report was funded by the Sustainable Energy Authority of Ireland, SEAI, but it was an industry trade group which stated that Ireland's climate was not the primary reason we have data centres here. We have a favourable climate, but the relevant tax incentives are a factor.

Moving then on to the energy security question, which is what we were also asked to look at today, my fear is that if we continue to allow the data centres to expand without having the moratorium, it will make the argument for building LNG terminals - in respect of which there are two planning applications at present - stronger because we have this energy demand coming from the data centres and, as a result, we need to have energy security. Am I correct in stating, Dr. Tienhaara, that if planning permission is given for those two terminals, they will be covered by the ECT and all of its provisions - prior to any reform of the energy charter - they will be protected under the very old ISDS model and that this will be the case for a period of 20 years? This is a chicken-and-egg question in that are the data centres leading the demand for the LNG terminals. Will what I have outlined mean that we will be left exposed to ISDS compensation claims if we want to phase out those terminals?

Chairman: I thank Senator Boylan and call, first, on Dr. Bresnihan to answer.

Dr. Patrick Bresnihan: Is that the question on whether the expansion of data centres would become an encouragement or facilitator for the LNG terminals?

Chairman: Yes, it is.

Dr. Patrick Bresnihan: That seems plausible. I also know that the CEO of New Fortress Energy, which is seeking to develop the Shannon LNG terminal, has spoken publicly about developing data centres around the gas infrastructures.

Chairman: I am going to cut across Dr. Bresnihan again because we should not really speak about any live application. I would appreciate it if he could speak in general terms.

Dr. Patrick Bresnihan: It has been made explicit that these gas terminals are being developed in tandem with data centres. It is not just a question of energy supply and demand, but that data centres are actually incorporated as part of the development. I agree with Senator Boylan that there is a strong connection between those two things.

Chairman: Does Professor Carton wish to come in on that?

Dr. James Carton: I have a small comment on that in that our energy security does not

become more guaranteed by putting in an LNG import terminal. As to the time and taxpayer' money needed to build that, we will ultimately be decommissioning it to achieve our alignment and decarbonisation targets under the Paris Agreement. Quite literally, energy spent elsewhere is better. It is a complex situation but we have discussed much of the situation on the need for data centres, the controls relating to the data centre build-out and then the opening up of opportunities for data centres to decarbonise. These are the key aspects we should think about.

Chairman: I thank Professor Carton and call Dr. Tienhaara.

Dr. Kyla Tienhaara: I am not aware of the specifics regarding the investors involved in those terminals. If they are investors that can claim to have any sort of office - it does not need to be the main headquarters but some kind of operation through which they are using it to invest in to Ireland - that is in an ECT country, then those facilities are completely protected. I should also note that an investor does even not have to wait until the terminal is built. If the terminal it built was phased out, that would also be covered by the ECT. Many of these investor-state disputes are launched even before something is actually built, depending on how far along they are in the process of developing a project. The Keystone XL pipeline, for example, does not come under the ECT. Rather, it comes under the provisions of very similar North American Free Trade Agreement. That pipeline has not been built. The company was still in the process of getting all the permits and so forth, but it can still bring a case and it can be not only in respect of the money that was sunk into the investment up until that point, it can also relate to the profits that it expected to make over the duration of the infrastructure being in place. With a terminal, I would expect that to be quite a long period - of 20 to 30 years' duration at least.

Chairman: I thank Dr. Tienhaara for that answer and call Deputy Bríd Smith.

Deputy Bríd Smith: I thank everybody for their presentations. The figures we have heard today regarding data centres are very stark, as are those relating to the fossil fuel industry. I will start with a question for Dr. Tienhaara. Our Government recently banned offshore exploration for fossil fuels and we have a ban on fracking. Does Dr. Tienhaara think it contradictory that the Government would encourage the importation of LNG and, in light of the number of planning applications that are in train, would be looking at the possibility of establishing LNG terminals? Does she think it is time for this type of activity to be banned?

I thank Senator Boylan for connecting the ban between LNG terminals and data centres because that is very much what the Solidarity-People Before Profit Bill would do if it is passed on Thursday. The Bill in question is about banning both fossil fuel infrastructure and the proliferation of data centres. That does not mean we should shut down existing data centres, of which there are more than 70 in the country; it means we should stop the development of more. I honestly believe this is linked to the question of LNG terminals. If 59% of gas reserves remain in the ground and if we take account of full-cycle emissions from the production of the gas to its distribution, would it be consistent to ban the import of LNG? That is if we are banning offshore exploration for gas and oil and onshore exploration for fracked gas.

I have a question for Dr. Bresnihan. An interesting question arose earlier as to what data centres are used for and the type of business model they represent. It is clear the business model used by companies building these data centres, and who mostly use them, is about mining data in order to advertise, sell and develop business around what can be sold to a population. This goes back to the point made by Dr. Tienhaara about reducing the amount of energy we use. We must make stark decisions because we are in a climate emergency.

Dr. Bresnihan indicated that Ireland shoulders more than its fair share of the energy and water burden of global digital activities and that the prospects of energy insecurity may carry greater reputational and economic damage than a moratorium on data centre development. Will he expand on that, particularly as there is a cohort of Deputies and Senators who believe we are damaging ourselves by not expanding the data industry? Dr. Bresnihan is making the opposite argument. There is also the question of just transition and how this affects communities, which perceive that they are bearing the burden because data centre activity eats into our electricity supply.

I have a final question for Dr. Tienhaara. There must be an answer to all of this. She mentioned the Beyond Oil and Gas Alliance demand, which is that we address both demand and supply simultaneously. I agree with her. The severity of the climate crisis dictates that we need the State to intervene directly on the question of supply. In other words, there should be state-led, controlled and delivered renewable energy power companies. We have did that before with the ESB in the 1930s and 1940s and we could absolutely do it again. If there is time, will Dr. Tienhaara comment on that?

Chairman: I ask the witnesses to be as brief as possible, given that there are just six or seven minutes remaining. Deputy Devlin wishes to contribute and I have some comments and questions as well.

Dr. Patrick Bresnihan: I will briefly expand on the point in my statement. In speaking about reputational damage, I was referring quite specifically to the recent news about Intel's expansion. There was a discussion about whether it would invest in a bigger expansion of its plant in Leixlip, and whether this came down to a question of energy security. It is not clear whether it is but it is interesting that the matter was raised. If there are brownouts or blackouts this winter, it would not look great if Ireland wanted to attract data centres or other kinds of industries.

The other aspect of reputational damage relates to climate and energy commitments. There is the question of words versus actions. The figures are really stark. Ireland is known as a hub for these data centres. It is also becoming known, both among the public in Ireland and outside the country, that there are contradictions in the data centre expansion, energy security and climate obligations. If we continue down this path in the hope there might be some sort of technological solution - that does not look likely - it will cause more reputational damage. It will not just be about inward investment but generally about Ireland's commitment to such matters.

Dr. Kyla Tienhaara: I thank the Deputy for the questions. I applaud Ireland on going as far as ruling out offshore exploration for oil and gas and fracking onshore. That is much more than my country has done. However, I agree that building out infrastructure for importing gas is somewhat inconsistent with this approach, particularly if we look at the energy costs required to compress gas for transport as is the case with LNG. It seems very inconsistent. I also worry about the lock-in effect of that infrastructure. As I have noted, such infrastructure is built for a long period and this makes it harder to transition, particularly when we add in elements such as the ECT, which helps reinforce that kind of lock-in.

On the question of how to address demand and supply, there are interesting proposals from the Beyond Oil and Gas Alliance. There is an academic and activist proposal for a fossil non-proliferation treaty. There are interesting efforts in this regard. I tend to agree that the state needs to lead and there are increasing calls for the energy sector to be nationalised and have more public companies providing energy. I bring this back to the threat that any time a company is nationalised or we take public control of any aspect of the private sector, and not just the

energy sector, there is a risk of being sued under these investment treaties. As part of a broader plan to go that route, we also need to get rid of these treaties. I thank the Deputy again for the questions.

Chairman: Deputy Devlin has been sitting there very patiently.

Deputy Cormac Devlin: As Deputy Bríd Smith stated, it is very hard to ask any new questions but I will do my best in the limited time available. I thank the speakers for their contributions. It illustrates the level of interest in this matter that we are only now getting to the final questions.

In her opening remarks, Dr. Tienhaara she spoke about fossil fuel phase-out policies and the issue that governments may have in overcompensating sectors in an adversarial legal process. Is any other method possible? In the previous contribution she spoke about phasing out treaties but how else could this be done?

There have been exciting prospects for green hydrogen, and I stress the green element after we heard the previous contribution. I note Dr. Carton leads the HyLIGHT advisory group so what does he see as the biggest challenges and obstacles facing the expanding roll-out of hydrogen here?

Many of the questions I wanted to put to Dr. Bresnihan have already been asked. However, he stated that the 70 data centres in Ireland use approximately 11% of grid capacity at present. EirGrid estimates this will move to 28% by 2030. I read Dr. Bresnihan's remarks in *The Irish Times* that it may be up to 70%. That is quite a considerable differential. Will the witness elaborate on that?

Dr. Kyla Tienhaara: Those are great questions. The number one action that governments can take to avoid disputes in the first place would be to stop giving out new exploration licences and permits. Ireland is already doing well on that by having a moratorium on offshore oil and gas. With other approaches to compensation, it depends very much on what kind of sector we are looking at. I have seen some interesting proposals in the US that would phase out coal plants through an auctioning system, so companies would voluntarily offer to close early and there are limits on compensation etc. That is largely under the assumption that the plants are domestic and there would not be another avenue to bring claims for compensation.

My main concern is that whatever fair kind of system is formulated, if an investor thinks it can get more from the arbitration system, it will pursue that action. That would inevitably influence negotiations, which is a key problem.

Deputy Cormac Devlin: I thank Dr. Tienhaara. Does Dr. Carton wish to comment?

Dr. James Carton: Again, I would highlight who represents industry and who represents advisory organisations and associations. The main bottleneck for the industry today to investing in offshore wind energy coupled with hydrogen or onshore wind energy coupled with hydrogen is demand. This means that the demand that is fossil fuels today needs to turn to something greener sooner rather than later. DCU carried out a survey of a number of haulage companies which, between them, have 300 trucks. The survey found that more than 70% see hydrogen as a key element in connection with electric vehicles, but hydrogen has the range and logistical benefits. That initial small demand is really important, but, coupled with that demand, we need support from the Government. Certainly, the Government's hydrogen strategy needs to be published sooner rather than later in order to give clarity to the industry as to where to

invest and what sectors will change. Again, data centres are an opportune application and can use green hydrogen as a shift from wind, onshore and offshore.

Dr. Patrick Bresnihan: The figures are all provided by EirGrid. My understanding is that there is currently 1,800 MW of capacity with the data centres and that if those data centre applications that are in the planning process or that have put forward a planning proposal are given the green light, that is an additional 2,000 MW, which equals 3,800 MW. On a given day in winter, the peak demand in Ireland is 5,500 MW, and 3,800 MW of 5,500 MW is about 70% of demand. This would be by 2030. My understanding of the gap in the figures is that there is 1,800 MW currently, which is 11%, but there are data centres that have planning permission but have not been built out to full size yet. For example, Amazon has a very large data centre in Mulhuddart but it will not be built out for a number of years because it does so data shed by data shed. There might be 28 data sheds. That is how I understand those figures. I think Deputy Christopher O'Sullivan said that the idea that all planning proposals would be given the green light is a big "if", but those are the figures.

Chairman: We are pretty much out of time. It has been a brilliant discussion, with great contributions from all the members. The answers from our guests have been very interesting and will give us plenty to think about. I do think there is a big question about that 70% figure. It seems to me that that is very much related to a peak demand scenario rather than the average demand scenario, and I think that if you look at the EirGrid projections, based on the average demand scenario, you are looking at 28% of power by 2030 that would be used by data centres. We will have representatives of EirGrid before us next week and we will put that question to them. It is critically important that we are accurate in the numbers we speak about.

I heard an interesting discussion earlier today. We are hearing caution - I will not say pessimism - on the one hand, and I am hearing ambition and optimism, on the other. It is appropriate that those be the bounds of our conversation. I view the world perhaps through an optimistic lens. We have vast opportunity in Ireland to build out green energy infrastructure quickly. Our challenge is to do that as quickly as possible. In the past few years, we have started to see that a quicker decarbonisation of our energy systems - of our whole economy, actually - is quite possible, and what we see now as possible we did not see as such until quite recently.

I wish to pick up on a point Dr. Bresnihan made about Wind Energy Ireland. Wind Energy Ireland had its conference during the week and is certainly doing what it is meant to be doing, which is pushing the Government as much as it can to develop its sector. Wind Energy Ireland produced an excellent report called Endgame in the past few months, which shows that it is with the 30% demand from data centres scenario, which is the high scenario, that we could get well beyond 70% and even beyond 80% renewable electricity by 2030. We should be ambitious and optimistic and work with the likes of Wind Energy Ireland to get to where we need to get to. I am very heartened to hear Dr. Carton's comments and his vision for green hydrogen in Ireland and that Ireland would be a global energy hub. I think we will be exporting clean energy around the world in the decades to come, and that is a very positive vision that we should all hold on to.

I have questions for Dr. Tienhaara. We do not have time, unfortunately, to go into them. Her contributions today were excellent and we value them very much. I will not put any questions simply because we are well over time at this point, but I thank all the witnesses who have appeared before us today. It really was an excellent discussion. I thank members as well. I think we have advanced the level of debate on this subject. With respect to questions about moratoriums, we have heard today that this is a very nuanced situation and that there are real technical challenges in what we are trying to do. We are world leaders in this area and, to my mind, that

question of a moratorium needs to be looked at very closely. In a nuanced technological situation, it seems to me that a moratorium might be a sledgehammer-to-crack-a-nut approach. This is very much an operations issue with the likes of EirGrid, which is a world leader, and I think we should listen to them and trust them in their abilities.

The joint committee adjourned at 2.38 p.m. until 12 noon on Tuesday, 5 October 2021.