

# DÁIL ÉIREANN

## AN COMHCHOISTE UM CHOMHSHAOL AGUS GHNÍOMHÚ AR SON NA HAERÁIDE

### JOINT COMMITTEE ON ENVIRONMENT AND CLIMATE ACTION

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*Dé Máirt, 25 Bealtaine 2021*

*Tuesday, 25 May 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,	Timmy Dooley,
Cormac Devlin,	Alice-Mary Higgins,
Alan Farrell,	Pauline O'Reilly.
Darren O'Rourke,	
Jennifer Whitmore.	

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

## **Reduction of Carbon Emissions of 51% by 2030: Discussion (Resumed)**

**Chairman:** I welcome to the meeting Mr. Dara Lynott, chief executive officer, Mr. Stephen Douglas, senior policy adviser, and Ms Gemma Bewley, policy adviser, from the Electricity Association of Ireland, EAI. On behalf of the committee I thank them for coming here to share their expertise with the committee.

First, I will read the note on privilege. I remind witnesses 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 a witness's statements are potentially defamatory in relation to an identifiable person or entity, the witness will be directed to discontinue his or her remarks. It is imperative that witnesses comply with any such direction. For witnesses who are attending remotely, outside the Leinster House campus, there are some limitations to parliamentary privilege. As such, they may not benefit from the 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 of 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 contribution to the meeting, to confirm they are on the grounds of the Leinster House campus.

For those who are watching this meeting online, Oireachtas Members and witnesses are accessing this meeting remotely. Only I, as Chair, and the necessary staff essential to the running of the meeting are physically present in the committee room. Due to these circumstances, as well as the large number of people attending the meeting remotely, I ask that everyone bear with us, should any technical issues arise.

I call on Mr. Lynott to make his opening statement.

**Mr. Dara Lynott:** I thank the Chair for inviting the Electricity Association of Ireland to address the committee on the issue of achieving a 51% reduction in emissions by 2030 over 2018 levels.

I am the chief executive of the Electricity Association of Ireland and I am joined by Mr. Stephen Douglas, senior policy adviser and Ms Gemma Bewley, policy adviser. At the end of this presentation, we would be happy to answer any questions the committee might have. If we are unable to provide answers today, I will arrange for the relevant information to be sent in writing to the committee.

The EAI is the trade association for the electricity industry on the island of Ireland. We represent over 90% of electricity generation and retail supply activities, and 100% of distribution. Our members have a significant presence across the sector value chain. We represent the interests of the all-island electricity market in Ireland, the UK and the EU, through membership of the European electricity sectoral representative body, Eurelectric.

Our vision is for a decarbonised future, powered by electricity. Our sector supports the Government's ambition for a carbon-neutral economy. As stated by the Climate Change Advisory Council, the continued decarbonisation of Ireland's electricity sector is of fundamental

importance to achieving climate action targets, as this is the foundation of decarbonisation in many sectors.

There is no other energy carrier that can curb greenhouse gas, GHG, emissions in transport and heating sectors to the same extent and scale as electricity. As part of our commitment to achieving our vision, the EAI commissioned the centre for Marine Research and Innovation, MaREI, to model the electricity system in 2030, under the base assumption that 70% of the 50 TWh of electricity consumed on the island will be generated by renewable energy sources. The resultant report, *Our Zero e-Mission Future*, which was circulated to this committee previously, demonstrates unequivocally that a 70% ambition for renewables in 2030 is achievable on an all-island basis. However, it will require significant investment in the all-Ireland grid and an accelerated electrification of heating and transport to place Ireland firmly on the path to net zero emissions.

The MaREI researchers used publicly available data, stated Government ambition and independent modelling to project into the future. Uniquely, they examined a quarter of a million hours of historical weather data. This allowed them to determine the extremes that the future weather-dependent, electricity generation system on the island of Ireland will have to flex to. They found that by the end of the decade, the island's electricity system will be 40% larger in capacity but will emit half the emissions of today. This will require all planned electricity interconnectors - including North-South, from the Republic of Ireland to the UK and from the Republic of Ireland to France - to be in place by 2030. However, backup generation fuelled by natural gas will be used less. The findings will have implications for the economics of existing and new investments.

The analysis of the weather data shows the importance of being able to export and import energy through the interconnectors during high and low wind periods. During conditions where electricity demand is high but weather-dependent generation is low, we will need all storage and system flexibility to be maximised and all backup generation, including natural gas, to be available.

The study looks at potential pathways to net zero. It includes the 5 GW of additional wind energy to the climate action plan that is in the programme for Government and highlights the need for increased interconnection. After 2030 there is implicit uncertainty about the most appropriate low-carbon technologies and energy sources. Large storage projects, carbon capture and storage, interconnection or power to hydrogen all share a requirement for early investment decisions, significant capital commitment and long lead times for construction.

With one year gone and nine to go to 2030, it is imperative that the Oireachtas turns its attention to ensuring that the correct policy signals stimulate appropriate market incentives and the right investments for a cost-effective and just transition. Ireland has already achieved world-leading rates of renewable penetration for weather dependent energy on an isolated island system. There is now a significant opportunity to crystallise a leadership role in the energy transition. However, this will require a much faster rate of switching from high carbon fossil fuel to electric heat pumps and vehicles and a much more flexible and agile electricity grid to absorb the projected level of weather-dependent generation. An all-island approach to market development and infrastructural investment will be required too.

This report is a postcard from the future and sets out the challenge we face of swapping the petrol in our cars and the kerosene in our boilers for plugs. We must also co-ordinate policy, planning and investment to facilitate the increasing levels of electricity generated renewably.

Ultimately, it will be this renewable electricity that will be relied upon to fuel the backup zero carbon emission generation of the future. The time to invest in our all-island electricity system is now and is a no-regrets decision from which future generations will benefit.

I thank the committee for the opportunity to give evidence to the inquiry. I am happy to answer, with my colleagues, any questions the committee might have.

**Chairman:** I thank Mr. Lynott for his statement. We can now take questions from members. I ask members to limit their questions to two minutes per member and if there is time we can have another round of questioning. Deputy Whitmore has another engagement so has asked to come in first.

**Deputy Jennifer Whitmore:** I will be quick. I thank Mr. Lynott for the statement, which is very interesting and comprehensive. I look forward to having a more thorough reading of it after today's debate. My question relates to whether we have incorporated enough demand management into how we meet our renewable targets. It seems we are allowing our electricity demand to increase rapidly and our renewable technologies are sort of chasing them in order to catch up.

The witness has spoken about having a base assumption that 70% of the 50 TW of electricity consumed will be generated, and I am assuming that within that 50 TW we have something like 12% or 13% of the terrawattage predicted to be used for data centres. If we capped the level of electricity used by big users like data centres at this point and allow our technology to catch up with the renewable needs we have, would it be possible for us to meet 100% of the electricity consumed? Would that be a possibility for 2030?

**Mr. Dara Lynott:** With respect to 2030, our study has incorporated projections by EirGrid for data centres, which are a big user of electricity. They also provide challenges and opportunities. The fact that they are always on allows some potential flexibility in the storage of energy that can be used by the wider grid. By being on the grid they reduce costs across the grid for everybody else.

Currently much of the energy for some of these big companies is green electricity procured through corporate power purchase agreements separate from main contracting or auctions held for wider electricity. It is hard to predict and we are not an expert body when it comes to projections. We rely very much on what EirGrid indicates in this regard. We live in an organic system when it comes to electricity and it is a chicken and egg scenario. If the data centres were not there, would consumption collapse somewhere else or would renewables get built?

Data centres are in Ireland because of their attractiveness to the economy and ecosystem within the economy, particularly the information technology economy we are trying to support in Ireland. They are very important in that regard. One imagines that with their arrival in Ireland, more solutions will be provided both by EirGrid and suppliers that will make them a very important part of the ecosystem.

**Deputy Jennifer Whitmore:** Okay, but those solutions are not here at the moment. We are looking at future technological-----

**Mr. Dara Lynott:** They need to be on 24-7 and there is a requirement for backup generation. We have one of the most resilient electricity systems in the world and the number of minutes that our system goes down means we are near the top of the league for resilience in Europe. Data centres have a requirement for backup generation nonetheless and recent papers I have

seen indicate that this potentially provides system services that would allow greater amounts of renewables to be put on the system. That is because there is such a large requirement for backup generation and storage that the storage in itself could potentially provide a significant amount of system services. This is in addition to the likes of what we have seen in north Dublin, with the potential for waste heat to be used in heating systems located near these data centres. That allows for renewable heat to be used and a reduction of fossil fuel use in the heating of homes around those data centres.

**Deputy Alan Farrell:** I am in Leinster House. I thank Mr. Lynott for his presentation, which was very interesting. I will focus very briefly on security of supply if that is okay. It is not too far from Deputy Whitmore's comments. The witness commented on backup generation and natural gas, which is a concern, and the ability of the existing network to cater for micro-generation. We are creating awareness in the public sphere on a daily basis in what we do as a country and have done for many years. That is in itself promoting individuals to look at how they can reduce their own electricity consumption, generate it themselves and reduce their bills. That can make a difference to the environment. I have asked this question of the providers in the past and I will ask it of the witness as well. Could we cater for microgeneration with the existing network?

I might come back in the second round if that is okay. The interconnectors east-west and North-South have been repeatedly delayed, particularly the North-South interconnector. I wonder if we will be ready for the targets we have set by way of the energy market because of those delays. This particularly relates to the connection to France, which is six years away. That is an eternity in terms of our targets so Mr. Lynott's comments would be beneficial. Can he comment on security supply, backup generation, gas, microgeneration and the interconnector?

**Mr. Dara Lynott:** Our study, completed by MaREI, looked at 2030 and stated it was possible but there were many caveats and challenges. The number one challenge, identified by the Deputy, is the connection. The study assumes the North-South interconnector will be operational, as current documents suggest, by 2024. It also assumes the Celtic and Greenlink interconnectors will be operational. It is an absolute necessity that they are. It is important for the North of Ireland's security of supply and it is also important if we are to grow our renewables.

Our study also indicated gas would still be on the system in 2030, but with 20% fewer hours. Some types of gas generation will be operating on minimum generation for nearly a third of those hours. Gas will be used quite a bit less but, nonetheless, it will still very much be a requirement of the system by 2030.

There will have to be a rapid move to either zero carbon backup generation or negative carbon backup generation post 2030. Again, those technologies need to be studied, evaluated and a cost-benefit analysis undertaken to determine which is the best technology on an all-island basis for Ireland.

Microgeneration will happen. It is a citizen's right, according to the clean energy package. Suppliers are very supportive of the role. It will be a significant win for homeowners as they get to consume up to 60% of what they generate. However, we are awaiting legislation from the Department that will bring this into play. The sooner suppliers get that the better, because IT systems and billing systems all have to be put in place to ensure that customers, who are the microgenerators, have a very good service from their suppliers, which can be trusted and can assure them of getting a very good service for their electricity supply.

**Deputy Alan Farrell:** I have a follow-up question on the security of supply element in our energy generation ability in a case where our renewables might have an off-day or off-week, dependent on the weather, which Mr. Lynott touched on. Is there scope within the existing network of power stations to take up that slack as we head towards 2030?

**Mr. Dara Lynott:** Our model uniquely modelled approximately 250,000 hours of weather data. Many studies settle into the averages of various kinds of weather but our study looked at the extremes. These are when there is far too much wind, and its reliance on interconnection, but also when there is not enough wind. The Deputy might remember we had a bit of that at Christmas, when the weather was cold and very cloudy with not much wind. We had a number of amber alerts around that time.

Our study indicated that in order to prevent significant percentages of dispatch down, all the interconnection and all the current capacity that is on the system for gas generation will be needed. In order to avoid significant levels of dispatch down, and to keep those levels at about 7%, approximately 1.1 GW of battery storage that is currently not on the system will need to be brought on. If that battery storage and that interconnection do not come online, there will be difficulties with security of supply in 2030.

**Deputy Alan Farrell:** My time is up. I ask Mr. Lynott to consider setting out for the committee the timelines for the delivery of that battery storage he mentioned, perhaps later on in the discussion.

**Chairman:** We will have time for a second round, so I look forward to the Deputy's further contributions.

**Deputy Richard Bruton:** I thank Mr. Lynott and his team for their presentation. The Government has stepped up its ambition for 2030. Can ambition from the electricity sector be upped from where it is, that is, 70%, and at what marginal abatement cost is it at per tonne of carbon? On the issue of microgeneration, is policy settled on the price the system will pay those microgenerators? Where will that land? That will be important.

The witnesses mentioned in their presentation the need for correct signals. Can they elaborate on those correct signals? The Minister made a significant announcement about offshore recently, which indicated the State will take a greater role in it. On the issue of being in the emissions trading scheme, ETS, versus not being in it, as I understand it being in the ETS means things like data centres go to the most efficient location in Europe. To some extent, that is why they have come to Ireland. How does that impact on the system? Presumably the ETS makes some allowance for the fact that Ireland is providing, to some degree, an important service because we are efficient at doing so. I ask how being in the ETS, or not, bears on public policy.

**Mr. Dara Lynott:** I will go through a number of those issues and will ask Mr. Douglas to come in on the ETS issue at the end. On delivery, our study projected beyond 70% because even as a study is written, things move on and it becomes out of date almost the minute it is written. Of course, within the programme for Government a number of additional ambitions were put in place.

The Deputy asked whether electricity can up its game to deliver beyond that 70%. The answer is "Yes". Our study looked at some of the ways we would do this. An extra 5 GW of offshore, indicated in the beyond carbon action plan in the programme for Government, would lead to an extra 1.3 million tonnes, but that would again rely heavily on batteries. In the sce-

nario presented in our study, battery usage would increase battery storage to 2.4 GW.

Additional interconnection would also be needed beyond the Celtic, Greenlink and North-South interconnectors, and it would be necessary to rely on at least one of the gas plants having some form of carbon capture and storage. That is not to say anything about the operations of the grid. At that point, one would have to reduce. Currently, the requirement is for six generation plants to be on minimum generation. That would need to drop below four and approach zero, which means relying on certain system services from technology not currently available.

The answer is “Yes, this can be done”, but there are challenges around operating a system beyond 70% and delivering 5 GW of wind, in addition to developing 2.4 GW of battery storage, additional interconnection and post-2030 technology such as hydrogen and carbon capture and storage. Our study states this is not possible by 2030, but beyond 2030 is where the next bit needs to happen.

Regarding microgeneration, again, as part of the final design we are waiting for what the Department and regulator will set out on remuneration. It was expected the July deadline would be met but given the timeline suppliers will need to bring in a microgeneration scheme for their customers, it is doubtful it will be. However, we await word from the Department on that.

In terms of the signals, at the moment, in terms of market design, we rely on a number of remuneration mechanisms, whether that be through system services for energy itself or for a capacity market. Things are going to change fairly radically out to 2030. Current facilities and energy generation on the system will be used a lot less. We will have far more renewables on the system. Our view is that the regulator has to look at all of these remuneration mechanisms to ensure the right mix of generation is on the system in 2030, relates to each other, is very much integrated on the system and attracts the level of investment necessary to ensure we have a very reliable and safe electricity system. Given some of the amber alerts we have had this summer, I believe the regulator is going to run what is known as a T minus 3 option to secure additional capacity in generation in the next few years. I might bring in Mr. Douglas to talk about how data centres are dealt with through the ETS and their impact.

**Mr. Stephen Douglas:** Deputy Bruton will be aware that the EU is reviewing its current suite of policy measures under what it calls the Fit for 55 package - making European energy and climate policy fit to meet the 55% reduction target. The emissions trading scheme is one of those measures and that is under consideration at the moment. As the Deputy is aware, the power generation sector and parts of heavy industry are included in the emissions trading scheme. What the EU proposes to do is to possibly expand that to other sectors of the economy such as transport and possibly heating and other parts of heavy industry. Data centres are not included in the ETS at the moment. I understand there was an option under previous flexibilities to include data centres in the ETS and our Government took the decision not to include them. They could be included in the future.

**Deputy Richard Bruton:** Could Mr. Douglas clarify what difference it would make if they were included and who has discretion to include them?

**Mr. Stephen Douglas:** I think there was discretion for Government to include them. What difference would it make? The ETS gives us a price for carbon in those sectors. At the moment, it is around €50 per tonne so we have this in the power generation sector. It is used in respect of price formation around electricity. Data centres use a lot of electricity so it is already zero price. The price of carbon is already included in their electricity consumption but if they used

other sources of energy, for example, with gas backup, they would then have to buy allowances for that carbon if they were included in the ETS.

**Mr. Dara Lynott:** The main point is that when it is non-ETS, it becomes a responsibility of Ireland to meet targets. When it is in the ETS, it becomes a responsibility of industry. Moving it into the ETS would allow for industry to take that generation and carbon reduction as part of its ETS targets.

**Chairman:** While I am waiting for other members to indicate to speak, I might ask a few questions. I was very interested in Mr. Lynott's comments about data centres and how the increased number of data centres might actually help as we become more ambitious in renewable energy penetration across our grid. Could Mr. Lynott elaborate on that? I am interested in the geographic distribution of data centres. Does that help?

I was very glad to see hydrogen touched on in the association's report. We put ambitious language on hydrogen into the programme for Government. It is quite interesting to see in the past few months in particular a big move globally as well as in Ireland. There are some very significant moves towards developing the hydrogen economy. The Minister for Foreign Affairs was down in Cork this morning looking at the planning of an electrolyser project down there. It is very exciting. The witnesses mentioned earlier that no sooner is a report published than it becomes out of date. I am interested in the association's modelling around hydrogen. It seems as though the technological challenge is not there so much and it is very much becoming a regulatory and economic one as opposed to a technical one.

The witnesses mentioned storage and the need for it in 2030 in terms of battery technology on the grid. I am interested in microstorage and the potential for electric vehicles as we significantly increase the number of electric vehicles in our transport fleet in order that these can provide the storage and essentially the buffer for those periods of fluctuating renewable generation. Could Mr. Lynott speak to that? Is it a realistic prospect that our private vehicle fleet could essentially bolster and support greatly increased renewable energy generation?

A German term was used in the report provided. I think it was *kalte Dunkelflaute*. My German is not so good so I hope I pronounced it correctly. It means the cold dark doldrums. The witnesses were referring to that time that occurs every year where the wind and solar generation are low but demand is high. I am quite interested in this. I am interested in the association's modelling around that. Could Mr. Lynott speak more to that modelling piece done by the association? Will we need particular generation just for those periods? Perhaps that is as much an economic question as it is a technical one.

**Mr. Dara Lynott:** Data centres take up about 9% of demand and are projected to grow by between 19% and 50% over the next decade reaching an expected 27% of electricity demand, so they are a very big player within electricity demand. The difficulty and opportunity are that they require high availability. There is a possible flexibility in terms of either storage they provide to the system or their backup generation may make provision for system services. This is something that is being actively pursued by EirGrid in its discussions with data centres.

Regarding geographic possibility in the recent consultation on the future of our electricity system by EirGrid, it has indicated that one of the potential routes is shifting demand to where electricity is being generated. The potential is then to shift data centres closer to concentrations of electricity generation that would minimise the amount of grid that needs to be developed to bring power to the centre of data centres, which is around the Dublin area. Again, this is very

much into the future.

Regarding storage, the hope is that the advent of significant numbers of electric vehicles and smart metering will allow some of the technology or at least the smart technology to pass through a smart meter and potentially provide for system services. This is envisaged within the clean energy package but, again, we are waiting for the legislation and the regulatory framework that would allow this to happen. There is a challenge. The Chairman mentioned the *Dunkelflaute*. A two-week period was modelled using the pan-European proprietary PLEXOS model, which includes the UK and EEA countries and has the ability to take on board weather data. The modelling indicated that, in such periods in 2030, all available generation capacity from gas will be needed, all interconnections will be needed and 1.1 GW of storage will be needed, which is not available on the system currently. The volume of storage is the difficulty. Our study cited an example. In a two-week window of low wind speeds, and assuming 13.5 kWh per unit, the equivalent of approximately 65 million Tesla Powerwalls would be required. Obviously, we are not at that level of technology. Long-duration storage technologies could provide some of the solutions. By that, I mean pumped hydro, of which Turlough Hill is an example, compressed air energy storage, thermal energy storage using liquid salt or hot rocks, liquid air energy storage and novel battery compositions. Some of the projects in this category are in Silvermines, County Tipperary and compressed air energy storage in Islandmagee, County Antrim. They are the types of storage that could provide backup to address the *Dunkelflaute*. There is a great deal being done in terms of battery storage, with much storage coming on the system. There is a call for many hybrid systems in the future, combining renewables with storage on the same site. I have already mentioned data centres, which might be able to provide some storage and system services. The private vehicle fleet forms part of the package of materials around storage. Reverting to my point about 65 million Tesla Powerwalls, though, will it have the impact that is needed to back up an electricity generation system that is 40% larger than it is currently?

Regarding hydrogen, it is important to stress that, because the Electricity Association of Ireland represents the entire value chain, we are technology neutral. Our study considered what potential technologies could be used in 2030 to ensure backup generation, which is currently being provided by something else. The two significant runners in that race are hydrogen and carbon capture and storage. Along with issues of interconnection and battery storage, the difficulty is that these are expensive and complex capital projects that require a great deal of planning and lead-in time. Therefore, we believe that the focus needs to be on undertaking a cost-benefit analysis and proper assessment of the technology that will be needed on an all-island basis to provide backup generation. Hydrogen is definitely one such technology. Throughout Europe, there is considerable investment in the use of green hydrogen through electrolyzers. Europe would say that, in the first instance, hydrogen could be used as a fuel for the hard-to-electrify sectors, including aviation, maritime, heavy transport and some large industries that are currently using fossil fuels. Hydrogen also provides a system service potential in terms of storage, in that it could become a fuel during a *Dunkelflaute*.

These decisions can only be made if we assess them correctly, pick the right winners for Ireland and back this up with legislation and regulation that invite the private sector to come forward with solutions that support Ireland's renewables ambitions.

**Chairman:** I thank Mr. Lynott for his answers. Deputy Farrell has indicated, but I wish to pick Mr. Lynott up on his reference to 40%. Is that the increase in peak generation? I believe he stated that demand would be 40% greater than it is currently.

**Mr. Dara Lynott:** According to EirGrid, generation is due to increase by 40% by 2030.

That said, emissions are due to halve according to our study. We will have nearly a doubling of our electricity generation and a halving of our carbon emissions.

**Chairman:** Generation will increase by 40%, meaning that demand will increase by 40%.

**Mr. Dara Lynott:** That is it. Data centres will represent 27% of that demand.

**Chairman:** Is that 27% of the 40% or-----

**Mr. Dara Lynott:** I mean 27% of the 50 TWh that are expected to be generated in 2030.

**Chairman:** Besides data centres, I am interested in discussing transport. We held a series of sessions on transport emissions in recent months and are finalising our report. We heard from experts from other countries. One of the points that arose was demand management. Has the Electricity Association of Ireland factored demand management into its model - I do not just mean in transport, but generally - of what the electricity sector's profile will look like in 2030?

**Mr. Dara Lynott:** The study considered this matter. One of the sensitivities that it considered was increased or reduced electrification of the system. For example, if we did not reach the target for electric vehicles outlined in the programme for Government, we would have increased fossil fuel usage balanced by a decrease in the amount of electricity generated to fuel electric vehicles.

I will make a few points about demand management, the first of which is on electrification. If we do not switch from petrol in our cars and kerosene in our heating systems to plugs, there will be no demand for the electricity we are generating. Along with investment in and the innovative operation of our grid, we need to shift fossil fuel usage over to plugs. Eurelectric, the European representative organisation, has stated that we need to decrease our overall energy usage per year by 1.5% and increase electrification by 1%. Energy efficiency forms part of demand management. Our members that are suppliers will play a role in that through the energy efficiency obligation scheme of which they are a part. We also need to crack on with rolling out smart metering and microgeneration, which will allow for services and demand management to shift some of the peak demand to times when it costs less to provide electricity.

**Chairman:** It seems that we could make life easier for ourselves if we delved into the demand management side. Whatever we do, demand for electricity will inevitably increase. The burden of that increase can be lessened if we do a great deal on the demand management side.

I apologise to Deputy Farrell. I took a significant amount of time.

**Deputy Alan Farrell:** Continuing that theme through to security of supply, I wish to discuss the interconnection, offshore and other options that we are exploring, as well as future technological developments, in particular those relating to hydrogen, which fascinates not just the Chairman, but me. I am very interested at looking at interconnector delivery. As far as I am aware, we are looking at approximately 36 months for completion of the North-South interconnector. As I mentioned, we are also looking at six to seven years for the completion of the connector to France. This will bring us to between 2026 and 2028 before we have fully operational interconnectors. This is on the basis that everything runs smoothly, which it never does here but let us assume for a moment it will.

In 2025, we will close Moneypoint, which is capable of generating 25% of the country's electricity requirements. Will we be able to provide security of supply to the network? De-

mand is ever increasing, and will continue to do so as we move towards electric vehicles and have more consumers of electricity as our population grows. Our population has grown by 1.2 million since 2000. It is important that we ask these questions. Is it appropriate to shut down Moneypoint completely? Will it be on standby for us? If it is on standby, are we speaking about the continued burning of coal or will we be reliant on the burning of heavy fuel oils, which I know it is capable of burning in certain cases? Is there an alternative supplier of backup energy generation in the case of those interconnectors not being delivered on time?

**Mr. Dara Lynott:** My first reply is that the ESB, as opposed to us, is probably best placed to speak about its plans for Moneypoint. Like the Deputy, I heard the announcement and I have the same information as him. I believe it intends to shut down generation there but to have it as a potential backup for a number of years. As to what extent and the detail of it, unfortunately I am not able to give the Deputy information on this. It would have to come from the ESB.

From our perspective, there is no doubt that the vast bulk of the 40% increase in generation will come from wind according to our study. It will double in size from 5.5 GW capacity at present to 11.6 GW capacity. The amount of gas plant on the system will be roughly the same with regard to capacity but the number of hours will be far fewer.

If the interconnectors do not happen, there will be a real difficulty in managing the system. Our study assumes the Celtic, Greenlink and North-South interconnectors will be up and running. With regard to the timeframes, as is the committee we are very much reliant on EirGrid for these. The assumption is if they are available before 2030, they will be operational in 2030. Again, there is a huge caveat in our study, which is whether we can reach the ambition of electricity demand for electric vehicles and electric heat pumps and whether we can develop the types of storage technology needed. In the PLEXOS study, to maintain dispatch down at 7%, which is seen as an average by the industry, the gap has to be plugged with 1.1 GW of storage. I do not think our study is certain. It is a particular picture of the future, and like any picture of the future it is wrong almost before the print hits the page. However, it shows the challenge that meeting 70% by 2030 will create for building grid, operating grid, new technologies, interconnection and shifting demand from fossil fuels to plugs.

**Chairman:** In section 5.6, the EAI's report speaks about minimum generation units. It indicates that reducing or removing this constraint would enable almost 1 megatonne of reduced emissions. For the benefit of the committee will the witnesses go into this in more detail? It is not something I understand but certainly it is something in which I am very interested. How might it affect frequency stability and voltage stability throughout the grid? Would it have an effect? Is this something the witnesses can tell us more about?

**Mr. Dara Lynott:** I will ask Mr. Douglas to answer this question.

**Mr. Stephen Douglas:** I thank the Chair. At present, we need eight units on at all times due to how the system is configured. For example, in Dublin we need a certain amount of plant to be on at all times to keep the voltage at a certain level. What we are saying in the study is that we can bring the minimum unit requirement down to four from eight. We also say in the study we need to remove all the constraints. We need to build the North-South interconnector and the wires we urgently need. This is an important caveat. In our study, we assume the removal of constraints. This would enable us to reduce the minimum number of units we need to run at all times on the system.

**Chairman:** I thank Mr. Douglas. In the North, is the trajectory of renewables development

the same as it is here?

**Mr. Dara Lynott:** At present, the Department for the Economy is out for consultation on the next Northern Ireland energy strategy. A number of political statements suggest that it may land at 70% renewable by 2030. Again, this has not yet been set in stone. A number of political parties in the North have indicated that potentially it could be 80%. Again, the consultation is out at present and the idea is that a draft strategy will be available in the autumn and it will be finalised towards the end of the year. Broadly, from what we have heard it will be in line with 70% but it has yet to be set in stone.

**Chairman:** Do the witnesses have a comment on the transmission system and the distribution system? Are they in their scope of interest or influence? Do they have a comment on the work done by EirGrid and ESB Networks in the distribution system? Can the witnesses tell us what is required of these organisations? Are they in frequent contact with them? Do they need to be pushed? It is our role as a committee to bring the thoughts and expertise of the witnesses to these organisations. I acknowledge the world-class work both organisations do in this area and I really believe they are the unsung heroes of climate action. I certainly would like to hear the views of the witnesses on the role of these organisations, if they can comment.

**Mr. Dara Lynott:** We represent ESB Networks, which is the distribution service operator, DSO in the South, and Northern Ireland Electricity in the North. As the Chair has rightly said both the DSO and EirGrid, the transmission system operator, TSO, have done remarkable work. In the case of the DSO, every three years the network has doubled the amount of renewables on the distribution system. I will hand over to Mr. Douglas with regard to EirGrid as a TSO. We are formulating our response to its strategy on shaping our electricity future. One of the main points we say of the transmission system operator is that it has done fantastic work to date but now there needs to be a pre-emptive delivery of infrastructure to allow the amount of renewables needed on the system to meet the ambition of the Government.

**Mr. Stephen Douglas:** The infrastructure is for climate action. This is the new narrative. We need political leadership around the need for infrastructure. I see that in the ongoing consultation that EirGrid is currently undertaking. It is very clearly stating that we will need to build. It is the same with ESB Networks. There is a need for new infrastructure. That is the big message that comes from the EAI. We would like to see political leadership on that need for infrastructure.

**Mr. Dara Lynott:** In respect of the success, it has been very much built on a developer-led model to date. Again, in that consultation a number of models have been suggested. Most commentators have suggested that a hybrid of four potential pathways is probably the way to go forward. From an EAI point of view, we would like to see a wires-first policy and non-wire solutions after that. There is a lot to be said for it, and great work has been done in making the current system very efficient, but our report will be very clear that the current system is not suitable to meet the ambition for 2030. A significant amount of grid needs to be built. After that, an optimisation in non-wire solutions can be put in place to make the system more efficient.

**Deputy Alan Farrell:** As somebody who does not normally like members going on and on, I am contributing for the third time. I ask my colleagues to forgive me.

I wish to touch upon the issue battery development again. While it is an area of emerging technology, we have seen a significant shift in terms of capacity in batteries in recent years, particularly in the last decade. I am sure that will continue, given the billions of euro that has

been invested in the technology.

I am thinking about the capacity of the State or our providers to build up a reservoir of capacity for the country in the coming years. Timelines and things like that are obviously important for this committee and for Government to consider. What are the best-case scenarios that the witnesses are aware of in respect of the delivery of battery storage for those dark days that we have discussed, with the various constraints that are present in terms of interconnectors, back-up supplies and natural gas and all of the other things? It will clearly form an integral part of the future of our network. At what stage will it become a significant part of our network? How big a role will it play?

**Mr. Dara Lynott:** Sooner rather than later, would be the answer to the Deputy's question. Our study is a snapshot of the future. It mentions 1.1 GW of battery storage. If we are to minimise the dispatch down of renewables, we need that quantum of battery storage. Already, I know that the auctions, regulators and EirGrid are seeking proposals for battery storage and are ramping that up. With our study, we are trying to provide that snapshot of the future. We want to highlight that it is all interconnected. If we do not have the interconnectors, there will be a problem. If we want to reduce dispatch down, we need batteries. If we want to achieve the ambition, we need to build grid, be innovative about using it and we need to switch. It is all interrelated. It is very difficult to single out storage and argue that will be the solution at a particular time. Like much of the work that is currently under way, we need to make decisions now in order that they are in place by 2030. Battery development is one solution. There are technologies available. Unfortunately, there does not seem to be any long-term storage battery solutions out there beyond what I have already mentioned about the number of Tesla Powerwalls that will be needed. Therefore, we must look at pumped-water and pumped-air storage. Those are technologies that would allow for hours of storage as back-up for the *Dunkelflaute*. Obviously, if there is widespread use of batteries along with generation, that will also dampen the peak demand and the backup that we would need. Perhaps Mr. Douglas has something to add to the discussion.

**Mr. Stephen Douglas:** I thank the Deputy for his questions. One of our members, AES, built the first battery project in Ireland, in the North. It is a 10 MW array. There are a number of projects that are possibly in the hundreds of megawatts, as I understand it. The Deputy was asking about the pipeline and how we are going to get capacity that we need. The system services programme that EirGrid runs is where the smaller battery projects will be seeking to get a lot of their revenue. EirGrid has given long-term contracts to a number of projects. Also, it continues pay out to battery projects every day in terms of system services revenue. It publishes information around the volumes of services that it is procuring from battery providers and also the amounts it is spending on it. The Deputy will be aware that there is an overall expenditure cap for system services. EirGrid pays out to battery projects within that expenditure cap. The information on system services should all be available on EirGrid's website.

**Mr. Dara Lynott:** There is also a question of whether that cap is appropriate. When those caps were put in place, there was a different ambition around renewables. If we are saying that the amount of renewables is going to double to meet a 40% increase in generation, the caps on system services, and on batteries in particular, probably warrant another review, given that those caps were set a time of much lesser ambition. Now that our ambition has grown, it is appropriate for some of those caps for system services to be re-evaluated, particularly if it is as important as our study finds, in respect of delivering the back-up generation in 2030.

**Mr. Stephen Douglas:** Yes. These are technologies that are relying as much on the income

for services as they are for energy. The services part of their income is very important, both in respect of short- and long-duration storage.

**Chairman:** I thank the witnesses. Senator Higgins had a prior engagement but she has joined us now. I invite her to make her contribution.

**Senator Alice-Mary Higgins:** I have two sets of questions. I am focusing on some of the narrative in respect of the demand for energy. When I was reading the presentations, I was a little concerned that there is still a lot of reference to reliance on hydrogen. We are looking at a context in which the use of blue hydrogen in particular, may not be an option, because it is ultimately a fossil fuel. In that context, we need to think very carefully. I am concerned about assumptions being built-in. As Mr. Lynott said, the ambition levels are rising all the time. The balance in respect of the cap will also have to change. I am conscious that the rationale behind the plan was related to that fact that energy demands are increasing.

I would like to comment on the increase in demand for energy. That is something that needs to be looked at. I would appreciate a comment on that. We are talking about 30% to 40% increase in demand for energy. We know, from meeting with representatives of EirGrid, that a large amount of that demand is from data centres. We are going to come to a crunch point which is not simply about whether we can produce more renewable energy. Everybody is on board with the idea of producing more renewable energy. However, the question is, what are we going to do with that renewable energy? If we are only increasing our renewable energy by 30%, 40%, 50% or 60%, but 30% of it is immediately going to data centres, we are forcing the State to use other sources of energy for essential services that it may need.

Do the witnesses think that we need to look at the prioritisation of the direction of sustainable energy? I would appreciate comments from the witnesses on the narrative of the balancing of the developer-led and the State-led models. When we talk about balance, there may well be State policies pushing development in certain directions, but there is also a wider State context, which is not something that gets balanced off against developer desires or anything else. It is about the fact that, as is appropriate, the State needs to think about planning properly. In respect of the marine protected areas, for example, the State needs to consider how to ensure that we plan in a way that is thoughtful and is going to dovetail rather than clash with that. Again, these are all things that can be done. However, I sometimes wonder when we hear this kind of talk about how there will be a little bit of planning and a little bit of State policy and little bit of developer-led but all of this will happen within a State regulatory framework, including a planning framework. Comments on that would be really useful.

I echo much of what Deputy Alan Farrell has been saying about batteries because that seems to be the key area where we need to have research. I would like if the EAI representatives could comment a little bit more about the pumped air and pumped water storage and how we can basically have what looks like best international environmental practice on that. I ask because something we want to do as a committee is ensure our climate actions are done in an environmental best-practice way. On that point, what of public-public partnerships? Which states have been doing good research? The same battles have been had everywhere, the same challenges are faced everywhere and something we cannot afford is that maybe one company gets a great solution but the State as a whole must be really ahead of the curve and looking to what other states are doing with storage infrastructure in order that everybody can make use of the best practice as it emerges. I ask the EAI representatives to comment on public-public investment, public research specifically on that issue and public-public partnership between states around that research.

**Mr. Dara Lynott:** On demand, the 40% increase in demand comes from an EirGrid figure based on Government ambitions. Part of that demand is going to be moving from about 20,000 electric vehicles, EVs, right now to over 1 million such vehicles which will need to be charged and moving from 45,000 heat pumps right now to 750,000 heat pumps in 2030. As we move from petrol as a primary energy fuel to electricity, our electricity consumption goes up but our petrol goes down. Consequently, it is not just demand for demand's sake, it is substituting heavy fossil fuel - kerosene in our heating tanks and petrol in our cars - over to electricity and then that electricity progressively decarbonising. What our study said is that it is going to be a challenge but 70% renewables by 2030 is very doable, so that is very important. Energy efficiency is in itself very important because this is not so much about growing the total energy pie but about growing the electricity portion of the energy pie, albeit with the pie getting reduced. For example, in the Sustainable Energy Authority of Ireland, SEAI, energy statistics, electricity takes up about 30% of the total energy used in Ireland, transport 35% and heat 33%, so of the total energy used in Ireland only 30% of that is used by electricity. Therefore what is being done by growing the 40% demand in electricity is that the 30% is going to grow but heat and transport are going to shrink and the overall total pie, the idea is it must shrink in terms of energy efficiency.

On public to public partnerships, what the public service is doing on energy efficiency is very important and there are some significant targets that one of the biggest landowners in the State, namely, the State itself, must achieve and in achieving that through green procurement and through all the other things, it will bring in a lot more service providers, a lot more expertise and a lot more personnel, which are then available to the private sector where energy efficiency is concerned. Indeed, our own energy obligations supply scheme, in which our members are involved, has achieved incredible amounts of energy efficiency. Thus the demand for electricity should not be seen in isolation, it is growing at a time when the total primary energy must reduce and the public partnerships are involved there.

On the demand, obviously the data centres are there for an economic reason, they provide a lot of backup to other sectors of the economy and as they are a highly important part of the ecosystem of the information technology economy that is in Ireland. I believe the IDA has a strategy on data centres and has made statements about their importance. Again, earlier on in the discussion I talked about how, because such centres have an always-on requirement, they must have a backup requirement. There are possibilities the backup they have can provide system services both for storage that may available to other parts of the system but also with waste heat. In north Dublin I think we have seen examples where the waste heat of a data centre is being utilised to provided heat for residences, which will in itself reduce the amount that is there.

On storage we mentioned two storage modes, namely, pumped water in the Silvermines, County Tipperary, which is a potential solution and then pumped air in Islandmagee, County Antrim, which is another. Again, they are the types of long-term storage that will be needed. On the research that is there, obviously Ireland has been very successful with projects of common interest for large projects like this, in public funding terms. Indeed, the Celtic interconnector was a recipient of significant amounts under the public projects of common interest. There is a significant amount of research available through the European research funding for renewable heat projects and the Environmental Protection Agency, EPA, does a lot of research on climate and on that area as well. I am not sure if I have covered everything the Senator indicated. If I missed anything she might repeat the question.

**Senator Alice-Mary Higgins:** No, although the data centres remain an elephant in the pie,

to mix metaphors, in that it was clear that this is not a substitution but rather is an additional pressure that is coming down.

**Mr. Dara Lynott:** Yes, absolutely it is.

**Senator Alice-Mary Higgins:** There is going to be a question about electricity being generated and electricity being required. I have a concern we may effectively see data centres in competition with other public good needs for which we might need electricity. I wish to signal that is something that needs to be looked at. I understand the IDA will have its imperatives but on this committee, we will need to try to join up those pieces. It is one thing if a data centre is providing an essential service or backing up something but if it is making cryptocurrency, we might have to come to a point where we are asking if this is the best possible use of our electricity reserves or our resources. We must bear in mind we are moving ultimately to fully renewable energy and there will be all these other demands on electricity.

I would appreciate it if Mr. Lynott had any further written notes on the projects he mentioned in the Silvermines and the pumped air project. I am especially interested in the environmental impact assessments because I imagine these technologies are being looked at around the world and we want to ensure we have the best environmental practice, taking in all the relevant EU directives, including those on biodiversity, sustainability and water. I imagine the latter directive is key here. It would be great to have the research on that.

**Mr. Dara Lynott:** The habitats directive is also relevant.

**Senator Alice-Mary Higgins:** Yes, so it would be good to know how that is factoring in. If the EAI does have any information, especially on public research, on equivalent projects in other countries, that would be very useful.

I have one last question. The EAI representatives have heard from us the focus on batteries and storage. I raise carbon capture. Storage is our key priority because that is what allows us to move to renewable energy but I am aware there have been concerns around some of the carbon capture mechanisms. They tend to become stranded assets because it can effectively be a way of prolonging unsustainable energy sources for a very long time and they can become something of a stranded asset or white elephant. There has been an argument against too much investment in that area versus storage, such that one piece is attached to renewable energy and the other to traditional fossil fuel energy. Does Mr. Lynott have a comment on that?

**Mr. Dara Lynott:** The Senator reminded me of something else she mentioned. Our study did not indicate one way or the other for hydrogen or carbon capture and storage. It just outlined that in 2030, there is an expectation the 30% will still be provided by about the same amount of gas as we have now, except it will operate for 20% fewer hours and operate for significant periods of time on minimum generation. To get beyond and move to zero carbon or negative carbon backup generation, and batteries are important, the technology is not ripe. Our study looked at two of the front runners. Those were hydrogen and carbon capture and storage. There are some novel technologies such as synchronous condensers. We are technology-neutral and represent the whole value chain. Therefore, we are not proponents of either hydrogen or carbon capture and storage. However, it would seem that when our study reviewed all the pathways to net zero, those two technologies seemed to be in all of those pathways. From an all-island perspective, and we are an all-island body, our view is that some time and effort need to be put into studying these options and the cost-benefit analysis and determining what is best for Ireland or what types of technology, solution or outcome would be best in order that the regulator looks for a

particular outcome and then allows industry to put forward solutions and investment that will bring about that outcome. Our view would be that we should rule nothing in and nothing out but see what is the best-value solution to achieve the outcome, namely, to back up renewables. It may be hydrogen, carbon capture, synchronous condensers or long-term storage. Those studies need to be done quickly because if the investment does not go in within the next few years, it will not be available for us to be able to rely on in 2030 and post 2030.

**Senator Alice-Mary Higgins:** Industry might also need to develop at least one pathway that does not involve hydrogen because that is a likely direction and it is important to note in order that we are all prepared for all scenarios. The level of ambition is only rising internationally.

**Chairman:** We should certainly make the distinction between green and blue hydrogen-----

**Senator Alice-Mary Higgins:** Absolutely.

**Chairman:** -----and grey hydrogen and the range of colours associated with it.

**Senator Alice-Mary Higgins:** Like a rainbow.

**Chairman:** Ireland is well placed to be a real player in the green hydrogen space. I have a few more questions as I do not have others indicating. I hope this is not too much of an interrogation.

**Mr. Dara Lynott:** Not at all.

**Chairman:** I am quite interested in the co-location of large ambitious renewable energy projects with thermal plant. We saw earlier in the year with the announcement of the Money-point project that this is really piggybacking on the two 400 kV lines that traverse the country west to east. Does Mr. Lynott see other potential for those kinds of hybrid connections or co-locating renewables with thermal plant?

Last August, we had the results of the renewable electricity support scheme, RESS, auction. Mr. Lynott may have some feedback to give us on that. We certainly would be very interested to hear it because there will be a number of these kind of auctions in the coming years and they will need to evolve and be appropriate for the technology, the electricity profile and the generation profile we are trying to develop.

I am quite interested in retrofitting. As Mr. Lynott mentioned, about 750,000 homes will switch from fossil fuel boilers to heat pumps. Is there more that can be done on the supplier and retail side to incentivise that switchover? There is a very legitimate concern across Government that the skills pipeline for the revolution about which we are talking may not be there. I know the Minister for Further and Higher Education, Research, Innovation and Science, Deputy Harris, is doing a lot of good work in the area but what we are trying to do is truly phenomenal and will require a significant uptake in skills in engineering and across the whole spectrum of education, not just technical education. What are Mr. Lynott's views on that? Does he think we are doing enough? Can we do more? If he has any wisdom to offer us, we would appreciate it.

Mr. Douglas made a very important point earlier about political leadership. I would like to hear more about that because political leadership has been lacking in the past. We will not get to where we want to go unless we have very clear direction and very strong political leadership. Mr. Douglas is speaking to a bunch of politicians now. I must give credit to the committee. It is

a very engaged committee that is very serious about the work it is doing. Perhaps that political leadership does not exist across the Government system. Could Mr. Lynott comment on that and what he would like to see there?

**Mr. Dara Lynott:** Some really good work has been done by the 3 Counties Energy Agency, Codema and the Tipperary Energy Agency in the area of retrofitting. They are fulfilling the role of independent expert advisers. It was very gratifying to see the increase in funding to the SEAI to allow for retrofits. Our members as suppliers will play their part in assisting in terms of advice. The energy efficiency obligation scheme was initiated in 2014 with an annual target at that point of 550 GW hours. This was increased to 700 GW in 2018. This is 700 GW hours every year. This represents about 2.7% of electricity generation in that year, which gives an indication of how the demand can be reduced. The mix of that energy efficiency was 75% non-residential, mostly in the commercial sector, while 20% was residential and 5% was in the fuel poor. We are about to embark on the next level of energy efficiency according to the energy efficiency directive. Now that a lot of the low-hanging fruit has been picked, those targets will become more difficult for suppliers to achieve but access to low and zero-cost finance will be very important for homeowners before they decide to do the deep retrofit. Regulations have played a significant role here. New buildings now are being constructed with electric heat pumps. Again, this will really assist us in meeting targets.

A lot of work has been done by the SEAI and SOLAS mapping out the skills that are required, particularly around construction, repair and maintenance of passive houses. This needs to be rolled out. The energy sector as a whole needs attention to ensure that the right skill sets are there across the entire value chain from generation to distribution to supply of electricity. I might ask Mr. Douglas to address the issue of co-location and the results of the latest RESS auctions.

**Mr. Stephen Douglas:** On what we call hybrid sites, grid is scarce and we must maximise the use of the existing infrastructure. It was an action in the previous climate action plan. It has been removed in the interim. The industry will be looking for that action to be reinstated to progress hybrid sites. There has been some progress in the regulatory space on some of the issues hybrid sites create for the existing policy. There are two legal entities using the same metered export capacity. The way we set up the system is for one legal entity, so there are issues there. There are issues with how those projects bid into RESS auctions. There are many issues that have to be resolved for us to be able to take advantage of this, and having it reinstated in the climate action plan would be welcome as well. In terms of offshore development, there are many projects on the east coast seeking to connect to the grid. Being able to use existing connections, for example, where there is a gas plant for a generator or for a portfolio player to be able to use that existing grid and maximise that use, is something the industry wants.

Would you mind repeating the specific question about the RESS results, Chairman?

**Chairman:** Yes, it concerns feedback from the EAI. We have been through one auction and there will be many more. How did it go? What can be changed, perhaps? There will be a series of these over the next few years and we need to get them right. If you have a comment, we would like to hear it.

**Mr. Stephen Douglas:** As we keep saying, we need infrastructure and the projects. We need a steady drumbeat of projects to ensure there is competition in those auctions. The regulator was satisfied that there was a competitive auction for RESS 1 and the intention is to have up to four auctions. Some of them will be technology-specific. However, they need the projects

behind them, so they must have the connections to the grid. We have to line up connection policy with those auctions to provide that drumbeat of projects. That is very important. We were happy with the level of competition in the first auction, the results and that those projects will be delivered, including the onshore and the solar projects. There also were seven community projects that cleared, and that is very much in line with what the Government wants.

**Chairman:** There was a question about political leadership. Do you want to address that?

**Mr. Stephen Douglas:** Yes, and thank you for picking up on the point. There is very good political buy-in on the new narrative on climate action. This Oireachtas joint committee is a good example of that. At the public level, perhaps the awareness of what we need to do and the infrastructure we need to decarbonise might not be there. There is an opportunity there for political leadership and for leadership from sectors such as ours to help in that process. It is about linking the need - why we are doing it and the so what.

**Chairman:** Thank you for reiterating that. A big part of this is the communication about what needs to be done. You and other organisations in this space certainly have a role. I call Senator Higgins.

**Senator Alice-Mary Higgins:** I have a new question. Mr. Douglas touched on one part of it because I was going to ask about the community projects. I do not know to what extent the association engages with community projects and sustainable energy communities, which are beginning to engage. That is a positive measure. Do the witnesses have a comment on that and on how the association is engaging with those projects or is connected with them?

I have a question that follows up on the retrofitting piece. I believe retrofitting is one of the few remaining low-hanging fruits, if it were to be really scaled up and if we were to look at deep retrofitting. Linked to that is looking at embodied energy. In terms of our electricity, we are looking at it sector by sector. We are looking at energy and we are going to look at construction. One of the big things we are seeing now, certainly in the UK, is a focus on a very deep retrofitting of large-scale buildings and projects, whereby one might repurpose or add a storey or two to a building. One uses the skeletal structure and, in that way, the overall energy cost of a building, rather than tearing it down and building a new renewable building. The more energy efficient way in many cases is to adapt or change a building and build on the existing skeleton or sleeve, as I believe it is called. Will the witnesses comment on that? It is different from just retrofitting. It is about almost remaking buildings while keeping as much embodied energy as possible. That has been advanced a great deal in the UK and it will have to come into play more here when we start calculating emissions, not just in terms of future energy usage but also the energy cost of the construction process.

The other part I have a question on is the clean-up costs on stranded assets. I know the witnesses cannot speak about the specific, as the association has a suite of members. We have seen in other countries that some companies will stop functioning, some will reinvent themselves and some will amalgamate. However, there have been concerns in other countries about the clean-up costs of that transition. What mechanisms might be in place within the industry to ensure there is best practice in that context? I am concerned that the State could be left with the mopping up of old elephant infrastructure. Within that transition and within the witnesses' sector, we have seen a contradictory thing at European level where sometimes the same companies that are investing in renewable energy for electricity or whatever are also, at the same time, suing states in respect of old infrastructure that they own relating to fossil fuels. It is the same parent company wearing two different hats, one from the past and one for the future. That is a

major concern with regard to the Energy Charter Treaty. The concern is the extent to which the industry's previous investments and the protection of those could act as a brake on us moving to the green new deal and the future we need on a regulatory base. Do the witnesses have comments on that? I believe that it will require a sea change from the industry.

My last question is an ambitious one. It is one I asked of the Minister with responsibility for the environment a year ago, and it is probably five to seven years away. We have the National Oil Reserves Agency. Can the witnesses envisage a point at which we will have a national electricity reserve agency, whereby we would have policies that would enable us to have a national electricity reserve in terms of that same infrastructure? I know we are not there yet, but is it something to which the witnesses could see pathway at national or European level?

**Mr. Dara Lynott:** I will take the last question first. I will ask Mr. Douglas to deal with the stranded assets or what we would call the forced exit from or entry into the system and how the market design tries to minimise stranded assets or at least unexpected exits from the market.

The difficult thing about electricity as opposed to oil or gas is that one cannot store it or can store only very little of it. It has to be used pretty much instantaneously. Therefore the nearest one could come to what one could call a security of supply is the project that is being developed by the Department of the Environment, Climate and Communications. That went out to tender last December. Tenders were finalised or came to a close in early December. That is something that will point to whether we are robust enough. In 2019, 56% of our electricity was generated from gas. The gas comes from the UK and our own gas field, which is winding down. We have come from a position where nearly 90% of our gas was imported.

There is a fragility about being at the end of the line. There is a fragility that is dependent on interconnections and whether we have the right number, if they are robust enough and whether we have the right mix of technologies that will allow us to be able to continue to have a resilient electricity sector. I stated earlier that the TSO has one of the top records in the EU in respect of resilience and the number of minutes during which the electricity system drops in Ireland. It is a European leader in that regard.

While we do not have an electricity reserve agency, we do have security of supply. We would like to see the work that is ongoing finalised as quickly as possible because that in itself might influence the way that we deal with the technologies into the future.

On the community side, the electricity sector is very supportive of community projects. The RESS auctions allowed for those community projects to come on board. A number of them did subscribe to that. From an association point of view, we would like to see us achieving decarbonisation of the electricity system as quickly as possible. We would not be fans of the idea of ring-fencing. Rather, we would support any unused quota being used to ensure that whatever money is available through those auctions delivers the solution as cost-effectively and as quickly as possible. If communities can be assisted to be involved in that, we are all supportive of it.

In terms of stranded assets, I ask Mr. Douglas to comment on market design and how it is managed to avoid unintended exits from the market.

**Mr. Stephen Douglas:** I thank Senator Higgins for her questions. It is definitely an important issue for the industry. The investments made are made over a very long period, spanning 25 to 40 years. Obviously, one is seeking to recover the money one has put in and to generate a profit over that time. At present, we are in transition. We are moving from a brown system to

a green system. That is happening perhaps even faster than we would have expected, with the increased climate action ambition.

First, from an industry perspective, those costs need to be known. We need to be aware of those costs and we need to compare them to the counterfactuals in terms of whether we can use those assets and optimise them. We must consider whether we can abate carbon in a conventional generator or whether we can use the gas network for something else. We are asking those questions at the moment but the time for decisions is now, because we also need to make new investments. That is a conversation that we need to have right now.

I welcome Senator Higgins's point. It is something that our association thinks about a lot. We will take that away to reflect on.

**Senator Alice-Mary Higgins:** Does Mr. Lynott wish to comment on embodied energy? I noticed him nodding as I was asking my question.

**Mr. Dara Lynott:** A lot of research has been done. The Environmental Protection Agency, through its climate action seminars, has started to look at some of the pioneers of energy efficiency, who are now revisiting their initial data on, for example, ripping up a building in order to renovate it and what that is costing. The reason I was nodding is because it comes very much into life cycle analysis. There are a lot of data on it. We live in a world of data. A significant amount of data are being generated from initiatives such as the building energy rating, BER, ratings scheme that the SEAI is running, as well as the GeoHive initiative that is being done by Ordnance Survey Ireland.

Some research has been done on this issue at a European level. I am not sure what research has been done in Ireland. This research is relevant, not so much in respect of one-off houses but rather in respect of estates where there are similar houses that were all built at around the same time and to the same standard. Research should be available on the life cycle cost and the entire carbon cost associated with substantially demolishing or renovating a building and a calculation being made as to whether it is the best option, as opposed to minimising the destruction of materials only to bring in brand new materials that have to be manufactured at a carbon cost.

The work has started. I have heard discussions on this subject at some of the EPA climate talks and they are most interesting. It would be well worth researching. The findings of the research would be most fruitful in respect of those large estates in Dublin, Cork, Galway, Limerick and Waterford that were built around the same time, where one could focus on one type. There could be co-operation on the sharing of data between the SEAI and the likes of Ordnance Survey Ireland. As with many general data protection regulation, GDPR, issues, a lot of this data sharing has to be facilitated in primary legislation. Legislators could take on board the question of how anonymised data could be used in this way to facilitate the research and some of the actions that will help us get to carbon neutrality.

**Chairman:** I thank Mr. Lynott, Mr. Douglas and Senator Higgins. No other members are indicating that they wish to contribute. I do not have any other questions.

**Senator Alice-Mary Higgins:** I had another question but I did not want to cut across others. Could the witnesses comment briefly on the Energy Charter Treaty? I had a question on that in terms of the situation whereby some companies are entering the renewable electricity market but they have a previous identity. I ask the witnesses to comment on the tensions that have been discussed, for example, in respect of the European Commission and the green deal

and the Energy Charter Treaty. Do the witnesses have perspectives on that? They may also wish to follow up on the issue in writing.

**Mr. Dara Lynott:** Briefly, as an electricity sector, we represent the value chain. The sector is fully committed to decarbonising by the mid-2040s at the latest. Our own vision is of a decarbonised future powered by electricity. We do not see a tension. In our own study on 2030, we found that Ireland is an island that does not have the benefits of other continental countries that can rely on other significant sources of hydro, biomass and nuclear energy. Therefore, it has to stand on its own two feet. According to our study, the holistic energy system in 2030 will be a mix of 70% renewables and 30% backup generation that will be used much less. Primarily, it will be a dual-fuel system of gas and renewables. That is heavily dependent on technology advances in storage, on infrastructure delivery in terms of our grid and interconnection and on behavioural change, if we are to have 1 million EVs and 750,000 retrofits done by 2030.

It is not an either-or situation. There is not a tension. Ireland is unique in terms of its island status. We rely heavily on the expertise and experience of EirGrid to chart a way forward, and also a market that supports the types of investments. If we have those technology-neutral type incentives, then naturally, old business models fall away and new technologies will take their place. That is where they will follow the incentives put there by the market designer, the regulatory authority.

**Senator Alice-Mary Higgins:** We might need to demonstrate a little preference to some technologies. A technology-neutral approach does not always encourage the best innovation. We must look to rewarding new technologies and similarly, with energy options we must look to potentially ring-fencing preferences. There is a hierarchy.

**Mr. Dara Lynott:** It is within a policy choice of achieving net zero by 2050 and 70% renewable energy by 2030. These are all policy choices and they can be as expansive or restrictive as one wishes. I am just saying the industry will respond to those policy choices and incentives coming from those policy choices. It would be very difficult for industry to plough its own furrow outside of policy or incentive choices because it just would not make any economic sense.

**Senator Alice-Mary Higgins:** We may need to squeeze the industry on that 30% assumption and the policy choice. Maybe it will be about industry innovating faster if we go to 5%, 10% or zero from 30%. It is likely we will need to squeeze industry on that. It could be squeezed on the demand side or in terms of innovation. I hope it can happen with storage on the supply side. I would not think it is a safe assumption that there will be a 70-30 split, given what we have seen at the European level and internationally and what is likely to emerge from the next COP summit. It is better to be preparing for other options.

**Mr. Dara Lynott:** Absolutely, and I assure the Deputy that the industry will be ready and willing for whatever policy choices are coming.

**Chairman:** I thank the Senator and Mr. Lynott. It is a very interesting discussion and it is good that it will come to policy choices and we are not bound by technological deficits. It is a matter of us making decisions and tweaking things so we can get the outcome we desire. Green hydrogen is an idea we could accelerate if we wanted to get to greater than 70% of energy coming from renewables by 2030. It is very exciting to see the ESB's plans for Moneypoint and I am interested to hear of more ambitious plans in that space in the coming weeks, months and years.

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I sincerely thank Mr. Lynott and Mr. Douglas for their comprehensive answers to our questions and we really appreciate them. I need to listen back to the session and do some thinking about some of those answers. I have certainly learned much today and I know when I listen back I will probably have many more questions. Perhaps at some other time the witnesses will come before us if we have further questions.

We will now adjourn until next Tuesday, 1 June, when we will meet in private session at 11 a.m.

**Mr. Dara Lynott:** Thank you very much.

**Senator Alice-Mary Higgins:** Some very interesting research was mentioned by the witnesses and colleagues would love to see it if it could be forwarded to the committee.

**Chairman:** We are certainly open to receiving supplementary evidence from the witnesses. We would consider it with interest.

The joint committee adjourned at 2.24 p.m. *sine die*.