

# DÁIL ÉIREANN

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

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

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*Dé Máirt, 16 Eanáir 2018*

*Tuesday, 16 January 2018*

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Tháinig an Comhchoiste le chéile ag 5 p.m.

The Joint Committee met at 5 p.m.

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Comhaltaí a bhí i láthair/Members present:

Teachtaí Dála/Deputies	Seanadóirí/Senators
Timmy Dooley,	Terry Leyden,
James Lawless,	Tim Lombard.
Michael Lowry,	
Eamon Ryan,	
Bríd Smith,	
Brian Stanley.	

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

*The joint committee met in private session until 5.25 p.m.*

### **Energy Policy: Discussion**

**Chairman:** Everybody is welcome to the meeting. By virtue of section 17(2)(l) of the Defamation Act 2009, witnesses are protected by absolute privilege in respect of their evidence to the joint committee. However, if they are directed by the Chairman to cease giving evidence on a particular matter and continue to do so, they are entitled thereafter only to a qualified privilege in respect of their evidence. They are directed that only evidence connected with the subject matter of these proceedings is to be given and asked to respect the parliamentary practice to the effect that, where possible, they should not criticise or make charges against any person or an entity by name or in such a way as to make him, her or it identifiable. I also advise delegates that any submission or opening statement they have forwarded to the committee will be published on its website after the meeting.

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 remind delegates and members to turn off their mobile phones or switch them to flight mode as they interfere with the sound system and make it difficult for the parliamentary reporters to report the meeting. Television coverage and web streaming of the proceedings are also adversely affected.

It is proposed that the main delegates speak for five minutes each. If they propose to share time with other speakers, they should indicate this at the start of their presentations. I am very conscious of the number of delegates. We have all received the opening submissions and members are up to speed on the presentations to be made. I would be grateful, therefore, if delegates remained conscious of the five-minute time allocation. The presentations will be followed by a question and answer session with members whom I ask to wait until all of the presentations have been made before putting questions. Is that agreed? Agreed.

I invite the assistant secretary at the Department of Communications, Climate Action and Environment, Mr. Michael Manley, to make his contribution.

**Mr. Michael Manley:** I thank the Chairman and committee members. I am accompanied by Ms Rebecca Minch, head of energy efficiency and affordability; Mr. Frank Maughan, head of climate mitigation and awareness; Mr. Kevin Brady, head of transport energy policy; and Mr. Eamonn Confrey, head of electricity policy.

The three pillars of Irish energy policy are sustainability, security of supply and competitiveness, leading to the affordability of energy. We are very much in the mainstream of European energy policy. One of the challenges is that very few policy interventions actually serve all three pillars equally.

I know that renewable energy is the focus of the joint committee today. The key element in that regard is the enabling directive of 2009 which is only 29 articles long. It provides for the development of a renewable energy market and a process to embed renewable energy resources in the energy mix. It very much focuses on the European approach and five of the articles deal with trade in energy supplies across borders. It focuses on support for the integration of renew-

ables in the transmission and distributions systems.

All countries have a national target and under the directive Ireland has a target of 16%. Our starting point in 2005 was 3.1%. The increase of 12.9% was the fourth largest asked of a European member state. In making progress Sustainable Energy Ireland, SEI, has modelled our likely landing point in 2020. It suggests we should land on a figure between 13.2% and 15.4%, depending on the scenario modelled, which puts us between 80% and 96% of the 2020 target. In the second report on the state of the energy union 2017 the European Union projects that Ireland will land on a figure of 15.5%. It is important to bear in mind that when the directive was developed, the price of a barrel of oil ranged from \$60 to \$70. It subsequently went to the about \$120 a barrel and peaked at \$140 for a short period. For much of this decade it has fallen back to \$40 to \$50 a barrel. In Ireland we have had a very profound economic correction which has impacted significantly on consumer decision-making, particularly when it comes to heat and transport.

In individual sectors we have had our greatest level of success under the heading of renewable electricity. The outturn in 2016 was 27% against a target of 40%. We do not have final data for 2017, but the initial indications are that we will land on a figure between 31% and 33%. We have had less success under the headings of renewable heat - we landed on a figure of 6.5% against a target of 12% - and transport - we landed on a figure of 4.5% against a target of 10%. Therefore, we face a significant challenge in meeting the targets set under both headings. An important point borne out in the presentation is that we have to decarbonise the electricity system. This is important for the sector itself but it is also important as we move heat and transport to electricity.

Energy efficiency was the second item referred to in the letter inviting us to appear before the committee. The International Energy Agency has identified that the barrel of oil not used is the cheapest, cleanest and most secure form of energy. Energy efficiency has long been a focus in Irish energy policy. We have a target of 20% by 2020 and the indications are that we will reach approximately 16%. Unlike the renewable energy target, this is not binding but it is really important nonetheless. In terms of funding, the constrained Exchequer position has impacted our capacity to invest but over recent years, from 2016 to 2018, funding has risen from €55 million to €107 million. The increase in resources has led to new initiatives. This year support is being provided for heat pumps, for a deep retrofit pilot warmth and well-being programme and €14 million is being provided for SMEs.

The focus now is much more on the post-2020 period and our ambitions out to 2030. The European Commission has published its Clean Energy for All Europeans package which contains targets of a 40% reduction in greenhouse gases and a 27% increase in energy savings. We had negotiations at the energy Council on 18 December and substantial agreement was reached by the energy Ministers. The package is now in the trialogue in terms of the individual instruments. It contains a total of 11 individual instruments - eight in the package proper and three which preceded it.

Our next objective is the completion of the national energy and climate plan which must be in draft form by the end of the this year and submitted to the European Commission. It must be finalised by 31 December 2019. I will stop there for now.

**Chairman:** Thank you very much. We will now move on to our next witness, Mr. Garrett Blaney of the Commission for Regulation of Utilities.

**Mr. Garrett Blaney:** We will split our presentation. My fellow commissioner, Ms Aoife MacEivilly, will start.

**Ms Aoife MacEivilly:** We have prepared a presentation, copies of which have been provided for members. We are speaking primarily from the point of view of the electricity sector as we regulate in that area. We believe the electricity sector is making good progress towards meeting our 40% target although there are obviously some risks to delivery. It should be underlined that significant effort has gone into the successful progress towards the 40% target. Electricity markets and networks as well as the individual generators have worked hard to deliver this new capacity. That work is backed by the public service obligation, PSO, levy. Electricity customers bear the costs of supporting our renewable electricity. They do this through the aforementioned PSO levy, through additional network charges and the cost of systems services to support increasing penetration of renewables.

It is incumbent on us all to deliver decarbonisation at least cost for electricity consumers. To that end, we believe strongly in delivering competitive, technology neutral options to determine the least cost option in terms of the next renewable support schemes. We have supported this approach in our contribution to the Department's renewable energy support scheme and believe it is the best approach. We also think it is important not only to focus on renewable electricity. Decarbonisation is about heating and transport. It is also about reducing the carbon intensity of fuels, not only about renewables. If we think about how we might make the next gains in heating and transport, it is possible that electrification and gasification can play a role. However, we need to do this in a smart way in order to ensure that we are not adding costs to energy consumers and that we are doing it at least cost.

To underline the point about the costs for electricity consumers, I have included a slide on the PSO levy calculation. We published this last summer. Committee members can see on the graph the increase in the cost of the overall PSO levy. The renewable element of the PSO levy is what is driving the overall increase, in the main. That is likely to increase further as we reach our 40% target. It is really important that we keep in mind the costs for energy consumers. Households are currently paying €92.25 per annum through the PSO levy, which could be 9% or 10% of their overall annual bill. Customers also pay additional network charges and for the cost of system services, although they may see some benefits in terms of micro-price reductions when we have higher renewables on the system. When we think about the next renewable electricity targets or if we are thinking about supporting higher cost renewables, we must keep in mind the impact on the PSO levy for customers.

While we are looking at higher costs for renewable electricity support, we are not doing a bad job overall. As we can see from the comparison of European energy regulator support schemes, Ireland has done a reasonably good job of bringing on relatively low cost renewables up to now. The wind energy support scheme renewable energy feed-in tariff, REFIT, has been successful and has delivered the right outcomes for the energy system at a relatively low cost. Germany, by contrast, has supported much more expensive renewables.

**Chairman:** I thank Ms. MacEivilly. We will have a chance to engage with witnesses as the meeting progresses. We will now move on to our next witness Mr. Aidan Skelly, chief executive of EirGrid.

**Mr. Aidan Skelly:** I thank the committee for inviting us to participate in this discussion and to provide an overview of EirGrid's role in assisting the country in achieving our key climate change targets. I am joined today by my colleague, Mr. John Fitzgerald, who is director of grid

development and interconnection.

Since EirGrid came into existence ten years ago we have placed a key emphasis on ensuring that the national electricity transmission grid is adaptable and flexible. This flexibility has meant that to date we have been able to accommodate the increasing levels of renewable energy being generated. Thanks to work by policy makers such as members of this committee, the Department of Communications, Climate Action and Environment as well as the broader renewable energy industry, Ireland has now become a world leader in the integration of renewables onto the electricity grid. As a country, we are now able to integrate over 60% of our renewables onto the grid. This is what my engineering colleagues call system non-synchronous penetration or SNSP. Our stated aim is to increase this to at least 75% by the end of 2020. This is significantly ahead of our European counterparts and we believe it will assist considerably in helping this country to achieve our 2020 and 2030 targets.

Recently an EirGrid-led consortium was awarded Horizon 2020 funding from the European Commission to see how the successful integration of renewables in Ireland might be transferred to the wider European electricity grid. The project is called the Sysflex project and when finished in 2022, we hope that the learning and success in Ireland will lead the way in helping to decarbonise the European electricity supply.

In terms of delivering an integrated single electricity market, ISEM, another major milestone will be reached in May of this year. Building on the success of the single electricity market on the island of Ireland, which was a key success story of the peace process, the next phase is for us to integrate with the European electricity markets. From May this year, when ISEM goes live, we will benefit from increased competition which we expect to deliver cheaper electricity and increased energy security. Most importantly, we believe that the more competitive market that ISEM will deliver will bring a better price for renewable energy onto the electricity system. Against the backdrop of all the change in the electricity market and the key requirement to ensure we can cater for the new renewable energy sources, EirGrid has undertaken a new initiative to bring greater scenario planning into its work. Based on best practice across Europe, our document entitled Tomorrow's Energy Scenarios which was published last year sets out four comprehensive scenarios on how electricity is both generated and consumed in Ireland over the coming decades. A lengthy engagement with a large cross section of stakeholders, State agencies and policy makers was followed up with a public consultation to produce these scenarios. A range of inputs such as economic performance, population growth, Government policies, technology developments and changes in consumer behaviour and attitudes have helped us create four different scenarios. These scenarios will ultimately allow us to ensure that the grid requirements of the future are planned appropriately. The first of the four scenarios we have identified is steady evolution, which would see renewable electricity generation maintaining a steady pace of growth. In this scenario there are steady improvements in the economy and in the technologies which generate electricity and new consumer technologies help to increase energy efficiency in homes and businesses. The second scenario, identified as low carbon living, shows the economy enjoying high economic growth which would in turn encourage the creation and roll out of new technologies for low carbon electricity generation. This is accompanied by a strong public demand to reduce greenhouse gas emissions, in addition to high carbon prices and incentives for renewables, which creates a high level of renewable generation on the grid.

A third scenario is a slower change where we see there is little change in the way electricity is generated, economic growth is slower and the adoption of new technologies at residential,

commercial and electricity generation levels has been slow. The final scenario is where we see consumer action and in a strong economy, members of the public want to reduce greenhouse gas emissions. In this scenario, electricity consumers will enthusiastically limit their energy use and generate their own energy, there are a large number of community-led energy projects and a rapid adoption of electric vehicles and heat pumps in the home.

These four scenarios are a relatively accurate synopsis of the how electricity usage may develop. The decisions taken by policymakers and legislators in the Dáil and the Seanad will be pivotal in determining which of these scenarios is realised by. As a State-owned organisation, EirGrid assures the joint committee that the national electricity grid will be able to fully cater for each of these scenarios. While we do not advocate for any particular technology - traditional generation or renewable energies - we assure members of our ability and willingness to integrate greater levels of renewables onto the national electricity grid, whether from onshore wind, offshore wind, solar or other renewable sources.

I thank the Chairman and members for the opportunity to update the joint committee on our work on integrating renewable energies. We can provide more detail in the later discussion.

**Mr. Peter O'Shea:** Given that greenhouse gases cause climate change, it is important that everyone understands how much greenhouse gases Ireland produces annually. In 2016, we produced 61 million tonnes of greenhouse gases, of which agriculture accounted for one third and electricity, transport and heat each accounting for one fifth. The ESB is working on strategies with a dual purpose. On the one hand, we want to decarbonise the electricity system while, on the other, we want to power the heat and transport systems with electricity. By doing this, we will be able to address 60% of Ireland's total emissions and up to 80% of its energy emissions. As a result, electricity will move from being 20% of the problem to being 60% of the solution.

We were asked to address the issue of targets. The emissions of European Union member states are categorised in two distinct ways. The first group of emissions relates to individual installations such as power stations and large industrial facilities. This group is accounted for through the EU emissions trading scheme, or ETS. The second group are non-ETS emissions, in other words, all other emissions, typically emissions from agriculture, heating homes and transporting people and goods around the country.

For the ETS group, which includes power generation, Ireland does not have an EU target to meet because responsibility rests with the owners of the relevant installations. These installations will progressively decarbonise as the ETS reduces the amount of emissions allowed year on year. Power generation is part of this group and the scheme will ensure power generation across the European Union decarbonises in the period until 2050 as carbon allowances are ratcheted downwards year after year.

The second group of emissions - non-ETS emissions - is more difficult. Ireland is legally responsible for reducing its non-ETS emissions, primarily composed of emissions from agriculture, heat and transport. Our target for 2020 requires us to reduce these emissions by 20% from 2005 levels. Evidence to date shows there has been a shortcoming in this area. As such, this area requires most attention in the national climate strategy.

Ireland also has renewable energy targets. As Mr. Manley stated, we have a renewable energy sources, RES, target of 16% by 2020. We have chosen to address this target by having a 40% target for RES electricity, a 12% renewable heat target and a 10% renewable transport target. Analysis to date indicates we will not meet the 16% RES target and the most recent

reports suggest we may achieve a RES of 13%. However, the ESB's analysis indicates we will meet the 40% target set for electricity. We believe that between 3,800 MW and 4,300 MW of wind generated electricity will be needed to meet the 40% target. We currently have 3,300 MW of wind connected on the system and we are projecting that we will have another 1,000 MW on the system by 2020. As such, we are well on the way to achieving the electricity element of the RES target.

While our shortcomings in respect of emissions and renewable targets related to heat, transport and agriculture rather than electricity, we should not be complacent about electricity decarbonisation. We will achieve the 40% target in or around 2020 but we have to do more to increase this figure as we move to 2020 and 2050. The ESB's view of the future is to decarbonise the electricity system to enable the electrification of the heat and transport sectors. This was the subject of a comprehensive report we published in November 2017 entitled, Ireland's Low Carbon Future - Dimensions of a Solution.

I will briefly address the solar and offshore wind sectors. By 2020, we will produce 40% of our electricity through renewable energies, largely onshore wind and hydro power. In our view, there is limited scope on the island for further onshore wind. We estimate a further 1,000 MW of onshore wind is possible over and above that which is in the pipeline. We must, therefore, look offshore, which offers great potential for wind generation. Ireland has a small amount of offshore wind but there are many consented projects around the island. It is in this area that we envisage further RES growth under the new renewable electricity support scheme.

Solar energy will also have a significant part to play in the future energy mix and there are a large number of applications for grid connections for solar power. Not all of these are consented projects, however, and some will not proceed unless there are attractive supports in place. Solar costs have reduced by as much as 80% since 2009 and we expect them to decrease further. In this context, we must avoid locking in high prices for customers.

On the retrofit of buildings, we will not meet our climate targets unless we can decarbonise the heat sector. It is estimated that 30% of the houses in which people will live in 2050 have yet to be built. This means between 500,000 and 600,000 new houses will be added to the housing stock by 2050. The first step, therefore, is to ensure these houses are built to a standard that reduces their demand for energy and ensures the energy they use is zero carbon-emitting. All the technologies required to achieve these objectives are available and consideration should be given to altering the building regulations to ensure they are met.

While the existing housing base is more difficult to address, the same two principles should apply, namely, we should reduce their demand for energy and switch to zero carbon energy sources. This will ensure we progressively address the existing inventory of carbon based heating over the coming decades.

In Ireland, oil is the major fuel for domestic heating and has a significant carbon footprint. Heat pumps with insulation and air tightness are the leading candidate to replace oil.

The policy focus will increasingly need to shift towards the 2030 targets as a critical milestone on Ireland's journey to a largely decarbonised energy system by 2050. Decarbonising electricity and powering the heat and transport sectors from this offering gives Ireland the best means of addressing its current and future targets and enabling electricity to move from being 20% of the problem to being 60% of the solution.

**Chairman:** I invite the chairman of the Irish Solar Energy Association, Mr. David Maguire, to make his presentation.

**Mr. David Maguire:** I am joined by colleagues, Mr. Michael McCarthy, Mr. Michael Moore and Mr. Barry Sherry. I thank the joint committee for inviting us to make a presentation.

To pick up on some of the points made by previous speakers, Ireland has been extremely successful in terms of the cost at which it has deployed wind energy. I understand the cost of wind here is among the lowest in Europe. The deployment of that non-synchronous generated energy on our transmission network has been extremely successful and we are a leader in this area. Nonetheless, according to recent figures from the Environmental Protection Agency, greenhouse gas emissions increased by 3.7% in the past year. We also heard from the previous speaker that in terms of our renewable energy targets for 2020, we are likely to see a shortfall of 3% across the renewable sectors.

While I appreciate that under the European Union's renewable energy scheme, RES, there has been a focus on 2030, which is appropriate, we can also do something about the 2020 targets. While solar power is not a silver bullet and will not solve all the issues, it can make a significant contribution.

A number of speakers referred to our successful track record in various aspects of the renewable sector in recent years. Nonetheless, under the climate change performance index, which is effectively the assessment of 14 indicators, including greenhouse gas emissions, renewable energy, energy use and climate policy, we are ranked 49 out of 56 states. This places Ireland last in Europe in terms of performance on climate change, which is extremely disappointing. As a nation, we rely on large amounts of foreign direct investment. The green image of the country is being tarnished by the lack of action on climate change in recent years.

On the more immediate financial implications for Ireland of failing to meet the 2020 targets, estimates of the cost range from €300 million to €500 million per annum. While I do not wish to get caught up on these costs, they are significant and a matter of real concern. In that context, I speak not as a representative of the solar industry but as a taxpayer. It is unfortunate that we have very little time left to bridge that gap. Solar power can assist in mitigating against this financial liability. According to Bloomberg, solar power has attracted more investment than wind. In 2016, €160 billion of new investment was made in solar alone, more than in coal and gas in the same period. Clearly, it is a technology that is gaining lots of ground in terms of its deployment and investment. Ireland is the only EU member state that does not offer a support mechanism for solar energy. I may be critical of that, as a representative of the solar industry, but I actually think it is a great opportunity because we have a late-mover advantage both in adopting best practice in design support and in technology, design, planning and construction. More than that, because of the cost reductions in solar in the past decade, we can benefit from deployment at a much cheaper price than other EU member states.

Solar continues to decrease but only at approximately 7% or 8% per annum and the industry welcomes the proposal from the renewable electricity support scheme, RESS, that we have competitive auctions. We are very concerned, however, about a technology-agnostic auction, which we have seen in other member states and which do not work. In Ireland, they would lead mostly to the deployment of wind at a potentially higher cost. We believe we can deploy 1.5 GW of solar by the end of 2020, thus mitigating at least half of the potential cost to the Exchequer. The average cost would be between €14 million and €15 million per annum, or less than 7 cent on a monthly basis in the average consumer bill, to avoid a potential fine, or cost in terms

of credits, in excess of €200 million.

**Chairman:** Our sixth witness is head of policy at the Irish Wind Energy Association, IWEA, Dr. David Connolly.

**Dr. David Connolly:** Peter Harte will start and I will take the second half.

**Mr. Peter Harte:** We have circulated slides. I will focus on the key issue regarding wind, which is community engagement and social acceptance. I will take members through the history of this. There has been a detailed process of engaging with communities since 2006, following the Department's guidelines, and IWEA developed a number of codes of practice as well as updates to the guidelines over the years in 2012. The Department launched a good document in 2016 and we fully support and endorse it. We produced a document on being a good neighbour in 2013 and formalised the practice of the time of putting in place a community benefit fund of some €1,000 per MW. The amount is proposed to be increased under the RESS consultation, which sets a price a of €2 per MW hour, bringing the figure to €275,000 per turbine over the life of a project. They are substantial figures and, not surprisingly, we find that these funds are very well received.

All this process and paperwork would not count for anything if it did not have an effect and we believe, notwithstanding a vocal minority, that there is very strong support for wind in Ireland. One of the studies that was carried out was a survey of 2,000 adults in October 2017, which showed that 84% of people were fully or strongly in favour of wind energy, with only 3% strongly opposed. This 3% are very vocal and we hear a lot from them but it is important to keep the numbers in perspective. The trend is also important and support has been rising over the past five years. Another study commissioned by the ESRI last May gives almost exactly the same result and it has some useful suggestions for moving forward with community benefit and community ownership.

Members will see specific examples of the Sliabh Bawn project, which is a Coillte and Bord na Móna joint venture of 58 MW. In addition to the traditional community benefit, that project did some groundbreaking stuff by building cycleways and equestrian trails and having 5 km running events, all of which were very well received.

On the next slide, members will see other innovations. There has been a lot of talk of community ownership and the industry fully supports this. We supported it in our response to the RESS consultation paper and some of our members are already offering this to communities. We have surveyed our members and 70% already have a community scheme in place, as well as being open to ownership. We may not have got everything right but our members are improving the level of engagement we have with communities and this has resulted in good acceptance. We will continue to raise the bar in this area.

**Dr. David Connolly:** I will focus on how wind energy is delivered at a national level, especially in terms of targets. Wind energy is delivering and the latest figures suggest that over 25% of electricity last year was delivered from onshore wind, putting Ireland at No. 2 in the world for wind penetration. This is an amazing achievement and something that has come about thanks to a long-term, stable policy backed up by an industry that has been able to deliver. The electricity sector demonstrates how Ireland can be successful in delivering renewable energy to our energy system.

We have mentioned the 16% renewable energy target by 2020. With wind energy expected

to provide in the region of 35% of our electricity in 2020, we expect it to make up half of that target. It will be just short of 8% of the target and this demonstrates how the industry is delivering on the national target. We expect it will avoid between €600 million and €700 million in compliance costs that would arise if the industry was not developed.

Reference has been made to how the PSO levy subsidises the development of renewable electricity but there is also a benefit for the consumer on the other side, because renewable electricity brings down the wholesale cost. Studies by reputable organisations such as the Sustainable Energy Authority of Ireland SEAI, the Economic and Social Research Institute, ESRI, and the European Commission have all concluded that onshore wind in Ireland is cost-neutral to the consumer because of that dynamic. This is important in the context of the discussion of how we cost-effectively implement renewable energy in Ireland. We are at 3,200 MW and we expect to grow to around 4,300 MW in 2020 but we can do more if there is a shortfall in other sectors because a large pipeline of wind projects is available.

**Chairman:** Our seventh witness is chief executive of the SEAI, Mr. Jim Gannon.

**Mr. Jim Gannon:** The SEAI produces Ireland's national energy projections every year and we agree with what has been stated about the projections to 2020. We are unlikely to hit our targets though it is possible, with a high degree of grid connection between now and 2022, predominantly from wind, that we could make 40%. Solar could provide some additional generation capacity, given how quickly it can be delivered subject to planning and grid connection.

As regards the expansion of solar power globally, new solar PV capacity grew by 50% last year although it remains around 2% of global supply. It has outpaced gas, coal and wind in terms of growth in the past 12 months and is considered likely to continue on that trend. The costs of solar have decreased by approximately 85% since 2009, predominantly catalysed by national support schemes in other jurisdictions. It has increased demand so the scale of the supply chain has increased and the amount of research and development has increased, adding to efficiency and reducing costs for delivered capacity. Ireland can benefit from that through appropriate support of solar PV.

There are only in the region of 10 MW of solar in Ireland, predominantly at residential and SME scale. Ireland supports solar PV at that scale through better energy communities and accelerated capital allowances but, to date, no support has been in place at utility scale. Small-scale deployment is important because it can tie in communities, businesses and individuals to a technology and the tangible benefits relating to it such that as attempts are made to develop a utility scale, they are comfortable with it. There is no one method that appears to be successful for micro-generation support. Net metering, tariffs and grants have been attempted in other jurisdictions. In terms of micro-generation support, we need to determine what is right for Ireland and this cannot be done in a short timeframe.

On the large-scale side, there is a trend towards auctions, particularly technology-neutral auctions. It is a matter for the Department to determine how this would be conducted. The Department is currently in the middle of a review of the consultation phase of the RESS to address that issue.

The SEAI has produced a report on the supply chain opportunities for Ireland with regard to solar PV focusing only on those industries where we are currently leading, including semiconductor production, and how we can transfer those skills into the PV industry. On deep retrofit, the SEAI, funded by the Department, has supported the upgrade of approximately 300,000

homes over the past seven to eight years. We have started raising the bar for our commodity schemes. For example, in regard to the better energy homes scheme, this week we dropped oil and gas supports but we have increased the support for external wall insulation and for controls, where a larger bang for the taxpayers' euro is achieved. Separately, as soon as possible over the coming months we will implement a support for heat pumps which, again, will help the transfer of people from fossil fuels to more sustainable heat supplies. Alongside the increase in the lower bar, we are examining the deep retrofit of buildings. This is a specific project looking at the different types of houses in different conditions in the country in terms of the best combination of technologies to bring our housing stock to the level it needs to be at by 2050. We are examining the technologies available, the return on investment for those technologies, the supply chain, how the homeowner will finance it and how in the background not just the Exchequer but private sector finance can be brought this area. We have early learnings that I am happy to do into in more detail with any of the members or the Chairman.

There is a similar trend regarding offshore wind. There has been a significant decrease in the overall cost of offshore wind across a number of different auctions in Europe and worldwide. It is a technology that has proven to deliver at scale. The challenges in Ireland that could need to be addressed, that can help militate against inertia in these projects, would be the review of the offshore renewable energy development plan which is underway in the Department and will set this consistent policy framework. Separately, it is critical that the maritime area and foreshore Bill is delivered soon to provide clarity around that licensing and consenting regime for external developers and Irish developers.

I am happy to take questions from members.

**Chairman:** I thank Mr. Gannon and I invite Mr. Barry Sharkey to make his opening statement.

**Mr. Barry Sharkey:** Members will forgive me if I am bit nervous. Guys from the hills of Donegal do not come to the big smoke too often and we are a little overwhelmed.

**Deputy Timmy Dooley:** The witnesses do not go home empty-handed either.

**Mr. Barry Sharkey:** I am here to speak about the expansion of solar in Ireland on behalf of the many small companies that are already engaged in the roof-top solar business. My submission is about regional development, the creation of long-term, highly-skilled, sustainable jobs and the stimulation of a new industry in clean technology, which is struggling to get off the ground in Ireland. It is also about improving the competitiveness of Irish businesses and farming. I have heard nothing this evening about energy poverty and nothing about the people in homes who are struggling to pay their electricity bills. I read in one submission that it is predicted that energy prices in Ireland will increase by 36% over the next ten years and that it is proposed to increase the PSO levy for everybody by 6%. I am making this submission on behalf of consumers, the people who pay their electricity bills and the PSO levy, which is being divided between all the other industries.

The White Paper contains many paragraphs about the need to engage citizens and communities in the energy transition policy and the benefits of moving to green energy. However, I have not heard much about this evening. Approximately 10% of the PV energy that will be generated in Ireland in the future will come from roof-top solar on farm buildings, factories, shops and homes. This 10% is very important. I am proposing that roof-top solar be incentivised. Last night's "Prime Time" programme addressed the serious consequences of a harsh Brexit for

the farming industry and rural communities. In terms of roof-top solar, farmers have acres of ready-to-go sites with grid connections, as have our industries, shops, homes and sports clubs. Every sports club in the country has a building on site. These are all ready-to-go sites with grid connections, planning permission and so on. If my proposal is not taken on board we will have renewable industry that will meet our targets and we will have solar PV which will meet our targets but there will be no clean tech industry, no regional development, no regional job creation and no relief for households. In every developed country in the world, roof-top solar was rolled out first. California is the prime example of how to do this right. It did not go straight to an auction system. The only country in Europe, of which I am aware, that went straight to an auction system for solar PV is Greece and that was a disaster. Today, I am proposing that roof-top solar be incentivised sooner rather than later.

**Chairman:** I thank all of the witnesses for adhering to their time allocations. Before calling members, I would like to put a few questions to the witnesses. My first question is to the officials from the Department. What Government buildings, if any, have been retrofitted and have any of the mitigation measures of the national mitigation plan 2017 been implemented?

My second question is to Mr. Peter O'Shea. In the context of the statement in the ESB report that 60% of cars sold by 2050 will be electric, what is the basis for this projection and will sufficient charging stations be installed?

My third question is for Dr. Connolly. Is there a plan to roll out more offshore wind energy sites as the capacity for onshore sites decreases?

My final question is to the witness from the North West PV and Smart Renewable Energy Limited. It was stated that for every €3 of economic activity will be created for every €1 of State incentive support provided. On what are these figures based in terms of research?

I now invite Deputy Dooley to put his questions, following which I will revert to the witnesses.

**Deputy Timmy Dooley:** I wish to make a couple of comments as well as ask some questions. The departmental officials did not elaborate sufficiently on the potential cost of missing the targets. I have heard a number of people mention 2020 but then say that we are really moving towards 2030. It seems that if we do not achieve the 2020 target, we face significant fines that we will carry into the future. It is bit like sitting the junior certificate examination and taking the view that it does not really matter because the leaving certificate examination is the important one. If a student cannot get his or her act together in terms of a study plan for the junior certificate examination, then he or she probably will not have it in place for the leaving certificate examination. As a politician who looks to the electoral cycle, I am conscious that when we stand back from that cycle, we often bemoan our failure to get things right that have been going on for ten, 15 or 20 years. I am concerned that the electoral cycle is a factor when this is being looked at from a departmental and a political perspective. The concern is that because 2030 is a long way off, successive Ministers have decided that this is not something they need to sort out. I suspect someone may have taken that view a little bit further back. Now that we are heading into this particular cycle, people have to address it.

I ask the witnesses to comment on the potential cost. How might that money be better deployed in the medium term? Mr. Gannon has said that if we address the solar aspect of this matter, in addition to some of the onshore wind aspect, we could improve our output and increase our return within a short period. This would be of some benefit and would lead to some

money being saved. Any short-term investment that prevents us having to pay fines is a better form of investment.

I am conscious that we are looking principally at electricity generation, where the laggards or blackguards - I am not talking about anyone individually - are the transport and heat sectors. As a committee, maybe we should be exercising most of our functions in addressing the areas of greatest concern. Everybody here has a good news story to tell. Perhaps we are looking for a little bit more. We are trying to squeeze the last couple of per cent out of a sector that has performed exceptionally well. Maybe the committee should reflect on how we might address that in the future.

I was interested in Mr. Sharkey's point because I know a little bit about it. I have met the chairman of the Micro Renewable Energy Federation. I have read what Mr. Sharkey and his colleagues have produced to date. It is more important to focus on getting citizens to buy into this than it is to focus on what is deliverable against our targets. The electric car is a case in point. The witnesses are part of a big industry that is often largely at a remove from consumers. When a consumer plugs in the kettle and it works, he or she generally does not know too much about how that happens. The kettle boils. The television comes on. It is there. That is big industry. That is really important. That is where we need to focus. If we want citizens to change their behaviour right across the environmental arena, we need to get that right.

Mr. Sharkey has brought to the table an opportunity for citizens to see short-term benefits from their decision to buy into the protection of the environment. It is not necessarily going to change how we will view electricity in 2050, but it will get citizens to change their behaviour in an array of ways. I know people who have adapted, moved to electric vehicles and changed the way they live their lives in many other respects. They are focusing on the environment and on how they treat it. For that reason, the initiatives discussed by the people in the Micro Renewable Energy Federation and by Mr. Sharkey have the capacity to bring people with them. They also have the capacity to address some of the issues that have been discussed by the witnesses, including those from the onshore wind sector. It has been suggested that 3% or 4% of people are against this. As people buy into the protection of our environment in a meaningful way, they must see themselves having a role in it. For many people, electricity and public transport are behind the scenes, whereas the decisions they make in their own lives have real potential. I think we need to try to support such initiatives, even if they might not result in a massive dial change in respect of our targets in the short term.

I have a real concern about the RESS and the notion of taking a technology-agnostic approach to the auctions because I believe it equates to hoping some other country will resolve our problem for us. We need to get some level of activity in the whole solar area at an early stage. Perhaps it is not early any more. We need to develop that technology ourselves. We are behind the curve in this regard. We need to catch up. That is why I think the technology-agnostic approach to the auctions is not in our best interests in the long term. It does not provide for diversity. I do not mean to be negative with regard to onshore wind in any way. We need to be looking at offshore wind in this context as well. The witnesses might not be aware that before today's meeting of the joint committee, we decided to invite representatives of other groups to come before us, including those involved in the offshore wind sector, which is an area of untapped potential. People have told me we are ten years away from putting this in place, but that should not be the case given the resource we have. I know there is a cost associated with it from the point of view of the Department. We need to address it.

There are probably some other points I intended to make. I have written so many notes for

myself that I am starting to get a bit confused. I am sure the Chairman is delighted that I am concluding.

**Chairman:** I ask the officials from the Department of Communications, Climate Action and Environment to respond. Anyone else who wants to come in on any of these issues should indicate that they wish to do so.

**Ms Rebecca Minch:** I would like to put the point that was made about the public sector building stock into context. The target set for the public sector is to improve its energy efficiency by 33% by 2020. That is even higher than the target set for the rest of the economy and society. Significant opportunities exist in this regard. It has been made clear in the SEAI's annual reports on public sector energy efficiency performance that since 2009, the public sector has improved its energy efficiency by 20%. It has reached the level that we are trying to get the rest of the economy to reach.

While good progress has been made, real challenges remain. One of these involves the deeper retrofit of the building stock. Much of the progress that has been made so far has come from behaviour change, which is extremely important, through the OPW's Optimising Power at Work scheme. We need to maintain our efforts in that regard. We have achieved a lot, but we are now at a juncture where we need to move on. The next step change in effort must involve achieving savings by upgrading the fabric of public sector buildings. To that end, the Department of Communications, Climate Action and Environment made €6 million available in 2017 for a partnership scheme between the SEAI and the OPW to carry out retrofits of central government buildings. This scheme had a successful first year. The critical thing is to get replicable packages in areas like procurement, specification and design that can be rolled out in a cost-effective way across the building stock. A further €2 million has been provided as part of a partnership between the SEAI and the Department of Education and Skills for a deep retrofit of ten schools around the country. Some of those schools have seen energy savings of as much as 40% as a result. All of that tells us there is a big opportunity in this area.

Of course, funding all of this has been a very big challenge in more recent years. The Department of Communications, Climate Action and Environment is leading a new governance network of senior managers across all Departments to identify a project pipeline out to 2020 but also beyond. We think our approach out to 2020, which focuses on heating and lighting, is a cost-effective one. We will take opportunities before 2020 as they arise. We are working closely with the SEAI and the OPW to identify where opportunities arise in the life cycle of public sector buildings and where it is cost-effective to carry out deep renovations.

New builds are also important. The public sector is showing the way in that regard. That is why the public sector is required to adhere to the nearly zero energy building regulations two years ahead of the wider economy.

**Chairman:** Would one of the witnesses like to answer the question about the mitigation measures under the national mitigation plan and answer Deputy Dooley's question about targets and costs?

**Mr. Michael Manley:** I will answer the question about the targets and Mr. Maughan will answer the question about the mitigation plan. Understandably, there is a big focus on the targets and the costs. There is always a focus on money. Essentially, the costs will be determined by how much we miss the targets by and how much it will cost to purchase statistical transfers. As I said at the outset, the renewable energy directive is not really a punitive instrument. It is

designed to create a framework through which countries can develop renewable energies. In fact, it has five articles dealing with international trade and renewable energy through statistical transfers. Statistical transfers through cross-border projects are important. Statistical transfers will be a system whereby those countries with a surplus will sell to those countries with a shortfall. We have been trying to get some sense of what that could mean. The Sustainable Energy Authority of Ireland, SEAI, did an analysis. It looked at a situation where we had to pay the cost of creating renewables in other countries. The figures were in a range of €65 million to €130 million for each percentage point. If a country misses a target by 3%, that would give a range of between €195 million to in excess of €400 million. There has been one trade so far. Luxembourg has done a trade with Latvia to make up its shortfall. If that sets a benchmark, then the total cost of 3% would be €60 million, which is €20 million per percentage point. Overall, the European Commission estimates that Europe will exceed the 20% target for 2020 and achieve 21%. In a normal market where supply exceeds demand, that impacts price. It is important that statistical transfers are not seen as a failure within the directive. They are seen as an instrument that a country can opt to use. It supports the energy union throughout Europe. It is not necessarily a preferred point of departure. A number of people have made a point about the new renewable electricity support scheme, RESS, and how we could play a role in accelerating its delivery and bringing forward solar, additional onshore or offshore wind energy, of which we are very cognisant. We aim to have the new RESS operational in 2019. There are a range of potential costs for statistical transfers but, right now, it is really difficult to put a precise number on where that will end.

**Mr. Frank Maughan:** To answer the Chair's question on mitigation plan measures, it is important to recall that when the mitigation plan was published in July of last year, it set out a range of measures which were already in place across Government for four separate sectors - electricity, the built environment, transport and agriculture - to address greenhouse gas emissions. It also identified a number of other measures on which work was continuing. In total, there were just over 70 measures, supported by more than 100 separate actions which were identified as necessary work to take forward for the consideration of individual measures. The short answer is that measures were in place. Some measures have subsequent announcements relating to them. For example, there have been announcements about the development of the support scheme for renewable heat, the renewable electricity support scheme and smart metering. The mitigation plan reflected a certain point in time and the position across Government then. It was characterised as a living document by the Minister. That very much continues to be the case. I bring back to the committee's attention the annual transition statement which was laid before the Houses in December of last year, which presented an update on the implementation of the measures in the mitigation plan across the system. It reflects, as I mentioned, updates which had been announced by the relevant Ministers and also updates where announcements from the budget acted to enhance and expand existing measures. That will be an ongoing annual, iterative process for the expansion of measures already in place or the announcement of new measures.

I will address Deputy Dooley's question on costs of meeting targets. As Mr. Manley has mentioned about the issue of compliance costs with renewables directives, there is a separate set of compliance issues around our targets for the non-emissions trading system, ETS, sector. Similar to renewables, the question is where we will land in 2020. Unlike the renewables directive, the legislation governing the non-ETS sector has individual targets for each year of the period from 2013 to 2020. Between 2013 and 2016, our emissions have been under our targets so we have been able to bank a certain amount of excess allowances to carry forward into future years. We know based on EPA projections and published inventory data that, notwithstanding

what we have been able to bank, there will continue to be a shortfall. It estimates, based on current policy implementation, a shortfall of between 11 million and 13 million tonnes, cumulatively, over those eight years. Those projections will continue to be updated annually by the EPA. The next projections are due to be published in March or April of this year. That will allow us to refine further our assessment of our shortfall between now and 2020. The other part of the equation is the price. Unlike the renewable space, it is probably fair to say that there is not a market on which we can identify the price on which we may end up purchasing allowances. The point is that the EU 28 are expected to succeed in reducing their emissions well below their targets. Cumulatively, the European Environment Agency estimates that we could see a potential surplus of €1 billion in allowances in the system overall. With that level of surplus, we would expect the prices to be quite low. It is only when we start to speak to potential seller countries that we get a sense of how much they are willing to sell their allowances for.

**Mr. Peter O'Shea:** The Chairman mentioned the report. She asked about 60% of all vehicles sold in 2030 being electric vehicles, EVs, and also about the infrastructure. I will point out two points in the report which might be of interest to members. A battery electric vehicle on the electricity system in Ireland right now would be twice as carbon efficient as an internal combustion engine. Right now, it is carbon effective to have a battery EV rather than an internal combustion engine. As the electricity system decarbonises further to 2020 and beyond that to 2030 and 2050, that ratio increases massively. There is no comparison between the amount of carbon produced by a battery EV compared with an internal combustion engine. The question was not about that but about the projections for 60% of all cars sold in 2030. We did much research to come up with the report. It was peer-reviewed research from different organisations across the globe. There is a general view that, before 2025, we will reach cost parity between the battery EV and the internal combustion car. At that rate, one would expect to see a much bigger uptake of the battery EV. We also expect that, by then, the range of the battery EV will be significantly beyond where it is now. Taking those two points together, I would argue that, to date, we have overestimated the penetration of EVs at different time periods. I think there is a real prospect that we will now underestimate it. I think the electric vehicle will take off in a really massive way and our research would show that.

On the question about infrastructure, the infrastructure has to be there. It is in three flavours. The first flavour is fast chargers. Think of motorway service stations. The Department is working with its work group about how that might come into play. I am confident that will come into play. The second is the matter of on-street chargers which we currently see. There is work to do to work out just where that fits. The third matter is domestic charging. To enable the electricity system to allow domestic charging at the sort of volume we predict for 2030, significant investment will be required in the distribution system in particular since there will suddenly be a whole street of cars to charge at the same time. That is a very different technical question for the distribution system than the current system where electricity demand is far more dispersed across individual users. I think, for the price controls that we will get into over future years, that will have to feature with regard to how one actually funds the level of investment required in networks to enable EVs. Five years ago had we asked about the electrification of transport, it was an open question as to whether it would happen. I think that question is done and dusted. It has been answered. Electrification of the small vehicle is, by the large majority view of analysts, the way it will go. Hydrogen will play a part in large vehicles but electrification of small vehicles will happen. All the things that need to be put in place to enable that will have to be put in place.

**Dr. David Connolly:** I will address the question about offshore electricity generation. Ire-

land has a huge wind resource. To give a sense of that, an SEAI report once estimated Ireland's wind resource at approximately 45,000 MW. We currently have approximately 3,000 MW. Our opinion in the Irish Wind Energy Association, IWEA, would be that it is about trying cost-effectively to get the best projects for the consumer out of that huge resource onto our system. With that in mind, we would commend the Department's proposal in the recent RESS for there to be technology neutral auctions. In that case, projects could compete with one another and the most cost-effective would then be brought forward to be developed. In that sense, the consumer is getting the best value projects onto the system. The IWEA's view is that the key to making that happen is for policy to remove any unnecessary barriers for either onshore or offshore companies when they access technology neutral auctions. Over time, as the price of offshore wind comes down and as the best sites for onshore wind begin to be used up, we are likely to see a transition where more offshore wind starts to come onto the system throughout the next decade. There should at least be more diversity in our portfolio. It is not about picking one over the other. It is about providing a platform where they can compete against each other for the most cost-effective projects to come forward. We call on policymakers to make sure that both technologies do not face unnecessary barriers in accessing the market, grid, planning and so on.

Deputy Dooley mentioned that the electricity sector is predominantly represented at this meeting. We echo that the shortfall is primarily in heat and transport but I reiterate they can take two lessons from the electricity sector. One is that the key to the success in the sector was a long-term stable policy. Energy is not something that can be fixed in a short two or three-term horizon. One has to have a long-term perspective because of the scale of the changes that are necessary. The sector has demonstrated how that can be achieved. Second, I echo the views on how electricity can be a key part of the solution to decarbonising heat and transport. We often use an electric vehicle or a heat pump, for example. They are three to four times more efficient than the fossil fuel alternative that is used. Electricity is a fundamental part of the solution to the shortfall in heat and transport.

**Chairman:** According to Mr. Sharkey's research, for every €1 of State incentive support, €3 is generated in economic activity. What is the basis of that research?

**Mr. Barry Sharkey:** I obtained it from an SEAI report, Ireland's Solar Value Chain Opportunity. The authority estimated that the photovoltaic, PV, market would be worth €341 million and that if we were able to build our expertise in that regard, we could capture some of the European market, which is valued at €4.5 billion. I have an article about a company in France that has won a contract in the state of Victoria in Australia for a wind turbine project. It is buying the wind turbines from Germany and the battery storage from the US. This is what the clean technology industry means. This is not impossible for Irish companies if we build up our expertise, but if we just build solar farms, close the gate without building up industry and expertise, that will not happen. I have been involved in this business for the past 30 years. I was winning contracts in Norway, Denmark, Spain and Portugal, buying in all the equipment and sending it and my technicians to those countries. This is what I mean by a clean technology industry and building up regional jobs in our industry. We must start small. People say the house of the future will be all electric. It will have electric cars, heat pumps, and cookers. I analysed what a future electricity bill will be and it will come in at approximately €3,500, which is a massive bill for every household. Every one of us gets an electricity bill. Some of us get two or three if we have a business, office or factory. We should examine how this bill can be reduced for people. I came up with an analysis that can reduce that amount by 40%. It can be easily done. I have not designed the system. It is being done in Germany. We should consider what is being done in Germany and Denmark. Denmark has the same population as Ireland and 18,000 people are

employed in the clean technology industry while 100,000 are employed in Germany and more than 1 million in California. Our industry employs approximately 100 people.

Can I have one minute to show how an electricity bill can be reduced?

**Chairman:** Yes, briefly.

**Mr. Barry Sharkey:** First, customers should install a solar PV and size it to the size of their house or business. That will reduce the bill by 30%. Next an energy diverter should be installed which prevents customers from releasing surplus electricity into the grid or else battery storage should be installed. Battery storage is currently used in domestic houses, for example, in Germany where 100,000 houses have it. Then off-peak electricity should be used to fill the batteries in order that the cost of an electricity unit can be halved and the batteries can be used during the day. Each homeowner should be given a subsidy which will cut the bill by another 5% and then they should become part of the smart grid, which the ESB is experimenting with in Dingle. If one has surplus electricity, it can be given to a neighbour or somebody down the street and they can return the favour. That will reduce the bill by another 5%. Between all of these measures and by being clever and doing something new, a bill could be cut to a more manageable amount. The people will not stand for us continuing to push up electricity prices and the public service obligation, PSO, levy every year. They have to be given relief.

**Deputy Eamon Ryan:** I agree with Mr. Sharkey. I am full of hope that we, as a country, will be brilliant at this. According to the EirGrid calculator, wind generates 2,951 MW, which is amazing, although it is a windy day. I think of the former head of EirGrid who swore to me only ten years ago that the maximum wind generation would be only 800 MW in the Irish system and that it was physically impossible and dangerous to go beyond that. Now it is running at 3 GW. EirGrid has demonstrated expertise since it gave up that old-fashioned view of the world and it has become a world leader in integration renewables.

I read with interest the scenarios and alternatives, which were referred to earlier. I would go with a combination of the low carbon living and consumer action scenarios. If I have read this correctly, EirGrid is saying that by 2030, we could have 75% renewables in our system. This is according to the experts. I scratch my head and I wonder. I have the height of time for Mr. Manley but why did the Department come out in the renewables support consultation before Christmas and say that as part of the mainstream scenario, the State will maintain the current level of renewables, with a target of 40% by 2030 being the height of its ambitions? That beggars belief in a world where China, California and Germany are pursuing an industrial revolution. I follow closely what the Department is doing in Brussels. I attended the climate summit in Bonn and met the head of the Climate Action Network who said it was terribly sad that in every file, Ireland was taking a negative stance when it came to emissions. That is why we are No. 49 in its world league table.

I refer to the Department's submission on 17 November to the European Commission on the renewable energy directive and its submission to the Commission on 5 December on the electricity market design and, in every single section, Ireland has taken a negative position regarding this revolution that is inevitable and under way. Why does the Department not set a 75% renewables target by 2030 and why does it not back that up in Europe by supporting inter-connection, community ownership and sectoral targets rather than opposing every one of those initiatives in those public documents?

Similarly, I have the highest regard for the ESB. It is the finest example of a semi-State

enterprise with a proud tradition and brilliant people, management and engineers. I despair when I hear the ESB representatives saying the issue of the ETS has nothing to do with us as policymakers, and they are in with Poland and we have to let them be because it is not their issue. If the ESB were a private company, I would agree with Mr. O'Shea, but in this case the public are the shareholders and, as Oireachtas Members representing the public, we have the right to say that the approach where the company keeps on burning coal in Moneypoint and other companies continue to burn peat in peat-fired power stations is simply not acceptable. It may be legally correct but politically it is just plain wrong. From my calculations based on the SEAI figures for 2016, there are 7 million tonnes of carbon per annum from those four power stations. I agree about electricity, which is represented here, being 60% of the solution but it cannot be 10% or more of the problem. If we switched them off tomorrow, it would not have a single effect on the security of electricity supply. It would improve our competitive position because the peat is so expensive. It is doable and it helps us in a whole range of other energy sectors or industry sectors where the likes of Apple and others are saying they want 100% renewable power supply. We can do that but not if we keep burning coal and peat. It has to stop now. From the public policy side, as the ESB is representing its shareholders, who are the Irish people, it should stop and stop telling us it is an ETS market, it is complex and if we give up, Poland will keep going. We will deal with Poland separately in foreign affairs but in terms of Irish domestic policy, the ESB has to stop now.

I will make two other points. Mr. Gannon said microgeneration is complex. It is complex because of net metering and how prices are decided. We have to look at the demand side and management, so it is very complicated. I agree 100% with Mr. Sharkey that we should be aiming for 2.5 GW of rooftop solar energy in 2030. Mr. Sharkey has said two years, which would be a miracle, but even if it takes ten years to achieve 2.5 GW, we should aim for it. My understanding of the EirGrid scenarios is that if we added 3 GW of offshore wind and 1 GW of onshore wind, we would be at 75%. That is all doable technologically. When I hear Mr. Gannon saying it is complicated and cannot be done in a short period of time, my response is we have been thinking about this for ten years. Which of those mechanisms would Mr. Gannon support if he was asked tomorrow by a Minister who wanted to announce rooftop solar energy next Friday? This is a revolution.

We have a difficulty here. It is very good to have all the people we have here but they are all representatives from the generation side and they do not even represent all the generation side. We do not have offshore wind, which is a huge opportunity for us. I agree with Deputy Dooley that we should not just be thinking 3 GW. When that offshore floating technology comes, there is nothing to stop us from putting 10 GW off the west coast and, with interconnection, shipping it into the rest of Europe. We could put 5 GW in the Irish Sea and another 5 GW down off Cork. That is what we should be thinking about. That is what the Chinese are thinking. That is where the real world is at. I was at a conference in Brussels a few months ago with big developers. People told me they are thinking in 5 GW chunks. How come we are not thinking at that scale of ambition as a country? That is what the ESB should be thinking of in line with its proud tradition of thinking big and long term. When we have to do our work, it is difficult because we have not even looked at transport, heat or the demand side, which is efficiency and heat retrofitting of domestic buildings. It is really good we are hearing from representatives from the generation side today. The question I would ask the Department is why not aim for 75% by 2030. EirGrid is a world expert in how to integrate renewables. Why not go for that? Why not do a solar support scheme straight away for rooftops because that is part of the revolution we need? The industrial revolution is in the balancing of all this power supply. It is huge for the ESB because it will not be the death of the grid. If there are heat pumps and EVs, all

the demand will be on that domestic grid. The amount of work to be done in getting that right is massive and that is what we should be doing.

**Chairman:** If the witnesses could bank those questions, I will go to Senator Lombard before I go to the witnesses.

**Senator Tim Lombard:** I will be brief. I missed some of the presentations because I was at other meetings. I have two questions for the Department and one for Mr. Maguire. I have an issue with where we are with our emissions and where we will be going with our emissions. We are now talking about 2020 but I am asking about after 2020. We have two coal plants on the island that are considerable. There is Moneypoint and there is one in Carrickfergus in Northern Ireland. We have an all-Ireland grid. That is where we are at the moment. With Brexit coming down the line, we have issues regarding licensing. Different licensing could be brought in. What negotiations and what thoughts has the Department put into those issues? Where is the Department regarding an all-Ireland electricity platform if we have a Brexit? How will we deal with the regulations attached to it? If we have one coal plant in the South doing one thing and sticking to the regulations and one coal plant in another jurisdiction in the same energy network doing something else, how can we work towards targets after 2020? I am asking what body of work is behind that thought. What information can the witnesses give to assure me we have a plan in place and that we are thinking about it and planning for an unfortunate situation if it arises? I do not know what will happen with Brexit but I want to know the plan.

The other issue for the Department is solar farms, which have been an issue in recent months if not years. There have been issues regarding planning permissions that we have seen throughout the country. Tonight we have no planning guidelines for those solar farms. Local authorities and local councils throughout the country have been requesting the Department to bring forward those guidelines. There have been several motions passed throughout the entire country. We have not seen them. We have no indication they are happening. The line we got back is that there are appropriate measures in place. The view of some local authority planners is that there are not. What is the Department's view on that? Will the Department be bringing forward guidelines and when will it be bringing them forward? It is holding back the industry. It is holding back the ability of local authorities to make proper planning permissions, when we take into consideration some of the decisions by An Bord Pleanála in recent months. It is a key issue in why the industry has not progressed, why some planning has not progressed and why some residents feel their voices have not been heard. The industry can move forward. It is a very important tool that the Department needs to come forward with. The Department could say it is the responsibility of the Department of Housing, Planning and Local Government but it is an important issue that the Department of Communications, Climate Action and Environment should look at and on which it should bring forward recommendations.

My final question is to Mr. Maguire on solar farms. If the tariff issue were to be sorted tomorrow morning, when does he think they could be installed and what impact does he think it would have on the impending financial penalty issues? What does he believe he can bring to the table regarding those financial penalties?

**Chairman:** I will go to the Department first to deal with Deputy Ryan's questions and those of Senator Lombard.

**Mr. Michael Manley:** I will try to deal with Deputy Ryan's questions as best I can. On the issue of the level of wind in the system, for us to have 40% renewable wind in the system, we have to have the capacity to take up to 75% at peak times. The wind does not blow all the time

so we have to take as much wind as we possibly can when the wind is peaking. Currently the target is 40% for 2020. In that consultation, we model at 45%, 50% and 55%. It is not as if 40% is something that is chiselled in stone and which we see as immutable and unchangeable. Going forward, we will certainly have to increase the level of renewable energy in the electricity sector. Wind can be part of that. Solar will be too. The analysis of offshore wind shows the potential for 4,500 MW of offshore wind. That was on the older, smaller turbine. It is likely that number will be increased. In terms of the ambition for 2030, decisions have not been made on that yet. Ireland has to produce its draft national energy climate plan this year. It will be set against the context of an EU ambition to start at 27%. Yesterday the European Parliament opted for 35% and the Commission will likely cascade that down and look at how member states will contribute to it. I cannot say it will be 70% in 2030 but certainly there is a recognition that we have to increase our renewable energy, particularly in transport and heat.

**Deputy Eamon Ryan:** Do we support the European Parliament's overall target of 35% for renewable energy?

**Mr. Michael Manley:** Thankfully, that is a matter for the Minister and not me. It will be a political question. The national energy and climate plan will eventually go to Cabinet and will have to have Cabinet approval before it is submitted, so there will be a political decision in terms of the ambition there.

**Chairman:** I will let Mr. Manley continue with his answers and then I will bring in other members.

**Mr. Michael Manley:** We were very active in the negotiations. We were very supportive of the agreement at the Council's conclusion in 2014 on the overall targets, but in terms of the actual text we have seriously engaged and we were concerned throughout that we would have a text that works for us. As the UK exits the EU, we will probably be the only member state using English as a first language. We will also be the only one relying on common law. We are generally exercised about how things are structured and about there being sufficient flexibility within the language of instruments so that we can actually deliver. It is not an effort to weasel out, but a search for suitable language. There was some media coverage at the time. For instance, at one stage we sought to have the words "at least" removed. Our reason for that was that we were concerned others would oppose it. We felt that if the text was removed, the debate around that issue would be removed. Others saw it differently and as us being hostile to the proposition. That was very much not the case.

Senator Lombard asked about emissions. I will leave emissions to my colleague but we have been very active with regard to Brexit. We are very cognisant of the fact that we have an all-island single electricity market, which is probably the single greatest exemplar of a common market in Europe. We have engaged with the European Commission, the UK and Northern Ireland. We have had two civic dialogue events, one was a very wide event with very wide attendance and the second was more industry focused. We wanted industry to come in and tell us how it saw the issues arising there. We have surfaced the issues that are of concern to us. The answers to those questions are not in our gift. They very much depend on the final arrangement between the UK and the European Union. We are conscious that for things like the single electricity market to work, there will need to be oversight mechanisms and common and level playing fields. We will have to be EU compliant because we are staying in the Union. We will need devices and mechanisms to that end. We will continue to engage with the UK throughout the current process. It is very important that the agreement reached before Christmas, apart from dealing with Irish issues, provides that Irish issues will remain a live dimension as sectoral

issues are discussed.

On coal plants North and South, I acknowledge that the UK published a paper the week before last which said that it would have no more unabated coal. To an extent, that reflects the age of its coal fleet. Its coal fleet was generally built in the 1960s, whereas Moneypoint was built in the 1980s. There is a significant age difference and there is an advantage to the UK being an early mover on that issue. The White Paper provides that decisions will have to be made on Moneypoint before the end of 2020, as it will come to the end of its natural life in 2025. There is a real recognition that we may be ending coal-fired electricity generation at that point. It will not be a simple issue however. There is over 900 MW of generation capacity at Moneypoint. It is at the end of the 400 kV link from the west coast to the east coast. Moneypoint also represents one third of the rate base of County Clare. There are significant economic and generation issues in managing the transition away from coal and into other fuels at Moneypoint. I do not know if that fully answered the question. I hope it did.

**Senator Tim Lombard:** Just to prove the point, 30% of our energy is produced in Cork. That industry accounts for a fifth of the local authority's rate base. It is a significant driver in the economy. The rate payer issue is very important. My issue is on the compliance element. Mr. Manley just touched on it. If there was a difference in regimes in two parts of this island with one energy network, how could it be ensured that compliance is appropriate?

**Mr. Michael Manley:** That will be a key issue in the discussion. It will take wiser heads and more time to work it out.

**Chairman:** In respect of planning, I know it relates to a different Department but it has a significant impact here.

**Mr. Michael Manley:** In fairness, we are conscious of that. We put in a lot of work on planning for wind energy with our colleagues in the Custom House throughout 2016. Very shortly there will be a public consultation on the strategic environmental assessment. On solar energy, the Minister, Deputy Naughten, has written to his colleague pointing out that this issue has been raised as a concern and that he believes it is a matter worthy of consideration.

**Chairman:** Did Mr. Maguire want to come in on Senator Lombard's remarks?

**Mr. David Maguire:** Perhaps I could touch on the planning point in the first instance. There is an absence of national guidelines on planning and that is a matter of some concern. However, as an industry we believe that the planning regime is sufficiently robust to filter out any poorly sited projects. The main impact of large scale or utility scale solar energy generation is visual. There are no emissions and no moving parts. That is the key issue. To that end, and in the absence of national guidelines, we have produced our own planning recommendations and guidelines. We have sat down with senior officials from the relevant Department. We have presented our guidelines to them and are hoping for feedback. We engaged widely with An Taisce, Friends of the Earth, the EPA and various other bodies on this document. We have sent it out to local authorities. There is a statutory requirement for planning, but as an industry we have sought to raise the bar in terms of what we deem best practice and what we have seen from our experience in Europe in the past 20 years. We have sought to bring those planning practices to Ireland where they are applicable. We have done that as an industry.

With respect to what we can deliver, when we can deliver and how much it will cost, if we look at the order of merit of deploying renewables in Ireland, our wind resource is second to

none in Europe, with the possible exception of Scotland. In terms of the deployment of renewable energies that should be where we look first. One of the key pillars of the Department's role is energy security, which includes having a diversity of energy generation in the mix. After onshore wind, solar is the cheapest form of renewable generation in Ireland by some margin. That is where we should go in the second instance. On the mix of those two forms of generation, because of the Irish climate when it is windy we tend to have lower light levels and when we have high light levels, we tend to have lower wind levels. The two kinds of generation are very complementary.

From that perspective, geographically we also have the east and the south east coast. The south coast is where the greatest solar resources are located. It is also where there is a lot of grid capacity available at the distribution level. Those assets - grid capacity and solar resources - are assets which wind energy cannot avail of, so again solar is a good fit there.

What can we deploy? On what we have in planning and in the grid at the moment, members will have heard numbers such as 6 GW in the grid queue and so on. We have called for a lot of that speculative grid application. With the regulator we have sought to have a group processing approach, GPA, or gate processing approach, which would filter out many projects. We want to see planning as a filter so that only the real projects come forward. Already, just looking at what will come through between now and the end of 2020, as an industry we could deliver 2 GW. We already have line of sight to 1.5 GW. In order to have a competitive auction for 1.5 GW, we need at least 2 GW ready to go with planning. What does that equate to? If we can deliver 1.5 GW by the end of 2020, what will that save us in terms of the shortfall on our 2020 targets? Approximately 1% of that target equates to 1 GW of solar energy. We could halve the potential shortfall. If we look at a total shortfall of up to approximately €420 million, we could potentially save the Exchequer more than €200 million per annum at the cost of approximately €15 million per annum on the public service obligation, PSO, levy. Solar can deploy very quickly. What is holding solar back on the grid side is the long lead-in, the switchgear and so on. The reality is that we can still deliver that much at the distribution level within the timeframe, that is by 2021.

**Chairman:** Does Mr. Gannon want to come in at this point? Deputy Ryan is indicating.

**Mr. Jim Gannon:** To respond to Deputy Ryan, at the moment solar photovoltaic, PV, activity is catalysed both by incentivisation and regulation in this country. Quite a bit of photovoltaic capacity has been put in through our better energy communities programme, which will cost a little more than €20 million this year, and it is growing all the time. Accelerated capital allowances allow people to chew back through tax for solar PV technologies more quickly than they would normally be able to. The home renovation incentive also gives a VAT exemption for PV. On the regulation side, the near-zero energy buildings for both residential and commercial purposes will generally lead people towards PV. On the research and development side, we funded research on blockchain last year and have funded research on PV technology itself. We have performed the supply chain study which the Deputy is talking about. We also conducted a study of the planning aspects, including what planning guidelines look like in other jurisdictions and what lessons could be brought back to Ireland. As such, I would not say that there is little activity or no incentivisation.

I was asked a specific question about what I would vote for tomorrow. I am not sure. I will get to the end of it. Net metering has been an almost abject failure in the various European countries where it has been attempted. Grant support is a case in point. It is what we have and what we know. A PSO exemption has been discussed in Ireland. It would have a considerable

cost in terms of the background systems and executing it would be challenging. Generation tariffs have worked in some jurisdictions and not in others. If asked tomorrow to make a decision, I would say that we should go with what we know until we see something better. Unfortunately, that means grant systems. While grant systems work and incentivise activity, they can become blunt over time and turn into inefficient market supports that are depended upon by a supply chain. They need to have an end in sight. Such systems need to prime a market without necessarily having the market resting on them.

Then there are the other issues at domestic and commercial scales that the supply chain and PV customers are mentioning. On behalf of the Department, we hosted a workshop on micro-generation during the renewable energy share, RES, consultation. We invited people to attend. Separately, we suggested that the microgeneration community get together to decide what it should collectively submit to the RES and to outline the common challenges.

Planning remains a challenge not just in terms of the uncertainty around the conditions, but the uncertainty around the exemptions that are in place and whether they are still appropriate for updated technologies. The quality and depth of the supply chain is a major issue. What would happen if we turned on a massive tap of incentivisation tomorrow? Even in our modest deep retrofit pilot, the quality has not been there to date. It is not the supply chain's problem, but it needs to be developed over time. We need to ensure that the designers and the people who will tie in to the various ESB Networks boxes consider what the implementation of 30 or 40 of these devices in a housing estate that is just 45 houses big with one box at the end will entail.

In terms of the quality, specifications and standard of products entering the market, the SEAI's experience has been that, if one turns on the tap too quickly, the supply chain, through no fault of its own, has a challenge keeping up with demand. There is a risk. It happened with other technologies eight or ten years ago. If the tap is turned on too quickly, it can discredit a technology or give people a first bite that is negative as opposed to positive.

We are pro-microgeneration once it is cost effective for the consumer and the community. There are technical and economic challenges if microgeneration is just viewed from a cost-benefit analysis perspective, but there are social benefits in terms of the individual taking ownership of it in his or her home, as Deputy Dooley mentioned, and accepting other technologies and infrastructure. Those benefits can be significant and provide a major opportunity for the supply chain to grow to a sustainable level.

The challenge for us is that, if one incentivises to a large degree at the start, the supply chain will not necessarily grow in a sustainable way. That is part of what we are examining. We are testing it, looking for the training and technical gaps and determining what sort of capacity is needed in light of those gaps. Significant activity is under way, but there are challenges depending on the route one takes and the speed at which one turns on incentivisation, be it purely regulatory or purely incentives.

**Chairman:** Before I call Deputy Ryan, Mr. Garrett Blaney of the Commission for Regulation of Utilities, CRU, has indicated. If anyone else wishes to contribute before we wrap up, he or she should indicate. I will also invite Mr. O'Shea and Mr. McCarthy to speak.

**Mr. Garrett Blaney:** I have just taken over as the chair of European energy regulators. As part of that process, I have engaged with various European regulators on, among other matters, the question of distributed resources. We have debated solar panels on people's roofs and the potential impact of electric vehicles, EVs, and electrification generally as it comes through.

The experience at European level has shown that there are good ways and bad ways of doing this and that we could incur significantly higher extra costs. Mr. O'Shea referred to the need to spend much more money on systems and the network, but we need to be careful. Electrification may be the cheapest solution for doing much more at a distribution level, but we need to approach it carefully and in a smart way. Using smart meters and encouraging and allowing consumers to engage and be active players in the market will help with their costs as well as overall costs in the system.

As a regulator, we have been actively engaging with best practice. We have some leadership to show in this regard. There is no standard solution that will necessarily work. Ireland can be a part of delivering that. We have heard about new technologies like blockchain. There are many clever technologies that we can access. We have come in at a good time. The reduction in the cost of the solar resource available in the system has been fundamental in recent years. There is an opportunity for Ireland to tap into that. Not only are we decarbonising, but we are doing so at the least cost and in a way that enhances the competitiveness of the economy and ensures that, rather than adding to consumer poverty, we enhance the consumer's overall cost position.

**Chairman:** I thank Mr. Blaney.

**Deputy Eamon Ryan:** Well done to Mr. Blaney, the chairman of the board of regulators of the Agency for the Cooperation of Energy Regulators, ACER. Also from Ireland are the CEO of Ofgem, the UK regulator, and the Permanent Secretary of the UK Department with responsibility. We have just sent over one of our best grid people to run the UK's grid for it. We are good at this, but we will no longer be good if we delay on solar. Now is the time to do it. While there is a risk to the industry and solar has to be built up, there is also a risk to the people in the industry who have been working on this for ten years and crying because every obstacle has been put in their way. It is time for that to stop.

As we stated in our submission, there should be a support price on export only. That encourages efficiencies and helps to fold the envelope and play our bit in a connected system that has to balance the grid locally. It needs to go beyond a grant or community scheme. Everyone needs to be involved because what Deputy Dooley said was true. Ultimately, what matters in this is politics, specifically public and political support for a transition. Technology is not the issue. We will learn and make mistakes, but we must have public support. We will get it when people feel like they are a part of it, understand it and benefit from it. This will not just unlock solar generation, but also EVs, heat pumps, efficiencies, retrofits and everything else. It will unlock the farming community, which has to be on the green side. It already is, and it is begging for some kind of support for putting tech on a barn.

I would be interested in the regulator's opinion regarding a support price on export only. It would not have a large effect, and certainly not in the next five years. If it suddenly became a runaway success with 3 GW, we could manage that, but it is time to support rooftop solar and community energy. We must do it now.

**Chairman:** I will call Mr. Sharkey after Mr. O'Shea and Mr. McCarthy.

**Mr. Peter O'Shea:** I will address some of Deputy Ryan's comments. I was asked to speak on Ireland's targets. The EU emissions trading system, ETS, is an important element of that. We did not create it, but it is a part of the regulatory mechanism with which we must deal. In the past year, changes have been made to the ETS to increase the pace of reductions. The ESB supported those changes.

As to the broader perspective, we have set out in our report, entitled Ireland's Low Carbon Future - Dimensions of a Solution, how we could see the energy system as a whole rather than just the electricity system being decarbonised between now and 2050.

Moneypoint was mentioned. For us, it is a matter of when, not if, Moneypoint transitions away from coal. Among the issues we are considering is the exact timing of that. It is the youngest coal-fired power station on these islands. Others can judge whether that fact is important, but it is important to recognise that Moneypoint is the largest single store of energy on this island. Moneypoint can hold three months of fuel, which would be invaluable to the island if a security of supply issue arose. That comment is just meant to balance the argument. Moneypoint meets approximately 20% of our demand and acts as a good counterbalance that enables wind and other intermittent plants to operate.

We undertook a joint report in 2015 that indicated that, between 2008 and 2020, Moneypoint would save Irish consumers an average of €200 million per year based on modelled prices. ETS is important because it sets an overall volume of carbon that can be emitted over a period across Europe. If we close Moneypoint before it is economically efficient to do so, we will lose the security supply benefit and the cost benefit to Irish customers, notwithstanding the fact that it is not clear it would impact positively on the environment. That is because of the way the trading mechanism that is ETS works, whereby other coal plants across Europe, which may be far less efficient, will generate the carbon instead of Moneypoint. It is important to understand all the issues around it. The Department mentioned earlier that the White Paper indicates 2025 as a period and we are looking at the various options around that. It is important to balance the security of supply issue, the cost issue and the fact that, due to the way ETS works, there would be no environmental benefit if we closed it in the morning. The carbon that Moneypoint emits would be taken up by other power plants across Europe.

**Chairman:** I will bring in the Irish Solar Energy Association next.

**Mr. Michael McCarthy:** When I was Chairman of this committee in 2014, we had long and arduous discussions in this room around the issue of climate change legislation. We found unanimity in the end and published a report, which was widely welcomed. I recall that the mantra at the time was that the clock was ticking. It is now 2018 and we are edging ever closer to 2020. In terms of the deficit where we miss our targets, we have a very strong and viable position in the Irish Solar Energy Association. With the rapid deployment of solar projects, all depending on the outcome of RES, we could put 2 GW on the system. Ours is the only technology which can provide new generation by 2020 in terms of planning, grid and rapid deployment. A critical issue for us is the manner in which RES, once its gets the green light and comes back from the Directorate Generation for Competition in Brussels, focuses on the auction aspect of what is intends to do. We have argued consistently for a technology-specific process which is key to ensuring we get new generation for solar and a native, viable solar industry up and running.

We have published our own documentation on community participation proposals which is available on our website. In the context of popularising solar, we have a strong case around rooftop solar to complement the large-scale, ground-mounted projects some of our members have. Rooftop solar is the way to create the energy citizen. In effect, it democratises energy and allows people in their homes and businesses to generate their own electricity. I welcome the fact that there is a role for the SAI in the RES document to develop microgeneration schemes. That would be huge and useful to popularise the technology. KPMG compiled a report a number of years ago on a brighter future which looked at many aspects of what solar can do for our economy not only in terms of foreign direct investment, but also in terms of job creation. This

was against the backdrop of a country that had seen its unemployment rate hit almost 16%. It is now, thankfully, down to 6% and there is an ambition on the part of Government to see the figure reduced to zero. With a strong and viable native solar industry, we can contribute, according to a conservative estimate, approximately 7,300 jobs per annum. For every €1 invested in solar, there is a gross value add of approximately €3.

I welcome the fact that we are having a wide-ranging discussion with other significant stakeholders in the industry at the committee today. To deploy solar and meet our 2020 targets, time is of the essence. The sooner we get a policy support mechanism in place to see the advancement of large-scale, ground-mounted and rooftop solar, the sooner we can get the industry going to help to meet our climate targets.

**Chairman:** I call Mr. Sharkey to give his final comments.

**Mr. Barry Sharkey:** I would appreciate it if Mr. Gannon put some structures in place to turn on the tap just a little. I speak on behalf of solar PV installers nationally. We have a stop-go scenario and there is not enough work for us to keep working every week or every day. Half the month is what we are working and, as such, we need Mr. Gannon to turn on the tap. He should not be afraid that he will drown us.

We did not discuss curtailment, which is becoming a huge issue in a lot of countries where the level of wind is increasing. It is a very fancy word for dumping electricity. Much of the electricity that has been generated in the few weeks since Christmas has been dumped. Why are we dumping electricity and then charging people 18.3 cent a unit? My proposal on a future system for homes, which includes battery storage and off-peak metering using smart meters, would mean electricity could, instead of being dumped, be fed to businesses, homes and farms at a reduced rate. However, we are way behind the curve as regards energy storage and I have heard no discussion about it here today. Every large wind or solar project internationally is installing energy storage as part of the package.

Rooftop solar can be rolled out in significant quantities. One is talking about up to 1 MW. However, in Ireland, one is only allowed to put six panels on one's home without seeking planning permission. It is a bit silly. A farmer can only install 38 or 40 panels without seeking planning permission. On the one side we are saying, "Go ahead, here is your grant and incentive to install this stuff", while on the other we are saying, "No, you must apply for planning permission". That is a big turn-off for many businessmen who do not have the time. We must look at our existing planning requirements for rooftop solar panels, which are very restrictive.

Last but not least, I have a quiz for the committee. What caused the Great Famine of 1845? The answer is that bad policy decisions caused the Famine. A group of politicians and policy-makers sat around in a room and said, "We must keep exporting the food to meet our balance of payments, pay the rent, provide for the army and supply the British market". What caused the Famine to run on for five or six years was inaction and bad decisions. I have been waiting ten years for a decision on solar PV. I sold a brilliant business in 2009 thinking the next revolution was in renewable energy and I have been waiting ten years for it to take off in Ireland.

**Chairman:** Finally, I bring in Mr. Peter Harte of the Irish Wind Energy Association, who has indicated.

**Mr. Peter Harte:** I will be very brief. Curtailment is something the wind industry has worked with over a number of years. It is at a relatively low level of 3% to 4% currently and is

projected to go to perhaps 5% by 2020. It is by no means a limit on how much wind can be put on the system. EirGrid's own good work on flexibility measures, the electrification of heat and transport in future, the provision of additional interconnection and, in due course, the provision of storage will mean we can get to 2030 at the 70% level. We have done the work ourselves and EirGrid will back it up. I think the regulator would see the same sort of numbers. We can get to 2030 also with no lower amount of curtailment. In due course, if solar goes to high levels, it will find the same problems. We have a very clear vision that we can get to 70% without high curtailment by 2030. Certainly, the onshore resource alone could probably get us there, but in due course the mix will no doubt widen to solar and offshore. We look forward to that day.

**Chairman:** I thank all the witnesses for attending. We will hold a second meeting on the issue in the near future. It is proposed that the committee will publish the submissions received on our website. Is that agreed? Agreed. Tomorrow, the committee will commence detailed scrutiny of the Waste Reduction Bill 2017.

The joint committee adjourned at 7.30 p.m. until 1.30 p.m. on Wednesday, 17 January 2018.