I would like to begin by thanking An Cathaoirleach and the Committee for the invitation to appear today. My name is Muireann Lynch of the Energy Economics team in the ESRI and I am accompanied by Dr Kelly de Bruin of the Climate Economics team.

The brief for today's meeting concerns energy poverty and has three subparts. I would like to address the first two together.

Defining and measuring energy poverty, and the impact of increased carbon taxation

(1) Review of the most appropriate measure of, and the extent and nature of fuel poverty across all cohorts.

(2) The short, medium and long- term impact on fuel poverty of the options for increasing the carbon tax

The appropriate measurement of fuel poverty is not a settled question in the literature. There are generally three distinct definitions:

A) The first definition considers a household to be experiencing fuel poverty if they spend more than a certain percentage of their total income on fuel. This percentage is typically set at ten percent of net income excluding housing costs, and this definition has been adopted by the Department of Communications, Climate Action and Environment.
B) The second measurement considers modelled rather than actual spend. In other words, the expenditure on fuel that would be required to achieve an adequate temperature is determined, taking into account household and dwelling characteristics. The household is again considered to experience fuel poverty if this expenditure is above a certain percentage of total household income.
C) The third metric relies on self-reported subjective data, and categorises a household as experiencing fuel poverty if they have difficulty affording adequate heating or fuel.

At this point, I would like to note that these definitions pertain to household thermal energy expenditure only, and do not consider costs of private or public transportation.

Choosing an appropriate measurement of fuel poverty from the three above is not straightforward and the reasons for this are perhaps best explained by means of a simple example considering a carbon taxation increase (part (2) of the Committee's brief), as well as considering the eleven Indicators of Basic Deprivation, the full list of which I have provided as an Appendix to this Statement. A household is considered to be experiencing Basic Deprivation if they are unable to afford two or more of the eleven items. I would like to stress at this point that the figures chosen here are purely indicative.

The Murphy household is a low-income household that currently spends just below ten per cent of their income net of housing costs on fuel. They live in a poorly insulated house and have a low efficiency gas boiler for central heating. They cannot afford one of the eleven indicators of basic deprivation, meaning they are not currently considered to be experiencing basic deprivation.

Carbon taxation is increased by some quantum which means that, assuming the Murphys make no change whatsoever to their behaviour, their energy bills increase by €200 per year. The Murphy household includes a small baby and an elderly relative, and so reducing the extent to which they use their central heating is not an option. Therefore, they continue to heat their house as normal, and are now considered to be experiencing fuel poverty under criterion (A), which relates to actual fuel expenditure, and under criterion (B), which relates to modelled necessary fuel expenditure. They can, however, "afford" their energy costs, and so are not considered to be experiencing fuel

poverty under criterion (C), which relates to self-reported ability to afford fuel. In order to afford the increase in their energy bill, the Murphys reduce expenditure on social activities and put off replacing worn out furniture, and now cannot afford more than one of the eleven items necessary to be considered as experiencing basic deprivation. Assuming fuel and carbon prices continue to rise, this effect will hold in the short and long run.

Suppose instead that the Murphy household consists of a couple with teenagers. They decide to reduce the extent to which they use their central heating by turning off the heating in the morning, leaving the house earlier and eating breakfast at work or school rather than at home. Here the Murphy household does not qualify as experiencing energy poverty under criterion (A), but does qualify under criteria (B) and (C). They also qualify under the measure of basic deprivation (as inability to keep the house adequately warm is one of the eleven items that indicate basic deprivation). This holds in the short and long run.

Finally assume the Murphys take out a loan of €2000 from the Credit Union to buy a new more efficient boiler, that reduces their annual energy bills by €300. They repay this loan at a rate of €21 per week over the next two years, and again pay for this loan by reducing their expenditure on social activities and replacing worn out furniture. In this scenario, the Murphys do not qualify as experiencing fuel poverty under any of the three criteria. They are, however, considered to be experiencing basic deprivation, for the next two years. In the long run, once they have paid off the loan, they do not qualify as experiencing either fuel poverty or basic deprivation, under any definition.

ESRI research on energy poverty

Notwithstanding the difficulties associated with measuring fuel poverty, several pieces of ESRI research have considered this question. At this point I would like to draw attention to two of the more recent papers. Roantree and Bercholz (2019) estimated the impact of an increase in carbon taxation on fuel poverty, using definition (A) above. They found that increasing carbon taxation from €20 to €30 per tonne increases the percentage of households spending more than 10% of their income on heating from 17.4% to 18.1%. They also found, however, that according to the self-reported definition of energy poverty, definition (C) above, only 8.7% of households are considered to be experiencing energy poverty. This highlights the sensitivity of fuel poverty policy to the definition chosen.

The second piece of research I would like to mention at this point is by Watson and Maitre (2011). They analysed data from the indicators of basic deprivation, and found that energy poverty is not a distinct type of deprivation. In other words, households that experience basic deprivation and households that experience fuel poverty are one and the same. In order to target households in fuel poverty, it is sufficient to target households in poverty. The illustrative examples of the Murphys above should go some way to explaining this result: poverty is a problem of limited resources. A family with insufficient resources to achieve an adequate standard of living must decide where to prioritise expenditure, and different families will have different priorities. Given the difficulties associated with defining and measuring fuel poverty, a policy that seeks to mitigate the impact of carbon taxation on *poverty* will therefore perform at least as well as a policy that seeks to mitigate the impact of carbon taxation on *fuel poverty*, and may well do better.

Protecting those on low incomes

This brings me to the third subpart of the Committee's brief, how to protect those on low incomes. There are several recent pieces of ESRI research on this topic, the aforementioned paper by

Roantree and Bercholz, a paper by myself and Dr Miguel Tovar Reaños, and several pieces of work by Dr de Bruin and her colleagues. They use different datasets and methodologies, but the broad conclusions are similar. I have attached a detailed summary of the three pieces of work as an Appendix to this Statement. The main results agree that, as is the case in all high-income countries, increasing carbon taxation is regressive, which means that less affluent households would pay more in carbon tax, as a proportion of their total income, than the most affluent households. However, all three pieces of research have found that these impacts can be reversed by recycling the revenues raised from carbon taxation back to households. While these papers do not specifically consider the impact on fuel poverty, we find several ways of recycling carbon taxation revenues that leave the poorest cohorts of households better off. These cohorts naturally include those experiencing energy poverty.

Different recycling mechanisms have different impacts. Roantree and Bercholz find that giving every household an equal share of revenues makes every income decile better off, with the lowest income decile experiencing the greatest proportional increase in income. However, 23% of households, across all deciles, are worse off, even after compensation, including 21% of the households in the lowest income deciles. If we recycle the revenues to households through increasing tax credits and social welfare payments, rather than via a lump sum, all income deciles are also rendered better off on average.

Similar findings are made by myself and Miguel Tovar Reaños. We find that a flat allocation of revenues raises the incomes of the poorest households by the highest amount in proportional terms, but targeting revenues to poorer households, for example through the social welfare system, is more progressive again. In addition, we examined the impact on total income inequality, and found that combining carbon taxation with revenue recycling actually reduces income inequality, relative to a business as usual scenario. This is in addition to the reduction in carbon emissions that comes about as a result of the tax increase.

Dr de Bruin's team has analysed the economy-wide impact of carbon taxation and revenue recycling, which takes into account all behavioural and economic impacts. They find that recycling the revenues to households, either through a lump sum or through the social welfare system, mitigates the impact on those on low incomes. Poorest households benefit most when the social welfare system is employed, but all households better off under this policy, with the exception of the highest income cohorts in both urban and rural settings, who experience small declines in income. If instead we recycle the using a combination of income tax cuts and transfers to households, either via a lump sum or via the social welfare system, all households are better off, but richer households gain more than the poorest cohorts.

In conclusion, energy poverty is difficult to measure, and the final determination of the extent and degree of energy poverty is highly sensitive to the definition chosen. However, households experiencing energy poverty are included in the wider set of households experiencing poverty, and therefore the most appropriate policy response may be to consider the impact of increased carbon taxation on poverty, rather than energy poverty. The research is clear that combining carbon taxation with appropriate revenue recycling can render the entire policy initiative progressive, with poorest households being the greatest beneficiaries. Recycling revenues through the taxation and welfare system is therefore an obvious way of protecting low income households.

I'd like to thank you very much again for the opportunity to present this research to you and we would be happy to answer any questions you may have.