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Government of Ireland

Public Consultation on a Micro-generation Support Scheme in Ireland

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Prepared by the Department of
the Environment, Climate and Communications
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1 Executive Summary

This public consultation focuses on the high-level design options of a proposed new Micro-Generation Support Scheme (MSS) for Ireland. It follows on from the Economic Assessment of Renewable Technologies to underpin the Renewable Electricity Support Scheme RESS[1] commissioned by Department of Communications, Climate Action and Environment (DCCAE) in 2017, which considered micro-generation and identified challenges that needed to be addressed if an equitable approach to supporting prosumers and micro-generation is to be delivered.

It uses the evidence base of a piece of analysis work that is being undertaken in parallel, an assessment report on economic and policy advice to support the design and implementation of the new micro-generation support scheme in Ireland (commissioned by the Department of the Environment, Climate and Communications (DECC) in 2020).

While the primary objective of the new MSS is to provide a route to market for citizens and communities to generate their own renewable energy and receive a fair and efficient price for doing so, there are other energy policy objectives such as: establishing the 'renewables self-consumer' model of energy generation and consumption in Ireland, and supporting community and citizen participation in the transition to a net-zero carbon economy, that must be met, while simultaneously delivering value for money for the consumer. These other policy objectives are being factored into the scheme as design criteria.

The analysis carried out clearly indicates how Ireland can most cost effectively provide a framework that will comply with the requirements of the recast Renewable Energy Directive 2018 (RED II) (EU/ 2018/2001)[2], while at the same time contributing to the achievement of our goal of 70% renewable electricity by 2030 in line with the 2019 Climate Action Plan (CAP) and delivering broader policy objectives under the 2020 Programme for Government commitments.

In framing a new support scheme for micro-generation, the Government is mindful of the overarching objective to ensure any support scheme is equitable and addresses cost burden sharing. The scheme needs to protect customers, focus on protection of vulnerable customers and be accessible to all electricity customers. Thus the scheme costs must take account of the costs for renewable electricity demonstrated in the recent RESS-1 auction in order that the sustainable development of Ireland's renewable energy resources is achieved.

[1] by Cambridge Economic Policy Associates Ltd

[2] EUR-Lex - 32018L2001 - EN - EUR-Lex (europa.eu)

In developing the design principles of this new scheme, a range of commercial renewable micro-generation technologies have been assessed, focussing on self-consumption and sizing the installation appropriately to meet relevant electricity demand, whilst catering for increased electricity demands due to electrification (heat pumps and electric vehicles (EV)). Particular attention was placed on their viability, and whether financial supports are necessary to incentivise their deployment and if so, the likely cost of that support. Micro-generators will always optimise their investment through achieving the lowest cost installations with the highest possible level of self-consumption which increases the savings against the retail rates that would otherwise be paid. Remuneration for exported electricity is a small additional benefit in the overall context rather than a revenue generating opportunity.

While the cost-effective deployment of renewable technologies is a key objective, the principle of an energy efficiency first approach to building retrofit is included, and micro-generators considering availing of support for the installation of micro-generation installations will need to consider this in conjunction with other energy retrofit measures in order to meet minimum post-works energy performance standards.

There is also a responsibility on industry to play its part in bringing to market technology options that will minimise and control costs for households and businesses alike.

The development process of the MSS sets a level of ambition for micro-generation as part of the overall strategy for developing renewable electricity generation in line with the commitment to reach 70% RES-E by 2030. The emerging scheme design allows the Government to control both the costs and the level of micro-generation ambition. It is highly flexible and can respond to market driven outcomes and take advantage of maturing technologies.

Following this Executive Summary, the structure of this consultation is as follows:

- Section 2 – Introduction
- Section 3 – Methodology and Assessment Criteria
- Section 4 - High Level Findings
- Section 5 – Emerging Options and Questions

2 Introduction

2.1 Background to the proposed new Micro-generation Support Scheme

In November 2019 the then Minister for Communications, Climate Action and Environment outlined in the Dáil, in response to the Micro Generation Support Scheme Bill 2017 that he was supportive in principle of providing a route to market for citizens and communities to generate their own renewable energy and receive a fair and efficient price for doing so. This aligns with energy policy as set out in the Energy White Paper 2015, REDII and the Clean Energy Package which entitles renewables self-consumers to receive remuneration for excess electricity exported to the grid.

Both the 2015 Energy White Paper and the 2019 Climate Action Plan identify a role for micro-generation in contributing to the energy transition. Generally speaking micro-generation encompasses small electricity generators deployed on the low voltage distribution network.

This paper will set out a number of principles which will be used to underpin the design of the policy for micro-generation, including provisions for communities.

There are a range of options for how to incentivise/fund micro-generation – broadly the options are:

- Suppliers recover the costs based on their market value
- Suppliers recover the costs through a Public Sector Obligation (PSO) levy or equivalent
- Suppliers socialise the costs through their unit rates
- The Exchequer funds the costs via a voted grant scheme.

The actions to develop micro-generation policy will assess these and other options. It should be noted that micro-generation is a means to increase citizen participation in the energy transition through the generation of renewable electricity for self-consumption and the export of excess electricity generated to the grid. It can be a driver for engaging citizens in further energy efficiency investments in their homes and businesses. It is important that any support scheme for micro-generation is equitable and addresses any negative distributional effect where those who cannot afford or who are unable to participate are in effect subsidising

those who can e.g. those residing in apartments, rental accommodation or affected by energy poverty.

The current Climate Action Plan also sets the following goals for the electricity sector:

- "Put in place a coherent support scheme for micro-generation with a price for selling power to the grid".
- "Open up opportunity for community participation in renewable generation as well as community gain arrangements"
- "Streamline the consent system, the connection arrangements, and the funding supports for the new technologies on and off shore"

Previously a new Micro-generation policy was proposed via a Private Members Bill to promote the development of micro-generation in Ireland in the form of a supplier obligation to provide a tariff for electricity exported to the grid and was progressing through the legislative process. However, the proposed micro-generation bill lapsed in January 2020 with the dissolution of Dáil Éireann.

A Micro-generation working group was established under Action 30 of the Climate Action Plan which set out the steps needed to develop a micro-generation support scheme in Ireland. Some of the main steps outlined by this working group include[3]:

- A review of the charging structure of electricity network charges to ensure a fair and equitable charging mechanism that does not benefit owners of micro-generation
- A review of "the current exemptions relating to solar panels as provided for in the Planning and Development Regulations […] and implement amendments arising from review"
- Ensuring that there is an appropriate grid connection policy for renewable self-consumers and access for micro-generation. This comes in light of other development such as:
    - The Commission for Regulation of Utilities (CRU) are reviewing changes to the grid connection process for micro-generation with a capacity greater than 11kW, but less than 50kW[4]

[3] Government of Ireland. 2019. Terms of Reference – micro-generation Working Group. Available from: https://assets.gov.ie/76537/226b862d-612e-4991-b2c9-adc51f20767c.pdf

[4] For generators that produce less than 6kW for single phase connections and 11kW for 3 phase connections, there is a streamlined process already in place

- Analogue meters are being replaced nationally by smart meters which will see 2 million smart meters installed by the end of 2024, an essential step to facilitate the recording of the export of excess electricity generation.

- An assessment of impacts on the distribution network with higher proportions of microgenerators. ESB Networks Asset Management has carried out an initial analysis of these impacts and has concluded "that the network can currently accommodate widespread micro-generation penetration at levels up to 3kWp (rural) and 4kWp (urban). At lower levels of penetration, 6kWp/11kWp can be provided and may result in some levels of reinforcement. At higher penetration levels of 6kWp/11kWp, or at greater than 11kWp, an individual system study is required for each connection assessing associated work and costs."[5]
- Evaluation of different types of micro-generation support schemes targeting different sectors and incorporating energy efficiency and equity principles as well as a public consultation.

The new micro-generation scheme will need to be aligned with the specifications for micro-generation under the EU regulatory framework. In particular, the recast Renewable Energy Directive (REDII) will ensure owners of micro-generation are paid the market rate for the electricity they export to the grid. In addition, article 21(3)c of the REDII outlines that Member States may charge fees to renewable self-consumers on the renewable electricity they self-generated if the electricity produced is from an installation of electricity capacity of more than 30 kW. In addition, Regulation (EU) 2019/943 on the internal market of electricity outlines that "power-generating facilities using renewable energy sources with an installed electricity capacity of less than 400 kW" (reducing to 200 kW in 2026) are exempt from balance responsibility and may receive dispatch priority. It is expected that all microgenerators will receive dispatch priority as there will be no control on when they export excess electricity to the grid.

As part of the work under the Climate Action Plan, in June 2020 the Department appointed Ricardo AEA to deliver economic and policy advice to support the design and implementation of the new Micro-generation Support Scheme (MSS) in Ireland.

The main objectives of this assessment report (which is available here) were to provide an:

1. Overview of the main micro-generation technologies in Ireland;

[5] ESB Networks Asset Management. 2019. Assessment of potential implications for the distribution network of defined higher penetrations of distributed generators.

2. Assessment of their costs;
3. Analysis of the viability gap of these technologies in different sectors;
4. Identification of policy options for the Irish micro-generation market through assessment of international best practice;
5. Finally, it provides a review of each of the identified policy options in terms of their effectiveness, costs, funding mechanisms and complexity for implementation to provide a recommendation on the most suitable micro-generation scheme to be introduced in Ireland in July 2021.

DECC has assessed the implications for State Aid from the scheme and on the basis of the current proposals, EU State Aid approval will not be required for the MSS as the amount of support to businesses is below the threshold for evaluation under the General Block Exemption Regulation (GBER) guidelines. Once Government approval on the overall design and direction of the new scheme has been obtained, DECC will seek approval for the scheme from the EU under GBER Guidelines[6].

A detailed assessment of the structures required both in terms of administering the scheme and managing the scheme reviews, will be undertaken separately, and are not covered in this consultation. The extent of the administration requirements that are needed to manage the scheme may have a bearing on the final design of the new MSS.

This public consultation on the MSS high-level design will remain open until **17.30 on Thursday 18th February 2021**.

All responses should be submitted to publicconsultation_mss@decc.gov.ie or in writing to:

MSS Consultation
Electricity Policy Division
Department of the Environment, Climate and Communications
29-31 Adelaide Road
Dublin
D02 X285
Ireland

Note: all submissions and comments submitted to DECC for this purpose may be subject to release under the Freedom of Information Act 1997-2003 and will be published on the Department's website. Any information which is commercially sensitive should be clearly indicated in the submission.

[6] https://ec.europa.eu/competition/state_aid/legislation/block.html

2.2 Lessons for the Micro-generation Support Scheme

2.2.1 SEAI grant schemes supporting Solar photo-voltaic (PV)

The SEAI implemented a new solar PV grant scheme in 2018 for existing domestic homes built before 2011. To date, 4,353 homes have been supported to install 15MW of micro-generation, saving 4,381 tonnes of CO_2 emissions per annum at a cost of €10.7m. In January 2020, following a scheme review, the grant rates were changed and a minimum Building Energy Rating (BER) C rating requirement was introduced to ensure energy efficiency first principles are achieved. The number of applications in 2020 exceeded previous years. According to SEAI, applications to this grant scheme have led to further upgrades to homes as a package of measures, including approximately 1,000 homes who achieved a B2 BER. The scheme has been allocated €7m funding in 2021.

At the same time, new build houses, which have a minimum BER B2 rating requirement, have delivered 10MW of microgeneration without support. It should be noted that the costs to install rooftop solar PV during construction of a new building are substantially less than compared to the costs to install rooftop solar PV on an existing building. The Government has set a target of a B2 BER rating for supports under the National Home Retrofit Scheme and there is minimum BER B requirement for commercial and public buildings in other grant supported schemes. The MSS will need to align with these minimum requirements. Therefore it is proposed that the minimum BER C rating will be increased over the life of the scheme to a B rating, with the exact timing of the changes to be determined as the scheme develops.

2.2.2 2020 RESS-1 Auction

The recent RESS-1 auction has provided us with a baseline for the lowest cost of deploying large scale renewable energy technology on a competitive basis. EirGrid published the final auction results[7] on the 10th September 2020 which details the following:

- Weighted Average Strike Price of the All Projects category is 74.08 €/MWh
- Weighted Average Strike Price of the Solar category is 72.92 €/MWh

While the strike prices from the RESS-1 auction above provide us with information on the direct supports to generators, there are additional costs associated with the deployment of these projects that were included in the economic assessment of the RESS scheme, in particular the cost to reinforce and extend the electricity grid in order to ensure adequate

[7] https://www.eirgridgroup.com/site-files/library/EirGrid/RESS-1-Final-Auction-Results-(R1FAR).pdf

capacity for the increased generation. The addition of the forecast direct and indirect costs gives us the total costs of the scheme. Supports for micro-generation must be considered in the context of these total costs in order to ensure that the cost of meeting our RES-e targets can be achieved in a cost-optimal manner.

The RESS-1 Auction also included a definition of a Community-Led Project based on a set of qualifying criteria. These criteria can be used in the MSS to define the requirements for fulfilling the definition of a Renewable Energy Community under the framework. This is discussed further in Section 4 below.

3 Methodology and Assessment Criteria

One of the aims of the proposed new Micro-generation Support Scheme is to assist Ireland in meeting its 70% renewable electricity target by 2030, to deliver the required additional renewable electricity to contribute to the EU wide target of 32% by 2030 and the potential to meet future national renewable electricity targets, in a cost efficient manner, while at the same time delivering broader policy objectives in line with the 2019 Climate Action Plan and the 2020 Programme for Government ambitions. Ireland's energy policy is shaped by three core objectives, known as the 'energy pillars':

- Competitiveness
- Security of Supply
- Sustainability

The recent Renewable Electricity Support Scheme (RESS) auction is delivering on a primary policy objective of meeting Ireland's mandatory RES-E targets at least cost. Broader energy and climate change policy has come more to the fore in recent years, and while cost implications for people and businesses will continue to be a high priority and a core objectives of the new scheme – other policies, such as energy efficiency, increasing community and citizen participation in renewable electricity and a range of other ambitions outlined in both the Climate Action Plan and the Programme for Government, have been considered during this design process.

3.1 Climate Action Plan and Programme for Government ambitions

The 2019 Climate Action Plan Energy White Paper states that the energy system will change into one where citizens and communities will increasingly be participants in renewable energy generation and distribution and where citizens and communities will be active

participants, and agents of change in how we generate, transmit, store, conserve and use our energy.

Specific Energy White Paper and Programme for Government ambitions include:

(i) Supporting community participation in renewable energy projects

(ii) Facilitating access to the national grid for designated renewable electricity projects, and developing mechanisms to allow communities to receive payment for electricity

(iii) prioritise the development of microgeneration, letting people sell excess power back to the grid

(iv) Develop a solar energy strategy for rooftop and ground based photovoltaics to ensure that a greater share of our electricity needs are met through solar power

The new scheme is one of a number of policies and measures that are part of a framework for action across the electricity generation sector, aimed at decarbonising the electricity sector and achieving a net-zero carbon economy by 2050. These measures, in the context of Ireland's existing renewable energy targets are complimented by the longer-term policy framework provided by the Energy White Paper **Ireland's Transition to a Low Carbon Energy Future.**

3.2 EU-legislative Framework and Context

The EU Clean Energy Package is part of a package of initiatives entitled "Clean Energy for all Europeans".

It consists of eight legislative proposals as follows:

1. Internal Market for Electricity Regulation (Recast)
2. ACER Regulation (Recast)
3. Regulation on Risk-Preparedness in the Electricity Sector and Repealing the Security of Supply Directive
4. Renewable Energy Directive (Recast)
5. Revised Energy Efficiency Directive
6. Revised Energy Performance of Buildings Directive
7. Regulation on the Governance of the Energy Union

There are provisions pertinent to micro-generation/self-generation, specifically the provisions relating to Active Customers & Citizen Energy Communities, contained in the Internal Market for Electricity Directive (IMED). The provisions of the recast Renewable Energy Directive

(RED II), particularly in relation to Renewables self-consumers and Renewable Energy Communities are also directly relevant to this topic.

It should be noted that subparagraph 1 of Article 3(3) of RED II provides:

> Member States shall ensure that their national policies, including the obligations deriving from Articles 25 to 28 of this Directive, and their support schemes, are designed with due regard to the waste hierarchy as set out in Article 4 of Directive 2008/98/EC to aim to avoid undue distortive effects on the raw material markets.

The consolidated Waste Directive is here.

Additionally, the Energy and Environment State Aid Guidelines, applicable for renewable support schemes designed between 2014 and 2020, can limit—from a State Aid and internal market perspective—the design options for national RES-E support schemes except for small scale installations.
The 2014 State Aid guidelines published by the European Commission will inform and may shape the development of the new scheme. EU State Aid applies to supports to companies. Therefore the costs in this scheme to support the domestic sector are not considered in the State Aid assessment.

3.3 Micro-generation Support Scheme Policy Principles

Micro-generation policy should be based on clear and unambiguous objectives, and should target specific sectors of society where there are proven market failures.

Despite the potential of micro-generation technologies to help Ireland meet its energy and emission targets and induce positive shifts in energy consumption, the rate of adoption among homeowners remains low at approximately 1.5% of domestic electricity end-users. The reasons include installation costs, low awareness of micro-generation among homeowners and homeowners' willingness to pay (WTP) falling significantly below market prices. In addition, homeowners purchase or investment decisions are influenced by factors other than cost–benefit evaluations including the benefits of micro-generation and positive social pressure which can translate into higher uptake.

Proposed principles to underpin micro-generation policy:

1. Establish the '**renewables self-consumer' model** of energy generation and consumption in Ireland, meeting the commitment within the Climate Action Plan and the tenets of energy communities as set out in RED II and the IMED.
2. Support the concept of **community empowerment and participation** set out in the Climate Action Plan,

3. Ensure any support scheme is **equitable and addresses cost burden sharing**. The scheme needs to protect customers, focus on protection of vulnerable customers and be accessible to all electricity customers,
4. Adopt an **energy efficiency first** approach to building energy supports where possible, and decision makers should consider micro-generation installations in conjunction with other building energy retrofit measures,
5. Focus on **self-consumption (including storage and demand response)** and sizing the installation appropriately to meet relevant electricity demand (note increased electricity demands due to electrification (heat pumps and EVs),
6. Based upon **data and evidence** from existing and historical schemes including other research (behavioural and attitudes, stakeholder workshops etc.) and other relevant economic and financial assessments,
7. Supports a **sustainable and enduring micro-generation industry** in Ireland, supporting local enterprise and employment,
8. Deliver a **coherent scheme**, aligned with other support schemes (e.g. Programme for Government 2020: Deep Retrofit, Heat Pumps and Electric Vehicles) including any suitable supports, with provision for a feed-in tariff for selling power to the grid to be set at least at the wholesale price point,
9. **Address technical barriers** and planning constraints where appropriate, and provide a clear grid connection policy.

There are a number of barriers that need to be overcome that will impact on any assessment of options for a suitable support scheme for micro-generation. These include planning, grid connections for export, access to and cost of finance and systems to measure and settle exported electricity.

Factors currently influencing installation of micro-generation include:

i. Grant aid and investment schemes, including Solar PV, Better Energy Communities (BEC), Sustainable Energy Communities (SEC), Targeted Agricultural Modernisation (TAMS II) and the Accelerated Capital Allowances scheme.
ii. A minimum requirement for renewable energy systems in Part L of the Building Regulations
iii. Decline in capital costs for systems
iv. Low interest rate environment

Future policies and factors that may change investment in microgen:

i. Changes to supports for micro-generation
ii. Planning exemption changes that will reduce barriers to microgen
iii. Building Regulation changes that ban oil and gas boilers in new buildings
iv. Changes in technology
v. Higher interest rates
vi. Changes in retail electricity prices

3.4 Methodologies

High level approach to economic assessment of micro-generation technologies (economic and policy analysis report).

In order to develop a detailed understanding of inputs and best practice for micro-generation in Ireland, DECC commissioned an economic and policy analysis report, which provides an:

A. Overview of the main micro-generation technologies in Ireland;
B. Assessment of their costs;
C. Analysis of the viability gap of these technologies in different sectors;
D. Identification of policy options for the Irish micro-generation market through assessment of international best practice; and
E. Finally, it provides a review of each of the identified policy options in terms of their effectiveness, costs, funding mechanisms and complexity for implementation to provide a recommendation on the most suitable micro-generation scheme to be introduced in Ireland in July 2021.

The timeframe for the economic analysis covers the period from the present up to 2030. The report provides research and analysis on the Irish micro-generation market and a range of designed policy options matching the Irish environment. Details include considerations for the development of a micro-generation market price compensation and support scheme for micro-generation in Ireland from July 2021, taking account of the objectives of the CAP in Ireland.

Key assessment for any further policy designed is the calculation of levelised cost of energy and the viability gaps of micro-generation technologies in different sectors:

LCOE

Levelised Cost of Energy (LCOE) is typically used when comparing large-scale electricity generators. It is not however an appropriate measure of competitiveness for micro-

generation technologies since they compete with the price of retail electricity, as opposed to the cost of electricity supplied in the wholesale market.

Viability Gap

A more appropriate metric to use is the viability gap, which measures the level of financial support needed per unit of electricity in order for the investment to be viable.

Micro-generation technologies have different characteristics that make them more appropriate for use within different sectors. The assessment study found that there is a role for all of the technologies assessed except fossil fuelled micro-CHP as it does not reduce primary energy or CO_2 over the period, given the projections for reduction in electricity grid carbon emission levels, and therefore does not align with the climate ambitions of Government as it would lock-in fossil fuel technologies. An overview of the suitability of the main micro-generation technologies in Ireland (micro- solar, wind, hydro, CHP) for different sectors is provided in the table below.

Table 3-1 Suitability of technologies by sector

Sector	Solar	Micro-wind	Micro-hydro	Micro-CHP
Domestic				
SME (commercial)				
SME (industrial)				
Agriculture				
Community/social enterprises				
Citizen energy communities				
Public buildings (local authorities)				
Public buildings (schools)				

Key	RAG grading criteria
High	None/negligible issues identified with technology within sector
Medium	Technology is appropriate for sector although some issues to address
Low	Technology is not suitable for sector

Micro-generation support levels should be set at a level to incentivise the uptake of the technology where there are gaps in the market (i.e. the revenue received from operating the technology does not compensate for the cost of that technology). A balance must be reached between providing a sufficient incentive to cover the difference that exists between the cost of installing a particular technology and the savings that result from self-consumption. This difference is defined as the viability gap.

Policy identification and assessment

Based on a review of international best practice of schemes to promote micro-generation uptake, a set of five policy options was identified as listed in the table below.

Table 3-1 Overview of five proposed policy option for a micro-generation scheme in Ireland

Policy options	1	2	3	4	5
Smart Export Guarantee for all installations (old and new)	✓	✓		✓	✓
Investment subsidy for new installations as a percentage of total investment costs		✓			✓
Feed-in-tariff with one export payment (for existing and new installations) and one payment for generation (only new installations)			✓		
Feed-in-premium for new installations only based on difference between viability gap and smart export guarantee rate				✓	
Different **eligibility criteria** for **increased accessibility**					✓

Each of these five policy options were assessed in terms of their effectiveness, costs, funding mechanism and complexity for implementation.

3.5 Micro-generation Support Scheme - Assessment Criteria

Micro-generation technologies in Ireland

Micro-generation technologies have different characteristics that make them more appropriate for use within different sectors. As a first step to develop a micro-generation support scheme in Ireland, the characteristics of different sectors are assessed and compared against the suitability of different micro-generation technologies.

Sector analysis

A range of technology and sector combinations are considered for the development of micro-generation policy options. The technology options are:

1. Solar PV
    a. Ground mounted
    b. Roof mounted
2. Micro-wind
3. Micro-hydro
4. Micro-CHP

The sectors considered specifically for these micro-generation technologies are:

1. Domestic
2. Agricultural

3. Small-Medium Enterprises (SME's) (commercial and industrial)
4. Public buildings (school and local authority buildings)
5. Community/social enterprise
6. Citizen Energy Communities

The qualitative assessment outlines the suitability of each technology/sector combination based on the following metrics:

1. Electricity load
2. Installation requirements
3. Operation and maintenance requirements

Each of these technology sector combinations are considered as an archetype throughout this study. For example, domestic rooftop solar is one archetype. Each is qualitatively assessed on a red-amber-green (RAG) basis to give an outline of the suitability of a technology within a sector.

It is important to note that the assessment considers the suitability of each technology on a broad scale and does not consider all potential scenarios for each technology/sector combination. It is likely that each technology could be implemented in any sector under specific conditions; however the assessment focuses on what can be commonly done given each sector's individual requirements

3.6 Capacity banding

The key principles behind the banding of the different technologies used in the assessment were:

- Alignment with European standard EN50549 "Requirements for generating plants to be connected in parallel with distribution networks";
- All connections will be behind the meter, such that any generator installed is to supply power to a specific load;
- Optimising the micro-generation scheme to support self-consumption with at least 70% of the electricity being generated used on site.

A 30% limit on the level of export onto the network was chosen to maximise self-consumption savings, which is the optimal arrangement for prosumers to pay back their installation costs quickly. Over its lifetime, a micro-generation installation is a means of reducing energy costs for consumers and will help to reduce Ireland's carbon emissions. The scheme also provides limited supports to incentivise additional installed capacity of renewables where a gap in funding is not provided by the market, supporting installations across all sectors.

The capacity banding exercise determined the appropriate capacity ranges for each technology to maximise self-consumption across the targeted sectors. The steps to complete this were:

1. Defining the energy demand of each sector
2. Examining the technical factors influencing generator capacities
3. Determining the generation of a technology at a defined capacity
4. Matching the generation capacity to meet approximately 70% of the estimated demand

Details on data assumptions and methodology can be found in Appendix A1.3.2.of the report.

Sector demands

The sectors considered have significantly varying annual, seasonal and daily energy demand profiles. This also applies to different consumers within each sector. For example, within the agricultural sector, dairy farms have much different energy requirements than those used for cattle rearing. Therefore, any forecast of energy demands for a sector will be an estimate of typical demands. Data from a range of different sources has been used to estimate demands across the sectors. It should be noted that the energy demand for both social enterprises and community energy schemes is not explicitly examined as these sectors do not have definable end-use cases. For example, community schemes looking to use solar could develop rooftop PV on multiple dwellings or a town hall.

Sector demands, with exception of the domestic sector, have been estimated based on recent demand data and therefore do not account for any projected changes over time. SEAI have produced a range of future energy scenarios highlighting an absolute increase in demand[8,9.] The increase in demand may increase the levels of self-consumption rate above the 70% threshold, therefore reducing the amount of electricity purchased from the grid, thereby further reducing energy spend across the sectors. As a result, the demand analysis is expected to be conservative in non-domestic sectors.

A significant proportion of micro-generation uptake is forecast to be from the domestic sector as has been seen across many other countries. Therefore, a more detailed projected domestic demand has been completed, based on season and daily hourly demand profiles.

[8] SEAI (2018) National Energy Projections to 2030: Understanding Ireland's *energy* transition. Available at https://www.seai.ie/publications/National-Energy-Projections-to-2030.pdf

[9] SEAI (2019) National Energy Projections: 2019. Available at https://www.seai.ie/publications/2019-04_SEAI2019ProjectionsReport_Final.pdf

This takes into consideration the increase in average domestic demand forecast by SEAI out to 2030, driven by an expected increase in the number of heat pumps installed and increased EV consumption.

Given the variety of different use cases within a sector and the lack of available demand data for these use cases, it was necessary to make several assumptions to determine the demand which is detailed below. The following table summarises the annual demand assumed across each sector.

Sector use cases	Annual power demand (kWh)	Annual heat demand (kWh)
Domestic[10]	5,220	13,500
Agriculture – small farms[11]	3,000	20,000
Agriculture – large farms	19,000	65,000
SME's – commercial[12]	146,500	132,375
SME's – industrial[13]	56,750	178,750
Public buildings – local authorities	146,500	132,375
Public buildings - schools[14]	28,000	132,250

Using these annual demands, annual hourly demand profiles are determined to examine supply vs demand and generate self-consumed and exported power proportions.

[10] Approximates energy use based on last 3-5 years of data as annual energy trends fluctuate. Data uses 'electricity' and 'non-electric energy' https://www.seai.ie/data-and-insights/seai-statistics/key-statistics/residential/

[11] Agricultural data used from Department of Agriculture, Food and the Marine, Teagasc, National Farm Survey (NFS 2020) and the Central Statistics Office (CSO) detailed in A1.3.2.

[12] Demand derived from CIBSE 2012 Guide F building standards using an average of 'Office' categories as a proxy, assuming a 100m x 100m (1000m^2) building for ease of comparison

[13] Demand derived from CIBSE 2012 Guide F building standards using an average of 'Mixed Use/Industrial' as a proxy, assuming a 100m x 100m (1000m^2) building for ease of comparison

[14] Demand data derived from CIBSE Guide F building standards using an average of 'Primary school' and 'Secondary school as a proxy, assuming a 100m x 100m (1000m^2) building for ease of comparison

Finalised capacity bands

The table below demonstrates the finalised capacity bands of each technology and the sector that these are suitable for. This coupling of technology to sector use cases defines an archetype. These archetypes are analysed further to determine what level of financial support will be needed to incentivise the uptake of the technology within that sector.

Table 3-4 – Finalised technology/sector archetype capacity bands

Technology	Sector	Capacity banding range (kW – kW)
Rooftop solar	Domestic and small agriculture	0-3
Rooftop solar	Large agriculture and schools	3-11
Rooftop solar	SME-commercial/industrial and local authorities	11-50
Ground solar	Small/large agriculture and schools	0-11
Ground solar	SME-commercial/industrial and local authorities	11-50
Wind	Small agriculture	0-6
Wind	Large agriculture and schools	6-11
Wind	SME-commercial/industrial and local authorities	11-50
Hydro	Domestic and small/large agriculture	0-6
Hydro	Schools, SME-commercial/industrial and local authorities	6-50
Micro-CHP	Domestic and small agriculture	1 – 1
Micro-CHP	Large agriculture and schools	1 – 5.5
Micro-CHP	SME – commercial/industrial and local authorities	5.5 - 30

The capacity banding analysis suggests there is a range of renewable technology that can be deployed in domestic and SME premises that can facilitate high levels of renewable electricity self-consumption. The definition or micro-generation is therefore proposed to be:

“micro-generation technologies including micro-solar PV, micro-hydro, micro-wind and micro-renewable CHP with a maximum electrical output of 50kW”.

3.7 Overview of Micro-generation policy design options

Microgeneration Support Scheme Options

RED II states that Renewables Self Consumers are entitled:

‘to receiving remuneration, including, where applicable, through support schemes, for the self-generated renewable electricity that they feed into the grid, which reflects the market value of that electricity and which may take into account its long-term value to the grid, the environment and society’.

Therefore an export payment is a minimum requirement for compliance with the Directive. Any support scheme should consider the need, and the most suitable support mechanisms required, for micro-generation over and above an export payment.

There are numerous support schemes options for both domestic and Industrial & Commercial (I&C) micro-generation, including Capital grants, Feed in Tariff, Feed in Premium, Generation Tariff, Net Metering or Tax Rebate.

Policy option identification

There are a number of other jurisdictions across Europe that have already implemented micro-generation support schemes. Ireland is therefore able to ensure lessons are learnt from other jurisdictions in their policy development. There are many examples of improvements that can be made to the design of policies to ensure that they are efficient and to prevent market distortions. If designed poorly, policies can either be ineffective or result in overcompensation of the market, resulting in the inefficient deployment of technologies and impacting the policy cost.

The main policy types that have been used to incentivise micro-generation and that are in line with RED II are outlined below:

- A **feed-in tariff (FIT)** incentivises investment in renewable energy technologies by offering long-term contracts to renewable energy producers. In a FIT, cost-based compensation is offered to renewable energy producers, providing price certainty and long-term contracts that help finance renewable energy investments. This is an

attractive option for technologies that lack maturity, in order to accelerate their uptake.

- Under a **feed-in premium (FIP)** scheme, generators receive a premium on top of the market price of their electricity production. Premiums can either be fixed (at a constant level independent of market prices) or sliding (with levels varying in line with wholesale electricity prices). Fixed FIP schemes are simpler in design but there is a risk of overcompensation in the case of high market prices or under-compensation when market prices are low. In the case of sliding FIP schemes, the regulator faces some risk in case electricity prices decrease, as support levels fluctuate with changes in electricity market prices. On the other hand, the regulator does not risk having to pay for overcompensation, as is the case under a fixed FIP scheme. The sliding FIP scheme does however make the scheme more complex, thereby adding additional administration costs.
- **Investment subsidies or grants** can also be provided for costs associated with the purchase and installation of micro-generation equipment.
- An alternative policy mechanism is the use of **Renewables Obligation Certificates (ROCs)**, which can be issued for eligible micro-generation from an accredited station. These certificates can be traded with third parties, or sold to electricity suppliers directly, who use them to meet their Renewables Obligation.
- A **Smart Export Guarantee (SEG)**, which is an obligation on licensed electricity suppliers of a specific size to offer an export tariff to renewable generators with eligible installations. The suppliers can decide the level of the export tariff as well as its type and length. This could mean there could be a variety of different SEG tariffs available and generators may consider switching to suppliers with the most favourable SEG.

4 High Level Findings

4.1 Form of Primary MSS Mechanism – Inputs and Assumptions

To support the viability gap calculation and assessment, a financial model was developed. Details about the model can be found in Appendix A1.4.1. of the report.

The viability gap can be defined as the difference between the levelised cost of electricity (LCOE) for a technology and the value of self-consumption over the lifetime of the

technology. The model uses technical and performance data, the capital expenditure (CAPEX) and operating cost (OPEX) inputs from the capacity banding and cost assessment exercises to calculate the total generation, onsite consumption and exported electricity and lifetime costs of each archetype. It should be noted that the CAPEX and OPEX are lower than those used in the Sustainable Energy Authority Ireland (SEAI) pilot solar PV scheme as this would be inappropriate for fair tariff support in a potentially larger support scheme.

The self-consumption is valued as the avoided purchase of electricity for which retail electricity prices are used. The price trajectories were provided by the SEAI for two scenarios: 'High price scenario' and 'Low price scenario'. Further details can be found in Appendix A1.4 of the report. The 'Low price scenario' is used in this study for the base case for consistency with Ireland's National Energy and Climate Plan (NECP) where this was also used as the baseline price scenario. This approach uses an amalgamated assessment of fixed and variable costs to consumers to forecast a single rate (in €/kwWh) for each sector. Further work could be carried out to focus on the variable aspect of these rates as this is the portion of electricity costs that can be avoided through self-consumption.

The opportunity cost of investing in a comparable investment is captured in the discount rates. Although discount rates vary across different archetypes, as they reflect the hurdle rate for any investment, to set a level playing field, the same discount rate for all archetypes is used. It was identified that the model is very sensitive to changes in the discount rate and as a result of the research and optimisation process a 3.75% discount rate is used in the Base case to strike a balance between the competing interests of a return on investment and the cost of the support required to close the viability gap, and resulting in a discount rate that is very close to the rate in the Public Spending Code[15].

The Base case is defined by the CAPEX and OPEX figures described above, using the 'Low price scenario' and the 3.75% discount rate. It is against the Base case that all sensitivities are assessed.

4.2 Results

The main results of the model are calculated using a cash flow analysis for the useful lifetime of the archetypes. With the inputs described in the previous section, the levelised cost of electricity (LCOE) per archetype is calculated first. This is then used to determine the levelised viability gaps per archetype. These are calculated for the Base case scenario.

[15] gov.ie - The Public Spending Code (www.gov.ie)

Sensitivity tests are run, varying input parameters to compare the results with those of the base case. The main outputs of the model are set out in the following section.

4.3 Base case scenario

The LCOE results (see Figure 3-1, section 3.2.1 of the report) can be interpreted as the relative cost effectiveness of the archetypes, as it is expressed per unit of electricity generated. The LCOE figures under the base case suggest that the rooftop and ground mounted solar archetypes are the most cost-efficient means of generating electricity on the micro-generation scale.

It can be observed that LCOE figures for almost all archetypes decline over the period of 2021 and 2025, except the hydro technologies, mainly due to the assumed material cost reductions and learning curves in technology costs.

The viability gap is defined as the difference between lifetime costs and lifetime electricity savings from self-consumption. In other words, it is the additional revenue that micro-generators need to earn to cover their costs for new installations. The lifetime costs, the volume and value of the self-consumption and the discount rates are the main drivers of the viability gaps over the lifetime of the archetypes.

Consequently, the variables that need to be considered when modelling the viability gap include:

a) whether an incentive is paid on electricity generated or electricity exported

b) the life of the technology

c) the life of the incentive scheme

The scenarios that are modelled in the report are:

1) incentive is paid on electricity generated over the life of the technology, as presented in Figure 3-2

2) incentive is paid on electricity exported over the life of the incentive scheme, as presented in Figure 3-3

3) incentive is paid on the electricity generated, over the life of the incentive scheme, as presented in Figure 3-4

The levelised viability gap can be considered as a proxy for the required subsidy level. One option for a micro-generation support scheme is to pay an incentive on electricity generated. Another option is to pay an incentive on electricity exported. Therefore, it is important to

explore the viability gap levels also over the exported electricity. Further, the subsidy life has a significant impact on the levelised viability gap figures as the total lifetime viability gap could be recovered over a shorter period and thus over a smaller electricity generation or exported electricity volume. This is shown in Figure 3-3 of the report. The assumed 15 year subsidy life here aligns with the current Support Scheme for Renewable Heat (SSRH) and Renewable Electricity Support Scheme (RESS) schemes subsidy duration.

Another important consideration for the policy design is that the viability is optimised through encouraging higher self-consumption, which is more likely if the subsidies are set lower than the retail tariffs, which is explored in Chapter 5 of the report.

The viability gap over the electricity export provides a proxy to determine the support level which would be required for a certain archetype to cover its lifetime viability gap over the subsidy life if the scheme would be designed to be paid on exported electricity. As the self-consumption and therefore the exported electricity levels vary significantly among the archetypes, the levelised viability gap figures fluctuate significantly, when they are expressed over the exported electricity. These figures suggest that all archetypes to be installed in 2021 have viability gaps. Please note also that some of the CHP archetypes have no excess electricity so therefore the viability gap over export is zero, but it doesn't mean that these archetypes are financially viable as can be seen in Figure 3-4 of the report.

Offsetting the retail price paid for electricity consumption is the key driver for promoting self-consumption. Considering both the assumed consumption profiles which have high self-consumption figures across the archetypes and the underlining policy goal to promote self-consumption, it is proposed that the micro-generation scheme is designed to be paid on export from a site.

Given the large number of potential archetypes, an archetype-based remuneration doesn't seem to be practical. Therefore, other factors such as technology neutrality and cost-efficiency were considered to select the optimal remuneration approach. This is further discussed in Section 5 of the report.

Based on the assessment report, the recommended policy option is an option that includes a Clean Export Guarantee[16] (CEG). The advantages of a Clean Export Guarantee is that it can be provided at near cost-neutrality as the rates are provided by suppliers based on wholesale electricity prices, which also aligns with the European objectives of the recast Renewable Energy Directive. Moreover, a CEG is inherently able to provide incentives for

[16] Referred to as Smart Export Guarantee in the report

self-consumption, energy efficiency and avoids the risk of overcompensation, which are all objectives set under the Climate Action Plan. The long-term objective is to have an arrangement that provides a market-based payment that incentivises export of electricity when the peak system demand occurs through optimising demand side time-of-use of appliances, so as to reduce the costs of supporting non-renewable back-up generation. Suppliers would then be able to offer time-of use tariffs that vary for different periods of the day and this would optimise micro-generation for system demand. This requires a system of time-of use tariffs and a deployment of Smart Meters that is not available in the Irish electricity market today but should be planned for over the lifetime of the MSS. In the interim, the CEG can be supported through an interim settlement arrangement based on a manual process, and therefore a minimum tariff is being proposed that reflects the average wholesale Day Ahead Market Price (DAM).

As the CEG will not be able to meet the viability gap for the lowest cost technologies in any sector until technology costs reduce further, it is recommended that the CEG is supplemented by a Clean Export Premium[17] (CEP) in the first years to support deployment of new renewable micro-generation. In line with the CEG, a minimum tariff by sector based on the viability gap of the lowest cost technology is being proposed. As the CEP is defined as bridging the difference between the viability gap and the CEG provided for new installations, and the technology costs are expected to reduce, there is also a planned phase-out of this subsidy over time, thereby reducing the risk of policy uncertainty or overcompensation.

4.4 Community participation in Micro-generation

Under RED II & IMED, opportunities for the participation of prosumers in micro generation are not limited to homeowners and/or individual citizens. Communities are entitled to come together and produce, consume, store and sell renewable energy to the grid, which can be seen from the following definitions from Article 2 of RED II:

> (14) ‘renewables self-consumer’ means a final customer operating within its premises located within confined boundaries or, where permitted by a Member State, within other premises, who generates renewable electricity for its own consumption, and who may store or sell self-generated renewable electricity, provided that, for a non- household renewables self-consumer, those activities do not constitute its primary commercial or professional activity;

[17] Referred to as a Feed in Premium in the report

(15) ‘jointly acting renewables self-consumers’ means a group of at least two jointly acting renewables self-consumers in accordance with point (14) above who are located in the same building or multi-apartment block;

(16) ‘renewable energy community’ means a legal entity: (a) which, in accordance with the applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity; (b) the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities; (c) the primary purpose of which is to provide environmental, economic or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits.

Under RED II, where a community is arranged as jointly-acting renewables self-consumers, i.e. they are located within the same building or multi-apartment block, they shall be entitled to engage jointly to:

- generate renewable energy, including for their own consumption,
- store renewable energy,
- sell their excess production of renewable electricity, including through power purchase agreements, electricity suppliers and peer-to-peer trading arrangements and are allowed to arrange sharing of renewable energy that is produced on their site or sites between themselves,
- receive a remuneration, including where applicable through support schemes, for the self-generated renewable electricity they feed into the grid which reflects the market value and may take into account the long-term value of the electricity fed in to the grid, the environment and society.

Under RED II, Renewable Energy Communities are described as follows:

Final customers, in particular household customers, are entitled to participate in a renewable energy community without losing their rights or obligations as final customers, and without being subject to unjustified or discriminatory conditions or procedures that would prevent their participation in a renewable energy community, provided that for private undertakings, their participation does not constitute their primary commercial or professional activity.

Under RED II Renewable Energy Communities are entitled to:

- generate renewable energy, including for their own consumption,

- store renewable energy,
- to arrange sharing of renewable energy within the community that is produced by the production units owned by the community and retaining community members' rights and obligations as customers
- to access all suitable energy markets both directly or through aggregation in a non-discriminatory manner,
- sell their excess production of renewable electricity, including through power purchase agreements, electricity suppliers and peer-to-peer trading arrangements.
- compete for support schemes on an equal footing with other market participants

In relation to supports for the installation of micro-generation technologies, both jointly acting consumers and renewable energy communities will be subject to the eligible technology upper limit of the Micro-generation framework.

The Commission for Regulation of Utilities (CRU) in its Roadmap for the Clean Energy Package Implementation[18] and in its Micro-generation Information Paper[19] indicated it will consult with the public on a number of issues in Q4 2020 including Articles 15 & 16 of IMED and Articles 21 and 22 of the RED II. DECC will work with CRU and other stakeholders to ensure implementation of those aspects of the Clean Energy Package that facilitate community participation in micro-generation.

Renewable Energy Communities (REC) will be eligible to participate in the MSS if they fulfil the criteria as defined in the recent RESS-1 Auction, as follows:

"Renewable Energy Community" means a legal entity:

> (a) which, in accordance with applicable law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located (in the case of SMEs or local authorities) or resident (in the case of natural persons) in the proximity of the RESS 1 Project that is owned and developed (or proposed to be owned and developed) by that legal entity;

[18] view latest document (cru.ie)

[19] view latest document (cru.ie)

(b) the shareholders or members of which are natural persons, SMEs, local authorities (including municipalities), not-for-profit organisations or local community organisations;

c) for any shareholder or member (with the exception of “Sustainable Energy Communities” as registered with SEAI), that shareholder or member’s participation does not constitute their primary commercial or professional activity;

(d) the primary purpose of which is to provide environmental, economic, societal or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits;

(e) in respect of which, each shareholder or member is entitled to one vote, regardless of shareholding or membership interest; and

(f) which is, or which has at least one shareholder or member that is, registered as a “Sustainable Energy Community” with SEAI,

and all of the above criteria must be evidenced to the satisfaction of the Supplier.

REC’s who own existing micro-generation installed prior to the MSS will be eligible for the Clean Export Guarantee. REC’s who install micro-generation installations under the scheme will be eligible for the Clean Export Premium, in addition to the CEG, for a period of 15 years.

4.5 Assessment of potential impacts of the MSS

4.5.1 Electricity Market Impacts

4.5.1.1 Network tariffs/charges

Electricity bills are comprised of variable unit charges based on the amount of electricity consumed, fixed standing charges and other charges including the PSO levy. Customers with micro-generation can reduce the variable (or per kWh) component of their electricity bills by replacing imported energy by self-generated electricity. This will reduce the portion of their bill related to electricity consumed from what it otherwise would have been.

Currently, customers with or without micro-generation pay the same fixed component of electricity charges. Suppliers are charged the same network charges for each household regardless of whether or not micro-generation is installed, as these charges relate to the development, maintenance and operation of the transmission and distribution networks. Customers with micro-generation continue to use the transmission and distribution networks when they import electricity, often at peak times and should therefore continue to pay a fair

contribution to those charges. They will also be using these networks in order to export their electricity to other consumers and the market.

Customers who may not be in a position to invest in micro-generation should not be disadvantaged or cross-subsidise those customers who can do so. All customers should have the opportunity to contribute to the transition to a low carbon energy system, whether through micro-generation, taking up time of use or dynamic tariffs or through demand response.

In 2021, the CRU plans to commence a review of the structure of electricity network charges and, along with a range of other factors, will consider the equity, transparency and fairness of network charges in the context of micro-generation during this review.

4.5.1.2 Impacts on fuel poverty/ low income households

Any support scheme needs to be developed in a way that is equitable and fair, and does not over compensate those participating or over burden those who are unable to, in particular those with low incomes or in energy poverty. The review of network charges referred to in 4.5.1.1 above will assess the impact of MSS costs with respect to ensuring, so far as is practicable, that the cost allocations are equitable and fair to those who do not participate in the scheme through a review that will include an assessment of the allocation of fixed and volumetric elements of the charges.

4.5.1.3 Administration Costs

The CRU has formed a view on interim arrangements for settlement of any payments associated with micro-generation. They note that that there are a number of balanced and transparent options that can be considered to facilitate payment and settlement for micro-generators once a smart/export meter is in place, and before systems are developed for the transfer of information on import and export from smart meters in 2024 as part of Phase 3 of the National Smart Metering Programme. Following a workshop with industry, CRU determined the interim settlement solution will need to be carried out on a manual basis for any support scheme put in place by DECC for July 2021. The CRU is also progressing work in relation to the development of a facilitative framework for aggregation in 2020 based on the requirements under the new Electricity Regulation and Electricity Directive and is of the view that this could potentially provide a route to consumers interacting with the wholesale electricity market while minimising their exposure to balancing market risks. These approaches will minimise the costs to Suppliers for implementing the settlement process.

Suppliers will incur additional administration costs for the settlement and payment of exported electricity and determining and managing the eligibility of applicants to the scheme.

ESBN will incur costs for administration of export meter data, additional export connection requests and liaison with Suppliers. Finally, there may be costs for managing a register of installers, quality assurance of installations and liaison with Suppliers, a role that is currently carried out in part by SEAI, but could be carried out by an industry group on behalf of suppliers. However, the future roles & responsibilities of key stakeholders have yet to be determined.

4.5.1.4 Impacts on PSO process

Increased uptake of micro-generation and the nature of the support scheme that is implemented involves some customers being paid a premium for electricity exported to the grid which is proposed to be funded by the PSO.

The impacts of these payments to micro-generators can be incorporated into the annual review of the PSO charges. Prior to the approval of the final design of the scheme, the estimated annual cost of the premium payments will be assessed in order to examine in detail the impacts on the funding mechanism chosen.

4.5.2 Impact of scheme costs

4.5.2.1 Overall indicative scheme costs

The overall costs of the scheme will be determined based on the final design. The assessment report provides an estimate of total scheme remuneration in the range of €229million to €329million depending on whether the supports are guaranteed or not. It should be noted that of that range, €159million is related to the Clean Export Guarantee, which will be cost-neutral for Suppliers. This leaves a scheme cost ranging from €70million to €170million over nine years with the higher estimate based on a guaranteed minimum premium tariff.

4.5.2.2 Costs to consumers

Some important key principles in relation to micro-generation are as follows:

- The approach is to facilitate customers that want to contribute to decarbonisation, enabling a reasonable, market-based price for exports, while minimising impacts on customers that do not have the means or opportunity to invest in micro-generation themselves.
- To support and encourage engaged customers to manage their own demand in an affordable and low-carbon way.

- To ensure that the network, system operation and market costs associated with the provision of a reliable, safe and secure supply of electricity continue to be attributed in an equitable and transparent way between customers with and without micro-generation.

The emerging policy proposal is that the scheme costs will be paid through the Public Service Obligation (PSO) levy on the basis that the PSO covers costs related to increasing the share of renewable energy in Ireland, and these costs are to support decarbonising electricity customers only through renewable energy. It would mark the first time that the levy is used to fund citizens and small businesses, and, as part of a regulated annual review process, provides clarity and transparency on what is being funded and how much is being spent on it. However, we recognise that the PSO is not based on consumption which means those who wish to reduce the impact of these costs, particularly those who are energy poor, will find it impossible to avoid the increase through energy efficient improvements or behavioural changes that reduce energy consumption. Equally, the supports are for a limited period of time and diminish over the period, so if the costs are absorbed into Suppliers rates, there is a risk of electricity price inflation that may endure after the scheme.

The impact of the MSS will be assessed at the final design stage and the approved scheme will be included as part of a review of network tariffs and charges commencing in 2021 by CRU. It is anticipated that given the current number of existing micro-generators and the gradual ramp up in deployment of micro-generation installations over the scheme life, the impact in the early years will be low. For example, based on the estimate of scheme costs in section 4.5.2.1 above, the largest annual cost of the scheme based on the higher estimate in the range (i.e. €170million) is €29million. The total remuneration of the retail electricity market is approximately €3billion per annum. Therefore, the annual costs are less than one per cent of this value. The total cost of the PSO in 2021 is estimated to be €393m, therefore the peak annual cost is less than 8% of this value.

4.5.2.3 Impacts on Distribution System Operator (DSO) Grid

Increased uptake of micro-generation will have potential impacts on both the transmission and distribution systems which may be dependent on the configuration and age of the network. This will be influenced by existing installed micro-generation, trends in installation of electric vehicles, heat pumps and electrification of heat. Any additional costs associated with significant reinforcement due to the interaction between these factors will need to consider the most equitable means of recovering additional network costs. Any potential benefits accruing from micro-generation, or the efficient aggregation of same in the longer term, could also be considered such as the potential for reduction in system losses

associated with the transport of electricity at the distribution level. The DSO, ESB Networks has published a report that assessed the impacts of increased penetration of micro-generators on their network[20]. They have concluded that all electricity consumers could install up to 3kW in rural areas and 4kW in urban areas with little or no impact on the network. The impacts of exported electricity from micro-generation during the lifetime of the scheme will be assessed as part of the five year Price Review process managed by CRU.

4.5.2.4 State Aid Assessment

EU State Aid applies to supports to companies. Therefore the costs in this scheme to support the domestic sector are not considered in the State Aid assessment. The cost to support the non-domestic sector relates to the Clean Export Premium. It is important to note that support given to enterprises under the Clean Export Premium will be considered State aid. However, any aid provided will be below the De Minimis Aid threshold of €200,000 over any three fiscal years. According to an assessment carried out by DECC, specific EU State Aid approval will not be required for the overall Micro-generation Support scheme as the amount of support to businesses is below the threshold. Once Government approval on the overall design of the scheme has been obtained, DECC will notify the EU of the details of the scheme under General Block Exemption Regulation (GBER) guidelines[21].

5 High Level Design & Public Consultation Questions

The proposed new MSS has been designed with the primary policy objective of providing supports to micro-generators that encourage renewable self-consumption and energy efficiency and can support Ireland's contribution to the EU wide 2030 renewable energy targets. The proposed design meets the ambitions for micro-generation under the Climate Action Plan and the 2020 Programme for Government. As outlined, various different MSS scenarios and support mechanisms have been assessed against these criteria, and also against other policy objectives. All of these scenarios have been modelled against a range of sensitivities.

The high level emerging options are:

[20] assessment-of-the-scope-for-higher-penetrations-of-distributed-generation-on-the-low-volage-distribution-network.pdf (esbnetworks.ie)

[21] https://ec.europa.eu/competition/state_aid/legislation/block.html

1. Implementation of a proposed Clean Export Guarantee (CEG) tariff for excess electricity exported to the grid from renewables self-consumers and renewable energy communities that reflects the fair market value of the electricity, aligned to the requirements of Article 21 Clause 2 (d) of the Renewable Energy Directive (EU/ 2018/2001). A minimum rate, proposed to be set by the CRU, will be made available based on the average Day Ahead Market (DAM) wholesale electricity price and will be the same across all technologies. Suppliers will recover the costs through balancing their portfolio and/or the sale of the electricity in the wholesale market, and are free to offer higher rates to attract or retain renewables self-consumers. When available, the arrangements for this tariff will be revised to incorporate time-of use tariffs that incentivise optimum export of electricity for system benefit. It should be noted that the recast RED Directive does not make any mention of micro-generation and therefore the CEG will be not be limited to the 50kWe upper limit referred to in the MSS.

Q1. Do you agree with the approach to introduce the CEG in order to provide an export payment that reflects the fair market value of the electricity in compliance with the recast Renewable Energy Directive? If not, what alternative model would you propose and why?

Q2. Do you agree that initially the CEG should be a fixed, minimum tariff provided by Suppliers as a pass through cost based on the annual average Day Ahead Market (DAM) wholesale electricity price? If not, what alternative model would you propose and why?

2. Additional supports will be offered for new micro-generation technologies installed after June 30th 2021 through a fixed Clean Export Premium Tariff rate each for domestic and non-domestic consumers for the excess electricity exported to the grid.
3. The viability gap uses a proposed discount rate of 3.75% .This discount rate was chosen to strike a balance between the competing interests of a return on investment and the cost of the support required to close the viability gap.

Q3. A common 3.75% discount rate across all sectors assessed was chosen as an input to the viability gap assessment. Do the respondents agree with this approach? If not, what alternative would you propose and why?

ii. The Premium rates will be determined by the lowest cost technology for each sector in order to provide a technology-neutral solution.

Q4. The emerging policy includes a measure whereby all Renewables Self-Consumers who install micro-generation technology after 30th June 2021 can access a payment of a fixed, minimum Clean Export Premium tariff for exported electricity determined by the lowest cost technology for each sector. Do the respondents agree with this approach? If not, what alternative model would you propose and why?

iii. The viability gap is being recovered through the CEG and the CEP. The CEP is being aid on exported electricity and is targeted to be at a rate that is below the retail rates paid by the prosumer, which encourages self-consumption. As a consequence of this, the duration of support will be 15 years for all technologies.

Q5. The proposed Clean Export Premium tariff for exported electricity will be offered for a maximum duration of 15 years for all technologies. Do the respondents agree with this approach? If not, what alternative model would you propose and why?

iv. The total amount of support will be capped by exported volume related to the installation size in order to prevent over-remuneration. A cap based on 30% of the total generation will be in place for all technologies and all sectors.

Q6. The high level design includes a measure whereby a Clean Export Premium tariff for exported electricity will be capped by exported volume related to the installation size in order to prevent over-remuneration. Do the respondents agree with this approach? If not, what alternative model would you propose and why?

3. Eligibility criteria must be fulfilled in order for renewables self-consumers or renewable energy communities to access the Clean Export Guarantee or Clean Export Premium tariffs.

i. The high level design proposes 4 eligible renewable technologies with maximum capacity banding as follows:

- Micro-Hydro, maximum 50kWe
- Micro-Wind, maximum 50kWe
- Solar Photovoltaic (PV), maximum 50kWe
- Renewable Micro-CHP, maximum 30kWe

Renewable micro-CHP excludes oil, solid fuel, natural gas and other non-renewable fuels as it does not reduce primary energy or CO_2 given the projections for reductions

in grid electricity carbon emission levels, and therefore does not align with the climate ambitions of Government as it would lock-in fossil-fuel technologies.

Q7. The high level design proposed 4 eligible renewable technologies listed above. Do the respondents agree with this proposal? If not, what alternative would you propose and why?

Q8. There is a range of renewable technology that can be deployed in domestic and SME premises and can facilitate high levels of renewable electricity self-consumption. The definition of micro-generation is therefore proposed to be “micro-generation technologies including micro-solar PV, micro-hydro, micro-wind and micro-renewable CHP with a maximum electrical output of 50kW”. Do the respondents agree with this proposal? If not, what alternative would you propose and why?

ii. Applicants will be required to have an export connection from the Distribution System Operator in order to access the grid for exporting excess electricity.

Q9. Applicants will be required to have an export connection from the Distribution System Operator. Do the respondents agree with this approach? If not, what alternative model would you propose and why?

iii. The CEP will be available to existing buildings only as the cost to install micro-generation for new buildings is much lower.

Q10. The CEP will be available to existing buildings only. Do the respondents agree with this approach? If not, what alternative model would you propose and why?

iv. Applicants wishing to avail of the CEP will need to meet a minimum post-works BER requirement in order to ensure an energy efficiency first principle is achieved. Occupied buildings will need to achieve a BER C rating. The minimum BER rating for the MSS will be increased over time to align with other Government energy efficiency retrofit programmes.

Q11. Occupied buildings will need to achieve a minimum post-works BER C rating. Do the respondents agree with this approach? If not, what alternative model would you propose and why?

Q12. The minimum BER rating for the MSS will be increased over time to align with other Government energy efficiency retrofit programmes. Do the respondents agree with this approach? If not, what alternative model would you propose and why?

v. Community groups must conform to the definition of a Renewable Energy Community (as per Section 4 above) and be registered with SEAI.

Q13. Community groups must conform to the definition of a Renewable Energy Community and be registered with SEAI. Do the respondents agree with this approach? If not, what alternative model would you propose and why?

4. Several options to fund the scheme were examined and the pros and cons to each were assessed, in particular Suppliers recovering the cost through their retail tariffs or through the PSO. It is proposed that Suppliers will be permitted to recover the costs of the Premium support through the Public Service Obligation Levy (PSO).

Q14. The emerging policy proposes that Suppliers recover the costs of the Premium support through the PSO. DECC welcome the respondents' views on the funding mechanism supporting micro-generation. Do you think the PSO should support micro-generation or should this be through Suppliers retail rates or other mechanism?

5. The performance of the Scheme will be subject to periodic reviews in order to take account of changes in technology and network costs and electricity prices, so that the supports offered can deliver on the objectives of the scheme, including level of take-up and the costs of the scheme. Where the scheme is not performing as desired, recommendations to changes in the scheme will be proposed to the Minister.

Q14. DECC welcomes the respondents views on how to manage the scheme costs and the frequency of changes in the support arrangements.

6 Glossary of Terms

BEC: Better Energy Communities

BER: Building Energy Rating

CAP: Climate Action Plan

CAPEX: capital

CEG: Clean Export Guarantee tariff for excess electricity exported to the grid from renewables self-consumers and renewable energy communities that reflects the fair market value of the electricity, consisting of a minimum tariff based on the average Day Ahead Market (DAM) wholesale electricity price and the same across all technologies.

CEP: Clean Export Premium is a 15-year support for deployment of new renewable micro-generation, consisting of a minimum export tariff differentiated by sector based on the viability gap of the lowest cost technology.

CHP: Combined heat and power

CRU: Commission for Regulation of Utilities

DAM: Day Ahead Market, part of the I-SEM

DECC: Department of the Environment, Climate and Communications

DSO: Distribution System Operator, i.e. ESB Networks

EV: Electric vehicles

Feed in Premium (FiP): A varying €c/kWh premium. The difference between the viability gap and the LCOE for the technology.

GBER: General Block Exemption Regulation

IMED: Internal Market for Electricity Directive

I-SEM: Integrated Single Electricity Market. A new wholesale market for electricity on the island of Ireland.

LCOE: Levelised Cost of Electricity. Expressed in €c/kWh, the average price of electricity that each type of micro-generation technology would have to earn in its lifetime, at a given load factor, in order to cover its capital and operating costs.

Micro-Generation: the generation of electricity on a small scale, typically for domestic use, by renewable energy sources.

OPEX: operating expenditure

NECP: National Energy and Climate Plan

PSO: Public Service Obligation levy

PV: Photo-voltaic

RED II: Recast Renewable Energy Directive (EU/ 2018/2001).

RES-E: Renewable Energy Sources for Electricity.

RESS: Renewable Electricity Support Scheme: An auction-based support scheme operated by DECC to support deployment of large-scale renewable electricity generation.

SEAI: Sustainable Energy Authority of Ireland

SEC: Sustainable Energy Communities

SME: Small and medium enterprise

SSRH: Support Scheme for Renewable Heat

TAMS: Targeted Agricultural Modernisation

Viability Gap: the shortfall between market revenues and a micro-generator's LCOE, expressed in €c/kWh.