



**Roinn Cumarsáide, Gníomhaithe  
ar son na hAeráide & Comhshaoil**

Department of Communications,  
Climate Action & Environment

# Public Consultation on the Design of a new Renewable Electricity Support Scheme in Ireland

September 2017

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## Section 1 - Executive Summary

This public consultation focuses on the Design Options of a proposed new Renewable Electricity Support Scheme (RESS) for Ireland. It follows on from the first Renewable Electricity Support Scheme Technology Review consultation in 2015 which identified a range of renewable electricity technologies to be further assessed. Further, it uses the evidence base of two pieces of work that are being undertaken in parallel. The first study is an Economic Assessment of Renewable Technologies to underpin a new RESS (commissioned by Department of Communications, Climate Action and Environment (DCCA/E)) and the second study is An Assessment of Models to Support Community Ownership of Renewable Energy in Ireland (commissioned by the Sustainable Energy Authority of Ireland (SEAI)).

While the primary objective of the new RESS is to incentivise the introduction of sufficient renewable generation to deliver national and EU wide renewable energy and decarbonisation targets, there are other energy policy objectives such as: broadening and diversifying the renewable technology mix, enhancing security of energy supply, promoting economic development, and supporting community and citizen participation in the transition to a low 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.

Providing pathways for increased community participation will be a cornerstone of the new scheme, delivering on Energy White Paper commitments. This consultation sets out various policy options (primary and enabling) to support community-led projects and those required to support developer-led community projects.

The analysis carried out clearly indicates how Ireland can most cost effectively meet different levels of Renewable Electricity (RES-E) by 2030, while at the same time delivering broader policy objectives in line with the 2015 Energy White Paper and the 2016 Programme for Government commitments.

In framing a new support scheme for renewable electricity, the Government is mindful of the overarching objective to ensure secure and sustainable supplies of competitively priced energy to all

consumers. The sustainable development of Ireland's renewable energy resources is critical for the achievement of this objective.

In developing the design principles of this new scheme, a range of commercial technologies have been assessed. 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.

While the cost-effective deployment of renewable technologies is a key objective, diversification of our portfolio is also an important consideration. Moreover, the Department recognises that certain emerging technologies can be complimentary to other mature ones which could, in tandem, deliver more efficient outcomes e.g. maximising the available land footprint in certain areas. There is also a responsibility on industry to play its part in bringing to market, technology options that can deliver, at scale, solutions that will minimise and control costs for households and businesses alike. Meeting our low carbon transition policy objectives will mean harnessing our combined efforts to effect the scale of transformation necessary.

Furthermore, the RESS economic assessment and policy support review of micro-generation has identified challenges that need to be addressed if an equitable approach to supporting prosumers and micro-generation is to be delivered.

The development process of the RESS does not include setting a level of ambition for renewable electricity generation. The RESS is being developed as a scheme that can support a range of ambitions. This includes the potential objective of maintaining the target 2020 level of 40% RES-E out to 2030 as the baseline ambition. Further, more ambitious potential objectives of 45%, 50% and 55% are also examined.

The emerging scheme design allows the Government to control both the costs and the level of RES-E ambition. It is highly flexible and can respond to market driven outcomes and take advantage of maturing technologies.

Nevertheless, technology specific categories, as a means to delivering increased renewable diversity at significant scale, are more expensive than a technology neutral approach and would have a greater impact in terms of additional cost to the PSO. A key consideration for the final scheme design will be to strike a balance between these multiple policy objectives.

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

## Section 2 - Introduction

### *2.1 Background to the proposed new Renewable Electricity Support Scheme*

The 2009 EU Renewable Energy Directive sets Ireland a legally binding target of meeting 16% of our energy requirements from renewable sources by 2020. Ireland is committed to achieving this target through meeting 40% of electricity demand, 12% of heat and 10% of transport from renewable sources of energy. The Government has a range of policy measures and schemes to incentivise the use of renewable energy and although good progress towards the target has been made to date, meeting the 16% target remains challenging.

Renewable energy sources for electricity (RES-E) forms an important part of Ireland’s current energy mix in recent years, accounting for 26% of gross electricity generation in 2016, up from 5.3 percent in 1990. The majority of this growth has come from increased onshore wind generation, accounting for over 85 percent of all RES-E generation.<sup>1</sup> The increase in RES-E capacity in Ireland and other countries across Europe has come as a result of large reductions in the cost of technologies (for example, in solar PV as well as wind) and the attractive regulatory frameworks and support measures established.

While considerable progress has been made in RES-E development in Ireland, further expansion will be required to meet Ireland’s contribution to the EU-wide target of at least 27 percent share of

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<sup>1</sup> Sustainable Energy Authority of Ireland (2015), *Renewable Electricity in Ireland 2015*.

renewable energy consumption by 2030.<sup>2</sup> The 2015 Energy White Paper sets out a vision of reducing the greenhouse gas (GHG) emissions from Ireland's energy system by 80%-95% compared to 1990 levels by 2050.<sup>3</sup>

The 2015 Energy White Paper places citizens at the centre of the future energy transition in Ireland, which will mean providing a range of mechanisms through which citizens and community groups can meaningfully contribute to the transition to a low carbon economy. Notwithstanding the significant reductions in the cost of deploying renewable technologies, seen in the past decade, RES-E projects in the majority of cases are still not viable without financial support (the cost of developing these renewable electricity projects is greater than the return they receive in the form of market prices).

In July 2015, the then Department of Communications, Energy and Natural Resources (now known as DCCAE) published the first Technology Review consultation on a new Renewable Electricity Support Scheme. The primary objective of this consultation was to examine the requirement and potential to introduce a new support scheme for electricity from renewable sources. The Department received 800 submissions to this consultation.

Following on from this study, in December 2016 the Department appointed Cambridge Economic Policy Associates (CEPA) to carry out an evidenced based economic assessment to underpin the new Renewable Electricity Support Scheme (RESS) in Ireland.

The main objectives of this analysis were to:

1. Estimate the costs associated with introducing the scheme, and
2. Develop a series of cost –effective, high-level design options, based around the need to ensure the scheme is structured so that it supports efficient and effective design, installation and operation, industry investment and overall value-for-money for Irish customers.

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<sup>2</sup> European Commission (2016). Targets can be found at on the European Commission website [here](#).

<sup>3</sup> Department of Communications, Energy & Natural Resources (2015), *Ireland's Transition to a Low Carbon Energy Future 2015-30*.

In parallel, the Sustainable Energy Authority of Ireland (SEAI) in conjunction with DCCAE appointed Ricardo Energy and Environment to assess models for community renewable energy schemes in Ireland.

The main objectives of this analysis were to:

1. Identify and give a detailed assessment of policies and measures to increase community ownership of, and participation in, renewable electricity projects in Ireland, and
2. Based on the assessment, recommend a model for supporting community ownership of, and participation in, renewable electricity projects in Ireland.

Outputs from the SEAI-led community assessment provided both financial data which fed into the economic analysis carried out by CEPA, and policy measures, which will feed into the design of the new RESS. Findings from the work undertaken by Cambridge Economic Policy Associates and the work undertaken by Ricardo Energy & Environment form the basis of this public consultation.

It is important to note that EU State Aid approval will be sought for the entire RESS proposal, once Government approval on the overall design and direction of the new scheme has been obtained.

Work continues on the two reports (the Economic Assessment to underpin the new RESS known as the 'Economic Report' and the Assessment of models to support community ownership of renewable energy in Ireland known as the 'Community Report') and they will be published once the final scheme design has been finalised.

A detailed assessment of the structures required, both in terms of administering the scheme and managing the proposed capacity auction processes 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 RESS.

This final public consultation is the next phase in a multi-phase RESS design process and will remain open until **16.00 on Friday 3<sup>rd</sup> November 2017**.

All responses should be submitted to [ress@dccae.gov.ie](mailto:ress@dccae.gov.ie) or in writing to:

RESS Consultation

Electricity Policy Division

Department of Communications, Climate Action and Environment

29-31 Adelaide Road

Dublin

D02 X285

Ireland

Note: all submissions and comments submitted to DCCAE 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.

## *2.2 Renewable Electricity Support Scheme Economic Assessment*

Following the 2015 Technology Review consultation, a range of Renewable Electricity Technologies were identified to be considered for support under the new RESS.

Figure 1. List of all renewable technologies included in the economic assessment to underpin the new RESS

- Solar PV
  - Large Ground Mounted
  - Medium Ground Mounted
  - Commercial Rooftop
  - Domestic Rooftop
- Wind
  - Large onshore
  - Large onshore repowering
  - Medium onshore
  - Small onshore
  - Micro onshore
  - Large offshore

- Bioenergy
  - Biomass LFG
  - Large biomass combustion
  - Large biomass combustion repowering
  - Small biomass combustion
  - Large biomass CHP
  - Large biomass CHP repowering
  - Small biomass CHP
  - Large AD CHP
  - Large AD CHP (50/50)
  - Small AD CHP
  - Sewage Gas
  - Biogas/biomethane
  - Bio LPG CHP
- Micro CHP
  - Domestic CHP
- Hydro
  - Large hydro
  - Large hydro repowering
  - Small hydro
  - Micro hydro
- Ocean
  - Large wave
  - Small wave
  - Tidal stream
  - Tidal range
- Waste to Energy
  - Large
- Geothermal
  - Large
  - Small

DCCAE is proposing that each technology listed above will remain open for consideration under a range of design scenarios that are being developed. The findings from this consultation will help to inform the final scheme design. While it is recognised that each renewable electricity technology can, in principle, contribute towards Ireland’s renewable electricity ambitions, it is also important to take account of the fact that some renewable electricity technologies are more market ready and more cost effective than others, meaning they are likely to be in a position to deploy faster and at a lower cost to the consumer.

### *2.3 Assessment of models for community ownership and participation*

A central component of the new Renewable Electricity Support Scheme will be the provision of pathways and opportunities for community and citizen ownership, and benefit sharing of renewable electricity projects.

To inform the design of this feature of the RESS, the SEAI commissioned a study aimed at understanding the most effective approach to addressing the ambitions set out in the Energy White Paper relating to greater involvement of communities and citizens in the energy transition in Ireland. The Community Report, undertaken by Ricardo Energy and Environment (Ricardo) sought to identify the optimal suite of policies and measures to support community ownership and benefits sharing by drawing on international experience, existing publications on the subject, expert stakeholder inputs, as well as the knowledge and experience of the project consultants.

The study identified numerous existing barriers to community ownership and participation in renewable electricity projects in Ireland, and set out how to address them when designing the new RESS policy. However, it is important to acknowledge that specific barriers to certain types of community participation cannot be overcome by the introduction of the new scheme on its own. Examples of these types of challenges include facilitating Direct Lines, Private Wire and Net Metering arrangements. Those issues identified as barriers to specific community participation models and the policy and regulatory options to address them will be examined separately, outside of the main RESS. However, these specific barriers will not impact on the ability of the new RESS to deliver on increased community ownership or community benefit from renewable electricity projects. The new RESS will facilitate community-led projects where these issues do not apply.

In undertaking the models for community ownership study, Ricardo was directed by DCCA and SEAI to hold a workshop on 2<sup>nd</sup> February 2017 to explore the barriers and solutions to community ownership. The workshop drew together almost 50 experts across 13 different sectors with knowledge of community ownership or renewables. Further to this, 22 stakeholders across 10 different sectors were interviewed by the project team. Stakeholders were strategically selected to cover all key sectors including academics, financiers, electricity suppliers, developers, equipment suppliers and technical consultants and included experienced and influential professionals with a strong understanding of the energy sector in Ireland.

A full list of the respondents is provided below:

Figure 2. List of stakeholders interviewed as part of the community ownership and participation assessment.

Group	Organisation
Community Energy	Templederry Community Wind
	Sustainable Clonakilty
	Energy Co-operatives Ireland
	Aran Islands Energy Co-op
Energy Associations	Irish Solar Energy Association (ISEA)
	Irish Wind Energy Association (IWEA)
Energy Agencies	Tipperary Energy Agency (TEA)
	Dublin Energy Agency - Codema
Developers	Enercon Wind Farm Services Ireland Ltd.
	Gaelectric Bioenergy & Solar
	Arcogen
	Natural Forces
Financial	Bridge & York
	Clann Credo
	AIB
Grid Connection	Mullan Grid
Electricity Buyer	Energia
Academic	The Institute of International and European Affairs
	CUBS
Government	Western Development Commission (WDC)
	NESC
Planning	Fehily Timoney

This engagement process was a necessary part of developing the Community ownership and participation pathways policy in terms of the new RESS; however a broader full public consultation is now warranted to seek the views of all interested stakeholders on the final design of the new scheme.

## Section 3 - Methodology and Assessment Criteria

The aim of the proposed new Renewable Electricity Support Scheme is to assist Ireland in meeting its 40% renewable electricity target by 2020, to deliver the required additional renewable electricity to contribute to the EU wide target of 27% 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 2015 Energy White Paper and the 2016 Programme for Government ambitions. Ireland's energy policy is shaped by three core objectives, known as the 'energy pillars':

- Competitiveness
- Security of Supply
- Sustainability

Previous renewable electricity support schemes were largely driven by the single, 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 enhancing security of supply, increasing community and citizen participation in renewable electricity projects, exploring opportunities for microgeneration and a range of other ambitions outlined in both the Energy White Paper and the Programme for Government, have been considered during this design process of the new RESS.

### *3.1 Energy White paper and Programme for Government ambitions*

The 2015 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) Provide funding and support for community-led projects in the initial stages of development, planning and construction

- (iv) Examine shared ownership opportunities for renewable energy projects in local communities
- (v) Developing a framework for agreeing how communities share in the benefits of substantial new energy infrastructure located in their area
- (vi) Exploring the scope to provide market support for micro-generation
- (vii) To facilitate the development of solar energy projects in Ireland

The proposed new RESS aligns with the principles of the recently published National Mitigation Plan (NMP). The plan recognises that achievement of a low carbon future will involve ‘generating our electricity from renewable sources of which we have a plentiful indigenous supply’.

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 low 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 current EU-legislative framework for supporting new RES-E capacity runs until 2020. It is characterised by two main elements:

- First, the Renewable Energy Directive (RED) 2009/28/EC, which sets binding national targets for renewable energy, and leaves the Member State (MS) with discretion in designing and managing renewable energy support schemes within the boundaries of the EU State Aid rules.
- Secondly, the Energy and Environment State Aid Guidelines, applicable for renewable support schemes designed between 2014 and 2020, significantly limit—from a State Aid and internal market perspective—the design options for national RES-E support schemes. In general and except for small scale installations;

- RES-E support levels must be set through competitive bidding processes
- All new RES-E schemes should provide support in the form of a premium in addition to the market price, except for small scale or demonstration projects
- RES-E producers are increasingly exposed to market prices and must directly market the electricity they generate; and
- RES-E producers must take on standard balancing responsibilities, unless a liquid intraday market does not exist.

The 2014 State Aid guidelines published by the European Commission will inform and shape the development of the new scheme, as ultimately the scheme will be the subject of a formal State Aid application to the European Commission.

Further to the 2014 State Aid Guidelines, on 30<sup>th</sup> November 2016, the European Commission published its 'Clean Energy for All Europeans' legislative proposal, commonly referred to as the 'Clean Energy Package'.<sup>4</sup> The package contains a proposal for a new Renewable Energy Directive (RED). This Directive is still under consideration but the main elements of the proposal are as follows:

- An EU-wide target of at least 27 percent share of renewable energy in gross final consumption by 2030. Member States do not have individual targets, but they must meet a minimum share of renewable energy in gross final consumption each year from 2021 to 2030. For Ireland this level is 16%.
- RES-E support mechanisms should be designed to integrate renewables in the electricity market and should be granted in an open, transparent, competitive, non-discriminatory and cost-effective manner.

It is important to note that under State Aid rules, a new CHP unit can avail of support under a renewable electricity support scheme (RESS) for the electricity generated and under a renewable heat incentive (RHI) for the heat produced. However, issues related to the accumulation of aid (in order to exclude overcompensation) would need to be addressed.

### 3.3 Methodologies

#### High Level Approach to Economic Assessment of Renewable Technologies (Economic Report)

The timeframe for the economic analysis covers the period from the present up to 2030 and this analytical work consisted of three core components:

- First, RES-E market revenues were estimated using an hourly dispatch model of the Integrated – Single Electricity Market (I-SEM).
- Secondly, the simulated market revenues served as an input for a financial model, where they were compared to estimates of developer costs to assess the viability gap of each RES-E technology – defined as the shortfall between market revenues and costs in €/MWh of

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<sup>4</sup> COM(2016) 860 final, available on the European Commission website [here](#).

constructing and operating RES-E generators. This analysis allowed for the calculation of the cost of support for each policy option.

- The final component of this approach consisted of a systematic assessment of policy options, using the results from the quantitative analysis, as well as qualitative methods.

The primary metric used for the comparison of the costs associated with these technologies was the Levelised Cost of Electricity (LCOE). The LCOE, expressed in €/MWh, represents the average price of electricity that each type of RES-E generator would have to earn during its given lifetime, at a given load factor, in order to cover its capital and operating costs. In addition, the discount factors used in the LCOE calculation reflected technology-specific risks and the RES-E costs assumed in the LCOEs reflect Ireland-specific conditions, whenever such data was available.

The viability gap represents the difference between a RES-E generator's LCOE and its levelised market revenues.

A project with a zero or negative viability gap should be able to recover its costs from the market, without needing any other form of support. Viability gaps were used to estimate the cost of support associated with different forms of support and scenarios.

In addition to the RES-E mix assumed in the Baseline Scenario, four additional scenarios were modelled. The second scenario was the 'least-cost' mix identified based on the results of LCOE analysis with no additional community-led component. Although this scenario does not meet the policy objectives in relation to community participation, it does provide a benchmark for comparison purposes.

Three additional scenarios were examined in order to understand the implications of technology specific allocations. The five scenarios are therefore:

**Scenario 1** – the 'Baseline' scenario (i.e. Least Cost with community specific projects)

**Scenario 2** – the 'Least Cost' mix

**Scenario 3** – the 'Solar PV plus' mix;

**Scenario 4** – the 'Offshore wind plus' mix; and

**Scenario 5** – the 'Bioenergy plus' mix.

All five of these scenarios were evaluated assuming a 2030 RES-E objective of 40%, which is in effect a continuation of the 2020 40% RES-E target extended out to 2030, taking growth in electricity demand into account. This baseline analysis assumes no change in policy regarding the contribution that RES-E will be expected to make as part of Ireland's contribution to an EU-wide renewable energy target out to 2030 which is still subject to negotiation. The Directive proposes that the 2020 national renewable energy target of 16% for Ireland will become the baseline target out to 2030. Moreover, the analysis is based on Eirgrid's Generation Capacity Statement (GCS) 2017-2026, where the annual electricity demand in Ireland in 2030 is calculated to be 29% higher (at the median) than the 2016 figure (accounting for economic growth, increase in data centres etc.). High and Low electricity demand sensitivities were also modelled as part of the economic assessment.

Higher levels of 2030 RES-E penetration (45%, 50% and 55%) were also examined as sensitivities to the Baseline scenario. These additional sensitivities were modelled in order to better understand the impact on cost of support, if Government took a decision to move away from the Baseline (least-cost + Community) scenario, in order to meet its multiple objectives.

The five RES-E scenarios were then assessed against other policy objectives, namely;

- Financial
  - Cost of Support
  - Impact on PSO
  - Savings on Imported Fuel
  - Impact on Grid/System Costs
  - Facilitate Private Sector Investment
- Security of Supply
- Market Opportunities for MicroGeneration
- Ireland / EU RES-E Targets
- Compatibility with I-SEM
- Environmental Impacts / GHG reductions

## High Level Approach to Community Ownership and Participation model assessment

The Community Report sought to identify the optimal suite of policies and measures to support community ownership and benefits sharing by drawing on international experience, existing publications on the subject, expert stakeholder inputs, as well as the knowledge and experience of the project consultants. The study consisted of five tasks:

1. National and international literature review
2. Stakeholder engagement
3. Assessment of policies and measures
4. Detailed model design
5. Reporting

**Task 1** comprised a review of the existing body of literature on the subject. This included analysis of community ownership policies in other jurisdictions (including Denmark, Germany, the United Kingdom and Canada), existing Irish publications on the subject, and other relevant publications.

**Task 2** was intended to identify the barriers and potential solutions to community ownership of renewable energy by drawing on the existing knowledge of expert stakeholders in the field. This involved a series of telephone interviews with experts from Ireland from a broad range of disciplines (including project developers, energy agencies, community organisations, trade bodies, planners and academics) and a half-day stakeholder workshop held in Portlaoise. Key barriers were identified and possible solutions were discussed along with a consideration of the benefits and risks of various interventions.

The first two tasks generated a long list of policies and measures supporting community ownership which could potentially be applied in the Irish context.

**Task 3** sought to compare all of these policies and measures to identify the most viable solutions. First the policies and measures were grouped together based on their function in supporting community projects. Three broad categories were established:

- **Primary policies:** policies that secure generation revenues for community projects.
- **Enabling policies:** policies that assist communities during the feasibility and planning stages and community-specific policies that offer additional benefits.
- **Supporting measures:** additional measures to support community ownership and address barriers to community ownership, such as the availability of expert advice for communities.

The policies and measures in each category were then assessed against a range of criteria including potential cost to consumers, administration cost, and complexity of implementation, risks, wider benefits and overall effectiveness. This generated a ranking of the various policies and measures in each category along with a detailed summary of how each option performed against each criterion.

**Task 4** then sought to compile the outcomes of the previous tasks and establish the optimal design of a model to support community ownership. As well as drawing on the highest ranked policies and measures, it considered the mix of options necessary to address the main barriers identified by stakeholders. An overall model was then proposed.

**Task 5** delivered a summary report presenting the findings of each task.

Other than in the least cost RES-E mix, a standard level of community-led RES-E was included in each of the other 4 scenarios modelled. For modelling purposes, the technologies and scales included in this community category are supported through a single separate mechanism outside the primary RESS.

Discount rates and development costs associated with community based projects, were identified and fed into the economic analysis, to develop costs associated with community participation.

In addition to including community-led project costs, two sensitivities to capture further options to support developer-led projects with community involvement were assessed. These sensitivities include a €2/MWh (2017 prices) community benefit payment paid by all RES-E projects, and a further sensitivity to capture potential increases in development costs related to community ownership of developer-led projects.

### 3.4 Renewable Electricity Support Scheme - Assessment Criteria

In order to ensure the RESS is designed in a way to meet the objectives outlined, within the confines of the EU State Aid Guidelines, a set of baseline assessment criteria was developed. The final design of the new scheme must be consistent with the full list of assessment criteria to the fullest extent possible. The full assessment criteria identified for the new RESS are as follows:

Figure 3. RESS Assessment Criteria.

Assessment Criteria	Description
1. Incentivise an efficient level of investment to meet the primary objective	Does the design option incentivise the introduction of sufficient renewable generation to ensure the delivery of Ireland's 2030 RES-E ambitions?
2. Minimising costs to the consumer	Is the design option cost effective, does it minimise impact on the consumer and does it find the right balance between lowest overall cost, and broader policy objectives?
3. Allocating Risks efficiently	Does the design option allocate risks efficiently, such as between the consumer and the renewable electricity producer?
4. Complexity / Clarity	Would the complexity of the design option deter investors?
5. EU State Aid Guidelines	Is the design option compatible with EU State Aid Guidelines?
6. Impact on the diversity of the renewable technology industry	Does the design option lead to a sufficiently diverse technology mix?
7. Community and Citizen ownership and Participation.	Does the design option provide pathways for community and citizen participation and benefit in renewable electricity projects in their local area?
8. Security of Supply	Does the design option Improve Ireland's security of supply?
9. Other policy ambitions	Does the scheme provide potential for supporting broader policy objectives as per the Programme for Government?

While the primary objective of the new RESS is to incentivise sufficient renewable electricity generation to meet Ireland's RES-E ambitions out to 2030, where the design and focus of the RESS can derive additional public policy benefits and value for the consumer then this is the preferred approach of DCCA.

### 3.5 Community Ownership and Participation Policy – Assessment Criteria

#### Community Definition

While the study did not set out a comprehensive definition of a community renewable electricity project in the context of the proposed scheme, a broad working definition was needed to ensure some common understanding of what constitutes a community renewable electricity project.

There was general agreement amongst stakeholders that two key characteristics should feature in such a definition to ensure that a meaningful notion of 'community' is captured, in particular:

- There should be some geographical element to 'community' (i.e. within some catchment area of a renewable installation)
- In order to be classified as 'community' there needs to be some minimum combination of different stakeholders (i.e. single entity acting alone such as an SME does not constitute a community).

Definitions in other jurisdictions vary widely and encompass a range of actors, all of whom could in principle form part of a community project.

For the purposes of this study, a working definition for community renewable energy projects was:

*'A community renewable energy project encompasses some minimum combination of citizens, co-operatives, community groups, charities, educational bodies and SMEs (including farmers) within a certain distance of the installation, as well as municipalities and local authorities.'*

## Community Project Genre

The assessment was carried out for two different types of projects with different levels of community ownership, namely:

- **Community-led project:** a renewable energy project, where community investors have over 50% equity stake in the project. This includes projects that are 100% community owned.
- **Developer-led community project:** a renewable energy project, where community investors have less than 50% equity stake in the project.

The Community Report tasks 1 & 2 identified a long and diverse list of policies and measures which were subsequently grouped into the three categories of primary policy, enabling policy and supporting measures. In task 3 the primary and enabling policies were assessed against the assessment criteria below, to enable a meaningful comparative assessment.

Figure 4. Models for Community Ownership and Participation Assessment Criteria.

Assessment Criteria	Criterion Description
<b>Within the scope of the RESS</b>	This initial criterion is a stage gate, in that if the policy, although interesting, is out with the scope of the RESS then no further analysis is needed of that option.
<b>Complexity of Implementation</b>	This is a qualitative view of the complexity to implement the policy. This takes account of the legislative changes that may need to be implemented and the likely timetable for implementing the policy (short <1 year, medium 1 – 2 years, long > 2 years).
<b>Sharing benefits</b>	A qualitative analysis of how widely the benefits from the policy would extend. Would they be limited solely to those investing in the project, or would they extend more widely to others in the local community, local businesses or the wider public?
<b>Cost to consumer</b>	It is beyond the scope of this study to complete a full quantitative impact assessment; however a qualitative analysis of the comparable costs of the policies was undertaken to determine the impact on the PSO Levy or other impact on electricity bills.

<b>Cost to project</b>	This involved a qualitative assessment of the higher or lower costs to the project of the policy. This includes any impact on project costs during development, construction or operation. Whilst the variation in costs from one technology to another and at different scales of project means the impact is likely to vary between projects, the qualitative analysis still provided a possible range of costs.
<b>Administrative Cost</b>	How much would policy cost to implement? This includes the costs of setting up all the rules and policies, and then the ongoing costs to the public sector including the structures required to administer and support the scheme. Included would be the cost of grants awarded, the costs of loans that are written off and paying for continued support to the sector. There is also the need to consider the net impact on tax revenues?
<b>Effectiveness of delivering community ownership</b>	This involved a qualitative assessment of the leverage effect of the policy, i.e. by how much may the amount of ownership of renewable projects by communities' increase?
<b>Wider additional benefits</b>	This involved a consideration of other wider benefits from the policy, e.g. building technical expertise within communities, de-risking project for communities.
<b>Summary of risks</b>	Each policy may have a number of risks. This criterion assesses the potential risks of policies (e.g. risk of overcompensation, potential loopholes) and the potential impact of these risks.

### 3.6 Overview of RESS design options

#### Competitive Auctions for Renewable Electricity Support

The Energy and Environment State Aid Guidelines, applicable from 2014 to 2020, significantly limit – from a State Aid and internal market perspective – the design options for national RES-E support schemes. In general and except for small scale installation:

RES-E support levels must be set through competitive bidding processes

Across Europe, factors that influence policy-making have shifted dramatically in the past decade, creating a need for tailored policies that build on past experiences and lessons learnt to address barriers to renewable energy deployment.

These factors include the rapid decline in the costs of renewable energy technologies and the growing share of variable renewable energy in the energy mix. To account for these dynamics, support policies are continuously being adapted to maintain a stable and attractive environment for investments in the sector while ensuring the long-term stability of the energy system in a cost-effective manner (IRENA, 2014). In this context, auctions for renewable energy development have become increasingly popular in developing and developed countries and are often implemented in combination with other measures. The number of countries that have adopted renewable energy auctions increased from six in 2005 to at least sixty seven by mid-2016.

The strength of auctions lies in some of their key characteristics:

i. Potential for real price discovery. An auction's power to discover real prices is of particular relevance given recent market developments, notably the rapid downward evolution of technology costs. The effect of price discovery is clearly shown in the global trends of auction prices for both solar and wind projects, and it is especially important for the development of local supply chains and the maturity of the market. The potential to achieve low prices has been acclaimed as one of the most important strengths of auctions and has been a major motivation for their rapid dissemination worldwide. This strength can largely be attributed to their ability to promote competition among potential developers and lead to accurate price discovery in a robust and transparent manner.

ii. Certainty regarding quantities of renewable electricity supported. The commissioning authority can control the quantity of renewable electricity produced and supported by auctioning specific volumes of capacity in each auction round.

iii. Flexibility of design. Authorities can tailor different elements of auctions to meet deployment and development objectives e.g. in Ireland's case, multiple auctions can be held if required, to support broader policy objectives. Auction participation rules such as viability gap analysis, and community equity offer pre-requisites can be tied into the design.

iv. Degree of commitment and transparency. Stating clear penalties for underbidding and delays can also ensure that auctioned projects deliver as per the bid.

From an Irish perspective, dividing the total amount of additional renewable electricity required (MWh) across multiple auctions, spread throughout the lifetime of the scheme, for example every two years, will allow for greater budgetary control and deliver for the customer the benefits of falling technology costs (as technologies mature and supply chains emerge). In addition, the competitive nature of the auctions themselves will help to drive future support costs down.

## Form of Primary RESS Mechanism

The economic data generated was used to proceed to the next phase of the quantitative analysis and assess the three main features of the new RESS, namely;

- (i) The form of the primary RESS mechanism;
- (ii) Whether support is provided on a technology-neutral or technology-specific auction basis; and
- (iii) The high-level measures to support community participation.

The financial support mechanism that the RESS uses has an impact on the cost of capital, and thus the uniform-price cost of support, which is one of the main criteria for assessing potential RESS options against the policy objectives.

In the study, five high level forms of primary RESS mechanism were quantitatively assessed:

- **Feed-in-Tariff (FIT):** A price-based support mechanism, designed to provide full remuneration by guaranteeing RES-E projects a €/MWh fixed payment for each unit of electricity produced during a pre-determined/fixed support period. Previous support schemes in Ireland were FIT mechanisms.
- **Floating Feed-In-Premium (FIP):** Varying €/MWh premium, calculated as the difference between the strike price and the reference market price. This provides RES-E projects with significant protection from wholesale market price risk, though to a lesser extent than under a FIT.
- **Fixed FIP:** RES-E producers receive a constant €/MWh premium. RES-E producers remain exposed to wholesale market risks, aligning them with conventional generators.
- **Quota scheme:** Quantity-based support options where the policy-maker sets targets (e.g., a given GWh of electricity to be produced by RES-E by a certain date), and RES-E producers receive a certificate for each unit produced. Although the target amount of RES-E generation is known ex ante, the price/ level of support is determined ex post by supply of and demand for certificates.
- **Grant:** Lump sum payments linked to non-generation milestones (e.g. financial close, commercial operation, 5<sup>th</sup> year of operation, availability, etc.).

These five support mechanisms were assessed using a qualitative scale, against a range of assessment criteria, including price and cost risk, flexibility and robustness, regulatory and technical risks, as well as feasibility. The results of this qualitative assessment are summarised in Figure 5.

Following on from this qualitative assessment, these RESS mechanisms were assessed against the specific policy objectives and finally the support mechanisms were assessed against the potential consumer impact (impact on PSO) for each scenario and sensitivity identified.

### Technology- Neutral or Technology-Specific Auctions

The technology-neutral or technology-specific nature of a scheme is a further defining feature of a RESS and an appraisal of both archetypes was included in the assessment of design options for Ireland.

This question is fundamentally about which technologies are likely to be supported under the new RESS, as the competitive auction approach will ensure that only the most economically viable projects go ahead.

Each of the RES-E mixes analysed could hypothetically be supported through either a technology-neutral or a technology-specific form of support. Technology-neutral schemes are agnostic as to what RES-E technologies are selected to meet the RES-E targets, as long as they do so at least cost. Technology-specific schemes introduce some form of differentiation between RES-E technologies, e.g. either by setting a up a separate scheme or by providing differentiated levels of support to a subset of technologies.

In assessing the additional RES-E mix scenarios, it was assumed that some form of technology-specific auction had been implemented alongside the primary technology-neutral auction, from which those technologies are then excluded. In each auction, it would be expected that the project/technology requiring the highest level of support would set the uniform-price level of support.

Multiple auctions can be constructed if the results of initial auctions do not deliver broader energy objectives.

## Section 4 – High Level Findings

### *4.1 Form of Primary RESS Mechanism – Floating Feed In Premium*

The qualitative assessment suggests that Floating Feed In Premium (FIP) performs best against the assessment criteria and should be used as the primary financial support mechanism for the new RESS. A Floating FIP is calculated as the difference between the strike price and the reference market price.

While Feed-in Tariff (FIT) could theoretically provide a lower cost of support, for all but the smallest RES-E generators, it is not compatible with EU rules, and it also does not perform well against market integration/I-SEM compatibility criteria. Specifically, generators receiving a FIT are generally guaranteed a price for their output, leaving them with little to no incentive to respond to the wholesale price of electricity. This in turn weakens the market price as a means of matching supply and demand.

This lack of response to market prices can result in higher than necessary balancing costs and while such system costs are not in the direct costs of providing RES-E support, they can be very significant at high RES-E penetrations, and will ultimately be borne by the consumers.

This qualitative analysis indicates that the lower cost of support for FIT is more than offset by associated higher systems costs, compared to Floating FIP. Thus the Floating FIP is likely to deliver the required amounts of RES-E investments at a lower system-wide cost than a FIT.

In addition, other RESS mechanisms, such as a Fixed FIP or Quota Schemes, are generally perceived to be riskier by investors than a Floating FIP. This results in higher costs of capital, and thus cost of support, under these schemes, compared to a Floating FIP. At the same time, the relative advantages of the schemes are unlikely to offset this cost differential.

The Floating FIP scheme appears to be the direction of travel in RES-E support across Europe, with six EU Member States having already implemented some form of a FIP scheme.

The high level assessments are contained below with the resultant recommendations outlined and described.

Figure 5. Based on CEPA study ‘Supporting investments into renewable electricity in context of deep market integration of RES-e after 2020: Study on EU-, regional- and national-level options’, prepared for the European Commission.

Criteria group	Criterion	FIT	Floating FIP	Fixed FIP	Quota Scheme	Grants
<b>Revenues and costs</b>	Uncertainty of revenue streams	Very low	Low	Moderate	Very high	Very low
	Cost of capital and risk premiums	Very low	Low	Moderate	Moderate	Low/Moderate
	Risk of windfall profits	Very high	Moderate	Moderate	Moderate	High
	Risk of deadweight costs	Very high	Moderate	High	Moderate/Low	Moderate
	Overall system costs	High	Moderate	Moderate / High	Moderate/Low	Moderate
<b>Flexibility and robustness</b>	Risk of miss-specified parameters	Very high	Moderate	Moderate	Moderate	Moderate
	Risk of future need for re-design	Very high	Moderate	Moderate	Moderate	Moderate
<b>Regulatory</b>	Subsidy risk	Very low	Low/Moderate	Low	Very high	Moderate
	Policy uncertainty /credibility risk	High	Low	Moderate	Moderate	High
	Complexity	Very low	Low	Moderate	Moderate	Low
	Risk of unintended consequences	Very high	Moderate	High	High	Moderate
<b>Technical</b>	Learning curve / technology cost risk	High	High	Moderate	Low	High
<b>Political feasibility</b>	Negative distributional impacts	High	Moderate	Moderate	Moderate	Moderate

Under a Floating FIP (a RESS which can enable market integration), wholesale market prices themselves may provide an incentive to provide RES-E diversity. This stems from the nature of RES-E technologies that the output of the same type of generators tends to be correlated, and thus they tend to cannibalise their own revenues. Therefore, other types of RES-E technologies with complementary generation profiles will over time start to have competitive advantages as they will be able to earn relatively higher wholesale prices.

### Uniform-Price Cost of Support

Each auction should be uniform-price, with the level of support set by the highest value bidder still needed to meet the required amount of RES-E. All bidders with offers below the clearing price would receive the clearing auction price.

In uniform-price auctions, competitive pressure removes any ability of suppliers to affect the market-clearing price. Suppliers have no incentive to bid above their project specific cost price needed to eliminate the viability gap, as this would significantly reduce the likelihood that their project will be chosen. Conversely, bidding below the required strike price would result in a financial loss.

At face value, it may seem like a good idea to set RES-E support payments based on actual bids, as this would in theory reduce the cost of support. However, in reality suppliers are likely to alter their bidding strategy if they know they will only receive their bid price. They may in fact bid their best guess of the market clearing price in order to maximise their revenues.

Overall, economic theory suggests that under competitive market conditions, market prices are unlikely to be significantly different between uniform and pay-as-bid auction formats, as long as the bidders face competitive pressure. However, pay-as-bid auctions may have an adverse impact on market efficiency. This is because pay-as-bid auctions introduce an element of subjectivity, as suppliers' bids are no longer simply related to their own underlying costs of RES-E, but rather are based on their expectation of other suppliers' costs and of the market clearing price. As a result, RES-E with the lowest overall cost may be overly optimistic with its forecast, and bid over the market clearing price that would occur if they all bid their cost. This could result in a higher-cost RES-E being chosen instead. This would also result in a sub-optimal final mix of RES-E capacity. In the long run, this inefficient use of resources will reduce incentives for investment, and lead to higher consumer costs.

## 4.2 Technology Neutral Vs Technology-Specific Auctions

The LCOE analysis will inform the decision regarding the approach to auctions, as based on renewable technologies' LCOE (and other inputs), it is possible to model the likely outcome of an auction process, and assess whether the least-cost auction approach delivers on broader Government policy objectives.

Results of the economic assessment indicate that a number of renewable technologies have a broadly similar range of LCOE's, and that under specific project circumstances; they might be able to compete in technology neutral mechanisms. Although the exact scale at which they could participate successfully is unknown at this stage.

Notwithstanding this, the analysis indicates that technology-neutral schemes are the most cost appropriate for Ireland, given the stated policy objectives and converging viability gaps of most RES-E capacity within the least cost mix.

Meeting the Government's numerous policy objectives may require the setting up of multiple auction categories however. For example, the Government are very supportive of the nascent renewable technology sector, and setting up separate categories of auctions for emerging or nascent technologies such as Solar PV or Offshore wind may be required. If such an approach is taken, it is recommended that each additional auction category should be based on competitive bidding with technologies eligible for each auction category (based on viability gap analysis) competing against each other, on an equal footing, to receive RES-E support.

The economic analysis undertaken to underpin the new RESS indicates that the least-cost and baseline RES-E mix of technologies presented would be best achieved through the application of a technology-neutral auction process open to all RES-E technologies with comparative viability gaps.<sup>5</sup>

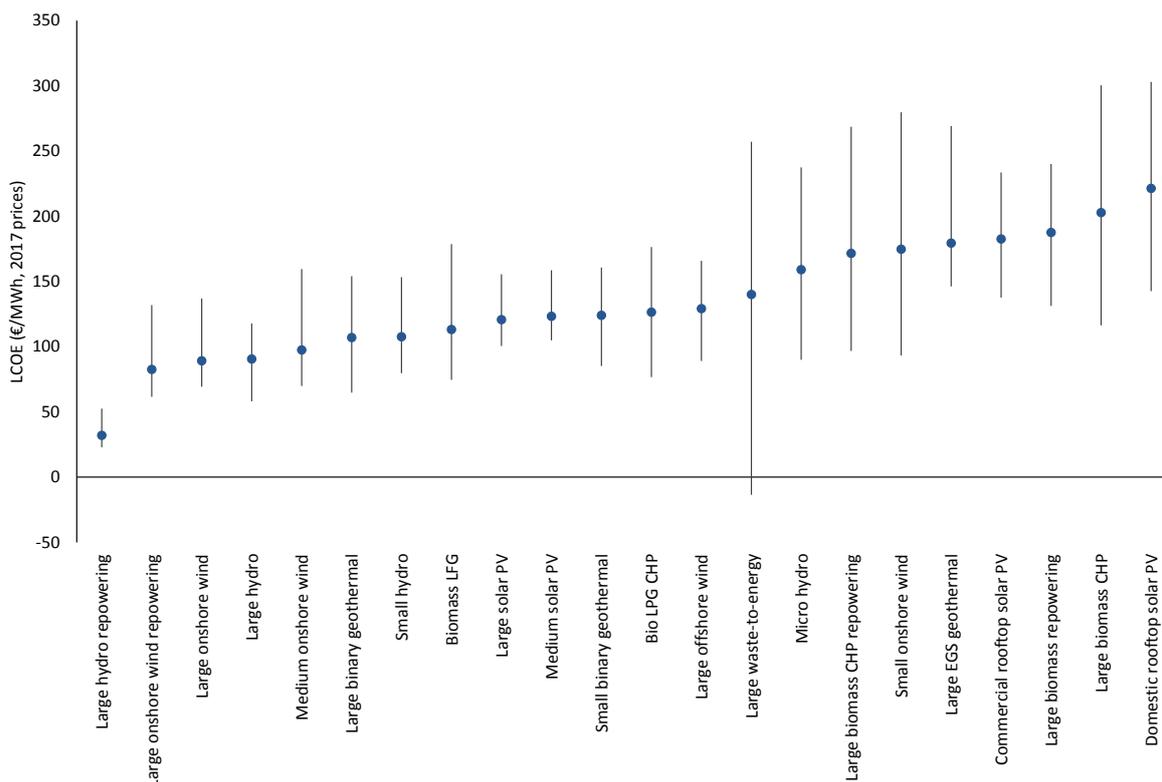
The economic appraisal undertaken indicates that under each of the additional technology specific scenarios that have been modelled, the cost of support is greater than under the baseline scenario or the least-cost RES-E mix. A policy objective supporting the delivery of increased diversification of the renewable generation portfolio, (notwithstanding a number of technologies have seen significant reductions in the cost of technology), through technology-specific auctions, will result in trade-offs i.e. an increase in cost of support.

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<sup>5</sup> In practice, it may be useful to implement protections that exclude certain technologies based on having a much higher cost than anticipated should clear in the competitive process. However, such outcomes are only likely to occur in situations in which the auction fails to secure sufficient competition, for which separate protections should be put in place, potentially reducing the need to exclude those more costly technologies.

In short, technology specific categories, as a means to delivering increased renewable diversity at significant scale, are more expensive than a technology neutral approach and would have a greater impact in terms of additional cost to the PSO. Part of the final scheme design will be to strike a balance between these multiple policy objectives.

Figure 6. Range of 2020 LCOE estimates under cost scenarios, using standard discount rate.



Many technologies achieve the benchmark of having cost ranges that overlap with that of onshore wind or could even be below onshore wind's central estimate, indicating that under the least cost scenario, and in specific circumstances, it might be difficult to rule out specific projects from those technologies forming part of the least-cost mix – though their participation in large numbers, may be less likely.

Evidence suggests that while it is possible that the range of renewable technologies supported under a single least-cost approach will broaden, it is unlikely that the scale of this increased diversity would be significant. Therefore, in order to deliver on the policy ambition of increased renewable technology diversification, the approach has been taken to assess the impact of schemes that cater for separate categories supporting nascent technologies, and their ability to participate in least-cost technology neutral auctions will be kept under constant review.

Summarised below are key points relating to technology-neutral schemes and why they are the recommended design approach for the new RESS for Ireland.

a) The LCOE analysis completed in this study, combined with a consideration of resource potential, suggests that the RES-E supply curve for Ireland is and should continue to be relatively flat; that is, the viability gap of most individual RES-E capacity within the least-cost mix is comparable. Therefore, technology-neutral schemes—under which supported RES-E generators receive the same amount—'uniform price' of support per MWh—are the most appropriate for supporting the RES-E technologies within the least-cost mix.

b) Based on DCCAE analysis, the viability gaps of many technologies are converging, therefore the cost of support under a technology-neutral scheme (assuming technologies are chosen to participate in each pot based on viability gap analysis) could be similar to that under a technology-specific scheme. At the same time, a technology neutral scheme would rely on fewer administrative parameters than a technology-specific scheme.

c) Under such a technology-neutral scheme, competition among RES-E technologies would ensure that the least-cost technologies would receive support in light of the latest technology and market developments. The analysis suggests that in some regions, from 2025 and by 2030, onshore wind and solar PV generators would have similar LCOEs.

d) Given the comparable viability gaps of technologies in the least cost mix, it is expected that windfall profits will not accrue to individual projects within this mix. However, should one of the technologies achieve faster cost reductions than expected, the relative level of costs between the technologies may change. Technology-neutral schemes are robust to these changes; technology-specific schemes are not.

e) Based on above, and subject to assumptions around electricity demand, a baseline 40% RES-E penetration and with incentivising a diverse mix of renewable electricity generation at least-cost being the primary objective of the new scheme; it is recommended that the structure of new RESS is technology neutral auctions, supported by Floating Feed in Premium, where technologies (projects) with similar viability gaps compete in appropriate auctions, with success being based entirely on bid price. Specific auctions for nascent technologies such as Solar PV and Offshore wind can be catered for under this scenario.

f) The number of auction categories can be amended year on year, based on a review of previous auction results, a 'look-back' at viability gaps, and a continuous appraisal of government objectives and policy with regard to supporting emerging renewable technologies.

- DCCAE are minded to implement the emerging Technology-Neutral approach to auctions, where projects and technologies with similar viability gaps, compete (based on price and having satisfied pre-qualification criteria) against each other for support. If this principal category technology-neutral approach results in a sub-optimal outcome in terms of meeting Ireland’s energy policy objectives, then the scheme can allow for the setting up of subsequent technology neutral auctions.
- Certain technologies will be excluded from the first primary category auction, as they are still too expensive to compete in a primary technology neutral least cost auction. Their inclusion in any least-cost or baseline scenario could artificially increase the uniform-price cost of support, if they happen to clear in the auction.
- If they are to be supported it is recommended that a separate, budget controlled, ‘nascent/emerging technology auction’ is created for them, where they can compete against each other in the same way the least cost auction operates.

### *4.3 How many Technology-Neutral Auctions?*

It is proposed that a separate Community Category will be provided for from the inception of the scheme.

Government may wish over the course of the scheme to hold multiple auctions, for emerging/ less mature (more expensive) technologies, which are unable to compete successfully in the primary RESS category. Where there is a strong policy objective, not being met by the principal category, separate categories may be provided for. Under this scenario, the same principles of competing technologies, competitive bidding and Floating Feed in Premium would apply.

DCCAE are minded to hold a number of primary category auctions during the period which the scheme is open, and not to auction all additional renewable electricity capacity (for 2030) at the same time. The rationale for this is to take advantage of continually falling renewable technology costs and to retain a portion of RES-E capacity for technologies that are currently not as mature or cost effective as others.

Multiple category auctions are perfectly valid, and have been implemented in other countries across Europe. They can be administrated, with various capacities and for various technologies (based on viability gap analysis) depending on Government policy objectives and the results of the early auction rounds. Technologies eligible to participate in each auction should be selected based on their expected viability gaps. Auctions pots should be constructed so that there is sufficient competition among the eligible technologies to achieve a competitive outcome.

## 4.4 Community Ownership and Participation

### Outcomes of Policy Assessment

The rankings of the primary policies resulting from the multi-criteria analysis are presented in the tables below. A distinction was made between primary policies to support community-led projects and primary policies to support developer-led community projects. The enabling policies were also assessed against the assessment criteria, and the supporting policies were assessed qualitatively (not presented here).

Figure 7. Highest ranking primary policy options for developer-led and community-led projects.

Developer-led community projects		Community-led	
Ranking	Policy	Ranking	Policy
Joint 1 <sup>st</sup>	RESS generation revenue policy with mandated requirement for investment opportunities to be made available to communities.	1	FIP for community-led projects.
Joint 1 <sup>st</sup>	FIP for smaller developer-led community projects.	2	In a capacity auction, auction rules account for provision of community-led projects through a ring fencing of capacity.
3	In a capacity auction, auction rules account for provision of developer-led community projects through a ring fencing of capacity.	3	FIT for community-led projects.
4	FIT for smaller developer-led community projects.	Joint 4 <sup>th</sup>	In a capacity auction mechanism, auction rules account for provision of community-led with preferential weighting applied to community-led projects.
Joint 5 <sup>th</sup>	In a capacity auction mechanism, auction rules account for preferential weighting applied to developer-led community projects.	Joint 4 <sup>th</sup>	In a capacity auction, auction rules account for provision of community-led projects by applying an uplift to the auction strike price.
Joint 5 <sup>th</sup>	In a capacity auction, auction rules account for provision of developer-led community projects by applying an uplift to the agreed strike price.		

The assessment identified that the most efficient primary policy for supporting community ownership is the obligation for developers to offer the community an opportunity to invest in their project. This would mean that some portion of all new renewable electricity projects supported by the RESS would be made available for community investment. This policy option provides the widest opportunity for a community to invest in a renewable scheme, whether that be as shares in projects, shares in revenue streams, or more secure loan notes.

However, the Government are aware that it will not be straightforward for all citizens and all communities to participate in such investment opportunities, and it is acknowledged that some form of incentive could prove effective in maximising participation in the scheme from citizens and communities. Several means of facilitating higher investment were reviewed at a high level, including tax incentives, establishment of green bonds, and the facilitation of crowd funding.

It is important to note that this policy option is not limited to offering an equity stake in the project. The recommendation is that each project offers an investment opportunity which could include an equity stake, investments into a right to a share of the net revenues, or a loan note approach. This gives flexibility to the developers and community investors, and allows for a broader variety of financial offerings from the market for citizens to invest. This could allow for a higher participation as some of these offerings would require minimal capital investment from citizens.

This is a policy which has been successfully implemented in other jurisdictions, most notably in Denmark where developers of wind projects above a certain size are obliged to offer the community the opportunity to invest in an equity stake of their project. This policy performed favourably under most of the criteria, in particular the cost to consumers, complexity of implementation, sharing benefits and overall effectiveness at delivering community investment. During the stakeholder engagement this was considered a favourable option.

For smaller projects (<6MW for wind, <1MW for other technologies) a feed in premium (FIP) was identified as the preferred policy for supporting these projects in securing generation revenues. For community-led projects the policy performed favourably under most of the criteria, in particular complexity of implementation, sharing benefits, cost to public sector and policy risks. For developer-led community projects the policy performed well under complexity of implementation and policy risks, compared with the other policies for supporting developer-led projects (including larger projects). These two policies form the basis of the proposed model for community ownership and benefit sharing. Further details on these policies as well as the preferred enabling policies and supporting measures are presented in section 5.2, which sets out the proposed community model in more detail.

## 4.5 Assessment of potential consumer impacts (Public Service Obligation levy)

The impact on consumer electricity bills was assessed in relation to the funding cost of supporting renewable generation, against the backdrop of the five scenarios modelled and the broad range of sensitivities analysed.

The analysis indicates that the cost of support would be significantly higher under scenarios with a higher RES-E target. At the same time, the analysis also shows that the wholesale electricity prices are lowest under the highest RES-E target scenarios, which could partially mitigate the impact of higher support costs on consumer bills.

Currently, the cost of supporting renewable generation is funded through the Public Service Obligation (PSO) levy. The PSO levy is charged to all electricity customers in Ireland, with the total amount allocated to three customer categories, based on total peak electricity demand in each category. The three categories are:

- Domestic customers
- Small, non-domestic customers
- Medium-large non-domestic customers

Based on the total uniform-price cost of support estimates, each RESS scenario modelled was assessed on the different consumer categories under the assumption that the allocation of the overall cost to the different consumer categories is done in the same proportions as for the 2016/17 PSO levy calculation.

The uniform-price cost of support estimates represent the sum of Net Present Value (NPV) of the total support received by each RES-E installation over the new RESS scheme lifetime. Therefore it is very difficult to estimate the precise cost of support in a given year, under a Floating FIP with uniform-price cost of support, particularly as the support needed will not be constant across years but, most likely, will increase gradually as more RES-E capacity is added, and then gradually decrease over time as projects reach the end of their support lifetime.

The Floating FIP results in the lowest estimated impact on the uniform-price cost of support on domestic, small non-domestic and medium to large customers (as part of the assessment of eligible support mechanisms).

Additional RES-E targets (45%, 50% and 55%) results in higher impacts on the PSO levy – at least twice the potential PSO increase at the 45% RES-E target; at least three times the PSO impact at the 50% target and at least six times the PSO impact than the baseline 40% RES-E at the 55% target level.

This is due to all of the additional / new RES-E capacity required to meet the higher targets and their additional associated support costs.

#### 4.6 Micro Generation Assessment

The 2015 Energy White Paper commits that Government will explore the scope to provide market support for micro-generation.

- DCCAE have duly assessed micro-generation of various technologies as part of the economic assessment to underpin the new RESS, and the evidence generated indicates that the relative cost of micro-generation is very high.
- For example, micro generation of hydro has an LCOE nearly €70/MWh more than its large scale equivalent. Domestic rooftop solar PV is €100/MWh more expensive than large and medium solar PV in 2020 (although this gap is projected to narrow slightly over time).

The study indicates that meeting renewable electricity targets and renewable diversity ambitions are more cost effectively achieved at large and medium scale levels.

#### Micro Generation - EU Experience

Micro-generation is generally operated at the distribution level, and consumers that invest in such generation usually do not participate directly in the wholesale electricity market. Consequently, some of the primary support mechanisms that require RES-E generators to directly participate in the wholesale market (e.g., Floating FIP) may not be suitable for micro-generation.

In most EU Member States, no specific schemes to support micro-generation and self-consumption exist. In fact, in a number of Member States, distribution system operators do not even measure the volume of self-generated electricity. Nevertheless, even in these countries consumers may find that they can save money by generating their own electricity from small-scale RES-E installations (e.g., rooftop PVs), rather than buying it from the grid. Examples of this type of activity are happening across Ireland today, without subsidy or payment.

## Micro-Generation support

In terms of providing remuneration for micro-generation for citizens and community based projects, DCCAE assessed three approaches:

- **Feed-in tariff/premium/grant/levy exemption approach**—electricity producing consumers (prosumers) receive explicit payments—in the form of a FIT, premium, grant—or are exempt from a levy or tax for the energy they generate and do not self-consume. Experience with FIT to support micro-generation suggests that unless tariffs are adjusted frequently in response to technology costs developments, there is a risk of overcompensation. For this reason, both Germany and Italy have had to reform their schemes. In addition to FIT/premium schemes, some EU Member States (e.g., Germany, Sweden) have provided full or partial exemptions from levies, charges or taxes (e.g., the EEG levy<sup>6</sup> in Germany), however such exemptions may involve considerable implications for burden-sharing between electricity consumers<sup>7</sup>.
- **Net metering**—excess electricity injected into the grid can be used at a later time to offset consumption during times when their onsite renewable generation is absent or not sufficient. Under these schemes, consumers effectively use the grid to store their excess generation. Net metering has been implemented in some EU Member States (e.g., Greece, Latvia, Slovenia), most US states and in Australia. Net metering has proved effective at jump-starting distributed micro-generation, but concerns have been raised about negative system impacts at relatively large deployment levels, which occur because at certain times micro-generation is remunerated at rates that exceed the value of the generated electricity to the system. This has prompted several EU Members States, as well as a number of states in the US, to limit their net metering schemes.
- **Market value approach**—envisaged by the European Commission, but not fully implemented yet. Under this approach, consumers would receive the market price for electricity generated and not self-consumed. From a policy standpoint, the EC views this approach as the most sustainable, however it requires market design reforms (e.g., ensuring that market prices reflect the true value of scarcity, consumers are on dynamic pricing tariffs, etc.).

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<sup>6</sup> ‘EEG-Umlage’ in German, used to fund renewable support schemes in Germany pursuant to the Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz).

<sup>7</sup> See Ecofys (2014), Design features of support schemes for renewable electricity, Task 2 report, 27 January 2014, available for download [here](#).

International experience suggests that the last approach—Market Value—may be the best way of supporting micro-generation; however, research indicates that reforms to how network charges are distributed and how compensation for electricity exported is delivered, should be undertaken before a support scheme for micro-generation is implemented. This reform will need to remove the benefits of self-consumption (which includes a form of subsidy through the structure of the retail tariffs).

In recent years, an increasing number of countries have undertaken, or are looking to undertake, reforms to ensure self-consumers pay their share towards the fixed and historic network costs.

### Summary - Micro-Generation

The RESS economic assessment and policy support review of micro-generation has identified challenges that need to be addressed if an equitable approach to supporting prosumers and micro-generation is to be delivered. The Market Value Approach and other mechanisms for supporting micro generation such as Grant Aid, Tax Incentives etc. will need to be evaluated as part of this work and key questions will need to be addressed in the following areas:

- Whether prosumers should be supported for electricity exported into the Grid or whether support for generation and self-consumption is sufficient.
- Whether support for micro-generation is funded by the central exchequer or via all electricity customers and what rate should that support be provided at.
- How avoided system costs can be addressed through network charges.
- Whether suppliers should be mandated to take a certain % of their electricity supply from micro-generators.

It is acknowledged that there are wider societal and environmental benefits associated with micro-generation, however the economic analysis indicates that support for micro-generation may be excluded from support directly under the new RESS, for the following reasons:

1. There are significant higher costs associated with micro-generation above medium and large scale renewable projects. Renewable targets can be achieved more cost effectively through a primary RESS for medium and larger scale projects. Cost implications for people and businesses are a high priority for Government and the new scheme will be designed in a cost efficient manner.
2. International experience directs that market and network reform is required before micro-generation tariffs are introduced.

3. Community and Citizen Participation ambitions are being strongly supported via the main RESS through both investment opportunities and benefit payments.

The Government is committed to ensuring value for money for all consumers. Therefore it may not be appropriate to include support for micro-generation in the new RESS, particularly as the RESS will be funded via the PSO. In parallel with RESS development, alternative means for developing and supporting micro-generation will be identified. DCCAE are proposing that a comprehensive review of the public demand for micro-generation, including identifying the policy drivers for same, are first identified. A policy framework will then be designed to appropriately support prosumers and micro-generation in Ireland, including the structure of any support mechanism.

## Section 5 – Emerging Options & Public Consultation Questions

### *5.1 RESS Detailed Design*

The proposed new RESS has been designed with the primary policy objective of delivering sufficient renewable electricity to meet Ireland’s contribution to the EU wide renewable energy targets, out to 2030. The proposed design meets Ireland’s three energy pillars of Competitiveness, Security of Supply and Sustainability, while simultaneously addressing multiple other government ambitions. As outlined, various different RESS 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:

1. Allocating support through auctions, with potential exceptions for small-scale generation or emerging technologies.
  - i. A Principal Category auction encompassing all viable technology options leading to the most cost effective projects being successful.
  - ii. Qualification criteria must be fulfilled in order for projects to be able to enter auctions (e.g. planning, grid connection etc.)
  - iii. Auctions to be uniform price, with the level of support set by the highest value bidder still needed to meet the required amount of RES-E. All bidders with offers below the clearing price would receive the clearing auction price.

iv. Selection of winners should be based on price only. The evidence suggests that criteria beyond cost-effectiveness can be incorporated through the process of hosting different categories of auctions for RES-E support. For example, to meet broader policy objectives, additional auctions can be defined.

v. Sufficient competition can be ensured by selecting appropriate volumes to be auctioned in each auction. Learning between auctions would increase the chances of competitive outcomes, and would most likely lead to reduced strike prices over time as technological reductions in cost are layered into subsequent bidding processes. Auctioning of smaller volumes annually or biennially would also control the cost of support exposure for the consumer.

vi. Meeting the Government's policy objectives may require the setting up of additional auction categories. Evidence indicates that these auctions are kept separate from each other, with technologies within each category competing against each other, on an equal footing, to receive RES-E support. If additional categories are to be introduced, then technologies eligible to participate in each one should be selected based on their expected viability gaps and these auctions should be constructed so that there is sufficient competition among the eligible technologies to achieve a competitive outcome.

vii. The number of potential auction categories should be limited and reviewed over time, so that competition in each one is sufficiently high. The expectation is that each auction with the RESS would be oversubscribed which would restrict opportunities for over compensation.

Q1a. The emerging policy includes a measure whereby all capacity available under the new RESS (with the exception of small scale developments) should be allocated through a competitive bidding process via auctions. Do the respondents agree with the competitive auction based approach? If not, what alternative model would you propose and why?

Q1b. Do respondents agree with the use of Uniform-Price cost of support for RES-E projects in the main RESS capacity auctions, as a mechanism to keep costs to the consumer to a minimum?

2. Evidence indicates that the Floating FIP should be used as the form of support. However, the modelling carried out for DCCAE shows that some RES-E investments will become viable (without support) by 2030 and thus eligibility rules will have to be monitored continuously, and revised, if necessary. DCCAE are minded to assess technology viability ex-post, using a backward-looking analysis of a three to five year period preceding each RES-E support auction and if a RES-E

technology was viable in each of those years, new RES-E within that technology category should not be eligible for future support.

Q2. The analysis suggest that a Floating Feed in Premium (FIP) is the primary financial support mechanism for the main RESS, as evidence indicates this is the most cost effective approach.

Do you agree with this proposal versus the other mechanisms identified?

3. Price or budget caps should be added as cost control measures into each auction. Price caps should be based on estimated viability gaps for the RES-E technology allowed to participate within each auction.

Q3. What are respondents views on a proposed price cap (maximum €/MWh) within the uniform price proposal? What alternative approach would you propose and why?

4. The emerging approach is to hold Principal Category technology neutral auctions, in which technologies with similar viability gaps participate. This will lead to the most cost effective projects being successful. DCCAE would anticipate that the outcome of each auction from a technology perspective would broaden and increase renewable diversity during the lifetime of the scheme. Where there is a strong policy objective not being met by the Principal Category, separate categories may be provided for.

In order to keep costs to the consumer to a minimum, a Principal Category, encompassing all viable technology options leading to the most cost effective projects, is provided for. The outcome of this initial auction will inform the design of future auctions.

Q4a. Do you agree with this approach? What alternatives would you propose to this approach and why?

Q4b. Would you support separate technology specific auctions for emerging technologies, at a greater cost to the PSO, and if so what percentage of the overall scheme capacity (MWh) would you allocate to this category?

5. A separate Community Category to support community-led projects. There are clear Energy White Paper ambitions calling for greater community and citizen participation in renewable electricity projects. Supporting community-led renewable electricity projects is one of the clear policy objectives underpinning this scheme.

Q5. Separate to the Principal Category RESS, a dedicated Community Category volume of renewable capacity (MWh) allocated for community-led renewable projects is envisaged in the preferred approach. The initial proposal is that between 10-20% of the total capacity (of new MWhs) of each auction is ring-fenced for community-led projects.

Do you agree with this proposal? What changes would you propose to this proposal including reference to the viable level of ambition for community-led projects?

6. To further develop pathways for micro-generation outside of but in conjunction with the main RESS. Due to the higher costs associated with supporting micro-generation, and the market and network reform required, it is proposed that micro-generation would not be supported via the main RESS.

Q6. Do you agree with the proposal to further develop opportunities for micro-generation, outside of the main RESS?

Respondents are asked for their views on how best to support micro-generation.

7. The total amount of support received by each RES-E project that clears in a RES-E auction should be capped by the level of support (€/MWh) determined in the auction and the cleared volume of the project (MWh). Capping the total amount of support will benefit consumers since they will not pay more than necessary for RES-E support than initially expected.

Q7. Do you agree with capping the amount of support received by each RES-E project that clears in a RES-E auction? What changes would you make to the proposal to set this cap by the level of support (€/MWh) determined in the auction and the cleared volume of the project (MWh).

8. Multiple Principal Category auctions to be held over the lifetime of the scheme.

Q8. Do respondents agree with the proposal to hold periodic auctions e.g. every two years, over the course of the lifetime of the scheme, to take advantage to falling costs and reduce the impact on the electricity consumer?

What changes if any would you make to this proposal?

9. RES-E projects allowed to participate in support auctions should be subject to pre-qualification rules to ensure that, if selected, the projects are likely to be realised. Penalties should be established for RES-E selected in the auctions for non-compliance and delays. Pre-qualification (in addition to planning requirements) criteria could include; bid bonds or deposits which are lost if

projects that successfully apply to the scheme do not get built within a certain timeframe, community participation obligations etc.

Q9. Do you agree that planning approval, grid connection, bid bonds/penalties and community participation criteria should be met before projects can apply for support under the new RESS?

What other pre-qualification criteria would you like to see introduced?

10. It is proposed that the new RESS is financed through the Public Service Obligation Levy (PSO). Due to the expected increase in the PSO levy owing to increased new renewable electricity generated under the new RESS, cost effectiveness has been a core principle during this design phase.

Q10. DCCAE welcome the respondents' views on the PSO levy supporting a baseline 40% RES-E.

Do you think the PSO should support higher levels of ambition?

11. It is proposed that highly efficient CHP plants may be able to avail of financial support under a renewable electricity support scheme (RESS) for electricity generated (through the technology neutral competitive auction process described) and under a renewable heat incentive (RHI) for the heat produced. Under this approach, issues related to the accumulation of aid (in order to exclude overcompensation) would need to be addressed.

Q11. Do respondents agree with this approach?

What are respondents' views on an alternative approach whereby renewable energy CHP plants receive support from the RESS or the proposed RHI but not both, and that the project promoter should decide which support scheme best suits the proposed development.

## 5.2 Community Policy Detailed Design

The study makes several proposals regarding the features of a community scheme within the new RESS. The main emerging options are summarised below:

1. Projects supported under the RESS must offer the community an opportunity to invest.
  - a) In order to receive supports under the new RESS all projects above a certain minimum size (e.g. >500kW) must offer the community an opportunity to invest in some minimum share of the project. A targeted offer of 20% of the project is proposed.
  - b) The form of investment could be an equity share of the project, investment into a right to a share of the net revenues in the project, or loan notes.
  - c) This would be enforced as a criterion for pre-qualification for the RESS as opposed to a planning requirement. Hence there would be no changes to planning regulations or property ownership laws required.
  - d) The option would first be made to those within a certain geographic distance (e.g. 5km) from the project. If the minimum offer requirement is not achieved within this catchment area the offer would be opened up to the whole District Electoral Division (DED) after a period, and subsequently to the surrounding DEDs.
  - e) Project developers must make reasonable efforts to market the offer and secure community investment (this will be monitored by a Trusted Intermediary (TI) to ensure the terms are appropriate, see below), but they do not necessarily need to secure the investment in order to proceed under the RESS. Evidence would need to be provided to satisfy the TI that the pre-qualification criterion has been met.
  - f) If managed appropriately this policy measure should result in a significant increase in community ownership of and participation in renewable energy projects.
  - g) It is recognised that community investment in renewable projects could be facilitated further through the introduction of some form of financial incentive for individuals. As part of the project examining community models, several means of facilitating higher investment were reviewed at a high level, including tax incentives, establishment of green bonds, and the facilitation of crowd funding. It is acknowledged that some form of incentive could prove effective in maximising participation in the scheme from citizens and communities, although the costs of any such support must be weighed up against the potential benefits.

Q12a. What should the minimum size of project be, below which a community investment offer does not need to be made (e.g. 100kW, 500kW, 1MW)?

Q12b. What minimum share should be offered to the community for investment (e.g. 20%) and should there be a maximum amount any one individual can purchase?

Q12c. What is the appropriate distance from the project for the initial offer (e.g. 5km)? Views are welcome on subsequent offers to DED then neighbouring DEDs etc.

Q12d. What are respondents' views on whether additional financial supports are necessary in order to enable mandatory investment opportunities for citizens and communities?

Q12e. Other comments on the mandatory investment offer requirement are welcome.

2. For smaller community projects (<6MW wind, <1MW other technologies) a floating feed-in-premium (FIP) should be made available

a) FIP would be available to community-led projects above a certain minimum size and below the thresholds above.

b) Viability gap modelling will be used in the determination of an appropriate FIP. The FIP would be capped at a total number of MWh for community-led projects.

Q13a. Do you agree with the emerging proposal that a Floating FIP is made available for smaller community projects?

Q13b. What should the minimum size project be below which the FIP will not be available?

3. Development grants should be made available to suitable community-led projects

a) Grants of up to €20,000 would be made available to support community-led projects through the initial high-risk stages of a project. This could support start-up costs, feasibility studies, community consultation etc.

b) The size of grant would be dependent on the scale of project.

4. Soft loans for development and construction should be made available to suitable community-led projects
  - a) Development soft loans provided by a state-backed third party would cover a portion of costs associated with developing a project to financial close
  - b) Construction soft loans provided by a state-backed third party would cover a portion of project construction costs.

Q14a. Do you agree with the emerging proposal to support community-led projects with grants and soft loans through various stages of a projects development?

Q14b. What size of loans for development and construction would you consider to be appropriate to support?

Any other comments on the proposed use of grants and soft loans?

5. Grid access should be facilitated for community-led projects
  - a) Community-led projects should be facilitated to allow timely access to the grid. Grid access is a key consideration for any electricity generation project, and it is unlikely to be available for new community projects in the short to medium term without some changes to the rules governing access to the Grid.
  - b) For any change to be made to the process for securing grid access there would need to be a clear case that it is in the public interest, something that can be argued for community-led projects. DCCAE are of the view that this case can be made with regard to developing community-led projects. While the national policy would be to support facilitation of grid access for community-led schemes, the Commission for Energy Regulation (CER) will set the regulatory policy in this regard.

Q15. In respect of Grid Access, DCCAE and SEAI are keen to receive feedback on the policy proposal to facilitate grid access for community-led renewable electricity projects.

6. A Trusted Intermediary should be established to facilitate increased community ownership in renewable energy projects
  - a. A Trusted Intermediary should be established to fulfil the following roles:
    - i. Act as an independent facilitator and broker of dialogue between communities and developers as required;

- ii. Support community participation in renewable energy and energy efficiency projects to share best practice, provide information and ensure that local strategies align with broader Government policy;
- iii. Oversee the administration of grants and loan awards;
- iv. Manage the register of community benefits.

Q16. DCCAE and SEAI welcome feedback on the role of the proposed Trusted Intermediary.

- 7. A framework of Trusted Advisors (TA) should be established to allow communities to avail of expert advice on renewable energy projects
  - a) Community groups can apply for support on technical, legal or financial issues related to renewable energy developments.
  - b) The framework of expert Trusted Advisors would be available to community groups involved in a project.

Q17. DCCAE and SEAI welcome feedback on the proposed Framework for Trusted Advisors.

- 8. A register of community benefits should be established along with community benefit good practice principles.
  - a. While it has no impact on the level of community ownership of renewables it is widely considered, that projects contributing some community benefit payment can ensure wider community benefits from renewable developments.
  - b. Mandating community benefit payment is not considered to be required if the following steps are implemented:
    - i. Clear sector-wide Good Practice Principles are drafted around how community benefit should be best managed. This should include a recommended level of community benefit payment.
    - ii. The Trusted Intermediary is responsible for oversight of community benefit payments and manages a community benefits register.
    - iii. There is scope for organisations to manage community benefits on behalf of renewable developers in the best interest of the community.
  - c. By mandating a level of payment, this will be the level of payment made. However, by incentivising payments through good practice guidelines and a community benefits register, higher payments may be made by developers to communities. This approach also allows communities and

developers some flexibility to agree on the most appropriate form of community benefit, since in some cases alternative benefits may be preferred (e.g. supporting local infrastructure).

d. DCCAE consider that a community benefit payment is introduced as part of the new RESS and that this is based on a voluntary industry best practice basis. An indicative figure of €2/MWh was used in the analysis and is comparable with other EU member states.

Q18a. Do you agree with the proposal that community benefit payment be based on best practice principles?

Q18b. Do you agree with the proposed €2/MWh level of community benefit?

Do you have any other comments on the proposed community benefit good practice principles?

The report also explored several means of enabling communities to make their investments, including tax incentives, green bonds, facilitating crowd funding and offering investment soft loans. No recommendation is made regarding supporting these options but further analysis of these measures is proposed to understand their suitability.

Q19. What are your views on the definition of ‘community renewable electricity projects’, ‘community-led community projects’ and ‘developer-led community projects’?

Q20. What are your views on proposing additional financial measures to enable citizens to invest in projects (e.g. tax incentives, green bonds etc.).

## Glossary of Terms

**RES-E:** Renewable Energy Sources for Electricity.

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

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

**Viability Gap:** the shortfall between market revenues and a generator's LCOE, expressed in €/MWh.

**Technology Neutral Auctions:** a scheme comprising of auctions where projects from different technologies (with close or overlapping viability gaps) compete against each other, bidding for support. Technology neutral schemes are typically technology agnostic.

**Technology Specific Auctions:** a scheme or auction where a category is set up for a specific technology. Projects utilising this technology then compete against each other, bidding for support.

**Floating Feed in Premium (FiP):** A varying €/MWh premium. The difference between the strike price and the reference market price.

**Strike Price:** the uniform price received by all RES-E capacity successfully cleared in a RES-E support auction. This should be set by the bid of the marginal RES-E capacity cleared in the auction.

**Community-led Project:** a renewable energy project, where community investors have over 50% equity stake in the project. This includes projects that are 100% community owned.

**Developer-led Community Project:** a renewable energy project, where community investors have less than 50% equity stake in the project.

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