



Rialtas na hÉireann  
Government of Ireland

# Renewable Electricity Support Scheme (RESS)

## High Level Design

# 1 - Executive Summary

This paper focuses on the High Level Design (HLD) for the new Renewable Electricity Support Scheme (RESS) for Ireland. The RESS will be very different to previous support schemes with a proposal to support renewable electricity projects through a series of scheduled, competitive auctions.

This approach will allow Government to respond to falling technology costs, market conditions and renewable electricity policy objectives throughout the lifetime of the scheme and to 'change as we go' the focus of individual auctions, as appropriate.

This RESS design described in this paper reflects both the independent economic report and the community report which underpin the new scheme along with submissions received through two public consultations. The paper outlines the main policy objectives and external policies impacting the design of the new scheme, setting the context for the volume of renewable capacity to be procured under RESS and the framework for the proposed renewable electricity auctions.

The paper outlines the overall ambition for RESS, provides options in terms of how the first two auctions may be structured in relation to capacity and the use of various levers to deliver multiple policy objectives.

Providing pathways for increased community participation will be a cornerstone of the new scheme, delivering on Energy White Paper commitments. This paper sets out which policy options (primary and enabling) will be implemented to support community-led projects and other measures to increase community participation.

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

- Section 2 – RESS Introduction
- Section 3 – Factors underpinning RESS Design
- Section 4 - Proposed Characteristics of RESS
- Section 5 – RESS Auction Design Proposal (RESS auctions 1 & 2)

A key challenge at this point is the establishment of the RESS Auction Design and Implementation Working group. This group will deliver the detailed design of the RESS auctions including the running and administration of the auction process which is expected to commence in 2019.

## 2 - Renewable Electricity Support Scheme (RESS)

### 2.1 Introduction

- The new Renewable Electricity Support Scheme (RESS) will help deliver Ireland's contribution to the EU-wide binding renewable energy target of 32% RES out to 2030, with this level of ambition recently agreed by EU Commission, EU Parliament and EU Council. The new Directive also includes a review clause by 2023 for an upward revision of the EU level target. Where possible, the scheme will also deliver additional renewable electricity which can be counted towards Ireland's RES-E 2020 target.
- Primary policy objectives that have shaped the design of the new RESS include: delivering our renewable electricity ambitions as part of an EU-wide target; increasing community participation in and ownership of renewable electricity projects; ensuring value for money for electricity consumers; enhancing security of supply.
- The scheme will deliver opportunities for communities, in terms of increased engagement with, participation in, ownership of and benefit from, renewable electricity projects.
- The scheme will delivery diversity, in terms of an increased mix of renewable technologies, the number of and types of project actors, and the scale of projects receiving support.
- The scheme will provide opportunities for multiple technologies including solar PV, bioenergy, wind (both onshore and offshore) all within a cost competitive framework. The scheme will deliver all of these policy objectives in a cost effective manner, designed under the 2014-2020 EU State Aid rules.

*The new RESS will deliver:*

- 1. Ireland's renewable electricity ambitions to 2030 including reducing the gap to 2020;*
- 2. Community ownership and partnership;*
- 3. Increased renewable technology diversity.*

*All of the above within a cost effective competitive framework*

The new scheme will be largely characterised by a series of renewable technology competitive auctions, run periodically throughout the lifetime of the scheme, to deliver Ireland’s targets in line with the National Energy and Climate Plan, developed as part of the recast Renewable Energy Directive (RED2) and the Governance Regulation under the EU Clean Energy Package.

## 3 Factors underpinning RESS design

### 3.1 European Policy

#### 2009 Renewable Energy Directive (RED1)

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, with the latter target also being legally binding. The most recent annual data (2016) from the SEAI indicates that 27.2% of electricity, 6.8% of heat and 5.0% of transport energy requirements were met from renewable sources at end 2016. Overall, SEAI analysis shows that 9.5% of Ireland’s energy requirements in 2016 were met from renewable sources. The SEAI projects that Ireland will achieve between 13.2% and 15.4% of its 16% renewable energy target by 2020, indicating that Ireland should be between 82% and 96% of its target.

% of each target	Progress towards targets									Target 2020
	2000	2005	2010	2011	2012	2013	2014	2015	2016	
RES-E (normalised)	4.8	7.2	14.6	17.4	19.7	21.0	22.9	25.3	27.2	40
RES-T	0	0	2.4	3.7	3.9	4.8	5.1	5.7	5.0	10
RES-H	2.4	3.5	4.5	4.9	5.1	5.5	6.6	6.6	6.8	12
<b>Directive (2009/29/EC)</b>	<b>2.0</b>	<b>2.8</b>	<b>5.6</b>	<b>6.5</b>	<b>7.1</b>	<b>7.6</b>	<b>8.6</b>	<b>9.1</b>	<b>9.5</b>	<b>16</b>

Source: SEAI

#### Recast Renewable Energy Directive (RED2)

On June 14<sup>th</sup> 2018, the recast Renewable Energy Directive was agreed between the European Commission, the European Parliament and the European Council. This new regulatory framework includes a binding renewable energy target for the EU for 2030 of 32% with a review clause by 2023 for an upward revision of the EU level target.

The Sustainable Energy Authority of Ireland's analysis of 2030 renewable energy forecast shows that, taking into account all of the measures being supported in the National Development Plan together with the EU reference rate for oil prices of \$125 by 2030 and increased renewable electricity generation ambition to 55%, that the national share of renewables in the overall energy mix would be between 24% and 26%. This analysis work will be further refined in developing the initial draft NECP.

The new RESS will deliver Ireland's contribution towards the EU wide 32% RES target, out to 2030. RESS auctions will be designed in line with trajectory targets identified in Ireland's National Climate and Energy Plan (NECP). The International Renewable Energy Agency (IRENA) has recently published a report into renewable energy prospects for the European Union. The study has identified that, from a technical perspective, the EU could double the renewable share in its energy mix, cost effectively, from 17% in 2015 to 34% in 2030. It is likely that wherever we end up at in 2020, given our 2050 commitments, Ireland will have to demonstrate significant progress towards 2030, with a substantial amount of the new generation required for delivery by 2022 to close the gap from our 2020 finishing point to meeting the first milestone trajectory envisaged under RED2, which will be overseen through the Governance Regulation.

While it is unlikely that there will be national sectorial binding targets for RES-Electricity, RES-Heating and RES-Transport, it is expected that RES-E will be required to compensate for under-achieving in Heat and Transport. Moreover the European Parliament is likely to push for indicative national targets to underwrite Member State contributions to the EU wide binding target.

The expectation is that Ireland will have to be at a mid to high 20% range in overall RES terms by 2030 i.e. 26% (+10 over baseline) or even 28%.

Therefore, as part of the RESS scheme, an accelerated renewable electricity programme (via near-term delivery date RESS-1 and RESS-2 auctions) are proposed, to facilitate the early delivery necessitated under these assumptions.

### 3.1.1 National Policy on Renewable Energy Generation

Domestically, there is now a co-ordinated response setting out Ireland's position in relation to climate change and renewable energy generation.

The 2015 Energy White Paper (EWP) sets out a framework to guide policies (actions which the Government intends to take) to transition to a low carbon energy future 2015-2030.

Within the EWP there are specific commitments made regarding the provision of supports to communities wishing to participate in renewable energy projects; provision of funding and support for community-led projects in the initial phases of development; examining shared ownership opportunities; development of a framework for how communities can share in the benefits of new energy infrastructure in their area etc.

The 2016 Programme for Government (PfG) recognises that Ireland's long-term interests are best supported by further decreasing our dependence on imported fossil fuels through the continued development of indigenous renewable energy. Furthermore, Ireland commits to examining how new technologies can be ready for incorporation into Ireland's electricity system and how the cost of existing renewable technologies can be lowered. The PfG identifies that community participation in renewable energy and energy efficiency projects as being in both the national and local interest.

In July 2017 the Government held a special all-day meeting, focussing on Climate Change and related challenges. In conclusion, the Government agreed that Climate Change is one of the most important long-term challenges facing Ireland and the Government is committed to the transformation required to achieve a low carbon and climate resilient future.

Moreover, the National Mitigation Plan 2017 provides a framework to guide investment decisions by Government in domestic measures to reduce greenhouse gas emissions. The purpose of the Plan is to specify the policy measures required in order to manage Ireland's greenhouse gas emissions at a level appropriate for making progress towards our long-term national transition objective as set out in the Climate Action and Low Carbon Development Act 2015, as well as to take into account existing EU and international obligations on the State in relation to reducing greenhouse gas emissions

Delivering on this co-ordinated response means increased investment in renewable electricity technologies.

This new RESS is step to enabling Ireland to transition to a leadership role in relation to renewable energy, energy efficiency and action on climate change. The delivery of a new Renewable Electricity Support Scheme is on the critical path to this transition.

This national policy objective will deliver the transition, by 2050, to a competitive, low carbon, climate resilient and environmentally sustainable economy.

Renewable Energy targets are a key part of how Ireland will deliver on our commitments and ambitions; however the energy transition is about more than targets.

Now is the time to develop the long term narrative about low-carbon transition and the importance, not simply of targets and Government policies, but rather about the enduring economic and societal changes required.

Project Ireland 2040, incorporating the National Planning Framework (NPF) and National Development Plan (NDP) both point the direction of Government policy on climate change and the transition to a low-carbon and climate resilient society. The NPF identifies the need for renewable energy to transition into our low carbon energy future, as part of an accelerated action on climate change. The NDP recognises that this long-term vision will require fundamental societal transformation, and more immediately, the allocation of resources and sustained policy and behavioural change.

Other national considerations which have a direct impact on the design of RESS include Brexit and its impact on renewable energy demand and supply, Rural Development and Farming, Irelands strategic resources e.g. offshore renewable resources and deep water ports and how we maximise opportunities to exploit them, Irelands ICT sector including technological opportunities and challenges, and Irelands growing green finance sector.

Security of supply is also key energy policy objective, and the RESS will further reduce Ireland's dependence on imported fossil fuels by broadening the mix of technologies and increasing domestic renewable generation.

### 3.2 Independent Economic Evidence

#### 1. Cambridge Economic Policy Associates (CEPA) 2017

Contracted by DCCAE, CEPA carried out an extensive economic appraisal to underpin the new RESS. The key findings of this economic analysis are:

- Since it is likely that not enough RES-E technologies will become viable (they will not earn sufficient revenues direct from the market to cover their costs over their lifetime) in time to deliver Ireland's 2030 RES-E ambitions, a new RESS is required to
- ensure that the targets can be met, even if it may be possible to phase out support for some RES-E technologies over time.
- All renewable technologies appraised continue to have a viability gap until at least 2025. It will be important to manage their transition to economic viability appropriately and in a way that safeguards the consumer.

- Renewable Electricity auctions should be based on viability gap analysis (a three year Levelised Cost of Energy (LCOE) based look back analysis). Technologies without a 3 year straight viability gap will not be able to participate in the auction.
- Certain renewable technologies (offshore wind, onshore wind, solar PV and bioenergy technologies) have potential for overlapping viability gaps, meaning that it might be difficult to rule out their inclusion from the least cost mix within a competitive auction framework.
- RES-E Technology costs will continue to fall and converge throughout the duration of the scheme meaning technology diversity will increase naturally as the scheme matures.
- CEPA appraisal was based on Levelised Cost of Energy (LCOE) analysis and subsequent viability gap and funding gap analysis. LCOE represents the cost of energy production and they do not take wider system costs into account. Internationally, LCOE analysis is the standard methodology for assessing and comparing renewable technologies.

## **2. International Renewable Energy Agency (IRENA) Renewable Power generation Costs in 2017**

The International Renewable Energy Agency (IRENA) report on power generation costs outlines that based on cost data for circa 15,000 utility scale projects and auction results for circa 7,000 projects:

- Cost reductions for RES-E technologies will continue to 2020 and beyond.
- LCOE from solar PV decreased by 69% between 2010 and 2016 and will fall by a further 50% by 2020 or by 60% in the coming decade.
- As renewable installations accelerate globally, the cost equation for renewables improves. With every doubling of cumulative installed capacity for onshore wind, investment costs fall by 21%, Solar PV by 35% and offshore wind by 14%. Learning rate is the percentage cost reduction experienced for doubling of cumulative installed capacity. [http://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Jan/IRENA\\_2017\\_Power\\_Costs\\_2018\\_summary.pdf?la=en&hash=6A74B8D3F7931DEF00AB88BD3B339CAE180D11C3](http://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Jan/IRENA_2017_Power_Costs_2018_summary.pdf?la=en&hash=6A74B8D3F7931DEF00AB88BD3B339CAE180D11C3)

### 3. Economic and Social Research Institute (ESRI) 2018. 'Optimally allocating renewable generation in Ireland: A long term outlook until 2050'

The key findings of the ESRI analysis are that:

- Compared to onshore wind, offshore wind and bioenergy technologies would lead to a moderate cost increase and rooftop solar PV would lead to a more substantial cost increase.
- RES-E diversification may implicitly contribute to reducing concerns in relation to acceptance and land-use planning; however it doesn't come for free.
- Trade-off between cost minimisation and diversification are complex.
- Higher costs of diversification (including solar PV) are likely to be at least partially compensated by lower grid costs.

See: <http://www.esri.ie/pubs/RB201809.pdf>

Evidence indicates that renewable electricity technology costs will converge during the next decade, and there is significant potential for the cost of different technologies to overlap.

The recent IRENA report (Jan 2018 – Renewable Power Generation Costs in 2017) highlights the trend in renewable technology cost reductions over the past number of years, and confirms that cost reductions are set to continue through 2020 and beyond. IRENA identifies three key cost reduction drivers that are becoming increasingly important:

1. Technology improvements
2. Competitive procurement
3. A large base of experienced, internationally active project developers.

Of these three drivers, Competitive Procurement is the area where Irish policy can have the greatest impact on RES-E costs. Irish policy will set the demand (GWh) to be bought within each auction round. Understanding the renewable electricity project supply pipeline and setting the demand accordingly can result in competitive results and drive down RES-E costs.

### 3.3 RESS Public Consultation & Submissions

Following an independent economic appraisal of a range of commercial renewable technologies, a public consultation on the design principles of the new RESS ran from September – November 2017. Over 1,250 were submissions received including circa 1,000 from individual citizens with the remainder coming from community groups, energy companies, the renewable energy sector, political parties and other government departments etc.

Consistent themes emerging from the public consultation include:

- Very strong public and industry support for Community proposals including mandatory investment opportunities for those in closest proximity to renewable electricity projects and technical, financial and infrastructural support measures for community-led RES-E projects.
- Very strong support for a higher RES-E ambition above maintaining the 2020 baseline 40%, notwithstanding the potential higher cost to the PSO.
- Strong call for increasing Ireland's renewable technology diversity away from a singular reliance on onshore wind. Strong industry call for support options for the bio-energy, solar and off-shore wind sectors.
- Very strong public support for micro generation and for fair payment for electricity generated and exported to the grid.
- Strong support for competitive auctions as per State Aid Guidelines as a mechanism to deliver competitively priced renewable electricity at scale. Diversity of views in relation to Technology Neutral Vs Technology Specific. In the round, more nascent and less established technologies calling for ring fenced Technology Specific auctions, at least initially. Non-renewable industry submissions largely calling for least cost Technology Neutral auctions.

### 3.4 Renewable Technology Diversity

Increasing renewable technology diversity is a policy objective and will be delivered by RESS.

Technology diversity enters the renewable technology mix under all scenarios modelled by DCCAE (through Cambridge Economic Policy Associates CEPA) during the economic appraisal to underpin RESS.

This broadening of the renewables mix is seen particularly within the envisaged 'Community category' which sees a broad mix of technologies emerge, including; commercial rooftop solar PV, medium solar PV, medium onshore wind, small onshore wind, small hydro.

Furthermore, renewable technology diversity increases in range, scale and pace as RES-E ambition increases (40%-45%-50%-55%) and increased technology diversity is reflected in each of EirGrid's 'Tomorrow Energy Scenarios'. <http://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-Tomorrows-Energy-Scenarios-Report-2017.pdf>

Under the 55% RES-E scenario (using CEPA's analysis) the technology mix broadens significantly with over 2,000MW of Solar PV capacity entering the mix by 2030. This is particularly important because this broadening of the RES-E mix happens 'naturally' and at significant scale under a technology neutral auction process.

Renewable technology diversity accelerates as RES-E ambition increases:

- a. Due to cost reductions and subsequent cost convergence between renewable technologies
- b. Due to social acceptance challenges and limits on the amount of available land for onshore wind in Ireland

Diversity also increases via the 'Community Category' given that larger scale developer-led projects are excluded.

Within the auction process and throughout the lifetime of the scheme, DCCAE will use certain interventionist levers (described in section 4.2.1) to deliver increased renewable technology diversity in conjunction with the prioritisation of policy objectives.

### 3.4.1 Technology Diversity - a focus on the spatial capacity Issues facing onshore wind:

As part of the development of the proposed amendments to the 2006 Wind Energy and Development Guidelines (WEDGs), a spatial mapping exercise was undertaken to examine the potential for further exploitation of on-shore wind natural resources; depending on the set back distance agreed, the use of (multiple) fixed or relative absolute noise limits and a variety of planning success rates.

The revised WEDGs will have a direct impact on the volume (MWs and in turn GW/hrs) that onshore wind will be able to deliver and will impact on diversity and the 'need' to intervene and pull the various levels described in section 4.2.1.

The WEDGs will effectively place a cap on the volume of renewable electricity (GW/hrs) that can be delivered by onshore wind projects under RESS, notwithstanding that onshore will continue to be the cheapest form of renewable electricity generation in Ireland.

DCCAIE recognises that pure technology neutral auctions can be difficult to implement given the different electricity production profiles of the different technologies, and favouritism may be inadvertently bestowed upon certain technologies by way of the auction design, if all technologies are treated equally. Technology Neutral auctions, with targeted interventions can deliver technology diversity and ensure the introduction of a level playing field for competing technologies.

Diversity, as a policy objective, will be accommodated in the auction design; however it is crucial not to lose the benefit of competition.

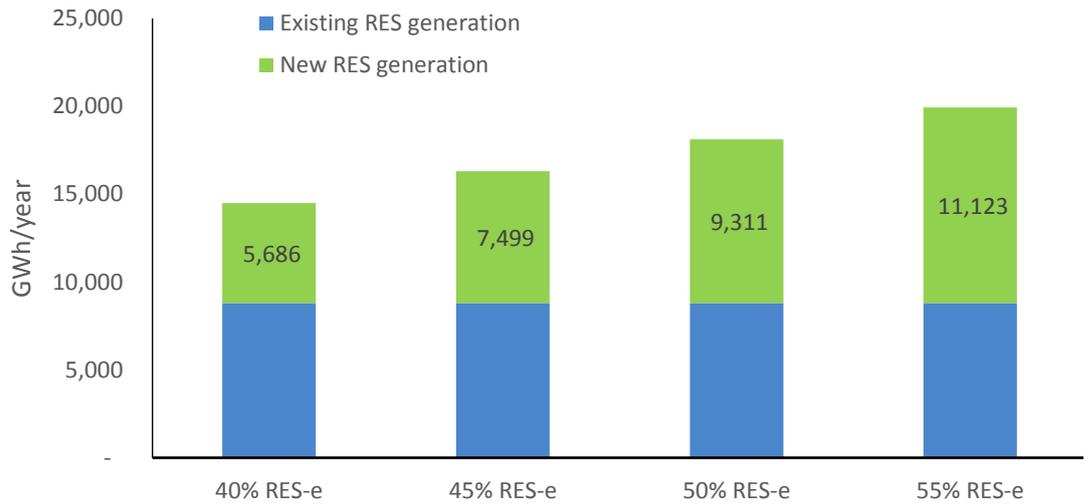
### 3.5 Ireland's Renewable Electricity ambition (2030 RES-E target)

At this point it is worth switching the discussion from MWs to GW/hrs, as a varying amount of MWs would be needed to deliver a set amount of GW/hrs, depending on the breakdown of renewable technologies supported. It is proposed that under RESS, auctions will be for a set amount of GW/hrs per auction round.

The CEPA economic analysis to underpin the new RESS identified that around twice as much new RES-E capacity is needed to meet the 50% RES-E scenario compared to maintaining the 40% baseline RES-E scenario, and more than two and a half times more capacity is needed than in the baseline to meet the 55% RES-E scenario.

This is due to two main factors:

Firstly, while the total amount of RES-E generation needed to meet the 55% scenario is only 15% higher than that needed to maintain the 40% baseline scenario, all this additional RES-E generation needs to be met by new installed capacity. As shown below, after accounting for existing RES-E generation, the volume of new RES-E generation needed under the 55% RES-E scenario is circa double that needed under the baseline scenario.



Secondly, load factors for the technologies in the RES-E mix tend to decline as more RES-E generation (including different technologies) is added to meet the higher targets. This means that more installed capacity (MWs) is needed to produce a given amount of targeted RES-E generation. For example, three times MW capacity of Solar PV would be required to deliver an equivalent MW volume of onshore wind.

Currently, there is circa 3,500MW of renewable electricity generation in Ireland and Ireland's National Development Plan (NDP) has identified that Ireland will need to deliver an additional 4,500MW (onshore wind equivalent) of renewable electricity generation by 2030.

It is proposed that the RESS EU State Aid submission will look for approval to support a RES-E ambition of up to 55% RES-E or circa 11,000-12,000 GW/hrs.

This ambition broadly aligns with EirGrid's Tomorrow's Energy 'Consumer Action' Scenario, which sees development of further onshore wind and bioenergy projects, alongside the deployment of new technologies at scale including solar PV, offshore wind and ocean energy. Under Eirgrid's four scenarios, it is estimated that a 2030 RES-E generation (total) range of between 5,660MW to 12,140MW is needed, depending on a number of variables. This amount of new RES-E will be deployed via a series of renewable electricity auctions held throughout the lifetime of the scheme.

The exact quantities to be auctioned in each round will be a function of:

- Growth in electricity demand during the lifetime of the scheme
- Project pipeline i.e. the amount of available projects working through the CRU's Enduring connection Policy 'batch' process – to ensure a competitive outcome.
- Ireland's NECP trajectory targets and the ability of RES-E to compensate other sectors such as Heat and Transport.

At this point in time, it is expected that the amount of renewable electricity generation capacity sought for RESS under EU State Approval will be sufficient to deliver Ireland's 2030 contribution to EU renewable electricity targets. However it is recognised that there are key demand assumptions (data centre demand for RES-E, Electric Vehicles, Heat Pumps etc.) and supply assumptions (CRU enduring connection policy) underpinning this ambition which will need to be monitored closely during the lifetime of the scheme.

The obvious risk being that the amount of new capacity deployed under RESS is not sufficient to deliver the Ireland final RES-E ambition (based on unexpected increase in electricity demand out to 2030).

The level of ambition for 2030 and the intervening 'trajectory years' will be captured in the first National Energy and Climate Plan (NECP). Detailed modelling is currently underway with SEAI, UCC and TRAM regarding options for decarbonisation of Electricity, Heat and Transport and these findings will inform future decisions about auction capacity.

Careful consideration has been given to the amount of RES-E supported under RESS as a total volume of capacity will need to be submitted as part of the EU State Aid application. The logical proposal is to seek EU State Aid clearance for the maximum amount of new capacity required under the highest level of modelled RES-E generation.

Additional resources will be required to deliver this level of RES-E ambition, right across the range of energy actors, including DCCAE, SEAI, CRU, EirGrid and ESB Networks.

The administrative delivery framework to run the auctions, set the policy/budget, manage the contracts with generators etc. is currently under development and will require intensive stakeholder engagement in the second half of 2018 (and into 2019.) The progress of the RESS Auction Design and Implementation Group is on the critical path for the delivery of the first RESS auctions.

## 4. Proposed Characteristics of new RESS

### 4.1 Communities

Communities are being designed into the fabric of the new Renewable Electricity Support Scheme. The RESS will be characterised by increased community participation in, and ownership of, renewable electricity projects. Policies and support measures will be put in place to ensure:

- Financial support for community-led projects across early phases of project development including feasibility and development studies (grants, legal and technical assistance). Financial support would also deliver key capacity building supports such as trusted advisors; trusted intermediaries to support communities who may wish to develop renewable energy projects. Financial risk mitigation will be crucial in assisting communities to realise local energy projects.
- Mandatory Community Benefit Fund and Register standardised across the sector. It is proposed that this contribution is set at €2/MWh for all RES-E generation produced and seeking support via RESS auctions. A national community benefits register will be established.
  - As per both points above, financial support will come from both the State and the private sector.
- Mandatory investment opportunities for communities and citizens in all RESS projects. To qualify for RESS auctions, projects will have to meet community investment criteria. It is proposed that projects will have to facilitate the registration of interest in investing by individuals prior to participating in RESS auctions. If successful in the auctions, these individuals will then have the opportunity to realise this investment option. This phased approach will significantly de-risk the investment process for individuals and projects will know in advance of submitting their auction bids the likely scale of 3<sup>rd</sup> party investment.
  - There will be ongoing engagement with renewable industry groups throughout the remainder of 2018 to develop the most effective measures to achieve this ambition and to ensure a level playing field for all projects, and that projects that attract maximum 3<sup>rd</sup> party investment are not unduly 'penalised' vis-à-vis projects that do not attract the same level of investment.

- It is proposed that priority investment opportunities will be given to those living closest to the proposed development (within 5km). Projects looking to enter RESS auctions will have to establish project websites where citizens can express an interest in investing. The proposal is for a single offering opportunity where an investment opportunity is advertised and open to all residents within a 10km radius but those living within 5km have first refusal. If the offering is not fully subscribed by those within the 5km zone then it can be offered to the residents within the 10km zone.
  - There will be no minimum level of community investment required, and no penalties for projects that fail to attract community investment, provided the offerings have been made in a fair and transparent manner.
- Separate 'community' category in the RESS auction. It is proposed that this ring-fenced capacity would be limited to up to 10% of the second auction (circa 300 GW/hrs) which will be subject to review for future auctions and projects would need to meet community-led criteria to qualify.
  - Project supports providing independent financial, legal, technical and project advice funded by both state and private sector funding.
  - DCCAE will work with the Commission for Regulation of Utilities (CRU) to identify measures to support Community-led projects through the grid connection process.
  - DCCAE will work with industry representative groups and community reps e.g. farm organisations, Irish Rural Link etc. to ensure the detailed model developed works for Irish communities and project developers.

## 4.2. Ireland's Renewable Electricity Auctions

The new RESS will be characterised by a series of renewable electricity auctions, scheduled at frequent intervals throughout the lifetime of the scheme. The auctions will have staggered delivery dates with a potential roadmap proposed below.

	Auction Capacity (GW/hrs)	Auction Year	Delivery Year (end of)	Single Technology Cap
RESS 1	1,000	2019	2020	No
RESS 2	3,000	2020	2022	Yes
RESS 3	3,000	2021	2025	tbc
RESS 4	4,000	2023	2027	tbc
RESS 5 (possible)	2,500	2025	2030	tbc

For information purposes, the following rounded figures can be used to illustrate the volume of capacity required per technology to deliver a sample of 1,000 GW/hrs.

Technology	Capacity Factor	No. of MWs required to deliver 1,000 GW/hrs.
Onshore Wind	31%	356
Offshore Wind	45%	253
Solar PV	11%	1000
Biomass	85%	134

This approach will allow Ireland to take advantage of falling technology costs, and by not auctioning all the required capacity at once, we will avoid ‘locking-in’ higher costs for consumers for the entirety of the scheme. The roadmap will provide project developers with the necessary confidence to progress with their projects in advance of RESS auctions.

A key factor in ensuring competitive auction results is the relationship between supply and demand, and determining the exact quantity of renewable electricity to be auctioned in each round. This will be a function of RES-E project pipeline and Ireland’s RES-E ambition.

Critically, cost control measures will form a key part of the auction design, including the potential use of Administrative Strike Prices; the setting of budgetary caps per auction; and technological competition.

All renewable technologies will be subject to a viability gap look back analysis prior to each auction, to ensure technologies that no longer require a subsidy are ineligible but also to allow for new, nascent technologies to participate if they have become commercially viable during the lifetime of the scheme.

The RESS will deliver multiple policy objectives, with a view to delivering our 2030 ambitions and building a solid foundation for our 2050 ambitions, and it will do this within a cost competitive framework.

#### 4.2.1 Intervention Levers:

These multiple policy objectives may require the use of different mechanisms or levers within each auction, within neutral cost competitive framework. Examples of these levers include:

1. Targeted Delivery Dates – dates by which the renewable generation projects looking for support must be connected and energised. It is acknowledged that some technologies take longer than others from project conception through to becoming operational and that it may be necessary to support projects that can deliver in the near term to help Ireland meet its 2020 targets and 2030 trajectory year obligations (under the NECP). Projects that fail to meet their delivery dates will forfeit their bid bonds and may be excluded from future auction rounds. A clear rationale for publishing an indicative roadmap for renewable electricity auctions with targeted delivery dates is to give clarity and confidence to the industry. It is expected that this will result in a high realisation rate of project delivery.

2. Placing a cap on single technology (e.g. within pre-determined ranges and set for each auction: 45-55%; 55-65%, 65-75% etc.) allows other technologies to gain a foothold and for nascent supply chains to mature in Ireland. If a single technology cap is reached within an auction, then other, more expensive technologies could be accepted, provided their bid prices were within a certain range of the marginal uniform price. Budget caps per auction would reduce the risk of financial exposure and if deemed necessary, the single technology cap can be set on an auction by auction basis to deliver specific policy objectives during the lifetime of the scheme. This approach would allow for more of the nascent technology projects to be procured the closer their bid prices are to the clearing price.
3. Technology Neutral but with Enhanced LCOE – a whole system costs approach which will add a premium cost to certain technology's LCOE. This approach would value certain technologies over others in terms of their ability to dispatch 'on demand' to the grid and would also take non LCOE (external) costs associated with certain technologies into account.
4. Getting the Demand / Supply Ratio right is key to delivering competitive outcomes. The higher the demand (i.e. what is being procured in each auction) compared to the supply, the likelihood is a less competitive auction result. DCCAE will retain the flexibility for auctioning more than the initially planned capacity (through setting relevant parameters in the auctions); if prices submitted are lower than expected (however there will be a fixed budget per auction round set in advance). DCCAE will liaise closely with the CRU and the System Operators to ensure there is a sufficient supply of renewable electricity projects available to participate in each auction round.
5. Variation in length of support per technology. This may be useful in terms of support for specific technologies and may differ on an auction by auction basis. Careful consideration will be required to ensure that varying contract lengths do not negatively affect competition within the auctions.
6. Budgetary caps per auction – with these in place, lower bid prices allows more to be procured for a pre-set budget. The budget per auction will be set once the volume of capacity to be procured per auction is agreed. The use of administrative strike prices may be used to inform the budget and ensure technologies are not over compensated.

7. Administrative Strike Price per technology – a cost control measure; this involves setting a maximum cap on what we are prepared to pay for a MW/hr per technology. If bid prices are above this then projects will still not receive more than the administrative strike price for each technology. This provides a safety net in terms of the scheme costs not exceeding the pre-agreed budget per auction and technologies will not be over-compensated.
8. To deliver on policy objectives relating to community ownership of renewable electricity projects, it is proposed that in each auction round after RESS-1, a volume of capacity will be allocated to community-led projects. This volume will be set on an auction by auction basis depending on specific auction policy objectives and will range from 5%-15%.

The auction design will provide the opportunity to push out or pull back the demand curve – buy more if prices are lower and supply is high.

It is proposed for RESS-1 and RESS-2 that a number of these mechanisms will be used, in particular the targeting of near term delivery dates and the use of single technology caps.

These levers will help deliver diversity in a competitive framework and will naturally dissipate as the schemes mature and costs converge further. Detailed design of each auction will be carried out by the relevant body in line with national policies as set out by DCCAE.

#### 4.2.1 Characteristics of the RESS auctions will include:

- **Eligibility Rules:** To participate in RESS auctions, projects will have to meet specific community requirements (investment opportunity; engagement, community benefit fund etc.). As per the current REFIT process, it is expected that projects will require full planning permission and a full grid connection offer.
- **Bid Bonds:** Projects looking to participate in RESS auctions will be required to submit bid bonds in advance of participating in auctions. Bid bonds will incentivise the delivery of project milestones and will reduce speculative bids. Bid bonds may lead to a reduction in diversity in the type of actor participating in RESS auctions (will favour larger generators) but increased actor diversity is expected through the community-led category. It is proposed that community-led projects are exempted from auction bid bond requirements.
  - Other penalties may be designed for non-realisation including exclusion from future RESS auctions.

- **Project milestones:** Milestones will need to be set and met in terms of achieving financial close, project development, meeting community engagement rules, construction, becoming operational etc.
- **Financial Structure:** The proposed funding mechanism is a 2-way contract for difference (CFD). This will be funded via the Public Service Obligation (PSO) levy.
- **Floating Feed in Premiums:** It is proposed that a Floating Feed in Premium (FIP) is the default primary mechanism for RES-E support. Under a Floating FIP scheme, payments made to generators are a function of (i) generation output, (ii) a strike price, and (iii) a reference market price.
- **Uniform Price:** It is proposed that each auction would be uniform-price, with the level of support set by the highest value bidder still needed to meet the required amount of RES-E capacity auctioned. All bidders with offers below the clearing price would receive the auction clearing price.
  - In the case of an auction with a single technology cap, where this single technology cap is reached before the full amount of capacity has been allocated, the 'more expensive' projects will receive at the maximum the administration strike price for their technology, until the capacity being auctioned has been reached.
- **Market Reference Price:** The market reference price will be a key detailed design feature of the RESS in terms of the distribution of balancing costs. It is proposed that the reference price will be the day ahead I-SEM price, such that generators bear the balancing costs. This is in line with the recast RED and the market regulation under the Clean Energy Package.

#### 4.3 Shaped by 2014-2020 EU State Aid Guidelines

The new RESS scheme will be subject to the new rules on public support for projects in the field of energy, adopted by the Commission in April 2014, which seek to promote a gradual move to market-based support for renewable energy. This will result in a shift from guaranteed fixed prices for renewable generators (as per existing REFIT feed in tariffs) to a more market oriented mechanism (renewable auctions) where the cost of support will be determined primarily by competitive bidding between renewable generators.

There are exceptions allowed for small scale and demonstration projects.

## 5. RESS Auction Design

It is proposed that the new scheme enables frequent auctions throughout its lifetime. This will allow Ireland to take advantage of falling technology costs, and by not auctioning all the required capacity at once, we will not be 'locking-in' higher costs for consumers for the entirety of the scheme.

It is proposed that the first auction (RESS-1) takes place in 2019 with the second auction (RESS-2) in 2020

As set out, the Government will predetermine the volume of RES-E to be procured and the uniform price will develop according to the existing resource conditions, technology costs and project bidding strategy. RESS auctions will be informed by a three year look back viability gap analysis which will inform the detailed design of each auction. Only those technologies with overlapping viability gaps will be allowed to participate in each auction.

Administrative Strike Prices (ASP) may be set for each technology prior to each auction based on the backward look viability gap analysis. This will take place no further out than 6 months prior to each auction. ASP will allow for a price cap to be placed on each technology which will safeguard the scheme and avoid over-compensation within the Uniform-Price framework.

A proposal to support up to 50-55% RES-E (circa 11,000GWhrs) by 2030 would give stimulus to other technologies i.e. solar PV, offshore wind. This level of ambition would underwrite Government commitments to show leadership on climate change and such a level of ambition would show a signal to the investment community that Ireland is a place to do business and is not solely focused on onshore wind. This level of commitment would have a positive impact on the cost of capital and provide an amount of investor certainty, leading to lower bid prices than would be otherwise expected.

### 5.2 Option 1 – RESS-1 and RESS-2 Technology Neutral Auctions

RESS -1 It is proposed that RESS-1 auction will take place in 2019 will auction a capacity of circa 1,000 GW/hrs and have a delivery date of end 2020. The purpose of this first, simpler, RESS auction will be to deliver additional renewable electricity generation to meet our 2020 RES obligations.

RESS –2 Following on quickly from RESS-1, it is proposed that RESS-2 auction will be for between 3,000 – 4,000GW/hrs and have a delivery date to facilitate the trajectory agreed by the EU and will utilise a single technology cap.

The use of specific levers in RESS1 and RESS2 will accelerate the establishment of a supply chain for nascent technologies; will facilitate diversity through the technology neutral process and will deliver towards Ireland 2020 and 2022 ambitions.

RESS auctions 1 & 2 will also deliver technology diversity, community ownership and participation and benefit.

### 5.2.1 Option 1 – RESS 1

Within RESS-1, the interventionist lever is a delivery date for RES 2020. This means that all projects looking for support under RESS 1 will have to have connected to the grid and be energised by the end of 2020. Ireland is committed to doing everything within its power to closing the gap on the expected shortfall to our 2020 RES binding targets. This first auction will be designed to specifically target this shortfall.

Technologies will be allowed to participate in the RESS-1 principle category auction based on 3 year look back viability gap analysis (e.g. onshore wind, offshore wind, solar PV and bioenergy projects).

RESS-1 is dependent upon the current project supply chain being processed efficiently for connection to the grid by the system operators: ESB Networks and EirGrid in line with connection policy and rules set by the Commission for Regulation of Utilities (CRU).

The CRU's Enduring Connection Policy (ECP batch 1 decision will see at least 1,000MW of new capacity processed in the 2018 batch. In addition, existing applicants with live connection offers and non-Group Processing Approach (GPA) applicants in process will have the option to fold into the 2018 batch. Up to 1,600MW of existing projects may decide to fold into this batch.

The RESS-1 auction will deliver additional RES-E capacity for 2020 and will be the first step on Ireland's contribution towards 2030 targets, technology diversity and community benefit.

For illustrative purposes, below is a representation of potential outcomes (with sample cost estimates, based on LCOE data) from the RESS-1 auction. This auction has a delivery date of the end of 2020. This auction will not utilise a single technology cap.

RESS 1	Sample Outcome 1			Sample Outcome 2			Sample Outcome 3		
	Auction capacity (1,000) (GW/hrs)	MW	€M	Auction capacity (1,000) (GW/hrs)	MW	€M	Auction capacity (1,000) GW/hrs	MW	€M
Onshore wind				250 (25%)	90	<b>20</b>	<b>500</b> <b>(50%)</b>	<b>180</b>	<b>40</b>
Solar PV	1000 (100%)	1000	<b>120</b>	750 (75%)	750	<b>90</b>	<b>300</b> <b>(30%)</b>	<b>300</b>	<b>36</b>
Bioenergy							<b>200</b> <b>(20%)</b>	<b>30</b>	<b>40</b>
Offshore wind									
Total Cost			<b>€120 m</b>			<b>€110 m</b>			<b>€116m</b>

It may be useful at this point to note that under the 2009 Renewable Energy Directive (RED), Member States are allowed to meet targets by purchasing compliance from Member States that overachieve on their renewable targets through a flexibility measure known as 'statistical transfers'.

### 5.2.2 Option 1 - RESS 2

The second RESS auction, RESS-2, is expected to be held in 2020 and the capacity auctioned in this round will be sufficient to enable Ireland to meet its early NECP trajectory targets. Within RESS-2, it is proposed to use a single technology cap as an interventionist measure to deliver additional technology diversity. If a single technology has reached the agreed cap for this auction, then projects using this technology will not be allocated any of the remaining capacity within the round.

Technologies will be allowed to participate in the RESS-2 principle category auction based on 3 year look back viability gap analysis (e.g. onshore wind, offshore wind, solar PV and bioenergy projects).

As with RESS-1 and future auctions, RESS-2 demand capacity will be based upon the future project supply chain being processed by the system operators; ESB Networks and EirGrid in line with connection policy and rules set by the Commission for Regulation of Utilities (CRU).

The remaining capacity will be allocated, on a price basis, until the total amount of auctioned capacity has been accounted for. These prices will have to be within a certain range of the uniform clearing price e.g. + 15%, for the technology accounting for the (proposed) single technology cap. If there is insufficient capacity within this 15% price range of the marginal uniform price, then the remaining capacity can be re-allocated back into the principle category or the price range could be increased to deliver the required level of diversity.

This dynamic relationship between single technology cap and the price range will allow for the procurement of more of the second and third technologies the closer they are in price to the cheapest technology. The auction will have a pre-set budget cap and additional capacity may be procured if the capacity originally required is reached below the budget threshold.

In the proposed auction RESS-2, it is proposed that up to 10% of capacity will be withheld for community-led projects.

The RESS-2 two-step auction will deliver on Ireland's contribution towards 2030 targets (in particular facilitate the trajectory agreed by the EU ), technology diversity, community participation and community benefit.

The Single Technology cap for the RESS 2 auction (and future auctions) will be informed by future modelling as part of the National Climate and Energy Plan.

Example of RESS 2 Auction with three separate outcomes. Technology Neutral (estimates based on proxy bid prices) auction with a delivery date of end 2023 and single technology caps of 50%, 60% and 70%.

RESS 2	Sample outcome 1 (single technology cap 50%)		Sample outcome 2 (single technology cap 60%)		Sample outcome 3 (single technology cap 70%)	
	Auction capacity (3,000) (GW/hrs)	Estimated cost (€m)	Auction capacity (3,000) (GW/hrs)	Estimated cost (€m)	Auction capacity (3,000) (GW/hrs)	Estimated cost (€m)
Onshore wind	1500 (50%)	<b>120</b>	1800 (60%)	<b>144</b>	2100 (70%)	<b>168</b>
Solar PV	500 (17%)	<b>60</b>	600 (20%)	<b>72</b>	900 (30%)	<b>108</b>
Offshore wind	1000 (33%)	<b>125</b>	600 (20%)	<b>75</b>		
Total Cost		<b>€305m</b>		<b>€291</b>		<b>€276</b>

These figures and auction results are indicative only and for illustrative purposes and do not represent the cost of the scheme to the PSO or to electricity users final bills.

What these tables clearly indicate is that there is a direct link between the use of a single technology cap and increased costs for renewable electricity supports. As the level of the single technology cap increases, the cost of support falls.

It is also clear that the lower the range set for the single technology gap, the greater the broadening of the renewable electricity mix.

In terms of timelines and the volume of GW/hrs auctioned, RESS-2 will provide real opportunities for offshore wind, solar PV and bioenergy technologies, based on their eligibility within the context of the look back viability gap analysis.

Given the demanding near time delivery dates proposed in both RESS-1 and RESS-2, it is crucial that grid connection processing and build out is able to keep up with the ambition. DCCAE is engaged with the CRU and the system operators to ensure the supply of projects keeps up with the required new capacity.

Competitive RESS 1 and RESS 2 auctions with near term delivery dates and single technology cap levers will deliver Ireland's renewable electricity ambitions and parallel energy policy objectives within a cost effective framework. The RESS is being designed to minimise cost impacts to customers while delivering Ireland's RES-E ambitions and Ireland's energy objectives.

Further auctions will be required to deliver for NECP trajectory years and ultimately for 2030. The frequency of these auctions and the volume of GW/hrs to be procured in each auction round will be precisely determined by detailed NECP modelling but as set out, the scheme will support up to circa 11,000 GWh of additional new capacity out to 2030.

Each subsequent auction round will have pre-determined delivery dates and the use of single technology caps may be phased out over time.

### **5.3 Option 2 - Technology Specific – Auctions divided into specific pots for certain technologies.**

As part of the economic appraisal to underpin the new RESS, DCCAE also examined the potential costs associated with Technology Specific auctions.

In certain circumstances, it may be desirable to intervene and ring fence support for specific nascent technologies which otherwise would not clear in a framework of technology neutral auctions, even with the levers outlined above in option 1.

It is likely that a Technology Specific approach would be more challenging to progress through the State Aid process. Ireland would need to clearly identify which policy objectives were not met by Technology Neutral auctions and how much in additional costs consumers would incur by supporting specific technologies with dedicated capacity.

There are different costs and different capacity factors associated with different renewable technologies, and the additional costs associated with technology neutral auctions will be directly related to the quantity of MW/hrs auctioned per technology.

Example of RESS 2 Auction with two separate outcomes. **Technology Specific** (estimates based on proxy bid prices) auction with a delivery date of end 2023 and no single technology cap.

	Auction capacity (3,000 GW/hrs)	MW equivalent	Est Cost (€m)	Auction capacity (4,000 GW/hrs)	MW Equivalent	Est Cost (€m)
Onshore wind	1500 (50%)	535	<b>120</b>	2000 (50%)	714	<b>160</b>
Solar PV	500 (17%)	500	<b>60</b>	800 (20%)	800	<b>96</b>
Bioenergy				400 (10%)	60	<b>80</b>
Offshore wind	1000 (33%)	253	<b>125</b>	800 (20%)	202	<b>100</b>
<b>Total Cost</b>			<b>€305</b>			<b>€434</b>

*These figures are indicative only and do not represent the cost of the PSO to the scheme or to electricity users final bills.*

Technology specific lots, by their nature, offer protection from competition and therefore should only be considered where a clear policy need is not delivered through the Principal Auctions and should be subject to rigorous justification on costs.

The RESS is being designed to minimise cost impacts to customers while delivering Ireland's RES-E ambitions and obligations. Therefore it is proposed that the overarching framework of RESS will be one of technology neutral auctions, with the use of interventionist levers to deliver an accelerated broadening of the technology mix.

Further auctions will be required to deliver for NECP trajectory years and ultimately for 2030. The frequency of these auctions and the volume to be procured in each auction round will be determined by DCCAE as part of the NECP modelling.

## 5.4 RESS Financial Structure

The proposed funding mechanism is a 2-way contract for difference (CFD) which will be funded via the Public Service Obligation (PSO) levy.

- **Floating Feed in Premiums:** It is proposed that a Floating Feed in Premium (FIP) is the default primary mechanism for RES-E support. Under a Floating FIP scheme, payments made to generators are a function of (i) generation output, (ii) a strike price, and (iii) a reference market price.
- **Uniform Price:** It is proposed that each auction would be uniform-price, with the level of support set by the highest value bidder still needed to meet the required amount of RES-E capacity auctioned. 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.

- **Market Reference Price:** The market reference price will be a key detailed design feature of the RESS in terms of the distribution of balancing costs. It is proposed that the reference price will be the day ahead I-SEM price, such that generators bear the balancing costs. This is in line with the recast RED and the market regulation under the Clean Energy Package.

## 5.5 Pre-Qualification Rules

To ensure that the projects that participate in auctions and in particular those that clear and win support are realised within the auction timelines, it is proposed that a number of criteria will need to be met prior to projects being eligible to participate in the RESS auctions. These include:

- Ensuring the technologies require financial support. Latest analysis indicates that some RES-E projects will become viable by 2030, and therefore eligibility rules will need to be monitored continuously to ensure only technologies with viability gaps are allowed to participate in RESS auctions.

- Community criteria - Projects bidding for support under RESS will need to prove that they have met all community criteria including equity opportunities, community benefit payments, stakeholder engagement, have signed up to and are implementing industry codes of practice, including processes for dealing with complaints.
- Planning Permission – projects will need to have secured appropriate planning permission in advance of participating in RESS auctions.
- Grid connection offer/application. Projects will have to secure a grid connection offer in advance of being eligible to participate in RESS auctions. There will need to be close alignment between RESS auction (demand) and the CRU's enduring connection policy.
  - An alternative approach would be to allow the projects to participate in the RESS auctions without a full grid connection offer. If the projects clear in the auction this would be a signal for the grid connection application to be processed. This question will be addressed by the RESS Auction Design and Implementation working group (DCCAE, CRU and EirGrid).
- Bid Bonds – projects will have to submit bid-bonds in advance of participation in RESS auctions. Bid bonds will incentivise the delivery of project milestones and will reduce speculative bids. These bid bonds will be non-refundable in the event of the project not being realised by the delivery date. Bid bonds are necessary because:
  - Project milestones such as dates for financial close, dates for development works, dates for construction works etc. will be developed as part of each auction's detailed design, and these will need to be met by all projects successful in RESS auctions. Failure to meet these milestones will result in potential exclusion from future auctions, removal of support and financial penalties.

## 5.6 RESS Administration, Auction Design and Implementation

Once the final high level design of the RESS has been approved, and the EU State Aid Application has begun, the Department will develop the detailed design of the scheme in conjunction with the bodies and agencies with responsibility for administering and managing the scheme and auctions.

A RESS Auction Design and Implementation Working Group has been established, led by DCCAE it consists of DCCAE, EirGrid and the CRU. The purpose of the working group will be to establish roles and responsibilities for delivery of the RESS auction, initially to oversee implementation of the first auction detailed design, to establish enduring operational and reporting requirements for ongoing multi-annual RESS auctions in accordance with the requirements of the recast Renewable Energy Directive and the level of ambition to be set out in Ireland's National Energy and Climate Plans. DCCAE will look to leverage and build on existing expertise, utilise synergies across EirGrid and CRU particularly around auction delivery (e.g. the I-SEM Capacity Auctions), grid connection policy (ECP 1) and economic analysis of project costs.

DCCAE will set policy in relation to the product being auctioned i.e. the amount of RES-E (GW/hrs) being bought per auction), the auction parameters and the length of the support. DCCAE will ensure the scheme is state-aid approved, determine which policy levers (if any) are applied to each auction setting out the underpinning policy objectives, set the total budget for each auction, develop the Terms and Conditions of the scheme for the relevant auctions, determine the RESS auction pre-qualification criteria and set the community category criteria (per auction).

It is expected that stakeholder engagement on the detailed design and Terms and Conditions of the RESS will take place following publication of the High Level Design and in advance of the relevant auction.

It is important to note that the final design of the RESS will be subject to EU State Aid Approval. Further detail design of the scheme will be developed in conjunction with and feed into the State Aid notification.