



An Coimisiún  
um Rialáil Fónas  
Commission for  
Regulation of Utilities

An Coimisiún um Rialáil Fónas  
**Commission for Regulation of Utilities**

# Consultation Paper

## Arrangements for Calculation of the PSO Levy: Renewable Electricity Support Scheme and Clean Energy Package

Reference: CRU/21/04

Date Published: 25/01/2021

Closing Date: 22/02/2021

# Executive Summary

In February 2020, the Department of the Environment, Climate and Communications (the “Department”)<sup>1</sup> established its new Renewable Electricity Support Scheme (RESS) and published the Terms & Conditions of this scheme.

As per Section 5.1.6 of the RESS 1 Terms & Conditions, the Commission of Regulation of Utilities (CRU) is responsible for implementing and administering the arrangements for the calculation of RESS 1 Support Payments.

Following the publication of the Department’s RESS Terms & Conditions, the CRU commenced a review of its current arrangements for calculating the PSO levy ([CRU/20/013](#))<sup>2</sup> to facilitate the fulfillment of its PSO obligations and to ensure that robust arrangements are in place for the calculation of RESS 1 Support Payments. Arising from this review, the CRU is publishing this Consultation Paper, which details the CRU’s proposed arrangements for the calculation of RESS 1 support payments.

Under RESS, the CRU also notes there is the possibility for suppliers to owe money back to the PSO levy. Consequently, this Consultation Paper considers a number of options for addressing the risk of bad debt to the PSO levy. In addition, this Consultation Paper also proposes a resettlement threshold for reconciliations as a result of differences between M+13 and M+4 settlement data used in the calculation of ex-post PSO submissions (for both REFIT & RESS).

Due to the implementation of EU Regulation 2019/943 of the Clean Energy Package (CEP), this Consultation Paper also considers the exclusion of payment for non-market based redispatch from the Actual Market Revenues (AMR) calculation for REFIT supported generation (which has the effect of allowing the supplier to keep such payment), while noting that the calculation of support payments under RESS is unaffected. Stakeholders should note that any element of a decision resulting from this consultation process that relates to the forgoing may be reviewed and amended by the CRU, as appropriate and necessary, following any future decision made by SEM Committee (SEMC) in relation to

---

<sup>1</sup> Previously known as the Department of Communications, Climate Action and the Environment (DCCAE).

<sup>2</sup> Decision Paper CRU/20/013: “Arrangements for the Calculation of the Public Service Obligation Levy Post I-SEM Implementation.

the interpretation of Article 13(7) of EU Regulation 2019/943. A SEMC decision on this matter is expected in Q2 of 2021.

To facilitate responses to this Consultation Paper, the CRU has compiled a list of consultation questions (Appendix 1) that addresses the key topics that may interest stakeholders when considering the CRU's interpretation of the RESS Terms and Conditions and the CEP.

Separate to this Consultation Paper, the CRU also intends publishing a consultation paper on its review of measures to managing PSO volatility. The CRU's consultation paper on PSO volatility will be published in Q1 2021.

# Public/Customer Impact Statement

The PSO levy is charged to all electricity final customers in Ireland and is used to fund various electricity generation support schemes designed by the Irish Government. The proceeds of the PSO levy are paid to eligible suppliers to cover the additional costs they incur in purchasing PSO supported electricity generation. The payment is initially made based on an estimate of what these costs will be and is then reconciled once the actual costs are known.

As part of the implementation of the revised SEM arrangements, the Government's PSO schemes were updated by the Department to reflect new wholesale electricity trading arrangements. These updates necessitated changes to the CRU's arrangements for calculating the PSO levy, which were published in January 2020 (CRU/20/13). Subsequently, the Department has introduced a new renewable support scheme, the Renewable Electricity Support Scheme ("RESS"), while the European Clean Energy Package ("CEP") has also come into force.

The CRU is therefore updating its PSO arrangements to take account of RESS and CEP. These updated arrangements will ensure transparency of the CRU's procedures for calculating the PSO levy and will facilitate the continued operation of the Government's PSO schemes by ensuring an accurate calculation of the PSO levy and relevant support payments. This will protect the interests of the Irish electricity customer and facilitate Ireland meeting its renewable energy targets.

## Table of Contents

<b>1. Introduction .....</b>	<b>1</b>
1.1 The Commission for Regulation of Utilities .....	1
1.2 Purpose of this Document .....	1
1.3 Scope of the Consultation .....	2
1.4 Structure of Paper .....	2
1.5 Responding to this Document .....	3
1.6 Related Documents .....	4
<b>2. Background .....</b>	<b>6</b>
2.1 Overview of the PSO Levy .....	6
2.2 Legislation Governing the PSO Levy .....	8
2.3 State Aid Notifications .....	10
2.4 Government Schemes Supported by the PSO Levy .....	10
2.4.1 REFIT .....	10
2.4.2 RESS .....	13
2.5 Clean Energy Package .....	14
<b>3. RESS 1 .....</b>	<b>15</b>
3.1 RESS 1 Overview .....	15
3.2 RESS 1 Support: Ex-ante Calculations .....	16
3.2.1 Submission of Estimated Metered Quantity .....	16
3.2.2 Ex-ante Benchmark Price .....	16
3.2.3 Estimated RESS 1 Payment: In-Market .....	16
3.2.4 Estimated RESS 1 Support: Out-of-Market .....	17
3.3 RESS 1 Support: Ex-post Calculations .....	19
3.3.1 Actual RESS 1 Support: In-Market .....	19
3.3.2 Actual RESS 1 Support: Out-Of-Market .....	20
3.3.3. Reconciliation (“R-factor”) Payments .....	21
3.4 Curtailment Compensation .....	22
3.5 Sourcing Data .....	23
3.6 Risk of Bad Debt .....	25
<b>4. Clean Energy Package .....</b>	<b>27</b>
4.1 REFIT .....	27
4.2 RESS .....	29
<b>5. Next Steps .....</b>	<b>30</b>
<b>Appendix 1: Consultation Questions .....</b>	<b>31</b>
<b>Appendix 2: RESS 1 Terms &amp; Conditions .....</b>	<b>32</b>

<b>Appendix 3: Article 13(7)</b> .....	<b>37</b>
<b>Appendix 4: Curtailment Compensation</b> .....	<b>38</b>

# Glossary of Terms and Abbreviations

Abbreviation	Meaning
<b>BM</b>	Balancing Market
<b>CEP</b>	Clean Energy Package
<b>CfD</b>	Contract for Difference
<b>CPI</b>	Consumer Price Index
<b>CRU</b>	Commission for Regulation of Utilities, formerly the Commission for Energy Regulation.
<b>DAM</b>	Day Ahead Market
<b>DECC</b>	The Department of Environment, Climate and Communications, formerly the Department of Communications, Energy and Natural Resources (DCENR) and Department of Communications, Climate Action and Environment (DCCA). (DCCA).
<b>DSO</b>	Distribution System Operator
<b>EURIBOR</b>	Euro Interbank Offered Rate
<b>GWh</b>	gigawatt-hour
<b>I-SEM</b>	Integrated Single Electricity Market, also referred to as just “SEM”.
<b>MW</b>	megawatt
<b>MWh</b>	megawatt-hour
<b>PPA</b>	Power Purchase Agreement
<b>PSO</b>	Public Service Obligation
<b>REFIT</b>	Renewable Energy Feed-in Tariff
<b>RESS</b>	Renewable Energy Support Scheme
<b>S.I.</b>	Statutory Instrument
<b>SEM</b>	Single Electricity Market
<b>SEMC</b>	SEM Committee
<b>TSO</b>	Transmission System Operator

# Glossary of Formula Terms

Variable	Long Name	Unit
<b>CABBPO</b>	Bid Price Only Accepted Bid Payment or Charge	€
<b>CAOPO</b>	Offer Price Only Accepted Offer Payment or Charge	€
<b>CCP</b>	Capacity Payment	€
<b>CCURL</b>	Curtailment Payment or Charge	€
<b>CCURLCOMP</b>	Curtailment Compensation	€
<b>CDIFFCDA</b>	Day-ahead Difference Charge	€
<b>CDIFFCWD</b>	Within-day Difference Charge	€
<b>CDISCOUNT</b>	Discount Component Payment	€
<b>CFC</b>	Fixed Cost Payment or Charge	€
<b>CPREMIUM</b>	Premium Component Payment	€
<b>CSUPP</b>	RESS 1 Support	€
<b>ECSUPP</b>	Estimated RESS 1 Support	€
<b>EFQMCC</b>	Expected Capacity Charge Metered Quantity Factor	-
<b>EQMLF</b>	Estimated Loss-Adjusted Metered Quantity	MWh
<b>EPCCSUP</b>	Supplier Capacity Price	€/MWh
<b>EPMKT</b>	Estimated Market Reference Price / Ex-ante Benchmark Price	€/MWh
<b>FQMCC</b>	Capacity Charge Metered Quantity Factor	-
<b>PCCSUP</b>	Supplier Capacity Price	€/MWh
<b>PCURL</b>	Curtailment Price	
<b>PIMB</b>	Imbalance Settlement Price	€/MWh
<b>PMKT</b>	Market Reference Price	€/MWh
<b>PSTR</b>	Strike Price	€/MWh
<b>QABBIAS</b>	Biased Accepted Bid Quantity	MWh
<b>QABCURLLF</b>	Loss-Adjusted Curtailment Accepted Bid Quantity	MWh
<b>QABUNDEL</b>	Undelivered Accepted Bid Quantity	MWh
<b>QCURLLF</b>	Curtailed Quantity	MWh
<b>QFPN</b>	Final Physical Notification Quantity	MWh
<b>QFPNLF</b>	Loss-Adjusted Final Physical Notification Quantity	MWh
<b>QM</b>	Metered Quantity	MWh
<b>QMLF</b>	Loss-Adjusted Metered Quantity	MWh
$\sum b$ in Y	Summation over all Billing Periods, b, in PSO Year, Y.	-
$\sum d$ in Y	Summation over all Settlement Days, d, in PSO Year, Y.	-
$\sum \gamma$ in Y	Summation over all Imbalance Settlement Periods, $\gamma$ , in PSO Year, Y.	-

<b>b, c, d, h, <math>\gamma</math></b>	Subscripts denoting Billing Period, Capacity Period, Settlement Day, Trading Period and Imbalance Settlement Period, respectively.	-
<b>u</b>	Subscript denoting Generator Unit.	-
<b><math>\Omega</math></b>	Subscript denoting Capacity Market Unit	

# 1. Introduction

## 1.1 The Commission for Regulation of Utilities

The Commission for Regulation of Utilities (CRU)<sup>3</sup> is Ireland's independent energy and water regulator. The CRU's mission is to protect the public interest in Water, Energy and Energy Safety. The CRU is guided by four strategic priorities that sit alongside the core activities it undertakes to deliver in the public interest. These are:

- Deliver sustainable low-carbon solutions with well-regulated markets and networks;
- Ensure compliance and accountability through best regulatory practice;
- Develop effective communications to support customers and the regulatory process; and
- Foster and maintain a high-performance culture and organisation to achieve our vision.

## 1.2 Purpose of this Document

The purpose of this Consultation Paper is to consult on how the CRU will calculate support payments under the Department of Environment Climate & Communication's (the "Department") Renewable Electricity Support Scheme (RESS) and to consult on how the European Clean Energy Package (CEP) will be given effect both in the calculation of support payments under RESS and in changes to the current calculation of support payments under REFIT.

The CRU notes that it raised questions in previous CRU consultations regarding its PSO arrangements including:

- i. the methodologies used to estimate PSO-supported generator output and the ex-ante PSO benchmark price, which are used to estimate PSO support payments; and
- ii. the volatility in the PSO levy particularly as a result of the reconciliations that are needed between actual output quantities and prices and the estimates.

These issues are being addressed by the CRU in a separate consultation paper, which will be published in Q1 2021.

---

<sup>3</sup> Previously known as the Commission for Energy Regulation (CER).

## 1.3 Scope of the Consultation

In September 2020, the CRU published an Information Note [18], stating that it intended to consult on a number of issues concerning the PSO levy, and inviting views on issues that interested parties considered should be included.

Ten responses to the Information Note were received.

Several responses stated that the CRU needed to address the implications of Article 13 of the CEP, which is one of the key areas this consultation is intended to cover. Another respondent stated that the consultation should cover also the arrangements for the recovery of bad debt, and the CRU agrees that it is appropriate to consider this issue as part of the arrangements to implement RESS.

Responses to the Information Note also referenced PSO volatility and the PSO benchmark price. The CRU sees these issues being interlinked and, moreover, believes that they warrant a separate consultation paper, which will be published in Q1 2021.

A number of responses raised issues concerning the charging basis for the PSO levy (including whether customers with “Corporate PPAs” with renewable electricity generators should be exempt), and whether or not certain types of generation should be eligible for support. Other responses questioned the appropriate market reference price for particular types of generation. These are all matters that are covered by the legislation or the terms and conditions of the support schemes, which are set by the Department. As such they are outside the scope of this Consultation Paper.

## 1.4 Structure of Paper

This Consultation Paper is structured as follows:

**Section 1** is this introduction;

**Section 2** provides background information on the public service obligation (“the PSO”), including on the legislative framework, on the various PSO support schemes, and on the CEP;

**Section 3** describes the CRU’s proposals for the calculation of the PSO support payments and the PSO levy for RESS;

**Section 4** describes the CRU’s proposals for the calculation of the PSO support payments and the PSO levy for REFIT in the light of the CEP; and

**Section 5** outlines next steps.

**Appendix 1** lists the consultation questions;

**Appendix 2** contains relevant extracts from the RESS 1 Terms & Conditions;

**Appendix 3** contains relevant extracts from Article 13 of Regulation 2019/943/EC; and

**Appendix 4** contains additional details and an example of how Curtailment compensation is calculated over the 15-year duration of RESS 1.

## 1.5 Responding to this Document

Responses to this consultation should be sent by close of business on 22 February 2021, either in electronic format to [PSO@cru.ie](mailto:PSO@cru.ie) or alternatively by post to:

PSO Team  
Commission for Regulation of Utilities  
The Grain House  
Belgard Square North  
Tallaght, Dublin 24

Unless marked confidential, all responses may be published on the CRU's website. Respondents may request that their response is kept confidential. The CRU shall respect this request, subject to any obligations to disclose information. Respondents who wish to have their responses remain confidential should clearly mark the document (or parts of the document) to that effect and include the reasons for confidentiality. Responses from identifiable individuals will be anonymised prior to publication on the CRU website unless the respondent explicitly requests their personal details to be published. Our privacy notice sets out how we protect the privacy rights of individuals and can be found [here](#).

## 1.6 Related Documents

### Relevant Legislation

- [1] Electricity Regulation Act, 1999
- [2] [S.I. No. 217 of 2002](#), “Electricity Regulation Act 1999 (Public Service Obligations) Order 2002”, as amended.

### Relevant EU State Aid Notifications and Clearance Decisions

- [3] [EC C\(2007\) 4317](#), State aid N 571/2006 – Ireland, “RES-E support programme” (REFIT 1);
- [4] [EC C\(2011\) 7593](#), “State aid SA.31861 (2011/N) – Ireland, Biomass electricity generation” (REFIT 3);
- [5] [EC C\(2012\) 8](#), “State aid SA.31236 (2011/N) – Ireland, Renewable Feed In Tariff” (REFIT 2);
- [6] [EC C\(2020\) 4795](#), “State Aid SA.54683(2020/N)–Ireland Renewable Electricity Support Scheme (RESS)”, 20 Jul 2020;

### Relevant Department Papers

- [7] “Renewable Energy Feed in Tariff: A Competition for Electricity Generation from Biomass, Hydro and Wind”, DCENR, [updated September 2013] (also referred to as the “REFIT 1 Terms and Conditions”);
- [8] “Renewable Energy Feed in Tariff: A Competition for Electricity Generation from Onshore Wind, Hydro and Biomass Landfill Gas Technologies 2010-2017 (REFIT 2)”, DCENR, updated November 2015 (also referred to as the “REFIT 2 Terms and Conditions”);
- [9] “Renewable Energy Feed in Tariff: A Competition for Electricity Generation from Biomass Technologies 2010-2015 (REFIT 3)”, DCENR, [updated July 2013] (also referred to as the “REFIT 3 Terms and Conditions”);
- [10] “Terms and Conditions for the First Competition under the Renewable Electricity Support Scheme: RESS 1”, DCCAE, February 2020.

### Relevant CRU Papers

- [11] [CER/08/236](#), “Calculation of the R-factor in determining the Public Service Obligation Levy”, 20 November 2008;
- [12] [CRU/18/261](#), “Decision Paper: Addressing the Risk of Bad Debt to the PSO Levy”, 18 December 2018;

- [13] [CRU/19/126](#), “Information Paper: Arrangements for PSO Invoicing and Collection”, 11 October 2019;
- [14] [CRU/20/012](#), “Notification to Suppliers – Submissions to the CRU for the 2020/21 Public Service Obligation (PSO) Levy”, 24 January 2020;
- [15] [CRU/20/013](#), “Decision Paper: Arrangements for the Calculation of the Public Service Obligation Levy Post I-SEM Implementation”, 27 January 2020;
- [16] [CRU/20/019](#), “Notification to Suppliers: Certification of the PSO Levy, including the role of independent auditors”, 31 January 2020;
- [17] [CRU/20/086](#), “Decision Paper: Public Service Obligation Levy 2020/21”, 31 July 2020;
- [18] [CRU/20/114](#), “Information Note: Public Service Obligation (PSO) Levy Arrangements”, 25 September 2020;
- [19] CRU/20/XXX, “Managing Volatility of the Public Service Obligation Levy”, [Forthcoming];

#### **Other Relevant Papers**

- [20] [SEM-19-073](#), “Roadmap to Clean Energy Package Implementation Information Paper”, 16 December 2019;
- [21] “Renewable Electricity Support Scheme 1 RESS 1 Final Auction Results”, EirGrid, 10 September 2020.
- [22] “Trading and Settlement Code”, Single Electricity Market Operator; and
- [23] [SEM-20-028](#), “Implementation of Regulation 2019/943 in relation to Dispatch and Redispatch”, 27 April 2020.

## 2. Background

### 2.1 Overview of the PSO Levy

The PSO levy is used to fund various schemes designed by Government to support national policy objectives related to renewable energy.

The PSO levy is charged to all electricity final customers in Ireland, and the proceeds are used to compensate the:

- (a) additional costs<sup>4</sup> incurred by market participants in generating or purchasing electricity from PSO-supported generators<sup>5</sup>. In the case of “in-market<sup>6</sup>” generators, these are the additional costs over and above the revenues received from selling that electricity into the market, and in the case of “out-of-market” generators, they are the additional costs over and above the avoided cost of buying that electricity from the market; and
- (b) administrative expenses incurred by suppliers, the Distribution System Operator (“DSO”), i.e. ESB Networks, and the Transmission System Operator (“TSO”), i.e. EirGrid, in collecting payment of the PSO levy.

Policy and terms associated with the generators eligible for support from the PSO levy under the various schemes are set out in legislation and documents published by the Department, which have also been subject to state aid approval from the European Commission. The CRU has no discretion over the terms of the various schemes. The CRU’s role in relation to the PSO levy is to calculate the amounts of the levy and payments in respect of supported

---

<sup>4</sup> “Additional costs” as referenced in the 2002 Order does not define what is meant by such costs other than to state in Article 2(3) of the 2002 Order that they include costs incurred by the Board (i.e. ESB) in complying with its obligations under: Article 5(1) and (b) (i.e. Public service obligations for Peat); Article 6A or 6B (i.e. Public service obligation for short-term peaking capacity); Article 6(C) (i.e. CADA); and the costs incurred by a supplier in complying with its obligations under Article 6D (i.e. Public service obligations for REFIT contracts). Under the CRU’s current arrangements for the PSO Levy, the relevant market participants are not entitled to recover such additional costs, unless those costs are in accordance with the relevant State Aid Notifications, legislation and the terms and conditions of the relevant schemes.

<sup>5</sup> Under PSO support schemes such as REFIT, this electricity is procured via Power Purchase Agreements (PPAs) that suppliers (also referred to as off-takers) enter into with electricity generators.

<sup>6</sup> Generators that are registered separately as Generator Units under the Trading & Settlement Code, and whose output is thus sold through the SEM, are referred to as “in-market” generators. In contrast, “out-of-market” generators are included as part of a Supplier Unit, and the output of the generator merely reduces the Supplier Unit demand that has to be purchased through the SEM.

generators, in accordance with Government policy, and to ensure that the scheme is administered appropriately and efficiently.

Before the start of each PSO Year, which runs from 1 October to 30 September, the CRU calculates the PSO levy for that PSO Year based on:

- (i) An estimate, for the forthcoming PSO Year, of the additional costs based on a forecast of the cost of selling or buying from the market using a benchmark wholesale electricity price (“the Ex-ante Benchmark Price”) as determined by the CRU, and an estimate of the generation output determined and submitted to the CRU by the relevant supplier; and
- (ii) A reconciliation, for the preceding PSO Year, of the additional costs actually incurred or deemed to have been incurred, with the estimates made in advance of that PSO Year. Thus, for example, the PSO levy calculation carried out by the CRU prior to the start of the PSO Year 2021/22 will include a reconciliation of the costs actually incurred or deemed to have been incurred during the PSO Year 2019/20 with the estimates made for the PSO Year 2019/20 prior to the start of PSO Year 2019/20. The resulting reconciliation payments are known as “R-factors” or “R-factor payments”, and may be positive or negative, depending on whether the actual costs incurred or deemed to have been incurred are higher or lower than the estimates. Such differences arise primarily due to differences between the estimated and the actual amount of electricity generated, and between forecast and actual market prices.

The PSO levy is collected from electricity final customers by electricity suppliers. For distribution-connected customers, the levy collected by electricity suppliers is passed to the DSO and then from the DSO to the TSO, while for transmission-connected customers the levy is passed directly to the TSO. The TSO pays out the appropriate PSO amounts, as instructed by the CRU, to the relevant market participants. Although the PSO levy is paid to the supplier, generators receive support through the price specified in the PPA, which must be greater than or equal to a defined minimum price.

## 2.2 Legislation Governing the PSO Levy

### Electricity Regulation Act 1999

Section 39 of the Electricity Regulation Act 1999, as amended (“the Act”), gives the Minister the power to direct, by order, the CRU to impose obligations on holders of licences or authorisations in relation to security of supply, environmental protection and use of indigenous energy sources, including the collection of a levy from final customers. In accordance with Schedule 2 of the Act, the calculated PSO levy is allocated annually across three categories of electricity customer (i.e. Domestic Accounts, Small Accounts & Medium-Large Accounts)<sup>7</sup> based on the maximum demand in respect of each category, as a proportion of the sum of the three maximum demand figures. The attribution of the maximum demand in respect of each category of electricity account is carried out by the DSO for each PSO Year, in accordance with Section 39 (5A) (b) of the Act. CER/17/073<sup>8</sup> provides further details.

### The 2002 Order

The Electricity Regulation Act 1999 (Public Service Obligations) Order 2002 (Statutory Instrument No. 217 of 2002) (as amended) (“the 2002 Order”) sets out more detail in relation to issues such as:

- **PSO Schemes:** Articles 5, 6, and 6A through to 6D require the CRU to oblige ESB and suppliers to purchase electricity from specified generators and under specified contracts that have been accepted under the various schemes;
- **PSO Calculations:** Articles 7 to 10 refer to the procedure for estimating, calculating and certifying PSO payments and the PSO levy;
- **Duties of suppliers:** Article 11 obliges suppliers to collect the PSO levy from customers and pay it to the DSO (Article 12) and to the TSO (Article 13).
- **Duties of the DSO:** Article 14 obliges the DSO to collect payments of the PSO levy from suppliers, put in place and implement procedures to recover the PSO levy from suppliers, and to account for and pay to the TSO all appropriate amounts received by

---

<sup>7</sup> In accordance with Schedule 2 of the 1999 Act, Domestic Accounts means electricity accounts held by final customers and identified by the DSO as liable for distribution use of system charges at the rate for urban domestic customers or the rate for rural domestic customers. Small Accounts means electricity accounts held by final customers which are not Domestic Accounts or Medium-Large Accounts, while Medium-Large Accounts means electricity accounts held by final customers which, in respect of each such account, the DSO certifies as having a maximum import capacity of not less than 30kVA.

<sup>8</sup> Decision on ESB Networks’ Updated PSO Levy Cost Allocation Methodology.

it in respect of the PSO levy. Article 17 states that it is the duty of the DSO to inform the CRU if the level of payments received by it in respect of the PSO levy is materially different from that anticipated by the CRU as being payable in respect of a particular levy period and of the measures being taken to recover amounts due.<sup>9</sup>

- **Duties of the TSO:** Article 15 obliges the TSO to collect payment of the PSO levy from suppliers and the DSO, and to put in place and implement procedures to recover the PSO levy from suppliers and the DSO. Article 15 also obliges the TSO to account for and pay relevant market participants all appropriate amounts received in respect of the PSO levy. Article 17 states that it is the duty of the TSO to inform the CRU if the level of payments received by them in respect of the PSO levy is materially different from that anticipated by the CRU as being payable in respect of a particular PSO Year, and to inform the CRU of the measures being taken to recover amounts due.<sup>10</sup>
- **Duties of final customers:** Article 16 states that it shall be the duty of each final customer to pay to their supplier the amount of the PSO levy properly invoiced to such customers.
- **Recovery of contract debt:** Article 18 states that a supplier, the DSO and the TSO may recover as a simple contract debt in any court of competent jurisdiction, any amount due and owing in respect of the PSO levy.
- **Documenting of procedures by market participants:** Article 19 states that each person, other than a final customer, who has duties imposed on him or her shall submit a document to the CRU for approval in such form as may be required by the CRU from time to time specifying the procedures which he or she will adopt in order to comply with those duties.
- **Provision of information:** Article 20 states that it shall be the duty of each person who has duties pursuant to provide such information and documents to the CRU as it may require for the purpose of ensuring that they comply with their duties including information regarding amounts invoiced, received, accounted for and paid, and the administrative expenses incurred.

The 2002 Order has been amended by subsequent S.I.s to provide for the recovery of costs under the PSO for such schemes. As of February 2020, the Order also requires the CRU to oblige the TSO to administer a competition, established by the Minister, to ensure the

---

<sup>9</sup> In accordance with Condition 23 of the DSO licence, the Licensee shall also comply with any public service obligation imposed on it by the CRU pursuant to Section 39 of the Act.

<sup>10</sup> In accordance with Condition 25 of the TSO licence, the Licensee shall also comply with any public service obligation imposed on it by the CRU pursuant to Section 39 of the Act.

availability of renewable, sustainable or alternative forms of energy, namely through RESS auctions.

## 2.3 State Aid Notifications

The Government is required to notify the terms of each support scheme under the PSO to the European Commission and obtain approval. The original State Aid Notification of November 2000 sets out the broad areas that may be covered by the PSO as listed in Section 39 of the Act. These have included security of supply through the use of indigenous fuel sources, as well as environmental protection. Since the original notification, various Government support schemes that are funded by the PSO have been notified to the EU Commission and have received state aid clearance.

## 2.4 Government Schemes Supported by the PSO Levy

Post 2021<sup>11</sup>, the PSO levy will be used to fund the following electricity support schemes

- i. REFIT; and
- ii. RESS.

### 2.4.1 REFIT

The REFIT schemes are the main financial supports provided to renewable electricity generators at this time, with approximately 3,866 MW of REFIT supported capacity. Specifically, there are three REFIT support schemes (REFIT 1, REFIT 2 and REFIT 3. These schemes are feed-in tariffs, with various REFIT reference prices to support a number of technologies being set by the Department.<sup>12</sup> In all three schemes, support has been allocated to eligible suppliers, on a first-come-first-served basis.

Generators that have been accepted into a REFIT scheme contract with licensed electricity supply companies via a PPA of 15-year duration (or for the remainder of the duration of the

---

<sup>11</sup> There is one project remaining under the Alternative Energy Requirement (AER) scheme, with support for this project due to terminate at the end of 2021.

<sup>12</sup> REFIT reference price (expressed in €/MWh) refers to the price for a particular category of electricity (e.g. large scale wind, small scale wind, hydro, biomass, etc.) which has been set by the Department and adjusted annually by way of indexation, based on the Consumer Price Index (CPI).

REFIT scheme, if shorter)<sup>13</sup>. The participating supplier thereby undertakes to purchase electricity generated by the REFIT-supported generator, with whom it has concluded a PPA. The price (the “PPA price”) paid by the supplier to the generator is a matter for commercial negotiation between the two parties, except that the PPA price must be greater than or equal to a REFIT reference price<sup>14</sup> as specified in the terms and conditions of the scheme published by the Department.

With reference to the purchase of the electricity generated by the supported generator, it should be noted that in accordance with the relevant REFIT terms and conditions, support is not payable for electricity generation consumed onsite (i.e. only exported metered generation may be eligible for REFIT support) and all individual generation projects accepted into REFIT must be metered separately. Additionally, in the case of hybrid generators, the electricity used for house-load by the generating unit is regarded as having the same composition as the electricity exported from the same source, meaning that REFIT support cannot be maximised by deeming electricity eligible for support (typically biomass) to have been exported, with electricity that would not be eligible for support being used for house load.

### **REFIT 1:**

The terms and conditions of REFIT 1 are published by the Department, which stipulate that the REFIT payment to the supplier comprise three separate compensation streams:<sup>15</sup>

#### **i. Opportunity Cost Payment<sup>16</sup>**

This payment compensates the supplier for the additional cost of buying REFIT generation. A REFIT reference price is set for the cheapest category of REFIT-supported generation (i.e. large scale wind), and the payment is equal to the amount, as calculated over the PSO Year, by which the cost of buying at the REFIT reference price (referred to as the Actual Market Cost) exceeds the revenue from selling or cost of buying that same generation from the market (referred to as the Actual Market Revenues).

---

<sup>13</sup> The backstop dates for REFIT support under the various schemes are as follows REFIT 1 – 31 December 2027, REFIT 2- 31 December 2032 and REFIT 3 – 31 December 2030.

<sup>14</sup> Refer to Section 3.6 of REFIT 2 and 3 terms and conditions for further detail.

<sup>15</sup> The details of the compensation streams are referenced in Section 5 of REFIT 1 terms and conditions and paragraphs 20-24 of the EU Commission’s State Aid Decision (N 571/2006).

<sup>16</sup> Also referred to as a “Market Price Equalisation Payment” in the EU Commission’s State Aid Decision – N571/2006.

ii. **Technology Difference Payment**<sup>17</sup>

Under REFIT 1, this payment is made to a supplier to promote diversity in renewable generation technologies by compensating the supplier for the additional cost of the PPA, over and above the REFIT reference price, for technologies other than large scale wind. The maximum premium for any particular category of generation is the amount by which a reference price for the particular technology exceeds the REFIT reference price<sup>18</sup>.

iii. **Balancing Cost Payment**

This payment equals 15% of the REFIT reference price for large scale wind. On the basis that typical REFIT-supported generation is intermittent, the payment compensates suppliers for the cost of purchasing additional electricity when the REFIT supported generator is unavailable.

Under REFIT 1, in contrast to the earlier AER and Peat PSO schemes, suppliers do not return money to the PSO if the total revenue they receive from the market as a result of their contracting with REFIT-supported generators is greater than the costs they incur from contracting with a REFIT supported generator.

Also under REFIT 1, unlike in the subsequent REFIT 2 and 3 schemes, the Technology Difference Payment and Balancing Cost Payment are paid even in the event that the value of the supported generation in the market (as reflected in Actual Market Revenues) exceeds the cost of procuring the supported generation (as reflected in Actual Market Costs).

**REFIT 2 & 3**

Under REFIT 1, an Opportunity Cost Payment is made when the market revenues fall short of the REFIT reference price for large scale wind, with a separate Technology Difference Payment. In contrast, under REFIT 2 and 3, the Opportunity Cost Payment is made when market revenues fall short of a technology-specific reference price, with no explicit Technology Difference Payment.

Additionally, a Balancing Payment is made which:

- equals €9.90/MWh when Actual Market Revenues are less than the technology-specific reference price;

---

<sup>17</sup> Also referred to as a “Premium Payment”.

<sup>18</sup> The particular technologies are large wind, small wind, small hydro, landfill gas or other biomass. Note that, as the reference price for large scale wind and the REFIT reference price are one and the same, there is no Technology Difference Payment for large scale wind.

- reduces by a €/MWh for every €/MWh Actual Market Revenues exceed the technology-specific reference price; and
- equals zero when Actual Market Revenues exceed the technology-specific reference price plus €9.90/MWh.

Unlike the REFIT 1 Balancing Payment, the maximum Balancing Payment of €9.90/MWh is not indexed by CPI.

The effect of the two payments under REFIT 2 and REFIT 3 is that the total PSO payment is equal to the amount by which the market revenues fall short of the relevant technology-specific reference price plus €9.90/MWh.

As with REFIT 1, under REFIT 2 and 3, no payment is made back to the PSO if the supplier's market payment is greater than the costs incurred by the supplier when contracting with REFIT generators.

## 2.4.2 RESS

In February 2020, the Department established RESS. Like REFIT, RESS provides support primarily in the form of contracts for differences (CfDs), with payments being calculated as a metered quantity times the difference between a strike price and a deemed market price. RESS differs from REFIT primarily by the fact that:

- (i) CfDs are two-way rather than one-way, meaning it is possible for the supplier to owe, rather than be owed, payments under RESS; and
- (ii) support is allocated not on a first-come-first-served basis but through auctions, run by the TSO, for each supported generation technology, in which eligible projects compete on strike price, with the successful projects being those offering the lowest strike prices.

The process of auctions for each technology means that the technology reference prices, as used in REFIT, are not required. The Balancing Payment, also used in REFIT, is not used in RESS 1.

The first auction, RESS 1, took place in July 2020, with final results announced in September 2020. In this auction, 480 MW of wind generation and 796 MW of solar were successful.

The form of the support is specified in Section 5 of the RESS 1 Terms and Conditions, with the relevant extracts shown in Appendix 2 of this Consultation Paper. The Terms and Conditions specify that RESS 1 Support is to be calculated for each hourly period as the strike

price (the “Strike Price”) less the deemed market price (the “Market Reference Price”), multiplied by the Metered Quantity, adjusted for transmission and distribution losses. The Market Reference Price is specified to be either: the hourly DAM price for ‘variable’ generators, being wind, solar or hydro; or the time-weighted average over the PSO Year of the DAM price for ‘non-variable’ generators, being waste-to-energy HECHP, biomass HECHP or biogas HECHP. No support payment is paid if the Market Reference Price is less than zero. Capacity market revenues are to be deducted.

The terms and conditions also specify ‘Curtailed Compensation Arrangements’. The effect of these arrangements is to calculate additional compensation, equal to the Strike Price times a quantity, which quantity is a measure of the curtailed energy less ten percent of the uncurtailed quantity.

As with previous support schemes and as specified by the legislation, support payments are calculated during the course of a PSO Year as an estimate for the following PSO Year plus a reconciliation between actual and estimated amounts for the previous PSO Year. Support payments are made, monthly.

## 2.5 Clean Energy Package

Regulation 2019/943 of the EU CEP came into force in July 2019 and amends and recasts the previous regulation on the internal market for electricity.

The Regulatory Authorities (i.e. CRU & UREGNI) undertook a review in 2019 [21] to identify the areas where the new regulation would require action from the SEM Committee. Two of six areas identified relate to Articles 12 and 13, and concern arrangements for priority dispatch and for compensation for ‘non-market redispatch’. The SEM Committee is currently consulting on these issues [23].

Of relevance in respect of the PSO levy arrangements is paragraph 7 of Article 13, and in particular the stipulation that compensation for redispatching should be, at a minimum, the generator’s net revenues and that, “*where financial support is granted ... based on the electricity volume generated or consumed, financial support that would have been received without the redispatching request shall be deemed to be part of the net revenues.*” It is thus appropriate to consider whether any changes to the PSO support schemes are necessary to comply with this requirement.

# 3. RESS 1

## 3.1 RESS 1 Overview

Section 5 of the RESS 1 Terms and Conditions sets out the support to be provided under RESS 1 (the first competition held under the RESS), which comprises:

- (a) RESS 1 Support; and
- (b) Curtailment Compensation.

The support amounts will be calculated by the CRU in advance of each PSO Year and paid by the TSO to each supplier in monthly instalments.

As stipulated in Section 5.2.4 of the RESS 1 Terms and Conditions, and consistent with previous PSO support schemes, the RESS 1 Support for each supplier will comprise:

- (a) an estimate or “ex-ante” amount for the forthcoming PSO Year, calculated on the basis of estimated prices and quantities for the forthcoming PSO Year;
- (b) and an out-turn or “ex-post” amount, determined on the basis of actual prices and quantities for the previous PSO Year, which is then reconciled against the ex-ante amounts previously estimated for that previous PSO Year<sup>19</sup>, and the difference adjusted for inflation to give a reconciliation amount, or ‘R-factor Payment’.

However, in contrast to REFIT, RESS 1 Support will not include a Balancing Cost Payment or a Technology Difference Payment. Additionally, the Strike Price for each RESS 1 supported generator is not indexed by inflation.

---

<sup>19</sup> Additional reconciliation is also necessary to account for the fact that support payments actually made may not equal the estimated amounts, depending on the amount of Levy charges that has been recovered from customers.

## 3.2 RESS 1 Support: Ex-ante Calculations

The relevant inputs into the calculation of the ex-ante RESS 1 Support are:

- (i) Estimated Output Generation; and
- (ii) Ex-ante Benchmark Price.

### 3.2.1 Submission of Estimated Metered Quantity

Suppliers seeking RESS 1 Support will be required to provide the CRU with a completed RESS Estimates Template for the forthcoming PSO year<sup>20</sup>. In completing the RESS Estimates Template, the onus will be on the supplier to provide an estimate of the output of each of its RESS-contracted generators with a view to minimising the difference between ex-ante estimates and ex-post outturn values<sup>21</sup>. The supplier's completed RESS Estimates Template will be used by the CRU in determining the estimate for the forthcoming PSO Year.

### 3.2.2 Ex-ante Benchmark Price

The Ex-ante Benchmark Price is a forecast of the market price of electricity and is determined by taking a time-weighted average over the PSO Year of the prices forecast using CRU's validated SEM PLEXOS model. Any potential amendments to the CRU's derivation of the Ex-ante Benchmark Price will be considered in its forthcoming consultation on PSO volatility, which will be published in Q1 2021.

### 3.2.3 Estimated RESS 1 Payment: In-Market

The ex-ante RESS 1 Support payment,  $ECSUPP_u$ , for Generator Unit  $u$  in PSO Year  $y$ , is calculated from the Supplier's estimate of  $EQMLF_u$  and a Benchmark Price set by the CRU, and by assuming capacity difference charges are zero, as follows,

$$ECSUPP_u = PSTR_u * EQMLF_u - (EPMKT * EQMLF_u + CCP_{\Omega}) \quad (3.1)$$

where:

$EQMLF_u$  is the Supplier's estimate of the loss-adjusted Metered Quantity for Generator Unit  $u$  for PSO Year,  $y$ ; and

---

<sup>20</sup> For new projects, the supplier will also be required to provide a copy of the RESS Letter of Offer; evidence of the PPA; evidence of a supply licence; and evidence of each relevant generator's strike price under RESS.

<sup>21</sup> The basis for estimating generation output in PSO submissions will be reviewed in a forthcoming consultation on PSO volatility, but in the interim suppliers should ensure that they provide their best estimate of output for their RESS-contracted generator(s).

- EPMKT is the estimated Market Reference Price, i.e. the Ex-Ante Benchmark Price, for the PSO Year,  $y^{22}$ ;
- CCP<sub>Ω</sub> is the Capacity Payment due in PSO Year  $y$  for the Capacity Market Unit  $Ω$  corresponding with Generator Unit  $u$ , as determined from the results of the relevant Capacity Market auctions; and
- PSTR<sub>u</sub> is the Strike Price, being the Offer Price for Generator Unit  $u$  in the RESS 1 Auction, as specified in the RESS 1 Terms and Conditions.

Note: A variable naming convention that is consistent with the TSC has been used in the above formula, whereby: price variables have the prefix “P”; MWh quantities, the prefix “Q”; and cashflows, the prefix “C”. Any variable that is estimated has the additional prefix, “E”. EQMLF is thus the estimated metered generation (loss adjusted) which, for in-market generators, is an estimate of the TSC variable QMLF. Note also that EQMLF corresponds approximately with the REFIT variable, Estimated Output Generated (EOG), although EOG may be loss-adjusted or not, whereas EQMLF for RESS 1 generators is always loss-adjusted, as required by the RESS 1 Terms and Conditions.

### 3.2.4 Estimated RESS 1 Support: Out-of-Market

The ex-ante RESS 1 Support, ECSUPP<sub>u</sub>, for Generator Unit  $u$  in PSO Year  $y$ , is calculated from the Supplier’s estimate of QMLF and the Benchmark Price set by the CRU, and by assuming capacity difference payments are zero, as follows,

$$\begin{aligned} \text{ECSUPP}_u &= \text{PSTR}_u * \text{EQMLF}_u \\ &\quad - (\text{EPMKT} + \text{EPCCSUP} * \text{EFQMCC}) * \text{EQMLF}_u \end{aligned} \tag{3.2}$$

where:

- EQMLF<sub>u</sub> is the Supplier’s estimate of the loss-adjusted Metered Quantity for Generator Unit  $u$  for PSO Year  $y$ ; and
- EPMKT is the estimated Market Reference Price, i.e. the Benchmark Price, for the PSO Year; and

<sup>22</sup> The acronym, XBP, is used in REFIT to represent the Ex-Ante Benchmark Price. However, the acronym PMKT has been used here to denote Market Reference Price, so as to be consistent with the naming convention, since October 2018, in the TSC whereby acronyms for prices begin with a “P”.

$PSTR_u$  is the Strike Price, being the Offer Price for Generator Unit  $u$  in the RESS 1 Auction, as specified in the RESS 1 Terms and Conditions;

EPCCSUP is the expected Supplier Capacity Charge Price for the forthcoming PSO Year, as defined in the Trading and Settlement Code;

EFQMCC is the average estimated Capacity Charge Metered Quantity Factor over the PSO Year, being equal to  $\sum_{\gamma \text{ in } Y} EFQMCC_{\gamma} / n$ , where:  $EFQMCC_{\gamma}$  is the expected Capacity Charge Metered Quantity Factor in Imbalance Settlement Period  $\gamma$ , as defined in the Trading and Settlement Code; and  $n$  is the number of Imbalance Settlement Periods in the PSO Year; and

$\sum_{\gamma \text{ in } Y}$  is the summation over all Imbalance Settlement Periods in the PSO Year.

In accordance with the provisions of the Trading & Settlement Code, the value of Supplier Capacity Charge Price is proposed by the Market Operator and approved by the Regulatory Authorities, and values of Capacity Charge Metered Quantity Factor are determined by the Regulatory Authorities or determined by the Market Operator applying a methodology determined by the Regulatory Authorities. Thus, when the CRU is calculating the ex-ante RESS 1 Support for any Generator Unit:

- (a) if the values of these parameters have been approved or determined for the forthcoming PSO Year then the expected Supplier Capacity Charge Price will be the value of Supplier Capacity Charge Price approved by the Regulatory Authorities, and the expected Capacity Charge Metered Quantity Factor will be the value of Capacity Charge Metered Quantity Factor determined by the Regulatory Authorities or Market Operator;
- (b) if any of these parameters has not been approved or determined then any proposed but not yet approved or finalised value will be used; or,
- (c) if there is no proposed value then the relevant value for the current PSO Year, i.e. the PSO Year before the forthcoming PSO Year, will be used.

### 3.3 RESS 1 Support: Ex-post Calculations

When submitting its RESS Outturn Template, the supplier is required to calculate the RESS 1 Support that it is due, based on out-turn (rather than estimated) data, and certify their additional costs associated with RESS accordingly. As with REFIT, different methods for calculating support will be required, depending on whether the generator is registered as a Generator Unit in the Trading and Settlement Code (an “in-market generator”) or is not separately registered and is treated instead as negative demand for the supplier (an “out-of-market” generator).

#### 3.3.1 Actual RESS 1 Support: In-Market

In accordance with Section 5.2.5 of the RESS Terms and Conditions, the CRU proposes calculating RESS 1 Support,  $CSUPP_{u\gamma}$ , for each supported Generator Unit,  $u$ , in each Imbalance Settlement Period,  $\gamma$ , as follows.

If  $PMKT_h < PSTR_u$  and  $PDAM_{uh} > 0$ , or if  $PMKT_u > PSTR_u$ ,

$$CSUPP_{u\gamma} = PSTR_u * QMLF_{u\gamma} - ( PMKT_{uh} * QMLF_{u\gamma} + CCP_{\Omega\gamma} + CDIFFDA_{\Omega\gamma} + CDIFFWD_{\Omega\gamma} ) \quad (3.3)$$

else

$$CSUPP_{u\gamma} = - ( CCP_{\Omega\gamma} + CDIFFDA_{\Omega\gamma} + CDIFFWD_{\Omega\gamma} ) \quad (3.4)$$

where:

$PSTR_u$  is the Strike Price for Generator Unit  $u$ , being the Offer Price in the RESS 1 Auction, as specified in Section 5.2.2;

$PMKT_{uh}$  is the Market Reference Price, as specified in Section 5.2.3, being: (i) for variable generators, the Day-Ahead Market Price for the Trading Period,  $h$ , that includes the Imbalance Settlement Period,  $\gamma$ ; and (ii) for non-variable generators, the time-weighted average Day-Ahead Market Price for the PSO Year;

$PDAM_{uh}$  is the Day-Ahead Market Price for the Trading Period,  $h$ ;

$QMLF_{u\gamma}$  is the Metered Quantity, adjusted for losses, for Generator Unit  $u$ , as defined in the Trading and Settlement Code;

$CCP_{\Omega\gamma}$  is the Capacity Payment for Capacity Market Unit,  $\Omega$ , corresponding to Generator Unit,  $u$ , as defined in the Trading and Settlement Code; and

CDIFFDA<sub>Ω<sub>y</sub></sub> and CDIFFWD<sub>Ω<sub>y</sub></sub> are the Day-Ahead Difference Charge (CDIFFCDA) and the Within-day Difference Charge (CDIFFCWD), as defined in the Trading and Settlement Code.

In (3.3), PSTR\*QMLF can be regarded as deemed costs and PMKT\*QMLF as deemed energy revenues. In accordance with the RESS 1 Terms and Conditions, RESS 1 Support (CSUPP) compensates the supplier for the difference between these two quantities (whether positive or negative) as long as the Day Ahead Price is greater than zero. If the Day Ahead Price is negative then the supplier will not receive support when the Market Reference Price is less than Strike Price but will pay the difference when the Market Reference Price exceeds the Strike Price, which can occur if the generator is a non-variable generator such that the Market Reference Price is the annual average of the Day Ahead Price.

CCP, CDIFFDA and CDIFFWD, taken together, are the capacity market revenues: as with REFIT, if a generator has been successful in the Capacity Market, it will have capacity revenues that comprise not only Capacity Payments but also (negative) Day-Ahead Difference Charges and Within-day Difference Charges that must be paid in respect of the generator even when it fulfils all of the obligations under its reliability option. In accordance with the RESS 1 Terms and Conditions, these capacity market revenues are deducted in calculating RESS 1 Support.

The Ex-Post RESS 1 Support, CSUPP<sub>u</sub>, for PSO Year, y, is then calculated as

$$CSUPP_u = \sum_{Y \text{ in } y} CSUPP_{uy} \quad (3.5)$$

where

$\sum_{Y \text{ in } y}$  is the summation over all Imbalance Settlement Periods in the PSO Year.

Note, unlike REFIT, the differencing of deemed costs and revenues is calculated on an hourly basis, and then summed over the PSO Year, rather than vice versa.

### 3.3.2 Actual RESS 1 Support: Out-Of-Market

As under REFIT, the Supplier Capacity Charge Price, PCCSUP, is used in place of the capacity market revenues, CCP, CDIFFDA, and CDIFFWD.

Thus, the ex-post RESS Support Payment is calculated as follows:

If  $PSTR_u > PMKT_{uh}$  and  $PMKT_{uh} > 0$ , or if  $PSTR_u < PMKT_u$ ,

$$CSUPP_{uy} = (PSTR_u - PMKT_{uh} - PCCSUP * FQMCC_Y) * QMLF_{uy} \quad (3.6)$$

else

$$CSUPP_{uy} = - (PCCSUP_Y * FQMCC_Y) * QMLF_{uy} \quad (3.7)$$

where:

$PSTR_u$  is the Strike Price for Generator Unit  $u$ , being the Offer Price in the RESS 1 Auction, as specified in Section 5.2.2;

$PMKT_{uh}$  is the Market Reference Price, as specified in Section 5.2.3,

$QMLF_{uy}$  is the Metered Quantity, adjusted for losses, for Generator Unit,  $u$ ;

$PCCSUP$  is the e Supplier Capacity Charge Price, as defined in the Trading and Settlement Code; and

$FQMCC_Y$  is the Capacity Charge Metered Quantity Factor, as defined in the Trading and Settlement Code.

The ex-post RESS 1 support payment,  $CSUPP_u$ , for the PSO Year is then calculated as

$$CSUPP_u = \sum_{Y \text{ in } \Upsilon} CSUPP_{uy} \quad (3.8)$$

where

$\sum_{Y \text{ in } \Upsilon}$  is the summation over all Imbalance Settlement Periods in the PSO Year.

### 3.3.3. Reconciliation (“R-factor”) Payments

The reconciliation or “R-factor Payment” is calculated as the difference between the ex-post RESS 1 Support,  $CSUPP_u$ , and the ex-ante amounts that were paid to them. The ex-ante amounts are based on the ex-ante estimated amounts,  $ECSUPP_u$ , but may differ in the event that the PSO levy revenues do not cover the aggregate payments due to suppliers.

Further, the reconciliation or R-factor Payment is then adjusted using EURIBOR compounded over a two year period. Specifically, an average rate in the first year is calculated by taking the average of the EURIBOR 3-month rates for each of the 12 months. For the second year, not all the monthly rates are known at the time of calculation, and so an average is calculated of just those months for which the EURIBOR 3-month rate is available. Subsequently, when the remaining rates are known, a correction is calculated, and an adjustment made the following year.

### 3.4 Curtailment Compensation

Curtailment compensation is specified in Section 5.6 of the RESS Terms & Conditions. No ex-ante estimate is made for the forthcoming PSO Year, but the CRU is proposing that the supplier should calculate, have certified and submit the ex-post amount for the previous PSO Year as follows<sup>23</sup>.

For each Generator Unit,  $u$ , a 'Curtailment Ratio' is calculated ex-post, as,

$$FCURL_u = QCURLLF_u / (QCURLLF_u + QMLF_u) \quad (3.9)$$

where

$QMLF_u$  is the Metered Quantity over the PSO Year, and

$QCURLLF_u$  is a loss-adjusted 'Curtailed Quantity, being the quantity of curtailment over the PSO Year, calculated as,

$$QCURLLF_u = \sum_{Y \text{ in } \Upsilon} \min( QABCURLLF_{uoiY} - \min(QABBIAS_{uoiY}, QABUNDEL_{uoiY}), 0 ) \quad (3.10)$$

Note that, as all of the terms in (3.10) are loss adjusted, so is the result,  $QCURLLF_u$ .

In accordance with Section 5.6.1 of the RESS Terms & Conditions, if  $FCURL_u$  for Generator Unit  $u$  exceeds 0.1 in any two consecutive PSO Years then Curtailment Compensation is calculated for each subsequent PSO Year in the remaining term of the RESS 1 Support for that Generator Unit.

The Curtailment Compensation,  $CCURLCOMP_u$ , is then calculated as follows,

$$CCURLCOMP_u = PSTR_u * \max\{ QCURLLF_u - 0.1*(QCURLLF_u + QMLF_u), 0 \} \quad (3.11)$$

where

$PSTR_u$  is the Strike Price being the Offer Price for Generator Unit  $u$  in the RESS 1 Auction, as specified in the RESS 1 Terms and Conditions.

$QCURLLF_u$  is the 'Curtailed Quantity' as defined in (3.10); and

$QMLF_u$  is the Metered Quantity, loss-adjusted, as defined in the Trading and Settlement Code.

---

<sup>23</sup> The formulae are expressed differently to the RESS 1 Terms and Conditions. However, the CRU believes these formulae are identical in effect. (More detail in Appendix 4)

The term  $(QCURLL_{F_u} + QMLF_u)$  is a measure of the “uncurtailed quantity”, i.e. the Metered Quantity had it not been for curtailment, and  $FCURL$  is the Curtailed Quantity as a fraction of this uncurtailed quantity. Hence, the Curtailment Compensation is equal to the Strike Price multiplied by a quantity equal to the Curtailed Quantity less 10% of the uncurtailed quantity, provided this quantity is positive. If the Curtailed Quantity less 10% of the uncurtailed quantity is zero or negative, then the Curtailment Compensation is zero. It is thus implicit in (3.11) that if  $FCURL$  drops below 0.1 in any given year then no compensation is paid for that year but could be paid in any subsequent year for which  $FCURL$  exceeded 0.1. An example illustrating this is in Appendix 4.

The CRU notes that Section 5.6.1(b) of the RESS 1 Terms and Conditions stipulates that the Curtailed Quantity is the curtailed quantity, “*which is not compensated by another party and/or through another mechanism*”. The Trading and Settlement Code<sup>24</sup> defines a cashflow in respect of the curtailed quantity of the generator, as calculated in (3.11). However, this cashflow, in combination with a cashflow priced at the Imbalance Price, merely refunds revenues earned through the SEMOpx ex-ante markets, such that there is no net revenue in respect of the curtailed quantity. Thus, while there is compensation for the Curtailed Quantity through another mechanism, there isn’t any compensation from the two mechanisms - the ex-ante markets and the Balancing Market - taken together.

Curtailment Compensation is not calculated for out-of-market generators.

### 3.5 Sourcing Data

The Market Reference Price,  $PMKT_{uh}$ , is either the DAM price or the time-weighted average of the DAM price over the PSO Year, with DAM prices being published and made publicly available on the SEMOpx website<sup>25</sup>.

Strike Price is the Offer Price submitted in respect of the particular generator as part of the application for RESS 1 Support. This price should be known to the supplier.

All other data is provided by SEMO or can be derived from data provided by SEMO and the relevant Meter Data Provider. For in-market generators, the required data will be part of Settlement Reports received by the generator. For out-of-market, the required data will be

---

<sup>24</sup> Section F.8.

<sup>25</sup> [www.semopx.com](http://www.semopx.com).

received by the supplier from the SEMO, with the exception of Metered Quantity, which will be available from the Meter Data Provider<sup>26</sup>.

Suppliers should base their PSO submissions on M+4 settlements reports but may make use of any available M+13 reports should they wish. In the event M+4 data is not available for the whole PSO Year, the latest available data should be used.

Where PSO submissions have been based on M+4 settlements reports then, following the receipt of M+13 data, a reconciliation may be required:

- (a) In the event that the reconciliation would reduce support payments to the supplier, the supplier will be obliged to calculate have certified and submit a reconciliation unless it has reasonable grounds to believe that such a reconciliation would be immaterial, e.g. as a result of the differences between M+13 and M+4 data being insignificant.
- (b) In the event that the reconciliation would increase support payments to the supplier, the supplier may calculate have certified and submit a reconciliation only if it has reasonable grounds to believe that such a reconciliation would be material.

As regards what might be considered immaterial or material, the CRU notes that the Trading & Settlement Code defines a Settlements Recalculation Threshold, which threshold must be exceeded if and settlements reruns are to be undertaken, this threshold is currently set at €15,000. The CRU is of the view that this threshold is too high as a definition of materiality for the purposes of the PSO levy. Instead, the CRU proposes that a threshold of:

- (a) €1,000 should be used for reconciliations that would reduce support payments to the supplier; and
- (b) €5,000 should be used for reconciliations that would increase support payments to the supplier.

The CRU recognises that this arrangement is asymmetrical. However, the CRU believes that this would provide an appropriate incentive for suppliers to ensure that the best data is used in their earlier submissions. Also, the CRU is of the view that, given that PSO levy calculations depend on data that relates to generators, and not on the allocation of customer demands, it is highly unlikely that differences between M+4 and M+13 data will arise. The CRU propose that this threshold will be applicable for both RESS and REFIT resubmissions. Any resubmission based on M+13 data will need to be certified.

---

<sup>26</sup> In the case of a Supplier Unit that comprises only the particular generator, this data should be available also from SEMO.

### 3.6 Risk of Bad Debt

Under RESS, payments may be made by, rather than to, the supplier. Broadly-speaking, this will happen only if the Strike Price is lower than the Market Reference Price. That a supplier could then be liable to make rather than receive payments raises the risk of bad debt in the event of the supplier failing.

The CRU notes that the RESS 1 Terms and Conditions require generators to have provided a 'Performance Bond' in the amount of €25,000 per MW of capacity. The bond must have been provided within 30 working days of a project being notified that it was successful in the RESS 1 Auction. However, the Performance Bond is intended to ensure only that the project is not speculative, and that the generator achieves commercial operation, with the bond expiring seven months after the date commercial operation is achieved.

Possible options to address the risk of bad debt include:

(1) *Credit Cover*

A bond, similar to the Performance Bond, is provided by the generator or the supplier, which can be drawn down in the event the difference payments are not paid by the supplier. In the CRU's view, there isn't a clear basis for deciding the appropriate amount of such bond, as there is no obvious limit to how high market prices could rise above the Strike Price, and hence the size of difference payments. The level of the Performance Bond, i.e. €25,000/MW, would cover, assuming a generator load factor of 30%, difference payments of up to approximately €10/MWh for one year. Potentially, though, difference payments could arise for the entire remainder of the RESS 1 support, i.e. up to 15 years.

Other forms of credit cover could potentially be used.

(2) *Obligation to Enter into New RESS 1 PPA*

In the future the CRU may consider that the generator, rather than being given an option, could be given an obligation to enter into a new RESS 1 PPA, such that the terms of the original RESS 1 support, including the Strike Price would have to be honoured. If necessary, the generator could be required to set up a 'Supplier Lite' arrangement, and so unwillingness of any other supplier to enter into a new RESS 1 PPA should not be an issue.

(3) *Amend Supplier Licences/ Licencing Process*

The CRU may consider amending relevant Supplier licenses to contain an obligation on the Supplier to demonstrate how they will pay back any potential liabilities owed to the PSO levy. Alternatively, the CRU may amend the current licencing process, requiring relevant participants to post a bond or provide assurances that all liabilities would be guaranteed by a parent company (where applicable).

(4) *Take no additional measures towards reducing the risk of PSO bad debt.*

An acceptably low expected level of bad debt would depend on the probability of supplier failure and the likelihood of market prices exceeding Strike Prices being low.

The CRU notes that under the RESS 1 Terms and Conditions, Community Zero-Bond Projects are not required to post a Performance Bond. Hence, in the case of Option (1), it is for consideration as to whether Community Zero-Bond Projects should be exempt also from any requirement to provide credit cover for difference payments.

# 4. Clean Energy Package

## 4.1 REFIT

In respect of compensation for “non-market based redispatching”, Article 13(7) of Regulation 2019/943 states,

*“where financial support is granted to power-generating, energy storage or demand response facilities based on the electricity volume generated or consumed, financial support that would have been received without the redispatching request shall be deemed to be part of the net revenues.”*

The SEM Committee has consulted on the implementation of Article 13(7) [23], and its consideration of the issue, and of when compensation for non-market based redispatch applies, is ongoing. Nevertheless, the CRU is of the view that, were compensation to be provided for non-market based redispatch, the coming into force of Article 13(7) means it would no longer be appropriate for that compensation to be then taken away by deducting it (by dint of its inclusion in the calculation of Actual Market Revenues) from support payments.

Currently, in REFIT, Actual Market Revenues includes terms that relate to the redispatch of generation. The CRU proposes that, where their compensation for non-market based redispatch applies, it would be appropriate to remove these terms from the calculation of Actual Market Revenues, such that the current calculation of,

$$AMR_{uY} = AMR_{uY}(\text{Energy}) + AMR_{uY}(\text{Constraints}) + AMR_{\Omega Y}(\text{Capacity}) \quad (4.1)$$

where

$$AMR_{uY}(\text{Energy}) = \sum_{Y \text{ in } Y} (\text{PMD}_{uY} * \text{QMLF}_{uY}) \quad (4.2)$$

$$\begin{aligned} AMR_{uY}(\text{Constraints}) &= \sum_{Y \text{ in } Y} (\text{PIMB}_Y - \text{PMD}_{uY}) * (\text{QMLF}_{uY} - \text{QFPNLF}_{uY}) \\ &+ \sum_{Y \text{ in } Y} (\text{CPREMIUM}_{uY} + \text{CDISCOUNT}_u \\ &+ \sum_{Y \text{ in } Y} (\text{CAOOPO}_{uY} + \text{CABBPO}_{uY}) \\ &+ \sum_{b \text{ in } Y} (\text{CFC}_{ub}) \\ &+ \sum_{Y \text{ in } Y} (\text{CCURL}_{uY}) \end{aligned} \quad (4.3)$$

$$AMR_{\Omega Y}(\text{Capacity}) = \sum_{c \text{ in } Y} (\text{CCP}\Omega c)$$

$$+ \sum_{Y \text{ in } \Upsilon}(\text{CDIFFCDA}_{\Omega Y}) + \sum_{Y \text{ in } \Upsilon}(\text{CDIFFCWD}_{\Omega Y}), \quad (4.4)$$

is modified such that  $\text{AMR}_{uY}(\text{Energy})$  and  $\text{AMR}_{\Omega Y}(\text{Capacity})$  are unchanged but  $\text{AMR}_{uY}(\text{Constraints})$  is given by,

$$\begin{aligned} \text{AMR}_{uY}(\text{Constraints}) &= \sum_{Y \text{ in } \Upsilon}(\text{PIMB}_Y - \text{PMD}_{uY}) * (\text{QMLF}_{uY} - \text{QFPNLF}_{uY}) \\ &+ \sum_{Y \text{ in } \Upsilon}(\text{CCURL}_{uY}) \end{aligned} \quad (4.5)$$

Note that the sum of  $\text{AMR}_{uY}(\text{Energy})$  and  $\text{AMR}_{uY}(\text{Constraints})$  is then given by,

$$\begin{aligned} &\text{AMR}_{uY}(\text{Energy}) + \text{AMR}_{uY}(\text{Constraints}) \\ &= \sum_{Y \text{ in } \Upsilon}(\text{PMD}_{uY} * \text{QMLF}_{uY}) \\ &+ \sum_{Y \text{ in } \Upsilon}(\text{PIMB}_Y - \text{PMD}_{uY}) * (\text{QMLF}_{uY} - \text{QFPNLF}_{uY}) + \sum_{Y \text{ in } \Upsilon}(\text{CCURL}_{uY}) \end{aligned} \quad (4.6)$$

In (4.1) to (4.6), above,

$\text{PMD}_{uY}$  is the Deemed Market Price

$\text{QMLF}_{uY}$  is the Loss-Adjusted Metered Quantity

$\text{QFPNLF}_{uY}$  is the Loss-Adjusted Final Physical Notification Quantity;

$\text{CPREMIUM}_{uY}$  and  $\text{CDISCOUNT}_{uY}$  are the Premium Component Payment and Discount Component Payment, respectively;

$\text{CAOOPO}_{uY} + \text{CABBPO}_{uY}$  are the Bid Price Only Accepted Bid Payment or Charge and the Bid Price Only Accepted Offer Payment or Charge, being an cashflow adjustment relating to costs of BM actions;

$\text{CFC}_{ub}$  is the Fixed Cost Payment or Charge, being an cashflow adjustment relating to costs of BM actions;

$\text{CCURL}_{uY}$  is Curtailment Payment or Charge, concerning compensation for curtailment instructions;

$\text{CCP}_{\Omega c}$ ,  $\text{CDIFFCDA}_{\Omega Y}$  and  $\text{CDIFFCWD}_{\Omega Y}$  are the Capacity Payment, Day-ahead Difference Charge and Within-day Difference Charge, being capacity market revenues and allowable costs;

$\sum_{Y \text{ in } \Upsilon}$  is the summation over all Imbalance Settlement Periods in [PSO/levy] Year Y

$\sum_{b \text{ in } Y}$  is the summation over all Billing Periods in PSO Year, Y

$\sum_{c \text{ in } Y}$  is the summation over all Capacity Periods in PSO Year, Y

Hence, equation (4.5) allows the supplier to retain any CDISCOUNT and any other redispatch compensation that the supplier may receive through the TSC as a result of the generator being redispatched. In contrast, by including these cashflows in the calculation of Actual Market Revenues, equation (4.3) would result in these cashflows being received through the TSC but then deducted from the REFIT support payment.

The remaining terms in equations (4.2) and (4.5) merely deduct the revenue for the sale of energy at the Deemed Market Price, and remove any imbalance risk (i.e. the difference between the Imbalance Price and the Deemed Market Price , plus any Curtailment Payment or Charge) on the dispatched-down quantity

To clarify, following the conclusion of the SEMC consultation on the implementation of Article 13(7), were compensation to be provided for non-market based redispatch the CRU proposes that equation (4.5) should apply. In the alternative, the CRU proposes that equation (4.3) should continue to apply.

With reference to Out-of-market generators, the CRU considers such units are not being subject to redispatch, and hence no amendments are necessary to comply with Article 13(7).

The CRU also notes that a deduction of compensation for non-market based redispatching from Actual Market Revenues may increase the cost of the PSO levy. For the purposes of PSO ex-post submissions, the effective date for the above changes is yet to be confirmed by SEMC. The CRU will confirm the effective date in advance of the PSO submission deadline. As outlined above, the CRU notes that a future decision by SEMC in relation to the interpretation of Article 13(7) of EU Regulation 2019/943 may necessitate further amendments to the above equation (4.5), Therefore, the proposed exclusion of payments for non-market based redispatch from the AMR REFIT calculation may be deemed an interim measure, pending any further regulatory decisions regarding interpretation of Article 13(7). Any subsequent proposed updates to the AMR REFIT calculation will be communicated accordingly to market participants.

## 4.2 RESS

The calculation of RESS 1 support, as described in Section 4, does not involve costs of redispatching, and hence does not require amendment to comply with Article 13(7).

In the event that the Trading & Settlement Code is amended to provide additional compensation for curtailment, then the calculation of Curtailment Compensation, as discussed in Section 3.4, may need to be amended also, such that the relevant quantity is deducted from the Curtailed Quantity, QCURL, used to calculate Curtailment Compensation, CCURLCOMP.

## 5. Next Steps

The CRU invites feedback from all interested stakeholders on the content in general of this consultation paper and, in particular, on the questions listed in Appendix 1

Responses to this consultation paper should be sent by close of business on 22 February 2021 preferably in electronic format to [PSO@cru.ie](mailto:PSO@cru.ie) or alternatively by post to:

PSO Team  
Commission for Regulation of Utilities  
The Exchange  
Belgard Square North  
Tallaght  
Dublin 24

# Appendix 1:

## Consultation Questions

- Q1 Do you agree with the proposals for the calculation of RESS 1 Support and Curtailment Compensation for RESS 1 projects?
- Q2 Are there any other curtailment compensation mechanisms, within the meaning of Section 5.6.1(b) of the RESS 1 Terms and Conditions, that the CRU should have taken into account in the proposals for Curtailment Compensation?
- Q3 What are your views on the proposals for addressing the risk of bad debt in the event of the failure of a supplier to make difference payments in respect of a RESS 1 project?
- Q4 Do you agree with the proposed equation (4.5) regarding  $AMR_{UY}(\text{Constraints})$ ?
- Q5 For REFIT are there any circumstances in which equation (4.5) should not apply and equation (4.3) should continue to apply, and, if so, why?"
- Q6 As regards further reconciliations after the supplier's normal submission for the previous PSO Year, do you agree with the CRU's proposal that a threshold of:
- (i) €5,000 should be used for reconciliations that would increase support payments to the supplier; and
  - (ii) €1,000 should be used for reconciliations that would decrease support payments to the supplier.

If you disagree with this proposal, what would you propose instead, and why?

# Appendix 2:

## RESS 1 Terms & Conditions

### Section 5.2

5.2.1 RESS 1 Support is structured as a FIP.

#### 5.2.2 Strike Price

Each Qualified Applicant will be required to specify an Offer Price for its RESS 1 Project in the RESS 1 Auction. If successful in the RESS 1 Auction, this Offer Price shall be the 'strike price' for that Qualified Applicant used to settle the FIP for the RESS 1 Project (the "Strike Price"). The Strike Price will be constant over the term of the RESS 1 Support and will not be indexed or adjusted for inflation.

#### 5.2.3 Market Reference Price

For RESS 1 Projects that are:

- (a) Variable, the market reference price used to settle the FIP will be the hourly DAM Price; and
- (b) Non-Variable, the market reference price used to settle the FIP will be the time weighted average of the DAM Price calculated over the relevant PSO Year (or part thereof in any instance where a period of RESS 1 Support does not coincide with a full PSO Year), (each the relevant "Market Reference Price").

The suitability of using the DAM Price for this purpose may be reviewed from time to time. In the event of changes to market conditions which result in the DAM Price being no longer suitable or feasible for use in the Market Reference Price calculation, a suitable and feasible alternative to the DAM Price will be established.

#### 5.2.4 Annual Forecasts

RESS 1 Support will be calculated annually based on forecasts and will be reconciled by the Regulatory Authority after the end of the following PSO Year.

#### 5.2.5 Overview of the Arrangements for Calculating RESS PSO Monies

The FIP will be calculated by the Supplier on an hourly basis and will effectively be calculated with respect to deemed energy revenues based on the Loss-Adjusted Metered Quantity of the RESS 1 Project applied to the Strike Price and the Loss-Adjusted Metered Quantity of the RESS 1 Project applied to the Market Reference Price.

Specifically:

For hours in which:

(a) the Strike Price multiplied by Loss-Adjusted Metered Quantity,  
exceeds

(b) the Market Reference Price multiplied by Loss-Adjusted Metered Quantity,

then if the DAM Price equals or exceeds zero euro per MWh, the Supplier will be entitled to receive a payment equal to (a) minus (b), otherwise it will be entitled to a payment of zero (the "Support Payment"); and

For hours in which:

(a) the Market Reference Price multiplied by Loss-Adjusted Metered Quantity,  
exceeds

(b) the Strike Price multiplied by Loss-Adjusted Metered Quantity,

then the Supplier will be obligated to make a payment equal to (b) minus (a) (the "Difference Payment").

The Support Payment and the Difference Payment will be further adjusted to account for capacity market revenues actually received. The market revenue calculations for the purposes of calculating the PSO levy for RESS 1 Projects will take into account only capacity market revenues and not capacity market costs (and for the avoidance of doubt the calculations will not take into account any cost obligations of the RESS 1 Project associated with non-performance under a CRM reliability option). Capacity market revenues will (as applicable) decrease the Support Payment or increase the Difference Payment for the PSO Year.

For avoidance of doubt, DS3 and constraint revenues will not be considered as market revenues and therefore will not be taken into account in the calculation of Support Payments and Difference Payments.

The net difference between the aggregate of Support Payments and Difference Payments over the relevant PSO Year will be funded through the PSO Levy.

#### 5.2.6 Annual Reconciliation

The TSO will be responsible for disbursing and collecting the net difference between the aggregate of Support Payments and Difference Payments over the relevant PSO Year. Such duties shall, inter alia, take account of the Regulatory Authority's forecast of the level of payments to and from Suppliers with a RESS 1 PPA and a reconciliation to

adjust for deviations between forecasts and actual outcomes of generation, loss factors, DAM Prices and any other factors that contribute to the calculation of the level of payments, as necessary. The arrangements for the calculation of PSO Levy for RESS are expected to be broadly similar to the arrangements described in CRU/20/13 Decision Paper on “Arrangements for the Calculation of the PSO Levy post I-SEM implementation” (but for the avoidance of doubt, these arrangements may be modified by the Regulatory Authority from time to time). However, to accord with these Terms and Conditions, the reconciliation with each Supplier will recognise the unique Strike Price and Loss-Adjusted Metered Quantity applicable to each RESS 1 Project in the reconciliation.

#### 5.2.7 Payments from Suppliers to the PSO

In the event that the forecast net amount due in respect of a RESS 1 PPA for a PSO Year is negative after adjusting for any reconciliation, the Supplier that is a party to the RESS 1 PPA will be required to make monthly payments over the course of the next applicable PSO Year to the TSO as opposed to receiving payments. In the event that, at the end of the term of RESS 1 Support for a RESS 1 Project or after a RESS 1 Project has exited RESS 1 pursuant to the provisions in these Terms and Conditions, the final reconciliation calculation indicates that there is an amount due from the Supplier, such amount will be the joint and several responsibility of the Supplier and the Generator. This provision will apply to the RESS 1 Project without regard to ownership of the RESS 1 Project after the final year of RESS 1 Support.

### Section 5.6

5.6.1 On an annual basis after each PSO Year, the Regulatory Authority will review the following in respect of each RESS 1 Project:

- (a) the aggregate annual MWh of Metered Quantity of that PSO Year;
- (b) the annual MWh of Curtailment of that PSO Year which is not compensated by another party and/or through another mechanism; and
- (c)  $(c) = (b) / ((a) + (b))$ .

If (c) equals or exceeds ten percent (10.0%) for two consecutive PSO Years for any RESS 1 Project, (the “Curtailment Issue”) the Regulatory Authority will develop and implement Curtailment compensation arrangements (the “Curtailment Compensation Arrangements”).

5.6.2 The Curtailment Compensation Arrangements will set out the calculation, in respect of

a RESS 1 Project in a given PSO Year, of the level of additional compensation (if any) that is consistent with a Curtailment level limited to a maximum of 10.0% for that RESS 1 Project in that year.

This calculation will have the following form:

Compensation = TQMLF x Strike Price x CFactor

Where:

- (1) TQMLF is the total Loss-Adjusted Metered Quantity of the RESS 1 Project in the PSO Year (in MWh);
- (2) Strike Price (as is defined in Section 5.2.2 of these Terms and Conditions); and
- (3) CFactor =  $(1 - 0.1) / (1 - (c)) - 1$  if positive and is otherwise set to zero. For example:
  - (i) if (c) is 11% then Curtailment is greater than 10% and so compensation applies for the PSO Year concerned for that RESS 1 Project at a factor of  $0.90 / 0.89 - 1 = 0.01124$ ,
  - (ii) if, alternatively, (c) is 9% then Curtailment is less than 10% and so no compensation factor applies for that PSO Year for that RESS 1 Project.

5.6.3 Any compensation as part of such Curtailment Compensation Arrangements will be funded through the PSO Levy.

5.6.4 Any such Curtailment Compensation Arrangements will be available for application in respect of any PSO Year after the two years for which the Curtailment Issue was first identified. Such Curtailment Compensation Arrangements will be available on this basis for RESS 1 Projects for which (c) as defined in Section 5.6.1 equals or exceeds ten percent (10.0%). Compensation can therefore potentially accrue (if applicable) beginning on the first PSO Year after those two years for which the Curtailment Issue is first identified. Compensation will not be applied retrospectively to the PSO Years for which, or before which, the Curtailment Issue was first identified.

5.6.5 Compensation (if applicable) will be made on a two-year lagged basis, i.e. compensation accrued in respect of PSO Year y will be made in PSO Year y+2.

5.6.6 Once and if the Curtailment Issue has been identified, the Curtailment Compensation Arrangements will remain in place for the remainder of the term of RESS 1 Support.

5.6.7 Any Curtailment Compensation Arrangements developed will be designed to only provide support for foregone Metered Quantity that meets the definition of Curtailment, is beyond the 10.0% level, and is not otherwise compensated. For avoidance of doubt,

compensation will not be provided if Curtailment is being compensated by another party and or through another mechanism.

5.6.8 For the avoidance of doubt, Curtailment Compensation Arrangements do not apply to all generation reductions that the Generator is required to implement – for example they do not apply to generation reductions to accommodate network constraints, local system stability constraints, forced or planned generator or transmission outages, or economic factors such as economic dispatch or negative market prices, unless they are concurrent with Curtailment as defined in Section 2.1 of these Terms and Conditions.

## Appendix 3: Article 13(7)

Paragraph 7 of Article 13, concerning compensation for 'non-market redispatch', states,

*“Where non-market based redispatching is used, it shall be subject to financial compensation by the system operator requesting the redispatching to the operator of the redispatched generation, energy storage or demand response facility except in the case of producers that have accepted a connection agreement under which there is no guarantee of firm delivery of energy. Such financial compensation shall be at least equal to the higher of the following elements or a combination of both if applying only the higher would lead to an unjustifiably low or an unjustifiably high compensation:*

- (a) additional operating cost caused by the redispatching, such as additional fuel costs in the case of upward redispatching, or backup heat provision in the case of downward redispatching of power-generating facilities using high-efficiency cogeneration;*
- (b) net revenues from the sale of electricity on the day-ahead market that the power-generating, energy storage or demand response facility would have generated without the redispatching request; where financial support is granted to power-generating, energy storage or demand response facilities based on the electricity volume generated or consumed, financial support that would have been received without the redispatching request shall be deemed to be part of the net revenues.”,*

The term 'redispatching' is defined in Article 2 as,

*“a measure, including curtailment, that is activated by one or more transmission system operators or distribution system operators by altering the generation, load pattern, or both, in order to change physical flows in the electricity system and relieve a physical congestion or otherwise ensure system security”*

# Appendix 4: Curtailment Compensation

Section 5.6 of the RESS 1 Terms and Conditions, specifies a ratio, which is the quantity of curtailment over the PSO Year as a proportion of the sum of the quantity of curtailment and the Metered Quantity. The sum of the curtailment quantity and the Metered Quantity can be regarded as the total or “uncurtailed” quantity, i.e. what the Metered Quantity would have been had the generator not been curtailed.

Using terminology consistent with the Trading and Settlement Code, this can be expressed as,

$$FCURL_u = QCURLLF_u / QTOTALLF_u \quad (1)$$

where

$QMLF_u$  is the Loss-Adjusted Metered Quantity as defined in the Trading and Settlement Code,

$QCURLLF_u$  is the quantity of curtailed energy on which is paid the difference between Curtailment Price,  $PCURL_{uy}$ , being the average price of the ex-ante trades, and Imbalance Price,  $PIMB$ , as per F.8.3.1 of the Trading and Settlement Code, and which is given by

$$QCURLLF_u = \sum_{y \text{ in } Y} \min\{ (QABCURLLF_{uoiy} - \min(QABBIA S_{uoiy}, QABUNDEL_{uoiy})), 0 \} \quad (2)$$

$QTOTALLF_u$  is the uncurtailed quantity, and given by

$$QTOTALLF_u = QCURLLF_u + QMLF_u$$

In the event that power has been sold in the ex-ante market in respect of a Generator Unit, and that Generator Unit has subsequently been curtailed by an amount  $QCURL$ , then there will be:

- (iii) a revenue of  $PCURL * QCURL$  through the ex-ante market, as calculated under E.6 of the TSC;
- (iv) a charge of  $PIMB * QCURL$ , under F.5.3.1 of the TSC, albeit  $QCURL$  will be part of an Imbalance quantity, given by  $(QMLF - QEX)$ , some of which may be due to curtailment and some due to constraints, where  $PIMB$  is the Imbalance Price; and
- (v) a charge of  $(PCURL - PIMB) * QCURL$ , under F.8.3.1.

The effect of these terms, taken together, is that no revenue will have been received or lost through the combination of the ex-ante markets and the Balancing Market as a result of the Curtailment. Hence, the Curtailment Compensation under the RESS 1 Terms and Conditions will be the only compensation for the curtailed quantity.

Note also that calculation of FCURL could use either all loss-adjusted quantities or all quantities which are not loss-adjusted. However, the quantities that are available under the TSC to calculate QCURLLF are loss-adjusted, and hence it is more straightforward to calculate FCURL from all loss-adjusted quantities. Note also that QCURL is calculated from: QABCURLLF, being the quantity of any accepted Bid as a result of a Curtailment Dispatch Instruction, QABBIAS; being the quantity of the accepted Bid not covered by the ex-ante market position; and QABUNDEL, being the quantity of the Bid that was accepted but not delivered.

Section 5.6.2 specifies the compensation as being the product of the Loss-Adjusted Metered Quantity for the PSO Year, the Strike Price and a “CFactor”, i.e.

$$CCURLCOMP_u = QMLF_u * PSTR_u * CF_u \quad (3)$$

where

CCURLCOMP<sub>u</sub> is the Curtailment Compensation for Generator Unit u;

QMLF<sub>u</sub> is the Loss-Adjusted Metered Quantity; and

CF<sub>u</sub> is the “CFactor” for Generator Unit u, which is given by,

$$CF_u = ((1 - 0.1) / (1 - FCURL_u)) - 1 \}, \text{ if positive} \quad (4a)$$

$$CF_u = 0, \text{ otherwise} \quad (4b)$$

Rearranging (4a) gives,

$$CF_u = (FCURL_u - 0.1) / (1 - FCURL_u)$$

Substituting for FCURL, gives,

$$\begin{aligned} CF_u &= (QCURLLF_u / QTOTALLF_u - 0.1) / (1 - QCURLLF_u / QTOTALLF_u) \\ &= (QCURLLF_u - 0.1 * QTOTALLF_u) / (QTOTALLF_u - QCURLLF_u) \\ &= (QCURLLF_u - 0.1 * QTOTALLF_u) / QMLF_u \end{aligned}$$

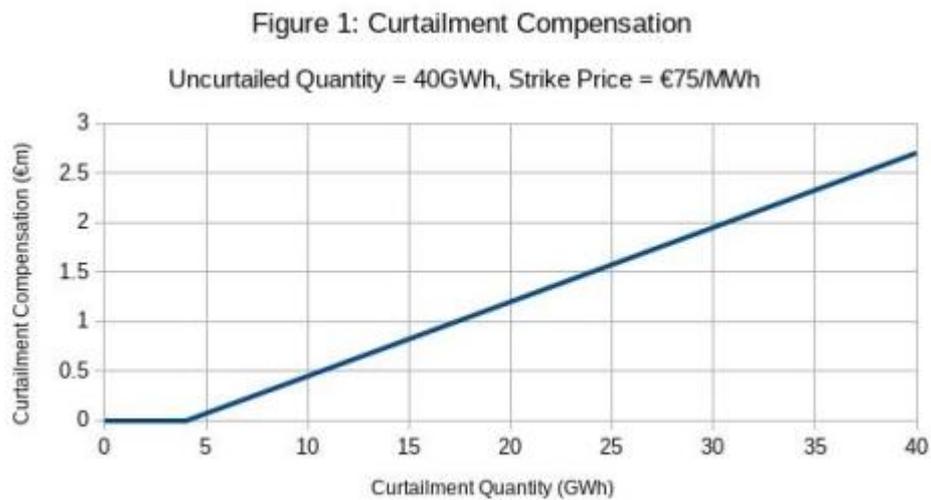
and hence,

$$CCURLCOMP_u = PSTR_u * (QCURLLF_u - 0.1 * QTOTALLF_u)$$

or allowing also for the case where CF<sub>u</sub> is set to zero,

$$CCURLCOMP_u = PSTR_u * \max\{ (QCURLLF_u - 0.1 * QTOTALLF_u), 0 \}$$

Thus, the Curtailment Compensation is equal to the curtailed quantity inasmuch as it exceeds 10% of the uncurtailed quantity, priced at the Strike Price. For a generator, with a Strike Price



of €75/MWh and, in a given year, an uncurtailed quantity of 40,000MWh, then the Curtailment Compensation would be as shown in Figure 1,

Thus, above 4GWh of curtailment, Curtailment Compensation would increase by €75 for each additional MWh of curtailment, reaching €2.7m in the unlikely event that the generator was curtailed completely.

Table 1 illustrates how the Curtailment Compensation might be calculated over the 15-year duration of the RESS 1 support. Note that, Curtailment Compensation does not commence until the Year 7, being the first year that follows two consecutive years in which FCURL exceeds 10%. Curtailment Compensation is then calculated for every subsequent year until the end of RESS 1 Support but is only non-zero in years in which FCURL exceeds 10%.

Year	Loss Adjusted Quantities			FCURL	FCURL > 10%	Strike Price PSTR	Curtailment Compensation CCURLCOMP
	Metered Quantity QMLF	Curtailed Quantity QCURLLF	Uncurtailed Quantity				
	(GWh)	(GWh)	(GWh)			(€/MWh)	(€000)
1	25.823	1.783	27.606	6.46%		75	-
2	36.794	0.392	37.185	1.05%		75	-
3	32.305	4.017	36.322	11.06%	Y	75	-
4	37.932	1.931	39.863	4.84%		75	-
5	31.885	5.134	37.020	13.87%	Y	75	-
6	30.595	5.695	36.290	15.69%	Y	75	-
7	34.497	4.443	38.940	11.41%	Y	75	41.2
8	31.208	5.207	36.414	14.30%	Y	75	117.4
9	31.777	3.313	35.089	9.44%		75	0.0
10	32.418	4.847	37.265	13.01%	Y	75	84.1
11	34.366	3.828	38.194	10.02%	Y	75	0.7
12	36.727	0.828	37.554	2.20%		75	0.0
13	37.651	0.979	38.630	2.53%		75	0.0
14	32.814	5.003	37.817	13.23%	Y	75	91.6
15	33.882	2.992	36.874	8.11%		75	0.0

**Table 1: Curtailment Compensation over 15 Year RESS 1 Support Period**