MODIFICATION PROPOSAL FORM			
Proposer *(Company)*	**Date of receipt** *(assigned by Secretariat)*	**Type of Proposal** *(delete as appropriate)*	**Modification Proposal ID** *(assigned by Secretariat)*
Tynagh Energy Limited	**23rd August 2022**	**Standard**	**Mod_10_22**

Contact Details for Modification Proposal Originator		
Name	**Telephone number**	**Email address**
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Modification Proposal Title
Strike Price Volatility Modifier

Documents affected *(delete as appropriate)*	**Section(s) Affected**	**Version number of T&SC or Agreed Procedure used in Drafting**
T&SC Part B	**F.16**	

Explanation of Proposed Change
(mandatory by originator)

This modification is proposed in response to recent gas commodity price volatility and what this has meant for the calculation of the Strike Price. Throughout the past several months, the worldwide energy market has experienced a significant level of volatility. This was worsened by the Russian invasion of Ukraine in February 2022. This volatility has resulted in commodity price fluctuations at levels which were previously unseen in both the SEM and the wider global markets.

One consequence of commodity price fluctuations is the calculation of the Strike Price. Currently, the Strike Price is calculated on a monthly basis using monthly commodity values as inputs. Traditionally, this was sufficient, given that movements in gas commodity prices were unlikely to be significant in a single month. However, the higher level of volatility with commodity prices means that a more flexible approach to setting the Strike Price is required.

This modification proposes to introduce a volatility modifier to the Strike Price calculation to reflect commodity fluctuations in months where there is significant levels of price movements.

Volatility Modifier

This modification proposal introduces an additional variable term to the Strike Price calculation. This term will represent a percentage increase on the initially calculated Strike Price. It is proposed that when a certain level of volatility is observed in commodity markets affecting the Strike Price, that this will be reflected by an increase to the variable term. Initially we are proposing a threshold of 15% volatility.

This proposal can be summarised in the equation below:

$$PSTR \times (1 + VM)$$

Where:

- PSTR is the calculated Strike Price; and
- VM is the volatility modifier.

The volatility modifier will be set to a value of zero for all months where the volatility is calculated at less than 15%.

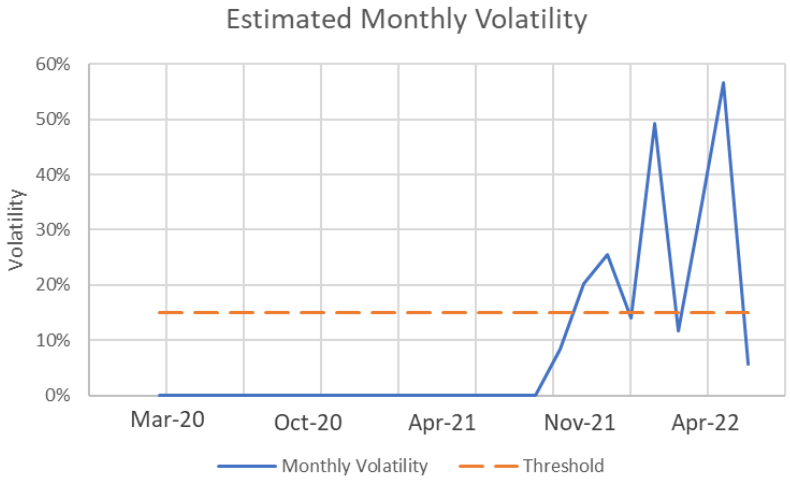
To assess volatility, we propose that prior to the beginning of each month (prior to the calculation of Strike Price), theoretical daily Strike Price values are calculated for each day of the preceding month, using daily commodity values for each day. Following this, the maximum daily Strike Price is compared to the mean daily Strike Price and the difference between the two values is used as the Volatility Modifier to apply to the following month.

Potential Impact-

In order to assess the potential impact of this modification proposal, Tynagh sought to apply the calculation to the modification to the previous 24 months of market data. To do this, commodity values were estimated for each trading day (excl. weekends and bank holidays), and each dataset was used in the calculation of Strike Price. This gave a theoretical Strike Price for each day of the last 24 months. The results were as follows:

The flat Strike Price up to August 2021 represents the fact that the Strike Price was being set by demand (at €500/MWh) for this period. Based on this, we would expect no changes over this period.

Following this calculation of theoretical daily Strike Price, Tynagh calculated the theoretical volatility for each month. In total, there were five instances in the past 24 months where volatility exceeded the proposed 15% threshold. These months were Sep-21, Oct-21, Dec-21, Feb-22, and Mar-22. The graph below demonstrates the calculated volatility for each month:



If this modification was to be applied over the past eight months, the following re-calculated Strike Prices would have been obtained:

	Volatility	M+1	PSTR M+1	$PSTR_{MD}$ M+1
Sep-21	20%	Oct-21	739.6	884.8
Oct-21	26%	Nov-21	539.0	673.8
Dec-21	49%	Jan-22	697.8	1052.9
Feb-22	35%	Mar-22	755.5	1009.5
Mar-22	57%	Apr-22	882.2	1368.9

Where $PSTR_{MD}$ represents the modified Strike Price.

In order to further assess the impact of this modification, Tynagh examined how the Strike Price and modified Strike Price compare to the imbalance settlement price (PIMB) for each half-hourly period. Without applying the modification there were 43 instances where the PIMB exceeded the Strike Price for the five months above. When the volatility modifier was applied to these months, the number of instances reduced to 31, representing a 28% decrease in high volatility months. This reflects the intended impact of our modification proposal whereby the Strike Price will still play a role and provide a hedge for suppliers, but at the same time will respond to significant volatility in commodity markets. This reflects the high-level design of the floating Strike Price as set out in SEM-15-103.

While ultimately, Tynagh believes that the Strike Price should be calculated on a more frequent basis (weekly) as an enduring solution. This modification should serve as a practical short-term solution to commodity volatility. As the Strike Price is currently calculated manually, we believe that this modification, if approved, could be implemented immediately.

Legal Drafting Change

*(Clearly show proposed code change using **tracked** changes, if proposer fails to identify changes, please indicate best estimate of potential changes)*

In order to enact this modification the following amendment to the TSC is proposed:

F.16.2 Calculation of Strike Price

F.16.2.1 The Market Operator shall calculate the Strike Price (PSTRm) in Month, m, as follows:

$$PSTR_m = Max\left(\frac{1}{FTHEORYPU_y} \times Max\left(PFUELNG_m + \left(PCARBON_m \times FCARBONING_y\right), PFUELO_m + \left(PCARBON_m \times FCARBONIO_y\right)\right), PTHEORYDSU_y\right) \times (1 + V_m)$$

where:

(a) $FTHEORYPU_y$ is the Peaking Unit Theoretical Efficiency for Capacity Year, y, determined in accordance with section **Error! Reference source not found.**;

(b) $PFUELNG_m$ is the Natural Gas Fuel Price for Month, m, determined in accordance with section **Error! Reference source not found.**;

(c) $FCARBONING_y$ is the Natural Gas Carbon Intensity Factor for Capacity Year, y, determined in accordance with section **Error! Reference source not found.**;

(d) $PFUELO_m$ is the Oil Fuel Price for Month, m, determined in accordance with section **Error! Reference source not found.**;

(e) $FCARBONIO_y$ is the Oil Carbon Intensity Factor for Capacity Year, y, in determined accordance with section **Error! Reference source not found.**;

(f) $PCARBON_m$ is the Carbon Price for Month, m, determined in accordance with section **Error! Reference source not found.**; and

(g) $PTHEORYDSU_y$ is the Demand Side Unit Theoretical Price for Capacity Year, y, determined in accordance with section **Error! Reference source not found.**.

(h) V_m is the Volatility Modifier as calculated in F.16.2.2.

F.16.2.2 The Market Operator shall calculate the Volatility Modifier (V_m) in Month, m, as follows:

$$V_m = \frac{PSTRDAILYMAX_{m-1}}{PSTRDAILYMEAN_{m-1}} - 1$$

where:

(a) $PSTRDAILYMAX_{m-1}$ is the maximum daily theoretical Strike Price in Month, m-1; and

(b) $PSTRDAILYMEAN_{m-1}$ is the mean daily theoretical Strike Price in Month, m-1.

Where the V_m is calculated at a value of less than 15%, it will be set to a value of zero.

Modification Proposal Justification

(Clearly state the reason for the Modification)

The SEM-15-103 Decision Paper outlines the SEM Committee's decision to implement a floating Strike Price and states that "by ensuring that the Strike Price adjusts naturally to the fluctuations of fuel prices, it will ensure that the Strike Price does not fall below the marginal cost of plant". In order to remain consistent with this intention, it seems imperative that the Strike Price be calculated more frequently in response to a level of volatility which is significantly higher than it has been since the beginning of I-SEM.

One of the key purposes of the Strike Price is to provide a hedge for suppliers against high market prices and limit the ability of generators who hold Reliability Options to exert market power. However, if the Strike Price is set at a level which is not reflective of fluctuations in commodity prices and is set too low, generators are exposed to an unavoidable loss. This means that the Strike Price is no longer a means to limit market abuse, but instead becomes a mechanism which penalises generators regardless of how they behave in the market.

Additionally, implementing this modification proposal should reduce the risk of market distortion in months were commodity prices increase sharply. This risk was identified by the SEM Committee in SEM-15-103 who noted that setting the Strike Price too low distorts the wholesale energy market by forcing participants to bid below cost. Additionally, there is a risk that some high merit order plant may be exposed to making difference payments at a point when it is still out-of-merit, and so will not be earning any compensating energy payments.

Furthermore, while this modification would reduce the number of events where imbalance prices exceed the Strike Price (by an estimated 28%), the mechanism would still be active and provide a hedge for Suppliers. At the same time however, the calculation will still take account of volatile fuel price movements which we consider to be more closely aligned with the high-level design of the CRM.

The current price volatility and its impact on generators' marginal costs has been recognised by the SEM-O in March 2022 following significant price increases. In this instance, SEM-O sought feedback from stakeholders on whether or not to recalculate the Strike Price before ultimately deciding to not to take action. Additionally, the SEM Committee made the decision to postpone Round 18 of Directed Contracts in March 2022, before extending this postponement in April 2022. This decision was based on the high level of volatility in the commodities market. These actions clearly demonstrate a recognition of commodity volatility and its impact on market parameters. Accordingly, we believe that this should be extended to the Strike Price calculation by moving to a weekly rather than a monthly basis.

Based on analysis from August 2021 – April 2022, Tynagh do not expect this modification, (or higher Strike Prices generally), to result in higher electricity prices or DAM bidding. Historic evidence would suggest that there is no correlation between the level at which the Strike Price is set and the value of DAM bids. Instead, commodity prices (which are also inputs to the Strike Price), drive bidding behaviour.

Code Objectives Furthered

(State the Code Objectives the Proposal furthers, see Section 1.3 of Part A and/or Section A.2.1.4 of Part B of the T&SC for Code Objectives)
A.2.1.4 The aim of this Code is to facilitate the achievement of the following objectives: (a) to facilitate the efficient discharge by the Market Operator of the obligations imposed upon it by its Market Operator Licences; (b) to facilitate the efficient, economic and coordinated operation, administration and development of the Single Electricity Market in a financially secure manner; (c) to facilitate the participation of electricity undertakings engaged in the generation, supply or sale of electricity in the trading arrangements under the Single Electricity Market; (d) to promote competition in the Single Electricity Market; (f) to ensure no undue discrimination between persons who are parties to the Code;
Implication of not implementing the Modification Proposal *(State the possible outcomes should the Modification Proposal not be implemented)*
If this modification proposal is not implemented, the application of Reliability Options will continue to be misaligned with the high-level design of the CRM (as set out in the CRM). A floating Strike Price that does not respond to fluctuations in commodity prices cannot accurately reflect the marginal costs of generators in SEM. This creates risk of significant downside and market distortion, which was identified by the SEM Committee in SEM-15-103. Additionally, failure to implement the modification proposal is detrimental to several of the TSC objectives as identified above. Specifically, in relation to operating the Single Electricity Market in a financially secure manner by not exposing market participants to significant downside regardless of behaviour in the market. Additionally, not amending the process in the face of high volatility interferes with the TSC objective of facilitating participation in the SEM. By exposing generators to an unavoidable downside where they have no choice but to make a loss in the market, it is unclear how parties are expected to participate long-term in the market. Furthermore, the code objective of promoting competitiveness is affected due to the market distortion affect which has been outlined above.

Working Group *(State if Working Group considered necessary to develop proposal)*	**Impacts** *(Indicate the impacts on systems, resources, processes and/or procedures; also indicate impacts on any other Market Code such as Capacity Market Code, Grid Code, Exchange Rules etc.)*

Please return this form to Secretariat by email to balancingmodifications@sem-o.com

Notes on completing Modification Proposal Form:

1. **If a person submits a Modification Proposal on behalf of another person, that person who proposes the material of the change should be identified on the Modification Proposal Form as the Modification Proposal Originator.**
2. **Any person raising a Modification Proposal shall ensure that their proposal is clear and substantiated with the appropriate detail including the way in which it furthers the Code Objectives to enable it to be fully considered by the Modifications Committee.**
3. **Each Modification Proposal will include a draft text of the proposed Modification to the Code unless, if raising a Provisional Modification Proposal whereby legal drafting text is not imperative.**
4. **For the purposes of this Modification Proposal Form, the following terms shall have the following meanings:**

Agreed Procedure(s):	**means the detailed procedures to be followed by Parties in performing their obligations and functions under the Code as listed in either Part A or Part B Appendix D "List of Agreed Procedures". The Proposer will need to specify whether the Agreed Procedure to modify refers to Part A, Part B or both.**
T&SC / Code:	**means the Trading and Settlement Code for the Single Electricity Market. The Proposer will also need to specify whether all Part A, Part B, Part C of the Code or a subset of these, are affected by the proposed Modification;**
Modification Proposal:	**means the proposal to modify the Code as set out in the attached form**
Derivative Work:	**means any text or work which incorporates or contains all or part of the Modification Proposal or any adaptation, abridgement, expansion or other modification of the Modification Proposal**

The terms "Market Operator", "Modifications Committee" and "Regulatory Authorities" shall have the meanings assigned to those terms in the Code.

In consideration for the right to submit, and have the Modification Proposal assessed in accordance with the terms of Section 2 of Part A or Chapter B of Part B of the Code (and Part A Agreed Procedure 12 or Part B Agreed Procedure 12) , which I have read and understand, I agree as follows:

1. **I hereby grant a worldwide, perpetual, royalty-free, non-exclusive licence:**

   1.1 **to the Market Operator and the Regulatory Authorities to publish and/or distribute the Modification Proposal for free and unrestricted access;**

   1.2 **to the Regulatory Authorities, the Modifications Committee and each member of the Modifications Committee to amend, adapt, combine, abridge, expand or otherwise modify the Modification Proposal at their sole discretion for the purpose of developing the Modification Proposal in accordance with the Code;**

   1.3 **to the Market Operator and the Regulatory Authorities to incorporate the Modification Proposal into the Code;**

   1.4 **to all Parties to the Code and the Regulatory Authorities to use, reproduce and distribute the Modification Proposal, whether as part of the Code or otherwise, for any purpose arising out of or in connection with the Code.**

2. **The licences set out in clause 1 shall equally apply to any Derivative Works.**

3. **I hereby waive in favour of the Parties to the Code and the Regulatory Authorities any and all moral rights I may have arising out of or in connection with the Modification Proposal or any Derivative Works.**

4. **I hereby warrant that, except where expressly indicated otherwise, I am the owner of the copyright and any other intellectual property and proprietary rights in the Modification Proposal and, where not the owner, I have the requisite permissions to grant the rights set out in this form.**

5. **I hereby acknowledge that the Modification Proposal may be rejected by the Modifications Committee and/or the Regulatory Authorities and that there is no guarantee that my Modification Proposal will be incorporated into the Code.**