Smart Energy, Sustainable Future

REGISTRATION OF PSEUDO GENERATION SETTLEMENT FACILITIES BY AGGREGATING STANDALONE INTERMITTMENT GENERATION SOURCES FOR MARKET PARTICIPANTS

FINAL DETERMINATION PAPER

27 October 2021

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1. Executive Summary

1.1. The Energy Market Authority (“EMA”) supports the adoption of solar energy in Singapore. In ensuring fair and sustainable growth of solar, EMA continues to make regulatory enhancements to facilitate the entry of solar photovoltaic (PV) installations into the National Electricity Market of Singapore (NEMS).

1.2. EMA has received industry requests to allow Market Participants (“MPs”) to register multiple distributed standalone (i.e. direct grid-connected) Intermittent Generation Source (“IGS”) installations with the Energy Market Company (“EMC”). However, there is a technical limit to the unique number of facilities that EMC’s current settlement engine can effectively handle (i.e. about 180 facilities estimated by EMC). As of October 2021, EMC has already registered more than 100 facilities on its system. Continuing to register every IGS installation as individual Generation Settlement Facilities (“GSFs”), as per current practice, would breach the limit in due course, resulting in longer settlement processing time for the settlement engine and consequently impact the settlement operations of the wholesale electricity market. While this issue could be addressed via system upgrades, it is costly.

1.3. EMA embarked on a public consultation exercise from 12 August 2021 to 26 August 2021 to seek feedback on the registration of pseudo GSFs by MPs aggregating standalone IGS to resolve the constraint. After considering the feedback received, EMA has decided to allow MPs to aggregate multiple standalone IGS and register them as pseudo GSFs under the conditions as set out in this Final Determination Paper.

1.4. EMA will continue to review the existing registration and settlement schemes for IGS installations with EMC and the Market Support Services Licensee (“MSSL”) to support solar deployment in Singapore.

2. Feedback from the Public Consultation Paper

2.1. EMA received feedback from four respondents namely Energetix, PacificLight, Senoko and SP Group.

2.2. EMA's responses to the feedback can be found in Annex A. EMA would like to clarify that this proposed GSF scheme is only meant for standalone IGS installations i.e. those that are directly connected to the power grid, also referred to as non-embedded, and are individually less than 10 Megawatt alternating current (MWac). Embedded IGS installations that are individually less than 10 MWac can continue to be registered under the Enhanced Central Intermediary Scheme ("ECIS") that is administered by the MSSL.

3. EMA's Final Determination on Allowing MPs to Aggregate Multiple Standalone IGS and Register Them as Pseudo GSFs

3.1. MPs will be allowed to aggregate multiple standalone IGS and register them as pseudo GSFs under the following conditions:

a. The MP, who will need to hold at least a Wholesale Licence, will be allowed to aggregate and register multiple standalone IGS[1] under a single pseudo GSF. The MP is allowed to register multiple pseudo GSFs;

b. Each standalone IGS must be less than 10 MWac[2];

c. Each pseudo GSF will be limited to aggregate multiple standalone IGS such that collectively there will be no more than 50 meter[3] readings by MSSL;

d. Each pseudo GSF will be paid at the prevailing half-hourly volume-weighted average market energy price and be subject to regulation reserves charges;

e. Spinning reserve charges will not be applicable for each pseudo GSF since the capacity of each IGS installation therein is less than 10 MWac[4]; and

f. All technical requirements (e.g. Metering Code, Transmission Code, licensing, etc) for each IGS installation shall remain.

3.2. The registration of pseudo GSFs by MPs is currently expected to be implemented by end-2021, to provide sufficient time for EMC to modify its IT system.

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[1] Given that this is a new solution for market settlement, as a start, the MP can only aggregate standalone IGS installations that it owns and operates. EMA may review this in the future when deemed appropriate.

[2] This less than 10MWac threshold is aligned with the Enhanced Central Intermediary Scheme ("ECIS") that is administered by MSSL.

[3] The 50 meter readings limit is based on SP's current IT system design. It is inclusive of main and check meters i.e. up to 25 IGS installations per pseudo GSF if each IGS installation has a main and check meter. EMA reserves the right to implement a cap on the allowed total registered capacity per aggregator, if deemed necessary.

[4] Treatment of regulation and spinning reserves charges are subject to the Intermittency Pricing Mechanism (IPM), which sets out the allocation of the fair share of reserves to all generation types that contribute to the need for reserves, including recognising the characteristics and effects of IGS on the power system. The Final Determination on IPM dated 30 October 2018 can be found at https://www.ema.gov.sg/cmsmedia/Final%20Determination%20Paper%20-%20Intermittency%20Pricing%20Mechanism%20vf.pdf and the Addendum dated 16 December 2020 can be found at https://www.ema.gov.sg/cmsmedia/PPD/Addendum-Intermittent-Pricing-Mechanism-2020.pdf .

Annex A – Feedback from Public Consultation

Organisation	Feedback	EMA's response
Energetix	We welcome EMA's proposal for EMC to allow MPs to aggregate standalone IGS into pseudo-GSFs, and look forward to confirmation on the effective date for this. Questions: 1. Will it be possible to transfer systems already registered under Hybrid-ECIS scheme to EMC's pseudo-GSF plan? So far, Hybrid-ECIS applies for e.g. rooftop systems which feed in front of the building meter but are connected in the main switch room rather than into SP's substation like other standalone systems. 2. Will it be possible register new systems and to transfer existing embedded PV systems currently under ECIS, to EMC's pseudo-GSF plan? 3. Alternatively, when can we expect the MSSL to route export payments to the 3rd-party PV system owner instead of to the utility account holder (i.e. building tenant)?	It would be possible to transfer systems already registered under Hybrid-ECIS scheme to this EMC's pseudo-GSF, if the conditions are met, including having the IGS connected as standalone connection. This pseudo-GSF solution is meant to aggregate standalone IGS. System changes would be needed to allow embedded IGS systems to be added. EMA is exploring this with MSSL and EMC, and we will update the industry if this is assessed to be feasible. MSSL would need to make system changes to allow for this. We will update the industry once this is ready.
PacificLight Power Pte Ltd / PacificLight Energy Pte Ltd	PacificLight are supportive of the proposed registration of pseudo Generation Settlement Facilities (GSF) by aggregating standalone Intermittent Generation Source (IGS). We would like to take this opportunity to highlight that for embedded IGS, and to standalone IGS if also applicable, an IGS could contract with and purchase electricity from different retailers and IGS aggregators. We would recommend that the rules include adequate provision for the administration of pseudo GSFs	This pseudo-GSF solution is meant to aggregate standalone IGS only. EMA notes the comments on adequate provisions for administration of pseudo GSFs registration to avert settlement issues between EMC-retailers and EMC-pseudo GSFs. We would take this into consideration if we were to allow embedded

	registration to avert settlement issues between EMC-retailers and EMC-pseudo GSFs. Given that meters are bi-directional we would like to understand if there is any possibility that the MSSL could send usage data of import and export quantities to the retailer (whom the IGS has a contract with) and the IGS aggregator at the same time. Or could the same IGS be registered with multiple IGS aggregators? We seek clarification on the process if there are mitigation measures in place to prevent double counting. Specifically, how would MSSL avoid duplicate registration of meters with IGS aggregators and retailers?	IGS to be aggregated under this pseudo GSF in the future. MSSL has established the metering data registry that contains the following measures to maintain usage data for each metered entity: 1. Unique identifier of each meter installation cross referenced to the location of each meter installation 2. Database mapping out the relationship between each meter unique identification number and account (i.e. generation account or load account) 3. Each meter can only be tagged to each account (either load or gen account) in the system The aggregator/ Metering Equipment Service Provider (MESP) is also responsible for ensuring that the connection/energy flow of either pseudo GSF or IGS is in order to avoid duplicate recording of meter data to/from a non-relevant meter installation which could lead to double counting as well as for ensuring the accuracy of meter data submitted to MSSL for settlement purposes.

Senoko Energy	Senoko Energy is supportive of the efforts made by the Singapore Government in promoting the fair and sustainable growth of solar energy usage. We are also appreciative of the government's approach towards improving the existing environment to promote the growth of sustainable energy solutions. While the intent of the Pseudo GSF scheme is good, it would be prudent for the authority to defer the implementation of the Pseudo GSF scheme until the downstream impact on our industry can be addressed. In relation to paragraphs 2.1.1 to 2.1.4 of the Consultation Paper, we wish to provide our comments as follows: (a) While the Pseudo GSF scheme may be beneficial in ensuring that the market clearing and settlement system would not be adversely affected without the need for expensive system upgrades, it would increase the burden on Gencos to correct disruptions in electricity production due to the intermittent nature of IGS. Given that the size of a typical standalone intermittent generation source ("IGS") ranges from 0.5 MWp to 2 MWp, the aggregation of such facilities under the Pseudo GSF scheme would easily exceed 10 MWac. While 'artificially' aggregating these facilities into one Pseudo GSF may seemingly reduce the intermittency based on aggregated data, in reality, each standalone IGS will still have intermittent and varying outputs; this would increase the burden on online dispatchable generators to correct such disruptions in electricity production, and ensure power system security and reliability for consumers, especially with the growth in the number of standalone IGS.	As all technical requirements for IGS, regardless of their settlement scheme (ECIS, pseudo-GSF, NEIGF or GSF), remain unchanged, the introduction of the pseudo GSF scheme will not increase any burden on the gencos in managing intermittency introduced to the power system by IGS. EMA will continuously review the technical requirements applied to IGS to ensure the continued security, reliability and stability of the power system. EMA is reviewing the Intermittency Pricing Mechanism as stated in the Addendum dated 16 December 2020. EMA will take this Pseudo GSF scheme into consideration in the design and implementation details of the IPM. The standalone IGS installations, each less than 10 MWac, though aggregated, will each still bear its fair share of the regulation reserves charge as per current rules i.e. the aggregated Injection Energy Quantity (IEQ) of the pseudo GSF will be charged AFP, capped at 5MWh in each half hourly period per installation.

	(b) The Pseudo GSF scheme should only be implemented and/or rolled-out when the Intermittency Pricing Mechanism for intermittent generation sources (the "IPM scheme") takes effect. The IPM scheme was initially proposed to strike a balance between the benefits of IGS and the intermittency costs it imposes on the system, by providing for a mechanism to allocate the fair share of reserves costs to IGS. Implementing the Pseudo GSF scheme without the implementation of the IPM scheme would therefore erode the 'causer-pays' principle for reserves cost allocation, where generators would be 'subsidising' the Pseudo GSF scheme by having to shoulder a larger share of reserves obligations. Additionally, we wish to highlight that the IPM scheme in its current form does not address the costs and/or reserves allocation among each standalone IGF within a pseudo GSF; the IPM scheme would need to be revised to ensure that the Pseudo GSF scheme is implemented fairly.	
SP Group	With reference to para 2.1 of the consultation paper, while each pseudo GSF can aggregate up to 50 meter-readings, the MSSL shall have the right to decline to add or remove any standalone IGS installations to or from the pseudo GSF if the MSSL determines that such addition or removal would affect the ability of the MSSL to perform its obligations under the Market Rules, any applicable market manual, its electricity licence or any applicable Code of Practices. MPs under this scheme are responsible to: • Identify and provide the MSSL with the list of meters (along with details of the solar PV installation, including but not limited to the premises address) tagged to the pseudo GSF;	EMA notes this clarification and has no objections.

	• Provide confirmation to the MSSL the list of meters tagged to the pseudo GSF upon set-up of the generation account; and • Inform the MSSL for any subsequent updates to the pseudo GSF. • Install, commission, maintain, replace, repair and test each meter installation to ensure they are in good working conditions, have been tested for accuracy by accredited laboratory, and meet the applicable standards described in the Metering Code	
	With reference to para 2.1.5 of the consultation paper, MSSL shall not assume additional liability or penalties arising from performing the aggregation of meter readings for the pseudo GSF on behalf of EMC. Meter reading errors and/or inaccuracies should be handled in accordance with the existing methodology as stipulated in the Market Rules and relevant Code of Practices. • MPs under this scheme, who is defined as the MESP under the Metering Code, continues to be responsible to ensure and verify the accuracy of meter data for wholesale settlement with the EMC. • MSSL may request the MP as the Meter Equipment Service Provider (MESP) to conduct an audit on their meter installation to ensure consistency between the meter data recorded in the Meter Data Registry owned by MSSL and the meter data recorded in the meter installation owned by the MP. The MP shall, as soon as practicable, make the result of the audit available to MSSL.	EMA notes this clarification from MSSL and has no objections.

	With reference to para 2.1.6 of the consultation paper, while MSSL assumes that any applications for pseudo GSF treatment is on a case-by-case basis, and subject to EMA's and EMC's approval.	EMA would like to clarify that as long as the application for pseudo GSF treatment is aligned with the conditions as set out in the Final Determination Paper and in the Market Rules, MSSL and EMC need not seek EMA's specific approval on a case-by-case basis, unless there are any special circumstances that may arise.