14 January 2025

ENERGY REGULATORY COMMISSION
Exquadra Tower, 1 Jade Drive, Ortigas Center, Pasig City

THRU: HONORABLE MONALISA DIMALANTA
Chairperson

SUBJECT : GREEN ENERGY AUCTION-4 GREEN ENERGY AUCTION RESERVE PRICE FOR FLOATING PHOTOVOLTAIC SOLAR ABOVE WATER

Greetings of Peace!

The Philippine Solar and Storage Energy Alliance ("PSSEA", for brevity) in its earnest effort in supporting the upcoming fourth round of Green Energy Auction Program ("GEAP-4") hereby submits before your good office a Position Paper for the GEA Reserve Price on Solar PV on Water substantiated by studies conducted by Mott MacDonald and Dr. Cristina Alfonso.

The Position Paper together with the attached copies of the studies extensively discussed why an increase on the GEAR Price for Solar PV on Water from the GEA-2 Gear Price is wanting. Further, the indexation of tariff would minimize the risks faced by developers, fosters a more competitive auction environment and lowers energy price. This would also likely increase committed renewable energy capacities during the auction.

In establishing the parameters and methodology for the GEAP-4, PSSEA urges the Honorable Commission to consider the Mott MacDonald study report and Dr. Cristina Alfonso's recommendations. The studies do not only justify the proposed levelized cost of electricity as stated in the Position Paper but would encourage more developers to participate in the auction program, hence, a robust GEAP-4 for all renewable energy developers.

PSSEA, committed to its objectives, will continuously extend its support in assisting your good office for the swift transition of the country to a renewable energy country, with stabilized and low-cost of electricity. Thank you.

Respectfully,

JOSE RAFAEL "PING" MENDOZA
President
Philippine Solar and Storage Energy Alliance

MARIA THERESA "TETCHI" CAPELLAN
Chairman
Philippine Solar and Storage Energy Alliance

REPUBLIC OF THE PHILIPPINES
ENERGY REGULATORY COMMISSION
Exquadra Tower, 1 Jade Drive, Ortigas Center, Pasig City

IN RE: GREEN ENERGY AUCTION-4 GREEN ENERGY AUCTION RESERVE PRICE FOR FLOATING PHOTOVOLATIC SOLAR ABOVE WATER

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POSITION PAPER

PHILIPPINE SOLAR AND STORAGE ENERGY ALLIANCE ("**PSSEA**"), by counsel, respectfully submits this Position Paper and states:

1. PSSEA, formerly known as Philippine Solar Power Alliance, Inc., is a non-stock corporation registered under the laws of the Philippines. It was established in 2010 with the objective of promoting the development of solar energy resources, among others. It may be served orders and other legal processes through its undersigned counsel.

2. This position paper is submitted to present to the Honorable Commission the proposed changes for the fourth round of the Green Energy Auction ("**GEA-4**"), specifically on the proposed Green Energy Auction Reserve Price ("**GEAR Price**") for floating photovoltaic solar above water ("**Solar PV on Water**").

Green Energy Auction Program

3. The Republic Act No. 9513 or the "*Renewable Energy Act of 2008*" ("**RE Act**") mandated the establishment of a feed-in-tariff ("**FIT**") system for electricity produced from wind, solar, ocean, run-of-river hydropower and biomass to accelerate the development of these emerging renewable energy ("**RE**") sources. Among the key components of the FIT system is the determination of the fixed tariff to be paid for electricity produced from wind, solar, ocean, run-of-river hydropower and biomass energy sources.[1]

4. Pursuant to this mandate, the Department of Energy ("**DOE**") issued, among others, Department Circular ("**DC**") No. DC-2015-07-0014 which sets the following policies: (1) prescribing at least thirty percent (30%) share of RE in the country's total power generation capacity through the

[1] Section 7, RE Act; Section 5, DC No. DC2009-05-0008.

wholistic implementation of the FIT system and other initiatives under the RE Act; and (2) upon full subscription of the existing FIT installation targets, the succeeding rounds for the installation targets for FIT-eligible resources shall be made through an auction system to be adopted by the DOE. The FIT installation targets for solar, wind and biomass are fully subscribed.

5. Pursuant to DC No. DC-2015-07-0014, the DOE issued DC No. DC2021-11-0036 known as "*Providing the Revised Guidelines for the Green Energy Auction Program in the Philippines*" (the "**GEAP Guidelines**"). The GEAP Guidelines set the policies for the implementation of the Green Energy Auction ("**GEA**") Program ("**GEAP**").

6. On March 20, 2023, the DOE issued the Notice of Auction in connection with the second round of GEA ("**GEA-2**") offering a total of 11,600 megawatts ("**MW**").

7. The Honorable Commission issued the GEAR Price for GEA-2 for the following technologies:

Ground-Mounted Solar	Php4.4043/kWh
Rooftop Solar	Php4.8738/kWh
Floating Solar	Php5.3948/kWh

8. Of the 11,600 MW capacity on offer under GEA-2, only 3,580.76 MW in committed capacities were received, and consequently awarded, by the DOE.

GEAR Price

a. Levelized Cost of Electricity

1. To assess the Levelized Cost of Electricity ("**LCOE**") for the upcoming GEA-4, Mott MacDonald[2] conducted a technical assessment of a reference Solar PV on Water scheme. The assessment was based on an analysis of three (3) sites in the Philippines (the "**Projects**").[3]

2. In its report, Mott MacDonald provided a high-level benchmark of capital expenditure and operation expenditure costs for large-scale Solar PV on Water projects as cost assumptions to the LCOE analysis of the Projects. The LCOE model used by Mott MacDonald is a simplified model where financing and taxation-related parameters are not considered. Further,

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[2] Mott MacDonald is a global, employee-owned engineering, management, and development consultancy. Mott MacDonald focuses on sustainable energy solutions, including the development of renewable energy projects. They assist in the energy transition by integrating cleaner technologies such as hydrogen and carbon capture. Additionally, they provide expertise in power generation, transmission, distribution, and energy efficiency to enhance grid stability and reduce emissions.

[3] A copy of Mott MacDonald's report is attached as **Annex "A"**.

Mott MacDonald applied the key technical and costs assumptions for each of the cases modelled to the "Official NREB – Solar Financial Model – GEAP Model.xlsx" ("**GEAR Model**"), which is understood to be the basis of the GEAR Price evaluation.

3. Based on the assessment and assumptions outlined in Mott MacDonald's report, the LCOEs range from Php5.3923/kWh to Php6.5286/kWh. For purposes of this Position Paper, PSSEA will use the LCOE results for Laguna Lake as the base case with an LCOE of Php6.3364/kWh.

Cases	LCOE results (PHP/kWh)		
	LLDA	Sagay	Magat
Base Case	6.3364	5.5295	5.3923

Figure 1. LCOE results from LCOE Model

4. In relation to the above, solar on stilts should not be considered in the same category as ground-mounted solar because it cannot compete with ground-mounted solar primarily due to cost inefficiencies and additional complexities. The base case LCOE for the Sagay project demonstrates that its tariff is higher than the approved GEAR Price for ground-mounted solar, which is Php4.4043/kWh. This is largely because stilt-mounted structures require more intricate design, installation, and operational processes. For instance, they need elevated medium voltage stations, specialized equipment, and labor for draining water from the installation area. These factors contribute to higher overall costs compared to ground-mounted systems, which are simpler and more straightforward to install and maintain. Hence, stilt-mounted solar systems should be part of the broader category of Solar PV on Water, which includes floating solar systems.

5. Further to the LCOE evaluation, Mott MacDonald conducted a comparative analysis between the LCOE results mentioned above and the GEAR Price for GEA-2 which was Php5.3948/kWh for Solar PV on Water. Figure 2 below provides the comparison of assumptions in LCOE and GEAR models. Note, however, that the assumptions summarized in Figure 2 do not include other financial and taxation-related parameters applied to the GEAR Price.

Table 6.5: Comparison of assumptions in LCOE and GEAR models

Parameters	Unit	LCOE Model	GEAR Model	Remarks
Technical assumptions				
Installed capacity	MW	126.0 – 139.8	50	
Project operating life	Year	20	25	
Construction period	Month	18	12	LCOE Model assumption based on size of the Project.
Net capacity factor	%	16.3 – 18.8	19.8842%	
Plant degradation	% p.a	0.5%	0.5%	
Cost assumptions				
CAPEX	USD/kWp	969 – 1,054	1,011	
VAT	%	N/A	12%	
Contingency	% of the CAPEX	5%	2%	
OPEX	USD/kWp/ year	21.5 – 22.0	15.5	The figure in GEAR price was converted from the assumption of PHP43,081,165 per year (using fx rate of 55.5886PHP/USD)
VAT recovery level	-	N/A	100% VAT	The LCOE model did not take into account the taxation.
VAT recovery period	years	N/A	5 after COD	
Macroeconomic assumptions				
Exchange rate	PHP/USD	55.5886	55.5886	
Local inflation	% p.a.	4%	0%	Local inflation applies mainly to operating costs.
Discount rate	%	10%	9.4% (see remarks)	LCOE model calculates evaluates the LCOE with the NPV (using the discount rate of 10%). Whereas, the GEAR model applies Pre-tax WACC[26] as the discount factor.

Figure 2. Comparison of assumptions in LCOE and GEAR models

6. Based on Figure 3, the LCOE is Php7.1074/kWh, including taxation and financing parameters.

Cases	LCOE results (PHP/kWh)		
	LLDA	Sagay	Magat
Base Case	7.1074	6.3776	6.2556

Figure 3. LCOE results from GEAR Model

7. In sum, the LCOE must not be below Php6.3364/kWh without taking into consideration the financing and taxation parameters, and a minimum of Php7.1074/kWh if taxation and financing parameters are to be included. These results show that for cases based on the GEAR Model, the LCOE results are higher than the GEAR Price of Php5.3948/kWh for Solar PV on Water for GEA-2.

8. PSSEA urges the Honorable Commission to give significant consideration to the Mott MacDonald report when formulating the GEAR Price. The report shows that the current cost of producing electricity from floating solar panels exceeds the set selling price, even before accounting for financing and taxes. This discrepancy highlights the need for a reassessment of the pricing structure to ensure the financial viability of these RE projects.

9. By integrating the findings and suggestions from the Mott MacDonald report, the Honorable Commission can ensure that the GEA-4 framework is robust, transparent, and aligned with the best practices in the industry, ultimately fostering a more competitive and sustainable RE market.

b. Tariff with Indexation

10. The Philippine Energy Plan outlines a power generation mix target of 35% RE by 2030 and 50% RE by 2040. However, the results of the GEA have been less promising. In GEA-2, only 32.21% (3,580.76 MW) out of the 11,600 MW installation target was achieved.

11. One possible reason for this shortfall is the significant risks developers face in these auctions. In GEA-2, the GEAR Prices were fixed and not subject to adjustment, lacking indexation to inflation and exchange rates. The economic assumptions in GEA-2 did not account for uncertainties in the economic landscape, possibly deterring developers from participating.

12. Hence, Dr. Cristina Alfonso[4] ("**Dr. Alfonso**") conducted a study aimed to demonstrate that indexing RE auction prices to inflation and exchange rates can enhance auction outcomes and reduce the future risk of price fluctuations for developers.[5] The inflation and exchange rate forecasts from the Bangko Sentral ng Pilipinas ("**BSP**") for the next two (2) years have been analyzed to determine the trajectory of these variables. According to the BSP, the inflation forecast for 2025 and 2026 in the Philippines is 3.1% and 3.2%, respectively.

13. Dr. Alfonso's review of related literature showed successful outcomes in other countries' energy auctions with the introduction of indexation of tariffs for inflation and foreign currency exchange rates, which led to increased competition, significantly lower prices, and reduced financial risks for developers. Dr. Alfonso mentioned in her study that developers face investment risks due to inflation. Price risk, particularly related to inflation, is significant in auctions as it affects financing.

14. Specifically, Kazakhstan's auction process aimed to select the most effective RE projects and secure competitive prices for RE-generated electricity. The selection criterion was the lowest price, with their Ministry of Energy setting auction ceiling prices. In 2018, these ceiling prices matched the FIT for each RE type, which are indexed annually (70% for inflation and 30% for foreign currency exchange rate). Auction tariffs are also indexed annually but with a different ratio (30% for inflation and 70% for foreign currency exchange rate). The 2018 auctions saw a significant reduction in RE prices: solar prices dropped by 48% from USD9.2 cents/kWh to USD4.8 cents/kWh.

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[4] Dr. Alfonso is an economist from the Philippines who has conducted significant research in the field of energy economics. She has worked on topics such as interfuel substitution, energy efficiency, and their impacts on economic growth and carbon emissions in Asian countries. Dr. Alfonso is also involved in regional cooperation and integration within the ASEAN+3 region, focusing on energy security and trade.

[5] A copy of Dr. Cristina Alfonso's study is attached as **Annex "B"**.

15. In September 2022, Kazakhstan adjusted energy tariffs to compensate RE producers for the devaluation of the Kazakhstani Tenge against the US Dollar and Euro, due to high capital costs for imported equipment, lack of foreign exchange hedging, ongoing currency depreciation, and foreign currency loans. Investors could choose between one-time indexation during construction or annual indexation based on the Consumer Price Index ("**CPI**") or KZT/USD rate changes. The 2022 auctions registered 2,809 MW of bidded capacity, four times the 690 MW installation target, demonstrating that the 2022 indexation reform effectively mitigated price risks, leading to higher participation and lower RE prices.

16. According to Dr. Alfonso, indexation enhances competition among investors in energy auctions, offering several benefits:

i. **Price Stability**: It stabilizes prices, reduces volatility, and makes costs and revenues more predictable for developers.

ii. **Transparency**: A standardized pricing mechanism fosters trust in the auction process by promoting transparency in price determination, and encouraging new investors to participate.

iii. **Increased Competition**: It promotes competition among bidders, lowering costs and ensuring project viability.

iv. **Attracting Investors**: Predictable pricing structures can attract more investors to the RE sector.

v. **Policy Support**: It supports government policy to accelerate RE adoption in the country.

vi. **Risk Reduction**: Eliminating risks can encourage companies to invest in new technologies.

vii. **Grid Stability**: It supports grid stability by promoting a diverse energy mix.

viii. **Lower Energy Prices**: The resulting lower energy prices due to competition will translate into lower electricity prices for households and industries. High electricity prices have made the country's industrial sector uncompetitive and less attractive for investments.

17. Thus, indexation to the CPI and exchange rates for GEAR Prices minimizes risks, fostering a more competitive auction environment and lowering energy prices. Dr. Alfonso's study highlights that developers face investment risks due to fluctuating prices and exchange rate volatility driven by global events beyond the control of RE developers and investors. Indexing

GEAR prices to the CPI and exchange rate can minimize these risks, fostering a more competitive auction environment and lowering energy prices.

18. To reduce uncertainty for developers, Dr. Alfonso recommends two actions for the government:

i. **Adopt BSP Forecasts**: Use the BSP's CPI and exchange rate projections for setting GEAR prices, as these forecasts consider both external and domestic conditions and are periodically reviewed for unexpected economic developments.

ii. **Introduce One-Time Indexation**: Allow one-time indexation of auction prices to protect developers' contracts from macroeconomic uncertainties. RE companies should have the option to apply for tariff rate indexation based on inflation and exchange rate changes at the Honorable Commission, depending on when their project costs are most affected.

19. PSSEA urges the Honorable Commission to adopt Dr. Alfonso's methodology in order to arrive at the correct tariff. By adopting Dr. Alfonso's study, the Honorable Commission can ensure that the tariff-setting process is transparent, fair, and conducive to the growth of the RE sector in the Philippines.

20. In sum, the LCOE for Solar PV on Water in GEA-4 must not be below Php6.3364/kWh without considering financing and taxation, and must not be below Php7.1074/kWh when these factors are included. To mitigate risks and foster a competitive auction environment, it is recommended to index GEAR Prices to the CPI and exchange rates. PSSEA appeals to the Honorable Commission to adopt Dr. Alfonso's methodology, which includes using BSP's CPI and exchange rate projections for setting GEAR Prices and allowing one-time indexation of auction prices to protect developers from macroeconomic uncertainties.

PRAYER

WHEREFORE, PSSEA respectfully prays that the Honorable Commission consider this Position Paper in the determination of the GEAR Price for the upcoming GEA-4.

Other just and equitable reliefs are prayed for.

Mandaluyong City, 16 December 2024.

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