

INDEXATION OF GEAR PRICES TO INFLATION AND EXCHANGE RATE

I. INTRODUCTION

The Philippine Energy Plan shows the power generation mix target in 2020-2040 composed of 35% renewable energy (RE) by 2030 and 50% RE by 2040. However, the results of the green energy auction are not very promising. In GEA-2, of the 11,600 MW installation target, only 30.9% or 3,580.76 MW was awarded.

One possible reason is that developers take on significant risks in these auctions. In GEA-2, the GEAR prices are fixed and not subject to adjustment. They are not indexed to inflation and the exchange rate. The economic assumptions in GEA-2 (Table 1) do not address uncertainty in the economic landscape. Hence, developers may be hesitant to participate in the auctions.

This study aims to show that indexation of RE auction prices to inflation and the exchange rate will improve the auction outcome. This initiative minimizes the future risk of price changes to the developers. The methodology is an indexation formula based on the tariffs of the RE companies. The inflation and the exchange rate outlook of the Bangko Sentral ng Pilipinas (BSP) for the next two years will be discussed to determine the trajectory of these variables. Moreover, the timing and frequency of the indexation are included in the recommendation.

Table 1. GEA-2 Economic Assumptions.

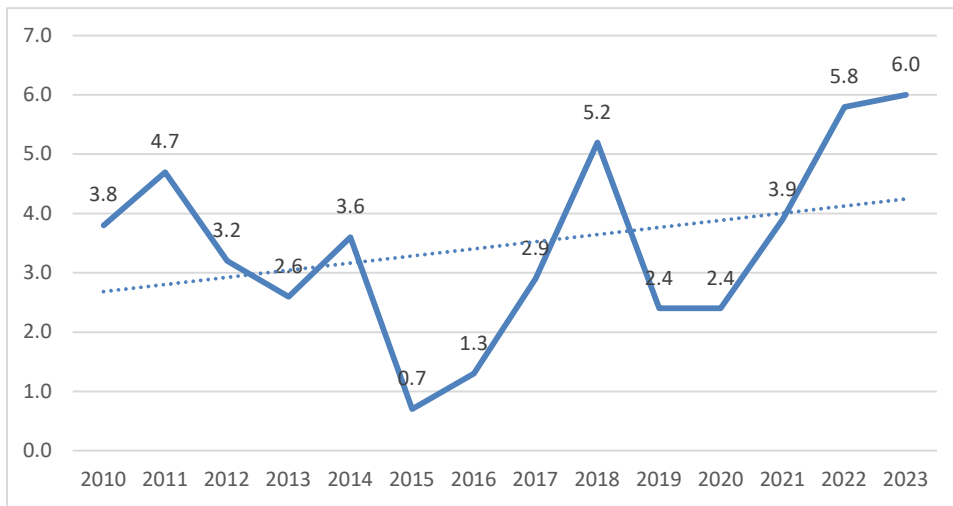
Economic Assumptions	
Forward Peso to US\$ Exchange Rate	PhP55.5886: US\$1
Local Inflation Rate	0%
Foreign Inflation Rate	0%
Base PhP to US\$ Exchange Rate	PhP55.5886: US\$1

Source: ERC.

II. TRENDS IN INFLATION AND THE EXCHANGE RATE

There has been a rising trend in the inflation rate from 3.8% in 2010 to 6% in 2023 (Figure 1). The lowest inflation rate was recorded in 2015 at 0.7%. During the pandemic, the inflation rate declined from 5.2% to 2.4% in 2019 and 2020. However, with the economic recovery it climbed to 5.8% in 2022, surpassing pre-pandemic levels.

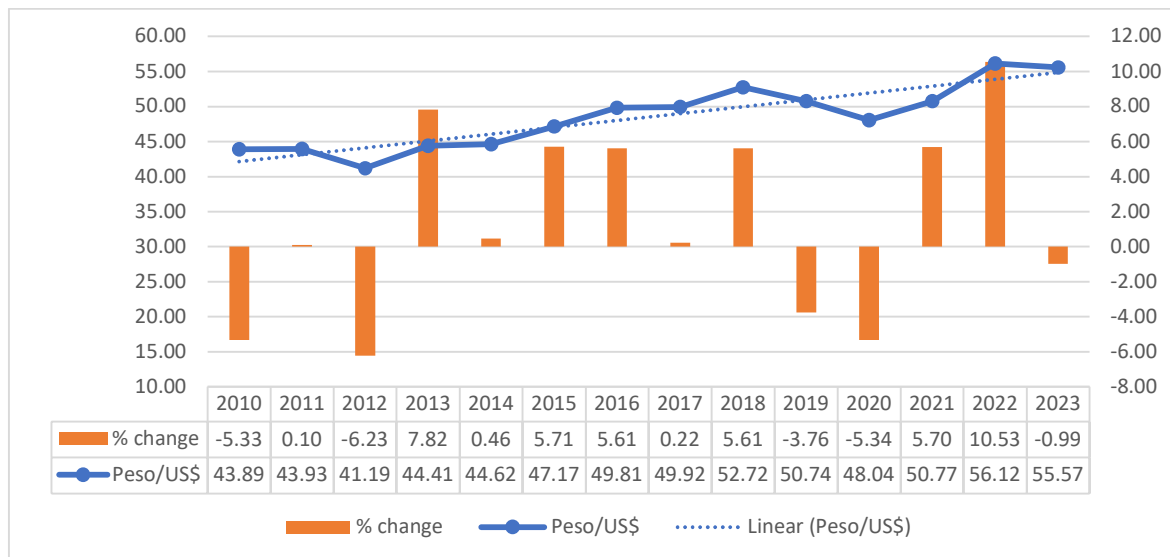
Figure 1. Inflation Rate (in %)



Source: Philippine Statistical Authority.

The Philippine Peso has been steadily depreciating against the US Dollar (Figure 2). From PhP43.89 per US\$ in 2010, the exchange rate has depreciated to PhP55.57 per US\$ in 2023. In more than a decade, the exchange rate reached its lowest rate against the US dollar in 2022 at PhP56.12 per US\$ in 2022. Over time, the exchange rate has been subjected to volatility with an appreciation of 6.23% in 2012 and almost 11% depreciation in 2022. On a daily basis, the exchange rate in October 2024 ranged from PhP56.0170 per US\$ to PhP58.3600 per US\$. As of November 14, 2024, it is recorded at PhP58.7060 per US\$.

Figure 2. Philippine Peso per US Dollar Rate (end-of-period)



Source: BSP.

III. REVIEW OF LITERATURE

A. BEST PRACTICES

1. Chile

Nasirov et al. (2019) analyze the factors that enable renewable energy technologies (RET) to expand in the country’s energy auction. In the last auction held in 2017, RET was awarded the entire capacity at an average price of \$32.5 per MWh. This is the lowest achieved price since the start of the auction in 2006 until 2016. The highest average price was recorded in 2012 at \$140 per MWh.

The Chilean energy auction covers both RET and conventional generation. In the early auctions, the results were considered as unsuccessful. Over 90% of the awarded energy went to only three main generation companies and prices increased substantially. In 2014, RET companies were able to participate in the auctions as the cost of these technologies declined and new policies were introduced.

Table 2 shows the changes in auction design between 2014 and 2015. Among the changes introduced were the **Price Revision Mechanism and Contract Indexation**. These policies combined with other policies such as “supply time blocks,” “longer contract duration,” and “longer lead time for project construction” led to the successful auction results in 2017 where solar and wind were the most attractive RE technologies in the auction.

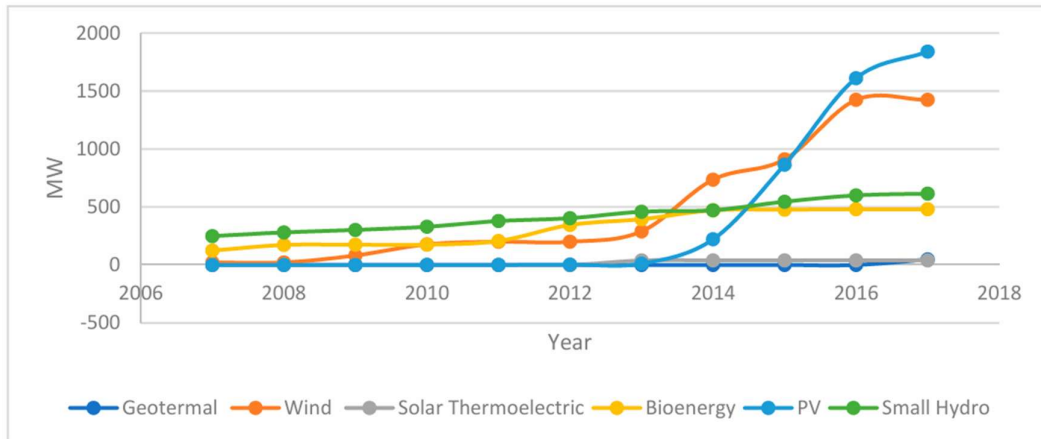
Table 2. Main Changes to the Auction Design in Chile.

Design Elements	Previous	Current
Longer Contract Duration (DC)	15 years	20 years
Lead Time for Project Construction (LT)	3 years	5 years
Price Revision Mechanism (PR)	No	Yes
Auction Management (MA)	Distribution Companies	National Energy Commission (CNE)
Possibility to Postpone/Abandon and Transfer the Contract (PT)	No	Yes
Supply Time Blocks (TB)	Single 24 h block	Several block and subblock schedules
Price Ceiling (CP)	Public	Secret
Contract Indexation (IF)	No	Contracts are in USD and indexed to inflation

Source: Nasirov et al. (2019).

Figure 3 shows that after just 2 RE generators participating in the 2013 auctions, RET climbed to 18 in 2014, 38 in 2015 and 84 in 2016. With greater competition, prices started to subside. The average price in the auctions have significantly declined after the auction reform. From a high of \$140/MWh in 2012, the average price fell to \$32.5/MWh in 2017.

Figure 3. Share of renewable energies in auctions.



Source: Nasirov et al. (2019).

2. Kazakhstan

The auction process began at end-2017 with the objectives of choosing the most effective projects and ensuring the most competitive price for RE-generated electricity. The criteria to select the auction winners is the lowest price. The Ministry of Energy provides the auction ceiling prices. In the 2018 auctions, the auction ceiling prices were set at the level of the feed-in tariff for each RE type.

Feed-in tariffs are subject to annual indexation: 70% for inflation and 30% for foreign currency exchange rate. Tariffs set through auctions are also subject to annual indexation: 30% for inflation and 70% for foreign currency exchange rate.

The results of the 2018 auctions show that there was a significant decrease in RE auction prices (Table 3). The starting auction ceiling prices were US6 cents/kWh for wind RE and US9.2 cents/kWh for solar. The ceiling price can be interpreted as the GEAR price while the minimum auction price shows the final tariff result. For solar projects, the price decreased from US9.2 cents/kWh to US4.8 cents/kWh, a 48% decrease. For wind projects, from the ceiling price of US6 cents/kWh the minimum bid price was recorded at US4.6 cents /kWh. This is a 2.3% decrease in wind-generated energy price.

Out of the 1000 MW auction capacity and 3,422 MW capacity proposed by bidders, the total installed capacity selected reached 857.93 MW. This constitutes 36 total RE projects. The installed capacities by technology are: Wind – 500.85 MW, Solar – 270 MW, small HPP – 82.08 MW, and Biogas – 5 MW (Table 4).

Table 3. Results of the 2018 RE Auctions.

RE technology	Auctions capacity (MW)	Capacity proposed by bidders (MW)	Capacity successfully auctioned (MW)	Number of projects selected	Starting auction ceiling price (KZT/kWh) / (US cents/ kWh)	Minimum auction price (KZT/ kWh) / (US cents/ kWh)
Wind	620	1235.85	500.85	16	22.68 / 6	17.39 / 4.6
Solar	290	2023.10	270	12	34.61 / 9.2	18 / 4.8
Small HPP	75	152.50	82.08	7	16.71 / 4.4	12.80 / 3.4
Biogas	15	10.90	5	1	32.23 / 8.6	32.15 / 8.5
Total:	1,000	3,422	857.93	36	-	-

Source: USAID.

In September 2022, the Government of Kazakhstan introduced amendments to adjust the energy tariffs to compensate RET producers for the devaluation of the Kazakhstani Tenge versus the US Dollar and Euro¹. The reasons stated are: 1. 80% of capital costs on average are used to purchase imported equipment; 2. There is no foreign exchange hedging mechanism; 3. The KZT continues to depreciate against the Euro and the USD; and 4. Loans from international financial institutions are usually in foreign currencies (Euro or USD).

The investor is given the choice of two indexation formulas, which will be applicable for the entire duration of the power purchase agreement:

1. A one-time indexation of auction prices during the construction of the RET facility.
2. The annual indexation of auction prices with (a) the consumer price index (CPI), or (b) the change in KZT/USD rate.

In the 2022 RE auctions, there were a total of 2,809 MW registered bid capacity. This is four times more than the installation target offered by the auction which is 690 MW. Moreover, there was great interest in wind projects as the total bid capacity of 2,745 MW was seven times higher than the installation target of 400 MW. Ultimately, 10 RE projects were selected with a total installed capacity of 440 MW. This comprised 63.77% of the installation target in the auction. In terms of the price, wind RE realized a 42.5% decrease from US4.68 cents/kWh to US2.69 cents/kWh. Hence, the indexation reform during 2022 was able to allay price risk concerns of bidders in auctions leading to higher participation and lower RE prices.

¹ <https://www.dentons.com/en/insights/articles/2022/september/26/kazakhstan-to-index-auction-prices-for-renewable-power-another-welcome-move-for-investors>

B. INVESTMENT RISK

Egli (2019) identified **5 types of risk that developers** are subjected to. These are curtailment, policy, price, resource, and technology risks. The findings resulted from investor interviews composed of commercial and investment banks, private sector equity providers, and public utilities.

Curtailment risk refers to the chance of lower revenues because of unexpected curtailment such as grid bottlenecks. The major factor of curtailment risk is policy credibility. The factors that determine policy credibility are the unsustainable cost of policy, the credibility of the future trajectory of policy and grid access, quality, and congestion.

Policy risk happens when there is a retroactive change in a cornerstone RET policy, taxation, or other policy instruments. This risk is driven by policy credibility, technology characteristics and developments, and data availability and assessment tools. Policy risk may decline as investors understand policymakers more over time. This is called regulatory learning when there is an exchange of knowledge between investors and regulators. The regulators' concern for policy costs that are perceived by the public as too high can increase the risk of retroactive policy change.

Declining technology costs lower policy changes since generation costs approached market prices. Narrowing the gap between subsidies and market price increases the competitiveness of RE and decreases investment risk. In addition, there is a higher probability that the PPA contracts can be fulfilled the closer RE prices are to market prices.

Price risk increases with inflation risk. In auctions, price risk has become very important because securing financing by developers has become more difficult. As developers are expected to present the sealed financing deal in an auction, banks are expected to come up with assumptions regarding future technology, operating costs among others.

Resource risk refers to the risk of lower revenues caused by inaccurate estimates of resource potential such as wind speed or solar irradiation. The main factors which affect resource risk are technology characteristics and developments, and improved assessment tools due to increasing data availability.

Lastly, technology risk refers to higher maintenance costs because the technology is new and unpredictable such as having a faster degradation rate. To lower this risk the main requirement is a successful technology track record of the company.

Descioli (2004) shows that price inflation changes the cost structure of renewable energy projects raising production and sourcing costs. The findings from interviews with industry professionals, policymakers, academics, and other experts are:

1. The cost structure of renewable energy projects is significantly affected by fluctuations in energy prices, raw material costs, and currency exchange rates. This can have adverse effects on their financial viability and profitability.

2. Price inflation makes project planning and investment decisions more uncertain and riskier. This makes it difficult to forecast future costs and revenues accurately.

3. Price inflation can produce conflict between supply chain partners when cost increases are passed down the supply chain. Tension between buyers and suppliers can build up if contracts are renegotiated to adjust pricing terms to reflect higher input costs.

According to the participants, the government plays an important role in mitigating the impact of price inflation on renewable energy supply chains. Stable and predictable regulatory environments promote investment and innovation in renewable energy projects like government incentives, subsidies, and tax credits that reduce project costs and improve financial returns. However, these policies may not be enough to mitigate the price risk.

This paper emphasized the importance of incorporating indexation in RE cost structures that would encourage investment, enhance market transparency, and ultimately, lead to mitigation of cost for fairer pricing for consumers.

IV. METHODOLOGY: INDEXATION FORMULA

A company's project costs are affected by the inflation rate and the exchange rate. An indexation formula is necessary to avoid loss due to these factors. Project costs are funded in local currency and in foreign currency.

$$T_{b(indexed)} = T_b \left\{ 1 + \left[x \frac{(ACPI_n - CPI_b)}{CPI_b} \right] + \left[y \frac{(AER_n - GER_b)}{GER_b} \right] \right\}$$

Where:

b = the auction date

n = adjustment date

x = the percent of project cost funded in local currency

y = the percent of project cost funded in foreign currency

T_b = the awarded bid price at the auction

$T_{b(indexed)}$ = the tariff after indexation to inflation and exchange rate

$ACPI_n$ = the average of the monthly values of the Philippines Consumer Price Index (CPI) for the 12 calendar months immediately preceding the adjustment date

CPI_b = the monthly CPI at the auction date

AER_n = the average of the month-end reference exchange rate between the Philippine peso and the US Dollar for 12 calendar months preceding the adjustment date

GER_b = the exchange rate assumption in setting the GEAR price in the auction

Data for the CPI will be sourced from the Philippine Statistical Authority and the exchange rate will be taken from the Bangko Sentral ng Pilipinas.

V. BSP OUTLOOK ON INFLATION AND EXCHANGE RATES

The inflation forecast for 2025 and 2026 are 3.1% and 3.2%, respectively (table 5). This is on the back of a stable external environment and a robust domestic economy. Based on International Monetary Fund (IMF) projections, the US economy will soften as it pursues fiscal tightening and a slowing labor market. The eurozone will continue to recover on the strength of the services and manufacturing sectors. This is driven by high private consumption and investment demand as financial conditions eased. Likewise, China and Japan's economies are set to rebound following stronger private consumption.

Table 5. BSP Inflation and Exchange Rate Forecast.

Year	Inflation Projections	Exchange Rate Forecast
2024	3.4	₱56.00–₱58.00/US\$1
2025	3.1	₱55.00–₱58.00/US\$1
2026	3.2	₱55.00–₱58.00/US\$1

Source: BSP.

For an oil-importing country, Dubai's crude oil prices need to be tracked. There is a downward trend in world oil prices as global oil demand growth decelerated, particularly in China. In order to offset this trend, the Organization of the Petroleum Exporting Countries (OPEC)+ has started a round of production cuts which is intended to reduce global oil inventories. Thus, Dubai's crude oil price is expected to record at US\$ 74.13 per barrel in 2025 and decline further in 2026 to US\$ 71.36.

Price pressures will also be coming from trade or geopolitical tensions. In particular, the Middle East conflict could disrupt the supply chain raising prices and fueling inflation.

On the domestic front, interest rates are not expected to change. The target reverse repurchase rate (RRP rate) and the reserve requirement ratio (RRR) are pegged at 6.5 percent and 9.5 percent, respectively, from August 2024 until the end of 2026.

Other factors that can influence prices are wages, policy changes, and government spending. Wages are forecast to increase 5.0 percent each for 2025 and 2026 following historical wage adjustments. On policy changes, the president reduced the tariff on rice from 35.0 percent to 15.0 percent to push imported rice prices down. In addition, NEDA launched the new Comprehensive Tariff Program for 2024–2028 with reduced tariffs in the energy and manufacturing sectors and maintains low agricultural rates. The inflation rate is also in line with the fiscal deficit assumption. Government spending is forecast to be 5.3% in 2025 and 4% in 2026.

The exchange rate outlook will be ₱56.00–₱58.00/US\$1 for 2024 and ₱55.00–₱58.00/US\$1 for 2025 and 2026. A depreciation is more likely with the worsening of geopolitical risks. However, the projections have taken into account the 100-basis point (bp) reduction in the US federal funds rate in 2024 and a further 125-bp rate cut in 2025.

VI. BENEFITS OF INDEXATION

Indexation promotes more robust competition among investors in the auction. The benefits are as follows:

1. It stabilizes prices, reduces volatility, and makes costs and revenues more predictable for developers.
2. A standardized pricing mechanism fosters trust in the auction process by promoting transparency in the determination of prices. New investors will be more willing to participate in the auctions.
3. Promotes competition among bidders lowering costs and ensuring project viability.
4. Predictable pricing structures can attract more investors in the RE sector.
5. It supports government policy to accelerate renewable energy adoption in the country.
6. Elimination of risks can encourage companies to invest in new technologies.
7. It supports grid stability by promoting a diverse energy mix.
8. The resulting lower energy prices due to competition will translate into lower electricity prices for households and industries. Higher electricity prices have made the country's industrial sector uncompetitive against other regional economies. It has also made the country less attractive for investments (Lu, 2024).

VII. RECOMMENDATIONS

This paper shows that developers take on investment risks caused by fluctuating prices and exchange rate volatility. Based on the examples of Chile and Kazakhstan, indexation to the CPI and the exchange rate of the GEAR prices minimizes these risks. It produces a more competitive environment in auctions leading to the eventual lowering of energy prices. Hence, the recommendation is a two-step indexation process during the setting of the GEAR price and a one-time adjustment during the development phase.

1. It is recommended to index the GEAR prices to the BSP forecast of CPI and exchange rate. The BSP forecast has considered both external and domestic conditions in setting these prices. Moreover, it is reviewed by the BSP periodically to ascertain unexpected economic developments. Therefore, the economic assumptions in setting the GEAR prices particularly the forward fixed exchange rate and the annual local inflation rate can follow the BSP forecasts.
2. Apart from the GEAR price, it is also recommended to introduce a one-time indexation of awarded auction prices using the indexation formula presented in this paper. This will assure developers that their contracts are protected from uncertainties brought about by macroeconomic factors. The indexation of the tariff rate on inflation and exchange rate should be an option for RE companies if they wish to apply for it at the Energy Regulatory Commission (ERC). Thus, the timing of the indexation will depend on whatever stage of the operation a company finds itself in which its project costs are adversely affected by inflation and the depreciation of the exchange rate.

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