

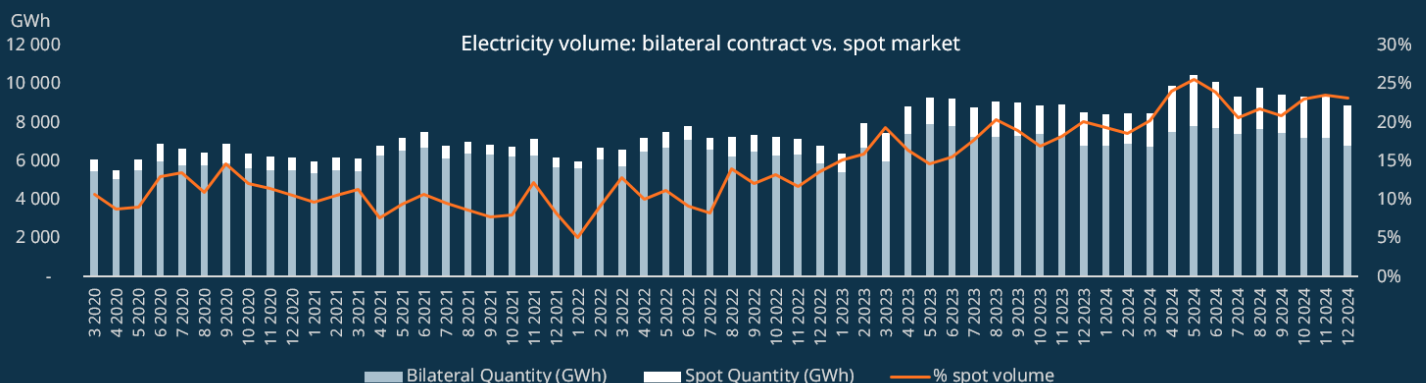


Advantages of engines as balancers in the Philippine 5-minute WESM & reserve market

📍 Philippines

The Philippines operates one of Southeast Asia's most advanced electricity markets. Following sector deregulation in 2001, the launch of the Wholesale Electricity Spot Market (WESM) in 2006, and retail competition in 2013, the country introduced a major structural reform in 2021 by transitioning to 5-minute dispatch and settlement intervals. This move, matched only by Australia in the region, significantly increased price granularity and volatility, creating new opportunities for flexible technologies to respond to short-term price spikes.

Over time, the role of the spot market has expanded. Spot transactions now account for around 20% of total market volume, which is double the share observed just a few years ago. Alongside this, the frequency and magnitude of price volatility have also grown, offering strong arbitrage opportunities for technologies capable of rapid response. In early 2024, the Philippines launched a co-optimised reserve market, which became fully operational by August of 2024. This development enabled real-time trading of ancillary services on the same 5-minute interval basis as the energy market, further increasing the value of flexibility.



To assess the business potential, a simulation was conducted using actual WESM price data from 2023 for a 100 MW engine power plant operating purely as a merchant balancer. The results were compelling:

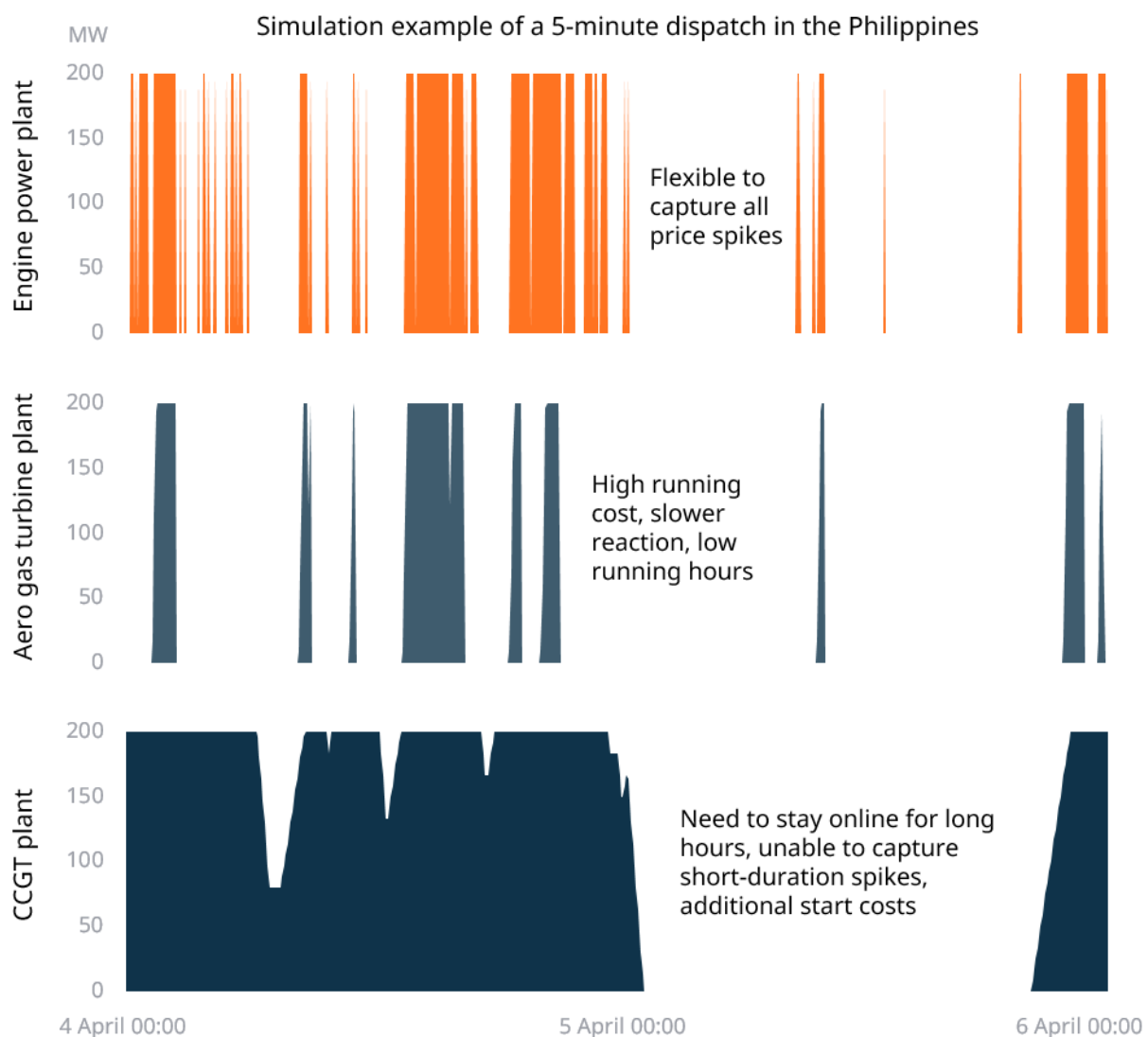
- Annual running hours: 3,400 hours (39% capacity factor)
- Gross profit: 20 MEUR
- Equity IRR: 25%
- Payback period: 5 years

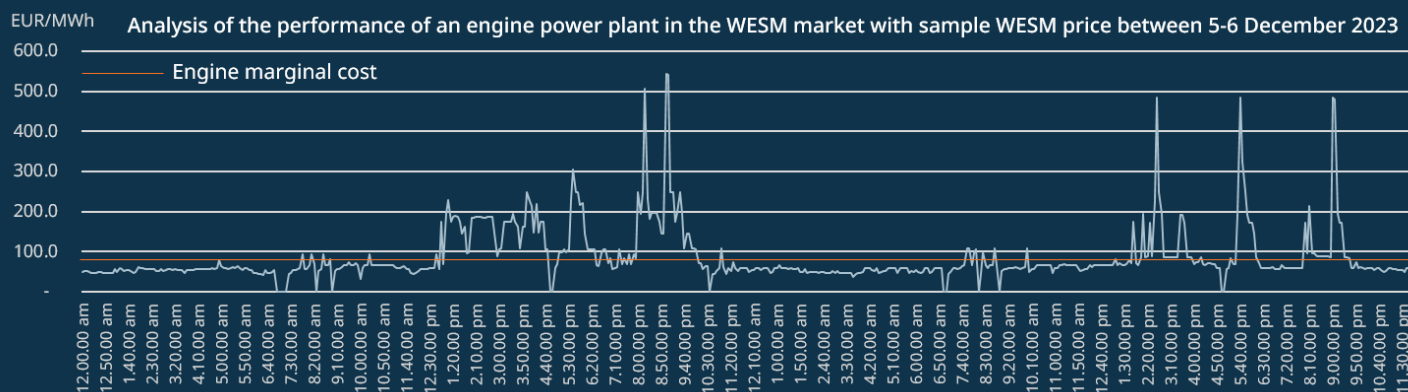
This performance was driven by the engine's ability to start and stop quickly, ramp throughout the day, and shut down entirely during periods of low or negative pricing – without incurring start-up penalties or excess maintenance costs.

Compared to other thermal technologies, engine power plants demonstrated a clear advantage. Aeroderivative gas

turbines, due to their lower efficiency and slower response times, failed to capture most price spikes. Combined cycle gas turbines (CCGTs), while more efficient, are constrained by longer minimum run times and are often forced to operate during low-price hours, reducing profitability. Engine power plants, by contrast, operate only when profitable and benefit from the modular design and fast responsiveness, enabling them to effectively monetise market volatility.

The modular design of engine power plants allows them to run in smaller, flexible blocks, unlike large gas turbines that must commit bigger capacities. This means that engine power plants can better match output to demand, reduce part-load inefficiencies, and avoid committing unnecessary capacity during low-demand periods.





The introduction of the reserve market further strengthens the business case for engine technology. These plants are well-suited to participate across all reserve products, offering system operators a single asset class capable of delivering both energy and reliability services. This revenue stacking potential improves asset utilisation and derisks merchant exposure.

In conclusion, the Philippines' 5-minute co-optimised market creates strong incentives for fast and flexible power generation. As the country moves toward its targets of 35% renewable energy by 2030

and 50% by 2040, the influx of variable renewables will require balancing solutions. Engines, with their rapid dispatch capability, modular scalability, and diversified revenue potential, are well positioned to meet these needs. They represent a versatile and financially attractive solution for ensuring system reliability in a renewable-intensive grid.