AEMC

INFORMATION

Fact sheet:
How the spot market works

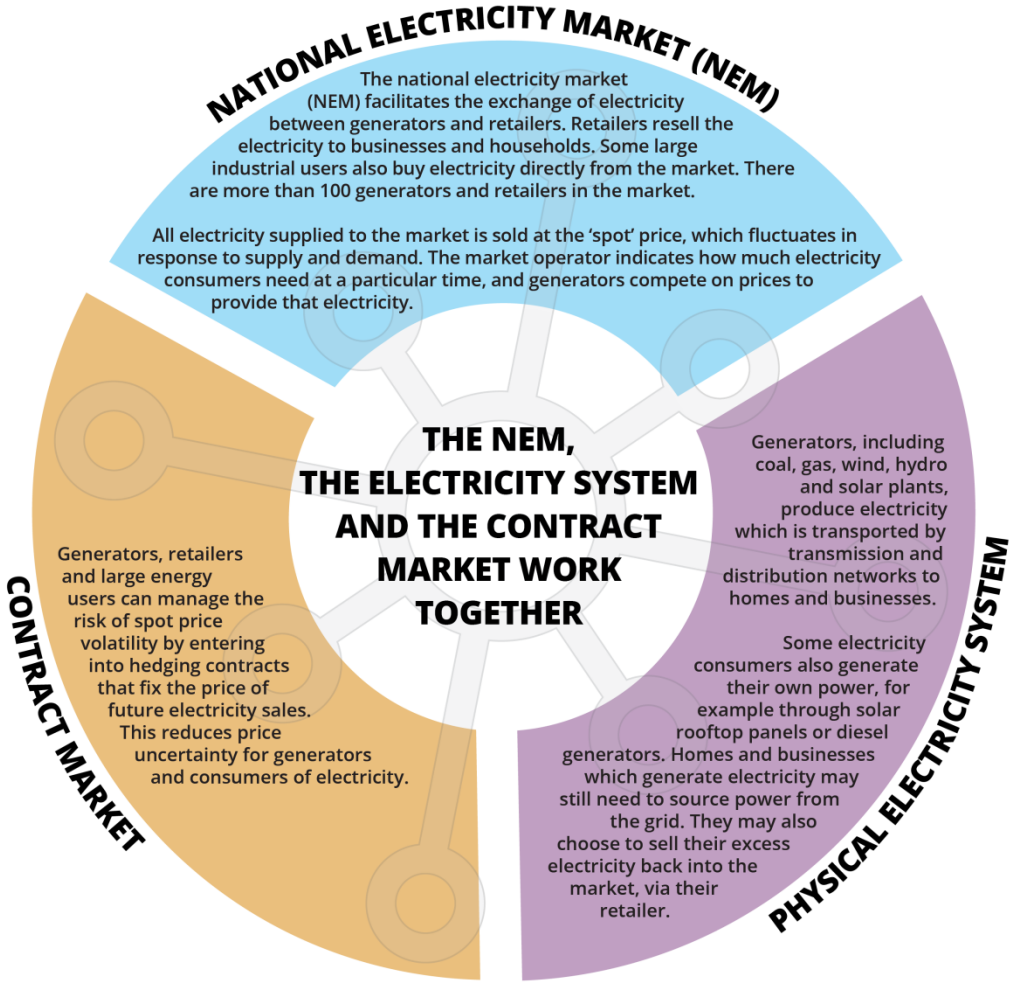
The national electricity market (NEM) facilitates the exchange of electricity between generators and retailers. All electricity supplied to the market is sold at the 'spot' price.

Buying and selling electricity in the national electricity market

The national electricity market (NEM) operates as a market where generators are paid for the electricity they produce and retailers pay for the electricity their customers consume.

The spot market coordinates production and consumption so that power supply and demand is matched instantaneously. The Australian Energy Market Operator (AEMO) manages this process.

The physical and financial markets for electricity are interlinked. Complex information technology systems underpin the operation of the NEM. The systems balance supply with demand in real time, select which generators are dispatched, determine the spot price, and in doing so, facilitate the financial settlement of the physical market. And all this is done to deliver electricity safely.



Scheduling generators

Generators submit offers to AEMO, signalling their willingness to generate electricity. AEMO's central dispatch engine orders the generators' offers from least to most expensive and determines which generators will be dispatched.

In this way, the expected demand for electricity is supplied by the lowest cost mix of generators.

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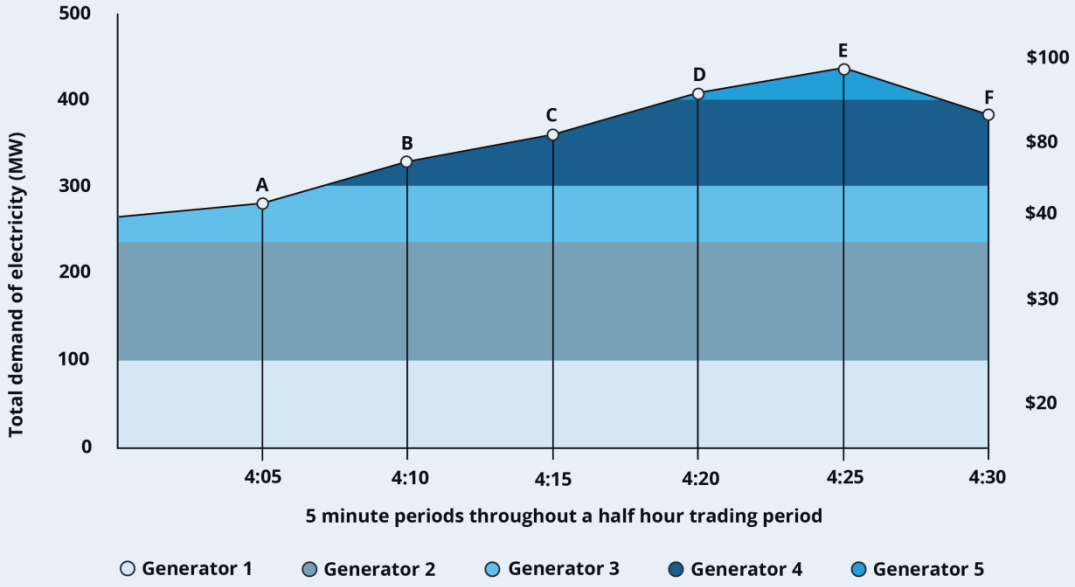
In delivering electricity, AEMO dispatches electricity every five minutes, so generators are required to bid to supply electricity in five minute blocks. For the purposes of settlement, the price is then averaged out over 30 minutes.

The spot price for a 30 minute trading interval is therefore the average of the six dispatch interval prices. All generators dispatched in that trading interval receive the spot price.

AEMO uses the spot price as the basis for the settlement – that is, the transfer of money for electricity supplied to the market and consumed by end users.

Example: Scheduling generators in the NEM



Bids to produce electricity received by AEMO are stacked in price order for each dispatch period. Generators are then progressively scheduled into production to meet demand, starting with the lowest cost generator.

A. To supply electricity at 4.05pm, Generators 1 and 2 are dispatched to their full bid capacity, and Generator 3 is only partly dispatched. The price is $40 per MWh.

B. At 4.10pm demand has increased. Generators 1, 2 and 3 are fully dispatched, and Generator 4 is party dispatched. The price is $80 per MWh.

C. At 4.15pm demand has increased a further 30MW. Generators 1, 2, 3 and 4 continue producing power and the price remains at $80 per MWh.

D. By 4.20pm demand has increased to the point that Generator 5 is needed and the price increases to $100 per MWh.

E. At 4.25pm Generators 1-4 are fully dispatched and Generator 5 partly dispatched. The price remains at $100 per MWh.

F. By 4.30pm demand has fallen. Generator 5 (the most expensive generator) is no longer required, and Generator 4 is only partly dispatched. The price returns to $80 per MWh.

The spot price for the trading period is the average of the six dispatch prices:

$(40+80+80+100+100+80) per MWh divided by six, or $80 per MWh

This is the price all generators receive for production during this period, and the price retailers and large users pay for electricity they consume from the spot market during this period.

The spot market and contract market are designed to provide market signals for investment in new generation and demand-side technologies in the national electricity market

Different timeframes for dispatch and settlement

Dispatch and settlement are determined over different timeframes. This means that generators and large energy users are incentivised by price signals that can be up to 25 minutes after the physical energy system needs a response.

The 'averaged' spot price may be lower than the price a fast responder such as a battery would be willing to offer for providing supply for a shorter period, say five or ten minutes.

This is shown in the bid stack example above, where Generator 5 receives $80 per MWh, rather than its bid price of $100 per MWh.

Similarly, a large user such as a smelter may find it worthwhile to curtail its electricity use for short periods, but not a full half hour.

The role of the contract market

Retailers and generators use electricity contracts as a form of insurance against fluctuating spot prices – locking in long term revenues or costs at a fixed rate.

Contracts provide retailers with a consistent price for electricity, which in turn allows them to write longer-term contracts with consumers, and therefore offer stable retail prices.

For generators, contracts provide a steadier stream of income. This guaranteed revenue enables them to obtain financing for new investment.

While the contract market is distinct from the spot market, the prices of contracts are based on forecast spot market outcomes.

Broadly, the spot market and contract market are designed to provide market signals for investment in new generation and demand-side technologies in the national electricity market.

However, this relies on enough hedge contracts being available, to provide a more certain revenue stream to underwrite investments. Also, outside interventions, such as investments not undertaken in response to price signals, can distort spot market prices and hence investment decisions.

Five minute settlement rule change request

As outlined above, settlement prices are calculated on a 30 minute basis.

This system has been in place for around 20 years. Different periods for dispatch and settlement were adopted due to limitations in metering and data processing at the time the national electricity market started. Technology is now available which makes five minute settlement possible.

The AEMC has made a draft determination to change the time interval for settlement in the wholesale electricity market from 30 minutes to five minutes.

Moving to five minute settlement would align the physical electricity system – which matches demand and supply of electricity every five minutes – with the price signal provided by the market for that five minute period.

Improved price signals can lead to more efficient bidding and operational decisions by generators, and more efficient investment in flexible technologies such as aggregating distributed storage, new generation gas peaker plants and rapid demand response. Over time, this would feed through to lower wholesale costs, which make up around one third of a typical electricity bill.

The draft determination proposes a transition period of three-and-a-half years to move to five minute settlement, which would require major upgrades to IT systems and metering.

The move would also affect the contract market. Under five minute settlement, gas peaking generators may not be able to offer the same volume of contracts, or meet their existing contracts with retailers, if they are not able to obtain the same returns at times of high spot prices. The transition period would allow most existing hedging contracts to roll off, while enabling new contracts to accommodate the future implementation of five minute settlement.

Stakeholder submissions on the draft determination are due by 17 October 2017.

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