24 December 2015

Mr John Pierce
Chairman, Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

Dear Mr Pierce,

Rules change proposal – Non-Scheduled generation in central dispatch

GDF SUEZ Australian Energy submits this National Electricity Rules change request to the Australian Energy Market Commission in relation to the obligations on non-scheduled generating units.

This rules change proposal aims to address a deficiency in the current National Electricity Market arrangements which allows growing volumes of non-scheduled generation to interact with the market without any obligation to indicate in advance how it intends to vary its output.

This deficiency is not new, as the rules for registration of non-scheduled generation have remained largely unchanged since the commencement of the National Electricity Market in 1998. As the amount of non-scheduled generation was inconsequential in 1998, its exclusion from the scheduling process did not have a notable impact at the commencement of the National Electricity Market. Since then the strong growth in the amount of non-scheduled generation has meant that it is now having a detrimental impact which is likely to increase going forward.

In preparing this rules change proposal GDF SUEZ Australian Energy has sought to identify means by which information transparency can be improved, whilst being mindful not to impose complex or overly onerous obligations on owners of smaller generators especially those that are not seeking to be active in the market.

GDF SUEZ Australian Energy believes that the proposal provides a proportionate response to the issues identified that will enhance market efficiency and that the enclosed proposal meets the requirements for a rules change as set out in the National Electricity Law and rules.

Should the Australian Energy Market Commission require additional information, or wish to discuss this rules change proposal, please do not hesitate to contact me on, telephone, 03 9617 8415 or Mr Chris Deague on, telephone, 03 9617 8331.

Yours sincerely,

Jamie Lowe
Head of Regulation

Non-scheduled generation in central dispatch rules change

Introduction

GDF SUEZ Australian Energy (GDFSAE) has prepared the following National Electricity Rules (rules) change proposal for consideration by the Australian Energy Market Commission (AEMC).

In preparing this rules change proposal GDFSAE have taken account of the AEMC document *Guideline for proponents – preparing a rule change request* on the AEMC's website.

Statement of issues

The ongoing success of the wholesale electricity market relies upon the ability of market participants to reasonably anticipate and respond to dynamic changes in the market. For this to be achieved, it is important that all participants capable of impacting market outcomes are equally obliged to inform the market of their intentions.

The existence of asymmetric obligations to provide market inputs undermines the ability of all participants to respond equally to market changes. This in turn leads to inefficiencies in market outcomes since the most cost effective response can be impaired due to inadequate information.

In addition to inefficient market outcomes, information asymmetries will inevitably limit the ability of the Australian Energy Market Operator (AEMO) to monitor and maintain the security of the power system, as key pieces of information will be unavailable. Where information is incomplete, AEMO needs to take a more conservative approach to managing the security of the power system. This in turn contributes to inefficient asset utilisation and market outcomes.

GDFSAE believes that there is at present, a significant information asymmetry in the obligations of market generators to provide inputs to the NEM dispatch process. This information asymmetry is due to the relaxed obligations placed on market generators that are smaller than 30 Megawatts (MW) as compared with larger units.

Businesses that wish to connect a generator larger than 5 MW generator to a transmission or distribution network are required to register the generator with AEMO. The registration obligations for generators are defined in clause 2.2 of the rules, with further detail described in the AEMO *Guide to NEM Generator Classification and Exemption*[1].

Rules clause 2.2 requires that any generator rated at greater than 30 MW be registered with AEMO as a scheduled generating unit. A generator with a rating of less than 30 MW can be registered as a non-scheduled generating unit.

The AEMO *Guide to NEM Generator Classification and Exemption* establishes that a generator with a rating of less than 5 MW is generally exempt from the obligation to register with AEMO.

Scheduled generating units are obliged under the rules clause 3.8.6 to provide dispatch offers to AEMO which contain the generation volume and price bands for the upcoming 24 hours. Scheduled generators must follow their five-minute dispatch targets in accordance with rules clause 3.8.21.

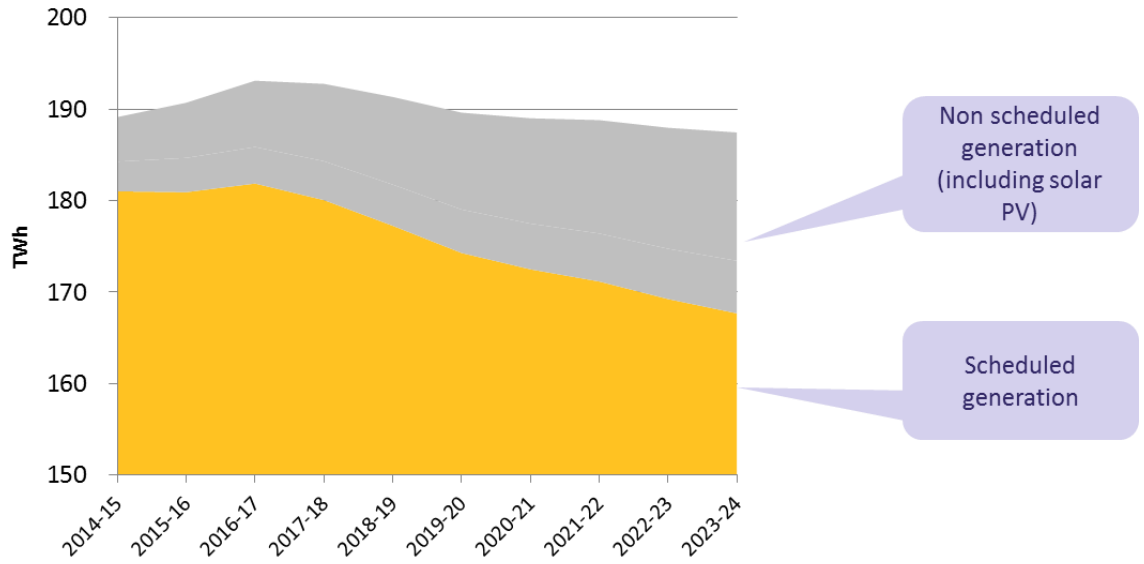
[1] August 2014 version available at http://www.aemo.com.au/About-the-Industry/Registration/How-to-Register/Application-Forms-and-Supporting-Documentation/NEM-Generator-Exemption

Non-scheduled generators are not required to submit dispatch offers, nor are they required to follow dispatch targets.

When the NEM commenced and the 5 MW and 30 MW thresholds were established, there were relatively few small generators in the NEM and they were able to be either exempt or non-scheduled with little negative impact on the overall level of power system control or market transparency.

However, as shown in figure 1, the total amount of non-scheduled generation in the NEM has increased significantly in recent years, and is forecast by AEMO to continue to grow. This is being contributed to by the growth in small distributed generation including but not limited to small wind and solar photovoltaic (PV) installations.

Figure 1: Forecast annual energy generation from non-scheduled sources[2]



Although non-scheduled generation is not required to respond to dispatch instructions, presently a substantial amount of non-scheduled generation is by choice responsive to wholesale electricity prices. This is due to the non-scheduled generator being a market generator (and therefore subject to the NEM settlement processes), or because the non-scheduled generator chooses to be exposed to the wholesale price through a contractual arrangement with another party. It is clear that being exposed to market prices is beneficial to these participants.

The growth in the amount of price responsive non-scheduled generation in the NEM is leading to a non-transparent distortion in the NEM pre-dispatch and dispatch processes. This distortion arises through non-scheduled generators changing their output, either in response to the NEM wholesale price or some other locally determined process, without the change being fully taken into account by AEMO in the NEM forecast or dispatch processes.

This typically impacts when there is a sudden increase in the five-minute spot price in a particular region. After the five-minute price has been published and dispatch instructions issued to all scheduled generators, non-scheduled generation is able to respond to the high five-minute price by increasing output suddenly. The NEM dispatch process has no direct information about non-scheduled generation, so it appears to the NEM as if there has been a sudden decrease in demand.

[2] Source – AEMO National Electricity Forecast Report 2014

Scheduled generators are required to follow their five-minute dispatch targets, even if the demand suddenly changes during a five-minute dispatch interval. AEMO manages any unexpected deviations in demand through the use of frequency control ancillary services. These services are typically provided by certain generating units that are capable of responding quickly to measured changes in the power system frequency.

This apparent decrease in demand part way through a five-minute dispatch interval interferes with the efficient dispatch of NEM scheduled generators. For example, when the spot price in a region increases beyond their offer price, scheduled "fast-start" generators (typically gas turbines) in that region receive dispatch targets to come on line. Most fast-start generators require at least five minutes from the time of receiving a non-zero dispatch target, to the time to synchronise from rest[3]. By this time, non-scheduled generators (who are not required to wait until they receive a dispatch instruction to come on line) can start to generate power, thus causing the measured demand and spot price to fall. In this situation, the fast start scheduled generator finds that by the time it has synchronised, the price has fallen below its bid price, and it then runs uneconomically for its minimum run time.

Because non-scheduled generators are not required to advise AEMO of their dispatch intentions or price responsiveness, AEMO is not able to take the impact of non-scheduled generation into account in the NEM dispatch and pre-dispatch processes. This lack of transparency in the intentions of the non-scheduled generators means that the scheduled generators are being sent dispatch targets that have been calculated without any account of the impact of non-scheduled generation. The dispatch targets sent to scheduled generators are therefore not as accurate as they could be, and can lead to inefficient dispatch and less effective power system control.

This inefficient dispatch can result in scheduled generators being dispatched uneconomically leading to them incurring large costs with no means of mitigation.

This rules change proposal would alleviate the inaccurate and inefficient dispatch outcomes by providing more accurate information to the AEMO pre-dispatch and dispatch processes that include actual intentions and reasonable estimates of when non-scheduled generation is likely to run.

This rules change does not seek to impede the ability of non-scheduled generator owners to run their plant in accordance with their individual businesses drivers.

Description of the proposed Rule

In considering how to overcome the current inadequate transparency of non-scheduled generation, GDFSAE has provided three mechanisms. These are described in the following sections.

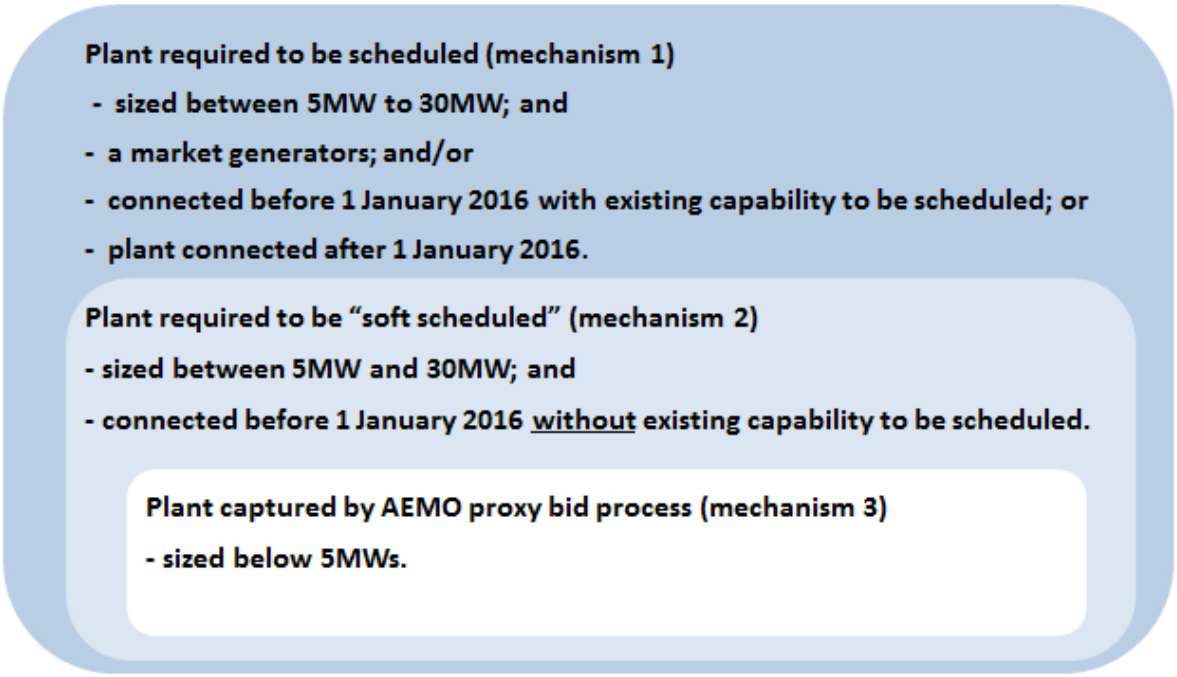
It is GDFSAE preference that as many generators as possible are required to be scheduled generators as this will provide the greatest level of transparency and accuracy in dispatch and pricing outcomes.

The second mechanism is proposed to apply to some 5MW to 30MW generators should the consultation process reveal a strong case for exclusion of certain classes of non-scheduled generation of that size. Likewise, GDFSAE is not proposing that generators smaller than 5MW should be scheduled and has provided an additional mechanism to apply to these generators.

[3] Based on examination of typical "T1" time in bids for fast start plant, available at http://www.nemweb.com.au/REPORTS/CURRENT/Yesterdays_Bids_Reports/

Figure 2 conceptualises how the three mechanisms could apply, noting that GDFSAE preference is to apply mechanism 1 widely and that mechanisms 2 and 3 are fall back options should wide application of mechanism 1 prove too challenging for all non-scheduled generators at this time.

Figure 2: Possible mixture of proposed mechanisms.



GDFSAE has proposed this combination of mechanisms as a possible approach should the AEMC not be minded to schedule all generation over 5 MW.

The following sections outline the elements of the three different proposals.

Mechanism 1: Scheduled

GDFSAE believes that the ideal solution to the issues discussed above would be that:

- all new generator registration applications with AEMO would be required to be scheduled;
- existing generators registered with AEMO as non-scheduled generators capable of being scheduled, would be required to become scheduled generators by a nominated time; and
- all market non-scheduled generators be scheduled.

GDFSAE is aware that there are likely to be some that argue that requiring all generators registering with AEMO to be scheduled may be imposing too onerous an obligation on businesses whose primary focus may not be operating in the wholesale electricity market. This is understandable but not a justification for maintaining the existing inefficiency in the market.

GDFSAE is of the view that this approach will be the most effective in overcoming the lack of transparency in the NEM, and will enable AEMO to manage the price and dispatch process in a more complete and accurate manner. Further, the costs imposed on impacted participants are not expected to be significant (see cost assessment below).

As such, there is a strong case for all market generators and others who are price responsive to be included already and although this would impose new obligations onto existing participants, the compliance burden is believed to be proportionate.

Nonetheless, if the AEMC were predisposed to the view that it would not be reasonable to require all current non-scheduled generators to become scheduled, the obligation could be linked to some defined measure which seeks to establish the practical ability of the individual generator to comply with the obligations for being a scheduled generator.

In addition to the above, GDFSAE has proposed two additional approaches for consideration that support the primary mechanism, that the AEMC may be minded to apply to sub-classes of non-scheduled generators should scheduling be impractical in limited circumstances.

Mechanism 2: Soft scheduled

While GDFSAE has reservations about permitting exclusions, it is realised that in some limited circumstances the same objective may be achieved, and thus efficiency improved, with an alternative interface with the scheduling process. The preference would still be that all generators are scheduled as described for mechanism 1; however, if it is concluded that a particular generator is not reasonably able to be scheduled, it would then register the generator as "soft scheduled".

A soft scheduled generator would be a new participant category with less obligations than scheduled generation. It would apply to a limited number of generators where an exception to being scheduled can be fully justified but the generators output is still material to market efficiency.

Soft scheduled generators would either be 'price responsive' or 'non-price responsive'. These generators would be required to indicate to AEMO which of the two soft scheduled nominations best describes the variation of its generation output as defined below.

> **Soft scheduled, Price responsive**: generation output will change in response to the NEM spot price.
>
> **Soft scheduled, Non-price responsive**: generation output is independent of NEM spot price and generation volume is driven by other variables.

Soft scheduled generators would be able to change their nomination with AEMO between these two categories if the nature of their price responsiveness changes.

The following description provides a conceptual design for how soft scheduled generators could be better incorporated into the AEMO dispatch and pricing processes.

Price responsive soft scheduled generators

Each soft scheduled generator that has indicated to AEMO that it is price responsive, must provide to AEMO:

- Advice on generation price-volume response bands (up to ten bands) for the upcoming pre-dispatch period.
    - AEMO to develop response bands advice submission process – simplified version of the full bidding system.

    - Price responsive soft scheduled generators are able to update their response bands advice up to 1 hour prior to actual dispatch time.
        - Note: suggest gate closure to ensure that AEMO have time to update new response bands into the dispatch process, as it is likely to be a somewhat manual process. If soft scheduled generators wanted full bidding flexibility they could elect to be scheduled.
- A dispatch inflexibility profile and the minimum loading level as per the rules clause 3.8.19(e).
    - Note – Although AEMO will not issue dispatch targets to price responsive soft scheduled generators, AEMO will take the generators dispatch inflexibility profile and minimum loading level into account in the pre-dispatch and dispatch processes.

Non-price responsive soft scheduled generators

Each soft scheduled generator that has indicated to AEMO that it is non-price responsive, must provide to AEMO:

- The expected generation profile for each 30-minute period in the upcoming pre-dispatch period.
    - AEMO to develop advice submission process for the generation profile– simplified version of the full bidding system.
    - Independent soft scheduled generators are able to update their expected generation profile advice up to 1 hour prior to actual dispatch time.
        - Note: suggest gate closure to ensure that AEMO have time to update new generation profile into the dispatch process, as it is likely to be a somewhat manual process.

AEMO processes

AEMO is to take into account all information provided by price responsive and non-price responsive soft scheduled generators when preparing and reporting the pre-dispatch schedule, and the five-minute dispatch process.

The generation profiles of all non-price responsive soft scheduled generators would be used by AEMO in preparing the demand forecast for the relevant region. Price-volume response bands for the price responsive soft scheduled generators would be treated in the dispatch and pre-dispatch processes in the same way as a price-volume band from a scheduled generator, with the exception that the soft scheduled generators will not be subject to network constraints.

Although the dispatch outcomes for soft scheduled generators will be calculated by the dispatch process, AEMO will not issue dispatch targets for soft scheduled generators, but will prepare a daily file for each price responsive soft scheduled generator indicating the level of output that was calculated within the dispatch process for each five-minute period on the day. These daily files will be made available to the relevant soft scheduled generator.

Conformance of soft scheduled generators with forecast

Soft scheduled generators would not be issued with dispatch targets and therefore would not be subject to the dispatch conformance requirements in the rules that apply to scheduled generators.

Nevertheless, it will be important to have a reasonable compliance obligation in place to ensure that soft scheduled generators take acceptable measures to run their generation in a manner which is consistent with the information provided in advance to AEMO.

Soft scheduled generators would therefore be required to provide a report each month to the Australian Energy Regulator and AEMO which indicates:

- the actual generation output during the previous reporting period (each five minutes); and
- the most recent price/volume band information provided to AEMO (for price responsive soft scheduled generators) or expected generation profile (for independent soft scheduled generators).

AEMO would each month, compare the actual generation output profile for each soft scheduled generator with the expected generation output based on their price/volume information or forecast generation profile. New rules would need to be established to set the tolerance allowance that would apply to soft scheduled generators, before a non-conformance notice would be issued.

GDFSAE anticipates that some non-scheduled generators may argue against this on the basis that it would become an onerous obligation. GDFSAE would dispute this on the basis that non-scheduled generators need to retain accurate fuel, volume and performance data to manage their facilities and this data could be used as the basis to inform AEMO.

Mechanism 3: AEMO proxy bids

The third mechanism that GDFSAE proposes is for AEMO to develop a new process that, through existing real time measurements of demand at all connection points, correlated with the published five-minute regional prices, prepares proxy price/volume offer bands to represent the expected aggregate response of non-scheduled generators. This proposal has the advantage that it also captures aggregate response from smaller (less than 5 MW) generators (and demand blocks) who would not be captured by mechanisms 1 or 2.

AEMO already forecasts the expected output of semi-scheduled wind generators based on the expected wind forecasts, and it is understood that AEMO are also developing new forecasting processes to account for small scale solar PV generation. Future growth in storage systems are expected, which will also require AEMO to develop new processes for forecasting and incorporating storage into dispatch and pre-dispatch.

At present, the demand forecast used in the dispatch processes represents the demand that must be met by all scheduled generators. It is recognised that there is a significant (and growing) amount of consumer demand that is met by generation that sits outside of the dispatch process. Some of this generation is registered with AEMO as non-scheduled generation (the category of generation that is the subject of this rules change proposal), and other generation is not registered with AEMO at all.

The generators that are not registered with AEMO are mostly smaller than 5 MW, and a large proportion of this category is now represented by household solar PV. The total output of these solar PV and other small scale generators are independent of the wholesale pool price, and are seen by the NEM participants and AEMO as displacements in the demand that has to be met by scheduled generators.

AEMO are working to improve their processes for forecasting these displacements in order to provide more accurate demand forecasts.

The difficulty with non-scheduled generators that are price sensitive is that when they generate, they displace the demand for scheduled generators in the same way as the other small scale generators described above. Nevertheless, it is not practical for AEMO to incorporate the effect of price sensitive non-scheduled generation into the demand forecast.

AEMO dispatch scheduled generation sources each five minutes in order to meet the forecast demand for that period; however, if the demand includes a component that will change at a certain price point, AEMO is unable to account for this in their demand forecast process. This is due to the fact that the demand forecast is an input into the dispatch process, and therefore must be determined in advance of knowing what the price outcome will be.

The demand forecast used in dispatch therefore takes no account of the impact of the price response of non-scheduled generators. This effectively means that whenever a non-scheduled generator chooses to run in response to a price spike, the AEMO demand forecast will suddenly be too high, as it did not anticipate the output of the non-scheduled generator.

The only option for AEMO to incorporate this into the dispatch process is as a proxy scheduled, "normally on[4]" load block. AEMO would need to include this as a proxy demand bid, rather than a generation offer, since the impact of the NEM dispatch process choosing to dispatch one of the proxy offers is that it will effectively reduce the demand available for the scheduled generators.

There will inevitably be some arguments against AEMO being responsible for preparing and submitting a proxy offer on the basis that the independent market operator should not be a player in the market. This is a view that GDFSAE is quite sympathetic towards, and agrees that such a step would need to be taken with appropriate safeguards to ensure that AEMO's involvement was appropriately structured.

How proposed rules contribute to the NEO

GDFSAE believes that if implemented, the rules change proposal would contribute to the National Electricity Objective (NEO) in a number of different ways as discussed below.

More accurate and predictable dispatch of generation will improve the ability of scheduled generators to respond to wholesale price variations. This will be particularly important for peaking generators who when faced with a five minute price spike, need to make a decision about whether to commit their plant, or wait to ascertain whether the high price will be sustained. Having peaking generators dispatched more efficiently with less risk of being exposed to inefficient running periods will lead to more competitively priced generation, and better customer outcomes.

For example, when a peaking generator enters into a cap contract, the generator needs to manage its risk exposure by ensuring that when the pool price exceeds the cap contract price, the generator is able to be dispatched in the market. If a peaking generator is not confident that it will be able to be dispatched at higher pool prices, then the generator will be reluctant to enter into cap contracts.

[4] Scheduled demand in the NEM can be either "normally on" (a customer that normally consumes electricity but can reduce for short periods), or "normally off" (a customer that normally does not consume electricity, but will do so for short periods if the price is low – eg hydro pump storage).

This will reduce the liquidity of hedge instruments available to the market in general, and will impact negatively on market customers (retailers).

The rules change proposal would contribute to the NEO by facilitating peaking generators' being better placed to offer competitively priced cap contracts with greater confidence that they will be able to respond to market price signals.

Improved dispatch and pricing allows peaking generators to be more confident in their predictions of when they might be needed to run and for how long. Clearer dispatch and pricing signals improve the ability of peaking generators to make decisions regarding their ongoing availability or willingness to invest in new plant. This leads to improved reliability and security of supply for customers and the electricity system.

Where the market better utilises available resources to reduce total costs of producing electricity and better allocates those resources to other demands, it will deliver more efficient outcomes to consumers. A reduction in operating costs and better signals in the market will ultimately lead to reduced costs for consumers and better signals for investors.

Notably, the inefficiencies considered relevant to this rules change are akin to those cited by the AEMC in seeking to better manage late rebidding. Likewise, where information that can be made available to the market is not made available, in this case non-scheduled generator operations information, it will lead to avoidable inefficiencies. As such, GDFSAE believes that there is a strong case for change and that improved market information will better meet the NEO.

Costs and benefits and potential implications

If the proposed rules change were to be implemented, depending how the mechanism were to be adopted, there will be some additional costs imposed on non-scheduled generators and AEMO.

The benefits from the rules change would, as discussed in the previous section, arise from the improved market efficiency through increased market transparency.

Although it is difficult to estimate the quantum of these costs, the following section attempts to provide a high-level estimate.

In attempting to provide cost estimates, GDFSAE has considered the number and size of existing generators are registered with AEMO as non-scheduled.

Based on information available on the AEMO website, there are currently 73 non-wind, non-scheduled generators registered with AEMO[5] and a further 18 non-scheduled wind generators[6].

The capacity (in MW) of these non-scheduled generators is summarised in the following table:

	Non Wind		Wind	
Region	Market	Non-Market	Market	Non-Market
VIC	100	58	293	201
NSW	357	125	170	0

[5] Information derived from AEMO Registration and Exemption List on 17 November 2014
[6] GDFSAE understands that the non-scheduled wind generators were those that were registered with AEMO prior to the semi-scheduled category being introduced.

QLD	435	287	12	0
SA	148	0	388	0
TAS	98	6	140	0
TOTAL	**1138**	**476**	**1003**	**201**

GDFSAE does not propose that the wind generators that are registered as non-scheduled should be required to make any change to their current processes. When the semi-scheduled changes were introduced into the NEM, these generators had already registered, and were not required to make changes to become semi-scheduled.

The focus of this rules change proposal is non-wind generators. Any new wind generators seeking registration with AEMO will presumably, be required to be semi-scheduled as per the current rules requirements.

The costs for implementing this rules change proposal would depend on how the mechanisms were adopted. GDFSAE have attempted to estimate the costs of each mechanism in the following.

Scheduled generator

The additional costs that this would impose on the generator are estimated to be as follows:

- Establish communications platform with AEMO for providing bids and receiving dispatch instructions: One off: $10,000
- Internal resource to establish policy and procedures for providing and updating advice to AEMO (40 resource hours): One-off: $3,000
- Assign resource to be responsible for preparing and submitting bids and responding to dispatch instructions (two to ten resource hours per week, depending on how dynamically the participant changes their price): $150 - $750 per week = $7,500 - $37,500 per year depending on level of activity.
- Total cost:
    - One off: $13,000
    - Ongoing: $7,500 - $37,500 pa

It is important to note that many non-scheduled generators are already active in the market and the incremental costs arising from this rules change will be limited if not negligible.

Although there would be a small increase in the costs for AEMO to accommodate the additional scheduled generators, as AEMO have well established process to deal with this for existing scheduled generators, it is not expected that there will be a significant increase in AEMO costs for this function.

Soft scheduled generator

The estimated costs for a soft-scheduled generator below recognise that the costs will vary depending on whether the generator chooses to interact with the spot market, or whether it chooses to remain somewhat passive, and simply adopt the same price response profile each day for an extended period.

- Assume that price responsive generators costs would be:
    - Establish communications platform for providing regular advice to AEMO (could simply be email): One off: $5,000
    - Internal resource to establish policy and procedures for providing and updating advice to AEMO (20 resource hours): One off: $1,500
    - Assign resource to be responsible for preparing and submitting advice to AEMO (two resource hours per week): $150 per week = $7,500 per year
- Total cost for price responsive generators:
    - One off: $6,500
    - Ongoing: $7,500 pa

- Assume that non-price responsive generators costs would be:
    - Establish communications platform for providing and updating generation profile to AEMO (could simply be email): One off: $5,000
    - Internal resource to establish policy and procedures for providing and updating profile to AEMO (ten resource hours): One off: $750
    - Assign resource to be responsible for preparing and submitting profile to AEMO (one resource hours per week): $75per week = $3,700 per year
- Total cost for independent generators:
    - One off: $5,750
    - Ongoing: $3,700 pa
- Assume that AEMO costs would be:
    - Establish communication arrangements for price responsive and independent generator advice. One off cost: $10,000
    - Include new generation entities in the NEM dispatch engine to account for price responsive non-scheduled generators. $10,000
    - Include changes to demand forecasting processes to account for independent non-scheduled generation profiles. $10,000
    - Update relevant procedures. $5,000
    - Prepare new reports and output data files. $5,000
    - Note: no ongoing additional cost is anticipated for AEMO as once the new units have been included in the dispatch and forecasting processes as outlined above, it is expected that AEMO's existing operational resources will be able to absorb this change with no significant impact.

Total AEMO costs: One off: $40,000

AEMO proxy bid

If the proposal is adopted for AEMO to incorporate proxy bids to represent the expected response of certain non-scheduled generation, then AEMO will need to develop monitoring tools to capture how these units are responding, and then analysis tools to determine the proxy bids needed to represent the expected response.

GDFSAE understands that AEMO already have SCADA monitoring of many of the existing non-scheduled generators. For those non-scheduled generators that AEMO does not have SCADA monitoring, then AEMO would need to either arrange for the appropriate monitoring to be installed, or alternatively use an estimate abased on metering of nearby connection points. Since the cost for installing new metering could be substantial, GDFSAE suggests that AEMO initially establish systems based on estimates.

GDFSAE believes that the changes proposed above for AEMO should be able to be developed by AEMO with minimal need for new information technology systems. It will require AEMO to devote resources to the development of the new process, and ongoing resources to ensure it is appropriately maintained.

GDFSAE estimates that AEMO would need to devote 2 dedicated resources for 6 months to develop the processes, and a further 0.5 ongoing full time equivalent resource.

Estimated one off cost: $160k

Estimated ongoing cost: $80k pa

Like many initiatives to improve market efficiency and effectiveness, the benefits that are expected to arise from this rules change are difficult to quantify accurately. The manner in which the benefits are most likely to manifest are detailed below.

In the first few dispatch intervals immediately following a significant price spike:

- AEMO will be able to include in the NEM dispatch engine, the expected dispatch changes from price responsive non-scheduled generators, thus reducing the likelihood of dispatching scheduled generating units unnecessarily and inefficiently.
- It is difficult to quantify this benefit but enabling a fast start generator to be more confident of meeting its minimum run time and cover its operating costs will not only reduce the likelihood of the peaking generator running at a loss, but will also encourage greater liquidity in cap contract provision. These benefits are likely to be in the order of 10's or 100's of thousands of dollars per event.

In the upcoming one-two hours of the pre-dispatch:

- AEMO will be able to include in the pre-dispatch forecasts, advice regarding how non-scheduled generators are intended to be dispatched, which will contribute to a more accurate forecast of how scheduled generators will be dispatched. This will reduce the likelihood of price spikes being forecast, which subsequently do not occur because of un-forecast response from non-scheduled generators.
- Preventing price spike forecasts that are regarded sceptically by market participants will improve the confidence of market participants and potential investors in the integrity of these forecasts. This will lead to more efficient dispatch, as peaking generators will be more likely to respond to pre-dispatch forecasts in such ways as ensuring sufficient fuel and staff are available to meet the forecasts.

Pre-dispatch forecast for the upcoming 24 hours:

- The accuracy of the pre-dispatch forecast for the upcoming 24 hours and beyond will be improved by the inclusion of advice regarding non-scheduled generator intentions. This will contribute to increased confidence in the accuracy of the pre-dispatch forecast by scheduled generators, particularly the marginal generators that need to finalise operational arrangements for the upcoming day. For example, some peaking gas generators might make arrangements for gas supply and transport, based on their pre-dispatch forecast schedule.

In the longer term:

- Increased confidence in forward price information provided to the markets, which is critical given participant reliance on pre-dispatch information.
- Generators will have increased confidence that difficult to predict price shocks, based on a lack of information transparency, will not arise. Such risks can cause participants to run at a loss which may harm long term financial viability. This is likely to deter investment.
- Where investment is sub-optimal it can interfere with least cost delivery of energy to consumers. For instance, longer-term impacts on the efficient plant mix will increase the costs of energy to consumers.
- A misallocation of resources has flow on effects in the contracts market. Improved information will ensure accurately priced contracts, for example caps. The alternative is contracts that are inflated in price to manage the unexpected and difficult to predict impacts of non-scheduled generation. Better information reduces this source of inefficiency and risk.
- Inefficiently priced contracts will ultimately flow through to consumers. For example, inefficiently priced contracts harm retail markets and impact retail competition. Inefficient spot and contract markets may undermine competition in some or all regions where retailers cannot access efficiently priced contracts.
- Ultimately, any increases in efficiency – productive, allocative and dynamic – will meet the long term interests of consumers and thus the NEO.

The overall impact of these benefits, whilst difficult to quantify, would seem to GDFSAE to be of the order of 100's of thousands of dollars per price spike event, with additional benefits also likely through greater confidence in dispatch and pricing forecasts.

These benefits would seem to be greater than the costs outlined earlier, by a considerable margin.

GDFSAE therefore believes that although this has been a simplistic analysis of costs and benefits, there would appear to be a strong case to argue that the benefits would easily exceed the costs.

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