Purpose of this document

AEMC staff have developed this paper to inform discussion at the technical working group. Please note that the thinking and views contained in this paper are indicative and have been developed by AEMC staff for consultation purposes at the technical working group only. The content is therefore subject to change.

AEMC staff appreciate the assistance of the AER and ACCC, particularly Dr Darryl Biggar, in the preparation of this paper. All misconceptions are our own.

FTR Funding and Procurement

In March 2020, the Commission published a technical specifications paper for the *Coordination of Transmission and Generation Investment (COGATI)* review.[1] That paper set out a blueprint for the proposed access model, as a basis for discussion with stakeholders over the course of 2020.

The purpose of this document is to seek the technical working group's input on the Commission's proposed approach to the **funding and procurement** of the **financial transmission rights** (FTRs)[2]

In the technical specifications paper, the Commission proposed that eligible parties would be able to purchase FTRs through a simultaneous feasibility auction. To support the firmness of FTRs, the Commission also proposed that FTRs would be funded by both the congestion rent that arises from wholesale market settlement (also known as "settlement residue"), and the revenue generated from the sale of the FTRs through an auction. The use of the revenue from the sale of the FTRs was a change to the blueprint compared to October 2019.

In this paper, we provide further detail on:

1. The rationale for selling FTRs through a simultaneous feasibility auction, and what this means for the quantity of FTRs that will be available for purchase.
2. How the proposed funding arrangements impact the available quantity of FTRs and their firmness.

There are a number of conclusions, which are summarised below:

- Including the FTR auction revenue to back FTR payouts in addition to the congestion rent (also known as "settlement residue") appears to make sure that FTRs have a very high probability of not being scaled back. This is because:
    - in a competitive FTR market, the FTR auction revenue would approximate the expected FTR payouts
    - under the simultaneous feasibility test the *expected* congestion rent is equal to or greater than the *expected* FTR payouts

[1] Available at: https://www.aemc.gov.au/sites/default/files/documents/technical_specifications_report_-_transmission_access_reform_-_march_update.pdf

[2] This paper discusses the ongoing process for FTR procurement, rather than any initial allocation of FTRs that could potentially take place under grandfathering arrangements.

  - consequently, in a competitive FTR market the inclusion of FTR auction revenue would approximately double the amount of money available to back the FTRs compared to using the congestion rent alone
  - even in an FTR market with low competition, the auction revenue would be expected to considerably increase the amount of money available to back the FTRs, substantially lowering the changes they are scaled back.

- We have set out this detail in response to continuing stakeholder concerns that the FTRs will not be firm. We consider that the above means, from a theoretical perspective, supports the argument that the FTRs will be relatively firm. We are continuing to test this empirically through the NERA modelling; as well as looking at overseas experience of this issue.
- This also means that the precision of the simultaneous feasibility test (i.e. specifications of the simultaneous feasibility auction) is less crucial for ensuring the firmness of FTRs. Were "too many" FTRs to be sold such that the actual congestion rent is less than the actual FTR payouts, the auction revenue (which itself would be higher than would otherwise be the case because more FTRs have been sold) would be used to back the FTRs.
- We think that it is appropriate that FTR issuance should aim to fully utilise the expected congestion rent, as this leaves consumers in a "balanced position". If the actual congestion rent exactly equals the actual FTR payouts then the two exactly cancel out, meaning that the consumers receive a fixed offset to their TUOS – the auction revenue. If the two do not exactly equal, then consumers will be exposed to variability in the amount which is used to offset their TUOS (either higher or lower).
- The simultaneous feasibility test (which applies to fixed volume FTRs) does not target this objective precisely. Rather, it targets the congestion rent being *at least* enough (and therefore, on average *more than enough*) to back the FTRs issued.
- However, the simultaneous feasibility test (and fixed volume FTRs) is the only tested and practically implementable approach that we have identified for an auction-based procurement model. We are continuing to look at alternatives that could allow a more appropriate number of (potentially alternatively designed) FTRs to be released. However, based on our research, the simulteanous feasibility test is the only international example we could find that seeks to achieve this. We consider that this supports our conclusion that we can have confidence in how the simultaneous feasibility test operates.

We are seeking the technical working group's input on these issues.

The discussion planned for 5 June 2020 will focus on this paper. To maximise the time for discussion, we will take the contents of this paper largely as read. The paper sets out a number of questions for discussion during the technical working group meeting. While we are interested in your feedback on any aspect of this paper, please come prepared to discuss these questions.

Table of Contents

1 Overview of the proposed access model

The proposed access model involves two key changes to the current transmission access frameworks – the introduction of locational marginal pricing; and financial transmission rights. While, the detailed design of each of these elements could differ, the March technical paper set out the following:

1. Scheduled and semi-scheduled market participants would receive or pay a spot price that varies with their location (a locational marginal price or 'LMP'). LMPs reflect the value of supplying electricity in different parts of the network, accounting for both transmission congestion and losses. Non-scheduled participants would continue to pay a regional price.
2. Participants would be able to purchase financial transmission rights (FTRs) which pay out on the differences in LMPs that arise due to congestion and losses.

1.1 What is locational marginal pricing?

LMPs represent the marginal cost of supplying an additional increment of energy at a given location in the transmission system. Without any binding shared network constraints or transmission losses, the cost of supplying an additional megawatt of electricity would be the same at all locations. This is because:

- The same marginal generator could supply an additional unit of energy to any location (since there is no congestion).
- The quantity of energy injected into the system would be the same as the quantity withdrawn (assuming no losses).

If transmission constraints bind, the same marginal generator would no longer be able to supply all locations in the system. This is because the transmission constraint will restrict the amount of energy that certain generators can supply. For connection points located “downstream” of the constraint, an additional megawatt can now only be supplied by another, more expensive, generator. This means that the LMPs at these connection points are now higher due to the transmission constraint, resulting in a higher LMP for those located “downstream” of the constraint and lower LMPs “upstream” of the constraint.

Even when there are no binding transmission constraints, LMPs will still vary from one another due to the impact of transmission losses. That is, LMPs will always reflect the marginal impact on system losses of supplying an additional unit of energy at a given connection point.

Currently, marginal transmission losses are reflected in settlement through the application of static marginal loss factors (MLFs). The COGATI review is exploring the consideration of a more market integrated loss factor approach, such as whether it would be better to move to dynamic marginal losses.

1.2 What are financial transmission rights?

If locational marginal pricing is introduced, the price of energy will vary across the network. This means that participants will face basis risk, when they buy and/or sell energy at different locations.

The standard, fixed volume FTR design that is used internationally and also envisaged by the AEMC, entitles the holder to a payment equal to the difference in wholesale market prices at two locations, multiplied by the FTR quantity.[3] Purchasing FTRs therefore allows market participants to hedge basis risk, supporting contracting between market participants located in different parts of the network.

In most markets that have adopted a form of LMP/FTR model, FTRs only hedge differences in LMPs that arise due to congestion. New Zealand is the exception, which has FTRs which hedge the full difference between LMPs arising from both congestion and losses.

2 FTR funding and procurement

This section summarises how the proposed design in relation to FTR funding and procurement has evolved, from the October 2019 discussion paper up to now. We focus here on FTRs that hedge congestion-related price differences only.

2.1 Introduction

The funding and procurements arrangements that apply to FTRs seek to resolve two related questions:

1. How can you make sure that there is sufficient revenue to back FTRs?
2. How do you determine the quantity of FTRs that will be sold?

Traditionally, in FTRs the funding source is the **congestion rent** that arises from the introduction of locational marginal pricing i.e. the differences between the nodal prices that exist at either "end" of the FTR.[4]

LMP means that those parties that are exposed to their local prices (in a full nodal model, both generators and consumers; in the COGATI proposal only scheduled participants) are paid / pay different prices for the same electricity in the presence of congestion and losses.

Under the traditional design, this would result in either the same or more money being paid into the system operator's settlement system than out of settlement. Therefore, there is excess money left over. In many markets with LMP/FTR models, the congestion rent (which arises due to transmission infrastructure which is paid for by consumers) is viewed as the natural 'counterparty' to FTRs, and therefore as the 'primary' source of FTR funding.

Consistent with this perspective, many LMP/FTR markets aim to sell a quantity of FTRs that can be backed by the available congestion rent. The procurement mechanism to achieve this is a **simultaneous feasibility auction**. As described in Box 1 below, a simultaneous feasibility auction **will sell the most valuable combination of fixed volume FTRs that is also consistent with the underlying physical characteristics of the transmission network.** If the transmission network represented in the auction is consistent with the network represented in the dispatch engine at the time of dispatch, this will make sure that the congestion rent will be greater than or equal to payments due to FTR holders. That is, in a given dispatch interval:

$$\textit{Congestion rent} \geq \textit{FTR payouts}$$

[3] FTR payouts will be subject to scaling in the event that there is insufficient money (from the congestion rent and loss rent, and revenue from the sale of FTRs) to back the FTRs.

[4] Hogan, W., 1992. "Contract Networks for Electric Power Transmission," Journal of Regulatory Economics 4, pp. 211 – 242.

If this condition is met, the set of FTRs sold can be described as **'revenue adequate'**.

Box 1: Simultaneous feasibility auction

The purpose of a simultaneous feasibility auction is to make sure that – provided the assumptions underpinning the auction are correct – the congestion rent arising from dispatch is always greater than or equal to the payout for the set of FTRs sold.

The simultaneous feasibility test applies specifically to fixed volume FTRs (ie, those that pay out on the price difference between locations multiplied by a fixed quantity).

In effect, the auction algorithm is set to maximise the *value* of the FTRs sold through the auction (as opposed to the quantity), subject to that set of FTRs being simultaneously feasible i.e. within the physical constraints of the network. This means that the FTRs are allocated in the combination that is most valued (collectively) by market participants, and so would best allow them (collectively) to manage any basis risk that would arise from the local prices differing from one another (or differing from the regional price).

Based on our understanding of overseas markets, the simultaneous feasibility test is based on a detailed network model. The network model is, effectively, the same as that used in the dispatch engine – and so includes all of the constraints that exist in the dispatch engine, including details of the transmission network as well as any (but not necessarily all) constraints that would relate to system security.

Simultaneous feasibility is therefore tested by treating each FTR bid as an 'injection' and 'withdrawal' of energy at the two connection points specified in the FTR instrument. In other words, if a participant submits a bid to purchase a 100MW FTR from Point A to Point B, the FTR auction will treat this as a 100MW injection at A and 100 MW withdrawal at B. The auction will therefore find the combination of FTR bids that maximises the aggregate value of FTRs sold (which is based on the auction bids), subject to the implied pattern of injections and withdrawals being feasible given:

- system constraints, including any system security constraints represented in the dispatch engine
- the investment decisions made by TNSPs with regard to existing and committed network capacity, and
- the existing FTRs that have already been sold to other market participants.

Mathematically, this has the effect that for the set of FTRs sold:

Congestion risk ≥ FTR payouts

It is important to note that this is only guaranteed if the network model used for the auction is consistent with that used in dispatch.[5] In practice, the transmission network assumptions that feed into the auction will not perfectly match actual conditions in dispatch, given the conditions in dispatch will dynamically adjust in response to conditions at a particular point in time.[6] For example, the network configuration might change, new transmission system constraints may be introduced, or there could be transmission network outages. Such differences will generally be

[5] Note that the simultaneous feasibility condition does not require the real time dispatch to be identical to the implied FTR injections and withdrawals. Simultaneous feasibility, and therefore revenue adequacy, are achieved as long as the system operator is *able* to set the controls and configuration of the network to make the point to point FTRs feasible.

[6] The simultaneous feasibility auction model often contains some manual adjustments, such as a reduction in network capacity, to account for these potential network uncertainties.

more likely to arise the further ahead FTRs are sold in advance of real time dispatch. These differences can obviously be incorporated next time the auction is run, but there will be a period of time before this can occur.

While the mathematical proof of the simultaneous feasibility test is complex, it is intuitively correct. It is not possible for the 'dispatch' of FTRs to be more valuable than the actual dispatch in any given dispatch interval, because if it were, the dispatch engine would have selected a dispatch exactly consistent with the FTRs instead (because they are more valuable). The actual dispatch must be the same as or more efficient that the pattern of FTRs actually held, meaning there must be at least sufficient congestion rent arising from the dispatch to cover the FTR payouts.

As noted in Box 1, inaccuracies in the network model that underpins the simultaneous feasibility auction could mean that the congestion rent is less than the full payout due to FTR holders.[7] LMP/FTR markets in other jurisdictions take different approaches to account for the possibility of 'revenue inadequacy' i.e. not having enough money to pay out FTRs. These approaches include either or a combination of:

- **Reducing the quantity of FTRs sold.** That is, the party administering the auction applies an adjustment to reduce FTR sales below the level permitted under a 'pure' standard simultaneous feasibility test. This effectively involves scaling back the capacity of the transmission network represented in the auction algorithm, to account for uncertainty in the assumptions. This amount aims to limit the likelihood that revenue inadequacy will arise.
- **Providing additional sources of funding.** If, in any dispatch interval, the congestion rent is less than the full FTR payout due, an alternative funding source is drawn on. Potential sources include:
    - Accumulating excess congestion rent in a fund, for later use in dispatch intervals when there is a deficit.
    - Using the proceeds of the FTR auctions to make up any shortfall.
    - Levying an uplift charge on consumers.
- **Scaling back payouts to FTR holders.** That is, payments to parties who hold FTRs are reduced so that they match the available funding (whether this is the congestion rent alone, or in combination with one or more of the sources described above). In this way, generators themselves bear the risk of there being insufficient money to pay out FTRs.

The likelihood that FTR payouts would be scaled back determines the extent to which the FTRs are considered '**firm**'. Accordingly, there is a link between:

- the sources of funding made available to fund FTR payments,
- the number of FTRs issued, and

[7] This is not automatically the case. For example, it might be that participants have purchased less than the maximum amount of FTRs that could have been sold, in which case there may be 'unallocated' congestion rent that provides a buffer.

- the level of firmness i.e. what proportion of time can FTR holders consider that they will receive a full payout from the FTRs (or, what proportion of the revenue that the FTR holders would expect to receive absent of scaling).

Indeed, the links can be somewhat circular. For example, if FTRs are made very firm by including auction revenues as a funding source, they are more valuable to the holder. Therefore, the auction proceeds may be greater than if FTRs were less firm, which in turn increases the available funding and firmness.

2.2 October 2019 discussion paper

In October 2019, the Commission released a discussion paper on the proposed access model design. In relation to FTR funding and procurement, the October paper proposed that FTRs would be issued through a simultaneous feasibility auction and funded by the available congestion rent. To support the firmness of the FTRs, the Commission proposed that:

- The volume of FTRs sold through the simultaneous feasibility auction would be set to make it very unlikely that the congestion rent would not be enough to fund payouts i.e. the amount of FTRs sold would be reduced.
- The congestion rent would be 'pooled' across the NEM. That is, funding for a particular FTR would not be limited to the congestion rent arising from binding constraints in that part of the network.
- Any excess congestion rent in one period would be held in a fund for later use in periods when there were shortfalls.
- If after these measures the available funding was still insufficient to fully fund FTR payouts, payment would be scaled back accordingly i.e. generators wold bear the risk.

At that time, the Commission did not favour using the auction revenue to increase the firmness of the FTRs. This was because the Commission considered that the benefits to consumers from using the auction revenue to offset TUOS charges would exceed the benefits from increasing the firmness of FTRs.

2.3 March 2020 technical specification paper

Following the October 2019 discussion paper, the Commission undertook extensive stakeholder consultation. Stakeholders concerns, in the context of this paper, were that for FTRs to be a useful risk management tool, it is important that:

- FTRs are very firm;
- the quantity of FTRs available is maximised; and
- if possible, alternatives to fixed volume FTR instruments are made available which better match the variable output of generators.

In light of this feedback, and additional research, the March paper proposed that:

- FTRs would be funded by *both* the congestion rent, including from congestion rent in other areas of the network and different times, *and* the FTR auction revenue.

The measures to support firmness outlined in the October paper (i.e. conservative issuance of FTRs, pooling congestion rent across time and locations) would remain in place. In the event that the congestion rent and auction revenue were not sufficient to support FTR payouts, the FTR payouts would still be scaled back. We have been clear that it does not consider an uplift charge on consumers to be appropriate. However, our expectation is that with the inclusion of FTR auction revenue as an additional funding source, the likelihood of scaling would be very remote.

The March technical paper envisaged that the congestion rent and FTR auction revenue would accumulate in two separate funds (the “settlement account” and the “auction account”). The intent of maintaining two separate accounts was to more frequently return excess funds from the auction account to consumers as an offset to TUOS charges in order to still obtain as much of the benefits for consumers as possible.

2.4 Updates since March

Since the March paper was published, the project team have been working through the implications of the proposed inclusion of FTR auction revenue as a funding source. Further consideration is also being given to the use of the simultaneous feasibility test as the basis for setting how many FTRs are available for purchase. The following sections provide an update of how our thinking has progressed to date.

2.5 Simultaneous feasibility and revenue adequacy

As described in section 2.1, the function of the simultaneous feasibility test applied by the FTR auction is to achieve revenue adequacy, where this is defined as:

Congestion rent ≥ FTR payouts

This was, effectively, the revenue adequacy definition adopted in the October 2019 paper, which proposed that the congestion rent would be the only source of funding for FTRs (albeit smoothed across time and location). Under this funding model, the firmness of FTRs depends <u>substantially</u> on how well the network model used in the auction represents actual network conditions in dispatch. To deliver FTRs that were very firm, we suggested that the auction would need to apply an additional level of conservatism (beyond the standard simultaneous feasibility test), resulting in less FTRs being available to market.

As stated in Section 2.3, following stakeholder feedback that it is important that FTRs are very firm (Box 2), the Commission proposed in the March 2020 paper that auction revenues could also be used to back FTR payouts.

With the inclusion of auction revenues as an additional funding source, the test to determine whether an FTR needs to be scaled back becomes:

Congestion rent + FTR auction revenue ≥ FTR payouts

Therefore, the relevance of the congestion rent as the constraining factor on FTR issuance might appear to have decreased. After all, if there is insufficient congestion rent to pay the FTRs, the FTRs will not need to be scaled back, as they will also be funded from the FTR auction revenue (unless the FTR auction revenue is *also* insufficient).

Given we are using both the congestion rent and auction revenue to back the FTRs, we would expect the FTRs have a very high probability of not being scaled back, even if they sell for less than the eventual payout.

In a competitive FTR market, one could expect the FTR auction revenue to approximately equal the expected FTR payouts. In turn, this would then double the amount of money available to back the

FTRs, compared to just using the congestion rent alone, if the FTRs are sold consistent with the simultaneous feasibility test.

Even assuming a particularly uncompetitive FTR market the likelihood of scaling back the FTRs seems to have dramatically reduced with the inclusion of the FTR auction revenue to back then.

For example, assume that the FTR auction revenue is considerably less than the FTR payouts (say, half) because the FTR market is uncompetitive. Even under these circumstances, there would be 1.5 times the amount of money expected to be required to meet the FTR payouts if the FTRs are sold consistent with the simultaneous feasibility test. Or put another way, there would have to be less than half the amount of congestion rent than expected to require the FTRs to be scaled back.

Conclusion

Revenue adequacy - as defined as congestion rent (alone) being equal to or greater than the FTR payouts - is not a relevant consideration in determining how many FTRs to sell, given the use of the FTR auction revenue to also back the FTR payouts.

Including the FTR auction revenue to back FTR payouts in addition to the congestion rent appears to make sure that FTRs have a very high probability of not being scaled back.

Questions for the TWG:

1. Do you agree with our conclusions about the high degree of firmness of the FTRs given the use of the auction revenue to back the FTRs, and so revenue adequacy – as designed above – is not a binding consideration?

From this perspective, it is relevant to ask whether simultaneous feasibility test – which aims to ensure that the congestion rent (alone) is the same as or greater than FTR payouts – is still the correct basis for determining how many FTRs should be allocated.

2.6 Is the congestion rent a sensible constraint for FTR issuance?

Given the revenue from the FTR auction is also being used to back the FTRs, the most relevant consideration in determining how many FTRs to issue is no longer minimising the chances of an FTR being scaled back, but instead minimising the risk to consumers arising from congestion rent and FTR payouts. This risk is the variability in the amount of money by which TUOS is offset.

This is achieved when expected congestion rent is equal to the expected FTR payouts. That is, when the expected “income” (the congestion rent) exactly matches the expected liability for the consumer (the FTR payout), meaning that TUOS is offset by a pre-determined amount – the revenue generated from the sale of the FTRs.

As raised in Section 2.3, stakeholders stated in feedback to the October 2019 Paper that it is important to them that the quantity of FTRs available to auction is maximised.

This section explores why congestion rent is a sensible constraint to make sure the number of FTRs sold are appropriate to minimise the risk to consumers, in contrast with two alternatives for determining the number of FTRs to sell:

1. Maximising the number of FTRs made available to the market, therefore increasing the opportunity for market participants to hedge price risk.

2. Maximise the direct return to consumers. This is based on the view that consumers are the natural 'owners' of the congestion rent, as through TUOS charges, they pay for the transmission network that creates the surplus.

Taking the first alternative, it would be logical to sell FTRs up to the point that:

Expected congestion rent + FTR auction revenue = Expected FTR payouts

Effectively, this would release more FTRs to the market than the simultaneous feasibility test would allow while still avoiding the FTRs being scaled back (because of the auction revenue being used to back the FTRs.

Indeed, under the (extreme) assumption of perfect competition in the FTR market and risk neutral market participants, the FTR auction revenue should equal the expected FTR payouts. This is because for every extra FTR sold, there is additional FTR auction revenue and extra expected FTR payouts. This leads to a hypothetically infinite amount of FTRs to be sold. Relaxing this assumption and assuming that the FTR payouts are greater than the auction revenue may still allow for considerably more FTRs to be released to the market than the simultaneous feasibility test would allow.

The main concern related to this option is that it would leave consumers in an "unbalanced" position, taking on downside risk.

The consumer's reduction in TUOS is equal to:

Reduction in TUOS = congestion rent + FTR a*uction revenue - FTR payouts*

That is, the consumer receives the net of the merchandising surplus plus the FTR auction revenue, less the FTR payouts. Selling FTRs with a combined expected payout greater than the congestion rent means the consumer is taking on the role of a *speculator*. In selling additional FTRs above that backed by the congestion rent, it is receiving a fixed income (the FTR auction revenue) in exchange for taking on a variable future liability (the FTR payouts) that are not backed by the congestion rent.

Now in consideration of prioritising the alternative second objective of aiming to maximise the direct return for consumers, it might be preferable to not sell any FTRs at all and simply allocate the congestion rent directly as an offset to TUOS charges. This would recognise that there is a cost involved in setting up and running FTR auctions and reflects the observation that in other markets FTRs often sell for less than their eventual payout (Box 2).

Box 2: Is it reasonable to assume that the FTR auction will be efficient?

The 'efficiency' of an FTR auction refers to how effective the auction is at 'discovering' the fair value of FTRs. That is, the extent to which the clearing prices established through the auction represent the expected payout of the FTRs.

In practice, the efficiency of the auction may be compromised by:

- Lack of perfect foresight, particularly if FTRs are issued over long time horizons (network configuration is likely to change)
- Imperfect competition (implying that the FTRs sell for less than fair value)
- Participants that are not risk neutral (if participants are more likely to be risk averse, this would tend to imply a premium is being applied – FTRs selling for more than fair value).

Experience in other markets suggests that it is common for auction revenues to be less than eventual FTR payouts. Disentangling the reasons for this can be challenging. Observing that auction revenue is less than the actual payout does not necessarily mean that FTRs did not trade for fair value (if we define this as the expected value of the FTRs at the time they were sold). Instead, it may simply mean that the expected value was based on assumptions that turned out to be incorrect (e.g. lack of perfect foresight).

While auction inefficiency is unlikely to result in FTRs being scaled back we still need to think carefully about what the likely efficiency of the FTR auction means for how many FTRs should be issued as it impacts how much consumer TUOS is offset.

We note that in some US markets, policy makers are considering how to address the concern of FTR auction efficiency, including through restricting the number of FTRs sold below that implied by the simultaneous feasibility test. By restricting supply this would increase the price of the FTRs that are sold and allow congestion rent not used to back FTRs to be returned directly to consumers.

It should be noted that any decision to restrict the numbers of FTRs released in order to increase the returns to consumers is contrary to the objective stated above – namely to minimise the variability in the money that offsets consumer TUOS.

While using the congestion rent to directly offset TUOS charges might maximise the direct return to consumers, it means that an opportunity is lost to provide market participants with tools to manage the risk associated with locational marginal pricing (which is intended to generate significant long-term benefits for consumers by improving the overall efficiency of the wholesale market). Furthermore, such an approach would not minimise consumer's risk because they would be exposed to the variability in the congestion rent.

In conclusion, using the congestion rent as a constraint for determining the appropriate amount of FTRs to sell meets the objective of minimising risk to consumers. Selling more FTRs results in consumers being exposed to a liability (the FTR payout) which is unhedged by congestion rent. Conversely, selling less means that consumers are exposed to an upside risk as the congestion rent is unhedged by the FTR payout.

Conclusion

Congestion rent is an appropriate constraint for FTR issuance as it meets the objective of minimising both upside and downside risks to consumers.

Questions for the TWG:

2. Do you agree the objective of allowing participants to buy as many FTRs as the merchandising surplus will support is the right approach?

2.7 Is simultaneous feasibility the right test and are fixed volume FTRs the right FTRs?

As described in section 2.1, assuming that the underpinning assumptions are correct, the simultaneous feasibility test ensures that the maximum set of fixed volume FTRs sold through the auction achieves:

$$\textit{congestion rent} \geq \textit{FTR payouts}$$

This inequality[8] means that on average, less than 100% of the potentially feasible FTRs will be made available. That is, the simultaneous feasibility test results in the sale of less FTRs than the congestion rent could support.

As discussed in Section 2.6, the ideal situation, based on managing consumer risk, is one where the congestion rent is *equal* to FTR payouts on average.

We are investigating whether it is possible to determine, empirically, the extent to which the congestion rent exceeds (or would exceed) the FTR payouts in practice. This would help us to understand the extent to which the simultaneous feasibility test approximates the ideal situation in practice.

As noted in section 2.3, stakeholders value the maximum possible number of FTRs to be released, and if possible, alternatives to fixed volume FTR instruments which better match the variable output of generators.

Noting that the design of the FTRs (fixed volume) is in part because this design is mathematically compatible with the simultaneous feasibility test, the project team is also investigating whether there is an alternative approach that could more closely target this objective. That is, is it possible to design an FTR instrument(s), and a test for determining how many FTRs are released, which means that the congestion rent equals (or more closely equals) the FTR payouts (as opposed to equals or exceeds). This may both increase the number of FTRs available, and make the FTRs more useful for market participants for risk management purposes. We have not yet identified a proposal for how this approach could be operationalised in practice.

Conclusion

While the simultaneous feasibility test, and fixed volume FTRs, may not perfectly achieve the objective of minimising the risk to consumers arising from congestion rent and FTR payout, they remain the best option that we have identified that could be implemented. Alternative approaches which also minimise risk for consumers but release more (and differently designed) FTRs may be possible, but have not been identified.

Questions for the TWG:

3. Is the simultaneous feasibility test, as applied to fixed volume FTRs, the right test?
4. Is there an alternative means for determining the type and quantity of FTRs that should be released?

2.8 Management of FTR funds

As outlined in section 2.3, the March technical paper proposed a system for tracking the funds available for FTR payments, with separate accounts for the congestion rent and auction revenue. Each account would be drawn down at different points in time based on a number of variables. This

[8] Equations, by definition, have "equals" symbols in them. Inequalities have "inequality" symbols.

also included some accounts accumulating indefinitely and some being returned to consumers at certain times.

We are currently considering whether this is necessary, or whether instead the approach could be simplified by combining both sources of funding in one account, with common rules around how funds would accumulate and at what point substantial positive balances might be returned to consumers.

Some potential options for consideration and further discussion are:

- A single fund for all the congestion rent and auction revenue which gets drawn down from to pay for FTRs and is returned to consumers at regular intervals, or when it reaches a certain monetary value, or
- A single fund (for congestion rent and auction revenue) per FTR product length. For example, all payments for FTRs for summer 2025 are all drawn down from the same fund. At the end of summer 2025, the remnants of the fund (ie, the congestion rent plus the revenue from the sale of the FTRs less the FTR payouts) gets returned to consumers.

Questions for the TWG:

5. What options do you think would be appropriate for managing the funds to back FTRs?

2.9 Summary

The main points raised in this section are:

- Including the FTR auction revenue to back FTR payouts in addition to the congestion rent (also known as "settlement residue") appears to make sure that FTRs have a very high probability of not being scaled back. This is because:
    - in a competitive FTR market, the FTR auction revenue would approximate the expected FTR payouts
    - under the simultaneous feasibility test the *expected* congestion rent is equal to or greater than the *expected* FTR payouts
    - consequently, in a competitive FTR market the inclusion of FTR auction revenue would approximately double the amount of money available to back the FTRs compared to using the congestion rent alone
    - even in an FTR market with low competition, the auction revenue would be expected to considerably increase the amount of money available to back the FTRs, substantially lowering the changes they are scaled back.
- We have set out this detail in response to continuing stakeholder concerns that the FTRs will not be firm. We consider that the above means, from a theoretical perspective, supports the argument that the FTRs will be relatively firm. We are continuing to test this empirically through the NERA modelling; as well as looking at overseas experience of this issue.

- This also means that the precision of the simultaneous feasibility test (i.e. specifications of the simultaneous feasibility auction) is less crucial for ensuring the firmness of FTRs. Were "too many" FTRs to be sold such that the actual congestion rent is less than the actual FTR payouts, the auction revenue (which itself would be higher than would otherwise be the case because more FTRs have been sold) would be used to back the FTRs.
- We think that it is appropriate that FTR issuance should aim to fully utilise the expected congestion rent, as this leaves consumers in a "balanced position". If the actual congestion rent exactly equals the actual FTR payouts then the two exactly cancel out, meaning that the consumers receive a fixed offset to their TUOS – the auction revenue. If the two do not exactly equal, then consumers will be exposed to variability in the amount which is used to offset their TUOS (either higher or lower).
- The simultaneous feasibility test (which applies to fixed volume FTRs) does not target this objective precisely. Rather, it targets the congestion rent being *at least* enough (and therefore, on average *more than enough*) to back the FTRs issued.
- However, the simultaneous feasibility test (and fixed volume FTRs) is the only tested and practically implementable approach that we have identified for an auction-based procurement model. We are continuing to look at alternatives that could allow a more appropriate number of (potentially alternatively designed) FTRs to be released. However, based on our research, the simulteanous feasibility test is the only international example we could find that seeks to achieve this. We consider that this supports our conclusion that we can have confidence in how the simulteanous feasibility test operates.