FTR Manager

FTR Market Review September 2016

19 September 2016

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Document History

Version	Date	Status	Edited By	Revision Description
1.0	19 September 2016	Final	FTR Manager	Released to FTR User Group

1 Introduction

The FTR Allocation Plan provides that the FTR Manager will maintain, publish, apply and regularly review FTR policies detailing how it will implement the FTR Allocation Plan, including an FTR policy on the FTR Grid[1].

In developing that FTR Grid Policy, the FTR Manager's approach has been to be initially conservative in specifying the FTR Grid, and equilibrating the capacity to the Revenue Adequacy Objective over time[2].

The first review of the FTR market by the FTR Manager was in October 2014[3], based on the first 14 months of FTR settlement (July 2013 to August 2014 inclusive). It recommended increasing the values of the Capacity Scaling Factors and the HVDC constraints for bipole outages, which has since been done in an amendment to the FTR Grid Policy[4].

The FTR market has now been operating for three years, with the initial two hubs increased to five from the January 2015 FTR period inclusive. It is therefore timely to again review the FTR Grid Policy against the Revenue Adequacy Objective, to see if any policies should be adjusted in light of market experience.

The Revenue Adequacy Objective is:

FTR Allocation Plan 2014, section 4.8, Policy on the FTR Grid:

In evolving the FTR policy on the FTR Grid, the FTR Manager will target a balance between ensuring that there is revenue available sufficient to settle the FTRs, and ensuring that sufficient volume of FTRs are available so that participants who wish to purchase FTRs are able to obtain them.

The FTR Manager will evolve the FTR policy on the FTR Grid such that, in its reasonable opinion at that time, it is expected that the primary objective will be achieved, with consideration given to also achieving the secondary objective:

- The primary objective is for Revenue Inadequacy to occur one month in twelve
- The secondary objective is for the annual average scaling factor to be 98%.

Collectively, these primary and secondary objectives are referred to as the Revenue Adequacy Objective.

[1] The policy that covers this requirement is the FTR Policy on *FTR Grid and Auction Data*

[2] FTR Manager, *FTR Grid Policy – Supporting Analysis*, 24 November 2014, section 2.3

[3] FTR Manager, *FTR Market Review September 2014*, 23 October 2014

[4] FTR Manager, *FTR Grid and Auction Data Policy, 26 November 2014, section 4.3*

2 Market results

The FTR market settlement results to date are presented in Appendix A.

2.1 FTR Revenue Adequacy Factors

The FTR Payment Scaling Factor is defined in the FTR Allocation Plan as:

$$FTR\ Payment\ Scaling\ Factor = Minimum\left(1,\ \frac{FTR\ Account\ Amount}{Sum\ of\ FTR\ Hedge\ Values\ (Provisional)}\right)$$

Revenue inadequacy is determined by whether the FTR Payment Scaling Factor is less than one. To date there have been no periods of revenue inadequacy: FTR Payment Scaling Factors have always been 1. For convenience we can define the term Revenue Adequacy Factor as the FTR Payment Scaling Factor as calculated before it is truncated at 1:

$$FTR\ Revenue\ Adequacy\ Factor\ = \frac{FTR\ Account\ Amount}{Sum\ of\ FTR\ Hedge\ Values\ (Provisional)}$$

In considering the FTR Revenue Adequacy Factor for each settlement period, some adjustments need to be applied to reflect market changes, to ensure an 'apples v apples' comparison across all FTR Periods:

- **Modification of FTR rentals calculation**. For FTR Periods to October 2014 inclusive, an assessed underestimate in HVDC rentals is added: the FTR Rentals calculation was modified from then to its current form. The resultant adjustment is referred to here as the FTR Revenue Adequacy Factor (adjusted)[5].
- **Increase in Capacity Scaling Factor and HVDC capacity for bipole outages**. The 2014 market review led to changes in these two parameters for FTR Periods from January 2015 inclusive:
    - The Capacity Scaling Factor was increased from 69% to 72%. The FTR Revenue Adequacy Factor (adjusted) is multiplied by 69/72 for FTR Periods prior to January 2015 to reflect this.
    - The multiplier for HVDC capacity for periods of bipole outage relative to no bipole outage was increased from 25% to 55%, over doubling the available HVDC capacity during periods of bipole outage. To approximate the effect of this, the FTR Revenue Adequacy Factor (adjusted) – for FTR Periods prior to January 2015 with a bipole outage only – is multiplied by

      $$1 - \frac{(55-25)}{55} \times \frac{HVDC\ FTR\ Rentals}{Total\ FTR\ Rentals}$$

    - The combined effect of the resultant adjustments is referred to here as the FTR Revenue Adequacy Factor (normalised).
- **Increase in number of hubs.** Also from the January 2015 FTR Period inclusive, the number of hubs was increased from two to five. This does not require any further adjustment to the FTR Revenue Adequacy Factor. It does however mean that, from then, it is not possible to meaningfully split the HVDC component of revenue adequacy from the HVAC, because for

[5] In the 2014 market review, we referred to this as 'FTR Scaling Factor (Full)', and described the issue in more detail.

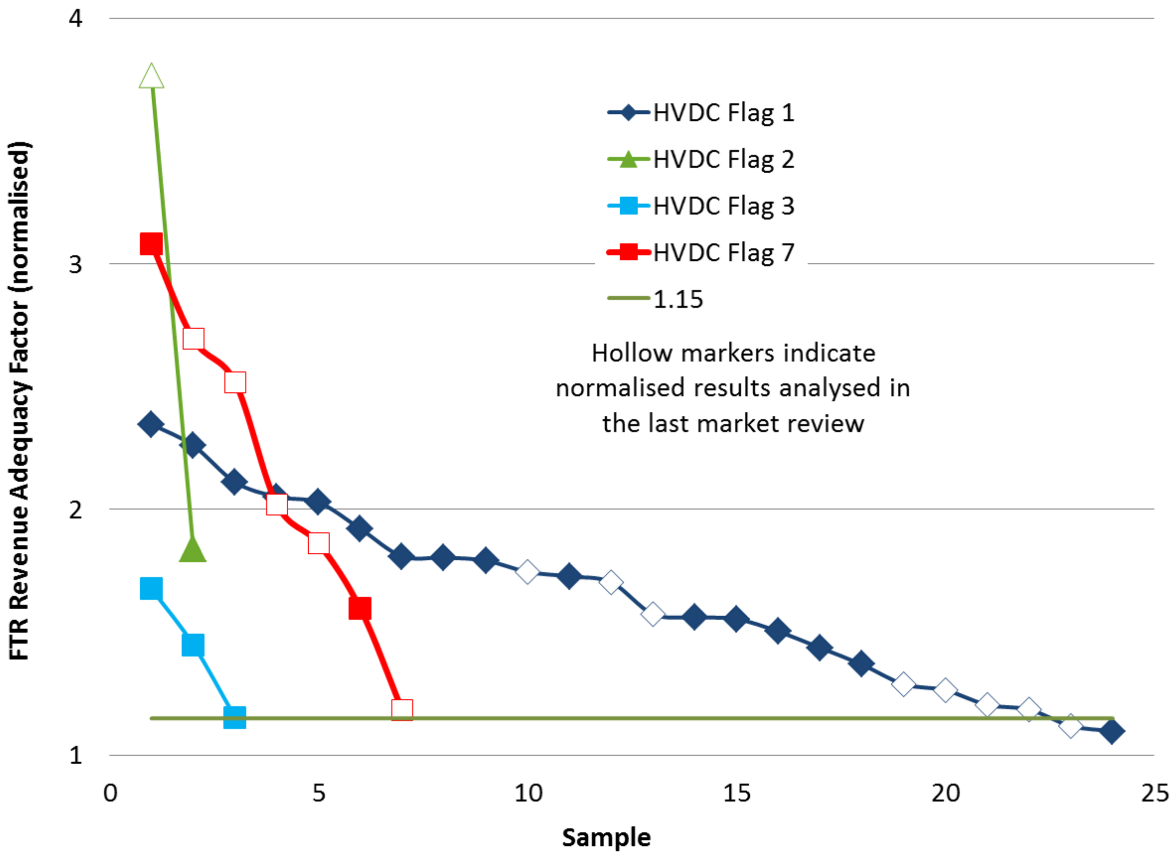
option FTRs from INV or ISL to HAY or OTA (or vice versa) the revenue adequacy of the HVDC part of that FTR is affected by the HVAC parts of that FTR.

Given a particular FTR Grid, the single parameter that most affects available capacity is the HVDC flag, which reflects the availability of the HVDC link and hence the constraints to be applied to the HVDC link in the FTR Auction (as per section 4.2.2. of the FTR Grid Policy). The four HVDC flags that have applied to date are:

- HVDC Flag 1 – Pole 2 and Pole 3, no bipole outages
- HVDC Flag 2 – Pole 2 only, no bipole outages
- HVDC Flag 3 – Pole 3 only, no bipole outages
- HVDC Flag 7 – Bipole outages, with configuration otherwise Pole 3 only

The results grouped by HVDC Flag and ordered by descending Revenue Adequacy Factor are presented in Figure 1, and tabulated in 4Appendix B. The solid markers indicate results since the last market review (which analysed FTR Periods up to August 2014 inclusive), while hollow markers indicate results analysed in the last market review. The '1.15' line is explained in section 2.2.3.

Figure 1 – Market results by HVDC Flag



2.2 Implications of results

What we consider in this section is whether these results indicate that we should adjust any of the parameters of the FTR auction to better meet – or expect to meet – our revenue adequacy target. The two main parameters of interest are:

- Capacity Scaling Factors, which apply across the FTR Grid, for both HVAC and HVDC circuits
- HVDC constraint values, which apply only to the HVDC circuits.

We could use these parameters in combination to apply only to the HVAC circuits if needed, by for example multiplying the Capacity Scaling Factors by X and dividing the HVDC constraint values by X.

There is also the Capacity Release Factor, discussed separately in section 3.

2.2.1 Direct approach –HVDC flag 1

Only HVDC Flag 1 has sufficient data to estimate this directly. We have 24 periods with HVDC Flag 1, so if the primary revenue adequacy target had been met, two of those periods would have been revenue inadequate.

Considering the results in descending order of Revenue Adequacy Factor (normalised) as illustrated in Figure 1, to meet our primary revenue adequacy target the lowest two observations would have had to have Revenue Adequacy Factors (normalised) less than one, so the unity revenue adequacy line would pass between the second and third lowest observations. This gives a range of above 1.12, less than 1.19, with a mid-point of 1.15.

All else equal, this implies that we should increase the Capacity Scaling Factor by 15%, from 0.72 to 0.83.

2.2.2 Probability distribution approach – all HVDC flags

For other HVDC flags, we assume that the data define a probability distribution (and will do this as a check for HVDC Flag 1 also). We further assume that this distribution is normal, because the sample is too small to be sure of the distribution, and normal is the limiting distribution for large systems with finite variance.

HVDC Flags 2 and 3, being either Pole 2 or Pole 3 respectively, with no bipole outages, are similar physically and in the FTR Grid Policy have the same HVDC constraints, so we consider also a combination of these flags. Other flags represent very different physical situations and have different HVDC constraints currently, so we do not consider other combinations.

We determine in this way what is the scaling factor X that we can expect 11/12 of results to be greater than. This is calculated using the assumption of a normal distribution:

$$X = \text{Mean} - (\text{StdDev} \times \text{Zvalue})$$

The Zvalue is a characteristic of a one-tailed normal distribution with p=1/12, giving a Zvalue of 1.38.

We can then calculate values of X per HVDC Flag as shown in Table 1:

Table 1 – Analysis of market results by HVDC Flag

HVDC Flag	Sample	Sample mean	Sample std dev	X
1	24	1.64	0.36	1.15
2	2	2.80	1.36	0.92
3	3	1.43	0.26	1.06
2 and 3	5	1.98	1.03	0.55
7	7	2.14	0.66	1.22

2.2.3 Secondary Revenue Adequacy objective

The above analysis is based on the primary revenue adequacy objective for revenue inadequacy to occur one month in twelve. The secondary objective is for the annual average scaling factor to be 98%.

Currently the annual average scaling factor has been 1, or 100%. Considering the time series of Revenue Adequacy Factors (normalised), increasing capacity by 15% would bring the three-year average to 99.8%. An increase of 30% would bring it to 98%.

However, as this is a secondary objective, we do not propose increasing the Capacity Scaling Factor by more than the 15% that the primary objective implies.

2.2.4 Conclusions

For HVDC Flag 1, the result of the probability distribution approach is reassuringly consistent with that of the direct approach. Therefore, a conclusion is that the Capacity Scaling Factor should be increased by 15%, from 0.72 to 0.83.

As the Capacity Scaling Factor affects equally all HVDC Flags, this in effect decreases the value of residual X by 1/1.15 as shown in Table 2, and as illustrated in Figure 1 by the '1.15' green line:

Table 2 – Implications of increasing Capacity Scaling Factor by 15%

HVDC Flag	X / 1.15
1	1.00
2	0.80
3	0.93
2 and 3	0.48
7	1.06

The resultant low values of X / 1.15 for HVDC Flags 2 and 3 raises some concern, but the sample sizes are small so firm conclusions cannot be drawn. The FTR Manager does not consider that increasing the Capacity Scaling Factor without decreasing some HVDC capacity values commensurately would be a high risk, as single-pole HVDC outages long enough to register for the FTR Grid have been relatively rare.

3 Capacity Release Factors

In our 2014 market review we also discussed Capacity Release Factors. In every auction, the Capacity Release Factor is a multiplier just like the Capacity Scaling Factor. However, for the last auction of an FTR Period the Capacity Release Factor is always 100%: the choice of Capacity Release Factors for previous auctions therefore does not affect revenue adequacy (except as a second-order effect in exceptional cases of major outages affecting the FTR Period).

More relevantly, the proposed FTR Allocation Plan 2016 contains a recommendation to increase the number of FTR periods auctioned each calendar month from 9 to 12. If AP16 is approved in Q4 2016, then the FTR Manager will publish an updated FTR Calendar policy that specifies the updated capacity release factors required to transition from the current steady-state. This new build-up will include detail on the primary and variation periods auctioned each month.

It is likely that the operational date of AP16 will be sometime toward the end of Q1 2017. This will allow participants time to review the new FTR Calendar policy prior to it being released.

As a result of this work already being undertaken, we therefore do not propose considering changes to Capacity Release Factors as part of this market review.

4 Proposals

It is proposed the Capacity Scaling Factor should be increased by 15% as shown below:

Table 3 – Capacity Scaling Factors (Figure 8 in Policy)

	FTR Periods for which there is an Outage File	FTR Periods for which there is no Outage File
Current	72%	61%
Proposed	83%	70%

It is not proposed that any other changes are made, for example to HVDC constraint values (noting that HVDC capacity will increase with the change to the Capacity Scaling Factor).

Appendix A MARKET SETTLEMENT RESULTS

FTR Period	Auction Income	FTR Payments	Auction Surplus	Assessed underestimate in HVDC rentals	Calculated scaling factor (adjusted)
Jul 13	$ 978,405	$ 1,921,892	$ 551,490	$ 111,494	1.34
Aug 13	$ 463,661	$ 1,258,788	$ 3,626,744	$ 58,295	3.93
Sep 13	$ 613,940	$ 673,410	$ 1,665,487	$ 53,276	3.55
Oct 13	$ 707,380	$ 1,018,793	$ 4,267,710	$ 50,983	5.24
Nov 13	$ 803,032	$ 1,232,776	$ 4,884,829	$ 66,537	5.02
Dec 13	$ 1,545,224	$ 3,360,111	$ 2,514,097	$ 99,472	1.78
Jan 14	$ 1,023,525	$ 2,644,003	$ 1,565,630	$ 133,755	1.64
Feb 14	$ 2,245,101	$ 3,588,053	$ 632,187	$ 220,803	1.24
Mar 14	$ 1,394,098	$ 969,786	$ 646,915	$ 150,205	1.82
Apr 14	$ 1,514,827	$ 629,532	$ 1,788,492	$ 56,882	3.93
May 14	$ 909,107	$ 1,938,836	$ 2,284,125	$ 88,855	2.22
Jun 14	$ 1,979,132	$ 3,061,980	$ 871,004	$ 107,820	1.32
Jul 14	$ 1,861,783	$ 3,023,592	$ 654,133	$ 123,348	1.26
Aug 14	$ 1,692,993	$ 4,313,525	$ 574,207	$ 149,943	1.17
Sep 14	$ 1,806,091	$ 1,530,902	$ 858,067	$ 105,119	1.63
Oct 14	$ 1,070,061	$ 848,315	$ 674,728	$ 105,119	1.92
Nov 14	$ 624,469	$ 354,280	$ 1,074,038		4.03
Dec 14	$ 2,897,533	$ 5,079,754	$ 1,038,437		1.20
Jan 15	$ 4,230,748	$ 7,601,998	$ 745,905		1.10
Feb 15	$ 4,662,156	$ 6,186,747	$ 2,283,780		1.37
Mar 15	$ 4,538,166	$ 3,437,106	$ 3,820,709		2.11
Apr 15	$ 5,032,407	$ 4,484,749	$ 4,716,688		2.05
May 15	$ 3,687,751	$ 4,650,302	$ 3,386,327		1.73
Jun 15	$ 5,291,929	$ 5,037,376	$ 3,990,909		1.79
Jul 15	$ 6,219,416	$ 5,054,845	$ 4,066,175		1.80
Aug 15	$ 5,246,803	$ 4,436,126	$ 3,591,331		1.81
Sep 15	$ 3,445,291	$ 3,113,830	$ 3,202,178		2.03
Oct 15	$ 3,794,001	$ 4,479,135	$ 2,483,515		1.55
Nov 15	$ 3,056,747	$ 4,237,744	$ 2,523,790		1.60
Dec 15	$ 3,472,520	$ 5,370,573	$ 2,412,838		1.45
Jan 16	$ 4,924,959	$ 3,609,490	$ 4,862,721		2.35
Feb 16	$ 4,515,541	$ 4,388,440	$ 4,042,277		1.92
Mar 16	$ 2,750,500	$ 3,161,984	$ 3,984,146		2.26
Apr 16	$ 4,590,649	$ 6,069,793	$ 3,055,545		1.50
May 16	$ 4,412,430	$ 5,035,853	$ 3,409,760		1.68
Jun 16	$ 6,015,125	$ 7,883,732	$ 3,446,272		1.44

Appendix B MARKET RESULTS BY HVDC FLAG

HVDC Flag	FTR Period	Revenue Adequacy Factor (normalised)
1	Jan 16	2.35
	Mar 16	2.26
	Mar 15	2.11
	Apr 15	2.05
	Sep 15	2.03
	Feb 16	1.92
	Aug 15	1.81
	Jul 15	1.80
	Jun 15	1.79
	Mar 14	1.75
	May 15	1.73
	Dec 13	1.70
	Jan 14	1.57
	Sep 14	1.56
	Oct 15	1.55
	Apr 16	1.50
	Jun 16	1.44
	Feb 15	1.37
	Jul 13	1.29
	Jun 14	1.26
	Jul 14	1.20
	Feb 14	1.19
	Aug 14	1.12
	Jan 15	1.10
2	Apr 14	3.77
	Oct 14	1.84
3	May 16	1.68
	Dec 15	1.45
	Dec 14	1.15
7	Nov 14	3.08
	Nov 13	2.69
	Oct 13	2.52
	Sep 13	2.02
	Aug 13	1.86
	Nov 15	1.60
	May 14	1.18