FTR MANAGER

FTR MARKET REVIEW SEPTEMBER 2014

23 OCTOBER 2014

Disclaimer

1. EMS, as FTR Manager, will only offer and issue FTRs in New Zealand to persons who are:
   (a) natural persons resident in New Zealand, bodies corporate who are incorporated in New Zealand, or persons with a branch office or other substantial physical presence in New Zealand through which they participate in the FTR market; and
   (b) within one of the categories of "approved participant" in *The Authorised Futures Dealers (Financial Transmission Rights) Notice 2012*,

2. Information about FTRs made available by EMS through any medium (**FTR information**) is not:
   (a) advice on, or a recommendation of, FTRs or any other investment, financial product or risk management arrangement;
   (b) an offer or solicitation by EMS to issue or deal in FTRs or any other investment, financial product or risk management arrangement; or
   (c) directed to any person who is not an authorised person.

3. Clause 2(c) applies to all FTR information including FTR information that is or may be accessible to persons who are not authorised persons, for example on the Internet or by being distributed outside New Zealand by persons to whom EMS initially made the FTR information available. No recipient of FTR information is authorised to distribute it outside New Zealand.

4. Prior to any person acquiring, entering into or dealing in any investment, financial product or risk management arrangement they should obtain their own tax, legal and financial advice.

5. EMS is not an authorised futures exchange under the Securities Markets Act 1988 or otherwise. The FTR auction, reconfiguration auction and assignment facilities provided by EMS as FTR Manager are not regulated under New Zealand law other than by the Electricity Authority under the Electricity Industry Act 2010, Electricity Industry (Enforcement) Regulations 2010 and Electricity Industry Participation Code 2010.

Table of Contents

Figures

Document History

Version	Date	Status	Edited By	Revision Description
1.0	23 October 2014	Released	CE/MM/RR	

1 Introduction

The FTR Allocation Plan provides in section 1.6 that the FTR Manager will develop, publish, apply and regularly review FTR Policies detailing how it will implement the FTR Allocation Plan, including an FTR policy on Determining the FTR Grid (the Grid Policy).

In developing the Grid Policy, the FTR Manager's approach is to be initially conservative in specifying the FTR Grid, and equilibrating the capacity to the Revenue Adequacy Objective over time[1].

In September 2014 the FTR Market achieved its 14th FTR settlement period, so it is timely to review the Grid Policy against the Revenue Adequacy Objective, to see if any policies should be adjusted in light of experience.

The Revenue Adequacy Objective is:

FTR Allocation Plan 2012, section 4.8, Policy on the FTR Grid:

In developing 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 develop 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] FTR Manager, FTR Grid Policy – Supporting Analysis, 26 September 2013, section 2.3.

2 Market results

The aggregate market settlement results are presented in Appendix A.

The Authority has been corresponding with the FTR Manager about the calculation of the HVDC component of the FTR rentals amount[2]. The FTR Manager has interpreted the Code to include the impact of fixed HVDC losses, whereas the Authority's intention in drafting Schedule 14.6 was that they should be excluded. The Authority is therefore preparing a Code Change to specify this unambiguously. A system change request has been prepared to update the system to align it with the Authority's original intention. In the expectation of this change, and as this review should be forward looking in its affect, we have allowed for the Authority's assessment of the underestimate in our assessment below. Note that this had no market impact, as all periods were revenue adequate. The assessed underestimate is included also in Appendix A.

The critical aspect of the market results, in this regard, is the degree of revenue adequacy achieved under different market FTR Grid parameters. The key FTR Grid parameter that caused different market outcomes over the last year is the HVDC Flag, which is used to signal the status of the HVDC link. The results grouped by HVDC Flag and ordered by descending scaling factor are presented in Figure 1:

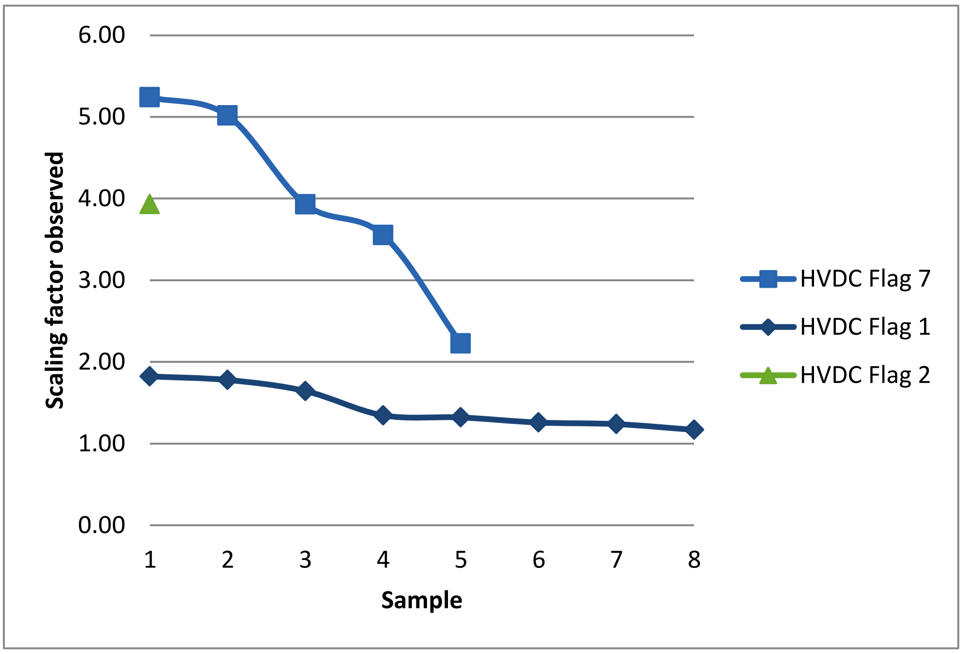
Figure 1 – Market results by HVDC Flag

HVDC Flag	FTR Period	Sample size	Scaling factor (full)
1 Pole2 and Pole 3	Mar-14	8	1.82
	Dec-13		1.78
	Jan-14		1.64
	Jul-13		1.34
	Jun-14		1.32
	Jul-14		1.26
	Feb-14		1.24
	Aug-14		1.17
2 Pole 2 only	Apr-14	1	3.93
7 Bipole outage, with configuration otherwise P3 only	Oct-13	5	5.24
	Nov-13		5.02
	Aug-13		3.93
	Sep-13		3.55
	May-14		2.22

[2] Electricity Authority, Rental calculations for Financial Transmission Rights, Market performance enquiry, 25 September 2014

The results are presented graphically in Figure 2:

Figure 2 – Market results by HVDC Flag – Graph



Our primary revenue adequacy target is one month in twelve. For different HVDC flags there is too small a sample (1, 5 or 8) to ascertain this directly. We therefore assume that the data define a probability distribution. 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.

The data for HVDC flags 1 and 7 are clearly distinct, as illustrated in in Figure 2, so there is no point considering the aggregate statistics. Rather, we analyse by flag, to determine 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 = Mean – StdDev * Zvalue

ZValue = is a characteristic of a one-tailed normal distribution with p=1/12 = 1.38

We can then calculate values of X per HVDC Flag as shown in Figure 3:

Figure 3 – Analysis of market results by HVDC Flag

HVDC Flag	Sample	Sample mean	Sample std dev	X
1	8	1.45	0.26	1.09
2	1	3.93	Undefined – sample too small	
7	5	3.99	1.22	2.31

As all settled FTR periods have been revenue adequate to date, the average scaling factor has been 100%. There is insufficient data to date to determine whether any further policy changes could be justified to achieve the secondary objective is for the annual average scaling factor to be 98%.

3 Policy interpretation

For HVDC Flag 1 we observe a value X = 1.09. As this value is the lowest of the observed scaling factors we take it as applying to all HVDC states. The Capacity Scaling Factors are made up by multiplying the applicable scaling factor components together[3]. One of those components is a general one, being an allowance for monthly wash-ups in the rentals amount, set at 85%. We propose raising this to 90% (a ratio of 1.06). This will increase the Capacity Scaling Factors as shown below:

Figure 4 – 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	68%	58%
Proposed	72%	61%

For HVDC Flag 2, the single sample has a relatively high scaling factor of 3.84. While this value is well outside the range of values observed for HVDC Flag 1, it remains a single sample and we propose no change here either. The capacity available will of course be increased by the increase in the Capacity Scaling Factors.

HVDC Bipole Outages

The current policy on bipole outages is 'Rule 19' that "When there is a relevant bipole outage planned for the FTR Period, the HVDC capacity relevant to the remaining parts of the period will be used, multiplied by 25%"[4]. The 25% figure chosen was the lowest indicated value, while historically values of X of around 60% would have met the revenue adequacy objective[5].

Rule 19 covers all bipole outage configurations (Flags 5, 6, 7), while the market results for bipole outages for the last year include only Flag 7. However there seems no reason not to suppose that we would have observed similar results to X=2 had the bipole outages been a mix of Flags 5, 6, and 7.

For HVDC Flag 7, an HVDC bipole outage, we observe a value X = 2.31. Following the increase in the Capacity Scaling Factors, this is reduced to 2.31 × 85 / 90 = 2.18. 25% × 2.18 = 55%. We therefore

---

[3] FTR Manager, FTR Grid Policy – Supporting Analysis, 26 September 2013, section 5, Rule 12.

[4] FTR Manager, FTR Grid Policy – Supporting Analysis, 26 September 2013, section 8.5, Rule 19.

[5] Ibid, section 8.5. This is 'historically' as at September 2013.

propose to increase the multiplier for HVDC Bipole Outages, such that Rule 19 becomes "When there is a relevant bipole outage planned for the FTR Period, the HVDC capacity relevant to the remaining parts of the period will be used, multiplied by 55%". This will have the effect shown below:

Figure 5 – HVDC constraints (Current Figure 7 in Policy)

	HVDC configuration						
	No bipole outages			Bipole outages, with configuration otherwise:			
	P2 and P3	P2 only	P3 only	No poles	P2 and P3	P2 only	P3 only
HVDC flag	1	2	3	4	5	6	7
Northwards	907 MW	440 MW	440 MW	0	227 MW	110 MW	110 MW
Southwards	630 MW	180 MW	180 MW	0	158 MW	45 MW	45 MW

Figure 6 – HVDC constraints (Proposed Figure 7 in Policy)

	HVDC configuration						
	No bipole outages			Bipole outages, with configuration otherwise:			
	P2 and P3	P2 only	P3 only	No poles	P2 and P3	P2 only	P3 only
HVDC flag	1	2	3	4	5	6	7
Northwards	907 MW	440 MW	440 MW	0	499 MW	242 MW	242 MW
Southwards	630 MW	180 MW	180 MW	0	347 MW	99 MW	99 MW

These capacities will be multiplied by the relevant Capacity Scaling Factor and Capacity Release Factor.

4 Other issues raised

In addition to the proposed change to Capacity Scaling Factors and HVDC constraints discussed above, the FTR Manager has received inquiries from participants on whether the Capacity Release Factors remain appropriate. These are considered below.

Capacity Release Factors

From the time 'steady state' has been reached (June 2014), each FTR Period is auctioned 9 times. The Capacity Release for each consecutive auction is 11%, 13%, 14%, 17%, 20%, 25%, 33%, 50% and 100%. This is shown clearly in the Pattern for Capacity Release table below.

Figure 7 – Pattern for Capacity Release

Auction	Primary Periods			Variation Periods					
20	11%	11%	11%	25%	25%	25%	33%	50%	100%
21	13%	13%	13%	17%	17%	17%	33%	50%	100%
22	14%	14%	14%	20%	20%	20%	33%	50%	100%
23	11%	11%	11%	25%	25%	25%	33%	50%	100%
24	13%	13%	13%	17%	17%	17%	33%	50%	100%
25	14%	14%	14%	20%	20%	20%	33%	50%	100%

The Capacity Release Schedule is controlled by the FTR Calendar Policy which makes specific reference to the following:

FTR Allocation Plan 2012, section 4.8, Policy on the FTR Grid:

The capacity release factor is separate from the Capacity Scaling factor used to determine the amount of FTRs available for auction for each maturity. Unplanned outages can increase the likelihood of Revenue Inadequacy if the FTR Grid does not allow for them so the FTR Manager will apply a balancing factor in the FTR Grid to allow for the expected, average impact of:

- Unplanned outages
- Planned outages that are not "relevant" (e.g. of shorter duration)
- Electrical losses.

Refer to the FTR Policy on the FTR Grid

To date, the maximum number of times a single FTR Period has been auctioned is 5, with 11 periods auctioned 4 times. The graphs below include FTR Register data up to and including the VAR_SEP_2014 Auction. The MW values displayed in the graph are aggregates for the entire period, and include awarded capacity for all products.

Figure 8 – MW Awarded for same FTR Period (5 or more)

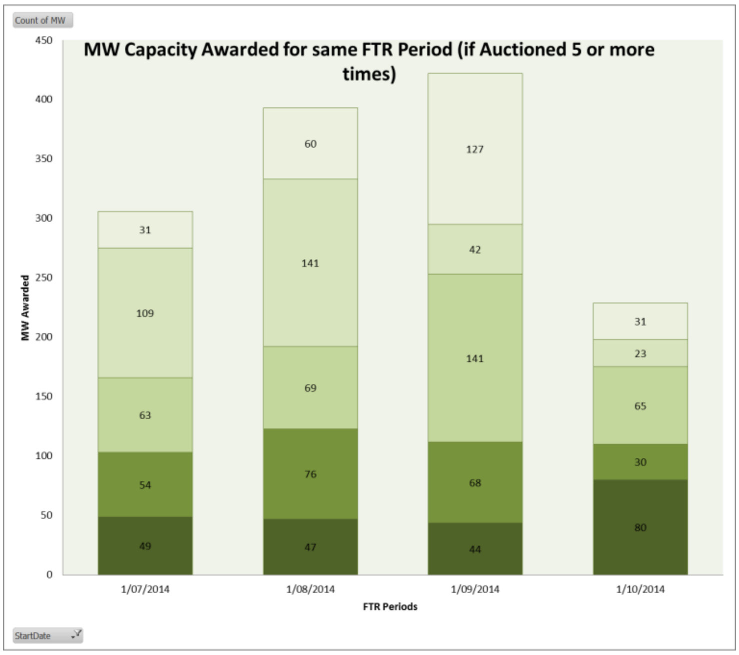
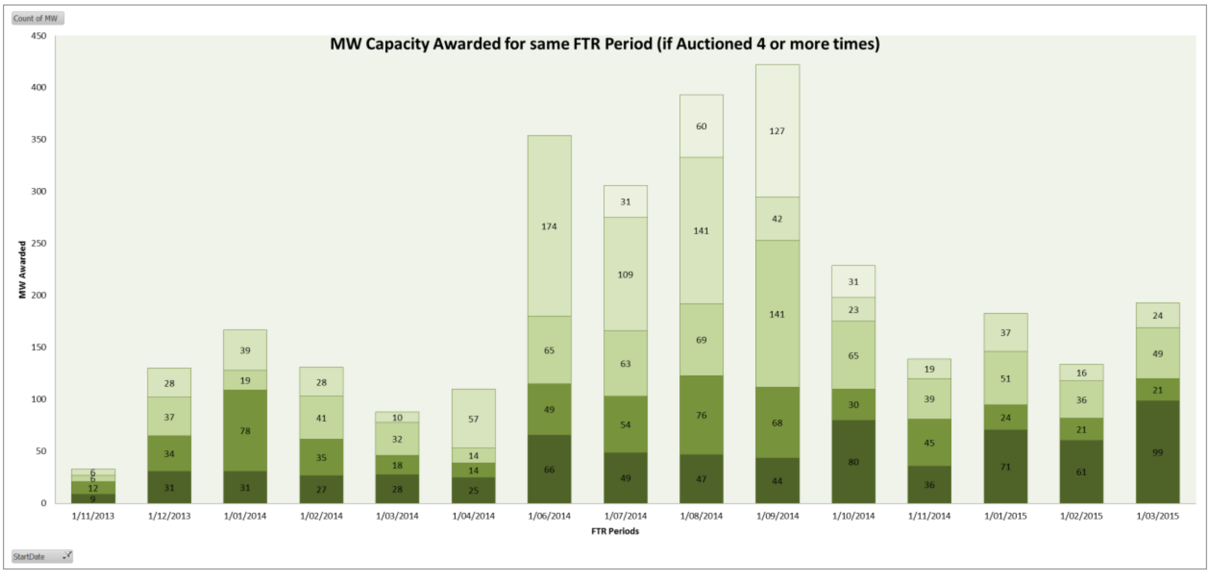


Figure 9 – MW Awarded for same period (4 or more)



The FTR Manager proposes to leave the pattern of Capacity Release unchanged, but with a likely review to occur once FTR maturity reaches the 9 auction threshold. The maturity horizon is referenced in the FTR Calendar Policy.

Appendix A AGGREGATE MARKET SETTLEMENT RESULTS

Period	Jul 13	Aug 13	Sep 13	Oct 13	Nov 13	Dec 13	Jan 14
Auction Income	$978,405	$463,661	$613,940	$707,380	$803,032	$1,545,224	$1,023,525
FTR Payments	$1,921,892	$1,258,788	$673,410	$1,018,793	$1,232,776	$3,360,111	$2,644,003
Auction Surplus	$551,490	$3,626,744	$1,665,487	$4,267,710	$4,884,829	$2,514,097	$1,565,630
Assessed underestimate	$111,494	$58,295	$53,276	$50,983	$66,537	$99,472	$133,755
Calculated Scaling factor (full)	134%	393%	355%	524%	502%	178%	164%

Period	Feb 14	Mar 14	Apr 14	May 14	Jun 14	Jul 14	Aug 14
Auction Income	$2,245,101	$1,394,098	$1,514,827	$909,107	$1,979,132	$1,861,783	$1,692,993
FTR Payments	$3,588,053	$969,786	$629,532	$1,938,836	$3,061,980	$3,023,592	$4,313,525
Auction Surplus	$632,187	$646,915	$1,788,492	$2,284,125	$871,004	$654,133	$574,207
Assessed underestimate	$220,803	$150,205	$56,882	$88,855	$107,820	$123,348	$149,943
Calculated Scaling factor (full)	124%	182%	393%	222%	132%	126%	117%

The assessed underestimate is described in section 2.