

Independent Market Operator

**Calculation of the Capacity Value of Intermittent Generation
(RC_2010_25 & RC_2010_37) Workshop**

Workshop Minutes

Location:	Parmelia Hilton, Stirling Room, 14 Mill Street, Perth
Date:	Thursday, 8 September 2011
Time:	3.00pm – 5.30pm

Attendees	
Suzanne Frame	IMO (Chair)
Allan Dawson	IMO
Richard Tooth	Sapere Research Group (Presenter)
Stacey Oldfield	IMO (Minutes)
Greg Ruthven	IMO
Fiona Edmonds	IMO
Jenny Laidlaw	IMO
Johan Van Nierkerk	IMO
Monica Tedeschi	IMO
Corey Dykstra	Alinta
Robbie Flood	Alinta
Chrys Chandraraj	Alinta
Shane Cremin	APA Group
Tim Rosser	Blairfox
Matthew Rosser	Blairfox
Alan Gibson	Clifford Chance
Harry Street	Collgar
Wana Yang	Economic Regulation Authority (ERA)
Shibli Khan	ERA
Jenni Conroy	Future Effect
Bill Bowyer	Infigen Energy
Matthew Bowen	Jacmac
Steve Gould	Landfill Gas & Power (LGP)
Tony Leahy	LGP
Brooke Eddington	Office of Energy
Paul Hynch	Office of Energy
Joachim Tan	Office of Energy
Mena Gilchrist	Office of Energy
Michael Reid	Office of Energy
John Vendel	Pacific Hydro
Andrew Woodroffe	Skyfarming

Attendees	
Stephen MacLean	Synergy
John Rhodes	Synergy
Phil Kelloway	System Management
Brendan Clarke	System Management
Troy Forward	TransAlta
Ken McAlpine	Vestas
Andrew Everett	Verve Energy
Brad Huppatz	Verve Energy
Peter Mattner	Western Power
Oscar Arteaga	Western Power

Item	Subject
1.	<p>WELCOME</p> <p>The Chair opened the workshop and thanked participants for their attendance. The Chair presented a brief overview of the issues with the current methodology used to determine Capacity Credits for Intermittent Generators noting that it is not reflective of a facility's expected contribution during peak periods. The Chair acknowledged that the issue at hand was complex and noted that IMO Board's decision to commission Sapere Research Group (Sapere), an independent expert, to examine Methodology 1 (RC_2010_25) and Methodology 2 (RC_2010_37). The Chair acknowledged that a balance between simplicity and accuracy would be required. Sapere was also requested to consider options for the implementation of a glide path for transition of these arrangements.</p> <p>The Chair requested attendees to ask any questions at the completion of the presentation by Dr Richard Tooth from Sapere.</p> <p>A copy of the presentation made by the Chair is attached.</p>
2.	<p>CAPACITY VALUE OF INTERMITTENT GENERATION</p> <p>Dr Tooth gave a presentation on the analysis and recommendations of the Sapere report on the capacity value of Intermittent Generators in the Wholesale Electricity Market (WEM), including details of the modified Methodology 1 as recommended by Sapere.</p> <p>A copy of the presentation made by Dr Tooth is attached</p>
3.	<p>QUESTIONS AND DISCUSSION</p> <p>The Chair invited questions from attendees for both the IMO and Dr Tooth. The following points were raised.</p> <p>Mr Bill Bowyer noted that this public workshop was the industry's first chance to be briefed on the modified Methodology 1, and suggested that proposing this methodology as an amendment to the methodology originally put forward by the IMO under RC_2010_25 rather than as a new Rule Change Proposal does not give participants enough time to evaluate the information presented in the Sapere report or consider the application of modified Methodology 1. Mr Allan Dawson replied that it was not the IMO's intention to push the Rule Change Proposal through, noting that the second submission period for the Rule Change Proposals had been extended (at the request of a participant) to allow participants time to consider the recommendations and understand the Methodology.</p> <p>Mr John Vendel noted that a number of reports had been prepared by consultants for the Renewable Energy Generation Working Group (REGWG), and sought Dr</p>

Tooth's thoughts on these reports and in particular on their findings around the correlation between wind and peak demand periods. Dr Tooth answered that he had reviewed the public materials and submissions for the REGWG. With regard to Mr Vendel's specific question regarding the correlation between wind and peak demand periods, Dr Tooth recalled that McLennan Magasanik Associates (MMA) had made some note that there may be some correlation. Dr Tooth however noted that the work undertaken as part of the REGWG process had been impacted by limitations on data availability. Dr Tooth noted that the analysis undertaken by Sapere had the benefit of additional 2 years of Intermittent Generation performance data. Dr Tooth noted that he had not found anything in the REGWG reports that was inconsistent with the conclusions reached by Sapere. Mr Dawson clarified that Dr Tooth had been requested by the IMO Board to consider options for amending the two proposed valuation methodologies to make them simpler and more accurate and not to review the deliberations of the REGWG.

Mr Corey Dykstra requested an overview of the derivation of the "U" factor used in modified Methodology 1. Dr Tooth replied that there is no recognised international methodology for dealing with "unknown unknowns" and so Sapere had conducted a more detailed analysis of extreme events. Rather than concentrating on the average output during the peak periods (whether measured by market generation or Load for Scheduled Generation (LSG)) Sapere focused on the contribution of Intermittent Generators in reducing the peak for Scheduled Generators, and how this changed on the very peak days. Dr Tooth noted that this research had led to the conclusion that a range could be chosen for the "U" factor and that an element of professional judgement was required, due to the continued level of uncertainty around the performance of Intermittent Generation during peak events. The middle of this range was used in determining an appropriate "U" factor plus an adjustment to ensure conservatism. Dr Tooth reassured attendees of Sapere's independence in providing this advice on the appropriate value of "U".

Mr Shane Cremin noted that the "U" factor added a conservative bias and questioned whether, when considering the impact on the reliability criterion, Sapere had considered the current excess capacity in the market. Dr Tooth considered that if the market had secured more capacity than was required to meet its reliability needs then this was a separate issue.

Mr Dykstra also questioned whether the "U" factor was needed, given the current excess of capacity in the market. Mr Dawson noted that in the dataset used by Sapere a one in ten year peak event had not occurred. To account for this uncertainty as to whether the one in ten year peak could be met, Dr Tooth's advice to the IMO Board was include the "U" factor in the capacity valuation methodology (modified Methodology 1).

Mr Dawson noted that within the fleet of wind farms there is currently one wind farm whose performance is uncorrelated with the others.

Dr Tooth noted that while the "U" factor has been described as an adjustment for uncertainty it was also reflective of a real, known concern that the current Trading Intervals selected are not representative of the extreme peaks. The adjustment to be made now must represent our best guess to what the data will be when we have a one in ten year peak event.

Mr Bowyer suggested that there is nowhere else in the Market Rules where a 'judgement' factor that has no basis for its calculation has been used. Mr Stephen MacLean considered that the Market Rules contain many such judgement factors. Mr Bowyer asked Dr Tooth to provide Market Participants with a simple method or formula to show how the "U" factor is calculated, to provide greater transparency. Dr Tooth reiterated that he had applied his judgement in determining the value based on the range he had identified during his analysis.

Action Point: Sapere to consider deriving a formula to reflect the calculation of the "U" factor and making this publically available. [AD I thought he declined or was this related to the K factor??]

Mr Bowyer questioned if in the future when there is enough data the "U" factor will be calculated in a different way why that method cannot be used now. Mr Dawson replied that the IMO does not have this data currently and when Western Australia does have a number of consecutive 40 degree heat days the IMO will be in a much better position to evaluate how the wind generators perform. At the moment the IMO only has five years worth of data which does not include a one in ten year peak event. Mr Bowyer asked whether an effort had been made to contact Collgar to include its data in the analysis. Mr Troy Forward noted Collgar had been contacted during the REGWG process but had declined to provide the data. Dr Tooth further confirmed that Collgar data had not been used in Sapere's research.

Mr Shane Cremin asked why Sapere used twelve Trading Intervals in modified Methodology 1 and questioned the appropriateness of using LSG. Dr Tooth explained that he had looked at how Intermittent Generators changed the peak and identified that they have an impact on the amount of capacity required to be provided by Scheduled Generators. Sapere had considered this to produce a value between the average output at the market peak and the average output at LSG. The true value needed is how much the peak has been reduced. There is no simple way to introduce this into the formula but to guarantee the best estimate it was necessary to look at the peak before the Intermittent Generators were introduced and the peak after the Intermittent Generators are introduced. Mr Cremin again questioned the use of twelve trading intervals, comparing this with the requirements on Scheduled Generators. Dr Tooth noted when selecting a number of intervals from separate days it would not be wise to go above twenty Trading Intervals. There was some discussion about the use of LSG to determine the capacity of Intermittent Generators.

In response to a question from Mr Vendel, Dr Tooth clarified that the "K" factor is a function of the variability in demand and the variability in conventional generation.

Mr Bowyer asked Dr Tooth if his reading research into international methodologies for capacity valuations had found the focus was normally on the absolute peak or were other factors considered. Dr Tooth replied that his impression was that consideration of the peak was predominant.

Mr Cremin asked whether any of the extreme points plotted on slide 21 of Sapere's presentation were for periods where transmission constraints had been in effect. Mr Phil Kelloway added that System Management did not think this had been the case.

Action Point: Sapere to identify whether there were any applicable transmission constraints during the Trading Intervals associated with the extreme data points of the graph in slide 21 of the presentation

Mr Dawson reminded the audience that the second submission period ends on the 14 October 2011, 20 business days longer than usual. Mr Dawson requested that stakeholders contact the IMO if they considered that this timeframe did not give them sufficient time to compile their submissions. Mr Dawson informed the workshop that Dr Tooth would be available for further consultation if a Market Participant required further clarification

CLOSED: Mr Dawson thanked participants for their attendance and declared the work shop closed.