2015 Energy Price Limits Decision

24 June 2015

Economic Regulation Authority

WESTERN AUSTRALIA

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Economic Regulation Authority
Perth, Western Australia
Phone: (08) 6557 7900

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DECISION

1. Pursuant to clause 2.26 of the *Wholesale Electricity Market Rules* (**Market Rules**), the Economic Regulation Authority (**Authority**) approves the revised value for the Maximum Short Term Energy Market (**STEM**) Price of $253/MWh for the 2015/16 financial year.

2. Pursuant to clause 2.26 of the Market Rules, the Authority approves the non-fuel and fuel coefficients for the Alternative Maximum STEM Price for the 2015/16 financial year:

   $74.90/MWh + 19.500 multiplied by the Net Ex Terminal distillate fuel cost in $/GJ[1]

3. In accordance with clause 6.20.11 of the Market Rules, the approved revised values for the Maximum STEM Price and the Alternative Maximum STEM Price will apply with effect from the time specified in a notice to be published on the Independent Market Operator's (**IMO**) website.

REASONS

Background

4. The Energy Price Limits are a set of price limits comprising the Maximum STEM price, the Alternative Maximum STEM price and the Minimum STEM price. The Energy Price Limits are the price caps within which participants in the Wholesale Electricity Market are allowed to bid for or offer energy in the STEM and Balancing Market, as provided for under the Market Rules.[2] These price caps are part of the market power mitigation mechanisms in the market.

5. The maximum price depends on whether gas or liquid fuelled generation is required to meet the electricity demand. The Maximum STEM Price is applied when gas-fuelled generation is required, and the Alternative Maximum STEM Price is applied when liquid-fuelled generation is required.

6. The Market Rules require the IMO to annually review the appropriateness of the value of the Energy Price Limits.[3] In conducting the review, the IMO may propose revised values for the Maximum STEM Price and the Alternative Maximum STEM Price.[4] If it does propose such revised values, the IMO must use the applicable methodology set out in clause 6.20.7(b) of the Market Rules.

7. Clause 6.20.7(b) of the Market Rules stipulates that in conducting the review required by clause 6.20.6 the IMO must calculate the Maximum STEM Price or Alternative Maximum STEM Price using the following formula:

   (1 + Risk Margin) x (Variable O&M + (Heat Rate x Fuel Cost)) / Loss Factor

[1] Currently based on the Perth Terminal Gate Price (less excise and GST).

[2] Clause 7A.2.4

[3] Clause 6.20.6 of the Market Rules.

[4] Clause 6.20.7 of the Market Rules.

Where

i. Risk Margin is a measure of uncertainty in the assessment of the mean short run average cost for a 40 MW open cycle gas turbine generating station, expressed as a fraction;

ii. Variable O&M is the mean variable operating and maintenance cost for a 40 MW open cycle gas turbine generating station, expressed in $/MWh, and includes, but is not limited to, start-up related costs;

iii. Heat Rate is the mean heat rate at minimum capacity for a 40 MW open cycle gas turbine generating station, expressed in GJ/MWh;

iv. Fuel Cost is the mean unit fixed and variable fuel cost for a 40 MW open cycle gas turbine generating station, expressed in $/GJ; and

v. Loss Factor is the marginal loss factor for a 40 MW open cycle gas turbine generating station relative to the Reference Node.

8. The IMO must determine appropriate values for the factors described in (i) to (v) above as applicable to the Maximum STEM Price and Alternative Maximum STEM Price.

9. Where the IMO has proposed a revised value for the Maximum STEM Price and/or the Alternative Maximum STEM Price, the IMO is required to prepare a Draft Report describing how it arrived at the proposed revised values. The IMO must publish the report on the Market Website and advertise the report in newspapers widely published in Western Australia, and request submissions from all sectors of the Western Australian energy industry, including end-users, within six weeks of the date of publication.[5]

10. After considering the submissions on the Draft Report, the IMO must propose a final revised value for any proposed change to an Energy Price Limit and submit those values in its Final Report, including submissions received on the Draft Report, to the Authority for approval.[6]

11. The Market Rules require the Authority to review the Final Report provided by the IMO, including all submissions received by the IMO in the preparation of the report, and to make a decision as to whether or not to approve the revised value for any value comprising the Energy Price Limits.[7]

12. In making its decision as to whether or not to approve any proposed change to an Energy Price Limit, the Authority must only consider:[8]

- whether the revised value for the Energy Price Limit proposed by the IMO reasonably reflects the application of the method and guiding principles for calculating the Energy Price Limits described in clause 6.20 of the Market Rules; and

- whether the IMO has carried out an adequate public consultation process.

[5] Clause 6.20.9 of the Market Rules.

[6] Clause 6.20.10 of the Market Rules.

[7] Clause 2.26.1 of the Market Rules.

[8] Clause 2.26.1(c) of the Market Rules.

The IMO's process

13. Consistent with the approach in previous years, the IMO engaged Jacobs Group (Australia) (**Jacobs**) to assist it in undertaking the 2015 Energy Price Limits review. Jacobs prepared a draft report which was released for public consultation by the IMO on 16 March 2015.[9]

14. In preparing the draft report, Jacobs used two different methods to develop the gas price distributions for use in determining the Maximum STEM Price:

- Base gas price forecast – this method used time series analysis to project the maximum, mean and minimum monthly spot gas price variables on the basis that the entire spot gas price distribution is relevant to the analysis.
- Alternative gas price forecast – same as the base gas price forecast but only the maximum monthly spot price was used in the analysis.

15. In its invitation for submissions, the IMO noted that the spot gas price forecast has a significant impact on the Maximum STEM Price. The 2014/15 Maximum STEM Price is $330/MWh. The 2015/16 Maximum STEM Price would reduce to $195/MWh if the base gas price forecast of $3.40/GJ is used. Based on the alternative gas price forecast of $6.04, the 2015/16 Maximum STEM Price would reduce by a lesser amount to $261 MWh. The IMO noted that it may be more appropriate to use the alternative gas price forecast methodology.

16. The consultation period on Jacobs' draft report closed on 24 April 2015. The IMO received submissions from Alinta and Community Electricity[10] which generally supported the Energy Price Limits in the draft report. Both submissions supported the use of the alternative gas price forecast for reasons of continuity of approach and lack of better information about gas prices.[11]

17. On 25 May 2015 the IMO provided the Authority with its final report, together with Jacobs' final report on the review of the Energy Price Limits for the 2015/16 financial year.

18. Jacobs, in its final report, recommended the use of the alternative gas price forecast for the purpose of calculating the Maximum STEM Price and the IMO adopted this approach in its proposed Maximum STEM Price.

19. The IMO subsequently updated the revised Loss Factors determined by Western Power for the 2015/16 financial year and the final values of the Energy Price Limits were provided to the Authority on 16 June 2015. The revised Loss Factor for Pinjar is 1.0298 for the 2015/16 financial year.

[9] See IMO website, Energy Price Limits for the Wholesale Electricity Market in Western Australia, 16 March 2015, http://www.imowa.com.au/docs/default-source/rules/other-wem-consultation-docs/jacobs-draft-report---final.pdf?sfvrsn=0

[10] See IMO website, Submissions received during consultation period, 2015 Energy Price Limits Review, http://www.imowa.com.au/home/electricity/consultations/2015-energy-price-limits-review

[11] The alternative gas price methodology is consistent with the approach taken in 2014 in that only the maximum monthly spot price was considered.

20. The Maximum STEM Price approved by the Authority for the 2014/15 financial year, and proposed by the IMO for the 2015/16 financial year are as follows:

Financial year	Maximum STEM Price
2014/15 (Approved)	$330/MWh
2015/16 (Proposed)[12]	$253/MWh

21. Jacobs' report notes that the decrease in the Maximum STEM Price since last year's review has been primarily driven by a large reduction in the estimated gas price and the repeal of the carbon price, offset by an increase in variable O&M costs as a result of a reduction in the Australian Dollar / US Dollar exchange rate and updated maintenance costs. A summary of the movement in costs is shown in Figure 2 of Jacobs' final report.

22. The Alternative Maximum STEM Price is recalculated monthly based on changes in the monthly distillate price. The following equation is used to derive the Alternative Maximum STEM Price each month:

> Alternative Maximum STEM Price = Non-fuel coefficient + (Fuel coefficient multiplied by the Net Ex Terminal distillate fuel cost)

23. The Fuel coefficient for the Alternative Maximum STEM price only relates to the distillate fuel price. The non-fuel coefficient for the Alternative Maximum STEM Price relate to the rest of the cost components including the carbon price,[13] variable O&M and fuel transport cost.

24. The non-fuel and fuel coefficients for the Alternative Maximum STEM Price approved by the Authority for the 2014/15 financial year, and proposed by the IMO for the 2015/16 financial year are as follows:

Financial year	Non-fuel coefficient of the Alternative Maximum STEM Price	Fuel coefficient of the Alternative Maximum STEM Price
2014/15 (Approved)	$92.03/MWh	19.336
2015/16 (Proposed)[14]	$74.90/MWh	19.500

25. The Alternative Maximum STEM Price will vary depending on the distillate fuel price. The June 2015 Alternative Maximum STEM Price of $438/MWh is based on a distillate fuel price of $17.89/GJ. If the distillate fuel price were to remain unchanged, and the proposed parameters for 2015/16 were applied, the Alternative Maximum STEM Price would be $424/MWh.

26. Jacobs' report notes that the decrease in the Alternative Maximum STEM Price is mainly due to the decrease in the distillate price, driven by the recent decrease in the world oil price, and the repeal of the carbon price, offset by an increase in the variable O&M costs mainly due to a reduction in the Australian Dollar / US Dollar exchange rate and updated maintenance costs. A summary of the movement in costs is shown in Figure 3 of Jacobs' final report.

[12] Based on a revised Loss Factor for the 2015/16 financial year.

[13] The carbon price has been removed through the repeal of the *Clean Energy Act 2011* effective from 1 July 2014.

[14] Based on a revised Loss Factor for the 2015/16 financial year.

The Authority's assessment

27. In January 2014, the Authority published the *Review of the methodology for setting the Maximum Reserve Capacity Price and the Energy Price Limits in the Wholesale Electricity Market* final report, as required under clause 2.26.3 of the Market Rules.[15] The Authority made a number of findings and recommendations it considered would improve the arrangements for determining the Energy Price Limits. However, the Authority recognises it is not appropriate for any Rule Changes relating to the current market power mitigation measures (which the Energy Price Limits are part of) to be progressed at this time given the potential changes which may arise as a result of Phase 2 of the Electricity Market Review which is currently in progress. The Authority considers any modifications to the arrangements for determining the Energy Price Limits should be considered as part of the detailed design work being undertaken for Phase 2 of the Electricity Market Review.

28. For the purposes of this decision, as required under clause 2.26.1 of the Market Rules, the Authority is required to only consider whether the IMO's proposed values reflect the application of the method and guiding principles for calculating the Energy Price Limits described in clause 6.20 of the Market Rules. Consequently the issues raised in the Authority's review on the methodology are not considered in this decision.

29. The method and guiding principles set out in clause 6.20 of the Market Rules are relatively broad. There are also a number of inconsistencies. Since the Energy Price Limit reviews commenced, more detailed procedures and interpretations of the clause 6.20 principles have developed as part of the annual review.

30. In making its assessment of the proposed Energy Price Limits for 2015, the Authority has considered whether they have been calculated on a consistent basis with the methodologies approved by the Authority in previous reviews. Where a new or modified methodology has been introduced, the Authority has considered whether the change reasonably reflects the requirements of clause 6.20.

Key parameters

31. The Authority has reviewed Jacobs' Draft and Final Report and the IMO's Final Report on the review of the Energy Price Limits for the 2015/16 financial year. With the exception of the forecast gas price methodology, Jacobs' review generally continued with the basis for setting the Energy Price Limits approved by the Authority last year. In this year's review, the carbon price was excluded in the Energy price Limits as the carbon price was repealed in July 2014.[16]

32. As outlined above, the Market Rules define both the formula for calculating the Maximum STEM Price and Alternative Maximum STEM Price and the key parameters which must be used. The table below sets out the proposed values for the key parameters in relation to the Maximum STEM Price.

[15] ERA website, *Review of methodology for setting the Maximum Reserve Capacity Price and the Energy Price Limits in the Wholesale Electricity Market* Report, http://www.erawa.com.au/cproot/12036/2/Review%20of%20methodology%20for%20setting%20the%20MRCP%20and%20the%20EPLs%20in%20the%20WEM.pdf

[16] The carbon pricing mechanism was removed through the repeal of the *Clean Energy Act 2011* effective from 1 July 2014.

Key parameters of the Maximum STEM Price[17]	Units	2015/16 Proposed	2014/15 Approved
Mean Variable O&M	$/MWh	$57.33	$42.27
Mean Heat Rate	GJ/MWh	19.019	19.267
Mean Fuel Cost	$/GJ	$8.39	$13.60
Loss Factor		1.0298	1.0396
Before Risk Margin 6.20.7(b)	$/MWh	$210.62	$292.71
Risk Margin added	$/MWh	$42.38	$37.29
Risk Margin Value	%	20.1%	12.7%
Assessed Maximum Price	$/MWh	$253	$330

33. The parameters required to calculate the Alternative Maximum STEM Price are the same, although the heat rate and fuel cost values differ reflecting the use of distillate rather than gas. The table below sets out the proposed values for the key parameters in relation to the Alternative Maximum STEM Price.

Key parameters of the Alternative Maximum STEM Price[18]	Units	2015/16 Proposed	2014/15 Approved
Mean Variable O&M	$/MWh	$57.33	$42.27
Mean Heat Rate	GJ/MWh	19.070	19.319
Mean Fuel Cost	$/GJ	$18.57	$24.81
Loss Factor		1.0298	1.0396
Before Risk Margin 6.20.7(b)	$/MWh	$399.55	$501.71
Risk Margin added	$/MWh	$29.45	$29.29
Risk Margin Value	%	7.4%	5.8%
Assessed Maximum Price	$/MWh	$429[19]	$531[20]

Selection of generating unit

34. As identified in previous years, whilst clauses 6.20.7(a)(i) and 6.20.7(a)(ii) require the Maximum STEM Price and Alternative Maximum STEM Price to be based on the "highest cost generating works" in the SWIS fuelled by natural gas and distillate, respectively, clause 6.20.7(b) which defines the parameters to be used, refer to a "40 MW open cycle gas turbine generating station". Furthermore, clause 6.20.7(b) does not specify the type of gas turbine technology, for example aero-derivative or industrial gas turbine.

[17] Based on a revised Loss Factor.

[18] Based on a revised Loss Factor.

[19] Based on distillate price of $18.17/GJ.

[20] Based on distillate price of $22.70/GJ.

35. As noted in Jacobs' final report, previous years analysis has shown that the Pinjar 40 MW gas turbines (GTs) have the highest cost for short dispatch periods and the Parkeston aero-derivative gas turbines are the next most costly to run for peaking purposes. It also notes the Kwinana twin sets were included in the 2011 review and shown to be very unlikely to have higher dispatch costs than the Pinjar gas turbines. Jacobs notes there is no reason to suggest this would change in the foreseeable future and has only considered the Pinjar GTs and Parkeston aero-derivative gas turbines for analysis in the 2015 review.

36. Jacobs has updated its modelled costs for the candidate machines (i.e. Pinjar GTs and Parkeston) and confirmed that the Pinjar GTs continue to be the highest cost machines.

Mean Variable O&M

37. The Market Rules stipulate that Mean Variable O&M is the mean variable operating and maintenance cost for a 40 MW open cycle gas turbine generating station, and includes, but is not limited to, start-up related costs.

38. As outlined above, consistent with the methodology approved in prior years, costs have been based on the most expensive unit fuelled by natural gas i.e. Pinjar GT. Jacobs has determined the variable O&M costs for Pinjar GT based on engineering data available to Jacobs. Jacobs has updated the O&M costs by obtaining new quotes for maintenance and taken account of movements in foreign exchange rates.

39. Consistent with previous years, Jacobs continued the same treatment of cost uncertainty and included start-up costs in Variable O&M. Costs were modelled to cover run times of between 0.5 and six hours.

Mean Heat Rate

40. The Market Rules stipulate that the Mean Heat Rate used is the rate at minimum capacity for a 40 MW open cycle gas turbine generating station.

41. As outlined above, consistent with the methodology approved in prior years, the parameters have been based on the most expensive unit fuelled by natural gas i.e. Pinjar GT. Jacobs has retained assumptions used in previous reviews on average heat rates at maximum and minimum capacity provided by the manufacturer.

42. Consistent with the approach approved in previous years, Jacobs has estimated the heat rate based on the minimum capacity for the Pinjar GTs using historical market observations from the 2013 and 2014 calendar year.

Mean Fuel Cost

43. The Market Rules stipulate that the Mean Fuel Cost is the mean unit fixed and variable fuel cost for a 40 MW open cycle gas turbine generating station.

44. As outlined above, consistent with prior years, costs have been based on the most expensive unit fuelled by natural gas i.e. Pinjar GT.

Gas Price

45. Consistent with the methodology approved in previous years, the gas price includes both the price at the gas producer's plant gate and the cost of transmission from the plant gate to the delivery point at the power station. The price has been set based on the opportunities in the spot gas market for gas that would be used by a 40 MW peaking plant at Pinjar.

46. In the 2014 review, Jacobs modified the methodology for determining the spot gas price range. In previous years' reviews, ACIL Tasman[17] determined the spot gas price range based on the opportunities in the spot gas market for gas that would be used by a 40 MW peaking plant at Pinjar. The gas price ranges were based on publicly available data and reports, information from consultations with key stakeholders, and ACIL Tasman's own judgment.

47. In the 2014 review, Jacobs determined the spot gas price range based on a statistical model that estimated the impact of contract price movements on the gasTrading[21] maximum spot price distribution.

48. However, in its 2015 report, Jacobs notes that its postulated link between the contract market and the spot gas market is not apparent in prices observed since the 2014 review. Jacobs notes the price distribution it forecast in 2014 is significantly higher than what has actually transpired.

49. Consequently, Jacobs reviewed its approach for the 2015 review and considered two alternatives:

- The base gas price forecast which assumes that the entire spot gas price distribution is relevant to the analysis and uses a range of the maximum, mean and minimum monthly spot gas price. Jacobs stated this method was based on analysis that indicated a weak correlation between a high spot gas price and when peaking generation was running in the SWIS.
- The alternative gas price forecast which only uses maximum monthly spot prices (the 2014 approach also only considered maximum spot prices) from a short term gas trading platform only to determine a spot gas price forecast. This is consistent with last year's approach[22] which only considered maximum monthly spot prices.

50. The base gas price forecast is considerably lower than the alternative gas price forecast and considerably lower than gas price forecasts used in previous years.

51. In its final report, Jacobs recommended the use of the alternative gas price forecast. Although Jacobs' analysis indicated there is only a weak correlation between a high spot gas price when peaking generation is running in the SWIS, it considers the data is not granular enough to reliably draw the conclusion discounting the linkage between peaking generation and the spot gas price. This uncertainty, coupled with the imperative that the Maximum STEM price should not act to impede participation

[21] gasTrading is a commercially operated short term gas trading platform which enables prospective buyers and sellers to make offers to purchase and bids to sell gas on a month-ahead basis at any gas injection point. The gasTrading spot market matches individual bids and offers over a range of prices, and provides summary information on offers to purchase and gas scheduled.

[22] In last year's review, Jacobs determined the spot gas price distribution based on a statistical model that estimates the impact of contract price movements on the gasTrading platform's maximum spot price distribution. Jacobs states in its Final Report that the primary reason for the change in methodology is that the postulated link between the contract market and the spot gas market is not apparent in the spot gas prices for the 2014/15 financial year.

of high cost generators (i.e. the gas price should not be set too low) led Jacobs to recommend the use of the alternative gas price forecast.

52. The Authority notes, as set out in Jacobs report, that it has only used spot price data from the gasTrading platform. As set out in Jacobs' report, there are currently three short term gas trading platforms in WA. These include the gasTrading platform, the Inlet Trading market operated by DBNGP and the gas trading platform operated by Energy Access Services. Of these three platforms, only the spot gas prices in the gasTrading platform are published, which is why Jacobs has only considered these prices.

53. Jacobs recognises that, ideally, prices from all three platforms should be considered, but states it was not achievable within the review time frame. The same approach and similar comment were made in Jacobs' 2014 Report. As set out in its 2014 decision, the Authority agrees that consideration of spot gas prices from all short term gas trading platforms would be a much more robust method and should be considered in future reviews.

54. The Authority acknowledges there is currently a lack of transparency around gas prices in Western Australia which makes it difficult to accurately determine the gas prices for the purpose of deriving the Maximum STEM Price.

55. The Authority notes, as set out in the IMO's final report, that the spot gas price of $3.40/GJ would be estimated using the base gas price forecast and that a spot gas price of $6.04/GJ would be estimated if the alternative gas price forecast is used. The IMO noted it considered the spot gas price of $3.40/GJ using the base gas price forecast was low when compared to other gas price forecasts the IMO was aware of or has published[23] and that using this method would result in a significant reduction from the current Maximum STEM Price.[24]

56. The Authority considers the Maximum STEM price needs to be set at an appropriate level so that it is low enough to mitigate market power but high enough so that it does not deter high cost generators from participating in the market. Given the uncertainties and concerns regarding the forecast, the Authority considers adopting the alternative gas price forecast to derive the Maximum STEM Price is reasonable.

57. Consistent with the methodology approved in previous reviews, for the purposes of calculating the Maximum STEM Price, forecast gas prices are capped at the level where the dispatch cycle cost would be equal for gas and for distillate firing for a dual fuel turbine. The Authority considers this approach to be reasonable on the basis that it provides a better representation of the variation in Western Australian distillate prices. Also, the Singapore gasoil price is what is used to estimate the distillate price in deriving the Alternative Maximum STEM Price. Hence, this ensures consistency in the distillate price used in the review.

58. The Authority notes gas transport costs have been calculated in a manner consistent with the methodology approved in previous years.

[23] The Authority understands from the IMO that it was referring to gas prices from the gasTrading platform and the IMO's 2014 Gas Statement of Opportunities.

[24] In the IMO's Final Report, it notes a reduction of 41% from the proposed 2014 Maximum STEM Price if the "base gas price forecast" is adopted in this review.

Distillate Price

59. As approved in previous reviews by the Authority, Jacobs has used the Singapore gasoil price to estimate the distillate price in deriving the Alternative Maximum STEM Price.

Loss Factor

60. The Market Rules stipulate that the Loss Factor is the marginal loss factor for a 40 MW open cycle gas turbine generating station relative to the Reference Node.

61. As in approved in previous reviews by the Authority, Jacobs obtained the Loss Factors for the 2014/15 financial year from the IMO's website. Consistent with previous years, the IMO subsequently updated the Loss Factors to reflect the latest values determined by Western Power.

Risk Margin

62. The Market Rules stipulate that the Risk Margin is a measure of uncertainty in the assessment of the mean short run average cost for a 40 MW open cycle gas turbine generating station.

63. Consistent with previous years, Jacobs has identified the likely variability in key inputs to the calculation of Energy Price Limits and modelled the impact that the variability in the key inputs would have on the dispatch cycle cost. This method results in a probability distribution of possible costs from which the price limits have been selected to cover 80% of the possible outcomes. Jacobs acknowledges that through this approach, the Risk Margin is an output of the calculation rather than an input in determining the Energy Price Limits (as set out in the formula in clause 6.20.7(b)) but considers the approach it has taken to be industry best practice.

64. As set out in previous decisions, the Authority considers this approach to be more appropriate than adding a risk margin as an input and recommends a rule change should be made to reflect this.

Coefficients for the Alternative Maximum STEM Price

65. The Alternative Maximum STEM Price is revised every month according to changes in the Singapore Gas Oil (0.5% sulphur) price, as provided in clause 6.20.3(b) of the Market Rules.

66. The Authority notes it has determined in previous reviews that it is more appropriate to approve the coefficients for the Alternative Maximum STEM Price, rather than a single revised value.

67. The Authority notes that Jacobs has calculated the coefficients in line with the methodology approved in previous reviews.

Public Consultation

68. The Authority is satisfied that the IMO has carried out an adequate public consultation process. The IMO published the Draft Report prepared by Jacobs, describing how it arrived at the proposed revised values of the Maximum STEM Price

and the Alternative Maximum STEM Price on the Market Website, accompanied by an invitation for submissions. The IMO also advertised a notice in newspapers widely distributed in Western Australia, inviting submissions from all sectors of the Western Australian energy industry, including end-users.

Conclusion

69. On the basis of the above assessment, the Authority is satisfied that:

- the proposed values for the Energy Price Limits by the IMO reasonably reflect the application of the method and guiding principles for calculating the Energy Price Limits; and
- the IMO has carried out an adequate public consultation process.