IPART
New South Wales

Independent Pricing and Regulatory Tribunal

Review of a maximum price for wholesale ethanol in automotive fuel blends

Other — Final Report
December 2016

Independent Pricing and Regulatory Tribunal

Review of a maximum price for wholesale ethanol in automotive fuel blends

Other — Final Report
December 2016

The Tribunal members for this review are:

    Dr Peter J Boxall AO, Chair

    Ms Catherine Jones

    Mr Ed Willett

Inquiries regarding this document should be directed to a staff member:

John Smith	(02) 9113 7742
Cato Jorgensen	(02) 9113 7724
Jenny Suh	(02) 9113 7775
Edward Jenkins	(02) 9113 7774

Contents

1 | Executive summary

The Independent Pricing and Regulatory Tribunal of NSW (IPART) has been asked by the Premier of NSW to recommend a maximum price, or price methodology, for wholesale ethanol used in petrol-ethanol blends such as E10.[1]

In late 2015, the NSW Government decided that IPART would regulate the price of wholesale ethanol to support the availability of E10 at petrol stations at an attractive price to customers.[2] This decision was part of a range of measures announced with the aim of improving the state's performance against the ethanol mandate established by the *Biofuels Act 2007* (the Biofuels Act).

The primary objective of the Biofuels Act is to support the development of a sustainable biofuels industry in NSW. It seeks to meet this objective by mandating that all major fuel sellers ensure ethanol accounts for at least 6% of the total volume of petrol they sell in NSW per quarter. The ethanol mandate requires that major fuel sellers make E10 available to consumers. However, consumers can choose between E10, and regular and premium unleaded fuel blends. The Minister may grant a major fuel seller an exemption from meeting the mandate, for example, if it has taken all reasonable steps to comply, but E10 sales did not meet the 6% requirement. Details on the different grounds for exemptions are set out in the Biofuels Act and regulation.

IPART's recommended maximum price for wholesale ethanol will form part of the exemptions framework for the mandate. Under changes in the *Biofuels Amendment Act 2016 (NSW)* (the Biofuels Amendment Act), the Minister may exempt a major fuel seller from complying with the mandate if it can satisfy the Minister that the price at which they purchased ethanol - for production of E10 - exceeded the price determined by IPART. Other grounds for exemptions would continue to exist, including that a major fuel seller has taken all reasonable steps to comply with the mandate (see Chapter 5 for more information).

The changes in the Biofuels Amendment Act refer to IPART determining a 'reasonable wholesale price' for the purposes of the exemptions framework.[3] However, in this report we refer to a 'recommended maximum price' in line with

---

[1] E10 is regular unleaded petrol containing up to 10% ethanol. See Chapter 2 for more details.
[2] Victor Dominello MP, Minister for Innovation and Better Regulation, *Media release - Reforms To Biofuels Mandate To Boost Competition And Transparency*, 20 December 2015.
[3] *Biofuels Amendment Act 2016* (NSW) No.12 Schedule 2, Item 31. (The new Part 3A). Schedule 2 of the Biofuels Amendment Act will commence on 1 January 2017.

our terms of reference. Our recommended maximum price is not a binding maximum price in the market; ethanol producers and fuel wholesalers will continue to negotiate both price and terms and conditions and could agree to price above the recommended maximum price to ensure continued supply of E10 to retailers and consumers. If this were to occur, a major fuel seller could apply for an exemption from the mandate on the grounds that the wholesale price at which they purchased ethanol exceeded the price determined by IPART.

In conducting our review, we have consulted with stakeholders and analysed the current market for ethanol, including the efficient costs of ethanol production. This report sets out our final findings and recommendations and responds to stakeholder submissions received on our draft recommendations released in October 2016.

1.1   Final recommendation

Our recommended maximum price for the first quarter of 2017 (1 January to 31 March) is **115.2 cents per litre**, excluding GST. As indicated above, our recommended maximum price will become the 'reasonable wholesale price' under the Biofuels Amendment Act when it commences on 1 January 2017.

Our recommended maximum price is based on an estimate of an import parity price (IPP) for ethanol, including excise tax. Our final recommendation is lower than the recommendation in our Draft Report, mainly reflecting our decision to incorporate the lower of United States (US) and Brazilian ethanol prices in the IPP, rather than just using Brazilian prices. We will update the maximum price using our IPP methodology and publish it on our website around two weeks before the beginning of each quarter.

Our recommended maximum price is at the upper end of our estimate of the efficient cost of producing ethanol. It is also higher than prices currently being negotiated in contracts between ethanol producers and fuel wholesalers. We understand that some stakeholders might have expected that our recommended maximum price would need to be much lower to ensure E10 is available at an attractive price. However, in making our recommendation we had regard to our terms of reference which require that we consider the need to protect consumers from potential abuse of monopoly power, the efficient cost of producing ethanol, and any other matters we consider relevant. In our view it is also important to consider the risk of over-regulating the market, promoting competition in the ethanol market, and the objective of a sustainable biofuels industry in NSW.

We found that currently consumers have a range of fuel choices available, that competition is emerging in the wholesale ethanol market, and that low petroleum prices are placing a market constraint on ethanol prices. Under these conditions, we consider that 'heavy-handed' regulation of ethanol prices is not needed to protect consumers from potential abuse of monopoly power and that recommending a much lower maximum price would:

▼ be unlikely to drive improved performance against the mandate,

▼ pose a risk to the financial viability of existing ethanol producers, and

▼ may discourage new producers from entering the market and hamper the development of a sustainable biofuels industry.

Our approach to recommending the maximum price avoids distorting the ethanol market. We expect ethanol producers and fuel wholesalers will continue to negotiate wholesale ethanol prices below our recommended maximum. These negotiations are generally between sophisticated counterparties who have developed mechanisms to manage their risks, for example through floor and ceiling prices in wholesale contracts. Our recommendation also allows competition in the wholesale ethanol market to continue to develop. In the longer term, we consider that effective competition in this market is the best way to support the availability of E10 to consumers at an attractive price **and** achieve the objective of a sustainable biofuels industry in NSW. As discussed in section 1.3, we will conduct annual monitoring and reporting to ensure our approach to recommending a maximum price remains appropriate.

We recognise that gaining an exemption from the mandate on the grounds of our recommended maximum price is unlikely at present. However, as outlined in more detail in Chapter 5, there continues to be a range of other grounds for exemptions.

1.2   Framework for our recommendation

In any market, the need for government intervention depends on the extent of competition in the market. In the wholesale ethanol market, it also depends on the degree of consumer choice in the retail fuel market and the level of oil/petroleum prices. The 6% ethanol mandate (and other measures to support the mandate) has the potential to restrict consumer choice for retail fuel and could increase the opportunity for ethanol producers to exercise market power. As ethanol blended fuels compete with regular and premium unleaded petrol, low oil/petroleum prices place a market constraint on wholesale ethanol prices.

Figure 1.1 provides our framework for considering the appropriate approach for recommending a maximum price for wholesale ethanol in NSW. This is a schematic representation and the regions within this figure are indicative only.

Figure 1.1   Framework for recommended maximum wholesale price of ethanol in NSW
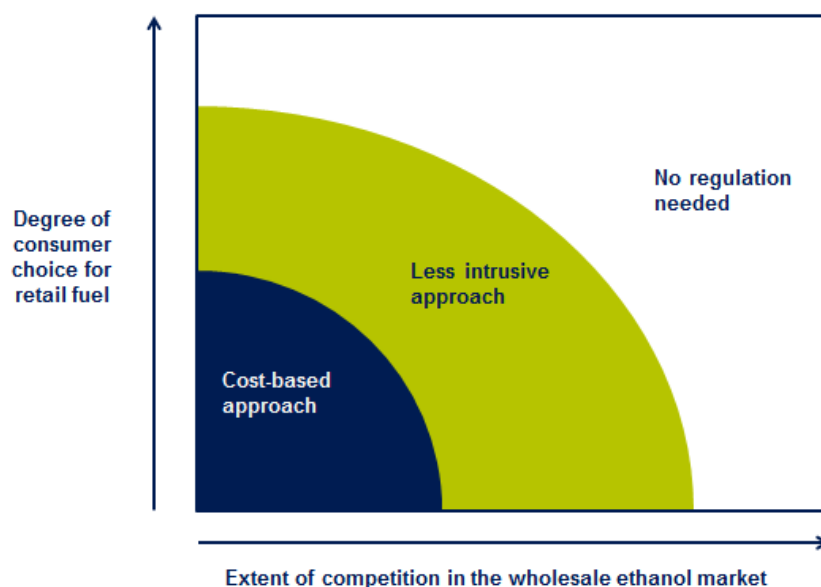
Under our framework:

▼ If there were very limited consumer choice of retail fuel (eg, if E10 were the only fuel available) and little or no competition in the wholesale ethanol market (eg, only one producer that can supply NSW and high barriers to entry), our approach for recommending a maximum price would appropriately be based on the cost of a new entrant producer.

▼ If there were unrestricted consumer choice of retail fuel (eg, if the ethanol mandate was removed completely), there would be no need for intervention in the pricing of wholesale ethanol, even if there were little or no competition in the wholesale ethanol market.

▼ If the wholesale ethanol market were competitive or there were a strong threat of competition with low barriers to entry, this would ensure that wholesale ethanol prices reflected the efficient costs of production regardless of the degree of consumer choice, and no intervention in the pricing of wholesale ethanol would be needed.

▼ In other cases, the approach for recommending a maximum wholesale price would be less intrusive than a cost-based approach, to avoid distorting the wholesale ethanol market and encourage the development of more competition.

As petroleum prices are currently low, and consumers have a high degree of choice for retail fuel, the market imposes a constraint on wholesale ethanol prices. In the context of our framework in Figure 1.1, if petroleum prices rise, and if there were little competition in the wholesale ethanol market and/or

limited consumer choice at the retail level, higher petrol prices could allow ethanol producers to earn further profit by charging above what would be the competitive price. As discussed further below, in this instance we would reassess and consult on whether our approach remains appropriate.

1.2.1 Current market conditions support a less intrusive approach

In previous years, enforcement of the ethanol mandate reduced the fuel choices available to motorists in NSW. However at present consumers have a relatively high degree of choice between regular unleaded petrol (RULP), premium unleaded petrol (PULP) and E10 at most service stations. There are three producers in the wholesale ethanol market in eastern Australia, and there is evidence of increasing competition between these producers. As noted above, petroleum prices are relatively low at present and this imposes a market constraint on wholesale ethanol prices.

Under these conditions we consider that a 'heavy-handed' form of regulation is currently not needed to protect consumers from potential abuse of monopoly power. Instead, a less intrusive approach to recommending a maximum price is appropriate.

We have been asked to recommend a maximum price, however our intent is that a less intrusive methodology would not distort the wholesale ethanol market and would support more competition. In the longer term, effective competition in this market is the best way to support the availability of E10 to consumers at an attractive price **and** achieve the objective of a sustainable biofuels industry in NSW.

1.2.2 An import parity price is the most appropriate pricing methodology

Of the various pricing approaches we investigated, we consider that an IPP including excise would be the most suitable approach. Fuel wholesalers in NSW already have the option of importing ethanol from overseas. However, they generally would not do so because of the excise subsidy provided to local ethanol producers. As notes in our Issues Paper, an IPP including excise would not affect the local market.[4]

Our IPP methodology estimates the cost of importing ethanol into NSW, including the following cost components:

▼ the international market price

▼ transport costs

▼ landing costs in Australia, including relevant excise tax, and

---

[4] IPART, *Review of a maximum price for wholesale ethanol in automotive fuel blends – Issues Paper*, June 2016, p 38.

▼ storage and handling costs in Australia.

In developing our methodology we had regard to simplicity, transparency and minimising regulatory and administrative costs. Our IPP is based on international prices from both Brazil (ESALQ[5] price index) and the US Department of Agriculture. These prices are freely available and indicative of the average price of ethanol exported from these counties.

Our IPP methodology is similar to that which is commonly used by fuel importers and wholesalers to determine contract prices for petroleum. However, in contrast to these petroleum pricing methodologies, our methodology will determine maximum ethanol prices on a quarterly (ie, three-month) basis, rather than on a daily basis. Our methodology calculates a maximum price for the upcoming quarter based on a nine month historical average of the lowest weekly IPP from either the US or Brazil. From 1 January 2017 we will determine the reasonable wholesale price using this methodology.

More detail about our IPP methodology is provided in Chapter 4 and Appendix C. We have also developed an Import Parity Price Excel model to calculate the IPP which is available on our website.[6]

1.3   Annual monitoring and reporting

Under the Biofuels Amendment Act, IPART has been asked to monitor the retail market for petrol-ethanol blend (E10) and report to the Minister. As discussed in Chapter 6, we will undertake this reporting annually.

The NSW Government recently launched the FuelCheck website which provides consumers with real-time fuel price information covering every service station in NSW.[7] We will use FuelCheck data as part of our retail monitoring. We are also liaising with the Australian Competition and Consumer Commission (ACCC) over their retail fuel monitoring role.

In conjunction with our retail monitoring of the E10 market, we will conduct annual monitoring and reporting on consumer choice for retail fuel, the wholesale ethanol market and the level of oil/petroleum prices. This assessment would consider whether a cost-based, less intrusive, or no regulation approach is most appropriate. Deciding on this involves a judgement based on a number of factors. We do not have any automatic triggers for reconsidering our approach and will consult with stakeholders before doing so.

---

[5] ESALQ stands for 'Escola Superior de Agricultura Luiz Queiroz', which translates to Luiz de Queiroz College of Agriculture. This index is published by the Centre for Advanced Studies on Applied Economics within Sao Paulo University.

[6] www.ipart.nsw.gov.au.

[7] www.fuelcheck.nsw.gov.au.

More detail about our annual monitoring and reporting is set out in Chapter 6. In late March 2017 we will release an Issues Paper that provides more information on our proposed approach to our annual monitoring, and invite stakeholder comment. We expect to finalise our first annual report, covering the 2016-17 financial year, by the end of 2017.

1.4 Changes since our Draft Report

Stakeholders provided general support for our framework for recommending a maximum price in submissions to our Draft Report and at the public forum. The main changes since our Draft Report relate to our methodology for the IPP.

We have made the following refinements to our IPP methodology:

▼ incorporating ethanol prices from the US, using the lower of US and Brazilian ethanol prices in any given week

▼ extending the pricing period, ie, the period for which our recommended maximum price applies, to three months (up from four weeks in our Draft Report) to correspond to the exemption period for the ethanol mandate

▼ extending the historical average period to nine months (up from 15 weeks in our Draft Report)

▼ revising some of the other cost components in the IPP.

These changes have resulted in a lower maximum price compared to our Draft Report. More information is provided in Chapter 4.

1.5 Structure of this report

The rest of this report explains our review and recommendations in more detail:

▼ Chapter 2 discusses the context and process for the review.

▼ Chapter 3 explains our proposed framework for recommending a maximum wholesale ethanol price and why we are recommending a less intrusive approach.

▼ Chapter 4 explains why we consider an IPP that includes excise tax is the most appropriate pricing methodology, and sets out details of our methodology.

▼ Chapter 5 discusses how the recommended maximum price would apply in the NSW Government's exemption framework for the mandate.

▼ Chapter 6 sets out our proposed scope and procedure for annual monitoring and reporting.

▼ Appendices A to F provide supporting information.

1.6   List of our final findings and recommendations

Our findings and recommendations are set out in the following chapters. For convenience they are also listed below.

1.6.1   Final findings

1   That the degree of consumer choice in the retail fuel market is relatively high and there is emerging competition in the eastern Australian wholesale ethanol market. 20

2   That the current degree of consumer choice for retail fuel, the extent of competition in the wholesale ethanol market and the level of petroleum prices support a less intrusive approach to a recommended maximum price. 21

3   That annual monitoring and reporting is needed to confirm the approach for the recommended maximum price for wholesale ethanol remains appropriate. 50

4   That the scope of annual monitoring and reporting include: 50

   –   an assessment of the state of wholesale and retail markets for ethanol using the framework described in Chapter 3 50

   –   consideration of any necessary changes to the import parity price methodology 50

   –   consultation with stakeholders before changing our approach/methodology for the maximum price 50

   –   monitoring the retail market (including prices) for petrol-ethanol blend and reporting to the Minister on the effect of the recommended maximum price on that market (as required under the Biofuels Amendment Act). 50

1.6.2   Final recommendations

1   That the recommended maximum price of wholesale ethanol for use in automotive fuel blends be the price that results from the application each quarter of the Import Parity Price Excel model, both published on IPART's website. 33

2   That for the first quarter of 2017 (1 January to 31 March) the recommended maximum price that results from the application of the Import Parity Price Excel model is 115.2 cents per litre, excluding GST. 33

2 | Context and process for this review

We have conducted this review under terms of reference provided by the Premier of NSW. Going forward under changes to the Biofuels Act, IPART is required to determine and periodically review a maximum price for ethanol for use in automotive fuel blends.[8] The sections below outline the key context for the review – including the *Biofuels Act 2007* and ethanol mandate, IPART's previous review of options to improve the state's performance against this mandate, the Government's measures for improving this performance, and our terms of reference for this review. The final section outlines our process for conducting the review.

2.1 Biofuels Act and ethanol mandate

As Chapter 1 noted, the Biofuels Act has the primary objective of supporting the development of a sustainable biofuels industry in NSW. Its secondary objectives include improving air quality, providing consumers with cheaper fuel options and supporting regional development.[9]

The main means through which the Biofuels Act seeks to meet these objectives is the ethanol mandate. Since 2011, major fuel sellers have been mandated by the Biofuels Act to ensure that ethanol accounts for at least 6% of the total volume of petrol they sell per quarter. However, they can be exempted from the mandate, for example if they demonstrate they have taken all reasonable steps to comply with the mandate (see Chapter 5 for more information).

There are two types of petrol-ethanol blended fuel sold in NSW; E10 and E85. E10 is a blend of regular unleaded petrol with up to 10% ethanol.[10] E85 is a specialist fuel for high performance vehicles, and is a blend of 85% ethanol and 15% petrol. Over 99% of petrol-ethanol blended fuel sold in NSW is E10.[11]

---

[8] *Biofuels Amendment Act 2016* (NSW) No.12 Schedule 2, Item 31.

[9] NSW Fair Trading, *Regulatory Impact Statement – Biofuels Regulation*, May 2016, p 3.

[10] NSW Fair Trading, Frequently asked questions – ethanol, available at http://www.fairtrading.nsw.gov.au/ftw/Consumers/Buying_goods/Petrol/Frequently_asked_questions_ethanol.page?, accessed 20 October 2016.

[11] NSW Fair Trading, *Service station data collection results – July 2016*. Available at, http://www.fairtrading.nsw.gov.au/biz_res/ftweb/pdfs/Businesses/Biofuels_industry/Service_station_data_collection_results.pdf, accessed 20 October 2016.

To date, the ethanol mandate has not been met, and ethanol sold as a proportion of petrol sold is currently around 2.5% (Figure 2.1).

Figure 2.1   Ethanol as a percentage of total petrol sales per quarter in NSW
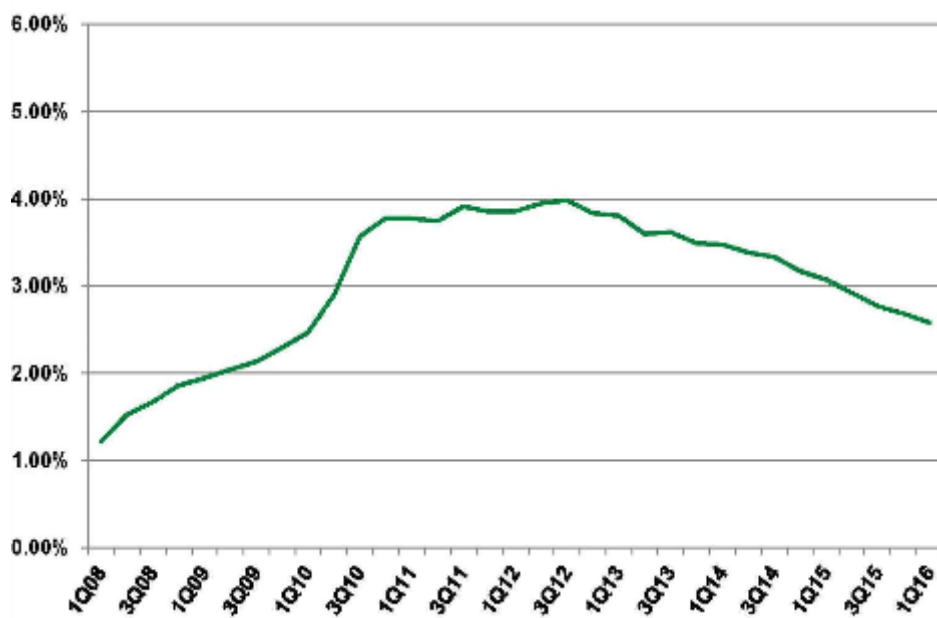
Note: The data is presented in quarters, where 1Q16 refers to the first quarter in 2016 etc.
Data source: NSW Fair Trading, *Biofuels marketplace data – Progress charts*, available from: http://www.fairtrading.nsw.gov.au/ftw/Businesses/Specific_industries_and_businesses/Biofuels_industry/Biofuels_marketplace_data.page, accessed 8 December 2016.

2.2   IPART's previous review of options to improve performance against the mandate

The Premier asked IPART in January 2015 to review the policy options for increasing uptake of ethanol. In our May and October 2015 Final Reports, we found that achieving the 6% mandate would require a set of measures that would impose a net cost to the NSW community. These options included requiring ethanol in almost all fuel grades and therefore removing consumer choice in the retail fuel market. We recommended that if such measures were introduced, they would need to be accompanied by price regulation of ethanol to ensure value for money for consumers.[12]

---

[12] IPART, *Ethanol mandate, Options to increase uptake of ethanol blended petrol – Final Report*, May 2015, p 1.

2.3 Government's selected measures to improve performance against the mandate

In December 2015, the NSW Government announced that it would implement a range of measures to improve performance against the ethanol mandate. These measures include:

▼ broadening the mandate to a wider range of fuel retailers and enforcing the mandate at the retail level

▼ implementing an education campaign to inform consumers of the benefits of ethanol and dispelling the myths

▼ establishing an online tool (FuelCheck) to provide consumers with real-time fuel price information covering all service stations, and

▼ empowering IPART to regulate wholesale prices for ethanol and monitor the retail market for petrol-ethanol blended fuel.[13]

2.4 Terms of reference for this review

For this review we have been asked to recommend:[14]

▼ a maximum price for wholesale ethanol for use in automotive fuel blends, and/or

▼ a price methodology which ethanol suppliers must apply to determine a maximum price when selling wholesale ethanol for the purposes of complying with the Biofuels Act and regulation.

In making our recommendations, we have been asked to review prices in the biofuels industry and have regard to:

▼ protecting consumers from potential abuses in monopoly power relating to prices

▼ the efficient costs of supplying ethanol, and

▼ any other matters we consider are relevant.

The terms of reference for the review are provided at Appendix A.

---

[13] See Victor Dominello MP, Minister for Innovation and Better Regulation, *Media release - Reforms To Biofuels Mandate To Boost Competition And Transparency*, 20 December 2015, available from: https://www.finance.nsw.gov.au/about-us/media-releases/reforms-to-ethanol-mandate-to-boost-competition-and-transparency, accessed 28 September 2016.

[14] The *Biofuels Amendment Act 2016* (NSW) No.12 Schedule 2, Item 31 requires that IPART determine a reasonable wholesale price. In this report we refer to a recommended maximum price in line with our terms of reference.

2.5   Our process for this review

To make our recommendations for this review we conducted a review process that involved detailed analysis and public consultation. A summary of our review process is provided in Box 2.1 below.

Box 2.1   Summary of our review process

▼ In February 2016 we released a draft version of the **terms of reference** for consultation. We received three submissions.

▼ In June 2016 we released an **Issues Paper** which set out our proposed approach for the review. We received 17 submissions, some of which were anonymous and/or confidential.

▼ We requested cost information from ethanol producers on a confidential basis and appointed AECOM to provide advice on efficient new entrant costs of ethanol production.

▼ We visited ethanol production facilities in Nowra (NSW) and Dalby (Queensland), and met with other stakeholders in the ethanol and petroleum industry.

▼ We sought stakeholder comment on draft recommendations in our **Draft Report** released in October 2016. We received four submissions to our Draft Report (see Section 2.6 below).

▼ On 22 November we held a **public forum** in Sydney to provide the opportunity for stakeholders to comment and ask questions on our draft findings and recommendations.

▼ We have taken into account submissions to our Draft Report and feedback from the public forum in providing this **Final Report** to the Premier by the end of December 2016.

2.6   Stakeholder submissions to our draft recommendations

We received four submissions to our draft recommendations and findings. Stakeholders also provided comment on our draft recommendations at the public forum on 22 November 2016. The main themes to arise from this consultation are summarised below.

2.6.1   Support for our review framework

Stakeholders generally supported the framework we applied to make our recommendations on a maximum price, although some considered that no regulation of ethanol prices is required.[15] Manildra submitted that consumers

---

[15] See comments from Mr G Hughes (United Ethanol) and M Sutton (Biofuels Association of Australia), Public forum transcript, November 2016, p 11, lines 15-21, 25-31; submission from Manildra, November 2016, p 2.

have unrestricted consumer choice, and it may be appropriate for us to recommend in future that no regulation is required.[16] We have considered Manildra's view on the degree of consumer choice, however we consider at this stage there is not unrestricted choice. This is discussed further in Chapter 3.

2.6.2 Submissions opposed to the ethanol mandate in NSW

The Australian Lot Feeders Association (ALFA) and Australian Pork submit that the NSW ethanol mandate has a number of undesirable consequences. For example, these include:

▼ increasing grain and food prices

▼ distorting grain markets

▼ misallocating resources towards ethanol producers who would be unviable without government assistance

▼ imposing a significant upfront cost burden on fuel retailers and distributors who recoup this cost by increasing fuel prices, and

▼ stymying investment in second generation ethanol production technologies as there is no preferential treatment.

Both these stakeholders submit that the ethanol mandate should be removed in NSW on the basis that its costs outweigh the benefits.[17]

As noted in the Australian Pork submission, the terms of reference for this review do not extend to the impact of the ethanol mandate or whether its benefits exceed its costs. An ethanol mandate is a matter for the NSW Government.

2.6.3 Amendments to our IPP methodology

We have made some amendments to our IPP methodology in response to discussion at the public forum and in submissions to the Draft Report. The main change is that the IPP is now based on the lower of the US and Brazilian ethanol prices in any given week. This is discussed in detail in Chapter 4.

---

[16] Manildra submission, November 2016, pp 2-4.
[17] ALFA submission, November 2016, pp 2-3; Australian Pork submission, November 2016, p 1.

3 | Approach to recommending a maximum price should be less intrusive

To form our view on the appropriate approach to a recommended maximum price, or price methodology, we developed a framework. As the markets for retail fuels and wholesale ethanol production can vary over time, our framework considers three key factors – the degree of consumer choice in retail fuels, the extent of competition in the wholesale ethanol market and the level of oil/petroleum prices. To make our final findings, we:

▼ applied our framework to assess the degree of consumer choice in the retail fuel market and the extent of wholesale competition, and

▼ considered stakeholder comments on the current need for determining a maximum wholesale price.

The sections below outline our findings, and then discuss our analysis and findings on each step in more detail.

3.1 Overview of our final findings

We consider that the degree of consumer choice in the retail fuel market is relatively high and there is emerging competition in the eastern Australian wholesale ethanol market. Petroleum prices are relatively low at present and this imposes a market constraint on wholesale ethanol prices.

Under these conditions we consider that a 'heavy-handed' form of regulation is currently not needed to protect consumers from potential abuse of monopoly power. Instead, a less intrusive approach to recommending a maximum price is appropriate. Our intent is that a less intrusive methodology would not distort the wholesale ethanol market and support more competition. In the longer term, effective competition in this market is the best way to support the availability of E10 to consumers at an attractive price **and** achieve the objective of a sustainable biofuels industry in NSW.

Final findings

1 That the degree of consumer choice in the retail fuel market is relatively high and there is emerging competition in the eastern Australian wholesale ethanol market.

2   That the current degree of consumer choice for retail fuel, the extent of
competition in the wholesale ethanol market and the level of petroleum prices
support a less intrusive approach to a recommended maximum price.

3.2   Framework for recommending a maximum price

In any market, the need for government intervention depends on the extent of
competition in the market. In the wholesale ethanol market, it also depends on
the degree of consumer choice in the retail fuel market and the level of
oil/petroleum prices. The 6% ethanol mandate (and other measures to support
the mandate) has the potential to restrict consumer choice for retail fuel and may
increase the opportunity for ethanol producers to exercise market power. As
ethanol blended fuels compete with regular and premium petrol, low
oil/petroleum prices place a market constraint on wholesale ethanol prices.

Figure 3.1 provides our framework for considering the appropriate approach for
recommending a maximum price for wholesale ethanol in NSW. This is a
schematic representation and the regions within this figure are indicative only.
As discussed in Chapter 2, stakeholders provided general support for this
framework.

**Figure 3.1   Framework for recommended maximum wholesale price of
ethanol in NSW**
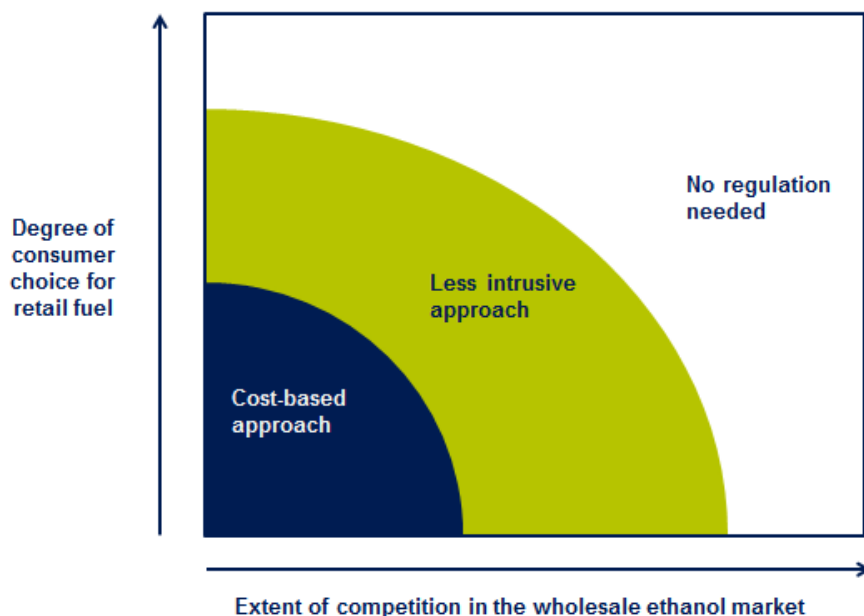
Under our framework:

▼ If there were very limited consumer choice of retail fuel (eg, if E10 were the only fuel available) and little or no competition in the wholesale ethanol market (eg, only one producer that can supply NSW and there are high barriers to entry), our approach for recommending a maximum price would appropriately be based on the cost of a new entrant producer.

▼ If there were unrestricted consumer choice of retail fuel (eg, if the ethanol mandate was removed completely), there would be no need for intervention in the pricing of wholesale ethanol, even if there were little or no competition in the wholesale ethanol market.

▼ If the wholesale ethanol market were competitive or there were a strong threat of competition with low barriers to entry, this would ensure that wholesale ethanol prices reflected the efficient costs of production regardless of the degree of consumer choice, and no intervention in the pricing of wholesale ethanol would be needed.

▼ In other cases, the approach for recommending a maximum wholesale price would be less intrusive than a cost-based approach, to avoid distorting the wholesale ethanol market and encourage the development of competition.

When there is a high degree of choice available to consumers, ethanol-blended fuels like E10 need to be priced competitively with regular and premium unleaded petrol (see Box 3.1 for more discussion). As petroleum prices are currently low, the market imposes a constraint on wholesale ethanol prices.

Box 3.1   The cellophane fallacy

The fact that ethanol-blended fuel prices are constrained by petrol prices does not necessarily mean that ethanol producers have no ability to exercise market power. An E10 price that is just below the RULP price could be highly profitable for ethanol producers, especially when petrol prices are high. This would be the result of a lack of competition in the wholesale ethanol market. A similar situation occurred in a famous 1956 US Supreme Court case that gave rise to the so-called 'cellophane fallacy'. In that case, Du Pont, the near monopoly supplier of cellophane, argued that its prices were constrained by the prices of other flexible sandwich wrapping products. Subsequently it has been widely accepted that Du Pont's argument involved a fallacy. The fallacy was that, as the cost of manufacturing cellophane was very much lower than the cost of these other products, while the prevailing price for both was a competitive price for greaseproof paper, it was close to a monopoly price for cellophane.

For more discussion see, Smith R, and Merrett A, *The state of competition, Unwrapping a fallacy: market definition, market power and cellophane*, Issues 18, June 2014. Available at, http://thestateofcompetition.com.au/wp-content/uploads/2014/07/TSoC-Issue-18-cellophane.pdf.

In the context of our framework in Figure 3.1, if petroleum prices rise, and if there were little competition in the wholesale ethanol market and/or limited consumer choice at the retail level, higher petrol prices could allow ethanol producers to earn further profit by charging above what would be the competitive price. As discussed further below, in this instance we would reassess and consult on whether our approach remains appropriate.

3.3 Findings on the current approach for recommending a maximum price

Deciding a position on either axis of this framework involves a judgement based on a number of factors. We found that the current degree of consumer choice, extent of competition in producing ethanol and the level of petroleum prices result in a position within the green area in our framework, indicating that a less intrusive regulatory approach is appropriate.

Our intent is that a less intrusive approach would result in a recommended maximum price that would not distort the wholesale ethanol market and support more competition. Our recommended maximum price using the methodology outlined in Chapter 4 is higher than prices currently being negotiated in contracts between ethanol producers and fuel wholesalers. We understand that some stakeholders might have expected that our recommended maximum price would need to be much lower to ensure E10 is available at an attractive price. However, in making our recommendation we had regard to our terms of reference which require that we consider the need to protect consumers from potential abuse of monopoly power, the efficient cost of producing ethanol, and any other matters we consider relevant. In our view it is also important to consider the risks of over regulating the market, promoting competition in the ethanol market, and a sustainable biofuels industry in NSW.

We consider that 'heavy-handed' regulation of ethanol prices is currently not needed to protect consumers from potential abuse of monopoly power. We expect ethanol producers and fuel wholesalers will continue to negotiate wholesale ethanol prices below our recommended maximum. These negotiations are generally between sophisticated counterparties who have developed mechanisms to manage their risks, for example through floor and ceiling prices in wholesale contracts. Furthermore, recommending a much lower maximum price would be unlikely to drive improved performance against the mandate. Consumer research indicates that people who avoid using E10 mainly do so due to concerns about the potential negative impact the fuel may have on their vehicle. In contrast, relatively few indicate that price is a key reason for avoiding E10.[18] Recommending a much lower maximum price under current market conditions would pose a risk to the financial viability of existing ethanol

---

[18] Confidential consumer research provided by NSW Fair Trading.

producers, may discourage new producers from entering the market and hamper the development of a sustainable biofuels industry.

In the longer term, we consider that effective competition in the wholesale ethanol market is the best way to support the availability of E10 to consumers at an attractive price **and** achieve the objective of a sustainable biofuels industry in NSW. As discussed in Chapter 6, we will conduct annual monitoring and reporting to ensure our approach to recommending a maximum price remains appropriate.

More detail on our assessment is provided below.

3.3.1 Degree of consumer choice

To assess the degree of consumer choice we considered data on the different fuels available at service stations in NSW, and the way that the mandate and supporting measures affect consumer behaviour. We found consumers currently have a relatively high degree of choice between RULP, PULP and E10 at most service stations. Information recently collected by NSW Fair Trading indicates that:

▼ around 78% of service stations in NSW sell RULP

▼ around 70% of stations that sell E10 also sell RULP, and

▼ there are roughly equal numbers of E10 and RULP pumps in NSW (7,584 E10 pumps vs 8,371 RULP pumps).

The NSW Government's FuelCheck online price monitoring tool is now available and further increases consumers' ability to choose between E10 and RULP and PULP. FuelCheck enables consumers to enter their postcode and see nearby prices for all fuel types (including RULP and E10).

This finding suggests the current level of choice is towards the upper end of the vertical axis in our framework.

Stakeholder submissions

In response to our Draft Report, Manildra submitted that the degree of consumer choice is even greater than we have assessed. It makes three observations to support this:

▼ There is no reason that high/low petroleum prices would affect the availability of different fuel types and so the degree of consumer choice at service stations.

▼ Wholesale ethanol represents a small fraction of the NSW automotive fuel industry and so ethanol producers are price takers incapable of exercising market power.

▼ Our analysis of NSW Fair Trading data does not refer to PULP which Manildra consider is a closer substitute for E10 compared to RULP due to its similar Research Octane Number (RON).

Manildra consider that consumers have unrestricted choice as:

▼ every service station has the option of offering RULP and those that do not are responding to consumer demand, and

▼ PULP is available almost everywhere.[19]

Our response to stakeholder submissions

We retain our view that consumers have a relatively high degree of choice for retail fuel, but not unrestricted choice. Given consumers have different preferences, we consider that a high degree of consumer choice means choice between all major fuel types (RULP, PULP and E10). The reason that our analysis above focusses on availability of RULP (as opposed to PULP) is because the ethanol mandate requires that large fuel retailers make E10 available. E10 has generally replaced RULP as the NSW Government had proposed to remove RULP from sale in NSW from 1 July 2012, but reversed this decision in January 2012.[20]

Figure 3.2 shows the changing composition of petrol sales in NSW following the introduction of the ethanol mandate in 2007. This shows that:

▼ sales of PULP have been increasing

▼ sales of E10 increased up until around 2011-12 and more recently have been falling, and

▼ sales of RULP fell until 2011-12 and have since stabilised at around 30% of all petrol sold in NSW.

With RULP less available, many consumers have decided to instead purchase PULP rather than E10. While PULP and E10 have a similar octane rating, many consumers do not consider them substitutes as they prefer not, or are unable, to use E10. A similar observation was recently made by the ACCC.

> The introduction in October 2007 of the ethanol mandate in NSW has affected the competitive dynamic among retailers by reducing the availability of regular unleaded petrol (RULP) from many retail sites and reduced consumer choice. Some motorists who could not, or chose not to, use E10 in their vehicles used premium unleaded petrol (PULP) due to the reduced availability of RULP.[21]

---

[19] Manildra Group submission, November 2016, pp 3-4.
[20] http://www.abc.net.au/news/2012-01-31/bowser-backflip3a-nsw-regular-petrol-ban-ditched/3801768, accessed 14 December 2016.
[21] ACCC, *Report on the Australian petroleum market – September quarter 2016*, November 2016, p 3.

Figure 3.2   Composition of petrol sales in NSW
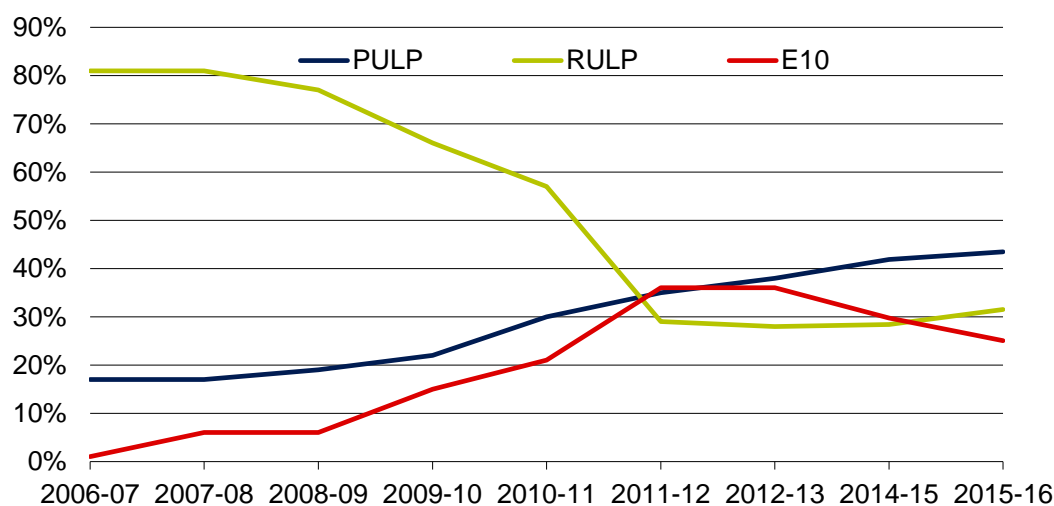
a Includes ACT sales.
Note: PULP includes 95 and 98 octane.
Data source: Australian Petroleum Statistics.

PULP sales have also increased in other states and territories in Australia (Figure 3.3). This may relate to sales of newer motor vehicles that recommend premium fuel use. However, the trend for increasing sales of PULP is more apparent in NSW where there is an ethanol mandate. Ethanol blended fuel is available in all states and territories, although only small amounts are sold in South Australia, Western Australia, Tasmania and Northern Territory.

Figure 3.3   Composition of petrol sales across jurisdictions (2015-16)
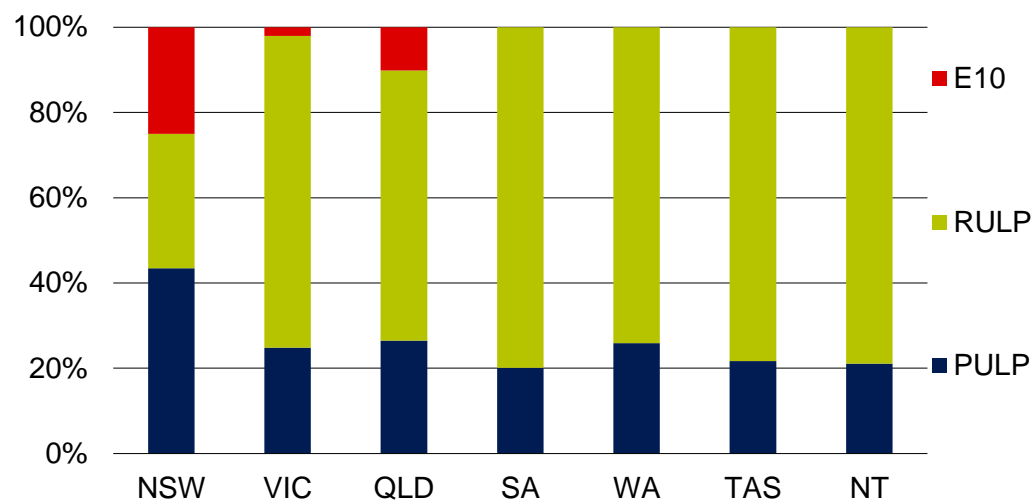
Note: Small amounts of ethanol-blended fuel are sold in South Australia, Western Australia, Tasmania and Northern Territory although full details are not available. The volume sold in these states/territory are not reported in this table.
Data source: Australian Petroleum Statistics.

Our assessment is that most consumers in NSW would likely be able to use their preferred fuel, including RULP. Our assessment is at an aggregate level, and the availability of different fuel types may vary by individual locations.   For example, recently the ACCC reported that three out of eight petrol stations in Armidale sell RULP, and only one sells both E10 and RULP.[22] In summary, the ethanol mandate in NSW:

▼ requires many fuel sellers to make E10 available, and therefore may not allow them to offer RULP as well without incurring substantial costs

▼ may make obtaining RULP less convenient for consumers than would otherwise be the case, and

▼ has contributed to a substantially different composition of fuel sales in NSW relative to other jurisdictions where there is no mandate.

For these reasons, we consider that there is not unrestricted choice of fuel in NSW.

3.3.2   Extent of competition in the wholesale market

Given our findings on the degree of consumer choice, we considered that a high level assessment of the extent of competition would provide a sufficient basis to form a judgement on the most appropriate approach to recommending a maximum wholesale ethanol price. To conduct this assessment, we analysed the current barriers to entry, level of market concentration, and pricing outcomes in this market. We found that there is emerging competition in the wholesale ethanol market.

This finding suggests the current extent of competition is moving towards the middle of the horizontal axis in our framework.

Barriers to entry

A competitive market generally has low barriers to entry: new producers can readily enter the market and compete for contracts, and existing ethanol producers face the ongoing threat of competition from new entrants. This provides the most effective protection from the exercise of market power.

Currently the barriers to enter the ethanol production market are relatively high, but not so high as to preclude new entry. A new entrant would need to make a relatively large capital investment, as well as gain the necessary environmental and planning approvals. This would involve long lead times. However, on 1 July 2016, the Dongmun Greentec ethanol project in Deniliquin NSW received

---

22 ACCC, *Armidale petrol market has not had sufficient competition*, Media Release, 21 November 2016.

planning and environmental approval[23] and other ethanol projects in eastern
Australia are at various stages of development.[24]

Market concentration

A competitive market generally has a large number of suppliers and low market
concentration. The wholesale ethanol market in eastern Australia currently has
three producers. However, during our consultations, we found there is
increasing competition from the smaller Queensland producers.

Pricing outcomes

In a competitive market, ethanol producers would not be able to sustain
monopoly pricing (pricing above long-run marginal cost). As part of this review
we considered confidential information on ethanol production costs, and
discussed with stakeholders the pricing under ethanol contracts. We also
considered advice from AECOM on the efficient costs of new entrant ethanol
producers, which is summarised in Box 3.2.

For AECOM's analysis in its Final Report, we advised them to include a return
on capital based on a real post-tax weighted average cost of capital (WACC) of
7.3%. This is up from 6.9% in our Draft Report. Details of our WACC calculation
are provided in Appendix D.

---

[23] Dongmun Greentec, E*thanol Plant in Deniliquin is finally approved*, 2016, at
http://dongmungreentec.com.au/?p=1559, accessed 13 October 2016.

[24] See for example: AECOM, *Efficient Costs of New Entrant Ethanol Producers – Prepared for
Independent Pricing and Regulatory Tribunal*, October 2016, pp 25, 26, 33.

Box 3.2   AECOM's findings on new entrant costs of production

We engaged AECOM to research and provide advice on the efficient operating and capital costs of new entrant ethanol producers. AECOM's analysis considered a number of potential production pathways, and identified the likely locations, feedstock availability and production scale (plant size) for each pathway, as well as process and plant requirements.

AECOM estimated ranges of efficient production costs depending on feedstock and production capacity. These ranges are shown in the figure below.
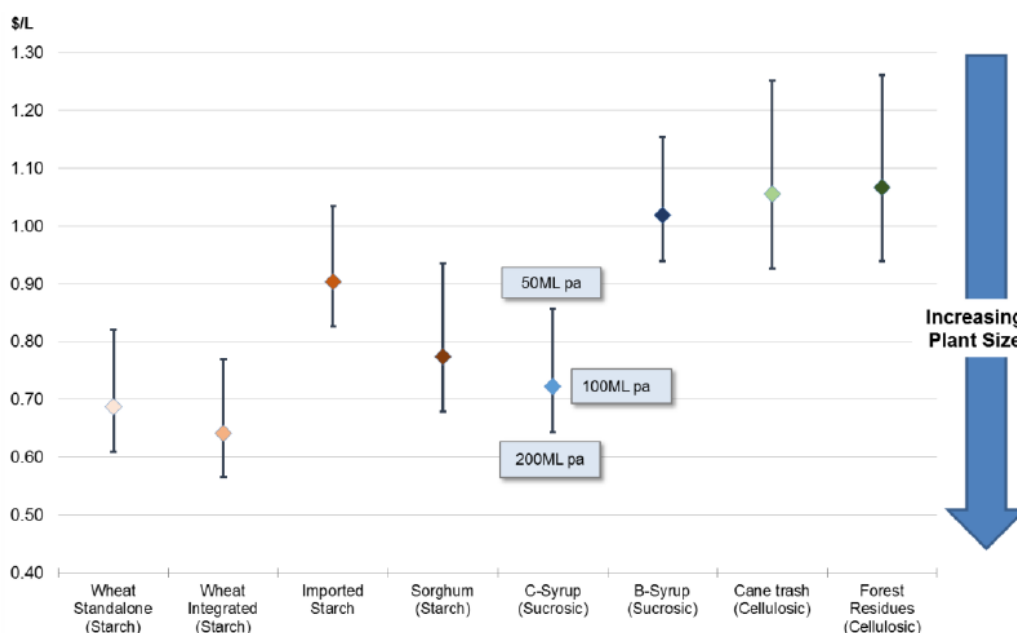
Some of AECOM's key findings were:

▼ Currently, the lowest cost of production is available through the use of wheat starch in an integrated facility that primarily produces gluten.

▼ To be competitive, a new entrant would have to invest in an integrated gluten and ethanol production facility and be based in remote NSW to take advantage of wheat price differentials and the current over-supply in global wheat markets.

▼ Economies of scale apply, so that a larger plant will produce ethanol at a lower cost per unit.

▼ Feedstock costs are in general not closely linked to global commodity or oil prices.

While AECOM found that the use of wheat feedstocks is the most cost-effective at this time, we note that feedstock prices can fluctuate considerably over time. For most production pathways, the cost of feedstock is by far the largest cost component. Fluctuations in feedstock prices can therefore mean different production pathways are the most cost effective at different points in time.

3.4 Stakeholder comments on the need for regulation of ethanol prices

Two key themes emerged in stakeholder submissions to our Issues Paper and Draft Report. The first was that there was no need for regulation of wholesale ethanol prices, while the second was that regulation could damage competition in the market.

3.4.1 No need for regulation

Both ethanol producers and purchasers submitted that ethanol prices did not need to be regulated. For example, Manildra Group – the largest ethanol producer in Australia – contended that it does not have substantial market power, and that it has not exercised its market power to set prices at a sustained level of monopoly profit.[25]

To support this view, Manildra commissioned a report by HoustonKemp. This report provided analyses that suggest Manildra does not have a durable form of market power in the supply of wholesale ethanol. In particular, it argued that the relevant constraint on Manildra's prices is not its own costs, nor the costs of rival producers, but rather the price of a close substitute in pure petroleum-based fuels.[26]

The Australian Institute of Petroleum (AIP) – which represented major petroleum companies – argued against the regulation of fuel prices in general. It submitted that any recommendation from IPART should support the normal efficient and competitive operation of the Australian wholesale and retail fuels market. It also commented that in most sectors where price regulation exists, the regulated product does not compete against an immediately available substitute product. But this is not the case with ethanol, as ethanol blended fuels compete with RULP.[27]

We consider that our framework addresses these stakeholder concerns. By considering the degree of consumer choice of retail fuels, our framework takes account of the availability of alternative products. Under our framework, the more choice available to consumers, the less need for regulation. Our previous recommendations in relation to regulating ethanol prices[28] were made in the context of the Government considering options to improve performance against the ethanol mandate. Some of these options involved substantially reducing consumer choice of retail fuel (for example, by requiring that ethanol be included

---

25 Manildra Group submission, August 2016, p 1; Manildra Group submission, November 2016, p 1.

26 HoustonKemp Economists, *Maximum price for wholesale fuel-grade ethanol* – A report for Manildra Group, August 2016, p 1.

27 AIP submission, July 2016, pp 3, 12.

28 IPART, *Ethanol mandate, Options to increase uptake of ethanol blended petrol* – Addendum to May 2015 Final Report, October 2015, p 2.

in almost all fuel blends). In addition, at the time of those recommendations, there was less evidence of competition in the wholesale market. Therefore, if these options had been implemented the state's position would be closer to the bottom left of our framework.

3.4.2 Regulation could damage competition in the market

Some stakeholders expressed concern over the implications that regulating wholesale ethanol prices would have on the development of a competitive market. During our consultations some expressed the view that regulating a maximum price would create a risk for ethanol producers, and in particular potential new entrants, at a time when competition is improving. HoustonKemp's report also noted the risk of regulation damaging competition, and that our recommendations should be consistent with a 'first do no harm' intervention in the ethanol production market.[29]

We agree with stakeholders that given the degree of consumer choice and improving competition in the wholesale ethanol market, a less intrusive approach to recommending a maximum wholesale price that does not distort the market and risk damaging the development of competition, is appropriate. We consider that recommending a maximum wholesale price using our proposed IPP methodology would be a 'first do no harm' intervention.

---

[29] HoustonKemp Economists, *Maximum price for wholesale fuel-grade ethanol* – A report for Manildra Group, August 2016, p 3.

4 | An import parity price is the most appropriate pricing methodology

Having established that a less intrusive approach is appropriate in the current market and policy setting, the next step is to decide on the appropriate price, or price methodology for the recommended maximum price.

Determining the price, or price methodology, involved the following steps:

▾ assessing which pricing options best fit a less intrusive approach, and

▾ considering stakeholder views on different pricing options.

The sections below outline our final finding, and then discuss our analysis and findings on each of these steps in more detail.

4.1 Overview of our recommendations on pricing methodology and pricing periods

Our final recommended maximum price uses an import parity price (IPP) methodology. The IPP includes the applicable customs duty and excise, as well as costs of storage and handling at an import terminal, and costs of transport to the fuel wholesaler's terminal. Our IPP methodology provides an indicative import price for ethanol, while minimising the risk that this maximum price distorts the market and stifles emerging competition.

The basis for our price methodology is an IPP methodology similar to that which is commonly used by fuel importers and wholesalers to determine contract prices for petroleum. However, in contrast to these petroleum pricing methodologies, our methodology will determine maximum ethanol prices on a quarterly basis, rather than on a daily basis. This reflects feedback from stakeholders and our view that longer pricing-periods ensure greater stability and predictability for affected parties. In our Draft Report we proposed four-weekly pricing periods, but stakeholders suggested that this would result in prices being updated too frequently and would create too much uncertainty.[30] Quarterly pricing periods were supported by both buyers and sellers of wholesale ethanol and ethanol-blended petrol.[31] Quarterly prices also have the advantage that the prices would align with the exemption periods in which they apply.

---

30 See for example Transcript of IPART Public Hearing, 22 November 2016, p 20.
31 Personal communications with buyers and sellers, December 2016.

Using our final IPP methodology, the recommended maximum wholesale ethanol price to apply from 1 January 2017 until 31 March 2017 is 115.2 cents per litre, excluding GST.

Recommendations

1   That the recommended maximum price of wholesale ethanol for use in automotive fuel blends be the price that results from the application each quarter of the Import Parity Price Excel model, both published on IPART's website.

2   That for the first quarter of 2017 (1 January to 31 March) the recommended maximum price that results from the application of the Import Parity Price Excel model is 115.2 cents per litre, excluding GST.

4.2   Assessing price setting options

Given a less intrusive approach is appropriate in the current market and policy setting, we consider that the recommended maximum price or price methodology should support the development of a competitive wholesale ethanol market and be administratively simple for stakeholders.

In our Issues Paper we considered a number of approaches to recommending a maximum price or methodology, including basing these on the:

▼ efficient costs of producing ethanol

▼ willingness to pay for ethanol

▼ economic price of ethanol, or

▼ IPP of ethanol.

Having further considered these approaches and stakeholder comments on them, we consider that the first three would not support the development of a competitive wholesale ethanol market. These options were generally not supported by stakeholders. In Appendix B we discuss these options in further detail, including stakeholder views on them.

We consider that setting the maximum ethanol price using an IPP methodology that includes duties and excise is the most appropriate methodology to support competition in the wholesale ethanol market. This methodology reflects an option already available to local purchasers of wholesale ethanol – importing ethanol from overseas. An IPP price therefore reflects the upper bound for what a local purchaser would be willing to pay to a domestic ethanol producer.

As domestic ethanol producers receive a subsidy for fuel excise and duties, importing ethanol from overseas is currently not an economic option for fuel wholesalers. Our methodology ensures regulation does not distort the market and stifle emerging competition. Effective competition in this market is the best

way to support the availability of E10 to consumers at an attractive price **and** to
achieve the objective of a sustainable biofuels industry in NSW.

In the next sections we outline the general formula for our IPP methodology, and
the data sources we will use.

4.3 General formula for calculating an import parity price

An IPP approach is commonly used as the basis for prices charged for petrol by
major fuel suppliers in Australia. While each major fuel supplier has its own
methodology for calculating the IPP for petrol, the IPP can generally be
expressed as:[32]

*IPP for petrol (ex GST) = International benchmark price for refined fuel (MOPS95 for
petrol) + Quality premium (for specific Australian and State fuel standards) + Freight +
Insurance and loss + Wharfage*

Our methodology uses a similar approach to calculating an IPP for wholesale
ethanol. Specifically, we recommend that an IPP for ethanol be calculated ex-
GST delivered to the wholesale fuel terminal in NSW using the following
formula:

*IPP for wholesale ethanol (ex GST) = International benchmark price for ethanol
including costs of freight from the mill to port and export terminal charges + Sea freight
+ Insurance and loss + Wharfage in Australia+ Landing costs in Australia (excise and
import duties) + Storage & handling at import terminal + Freight from import terminal
to wholesale fuel terminal*

However, as noted above, our methodology is used to determine a recommended
maximum price for ethanol on a quarterly basis, rather than a daily basis
common in petroleum contracts. Our methodology also gives the price faced by
fuel wholesalers for ethanol delivered to their terminals, rather than the price
delivered to an import terminal.

4.4 Estimating the IPP components

In the Draft Report we stated that our preference would be to use the lower of US
and Brazilian ethanol export prices as the international benchmark price in our
IPP methodology. We also noted our preference for using publicly available data
where possible to ensure transparency and to avoid imposing additional costs on
affected stakeholders (eg, fuel retailers).

At the time we were not aware of a reliable and public source for US ethanol
prices, but we have since learnt that the US Department of Agriculture (USDA)

---

[32] ACCC, *Monitoring of the Australian petroleum industry* – Report of the ACCC into the prices, costs
and profits of unleaded petrol in Australia, December 2009, p 83.

publish average mill-gate prices on a daily basis for 11 of the largest ethanol producing states, accounting for approximately 90% of US ethanol production.

Stakeholders have expressed support for using a combination of US and Brazilian export prices as the basis for our IPP calculation.[33] However, Manildra and United Petroleum consider the IPP calculation should use an average of US and Brazilian prices, rather than the lowest of the two prices.[34] We consider this further in section 4.4.1.

In the next sections we set out our decisions on how we will estimate each of the components of the IPP, and Table 4.1 provides an overview of our final decisions.

Table 4.1   IPP component estimation basis

IPP component	Data source	
	Brazilian ethanol	*US ethanol*
'Free On Board' (FOB) price — International benchmark price	University of Sao Paulo College of Agriculture (ESALQ) ethanol price index	US Department of Agriculture (USDA) national daily ethanol report
'Free On Board' (FOB) price — Freight from mill-gate to export port in origin country	University of Sao Paulo ESALQ research unit into agro-industrial logistics	USDA Agricultural Marketing Service transport research and analysis datasets.
'Free On Board' (FOB) price — Origin country port costs	University of Sao Paulo ESALQ research unit into agro-industrial logistics	Port of Houston Authority Tariff schedule for chemical exports
Sea freight from origin country to Australia	ICIS Market Intelligence sea freight rates from Brazil to Asia Pacific	ICIS Market Intelligence sea freight rates from the US to Asia Pacific
Insurance and loss	Quotes from sea freight insurance brokers	
Australian wharfage (Botany)	Pricing information published by NSW Ports	
Australian landing costs (taxes)	Australian customs tariff rates for fuel ethanol imports	
Storage and handling at Australian import terminal	Estimate by IPART based on confidential information	
Transport costs from port to fuel terminal	Estimate by IPART based on confidential information	

4.4.1   International benchmark price for ethanol

The international benchmark price for ethanol is the largest component of the IPP estimate. It is important that the international benchmark price be based on a likely source market for ethanol imported to Australia, and it's important that the price information is robust and reliable.

---

[33] See for example transcript of our public hearing, 22 November 2016, pp 14 and 16, available at https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/pricing-reviews-section-12a-publications-review-of-a-maximum-price-for-wholesale-ethanol/transcript-recommended-maximum-price-for-ethanol-used-in-automotive-fuel-blends-22-november-2016.pdf, accessed 19 December 2016.

[34] Transcript of public hearing 22 November 2016, pp 14, 16-17.

There are three key issues to consider:

▼ Which overseas market(s) would be the most likely source of ethanol imported to Australia?

▼ What is an appropriate source of information on prices for the chosen ethanol source(s)?

▼ How is the ethanol price information best used in coming up with a recommended maximum price for the purpose of the exemptions framework?

### The US and Brazil would be the most likely sources of ethanol imported into Australia

Ethanol is produced in many countries around the world. The two largest producers of ethanol currently are the US and Brazil, accounting for 58% and 28% respectively of global ethanol production in 2015.[35] The OECD forecasts that Brazil and the US will remain the two largest net exporters of ethanol until at least 2025, as shown in Figure 4.1. We therefore consider Brazil and the US would be the two most likely sources for ethanol imports into Australia, at least in the next year.

The prices for ethanol from Brazil or the US would vary over time depending on factors such as the markets for the relevant feedstocks, production levels and domestic and international demand. Stakeholders supported our proposal at our public hearing to use a combination of US and Brazilian ethanol prices in our IPP methodology. While we proposed to use the lowest priced ethanol source at any given time, ethanol producers argued that it was more appropriate to use an average of US and Brazilian ethanol prices. However, we maintain our view that an efficient ethanol importer would be expected to source their imports from whichever of the US and Brazil is the lowest cost source at any point in time.

---

[35] Renewable Fuels Association, *Fuelling a High Octane Future – 2016 Ethanol Industry Outlook*, 2016, p 8.

Figure 4.1   OECD forecast of ethanol exports from net exporting countries
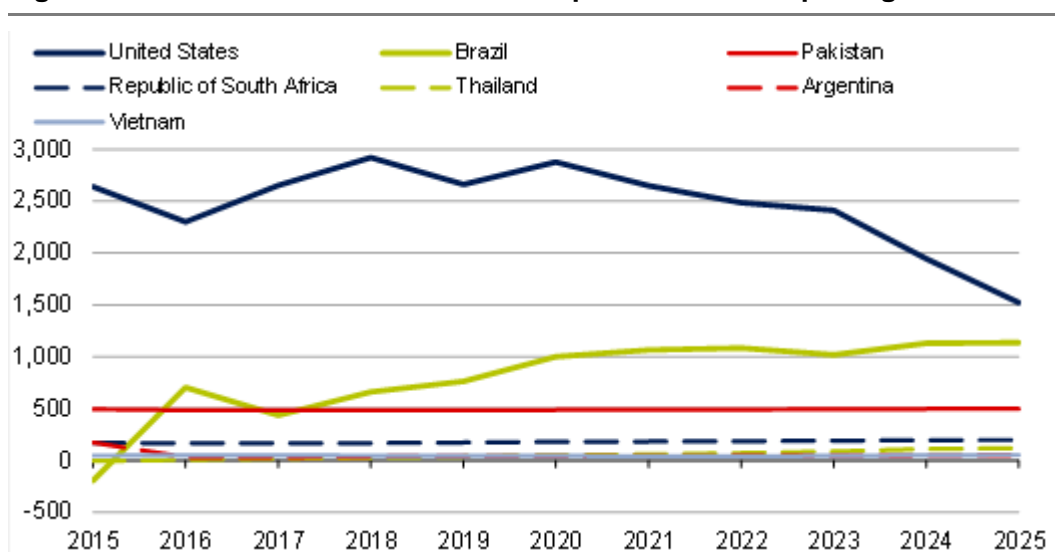
Note: The chart excludes Australia, which OECD forecast to export between 7ML and 13.5 ML over this period.
Data source: OECD Statistics, *OECS-FAO Agricultural Outlook 2016*-2015, at
http://stats.oecd.org/Index.aspx?DataSetCode=HIGH_AGLINK_2016, accessed 13 October 2016.

## We prefer using publicly available US and Brazilian ethanol prices

We considered a range of possible sources for prices for US and Brazilian ethanol (see Appendix E for an overview of the data sources considered). Most of the available sources are paid subscription services, but we also identified reliable public sources for US and Brazilian (São Paulo) mill-gate prices. The primary benefit of using some of the paid subscription services would be that they can provide prices 'Free On Board' (FOB) the vessel at the port of export, which accounts for costs of transport from the mill to port and any relevant port charges. By contrast, when using mill-gate prices we have to add our own estimates of the costs of transport from mill to port and port costs.

As we noted in our Draft Report, our preference is to use publicly available data to ensure transparency and to avoid imposing costs on stakeholders associated with subscription services. We have compared our estimated FOB prices using publicly available data from ESALQ and USDA with FOB prices from Platts, as seen in Figures 4.2 and 4.3 below. Platts is widely used as a source for benchmark prices in the petroleum industry.

Figures 4.2 and 4.3 show that our estimated FOB prices using the publicly available source for Brazilian ethanol prices closely tracks the Platts' FOB prices. For US FOB prices, the USDA estimates are on average 5 cents per litre higher than the FOB prices from Platts. This means that, for periods when the US ethanol prices are lowest, an IPP methodology based on the lower of US and Brazilian prices could be expected to be slightly higher using USDA prices than using prices from Platts and likely other paid subscription services.

In Figure 4.4 we compare weekly IPPs based on ethanol prices from USDA and
ESALQ. The red dotted line tracks the lowest of the two IPP prices at any given
time, showing the prices that would be included in our IPP methodology. It
shows that for a long time, the US IPP has been significantly lower than the
Brazilian IPP. More discussion on US and Brazilian ethanol prices is provided in
Appendix F. As noted above, we consider an efficient ethanol importer in
Australia would currently be sourcing its ethanol from the US rather than from
Brazil.

**Figure 4.2   Estimated Brazilian FOB prices using data from ESALQ
compared with FOB prices from Platts (AUD nominal)**
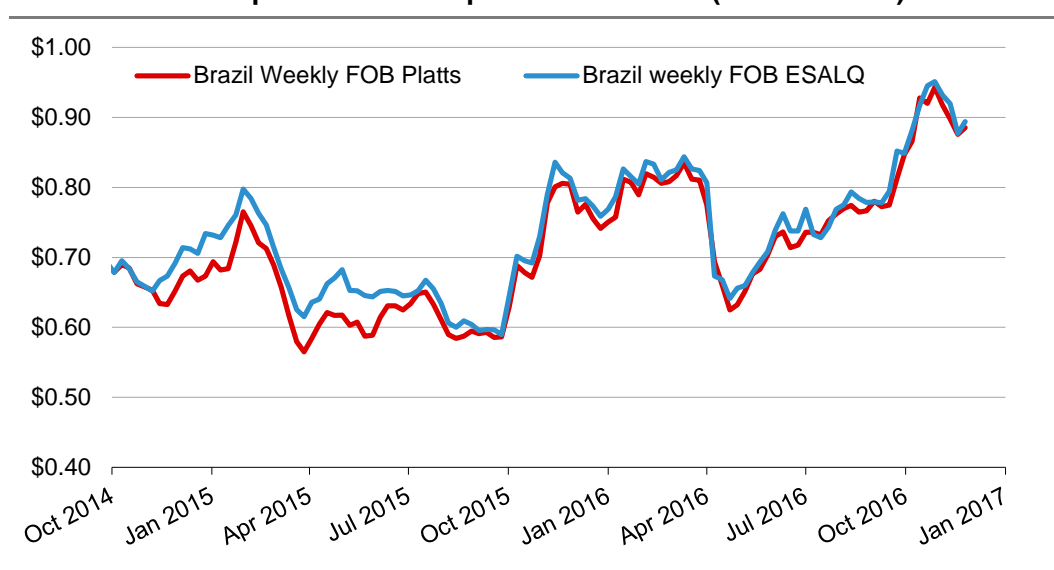
Data source: Platts, ESALQ, RBA (exchange rates) and IPART calculations.

**Figure 4.3   Estimated US FOB prices using data from USDA compared with
FOB prices from Platts (AUD nominal)**
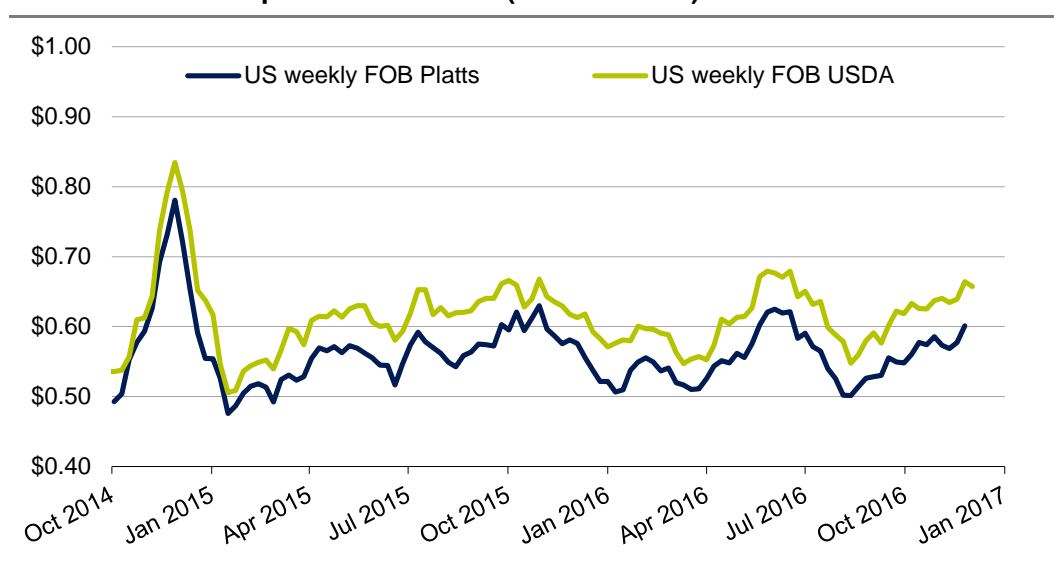
Data source: Platts, USDA, RBA (exchange rates) and IPART calculations.

**Figure 4.4   Lowest of US and Brazilian weekly IPPs using publicly available
prices (USDA & ESALQ) (AUD nominal)**
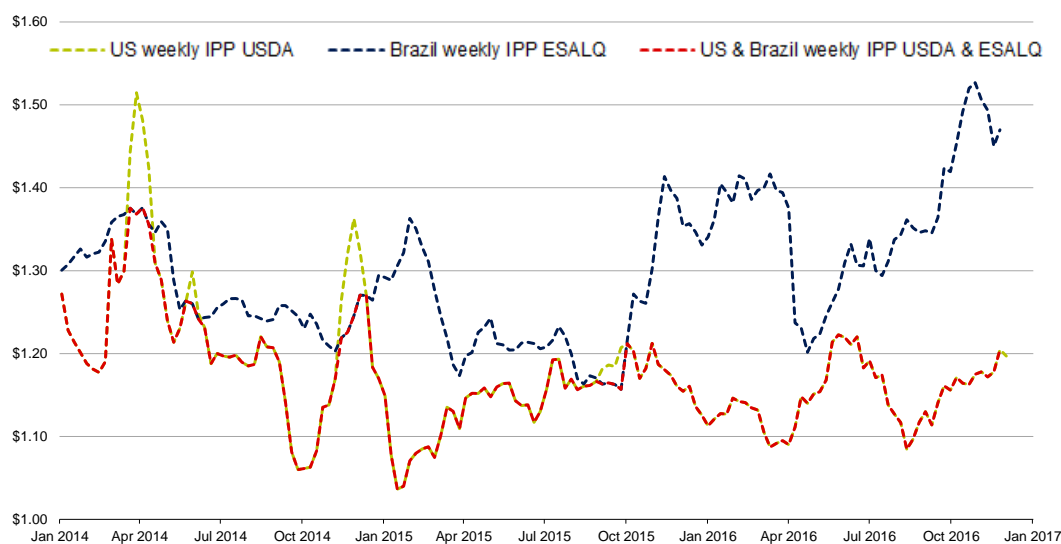
Data source: USDA, ESALQ, and IPART calculations.

We will recommend maximum prices on a quarterly basis using a lagged nine-month average of the lowest weekly IPPs based on ethanol from either the US or Brazil

In our Draft Report, we proposed four-weekly pricing periods using an average of Brazilian ethanol prices between five and 20 weeks prior to the pricing period. This reflected the expected lead-time from when an Australian ethanol importer placed an order for ethanol from Brazil until that ethanol arrived at a fuel wholesaler in NSW.

At our public forum, sellers of ethanol indicated a preference for longer pricing periods, such as quarterly pricing periods. We have consulted with buyers of ethanol, who also have indicated support for quarterly pricing periods.

While the proposed four-week pricing periods would more accurately represent hypothetical import prices of the day, there are several advantages with quarterly prices. Quarterly prices based on a nine-month average of import prices would provide greater stability and predictability for stakeholders, while also aligning with the quarterly exemption periods in which they apply. This reduces the regulatory burden for stakeholders, while also being administratively simpler.

Figure 4.5 compares the quarterly maximum prices using our final IPP methodology with the four-weekly prices using our Draft Methodology, with both being based on an average of the lowest weekly IPPs for US and Brazilian ethanol.

Figure 4.5   Maximum ethanol prices under the Draft IPP methodology vs Final IPP methodology (AUD nominal)
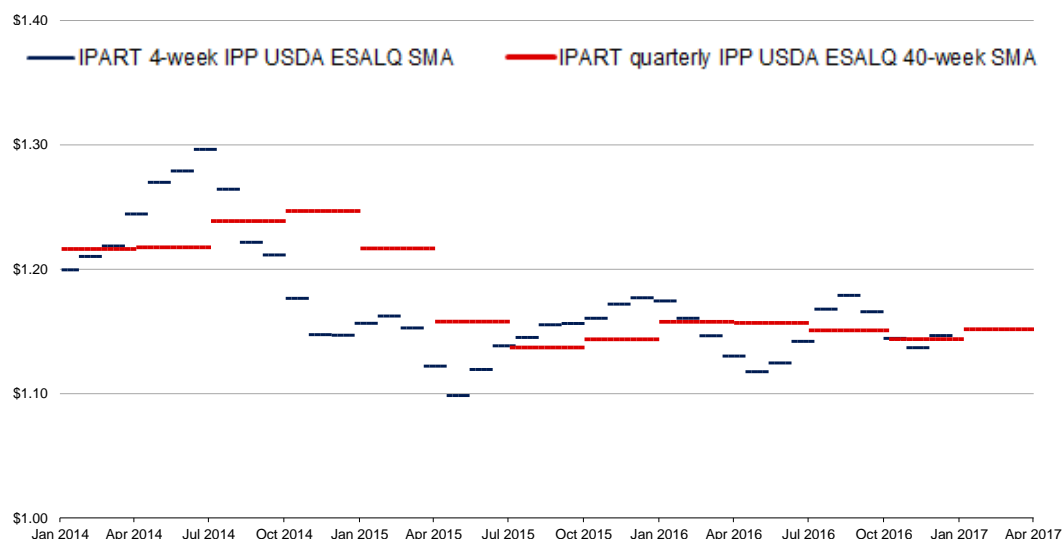
Data source: USDA, ESALQ and IPART calculations

Using our final IPP methodology, the recommended maximum wholesale ethanol price to apply from 1 January 2017 until 31 March 2017 is 115.2 cents per litre, excluding GST.

4.4.2   Local freight and port costs in country of origin

Our benchmark international ethanol prices are mill gate prices in their respective locations. This means we need to add an estimate of the costs of land transportation from the factory to the port, as well as any relevant port costs. In our Draft Repot we used an estimate of USD 60 per tonne (USD 0.05 per litre) for freight and port costs in Brazil.

Brazil

Since our Draft Report we have obtained data on historical Brazilian factory to port freight costs from the University of Sao Paulo. This data consists of monthly average costs for freight of ethanol from five different ethanol production regions to the Port of Santos. These five routes are considered to be representative of ethanol flows from production centres to Port of Santos.

Monthly average transport costs from ethanol producing zones to Port of Santos have varied by 2 Brazilian Real cents per litre over the last two years, with an average cost of 10 Brazilian Real cents per litre over the last 12-months. Our final decision is to include a factory to port cost of 10 Brazilian Real cents per litre in the Brazilian IPP calculation.

The University of Sao Paulo has also provided us with an estimate of 10 Brazilian Real cents per litre for port costs of exporting ethanol at the Port of Santos. Our final decision is to use this estimate as the port cost component in the Brazilian IPP calculation. We will update freight and port costs annually.

United States

We have estimated US factory to port freight costs by analysing rail freight tariff data collected and published by the USDA Agricultural Marketing Service (USDA AMS). This data takes a sample of the rail freight contracts for transport of ethanol from ethanol producing hubs[36] to destinations throughout the US.

We have assumed that ethanol exported from the US to the east coast of Australia will travel through the port of Houston. The port of Houston is a major port on the US Gulf; over 5,000ML of chemicals were exported from Port of Houston in 2015.[37] For this reason we have analysed the freight routes from the ethanol producing hubs to the port of Houston to form our factory to port transport cost estimate.

We consider that a yearly average is a reasonable approach to estimate factory to port freight costs in the US IPP calculation. Annual average per litre ethanol transport tariffs for the previous five years are included in Table 4.2.

Table 4.2   Average ethanol transport tariffs from ethanol producing zones to port of Houston (US cents/L)

	2012	2013	2014	2015	2016
Average costs	5.2	5.2	5.4	5.3	5.5

Note: Due to data availability the 2016 average contains data from January to November 2016.
Source: USDA Agricultural Marketing Service and IPART calculations.

Our final decision is to use US factory to port ethanol freight costs of 5.5 US cents per litre. This is based on the most recent (2016) average annual cost in Table 4.2.

To estimate port costs in the port of Houston we have analysed the shipping tariff schedule published by the Houston Port Authority.[38] The published tariffs for 2016 indicate there are port costs of 2.4 US cents per litre of ethanol

---

[36] Eleven cities dispersed across Illinois, Indiana, Iowa, Nebraska, Minnesota and South Dakota which collectively account for approx. 75% of ethanol production in the US.

[37] Port of Houston commodity statistics, 18 February 2016, http://porthouston.com/portweb/wp-content/uploads/2016/11/4-Container-Volume-by-Commodity-Stats-PN-2015.pdf, accessed 1 December 2016.

[38] Port of Houston Authority, Tariff No. 8, January 2016, http://porthouston.com/portweb/wp-content/uploads/2016/08/Tariff_8_July_2016.pdf, accessed 5 December 2016.

exported.[39]   Our final decision is to include domestic port costs of US 2.4 cents per litre of ethanol in the US IPP calculation.   These costs will be updated annually in line with the updating of Houston Port Authority tariff schedules.

4.4.3   Freight (sea)

Ethanol is transported in specialist ships called chemical carriers. These ships are smaller than oil tankers and as such shipping costs are more expensive per litre for ethanol than for petrol.

There is currently limited chemical trading on the Brazil to Australia and US to Australia shipping routes. In our Draft Report we estimated freight costs from Brazil to Australia at US$110 per tonne, but undertook to update this estimate based on shipping cost data provided by ICIS Market Intelligence.

We have analysed shipping cost data from ICIS Market Intelligence for both the Brazil to Asia-Pacific and US Gulf to Asia-Pacific chemical shipping routes. We consider that tariffs for a 2,000 metric tonne (MT) chemical shipment (approx. 2.5ML) are reasonable for our IPP calculation.

Monthly average shipping tariffs from Brazil to Asia-Pacific have been relatively constant over the past four years. Based on our analysis of the data from ICIS Market Intelligence, our final decision is to use a shipping cost of 6.9 US cents per litre for the Brazilian IPP calculation.

The costs of shipping on the US Gulf to Asia-Pacific route are more volatile than those of the Brazil to Asia-Pacific route. However this volatility is still relatively low.   The monthly averages of per litre tariffs for US Gulf to Asia-Pacific chemical shipping have been fairly consistent since April 2014.   Our final decision is to use a shipping cost of 7.0 US cents per litre for the US IPP calculation.[40]

If as part of our annual monitoring role we find that the IPP methodology remains an appropriate approach to setting maximum wholesale ethanol prices, we will update our shipping cost estimates annually.

4.4.4   Insurance and loss

We obtained quotations for the cost of insurance for sea freight of ethanol to Australia from the US and Brazil. Based on these quotations, our final decision is

---

[39] This estimate is derived from summing the loading/unloading and wharfage charges for chemicals per metric tonne under sub-rule no. 153, and security charges (bulk cargo) under sub-rule no. 051 of Port of Houston Authority, Tariff No. 8, January 2016, http://porthouston.com/portweb/wp-content/uploads/2016/08/Tariff_8_July_2016.pdf, accessed 5 December 2016.

[40] Based on our analysis of data from ICIS Market Intelligence.

to include the cost of insurance for both US and Brazilian ethanol of 0.4% of the FOB value plus sea freight. For the purposes of our IPP calculation, we have assumed no uninsured losses would be incurred. This decision is unchanged from our Draft Report.

4.4.5   Wharfage

We have estimated wharfage costs for landing ethanol in Australia based on NSW Ports' pricing schedules for the wharfage of bulk liquids per tonne at Port Botany. The current rate is AUD 2.48 per tonne excluding GST, which converts to approximately 0.2 cents per litre of ethanol.[41] This wharfage rate is updated annually from 1 July, and we will update our IPP methodology to reflect any changes to the wharfage rate from 1 July 2017.

4.4.6   Landing costs in Australia (taxes)

Our IPP methodology includes any applicable fuel excise and customs value duty on imported ethanol.

The fuel excise tax for imported ethanol is currently 39.6 cents per litre.[42] This excise increases bi-annually in February and August each year in line with CPI, and we will update our IPP methodology to reflect these changes for the quarterly pricing periods commencing 1 April 2017 and 1 October 2017.

Ethanol imported from Brazil will also incur a 4% import duty, levied on the FOB price of the ethanol.[43] Ethanol imported from the US is not subject to this duty.

4.4.7   Storage and handling costs at import terminal

Storage and handling costs at the Australian import terminal need to be included in our IPP estimate. This is because the IPP is intended to represent the price faced by fuel wholesalers for ethanol delivered to their terminals, rather than the price delivered only to an import terminal. On the basis of confidential information which we consider reasonable, our final IPP methodology includes an estimate of the cost of storage and handling at the import terminal of 3 cents per litre.

---

[41] NSW Ports – Port Botany, *Schedule of Port Charges – Effective 1 July 2016*, p 3.

[42] Australian Tax Office, Excise rates for fuel, https://www.ato.gov.au/business/excise-and-excise-equivalent-goods/fuel-excise/excise-rates-for-fuel/, accessed 1 September 2016.

[43] *Customs Tariff Act 1995*, Schedule 3 – Item 2207.20.10.

4.4.8   Transport costs from port to wholesale terminal

In our Draft Report, we based our estimate of the cost to transport ethanol from the import terminal to the wholesaler terminal on AECOM's report on new entrant ethanol production costs.[44] AECOM estimated the cost of long-haul road transport of ethanol in Australia. Based on this, we estimated a cost of 1 cent per litre (AUD) to transport from an import terminal at Port Botany/Kurnell to wholesale terminals at Silverwater/Parramatta. We took account of rates per tonne-km likely being higher for shorter distance trips.

In response to our Draft Report, Manildra submitted that our 1c/L estimate was too low. It provided confidential information on freight rates from its ethanol plant in Nowra to various locations in NSW and Queensland. Having regard to this information, we have adjusted our estimate for the cost of freight from the import terminal to a fuel wholesaler's terminal to 1.50 c/L.

4.4.9   Conversion to AUD

Many of the input costs used to build the IPP are expressed in US dollars, and some costs are also expressed in Brazilian Real. On a weekly basis, we will use exchange rates provided by the US Federal Reserve,[45] to convert Brazilian Real costs into US dollars, and the RBA[46] to convert US dollar costs into Australian dollars.

4.5   Example IPP calculation and calculation tool

Table 4.3 compares the components of the IPP calculated in our Draft Report with our final recommend maximum price from 1 January 2017 to 31 March 2017.

Appendix C describes our final IPP methodology in detail, and we have published an Excel model on our website www.ipart.nsw.gov.au that allows stakeholders to calculate the IPP for a relevant pricing period, around two weeks prior to the pricing period.

---

[44]   AECOM, *Efficient Costs of New Entrant Ethanol Producers – Draft Report - Prepared for Independent Pricing and Regulatory Tribunal*, October 2016, p d-3.

[45]   US Federal Reserve Board, *Historical Rates for the Brazilian Real*, https://www.federalreserve.gov/releases/h10/hist/dat00_bz.htm, accessed 19 December 2016.

[46]   Reserve Bank of Australia, *Exchange Rates*, http://www.rba.gov.au/statistics/historical-data.html#exchange-rates, accessed 19 December 2016.

**Table 4.3 Recommended maximum price in Draft Report vs for Quarter 1 2017
(AUc/litre, $2016)**

IPP component	Draft recommendation: 10 October 2016 to 6 November 2016	Final recommendation: 1 January 2017 to 31 March 2017
Mill gate price	69.8	50.8
Origin country freight and port costs	6.3	10.5
Total FOB price	**76.1**	**61.4**
Freight (Sea)	11.4	9.3
Insurance costs	0.4	0.3
Wharfage Sydney	0.2	0.2
Storage and handling costs import terminal	3.0	3.0
Transport from port to wholesaler terminal	1.0	1.5
Total transit costs	**16.0**	**14.3**
Customs value duty	3.0	0.0
Customs fuel import duty	39.6	39.5
Total landing costs (taxes)	**42.6**	**39.5**
Total IPP delivered to wholesale terminal (ex GST)	**134.7**	**115.2**

Note: Numbers may not add due to rounding.

Source: IPART calculations based on data sources described above.

4.6   Publishing the recommended maximum price

We will publish our updated recommended maximum price for wholesale
ethanol and IPP model on our website around two weeks prior to each quarterly
pricing period.

In each update we will include historical information on the IPP estimated
according to our methodology, and we will provide an updated Excel model.
This approach ensures that stakeholders have access to the relevant maximum
ethanol price for the purpose of the exemptions framework at least two weeks
prior to the pricing period. The exemptions framework is discussed in greater
detail in the next chapter.

5 | The recommended maximum price in the exemptions framework

As outlined in Chapter 1, our recommended maximum price will form part of the NSW Government's exemption framework for the ethanol mandate. This chapter also outlines the exemptions framework and how our recommendation would apply within it.

5.1 IPART's recommended maximum price in the exemptions framework

The primary objective of the Biofuels Act is to support the development of a sustainable biofuels industry in NSW. It seeks to meet this objective by mandating that all major fuel sellers ensure ethanol accounts for at least 6% of the total volume of petrol they sell in NSW per quarter.

The mandate currently requires major fuel sellers to make E10 available to consumers. However, consumers can choose between E10, and regular and premium unleaded fuel blends.

5.1.1 Exemptions from the mandate

Under the Biofuels Amendment Act, the Minister may grant an exemption from the minimum biofuels requirement if the Minister is satisfied:

a) that, if the retailer were prosecuted for failure to comply with the requirement, the retailer would have a defence to the prosecution, or

b) that the exemption is reasonable in order to allow the retailer a period within which to take the steps required to establish a defence to a prosecution for failure to comply with the requirement, or

c) that compliance by the retailer may result in a risk to public health or safety, or

d) that the exemption should be granted on other grounds specified in the regulations, or

e) that there are other extraordinary circumstances justifying the grant of the exemption.[47]

---

[47] The *Biofuels Amendment Act 2016* (NSW) No.12 Schedule 2, Item 21. (The new Section 15). Schedule 2 commences on 1 January 2017.

The Biofuels Amendment Act sets out that it is a defence to a prosecution if the defendant proves that it was not economically viable to comply with the requirement. This includes because the wholesale price of ethanol for use in the production of petrol-ethanol blend exceeded the 'reasonable wholesale price' determined by IPART.[48] In this report we refer to the 'reasonable wholesale price' as a 'recommended maximum price' in line with our terms of reference (see Appendix A). Our recommended maximum price will become the 'reasonable wholesale price' under the Biofuels Amendment Act when it commences on 1 January 2017.

It is a defence to prosecution if the defendant proves that it has taken all reasonable steps to comply with the mandate. The steps set out in the regulations to comply are as follows:

▼ taking all reasonable steps to upgrade infrastructure as necessary to enable their service stations to sell ethanol blended fuel

▼ taking all reasonable action to ensure ethanol blended fuel is available at their service stations

▼ making all reasonable efforts to secure sufficient supply of ethanol blended fuel for their service stations

▼ marketing the ethanol blended fuel they sell, including at a minimum, displaying the price of E10 prominently on a price board alongside the price of other fuels

▼ ensuring that all ethanol blended fuel sold contains at least 9% ethanol.[49]

The regulation also provides a defence to prosecution if the defendant proves that it was not economically viable to comply with the requirement in respect of a service station:

▼ the defendant had not, despite the defendant's best efforts, been able to secure finance to install or upgrade infrastructure at the service station as necessary to meet the requirement,

▼ the capital costs of installing or upgrading infrastructure at the service station or, if the service station is in a remote or regional area, the recurrent costs of transporting petrol-ethanol blend to the service station, as necessary to meet the requirement (or a combination of those costs) were such that it was not economically viable to supply petrol-ethanol blend at the service station, taking into account the price that would have had to be charged for the petrol-ethanol blend to recover the costs.[50]

---

[48] *Biofuels Amendment Act 2016* (NSW) No.12 Schedule 2, Item 12.
[49] Biofuels Regulation (No 2) 2016, section 9.
[50] Ibid.

5.1.2 Implication of our recommended maximum price for exemptions

Given that our recommended maximum price is above prices currently being negotiated in the market, gaining an exemption from the mandate on the grounds of this price is unlikely at present. However, there continues to be a range of other grounds for exemptions as outlined above.

6 | Annual monitoring and reporting on the wholesale ethanol and E10 markets

As Chapter 3 discussed, the wholesale market for ethanol and the market for petroleum are not static – they vary over time, depending on market and regulatory changes. Therefore, we consider monitoring and reporting is essential to check that our recommended maximum price remains appropriate. We will monitor and report on consumer choice for retail fuel, the wholesale ethanol market and the level of oil/petroleum prices, in conjunction with the retail monitoring and reporting on the effect of the recommended maximum price on the E10 market, as required in the Biofuels Amendment Act.

We found that annual monitoring and reporting is appropriate, taking into account:

▼ our final framework for the recommended maximum price, and how rapidly the key factors might change so as to significantly affect the state's position within this framework

▼ whether relevant information is readily available

▼ the potential burden on stakeholders of this monitoring and reporting, and

▼ the extent to which there is overlap between this monitoring and reporting and the functions carried out by other regulatory bodies or agencies.

The sections below outline our final findings and recommendations, and then discuss them in more detail.

6.1 Overview of our final findings

We found that annual monitoring and reporting is required to ensure our recommended maximum price remains appropriate over time. Our approach for this annual monitoring and reporting would include:

1. assessing the state of the wholesale and retail markets for ethanol using the framework described in Chapter 3

2. monitoring the effect of the recommended maximum price on the retail market for ethanol blended petrol (E10), and

3. considering these assessments, to judge whether the wholesale ethanol market has changed sufficiently to warrant reconsidering our approach.

Our assessment on the state of the wholesale market for ethanol would consider whether a cost-based, less intrusive, or no regulation approach is most appropriate. If we find that our current approach remains suitable, we would review our IPP methodology, including the input data, averaging methods, and pricing period. We will consult with stakeholders before making any changes. On the other hand, if our assessment suggests there is a need to change to a cost-based or no regulation approach, we would also consult on any proposed changes.

Final findings

3   That annual monitoring and reporting is needed to confirm the approach for the recommended maximum price for wholesale ethanol remains appropriate.

4   That the scope of annual monitoring and reporting include:

–   an assessment of the state of wholesale and retail markets for ethanol using the framework described in Chapter 3

–   consideration of any necessary changes to the import parity price methodology

–   consultation with stakeholders before changing our approach/methodology for the maximum price

–   monitoring the retail market (including prices) for petrol-ethanol blend and reporting to the Minister on the effect of the recommended maximum price on that market (as required under the Biofuels Amendment Act).

6.2   Annual assessment of the state of wholesale and retail markets for ethanol

As Chapter 3 discussed, the appropriate approach for recommending a maximum wholesale ethanol price in NSW depends on three key factors – the degree of consumer choice in retail fuels, the extent of competition in the wholesale ethanol market and the level of oil/petroleum prices.

We will carry out an annual assessment of the wholesale ethanol and retail fuel markets. If we find signs that the ethanol market is changing and that a different approach may be warranted, we would consult on any proposed changes.

6.2.1   Approach for assessing the degree of consumer choice in the retail fuel market

To assess the level of consumer choice for retail fuels, we will consider the following indicators:

▼   overall performance against the mandate (ie, percentage of ethanol in total volume of petrol sold)

▼ the percentage of service stations that offer alternatives to ethanol-blended fuel (ie, RULP and PULP)

▼ the percentage of service stations subject to the mandate

▼ the percentage of service stations that offer RULP and PULP **in addition to** ethanol-blended fuel (E10), and

▼ the percentage of bowsers and nozzles across all service stations used to deliver RULP and PULP versus E10.

We would also consider any changes to the regulatory arrangements for the mandate including, for example, changes to the exemption framework which may affect consumer choice or behaviour.

Provided that a less intrusive approach remains appropriate, our review will consider whether there is a need to revise our IPP methodology. For example, we would consider the relevance of the US and Brazilian ethanol price data for the purpose of calculating the IPP for the Australian market. Also, we would evaluate the appropriateness of the averaging methods, pricing period, and other input estimates such as transportation costs used to calculate the IPPs.

6.2.2 Approach for assessing extent of competition in the wholesale ethanol market

If our assessment shows there is a relatively high degree of consumer choice, then a high level assessment of competition may be appropriate. Alternatively, a substantial lessening of consumer choice may indicate that a more detailed review of competition is needed.

There is no single indicator that provides a complete view of the level of competition in a market. Instead, we will consider a range of indicators as set out below.

Barriers to entry, exit and expansion

There are economic, legal, regulatory and other barriers that affect the ability to enter the wholesale ethanol market, expand market share, and exit the market. When there are low barriers to entry, new producers are able to enter the market and incumbent producers face an ongoing threat of competition. High barriers to entry may discourage new entrants into the market, resulting in less intense competition than otherwise.

In assessing the extent of barriers to entry exit or expansion in the wholesale ethanol market, we will consider:

▼ The level of upfront capital costs required to enter into the market, where high levels suggest higher barriers to entry.

▼ Regulatory barriers, such as planning approvals and environmental impact assessments, as well as regulatory uncertainty.

▼ The degree to which production inputs are readily available at competitive prices. Lack of availability or high cost of production inputs can be a barrier to both entry and expansion.

▼ The extent to which the value invested in production assets can be recovered. If production assets are highly specialised, the value recoverable to a producer from selling these assets might be very low. This increases the barriers to exit, and therefore might cause producers to remain in an industry longer than they would have otherwise, even if they are earning little or no profit. High barriers to exit might intensify the level of competition in the short run. However, high exit barriers also increase the risk to market participants, and can therefore also act as barriers to entry.

Market concentration

A highly concentrated market means that a small number of sellers supply the majority of the market. One potential consequence of this might be that the largest suppliers have significant market power and can influence the market price for the product. If the same suppliers retain large market shares for an extended period, it could suggest that it is difficult for smaller suppliers to gain market shares, or for new entrants to enter the market. Some indicators that we will consider when assessing the extent of market concentration include:

▼ the number of ethanol producers contesting the wholesale ethanol market in Eastern Australia, where a greater number of producers would generally indicate a more competitive market, and

▼ the market share of these producers.

Pricing outcomes

In competitive markets, producers cannot sustain prices above the long-run marginal cost of production for extended periods. Rather, producers will tend to compete by lowering their prices until prices reflect the cost of production. Even in markets that have less intense competition, when prices remain above the cost of production for extended periods, new entrants would eventually enter the market, intensifying competition and again putting downward pressure on prices, provided barriers to entry are not excessive.

Comparing prices paid for ethanol by fuel wholesalers in NSW with our estimates of the efficient cost of a new entrant producer (a proxy for long-run marginal cost), could therefore provide a useful indication of the competitiveness in the wholesale ethanol market. To make this assessment, we may consult with stakeholders on the prices paid for wholesale ethanol in NSW and compare that with estimates of the efficient cost of a new entrant producer (a proxy for long-run marginal cost). We may also need to update the relevant cost of production

estimates provided by AECOM to reflect changes in input costs, particularly feedstock costs.

6.3   Annual assessment on the effect of the recommended maximum price on the retail market for ethanol-blended fuel

When the Biofuels Amendment Act commences IPART will have a function to monitor and report on the effect of the recommended maximum wholesale price on the retail market for ethanol-blended fuel (mainly E10).[51]

As Chapter 4 noted, we do not expect our recommended maximum price to affect domestic wholesale prices for ethanol – and therefore retail E10 prices - in the near term. This is because an IPP methodology is likely to be well above market wholesale ethanol prices, since the full fuel excise applies to imported ethanol whereas only a very small excise applies to domestically produced ethanol.

Manildra's submission to our Issues Paper raised an issue in regards to the relationship between wholesale ethanol and retail E10 prices. It submits that the combined retail and wholesale margin added to the wholesale price of ethanol has increased over time, while the price differential between E10 and regular unleaded petrol has reduced. In its view, the role of pricing decisions made by wholesalers and retailers suggests that the establishment of a recommended maximum price would not assist in improving performance against the mandate or providing cheaper E10 to motorists.[52]

We note that the ACCC monitors the prices, costs and profits relating to the supply of unleaded petroleum products in the Australian petroleum industry, including wholesale fuel supply. The ACCC publishes quarterly reports on fuel prices movements around Australia, and conducts investigations where it sees issues of concern.[53] We are liaising with the ACCC about our retail monitoring.

As part of our retail monitoring and reporting, we will track movements in the implied gross retail margins for E10 and pure petroleum fuels. We will consider two main sources of information:

▼ publicly available terminal gate prices (TGPs), which are wholesale fuel prices that are published daily, and

▼ FuelCheck, which is an online tool providing consumers with real-time fuel price information covering every service station in NSW.[54]

---

[51] *Biofuels Amendment Act 2016* (NSW) No.12 Schedule 2, Item 31. (The new Part 3A.)
[52] Manildra submission, August 2016, p 6.
[53] ACCC,   *ACCC's   fuel   monitoring   role*,   https://www.accc.gov.au/regulated-infrastructure/fuel/acccs-fuel-monitoring-role, accessed 10 October 2016.
[54] FuelCheck is an online tool providing consumers with real-time fuel price information covering every service station across NSW, http://www.fuelcheck.nsw.gov.au/, accessed 19 December 2016.

We will release an Issues Paper in late March 2017 that will provide more detail on our proposed approach to annual monitoring and reporting and invite stakeholder comments. We plan to finalise our first annual report, covering the 2016-17 financial year, by the end of 2017.

Appendices

A | Terms of Reference

TERMS OF REFERENCE

Maximum price for wholesale ethanol in NSW

I, Michael Baird, Premier of New South Wales, under section 12A of the *Independent Pricing and Regulatory Tribunal Act 1992* (**Act**), request the Independent Pricing and Regulatory Tribunal (**Tribunal**) to investigate and report on a maximum price for wholesale ethanol in accordance with this Terms of Reference.

Context

In December 2015 the Government announced it would implement a range of measures to improve NSW's performance against the ethanol mandate imposed on major fuel sellers. This includes amending the *Biofuels Act 2007* and regulation to extend the ethanol mandate to all service stations which sell three or more fuel types above a certain volume.

The Government also decided to regulate the price of wholesale ethanol to support availability of E10 at petrol stations at an attractive price to customers.

The task

IPART is requested to recommend:

    (a)   a maximum price for wholesale ethanol for use in automotive fuel blends; and/or

    (b)   a price methodology which ethanol suppliers must apply to determine a maximum price when selling wholesale ethanol for the purposes of complying with the *Biofuels Act 2007* and regulation.

In deciding the relevant maximum price and/or wholesale ethanol price methodology, the Tribunal is to review prices in the biofuels industry and have regard to:

    (a)   protecting consumers from potential abuses in monopoly power relating to prices

    (b)   the efficient costs of supplying ethanol

    (c)   any other matters the Tribunal considers relevant.

Process and timeframe

The Tribunal is required to consult with the public and provide a final report to the Premier by the end of December 2016. The final report will be made publicly available.

The Finance, Services and Innovation cluster will meet the agreed costs of the review.

B │ Other methodologies for setting recommended maximum prices

In our Issues Paper we proposed four methodologies for a recommended maximum wholesale ethanol price. These included:

▼ a price based on the efficient costs of producing ethanol

▼ a price likely to induce enough demand to meet the mandate

▼ a price to encourage the economically efficient level of ethanol production and use, and

▼ an international ethanol price.

Based on our assessment of the ethanol market discussed in section 3.2, we consider that some of these methodologies would not be the most appropriate way to recommend a maximum price. This is discussed below, along with a summary of stakeholder submissions on these methodologies.

B.1   Efficient costs of producing ethanol

In many industries that IPART regulates, we use a building block approach to estimate how much revenue the business needs to generate from prices to recover the total efficient costs of providing the services. In our Issues Paper we proposed to estimate the efficient costs of producing ethanol using different feedstocks (eg, molasses, wheat and sorghum).

The AIP's submission noted that this methodology is unable to address circumstances where the efficient production cost is higher than the cost of producing the available substitute (ie, RULP). It also considers that determining efficient costs is complicated by different feedstocks whose prices vary according to their markets.[55]

Manildra submitted that it would be inappropriate to set the maximum price based on the price of a feedstock that is unavailable in a producer's location. It considers that this methodology carries a risk that competition is damaged as ethanol producers are unable to switch between feedstocks without substantial costs and would be unable to recover costs over the long run.[56] Similarly, the report by HoustonKemp noted that setting a maximum price based on the lowest

---

[55]   AIP submission, July 2016, p 12.
[56]   Manildra submission, August 2016, pp 8-9.

cost of producing ethanol from different feedstocks would mean that any single producer would never recover its efficient costs.[57]

Given our view that a less intrusive approach is appropriate, we are not recommending that a maximum price be set with reference to the efficient costs of ethanol production at this time. In the event that we considered cost-based approach may be needed, we would consult with stakeholders and take account of market conditions at the time.

Our terms of reference require that we have regard to the efficient costs of supplying ethanol. We commissioned AECOM to estimate the efficient costs for new entrant ethanol producers using a variety of different feedstocks. We also obtained confidential information from ethanol producers. AECOM's final report is available on our website www.ipart.nsw.gov.au.

B.2   A price to induce enough demand to meet the mandate

One possible method for setting the maximum wholesale ethanol price is to calculate the price based on the willingness to pay (WTP) for ethanol, in particular the price required to meet the mandate. In our Issues Paper we noted that this approach implies a discount of around 3.2% for E10 relative to RULP, given its lower energy content. We also noted that given some consumers' aversion toward E10, an additional discount may be required.[58]

In its submission Manildra noted that our example for this methodology outlined on page 31 of the Issues Paper contained an error,[59] and submitted that the retail margin for E10 should be lower, not higher, than that for RULP. It also attached a paper by Professor Brear of the University of Melbourne which shows that fuel consumption of a vehicle using E10 was on average one per cent lower than RULP, rather than 3.2 per cent higher, as noted in our Issues Paper. Manildra note the reason for this is the addition of ethanol in fuel allows engines to achieve more complete combustion of fuel.[60]

The submission from the AIP agreed that there are additional costs for retailing and wholesaling ethanol blended fuels. However, it considers that this methodology would likely require a reasonably large discount to meet the mandate, and that it couldn't guarantee that ethanol would be produced economically, putting producers at risk of failure.[61]

---

[57] HoustonKemp Economists, *Maximum price for wholesale fuel-grade ethanol* – A report for Manildra Group, August 2016, p 27.

[58] IPART, *Review of a maximum price for wholesale ethanol in automotive fuel blends*, Issue Paper, June 2016, p 28.

[59] The illustrative example in our Issues Paper used an implied wholesale price of RULP of 91.4 cents, however the correct price should have been 91.1 cents.

[60] Manildra submission, August 2016, pp 12-17.

[61] AIP submission, July 2016, p 13.

We are not proposing a WTP approach for recommending a maximum wholesale ethanol price.

On consideration of the issue raised by Manildra, we agree that using energy content as the basis for an E10 discount would not be appropriate in all instances. The efficiency of any given fuel is maximised when an engine is optimised for that fuel, and energy content is one of several factors that determine mileage or output from a particular fuel and engine combination. E10 has a higher octane rating compared with RULP (94 versus 91) which in the right engine allows more efficient combustion of E10 relative to RULP.

Consumer research indicates that people who avoid using E10 mainly do so due to concerns about the potential negative impact the fuel may have on their vehicle. In contrast, relatively few indicate that price is a key reason for avoiding E10.[62] This suggests that consumer education is likely to be more important for achieving improved performance against the mandate, rather than E10 pricing. Given current consumer preferences, any price discount would likely need to be considerable in order to encourage enough motorists to buy E10 to meet the mandate. Particularly at times when petrol prices are low, this discount could result in a wholesale price below the cost of ethanol production. We consider that this approach would not support a sustainable biofuels industry.

B.3   A price to encourage the economically efficient level of ethanol production and use

In theory, there is a wholesale ethanol price that will encourage the economically efficient level of ethanol production and consumption – that is, the level where the production and use of ethanol has the greatest net benefit to society. This is known as the 'economic price'.

The economic price for ethanol would be set so that ethanol would be produced up to the point at which its cost was equal to the cost to society of the alternative — unleaded petrol. The cost to society differs from the cost of production, because it includes 'externalities' of petrol versus ethanol – that is, the impacts on others, such as environmental and health impacts and government revenue impacts from the use of ethanol-blended fuels compared to unleaded petrol. In our Issues Paper we provided an example of how the economic price of ethanol could be estimated.[63]

---

[62]   Confidential consumer research provided by NSW Fair Trading.
[63]   IPART, *Review of a maximum price for wholesale ethanol in automotive fuel blends - Issue Paper*, June 2016, p 34.

Manildra submitted that this methodology is flawed as it has the effect of giving the full benefit of the current concessional tax arrangements for domestically produced ethanol to fuel wholesalers rather than the intended recipients of the concessions, being domestic producers. This is because:

▼   the proposed maximum price is the price that fuel wholesalers would pay for ethanol blended into E10, whereas

▼   the economic price is calculated using the pre-excise prices of E10 and ULP.[64]

The AIP is also opposed to this approach because it introduces additional complexity compared to the WTP methodology, and that significant additional work would be needed to justify the additional benefits of E10 over unleaded fuel. The AIP also submitted that the benefits cited as reasons for the mandate have not been rigorously tested:

▼   regional development benefits (eg, jobs and economic development benefits) have not been adequately tested and may not be the optimal use of such a significant implicit subsidy of biofuels

▼   environmental benefits have previously been found to be minimal and should be retested under the current fuel and vehicle standards, ethanol production technologies and distance to market.[65]

We are not recommending using an economic price for recommending a maximum price. The external benefits of ethanol production are likely to be relatively small. We have reviewed available literature, including a confidential report by AECOM on behalf of the NSW Department of Trade & Investment that quantified external benefits.   This, combined with the current excise arrangements, means that the socially optimal price is likely to be below the costs of a new entrant producer.

---

[64]   Manildra submission, August 2016, p 17.
[65]   AIP submission, July 2016, p 14.

C   Methodology for calculating the recommended maximum price for wholesale ethanol

This appendix sets out the methodology used to calculate the recommended maximum price for wholesale ethanol in each quarterly pricing period in 2017. The first pricing period is from 1 January 2017 until 31 March 2017.

C.1   Step 1: Calculating weekly IPPs for US and Brazilian ethanol

The first step in calculating the recommended maximum price for wholesale ethanol is calculating weekly IPPs for US and Brazilian ethanol for nine months up to one month prior to the commencement of the pricing period. This is illustrated in Figure C.1, which shows that for the pricing period commencing at Month 1, the averaging period for weekly IPPs covers Month -9 through Month -1. **Weekly IPPs need to be calculated for every week for which the Friday of that week is within the averaging pricing period.** The averaging period will include between 37 and 39 weeks of weekly IPPs.

Table C.1 sets out volume and mass conversion factors required. Tables C.2 through C.4 describe how the weekly IPPs are calculated for US and Brazilian ethanol. These weekly IPPs include relevant fuel excise and customs duties, but exclude GST.

Table C.1   Conversion factors

Parameter	Definition	Unit
Ethanol kg per litre at 20°C	1 litre = 0.7893 kg	Kg per litre
Gallon to litre conversion factor	1 gallon = 3.78541 litres	Litres per gallon

Figure C.1   Pricing periods and corresponding averaging periods for weekly IPPs
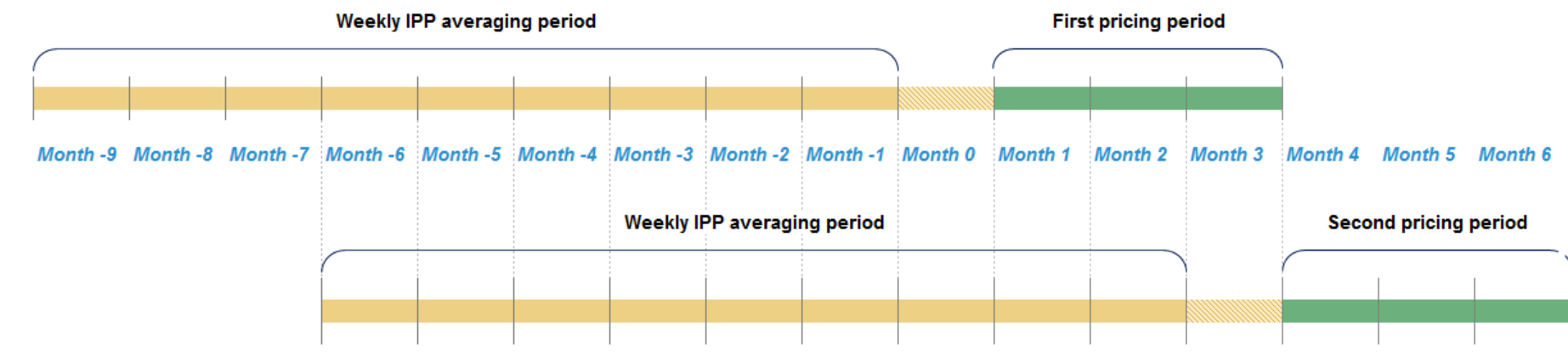
Table C.2 Parameters common to the calculation of weekly IPPs for US ethanol and Brazilian ethanol

Parameter	Definition	Unit
$Ex^{AUD/USD}$	Daily AUD/USD (A\$1=USD) exchange rate as published by the Reserve Bank of Australia (RBA) at http://www.rba.gov.au/statistics/historical-data.html#exchange-rates	AUD/USD
$Ex^{USD/BRL}$	Daily USD/BRL (US\$1=BRL) exchange rates as published by the US Federal Reserve at https://www.federalreserve.gov/releases/h10/hist/dat00_bz.htm	USD/BRL
$Ex^{AUD/USD}_{Week\ t}$	Arithmetic mean of $Ex^{AUD/USD}$ for Monday through Friday in *week t*	AUD/USD
$Ex^{AUD/BRL}_{Week\ t}$	Arithmetic mean of $\left(Ex^{AUD/USD} \times Ex^{USD/BRL}\right)$ for Monday through Friday in *week t*	AUD/BRL
$C^{AUD}_{Wharfage,\ Week\ t}$	Wharfage charges at Australian import terminal in *week t*, based on ex-GST bulk liquids tariffs at Port Botany, published at http://www.nswportsbotany.com.au/trade/port-charges/ For the pricing period commencing 1 January 2017, the relevant wharfage charges for the weekly IPP calculations are: ▼ 1 July 2015 to 30 June 2016: AUD 2.43/tonne ▼ 1 July 2016 to 30 June 2017: AUD 2.48/tonne For the purpose of our methodology, these amounts are converted to AUD/litre. Wharfage charges in the calculation of weekly IPPs from 1 July 2017 will reflect updates to Port Botany's bulk liquids tariffs.	AUD/litre
$C^{AUD}_{S\&H}$	Cost of storage and handling at import terminal, assumed constant at AUD 0.03/litre	AUD/litre
$C^{AUD}_{Freight\ Australia}$	Cost of freight from import terminal to fuel wholesaler's terminal, assumed constant at AUD 0.015/litre	AUD/litre
$T^{AUD}_{Excise,\ Week\ t}$	Fuel excise tariffs applicable to imported ethanol in *week t*, as published by the ATO at https://www.ato.gov.au/business/excise-and-excise-equivalent-goods/fuel-excise/excise-rates-for-fuel/ For the pricing period commencing 1 January 2017, the relevant excise tariff for the weekly IPP calculations are: ▼ 1 February 2016 to 30 July 2016: AUD 0.3950/litre	AUD/litre

Parameter	Definition	Unit
	▼ 1 August 2016 to 30 January 2017: AUD 0.3960/litre Excise tariffs in the calculation of weekly IPPs from 1 February 2017 will reflect updates to the excise tariffs published by the ATO.	

Table C.3   Calculation of weekly US IPPs

Parameters	Definition	Unit
$P^{USD}_{USDA,\ Week\ t}$	Price of wholesale ethanol at the mill gate in the US in *week t*. The USDA publishes end-of-week (EOW) low/high spot bids for wholesale ethanol at the mill-gate for seven major ethanol producing regions. Bids are presented in USD/gallon, and are converted to USD/litre. For each week, $P^{USD}_{USDA,\ Week\ t}$ is calculated as the median of the mid-points of the EOW bids in each of the seven regions (where available). Occasionally, the USDA does not publish the EOW bids. In those cases, we will seek daily price information directly from USDA, and use the latest of the bids obtained for the relevant week. Each $P^{USD}_{USDA,\ Week\ t}$ used in the calculation of the IPP will be published in the IPP model on our website www.ipart.nsw.gov.au. In the case that we do not obtain the necessary prices for the relevant week, we will use the last price previously available.	USD/litre
$P^{AUD}_{USDA,\ Week\ t}$	$P^{USD}_{USDA,\ Week\ t}$ converted from USD to AUD	AUD/litre
$C^{USD}_{US\ Freight}$	Sum of the costs of transporting the ethanol from the mill-gate in the US to Houston Port, plus any port and handling costs at Houston Port. ▼ US freight costs assumed to be constant at 0.0553 USD per litre ▼ Houston port costs assumed to be constant at 0.0242 USD per litre	USD/litre
$C^{AUD}_{US\ Freight,Week\ t}$	$C^{USD}_{US\ Freight}$ converted from USD to AUD in *week t*	AUD/litre
$FOB^{AUD}_{US,\ Week\ t}$	Estimated price of the ethanol delivered 'Free-On-Board' (FOB) the vessel at Houston port in *week t*, calculated as	AUD/litre

Parameters	Definition	Unit
	$$FOB_{US,\ Week\ t}^{AUD} = P_{USDA,\ Week\ t}^{AUD} + C_{US\ Freight,Week\ t}^{AUD}$$	
$C_{US\ Sea\ freight}^{USD}$	Cost of sea freight from US to Australia. Assumed constant at 88.68 USD per tonne, converted to USD/litre	USD/litre
$C_{US\ Sea\ freight,\ Week\ t}^{AUD}$	$C_{US\ Sea\ freight}^{USD}$ converted from USD to AUD in *week t*	AUD/litre
$C_{US\ Insurance,\ Week\ t}^{AUD}$	Insurance of ethanol in transit from the US to Australia in *week t*, calculated as: $$C_{US\ Insurance,\ Week\ t}^{AUD} =$$ $$0.4\% \times \left(FOB_{US,\ Week\ t}^{AUD} + C_{US\ Sea\ freight,\ Week\ t}^{AUD}\right)$$	AUD/litre
$C_{US\ Import\ ex\ tax,\ Week\ t}^{AUD}$	Total costs associated with the shipping of ethanol from the US to fuel wholesaler's terminal in NSW in *week t*, excluding taxes. Calculated as: $$C_{US\ Import\ ex\ tax,\ Week\ t}^{AUD} =$$ $$C_{US\ Sea\ freight,\ Week\ t}^{AUD} + C_{US\ Insurance,\ Week\ t}^{AUD} +$$ $$C_{Wharfage,\ Week\ t}^{AUD} + C_{S\&H}^{AUD} + C_{Freight\ Australia}^{AUD}$$	AUD/litre
$T_{US\ Customs\ duty,\ Week\ t}^{AUD}$	For the pricing period commencing 1 January 2017, customs duty on ethanol imported from the US was nil for all relevant weeks, as set out in the Australia – United States Free Trade Agreement (FTA), found here: http://dfat.gov.au/trade/agreements/ausfta/pages/australia-united-states-fta.aspx The customs duty for US ethanol is thus calculated as: $$T_{US\ Customs\ duty,\ Week\ t}^{AUD} = 0.0\% \times FOB_{US,\ Week\ t}^{AUD}$$ If relevant changes are made to the FTA, the changes will be reflected in the calculation of weekly US IPPs for the subsequent pricing period.	AUD/litre
$T_{US\ Total,\ Week\ t}^{AUD}$	Total import taxes on US ethanol in *week t*, calculated as: $$T_{US\ Total,\ Week\ t}^{AUD} = T_{US\ Customs\ duty,\ Week\ t}^{AUD} + T_{Excise,\ Week\ t}^{AUD}$$	AUD/litre
$IPP_{US,\ Week\ t}^{AUD}$	Total IPP for US ethanol in week t, calculated as: $$IPP_{US,\ Week\ t}^{AUD} =$$ $$FOB_{US,\ Week\ t}^{AUD} + C_{US\ Import\ ex\ tax,\ Week\ t}^{AUD} + T_{US\ Total,\ Week\ t}^{AUD}$$	AUD/litre

Table C.4   Calculation of weekly Brazilian IPPs

Parameters	Definition	Unit
$P_{ESALQ,\ Week\ t}^{USD}$	Price of wholesale ethanol at the mill gate in São Paulo, Brazil in *week t*. The Centre of Advanced Studies on Applied Economics (CEPEA) at the "Luiz de Queiroz" College of Agriculture (ESALQ) at the University of São Paulo publishes weekly volume-weighted average spot prices for wholesale anhydrous ethanol at the mill-gate for ethanol producers in São Paulo. This publication is referred to as the CEPA/ESALQ Anhydrous Ethanol Index - São Paulo (ESALQ index), and is published at: http://www.cepea.esalq.usp.br/en/indicator/ethanol.aspx The index is published in USD per litre.	USD/litre
$P_{ESALQ,\ Week\ t}^{AUD}$	$P_{ESALQ,\ Week\ t}^{USD}$ converted from USD to AUD in *week t*	AUD/litre
$C_{BR\ Freight}^{BRL}$	Sum of the costs of transporting the ethanol from the mill-gate in São Paulo to Santos Port, plus any port and handling costs at Santos Port. ▾ São Paulo freight costs assumed to be constant at 0.10 BRL per litre ▾ Santos port costs assumed to be constant at 0.10 BRL per litre	BRL/litre
$C_{BR\ Freight,\ Week\ t}^{AUD}$	$C_{BR\ Freight}^{BRL}$ converted from USD to AUD in *week t*	AUD/litre
$FOB_{BR,\ Week\ t}^{AUD}$	Estimated price of the ethanol delivered 'Free-On-Board' (FOB) the vessel at Santos port in *week t*, calculated as $$FOB_{BR,\ Week\ t}^{AUD} = P_{ESALQ,\ Week\ t}^{AUD} + C_{BR\ Freight,\ Week\ t}^{AUD}$$	AUD/litre
$C_{BR\ Sea\ freight}^{USD}$	Cost of sea freight from Brazil to Australia. Assumed constant at 87.50 USD per tonne, converted to USD/litre	USD/litre
$C_{BR\ Sea\ freight,\ Week\ t}^{AUD}$	$C_{BR\ Sea\ freight}^{USD}$ converted from USD to AUD in *week t*	AUD/litre
$C_{BR\ Insurance,\ Week\ t}^{AUD}$	Insurance of ethanol in transit from Brazil to Australia in *week t*, calculated as: $$C_{BR\ Insurance,\ Week\ t}^{AUD} =$$ $$0.4\% \times \left(FOB_{BR,\ Week\ t}^{AUD} + C_{BR\ Sea\ freight}^{AUD}\right)$$	AUD/litre

Parameters	Definition	Unit
$C_{BR\ Import\ ex\ tax,\ Week\ t}^{AUD}$	Total costs associated with the shipping of ethanol from Brazil to fuel wholesaler's terminal in NSW in *week t*, excluding taxes. Calculated as: $$C_{BR\ Import\ ex\ tax,\ Week\ t}^{AUD} = C_{BR\ Sea\ freight}^{AUD} + C_{BR\ Insurance,\ Week\ t}^{AUD} + C_{Wharfage,\ Week\ t}^{AUD} + C_{S\&H}^{AUD} + C_{Freight\ Australia}^{AUD}$$	AUD/litre
$T_{BR\ Customs\ duty,\ Week\ t}^{AUD}$	For the pricing period commencing 1 January 2017, customs duty on ethanol imported from Brazil was 4.0% for all relevant weeks, as specified in Schedule 3 to the Customs Tariff Act 1995 – Item 2207.20.10. The customs duty for Brazilian ethanol is thus calculated as: $$T_{BR\ Customs\ duty,\ Week\ t}^{AUD} = 4.0\% \times FOB_{BR,\ Week\ t}^{AUD}$$ If relevant changes are made to the customs duty that applies to ethanol imported from Brazil, the changes will be reflected in the calculation of weekly Brazilian IPPs for the subsequent pricing period.	AUD/litre
$T_{BR\ Total,\ Week\ t}^{AUD}$	Total import taxes on Brazilian ethanol in *week t*, calculated as: $$T_{BR\ Total,\ Week\ t}^{AUD} = T_{BR\ Customs\ duty,\ Week\ t}^{AUD} + T_{Excise,\ Week\ t}^{AUD}$$	AUD/litre
$IPP_{BR,\ Week\ t}^{AUD}$	Total IPP for Brazilian ethanol in week t, calculated as: $$IPP_{Brazil,\ Week\ t}^{AUD} = FOB_{BR,\ Week\ t}^{AUD} + C_{BR,\ Import\ ex\ tax,\ Week\ t}^{AUD} + T_{BR\ Total,\ Week\ t}^{AUD}$$	AUD/litre

C.2   Step 2: Calculating the recommended maximum price for wholesale ethanol

After weekly IPPs for US and Brazilian ethanol have been calculated for all relevant weeks in the averaging period, they are combined to produce the recommended maximum price for wholesale ethanol. Let *t* represent the week-number of a given week in an averaging period, so Week 1 is the first week in the averaging period, etc.

The recommended maximum price for wholesale ethanol is calculated as follows:

$$Recommended\ maximum\ wholesale\ ethanol\ price =$$

$$\frac{1}{n}\sum_{t=1}^{n} MIN\{IPP^{AUD}_{US,\ Week\ t}, IPP^{AUD}_{BR,\ Week\ t}\}$$

Where:

$Week1$ = the first week ending on a Friday within the averaging period

n = the number of Fridays in the averaging period

Table C.5 sets out the averaging periods and corresponding week numbers for the pricing periods in 2017.

Table C.5   Averaging periods and week numbers

Pricing period	Week 1 is the week ending on the following Friday	Week n is the week ending on the following Friday	Number of Fridays in period, n
2017 Q1	4 March 2016	25 November 2016	38
2017 Q2	3 June 2016	24 February 2016	38
2017 Q3	2 September 2016	26 May 2017	38
2017 Q4	2 December 2016	25 August 2017	38

D │ Weighted average cost of capital (WACC)

As discussed in Chapter 3, we commissioned AECOM to provide advice on the efficient new entrant costs of ethanol production. For AECOM's analysis, we provided our estimates of a return on capital, depreciation and tax allowances.

IPART's approach for calculating a return on capital is to multiply the value of the asset in each year of the review period by an appropriate rate of return estimated using a weighted average cost of capital (WACC). The WACC is the expected cost of debt and equity, weighted to take into account their proportions in a capital structure.

AECOM's modelling of the efficient costs of new entrant ethanol producers is based on an assumption that ethanol plants will be constructed during 2016-17 and be operational from 2018-19 for the subsequent 15 years. Therefore, to calculate a return on capital, we multiplied the value of the asset in each year from 2018-19 to 2032-33 by our estimated WACC. This appendix discusses how we estimated the WACC.

Consistent with our standard approach, to determine the WACC for new entrant ethanol producers, we:

▼ estimated the possible range for the WACC, by calculating values for each of the parameters that determine the cost of debt and the cost of equity, and then

▼ made a decision on the appropriate WACC point estimate within the range based on IPART's WACC decision rule, which takes into account the level of economic uncertainty.

Section D.1 below provides a summary of the WACC used in AECOM's modelling of efficient costs for our Final Report. The remainder of this chapter discusses how we determined individual parameters underlying the WACC.

D.1   Summary of the WACC used in AECOM's modelling

For AECOM's modelling of efficient costs of new entrant ethanol producers, we estimated a return on capital based on a real post-tax WACC of 7.3%. This is the midpoint of the WACC range established based on:

▼ market-based WACC parameters (ie, risk-free rate, inflation rate, debt margin, market risk premium) estimated as of 6 December 2016, and

▼ an equity beta range of 0.9 to 1.1.

Table D.1 sets out the individual WACC parameters underlying the estimated real post-tax WACC of 7.3%.

Table D.1   WACC for Final Decision (as of 6 December 2016)

	Current market data			Long term averages			WACC range		
	Low	Mid	High	Low	Mid	High	Low	Mid	High
Nominal Risk free	2.5%	2.5%	2.5%	4.3%	4.3%	4.3%			
Inflation	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%			
Debt margin	2.4%	2.4%	2.4%	3.2%	3.2%	3.2%			
Gearing	30%	25%	20%	30%	25%	20%			
Market risk premium	7.5%	9.3%	11.0%	5.5%	6.0%	6.5%			
Equity beta	0.9	1.0	1.1	0.9	1.0	1.1			
Nominal Vanilla WACC	7.9%	10.1%	12.7%	8.7%	9.6%	10.7%			
Post-tax real WACC	5.4%	7.5%	10.0%	6.2%	7.0%	8.1%	7.0%	7.3%	7.5%

Source: Bloomberg, RBA and IPART analysis.

As discussed above, we decided to select the midpoint of our WACC range based on IPART's WACC decision rule, which takes into account the level of economic uncertainty. IPART's WACC decision rule prescribes that:

▼ We select the midpoint if IPART's uncertainty index, which measures the level of economic uncertainty, is within or at one standard deviation from the long-term average of zero.

▼ If the uncertainty index is more than one standard deviation from the long-term average of zero, we consider selecting a point other than the midpoint within the WACC range.[66]

As shown in Figure D.1, IPART's measure of uncertainty is currently within one standard deviation of the long-term average value of zero. Therefore, we decided to select the midpoint of the established WACC range (ie, 50% weight on the long-term WACC estimate and 50% weight on the current WACC estimate).

---

66   IPART, *Review of WACC methodology – Final Report*, December 2013, p 4.

Figure D.1   Uncertainty Index as of 30 November 2016
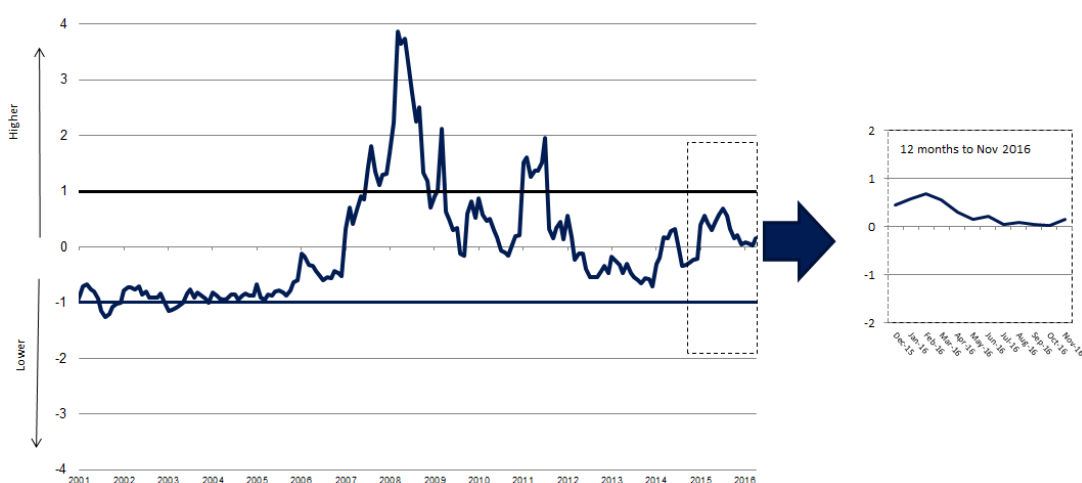
Data source: Thomson Reuters Datastream and IPART analysis.

D.2   Market based parameters

This section summarises our approach for the market-based parameters. We have estimated the market-based parameters using IPART's standard approach as of 6 December 2016. Table D.2 summarises the approach to calculating the market-based parameters.

Table D.2   Estimating the market-based WACC parameters

	Current market data	Long term average
Risk free rate	Based on end-of-trading-day data sampled over the 40-day trading period to 6 December 2016 from Bloomberg.	Based on end-of-trading-day data sampled over 10 years to 6 December 2016 from Bloomberg.
Inflation	Based on the geometric mean of: - the latest available one-year forecast from the RBA and - the midpoint of the RBA's target range for inflation (2.5%).	
Debt margin	Based on the latest two-month average of the RBA's corporate BBB-rate bond spreads (plus 12.5 basis points for debt raising costs).	Based on the latest ten-year average of the RBA's corporate BBB-rate bond spreads (plus 12.5 basis points for debt raising costs).
MRP	Based on monthly data using IPART's standard approach.	IPART's standard parameter valuation.

D.3   Changes from the Draft Report

Submissions have not commented on our Draft Decision on the WACC.

For the Final Decision, we have updated the market-based parameters as of 6 December 2016, following IPART's standard approach. We have used an equity

beta range of 0.9 to 1.1, a gearing ratio of 20% to 30%, and a credit rating assumption of BBB, consistent with our Draft Decision.

Table D.3 compares the WACC for our Draft and Final Decision. The WACC for the Final Decision is 40 bps higher than that for the Draft Decision.

Table D.3   IPART's Final and Draft Decision on the WACC

|	Draft Decision (7 September)			Final Decision (6 December)		
	Current data	Long term	Final range	Current data	Long term	Final range
Nominal risk free rate	1.9%	4.4%		2.5%	4.3%	
Inflation	2.4%	2.4%		2.4%	2.4%	
Debt margin	2.6%	3.2%		2.4%	3.2%	
Gearing	30%-20%	30%-20%		30%-20%	30%-20%	
MRP	7.3%-10.7%	5.5%-6.5%		7.5%-11.0%	5.5%-6.5%	
Equity beta	0.9-1.1	0.9-1.1		0.9-1.1	0.9-1.1	
WACC (real post-tax)						
Range	4.8%-9.2%	6.3%-8.2%	6.7%-7.1%	5.4%-10.0%	6.2%-8.1%	7.0%-7.5%
Midpoint	6.7%	7.1%	**6.9%**	7.5%	7.0%	**7.3%**

Source: IPART analysis.

As shown in the table above, the increase in the WACC for the Final Decision is largely attributable to higher 40-day average risk-free rate and implied MRP. In particular, since IPART's Draft Decision on the WACC in September 2016,

▼ the current data risk free rate has increased by 60 bps, and

▼ the implied MRP has increased by between 20 and 30 bps.

We note that the impact of these increases on the WACC is partially offset by a slight reduction in the current data debt margin (by 20 bps).

The substantial increase in the 10-year government bond yield is the key driver of the increase in the WACC for the Final Decision. As shown in Figure D.2, the 10-year Australian government bond yield appears highly correlated with the 10-year US government bond yield. Therefore, the increase in the Australian government bond yield is likely to be a flow-on effect of the recent increase in the US government bond yield.

Figure D.2   10-year Australian and US government bond yield (6 December 2016)
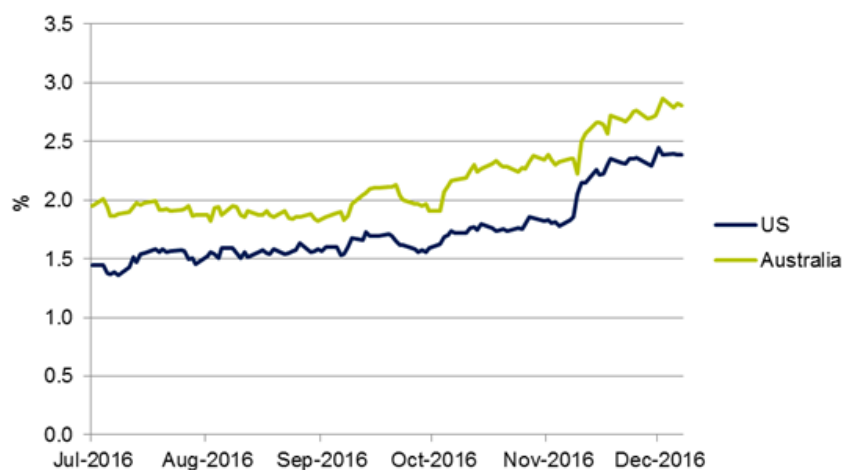
Data source: Bloomberg.

D.3.1   Impact of the updated WACC

A noted above, the WACC is used in AECOM's advice on efficient new entrant costs of ethanol production. The updated WACC does not have a substantial impact on the costs of production across all feedstocks (Table D.4). The costs of production increase by less than or equal to one cent per litre. This is because capital cost is generally a small component of the total cost of ethanol production.

Table D.4   Impact of the WACC on new entrant costs of ethanol production ($ per litre)

Feedstock	Draft Report	Final Report
Wheat Standalone (Starch)	0.60 - 0.81	0.61 - 0.82
Wheat Integrated (Starch)	0.56 - 0.76	0.57 - 0.77
Imported Starch	0.82 - 1.03	0.83 - 1.04
Sorghum (Starch)	0.67 - 0.93	0.68 - 0.94
C-Syrup (Sucrosic)	0.64 - 0.85	0.64 - 0.86
B-Syrup (Sucrosic)	0.94 - 1.15	0.94 - 1.15
Cane trash (Cellulosic)	0.92 - 1.24	0.93 - 1.25
Forest Residues (Cellulosic)	0.93 - 1.25	0.94 - 1.26

Note: The ranges are given by the unit costs of production of 200 ML and 50 ML plant.
Source: IPART and AECOM.

D.4   Overview of our analytical approach for industry-specific parameters

D.4.1   Approach for estimating the industry-specific parameters

To decide on the industry-specific parameters such as the gearing ratio and equity beta, it would be ideal to conduct a peer group analysis using a large number of stand-alone businesses producing ethanol for use in automotive fuel blends. However, our sample includes only four stocks which are classified as *Ethanol Fuels* which derive a substantial portion of their total revenues from ethanol production.

To deal with this constraint, we have decided to also analyse equity betas and gearing ratios of petroleum production businesses. We considered petroleum production businesses for two reasons.

First, demand for ethanol is highly dependent on petroleum consumption. The automotive fuel is the principal downstream market for ethanol as ethanol is mixed with petroleum to produce ethanol blended fuels such as E10 and E85. This suggests the revenues of ethanol producers would be highly correlated with those of petroleum producers.

Second, there are several factors which commonly affect the revenues of both ethanol and petroleum production businesses. Movements in international oil price have a substantial impact on both ethanol and petroleum production businesses.   Since changes in the international oil price are passed onto consumers through petrol prices, an increase in the international oil price could mean that ethanol becomes more economically viable as an alternative for oil. For petroleum producers, a higher international oil price is likely to increase revenues and provide an additional growth opportunity.

Another factor influencing the revenues of ethanol and petroleum producers is the number of motor vehicles travelling on roads. An increase in the number of motor vehicles travelling on roads would lead to greater demand for petroleum product, including E10 fuel, subsequently increasing demand for ethanol.

D.4.2   Data

Our sample of ethanol producers includes stocks from Brazil, Germany, Spain, Sweden, Thailand and the US, which are classified as *Ethanol Fuels* by Thomson Reuter Business Classification (TRBC).

Ethanol production firms are typically "diversified" in that they produce multiple other products such as biodiesel, sugar, and other agricultural products, and by-products from ethanol production, such as starch, gluten, glucose syrup, dried distillers' grains, etc, in addition to ethanol for fuel blends. Therefore, we

have excluded those that earn less than two thirds of revenues from ethanol production activities (including revenues derived from by-products of ethanol production where this is not reported as a separate item) based on segment reporting for the latest financial year, 2015. We have also excluded those that do not have segment information available.

As a result, our sample includes four ethanol production stocks. We also identified 68 stocks from Australia, Canada, France, Japan, the Netherlands, the UK, and the US, which are classified as *Oil and Gas Production*. A list of stocks included in our sample is available upon request.

We then obtained monthly total return indexes for individual stocks, monthly total market return indexes, annual market capitalisation, and other annual financial information including total debt over the period from 1 Jan 1980 to 29 July 2016 from Thomson Reuters Datastream.

D.5   Gearing ratio

The gearing ratio is the proportion of debt to total assets in the business' capital structure. We adopt a benchmark capital structure rather than the actual capital structure of the regulated entity, to ensure that customers will not bear the costs associated with an inefficient capital structure.

For the purpose of estimating the WACC for AECOM's modelling of efficient costs of new entrant ethanol producers, we decided to adopt **a gearing ratio range of 20% to 30% with a midpoint of 25%**.

Empirical analysis

To form our view on the appropriate gearing ratio for a typical ethanol production business, we analysed actual gearing ratios of ethanol fuel and petroleum production businesses. As a firm's financial leverage may change over time, we considered gearing ratios over the past five years.[67]

Table D.5 shows average and median gearing ratios of the ethanol and petroleum production stocks included in our sample. Given that there are four stocks in our ethanol sample, and that the sizes of these stocks (in terms of their market capitalisation) vary widely, we have calculated a market value weighted average.

We find that ethanol production businesses, which derive a substantial proportion (ie, more than two thirds) of their total revenue from ethanol fuel production, have an average gearing ratio of 24% with a median value of 28%. Petroleum production businesses show a similar level of gearing ratio at an average of 19% and a median of 23%.

---

[67]   The 5-year estimation window of the gearing ratio is from 2011 to 2015. We chose five years to be consistent with the estimation window for equity betas (presented in Section D.5).

Table D.5   Gearing ratios of ethanol fuel and petroleum production stocks

Statistics	Ethanol fuel production	Petroleum production
Number of observations	4	68
Value-weighted average	**24%**	**19%**
Median	28%	23%

Note: The gearing ratio is obtained by dividing firm's total debt by the sum of total debt and market capitalisation.

Source: Datastream and IPART analysis.

Due to the limited number of available observations for our representative ethanol production businesses, we considered that the value-weighted average provides a much better indication of a benchmark gearing ratio than the median, as the latter does not take into account the varying market capitalisation of these companies.

Overall, our empirical analysis suggests that typical ethanol businesses would have an average gearing ratio of 24%. We therefore decided to adopt a gearing ratio range of 20% to 30% with a midpoint of 25%.

We note that when we included stocks that derive less than two thirds of total revenue from ethanol production, the value weighted average increased to 39%. This higher gearing ratio may reflect the more diversified nature of these businesses.

D.6   Equity beta

The equity beta measures the extent to which the return of a particular security varies in line with the overall return of the market. It represents the systematic or market-wide risk of a security that cannot be eliminated through diversification. It is important to note that the equity beta does not contain business-specific or diversifiable risks.

For the purpose of estimating the WACC for AECOM's modelling of efficient costs of new entrant ethanol producers, we decided to adopt **an equity beta range of 0.9 to 1.1 with a midpoint value of 1.0**. This is based on an asset beta range of 0.7 to 0.9 with a midpoint value of 0.8. We used the midpoint of the gearing ratio range, which is 25%, to convert the asset beta to the equity beta used to calculate the WACC.

Estimating equity beta

We estimated equity betas of listed ethanol fuel businesses by regressing monthly stock returns (R_i) against monthly market returns (R_m) over an estimation period of five years:

$$\bar{R}_i = \hat{\alpha}_i + \hat{\beta}_i\,\bar{R}_m$$

where $\hat{\alpha}$ = Intercept from the characteristic line

$\hat{\beta}$ = Slope of the characteristic line = Covariance $(R_i, R_m)/\sigma_m^2$

The slope of the regression, $\hat{\beta}_i$, is the estimated (OLS) beta of the stock and measures its systematic risk. In this briefing, $\hat{\beta}_i$ is referred to as OLS beta. In addition, we also estimate betas correcting for potential estimation errors using two techniques: Blume (1975) and Vasicek (1973)[68].

Blume technique is currently used by Bloomberg. It adjusts all betas towards 1 using the following equation.

$$\text{Beta}_{\text{Blume}} = \text{Beta}_{\text{OLS}} * \frac{2}{3} + 1 * \frac{1}{3}$$

where

Beta$_{\text{OLS}}$ is a raw beta derived from an OLS regression, and Beta$_{\text{Blume}}$ is the Blume-adjusted beta.

The Vasicek adjustment is implemented using the following formula.

$$\beta_{Y|X}^{Vasicek} = w_\gamma \times \beta_{Y|X} + (1 - w_\gamma) \times \beta_{average}$$

where

$$w_\gamma = \frac{\sigma_{Cross-Sectional}^2}{\sigma_{\rho(Y|X)}^2 + \sigma_{Cross-Sectional}^2}$$

This process adjusts OLS regression-based equity betas toward the best prior beta estimate ($\beta_{average}$), with the degree of adjustment determined by the precision of the OLS beta estimates ($\sigma_{\rho(Y|X)}^2$) and the prior distribution ($\sigma_{Cross-Sectional}^2$).

---

[68] Vasicek (1973) sets $\beta_{average}$=1 and $\sigma_{Cross-Sectional}^2$ = 0.5 if nothing was known about a stock prior to sampling except that it comes from a certain exchange. Vasicek, O.A., A Note on Using Cross-Sectional Information in Bayesian Estimation of Security Betas, *Journal of Finance 28,* pp 1233-1239.

The standard errors of OLS regression-based equity betas have been used to calculate $\sigma^2_{\rho(Y|X)}$. In our analysis, $\beta_{Y|X}$ in the last equation above is an equity beta estimated over the last five years ending 29 July 2016. $\beta_{average}$ has been calculated as the average of OLS regression-based equity betas estimated using all available returns excluding the last five years (ie, out-of-sample period), and $\sigma^2_{Cross-Sectional}$ is the variance of OLS regression-based equity betas estimated over the same out-of-sample period.[69]

Empirical analysis

Table D.6 presents median and value-weighted average OLS equity betas and bias-adjusted equity betas of the comparable ethanol fuel and petroleum production businesses in our sample.

Table D.6   Equity betas of ethanol fuel and petroleum production stocks

	Ethanol fuel production	Petroleum production
Number of observations	4	68
Median		
OLS beta	1.29	1.10
Blume-adjusted (1975)	1.19	1.07
Vasicek-adjusted (1973)	0.98	0.97
Average	**1.16**	**1.04**
Value weighted average		
OLS beta	1.04	1.00
Blume-adjusted (1975)	1.03	1.00
Vasicek-adjusted (1973)	0.87	0.94
Average	**0.98**	**0.98**

Source: Thomson Reuter Datastream and IPART analysis.

Table D.7 presents the asset betas of the comparable ethanol fuel and petroleum production businesses.

---

[69] Industry Panel, *Review of the Independent Competition and Regulatory Commission's 2013 Price Direction for regulated water and sewerage services in the ACT,* Draft Report, December 2014, p 183.

Table D.7   Asset betas of ethanol fuel and petroleum production stocks

	Ethanol fuel production	Petroleum production
Number of observations	4	68
Median		
OLS beta	1.06	1.01
Blume-adjusted (1975)	0.98	0.96
Vasicek-adjusted (1973)	0.69	0.83
Average	**0.91**	**0.93**
Value weighted average		
OLS beta	0.87	0.86
Blume-adjusted (1975)	0.85	0.86
Vasicek-adjusted (1973)	0.72	0.81
Average	**0.82**	**0.84**

Source: Thomson Reuter Datastream and IPART analysis.

Ethanol fuel and petroleum production stocks in our sample exhibit a similar level of asset betas of around 0.80 (based on the value weighted average).

We used the midpoint of the gearing ratio range we determined in Section D.4 (ie, 25%) to convert an asset beta to an (re-levered) equity beta. An asset beta of 0.8 translates into an (re-levered) equity beta of 1.0 based on the midpoint gearing ratio of 25%.   This means that a typical ethanol fuel/petroleum production stock with a gearing ratio of 25% has an equity beta of one.

An equity beta less than one indicates that the stock is less volatile than the market, while an equity beta greater than one indicates that the stock is more volatile than the market.   Our results indicate that a typical ethanol fuel/petroleum production stock is likely to have the same level of stock return volatility as the market.

These results are consistent with our expectation.   The performance of the ethanol fuel and petroleum production stocks is likely to be highly influenced by movements in, and uncertainty about, oil prices. Macroeconomic factors that affect demand and supply in the oil market would have a substantial impact on ethanol fuel/petroleum production stock returns. In addition, given the systemic role of transport in the economy, oil consumption levels are closely tied to the levels of overall economic activity.   Hence, the stock returns of companies producing petroleum/ethanol fuel tend to be closely tied to returns of the market as a whole.

In addition to oil price risk, the financial performance of ethanol production businesses is also likely to be influenced by two other factors. First, performance of ethanol production businesses relies on a favourable spread between feedstock costs and the market price of ethanol. If a fall (an increase) in the market price of ethanol coincides with high (low) costs of feedstock, this would have a

substantial impact on the revenue volatility of the ethanol industry. Also, the ethanol industry is highly influenced by government policy such as ethanol mandate, and regulatory uncertainty poses additional risk to ethanol production businesses. While these factors would increase revenue risks for ethanol businesses, these are not market-driven (ie, non-systematic risks), and therefore are not factored into equity beta.

D.7   Comparison with other industries regulated by IPART

Figure D.3 ranks asset betas of various industries adopted in IPART's past decisions. The asset beta underlying the equity beta we determined for AECOM's modelling of new entrant costs of ethanol production is at the top end of asset betas previously determined by IPART.

Figure D.3   IPART past decisions on asset betas
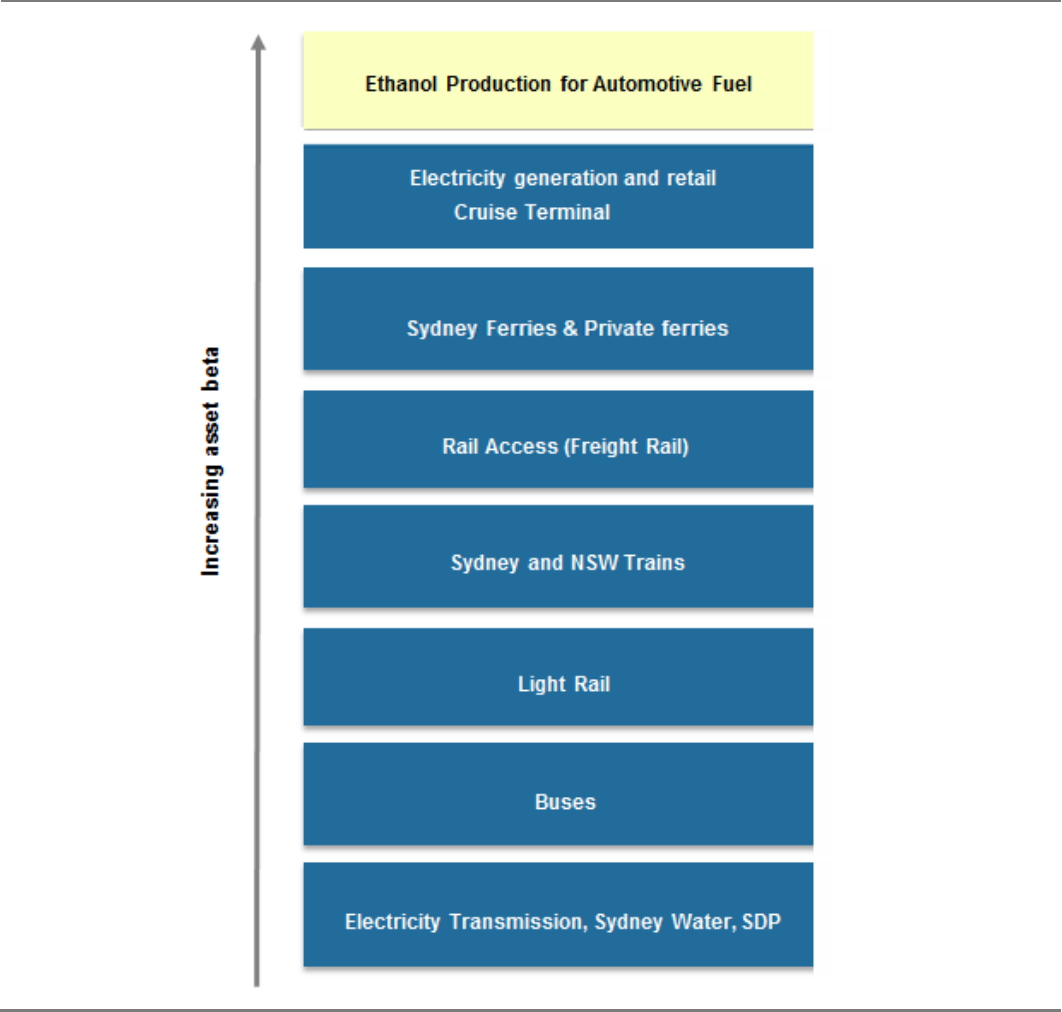
E | Considered sources for ethanol price data

There are a number of potential sources for US and Brazilian ethanol prices. An overview of the sources we considered is contained in Table E.1.

Table E.1   Data sources for US and Brazilian anhydrous ethanol prices

Data source	Frequency	Basis and location	Delivery	Volume
Platts *Subscription*	Daily	FOB US Gulf FOB Santos, Brazil	10-30 days forward	10,000m³ minimum
Argus *Subscription*	Daily	FOB US Gulf	5-15 days forward	10,000 barrels minimum
		FOB Santos, Brazil	5-30 days forward	10,000 barrels minimum
ESALQ *Public*	Weekly	Mill gate price ex tax Sao Paulo, Brazil	Not specified	Various
ICIS *Subscription*	Daily/ Weekly	Mill gate price ex tax Sao Paulo, Brazil	0-14 days forward	Standard 1,000 tonne
		FOB NY Harbour, US	0-14 days forward	Standard 1,000 tonne
		Mill gate price Midwest, US	0-14 days forward	Standard 1,000 tonne
		FOB Chicago, US	0-14 days forward	Standard 1,000 tonne
OPIS *Subscription*	Daily	FOB US Gulf	3-15 days forward	Typically up to 10,000 barrels
		FOB Santos	5-30 days forward	Typically 50,000 barrels or more
USDA *Public*	Daily	Mill gate price Midwest, US	On the day	Not specified
ESALQ *Public*	Weekly	Mill gate price ex tax Sao Paulo, Brazil	Not specified	Various

Note: All sources provide prices for anhydrous ethanol, which is the grade of ethanol suitable for blending with petrol in Australia. Anhydrous (or dry) ethanol has an ethanol purity of at least 99%. Hydrous (or wet) ethanol typically has an ethanol purity of 93-97% and is not suitable for blending with petrol without further refinement.

Sources: Platts, *Methodology and Specifications Guide – Biofuels*, October 2016, p. 15, at
http://www.platts.com/IM.Platts.Content/MethodologyReferences/MethodologySpecs/biofuelsglobal.pdf,
accessed 13 October 2016; Argus, *Methodology and Specifications Guide – Argus Americas Biofuels*, October
2016, pp. 6-7, at http://www.argusmedia.com/~/media/files/pdfs/meth/argus_americas_biofuels.pdf/?la=en,
accessed 13 October 2016; ICIS, *Ethanol Methodology – 5 October 2016,* at
https://www.icis.com/compliance/documents/ethanol-methodology-5-october-2016/, accessed 13 October 2016;
OPIS, *OPIS Methodology - OPIS Renewable Fuels*, at
http://www.opisnet.com/about/methodology.aspx#RenewableFuels, accessed 13 October 2016; ICIS*, Ethanol
Methodology*, October 2016, pp. 4-6, at https://s3-eu-west-1.amazonaws.com/cjp-rbi-icis-compliance/wp-
content/uploads/2016/10/Ethanol-Methodology-5-October-2016.pdf accessed 9 December 2016; Port of
Houston Authority, Tariff no. 8 Rates, rules and regulations governing the Houston ship channel and the public
owned wharves, January 2016, at http://porthouston.com/portweb/wp-
content/uploads/2016/08/Tariff_8_July_2016.pdf, accessed 9 December 2016; personal communication with
USDA November and December 2016; and ESALQ, *Methodology*, at
http://www.cepea.esalq.usp.br/en/methodology/methodology-14.aspx, accessed 8 December 2016.

F | Further analysis on international ethanol prices

As outlined in Chapter 4, there is currently a substantial difference between US and Brazilian ethanol prices. In the past two years, the price of US ethanol has been consistently lower than that of Brazilian ethanol. 2016 also saw a diversion of sugarcane use away from ethanol towards sugar production due to high international sugar prices. Higher feedstock prices and lower ethanol production resulted in higher domestic prices for ethanol in Brazil.[70]

In its submission to our Draft Report, Manildra noted that:

> …. despite the data presented by IPART implying that US producers have had a substantial price advantage over Brazilian sourced ethanol in many years, there has been no increase or changes in the level of US exports.[71]

Manildra's submission is based on a comparison of US and Brazilian IPPs and *total* US exports of fuel ethanol. We confirmed with the US Energy Information Administration that the US ethanol export chart reproduced in Manildra's submission includes industrial grade ethanol.

We consider that a preferred approach is to examine how US exports of fuel grade ethanol (excluding industrial ethanol) have changed *relative* to Brazilian exports of fuel grade ethanol, and whether their relative changes are explained to some extent by the differentials in ethanol export (FOB) prices.

Figure F.1 shows US and Brazilian ethanol FOB export prices,[72] and Figure F.2 shows the levels of US and Brazilian annual exports of fuel ethanol.[73] As shown in Figure F.2, the level of US exports of fuel grade ethanol has increased substantially *relative* to Brazil in the last three years. In our view this trend seems

---

[70] Personal communications with Platts, December 2016.

[71] Manildra Group submission, November 2016, p 6.

[72] These are estimated FOB export prices based on publicly available data sources from ESALQ and USDA. See Chapter 4 for more information.

[73] No Brazilian government entity or trade source maintains production data for "fuel" or "other use" and all ethanol production figures are reported as hydrous and anhydrous volumes. According to the USDA Foreign Agricultural Service GAIN report, Brazilian exports of ethanol for "fuel" is estimated based on the type of ethanol that is usually imported by the final destination, as reported by the Sugar and Alcohol Millers Association of São Paulo State (UNICA). For example, the United States, the Caribbean countries and Sweden usually import ethanol for fuel, whereas Japan, Korea and several other importing countries, including the European Union import ethanol for industrial and other uses.
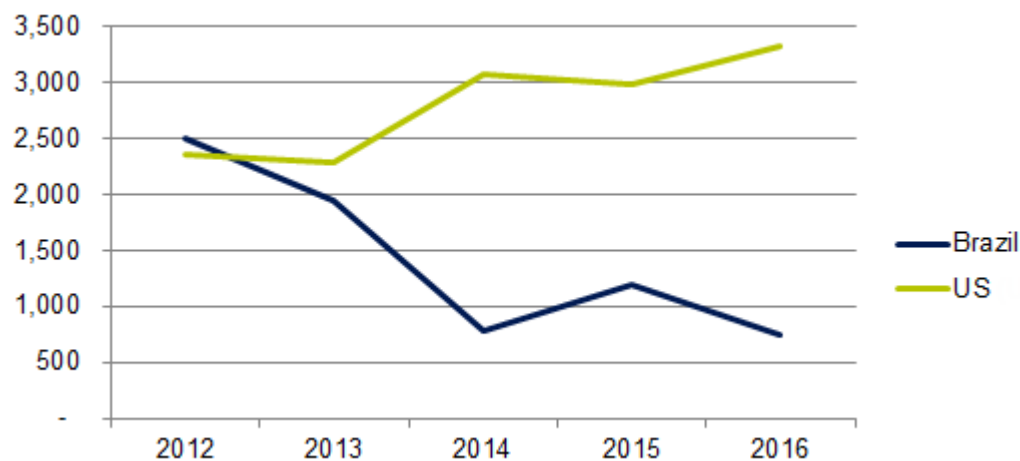
to generally coincide with a reduction in US FOB prices relative to Brazil shown in Figure F.1.

Figure F.1   US and Brazil weekly average ethanol FOB prices (USD/litre)

Data source: ESALQ, USDA and IPART calculations.

Figure F.2   US and Brazil exports of Fuel Ethanol (Million litres)

Note: US exports in 2016 are annualised export based on actuals from January to September 2016. Brazilian exports in 2016 are forecast.

Data source: USDA Foreign Agricultural Service, Global Agricultural Information Network, 12 August 2016 Section 4; https://apps.fas.usda.gov/gats/ExpressQuery1.aspx accessed 6 December 2016.