IPART
New South Wales

Independent Pricing and Regulatory Tribunal

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

Other — Draft Report
October 2016

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The Tribunal members for this review are:

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Ms Catherine Jones

Mr Ed Willett

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Invitation for submissions

IPART invites written comment on this document and encourages all interested parties to provide submissions addressing the matters discussed.

Submissions are due by 25 November 2016.

We would prefer to receive them electronically via our online submission form <www.ipart.nsw.gov.au/Home/Consumer_Information/Lodge_a_submission>.

You can also send comments by mail to:

> **Review of a maximum price for wholesale ethanol**
> Independent Pricing and Regulatory Tribunal
> PO Box K35
> Haymarket Post Shop   NSW   1240

Late submissions may not be accepted at the discretion of the Tribunal. Our normal practice is to make submissions publicly available on our website <www.ipart.nsw.gov.au> as soon as possible after the closing date for submissions. If you wish to view copies of submissions but do not have access to the website, you can make alternative arrangements by telephoning one of the staff members listed on the previous page.

We may choose not to publish a submission—for example, if it contains confidential or commercially sensitive information. If your submission contains information that you do not wish to be publicly disclosed, please indicate this clearly at the time of making the submission. IPART will then make every effort to protect that information, but it could be disclosed under the *Government Information (Public Access) Act 2009* (NSW) or the *Independent Pricing and Regulatory Tribunal Act 1992* (NSW), or where otherwise required by law.

If you would like further information on making a submission, IPART's submission policy is available on our website.

Contents

1 | Executive summary

The Independent Pricing and Regulatory Tribunal of NSW (IPART) is currently conducting a review 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. Currently, ethanol accounts for around 2.5% of this volume.[3]

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. 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. 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.

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[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] 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 20 October 2016.

The changes in the Biofuels Amendment Act refer to IPART determining a 'reasonable wholesale price' for the purposes of the exemptions framework.[4] However, in this report we refer to a 'recommended maximum price' in line with our terms of reference. Our recommended maximum price is not a binding maximum price in the market; ethanol producers and fuel wholesalers could agree to prices 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. We have made our draft findings and recommendations, and are now seeking comments from all interested parties.

1.1   Draft recommendations

Our draft recommendations are that IPART:

▼ Establish a recommended maximum price based on an import parity price (IPP) methodology that includes relevant excise tax.

▼ Monitor and report annually on the degree of consumer choice in the retail fuel market and the extent of competition in the wholesale ethanol market, to ensure that our approach to recommending the maximum price remains appropriate over time.

A recommended maximum price based on our IPP methodology would currently result in a price of around 135 cents per litre excluding GST (see Chapter 4 for more details). This is higher than current prices in contracts between ethanol producers and fuel wholesalers. These contracts generally link ethanol prices to oil/petroleum prices which at present are historically low.

Some stakeholders might have expected that a recommended maximum price would need to be much lower to ensure E10 is available at an attractive price. However, there is a risk that recommending a much lower maximum price at this time may not support a sustainable biofuels industry in NSW. In particular, it would pose a risk to the financial viability of existing producers, may discourage new producers from entering the market and hamper the development of competition in the wholesale ethanol market. As discussed in Chapter 3, both ethanol producers and purchasers share this view.

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[4]   *Biofuels Amendment Act 2016* (NSW) No.12 Schedule 2, Item 31. (The new Part 3A). Schedule 2 of the Biofuels Amendment Act has yet to commence.

We found that the current degree of consumer choice for retail fuel, the extent of competition in the wholesale ethanol market, and low oil/petroleum prices indicate that a light-handed approach to recommending a maximum price is appropriate at this time. We do not expect that ethanol prices will rise to the level of our recommended maximum price under current market conditions. Instead, we expect the ethanol market will continue to determine prices below the recommended maximum.

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.

1.2   Framework for our draft recommendations

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 petrol, low oil/petroleum prices place a market constraint on wholesale ethanol prices.

Figure 1.1 provides a 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   Proposed framework for recommended maximum wholesale price of ethanol in NSW
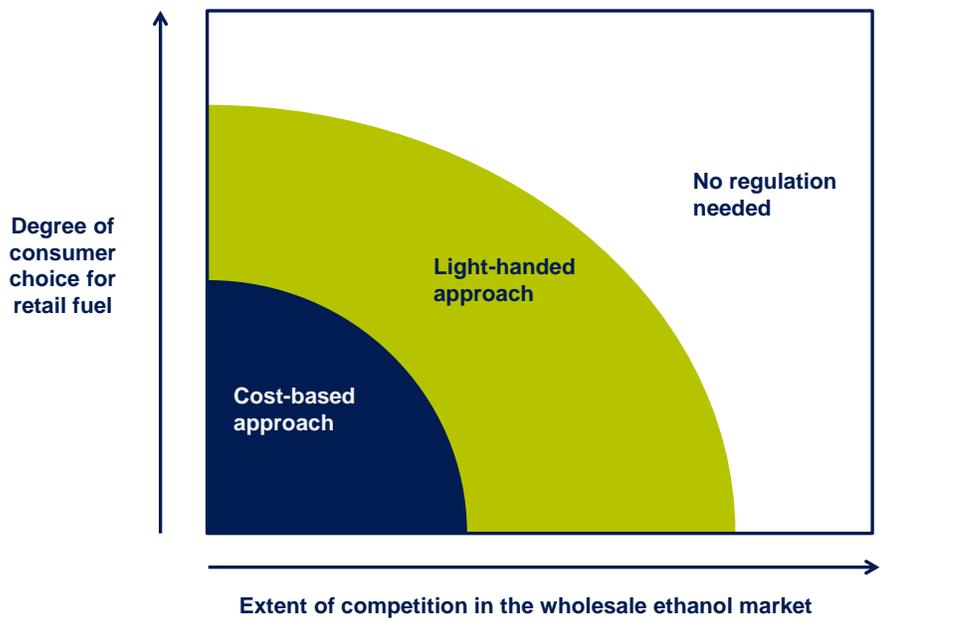
Under our proposed framework:

▼ 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 light-handed, to encourage the development of a more competitive wholesale ethanol market.

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 light-handed 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 light-handed approach to recommending a maximum price is appropriate.

1.2.2 An import parity price is the most appropriate pricing methodology

Of the various pricing approaches we investigated, an IPP including excise would be the most suitable light-handed pricing methodology. An IPP methodology would allow emerging competition in the wholesale ethanol market to continue to develop, and would support a sustainable biofuels industry in NSW.

Our proposed IPP methodology involves estimating 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

▾ storage and handling costs in Australia.

In developing our methodology we had regard to simplicity, transparency and minimising regulatory and administrative costs. We propose to use the ESALQ[5] price index as the basis of the international market price of ethanol. This price index is freely available, is commonly referenced in ethanol purchasing contracts worldwide, and is indicative of the average price of ethanol exported from Brazil. We also propose to estimate the costs for transport to, and storage and handling in Australia based on historical data. These represent a relatively small part of the IPP and we propose to update these estimates on an annual basis. Information on excise and other taxes is available from the Australian Taxation Office. More detail about our proposed IPP methodology is provided in Chapter4 and Appendix C. We have also developed an Excel model to calculate the IPP which is available on our website.[6]

1.2.3 Annual monitoring and reporting of consumer choice and competition

Under the Biofuels Amendment Act, IPART is asked to monitor the retail market for petrol-ethanol blend and report to the Minister. As discussed in Chapter 6, we propose to report annually to the Minister.

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 propose to use FuelCheck data as part of our retail monitoring.

In addition to retail monitoring of the E10 market, we are recommending to conduct annual monitoring and reporting on consumer choice for retail fuel, the wholesale ethanol market and the level of oil/petroleum prices. Our annual assessment would consider whether a light-handed, cost-based, or no regulation approach is most appropriate.

Deciding on this involves a judgement based on a number of factors. We do not propose to establish any automatic triggers for reconsidering our approach. However, we would consider a number of factors including, changes to the mandate and the degree of consumer choice for retail fuel, changes in barriers to entry and the extent of competition in the wholesale market, and the level of oil/petroleum prices. We would consult with stakeholders before making any change to our approach.

More detail about our proposed approach to monitoring and reporting is set out in Chapter 6.

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[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.

1.3   Have your say on this draft report

We plan to hold a public forum to discuss our draft report and draft recommendations in Sydney on 22 November 2016. You can register to attend the public forum on our website, www.ipart.nsw.gov.au.

We are also seeking written submissions on this draft report, and encourage all interested parties to comment on the matters it discusses, or any other issues relevant to the review. Page iii of this report provides more information on how to make a submission. Submissions are due by 25 November 2016.

1.4   Structure of this report

The rest of this report explains our review and draft 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 light-handed 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 proposed 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 D provide supporting information.

1.5 List of our draft findings and recommendations

Our draft findings and recommendations are set out in the following chapters. For convenience they are also listed below. Please feel free to comment on any or all of these, AECOM's draft report on the costs of new entrant ethanol producers, or any other matter relevant to our review.

1.5.1 Draft 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.   13

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 light-handed approach to a recommended maximum price.   13

3   Annual monitoring and reporting is needed to confirm the approach for the recommended maximum price for wholesale ethanol remains appropriate.   37

1.5.2 Draft recommendations

1   That recommended maximum wholesale ethanol prices be set for four-week periods using an import parity price methodology including relevant customs duty and excise, as well as costs of storage and handling at an import terminal, and of transport to the fuel wholesaler's terminal.   21

2   That IPART's approach for conducting annual monitoring and reporting include: 37

–   an assessment of the state of wholesale and retail markets for ethanol using the framework described in Chapter 3   37

–   monitoring the effect of the recommended maximum price on the retail market for ethanol-blended petrol.   37

3   That IPART would consult with stakeholders before changing our approach/methodology to the recommended maximum price.   37

2 | Context and process for this review

IPART is conducting 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 2007* (the 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 Act seeks to meet these objectives is the ethanol mandate. Since 2011, major fuel sellers have been mandated by the 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 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]

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[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
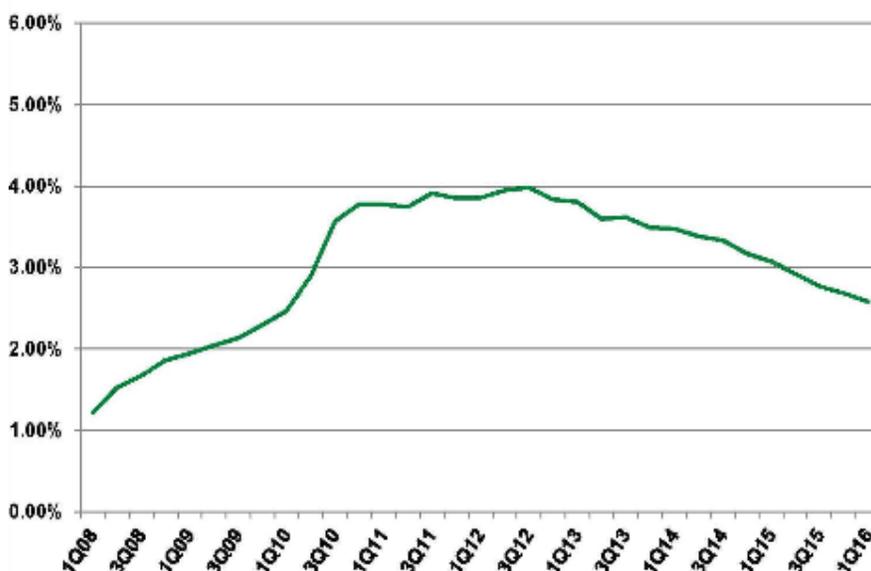
Note: The data is presented in quarters, where 1Q16 refers to the first quarter in 2016 etc.

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 20 October 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, including 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]

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

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 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.

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[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

Our review process to date has involved detailed analysis and public consultation:

▼ 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 are now inviting stakeholder submissions on our draft findings and recommendations in this report. Submissions are due by 25 November 2016. Information on how to make a submission is provided on page iii at the front of this report. We will also hold a public hearing in Sydney on Tuesday 22 November. This will provide the opportunity for stakeholders to comment or ask questions on our draft findings and recommendations.

We will provide our Final Report to the Premier by the end of December 2016.

3 | Approach to recommending a maximum price should be light-handed

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 draft 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 draft findings, we:

▼ applied our draft 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 draft findings, and then discuss our analysis and findings on each step in more detail.

3.1 Overview of our draft 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. We consider that a light-handed approach to recommending a maximum price is sufficient to protect consumers, while a prescriptive cost-based approach to recommend a price is likely to hinder the continued development of competition in the wholesale market. Effective competition in the wholesale ethanol market is the best way to support the availability of E10 to consumers **and** support a sustainable biofuels industry in NSW.

Draft 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 light-handed approach to a recommended maximum price.

3.2 Draft 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 a draft 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 3.1   Proposed framework for recommended maximum wholesale price of ethanol in NSW
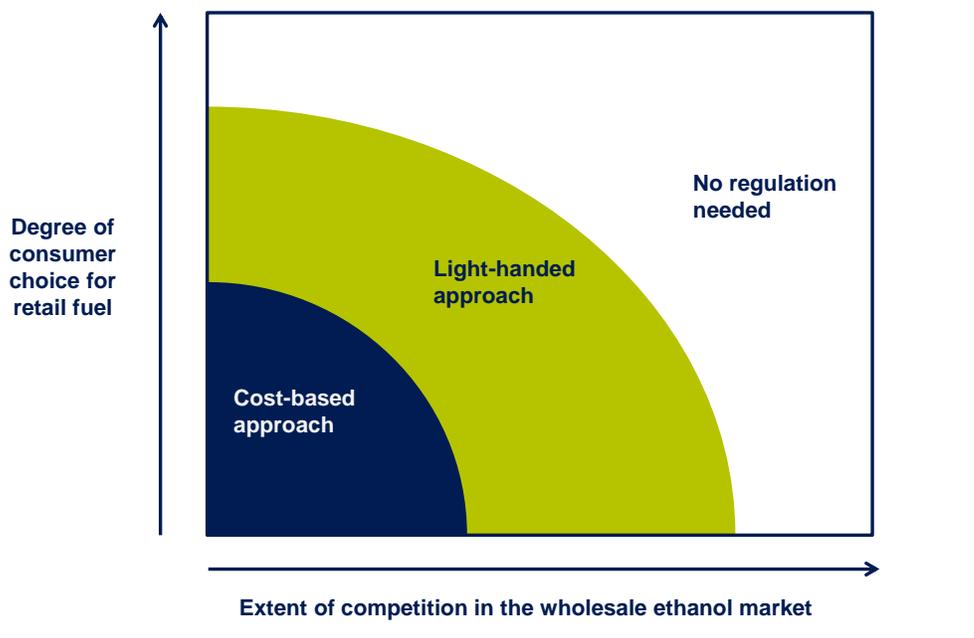
Under our proposed framework:

▼ 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 light-handed, to encourage the development of a more competitive wholesale ethanol market.

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. 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.

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.

3.3 Draft 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 and extent of competition in producing ethanol results in a position within the green area in our framework, indicating that a relatively light-handed regulatory approach is appropriate. This is discussed 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 collected by NSW Fair Trading indicates that presently:

▼ around 78% of service stations in NSW sell RULP

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

▼ 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. 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.

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 planning and environmental approval[15] and other ethanol projects in eastern Australia are at various stages of development.[16]

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, we advised them to include a return on capital based on a real post-tax weighted average cost of capital (WACC) of 6.9%. Details of our WACC calculation are provided in Appendix D.

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

[16] 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 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.
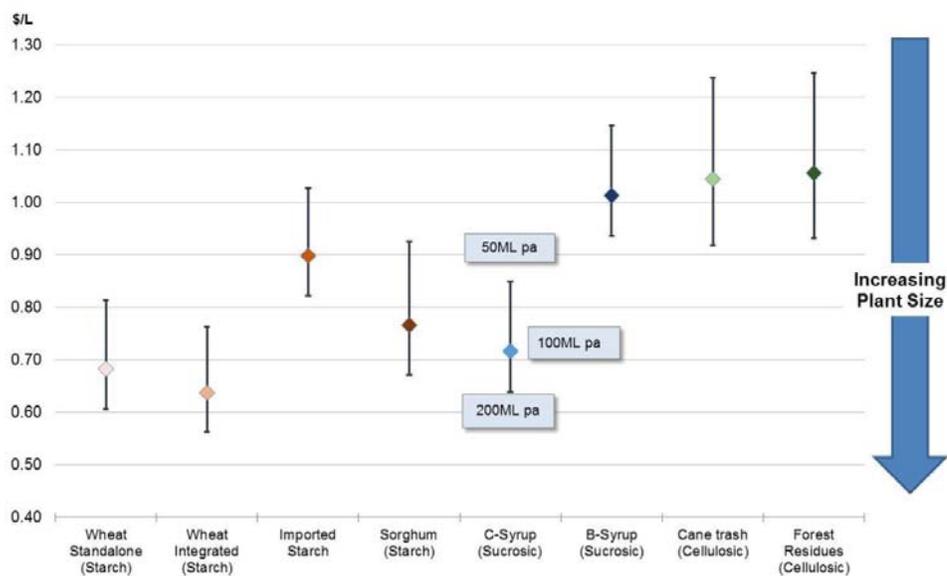
Some of AECOM's key findings were:

▼ 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. 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.[17]

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.[18]

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.[19]

We consider that our draft 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[20] 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 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

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[17]   Manildra Group submission, August 2016, p 1.
[18]   HoustonKemp Economists, *Maximum price for wholesale fuel-grade ethanol* – A report for Manildra Group, August 2016, p 1.
[19]   AIP submission, July 2016, pp 3, 12.
[20]   IPART, *Ethanol mandate, Options to increase uptake of ethanol blended petrol* – Addendum to May 2015 Final Report, October 2015, p 2.

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 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.[21]

We agree with stakeholders that given the degree of consumer choice and improving competition in the wholesale ethanol market, a light-handed 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.

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[21] 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 light-handed 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 light-handed approach, and

▼ considering stakeholder views on different pricing options.

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

4.1 Draft recommendation on the pricing methodology

Our draft recommendation is to recommend maximum wholesale ethanol prices using an import parity price methodology, including applicable customs duty and excise, as well as costs of storage and handling at an import terminal, and of transport to the fuel wholesaler's terminal. The proposed IPP methodology provides a reference import price for ethanol, while minimising the risk that this maximum price distorts the market and stifles emerging competition. Because domestic and international ethanol prices change daily, we are proposing to use a pricing methodology, rather than a single price. However, our proposed methodology sets prices for discrete four-week periods rather than daily or weekly prices. This approach takes into account the possible lead-time from when an order is placed for ethanol overseas until it arrives to a fuel wholesaler in Australia, and also minimises administrative costs while smoothing volatility in daily prices.

Draft recommendation

1 That recommended maximum wholesale ethanol prices be set for four-week periods using an import parity price methodology including relevant customs duty and excise, as well as costs of storage and handling at an import terminal, and of transport to the fuel wholesaler's terminal.

4.2   Assessing price setting options

Given a light-handed 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

▼ import parity price (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 a price set using an IPP methodology that includes duties and excise would be 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 proposed methodology would ensure 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** achieve the objective of a sustainable biofuels industry in NSW.

In the next sections we outline the general formula for our proposed IPP, and the data sources we propose to use to calculate it.

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:[22]

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

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

IPP for wholesale ethanol (ex GST) = International benchmark price for ethanol + local freight and export terminal charges + Freight (sea) + Insurance and loss + Wharfage + Landing costs (excise and import duties) + Storage & handling at import terminal + Transport from port to wholesale fuel terminal

Our proposed IPP methodology gives the price faced by fuel wholesalers for ethanol delivered to their terminals, rather than the price delivered to an import terminal.

4.4   Data sources for the IPP

There are a number of different data sources available to estimate the individual components of the IPP. In Table 4.1 below we summarise the sources of data we propose to use.

Table 4.1   IPP cost component estimation method

IPP component	Draft recommendation
International benchmark price	ESALQ ethanol price index
Freight and port costs (Brazil)	Published estimate by EnergyQuest for the ACCC
Freight (sea)	Proprietary information published by ICIS Market Intelligence
Insurance and loss	Published estimate by EnergyQuest for the ACCC
Wharfage (Botany)	Pricing information published by NSW Ports
Landing costs (Taxes)	ATO tax rates
Storage and handling at Australian import terminal	IPART estimate
Transport costs from port to fuel terminal	Estimate by IPART based on public analysis by AECOM for IPART

Source: EnergyQuest, *Benchmarking the Price of Fuel Ethanol in Australia – Report to the ACCC*, July 2010; NSW Ports, *Schedule of Port Charges – Effective July 2016*; AECOM, *Efficient Costs of New Entrant Producers – Draft Report – Prepared for Independent Pricing and Regulatory Tribunal*, October 2016.

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[22]   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.

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 for the international benchmark price to be from a credible and reputable source, based on a likely location of imported ethanol into the Australian market.

There are three key issues to consider:

▼ Which market(s) is the most likely source of ethanol for Australia?

▼ What is an appropriate source of information for the chosen benchmark price?

▼ What is an appropriate averaging period for the chosen benchmark price?

The most likely source 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% of global ethanol production as of 2015.[23] 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 to be the two most likely sources for ethanol imports into Australia.

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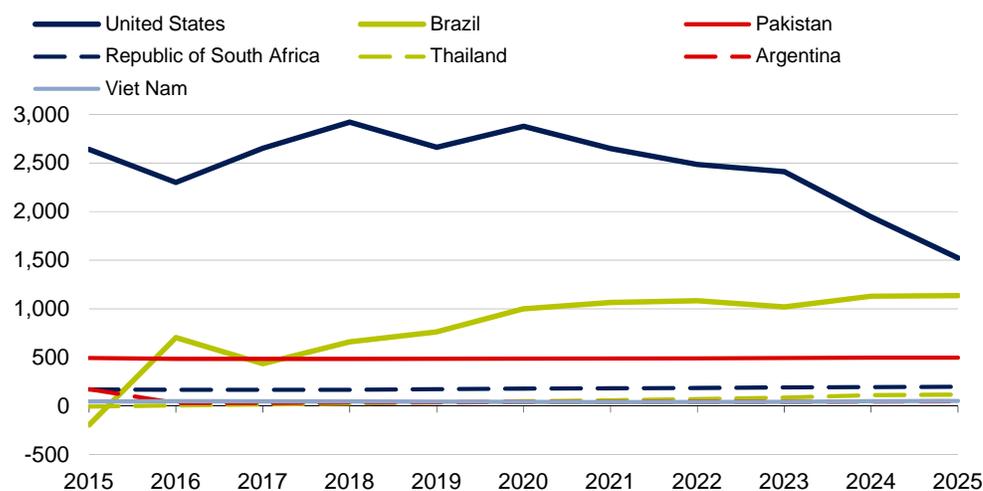
Note: The chart excludes Australia, which OECD forecast to export between 7ML and 13.5 ML over this period.
Data source: OECD Statistics, *OECS-FAO Agricultural Outlook 2016*-2015, at http://stats.oecd.org/Index.aspx?DataSetCode=HIGH_AGLINK_2016, accessed 13 October 2016.

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

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. An efficient ethanol importer could be expected to source their imports at any point in time from the lowest cost source of either the US or Brazil.

Possible data sources for ethanol prices

There are a number of potential sources for US and Brazilian ethanol prices. An overview of the sources we have considered is contained in Table 4.2.

Table 4.2   Possible data sources for US and Brazilian anhydrous ethanol prices

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

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; ESALQ, *Methodology*, at http://www.cepea.esalq.usp.br/english/ethanol/?id_page=242, 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.

Only the prices provided by ESALQ are freely available to the public. All other sources require ongoing subscriptions to data services. Due to the lack of transparency and potentially high cost imposed on stakeholders by using a source that requires an ongoing subscription, we are recommending that our IPP methodology be based on the publicly available prices from ESALQ. ESALQ is referenced in ethanol purchasing contracts worldwide and considered an indicative average price of ethanol exported from Brazil. However, we note the following two drawbacks of using ESALQ as the basis for our IPP methodology:

▼ The lack of an equivalent publicly available source for US ethanol prices means the IPP would not be based on the lowest priced source of either the US and Brazil.

▼ ESALQ prices are as at the mill-gate, as opposed to delivered Free On Board (FOB) at the relevant port. We therefore need to add an estimate of the cost of transporting the ethanol from the factory in São Paulo to Santos port, and any relevant port costs.

Appropriate averaging period for ethanol prices

There could be considerable 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. We have estimated this lead-time to be between five to 20 weeks, based on:

▼ delivery from ethanol factory in São Paulo to Santos port between 5-30 days (approximately one to four weeks) after date of purchase

▼ shipping time from Santos to NSW of approximately three to five weeks, and

▼ storage at import terminal of between one to seven weeks before being delivered to the fuel wholesaler.

This lead-time means that the Brazilian spot market prices are effectively forward-looking prices for ethanol imported to Australia. Our proposed IPP methodology takes account of this range in the lead-time from date of purchase to delivery at fuel wholesaler in NSW. Figure 4.2 shows that ethanol delivered to a fuel wholesaler in NSW during the four-week pricing period (Week 0 to Week 3) could have:

▼ arrived at the NSW import terminal one to seven weeks before being delivered to the fuel wholesaler (ie, from Week -7 to Week 2)

▼ been shipped from Brazil three to five weeks before arriving at the NSW import terminal (ie, from Week -12 to Week -1), and

▼ been purchased approximately one to four weeks before being shipped from Brazil (ie, from Week -16 to Week -2).

As shown in the figure, we are proposing to recommend maximum prices for discrete periods of four weeks. Under our proposed IPP methodology, this means using an average of the ESALQ prices over the 15-week period that concludes one week prior to the relevant pricing period (ie, from Week -16 to Week -2 in Figure 4.2). This methodology also smooths fluctuations in the market, and provides greater stability and certainty for ethanol producers, fuel wholesalers and retailers in NSW.

While we considered recommending maximum prices on a weekly basis, the long averaging periods implied by the above lead-times meant there would be little benefit from weekly rather than four-weekly pricing periods. Four-week pricing periods also have the added benefit of being administratively simpler than weekly pricing periods.

Using the above methodology, for the IPP that would apply for the period 10 October 2016 to 6 November 2016, we calculated the Brazilian ethanol price to be 69.8 Australian cents per litre.

4.4.2 Freight and port costs (Brazil)

The ESALQ price index is based on São Paulo mill gate prices, which requires us to add an estimate of the costs of freight from the factory to Santos port,[24] as well as any relevant port costs. For the purpose of estimating the IPP for our draft report, we have used an estimate of USD 60 per tonne for freight and port costs, sourced from a 2010 report by EnergyQuest to the ACCC.[25] This translates to approximately 6.3 Australian cents per litre of ethanol for the IPP calculated for the period 10 October 2016 to 6 November 2016.

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 between Brazil and Australia; however an estimate of shipping costs can be generated through the use of proprietary market data. We propose to use data provided by ICIS Market Intelligence to produce an estimate of the per litre shipping costs of ethanol from Brazil to Australia. We would monitor these cost estimates as part of our market monitoring role and update them annually.

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[24] Santos port is the main export terminal for ethanol from São Paulo.

[25] EnergyQuest, *Benchmarking the Price of Fuel Ethanol in Australia – Report to Australian Competition and Consumer Commission*, July 2010, pp 23-24.

For the purpose of our draft report, we have estimated freight costs of USD 110 per tonne, sourced from EnergyQuest's 2010 report to the ACCC.[26] This amounts to approximately 11.4 Australian cents per litre of ethanol for the IPP calculated for the period 10 October 2016 to 6 November 2016.[27]

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[26] EnergyQuest, *Benchmarking the Price of Fuel Ethanol in Australia – Report to the Australian Competition and Consumer commission*, July 2010, p 32.

[27] Calculating the cost of sea freight from Brazil to NSW means converting our estimated cost of freight in USD to AUD. While the relevant shipping period from Brazil is any time from Week -12 to Week -1, the relevant exchange rates for Week -1 would not be available until Week 1 (first week of pricing period). To ensure that the recommended maximum price for wholesale ethanol is available prior to the commencement of the pricing period, we will only use the average of exchange rates from Week -12 through Week -2. We expect this to have negligible impact on the resulting IPP.

Figure 4.2   Proposed averaging period for import parity price methodology

4.4.4   Insurance and loss

The IPP would need to include an allowance for insurance and loss during transit. In its 2010 report to the ACCC, EnergyQuest noted that insurance on chemical cargoes is typically calculated as follows:[28]

*Insurance = 0.4% * (FOB value + freight cost) * 110%*

EnergyQuest also noted that loss of product during voyage is generally claimable beyond 0.5% by volume, and EnergyQuest assumed no voyage losses for the purpose of its IPP assessment.

We propose to adopt EnergyQuest's estimates of insurance costs and loss. On this basis, for the IPP calculated for the period 10 October 2016 to 6 November 2016, we calculated insurance costs of 0.4 Australian cents per litre.

4.4.5   Wharfage

We propose to estimate wharfage costs for landing ethanol in Australia based on NSW Ports' pricing schedules for the wharfage of bulk liquids per tonne at Port Botany. This wharfage rate is updated annually. The current rate is AUD 2.19 per tonne excluding GST, which converts to approximately 0.2 cents per litre of ethanol.[29]

4.4.6   Landing costs in Australia (taxes)

Landing costs for ethanol imported to Australia consists of a fuel excise of 39.6 Australian cents per litre[30] and a 4% import duty, levied on the FOB price of the ethanol.[31] The excise is increased bi-annually in February and August of each year in line with the CPI.

For the IPP calculated for the period 10 October 2016 to 6 November 2016, the fuel excise and customs duty amounts to 42.6 cents per litre of ethanol.
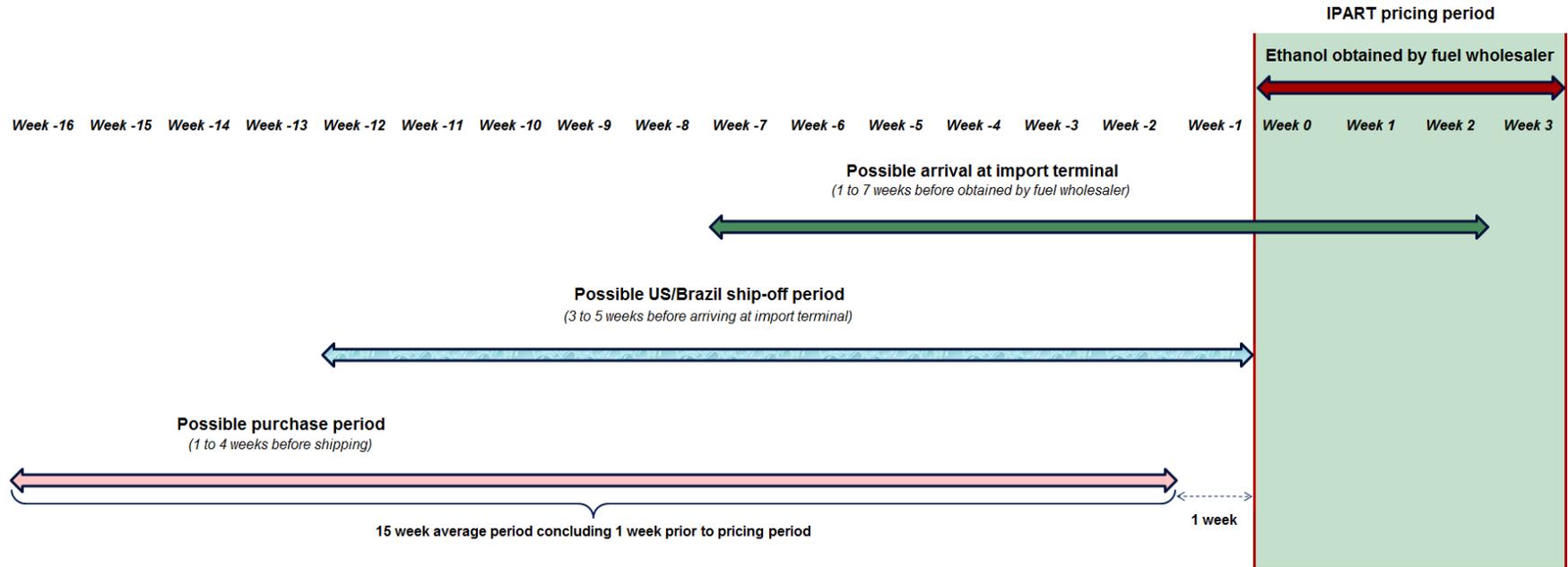
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[28] EnergyQuest, *Benchmarking the Price of Fuel Ethanol in Australia – Report to the Australian Competition and Consumer commission*, July 2010, p 31.

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

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

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

4.4.7 Storage and handling costs at import terminal

Storage and handling costs in the Australian import terminal will form a component of the IPP. These costs need to be included in our IPP estimate, since the IPP is intended to give the price faced by fuel wholesalers for ethanol delivered to their terminals, rather than the price delivered only to an import terminal.

We expect that the cost of storage and handling at the import terminal would make up a relatively small component of the IPP. For the purpose of our draft report, we have estimated an average cost of 3 cents per litre, on the basis of information obtained confidentially.

4.4.8 Transport costs from port to wholesale terminal

For the purpose of our investigation into new entrant costs of production, AECOM estimated the cost of long-haul road transport of ethanol in Australia to be around 6.88c/tonne-km, or about 0.005c/litre-km.[32] The distance from Port Botany to one of the wholesale terminals near the port is around 5 km, and around 35km to 40km for the wholesale terminals in Silverwater and Parramatta. From Kurnell, the distances range from 25km to 45km. These transport distances are much shorter than the distances costed in AECOM's report, and could therefore be expected to cost more per tonne-km. In Table 4.3 we have assumed a multiplier of 2 for rates per tonne-km for distances greater than 20km, and a multiplier of 4 for shorter distances. We have also assumed empty back-haul.

Table 4.3   Estimates of ethanol transport costs (cents per litre, cpl)

From import terminal location…	To wholesale terminals at…	
	Banksmeadow and Sydney Airport	**Silverwater and Parramatta**
Port Botany	0.22cpl	0.76cpl to 0.87cpl
Kurnell	0.54cpl to 0.65cpl	0.87cpl to 0.98 cpl

Note: Assumed empty back-haul.

Source: Based on AECOM's estimates on long-haul transport costs, using multipliers of 2 for distances greater than 20km, and 4 for shorter distances. AECOM, *Efficient Costs of New Entrant Ethanol Producers – Draft Report - Prepared for Independent Pricing and Regulatory Tribunal*, October 2016, p d3.

We propose to allow for the cost of transport from port to the wholesale terminal of 1 cent per litre in the IPP, which is at the upper end of the ranges in Table 4.3.

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[32] AECOM, *Efficient Costs of New Entrant Ethanol Producers – Draft Report - Prepared for Independent Pricing and Regulatory Tribunal*, October 2016, p d3.

4.4.9   Conversion to AUD

Many of the input costs used to build the IPP are expressed in US dollars. We propose to use exchange rates provided by the RBA[33] to convert these costs to Australian dollars at the time that the costs would have been incurred according to our IPP methodology timeline (Figure 4.2).

4.5   Example IPP calculation and calculation tool

Table 4.4 provides an example of the calculation of the IPP using the methodology described above, and Appendix C describes the calculation of the IPP in greater detail. We have also published a simple Excel model on our website www.ipart.nsw.gov.au that would allow stakeholders to calculate the IPP for a relevant pricing period, up to four weeks forward in time.

Table 4.4   Example IPP calculation for period 10 October 2016 to 6 November 2016 ($2016)

Cost item	Australian cents per litre
International ethanol benchmark price FOB	
International benchmark price at mill gate	69.8
Freight and port costs (Brazil)	6.3
Ethanol price – FOB Santos	**76.1**
Transport, storage and handling costs	
Freight (Sea)	11.4
Insurance costs	0.4
Wharfage Sydney	0.2
Storage and handling costs (import terminal)	3.0
Transport from port to wholesaler terminal	1.0
Total transport, storage and handling costs	**16.0**
Landing costs (taxes)	
Customs value duty	3.0
Customs fuel import duty	39.6
Total landing costs (taxes)	**42.6**
Ethanol IPP delivered to wholesale terminal (ex GST)	**134.7**

Source: IPART calculations based on data sources described above.

4.6   Publishing the recommended maximum price

We propose to publish an update on the recommended maximum price for wholesale ethanol on our website in the week preceding each 4-week pricing period.

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

In each update we would include historical information on the IPP estimated according to our methodology, and we would update the IPP Excel model. This approach ensures that stakeholders have access to the relevant maximum ethanol price for the purpose of the exemptions framework up to four weeks in advance. 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 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. Section 15 of the Biofuels Act gives the Minister the power to grant an exemption from the minimum biofuels requirement. For example, the Minister may grant an exemption under section 15(1) if the Minister is satisfied one or more of the following circumstances exist and that those circumstances, separately or in combination, justify the grant of the exemption:

a) it is uneconomic for the person to comply with the requirement because of the price at which the person is reasonably able to obtain ethanol or biodiesel,

b) the person has taken, is taking or will take all reasonable steps to comply with the requirement,

c) other circumstances as are prescribed by the regulations for the purposes of this section.

5.2   IPART's recommended maximum price

Under 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 they purchased ethanol for production of E10 exceeded the price determined by IPART.[34] Other grounds for exemptions would continue to exist, including that a major fuel seller has taken all reasonable steps to comply with the mandate.

The changes in the Biofuels Amendment Act refer to IPART determining a 'reasonable wholesale price' for the purposes of the exemptions framework.[35] However, in this report we refer to a 'recommended maximum price' in line with our terms of reference (see Appendix A).

Our recommended maximum price is not a binding maximum price in the market; ethanol producers and fuel wholesalers could agree to prices above the recommended maximum price to ensure continued supply of E10 to retailers and consumers. If this was to occur, a major fuel seller could apply for an exemption from the mandate based on the wholesale price.

We do not expect that ethanol prices would rise to the level of our recommended maximum price. Instead, we expect market prices will remain below our recommended maximum.

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[34] *Biofuels Amendment Act 2016* (NSW) No.12 Schedule 2, Item 12. Schedule 2 of the Biofuels Amendment Act has yet to commence.

[35] *Biofuels Amendment Act 2016* (NSW) No.12 Schedule 2, Item 31. (The new Part 3A). Schedule 2 of the Biofuels Amendment Act has yet to commence.

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 propose to do this 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 have considered how frequently such monitoring and reporting is required and the appropriate approach for the task, taking into account:

▼ our draft 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 draft findings and recommendations, and then discuss them in more detail.

6.1 Overview of our draft findings and recommendations on monitoring and reporting

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).

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

If these assessments suggest there is a need to reconsider our approach to the recommended maximum price, we would consult with stakeholders.

Draft finding

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

Draft recommendations

2   That IPART's approach for conducting annual monitoring and reporting include:

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

  –   monitoring the effect of the recommended maximum price on the retail market for ethanol-blended petrol.

3   That IPART would consult with stakeholders before changing our approach/methodology to the recommended maximum price.

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 propose to 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 propose to 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.

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 propose to 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 propose to 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.

▼ 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).[36]

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[36] *Biofuels Amendment Act 2016* (NSW) No.12 Schedule 2, Item 31. (The new Part 3A.)

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.

The submission from Manildra 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.[37]

Given we are in a light-handed region of our framework, we do not propose to examine in detail the costs and profit margins of fuel wholesalers and retailers. However, 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.[38]

As part of our retail monitoring and reporting, we propose to track movements in the implied gross retail margins for E10 and pure petroleum fuels. This would use two main sources of information:

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

▼ retail fuel prices collected by Fair Trading for the purpose of its online FuelCheck tool.[39]

We will undertake further consultation with stakeholders on our approach to retail monitoring and reporting once the Biofuels Amendment Act commences.

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[37] Manildra submission, August 2016, p 6.

[38] ACCC, *ACCC's fuel monitoring role*, at https://www.accc.gov.au/regulated-infrastructure/fuel/acccs-fuel-monitoring-role, accessed 10 October 2016.

[39] FuelCheck is an online tool providing consumers with real-time fuel price information covering every service station across NSW, available at http://www.fuelcheck.nsw.gov.au/.

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.[40]

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.[41] Similarly, the report by HoustonKemp noted that setting a maximum price based on the lowest

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[40]   AIP submission, July 2016, p 12.
[41]   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.[42]

Given our view that a light-handed 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 draft 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.[43]

In its submission Manildra noted that our example for this methodology outlined on page 31 of the Issues Paper contained an error,[44] 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.[45]

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.[46]

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

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

[44]   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

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

[46]   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.[47] 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.[48]

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[47]   Confidential consumer research.
[48]   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.[49]

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.[50]

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.

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[49] Manildra submission, August 2016, p 17.
[50] AIP submission, July 2016, p 14.

C | Import parity price calculation methodology

We set out below our proposed methodology for calculating the import parity price (IPP) for wholesale ethanol for pre-defined four-week pricing periods,[51] including excise and transport to fuel wholesalers' terminals, but excluding GST. In Table C.1 we define the relevant variables and present the notation used in this chapter, then we describe how each of the components of the IPP is calculated.

Table C.1   Notation and definitions

Variable	Definition	Unit
FOB^{AUc}:	Week -16 through Week -2 average price of ethanol delivered Free On Board (FOB) ex Santos Port, Brazil, including cost of freight from mill gate to port and any associated port costs.	AUc/litre
$Ex^{AUD/USD}_{Week\ t}$:	Average (arithmetic mean) of daily AUD/USD (A\$1=USD) exchange rates for Monday through Friday in *Week t* as published by the Reserve Bank of Australia (RBA) at http://www.rba.gov.au/statistics/historical-data.html#exchange-rates	USD
$P^{USD}_{ESALQ,\ Week\ t}$:	Volume weighted weekly average price of wholesale anhydrous ethanol at mill gate in São Paulo Brazil in *Week t*, as reported by CEPEA/ESALQ at http://cepea.esalq.usp.br/english/ethanol/?id_page=209&full=1	USD/litre
$C^{USc}_{Freight\ Brazil}$:	Cost of transporting the ethanol from the mill-gate in São Paulo to Santos Port, plus any port and handling costs at Santos Port, Brazil, assumed to be constant over the relevant period at 60 USD/tonne or 4.74 USc/litre.	USc/litre
$C^{USc}_{Sea\ freight}$:	Cost of shipping the ethanol from Santos Port, Brazil, to the east coast of Australia, assumed to be constant over the relevant period at 110 USD/tonne or 8.68 USc/litre.	USc/litre
$C^{AUc}_{Sea\ freight}$:	Average cost per litre of shipping the ethanol from Santos Port, Brazil, to the east coast of Australia in the relevant period, converted to AUc/litre.	AUc/litre
$C^{AUc}_{Insurance}$:	Average cost per litre of insurance for shipping ethanol from Santos Port, Brazil, to east coast of Australia in the relevant period.	AUc/litre
$C^{AUc}_{Wharfage}$:	Wharfage costs for landing imported ethanol at an Australian import terminal, assumed to be constant over the relevant period at 2.19 AUD/tonne or 0.17 AUc/litre.	AUc/litre

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[51] We recommend that the first pricing period will commence on Monday 2 January 2017.

Variable	Definition	Unit
$C_{Storage\&handling}^{AUc}$:	Costs associated with storage and handling imported ethanol at import terminal in Australia, assumed to be constant over the relevant period at 3.00 AUc/litre.	AUc/litre
$C_{Freight\ Australia}^{AUc}$:	Cost of transporting imported ethanol from the import terminal to a fuel wholesaler's terminal, assumed to be constant over the relevant period at 1.00 AUc/litre.	AUc/litre
TSH^{AUc}:	Average total transport, storage and handling (TSH) costs per litre of ethanol from port in Brazil to fuel wholesale terminal in NSW, excluding taxes, for the relevant period.	AUc/litre
T_{Excise}^{AUc}:	Customs fuel import duty for ethanol imported to Australia, constant at 39.60 AUc/litre.	AUc/litre
$T_{Customs\ duty}^{AUc}$:	Average customs value duty per litre of ethanol imported from Brazil to Australia in the relevant period, equal to 4% of FOB^{AUc}	AUc/litre
T_{Total}^{AUc}:	Average total taxes and duties per litre of ethanol imported from Brazil to Australia, for the relevant pricing period.	AUc/litre
IPP^{AUc}:	Import Parity Price (IPP) for the relevant pricing period (Week 0 through Week 3) for ethanol delivered from São Paulo to fuel wholesaler's terminal in NSW, excluding GST.	AUc/litre

Step 1: Calculating the price of ethanol Free On Board at Santos Port

The average FOB price ex Santos Port for the pricing period (Week 0 to Week 3) is calculated as follows:

$$FOB^{AUc} = \frac{1}{15} \times \sum_{t=-16}^{-2} \left[\left(\frac{P_{ESALQ,\ Week\ t}^{USD}}{100} + C_{Freight\ Brazil}^{USc} \right) \Big/ Ex_{Week\ t}^{AUD/USD} \right]$$

Step 2: Calculating the price of transport, storage and handling cost

Calculating the total transport, storage and handling costs from port in Brazil to fuel wholesale terminal in NSW involves several steps. First, calculating the cost of sea freight from Brazil to the east coast of Australia means converting our estimated cost of freight in USc to AUc. Ethanol imported from Brazil and delivered to a NSW fuel wholesaler in the relevant pricing period could potentially have been shipped from Santos any time from Week -12 through Week -1. However, the relevant exchange rates for Week -1 would not be available until Week 0 (first week of pricing period). To ensure that the recommended maximum price for wholesale ethanol is available prior to the commencement of the pricing period, we will only use the average of exchange rates from Week -12 through Week -2. We expect this to have a negligible impact on the resulting IPP.

For the pricing period, the average total cost of transport, storage and handling from port in Brazil to fuel wholesale terminal in NSW is calculated as follows:

$$TSH^{AUc} = C_{Sea\ freight}^{AUc} + C_{Insurance}^{AUc} + C_{Wharfage}^{AUD} + C_{Storage\&handling}^{AUD} + C_{Freight\ Australia}^{AUD}$$

where:

$$C_{Sea\ freight}^{AUD} = C_{Sea\ freight}^{USD} \Big/ \left(\frac{1}{11} \times \Sigma_{t=-12}^{-2} Ex_{Week\ t}^{AUD/USD}\right) = USc\ 8.68 \Big/ \left(\frac{1}{11} \times \Sigma_{t=-12}^{-2} Ex_{Week\ t}^{AUD/USD}\right)$$

$$C_{Insurance}^{AUc} = 0.4\% \times \left(FOB^{AUc} + C_{Sea\ freight}^{AUc}\right) \times 110\%$$

$$C_{Wharfage}^{AUc} = AUc\ 0.17$$

$$C_{Storage\&handling}^{AUc} = AUc\ 3.00$$

$$C_{Freight\ Australia}^{AUc} = AUc\ 1.00$$

Step 3: Calculating total import taxes and duties

For fuel ethanol imported from Brazil, there are two import taxes that apply: fuel import duty and customs value duty. For the pricing period, the average total import tax per litre of ethanol imported from Brazil is calculated as follows:

$$T_{Total}^{AUc} = T_{Excise}^{AUc} + T_{Customs\ duty}^{AUc} = AUc\ 39.60 + FOB^{AUc} \times 4\%$$

Step 4: Calculating import parity price for ethanol delivered fuel wholesaler in NSW

The final step in calculating the IPP for ethanol from Brazil, as faced by fuel wholesalers in NSW, is to add together the components calculated above, ie:

$$IPP^{AUc} = FOB^{AUc} + TSH^{AUc} + T_{Total}^{AUc}$$

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 Draft 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 6.9%. 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 8 September 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 6.9%. We will update the WACC for our Final Report.

Table D.1   WACC for Draft Decision (as of 8 September 2016)

	Current market data			Long term averages			WACC range		
	Low	**Mid**	**High**	**Low**	**Mid**	**High**	**Low**	**Mid**	**High**
Nominal Risk free	1.9%	1.9%	1.9%	4.4%	4.4%	4.4%			
Inflation	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%			
Debt margin	2.6%	2.6%	2.6%	3.2%	3.2%	3.2%			
Gearing	30%	25%	20%	30%	25%	20%			
Market risk premium	7.3%	9.0%	10.7%	5.5%	6.0%	6.5%			
Equity beta	0.9	1.0	1.1	0.9	1.0	1.1			
Nominal Vanilla WACC	7.3%	9.3%	11.8%	8.8%	9.7%	10.8%			
Post-tax real WACC	4.8%	6.7%	9.2%	6.3%	7.1%	8.2%	**6.7%**	**6.9%**	**7.1%**

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.[52]

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).

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

Figure D.1   Uncertainty Index as of 31 August 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 8 September 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 8 September from Bloomberg.	Based on end-of-trading-day data sampled over 10 years 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 average of latest available two monthly BBB observations from the RBA (plus 12.5 basis points for debt raising costs).	Based on the average of the latest available 10-year average of the RBA's monthly BBB observations (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   Overview of our analytical approach for industry-specific parameters

D.3.1   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.3.2   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.4   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.[53]

Table D.3 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%.

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[53]   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.3   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.5   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)[54].

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 ($\sigma_{Cross-Sectional}^2$).

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[54] 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.[55]

Empirical analysis

Table D.4 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.4   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.5 presents the asset betas of the comparable ethanol fuel and petroleum production businesses.

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[55] 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.5   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.6   Comparison with other industries regulated by IPART

Figure D.2 ranks asset betas of various industries adopted in IPART's past decisions.   The asset beta underlying the equity beta we determined for AECOM's draft modelling is at the top end of asset betas previously determined by IPART.

Figure D.2   IPART past decisions on asset betas