IPART

Independent Pricing and Regulatory Tribunal
New South Wales

Monitoring of wholesale and retail markets for fuel ethanol in 2016-17

Proposed approach

Issues Paper
Fuel ethanol

March 2017

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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 28 April 2017

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:

Monitoring of wholesale and retail markets for fuel ethanol
Independent Pricing and Regulatory Tribunal
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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.

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1 Introduction

Under the NSW *Biofuels Act 2007* (Biofuels Act), volume fuel retailers must ensure that ethanol accounts for at least 6% of the total volume of petrol sold in any one quarter (ethanol mandate), unless they have been provided an exemption.[1] The Independent Pricing and Regulatory Tribunal (IPART) has two ongoing roles under the Biofuels Act:[2]

1. to determine, and periodically review, a 'reasonable wholesale price' (wholesale price) for ethanol for use in the production of petrol-ethanol blends such as E10,[3] and
2. to monitor the retail market (including prices) for petrol-ethanol blend and make reports to the Minister for Innovation and Better Regulation (the Minister) on the effect of a determination of the reasonable price for wholesale ethanol.

IPART's determined wholesale price for ethanol forms part of the exemptions framework for the ethanol mandate. The Minister may exempt a volume fuel retailer from complying with the mandate if the price at which they purchased ethanol exceeded the price determined by IPART. Other grounds for exemption also exist, such as there being insufficient sales of E10 after the volume fuel retailer has taken all reasonable steps to comply with the mandate.[4]

In 2016 we carried out our first review of wholesale ethanol prices.[5] We developed a framework for assessing the degree of price regulation required in the wholesale ethanol market and found that a 'less intrusive' approach to price regulation was appropriate. Given this finding, we developed a methodology for determining wholesale ethanol prices from 1 January 2017 based on an estimate of the import parity price (IPP) for ethanol.

We also found that the markets for petrol and for wholesale ethanol are not static, but are impacted by fluctuating supply and demand conditions, as well as regulatory changes. Therefore, we considered that annual monitoring of the wholesale ethanol market is essential to reaffirm that a 'less intrusive' approach

1 *Biofuels Act 2007* (NSW), ss 6-9B.
2 *Biofuels Act 2007* (NSW), s 17A.
3 E10 is regular undleaded petrol (RULP) mixed with up to 10% ethanol.
4 *Biofuels Act 2007* (NSW), s 9A(2) and s 9B(1); and *Biofuels Regulation (No 2) 2016* (NSW) cl 9.
5 IPART, *Review of a maximum price for wholesale ethanol in automotive blends – Final Report*, December 2016.

to regulation remains appropriate. We will undertake this assessment in conjunction with our monitoring and reporting on the retail market for E10.[6]

This Issues Paper sets out how we propose to undertake these annual monitoring and reporting roles on an ongoing basis, and it expands on the approach set out in our 2016 Final Report on our review of wholesale ethanol prices. Once we have established our approach to monitoring and reporting, we expect to carry out these reviews annually in the second half of each year, where the focus will be reporting on the preceding financial year. We will consult with stakeholders during these annual reviews, and if we were to find that any changes to the approach or methodology for determining wholesale ethanol prices were needed, these changes would generally apply from 1 January the following year.

Our first annual review of the retail market for petrol-ethanol blends will be for the 2016-17 financial year.

1.1 How can stakeholders provide input to the review?

For this review, we will consult publicly as well as directly with key stakeholders, such as ethanol producers, fuel wholesalers and retailers, industry bodies and government agencies.

Stakeholders are invited to make a submission in response to this Issues Paper by 28 April 2017. Details on how to make a submission are provided on page iii at the front of the paper. The key issues for which we are seeking stakeholder comment are listed below in section 1.3.

If we were to find that any changes to our approach or our IPP methodology were required, we would consult with stakeholders in our draft report. The draft report will also detail our draft findings and supporting analysis on the retail market for E10, and stakeholders will have the opportunity to comment on these.

Table 1.1 provides an indicative timetable for the review. We will update this timetable on our website as the review progresses.

Table 1.1 Indicative review timetable

Milestone	Indicative date
Issues Paper released	16 March 2017
Submissions on Issues Paper due	28 April 2017
Draft Report released	September/October 2017
Submissions on Draft Report due	October/November 2017
Final Report to Minister	December 2017

6 As of mid-2016, over 99% of petrol-ethanol blended fuel sold in NSW was E10. 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.

1.2 How is this paper structured?

The rest of this Issues Paper provides more information on our proposed analytical approach, and the key issues we will consider and that we are seeking stakeholders' comments on:

- Chapter 2 sets out how we propose to assess the continued suitability of a less intrusive approach for setting wholesale ethanol prices, and the detail of the IPP pricing methodology if the approach remains appropriate.
- Chapter 3 provides an overview of how we propose to monitor and report on the retail market for petrol-ethanol blend.

1.3 List of issues for stakeholder comment

Throughout this paper, we have identified the issues on which we particularly seek stakeholder comment. Stakeholders may address all or some of these issues, and are also free to raise and discuss any other issues relevant to the review and IPART's role under the Biofuels Act. For convenience, a full list of the issues we seek comment on is provided below:

2 How we propose to review the methodology for determining the price of wholesale ethanol from 1 January 2018

In our 2016 Final Report on the *Review of a maximum price for wholesale ethanol in automotive fuel blends*, we noted that we would review annually the level of pricing intervention required in the wholesale market for fuel ethanol, and assess the continued suitability of a less intrusive approach to price regulation. We would also assess whether the import parity price (IPP) methodology used to determine the wholesale ethanol price had worked as intended, and whether any changes or refinements to the methodology might be appropriate.

This chapter sets out our proposed approach to carrying out these assessments.[7] If we find that a different regulatory approach is required, or that there should be a change in the IPP methodology, we will consult on these changes in our draft report. Any changes would come into effect from 1 January 2018.

2.1 Assessing the level of pricing intervention required in the wholesale fuel ethanol market

In any market, the need for government intervention depends on the extent of, and potential for, competition in the market. In the wholesale ethanol market, it also depends on the degree of consumer choice for retail fuels and the level of oil/petroleum prices. By regulating the mix of fuel types offered at service stations in favour of ethanol blends such as E10, the ethanol mandate has the potential to restrict consumer choice and increase the opportunity for ethanol producers to exercise market power.

As part of our 2016 review, we developed a framework to assess the need for pricing intervention in the wholesale ethanol market. The framework considers the extent of competition in the wholesale ethanol market and the degree of consumer choice for retail fuels to identify whether ethanol producers' market power is such that:

a) cost-based price regulation is required, or
b) a less intrusive approach to price regulation is needed, or
c) no price regulation is needed.

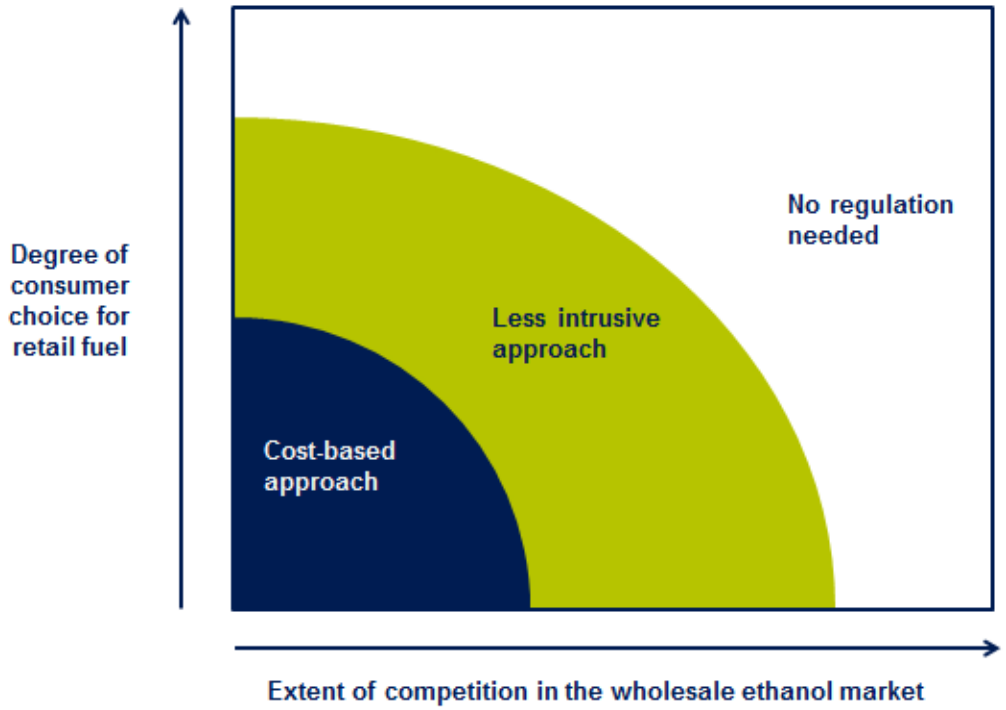
A schematic representation of this framework is shown in Figure 2.1. In our 2016 review of the wholesale ethanol price, we found that there was a relatively high degree of consumer choice, and that competition was emerging. On this basis,

7 These assessments will be carried out under s17A(3) of the *Biofuels Act*.

we found that a 'less intrusive' approach to price regulation was appropriate,[8] and we developed and consulted extensively on an IPP methodology that would avoid distorting the ethanol market. In applying this method to determine the wholesale ethanol price, we expect that ethanol producers and fuel wholesalers will have continued to negotiate ethanol prices below our determined price.

We will use the same framework as that used in 2016 to consider whether changes in the markets for petrol or wholesale ethanol might warrant a move away from a less intrusive approach to price regulation.

Figure 2.1 Framework for assessing the level of pricing intervention required in the wholesale fuel ethanol market



Note: This is a schematic representation and the regions within this figure are indicative only.

Source: IPART, *Review of a maximum price for wholesale ethanol in automotive fuel blends – Final Report*, December 2016, p. 10.

Under the 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 could supply NSW and there were high barriers to entry), our approach to setting the wholesale price would appropriately be based on the cost of a new entrant producer.

8 IPART, *Review of a maximum price for wholesale ethanol in automotive fuel blends – Final Report*, December 2016, p. 11.

- If there were unrestricted consumer choice of retail fuel (eg, if the ethanol mandate were 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 increased competition with low barriers to entry, wholesale ethanol prices would reflect the efficient costs of production regardless of the degree of consumer choice, and no pricing intervention would be needed.
- In other cases, the appropriate approach to setting the wholesale ethanol price would be 'less intrusive' rather than a cost-based approach, to avoid distorting the wholesale ethanol market and to encourage the development of competition.

2.1.1 Assessing the degree of consumer choice for retail fuel

To assess the degree of consumer choice we will consider data on the different fuels available at service stations in NSW, and the way that the mandate and supporting measures affect consumer behaviour. This mirrors the approach in our 2016 review of wholesale ethanol prices. We will consider various indicators including (where available):

- 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, regular unleaded petrol (RULP) and premium unleaded petrol (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 (eg, E10), and
- the percentage of bowsers and nozzles across all service stations used to deliver RULP and PULP versus E10.

In our 2016 Final Report we found that consumers generally have a relatively high degree of choice between RULP, PULP and E10.[9] We also found that the increasing availability and use of apps and websites[10] that display in near real-time the prices of available fuels at each service station also makes it easier for consumers to find the nearest location at which their preferred fuel type is available. By reducing consumers' search costs, these apps and websites effectively increase the choice of retail fuels available to consumers.

We seek comment on the following:

1 We are proposing to consider a range of indicators to assess the degree of consumer choice for retail fuel, such as the percentage of service stations

9 IPART, *Review of a maximum price for wholesale ethanol in automotive fuel blends – Final Report*, December 2016, p. 11.

10 For example, the NSW FuelCheck website at https://www.fuelcheck.nsw.gov.au/app.

that offer regular petrol in addition to E10. Are there other indicators than those proposed in section 2.1.1 that we should consider in assessing the degree of consumer choice for retail fuel?

2 Have there been significant changes since mid-2016 in:

- the availability of regular or premium unleaded fuels in NSW?
- factors *likely* to impact the availability of regular or premium unleaded fuels in NSW in the near term?

2.1.2 Assessing the extent of competition in the wholesale ethanol market

If there is a relatively high degree of consumer choice of non-ethanol blended petrol, then the amount of ethanol consumed depends on consumer preferences for ethanol-blended petrol such as E10, and whether these fuels are priced competitively relative to non-ethanol petrol types. With a high degree of choice, the price charged for wholesale ethanol is constrained by the price of non-ethanol petrol, and need for pricing intervention in this market becomes less dependent on the extent of competition between ethanol producers. Therefore, we consider an in-depth review of the extent of competition in the wholesale ethanol market is only necessary if, compared to our 2016 findings:

1. we find a significant deterioration in the degree of consumer choice of retail fuels, or
2. a preliminary assessment suggests there has been a substantial lessening of competition or changes in factors likely to negatively impact on competition in the near term.

There is no single indicator that provides a complete view of the level of competition in a market. Instead, we are proposing that our assessment of the extent of competition focus on the following key market characteristics:

- **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. A competitive market generally has low barriers to entry, where incumbent producers face an ongoing threat of competition from new or potential entrants into the market. Low barriers to entry therefore provide the most effective protection from the exercise of market power and uncompetitive pricing.
- **Market concentration.** A highly concentrated market means that a small number of sellers supply the majority of the market. The wholesale ethanol market in eastern Australia is currently supplied by three 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.

Some of the indicators that we may consider in assessing these market characteristics include:

- The number of ethanol producers contesting the wholesale ethanol market in eastern Australia, and whether new producers have entered the market since 2016 or are expected to enter the market in the near future.
- The market share of these producers, and whether there have been recent changes in these market shares.
- Whether there have been significant changes in regulatory barriers, such as planning approvals and environmental impact assessments, as well as in regulatory uncertainty.
- Whether there have been significant changes in the availability of production inputs, in particular feedstock, at prices that allow for competitive ethanol production.
- The actual prices paid for wholesale ethanol and how they compare with estimates of the efficient cost of a new entrant producer provided by AECOM in our 2016 review of wholesale ethanol prices. AECOM's findings are summarised in Box 2.1, and their full report to our 2016 review is available on our website, www.ipart.nsw.gov.au. AECOM's cost estimates may need to be updated if there have been significant changes in input costs, in particular in the costs of feedstock.
- The level of the oil and petrol prices, and the effect these may have on the wholesale price of ethanol. When there is a relatively high degree of consumer choice in non-ethanol blended petrol, a low oil/petrol price puts a constraint on the ability of ethanol producers to charge prices significantly above the cost of production.

We seek comment on the following:

3 We are proposing to consider a range of indicators in assessing the extent of competition in the wholesale ethanol market, such as the number of ethanol producers and their market shares. Are there other indicators than those proposed in section 2.1.2 that we should consider in assessing the level of competition in the wholesale ethanol market?

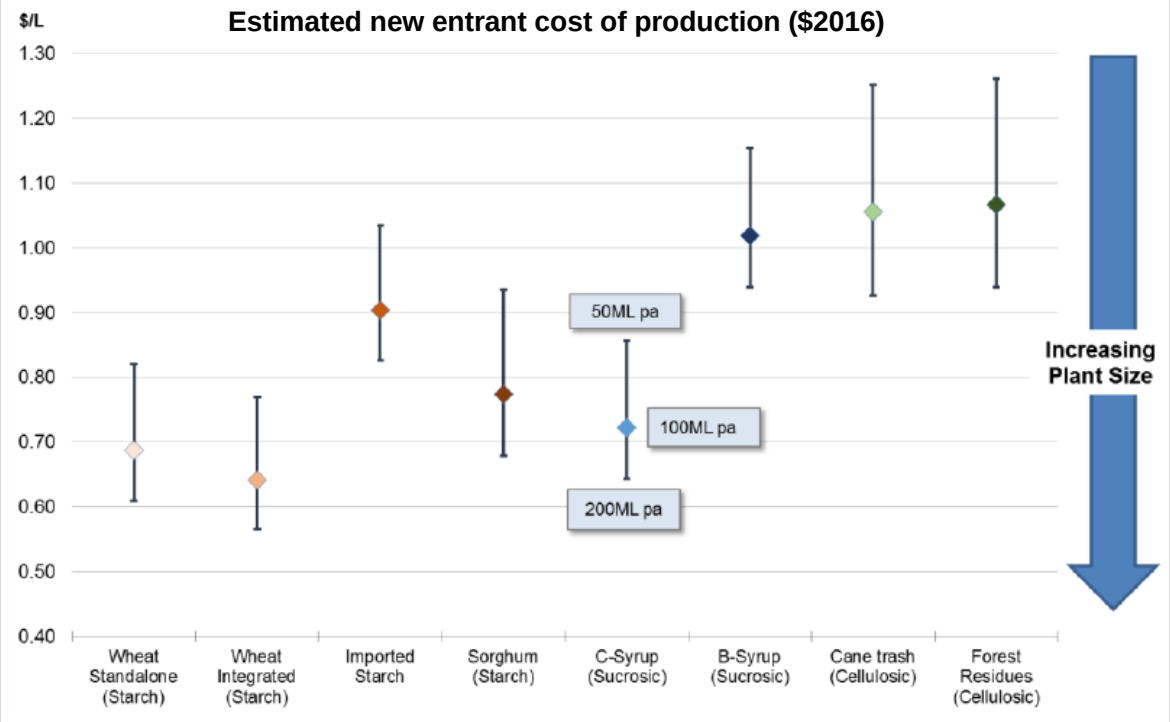
4 Have there been significant changes since mid-2016 in:

- the level of competition in the wholesale ethanol market in NSW, including the number of producers or changes in market shares?
- factors *likely* to impact the level of competition in the wholesale ethanol market in NSW in the near term, such as regulatory barriers or the availability or cost of feedstock?

Box 2.1 AECOM's findings on new entrant costs of production for IPART's 2016 review of wholesale ethanol prices

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

AECOM estimated ranges of efficient production costs depending on feedstock and production capacity. These ranges are shown in the figure below.



Some of AECOM's key findings were:

- As of 2016, the lowest cost of production was 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 can 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 was the most cost-effective as of 2016, 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.

Source: AECOM, *Efficient Costs of New Entrant Ethanol Producers*, 13 December 2016, at https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/pricing-reviews-section-12a-publications-review-of-a-maximum-price-for-wholesale-ethanol/aecom-efficient-costs-of-new-entrant-ethanol-producers-final-report-december-2016.pdf

2.2 Reviewing the import parity price methodology for determining wholesale ethanol prices

If our findings on the level of pricing intervention required in the wholesale ethanol market suggest that a 'less intrusive' approach to determining the price of wholesale ethanol remains appropriate, we will retain an import parity price (IPP) methodology to determining the wholesale price. If, on the other hand, we were to find that a change in approach may be warranted, our Draft Report would consult on the appropriate way to implement either a cost-based pricing methodology or no price regulation.

The remainder of this section will focus on whether the IPP methodology established in 2016 remains fit for purpose, and whether refinements to the methodology would be appropriate.

2.2.1 Does the import parity price methodology established in 2016 remain fit for purpose?

Under a less intrusive approach to determining the price of wholesale ethanol, we consider that the pricing methodology should be administratively simple for stakeholders and should support the development of a competitive wholesale ethanol market. We consider effective competition in this market is the best way to support the availability of E10 to consumers at an attractive price and to achieve the objective of a sustainable biofuels industry in NSW.

In our 2016 review, we found that an IPP methodology that included the relevant fuel excise and customs duties would support the development of competition in the wholesale ethanol market, and the methodology could be designed to be administratively simple. An IPP methodology means that the wholesale price for ethanol would be set in a way that reflects an option already available to local purchasers of wholesale ethanol – ie, importing ethanol from overseas. This price would therefore reflect the upper bound for what a local purchaser would be willing to pay for domestically produced ethanol.

Since domestic ethanol producers receive a subsidy for fuel excise and do not pay customs duties, import prices are currently higher than domestic ethanol prices. Importing ethanol is therefore not currently an economic option for fuel wholesalers. By using an IPP methodology that includes the full excise and customs duties, our determined prices avoid distorting the domestic market for wholesale ethanol, including prices. This allows local competition in ethanol production to continue to develop and deliver increasingly competitive prices over time. We expect producers and fuel wholesalers to continue to negotiate wholesale ethanol prices below our determined prices.

The IPP methodology developed in 2016 is similar to the methodologies used by fuel importers and wholesalers to determine contract prices for petroleum. However, in contrast to the IPP methodologies used for petroleum pricing, our IPP methodology will be used to determine wholesale ethanol prices on a quarterly basis, rather than on a daily basis. This reflects feedback from

stakeholders and our view that longer pricing-periods ensure greater stability and predictability. Quarterly pricing periods also have the advantage that they align with the exemption periods in which the prices apply.

Our IPP methodology also gives the price faced by fuel wholesalers for ethanol delivered to their terminals, rather than the price delivered to an import terminal. The components of the IPP are as follows:

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

Appendix A provides the detailed IPP methodology used to determine ethanol prices from 1 January 2017. Chapter 4 in our December 2016 Final Report on the price for wholesale ethanol sets out the reasons for our approaches to calculating each of the IPP components.[11] The key component in the IPP is the international benchmark price for ethanol. In the 2016 review, we concluded that the US and Brazil were the two most likely sources for ethanol if it were to be imported to Australia.

In assessing whether the IPP methodology has worked as intended and remains fit for purpose, we will consider the level of actual prices paid for wholesale ethanol relative to our determined prices. Our IPP methodology avoids distorting the ethanol market and we expect that ethanol producers and fuel wholesalers will have continued to negotiate wholesale ethanol prices below our determined prices.

We are also seeking comments from stakeholders on their experiences with our IPP methodology and their views on whether refinements to the methodology should be considered. Importantly, we are seeking comment on whether the US and Brazil remain the two most likely sources for ethanol if it were to be imported to Australia.

We seek comment on the following:

5 Have fuel wholesalers and ethanol producers continued to negotiate prices below our determined wholesale prices?

11 IPART, *Review of a maximum price for wholesale ethanol in automotive fuel blends – Final Report*, December 2016, pp 32-45.

6 Could improvements be made to the import parity price methodology without significantly impacting on the simplicity, transparency and predictability of the methodology?

7 Does the US and Brazil remain the two most likely sources for ethanol if it were to be imported to Australia in 2018?

3 How we propose to monitor retail prices for E10

Under the Biofuels Act, we are required to monitor and report on the retail market for E10,[12] including the effect on retail prices of our determined wholesale ethanol prices. While the prices determined under our import parity price (IPP) methodology are unlikely to affect E10 retail prices in the near term, we are proposing to assess the degree to which E10 retail prices reflect market prices for wholesale ethanol.

We note that the Australian Competition and Consumer Commission (ACCC) monitors and reports regularly on retail fuel prices nationally, including retail prices for E10. We are therefore proposing that our monitoring and reporting role should focus on whether the *differences* in the price of regular petrol and E10 appear to reflect market prices for wholesale ethanol.[13]

This chapter outlines how we propose to carry out this assessment, and seeks stakeholder feedback on the proposed approaches. Note that the examples below are based on a small sample of proxy data and are used for illustration only. A data set that is more complete and for a different time period may produce observations that differ significantly from the examples below.

3.1 Assessing whether E10 wholesale and retail prices reflect wholesale prices for ethanol

Since E10 consists of approximately 90% RULP and 10% ethanol, we can assess the degree to which E10 retail prices reflect wholesale prices for ethanol by comparing the gross margins charged by fuel wholesalers and retailers on RULP with the implied margins on the ethanol component in E10. Gross margins include both the profit margins and the costs incurred by fuel wholesalers and retailers. If the implied margins on ethanol in E10 differ from the margins on RULP, this could be explained either by different costs of wholesaling or retailing E10, or different profit margins on E10 compared with on RULP.

Figure 3.1 shows the key price components of E10 that we must estimate to arrive at indicative gross wholesale and retail margins for RULP and for the ethanol component in E10. Many of these components can be estimated using publically available information:

- Excise rates are published by the Australian Tax Office.

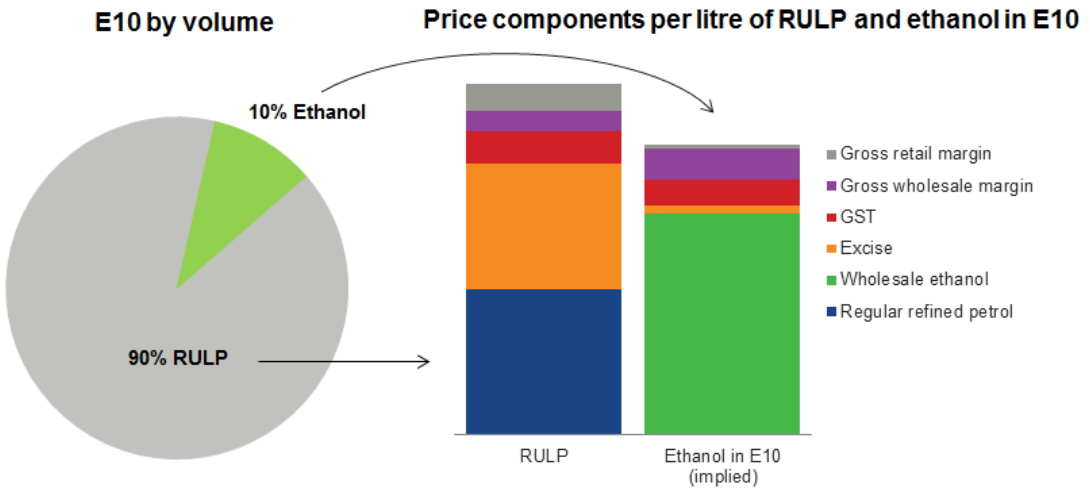
12 Biofuels Act, s 17A(1)(b). While the Act requires us to monitor and report on the retail market for *petrol-ethanol blends*, we note that almost all the petrol-ethanol sales in NSW is in the form of E10.

13 This reflects the fact that E10 consists of approximately 90% RULP and 10% ethanol.

- GST is 10% of the retail price, which is available for RULP and E10 through the NSW FuelCheck website.
- Fuel wholesalers publish terminal gate prices (TGPs) on their websites daily – these are indicative of the prices that retailers pay for the fuel from the wholesalers, and can be used in combination with the retail prices to estimate indicative gross retail margins.

The two remaining components – the ethanol wholesale price and the price of regular refined petrol – are not directly observable. We are proposing to estimate the price of regular refined petrol using an import parity price (IPP) approach similar to that used in fuel contracts. To obtain wholesale ethanol prices, we will seek information from ethanol producers and fuel wholesalers on prices paid for ethanol.

Figure 3.1 Components of E10 retail prices



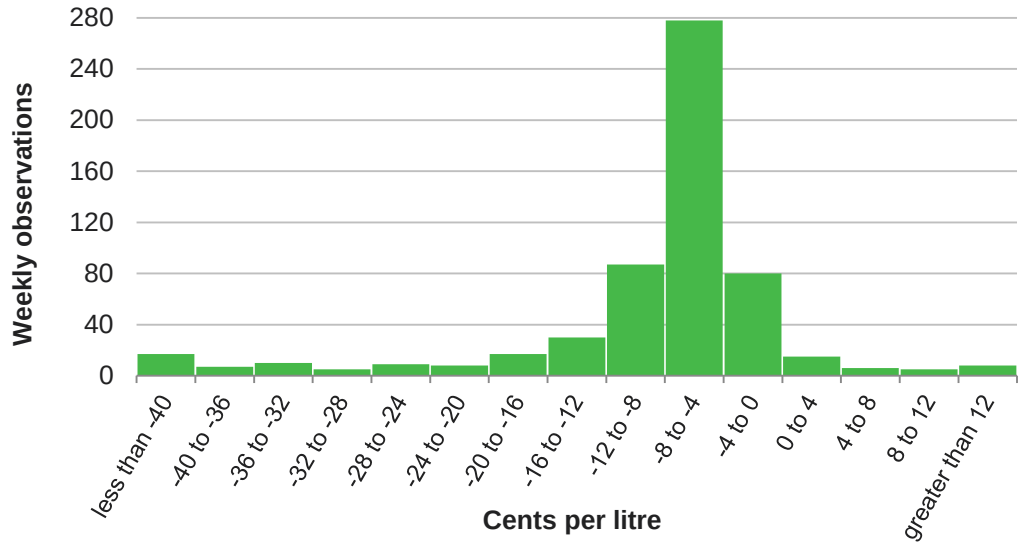
Note that the relative sizes of the different components in Figure 3.1 are for illustration only. While the excise component is fixed for up to six months, the relative sizes of the remaining components vary slightly from day to day, and are significantly influenced by retail price cycles and the price of oil/refined petroleum.

3.1.1 We propose to compare implied gross retail margins on regular petrol and on ethanol in E10

Using publicly available retail prices and TGPs for RULP and E10, we can compare the indicative gross retail margins on RULP with the implied gross retail margin on the ethanol component in E10. For illustrative purposes we have carried out such a comparison for around 50 service stations in the Sydney area, using weekly average prices from August 2016 through December 2016 (582 total observations). Figure 3.2 shows that in this period, the implied gross retail margins on ethanol in E10 appear to have been smaller than the gross retail margins on RULP. In the majority of cases, the implied ethanol margins were in the range of 4 to 8 cents per litre less than that on RULP.

As noted above, the relative size of the different price components will vary from day to day, and will depend on oil/petrol prices and the retail price cycles. Importantly, the sample period used in Figure 3.2 was a period of relatively low petrol prices, with the price of RULP briefly dipping below 100 cents per litre in Sydney in August 2016. At the same time, the vast majority of service stations in NSW tended to price E10 at a fixed 2 cents per litre discount relative to RULP. This practice necessarily translates to comparatively lower implied retail margins on ethanol in E10 when RULP prices are low, compared to when RULP prices are higher. Our observations in 2017 may be very different as oil and petrol prices are trending higher.

Figure 3.2 An example of implied gross retail margins on ethanol in E10 compared with on RULP, Sydney, August 2016 to December 2016 (ex GST)



Data sources: RULP and E10 retail prices from NSW FuelCheck at http://data.nsw.gov.au/data/dataset/fuel-check, accessed 10 March 2017; and TGPs for RULP and E10 from FuelTrac.

3.1.2 We propose to compare implied gross wholesale margins on regular petrol and on ethanol in E10

To compare indicative gross wholesale margins on RULP and on ethanol in E10, we can again use publicly available TGP prices, but we also require information on prices paid for wholesale ethanol and for refined regular petrol. We will seek information on prices paid for ethanol from fuel wholesalers and from ethanol producers, and we propose to use an import parity price (IPP) approach to estimate the price of refined petrol.

In Figure 3.3, we have used a sample of confidential data on 6-monthly average wholesale ethanol prices from Manildra[14] for the period 2010 to 2016, along with TGPs and indicative RULP IPPs from FuelTrac, to compare implied gross wholesale margins on RULP and on ethanol in E10. The figure shows that the

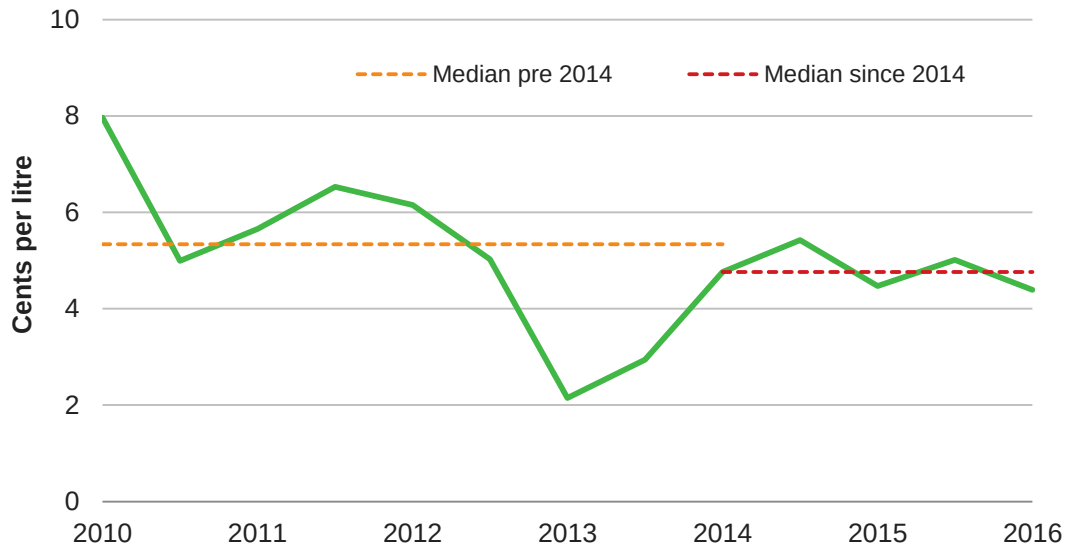
14 Manildra permitted use of the confidential data for the purpose of this example.

implied wholesale margin on ethanol in E10 has tended to be higher than the wholesale margin on RULP. Assuming a 10% blend of ethanol in E10[15], the median additional margin on ethanol was about 5.3 cents per litre higher than on RULP before 2014, and about 4.8 cents per litre higher from 2014 to 2016. This difference would translate to a higher wholesale margin on E10 compared with on RULP of about 0.48 cents per litre since 2014.

The data used in Figure 3.3 is a limited sample only, and with a more complete dataset our observations might differ somewhat. We also note that a blending rate slightly below 10% (eg, at 9.5%) would produce a smaller difference between the margins observed on RULP and ethanol in E10.

A marginally higher wholesale gross margin on E10 relative to RULP might be expected, since there are ongoing costs associated with wholesaling of E10 in addition to those associated with RULP. These costs may include storing, blending and handling of ethanol and of E10, and in some cases the recouping of infrastructure costs.

Figure 3.3 An example of implied gross wholesale margins per litre of ethanol in E10 compared with on RULP, Sydney, 2010 to 2016 (ex GST)



Note: The example uses confidential data from Manildra (used with permission from Manildra) on 6-monthly average prices received for wholesale ethanol sold nationally (but mostly in NSW), and it uses average 6-monthly average TGPs for Sydney.

Note: Our calculation of the implied wholesale margins on ethanol in E10 assumes a blending rate equal to 10% ethanol. E10 may contain a *maximum* of 10% ethanol, and is generally blended at a rate between 9% and 10%. A lower blending rate would imply a lower gross wholesale margin on ethanol in E10.

Data sources: Confidential data on average wholesale ethanol prices from Manildra (used with permission from Manildra); RULP and E10 TGPs and RULP indicative import parity prices from FuelTrac.

15 E10 may contain a *maximum* of 10% ethanol, and is generally blended at a rate between 9% and 10%.

We seek comment on the following:

8 Do you agree with our proposed approach to monitoring the retail price for E10, including our proposal to compare the implied gross retail and wholesale margins on ethanol in E10 with those on regular petrol?

9 Are there other issues we should consider in monitoring the retail price of E10?

A Import parity price methodology for determining the price of wholesale ethanol

This appendix sets out the methodology used to calculate the reasonable price for wholesale ethanol in each quarterly pricing period in 2017. The first pricing period commenced on 1 January 2017.

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

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

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

Table A.1 Conversion factors

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

Figure A.1 Pricing periods and corresponding averaging periods for weekly IPPs

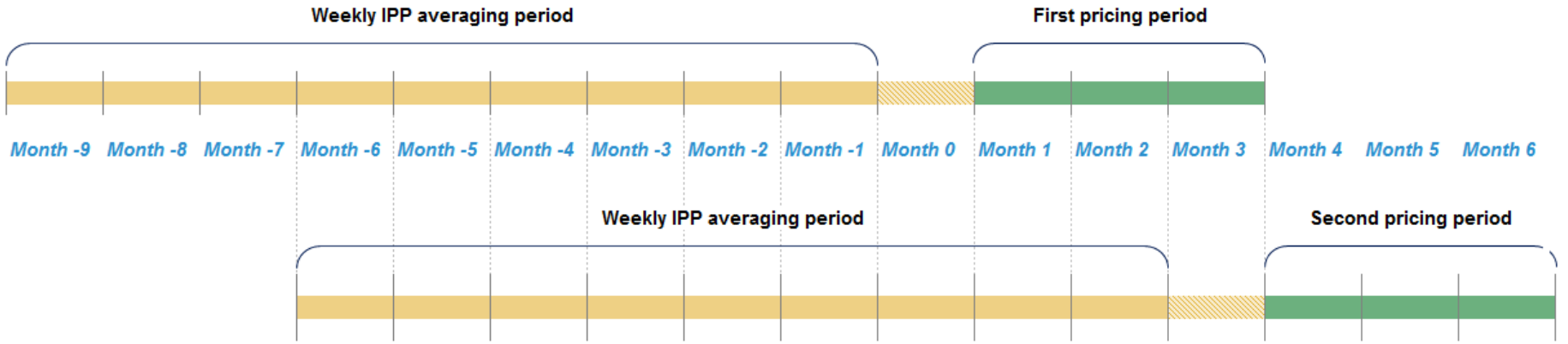


Table A.2 Parameters common to the calculation of weekly IPPs for US ethanol and Brazilian ethanol

Parameter	Definition	Unit
$Ex^{AUD/USD}$	Daily AUD/USD (A$1=USD) exchange rate as published by the Reserve Bank of Australia (RBA) at http://www.rba.gov.au/statistics/historical-data.html#exchange-rates	AUD/USD
$Ex^{USD/BRL}$	Daily USD/BRL (US$1=BRL) exchange rates as published by the US Federal Reserve at https://www.federalreserve.gov/releases/h10/hist/dat00_bz.htm	USD/BRL
$Ex^{AUD/USD}_{Week\ t}$	Arithmetic mean of $Ex^{AUD/USD}$ for Monday through Friday in *week t*	AUD/USD
$Ex^{AUD/BRL}_{Week\ t}$	Arithmetic mean of $(Ex^{AUD/USD} \times Ex^{USD/BRL})$ for Monday through Friday in *week t*	AUD/BRL
$C^{AUD}_{Wharfage,\ Week\ t}$	Wharfage charges at Australian import terminal in *week t*, based on ex-GST bulk liquids tariffs at Port Botany, published at http://www.nswportsbotany.com.au/trade/port-charges/ For the pricing period commencing 1 January 2017, the relevant wharfage charges for the weekly IPP calculations are: ▼ 1 July 2015 to 30 June 2016: AUD 2.43/tonne ▼ 1 July 2016 to 30 June 2017: AUD 2.48/tonne For the purpose of our methodology, these amounts are converted to AUD/litre. Wharfage charges in the calculation of weekly IPPs from 1 July 2017 will reflect updates to Port Botany's bulk liquids tariffs.	AUD/litre
$C^{AUD}_{S\&H}$	Cost of storage and handling at import terminal, assumed constant at AUD 0.03/litre	AUD/litre
$C^{AUD}_{Freight\ Australia}$	Cost of freight from import terminal to fuel wholesaler's terminal, assumed constant at AUD 0.015/litre	AUD/litre
$T^{AUD}_{Excise,\ Week\ t}$	Fuel excise tariffs applicable to imported ethanol in *week t*, as published by the ATO at https://www.ato.gov.au/business/excise-and-excise-equivalent-goods/fuel-excise/excise-rates-for-fuel/ For the pricing period commencing 1 January 2017, the relevant excise tariff for the weekly IPP calculations are: ▼ 1 February 2016 to 30 July 2016: AUD 0.3950/litre ▼ 1 August 2016 to 30 January 2017: AUD 0.3960/litre Excise tariffs in the calculation of weekly IPPs from 1 February 2017 will reflect updates to the excise tariffs published by the ATO.	AUD/litre

Table A.3 Calculation of weekly US IPPs

Parameters	Definition	Unit
$P^{USD}_{USDA,\ Week\ t}$	Price of wholesale ethanol at the mill gate in the US in *week t*. The USDA publishes end-of-week (EOW) low/high spot bids for wholesale ethanol at the mill-gate for seven major ethanol producing regions. Bids are presented in USD/gallon, and are converted to USD/litre. For each week, $P^{USD}_{USDA,\ Week\ t}$ is calculated as the median of the mid-points of the EOW bids in each of the seven regions (where available). Occasionally, the USDA does not publish the EOW bids. In those cases, we will seek daily price information directly from USDA, and use the latest of the bids obtained for the relevant week. Each $P^{USD}_{USDA,\ Week\ t}$ used in the calculation of the IPP will be published in the IPP model on our website www.ipart.nsw.gov.au. In the case that we do not obtain the necessary prices for the relevant week, we will use the last price previously available.	USD/litre
$P^{AUD}_{USDA,\ Week\ t}$	$P^{USD}_{USDA,\ Week\ t}$ converted from USD to AUD	AUD/litre
$C^{USD}_{US\ Freight}$	Sum of the costs of transporting the ethanol from the mill-gate in the US to Houston Port, plus any port and handling costs at Houston Port. ▼ US freight costs assumed to be constant at 0.0553 USD per litre ▼ Houston port costs assumed to be constant at 0.0242 USD per litre	USD/litre
$C^{AUD}_{US\ Freight,Week\ t}$	$C^{USD}_{US\ Freight}$ converted from USD to AUD in *week t*	AUD/litre
$FOB^{AUD}_{US,\ Week\ t}$	Estimated price of the ethanol delivered 'Free-On-Board' (FOB) the vessel at Houston port in *week t*, calculated as $FOB^{AUD}_{US,\ Week\ t} = P^{AUD}_{USDA,\ Week\ t} + C^{AUD}_{US\ Freight,Week\ t}$	AUD/litre
$C^{USD}_{US\ Sea\ freight}$	Cost of sea freight from US to Australia. Assumed constant at 88.68 USD per tonne, converted to USD/litre	USD/litre
$C^{AUD}_{US\ Sea\ freight,\ Week\ t}$	$C^{USD}_{US\ Sea\ freight}$ converted from USD to AUD in *week t*	AUD/litre
$C^{AUD}_{US\ Insurance,\ Week\ t}$	Insurance of ethanol in transit from the US to Australia in *week t*, calculated as: $C^{AUD}_{US\ Insurance,\ Week\ t} = 0.4\% \times \left(FOB^{AUD}_{US,\ Week\ t} + C^{AUD}_{US\ Sea\ freight,\ Week\ t}\right)$	AUD/litre

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

Table A.4 Calculation of weekly Brazilian IPPs

Parameters	Definition	Unit
$P^{USD}_{ESALQ,\ \ Week\ t}$	Price of wholesale ethanol at the mill gate in São Paulo, Brazil in *week t*. The Centre of Advanced Studies on Applied Economics (CEPEA) at the "Luiz de Queiroz" College of Agriculture (ESALQ) at the University of São Paulo publishes weekly volume-weighted average spot prices for wholesale anhydrous ethanol at the mill-gate for ethanol producers in São Paulo. This publication is referred to as the CEPA/ESALQ Anhydrous Ethanol Index - São Paulo (ESALQ index), and is published at: http://www.cepea.esalq.usp.br/en/indicator/ethanol.aspx The index is published in USD per litre.	USD/litre
$P^{AUD}_{ESALQ,\ \ Week\ t}$	$P^{USD}_{ESALQ,\ \ Week\ t}$ converted from USD to AUD in *week t*	AUD/litre
$C^{BRL}_{BR\ Freight}$	Sum of the costs of transporting the ethanol from the mill-gate in São Paulo to Santos Port, plus any port and handling costs at Santos Port. ▼ São Paulo freight costs assumed to be constant at 0.10 BRL	BRL/litre

Parameters	Definition	Unit
	per litre ▼ Santos port costs assumed to be constant at 0.10 BRL per litre	
$C^{AUD}_{BR\ Freight,\ Week\ t}$	$C^{BRL}_{BR\ Freight}$ converted from USD to AUD in *week t*	AUD/litre
$FOB^{AUD}_{BR,\ Week\ t}$	Estimated price of the ethanol delivered 'Free-On-Board' (FOB) the vessel at Santos port in *week t*, calculated as $FOB^{AUD}_{BR,\ Week\ t} = P^{AUD}_{ESALQ,\ Week\ t} + C^{AUD}_{BR\ Freight,\ Week\ t}$	AUD/litre
$C^{USD}_{BR\ Sea\ freight}$	Cost of sea freight from Brazil to Australia. Assumed constant at 87.50 USD per tonne, converted to USD/litre	USD/litre
$C^{AUD}_{BR\ Sea\ freight,\ Week\ t}$	$C^{USD}_{BR\ Sea\ freight}$ converted from USD to AUD in *week t*	AUD/litre
$C^{AUD}_{BR\ Insurance,\ Week\ t}$	Insurance of ethanol in transit from Brazil to Australia in *week t*, calculated as: $C^{AUD}_{BR\ Insurance,\ Week\ t} = 0.4\% \times \left(FOB^{AUD}_{BR,\ Week\ t} + C^{AUD}_{BR\ Sea\ freight}\right)$	AUD/litre
$C^{AUD}_{BR\ Import\ ex\ tax,\ Week\ t}$	Total costs associated with the shipping of ethanol from Brazil to fuel wholesaler's terminal in NSW in *week t*, excluding taxes. Calculated as: $C^{AUD}_{BR\ Import\ ex\ tax,\ Week\ t} = C^{AUD}_{BR\ Sea\ freight} + C^{AUD}_{BR\ Insurance,\ Week\ t} + C^{AUD}_{Wharfage,\ Week\ t} + C^{AUD}_{S\&H} + C^{AUD}_{Freight\ Australia}$	AUD/litre
$T^{AUD}_{BR\ Customs\ duty,\ Week\ t}$	For the pricing period commencing 1 January 2017, customs duty on ethanol imported from Brazil was 4.0% for all relevant weeks, as specified in Schedule 3 to the Customs Tariff Act 1995 – Item 2207.20.10. The customs duty for Brazilian ethanol is thus calculated as: $T^{AUD}_{BR\ Customs\ duty,\ Week\ t} = 4.0\% \times FOB^{AUD}_{BR,\ Week\ t}$ If relevant changes are made to the customs duty that applies to ethanol imported from Brazil, the changes will be reflected in the calculation of weekly Brazilian IPPs for the subsequent pricing period.	AUD/litre
$T^{AUD}_{BR\ Total,\ Week\ t}$	Total import taxes on Brazilian ethanol in *week t*, calculated as: $T^{AUD}_{BR\ Total,\ Week\ t} = T^{AUD}_{BR\ Customs\ duty,\ Week\ t} + T^{AUD}_{Excise,\ Week\ t}$	AUD/litre
$IPP^{AUD}_{BR,\ Week\ t}$	Total IPP for Brazilian ethanol in week t, calculated as: $IPP^{AUD}_{Brazil,\ Week\ t} = FOB^{AUD}_{BR,\ Week\ t} + C^{AUD}_{BR,\ Import\ ex\ tax,\ Week\ t} + T^{AUD}_{BR\ Total,\ Week\ t}$	AUD/litre

A.2 Step 2: Calculating the price for wholesale ethanol

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

The reasonable price for wholesale ethanol is calculated as follows:

$$Reasonable\ price\ for\ wholesale\ ethanol =$$

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

Where:

$Week\ 1$ = the first week ending on a Friday within the averaging period

n = the number of Fridays in the averaging period

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

Table A.5 Averaging periods and week numbers

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