IPART

Independent Pricing and Regulatory Tribunal
New South Wales

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

Draft Report

Draft Report
Fuel ethanol

October 2017

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The Independent Pricing and Regulatory Tribunal (IPART)

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Tribunal Members

The Tribunal members for this review are:

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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 24 November 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:

Ethanol market monitoring
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. However, 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 Executive Summary

Amendments to the NSW *Biofuels Act 2007* (Biofuels Act) came into effect in January 2017, moving the obligation for mandated biofuels sales from a small number of major fuel retailers and wholesalers to a greater number of large retailers.[1] Under the revised Biofuels Act, volume fuel retailers[2] 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.[3] The Independent Pricing and Regulatory Tribunal of NSW (IPART) has two ongoing roles under the amended Biofuels Act:[4]

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,[5] 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.

Since January 2017, we have determined the wholesale price using an import parity price (IPP) methodology. We developed this methodology as part of our 2016 review where we found that a 'less intrusive' approach to price regulation of wholesale ethanol was appropriate. We found that as petrol prices were relatively low, and consumers had a high degree of choice for fuel in the retail market, the market imposed a sufficient constraint on wholesale ethanol prices. In addition, there was evidence of increasing competition between the three producers in the wholesale ethanol market in eastern Australia.

In our 2016 review, we also found that the retail market for petrol and the wholesale market for ethanol are not static, but are impacted by fluctuating supply and demand conditions, as well as regulatory changes. Therefore, we considered that we should monitor and report on these markets annually to reaffirm that a 'less intrusive' approach to regulation remains appropriate.[6]

This report presents our draft findings on the retail market for E10, along with our draft findings on the wholesale ethanol market and the form of price regulation needed in that market.

1 *Biofuels Act 2007* (NSW)
2 Under the Biofuels Act 2007 (s 4A) and the Biofuels Regulation (No 2) 2016 (cl 6), a volume fuel retailer is one that operates or controls the operation of: (a) 20 or more service stations, or (b) a service station that in each of the preceding two quarters sold more than 900,000 litres in total of diesel and petrol.
3 *Biofuels Act 2007* (NSW), ss 6-9B.
4 *Biofuels Act 2007* (NSW), s 17A.
5 E10 is regular petrol mixed with up to 10% ethanol.
6 IPART, *Review of a maximum price for wholesale ethanol in automotive fuel blends – Final Report*, December 2016, pp. 49-50.

1.1 Overview of our draft decisions, findings and recommendations

We found that consumer choice in retail fuels remains high and availability of E10 has become more widespread under the revised ethanol mandate. Across New South Wales, retail prices of E10 were on average 2.2 cents per litre lower than regular petrol prices between August 2016 and June 2017, and sales of E10 in New South Wales as a proportion of total petrol sales were relatively stable during 2016-17, at around 24%. Since E10 contains around 10% ethanol, this means approximately 2.4% of total petrol sales were ethanol during 2016-17.

Since the revised ethanol mandate came into effect in January 2017, the majority of volume fuel retailers applied for and were granted exemptions from meeting the mandate. Most of these exemptions were granted on the basis that the retailers were not able to meet the mandate despite having taken all reasonable steps to comply.

The NSW Government's 'E10 Fuel for Thought' information campaign and its real-time fuel price monitoring service, FuelCheck, have provided consumers with better information to make fuel choices. The FuelCheck website[7] allows consumers to shop around and find the lowest fuel prices, putting pressure on retailers to offer fuel at competitive prices. It also allows consumers to find nearby locations for alternatives to ethanol-blended petrol.

We are recommending that NSW Fair Trading – the agency responsible for maintaining FuelCheck and for overseeing the ethanol mandate – continue to work with retailers to ensure the integrity of data collected for the purposes of FuelCheck and for monitoring the mandate.

In relation to the wholesale market for fuel ethanol, we found competition has continued between the three major producers during 2016-17, with the Queensland producers selling ethanol into New South Wales and vice versa. Plans for a number of new ethanol production facilities have been progressing, with two new plants in Queensland having reached or being close to reaching financial close. East coast demand for fuel ethanol has increased marginally since the start of 2017, mainly driven by the introduction of a biofuels mandate in Queensland, combined with a strengthened mandate in New South Wales, and E10 information campaigns in both New South Wales and Queensland.

We found that our IPP methodology for determining wholesale ethanol prices has provided scope for ethanol producers and fuel wholesalers to continue to negotiate prices below our determined prices. Relatively low oil and petrol prices have also continued putting downward pressure on ethanol prices, since prices of E10 must be competitive with those of regular petrol.

With a high degree of consumer choice in retail fuels and with continuing competition in the market for wholesale ethanol, we consider that a 'less-intrusive' approach to determining wholesale ethanol prices remains appropriate. Our draft decision is to retain our IPP methodology for determining the wholesale ethanol price on a quarterly basis, minimising distortion of the wholesale ethanol market. The methodology is detailed in Appendix A.

7 https://www.fuelcheck.nsw.gov.au/app

1.2 List of draft decisions, findings and recommendations

Draft findings

Draft decisions

Draft recommendation

1.3 How can stakeholders comment on this Draft Report?

We are inviting written submissions from stakeholders by 24 November 2017. Page iv at the front of this report provides information on how to make a submission. Late submissions may not be accepted.

We do not have a specific set of questions for stakeholders to comment on. Instead, we invite stakeholders to address any of our draft findings, decisions and recommendations or provide details of additional information that is relevant to our assessment.

We will consider all the issues raised in submissions to our Draft Report, and provide a Final Report to the Minister by 22 December 2017.

1.4 How is this paper structured?

The rest of this report explains our draft decisions, findings and recommendations in more detail:

- Chapter 2 describes the NSW retail market for E10 and developments in this market in 2016-17.
- Chapter 3 describes the current state of the east coast market for wholesale ethanol, and outlines potential future developments in this market.
- Chapter 4 explains our draft decision to continue to use our import parity price methodology for determining the wholesale ethanol price on a quarterly basis.
- Appendix A describes our import parity price methodology in detail.
- Appendix B outlines how we calculated average retail prices using data from the FuelCheck website.

2 Monitoring the NSW retail market for E10

The prices of retail fuels are determined in a competitive market, and effective competition is the best protection for consumers from excessive prices. The ACCC monitors and reports regularly on the national fuel market to ensure competition is effective, and it also carries out in-depth investigations of retail fuel markets in regional areas.

We have taken a light-handed approach to monitoring the retail market for E10 as this is a competitive market, which is also monitored by the ACCC. In this chapter, we focus on changes in the retail market that affect the choices available to consumers, as well as consumers' ability to identify and access these choices. This includes considering the physical availability of various fuel types, and the availability of information about prices and locations of fuel. We consider the impact of the amended biofuels legislation that came into effect from January 2017, and report on E10 prices and volumes sold.

2.1 Overview of draft findings

We found that more retailers are required to offer E10 under the revised ethanol mandate, but that the majority of retailers applied for and were granted exemptions from meeting the mandate in the first half of 2017. Availability of E10 has become more widespread since the revised mandate came into effect in January 2017, with the number of nozzles dispensing E10 now slightly higher than the number dispensing regular petrol. However, choice in retail fuels remains high, with 92% of service stations offering regular petrol as of September 2017.

In August 2016, the NSW Government launched a real-time fuel comparison website, FuelCheck. The website allows consumers to shop around and find the lowest fuel prices, putting pressure on retailers to offer fuel at competitive prices. It also allows consumers to find nearby locations for alternatives to ethanol-blended petrol. Analysing FuelCheck data from August 2016 to June 2017, we found E10 retail prices in New South Wales were on average 2.2 cents per litre lower than regular petrol prices in this period.

Monthly sales of E10 as a proportion of total petrol volumes sold were relatively stable at around 24% during 2016-17. Since E10 contains around 10% ethanol, this means approximately 2.4% of total petrol sales were ethanol during 2016-17. The ethanol mandate requires volume fuel retailers to ensure that ethanol makes up a minimum of 6% of the total volume of their petrol sales.

2.2 Amended biofuels legislation came into effect 1 January 2017

The most significant development affecting the NSW retail market for E10 during 2016-17 was the changes to the NSW biofuels legislation coming into effect from 1 January 2017.[8]

8 *Biofuels Act 2007 No 23 (NSW)*

The amended legislation aims to increase availability of E10 by shifting the obligation from only the *major* fuel retail chains and wholesalers to all retailers that sell more than a certain volume of fuel (defined as 'volume fuel retailers' under the amended biofuels legislation).[9]

In addition to meeting the mandate, volume fuel retailers must ensure that E10 is available across the forecourts of their service stations, and that the number of E10 nozzles is comparable to that of the other most available petrol product being offered.[10] Retailers are also required to take reasonable steps to market E10, including advertising the price of E10 on their main price board along with other fuel prices.[11]

NSW Fair Trading is responsible for administering and enforcing the biofuels mandate, including collecting the relevant data from service stations. It is also responsible for the NSW Government's fuel price monitoring website, FuelCheck (see section 2.3). In carrying out our role as retail market monitor, we obtained data from Fair Trading and analysed historical FuelCheck data available on the NSW Government's Open Data Portal.[12] Fair Trading advised us of some data issues, and we have reviewed the data for outliers and other issues. We recommend that Fair Trading continue to work with retailers to ensure the integrity of data collected for the purposes of FuelCheck and for monitoring the mandate.

Draft recommendation

1 NSW Fair Trading continue to work with retailers to ensure the integrity of data collected for the purposes of FuelCheck and for monitoring the mandate.

2.2.1 More service stations required to offer E10 under the revised mandate

The majority of the service stations required to meet the mandate under the revised biofuels legislation were also subject to the mandate prior to January 2017.[13] The changes mean 360 additional service stations are now required to meet the mandate compared with before January 2017. In the first half of 2017, the majority of volume fuel retailers applied for and were granted exemptions from meeting the mandate. Most of these exemptions were granted on the basis that the retailers were not able to meet the mandate despite having taken all reasonable steps to comply. A small number of retailers were exempted on the grounds that fitting out their service stations to offer E10 would be prohibitively costly.[14]

9 Prior to January 2017, the mandate applied to 'volume fuel *sellers*', which included fuel wholesalers without retail outlets. Under the amended biofuels legislation, the mandate applies to 'volume fuel *retailers*', which excludes wholesalers with no retail outlets, but includes all retailers selling above a certain volume of fuel.

10 NSW Fair Trading, *Biofuels Act 2007 – Statement of Regulatory Intent*, December 2016, at http://www.fairtrading.nsw.gov.au/biz_res/ftweb/pdfs/Businesses/Biofuels_industry/Biofuels_statement_of_regulatory_intent_december_2016.pdf, accessed 26 October 2017.

11 Biofuels Regulation (No 2) 2016 (NSW), cl 9(1)(d).

12 *NSW Government Open Data Portal – Datasets – FuelCheck*, at https://data.nsw.gov.au/data/dataset/fuel-check accessed 26 October 2017.

13 These service stations were operated or controlled by one of the major volume fuel sellers subject to the mandate prior to January 2017.

14 NSW Parliament, *Budget Estimates 2017-2018 – Supplementary Questions, Portfolio Committee No. 1 – Premier and Finance, Innovation and Better Regulation – Hearing: Monday 4 September 2017, Answers due by: Thursday 28 September 2017*, p. 38, at https://www.parliament.nsw.gov.au/committees/DBAssets/InquiryOther/Transcript/11010/ASQs%20-%20Kean.pdf, accessed 19 October 2017.

2.2.2 Availability of E10 has become more widespread while choice in fuels remains high

Since the revised ethanol mandate came into effect in January 2017, availability of E10 has become more widespread. Of the total number of nozzles dispensing either E10 or regular petrol, 52% now dispense E10 and 48% dispense regular petrol. This is roughly the inverse of the split in the first quarter of 2016, which was 47% dispensing E10 versus 53% dispensing regular petrol. But choice remains high, with 92% of service stations offering regular petrol as of September 2017.[15]

Draft finding

1 Availability of E10 has become more widespread since the ethanol mandate was amended in January 2017 with the number of nozzles dispensing E10 now slightly higher than the number dispensing regular petrol.

2.3 NSW Government launched real-time fuel-price monitoring service

In August 2016, the NSW Government launched FuelCheck, a fuel-price monitoring service that provides real-time information to consumers about fuel prices across NSW.[16] Every service station is legally required to submit its prices to FuelCheck every time prices change, to ensure complete coverage and that the prices seen in FuelCheck are up-to-date.

In markets where competition is working well, we would expect most consumers to be aware of choices available to them and to be shopping around for better deals. By improving transparency around choice and prices of fuel to both consumers and other retailers, FuelCheck can put greater pressure on retailers to offer competitive prices and services. In the context of the ethanol mandate, FuelCheck also allows consumers to easily locate alternative fuels not blended with ethanol (see Figure 2.1).

Services similar to FuelCheck have existed for some time, but they have not had prices from every service station and/or would often rely on consumers to report observed prices. Some of these pre-existing services have incorporated prices from FuelCheck, and sometimes offer additional information and services not available via FuelCheck. For example, based on understanding local petrol price cycles, MotorMouth offers forward-looking buying advice for a chosen area.

2.4 NSW Government launched 'E10 Fuel for Thought' information campaign

In May 2017, the NSW Government launched its 'E10 Fuel for Thought' information campaign, aimed at giving motorists a better understanding of E10 and its compatibility with most petrol-powered cars on the road today. The campaign includes advertising across television, radio, billboard, online video, petrol pumps and social media channels. It also

15 Information provided by NSW Fair Trading; and NSW Parliament, *Budget Estimates 2017-2018 – Supplementary Questions, Portfolio Committee No. 1 – Premier and Finance, Innovation and Better Regulation – Hearing: Monday 4 September 2017, Answers due by: Thursday 28 September 2017*, p. 41, at https://www.parliament.nsw.gov.au/committees/DBAssets/InquiryOther/Transcript/11010/ASQs%20-%20Kean.pdf, accessed 19 October 2017.

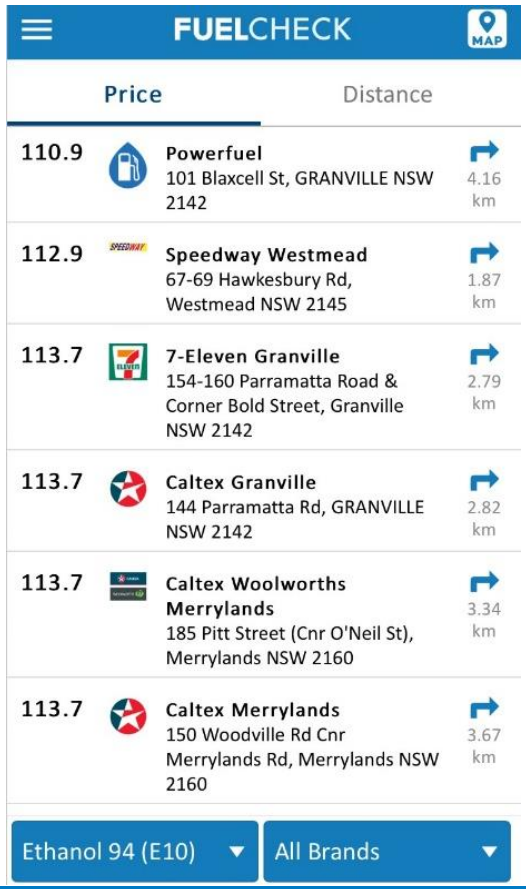
16 FuelCheck can be accessed from any internet-enabled device, at www.fuelcheck.nsw.gov.au.

includes a website – www.e10fuelforthought.nsw.gov.au – with further information and answers to common questions. In addition, the website allows motorists to check the compatibility of E10 with their vehicle model.[17]

Figure 2.1 FuelCheck website screenshots

FuelCheck map view

FuelCheck list view



Source: www.fuelcheck.nsw.gov.au.

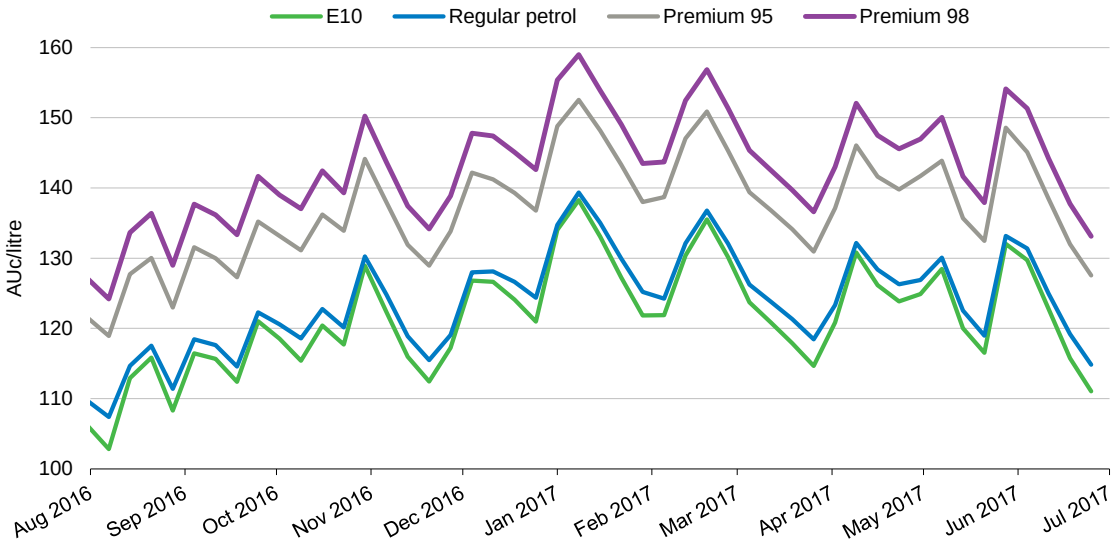
2.5 Prices and sales volumes of E10 and other petrol types

Historical data from the FuelCheck website indicates the price of E10 in New South Wales has been on average 2.2 cents per litre lower than that of regular petrol since the launch of the website in August 2016.[18] Figure 2.2 shows the average weekly petrol prices in New South Wales in this period.

17 'E10 Fuel for Thought' website at http://www.e10fuelforthought.nsw.gov.au/

18 *NSW Government Open Data Portal – Datasets – FuelCheck*, at https://data.nsw.gov.au/data/dataset/fuel-check accessed 26 October 2017. An overview of our methodology is provided at Appendix B.

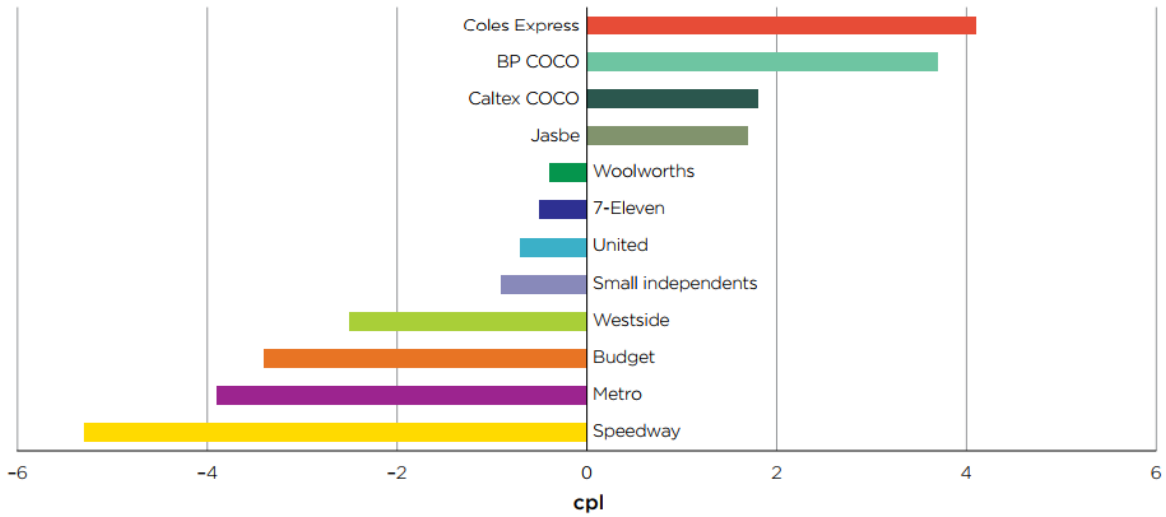
Figure 2.2 Average weekly petrol in NSW August 2016 to June 3017 (AUc/litre)



Data source: *NSW Government Open Data Portal – Datasets – FuelCheck*, at https://data.nsw.gov.au/data/dataset/fuel-check accessed 26 October 2017.

However, prices vary considerably between the various retail brands. In its recent report on the Brisbane petrol market, the ACCC showed the average price dispersion for E10 among Sydney retailers between 1 January and 30 April 2017 (see Figure 2.3). The ACCC found that the four lowest-priced retailers (Speedway, Metro, Budget and Westside) were on average 3.8 cents per litre lower than the average market price. Figure 2.3 also shows that the difference between E10 prices of the highest-priced retailer (Coles Express) and the lowest-priced retailer (Speedway) exceeded 9 cents per litre.[19]

Figure 2.3 ACCC findings on E10 price dispersion in Sydney by brand, 1 January to 30 April 2017



Note: Informed Sources collects price data electronically from its subscribers and manually for other brands. Data was also obtained from NSW FuelCheck.

Source: ACCC calculations based on data from Informed Sources. ACCC, *Report on the Brisbane petrol market*, October 2017, p. 4.

19 ACCC, *Report on the Brisbane petrol market*, October 2017, p. 4.

The latest available edition of the Australian Petroleum Statistics (APS) from the Australian Government's Department of the Environment and Energy shows that total sales of E10[20] in NSW were lower in 2016-17 than in 2015-16.[21] As a percentage of total petrol sold in NSW, E10 made up around 23.8% of petrol sales in 2016-17, down from 25.5% in 2015-16. As explained in Box 2.1, the ethanol mandate requires around 60% of all petrol sales to be E10.

Box 2.1 Sales of E10 required to meet ethanol mandate

Approximately 80% of service stations in NSW are subject to the ethanol mandate, which requires that 6% of total petrol sold at these sites (including petrol-ethanol blends) is fuel ethanol.

E10 consists of regular petrol (unleaded 91 octane) mixed with between 9% and 10% ethanol. If E10 was the only ethanol-blended petrol sold by a service station subject to the mandate, it would have to sell between 60% (with 10% ethanol) and 67% (with 9% ethanol) E10 to meet the mandate.

A small number of service stations also offer E85 – a specialist fuel for high performance vehicles which consists of unleaded petrol mixed with 70% to 85% ethanol. Those service stations that sell E85 can therefore sell less E10 in order to meet the 6% ethanol mandate.

The Australian Petroleum Statistics do not distinguish between sales of E10 and E85. However, in late 2015/early 2016, E85 made up only 0.1% of total petrol sold in NSW.[22]

We also note that the sales volumes reported for NSW in the Australian Petroleum Statistics includes sales from the ACT as well as sales from non-retail outlets and from retail sites not subject to the mandate. Performance against the mandate by those retailers subject to it would therefore be slightly above that suggested by the Australian Petroleum Statistics.

Figure 2.4 shows the proportions of E10, regular petrol and premium/proprietary blends sold in NSW since July 2010. The orange line shows approximately the proportion of petrol sales required to be E10 in order to meet the mandate. During 2010, the ethanol mandate was 4%, so E10 sales would have needed to account for around 40% of total petrol sales to meet the mandate. Since January 2011, the ethanol mandate has been 6%, meaning E10 sales would have to reach around 60% of petrol sales in order to meet the mandate.[23]

Figure 2.4 shows that sales of both E10 and regular petrol dropped in favour of premium blends (PULP) over this period. As a proportion of total petrol sales, monthly E10 sales peaked at around 40% in the first half of 2011 (ie, approximately 4% ethanol), but dropped to 23.4% in April 2017 (ie, approximately 2.34% ethanol). However, the latest figures show a small increase in the proportion of E10 sales since May 2017, up to around 25% of total petrol sales in August 2017.[24]

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20 The statistics report sales of ethanol-blended petrol, which includes E85. However, E85 is not widely available, and represents a very small portion of ethanol-blended petrol sold.

21 Note: The stastistics for NSW include sales volumes for ACT. Source: Australian Petroleum Statistics, Commonwealth of Australia 2017, at http://www.environment.gov.au/energy/petroleum-statistics, accessed 9 October 2017

22 NSW Fair Trading, *Service station data collection results,* July 2016, p. 4, at http://www.fairtrading.nsw.gov.au/biz_res/ftweb/pdfs/Businesses/Biofuels_industry/Service_station_data_collection_results.pdf accessed 25 October 2017.

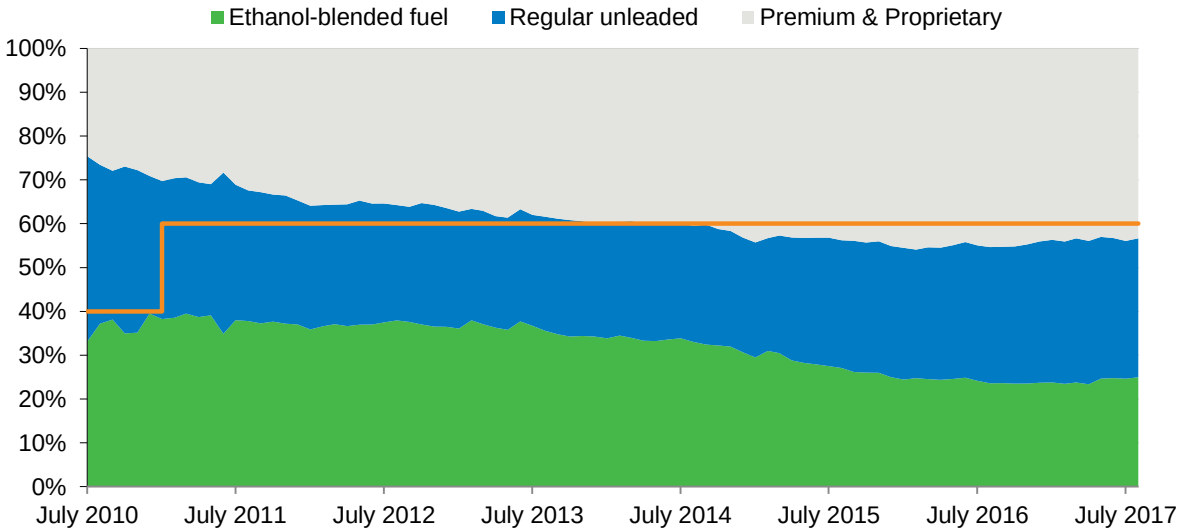
23 E10 is regular unleaded petrol blended with 9-10% ethanol. However, not all fuel sales in NSW are via retailers subject to the ethanol mandate.

24 Australian Petroleum Statistics, Commonwealth of Australia 2017, at http://www.environment.gov.au/energy/petroleum-statistics accessed 25 October 2017.

Draft finding

2 Monthly sales of fuel ethanol in NSW remained largely stable during 2016-17, at around 2.4% of total petrol sales. The ethanol mandate requires volume fuel retailers to ensure that ethanol makes up a minimum of 6% of the total volume of their petrol sales.

Figure 2.4 Sales of petrol types in NSW since July 2010 (%)



Data source: Australian Petroleum Statistics, Commonwealth of Australia 2017, at http://www.environment.gov.au/energy/petroleum-statistics, accessed 25 October 2017; IPART calculations.

3 The east coast market for wholesale ethanol

This chapter provides an overview of the current state of the wholesale ethanol market, and outlines plans for future expansion of ethanol production on the Australian east coast.

3.1 Overview of draft findings

We found that under our methodology for determining wholesale ethanol prices, ethanol producers and fuel wholesalers have continued to negotiate prices below our determined prices. Relatively low oil and petrol prices have also maintained downward pressure on ethanol prices, since E10 prices must be competitive with prices of regular petrol.

Competition between the three major ethanol producers continued during 2016-17, while plans for a number of additional ethanol production facilities have been progressing. East coast demand for E10 and therefore fuel ethanol increased during 2016-17, mainly due to the introduction of a biofuels mandate in Queensland.

3.2 Prices for wholesale ethanol remain below IPART's determined prices

Since January 2017, we have determined wholesale ethanol prices on a quarterly basis using an import parity price (IPP) methodology developed with industry stakeholders in 2016. Our determined prices remained stable throughout 2017, ranging from 115.2 to 116.7 cents per litre of wholesale ethanol.[25] The IPP methodology has provided scope for ethanol producers and fuel wholesalers to negotiate prices below our determined prices.

Information provided by buyers and sellers of fuel ethanol confirms that prices have remained below our determined prices. This is further verified when we compare average terminal gate prices (TGPs) for regular petrol and E10 in Sydney. The green area in Figure 3.1 shows the upper range of prices for wholesale ethanol[26] implied by the observed differences in TGPs for regular petrol and E10. The green area is well below IPART's determined prices, also shown in the figure.

Relatively low oil and petrol prices have continued during 2017, contributing to the downward pressure on wholesale prices for ethanol for E10 to remain competitive with petrol. Figure 3.2 shows that the Sydney TGP for regular petrol was on average about 20 cents per litre higher in the period from January 2010 through August 2015 compared with the period since then.

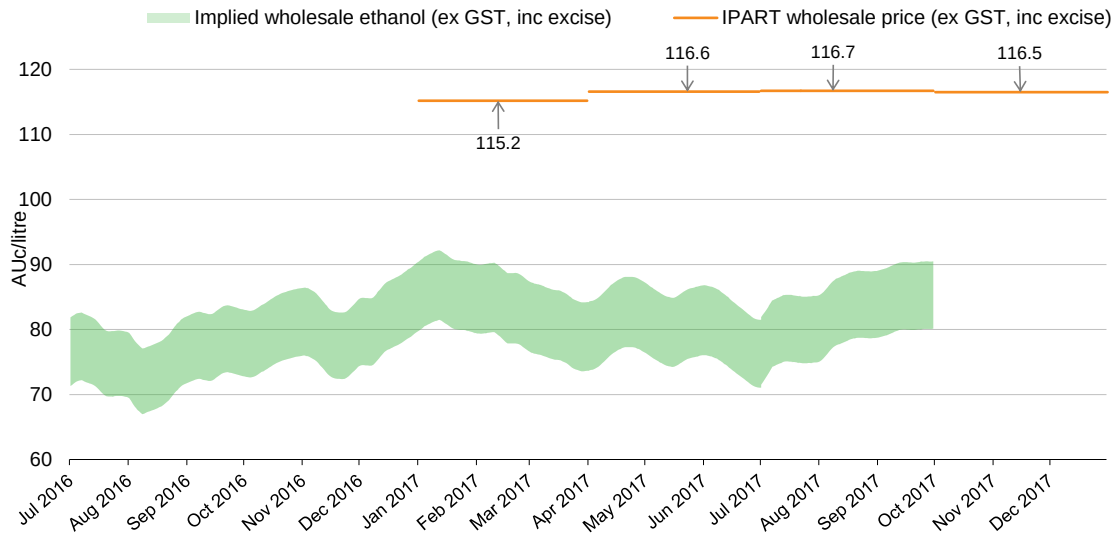
25 Our determined price is the price of wholesale ethanol delivered to fuel wholesalers' terminals, including the excise but excluding GST.

26 This range assumes an ethanol blend in E10 between 9% and 10%, and includes domestic excise on ethanol, but excludes GST. It assumes fuel wholesaler margins of between 3 and 12 cents per litre of fuel, based on past estimates from ACCC.

Draft finding

3 IPART's IPP methodology continues to provide scope for ethanol producers and fuel wholesalers to negotiate prices below IPART's determined prices.

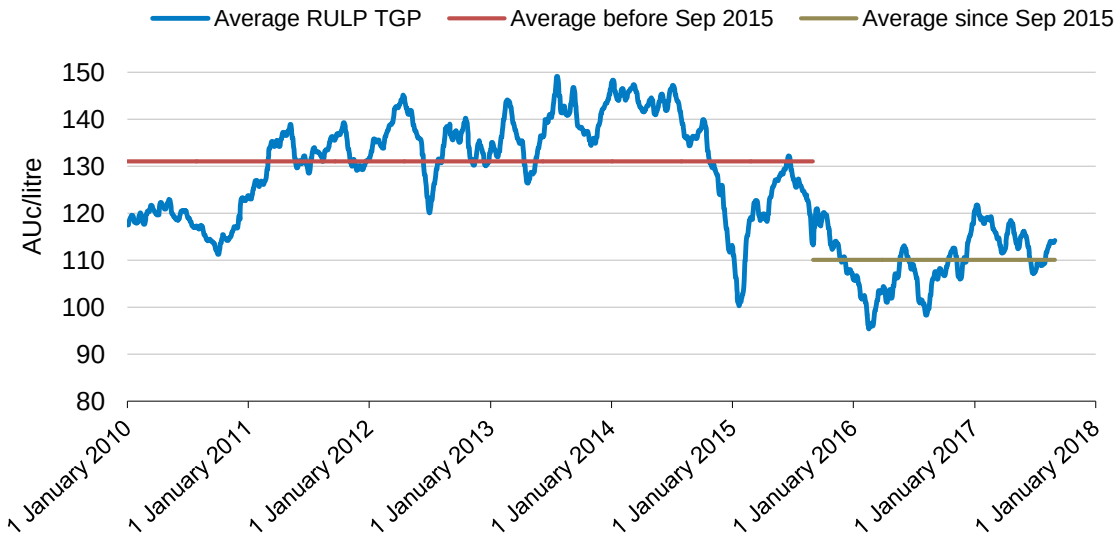
Figure 3.1 Wholesale ethanol prices determined by IPART vs implied by Sydney TGPs



Note: The range for the implied wholesale ethanol price assumes an ethanol blend in E10 between 9% and 10%, and includes domestic excise on ethanol, but excludes GST. It assumes fuel wholesaler margins of between 3 and 12 cents per litre of fuel, based on past estimates from ACCC. The range is smoothed using 7-day rolling averages.

Data source: Daily average Sydney TGPs for regular petrol and E10 from FuelTrac (www.fueltrac.com.au); IPART calculations.

Figure 3.2 Historical Sydney average TGPs for regular petrol



Data source: Daily average Sydney TGPs for regular petrol from FuelTrac (www.fueltrac.com.au); IPART calculations.

3.3 Outlook for competition in the wholesale ethanol market

Competition in the wholesale market for fuel ethanol continued during 2016-17. As in 2015-16, there were three major ethanol producers in Australia during 2016-17: Manildra

Group (New South Wales); Dalby Bio-Refinery (Queensland); and Wilmar BioEthanol (Queensland). Their combined plant capacity is estimated to be around 450 ML per annum, with some of this capacity being used to produce non-fuel ethanol and some capacity remaining unutilised.[27]

Manildra remains the largest fuel ethanol producer in Australia, with an estimated market share of 74% during 2016.[28] However, in our 2016 review, we found that competition from the two Queensland producers had been increasing, and ethanol transportation costs did not constrain competition.[29] Information provided by ethanol producers and fuel wholesalers confirms that during 2016-17, ethanol producers have continued to supply ethanol across state borders.

A number of ethanol projects are planned for New South Wales and Queensland, with over 350ML of additional production capacity having received planning approval.[30] Construction of two of these plants with capacity totalling 220-280ML appears to be moving closer, as they have reached or are nearing financial close.[31] Further, the Queensland government recently announced its support for a 24ML expansion of the Dalby ethanol plant, and for a new 55 ML ethanol plant in Atherton, North Queensland.[32]

3.4 East coast demand for fuel ethanol has increased marginally

As shown in section 2.5, there has been a small increase in demand for E10 in NSW since May 2017. Since late 2016, a similarly small increase in demand for E10 was observed in Victoria, while Queensland saw the most significant increase – likely as a result of the Queensland Government's introduction of its biofuels mandate. East coast sales of E10 during June to August 2017 suggest an increase in ethanol sales relative to the same period in 2016 of 8-9 ML, or over 30 ML if annualised.[33]

3.5 Domestic excise on ethanol increased from 0 to 5.3 cents per litre

The domestic excise on ethanol increased gradually from 0 cents per litre prior to 2016-17 to 5.28 cents per litre from 1 August 2017. This means the excise advantage on domestically produced ethanol compared with petroleum and imported ethanol reduced from a high of 39.5 cents per litre in June 2016 to 35.0 cents per litre from August 2017.[34] The lower excise advantage means ethanol producers would need to offer lower prices to ensure that E10 remains competitive with petrol.

27 APAC Bioefuels consultants, *Australian Biofuels 2017*, April 2017, p. 23.
28 APAC Bioefuels consultants, *Australian Biofuels 2017*, April 2017, p. 23.
29 IPART, *Review of a maximum price for wholesale ethanol in automotive fuel blends – Final Report*, December 2016, p. 11.
30 APAC Bioefuels consultants, *Australian Biofuels 2017*, April 2017, p. 23.
31 North Queensland Bio-energy plant at Ingham, QLD – a sugar/ethanol swing plan with ethanol capacity 30-90ML pa, has reached financial close and construction is due to commence early 2018. Renewable Developments Australia plant at Pentland, QLD, with 190ML pa capacity, has an offtake agreement in place.
32 https://governmentnews.com.au/2017/07/queensland-boost-biofuels-adani-support-questioned/
33 Source: Australian Petroleum Statistics, October 2017; IPART calculations. Note: the annualised figure does not account for trends or seasonality in fuel consumption.
34 In August 2017, the petrol excise increased to 40.3 cents per litre, and the excise on domestic ethanol increased to 5.28 cents per litre.

4 We will continue to set the wholesale ethanol price using an import parity price methodology

Under the Biofuels Act, IPART is required to determine a wholesale price for fuel ethanol.[35] This price forms part of the exemptions framework for the biofuels mandate. In this chapter we consider whether we need to make changes to our approach to determining the wholesale ethanol price, applying a framework we developed as part of our 2016 review.

4.1 Overview of draft findings and decisions

Based on our findings in chapters 2 and 3, we have reassessed the wholesale and retail markets for ethanol and E10, again applying the framework we developed in 2016. We found that consumers have a high degree of choice in retail fuel, and competition in the wholesale ethanol market has continued. Petroleum prices have increased somewhat since mid-2016, but remain at historically low levels. Our draft decision is therefore that we will continue to determine wholesale ethanol prices on a quarterly basis during 2018 using our import parity price (IPP) methodology. We set out the methodology in full in Appendix A.

4.2 Framework to assess the need for price regulation in wholesale ethanol

As part of our 2016 review of the wholesale market for fuel ethanol, we developed a framework to assess the need for price regulation for wholesale ethanol. A schematic of the framework is presented in Figure 4.1. It considers two key factors – the degree of consumer choice in retail fuels and the extent of competition in the wholesale ethanol market – both likely to change over time. We also noted that when there is a high degree of consumer choice in retail fuels, a low petroleum price imposes a market constraint on the price of wholesale ethanol. This framework assists us in determining whether ethanol producers' market power is such that:

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

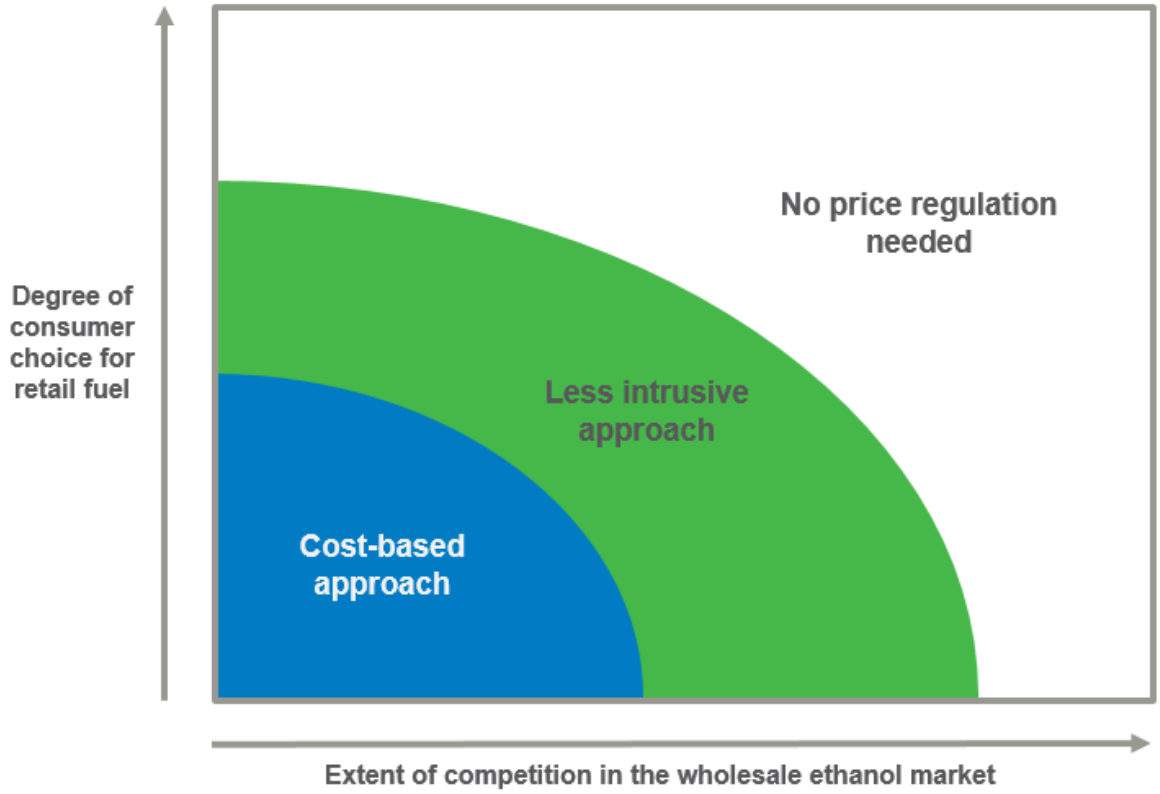
Under the framework:

- 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 be based on the cost of a new entrant producer (blue area in Figure 4.1).

35 *Biofuels Act 2007* (NSW), s 17A.

- 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 (white area in Figure 4.1).
- 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 (white area in Figure 4.1).
- In other cases, the 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 (green area in Figure 4.1).

Figure 4.1 Framework for recommended maximum wholesale price of ethanol in NSW



4.3 A 'less-intrusive' IPP approach to price regulation remains appropriate

As reported in chapter 2, we found that availability of E10 has become more widespread, but consumers continue to have choice in retail fuels. In addition, fuel-price comparison websites, like the NSW Government's FuelCheck website, can help consumers easily locate nearby service stations that offer other fuel types.

In chapter 3 we found that competition between the three major ethanol producers continued during 2016-17, and we noted that plans for a number of new ethanol production facilities have been progressing.

On this basis, we consider it remains appropriate to use a 'less-intrusive' approach to determining the price for wholesale ethanol. Our draft decision is to continue to use our IPP methodology to determine prices for wholesale ethanol on a quarterly basis during 2018. The next section considers which ethanol exporting countries would be likely sources for ethanol if it was to be imported to Australia.

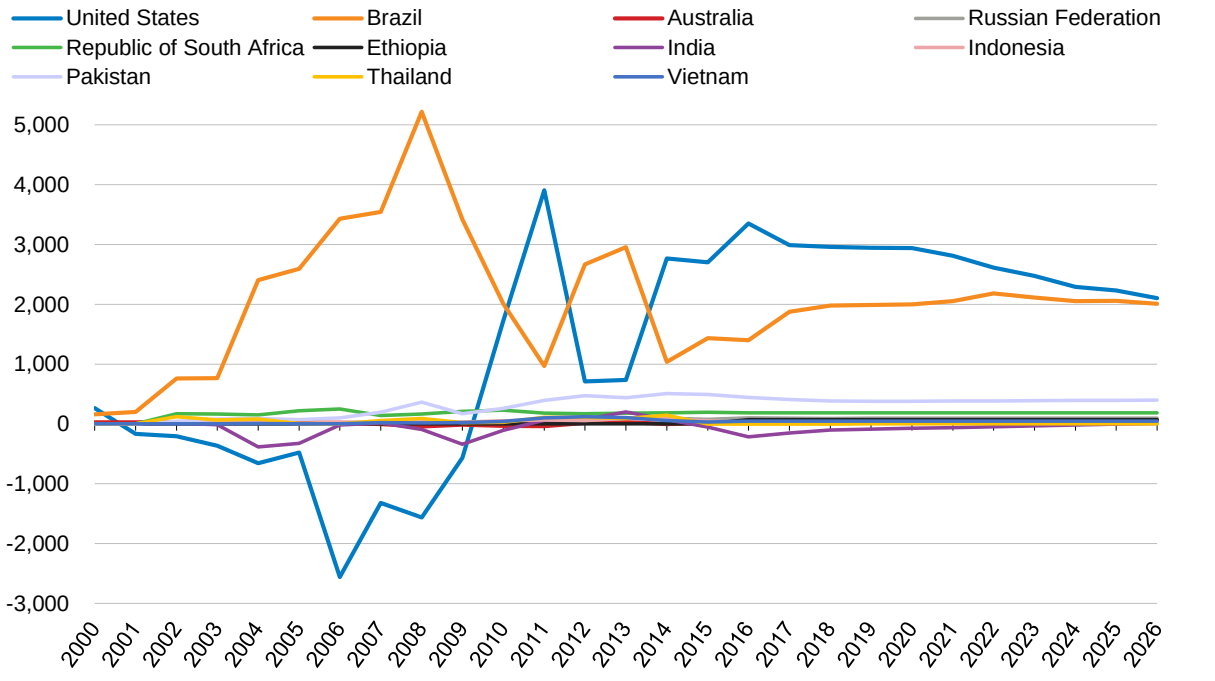
Draft decision

1 IPART will continue to use our import parity price methodology to determine prices for wholesale ethanol on a quarterly basis in 2018.

4.4 The US and Brazil remain the two most likely origins for imported ethanol

In making our draft decision on retaining the IPP methodology for determining wholesale ethanol prices, we have also reassessed whether the US and Brazil remain the appropriate hypothetical sources for imported ethanol. We found that the US and Brazil remain the two largest net exporters of ethanol, and the OECD forecasts that this situation is likely to continue in the foreseeable future. Figure 4.2 shows the countries with the largest current and forecast net ethanol exports.

Figure 4.2 Major ethanol net exporting countries – historical and forecast net exports (ML)



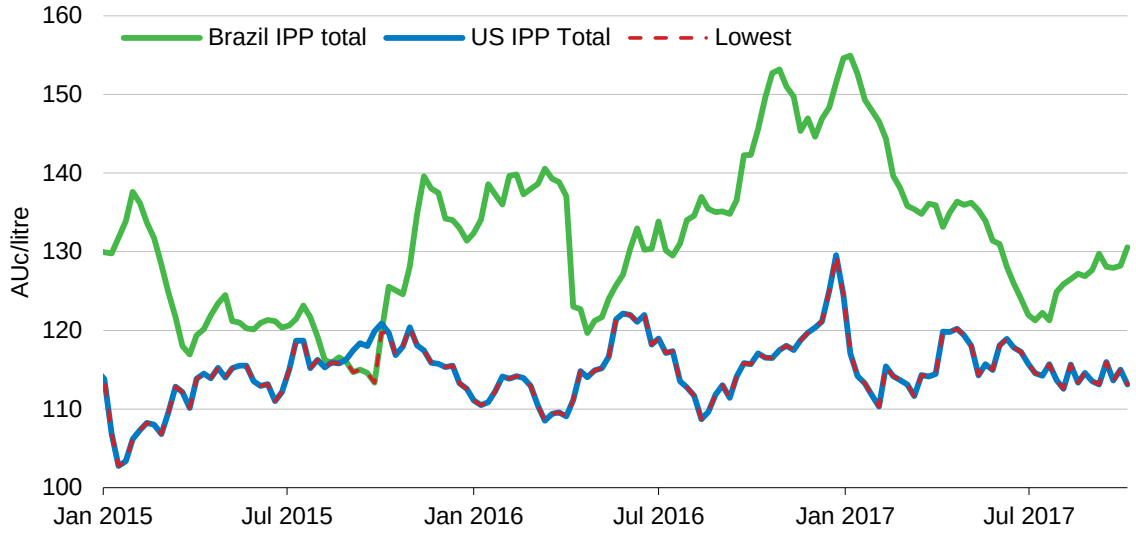
Note: Includes only countries with historical or forecast net ethanol exports greater than 50ML in any year from 2014 through 2026. Figures for 2016 and 2017 are estimates, and figures from 2018 onward are forecasts.

Data source: OECD (2017), *Agricultural Outlook 1990-2027, by commodity*, at http://stats.oecd.org/# accessed 13 October 2017.

As in 2016, we consider that an Australian ethanol importer would choose to import from either the US or Brazil, whichever had the lowest prices at the time. Our draft decision is

therefore also to continue to calculate the ethanol IPP based on the lowest of US and Brazilian ethanol prices in each relevant week. Figure 4.3 shows our estimated weekly IPPs for the US and Brazil since January 2015, and the orange dotted line shows the lowest of the two, including the prices that we used in our quarterly determinations of wholesale ethanol prices. It shows that US ethanol prices have consistently been the lowest in this period, except for a brief period around August and September 2015.

Figure 4.3 Weekly estimates of US and Brazilian IPPs (AUc/litre)



Data source: IPART IPP model, on www.ipart.nsw.gov.au

Draft decision

2 IPART will continue to calculate the import parity price based on the lowest of US and Brazilian ethanol prices at any given time.

4.5 Some components in the IPP methodology require updating for 2018

In our 2016 Final Report, we explained that we would update certain components every quarter, and other components annually.[36] The two largest components in the IPP methodology are the mill-gate prices for ethanol and the Australian fuel excise. The exchange rate also has a significant effect on the estimated IPP. We will continue to update these three key inputs when determining wholesale ethanol prices on a quarterly basis. Table 4.1 sets out how we intend to update all the IPP components for 2018. We are proposing to use the same data sources as used previously to calculate these components, listed in Table 4.2.

Draft decision

3 IPART will continue to update three key components on a quarterly basis: the ethanol mill gate price; the fuel excise; and the relevant exchange rates. The remaining components should be updated on an annual basis, or as required.

36 IPART, *Review of a maximum price for wholesale ethanol in automotive fuel blends – Final Report*, December 2016, p. 12.

Table 4.1 Updates of IPP components for 2018

Component	Size of component in 2017 quarterly IPPs (AUc/litre)	Updating frequency	Next update
Ethanol mill gate price	50.8 – 52.1	Quarterly	December 2017
Origin country freight costs	7.3 – 7.4	Annual	December 2017
Origin country port costs	3.2	Annual	December 2017
Sea freight	9.2 – 9.3	Annual	December 2017
Freight insurance	0.3	Annual (if required)	No change proposed
Wharfage NSW	0.2	Annual	July 2018
Import terminal storage and handling	3.0	Annual (if required)	No change proposed
Transport to fuel wholesale terminal	1.5	Annual (if required)	No change proposed
Customs value duty	0.0	As required	December 2017 (if required)
Fuel excise	39.5 – 40.0	Quarterly	December 2017
Exchange rates	N/A	Quarterly	December 2017

Table 4.2 IPP component estimation basis

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

Appendices

A IPP methodology for determining the price of wholesale ethanol in 2018

This appendix sets out the methodology used to calculate the reasonable price for wholesale ethanol in each quarterly pricing period in 2018. The first pricing period using this methodology will commence on 1 January 2018.

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

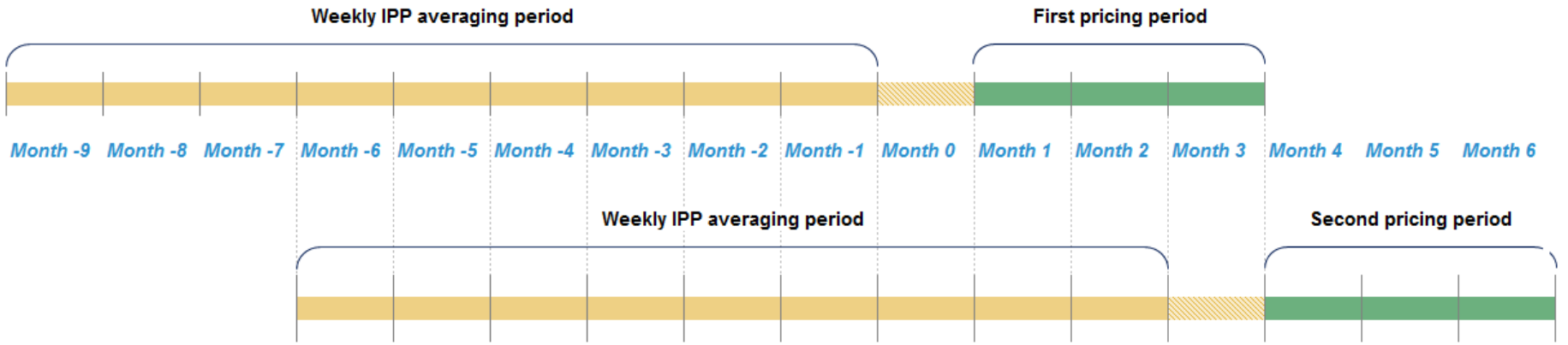


Table A.2 Parameters common to the calculation of weekly IPPs for US ethanol and Brazilian ethanol

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 2018, the relevant wharfage charges for the weekly IPP calculations are: ▼ 1 July 2017 to 30 June 2018: AUD 2.53/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 2018 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 2018, the relevant excise tariff for the weekly IPP calculations are: ▼ 1 August 2017 to 30 January 2018: AUD 0.4030/litre Excise tariffs in the calculation of weekly IPPs from 1 February 2018 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. For the 2017 pricing periods, these were estimated and assumed to be constant as follows: ▼ US freight costs at 0.0553 USD per litre ▼ Houston port costs at 0.0242 USD per litre We will update these in December 2017, to apply for the 2018 pricing periods.	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. For the 2017 pricing periods, this was estimated and assumed to be constant at 88.68 USD per tonne, converted to 0.07 USD/litre. We will update this in December 2017, to apply for the 2018 pricing periods.	USD/litre
$C^{AUD}_{US\ Sea\ freight,\ Week\ t}$	$C^{USD}_{US\ Sea\ freight}$ converted from USD to AUD in *week t*	AUD/litre

Parameters	Definition	Unit
$C^{AUD}_{US\ Insurance,\ Week\ t}$	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
$C^{AUD}_{US\ Import\ ex\ tax,\ Week\ t}$	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
$T^{AUD}_{US\ Customs\ duty,\ Week\ t}$	As of October 2017, customs duty on ethanol imported from the US was nil, 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 next 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

Parameters	Definition	Unit
$C^{BRL}_{BR\ Freight}$	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. For the 2017 pricing periods, these were estimated and assumed to be constant as follows: ▼ São Paulo freight costs assumed to be constant at 0.10 BRL per litre. ▼ Santos port costs assumed to be constant at 0.10 BRL per litre. We will update these in December 2017, to apply for the 2018 pricing periods.	BRL/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. For the 2017 pricing periods, this was estimated and assumed to be constant at 87.50 USD per tonne, converted to 0.0691 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
$T^{AUD}_{BR\ Customs\ duty,\ Week\ t}$	As of October 2017, the customs duty on ethanol imported from Brazil was 4.0%, 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 next 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

Parameters	Definition	Unit
$IPP_{BR,\ Week\ t}^{AUD}$	Total IPP for Brazilian ethanol in week t, calculated as: $IPP_{Brazil,\ Week\ t}^{AUD} = FOB_{BR,\ Week\ t}^{AUD} + C_{BR,\ Import\ ex\ tax,\ Week\ t}^{AUD} + T_{BR\ Total,\ Week\ t}^{AUD}$	AUD/litre

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:

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

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

Where:

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

n = the number of Fridays in the averaging period

B FuelCheck average prices methodology

We calculated annual and weekly average prices by fuel type, using FuelCheck data for the period August 2016 to June 2017, available on the NSW Government Open Data Portal.[37] We used the following methodology:

1. Reviewed the data for outliers.
2. Created a time-series of half-hourly prices for each fuel-type for all service stations, where each price was carried forward up to 30 hours unless there was an earlier price change.
3. Calculated weekly average site-specific prices for each fuel-type.
4. Calculated the weekly average prices across NSW for each fuel type by averaging the weekly site-specific averages for each fuel-type. The resulting series are shown in Figure 2.2.
5. Calculated the average annual price difference between regular petrol and E10 across NSW by:
   a) calculating the differences in weekly average prices of regular petrol and E10 for each site that offered both fuel types in any given week, and
   b) averaging weekly price differences between regular petrol and E10 across all sites that offered both regular petrol and E10 in any given week.

37 *NSW Government Open Data Portal – Datasets – FuelCheck*, at https://data.nsw.gov.au/data/dataset/fuel-check accessed 26 October 2017.