

## 6 Biofuels

### Key points:

- Biofuels are becoming an increasingly important part of the fuel mix in Australia and worldwide. During 2009-10 there has been a substantial increase in sales of E10, primarily as a result of the scaling up of the New South Wales (NSW) Government ethanol mandate and anticipation of an ethanol mandate in Queensland (which was suspended in October 2010).
- A number of retail sites in NSW and Queensland have removed regular unleaded petrol (RULP) from sale to comply with the existing and proposed mandates. This has resulted in reduced availability of RULP in these states. There has also been a related increase in sales of premium unleaded petrol (PULP).
- Given increasing demand, limited domestic ethanol production capacity and an effective excise treatment that favours domestic production over imports, there are concerns in the short to medium term regarding the supply and price of ethanol used for automotive fuel.

### 6.1 Overview

Biofuels, such as ethanol and biodiesel, are becoming increasingly important in Australia. The shift towards biofuels has largely been driven by government (particularly state government) policy. Consumer concerns about the depletion of crude oil and the environmental impact of its use have also led many consumers to actively seek what they perceive as more sustainable alternatives. Governments are responding to these concerns and simultaneously supporting local economic development through policies promoting alternative fuels. To date this has largely focused on biofuels. Industry has responded by offering biofuels for sale and marketing these products.

### 6.2 Biofuels in Australia

Unlike petrol and diesel, which are made from 'non-renewable' resources like crude oil, biofuels are derived from 'renewable' materials such as vegetable and animal products. Biofuels can be fully or partially substituted for petroleum-based fuels, and because they can be produced from renewable sources, have the potential to emit less greenhouse gases than fuels derived from crude oil. The two main types of biofuels used as transport fuels in Australia are ethanol and biodiesel.

## 6.2.1 Ethanol

Ethanol in its pure state is otherwise referred to as ethyl alcohol, alcohol or grain spirit.<sup>64</sup> Globally, most ethanol is produced by fermenting raw materials such as sugar cane, sugar beet, molasses, wheat, grains and forest products.<sup>65</sup> Fuel ethanol is typically used as a replacement for, or additive to, petrol. In Australia, it is added to petrol to produce various grades of ethanol blended petrol (EBP). Most commonly, ethanol is blended with RULP to produce an EBP known as E10 (petrol containing up to 10 per cent ethanol). It is also sometimes blended into PULP and proprietary products.

Fuel with greater than 10 per cent ethanol is also available but is generally only suitable for purpose-built vehicles. E85 (containing up to 85 per cent ethanol) is a relatively new product in Australia. Its usage is expected to increase over the next few years as more flex-fuel vehicles (FFV), such as the latest version of the Holden Commodore VE Series II, are sold and more retail outlets offer the fuel.

## 6.2.2 Biodiesel

Biodiesel is derived from plant or animal feedstocks containing fatty acids, such as vegetable oils and tallow. Biodiesel is usually blended with petroleum-based diesel to produce fuels for use in diesel-powered vehicles and equipment. In Australia, biodiesel is typically used as a fuel additive in 5 per cent (B5) and 20 per cent (B20) blends.

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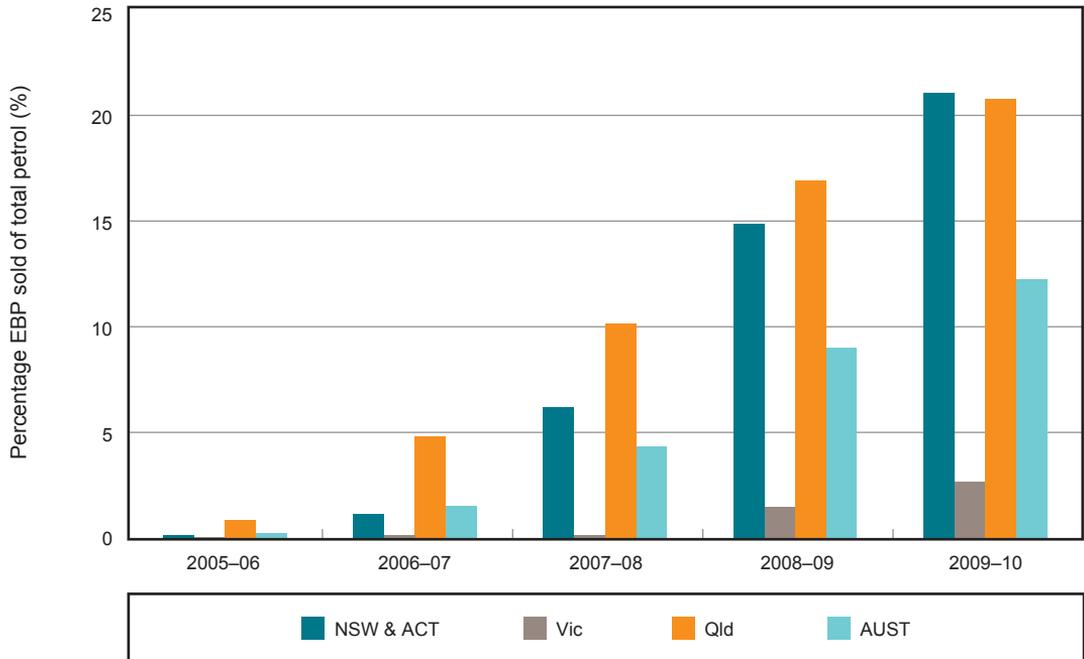
<sup>64</sup> Energy Quest, *Report to the ACCC: Benchmarking the price of fuel ethanol in Australia*, July 2010, p. 10.

<sup>65</sup> Energy Quest, *ibid.* p. 10.

### 6.2.3 Increasing use of biofuels

Use of biofuels, particularly E10, has been growing steadily in recent years. There is currently no data available for biodiesel sales. Most of the growth in E10 consumption has been in NSW, where there is a mandate for the sale of EBP, and Queensland, where a mandate has been proposed (although it is currently suspended). Notably, consumption has also been growing in Victoria where no mandate for EBP has been proposed or implemented (chart 6.1).

Chart 6.1 EBP as a percentage of total petrol sales: 2005–06 to 2009–10

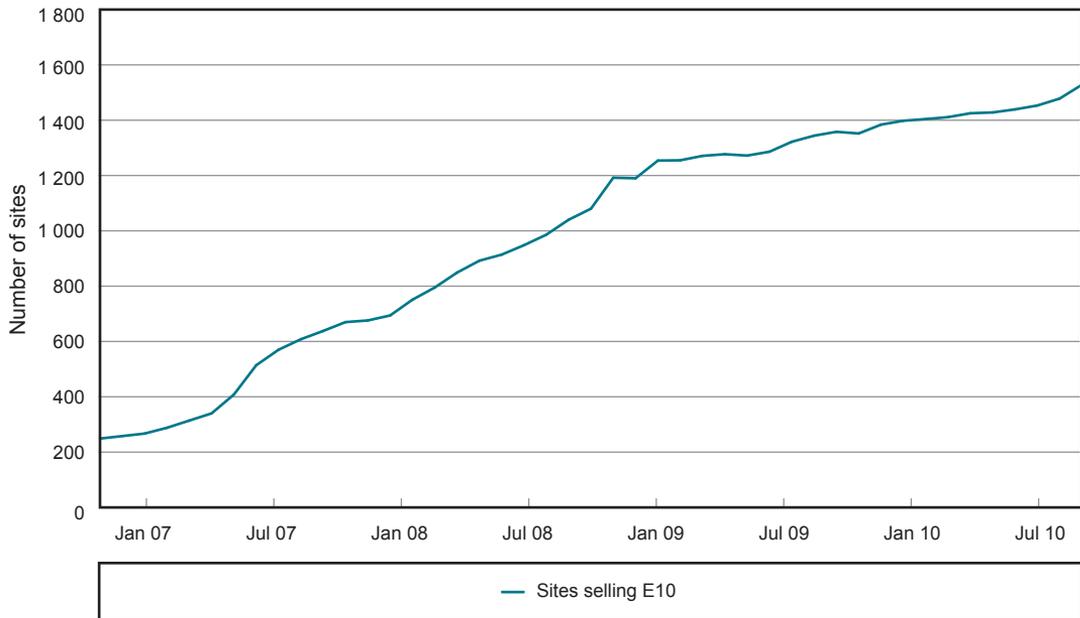


Sources: ACCC analysis based on RET, *Australian Petroleum Statistics data*, various issues<sup>66</sup>

66 RET data does not include the bulk of sales from independent retailers, nor sales in South Australia or Tasmania. Therefore it is likely that sales of EBP are higher than reflected in the data.

The number of sites selling E10 across Australia has grown substantially in recent years (chart 6.2).

Chart 6.2 Number of sites selling E10 in Australia: January 2007 to September 2010



Source: ACCC analysis based on Informed Sources data

## 6.3 Biofuels and government regulation

### 6.3.1 Mandates for biofuel consumption

#### New South Wales

Growing consumption of biofuels in Australia has largely been driven by the biofuel mandate in NSW. The *Biofuels Act 2007* (NSW) came into effect in October 2007, with the aim of increasing EBP sales. Initially a 2 per cent mandate, since 1 January 2010, it has required that volume fuel sellers<sup>67</sup> ensure that the volume of ethanol sold makes up a minimum of 4 per cent of the total volume of petrol sales.

In early December 2010, the NSW government announced a delay in the implementation of their ethanol mandate.<sup>68</sup> From 1 July 2011 the NSW ethanol mandate is scheduled to increase to 6 per cent. From 1 July 2012, all RULP sold by 'primary wholesalers' will be replaced with E10. In effect this means that RULP will be largely unavailable in NSW, and effectively in the Australian Capital Territory (ACT) from this time. A number of sites in NSW have already withdrawn RULP from sale and switched to E10 in preparation for the changes to the mandate. In Sydney there are already more sites selling E10 than RULP (chart 6.3).

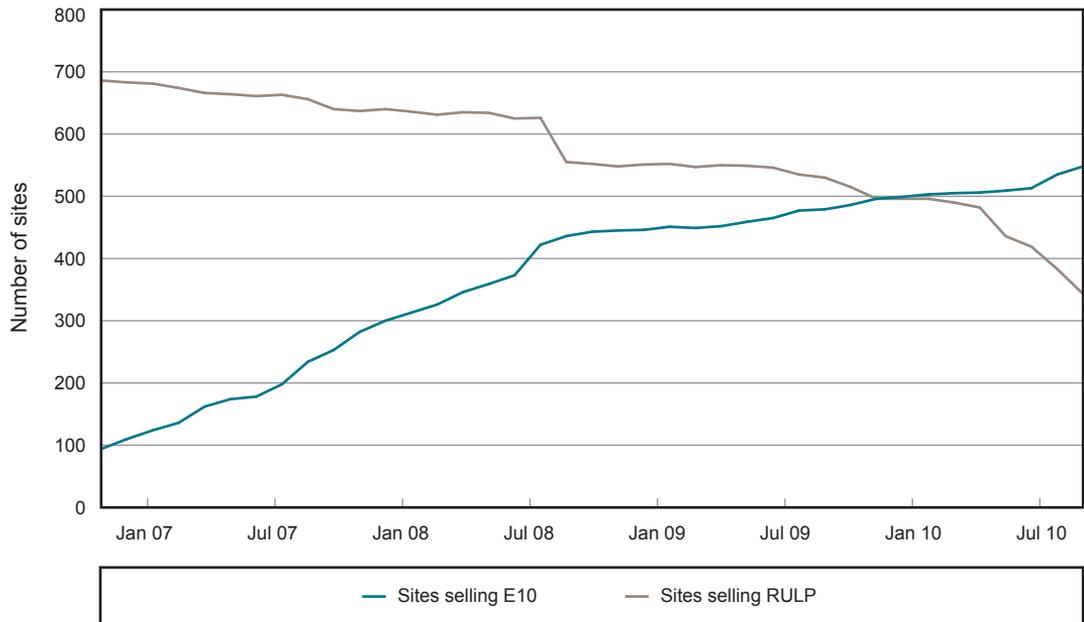
<sup>67</sup> Under the Act, a volume fuel seller means a major retailer (a person who operates or controls the operation of more than 20 service stations) or primary wholesaler. See the legislation at <http://www.legislation.nsw.gov.au/maintop/view/inforce/act+23+2007+cd+0+N> for more details.

<sup>68</sup> Hon Tony Kelly MLC (Minister for Lands), Suspension of NSW ethanol mandate, media release, NSW government, 2 December 2010.

The NSW mandate also covers biodiesel. Since 1 January 2010, the mandate has required that volume sellers ensure that the volume of biodiesel sales is not less than 2 per cent of the total volume of total diesel fuel sales.

In January 2012, the mandate for biodiesel in NSW will increase to 5 per cent.

Chart 6.3 Number of sites selling E10 and RULP, Sydney: January 2007 to September 2010



Sources: ACCC analysis based on Informed Sources data

### Queensland

The Queensland Government had proposed the introduction of an ethanol mandate for petrol sold in Queensland by 31 December 2010. The final draft report of a public benefit test was tabled in the Queensland Parliament on 11 November 2009. The intention of the mandate was to ensure that the volume of ethanol was not less than 5 per cent of the total volume of RULP and EBP sold in Queensland from 31 December 2010.

However, on 28 October 2010, it was announced that the timing for the commencement of the mandate had been delayed. The Queensland Treasurer, the Hon. Andrew Fraser MP commented that due to proposed changes to national ethanol taxation arrangements, the government had decided to exercise caution and suspend the implementation of the mandate to allow for careful consideration.<sup>69</sup>

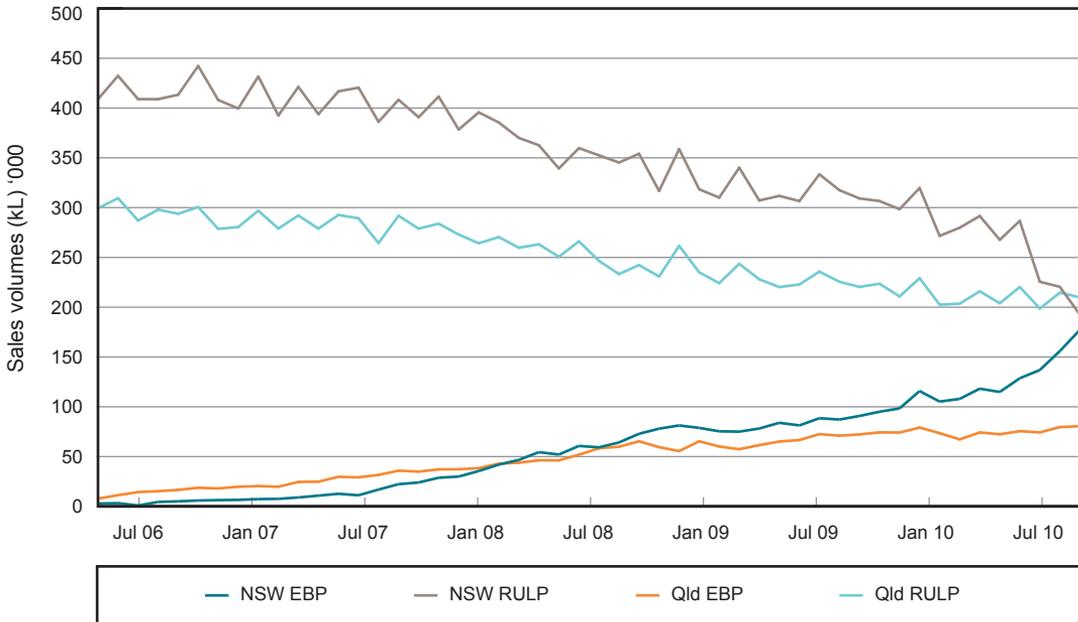
Although there is no ethanol mandate in place in Queensland, sales of EBP have grown there in recent years. Some retailers in Queensland removed RULP from sale at selected sites, possibly in anticipation of the proposed ethanol mandate. As of September 2010, approximately 160 of the 1 200 service stations in Queensland had already removed RULP from sale.<sup>70</sup>

69 The Hon. A. Fraser MP (Queensland Treasurer and Minister for Employment and Economic Development), *Ethanol mandate suspended*, media release, Queensland Treasury, 28 October 2010.

70 Informed Sources.

Sales of EBP have grown steadily in NSW and Queensland since 2007. In NSW, RULP sales have significantly decreased since the inception of the mandate in October 2007 (chart 6.4).

Chart 6.4 Monthly sales of EBP and RULP in NSW and Queensland: July 2006 to August 2010



Sources: ACCC analysis based on RET *Australian Petroleum Statistics* data, various issues

### 6.3.2 Excise on ethanol

Currently, an excise of 38.1 cpl is applied to ethanol (the same level as for petrol and diesel). Domestic producers are eligible for a production grant, which fully offsets the fuel excise. Therefore domestically produced ethanol for use in fuel is effectively excise free. Ethanol imports, however, are subject to the full level of excise, plus a 5 per cent import duty (depending on the country of origin). Consequently, ethanol imports have not been able to compete with locally produced ethanol.

#### Changes to excise on ethanol from 1 July 2011

The 2010–11 federal budget included two measures that will impact upon ethanol excise. Further changes were also announced after the federal election in July 2010. In addition, in October 2010, Treasury released a discussion paper, *Implementation of alternative fuels taxation policy*. The proposed changes involve reducing excise from 38.1 cpl to 25 cpl on 1 July 2011, for both domestically produced and imported ethanol, and progressively phasing the excise rate down to a final rate of 12.5 cpl on 1 July 2015.

At the same time, domestic ethanol producers will also be eligible for an offsetting grant payment of 23.75 cpl in 2011, to 'provide the ethanol industry with adequate time to prepare for the forthcoming changes'.<sup>71</sup> The offsetting payment will progressively phase down each year before reaching zero on 1 July 2020.<sup>72</sup> If the proposed changes go ahead, domestic and imported ethanol will not be subject to equivalent levels of effective excise until 2020.

### 6.3.3 Fuel quality standards for petrol and diesel blended with biofuels

The *Fuel Quality Standards Act 2000* empowers the minister responsible to determine standards in respect of specified kinds of fuel. Various standards under that Act are currently in force. Relevantly, the *Fuel Standard (Petrol) Determination 2001* allows for RULP to be blended with a maximum of 10 per cent ethanol.<sup>73</sup> There is also a labelling standard for petrol containing ethanol, which requires that service stations display at the pump either the exact percentage of ethanol contained in the blend or that the blend contains up to a percentage of ethanol (maximum 10 per cent).<sup>74</sup>

The *Fuel Standard (Automotive Diesel) Determination 2001* allows for petroleum-based diesel to be blended with up to 5 per cent biodiesel. Diesel containing more than 5 per cent biodiesel needs to be labelled as biodiesel. Unlike the percentage of ethanol in unleaded petrol, there is no maximum amount of biodiesel permitted to be blended with diesel.<sup>75</sup>

## 6.4 Biofuel production in Australia and overseas

Production and sales of biofuels, both in Australia and globally, have been increasing in recent years. Globally, both ethanol and biodiesel production increased by approximately 16 per cent from 2008 to 2009.<sup>76</sup> Production growth has largely been in response to government mandates for biofuels, such as the United States' Renewable Fuels Scheme (US RFS) and the *NSW Biofuels Act*.

Under the US RFS, regulation has been developed to ensure that transportation fuel sold in the US contains a minimum volume of renewable fuel.<sup>77</sup> Ethanol use is increasing rapidly in the US and is expected to rise further in the future with the US Environmental Protection Agency (EPA) recently approving E15 (fuel containing up to 15 per cent ethanol) for vehicles made after 2006.<sup>78</sup>

Chart 6.5 shows that the US and Brazil were the major producers of ethanol in 2009. European countries were the largest producers of biodiesel (chart 6.6). Australian production of ethanol and biodiesel is quite small compared with many other nations. Australia produced 0.3 per cent and 0.6 per cent of global ethanol and biodiesel respectively in 2009. In its 2001 election policy, the then federal government set a target for production of 350 ML of biofuels by 2010.<sup>79</sup> This amounts to 0.004% of 2009 world production. It is estimated that biofuel production capacity in 2010 will easily exceed that target.<sup>80</sup>

71 Treasury Department, Budget 2010–11, May 2010, viewed 1 August 2010, <[http://www.budget.gov.au/2010-11/content/bp2/html/bp2\\_revenue-06.htm](http://www.budget.gov.au/2010-11/content/bp2/html/bp2_revenue-06.htm)>

72 Treasury Department, 'Implementation of alternative fuels taxation policy', Discussion paper, October 2010, viewed 26 October 2010, <<http://www.treasury.gov.au/contentitem.asp?NavId=037&ContentID=1845>>.

73 Fuel Standard (Petrol) Determination 2001.

74 Fuel Quality Information Standard (Ethanol) Determination 2003 (as amended).

75 Fuel Standard (Automotive Diesel) Determination 2001.

76 APAC, 2009, pp. 15–16; *Australian Biofuels 2010–11*, client report, September 2010, pp. 11–12.

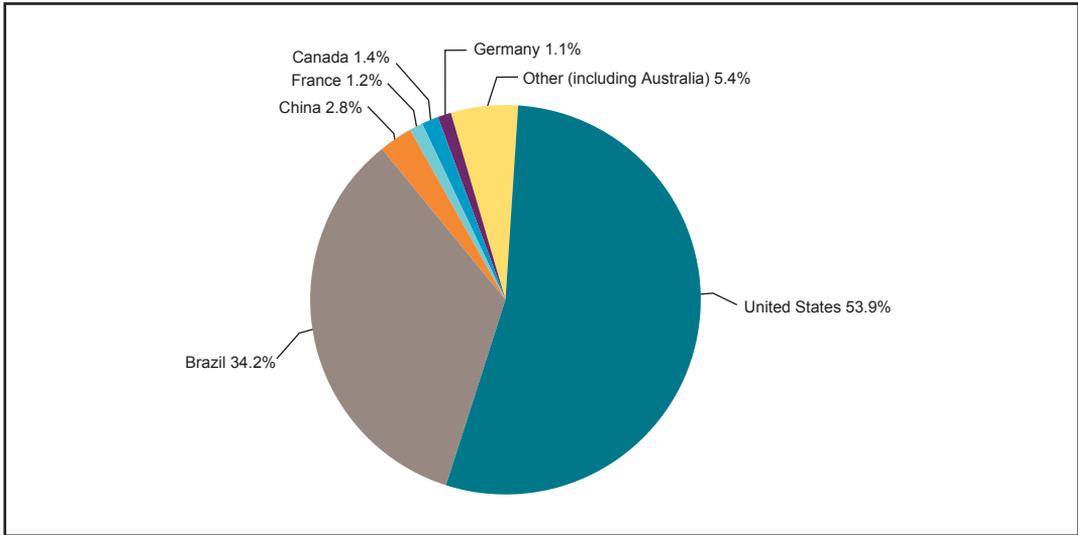
77 US EPA 8 July 2010, viewed 18 August 2010, <<http://www.epa.gov/otaq/fuels/renewablefuels/index.htm>>.

78 APAC Biofuel Consultants, *Australian Biofuels 2009*, final report, 28 August 2009, p. 14; Biofuels Digest, 'E15 fuel approved in US', 16 October 2010, viewed 16 October 2010, <<http://www.tandlnews.com.au/2010/10/16/article/E15-fuel-approved-in-US/MRNEQMBNGM.html>>

79 Australian Government Biofuels Taskforce, *Report of the Biofuels Taskforce to the Prime Minister*, August 2005, p. 5.

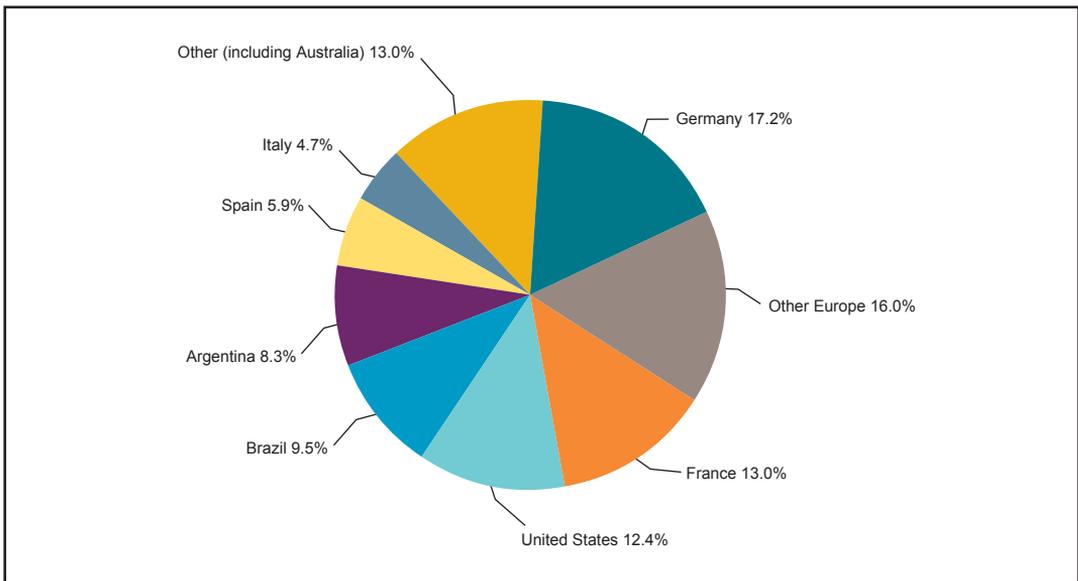
80 APAC, 2009, pp. 36, 47.

Chart 6.5 Global ethanol production: 2009



Sources: ACCC analysis based on APAC *Australian Biofuels 2010–11* data

Chart 6.6 Global biodiesel production: 2009



Sources: ACCC analysis based on APAC *Australian Biofuels 2010–11* data

## 6.4.1 Biofuel feedstocks in Australia

As discussed in section 6.2, biofuels can be produced from a variety of different feedstocks. In Australia, the main feedstocks for ethanol production are sugarcane, wheat starch waste and sorghum. Biodiesel feedstocks include tallow, canola, and used vegetable oil.

## 6.4.2 Australian ethanol production capacity

Prior to 2007, Manildra's plant in Nowra, NSW, accounted for almost all of Australia's ethanol production. Manildra is still the largest producer, having increased capacity to 210 ML per annum in 2010. A further capacity increase to 300 ML is planned for 2011. Ethanol production in Queensland has also grown. Sucrogen BioEthanol (formerly CSR Ethanol) at Sarina increased capacity to 60 ML in 2009 and a further capacity increase is planned in 2013. A new 'greenfields' plant at Dalby in Queensland opened in 2009, with a capacity of 80 ML.

The Dalby plant went into voluntary administration in June 2010. The receivers advised that the plant will continue to operate as normal and will be prepared for sale.<sup>81</sup> It has also been reported that Sucrogen has entered into an arrangement to sell its business to Singapore-based Wilmar International.<sup>82</sup>

Table 6.1 shows current operating ethanol production capacity (in blue) and potential future capacity (in orange) to 2015 if planned plants go ahead. In 2010 total ethanol production capacity is 350 ML. There are four proposed plants which may come online from 2013 onwards. If all planned plants go ahead in the coming years, production capacity could be up to 910 ML in 2015.

Table 6.1 Australian ethanol production capacity (ML): 2010 to 2015

Operator	Location	Feedstock	Current Status	2010	2011	2012	2013	2014	2015
Manildra	Nowra, NSW	wheat starch, wheat	Operating	210	300	300	300	300	300
Sucrogen Bio-Ethanol	Sarina, Qld	molasses	Operating	60	60	60	100	100	100
Dalby Bio	Dalby, Qld	sorghum, other grain	Operating	80	80	80	80	80	80
Austcane	Ayr, Qld	sugar juice, molasses	Potential	0	0	0	50	100	100
NQBR	Ingham, Qld	sugar juice, molasses	Potential	0	0	0	35	70	70
Coskata	Vic.	biomass	Potential	0	0	0	50	100	200
Mackay Sugar	Mackay, Qld	molasses	Potential	0	0	0	0	30	60
Total from existing plants				350	440	440	480	480	480
Total from (proposed) new and existing plants				350	440	440	615	780	910

Source: APAC *Australian Biofuels 2010-11*

81 Stuart Cumming, 'Bio-refinery in financial trouble', *Toowoomba Chronicle*, 23 June 2010, viewed 10 August 2010, <<http://www.thechronicle.com.au/story/2010/06/23/Dalby-Bio-refinery-financial-trouble/>>.

82 Dave Ernsberger, 'Singapore's Wilmar buys Australian ethanol maker', *Platts Oilgram News*, 8 July 2010, p. 2.

### 6.4.3 Australian biodiesel production capacity

The Australian biodiesel industry suffered from high feedstock prices in 2008 and 2009. Natural Fuels' Darwin plant (capacity 140 ML per annum) went into liquidation, while ABG's Narangba (Queensland) plant (capacity 160 ML) ceased operations. A number of other plants are still operating in 'stand-by' mode.<sup>83</sup> Elements of the industry claim to be suffering as a result of the 'dumping' of US biodiesel in the Australian market, undercutting Australian producer's prices. Industry participants lodged an 'Application for Dumping or Countervailing Measures' to the Australian Customs and Border Protection Service in June 2010, requesting an investigation into the potential need for imposing an anti-dumping duty on US biodiesel. This is currently being investigated by Customs.<sup>84</sup>

Table 6.2 shows current operating biodiesel production capacity (in blue) and potential future capacity (in orange) to 2015 if planned plants go ahead. Plants on stand-by are in grey. In 2010 total (operating) biodiesel capacity is 131 ML. If all planned plants go ahead in the coming years, production capacity could be up to 609 ML in 2015.

Table 6.2 Australian biodiesel production capacity (ML): 2010 to 2015

Operator	Location	Feedstock	Current Status	Year					
				2010	2011	2012	2013	2014	2015
Biodiesel Industries	Rutherford, NSW	tallow, canola	Operating	20	20	20	35	35	35
Biodiesel Producers	Barnawatha, Vic.	tallow	Operating	60	60	60	60	60	60
Biomax Fuels (Energetix)	Laverton, Vic.	used cooking oil, tallow, algae	Operating	30	30	50	50	50	50
Macquarie Oil	Tasmania	poppyseed, tallow	Operating	15	15	15	15	15	15
Australian Renewable Fuels	Laverton, Vic.	tallow	Operating	6	6	6	6	6	6
Total operating				131	131	151	166	166	166
Australian Renewable Fuels	Picton, WA & Adelaide, SA	tallow, canola	Stand-by	90	90	90	90	90	90
BP	Bulwer, Qld	tallow	Stand-by	35	35	35	35	35	35
Eco Tech (Gull)	Narangba, Qld	waste oil, tallow	Stand-by	30	30	30	30	30	30
Total operating and stand-by				286	286	306	321	321	321
National Biofuels	Port Kembla	soybean	Potential new plant	0	0	100	288	288	288
Total from all plants				286	286	406	609	609	609

Source: APAC *Australian Biofuels 2010-11*

<sup>83</sup> APAC, 2010-11, p. 42.

<sup>84</sup> Australian Customs and Border Protection Service, 'Anti Dumping and Countervailing Actions – Status Report as at 31 August 2010', viewed 27 September 2010, <<http://www.customs.gov.au/webdata/resources/files/MicrosoftWord-2010-08StatusReportPat.pdf>>.

## 6.4.4 Cost of ethanol feedstocks relative to petrol feedstocks

In 2010, the ACCC commissioned biofuel consultants through Energy Quest to prepare a report, *Benchmarking the price of fuel ethanol in Australia*. A copy of this report is available on the ACCC website.<sup>85</sup> According to Energy Quest, the cost of ethanol feedstocks make up between 70 per cent and 85 per cent of the cost of production of ethanol, and is largely influenced by different factors to those affecting petrol inputs. The price of each feedstock is based on the price of the agricultural commodity it is derived from and therefore each feedstock has its own pricing dynamics. The cost of feedstocks is uncertain because of price volatility, which is driven by supply and demand factors influenced by population growth, weather and climate change factors.<sup>86</sup>

### 'Second-generation' feedstocks

Unlike 'first-generation' feedstocks, which are derived primarily from food crops, 'second-generation' feedstocks are produced from non-food biomass.<sup>87</sup> Use of second-generation feedstocks (such as forest products, wood wastes and crop residues) largely mitigates any 'food for fuel' issues associated with first-generation feedstocks, because second-generation feedstocks are not produced from crops that can be used as food. Ethanol production from cellulose is one second-generation feedstock that has shown promise. Authors of a UN Development Program/World Bank study commented that cellulosic ethanol could potentially be important in the future because of its widespread availability, abundance, low cost, and significant lifecycle greenhouse gas (GHG) emission reduction capability.<sup>88</sup>

To date, second-generation biofuels have been too expensive to compete with petroleum at current price levels on a large scale.<sup>89</sup> The Australian Government announced the release of its *Second Generation Biofuels Research and Development Program* in October 2008, which provides funding for a number of projects undertaking research, development and demonstration of new biofuel technologies.<sup>90</sup>

A consortium of companies is assessing the viability of building a plant in Victoria to produce ethanol from household waste.<sup>91</sup> The plant is still in the planning stage and it may take some time before second-generation biofuels are a viable alternative to conventional petroleum-based fuels.

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85 The report can be found on the ACCC website at <[www.accc.gov.au/fuel](http://www.accc.gov.au/fuel)>.

86 Energy Quest, pp. 17–18.

87 R.Sims, M.Taylor, J.Saddler, and W.Mabee, 'IEA's Report on 1st- to 2nd-Generation Biofuel Technologies', 9 March 2009, viewed 15 May 2010, <<http://www.renewableenergyworld.com/rea/news/article/2009/03/ieas-report-on-1st-to-2nd-generation-biofuel-technologies>>.

88 M.Kojima and T.Johnson, 'Potential for biofuels for transport in developing countries', World Bank Energy Sector Management Assistance Programme, Washington DC, October 2005, p. 120.

89 K.Kleiner, 'The backlash against biofuels', *Nature reports: Climate change*, Vol.2, January 2008, p. 11, viewed 8 April 2010, <[www.nature.com/reports/climatechange](http://www.nature.com/reports/climatechange)>.

90 Department of Resources, Energy and Tourism (RET), 'Second Generation Biofuels Research and Development Program (Gen2)', July 2010, viewed 3 August 2010, <[http://www.ret.gov.au/resources/resources\\_programs/alternative\\_fuels\\_programs/second\\_generation\\_biofuels\\_research\\_and\\_development\\_program/Pages/SecondGenerationBiofuelsResearchandDevelopmentProgram.aspx](http://www.ret.gov.au/resources/resources_programs/alternative_fuels_programs/second_generation_biofuels_research_and_development_program/Pages/SecondGenerationBiofuelsResearchandDevelopmentProgram.aspx)>

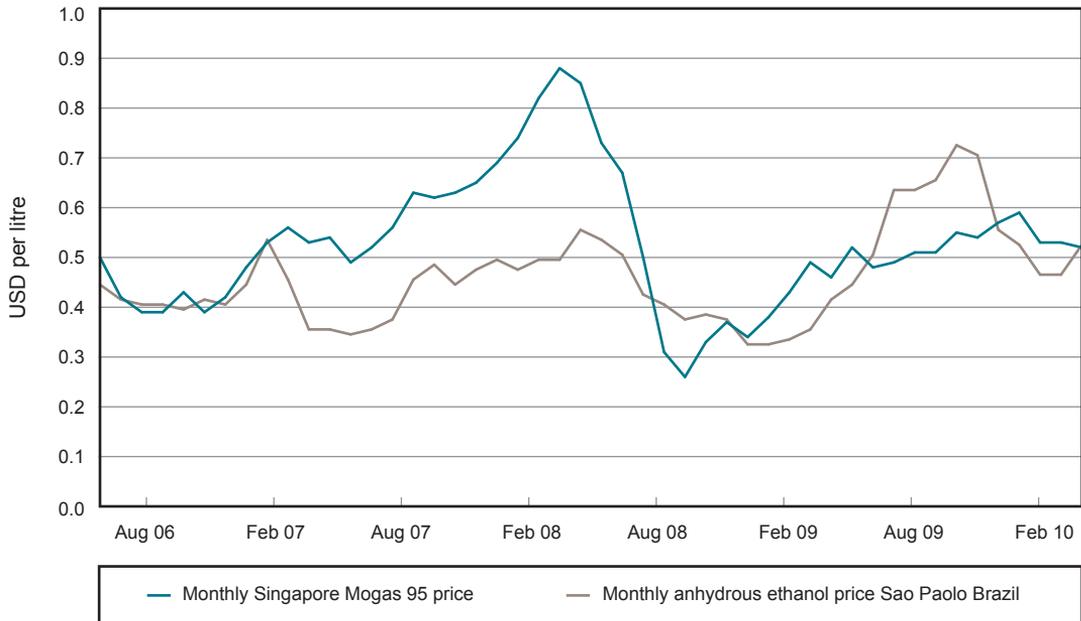
91 Caltex Australia, Holden, Veolia, Mitsui & Co, Coskata, Victorian Government, *High-tech fuel for tomorrow's cars*, joint media release, 24 March 2010.

## 6.5 Ethanol pricing

### 6.5.1 Global ethanol pricing

Chart 6.7 shows that movements in ethanol prices do not appear to be strongly correlated with petrol prices. Energy Quest (2010) identified that the Brazilian ESALQ price is the local measure for ethanol pricing in Brazil (the largest ethanol exporter worldwide). It is also the most referenced price for ethanol contracts worldwide (including in the Asian market).<sup>92</sup>

Chart 6.7 Brazilian ethanol price\* compared with Australian petrol benchmark (Singapore Mogas 95): August 2006 to July 2010



Source: ACCC analysis based on Platts and CEPEA data

Note: \*Brazilian ethanol price is the monthly average ESALQ (Escola Superior de Agricultura Luiz Queiroz) index price in cash for anhydrous ethanol from São Paulo State in USD per litre, as obtained from CEPEA, a research centre of the University of São Paulo.<sup>93</sup>

<sup>92</sup> Energy Quest, p. 7.

<sup>93</sup> <http://www.cepea.esalq.usp.br/xls/SaamensalUS.xls>

## 6.5.2 Ethanol pricing in Australia

Energy Quest found that a number of factors influence the price for ethanol in Australia and also the retail price differential between E10 and RULP.

For ethanol producers, the key consideration in pricing ethanol to be sold into the fuel market is the cost of production of ethanol. As summarised by Energy Quest, the cost of production is dominated by the cost of the ethanol feedstock (i.e., wheat, molasses or sorghum).<sup>94</sup> Pricing of ethanol to be used as transport fuel is also often linked to the price of petrol. According to Energy Quest, the rationale for adopting petrol linked ethanol pricing is that ethanol is used as a volume extender or a replacement for petrol.<sup>95</sup>

## 6.6 The increasing presence of biofuels

Use of biofuels has increased in Australia in recent years, due in part to state government mandates for consumption. There are a number of reasons why government policy might focus on promoting biofuels and consumers may choose to purchase them. Some reasons for the move to biofuels include price, performance and environmental characteristics, promotion of regional development and diversification of fuel sources.

Some of the considerations taken into account by consumers in determining whether to use E10 include:

- value for money
- potential performance (including octane rating)
- impact on the environment
- vehicle compatibility
- availability of E10, RULP, and PULP
- the degree of confidence consumers have in E10 as an alternative to RULP.<sup>96</sup>

### 6.6.1 Price of E10

In Australia, to date E10 has usually been sold at a lower price than RULP. This may be because E10 generally gives lower fuel economy or because unlike RULP, the ethanol component of E10 (if domestically produced) is effectively not subject to excise. There are a number of reasons why relative prices of RULP and E10 may vary. Ethanol also has different feedstock costs and production processes to RULP.

ACCC monitoring over the past year across the monitored locations found a differential between RULP and E10 prices of 2.6 cpl in 2009–10, a decrease of 0.2 cpl from 2008–09.<sup>97</sup> Chart 9.27 (chapter 9) shows E10, RULP and PULP prices from July 2007 to September 2010.

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94 Energy Quest, p. 13.

95 Ibid p. 14

96 Ibid p. 13.

97 Appendix D shows E10 prices for a number of monitored locations where both RULP and E10 are sold for the period October 2009 to September 2010.

## 6.6.2 Performance and environmental characteristics

### Biofuels and octane rating

Due to its high octane rating (129 RON), the addition of ethanol to petrol generally increases the octane of the fuel.<sup>98</sup> E10 generally has an octane rating of approximately 94 RON, compared with RULP, which is 91 RON.

Although ethanol has a higher octane rating than RULP, it has a lower energy content. This means that generally EBP gives lower fuel economy than RULP. Testing suggests that the increase in fuel consumption will be approximately 2.8 per cent for post-1986 vehicles running on E10.<sup>99</sup>

Biodiesel also typically has a lower energy content than diesel, varying between 88 per cent and 99 per cent of diesel.<sup>100</sup> Although delivering lower fuel economy, motorists are also likely to consider E10's other characteristics, such as its cleaner burning nature, when making purchasing decisions.<sup>101</sup>

#### Background on octane rating

Research octane number (RON) measures a fuel's performance under normal driving conditions. It gives an indication of its 'anti-knock' quality or resistance to pre-ignition.<sup>102</sup> Higher-octane fuels generally burn more evenly and resist engine knocking. According to the NRMA, running a vehicle on a lower-grade petrol than recommended by the vehicle manufacturer can result in a 'knocking', 'rattling' or 'pinging' sound that means the fuel is not burning with maximum efficiency. Knocking is undesirable because it wastes petrol and can damage an engine in the long run. Using fuel with the correct octane number for a vehicle's engine eliminates knocking.<sup>103</sup>

### Vehicle compatibility

The Federal Chamber of Automotive Industries (FCAI) lists suitability of E10 for a range of vehicles on its website.<sup>104</sup> Not all vehicles are compatible with E10, and some motorists will be forced to use PULP where RULP is unavailable. However, PULP may also contain ethanol, and consumers in certain areas may find it difficult to source petrol that does not contain ethanol.

The Queensland Department of Employment, Economic Development and Innovation's final report on the Public Benefit Test in relation to the Queensland mandate noted that as at November 2009 approximately 37 per cent of vehicles in Queensland were incompatible with E10. By 1 January 2011, it was estimated that this number would have declined to 20 per cent. A similar number of motorists unable to use E10 might be expected in NSW. Where RULP is unavailable, motorists who are unable to use E10 in their cars will pay a higher price for fuel, as, on average, five-city<sup>105</sup> PULP 95 prices were 9.3 cpl higher than five-city RULP prices over the 2009–10 financial year.

98 Energy Quest, p. 6.

99 Australian Government Biofuels Taskforce, p. 32.

100 *ibid*, p. 33.

101 *ibid*, p. 25.

102 Australian Institute of Petroleum (AIP), 'Biofuels Factsheet', viewed 9 August 2010, <<http://www.aip.com.au/pdf/BioFuelFactSheet.pdf>>.

103 NRMA, 'Fuel types - E10, ULP, PULP, UPULP...', viewed 24 September 2010, <[http://www.mynrma.com.au/cps/rde/xchg/mynrma/hs.xsl/fuel\\_types.htm](http://www.mynrma.com.au/cps/rde/xchg/mynrma/hs.xsl/fuel_types.htm)>.

104 Federal Chamber of Automotive Industries (FCAI) 2010, 'Can my vehicle operate on Ethanol blend petrol?', viewed 2 August 2010, <<http://www.fcai.com.au/publications/all/all/all/3/can-my-vehicle-operate-on-ethanol-blend-petrol->>>.

105 Average five-city prices refers to average prices in Sydney, Melbourne, Brisbane, Adelaide and Perth.

Warranties might also restrict some motorists from switching to E10. Although many new vehicles sold in Australia can use E10, some vehicles are not warranted to run on E10 and some consumers may be concerned about warranty cover.<sup>106</sup>

### Biofuels and the environment

Depending on the feedstocks and production processes used, biofuels can be better for the environment than conventional fuels sourced from crude oil. Many consumers choose to use biofuels due to perceived environmental benefits. This is largely because biofuels are made from renewable sources such as plant and animal materials. However, environmental claims made about biofuels should consider the whole life cycle production process in order to give an accurate representation of the environmental benefit of the product. Full fuel-cycle analysis of emissions takes into account not only direct emissions from vehicles, but also those associated with the extraction, production, transport, processing, conversion and distribution of the fuel. That is, both upstream (pre-combustion) and downstream (tailpipe or combustion) emissions.<sup>107</sup>

### Promoting regional development

Both the NSW and Queensland governments cite promoting regional development (through job creation and supporting farmers) as a key reason for introducing or intending to implement biofuel mandates in those states.<sup>108</sup>

### Diversifying fuel sources

Use of biofuels reduces reliance on crude oil, a non-renewable resource. Some governments consider that reducing reliance on crude oil is important for energy security. Currently biofuels are only blended into petrol at relatively low ratios in Australia. For example, as shown in chart 6.1, EBP made up approximately 12.2 per cent per cent of Australian petrol sales in 2009–10. At present ethanol replaces about 1.2 per cent of Australia's petrol needs.<sup>109</sup> Petrol containing greater concentrations of ethanol such as E85 is not widely available in Australia, but is widespread in Brazil.

### The food for fuel debate

There has been much debate globally regarding increased biofuel consumption potentially affecting feedstock prices (and consequently food prices). The IEA noted in 2008 that competition from biofuel production was one of the many factors contributing to higher food prices.<sup>110</sup> The Australian Bureau of Agricultural and Resource Economics (ABARE) and the Grains Research and Development Corporation (GRDC) also noted in its May 2009 *Australian Grains Report* that world demand for biofuels will continue to be a key driver of demand for grain and oilseeds over the medium term, particularly in the US, the European Union and Asia.

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106 Caltex, Caltex Star, *Time to get serious about biofuels*, December 2009 – January 2010, p. 6.

107 Australian Government Biofuels Taskforce, p.32.

108 NSW Land and Property Management Authority, *Biofuels in New South Wales*, viewed 12 November 2010, <<http://www.biofuels.nsw.gov.au/>>; Queensland Department of Employment, Economic Development and Innovation, *Ethanol factsheet*, viewed 12 November 2010, <<http://203.210.126.185/dsdweb/v4/apps/web/secure/docs/1838.pdf>>.

109 RET *Australian Petroleum Statistics*, ACCC.

110 International Energy Agency (IEA), *IEA World Energy Outlook 2008*, viewed 1 June 2010, p. 174, <<http://www.worldenergyoutlook.org/docs/weo2008/WEO2008.pdf>>.

According to ABARE and the GRDC, biofuel feedstock prices have become linked to the price of oil. Ethanol and biodiesel compete directly with petroleum-based petrol and diesel in energy markets, therefore oil prices have the potential to drive biofuel prices and influence the prices of their agricultural feedstocks.<sup>111</sup> Some industry participants have raised concerns about increased demand for biofuels driving up grain prices in Australia. APAC industry consultants, however, have noted that because the Australian biofuel industry is at present very small relative to the US/Brazil/EU producing regions, there may be less potential for Australian demand for biofuels to drive up food prices.<sup>112</sup>

## 6.7 Take up of biofuels and flex-fuel vehicles in Australia and overseas

In NSW and Queensland many petrol retailers offer E10 for sale in the capital cities as well as many regional areas. Sales of E10 in Victoria and South Australia are largely limited to the capital cities. There are also a few retailers offering E10 in Tasmania.

A small number of retailers started offering E85 in Melbourne and Sydney in recent years. This has expanded in 2010. For example, Caltex now offers an E85 fuel at approximately 30 service stations in the eastern capital cities and plans to increase the number of locations to approximately 130 in 2011.<sup>113</sup>

### 6.7.1 Flex-fuel vehicles

FFV are able to run on both high ethanol content EBP and RULP. These vehicles have experienced differing levels of success worldwide. Brazil was the first country to broadly embrace FFV and high ethanol petrol blends. FFV are also available in the US, but vehicle uptake has been less widespread than in Brazil. Understandably, FFV have seen more take-up in the corn producing states of the Midwest US, where ethanol pricing might be more attractive and consumers potentially more enthusiastic about supporting the local corn industry.<sup>114</sup> Although there have been relatively few FFV available for sale in Australia to date, they are becoming more widely available. Saab introduced a flex-fuel 'Biopower' model into Australia in 1996, and the latest versions of the Holden Commodore VE Series II, released in September 2010, are FFV.<sup>115</sup>

### 6.7.2 Take up of biodiesel

Germany and France are the largest biodiesel producers worldwide (chart 6.6). European countries accounted for approximately 57 per cent of global biodiesel production in 2009. Given the increasing demand for diesel in many European countries, it is not surprising that Europe is the biggest global market for biodiesel. Biodiesel blends are becoming more widely available at an increasing number of service stations across Australia.<sup>116</sup> Not all vehicles are compatible with biodiesel and the FCAI notes that vehicle owners should confirm with the manufacturer if their vehicle is suitable for use with biodiesel.<sup>117</sup>

111 Grains Research and Development Corporation (GRDC) and Australian Bureau of Agricultural and Resource Economics (ABARE), *Australian Grains*, May 2009, p. 5, viewed 2 June 2010, <[http://www.abare.gov.au/publications\\_html/crops/crops\\_09/crops\\_08.pdf](http://www.abare.gov.au/publications_html/crops/crops_09/crops_08.pdf)>.

112 APAC, 2009, p. 18.

113 Caltex media release, 2 August 2010, viewed 8 August 2010, <<http://www.caltex.com.au/LatestNews/Pages/NewsItem.aspx?>>.

114 US Department of Energy, 'Alternative and Advanced Vehicles: Flexible Fuel Vehicles', 2010, viewed 1 September 2010, <<http://www.afdc.energy.gov/afdc/data/geographic.html>>.

115 SAAB media release, 19 December 2008, viewed 16 September 2010, <<http://www.saab.com.au/au/en/start#/world/news-and-events/press-releases/e85/carrousel:all/commodore2>>.

116 Biofuels Association of Australia, Biodiesel in Australia, 2010, viewed 1 July 2010, <[http://www.biofuelsassociation.com.au/index.php?option=com\\_content&view=article&id=55&Itemid=63](http://www.biofuelsassociation.com.au/index.php?option=com_content&view=article&id=55&Itemid=63)>.

117 FCAI 2010, *Information on Biodiesel*, viewed 20 September 2010, <<http://www.fc.ai.com.au/environment/information-on-biodiesel>>.

## 6.8 Biofuels: consumers and competition

The ACCC is monitoring developments in the emerging market for EBP and biodiesel in Australia in readiness to consider issues of compliance with the Act if they arise. The ACCC is mindful that when markets are developing and competitors are attempting to carve out a niche or gain a competitive advantage, competition, consumer protection and supply issues may be more likely to occur.

### 6.8.1 Concerns for consumers

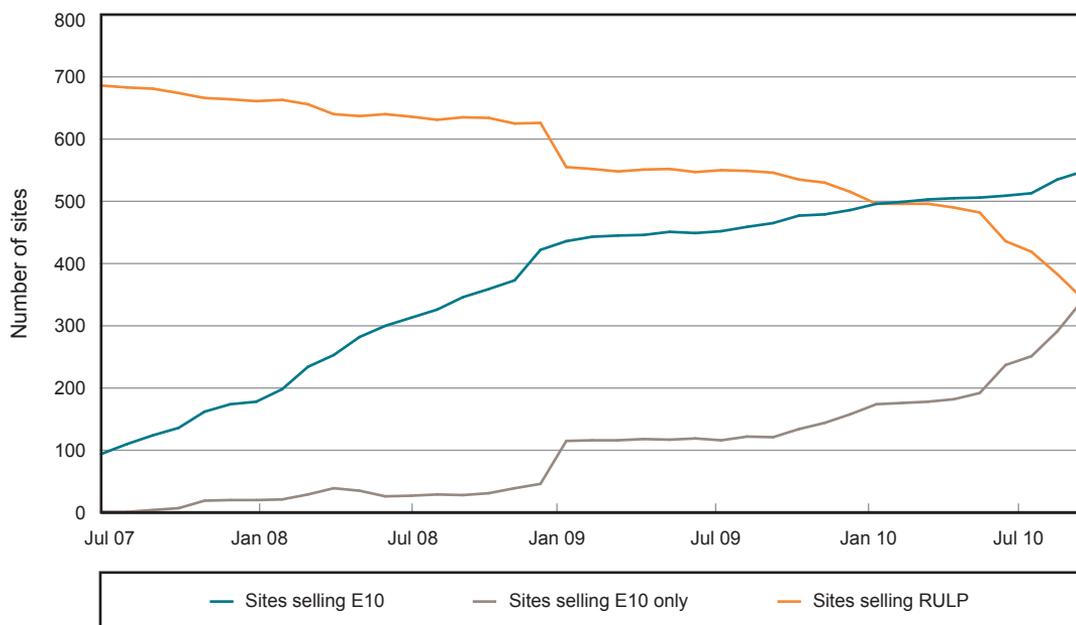
As is often the case with new products, there is a need for improved consumer awareness regarding biofuels so that consumers can make informed choices. This is especially important where use of biofuels is mandated, as in NSW and potentially in Queensland in the future.

#### Reduced consumer choice

Effectively, the NSW mandate results in reduced consumer choice in NSW because the decision by petrol companies to cease offering RULP has been largely driven by the mandate. There has already been a gradual decrease in the number of sites offering RULP in NSW. Chart 6.8 shows this trend in Sydney. This trend has also been seen in parts of Queensland, even though plans for the introduction of the Queensland mandate have been delayed (chart 6.9).

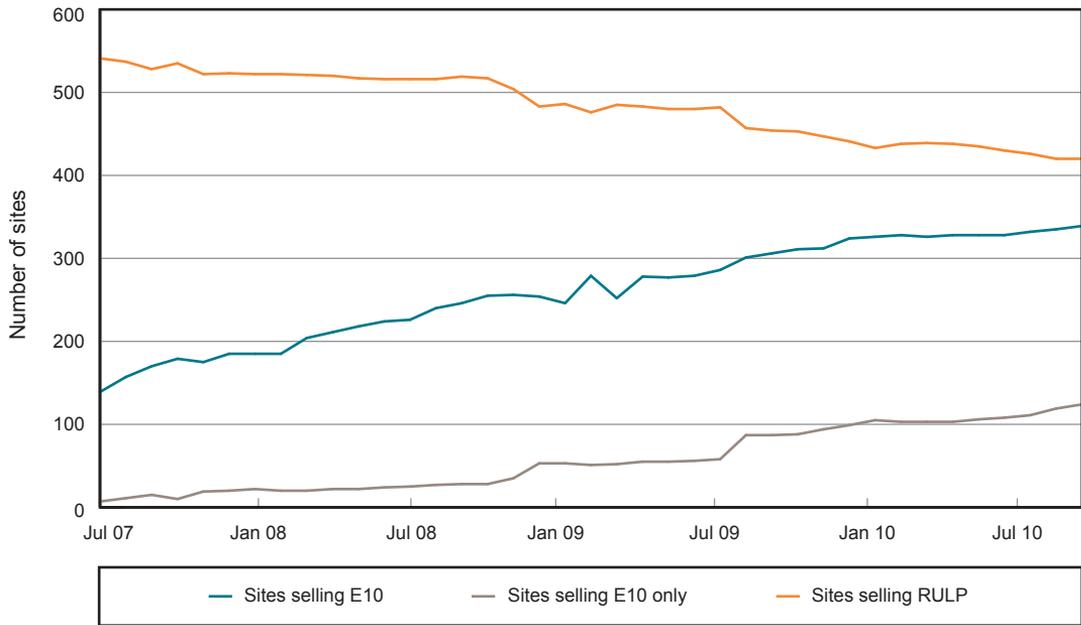
While the number of sites selling RULP has been relatively constant in Melbourne over the past few years, sites selling RULP in Sydney and in Brisbane have gradually decreased (charts 6.8, 6.9 and 6.10). In Brisbane and Sydney the number of sites selling E10 only (and no RULP) has also been increasing steadily. There are very few sites in Melbourne selling E10 only.

Chart 6.8 Number of sites selling RULP, E10 and E10 only in Sydney: July 2007 to September 2010



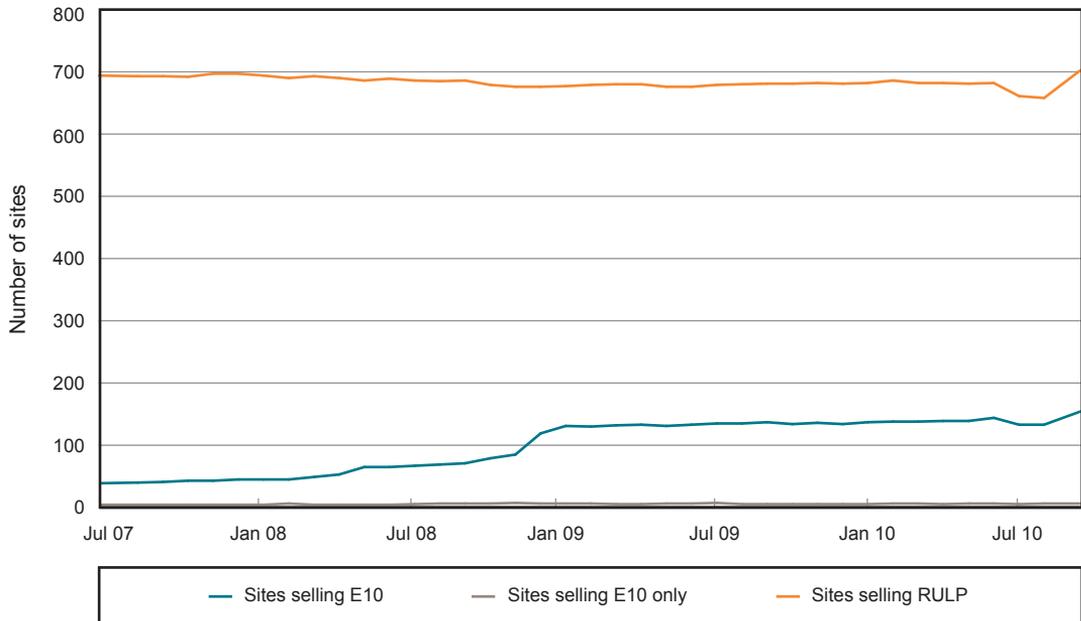
Sources: ACCC analysis based on Informed Sources data

Chart 6.9 Number of sites selling RULP, E10 and E10 only in Brisbane: July 2007 to September 2010



Sources: ACCC analysis based on Informed Sources data

Chart 6.10 Number of sites selling RULP, E10 and E10 only in Melbourne: July 2007 to September 2010



Sources: ACCC analysis based on Informed Sources data

## Consumer knowledge

The ACCC has received a number of complaints in recent years about EBP, particularly in NSW and Queensland. These are discussed in more detail in chapter 2. Consumers need to have information available to them to make informed decisions, particularly in states where EBP use is mandated. Given different state requirements, consumers travelling interstate will need to pay close attention to the labelling at the pump to ensure that they purchase the right type of fuel for their vehicle.

## Labelling and signage

The ACCC is receiving an increasing number of complaints about unclear labelling of E10. It should also be noted that the *Fuel Quality Standards Act 2000* requires petrol containing ethanol to be clearly labelled. This legislation is administered by the Department of Sustainability, Environment, Water, Population and Communities.

Consumers have also raised concerns that petrol products and prices may be advertised on price boards without clearly stating that the fuel contains ethanol. Because not all vehicles are compatible with E10, it is important that retailers label E10 appropriately so that consumers can make informed purchasing decisions.

Where there is evidence that consumers are misled or likely to be misled by retailers failing to ensure that labelling and signage of E10 is clear and accurate, the ACCC will take action to enforce the Act.

## ACCC green marketing guide

The ACCC released the *Guide to green marketing and the TPA* in 2008, with the aim of educating businesses about their obligations regarding environmental claims under the Act. Manufacturers, suppliers and advertisers of biofuels may find the guide useful in assessing the strength of any environmental claims they make and improving the accuracy and usefulness to consumers of their labelling, packaging and advertising.

## Issues raised at the ACCC Fuel Consultative Committee (FuelCC)

Ethanol mandates were one of the key issues raised at meetings of the FuelCC<sup>118</sup> in April and November 2010. FuelCC members raised concern about:

- ethanol mandates restricting consumer choice
- lack of consumer education about ethanol mandates
- consumer perceptions about EBP
- signage and labelling of E10
- value for money and energy content of E10
- competitiveness of ethanol pricing in a mandated environment with few suppliers
- retailers experiencing difficulty complying with the mandate requirements due to supply constraints
- price competitiveness of imports in the absence of domestic supply
- changes to ethanol excise
- implications of the NSW mandate and a potential increase in PULP sales
- the suspension of the Queensland mandate

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<sup>118</sup> See chapter 2 for more details on this committee.

- the cost of implementing the mandates, including the additional cost to petrol retailers in reforming their sites and further costs where mandates are withdrawn
- the effect of reduced availability of RULP on the marine fuel market.

## 6.8.2 Potential competition issues

### Supply

Future investment in the Australian ethanol industry has been affected by a number of factors in recent years. The global financial crisis in 2008 had the effect of threatening plant closures and capacity expansions worldwide. Asset financing of bio-refineries decreased.<sup>119</sup> Future plant capacity in Australia was affected with many planned ethanol and biodiesel projects having been cancelled or delayed.<sup>120</sup> Feedstock prices and volatility of oil prices are also likely to have impacted on investment decisions.

State government mandates promoting ethanol consumption have also affected supply. On one hand, existing ethanol producers have increased capacity to meet increasing demand. On the other, investors in new plants and planned capacity expansions at existing plants might have been affected by uncertainty about whether state mandates would be implemented. The federal government is also currently considering taxation on ethanol which will also be taken into account by industry when making investment decisions.

Due to the small number of ethanol producers and limited capacity of ethanol production in Australia, ethanol shortages may occur, and could lead to price increases for ethanol and EBP (chart 6.11).

In chart 6.11 it is assumed that all RULP volumes sold in NSW are replaced by E10 when RULP becomes unavailable from 1 July 2012. In practice, however, it is likely that a minority of NSW motorists will switch to more expensive PULP instead of E10. However, the chart also assumes that current ethanol suppliers will meet their projected production capacities. This may not be the case. Demand from Victoria and Queensland is estimated to be the same as sales in 2009–10, as reported by RET.<sup>121</sup>

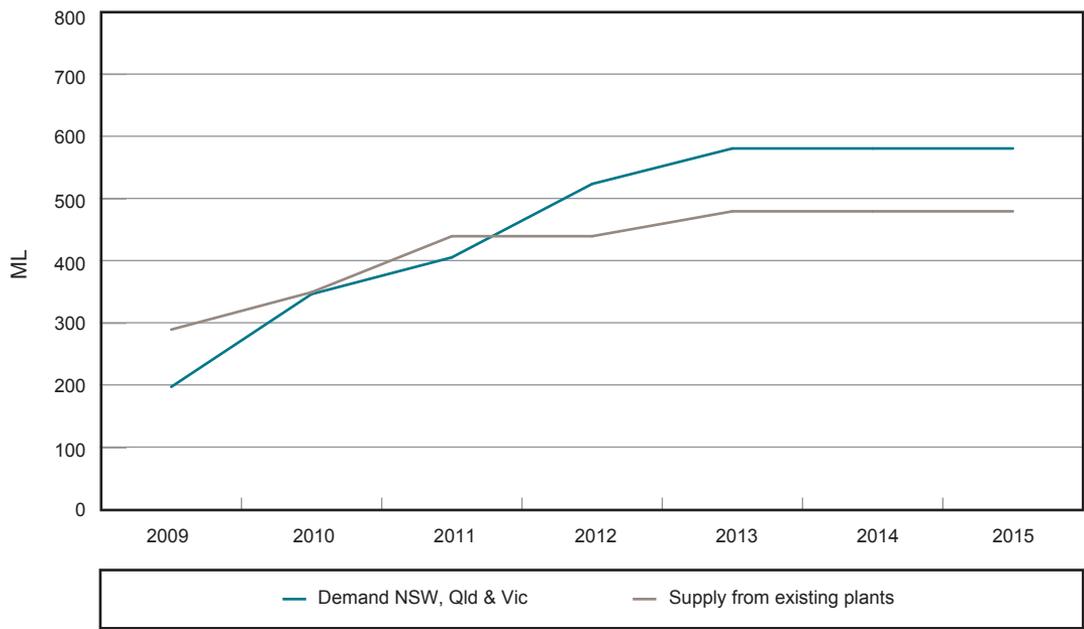
Although there are some new plants proposed for 2013 and 2014, given the current suspension of the Queensland mandate, the delay in the full implementation of the NSW mandate and other uncertainties it is unclear if these will go ahead. Therefore chart 6.11 does not take supply from proposed new plants into account.

119 APAC, 2009, p. 6.

120 Ibid, p. 30.

121 Potential growth in E10 demand from Queensland and Victoria as well as demand for higher blends of EBP such as E85 in all states where it is sold is not taken into account in the chart. This chart also does not include demand from South Australia and Tasmania, as RET does not report EBP sales from these states. Because of this and also because RET does not report the bulk of sales from independent retailers, shortages could potentially be greater than estimated here. The potential shortage of ethanol will be reduced to the extent that, when RULP is effectively prohibited, NSW motorists switch to more expensive PULP rather than E10.

Chart 6.11 Current and estimated mandated ethanol demand in NSW, sales demand from Queensland and Victoria, and Australian ethanol production capacity (supply): 2009 to 2015



Sources: ACCC analysis based on RET Australian Petroleum Statistics (APS), various issues; and APAC Australian Biofuels 2010-11 data

Note: Estimates based on 2009-10 petrol sales reported to RET (APS). Data for 2009 is based on actual sales reported to RET in all states. 2010 data is based on actual sales reported to RET in Victoria and Queensland to August 2010; average monthly sales to August 2010 are used as an estimate for the remaining four months. 2010 data for NSW is an estimate based on total petrol sales reported to RET for 2009-10 and a 4 per cent ethanol mandate. The first half of 2011 is an estimate based on 2009-10 total petrol sales and a 4 per cent mandate. The second half of 2011 and the first half of 2012 are estimated based on 2009-10 total petrol sales and a 6 per cent mandate. Estimated mandated volumes in NSW from July 2012 are based on the assumption that demand for RULP is transferred to EBP when RULP is effectively prohibited (and is estimated from 2009-10 sales). In practice it is likely that some RULP users will switch to more expensive PULP rather than use E10. Sales in Victoria and Queensland are estimated to be constant from 2009-10. Supply from existing plants assumes all existing plants produce at their maximum projected production capacity as reported by APAC. It is possible that exemptions will be granted by the NSW government so that retailers will not have to meet their full legislated requirements if there is a shortage of ethanol.

Even if the Queensland mandate is indefinitely suspended and taking account of the recently announced delays in scaling up of the NSW mandate, in the short to medium term there are still concerns over the supply of ethanol.

## Restrictions on ethanol imports

As discussed in section 6.3, the current excise policy for ethanol combined with the production grant and import duty arrangements effectively restrict ethanol imports. At present (and possibly up until 2020), domestic ethanol potentially has a pricing advantage over ethanol imports because of the production grant payable to domestic ethanol producers. Largely because of this, there have not been any significant fuel ethanol imports into Australia in recent years, despite the growing demand for ethanol. For imported ethanol to be competitive in the Australian market (under the current effective taxation arrangements), substantially higher petrol prices or lower global ethanol prices would be required.

Energy Quest predicts that any imports of ethanol will be limited until the excise treatment for both domestic and imported ethanol becomes more aligned.<sup>122</sup> Even then, the possibility of ethanol imports may be affected by the availability of fuel grade ethanol imports and appropriate coastal terminal infrastructure with the facilities to accept volumes of ethanol. Because fuel ethanol easily absorbs water or moisture, it requires specialised storage facilities to prevent it from being exposed to moisture.<sup>123</sup> According to Energy Quest, Australia currently has a very limited number of coastal terminals that have the facility to accept ethanol cargoes greater than 4 000 tonnes.<sup>124</sup>

The NSW Biofuels Act also requires that ethanol blended into fuel to meet mandate requirements complies with a biofuel sustainability standard.<sup>125</sup> This might have the effect of restricting retailers in NSW from selling imported ethanol, if the ethanol supplier was unable to comply with the conditions of the standard, or substantiate compliance with it.

### 6.8.3 Possible outcomes of limited supply

#### Price implications

There is a risk that limited supply and capacity, and growing mandated consumption will lead to higher ethanol prices. It is possible that consumers will bear any ethanol price increases by paying higher prices for EBP.

In both NSW and Queensland (if the mandate is introduced) it is possible that mandates might be temporarily relaxed if there is evidence of ethanol shortages or if mandates are having an adverse effect on petrol prices. In practise, this is likely to mean a lower percentage of ethanol is blended into RULP.

Data available to the ACCC shows that there may already be a trend towards higher E10 prices and that the price differential between RULP and E10 has been decreasing over time (table 6.3). It is likely that any costs of additional investment in ethanol production and distribution infrastructure will be borne by consumers.

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<sup>122</sup> Energy Quest, p. 5.

<sup>123</sup> *Ibid*, p. 10.

<sup>124</sup> *Ibid*, p. 33.

<sup>125</sup> *Biofuels Act 2007*(NSW) No. 23, Part 1, Section 3.1.

Table 6.3 Price differential between RULP and E10 across the monitored locations:<sup>126</sup>  
January 2007 to September 2010

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
2007	3.0	3.0	3.0	3.0	3.0	2.9	2.9	3.0	3.0	3.0	3.0	2.7	3.0
2008	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.9	2.9	2.9	2.9	3.0	2.8
2009	3.0	2.7	2.5	2.6	2.5	2.6	2.5	2.5	2.5	2.6	2.5	2.6	2.6
2010	2.6	2.6	2.6	2.5	2.6	2.5	2.6	2.6	2.6	—	—	—	2.6

Sources: ACCC, Informed Sources

### Limited supply and the Act

The ACCC would be concerned if limited supply of biofuels led to possible anti-competitive exclusive dealing or other anti-competitive agreements or conduct in breach of the Act. Such agreements could potentially have the effect of stopping smaller players from getting access to the biofuel market and limit their ability to provide competition in the market.

### Potential outcomes of increased demand for ethanol

Given expected shortages of ethanol in Australia, more pressure on supply could arise if E85 experienced a large take-up, or if other states decided to implement ethanol mandates. As the Australian biofuel industry grows, demand for biofuels could also put pressure on other industries, especially where food crops are being used for biofuel production. This could result in higher crop prices.

<sup>126</sup> See appendix D for more details on the locations where both E10 and RULP prices are monitored by the ACCC.

