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Task 42 Biorefining

Australia Task 42 Update
May 2019

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Federal elections called for Australia. Major party renewable platforms

- **Key Liberal Party (incumbent) promises with respect to the environment**
  - 26% to 28% CO_2 reduction below 2005 levels by 2030
  - A$2 billion Climate Solutions Fund that builds on the current Emissions Reduction Fund
  - Snowy 2.0. A pumped hydro power station with enough storage to power 0.5 million homes
  - A second power connector to bring hydro power from Tasmania to the rest of Australia
  - Develop a National Electric Vehicle Strategy to help transition to new technologies
  - Improve energy efficiency and create Cleaner, Greener Local Communities

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Federal elections called for Australia. Major party renewable platforms

- **Key Labor Party (challenger) promises with respect to the environment**
  - Renewable energy to provide 50% of total electricity demand by 2030
  - Reduce national carbon emissions by 45% from 2005 levels by 2030
  - A national electric vehicle target of 50% of all new car sales by 2050
  - Government fleet vehicles to be 50% electric by 2025 and tax deductions for electric vehicles
  - Double the original investment in the CEFC to A$10 billion
  - Government to invest A$1.14 billion into a National Hydrogen Plan
    - * To become a world leader in the hydrogen industry
    - * For use in exports, fuel security and reducing pollution in transport and industry
  - Develop a Bioenergy Strategy to develop the industry (A$2M)

Hydrogen Opportunity from PV and electrolysis in perspective

- In 2016 a report was prepared for ARENA authored by the CSIRO and Mitsui
- Report considered the opportunities in Australia for hydrogen production from PV sources
  - Australia is well endowed with solar resources and thus potentially a leader in this field
- Conclusions of the report included:
  - Currently it would cost about A$18.70/kg of hydrogen using a PV system
  - By 2030 the cost is projected to have declined to A$9.10/kg.
  - It currently costs A$0.48/kg to produce ethanol in the US (5% of that of the 2030 hydrogen PV cost)
  - It currently costs approximately A$2.00/kg to produce hydrogen via steam methane reforming
  - Steam methane reforming is not usually renewable as the gas is typically fossil sources

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Update on Fuel Production in Australia

* Data provided by Dept of the Environment and Energy as at January, 2019

(1) In 20 years Australia's crude oil production has reduced from 31 billion 664 Million litres in 2001 to 7 billion 79 Million litres currently - a reduction of 77.64%

(2) In 20 years Australia's crude oil and condensate production has reduced from 38 billion 705 Million litres in 2001 to 17 billion 916 Million litres currently - a reduction of 53.71%

Petroleum up to January, 2019

311 Australian production of primary petroleum

Year	Annual Crude oil ML	Annual Condensate ML	Annual Crude oil and condensate ML	Annual LPG ML	Annual Ethane Mm3	Annual Natural gas Mm3
1966-1967	645		645	0	0	0
1967-1968	1,902		1,902	0	0	10
1968-1969	2,236		2,236	0	0	60
1969-1970	4,882		4,882	37	0	780
1970-1971	14,936		14,936	752	0	1,960
1971-1972	19,038		19,038	1,228	0	2,630
1972-1973	20,668		20,668	1,796	30	3,710
1973-1974	23,193		23,193	2,030	50	4,400
1974-1975	23,134		23,134	2,172	60	4,820
1975-1976	23,827		23,827	2,232	70	5,380
1976-1977	24,598		24,598	2,530	100	6,400
1977-1978	25,369		25,369	2,918	130	7,050
1978-1979	24,896		24,896	3,171	140	7,860
1979-1980	23,711		23,711	3,112	150	9,090
1980-1981	23,093		23,093	2,984	140	10,520
1981-1982	22,386		22,386	3,033	150	11,650
1982-1983	21,085	984	22,069	2,909	170	11,750
1983-1984	25,732	1,096	26,828	3,132	180	12,310
1984-1985	29,241	1,715	30,956	3,864	200	13,170
1985-1986	29,782	1,952	31,734	4,016	200	14,500
1986-1987	29,457	2,047	31,504	3,927	180	14,900
1987-1988	14,158	1,276	15,434	1,943	93	7,258
1988-1989	25,573	2,681	28,254	3,763	184	15,772
1989-1990	28,744	3,250	31,993	3,785	192	20,090
1990-1991	28,661	3,294	31,955	3,547	182	21,111
1991-1992	27,780	3,529	31,309	3,589	189	22,564
1992-1993	27,039	3,666	30,704	3,778	194	23,959
1993-1994	25,196	3,730	28,925	3,701	190	26,114
1994-1995	26,777	4,395	31,171	3,609	203	29,095
1995-1996	24,058	6,193	30,251	3,649	202	29,985
1996-1997	24,163	6,885	31,049	3,789	435	29,317
1997-1998	25,779	8,183	33,961	4,437	566	30,323
1998-1999	19,938	7,960	27,898	3,904	562	30,681
1999-2000	29,604	7,861	37,465	4,368	612	31,180
2000-2001	31,664	7,041	38,705	4,056	479	31,524
2001-2002	28,933	7,167	36,100	4,612	406	32,136
2002-2003	25,816	7,504	33,320	4,682	406	33,162
2003-2004	20,668	7,208	27,876	4,639	380	33,279
2004-2005	18,172	7,201	25,372	4,628	407	37,267
2005-2006	17,117	7,003	24,120	4,722	456	38,016
2006-2007	21,168	7,404	28,572	4,550	439	39,331
2007-2008	18,832	6,957	25,789	3,971	454	39,283
2008-2009	20,107	7,680	27,787	3,929	395	40,109
2009-2010	18,429	8,901	27,330	4,096	427	43,537
2010-2011	17,334	8,438	25,772	3,906	407	47,558
2011-2012	16,584	7,484	24,068	3,813	416	45,173
2012-2013	13,695	7,572	21,267	3,627	419	52,299
2013-2014	12,934	7,205	20,140	3,722	328	51,705
2014-2015	12,596	6,465	19,061	3,323	332	51,751
2015-2016	11,582	6,813	18,395	3,060	311	88,169
2016-2017	8,973	7,161	16,132	3,016		104,232
2017-2018	8,145	7,535	15,680	2,762		120,914
2018-2019	7,079	10,837	17,916	2,780	0	142,085

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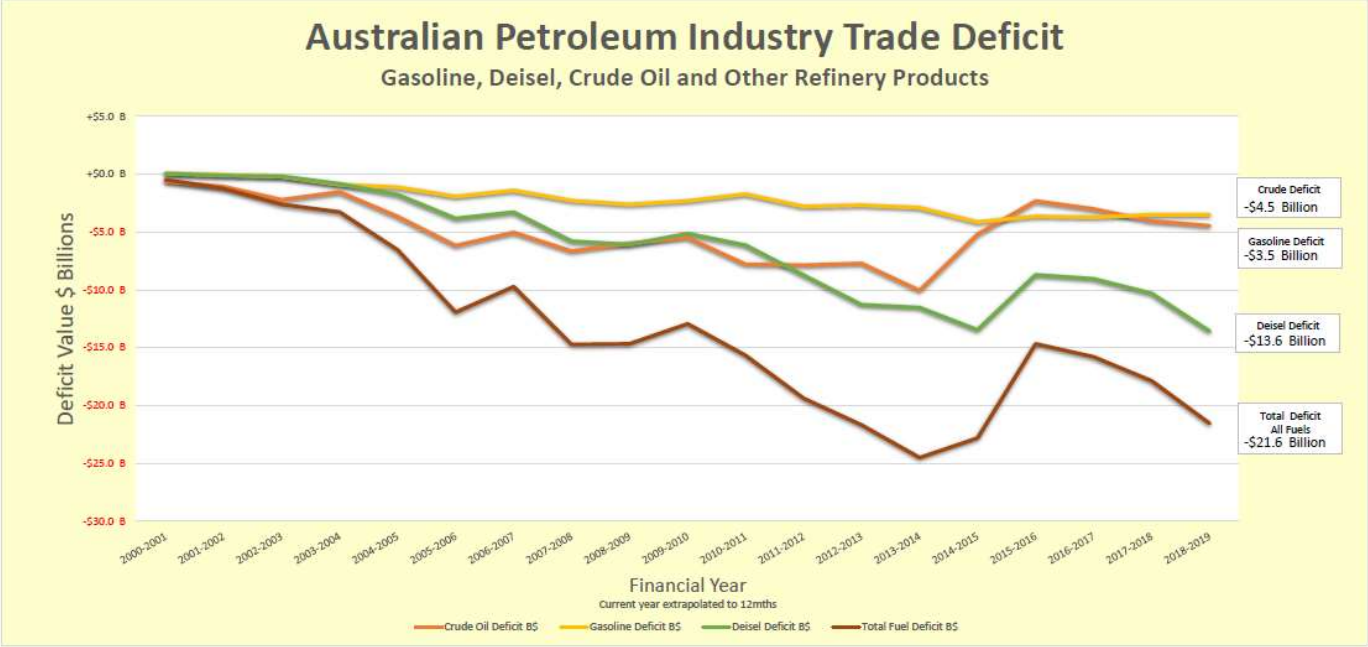
Impact of declining liquid fuels is impacting trade deficit



* Data provided by Dept of the Environment and Energy as at January, 2019

Report Generated 15-Apr-2019

	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Crude oil	-$0.6 B	-$1.1 B	-$2.2 B	-$1.5 B	-$3.7 B	-$6.2 B	-$5.0 B	-$6.7 B	-$6.0 B	-$5.5 B	-$7.8 B	-$7.9 B	-$7.7 B	-$10.1 B	-$5.2 B	-$2.3 B	-$3.0 B	-$4.1 B	-$4.5 B
Gasoline	+$0.1 B	-$0.1 B	-$0.2 B	-$0.9 B	-$1.1 B	-$1.9 B	-$1.4 B	-$2.3 B	-$2.6 B	-$2.3 B	-$1.7 B	-$2.8 B	-$2.7 B	-$2.9 B	-$4.1 B	-$3.6 B	-$3.7 B	-$3.5 B	-$3.5 B
Deisel	+$0.1 B	-$0.1 B	-$0.2 B	-$0.8 B	-$1.8 B	-$3.8 B	-$3.3 B	-$5.8 B	-$6.1 B	-$5.1 B	-$6.1 B	-$8.7 B	-$11.3 B	-$11.5 B	-$13.5 B	-$8.7 B	-$9.1 B	-$10.3 B	-$13.6 B
Total Fuel Deficit	*-$0.5 B*	*-$1.2 B*	*-$2.6 B*	*-$3.3 B*	*-$6.6 B*	*-$11.9 B*	*-$9.7 B*	*-$14.7 B*	*-$14.7 B*	*-$12.9 B*	*-$15.7 B*	*-$19.4 B*	*-$21.7 B*	*-$24.5 B*	*-$22.8 B*	*-$14.7 B*	*-$15.8 B*	*-$17.9 B*	*-$21.6 B*

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Biofuel usage declining despite lower cost and environmental benefits

- NSW ethanol use has declined by 35% since its peak in 2011/12
- Queensland ethanol use has declined by 39% since its peak in 2010/11
- Total Australian ethanol use has declined 39% since its peak in 2010/11

Australian Petroleum Statistics

Table 3B. Sales of petroleum products by state marketing area

	NSW (ML)										VIC (ML)						
	Automotive Gasoline										Automotive Gasoline						
	Premium unleaded	Proprietary brand	Regular unleaded	Ethanol-blended fuel	Total	[of which sales to retailers]	Mandate	Mandate (KL)	Ethanol % of Total Volume	Shortfall - Mandate vs Uptake (ML)	Premium unleaded	Proprietary brand	Regular unleaded	Ethanol-blended fuel	Total	[of which sales to retailers]	Ethanol % of Total Volume
2010-11	961.5	794.6	2,118.1	2,297.2	6,171.4	5,166.9	4%	248.85	3.72%	17.14	372.8	469.7	3,544.9	147.6	4,535.0	3,865.2	0.33%
2011-12	1,119.1	922.5	1,711.6	2,213.0	5,966.1	5,164.6	5%	288.31	3.71%	108.46	396.1	503.0	3,643.0	60.4	4,602.4	3,950.0	0.13%
2012-13	1,144.6	1,009.5	1,557.0	2,178.7	5,889.8	5,194.6	6%	363.38	3.70%	135.61	404.9	543.3	3,446.2	52.9	4,447.4	3,962.2	0.12%
2013-14	1,161.8	1,050.2	1,480.1	1,934.7	5,626.9	5,083.7	6%	337.81	3.44%	144.14	398.7	561.8	3,304.1	64.7	4,329.4	3,935.7	0.16%
2014-15	1,153.7	1,176.9	1,488.7	1,706.4	5,525.7	5,056.9	6%	331.54	3.09%	160.90	389.5	647.3	3,264.5	69.1	4,370.4	3,986.9	0.16%
2015-16	1,118.9	1,323.2	1,636.6	1,392.8	5,471.4	5,001.0	6%	328.29	2.56%	188.01	398.6	733.6	3,213.5	81.8	4,427.6	4,053.9	0.18%
2016-17	1,079.5	1,350.3	1,755.7	1,309.4	5,495.0	4,987.3	6%	329.70	2.38%	188.76	416.6	755.2	3,260.8	102.4	4,534.9	4,000.5	0.23%

	QLD (ML)									SA (ML)						
	Automotive Gasoline									Automotive Gasoline						
	Premium unleaded	Proprietary brand	Regular unleaded	Ethanol-blended fuel	Total	[of which sales to retailers]	Mandate	Ethanol % of Total Volume	Shortfall - Mandate vs Uptake (ML)	Premium unleaded	Proprietary brand	Regular unleaded	Ethanol-blended fuel	Total	[of which sales to retailers]	Ethanol % of Total Volume
2010-11	483.8	436.0	2,506.6	915.5	4,342.0	3,399.4	0%	2.11%		89.9	114.9	1,107.9	-	1,312.7	1,018.7	0.00%
2011-12	504.8	486.6	2,663.8	549.1	4,204.2	3,531.0	0%	1.31%		89.9	127.5	1,097.0	-	1,314.4	1,058.2	0.00%
2012-13	487.0	521.7	2,736.5	455.1	4,200.2	3,503.6	0%	1.08%		85.2	138.8	1,065.3	-	1,289.4	1,064.1	0.00%
2013-14	481.7	522.3	2,734.3	419.1	4,157.4	3,481.4	0%	1.01%		89.7	143.1	1,056.1	-	1,288.9	1,099.5	0.00%
2014-15	459.9	588.2	2,664.6	434.9	4,147.6	3,559.4	0%	1.06%		87.6	157.4	1,027.9	-	1,272.9	1,124.3	0.00%
2015-16	462.1	647.4	2,626.8	444.0	4,180.4	3,703.5	0%	1.06%		91.3	169.4	1,005.8	-	1,266.5	1,117.4	0.00%
2016-17	454.5	653.0	2,529.1	533.0	4,169.6	3,727.3	1.82%	1.28%	38	97.2	170.7	1,034.8	-	1,302.7	1,131.9	0.00%