ACIL ALLEN

An Overview of the Australian Chemical Industry, 2022-23 update

Chapter 3: Charts, Tables and Figures Updated for 2022-23

December 2024

3.1 Overview

ACIL Allen has been engaged by Chemistry Australia to provide updated tables to Chapter 3 of the previous report to Chemistry Australia, '*Chemical Industry Economic Contribution Analysis, 2017-18'*. The following short form report contains the updated tables, figures and charts requested.

3.2 Definitions

Table 1 Chemical industry in this study

IOIG	IOIG Descriptor	ANZSIC code	ANZSIC descriptor	Broad category*
1701	Petroleum and Coal Product Manufacturing	1709	Other Petroleum and Coal Product Manufacturing	Basic Chemicals
1803	Basic Chemical Manufacturing	1811	Industrial Gas Manufacturing	Basic Chemicals
		1812	Basic Organic Chemical Manufacturing	Basic Chemicals
		1813	Basic Inorganic Chemical Manufacturing	Basic Chemicals
		1821	Synthetic Resin and Synthetic Rubber Manufacturing	Basic Chemicals
		1829	Other Basic Polymer Manufacturing	Basic Chemicals
		1831	Fertiliser Manufacturing	Agricultural Chemicals
		1832	Pesticide Manufacturing	Agricultural Chemicals
		1891	Photographic Chemical Product Manufacturing	Specialty Chemicals
		1892	Explosive Manufacturing	Specialty Chemicals
		1899	Other Basic Chemical Product Manufacturing	Specialty Chemicals
1804	Cleaning Compounds and Toiletry Preparation Manufacturing	1851	Cleaning Compound Manufacturing	Consumer Chemicals
		1852	Cosmetic and Toiletry Preparation Manufacturing	Consumer Chemicals
1901	Polymer Product Manufacturing	1911	Polymer Film and Sheet Packaging Material Manufacturing	Specialty Chemicals

IOIG	IOIG Descriptor	ANZSIC code	ANZSIC descriptor	Broad category*
		1912	Rigid and Semi-Rigid Polymer Product Manufacturing	Specialty Chemicals
		1913	Polymer Foam Product Manufacturing	Specialty Chemicals
		1914	Tyre Manufacturing	Specialty Chemicals
		1915	Adhesive Manufacturing	Specialty Chemicals
		1916	Paint and Coatings Manufacturing	Specialty Chemicals
		1919	Other Polymer Product Manufacturing	Specialty Chemicals
1902	Natural Rubber Product Manufacturing	1920	Natural Rubber Product Manufacturing	Specialty Chemicals

Source: ABS – IOIG (2022) to ANZSIC06 Concordance. Accessed at: https://www.abs.gov.au/methodologies/australian-national-accounts-input-output-tables-methodology/2021-22#industry-and-product-concordances

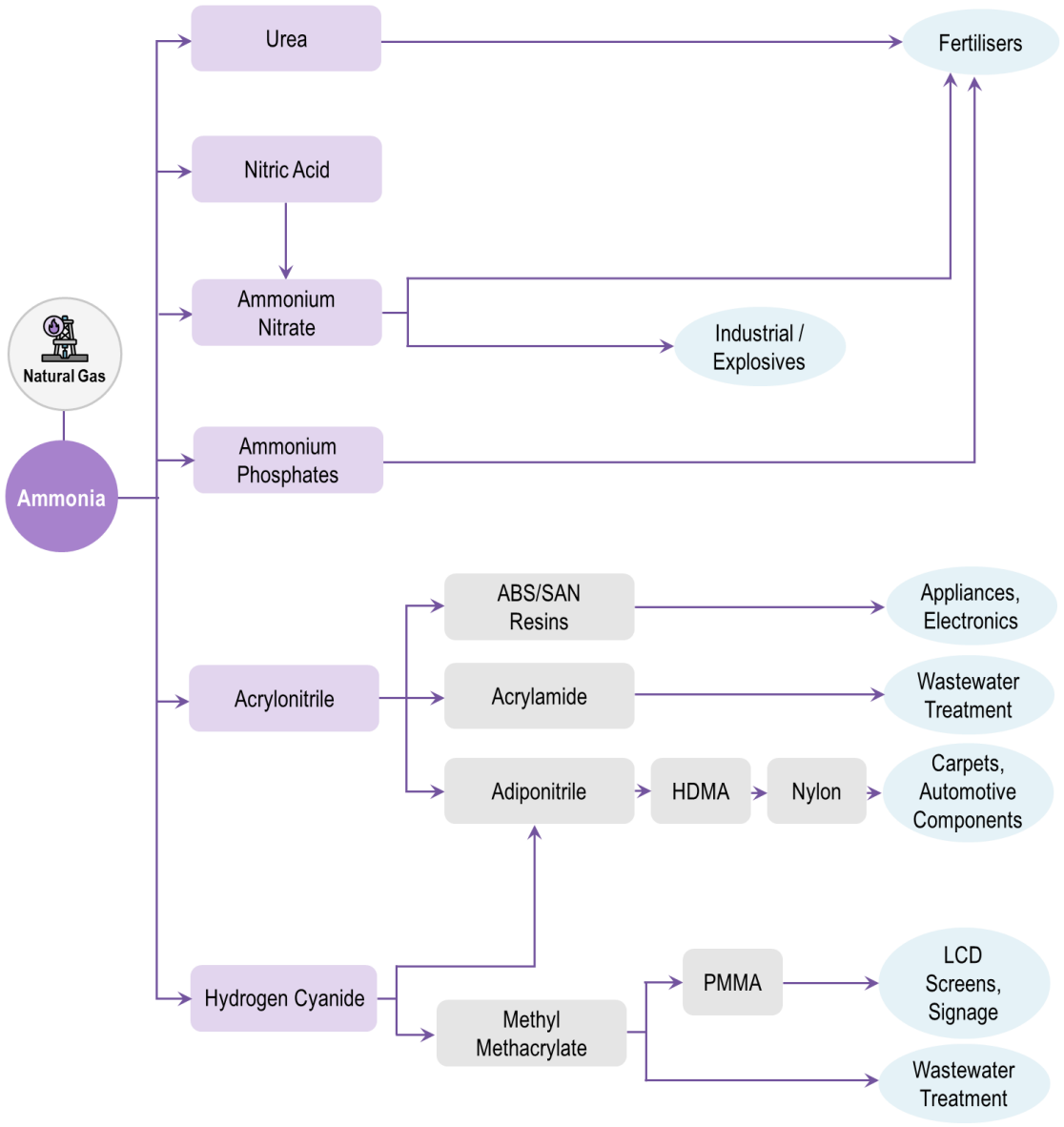
Note: **broad categories are based on the American Chemistry Council 2023 Guide to the Business of Chemistry, 2023. Accessed at: https://www.americanchemistry.com/chemistry-in-america/data-industry-statistics/resources/2023-guide-to-the-business-of-chemistry*

Table 2 Gas as a chemical feedstock in various applications

Feedstock	Chemical	Applications
Natural gas (Methane)	Ammonia Ammonium Nitrate	– Fertilisers to increase agricultural yields – Refrigeration, supply chain storage – Explosives – Carbon dioxide, soft drinks / medical
	Sodium cyanide	– Gold extraction and processing
	Methanol	– Building products: medium density fibre board, particle board – Agricultural chemicals – Water treatment: wastewater, sewerage – Fuels: biodiesel, fuel cells
	Peroxide	– Cleaning products, pulp, paper, mining, food and textile manufacturing
Natural gas (Ethane)	Ethylene	– Packaging, transportation, electrical/electronic, textile and construction industries as well as consumer chemicals, coatings and adhesives
	Polyethylene	– Agricultural piping, irrigation, tanks – Agricultural film: silage, grain bunkers – Packaging: bag and film, rigid containers, transport film and wrap – Industrial, mining commercial, residential piping for water, gas and other reticulation
	Ethylene oxide	– Surfactants, glycols and polyols for personal care, agriculture, automotive, mining, textiles, furniture, bedding

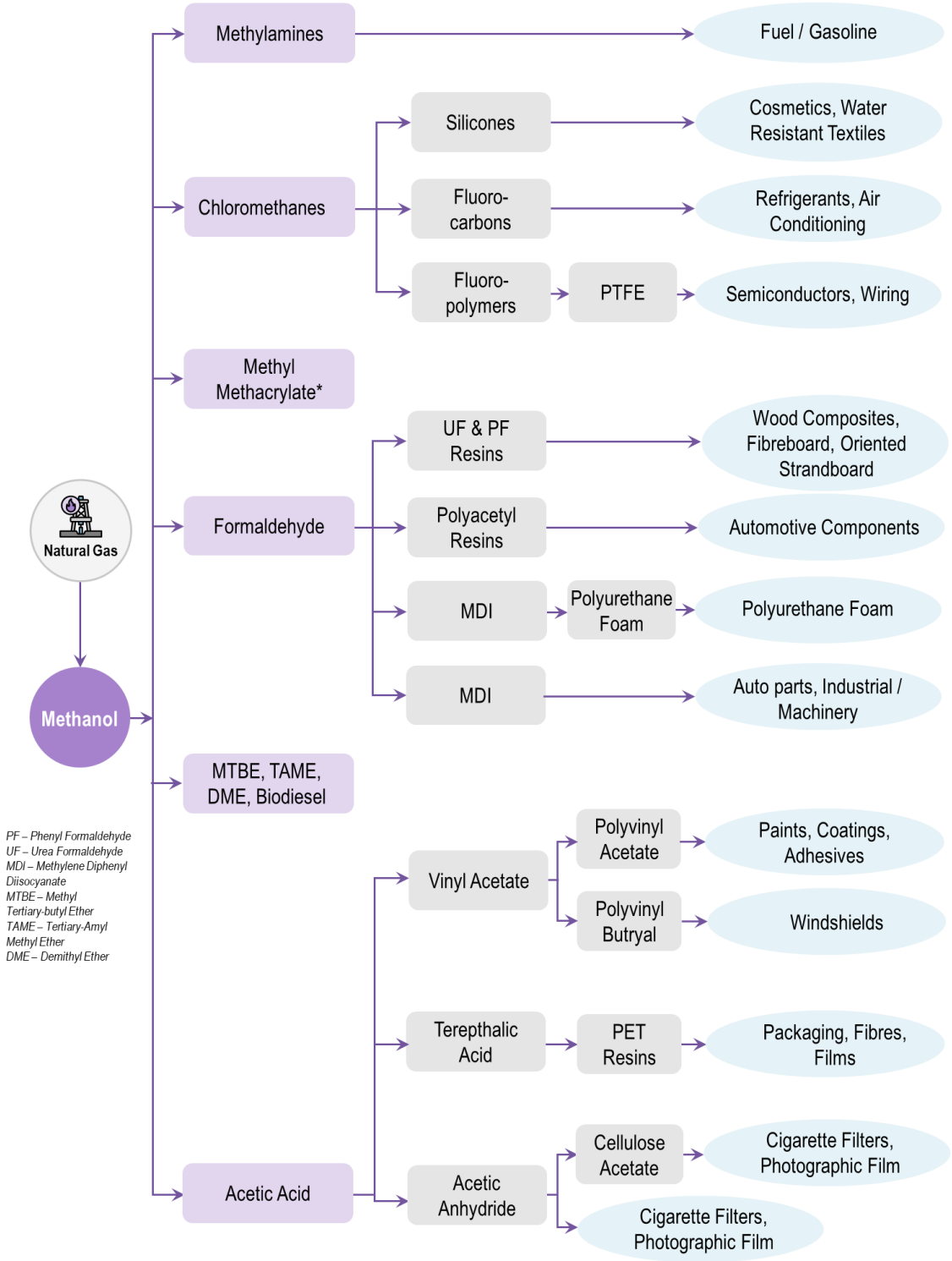
Source: Chemistry Australia 2018, chemistry and gas enabling the economy.

Figure 1 Natural Gas (Methane) as a feedstock for Ammonia



Source: American Chemistry Council 2023 Guide to the Business of Chemistry, 2023. Accessed at: https://www.americanchemistry.com/chemistry-in-america/data-industry-statistics/resources/2023-guide-to-the-business-of-chemistry

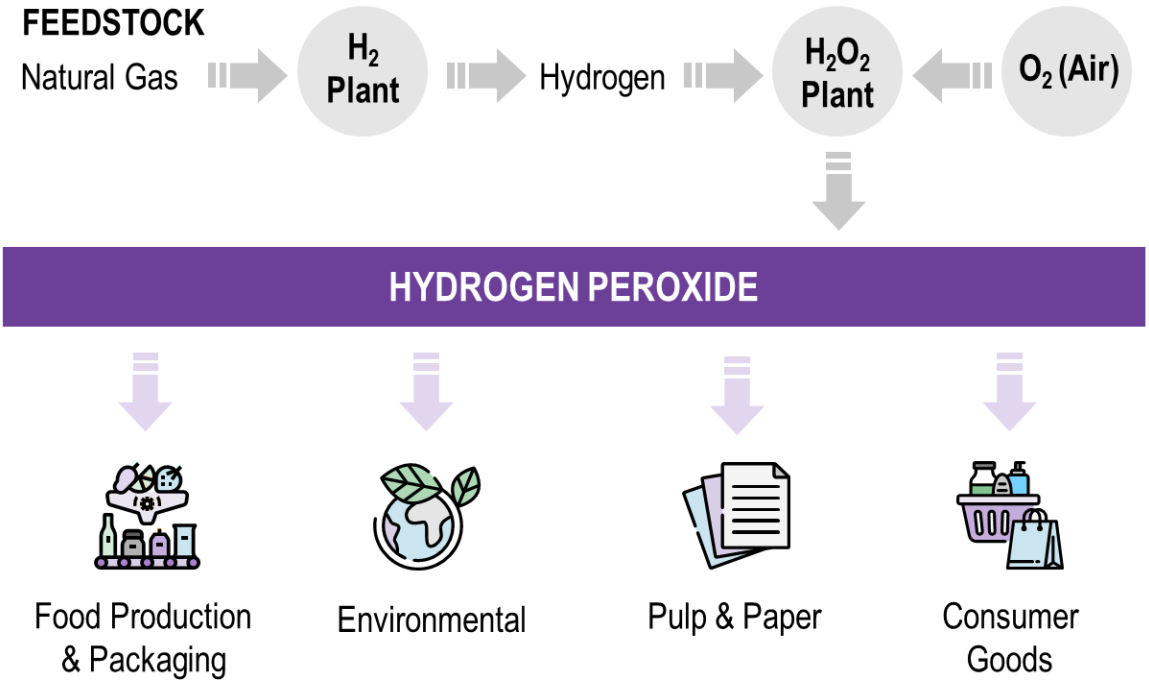
Figure 2 Natural Gas (Methane) as a feedstock for Methanol



Source: American Chemistry Council 2023 Guide to the Business of Chemistry, 2023. Accessed at: https://www.americanchemistry.com/chemistry-in-america/data-industry-statistics/resources/2023-guide-to-the-business-of-chemistry

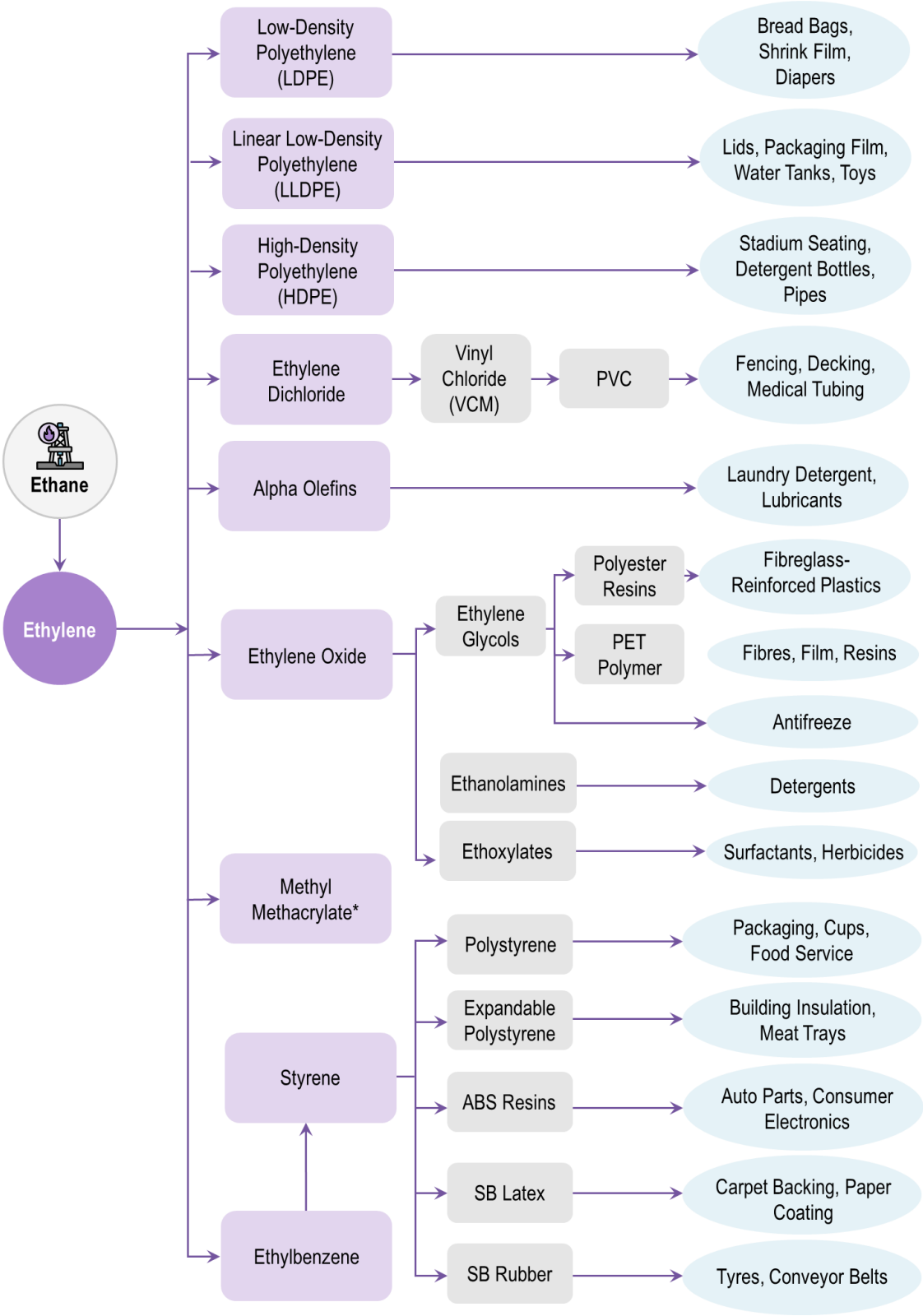
*Note: *see Figure 1, Natural Gas (Methane) as a feedstock for Ammonia, Methyl Methacrylate chain*

Figure 3 Natural Gas (Methane) as a feedstock for Hydrogen Peroxide



Source: Chemistry Australia 2018, chemistry and gas enabling the economy.

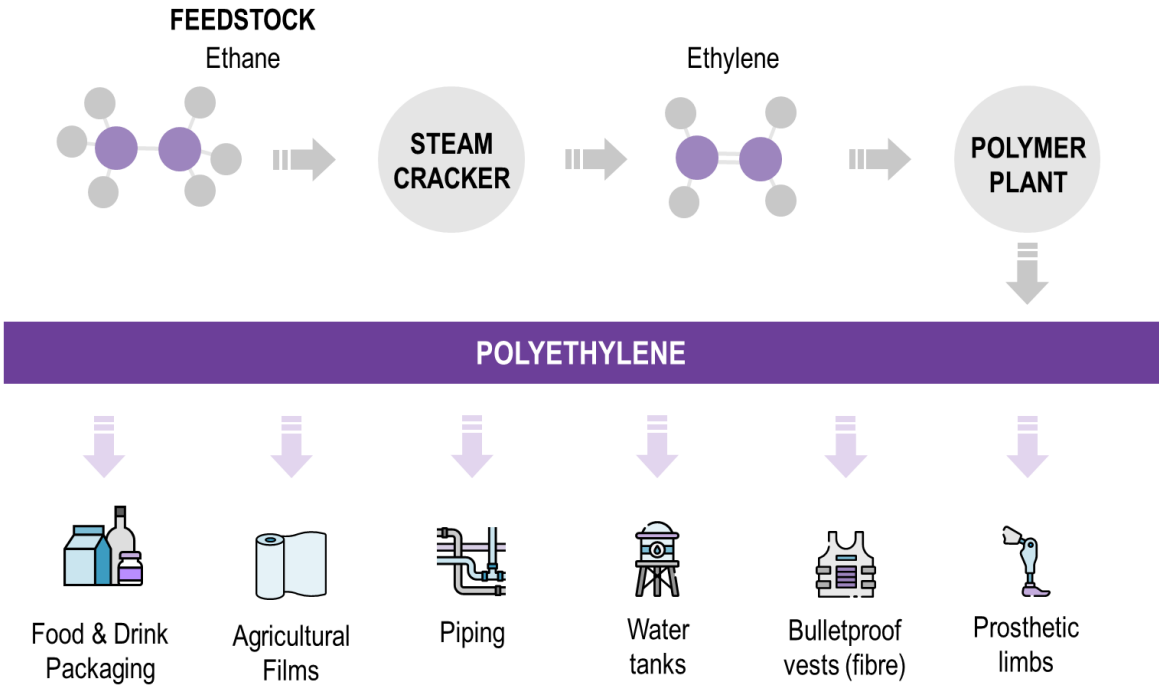
Figure 4 Ethane gas as a feedstock for ethylene



Source: American Chemistry Council 2023 Guide to the Business of Chemistry, 2023. Accessed at: https://www.americanchemistry.com/chemistry-in-america/data-industry-statistics/resources/2023-guide-to-the-business-of-chemistry

*Note: *see Figure 1, Natural Gas (Methane) as a feedstock for Ammonia, Methyl Methacrylate chain*

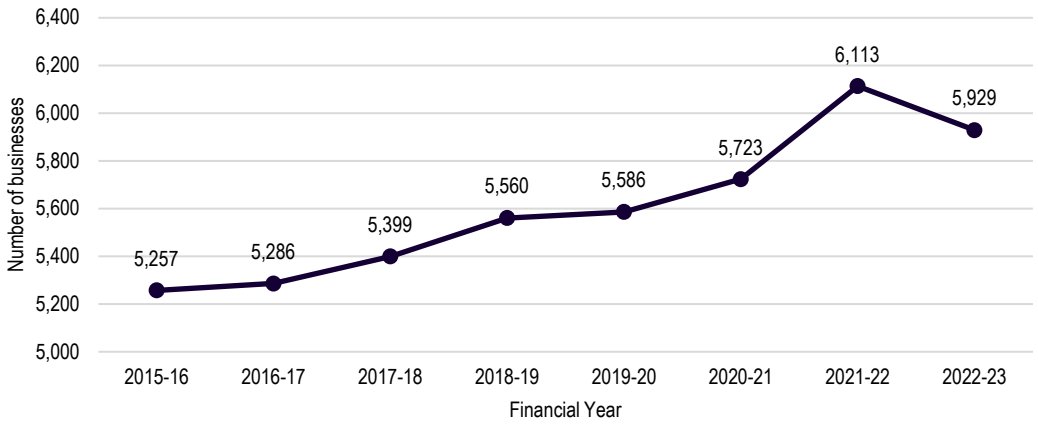
Figure 5 Ethane as a feedstock for ethylene / polyethylene



Source: Chemistry Australia 2018, chemistry and gas enabling the economy.

3.3 Number of businesses operating in Australia

Figure 6 Number of businesses in the Australian chemical industry operating at the end of the financial year



Source: ABS – Counts of Australian Businesses, Including Entries and Exits (8165.0)

Note: the Australian chemical industry is as defined in Table 1, and includes the following ANZSIC industry codes – 1709, 1811, 1812, 1812, 1821, 1829, 1831, 1832, 1851, 1852, 1891, 1892, 1899, 1911, 1912, 1912, 1914, 1915, 1916, 1919, and 1920.

Table 3 Number of chemical industry businesses by state, 2018 to 2023

State / Territory	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
New South Wales	1,559	1,580	1,617	1,653	1,644	1,692	1,814	1,780
Victoria	1,643	1,644	1,657	1,726	1,720	1,729	1,835	1,674
Queensland	1,055	1,085	1,083	1,102	1,119	1,152	1,253	1,271
South Australia	326	328	350	367	360	364	386	395
Western Australia	557	564	552	568	584	590	650	631
Tasmania	56	72	80	79	89	98	99	95
Northern Territory	25	26	24	16	26	17	30	31
Australian Capital Territory	22	23	30	22	15	24	32	34
Unknown	14	19	18	18	23	13	23	13
Total	**5,257**	**5,286**	**5,399**	**5,560**	**5,586**	**5,723**	**6,113**	**5,929**

Source: ABS – Counts of Australian Businesses, Including Entries and Exits (8165.0)

Note: the Australian chemical industry is as defined in Table 1, and includes the following ANZSIC industry codes – 1709, 1811, 1812, 1812, 1821, 1829, 1831, 1832, 1851, 1852, 1891, 1892, 1899, 1911, 1912, 1912, 1914, 1915, 1916, 1919, and 1920.

3.4 Industry Value Add

Table 4 Size of the Australian chemical industry, 2015-16 to 2022-23

Year	Wages and salaries	Sales and service income	Industry value add	Employment (Direct)	Per cent of GDP*
	$m (AUD)	$m (AUD)	$m (AUD)	Persons	%
2015-16	5,317	37,935	11,432	69,093	0.69
2016-17	5,340	34,430	10,889	67,033	0.62
2017-18	5,336	35,795	10,909	66,409	0.59
2018-19	5,496	38,632	10,775	66,458	0.55
2019-20	5,728	39141	11,057	66,633	0.56
2020-21	5,634	40,389	11,714	67,144	0.56
2021-22	6,174	41,736	13,947	73,095	0.60
2022-23	6,677	48,282	14,074	74,362	0.55

Source: ABS – Australian industry (8155.0). Noting that the ABS has provided updated statistics for 2017-18, so these do not match those figures provided in the 2019 report.

Note: The Australian chemical industry is as defined in Table 1, and includes the following ANZSIC industry codes – 1709, 1811, 1812, 1812, 1821, 1829, 1831, 1832, 1851, 1852, 1891, 1892, 1899, 1911, 1912, 1912, 1914, 1915, 1916, 1919, and 1920.

*Note: *calculated using ABS – Australian National Accounts data*

Employment

Direct employment for 2022-23 was captured by the Australian Bureau of Statistics (ABS) Australian Industry (8155.0) data.

This project scope did not include any new modelling. As such, an approximate estimate of indirect employment attributable to the Australian chemical industry for 2022-23 was estimated using the ratio of direct to indirect employment from the 2019 ACIL Allen report to Chemistry Australia[1] *Chemical Industry Economic Contribution Analysis, 2017-2018*.

This ratio of direct to indirect employment in 2017-18 for the lower bound estimate was roughly 1.5 indirect jobs created for every 1.0 direct jobs at a national level. At the upper bound, this ratio was around 2.4 indirect jobs created for every 1.0 direct jobs at the national level. It should be noted that there are large variances in the ratios applied at a state / territory level.

These figures were applied to 2022-23 direct employment figures to derive an upper and lower estimate of indirect employment.

[1] ACIL Allen (2019). Chemical Industry Economic Contribution Analysis, 2017-2018. Accessed at: https://chemistryaustralia.org.au/resources/economic-contribution-report

Table 5 Total employment supported by the Australian Chemical Industry

	Direct Employment	Estimated Indirect Employment		Estimated Total Employment	
		Lower Bound	Upper Bound	Lower Bound	Upper Bound
	FTE	FTE	FTE	FTE	FTE
New South Wales	21,143	30,345*	48,901*	51,488*	70,044*
Victoria	24,737	35,728*	57,147*	60,465*	81,884*
Queensland	12,667	20,241*	32,416*	32,908*	45,083*
South Australia	3,367	4,131*	6,626*	7,498*	9,993*
Western Australia	6,532	14,154*	22,580*	20,686*	29,112*
Tasmania	1,012	1,351*	2,034*	2,363*	3,046*
Northern Territory	295	513*	708*	808*	1,003*
Australian Capital Territory	97	212*	272*	309*	369*
Australia	**69,849**	**106,832***	**170,892***	**176,681***	**240,741***

Source: ABS – Australian industry (8155.0) and ACIL Allen.

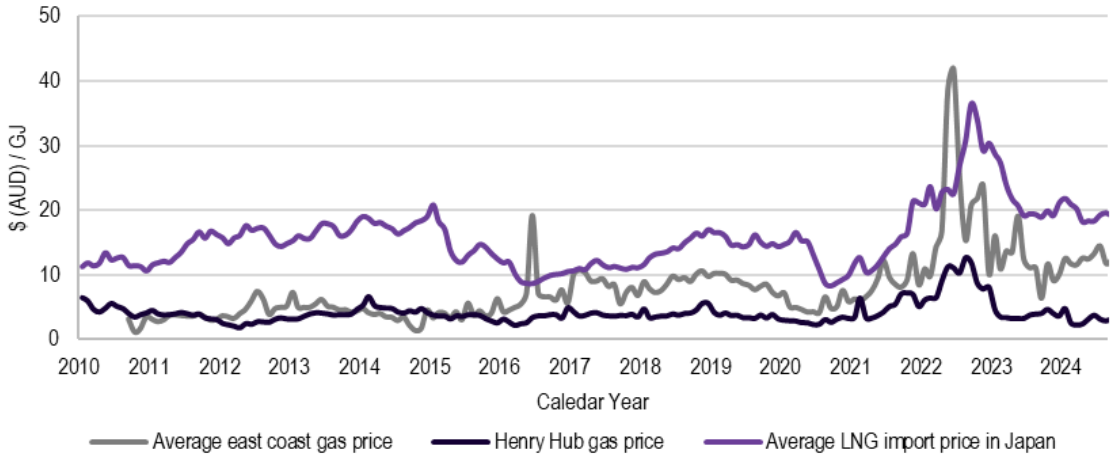
*Note: *there was no Input-Output modelling undertaken for this update, as such the indirect jobs were estimated by applying the ratios of indirect to direct jobs from the 2017-18 modelling to the 2022-23 direct employment figures.*

3.5 Trade

Figure 7 An indicative chemical industry competitiveness price ratio of crude oil to natural gas

Source: World Bank – "Pink Sheet" Commodity Prices Data

Figure 8 Average East Coast gas price and Henry Hub gas price (AUD$/GJ)



Source: World Bank – "Pink Sheet" Commodity Prices Data and AEMO STTM data

Table 6 Chemical industry trade by product type, 2022-23

Chemical product	Domestic sales	Value of exports	Value of imports	Trade balance
	$m (AUD)	$m (AUD)	$m (AUD)	$m (AUD)
Other petroleum and coal products	1,401*	435	1,971	(1,536)
Industrial gas	2,450	20	55	(35)
Basic organic chemical products	1,578	380	3,360	(2,980)
Basic inorganic chemical products	896	2,250	3,387	(1,137)
Synthetic resin and synthetic rubber products	2,271	278	3,077	(2,800)
Other basic polymer products	552	85	80	6
Fertilisers	6,599	624	4,702	(4,079)
Pesticides	1,519	225	2,144	(1,919)
Cleaning compounds	2,688	411	1,708	(1,297)
Cosmetic and toiletry products	764	1,211	3,217	(2,006)
Photographic chemical products	1	17	113	(96)
Explosives	4,592	36	269	(233)
Other basic chemical products	165	375	1,492	(1,117)
Polymer film and sheet packaging material	2,225	169	155	14
Rigid and semi-rigid polymer products	6,211	564	970	(406)
Tyres	3	182	2,771	(2,589)
Adhesives	667	62	2,628	(2,565)
Paint and coatings	3,492	237	2,548	(2,311)
Other polymer products	2,346	190	1,685	(1,496)
Natural rubber products	1,122	259	3,919	(3,660)
Total	41,544	8,008	40,249	(32,241)

Source: ABS Special Data Request

Note: polymer foam product manufacturing (ANZSIC 1913) is excluded from the table due to no import or export data being recorded by the ABS in the 2022-23 financial year.

Note: sum of rows may not equal column totals due to rounding.

*Note: *due to high standard error, the ABS did not report sales and service income for Other petroleum and coal products (ANZSIC 1709) in 2022-23. The total sales and service income reported above for the 2022-23 ANZSIC industry class is the average of the ANZSIC classes' sales and service income for 2020-21 and 2021-22*

Table 7 Chemical products trade by states, 2022-23

State / territory	Value of exports	Value of imports
New South Wales	1,752	11,502
Victoria	2,148	12,854
Queensland	1,338	7,507
South Australia	355	1,661
Western Australia	2,150	6,284
Tasmania	7	316
Northern Territory	257	125
Australian Capital Territory	1	0
Total	8,008	40,249

Source: ABS Special Data Request

Note: sum of rows may not equal column totals due to rounding.

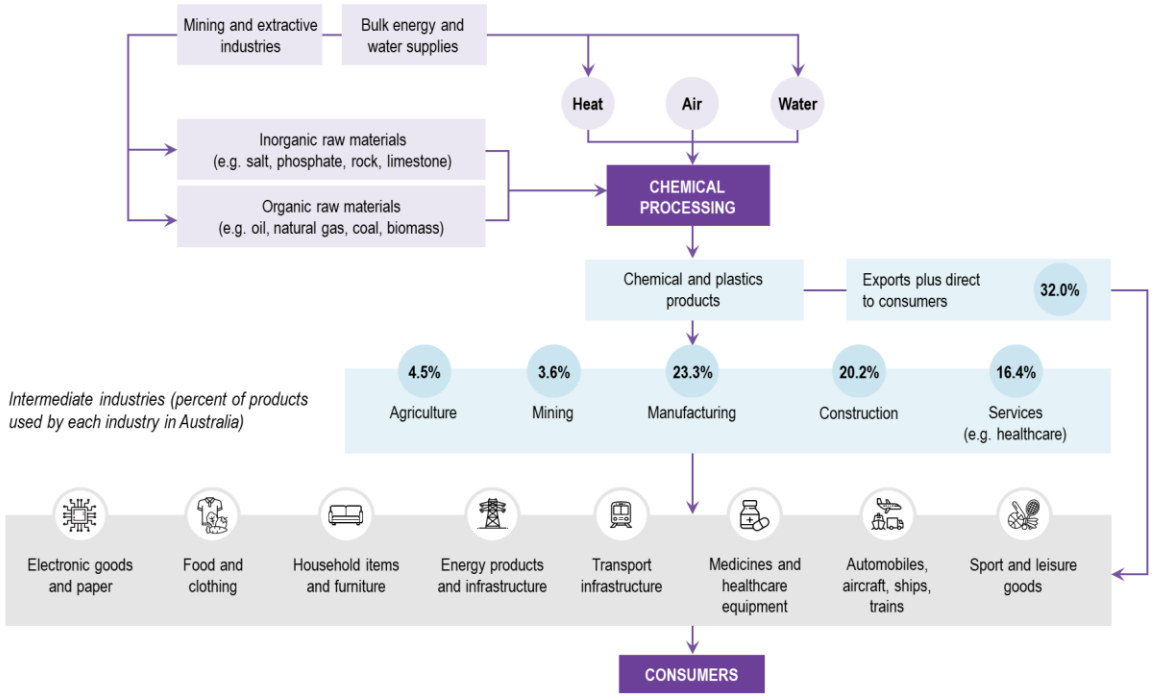
3.6 Chemical Industry Supply Chain

Table 8 Sales of chemical industry outputs, 2021-22

Broad industry	Usage (%)
Agriculture	4.5%
Mining	3.6%
Manufacturing	23.3%
Construction	20.2%
Services	16.4%
Chemical industry sales to other industries	68.0%

Source: ABS – Australian National Accounts: Input-Output Tables (2021-22)

Figure 9 Chemical Industry Inputs and Outputs in Australia, 2021-22



Source: updated based on Cook et al 2013, Elements in Everything: Current Profile and Future Trends for the Australian Chemicals and Plastics Industry. CSIRO, Australia

Note: this is based on 2021-22 ABS Australian National Accounts: Input-Output Tables (Product Details). Sales of explosives in mining are included in the construction sector.

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