



ERRATUM: Australian and Global Hydrogen Demand Growth Scenario Analysis

COAG Energy Council – National Hydrogen Strategy Taskforce

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Background

In December 2019, the National Hydrogen Strategy Taskforce published Australia's National Hydrogen Strategy. In addition to publishing the Strategy, numerous supporting reports were published into Deloitte's report *Australian and Global Hydrogen Demand Growth Scenario Analysis*.

Hydrogen continues to be a subject of interest in Australia and globally with additional work being done by Deloitte and others. As part of this, an error in the hydrogen model used in the report has been discovered. There is an error in the input used for the quantum of hydrogen required in the steelmaking process.

The model originally assumed that every tonne of steel required 0.0051 tonnes of hydrogen. However, upon further review it has been determined that the assumption should be that every tonne of steel requires 0.051 tonnes of hydrogen.

The correction of this assumption results in increases in the total domestic and global demand for hydrogen under all four scenarios modelled in the report. This increase is directly attributable to the increased hydrogen required for steelmaking.

Global Hydrogen Demand

The following tables provides a comparison of the total global hydrogen demand for the four scenarios under the original and updated assumption related to steelmaking:

Scenario 1: Hydrogen: Energy of the future

	Global Hydrogen Demand (Original) (MtH2)						Global Hydrogen Demand (Updated) (MtH2)					
	Australia	China	Japan	Korea	RoW	Total Int	Australia	China	Japan	Korea	RoW	Total Int
2019	0.08	0.77	0.14	0.10	0.56	1.65	0.08	1.18	0.18	0.13	0.59	2.17
2025	0.30	1.97	0.39	0.30	1.21	4.17	0.32	5.31	0.73	0.58	1.46	8.40
2030	0.73	4.29	0.95	0.73	2.38	9.07	0.81	12.96	1.74	1.47	3.02	19.99
2040	3.49	19.78	4.82	3.84	20.60	52.54	3.94	56.41	7.47	7.03	26.15	101.01
2050	6.83	44.96	9.74	8.02	182.32	251.88	7.83	106.17	13.27	13.52	225.48	366.28

Scenario 2: Hydrogen: Targeted deployment

	Global Hydrogen Demand (Original) (MtH2)						Global Hydrogen Demand (Updated) (MtH2)					
	Australia	China	Japan	Korea	RoW	Total Int	Australia	China	Japan	Korea	RoW	Total Int
2019	0.08	0.77	0.14	0.10	0.56	1.65	0.08	1.18	0.18	0.13	0.59	2.17
2025	0.11	1.21	0.20	0.16	0.70	2.38	0.14	2.89	0.38	0.30	0.83	4.53
2030	0.17	1.93	0.31	0.25	0.95	3.61	0.25	6.17	0.70	0.61	1.26	8.99
2040	0.62	7.53	1.19	1.06	6.43	16.83	1.06	32.69	3.02	3.24	10.24	50.26
2050	1.73	21.82	3.17	2.97	76.53	106.23	2.70	81.52	6.61	8.33	116.47	215.64

Scenario 3: Business as usual

	Global Hydrogen Demand (Original) (MtH2)						Global Hydrogen Demand (Updated) (MtH2)					
	Australia	China	Japan	Korea	RoW	Total Int	Australia	China	Japan	Korea	RoW	Total Int
2019	0.08	0.67	0.14	0.10	0.54	1.52	0.08	1.08	0.18	0.13	0.57	2.04
2025	0.10	0.88	0.17	0.13	0.61	1.90	0.10	1.49	0.24	0.19	0.66	2.67
2030	0.12	1.18	0.23	0.18	0.74	2.44	0.12	2.19	0.32	0.27	0.81	3.70
2040	0.24	3.57	0.64	0.56	4.13	9.15	0.28	8.56	1.00	0.99	4.89	15.72
2050	0.73	13.38	2.16	2.03	61.90	80.21	0.87	30.61	3.16	3.58	73.43	111.64

Scenario 4: Electric breakthrough

	Global Hydrogen Demand (Original) (MtH2)						Global Hydrogen Demand (Updated) (MtH2)					
	Australia	China	Japan	Korea	RoW	Total Int	Australia	China	Japan	Korea	RoW	Total Int
2019	0.08	0.68	0.14	0.10	0.55	1.54	0.08	1.08	0.18	0.14	0.58	2.06
2025	0.09	0.82	0.17	0.13	0.58	1.79	0.10	1.26	0.21	0.16	0.61	2.34
2030	0.11	1.02	0.20	0.16	0.65	2.14	0.12	1.48	0.24	0.20	0.69	2.73
2040	0.19	2.00	0.30	0.25	2.08	4.83	0.20	2.54	0.34	0.30	2.16	5.54
2050	0.28	5.01	0.23	0.18	16.84	22.54	0.29	5.63	0.26	0.24	17.25	23.67

In all scenarios, the global hydrogen demand increases under the update with the most significant increases being under the *Hydrogen: Energy of the future* and *Hydrogen: Targeted deployment* scenarios.

Australia's Share of Global Hydrogen Demand

The following tables provides a comparison of Australia's share of global hydrogen demand for the four scenarios under the original and updated assumption related to steelmaking:

Scenario 1: Hydrogen: Energy of the future

	International Demand captured by Australia (Original) (MtH2)					International Demand Captured by Australia (Updated) (MtH2)				
	China	Japan	Korea	RoW	Total Int	China	Japan	Korea	RoW	Total Int
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2025	0.05	0.02	0.01	0.01	0.09	0.14	0.04	0.02	0.01	0.20
2030	0.21	0.10	0.04	0.02	0.36	0.63	0.18	0.07	0.03	0.91
2040	1.83	0.95	0.36	0.37	3.51	5.23	1.47	0.67	0.47	7.83
2050	6.15	2.83	1.12	4.81	14.92	14.53	3.85	1.89	5.95	26.23

Scenario 2: Hydrogen: Targeted deployment

	International Demand captured by Australia (Original) (MtH2)					International Demand Captured by Australia (Updated) (MtH2)				
	China	Japan	Korea	RoW	Total Int	China	Japan	Korea	RoW	Total Int
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2025	0.03	0.01	0.00	0.00	0.05	0.08	0.02	0.01	0.00	0.11
2030	0.09	0.03	0.01	0.01	0.15	0.30	0.07	0.03	0.01	0.41
2040	0.70	0.23	0.10	0.11	1.15	3.03	0.59	0.31	0.18	4.12
2050	2.99	0.92	0.42	2.02	6.34	11.16	1.92	1.17	3.07	17.32

Scenario 3: Business as usual

	International Demand captured by Australia (Original) (MtH2)					International Demand Captured by Australia (Updated) (MtH2)				
	China	Japan	Korea	RoW	Total Int	China	Japan	Korea	RoW	Total Int
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2025	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.02
2030	0.01	0.01	0.00	0.00	0.02	0.03	0.01	0.00	0.00	0.04
2040	0.08	0.03	0.01	0.02	0.15	0.20	0.05	0.02	0.02	0.29
2050	0.46	0.16	0.07	0.41	1.09	1.05	0.23	0.13	0.48	1.89

Scenario 4: Electric breakthrough

	International Demand captured by Australia (Original) (MtH2)					International Demand Captured by Australia (Updated) (MtH2)				
	China	Japan	Korea	RoW	Total Int	China	Japan	Korea	RoW	Total Int
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2025	0.02	0.01	0.00	0.00	0.04	0.03	0.01	0.00	0.00	0.05
2030	0.05	0.02	0.01	0.01	0.08	0.07	0.03	0.01	0.01	0.11
2040	0.19	0.06	0.02	0.04	0.31	0.24	0.07	0.03	0.04	0.37
2050	0.69	0.07	0.03	0.44	1.22	0.77	0.08	0.03	0.46	1.34

It should be noted that the percentage of international demand captured by Australia does not change as a result of the update to the steelmaking assumption but rather, the quantum of Australia's share increases as a result of the increase in overall global demand.

Steelmaking Demand

As indicated, the change relates to the assumption of hydrogen required for steelmaking and as such, the hydrogen demand figures domestically and internationally are provided for each scenario.

Scenario 1: Hydrogen: Energy of the future

Domestic Demand (MtH2)	Hydrogen Demand for Steelmaking (Original)	Updated Hydrogen Demand for Steelmaking (Updated)
2019	0.00	0.00
2025	0.00	0.03
2030	0.01	0.09
2040	0.05	0.50
2050	0.11	1.11

Total International Demand (MtH2)	Hydrogen Demand for Steelmaking (Original)	Hydrogen Demand for Steelmaking (Updated)
2019	0.06	0.57
2025	0.47	4.67
2030	1.20	12.04
2040	5.34	53.35
2050	12.60	125.99

Scenario 2: Hydrogen: Targeted deployment

Domestic Demand (MtH2)	Hydrogen Demand for Steelmaking (Original)	Hydrogen Demand for Steelmaking (Updated)
2019	0.00	0.00
2025	0.00	0.03
2030	0.01	0.09
2040	0.05	0.49
2050	0.11	1.08

Total International Demand (MtH2)	Hydrogen Demand for Steelmaking (Original)	Hydrogen Demand for Steelmaking (Updated)
2019	0.06	0.57
2025	0.24	2.36
2030	0.59	5.89
2040	3.66	36.44
2050	12.05	120.48

Scenario 3: Business as usual

Domestic Demand (MtH2)	Hydrogen Demand for Steelmaking (Original)	Hydrogen Demand for Steelmaking (Updated)
2019	0.00	0.00
2025	0.00	0.00
2030	0.00	0.01
2040	0.00	0.04
2050	0.02	0.16

Total International Demand (MtH2)	Hydrogen Demand for Steelmaking (Original)	Hydrogen Demand for Steelmaking (Updated)
2019	0.06	0.57
2025	0.09	0.86
2030	0.14	1.40
2040	0.73	7.26
2050	3.48	34.76

Scenario 4: Electric breakthrough

Domestic Demand (MtH2)	Hydrogen Demand for Steelmaking (Original)	Hydrogen Demand for Steelmaking (Updated)
2019	0.00	0.00
2025	0.00	0.00
2030	0.00	0.00
2040	0.00	0.01
2050	0.00	0.01

Total International Demand (MtH2)	Hydrogen Demand for Steelmaking (Original)	Hydrogen Demand for Steelmaking (Updated)
2019	0.06	0.57
2025	0.06	0.61
2030	0.06	0.64
2040	0.08	0.78
2050	0.12	1.24

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