Standards Australia

Australia-India Standards Trade Enabling Project

Standards Market Potential Report

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About Standards Australia

Standards Australia is Australia's peak independent, non-government, not-for-profit standards organisation. We work with national, regional and international partners across various industry, government, academia, and consumer groups, to help address the challenges and opportunities that are common to all. Our vision is to ensure that communities have safe and reliable access to quality goods and services to support growth, resilience and development.

Standards Australia represents Australia at the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) and specialises in the development and adoption of internationally aligned standards. We endeavour for regional and international standards harmonisation to share the benefits with our regional neighbours and international community.

Contents

Key Data

Indicator	Australia	India
General Statistics		
Population (% yearly change)	27.8 million (+1%)	1.46 billion (+0.9%)
Urban Population (% of total)	23.3 million (86.5%)	522.5 million (37.7%)
Unemployment Rate	4.1%	4.2%
Median Age	37.8	28.1
Nominal GDP (rank globally)	USD 3.9 trillion (14th)	USD 3.9 trillion (6th)
Real GDP Growth Rate	+1.4%	4.2%
Total Investment (% of GDP)	25%	33%
Total Exports 2024-25 (goods and services)	AUD 646.6 billion	USD 820 billion
Total Imports 2024-25 (goods and services)	AUD 629.9 billion	USD 825.2 billion
Emission Targets		
Net Zero Target	Net Zero by 2050	Net Zero by 2070
Renewables/non-fossil electricity target	82% renewable electricity by 2030	50% cumulative electric power installed capacity from non-fossil fuel sources by 2030
Total Emissions Reduction Target	62-70% below 2005 levels by 2035	45% reduction in emissions intensity of GDP from 2005 levels by 2030
Green Hydrogen		
Green Hydrogen Production Target	0.5 million tonnes annually by 2030	5 million metric tonnes annually by 2030
Green Hydrogen Investment	~AUD 8 billion to 2035 (₹0.5 lakh crore)	₹8 lakh crore by 2030 (approximately AUD 136 billion)
Job Creation	13,150/16,050 by 2023	600,000 by 2030
Key Policies	National Hydrogen Strategy 2024	National Green Hydrogen Mission 2023
ICT Data Centres		
Number of Data Centres (2025)	260	153
Data Centre Capacity (Live)	1.6 GW	1.5 GW
Data Centre Capacity (Pipeline)	3.2 GW	6.5GW
World Digital Competitiveness Ranking (IMD)	23rd	50th
Key Policies	National AI Plan	IndiaAI Mission

Indicator	Australia	India
Food Supply Chain		
Food & Beverages Market Size	USD 154 billion (2025)	USD 510 billion (2025)
Food & Beverages Market as a % of GDP	1.3 % of GDP	7.8 % of GDP
Total Market Revenue (2025)	USD 90.2 billion	USD 860.6 billion
Average Market Revenue Per Capita (2025)	USD 3,363	USD 586
Key Policies	Economic Cooperation and Trade Agreement (ECTA) Mutual Recognition Arrangement Supply Chain Resilience Initiative (SCRI)	
Pet Food		
Pet Food Market Size	USD 3.91 billion (2025)	USD 770 million (2025)
Pet Food Market as a % of GDP	~0.21% of GDP	~0.02% of GDP
Total Market Revenue (2025)	USD 3.91 billion	USD 770 million

Note: Throughout this report, where possible, figures have been provided in both Australian dollars (AUD) and Indian rupees (INR). Currency conversions are approximate and use an indicative exchange rate of AUD 1 = ₹59.

Abbreviations and Acronyms

AUD	Australian dollar
AI	Artificial intelligence
BIS	Bureau of Indian Standards
Crore	A unit in the Indian numbering system to denote ten million
DFAT	Australian Department of Foreign Affairs and Trade
ECTA	Australia-India Economic Cooperation and Trade Agreement
EU	European Union
FCV	Fuel cell vehicle
GHCI	Green Hydrogen Certification of India
GHG	Greenhouse gas emissions
GW	Gigawatt
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Organization for Standardization
Lakh	A unit in the Indian numbering system to denote one hundred thousand
MMT	Million metric tonnes
NGHM	National Green Hydrogen Mission (India)
R&D	Research and development
SA	Standards Australia
SC	Sub committee
TC	Technical committee

Executive Summary

This report was developed through the Australia–India Standards Trade Enabling Project (AI-STEP), a bilateral initiative delivered by Standards Australia (SA) in partnership with the Bureau of Indian Standards (BIS). This project supports the implementation of the Australia–India Economic Cooperation and Trade Agreement (AI-ECTA) by identifying standards that can facilitate industry alignment between Australia and India, thereby reducing technical barriers to trade, within the scope and capacity of the respective national standards bodies.

Australia and India's economic partnership is strengthening rapidly, underpinned by ECTA, rising investment, and shared priorities in clean energy, digital infrastructure, and resilient supply chains. Between 2022 and 2024, Australia's non-coal exports to India rose 95%, agricultural exports increased 146%, and bilateral investment reached AUD 50.6 billion, or ~₹2.99 lakh crore, demonstrating accelerating commercial alignment across key sectors.

This research report examines three areas of high strategic opportunity for bilateral trade: green hydrogen, data centres, and food supply chain operations. Across all three, divergent standards and technical barriers are limiting the full potential of collaboration and trade. Standards harmonisation, particularly around safety, sustainability, certification, and interoperability, emerge as enablers of a stronger trade relationship.

Green hydrogen offers a significant long term export opportunity. Australia's renewable energy capacity complements India's industrial decarbonisation needs under its *National Green Hydrogen Mission*. However, bilateral trade remains minimal due to fragmented certification of 'green', differing emissions thresholds, and infrastructure gaps. The mapping of 136 standards shows misalignments in ISO committee participation and adoption. Closer coordination on certification, emissions accounting, transport, and safety would support scale up and unlock future commercial pathways.

In ICT and data centres, both countries are experiencing rapid digitalisation, hyperscale cloud growth, and rising AI driven demand. India is becoming one of Asia's fastest growing digital infrastructure markets, while Australia is focusing on sovereign, sustainable, AI ready facilities aligned with its *National AI Plan*. However, regulatory fragmentation across cybersecurity requirements, cooling technologies, network specifications, and renewable energy standards creates operational complexity. Mapping of 58 standards related to data centres highlights significant opportunities for harmonising performance benchmarks, carbon reporting methodologies, and infrastructure standards to support interoperability.

The food supply chain remains a core trade pillar, with new opportunities in organics, cold chain logistics, traceability, and the growing pet food market. While ECTA and other agreements have improved access, exporters face challenges such as Australia's strict biosecurity rules and India's fragmented cold chain logistics systems. This research mapped 90 standards relevant to food supply chain operations, revealing strong alignment in the management and food safety systems but gaps in packaging, traceability, and cold chain logistics. Aligning refrigerant, transport, and traceability standards would significantly reduce friction and improve market access.

Across all sectors, harmonised international standards will reduce duplicative testing, lower compliance costs, support sustainability goals, boost investor confidence, and strengthen two way trade. Coordinated standards adoption, deeper engagement in international committees, and structured bilateral cooperation will be essential to expanding the Australia-India economic partnership and capturing shared opportunities in hydrogen, data centres, and the food industry.

Introduction

In recent years, Australia and India's bilateral relationship has grown, bolstered by policies and agreements aimed at reducing barriers to trade, enhancing trade diversification, strengthening supply chain resilience, opening dialogue and collaboration. Along with Japan, Australia is one of only two countries with which India has "annual leader-level meetings, a free trade agreement, and a 2+2 foreign and defence ministers' meeting." [1] According to Australia's Department of Foreign Affairs and Trade (DFAT), there is "no single market offering greater growth opportunities out to 2035 than India."[2]

Trade in goods and services between the two countries has expanded and doing business has become easier since the *Australia-India Economic Cooperation and Trade Agreement* (ECTA) entered into force in late 2022, which also supports national objectives in decarbonisation, digital infrastructure and agricultural market access.[3] The agreement offers mutual benefits including Australian export access to India's 1.4 billion population economy, while Indian businesses benefit from preferential access to Australian raw materials and intermediate inputs. Under the ECTA, as of January 1st 2026, Australia has removed 100% of its tariffs for Indian exports[4,5] while 90% of Australian exports to India are now tariff free. Additionally, high tariffs have been reduced on some further agricultural products such as wine, almonds, lentils and strawberries.[6] The agreement has resulted in growth in diverse sectors including apparel, marine products, medical equipment, fruit and vegetables, ceramics, inorganic chemicals, plastics, man-made filaments, tea and coffee.[7]

Between 2021 and 2024, Australia's total exports to India (excluding the price volatile coal) are up 95% and agricultural exports are up 146%. Industrial exports (excluding coal) increased by 84%. Total imports from India under ECTA increased by 32%, driven by a 35% increase in agriculture goods and a 30% increase in non-diesel industrial products.[8]

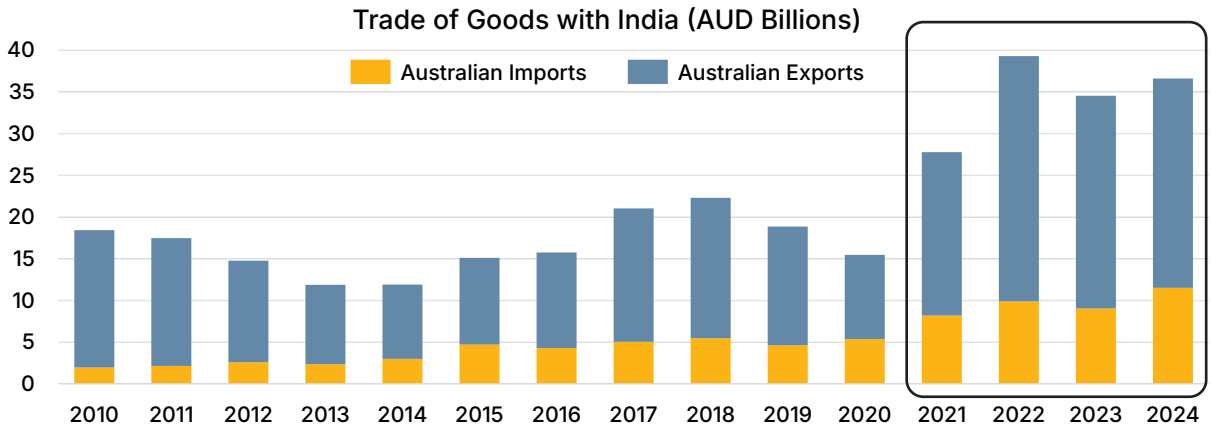

Figure 1: Australian trade with India, 2010 – 2024[9]

As illustrated in Figure 1, trade between the countries has seen significant momentum over the past 5 years, supported by the ECTA. Note that the sharp spike in trade value in 2022 was due to a global surge in commodity prices.[10]

Investment	2021	2022	2023	2024	CAGR (2021-2024)
Australia → India	20.13	17.81	22.20	27.62	11.1%
India → Australia	29.23	n/a	47.27	50.64	20.1%

Table 1: Total investment and compound annual growth rate (CAGR) for the 2021-2024 period. Figures are AUD billions.[11]

In terms of bilateral investment, at the end of 2024, Australia's stock of investment in India was AUD 27.6 billion (₹1.6 lakh crore) up from AUD 20.1 billion (₹1.2 lakh crore) in 2021. India's total investment in Australia was AUD 50.6 billion (₹2.99 lakh crore), up significantly (20% CAGR) from AUD 29.2 billion in 2021.[12]

In addition to enhancing trade through eliminating tariffs, the ECTA also sets out the need to ensure that standards, technical regulations, and conformity assessment procedures do no create unnecessary obstacles to trade. It provides for the facilitation of trade by ensuring that non-tariff measures do not create unnecessary obstacles to trade. To support this the agreement contains commitments for both countries to make any proposed new or amended standards, technical regulations and conformity assessment procedures publicly available. It also provides for *mutual recognition agreements* for mutual acceptance of each other's conformity assessment certifications and trade facilitation measures.[13] As the bilateral trade and investment relationship between India and Australia continues to strengthen, this research report explores three key strategic sectors - green hydrogen, ICT/data centres, and the food supply chain – which present significant future opportunities for both countries, while highlighting how the absence of harmonised standards could act as barriers to trade and investment.

1. Green Hydrogen Sector

1.1 Trade and Investment Landscape

Green hydrogen can be defined as hydrogen that has been "produced from non-fossil fuel feedstocks and emits zero or *de minimis* greenhouse gas emissions on a lifecycle basis." [i,14]

Sometimes called 'renewable hydrogen', green hydrogen can be generated from renewable electricity such as solar or wind by electrolysis, from biogas by steam reforming, or from biomass through thermal conversion.[15] It is a clean and safe energy carrier that can be used as a fuel for electricity production and transportation, as well as energy intensive, hard-to-decarbonise industrial sectors such as agriculture, steel manufacturing, cement production, and even aviation.[16] These industries are particularly challenging to electrify due to their high energy demands and their reliance on processes that traditionally use fossil fuels. Green hydrogen provides a viable alternative by replacing carbon-intensive fuels with hydrogen produced from renewable energy sources. This transition enables the decarbonisation of these sectors, helping to meet global climate goals and significantly reduce emissions from some of the most energy-intensive and polluting industries.[17]

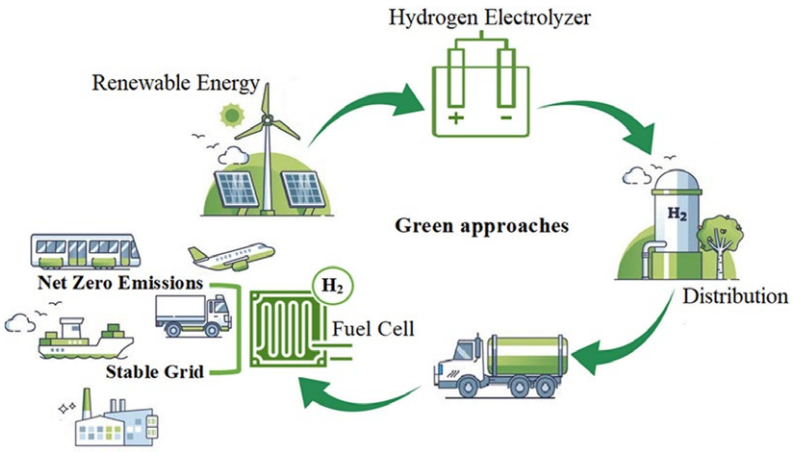

Figure 2: Green hydrogen generation by electrolysis[18]

Globally, government incentives and international agreements concerning decarbonisation and concerns around the depletion of fossil fuel resources have resulted in a shift of focus to green hydrogen as an alternative fuel. For example, the European Union's (EU) hydrogen strategy, *REPowerEU*, aims to produce 10 million tonnes of renewable hydrogen domestically and import another 10 million by 2030 to support the region's decarbonisation goals.[19] Financial measures such as subsidies, tax credits, and grants are being introduced to fast-track the expansion of hydrogen infrastructure, including electrolyser deployment, storage capacity, and transportation logistics. For the period 2021-2027, the total EU funding for hydrogen related projects is estimated to be €18.8 billion.[20]

The forecasted supply of green hydrogen (wind or solar) is estimated to grow by five times between 2030 and 2050.[21] This significant increase in supply is being driven by factors such as significant investment globally, the adoption of national hydrogen strategies,[22] and the scaling up of electrolyser manufacturing increasing capacity.[23] The total global hydrogen market is forecasted to reach USD 1.4

i The term 'de minimis' means that something is too small to be meaningful or taken into consideration.

trillion in 2050, including USD 280 billion of interregional trade.[24]

Additionally, in comparison to solar and wind, hydrogen has a higher energy content. It burns with no traces of pollution and classifies as a zero-emission fuel for fuel cell vehicles. This has led to a notable trend towards the adoption of hydrogen-powered vehicles evidenced by the number of total global fuel cell vehicles (FCV) growing by 22% in 2023 on the previous year.[25]

1.1.1 Significance of Green Hydrogen in the Trade Relationship

India's commitment to reach net zero by 2070 relies heavily on a transition to renewable energy, with green hydrogen having the potential to play a central role in decarbonising its hard-to-abate sectors like heavy transport, steel, and fertilisers.[26] This commitment is evident under the *National Green Hydrogen Mission* (NGHM), where India's Ministry of Steel has been allocated USD 177 million, 30% of the pilot project budget. There are multiple technologies that could facilitate the transition from traditional steelmaking methods to low-emission alternatives, however green hydrogen stands out for its potential to reduce 95% of carbon intensity in steel production.[27] The NGHM aims to place India as a global hub for the production, usage, and export of green hydrogen and its derivatives.[28]

Similarly, Australia's *National Hydrogen Strategy*, launched in 2024, sets out a vision to position the country as a global hydrogen leader, focusing on accelerating clean hydrogen industry growth with targets of avoiding emissions of between 93 and 186 million tonnes of CO2 per year by 2050.[29]

Australia's renewable resource capabilities complement India's large industrial demand and ambitious decarbonisation plans. This makes green hydrogen a key sector for deeper bilateral trade.

1.1.2 Overview of Bilateral Trade, Collaborations and Agreements

Actual bilateral trade between Australia and India in hydrogen is still very limited. The trade data in the tables below show Australian and Indian exports of hydrogen and machines for electrolysis. It's important to note that while HS code 854330 (Machines and apparatus for electroplating, electrolysis, or electrophoresis) is used to classify electrolysers,[30] this code may include other devices not related to hydrogen production. This data highlights the minimal one-way trade between countries, with India's export of equipment to Australia making up only 0.72% of India's global exports for that product code.

Product	Globally	To India	% of global
Hydrogen (HS Code 280410)	75,390	0	0.0%
Machines and apparatus for electroplating, electrolysis, or electrophoresis (HS Code 854330)	5,121,090	0	0.0%

Table 2: Australian export data, 2024 (in USD)[31]

Product	Globally	To Australia	% of global
Hydrogen (HS Code 280410)	17,360	0	0.0%
Machines and apparatus for electroplating, electrolysis, or electrophoresis (HS Code 854330)	10,438,720	75,030	0.72%

Table 3: Indian export data, 2024 (in USD)[32]

However, there is a lot of ambition to increase the trade of green hydrogen with joint projects and mutual agreements underway aimed at deepening collaboration and developing strong bilateral trade.

Research cited by the Smart Energy Council of Australia indicates that the potential market value of the India-Australia green hydrogen trade by 2050 is estimated to be USD 80 billion.[33]

Australia and India possess complementary strengths that support bilateral cooperation. Australia brings abundant renewable energy resources, technological expertise in hydrogen production, and emerging export capacity, while India offers a growing industrial base, strong domestic demand for hydrogen derivatives, and a strong policy framework that supports rapid development through the NGHM.[34]

As part of the *India-Australia Energy Partnership*, Australia says that it is committed to working with India to "seize the economic opportunities of the net zero transition," with both countries agreeing to coordinate on projects related to the technology, investment and deployment of green hydrogen.[35] Similarly, Australia's *National Hydrogen Strategy* sets out objectives to strengthen its partnership with India, deepen collaboration on R&D and supply chain development, foster innovation and technology transfer and build a resilient supply chain.[36]

Under the *India-Australia Energy Partnership*, the India-Australia Green Hydrogen Taskforce was established to identify practical ways both countries could work together to grow their industries, aiming to accelerate the manufacture and deployment of green hydrogen.[37] In October 2025, the taskforce submitted its final recommendation report to the Australian and Indian Governments, identifying five priority areas for collaboration:[38]

1. Hydrogen technology co-development and manufacture
2. Green minerals and metals
3. Green fuels and supply chains
4. Skills and workforce development
5. Knowledge sharing

Under the priority area of skills and workforce development, the report recommends mapping skills shortages and developing clear training and competency standards to ensure workforces are equipped with the correct skills needed for an emerging hydrogen economy. In relation to knowledge sharing, the taskforce recommends the sharing of initiatives between India and Australia in the area of policy, standards and regulation, with a key focus on interoperability and hydrogen certification. The report also emphasises the importance of coordination and discussion on best practices while sharing lessons learned to help accelerate the development of 'fit for purpose' policy and standards.[39]

At the *5th India-Australia Energy Dialogue* in October 2025, both countries reaffirmed their strategic partnership, emphasising the clean energy alliance as essential to support sustainability and secure energy systems with green hydrogen playing a central role.[40]

Under the *Quad Clean Energy Supply Chain Diversification Program*, Australia and India have partnered with Japan and the United States to strengthen and reduce costs across all elements of the clean hydrogen value chain. This includes technology development and efficiently scaling up the production of clean hydrogen, identification and development of delivery infrastructure to safely and efficiently transport, store, and distribute clean hydrogen for end-use applications, and stimulating market demand to accelerate trade in clean hydrogen in the Indo-Pacific region.[41] Under the program, Australia has committed to AUD 50 million to develop and diversify clean energy supply chains in the Indo-Pacific region. Funded projects include feasibility studies targeting hydrogen electrolysers and must be delivered jointly between Australian organisations and Indo-Pacific organisations.[42]

Finally, while not specific to green hydrogen, the *Australia-India Economic Cooperation and Trade*

Agreement (ECTA) may lower barriers for equipment and component trade (e.g. electrolysers) facilitating open two-way trade and strengthening the bilateral relationship.[43]

1.1.3 Investment Trends

Investment in Australia's green hydrogen sector is characterised by government support and incentives, a large project pipeline, private-sector investment, and the country's renewable resource endowment in solar and wind which is crucial for producing low-cost green hydrogen. Under the *Hydrogen Production Tax Incentive*, the Australian government will provide AUD 2 (₹119) per kg of green hydrogen produced for up to 10 years.[44] Additionally, the AUD 2 billion (₹11,800 crore) *Hydrogen Headstart Program* supports large-scale green hydrogen projects, and over AUD 500 million (₹2,950 crore) has been invested to develop hydrogen hubs in regional Australia which will co-host producers, users and potential exporters of hydrogen across industrial, transport, export and energy markets.[45]

Further, the Australian Renewable Energy Agency (ARENA) has committed over AUD 300 million (₹1,770 crore) to hydrogen R&D projects, feasibility studies and pilot plants.[46] The government estimates these incentives and support will unlock AUD 50 billion (₹2.95 lakh crore) in private capital investment into the Australian hydrogen industry by 2030.[47] These programmes have led to Australia having one of the largest pipelines of hydrogen projects of any country in the world. The International Energy Agency (IEA) reported in 2024 that 20% of all announced projects globally are in Australia.[48]

> **Case Study**: In May 2024, Australian-based green hydrogen electrolyser manufacturer, Hysata, raised USD 111 million to expand production capacity before joining forces with the Republic of Korea steelmaker POSCO later in the year to advance its electrolyser technology.[49]

In India, the *Strategic Interventions for Green Hydrogen Transition* (SIGHT) is a program under the NGHM designed to boost the country's green hydrogen sector through financial incentives for domestic manufacturing of electrolysers and green hydrogen production. This programme has been allocated ₹17,490 crore (approximately AUD 3 billion), with an additional ₹1,466 crore (AUD 250 million) for pilot projects and ₹400 crore (AUD 68 million) for R&D.[50] India targets five million metric tonnes (MMT) of green hydrogen production annually by 2030 and expects to attract the equivalent of over AUD 130 billion in investments.[51]

> **Case Study**: In June of this year, Indian conglomerate Adani Enterprises commissioned India's first off-grid 5-megawatt green hydrogen pilot plant in Kutch, Gujarat. A company statement said "the state-of-the-art plant is 100 per cent green-powered by solar energy and integrated with a Battery Energy Storage System (BESS), enabling it to operate completely off-grid. This represents a new paradigm in decentralised, renewable-powered hydrogen production."[52] Currently, Adani Enterprises is the third largest global green hydrogen producer by net capacity in the pipeline, followed closely by the Australian company Fortescue Future Industries.[53]

1.2 Key Barriers to Trade

1.2.1 Certifying Hydrogen as 'Green'

A significant challenge currently faced by the green hydrogen sector is a lack of harmonisation around certification. Certification frameworks define what qualifies as 'green' hydrogen, incorporating criteria such as renewable electricity sourcing, emissions intensity thresholds, along with monitoring, reporting and verification. However, divergent national and regional schemes apply varied definitions and emission thresholds. A report by the International Renewable Energy Agency (IRENA) found that hydrogen certification schemes have significant gaps that prevent international trade, including

inconsistent standards for greenhouse gas emissions, labelling, and production pathways.[54]

In April 2025, India launched the *Green Hydrogen Certification Scheme* (GHCI) to provide a national framework to certify hydrogen as green by assessing its greenhouse gas emissions across the entire production cycle. Under the GHCI, hydrogen will be labelled 'green' if it is produced using renewable energy and meets a threshold of less than 2kg of CO2 equivalent per kg of hydrogen produced, averaged over 12 months.[55] This benchmark aligns with international best practices and provides clarity to international investors seeking to participate in India's emerging hydrogen economy.[56] The certification is mandatory for any green hydrogen production facility in India that receives government support or sells/uses the hydrogen domestically.[57]

Internationally, the CertifHy scheme certifies hydrogen to the *Renewable Fuels of Non-Biological Origin* (RFNBO) criteria defined by the EU. This sets the emissions threshold at 3.4 kg of CO2 equivalent per kg of hydrogen, 1.4 kg of CO2 higher than India's. In the US it is 4.0 kg and, in the UK, it is 2.4 kg.[58] This highlights the disparity in thresholds and the fragmentation in green hydrogen certification across borders.

> **Case Study**: Hygenco Green Energies, an Indian company developing green hydrogen, received RFNBO pre-certification in early 2025 due to its "commitment to rigorous standards." With this, the company began paving its way to export to the EU market.[59]

While India's certification sets specific emission thresholds, Australia's *Guarantee of Origin* (GO) scheme does not set thresholds, is voluntary and focuses more on the traceability and transparency of hydrogen products, tracking emissions across the lifecycle which can be used to underpin environmental claims.[60] The GO certification helps Australian businesses to demonstrate eligibility for government initiatives like those discussed in section 1.1.2. of this report.

1.2.2 Logistical and Supply Chain Constraints

Large scale cross-border trade requires expensive dedicated infrastructure such as electrolysers, storage solutions, specialised vessels, and port terminals. According to a 2025 IEA review, a recent wave of project delays and cancellations globally, held back in part due to slow infrastructure development, has reduced expectations for the deployment of low-emissions hydrogen this decade.[61]

Through its *National Hydrogen Strategy*, Australia highlights the need for infrastructure planning and development in order to make the country's hydrogen industry cost competitive.[62] India is also investing in its hydrogen infrastructure to promote trade. In October 2025, the Ministry of New and Renewable Energy (MNRE) announced the recognition of three major ports - in Gujarat, Tamil Nadu, and Odisha - as Green Hydrogen Hubs. These coastal gateways will serve as integrated centres for production, consumption, and future export.[63]

Additionally, the global political landscape can have a bearing on trade. Reports in November 2025 indicate that hydrogen projects in India are likely to start later than originally planned due to delays in decisions by EU nations on their renewable energy targets. This has the potential to delay India's clean fuel ambitions. It is now expected that India will produce approximately 3 million metric tonnes of green hydrogen by 2030 but not reach its original 2032 target of 5 million metric tonnes.[64]

1.2.3 Environmental and Sustainability Requirements

Green hydrogen is increasingly validated as a significant industry in the transition towards a sustainable, low-carbon energy future. Its potential to transform various sectors especially those heavily reliant on fossil fuels supports multiple United Nations Sustainable Development Goals

(SDGs), particularly in mitigating climate change, promoting clean energy, and fostering economic growth.[65] When coupled with carbon capture, utilisation, and storage (CCUS) technologies, green hydrogen can help further reduce carbon emissions. The process of producing green hydrogen through renewable electricity generates no emissions and combining it with carbon sequestration could even create a carbon-negative cycle.[66]

However, meeting environmental requirements can act as a trade barrier for producers exporting hydrogen. Governments and buyers want robust emissions accounting to ensure the product meets low-carbon thresholds. As discussed in section 1.2.1, India's certification scheme uses emission calculations to certify green hydrogen, while the EU's scheme also requires detailed accounting. In Australia, transparent emissions tracking is critical to gaining a Guarantee of Origin certification.

Green hydrogen projects can also require impact assessments which must cover water sourcing, land use, biodiversity impacts and social safeguards, which can result in large costs and time constraints for developers.[67]

1.3 Standards Landscape

1.3.1 Current Standards used in the Hydrogen Sector

Total **International** **Indian** **Australian**	**135 standards** 49 standards 32 standards (15 national, 17 ISO adoptions) 54 standards (33 national, 21 ISO adoptions)
Standards Development Organisations	International: International Organization for Standardization (ISO), Society of Automative Engineers (SAE), American Society for Testing and Materials (ASTM), Green Hydrogen Organisation, and National Fire Protection Association. Indian: Bureau of Indian Standards (BIS). Australian: Standards Australia (SA), and National Transport Commission.
Areas Covered	Production, storage, transport, refuelling, fire & safety, emissions, and general.

Table 4: Green Hydrogen standards mapping overview

This research has mapped 135 standards related to the production, storage, transportation, and safety of green hydrogen. Included are 32 Indian and 54 Australian standards. While the majority of standards mapped were developed by ISO, BIS and SA, some additional standards have been included from national authorities and other international standards organisations. It is important to note that end-use standards, such as those used for land vehicles, have been excluded from the scope of this research.

1.3.2 Comparative Analysis of Standards

Table 5 below outlines both Australia's and India's membership status on the 11 ISO committees mapped in this research. Note that 'P' refers to a participating membership, 'O' refers to an observing membership, and 'NM' refers to non-membership.

International Standards Committee	Categories	Australia	India
ISO/TC 164/SC 1, *Uniaxial testing*	Fire and Safety	NM	P
ISO/TC 67/SC 6, *Process equipment, piping, systems, and related safety*	General	P	O
ISO/TC 58, *Gas cylinders*	Storage, Transport	P	P

International Standards Committee	Categories	Australia	India
ISO/TC 58/SC 3, *Cylinder design*	Storage, Transport	P	P
ISO/TC 58/SC 2, *Cylinder fittings*	Transport	P	P
ISO/TC 138/SC 3, *Plastics pipes and fittings for industrial applications*	Transport	P	O
ISO/TC 138/SC 4, *Plastics pipes and fittings for the supply of gaseous fuels*	Transport	P	O
ISO/TC 30, *Measurement of fluid flow in closed conduits*	Transport	NM	P
ISO/TC 2/SC 14, *Surface coatings*	Fire and Safety	P	P
ISO/TC 197/SC 1, *Hydrogen at scale and horizontal energy systems*	Production, Emissions	P	NM
ISO/TC 197, *Hydrogen technologies*	Refuelling, Fire and Safety, Production, Storage	P	P

Table 5: International Standards committee participation, by country

Of the 11 ISO standards technical committees (TC) producing green hydrogen standards, Australia and India are both members (either participating or observing) of eight. Both are participating members of five committees – Gas cylinders (TC 58), Cylinder design (TC 58/SC 3), Cylinder fittings (TC 58/SC2), Surface coatings (TC 2/SC 14), and most significantly, Hydrogen technologies (TC 197). As ISO/TC 197 has produced 11 relevant hydrogen standards covering refuelling, safety, production and storage, alignment with these international standards can be important for bilateral trade.

Conversely, Australia is not a member of Uniaxial testing (TC 164/SC 1) or Measurement of fluid flow in closed conduits (TC 30), while India is participating on both. Australia is participating on Hydrogen at scale and horizontal energy systems (TC 197/SC 1), while India is not a member.

Table 6 below outlines the adoption of ISO hydrogen standards by country. Note that adoption includes both direct adoption and modified adoption.

International Standard	Adopted by Australia	Adopted by India
ISO 11114-4:2017, *Transportable gas cylinders - Compatibility of cylinder and valve materials with gas contents, Part 4: Test methods for selecting steels resistant to hydrogen embrittlement*	✓	✓
ISO 11515:2022, *Gas cylinders - Refillable composite reinforced tubes of water capacity between 450 l and 3000 l - Design, construction and testing*	✓	✓
ISO 14687:2025, *Hydrogen fuel quality Product specification*	✓	✓
ISO 16111:2018, *Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride*	✓	✓
ISO 16964:2019, *Gas cylinders — Flexible hoses assemblies — Specification and testing*	✗	✓
ISO 19880-1:2020, *Gaseous hydrogen - Fuelling stations, Part 1: General requirements*	✓	✓
ISO 19880-3:2018, *Gaseous hydrogen - Fuelling stations, Part 3: Valves*	✓	✓
ISO 19880-5:2025, *Gaseous hydrogen - Fuelling stations, Part 5: Dispenser hoses and hose assemblies*	✓	✓

International Standard	Adopted by Australia	Adopted by India
ISO 19880-8:2024, *Gaseous hydrogen Fuelling stations - Part 8: Fuel quality control*	✓	✓
ISO 22734-1:2025, *Hydrogen generators using water electrolysis - Part 1: Safety*	✓	✓
ISO 26142:2010, *Hydrogen detection apparatus — Stationary applications*	✓	✓
ISO 5168:2005, *Measurement of fluid flow — Procedures for the evaluation of uncertainties*	×	✓
ISO 9809-2:2019, *Gas cylinders - Design, construction and testing of refillable seamless steel gas cylinders and tubes, Part 2: Quenched and tempered steel cylinders and tubes with tensile strength greater than or equal to 1,100 Mpa*	✓	✓
ISO/TR 15916:2015, *Basic considerations for the safety of hydrogen systems*	✓	✓
ISO 15649:2001, *Petroleum and natural gas industries - Piping*	×	×
ISO 16486-1:2023, *Plastics piping systems for the supply of gaseous fuels Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing - Part 1: General*	×	×
ISO 16486-2:2024, *Plastics piping systems for the supply of gaseous fuels Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing - Part 2: Pipes*	×	×
ISO 19880-2:2025, *Gaseous hydrogen Fuelling stations - Part 2: Dispensers and dispensing systems*	×	×
ISO 19880-9:2024, *Gaseous hydrogen - Fuelling stations - Part 9: Sampling for fuel quality analysis*	×	×
ISO 21036:2025, *Plastics piping systems for industrial applications Unplasticized polyamide (PA-U) Metric series for specifications for components and system*	×	×
ISO 7039:2024, *Metallic materials - Tensile testing - Method for evaluating the susceptibility of materials to the effects of high-pressure gas within hollow test pieces*	×	×
ISO 7866:2012, *Gas cylinders - Refillable seamless aluminium alloy gas cylinders - Design, construction and testing*	✓	×
ISO 9809-1:2019, *Gas cylinders - Design, construction and testing of refillable seamless steel gas cylinders and tubes, Part 1: Quenched and tempered steel cylinders and tubes with tensile strength less than 1,100 Mpa*	✓	×
ISO 9809-3:2019, *Gas cylinders - Design, construction and testing of refillable seamless steel gas cylinders and tubes, Part 3: Normalized steel cylinders and tubes*	✓	×
ISO 9809-4:2021, *Gas cylinders - Design, construction and testing of refillable seamless steel gas cylinders and tubes, Part 4: Stainless steel cylinders with an R m value of less than 1,100 Mpa*	×	×
ISO/CD 19870-2, *Hydrogen technologies — Methodology for determining the greenhouse gas emissions associated with the hydrogen supply chain — Part 2: Emissions associated with the conditioning and transport of gaseous and liquid hydrogen up to consumption gate*	×	×
ISO/CD 19870-3, *Hydrogen Technologies — Methodology for determining the greenhouse gas emissions — Part 3: Emissions associated with the production, storage and transport of ammonia up to delivery gate and the conversion of ammonia into hydrogen*	×	×
ISO/CD 19870-4, *Hydrogen technologies — Methodology for determining the greenhouse gas emissions associated with the hydrogen supply chain — Part 4: Emissions associated with the storage and transport of hydrogen via LOHC*	×	×
ISO/TR 20491:2019, *Fasteners - Fundamentals of hydrogen embrittlement in steel fasteners*	×	×

International Standard	Adopted by Australia	Adopted by India
ISO/TS 19870:2023, *Hydrogen technologies — Methodology for determining the greenhouse gas emissions associated with the production, conditioning and transport of hydrogen to consumption gate*	×	×
ISO/WD TS 22734-2, *Hydrogen generators using water electrolysis Part 2: Testing guidance for performing electricity grid service*	×	×

Table 6: Adoption of international hydrogen standards, by SDO

Australia and India have both adopted the same 12 ISO hydrogen standards. However, there are two standards which India has adopted but Australia has not and three standards that Australia has adopted but India has not. There are also 14 standards identified that neither nation has adopted. These standards represent areas to explore to increase standards harmonisation bilaterally, as well as increasing alignment with international best practice.

Figure 3 below shows the number of standards mapped through this research by stage on the green hydrogen supply chain. Note that the international standards represented in Figure 3 include standards from the American Society for Testing and Materials (ASTM), the Society of Automative Engineers (SAE) in addition to ISO standards.

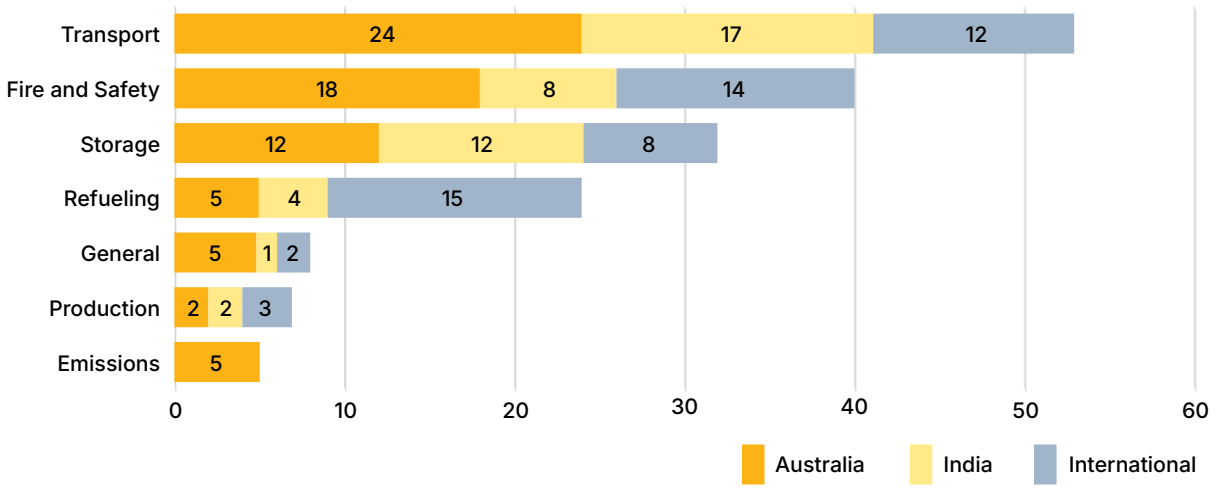

Figure 3: No. of standards mapped, by stage

The highest number of standards mapped are related to the transport of hydrogen (53), followed by fire and safety (40), storage (32), refuelling (24), general standards for hydrogen production (8), production (7), and emissions (5), noting that some standards cover multiple stages.

1.3.3 Opportunities for Harmonisation

Harmonisation between India and Australia on international green hydrogen standards is strategically important because it reduces friction across the value chain. Having harmonised international standards, such as ISO hydrogen fuel-quality standards, helps ensure consistent product quality and safety across production, storage, transport, and end-use, preventing fragmented national specifications from becoming non-tariff barriers.[68] Below are several opportunities for both countries to more closely align their standards based on the standards mapping research carried out for this report:

1. To support harmonisation with Indian standards, Australia should consider adopting:
   - ISO 16964:2019, *Gas cylinders — Flexible hoses assemblies — Specification and testing*
   - ISO 5168:2005, *Measurement of fluid flow — Procedures for the evaluation of uncertainties.*
2. To support harmonisation with Australian standards, India should consider adopting:
   - ISO 7866:2012, *Gas cylinders - Refillable seamless aluminium alloy gas cylinders - Design, construction and testing*
   - ISO 9809-1:2019, *Gas cylinders - Design, construction and testing of refillable seamless steel gas cylinders and tubes, Part 1: Quenched and tempered steel cylinders and tubes with tensile strength less than 1,100 Mpa*
   - ISO 9809-3:2019, *Gas cylinders - Design, construction and testing of refillable seamless steel gas cylinders and tubes, Part 3: Normalized steel cylinders and tubes*.
3. This research has mapped 12 relevant ISO hydrogen standards which have not been adopted by either India or Australia, which both countries could consider adopting to keep up with and align with international best practices.

Participating in the international green hydrogen standard development process is important for both countries to ensure the specific needs of their markets are considered, for keeping abreast of industry development and innovation, and for harmonising across borders. Below are gaps in green hydrogen technical committee participation:

4. Australia should consider becoming a member of ISO/TC 164/SC 1, Uniaxial testing, and ISO/TC 30, Measurement of fluid flow in closed conduits, to align more closely with India on fire and safety and transport standards.
5. India should consider joining the ISO/TC 197/SC 1, Hydrogen at scale and horizontal energy systems, and both countries should prepare to adopt the hydrogen technologies standards currently under development by this committee when they are fully published. As ISO/TC 197 has produced 11 relevant hydrogen standards covering refuelling, safety, production and storage, alignment with these international standards can be important for bilateral trade.

Other opportunities:

6. As discussed in section 1.2.1 of this report, Australia does not currently have a specified green hydrogen certification scheme. There is an opportunity for Australia to harmonise with India on the definition and emission thresholds (<2kg of CO2) for green hydrogen.
7. Figure 3 highlights potential gaps between Australia and India along the green hydrogen supply chain. For example, 24 of the transport standards mapped are Australian while 17 are Indian. Australia has 18 fire and safety standards, while India eight. Further, neither Australia nor India have adopted the standards mapped categorised under emissions. Four of these are ISO standards, with three of them currently under development and may be considered for future adoption by both countries.

2. Data Centres Sector

2.1 Trade and Investment Landscape

2.1.1 Significance of Data Centres in the Trade Relationship

India's expanding digital infrastructure is set to underpin a USD 1 trillion digital economy by 2027-28.[69] The trade and investment landscape for data centres between India and Australia is characterised by rapid digitalisation, strong bilateral economic cooperation, and increasing demand for cloud and artificial intelligence (AI) infrastructure.

In India, there are various states offering incentives to data centre providers to attract investment:

- In May 2022, the Government of Karnataka introduced the *Karnataka Data Centre Policy* for five years to attract investment and establish the state as a preferred destination for data centres. The policy provides the incentives, concessions and subsidies to data centre providers investing in the state.[70]
- The 2023 *Maharashtra IT/ITES Policy* offers strong incentives to attract investments in information technology (IT), information technology enabled services (ITES), and emerging technologies, including data centres. By dividing the state into zones, it provides higher benefits for underdeveloped regions to promote balanced growth. The policy includes capital subsidies, tax concessions, and streamlined approvals through an online platform, aiming to foster innovation and make Maharashtra a leading digital hub.[71]
- Uttar Pradesh's *Data Centre Policy* (2021, amended in 2022) provides land cost subsidies and a single-window clearance system to speed up approvals of data centre projects.[72]
- Odisha's *Industrial Policy Resolution (IPR) 2022* emphasises building core infrastructure, offering incentives for local manufacturing, and reducing compliance costs to attract data centre investments.[73]
- Tamil Nadu's *2021 Data Centre Policy* provides exemptions from building norms, renewable energy access, and subsidies for infrastructure.[74]

As per CBRE, Australia's operational data centre capacity will grow from about 1.4 gigawatts (GW) in 2025 to roughly 1.8 GW within three years. Despite this expansion, demand is expected to outpace supply, leaving a shortfall, estimated between 0.7 GW and 1.7 GW by 2028.[75] Sydney continues to dominate data centre investments followed by Melbourne due to favourable land availability.[76]

The data centre market in India and Australia is driven by data localisation mandates, hyperscale cloud adoption, and competitive construction costs. In India, the market is growing rapidly as global technology firms such as Google, AWS, and Microsoft, alongside Indian conglomerates like Reliance and AdaniConneX, are making significant investments.[77] Australia, in contrast, offers a mature and stable market with robust institutional investment in colocation and hyperscale facilities, particularly in Sydney and Melbourne, where sustainability and renewable energy integration are key priorities. This initiative also complements the Australian Government's recently announced National AI Plan, which prioritizes building domestic data centre capability to support the rapid growth of artificial intelligence and advanced digital technologies. Data centres are critical enablers of AI, requiring high-performance computing and secure infrastructure. By aligning data centre development with national principles and the AI Plan, Australia is positioning itself as a global leader in secure, sustainable digital infrastructure while driving innovation in AI and clean technologies.[78]

2.1.2 Overview of Bilateral Trade, Collaborations and Agreements

Both nations can leverage these synergies to collaborate on renewable-powered data centres, AI-ready infrastructure, and harmonised standards to support the growing digital economy. India and Australia have strengthened economic ties through the Economic Cooperation and Trade Agreement (ECTA), which came into effect in December 2022, along with ongoing negotiations for a Comprehensive Economic Cooperation Agreement (CECA).[79] These agreements aim to deepen trade in goods, services, and investment, with a growing focus on digital infrastructure, cloud services, and data centre ecosystems as part of their Indo-Pacific strategic partnership.[80]

Key Drivers for Bilateral Engagement in Data Centres

1. Digital Trade Liberalisation: ECTA and CECA negotiations include provisions for digital trade facilitation, which could streamline compliance for cloud and data centre operators.[81]
2. Sustainability and AI Readiness: Both countries emphasise carbon-neutral operations and AI-ready infrastructure, though certification standards remain fragmented, creating opportunities for harmonisation.[82]
3. Connectivity and Interoperability: Investments in submarine cable projects, carrier-neutral data centres, and edge computing are emerging as strategic priorities to reduce latency and improve global cloud interoperability. For instance, Google's investment in Dhivaru cables system and connectivity hubs under the Australia Connect initiative aims to strengthen Indo-Pacific digital infrastructure which includes connectivity with India.[83]
4. The *Australia-India Cyber and Critical Technology Partnership* (AICCTP) grants program funds collaborative research between Australia and India to develop ethical frameworks, best practices, and technical standards for cyber and critical technologies. Its goal is to promote the responsible development and use of emerging technologies across both countries and the broader Indo-Pacific region.[84]
5. India's National Association of Software and Service Companies (NASSCOM) and the Tech Council of Australia (TCA) have signed a landmark Memorandum of Understanding (MoU), marking a significant step in strengthening India-Australia bilateral ties in the digital and technology sectors. This collaboration aims to foster innovation, enhance digital trade, and promote joint initiatives in emerging technologies, including cloud, AI, and cybersecurity.[85]
6. In November 2025, Australia, Canada and India agreed on a trilateral partnership – the *Australian-Canada-India Technology and Innovation* (ACITI) partnership - which will improve development and mass adoption of AI to improve human wellbeing.[86]

2.1.3 Investment Trends

Data centre investments in India are accelerating at an unprecedented pace, driven by rapid digital adoption, cloud growth, regulatory requirements for data localisation, and the rollout of 5G networks. The market is in a high-growth phase, with capital flowing into hyperscale facilities, advanced cooling technologies, and renewable energy integration to meet sustainability targets. Investors are prioritising AI-ready infrastructure to support high-density computing workloads, while government incentives and favourable policies further enhance the attractiveness of this sector.

> **Case Study**: In January 2025, Australian-based telecom service provider, Telstra, and Accenture, an IT service provider, entered in a joint venture to focus on data and AI infrastructure modernisation, including cloud and edge computing platforms for both India and Australia workforce.[87]

Australia attracted AUD10 billion in data centre investment during 2024, making it the second-largest destination globally that year for this asset class after the United States,[88] and the Australian government is keen to continue this trend. In December 2025, the Australian Government released its *National AI Plan*. One of the plan's three goals is to capture opportunities by expanding high-speed connectivity in order to attract investment in advanced data centres. The government recognises that to realise the opportunities of AI requires reliable and extensive digital and computing infrastructure, particularly data centres.[89]

Data centre investments in Australia are characterised by modernisation and sustainability within a mature market framework. Key trends include the expansion of carrier-neutral ecosystems to support multi-cloud connectivity, integration of renewable energy sources such as solar and wind to meet carbon neutrality targets, and deployment of advanced cooling technologies for energy efficiency. There is a strong emphasis on AI-ready infrastructure, with facilities being upgraded to handle high-density computing workloads. Additionally, investments are focused on enhancing operational resilience, meeting stringent cybersecurity compliance standards, and aligning with national net-zero commitments. These trends reflect a strategic shift toward scalable, environmentally responsible, and technologically advanced data centre operations.[90]

> **Case Study**: Amazon will invest AUD20 billion from 2025 to 2029, to expand, operate, and maintain its data centre infrastructure in Australia one of the largest publicly announced technology investment in the country. This initiative aims to meet rising demand for cloud computing and AI, accelerate AI adoption, and support the digital transformation of Australian businesses across all sectors.[91]

India's data center industry is entering a transformative phase, fuelled by hyperscale cloud adoption, AI-driven workloads, and unprecedented capital inflows from global tech giants and private equity, positioning the country as one of Asia-Pacific's fastest-growing digital infrastructure markets. Driven by hyperscale cloud build-outs and surging AI workloads, India's data centre sector is on a fast track and Tier-3 prevalence with an accelerating Tier-4 pipeline, and mega-campuses clustering around Mumbai, Chennai, Hyderabad and Bengaluru where upcoming capacity is already twice installed base, further propelled by landmark commitments such as Microsoft's $17.5 billion hyperscale and AI investment (2025–2029) and Google's $15 billion AI hub in Visakhapatnam (2026–2030) and rapidly rising absorption that reflect structural demand from BFSI, OTT, 5G, and AI-native workloads.

Both India and Australia are witnessing strong investment momentum in data centres, but the nature of growth differs. While India is in a capacity-building phase fuelled by digital transformation and regulatory drivers,[92] Australia has set clear expectations for sustainability, including renewable energy integration and efficient cooling. Where investments meet these principles, the government aims to streamline approval processes with states and territories to accelerate major projects and attract investment.[93] Together, these trends underscore the strategic importance of data centres in supporting the evolving digital economy across both markets.

2.2 Key Barriers to Trade

2.2.1 Regulatory and Compliance Challenges

Both India and Australia face complex regulatory environments for data centres and digital trade. India's data localisation requirements under the *Digital Personal Data Protection Act*, increases compliance costs for foreign firms, while Australia enforces strict cybersecurity and privacy standards. Divergent legal frameworks create additional hurdles for cross-border operations. Additionally, in India, the fragmented state-level regulations on land acquisition, power tariffs, and

renewable energy policies further complicate nationwide deployment strategies. In Australia, data centre operators face key challenges hindering data centre growth including soaring construction costs, limited availability of suitable sites, and constraints in securing reliable, large-scale power supply.[94] Table 7 below provides a snapshot of the regulatory landscapes of Australia and India in areas key to data centre development and investment. The landscapes of both countries are quite similar overall, with the major difference being the incentives (tax breaks, grants, exemptions) for investors being more attractive in India over Australia.[95]

Issue	Little to no regulation; investment-friendly environment	Standard regulation across markets	Some regulatory hurdles, manageable with compliance	Significant restrictions or regulatory hurdles
Power access		Aus Ind		
Water access		Aus Ind		
Land: ease of acquiring		Aus	Ind	
Telecommunications regulations			Aus Ind	
FDI: accessibility for foreigners			Aus Ind	
Incentives	Ind		Aus	
Data protection & cyber security		Aus	Ind	
Critical infrastructure regulations			Aus Ind	
Data localisation		Aus Ind		
ESG reporting & compliance			Aus Ind	

Table 7: Regulatory Landscape Snapshot[96]

2.2.2 Technical Barriers and Product Standards

Standards, certification, technical and compliance requirements have been found to be disparate between Australia and India, imposing technical barriers to trade. Six broad disparities across the two countries have been identified below.

1. **Divergent Technical Standards for Cloud Infrastructure**
   Australia and India apply distinct technical frameworks for cloud infrastructure, which complicates seamless integration. These differences create operational friction for cross-border deployments.

   – Australia: Cloud providers must comply with the Australian Cyber Security Centre (ACSC) guidelines and undergo Information Security Registered Assessors Program (IRAP) assessments, focusing on risk management and the Essential Eight maturity model.[97]

   – India: The Computer Emergency Response Team (CERT-In) framework mandates annual cybersecurity audits, strict vulnerability scoring, and compliance with the Cloud Security Alliance (CSA) Cloud Control Matrix.[98]

2. **Absence of Harmonised Certification for Green-Powered and AI-Ready Data Centres**
   The lack of a unified certification framework adds complexity for investors seeking multi-region compliance. Both countries promote sustainability and AI readiness, but certification processes differ:

   – India: The Indian Green Building Council (IGBC) offers a Green Data Centre Certification emphasising renewable energy integration and eco-friendly cooling.[99]

   – Australia: Operators adopt Green Globes sustainability standards and NVIDIA DGX-Ready AI

certification for advanced workloads.

3. **Different Encryption Standards and Vulnerability Assessment Frameworks**
   - India: CERT-In requires organisations to report any cybersecurity breaches within six hours, conduct regular audits to track software and hardware components, and enforce strict access controls to ensure only essential permissions are granted.[100]
   - Australia: The Australian Cyber Security Centre (ACSC) requires cloud and data centre operators to follow the Information Security Manual (ISM) controls and complete IRAP assessments. These measures focus on building resilience and implementing the Essential Eight strategies to strengthen cybersecurity.[101]

4. **Variations in Fiber Network Specifications and Latency Benchmarks**
   Global providers must adapt to different ITU-T fiber standards and IEEE Ethernet protocols for interoperability. There are network infrastructure disparities between the two countries:
   - Australia: The National Broadband Network (NBN) delivers high-speed fiber (up to 1 Gbps) with low latency.
   - India: The BharatNet initiative is expanding fiber connectivity, but latency and bandwidth remain inconsistent. Global providers must adapt to different ITU-T fiber standards and IEEE Ethernet protocols for interoperability.[102]

5. **Divergent SaaS and IaaS Regulatory Frameworks**
   Compliance obligations differ for service providers:
   - Australia: Software as a Service (SaaS) providers must adhere to Australian Privacy Principles (APPs) and data sovereignty laws.[103]
   - India: CERT-In mandates audits for SaaS and Infrastructure as a Service (IaaS) platforms and Bill of Materials (BOM) tracking for AI models but lacks a dedicated SaaS law.[104]

6. **Certification for Cooling Systems and Renewable Energy Integration**
   India and Australia have different sustainability standards:
   - India: Indian Green Building Council (IGBC) certification includes renewable energy credits and eco-friendly refrigerants; The Energy and Resources Institute (TERI) promotes technician certification for sustainable cooling.
   - Australia: Green Globes certification and advanced cooling technologies (liquid immersion, seawater cooling) are widely adopted.

2.2.3 Logistical and Supply Chain Constraints

Project timelines are impacted by high capital requirements, land acquisition delays, and power availability challenges in India,[105] while Australia faces elevated construction costs and grid constraints. Global supply chain disruptions for critical equipment such as servers and cooling systems further exacerbate delays.[106]

Land Acquisition and Zoning Issues: In India, securing large contiguous land parcels for hyperscale data centres is challenging due to fragmented ownership and lengthy approval processes. In Australia, industrial land availability near major cities like Sydney and Melbourne is limited, driving up costs.

Construction and Infrastructure Delays: Both countries experience delays due to complex permitting processes, shortage of skilled labour, and dependency on imported equipment for advanced cooling and power systems.

High Logistics Costs: India's logistics sector is still developing, leading to higher transportation costs for heavy equipment. Australia faces similar challenges due to its geographic spread and reliance on long-haul transport.

2.2.4 Environmental and Sustainability Requirements

Data centres impact the environment in a number of harmful ways including enormous power and water usage, e-waste disposal, and generating emissions.[107] The global demand from data centres is set to more than double over the next five years, consuming as much electricity by 2030 as Japan does today, according to estimates. Many data centres also use significant volumes of water. According to the World Economic Forum, a one-megawatt data centre can consume up to 25.5 million litres of water each year only for cooling, comparable to the daily water use of around 300,000 people. This dependency can pose serious challenges, especially in regions facing water scarcity.[108]

Both Australia and India are pushing for net-zero commitments, requiring data centres to adopt renewable energy and advanced cooling technologies. Compliance with sustainability mandates increases upfront costs and demands innovation in energy efficiency, creating barriers for smaller operators. Additionally, certification for green-powered data centres and sustainability benchmarks varies widely.

India's emerging green compliance frameworks focus on renewable energy sourcing and water conservation, while Australia mandates carbon neutrality and advanced cooling technologies under its environmental codes. For instance, data centre facility in Australia hosting federal workloads must achieve a minimum 5-star NABERS Energy rating (National Australian Built Environment Rating System).[109] This divergence increases costs for multinational operators who must customise infrastructure and processes to meet dual compliance requirements. The absence of mutual recognition agreements for technical standards further delays project timelines and adds complexity for investors seeking to deploy uniform solutions across both markets. In 2024, data centres consumed approximately 4 TWh of electricity across the National Electricity Market around 2% of grid-supplied power and demand is projected to triple by 2030 (AEMO 2025). This growth underscores the need for sustainable practices, such as integrating renewable energy sources and adopting efficient cooling technologies.[110]

> **Case Study**: CDC Data Centres is an Australian provider of secure, sovereign digital infrastructure with an emphasis on sustainable practices. CDC offers its customers across Australia 100% net zero carbon electricity. CDC is also a leader in water conservation, with its closed-loop LiquidCore cooling system consuming near-zero water, saving billions of litres of water annually across 16 CDC-operated data centres in Australia and New Zealand. Approximately 47% of CDC's ownership is linked to Commonwealth entities through the Future Fund and the Commonwealth Superannuation Corporation (CSC).[111]

2.3. Standards Landscape

2.3.1 Current Standards used in the Data Centre Sector

Total **International** **India** **Australia**	**58 standards** 39 standards 15 standards (ISO adoptions) 4 standards (ISO adoptions)
Standards Development Organisations	International Organization for Standardization (ISO), International Electrotechnical Commission (IEC), Bureau of Indian Standards (BIS), and Standards Australia (SA).
Areas Covered	Carbon Emissions, Efficiency, and Infrastructure.

Table 8: Standards mapping overview

2.3.2 Comparative Analysis of Standards

International Standards Committee	Categories	Australia	India
ISO/IEC JTC 1/SC 25, *Interconnection of information technology equipment*	Infrastructure	P	P
ISO/IEC JTC 1/SC 27, *Information security, cybersecurity, and privacy protection*	Efficiency	P	P
ISO/IEC JTC 1/SC 39, *Sustainability, IT, and data centres*	Carbon Emissions, Efficiency, Infrastructure	O	P
ISO/TC 207/SC 1, *Environmental management systems*	Carbon Emissions	P	P
ISO/TC 292, *Security and resilience*	Efficiency	P	P
TC 46/SC 46C, *Wire and symmetric cables*	Infrastructure	NM	P
TC 86/SC 86A, *Fibres and cables*	Infrastructure	NM	P
TC 23/SC 23G, *Appliance couplers*	Infrastructure	O	O
TC 48/SC 48D, *Mechanical structures for electrical and electronic equipment*	Infrastructure	NM	O
TC 86/SC 86C, *Fibre optic interconnecting devices and passive components*	Infrastructure	O	O

Table 9: International Standards committee participation, by country (P=participating, O=observing, NM=non-member)

Australia and India exhibit a strong presence in international standardisation, with both countries engaged as either participating or observing members in ten ISO committees. This shared involvement underscores common strategic interests and provides a foundation for collaboration. Notably, both countries actively participate in four committees, signalling alignment in key areas of standards development.

However, there are clear gaps in Australia's engagement for the data centre sector. For instance, Australia is not represented in TC 46/SC 46C, TC 86/SC 86A, and TC 48/SC 48D, while India maintains a stance participating in TC 46/SC 46C and TC 86/SC 86A and observing TC 48/SC 48D. These differences highlight untapped opportunities for Australia to strengthen its influence and ensure alignment with both global and Indian best practices.

Expanding participation in these committees would enable Australia to contribute to shaping standards

development, safeguard national interests, and foster bilateral harmonisation with India. Such strategic engagement would also enhance Australia's ability to anticipate emerging trends, mitigate compliance risks, and support industry competitiveness in sectors where India is already active.

International Standard	Adopted by SA	Adopted by BIS
ISO 14001:2015, *Environmental management systems - A practical guide for SMEs*	✓	✓
ISO 22301:2019, *Security and resilience — Business continuity management systems — Requirements*	✓	✓
ISO/IEC 11801-5:2017, *Information technology - Generic cabling for customer premises - Part 5: Data centres*	✓	✓
ISO/IEC 27001:2022, *Information security, cybersecurity and privacy protection — Information security management systems — Requirements*	✓	✓
ISO/IEC 30134-1:2016, *Information technology - Data centres - Key performance indicators - Part 1: Overview and general requirements*	×	✓
ISO/IEC 30134-2:2016, *Information technology - Data centres - Key performance indicators - Part 2: Power usage effectiveness (PUE)*	×	✓
ISO/IEC 30134-3:2016, *Information technology - Data centres - Key performance indicators - Part 3: Renewable energy factor (REF)*	×	✓
ISO/IEC 30134-4:2017, *Information technology - Data centres - Key performance indicators - Part 4: IT Equipment Energy Efficiency for servers (ITEEsv)*	×	✓
ISO/IEC 30134-5:2017, *Information technology - Data centres - Key performance indicators - Part 5: IT Equipment Utilization for servers (ITEUsv)*	×	✓
ISO/IEC 30134-6:2021, *Information technology - Data centres key performance indicators - Part 6: Energy Reuse Factor (ERF)*	×	✓
ISO/IEC 30134-7:2023, *Information technology - Data centres key performance indicators - Part 7: Cooling efficiency ratio (CER)*	×	✓
ISO/IEC 30134-8:2022, *Information technology - Data centres key performance indicators - Part 8: Carbon usage effectiveness (CUE)*	×	✓
ISO/IEC 30134-9:2022, *Information technology - Data centres key performance indicators - Part 9: Water usage effectiveness (WUE)*	×	✓
IEC 60793-2-10:2019, *Optical fibres - Part 2-10: Product specifications - Sectional specification for category A1 multimode fibres*	×	×
IEC 61280-4-1:2019, *Fibre-optic communication subsystem test procedures - Part 4-1: Installed cabling plant - Multimode attenuation measurement*	×	×
IEC 61280-4-2:2024, *Fibre-optic communication subsystem test procedures - Part 4-2: Installed cabling plant - Single-mode attenuation and optical return loss measurements*	×	×
IEC 61280-4-5:2020, *Fibre-optic communication subsystem test procedures - Part 4-5: Installed cabling plant - Attenuation measurement of MPO terminated fibre optic cabling plant using test equipment with MPO interfaces*	×	×
IEC 62783-1:2023, *Twinax cables for digital communications - Part 1: Generic specification*	×	×
IEC 62966-1:2019, *Mechanical structures for electrical and electronic equipment - Aisle containment for IT cabinets - Part 1: Dimensions and mechanical requirements*	×	×
IEC 62966-2:2020, *Mechanical structures for electrical and electronic equipment - Aisle containment for IT cabinets - Part 2: Details of air flow, air separation and air-cooling requirements*	×	×

International Standard	Adopted by SA	Adopted by BIS
IEC TR 61282-15:2017, *Fibre optic communication system design guides - Part 15: Cable plant and link - Testing multi-fibre optic cable plant terminated with MPO connectors*	×	×
IEC TS 62966-3:2021, *Mechanical structures for electrical and electronic equipment - Aisle containment for IT cabinets - Part 3: Aspects of operational and personal safety*	×	×
IEC TS 63236-3:2021, *Direct current (DC) appliance couplers for information and communication technology (ICT) equipment installed in data centres and telecom central offices - Part 3: AC/DC appliance inlet*	×	×
ISO/IEC 22237-1:2021, *Information technology - Data centre facilities and infrastructures - Part 1: General concepts*	×	✓
ISO/IEC 22237-2:2024, *Information technology - Data centre facilities and infrastructures - Part 2: Building construction*	×	×
ISO/IEC 22237-3:2021, *Information technology - Data centre facilities and infrastructures - Part 3: Power distribution*	×	✓
ISO/IEC 22237-4:2021, *Information technology - Data centre facilities and infrastructures - Part 4: Environmental control*	×	✓
ISO/IEC 22237-6:2024, *Information technology - Data centre facilities and infrastructures - Part 6: Security systems*	×	×
ISO/IEC 23544:2021, *Information Technology - Data centres - Application Platform Energy Effectiveness (APEE)*	×	×
ISO/IEC TR 20913:2016, *Information technology - Data centres - Guidelines on holistic investigation methodology for data centre key performance indicators*	×	×
ISO/IEC TR 21897:2022, *Information technology - Data centres - Impact of the ISO 52000 series on energy performance of buildings*	×	×
ISO/IEC TR 23050:2019, *Information technology - Data centres - Impact on data centre resource metrics of electrical energy storage and export*	×	×
ISO/IEC TR 30133:2023, *Information technology - Data centres - Practices for resource-efficient data centres*	×	×
ISO/IEC TS 22237-30:2022, *Information technology - Data centre facilities and infrastructures - Part 30: Earthquake risk and impact analysis*	×	×
ISO/IEC TS 22237-31:2023, *Information technology - Data centre facilities and infrastructures - Part 31: Key performance indicators for resilience*	×	×
ISO/IEC TS 22237-5:2018, *Information technology - Data centre facilities and infrastructures - Part 5: Telecommunications cabling infrastructure*	×	×
ISO/IEC TS 22237-7:2018, *Information technology - Data centre facilities and infrastructures - Part 7: Management and operational information*	×	×
ISO/IEC TS 8236-1:2025, *Information technology - Provisioning, forecasting and management - Part 1: Data centre IT equipment*	×	×
ISO/IEC TS 8236-2:2025, *Information technology — Provisioning, forecasting and management — Part 2: Data centre facility infrastructure*	×	×

Table 10: Adoption of international data centre standards, by SDO

The adoption of data centre standards by Standards Australia (SA) and the Bureau of Indian Standards (BIS) reflects varying levels of harmonisation and strategic alignment. Currently, only four standards are harmonised between the two standards development organisations (SDOs), providing a limited foundation for interoperability and consistency.

In contrast, BIS has adopted 12 standards that SA has not, indicating a more proactive approach by India in formalising requirements for data centre operations. This divergence creates potential challenges for Australian stakeholders in maintaining global competitiveness and meeting cross-border compliance expectations. Furthermore, there are 23 standards that neither SDO has adopted, representing a significant gap in regional standardisation and a risk of fragmented practices as industry innovation outpaces regulatory frameworks. For Australia, aligning with BIS on the 12 adopted standards offers an immediate opportunity to close critical gaps, enhance market access, and support harmonised requirements for multinational operators.

For India, the key gaps include the need to prioritise international alignment, particularly in emerging technologies and sustainability requirements for data centres. While BIS has taken steps to adopt more standards, the absence of a structured roadmap for harmonisation with ISO or regional partners may limit India's influence in global standard-setting.

At a strategic level, both countries should prioritise the unadopted standards based on market demand, infrastructure criticality, and cost-benefit considerations. Establishing a joint roadmap and collaborative forums would accelerate adoption, reduce duplication, and strengthen bilateral influence in shaping global best practices for data centre standards.

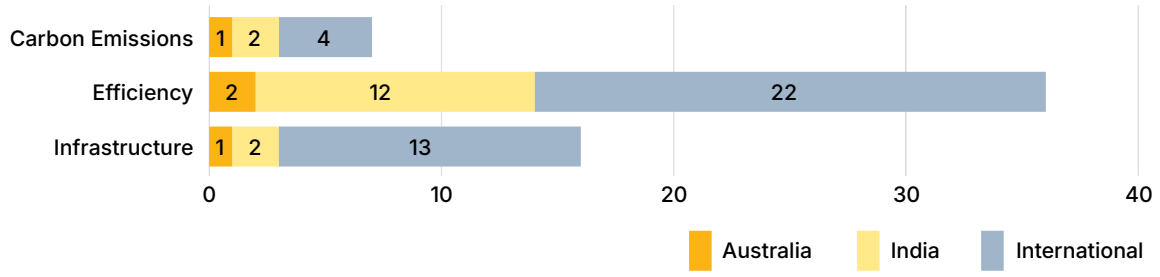

Figure 4: No. of standards mapped, by category

The mapping of standards across the data centres infrastructure reveals significant variation in coverage by category. The highest concentration of standards relates to efficiency, with 36 standards identified, followed by infrastructure (16), and carbon emissions (7). It is important to note that some standards span multiple categories and stages, reflecting their cross-functional relevance. Additionally, the international standards represented in this analysis include not only ISO but also BIS, IEC, and Standards Australia underscoring the global dimension of standardisation efforts.

Figure 4 provides a high-level overview of potential gaps in harmonisation between Australia and India. For example, within the infrastructure category, out of total 16 standards only one standard is mapped to Australia while two are mapped to India, indicating a disparity in coverage. There is an opportunity for both countries to adopt more international standards for data centres infrastructure. More critically, both Australia and India have very limited standards mapped under the carbon emissions category, despite the existence of four ISO standards in this area. This gap underscores an urgent need for both countries to prioritise the adoption of these international standards, particularly as sustainability and emissions reduction become central to global data centre operations.

2.3.3 Opportunities for Harmonisation

Currently, BIS has adopted 13 data centre standards that SA has not, while 26 standards remain unadopted by either SDO. These represent immediate opportunities for joint prioritisation and adoption, particularly in areas critical to cloud computing, cybersecurity, and sustainability. A coordinated roadmap could focus on high-impact standards such as ISO/IEC 27031, *Cybersecurity*

— *Information and communication technology readiness for business continuity, and ISO/IEC 22123 series, Information technology — Cloud computing*. Standards related to energy efficiency, microgrids, and renewable energy integration for data centres are under discussion globally. Both countries can collaborate on these emerging standards to address power supply challenges and sustainability goals. IEEE and ISO initiatives highlight the need for standards on grid interconnection, localised energy generation, and resilience against fast-changing loads areas where harmonisation would support infrastructure reliability and cost optimisation.[112]

3. Food Supply Chain Operations

3.1 Trade and Investment Landscape

3.1.1 Significance of Food Supply Chain Operations in the Trade Relationship

Food supply chain operations are the processes involved in moving food and agrifood products from initial production to the final consumer. The scope of this research includes the following supply chain stages: storage (including cold storage and refrigeration), transport, packaging, and traceability. This research also covers management systems and food safety controls which underpin all stages of the supply chain.

A resilient food supply chain is essential in order to produce safe products that meet consumer demands for high quality food, while helping to avoid problems from arising and causing loss down the line. Efficient food supply chain operations are also critical for both food security and economic value capture. Strengthening the supply chain between India and Australia can help in the following ways:[113]

- reduce wastage of perishables through better cold chains
- unlock higher-value trade (processed and certified organic goods)
- create investment opportunities (processing plants, logistics, standards and certification services).

The food industry offers promising trade and investment opportunities for India and Australia given the increasing demand for high-quality and diverse food products in both countries.[114] For example, given recent trends in health-conscious food consumption, the Australian market has opened up new opportunities for Indian exporters of healthy and sustainable food products. For Australian producers, India is one of the largest and most valuable markets for export in the world.

3.1.2 Overview of Bilateral Trade, Collaborations and Agreements

India and Australia have a growing and strategically important food and agrifood trading relationship. Total bilateral goods traded between the countries reached USD 24 billion in 2023-24,[115] with agrifood and related supply-chain services (cold chain, logistics, food processing, quality assurance) forming a meaningful and rising share of that relationship - making up around 6.7% of the trade.[116]

Australian exports of agriculture and related products to India are higher than that from India to Australia, totalling USD 1.14 billion in 2023. India's exports to Australia for the same year were USD 468 million.[117] Top Indian exports to Australia include rice, food preparations, vegetable saps and extracts, coffee, and bread/pastry/cake/biscuits etc., while Australia's top exports to India include lentils, almonds and oats.[118]

The *Economic Cooperation and Trade Agreement* (ECTA) reduced tariffs on many goods, lowering trade barriers, enhancing market access, and fostering closer ties between the two countries. The agreement has created a foundation for trade facilitation across industries, including the food and beverage sector.

In September 2025, India and Australia signed the *Mutual Recognition Arrangement* which recognises each other's organics systems as equivalent for a specific range of products. Under the terms of the arrangement, Australian organic producers will now be able to export and market the following products to India as 'organic':[119]

- unprocessed plant products (excluding seaweed, aquatic plants, and greenhouse crops)
- processed foods composed of one or more ingredients of plant origin
- organic wine

At the same time, India and Australia signed a Memorandum of Understanding (MoU) on food safety, enabling further collaboration on issues including food regulation, international food standards, and emerging food safety issues.[120]

To strengthen the trade links between the countries, the *Supply Chain Resilience Initiative* (SCRI), reaffirmed in 2022, is an international collaboration between Australia, India and Japan to promote national supply chain policies and principles in the Indo-Pacific.[121] While the initiative does not emphasise any one sector, investment in supply chain infrastructure has a positive influence overall on the food and beverage industry.

3.1.3 Investment Trends

Investment in the food supply chain within Australia and India is currently being driven by trends in cold chain logistics, sustainability, food safety, and traceability.

Investment in cold chain and temperature-controlled logistics in India is experiencing rapid growth driven by inefficiencies in storage, transport and handling, leading to significant food wastage and loss of revenue.[122] According to one report, India's cold chain logistics market size was estimated at USD 23 billion in 2025 and is expected to reach USD 31 billion by 2030.[123] Sustainability is also a key focus for this sector, driven by investor concerns and consumer preferences. In India, cold supply chain stakeholders are anticipated to invest in eco-friendly refrigeration solutions, energy-efficient transportation, and renewable energy sources. This shift towards sustainability aligns with global trends and reflects a commitment to reducing the industry's carbon footprint.[124]

In Australia, refrigerated warehouse capacity increased from 8.4 million cubic metres in 2020 to 10.2 million m^3 in 2024 with an estimated cold chain market size of AUD 8 billion in 2024.[125,126]

> **Case Study**: Snowman is India's leading integrated temperature-controlled logistics service provider operating on a pan-India basis. Implementing ISO 22000, *Food safety management*, ISO 14001, *Environmental management system*, and BRC standards for storage and transport has helped the company improve its quality management systems, product security, documentation and has resulted in stronger compliance with customer requirements.[127]

Growing consumer demands, regulatory requirements and food safety is resulting in food traceability along the supply chain emerging as a key investment trend. There is a rising consumer trend for ethically sourced and organic food products. Australian consumers have a high level of environmental awareness and aim to purchase environmentally friendly and sustainable products.[128] Global regulatory frameworks, like those in the EU and US, are mandating traceability to prevent contamination and ensure compliance with sanitary and phytosanitary (SPS) requirements.[129] Innovation in technology, including blockchain, AI and radio frequency identification (RFID) are transforming the industry by enabling real-time monitoring, improving data sharing throughout supply chains, and assuring buyers across markets.[130] The global food traceability market is forecasted to be growing at 10% between 2024 and 2029 and expected to reach AUD 38 billion.[131]

In addition, the CSIRO points to technology-enabled end-to-end traceability to track data across the supply chain and map the level of food imports and exports as a key R&D priority for Australia.[132] While recently, the Indian government announced plans to establish a national digital traceability

system for fisheries and aquaculture to "ensure compliance with international regulations, promote food safety, and improve market access."[133]

According to a number of reports, India's pet food market is growing rapidly driven by a growing pet population (38.5 million in 2023 [134]) and a change in attitudes towards pet nutrition, shifting from home-cooked food to packaged pet food.[135] One report estimates the current market size at USD 228 million and expects this to grow at 8.6% on average annually through to 2030.[136] In Australia, the pet population is around 29 million with reports putting the pet food market size somewhere around USD 3 billion.[137,138] There is a significant difference in market size between the two countries, highlighting investment opportunities.

> **Case Study**: In May of 2025, Nestlé acquired a minority stake in Drools Pet Food Limited, resulting in the Indian pet food manufacturer being valued at over USD 1 billion. The deal underscores "rising investor interest" in India's pet care sector.[139] Earlier in the year, Drools became the first Indian pet food manufacturer to export to Australia, after obtaining necessary import permits.[140]

3.2 Key Barriers to Trade

3.2.1 Regulatory and Compliance Challenges

Food and beverage products that are brought into Australia for sale must adhere to the *Australia New Zealand Food Standards Code*, which includes strict biosecurity requirements. It is the responsibility of Indian food exporters to ensure that the food they bring into Australia complies with the relevant standards in the Code.[141] To maintain food safety standards, the Department of Agriculture, Fisheries and Forestry (DAFF) operates the Imported Food Inspection Scheme, which employs a risk-based border inspection program.

According to research by the Trade Promotion Council of India, Indian food exporters to Australia highlight trade challenges which include costs of compliance, tough price competition, concerns of products being held up due to non-adherence to standards, and the lack of adequate brand awareness in the Australian market.[142]

Similarly, Australian exporters to India must comply with the Food Safety and Standards Authority of India's (FSSAI) requirements. These can include registration of food manufacturing facilities,[143] labeling and packaging rules,[144] and lab testing and sampling.[145] Between 2022-2023, the FSSAI turned away around 1,500 consignments of imported food products for failing to meet its rigorous quality and safety standards.[146]

> **Case Study**: Sahyadri Farms is a leading Indian exporter of fruit and vegetables. Since implementing the international standard ISO 22000, Food safety management, the company has reported a 90% reduction in customer complaints, an improvement in product safety and an increase in performance efficiency of 25%.[147]

3.2.2 Logistical and Supply Chain Constraints

Both countries experience logistical and supply chain challenges including long sea transit times (typically 25-30 days) [ii], import clearance requirements,[iii] and cold chain capabilities. Indian cold chain logistics is still in its infancy and faces disruptions stemming from organisational inefficiencies,

ii https://oxenlogistics.com.au/sea-freight-from-india-to-australia/
iii https://www.fssai.gov.in/upload/uploadfiles/files/Food%20Imports%20Manual.pdf

a shortage of specialised knowledge, and limited visibility into cargo movements. This fragmentation poses a formidable hurdle in the path toward achieving robust and efficient cold chain logistics systems, essential for sustaining India's position as a global export powerhouse.[148]

3.2.3 Environmental and Sustainability Requirements

In 2022, global consulting firm, McKinsey reported that the food supply system accounts for 34% of global GHG emissions.[149]

Consumers, retailers and processors are increasingly demanding sustainability credentials, which show, for example, low-emission transport, water-use stewardship, deforestation-free sourcing, antibiotic-use limits in animal products and verified carbon footprints.[150] These increasing demands in the global marketplace for agricultural products with environmental sustainability credentials has created growing expectations for producers and exporters to demonstrate to trading partners actions to improve sustainability.[iv] Compliance adds costs but is increasingly mandatory for premium market access. Exporters must align production practices, traceability and reporting to meet buyer and retailer requirements.

3.3 Standards Landscape

3.3.1 Current Standards used in the Food Supply Chain Operations Sector

Total **International** **Indian** **Australian**	**90 standards** 44 standards 29 standards (5 national, 24 ISO adoptions) 19 standards (4 national, 15 ISO adoptions)
Standards Development Organisations	International Organization of Standardization (ISO), Codex Alimentarius Commission, Brand Reputation through Compliance Global Standards (BRCGS), Safe Quality Food (SQF) Institute, Primary Industries Standing Committee (PISC), Bureau of Indian Standards (BIS), Food Safety and Standards Authority of India (FSSAI), Standards Australia (SA), Food Standards Australia New Zealand (FSANZ), Australian Food & Grocery Council.
Areas Covered	Management Systems, Cold Storage & Refrigeration, Transport & Storage, Packaging, Traceability, Food Safety, Pet Food.

Table 11: Standards mapping overview

This research has mapped 90 standards related to various stages and operations of the food supply chain. Included are 29 Indian and 19 Australian standards. While the majority of standards mapped were developed by Standards Australia (SA), the International Organization for Standardization (ISO), and the Bureau of Indian Standards (BIS), some additional standards have been included from national authorities and other international standards organisations.

3.3.2 Comparative Analysis of Standards

Technical Committee	Categories	Australia	India
ISO/IEC JTC 1/SC 27 - Information security, cybersecurity and privacy protection	Management Systems	P	P
ISO/TC 176/SC 2 - Quality systems	Management Systems	P	P
ISO/TC 207/SC 1 - Environmental management systems	Management Systems	P	P

iv https://www.oecd.org/content/dam/oecd/en/publications/reports/2025/04/environmental-sustainability-initiatives-related-to-highly-traded-agricultural-commodities_bd490ae0/0e943378-en.pdf

Technical Committee	Categories	Australia	India
ISO/TC 283 - Occupational health and safety management	Management Systems	P	P
ISO/TC 292 - Security and resilience	Management Systems	P	P
ISO/TC 301 - Energy management and energy savings	Management Systems	P	P
ISO/TC 34 - Food products	Management Systems	P	P
ISO/TC 86/SC 1 - Safety and environmental requirements for refrigerating systems	Cold Storage & Refrigeration	P	P
ISO/TC 86/SC 4 - Testing and rating of refrigerant compressors	Cold Storage & Refrigeration	P	P
ISO/TC 86/SC 6 - Testing and rating of air-conditioners and heat pumps	Cold Storage & Refrigeration	P	P
ISO/TC 86/SC 8 - Refrigerants and refrigeration lubricants	Cold Storage & Refrigeration	O	P
ISO/TC 104/SC 1 - General purpose containers	Transport & Storage	P	P
ISO/TC 104/SC 2 - Specific purpose containers	Transport & Storage	P	P
ISO/TC 122 - Packaging	Packaging	P	P
ISO/TC 154 - Processes, data elements and documents in commerce, industry and administration	Traceability	O	P
ISO/TC 315 - Cold chain logistics	Traceability, Transport & Storage, Cold Storage & Refrigeration	NM	P
ISO/TC 34/SC 17 - Management systems for food safety	Food Safety, Traceability, Management Systems, Pet Food	P	P

Table 12: Technical committee participation, by country (P=participating, O=observing, NM=non-member)

Of the 17 ISO technical committees (TC) producing standards related to food supply chain operations, Australia and India are both members (either participating or observing) of 16. India is a participating member on all TCs identified in this research, while Australia is observing on two committees - Testing and rating of air-conditioners and heat pumps (TC 86/SC 4) and Processes, data elements and documents in commerce, industry and administration (TC 154) – and currently not a member of ISO/TC 315 Cold chain logistics.

Standard	Adopted by Australia	Adopted by India
ISO 14001:2015, *Environmental management systems — Requirements with guidance for use*	✓	✓
ISO 1496-1:2013, *Series 1 freight containers - Specification and testing - Part 1: General cargo containers for general purposes*	✓	✓
ISO 1496-2:2018, *Series 1 freight containers - Specification and testing - Part 2: Thermal containers*	✓	✓
ISO 1496-4:2023, *Series 1 freight containers - Specification and testing - Part 4: Non-pressurized containers for dry bulk*	✗	✓

Standard	Adopted by Australia	Adopted by India
ISO 20854:2019, *Thermal containers - Safety standard for refrigerating systems using flammable refrigerants - Requirements for design and operation*	✗	✓
ISO 22000:2018, *Food safety management systems — Requirements for any organization in the food chain*	✓	✓
ISO 22002-1:2025, *Prerequisite programmes on food safety - Part 1: Food manufacturing*	✗	✓
ISO 22002-4:2025, *Prerequisite programmes on food safety - Part 4: Food packaging manufacturing*	✗	✓
ISO 22003-1:2022, *Food safety - Part 1: Requirements for bodies providing audit and certification of food safety management systems*	✓	✓
ISO 22003-2:2022, *Food safety - Part 2: Requirements for bodies providing evaluation and certification of products, processes and services, including an audit of the food safety system*	✓	✓
ISO 22005:2007, *Traceability in the feed and food chain - General principles and basic requirements for system design and implementation*	✗	✓
ISO 22301:2019, *Security and resilience — Business continuity management systems — Requirements*	✓	✓
ISO 28000:2022, *Security and resilience — Security management systems — Requirements*	✗	✓
ISO 45001:2018, *Occupational health and safety management systems — Requirements with guidance for use*	✓	✓
ISO 50001:2018, *Energy management systems — Requirements with guidance for use*	✓	✓
ISO 5149-1:2014, *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 1: Definitions, classification and selection criteria*	✓	✓
ISO 5149-2:2014, *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 2: Design, construction, testing, marking and documentation*	✓	✓
ISO 5149-3:2014, *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 3: Installation site*	✓	✓
ISO 5149-4:2022, *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 4: Operation, maintenance, repair and recovery*	✓	✓
ISO 6498:2012, *Animal feeding stuffs — Guidelines for sample preparation*	✗	✓
ISO 817:2024, *Refrigerants - Designation and safety classification*	✗	✓
ISO 9001:2015, *Quality management systems — Requirements*	✓	✓
ISO/IEC 27001:2022, *Information security, cybersecurity and privacy protection — Information security management systems — Requirements*	✓	✓
ISO 21922:2021, *Refrigerating systems and heat pumps - Valves - Requirements, testing and marking*	✗	✗
ISO 22002-100:2025, *Prerequisite programmes on food safety - Part 100: Requirements for the food, feed and packaging supply chain*	✗	✗
ISO 22002-5:2025, *Prerequisite programmes on food safety - Part 5: Transport and storage*	✗	✗
ISO 22002-6:2025, *Prerequisite programmes on food safety - Part 6: Feed and animal food production*	✗	✗
ISO 31510:2025, *Cold chain logistics - Vocabulary*	✗	✗

Standard	Adopted by Australia	Adopted by India
ISO 5151:2017, *Non-ducted air conditioners and heat pumps - Testing and rating for performance*	✓	×
ISO 916:2020, *Testing of refrigerating systems*	×	×
ISO/DIS 31513, *Temperature validation methods of temperature-controlled storage and land transport*	×	×
ISO/DIS 5149-1.2, *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 1: Vocabulary*	×	×
ISO/DIS 5149-3.2, *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 3: Installation site, classification and selection criteria*	×	×
ISO/TR 16340:2023, *Application of blockchain-based traceability platform for cold chain food*	×	×
ISO/TS 22984:2021, *Transport packaging - Cleaning and sanitation methods of reusable transport items for distribution purpose*	×	×
ISO/TS 26030:2019, *Social responsibility and sustainable development - Guidance on using ISO 26000:2010 in the food chain*	×	×
ISO/TS 31514, *Requirements and recommendations for food traceability in cold chain logistics*	×	×
ISO/WD 25458, *Transport packaging - Reusable, passive temperature-controlled packaging*	×	×

Table 13: Adoption of international food supply chain standards, by SDO

The adoption of food supply chain standards by SA and BIS reflects varying levels of harmonisation and strategic alignment. Of 38 ISO standards, 15 have been adopted by both the Australian and Indian standards bodies.

Australia is lagging India in its adoptions of ISO standards, with eight less adoptions. Conversely, India has not adopted one standard that Australia has - ISO 5151. Lastly, there are 14 ISO standards related to food supply chain operations which neither India nor Australia have adopted.

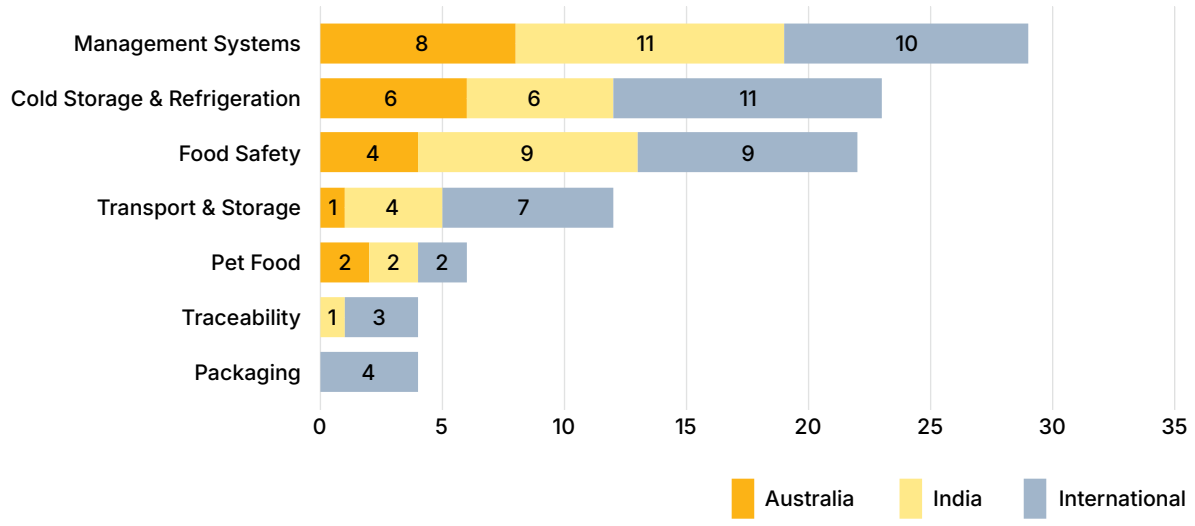

Figure 5: No. of standards mapped, by category

Along the different stages of the food supply chain, there are slight disparities between the number of

standards from each country. Management system standards represent the most standards mapped during this research, with 10 international, 11 Indian and 8 Australian. For cold storage and refrigeration standards, 9 international, and 6 standards apiece for India and Australia were mapped.

There are disparities in the number of Indian and Australian food safety and transport/storage standards, with Australia lagging. Interestingly, there are no Australian standards mapped for traceability and neither country have adopted ISO's packaging standards (two of the packaging standards are BRCGS standards which both countries do recognise).

3.3.3 Opportunities for Harmonisation

Harmonisation of international standards along the food supply chain helps to ensure food safety, build consumer trust and promote sustainability across borders. It helps to reduce duplicative testing, inconsistency in labeling, and mismatched risk controls. Below are several opportunities for both countries to more closely align their standards based on the standards mapping research carried out for this report:

1. To support harmonisation with Indian standards, Australia should consider adopting:
   - ISO 1496-4:2023, *Series 1 freight containers - Specification and testing - Part 4: Non-pressurized containers for dry bulk*
   - ISO 20854:2019, *Thermal containers - Safety standard for refrigerating systems using flammable refrigerants - Requirements for design and operation*
   - ISO 22002-1:2025, *Prerequisite programmes on food safety - Part 1: Food manufacturing*
   - ISO 22002-4:2025, *Prerequisite programmes on food safety - Part 4: Food packaging manufacturing*
   - ISO 28000:2022, *Security and resilience — Security management systems — Requirements*
   - ISO 22005:2007, *Traceability in the feed and food chain - General principles and basic requirements for system design and implementation*
   - ISO 6498:2012, *Animal feeding stuffs — Guidelines for sample preparation*
   - ISO 817:2024, *Refrigerants - Designation and safety classification*
2. Of the ISO standards mapped, only one standard has been adopted by Australia and not India which should be considered:
   - ISO 5151:2017, *Non-ducted air conditioners and heat pumps - Testing and rating for performance*
3. This research has mapped 14 relevant ISO hydrogen standards which have not been adopted by either India or Australia, which both countries should consider adopting to align closely with international best practices.
4. Currently, Australia is not a member of ISO/TC 315, Cold chain logistics, while India is a participating member. To align on traceability, transport and storage, cold storage and refrigeration standards, Australia should consider becoming a member of TC 315.

4. Pet Food

4.1 Trade and Investment Landscape

4.1.1 Significance of Food Supply Chain Operations in the Trade Relationship

Increasing rates of pet ownership and changing attitudes towards pet nutrition are significant drivers behind the growth in the global pet food market. As a result, consumers now place greater emphasis on the quality, hygiene, and safety of pet food products. The Australian pet food market is large and mature, characterised by steady growth of around 5% annually,1 reflecting high penetration and stable demand. In contrast, the Indian market is experiencing rapid expansion, growing over 20% between 2018 and 2023, creating significant opportunities for investment and market entry.2 Standards harmonisation is the process of aligning technical standards across jurisdictions to ensure compatibility and create a more predictable compliance environment that supports trade and innovation. It is typically achieved by adopting common benchmarks developed by international bodies such as the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC), or by recognising the equivalence of national standards that deliver comparable outcomes. Standards harmonisation between India and Australia reduces technical barriers around ingredient rules, labelling, safety testing, allowing pet food products to be accepted in both markets without costly re-certification. This lowers compliance costs, speeds up market entry, and increases trade volumes by giving exporters regulatory certainty and scalability.

4.2 Pet Food Safety and Hygiene Management

Food safety and hygiene management ensures pet food is produced in a controlled environment that prevents contamination (biological, chemical, physical), protecting animal health and public trust. Standards provide structured, auditable process controls (e.g. hygiene, facility design, handling practices), enabling consistent safety outcomes across producers and making regulatory enforcement and international recognition or certification possible. Below are two key standards which provide guidelines around production process controls, food safety systems and hygiene:

Region	Standard Code	Title
International	ISO 22002-6:2025	Prerequisite programmes on food safety - Part 6: Feed and animal food production
Australia	PISC Technical Report 88 (2009)	Standard for the Hygienic Production of Pet Meat

4.3 Product Specifications

Product specification defines what pet food is, including nutritional composition, ingredient requirements, and labelling, ensuring pets receive safe and nutritionally adequate diets. Standards create clear, enforceable benchmarks for quality and composition, prevent misleading claims, and enable market access by aligning expectations between producers, regulators, and consumers.

Below are key product specification standards in India and Australia:

Region	Standard Code	Title
India	IS 11968:2019	Pet food for dogs and cats - Specification
Australia	AS 5812:2023	Manufacturing and marketing of pet food - Cats and dogs

4.4 Testing and Sampling

Testing, sampling and analysis verifies that products actually meet the safety and specification requirements, such as nutrient levels or contaminants. Standards ensure consistency, repeatability, and comparability of results across labs and jurisdictions which is critical for compliance, certification, and mutual recognition in bilateral trade. ISO 6498 is a key international standard which specifies guidelines for the preparation of test samples from laboratory samples of animal feeding stuffs, including pet foods.

Region	Standard Code	Title
India	ISO 6498:2012	Animal feeding stuffs — Guidelines for sample preparation
Australia	IS 14831:2021	Animal Feeding Stuff - Guidelines for Sample Preparation (ISO Adoption)

4.5 Opportunities for Harmonisation

Opportunities for harmonisation in pet food are strongest in areas where Australia and India already regulate similar outcomes but through different standards frameworks, particularly product safety, hygiene, labelling, ingredient traceability, testing and conformity assessment. Australia's AS 5812:2023 sets requirements for the manufacture and marketing of pet food for cats and dogs, while India's IS 11968:2019 provides specifications for pet food for dogs and cats, including composition, nutritional content, labelling, sampling and testing. Aligning these national approaches with international food and feed safety frameworks such as ISO 22002-6:2025 could reduce duplicative testing, strengthen confidence in product safety and quality, and support smoother market access for pet food exporters in both countries

5. Insights from SA and BIS Collaboration

The Australia–India Standards Trade Enabling Project (AI-STEP) is a bilateral initiative delivered by Standards Australia (SA) in partnership with the Bureau of Indian Standards (BIS). The project aims to strengthen standards cooperation and identify opportunities to reduce technical barriers to trade between Australia and India. Through market research, comparative standards mapping and technical engagement with government, industry and subject-matter experts, AI-STEP has examined priority opportunities across green hydrogen, ICT and data centres, and food supply chain operations, including food and beverage testing and pet food. This report brings together the market analysis and insights generated through the project to identify areas where greater standards alignment, adoption of international standards and continued bilateral cooperation could support trade, investment, safety and innovation.

As part of AI-STEP, Standards Australia and the Bureau of Indian Standards convened a series of technical meetings virtually and in-person with representatives from government, industry, standards committees and relevant technical fields. These consultations complemented the market research and standards mapping undertaken for this report by providing practical perspectives on regulatory differences, implementation challenges and opportunities for bilateral cooperation. The findings below synthesise the principal themes raised across the consultations; they do not represent formally agreed positions of SA, BIS or individual participants.

5.1 Cross Sector Findings

Several consistent themes emerged across the technical consultations: Alignment with international standards can reduce duplicative testing, inconsistent compliance requirements and other technical barriers to bilateral trade. Standards are most effective when supported by appropriate regulatory frameworks, accredited testing and certification capabilities, skilled personnel and industry awareness. Rapid technological and market developments can outpace traditional standards-development processes, reinforcing the importance of early industry engagement and continued international participation. Mutual recognition of testing and certification outcomes may help reduce compliance costs and improve market access, where regulatory and conformity-assessment requirements allow. Continued cooperation between SA and BIS could support information exchange, comparative standards analysis, standards adoption and coordinated engagement in relevant international technical committees.

5.2 Green Hydrogen

Webinar and In-Country Workshop Insights

The green hydrogen engagement activities, comprising a technical webinar and an in-country workshop, confirmed strong Australian and Indian interest in using standards to support the safe development and commercialisation of hydrogen technologies. Webinar discussions identified hydrogen purity, high-pressure and cryogenic storage, material compatibility, transportation, dispensing, electrolyser manufacture and product certification as priority technical considerations across the hydrogen value chain. Participants noted that both countries have adopted relevant international standards and are continuing to assess standards gaps in emerging areas of hydrogen production, storage, transport and utilisation. Differences in national approaches, certification requirements and evolving regulatory frameworks may, however, create barriers to future trade and investment. Greater alignment in areas such as emissions accounting, safety, storage, transport and product certification could improve interoperability and provide greater certainty for industry and investors.

The in-country workshop extended the green hydrogen discussions by focusing on hydrogen-fired domestic and commercial cooking appliances. Australian and Indian technical experts examined appliance design, gas installations, safety controls, hydrogen-compatible materials and emerging hydrogen cooking technologies, including prototype hydrogen cookstoves under development in India. The discussions highlighted India's strong interest in hydrogen cooking applications, particularly as an alternative to LPG, which presents a distinctive use case compared with many other markets. They also reinforced shared interest in hydrogen blending with natural gas, an area where Australia's experience, including lessons captured through Standards Australia Handbook SA HB 225, could offer useful insights for India.

Australia and India are both developing their green hydrogen sectors, supported by strong policy ambition, renewable energy potential and emerging investment. However, their areas of maturity differ. Australia has developed experience in hydrogen blending, safety frameworks and standards guidance, while India has set larger near-term production targets under the National Green Hydrogen Mission and is progressing practical work on hydrogen cooking appliance design and testing. These differences create opportunities for complementary collaboration.

The workshop also identified the value of building on existing gas appliance standards and infrastructure as a foundation for future hydrogen deployment, while addressing standards gaps relating to appliance safety, flame arrestors, leak detection, ventilation and hydrogen-compatible materials. Future collaboration could include joint Australia–India technical workshops focused on hydrogen cooking, safety and burners; coordinated participation in ISO/TC 197 and IEC/TC 105; and online exchanges to share research, industry findings and emerging technical developments.

5.3 ICT/Data Centres

Webinar and In-Country Workshop Insights

The data centre webinar and in-country workshop in India reinforced the strategic importance of standards cooperation in supporting rapidly expanding digital infrastructure, AI-ready data centres and sustainable operations across Australia and India. The webinar highlighted that data centre standards are shaped by a mix of international standards, Australian standards and United States industry frameworks, including widely used frameworks such as TIA-942. This creates uncertainty for operators where international standards and industry frameworks overlap or diverge, particularly in areas such as infrastructure design, interoperability, sustainability measurement and certification.

The webinar also identified harmonisation as a practical way to reduce technical barriers to bilateral trade. Participants noted that overlapping or inconsistent compliance requirements can increase administrative and financial burden, particularly for smaller organisations. Greater alignment with international standards, rather than duplicating existing work, was seen as an opportunity to reduce duplication, simplify compliance, support mutual recognition of testing and certification, and improve the movement of critical data centre hardware, storage systems and electrical infrastructure between markets.

Interoperability emerged as a key theme across the webinar and workshop. Participants recognised that scalable, resilient data centre ecosystems require effective integration between systems from different manufacturers, particularly as AI, machine learning and high-performance computing increase network complexity, rack density, power demand and cooling requirements. The workshop further demonstrated that AI is reshaping data centre design and operation, with implications for power distribution, energy storage, cooling architecture, physical security, workload management and infrastructure resilience.

The in-country workshop provided a more detailed technical discussion on India's data centre standards ecosystem and implementation experience. BIS presented the role of LITD 31 as India's cloud computing, IT and data centres sectional committee, including its mirror committee function for ISO/IEC JTC 1/SC 38 and ISO/IEC JTC 1/SC 39. Workshop discussions identified opportunities for Australia to learn from India's committee participation, stakeholder engagement and experience implementing ISO/IEC 22237 and ISO/IEC 30134 in practice. They also highlighted India's experience in scaling data centre deployment and integrating sustainability, AI, energy management and physical security considerations into data centre infrastructure.

Areas of alignment between Australia and India include the need to support rapid data centre growth while improving energy efficiency, renewable energy integration, cooling performance, power management and sustainability reporting. Both countries face increasing pressure from AI-driven digital infrastructure, but the domestic contexts differ. Australia and India face many common challenges in scaling data centre infrastructure, including grid connection, access to reliable and affordable electricity, water use, cooling requirements, land availability, sustainability expectations and the management of large new loads. The main difference lies in the market context: Australia's challenges are shaped by a mature but capacity-constrained market, while India's are shaped by rapid capacity expansion, state-level infrastructure requirements and the implementation of adopted international standards across a fast-growing market.

Sustainability was a common priority across both engagements. The webinar identified the adoption of unified sustainability metrics, including the ISO/IEC 30134 series, as an important opportunity to support consistent measurement of power usage effectiveness, water usage effectiveness, carbon usage effectiveness and other key performance indicators. The workshop reinforced that sustainability, physical security and resilience should be treated as integral design and operational considerations rather than separate compliance issues. Consistent measurement boundaries, reporting methodologies, verification processes and conformity assessment approaches will be important to ensure performance claims are comparable and reliable across both jurisdictions.

Opportunities for future collaboration include stronger Australia–India engagement through ISO/IEC JTC 1/SC 39, particularly WG 3 on sustainable facilities and infrastructures and the ISO/IEC 22237 series; closer coordination on the ISO/IEC 30134 series for data centre performance indicators; and technical exchanges on AI-ready data centres, high-density computing, liquid and hybrid cooling, battery energy storage systems, renewable energy integration, physical security and resilience. Joint workshops, implementation case studies and a shared standards work programme could help BIS and SA identify standards gaps, reduce market access barriers, support mutual recognition of testing and certification where appropriate, and strengthen bilateral cooperation with global technology companies operating in both markets.

5.4 Food & Beverage

Webinar and In-country Workshop Insights

Both India and Australia largely harmonise their food and water microbiological test methods with ISO standards, with only a few indigenous standards where no ISO equivalent exists. This alignment facilitates smoother trade and regulatory cooperation. Active participation in ISO and Codex committees is seen as essential for harmonising standards and influencing international food safety practices. Both countries value sharing expertise and experiences to strengthen their standards frameworks and address emerging risks (e.g., new toxins, climate-driven changes in pathogens).

Attendees highlighted that continued investment in laboratory infrastructure, skill development, and

capacity building is necessary to keep pace with evolving standards and testing requirements.

Discussions identified gaps in methods for certain pathogens (e.g., Vibrio cholera in water), and both countries see value in collaborating to address these. Validation of methods for complex matrices (like seafood) remains a challenge, requiring matrix-specific validation and robust surveillance systems. Attendees also emphasised the need for rapid, validated testing methods is critical for industry, as delays in results can impact trade and compliance.

Attendees discussed that there is ongoing, though informal, communication between standards committees and regulators to ensure standards meet regulatory needs. Accreditation bodies (like NATA in Australia) play a key role in ensuring laboratory competency and are trusted by regulators for food safety testing.

5.5 Pet Food

Webinar and In-country Workshop Insights

Consultations through the pet food webinar and in-country workshop highlighted that standards harmonisation is central to enabling trade between Australia and India in the pet food sector. Participants noted that divergent standards can create duplicative testing, additional compliance costs and regulatory friction for businesses seeking to access both markets. Greater alignment between Australian and Indian approaches would help reduce technical barriers to trade, support recognition of products, improve market access and increase confidence for manufacturers, regulators and investors.

A key insight from the webinar was the difference in regulatory approaches between the two countries. Australia's pet food framework is largely industry-led and risk-based, supported by voluntary but widely adopted standards such as AS 5812, HACCP principles, quality assurance systems and third-party auditing. India's framework is more prescriptive and continues to evolve towards stronger regulation, with IS 11968:2019 focused more specifically on pet food product specifications. This difference means that Australia's approach may provide useful reference points for India as it considers how to strengthen its broader pet food hygiene and compliance framework.

The in-country workshop focused more directly on hygiene management across the pet food supply chain. Discussions highlighted that pet food hygiene risks are not limited to the final product, but can arise across ingredient sourcing, manufacturing, storage, packaging, handling and transportation. In India, key hygiene challenges may include contamination of raw materials, inconsistent sanitary controls across manufacturing facilities, variable testing and inspection capability, pest control, moisture management, storage conditions and the risk of cross-contamination during distribution. Contamination during transportation is particularly relevant where products are exposed to heat, humidity, damaged packaging, mixed cargo, unhygienic vehicles or poor segregation between raw ingredients and finished goods.

The workshop also reinforced the importance of an end-to-end systems approach to pet food safety. BIS expressed particular interest in AS 5812 because the Australian Standard takes a broader approach to the manufacturing and marketing of pet food for cats and dogs. It is supported by hygiene controls, HACCP principles, traceability, quality assurance and third-party auditing. By comparison, India's IS 11968:2019 is more focused on the pet food product and specification, with other hygiene, testing and regulatory requirements addressed through separate standards and mechanisms. This makes the Australian approach relevant to BIS as it considers how to strengthen and better integrate its evolving framework.

Emerging priorities identified through the webinar and workshop included ingredient traceability, country-of-origin labelling, stronger hygiene controls, compliance systems and clearer responsibilities across the supply chain. These are likely to become future harmonisation priorities as the Indian pet food market continues to grow and as consumer expectations around pet food safety, transparency and product quality increase.

A practical outcome from the workshop was BIS's interest in reviewing AS 5812 in more detail to identify principles that could be adopted or adapted within the Indian context. Given AS 5812's broader end-to-end approach to the manufacturing and marketing of pet food for cats and dogs, this review could help BIS consider how hygiene controls, HACCP principles, traceability, quality assurance and third-party auditing are addressed within the Australian framework. Rather than prescribing a direct model for adoption, the review would support BIS in identifying which elements may be relevant to India's evolving pet food standards framework and where further technical cooperation with Standards Australia may be useful.

Appendices

Appendix 1: Consultation List

This appendix lists organisations consulted through project activities, including webinars, technical workshops and bilateral discussions. The list is intended to document the breadth of stakeholder engagement that informed the report findings and does not necessarily indicate endorsement of the report's conclusions.

Note: Indian participants are listed with their organisational affiliations, reflecting their participation as representatives of those organisations. Australian participants contributed through Standards Australia technical committees, and their employers are therefore not identified as project contributors.

Green Hydrogen

Organisation consulted	Country
Advait Greenergy Private Limited	India
APCO Worldwide	India
Ashok Leyland Limited	India
Atharva Laboratories Private Limited	India
Automotive Component Manufacturers Association of India	India
Automotive Research Association of India	India
Australian Hydrogen Council	Australia
Bajaj Auto Limited	India
Bharat Heavy Electricals Limited	India
Bharat Petroleum Corporation Limited	India
Bhiwadi Cylinders Private Limited	India
Bureau of Indian Standards	India
Central Forensic Science Laboratory, Kolkata	India
Central Institute of Road Transport	India
Commonwealth Scientific and Industrial Research Organisation CSIRO	Australia
Council of Scientific and Industrial Research – National Physical Laboratory	India
Delhi Test House	India
DENSO International India Private Limited	India
Everest Kanto Cylinder Limited	India
G&A Group India	India
Garrett Motion India Private Limited	India
Global Automotive Research Centre	India
GM Modular Private Limited	India
GreenVize	India
Greenzo Energy India Limited	India
Hindalco Industries Limited	India
Impetus Green India Private Limited	India
Indian Institute of Technology Bombay	India
Indian Institute of Technology Roorkee	India

Organisation consulted	Country
Indian Institute of Technology Ropar	India
Indian Institute of Technology Tirupati	India
Indian Oil Corporation Limited	India
Indigen Partners	India
INOX India	India
Jai Gopal Engineering Works and Gases Private Limited	India
Jay Fe Cylinder & Technologies Private Limited	India
Jhansi Bose Engineering Consulting Services LLP	India
Kabsons Gas Equipment Private Limited	India
Larsen & Toubro Limited	India
LPG Equipment Research Centre	India
Mahanagar Gas Limited	India
Maruti Suzuki India Limited	India
Minda Westport Technologies Limited	India
Ministry of New and Renewable Energy	India
National Forensic Sciences University	India
National Institute of Secondary Steel Technology	India
National Institute of Solar Energy	India
National Test House	India
Natural Gas Society	India
Petroleum and Explosives Safety Organisation	India
Petroleum and Natural Gas Regulatory Board	India
Reliance Industries Limited	India
Reliance Jio Information and Vision	India
Reverclean Energy Private Limited	India
Rise Tech Software Private Limited	India
Samsung India Electronics Private Limited	India
Sero Power Systems Private Limited	India
Shigan Quantum Technologies Limited	India
Society of Indian Automobile Manufacturers	India
Solar Energy Corporation of India Limited	India
SRM Institute of Science and Technology	India
ST Telemedia Global Data Centres	India
Standards Australia	Australia
Steel Authority of India Limited / Research and Development Centre for Iron and Steel	India
Suzlon Energy Limited	India
Tata Consulting Engineers Limited	India
Technomechanical Services Private Limited	India
The Energy and Resources Institute	India
The Supreme Industries Limited	India
Time Technoplast Limited	India
Trans Valves India Private Ltd	India

Organisation consulted	Country
TUV India Pvt.Ltd	India
Vanaz Engineers Limited	India
Yotta	India

ICT/Data Centres

Organisation consulted	Country
Amazon Web Services	India
Atharva Laboratories Private Limited	India
Bureau of Indian Standards	India
Centre for Development of Advanced Computing	India
Classic Testing & Research Centre Private Limited	India
Commonwealth Scientific and Industrial Research Organisation	Australia
Council of Scientific and Industrial Research	India
Dell Technologies	India
Government of India, Ministry of Electronics and Information Technology	India
Havells India Limited	India
Hewlett Packard Enterprise India Private Limited	India
IG3 Infra Limited	India
Intertek India Private Limited	India
Koenig Solutions Private Limited	India
L.D. College of Engineering, Ahmedabad	India
Malaviya National Institute of Technology Jaipur	India
Ministry of Defence, Directorate General of Quality Assurance	India
Nasscom	India
National Fire Protection Association	Inida
National Institute of Biologicals	India
National Institute of Technology Mizoram	India
National Productivity Council	India
Narnix Technolabs Private Limited	India
Oracle India Private Limited	India
Quality Council of India	India
Schneider Electric India Private Limited	India
Siemens Limited	India
Standards Australia	Australia
Standardisation Testing and Quality Certification Directorate	India
Sterlite Technologies Limited	India
Susmita Electronics Private Limited	India
Tata Consulting Engineers Limited	India
Techno Electric & Engineering Company Limited	India
Telecommunications Standards Development Society, India	India
Turner & Townsend	India
TÜV Rheinland India	India

Organisation consulted	Country
Veer Surendra Sai University of Technology	India
Vigyanlabs Innovations Private Limited	India
Yotta Data Services Private Limited	India

Food and Beverages

Organisation consulted	Country
Bureau of Indian Standards	India
Export Inspection Agency – Kolkata Laboratory	India
Indian Council of Agricultural Research – Central Institute of Fisheries Technology	India
Indian Council of Agricultural Research – National Meat Research Institute	India
Indian Council of Medical Research – National Institute of Nutrition	India
Marine Products Export Development Authority	India
Merck	India
Mérieux NutriSciences AQ	Australia
National Accreditation Board for Testing and Calibration Laboratories	India
Nestlé India Limited	India
Punjab Biotechnology Incubator	India
Standards Australia	Australia

Pet Food

Organisation consulted	Country
Bureau of Indian Standards	India
Independent food auditor / consultant	India
Integral Advisory Services Private Limited	India
International Flavors & Fragrances	India
Karnataka Veterinary, Animal and Fisheries Sciences University	India
Lovely Professional University	India
Maharaja Agrasen Institute of Technology	India
Mars Petcare India	India
Ministry of Fisheries, Animal Husbandry and Dairying, Government of India	India
Nestlé India Limited	India
Novonesis	India
Royal Canin India Private Limited	India
Sona College of Technology	India
Standards Australia	Australia
Stock Feed Manufacturers' Council of Australia	Australia

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