

Australia Clean Energy Market Assessment, By Type [Hydropower and Tidal Power, Wind Power, Solar Power, Geothermal Power, Biomass and Waste, Nuclear Power, Green Hydrogen], By End-user [Residential, Commercial, Industrial, Others], By Region [Northern Territory, Western Australia, South Australia, New South Wales, Queensland, Tasmania, Victoria], Opportunities and Forecast, 2016-2030F

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# **Abstracts**

The adoption of clean energy in Australia has been driven by declining costs, technological advancements, supportive policies, and increasing public awareness. Clean energy solutions are being adopted by governments, businesses, and individuals to decrease carbon emissions, enhance air quality, and attain energy self-sufficiency. Total renewable energy capacity additions in Australia in 2022 were recorded at 6.53 GW and are expected to reach 17.15 GW by 2030.

Energy plays a vital role in the development of any economy. It is crucial for powering industries, transportation, and infrastructure, and meeting the daily needs of individuals and communities. Australia with its vast landmass is rich in all kinds of natural resources, critical minerals, fossil fuels and large renewable energy potential. In 2019, Australia ranked world's sixth-largest producer of fossil fuel energy and the fourth-largest fossil fuel exporter globally. It plans to become a renewable energy superpower in the future. Australia consumed 124 Mtoe of energy in 2021. In 2020-21, the primary energy mix in Australia was predominantly composed of fossil fuels, namely coal, oil, and gas, which accounted for 92% of the total. In the energy mix oil accounted for the largest share at 36%. Renewable energy met a record average 35% of demand in the



National Electricity Market (NEM) in 2022 with new investment in wind and solar hit a record total of 7.1 gigawatts (GW).

The growing need for energy has raised environmental concerns, particularly regarding greenhouse gas emissions and their contribution to climate change. Clean energy, on the other hand, refers to energy obtained from renewable and low-carbon sources that have minimal adverse effects on the environment. Clean energy sources include solar, wind, hydro, geothermal, and biomass, nuclear and hydrogen each offering unique advantages.

## Country's Emission Reduction Goals

The United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement have set the objective of restricting global warming to below 2 degrees Celsius above pre-industrial levels and striving to limit it to 1.5 degrees Celsius. To align with the Paris Agreement, Australian government has set its own emissions reduction goals, which aim for a 43% reduction from 2005 levels by 2030 and net zero emissions by 2050 and an ambitious target of achieving an 82% share of renewables in the national electricity sector by 2030. The government by launching "Powering Australia" initiative is actively supporting this agenda by making substantial investments in electricity network upgrades and storage, with the aim of accelerating the transition to renewable energy sources.

Additionally, renewable energy rose from 32.5% in 2021 to reach 35.9% of Australia's total electricity generation in 2022. Australia has more than doubled its renewable generation capacity since 2017. According to the Clean Energy Council Wind Energy with 1411 MW and Solar Energy with 860 MW accounted for large-scale capacity addition in 2022. Currently, Australia is in the process of constructing 72 renewable energy projects with a collective capacity of 9.5 GW. The rapid increase in renewable generation is bringing the emissions intensity of the grid down, Australian Energy Market Operator (AEMO) report recorded a low of 0.62 tCO2-e/MWh NEM Emission by the end of 2022. The downward trend is expected to persist as additional renewable power generators become operational and coal generators scale down their production, ultimately phasing out.

## **Rising Rooftop Solar Installations**

The promising developments of increased investment in large-scale renewables and rooftop solar provide a solid foundation for Australia's efforts to achieve its renewable



generation and emission reduction targets. The Australian Government policy announcements on the installation of community batteries to ease some low voltage distribution network constraints would enable and boost solar PV installations.

In 2022, Australia saw a significant number of rooftop solar installations completed, totaling 310,352 installations with a combined capacity of 2.7 GW. To capitalize on renewable capacity Australian government has 48 Solar Energy projects on the likes of the Suntop Solar Farm project in Queensland, which was its largest Solar Project.

Tapping its geographic potential of trade winds and offshore winds, made Wind Energy the largest leading contributor, accounting for 35.6% of the total renewable generation. With technological advancements, Australia is exploring other more novel ways to diversify its renewable portfolio such as investing in Bioenergy which yields 3.8% of its clean energy playing a small yet transformative role to transition Australia towards a Clean Energy Economy.

#### **Government Initiatives**

Government spending has played a central role in the rapid growth of clean energy investment, recognizing this the recently elected Australia's Labor government, has pledged to invest USD 13.74 billion to regenerate and upgrade the country's electricity grid while working towards a 43% reduction in carbon emissions by 2030 and achieving net-zero emissions by 2050. Out of the pledged amount USD 4.29 billion were invested in renewable energy in the last quarter of 2022, solidifying the Australian government's commitment towards Clean Energy.

Following the suit State and territory governments have announced strengthened emissions reduction and renewable energy targets, such as The Victorian Government announced new renewable energy targets of 65% by 2030, and 95% by 2035, along with the Queensland Government setting new renewable energy targets of 70% by 2032 and 80% by 2035. As part of the Queensland Energy and Jobs plan, all publicly owned coal-fired power stations have been committed to be converted into clean energy hubs by 2035. Australia's Federal Government also included hydrogen in its Technology Investment Roadmap and unveiled a network of 13 regional hydrogen technology clusters with aim to establish a nationwide hydrogen cluster with a total investment of USD 1.85 million.

Private Sector Discovering New and Affordable Clean Energy Sources



With the push from the Australian government and upcoming renewable energy projects have attracted attention of many private players. Government policies addressing climate change have fostered investments in the development of large-scale renewable electricity generation. Large conglomerates are looking to tie up with startups to gain leverage on the renewable race, in 2022 energy giant bp ventures made AUD 20 million investment in 5B Holdings Pty Ltd, an Australian renewable energy company possesses innovative technology that allows for the swift implementation of large-scale solar power projects. Other companies such as General Electric are converting proposed renewable energy technology into reality, by powering one of GE's 9F hybrid gas-hydrogen turbines for making electricity in 2023.

Moreover, Skylab, a solar tracking distributor and renewable energy project developer, has unveiled ambitious plans to build about 1 GW of solar and battery energy storage facility in the Australian state of Queensland. The increasing involvement of corporate and commercial entities in sourcing renewable energy, driven by sustainability goals and consumer demand for clean products and services, has created a market for renewable energy procurement and power purchase agreements. 2022 witnessed 28 such purchase agreements for renewable energy being finalized. Therefore, these developments are anticipated to boost market growth.

## Clean Energy Sources Offer Competitive Pricing to Fossil Fuel Sources

The declining costs of renewable technologies, particularly solar and wind, have made them increasingly competitive with traditional fossil fuel-based energy sources. This costeffectiveness has attracted investments and stimulated the deployment of renewable energy projects across the country.

Furthermore, Australia's significant increase in renewable energy capacity has contributed to a continued decline in wholesale power prices during the first quarter of 2023. This surge in renewables has resulted in the displacement of fossil fuels in the energy mix, leading to record-low carbon emissions from the power sector.

Additionally, ventures like Sun Cable proposes to build an Australia-Asia PowerLink connection from the Northern Territory to Singapore. Proposals have been put forward to construct expansive solar and wind farms in Western Australia and Queensland, aiming to produce green hydrogen products for international export. These will add non fossil fuel-based energy to its exports further slashing dependency on fossil fuels.

#### Impact of COVID-19



Like the most economies, the Clean Energy market in Australia was heavily impacted by COVID-19. Some of the short-term impacts were severe and there was a slowdown in projects reaching commercial operation. This could be due to a combination of physical problems, delivery constraints and financial barriers. However, it quickly utilized instruments such as corporate renewable power purchase agreements, which offered a long-term energy market hedge and emissions reduction benefits.

Hence, owing to the realization to cut energy dependency and enhance energy security, the government introduced the 2023-24 Federal Australian Budget. This included major investments in the energy sector, such as USD 2 billion for hydrogen head start, providing revenue support for large-scale renewable hydrogen projects through competitive hydrogen production contracts. The government has also pledged to invest USD 13.74 billion to rebuild and modernize the national electricity network.

Impact of Russia-Ukraine War

The conflict between Russia and Ukraine has brought about a fresh set of energy security challenges that affect Australia both domestically and internationally. As a result of official sanctions and unofficial avoidance of Russian exports, the prices of oil, coal, and gas have significantly risen worldwide. In June 2022, a series of factors contributed to a natural gas and subsequent electricity crisis, factors like delayed maintenance of generation plants due to the impact of the Covid-19 pandemic, flooding in coal mines, increased gas demand during a colder winter in the southern hemisphere, and soaring international prices for natural gas and coal.

As a response to the crisis, temporary price caps were implemented in the east coast gas market, and the National Electricity Market (NEM) was suspended for a period of time. Wind and solar technologies are now much cheaper in relation to per unit of total energy generated and can be integrated with energy storage to provide dispatchable "firmed" energy. Additionally, state governments like the New South Wales government is planning 12 GW of new renewables and storage and the Victorian government announcing plans for 9 GW of offshore windfarms. Such capital investments are bound to attract international players and secure Australia's long term energy needs.

Key Players Landscape and Outlook

Key players are heavily investing in R&D and diversifying their clean energy solutions. Governments are increasingly adopting auctions for centralized competitive energy



procurement using renewable and clean sources are promoting private sector competition. This encourages companies to expand their portfolio through mergers and acquisitions. For instance, Squadron Energy, (part of Tattarang group of companies), acquired CWP Renewables in 2022, thereby making it Australia's leading renewable energy company that develops, operates and owns renewable energy assets in Australia.

Furthermore, due to large demand and shift from fossil fuel-based energy, the renewable energy market in Australia is increasingly becoming competitive. According to the Green Electricity guide report 2022, AGL, Energy Australia, and Origin serve approximately 61% of Australian households, smaller retailers and are switching from coal to renewable sources. Some of these smaller retailers have developed business models centered around green energy solutions. As a result, they are gaining traction and challenging the dominance of the larger players in the market.



# Contents

- **1. RESEARCH METHODOLOGY**
- 2. PROJECT SCOPE & DEFINITIONS

## 3. IMPACT OF COVID-19 ON THE AUSTRALIA CLEAN ENERGY MARKET

## 4. IMPACT OF RUSSIA-UKRAINE WAR

5. EXECUTIVE SUMMARY

## 6. VOICE OF CUSTOMER

- 6.1. Market Awareness and Product Information
- 6.2. Factors Considered in Purchase Decision
- 6.2.1. Source Type
- 6.2.2. Source Feasibility
- 6.2.3. Government Incentives and policies
- 6.2.4. Generation Requirement
- 6.2.5. Grid Connectivity
- 6.2.6. Price per unit generation
- 6.2.7. Operational and Maintenance Cost
- 6.2.8. Green Electricity Guide
- 6.2.9. Ease of Use
- 6.2.10. Technical Support

## 7. AUSTRALIA CLEAN ENERGY MARKET OUTLOOK, 2016-2030F

- 7.1. Market Size & Forecast
  - 7.1.1. By Value
  - 7.1.2. By Volume
- 7.2. By Type
  - 7.2.1. Hydropower & Tidal Power
  - 7.2.2. Wind Power
  - 7.2.3. Solar Power
  - 7.2.4. Geothermal Power
  - 7.2.5. Biomass and Waste
  - 7.2.6. Nuclear

Australia Clean Energy Market Assessment, By Type [Hydropower and Tidal Power, Wind Power, Solar Power, Geothe...



- 7.2.7. Green Hydrogen
- 7.3. By End-user
  - 7.3.1. Residential
  - 7.3.2. Commercial
  - 7.3.3. Industrial
  - 7.3.4. Other
- 7.4. By Region
  - 7.4.1. Northern Territories
  - 7.4.2. Western Australia
  - 7.4.3. South Australia
  - 7.4.4. New South Wales
  - 7.4.5. Queensland
  - 7.4.6. Tasmania
  - 7.4.7. Victoria
- 7.5. By Company Market Share (%), 2022

## 8. MARKET MAPPING, 2022

- 8.1. By Type
- 8.2. By End-user
- 8.3. By Region

## 9. MACRO ENVIRONMENT AND INDUSTRY STRUCTURE

- 9.1. Supply Demand Analysis
- 9.2. Import Export Analysis Volume and Value
- 9.3. Supply/Value Chain Analysis
- 9.4. PESTEL Analysis
  - 9.4.1. Political Factors
  - 9.4.2. Economic System
  - 9.4.3. Social Implications
  - 9.4.4. Technological Advancements
  - 9.4.5. Environmental Impacts
  - 9.4.6. Legal Compliances and Regulatory Policies (Statutory Bodies Included)
- 9.5. Porter's Five Forces Analysis
- 9.5.1. Supplier Power
- 9.5.2. Buyer Power
- 9.5.3. Substitution Threat
- 9.5.4. Threat from New Entrant



## 9.5.5. Competitive Rivalry

#### **10. MARKET DYNAMICS**

- 10.1. Growth Drivers
- 10.2. Growth Inhibitors (Challenges, Restraints)

## 11. KEY PLAYERS LANDSCAPE

- 11.1. Competition Matrix of Top Five Market Leaders
- 11.2. Market Revenue Analysis of Top Five Market Leaders (in %, 2022)
- 11.3. Mergers and Acquisitions/Joint Ventures (If Applicable)
- 11.4. SWOT Analysis (For Five Market Players)
- 11.5. Patent Analysis (If Applicable)

## **12. PRICING ANALYSIS**

## 13. CASE STUDIES

## 14. KEY PLAYERS OUTLOOK

- 14.1. Acciona, S.A.
  - 14.1.1. Company Details
  - 14.1.2. Key Management Personnel
  - 14.1.3. Products & Services
  - 14.1.4. Financials (As reported)
  - 14.1.5. Key Market Focus & Geographical Presence
- 14.1.6. Recent Developments
- 14.2. Vestas Group
- 14.3. Energy Australia group
- 14.4. Iberdrola S.A.
- 14.5. Amber Electric Pty Ltd.
- 14.6. Diamond Energy Pty Ltd.
- 14.7. Australian Renewable Fuels Ltd.
- 14.8. AGL Energy Ltd.
- 14.9. Origin Energy Ltd.
- 14.10. Squadron Energy Pty Ltd.

\*Companies mentioned above DO NOT hold any order as per market share and can be changed as per information available during research work



## **15. STRATEGIC RECOMMENDATIONS**

## **16. ABOUT US & DISCLAIMER**

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