Australian Government
Department of Industry, Science, Energy and Resources

Office of the Chief Economist

Australia: estimating renewable energy use in the industrial sector

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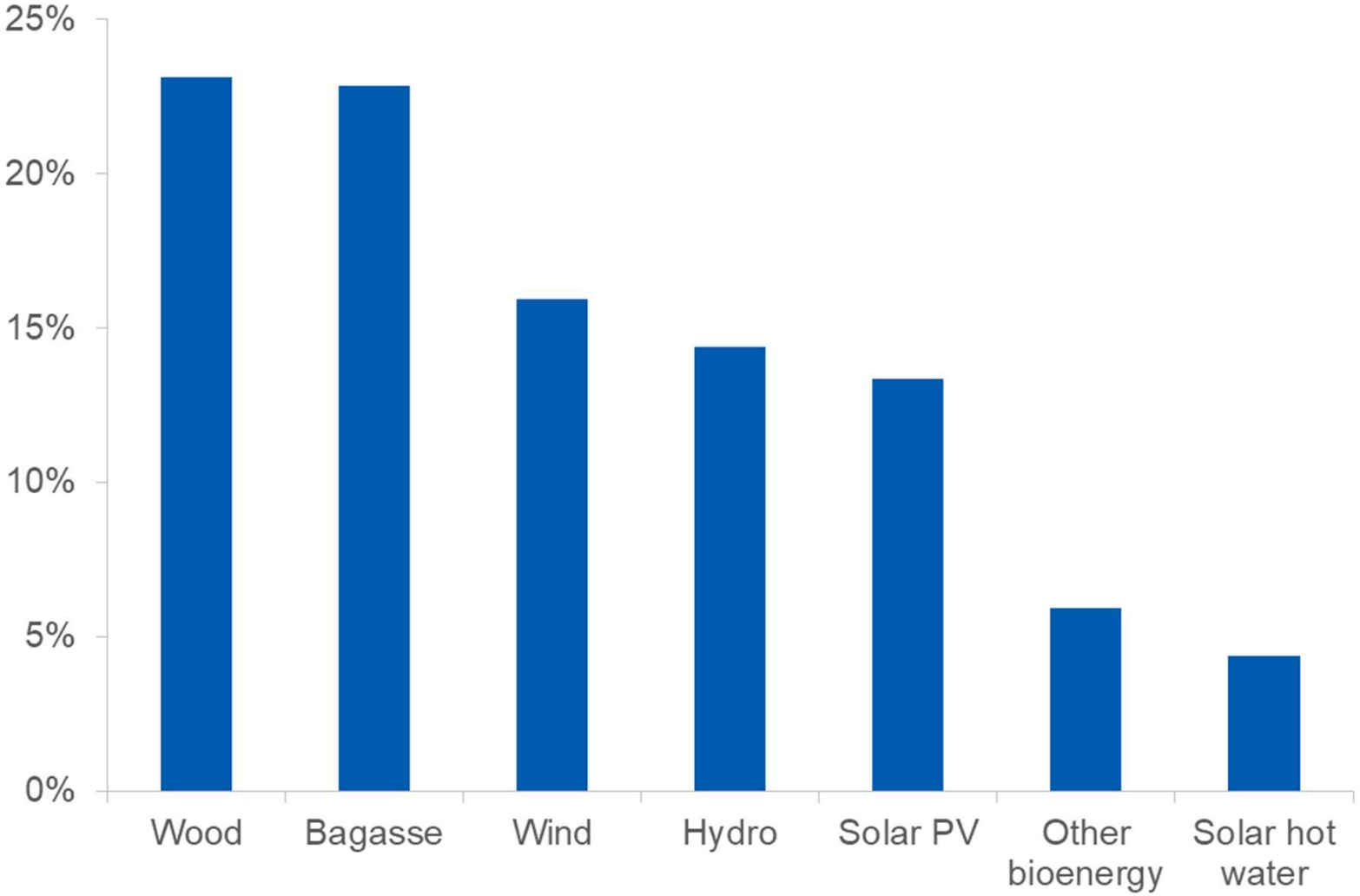
Biomass is the largest renewable energy source in Australia

Share of total primary energy renewables, by renewable type, 2018-19

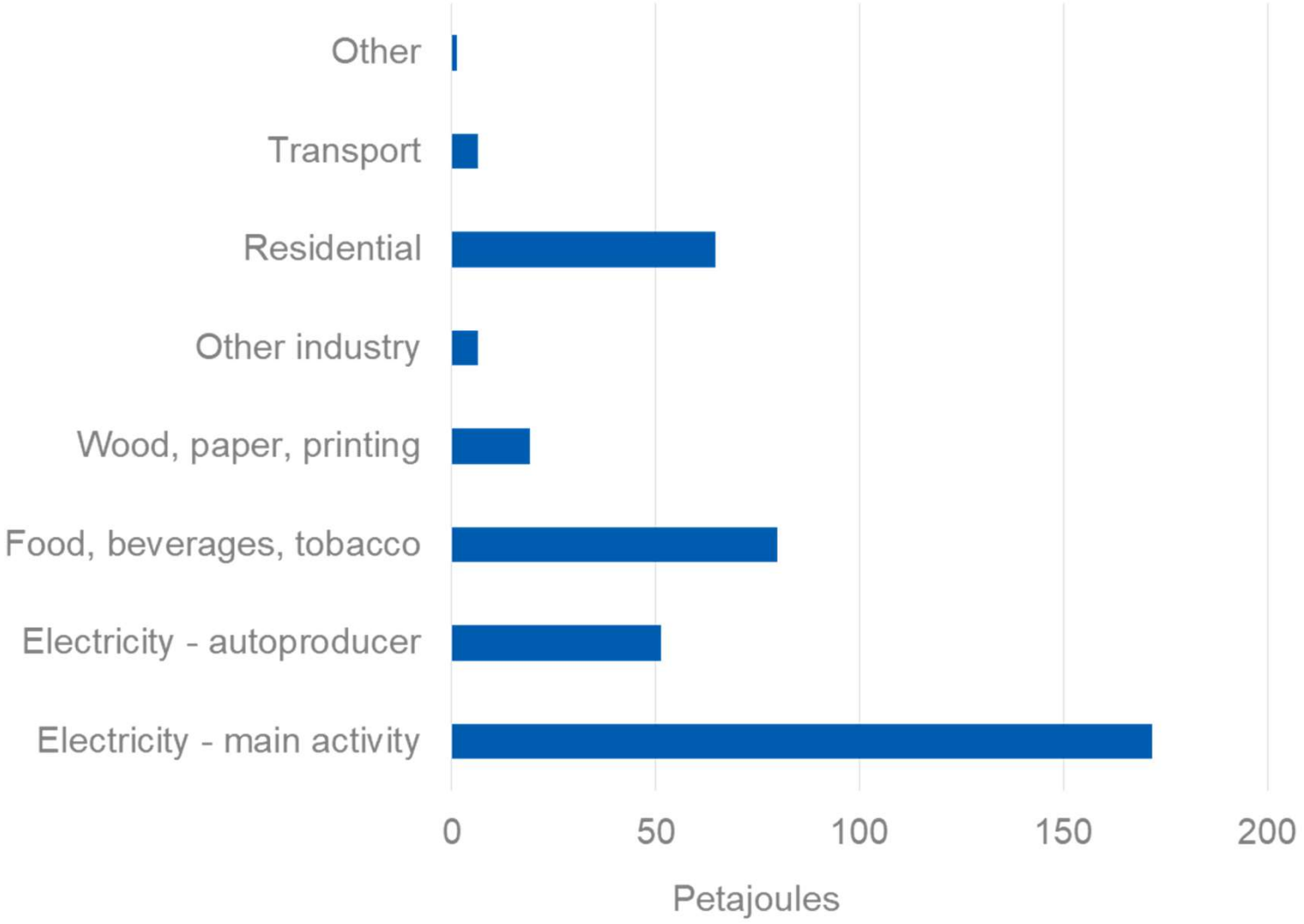


- Renewables 6% of primary energy mix - this share has been relatively stable in recent decades
- Wood and bagasse were each 23% of total renewables
- Total primary renewable energy supply 400PJ in 2018-19
- Solar PV grew 50% to 53 PJ in 2018-19
- Wind grew 17% to 64 PJ in 2018-19

Source: Department of Industry, Science, Energy and Resources (2020), *Australian Energy Statistics,* Table A

Most renewables used for electricity, industry and households

Australian primary renewables consumption, by sector, 2018-19

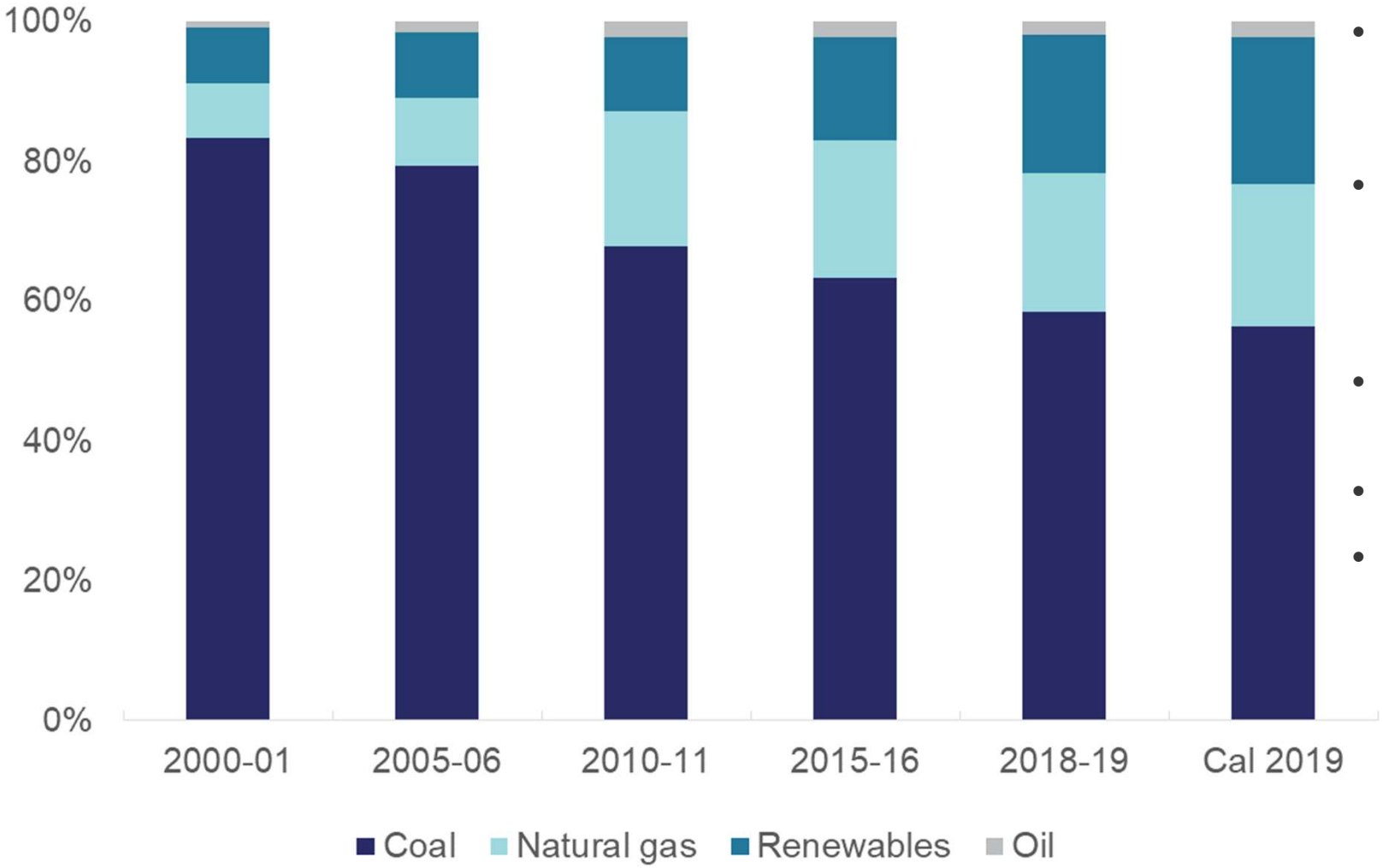


- Most renewable energy use is for electricity generation
  - main activity and autoproducers
- Food, beverages and tobacco also significant user
  – bagasse for heat in sugar refining
- Household
  - mostly fuelwood and solar hot water

Source: Department of Industry, Science, Energy and Resources (2020), *Australian Energy Statistics,* Table A and unpublished

All renewables growth is in electricity

Australian electricity generation, by fuel

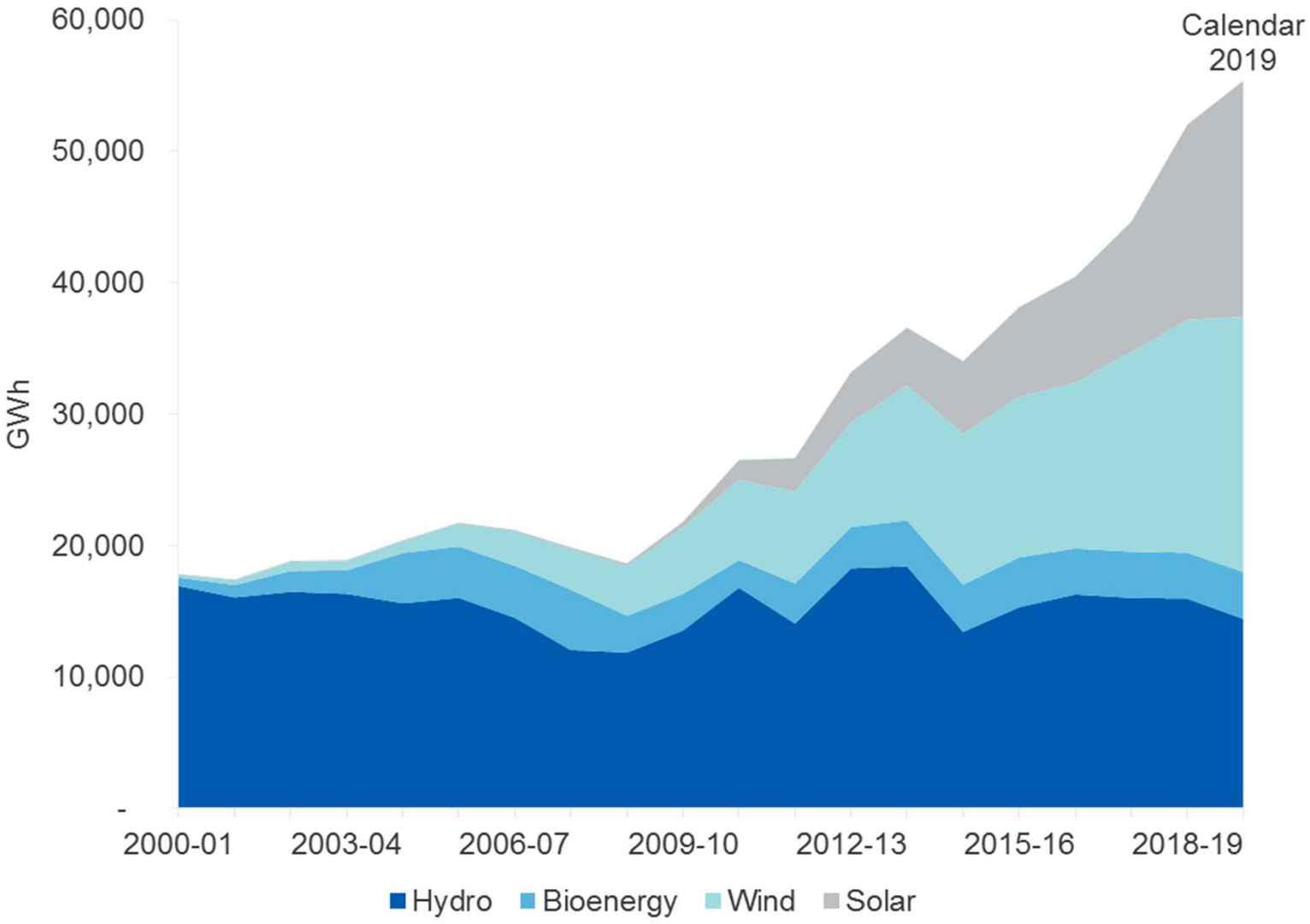


- Renewable generation up 12% from 2018 to 2019
- Share of renewable generation grown from 8% in 2000-01 to 21% in 2019.
- Solar 7% (2% large-scale)
- Wind 7%
- Hydro 5%

Source: Department of Industry, Science, Energy and Resources (2020), *Australian Energy Statistics,* Table O

Renewable electricity mix diversifying

Electricity generation from renewable sources (GWh)



- Renewables output more than triple start of the century

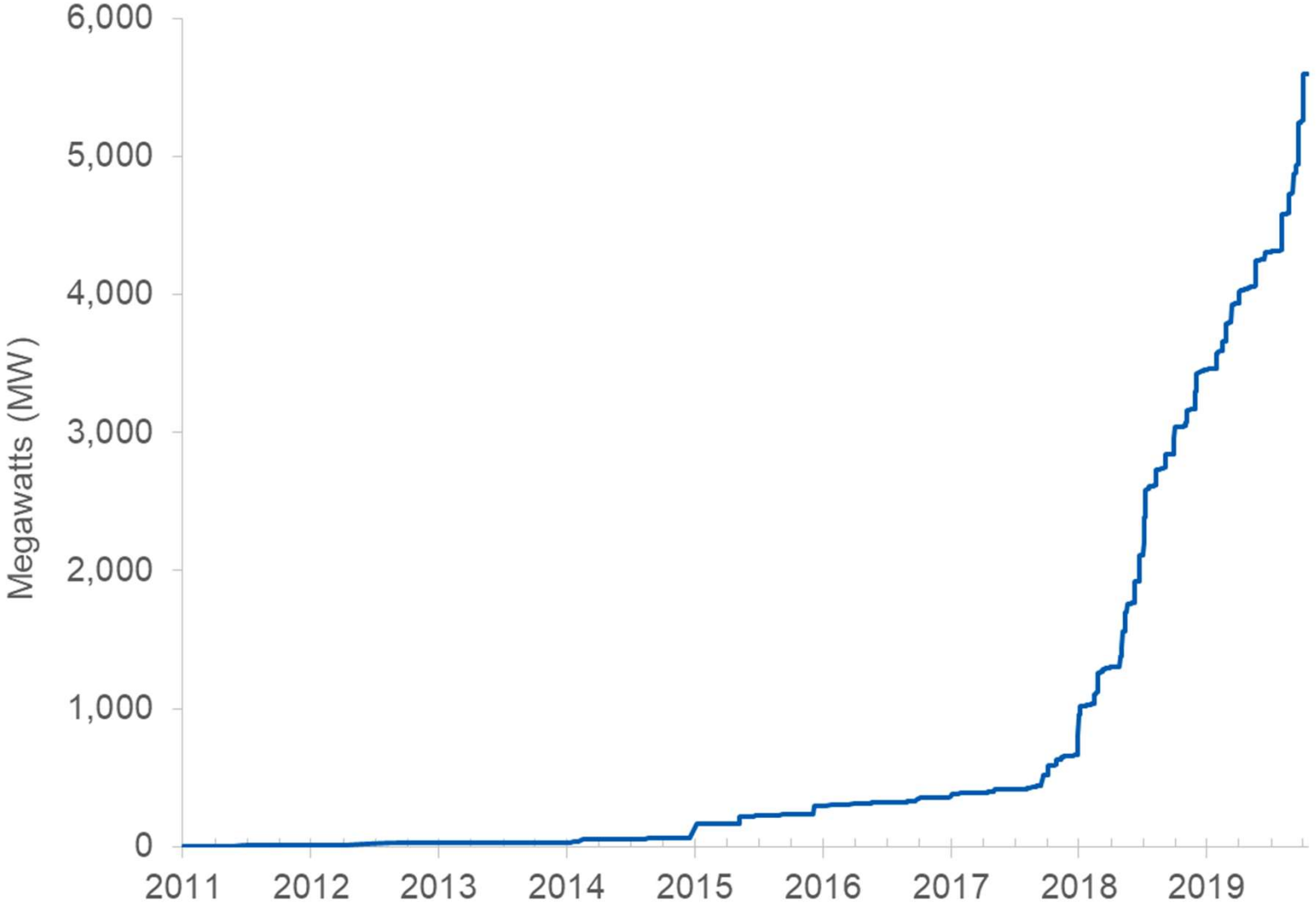
  In the most recent data (calendar year 2019):

  - Hydro share of total renewable generation was 26%, compared with 95% in 2000-01
  - Wind was 35% of renewable generation and 7% of total generation
  - Solar output doubled in less than 3 years and is now 32% of renewable and 7% of total generation

Source: Department of Industry, Science, Energy and Resources (2020), *Australian Energy Statistics,* Table O

Large-scale solar takes off

Cumulative capacity of accredited large-scale solar power stations (MW)



- Largescale solar generation increased nearly ten-fold in 3 years, to be 2% of all generation in 2019
- 31% of all solar generation in 2019, up from 8% in 2016.
- CER accredited power station installed capacities show timeline
- 46% of all capacity to Dec 31 2019 was installed during 2019

Source: Clean Energy Regulator (2020), *Historical Large-scale Renewable Energy Target supply data*

How we compile our industrial renewable statistics

Almost all data collected from industry under the National Greenhouse and Energy Reporting Scheme (NGERS)
http://www.cleanenergyregulator.gov.au/NGER/Pages/default.aspx

The NGERS legislation has been in place >10 years and is administered by the Clean Energy Regulator

Covers primary and secondary energy consumption and production and greenhouse gas emissions

The NGERS Act requires most medium and all large energy producers and users and emitters to report their annual energy production and consumption.

Reporting threshold is production and/or consumption of 100 TJ or more for facilities, or production and/or consumption of 200 TJ or more for corporations

Report online each year in October for the year ending in June

How we compile our industrial renewable statistics

Our department accesses this protected data via an MOU – it is collected once for multiple uses including for statistics, policy and compliance

We get non-QA data in November, and QA data in February – we will shortly get final data for year ending June 2020.

We get each facility name, parent company, location, and industry classification (eg mining, manufacturing)

How much energy they produce and consume (primary and secondary)

By fuel type (eg bagasse, wind, solar, hydro)

By activity type (eg for electricity generation, other stationary energy, transport, consumed not combusted)

Previously used voluntary survey to collect this information
– much lower coverage since legislation introduced

Example of reported data for a facility

Note: These are not real data.

Reporter	ABN	CER Id	Report Period	facility Name	Operational Days	ANZSIC	ANZSIC Division	Facility State	Latitude	Longitude
CompanyX	11111111	22222222	2018-2019	FacilityX	365	Sugar confectionary manufacturing	Manufacturing	QLD	11	22
CompanyX	11111111	22222222	2018-2019	FacilityX	365	Sugar confectionary manufacturing	Manufacturing	QLD	11	22
CompanyX	11111111	22222222	2018-2019	FacilityX	365	Sugar confectionary manufacturing	Manufacturing	QLD	11	22
CompanyX	11111111	22222222	2018-2019	FacilityX	365	Sugar confectionary manufacturing	Manufacturing	QLD	11	22
CompanyX	11111111	22222222	2018-2019	FacilityX	365	Sugar confectionary manufacturing	Manufacturing	QLD	11	22
CompanyX	11111111	22222222	2018-2019	FacilityX	365	Sugar confectionary manufacturing	Manufacturing	QLD	11	22
CompanyX	11111111	22222222	2018-2019	FacilityX	365	Sugar confectionary manufacturing	Manufacturing	QLD	11	22
CompanyX	11111111	22222222	2018-2019	FacilityY	365	Sugar confectionary manufacturing	Manufacturing	QLD	33	44
CompanyX	11111111	22222222	2018-2019	FacilityY	365	Sugar confectionary manufacturing	Manufacturing	QLD	33	44

Example of reported data for a facility

Note: These are not real data.

Sub Category	Activity Type	Fuel	Energy Context	Fuel Quantity	Unit	Energy Content	Energy Total	GJ
Electricity production	Electricity (thermal generation)	Electricity	Production	10000000	kWh		100000	GJ
Energy consumption	Energy consumed (not combusted)	Electricity	Consumption	100000	GJ	1	100000	GJ
Energy production	Energy content of fuel produced	Bagasse	Production	100000	tonnes	9.6	1000000	GJ
Emissions released from fuel use by certain industries	Electricity production - Solid fuels	Bagasse	Consumption	10000	tonnes	9.6	100000	GJ
Stationary and Transport energy purposes	Combustion of liquid fuels other than petroleum oils or greases - Stationary energy purposes	Diesel oil	Consumption	20	kL	38.6	1000	GJ
Stationary and Transport energy purposes	Combustion of liquid fuels other than petroleum oils or greases - Transport energy purposes	Diesel oil	Consumption	10	kL	38.6	500	GJ
Stationary and Transport energy purposes	Combustion of solid fuels	Bagasse	Consumption	500000	tonnes	9.6	5000000	GJ
Electricity production	Electricity (thermal generation)	Electricity	Production	1000000	kWh		1000000	GJ
Energy consumption	Energy consumed (not combusted)	Electricity	Consumption	200000	GJ	1	200000	GJ

Challenges

Relies on companies choosing correctly from drop down menus to report

Relies on us filtering the data correctly to compile

We are unable to talk to the companies directly – all queries go through the Clean Energy Regulator

Some small errors in reporting often don't show up in CER data quality assurance process – but can be significant for minor fuel types

Overall the quality of our industrial energy data is considered generally good and was designed with international reporting needs in mind

Most of our challenges are in household and small-medium business renewables energy production and consumption

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