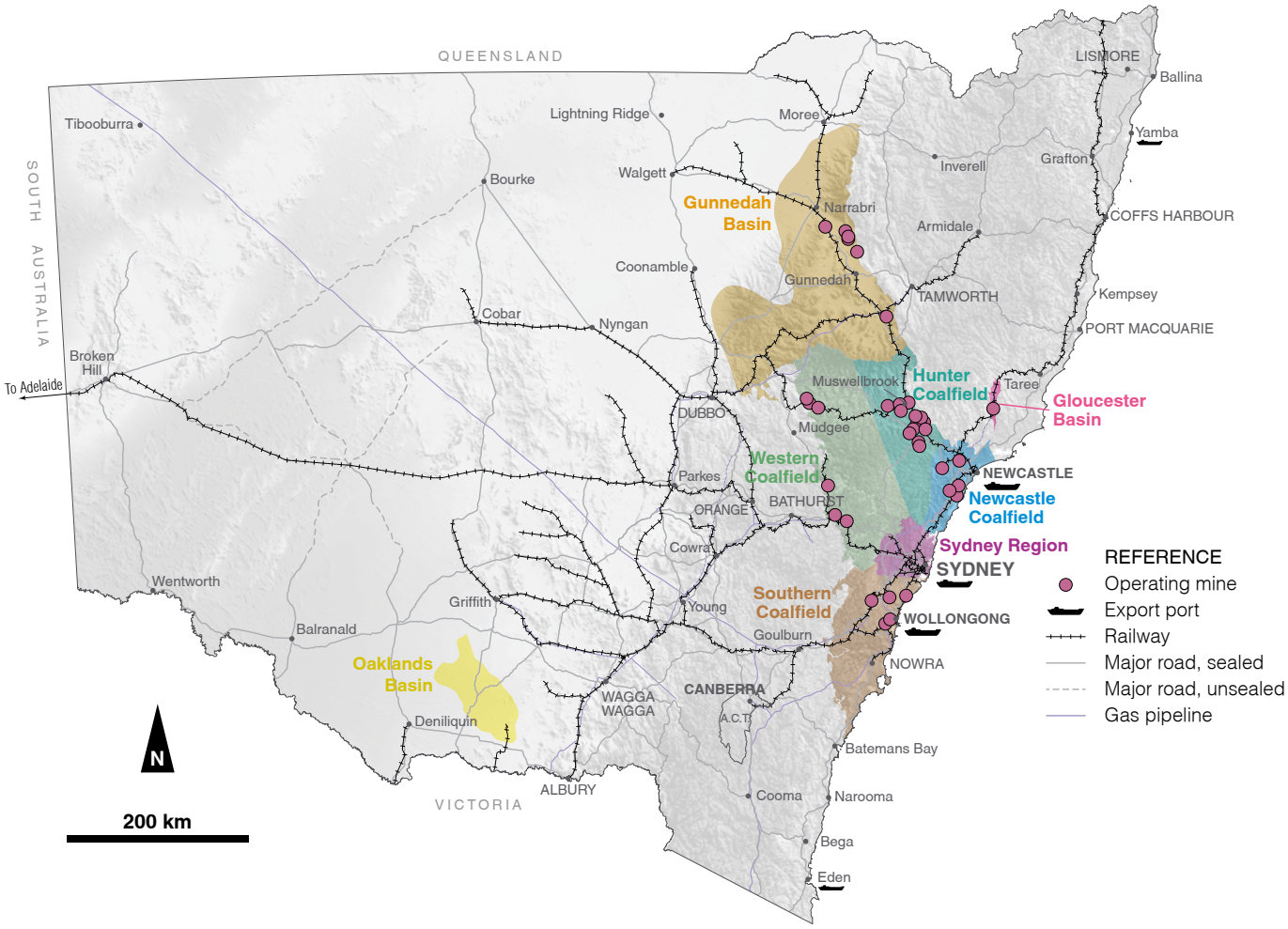
Thermal coal

Opportunities in New South Wales, Australia

JANUARY 2021



Overview

- Major coal resources of New South Wales (NSW) are located in the Sydney and Gunnedah basins.
- The Hunter Coalfield of the Sydney Basin is the largest coal producing area in NSW. It contains significant reserves of export quality low-ash, high-energy thermal coals and low-ash soft coking coals.
- In 2019–20, the NSW coal industry produced 256 Mt run-of-mine (ROM), yielding 200 Mt of saleable coal, worth around $18 billion or approximately 68% of the total value of the state's mineral production.
- NSW has more than 7 billion tonnes of recoverable coal reserves contained within 39 operating mines, and over 20 new major development proposals.

Geological setting

Over 60% of NSW is covered by sedimentary basins. The major coal resources of NSW are located in the 500 km long, 150 km wide Permian–Triassic Sydney–Gunnedah Basin in the east of the state. It extends from south of Wollongong to north of Newcastle and north-westerly through Narrabri into Queensland. Relatively minor coal resources are mined in the Werrie and Gloucester basins. Exploration is active in the Oaklands and Ashford basins. The Permian, bituminous coal resources in the Sydney–Gunnedah Basin consist of a variety of coal types from low-volatile, hard coking coals to high quality thermal coals.

Coal regions

The **Sydney Basin** is subdivided into five major coalfields namely the: Hunter, Newcastle, Southern, Western and Central coalfields.

The **Hunter Coalfield** is the largest coal producing area of NSW, containing significant reserves of export quality low-ash, high-energy thermal coals. Coal is mined within sixty seams in the Greta Coal Measures, Wittingham Coal Measures

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and the Newcastle Coal Measures. Many mines are large-scale, multi-seam, open-cut mining operations, with lesser numbers of underground operations.

The **Newcastle Coalfield** contains thermal coal ranging from medium-ash in the central area to medium- to high-ash in the southern area. Ten seams within the Greta Coal Measures, Tomago Coal Measures and the Newcastle Coal Measures are currently mined. Most mines are underground operations and the majority of the remaining undeveloped coal resources are accessible by underground mining methods.

The **Southern Coalfield** is renowned for its premium quality hard coking coals from the Bulli, Balgownie and Wongwilli seams, however export quality thermal coals are produced as a byproduct of washing coking coal. There are however, undeveloped thermal coal resources in the in the southern half of the coalfield.

The **Western Coalfield** produces medium- to high-ash, low to moderate sulphur, low phosphorus, high-energy thermal coal. The majority of these resources are extracted by underground mining methods, however there are also open-cut mines in areas that target three economic seams within the Illawarra Coal Measures: the Katoomba, Lithgow and Ulan seams.

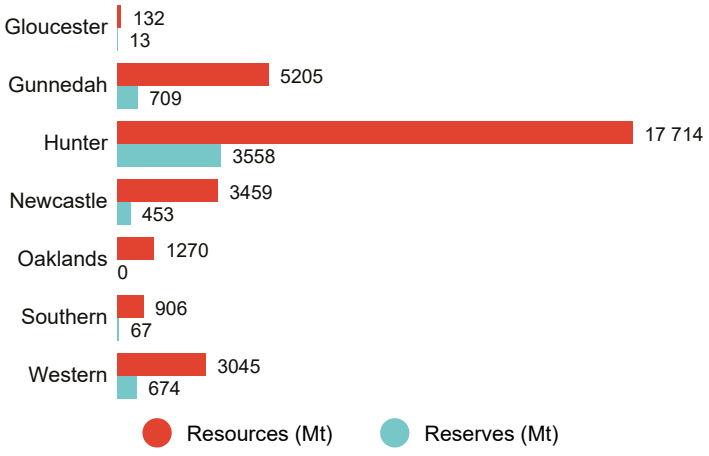
The **Gunnedah Basin** is divided into two sub-basins of unequal portions by the north–south-trending Boggabri Ridge. The eastern (smaller) portion, the Maules Creek sub-basin, contains significant resources of low-ash, high-energy, high-volatile thermal coal, with some high-volatile, high-fluidity soft coking coal found in twelve near surface seams in the Maules Creek Formation and in the Hoskissons Seam in the Black Jack Formation. The western (larger) portion, the Mullaley sub-basin, contains underground and open cut resources predominantly in the Hoskissons seam of the Black Jack Group which includes low- and medium-ash thermal coals.

Low-ash export thermal coal is also currently mined in an isolated outlier of coal measures at **Werris Creek (the Werrie Basin),** near the south-eastern part of the Gunnedah Basin.

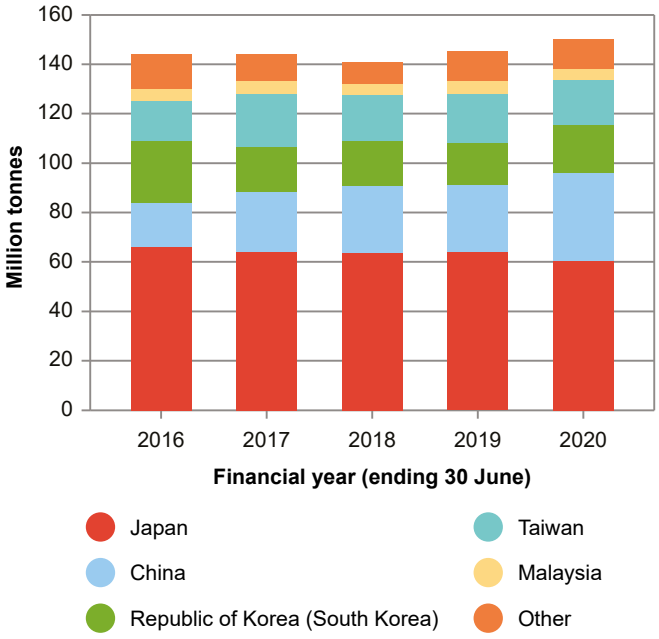
The **Gloucester Basin,** approximately 80 km north-east of Newcastle, also contains Permian bituminous coal. The basin is approximately 38 km long and 20 km wide and contains medium-ash, medium-volatile thermal and coking coals mined in five seams within the Gloucester Coal Measures.

The **Oaklands Basin** located in the state's south is 40 km wide and 140 km long hosting the Permian Coorabin Coal Measures with two coal seams. Only the Lanes Shaft Seam is considered to have economic potential. The basin contains moderate- to high-ash sub-bituminous coals which could be mined by both open cut and underground methods locally. Due to the large distance to ports, the resources in the Oaklands Basin are mainly considered suitable for use in close proximity to the mine such as for local power generation or potentially for conversion to liquids or plastics.

Thermal coal resources and reserves by region



NSW export thermal coal by destination



Typical specifications for NSW export thermal coal

	Region					
	Southern	Western	Hunter	Newcastle	Gunnedah	Gloucester
Moisture % (ad)	1.1	2.5	2.7	2.3	4.0	1.5
Moisture % (ar)	6.4	8.9	9.1	8.5	–	9.0
Ash % (ad)	19.5	13.7	13.5	15.1	10.0	17.5
Vm % (ad)	20.8	30.5	32.7	30.6	37.0	26.8
Ts % (ad)	0.45	0.65	0.60	0.60	0.45	0.65
Se % (kcal/kg)	6750	6890	6810	6760	7050	6800
CSN	1.5	1.0	1.5	2.0	–	–
AFT (°C) deform	1460	1420	1270	1380	1400	1530
AFT (°C) flow	1530	1560	1510	1540	1550	1600
HGI	64	49	50	52	45	65
Phosphorus % (ad)	0.030	0.009	0.027	0.032	0.006	0.002

Release of areas for coal exploration

Through its Strategic Release Framework for Coal and Petroleum Exploration, the NSW Government has introduced the independently chaired Advisory Body for Strategic Release, to review and define which areas of the state are released for coal exploration. Inputs into the framework include a geological resource assessment, conducted by the Geological Survey of NSW; and a preliminary regional issues assessment of economic, social and environmental factors, which incorporates community and stakeholder consultation, conducted by the NSW Department of Planning, Industry and Environment.

The Strategic Release Framework ensures that the NSW Government's approach to issuing coal exploration titles is transparent, informed and consistent with their broader land use strategies and community expectations.

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