

# Ni-Co

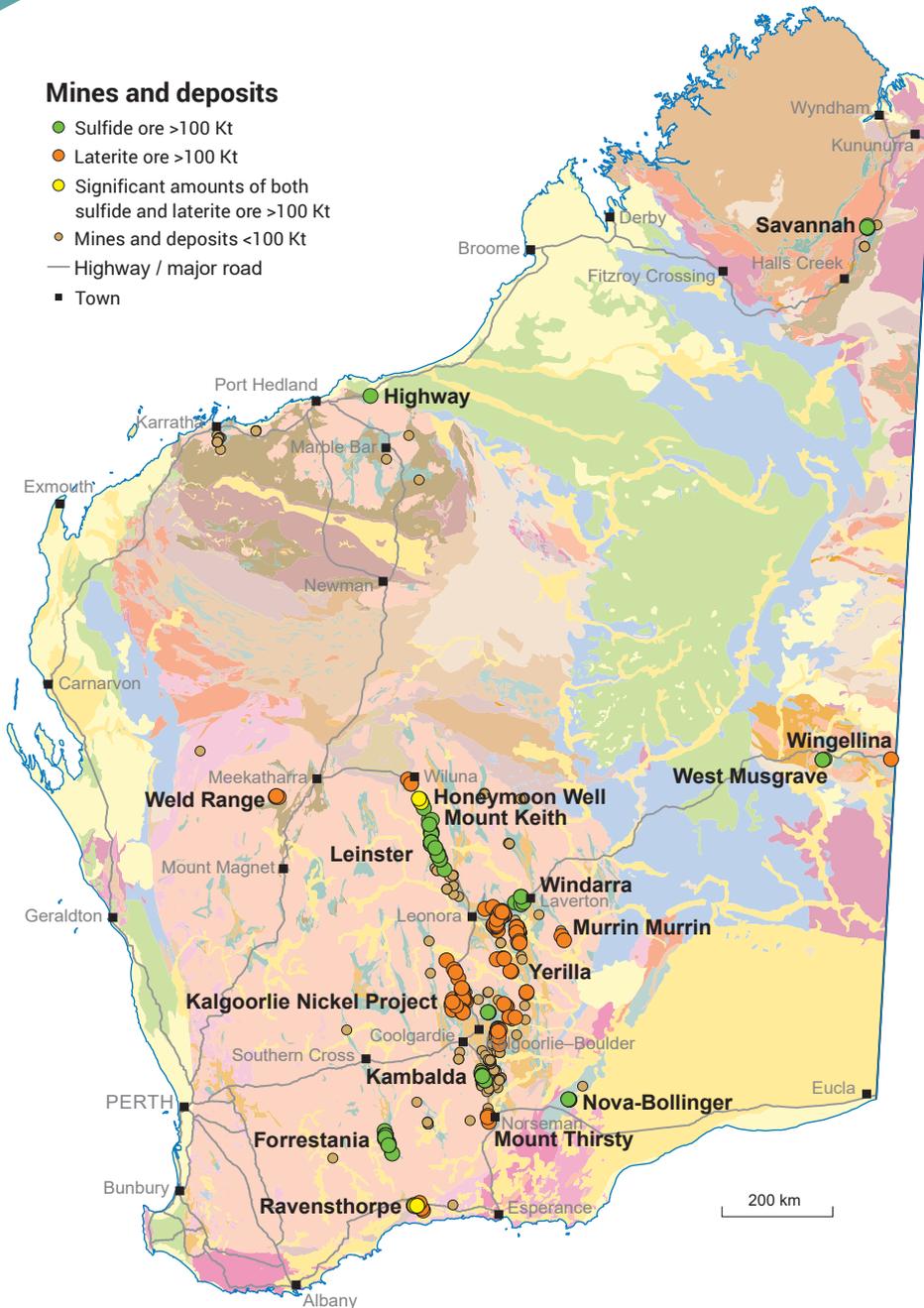
# NICKEL-COBALT

INVESTMENT OPPORTUNITIES

WORLD-CLASS RESOURCE PROVINCE | SECURE INVESTMENT LOCATION  
WORLD-LEADING GEOSCIENTIFIC DATA | GLOBAL MINING SERVICES INDUSTRY

## Mines and deposits

- Sulfide ore >100 Kt
- Laterite ore >100 Kt
- Significant amounts of both sulfide and laterite ore >100 Kt
- Mines and deposits <100 Kt
- Highway / major road
- Town



## Western Australia hosts world-class nickel deposits

- The Yilgarn Craton is Australia's premier nickel-producing region containing some of the world's largest nickel resources which are currently at 34 Mt of contained nickel
- Production in 2018 was 149 720 tonnes of nickel (metal and concentrate) from 49 operating mines. Three of these mines (Murrin Murrin, Nova-Bollinger and Nickel West) also produced 4878 t of cobalt as a byproduct from their nickel operations
- Anticipated demand for battery minerals have encouraged the reopening and development of new nickel mines, such as Savannah (Panoramic Resources), Cosmos (Western Areas), Ravensthorpe (First Quantum) and the Mt Keith Satellite Project (Nickel West)
- Exploration continues across the State, with updated mineral resource assessments reported for Nebo-Babel (Oz Minerals Ltd / Cassini Resources) and Mt Thirsty (Barra Resources Ltd / Conico Ltd) and a new discovery in the Albany-Fraser Orogen (Rockford Project - Legend Mining)

**\$2616 m**  
Sales value



**149 720 t**  
Tonnes sold



**\$2615 m\***  
Exports



**5702**  
Full-time employees



**\$2463 m<sup>††</sup>**  
Investment projects



**6th**  
Production world ranking



(2018 calendar year)

\* May include Ni mined <2018

† Ni, Cu, Zn

‡ Includes projects planned, possible, committed or under construction as of September 2019



Government of Western Australia  
Department of Mines, Industry Regulation and Safety

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Geological Survey of  
Western Australia



## Nickel projects with resources >200 Kt contained metal

Project	Status	Project owner	Ore (Mt)	Av. grade (%Ni)	Contained nickel (Kt)	Av. grade (%Co)	Contained cobalt (Kt)
Honeymoon well	Care and maintenance	Noril'sk	524.20	0.764	4005.26		
Mt Keith	Operating	BHP Billiton (Nickel West)	682.00	0.581	3960.10		
Weld Range – Range Well	Exploration	Ausinox	385.30	0.64	2465.92		
Kalgoorlie Nickel Project – West	Feasibility study	Ardea Resources	349.90	0.687	2404.04	0.05	185 202
Murrin Murrin	Operating	Glencore	230.90	0.995	2298.29	0.08	179 120
Leinster	Operating	BHP Billiton (Nickel West)	228.36	0.882	2013.00		
Wingellina <sup>M</sup>	Feasibility study	Metals X	215.84	0.905	1952.49	0.07	131 700
Ravensthorpe	Care and maintenance	First Quantum Minerals	307.30	0.583	1792.05	0.03	97 800
Avalon	Care and maintenance	Wingstar Investments	169.80	0.826	1403.02		
Cawse	Care and maintenance	Wingstar Investments	176.49	0.691	1219.51		
Kalgoorlie Nickel Project – East	Feasibility study	Ardea Resources	145.70	0.809	1178.70	0.05	70 058
Siberia JV	Feasibility study	Eastern Goldfields / Ardea Resources	163.30	0.67	1089.79	0.04	63 479
West Musgrave <sup>M</sup>	Pre-feasibility study	Oz Minerals / Cassini Resources	239.00	0.351	838.50	0.01	30 760
NiWest	Pre-feasibility study	GME Resources	67.10	1.039	696.89	0.06	55 400
Yerilla	Feasibility study	Ardea Resources	90.80	0.76	689.91	0.05	42 191
Wilconi	Exploration	A-Cap Resources / Blackham Resources	80.50	0.77	619.85	0.06	48 300
Cosmos	Operating	Western Areas	63.34	0.946	599.04		
Forrestania	Operating	Western Areas	26.02	1.717	446.60		
Nova–Bollinger <sup>A</sup>	Operating	Independence Group	13.24	2.05	271.36	0.70	9 094
Savannah <sup>H</sup>	Operating	Panoramic Resources	13.21	1.65	218.34		
Canegrass	Inactive	Nickelore	29.60	0.71	209.28	0.06	17 760

Laterite + sulfide
  Sulfide
  Laterite

Resource reporting codes vary

Tectonic unit is Yilgarn except: <sup>A</sup> Albany–Fraser Orogen, <sup>H</sup> Halls Creek Orogen, <sup>M</sup> Musgrave Province

## Nickel and cobalt prospectivity of Western Australia

- **Ultramafic rocks (komatiite and peridotite):** occur in Archean greenstone belts, mostly in the Yilgarn Craton. Examples include Kambalda, Mount Keith, and Leinster. This mineralization style dominates historic production
- **Mafic–ultramafic intrusions:** (similar to Voisey's Bay in Canada, Bushveld Complex in South Africa and the Thomson mine in the Cape Smith belt of Canada): Archean examples occur in the Pilbara and Yilgarn Cratons. Proterozoic examples occur in the Fraser Range area (Albany–Fraser Orogen), Lamboo Province (Halls Creek Orogen) and in the Musgrave Province
- **Mafic intrusives related to Large Igneous Provinces (LIP):** similar to Noril'sk-style mineralization. Potential areas include dolerite sills in the Edmund, Collier, Officer, Kimberley, Speewah, and Hamersley Basins, as well as large areas of flood basalt in the East Kimberley
- **Lateritic deposits in regolith (residual and supergene):** developed over weathered mafic–ultramafic rocks of the Archean Yilgarn Craton and Proterozoic Musgrave Province (Wingellina)

### For more information


 Geological Survey of Western Australia [www.dmirs.wa.gov.au/gswa](http://www.dmirs.wa.gov.au/gswa)


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