

VANADIUM

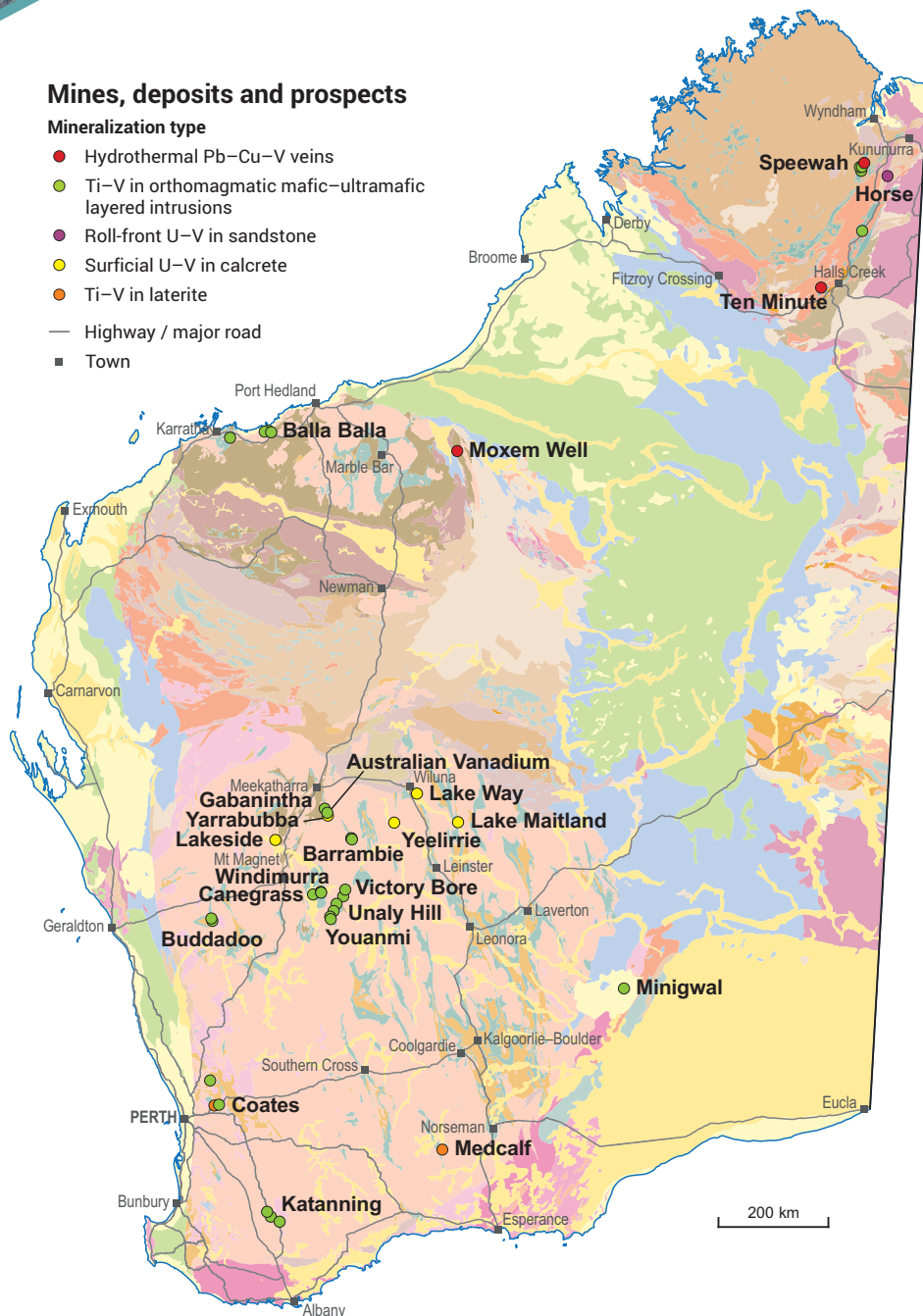
INVESTMENT OPPORTUNITIES

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

Mines, deposits and prospects

Mineralization type

- Hydrothermal Pb–Cu–V veins
- Ti–V in orthomagmatic mafic–ultramafic layered intrusions
- Roll-front U–V in sandstone
- Surficial U–V in calcrete
- Ti–V in laterite
- Highway / major road
- Town



Western Australia continues to grow into a global vanadium hub

- Historical vanadium production in 2000–04 and 2012–14 was 14 100 t of V_2O_5 from the Windimurra mine
- Uses for vanadium are primarily as an alloy to produce high-strength steel. Another emerging application is in redox flow batteries for energy storage uses
- Western Australia substantial vanadium resources – 26 Mt of contained V_2O_5

Nine projects at feasibility/pre-feasibility /scoping stages

Yilgarn Craton

- Australian Vanadium Project
- Barrambie
- Gabanintha
- Yarrabubba
- Medcalf
- Windimurra
- Youanmi

Kimberley Craton

- Speewah

Pilbara Craton

- Balla Balla

\$2641 m*
Investment
projects



5.0%
Royalty
rate



(2020–21 financial year)

* Includes projects planned, possible, committed or under construction as of October 2021



Vanadium resources ranked by contained V₂O₅ (kt)

Resources estimated according to JORC 2012

Project	Status	Owner	Resources (Mt)	Av. grade V ₂ O ₅ (%)	Contained V ₂ O ₅ (kt)	Resource date
Speewah	Scoping	King River Resources	4711.0	0.30	14 180	01/04/2019
Balla Balla*	Feasibility	BBI Group	455.9	0.66	2 988	31/07/2009
Australian Vanadium Project	Feasibility	Australian Vanadium	239.0	0.73	1 778	01/11/2021
Barrambie	Feasibility	Neometals	280.1	0.44	1 234	17/04/2018
Youanmi	Scoping	Venus Metals Corporation, Legendre Bruce Robert	354.7	0.30	1 075	18/03/2019
Windimurra	Feasibility	Atlantic	209.7	0.50	1 045	30/11/2019
Gabanintha	Feasibility	Technology Metals Australia	109.5	0.84	920	29/06/2020
Victory Bore	Exploration	Surefire Resources	151.0	0.44	664	29/06/2017
Youanmi	Exploration	Diversity Resources	185.0	0.33	611	22/05/2019
Canegrass	Exploration	Flinders Mines	79.0	0.64	503	30/01/2018
Unaly Hill*	Exploration	Surefire Resources	86.2	0.42	362	21/11/2011
Yarrabubba	Feasibility	Technology Metals Australia	27.7	0.87	240	18/03/2019
Medcalf – Bremer Range	Feasibility	Audalia Resources	32.0	0.47	149	31/08/2018

Resource estimates have been rounded

* Resource estimates are not JORC 2012 compliant



Ti-V in orthomagmatic mafic-ultramafic layered intrusions

Top vanadium resource projects

- **Australian Vanadium Project** (Yilgarn): pre-feasibility work included modelling of vanadium and titanium metal production (mine life >20 years). Possible vanadium–electrolyte pilot plant
- **Gabanintha/Technology Metals** (Yilgarn): pilot plant testwork for definitive feasibility study completed; reserve of 29.6 Mt at 0.88% V₂O₅ (mine life 13 years)
- **Barrambie** (Yilgarn): definitive feasibility study confirms high-purity vanadium pentoxide and ferrovanadium potential; plans for pilot-scale metallurgical testwork
- **Medcalf** (Yilgarn): lateritic vanadium–titanium over layered sill. Pre-feasibility study supports V₂O₅ and TiO₂ production from Vesuvius, Fuji and Egmont deposits (mine life 12 years)



The Windimurra vanadium pit, looking south (Image courtesy T. Ivanic)

For more information



Geological Survey of
Western Australia

www.dmirs.wa.gov.au/gswa



www.dmirs.wa.gov.au/minedex



www.dmirs.wa.gov.au/geoview

Contact us

Sarah Sargent

Geological Survey and Resource Strategy Division

Email: minerals.investors@dmirs.wa.gov.au

Tel: +61 8 9222 3890



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

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