

**Downer and ABB: A partnership  
to benefit our customers**

**Downer** 

**ABB**





## Downer Australia's leading rollingstock provider

Downer has 150 years' rail experience providing end-to-end, innovative transport solutions.

We are a leading provider of rollingstock services in Australia, with expertise in delivering whole-of-life asset management support to our customers.

At Downer we have a long history of designing and manufacturing locomotives and we are the largest provider of through-life support asset management services for passenger rollingstock in Australia.

We build and maintain passenger trains across all major cities in Australia with some of our key rollingstock projects including:

- Manufacture and maintain 65 new six-car trains as part of Queensland Train Manufacturing Program, supporting Cross River Rail and the 2032 Brisbane Olympic and Paralympic Games.
- Manufacture and maintain 119 Waratah trains in NSW – Australia's largest passenger fleet on Australia's largest passenger network.
- Manufacture and maintain 70 High Capacity Metro Trains in Victoria – a step change in public transport offering 20 per cent more capacity than the current fleet and designed with a customer-centered stakeholder engagement piece.
- Refurbish 85 per cent of the Yarra Trams fleet, making it the world's largest tram refurbishment project.
- Manufacture over 1,000 rail cars and nearly 1,000 locomotives from our Maryborough, Queensland site including most recently manufacturing GT42 locomotives.
- Construction of the Newcastle Light Rail Project, and through Keolis Downer the operations of the fleet.

### Our capability



# ABB: Leader in traction technologies that drive innovation in rail and e-mobility



With a comprehensive range of high performance propulsion, auxiliary and energy storage solutions, our solutions help improve energy efficiency and contribute to making transportation more sustainable. ABB also provides life-cycle service support, including maintenance and retrofits for its large global installed base.

In deep and trustful partnerships with vehicle builders, refurbishers, and rail operators, we supply state-of-the-art traction systems. Among traction specialists, ABB excels with the broadest traction portfolio and engineering capabilities for tailor-made solutions.

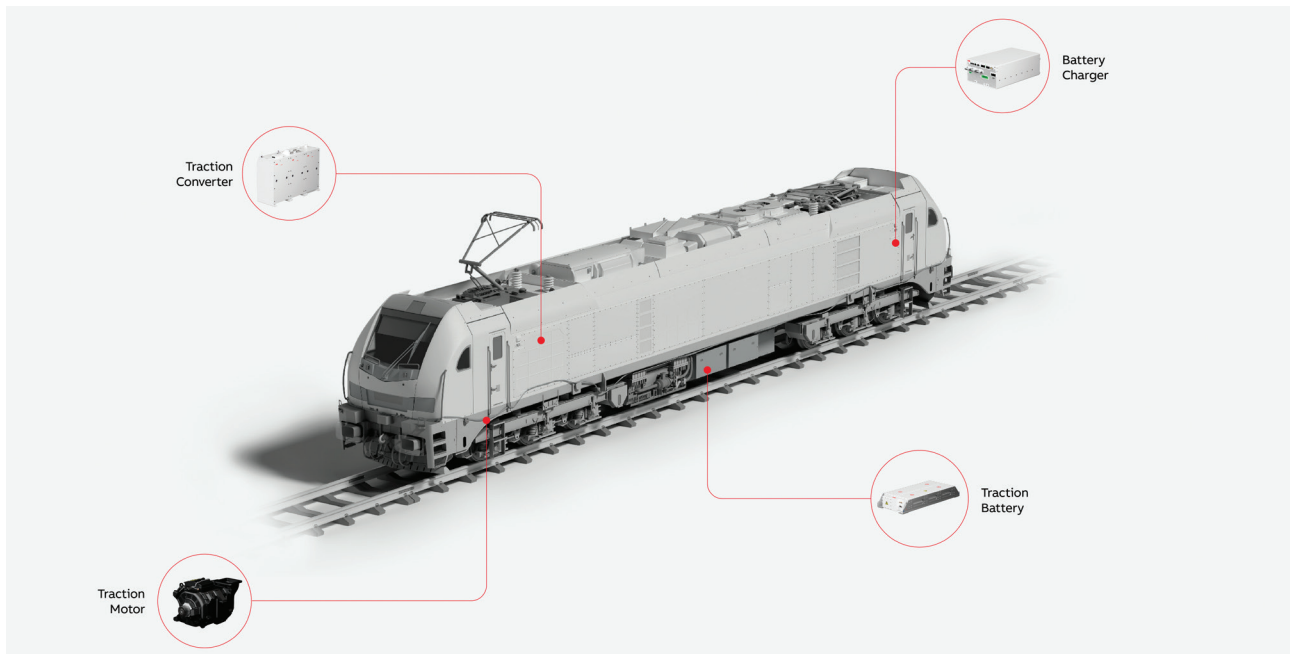
We combine decades of rail experience and a world-leading position in areas such as traction converters with a wealth of cross-industry know-how in power electronics, motion control and project management. ABB is not only the leader in industrial drives, but also the most innovative supplier of energy storage system (ESS).

ABB has an extensive installation base trains and locomotives fitted with ABB traction equipment. The systems are reliable, enabling economic operations every day and in every climate.

ABB's technology has been used in some of the most pioneering projects, including Australia's first diesel-hybrid train fleet conversion with Adelaide Metro for the South Australian Department for Infrastructure and Transport. With new ABB propulsion systems upgrade and subsequent utilisation of ABB's ESS, the class 3000 fleet will see a total energy efficiency improvement of up to 35 per cent.

This will reduce environmental impact including a reduction of 2,400 tons of CO<sub>2</sub> emissions annually, as well as reducing diesel engine noise and smell improving passenger experience.

## Individual components creating the traction system



Traction compact converter



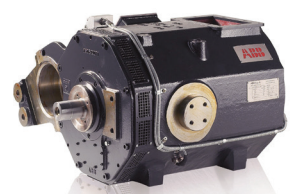
Auxiliary converter



Energy Storage System



Traction motor







## Downer and ABB: A partnership to benefit our customers

Downer is Australia's leading provider of rollingstock. We are a system level integrator with experience across over a century's worth of rollingstock delivery projects.

Downer is a trusted partner for the rail market who offers customers the full spectrum of design, manufacture and maintenance, as well as decarbonisation and digital solutions.

As we look to a net zero future, Downer is proud to bring a sustainability focus to provide engineering support, decarbonisation solutions and advanced rail technologies including our TrainDNA platform.

ABB is an expert partner focusing on traction system single components and complete systems for rail and e-mobility solutions, with the capability to take responsibility for design and supply of the entire traction chain and Train Control Management System including Transformers, Traction Converters, Motors, Auxiliary Converters and Energy Storage Systems.

Globally, ABB has an extensive reference list covering a range of environments and project scopes.

The Downer and ABB partnership benefits our customers as together we're able to provide new vehicle design and manufacturing, complete end-to-end management of traction upgrades and energy storage conversions. From design, testing, supply, integration and installation, Downer and ABB offer the complete delivery of the whole new vehicle and modification program.

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# Downer and ABB: A partnership of success

Downer and ABB have a long history of delivering for their individual customers and have now come together to deliver a partnership of success.

Downer as Australia’s leading provider of rollingstock and ABB as best-in-class traction technology supplier provide customers with end-to-end support for new vehicle supply and asset upgrades.

Customer outcome: Upgraded asset with new traction system					
Account Management	System Integration	Mechanical	Traction	Testing	Ongoing
<ul style="list-style-type: none"><li>■ Stakeholder engagement</li><li>■ One contact point for the customer</li><li>■ End-to-end project management</li><li>■ Oversight of the asset management upgrade lifecycle</li><li>■ ‘Speak the same language’ as well players</li></ul>	<ul style="list-style-type: none"><li>■ System engineering</li><li>■ Mechanical, electrical and ICT engineering and design</li><li>■ Performance modelling</li><li>■ Reliability, availability and maintainability engineering</li><li>■ Subsystem integration</li></ul>	<ul style="list-style-type: none"><li>■ Mechanical integration</li><li>■ Sites across Australia</li><li>■ Rail workforce in place across Australia</li></ul>	<ul style="list-style-type: none"><li>■ Design of traction systems</li><li>■ Supply of:<ul style="list-style-type: none"><li>• Traction Converters</li><li>• Auxiliary Converters</li><li>• Energy Storage Systems</li><li>• Traction &amp; Aux Motor</li><li>• Transformers</li><li>• TCMS</li></ul></li></ul>	<ul style="list-style-type: none"><li>■ Asset level verification and validation</li><li>■ Cyber security</li><li>■ Safety</li><li>■ Human Factors</li></ul>	<ul style="list-style-type: none"><li>■ Ongoing maintenance</li></ul>

Blue: Downer Management

Red: ABB management

## Locomotive retrofit option

Downer and ABB provide value to our customers through the retrofit of state-of-the-art adhesion control technologies onto existing locomotives. Downer offers end-to-end management, while ABB have proven systems which offer exceptional adhesion performance including superior determination of actual vehicle speed and perfect wheel-slip/slide control for all types of driven axle configurations (single axle or bogie control). More than 1500 locomotives are in frequent operation using ABB’s Traction system.

Together, Downer and ABB, can upgrade traction systems to improve tractive effort and increase haulage, ensuring a partnership of success for our customers.

## Downer and ABB: A partnership already delivering sustainable success

With the commitment to reduce emissions by 2030 and net zero emissions by 2050, we know that rail transport will need to decarbonise.

The need to reduce emissions and lower transport costs is driving change throughout the transport industry. Downer and ABB are proud to be a part of the sustainable solution.

### Hybrid technology: the power to drive change

Hybrid technology combining traditional fuels and electric battery power is already mainstream in the automotive industry. Downer has signed a strategic partnership agreement with ABB, who are a world leading in traction technology, on-board Energy Storage System (ESS), and electrical energy management.

Together we have developed hybrid technology which combines three modes of energy that provides operational flexibility to get the freight task done now, and into the zero-carbon emissions future.

Our hybrid technology can seamlessly switch between using onboard energy storage, to overhead catenary line energy (25kVa or 1500 VDC) or to a small diesel backup generator (or a combination of all three sources) which provides significant cost savings and carbon reduction across the rail network.

This gives it the power to climb, maintain speed on flat sections, the ability to recover energy through regenerative braking down hills, and the capability to recharge en route.

### Hybrid locomotive features

Our hybrid's three energy sources are specifically configured to successfully operate freight services, without the need for extensive new electrification or infrastructure. This allows retirement of diesel only locomotive and replacement of agency electric locomotives.

#### Hybrid locomotive co-configuration:

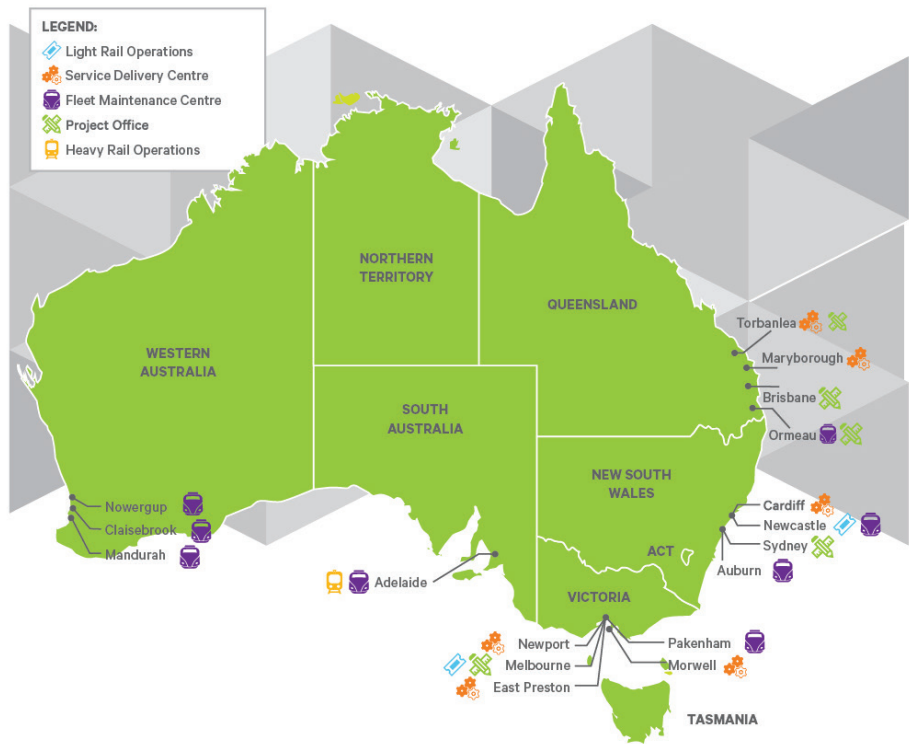
- Narrow gauge bogies and bodies.
- Six axles with six AC traction motors.
- 25 kV overhead pantograph equipment.
- 1400 kWh of energy storage.
- 1200 kW diesel generator.
- Overall Mass of 120 tonnes (132 tonne version is also available).
- Operate as independent unit or multiple units.
- Length 22,000 mm over couplers faces.
- Continuous tractive effort rating of 410 kN and starting tractive effort of 600kN. Power at the rail of 2300 kW in all modes of operation including overhead connection and with energy storage / diesel mode.
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- Full locomotive electric regenerative braking capability.
- Fully appointed vibration isolated Driver's Cab with AAR crashworthiness.





# Markets and presence

With strategically placed locations across Australia offering direct rail access, Downer provides trusted support to critical passenger train assets across Australia and is the largest national rollingstock maintainer.



## ABB

ABB is the number 1 traction propulsion system supplier, globally. With 11 manufacturing locations and projects delivered in over 50 countries, ABB remains the preferred manufacturer of integrated traction chain solutions for rail and e-mobility.

- 1. Australia**  
 Queensland Rail EMU Retrofit  
 Adelaide DMU Hybrid Upgrade  
 NSW Regional Train  
 Brisbane Metro

**2. New Zealand**  
 KiwiRail Diesel Locomotive

**3. Algeria**  
 SNTF EMU

**4. Azerbaijan**  
 ADY EMU

**5. Brazil**  
 Corcovado

**6. Canada**  
 Ottawa DMU

**7. China**  
 Nanjing Metro Line 5

**8. India**  
 CLW Locomotive

**9. Israel**  
 Tel Aviv LRV

**10. Kazakhstan**  
 Tulpar-Talgo  
 Passenger coach

**11. Mexico**  
 Tren Ligero

**12. Saudi Arabia**  
 SAR DMU

**13. South Africa**  
 TAL

**14. Taiwan**  
 Taiwan Railways  
 Administration  
 (TRA) Locomotives  
 Taipei Metro C321/C381  
 Danhai/Ankeng LRV

**15. Turkmenistan**  
 Monorail

**16. Uruguay**  
 EURO 4001

**17. USA**  
 Sound Transit  
 Valley Metro  
 DART Dallas  
 MTA Maryland  
 MARTA (Phoenix)  
 CALTRAIN KISS  
 TexRail

**18. Finland**  
 VR Shunter  
 VR EMU

**19. Italy**  
 EuroDual ITL  
 FAL  
 FNM  
 HEMU ESS  
 People Mover Bologna  
 RFI BMU

**20. Spain**  
 ADIF Service Locos  
 FGC Dual Freight  
 Renfe HC EMU  
 CityLink Dual Alicante

**21. Switzerland**  
 AVA Limmattalbahn  
 BLS EMU  
 RhB Ge 4/4 III  
 Pilatusbahn  
 KISS SBB  
 Re460

**22. Turkey**  
 EuroDual  
 Tram Istanbul  
 Tram Kocaeli  
 Gebze Metro

**23. UK**  
 Mersey Rail  
 Wales & Borders  
 CVL TT  
 Metro Glasgow





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Contact ABB in Australia

