

ASX Announcement FBR Limited



BuildTech Asia 2023 Singapore

Tuesday, 28th March 2023 – Robotic technology company **FBR Limited (ASX: FBR)** ('FBR' or 'the Company') is pleased to advise that the Company is exhibiting at the BuildTech Asia 2023 exhibition in Singapore. Attached is a presentation released today at the exhibition.

This announcement has been authorised for release to the ASX by the FBR Company Secretary.

Ends

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About FBR Limited

FBR Limited (ASX: FBR) designs, develops and builds dynamically stabilised robots to address global needs in a safer, more efficient and more sustainable way. These robots are designed to work outdoors using the company's core Dynamic Stabilisation Technology® (DST®).

The first application of DST® is the Hadrian X®, a bricklaying robot that builds structural walls faster, safer, more accurately and with less wastage than traditional manual methods. The Hadrian X® provides Wall as a Service®, FBR's unique commercial offering, to builders on demand.

To learn more please visit www.fbr.com.au





BuildTech Asia Conference



Singapore

28 March 2023



hadrianX

ASX:FBR

FBR designs, develops, builds and operates dynamically stabilised robots

About FBR

- **Hadrian X® is the world's most advanced construction robot**, capable of building structural, load-bearing walls of a brick/block house in as little as a day
- **Hadrian X® is designed to build structures safer, faster, cheaper and more accurately**, with waste virtually eliminated compared to traditional manual methods
- FBR's Dynamic Stabilisation Technology® (DST®), enables the Hadrian X® to take the precision of traditional indoor robotics into dynamic outdoor environments on a fully mobile truck-based platform
- **FBR** and the Hadrian X® technology currently offers a **Wall as a Service®** commercial model, where builders can order robotically erected walls with certainty on timing, cost, safety and waste
- **Hadrian X®** prototypes have built for top-tier builders in Perth, Western Australia on commercial terms
- Global brick/block low-rise construction market is approximately 525 billion bricks per year, estimated to >A\$500 billion/year to supply and lay



Automation is widely regarded as the future of construction

FBR Solution



- **Hadrian X®** is the only solution that is fully mobile without sacrificing utility, versatility, de-automation or speed of completion
- **Faster mobilisation** – no gantry setup, minimal site footprint, can build from the road or any other side of a construction site, uses existing building materials
- Proprietary architectural software automates conversion of existing plans to generate **Hadrian build file**
- **Compliant with National Construction Code (AU) and ICC (USA)**, working toward certification in others such as CE (EU)
- **Currently providing Wall as a Service® for top tier builders** in Western Australian on commercial terms, delivering structures faster, more accurately, safer and with less waste than traditional construction methods
- **Preliminary DST testing complete on potential 3D concrete printing** application – results extremely promising using existing technology and platform

Benefits of Hadrian X[®]

- **Speed and accuracy** – accurate forecasting of material costs and project completion times, with potential to lay bricks between 20-41x faster than manual bricklayers with a fully mobile and stabilised robot¹
- **Significant cost efficiencies over traditional building** – the next-generation Hadrian X[®] has the potential to reduce direct laying costs to A\$7/m² compared to the current approximate A\$57/m² for manual human bricklaying
- **Multi-purpose and superior output** – ability to lay single, double or large brick format, 24 hours per day, 7 days per week, even in rainy weather
- **Safety** – removes most manual labour and mitigates significant injury risks associated with bricklaying in the construction process
- **Environmental benefits** – compatible with sustainable building materials, minimising on-site waste generation, reducing landfill and water use



1. Based on Company assumptions provided on slide 22 and 23 of Investor Presentation released via ASX on 26 October 2022, utilising Hadrian X[®] H110 and presently available block sizes. Access to larger blocks would have the potential to increase comparative speed within the limits of H110 compatible blocks (see H110 compatible block dimensions on slide 5)

Automation is widely regarded as the future of construction

Next-generation Hadrian X[®] Programme

- The first next-generation Hadrian X[®] successfully laid its first blocks autonomously, with blocks passing through the entire robotic system via shuttle, before being laid
- Over the next 60 days further indoor calibration and optimisation and speed test builds will be carried out at FBR's facilities. This will be followed by outdoor housebuilding activities at FBR's facilities before being ready for residential/commercial site demonstration by 30 Jun 2023
- Following residential / commercial site demonstrations, H03 will be ready for subsequent US deployment by end of CY23
- Manufacture of H04 continues as planned, utilising learnings from H03 to drive process improvements
- Procurement process for US-spec machines has commenced, focusing on long-lead items such as US truck chassis, boom materials and industrial computer equipment
- Upon completion of manufacture, US bound machines will be deployed immediately to provide WaaS[®] in the US

On 13 March 2023, FBR announced it had secured A\$9 million in strategic funding from global fund manager M & G investment management for the manufacture and commercial deployment of three additional next-generation Hadrian X[®] units designed specifically for expedited use in the USA.



Automation is widely regarded as the future of construction

Technical Specifications

- Modular design and distributed control architecture of the next-generation Hadrian X[®] allows work on individual modules to progress independently
- Featuring a shuttle delivery system capable of being adapted to lay roof tiles, opening a potential new market for FBR using its existing technology
- Shuttle system allows handling of larger blocks, increasing targeted lay speed to ~80-120m²/hour of wall with largest format block¹
- Two-phase MOU with Liebherr-Mischtechnik, the world's largest privately owned OEM, to collaborate on commercializing the next-generation Hadrian X[®] ensuring suitability to mass manufacture²
- New and simplified Human Machine Interface greatly reduces complexity and improves user experience

- Fully mobile, modular design with ancillary equipment self-contained enables rapid deployment and mobilization/pack-up
- Handles blocks up to 600 x 400 x 300mm (23 Standard Brick Equivalent, weighing up to 45 kgs)
- 32-metre-long telescopic boom capable of building three storey structures from roadside, and laying blocks within 50mm of existing walls
- Brick saw module capable of making height, mitre and gable cuts as required
- Potential to complete a standard house in less than a day



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2. See FBR ASX announcement released 3 March 2022.

WaaS® expansion and entry to FBR's largest market initiated

U.S. Market Entry

- U.S. high-volume residential construction market poised to transition from reliance on manual labour, toward robotic construction
- Initial focus on Florida and Texas, the largest markets in the U.S. for new residential starts utilising masonry blocks
- First next-generation Hadrian X® to be sent to the U.S. in CY23 to complete build demonstrations with assistance from market leading block suppliers
 - Demonstrations to potential WaaS® partners to generate machine orders
 - Three next-generation Hadrian X® robots funded by M & G specifically for U.S. markets, expediting FBR's entry to its largest market globally
- Fastbrick Wall System is ICC code certified compliant with base code standards in the United States and numerous other international jurisdictions
- FBR seeking Miami Dade certification for southern Florida operations
- U.S. domiciled WaaS® entities to provide necessary platform from which to conduct U.S. operations

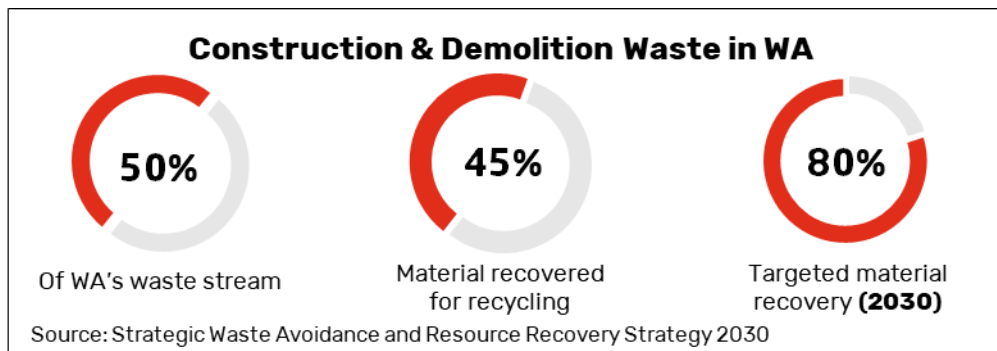


Source: Census Bureau, Moody's Analytics

U.S. Housing Supply

ESG Benefits

- Reduced environmental impact of construction process through **zero-waste sequenced pallet** capability:
 - maintains site cleanliness, massively reduces water use, waste generation and subsequent cost of waste removal to landfill
- Up to **10% of brick/blocks are wasted** in manual bricklaying from overordering, logistics and handling, and cutting bricks onsite :
 - This equates to **~A\$15 billion waste** in the A\$175 billion of global brick/blocks produced and sold annually
 - **Hadrian X®** could save >50% global brick/block waste per year
- **Block agnostic laying capability, ensuring forward compatibility with future developments in block materials**



No sand, cement or water required on site, eliminating;

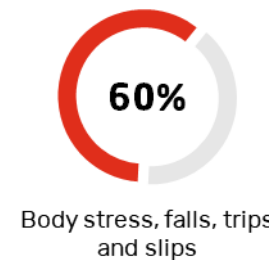
- impact of extraction, soil screening, removal and management of leftover waste; and
- potential exposure to hazardous silica dust, protecting the local environment, workers and public within vicinity

Reducing Health & Safety Risks

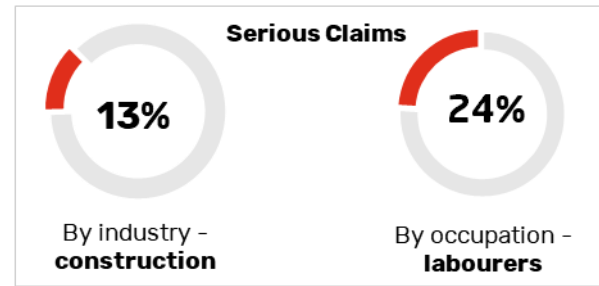
- **Safety in the construction industry is an issue globally – the Hadrian X® is part of the solution**
- **Reduces occurrences of repetitive stress injuries** and strains, while virtually eliminating risks during the undertaking of procedural construction tasks
- **Removes virtually all manual labour** from construction site during structure build (except minimal FBR quality control interactions)
- **No working at elevated heights** during blocklaying process. Removes the need for scaffolding, trestles or boards to reach the top courses and second storey
- Due to the use of construction adhesive, there is no exposure and inhalation of cement and sand dust while mixing mortar. Both contain silica which has been recognised as a serious industry hazard
- No injuries due to heavy manual handling of products – **Hadrian X®** handles, cuts and delivers all bricks necessary for the job
- **Less people required at work site** during construction and less trips to site required by workers



Work-related injury and disease in Australia (2020-2021)



Source: Safe Work Australia 2021



UN Sustainable Development Goals

FBR ability to impact and contribute		Relevant Sustainable Development Goal
 3 GOOD HEALTH AND WELL-BEING	• Reduction of hard waste generated on building sites • Reduction of foul water run-off from building sites • Reduction of exposure to silica dust	SDG 3.9: Impacts of chemicals and air, water and soil pollution
 7 AFFORDABLE AND CLEAN ENERGY	• Enable optimisation of building materials to; • reduce energy and emissions dealing with waste; and • produce structures with higher thermal/energy efficiency	SDG 7.2: Increase substantially the share of renewable energy in the global energy mix SDG 7.3: Improve the global rate of energy efficiency
 8 DECENT WORK AND ECONOMIC GROWTH	• Reducing exposure to dirty and dangerous construction related tasks; • Improving efficiency of land use and accessibility to housing and job creation, economic growth and prosperity.	SDG 8.2: Increasing economic productivity through technology and innovation, including a focus on high value added and labour-intensive sectors
 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	• Technological innovation in the construction industry has the ability to greatly improve efficiency and affordability of supplying homes	SDG 9.1: Support economic development and human well-being, with a focus on affordable and equitable access for all
 11 SUSTAINABLE CITIES AND COMMUNITIES	• Provision of technology capable of providing robotically constructed housing, faster, cheaper and safer than traditional residential construction methods	SDG 11.1: Access to adequate, sustainable and affordable housing SDG 11.3: Sustainable urbanisation and human settlement planning
 12 RESPONSIBLE CONSUMPTION AND PRODUCTION	• Utilise sustainable building materials in construction • Reduce construction related waste generation through technology and adoption of sustainable building practices	SDG 12.2: Sustainable management and use of natural resources SDG 12.4: Responsible management of chemicals and waste SDG 12.5: Sustainably reduce waste generation

Corporate Snapshot

Capital structure

Market capitalisation (as at 24/03/2023)	\$117.3m
Ordinary shares on issue	3.7b
Average daily volume (last 3 months)	1.4m
Gross cash balance (31 Dec 2022)	\$16.4m

Directors & Management

Richard Grellman AM	Non-Executive Chairman
Grant Anderson	Non-Executive Director
Greg Smith	Non-Executive Director
Nancy Milne AOM	Non-Executive Director
Mike Pivac	Executive Director – MD & CEO
Mark Pivac	Executive Director – CTO
Aidan Flynn	CFO & Company Secretary
Kiel Chivers	Chief Commercial Officer
Jonathan Lawe Davies	General Counsel

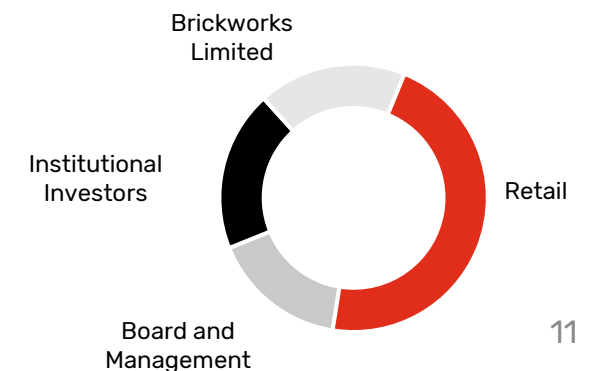
Share price performance



Shareholders

Brickworks Limited	17.9%*
Mark Pivac (Founder)	10.5%
FIL Limited	9.9%*
M & G Investments	9.5%*
Mike Pivac (Founder)	4.8%

Register



*as per last substantial holding notice

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