PITT STREET RESEARCH

RemSense Technologies

Digitising the Industrial Revolution 4.0

Share Price: A$0.056

ASX: REM

Sector: Technology

13 June 2023

RemSense Technologies (ASX: REM) is a technology company responsible for virtualplant. Virtualplant is an asset visualisation platform that virtually re-creates an existing real-life area, asset or facility. It is intended for companies with a distributed asset portfolio including oil and gas, utilities, industrials, mining, marine and infrastructure. Virtualplant facilitates operational efficiency, reduced costs, and risk mitigation for clients. It requires a limited advanced network to operate and is device agnostic. REM has a highly scalable and sustainable business model with Software-as-a-Service (SaaS) corporate contracts and a recurring revenue model.

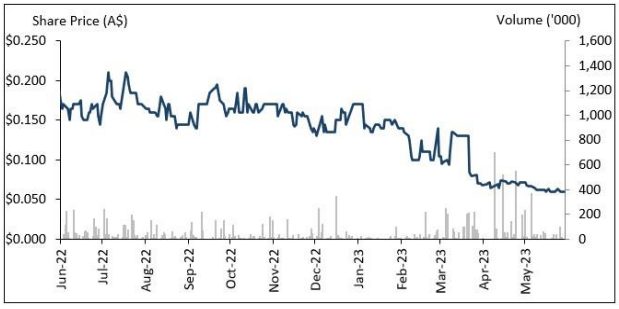
Market cap. (A$ m)	5.3
# shares outstanding (m)	93.8
# share fully diluted (m)	119.1
Market cap ful. dil. (A$m)	6.7
Free float	45.8%
12-months high/low (A$)	0.220 / 0.056
Avg. daily volume ('1000)	3,471.3
Website	https://remsense.com.au/

Source: Company, Pitt Street Research

REM's collaboration with major partners is a tipping point

REM has been collaborating with multiple high-profile clients and partners for expansion, particularly Chevron Australia, Woodside Energy and most notably IBM. With these partnerships, REM has crossed an inflection point, which should accelerate opportunities going forward. REM will integrate its virtualplant platform with IBM's Enterprise Asset Management (EAM) software, Maximo, and other asset management software suites. Through partner collaboration, REM intends to access a global market opportunity of US$5bn in the next 2-3 years. In return, virtualplant is expected to create a unique human-centric data navigation experience for partner clients.

Share price (A$) and avg. daily volume (k, r.h.s.)



Source: S&P Capital IQ, Pitt Street Research

Valuation of A$0.23-$0.30 per share

We value REM at A$0.23 per share in our base case scenario and A$0.30 per share in our optimistic case by using a composite valuation – 50% DCF and 50% relative valuation. We believe investors are not factoring in the full potential of virtualplant, because VR technologies such as virtualplant are newly emerging as well as the significant capital REM has invested to bring the platform to this point. However, we think that shares will re-rate as adoption increases. Please refer to pages 21-24 for further details on our valuation methodology and page 25 for the key risks associated with an investment in REM.

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Introducing RemSense Technologies (ASX:REM)

RemSense Technologies (ASX:REM) is a Perth-based technology solutions company that listed on ASX in November 2021. The current entity that bears its name was founded in March 2021 with the intent to act as the listing entity and parent company of the original RemSense that was founded in 2012 and first traded as Altitude Imaging.

REM develops and implements technology-based global applications across multiple sectors that focus on managing widely distributed and remotely located physical assets. Examples of such sectors include oil and gas, utilities, industrials, mining, marine and infrastructure. Currently, REM's focus is on its flagship solution called '***virtualplant***'.

Meet virtualplant

Virtualplant is a photographic asset visualisation platform fulfilling the requirement of VR and AR technology as a digital representation of plant assets

Virtualplant is a photographic asset visualisation platform that fulfils the promise of Virtual Reality (VR) and Artificial Intelligence (AI) technology as a digital representation of a physical plant asset. This 'digital twin' system integrates with existing asset management systems and provides greater productivity, increased safety and reduced operational costs. Virtualplant adds considerable value to users because it allows any individual to understand the physical environment and monitor operations without being physically present there.

Virtualplant was born in 2019, when REM was tasked by Woodside Energy Australia to design a software platform allowing asset knowledge and visibility anywhere, anytime and from any device, across employees and contractors. In 2022, REM secured the Intellectual Property (IP) rights for virtualplant from Woodside.

Virtualplant's integration into existing EAM solutions is a stepping stone for bigger things to come

REM's relationship with global EAM partners facilitates easier access to a large and elite client base.

Recently, REM entered into an agreement with IBM where REM can integrate the virtualplant platform into IBM's enterprise asset management (EAM) solution Maximo. While REM has a strong relationship with some of the tier-1 companies, such as Woodside Energy and Chevron Australia, the relationship with global EAM partners is a stepping stone for fast tracking its expansion plans.

REM's relationship with global EAM partners is important as its enables access to a wide and elite customer base. Integration trials of virtualplant into IBM's EAM was achieved in October 2022.

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Eight key reasons to look at REM

Investments by REM in the digital twin technology are likely to culminate in greater revenue opportunities, reduced costs and workplace injuries, higher productivity and enhanced operations

1) **REM fulfils the promise of Virtual Reality (VR) and Artificial Intelligence (AI)** – REM is leading industrial digital transformation with an operational photogrammic 'digital twin' called virtualplant, which fulfils the high potential of Virtual Reality (VR) and Artificial Intelligence (AI) technology as a digital representation of physical plant assets.
2) **Virtualplant is unique and offers significant benefits to multitude of industries** – REM's virtualplant technology is an AWS-qualified software tool built in the cloud. It is highly secure and reliable. Virtualplant provides remote viewing and monitoring of a remote asset such as an oil rig or process plant. Organisations can look through the applicable asset anytime, on any device, without any specialised industrial training, hardware and or enhanced data network. Virtualplant empowers organisations with higher operational efficiency, helps reduce travel cost and improves employee safety.
3) **Virtualplant has sound economics –** Virtualplant operates through multiple revenue streams: (i) an upfront fee for scanning and setting up each virtualplant; (ii) scanning, asset recognition and other value-added services commanding additional fees; (iii) a monthly subscription fee for the software system usage. This specific software-as-a-service (SaaS) operating model makes the investment return time period relatively short and is expected to catapult it to a high growth trajectory.

REM's pivotal relationship with Woodside Energy has played a key role in unlocking other potential clients especially with American energy major Chevron

4) **REM's strategic partnership with global IT service players provides the foundation for a fast-tracked expansion and big future** – REM has signed several partnerships with leading asset management software suppliers. As a global licensed partner, REM, gets access to the following: (a) a huge international market; (b) enhanced enterprise-grade technological features; (c) extensive sales channel support; (d) micro-services and related support systems; (e) compatibility with the development architecture of world-beating products. We believe that these partnerships, growing list of tier-1 clients and corporate relationships will be instrumental in unlocking other potential clients for REM. But even forgetting about all other clients, REM's involvement with IBM gives it access to a huge client base with a global market opportunity of ~US$4bn.
5) **Barriers to entry await any would-be competitors** – REM makes sure that there is no technology transfer clause in any contract, thereby safeguarding the intellectual property (IP) behind its entire process. This makes REM a classic investment opportunity, where the IP is secure and market opportunity immense.
6) **Virtualplant is ESG compatible, without the high price tag of other such investments** – While many ESG-investments have high capital requirements, REM's virtualplant is a relatively low expense given what we outlined in point 3. This provides significant cost benefits to companies who otherwise would have to invest in costly alternatives to be ESG complaint.
7) **REM's management** – REM has an experienced management team that comes with diverse experience across a wide range of industrial operations and has a proven track record of growing the business. We particularly note, Mr. Steve Brown, the company's founder and Managing Director - his commercial experience and astute thinking is one of the chief reasons behind the opportunity. We are confident that the company's management will be pivotal in enabling strong organisational and revenue growth.

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8) **REM is a grossly undervalued investment opportunity in a niche sector** – Apart from providing an attractive investment opportunity in the world of VR + AI, we think REM at its current valuation is a great value pick. Although the company has struggled since listing, we think it is mainly due to a lack of investor understanding about the company's decision to change its strategic direction to rebuild virtualplant in AWS and integrate into partner asset management EAM solutions. Granted, a higher cash burn and change in product structure hasn't helped REM's cause either. However, for reasons we will outline later in this report, we believe that the changes made would accelerate REM's growth trajectory greater than what it otherwise would be. Our composite valuation (involving separate DCF and RV approaches that are weighted equally in our final valuation) yields a target price range of A$0.23-$0.30 per share. This represents significant upside potential.

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REM is digitising the Industrial Revolution through virtualplant

RemSense Technologies (ASX:REM) is a Perth-based technology services provider that is engaged in solving industrial problems through new-age digital mechanics - including VR, AI, IoT, aerial and terrestrial imaging (drones with high resolution cameras). It supports multiple sectors on projects of various scales and aids clients in reaping the benefits that can be offered by Industry 4.0.

> ***Industry 4.0*** *is the fourth generation of Industrial Revolution. It is the next phase of enhancement in the industrial manufacturing sector, which is driven by digitisation-led disruptive trends including usage of data analytics, VR, network connectivity, AI and robotics.*

Virtualplant is a high-resolution digital representation of physical plant asset, enabling remote assets to be viewed anytime, anywhere.

REM's flagship product is virtualplant. ***Virtualplant facilitates a high-resolution digital representation of a physical plant asset, enabling remote assets to be viewed anytime, anywhere. It can be integrated suitably within the existing business operations and asset management systems to ensure greater productivity, increased safety and reduced costs***.

How virtualplant came to be

Virtualplant was developed under a contract between REM and Woodside Energy. The concept was conceived in 2019 when REM was hired to provide a solution to Woodside Energy that enabled knowledge and visibility of its onshore and offshore assets anytime, anywhere and from any device for its employees and contractors. Since then, REM has made significant investments in the development of virtualplant. The company is preparing to make its solution available to all asset and facility operators across the resource and infrastructure sectors. Woodside continues to use the platform under a SaaS agreement with REM, while REM retains the IP and right to market and sell it to other companies.

In July 2022, REM acquired background intellectual property for virtualplant from Woodside Energy. Previously, REM entered into an exclusive five-year license to use the IP owned by Woodside Energy for a 5% license fee. The IP was acquired for a sum of A$400,000 through a settlement on July 20, 2022.

The agreement helps in the simplification of the company's digital model with its business partners and is likely to result in improvements in overall product profitability. The SaaS based solution enables REM to deploy virtualplant at speed and scale, with a typical digital twin solution going live in four to six weeks for any major asset.

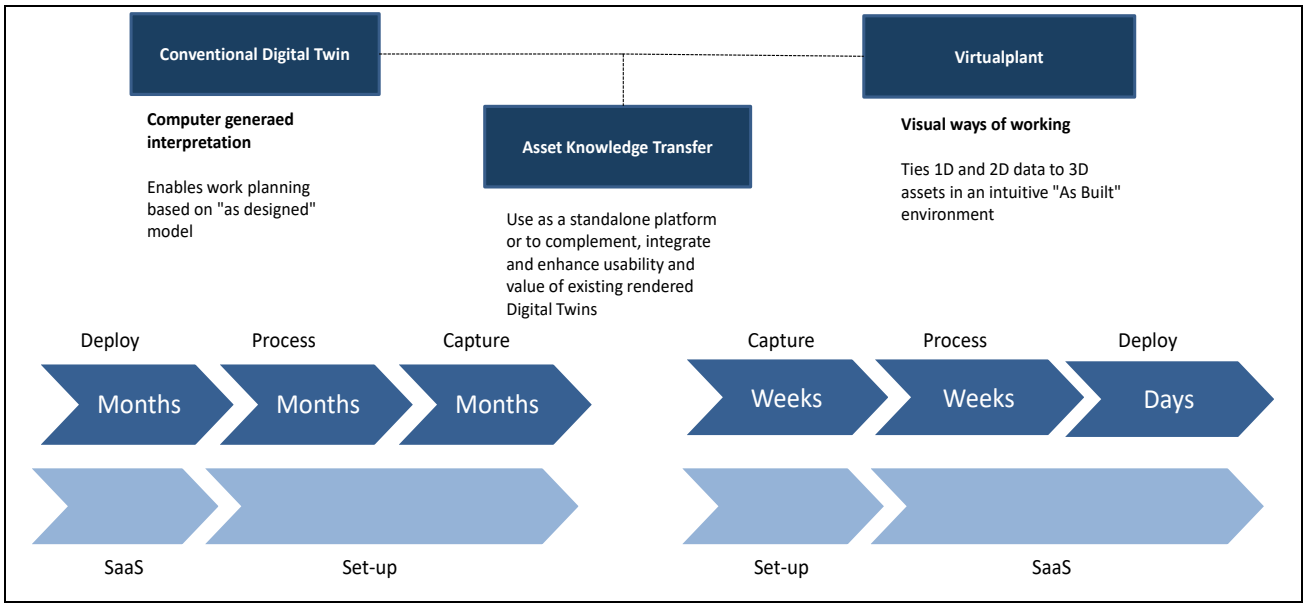
How does Virtualplant work?

Using a twin digital application of VR and AI, virtualplant is built from a series of photographic images (using high-resolution ground-based scanning cameras) capturing existing plant asset conditions accurately. This in turn, enables access to visual information for a distributed asset network, providing an intuitive and immersive experience. It is also a digital hub that enables companies and contractors to access operational information such as manuals, inspection reports and schedules.

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Virtualplant provides secure data access globally anytime and anywhere across an entire organisation using existing hardware and network systems. Virtualplant software is stored on the cloud and has been redesigned and certified on Amazon Web Services (AWS). Consequently, it can easily be integrated into the existing asset management system of the organisation, thereby saving substantial replacement or reinvestment costs (Figure 1).

Figure 1: Virtualplant integrates with existing solutions easily



Source: Company, Pitt Street Research

Virtualplant simplifies how employees and contractors access, view, navigates, interact and collaborate with data across distributed assets without physically travel to the asset location. It ensures worldwide users a close zoomed in view during digital navigation of the facility.

Virtualplant offers an intuitive viewing experience

The Virtualplant is not like a traditional 3-D visualisation model based on computer-rendered graphics or LiDAR colourised point clouds. Virtualplant depicts the true condition of the assets and their live working environment (Figure 1). It supports the organisation's staff to gain full understanding of the plant's operational ability without even visiting it.

Virtualplant offers numerous working advantages and special features (Figure 2 on page 8) including that it:

- Is a made-to-order software and can be up and running within weeks of the order being made.
- Enables detailing of facility including access to historical data (specifications, maintenance records and safety features) on assets.
- Captures existing "as-is" asset data in high faith and orchestration of dynamic data for providing operational insights. An intuitive user interface within the virtualplant platform allows users to search and navigate tagged assets and visualise them in their current physical state. It can be carried out throughout the asset lifecycle to include projects, modifications and decommissioning.

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Virtualplant results in considerable time savings than existing processes which is a labour-intensive and time consuming manual exercise

- Supports automatic asset identification of asset components through an existing Name Plate, Tag or Asset ID.
- Geolocation of assets aligned with the plant grid through the creation of an automatic digital tag within the digital twin.
- Can be integrated with the organisation's existing enterprise management systems and operational technology platforms.
- Saves a considerable amount of time to operators compared to existing processes.
- Enables integrations into third party enterprise asset management (EAM) systems and their federated learning of cohorts (FLOCs) systems.
- Visualises large areas to increase situational understanding and navigate to any point in seconds.
- Comes handy in the corrosion detection process.
- Empowers collaborations by bringing geographically dispersed and multi-functional teams on one platform.

Figure 2: Virtualplant offers numerous advantage



Source: Company, Pitt Street Research

Virtualplant adds considerable value to users because it makes it very easy to identify assets owned by the enterprise and obtain data from those assets. It can add value in any industrial sector with a distributed asset base and offers an expanded global opportunity. It covers multiple sectors and industries and is currently operational and live with two major multinational clients. It can also compliment more traditional Digital Twin systems. We believe that a significant opportunity exists for the virtualplant to become a visualisation and user interface for existing systems resulting in it being offered as an option to its clients.

To our knowledge, no other company in the world has created software to digitally twin industrial facilities with the level of detail and user-friendliness that REM achieves with virtualplant. We believe that any organisation with a large and dispersed asset base can find the virtualplant useful, particularly the industrial, oil and gas, infrastructure and resource sector customers – all of which REM intends to target.

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The rise of the metaverse marks perfecting timing for REM

The metaverse is different than other digital worlds

Virtualplant places REM in an ideal position as the metaverse becomes mainstream and is relied on by organisations.

Virtualplant places REM in an ideal position as the metaverse becomes mainstream and is increasingly relied on by organisations for purposes such as those that Virtualplant enables. The metaverse is an independent, physically persistent, interconnected virtual platform through which people can have lifelike personal and business experiences online. The metaverse environment allows users to create and share content and applications and simultaneously move freely from one world to another. The entire structure enables an unprecedented level of interaction and collaboration making it a highly customizable environment.

The metaverse offers new opportunities for businesses and individuals to engage with each other in innovative and transformative ways. Consequently, ***extensive adoption of the metaverse has the potential to significantly affect the digital transformation of businesses operations****.*

The basic difference between the metaverse and other similar digital environments (such as social media) is that in the virtual realm of the metaverse, users have the ability to create and modify the environment itself. In other digital environments, users are generally limited to exploring and interacting with environments created by the developers. To put it another way, you're just looking at it on your phone or computer screen and just typing and/or scrolling.

What does the metaverse have to do with REM and Virtualplant?

Two things. Firstly, this is as Meta founder Mark Zuckerberg said 'the next chapter for the Internet' and is part of the digital wave that will lead to virtualplant being adopted by would-be clients. Second, a brief wave of share market hype in 2021 (arguably sparked by Meta adopting its current name) and its waning as interest rates began to rise and Russia invaded Ukraine, came as REM listed and is in our view a key reason why it has been neglected for the best part of the last 12-15 months. REM is one of the few companies on the ASX offering exposure to this new generation of technology but is consequently a victim of myths surrounding it (Figure 3 on page 10).

Some sceptics see the metaverse as a hype-fuelled fad appealing to gamers and celebrities. The most high profile examples Apple CEO Tim Cook and Snap CEO Even Spiegal - at least in respect of the view that it can be as mainstream as the Internet 2.0 in our lives[1].

We believe that as more and more users get comfortable with the technological advancement across the daily usability, and as early movers turn their plans into concrete technologies and commercialise them, these myths around the metaverse environment are likely fade away.

[1] https://www.theverge.com/2022/10/3/23384708/tim-cook-metaverse-skeptical-meta-ar-vr-headset

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Figure 3: Myths of the metaverse

Myth	Challenges	Reality
No one knows what the metaverse is	• There is no single consensus definition of the metaverse – this often creates confusion.	• Just because there is no definition, it does not mean companies are not working on it
The metaverse is a fad	• Some companies are spending on the metaverse but not generating financial returns. • Others are still debating if there is a payoff in making investments in the metaverse. As we noted above, even some tech companies like Apple & Snap aren't certain.	• We believe that the metaverse is the future not a fad based on strong medium-term interest from consumers. • Consumers are increasingly expecting the metaverse to be a significant part of their lives, spending four hours a day in the metaverse within the next five years.
The metaverse is for gamers only. Otherwise, one cannot make money in the metaverse.	• Gaming was one of the earliest adopters of the metaverse and remains one the leading experiences. • Companies and consumers may have a natural inclination to prefer reality over the virtual world. • Even if, theoretically the metaverse could deliver windfalls, the necessary technology (i.e. software, hardware and user interfaces) may not be capable at the level required for wide-spread adoption and/or to meet expectations.	• Even though gaming is one of the first frontiers, spending on the metaverse related digital assets by non-gaming businesses and consumers is likely to increase in the next 5-10 years. Bloomberg anticipates the metaverse's economy to be US$2.5tn by 2030. • Even governments are spending money on the Metaverse[2].
The metaverse is geared towards Generation Z and Millennials	• Interest levels among Generation Z and Millennials about the Metaverse is far higher than older generations[3]. Just 29% of Boomers claim to know something about the metaverse while 59% of Gen Z and 55% Millennials do. • There is also lower awareness about the Metaverse among women – only 36% of women claim to know while 53% of men do.	• Awareness is growing rapidly – even quarter-on-quarter[4]. • 53% of adults are interested in learning more about the metaverse. • There is wide-spread expectation among those familiar with the universe that it could replace many real-world brand interactions or at least be part of a hybrid offering[5].

Source: Company, Pitt Street Research

[2] Hbr.org/2023/05/yes-te-metaverse-is-still-happening
[3] https://big-village.com/news/the-pulse-of-the-american-consumer-2022-pt-22/
[4] Just three months prior to the Big Village survey we site, the number of American adults who heard of the term grew from 68% to 76% and those who claim to know anything about it grew from 38% to 44%
[5] Telus International Survey 2022

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The global market for the metaverse is significantly vast

The general metaverse can be segregated into the industrial the metaverse and the consumer metaverse. Both use the same conceptual frameworks, but the end markets differ. The consumer metaverse is likely to be the one that most consumers interact with – exemplified by immersive games, new shopping experiences and VR goggles.

But the industrial metaverse, which serves non-consumer markets, is likely to be where more money can made by companies, and this is where REM fits in. It is a world where real machines and factories, buildings and cities, and grids and transportation systems are mirrored in the virtual world. The industrial metaverse aims to achieve enhancements in sustainability and efficiency by redefining the collaboration between people and machines for designing, building, operating, and optimising physical systems using immersive technologies in the cloud. An industrial metaverse is a classic example of combinatorial innovation, which refers to the creation of new things through a mix of different technologies with different degrees of maturity.

We believe that the metaverse is likely to evolve into an autonomous and intelligent immersive environment by blending automation and human intuition for quick problem-solving. Industrial companies are likely to gain control over the operations contributing significantly to the bottom line and are also likely to offer the transparency required for measuring and monitoring of carbon footprint.

Just how big is the market for the industrial metaverse?

While the consumer metaverse is gaining popularity, the industrial metaverse is likely to lead the way in commercialisation. The industrial metaverse market is likely to grow at a CAGR of 32% to US$100bn by 2030[6], with major proportion of the revenue coming from digital twins and extended reality applications. The industrial metaverse offers a vast potential spanning across bringing together of remote experts together to collaborate on designing a future factory floor or work process, increased collaboration among industrial organisations, reduced environmental impact as well as connecting and extending the digital thread. The asset or product-centric view of the industrial metaverse makes the conceptualisation of the latter highly focussed around productive integration with other industrial software stacks known as the digital thread. We believe that the industrial metaverse is helping in creating a pathway for the generation of data-driven insights that will help unlock product potential.

What is a digital twin?

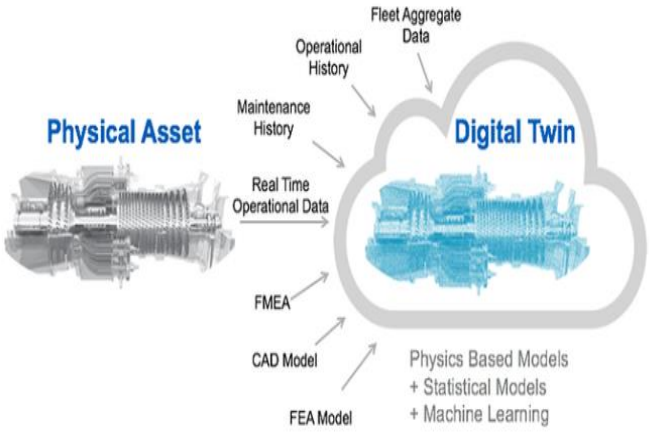
A digital twin is an exact, virtual representation of a physical product or process that exactly replicates the real-world system and its behaviour

The metaverse will lead to the rise of a number of technologies and one of these is digital twins and this is what virtualplant is. A digital twin is a virtual creation of an existing real-life object, area, asset or facility that can help the owner operate more safely and efficiently (Figures 4 and 5 on page 12). The twin covers the object's lifecycle, is updated with real-time information, and uses the latest digital tools (such as machine learning) to enable the decision-making process. It bridges the gap between the physical and the virtual world. It encompasses all aspects, components, and subcomponents of a facility. The developments with digital twins are a result of ongoing innovations in simulation technology and process industries.

[6] 2023 data from VentureBeat and ABI

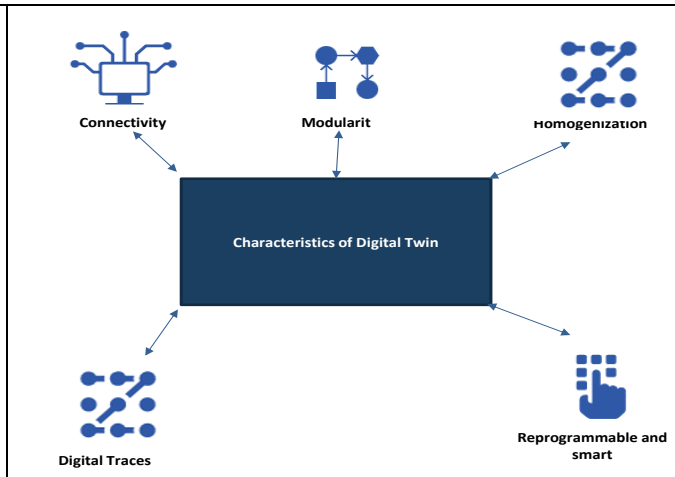
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Figure 4: A digital twin is virtual replica of a physical product



Source: Motioncontroltips.com, Pitt Street Research

Figure 5: Features of digital twin



Source: Leewayhertz, Pitt Street Research

Challenges in digital transformation have resulted in the need for a digital twin technology to help mitigate the concerns

The industries achieving the most success with digital twins are the ones involved with large-scale products and projects such as engineering, manufacturing, capital good design, construction, and energy. Digital twins are extensively used in the following applications: power-generation, large building structures (Heating, Ventilation and Air Condition (HVAC) systems), healthcare services, automotive industry, and urban planning.

Challenges in digital transformation have paved the way for digital twin technologies such as virtualplant.

Digital transformation is currently seeking reduced operational costs, an increased up-time for plants as well, expectations for a longer asset life as well as access and control over complex and siloed data. However, digital transformation is facing some limitations. Siloed data are complex and specialised, require training, not intuitive, operate in data silos and are difficult to get a complete picture of. As a result, a need has stemmed for a digital twin technology to address the concerns associated with digital transformation.

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A digital twin is progressive and different than simulations

Both simulations and digital twins entail the utilisation of digital models for replication of a system's processes (Figure 6). However, a digital twin is mainly a virtual environment and differs from simulations.

Figure 6: Differences between Digital Twins and Simulations

	Simulations	Digital Twins
Scale	Simulations can only study a particular process	Digital twins can run any number of useful simulations for the study of multiple processes
Real-time data	Simulations do not benefit from real-time data	Digital twins are designed around a two-way flow of information. The first information flow occurs when object sensors provide relevant data to the system processor. The next flow of information happens when insights created by the processor are shared back to the original source project.
Issues under study	Simulations have the scope for study of lesser issues from vantage points than digital twins	Digital twins are able to study more issues from far more vantage points than simulations with greater potential for improvement in products and processes. This is ensured as digital twins update data pertaining to a wide range of areas in a better and consistent manner. Digital twins also provide enhanced computing power along with a virtual environment

Source: Company, Pitt Street Research

Capture, presentation and analysis of meaningful data is an important element of digital transformation and plays a key role in the success of a digital twin

Benefits of digital twins

Digital twins have certain advantages. These are listed below

- **Better R&D –** The use of digital twins enables more effective research and design of products. The R&D results in the creation of abundant data around potential performance outcomes. This in turn, results in insights helping companies make the much-needed product refinements before commencement of production.
- **Enhanced efficiency –** Digital twins can help in the mirroring and monitoring of production systems even after a new product has gone into production. This is done with the objective of achieving and maintaining peak efficiency throughout the entire manufacturing process.
- **Product end-of-life** – With the help of digital twins, manufacturers can decide what to do with the products that are about to reach the end of their product lifecycle and receiving final processing through recycling and other measures.
- **Increasing focus on cutting-edge real-time data analytics** – The ability to model and monitor real-world objects is an important feature of the digital twin technology. Once established, digital twins and analytics provide more accurate diagnostic, optimal and predictive operations

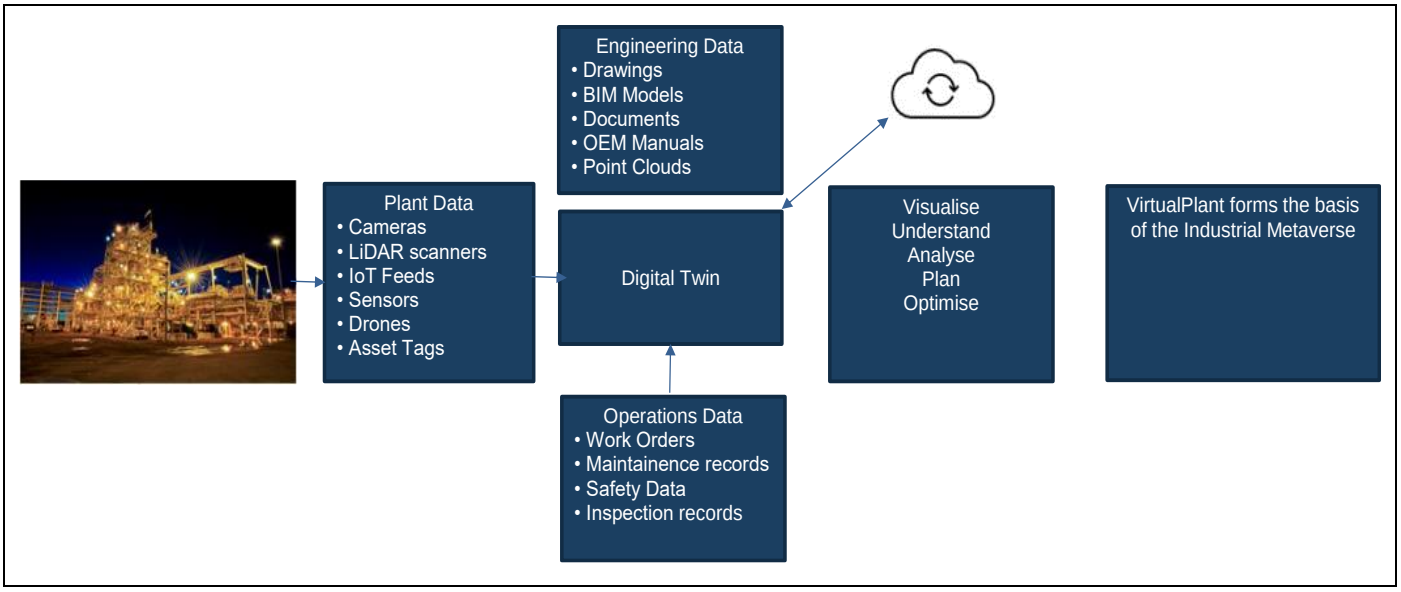
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REM is making significant investments in the digital twin technology

Along with IoT, data capture and data analytics technologies, REM is focussed on the digital twin technology to mitigate the concerns associated with digital transformation. Investments in the digital twin technology by REM are likely to result in several benefits for companies that adopt it. These include (but are not limited to) greater revenue opportunities, lower costs, reduction in workplace injuries, higher productivity, and enhanced operations. The replication of IoT-connected assets is likely to enable simulations, modelling, testing and monitoring based on data collected from sensors (Figure 7).

This is likely to be done using advanced visualisation through the application of 3-D, VR and AR to industrial assets, thereby resulting in a more holistic and strategic approach to asset management across a network of widely distributed assets. Furthermore, the capture, presentation and analysis of meaningful data is a key element of the digital transformation journey of REM's clients and plays an integral role in the success of a digital twin. We believe that most of REM's growth is likely to come from providing solutions to customers who are engaged in digital transformation of their businesses.

Figure 7: Virtualplant is a classic example of how different components of a digital twin can be brought together



Source: Company, Pitt Street Research

Virtualplant has solid economics through scalability and recurring revenues

Virtualplant operates through three revenue streams – an upfront fee, an ongoing subscription fee and charges for the value-added services

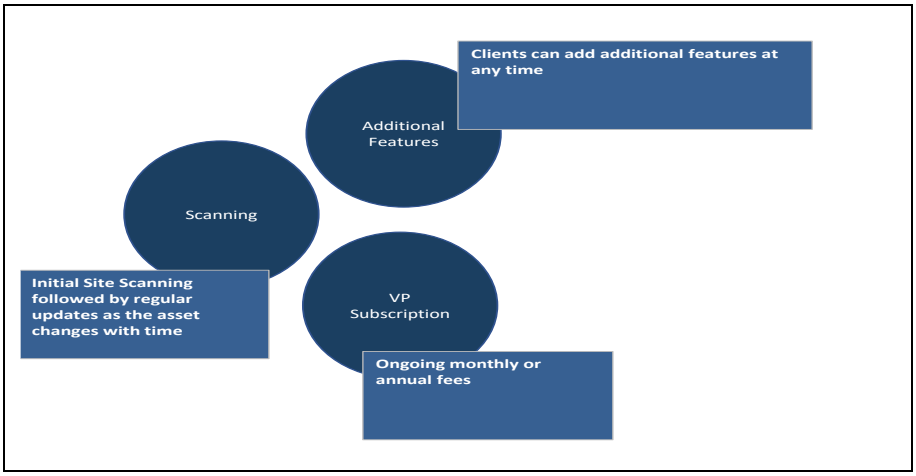
Virtualplant operates through three revenue streams (Figure 8):

- The commercial model begins with an upfront fee for setting up virtualplant. The set-up includes scanning, asset recognition and other value-added services offered for additional fees.
- Subsequently, a subscription fee is paid each month for the virtualplant software system, general support, security and hosting. This SaaS-based model makes the product highly scalable.

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- As the client relationship continues, new technical solutions specific to the client are likely to be adapted into the virtualplant. The integration of solutions in the existing and new client management systems is then likely to be charged on an hourly basis, depending on the scope.

Figure 8: Virtualplant's Commercial Model



Source: Company, Pitt Street Research

REM's Software as a Service (SaaS) agreement with Woodside

By May 2022, REM finalised its first multi-year cloud-based SaaS agreement with Woodside Energy for virtualplant to deliver an enterprise grade and scalable digital twin solution. Revenue is likely to be generated on a recurring basis for the first two years, with the agreed pricing for expansion of virtualplant's assets and features. The SaaS agreement includes cloud service, license, and support provided to some of Woodside's existing assets along with agreed terms for potential future expansion with new assets and virtualplant features.

Key partnerships with global clients justify virtualplant's potential scale

REM has established relationships with major suppliers of asset management and maintenance software to enable data held by clients on their systems to be available in virtualplant. Partner and ecosphere programmes (as approved technology partners with mutual benefits) help in providing access to addressable markets. REM is building a credible and sustainable business by successfully targeting strategic partners and engaging with Tier 1 clients (Figure 9 on page 16). REM has a clear plan to go global. The partnerships are likely to enable the sale of the virtualplant and aid its global use through their existing networks and customer relationships.

Integration with IBM – a renewed expansion strategy

The REM-IBM agreement is a pivotal deal with REM developing virtualplant as a digital twin user interface for IBM's Maximo software.

The relationship between REM and IBM is particularly important as it helps REM gain access to IBM's wide and elite customer base. The agreement with IBM was entered on October 11, 2022 with the objective of developing virtualplant as a digital twin user interface for IBM's Enterprise Asset Management (EAM) software called Maximo, which is the leading asset

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management software in the world. The Maximo software is deployed in 99 countries and 7 continents.

The integration of virtualplant is likely to produce significant value-added benefits for the Maximo software user. Users can monitor the plant asset data from the Maximo application directly within the photorealistic environment of virtualplant, in turn providing unprecedented contextual relevance to remote asset monitoring and predictive maintenance activities. Thus, the visualisation of assets is likely to provide significant value to clients and create a unique experience for the navigation and analysis of data in a human-centric manner. Virtualplant is also gaining further traction with asset management software providers and end users as it allows users to think and operate naturally.

Figure 9: Top Global asset-intensive industry leaders leverage Maximo



Source: Company, Pitt Street Research

The aim of REM's revamped marketing strategy was to focus better on strategic partnerships with leading global asset management solution providers

REM realised that through integrations with global industrial asset management and analytics system providers such as IBM, the opportunities for the virtualplant digital twin solution is exponentially larger than what was first anticipated. In light of this, REM refreshed its go-to-market strategy, pivoting from its initial emphasis on direct sales to focussing more on strategic partnerships with leading global asset management solution providers. Furthermore, REM redirected resources for the development of virtualplant as a fully certified enterprise grade solution with analytics capabilities. We believe that the revised strategy is a better long-term plan with more resources and time spent in further product development and integration with partner EAM systems. The company is also seeking additional working capital of A$2m for the execution of contracts and prospects, stemming from the expanded opportunity.

From IBM industrial EAM customers alone, the market size is likely to be valued at US$4bn (Figure 10 on page 17). We believe that capturing even a small share of the market will be material for REM. This can be game-changing for REM given Maximo's usage by the largest companies across industries.

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Figure 10: Estimated Total Market Size – IBM Maximo users



Source: Company, Pitt Street Research

Initial integration of virtualplant into IBM's Maximo software was achieved in October 2022. Currently, a structured approach is being employed, with signing of agreements, building of marketing stories, and sales enablement through a global network. REM is also working with IBM for the launch of its joint corrosion inspection based on the high-resolution curated image dataset of virtualplant and IBM's extensive experience in visual analytics. The data analytics capability is likely to offer efficiency enhancements for asset management activities, in turn enabling the localisation of plant assets from IBM's EAM package into REM's visually accurate virtualplant environment at a rapid pace. IBM has invested resources for the integration and validation of virtualplant to accelerate go-to-market opportunities.

Other partnerships

I. Foundation relationships with Woodside and Chevron

REM's relationship with its flagship customer Woodside Energy has played a key role in unlocking other potential clients.

Woodside Energy became the flagship early customer for REM mainly because of Steve Brown's initial involvement in the oil and gas industry. The company's relationship with Woodside has been instrumental in unlocking other potential clients, beginning with the American energy major Chevron.

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Chevron followed Woodside's lead in 2021 and is turning into an important early customer.

The important timelines for Chevron have been summarised below:

a) By early 2022, Chevron had virtualplant scanning at its Wheatstone gas-processing platform. REM also completed the first Chevron site with integrated scans of virtualplant into Kongsberg's Kognitwin Energy platform and submission of proposals for further sites.

b) In October 2022, REM announced that a second virtualplant scan would be conducted on Train 2 of Chevron's Gorgon LNG plant.

c) In March 2023, RemSense received a contract from AGC Industries, a provider of fabrication, construction, and maintenance services, for virtualplant scanning of additional Chevron LNG facilities through 2023 and 2024. The total contract value of this arrangement is around $2m.

II. Commercial partnership agreement with Matterport

The first commercial partnership agreement between REM and Matterport is likely to help the former gain access to the latter's international market and enterprise

REM signed its first commercial partnership agreement with Matterport, a US based visualisation company (Figure 11). This agreement makes REM Matterport's global licensed partner. Matterport is likely to provide REM and virtualplant recognition in the virtual 3D space. As a global licensed partner, REM has access to Matterport's international market, enhanced enterprise grade access and enhanced technical features and support. REM's solution has been promoted as a leading industrial solution on Matterport's sales channel.

III. Relationship with SAP

REM signed an agreement with SAP for development and certification as part of their ecosystem. SAP is another important provider of EAM software. REM is focussed on integrations that help SAP and their clients to use virtualplant as a navigation tool for SAP enterprise resource planning (ERP) and EAM systems. The SAP agreement is further likely to enable REM to gain certification for integration with SAP for validation of the visualisation user interface.

IV. Certified by AWS

REM is likely to gain access to the microservices, support and Global Marketplace sales channel of AWS ensuring full compatibility with the Matterport development architecture

Signing the AWS agreement enabled access to AWS microservices, support and their Global Marketplace sales channel, thereby ensuring full compatibility with the Matterport development architecture. REM also finalised the comprehensive software plan for virtualplant, under which it released the v1.5 version of virtualplant. The release of the v1.5 virtualplant was the first AWS enterprise release, along with considerable progress of the v2.0 version.

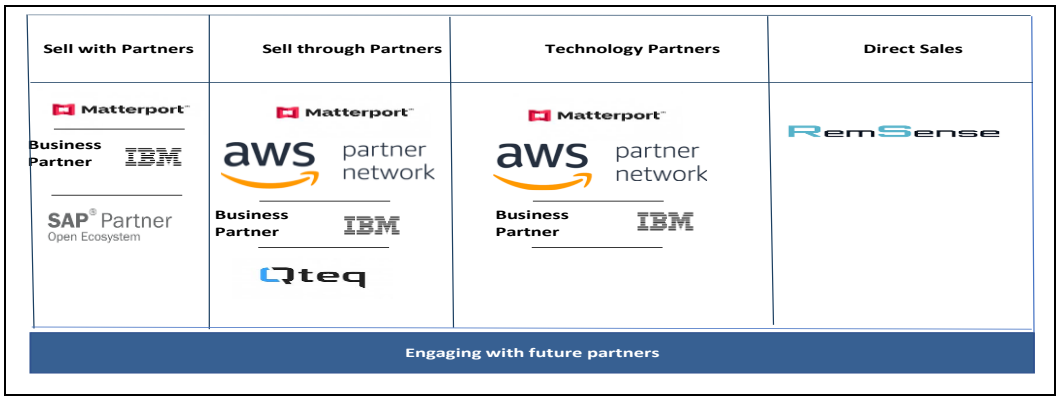
V. Recent contract awards by Fluid in Motion:

In December 2022, REM received a contract award from Fluid in Motion on behalf of Woodside to provide software solution by creation of a photogrammic digital twin of the Floating Production Storage and Offloading Vessel (FPSO). This marks the first time REM has delivered virtualplant on this asset type. The asset includes the oil processing and offtake facility as well as the marine vessel. The

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contract award marks another significant milestone for REM, as it is the first virtualplant application on a seagoing vessel. This validates flexibility of the product for usage in commercial shipping and marine operations market sectors. The contract is valued at A$206,000 and includes capturing of operational data and a SaaS agreement for an initial one-year contract. The work is scheduled to be completed by January 2023.

Figure 11: REM is establishing partner channels and sales networks



Source: Company, Pitt Street Research

Comparable companies

The industrial metaverse and generative AI sectors are fairly concentrated but there is a lack of pure-play players. We have considered 3D visualisation model companies, the metaverse and generative AI companies. Hence, for the companies comparable to REM (as outlined in Figure 12), we have used the following criteria:

1) Public companies operating in developed markets globally.
2) Companies with Market capitalisation of less than US$700m
3) Entities focussing on 3D visualisation models, the metaverse and generative AI

Figure 12: Comparable companies^

Public Company	Location	Ticker	Market cap (US$m)	Website
Aerometrex Ltd	Australia	ASX:AMX	39.0	www.aerometrex.com.au
Vection Technologies	Australia	ASX:VR1	53.0	www.vection-technologies.com
Playside Studios	Australia	ASX:PLY	171.0	www.playsidestudios.com
Appen Ltd	Australia	ASX:APX	395.0	www.appen.com
Straker	New Zealand	ASX:STG	47.0	
RemSense Technologies	Australia	ASX:REM	5.8	www.remsense.com.au

Notes: As of 31 May, 2023

Source: Refinitiv, Pitt Street Research

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Aerometrex Limited (ASX:AMX) is a geospatial technology company that engages in aerial mapping business in Australia and the US. The company offers an aerial LiDAR surveying service that maps the ground surface using airborne lasers and aerial imagery subscription services. It also provides 3D solutions, which include 3-D modelling and mapping system derived from oblique aerial photographs, and MetroMap - an online imagery web-serving application. Aerometrex Limited was founded in 1980 and is headquartered in Adelaide, Australia.

Vection Technologies (ASX:VR1) is an enterprise-focussed company that helps businesses in bridging the physical and digital worlds in Australia. The company operates in two segments, IT Development and Outsourced Services. It offers Mindesk, a virtual reality design review and real-time rendering in the unreal engine, for CAD and BIM; EnWorks, a solution to support training, manufacturing, and maintenance processes that enhance the work with augmented reality-powered visual assistance; 3DFrame, a no-code enterprise the metaverse application for immersive product presentations; configuration that manages product variations for ecommerce, from web to mobile devices; and XRKiosk, which transforms the in-store customer experience with 3D and augmented reality. Vection Technologies Limited was incorporated in 2016 and is based in Perth, Australia.

Playside Studios (PLY.AX) develops mobile, PC, and console video games in Australia. It provides titles in a range of categories, including self-published games based on original intellectual property and games developed in collaboration with studios. The company's portfolio includes 60 titles that are delivered across 4 platforms, which consist of mobile, VR, AR, and PCs. Playside Studios Limited was incorporated in 2011 and is headquartered in Melbourne, Australia.

Appen Ltd (ASX:APX) together with its subsidiaries, operates as an AI lifecycle company that provides data sourcing, data annotation, and model evaluation solutions. It operates through two segments, Global Services and New Markets. The company offers data sourcing services and mobile location services; pre-labelled datasets of audio, image, video, and text; and language-based AI solutions. It also provides data preparation services comprising machine learning assisted data annotation tools; enterprise-ready data annotation platform and knowledge graph and ontology support services. Appen Limited was founded in 1996 and is headquartered in Sydney, Australia.

Straker (ASX:STG) together with its subsidiaries, engages in the provision of translation services in Asia Pacific, Europe, the Middle East, Africa and North America. The company operates AI-POWERED RAY, a suite of customizable AI and automation translation tools that create a first draft translation and matching the customer's content with one or more of the approximately 10,000 crowd-sourced human translators for refinement. Furthermore, it offers onsite, online, conference, consecutive, simultaneous, court, telephone, sight, and medical interpreting services. Straker Translations Limited was incorporated in 1999 and is headquartered in Auckland, New Zealand.

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Valuation – REM has significant upside potential

To derive REM's long-term value, we have employed a weighted average valuation methodology calculating a peer-group-based relative valuation and DCF calculation, using both equally to derive our ultimate valuation.

Relative valuation

It is imperative to note that sophisticated investors looking for attractive return options across new-age technology companies often pit REM against VR, AR, industrial the metaverse and generative AI players. Consequently, to gauge the performance of REM adequately, we have included companies from diversified genres (Figure 13), i.e. aerial mapping, enterprise the metaverse application, VR-based gaming, AI-based data modelling and AI & automation tool providers.

Figure 13: Peer group valuation^

Company Name	Ticker	Last reported fiscal	M-Cap	EV	EV / Sales				
			(A$ m)	(A$ m)	2022F	LTM	2023F	2024F	2025F
Aerometrex Ltd	AMX.X	Jun-22	39.0	30.0	1.2x	1.3x	1.3x	1.0x	0.8x
Vection Technologies	VR1.AX	Jun-22	53.0	43.0		2.4x	1.7x	1.7x	
Playside Studios	PLY.AX	Jun-22	171.0	143.0	4.9x	3.9x	4.0x	3.3x	2.8x
Appen Ltd	APX.AX	Dec-22	395.0	375.0	0.7x	0.6x	0.7x	0.6x	0.6x
Straker	STG.AX	Mar-22	47.0	38.0	0.7x	0.6x	0.7x	0.6x	0.5x
Peer Average			**141.0**	**125.8**	**1.9x**	**1.8x**	**1.7x**	**1.4x**	**1.2x**
Peer Median			**53.0**	**43.0**	**1.0x**	**1.3x**	**1.3x**	**1.0x**	**0.7x**

Notes: ^As of May 31, 2023

Source: Refinitiv, Pitt Street Research

Given that the entire IT space is substantially saturated, we have restricted our peer list to only ASX-listed players. While all the companies in our peer list are significantly larger in size than REM, most of them cater to only one or two industries. The majority of these companies lack solutions for diversified industry groups, like REM. Consequently, we have applied a slight premium to the industry average FY2024 EV/Sales of 1.4x and have arrived at a valuation of A$0.13 per share in our base case scenario, and A$0.18 per share in our optimistic case (Figure 14).

Figure 14: Peer group valuation

REM (A$ m)	Base Case	Bull Case
Sector average	1.4x	1.4x
Discount/ Premium	20.0%	30.0%
Sales 2024F	7.96	10.49
Implied EV	**13.63**	**19.47**
Net (debt) cash	2.13	2.13
Minority interest	-	-
Other Investment / liabilities	(0.03)	(0.03)
Equity/Book value	**15.73**	**21.57**
Diluted Shares	119.13	119.13
Implied price (A$ cents)	**13.21**	**18.11**
Current price (A$ cents)	5.60	5.60
Upside (%)	*135.8%*	*223.4%*

Estimates: Pitt Street Research

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DCF

Our DCF modelling also suggests REM is undervalued (Figures 15-16 on page 23). Our assumptions are as follows:

- **Revenue model**: Our revenue for REM is calculated across the three revenue streams: SaaS (virtual plant), scanning fees and value-added service fees. We have started by assuming ~A$96k revenue from each virtualplant, inflating modestly each year in line with inflation. We have also assumed ~A$50k fees for one-time set-up costs for these plants. Considering a client conversion cycle of 15-18 months, we have assumed REM to have an average of ~125 yearly active client users in the next 5-7 years (base case). Furthermore, we have assumed that the individual asset base of REM to also expand accordingly. We think these are conservative figures given the advantages and utility of virtualplant and the market size we noted above.
- **Costs**: We have calculated cost of sales as a percentage of revenue – fixed at 50% across the life of our model. All other costs rise ~15% per annum across the life of our model, including personnel, marketing, administration and R&D costs.
- **WACC and risk premium**: We have used a 17% WACC for REM (reflecting a 17.2% cost of equity and a 7% post-tax cost of debt). The cost of debt is derived using 10% pre-tax cost of debt and a 30% tax rate, although the weight if debt is only 1.9% so this has an immaterial impact in our final valuation. The cost of equity reflects a 3.7% risk free rate of return, a 9% risk premium and a 1.5x beta.

  Due to the timing uncertainty related to the conversion of projects pipeline, we acknowledge the company's revenue cycles may be long and unpredictable, which can cause cashflow volatility over the short to medium term. As a consequence, we believe the higher equity risk premium is justified given the earnings risks including potential delays in the implementation of customer contracts as well as a risk that the new business strategy does not perform to expectations. As REM secures more contract wins and continues to deliver growth in recurring revenues, future models may come with a reduced discount rate accordingly. See Figure 16 for a WAAC sensitivity table for our base case.
- **Horizon**: We have applied this discount rate to our free cash flow projections through a 10-year period.
- **Corporate Tax**: We assume a corporate tax rate of 30%. As REM has a significant amount of tax losses to carry forward, our base case modelling expects the company to pay its first cash tax in FY26.

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Higher risk premium is justified given the volatility in contract completion, new client wins and risk associated with the implementation of new business strategy

Figure 15: DCF Calculation

REM (A$ m)	Base Case	Bull Case
Present Value of FCF	22.10	31.09
Present Value of Terminal FCF	15.61	16.42
Enterprise Value	**37.71**	**47.50**
Net (debt) cash	2.13	2.13
Minority Interest	-	-
Other Investments / liabilities	(0.03)	(0.03)
Equity value	**39.81**	**49.60**
Diluted Shares (m)	119.13	119.13
Implied price (A$ cents)	**33.42**	**41.64**
Current price (A$ cents)	5.6	5.6
Upside (%)	496.8%	643.5%

Estimates: Pitt Street Research

Figure 16: WAAC sensitivity analysis (base case)

Sensitivity Analysis						
WAAC	**17%**					
Terminal Growth Rate	**2%**	**Change in WAAC**				
Implied Price (A$ cents)	**33.4**	13%	15%	17%	19%	21%
	1.0%	52.0	40.6	32.5	26.5	21.9
	1.5%	53.2	41.3	33.0	28.5	22.1
	2.0%	54.5	42.1	**33.4**	27.1	22.3
	2.5%	55.9	43.0	34.0	27.4	22.5
	3.0%	57.5	43.9	34.5	27.8	22.8

Estimates: Pitt Street Research

Fair value of A$0.23-0.30 per share

The investor community is eagerly waiting for the management to deliver on the growth promise that they have been communicating, especially after the sudden change in strategy to rebuild virtualplant in AWS and integrate with current EAM systems. We have full confidence in the management's execution capabilities.

Our base case value of A$0.23 per share has been derived using a weighted average valuation methodology, which assigns equal weight to our relative valuation and our DCF calculation (Figure 17 on page 24). Our bull case calculation results in a valuation of A$0.30 per share. Both scenarios imply substantial upside from the current share price.

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Figure 17: Weighted average valuation for REM

Base Case	Weights (%)	Share Price (A$ cents)
DCF	50.0%	33.4
Relative valuation	50.0%	13.2
Composite Value		**23.3**
Current Price		5.6
Upside/ Downside (%)		**316.3%**

Bull Case	Weights (%)	Share price (A$ cents)
DCF	50.0%	41.7
Relative valuation	50.0%	18.1
Composite Value		**29.9**
Current Price		5.6
Upside/ Downside (%)		**433.5%**

Estimates: Pitt Street Research

Differences between our base and bull cases

There are two key differences between our base and bull cases.

- **Market Share**: We assume a slightly different growth trajectory across our valuation scenarios. Within our base case scenario, the yearly market penetration of REM varies between 0-2.5% of Maximo's client base reaching an average of 126 user client in next 5-7 years, whereas for our bull case this jumps to 175. By FY30, our base case has 300 active users and our bull case have 375 users. We have also assumed the individual asset coverage for REM to be restricted to 0.4% of global base in our base case (average of 34 assets), and 0.5% in bull case (average of 40 assets).
- **Operating Profitability**: While REM is assumed to achieve EBITDA break-even in FY26 across both the scenarios, we have assumed differentiated cost structure within them. In our base case, we have assumed an average EBITDA margin of 10.3%, while it is 11.3% in bull case.

Shares on issue

Everyone will observe that we have assumed a higher number of shares on issue than is actually the case. Post the due equity dilution, the company will have 93.8m shares on issue, but it also has 25.4m options on the table, and we have assumed these all are exercised. This will deliver additional cash flow during FY23.

Catalysts for REM's re-rating

REM's stock is currently trading below our base case valuation. We see the following factors supporting re-rating of REM into our valuation range:

- Technically swift deployment of the virtualplant platform into the partner EAM environments;
- Increased bundling of digital visualisation and analytic services to related industry players through partner EAM environments;
- New contract wins for virtualplant;
- Improved traction outside the home country of Australia and base industry of oil & gas;
- An increase in SAP's involvement with virtualplant;
- The first cash-positive quarter for RemSense, potentially achievable by mid-2024.

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Risks

We see the following risks to our investment thesis:

- **Execution risk**: REM is transitioning into a value-added product provider within partner EAM environments. Instead of an independent operator it is becoming a part of other's legacy. There is a risk associated in finding a place for itself within someone else's environment. Management has been facing challenges in explaining the true potential of this strategic change to investors Any delay in the strategic success of this new commercial initiative will further impact investor's confidence.
- **Technological risk**: REM's operational success will depend on how successful it is in integrating the full technical bouquet of virtualplant's capabilities into partner EAM environments. Any technological complication in the integration will be detrimental to REM's growth prospects.
- **Capital risk**: Considering that a lot of companies in the new-age tech space are chasing private capital, there exists a risk of higher cost of capital for REM. With inflationary pressure continuing across the globe, a higher cost of capital will reduce the fundamental return for REM's investors.
- **Reputational:** The performance of virtualplant is critical to its reputation and ability to achieve market acceptance. Any product or personnel failure could have an adverse effect on the company's reputation, especially since the company has had an unblemished record since the commencement of sales.
- **Key personnel risk:** There is the risk that the company could lose key individuals and be unable to replace them and/or their contribution to the business.

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Appendix I: REM's leadership

REM has an experienced board and management team (Figure 18) with diverse experience across a wide range of industries, including oil and gas, engineering, maintenance, business contracting, and finance.

Figure 18: REM's management and board members

	Name and Designation	Profile
	Steve Brown **Managing Director and CEO**	• Steve Brown was the founder of REM in 2012. • Steve has held various roles in European Company DOF Subsea from 2005 to 2013. One of the key roles being held included that of the Group CEO responsible for the global business in Europe. • He was also the Executive Vice President responsible for Australia and Asia, with directorships in group companies in Australia, Singapore, Indonesia, Malaysia and Brunei.
	**Chris Sutherland** Non-Executive Chairman	• Mr Sutherland has significant executive leadership expertise spanning over 20 years encompassing a wide array of sectors in Australia, including oil and gas, resources, infrastructure, and manufacturing. • Most notably, he was the Managing Director and Chief Executive Officer of Programmed Maintenance Services from January 2008 to September 2019.
	**Ross Taylor** Non-Executive Director	• Mr Taylor is a Chartered Accountant and an investment banking consultant with a thorough knowledge of international finance markets gained while working in Australia, London, New York and Tokyo. • Ross has extensive experience in the global investment banking sector and has held senior positions in Deutsche Bank, Bankers Trust and Barclays Capital.
	**Sue Murphy** Non-Executive Director	• Sue is a prominent engineer and company director with over 40 years of experience in resources and infrastructure. She led the Water Corporation as chief executive for a decade. Before that, she had a 25-year career with the Clough Group. • Recognised as one of the top engineers in Australia, in 2019 she was appointed an Officer of the Order of Australia for her distinguished service to the natural resources sector and engineering.

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	Jillian Rosich **Chief Financial Officer**	• Jillian is a qualified accounting and finance specialist, experienced in group accounting functions, financial forecasting and business consulting • She has previously held roles in corporate finance and investment banking - locally and in the UK. • Jillian has a Bachelor of Science degree in mathematics and post graduate qualifications in Applied Finance and Professional Accounting
	Adrian Hollis **General Manager Operations**	• Adrian, a qualified powerline worker with a deep understanding of construction, maintenance, inspection principles and techniques with experience throughout Australia. • Working within the RPAS industry since 2015, Adrian has a firm understanding of what can be achieved from both aerial and terrestrial based data capture services.
	**Rory O'Connor** Project and Engineering Manager - Virtualplant	• Rory has been involved in the development and implementation of multiple engineering solutions within REM and is currently leading the execution delivery of large-scale digital twin solutions through REM's Virtualplant product. • He brings a wealth of knowledge - from photogrammetry and geographic information systems to engineering system design and technology integration across a variety of industries.

Source: Company

Appendix II – Capital Structure

Class	In millions	% of fully diluted
Quoted Securities		
Ordinary shares on issue	93.8	78.7%
Options and performance rights	25.4	21.3%
Fully diluted shares	**119.1**	

Source: Pitt Street Research

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Appendix III – Analyst certification

Stuart Roberts, lead analyst on this report, has been an equities analyst since 2002.

- Stuart obtained a Master of Applied Finance and Investment from the Securities Institute of Australia in 2002. Previously, from the Securities Institute of Australia, he obtained a Certificate of Financial Markets (1994) and a Graduate Diploma in Finance and Investment (1999).
- Stuart joined Southern Cross Equities as an equities analyst in April 2001. From February 2002 to July 2013, his research speciality at Southern Cross Equities and its acquirer, Bell Potter Securities, was Healthcare and Biotechnology. During this time, he covered a variety of established healthcare companies, such as CSL, Cochlear and Resmed, as well as numerous emerging companies. Stuart was a Healthcare and Biotechnology analyst at Baillieu Holst from October 2013 to January 2015.
- After 15 months over 2015–2016 doing Investor Relations for two ASX-listed cancer drug developers, Stuart founded NDF Research in May 2016 to provide issuer-sponsored equity research on ASX-listed Life Sciences companies.
- In July 2016, with Marc Kennis, Stuart co-founded Pitt Street Research Pty Ltd, which provides issuer-sponsored research on ASX-listed companies across the entire market, including Life Sciences companies.
- Since 2018, Stuart has led Pitt Street Research's Resources Sector franchise, spearheading research on both mining and energy companies.

Nick Sundich is an equities research analyst at Pitt Street Research.

- Nick obtained a Bachelor of Commerce/Bachelor of Arts from the University of Sydney in 2018. He has also completed the CFA Investment Foundations program.
- He joined Pitt Street Research in January 2022. Previously he worked for over three years as a financial journalist at Stockhead.
- While at university, he worked for a handful of corporate advisory firms.

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