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Uninterruptable power

Maintaining continuous critical power - a data centre imperative

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Modernising data centre infrastructure

Digital innovation is set to deliver \$315 billion in gross economic value to Australia in the next decade, according to a new report commissioned by CSIRO's Data61. "Every sector of the global economy has been re-defined as a result of digital science and technology and the extensive use of data."²

Twenty-eight per cent of spending within key enterprise IT markets will also shift to the cloud by 2022, up from 19 per cent in 2018, according to September 2018 figures released by Gartner, Inc. They also reveal that despite this growth, traditional offerings will still constitute 72 per cent of the addressable revenue for enterprise IT markets in 2022 – recommending technology providers assess growth rates and addressable market size opportunities in each of the four cloud shift categories: system infrastructure, infrastructure software, application software and business process outsourcing.³

Meanwhile, the Australian Government spends about \$170 million annually on electricity for its data centres generating around 300,000 tonnes of carbon annually. With environmental sustainability matters increasing in importance, modern data centre technology can reduce this carbon footprint by around 13 per cent or 40,000 tonnes per annum. Further reductions are possible by using data centres in the many locations in Australia that can exploit the free cooling available when the air temperature is below 16° Celsius.⁴

If you're trusted to protect the information businesses and their customers rely on, safeguard online transactions and store critical content for easy access; then it's your job to maintain networks and systems so they can seamlessly manage the data that keeps our world moving. And for a world that never stops, you need to maintain uptime too.

EPSA is proud to be part of the global Cat[®] team making service and support accessible to you, anywhere in the world. Your customers rely on you to keep them oerational and secure – you can rely on us to give you the most reliable power to ensure that happens.

wave to revolutionise existing industries and create entirely new ones is ours to capture. But the opportunity is perishable if we don't collectively take action now."

"This next digital

ADRIAN TURNER, CEO, CSIRO DATA611

1. J Talevski, Digital innovation expected to deliver \$315B to Aussie economy, ARN, 18 September 2018, accessed 22 February 2019, https://www.arnnet.com.au/article/646869/ 2. Talevski, ibid. 3. PR Wire, Gartner Says 28 Percent of Spending in Key IT Segments Will Shift to the Cloud by 2022, 18 September, 2018, accessed 22 February 2019. https://prwire.com.au/pr/79436/gartner-says-28-per cent-of-spending-in-key-it-segments-will-shift-to-the-cloud-by-2022 4. Australian Government, Department of Finance and Deregulation Australian Government Data Centre Strategy 2010 - 2025, March 2010, accessed 22 February 2019, https://www.finance.gov.au/ files/2012/04/AGDC_Strategy.pdf 5.ComputerWorld, Australia's data centre industry guide, IDG Communications, 2009, accessed 22 February 2019, https://www.computerworld.com.au/digital_edition/372291923/pd



A commercial and environmental imperative

You're trusted to protect the information businesses rely upon Australia has some of the oldest capital intensive data centres in the Asia Pacific region meaning finding a source of reliable continuous and uninterruptible power supply is crucial.⁵

Discover Cat[®] generators exclusively designed for data centres Applications such as continuous, standby, and temporary power, prime and mission critical power integrated with Cat[®] automatic transfer switches and switchgear, are tailored to fit your needs by Energy Power Systems Australia (EPSA) who are experts in customisation. These generators are some of the most efficient in the industry and meet current emission standards.

Chris Murray, Managing Director

Big data is big business

From automation to chatbots, Artificial Intelligence (AI) is changing the face of business - and along with cognitive system investment, is predicted to reach AUD\$6.35 billion by 2021 - and set to revolutionise all industries.

The International Data Corporation predict worldwide revenues for big data and business analytics to reach more than \$203 billion by 2020 from \$103.1 billion in 2016 while some forecasts predict global IoT connected devices to reach 31 billion. This exponential growth makes data centres one of the greatest sole users of energy. And as the world's digital economy evolves, along with investment in big data analytics hardware, software, services, artificial intelligence, and in data scientists and their education; so too does the need for reliable, secure, critical, conditioned power.

Australia's energy crisis

Top 5 risks for doing business in Australia over the next decade

62.3% Energy price shock 41.6% Assets bubble **39%** Cyberattacks **32.5%** Unemployment or underemployment 26% Failure of critical infrastructure/ failure of climate change mitigation and adaption

The energy guzzlers

Australia's 100-plus data centres account for almost four per cent of Australia's total energy consumption.¹

Local demand for third-party data centre services is growing. The Australian market recorded annual growth of 16.8 per cent during the past five years - largely fuelled by the rapid shift to cloud computing² but also by the world of digital innovation driven by new technologies as businesses seek a competitive edge and to streamline efficiencies. The data centre market includes telehousing facilities, co-location facilities, cloud and IT services, content hosting, connectivity and interconnection. Sydney-based data centres currently offer the primary location for hubbing traffic for content and cloud providers and content delivery networks in Australia with Melbourne emerging as a second key Australian data centre hub. With the Australian home IoT market growing by over 50 per cent in 2017-2018³, providing reliable, secure, critical, conditioned power becomes even more crucial.

The average energy efficiency of new Australian data centres certified under the National Australian Built Environment Rating System (NABERS) is 4.1 stars.⁴

1. C Latimer, Data centre power use greater than Woolworths, Coles combined, The Sydney Morning Herald, September
 23, 2018, accessed 22 February 2019, <u>https://www.smh.com.au/business/the-economy/data-centre-power-use-greater-than-woolworths-coles-combined-20180922-p505df.html</u>
 2. According to IBISWorld research cited in Next DC,
 Power Play: Inside The Data Centres Fuelling Our Digital Economy, accessed 22 February 2019, <u>https://www.nextdc.
 com/storage/app/media/Whitepapers/160617_NEXTDC_Innovation_Final.pdf</u>
 3. BusinessWire, Data Centres and
 Internet of Things (IoT) in Australia, 2018 - Australia's Data Centre Market Attracting Significant New Overseas Entrants
 - ResearchAndMarkets.com, 24 September 2018, accessed 22 February 2019, <u>https://www.businesswire.com/news/
home/20180924005475/en/Data-Centres-Internet-Things-IoT-Australia-2018</u>
 4. D Bushell-Embling, Energy efficiency of
 Aussie data centres stagnates, Technology Decisions, 4 October 2018, accessed 22 February 2019, <u>https://www.technolog
 gydecisions.com.au/content/data-centres/news/energy-efficiency-of-aussie-data-centres-stagnates-1206922220
 </u>

Australia's obsessions with social media and search engines, alongside a cloud computing drive from corporations, is powering the growth in energy intensive data centres, which now use as much energy as regional cities... This data is held in massive data centres, which are swiftly becoming the fastest-growing consumers of power in the country, and are expected to boom as demand grows for processing power for cryptocurrencies such as Bitcoin, and because every single Facebook post, tweet, and Instagram picture needs to be powered by something.

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COLE LATIMER, THE SYDNEY MORNING HERALD, 23 SEPTEMBER 2018

C Latimer, ibid



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Global data creation



Big Cat[®]s powering big data

SPOTLIGHT Perth

In 2013, leading data centre operator Metronode In 2014, EPSA's market-leading Cat[®] solutions sought a supplier for a new generation data centre for critical data facilities, which house computer, in Perth that could deliver an efficient, ecological telecommunications and storage systems for and seamless continuous power solution. businesses supported a leading global e-commerce and technology business building two new data centres - its first in Australia.

This new generation data centre was based on a modular build configuration, which significantly reduced the build time by more than 60 per cent compared to a traditional, non-modular build. It was complemented by a modular supporting including a UPS, generator and switchgear within an ISO shipping container for conditioned continuous power.

Retrofitting can be quite expensive and adds weeks to a construction schedule, but EPSA's customised solution ensured reduction in time of travel and installation costs, with minimal disruption due to outages. The solution also delivered significant cost efficiencies, with lower upfront costs, a lower cost of ownership and a high energy efficiency rating, which was integral to the brief.

The three bespoke solutions built for Metronode's Perth data centre facility were the first of their kind in Australia – each a 40-foot ISO shipping container with a 12-hour base fuel system, diesel generator and integrated Flywheel UPS technology meeting Metronode's low noise requirement with a guiet 65 dB(A) at seven metres noise requirement.

Due to the timeframe and specific customer requirements, each module was constructed and rigorously tested in Sydney and then shipped to Perth as a complete unit. The speed to market was just 16 weeks. The guiding principle of this bespoke design was one of scalability where additional modules can be added as required. Working in collaboration with Cat® enabled the design, development and build to occur within EPSA's factory at Ingleburn in Sydney, meeting stringent technical requirements to achieve Metronode's requirements of Uptime Tier III performance.1

1. Energy Power Systems Australia, Power Profile: Metronode, 2013, accessed 4 March 2019, https://www.energypower.com.au/case-studies/electric-power-projects/metronode.aspx 2. Energy Power Systems Australia, EPSA wins new business in booming e-commerce industry, Engine Room, Summer 2014/2015, accessed 28 February 2019, https://www.energypower.com.au/theme/energypowercomau/assets/public/File/Engine%20Room%20Flipbooks/Summer%2015/index.html

SPOTLIGHT Melbourne

EPSA worked with the client and its consultants over a nine-month period to design and provide the best technical power solution for its new Australian sites.

With the client a global Cat[®] customer, EPSA worked closely with Caterpillar® representatives to ensure alignment and consistency with other projects occurring around the globe. Cat® also assisted with the provision of build slots on short notice, helped by a global forecast for builds from the client.

The scope of work included the supply and installation of multiple Cat[®] 3516BHD generator sets, and the design, supply and installation of bulk fuel systems, generator switch boards, air handling, noise attenuation and exhaust systems. EPSA also commissioned the complete system.²

SPOTLIGHT Shanghai

The Shanghai Tencent Cloud Data Centre (TCDC) is one of the most advanced service platforms for cloud computing and cloud storage infrastructures in the Asia-Pacific region for third-party.enterprises, domestic internet users, andn e-commerce services for the local government.

The Shanghai TCDC natural gas distributed generation project has an installed capacity of 10 MW. Two Cat® G3520H gas engine generator sets with a full load rating of 2,500 kW serves their need for high reliability, efficiency, and low cost of operation and maintenance. The combined cooling, heating and power (CCHP) system is able to meet all power and cooling needs.

The gas gensets are parallel to the municipal grid, connected with no injection mode. They provide partial power to the data centre, while the thermal energy from the high-temperature exhaust gas and hot jacket water is recovered in the absorption chiller to produce 7°C cooling water to meet the data centre's cooling load demand. Additionally, the system is equipped with cold storage tanks used to improve cooling system reliability for peak shaving.

TCDC is one of the first to use natural gas power CCHP systems for its power and cooling needs. The advanced natural gas-based system provides a clean, efficient, and cost-effective solution for demanding data centre requirements. When compared to conventional coal-fired power plants of the same capacity, 3,470 tons of conventional coal burning is saved, with 48 per cent reduction in CO2 emissions and also the reduction of 466 tons of SO2 and a 60.8 per cent reduction in NOx emissions.³

SPOTLIGHT Nebraska

Scott Data Centre in Omaha, Nebraska provides primary storage space, disaster recovery and a backup location for more than 50 companies worldwide including multiple Fortune 500 corporations.

When it expanded with an additional 30,000-square-foot power plant, facility managers worked with local Cat[®] dealer, NMC Power Systems to install four new Cat[®] 3516 diesel gensets to increase to 20 MW of power controlled by a customised, completely automated switchgear system. Designed with an N+1 configuration, which means the failure of any one unit will not impact the facility.

"Caterpillar[®] custom-designed everything for us," said Scott Pollard, Vice President of Operations.

"Since its installation in 2012, we have had zero problems—it has worked flawlessly."

The facility is certified by the Uptime Institute as a level Tier 3 data centre, meaning it can run constantly without downtime for maintenance or system upgrades. The long-term reliability of Cat[®] equipment and excellent service has resulted in a lasting partnership. Future expansion plans call for the addition of four more Cat[®] 3516 generator sets."⁴

SPOTLIGHT New York City

Intergate.Manhattan, the tallest high-rise data centre in the world was purchased by the Sabey Corporation, a multi-tenant data centre developer in 2011.

Sabey oversees critical data management for customers Located in central Moscow, physical space and natural gas requiring a protected environment including financial lines were limited, leading DataSpace to seek with a compact institutions, internet sites and a biomedical engineering group. footprint that runs on diesel fuel. Together with Cat® dealer Zeppelin Power Systems Russland, DataSpace designed an Intergate.Manhattan is supported by four Cat® C175 diesel infrastructure featuring six Cat® 3516B diesel generator sets, generator sets that provide emergency power systems for each capable of delivering 2 MVA of backup power, and each critical operations, delivering up to 4 MW of power. Equipped dedicated to a particular module. The unique backup power with a four-stroke-cycle diesel engine, the C175 is designed system configuration provides flexibility for technicians to shut for reliable uptime and works with an integrated control down and service any generator set with no disruption of system for improved performance.⁵ power supply to critical systems and loads.



SPOTLIGHT Moscow

DataSpace pioneered the Russian data centre arena with reliable space, equipment and bandwidth for leading Russian and multinational financial institutions and telecoms.

Providing critical backup power since commissioning in 2012, each genset meets ISO 8528-5 transient response requirements and accepts 100 per cent rated load in one step. Featuring an EMCP 4.2 control panel, the gensets also offer expanded engine and generator protection and monitoring.⁶



Delivering continuous and reliable critical power

Never be without power

Tried, tested and proven in data centres that cannot afford to be without power for even a split second, Cat[®] systems are relied upon to ensure continuous power is maintained when grid connections fail. Critical power operations, such as data centres, hospitals and manufacturing operations, all rely on Cat[®] mission critical diesel generators to maintain maximum uptime.

Standard genset package - energy module

From 1.300 to 2.504 ekW, experience lower total cost of ownership, higher fuel efficiency, less onsite works, and the Cat[®] support network in one affordable standardised packaged genset solution. Ideal for Australian conditions, this modular design is scaleable to your growing power needs and features a robust enclosure with remote monitoring available. It also seamlessly integrates with any hybrid microgrid system.

Pre-packaged, pre-fabricated and pre-tested, EPSA delivers a Cat[®] standardised genset package that reduces overall leadtime while minimising costs.

The solution is EPSA and Cat[®]

Energy Power Systems Australia (EPSA) is the exclusive Australia distributor of Cat[®] products and committed to providing optimum value to the data centre industry by leveraging the combined global engineering, manufacturing, distribution, and financial expertise of Cat[®] and the Cat[®] Dealer Network.

Unrivalled Cat[®] data centres that grow with your power needs

EPSA's new generation Cat[®] data centres are based on a modular build configuration that significantly reduces the build time by more than 60 per cent compared to a traditional build. It is compensated with a modular supporting power plant using EPSA's Energy Modules – standardised genset packages that include a generator and switchgear in an ISO shipping container. Energy Modules are pre-fabricated, pre-packaged and pre-tested, ready for fast deployment and less onsite works. The modular and scaleable design expands with your critical power needs. The Energy Modules seamlessly integrate with hybrid microgrid systems.

World-class full Cat[®] service and support

You're trusted to protect the information that businesses rely on, safeguard online transactions, store critical content for easy access and maintain networks and systems so they seamlessly manage the data that keeps our world moving. For a world that never stops, you need to maintain uptime that doesn't stop either. EPSA is your single-source supplier of integrated generators, switchgear products, and local service support for your emergency/standby system from highly skilled technicians.



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Unmatched experience in critical power and uninterruptible power

Maintaining continuous critical power is an imperative for EPSA because it is crucial for datacentres. Unrivalled experience in Australia, and extensive solution options, make EPSA the ideal partner. EPSA's full service capability includes feasibility studies, detailed design, project management, installation, commissioning, ongoing operation and maintenance, and remote monitoring connected assets. System life extension services are also available including:

- » Front End Engineering and Design (FEED)
- » Customer Support Agreement (CSA)
- » Cat[®] Extended Service Coverage (ESC Policy)
- » Site specific replacement parts
- » Switchgear upgrades and retrofits
- » Training services
- » Site operation simulator
- » Remote monitoring

The commercial and technical teams at EPSA have been very supportive and accommodating to develop, build and deliver a quality product both on time and within our allocated budget.

DATA FACILITIES MANAGER. METRONODE NEATEN GROUP HOLDINGS

Front-end engineering design

Delivering bespoke design work for your site and your application

EPSA has the in-house capabilities to perform a range of engineering tasks from front-end engineering design (FEED) through to detailed design, ensuring that reliable power products integrate seamlessly with the balance of plant.

Using information prepared during the client feasibility study and conceptual design, EPSA acts on behalf of the customer to conduct further investigations based on technical

requirements. This information provides a basis for detailed engineering, procurement, construction and management by EPSA's in-house engineering consultants.

EPSA also has the expertise to provide high quality specification documents to utilise in request-for-tender scenarios. EPSA enhance existing consultant relationships by providing expertise in power generation in addition to full consultancy services as design partner.

Working with a longer term project view, EPSA provides a solution that enhances efficiencies and identifies opportunities to minimise costs.

With over 25 years industry experience, EPSA understand the importance of client engagement in delivering site-based project specifications that utilise the latest technology and avoid over-engineered solutions.



Connect with Cat[®] – smart use of technology

Cat Connect[®] is a global suite of integrated equipment and asset management services and solutions. It makes smart use of technology and services to improve jobsite efficiencies and deliver insights. Connected asset management can improve productivity, efficiency, sustainability and safety.

THINK Solutions

Increase uptime and reduce operating costs by monitoring location, fuel burn and utilisation, as well as health and maintenance issues like hours and fluid contamination.

THINK Sustainability

Reduce environmental impact and simplify compliance reporting by monitoring fuel burn and managing resource consumption.

the data making informed decisions and helping our customers to what they do better every day.

JEVAN DAVENPORT, CAT CONNECT® CUSTOMER SOLUTIONS CENTRE WILLIAM ADAMS, MELBOURNE



THINK Safety

Get visibility with enhanced safety options like tire monitoring and off-board safety reporting provide valuable learning and coaching opportunities for everyone onsite.

THINK Productivity

Make it easier to achieve efficiencies through production monitoring on site.

Our value is more than just the data – it's the people sitting behind

Choose EPSA and the global reputation of Caterpillar[®] to experience reliable performance and the lowest total cost of ownership and operation.

There are thousands of Cat[®] generators providing prime power, standby, hybrid, critical, continuous and emergency power in regional, remote, commercial and residential operations across Australia provided by Energy Power Systems Australia (EPSA) – the exclusive provider of Cat[®] Power Systems in Australia.

EPSA is proud to offer purpose-built products and project services, purchase options, finance and warranty - all backed by the global power of Caterpillar[®].

Experience EPSA's world-class technical knowledge and engineering expertise, and benefit from over 100 Cat[®] Dealer Partners for service and support across Australia.

GLOBAL COVERAGE, LOCAL SUPPORT.

For new and used engine sales, rental and renewable energy solutions call Energy Power Systems Australia.

FREECALL 1800 800 441 energypower.com.au epsa@energypower.com.au



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