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FACTSHEET Green Data Centre Innovation Programme

Background

According to Boardgroup's report¹, Singapore is already the leading data centre hub of Southeast Asia, with more than 57.79% of the region's data centre capacity. This strong base continues to grow, as demand for and use of services such as the cloud, data analytics and the Internet of Things climbs.

This is especially so as Singapore journeys to a Smart Nation. The island nation faces certain challenges, such as its tropical climate and high humidity, which contributes to data centres already-high energy footprints to remain cool. These could be overcome with new, green technologies.

Based on IDA's estimates of 2012 statistics in a survey of data centres, the 10 largest data centre operators in Singapore account for energy consumption equivalent to 130,000 typical HDB households. An energy efficiency improvement of 20 per cent in the existing stock of commercial data centres in Singapore is estimated to be capable of yielding combined annual savings in excess of S\$34 million.

IDA has thus embarked on the Green Data Centre Innovation Programme (GDCIP) after the launch of the Green Data Centre Roadmap in late 2014. The GDCIP aims to boost the competitiveness of the data centre industry by raising their overall energy efficiency through a **first of its kind in Singapore** comprehensive view and assessment of emerging technologies which could significantly improve energy performance. These would go beyond the application of best-in-class technologies and processes today. Its recommendations are intended to guide the research community, technology companies and the data centre industry in charting their technology directions.

Some of the possible solutions could include raising the ambient level of tolerable heat within data centres, automatic smart allocation of computing resources within data centres or more intelligent systems-level solutions spanning IT and facilities.

About Green Data Centre Innovation Programme

IDA has embarked on the GDCIP that aims to boost the competitiveness of the data centre industry by raising their overall energy efficiency. The programme intends to:

¹ Boardgroup, 2012, "Data Centres South East Asia IV"

- **Direct local R&D efforts** in green data centre technologies by providing research funding for key areas of research through the Green Data Centre Research Grant Call.
- **Spur innovation** by catalysing the development and adoption of innovative green data centre related products, solutions and services through the Green Data Centre Innovation Call-for-Collaboration.
- **Demonstrate emerging technologies and innovations** which could be adopted by data centres in the future by establishing a Green Data Centre Innovation Hub.
- **Develop policies and guidelines** related to resource efficiency such as energy use by data centres in Singapore to achieve a sustainable computing infrastructure.

Challenges for Data Centres

Some of the identified challenges in the green data centre field which IDA hopes to address include, but are not limited to:

1. Operations of a data centre at high temperature: Singapore's tropical climate imposes a heavy energy burden on data centre cooling systems. Raising operating temperatures presents a possible solution to the problem. Industry studies have demonstrated significant savings for every unit increase in operating temperature. Potential research can be carried out to enable data centres to operate at temperatures and humidity levels far in excess of what is possible today, reducing the need for energy-intensive cooling.
2. Low level of IT utilisation due to silos of compute, storage and networking: Data centre IT systems suffer from poor energy proportionality (i.e. efficiency is poor at low utilisation levels). Potential research can be carried out to leverage the trend towards data centre programmability through virtualisation, orchestration and automation schemes.
3. Lack of system-level solutions spanning the IT and the facilities domain: Most data centre energy efficiency efforts focus on either IT or facility systems in isolation. There exists significant systems-level opportunities to improve energy efficiency. Potential research can be carried out to combine work in sensors, real-time monitoring and analytics to realise the dynamic optimisations of the whole data centre across facility systems and IT systems

Collaboration with industry

Memorandum of Intent with key technology players

As part of the programme, IDA has engaged key technology players to begin working collaboratively on the GDCIP to co-create and prototype potential solutions. IDA has signed Memorandums of Intent (MOI's) with Dell, Hewlett Packard, Huawei and IBM. These MOI's signal the strong commitment by the companies to enhance development into technologies and solutions in the greening of data centres. It will also enable IDA to tap on their expertise and inputs.

Green Data Centre Innovation Call for Collaboration

Concurrently, IDA has sent out a Call for Collaboration on Green Data Centre Innovations. These would develop and pilot promising innovative solutions to provide proof-of-concepts in Singapore's environment, the results of which could lead to immediately implementable solutions for data centres. This CFC will close by June 26th. More details on the exact proposals received will be revealed at a later date.

This CFC aims to:

1. Facilitate the development and piloting of innovative and pioneering solutions that will significantly improve the energy efficiency of data centres and,
2. Increase the depth of knowledge of the local data centre sector through the sharing of lessons learnt from implementations and the demonstrations of solutions at the Green Data Centre Innovation Hub.

As data centres comprise of both facilities and ICT systems, innovative proposals surrounding how facilities, ICT systems and design can be improved in a holistic manner are encouraged.

Green Data Centre Research Grant Call

By Q3 2015, IDA will also issue a Research Grant Call to invite research proposals from research organisations to conduct research and development projects around currently theoretical or nascent solutions for green data centre technologies. The research could leverage on solutions from the earlier CFC to springboard further, or explore brand new avenues of hardware, design or software solutions.

Green Data Centre Innovation Hub

As part of the GDCIP, IDA proposes to establish a first-of-its-kind state-of-the-art Green Data Centre Innovation Hub in Singapore. Its objective will be to promote green technologies and improve energy efficiency in data centres, and the Hub will be a data centre platform to demonstrate emerging technologies and innovations. The Request for Proposal will be called by Q3 2015.

The Hub will take a coordinated and multi-disciplinary approach through open collaborations amongst industry, and is intended to be re-configurable and an open platform. The Hub will allow for experiments and showcasing of proof-of-concepts for the latest energy efficient features and innovative data centre technologies in Singapore's context.

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