

**EMBARGOED TILL 30 MAY 2016, 1010**

**Annex A**

**MEDIA FACTSHEET**  
***Green Data Centre Programme***

**Background**

According to Boardgroup's 2013 report<sup>1</sup>, Singapore is the leading data centre hub of Southeast Asia, and accounts for 60% 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 continues its journey to be a Smart Nation. The island nation faces certain challenges, such as its tropical climate and high humidity, which exacerbate data centres already-high energy footprints to remain cool. These could be overcome with new, green technologies.

Data centres accounted for 7 percent of Singapore's total energy demand<sup>2</sup> in 2012, and are projected to reach 12 percent<sup>2</sup> of its total energy demand by 2030 due to continued growth of data centres based here.

IDA embarked on the Green Data Centre Programme (GDCCP) after the launch of the Green Data Centre Roadmap in late 2014. The GDCCP aims to boost overall data centre energy efficiency through innovation, pilot emerging technologies, and formulate new guidelines for sustainable computing. 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. The GDCCP also reaffirms Singapore's commitment to protect the environment.

**Key Updates May 2016**

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<sup>1</sup> Boardgroup, 2013, Data Centres South East Asia IV Edition

<sup>2</sup> McKinsey, 2014, Study on Long-Term Economy-Wide Energy Efficiency Potential

## **EMBARGOED TILL 30 MAY 2016, 1010**

### *World's first Tropical Data Centre*

IDA, in collaboration with industry and experts, will develop and deploy the world's first Tropical Data Centre (TDC). This proof-of-concept will establish the feasibility of operating data centres in a tropical environment, such as with ambient temperatures of up to 38 degrees Celsius and ambient humidity levels up to or exceeding 90 percent. It is part of the GDCP's Innovation Hub initiative.

IDA estimates that up to 40 percent of energy consumption could be reduced should the trial prove successful. Such savings would also cut carbon emissions. If successful, such energy savings could be quickly implemented globally as well.

Globally, data centres are kept consistently cooled to between 20 to 25 degrees Celsius with ambient relative humidity of between 50 to 60 percent to operate at levels with large safety margins commonly practiced by data centre operators. A data centre's main operating cost is therefore usually spent on energy consumption in maintaining such controlled environments. Allowing for higher ambient temperature and humidity would thus have immediate cost saving impact if the trial shows it is possible to run data centres in different environments, such as in South East Asia's tropical hot and humid climate.

IDA is partnering with Dell, ERS, Fujitsu, Hewlett Packard Enterprise, Huawei, Intel, Keppel Data Centres, The Green Grid, and Nanyang Technological University for the trial. The TDC will be set up in a controlled test environment in a Keppel data centre facility in the third quarter of 2016.

The data centre will trial test conditions to analyse some of the following during service:

- Feasibility of higher ambient temperatures of up to 38 degrees Celsius
- Feasibility of higher humidity levels up to and exceeding 90 percent
- Impact on data centre IT equipment's reliability and performance when operating in high temperatures and humidity conditions

## EMBARGOED TILL 30 MAY 2016, 1010

The trials will be conducted with simulated server loads to reflect “live” situations such as during sudden peak surges, low-usage, as well as while large amounts of data are being transferred between networks and storage devices. The trials are intended to be run continuously (i.e. 24 hours, 7 days a week) alongside a control setup. Some potential test setups could include:

- No temperature controls, controlled humidity
- No temperature or humidity controls

Partner companies will be contributing hardware (in the form of server racks and space), software (in the form of monitoring and management software), and expertise to define and develop the test plan. The findings and analysis will be studied by IDA and industry experts for further conclusions.

### *R&D Proposals Being Considered*

In Sep 2015, IDA issued a two-stage Research Grant Call to invite research proposals from research organisations. IDA is currently evaluating research proposal papers to further currently theoretical or nascent solutions for green data centre technologies under its Research Grant Call.

IDA received 28 submissions, of which 11 were selected for development into full proposals in its second stage. These 11 are currently undergoing further evaluation. Successful proposals will be given a grant to begin research work into their proposed solutions. More information will be released when available.

### **About Green Data Centre Programme**

IDA embarked on the GDCP to boost the competitiveness of the data centre industry by raising overall energy efficiency. The programme intends to:

- **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.

## EMBARGOED TILL 30 MAY 2016, 1010

- **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 through Green Data Centre Innovation Hub proof-of-concept trials.
- **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. 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.

## EMBARGOED TILL 30 MAY 2016, 1010

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

### **GDCP Initiatives**

#### Green Data Centre Innovation Call for Collaboration

IDA has also sent out a Call for Collaboration on Green Data Centre Innovations. These would look to 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 was closed in June 2015 with one consortium of partners consisting of Evercomm Uni-Tech, Arcstone and Elixir Technology being awarded in March 2016 to develop & pilot home-grown data centre energy monitoring and management solutions.

#### Green Data Centre Research Grant Call

The Green Data Centre Research Grant Call is intended to spur research and development around currently theoretical or nascent solutions for green data centre technologies. After a thorough peer review process and evaluation, successful proposals would be given a grant by IDA to pursue relevant R&D efforts for green data centre technologies.

#### Green Data Centre Innovation Hub

Under this initiative, IDA intends to establish a number of proof-of-concept (POC) trials of which the Tropical Data Center POC is one such trial. The main objective will be to promote green technologies and improve energy efficiency in data centres. Each POC trial will take a coordinated and multi-disciplinary approach through open collaborations amongst industry and academic parties, and to be a platform for experiments and showcasing the feasibility of emerging technologies and innovations for possible future global adoption.

**EMBARGOED TILL 30 MAY 2016, 1010**



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