2013 Data Center Trends

Prepared by:
Babak Mohajerani
Western US Regional Sales Manager
Thomson Power Systems

Sources: DCD Intelligence and Uptime Institute
Thomson Power Systems Overview

Two Main Product Families

Automatic Transfer Switches
ATS

Paralleling Switchgear
PGC 4000
Agenda:

- Global Trends
- North America Trends
- The Future: Carbon & Emission challenge
Datacenters represent a sizeable global industry

- Oil/Gas Fields + Coal seams: 120,000
- Airports [Paved]: 45,000
- Data Centers [100kW+]: 150,000
- Branded gas/service stations: 500,000
- Primary Acute Hospitals: 30,000
- Universities: 20,000
Data Center Growth Drivers

- 750 million laptops/ tablets
- 1 billion smart phones
- 100 million servers (2011 UC Berkeley)
- 644 million active websites (Netcraft 2012)
Digital Age = Energy Consumption

Source: DCD Intelligence 2012

Key

- Total GW (population)
If the Data Center Industry was a Country

- China: 4700 TWh(*)
- USA: 3750 TWh(*)
- United Kingdom: 340 TWh(*)
- Italy: 310 TWh(*)
- California: 290 TWh(*)

Datacenters: 332.9 TWh**
Growth in Space Globally

Key

- Total Million Square Metres (population)
- Outsourced (%)
Growth in Investment

Key
- Facility (in US$ bn)
- IT (in US$ bn)
- Outsourcing (in US$ bn)
- Growth Rate

Source: C&O Intelligence 2014

2014 Spring Convention - Savannah, GA
No end to growth?

- Datacenters are increasing in number, profile & importance.

- A high proportion of global growth comes from key emerging economies but in established markets there is still growth (& room for more).

- Growth will be limited by resources – power, water, space, skills, materials, money, connectivity – but technologies are being deployed to meet this.
Datacenters across North America
### ‘Intelligent growth’ in national asset portfolio 2011>2012

<table>
<thead>
<tr>
<th>Parameter</th>
<th>2011 Total</th>
<th>2012 Total</th>
<th>% +/- 2011&gt;2012</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Space</td>
<td>8,250,000</td>
<td>8,680,000</td>
<td>+5.2%</td>
<td>Square metres</td>
</tr>
<tr>
<td>Racks</td>
<td>271,000</td>
<td>282,000</td>
<td>+3.7%</td>
<td>Number</td>
</tr>
<tr>
<td>Power requirement</td>
<td>9,310,000</td>
<td>9,790,000</td>
<td>+5.2%</td>
<td>MW</td>
</tr>
</tbody>
</table>

- Lower growth in racks as servers get smaller and denser
- Clear evidence of virtualisation in low server growth & of impacts of energy efficiency in restrained power growth.
**Investment growth restrained, (but no cliff in sight)**

<table>
<thead>
<tr>
<th>Investment</th>
<th>E.g.</th>
<th>2011/12</th>
<th>2012/13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility equipment</td>
<td>Power, cooling, monitoring, DCIM etc</td>
<td>$15.6 bn</td>
<td>$15.9 bn</td>
</tr>
<tr>
<td>IT optimisation services &amp; solutions</td>
<td>Virtualisations, storage, systems upgrades, HP computing etc.</td>
<td>$10.5 bn</td>
<td>$12.2 bn</td>
</tr>
<tr>
<td>Outsourcing services</td>
<td>Hosting, cloud, collocation, managed services, ‘aaS’ services</td>
<td>$6.1 bn</td>
<td>$6.8 bn</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$32.2 bn</strong></td>
<td><strong>$34.9 bn</strong></td>
</tr>
<tr>
<td>Vendor/supplier sample</td>
<td>Revenue from datacenters</td>
<td>$13.9 bn</td>
<td>$16.2 bn</td>
</tr>
<tr>
<td></td>
<td>% revenue from datacenters</td>
<td>31%</td>
<td>42%</td>
</tr>
</tbody>
</table>
The USA: Low rates but big numbers

- While rates of increase for infrastructure and investment are restrained, the increases are still substantial.

- Over next 5 years, USA will account for around 15% of global new space requirement and as much as 20% of power.

- A substantial and ageing asset base needs renewing, refitting & replacing. This will continue to provide momentum.

- On current paths, China will take 8-9 years to have developed half the infrastructure of the USA and will have caught up by 2028/29 (but .... ?).
What does this all mean to our industry:

- The greater data center capacity means greater power (= electricity) demand which means the data centers are on their way to following their own set of utility rules on supply & demand.
- The greater data center capacity means greater demand for Standby Power Generation Capacity which means greater number of generator sets deployment in the data centers.
- As the footprint of the data centers is getting larger, the emission becomes a larger issue which will drive a larger demand for Tier 4i engines.
- The reliability of the standby power systems for the data centers is becoming the focus of the industry (Uptime Institute Tier 3 and Tier 4 certified data centers).
Thank You