Data Centres and Mission Critical Facilities

*Presentation to Enterprise Ireland*

*German Inward Buyer Event*

*March 2015*
The Project Delivery Specialists

You can rely on our team of 2,100 people to deliver your data centre project successfully

• An international, integrated design and project management firm
• Proven track record since 1973
• World class expertise
• Employee-owned company
• Revenue > €300million
• The right attitude!
Sector Focus

Mission Critical
Advanced Manufacturing
Biopharma
Food

Medical Technology
Healthcare
Energy
International Financial Institutions
PM Group Worldwide Office Network

International Office Network

Belgium
China
Czech Republic
India
Ireland
Poland
Russia
Saudi Arabia
Singapore
Slovakia
Turkey
United Kingdom
United States
Sample of Group Clients
ENR ranks PM Group as a Top 10 Data Centre Engineering Firm Worldwide

(ENR Global Sourcebook)
Our Data Centre Services

- Masterplanning and Programming
- Site Selection & Confirmation
- Architecture and Engineering
- Permitting
- Environmental
- Sustainability Engineering (LEED / BREEAM)
- Alternative energy solutions
- Procurement
- Cost & Schedule Management
- Construction Management
- Commissioning Management
- IST Management
We provide design services for ALL types of data centres.

**LEGACY** – perform audits & prepare action plans to...
• resolve operational problems
• increase capacity & reduce operating cost
• restore reliability & confirm availability

**BROWNFIELD**
• repurpose decommissioned buildings
• renovations & expansions

**GREENFIELD**
• site selection assistance
• masterplanning
• full service design - architecture & engineering
PM Group - Innovation Examples

- 2007
  - world’s first large scale direct free air cooled DC
  - Chillerless
  - PUE of 1.45
- 2013
  - Super High Density Air Cooled DC (14kW/m2)
  - PUE of 1.06 to 1.08
- 2014
  - Estimated PUE 1.0766, 32MW facility

Actual PUE’s achieved by PM Group

- 2002 – PUE > 2
- 2007-9 – PUE 1.45 - 1.25
  - Green Grid Gold equivalent
- 2010 – PUE 1.1
  - Green Grid Platinum equivalent
- 2014 – PUE 1.06 to 1.1
‘Thought Leadership’ studies for major MNC Clients

Focus Areas:
- Modular
- Layout / space relationships
- Fast Track
- Cost Effective / TCO
- PUE
- Chillerless
  - Air side economisers
  - Water side economisers
- Generators / UPS
- Electrical distribution
Selected Projects

delivered.
Confidential – Client A
DB3 & DB 4 Data centre

Project Type: Data centres
Value: Ca. €500 million
Completed: 2007 - 2012
Area: >40,000 M²
Services: DB3: Mechanical and Electrical Design, Procurement, Commissioning,
DB4: Architecture, Civil structural, Mechanical, Electrical
The Netherlands – Site Selection

Recognized by the European Commission’s Sustainable Energy Europe Campaign as ‘Best Practice’ in Environmental Sustainability
Confidential - Client B
Global Partner

- Projects 200 kW to 120MW
- Services:
  - Site Selection
  - Concept Design
  - Design to increase PUE
  - Detailed Design - Greenfield
  - Reliability Surveys
  - Program Management
  - Procurement
  - Construction Management
  - Commissioning
  - IST

- Project Locations:
  - USA
  - Europe
  - South America
  - Asia
Confidential Client
Santa Clara, California

Project Type: Former R&D Wafer fab converted to a Data centre
Size: 7 MW
Completed: 2014
Area: 5,000 sq. ft.

Key Points:
- 1400 W/SF
- PUE verified = 1.06
- Real-time power monitoring
- 100% Outside Air
- 95F cold aisle / 135F hot aisle
- Full transparent containment
- Fast track schedule
- 3 phases of server deployment
<table>
<thead>
<tr>
<th>Project</th>
<th>Value</th>
<th>Completed</th>
<th>Area</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tier 4 1.6 MW Facility (Dell)</strong></td>
<td>Confidential</td>
<td>2008</td>
<td></td>
<td>AE Design, Procurement, CM, Cx</td>
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<tr>
<td><strong>Data centre (Transfond)</strong></td>
<td>$20 million</td>
<td>2010</td>
<td>3,000 M²</td>
<td>AE Design</td>
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<tr>
<td><strong>Data centre (Datacube)</strong></td>
<td>Confidential</td>
<td>2012</td>
<td>1,500 M²</td>
<td>Construction management</td>
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<tr>
<td>Project Type:</td>
<td>Data centre</td>
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<tr>
<td>Value:</td>
<td>Refit of Existing Buildings</td>
<td></td>
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</tbody>
</table>
| Size         | Data Suite 2 – 1MW  
               Data Suite 3 – 2 MW |
| Services:    | Mechanical and Electrical Design |
Some of our German Projects

Cook Medical, Baesweiler

Danone Nutricia, Fulda

Kraft, Bremen

PepsiCo R&D, Hamburg
Summary

- Thought Leadership
- Leading edge design.
- Clients = Major MNC’s
- Clients = Household names in the tech sector
- Constantly innovating in design and construction
- *We Deliver*
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