



the green grid®  
get connected to efficient IT

# The Green Grid Webinar

Optimising Energy Efficiency in Data Centre

Design, Development and Operations

Victor Smith, EMEA Technical Work Group Chair, Dell

Ali Moinuddin, EMEA Communication Work Group Co-Chair, Interxion



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[www.thegreengrid.org](http://www.thegreengrid.org)

# Agenda

- Overview of The Green Grid
  - Mission
  - Community of Members
- The Green Grid Activities
  - Metrics
  - Tools
  - Training
  - Collaboration
- The Green Grid in EMEA
  - Technical Projects
  - Communications Projects
- Next Steps

# The Green Grid

A global, non-profit consortium dedicated to developing and promoting energy efficiency for data centres by:

- **Defining models and metrics** that are meaningful and user-centric
- **Developing standards, measurement methods, best practices** and **technologies** to improve performance against these metrics
- **Promoting the adoption** of energy efficient standards, processes, measurements, and technologies

An open consortium bringing together industry leaders and end users from critical segments of the data centre ecosystem to develop a unified global voice around data centre efficiency



# Who's In The Green Grid?

## Board of Directors



## 30+ Contributor Members

- BT plc
- Digital Realty Trust
- Google
- Interxion
- Sungard
- Thomson Reuters

## 125+ General Members

- Bloomberg
- Dimension Data
- Facebook
- Host Europe
- Keysource
- Savvis

## 12+ Associate Members

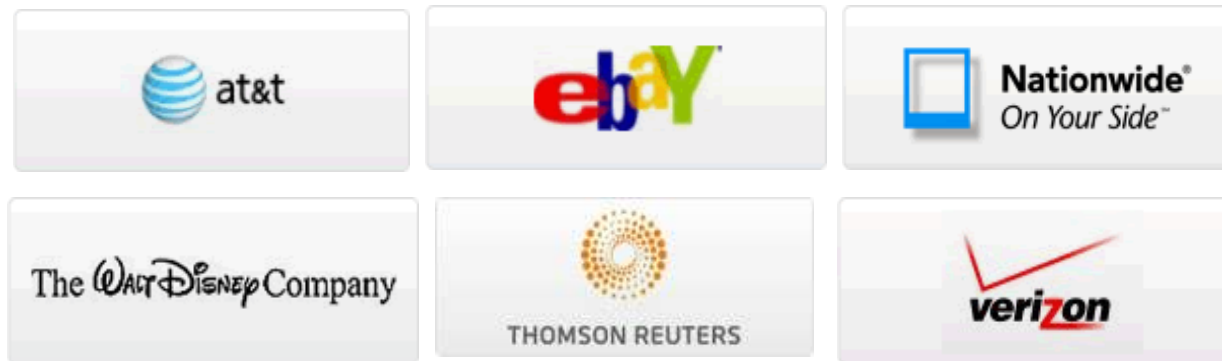
- Canada Revenue Agency
- Danish Electricity Saving Trust
- IDA Singapore
- Masdar
- Stanford University

# Members Community

<b>BOARD MEMBERS</b>	NTT Facilities, Inc	Carpathia Hosting, Inc.	GE Digital Energy - Power	Nexsan Technologies	Telvent
AMD	Sprint Nextel	CGI	GlassHouse Technologies (UK)	Nlyte Software	Teradata
APC	SunGard Data Systems	CHLORIDE	Glumac, Inc.	NTT America, Inc	Teridian Semiconductor Corp
Dell, Inc	Symantec Corporation	Citadel 100 Data Centers Ltd	HCF Australia	NTT COMWARE Corporation	Terremark Worldwide, Inc.
EMC	Texas Instruments	Cnet Training	HITT Contracting Inc	NTT DATA CORPORATION	The Bank of New York Mellon
Hewlett-Packard	The Uptime Institute	CommScope, Inc.	Host Europe GmbH	Ortronics	TIS Inc.
IBM	The Walt Disney Company	CommVault	Huawei Technologies Co., Ltd	OSisoft, Inc.	Triangle Computer Services
Intel Corporation	Thomson Reuters	Computer Science Corporation	IDC Frontier Inc.	Panduit Corp.	UK Grid
Microsoft Corporation	Tokyo Electric Power Company	Consonus	Ideas International Inc.	PEER 1 Network Enterprises	University of California, San Diego
Oracle America	Trane	CoreSite, LLC	INDILINX Co., Ltd.	PG&E	Verne Global
<b>CONTRIBUTOR MEMBERS</b>	Verizon Business	Corning Cable Systems	INS Sudlows Limited	Prism Power Limited	ViaWest, Inc
1E	Vmware, Inc.	CRAY INC	Internet Initiative Japan Inc.	Proteus Industries Inc.	Willdan Energy Solutions
3Com Corporation	<b>GENERAL MEMBERS</b>	Critchfield Mechanical Inc.	Intransa, Inc.	Qlogic	Wipro Technologies
AEG Power Solutions Inc.	42U	Crossbeam Systems Inc	IP Infusion Inc	Quantum Energy Services & Technologies, Inc.	WiT JAPAN Co., Ltd
AT&T	7x24 Exchange International	Data Center Consultores S.A.	ITM Communications Limited	RACKWISE	Wright Line LLC
Autodesk	Active Power	Delta Products Corporation	Juniper Networks	RampRate Sourcing Advisors	Xiotech
British Telecommunications plc	Adaptec, Inc	Dimension Data	KDDI Corporation	Raritan, Inc.	ZT Group Int'l Inc
Chatsworth Products	Advanced Data Centers	DLB Associates	Keysource Ltd	Rothstein Kass	<b>ASSOCIATE MEMBERS</b>
Cisco Systems, Inc.	Afco Systems	eBusiness and Resilience	KPN	SAKURA Internet Inc	Bryant University
Digital Realty Trust	Alcatel-Lucent	EDSA Micro Corp.	Lee Technologies	Savvis	Canada Revenue Agency
Eaton	Allstate	Emerald Telecom & Data Cente	LNA	Sentilla Corporation	Danish Electricity Saving Trust
eBay Inc.	Altron	Energy Trust of Oregon	Lockheed Martin Corp	Server Technology Inc	Dept of Finance & Deregulation: Australian Gov't Info. Mgmt. Office
Emerson Network Power	American Internet Services	Equinix, Inc	LSI	SGI, Inc	Excom Education Pty Ltd
Fujitsu Limited	Anixter	e-shelter facility services	Macquarie Telecom Ltd	Sify Technologies Ltd	IDA Singapore
Google, Inc	Antares Mangement Solutions	Evoswitch Netherlands B.V.	Mardix Ltd.	Socomec UPS	Knowledge & Development Authority
Hitachi, Ltd.	Atos Origin Nederland	Exelon Corporation	Mazzetti Nash Lipsey Burch	Storwize Inc	Masdar
Interxion	BigFix, Inc	Extreme Networks	METANET AG	Stulz Air Technology Systems	New York Power Authority
ITOCHU Techno-Solutions	Bloomberg LP	Facebook	Migration Solutions Ltd.	SYNNEX Corporation	Philadelphia Gas Works
Nationwide	Broadcom Corporation	FedEx Services	Modius, Inc.	Synopsys	Stanford University
NEC Corporation	BULL SAS	FICO	National Semiconductor	TATA Communications	The University of Notre Dame
NetApp	C&D Technologies, Inc.	Forsythe Solutions Group, Inc	NaviSite Inc.	TEAM Technologies, LLC	University of Illinois/NCSA
Nomura Research Institute, Ltd	Cadence Design Systems, Inc.	Fujitsu FIP Corporation	Net One Systems Co., LTD	TelecityGroup International Ltd	

# Advisory Council

- Represents the end user community and serves as an important advisory body to the Board of Directors



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# Metrics, Tools, Training & Collaboration

## Metrics

- PUE & DCiE: Usage & Reporting Guidelines
- DCP Proxies

## Tools

- Power Configuration Efficiency Estimator
- Free Cooling Tool and Maps
- PUE Estimator (coming soon)

## Training

- The Green Grid Academy

## Collaboration

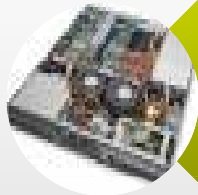
- Industry, End-Users, Governments, Universities
- Global Scope

# Metrics



# PUE Defined and Refined

$$\text{PUE} = \frac{\text{Total Facility Power or Energy}}{\text{IT Equipment Power or Energy}}$$



**Point of Measurement**



**Frequency of Measurement**



**Duration of Measurement**

**PUE Reporting**  
To Register or Certify your PUE results, please proceed to the [PUE Reporting Form](#).

**Report Your PUE**

Thank you for your interest in reporting your PUE. There are two classifications for reporting PUE to The Green Grid, they are: Registered and Certified. If you wish to Register your PUE with The Green Grid, please fill out all required information (denoted with an asterisk). Fields marked with two asterisks are required for certified class only. Fields without asterisks are for data collection purposes only and are not required. If you wish for The Green Grid to declare your facility's PUE as Certified, please be sure to fill out all of the "Certification Method Used" section.

To better understand the different classes of reporting your PUE, please refer to the below chart:

Class	Description	Benefit to Reporting Organization
Unrecognized	A publicly reported result with no claims of following TGG's guidelines. TGG will not comment on unrecognized results.	
Reported	A publicly reported result by the reporting organization claiming they followed TGG's measurement recommendations and nomenclature guidelines. TGG will not comment on reported results.	Reporting organization can use standard materials from The Green Grid to explain process and results to audience.
Registered	A publicly reported result, with key report contextual data provided to TGG by the reporting organization to TGG's data center performance database.	Optional registration of reported result. Receipt of a registration number from TGG. Link to public report data from TGG's website.
Certified	A publicly reported result, with key additional data required for third party validation or certification of results, provided to TGG by the reporting organization.	All benefits applicable to registered results, plus, consideration of repeated results in future ESG awards or recognition programs.

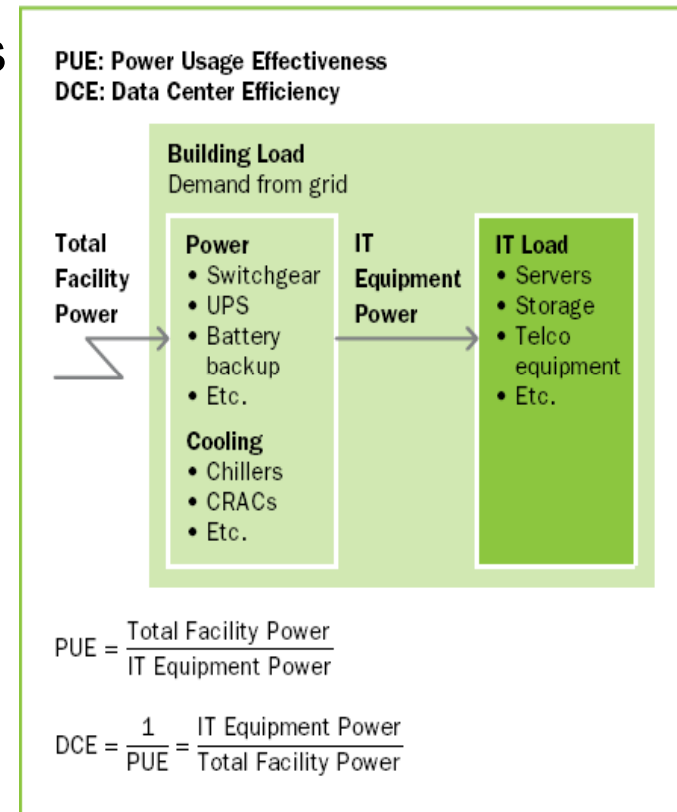
Sources: The Green Grid Metrics: Data Centre Infrastructure Efficiency (DCiE) Detailed Analysis (white paper #14)  
Usage and Public Reporting Guidelines for The Green Grid's Infrastructure Metrics PUE/DCiE (white paper #22)

# The Green Grid Metrics

- PUE = Power Usage Effectiveness
- DCiE = Data Center Infrastructure Efficiency
- DCeP = Data Centre Energy Productivity

More information on TGG metrics is available at:

[www.thegreengrid.org/library-and-tools.aspx?category=MetricsAndMeasurements&range=Entire%20Archive&type=All&lang=en](http://www.thegreengrid.org/library-and-tools.aspx?category=MetricsAndMeasurements&range=Entire%20Archive&type=All&lang=en)

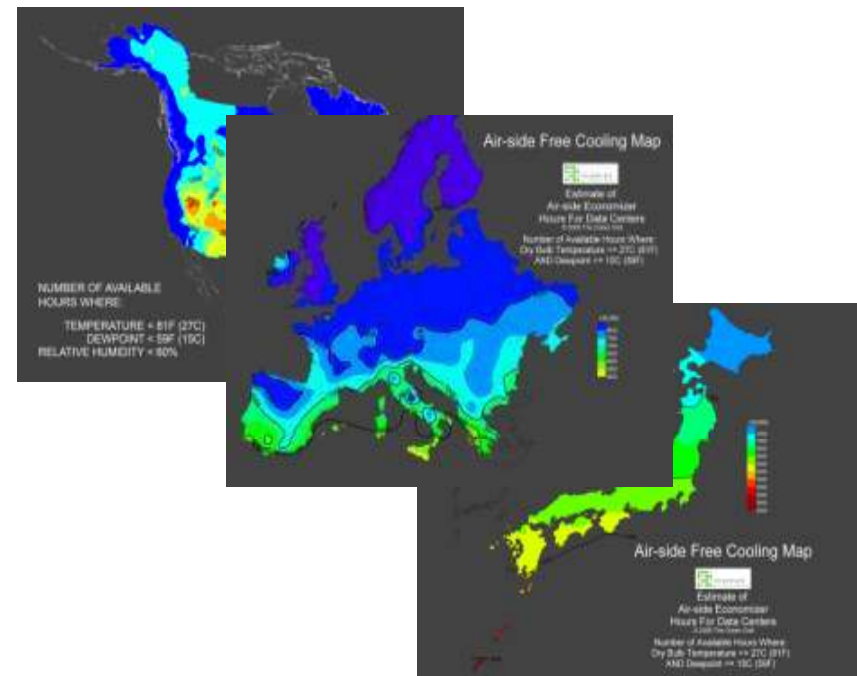


# Tools




# Data Centre Efficiency Tools

- PUE Reporting Tool
- Power Configuration Efficiency Estimator
- PUE Estimator (coming soon)
- Free Cooling Tools
  - European
  - Japanese
  - North American Update



# EMEA Free Cooling Tool


Free-Cooling Estimated Savings

COUNTRY:  CITY:

DEGREES IN:  FAHRENHEIT  CELSIUS
 
 SUPPLY AND RETURN AIR  
 ALLOW HUMIDIFICATION

DRYBULB TEMP THRESHOLD (DEG): 

 NONE  
 NONE

DEWPOINT TEMP THRESHOLD (DEG):

REL. HUMIDITY THRESHOLD (%):

DESIRED CHILLED WATER TEMP (DEG):

COOLING SYSTEM APPROACH TEMP (DEG):

DATA CENTER IT POWER (kW):

POWER USAGE EFFECTIVENESS (PUE):

TOTAL FACILITY POWER (kW):

OVERHEAD POWER (kW):

PERCENT OF OVERHEAD POWER FOR COOLING SYSTEM (%):  %  kW
 
 HOURS MEETING CRITERIA FOR FREE-AIR COOLING:

PERCENT OF COOLING SYSTEM POWER FOR CHILLER (%):  %  kW
 
 ESTIMATED SAVINGS USING FREE-AIR COOLING:

PERCENT OF COOLING SYSTEM POWER FOR TOWER (%):  %  kW
 
 HOURS MEETING CRITERIA FOR WATER SIDE ECONOMIZER:

PERCENT OF COOLING SYSTEM POWER FOR PUMPS/FANS (%):  %  kW
 
 ESTIMATED SAVINGS USING WATER SIDE ECONOMIZER:

PERCENT OF OVERHEAD POWER FOR POWER LOSSES and LIGHTING (%):  %  kW

ELECTRIC COST (€ per kWh):

# Training



# Education Committee

## TGG Academy



- The Green Grid Academy is garnering enormous interest
  - Enthusiastic acceptance from membership
  - 75% of learners rate as “good” or “excellent”
  - Demonstrated innovation and industry recognition
  - Best Custom Content – Brandon Hall
- Extensible delivery engine and design
  - Fully-hosted platform that can be extended to tens of thousands of learners
  - Translated versions of the course content
- New Course! Data Centre 101: Capacity Constrained
  - Explore steps to recover stranded capacity
  - Learn how to identify the current capacity
  - Learn how to make organizational, IT, cooling, and power improvements to improve capacity & utilization within the data centre

# Collaboration



# Building on our Liaisons for Industry Valued Deliverables



- EU Code of Conduct for Data Centres
- EU Sustainable Energy & Policy Research
- UK Carbon Reduction Commitment

- Tools and Education
- Metrics, Measurements and Protocols

BCS

The Chartered Institute for IT  
Enabling the information society

- Save Energy Now initiative
- DC Pro tool suite
- Certified Energy Practitioner program



- ENERGY STAR for Servers
- ENERGY STAR for Storage
- ENERGY STAR for UPS
- ENERGY STAR for Data Centres



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# We've Achieved A Lot!

## The Green Grid has hosted:

- ENERGY STAR Program Management Office
  - Enterprise Class Servers
  - Storage Equipment
- 5<sup>th</sup> Global Harmonization of Metrics Session
  - United States EPA and DOE
  - European Union Commission
  - Japan
  - Facility Metrics and IT Productivity Metrics
- Major milestones announced!



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  - **Technical Projects**
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# Communications Projects

Putting The Green Grid in a position of leadership..

EMEA  
Announcements



EMEA  
Events

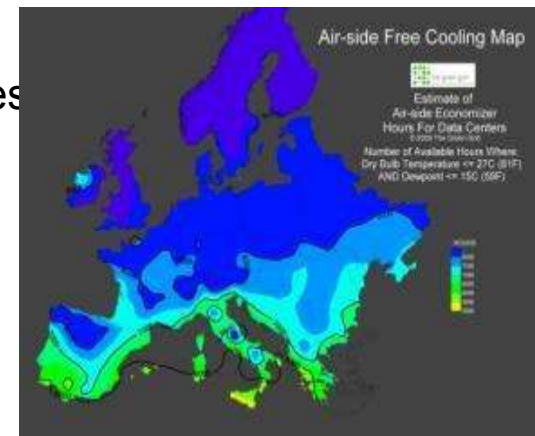


DCD  
Award



# The Green Grid in EMEA

- Energy Efficiency – data centre and IT collaboration (facilities IT)
  - Evaluation of extended operating parameters in the data centre
- Data Centre Design Guide Work Group
  - Creation of EMEA Chapter in the Data Centre Design Guide
- Carbon Legislation Part 2
  - More countries, tool integration, etc.
- Barriers to the Adoption of Power Management Study
  - U.S. launched white paper cooperation
- Glossary Update
  - Supporting the BCS work to extend The Green Grid Glossary.
- The Green Grid Technical Forums
  - Regional conferences in Europe during Fall 2010  
Paris, Frankfurt, London, Amsterdam



# EMEA Liaison Work Group

- EMEA Liaison Work Group established in April 2010
- Our aim to ensure consistent measurement methods, models, and metrics are applied to the data centre
  - Identify groups focusing on energy efficiency programs
  - Develop ongoing relationships
  - Develop alliance agreements or MOUs
  - Maintain and review work registers
  - Provide strategic insight and thought leadership on EMEA activities affecting data centre operations

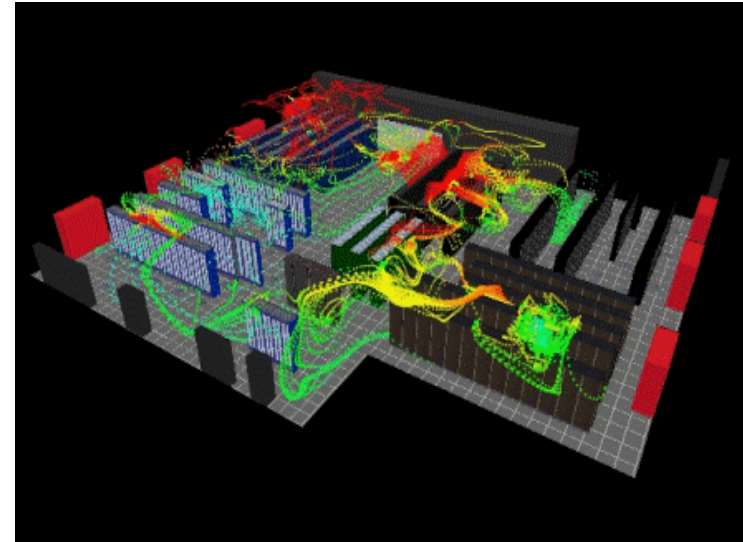


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# Improving Data Centre Operations

- **Align Responsibility**
- **Audit**
- **Measure**
- **Evaluate the physical elements**
  - Reorient your server, racks and rows
  - Raise data centre temperature
  - Strategically position vented floor tiles
  - Maximise settings and software
  - Power down servers when they are not in use
  - Optimise Cooling
  - Geography and climate
- **Continue to monitor and measure**



# Get Involved In The Green Grid

## Become a Member

- Contributor Members
- General Members
- Associate Members (government agencies /academic institutions)

## Join a Committee

- Technical Committee
- Education Committee
- Communications Committee
- Liaison Committee

## Participate in a Work Group

- EMEA Technical Work Group
- EMEA Communications Work Group
- EMEA Liaison Work Group
- Data Centre Design Guide Work Group
- Data Collection and Analysis Work Group
- Data Centre Technology and Strategy Work Group
- Data Centre Operations Work Group
- Data Centre Metrics & Measurements Work Group



# Thank you for attending The Green Grid Webinar!

For more information, please visit

[www.thegreengrid.org](http://www.thegreengrid.org)

Thank you to our media sponsor!

