

The European Programme for Energy Efficiency in Data Centres: The Code of Conduct

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- 14:30 Welcome by European Commission and UK DEFRA
- 14:40 Presentation of the European Code of Conduct (Paolo Bertoldi)
- 14:55 Presentation of the European Code of Conduct Best Practices and the proposed 2010 revision (Liam Newcombe)
- 15:10 Presentation on cooling best practices (Robert Tozer)
- 15:25 Presentation by Japan Green IT Promotion Council on DPPE metric (Takao Shiino, Nomura Research Institute)
- 15:40 Open Discussion
- 15:50 Coffee break
- 16:10 Presentation by Telecity (Rob Coupland)
- 16:30 Presentation by Onyx Group (Allan Rooms)
- 16:45 Presentation by Bracknell Forest Council (Iain Berry)
- 17:00 Presentation by Telecom Italia (Flavio Cucchietti)
- 17:15 Presentation by Atrium Data (Marc Lechavallier)
- 17.30 Open Discussion
- 17.45 Close of the meeting



EU Key Climate and Energy Objectives for 2020

By 2020 -20% **EU GHG**

By 2020 +20% **ENERGY SAVING**

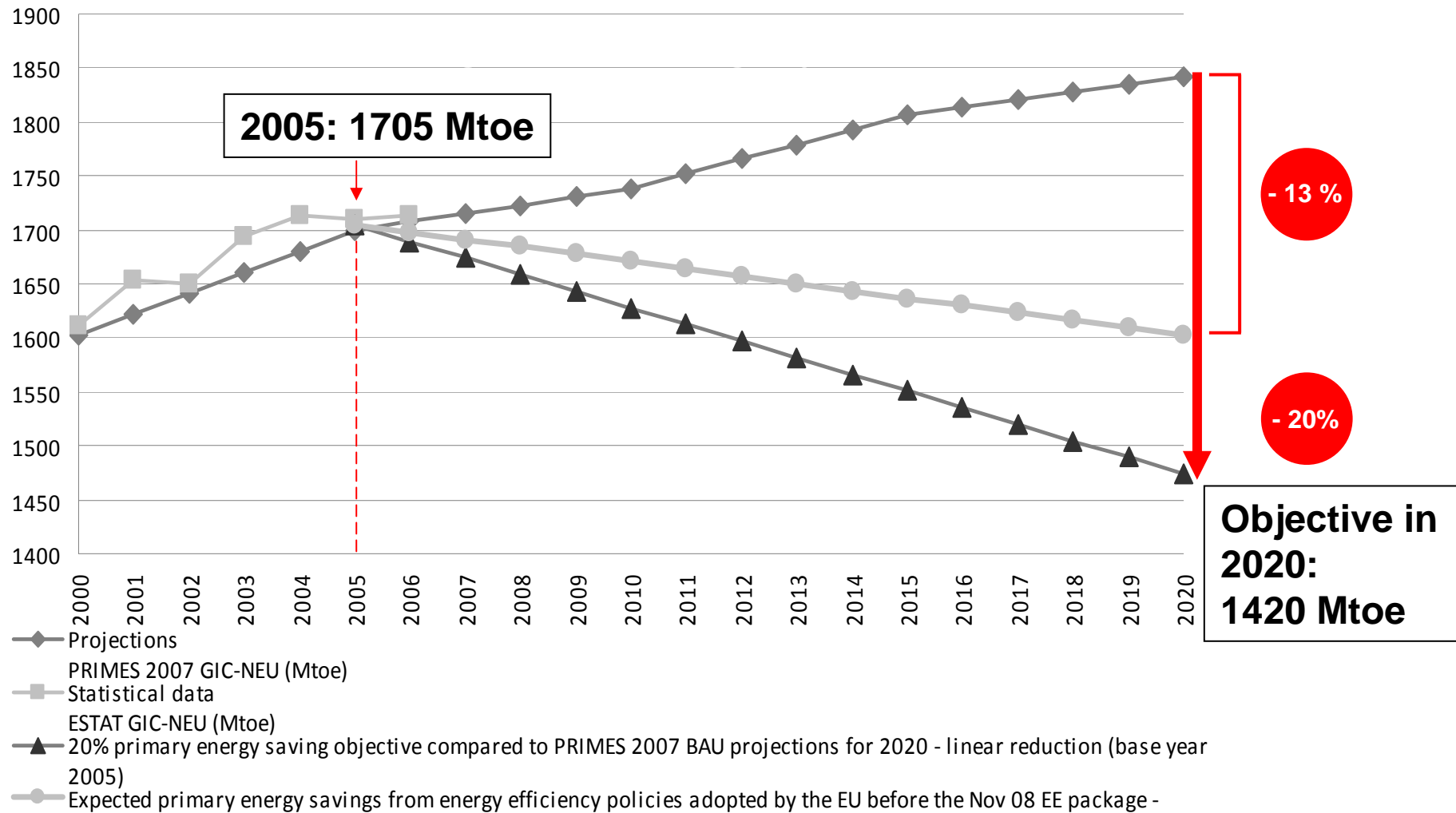
By 2020 binding 20% **RENEWABLES** in final energy consumption at EU level

RES in transport
Min 10% binding

ELECTRICITY
MS binding choice

HEATING & COOLING
MS binding choice

NATIONAL TARGETS & ACTION PLANS



- Led by European Commission Joint Research Centre
- Flexible mechanism to initiate and develop policy
- Forum for industry, experts and Member States
- Open and continuous dialogue on market and product performance
- Identify and focus on key issues and agree solutions
- Set ambitious voluntary standards and commitments



- Since 2002 Codes of Conduct on:
 - External power supply units
 - Digital TV services
 - Broadband
 - Uninterruptible power supplies
- Lays groundwork which has been used by other European policies (e.g. Eco-Design)



- Continuing demand for IT services
- Rising DC electricity consumption projected:
 - Western Europe: 56 TWh in 2007, projected to rise to 104 TWh in 2020
- Expected to contribute substantially to the UK and European Union (EU) commercial sector consumption
- Maximise energy efficiency of data centres to ensure the carbon emissions and energy consumption are mitigated



- Many activities have been initiated including US EPA Energy Star, US *DoE Save Energy Now* and The Green Grid
- But no EU regulatory or voluntary initiatives addressing the energy efficiency of data centres. This creates risk of confusion, mixed messages and uncoordinated activities
- Need for independent assessment and coordination – tailored to European conditions such as the climate and energy markets regulation
- The new Code of Conduct provides a platform to bring together European stakeholders to discuss and agree voluntary actions which will improve energy efficiency





- Code of Conduct is a **voluntary commitment** of individual companies, which own or operate data centers (including colo), with the aim of reducing energy consumption (against a BaU scenario) through the adoption of best practices in a defined timescale.
- Energy efficiency targets are complemented by **general commitments** of monitor power and energy consumption, adopt management practices, switching off components not needed, and reducing energy consumption where possible



- To **raise awareness** among managers, owners, investors, with targeted information and material on the opportunity to improve efficiency.
- To provide an **open process and forum** for discussion representing European stakeholder requirements.
- To create and provide an **enabling tool for industry** to implement cost-effective energy saving opportunities
- To develop a set of **easily understood metrics** to measure the current efficiencies and improvement.
- To produce a **common set of principles** in harmonisation with other international initiatives.
- To **support procurement**, by providing criteria for equipment (based on the Energy Star Programme specifications, when available, and other Codes of Conducts), and best practice recommendation for complex systems.



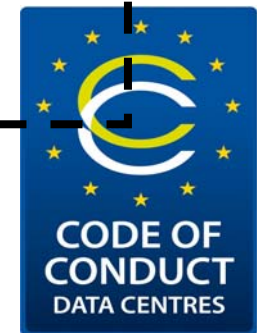
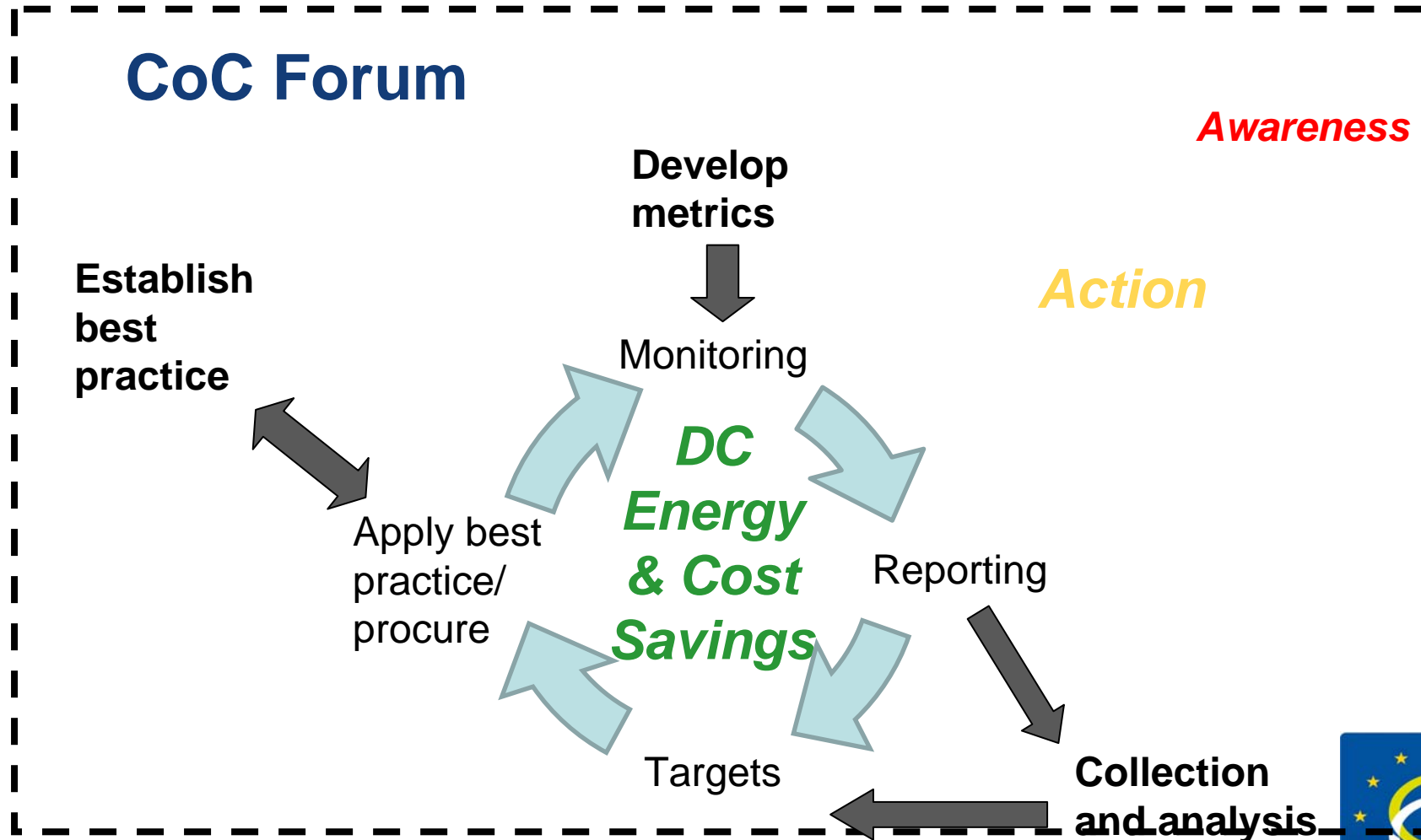
- The Code of Conduct covers:
 - “Data centres” of all sizes – server rooms to dedicated buildings
 - Both existing and new
 - IT power and Facility power
 - Equipment procurement and system design
- The Code of Conduct is for:
 - **Participants**: Data centre owners and operators
 - **Endorsers**: Vendors, consultants, industry associations



- Day to day operations (energy management)
- Normal replacement cycle/adding new servers
- Retrofit/ dedicated energy efficiency programme
- Designing new data centres

- Metrics and measurements
 - How to measure and report efficiency
- Best Practice
 - Establishing guidance and support
- Data collection & analysis
 - Monitor and report on savings





- For existing data centres partnership application start with an initial energy measurement, and energy audit to identify the major energy saving opportunities.
- An Action Plan must be prepared and submitted, once the Action Plan is accepted the **Participant status** is granted.
- Participant must implement the Action Plan according to the agreed time table. Energy consumption must be monitored regularly, as described in the monitoring section. *It is expected to see over time progresses in the energy efficiency indicator related to the data centre.*



- The revised retrofit and new build best practices will apply from 2011 onwards for new participants.
- A new construction data centre must be efficient according to the best practices from the start (design phase) and not wait to be retrofitted in the 36 months period. Energy monitoring shall start ASAP
- Clear identification of the type of operator & its responsibilities:
 - Operator
 - Colo Provider
 - Colo Customer
 - Managed Service Provider in Colo
 - Managed Service Provider



- The Commission will approve the plan submitted within 30 days, or explain its reasons for not approving and grant Participant status to the organisation.
- The Participant carries out its Action Plan, and reports at the completion of the actions to the Commission.
- The Commission will review the Participant 's report, and check whether it corresponds to the Action Plan.
- **Mandatory regular (annual) reporting of monthly energy**



- All Participants have the **obligation to continuously monitor energy consumption** and adopt **energy management** in order to look for continuous improvement in energy efficiency.
- One of the key objectives of the Code of Conduct is that **each Participant benchmark their efficiency overtime**, using the Code of Conduct metric (or more sophisticated metrics of available) so to have evidence of continuous improvements in efficiency.

Category	Description
Entire Data Centre	Expected to be applied to all existing IT, Mechanical and Electrical equipment within the data centre
New Software	Expected during any new software install or upgrade
New IT Equipment	Expected for new or replacement IT equipment
Build or retrofit 2010 onwards	Expected for any data centre built or undergoing a significant refit of the M&E equipment from 2010 onwards

Best Practice Intent:

- Neither a prescriptive nor exhaustive list of specific technologies
- Focussed on goals and processes
- Structured to allow the addition of new technologies



- Establish common vocabulary and terminology
- Provide operators with an understanding of the available technology options
- Their relative merits
- The processes they should establish
- The communication that is necessary
- The relationship between technology areas
- Most people are non-expert in some area(s) of the data centre
- Best Practices are guidance to operators on how they might improve energy efficiency
- Practices are scored 1-5 (min-max) based upon their likely energy use benefit
- Practices are ordered by score
- Practice scores are not intended to be summed for an 'overall score'



- Participants will receive public **recognition** for their efforts, through the **Code of Conduct promotion campaign**, aimed at raising public awareness of energy issues.
- Participants may use the **Code of Conduct logo** publicising their energy saving actions and the contribution they are making to the environment.
- Participants that score a low energy for the data centre, will be allowed to indicate that are Code of Conduct Low Energy Champion and will be eligible for the annual **Data Centre Awards** (starts in 2011).
- The **list of Participants**, including a description of their specific contribution to energy saving will be published widely (brochure, Internet, etc.)..
- The Participant Data Centres may be included in promotional activities, such as Awards and the **Catalogue**.
- Participants will be invited to a Code of Conduct **Stakeholder Forum** to review progresses and further develop the Code of Conduct. The **Code of Conduct Stakeholder Forum** will meet regularly and at least once per year.





- **A1 Telekom Austria AG - data centre in Vienna**
- **Bracknell Forest Borough Council**
- **British Telecommunications plc data center in Cardiff (Ty Cynnal)**
- **Bull SAS**
- **Business & Decision - Corporate level**
- **Bytesnet BV - Data Centre in Groningen**
- **EvoSwitch Netherlands B.V. - Data Centre in Haarlem (Amsterdam)**
- **FUJITSU Services - 2 data centres in London, one DC in Slough, one DC in Warwick and one DC in Manchester**
- **Hewlett-Packard - Data Centre Doxfrod Park**
- **IBM Deutschland Business Services GmbH, data centre located in Frankfurt**
- **IBM United Kingdom Limited : Data Centre in London**
- **INTEL - Data Centre Leixlip**
- **LAMDA Hellix S.A. - Data Centre Koropi Attica**
- **Memset Ltd. Corporate level - 2 Data Centres in Reading**
- **Microsoft Corporation - Data Centre in Dublin**
- **Onyx Group Limited - Data center in Edinburgh**
- **Petroleum Geo-Services (PGS) - Data Centre in Weybridge**
- **Reed Specialist Recruitment - Corporate level**
- **TCN Telehousing - Data Centre in Groningen**
- **TelecityGroup (corporate level) with datacentres: Paris 1 and 2; Stockholm 1 and 2; Frankfurt 1 and 2; Amsterdam 1, 2, 3 and 4; Milan 1, 2; London 1,2,3,4,5,6,7 and 10, Manchester 1 and Dublin 1**
- **The UK Grid Network Ltd -data center located in Mancehster**
- **Thomson Reuters**
- **TISSAT S.A. - Data Centre Tissat, Valencia**
- **UK Meteorological Office - Data Centre in Exeter**
- **VCD Infra Solutions - Data Centre in Groningen**
- **Vodafone Group Service GmbH - Data Centre Rehhecke, Ratingen**



- 64 Data Centres already approved;
- 15 Data Centres in the approval process;
- Two large companies declared intention to sign up
- The goal for 2010 was to reach 100 Data Centres, **we will reach it!!**



1E
3Com Corporation
3PAR Inc.
A.C.I.E.
Active Power Solutions Ltd.
ADA Networks Ltd
ADJUGO SA/NV
Aegide
AIT Partnership Group Ltd.
AMSTEIN +WALTHERT LAUSANNE
APC By Schneider Electric
APL France
AST (Advanced Shielding Technologies)
Atrium Data
BCS HQ
Belden
Bull
Business & Decision
ByrneDixon Associates
Camco International Limited
Cap Ingelec
Capitoline LLP
Carbon3IT Ltd.
CBI Plc
C.e.s.i.t. comité des exploitants des salles informatiques
Chloride Spa
Connectix Ltd.
Corning Cable Systems GmbH & Co. KG
CNet Training
Colofinder (Anytime Office Limited)
Comms Room Services Ltd.
Critical Building
CS Technology Ltd

Datacentre UK Limited
Dataracks
Daxten GmbH and Ltd
DECLIC Telecom TOUR AREVA
Deerns
Dell Corporation Limited
Dimension 85 Ltd
e-Business & Resilience Centre
EC2 Partners Limited
eCool Solutions
Eaton Corporation
Electron Technical Services T/A Optimum Data Centres
EMC Corporation
Enefy
Evolved IT Services Ltd
Externus Ltd.
FIBROPTIC INDUSTRY ASSOCIATION
FUJITSU Services
Future-Tech SCI Ltd
Gimélec
Greenvision
Haskoning Nederland B.V.
Hewlett Packard Company
Hewlett-Packard - Critical Facilities Services
Hitec Power Protection bv
IBM Data Center Services (EMEA)
Ingenium nv
INS Sudlows Ltd
ITE Projects Ltd
ITM Communications Ltd
JLBdata
Keysource Ltd
LAMDA Hellix S.A.
Memset Ltd. Corporate level
MANSYSTEMS NEDERLAND BV

Microsoft Corporation
NDSL Ltd., makers of Cellwatch.
NETPLEX Ltd.
Nexans Cabling Solutions
nlyte Software
Norland Managed Services
Nubis Solutions Ltd.
On365 Limited
Prism Power Ltd
Powertech Ltd
PTS Consulting Group plc
REM Enterprise
Rittal GmbH & Co. KG
Romonet Limited
Shoden Data Systems
Siemens NV/SA
Sir Robert McAlpine Integrated Solutions
SNIA Europe (Storage Networking Industry Association Europe Ltd.)
Société d'Etudes et des Management de Project (SEMP)
Societe Schneider Electric
Spook limited
Stratégies S.A.
STULZ GmbH
TA Migration Solutions Ltd.
TelecityGroup
Thames Renewables
The Green Grid Administration
UK Department for Environment Food and Rural Affairs (Defra)
Uniflair S.p.A.
Upsite Technologies Europe bv
Waterman Building Services
Weatherite Building Services Ltd
Workspace Technology Ltd



- Promote the Code of Conduct
- Help Participants to implement the Best Practices
- Promote technologies and solutions to help Participants to implement the Code of Conducts

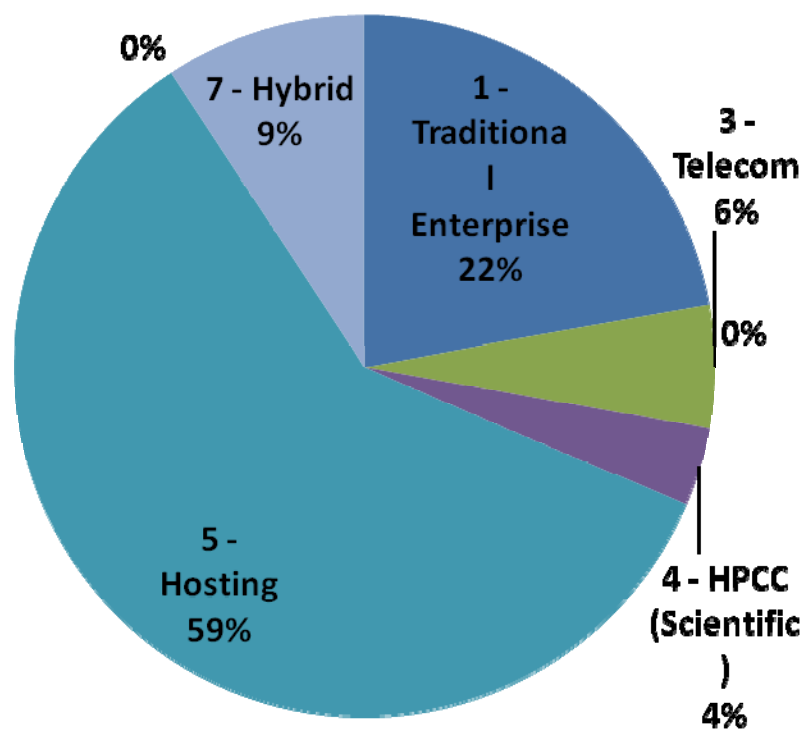


Data Analysis

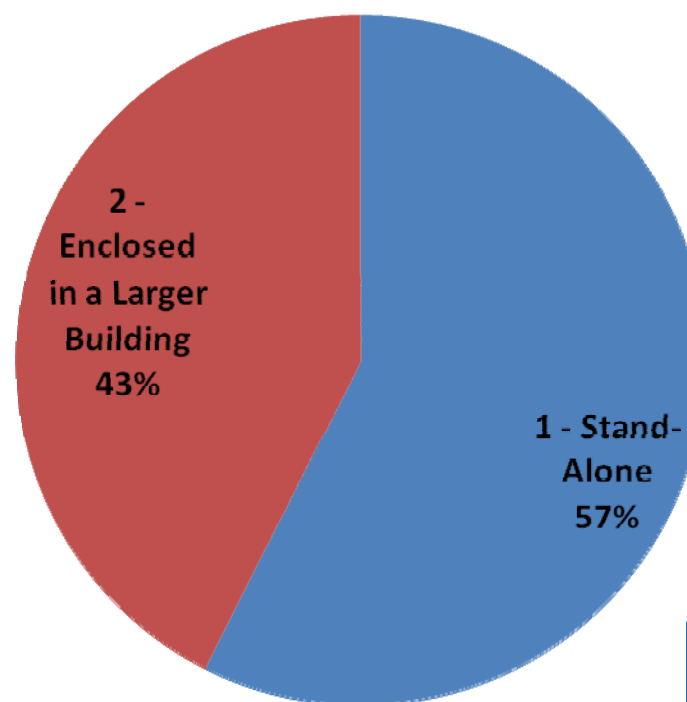
Prepared by Anson Wu

Total dataset	52	
Total annual electricity consumption	922 241 447	kWh
	922	GWh
Average DC floor area	2 688	m²
Average Rated IT load	38 224	kW
Average annual electricity consumption	20 494 254	kWh
	20.5	GWh
Average DCiE	56%	
Average high temp setpoint	20.6	degC
Average low temp setpoint	23.7	degC
Average high humidity setpoint	34.8	%
Average low humidity setpoint	63.0	%

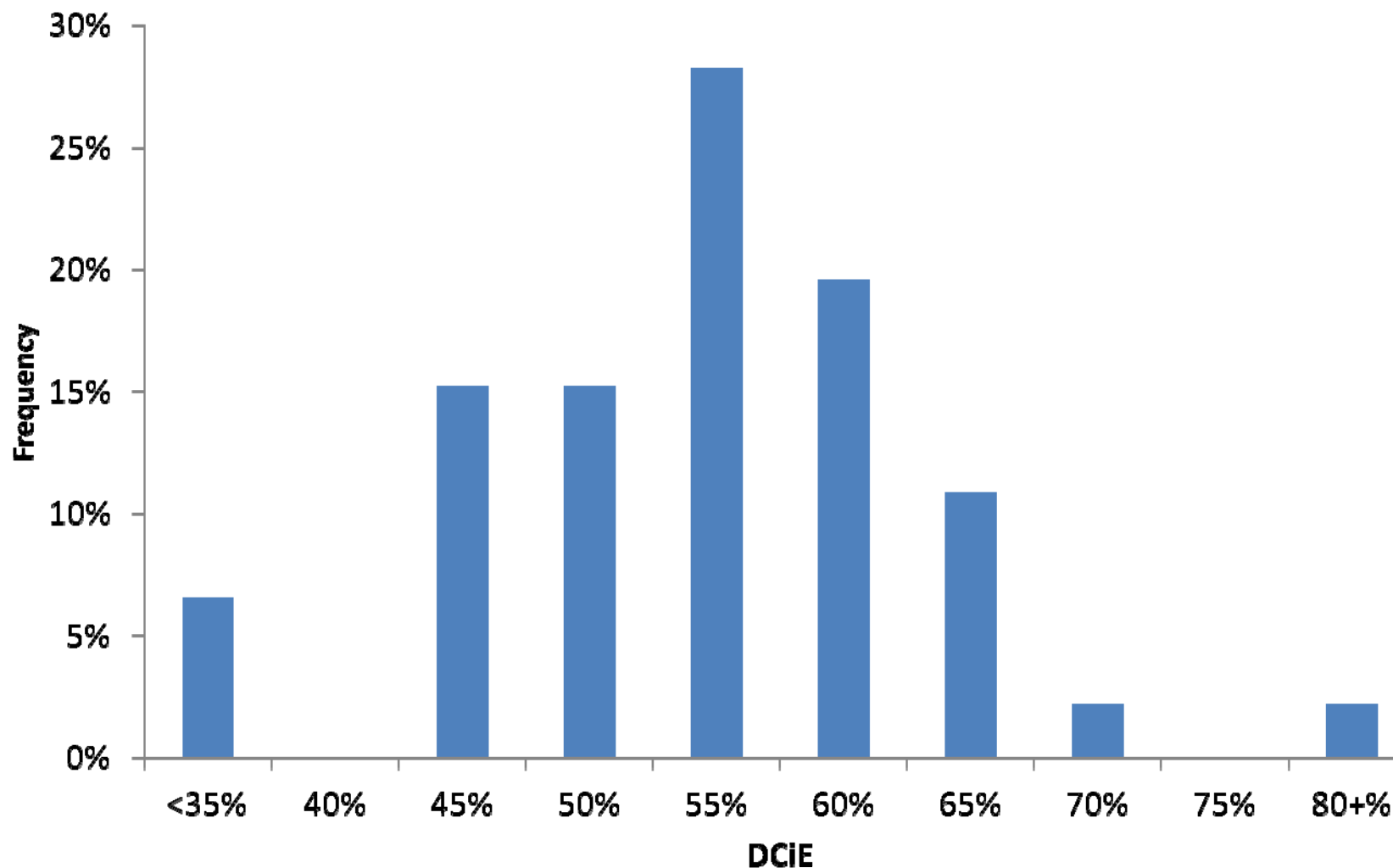
Type of data centre



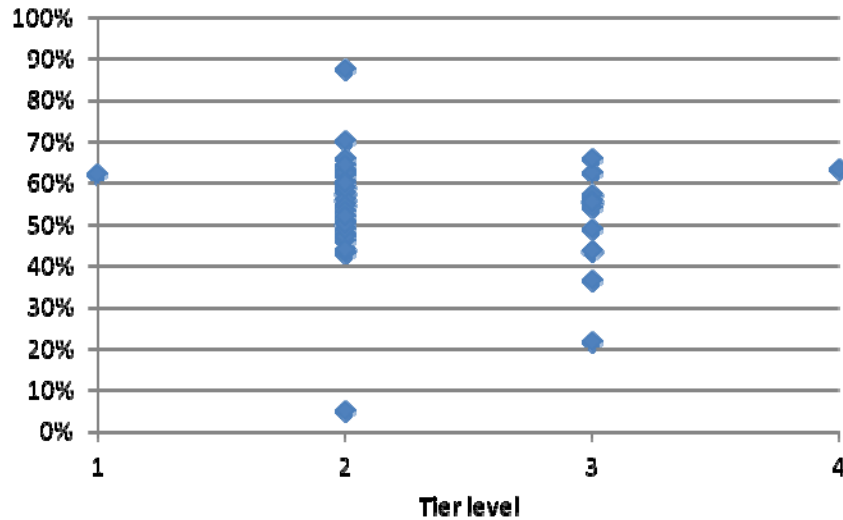
Data centre building



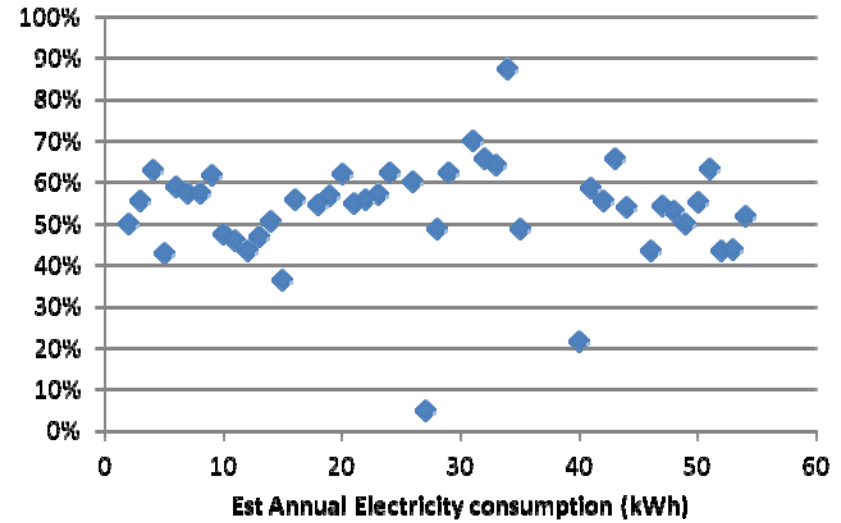
DCiE distribution



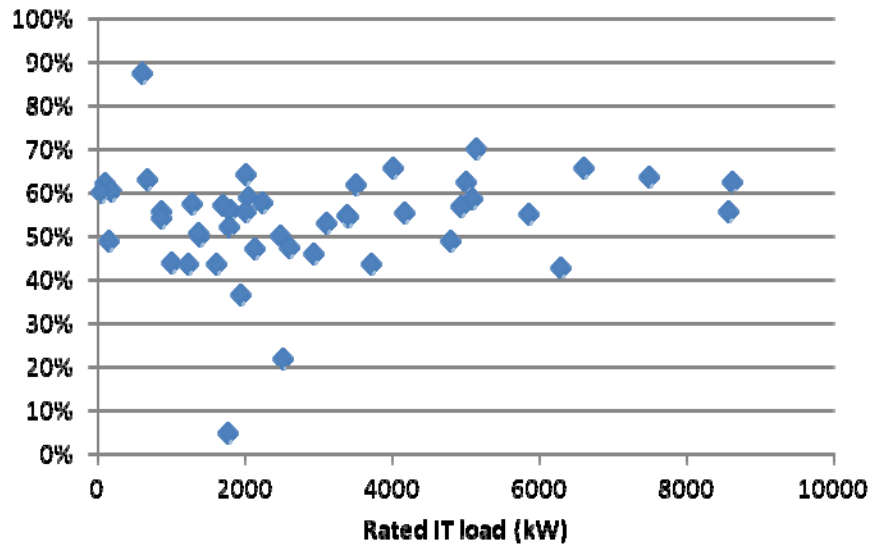
DCiE vs Tier



DCiE vs Electricity consumption



DCiE vs Rated IT load



Best Practices and Proposed 2011 revision

Presented by Liam Newcombe



- Minimum expected practice impacts
 - Air flow management
 - Driving toward containment
 - Greater understanding of the impacts of set points and the need to regularly review
 - Raising awareness of free cooling



- Minimum expected practice impacts
 - Raising awareness of IT power management
 - Increased awareness of the need for systems level strategy and decisions in the data centre
 - Operators are more able to justify energy saving activities
 - Leveraging basic PUE metering



- We have been less successful in
 - Improving temperature and humidity set points
 - Driving the selection of efficient software



- 4.1.5 Select rack mount equipment suitable for the cabinet – air flow
 - Many operators are constrained by a small number of non compliant devices
 - Considering making this practice a minimum expected practice
 - Should there be any exclusions?

- 4.1.9 Energy & temperature reporting hardware
 - Concern about temperature set points
 - Considering making this practice a minimum expected practice
 - Effectively a free power and temperature monitoring infrastructure though equipment churn
 - Must be open standards

- 5.1.10 Equipment segregation
 - Some classes of equipment cannot cope with the extended range
 - This equipment should not compromise the rest of the data centre
 - What types of equipment should be identified for this exclusion?

- Recommended and Extended operating ranges
 - Many operators are still very conservative
 - Concern about reliability
 - “But the IT fan power goes up if we go over 25°C”
 - “I need 10°C headroom in case....”

- Recommended and Extended operating ranges
 - CoC Scheduled to move to ETSI range in 2012
 - This is 5°C to 45°C 5% to 80%RH

- Recommended and Extended operating ranges
 - Problems with meeting 40°C / 45°C
 - Processor temperature
 - Form factor presents an issue

- Recommended and Extended operating ranges
 - Requiring 40°C / 45°C could make equipment more efficient at lower temperatures
 - Capital versus operational cost trade off
 - Rapid changes in cooling performance

Thank You for Your Attention

For more information contact

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http://re.jrc.ec.europa.eu/energyefficiency/html/standby_initiative_data_centers.htm

