



European Union Code of Conduct for Data Centres

Anson Wu

UK Market

Transformation Programme

MARKET TRANSFORMATION PROGRAMME

Supporting UK Government policy on sustainable products





Political Context

- Carbon reduction commitment
- Forecasts of rising energy use in Data Centres
 - Europe 56TWh / PA 2007
 - rising to 104TWh / PA by 2020
- Energy security





Industry Context

- Many activities within Industry
 - US EPA ENERGY STAR, Green Grid, Climate Savers Initiative, IEE E-Server project, Global Action Plan, etc.
- Risk of Confusion and Mixed Messaging
 - Broad review and input
 - CoC tailored to EU conditions
 - Lower the barrier to access and application



Economic Context

- Rising energy costs
 - Increased demand
 - Tipping point in supply
 - Environmental policy to allow energy cost to rise
- Data Centres represent an increasing proportion of overall business cost
- Carbon taxation / trading costs



Social Context

- Rising public awareness
 - Impacts of energy use – climate change
 - Energy used by ICT – comparisons to Aviation
- Data Centres represent an easy target
- ICT is a key enabler of environmental impact reduction both directly and indirectly
- Demonstrate that the industry is not profligate with energy



Goals

- Led by Paolo Bertoldi, DG JRC
 - *“aim is to inform and stimulate Data Centre operators to reduce energy consumption in a cost effective manner without hampering the critical function”*
- A Voluntary Commitment

Goals

- Build Awareness
 - *Financial and infrastructure benefits of improving Data Centre efficiency*
- Develop practical voluntary commitments
 - *which improve the energy efficiency of data centres and in so doing minimise the TCO.*
- Support Effective Decision Making
 - Multidimensional challenge in Facilities, IT and Demand

Scope

- The Code of Conduct covers:
 - “Data centres” of all sizes – server rooms to dedicated buildings
 - Both existing and new facilities
 - Equipment procurement and system design



Scope

- The Code of Conduct is for:
 - Participants: Data centre owners and operators
 - Endorsers: Vendors, consultants, industry associations



Substantial Interest

- Broad participation and support from
 - Vendors – directly and via the Green Grid
 - Data centre operators – CoLocation and Managed Services
 - End user organisations – all sectors - Retail, Finance, Industrial





Working Groups

- **Best Practice**
 - Focused on design best practice, Software, IT Architecture and Facility
 - Led by Liam Newcombe, BCS





Working Groups

- **Metrics & Measurement**
 - Developing a standard method of comparative measurement of energy efficiency
 - Led by Jan Viegand, Danish Energy Agency





Working Groups

- **Data Collection & Analysis**
 - Performance benchmarking across the industry
 - Led by Anson Wu, UK MTP





EUROPEAN COMMISSION
DIRECTORATE-GENERAL
Joint Research Centre



Best Practices

MARKET TRANSFORMATION PROGRAMME

Supporting UK Government policy on sustainable products



A Few Contributors

Name	Organisation	Name	Organisation
Paolo Bertoldi	EU JRC	Joerg Natelski	
Bernard Aebischer	CEPE ETH	Liam Newcombe	BCS
Joe Baguley	Quest Software	Michael K Patterson	Intel, ASHRAE, GG
Thomas Bogner	Austrian Energy Agency	Benjamin Petschke	Stulz
Christian Belady	Microsoft, the Green Grid	John Pflueger	Dell
Emiliano Cevenini	Chloride Power	Bernd Schaepi	Austrian Energy Agency
Flavio Cucciatti	Telecom Italia	Charlie Sheridan	Intel
Tony Day	APC	Hans-Paul Siderius	SenterNovem
Ciaran Flanagan	Verari	Harkeeret Singh	British Telecom
Sofia Flucker	EYP	Victor Smith	Dell, the Green Grid
John Jeffrey	Mace Group	Robert Tozer	EYP
Bernard Lecanu		John Tuccillo	APC
Zahl Limbuwala	BCS	Jan Viegand	DEST
Martin Link	Keysource	Kathrin Winkler	EMC, SNIA
Didier Marquet	France Telecom, EEIOCG	Anson Wu	UK MTP



Best Practice Intent

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



Best Practice Intent

- Some basic practices are identified as the expected minimum level for Participants
- Practices that apply to;
 - Existing estate
 - New IT equipment
 - New or refitted Data Centres



- 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 Practice Intent

- Some basic practices are identified as the expected minimum level for Participants
- Practices that apply to;
 - Existing estate
 - New IT equipment
 - New or refitted Data Centres



Value of Practices

- 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



Expected Practices

- Group Involvement
 - “Establish an approval board containing representatives from all disciplines (software, Require approval for any significant decision to ensure that the impacts of the decision have been properly understood.”



Expected Practices

- Grid and Virtualisation
 - “Processes should be put in place to require senior business approval for any new service that requires dedicated hardware and will not run on a resource sharing grid or virtualised platform”
- Select efficient software
 - “Make the performance of the software, in terms of the power draw of the hardware required to meet performance and availability targets a primary selection factor ”



Expected Practices

- Environmental
 - “Review and if possible raise target IT equipment intake temperature”
 - “Review and if possible increase the working humidity range”
 - “Review set temperature points for air or chilled water system”



Expected Practices

- **New IT Equipment**
 - “Include the Performance per Watt of the IT device as a high priority decision factor in the tender process ”
- **Power Provisioning**
 - “Provision power and cooling only to the as-configured power draw capability of the equipment, not the PSU or nameplate rating ”



Expected Practices – Retrofit or New

- Cooling
 - “Design – Contained hot or cold air”
 - “Variable Speed Air Fans”
 - “Rack air flow management”
- Utilisation, Management and Planning
 - “Lean provisioning of power and cooling for 18 months worth of data floor capacity”





Becoming a Code of Conduct Signatory

MARKET TRANSFORMATION PROGRAMME

Supporting UK Government policy on sustainable products





Participants

Endorsers

Analysis and reporting

Reporting Form



Participants

- Single data centre or corporate level
 - Corporate > 40% of facilities
- Select new or existing data centre(s)
 - Implement measurement capabilities, IT and total facility power
 - Implement or commit to implementing a subset of best practices
 - Implement energy and practice compliance reporting



- Complete application form
 - Practices implemented and committed to implement with dates
 - First energy report
 - Assessment by the CoC Secretariat
- Reporting
 - Continue to submit energy and practice compliance reporting

Endorsers

- Organisations
 - Vendors, Consultancies, Utilities, Government, Industry Associations & Standards bodies, End users
- Support and promote the goals of the Code
 - Products, consultancy, services
 - Programmes, education
 - Labelling
 - Supplier selection criterion

Analysis and reporting

- Internal document to demonstrate energy efficiency
 - How efficiently are you operating?
 - What is being done to improve this?
- Internal reference for future planning
 - How can you go further?



- Overview of data centre performance across Europe
 - Scope for improvement
- Implementation rate of best practices
 - How other data centres are pushing ahead
- Ensuring Code of conduct is making an impact
- Keeping the Best Practice list up to date and relevant





	A	B	C
1	< Prev	2/2 Energy Reporting>	Home
2			
3	Data Centre Information		
4	Building Information		
5	Data Center Name / ID	<i>Example #1</i>	
6	Location	<i>London</i>	
7	Type of Data Center	1 - Traditional Enterprise	
8	Type of Building	1 - Stand-Alone	
9	Building floor area	<i>4 000</i>	
10	Data Center floor area	<i>2 600</i>	
11	Year Constructed	<i>2003</i>	
12			
13	Operation		
14	Reliability (Tier Level)	<i>Tier II</i>	
15	Number of Racks	<i>500</i>	
16	Rated IT Electrical Load (kW)		
17	Air temp set points		
18	Humidity set points		
19	% of Average IT Utilization		
20	% of Peak IT Utilization		
21	Mechanical System Type	1 = Direct Expansion	
22			
23			

MARKET TRANSFORMATION PROGRAMME

Supporting UK Government policy on sustainable products





	A	B	C	D	E	F
1	< Prev	2/2 Finish>	Home			
2	Tab 4 - Electricity Data					
3	Data Center Name / ID	Meter ID	Start Date (MM/DD/YYYY)	End Date (MM/DD/YYYY)	Electricity Consumption (KWh)	
4	Example #1	Electric 45389	02/21/2008	03/20/2008	3 283 686	
5	Example #1	Electric 45389	01/21/2008	02/20/2008	3 265 200	
6	Example #1	Electric 45389	12/21/2007	01/20/2008	3 102 000	
7	Example #1	Electric 45389	11/21/2007	12/20/2007	3 101 900	
8	Example #1	Electric 45389	10/21/2007	11/20/2007	3 101 800	
9	Example #1	Electric 45389	09/21/2007	10/20/2007	3 101 700	
10	Example #1	Electric 45389	08/21/2007	09/20/2007	3 101 600	

	A	B	C	D	E	F	G
1	< Prev	1/2 Next>	Home				
2	Tab 3 - IT Measurement						
3	Data Center Name / ID	Total IT Plug Energy from UPS Meter (KWh)	Start Date (MM/DD/YYYY)	End Date (MM/DD/YYYY)	Total IT Plug Energy from PDU Meter (KWh) If Available	Start Date (MM/DD/YYYY)	End Date (MM/DD/YYYY)
4	Example #1	1 824 270	02/21/2008	03/20/2008	1 806 028	02/21/2008	03/20/2008
5	Example #1	1 814 000	01/21/2008	02/20/2008	1 795 860	01/21/2008	02/20/2008
6							
7							
8							
9							
10							

MARKET TRANSFORMATION PROGRAMME

Supporting UK Government policy on sustainable products





	A	B	C	D	G	H	I	J	K
1	< Prev	1/2 Next >	Home						
2	Identify the Best Practices Implemented in the Facility								
3		Application Date:	23/10/2008						
4		Missing Practices:	0			0	0	0	0
5									
6					Enter the status of the practice in this data centre				
7	Number	Practice	Value	Practice Status	Due Date	Entire Estate	New IT Equipment	New Software	Data Centre Refit
8	Data Centre Utilisation, Management and Planning								
9	Involvement of Organisational Groups								
10	3.1.1	Group involvement	3	Y		Y			
11	General Policies								
13	3.2.1	Consider the embedded energy in devices	2	Y		Y			
15	Resilience Level and Provisioning								
16	3.3.1	Build resilience to business requirements	3	Y					Y
17	3.3.2	Consider multiple levels of resilience	3	Y					Y
18	3.3.3	Lean provisioning of power and cooling for a maximum of 18 months of data floor capacity	3	Y					Y
19	3.3.4	Design to maximise the part load efficiency once provisioned	3	Y					Y
20	3.3.5	Design effective resilience	4						
22	IT Equipment and Services								
23	Selection and Deployment of New IT Equipment								
24	4.1.1	Multiple tender for IT hardware – Power	5	Y			Y		
25	4.1.2	Multiple tender for IT hardware – Basic operating temperature and humidity range	4	Y			Y		
26	4.1.3	Multiple tender for IT hardware – Extended operating temperature and humidity range	4						
27	4.1.4	Select equipment suitable for the data centre – power density	4						
28	4.1.5	Select equipment suitable for the data centre – air flow	3						
29	4.1.6	Enable power management features	3	Y			Y		
30	4.1.7	Provision to the as configured power	3	Y			Y		
31	4.1.8	Energy Star Hardware	2						

MARKET TRANSFORMATION PROGRAMME

Supporting UK Government policy on sustainable products





EUROPEAN COMMISSION
DIRECTORATE-GENERAL
Joint Research Centre



Paolo.bertoldi@ec.europa.eu
for details

MARKET TRANSFORMATION PROGRAMME

Supporting UK Government policy on sustainable products

