

The Green Grid, Metrics and DCMM

Presented by: Jay Taylor

www.thegreengrid.org

About The Green Grid

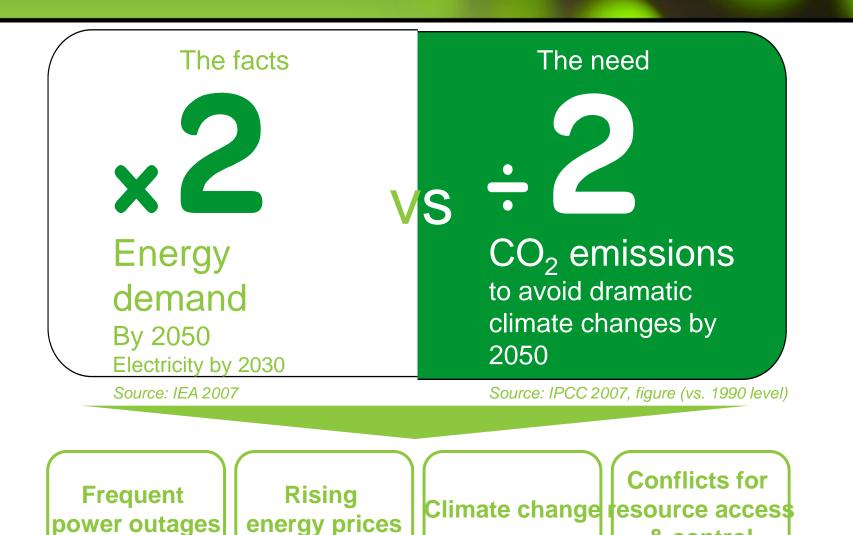
- A not-for-profit international consortium committed to advancing resource efficiency in business computing ecosystems and achieving bottom-line results
- Develop meaningful, user-centric standards, metrics and tools to help IT and facilities better achieve efficiency and sustainability across the entire data center ecosystem
 - Improving data center efficiency and sustainability is only effective when it is measurable
- Promotion and training about standards, measurement methods, best practices and technologies
- Collaborating with governments and other standards makers around the world



Over 170 Members Worldwide



The energy dilemma is here to stay



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& control

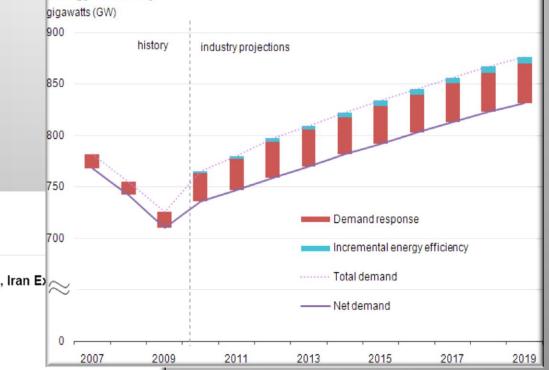
• • • the green grid

power outages

Enough Said?



Grid planners report increases in expected peak demand response, energy efficiency



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Businessweek Thursday February 23, 2012

Bloomberg

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Oil Rises to Nine-Month High on Greek Aid Deal, Iran Experimental Strength Strength

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Business Exchange
 E-mail

By Moming Zhou and Mark Shenk

Feb. 21 (Bloomberg) - Oil increased to a nine-month high after Greece won a second ballout and Iran said it stopped selling crude to France and Britain.

Futures rose 2.5 percent after the euro-area ministers approved 130 billion euros (\$173 billion) in aid for Greece by tapping into European Central Bank profits and coaxing investors into providing debt relief, shielding the region from a default. Iran stopped selling oil to the countries yesterday, preempting a European Union ban, an official news website said.

"There's a lot of relief about the Greek situation in the market and Iran is making a lot of noises," said Kyle Cooper, director of research at IAF Advisors, a Houston-based energy consulting company. "The Greek agreement has increased optimism about the economy."

Crude oil for March delivery gained \$2.60 to \$105.84 a barrel on the New York Mercantile Exchange, the highest settlement since May 4, Futures have risen 7.1 percent this year. The March contract expired at the close of floor trading.

The more active April contract increased \$2.65, or 2.6 percent, to \$106.25 a barrel on the Nymex. Floor trading was closed yesterday because of the U.S. Presidents Day holiday.

Brent oil for April settlement increased \$1.61, or 1.3 percent, to \$121.66 a barrel on the London-based ICE Futures Europe exchange, also a nine-month high.

Green Grid

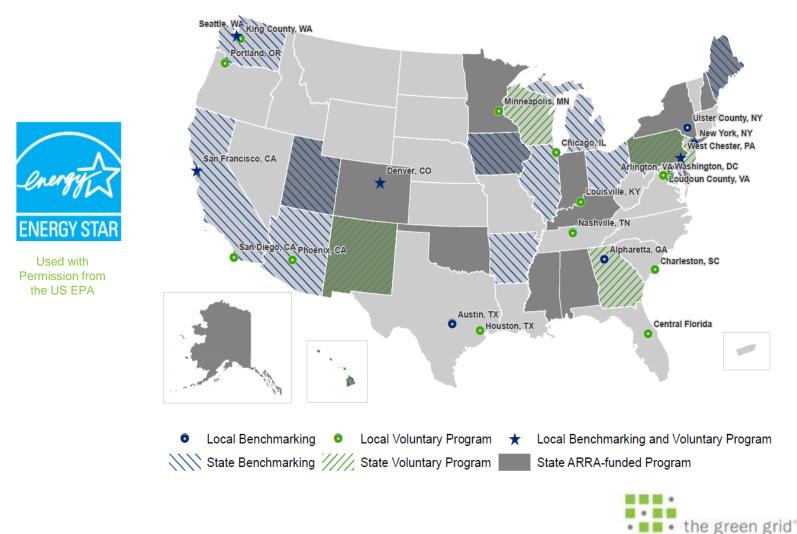
But Did You Know....?

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	Future Mandatory Energy Perfo	ormance	~											

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But Did You Know....?



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get connected to efficient IT

So How Do I Start? Assess the Energy Efficiency of Your Data Center

- US EPA Energy Star Data Center Rating System
 Portfolio Manager
- US DOE Data Center Energy Practitioner Program
 DC Pro
- The Green Grid
 - Data Center Maturity Model
 - PUE Reporting On-line Tool

Establish your baseline with an assessment and then manage with DCIM



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Data Center Maturity Model

- <u>DCMM</u>: A roadmap for the industry to significantly improve efficiency and sustainability through benchmarking data center facility efficiency to clearly show where improvements can be made
- Integrates every aspect of the data center including power, cooling, compute, storage and network
- Provides guidelines by data center area such that operators can benchmark their current performance using the Data Center Maturity Model Equalizer, thereby:
 - Understand how far they are from best practice
 - Identify the ongoing steps and innovations required to achieve greater energy efficiency and sustainability improvements, both today and into the future.
 - Use the higher levels of the model to inform data center and IT strategy.

Data Center Maturity Model

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the green grid" get connected to efficient IT

Investment (Financial, Time & Resource)

Structure





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Scope Includes

Energy Efficiency

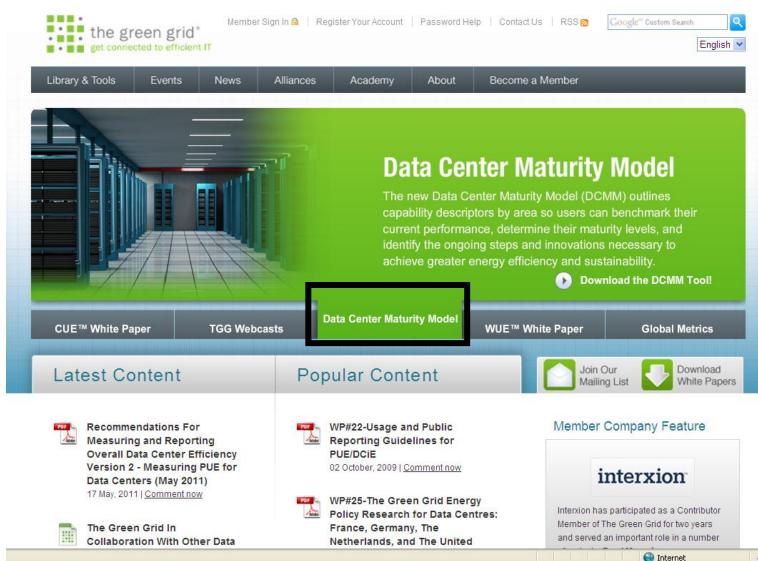
- Energy demand
- Energy supply low carbon generation
- Utilization/Effectiveness

Sustainability

- Carbon
- Water
- Waste heat
- Materials management
 - E-Waste
 - Cradle to cradle approach lifecycle
- Building sustainability
- Monitoring/metrics



Accessing Online



Library & Tools

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Library & Tools	Events	News	Alliances	Academy	About	Become a M	ember		
Gener	ral								
Tools							Comme	ent Policy	
Return to Main					-		The common on this part	ent option is to provide ticular deliverable. Any	
Data Center	Maturity	Model					adverusem	nent of products will be r	removeu.



The Green Grid has developed the <u>Data Center Maturity Model (DCMM)</u> and <u>supporting white paper</u> to outline capability descriptors by area such that users can benchmark their current performance, determine their levels of maturity, and identify the ongoing steps and innovations necessary to achieve greater energy efficiency and sustainability, both today and into the future. The maturity model touches upon every aspect of the data center including power, cooling, compute, storage and network. The levels of the model outline current best practices and a 5-year roadmap for the industry.

CMM - Full Model

DCMM - An management Sections in Zip File DCMM - Cooling Section DCMM - Cooling Section DCMM - Management Section DCMM - Network Section DCMM - Other Facility Section DCMM - Other IT Section DCMM - Power Section DCMM - Storage Section

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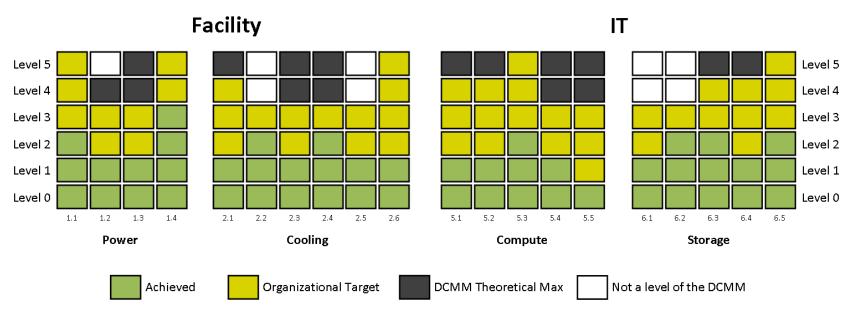
Data Center Maturity Model

Facility	Level 0 Minimal/No Progress	Level1 PartBest Practice	Level 2 Best Practice	(end)	Level4	Levels Visitners - 5 Years Amay
	/	/				
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12 Antriacture	Con efficiency power inhabitant and inefficient GPS can Onable rediendarity than required	 Exe Mode UPD Explosition to become type Prever and higher differency transformers (EDDA, 101 or equivalence) visibilities of the final composition of the conditional term in highest the the load-single solid is, highest events 	 Consultats transformers base fever perior transformers. Consultat antitatentiamenti 		 More to higher IT load voltage, ether AC er DC 	
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14 Orester		priver consumations			The directory distribution and directory and the	allowed and an effect taxes and of additional of
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				press print at . 5%		renge techniques
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	and the second sec	the state of the s	 Standardize approach to reapping realisence across the data centers and it's component - MMC, Data Cabling, Network, IT etc. 	 Certailized view of resolution access all V&E and IT components including understanding at all optimizer and developments registerized. 		Californial of updates an installance based on changes in take center (e.g. if a companient was to fail, companying trainitianed etc.) including fail understanding of all impact
3.2 Realiance vs. Need	- Desirenz requiver with 'unitrous' - data center resilience nat	- Duareas requirements lenses' - data center malience nat	- Vatiching data center resilience to SLA between Operations and		- Matching resilience to actual Scotwess need	 Matching mailence to the individual platform service.
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3.4 Building/Stell			 Rokas dependency or electrical lighting systems by song retroit lighting. Data certer buildingsheal in accordance with local sustainability standard (e.g. UEED in the US, INEEDAM in the UK or annita). 		imperatively or sheared lighting systems by 12%	are composition with a lower among consumption, given light, longer Weight and from recordative components
11 0.000 (10 C)		 Deter certier bailding shell or accordances with local numbered by standard (e.g. UEED or the US, BREZAW on the UK or similar) - fitness standard These principles comparents across the angletication 	 Handard (e.g. LEED is the US, BREEAW in the UK or anniar) - Take standard 	Data center buildingbheil in accentiance with local suntainability arandard (e.g. UEED in the US, BREEAM in the UK or anniar) - fixed coarderst	Other centre inciding/shall in accordance with local secondarily damlard (e.g. LEED in the US, DREEAM is the UK of similar) Plations standard "Scaptor and couply chain contract for wards one general and evidenmental puterSon practices	Les imputibles aux access arrays description, gene light, lenger though and financial the sourced the processes. - Data centre haldingshell to occure Platinum nitrops is berris of induce, rouse, recologi, and/executives and a comparation of induce in centres in the design and hald - Dapter and supply class sources & environmental com- programs included as gain of accounter-thousang for:
3.5 MBE Weeks	- MME weathe strategy not in place	- Search policy for components across the separation	New standard WAII: weeks weeks in place to deal with all opegaward aligned to localizational membersy regulations		· Supplier and supply chain evaluated to upon management and evidenmental participations	 Deploy and supply chain source & search/resettal comp programs included as part of procummers/security factors
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the green grid" get connected to efficient IT

Investment (Financial, Time & Resource)

Data Center Maturity Model Equalizer



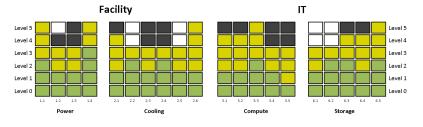


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Feedback

Feedback

- Where do I assess myself?
- How do I get the equaliser for my data center?



Also

- Track progress over multiple years for data centers
- Enter a template and create copies
- Export assessment and equaliser
- High level and detailed assessments depends on time and number of data centers
- Built with only user experience in mind and usable from your mobile device

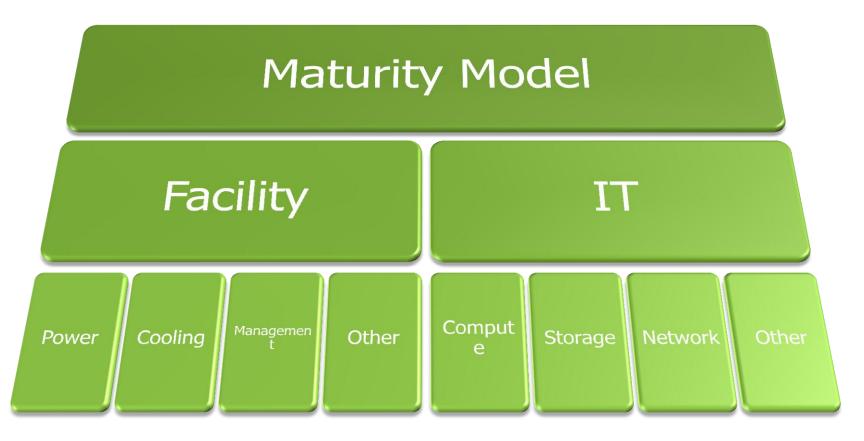


DCMM Stakeholder Use Cases





DCMM Integrates every aspect of the data center for a holistic business approach to efficiency



Facility – Power

- Critical Power Path Efficiency Building Entrance to IT load
- Architecture
- Operations
- Generation



Facility – Cooling

- PUE Cooling Contribution
- RCI (hi) & RCI (lo) if applicable
- Mechanical/Refrigerant Cooling reduction
- Environmental set point range at inlet to IT equipment
- Environmental monitoring and control
- Operations



Facility – Other

- Operational Resilience
- Resilience vs. Need
- Lighting
- Building/Shell
- M&E Waste
- Procurement



Facility – Management

- Monitoring
- PUE
- Waste heat reuse (as measured by ERF/ERE)
- CUE
- WUE
- xUE/additional metrics



IT – Compute

- Utilization
- Workload Management
- Operations
- Power management
- Server populations



IT – Storage

- Workload
- Architecture
- Operations
- Technology
- Provisioning



IT – Network

- Utilization
- Workload
- Operations
- Technology
- Base Performance
- Provisioning



IT – Other

- Utilization
- IT Sizing
- Internal Power Supply
- Service Catalogue/SLA's
- Incentivizing change for efficient behaviour
- E-Waste
- Procurement



Assessment Tool - Questions

Return to My Assessments Page

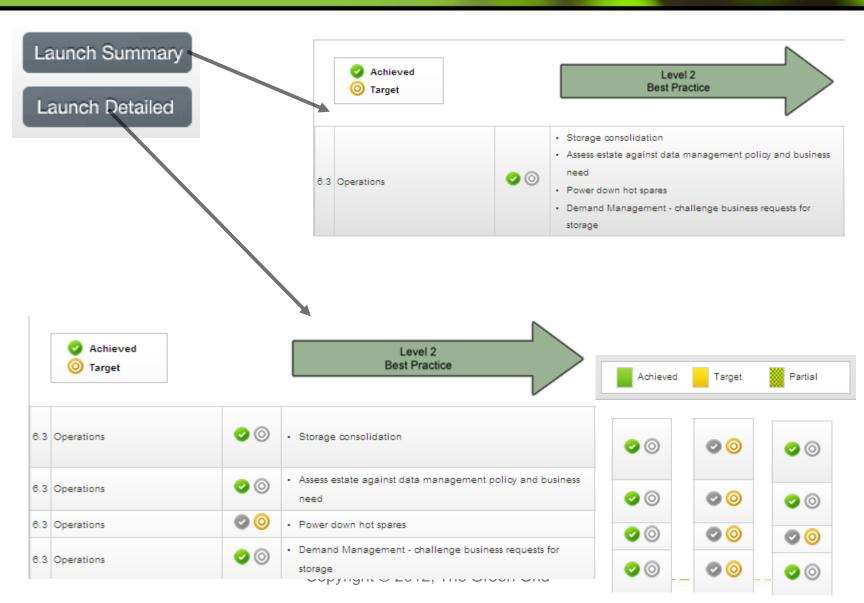
Data Center Maturity Model - Site Information

Questions

1	Data Center name :	
2	What country is your data center located :	Select 🗸 🗸
3	Building classification :	Select 💌
4	What type of data center is your site :	Select 💌
5	What vertical sector is your site in :	Select 🗸 🗸
6	What is the Tier of your data centre (1-4) :	Select 💌
7	What is the age of your data centre (in years) :	Select 🗸 🗸
8	Size of your data centre (sq ft) :	Select 🗸 🗸
9	Annual average PUE :	Select 🗸 🗸
10	Current measured UPS output (IT load only) :	Select 🗸 🗸
11	Number of Servers :	Select 🗸 🗸
12	Age of Servers :	Select 🗸

the green grid"

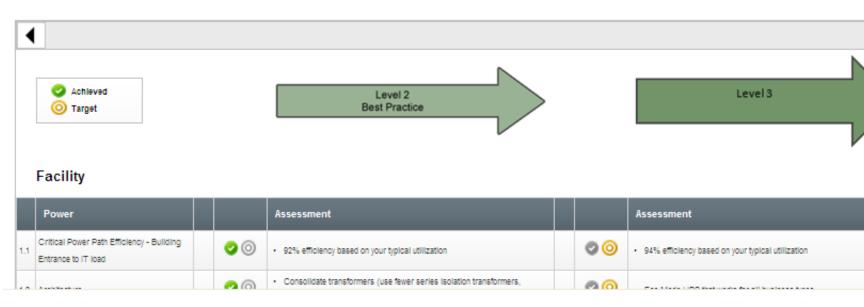
Assessment Tool - Summary or Detailed



		Facility	Power	Cooling	Other-Facility	Management	п	Compute	Storage	Network	Other IT
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Data Center Maturity Model - Detailed Assessment (Carolina)

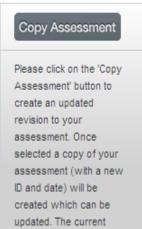




Completed Assessment

Data Center Maturity Model - Completed Assessment (Carolina)

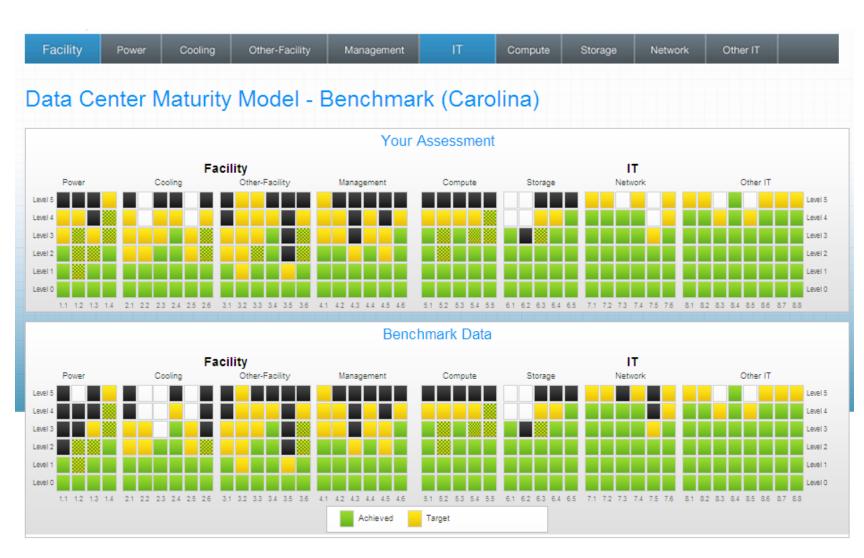




Export Assessment



Benchmark



Questions – why?

Return to My Assessments Page

Data Center Maturity Model - Site Information

Questions

1	Data Center name :	
2	What country is your data center located :	Select 💌
3	Building classification :	Select 💌
4	What type of data center is your site :	Select 💌
5	What vertical sector is your site in :	Select 🗸
6	What is the Tier of your data centre (1-4):	Select 💌
7	What is the age of your data centre (in years) :	Select 🗸
8	Size of your data centre (sq ft) :	Select 💌
9	Annual average PUE :	Select 🗸 🗸
10	Current measured UPS output (IT load only) :	Select 🗸 🗸
11	Number of Servers :	Select 🗸
12	Age of Servers :	Select 🗸 🗸

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Your Assessment



Benchmark Data



Country:	
Uganda	^
Ukraine	
United Arab Emirates	
United Kingdom	✓

Tier:	
Tier 1	
Tier 2	
Tier 3	
Tier 4	

Type of Data Centre:	
Database Transactions	~
Directory Services / Email	
Document Management	
Enterprise	✓

Age of Data Centre:

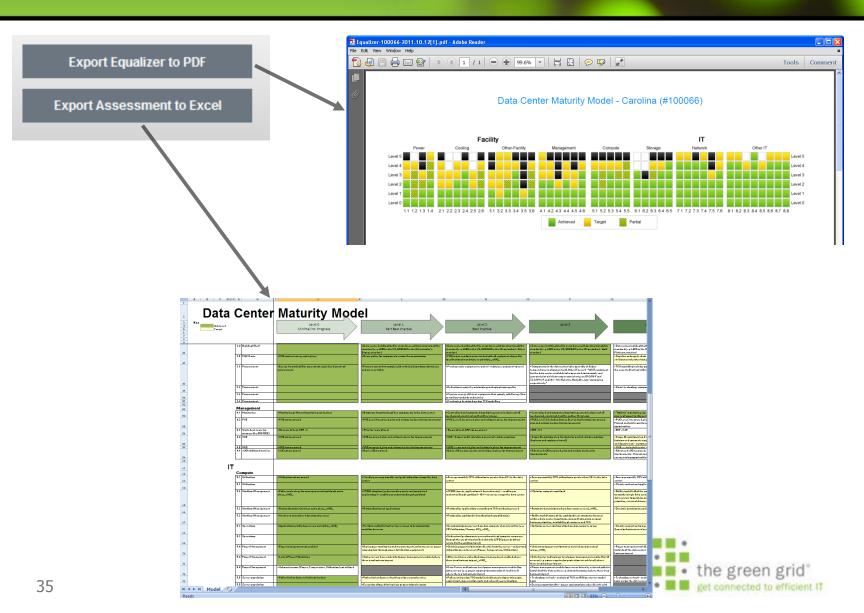
2010 - present	^
2008 - 2010	
2005 - 2008	_
2000 - 2005	~

Vertical Sector:

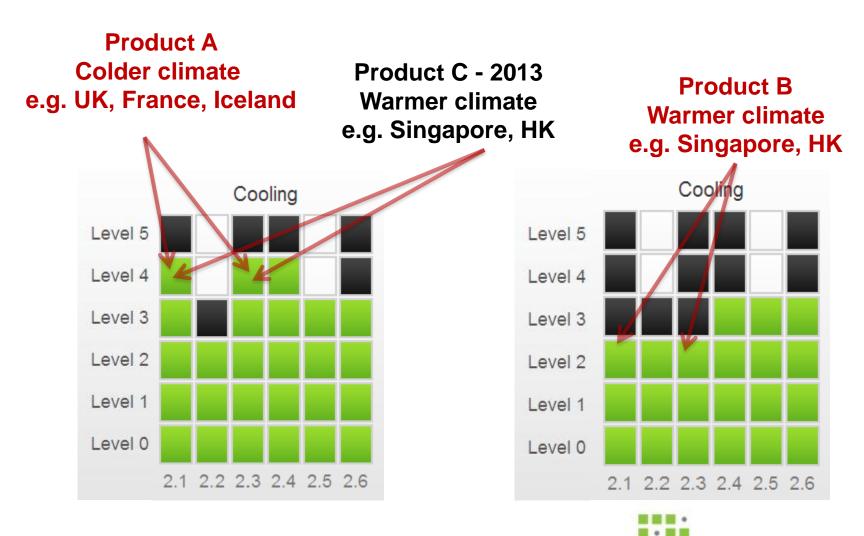
Education	~
Financial (inc. Banking)	(3)
Government	
Healthcare	~

Size of Data Centre:	
Up to 2,500 sqft	^
2,500 sqft - 5,000 sqft	
5,000 sqft - 10,000 sqft	
10,000 sqft - 25,000 sqft	~

Assessment Tool - Export



Vendor Benefit – product capability



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Summary

- Roadmap for the industry to significantly improve efficiency and sustainability
- Benchmark your data center using the Data Center Maturity Model Equalizer, thereby:
 - Seeing how you compare to best practice Level 2
 - Identifying the ongoing steps and innovations required to achieve greater energy efficiency and sustainability improvements
 - Designing new data centers and IT using the model's higher levels
- Provides your C-level suite with a clear guide for improving the energy efficiency and sustainability of the data center portfolio





Thank you Come join The Green Grid learn from industry experts and help guide the industry

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