The EU Commission Joint Action Plan for the Pan-European DCA

ESTABLISHING AN ACTION PLAN
FOR THE DATA CENTRE INDUSTRY

An EU Commission funded project under the seventh framework project number 320013

European Commission

Dedication

The PEDCA is dedicated to the memory of Dirk-Achim Tellbach "DA" 1961-2014.

Why Data Centres?

- All 500 million EU Citizens rely on data centres
- A key "infrastructure" for growth
- A Smart City needs Smart data centres
- EU Data centre market is worth around €18.85 Billion p.a.
- 38.6 million tonnes of CO_2 emitted in order to operate the EU's data centre industry
- But probably saves far more CO_2 by enabling ICT

The Vision

- Build upon the existing collaboration within the data centre industry via the Data Centre Alliance (DCA) extend the DCA facility for all European states

- Consider what would be the impact of all EU data centres successfully implementing design and operational best practices?

Some Potential?

What if the EU's data centres adopted these "best Practices"?

- – A 3 point improvement in PUE? (say 2.0 to 1.7)
- – A further 10% saving from consolidation, better utilisation of compute, turning on power saving features?

- Energy savings in region of 15GWh per year
- EU saves 1.1 Billion Euros per year
- 5.4 million tonnes of CO_2
- Equivalent to annual consumption of 900,000 EU households

What are the barriers?

- – **Awareness?, Education? Skills? Coherence of message? Lack of governance or policy? Lack of research and trusted information?**

Main Objectives

- Build a platform to assist with new technology adoption, skills enhancements and improved practices.
- Assist with identifying key requirements for improved data centres: reliability & security are big priorities
- Identify where R&D is best applied to new methods & technologies, skills & education particularly to address energy consumption.

What is Project PEDCA?

- Strategic EU investment of €1.7 Million Euros
- 18 month duration starting 1st July 2013, ending December 2014
- A result of a collaborative initiative between UK, Netherlands and Germany
- Partnership of Academia, Regional Government and Private Sector
- Coordinator UEL
- Technical lead DCA

The Research Consortium

Backdrop to the Project

- Emerging Industry - Lack of the skills and experience across the whole sector – acute problems in EU nations with developing data centre footprints

- Fragmented standards, many new methods and practices – need for wider collaboration and global harmonisation

- Lack of trusted information and scientific research

Guideline Principles

- Collaboration with industry & stakeholder participants
- Make PEDCA self-sustainable from Jan 2015
- Develop a "Joint" Action Plan (JAP)
- Develop a "business" plan
- Develop a "marketing" plan
- Develop the "success/impact criteria"

Research methodology - Scope

"The success of any project relies on clarity of scope and confirmed objectives to provide the project's participants with guidance and to guide against "scope creep".

Scoping - Output

- Confirmed and sharpened objectives
- Need to "bust silos"
- Much debate over "what is a data centre?"
- Something needed to be done about "skills"

4.4 Q1 Overall PEDCA Aims and Objectives – Survey results

- 97% agree, 3% do not agree

| Applications | CLOUD | Storage |
| IT Hardware & Software | | Telecoms Equipment |

Data Centre Infrastructure
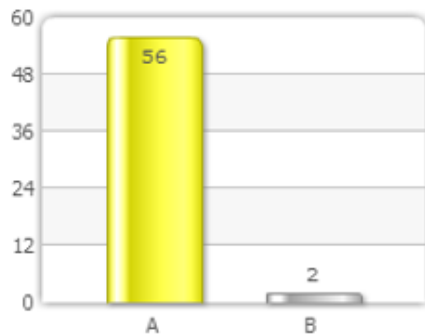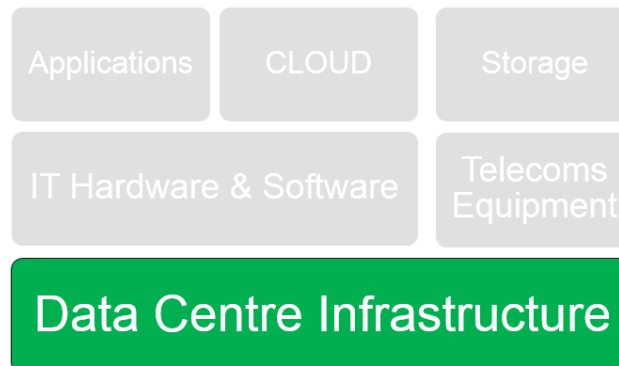
4.9 Skills Development – Survey results

This is designed to ensure that the skilling needs of the industry are identified, tracked and built into industry educational and training programmes.

93% agree, 7% agree it could be valuable, with modification of scope, 0% do not agree
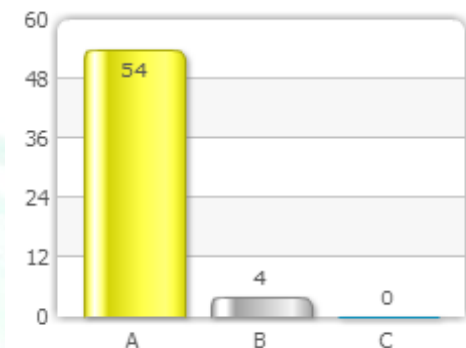
Research – Regional Analysis

- Does Europe need PEDCA?
- "Big Survey": regional differences in size, growth rates, training & Education, salaries, employment, concerns and investment levels

Pie chart with regional percentages: Eastern Europe, 33%; Switzerland, 15%; Italy, 15%; Nordics, 14%; Belgium, 11%; Germany, 10%; Netherlands, 7%; France, 5%; UK & Ireland, 3%; Spain, 3%
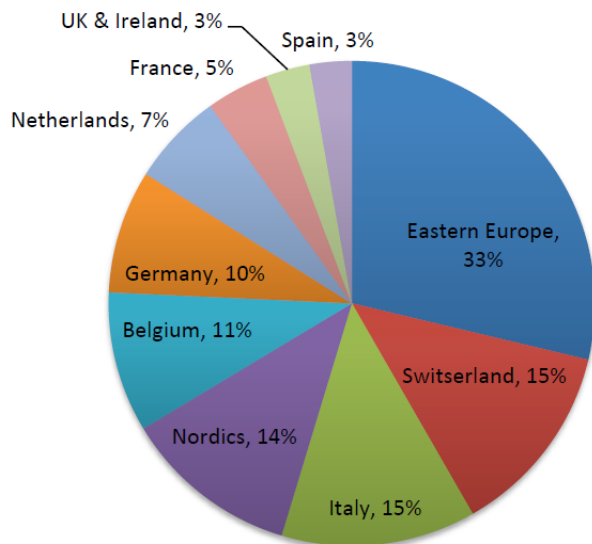
Please rate your view on if academia meets the education needs of the data centre industry

Universities should play a greater role in raising awareness of data centres within existing courses: 52%
Specific University data centre courses should be developed: 48%
Don't know: 20%
Universities provide adequate support right now and should stick to the generic sciences: 8%
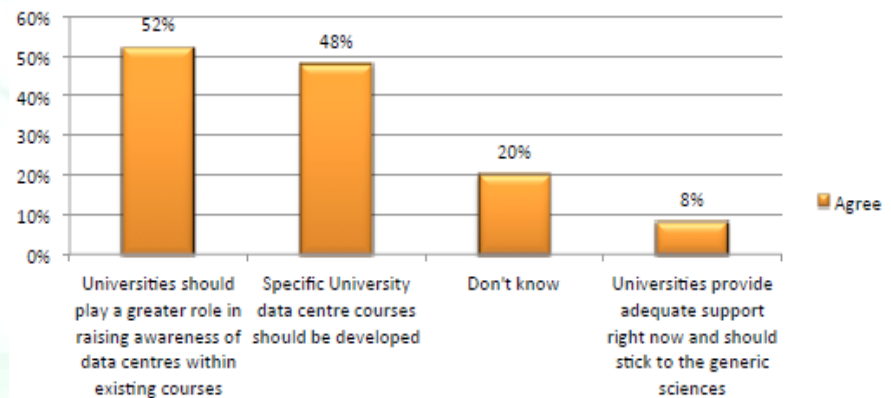
Research - Regional Analysis

- Staffing – no background pattern
- Training – different in each country
- Localised standards
- Strong indication for more academic involvement
- Strong indication for standardised training
- Selection of regional visit activities

Key Areas of Concern by Data Center Operators 2012/2013

Area of Concern	Percentage
Power costs	72.9%
Reduced operating budgets	72.8%
Reduced capital budgets	68.2%
Skills shortage	60.5%
Power availability	51.1%
Labour costs	51.1%
Lack of suitable real estate for development	39.9%
Lack of local outsourcing facilities	34.8%
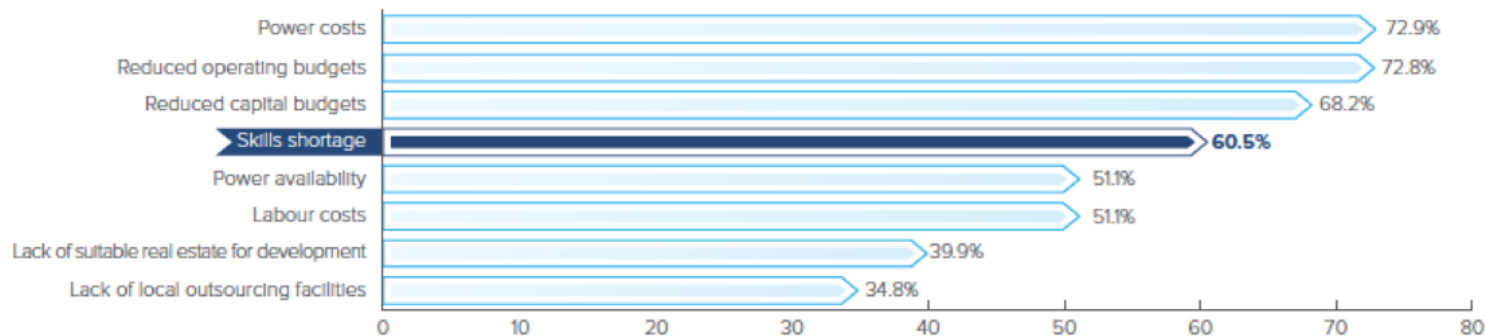
Research - Participant Network

- Not just data centre folk - reaching out to stakeholders
- Disseminating and conducting surveys
- Holding workshops
- Face to face interviews
- regional visits
- Categorisation of participant types

1-What is your organisation's relationship to the data centre industry?

Research – T&R SWOT Analysis

- What does existing Training & Research look like?
- What's the technology background and roadmap?
- Where are their gaps?

What level of data centre staff are the most difficult to obtain?
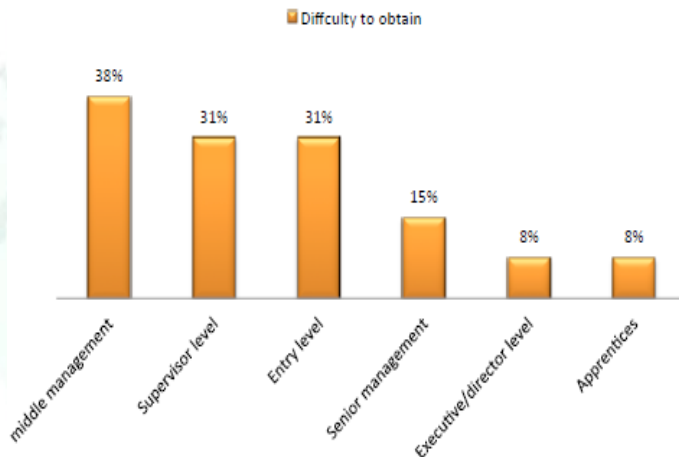
Training: unavailable externally/Need for development
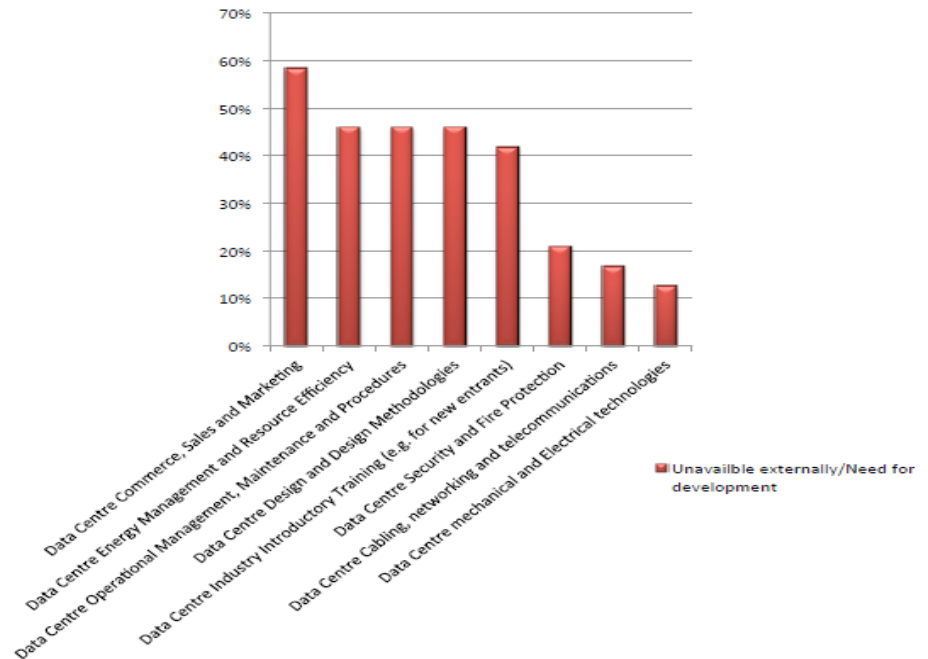
T&R SWOT - Output

- Systematic Literature Review (SLR) found most R&D funded in USA
- Lack of awareness of EU projects
- Evolving Training Institutes
- Gaps in grass roots and top level
- Some sectors not yet covered
- Matrices missing
- Weak link with fast evolving technology and standards

Figure 3. Number of primary studies (identified by the SLR) published per year [8]
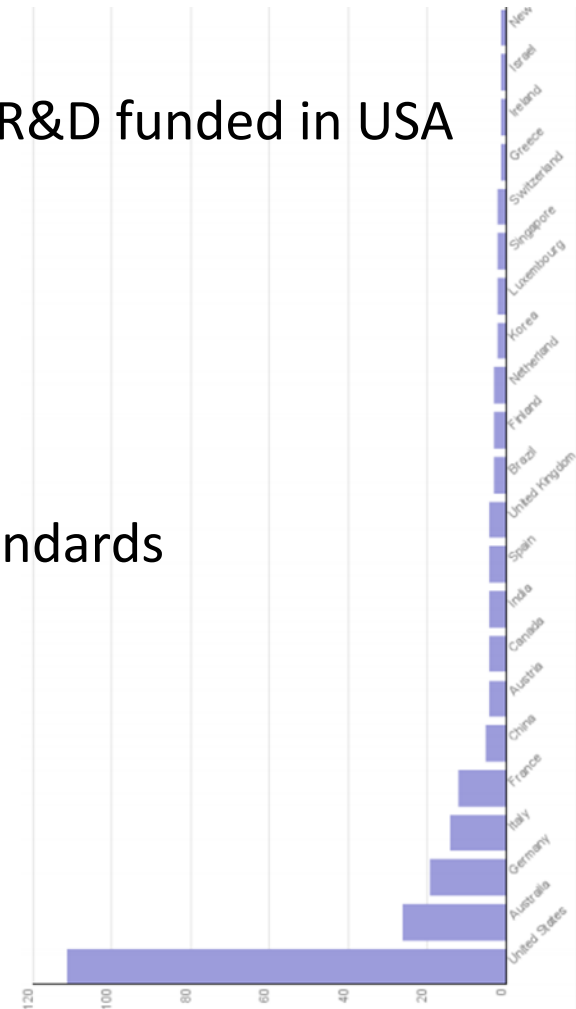
Figure 4. Number of primary studies (identified by the SLR) published per country [8]

Research - Technology Road-mapping

- Looking at how and what technology is in place
- Gaining an understanding of how technology is evolving
- Looking at the standards landscape and its adoption levels
- Looking at the drivers and problems that need solving

Technology Road map: output

- Rapid change in drivers
- Highlighted the changes in each tech area
- Fragmented standards adoption, many on the horizon
- Lack of support for innovation
- EU Code of conduct, strong views, not fully exploited

Research – The Requirements

- Carrying out an analysis from all the research
- Gaining participant views and comments via interviews, workshops and surveys
- Organising and categorising the "needs" into four pillars
- Developing a "plan to make a plan"

The Four Pillars of Requirements

Strategy	Business Innovation	Skills, Training and Education	Awareness
• Setting the Research Agenda • Coordination • Representation • Basic R&D / Idea Generation • Proof-of-Concept • Independent Review • Trusted Information	• Early Stage Technology Development (ESTD) • Development of Standards & Policies • Commercialization Support • IPR Framework	• Gap and Regional Analysis • Skills Identification and Mapping (e.g. SFIA) • Application of Standards & Policies (to training) • Programme Development (defining learning outcomes, etc.) • Programme Accreditation	• Awareness Programmes (e.g. policy makers and stakeholders, awareness events) • Voice for the industry • Quality Assurance and Processes • Cultural Change

PEDCA Focus Panels

- London, Warsaw, Amsterdam and Frankfurt
- Held between July and December 2014
- Each was a whole day – morning and afternoon sessions.
- Used professional "brainstorming" techniques
- Participants from industry stakeholders, governmental, scientific and academia.
- Asked to highlight "Pluses", "potentials" and "concerns"

PEDCA Focus Panels

PEDCA's reach

- More Participants
- 956 people contributed to PEDCA
- Better connectivity with stakeholders

34 – Countries

42 – Universities, Training and Educational Institutes

14 – RDA's (Regional Development Agencies)

21 – Branch and Trade Associations

8 – Standards Development Organisation Committees

10 – Governmental Bodies

3,282 – Participant followers

35,679 – Website visitors
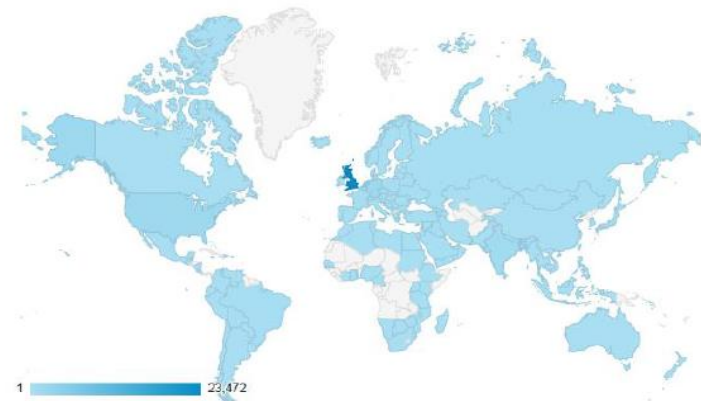
Acquisition			Behavior		
Sessions	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration
35,679	50.86%	18,148	50.22%	5.07	00:05:25
% of Total: 100.00% (35,679)	Site Avg: 50.95% (0.04%)	% of Total: 100.04% (18,141)	Site Avg: 50.22% (0.00%)	Site Avg: 5.07 (0.00%)	Site Avg: 00:05:25 (0.00%)

Six Joint Actions

Strategy

JA01 Technology Leadership Platform
- coordinate R&D
- Support Innovion
- Trusted reviews

JA02 Representation
- Coordination of voice
- Widen participation
- Financial Sustainability

Business Innovation

JA03 Awareness
- Educate & advise
- Shaping policies
- Creating growth opportunities

Skills, Training and Education

JA04 Skills Matrices
- Define skills needed
- Colo sector and industry matrices

JA5 Training Curriculum
- Programme development
- Programme accreditation

Awareness

JA6 Standards, Best Practices & Certifications
- Engaging Members with Standards
- Promoting Best Practices
- Quality Assurance
- Verification of policies

The impact of PEDCA

Jobs

Competetiveness

Reduced CO_2

Enabling Innovation

Exploiting EU Industry Lead

Improving the Workforce

JA01 Technology Leadership Platform	JA02 Representation	JA03 Awareness	JA04 Skills Matrices	JA5 Training Curriculum	JA6 Standards, Best Practices & Certifications
• coordinate R&D • Support Innovion • Trusted reviews	• Coordination of voice • Widen participation • Financial Sustainability	• Educate & advise • Shaping policies • Creating growth opportunities	• Define skills needed • Colo sector and industry matrices	• Programme development • Programme accreditation	• Engaging Members with Standards • Promoting Best Practices • Quality Assurance • Verification of policies

JA1 – Technology Leadership Platform

- Utilise the "network" for leadership
- Build on existing success – e.g. Leeds
- Attract the stakeholders e.g. investors, "end users"
- Disseminate useful research results
- Coordinate new research
- Develop "trusted information" e.g. guidelines, reviews and helpful advice
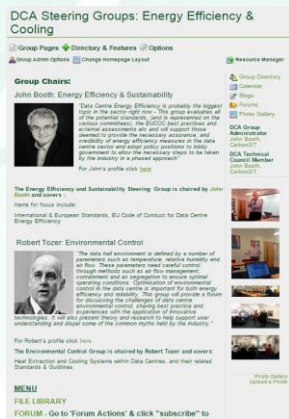
JA1: Data Centre Technology Leadership Platform

The platform consists of: An online portal, a network and activities:

Research

- Directory of research - links and abstracts in logical areas
- Profiles of Universities and other bodies e.g Uni of Leeds etc
- For Investors: industry information, Investment opportunities & events

Activities

- Interactive Research Agenda
- Review and R&D services available
- industry review of bids & strategy

Resources

- ASK An EXPERT - Interactive forum
- Regular Newsletter, blogs
- Trusted reviews - download area : eg publically available reviews of standards, KPI's, products, methods

Expected outputs of JA1

- Reduced risk of research duplication and scope cross-over
- More targeted research and better value for tax payer
- Improved exploitation and use of research results
- Improved awareness and take up of "best practice", new methods and standards
- Improved connectivity to the academic and scientific communities (including outside DC sector)
- Improved investor participation in the sector

JA2 Representation & JA3 Awareness

- Develop industry cohesion
- Improve understanding of data centres in the right places
- Widening of dialogues with stakeholder groups
- Building the network and community

JA2 Representation & JA3 Awareness

- Ensure collective non-profit organisation – aligned with international best practice for non-profits

- Build models to affiliate and collaborate with national representative groups and associations

- Increase the "end user" participation

- Dissemination enhancements

Outputs of JA2 & 3

- Widened participation – strengthened message
- Improved dialogue with stakeholder groups
- Better informed governments
- Improved engagement with educational institutions
- Improved customer adoption rates & uptake of best practices

JA4 Skills Matrices & JA5 Training

- Develop publically available set of skills matrices e.g. like SFIA (short – med – long term by sector)
- Assist with professional development policies
- Assist with developing academic involvement
- Improve the uptake of training
- Interface with fast evolving technology
- DCA will provide more Professional Association services

JA4 Skills Matrices & JA5 Training

- Leverage established EU models to address compatibility between differing national education systems, eg BTEC

- Build criteria that recognises the expertise & experience of existing workforce

- Work with training providers to help endorse the value of training

- Establish entry level training built during PEDCA to assist new entrants to workforce

Other JA4/5 outputs

- Developed "entry level" Training materials
- Conducted 3 courses – trained around 100 students – videos online http://www.data-central.org/page/micrositeBmedia

Outcomes for JA4 & JA5

- Better uptake of training
- Improved industry reputation
- Establish "best practices"
- Assist with quantity and quality of new entrants
- Help sector organisations to better equip themselves for the future
- Provide Career and Professional development roadmaps

JA6 Standards, Best Practices & Certifications

- Improve standards development efforts

- Improve uptake and recognition of best practices e.g. EU Code of Conduct

- Improve governance of standards & policies

JA6 Standards, Best Practices & Certifications

- Raise awareness of SDO's and their use

- Develop use models, case studies, tools for cost benefit analysis of best practices

- Build on DCA's pilot Certifications programme, ensure independence, affordability and non-commercial – the road map is ISO:17021

- Leverage new & existing standards, KPI's & benchmarks

Other JA6 outputs

- Launched DCA Certifications
- Carried out proof of concept data centre certification
- Began Implementing EU Code of Conduct Actions
- 32 Endorser reports obtained

Expected outcomes of JA6

- Better exploitation of standards
- Increased value proposition to end users of EU data centres
- Help address barriers to technology adoption
- Greater impact of best practices
- Increased reputation of data centre sector

What's the impact

- Economic impact calculation "ultra" conservative:
  - 5% Industry CAGR
  - 1% annual impact of JA's
- Five areas of impact considered as measurable:
  - Carbon savings
  - Technical resiliency
  - Commercial resiliency/advantage
  - Overall improvement to EU
  - Industry coherence, number of members
- There are lots of "flaws" (external factors)

Size of EU Data centres

- EU Data centre market is worth €18.85 BN pa

- Employs approx. 138,000 people

- EU data centres account for 11.8GW approx. 3% of total EU electricity production

GDP

Metric Topic	GDP (€Billion)			
	Y0	**Y2**	**Y4**	**Y6**
Cumulative Impact (Using 2014 as a Static Baseline)	€ 0.000	€ 0.303	€ 0.61	€ 0.92
Cumulative GDP Impact (Using and showing 2014 as a Static Baseline)	€ 18.850	€ 19.153	€ 19.46	€ 19.77
Cumulative Impact (Assuming Annual Industry Growth of 5% p.a)	€ 0.000	€ 0.33	€ 0.74	€ 1.24
Cumulative GDP Impact (using 2014 and showing as a static baseline and assuming Annual Industry Growth of 5% p.a.)	€ 18.850	€ 21.12	€ 23.64	€ 26.50

Energy

Metric Topic	Energy Savings impact (GW)			
	Y0	**Y2**	**Y4**	**Y6**
Cumulative Energy Savings Impact (Using 2014 as a Static Baseline)	0	-0.0602	-0.1214	-0.1836
Cumulative Energy Savings Impact (Using and showing 2014 as a Static Baseline)	3.75	3.68976	3.62855	3.56636
Cumulative Energy Savings Impact (Assuming Annual Industry Growth of 5% p.a.)	0	-0.0664	-0.1476	-0.2461
Cumulative Energy Savings Impact (using 2014 and showing as a static baseline and assuming Annual Industry Growth of 5% p.a.)	3.75	4.06796	4.40869	4.77892

Green House Gases

| Metric Topic	GHG (tonnes)			
	Y0	Y2	Y4	Y6
Cumulative GHG Impact (Using 2014 as a Static Baseline)	0	-621.03	-1853	-3655.4
Cumulative GHG Impact (Using and showing 2014 as a Static Baseline)	38660	38039	36807	35004.6
Cumulative GHG Impact (Assuming Annual Industry Growth of 5% p.a.)	0	-684.69	-2251.4	-4898.3
Cumulative GHG Impact (using 2014 and showing as a static baseline and assuming Annual Industry Growth of 5% p.a.)	38660	41938	44720.5	46906.1

Jobs

Metric Topic	Jobs			
	Y0	Y2	Y4	Y6
Cumulative Jobs Impact (Using 2014 as a Static Baseline)	0	2232	4500	6805
Cumulative Jobs (Using and showing 2014 as a Static Baseline)	138960	141192	143460	145765
Cumulative Jobs Impact (Assuming Annual Industry Growth of 5% p.a.)	0	2461	5468	9119
Cumulative Impact (using 2014 and showing as a static baseline and assuming Annual Industry Growth of 5% p.a.)	138960	155664	174304	195325

The Future

- JAP design guided entirely by participants
- Will follow the sustainability plan of the project
- Natural evolution of DCA: new constitution and improvements
- Open and subject to further change by participants

Implementation plans

- Steering group reorganisation
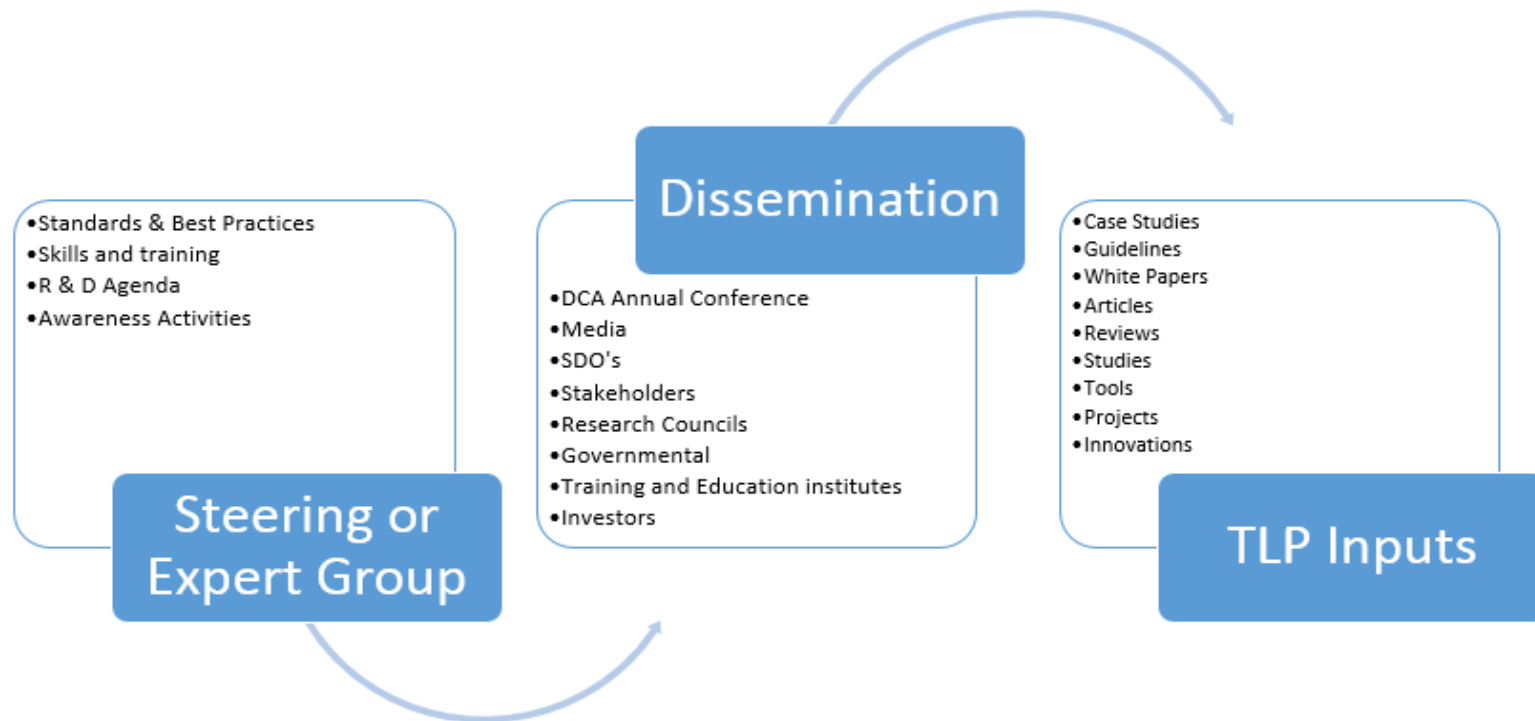
Implementation Plans

- Construction of TLP:
  - Population of EU funded projects
  - Results of PEDCA
  - Access to Groups
  - Certification case studies & resources
  - EU Code resources
  - Energy Efficiency Case studies
  - Standards development work

Summary

- The PEDCA team has identified 6 Joint Actions for the DC sector in Europe arrived at with significant stakeholder engagement.

- The "JAP" together with details are publically available – over 500 pages and 85,000 words

- PEDCA will be implemented throughout 2015