Data Center
Regulations, Standards, & Consortia

Octobre 2011

Christophe Garnier

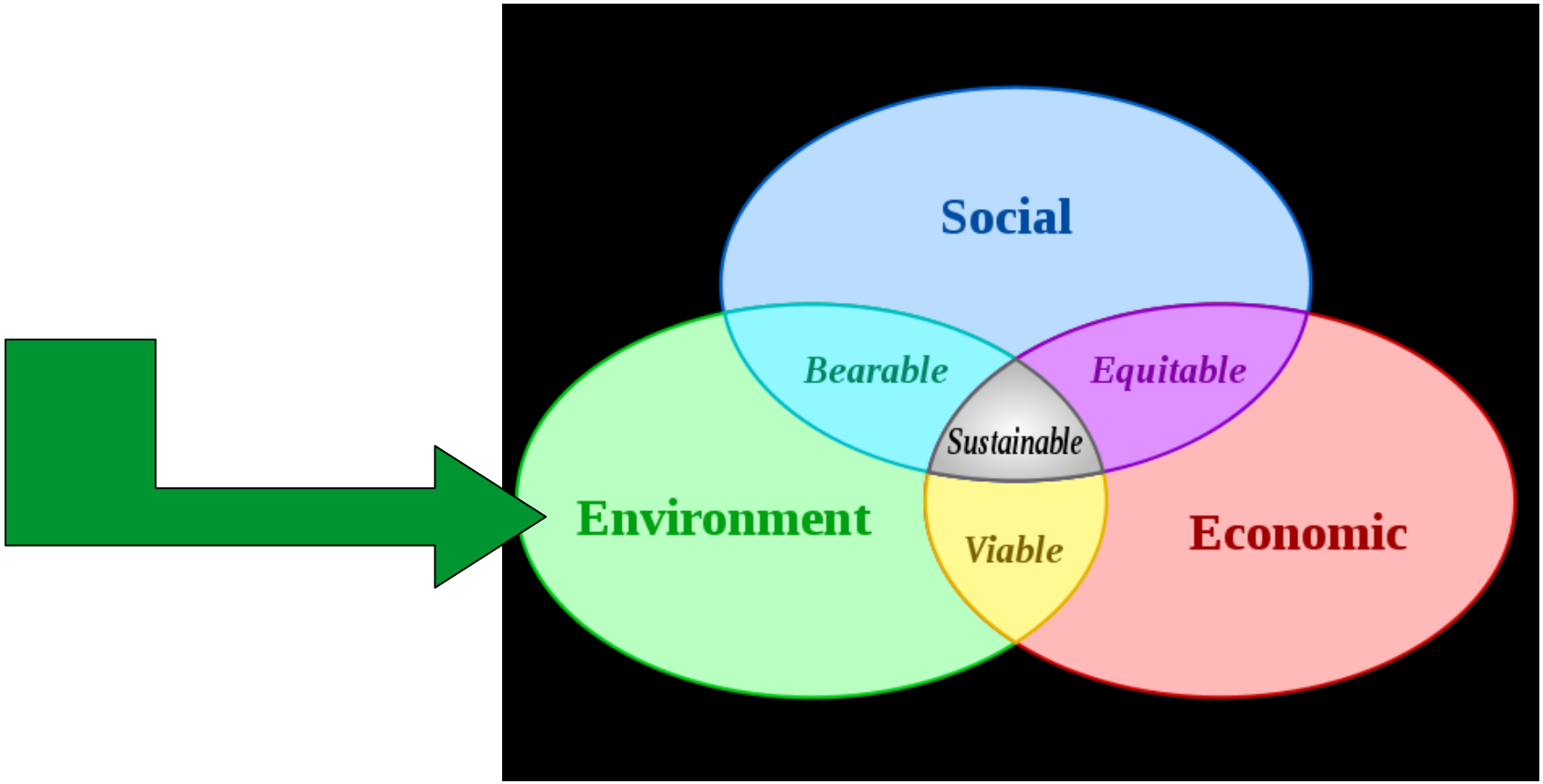
About myself

- Join MGE in 1996, when separation from =S=
  - 1996 ->1998 : marketing
  - 1998 ->2003: Web
  - 2003->2006: Eco-design in R&D
  - 2007: Environmental Affairs, ITB and Corporate
- Today
  - Standardization committees World, European or national level
  - Consortia
  - Focus on environmental issues, including energy efficiency

Environmental Worldwide trends

- Substances
  - RoHS WW, REACH, Prop 65,…
  - Nanomaterials
- Energy efficiency
  - Eco-design, ErP, Coc, EnergyStar, Green Datacenters,…
- Resource efficiency
  - Conflict minerals
  - Raw materials, Eco-design, ErP, WEEE, Battery, Packages, …

Environment vs sustainable



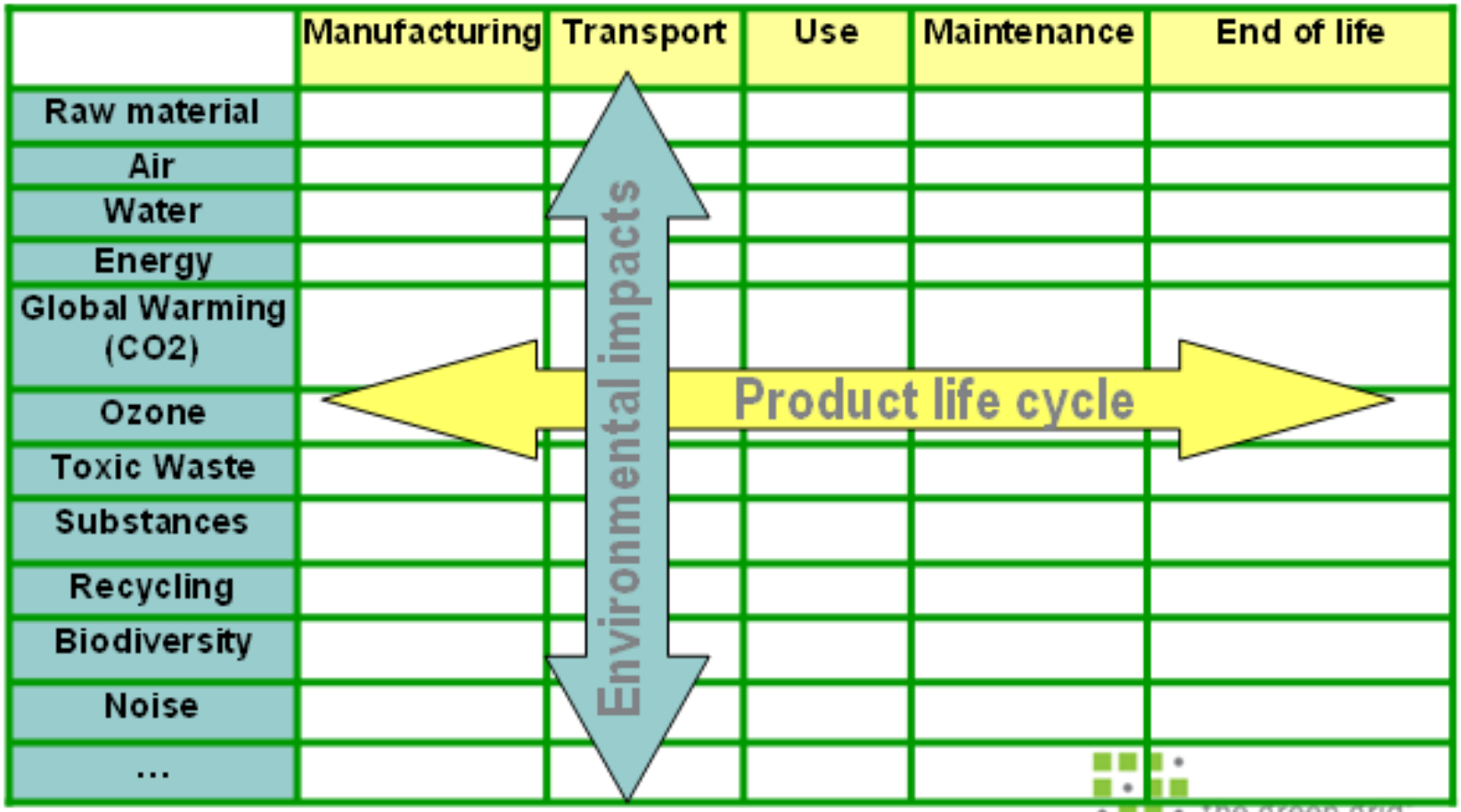
ISO 26000 Standard providing guidelines for social responsibility (SR) (Nov 2010)

Which Is Greener?

- **Paper or plastic bags?**
  - Plastic – if you reuse
- **Washed or dirty car?**
  - Dirty
- **Hand drier or paper towels?**
  - Electric hand drying machine
- **Movies from video store or online store?**
  - Online
- **Print or online newspaper?**
  - Paper, if reading for more than 30 minutes
- **Organic beef or stock-yard beef?**
  - Stock-yard beef

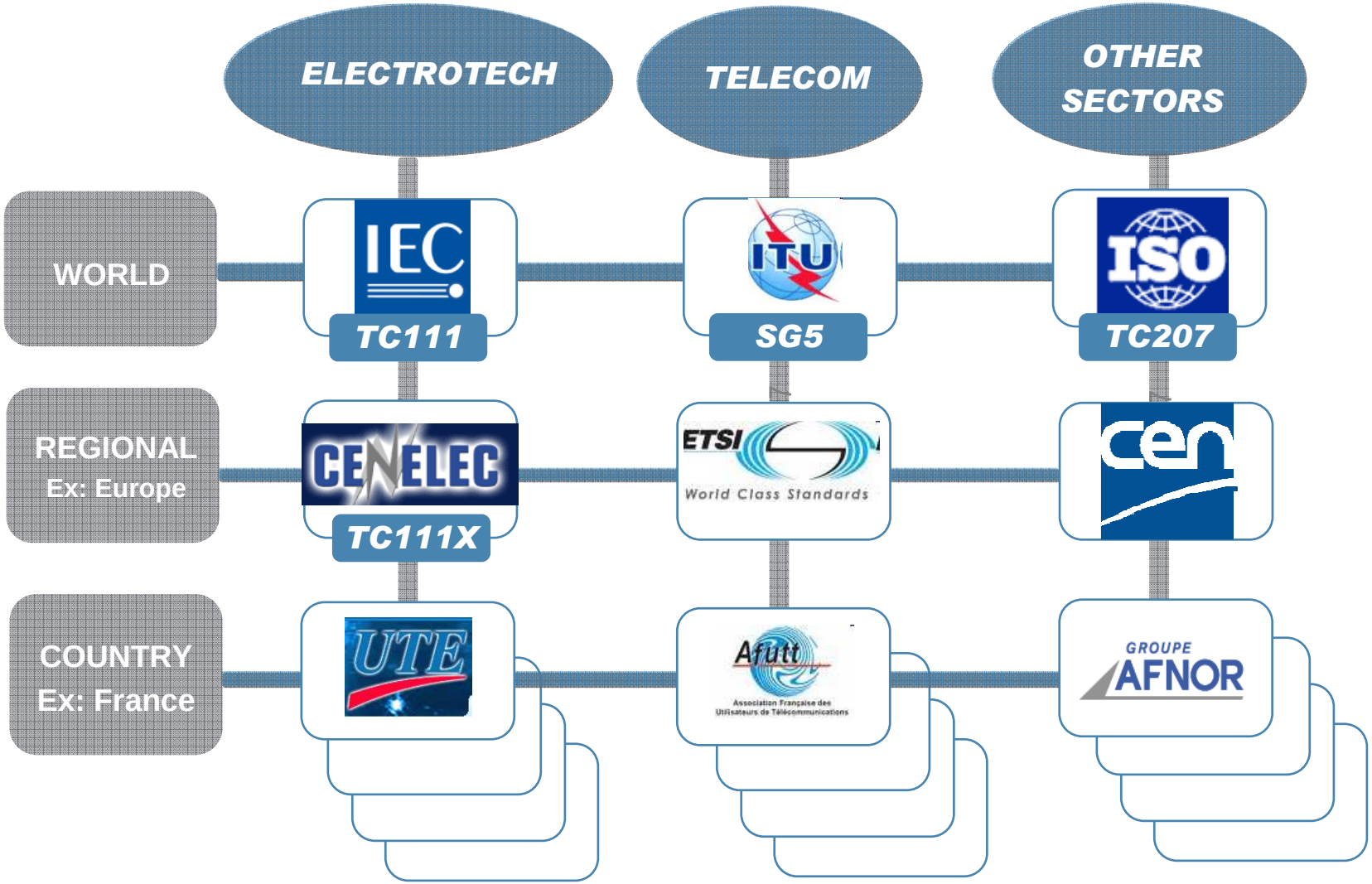
1.4 Complete product life cycle

A complete LCA should cover **all life cycle stages** and all **environmental impacts**



Standardization bodies

Standardization bodies

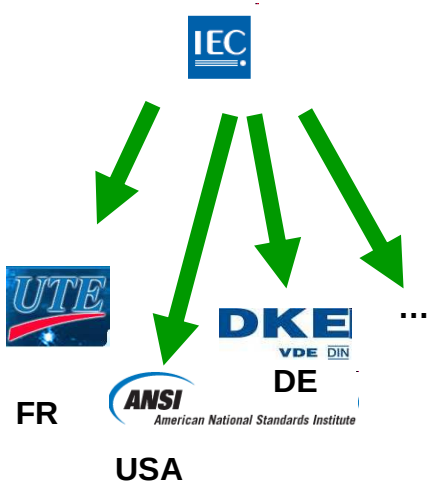


Standardization bodies

World

IEC

- International Electrotechnical Commission http://www.iec.ch/
- Location: Geneva (Switzerland), founded 1906
- Scope = World
- 81 Members = National Committees
- 1 NC = 1 vote
- 116 technical committees
- 20 ISO/IEC Joint committees



IEC Technical Committees

Committee	Description
TC 1	Terminology
TC 2	Rotating machinery
TC 3	Information structures, documentation and graphical symbols
SC 3C	Graphical symbols for use on equipment
SC 3D	Data sets for libraries
TC 4	Hydraulic turbines
TC 5	Steam turbines
TC 7	Overhead electrical conductors
TC 8	Systems aspects for electrical energy supply
TC 9	Electrical equipment and systems for railways
TC 10	Fluids for electrotechnical applications
TC 11	Overhead lines
TC 13	Electrical energy measurement, tariff- and load control
TC 14	Power transformers

...

...

TC 101	Electrostatics
TC 103	Transmitting equipment for radiocommunication
TC 104	Environmental conditions, classification and methods of test
TC 105	Fuel cell technologies
TC 106	Methods for the assessment of electric, magnetic and electro exposure
TC 107	Process management for avionics
TC 108	Safety of electronic equipment within the field of audio/video, i technology
TC 109	Insulation co-ordination for low-voltage equipment
TC 110	Flat panel display devices
TC 111	Environmental standardization for electrical and electronic pro
TC 112	Evaluation and qualification of electrical insulating materials
TC 113	Nanotechnology standardization for electrical and electronic p
TC 114	Marine energy - Wave, tidal and other water current converters
TC 115	High Voltage Direct Current (HVDC) transmission for DC volta
TC 116	Safety of hand-held motor-operated electric tools

Overview of IEC TC22

- Officiers
  - **Mr Peter Zwanziger** (DE) , Secretary: **Mr Jürgen Steinke** (CH)
- Scope
  - To prepare international standards regarding systems, equipment and their components for electronic power conversion and electronic power switching, including the means for their control, protection, monitoring and measurement. Note 1.- Components which are comprised within the scope include electronic devices. Note 2.- The scope does not include telecommunications apparatus other than power supplies to such apparatus.
- SC 22E - Stabilized power supplies
  - Chair: Mr Robert A. Taylor (GB) , Sec: Mr H. Dick Van Zuylen (CH)
- SC 22F - Power electronics for electrical transmission and distribution systems
  - Chair: Mr Ruifeng Gou (CN) Sec: Mr Lev V. Travin (RU) –
- SC 22G - Adjustable speed electric drive systems incorporating semiconductor power converters
  - Chair: **Mr Martial Patra** (FR) Sec: Mr Kenneth E. Gettman (US) –
- SC 22H - Uninterruptible power systems (UPS) + STS
  - Chair: Mr Per Grandjean-Thomsen (AU) Sec: Mr **Eric Brun** (FR) Secretary, Ass Sec: N Reynaud (FR) –
  - IEC 62040-4 “Environmental consideration of UPSs” Convenor **C Garnier**

Overview of IEC TC111

Published

In progress

Investigate

WG1: Material declaration — IEC 62474 + Validation Team (FDIS 2011) (Active)

WG2: Environmentally conscious design — IEC 62430 Ed.1.0
Disbanded. MT?

WG3: Test procedures of regulated substances — IEC 62321 Ed.1.0
Split in 7 parts

- **PT3: Sampling test pieces** — PAS 62596 Ed.1.0

PT 62476: Guidance for evaluation of product with respect to substance use restrictions — TR 62476 Ed 1.0

PT 62542:Terminology — IEC 62542 (CDV)

PT62635: Recyclability evaluation

PT62050: Info exchange

2 days meeting, Melbourne

PAS 62545:Environmental Information of products

2 days meeting, Melbourne

WG5: TR62725/62726 Life Cycle GHG Emissions / GHG reductions

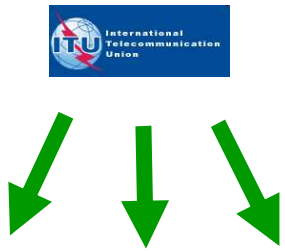
ISO

- International Organization of Standardization http://www.iso.org
- Location: Founded 1847
- Scope = World
- Members = 163 National Committees (World = 203 countries)
- Vote: 1 country = 1 vote
- Mission
  - Develop WW recognized standards
  - Official languages: English, French and Russian
- TC 207: Environment
  - 14001: Environment Management System
  - 50001: Energy Management System
    - Local/product application: Singapore stan[illegible]Green DataCenter
- ISO/IEC JTC1
  - Energy Efficiency of DataCenter
    - 2nd plenary meeting Oct 2011
    - Will move from Study Group -> Working Groups
  - **Christophe Garnier** Expert

National committees

FR **USA**

ITU



- International Telecommunication Union http://www.itu.int
- Location: Geneva (Switzerland), Founded: 1865
- Scope = World
- **Membership**
  - 191 Member States (Official Designations)
  - 564 Sector Members
  - 153 Associates

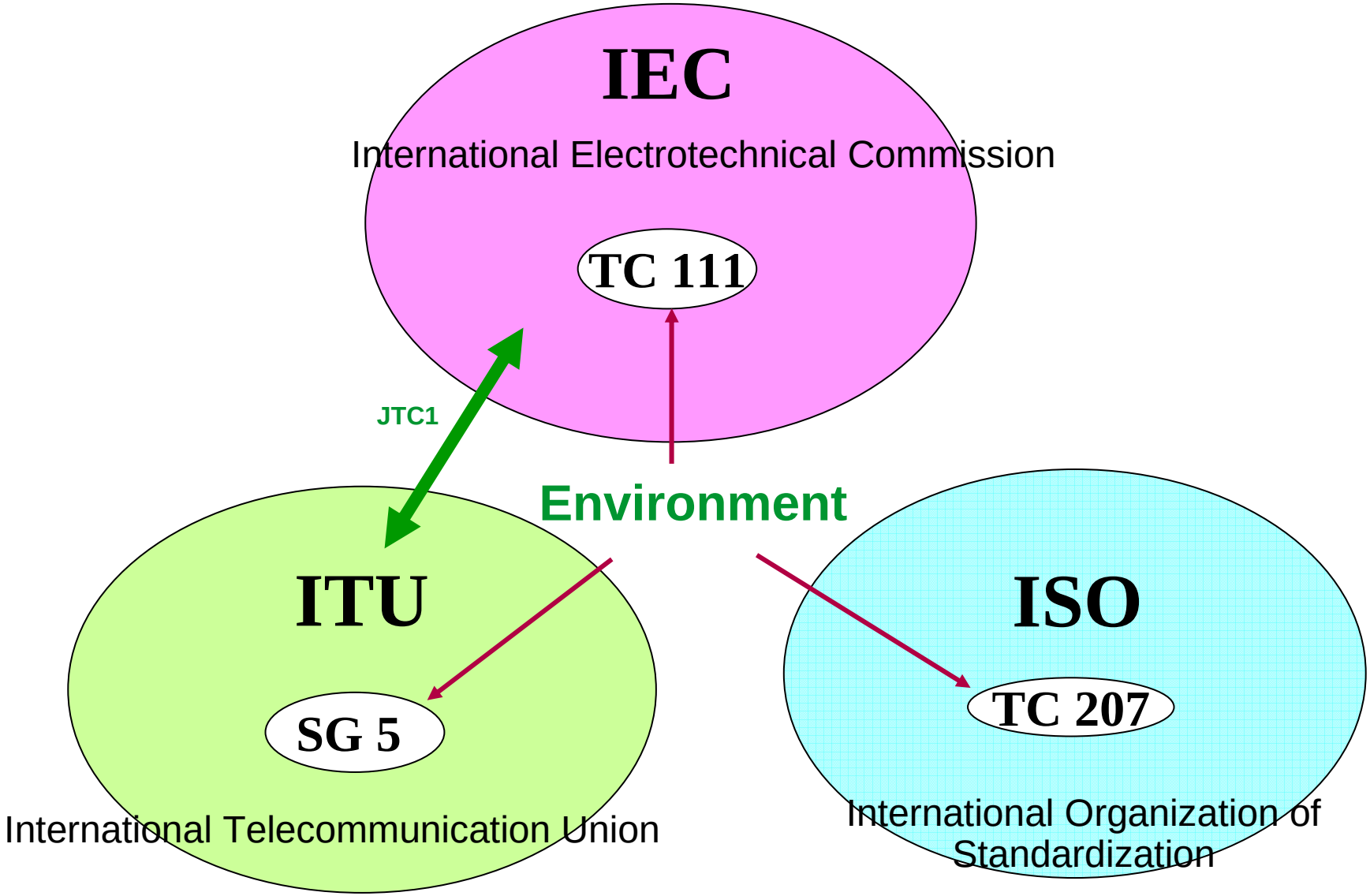
National committees

...

FR

- ITU-T SG5: Methodology for environmental impacts assessment of information and communication technologies (ICT) goods, networks and services

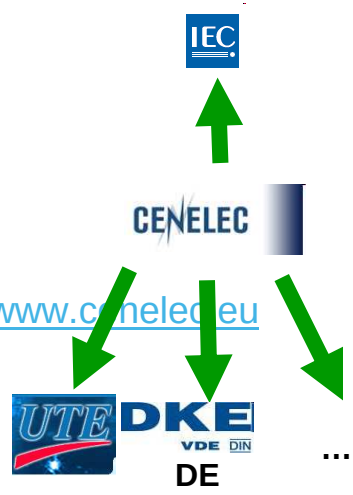
Environment in ISO/IEC/ITU



Standardization bodies

Europe

CENELEC



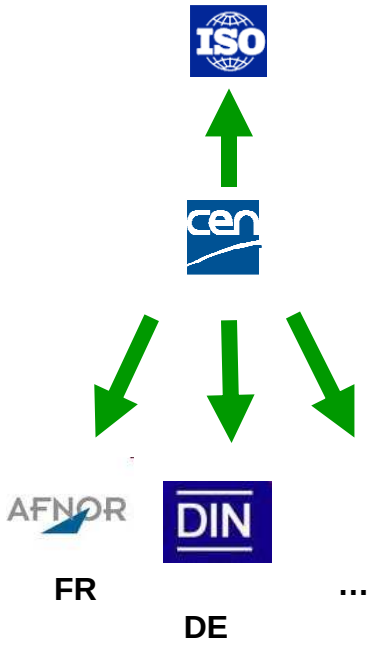
- European Committee for Electrotechnical Standardization
  Comité Européen de Normalisation Electrotechnique http://www.cenelec.eu
- Location: Brussels, Founded 1973
- Scope = Europe
- Members = 31 European countries + 11 neighboring countries
- Mission
  - Prepare electrotechnical standards that help develop the Single European Market (EN Standard)
  - IEC Mirror committees
  - Provide harmonized standards (compliance) for the electrotechnical field under the New Approach (CE Marking)

CLC/TC 22X – 111X

- CLC/TC 22X
  - Power electronics
    - Chairman Benno Weis (DE) – **Secretary: Martial Patra (FR),** Assistant Secretary: Eric Brun (FR)
  - Scope
    - To prepare standards dealing with power electronics.The standards will deal with equipment, their component parts (especially electronic devices) and their extension to the system aspect.

- CLC/TC 111X
  - Officers
    - Chairman: **Dr Herbert MROTZEK** (Germany) – Secretary: **Mr Andrea LEGNANI** (Italy)
  - Scope
    - To deal with environmental aspects for electrical and electronic products and systems.

CEN



- Comité européen de normalisation - European Committee for Standardization http://www.cen.eu
- Location: Brussels, Founded
- Scope = Europe
- Members = 31 European countries
- Vote
- Mission
  - Prepare standards that help develop the Single European Market (EN Standard)
  - Support IEC
  - Provide harmonized standards (compliance) for the electrotechnical field under the New Approach (CE Marking)

ETSI

- European Telecommunications Standards Institute (ETSI)
  http://www.cen.eu
- Location: Nice (France), Founded 1988
- Scope = Europe
- Members = 700 from 60 countries
- Vote
- Mission
  - produces globally-applicable standards for ICT (Information and Communications Technologies), including fixed, mobile, radio, converged, broadcast and internet technologies.

CEN/CENELEC/ETSI

- Joint committee

- **CEN-CENELEC-ETSI Coordination Group on Green Data Centres**
  - First meeting June 9th, 2011
  - Terms of reference TBD during meeting
  - Chair **André Rouyer**
  - Expert **Christophe Garnier**

JRC

European Commission
Joint Research Centre

- Location: Europe (BE, DE, IT, NL) 1
- Scope = EU
- Members = The JRC employs around 2750 staff coming from throughout the EU, its budget comprises €330 million, coming from the EU's research budget
- Mission: provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies. As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union. Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.

Stakeholders

Experts

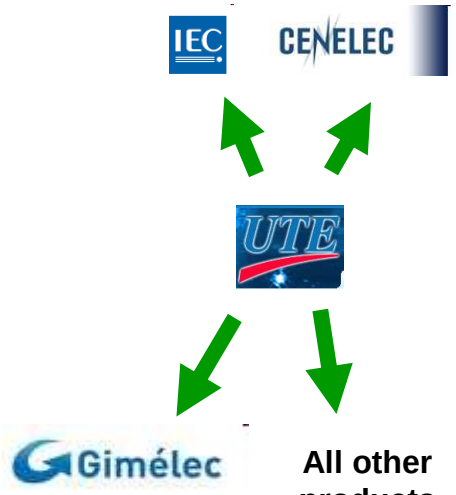
- UPS Code of Conduct (Website)
  - **JRC European project with strong presence of Schneider ITB**
  - **Voluntary agreement of UPS manufacturers for energy efficiency and better environmental impact of products: APC by Schneider, EATON, Emerson, Chloride, Meta System, Riello, Socomec**
  - **Version 1.0a Jan 22nd, 2008. New revision under discussion**
- Data Centers Code of conduct (Website)
  - **JRC European project with strong presence of Schneider ITB**
  - **Identify possible energy savings, without reducing performance or hampering technological development**
  - **Identify the systems and components that can be optimized, using international metrics and test methods**
  - **Version 2.0 Jan 1st, 2010.**
- EU Energy Star (Website)
  - **Voluntary energy labeling program for office equipment.**
  - **1stl Agreement was signed December 2000 between the Government of the United States of America and the European Community intended to co-ordinate energy-efficient labeling programs for office equipment – computers, monitors, copiers, printers, scanners and fax machines**
  - **2nd agreement: Dec2006**

Standardization bodies

Country (Ex: France)

UTE

- **Union Technique de l'Electricité** http://www.ute-fr.com
- Location: Paris-Puteaux (France), Founded
- Scope = France to EU / World. (US equivalent = ANSI)
- Members =
- Vote: define France voting for IEC standards
- Mission
  - Represent France to IEC



AFNOR

- **Association Française de Normalisation**
- Location: Paris (France), Founded
- Scope = France (+ EU / World)
- Members = Companies / Trade associations

World Trade associations

The Green Grid

- **The Green Grid**
  - Presentation
- Scope = World
- Members = Companies (Board: 11, Contributor: 30)
- Mission
  - *The Green Grid is a global consortium dedicated to advancing energy efficiency in data centers and business computing ecosystems.*

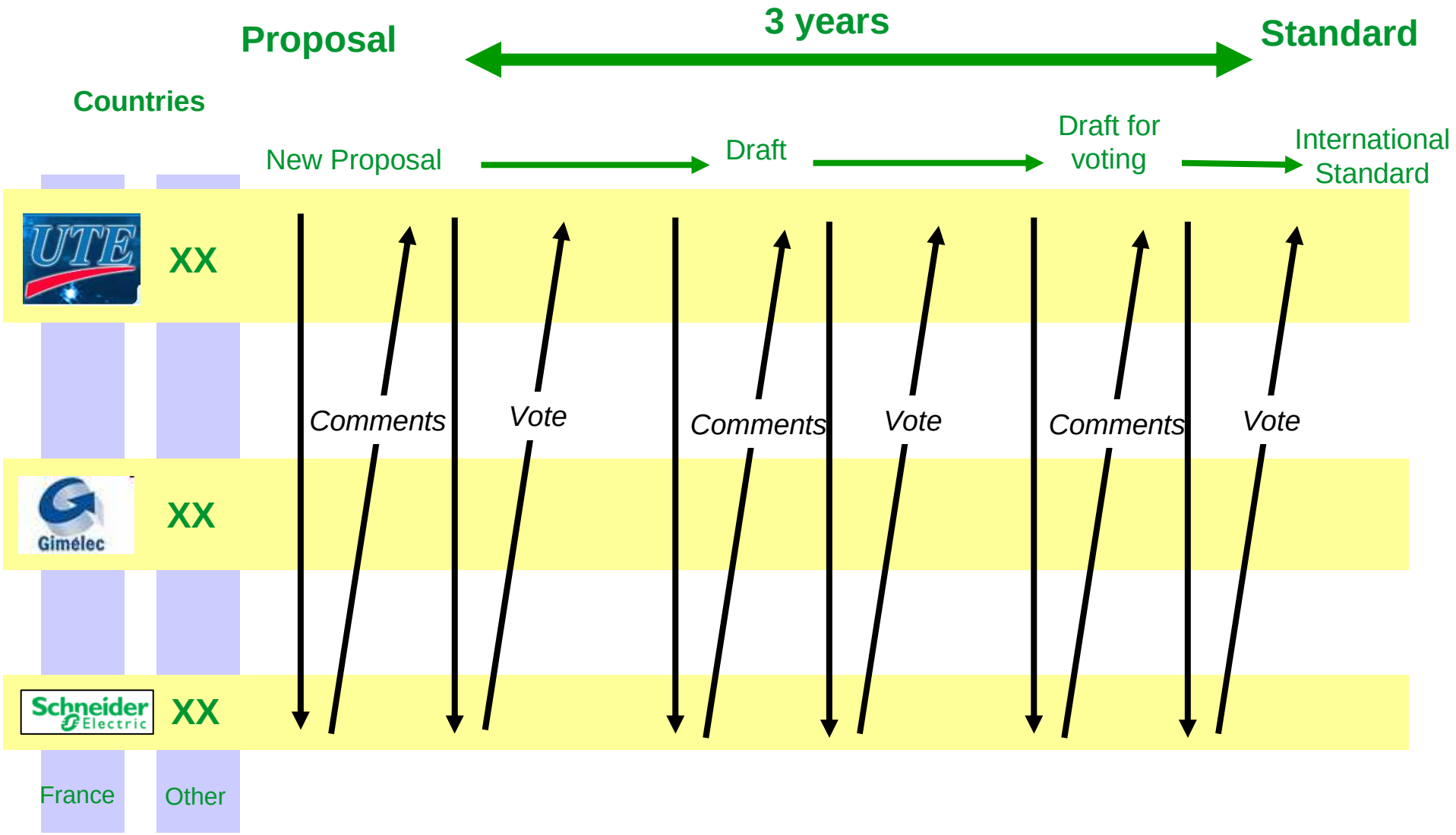
- **John Tuccillo**, Chair of the Board
- **Christophe Garnier** Convenor of the WG on “Life Cycle Analysis of DC”

French Trade associations

GIMELEC

- **Groupement des Industries de l'Equipement Electrique, du Contrôle-Commande et des Services associés**
- Location: Paris, Founded
- Scope = France (US equivalent = NEMA)
  - Membership mandatory to get access to EU ar[illegible]d
  - GIMELEC activity is dedicated to French market
  - Do not publish standards
- Members = 229 companies
- Structure
  - Chairman, Secretariat / Technical board
  - 4 Groups: Buildings, Industry, Energy infrastructure, Services
  - A22 = mirror committee IEC SC22H.

Standard procedure development



Consortia and other associations

GeSI

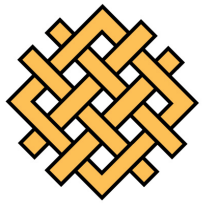
- **Glabl e-Sustainability Initiative**
- Founded
  - In June 2008, GeSI became an international non-profit association with an office near the EU institutions in Brussels, Belgium.
- Scope
  - Our mission is to provide business leadership as a catalyst for change toward sustainable development, and to support the business license to operate, innovate and grow in a world increasingly shaped by sustainable development issues.
- Structure
  - Full Members = companies (Alcatel, Nokia, CISCO,…)
  - Associated Members = UNEP and WWF
  - Partners = ETSI, ITU, STEP, WBCSD, WRI.

WBCSD

World Business Council for
Sustainable Development

- **World Business Council for Sustainable Development**
- Founded 2001
  - On the eve of the 1992 Rio Earth Summit to involve business in sustainability issues and give it a voice in the forum.
- Mission
  - The Council provides a platform for companies to explore sustainable development, share knowledge, experiences and best practices, and to advocate business positions on these issues in a variety of forums, working with governments, non-governmental and intergovernmental organizations.
- Structure
  - 200 companies, 30 countries, 20 major industrial sectors
- Schneider is member

WRI



WORLD
RESOURCES
INSTITUTE

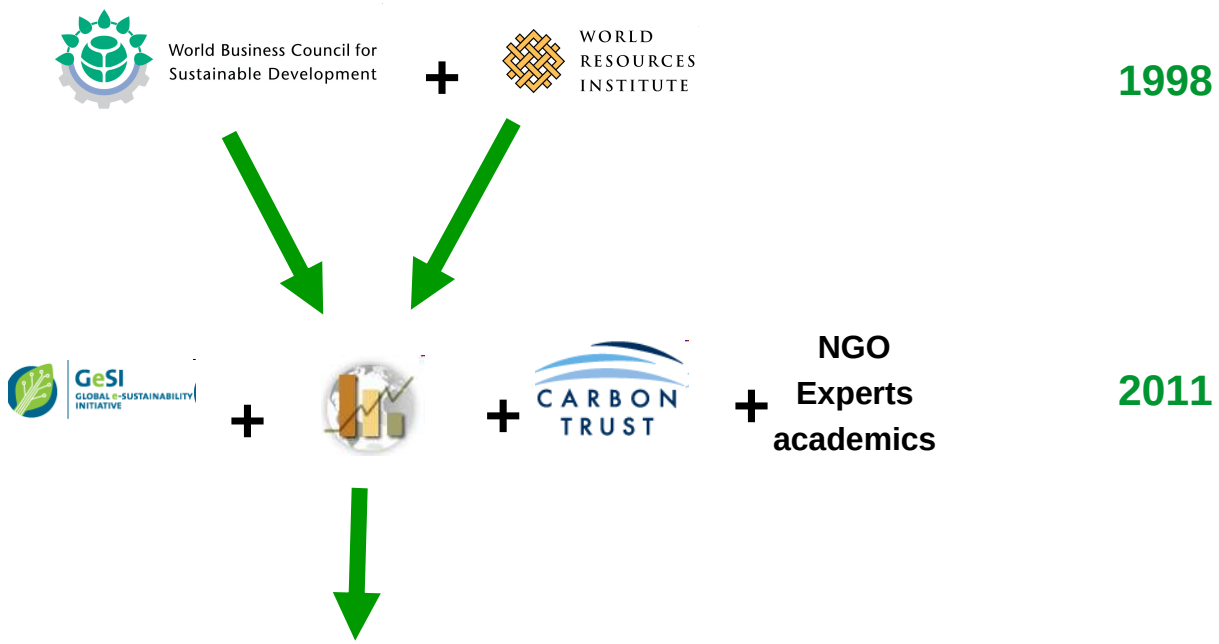
- **World resources Institute**
- Founded
  - WRI was launched June 3, 1982 as a center for policy research and analysis addressed to global resource and environmental issues.
- Location
  - Washington, DC.
- Mission
  - **WRI is a global environmental think tank that goes beyond research to put ideas into action.** We work with governments, companies, and civil society to build solutions to urgent environmental challenges.
  - Our mission is to move human society to live in ways that protect Earth's environment and its capacity to provide for the needs and aspirations of current and future generations.
- Structure
  - President: Jonathan Lash
  - Members
    - Individual expert
    - Companies

Carbon Trust

- Location: London, Founded: 2008?
- Mission
  - The Carbon Trust is a not-for-profit company with the mission to accelerate the move to a low carbon economy. We provide specialist support to help business and the public sector cut carbon emissions, save energy and commercialise low carbon technologies. By stimulating low carbon action we contribute to key UK goals of lower carbon emissions, the development of low carbon businesses, increased energy security and associated jobs.
- Structure
  - Our Board, led by Chairman, Sir Ian McAllister CBE, is responsible for approving our overall strategy and all investment decisions. It includes three executive directors and sixteen non-executive directors.

GHG Protocol

- GHG Protocol
  - the most widely used international accounting tool for government and business leaders to understand, quantify, and manage greenhouse gas emissions.



- Develop 7 ICT Sectors Guidance to support the GHG Protocol Product Standard
  - PR March 8th, 2011
  - Overview of initiative, March 10th, 2011
  - Datacenter Chapter: Draft End 2011, publication Feb 2012

Chapters

- **Hardware and Equipment**
- **Software**
- **Telecoms Network Services**
- **Desktop Managed Service**
- **Cloud computing**
- **Transport Substitution**
- **Data Centres**
  - Broad Definition of “Data Center”
  - Functional Unit
    – Floor size, KW, KWh ?
  - Life Cycle
    –Construction, Use, E-o-L [Focus on Use stage]
  - Organisational and Operational Boundaries
    –Data CenterLeasing models
  - Calculation and Estimation techniques
    –Floor area, equipment KW rating, metered KWh
  - Green Grid

European RoHS 2002/95/EC

- Restriction of the use **of certain hazardous substances in electrical and electronic equipment: Suppression of lead, cadmium, mercury, Chromium VI, PBB/PBDE in EEE**
- **UPS not listed. Based on article 95**
- **No mandatory marking**
- **UPS manufacturers Position:**
  - **Voluntary decision to comply with RoHS upon customer request to avoid quality/cost/delay risks**
  - **No conversion of large UPS**
- **RoHS review -> Dec 08, final 2011**
  - Harmonize scope of products concerned by WEEE and RoHS: Add medical (Cat 8) and control equipment (cat 9) in RoHS Scope
  - Coherence between RoHS and REACH
  - New substances: covered by REACH
  - 4 years revision to be replaced by 4 years authorization
  - Clear: fixed installation, put on the market…
  - More market control
  - Part of CE Marking

Etc…

Other RoHS

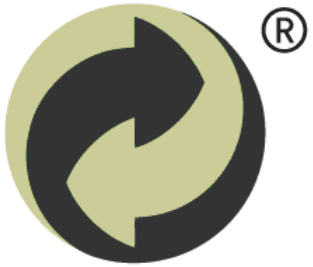
- Other RoHS legislations, this includes
  - China,
  - Korea,
  - Japan,
  - Turkey,
  - and the USA states of California and New Jersey.
  - Ukrain (Jan 1st, 2011)

Waste

- **WEEE Directive, Battery directive, Packaging directive**
- **Eco-taxes in European countries**
  - **WEEE is mandatory for small products (Save money), voluntary for larger products (Make money)**
  - **Packaging according to the amount of packages put on the market (Green Dot)**
  - **Batteries declaration only when industrial**
- **Waste management is transverse: administrative work, product marking, service offer, reverse logistics organization…**

WEEE

Battery



Packaging

ErP Energy Related Products 2009/125/EC

- **As of November 20, 2009 the Eco-Design Directive EuP was replaced with the new energy-related products directive (ErP) 2009/125/EC. The old Eco-Design Directive for energy using products only covered products that were using energy such as a microwave, washing machine or a television. The new ErP-Directive covers products under the old EuP Directive as well as products that are energy-related and do not directly use energy such as such as double glazing windows, taps and showerheads.**

- Directive establishing a framework to reduce environmental impacts by setting Ecodesign requirements for energy-using products Based on article 95

- Manufacturers must prove they work on reducing the environmental impacts : raw material, energy, eco-mode, recycling, emission (air, water, EMC, noise…)

- How to comply:
  - **Voluntary agreement to avoid future obligation. For instance, UPS Code of Conduct (Work in EU/JRC)**
    or
  - **Regulation specific per product: new or existing directive**

REACH Regulation

T - Toxique

Xn - Nocif

Registration of chemical substances

Evaluation of the information supplied

Authorization for

CHemicals of high concern, based on health or environmental hazards

- **The aim of REACH is to improve the protection of human health and the environment through the better and earlier identification of the properties of chemical substances. The principle is 'no data, no market'**

UPS Energy Star

- EPA (U.S. Environmental Protection Agency) is developing an EnergyStar specification for UPSs

  http://www.energystar.gov/index.cfm?c=new_specs.uninterruptible_power_supplies

- Objectives
  1. provide purchasers with the means to identify the most energy efficient UPS
  2. provide tools and information to improve the efficiency of data center operations,
  3. provide uniform efficiency testing conditions and reporting criteria to enable comparison of products.
- Scope
  - Products: EPA's intention is for the Version 1.0 specification to cover as much of the market as can be reasonably addressed in a timely manner, while maximizing the opportunities for energy savings.
  - Geographic: US Standard, but the standard will apply in Europe because of the agreement on Office Products in place between EPA and EU. Australia, Canada, Japan, New Zealand, Switzerland and Taiwan also follow ENERGY STAR.

DataCenter Energy Star

Summary of Initiatives in Energy Efficiency of Data Centers

- Standardization committees
  - First dedicated standard: Singapore Standard for Green Data Centers (SS564).
  - ISO 50001: Energy Management System (Similar to ISO 9001 Quality, ISO 14001 “Environment)
  - ISO/IEC: JTC1 Energy Efficiency of Data Centers
  - ITU: Methodology for environmental impacts assessment of information and communication technologies (ICT) goods, networks and services
  - IEC TC111: GHG Footprint of electric electronic equipment
  - Europe Code of Conduct for Data Center
- Consortia
  - GHG protocol: a Datacenter Chapter is in preparation (Feb 2012)
  - The Green Grid

the green grid
get connected to efficient IT

World Business Council for Sustainable Development

WORLD RESOURCES INSTITUTE

Thanks

Merci