BEFORE STARTING

HOUSEKEEPING

- Turn on your system's sound to hear the streaming presentation
- **Questions?** Submit them into the question box!
- The webinar on Twitter @ICTFOOTRPRINTeu

ICTFOOTPRINT.EU

European Framework Initiative for Energy & Environmental Efficiency in the ICT Sector

Webinar: Solutions for Energy Management & Life Cycle Assessment (LCA) in ICT

In parternship with:

Thursday, 27th April 2017

Speakers

Jean-Marc Alberola
Vice Chairman ISG OEU
ETSI

Energy Strategy Leader
AIRBUS

Fadri Casty
Head of Sales & Business Development
ecoinvent

Tereza Lévová
Environmental Engineer & Project Manager
ecoinvent

Berina Delalić
Component Leader
multEE

Silvana Muscella - Moderator
Founder & CEO
Trust-IT Services

The ICTFOOTPRINT.eu initiative -In a nutshell

Mission

Become "THE" consolidated effort that, at European level, raises awareness on metrics, methodologies & best practices in measuring the energy and environmental efficiency of the ICT-sector, to facilitate their broad deployment & uptake.

Stakeholders

- **ICT Intensive SME**
- **ICT Suppliers**
- **Cities & Public Administration**
- **Standard Development Organisations**

Helping you choose your Low Carbon & Energy Efficiency in ICT

Main Outputs for our stakeholders

ictfootprint.eu

Marketplace	**Buyer: Find sustainable ICT suppliers & publish ICT sustainable needs. Seller: publish ICT sustainable services or procurements & search for clients.**
Webinars	**Know more on sustainable ICT: get practical guides from a highly qualified experts in the Sustainable ICT sector and learn how to apply them in your organisation.**
Help Desk In 5 languages	**Get support about how to decrease your carbon footprint & implement ICT energy efficiency standards with Online Assistance (EN, FR, ES, DE, IT).**
Success Stories	**Best practices in Sustainable ICT. Search how players like you got energy savings & carbon footprint reduction. Or even showcase your success story!**
Self Assessment Centre	**Measure your own carbon footprint and start learning how to become sustainable thanks to ICT standards & methodologies. AVAILABLE SOON**

Join us and get energy savings by choosing low carbon ICT

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European Framework Initiative for Energy & Environmental Efficiency in the ICT Sector

Monitoring of the Energy management performance in Data Centres and ICT sites

Jean-Marc Alberola
Group Energy Strategy leader at Airbus Vice Chairman of ETSI ISG OEU

Thursday, 27th April 2017

ETSI AIRBUS

ETSI at a glance

- ICT standards organization, based in France, with global reach
- At the forefront of emerging technologies: NFV, IoT, smart cities, ITS
- Global membership: over **800** companies and organizations of various sizes, from **68** countries on **5** continents
- Direct participation-consensus based
- Staff of **120**, supporting around **7000** industry experts/year
- More than **35 000** free publications
- More than **90** partnerships
- Global network of alliances (regional/technical): 3GPP and oneM2M
- Major focus on Interoperability: Center for Testing and Interoperability
- Renowned IPR policy

ETSI World Class Standards

EU Policy framework for Climate & Energy - Targets

2020 Targets

reduce its greenhouse gas emissions by 20%,

increase the share of renewable energy to at least 20% of consumption and achieve energy savings of 20% or more.

2030 Targets

40% cut in GHG emissions compared to 1990 levels,

at least a 27% share of renewable energy consumption,

a 30% improvement in energy efficiency (compared to projections)

2050 Target

The EU has set itself a long-term goal of reducing greenhouse gas emissions by 80-95% when compared to 1990 levels

EU Policy framework for Climate & Energy directly or indirectly related to ICT

March 2010

Europe 2020: Smart, Sustainable and inclusive Growth: Confirmation of 20/20/20 targets for **2020**.

March 2011

Roadmap for moving to a competitive low carbon economy by 2050: GHG emissions by 80-95% below 1990 values by **2050**

July 2012

European Innovation Partnership on **Smart Cities and Communities**: large-scale deployment of smart city solutions in Europe, focusing on **intersections of ICT, energy and transport**.

June 2013

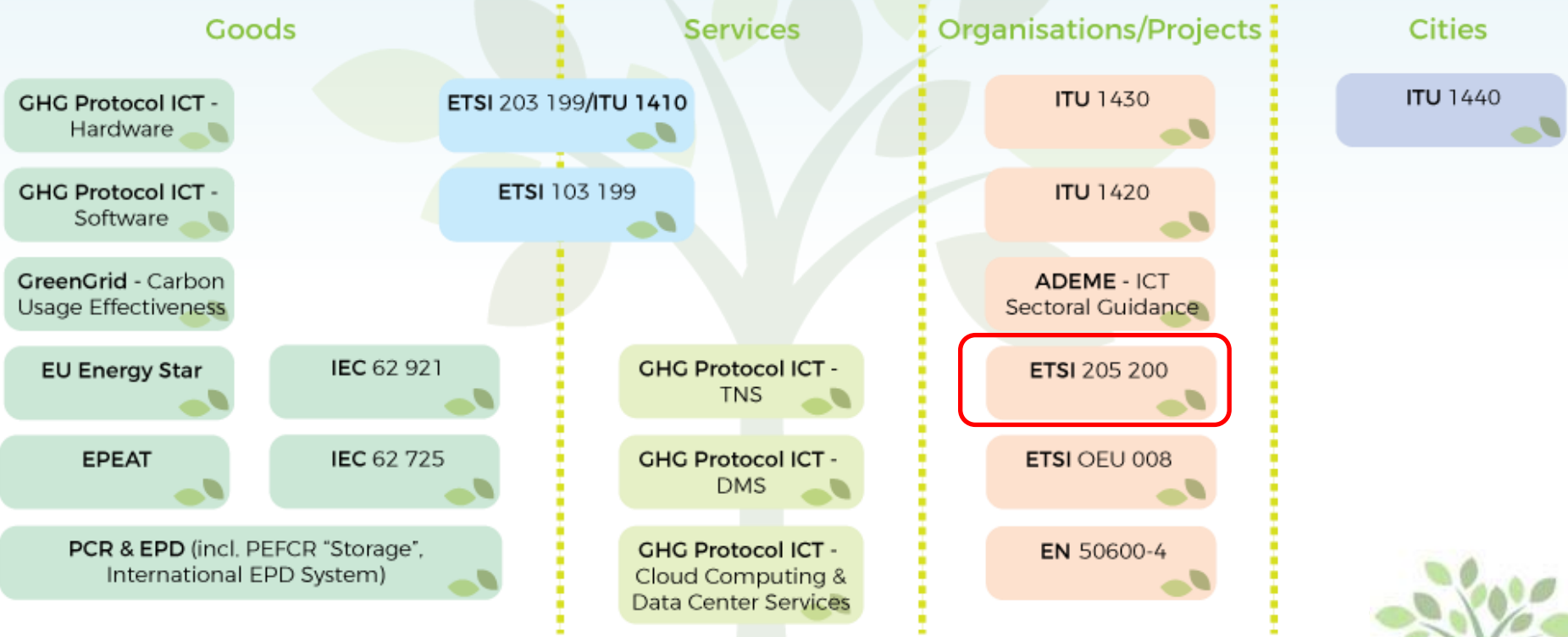
Start of the **Eco-design Directive** preparatory study of the feasibility of eco-design requirements and/or of an **energy labelling** scheme for enterprise **servers, data storage devices and transmission equipment**

January 2014

A policy framework for climate and energy in the period from 2020 to 2030: GHG emissions 40% below the 1990 level by **2030**. Renewable energy share to increase to at least 27% by **2030**.

Instruments for regional and country environmental policy shall be issued and implemented to support development of green Europe

Map of ICT Standards



Global KPIs of Operational infrastructures ES 205-200 series

ES 205-200-1
General Requirements

ES 205-200-2-2
Fixed access networks

ES 205-200-2-1
ICT Sites

ES 205-200-2-3
Mobile access networks

ES 205-200-3
Global KPI (DC_{EM}) for ICT Sites

ETSI EN 305 200-3
(2017 framework
EU Mandate M/462)

Technical Objective and global KPIs

Products

Design

Implementation

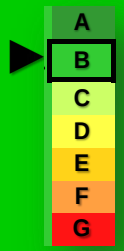
Operations

TECHNICAL KPIs

OBJECTIVE KPIs
Energy Consumption
Task Efficiency
Energy re-use
Energy Renewable

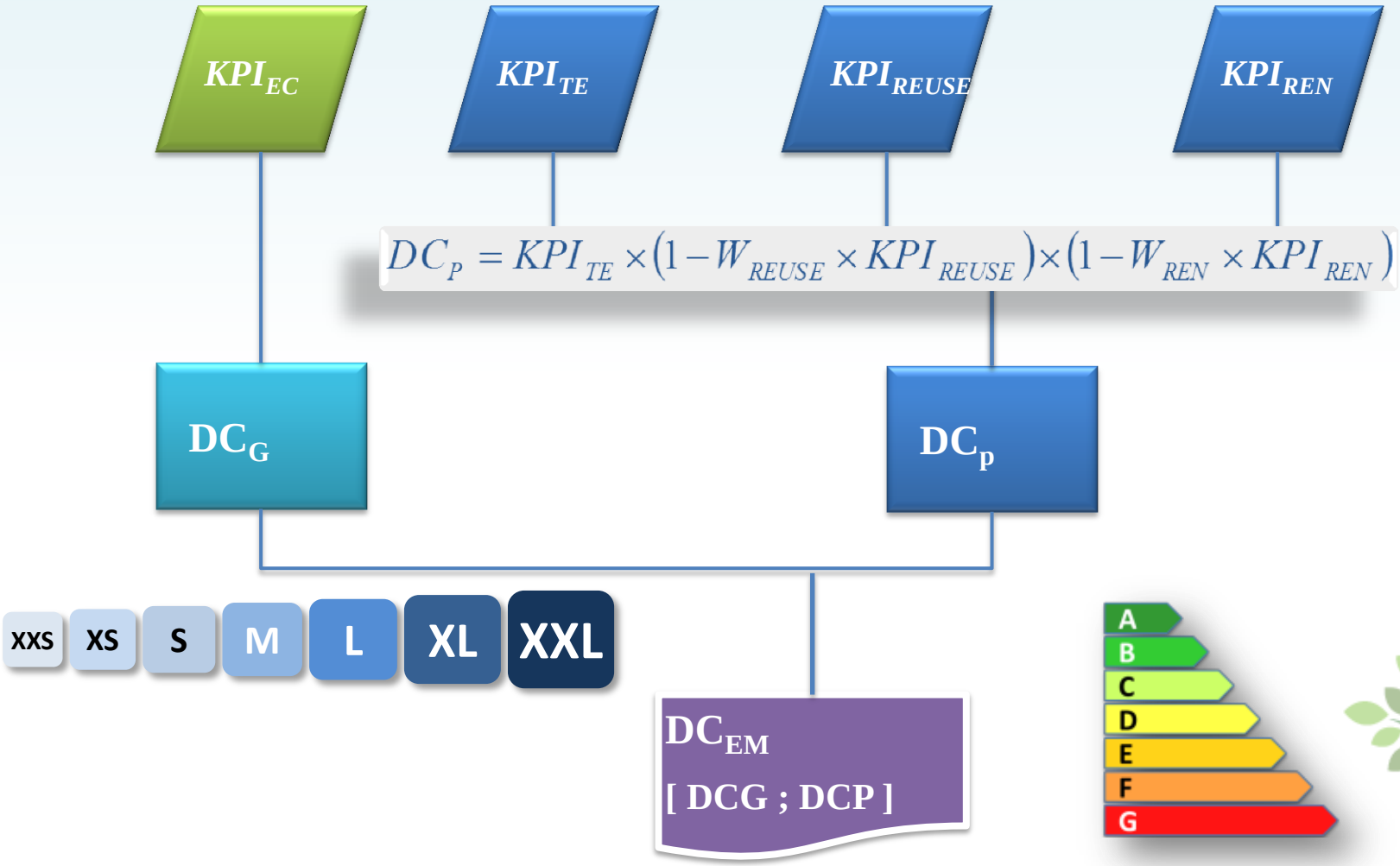
GLOBAL KPI

DC_{EM} : a synthesis of 4 Energy Efficiency Key Performance Indicators

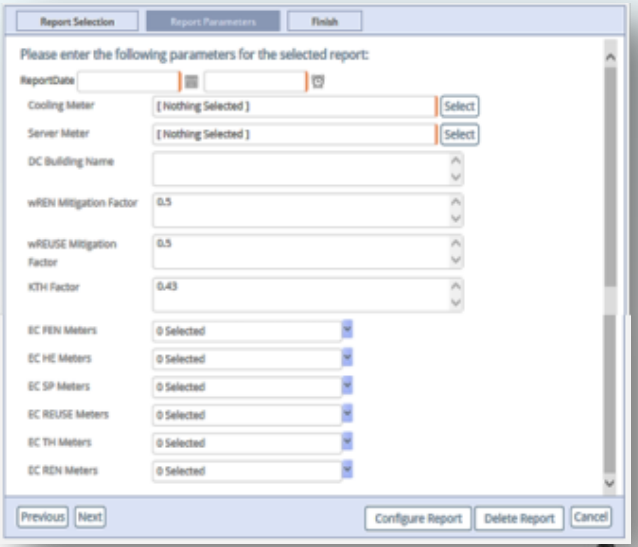
GLOBAL KPI		OBJECTIVE KPIs		DEFINITIONS
DCEM* 	DC_G	KPI_{EC}	Energy Consumption	The total consumption of energy by an operational infrastructure
	DC_P	KPI_{TE}	Task Efficiency	A measure of the work done for a given amount of energy consumed
		KPI_{REUSE}	Energy re-use	Transfer or conversion of the energy produced by the operational infrastructure to do other work
		KPI_{REN}	Energy Renewable	Proportion of energy produced from dedicated generation system using resources that are naturally replenished

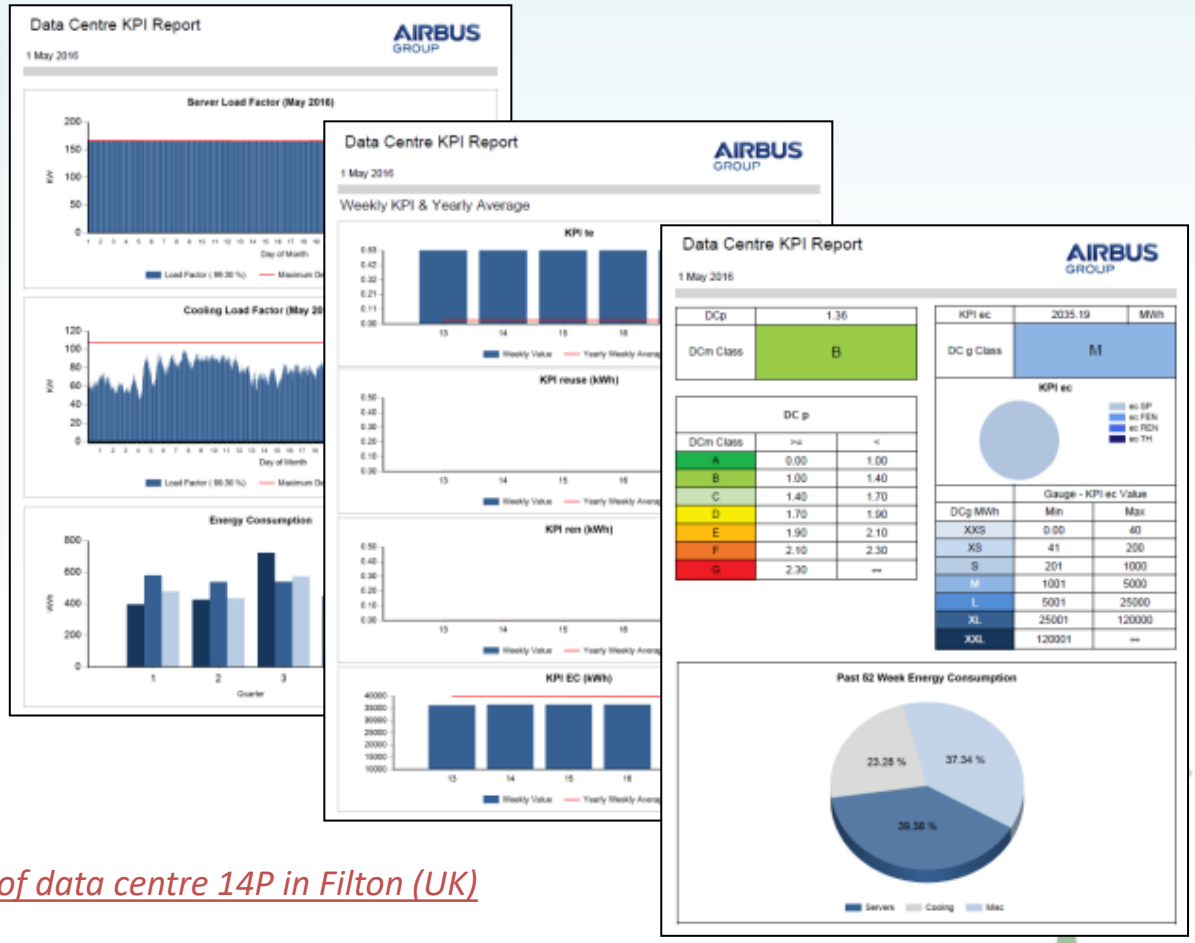
(*) ETSI Document : ES 305-200-3 "Global KPI (DC_{EM}) for ICT Sites"

Global KPIs : DC_{EM} construction



DC_{EM} Report in Energy Management Software
Same standard report used for all Data Centres

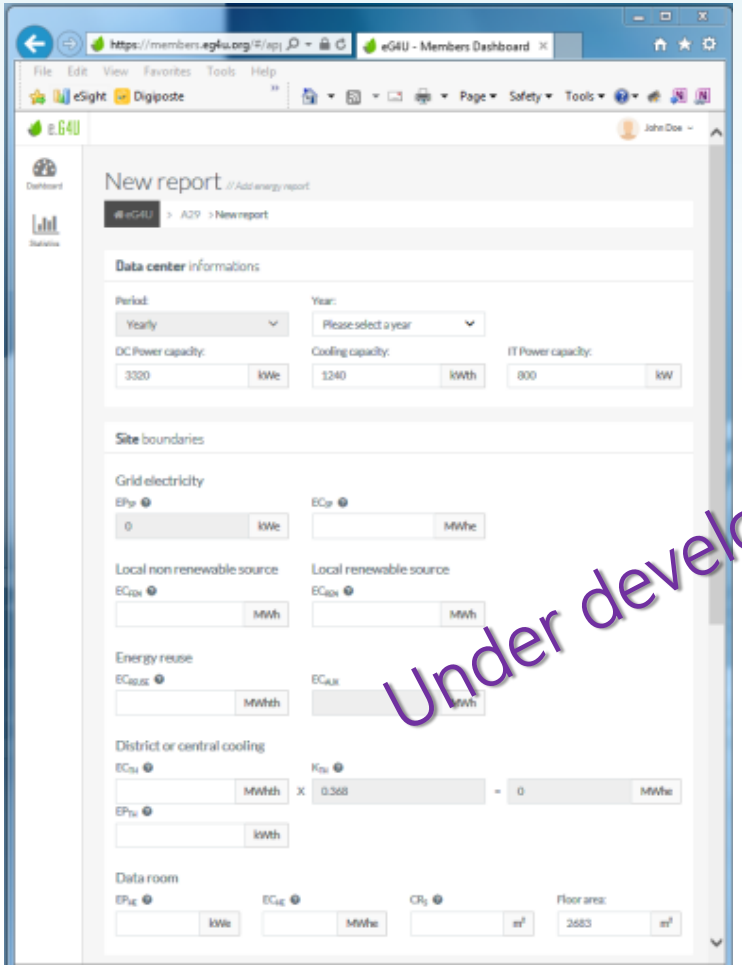


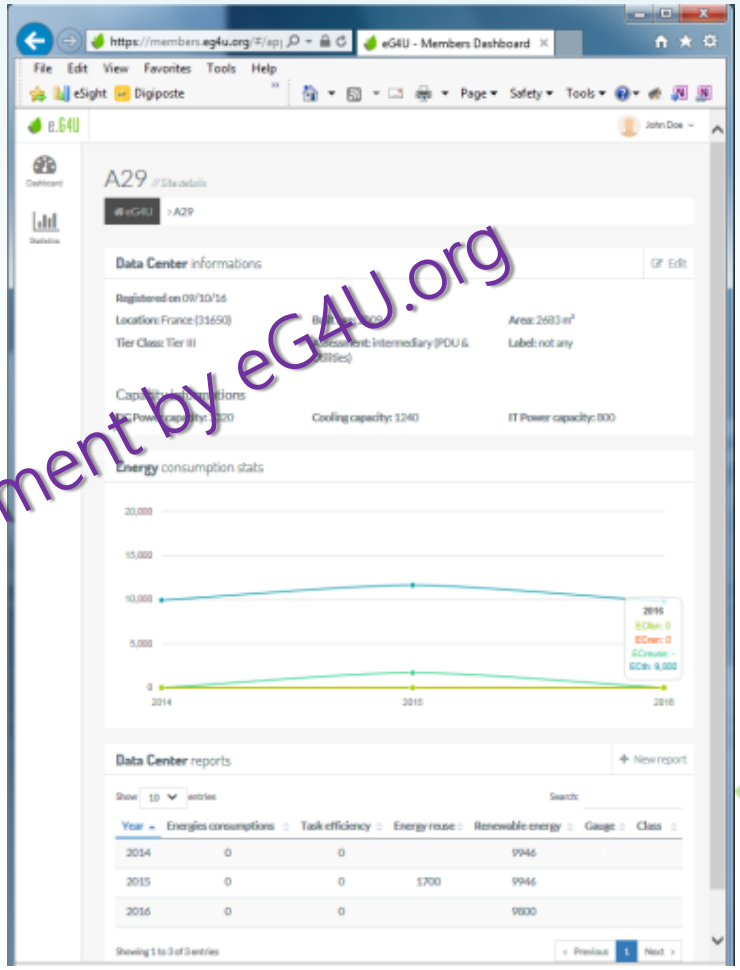


Report of data centre 14P in Filton (UK)

eG4U platform

e.green for users





Under development by eG4U.org

Conclusion/ Advantages

- One single operational global KPI, defined by the users for all ICT sites
- Support formulation of targets, trends or comparison
- Instruments for the development of Environmental policy for lands and regions :
  - Future environmental taxes
  - Incentives specific actions (i.e whites certificates in France)
  - Integrate flexibility for Policy making (weighting factors)
- Useful for ISO 50 001 certification:
  - chap. 4.4.5 Energy Performance Indicators
  - chap. 4.5.5 Operational control
- Free of manufacturer influence

Thank you for your attention

Contact: Jean-Marc Alberola
email: *jean-marc.alberola@airbus.com*
jeanmarc.alberola@eg4u.org

ETSI workshop "Making Smart Cities Sustainable", from large scale pilots to real-life deployment
7-8 June 2017 – BORDEAUX - France

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European Framework Initiative for Energy & Environmental Efficiency in the ICT Sector

Introduction of the ecoinvent Database

Fadri Casty & Tereza Lévová
ecoinvent

Thursday, 27th April 2017

What is ecoinvent?

- ecoinvent was founded by 5 Swiss research institutes and started off as the Swiss national Life Cycle Inventory (LCI) network

Agroscope ETH EMPA EPFL PSI

- Publishes the **world's largest**, **transparent LCI database**: ecoinvent
  - ⇨ Includes over **12,000 datasets**

    e.g. several modes of transport, agricultural products, chemicals, building materials, other raw materials and more
  - ⇨ Trusted by over **7,000 licenses representing ten of thousands users** from more than 80 different countries
  - ⇨ Video presenting ecoinvent in a nutshell

Why ecoinvent?

Sustainable product design

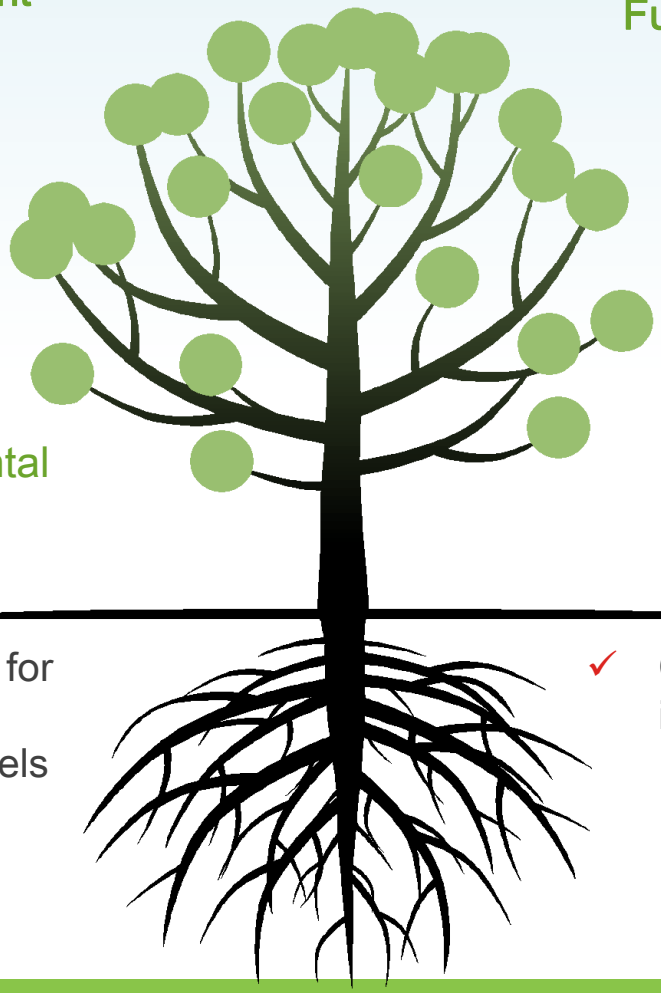
Carbon Footprint

GHG Protocol

Water Footprint

Life Cycle Costing

Product Environmental Footprint **PEF**



Full LCA studies

Carbon accounting

Supply chain – environmental assessment

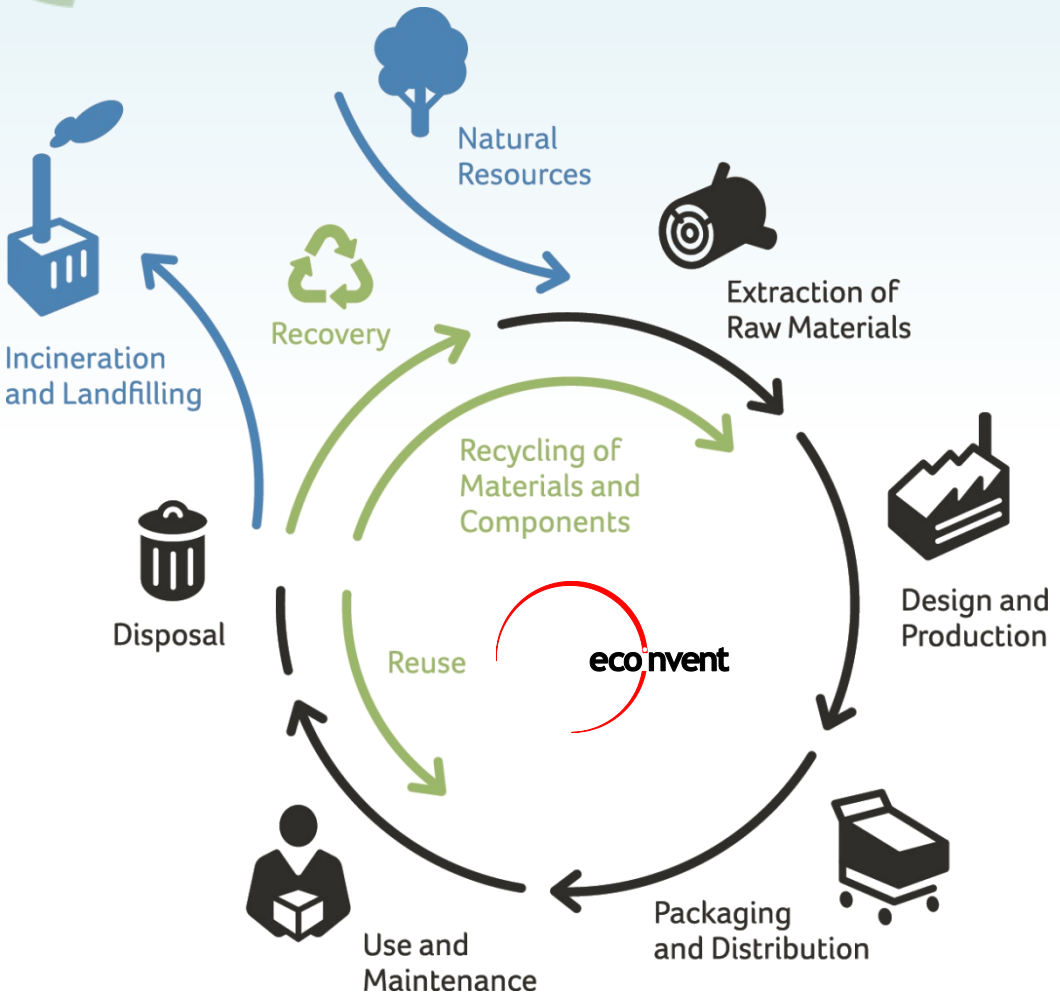
Carbon trading

Environmental Product Declaration **EPD**

⇨ Laying the **foundation** for your **environmental studies** on various levels of detail

✓ Compliant with a variety of national and international standards, such as the **ISO 14 series** (amongst other ISO 14040, 14044, and 14048)

ecoinvent's role in Life Cycle Assessment



ecoinvent **considers all** of a product's life cycle **stages** and presents these in a transparent and consistent way.

⇨ Making it easy to **tailor** your environmental studies to your **specific needs** and requirements.

What can ecoinvent offer?

- Wide variety **of environmental DATA**


…agricultural products


…constructio n materials


…electricity production


…transport


…wood or metals

We are here to **fill the gaps**!

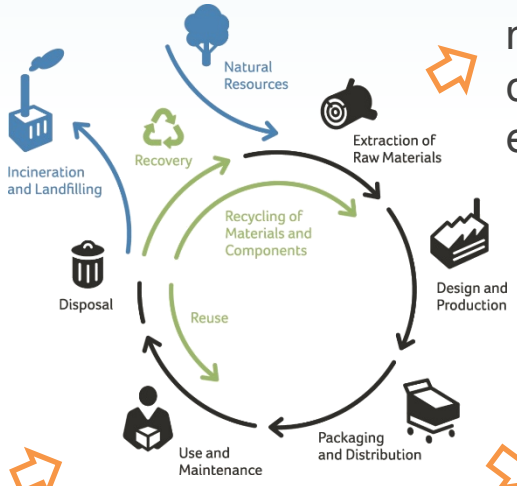
What can ecoinvent offer to the ICT sector?

- environmental **DATA** on majority of products and services present in the supply chain of the products of the ICT sector

emissions during end-of-life treatment

disposal of electronic devices

electricity consumption



mining of metals (gold, copper, silver, lithium, etc.)

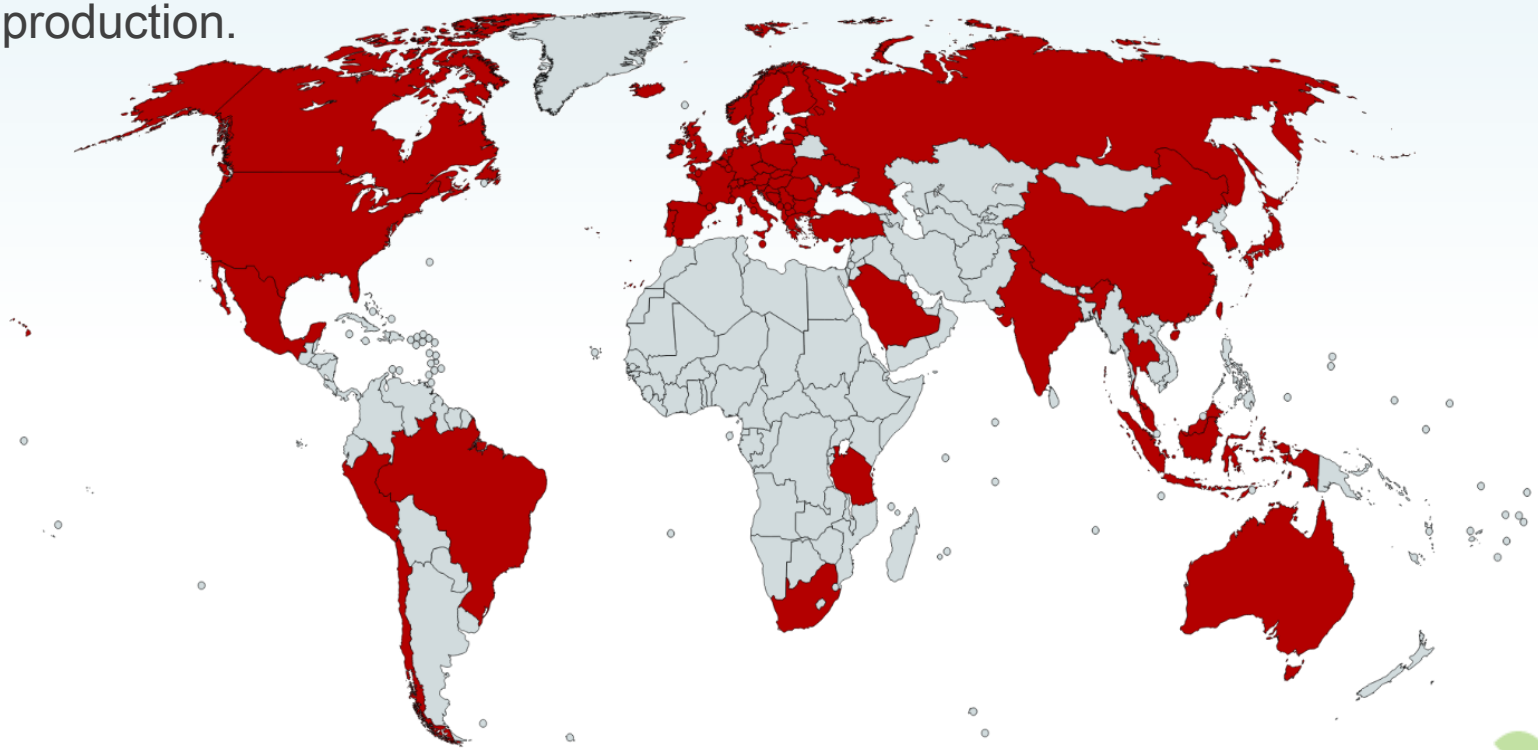
metals processing

production of electronic devices and batteries

packaging of products

Background Data – electricity production

- The ecoinvent database covers 89% of the world's electricity production.



We are here to fill the gaps!

What do I need the ecoinvent data for?

"Fairphone targets sustainable materials sourcing." (www.mobileworldlive.com)

⇨ ecoinvent has environmental data for mining of metals (gold, copper, silver, lithium, etc.)

"Facebook boasts green data centre in Lulea, Sweden." (www.euronews.com)

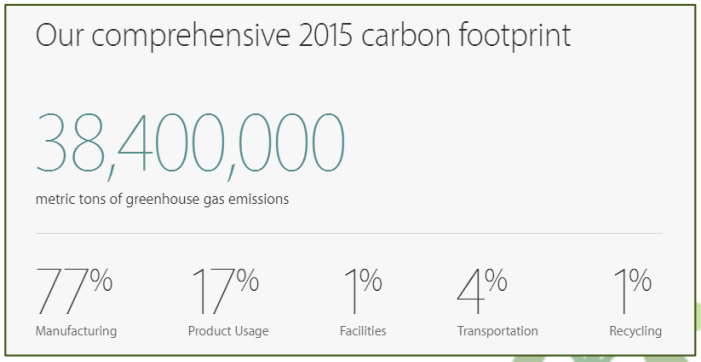
⇨ ecoinvent has environmental data on electricity production for most of the countries in the world

"Tesla's electric cars aren't as green as you might think." (www.wired.com)

⇨ ecoinvent has data on lithium mining, battery production and electric car operation

"Our comprehensive 2015 carbon footprint: 38'400'00 tons of greenhouse gas emissions." (www.apple.com)

⇨ ecoinvent has data on metals mining, production of electronics, end-of-life, transport, recycling and many more



The ecoinvent database provides answers to all these questions!

References

Well-known **multinational organizations** are using ecoinvent's LCI data

ICT companies:

CISCO, PHILIPS, HUAWEI, hp, Honeywell, SAMSUNG, Schneider Electric, Microsoft

References

Well-known **multinational organizations** are using ecoinvent's LCI data

References

Leading Universities as customers and data providers:

ETH Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich

EPFL ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

POLITECNICO MILANO 1863

DTU Technical University of Denmark

MINES ParisTech

UNIVERSITY OF OXFORD

KTH VETENSKAP OCH KONST ROYAL INSTITUTE OF TECHNOLOGY

TU Delft Delft University of Technology

Universität Stuttgart

UNIVERSITY OF CAMBRIDGE

NTNU Norwegian University of Science and Technology

HARVARD UNIVERSITY

Berkeley UNIVERSITY OF CALIFORNIA

Stanford University

Yale University

Massachusetts Institute of Technology

NUS National University of Singapore

UNIVERSITY OF CAPE TOWN IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

POLYTECHNIQUE MONTRÉAL

UNSW THE UNIVERSITY OF NEW SOUTH WALES SYDNEY • AUSTRALIA

Universidade de São Paulo

UTFPR UNIVERSIDADE TECNOLÓGICA FEDERAL DO PARANÁ

東京大学 THE UNIVERSITY OF TOKYO

Thank you for your attention!

Interested in data from ecoinvent?

We are just a call or email away!

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European Framework Initiative for Energy & Environmental Efficiency in the ICT Sector

Monitoring and Verification Platform

How to calculate and monitor progress in improving EE and reducing CO_2 emission

Berina Delalić
Component Leader for multEE project

Thursday, 27th April 2017

multEE facilitating multi-level governance for Energy Efficiency

german cooperation DEUTSCHE ZUSAMMENARBEIT

Implemented by: giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

multEE facilitating multi-level governance for Energy Efficiency

About the Project

- **multEE** aims to improve the **consistency** and **quality** of energy efficiency policy planning, implementation and monitoring between **different administrative levels**.

- **Main goals:**
  - Introducing **innovative monitoring and verification** (M&V) **schemes**. These schemes are based on bottom-up data to ensure that the impact of energy efficiency measures is correctly evaluated and useable for future energy efficiency planning.
  - **Improving vertical coordination** between administrative levels. The objective here is to exploit the full potential of the integrated M&V schemes developed in multEE and improve the overall quality of energy efficiency planning.

What is MVP Monitoring & Verification Platform ?

- The **Monitoring and Verification Platform (MVP)** is a web application that assists in measuring progress towards EE targets.
- The application is based on the collection of **bottom-up (BU) data** on:
  - plans and planed measures,
  - expected energy savings and/or CO_2 emission reducion,
  - implemented measures and projects,
  - corresponding achieved energy savings, CO_2 emission reduction and implementation costs.

How does MVP calculate energy savings and CO_2 emission reduction?

- Calcuation based on **BU methodology** – set of simple algebraic equations develop on principle:

$$E_{savings} = E_{old} - E_{new}$$

- Corresponding CO_2 emission reduction:

$$CO_{2\,reduct} = E_{old} \cdot f_{CO_{2\,old}} - E_{new} \cdot f_{CO_{2\,new}}$$

- Parameters:
  - $E_{savings}$ – annual energy saving (kWh/a)
  - E_{old}/E_{new} – energy consumption before/after EE measure (kWh/a)
  - $CO_{2reduct}$ – annual CO_2 emission reduction (t/a)
  - $f_{co_2\_old}/f_{co_2\_new}$ – emission factors for fuel used before/after (t_{CO_2}/kWh)

The Bottom-Up methodology

- Set of predefined methods for common EE measures in:
  - Buildings (residential and non-residential),
  - Public Lightning,
  - Transport,
  - Industry.

- *Improving buildings envelope,*
- ***Improving** heating and/or **cooling systems**,*
- *Info campaigns,*
- *Installing solar panels for water heating,*
- *Installing heat pumps,*
- ***Installation or replacement of office equipment**,*
- *Connection to district heating,*
- *Improving lightning system in buildings,*
- *etc.*

→ ICTFootprint

Measure the progress in reducing your ICT footprint with MVP

Office equipment:

$$TFES = \left(\frac{PA_{ref} \cdot h_{active} + PS_{ref} \cdot h_{standby}}{1000} - \frac{PA_{new} \cdot h_{active} + PS_{new} \cdot h_{standby}}{1000} \right) \cdot n$$

- Parameters:
  - PA_{ref}/PA_{new} – Electrical power input per applicnce in active mode before and after the measure implementation (W)
  - h_{active} – Hours of active mode (h/a)
  - PS_{ref}/PS_{new} – Electrical power input per applicnce in standby mode before and after the measure implementation (W)
  - $h_{standby}$ – Hours of standby mode (h/a)
  - n – number of replaced or newly installed office equipment

**Variations of presented formula are made for three types of measures: savings for active mode, savings for standby mode and savings from change of usage mode. Find more at www.multee.eu.*

Measure the progress in reducing your ICT footprint with MVP

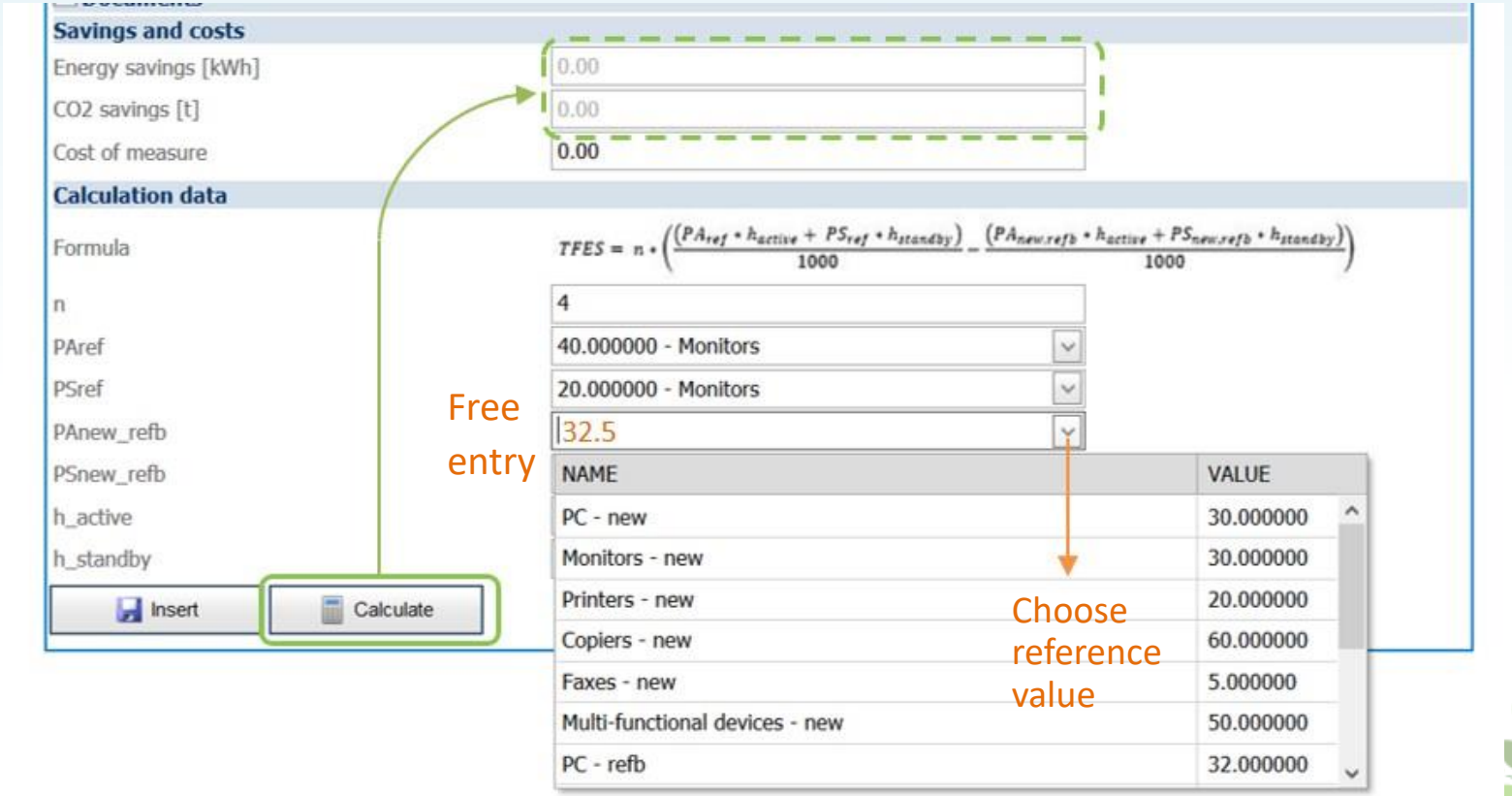
Centrall compression cooling system:

$$TFES = (P_C \cdot h_{FL}) \cdot (\frac{1}{ESEER_{Ref}} - \frac{1}{ESEER_{Eff}}) \cdot n$$

- Parameters:
  - P_C – Installed cooling power (kWh/a)
  - h_{FL} – Full-load hours related to the maximum installed colling power (h)
  - $ESEER_{Ref}$ – European Seasonal Energy Efficiency Ratio of the reference system
  - $ESEER_{Eff}$ – European Seasonal Energy Efficiency Ratio of the more efficient system
  - n – number of installed cooling systems

**For non-refurbished buildings. In case of refurbishment and reduced cooling demand, modified formula is recommended. Find out more at www.multee.eu.*

Sneak peek into the MVP



- *You can test the MVP now. The link and short tutorial can be found at http://multee.eu/how-innovative-web-applications-can-support-energy-efficiency-policy-planning.*

Thank you for your attention

Berina Delalić
Component Leader at multEE project
Open Regional Fund for South East Europe - Energy Efficiency, GIZ
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THANK YOU!

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the future is *sustainable*!

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