ICTFOOTPRINT.EU

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

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D2.2 – FIRST MARKET WATCH, BEST PRACTICE REPORT, SDOS UPDATE & VOICE OF THE USERS

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List of acronyms & abbreviations	
BFR	Brominated Flame Retardants
EAG	External Advisory Group
EC	European Commission
ETSI	European Telecommunications Standards Institute
FAQ	Frequently Asked Questions
GHG	Greenhouse Gases
ICT	Information and Communication Technology
IEC	International Electrotechnical Commission
ITU	International Telecommunication Union
LCA	Life Cycle Analysis
NGN	Next Generation Network

List of acronyms & abbreviations	
PVC	Polyvinyl Chloride
SAT	Self-Assessment Tool
SAT-O	Self-Assessment Tool for an ICT-intensive Organisation
SAT-S	Self-Assessment Tool for an ICT Service
SDO	Standard Development Organisation
SLA	Service Level Agreement
SME	Small Medium Enterprise

Executive Summary

This deliverable describes the vision of the environmental efficiency in the European ICT sector that has been acquired by the ICTFOOTPRINT.eu initiative during the first 12 months of activities. It specifically describes:

- Relevant market players providing sustainable solutions to the ICT sector;
- Success stories and best practices identified, in Europe and also abroad, in the segments of ICT products and services;
- SDOs progress in the field.

Moreover, the report outlines activities and results achieved by ICTFOOTPRINT.eu's helpdesk support tools, recently launched, including engagement with communities, as well as the 2nd year plan to manage and analyse information gathered from the users, e.g. through the helpdesk support tool. The marketplace and the self-assessment tools are also described, providing also a plan for their complete development in the following months of the project.

In particular, the "voice of the users", which has been and is continuously took into consideration to complete the project's developments and implementations, is reported in the document.

It is to be stressed that the present document is the 1st issue of the report. An updated version will be produced at the end of the 2nd year of activities, in January 2018 (D2.3), and also in January 2019, at project completion (D2.5).

1 Introduction

1.1 Purpose and Scope

ICTFOOTPRINT.eu has the objective to raise awareness on methodologies and best practices in measuring the energy and environmental efficiency of the ICT sector with a sufficient level of reliability. The inclusion of such environmental aspects – and more broadly, sustainability related topics – into the ICT sector may be approached through two distinct means: [1]

- By "creating, enabling, and encouraging sustainable patterns of production and consumption [in society] by means of ICT" – referred to as **sustainability by ICT**, i.e. how to reduce the environmental impact of any sectors through the use of ICT;
- By "making ICT goods and services more sustainable over their whole life cycle, mainly by reducing the energy and material flows they invoke" – called **sustainability in ICT**, i.e. how to improve the environmental performance of the ICT sector itself.

Estimations indicate that by 2020, ICT services are expected to avoid the emission of 9.1 Gt CO_2e from other sectors, while accounting for around 1.3 Gt CO_2e. [2] The abatement potential in other sectors is estimated at more than 7 times the carbon footprint from the entire ICT sector, contributing to **sustainability by ICT** as defined above.

The use of ICT devices and services increased over the past decade, and is expected to continue on this trend in answer to changes in society demand. For instance, the number of internet users went from 400 million users in 2000 to 3.2 billion in 2015, contributing to growing environmental impact from consumer devices, telecommunication services, data centre services, etc. [3] The overall impact of the ICT sector may be reduced through **sustainability in ICT**. Many ICT-related stakeholders refer to it as "green ICT", i.e. "the study and practice of designing, manufacturing, using and disposing of [ICT products] efficiently and effectively with minimal or no impact on the environment" [1]. This term will be used further in the report to refer to sustainability in ICT.

1.2 Structure of the document

The document is structured as follow:

Section 1, this section, introduces the deliverable and contextualises it in the framework of the ICTFOOTPRINT.eu project.

Section 2 provides an overview of the European situation regarding carbon footprint and energy efficiency in the ICT sector, and presents the market of green ICT players, i.e. organisations providing sustainable solutions such as products and services towards a more environment-friendly ICT sector.

Section 3 focuses on the players using such sustainable products and services to improve the energy efficiency or the carbon footprint of their ICT infrastructure.

Section 4 describes the development of ICTFOOTPRINT.eu services on the project platform, among which: helpdesk, description of the calculation methodologies specific to the ICT sector, marketplace, and self-assessment tools.

Section 5 and **Section 6** provide an update on the involvement of SDOs and the community engagement during the first year of the project.

Section 7 analyses the results and engagement observed during this first year, and details a plan of action for the second year. Section 8 concludes this document and sets the next steps.

Appendixes A to E provide supportive information such as the success stories currently identified and available on the ICTFOOTPRINT.eu platform, as well as the English version of the FAQ and the glossary, which are part of the ICTFOOTPRINT.eu helpdesk service. Appendix D lists companies currently registered on the marketplace.

1.3 Relationship to other project outcomes

This deliverable is part of WP2, which provides the technical background and knowledge around the ICT-specific carbon and, more generally, environmental footprint methodologies. It is the first of three deliverables outlining the activities and results achieved in the course of the project. Deliverables D2.3 and D2.5 will follow respectively at the end of years 2 and 3.

For the purpose of this deliverable, the consortium collected and analysed all data gathered from the use of services provided on the project platform, as well as feedback received during the first year, e.g. from the External Advisory Group (EAG) members. In addition, the consortium conducted in-depth analysis in order to have a better insight of the ICT sector in the European Union and the main sustainable players of the sector.

The results provided in this deliverable are based on the work of the consortium during year 1 only. Deliverables D2.3 and D2.5 will provide updated analysis, based on the outcome and experience gained during the following years of the project.

2 Market watch of the "green" ICT sector in the EU

2.1 Carbon footprint and energy efficiency in ICT in the EU: an overview

The ICT sector accounts for 8-10% of the European **electricity consumption** and up to 4% of its carbon emissions [4]. Worldwide, it represents around 1.9% of global emissions in 2011 and accounts for 1,037 TWh of the global energy consumption [5].

The continual growth of consumer ICT (smartphones, tablets, home products) and of demand for content streaming, bigger data storage, is expected to lead to an increase of the ICT energy consumption of 21% of the global electricity usage in 2030 [6]. Hence, it leads to an increase up to 2,3% of the carbon emissions by 2020 [7]. A study mandated by the European Commission shows that the European ICT sector is expected to use from 124 TWh in 2011 to 259 TWh in 2020 [8].

Currently, 66 % of the energy consumption of the ICT sector is due to the use ICT devices (home and office products), including television [8]. Data centres and telecommunication networks are respectively second and third contributors to electricity consumption, as displayed in Table 1 [8]. As consumer devices become more efficient, several studies forecast that the total electricity consumption of ICT devices will stay more or less stable, with the assumption that the growth of devices use will be offset by more energy-efficient products [6] [8]., However the share of data centres and telecommunication networks is expected to increase greatly: for example, data centres and telecommunication networks could contribute to about 3.8% of the total electricity consumption in EU in 2020, compared to 2.6% in 2011 [8].

ICT devices sub-sector stays the first contributor of the energy consumption (Table 1). Worldwide, the electricity usage of ICT devices is expected to reach 620 TWh in 2030 becoming the least energy-consuming sector, compared to the consumption of 3,520 TWh for telecommunication networks and 2,967 TWh for data centres [9].

Table 1 : Forecast of the ICT sector energy consumption between 2011 and 2020 [8]

Sub-sector	Measured consumption (TWh) in 2011	Estimated consumption (TWh) in 2020	Tendencies
ICT devices	142	132	-7%
Data centers	52	70	+35%
Telecommunication networks	20	50	+150%

Data centres market is growing by 25% per year [10], and represents between 1.1% and 1.5% of the global electricity consumption of the EU with a carbon footprint of 19 million tons in 2011 (based on the electricity consumption) [8]. This growth is directly linked to the continual growth of Internet and cloud services usage. Worldwide, data centres are responsible at least of 0.25% of GHG global emissions and 10% of all ICT-related emissions [11]. There is presently no publicly, transparent statistics of data centres Power Usage Effectiveness[1] (PUE) except for one US and French study, and one study from the industry, covering their worldwide activities. The average PUE is 2.21 worldwide, compared to 1.91 in US [11]. According to [12], at the EU level, the data centre management is less efficient with an average PUE of 2.53. This data however encompasses a large diversity of situations across the EU and among the players: for example, in France, a recent survey shows that 35% of the datacentres have a PUE less than 2.5, 30% between 2.5 and 2.1 and around 35% between 2 and 1.6 [12].

[1] Power Usage Effectiveness (PUE) is a metric used to determine the energy efficiency of a data centre. PUE is determined by dividing the amount of power entering a data centre by the power used to run the computer infrastructure within it. PUE is therefore expressed as a ratio, with overall efficiency improving as the quotient decreases toward 1. PUE was created by members of the Green Grid.

Networks are responsible for a third of all ICT GHG emissions according to [11], and 3.5% of global energy consumption According to [13]. GHG emissions and energy consumption are increasing due to the growth of mobile data traffic and mobile interne service [8]. To answer this challenge, the next-generation network (NGN) can use around 30 to 40% less energy than conventional network, thanks to simplified networks topologies [11.]

Web services are expected to increase and generate more traffic with the extensive use of video streaming. This service is responsible in Europe for 45.6% of downstream traffic [14].

Considering these trends, raising awareness among the ICT sector and the ICT consumers is a key challenge. Hence communicating reliable and sincere information on the environmental impacts of the ICT sector and ICT use becomes a crucial need. The generation of this information can be achieved through the development of dedicated and trusted guidance and standards for the implementation of calculation methodologies provided to the ICT players and users. It can be noticed that in the past years, big ICT companies made long-term commitment to be 100% renewably powered, like Facebook in 2011, Google, Apple in 2012, and Microsoft, Amazon in 2014 [14].

Although ICTFOOTPRINT.eu focuses on the energy and carbon footprint of ICT, other environmental impacts from the sector should be considered, such as water pollution, or mineral depletion. The following section mentions these other impacts in several examples.

2.2 Players in the field of green ICT solutions in Europe

As previously presented, awareness on green ICT is increasing in among players in Europe, at distinct levels. The green ICT solutions detailed here cover data centres, telecommunication networks, organisations providing software, hardware, web services, as well as additional ICT-related green services such as consultancy and certification.

A table summarising all observed best practices among ICT players is provided in players. The following table (Table 2) shows an overview of the market size of each category (as defined in the ICTFOOTPRINT.eu Marketplace).

Table 2 : Market size and forecast by category

Category	Market Value
Data Management	2014: 6,2 Billion Euros in Europe 2020 forecast: 10,2 Billion Euros[2] in Europe
Connectivity	2015: 37,5 Billion Euros worldwide 2024 forecast: 61 Billion Euros worldwide[3]
Hardware	2014: 55.8 Billion Euros[4] in Europe
Software	2015: 82,8 Billion Euros[5] in Europe
Advisory or Consultancy	2016: 92.3 Billion Euros[6] in Europe
Certifications & Other Services	N/A

In the following sections, most of the examples used to illustrate the range of green ICT solutions available on the market are proposed by large companies: this reflects the communication efforts put

[2] Source : https://www.reportbuyer.com/product/3848368/europe-data-center-colocation-market-growth-trends-and-forecast-2016-2021.html
[3] Source : http://www.grandviewresearch.com/industry-analysis/enterprise-networking-market
[4] Source : http://www.reportlinker.com/p0151610-summary/Computer-Hardware-in-Europe.html
[5] Source: https://www.statista.com/statistics/507690/europe-software-market-share/
[6] Source : http://www.consultancy.uk/consulting-industry/europe

by large companies on the topic of green ICT solution and does not mean that SMEs are failing to propose innovative and sustainable solutions.

2.2.1 Data Management

Best practices in the European ICT sector started being implemented by numerous data centres around 2011-2012. Data centres try to improve the data management, via the rationalisation and consolidation of ICT equipment (i.e. reduced equipment while ensuring the same service), or server virtualisation[7].

Numerous data centres also focus on energy management, as electricity consumption represents a significant share of the data centres' expenses. By optimising the electricity required for the cooling and the electrical distribution, companies can reduce their carbon and energy footprint.

For instance, Sun Microsystems (now part of Oracle) improved the efficiency of its European data centres by consolidating multiple data centres into a single one in the UK. This resulted in reducing the space required by 80% and cutting the electrical and cooling costs by 50%, and saving up to 4,100 t of CO_2e per year [15]. A similar approach was later applied to all Oracle data centres worldwide [16].

Logicalis manages the performance of its data centres worldwide by looking at the Power Usage Effectiveness (PUE) and other performance metrics such as the number of W per active server or the server utilisation rate. The performance is monitored through the use of a relevant software, which captures the data of interest across the data centre [11].

Specific technology may also allow for reduced energy consumption: in Switzerland, a data centre owned by Green Datacenter AG was opened in 2012, and used 20% less electricity than the average thanks to a technology based on direct current (DC) [17].

The carbon footprint of a data centre may be reduced by using renewable energy, such as Verne Global, which data centre is located in Iceland and uses geothermal and hydro-electric sources to supply 100% of its energy consumption. A similar approach is undertaken in the two data centres of Green Mountain, located in Norway [18]. The start-up Stimergy promotes the reuse of the heat (generated from data centre services) into heating water in various swimming pools: the servers are located within the swimming ground and are used as "digital heater" [19].

Finally, many data centres' plants are certified following the ISO 50001 (energy management standard) or the LEED rating system [20] (resource efficiency rating, mostly used in the US). Other may register to the EU Code of Conduct, a voluntary initiative which aims at reducing energy consumption from data centres [21].

2.2.2 Connectivity

A number of best practices are emerging for telecommunication networks. Most of them are similar to those implemented by data centres, by focusing on data and energy management of the servers providing the telecommunication network services (TNS). Server consolidation and virtualisation, use of DC electricity, management and monitoring of energy use through the use of specific software, are among the most common practices [11].

Nokia focuses on the energy consumption of the base station[8] sites, which represents up to 80% of a mobile network's total consumption. Actions were implemented to reduce the consumption of their

[7] Server virtualization is the partitioning of a physical server into smaller virtual servers to help maximize server resources. In server virtualization the resources of the server itself are hidden, or masked, from users, and software is used to divide the physical server into multiple virtual environments, called virtual or private servers. This is in contrast to dedicating one server to a single application or task (*source:* http://www.webopedia.com)

[8] A base station is a fixed communications location and is part of a network's wireless telecommunication system. It relays information to and from a transmitting/receiving unit, such as a mobile phone. Often referred to as a cell

base station sites by 70%. In addition, all base stations products were tested according to the ERSI power consumption test standard. [22]

Moreover, the energy consumption of TNS equipment does not significantly vary with the level of traffic. Although the energy consumption is highest when the equipment is operating at maximum throughput (e.g. 40 Mbit/s for a high speed broadband access network), the consumption does not fall by much when the equipment is underutilised (e.g. 15-20 kbit/s on daily average). [11] Although the EC revised in 2014 the 2008 Ecodesign Directive in order to include network standby, no company was clearly identified at this stage as communicating on the subject.

Finally, the environmental footprint of telecommunication networks may be reduced by improving the end of life treatment of ICT equipment. For instance, Nokia looked into the end of life of the equipment used in the base stations described above, and concluded that 93% of it could be reused or recycled.

2.2.3 Hardware

Several identified best practices relate to materials used when producing or transporting the hardware: reduced resource consumption, exclusion of specific hazardous material, optimised material selection for the product and its packaging. Other eco-design practices concern the extension of the product lifespan, an increased energy efficiency during the product use, or by ensuring that the hardware is recyclable.

Many manufacturers certify their products according to the energy star standard. Examples (at worldwide level) include Apple, Lenovo, Dell, or HP. At the European level, Nokia recently improved its charger energy rating by reducing the no load power consumption, i.e. the electricity used when chargers are left plugged into the mains, with no phone connected. The company reduced the consumption by 80% over the last decade [23].

Regarding hazardous substances, mobile manufacturers such as Samsung, Sony Ericsson, Apple, and Nokia eliminated hazardous PVC and BFRs from their products in the past years. Estimates indicate that in 2013, 59% of PCs (including tablets) were free of the compounds listed above [24].

Nokia focuses on the carbon footprint of its products, e.g. by setting carbon emission targets for their top 100 suppliers, or by monitoring and reducing GHG emissions from activities in offices and factories. This last aspect was implemented through an increase use of renewable electricity (51% of the used electricity); by replacing business travel by virtual meetings; among others [22].

Other companies communicate on the carbon footprint of some of their products – although it usually does not cover all their products. However due to the variety of distinct methodologies used by industrials, the scope of the product assessed vary between companies, which does not allow for any reliable comparison.

Fairphone accounts for many aspects of their phones life cycle: by using as much recycled and renewable materials as possible; by increasing the device lifespan thanks to modular compounds (easily replaced without impacting the lifespan of other compounds), using an OS which source code is publicly available (i.e. reducing software obsolescence, cf. explanation in section 2.2.4); by collecting old phones for reuse and recycling; etc. [25]

Although many hardware providers are involved in improving the energy and environmental footprint of their products, ensuring the quality and compliance of materials and devices from subcontractors and other suppliers seems to remain complex and at high cost for hardware manufacturers. Fairphone is one of the phone companies that communicates on its supplier policy regarding minerals sourcing. [25]

Finally, A2C Services is an example among the numerous organisations specialised in the remanufacture of hardware such as desktops, notebooks, monitors and hard drives. Between 2013 and 2015, the company redeployed more than 7 million kg of ICT equipment into reuse channels as part of their Circular Computing initiative. [26]

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site, a base station allows mobile phones to work within a local area, as long as it is linked to a mobile or wireless service provider.

2.2.4 Software

The main best practices in green software cover the implementation of green coding, which simplified feature allow for faster and less energy consuming processing; or open source coding, which allows for anyone to contribute to the code improvement or adaptation and therefore reduces the software obsolescence.

At this point, no European company communicating on green coding and energy aware software was found. Regarding open source coding, the example of Fairphone is presented in the previous section.

It should be noted that many companies offer software solutions to improve the environmental or energy footprint of the ICT or other sectors. Greenspector offers a software which helps to improve the eco-design of the software under development by improving its energy efficiency.

Other companies such as EasyVirt and NetworkDNA offer software for the power management of IT infrastructures such as data centres and other servers. Verismic, Avob or PCI propose power management software for PCs and similar devices (printer, phone).

Software used to improve the footprint of sectors other than the ICT are not covered in ICTFOOTPRINT.eu.

2.2.5 Other players

Players involved in providing consultancy services such as Carbon^{3}IT help reduce the environmental cost of using IT in business, either in the ICT sector or not. Other consulting companies may offer to establish the environmental footprint of a service or an organisation, e.g. through a life cycle analysis (LCA) approach and to identify eco-design solutions to improve the environmental impacts of ICT products and services.

Certification of an ICT service or a process may also be a solution offered by players in the field of “green” ICT. Organisations such as Carbon^{3}IT of the Green Grid are involved in such activities, either by providing their own certification or by providing guidance towards certification. Finally, the European Commission endorses data centres in joining the Code of conduct for Data centre energy efficiency.

3 Best practices and success stories in the European ICT sector

The consortium started listing existing European best practices and success stories relevant to the ICT sector, however all content is not currently available on the ICTFOOTPRINT.eu platform. Best practices are understood within the scope of the project as the application of procedures and changes towards improved results, e.g. in terms of environmental impact. The results obtained from the implementation of these best practices may be observed and quantified into success stories.

3.1 Best practices implemented in Europe

Whereas section 2.2 focuses on the main EU players providing ICT solutions with reduced energy or carbon footprint, this section covers all ICT users, either part of the ICT sector or not. After a first review of the ICT-intensive industry, examples will be provided among public organisations and municipalities.

3.1.1 Industry

Best practices in ICT activities of an organisation may cover distinct aspects. The choice of a “green” data centre (whether owned in-house or hosted by an external contractor) is one of them, e.g. by choosing a data centre enrolled to the EU Code of conduct for Data centre energy efficiency.

In 2009, Microsoft signed this Code of conduct and opened a new energy-efficient data centre in Dublin (with a PUE of 1.25). The company is currently implementing the best practices developed in the Code in its data centres worldwide, and set a target to eliminate half of existing data centres’ energy consumption (mostly by acting on artificial cooling, lighting and electricity transformers). The

use of innovative shipping containers as flexible and portable housing for servers is also currently being explored, as these servers would provide 10 times the density for data centres and drive dramatic savings in power usage [23].

Among the many companies involved in similar practices: Schneider Electric is working with EcoDataCenter to build a data centre in Sweden, which energy needs will be covered by wind and solar power from a nearby plant.

Organisations may as well monitoring the energy consumption of ICT equipment thanks to specific software or web-based architecture (see examples of ICT players providing such software in section 2.2.4). Simple implementation may be to power-off all devices outside of working hours.

Among the 270 worldwide companies surveyed in 2012 by Devoteam, almost two thirds of EU companies used environmental criteria when purchasing ICT equipment, e.g. energy efficient labelled equipment. Moreover, 68% of the surveyed organisations used at least one ecolabel in 2012, with a large use of the Energy Star certification (34% of the organisations) [10].

Finally, many organisations replace business travel by distance meeting solutions, with 90% of the surveyed companies using either audio-conferencing, video-conferencing or web meeting. [10] Nokia is one of the companies using these ICT solutions to reduce their overall carbon footprint.

3.1.2 Public organisations and municipalities

Best practices exist for municipalities to adopt in their ICT activities and consequently reduce the environmental or energy footprint from this sector. Most best practices identified are not location-specific, and could be easily adopted by other municipalities.

In Finland, the city of Pori focused its purchase decisions on product's total life cycle costs and the Finish Association of Local Authorities developed a web-based decision support system for environmentally friendly procurement, accounting for indicators such as energy efficiency. The platform provides general environmental information on the life cycle approach of products as well as specific information on criteria selection of environmentally preferable products.

In France, the City of Montpellier implemented energy efficiency measures in all public buildings: energy management is being automated, power switches are carried out where needed and maintenance specifications are issued. The estimated annual savings reach 15.250 euros.

Meanwhile, in Sweden, the Swedish National Board for Industrial and Technical Development and (later) the Swedish Energy Agency have developed computer screens with an automatic turn-off function, increasing energy (and cost) efficiency and improving indoor climate (humidity). [27]

Plus, public governments and Swedish ICT and telecom sector have been committed to reducing the environmental impact of its products and services for several years. This was possible thanks to both legislative and market requirements, and by considering the overall life cycle impacts of the products. The legislation covers everything from requirements on content, design and energy-efficiency to requirements on end-of-use collection and recycling.

For example, both Swedish ICT and telecom sector helped to generate several reports to the Swedish Government, highlighting the potential of ICT solutions for the environment and putting forward concrete proposals for targets and actions as regards to how ICT in the public sector's activities can realistically reduce its environmental impacts and economic costs. This is possible thanks to the improvement of its own ICT use efficiency, as well as comprehensive introduction of eServices, replacing work travel and, within the framework of public procurement, setting requirements that drive development towards greener products and services.

Another best practice municipalities can implement is ensuring that a city's own ICT infrastructure has the minimal possible carbon footprint. [28]

3.2 ICTFOOTPRINT.eu selection of success stories

By implementing best practices such as those described in previous section, players from the ICT sector are improving the environmental and energy footprint of their activities and products. ICTFOOTPRINT.eu is collecting their success stories, which are being published on the project website, so all community members be aware how their counterparts are benefiting from adoption of sustainable ICT best practices.

3.2.1 Success stories in the ICTFOOTPRINT.eu project

ICTFOOTPRINT.eu is recruiting success stories in adopting ICT footprint methodologies, especially from all over Europe but open to include non-European stories as well. The project relies on the consortium insight, as well as EAG members, synergies and communication efforts to collect relevant stories. Success stories answer a twofold purpose, by enabling relevant ICT providers and users to showcase their best practices, while providing examples to stakeholders on how they can achieve gains and competitive advantages thanks to sustainable ICT.

These success stories in ICT sector must describe how players implemented changes towards improved environmental and energy footprint, through the use or the provision of:

- IT goods or services with reduced environmental impact;
- IT solutions aiming to reduce the environmental impact of the ICT sector.

Stories are submitted on the website by project partners but the community can submit stories as well, by filling the online form available on the website. All stories submitted by community members will have a review process, providing feedback within 5 working days.

A success story factsheet template was prepared, where each success story available online will have the same page structure and type of content available, to make easier the information analysis:

1. **Organisation presentation**: Legal Name, City, Country, Contact, Website URL, Logo;
2. **Claim to fame** (max 500 characters): a short message explaining why the story is relevant for sustainable ICT landscape;
3. **Main benefits & achieved results** (max 1,000 characters): list all benefits and all results achieved;
4. **Presentation of the initiative** (max 700 characters):
    - Why the organisation/city/other started the initiative;
    - Short story describing the initiative;
    - Which standard or calculation methodology was used (if relevant);
5. **Commitments for the future & other relevant information** (max 600 characters): list all commitments and add links & figures for more information.

The sections currently in the factsheet template may be adjusted later in the project, if relevant.

3.2.2 ICTFOOTPRINT.eu success stories available online

At the moment, ICTFOOTPRINT.eu website has collected 4 Success Stories, which are available on the website. Table 3 lists the stories currently available on the platform. Figure 1 provides an example of a success story.

Table 3: Success Stories currently available on ICTFOOTPRINT.eu website

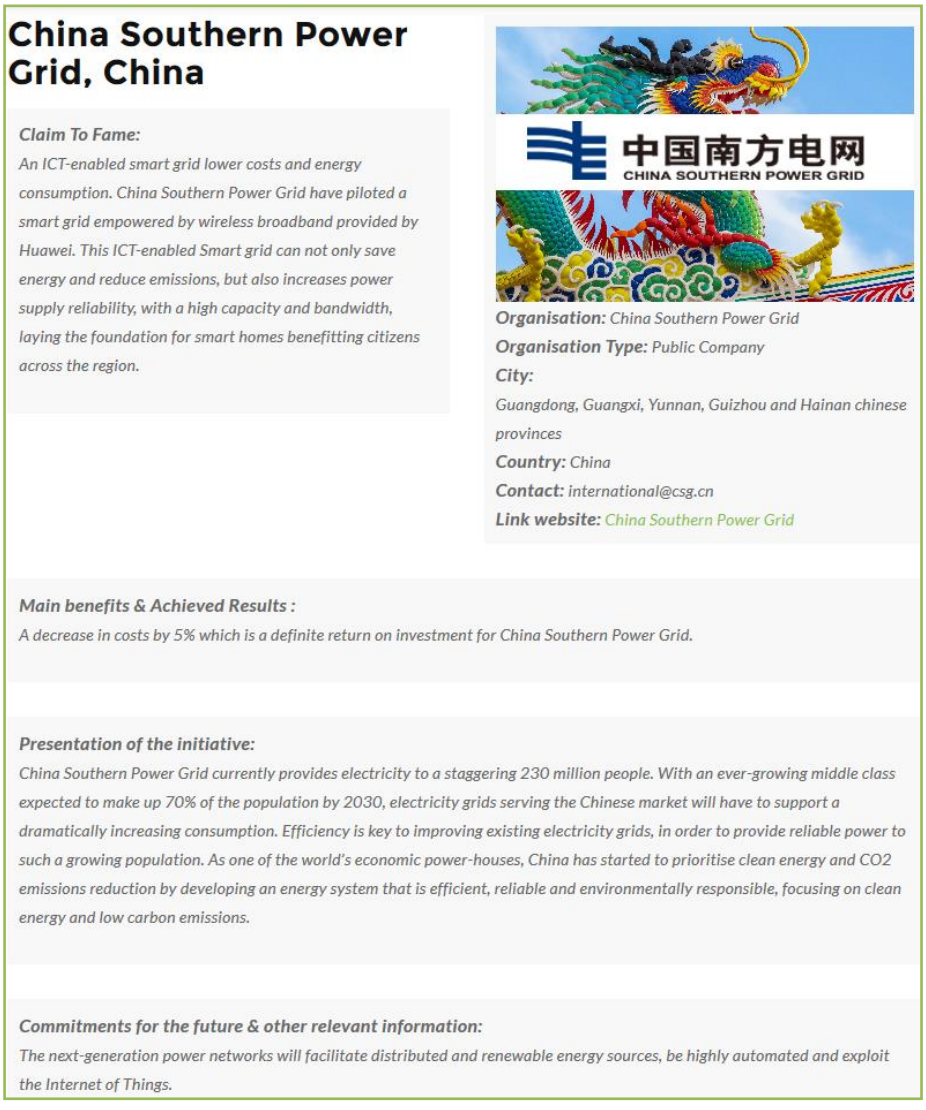
Nº	Organisation	Organisation Type	Country
1	Linköping	City / Public Administration	Sweden
2	Malmö	City / Public Administration	Sweden
3	China Southern Power Grid	Public Company	China

Nº	Organisation	Organisation Type	Country
4	Lexmark	Large Enterprise	United States of America
5	Walhalla	SME	Spain
6	BMW Group	Large Enterprise	Germany
7	EARLHAM Institute	Academia/Research	United Kingdom
8	Verne Global	SME	Iceland

The success stories collected are provided in Appendix B – Success stories. In Table 10, 9, 10 and 11 have success stories from private organisation (SMEs and Large Enterprises); in

Table 14, the success story collected from a public organisation. Table 15 and Table 16 gather the success stories from cities/municipalities.

Table 17 has a success story from a research institute.



China Southern Power Grid, China

Claim To Fame:
An ICT-enabled smart grid lower costs and energy consumption. China Southern Power Grid have piloted a smart grid empowered by wireless broadband provided by Huawei. This ICT-enabled Smart grid can not only save energy and reduce emissions, but also increases power supply reliability, with a high capacity and bandwidth, laying the foundation for smart homes benefitting citizens across the region.

中国南方电网
CHINA SOUTHERN POWER GRID

Organisation: *China Southern Power Grid*
Organisation Type: *Public Company*
City:
Guangdong, Guangxi, Yunnan, Guizhou and Hainan chinese provinces
Country: *China*
Contact: *international@csg.cn*
Link website: *China Southern Power Grid*

Main benefits & Achieved Results :
A decrease in costs by 5% which is a definite return on investment for China Southern Power Grid.

Presentation of the initiative:
China Southern Power Grid currently provides electricity to a staggering 230 million people. With an ever-growing middle class expected to make up 70% of the population by 2030, electricity grids serving the Chinese market will have to support a dramatically increasing consumption. Efficiency is key to improving existing electricity grids, in order to provide reliable power to such a growing population. As one of the world's economic power-houses, China has started to prioritise clean energy and CO2 emissions reduction by developing an energy system that is efficient, reliable and environmentally responsible, focusing on clean energy and low carbon emissions.

Commitments for the future & other relevant information:
The next-generation power networks will facilitate distributed and renewable energy sources, be highly automated and exploit the Internet of Things.

Figure 1: A success story published on the ICTFOOTPRINT.eu platform

ICTFOOTPRINT.eu will have a total of 100 success stories available on the website, by the end of year 2. Another group of 50 success stories will be identified, to be included on the website by the end of year 3. The final goal is to have a total of 200 success stories available on the website.

4 Development of ICTFOOTPRINT.eu services

4.1 Helpdesk

The helpdesk is one of the main services provided by ICTFOOTPRINT.eu, offering assistance to end-users on different aspects of ICTFOOTPRINT.eu initiatives and services.

The helpdesk is also an important instrument for the collection of end-users' feedback, allowing ICTFOOTPRINT.eu to monitor the efficiency of the platform services and to understand the main barriers and leverages to implementing sustainable ICT solutions.

4.1.1 Design

The helpdesk is available in 5 European languages (English, German, French, Spanish, and Italian) and provides high-standard response time and accurate content thanks to two levels of services:

- **First level:**
  - Frequently Asked Questions (FAQ): a manual with answers to the most common issues in adopting ICT existing methodologies and ICTFOOTPRINT.eu services. A glossary is also included, providing the end-user with a definition of the technical terms contained in the FAQ as well as in the platform on the overall (e.g. in the calculation methodologies' factsheets).
  - Live-chat: service where users can submit their questions and get direct feedback about ICTFOOTPRINT.eu services and ICT methodologies. The live-chat widget appears 5 seconds on the helpdesk page and all questions submitted are tracked and used to improve data on end-users feedback. The live-chat can have:
    - Online operator, replying directly to simple queries regarding the platform
    - Offline operator: the user's question is automatically forwarded to ICTFOOTPRINT.eu consortium. Depending on the question, feedback will provided in:
      - Basic questions: common questions to be replied within 2 working days;
      - Advanced questions: in the scope of the second level of helpdesk service.
- **Second level**:
  - Advanced questions: complex questions to be replied between 6 and 9 working days.

The FAQ will be regularly updated, e.g. by publishing the most common questions submitted by end-users on the live chat or by adapting the content of the answers based on end-users feedback.

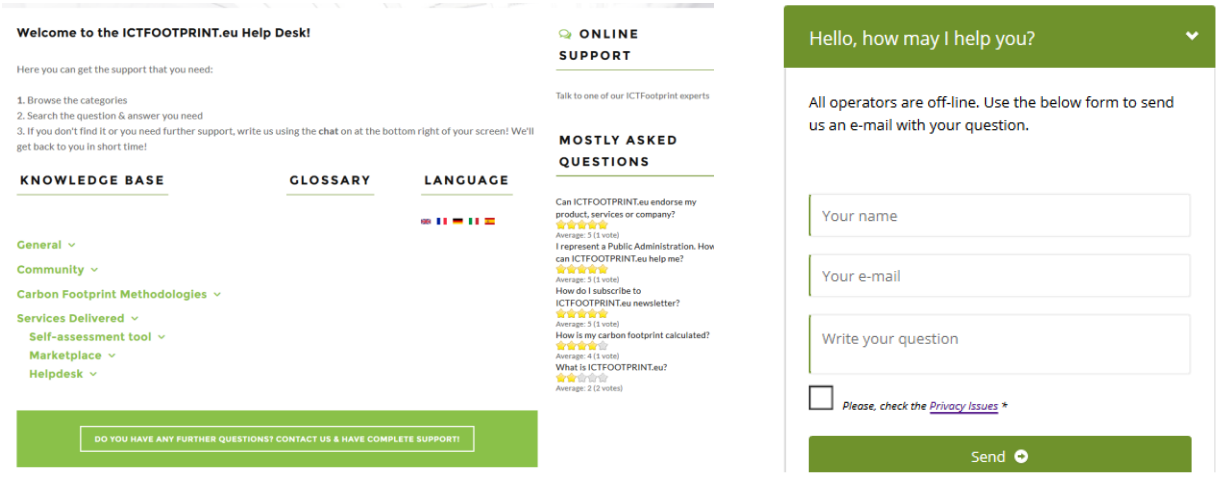


Figure 2: Helpdesk page, with FAQ (left) and Live-Chat widget (right) in English

4.1.2 Knowledge base

At the moment, the FAQ is organised into 4 categories described in Table 4, with questions and answers relevant to the topic of each category.

Table 4: Categories in ICTFOOTPRINT.eu FAQ page

Category	Description	Nº Questions
General	Questions about ICTFOOTPRINT.eu project	7
Community	Benefits, newsletter, registration, privacy and other topics regarding user's information and profile on the website	12
Carbon Footprint Methodologies	Questions about sustainability and carbon footprint.	9
Services Delivered	Information about services provided by ICTFOOTPRINT.eu (self-assessment tool, marketplace, helpdesk)	6
Self-Assessment Tool	Questions regarding ICTFOOTPRINT.eu self-assessment tool	3
Marketplace	Questions regarding ICTFOOTPRINT.eu marketplace	7
Helpdesk	Questions regarding ICTFOOTPRINT.eu helpdesk	4

The current FAQ as available on ICTFOOTPRINT.eu helpdesk may be found in At the moment, ICTFOOTPRINT.eu collected the following success stories from research institutues:

Table 17: EARLHAM Institute

EARLHAM Institute – United Kingdom	
Organisation presentation	Organisation: EARLHAM Institute Organisation Type: Academia/Research City: Norwich Country: United Kingdom Contact: Michael Brown Link website: http://www.earlham.ac.uk
Claim to fame	EARLHAM Institute, a research institute renowned for its contribution to the analysis and data-sharing of the highly complex wheat genome that is critical to securing future global food supplies, will save up to 70% in energy costs (based on 14p to 4p KWH rate) and with no additional power for cooling, significantly benefiting the organisation in their advanced genomics and bioinformatics research of living systems.
Main benefits & achieved results	- Supply medium and high power computing density at significantly lower energy costs; - Deliver excellent global network communications and data centre security; - Savings to 70% in energy costs (based on 14p to 4p KWH rate) and with no

EARLHAM Institute – United Kingdom	
	additional power for cooling.
Presentation of the initiative	EI has selected a carbon neutral data centre campus in Iceland to investigate the efficiencies of distributing large-scale genomics and computational biology data analysis. Through Verne Global, EI will have access to one of the world's most reliable power grids producing 100% geothermal and hydroelectric renewable energy. One of EI's primary goals is to understand crop genomes so new varieties can be developed to secure food supply in the face of a growing population and environmental change. The cutting-edge, high-throughput DNA sequencing instruments generate large amounts of data, from a few hundred gigabytes to several terabytes per run. The output requires significant computational effort, making the storage, processing, analysis and sharing of the data extremely challenging. "We are, therefore, very excited to be partnering with Verne Global in Iceland, who not only can supply medium and high power computing density at significantly lower energy costs, but who can also deliver excellent global network communications and data centre security," - Dr Tim Stitt, Head of Scientific Computing at EI.
Commitments for the future & other relevant information	None

Appendix C – FAQ in English. As described in the previous section, the FAQ list will be adapted and completed along the project, based on questions submitted by users on the helpdesk page as well as feedback on existing content.

The glossary currently provides with definition of 28 technical terms, and may be found in Appendix D – Glossary. The glossary aims at helping end-users to better understand terms related to energy efficiency in the ICT sector. The list will be updated, when pertinent

4.1.3 End-user usage & feedback

The Helpdesk (both service levels) has been published in July 2016 (M6) in its English version, while the complete 5-languages version (Italian, German, French, Spanish) was online in October 2016 (M9). At the end of year 1 of the project, 2 formal questions were received on the ICTFOOTPRINT.eu helpdesk, both of them regarding supplier's application process to be included in the ICTFOOTPRINT.eu marketplace ("Community" category in Table 4). The organisations that used the Helpdesk services to contact ICTFOOTPRINT.eu, asked for support directly via live-chat, which is displayed on the Helpdesk page itself. Both questions were answered within 2 working days, as per the stated SLA.

With 755 unique page views just in year 1, the lack of questions received on the helpdesk page regarding any other topics than "Community" may be an indication that the website is clear and easy to understand by all stakeholders. The consortium expects that, in the future, the project might get submissions related with the self-assessment tool.

4.2 Calculation methodologies available on the platform

The detailed description and characterisation of the methodologies selected within the scope of the project may be found in deliverable D2.1. For each ICT-specific methodology analysed, the consortium created a factsheet to collect relevant information in a structured way to highlight the most relevant characteristics. These factsheets were made available on the project platform; in addition, an interactive map of the methodologies was built for better readability from the user. The up-to-date map is presented in Figure 3.

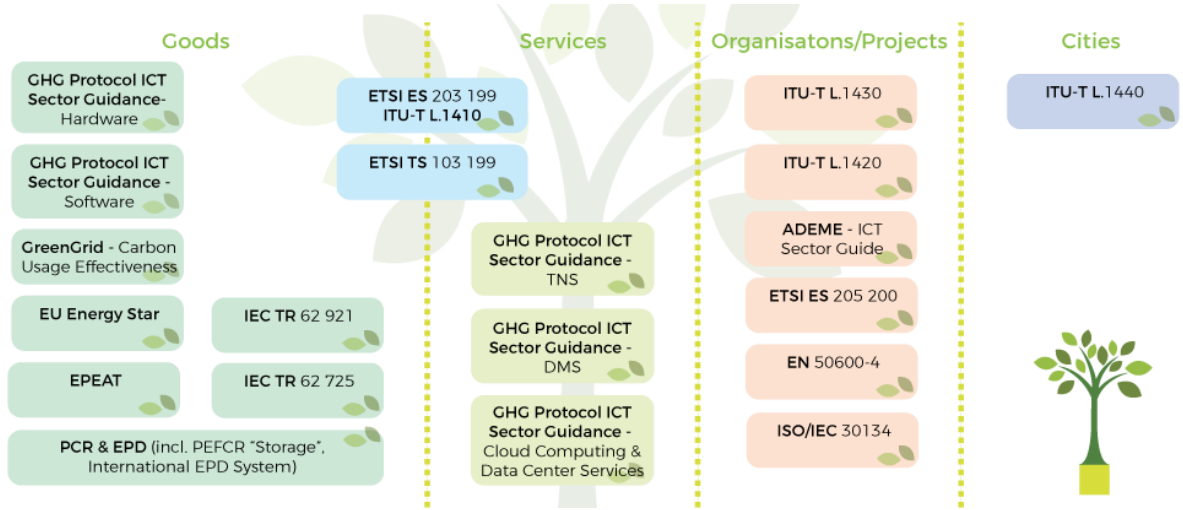


Figure 3: Interactive map available on the platform

The collection and analysis of ICT methodologies started with the project; the factsheets and the interactive map were continuously updated following the release of up-to-date methodologies as well as feedback received from the EAG members.

The consortium frequently invited the EAG members to provide with their feedback, by email and during a call conference organised within this goal. Specific comments were received from four EAG members, regarding the content of the factsheets, the presence or absence of specific methodologies

on the interactive map, as well as the classification of methodologies displayed on the map. In particular, the EAG referred to several relevant methodologies, not included on the website because not specific to the ICT sector.

Additional discussions were undertaken to allow for the consortium to gain a better insight on the ICT methodologies and initiatives, e.g. on the Green Grid initiative, the DCMM tool as well as the Open Eco rating.

ICTFOOTPRINT.eu will keep updating the calculation methodologies during the rest of the project. Additional feedback from EAG members and other SDOs will be gathered.

4.3 Marketplace

The online marketplace was launched during the sixth month of the project, with the aim to establish a level playing field and effectively contribute to speeding up the update of energy efficient and lower carbon footprint ICT solutions.

During the first year of the project, a total of 20 organisations sent a request to join the marketplace as a supplier; no registration was sent on the buyer side. 17 of the registered organisations are European (15 are from the EU, mainly the UK and France).

All applications received went through a first review from the consortium. Selection criteria were defined by the consortium regarding suppliers' applications:

1. Proposing goods more carbon/energy efficient than average products;
2. Proposing services which deliver carbon and energy savings to clients;
3. Providing solutions which fit in the categories supported by the marketplace.

Additional criteria were defined as helping the application process:

1. Attach additional documentation which provides evidence on supplier's claims on its "sustainable" products and services, namely recognized sustainable certification, environmental product declaration, life cycle assessment etc.;
2. Being a member of a "sustainable" network;
3. Being an SME;
4. Recognise or be a user of carbon footprint methodologies proposed by ICTFOOTPRINT.eu.

The marketplace as currently classified is divided between 7 categories: "Software", "Hardware", "Connectivity", "Data management", "Advisory/Consultancy", "Certifications & other services", and "Other solution offered". Figure 4 displays the type of solutions registered at end of year 1 on the online marketplace. It can be noted that 8 of the organisations offer more than one sustainable solution.

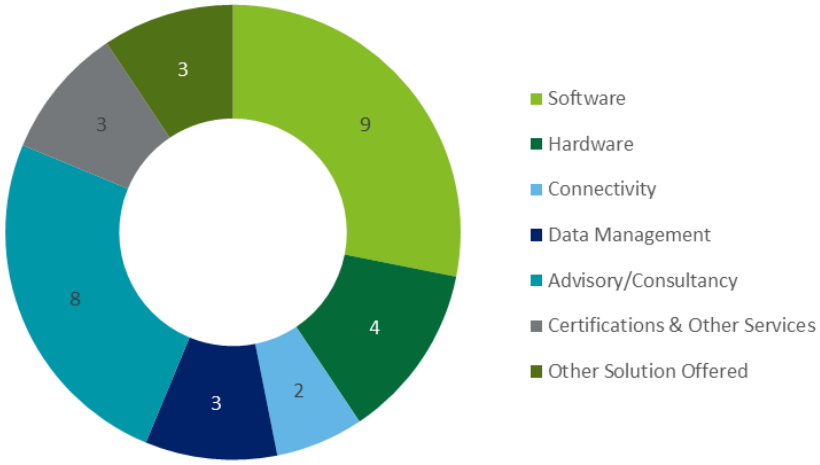


Figure 4: Type of solution offered on the marketplace available on ICTFOOTPRINT.eu platform

Most of the registered companies offer sustainable solutions in software and advisory/consultancy. Among the other solution offered, a company offers data centre collocation services. Please refer to Appendix E – Marketplace of the present deliverable for examples of registered companies.

4.4 Self-assessment tools

4.4.1 Goals & plan of development

The Self-Assessment Tool (SAT) is a calculator which main objectives are to:

- Raise awareness on the potential impacts of ICT products or activities and the potential main hotspots in terms of GHG emissions and primary energy consumption
- Raise awareness on the methodological principles of quantitative environmental evaluation methods in general and applicable to ICT products/activities in particular

The assessment is limited to two indicators, GHG emissions and primary energy consumption according to the main methodological principles and rules, as provided by existing standards and methodological guidelines specific to the ICT sector. It should be noted that some methodologies and standards ask for a more exhaustive impact assessment by requiring the evaluation of a more extensive set of indicators, covering all environmental aspects (e.g. abiotic resource depletion, air pollution, water pollution).

The tool enables users to get a better understanding of the potential GHG emissions and primary energy consumption of their ICT products or of their ICT considering two approaches depending on the type of system analysed:

- **Product-based approach:** the analysed system is an ICT product (either good or service);
- **Organization approach:** the analysed system is an ICT organization, or an organization using ICT intensively.

The self-assessment tool was identified from the beginning of the project as tangible and effective means to raise awareness and provide a practical insight to the potential users on:

- What stages may significantly influence the energy and carbon footprint of a product or an organisation, in particular the fact that some stages are not controlled by the tool user;
- The potential difference in results between primary energy footprint and carbon footprint: even if the two indicators are often highly correlated, in some cases, the results can be decoupled;
- The rationale of using ICT-related calculation methodologies to obtain these results.

Partly for these reasons, the SAT has gained a central position since the "Meeting with end users" held in Brussels on May 18th, 2016. At the same time, as acknowledged by the Policy Officer at the beginning of the project, due to the expected difficulty to access reliable data and the efforts needed to develop tools for such a wide range of applications vs. the constraints of the project, the assessment tools have to be considered as one of the elements provided by the platform and their main objective will be awareness raising. The tools will not be sufficiently robust and precise to be used e.g. for eco-design or external communication. In order to avoid any misinterpretation of the results estimated by the tool, a page presenting the main limits will be available online, for the user to view or download. This page will be developed during year 2.

Following the meeting held in May 2016, activities progressed substantially and the design on an online self-assessment tool has reached a conclusive point regarding the general architecture of the service and the web user experience. The requirements, as for the rest of the ICTFOOTPRINT.eu functionalities, follow a general principle of ease-of-use, to lower barriers to entry as much as possible for the ICTFOOTPRINT.eu community of users.

4.4.2 Design & online implementation

Originally, 3 versions of the SAT were foreseen, with a "Basic" version, a "Full" version and an "Advanced" version envisaged, delivering progressively accurate estimates of the carbon footprint from the ICT dimension of an "organisation". Discussions within the consortium and detailed analysis of the existing ICT methodologies led us to slightly re-align the plans (cf. section 4.4.1). According to the above, at the time of completing the present deliverable, the SAT is organised as follows:

- Self-Assessment Tool for an ICT "service" (the branding to be used in all communication efforts is going to be: **SAT-S**): this version is expected to raise strong interest among suppliers of the ICTFOOTPRINT.eu marketplace, enabling them to better understand the main life cycle stages contributing to the environmental impact of their service and how to conduct detailed and robust life cycle analysis;
- Self-Assessment Tool for an ICT-intensive "organisation" (the branding to be used in all communication efforts is going to be: **SAT-O**): this version will be one of the first attempts of online tool, based on the main methodological principles provided in the standards and guidelines identified by ICTFOOTPRINT.eu, for European organisations to calculate a first approximation of the environmental impact from their ICT related activities.

The SAT-S will cover various services, from an ICT provider perspective. The exact perimeter of the first version of the SAT-S will be further specified and explained on the platform.

For further versions of the SAT-S, the final list of ICT products and services to be covered by the tool will be decided later during the project. While it will not be possible to cover the full range of ICT goods and services (which would be well beyond the scope of this project), we will extend the scope or further refine the tool for specific products which are deemed of more interest. For example, we anticipate that ICT goods will not be in the scope of the future versions of the SAT-S..

The scope of the SAT-O covers the ICT activities of an organisation, whether ICT user or ICT provider. Although ICT methodologies may recommend to include all activities in the case of an ICT provider, this will not be the focus of the first version of the tool.

The SAT-S will be launched, following a progressively expanding validation campaign, by the end of February, whereas SAT-O is foreseen to go live by the end of the 1st quarter of 2017. By end of 2017, a revised version of the SAT-S might be released based on the feedback and expectations received from the users.

5 Status of activities towards SDOs

5.1 ICTFOOTPRINT.eu direct engagement with relevant SDOs

During the first year of activities, ICTFOOTPRINT.eu addressed specific efforts in the engagement with SDOs (Standard Development Organisations), particularly relevant for the project's purposes.

ICTFOOTPRINT.eu achieved remarkable attention from several of the biggest players worldwide in the scenario of ICT standards, which are relevant to environmental sustainability. Several SDOs were actively involved as speakers at ICTFOOTPRINT.eu webinars, providing valuable input and first hand insight on the status of the ICT methodologies. Details on the most relevant interactions with SDOs are reported in Table 5.

Table 5: Synergies established with SDOs

Organisation	Synergies / Potential Synergies
GHG	• Potentially participating to a future ICTFOOTPRINT.eu webinar.
IEC	• Potentially participating to a future ICTFOOTPRINT.eu webinar.
ITU	• Jean-Manuel Canet (Vice Chairman Working Party "ICT and climate change" at **ITU**) was a speaker during ICTFOOTPRINT.eu 3rd webinar.
CENELEC	• Lance Rutimann (Vice President of The Green Grid, participates to the CENELEC technical committee on data centre facilities and infrastructure) was a speaker during ICTFOOTPRINT.eu 3rd webinar.
ETSI	• Potentially participating to a future ICTFOOTPRINT.eu webinar

The impact of the engagement activity performed with SDOs has resulted in ICTFOOTPRINT.eu gaining reputability and achieving a unique, privileged position in Europe in the growing scenario of green ICT.

Reputability will result in increased engagement from the overall community. This impact is translated in several indicators, such as:

- Increased number of webinar attendees and variety of speakers;
- Increased number of social media members and dissemination results;
- Increased website visits.

Moreover, as detailed in section 5.2, this engagement activity is decisive for providing complete and up-to-date information on ICT-related methodologies and initiatives; ultimately for establishing ICTFOOTPRINT.eu as the reference platform for environmental and energy efficiency in the ICT sector.

Future plans regarding the engagement with SDOs are to:

- Establish a regular communication effort along with SDOs who have already shown interest in ICTFOOTPRINT.eu, through articles, press releases, social media posts, newsletters, etc.;
- Leverage on the engaged SDOs for establishing linkages with other organisations;
- Continue and improve the communication activities via newsletters and direct email messaging to the SDOs not engaged yet.

5.2 SDOs feedback on ICTFOOTPRINT.eu

As discussed in sections 4.2 and 5.1, the consortium frequently interacted with SDOs (included, but not limited to, several of the EAG members) for discussion on the selection of the methodologies and about the content provided on the platform.

The SDOs also provided explanations and valuable insight on the standards they are working on, as well as informing the consortium on new releases and updates of standards specific to the ICT sector. This concerns in particular the following standards:

- The final version of Recommendation ITU-T L.1440: Methodology for environmental impact assessment of information and communication technologies at city level
- The future release of EN 50600-4:2016. Information technology. Data centre facilities and infrastructures - Part 4.1, 2, 3

The consortium will continue this market watch in the following two years. A particular attention is paid to draft versions of the standards, such as the GHG Protocol standards and the IEC TR 62725:2013.

6 Community engagement

The community engagement is a core aspect in the project, and the team is involved in the identification of relevant stakeholders and definition of target messaging to stimulate the community involvement in the project. Communication on ICTFOOTPRINT.eu services are detailed in deliverable D4.2, which is the first annual report on ICTFOOTPRINT.eu communication and outreach activities.

This section presents the current community engagement. European players have shown that there is a lot of potential interest in the field, as reflected in the webinars participants and questions received, in the social media community and in particular in the requests being submitted on the marketplace and on the success stories sections.

During Year 1 of activities, ICTFOOTPRINT.eu actively engaged with at least 148 organisations (see table 5).

Table 6: Actively Engaged Organisations

Actively Engaged Organisations	
Webinars	121 participants, 3 questions received
Marketplace	15 Suppliers registered
Success Stories	8 Success Stories submitted
SDOs	4 SDOs actively engaged

Taking into account that most services – as presented in the previous sections - are being developed and are not yet fully deployed, ICTFOOTPRINT.eu expects to see higher engagement results as soon as these services will be available, during the second year of the project.

6.1 External Advisory Group (EAG) members

Through the regular communications with the EAG, the consortium has managed to establish a constructive and pragmatic relationship with its members. EAG members are being encouraged to support ICTFOOTPRINT.eu with success stories; Jaak Vlasveld has already contributed with content in this respect. This will be followed up in the coming months with the other members of the EAG.

Moreover, content was circulated by the EAG members in their networks: for instance Emma Fryer sent personalised messages to TechUK's national members. These activities resulted in the increased community members in the ICTFOOTPRINT.eu database and in our social media networks.

Plus, Osamu Namikawa from the Japanese company Hitachi, attended the "End-user requirements gathering & validation" meeting in Brussels, released a video testimonial, and consolidated an international support level to the project. Lance Rütimann, VP of the Green Grid and Jaak Vlasveld, Director of Green IT in Amsterdam, both participated as speakers in two webinars organised by ICTFOOTPRINT.eu, and provided useful input and discussions on the interactive map of ICT methodologies.

Table 7: EAG members

Name	Organisation
Andrae Anders	Huawei technologies
Boldi Mauro	Telecom Italia
Fryer Emma	TechUK
Namikawa Osamu	Hitachi

Name	Organisation
Roche Dominique	Orange & eG4U
Rütimann Lance	The Green Grid
Schien Daniel	University of Bristol
Stephens Andie	Carbon Trust
Willson Thomas	ECOS
Vlasveld Jaak	Green IT Amsterdam & EURECA

6.2 Helpdesk users

Despite the short time it has been online, the helpdesk already accounted for a total of 755 page views since M6.

As already mentioned in section 4.1.3, the helpdesk got two formal submissions, from marketplace suppliers which wanted to get feedback about their application in becoming sustainable suppliers in the marketplace. Their information request was promptly taken care of and they are currently official suppliers on the ICTFOOTPRINT.eu marketplace.

Further feedback is expected from the helpdesk as the consortium will continue deploying other services on the platform, and more particularly with the release of the second level helpdesk.

6.3 Success stories subscribers

Best practitioners from sustainable ICT are not limited to Large Organisations that implemented energy efficiency procedures in their businesses. Best examples can be found as well from municipalities and SMEs. In order to have a relevant role in decreasing ICT carbon footprint, every player can have his small but relevant role.

So far, thanks to EUROCITIES' network, ICTFOOTPRINT.eu identified Malmo and Linköping as cities leading the sustainability in municipalities. The EAG member Anders Andrae came up with a best practitioner from Asia, a public organisation called China Southern Power Grid. LEXMARK is a large corporation from toner cartridges sector and Walhalla is a SME which achieve greater efficiencies without compromising on data centre reliability.

More best practitioners will be identified during year 2 of ICTFOOTPRINT.eu, in order to have a "kind of catalogue" of best practices, where other players, interested in becoming sustainable in ICT, can consider them as benchmark to their own organisations.

6.4 Industry engagement

6.4.1 Suppliers & buyers of the marketplace

The online marketplace aims at bringing together the demand-side (SMEs willing to adopt low-carbon footprint solutions) and the supply-side (low-carbon footprint solution providers), establishing a level playing field & effectively contributing to speeding up the uptake of energy efficient ICT solutions.

The project launched the 2nd release of the online platform, providing an early fully working version of the online marketplace.

So far, the marketplace records a total of 19 organisations joining as sellers. The full list of the submitted requests is shown in Appendix E – Marketplace.

6.4.2 Other players

During year 1 of activities, ICTFOOTPRINT.eu also positively engaged with other industry players such as VMWare, an US based cloud and virtualisation company, providing software and services to a vast community of clients. Joe Baguley, VMWare vice president and chief technology officer for the

EMEA markets, joined the 3rd ICTFOOTPRINT.eu webinar, providing stimulating insights on ICT recommendations for minimising carbon footprint.

Collaboration with other players positively impacts ICTFOOTPRINT.eu visibility, increasing the project awareness among the community of ICT players, while fostering the project network and partnerships.

7 Second year plan for managing & analysing feedback form the users

7.1 Analysis of the first-year progress on ICTFOOTPRINT.eu services

As presented in the previous sections of the deliverable, several services and content were released on the ICTFOOTPRINT.eu platform during the first year of the project:

- ICT-related calculation methodologies factsheets;
- Success stories on reduced environmental and energy impact in ICT;
- First level helpdesk, including FAQ and glossary;
- Marketplace (first and second releases);
- Self-assessment tool applicable to services (first release).

Additional releases as well as updates of the information content provided online are planned during the rest of the project.

In complement to the above releases, stakeholders were actively contacted by the consortium in order to engage them in ICTFOOTPRINT.eu. As a quick summary of the work undertaken:

- The EAG members and additional SDOs were asked to provide their feedback on the technical content provided online, such as the ICT calculation methodologies factsheets;
- The success story factsheet template was circulated among EAG members and sent to almost 2,000 stakeholders, for them to share any success stories or best practices that they may be aware of;
- Similar contacts were undertaken for the release of the marketplace;
- The consortium continuously shared any updates on the project with social media community.

The consequent feedback received from SDOs, EAG members as well as from the user community is described in sections 5 and 6 of the report. The members of the EAG as well as additional SDOs contacted showed particular interest in the project, and their engagement ensured the reliability of the technical content provided on the platform. By participating to the webinars and by promoting the project among their contacts, they also allowed for an increased visibility among ICT-related stakeholders.

Feedback from end users was received through the helpdesk, registration to the marketplace and success stories, and during events organised by ICTFOOTPRINT.eu or in which ICTFOOTPRINT.eu was involved. This first round of feedback remains quite low, and is partly due to the progressive release of the services: further engagement is expected during years 2 and 3, for instance from the use of the self-assessment tool, and the implementation of the second level helpdesk. The main feedback received concerned:

- Main barriers to raising awareness and implementing ICT methodologies in the sector;
- Use of the ICTFOOTPRINT.eu platform.

A first analysis of the “green” ICT sector in the EU is provided in section 1 and shows that energy and environmental footprint in ICT is a rising topic among relevant stakeholders.

However, some observations can be made:

- While the multiple benefits (economic, environmental and even social benefits) of implementing best practises are often quoted by ICT players, it is harder to find players who can clearly provide quantified information on the environmental benefits achieved. The communication on the environmental benefits still relies on arguments often based on “common sense” whether on quantified information;

- ICT companies may face difficulties to justify their environmental claims if communication actions are not based on credible information: footprint methodology standards and guidelines can help ICT companies to produce such a robust information;
- The understanding of the benefits of using ICT environmental footprints methodologies to account for environmental and energy efficiency, seems to remain quite low among the ICT market today. As a result, very few organisations have a good comprehension of the existing methodologies in the sector, or how the use of ICT calculation methodologies may benefit them. This, of course, vary depending on the considered sub-sector: for instance, the share of organisations involved in green ICT seems to be higher for data centre services.

Therefore, the main challenge for years 2 and 3 is to identify the best ways to raise awareness among the ICT community.

7.2 Proposed plan of actions for the second year

Several plans of action are developed, for each of the services provided by ICTFOOTPRINT.eu.

In addition to these, the consortium identify several points as key aspects to be implemented in year 2. Most of them aim at demonstrating the benefits from ICTFOOTPRINT.eu as well as focusing on the business perspectives for ICT stakeholders, and are presented in Table 8.

Table 8: Proposed plan of actions for the second year

Topic	Action
Services	Success stories, complemented by additional interviews of identified key stakeholders of the “green” ICT market in Europe;
Platform	Revised content of the project platform, e.g. by always providing references (when relevant) and ensuring a global consistent and robust message;
Communication	Webinars involving organisations presenting their ICT-related best practices;
Communication	Webinars aiming at explaining how to implement ICT calculation methodologies. In addition, these webinars could be the base of a tool box, available to any potential user of the methodologies;
Survey	Surveys launched among the marketplace sellers, to gain their insight on what their clients expect, and why they got involved in “green” ICT;
All	Better integrate the consortium’s knowledge of the SME market in the ICT sector in Europe, to the points raised above.

The prominence of the above listed actions could depend on data gathered regarding the platform traffic, i.e. depending on the most popular webpages. For instance, the interviews indicated before could be displayed on the homepage, in addition to being in the list of success stories.

8 Conclusions

Year 1 allowed the ICTFOOTPRINT.eu Team to establish the vision, lingo, and engagement groundwork for the initiative. Particularly, progresses in line or beyond the set goals were made especially concerning implementation of tools and services, to be leveraged by ICTFOOTPRINT.eu to achieve its goals.

A segmentation of the ICT “green” solutions has been defined and is presented in the present document, including key players.

Concerning the CO2 Calculation Methodologies, selection of relevant ones was shared with the EAG members, with positive feedback received and general convergence achieved on their relevance to the Project goals. The consortium also contacted SDOs (in addition to those already among the EAG) directly involved in ICT energy efficiency and received promising feedback.

Further interaction is planned during year 2 with EAG members and SDOs, in order to continue receiving feedback on the tools and services proposed on the project platform, but also to value their engagement with the ICT community, e.g. during ICTFOOTPRINT.eu webinars and events.

During this first year, the community began to engage with the services, along with their implementation on the platform. Additional engagement is expected in coming months, with the further release of additional contents, tools and services.

Furthermore, the present document reports the success stories that have been identified so far. They represent an effective way to share the positive outcomes from implementing best practices in ICT activities, and could potentially inspire other organisations towards “greener” practices.

Collected success stories, along with literature review, led the consortium to gain a better insight of the green players among the European ICT market, and their best practices. This global vision will be useful for year 2, allowing the consortium to focus the effort on targeted aspects of the project.

The end-user feedback collected so far helped to understand the improvements needed on the web platform, particularly regarding the sellers’ application process and the submission of their ICT sustainable solutions on the marketplace section.

The outcome and experience gained during years 2 and 3 will allow for a more refined understanding of the ICT sector in Europe and of the main barriers and levers to improving the environmental footprint of the ICT providers and users. The experience gained during year 1 will also help to reinforce the impact of the ICTFOOTPRINT.eu‘s communication strategy on footprint methodologies and their benefits for ICT SMEs.

Deliverables D2.3 and D2.5 will provide updated analysis.

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Appendix A – Best practices among ICT players

Some best practices may be valid for several subsectors, e.g. best practices identified among data centres may apply to transmission networks as well. However the data provided in Table 9 only provides best practices currently used and displayed by the players of a subsector. For instance, eco-design of ICT equipment, to improve the reuse or recycling, was identified as a best practice among one of the organisations providing transmission networks. Although it is surely used by some data centres when selecting the servers and other equipment, the consortium did not find any references to eco-design at this stage among data centres in the EU. Therefore it is not listed here.

Table 9: Best practices found among ICT players in the EU at end of year 1

	Production & Transportation stages	Use & Maintenance stages	End of life stage
Data centres	Adapted location (e.g. to ease the cooling) Production of renewable energy onsite Building certification (e.g. LEED)	Improved data management, e.g. virtualisation Energy management (incl. cooling systems): reduction of energy used (e.g. via performance indicators), reuse of heat generated (internal or external reuse)	None identified for now
Transmission networks	Eco-design, for increase reuse or recycling of ICT equipment	Energy management: reduction of energy used (e.g. via performance indicators)	None identified for now
Hardware	Eco-design: choice of resources (e.g. by avoiding hazardous material), increased lifespan, increased energy efficiency during the use stage Calculation of environmental footprint (usually for only part of the equipment produced, on which a marketing advantage may be identified), e.g. to ensure a robust eco-design approach Ensuring the quality / compliance of material and devices from subcontractors seems to be one of the major obstacle to hardware providers	Increased lifespan: eco-design of the hardware, use of OS with optimised lifespan Modular components of the hardware, to ease the maintenance and ensure increased lifespan Increased energy efficiency: eco-design, use of software for energy management. Can be ensured via labels	Organisations offering a collection site for end-of-life hardware (independently from their activities) Organisations specialised in reuse and remanufacturing
Software	Greencoding of the software	OS with optimised lifespan	
Web services	Use of renewable energy Greencoding for the site platform, e.g. with reduce use of bandwidth	Selection of “green” data centres to host data Offset of end-user impact, e.g. via carbon offsetting	

Appendix B – Success stories

At the moment, ICTFOOTPRINT.eu collected the following success story from private organisations:

Table 10: LEXMARK Success Story

LEXMARK - USA	
Organisation presentation	Organisation: LEXMARK Organisation Type: Large Enterprise City: Lexington Country: United States Contact: Sylvie Thomas Link website: http://csr.lexmark.com/materials.html
Claim to fame	Lexmark has implemented industry-leading post-consumer recycled plastics in its toner cartridges using a closed-loop recycling process and has set significant future targets to drive further environmental impact reduction on all its product lines. With Lexmark Cartridge Collection Programme, Lexmark has reclaimed a feed-stream of high-impact polystyrene plastic from empty toner cartridges. After returning this material to near-virgin quality, it is used to make housings and other components, minimising the resource extraction necessary to produce new toner cartridges.
Main benefits & achieved results	• Benefit 1: The largest quantity used in Lexmark products by volume are plastics, such as HIPS (high-impact polystyrene) and ABS (acrylonitrile butadiene styrene). Usually manufactured from gas and petroleum feedstocks, the environmental impact of these feedstocks can be offset by increased use of recycled plastic. • Benefit 2: The product performs to the same standard as toner cartridges with no PCR content—just with enhanced environmental attributes. The user price is unchanged while internally the effort allows Lexmark to recover some of the costs related to our LCCP which is free and easy for customers to use. Of the empty cartridges returned to the company, 100 percent are either reused or recycled. • Result 1: Lexmark is an industry leader in the use of reclaimed plastic in its cartridges with 18% average PCR plastic content, by weight, across all toner cartridges, with several cartridges containing over 25% PCR in 2015: 92% of Lexmark-branded toner cartridges contain at least some PCR content. • Result 2: More than 30% of the Lexmark printer line now have a minimum of 5% recycled plastic content. The newly announced CS72x printer, for example, is made of 53% recycled plastics.
Presentation of the initiative	Since 2008, Lexmark's corporate social responsibility programs have grown stronger in both depth and breadth. In the past three years alone, Lexmark has dedicated more than $1.1B USD to research and development with a high portion used to develop energy efficient features and eco-designed products. One industry-leading approach is in the use of PCR plastic in our toner cartridges. Lexmark also looked at third-party resin suppliers for PCR in printers, identified stable suppliers and quality resins focusing on 8–10 material grades, and taking more risk, and convinced Design Engineers to use more PCR in printers. In addition to PCR in printers, a process was also designed and fully implemented at the LCCP plant in order to extrude and pelletize ground plastic parts to convert them into post-consumer resin.
Commitments	Lexmark's 2018 goal is to average 25% PCR plastic content across the entire toner

LEXMARK - USA	
for the future & other relevant information	cartridge product line. By 2018, Lexmark also aims to reuse 50% by weight of the cartridges returned, a substantial increase on the current figure of 34%, which currently establishes the company as the industry leader. Lexmark intends to partner with other industry sectors as well as plastics recyclers to develop a strong network. The network should identify new sources of plastics and line them up with the growing number of users of PCR plastic. In addition, partnering with Ellen MacArthur Foundation allows Lexmark to work together with a group of like-minded businesses to promote the benefits of the circular economy.

Table 11: Walhalla Success Story

Walhalla - Spain	
Organisation presentation	Organisation: Walhalla Organisation Type: Small and Medium Enterprise City: Madrid Country: Spain Contact: General Link website: http://www.walhalladcs.com
Claim to fame	Modern data centre that meets the needs of cloud-based services while simultaneously taking advantage of the latest eco-efficient technologies in order to cut energy consumption.
Main benefits & achieved results	At the moment Walhalla uses now uses Eaton's Variable Module Management System (VMMS) and Energy Saver System (ESS) technologies, helping the company achieve greater efficiencies without compromising on data centre reliability (achieved 99 per cent efficiency, as EATON's technology allows the UPS to provide mains current to a load when the input is within acceptable voltage and frequency limits). Plus, at lower load levels, VMMS maximises system efficiency in doubleconversion mode by automatically concentrating the load on the minimum number of UPS power modules. In Walhalla, these technologies are implemented in such a way that one of the electricity feeds uses ESS, whilst the other feed uses VMMS technology. Not only are the highly sophisticated from Eaton technologies helping to ensure maximum data reliability, but they also help increase the centre's overall productivity and improve energy efficiency by optimising the UPS's energy consumption. Walhalla has received a Tier IV rating from the Uptime Institute, which is the most stringent level and implies that the centre is able to guarantee 99.995 per cent availability in all circumstances. Walhalla was also recognised in 2010 with a Data Centre Leaders' Award for Innovation in the Medium Data Centre.
Presentation of the initiative	To ensure uninterrupted power for the data centre, it was required a power quality solutions provider that shared its own commitment to using the most advanced technologies to deliver the best possible results: reducing power consumption, achieving maximum energy efficiency and ecologically innovative solutions. Ultimately, the company needed high-performance Uninterruptible Power Supplies (UPSs) that would offer significant savings in power consumption.
Commitments for the future & other relevant information	The second equivalent room is scheduled to be completed in the next phase.

Table 12: BMW Group Success Story

BMW Group - Germany	
Organisation presentation	Organisation: BMW Group Organisation Type: Large Enterprise City: Munich Country: Germany Contact: Michael Brown Link website: https://www.bmwgroup.com/en.html
Claim to fame	BMW Group moves high performance computing applications (HPC) to Iceland to benefit from 100% renewable, affordable data centre power, reducing annual carbon emissions by 3,570 metric tons and cost of powering its HPC applications by as much as 82 percent.
Main benefits & achieved results	- High performance computing (HPC) applications tcarbon neutral, due to a dual sourced renewable powered data centre campus in Iceland; - Reduce annual carbon emissions by 3,570 metric tons; the equivalent of the carbon produced by burning 1.46 million litres of petrol; - Reduce the cost of powering its HPC applications by as much as 82 percent; - Improvement the reliability of its HPC operations while strengthening the company's commitment to environmental initiatives - Affordable, reliable and sustainable infrastructure
Presentation of the initiative	BMW Group moved its high performance computing (HPC) applications to Verne Global's 100 percent, dual sourced renewable powered data centre campus in Iceland. The deal will see BMW move a number of power-hungry applications to the Verne Global facility, including crash simulations, aerodynamic calculations and computer aided design and engineering (CAD/CAE), all of which are critical to the development of BMW's next generation of energy efficient vehicles. HPC is traditionally associated with high power consumption and carbon emissions, due to the need to both power and cool the high density servers required to run these applications. "Companies are facing a mounting challenge to keep both their data centre power costs and carbon emissions in check," said Jeff Monroe, CEO of Verne Global. "Particularly those involving power intensive computing such as HPC. By moving its applications to Verne Global, BMW is showing there are alternatives available today that address the unpredictable and fluctuating power prices found throughout the world and simultaneously reduce their carbon footprint in a very meaningful way."
Commitments for the future & other relevant information	BMW Group has firmly established environmental and social sustainability throughout its value chain. The company is committed to the principles of the United Nations' Global Compact, which are being implemented at all companies' locations since 2001.

Table 13: Verne Global Success Story

Verne Global - Iceland	
Organisation presentation	Organisation: Verne Global Organisation Type: SME City: Reykjanesbaer Country: Iceland Contact: General Link website: https://verneglobal.com/
Claim to fame	Verne Global needed to extend its commitment to sustainability in the form of highly efficient equipment throughout its entire power system. In addition, the company needed to maintain a flexible, scalable and secure infrastructure capable of supporting customers with optimized solutions for any data centre application — and required an enterprise-ready, ultra high-density critical power infrastructure that was still able to help customers lower overall costs. With a ground-breaking Energy Saver System (ESS), 9390 and 93PM UPSs that can operate at 99 percent efficiency, Verne Global reduces power and cooling operating expenses, without sacrificing reliability. It reduces the overall infrastructure energy consumption, resulting in significant operating cost savings.
Main benefits & achieved results	- Provide customers with continuous uptime and high availability; -Extend electrical savings with highly efficient UPSs ; - Preserve valuable space with the compact footprint of Eaton's solutions; - Quickly and easily expand its power protection solution with inherent UPS scalability; - Maintain the health of each UPS and ensure quick resolution of any issues with global footprint of service technicians; - Enhance power usage efficiency to industry-leading levels.
Presentation of the initiative	The challenge was to stablish a fully redundant, highly energy-efficient backup power system to support always-on data centre operations within a flexible, scalable and secure infrastructure running entirely on renewable power. The solution was Eaton onsite engineering support and expertise in critical power system design, Power Xpert™ 9395, Power Xpert 9395P, 9390 and 93PM backup power systems equipped with the Energy Saver System (ESS). The result was a comprehensive and highly scalable backup power system supporting a 100 percent uptime guarantee with the ability to lower energy costs, maintain industry-leading levels of power usage efficiency and support an industry-leading commitment to data centre sustainability.
Commitments for the future & other relevant information	None

At the moment, ICTFOOTPRINT.eu collected the following success story from public organisations:

Table 14: China Southern Power Grid Success Story

CHINA SOUTHERN POWER GRID - CHINA	
Organisation presentation	Organisation: China Southern Power Grid Organisation Type: Public Company City: Guangdong, Guangxi, Yunnan, Guizhou and Hainan chinese provinces Country: China Contact: international@csg.cn Link website: http://eng.csg.cn/
Claim to fame	A decrease in costs by 5% which is a definite return on investment for China Southern Power Grid.
Main benefits & achieved results	A decrease in costs by 5% which is a definite return on investment for China Southern Power Grid.
Presentation of the initiative	China Southern Power Grid currently provides electricity to a staggering 230 million people. With an ever-growing middle class expected to make up 70% of the population by 2030, electricity grids serving the Chinese market will have to support a dramatically increasing consumption. Efficiency is key to improving existing electricity grids, in order to provide reliable power to such a growing population. As one of the world's economic power-houses, China has started to prioritise clean energy and CO2 emissions reduction by developing an energy system that is efficient, reliable and environmentally responsible, focusing on clean energy and low carbon emissions.
Commitments for the future & other relevant information	The next-generation power networks will facilitate distributed and renewable energy sources, be highly automated and exploit the Internet of Things.

At the moment, ICTFOOTPRINT.eu collected the following success stories from cities/municipalities:

Table 15: Malmo Success Story

MALMO - SWEDEN	
Organisation presentation	Organisation: Malmö City Council Organisation Type: City / Public Administration City: Malmö Country: Sweden Contact: malmostad@malmo.se Link website: http://malmo.se/
Claim to fame	ICTFOOTPRINT.eu considers Malmö, the third largest city in Sweden, a success story of how a city addressed the challenge of decreasing the carbon footprint of ICT products. Malmö increased its energy efficiency, decreasing its carbon footprint and achieving considerable cost savings. The digitalisation of the city's administration has greatly contributed to energy and resource optimisation and has produced economic and environmental benefits. Malmo signed the EUROCITIES Green Digital Charter in 2010, and the city's green ambitions and achievements were nationally recognised in 2013, when it achieved some of the results listed above

MALMO - SWEDEN	
Main benefits & achieved results	• New standards in green procurement of IT products, introduced in 2012. - Purchasing ICT products/solutions (desktops, laptop computers, network printers, monitors) based on life cycle perspective. • Choosing suppliers based on energy and resource optimisation. • Buying products that came with recognised third-party environmental certifications, such as those of Germany's Blaue Engeln or TCO Development. • Avoiding the purchase of equipment that contained hazardous material or that were produced in an unethical manner.
Presentation of the initiative	• 98% of IT products are environmentally labelled. • Over 90% of products used are environmentally certified. - Decreased expenditure of €535,000 per year (between 2010-2014)
Commitments for the future & other relevant information	• Decrease carbon footprint of ICT products by 30% by 2020. • Estimated savings of over €500,000 each year. • Furthermore, Malmö is in talks with Atea, its chosen ICT supplier and logistics partner, regarding ways to manage the city's digital assets in a sustainable way.

Table 16: Linköping Success Story

LINKOPING - SWEDEN	
Organisation presentation	Organisation: Linköping City Council Organisation Type: City / Public Administration City: Linköping Country: Sweden Contact: http://www.linkoping.se/kontakt/ Link website: http://www.linkoping.se/
Claim to fame	Success Story of tackling energy efficiency issues and minimizing its carbon footprint in ICT sector, where Linköping city decreased its total ICT footprint and reduced energy consumption.
Main benefits & achieved results	• 8% less energy consumption by the city's data centre. • Decrease of over 30% of city's total ICT footprint in 2013. • No increase in city's total energy consumption despite the increased number of computers, smartphones, projectors, and networked equipment used (40% new equipment between 2008 and 2013 - representing 4,000 new units).
Presentation of the initiative	• Measurements on ICT environment's energy consumption, cost, and carbon footprint since 2008. • City data centre run by carbon-neutral hydropower.
Commitments for the future & other relevant information	• Plans to run a new measurement in 2017.

At the moment, ICTFOOTPRINT.eu collected the following success stories from research institutues:

Table 17: EARLHAM Institute

EARLHAM Institute – United Kingdom	
Organisation presentation	Organisation: EARLHAM Institute Organisation Type: Academia/Research City: Norwich Country: United Kingdom Contact: Michael Brown Link website: http://www.earlham.ac.uk
Claim to fame	EARLHAM Institute, a research institute renowned for its contribution to the analysis and data-sharing of the highly complex wheat genome that is critical to securing future global food supplies, will save up to 70% in energy costs (based on 14p to 4p KWH rate) and with no additional power for cooling, significantly benefiting the organisation in their advanced genomics and bioinformatics research of living systems.
Main benefits & achieved results	- Supply medium and high power computing density at significantly lower energy costs; - Deliver excellent global network communications and data centre security; - Savings to 70% in energy costs (based on 14p to 4p KWH rate) and with no additional power for cooling.
Presentation of the initiative	EI has selected a carbon neutral data centre campus in Iceland to investigate the efficiencies of distributing large-scale genomics and computational biology data analysis. Through Verne Global, EI will have access to one of the world's most reliable power grids producing 100% geothermal and hydroelectric renewable energy. One of EI's primary goals is to understand crop genomes so new varieties can be developed to secure food supply in the face of a growing population and environmental change. The cutting-edge, high-throughput DNA sequencing instruments generate large amounts of data, from a few hundred gigabytes to several terabytes per run. The output requires significant computational effort, making the storage, processing, analysis and sharing of the data extremely challenging. "We are, therefore, very excited to be partnering with Verne Global in Iceland, who not only can supply medium and high power computing density at significantly lower energy costs, but who can also deliver excellent global network communications and data centre security," - Dr Tim Stitt, Head of Scientific Computing at EI.
Commitments for the future & other relevant information	None

Appendix C – FAQ in English

CATEGORY: GENERAL

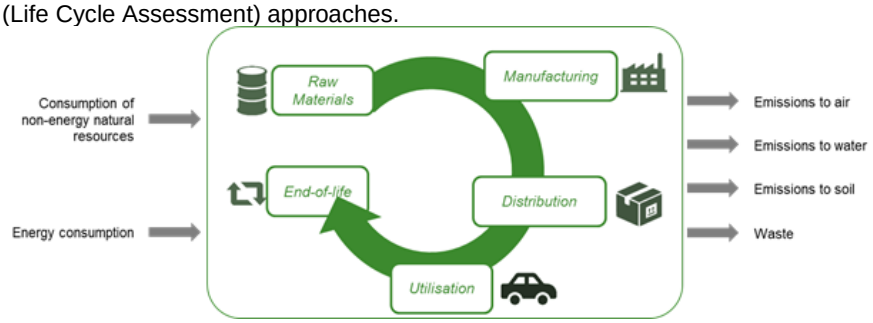
Nº	Question	Answer
1	What is ICTFOOTPRINT.eu?	The project main objective is to promote the adoption of carbon footprint calculation methodologies in the ICT sector. ICTFOOTPRINT.eu will help ICT sector by calculating its carbon footprint in an easy way, in order to decrease environmental impact and at the same time improve competitiveness. ICTFOOTPRINT.eu also plays a key role in raising awareness on energy efficiency issues through outreach and events.
2	What ICTFOOPRINT.eu can do for me?	ICTFOOTPRINT.eu will help ICT players by offering **high-standard solutions** and **methodologies** which will help reduce their carbon environmental footprint, such as carbon or energy footprint: 1. **A self-assessment tool** to guide end-users in measuring their ICT carbon and energy footprint. The tool will allow the user to perform a simplified evaluation of the carbon and energy footprint at product level or at organization level. The carbon and energy footprint's calculation rules which will be implemented in the tool will be based on the best methodological standards for the ICT sector. 2. A **helpdesk** with fast response time providing assistance to organisations interested in using the methodologies and the self-assessment tool; 3. An **online marketplace** for sustainable solutions: bringing together the **demand-side** (e.g. SMEs willing to adopt low-carbon and energy footprint solutions) and the **supply-side** (e.g. low-carbon and energy footprint solution providers), and establishing a level playing field which effectively contributes to speeding up the uptake of carbon and energy efficient ICT solutions. 4. **Webinars & communication materials** for continuous training and education on best practice ICT sustainable solutions; 5. **Best practices and success stories** from several ICT players in adopting ICT footprint methodologies in Europe.
3	I know little about ICT carbon footprint methodologies and energy efficiency. Is ICTFOOTPRINT.eu relevant to me?	ICTFOOTPRINT.eu is relevant to those who want to learn more about energy efficiency and carbon footprint methodologies for the ICT sector. ICTFOOTFOOTPRINT.eu will provide tools, knowledge and support to all those who want to address high levels of energy efficiency and decrease their carbon footprint.
4	Do I have to pay to use ICTFOOTPRINT.eu services?	Using ICTFOOTPRINT.eu services is totally free of charge.
5	Is ICTFOOTPRINT.eu only for Europeans or can anyone use it?	Europe is the primary audience of ICTFOOTPRINT.eu. However, our services are relevant to anyone around the world and we welcome all users to our platform and services.
6	How can I find out more about new ICTFOOTPRINT.eu services?	Keep up to date with new ICTFOOTPRINT.eu services and news by subscribing to our newsletter. Simply send an email to contact@ictfootprint.eu. You can also follow us on Twitter and connect with us on LinkedIn.
7	Will ICTFOOTPRINT.eu provide services after the end of the project?	ICTFOOTPRINT.eu runs from February 2016 to January 2019. After that visitors will be able to continue to use the self-assessment tool, the online marketplace and will be able to access methodologies to facilitate the uptake on energy efficiency measures.

CATEGORY: COMMUNITY

Nº	Question	Answer
1	What are the benefits of joining ICTFOOTPRINT.eu?	The main benefit of joining ICTFOOTPRINT.eu is to get help on how your business can become more carbon and energy efficient and how to calculate your ICT environmental footprint in an easy way, so that you can decrease your impact on the environment and make your business more competitive.
2	How do I register to ICTFOOTPRINT.eu?	It's really easy to register to ICTFOOTPRINT.eu. Simply visit our homepage at www.ICTFOOTPRINT.eu and click on "REGISTER" in the top right of the homepage. Then complete the information requested and click on "CREATE NEW ACCOUNT". You will then get a confirmation email in your mailbox.
3	How do I know my registration has been successful?	After your registration you will receive a confirmation email.
4	I registered for ICTFOOTPRINT.eu but I did not get any confirmation email, was my registration successful?	Please first check your spam folder. If you have still not received it, please send an email to contact@ictfootprint.eu
5	How can I delete my profile?	You may delete your profile by first logging into your account and going to "Your Profile". Then click on the "EDIT" tab and click on "CANCEL ACCOUNT" at the bottom of the page.
6	Why should I subscribe ICTFOOTPRINT.eu newsletter?	By subscribing to the ICTFOOTPRINT.eu newsletter you will receive up-to-date information about methodologies and metrics which improve energy efficiency in ICT sector. The newsletter is also the best way to find out about new ICTFOOTPRINT.eu services which can help you gain the competitive edge by reducing your carbon footprint.
7	How do I subscribe to ICTFOOTPRINT.eu newsletter?	To subscribe ICTFOOTPRINT.eu newsletter, visit our homepage: www.ICTFOOTPRINT.eu and add your email to the "Subscribe and Stay Updated" area available at the bottom right of the page. Alternatively, you can also send an email to contact@ictfootprint.eu and ask to be added to ICTFOOTPRINT.eu mailing list.
8	How do I unsubscribe from ICTFOOTPRINT.eu newsletter?	To unsubscribe you need to be registered. Simply log in and go to your profile page. Click on the "Newsletters" section and then click on "manage subscriptions" and unselect the newsletter subscription.
9	Is my information secure with ICTFOOTPRINT.eu?	ICTFOOTPRINT.eu does not plan to compile or process any personal data under any circumstances in relation to any activities, with the sole exception of data collected as part of the community development. No personal sensitive data will be collected for this database, since it will be built with information that is publicly available. Should data of high relevance to ICTFOOTPRINT.eu not be publicly available, ICTFOOTPRINT.eu will request relevant authorisation and will use such data only upon written consent. ICTFOOTPRINT.eu will comply with EU legislation with regard to data collection, storage protection, retention, destruction and confirmation, which will be used solely for the purpose of community building.
10	Does ICTFOOTPRINT.eu use cookies?	ICTFOOTPRINT.eu uses Cookies to provide you a personalised and comfortable navigation. Cookies are small files downloaded on your computer (or any other terminal used for the access to the website). Cookies enable a more personal navigation on the websites by memorizing some of the parameters you chose during your last visit. Cookies do not damage your computer. For further information, please visit www.allaboutcookies.org.
11	Where can I learn	For more information about ICTFOOTPRINT.eu privacy statement, please visit the

Nº	Question	Answer
	more about ICTFOOTPRINT.eu' s privacy statement?	"Privacy Policy" page.
12	Where can I find the legal disclosure and terms of use for ICTFOOTPRINT.eu?	For more information about ICTFOOTPRINT.eu terms of use, please visit the "Disclaimer Terms of Use" page.

CATEGORY: CARBON FOOTPRINT METHODOLOGIES

Nº	Question	Answer
1	Carbon footprint, Energy footprint, Environmental footprint… What are we talking about?	The concept of "footprint" is relatively recent and due to differing opinions on what this term refers to, things may get confusing for a non-expert audience. Terms like "carbon footprint", "energy footprint" or "environmental footprint" are often used without a clear understanding of their respective meaning. "Footprints" methodologies belong to the family of the environmental assessment methods based on Life Cycle Thinking (LCT) i.e. an approach that takes into consideration the spectrum of resource flows and environmental interventions associated with a product, service, or organization from a supply chain perspective, including all phases from raw material acquisition through processing, distribution, use, and end-of-life processes. Hence footprints methodologies are all LCA-based (Life Cycle Assessment) approaches.  An environmental footprint, unlike a carbon or energy footprint, is a multi-indicator measure of products/services/organisations impacts (see the definitions provided in the following sections). Environmental/carbon/energy footprints can be applied to: • Products and services (Product Environmental Footprint – PEF, Product Carbon Footprint - PCF), • Organizations (Organization Environmental Footprint – OEF) • Even regions or countries. Useful links: • European Commissions - Single Market for Green Products Initiative • Joint Research Centre of the European Commission – European Platform on Life Cycle Assessment • UNEP / SETAC – Life Cycle Initiative • Carbon Footprint of Nations
2	What is a Life Cycle Assessment?	A Life Cycle Assessment (LCA) is an environmental evaluation approach that considers the entire life cycle of a product or service, from raw material acquisition through processing, distribution, use, and end-of-life processes. LCA is a multi-criteria approach i.e. it takes into account several environmental issues. Through such a perspective, environmental burden shifting between life cycle stages or individual processes can be identified and avoided. A similar approach is undertaken for LCA of organisations or projects. The ISO 14044:2006 standard specifies requirements and provides guidelines for life cycle assessment (LCA).

Nº	Question	Answer
3	What is an environmental footprint?	An environmental footprint is the assessment of the potential environmental impacts of a defined product/service, organization or territory, within a specific spatial and temporal boundary. Environmental footprints are Life Cycle Assessment approaches which means that they take into consideration the whole life cycle of the studied system, i.e. all the steps from the raw material extraction through processing, distribution, use and end-of-life. Environmental footprints are multi-criteria methodologies i.e. not only focusing on one environmental issue such as climate change or energy consumption, but covering several environmental impacts such as: • Mineral/fossil resources depletion, • Water consumption, • Ozone depletion, • Eutrophication • Acidification • Etc.
4	What is a carbon footprint?	A carbon footprint is a type of environmental footprint focusing on a single environmental issue: climate change. In certain cases, it can be relevant to focus on a specific environmental impact category instead of looking at various impact categories (even if it is still recommended to consider several environmental impacts to avoid burden shifting): relevant impact categories are different for different sectors or product categories. For example, climate change (GHG emissions) is very important for energy-intensive sectors, whilst they are not as important for example for cosmetics– where it would be more the water use and toxicity aspects that define environmental performance. A carbon footprint is a measure of the total amount of potential greenhouse gases (GHG) emissions to the atmosphere of a defined product/service, organization or territory considering all relevant sources within a specific spatial and temporal boundary. This is calculated in most methodologies as carbon dioxide equivalent (CO2e).
5	What is an energy footprint?	Just as carbon footprint, energy footprints are environmental footprints focusing on a single environmental issue, the energy consumption. Hence an energy footprint is the assessment of the energy consumption related to a defined product, organization or territory, within a specific spatial and temporal boundary. This is calculated in most methodologies from a life cycle perspective. Usually, several types of energy sources can be distinguished according the nature of the energy source and its renewability e.g. non-renewable energy sources (fossil, nuclear), renewable energy sources (solar, wind, geothermal, water). There are several indicator definitions used to quantify energy footprint. Some of them consider all types of energy
6	What is climate change?	Solar radiation is re-emitted by the Earth's surface in the form of infrared radiation, which is itself partially absorbed by various chemical species in the atmosphere: this is called the "greenhouse effect." The radiation balance determines the average temperature of the planet and the presence of greenhouse substances allows the temperature to be compatible with life on Earth (without this, the temperature would be about -15 ° C). However, human activities generate long life greenhouse gas (GHG) emissions such as carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O) and halocarbons (a group of gases which includes fluorine, chlorine or bromine), resulting in an increased radiative forcing that causes an enhancement of the greenhouse effect. In conjunction with natural forces, it contributes to global climate changes: rising temperatures on the surface of the Earth and oceans, changes in precipitation, rising sea levels ... The influence of greenhouse gases on the changes of the Earth's climate system varies according to the radiative properties of these gases and their lifetime in the atmosphere.

Nº	Question	Answer
7	What are greenhouse gases (GHG)?	Greenhouse gases (GHGs) are gaseous substances able to trap heat in the atmosphere. The “enhanced” greenhouse effect, which is responsible for climate change, is caused by human activities emitting GHGs in the atmosphere such as: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF6). Please note that water vapour, although the largest contributor to the natural greenhouse effect, is not directly affected by human activity and is not included. (source: based on Kyoto Protocol website)
8	What are environmental footprint methodologies?	A **methodology** offers the theoretical support for understanding which method or "best practices" can be applied to a specific need, and guidance on how to implement the method in order to evaluate the environmental footprint (such as carbon or energy footprint) related to a specific product or organisation. Methodologies may be used for monitoring, assessing, and analysing many possible aspects of a business, in order to help organisations and public entities to become more carbon or energy efficient and, therefore, reduce costs and ultimately their environmental impact. Within the ICT sector, there are several methodologies which aim to assessing the carbon footprint and energy efficiency of ICT goods, services, and organisations. Methodologies are generally described in general and/or technical guidelines which can be subject to a specific standard developed either by an official Standards Development Organization (SDO) or through voluntary initiatives by a consortium of various private/public stakeholders. Go to the Methodologies page to learn more about them
9	Which Carbon Footprint Methodologies ICTFOOTPRINT.eu use?	ICTFOOTPRINT.eu provides information on methodologies specific to the ICT sector and related with environmental footprint implementation, with a particular focus on carbon footprint and energy footprint. Additional methodologies may be applied to calculate performance indicators, for instance in terms of energy consumption. Go to the Methodologies page to learn more about them.

CATEGORY: SERVICES DELIVERED

Nº	Question	Answer
1	Why should I reduce my carbon or my energy footprint?	With a wise energy and environmental efficiency strategy, **global emissions can be reduced by up to 15% by 2020**. By moving into the sustainable economy, you can improve your business’ energy efficiency which in turn can lead to cost savings and give you an advantage over competitors. Moreover, the improvement of the brand image is one of the main benefits of an environmental efficiency strategy such as ecodesign (in 2014, 81% of the companies surveyed in the EU identified “image improvement” as the top benefit, followed by an “increased motivation of the employees” and a “higher ability to develop new designs”. Source: IDP and Pôle éco-conception (2014) La profitabilité de l’écoconception – une analyse économique).
2	Why is ICTFOOTPRINT.eu relevant to small businesses?	ICTFOOTPRINT.eu will guide ICT small businesses on how to implement actions towards lower environmental footprint and greater and deal with related complex legal and administrative procedures. ICTFOOTPRINT.eu will provide ICT organisations with: • Guidance and tools to calculate energy and carbon footprint of ICT using standards and methodologies. • Information on certifications, best practice reports and how to customise to core business. • Support through a Frequently Asked Questions page and helpdesk. • Documents focussing on methodologies and success stories to raise awareness on benefits of adopting measures to reduce carbon footprint. • Access to the ICTFOOTPRINT.eu marketplace where users can access a

Nº	Question	Answer
		database of sustainable ICT service offers. • Opportunities to showcase relevant best-practices.
3	I am an ICT Service Provider. How can ICTFOOTPRINT.eu help my business?	Through the ICTFOOTPRINT.eu marketplace, ICT Service Providers will be able to promote their sustainable solutions (products and services) to SMEs willing to adopt products and services with low carbon and energy footprint.
4	Can ICTFOOTPRINT.eu endorse my product, services or company?	ICTFOOTPRINT.eu will provide support on products, services and companies which aim to improve energy efficiency and decrease carbon footprint levels in the ICT sector.
5	I represent a Public Administration. How can ICTFOOTPRINT.eu help me?	ICTFOOTPRINT.eu will help public administrations to play an active role in defining, implementing and assessing public policy within sustainable developments in order to reduce the direct footprint of the ICT sector in their communities. With ICTFOOTPRINT.eu, Public Administration can: • Showcase green procurement procedures and policies. • Find out about Success Stories of cities which are improving energy efficiency in ICT • Contribute to the Policy Action Plan Strategy Report, which will shape future policies. • Provide feedback on the implementation of the ICT methodologies framework. • Access information on the competitive advantages to local businesses and industry, by placing incentives for green aware initiatives, and using the ICTFOOTPRINT.eu platform for procurement procedures. • Provide tax reductions to ICTFOOTPRINT.eu **certified** end users as an indication of measurement of their carbon footprint with the ICT methodological framework. • Avoid proliferation of multiple environmental labels, reporting schemes, certification schemes.
6	I am a Standard Development Organisation (SDO). Why and how can I contribute to ICTFOOTPRINT.eu?	ICTFOOTPRINT.eu engages with SDOs involved in the development of ICT-specific energy and/or carbon footprint methodologies (including Life Cycle Assessme nt). ICTFOOTPRINT.eu will help SDOs by providing opportunities to: • **Showcase methodologies** on the ICTFOOTPRINT.eu web platform and monitor development. • Contribute to ICTFOOTPRINT.eu **Policy Action Plan Strategy Report**. • Receive practical feedback on the workability of **different standards and metrics**. • Align between the different methodologies, and simplification of the framework. • **Have access to a comprehensive action plan** with recommendations from real experience.

SUB-CATEGORY: SELF-ASSESSMENT TOOL

Nº	Question	Answer
1	How can I access the ICTFOOTPRINT.eu self-assessment tool?	The ICTFOOTPRINT.eu self-assessment tool will be available soon. Be the first to find out about its launch by registering for our newsletter. Simply send an email to contact@ictfootprint.eu
2	What information I should provide in order to assess my carbon footprint?	There will be several “self-assessment” services. To a “basic assessment” of your carbon footprint through the ICTFOOTPRINT.eu self-assessment tool, you should provide with an organisation profile. This includes information on activities, procedures and equipment/services acquired. For a more detailed and complete self-assessment, a mapping of your organisation’s digital processes is required.

Nº	Question	Answer
3	How is my carbon footprint calculated?	The ICTFOOTPRINT.eu self-assessment tool will calculate your carbon footprint based on the information you have provided us and the footprint model parameters from selected methodologies and metrics.

SUB-CATEGORY: MARKETPLACE

Nº	Question	Answer
1	What is ICTFOOTPRINT.eu marketplace?	The ICTFOOTPRINT.eu marketplace is an online meeting point which will bring together the demand-side (SMEs willing to adopt low-carbon footprint solutions) and the supply-side (low-carbon footprint solution Providers). The marketplace will establish a level playing field for both and contribute to speeding up the uptake of energy efficient ICT solutions.
2	How can I join the marketplace?	If you are a **buyer,** interested in low carbon footprint solutions, go to the marketplace and click on "REGISTER AS A BUYER". Then complete the requested information and click "Submit". You will then receive a confirmation email. To join ICTFOOTPRINT.eu marketplace as a **seller**, meaning you will provide low carbon footprint product and services, click on "REGISTER AS A SELLER" at the marketplace page, fill the form available and click "Submit". You will get a confirmation email in your mailbox.
3	I am a small business looking for solutions to help improve my environmental footprint as an ICT user. How can I find them on the marketplace?	The marketplace offers information on products and services to improve your energy efficiency from various providers. These are 6 categories: Hardware, Software, Connectivity, Data management, Advisory/Consultancy, Certifications & Other Services.
4	How do I find information about Solution Providers?	To find out more about Solution Providers in the ICTFOOTPRINT.eu marketplace, simply click on the Solution Provider name found on the product/service page or on product/service listing pages (search results) when browsing.
5	What types of sustainable solutions are available in the Marketplace?	ICTFOOTPRINT.eu marketplace has 6 types of green solutions: Hardware, Software, Connectivity, Data management, Advisory/Consultancy, Certifications & Other Services. All provide products and services which will help you to improve your energy efficiency and reduce your carbon footprint.
6	I am an ICT service provider involved in a sustainability approach and looking for new business opportunities. How can I advertise my services?	You can promote your products and services on the ICTFOOTPRINT.eu marketplace. To do this you should register as a seller on the marketplace and select which of our 6 categories your product or service best matches. The categories are as follows: Hardware, Software, Connectivity, Data management, Advisory/Consultancy, Certifications & Other Services
7	I am having difficulties setting up my profile. Where can I ask for help?	You can promote your products and services on the ICTFOOTPRINT.eu marketplace. To do this you should register as a seller on the marketplace and select which of our 6 categories your product or service best matches. The categories are as follows: Hardware, Software, Connectivity, Data management, Advisory/Consultancy, Certifications & Other Services

SUB-CATEGORY: HELPDESK

Nº	Question	Answer
1	What is ICTFOOTPRINT.eu helpdesk?	ICTFOOTPRINT.eu helpdesk will be dedicated to support SMEs interested in adopting LCE methodologies and that lack experience in this field. End-users can receive dedicated support on the adoption of best practices regarding energy efficiency in ICT and assistance on using ICTFOOTPRINT.eu services, such as

Nº	Question	Answer
		the self-assessment tool (available soon) and the online marketplace.
2	How does the ICTFOOTPRINT.eu helpdesk work?	To get assistance from ICTFOOTPRINT.eu helpdesk, either log in and access this service from your profile page, or visit the Frequently Asked Questions page and add your name and email to the chat box which appears automatically.
3	How many languages are supported on the ICTFOOTPRINT.eu helpdesk?	The ICTFOOTPRINT.eu helpdesk will provide support in 5 languages: English, French, Italian, German and Spanish, allowing barrier reduction to almost 60% of European ICT SMEs.
4	How can I select one of the 5 languages available in the ICTFOOTPRINT.eu helpdesk?	To select one of the 5 languages available on ICTFOOTPRINT.eu helpdesk, select the “flag” of the country/language.

Appendix D – Glossary in English

Nº	Term	Explanation
1	Allocation	Partitioning the input or output flows of a process or a product system between the product system under study and one or more other product systems. Allocations rules are often needed for multifunctionnal products/services. For example: if we consider the environmental footprint of a web-based service, it may be necessary to allocate the environmental burden of datacentres between the analyzed web-based service and other services hosted.
2	Avoided emissions	Emissions reductions that are indirectly caused by the studied product or a process that occurs in the studied product's life cycle.
3	Co-function	Any of two or more functions provided by the same unit process or system.
4	Co-product	Any of two or more products coming from the same unit process or system.
5	Cradle to gate	Approach accounting for all environmental impacts from the extraction of raw materials until a specific stage of the life cycle of the analyzed system (e.g. from the extraction of raw material for IT components production to the gate of a laptop assembly facility).
6	Cradle to grave	Approach accounting for all environmental impacts from the extraction of raw materials until the end-of-life of the product
7	Cut-off	Exclusion of specific processes or products in the assessment, usually due to a non-significant contribution of the overall impacts
8	Data quality analysis	Evaluation of the quality of data used in the assessment, mainly in terms of geographical, technological and temporal representativeness
9	Environmental impact	Potential impact on the natural environment, human health or the depletion of natural resources, caused by the interventions between the technosphere and the ecosphere as covered by LCA (e.g. emissions, resource extraction, land use)
10	First order effects	Impacts related to raw materials acquisition, production, use and end-of-life treatment of ICT goods and networks in cities
11	Functional Unit	Function or service delivered by a product / an organisation, providing a reference to which the inputs and outputs can be related.
12	Gate to gate	Approach accounting for all environmental impacts related to a specific stage withing the product life cycle (e.g. all processes occurring within the boundary of a given company)
13	GWP	Global Warming Potential

Nº	Term	Explanation
14	KPI	Key Performance Indicator
15	Life Cycle Analysis (LCA)	Assessment of potential environmental impacts of a product / an organisation, based on a multicriteria and multistage approach
16	Life Cycle Inventory (LCI)	Inventory of flows from and to the environment (e.g. inputs of raw materials, energy or releases to air and water), for a given elementary product system.
17	Offsets / credits	Emission credits (in the form of emission trading or funding of emission-reductions projects) that a company purchases to offset the studied product's inventory results
18	Organisation environmental accounting	Assessment of potential environmental impacts of an organisation during a given period, based on a multicriteria and multistage approach
19	Primary data / Specific data	Data coming from the product system, e.g. site-specific activity data
20	Product environmental assessment	Assessment of potential environmental impacts of a product during its lifetime, based on a multicriteria and multistage approach
21	Scope 1 (GHG emissions)	Direct GHG emissions i.e. GHG emissions from GHG sources owned or controlled by the organization
22	Scope 2 (GHG emissions)	Energy indirect GHG emissions i.e. GHG emissions from the generation of purchased energy, heat or steam consumed by the organization.
23	Scope 3 (GHG emissions)	Other indirect emissions i.e. GHG emissions other than energy indirect GHG emissions which are a consequence of an organization's activities but arise from GHG sources that are controlled by other organization e.g. extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the analyzed organization, outsourced activities, waste disposal, etc.
24	Second order effects	Environmental impacts due to the use of ICT in other products or sectors in order to reduce their GHG emissions or energy consumption
25	Secondary data / Generic data	Data from generic sources, such as databases, published literature or national inventories
26	Sensitivity analysis	Systematic procedures for estimating the effects of the choices made regarding methods and data on the outcome of a study
27	Uncertainty assessment	Systematic procedure to quantify the uncertainty introduced in the results of a life cycle inventory analysis due to the cumulative effects of model imprecision, input uncertainty and data variability
28	Unit process	Smallest element of a product system for which data are collected when performing a life cycle assessment

Appendix E – Marketplace

Table 18: Organisations registered as sellers on the marketplace at end of year 1

Name of company /organisation	Industry	Legal entity	Country	Website
Deloitte Sustainability	ICT Consultancy/ Development	Corporations	France	
Carbon3IT Ltd	ICT Consultancy/ Development	Ltd	United Kingdom	www.carbon3it.com
ecoinvent	NGOs	NGOs	Switzerland	www.ecoinvent.org
Circular Computing (A2C Services Ltd)	IT Hardware Manufacturing	Ltd	United Kingdom	http://www.circularcomputing.com/

Name of company /organisation	Industry	Legal entity	Country	Website
Enervalis	ICT Service Providers	Ltd	Belgium	www.enervalis.com
maki Consulting GmbH - Life cycle expert services	ICT Consultancy/ Development	Ltd	Germany	www.maki-consulting.com
EUROCITIES	Other	NGOs	Belgium	http://www.greendigitalcharter.eu/
GREENSPECTOR	ICT Software Development	Ltd	France	www.greenspector.com
Wi6Labs	ICT Service Providers	Corporations	France	www.wi6labs.com
EasyVirt	ICT Software Development	Public Limited Company	France	www.easyvirt.com
GreenGoWeb	ICT Software Development	Ltd	Switzerland	www.greengoweb.com
Planet First Ltd	Other	Ltd	United Kingdom	www.theplanetmark.com
Verne Global	Other	Corporations	Namibia	verneglobal.com
Caelus Sustainability Consulting	ICT Consultancy/ Development	One Man Company	United States	www.currentstate-online.com
The Green Grid	NGOs	Public Limited Company	United States	www.thegreengrid.org
Network DNA Ltd	ICT Service Providers	Ltd	United Kingdom	http://www.network-dna.com
InforData Consulting	ICT Consultancy/ Development	Ltd	United Kingdom	www.infordataconsulting.com
Perspective Risk Ltd	ICT Consultancy/ Development	Ltd	United Kingdom	www.perspectiverisk.com
Sony Mobile Communications	IT Hardware Manufacturing	Corporations	Sweden	