(greenconcept)

éco-conception numérique

Learnings from GreenConcept – how to deal with mulitfunctionality and data availability

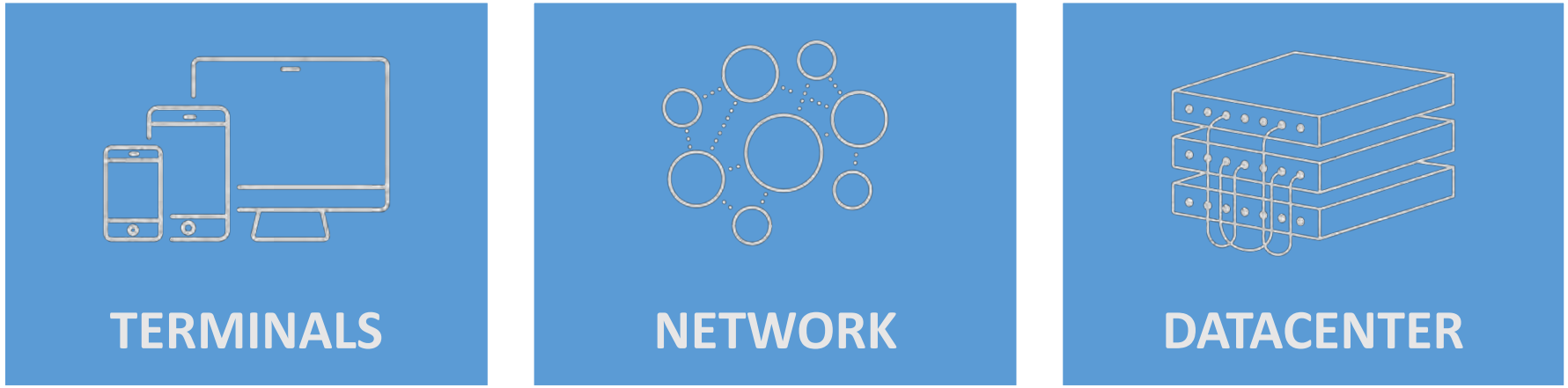
DF 73 – 21/11/2019

LCIE

Context

- "Digital services are constituted of a range of software, equipment, networks and infrastructures, and other digital services. It allows to fulfill a function such as "book a train ticket", "get a doctor appointment", "send a mail to friends", "transmit a smart meter data", etc."

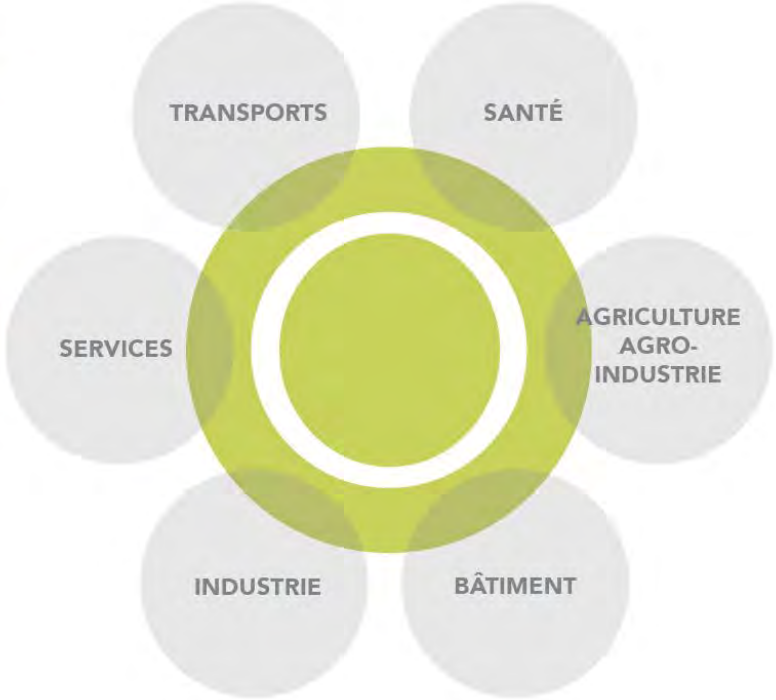
- It is composed of three parts:

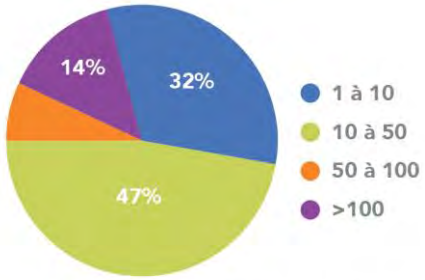


Presentation of the GreenConcept project

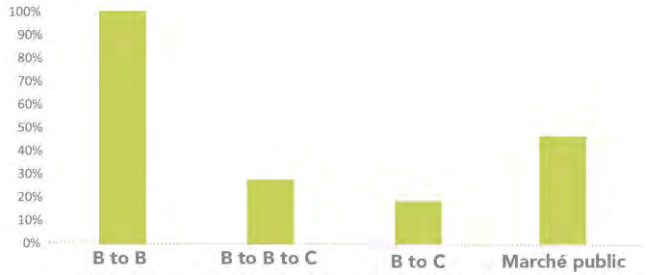
The GreenConcept participants

28 firms of the Occitanie region
Any sector – 80% with less than 50 employees
Mainly B2B and public markets





Répartition des entreprises accompagnées par tranche d'effectifs



Répartition des entreprises accompagnées par cible de marché

Répartition des projets selon la principale caractéristique du service numérique

Results

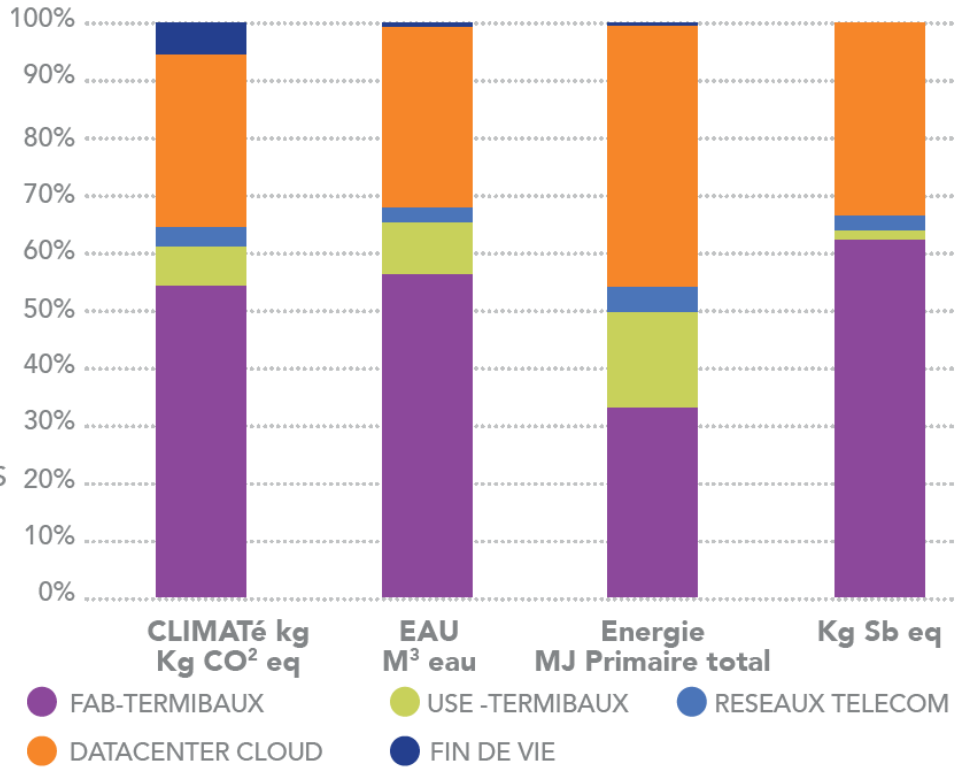
Global evaluation of all 28 projects

EAU
7150 m³
800 000 packs d'eau

ENERGIE
34 957 341 MJ
Energie Primaire
Consommation annuelle
de 1330 français

ÉPUISSEMENT DES RESSOURCES NATURELLES
15kg eq Sb
Extraction de 14,9 millions de barils de pétrole
Extraction de 417g d'or pur

CLIMAT
1400 T eq CO^2
11,5 millions km en voiture



Main conclusions

- Environmental impacts of digital services are important
- The main source of impact is terminals, mainly on their fabrication phase (30-60% of impacts). Specific to the mainly use of the French electricity mix
- The datacenter/cloud generates from 30% to 45% of impacts

Main factors

- Maturity level of the service
- Type of hosting
- Integration of connected objects (IoT)

Learnings

- 50% of projects had a 50+% impact reduction potential
- 25% had even stronger impact reduction potential (factor 4)
- Impact profiles evolve along the service deployment and development
- Recommendations: generic, by product family and specific to some projects
- White paper to be published by the end of the year

Improvement axes

Economic model	Communication	Terminals and objects	Networks	Datacenter and Cloud	Software

Specific issues associated with digital services

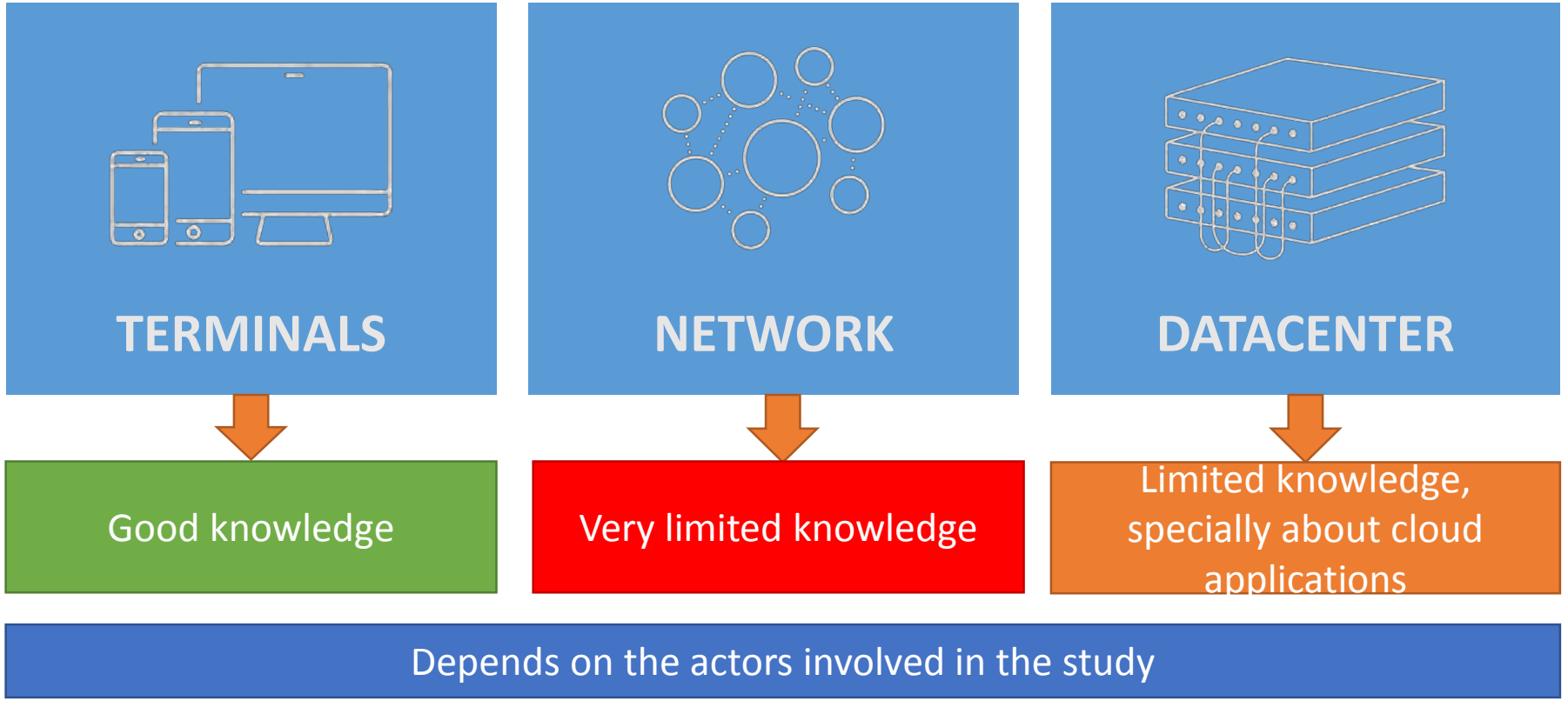
Issues

► **Digital services are complex systems:**

- Multi actor → How to deal with data availability?
- Multi product → How to deal with the life cycle?
- Multi functional → How to deal with multifunctionality?

Issues – How to deal with data availability?

- In the current bibliography, LCA is presented as the most relevant method, but is rarely applied:
  - Focus on energy consumption and climate change impacts only
  - Focus on the use phase (energy consumption)



Issues – How to deal with data availability?

LCI dataset level

Current LCI databases are incomplete

Existing tools and methods are based on heterogeneous data

- Different sources and methods
- Bot LCI and LCIA datasets

Results are not compliant with ISO 14040 and ETSI standards

Continuous improvement by developing datasets

Data collection level

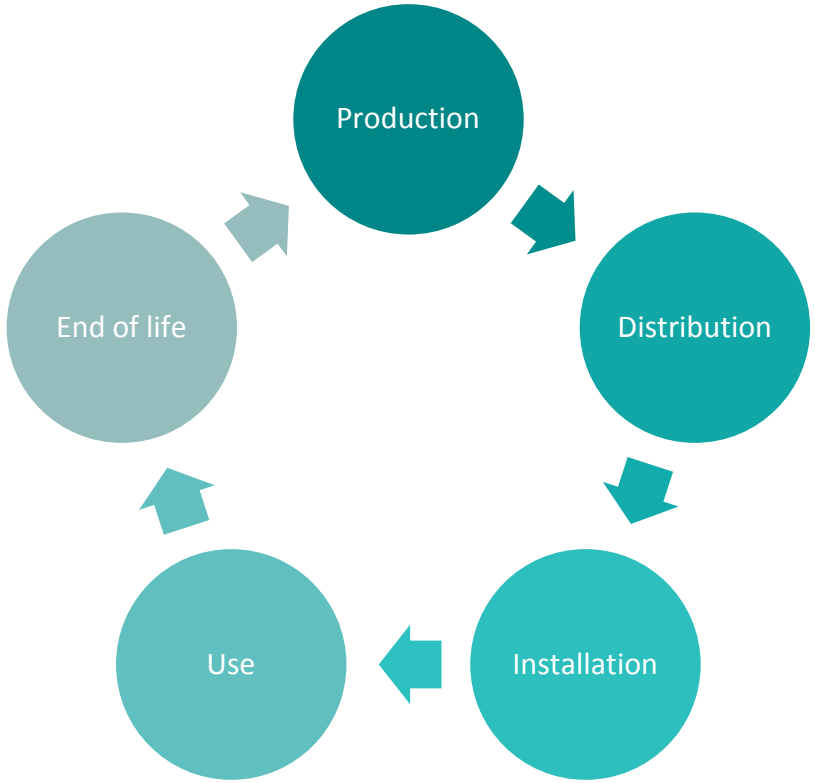
Need for default data and hypotheses (PEF approach)

ITERATION

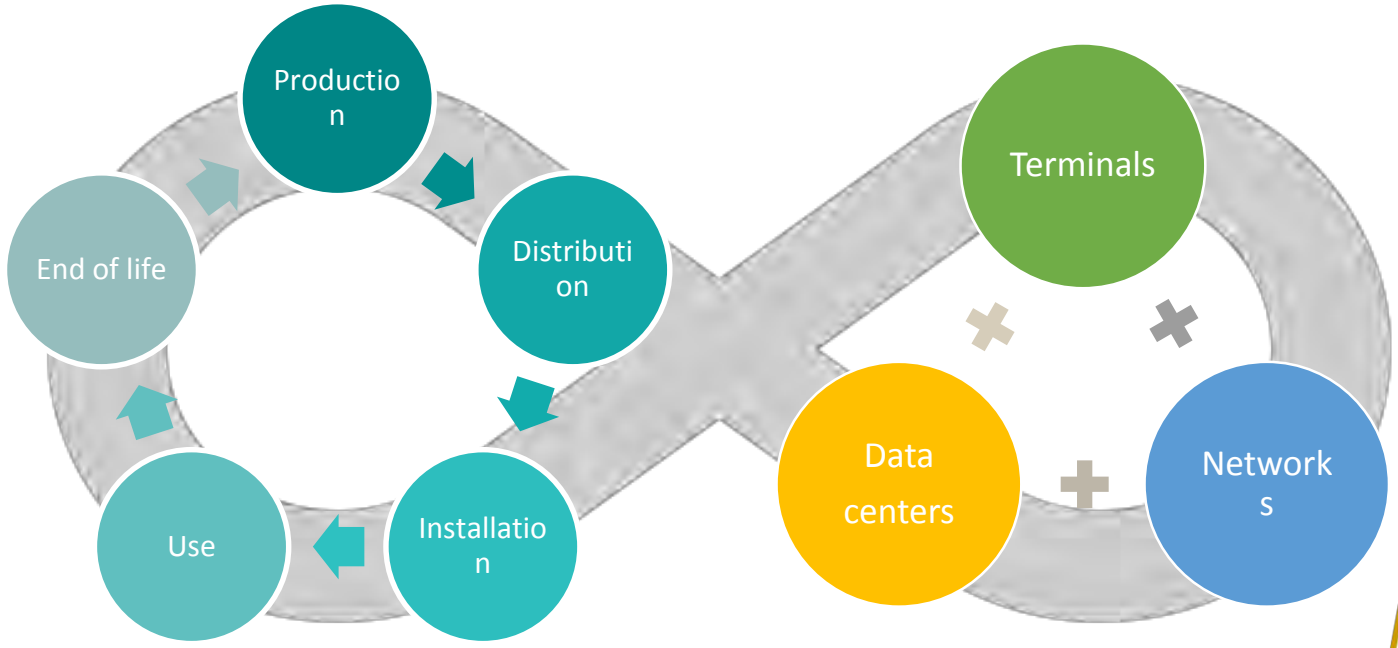
Creation of generic models based on built experience

Issues – How to deal with the life cycle?

From a simple life cycle…



…to a multi-product life cycle



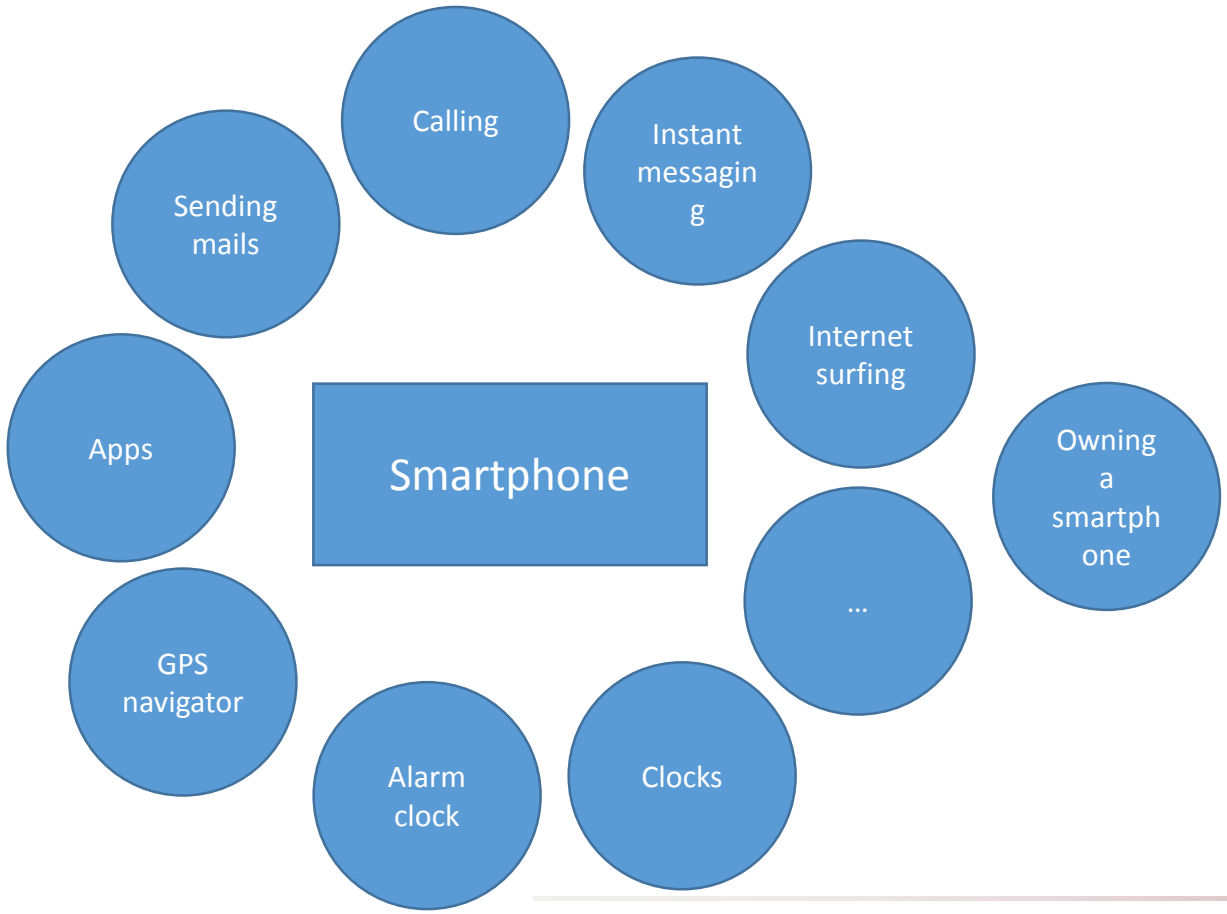
Equipment life cycles…

…used for digital services

Question: how to deal with allocations?

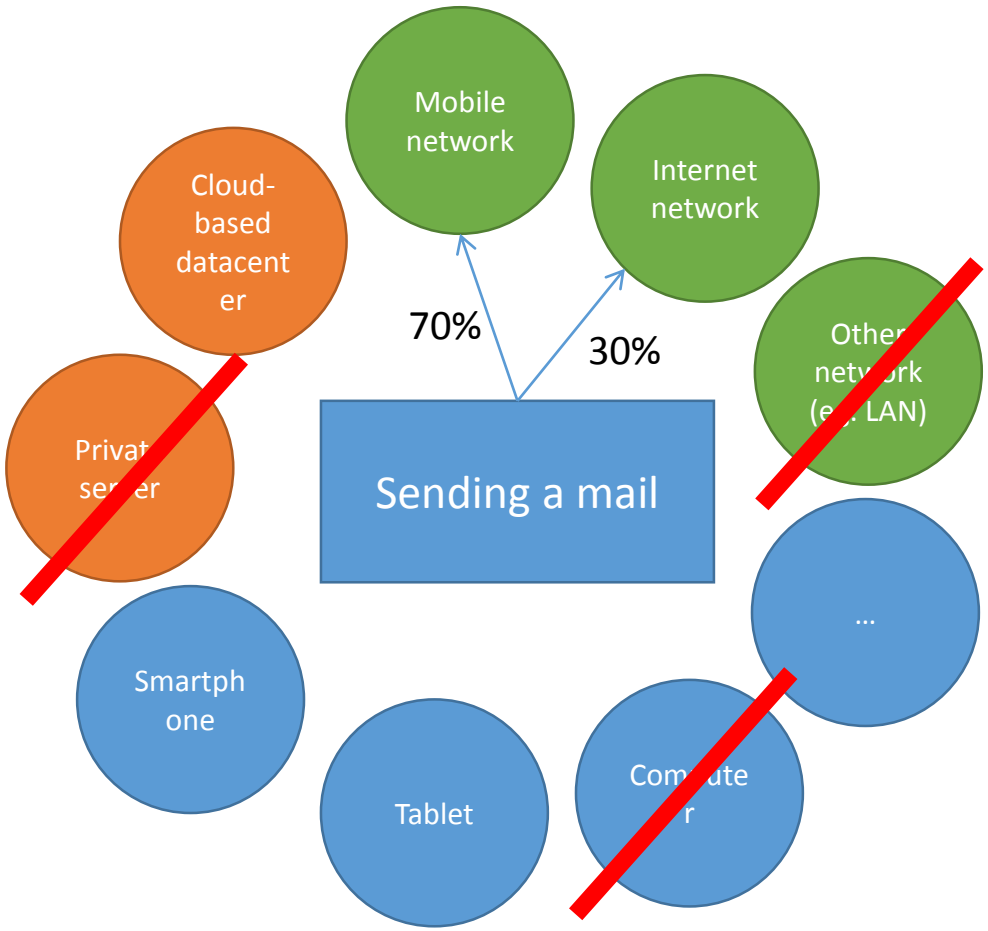
Issues – How to deal with multifunctionality?

- Two visions: function-based or product-based



- Dealing with the issue, ISO 14040:
  - Step one: avoid allocation
    - Dividing the process in smaller ones → Complex (yet not impossible)
    - System extension: accounting for the whole smartphone with all its functions → Easy for a single product LCA, almost impossible for comparison
  - Step 2: physical allocation (data transfer, use of processor, use of memory, time length of usage, etc.) → Possible, but requires a strong knowledge based on users behavior, and can vary drastically
  - Step 3: economic allocation (or other type)
    - Cost approach → Difficult, what are the cost of each function?
    - Value approach → That can be considered, but has not been performed yet

Issues – How to deal with multifunctionality?



- Dealing with the issue:
  - 1. Draw a flow diagram of the service
  - 2. Identify which solutions are relevant based on your point of view
  - 3. Allocate each solution based on usage (eg. number of use, time, data transfer, etc.)
  - 4. For each equipment, apply allocation based on ISO 14044

Issues – Some additional thoughts

- Are life cycle and functional unit still relevant?
  - Functions are fulfilled by many different equipment, both complementary and overlapping
  - Products can provide access to many completely different functions
  - Rebound effect: we have very little substitution of traditional equipment by digital services, but we fulfil more needs we didn't have before

- Is LCA the a good tool for assessing complex systems?
  - Link to circular economy → LCA is good for linear economy assessing, less so for cycling and product service systems with multiple usages and lives

- Yes LCA still has a place
  - To drive decision between two similar products
  - To identify hotspots
  - To provide a global overview
  - For IT for green
  - In business related functions

Conclusion and next steps

Conclusion and next steps

✓Digital services are perceived as immaterial

But

✓Multiplication of connected devices and services create environmental impacts

✓They can lead to environmental impact reduction (IT for green)

But

✓Their development can lead to rebound effects

✓More than a substitution, we mostly observe an addition of functions

✓Digital services impact evaluation is a trending matter

But

✓It remains an emerging matter. Very few complete LCA exist

✓Their application is very difficult:

- Distributed architecture
- Complex value chain
- Requirement of a large data collection
- Lack of consolidated and homogeneous data

✓Evaluation methods exist

But

➔ **More work is still needed**

Conclusion and next steps - Negaoctet

MEASURE TO IMPROVE

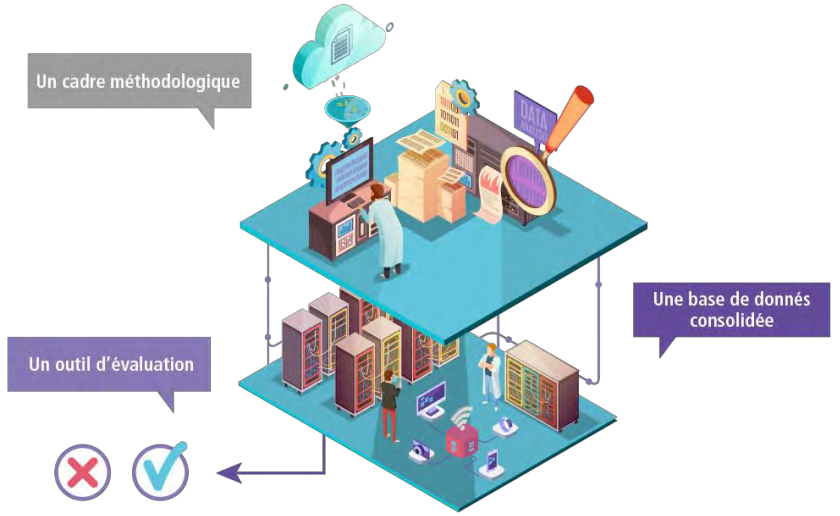
With partnership from

ADEME
Agence de l'Environnement et de la Maîtrise de l'Energie

CONSTRUCTION AND TEST OF AN EVALUATION METHODOLOGY FOR DIGITAL SERVICES ENVIRONMENTAL ASSESSMENT

✓**Research and development project, laureate of the 2018 PERFECTO call for proposals**

✓**Methodology, tool and database creation, enabling the performing of LCA on the complete digital service perimeter: terminals, networks and datacenters**



✓**In line with European and French environmental labelling schemes**

Thank you! Any question?

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