



WHITE PAPER

Comparative Analysis of the Environmental Impact of Softphony and Traditional Telephony in the City of Rouen

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Abstract

The City of Rouen is planning on transferring a part of its traditional telephony system to a softphone solution, enabling computers to be used as calling devices via dedicated applications.

The aim of this transition is to reduce the number of physical terminals and, potentially, the associated environmental costs. To support this decision, Resilio carried out a comparative Life Cycle Assessment (LCA) to evaluate the environmental impacts of the two solutions.

The results indicate that softphony could significantly reduce the environmental impact compared to traditional telephony, provided that the use and lifespan of the equipment are not significantly altered.

[Astrid Dhénain](mailto:astrid.dhenain@resilio.tech) - astrid.dhenain@resilio.tech

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Introduction

The technological transition towards more sustainable solutions is a major concern for local authorities, including the City of Rouen. Thinking about replacing traditional telephony with soft telephony is part of this process.

This white paper documents the results of a comparative Lifecycle Analysis, examining the environmental impacts of using softphones compared to traditional telephony on a scope of around a thousand telephones and agents.

The aim is to inform the city's decision-making process.

Characteristics of the studied IT system:

- 1174 users ;
- 1 landline phone and 1 computer per agent;
- In-house softphone solution;
- Terminal lifetime between 6 (laptops) and 8 years (PCs).

Methodology

Life Cycle Assessment (LCA) is an internationally standardised methodology for analysing the environmental footprint of a product or service (ISO [14 040/44/71](#)) and complies with the European Union Recommendation (2021-2279) on the use of environmental footprint assessment methods and the [Product Category Reference](#) (PEFCR).

The characteristics of this method, which distinguishes it from the carbon footprint, are:

- **Multi-criteria analysis:** assesses the impact on 16 environmental indicators (climate change, ecotoxicity, depletion of abiotic resources, etc.);
- **Multi-life cycle stage analysis** (manufacture, distribution, use, end of life);
- **Functional approach**, framed by a functional unit.

Functionnal unit

The functional unit is a need, a function that we want to study. It is also the common denominator used to compare different scenarios meeting this need. In our case, the functional unit is:

Providing a telephone service to an agent for 1 year

This study is an attribution-type LCA: all the equipment used to meet the functional unit is considered, and the impacts are counted in proportion to the use of the equipment that serves to meet the functional unit.

Scope

The scope of the study includes the impact of the City of Rouen's information system which provides telephony services. The domains considered are as follows:

- **User environment:** fixed telephone, fixed computer or laptop;
- **Network:** IT equipment linked to the telephone network or the Internet;
- **Data centres:** calculation and storage servers.

Exclusions

Only employees with a fixed telephone are included in the scope of the study. Smartphones are not included in the scope of the study, as it is considered that softphones do not replace the mobility function of mobile phones. In addition, mobile network equipment and non-IT equipment in data centres are excluded from the scope of the study.

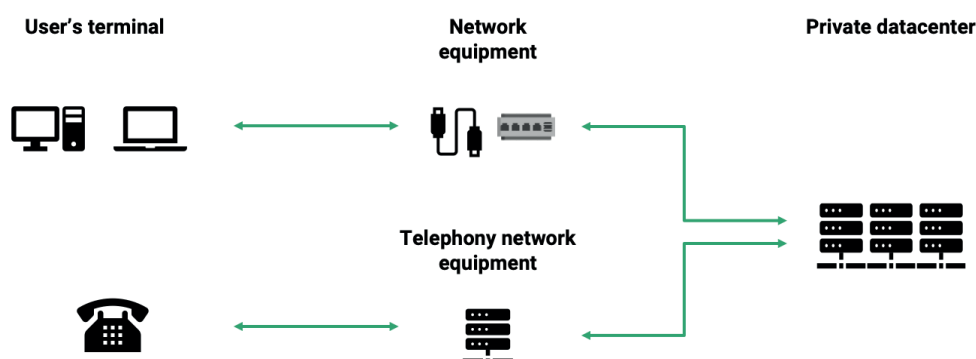


Figure 1 - Functional diagram of a telephony service

Scenarios

In order to answer the questions raised by the City of Rouen, a traditional telephony scenario and 2 softphony scenarios were developed. The first was used to determine the impact of telephony with the landline telephony solution. Regarding softphony, the Rouen City was not certain of making a 100% transition.

That's why we thought it would be interesting to develop 2 scenarios. A first scenario where the maximum number of agents is transferred to the softphony solution and a second more realistic scenario where only half of the agents switch to softphony and the other half keep the traditional telephony solution. These two scenarios show whether a transition, even a partial one, makes sense from an environmental point of view.

The scope includes agents who have to keep a telephone terminal for business reasons. Part of the traditional telephony solution is therefore still counted in the softphony scenarios.

We will refer to the different scenarios as follows:

- **Scenario 1** – Telephony: landline telephony solution;
- **Scenario 2** – Micollab 100% : all agents that are able to are transferred to the softphony solution;
- **Scenario 3** – Micollab 50% : half of the agents that are able to are transferred to the softphony solution.

Micollab is the name of the softphone solution chosen by the city of Rouen during the Covid episode.

The three scenarios are compared based on their respective PBCI (Planetary Boundaries per Capita per Indicator) scores. This score represents the impact of a perimeter considering the 16 environmental indicators. It is calculated using normalisation factors obtained from the [Joint Research Center's planetary boundaries](#), where each indicator has the same weight.

Modeling hypotheses

Several assumptions have been made to model the system:

- The iPBXs (telephone routers) have been assimilated to rack servers with the following technical configuration: 4GB RAM, 128GB SSD disk.
- The number of iPBXs in scenarios 2 and 3 is proportional to the number of agents using conventional telephony.

- The proportion of computers is estimated at 55% desktop and 45% laptop.
- The lifespans are 7 years for land-line telephones, 6 years for laptops, 8 years for desktop computers and screens, based on internal data from the city of Rouen.
- The proportion between the time spent using the telephone software and the total time spent using computers is 2.5%. This number is based on an average telephone call time of 10 minutes and 30 seconds per agent per day.
- The softphone solution is hosted internally in the city of Rouen's data centers.

Comparative results

Global results

The comparison between the scenarios is based on the overall results for all stages of the life cycle. Table 1 shows the total environmental footprint of each of the 3 scenarios for the main indicators.

Table 1- Total footprint over the entire life cycle for the main indicators

Impact indicator	Unit	Scenario 1	Scenario 2	Scenario 3
Resource use, fossils	GJ	2595	773	1675
Resource use, minerals and metals	g Sb éq.	916	359	623
Climate change	t eq. CO ₂	23,2	8,2	15,5
Electricity consumption*	kWh	206 066	59 300	132 243
PBCI	-	208	68	137

*not an environmental indicator, displayed for information

It can be observed that **scenario 1 – Telephony** generates the most impact, followed by **scenario 3 – softphony 50%** and then **scenario 2 – softphony 100%**, which has the least impact. The lower the proportion of traditional telephony, replaced by softphony, the lower the impact.

Results per domain

Figure 2 illustrates the breakdown of the impacts of each scenario according to the different domains, in PBCI. The majority of the impact of scenario 1 is due to the network. This is most probably because the telephone network equipment (iPBX) is relatively old and not very efficient. Reducing the number of traditional telephony network devices therefore greatly reduces the impact of the network.

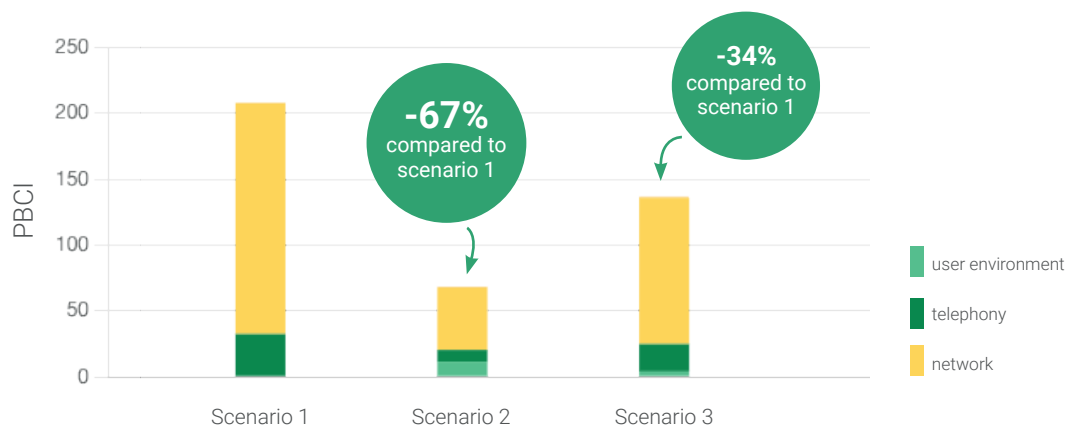


Figure 2- Distribution of impacts per domain

In the case of Rouen's information system, transferring all the staff that is able to use softphony would reduce the environmental impact of the telephony service by a factor of 3. Scenario 3, the most likely scenario for the city of Rouen, reduces the impact by a third, by transferring half of the agents who can use the softphony solution. We can also notice that the datacentre's impact is negligible and does not appear in the diagram.

Limits et hypotheses

Rebound effect

We assumed that the lifespan of user terminals remains the same regardless of usage. In other words, **the fact that computers are used for a new purpose will not shorten their lifespan, but also that the switch to softphony will not increase the average call time of agents.** If this were the case, we would be talking about a rebound effect: electricity consumption would increase and so would the impact.

Modeling of iPBXs

Due to a lack of data and time, it was not possible to model the network equipment for the city of Rouen's traditional telephony system accurately. We therefore modelled this equipment using a rack server with 4GB of RAM and 128GB of SSD disk.

Replacement of equipment

The study was conducted on the assumption that **no equipment would be replaced prematurely**, i.e. before its estimated end-of-life. Fixed-line telephones can be phased out either for all agents at the same time, or as and when fixed-line telephones reach the end of their service life. We considered this second hypothesis, which seemed consistent with the approach adopted by the city of Rouen. However, if this hypothesis is not verified, the results of the study are not guaranteed. Premature replacement of the equipment would increase the environmental impact.

Conclusion

The transition to softphony represents a significant opportunity for the city of Rouen to reduce the environmental impact of its telephony service. However, to fully realize these benefits, it is crucial to carefully manage the conditions under which equipment is used and replaced.

This study provides a solid basis for decision-making, underlining the importance of considering the entire life cycle of equipment when assessing technological transitions.

Finally, this is the first study to quantify the benefits of softphony compared to traditional telephony. The results will probably be similar for organisations which IT systems are similar to those of the city of Rouen, if the same assumptions are applied. However, a number of questions need to be asked before considering that eliminating landline telephones is a good solution, such as how to host the softphone solution, how to manage equipment lifecycles and what to buy.

If you would like more details or have any question, please don't hesitate to contact us.



resilio-solutions.com

+41 78 673 77 18

+33 6 84 29 53 30

contact@resilio.tech



Resilio SA - EPFL Innovation Park, Bâtiment C, 1015 Lausanne, Suisse – CHE-256.900.000

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