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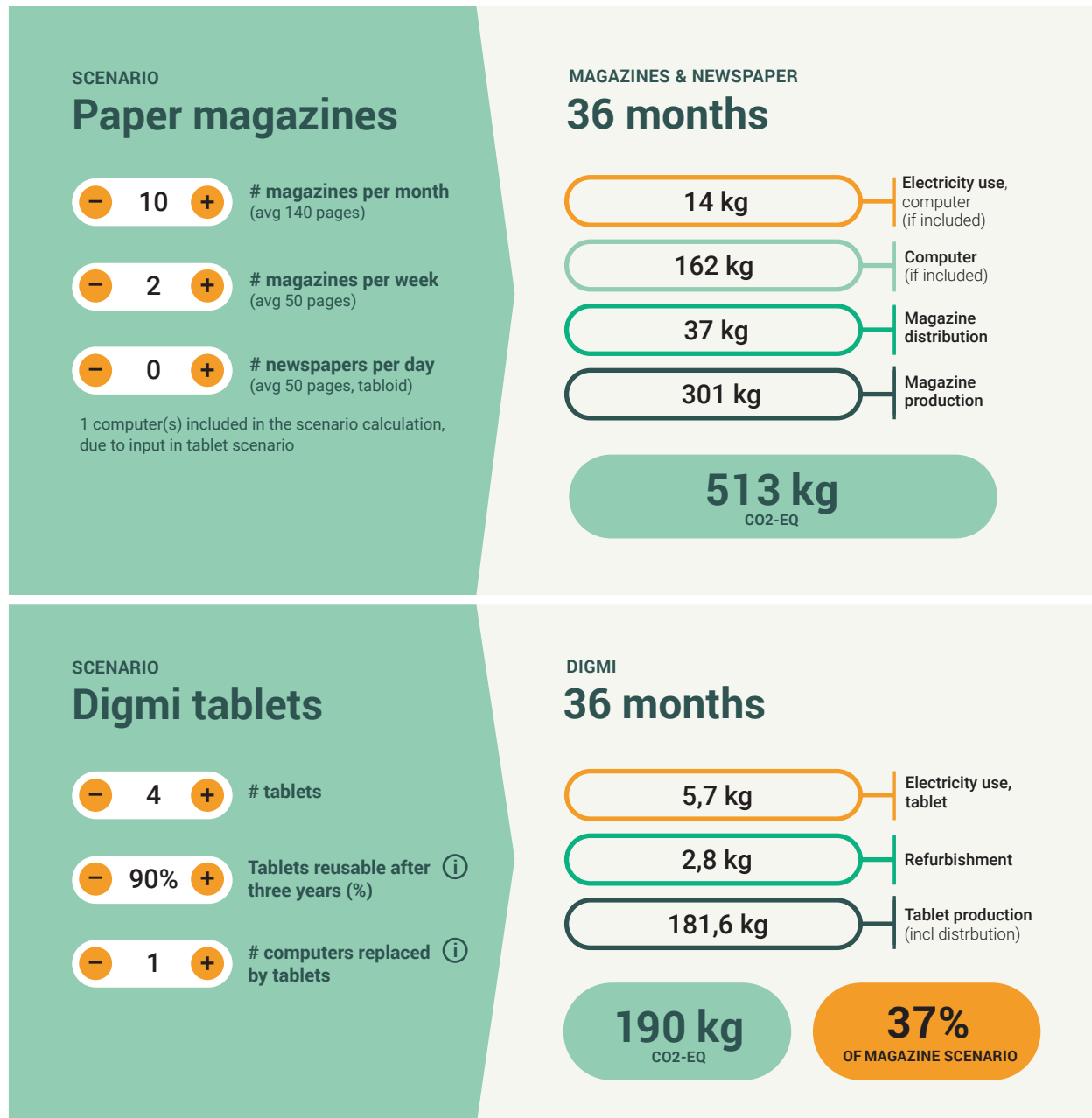
# Digmi Climate Impact Scenario Comparing Calculator



Rapport framtagen av  
Hållbarhetsteamet i Sverige AB  
Jonatan Wranne  
Göteborg 2023-01-10



# Digmi Climate Impact Scenario Comparing Calculator



Hållbarhetsteamet i Sverige AB

Jonatan Wranne – Göteborg 2023-01-10

# RÄKNA UT DIN SALONGS KLIMATAVTRYCK

Använd vår kalkylator och börja din resa mot ett minskat klimatavtryck.

Hållbarhetsteamet i Sverige AB  
Jonatan Wrånne - Göteborg 2023-01-10

SCENARIO

## Paper magazines

**10** # magazines per month  
(avg 140 pages)

**2** # magazines per week  
(avg 50 pages)

**0** # newspapers per day  
(avg 50 pages, tabloid)

1 computer(s) included in the scenario calculation, due to input in tablet scenario

## MAGAZINES & NEWSPAPER

36 months



SCENARIO

## Digmi tablets

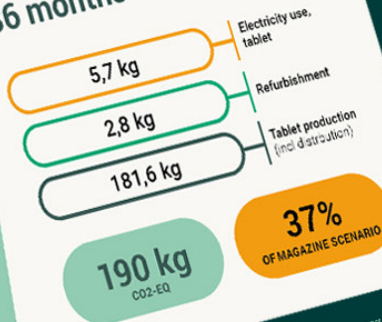
**4** # tablets

**90%** Tablets reusable after three years (%)

**1** # computers replaced by tablets

DIGMI

36 months



Important assumptions: - Paper production input comprises the magazine/newspaper production, and that input is half or data from LCA-database ecoinvent 3.6. - Tablets are used for 8 hours per day, low memory usage (common or processors 10%). - Tablets are refurbished and reused after three years. The following input is half the production impact (1) - input from tablet production includes distribution, but excludes impact from usage since that is added separately. - Input from tablet production based on official numbers for products from 2017, reduced by 25% to increase the risk of using a too low value. - Input from processing covered for the magazines are not included in any of the scenarios. - Computer is used for two years and not reused, low standby usage for 8 hours per day (screen on, processors off). - Computer input included in the Magazine scenario only if it can be argued that use of Digmi's tablets removes the need for one or more computer(s) at the salon.  
- Selling a product to reuse or buying a used product, saves 50% of production and waste handling impact, since you are responsible for one of the two decisions needed to complete a reuse. (So when both buying and selling a product from, and to, reuse then the impact from production and waste handling is zero, for both users). According to the IV-report, Product Databases, the environmental benefits of reuse, see more info in the report describing the calculation and data of this tool.

# Introduction

The Digmi Climate Impact Scenario Comparing Calculator (“the tool”) is created to enable easy comparison, for a hair salon, buying either a number of paper magazines each month or a number of tablets (used to read magazines on), according to the offer from Digmi. It is possible to also include a difference in needed computers, if the tablets are also used for handling bookings/scheduling/payment on.

→ The tool takes input on the number of magazines and newspapers the salon is buying, and the number of Digmi tablets potentially used to replace the customer magazines. It then calculates the climate impact for the two scenarios, over a time-period of 36 months.

**Results produced by this tool are calculated using climate impact data from various sources, most of them with relatively high credibility (e.g. EcoInvent and Apple). But the user should still be careful when drawing conclusions from the results, due to the inherent uncertainties in this kind of data. Please see the Scenario Analysis in this report for a good example on how data should, and should not, be interpreted.**

→ The tool is using climate impact data adjusted for a salon in Sweden. If it is used for a salon in another European country the impact from electricity will be less correct (minor to medium error, depending on the electricity mix in the country/salon). If the tool is used for a salon outside of Europe there are several potentially erroneous assumptions, severely decreasing the reliability of the tool and the result.

→ This report includes an analysis of a specific scenario, calculated on the tool, and also a description of the calculation and data in the tool.

# Scenario analysis

This section shows a potentially real scenario for a salon in Sweden. Focus is on explaining, and analyzing, the result.

## Scenario setup

The paper magazine scenario is:

- 10 monthly magazines (avg. 140 pages)
- 2 weekly magazines (avg. 50 pages)
- (1 computer included in the scenario)

The Digmi tablet scenario is:

- 4 tablets
- 90% of tablets reused
- 1 computer replaced by tablets

### COMMENTS:

→ The tablets are assumed to be reconditioned and sold to another user after 36 months. The “90% of tablets reused” means that the scenario takes height for the risk that a few of the tablets might break and need to be replaced during the three year period, and thus not be resold.

→ The monthly magazines, such as ELLE, generally have more pages than the weekly magazines, such as HÄNT EXTRA. The 10 monthly magazines are calculated as being produced and delivered 36 times each (since the period is 36 months). The 2 weekly magazines are calculated as being produced and delivered 156 times each (52\*3 weeks).

→ In the tablet scenario one (1) computer is no longer needed, to handle bookings/scheduling/payment, in the salon. The impact of this computer is added to the magazine scenario (where it is still needed), but the impact of it is decreased due to the assumed life-span being over 3 years (assumed to be replaced every 5 years).

SCENARIO  
**Paper magazines**

− 10 + # magazines per month (avg 140 pages)

− 2 + # magazines per week (avg 50 pages)

− 0 + # newspapers per day (avg 50 pages, tabloid)

1 computer(s) included in the scenario calculation, due to input in tablet scenario

SCENARIO  
**Digmi tablets**

− 4 + # tablets

− 90% + Tablets reusable after three years (%)

− 1 + # computers replaced by tablets

Scenario input

(where it is still needed), but the impact of it is decreased due to the assumed life-span being over 3 years (assumed to be replaced every 5 years).



## Scenario result

The magazines scenario has a calculated impact of 513 kg CO<sub>2</sub>-equivalents, divided onto:

- Magazine production: 301 kg CO<sub>2</sub>-eq.
- Magazine distribution: 37 kg CO<sub>2</sub>-eq.
- Computer production: 162 kg CO<sub>2</sub>-eq.
- Electricity use, computer: 14 kg CO<sub>2</sub>-eq.

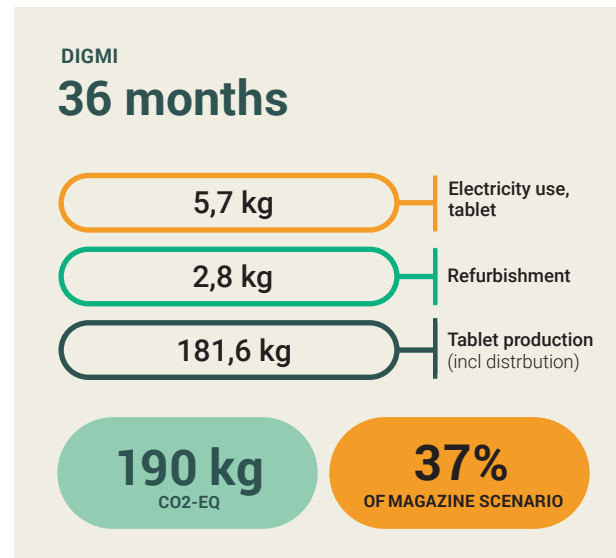
The tablets scenario has a calculated impact of 190 kg CO<sub>2</sub>-eq., divided onto:

- Tablet production and distribution: 182 kg CO<sub>2</sub>-eq.
- Electricity use, tablets: 5,7 kg CO<sub>2</sub>-eq.
- Refurbishment: 2,8 kg CO<sub>2</sub>-eq.

## Discussion

LCA results, and climate impact calculations based on them, always has a built in uncertainty, due to the long chain of different datasets and models that they are built on, and due to the fact that the reality that is being modeled is usually very complex. Therefore, the specific climate impact result coming out of an LCA, or a tool like this one, does not represent "reality", but rather the model version of reality. And this section, the Discussion, describes the relationship between reality and the model version of reality, with focus on aspects that influence what conclusions can be drawn about "reality", based on the model result.

Due to the general uncertainty there need to be relatively big differences between the compared model results, to be able to draw conclusions about reality. In general, a difference of "only" 20% between two calculated results would require the analyst to understand the data very well to be able



Scenario result

to draw any conclusions at all about which is probably the better of the them, in reality. As will be seen below the scenarios studied here has a difference of 170% (or 63% lower) which makes drawing credible conclusions possible, despite the uncertainty.

### COMMENTS, MAGAZINES SCENARIO:

→ Magazine production has the dominating impact of this scenario (ca 60% of total), which means that any conclusions drawn are dependent on the model for this. The major

part of that impact of the magazine production comes from the dataset for paper-production which is an Ecolnvent (v3.6) dataset for wood-free paper production in Europe (the daily newspapers are using a dataset for European news-print paper, but no such papers are included in this scenario calculation). As an average dataset it is of high quality, and since we are calculating impact from various magazines (which are assumed to not all be printed in the same place (not using the same paper), but probably in Europe) it should be ok as a representative impact data. However, for the newspapers it can be assumed that they are printed primarily in Sweden, in which case it is possible that the news-print dataset used is too high, since paper production is electricity intensive and Sweden has a lower electricity impact than average European electricity.

→ The computer production also has high impact (ca 30% of total). The computer impact comes from an average of producer-calculated impacts for a few different all-in-one computers. It is generally hard to know the quality of calculated impacts for computers and other advanced IT-equipment since the product includes lots of small, but extremely refined, components, and since they are mostly made in Asia (where it is generally hard to access emission data, compared to Europe). Some components also use gases with extreme climate impact in their production process, for cleaning the production reactors, and even small extra leakage of these gases would make a notable increased impact. The impact also depends on the assumed life-length of the computer, here it is assumed to be five years.

→ The distribution is responsible for ca 7% of the total impact. It can probably be both higher and lower, depending on which magazines are bought (where they are printed), but any data-error here should not have a notable impact on the overall conclusions, due to the relatively small base impact.

→ The electricity (used by the computer) is only 3% of the total impact of the magazines scenario, so it has generally no impact on the conclusions. The dataset used is average Swedish electricity which is a good match in this scenario calculation. Many countries around the world, and Europe, has 10-20 times higher impact from electricity compared to Sweden, so if a scenario calculation is made for a salon in those countries then the calculated electricity impact will be too low, which will then severely decrease the possibility to draw conclusions from the result. If a country has lower impact from electricity than Sweden, like Norway, or if the salon buys only renewable electricity, then this number will be too high, but since it already is such a small part of the overall result that will make no difference to the conclusions.

#### **COMMENTS, TABLETS SCENARIO:**

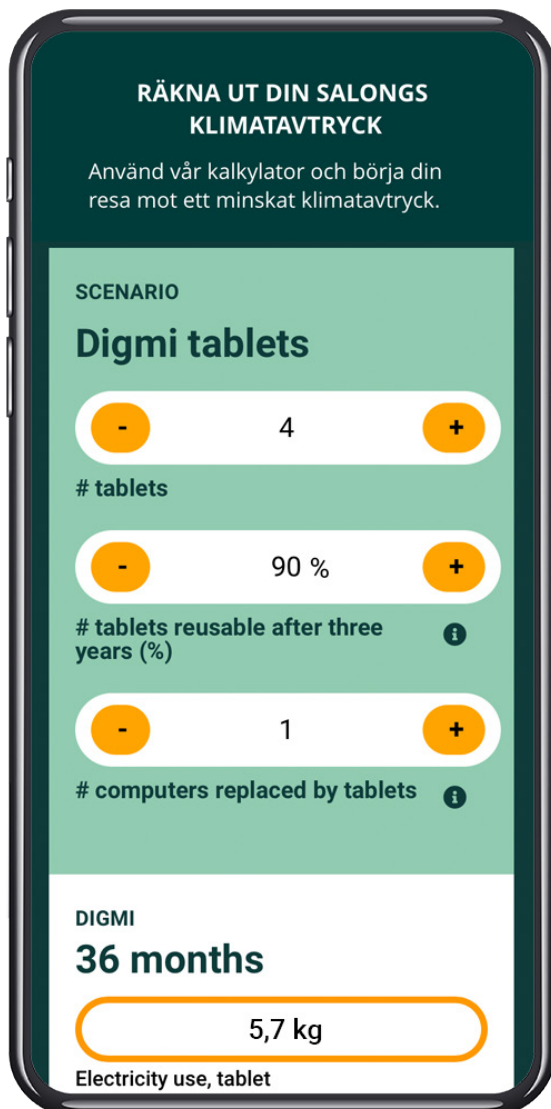
→ Impact from tablet production totally dominates the impact in the tablets scenario (over 95% of total impact). This means that the data quality, and matching, of this part is very important for the robustness of the result. There was no climate impact data available for the tablets used by Digmi, so the impact is taken from another premium tablet. The impact has also been increased by 20%, just to be on the safer side, since the tablet production impact is so important to this comparison. There are several IT-product producers that publish their own calculated carbon impacts for a selection of their products, and they are relatively close in their calculated impact, which increases their credibility, even though they are not third party reviewed. However, the transparency into the production sites and processes are low, and for the data to have high credibility we would ideally need a resent calculation that has been made by an independent expert with good access to process data, which will unfortunately probably never happen. So this is as good data as can be expected today.



→ The tablet production is also heavily impacted by the choice to only carry 50% of the impact of tablets that are resold after the three-year period (90% of tablets assumed to be resold, with the last 10% assumed to be damaged in a way that makes it impossible to sell as second-hand products (conservative assumption)). The general argument for the impact sharing with later owners is that “the two actions responsible for a reuse of a product are ‘not buying a new product’ and ‘not waste-handling a (still working) product’, and since both are equally needed they each

constitute a 50% total impact save” (loosely cited). The argument is presented and discussed in the report Product databases: the environmental benefits of reuse (IVL, 2020).

→ Electricity usage (for tablets) is only 3% of the total scenario impact and thus has no impact on the conclusions. The used impact for the electricity represents average Swedish supply mix, which is not as high as the “residual mix” that a salon might have if they don’t buy “renewable” electricity, or electricity with a certain, specified origin. But even if the electricity impact would be 3-4 times higher (possible for the residual mix) it would not, on its own, have a notable impact on the conclusions.



## Conclusions

→ Since the difference between the magazine scenario and the tablets scenario is so big – the tablet scenario impact is 63% lower than the magazine scenario – it is only reasonable to assume that the tablet scenario has a lower climate impact also in reality, even if we would assume that the uncertainties in the data would generally go against it.

→ Even if the computer is not included in the magazine scenario (in the event that the salon chooses to keep a computer to handle bookings/scheduling/payment) there is still notably lower impact for the tablet scenario (44% lower).

→ For the above conclusions to be faulty there would need to be big errors in the background data for either the paper production or the tablet production, or both. Since the background data for both of those have been taken from sources with as high credibility as possible, this is judged to be unlikely.

# Description of tool

## – calculation and data

### Usage of results

→ The tool uses LCA-results as background data, produced following the standards ISO 14040/44. But this report does not claim to follow these ISO-standards since that would require a third-party panel review, since we are comparing competing products, and this is outside of the scope of this assignment.

→ This limits the usage of the results from the tool in that they should not be used to motivate claims that are made public.

### The tool

→ The tool compares two scenarios: a magazine scenario and a tablet scenario. In the magazine scenario the salon buys a number of magazines each month, and week, and day (newspapers), for 36 months. The tool calculates the impact for those magazines by adding together impact for producing and distributing them. Literature data is used to estimate the impact.

→ In the tablet scenario the salon instead pays for a number of tablets which has a large number of magazines available on them. The tool calculates the impact of producing these tablets, including used electricity. Part of the production impact is removed (up to 50%), based on that the tablets are refurbished and sold to other users after three years. The impact of the refurbishment is also included. The method of dividing up the impact on the first and last owner of a product is described in detail in the reference "IVL (2020)".

→ There is also the option of using the tablets for booking customers, in which case it might be

possible for the salon to remove the need for one or more computers. If this option is added to the comparison then the impact of the chosen number of computers are added to the magazine scenario, along with the estimated electricity used.

→ Impact from producing the content of the magazines are not included in any of the scenarios, mostly because this content creation is needed for both the magazine scenario and the tablets scenario.

### The data

#### MAGAZINE PRODUCTION:

##### PAPER:

→ **EcoInvent** (impact woodfree paper, EU average) for magazine

→ **EcoInvent** (impact newsprint, EU, recycled)

##### PRINTING/CHEMICALS:

→ **Magazines:** 30% of paper impact (estimate based on a few different LCA:s of magazine printing)

→ **Newspapers:** 10% of paper impact (estimate based on a few different LCA:s of magazine printing)

##### NUMBER OF PAGES PER MAGAZINE:

→ 138 pages for monthly magazine

→ 50 pages for a weekly magazine

→ 50 pages for a newspaper

##### PAPER WEIGHT:

→ 115g for magazine paper

→ 50g for newsprint

##### FORMAT:

→ 210x280mm for magazine

→ 280x430mm for newspaper (tabloid)

#### **MAGAZINE DISTRIBUTION:**

EcoInvent (truck transport, EU)  
1000 km

#### **COMPUTER PRODUCTION:**

Production impact for 24" iMac (Apple,1),  
with the impact from usage removed

#### **ELECTRICITY USAGE, COMPUTER:**

Impact: Swedish electricity average  
(50 g CO<sub>2</sub>-eq/kWh)

Electricity usage: 31W, 8 hours per day  
(24" iMac (Apple,1))

#### **TABLET PRODUCTION:**

Production impact for iPad Air (5 gen)  
(Apple,2), with impact from usage removed

- Production impact increased by 20%  
(due to general uncertainty)
- Production impact then decreased by 50%  
for all tablets that still works after three years  
(assumed to be 90%, but this can be changed  
by the user), due to the tablets being sold into  
reuse.

→ The general argument for the impact sharing  
with later owners is that (loosely cited) "the  
two actions responsible for a reuse of a  
product are 'not buying a new product' and  
'not waste-handling a (still working) product',  
and since both are equally needed they each  
constitute a 50% total impact save". The  
argument is presented and discussed in the  
report Product databases: the environmental  
benefits of reuse (IVL, 2020).

#### **ELECTRICITY USAGE, TABLET:**

Impact: Swedish electricity average  
(50 g CO<sub>2</sub>-eq/kWh)

Electricity usage: 3,2W, 8 hours per day  
(iPad Air (Apple,2))

#### **REFURBISHMENT (TABLET):**

Impact from collection of "used" IT-equipment  
and function-checking. Impact according to  
report: Product databases: the environmental  
benefits of reuse (IVL, 2020)

## Referenser

IVL, 2020, Product databases: the environmental benefits of reuse.

<https://www.ivl.se/download/18.4c0101451756082fbad193d/1603899258637/B2372E.pdf>

<https://www.ivl.se/publikationer/publikationer/produktdatabaser-miljofordelar-med-aterbruk---klimatfordelar-med-aterbruk-av-it-produkter-samt-metod-for-databasskapande.html>

Apple (1), iMac 24".

[https://www.apple.com/environment/pdf/products/desktops/24-inch\\_iMac\\_PER\\_Apr2021.pdf](https://www.apple.com/environment/pdf/products/desktops/24-inch_iMac_PER_Apr2021.pdf)

Apple (2), iPad Air (5 gen).

[https://www.apple.com/environment/pdf/products/ipad/iPad\\_Air\\_PER\\_March2022.pdf](https://www.apple.com/environment/pdf/products/ipad/iPad_Air_PER_March2022.pdf)

EcoInvent LCA/LCI/LCIA database.

<https://ecoinvent.org>



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