

Supplementary Materials

Product Details

Table S1: LCI data values used for products

Product	kg CO ₂ -eq/ unit	Unit
Skis (Adult)	29	pair
Skis (Children)	22.16	pair
Electric Tool (w/o battery), e.g. table saw	70	pcs
Electric Tool (w/o battery), e.g. circle saw, drill	17.5	pcs
Electric Tool (w/battery), drill	22.25	pcs
Van	3100	pcs
Car (Combi)	2015	pcs
Car (Compact)	2635	pcs
Video Game Unit	500	pcs
Bicycle	82.5	pcs
Cargo Bike	275	pcs
Cooking Equipment	1.62	pcs

For products not contained within Ecoinvent databases, the Blocket methodology was used to produce ad-hoc LCA calculations of products based on their material composition. Table 2 below outlines a product with a share of plastic, steel, polyethylene and includes a production factor in order to account for production based impacts.

Table S2: Example of the ad-hoc LCA calculations for products based on Blocket methodology

Material	Amount (kg)	Impact (kg CO ₂ -eq/ kg material)	Result (kg CO ₂ -eq)
Plastic (Unspecified)	2	2.9	5.8
Steel (Stainless)	0.5	4.6	2.3
Polyethylene	1	4.5	4.5
Production Factor		(1.3)	(12.6*1.3)
		<i>Impact for Product</i>	<i>16.4 kg CO₂-eq/pc</i>

Data Infrastructure Details

Table S3: Assumptions for the Energy Use of Mobile Phones based on Malmodin et al. (2014)

Amount	Unit
28	GWh/year
10	million mobile phones
2.8	kwh per person/mobile phone/year
525 600	minutes/year
5.32E-06	kwh/minute/person

Table S4: Assumptions for the Energy Use of Computers based on Malmodin et al. (2014)

Amount	Unit
1 850	GWh/year
8.5	million computers
217.6	kwh/person/year
525 600	minutes/year
4.14E-04	kwh/minute/person

Table S5: Assumptions used/Data for impacts for Data Infrastructure for the sharing locker

Amount	Unit
2 min on mobile phone	1 Locking/Opening
2 MB Data Used	1 Locking/Opening
1.06E-05	kg CO ₂ -eq /mobile use
6.03E-06	kg CO ₂ -eq /data infrastructure service

Table S6: Assumptions used/Data for impacts for Data Infrastructure for P2P platform

Amount	Unit
3 min	Searching/Browsing on mobile phone
3 min	Searching/Browsing on Computer
15 MB	Data on Server
1.26E-03	kg CO ₂ -eq/search
4.53E-05	kg CO ₂ -eq /data infrastructure service

Locker Service Assumptions

Table S7: Assumptions for Packages and number of sharing lockers

Households	7 856
Population	17 619
Households per Building	30
Number of Buildings/Lockers	262

Details on the Lockers

The lockers are assumed to be made from roughly 10 kg of galvanized steel and use magnetic locking systems. Impacts for the use of lithium-ion batteries to operate the locks and digital infrastructure for locking and unlocking the boxes are included in the assessment.

Details on the delivery impacts

Traditional LCI data for freight transportation is not optimal to be used for the highly complex logistics of mail carriers. Therefore, instead of freight datasets in Ecoinvent, the DHL carbon calculator¹ was used to assess the impacts of shipping a package, which takes into account volume of the package and weight, among other factors such as delivery routes, etc. The average package was assumed to be roughly 0.06 m³ according to dimensions provided from QLocx² for maximum size of packages in the postbox system, and assuming an average weight of 5 kg. Using these factors, each package was calculated to have 0.012 kg CO₂-eq emissions per package delivery/pickup³. Data for upstream emissions of the package (i.e., for all transportation and freight up to the delivery to the logistics center in Solna) were not included.

References

Malmodin, J., Lundén, D., Moberg, Å., Andersson, G., Nilsson, M., 2014. Life Cycle Assessment of ICT. *Journal of Industrial Ecology* 18, 829-845.

Ecoinvent. The Ecoinvent Database v 3.1. Zurich, Switzerland, 2014. Available online:<http://www.ecoinvent.org/database/older-versions/ecoinvent-31/new-data-in-ecoinvent-31/newdata-in-ecoinvent-31.html>

¹ http://www.dhl.com/en/about_us/green_solutions/carboncalculator.html

² <https://www.qlocx.com/>

³ Based on data and calculative methods in the Carbon Calculator from DHL (<https://www.dhl-carboncalculator.com/>).