
Satellite Meeting: Inspired and Engaged on Sustainability

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Bringing environmental awareness of public libraries to the 2020s -project : Case Libraries Carbon Footprint

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Abstract:

Bringing environmental awareness of public libraries to the 2020s –project (2020-2021) was a national research and training project funded by the Finnish Ministry of Education and Culture and administered by Helsinki City Library.

Project started with a survey that looked at the level of environmental awareness of public libraries and simultaneously started measurements of libraries carbon footprint. The main objectives of this project were also to clarify the role of libraries in environmental awareness, sharing economy as well as UN Sustainable Development Goals. Also, to create a network of environmentally conscious librarians and free to use material bank were quite important aspects of the project.

This pioneering research gathered carbon footprint data from 13 public libraries across Finland and it was the first national data collection and measurement process in which emission data from public libraries were studied together with experts. The aim was to identify the key factors involved in calculating the carbon footprint of libraries and to develop a tool that would allow public libraries to assess their environmental impact more widely.

The project's participatory approach aimed to raise libraries understanding of the positive and negative climate impacts of public libraries and to clarify the role of libraries in combating climate change. With the help of carbon calculation, the climate impacts can be made comparable, relevant emission sources can be identified and first and foremost library sector can pay attention to it's climate impact and take actions to reduce it. One important highlight is that the results can be used as a reference for future calculations.

Keywords: public library, carbon footprint, carbon handprint, environmental awareness, climate emissions

Introduction : Bringing environmental awareness of public libraries to the 2020s - project : Case Librarys Carbon Footprint

Bringing environmental awareness of public libraries to the 2020s –project (2020-2021) was a national research and training project funded by the Finnish Ministry of Education and Culture and administered by Helsinki City Library.

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This pioneering research gathered carbon footprint data from 13 public libraries, and it was the first national data collection and measurement process in which emission data from libraries were studied together with experts. The aim was to identify the key factors involved in calculating the carbon footprint of libraries and to develop a tool that would allow public libraries to assess their environmental impact more widely.

The carbon footprint process included data collection on the pilot libraries own activities, limiting the measurements followed by data processing and analysis, and finally the carbon footprint for each pilot library and scaling the measurements to the national level. Together with processing the libraries carbon footprint we wanted to raise the role of customer and the ways how they can influence to libraries carbon footprint and in the other hand to the carbon handprint.

1 COLLECTING DATA

To determine the climate impact of libraries there are several questions that needs to be answered: what are the operations and facilities of libraries, what is being transported, what kind of waste is generated and many other effects that has to be taken into consideration. In order to calculate the carbon footprint of the entire library sector, the entire sector must be involved, from the national level to the grassroots level.

Carbon footprint has so far been the most popular measure of climate impact which summarize how much greenhouse gas emissions a product or activity causes. With the help of the carbon footprint, the climate impacts are made comparable and the relevant emission sources can be easily identified. As a result of the calculation, the resources for climate work, the reduction of emissions and the allocation of cost savings will become more efficient.

As I mentioned before, thirteen libraries of different sizes from different parts of Finland participated in the carbon measurements in autumn 2020. The consumption data for 2019 was used as a basis to calculate the footprint of each of the pilot library. Collecting the data consisted of four and a half day footprint clinics for the libraries. Also, private consultations were available from the climate experts to support the work of libraries. During this process, it was observed, that the quality of the materials and the availability of information varied quite a lot

¹ See: Harri Sahavirta: Survey on the environmental awareness of public libraries, 2022. [Summary Bringing environmental awareness of public libraries to the 2020s.pdf \(kirjastot.fi\)](#)

² [Vihreä kirjasto | Kirjastot.fi](#)

between libraries. It was estimated that the data collection per library would take approximately 40 working hours, but in some cases, it probably took some more time.

Collecting carbon footprint data is the most important work step in the process, which guarantee the reliability of the calculation. The limitation of carbon calculation in libraries was done in such a way as to give as realistic picture as possible of the library sector. The uncertainties included in the calculation were minimized by limiting the emissions to be considered to cover all library activities, but some limitations were also made to simplify the calculations. For example, only paper and e-books were considered from the material.

The primary data used in this calculation was the data collected by the participating pilot libraries on their own activities, and the secondary data was statistical data on the library sector. Based on these criteria, the carbon footprint measurements were limited as follows:

- energy consumption of the premises
- waste
- material transports
- business trips and
- material and other purchases.

2 LIBRARYS CARBON FOOTPRINT

As this was the first national data collection together between experts and libraries, the measuring libraries were given as much freedom as possible in the way the data were delivered and at the same time the minimum level was kept low. After data collection discovered that there was a lot of variation in the quality and availability of the material between libraries. This was actually one of the goals of the data collection process to obtain the picture of the different challenges for libraries to find and gather information for the carbon measurements.

Carbon footprint measurements showed that the climate emissions of public libraries are quite moderate and consist largely of emissions from buildings and electricity consumption. It is noteworthy that about two-thirds of the emissions comes from the energy consumption on the premises – in other words more than 60 % of all library emissions. From this point of view reducing emissions poses a challenge to municipalities, towns, and cities, since the property owner typically make these kinds of decisions.

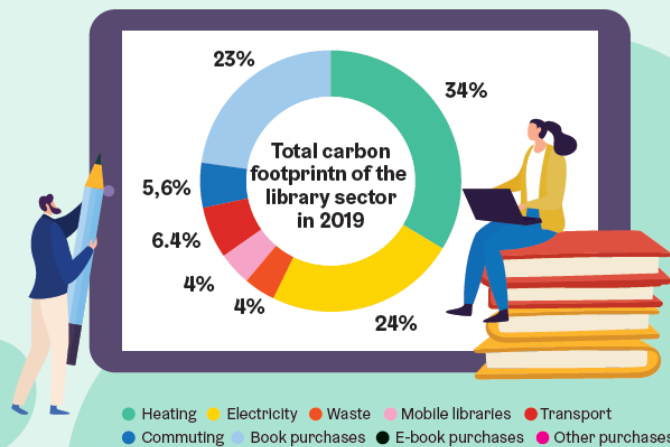
It could be surprising how low the emissions from library operations are in the end, material purchases and logistics are only 25% of total library emissions. The calculations also show the modest share of material transports of libraries in the carbon footprint. Material purchases account is less than 6% of emissions and material transport or logistics also around 6%. These are then only 12% of total library emissions. The total amount of carbon footprint of Finnish library sector is average 32 tons of CO₂e.

The carbon footprint of your library

The carbon footprint of your library is very moderate, on average 32 tonnes of CO₂e – this corresponds to the annual emissions of 3130 Finns.

The majority of library emissions arise from the building itself and its daily activities: heating, electricity and waste management account for more than 60 per cent of all library emissions.

In other respects, library activities are environmentally friendly: the share of material and other purchases is approximately 25% of the emissions. Material transportation, mobile libraries and commuting account for 16% of the emissions.



"Yleisten kirjastojen ympäristötietoisuus 2020-luvulle"
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3 CARBON HANDPRINT OF LIBRARY

To get a full picture of the climate impact of libraries the project introduced to its research also carbon handprint of library. Carbon handprint measures the positive impact on carbon emissions by enabling customers to reduce their negative climate impact. A carbon handprint is, in a way, the opposite phenomenon: it measures and describes the positive effects of a service or product. However, the handprint is not just the mirror image of the footprint, because its creation requires actions from the customer or user. The carbon handprint thus informs the customer of the benefits arising from the use of the service or product. The principle of handprint thinking is that as a handprint gives added value to the carbon footprint calculations and includes the sharing economy as a library activity.

The facilities of libraries are not only for the storage of materials and traditional library activities, but according to the Finnish Public Libraries Act³ libraries must furthermore provide access to materials, information and cultural content and to maintain a diverse and revolving collection. It should be noticed that besides these core tasks libraries offer a wide range of facilities for learning, working and hobbies hand in hand with the sharing services. Based on these points the positive effects of library operations as a well-established example of sharing economy is quite clear.

For example, a book borrowed from a library has roughly a third of the negative impact on climate compared to a book that is bought by an individual and read only once. These numbers are of course only approximates, as there are multiple factors forming the negative and also the positive climate impacts. But the carbon handprint of library use is not limited to the positive climate impacts of circulated books and other materials or shared facilities. Visiting the library has also other potentially positive climate impacts. The first thing that

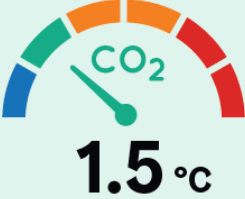
³ [en20161492.pdf \(finlex.fi\)](#)

comes to mind is, of course, emissions from visits to the library. These emissions are most affected by the mode of transport and the distance travelled.

A visit to the library keeps carbon emissions under control

The use of library services promotes a 1.5-degree lifestyle and the objectives of the Paris Agreement on climate change

Your library supports climate action







1.5 °C

- The library is located within a short and easy distance.
- The library includes countless books, magazines and other material, such as music.
- The library offers premises, information technology and other devices for sharing.
- The library borrows items that are not used on a daily basis.

You can influence the carbon footprint of your own library use

- How you make your way to the library impacts the carbon footprint of your visit.
- Collect your reservations and return your loans on time to improve material circulation and reduce unnecessary transportation. Also keep in mind e-materials and e-services; they reduce the need for logistics.
- Sharing premises, information technology and other equipment is environmentally friendly.
- Borrowing items reduces the need to own them – in many libraries you can use a sewing machine, borrow sports equipment or a power drill and use digital devices.

CO₂ emissions of different forms of transport per passenger-kilometre.

			
243.8 g/CO ₂ /pkm	17.7 g/CO ₂ /pkm	0 g/CO ₂ /pkm	

Tieteen kirjastojen ympäristötietoisuus 2020-luvulle
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Using library's premises, information technology and other devices for sharing, by collecting your reservations on time or using e-material you can reduce unnecessary transportation and by borrowing items from library that are not used on daily basis or you don't necessarily have to own you can promote 1,5-degree lifestyle as Paris Agreement on Climate Change sets as a target.

An important part of the libraries handprint is raise awareness of climate issues and be an example of climate actor and by using service design library can expand its premises and services towards to more environmentally sustainable direction.

4 READING KEEPS CLIMATE EMISSIONS UNDER CONTROL

Reading is a low-emission activity with a positive carbon handprint. The carbon handprint of a borrowed book is, thanks for the number of borrowing times, lower than a purchased book, which can be read only just once. In this calculation, the carbon footprint of the book has been estimated to be quite small, but the principle is clear: the climate emissions of a paper book borrowed from the library are slightly less than half of the emissions of a book purchased for one's own bookshelf – assuming the book is read only once. This calculation is based on the fact that library books have several readers, so that the book's emissions can be divided between several readers.

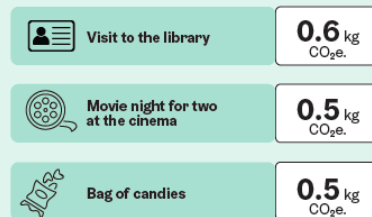
The handprint of reading can be determined by comparing, for example, the positive climate impact of a paper book purchased for the library with the climate emissions of a purchased paper book. The starting point is therefore the carbon footprint of the book, which consists mainly the emissions from the electricity and heat production used in the book production and the greenhouse gas emissions generated during transport.

Reading is a low-emission recreational activity with a positive carbon handprint.

The carbon footprint of a book consists of the emissions associated with its materials, manufacturing and transportation. A purchased book is often read by just one person.

The carbon handprint of a borrowed book consists of the positive impact of the borrowing on the book's emissions. A library book is read often, up to 100 times before it is removed from the library collection and recycled.

Using library services is an environmental act



Festolen kirjastojen ympäristötietoisuus 2020-luvulle
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Emissions related to reading (kg CO₂e)

Paper book from a shop		1.16
Paper book from an online store		1.07
Paper book from a library	0.7	0.46
E-book from an online store, with a separate reading device*		0.87
E-book from an online store, without a separate reading device	0.08	
E-book from a library	0.07	0.01
Handprint		Footprint



According to the project's estimate, taking trips to visit the library into account the carbon footprint of the library would increase the footprint by 30% or even 60% according to the highest multiplier. This is a very rough estimate, but it shows that the customer can significantly increase the carbon handprint of their library use by arriving at the library on foot or by bike.

5 CONCLUSIONS

Why this carbon footprint -pilot was important? With the help of carbon calculation, the climate impacts can be made comparable, relevant emission sources can be identified and first and foremost library sector can pay attention to its climate impact and take actions to reduce it. With this pilot we also wanted to obtain as comprehensive a picture as possible of the challenges of data collection.

This carbon footprint pilot was the first extensive review of the climate impact of public libraries in Finland. Because statistics and monitoring of developments are important with these calculations it is possible to monitor and enrich national library statistics and the development of climate emissions of the libraries. Finnish libraries have a unique, long-term time series of national statistics of the operation of the libraries. This should be complemented by environmental indicators and enriched existing statistics on emissions and activities.

In addition, statistics could be extracted as well under the UN Sustainable Development Goals (SDG) in order to related up-to-date key figures are easy to find. So, as a result libraries can follow by yearly basis both their carbon footprint and point out SDG goals according to their strategies. An important highlight is that these results can be used as a reference for the future calculations.

The climate perspective can be linked to a wide range of development projects, maybe even set it as one of the criteria for starting a project. Libraries can not only make their own climate actions and lead by example, but also raise overall awareness of climate issues and other sustainable development issues. This requires nothing more than courage to see the true state of the climate and bravely start to take actions.

Acknowledgments

This paper is based on the national project Bringing environmental awareness of public libraries to the 2020s project in Finland (2020-2021).

[Summary: Bringing environmental awareness of public libraries to the 2020s \(pdf\)](#)

References

Sahavirta, Harri 2022: "Advocating Public Libraries by the SDGs " a paper given in ENSULIB's satellite meeting 22-23 July 2022 in Cork, Ireland (IFLA WLIC 2022).