

# Empowering Zero Waste Cities through data

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**EPFL**



[www.epfl.ch/labs/herus](http://www.epfl.ch/labs/herus)  
[www.metabolismofcities.org](http://www.metabolismofcities.org)

ENERGY

. . . . . 5

GWh

. . . . . 5

kt CO<sub>2</sub>-eq

GHG EMISSIONS

# Urban Metabolism

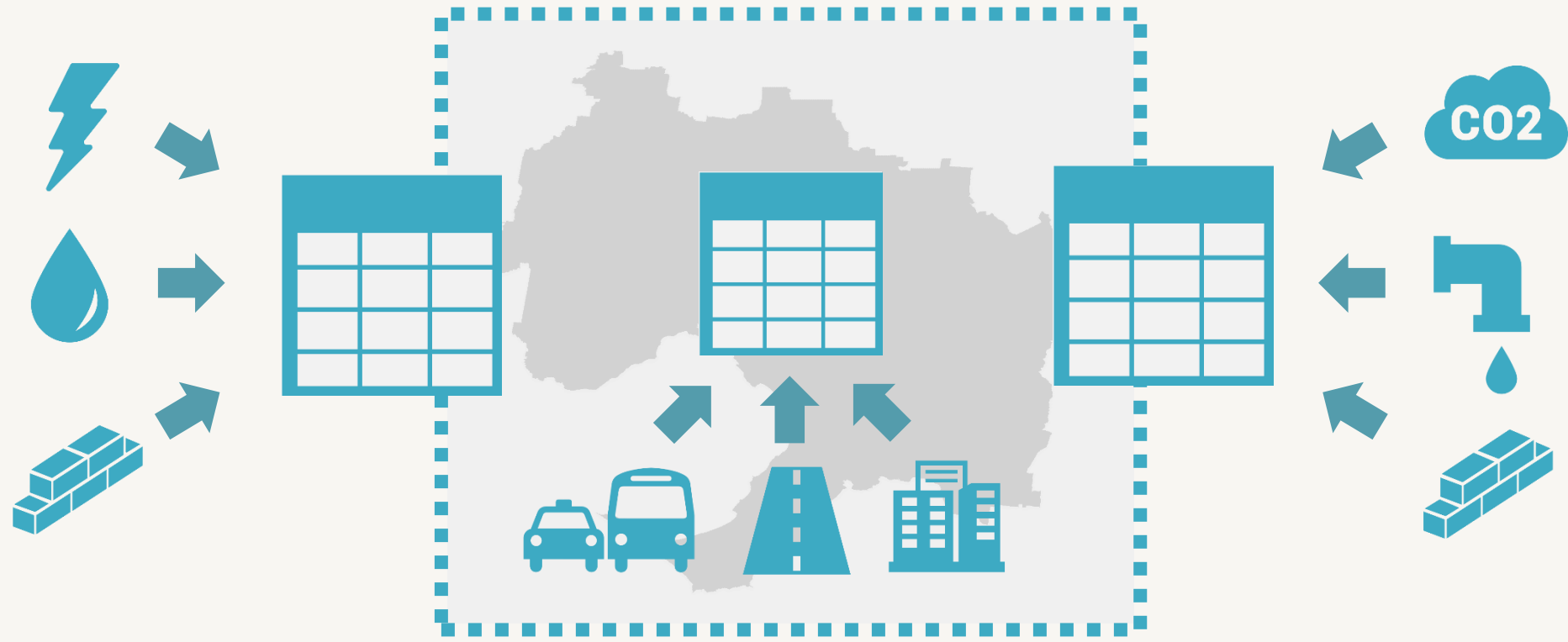
Central concept for  
Zero Waste Cities



=



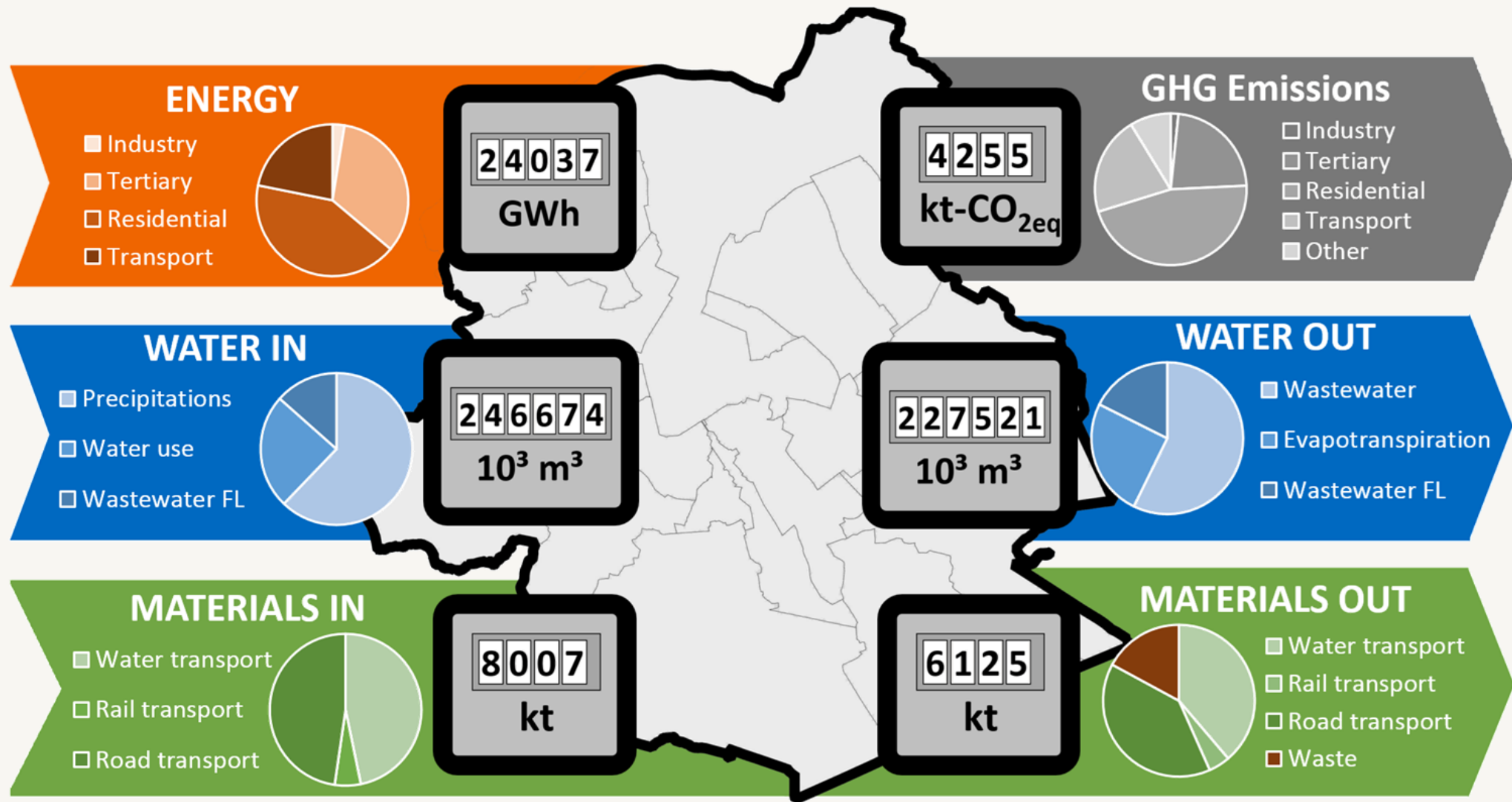
# Urban Metabolism



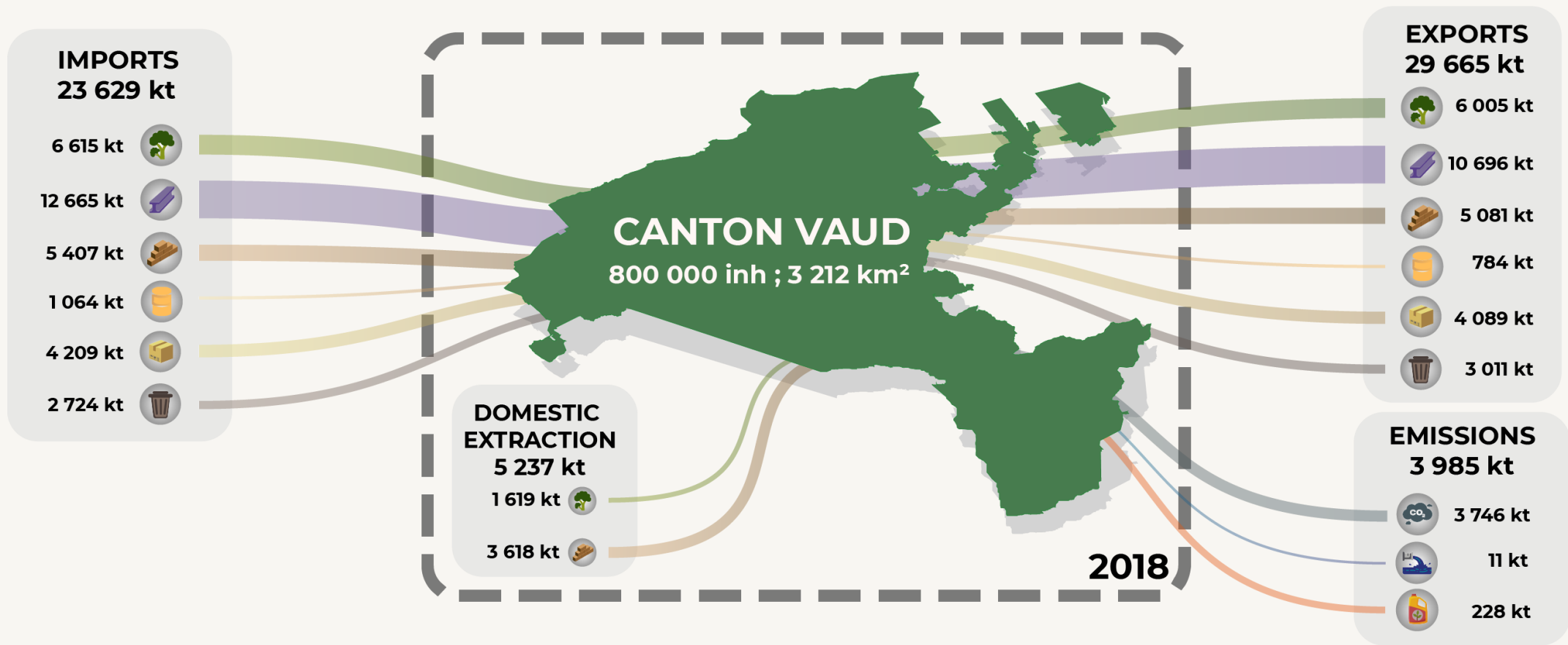
**An (unconsolidated) field studying urban flows/stocks, and associated actors and infrastructures from a systemic perspective**

# Urban Metabolism

Some insights for  
Zero Waste Cities

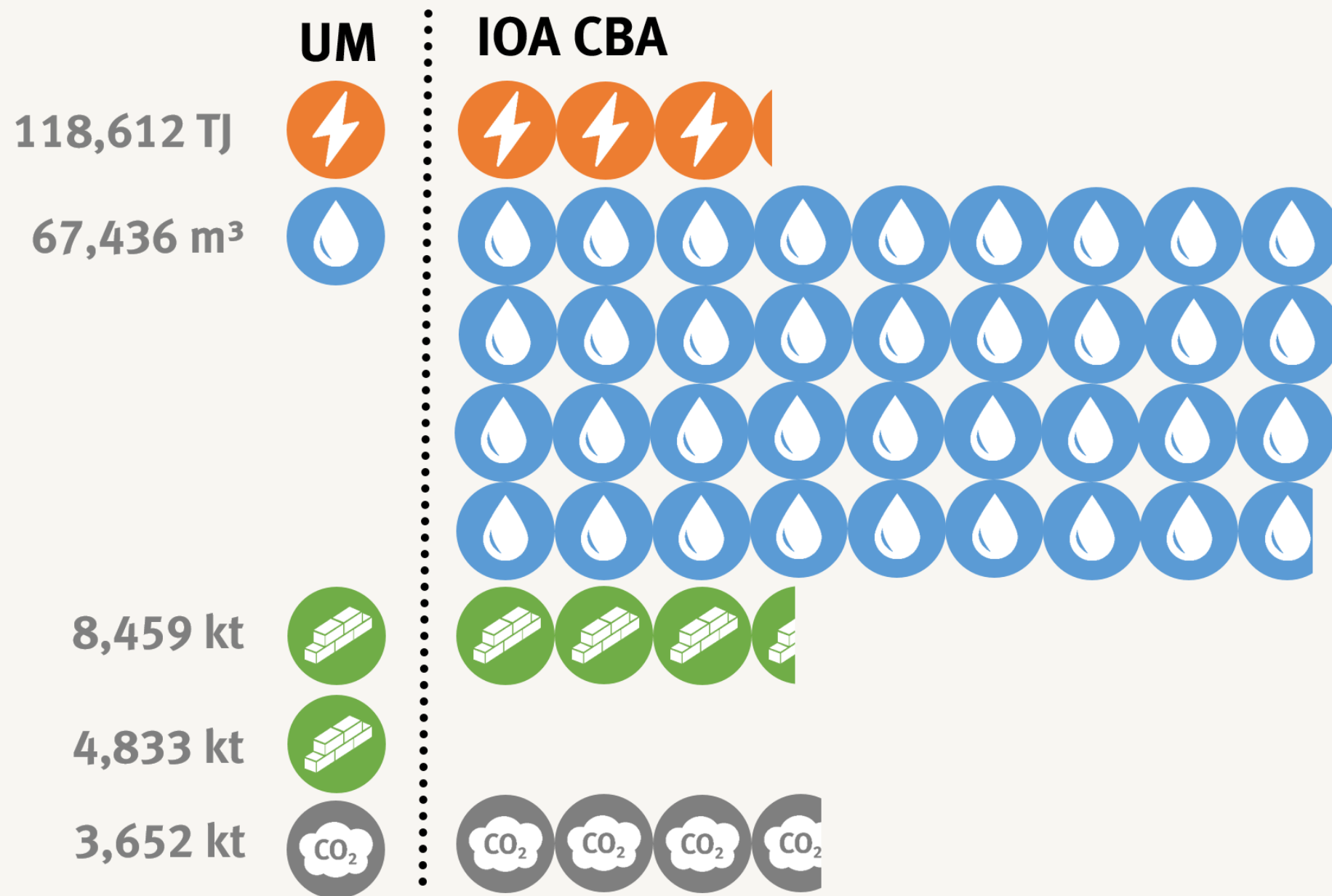


# Urban Metabolism of Brussels



# Cantonal flow assessment (EW-MFA)

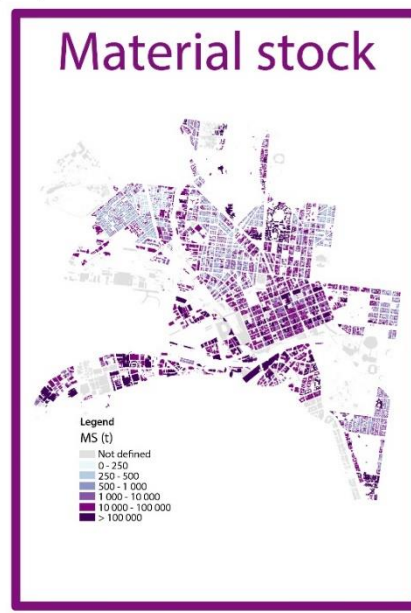
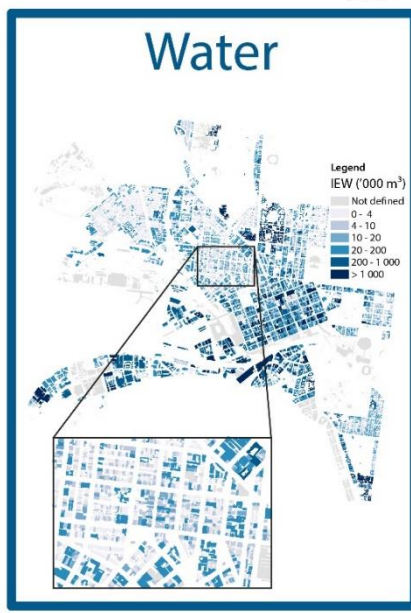
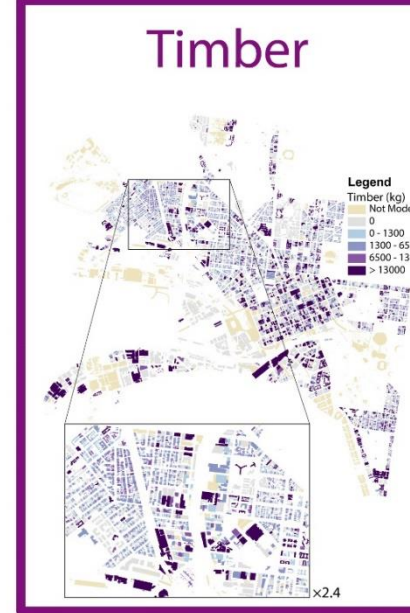
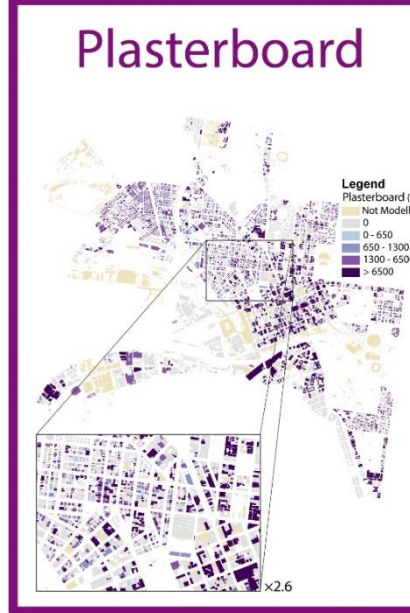
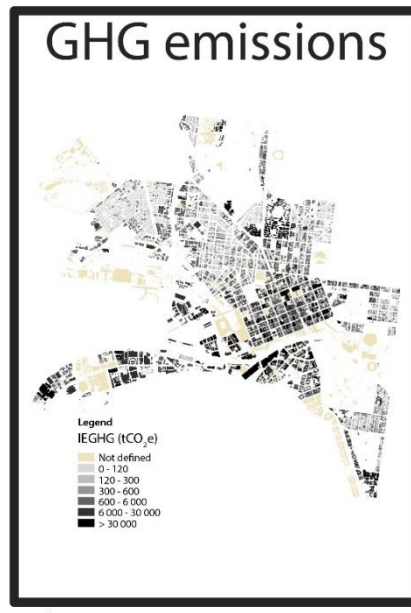
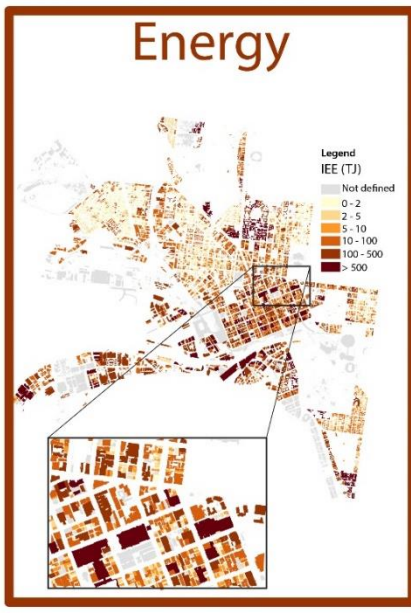




## Direct vs Indirect assessments



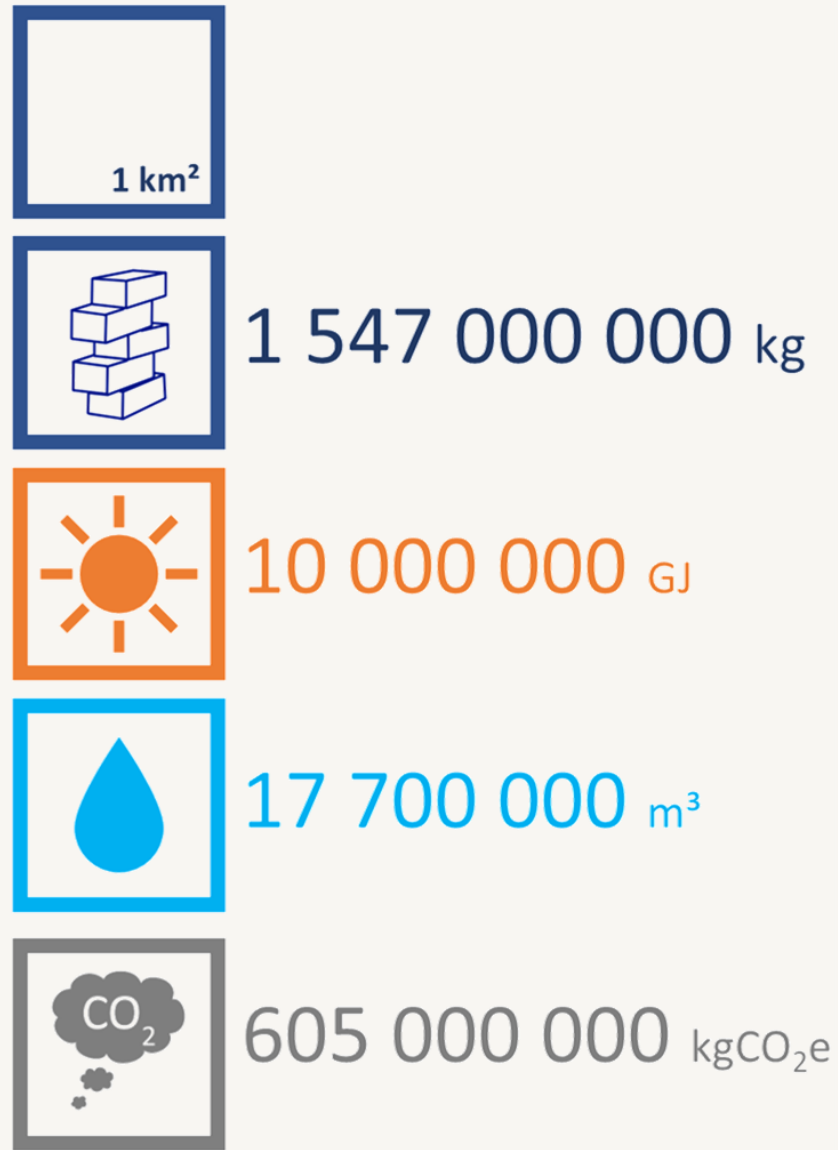




Stephan, A. and A. Athanassiadis. 2017. Quantifying and mapping embodied environmental requirements of urban building stocks. *Building and Environment* 114: 187-202.

Stephan, A. and A. Athanassiadis. 2018. Towards a more circular construction sector: Estimating and spatialising current and future non-structural material replacement flows to maintain urban building stocks. *Resources, Conservation and Recycling* 129: 248-262.

# Exploring the urban mine – predicting waste



Stephan, A. and A. Athanassiadis. 2017. Quantifying and mapping embodied environmental requirements of urban building stocks. *Building and Environment* 114: 187-202.

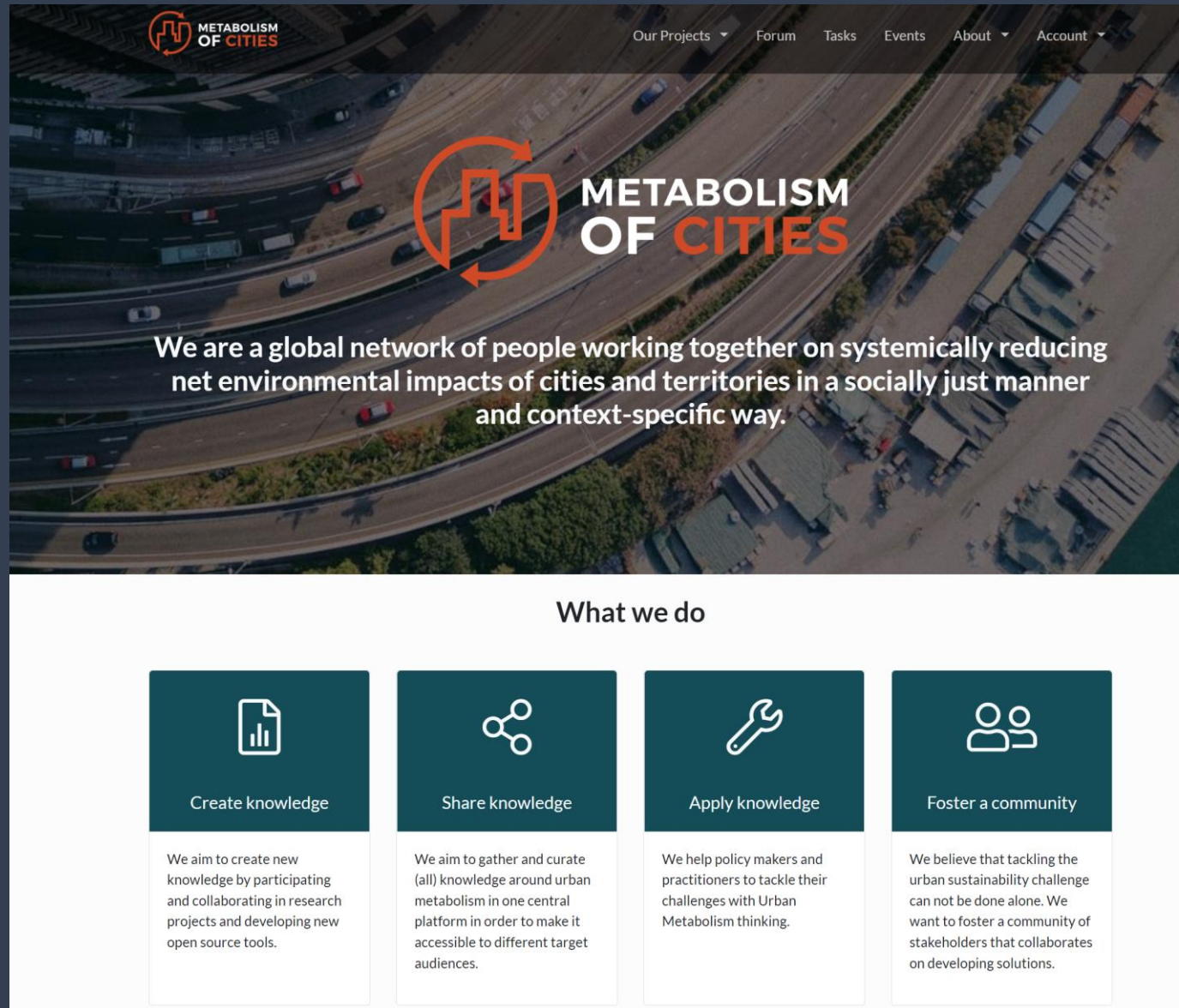
Stephan, A. and A. Athanassiadis. 2018. Towards a more circular construction sector: Estimating and spatialising current and future non-structural material replacement flows to maintain urban building stocks. *Resources, Conservation and Recycling* 129: 248-262.

# Explorer la mine urbaine – et ses impacts

# Metabolism of Cities

Accelerating the  
implementation of UM in  
policy and practice





[www.metabolismofcities.org](http://www.metabolismofcities.org)



**Develop an interface/community**



<https://library.metabolismo/cities.org/casestudies/map/>

# Gather / curate knowledge





## Case studies

Show 10 ▾ entries

Search: 


Publication	↑↓	Year ↑↓	Location	↑↓	Method(s)	↑↓
<a href="#">A Cities Approach to Sustainability</a>		2015	Dakar Mumbai Shanghai São Paulo Toronto			
<a href="#">A City and Its Hinterland: Vienna's Energy Metabolism 1800-2006</a>		2012	Vienna			
<a href="#">A comparison of the sustainability of public and private transportation systems: Study of the Greater Toronto Area</a>		2002	Toronto		Energy Accounting Greenhouse Gas (GHG) Accounting	
<a href="#">A Demand-Centered, Hybrid Life-Cycle Methodology for City-Scale Greenhouse Gas Inventories</a>		2008	Denver		Greenhouse Gas (GHG) Accounting Life Cycle Assessment (LCA)	
<a href="#">A Geodesign Decision Support Environment for Integrating Management of Resource Flows in Spatial Planning</a>		2019	Amsterdam			
<a href="#">A holistic framework for the integrated assessment of urban</a>		2018	Naples		Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism (MuSIASEM)	

<https://library.metabolismofcities.org/casestudies/>

# Gather / curate knowledge

<https://data.metabolismofcities.org/>

THE METABOLISM OF CITIES  
DATA HUB



CitiesData layersLibraryCommunityAboutAccount


## Metabolism of Cities Data Hub

The Metabolism of Cities Data Hub serves as a central repository for a wide variety of information pertaining to urban metabolism in cities around the world. Whether you are looking for resources on a city's infrastructure, stocks and flows, biophysical characteristics, or more, the Data Hub's well-defined structure allows users to easily search through available information. As an ongoing project, this tool is continuously improved through crowdsourcing uploads of new data and information sources. Contribute to this ongoing project, fulfill your information needs, and explore what the Data Hub has to offer!

### Phases


Data collection

1




Data processing

2



Data analysis


3



In the **Data collection** phase, we focus on gathering datasets, geospatial information, government reports, academic work, and other contextual and supporting material to provide a strong baseline before starting to work with the data.

Learn more →

### Current progress



Glasgow

1 documents

Context


Biophysical characteristics

Infrastructure

Stocks and flows

2% data collection completion

Explore cityContribute



Lausanne

177 documents

Context


Biophysical characteristics

Infrastructure

Stocks and flows

83% data collection completion

Explore cityContribute



Lisbon

12 documents

Context

Biophysical characteristics

Infrastructure

Stocks and flows

8% data collection completion

Explore cityContribute

View all cities (94)

View progress

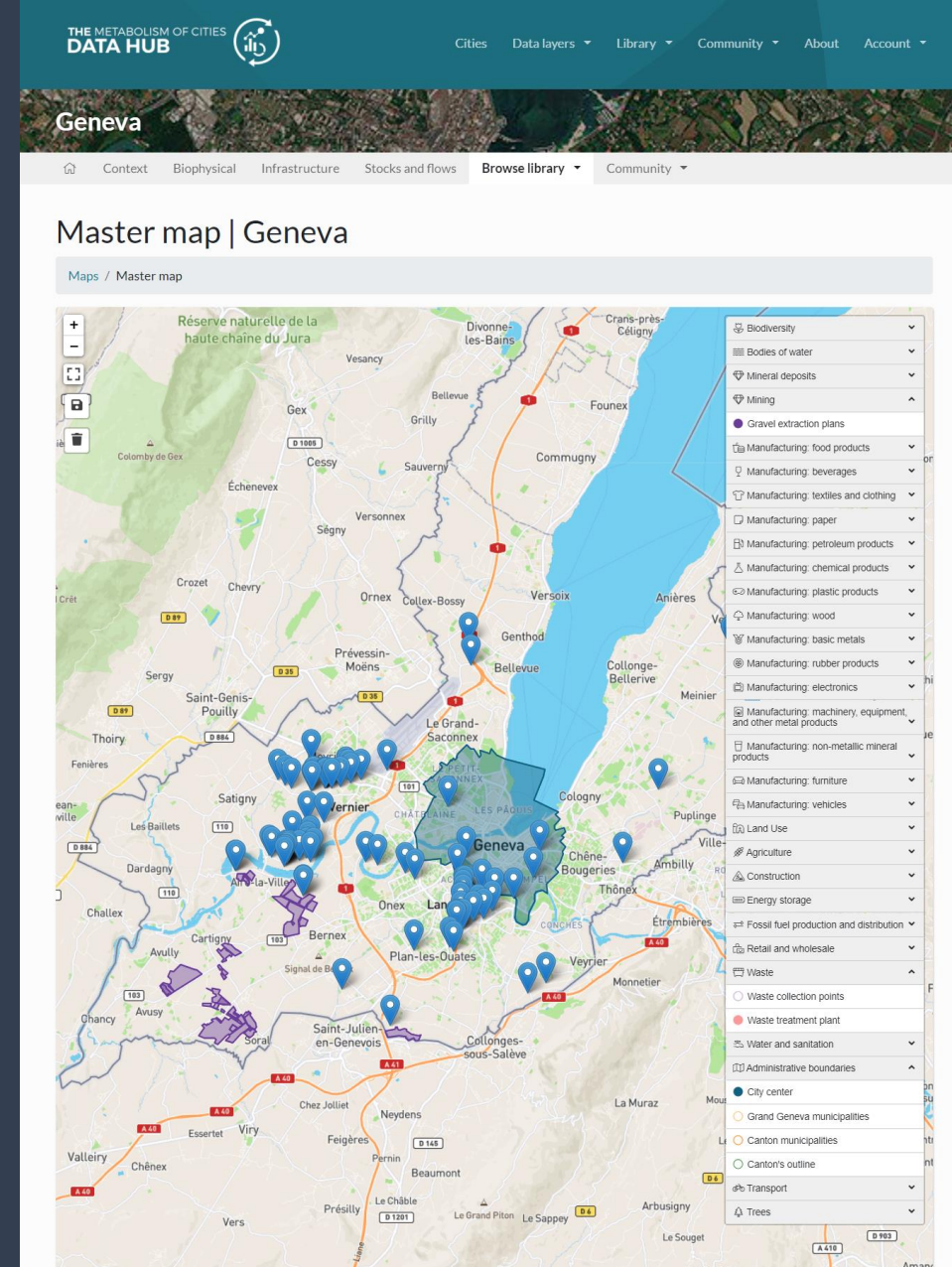
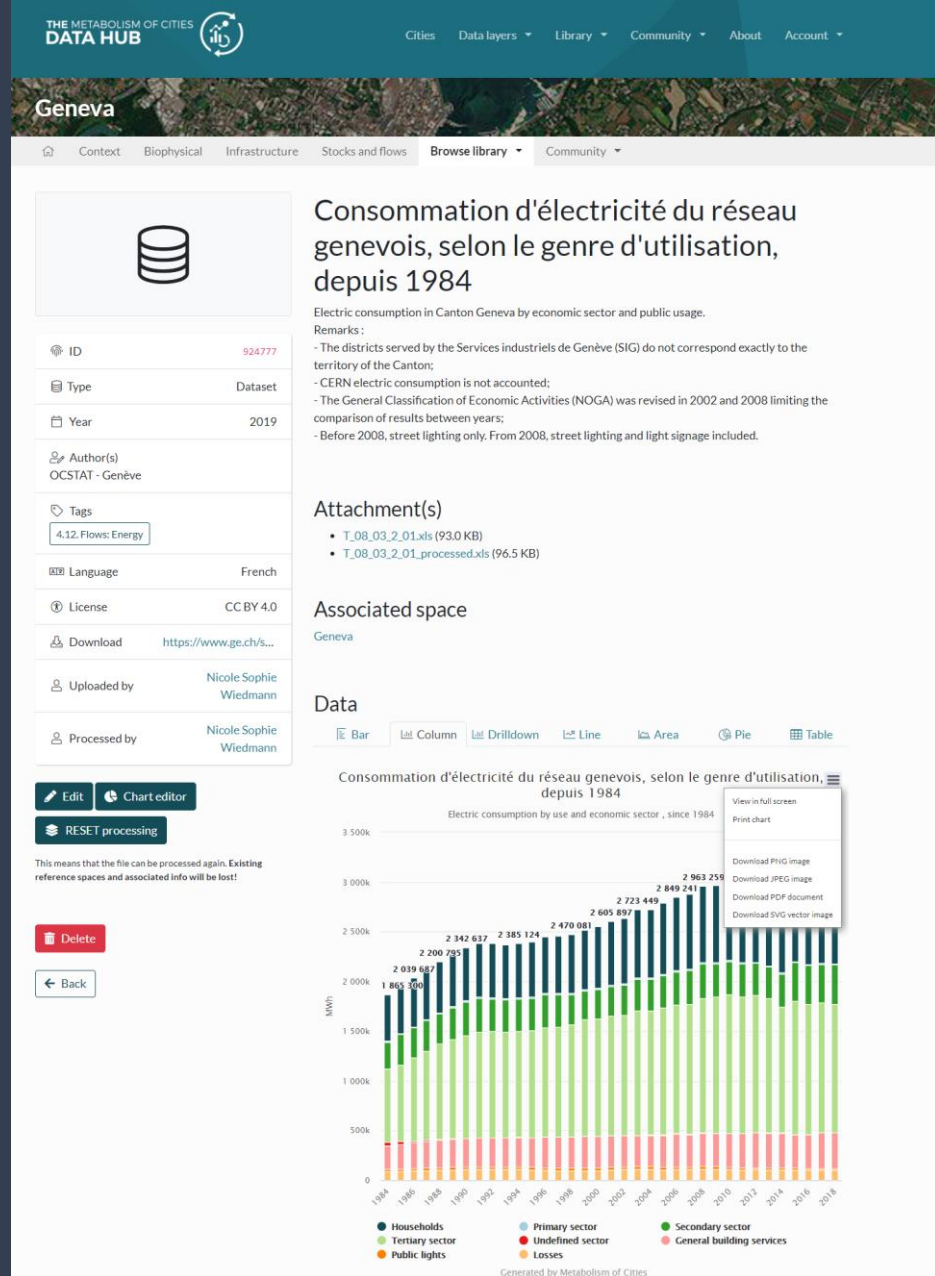
90+ cities

1790 datasets

827 maps

200+ people

# Metabolism of Cities Data Hub



Metabolism of Cities Data Hub


<https://data.metabolismofcities.org/>






<https://cityloops.eu>

# CityLoops project



data hub  
by



About ▾ Cities ▾ Circularity ▾ Deliverables ▾ Account ▾


## Cities

Sort order:

Alphabetically

Total documents

Completion percentage



Apeldoorn  
Netherlands

91 documents

Urban context


Sector economic activities

Material flows and stocks

34% data collection completion

Explore city

Contribute



Bodø

20 documents

Urban context


Sector economic activities

Material flows and stocks

13% data collection completion

Explore city

Contribute



Høje-Taastrup  
Denmark

66 documents

Urban context


Sector economic activities

Material flows and stocks


28% data collection completion

Explore city


Contribute




Mikkeli  
Finland




Porto  
Portugal



Roskilde  
Denmark




data hub  
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## Instructions


CityLoops-specific instructions on how to collect and upload data have been developed by Metabolism of Cities: The three courses provide hands-on instructions, Deliverable 4.3 gives more background information and the instructions sheet serves as an overview of what is expected in the single layers.



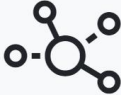
Course 1A: Data collection for circularity assessment of construction sector (WP2)  
9 modules




Course 1B: Data collection for circularity assessment of biomass sector (WP3)  
9 modules



Course 2: Data processing and analysis for Sector-wide Circularity Assessment (WP2+3)  
9 modules



Deliverable 4.3  
Sector-Wide Circularity Assessment Method



Instruction sheet  
Descriptions, instructions, and tips & tricks for filling the single layers and sublayers

<https://cityloops.metabolismofcities.org/courses/>

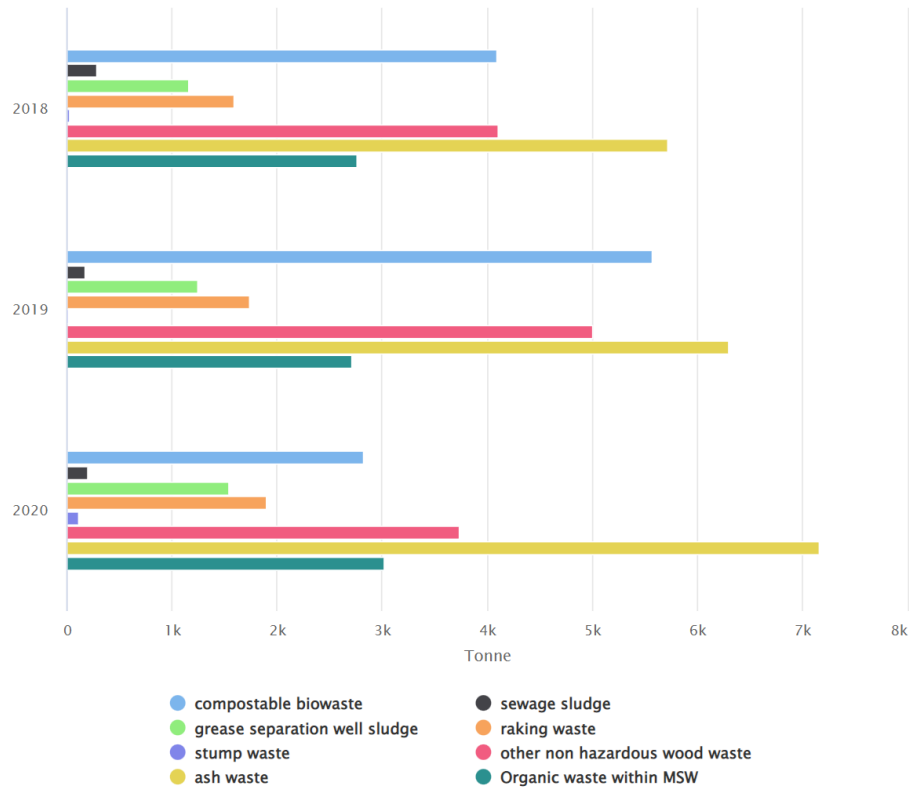
# CityLoops project



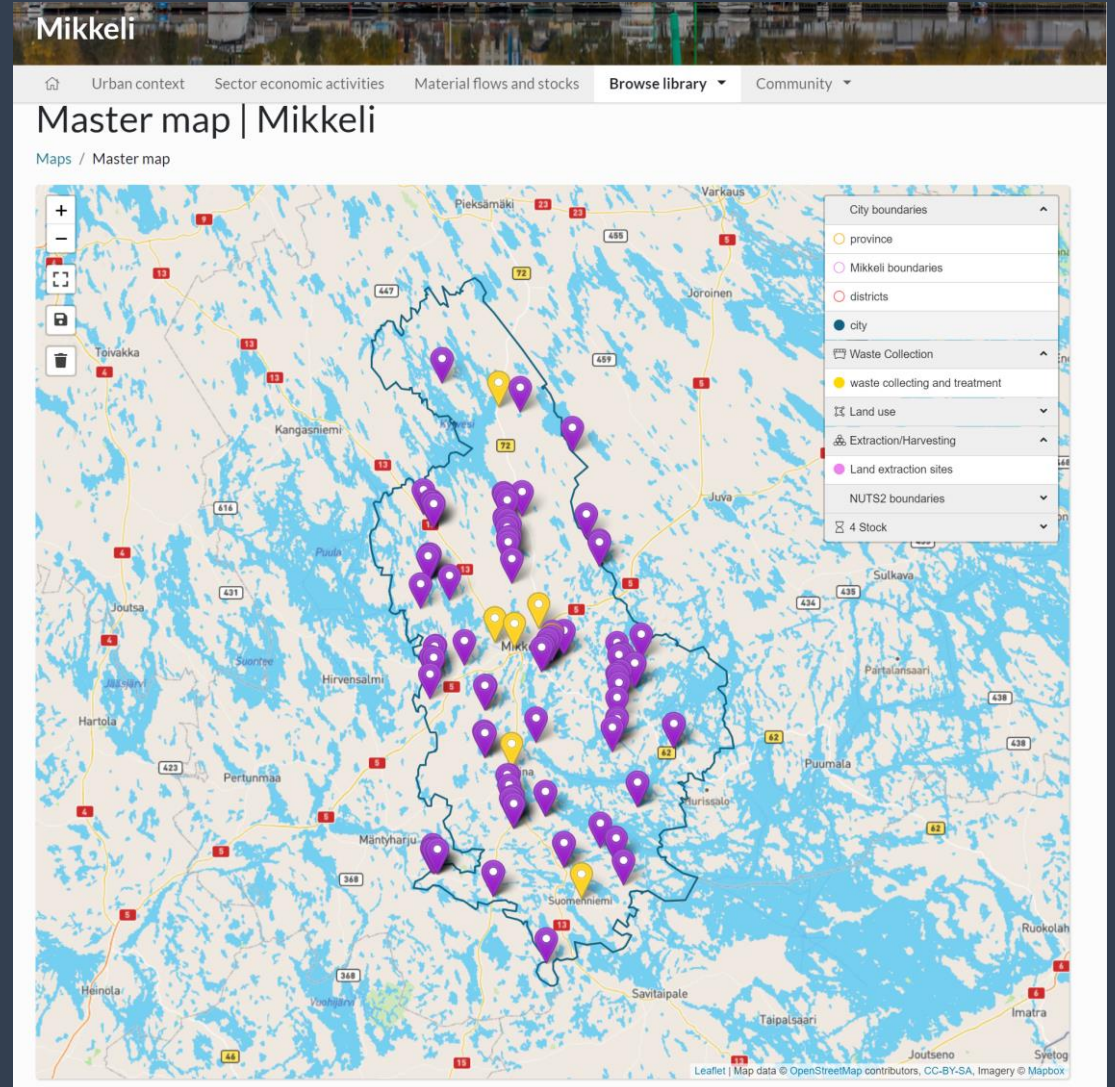
## Data

Bar Column Drilldown Line Area Pie Table

Various biomaterials by amount in waste collection in Mikkeli years 2018-2020



Generated by Metabolism of Cities



<https://cityloops.metabolismofcities.org/dashboards/mikkeli/flows-stocks/992132/>

# CityLoops project

SECTOR-WIDE CIRCULARITY

ASSESSMENT

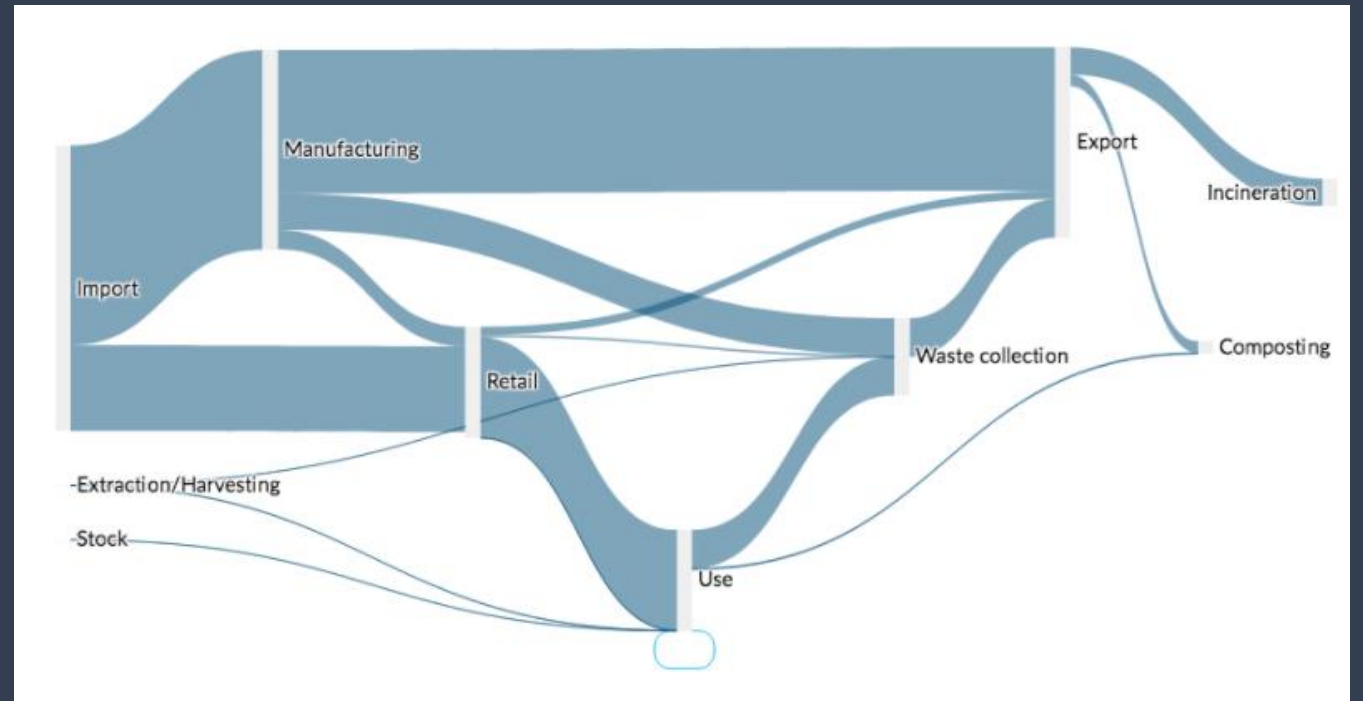
FOR THE BIOMASS SECTOR

PORTO



CITYLOOPS

METABOLISM  
OF CITIES



CityLoops project

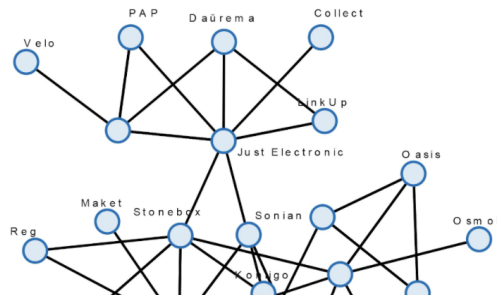
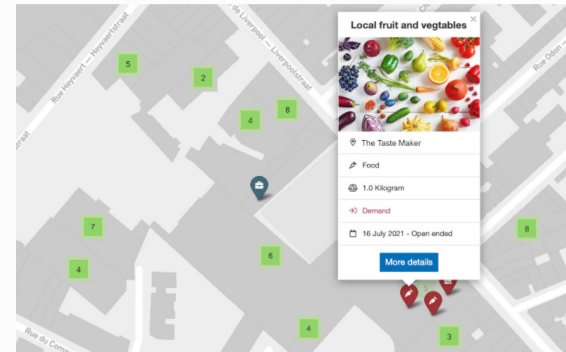


PlatformU is the essential digital tool for area managers to manage circular economy ambitions, improve industrial symbiosis and address local challenges.

[Sign Up](#)[Read More](#)

### Collect very different data, in one place

Area managers and coordinators of industrial and technology parks, are often weighed down in complexity. PlatformU helps to collect and visualise a range of geo-referenced data associated with the demand and supply of resources, technology, space and staff.



### Look for connections and symbiosis

By collecting data in one place, it is possible to look for opportunities to connect supply and demand. PlatformU provides visualisation tools to help show connections between organisations.

<https://platformu.org/>

# Urban / Industrial symbiosis

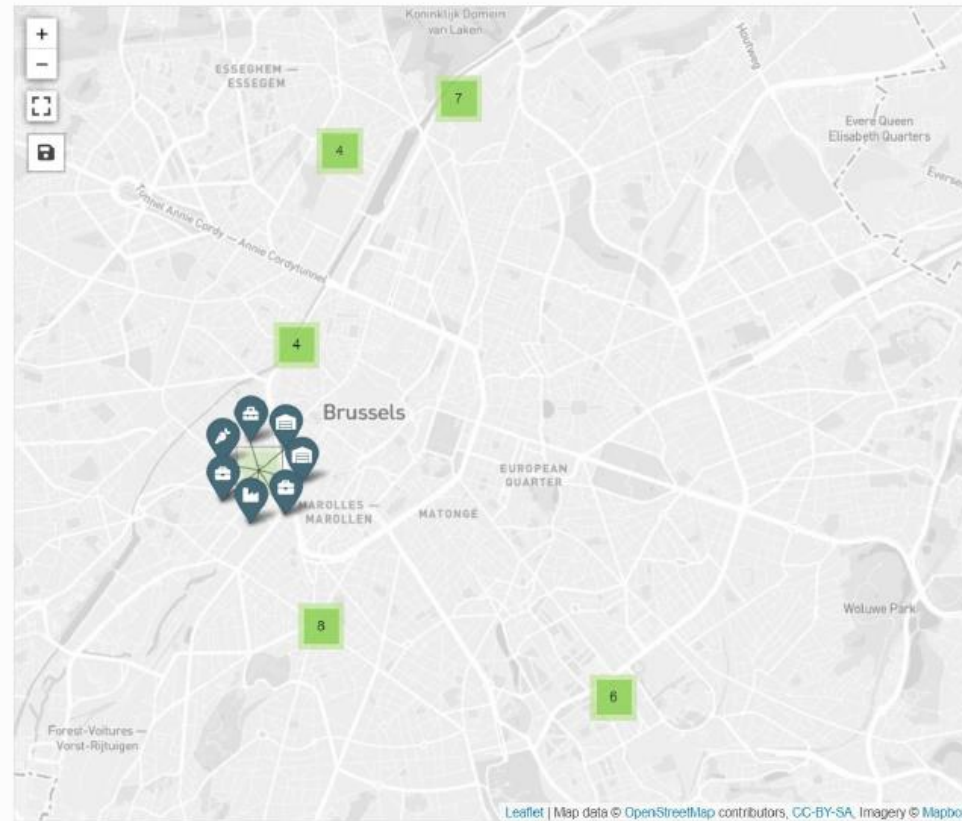


## Dashboard

Map Resources Space Staff Technology Latest

Layer All layers ▾ Type Any ▾ Date mm/dd/yyyy 📅

+ Add entry



36 entries found

Events space	100.0 Square metre
General management	1.0 Item
Events space	100.0 Hectare
Low-skilled technicians (no formal training)	1.0 Item
Food	2.0 Tonne
Events space	400.0 Square metre
Food	2.0 Tonne
Coloured bottles	1.0 Short ton
Events space	100.0 Square metre
Events space	200.0 Square metre
Electricity	3.0 Megawatt hour
Other	1.0 Item
Events space	100.0 Square metre
Light - goods (< 12 m³)	1.0 Item
Processing	1.0 Item

<https://platformu.org/>

<https://platformu.org/manager/dashboard/>

# Urban / Industrial symbiosis



## Data log

A log of all data entered into the system

### Resources

[Copy table](#) [CSV](#) [Excel](#) [PDF](#)

Search:

Status	Name	From	Until	Type	Quantity	Organisation
Demand	<a href="#">Computer boards</a>	Feb. 5, 2021		Electronics	11.0 item	<a href="#">Brasserie de La Source</a>
Demand	<a href="#">Windows</a>	Feb. 17, 2021		Glass	8.0 short ton	<a href="#">Brasserie de La Source</a>
Demand	<a href="#">Hops</a>	April 1, 2021	May 31, 2021	Organic matter	6.0 t	<a href="#">Abbaye de la Cambre</a>
Demand	<a href="#">Coloured bottles</a>	May 1, 2021		Glass	15000.0 kg	<a href="#">Brasserie Cantillon</a>
Demand	<a href="#">Electricity</a>	May 4, 2021		Energy	5.0 MWh	<a href="#">Abbaye de la Cambre</a>
Supply	<a href="#">Food</a>	Jan. 1, 2019		Organic matter	15.0 t	<a href="#">En Stoemelings</a>
Supply	<a href="#">Food</a>	Jan. 1, 2019	Dec. 31, 2019	Organic matter	15.0 t	<a href="#">Abbaye de la Cambre</a>
Supply	<a href="#">Food</a>	Jan. 1, 2019		Organic matter	4.0 t	<a href="#">Brussels Beer Project</a>
Supply	<a href="#">Food</a>	Jan. 1, 2019		Organic matter	0.5 t	<a href="#">OWA</a>
Supply	<a href="#">Food</a>	Jan. 1, 2019		Organic matter	20.0 t	<a href="#">Belgoobeer / Dikkenek</a>

Showing 1 to 10 of 22 entries

Previous **1** 2 3 Next

### Space

[Copy table](#) [CSV](#) [Excel](#) [PDF](#)

Search:

Status	Name	From	Until	Quantity	Organisation
Demand	<a href="#">Events space</a>	Feb. 8, 2021	July 3, 2021	200.0 m²	<a href="#">Beerstorming</a>
Demand	<a href="#">Storage &amp; logistics space</a>	March 3, 2021	April 11, 2023	1000.0 m²	<a href="#">Brussels Beer Project</a>
Supply	<a href="#">Events space</a>	Dec. 1, 2018	March 4, 2022	100.0 m²	<a href="#">Abbaye de la Cambre</a>

<https://platformu.org/>

# Urban / Industrial symbiosis



CIRCULAR METABOLISM PODCAST



**PHILIPPE  
BIHOUIX**  
AREP

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EP.31



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RAWORTH**  
DEAL

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EP.30



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# Circular Metabolism Podcast





## Courses

Join one of our online courses to learn about urban metabolism, data collection, and data processing! Our courses are free of charge and all available under a Creative Commons BY license. You can start the course at any time, and do it at your own pace. However, we also periodically run curated courses, where you can join organised sessions and be part of a group working together on one of these courses under the supervision of an instructor. Keep an eye on our [news section](#) or social media (see links in our footer below) for more information.

If you are an educator, and you would like to integrate our online, open courses as part of your curriculum (or as an optional exercise for your students), then don't hesitate to [get in touch](#) with Metabolism of Cities.



### Urban Metabolism for Policy Makers

8 modules



### Metabolismo urbano y manejo de datos: Procesamiento de datos

9 modules



### Data and Urban Metabolism: Data Processing

6 modules



### Data and Urban Metabolism: Data Collection

10 modules



### Metabolismo urbano y manejo de datos: Recopilación de datos

10 modules



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