



Co-Creating Circular  
Resource Flows in Cities

constRuctive mEtabolic processes For materiaL fIOWs in  
urban and peri-urban environments across Europe

A REFLOW CASE STUDY

# TEACHING GUIDE: Is Berlin getting into hot (waste)water?

Data-driven solutions towards climate neutral heating in the  
city



*This project has received funding from the European Union's Horizon 2020  
research and innovation programme under grant agreement number 820937.*

# TEACHING GUIDE: Is Berlin getting into hot (waste)water?

Data-driven solutions towards climate neutral heating in the city



Figure 1: Photo by [Claudio Schwarz](#) on [Unsplash](#)

<b>Date</b>	15 December 2021
<b>Author(s)</b>	Erika Hayashi (CBS)

The information, documentation and figures in this report are written by the REFLOW project consortium under EC grant agreement number 820937 and do not necessarily reflect the views of the European Commission. The European Commission is not liable for any use that may be made of the information contained herein.



*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement number 820937.*

## Synopsis of the Case

This case is based on a real organisation that has carried out activities as part of the European Union Horizon 2020 project, REFLOW. The case is fictional but, inspired by real events that have occurred.

The protagonist of this case is the head of the Wastewater Heat Department at the water agency Berliner Wasserbetriebe (BWB). BWB is responsible to providing drinking water and wastewater treatment for the city of Berlin. These services and supplies are considered critical infrastructures, and any disruptions to their operations could cause a series of challenges and risks for the city and Germany as a whole. The case focuses on the dilemma of the head of the Wastewater Heat Department as they assess whether to release data on these critical infrastructures in the name of a greener and more circular and regenerative future.

The case is set 2.5 years into the 3-year timeline of the REFLOW project, centring around a solution that the Berlin pilot team has developed to harness the potential of wastewater heat as a climate-neutral source for the city through the power of data. BWB's R&D Department is a key member of the Berlin pilot team, where they have played an instrumental role in giving access to key data for the development of the solution, the Wastewater Heat Radar. As things were on the way to finalising the development of this solution, the Waste Heat Department, a department in BWB that were outside of the REFLOW project informed the Berlin pilot team that they need to put a halt to their solution. With the rising concern of critical infrastructure (in)security and the obligations for BWB to ensure that these supplies of water and wastewater services are not interrupted by threats or attacks, they needed to discuss the pros and cons of releasing this critical infrastructure data.

Students are asked to put themselves in the shoes of the head of the Wastewater Heat Department at BWB and to consider the question: should a stop be put on the release of wastewater heat potential data or risk the potential security threat to critical infrastructure in Berlin? Pros and cons are outlined in the case study including climate-neutral goals alongside the risks and vulnerabilities associated with publishing information and data on critical infrastructure.

## Target Group

The case is suitable for undergraduate and graduate levels in courses on strategic decision making, the energy transition and innovation, cybersecurity, and circular economy.

## Learning Objectives and Key Issues

The learning objectives of the case sets out for students to evaluate the dilemma through understanding the pros and cons in releasing critical infrastructure data for the sake of sustainability. After completion of the case, students should be able to understand the following:



- The potential of wastewater heat as a climate-neutral source of energy
- The importance of data in circular transitions, specifically for wastewater heat
- The challenges of handling critical infrastructure data and how this affects innovative technological solutions
- Arguing for or against a decision

The case also allows students to make their own assessment of the dilemma by analysing the pros and cons of releasing critical infrastructure data. Students also have the opportunity to come up with their own arguments for or against release of data in solving the dilemma. Furthermore, students are also challenged to understand and prioritise the stakes at play by making a decision that considers conflicting interests and circumstances.

Students can be asked to evaluate the replicability of this place-based solution and if this would be an issue or a reality in other contexts.

## Relevant Readings

- The REFLOW website contains articles written by the Berlin pilot team which highlight the challenge they are addressing and how they intend to solve this. See articles [here](#).
- Information on critical infrastructure protection in Germany: <https://www.bmi.bund.de/EN/topics/civil-protection/critical-infrastructure-protection/critical-infrastructure-protection-node.html>
- Rothrock, R. et al. (2017) *The Board's Role in Managing Cybersecurity Risks*. MIT Sloan Management Review. Winter 2018 Issues. <https://sloanreview.mit.edu/article/the-boards-role-in-managing-cybersecurity-risks/>.

## Teaching Strategy

The case should take approximately 90 minutes to present, discuss, and solve. Students (individually or in a group) can discuss the dilemma.

### Strategy 1

Start by introducing the case to the students and bring up the key points of the case. Provide the students with discussion questions which they can use to facilitate their group discussion.

You can place the students in 2 groups (or more depending on the class size) where one side takes the “yes” side and the other takes the “no” side. The students in each of their stances on the dilemma’s answer can work together to formulate arguments for their reasoning.

The students can either be placed in groups or can self-assign themselves to the stances which they take. If they do self-assign themselves, you should ensure that there is still an even balance in the



groups. Together in their groups they can come up with key points which support their stance and possible rebuttals against the other side.

## Strategy 2

Organise the students into smaller groups (5 to 6 students) where they can discuss the pros and cons and different viewpoints that the dilemma touches upon. Have each student group go over discussion questions and allow them to discuss internally for 30 minutes. Tell the students that they should have a consensus on the decision after this 30 minutes and how and why they came to this end result. In plenary, have the student groups present their decision to the class. If there is time, you can group the student groups based on their stances and allow for a plenary discussion as a whole based on their decisions.

## Questions for Discussion

1. Why has wastewater heat not been exploited to its full potential in Berlin? And how is the Berlin pilot team addressing this?
2. What are the broader contextual goals for the City of Berlin in relation to climate?
3. What are the goals of the Berlin pilot team?
4. What is critical infrastructure and what is its importance in society? Why are there potential issues with publishing data?
5. In the shoes of the BWB Wastewater Department Head, what are the pros and cons that they are balancing?

## Multimedia

### REFLOW Berlin Pilot YouTube Video: Introducing the Topic of Wastewater Heat

<https://www.youtube.com/watch?v=hXMHDDbAwHY&t=13s>

### The REFLOW Berlin Pilot YouTube Video: Explaining the Wastewater Heat Radar

[https://www.youtube.com/watch?v=6\\_2VUhQoIMo](https://www.youtube.com/watch?v=6_2VUhQoIMo)

