

MEMPHIS

Methodology to evaluate and map the potential of waste heat from industry, service sector and sewage water by using internationally available open data

5th International Conference on Smart Energy Systems

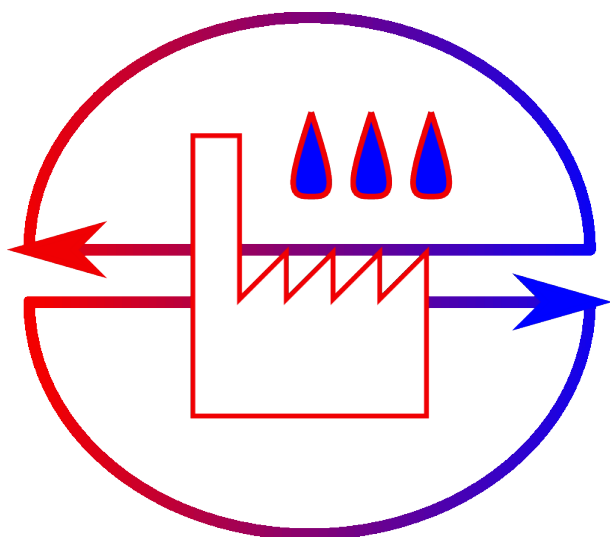
11. September 2019, Copenhagen

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MEMPHIS' Scope



Analyse **low-grade and spatially distributed heat potentials**

- from **small and medium industries (SMI)** and the service sector
- from **sewage water** systems.

Project time: 2017 – 2019

MEMPHIS Partners:



Content

- **Motivation and Objectives**
- **Key Achievements**
- **Waste Heat Explorer**
- **Example Application**

Motivation

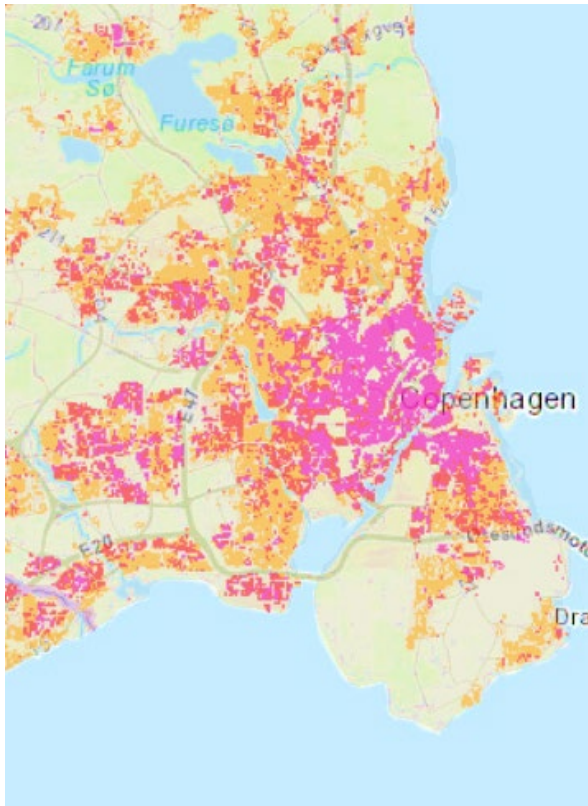


Fig. Heat Demand of Copenhagen
(Peta 4.3)

Decarbonisation of cities

- Covering the heat demand with carbon-neutral heat sources
- Various heat sources are available

Examples for barriers:

- Technical: temperature level
- Economic: conversion costs, legal framework
- Knowledge: **under-estimated potential**

Objectives

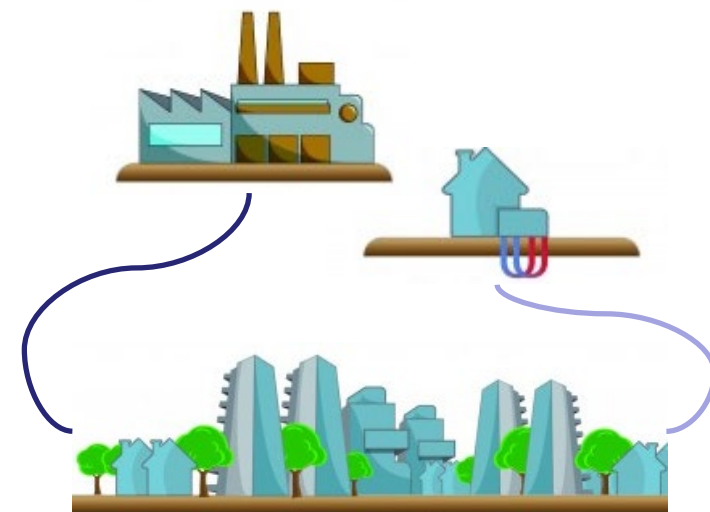
Open data methodology for wider integration of low-grade waste heat sources

- Focus on the city district level
- Easy to adapt for various types of cities
- District Heating Systems under changing boundary systems

Assess waste heat potential from industry and service sector

Assess heat potential from sewage water

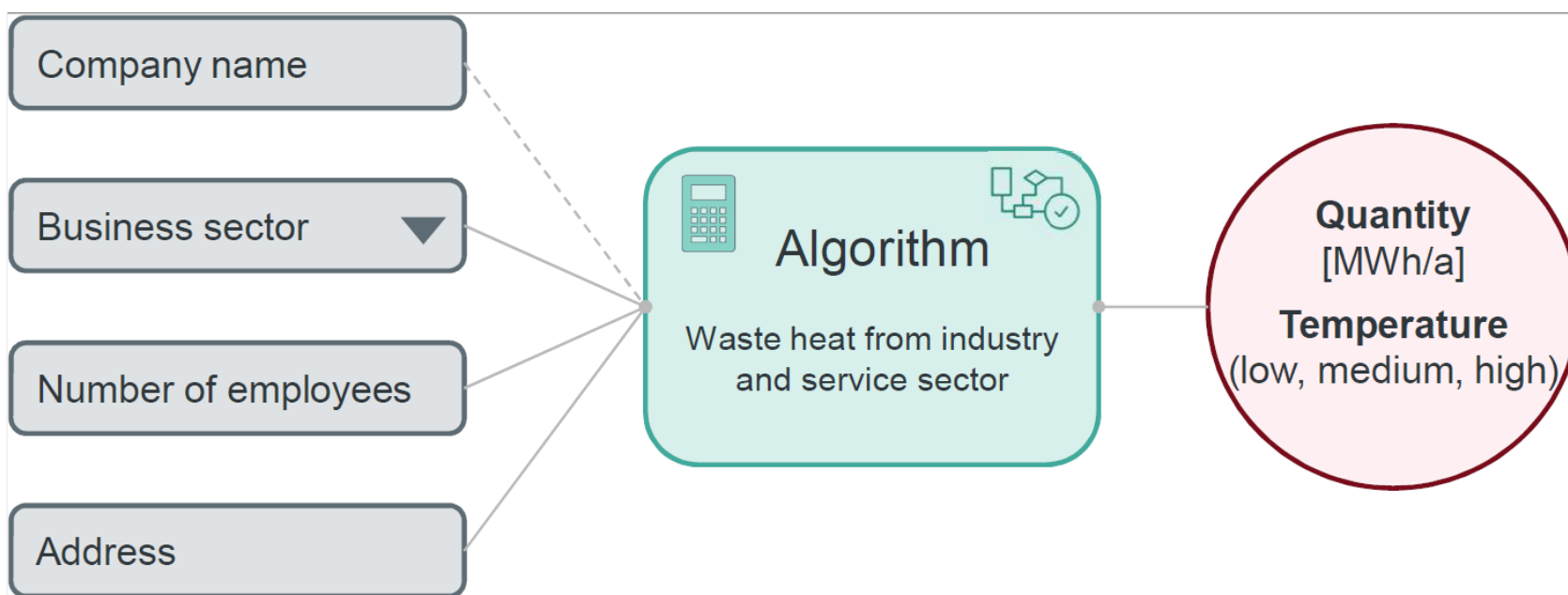
Apply to three representative cities in Germany, Austria and the United Kingdom



Euroheat&Power

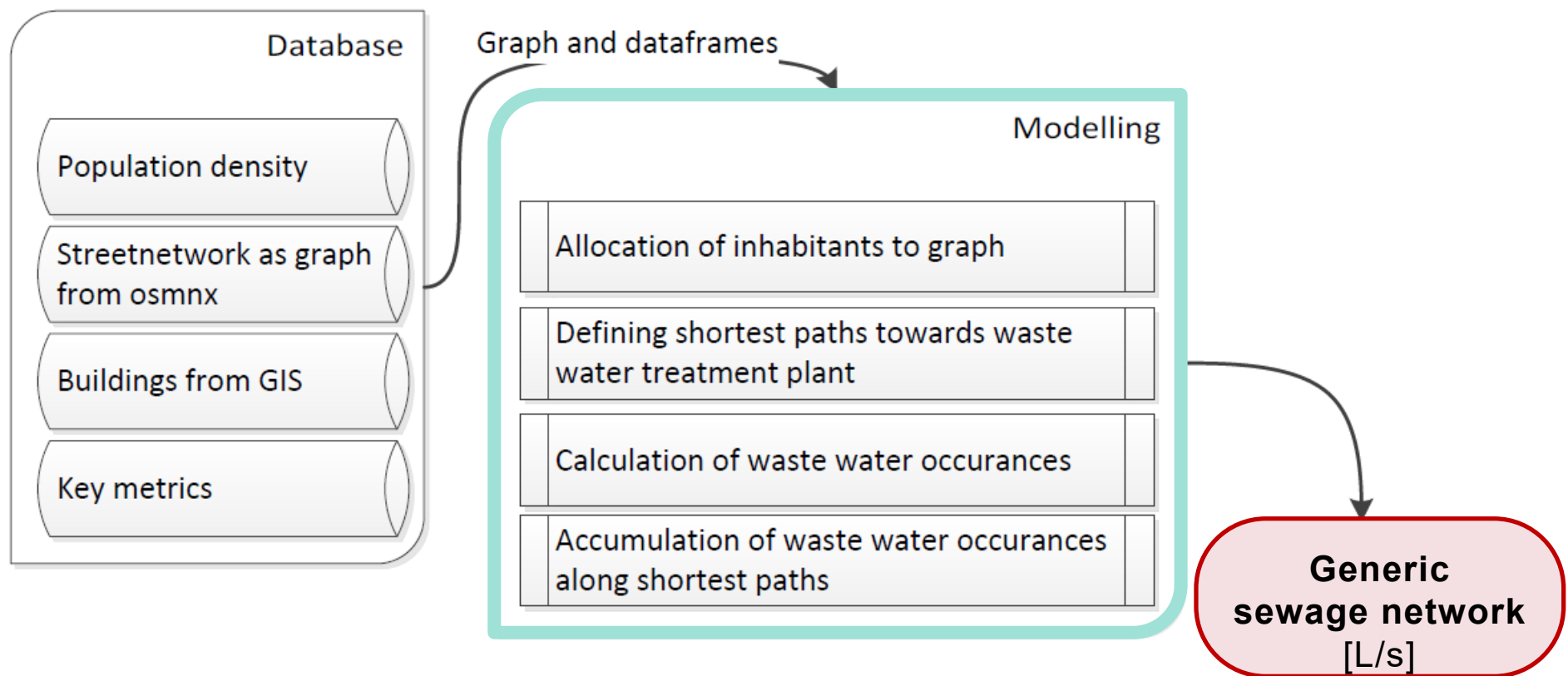
Key achievements

Generic Methodology for Assessing Waste Heat Potentials from Industry and Service Sector



Key achievements

Generic Methodology for Assessing Sewage Heat Potentials

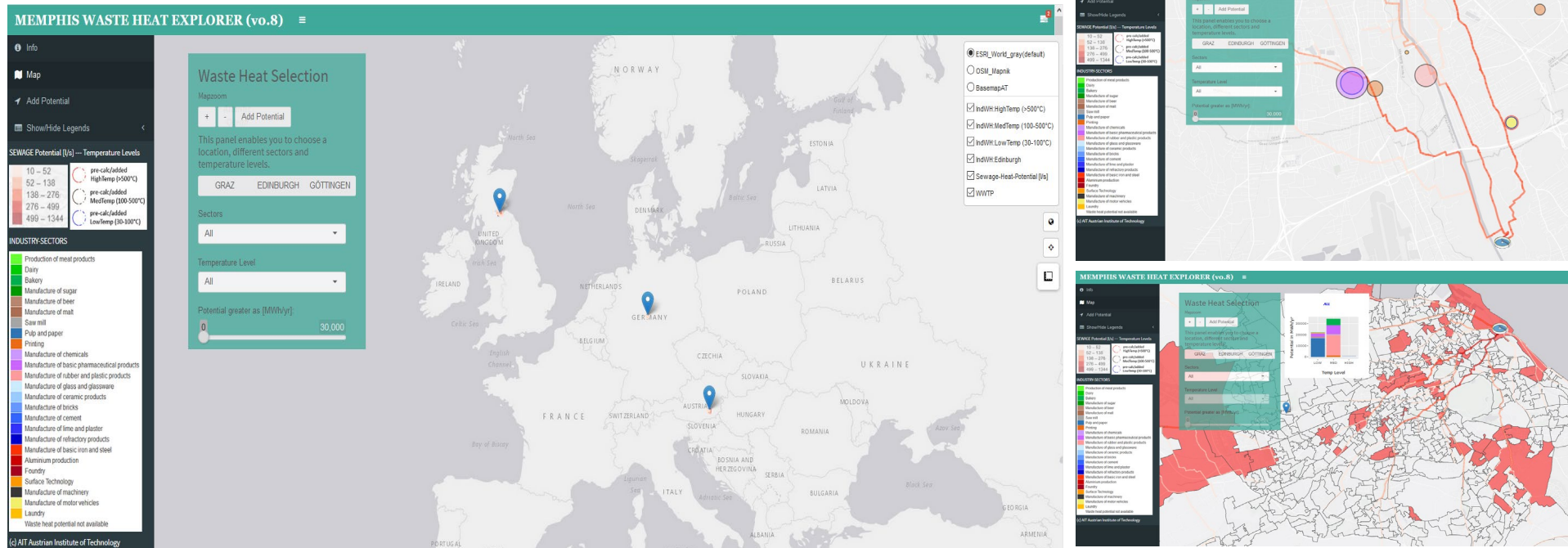


Key achievements

MEMPHIS – WASTE HEAT EXPLORER v0.8

<http://cities.ait.ac.at/uilab/udb/home/memphis/>

Showing the theoretical potential of the waste heat from business sector and from sewage water



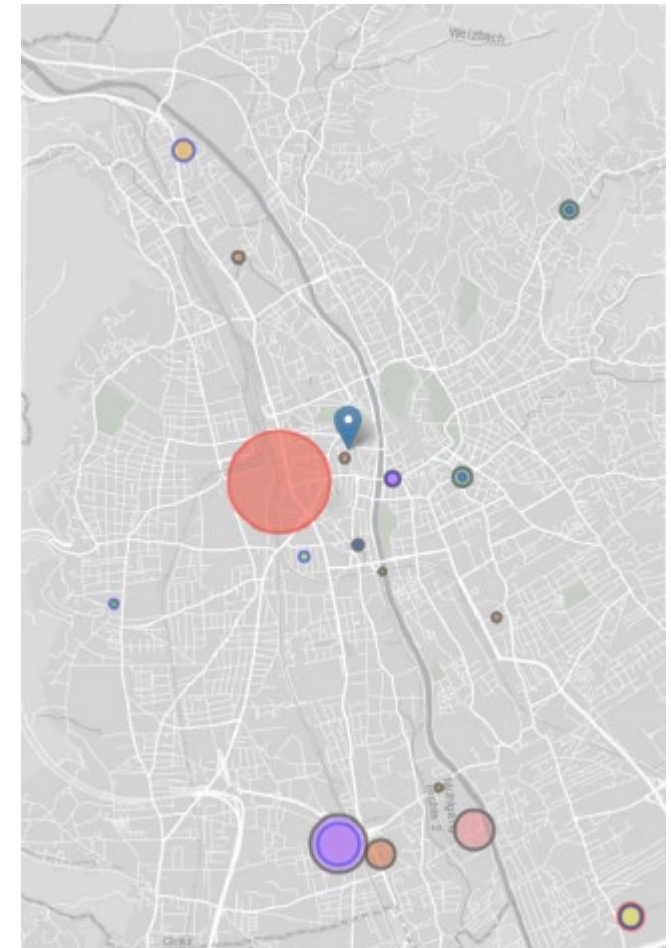
Example 1: Waste Heat Potential from Industry Sector in Graz, Austria

17 waste heat sources were identified

Steelworks and pharma offers largest potential

Additional potential from business sectors “Laundry”, “Bakery” and “Printing” with low temperature levels

Proximity to the existing heating network is advantageous



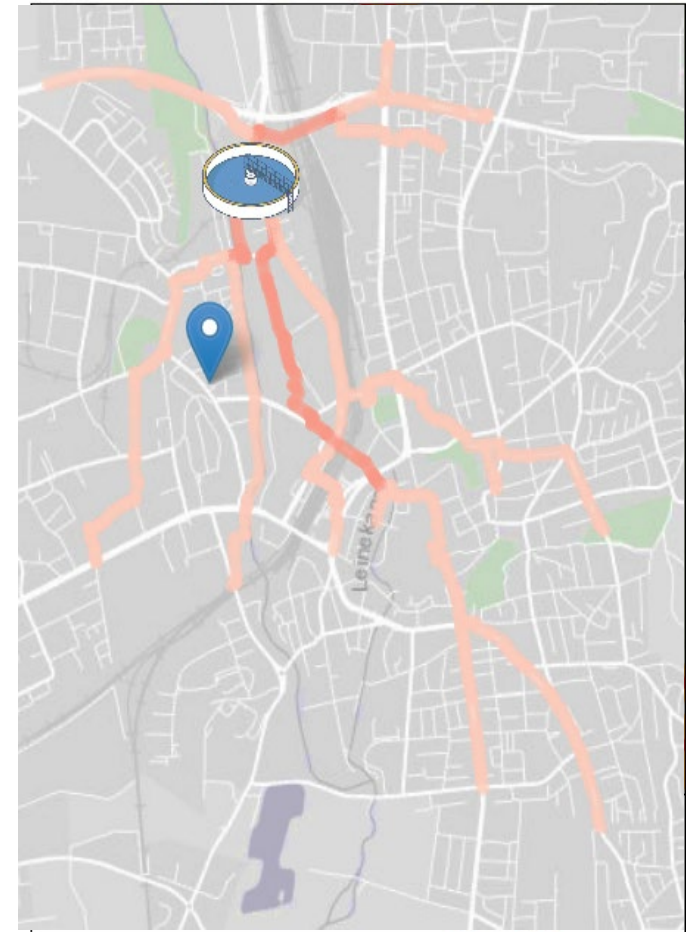
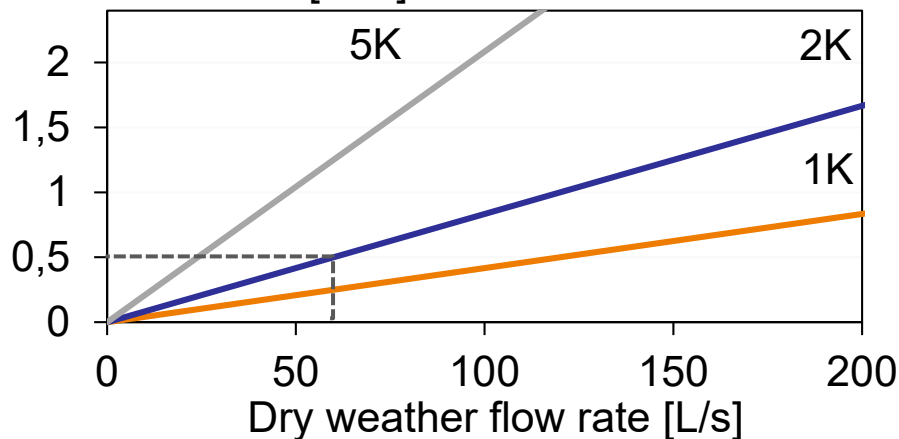
Example 2: Waste Heat Potential from Sewage Water in Göttingen, Germany

Economic feasible exploitation to be considered for

- Sewage pipes DN 800 – 2000
- Flow rate >10 L/s
- Temp. Gradient 1 - 5 K

Viable locations of the sewer network are near DHS/ heat demand

Thermal Potential [MW]



Conclusion

Market

- Technologies to utilize waste heat at all temperature levels are state of the art
- Incentives and subsidies are rare
- Successful business models involve multiple stakeholders and rely upon increased collaboration

Methodology

- The MEMPHIS Waste Heat Explorer provides information of low-temperature waste heat potential on the city level.
- Quality of results highly depends on the quality of data
- Methodology depends on few data sets, which are mostly free and open available. It is easy to transfer to other countries.

MEMPHIS Final Report

Available soon
@iea-dhc.org

MEMPHIS – WASTE HEAT EXPLORER v0.8
<http://cities.ait.ac.at/uilab/udb/home/memphis/>

Website
<http://blogs.hawk-hhg.de/memphis/>



International Energy Agency Technology Collaboration Programme on
District Heating and Cooling including Combined Heat and Power

Annex XII final report

MEMPHIS
Methodology to Evaluate and Map the Potential of Waste Heat from Industry, Service
Sector and Sewage Water by Using Internationally Available Open Data

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Thank you for your attention!

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