Spatio-temporal characterisation of electricity consumption: case of Switzerland

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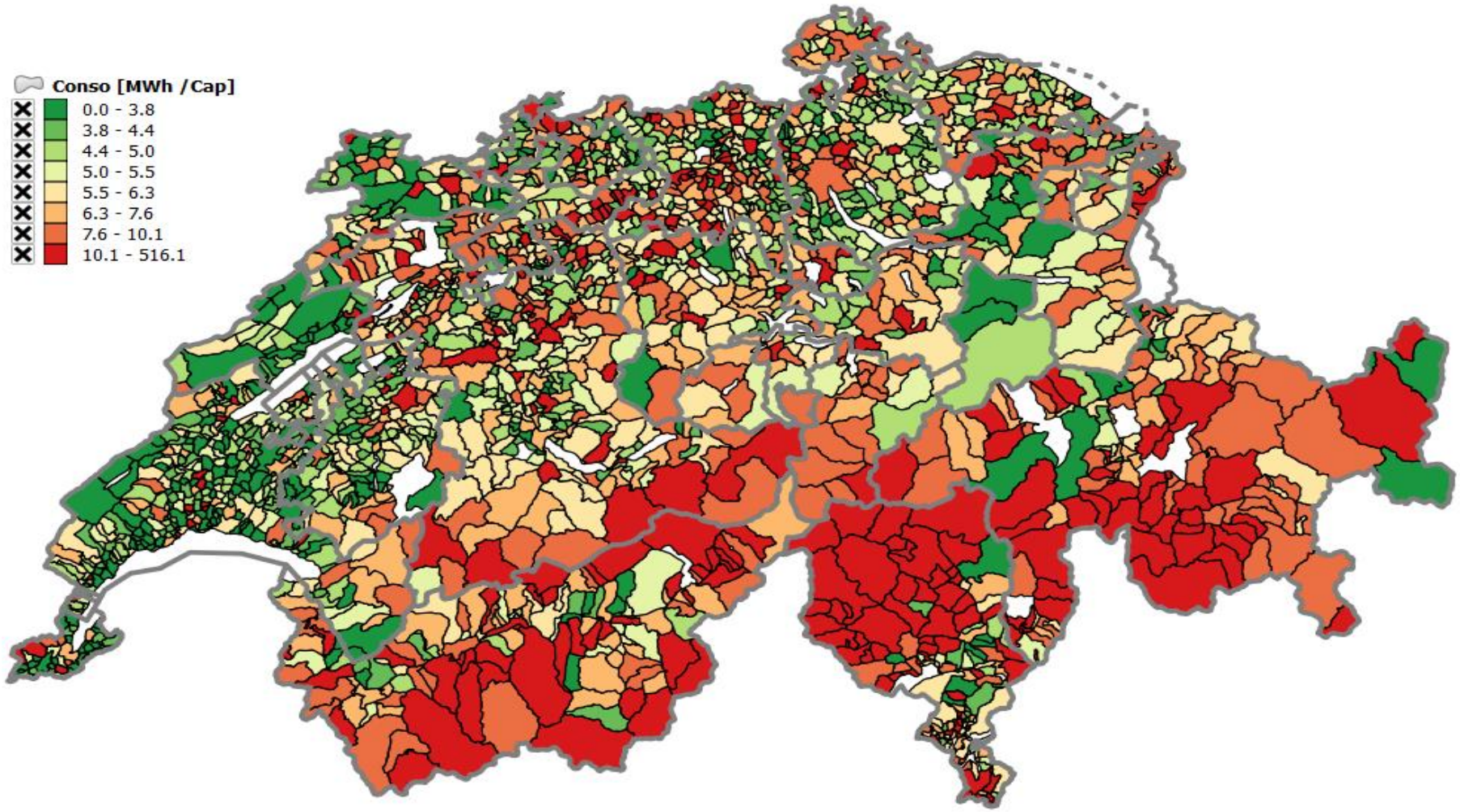
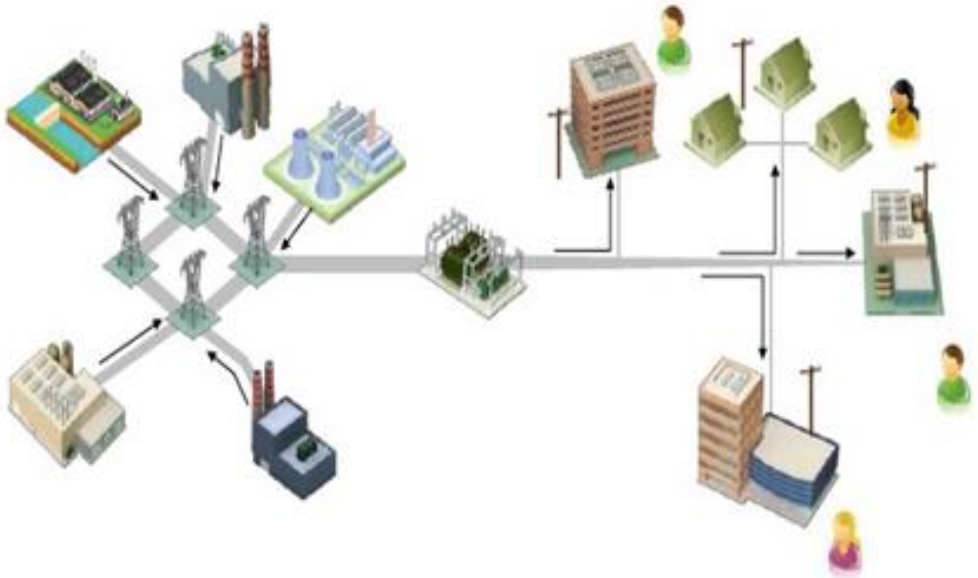
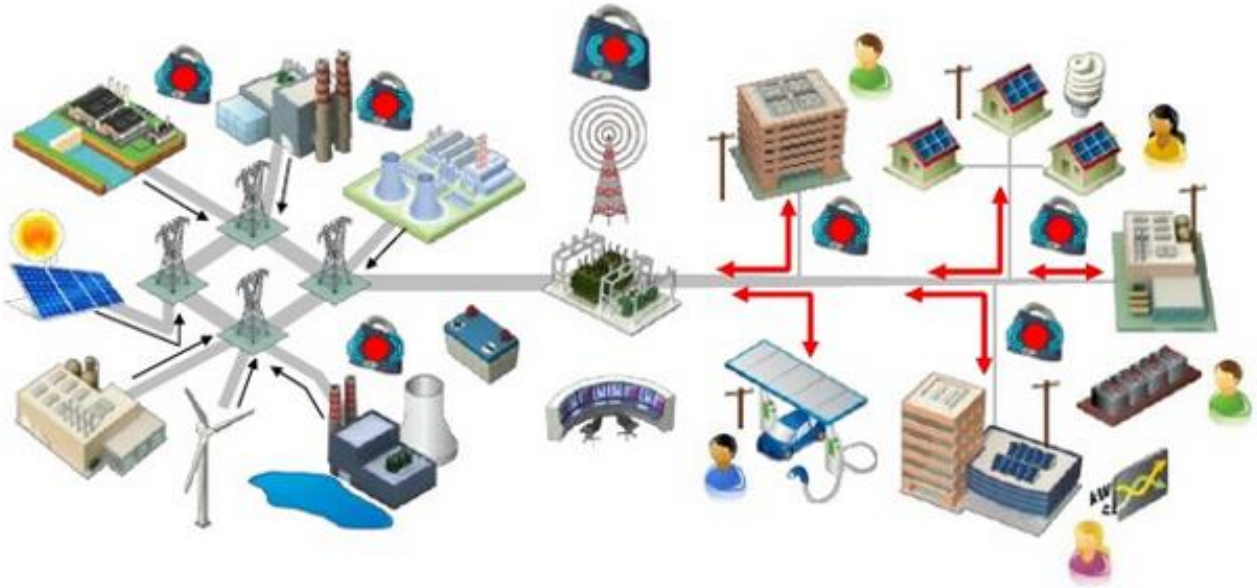
Spatio-temporal characterisation of electricity consumption



Role of Big Data & Spatio-temporal data



Central generation
One way flow
Passive consumers



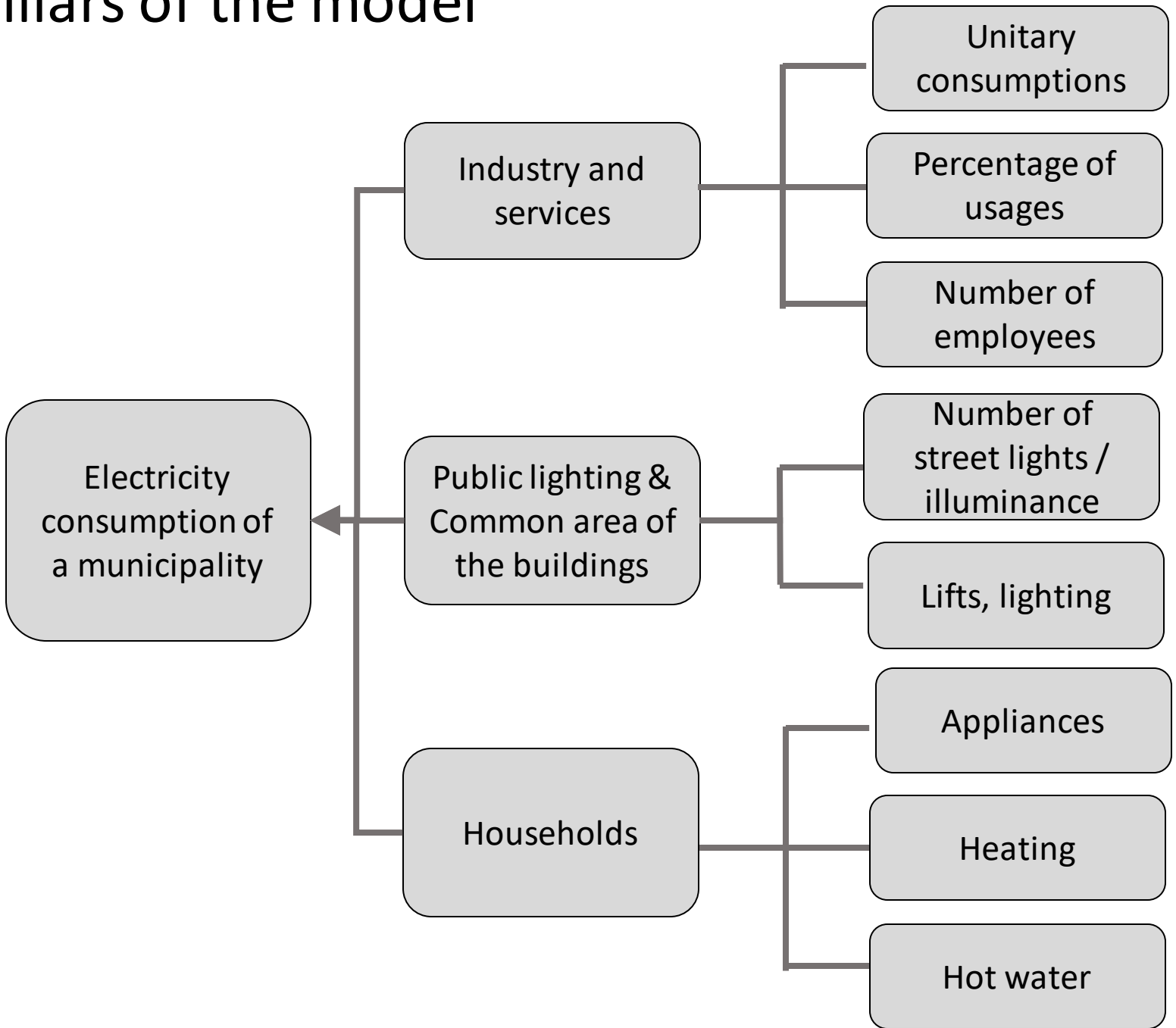
Distributed generation & Storage
Two-way power flow

Motivation

- Decentralised energy systems
- Intermittent future renewable energy resources
- Smart meters / digitalisation

Aim: To develop a bottom-up model of geo-spatial and temporal electricity consumption to improve the understanding of the demand side management potential (energy efficiency programmes / demand response)

Pillars of the model



Data collection

- Datasets are the first challenges.
- More than 20 datasets & measurements used to develop the sub-models and models.
- Barriers:

    1- Unavailable data

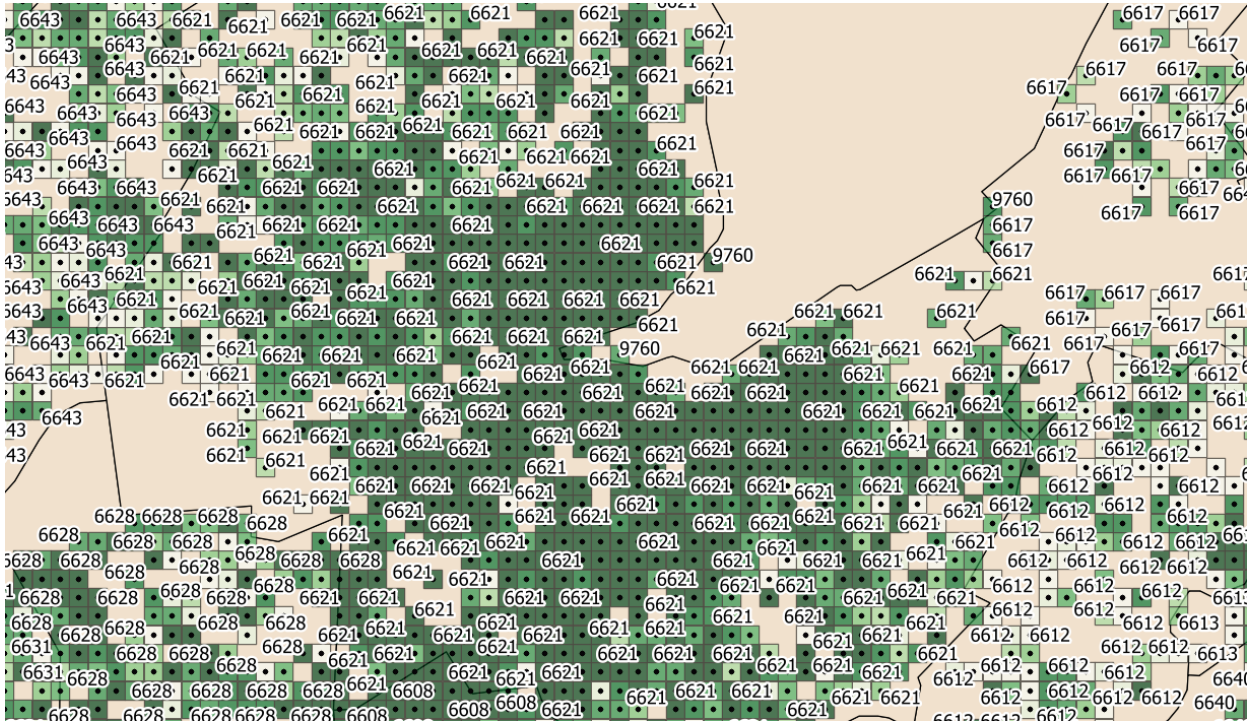
    2- Available data but unwilling to share.

    3- Available data: BIG DATA (computational loads) -> knowledge

METHODS / RECOMMENDATIONS

- Per hectare: number of employees and per sector code
- Requires a matching pixel → municipality
- Computational skills and softwares.
- Lack of expertise & time required

Import of file in database → Spatial join pixel → municipality (99,5% match) → Import of join result into database → Export statistics per municipality

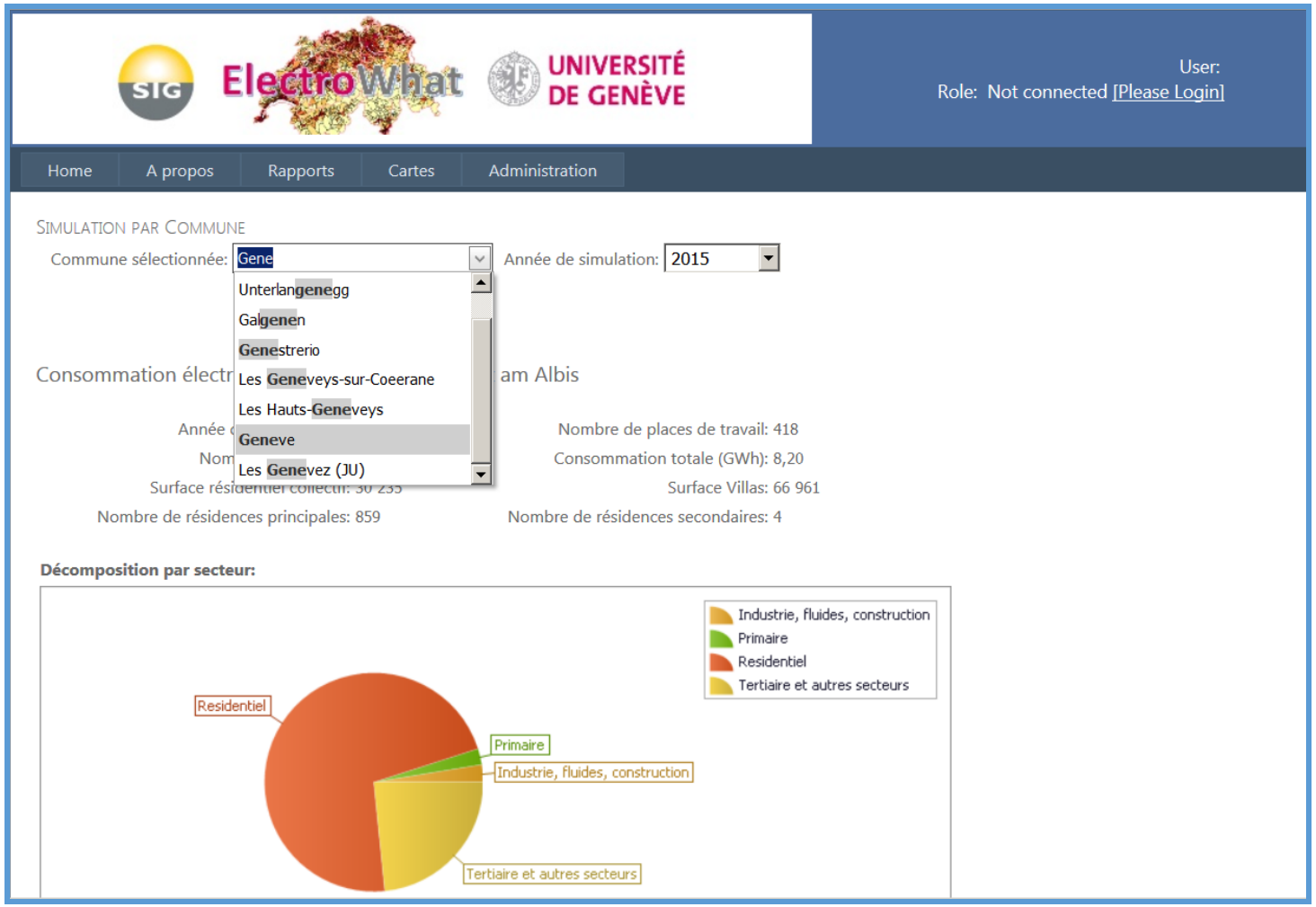


Collaboration with the institutions & utility

- Utility company: SIG
  - → Provide measured data of Service & Industrial.
  - → HVAC systems.
  - → Accurate measurements of public lightings.

- Government & canton institutions:
  - → Audits
  - → Feedback

Platform -> OpenAccess/Confidential



Interaction between

- DNOs
- Energy suppliers
- Researchers

www.electrowhat.ch

What learned & next?

- Challenging as research & organisation
- Protocols: formalizing data collection, collaboration within and between governments

THANK YOU!

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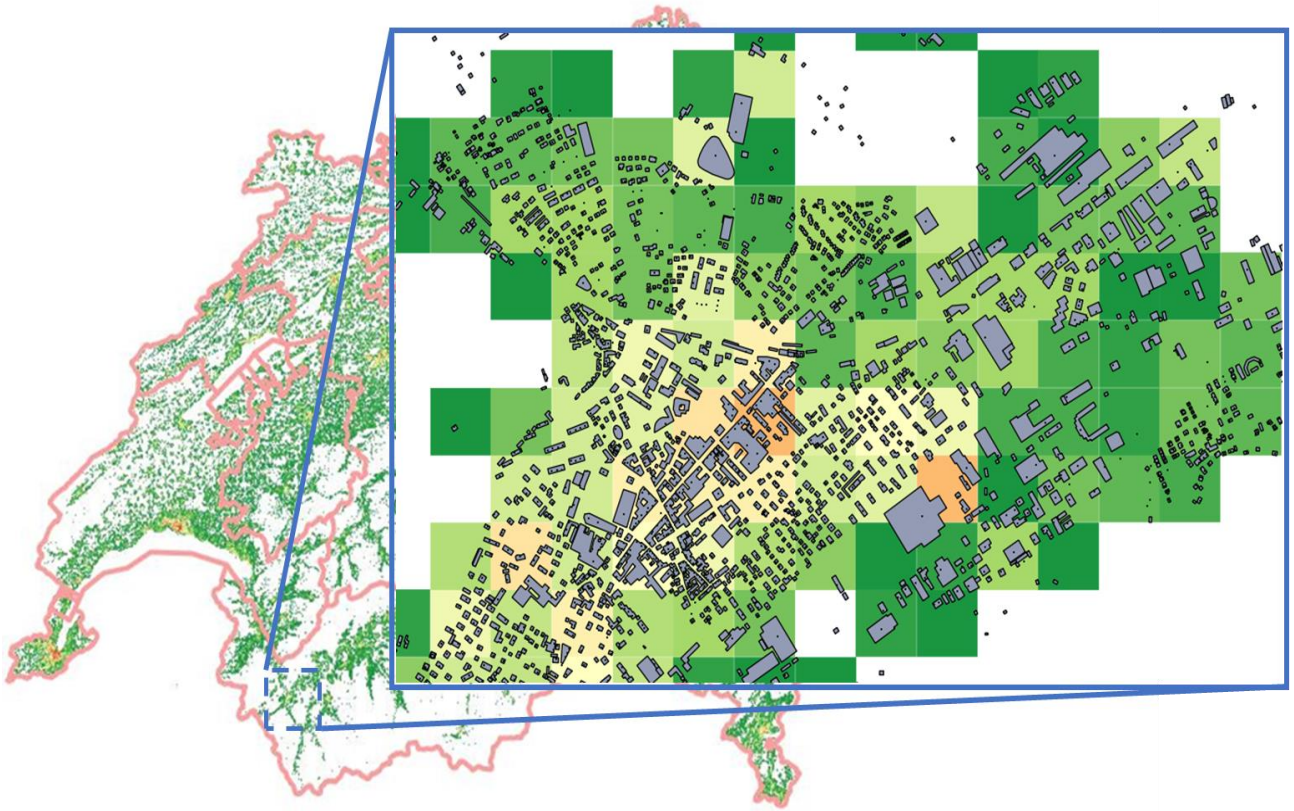
HEATING DEMAND



Pixel matching of:

- Building stock data
- Dwelling area
- Temperature readings

Computational skills and softwares.

Lack of expertise & time required