DESENT: Smart decision support system for urban energy and transportation

Intermediate results of
the project DESENT

Thomas Nacht

Real Corp 2018,
04.04 – 06.04.2018, Vienna/Austria

Agenda

- Introducing the project DESENT
- Methodology and Data Acquisition
- Smart Decision Support System
- First preliminary results for the city of Weiz
- Conclusion and outlook

Project Description

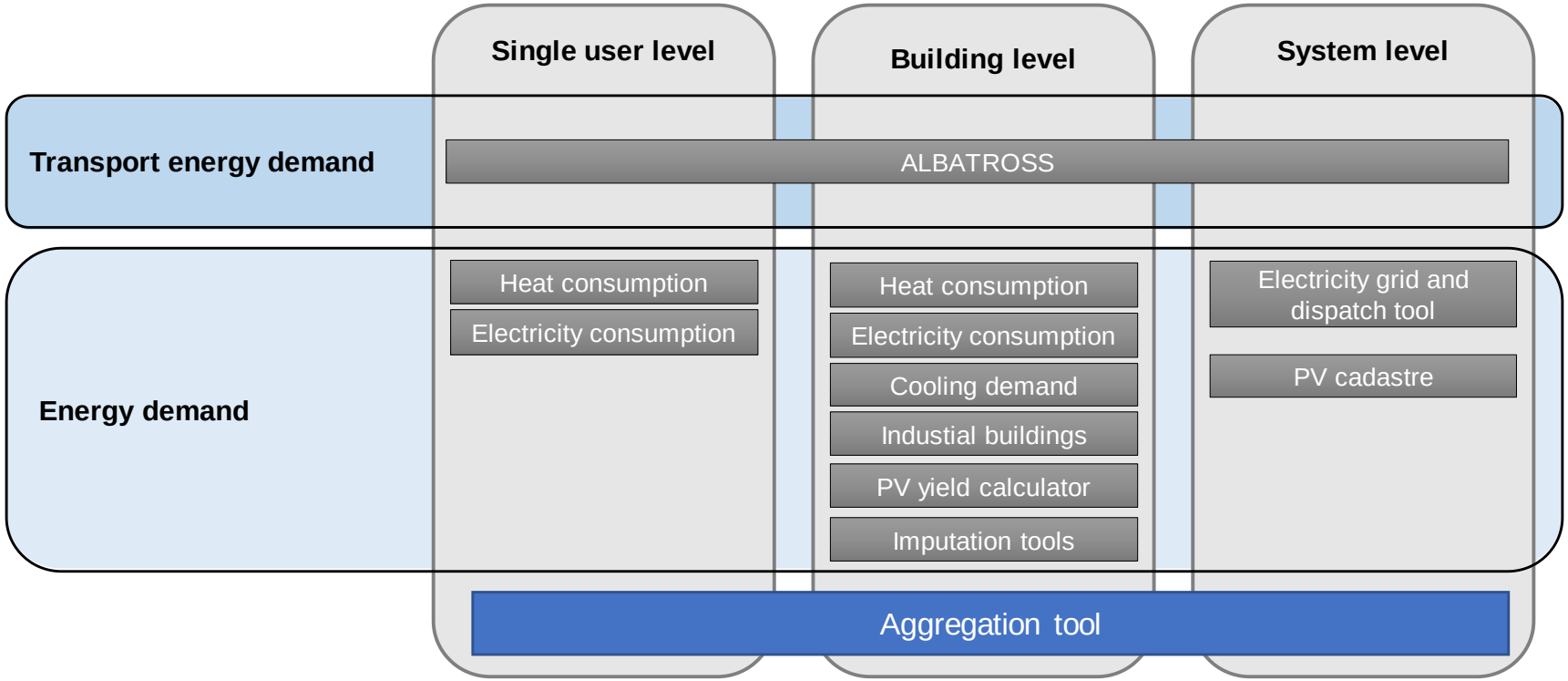
- **Start**: 25.03.2016 **Ende**: 24.03.2019
- **Duration**: 36 months
- **Funding scheme**: ERA-NET Cofund Smart Cities and Communities
- **Consortium**: 8 partners
  - Eindhoven University of Technology (Lead partner)
  - 4ward Energy Research GmbH
  - SINTEF Energi AS
  - Reiterer & Scherling GmbH
  - City of Weiz
  - Weizer Energie Innovations-Zentrum GmbH
  - City of Helmond
  - City of Steijnker

The project is operated within the framework of JPI Urban Europe on behalf of the Federal Ministry for Transport, Innovation and Technology (BMVIT) and with support from the European Union's Horizon 2020 research and innovation programme.

Project goals

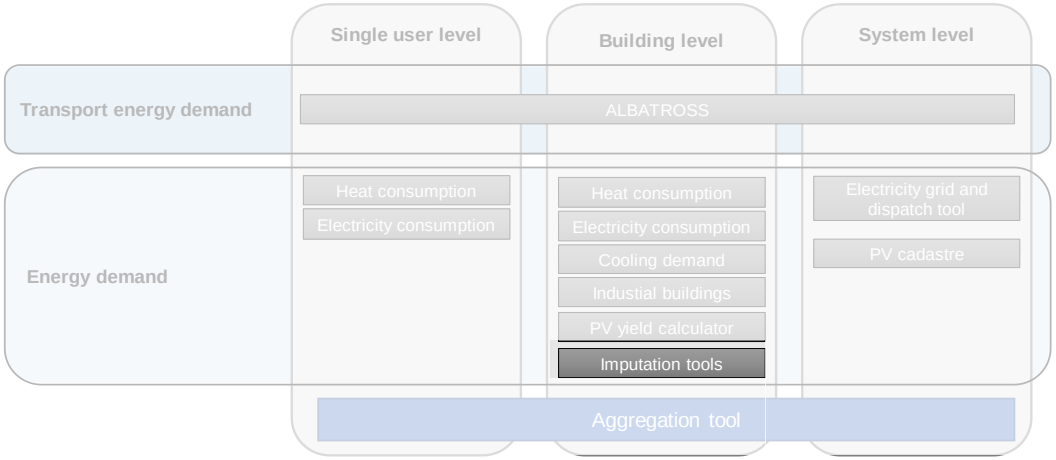
- Models for building energy and transport energy prediction
- Integrated framework for building energy simulation at district level
- Reduce uncertainties concerning future energy demand
- Enable energy infrastructure / service provision decisions
- Develop enhanced decision support systems
- Investigate the effects of new products and services in transport and energy demand
- Demonstration in case studies of the 3 demonstration cities

Basic-Models and Tools I



- Model structure is subject to constant changes

Basic-Models and Tools I



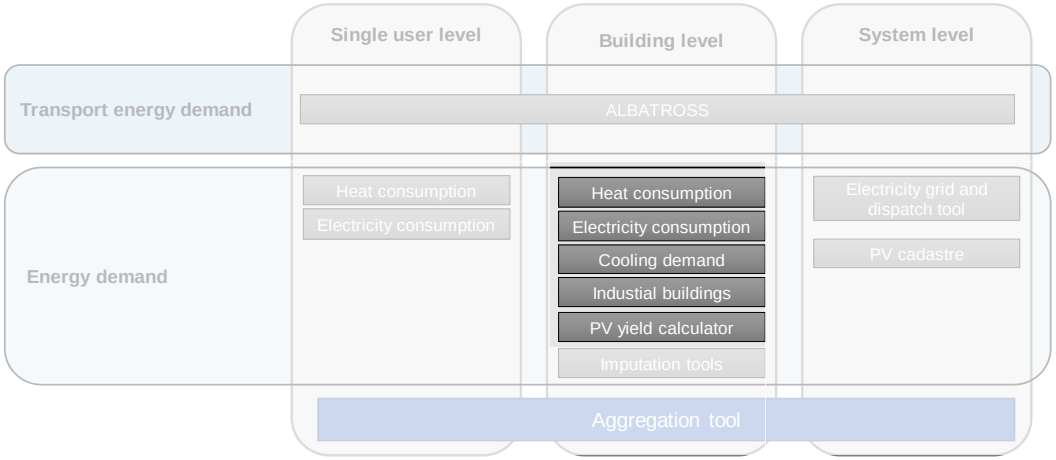
Tools:

- Identify missing data points
- Fill missing data with statistical values
  - National/regional statistical values
  - Actual data of the region considered

Data:

- Gebäude- und Wohnungsregister (GWR)
- Survey
- Statistical Data
- Geo-referencing

Basic-Models and Tools II



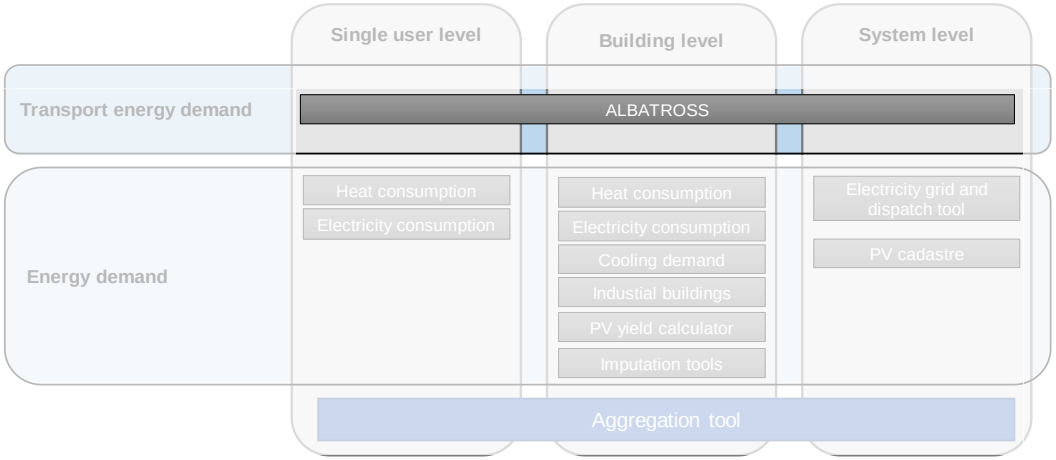
Tools:

- Calculate energy values
  - for each building
  - using available data
  - calculate effects of changed parameters
- Annual and ¼ hour values

Data:

- Standardised load profiles
- Statistical Data
- Real (Time) Data

Basic-Models and Tools III



Tools:

TU/e

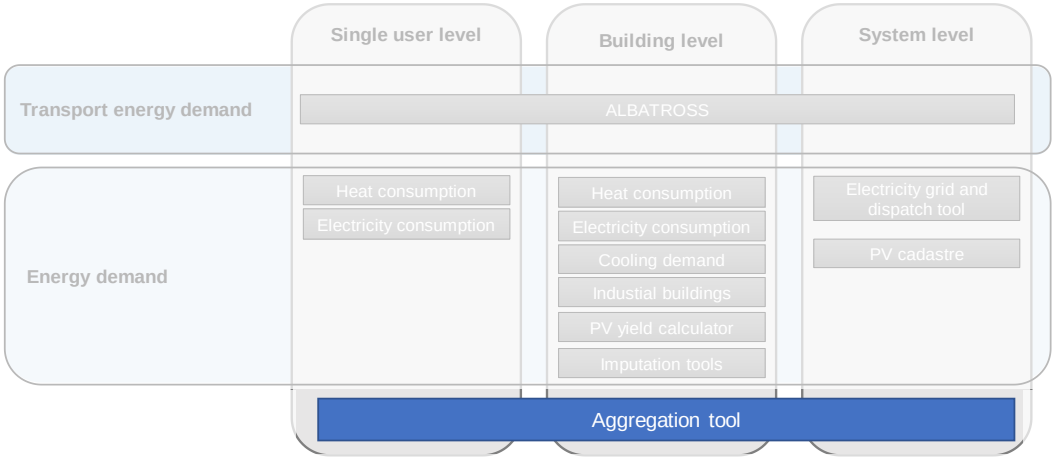
- Simulate transport movement behaviour:
  - Effects of vehicle type change
  - Calculate transport energy demand and emissions
  - Spatial distribution and allocation

Data:

Weiz | Innovationszentrum W.E.I.Z. | TU/e | SINTEF

- Mobility Questionnaire
- Road and network data
- GPS-tracking
- Mobile-App

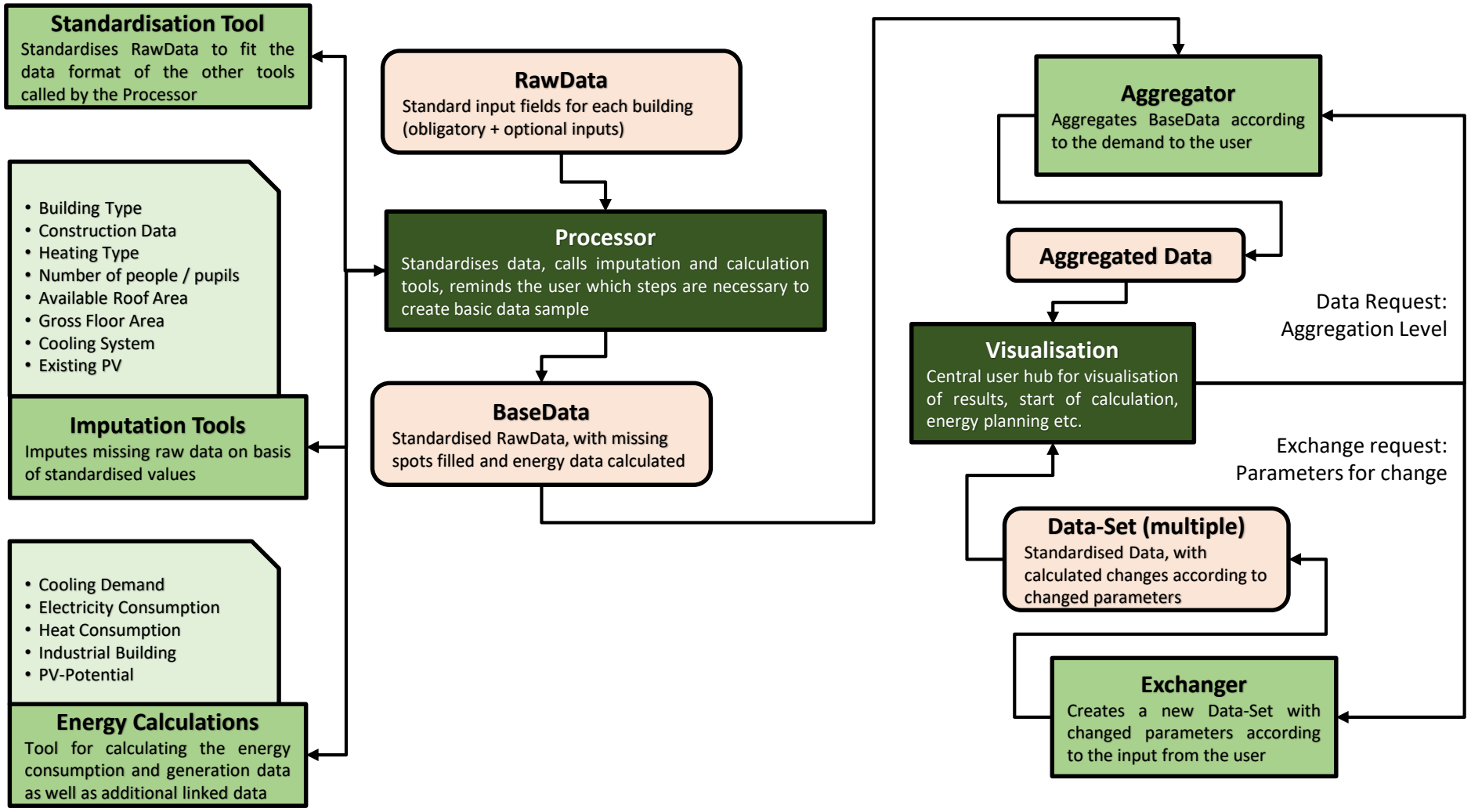
Basic-Models and Tools IV



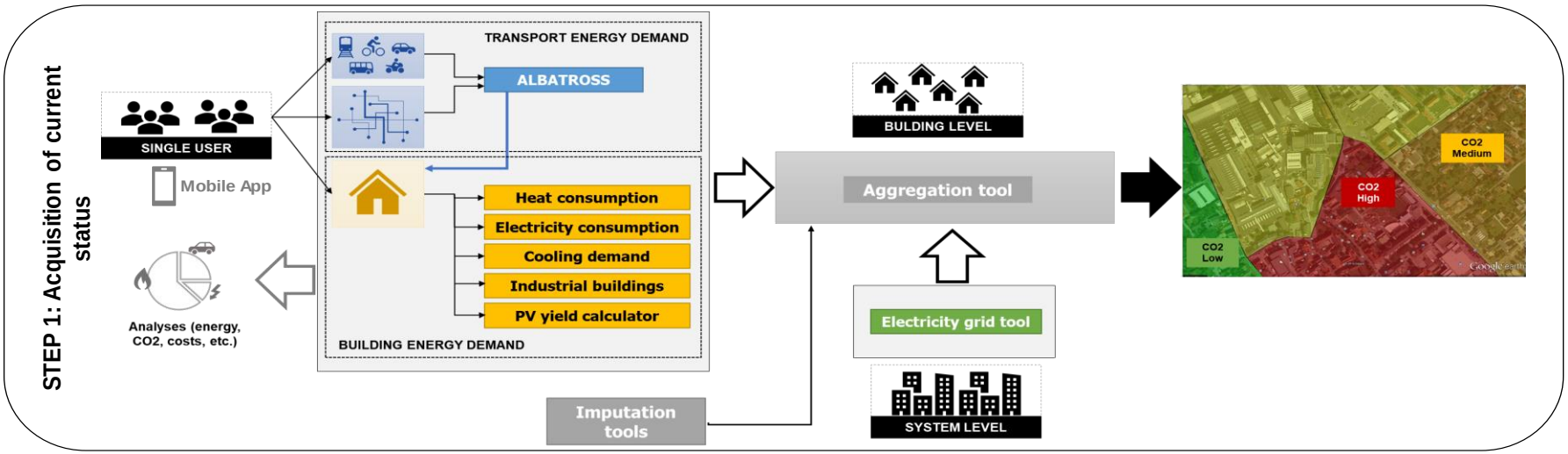
Tools:

- Aggregate Results on 4 different resolution levels
- Visualise Data
- Create basis for analyzation of:
  - Demand / System changes
  - Technology changes
  - Service changes

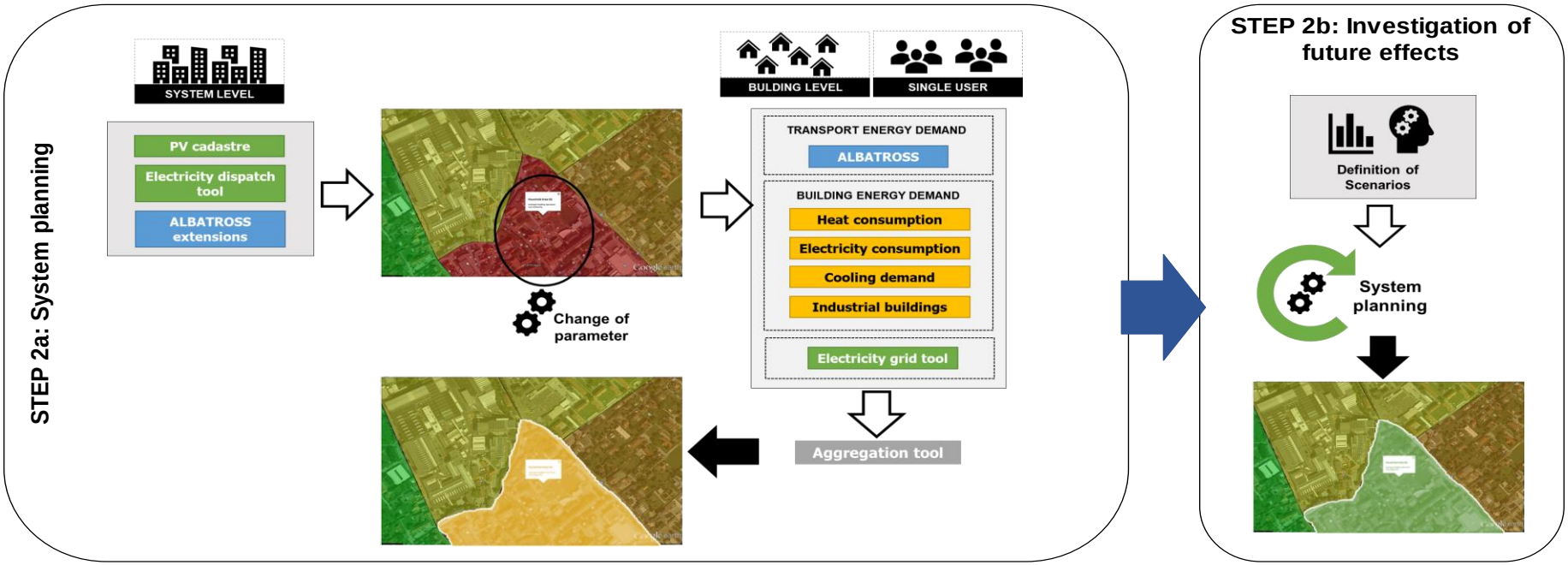
Models and Tools (current state)



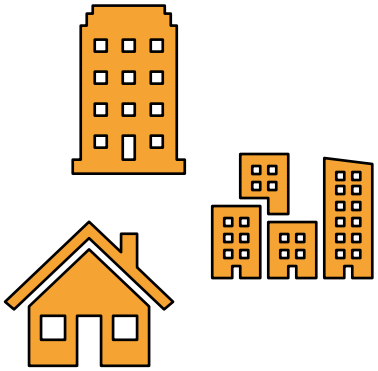
Step 1: Current Data



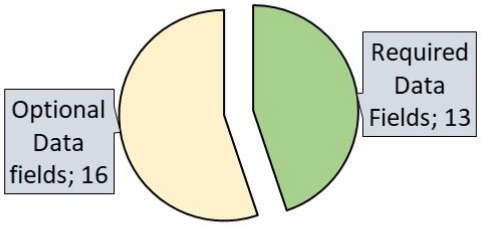
Step 2: System Planning + Future

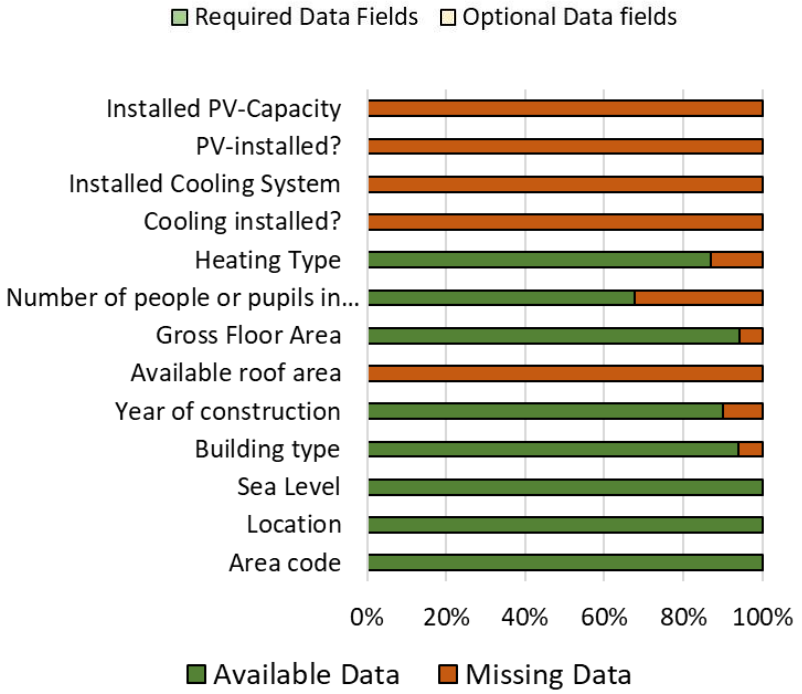


Available Data

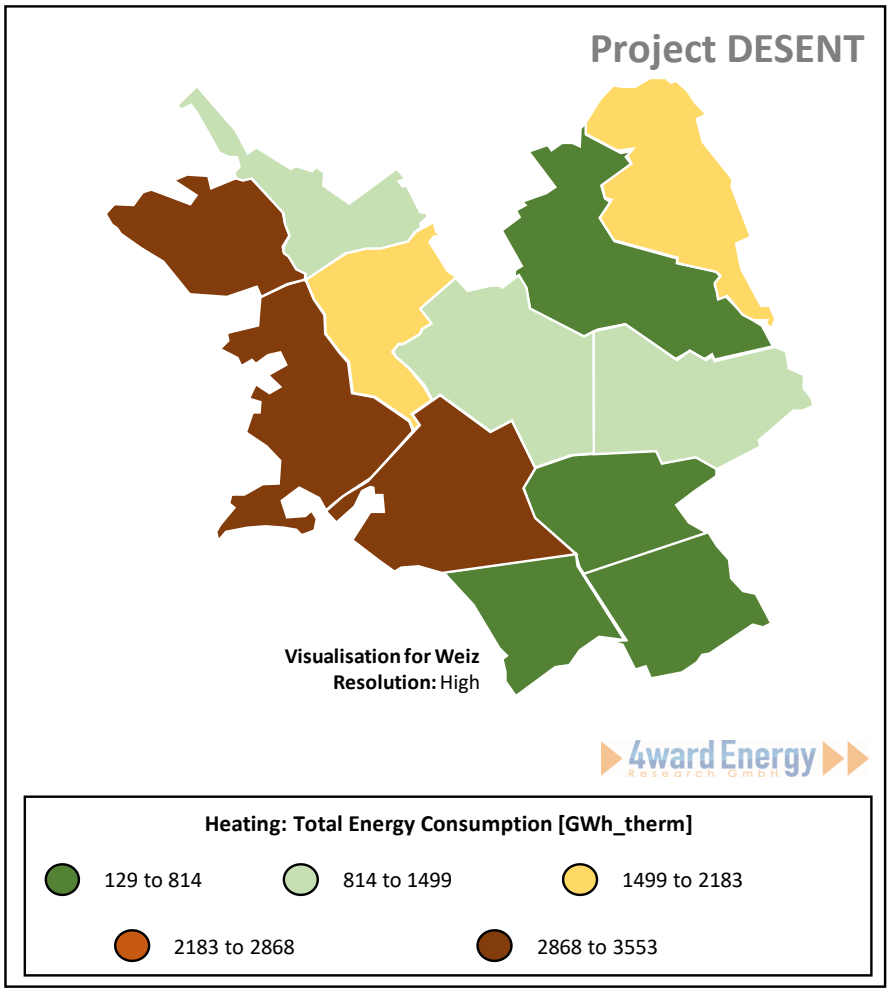


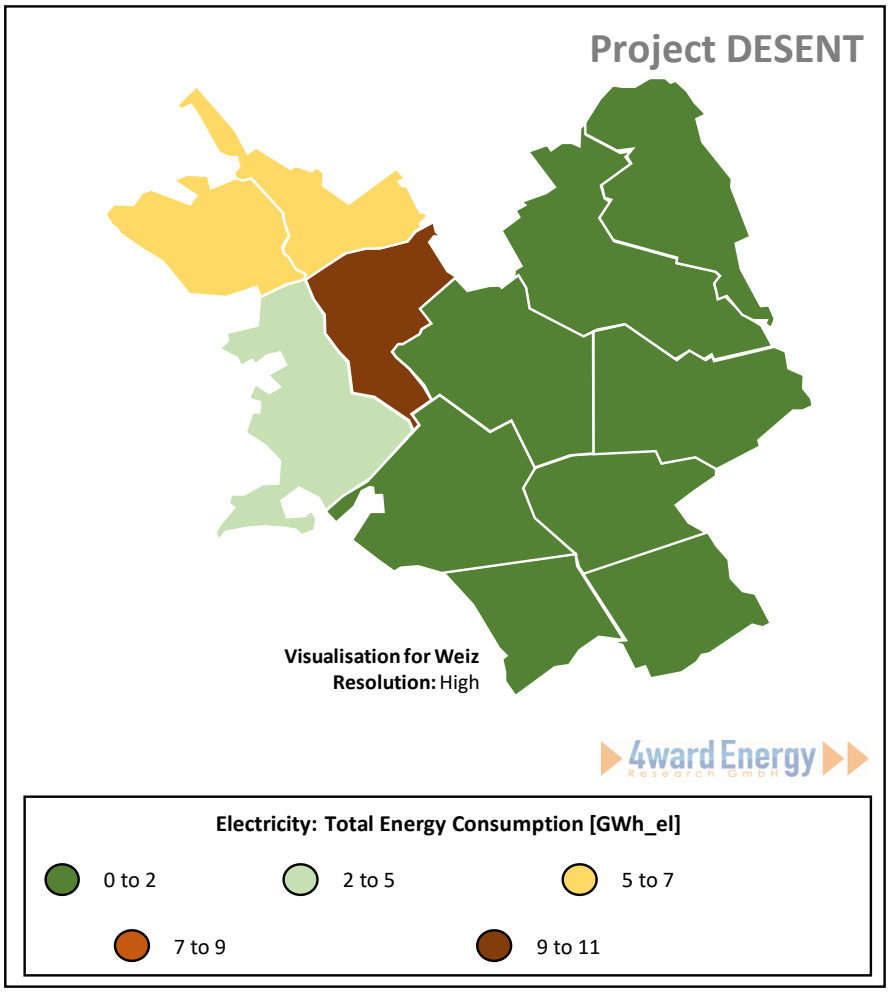
4077 buildings registered





Energy Data on High Resolution





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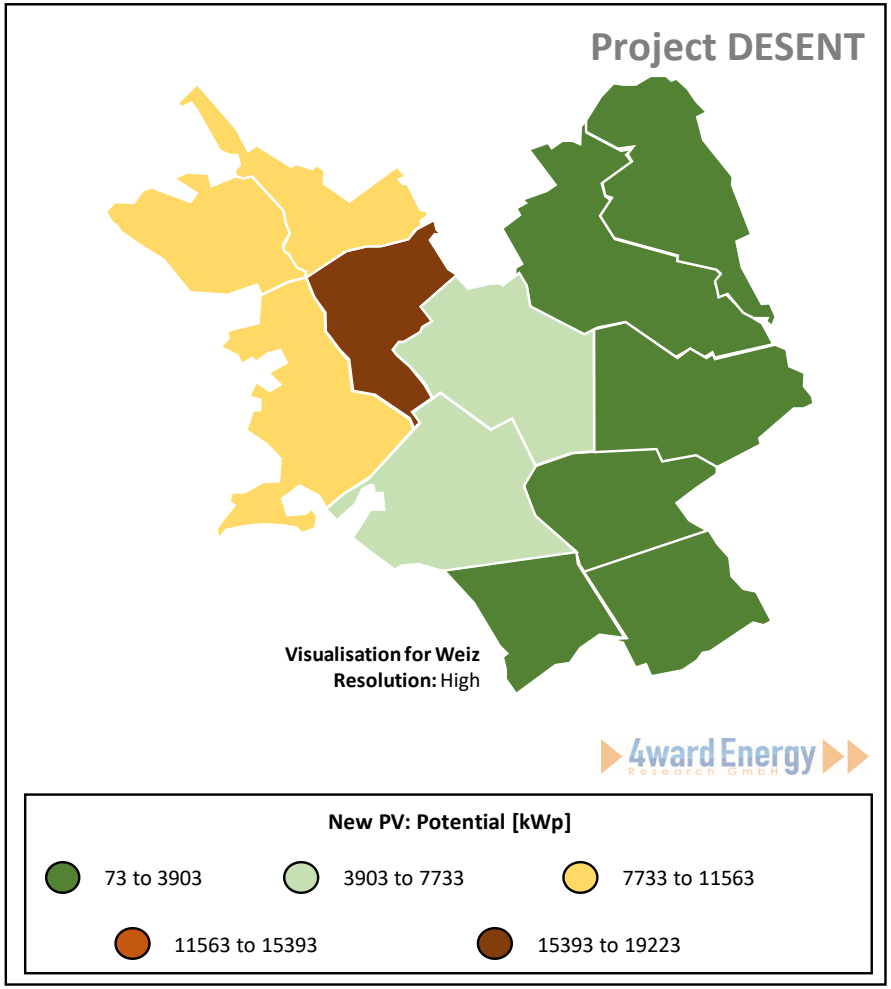

First findings and next steps

First findings:

- Data quality is one of the key factors
- Relevance of output data needs to be defined (What to show to whom)

Next steps:

- Implementation of **energy planning tool**
- Add **transport energy data**
- Validate Data and Results
- Implement other demonstration cities

Ich freue mich auf die Diskussion!

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