ADE Energy

Group Building Physics and Materials

Hochschule für Technik Stuttgart

TECHNISCHE UNIVERSITÄT MÜNCHEN

Karlsruhe Institute of Technology

EIFER
EUROPEAN INSTITUTE FOR ENERGY RESEARCH

RWTH AACHEN UNIVERSITY

SINERGIS
SUNSHINE

Objectives

WHAT IS IT FOR?

- Provide a data set, compatible with **steady state and dynamical** simulation, to calculate building **heating/cooling demand**

- Share information concerning the actual building physical state (useful in the perspective of building refurbishment studies)

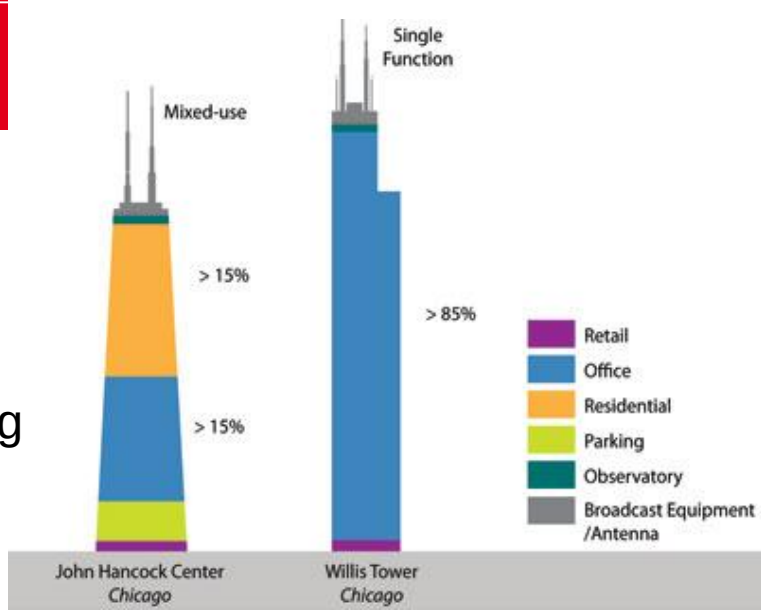
Our Methodology

- Confrontation of both first models of TU München and HFT Stuttgart, creation of a common proposition

- Discussion between 6 partners, representing different Building simulation model users (DIN 18599, ISO13790, VDI 6007)
  - List of **Use cases** (simulation and modelling) from the different partners
  - List of **requirements**

- Development of a class diagramm

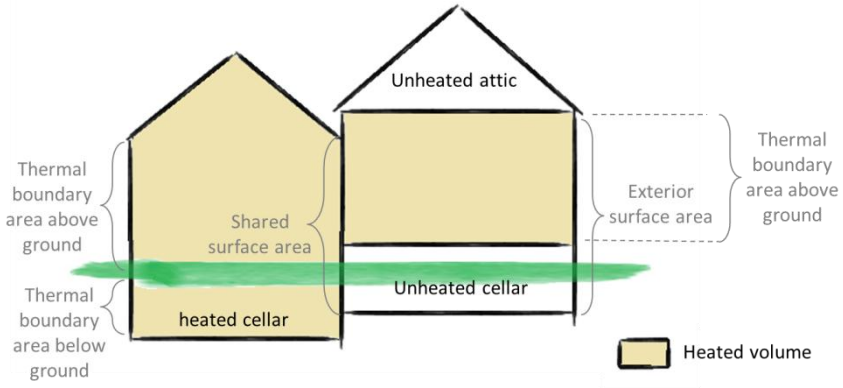
Modelling decisions – Zones



Differentiation of **AbstractBuilding**, **UsageZone** and **ThermalZone** objects, allowing for the modeling with flexibility of different building configurations (mixed-usage, partially unheated etc.)

- **ThermalZone** is the (heated/cooled) volume unit for the building simulation
- **UsageZone** is a volume with usage and occupancy considered as uniform
- 1 **Building** may have several **ThermalZone** (Multi-zone building model) and several **UsageZone** (mixed-usage building)
- For the need of the simulation, they must be 1 or more **UsageZone** in each **ThermalZone**
- A **UsageZone** may be outside the Building ThermalZone (e.g. non-heated garage)

Modelling decisions – Surfaces



- A ThermalZone is bounded by several „coplanar“ surfaces called **ThermalBoundarySurface**.

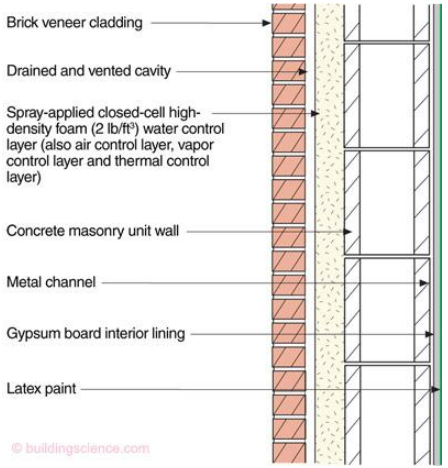
- If they correspond to the same construction element (e.g. wall, roof), **ThermalBoundarySurface** and **bldg:BoundarySurface** must be associated.

- Some **ThermalBoundarySurface** (e.g. top ceiling, cellar ceiling for LOD1-3) are non-related with any **bldg:BoundarySurface**

- Distinction of ThermalBoundarySurface between **OpaqueComponent** and **TransparentComponent** objects.

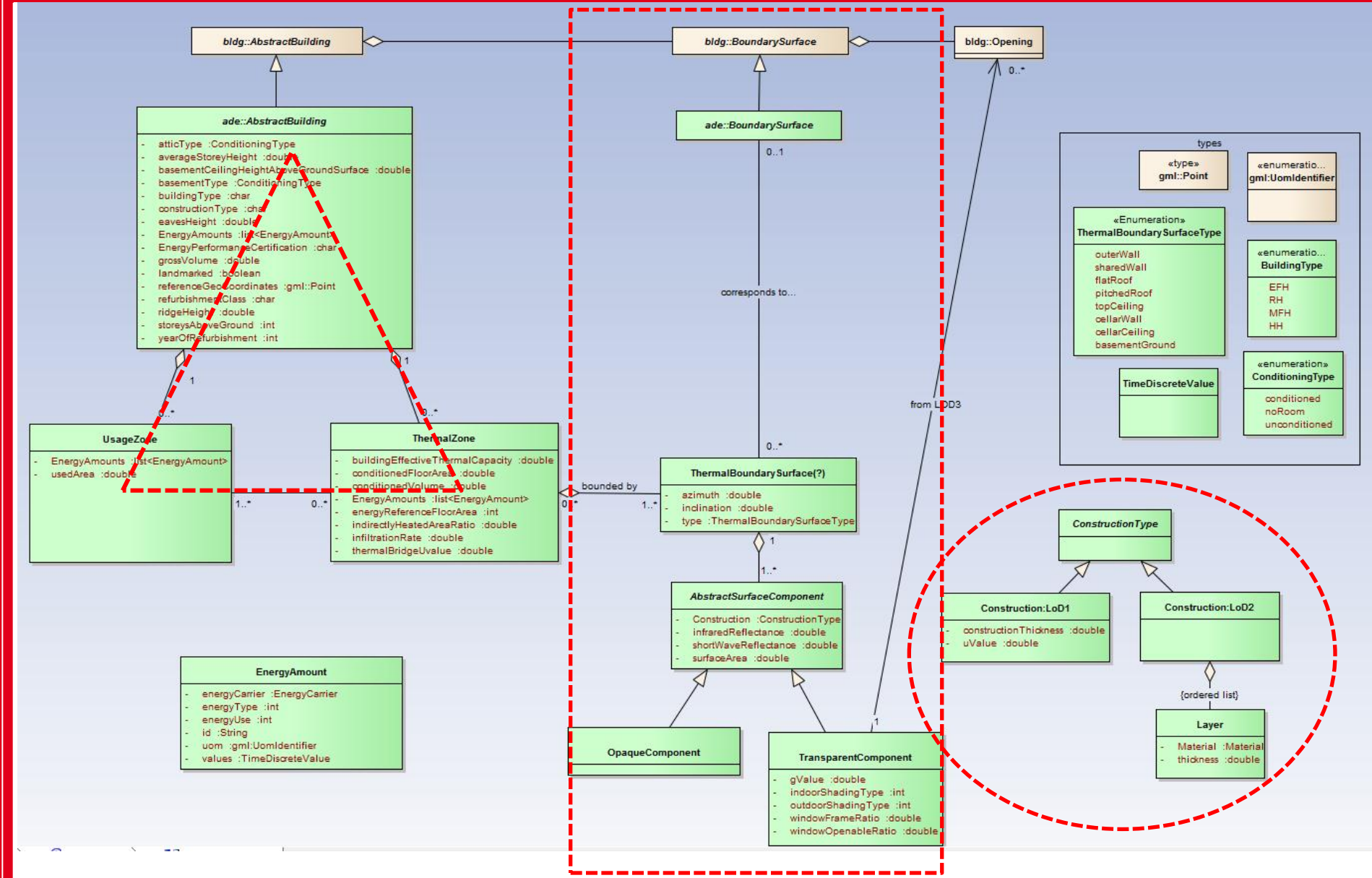
Modelling decisions – Construction & Materials

- Construction should be defined with different „**Level of Details**“, to comply with the different data requirements of the building simulaton methods
  - LOD1: Construction modelled as **a single layer**, with global information and no material precision
  - LOD2: **All construction layers** are separately modelled with detailled materials



- Construction objects should be related to ThermalBoundarySurface or/and BoundarySurface (for other material-related studies, e.g. acoustical, irradiance exchanges etc.)

Schema - overview



Next steps

Collect and synthesize feed-backs outside the working group

(rest of ADE Energy group and beyond)

Agree on object names and parameters to be integrated inside

Test this data model in practice

with our different building models and softwares