Minutes Videoconference WP 2.2
Non-Residential Buildings Classification Scheme

		Who / when
Date :	11.12.2018, 9:30 – 10:30 Uhr	
Minutes:	Michael Hörner (IWU)	
Participants:	Karl-Heinz Häfele, Joachim Benner (KIT), Julian Bischof (IWU)	
Mailing to:	All participants, Darren Robinson, Christoph van Treeck	
Annexes:	1. TABULA SR1.PDF 2. Bekanntmachung der Regeln für Energieverbrauchswerte und der Vergleichswerte im Nichtwohngebäudebestand 3. Building Categories NRB Germany	

Building Archetypes

One objective in IBPSA Project 1, WP 2.2 is to develop a classification scheme for non-domestic buildings functions as a base of a cross-national scheme of a building typology.

Residential Buildings

We suggest adopting the classification scheme from the EU-project *TABULA* (http://episcope.eu/building-typology/tabula-structure/concept/) (see Annex 1). Buildings are categorized by age bands and build size classes taking into account the history of national building energy ordinances and regional characteristics.

Non-Residential Buildings (NRB)

In this domain, building usage is very diverse and must be regarded in various main categories. Typology approaches of five European countries have been documented in the TABULA project (http://episcope.eu/building-typology/tabula-structure/non-residential/), the German concept, shown here, is part of the energy ordinance annex *Bekanntmachung der Regeln für Energieverbrauchswerte und der Vergleichswerte im Nichtwohngebäudebestand*, April 7, 2015 (see Annex 2), published in the Federal Gazette dated May 21, 2015 (https://www.bundesanzeiger.de/ebanzwww/wexsservlet?page.navid=to_bookmark_official&bookmark_id=aw0aIBTBco6yYzcam0E).

In the project Research Database Non-Residential Buildings (ENOB:dataNWG) we distinguish *12 Main Categories of Building Functions* as shown in Annex 3 together with a preliminary and exemplary mapping onto the categories of the *UK Ordnance Survey Classification*. Age bands have been adopted from the TABULA residential buildings typology since the energy ordinances address both, residential and non-residential buildings. — IWU, asap

In addition, such a typology in the NRB domain needs to be supplemented by data on typical usage zones and energy-related properties of the building envelopes and the technical installations typical for the building stock subset represented by that typology class. Ideally, typical buildings illustrate the properties of each class.

Furthermore, the TABULA concept of "average buildings" which are synthetic buildings with geometrical and thermo-physical characteristics equal to the average of

the building stock subset which they represent, should be considered.

The procedure of building classification in the „Urban Scale“

In order to simulate the energy performance of a building, data on the geometry, usage and energy-related properties of the building envelope and the technical installations are necessary. They can easily be collected in an on-site inspection. For many buildings, in the “urban scale”, other sources of these data need to be used.

In Germany 3D Building Models (LoD1) are available, based upon the Authoritative Real Estate Cadastre Information System (ALKIS®). Building envelope areas of building stock subsets, i.e. all buildings in a city district, for example, can be derived automatically. For a *single building,* the building perimeter has to be clarified first since building footprints from the official real estate map do not necessarily correspond to generic buildings.

In order to simulate the energy performance of many buildings, the building functions need to be classified as an input variable as realistic as possible. Ideally, the building function attribute of the ALKIS can be used. This attribute is hierarchically organized, while only subcategories, such as *2020 Office* or *2051 Retail*, allow assigning a meaningful building function.

IWU will provide a mapping table, assigning ALKIS subcategories to the 12 Main Categories of Building Functions of the NRB Typology proposed above. IWU, Jan. 2019

However, many building footprints are only classified into main categories of ALKIS, for example, more than 10 million footprints are classified as *2000 Commercial Buildings*. The attribution of realistic parameters of usage is fairly impossible in that case. Furthermore, 3D Building Models do not contain attributes concerning energy-related properties of the building. These have to be determined by on-site inspections or inquiries. This is exactly what we do in the project ENOB:dataNWG carrying out a representative sample survey on the non-residential building stock in Germany. Basically, this can be done for every building stock subset anywhere, using the questionnaires from ENOB:dataNWG.

Together with KIT we will try to further develop the Energy ADE within the CityGML data structure. We are currently working on the definition of an interface between ENOB:dataNWG and Energy Plus (for the energy performance simulation of many buildings) via Energy ADE.

Darmstadt, 16.12.2018

Michael Hörner