Comparison of heat atlas results with real-world measurements
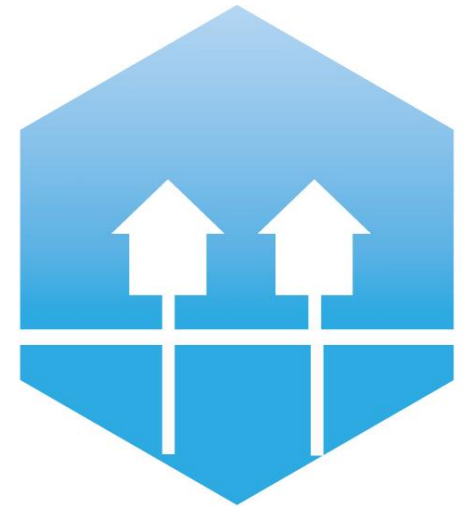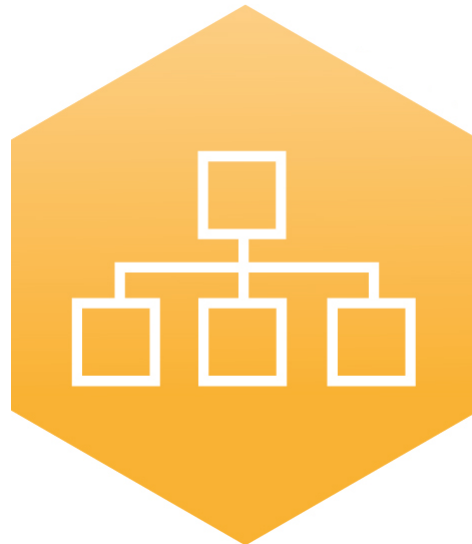
Lars Grundahl

AALBORG UNIVERSITY
DENMARK

4DH
4th Generation District Heating
Technologies and Systems

Available data

- **Heat Atlas 2014**
    - **BBR, data on buildings**
    - **SBi, heat demand model**

- **FIE data**
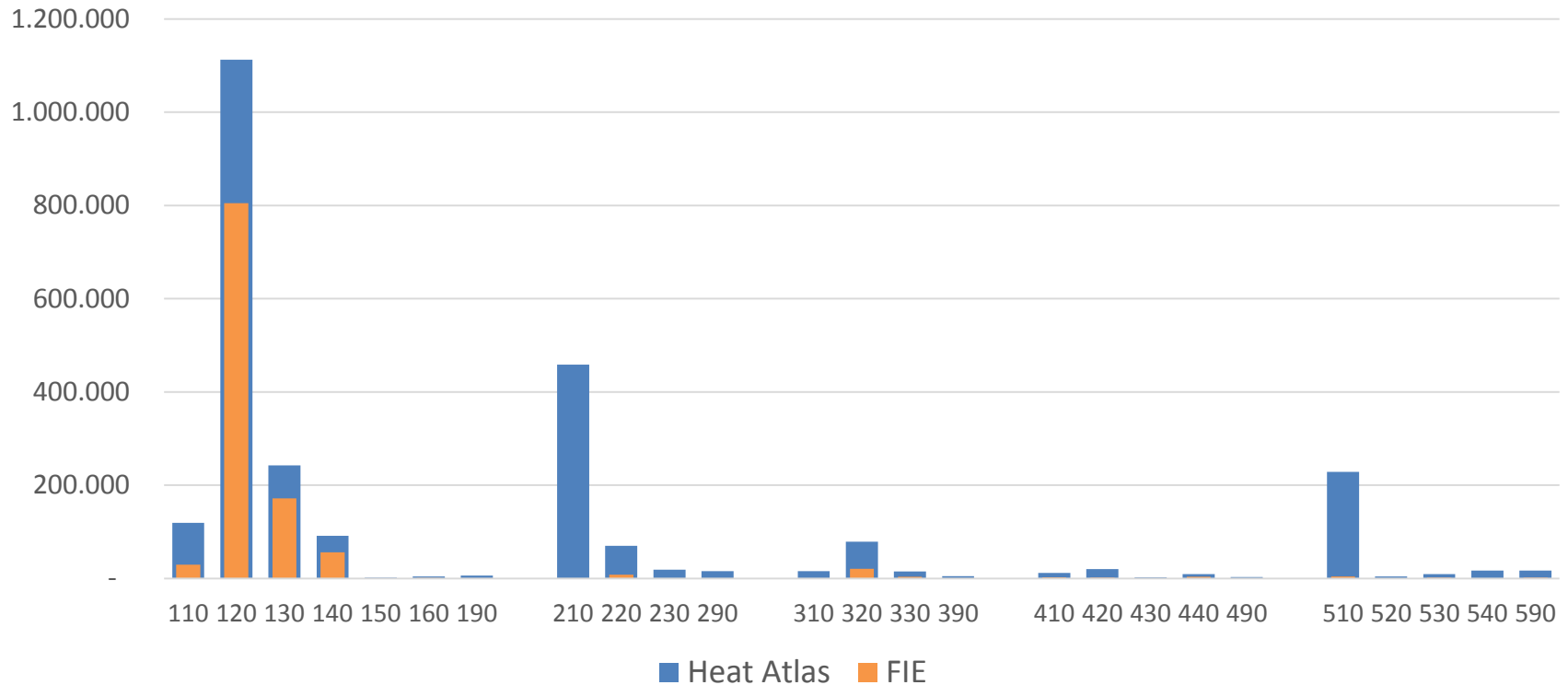   - **Real-world measurements of heat consumption**

International Conference on Smart Energy Systems and
4th Generation District Heating, Copenhagen, 25-26 August 2015

Statistics on data

	Number of data inputs	Accumulated number	% of HA (current year)
HA 2014	2,576,912		
FIE 2008	2,501	2,501	0%
FIE 2009	477,975	480,476	19%
FIE 2010	906,590	1,387,066	35%
FIE 2011	914,897	2,301,945	36%
FIE 2012	854,117	3,156,062	33%
FIE 2013	447,962	3,604,024	17%

International Conference on Smart Energy Systems and
4th Generation District Heating, Copenhagen, 25-26 August 2015

Data in the different categories

Number of buildings

Legend: ■ Heat Atlas ■ FIE

Overview of BBR110-190

	<1850	1850-1930	1931-1950	1951-1960	1961-1972	1973-1978	1979-1998	1999-2006	2006<
BBR110	4625	41454	6999	2451	2698	1791	2435	1135	678
BBR120	23681	389484	289615	266101	755462	382966	295383	133595	80774
BBR130	7660	66174	40540	35667	69800	49324	182764	72534	36963
BBR140	4732	100031	38028	8173	8077	1972	12490	6827	3456
BBR150	25	195	47	50	322	53	464	176	94
BBR160	34	661	284	269	474	323	1047	729	298
BBR190	76	538	111	108	119	46	172	82	59

Heat consumption single-family house
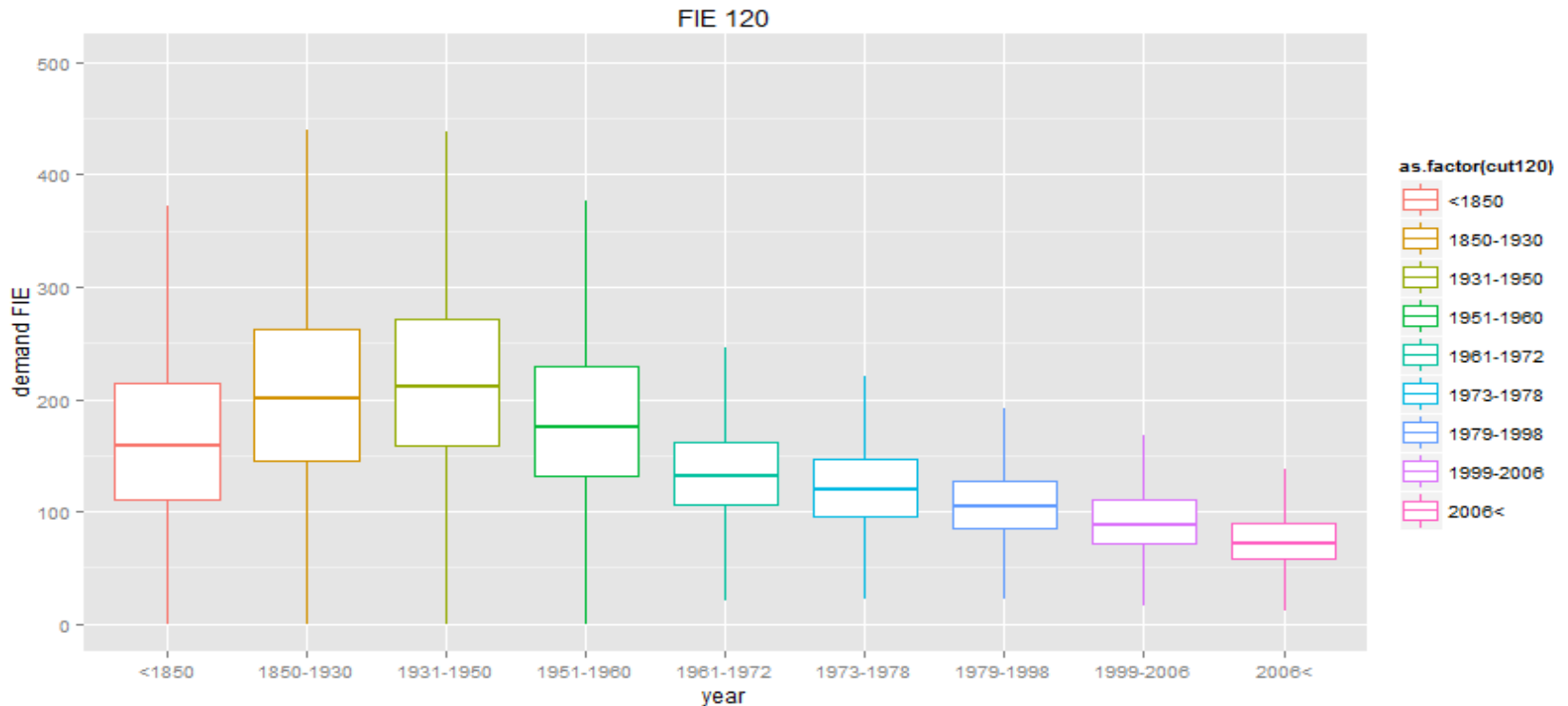
Heat consumption terrace house

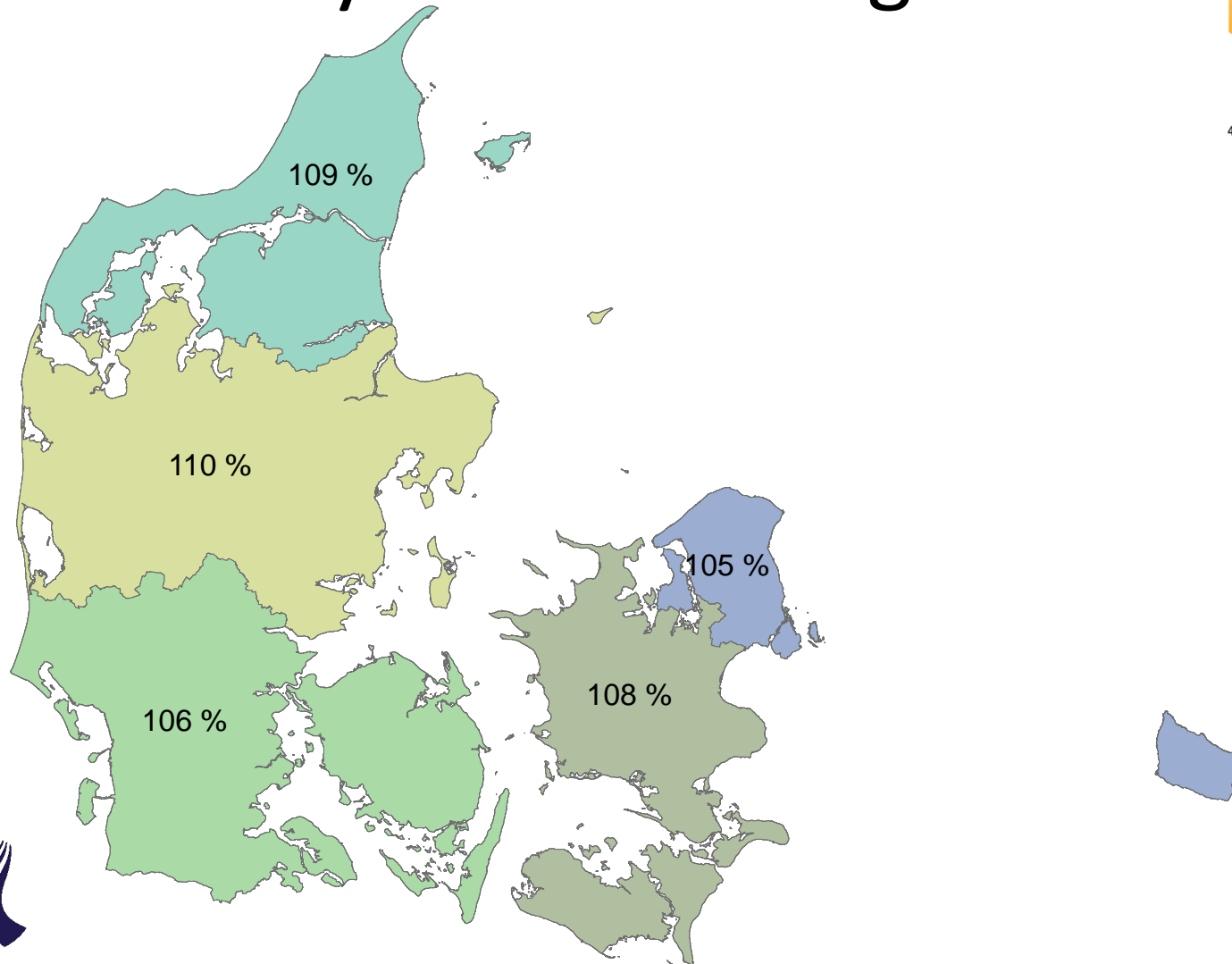FIE 130
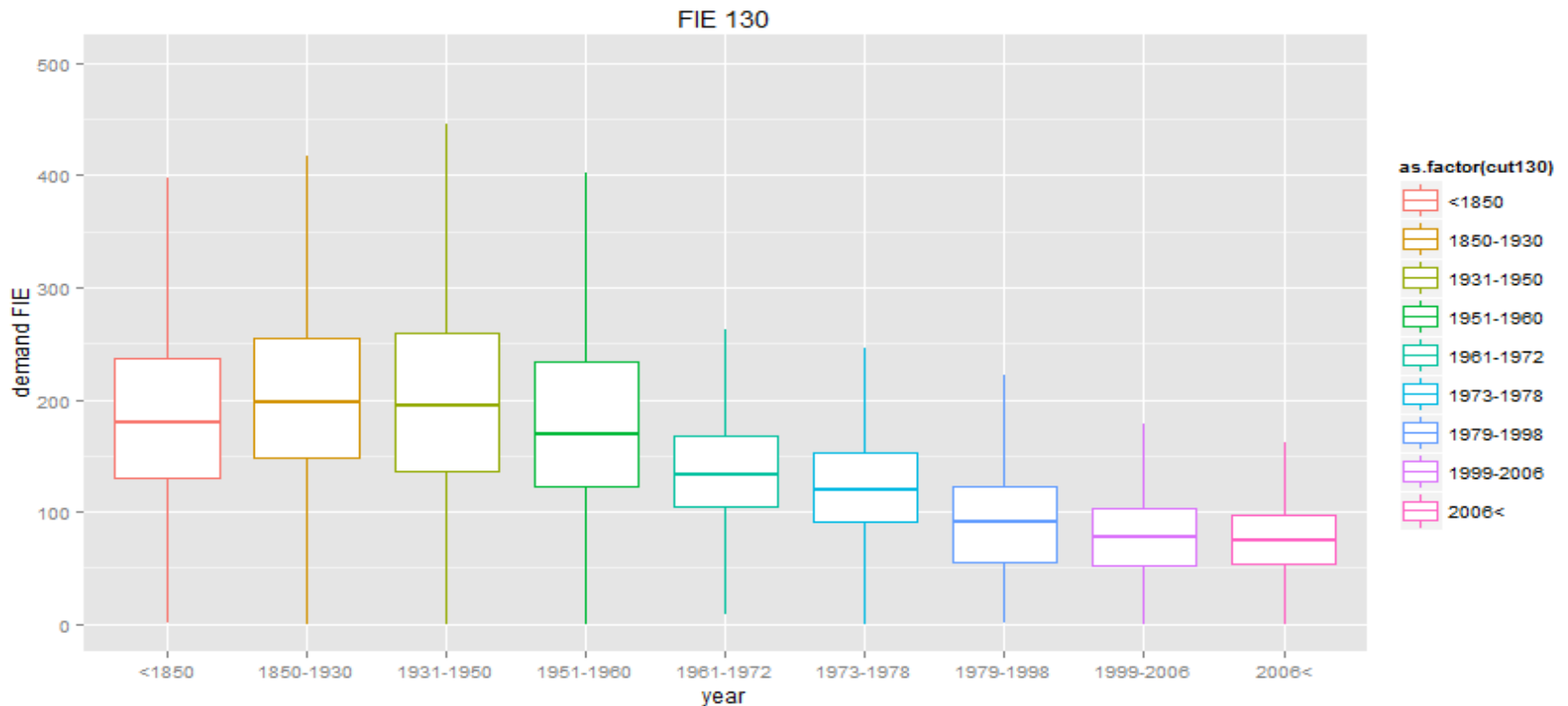
Heat Atlas 2015

Preliminary results

- **Tendency to overestimate the heat consumption with 5-10 % on average**

- **Expected to be due to data errors**

    - **Some areas have large errors in the data**

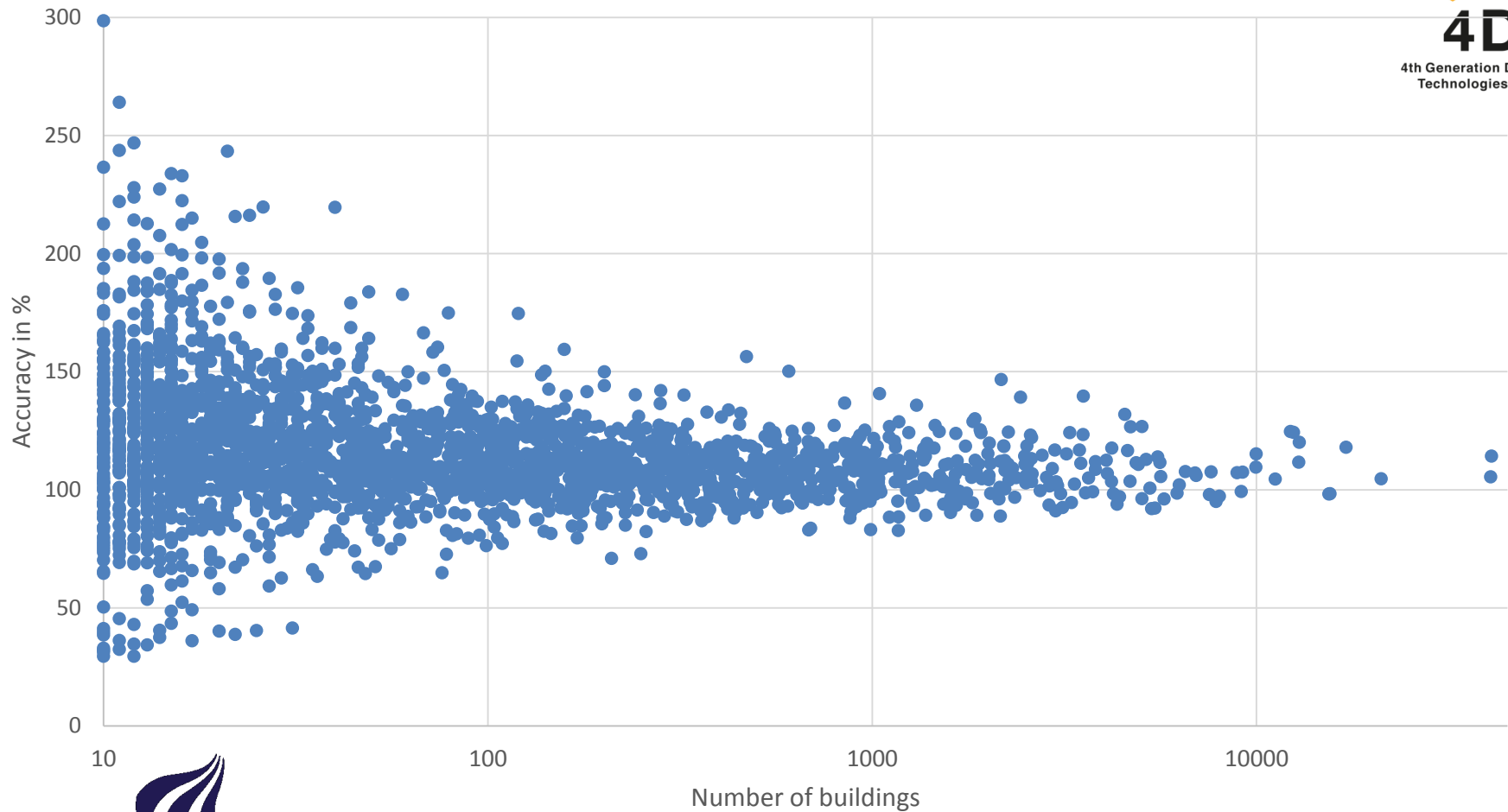   - **Some buildings are only registered as one unit in FIE but consist of several units in BBR**

International Conference on Smart Energy Systems and
4th Generation District Heating, Copenhagen, 25-26 August 2015

Accuracy in Danish Regions

109 %

110 %

105 %

106 %

108 %

AALBORG UNIVERSITY
DENMARK

4DH
4th Generation District Heating
Technologies and Systems

Accuracy in Smaller scales

Based on boundaries of urban areas

Number of buildings	Mean	Distribution (approximately)
10,000-50,000	111 %	+/- 15
5,000-9,999	104 %	+/- 20
1,000-4,999	109 %	+/- 30
500-999	108 %	+/- 40
200-499	109 %	+/- 40

Accuracy in Smaller scales

Questions?