



Heat consumption in public buildings in Slovakia

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Paper objectives

- To compare average specific heat consumption in two data samples
 Data collected through 3NEEAP
 Data based on EA (OP KaHR)
- > energy consumption profiles in selected types of PB
- > analysis of energy savings potential in public buildings

Public buildings in SR

- Cca 15 000 public buildings (Database of nonresidential buildings 1994-2003)
- Total floor area: ~35 mil. m²
- Unsuitable, unsustainable technical state
- Barriers: system of financing, lack of sources
- Programmes: ROP, PP Energy efficiency in Public Buildings, Ekofond, Munseff



3NEEAP

- Number of analysed buildings: 174
- Building types:
 - □ Educational,
 - □ Health care,
 - □ AB
- Ownership: esp. municipalities
- Advantages & disadvantages:
 - Large data sample, large coverage for dif. blg types
 - Heat consumption not separately monitored for SH & HW

EA

- Number of analysed buildings: 101
- Building types:
 - □ Educational,
 - Health care,
- Ownership: state
- Advantages & disadvantages:
 - Sample not complete yet (ongoing project)
 - Heat consumption divided into SH & HW

Results: 3NEEAP data (1)



Výsledky – 3AP (2)

 b) Average specific heat consumption 2010-2012, 3NEEAP (kWh/(m².a))







Results – 3NEEAP (3)



- Climate adjustment: heat consumption through normalized HDD
- Normalized heat consumption is 5% lower than the real consumption



Comment: only heat consumption is shown in graphs (electricity for HW is not included).

Results – EA (1)



Comment: only heat consumption is shown in graphs (electricity for HW is not included).

Results – EA (2)



Comparison 3NEEAP ~ EA (real vs. normalised)



- Difference btw. 3NEEAP & EA are in range of 19-25% (depending on the building type & type of consumption real or normalized)
- Difference betw. the samples is on average smaller for normalized heat consumption.

Conclusions

- The analysis shows that 3NEEAP data provides a wider coverage, more building types, however, EA has more detailed data and the heat consumption divided into SH & HW
- According to 3NEEAP most energy intensive: hospitas and health care centres
- Quality of 3NEEAP data
- Heat consumption of 3NEEAP divided into SH&HW through ratios, however, separate monitoring of SH&HW needed
- EA in hospitals and health care buildings needed, so that energy profiles for these building types can be developed: Educational, Health care and AB
- Difference betw. 3NEEAP & EA rather significant. Therefore results of the 3NEEAP analysis can be used only as proxy until this gap can be covered by EA.

Thank you for your attention

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Paper Objectives

- Compare the specific heat consumption in public buildings based on data collected within 3NEEAP to specific heat consumption based on EA (National project OP KaHR, op. 2.2)
- This is the basis for calculation of energy consumption profiles in selected types of PB
- Prerequisite for calculation of energy savings potential in public buildings

Methodology

- 1. Calculation of average specific heat consumption based on 3NEEAP data col.
- 2. Calculation of average specific heat consumption based on 102 EA
- 3. Comparison & analysis
- 4. Heat consumption profiles for selected public building types



Average annual heat consumption-space heating



Very small difference betw. Specific heat consumption in Educational & AB can be seen also in an analysis of energy consumption in public buildings in HU (Korytárová, 2010).

[In HU: Educational show slightly higher total specific heat consumption than in AB (factors: higher specific heat consumption of both SH & HW).

Difference: also due to the fact that Pre-school buildings are monitored separately, and thus average Educational buildings (incl. Pre=school), is slightly higher than small AB.]

Results – EA (1)

- Only Educational & AB were analysed
- Very small difference betw. Specific heat consumption of Educational and AB, ale
- Opposite results as in 3NEEAP data: AB are energy more intensive than Educational
- This can be explained by:
 - Among AB: police stations and fire fighting stations with nonstop operation, resp. multiple shifts (-> high energy intensity of AB)
 - Most of the AB only emergency repairs, in Educational buildings also partial renovation (-> lower en.intensity Educational)
 - AB: HW from DH (33%), individual boiler (NG) (29%) or electricity HW heater (38%)

Results – EA (2)

- Once consumption is recalculated through normalized HDD the situation is opposite :
- Educational are more energy intensive than AB
- Can be explained:
- In reality the SH can be shut off in the afternoon, however normalized HDDs include also afternoon operation -> therefore Qreal<Qnorm</p>
- In reality police stations have longer operational time than most of the ABs
- AB are heated also in the afternoon (unlike Educational)
- Difference is really very small

Comparison 3NEEAP ~ EA (real)

- In both cases (real cons.) AB more energy intensive than Educational
- Difference in EA betw. AB and Educational is lower than in 3NEEAP

Comparison 3NEEAP ~ EA (norm.)

- Pri normalizovanej spotrebe sú rozdiely medzi en.najnáročnejším typom budovy
- Pri 3AP: AB > ŠB
- Pri EA: ŠB > AB (veľmi malý rozdiel)
- Podobne ako pri skutoč.spotrebe, rozdiel v EA medzi AB a ŠB je menší ako v 3AP

Results – EA (1)



Comment: only heat consumption is shown in graphs (electricity for HW is not included).