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# Comments on proposed change of climate correction in ODYSSEE

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# Proposal in Warsaw, Oct 2011

- Use of square root of degree days in climatic corrections instead of linear correction
- Based on prof. Sven Werner's work (Chalmers University)
  - Paper: The New European Heating Index, 10<sup>th</sup> District Heating and Cooling Symposium, Hanover, September 4-5, 2006
  - ECOHEATCOOL -project

# Points to consider

- Drawbacks or errors in the current method
  - Possible slight overcorrection
- What are the benefits of the proposed change?
  - How correct is the new method from scientific viewpoint for ODYSSEE application? Does it improve the measurement and comparison of energy efficiency?
  - Is the proposed method justified and fair in country comparisons?
  - The benefits are unclear

# Objective of Werner's research

- The objective of Werner's research was to create a method for formulating a heating index which explains the impact of various factors on heat demand variations in Europe including climate, indoor temperatures, hot water consumption, heat costs and affordability of heating
- The method was not principally developed for normalisation in country comparisons

# The formula in Werner's method

$$t_{\text{opt}} = \sqrt{G \cdot k_q \cdot \lambda / (a \cdot k_t)}$$

- $t_{\text{opt}}$  = optimal heat consumption
- $G$  = degree-time integral in Ks ( $24 \cdot 3600 \cdot \text{Degree-days}$ ), based on an uniform chosen indoor temperature
- $k_q$  = heat cost (EUR/J)
- $\lambda$  = heat conductivity for the insulation, W/mK
- $a$  = annuity, from interest rate and economic lifetime
- $k_t$  = effective cost for insulation volume, EUR/m<sup>3</sup>
  
- What is the scientific basis of the square root formula? It is not given in the paper. E.g. why the square root and not another correlation?
- Is the equation for optimal heat consumption universally applicable given the big differences between countries? E.g. the formula assumes uniform indoor temperature which is not the reality. Other differences are big too.
- Physically heat consumption is proportional to the degree-days, not the square root of degree-days.

# Werner's method

- Werner recognises that buildings are much better insulated in some parts of Europe
  - Yet the use of square root for degree-days makes the differences in specific consumption almost disappear
  - Is it likely to be true that in the same climate specific consumption of northern buildings (with thick insulation and windows with triple glazing or more) would be quite close to those in the south?
- The method is strongly based on heat and insulation costs
  - Why only insulation costs? Why not also windows, ventilation etc.?
  - Economics is not the best matrix of energy efficiency, it is a driver
    - Not recommended in the ODYSSEE either
- The method does not make the heat demand curves smoother for all the countries

# Conclusions

- Werner method does not seem strongly justified
  - Scientific background and applicability unclear
  - The method does not provide a fair basis for country comparisons
- Eurostat publishes relative degree days using the linear approach
  - Why one single project would take a different approach?
  - The Finnish team proposes to continue the use of linear correction in country comparisons