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Lessons learned and closing remarks

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Met de steun van: fwo Fonds Wetenschappelijk Onderzoek Vlaanderen
Opening new horizons

Reducing the performance gap

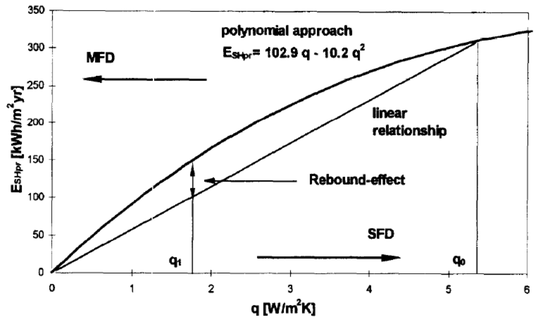
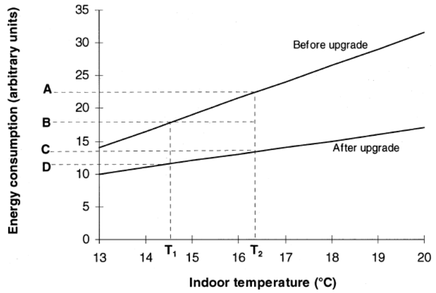
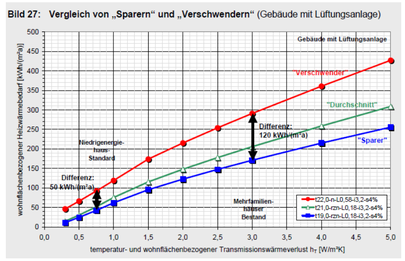


Fig. 5. Actual energy demand for space heating, E_{SHpr}, in relation to the thermal quality of buildings, q.

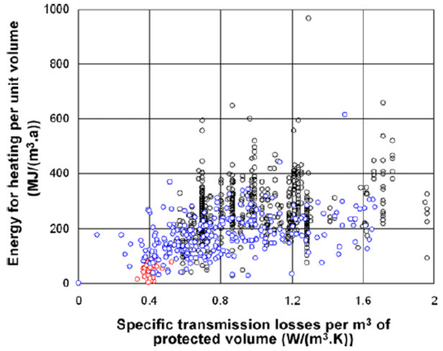
Haas et al. 1989



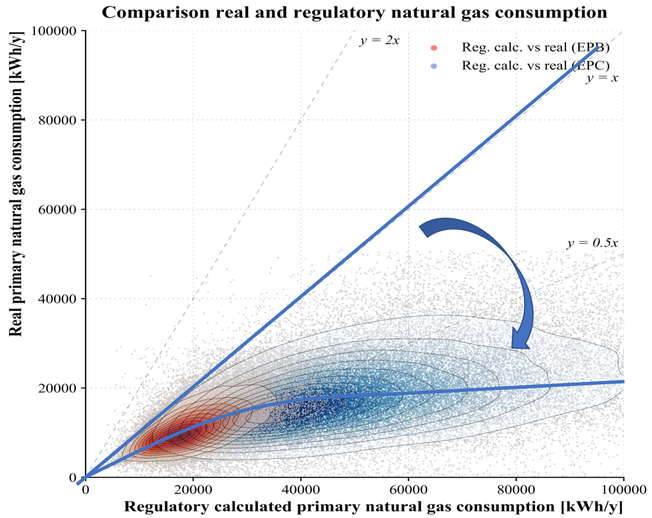
Milne & Boardman 2000



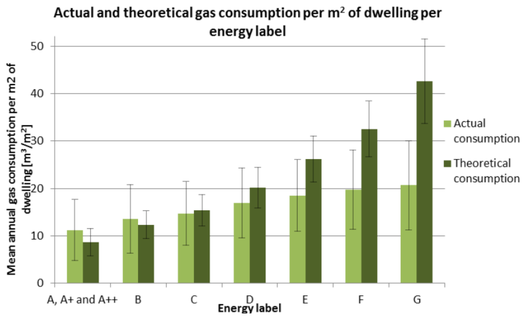
Loga et al. 2003



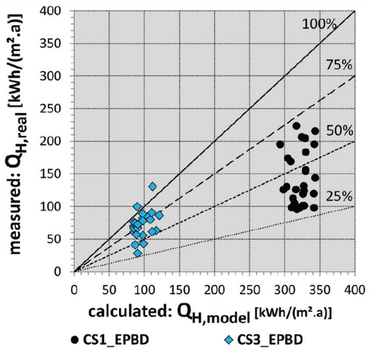
Hens et al. 2010



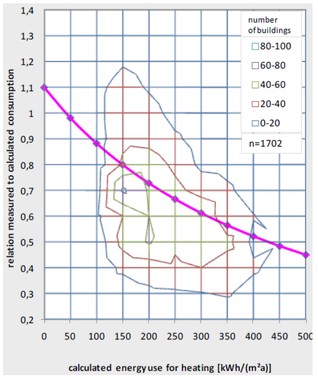
Van Hove et al. 2021



Majcen et al. 2012



Delghust et al. 2013

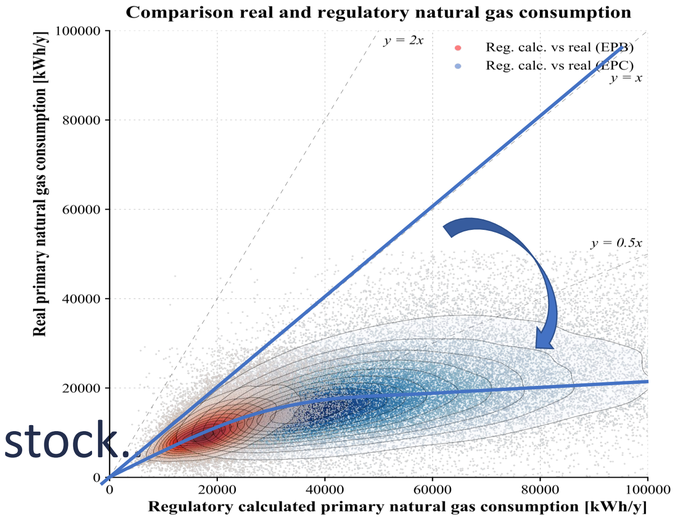


Loga et al. 2015

Looking at…

- ✓ User behaviour
- ✓ Heat generation systemsGrid interaction
- ✓ Primary & CO2 intensity
- ✓ Performance indicators
- ✓ Assessment framework
- ✓ Input accuracy & support
- ✓ Making it happen: barriers?
- ✓ …

Looking beyond the (individual) building: people, grid, mix, finances, stock…



Van Hove et al. 2021

“Challenge 0”: defining clearly the objectives

(1) to target them efficiently & keep focus

(2) to debate based on well defined grounds

(3) to distinguish main from side issues

Which “building energy performance” (gap)?

Energy performance of “buildings”?

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- ✓ Dynamics
- ✓ Looking beyond the individual building
  - Local conditions: *neighbourhood/street/…*
  - Cross boundaries: *electricity market*
- ✓ Future changes: *climate, energy mix, technology, behaviour…*

Energy performance assessment

⇒ **Is itself dynamic**

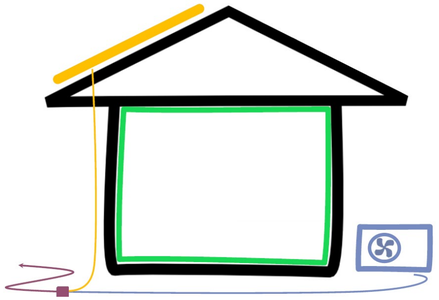
⇒ **Should look ahead (at least the lifespan) ànd will need updating**

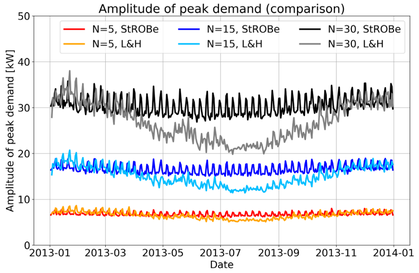
⇒ **Should it all be via EPB/C?**

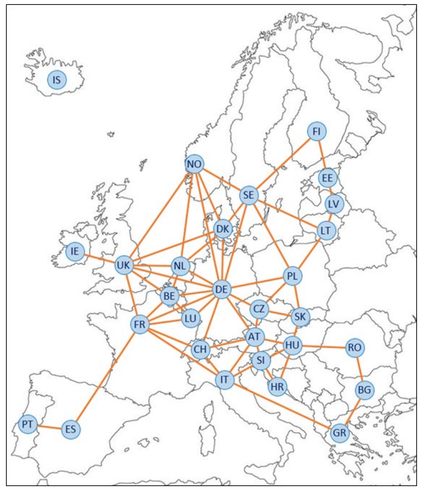
⇒ **Theoretical calculation or real data?**

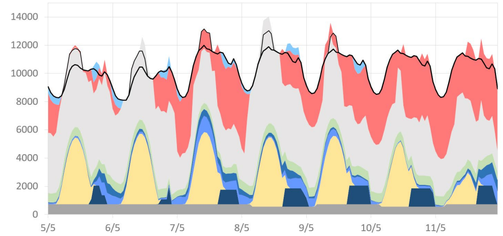
⇒ **To what level of detail?**

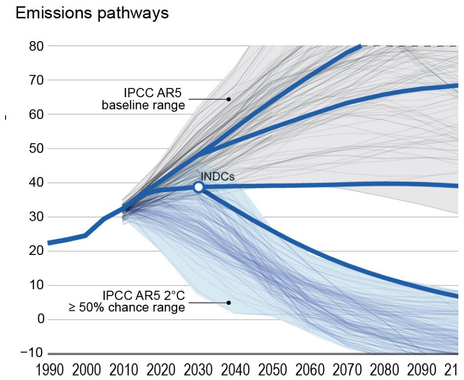
- Renewable energy production
- Low PE and/or CO2: what matters most?
- Grid stability: for the (near) future
- Smart(readi)ness
- Cost optimality~real energy use(r?) and predictions/scenarios
- LCA
- …











“energy performance of a building”

real energy use?

the amount of energy **actually consumed or estimated** to meet the different needs associated with a **standardised use** of the building, interaction!?

which may include, *inter alia*, heating, hot water heating, cooling, ventilation and lighting.

This amount shall be **reflected in one or more numeric indicators** which have been calculated, for!?

taking into account insulation, technical and installation characteristics, design and positioning building & context? location & time dependent?

in relation to climatic aspects, solar exposure and influence of neighbouring structures, own-energy generation and other factors, including indoor climate, that influence the energy demand;

(EPBD, EU Directive 2002/91/EC on the energy performance of buildings)

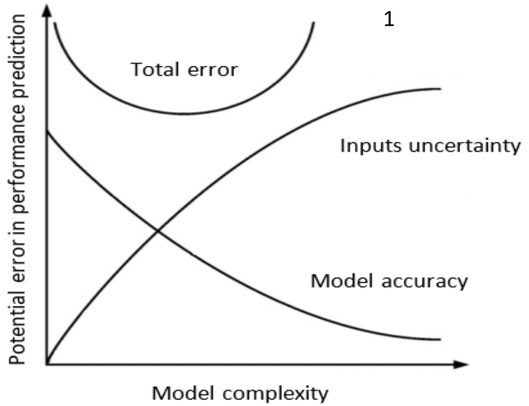
EPB/C: certificates reflect standardized indicators, not the actual energy use!

Simple versus complex?

A higher complexity is not always beneficial/needed and might give a false impression of accuracy.

Distinguish simplicity/complexity at different levels

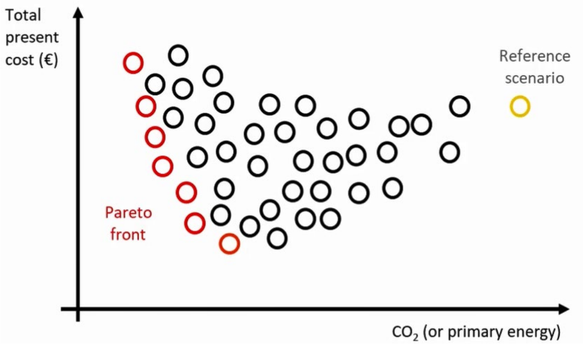
- ✓ Real life
- ✓ (Meta)model/algorithms
- ✓ Standardization
- ✓ Implementation for the end user**s**(!)
- ✓ Communication to the (ultimate) stakeholders



M. Trcka and J. L. M. Hensen, 2010.

Examples:

- ✓ Generation efficiency
  - more complex, better model, with more input data, but barely more work: data exists
- ✓ User behaviour
  - Improved modelling is possible, but an exact prediction is not
  - Stochastics (e.g. for robustness): longer calculation time doesn't mean more modelling work
  - Burden shifting: still choices to be made! (which profiles? Average/median/…?)
- ✓ Cost-optimum @building & @societal level
  - Future uncertainties: guaranteeing near optimum enough? (~robustness)
- ✓ PEF/CO2:
  - Complex European grid model for PE/CO2 in the grid
  - Seasonality => impact relatively limited(?) => "just" changing the average value?

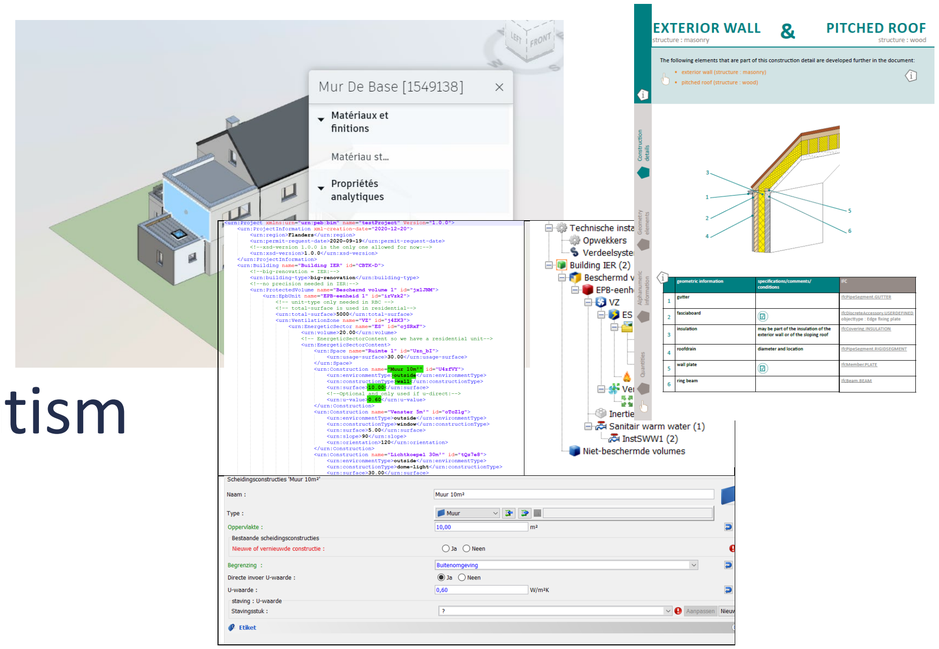


DATA & TOOLS: (availability) & accessibility

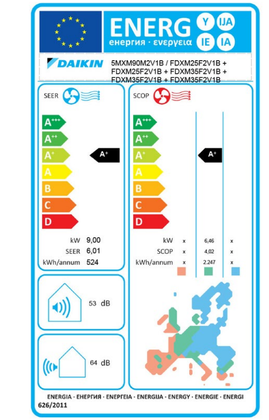
For EPB/C-assessment:

More about

- easy access
- exhaustiveness and detail versus pragmatism
  - ✓ BIM
  - ✓ Eco-design
  - ✓ Product databases, EPREL
  - ✓ …



Casteleyn et al. 2021



DATA & TOOLS: (availability) & accessibility

For Research, Development & Policy making

VEKA

- ✓ Open calculation method
  - Tracking changes?
  - Knowing the origin? Research & objectives!
- ✓ Open data EPB => EPC?, non-residential?
- ✓ Towards open calculation API and/or kernel?

Fluvius

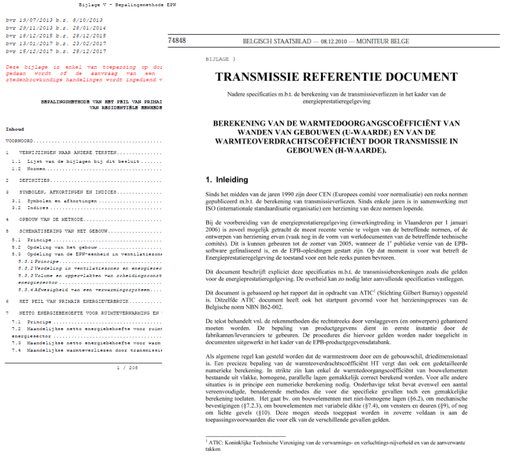
- ✓ Energy use data
- ✓ Asset data

Private companies

- ✓ Manufacturers, installers, b&s managers, users…
- ✓ Lab & field (cloud) data

Open libraries

- ✓ IDEAS, StROBe


Bijlage V - Bepalingsmethode EPW

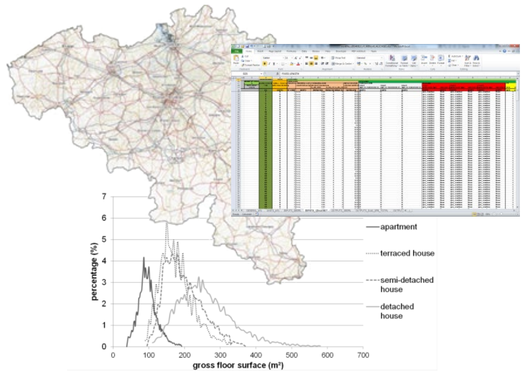
BIJLAGE 3

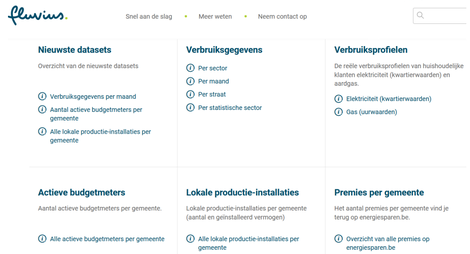
TRANSMISSIE REFERENTIE DOCUMENT

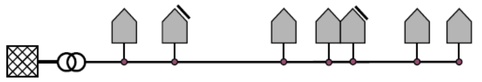
Nadere specificaties m.b.t. de berekening van de transmissieverliezen in het kader van de energieprestatieregelgeving

BEREKENING VAN DE WARMTEDOORGANGSCOËFFICIËNT VAN WANDEN VAN GEBOUWEN (U-WAARDE) EN VAN DE WARMTEOVERDRACHTSCOËFFICIËNT DOOR TRANSMISSIE IN GEBOUWEN (H-WAARDE).

1. Inleiding







https://www.fluvius.be/nl/blog/wat-doet-fluvius-voor-jou/fluvius-zomerroute-tour-elentrik

RESULTS: (availability) & easy access

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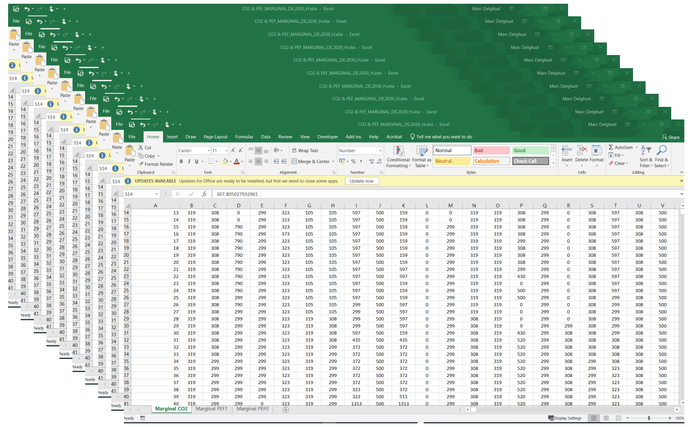
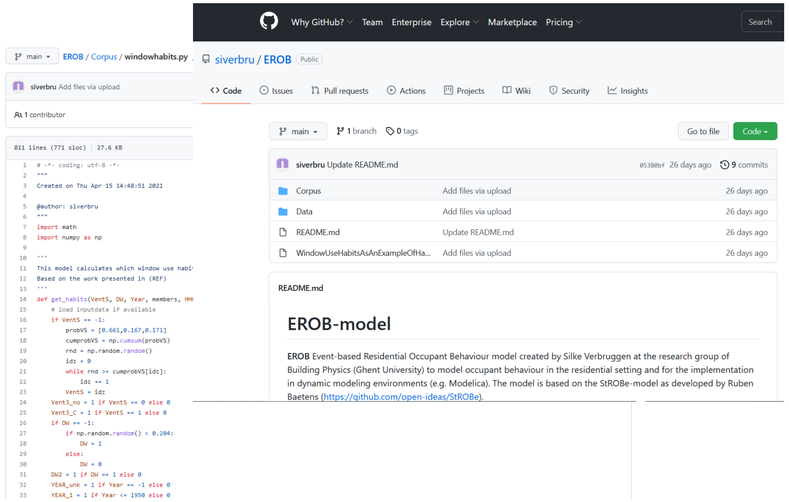
NEPBC: modelling tools, data and reports

- ✓ Scientific papers & PhD dissertations
- ✓ Public reports on http://new.nepbc.be/results/
- ✓ PEF & CO2 data for 28 countries
- ✓ EROB-model, building on StROBe, on GitHub
- ✓ …

=> Feel free to contact us!





Critical notes

- ✓ Beyond residential: integrating EPB & EPC, residential & non-residential
- ✓ Not everything related to building energy use can/should be dealt with via EPB/C
- ✓ Fully implementable solutions?
  - SBO: not software, regulatory document, or even directly implementable formulas/data, but knowledge, models and data
  - Looking at the past: some very easily implementable solutions not yet implemented

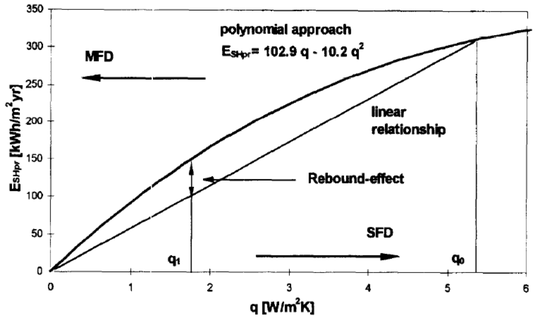
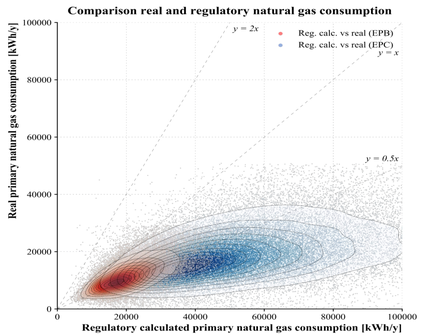


Fig. 5. Actual energy demand for space heating, E_{SHpr}, in relation to the thermal quality of buildings, q.

Haas et al. 1989



Van Hove et al. 2021

- ✓ Focus on what matters the most!
  - Urgency: often better to implement best available knowledge now than delay (temperature take-back, climate change, CO2&PE-F)
  - Looking ahead: building life span, (averaged) future user, climate, PE/CO2 intensity…
- ✓ Not looking enough at real consumption data, looking back fast enough
- ✓ Framework: quality of assessment (of the assessment)
  - “Challenge 0”: defining clearly the objectives
- ✓ Performance gap vs. renovation gap: total saving = {Δ * N}

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