



Knowledge transfer from professionals to end-users in the building hand-over phase

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"The next day I wondered what they said and I had forgotten half of it". Occupant

Paper`s objective

- Focus is on the meeting-point between professionals and occupants in the hand-over phase of a dwelling.
- Main objective: to investigate the procedures followed in the hand-over phase, and how these will influence the users` knowledge of the buildings` technology.

The EBLE project

(Evaluation of housing with low energy need)

- Norwegian research project, 2012-2016
- Main aim: to study the building process, energy use, indoor climate, and investigate user experience in eight low-energy housing areas in Norway.
- Financed by the Norwegian Research Council and partners

lavenergi
programmet.



Partnere:

SKANSKA

MESTERHUS
– det blir som avtalt


BOLIGPRODUSENTENE

VEIDEKKE


DIREKTORATET
FOR BYGGKVALITET

JADARHUS
Det lille ekstra

 **BLOCK WATNE**


FAGSTAD-HUS
– slik du vil ha det!


OBOS

 enova

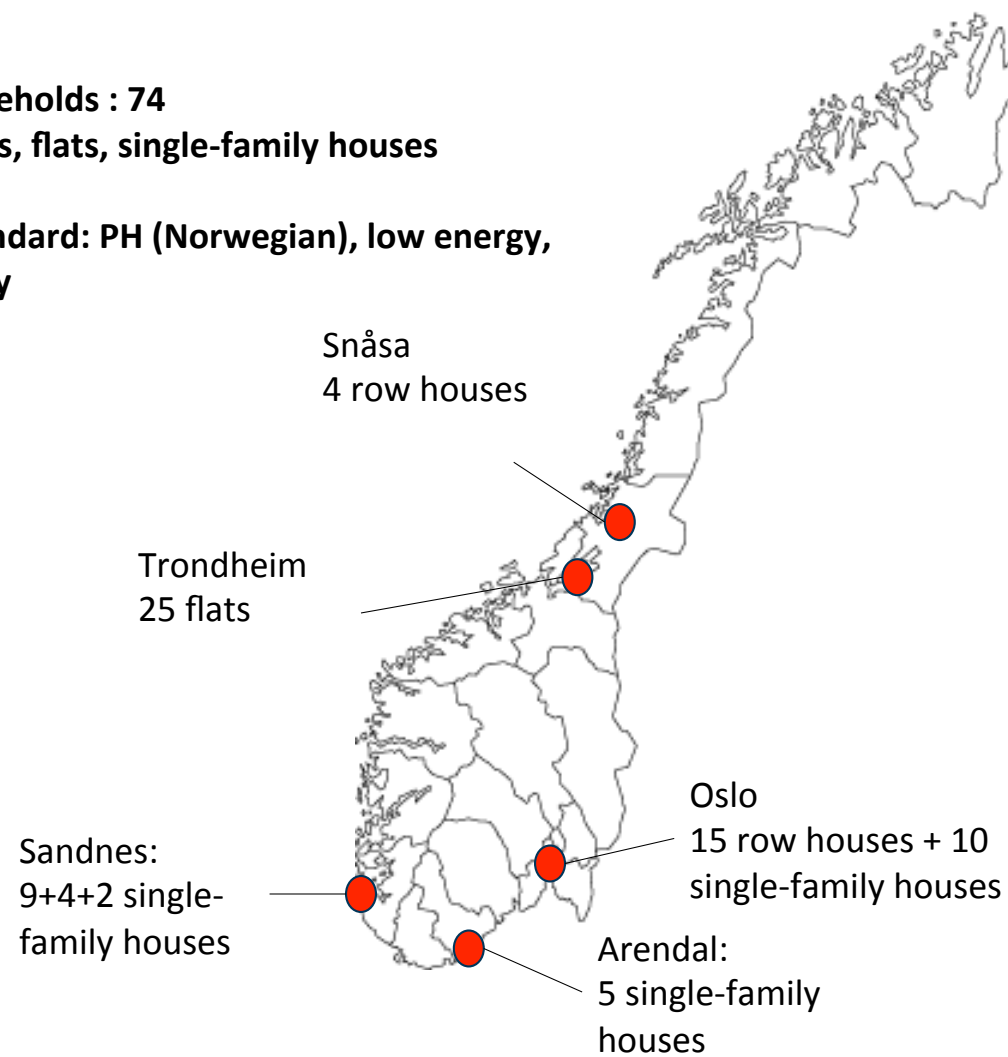
 **SINTEF**

EBLE

No of households : 74

Row houses, flats, single-family houses

Energy standard: PH (Norwegian), low energy,
Zero energy



EBLE – performance evaluation

- Measured and calculated energy use
- Measured indoor air temperature and relative humidity
- Interviewed occupants on perceived comfort, practices and satisfaction
- Interviewed key personnel involved in planning and construction
- Measured wood moisture content in construction

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Background

- Studies repeatedly highlight gaps in actual energy performance of energy efficient housing compared with expected results from energy simulations.
- wide differences in energy use between households even when living in the same type of housing with the same technical infrastructure.
- User behaviour and every day practice are found to be one of the important reasons for differences in household energy consumption

Background

- The hand-over phase and the following period are critical as the occupants are adjusting to the building.
- Occupants develop habits and ways of interacting with their home.
- This is impacted by the level of information about the dwelling the user has received,
- Adopted practices will influence buildings performance.

General findings EBLE

- We also found gaps in predicted and actual energy performance, both total and for heating.
- Great variations within the same housing areas.
- Difficulties to regulate indoor air temperature.
- Use of heating and ventilation systems, PV or solar collectors was often practiced as "learning-by-doing"
- Often low level of satisfaction with the information received.

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Interviews

- With 38 of 74 households in the EBLE study
- With 18 professionals, involved in construction, design og sales process.
- face-to-face semi-structured interviews and telephone interviews

Findings - overview

Housing developers` attitude

- There should be no difference in use of passive houses than of other housing built according to current technical standard. Therefore, there should be no additional need to provide information and going through use.
- No major adjustments in terms of passive house promotion.
- The housing developer has a countrywide routine for hand-overs, regardless of technical standard.

One case:

- Focus on user-friendly solutions already in the planning phase. Should be easy to maintain. Customer service and follow up important.

Findings - overview

Housing developers: type of information provided

- Go-through with all occupants at hand-over.
- User and operation manual.
- Explanation of the technical installations in most cases.
- Heat pump service and subscription for regular change of ventilation filters.

In some cases:

- Information sheet with recommended settings
- Standard information from Norwegian Home Builder's Association on passive houses.

Exception:

- Customer service advisors. The advisors are trained by the suppliers, and they are trained in how to handle the customers' requests.

Findings - overview

Housing developers: reflections on practice

- Procedure worked well for some but not for everybody.
- Insufficient focus on information about energy efficient buildings.
- There are unused opportunities to communicate more effectively, what the customer is buying.
- The customers` interest in energy standard / operation increased after moving in.
- Customers experience is dependent on the professional conducting the hand-over.
- One case: Intention to improve customer service and work on web-solution (my pages) with visual /video information

Findings - overview

Occupants` experience

"If we had received more information, I believe we could have used the dwelling in a better way. It is a pity we did not learn more about the possibilities of the systems. We had a meeting with the housing developer. They stood in the kitchen and we quickly went through the operation of the different zones of the hydronic heating system. The technical manual is hard to understand. We got a short overview with numbers to press, but there is no explanation of the number`s meaning."

Findings - overview

Occupants` experience

- Confirm that they received user manuals and go-through.
- Not all were run through the use of technical installations (just the one`s who asked for it)
- Little information on energy efficient concept during purchasing process
- Varied experience: enough / too little information
- Some are more interested in understanding and do well. Others practice trial and error.

Findings - overview

Occupants want more

- User-friendly and practical ways to learn about use and possibilities the technical installations offer. Suggested app`s and videos, "for dummies", crash-course.
- Especially when "new" / unfamiliar technologies are used (case with PV, solar collectors)
- General information about the housing concept, e.g. PH, Zero energy.
- Repeat information

Want less:

- Thick, technical manuals.

Conclusion

- In the case where housing developer offered a more service minded system, users were in general satisfied.
- Users were aware of a lack of information
- Least satisfied occupants: In cases without a clear plan for training, especially with uncommon solutions
- frustration and trial and error could have been lower with another type of introduction
- Housing developers had critical reflections on own practice.

Conclusion

Potential for improvement:

- Improve user-friendliness of information
- Spend more time on explaining the systems and transferring knowledge with the goal of establishing habits.
- Improve training of salespersons, adopting a more service-oriented approach in the housing developer industry
- Increase responsibility in follow-up process.

Conclusion - discussion

- Housing developers have to be motivated to instruct the residents!
- Would long-term follow-up contracts help?
- Would incentives help?
- Hand-over phase is only one aspect to approach the energy consumption gap.
- Would a more thoroughly organised hand-over phase diminish the energy consumption gap we commonly find? Or are other factors more dominant?

Thank you for listening!

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75
Nationalities



4000
Customers



NOK 3.1 billion
Revenues

NOK 450 MILL
International sales