The design process for achievement of an office living laboratory with a ZEB standard

1st Nordic Conference on Zero Emission and Plus Energy Buildings (Nordic ZEB +)

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Ill.: LINK Arkitektur/Veidekke

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Content

- The ZEB Laboratory
- The challenge – realising an ambition
- Designing the project delivery
- Integration of the ZEB method
- Lessons learnt

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Vision of the ZEB Laboratory

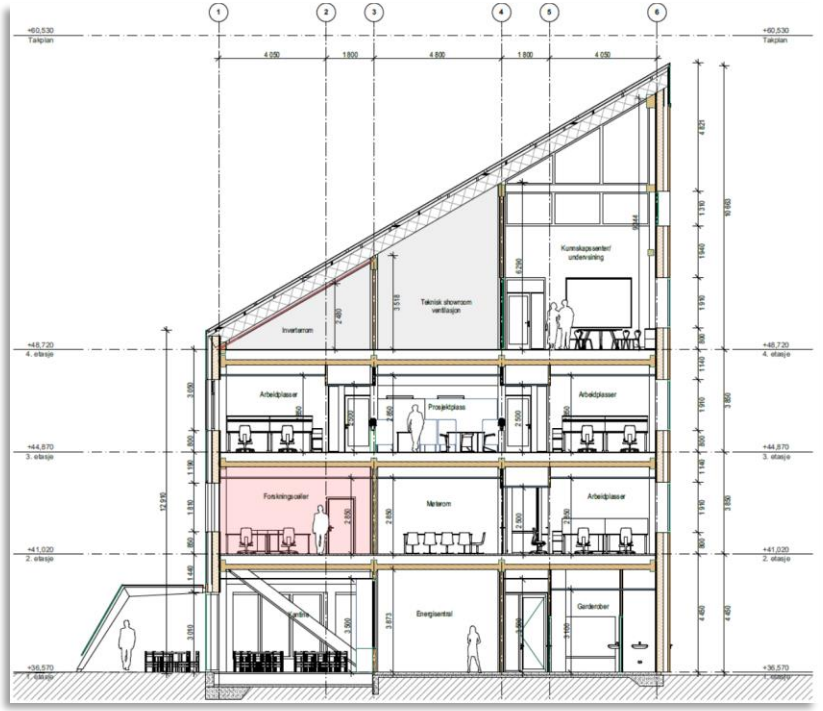
is to be an arena where

innovative solutions are developed,

investigated,

tested,

and demonstrated in mutual interaction with people.



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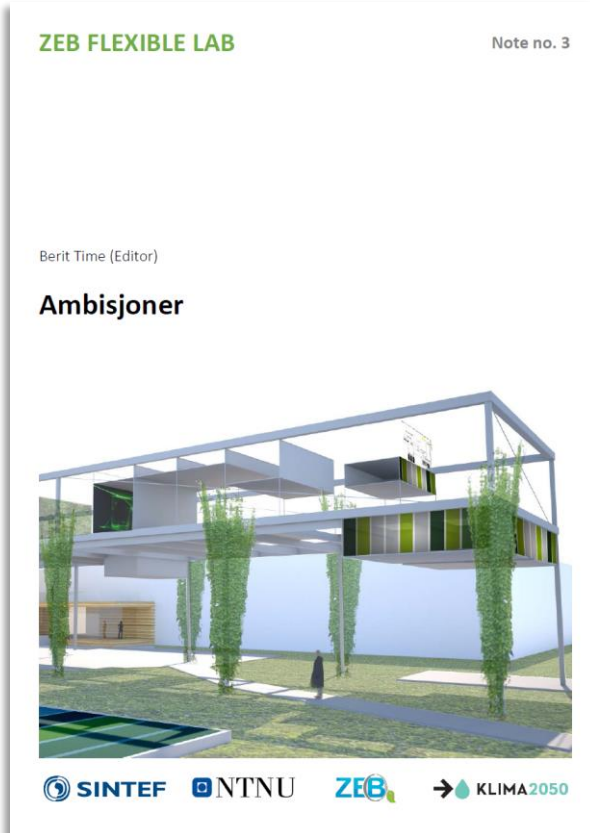
The challenge;

Going from an ambition to constructing a ZEB Laboratory

- The building should be a model project and achieve ZEB-COM level (simulated in a 60 years perspective)
- Separate control and measurement systems, one for ordinary operation and one for research
- Flexibility in design of energy and climatization systems
- Flexibility in design of working spaces
- Progressive selection of materials and enabling rebuilding parts of the facades
- Adaptation of the building to climate change



Designing the project delivery*

* incl.
- Project development
- Procurement
- Contracts

The ZEB Laboratory - a complex project

with ambitions to deliver in areas beyond time, cost and quality

Assessed project delivery models:

- Design-Bid-Built (*Utførelseskontrakt*)
- Design-Build (*Totalentreprise*)
- A collaborative form of project delivery method (*Samspillsmodell*)

Developing the contract

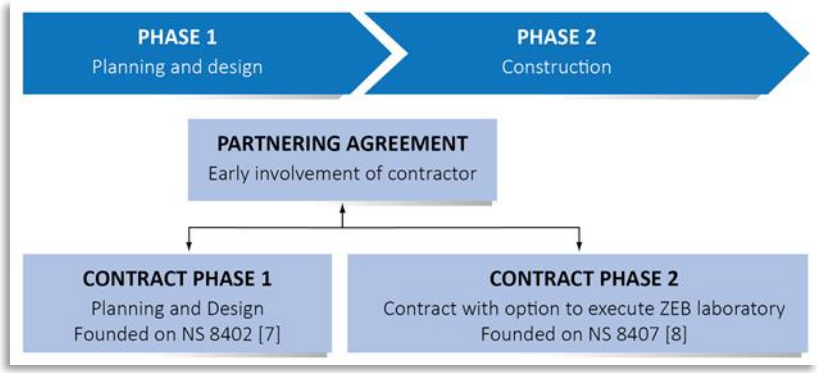
- NTNU/SINTEF, as client, developed a method together with an expert in project delivery methods.
- A partnering contract structure was developed and asked for
- The project delivery - divided into two phases,

  Phase 1; Planning & Design

  Phase 2; Contract with an option to execute ZEB Laboratory (if target cost was accepted)
- A pre-project was developed through an integrated team approach in *Phase 1* and a target cost was established.
- In *Phase 2*, the contractor has the responsibility for the design and the construction, the client contributes.

  The contractor has its expenses compensated, but carries risk when exceeding the target cost.

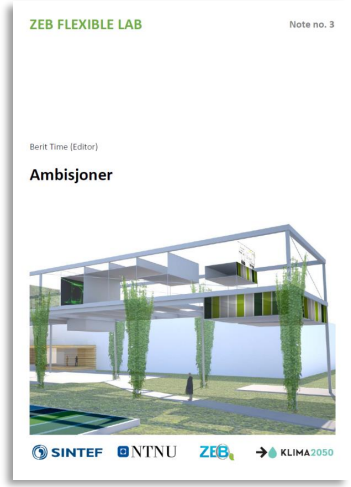
  The client has decision making competence through change mechanisms.



The bid

Focus on

- the content of the contract
  - for planning and design (*Phase 1*) and
  - construction (Phase 2),
- competition rules
- the project
  - the description with the ambitions for the project were made as part of the bid
- overall requirements



Evaluation award criteria and the weighting

- tender amount 0,30
- implementation plan 0,30
- the project organization's expertise and experience 0.40

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The ZEB method

Integrated energy design process (IED)* was used to achieve the ZEB goal in the best possible way

1. It calls for a different approach from the very early stages of design
2. It requires a high level of general skills (energy knowledge in a broad sense) and communication within the team
3. It leads to a high level of integration and synergy of systems
4. It involves modern simulation tools where suitable

*Hestnes A and Eik-Nes N-L (Ed.) (2017) Zero Emission Buildings, Utgave 1, Fagbokforlaget.

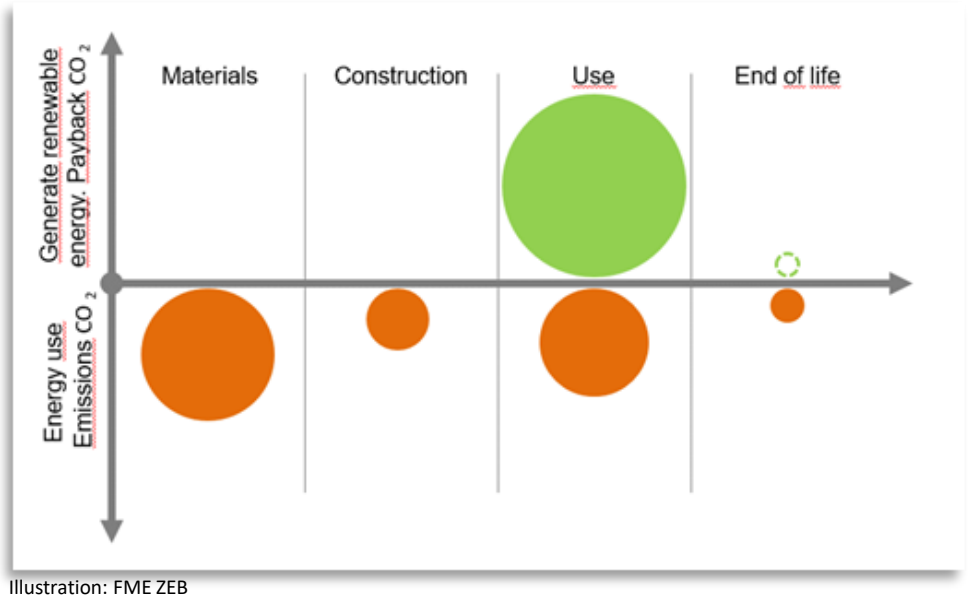
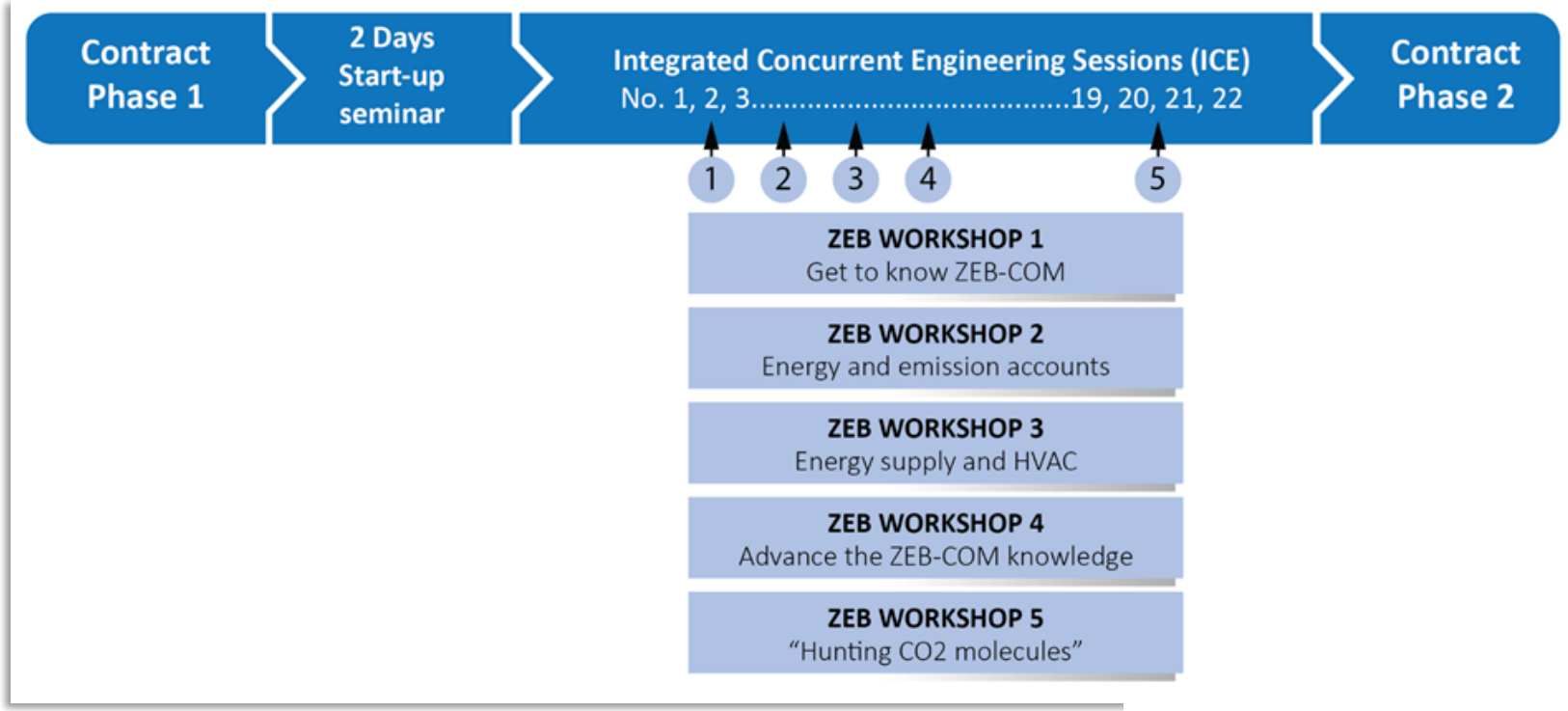


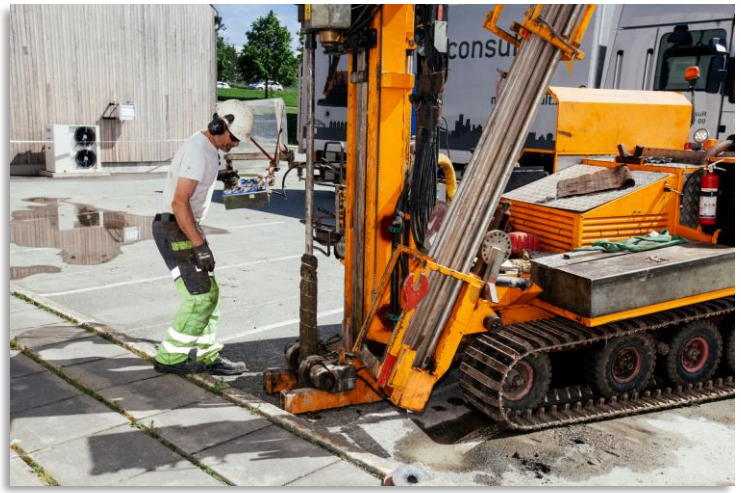
Illustration: FME ZEB

Implementation of measures to perform the ZEB methodology



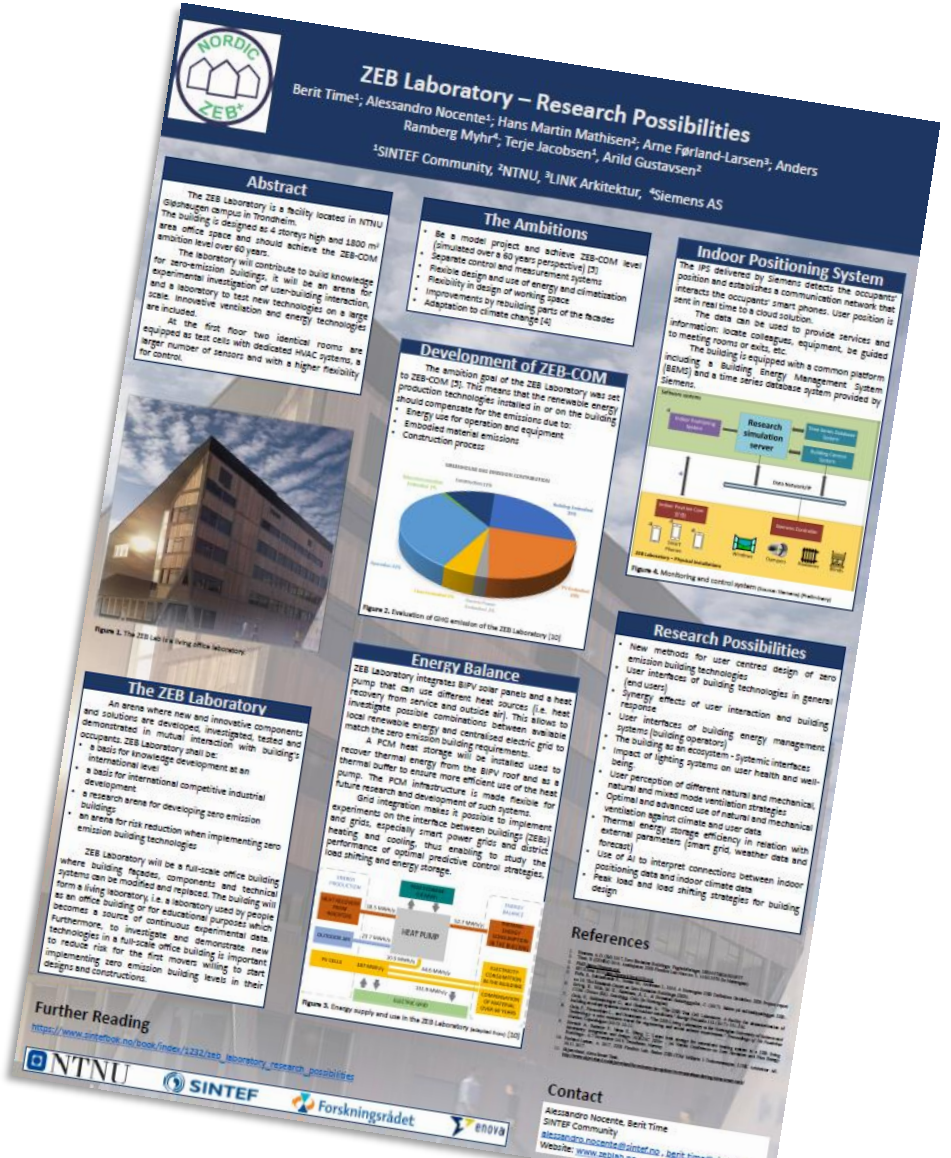
Lessons learnt

- Bring all the actors together early and create professional and social competent teams with little replacement of people
- Anchor the ZEB ambition and common goals initially – the ZEB workshops were a success
- Focus on improvements – use a system for evaluation of the process and mutual evaluation between the parties
- Continuously measure process and progress and keep team members accountable



For more information about the ZEB Laboratory

- Visit the poster presentation
- See www.zeblab.no
- Join conference excursion on the 8th of November



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