



Sammenligning af NZEB krav i den Nordisk-Baltiske region

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INTRODUKTION

- EU anbefalinger for behovet for primær energi (PE) i nye bygninger
- Forskellige klimazoner
- Netto PE behov
- NZEB (nye bygninger) PE med vedvarende energi



Energy use	Zone			
	Medi- terranean Zone 1	Oceanic Zone 4	Continen- tal Zone 3	Nordic Zone 5
	Catania, Athens, Larnaca, Luga, Seville, Palermo	Paris, Amsterdam, Berlin, Brussels, Copen- hagen, Dublin, London, Prague, Warszawa	Budapest, Bratislava, Ljubljana, Milan, Vienna	Stock- holm, Tallinn, Helsinki, Riga, Gdansk, Tovarene
Net PE kWh/(m ² ·y)	0-15	15-30	20-40	40-65
PE w/o RES kWh/(m ² ·y)	50-65	50-65	50-70	65-90
on-site RES kWh/(m ² ·y)	50	35	30	25

Formål

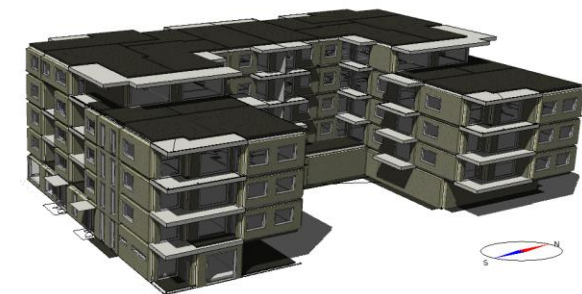
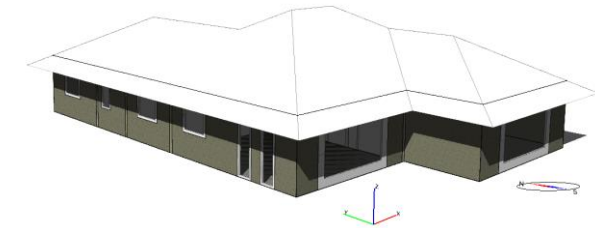
- ▶ Sammenligne metoder for beregning af energibehov i NZEB boliger
- ▶ Analyse af landenes energikrav og sammenligne med EUs anbefalinger
- ▶ Fokus på "Oceanic" og "Nordic" klimazone i Danmark, Estland og Finland

Metode

- Sammenligning af klimadata
- Sammenligning nationale krav i form af nøgletal (energiramme)
- Udvælgelse af NZEB boliger
- Beregning af bygningernes energimæssige ydeevne – nationale metoder
- Beregning af bygningernes energimæssige ydeevne jf. EN 16798-1:2019
- Justering af lokal produktion af vedvarende energi (VE) produktion for at møde nationale krav

Metode

- To boliger:
 - typisk dansk etplanshus
 - Fem etagers boligblok bygget i beton (Estland)
- Bygningerne er designet til at møde nationale NZEB krav (svarende til BR18 i Danmark)
- Dynamisk simulering med IDA-ICE og beregning med Be18



RESULTATER

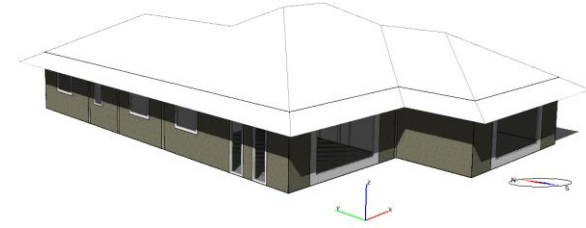
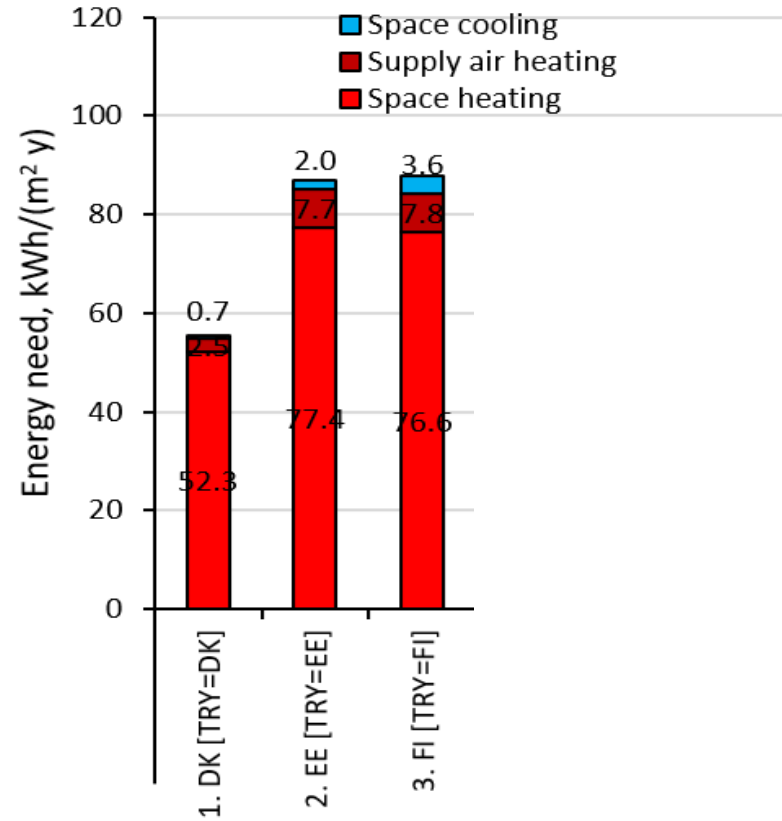
Nogle vigtige forskelle:

- ▶ Alle
 - ▶ klima
 - ▶ primære energi faktorer
 - ▶ brug af bygningerne, systemeffektivitet, fordelingstab, ventilation luftmængder
- ▶ Danmark
 - ▶ el fra udstyr og belysning er ikke med i beregninger
 - ▶ maksimum grænse for hvor meget lokalt produceret VE el der må indregnes
- ▶ Estland
 - ▶ yderligere PE krav: uden VE
 - ▶ kun egetforbrug af VE indgår i beregningen

RESULTATER

Forskelle i metode og klima - energibehov

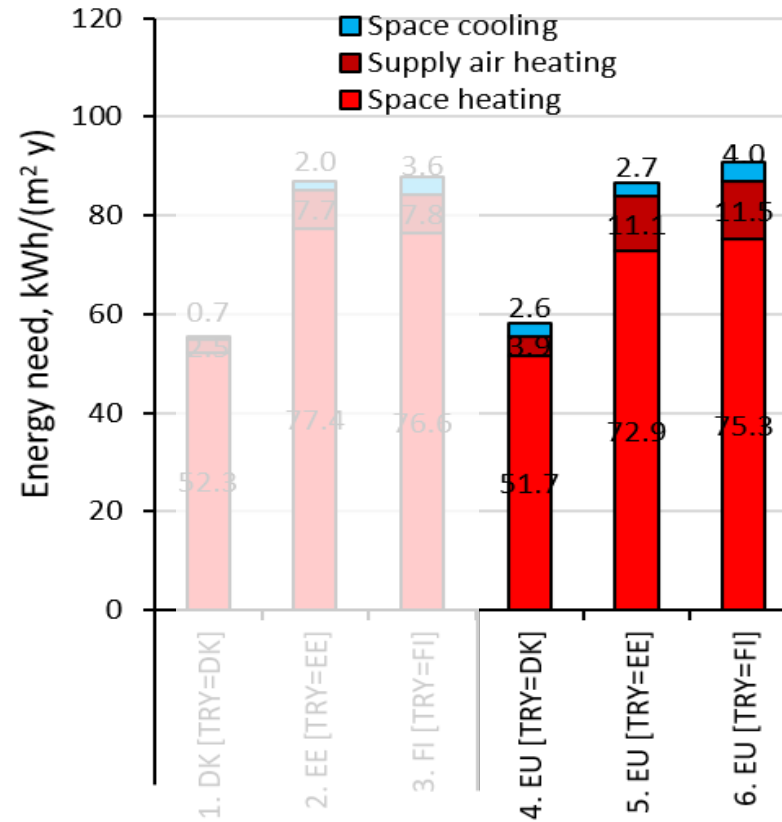
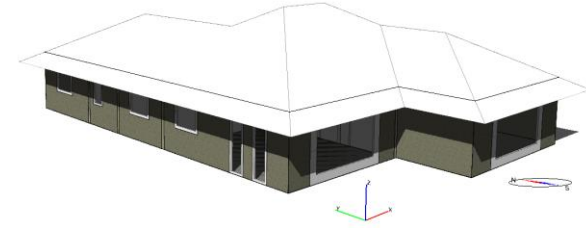
- Nationale



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Forskelle i metode og klima - energibehov

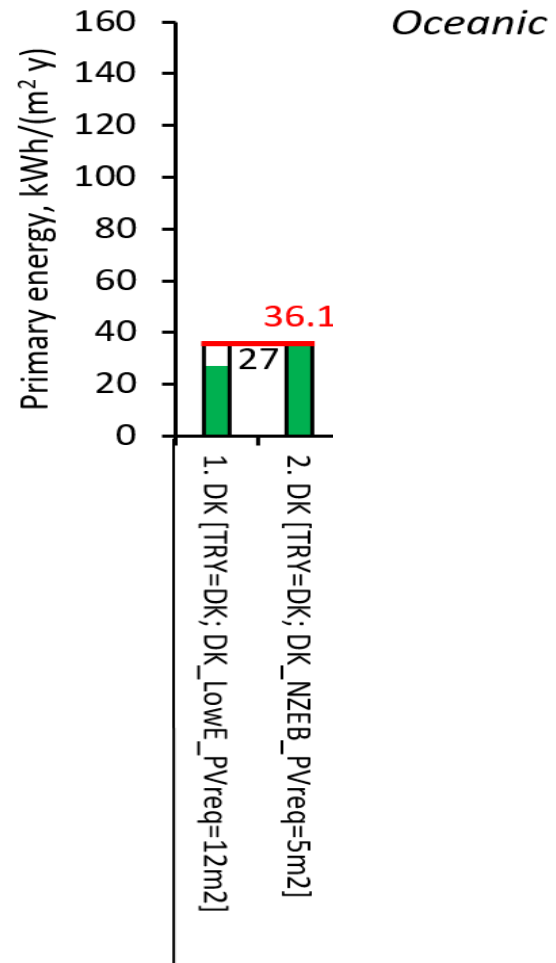
- National
- Standardiseret



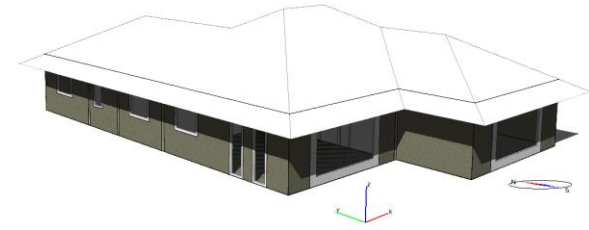
RESULTATER

Årligt behov for PE i reference enfamiliehuset

- Danmark



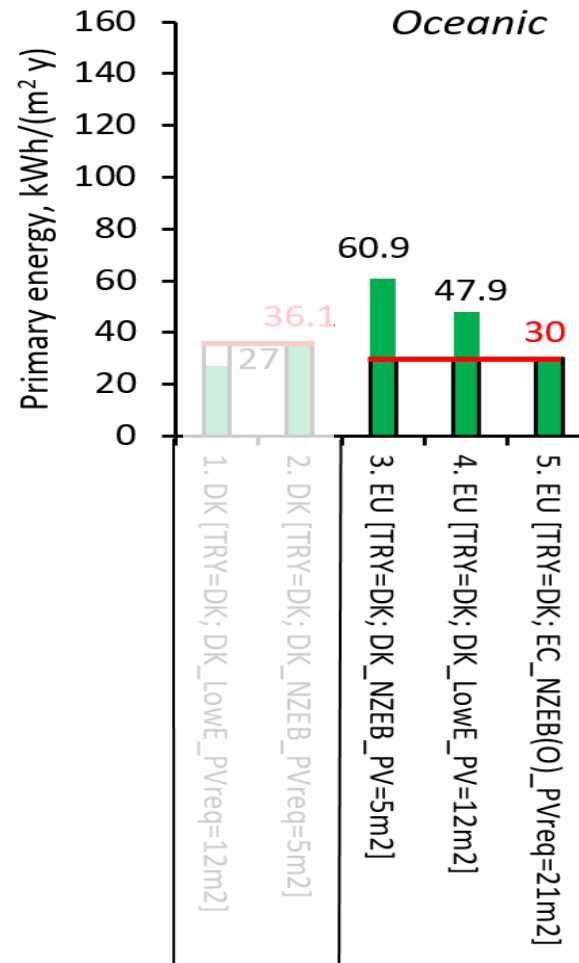
■ Calculated
□ NZEB requirement



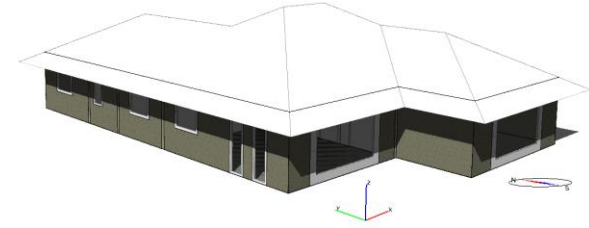
RESULTATER

Årligt behov for PE i reference enfamiliehuset

- Danmark
- Standardisret
 - DK TRY



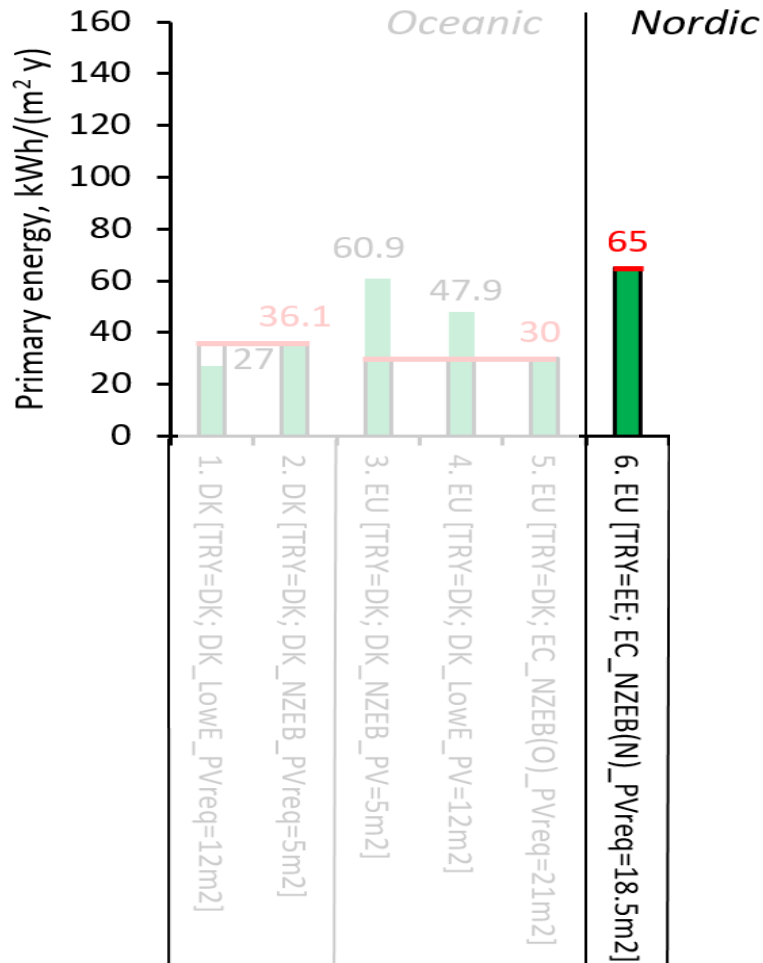
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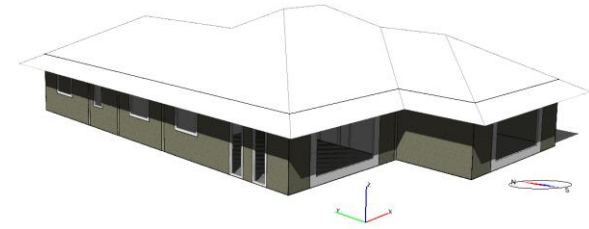
RESULTATER

Årligt behov for PE i reference enfamiliehuset

- Danmark
- Standardiseret
 - DK TRY
 - EE TRY



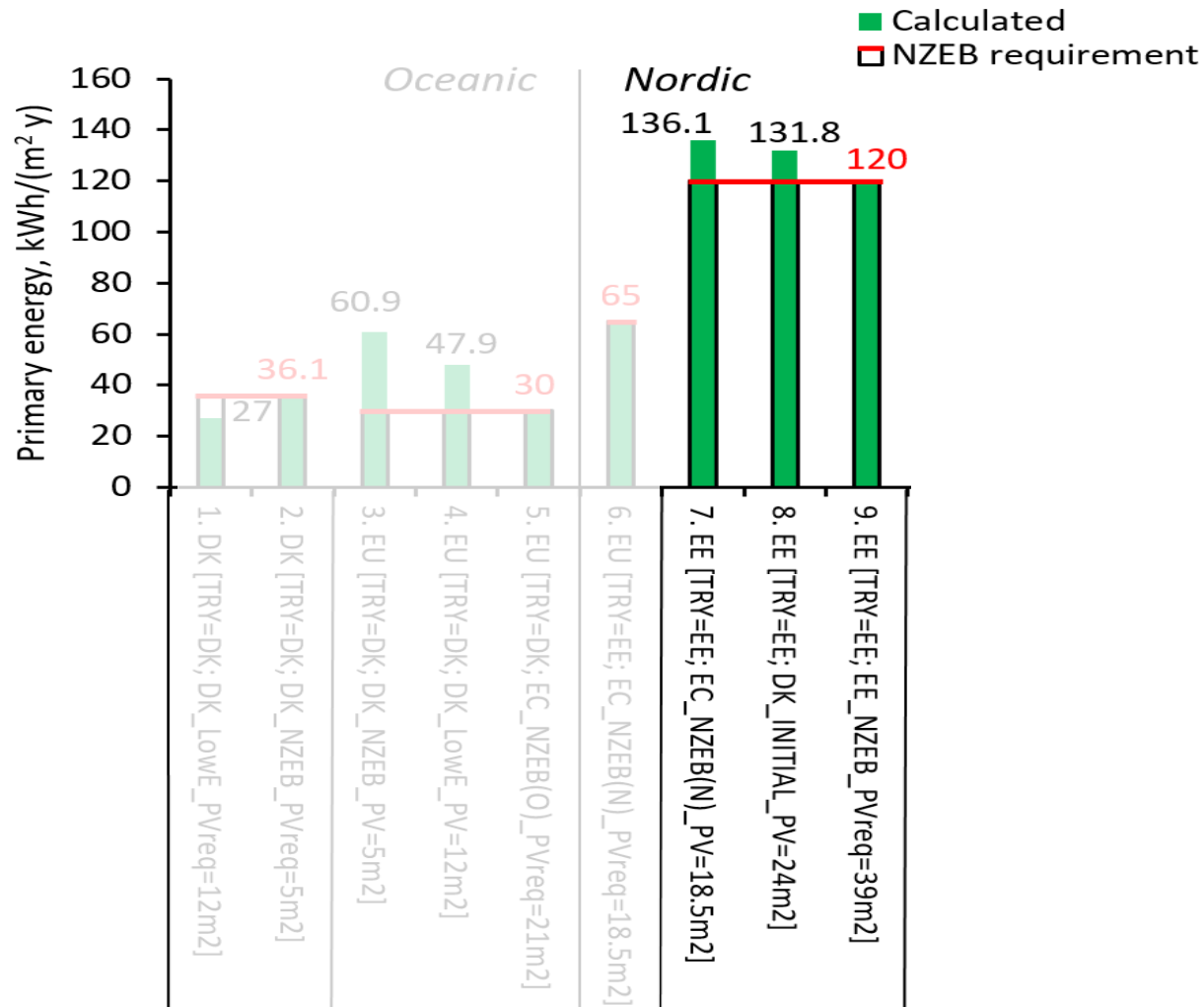
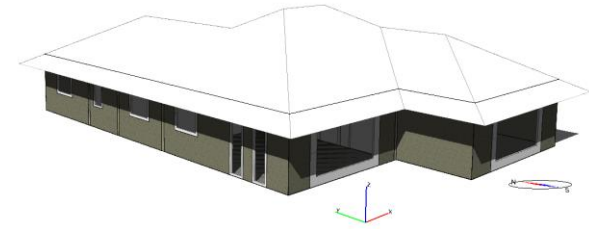
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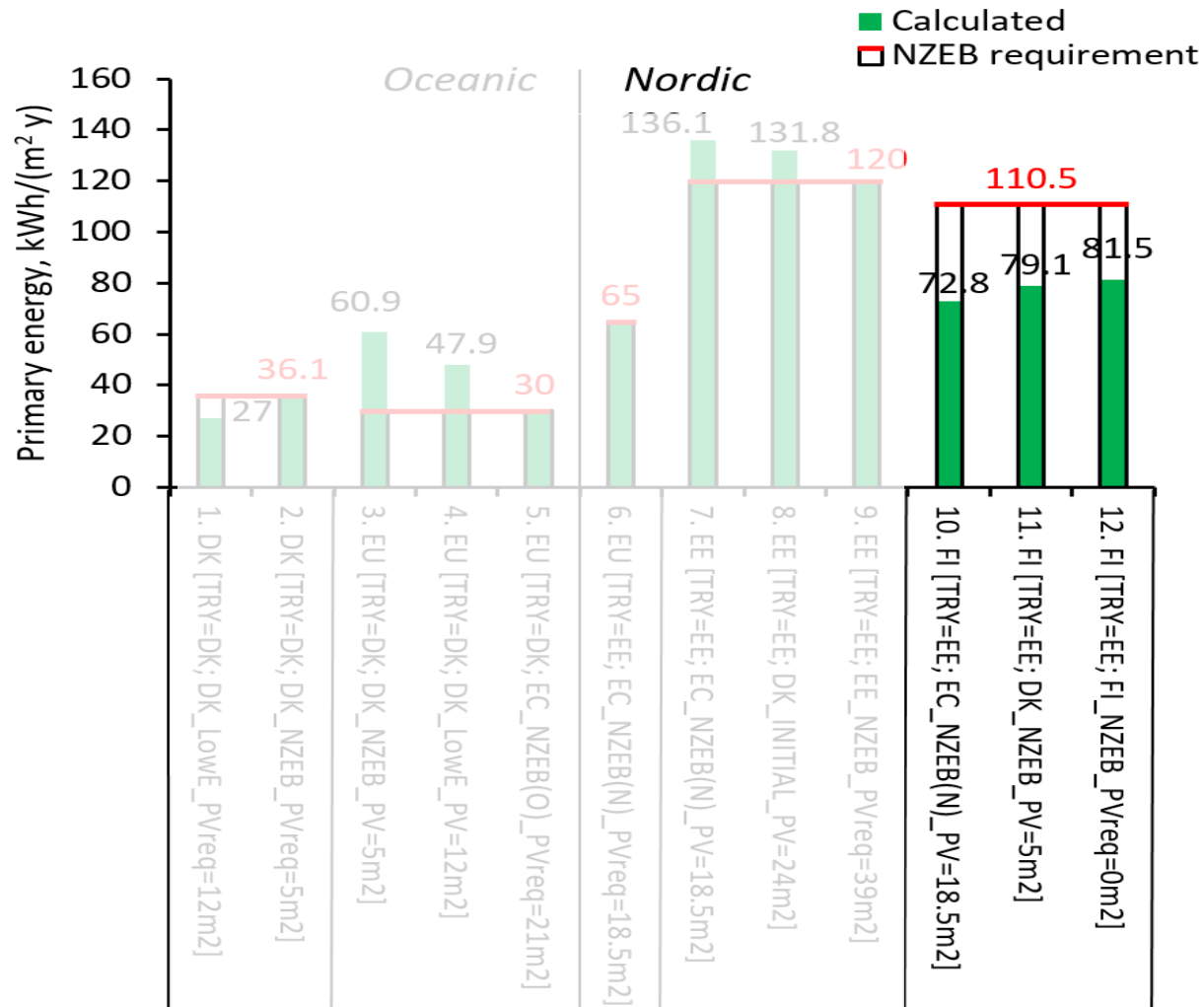
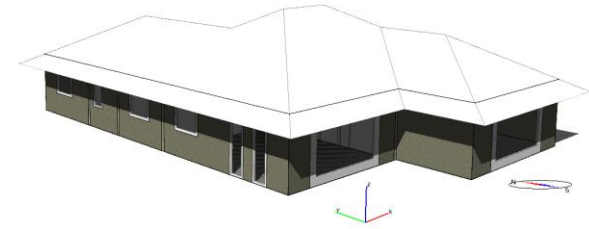
- Danmark
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 - EE TRY
- Estland



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Årligt behov for PE i reference enfamiliehuset

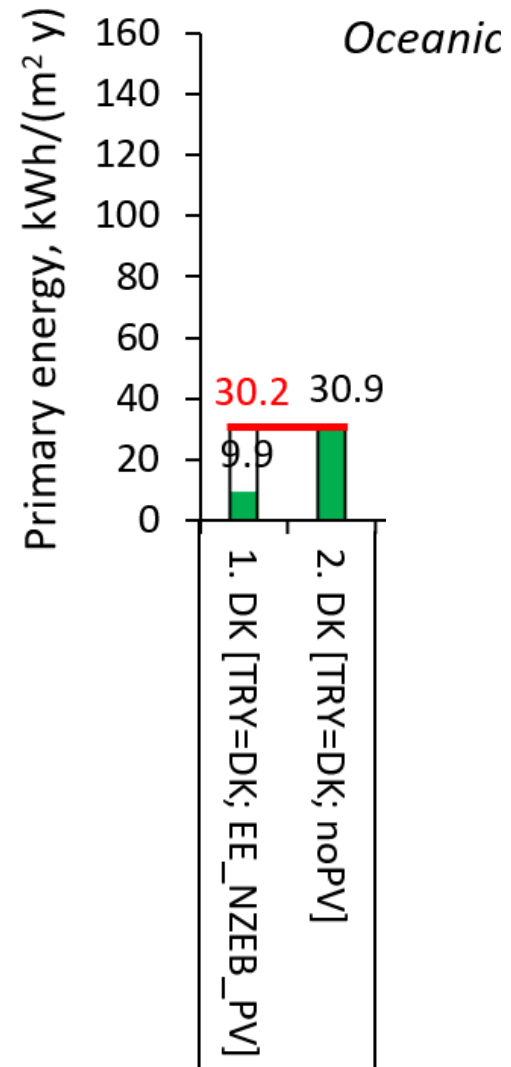
- Danmark
 - Standardiseret
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 - EE TRY
- Estland
- Finland



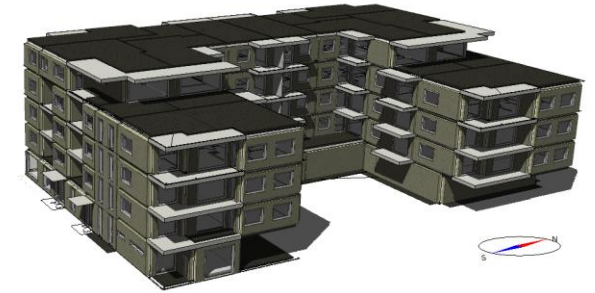
RESULTATER

Årligt behov for PE i reference etageboligen

- Danmark



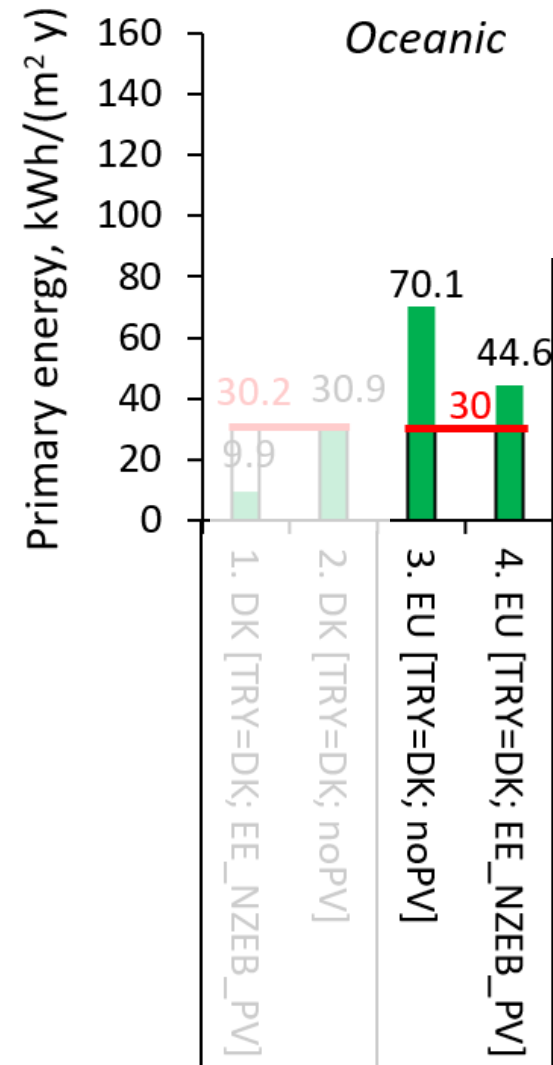
■ Calculated
□ Requirement



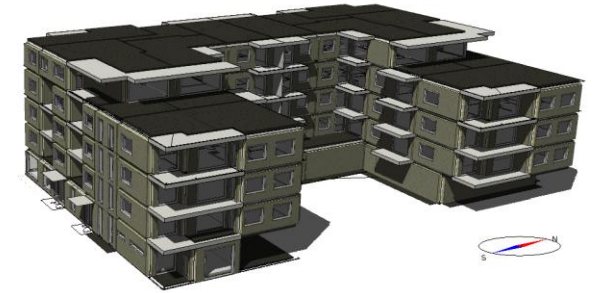
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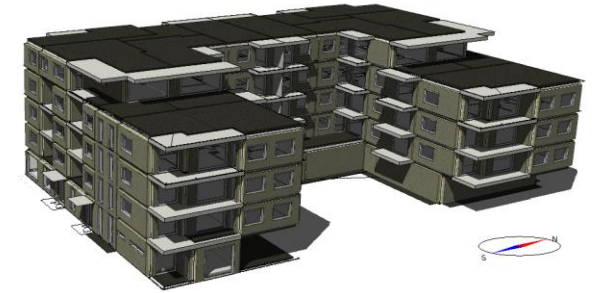
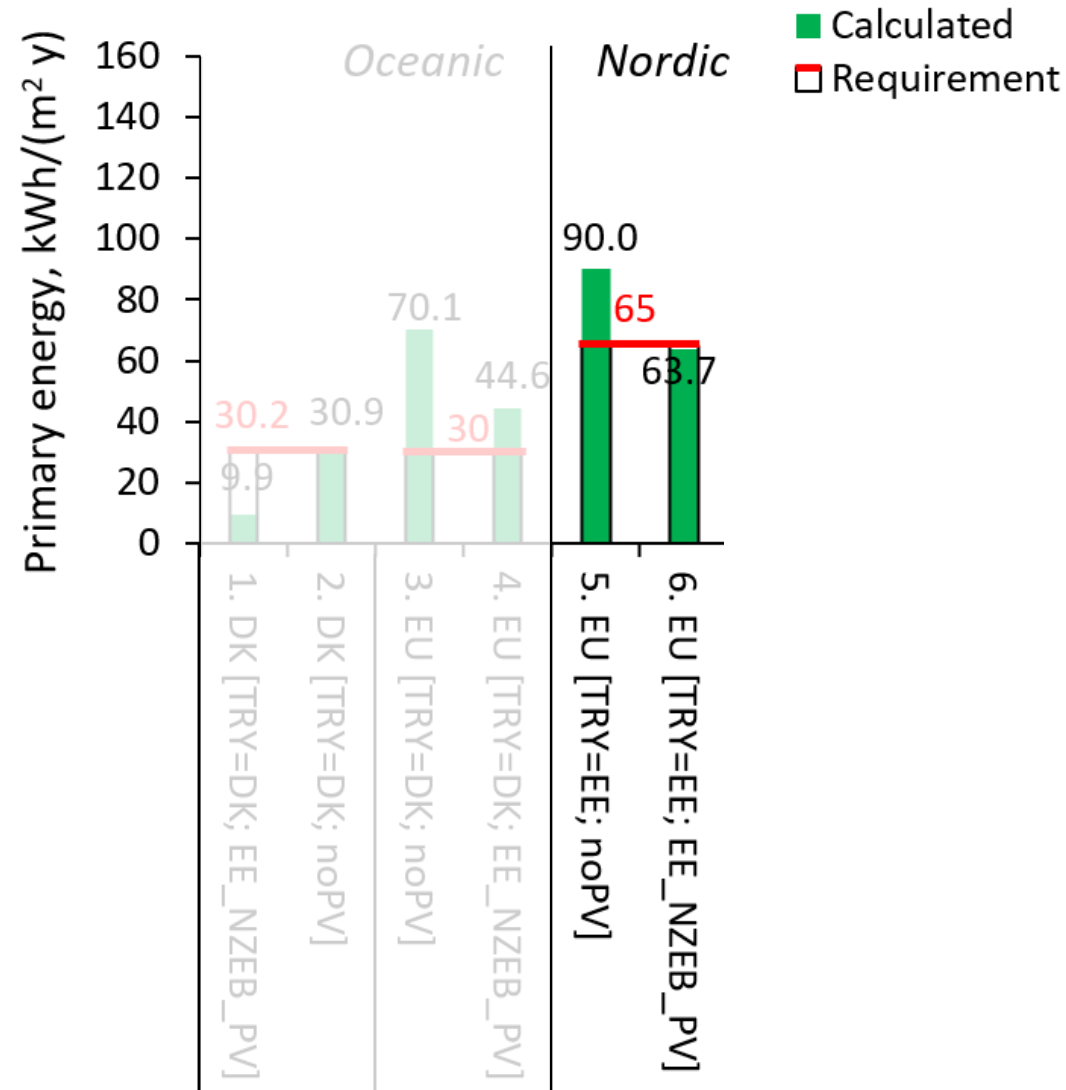
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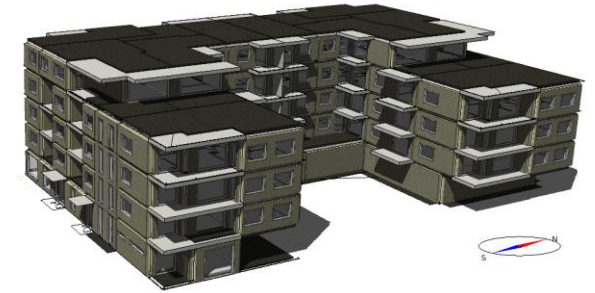
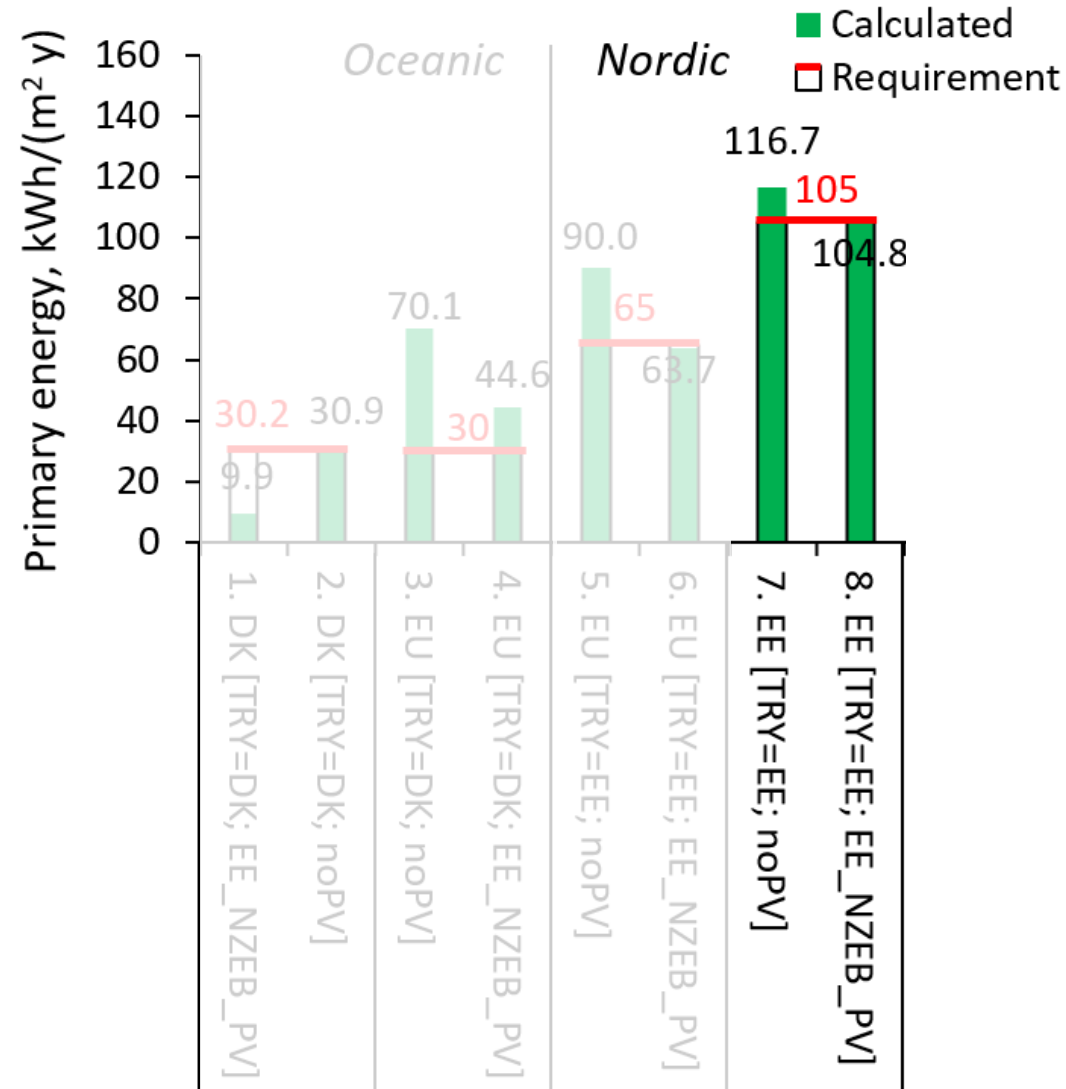
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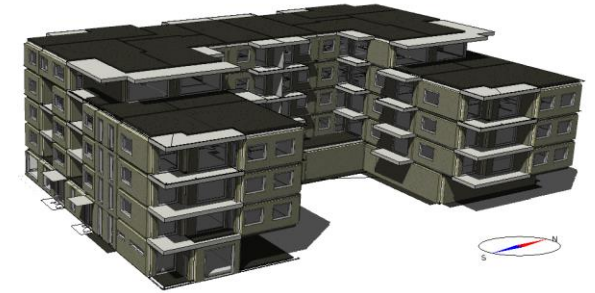
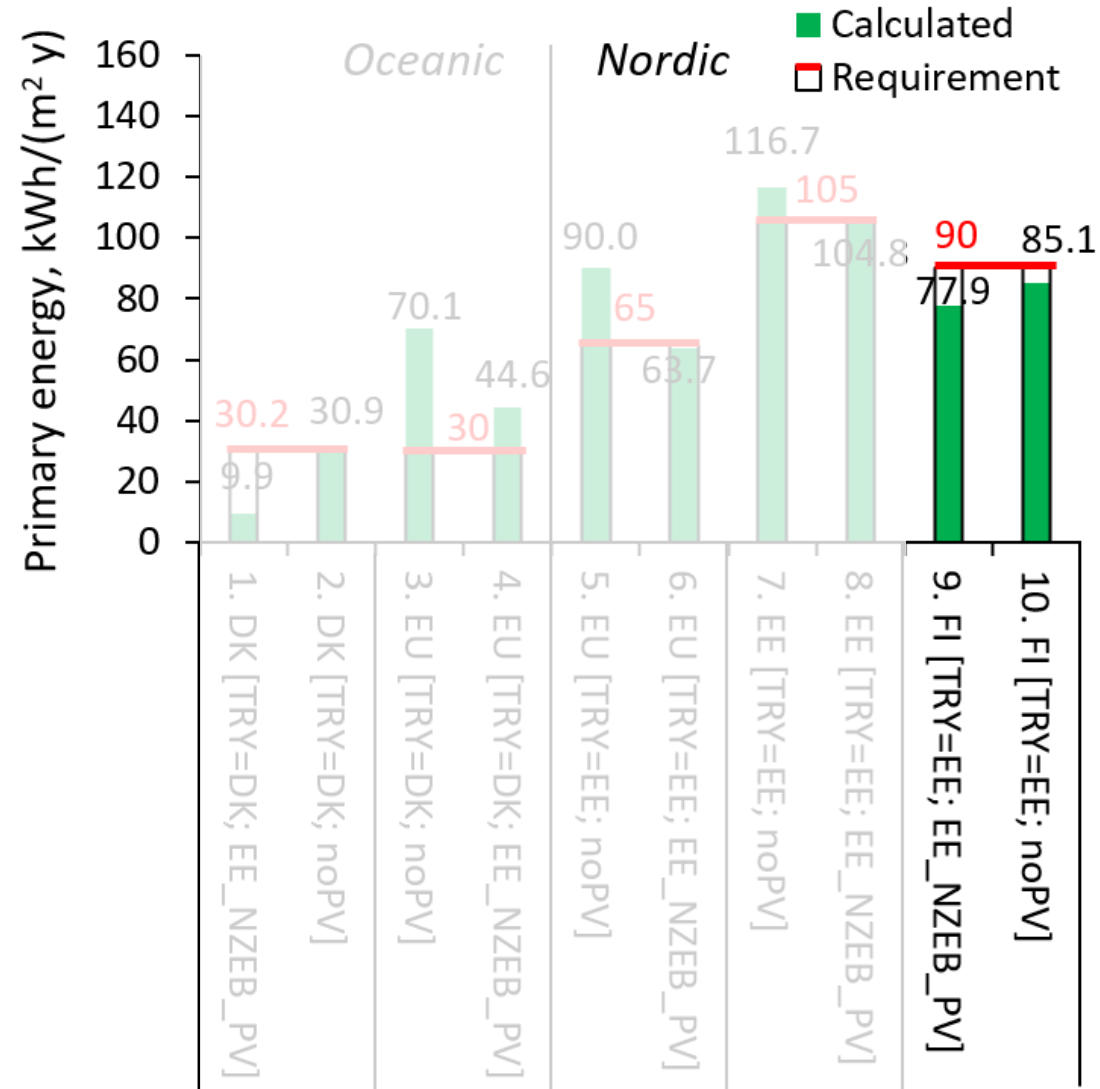
- Danmark
 - Standardiseret
 - DK TRY
 - EE TRY
- Estland



RESULTS

Årligt behov for PE i reference etageboligen

- Danmark
 - Standardiseret
 - DK TRY
 - EE TRY
- Estland
- Finland



Konklusioner

- 🕒 Oceanic zone - EU's anbefalinger for NZEB boligers behov for PE ser ud til at kræve en relativt bedre energimæssig ydeevne sammenlignet med anbefalingerne for den Nordiske zone.
- 🕒 Anbefalingerne nås med en jord-vand varmepumpe og en større solcelle installation som overskrider de danske nationale krav til i både BR18 og lavenergiklassen.
- 🕒 Estiske krav ligger meget tæt på EU's anbefaling til NZEB i den nordiske klimazone.
- 🕒 Finske krav er mindre skrappe og overholder ikke EU's anbefalinger til NZEB boliger i den nordiske klimazone.
- 🕒 Studiet viser, at der er behov for to sæt af krav: med og uden krav til lokal produktion af vedvarende energi (Danmark og Estland)

BUILD rapport udkommer snarest

- ❖ In case of the Oceanic zone, the EC recommendations for residential NZEB PE appear to require relatively higher energy performance compared to the Nordic zone recommendations. This is illustrated with the case of Denmark, located in colder part of the Oceanic zone. A highly insulated reference apartment building with district heating and PV fulfilling EC Nordic NZEB recommendation exceeded EC Oceanic NZEB recommendation. At the same time, a reference detached house with ground source heat pump and extensive PV installation was capable to meet EC Oceanic NZEB recommendation. However, this performance level clearly exceeded Danish NZEB and Low Energy.
- ❖ In the Nordic climate zone, Estonian NZEB requirements complied very closely to EC Nordic NZEB recommendation. Finnish NZEB requirements were less strict and did not fulfil EC Nordic NZEB recommendation.
- ❖ Incl. comparative calculations/analyses of typical NZEB office buildings.

Projektet er støttet af Nordic Energy Research – projekt no.: 96752 - *Know/edge sharing an NZEB buildings in the Nordic-Baltic region* som et samarbejde mellem AAU og TalTech

BUILD

Nordic-Baltic NZEBs

Exchange of experiences

