Influence of occupant behavior and operation on performance of a residential Zero Emission Building in Norway

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ZEB The Research Centre on Zero Emission Buildings

Nullutslippsbygg
– fra forskning til praksis

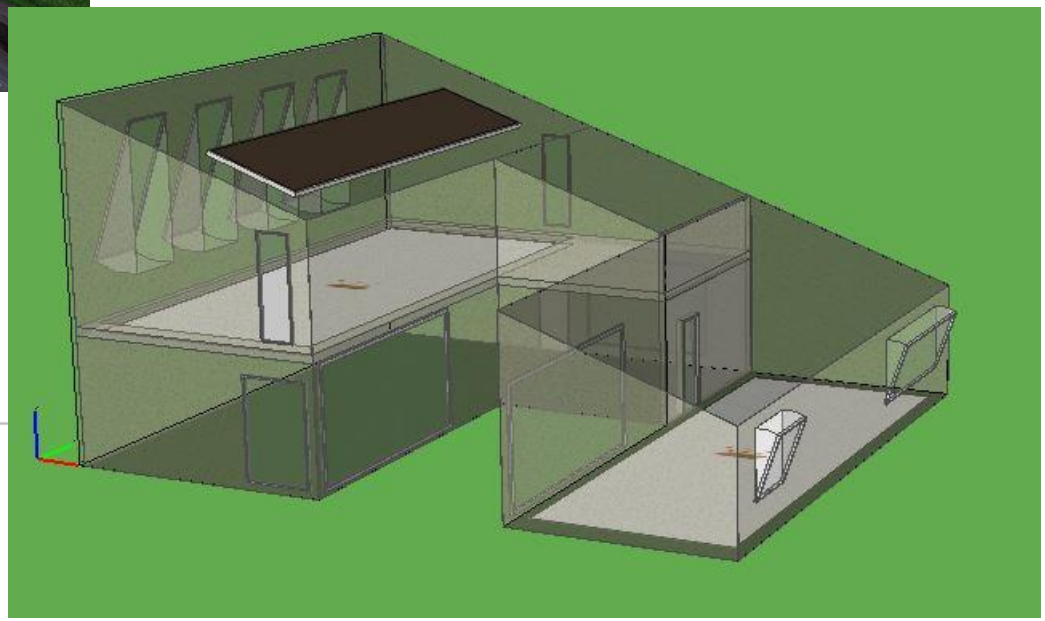
FME Forskningssenter for miljøvennlig energi

Building description

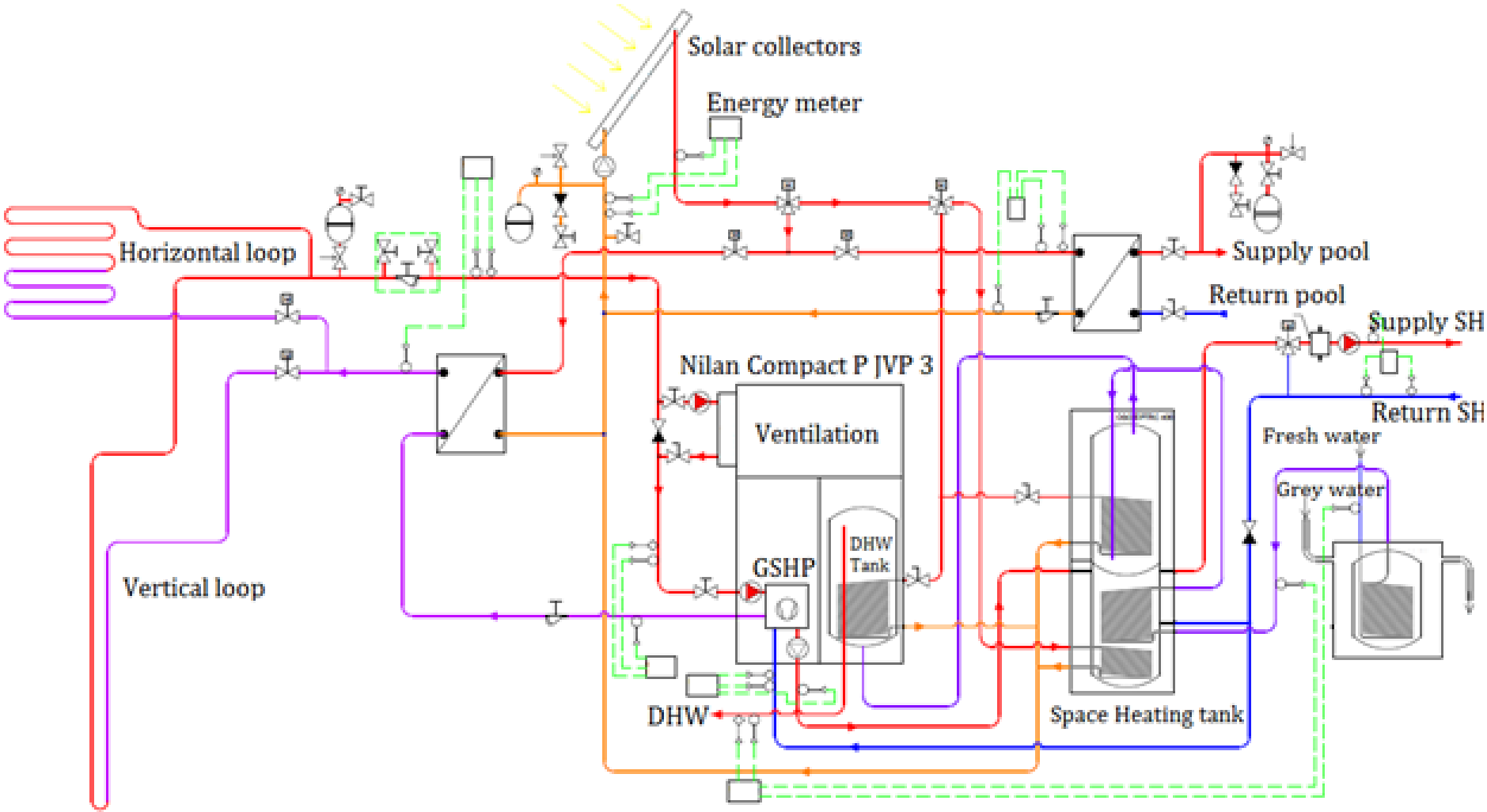
Architecture

- Zero emission building with the ambition level ZEB-Operation and Maintenance
- Two story family home with a floor area of 202 m^2
- **IDA-ICE** simulation program was used to perform the

http://www.multikomfort.no/prosjekthus/huset-i-larvik/

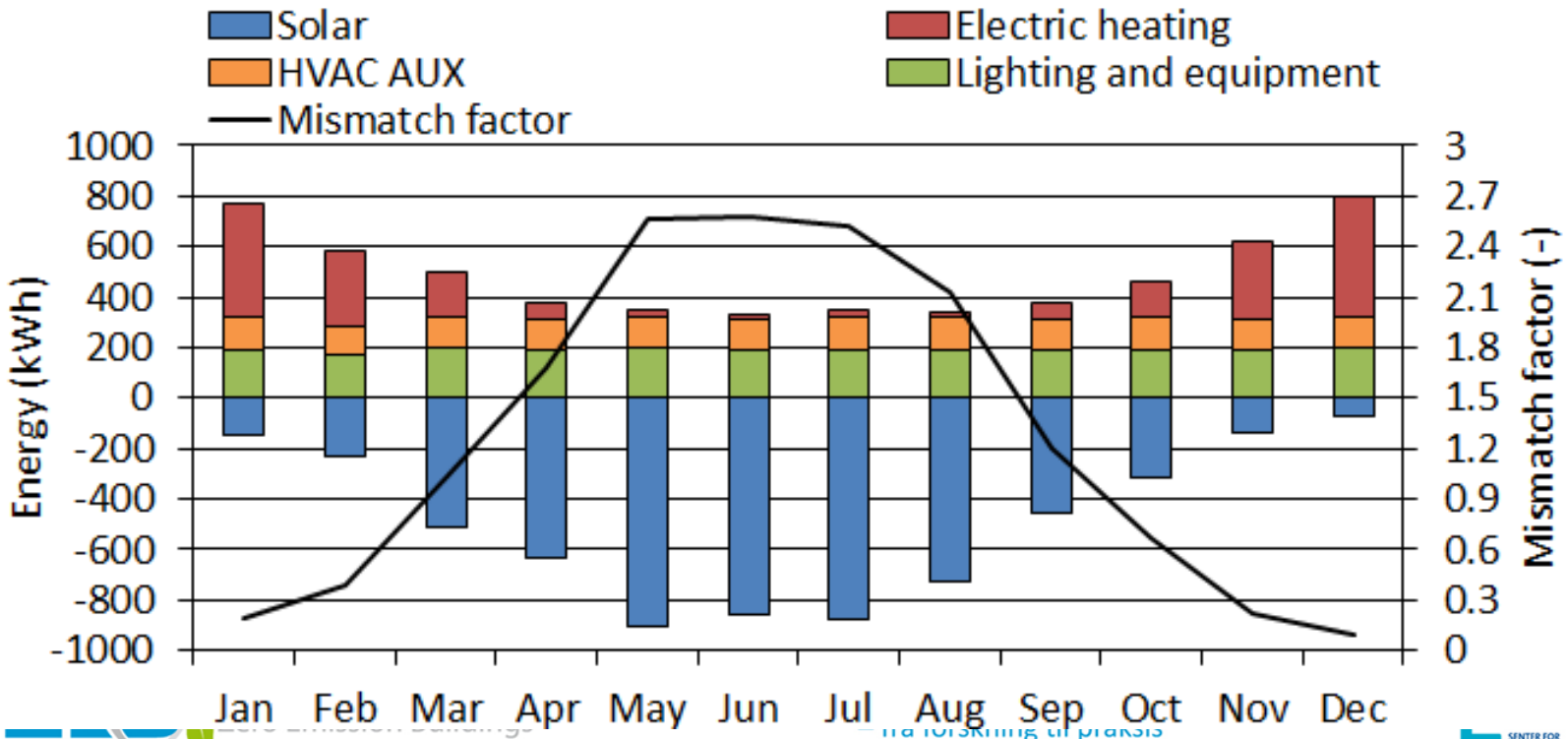


Energy supply system



Electricity use and production

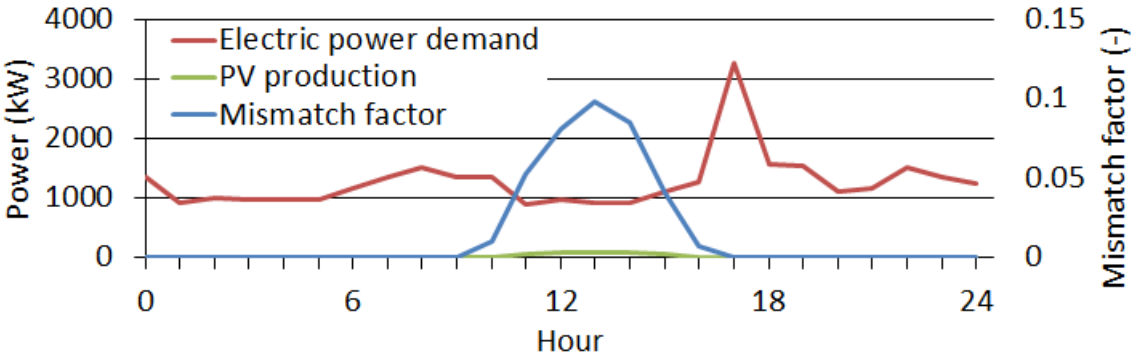
- The total specific electricity demand was 5 869 kWh/year or 29 kWh/m^2
- Heating contributed with 17.8 kWh/m^2
- PV area of 37.75 m^2



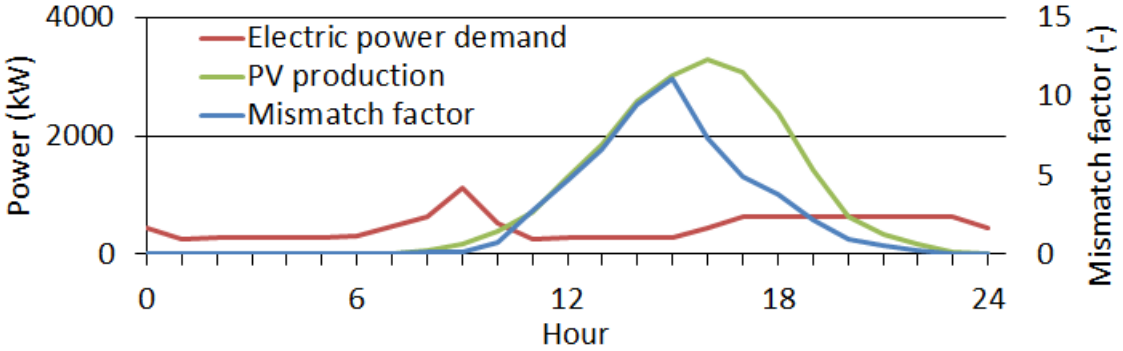
Mismatch factors on hourly level

- Hourly mismatch factors varies a lot over the year
- A problem for the energy system due to ZEBs is that ZEB may cause big stress at the energy infrastructure

Winter day – ZEB behaves as a usual building



Summer day – ZEB produces much more energy than it uses



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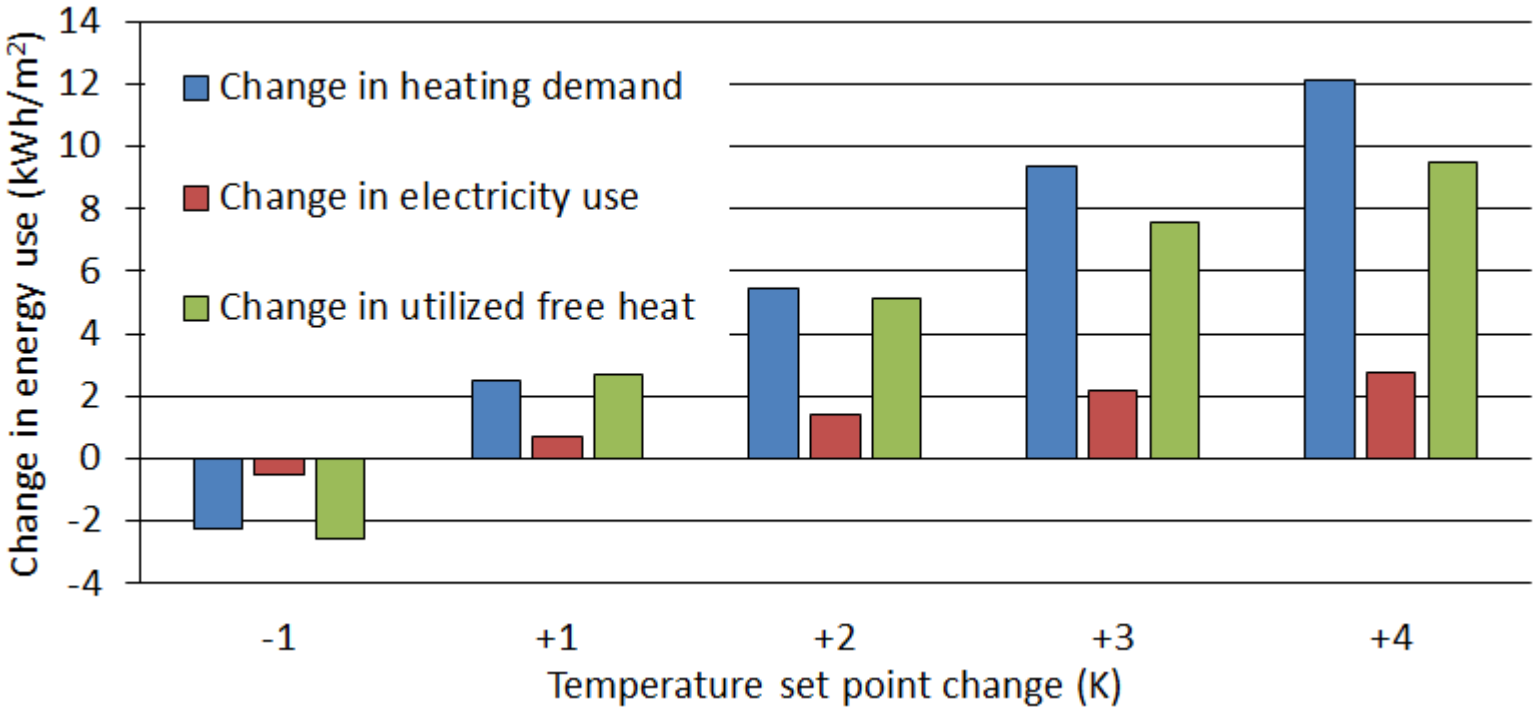
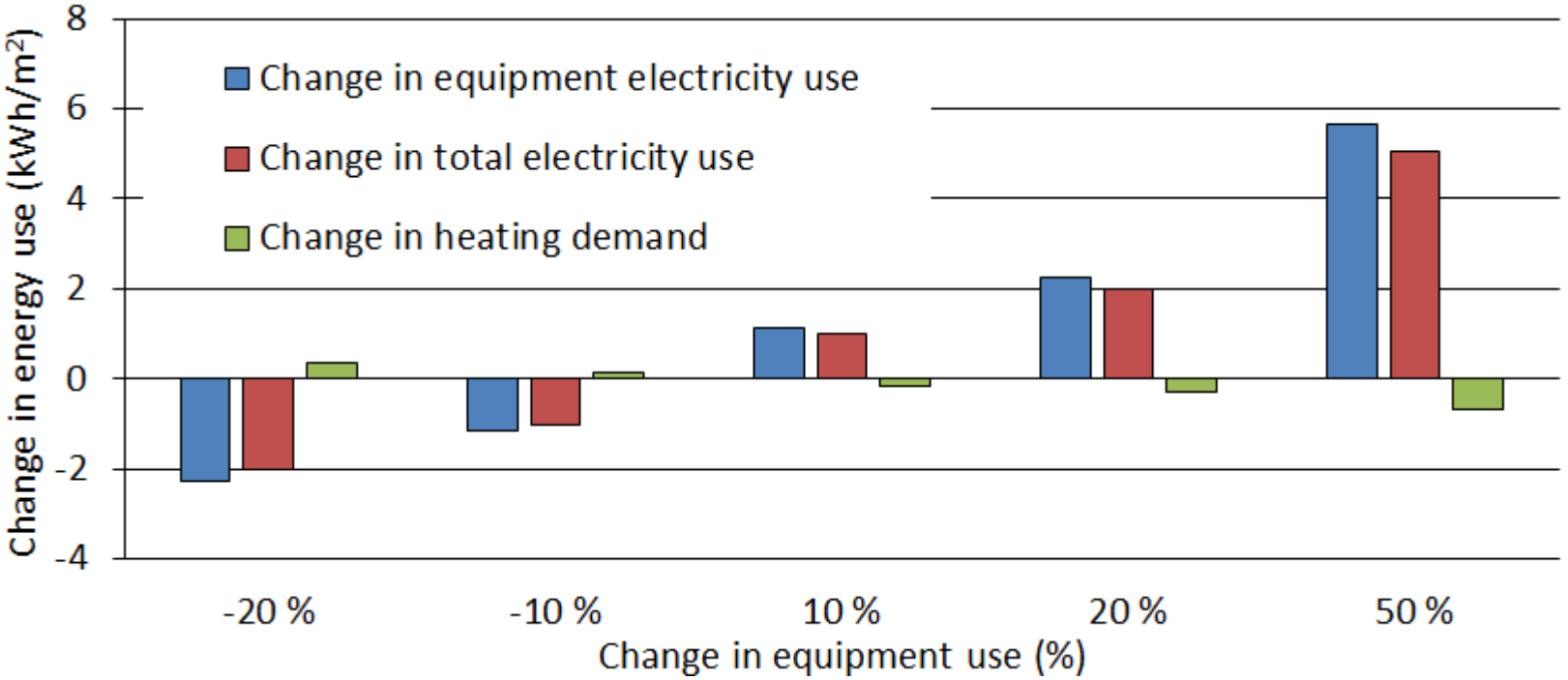
Influence of setpoint temperature on ZEB performance



Annual mismatch factors

Scenario	-1K	Reference	+1K	+2K	+3K	+4K
Mismatch factor	1.02	1.00	0.98	0.95	0.93	0.91

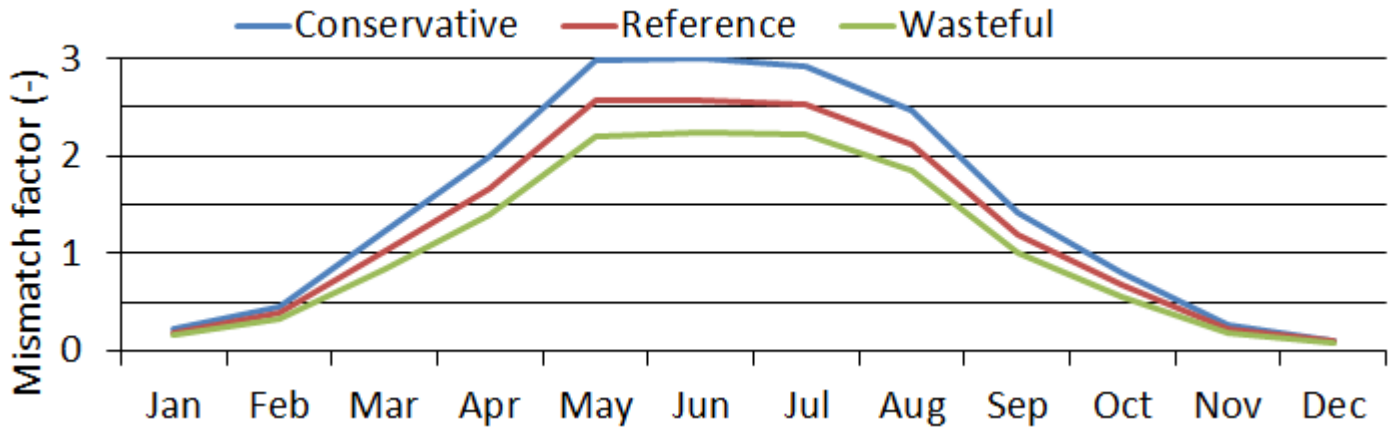
Influence of electrical equipment use on the ZEB performance



Annual mismatch factors

Scenario	EQ -20%	EQ -10%	Reference	EQ +10%	EQ +20%	EQ +50%
Mismatch factor	1.07	1.04	1.00	0.97	0.93	0.85

Overall influence of occupant behavior on ZEB performance



Annual mismatch factors

Scenario	Description	Value
Conservative	EQ and DHW decreased 20% and Tin lower for -1K	1.16
Reference	Standard values	1
Wasteful	EQ and DHW increased 20% and Tin higher for 2 K	0.85

Thank you for your attention!

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