Efficiency of BIPV system – Field study in Norwegian climate

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RISK REDUCTION THROUGH CLIMATE ADAPTATION
OF BUILDINGS AND INFRASTRUCTURE

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Roof tilt	30°
PV	poly-Si REC 260PE
Efficiency	15.8 %
Area (gross modules/total)	1.65/79.2 m²
Total installed power	12.48 kWp
Inverter power per roof	5.25 kW
Weight	10.9 kg/m²

The aim of this work has been to evaluate calculated and measured solar production of two BIPV roofs with identical PV installations.

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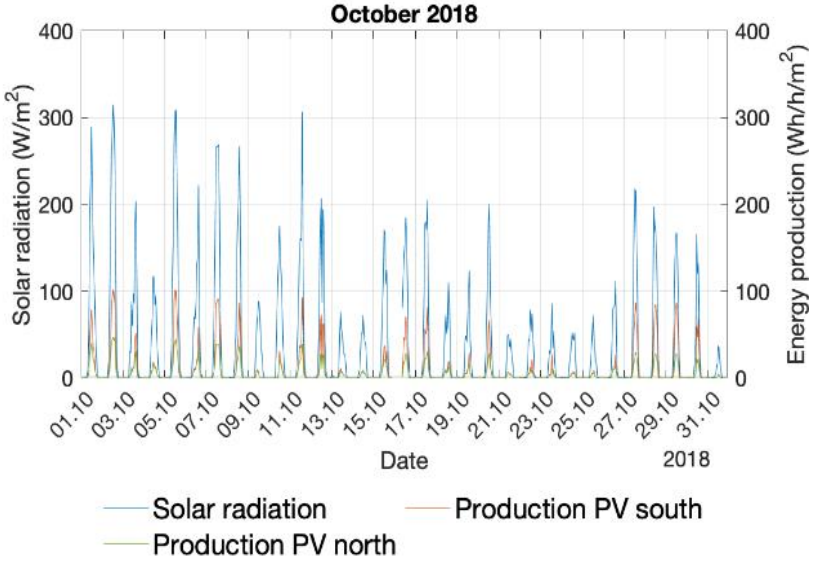
Method

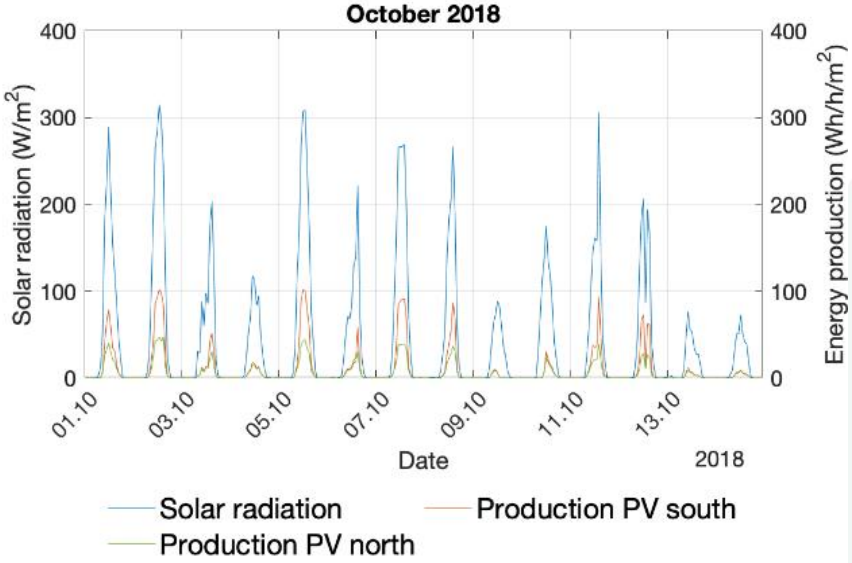
Labview:

Measured data from the PV roof (Logging interval of 30 sec) september 2018 – January 2019.

PV Sol:

Calculated energy production using measured climate data in proximity of the ZEB Living Lab.


October 2018
Solar radiation (W/m2)
Energy production (Wh/h/m2)
400
300
200
100
0
01.10
03.10
05.10
07.10
09.10
11.10
13.10
15.10
17.10
19.10
21.10
23.10
25.10
27.10
29.10
31.10
Date
2018
Solar radiation
Production PV south
Production PV north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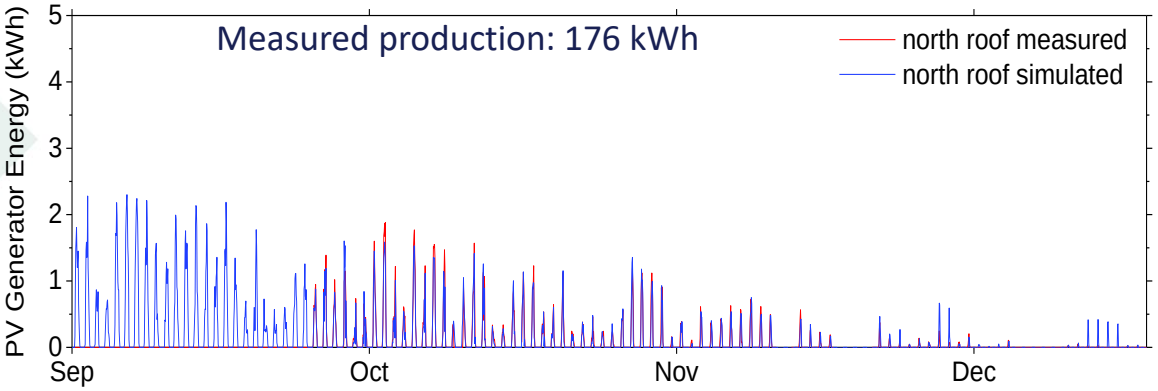
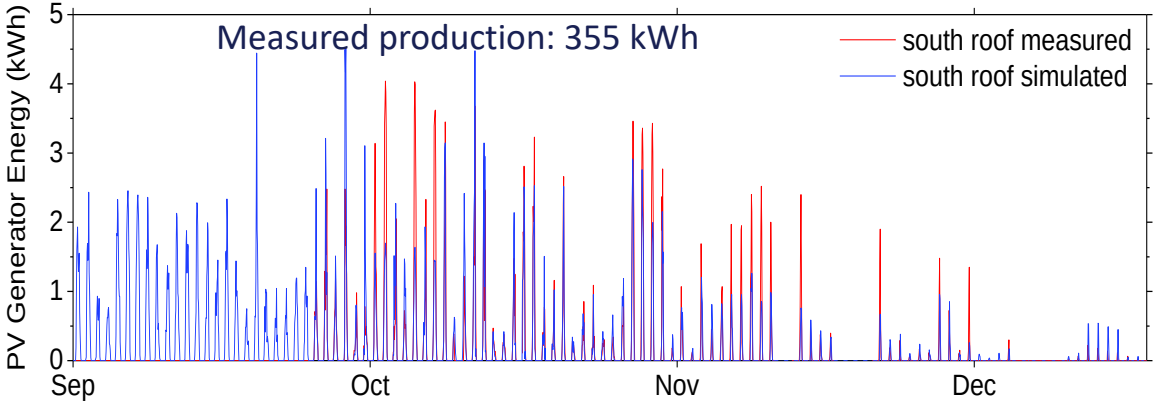
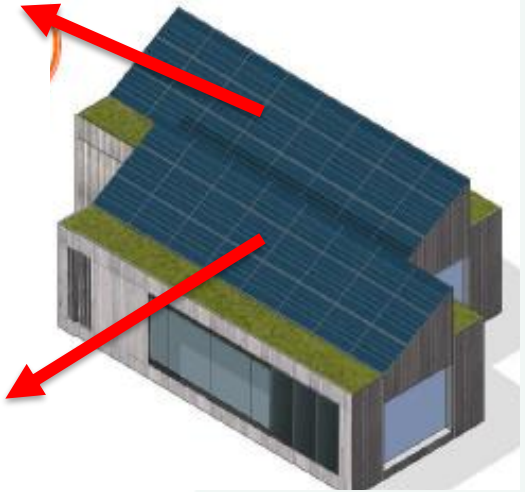
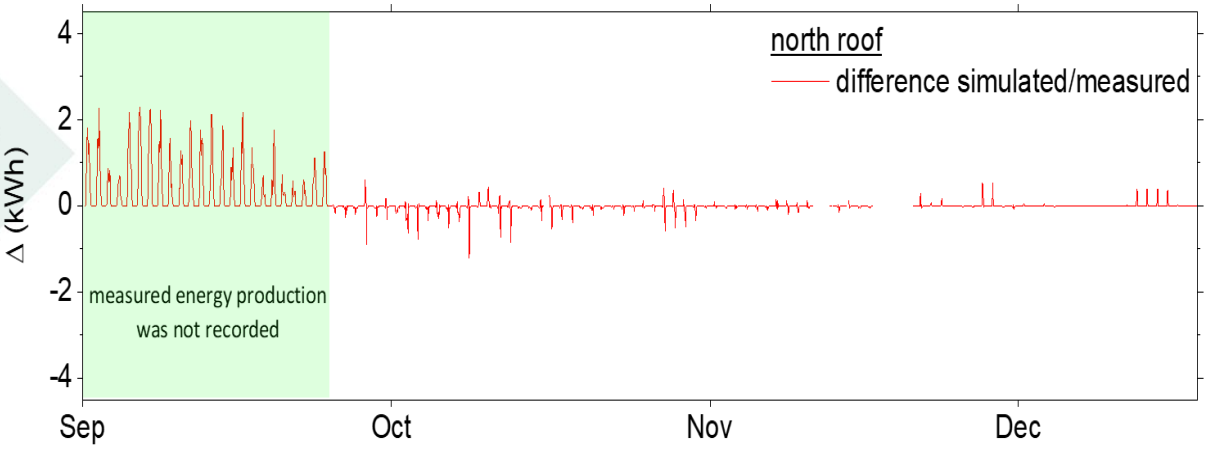
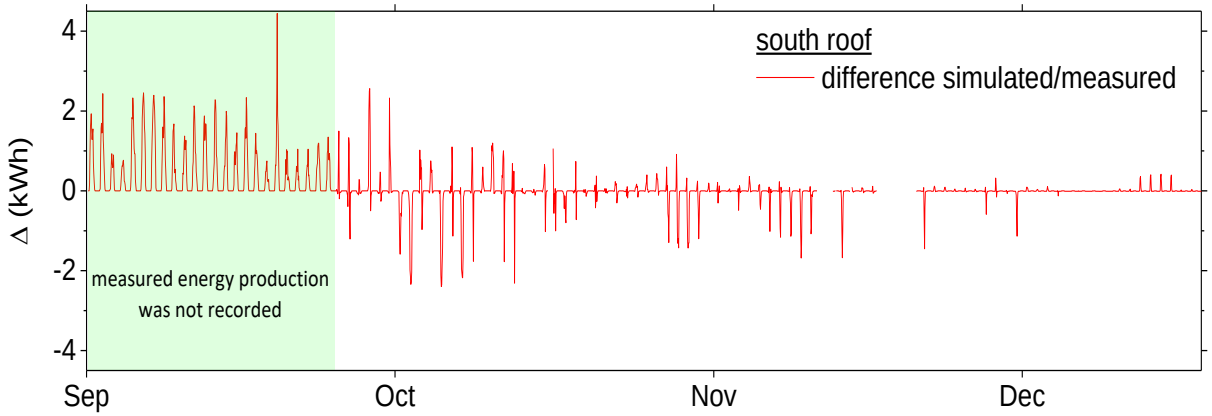
Solar radiation
Production PV south
Production PV north

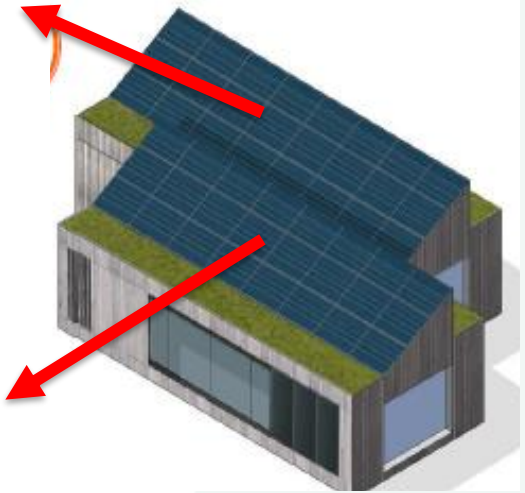

Measured production: 176 kWh
north roof measured
north roof simulated
PV Generator Energy (kWh)
0
1
2
3
4
5
Sep
Oct
Nov
Dec


Measured production: 355 kWh
south roof measured
south roof simulated
PV Generator Energy (kWh)
0
1
2
3
4
5
Sep
Oct
Nov
Dec




north roof
difference simulated/measured
Δ (kWh)
4
2
0
-2
-4
measured energy production
was not recorded
Sep
Oct
Nov
Dec


south roof
difference simulated/measured
Δ (kWh)
4
2
0
-2
-4
measured energy production
was not recorded
Sep
Oct
Nov
Dec



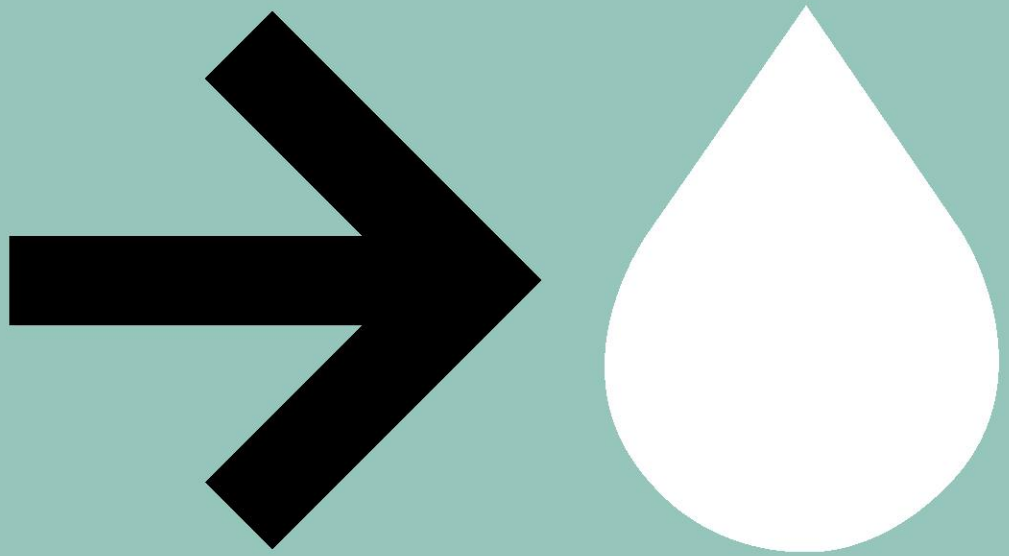
Conclusion

Large difference in energy production between the north and the south roof, possibly because of shading.

Design of PV roofs should be considered early in the design phase of the building project. Shading should be avoided in order to ensure a high performance of PV-systems.

Promising results when comparing measurements and calculations using measured temperatures, irradiance and wind speed and direction at the rooftop of the building.

Thank you for the attention



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