

Planing, installation and monitoring of building integrated photovoltaics (BIPV) with thin film modules on 60m tower buildings in Zürich, Switzerland.

60m tower buildings with surrounding PV façade

Introduction



Tower buildings with BIPV in Switzerland

The goal of the project was to renovate two almost identical 60 m towers (Sihlweid and Leimbachstrasse) in Zürich by adding solar modules on the façades of all four sides. These both buildings will point the way towards to the so- called “2000 Watt Society” vision in Switzerland. The PV plant is monitored to gain experience data about tower building with PV façades und thin film modules.

The concept of the PV plants was carried out in collaboration with students from the PV LAB during two Bachelor Theses with

- => the first Bachelor Thesi concentrated on the “Sihlweid” tower (in 2011)
- => the second Bachelor Thesi about the “Leimbachstrasse” tower (in 2012)

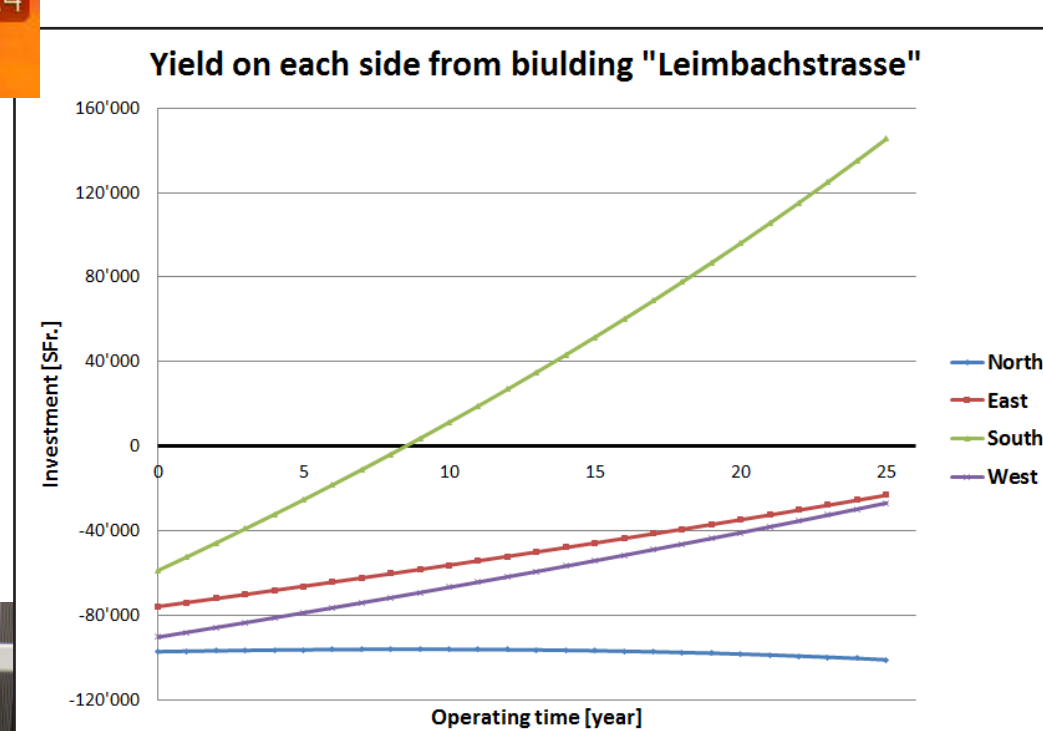
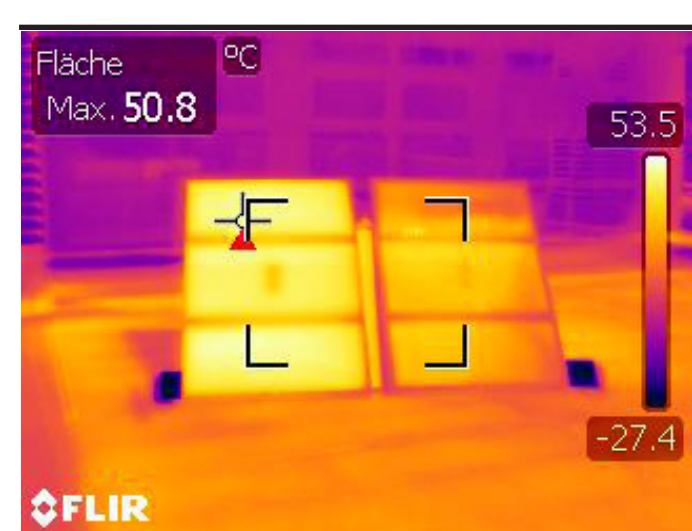
Summary

Building “Sihlweid”:

Calculations on the façade yield on each of the four tower sides were made, and a horizon and shading analysis carried out using the planning programme PVsyst. The profitability of the system was optimized, the modules were tested with regard to stability (wind load!) and the temperature of the modules is monitored. Analysis of these data enables rapid detection of possible problems and any damage due to partial shading may be resolved immediately (white spots).

Building “Leimbachstrasse”:

The best possible interconnection was tested and the profitability of the system was evaluated. Most simulation programmes were unable to handle with this complicated façade structure. The new 3D CAD tool “DDS-CAD”, including Polysun, was used to simulate and analyse the shading effects of the “Leimbachstrasse” tower. In addition, a new monitoring concept was developed (intelligent and precise measurement) and evaluated.



Testing and calculation for BIPV

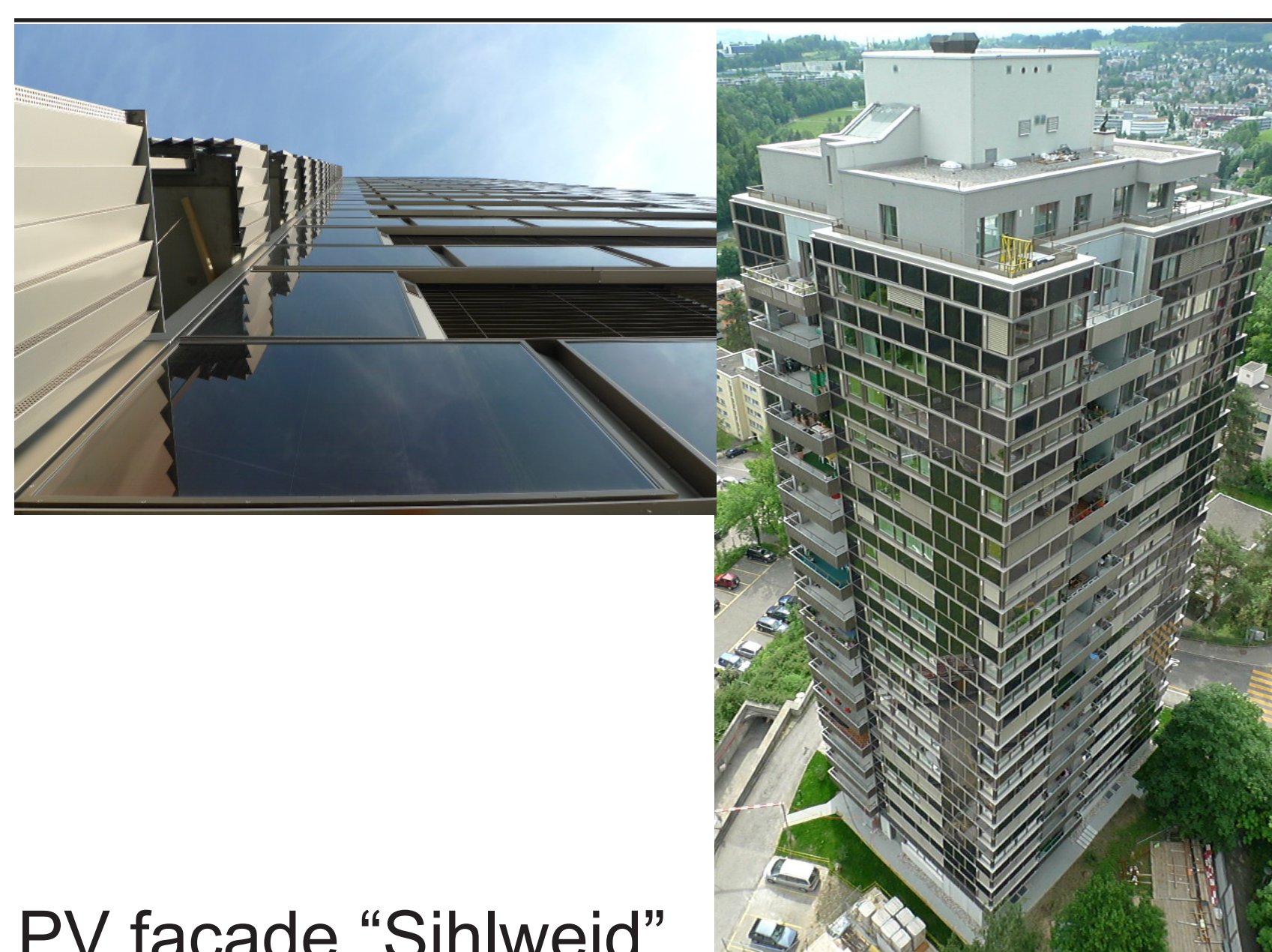
Technical facts

Building “Sihlweid”:

- Installed Power: 108.3kWp (S: 28kWp, E: 18kWp, N: 36kWp, W: 28kWp)
- Module: 882 x Sharp NA-F128G5 (846 connected, 36 not connected)
- Inverter: 23 x Fronius IG Plus 35 (isolated)
- Finished: February 2012 (1st side: December 2011)

Building “Leimbachstrasse”:

- Start renovation: May 2012
- Hardware: Module: Sharp NA-F128G5, Inverter: Fronius IG Plus 35



PV façade “Sihlweid”

Conclusion & Future

- The project is a successful example of interdisciplinary collaboration between architects, construction experts and technical engineers.
- It offered an excellent opportunity to engineering students to gain valuable experience in thin film façades and offered a interesting and realistic project.
- The data gathered (irradiation, temperature, DC and AC power) provide important information regarding longevity, visual stability, servicing and income of façades with thin film modules.
- It will serve as a best practice example to plan future façades with thin film modules.



At work at the Bachelor Thesis