From concept to reality: development and implementation of the adaptive solar facade

CIBSE IBG: Intelligent Building Façades

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Who are we?

Dr Esther Borkowski
Postdoctoral Researcher
Architecture and Building Systems
ETH Zurich

Dr Bratislav Svetozarevic
CEO
Zurich Soft Robotics
Outline

1. Overview of HiLo demonstrator
2. Performance of adaptive solar façade (ASF) in HiLo
3. History of ASF
4. Development of ASF into market-ready product Solskin
HiLo research unit: integrating energy systems with lightweight design

Architecture and Building Systems
Prof Dr Arno Schlueter
Dr Gearoid Lydon

Block Research Group
Prof Dr Philippe Block
Dr Tom Van Mele
Francesco Ranaudo

Digital Building Technologies (DBT)
Prof Dr Benjamin Dillenburger
Andrej Jipa
Energy systems in HiLo

Decentralised ventilation

Connection to vertical energy district (e-hub)

Low-temperature radiant heating/cooling

ASF
ASF concept

a. Summer
   - Solar tracking
   - View to the outside

b. Winter
   - Solar heat gains and daylighting
   - PV production

A/S
Architecture and Building Systems
Prof. Dr. Arno Schlueter
Institute of Technology in Architecture (ITA)
ETH Zurich
Timeline

- Opening of HiLo and start of operation: 10/21
- Start of data collection: 11/21
- End of commissioning: 12/21
- Full occupation: 01/22
- Submission of MSc thesis: 02/22
- Arc award: 03/22
- Full occupation: 04/22
- Full occupation: 05/22
- Full occupation: 06/22
- Full occupation: 07/22
- Full occupation: 08/22
- Full occupation: 09/22
- Full occupation: 10/22
- Full occupation: 11/22
- Full occupation: 12/22
- Full occupation: 01/23
- Full occupation: 02/23

Watt d’Or award: 11/22
Sensors in office 2

- IEQ
- Window contact
- Door contact
- Motion/illuminance
- TABS
- Ventilation
- HVAC
- ASF
Control algorithm of ASF
Produced energy vs consumed energy

![Graph showing produced energy vs consumed energy](image-url)
Impact of ASF on illuminance and energy consumption
Occupant interactions with ASF
Thank you!

borkowski@arch.ethz.ch