



THE FUTURE OF SOLAR ENERGY

‘Inspired by nature’



SUMMARY

1. H.Glass in a nutshell
2. DSSC Technology
3. Global situation
4. Our Solutions
5. Key Benefits
6. Our References

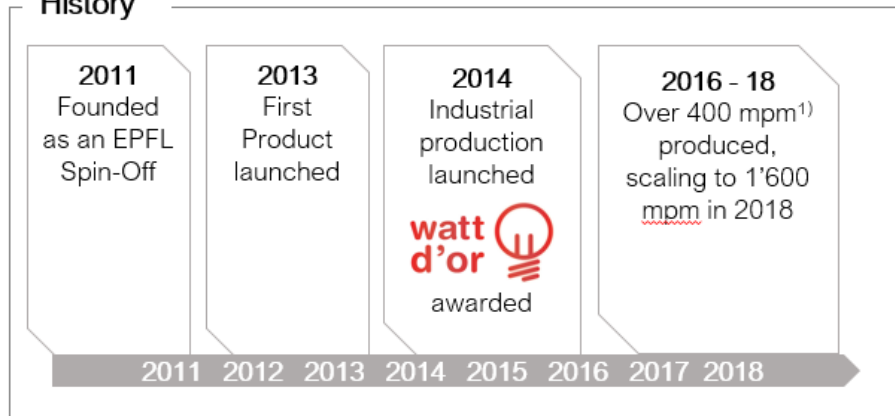
1.

H.GLASS IN A NUTSHELL



- Leader in manufacturing of large DSSC glass panels
- Nanotechnology invented by Prof. Michael Graetzel at EPFL (Nobel nominee for Chemistry, awarded prestigious prizes, e.g)
- HQ in Villaz-St-Pierre, Switzerland (40km to Lausanne) and strong focus on research & innovation
- *H.Glass' mission is to advance renewable energy in urban environments by transforming passive glass surfaces into sustainable solar energy production facilities, without losing transparency, aesthetic nor heat protection functionalities*

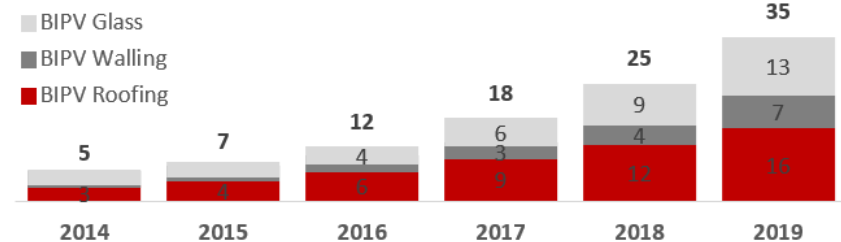
History



Building Integrated Photovoltaic (BIPV) Market

- H.Glass is addressing a USD 35bn market opportunity by 2019

World market for BIPV products (USD bn)

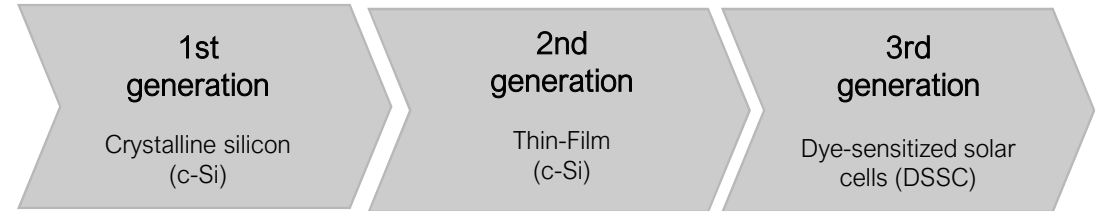


2.

DSSC TECHNOLOGY

PV Evolution

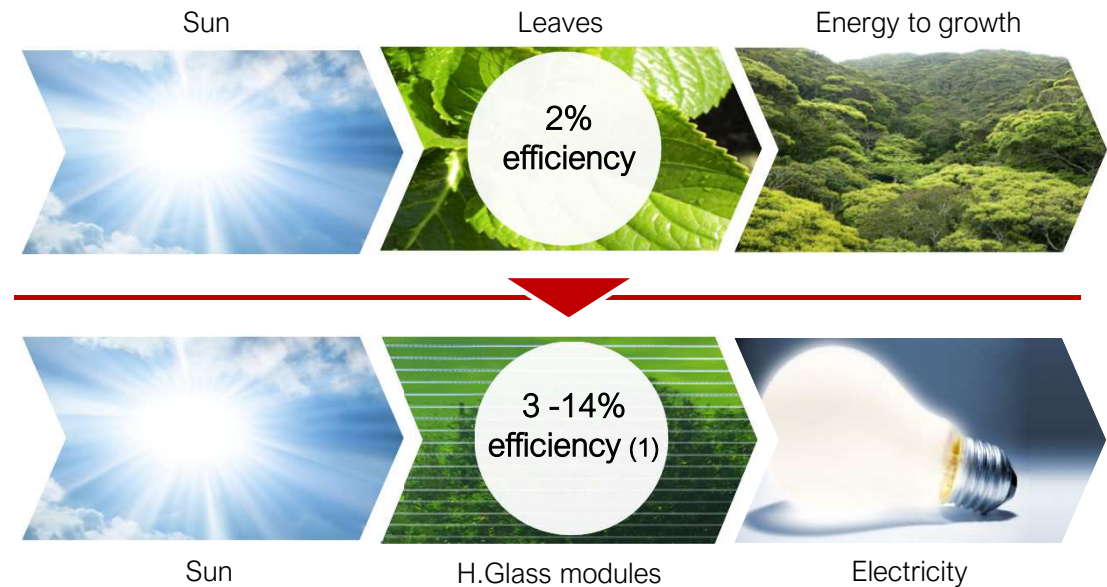
Representation of the 3rd generations of PhotoVoltaic (PV) solutions



DSSC

Dye Sensitized Solar Cells is reproducing the artificial photosynthesis

Functioning is analogous as the chlorophyll in leaves, where a sensitized dye absorbs light and generates electricity



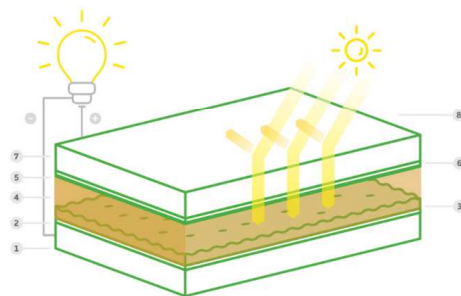
(1) 3% for large size industrial panels, up to 13.8% for small panels in research labs (World record by EPFL)

H.GLASS TECHNOLOGY

BIPV URBAN FURNITURES REFERENCES TECHNOLOGY COMPANY FR | EN | DE

- Colored
- Transparent
- Low Light
- Bifacial & 360° Efficiency
- High Temperature
- Easy Recyclable
- Glass Structure
- Outdoor & Indoor use

www.h.glass



And there was light!

- | | |
|--|--|
| 1 Glass | 5 Catalyst - Platinum |
| 2 Conductive film - SnO ₂ (F) | 6 Conductive film - SnO ₂ (F) |
| 3 Titanium + Dye | 7 Glass |
| 4 Liquid electrolyte | 8 Light |

PHOTOSYNTHESIS EXPERIENCE



PHOTOSYNTHESIS EXPERIENCE



H.GLASS TECHNOLOGY

SEMI-FINISHED MODULES

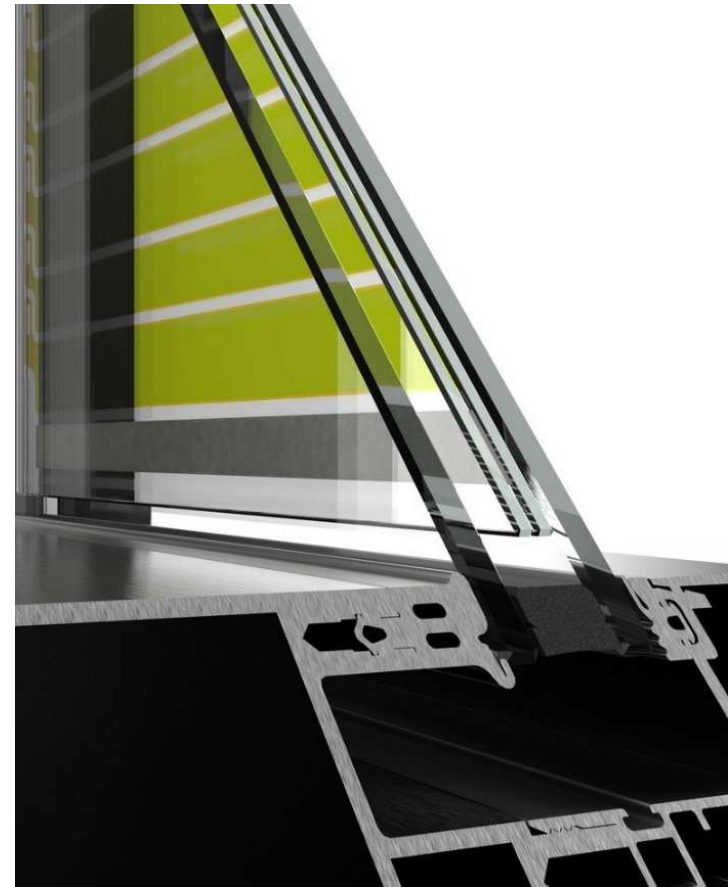
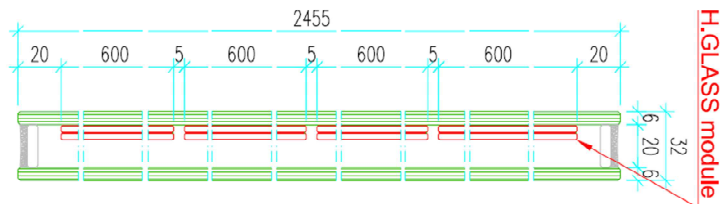
- 2 float glasses
- Chemical products: TiO_2 + Dye + Electrolyte
- 4 formats up to 1 m²
- Available Colors:



H.GLASS TECHNOLOGY

FINAL PRODUCTS

- Semi-finished modules laminated in 2 supporting glasses
- Double and triple insulated glasses
- Dimensions up to 2.5 m2
- Visible transmission : 35 %

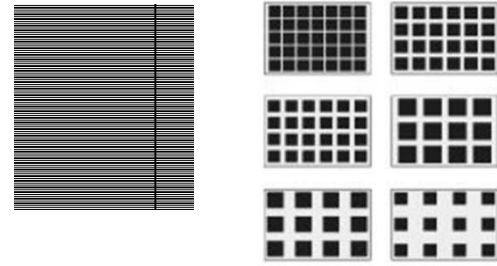


Design Oppizzi Davide - DCUBE design espaces lumière SA © 2017 all rights reserved

COMPARAISON WITH STANDARD TECHNOLOGIES



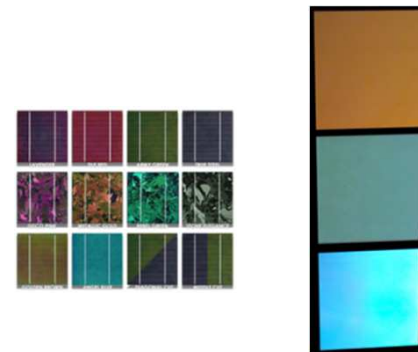
THE ACTIVE MATERIAL IS TRANSPARENT



The Transparency is given by the cells density



THE ACTIVE MATERIAL HAS DIFFERENT COLORS

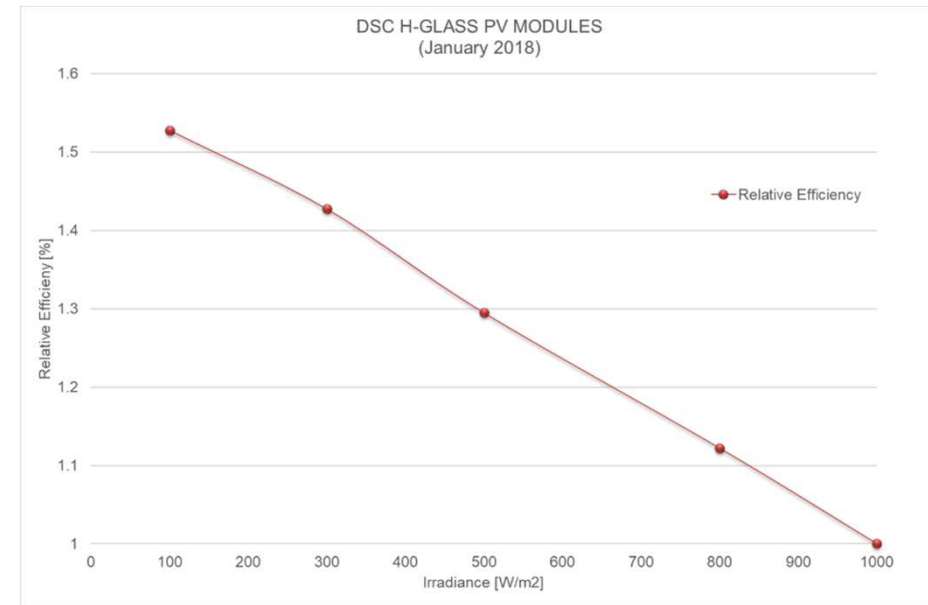


The Color is given by the glasses, the encapsulant or the cells

HIGH PERFORMANCES AT LOW IRRADIANCE

IDEAL FOR VERTICAL INSTALLATIONS

- The efficiency increase up to 50% at low irradiance
- Much better performances with respect to conventional technologies
- On façade the irradiance is often lower than 500 - 600 W/m²





HOW TO TRANSFORM ENERGY-INTENSIVE URBANIZATION ZONES INTO SUSTAINABLE ZONES?

3.

GLOBAL SITUATION



1.5 bn
of people will move
in towns in 10 years time



80%
of the world's carbon
emissions are produced
by cities



40%
of the world's carbon
emissions are produced
by cities

OUR CHALLENGE

- Available space is scarce •
- Aesthetic is valued
- Environmental impact must be minimal •
- Grid construction costs impact energy prices

OUR SOLUTION



Generate energy out of glass surfaces

4. SOLUTIONS

BIPV & URBAN FURNITURE

“

*In our future,
buildings will not only using
energy but also
producing some !*

”

BIPV and Urban Furnitures applications



- Transform a passive building skin to a surface which is generating energy
- New technology which is helping to increase your self-sufficiency



- Implementation of new European standards which require nearly zero-energy building by the end of 2020
- Green Trends is the future



- Offer the largest DSSC panels and an high customization's services
- The highest performance at low light
- Bifacial, vertical & 360° efficiency
- Improved efficiency at elevated temperatures



- High degree of transparency
- High level of aesthetic
- Different color varieties are proposed

SOLUTIONS

BIPV

Applications

www.h.glass



Curtain Walls

General description	+
Plans and documents	+



Ventilated Facades

General description	+
Plans and documents	+



Glass Shadings

General description	+
Plans and documents	+

SOLUTIONS

URBAN
FURNITURES

Applications

www.h.glass



Shelters

- General description +
- Plans and documents +



Balustrades and Barriers

- General description +
- Plans and documents +



New Developments

- General description +
- Plans and documents +

A photograph of a marina at sunset. In the foreground, a modern walkway with a glass railing curves along the water. The railing reflects the bright orange and yellow light of the setting sun. In the background, numerous sailboats are docked in the water, their masts silhouetted against the sky. The sun is low on the horizon, creating a strong glow and reflecting on the water. The overall mood is serene and contemplative.

WHAT MAKES US
DIFFERENT ?

5.

KEY BENEFITS

1
COLOR VARIETY & AESTHETICS



Available

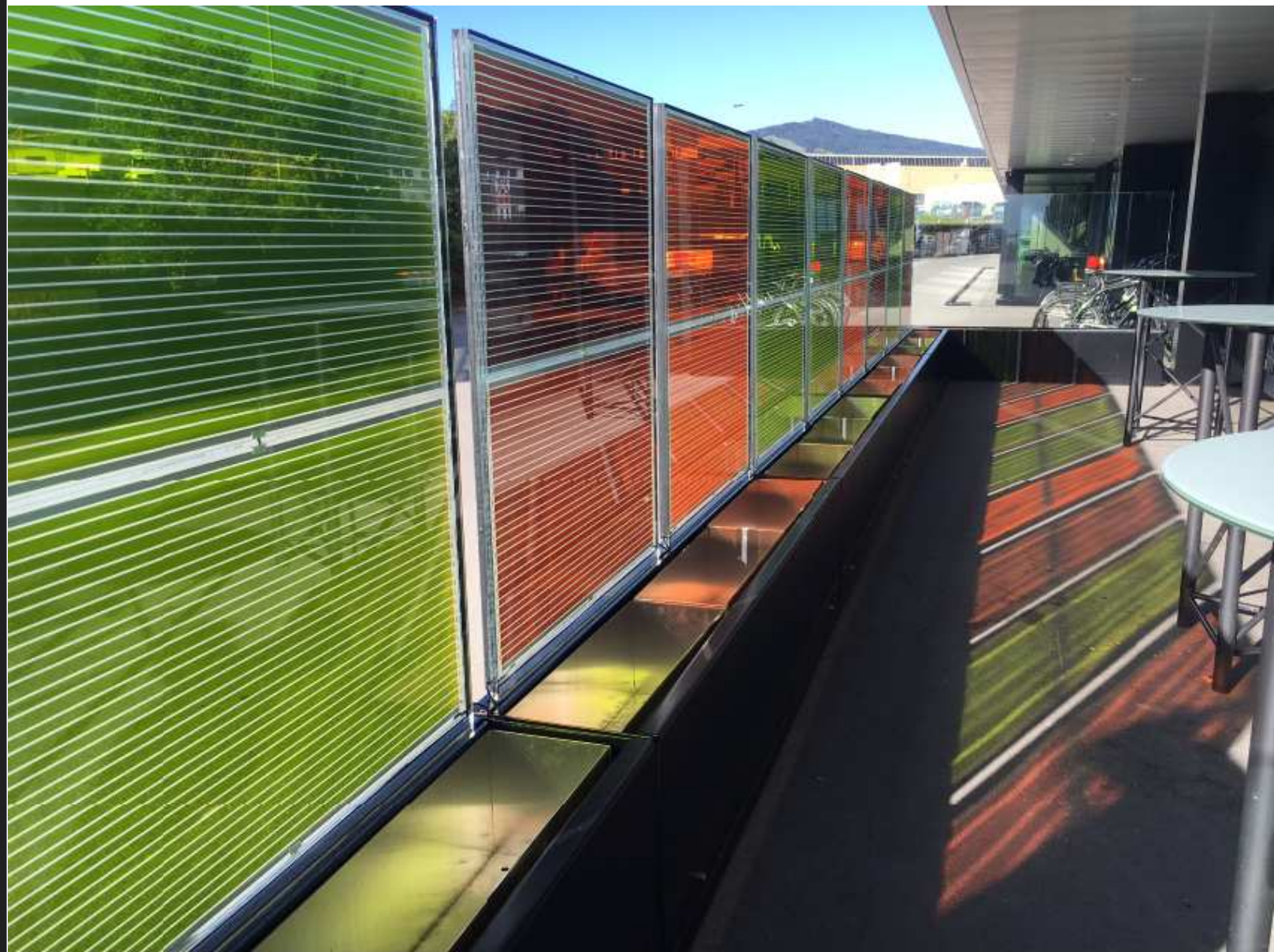


Soon available



REFERENCE

Sottas SA
Fribourg, Switzerland



KEY BENEFITS

2

TRANSPARENT

~35 % of the light passes through



REFERENCE

Charge barrier
Fribourg, Switzerland



KEY BENEFITS

3

*HIGH PERFORMANCE UNDER
LOW LIGHT*



REFERENCE *Merck Innovation Center
Darmstadt, Germany*



KEY BENEFITS

4

VERTICALE EFFICIENCY



REFERENCE *Swisscom Business Park
Bern, Switzerland*



KEY BENEFITS

5

*BETTER PERFORMANCES AT
HIGH TEMPERATURE*



REFERENCE

*Science tower
Graz, Austria*



KEY BENEFITS

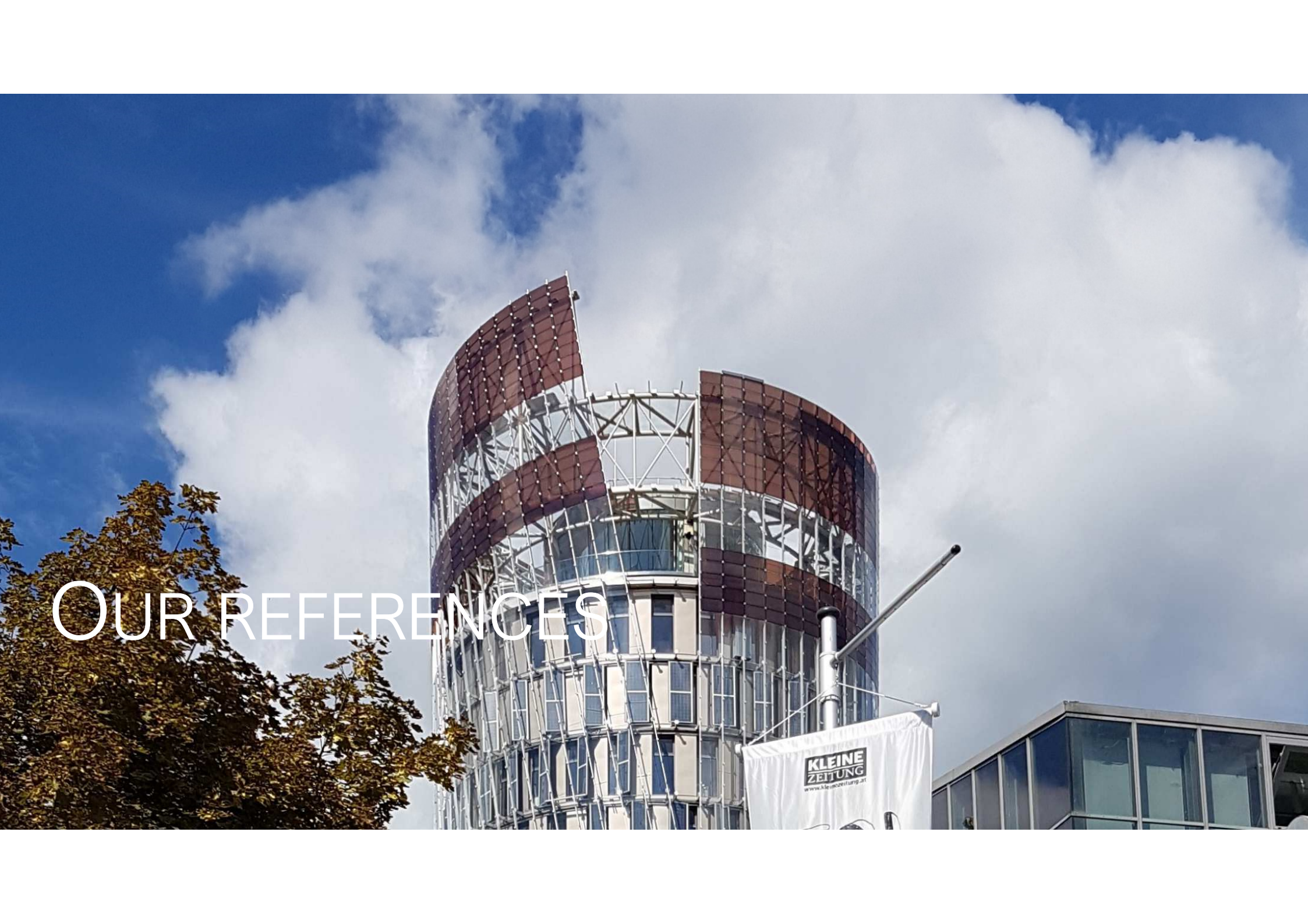
6

LOW EMBODIED ENERGY

REFERENCE

*New Balustrade
Available from Q2 - 2018*





OUR REFERENCES

6.

OUR REFERENCES



Geneva Airport
2013



Merck Innovation Centre
Darmstadt 2015 - Germany



Swisscom Business Park
Bern 2016 - Switzerland

OUR REFERENCES



EXPO - Austrian Pavillon
Milan 2015 - Italy



EXPO - Swiss Pavillon
Astana 2017 - Kazakhstan



1st place at Solar Decathlon
Denver 2017 – USA

NEIGHBORHUB
Swiss Living Challenge Project

OUR REFERENCES



SCIENCE TOWER
Graz 2017 - Austria



Place de la Navigation
Lausanne 2017 – Switzerland



THANK YOU
FOR YOUR
ATTENTION

H.GLASS SA

Le Vivier 16
1690 Villaz-St-Pierre
Switzerland
info@h.glass
www.h.glass

