



A SHORT UPDATE ON SOLAR ENERGY AND MORE

15.11.2024. Conférence Recherche Energétique

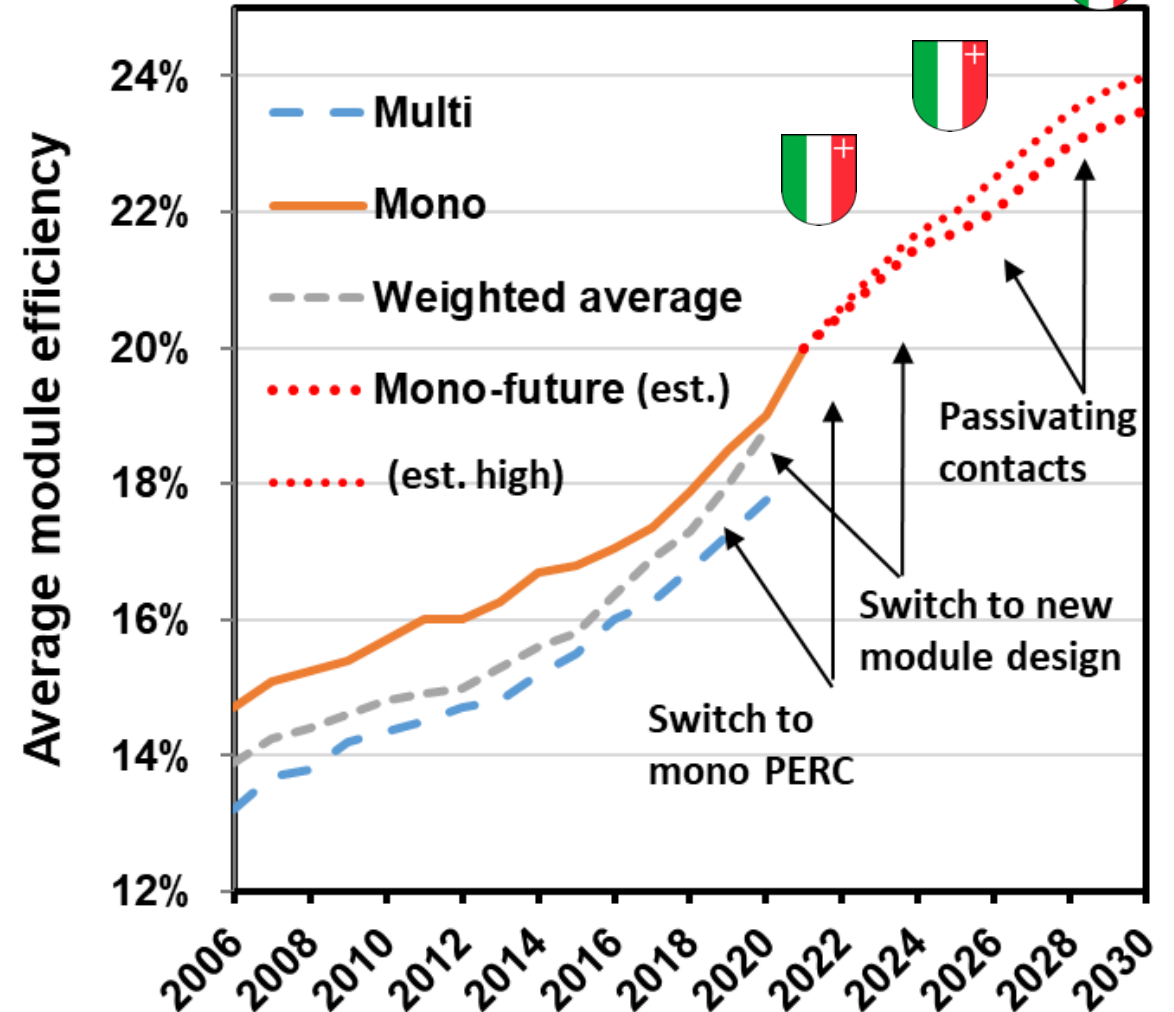
A QUICK VIEW



- Huge invest. by China (> 100 Billions in manufacturing), overcapacity, huge price drop (10-12 cts/W)
- IRA, NZIA
- Close to 550-600 GW in 2024
- Fast technology evolution



- in 2024, add 1.7-1.9 GW
- 10% electricity in CH
- New electricity law, rich PV ecosystem, including manufacturing



Haug, Ballif et al. Nat. Rev. Materials 2022

CHALLENGES

PV technology

- High efficiency → reliability challenges
- Keep knowledge and industry in Europe for manufacturing
- Fire norms → regulation challenging for façades
- Higher efficiency → stable « tandem modules »



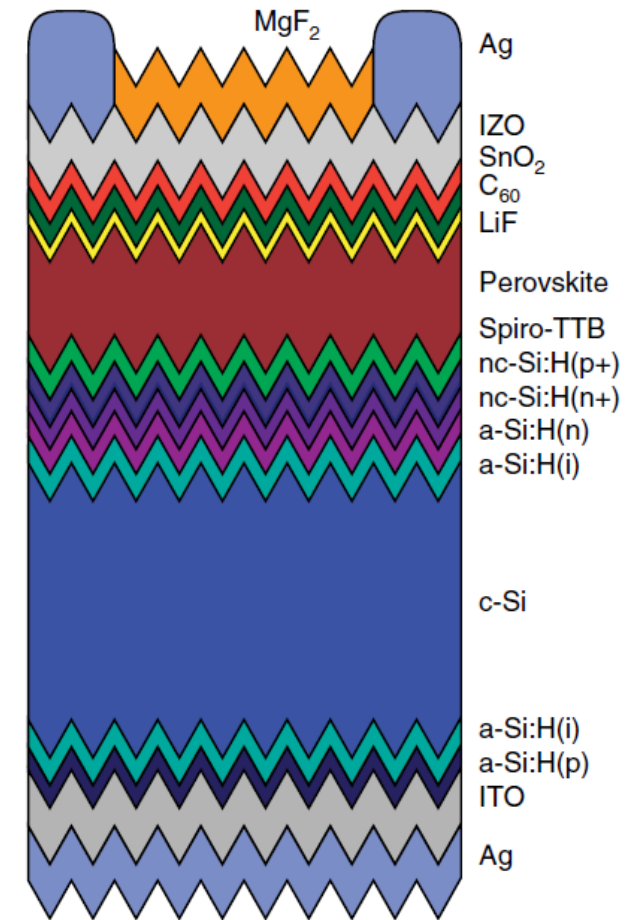
System and grid

- More accurate forecast
- More flexibility (curtail, HP, cars, batteries..)
- Better local and global coordination for the grid



Policy

- Lack of anticipation of speed of deployment
- Stepping back on energy transition
- **Stopping P+D and reducing Innosuisse ??????**

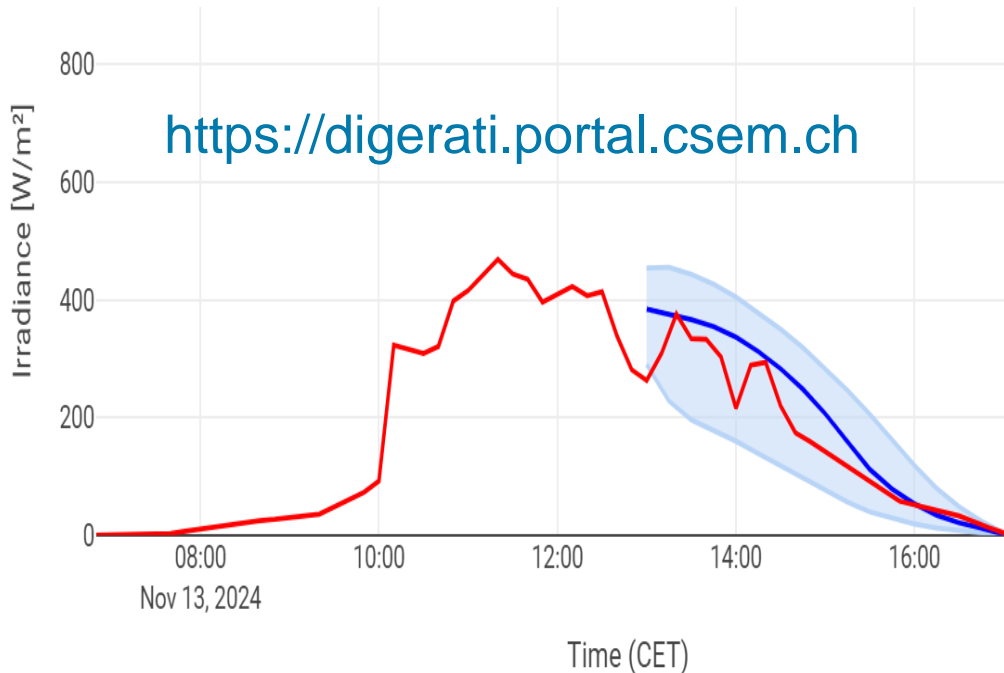


Xin Yu Chin et al. Science, 2023

Perovskite/Silicon
EPFL PV-lab/CSEM
first time > 30%
WRCertified WR > 31.3%*

OPPORTUNITIES

- Ultra-low cost PV (< 2 cts/kWh in sunny countries)
- Direct $H_2 \rightarrow NH_3 \rightarrow$ fertiliser and e.g. steel (see e.g. Maroco)
- Crack down Perovskite stabilities
- Smart systems, forecast, solution for easy system integration
- Niche product developments, more reliable products
- Integrated PV
- Excellent match with hydrosystems, (+ Wind, alpine PV, façades)



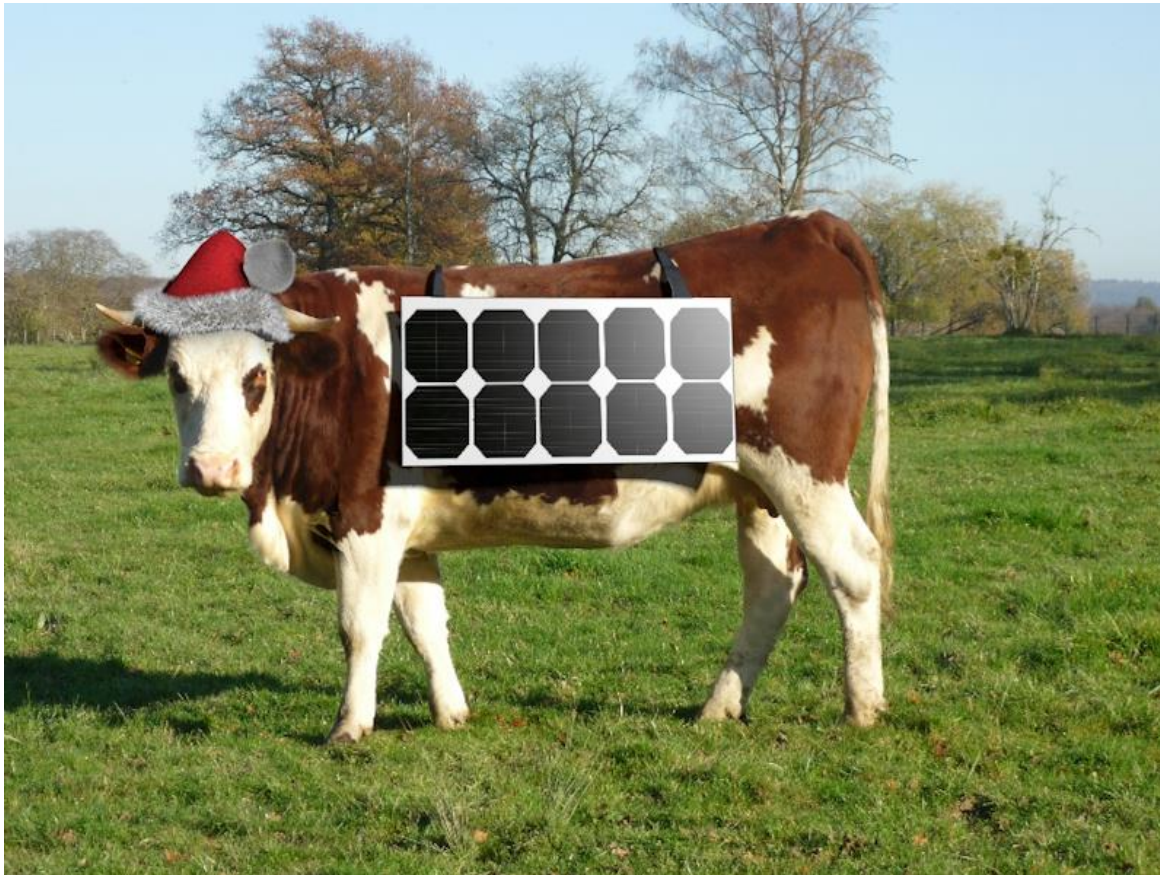
La force hydraulique, alliée du photovoltaïque

Une électricité suisse décarbonée, fiable et compétitive | Dans un contexte où la Suisse et ses voisins européens ont annoncé des objectifs ambitieux de réduction du nucléaire et de neutralité carbone à l'horizon 2050, le débat fait rage sur le maintien de l'équilibre énergétique journalier, et surtout saisonnier. Une étude conjointe d'Alpiq et du CSEM apporte de nouveaux éléments de réflexion.

Alet et al. bulletin.ch 10 / 2022

SWITZERLAND, SENSITIVE TO ACCEPTANCE IN RURAL AND URBAN ENVIRONMENT

Sensitive to aesthetics





Neuchâtel, maison des associations, Swiss Solar Award 2015 «renovation category»

Over 20'000 “Megaslates” systems installed (3S solar solution), fast ramping up of Swiss production

New Production lines in Thun

Prix solaire Suisse 2015

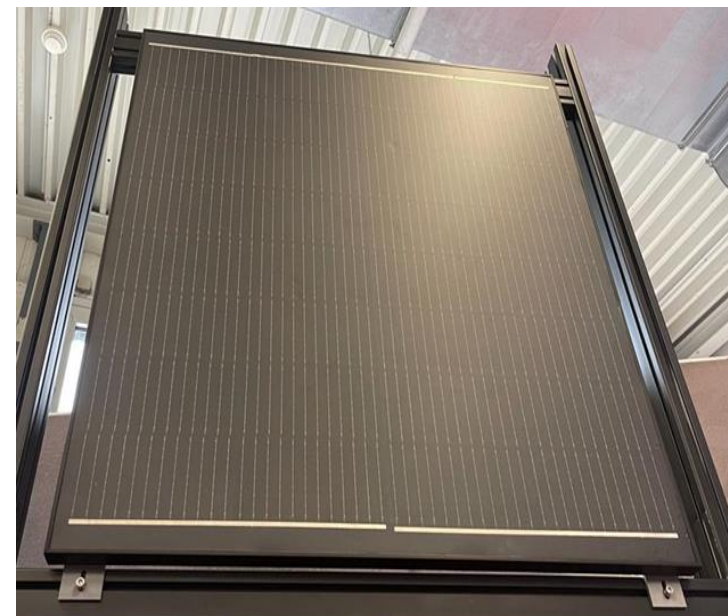


Neuchâtel, maison des associations, Swiss Solar Award 2015 «renovation category»

Over 20'000 “Megaslates” systems installed (3S solar solution), fast ramping up of Swiss production

New Production lines in Thun

Prix solaire Suisse 2015



Surviving critical tests with
new lightweight version.



TeraSlate®



WHAT DO ARCHITECTS WANT ?





Elegance and architecture

Transforming building and cities

CSEM as pioneer of transformative technologies for PV panes

Based on low cost c-Si modules,

White PV panels, together with Solaxess

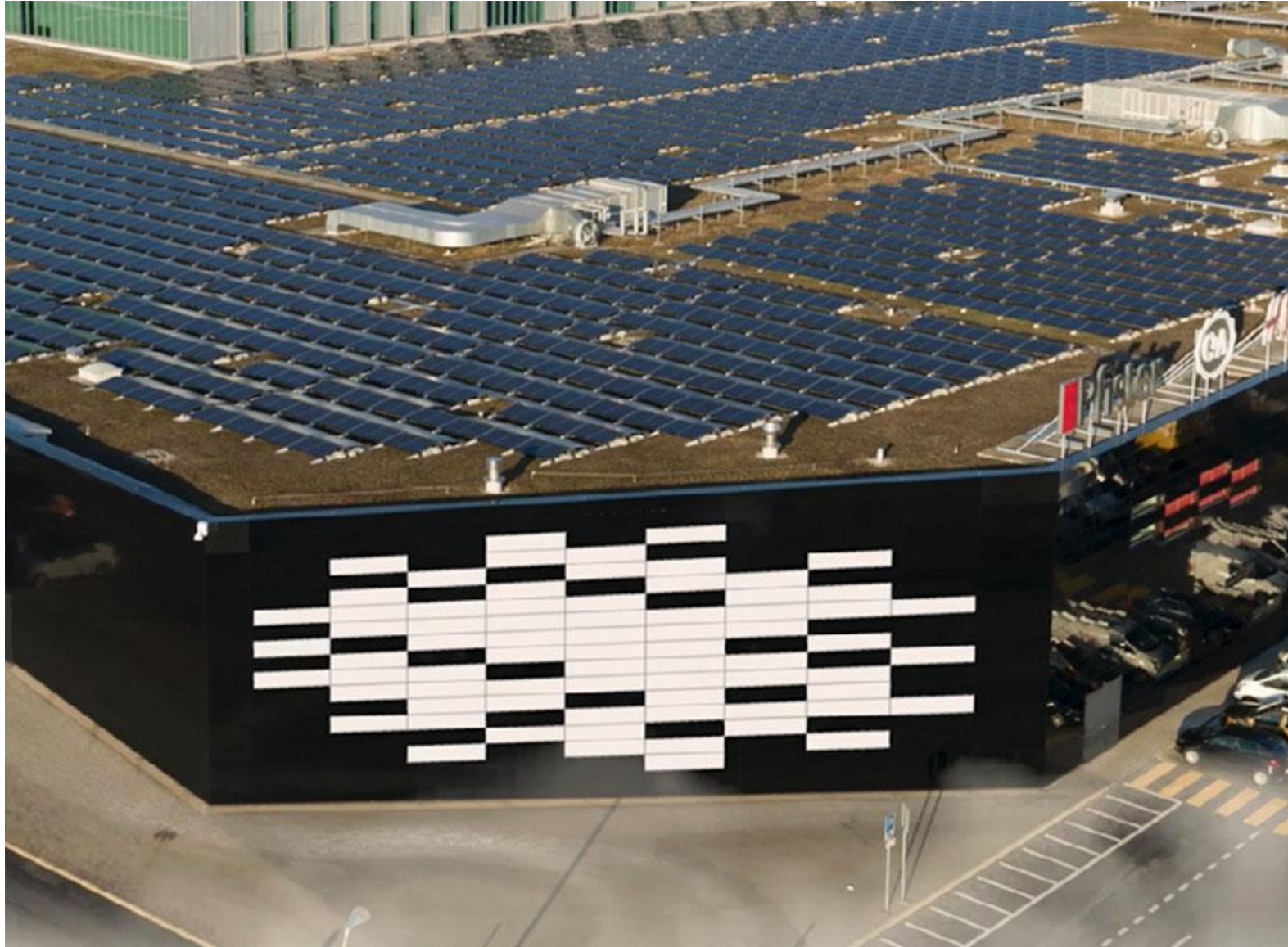


|| csem





FAÇADE ACTIVE, MIGROS DE MARIN



LA CHAUX-DE-FONDS





Ecuwillens


One of the
Terra-cotta tones

With ISSOL, Solstis,
Userhuus, SFOE

Soutien des Service de
l'énergie et des biens
culturels de Fribourg

Prix solaire
Suisse 2018

hflu⁺ Höhere
Fachschule
Luzern

 Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Federal Office of Energy SFOE

 ETAT DE FRIBOURG
STAAT FREIBURG

Schweizer
Solrif®

:: csem

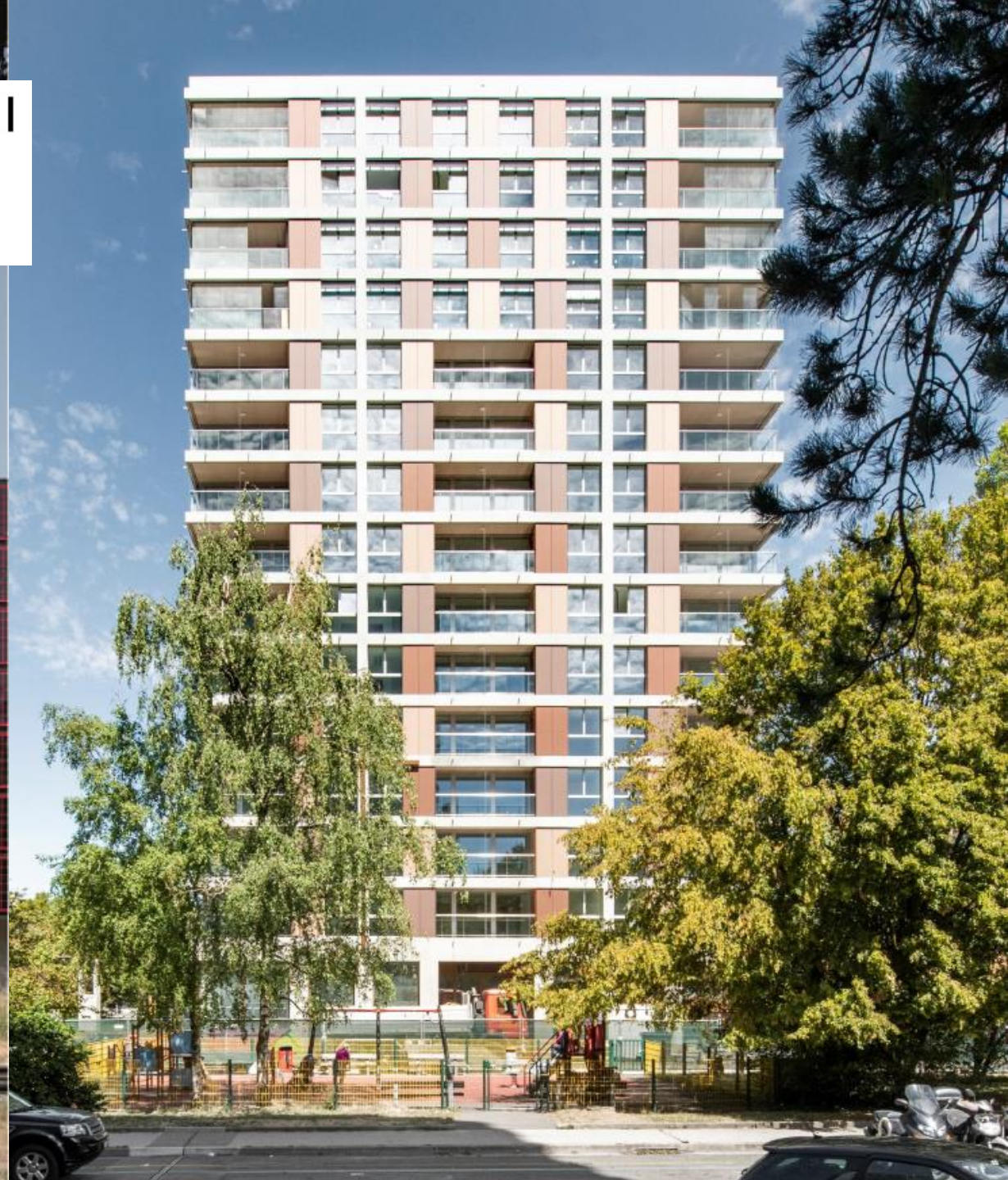








A Villars-Ste-Croix













Private house Neuchâtel

Courtesy L.E.
Perret-Aebi

compáz

∴ **csem**

INNOVATION IN SWITZERLAND



- Deployable PV systems

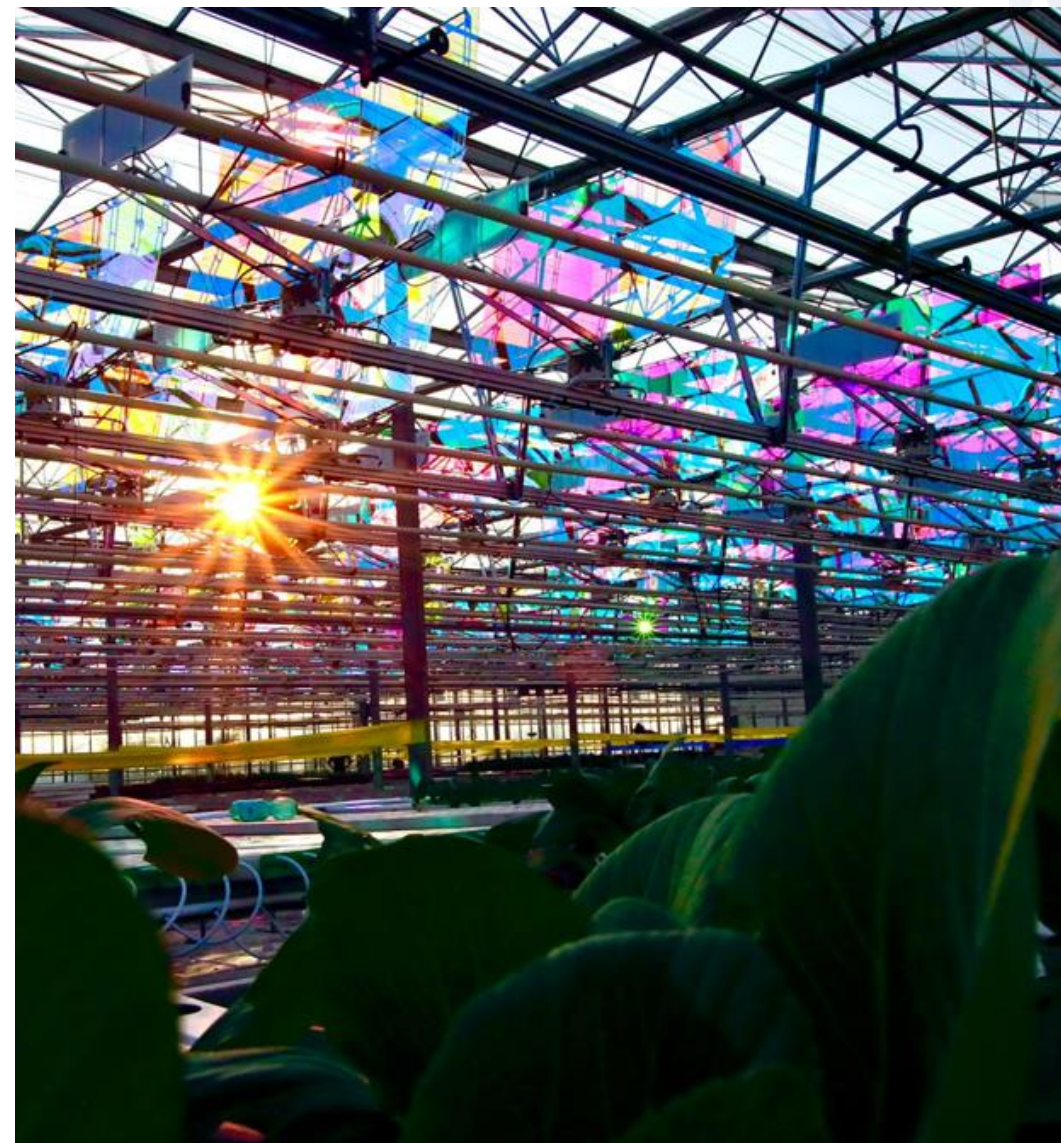




Agrivoltaics
on the move

**INSOLIGHT, THE AGRIVOLTAIC
SOLUTION PROVIDER**

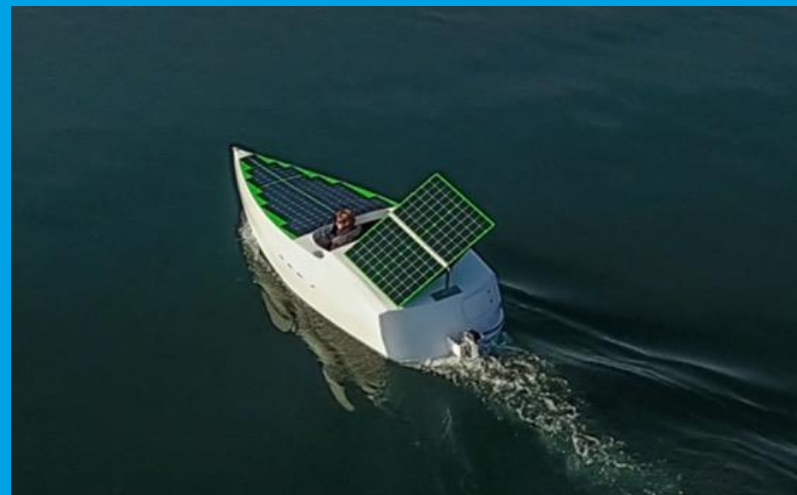
Discover our Solution





Integrated PV to reach the Stratosphere





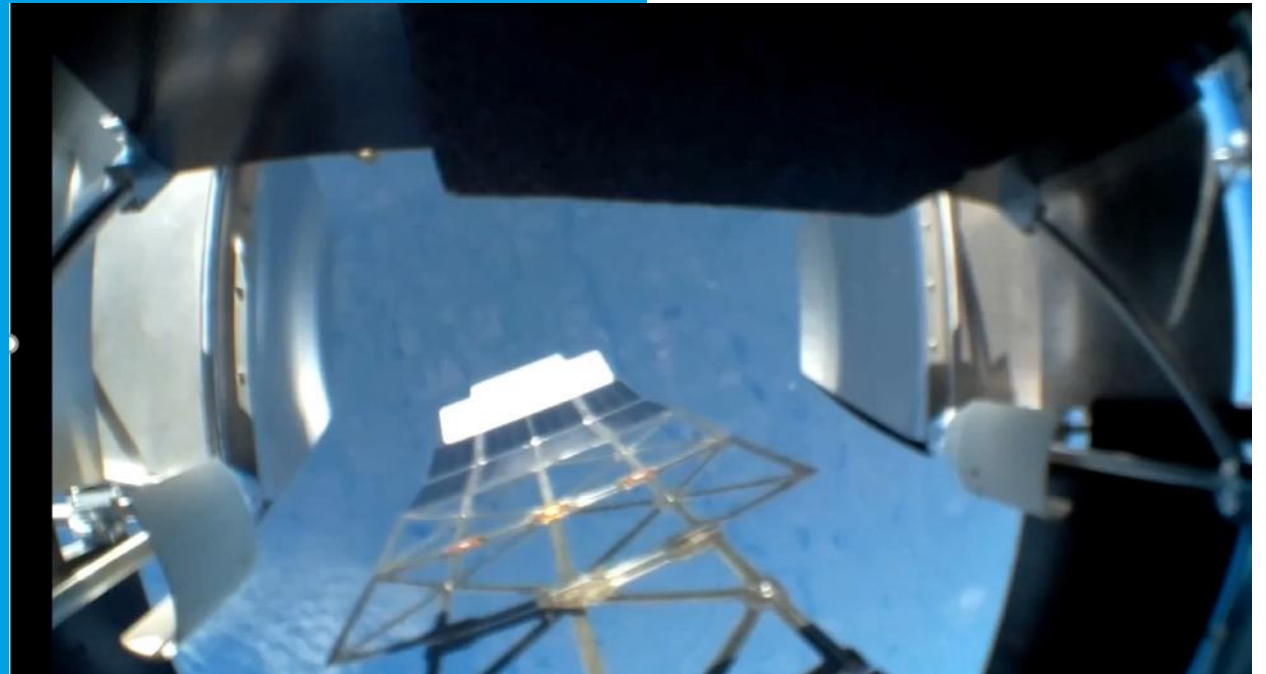
Light weight
customized ultra-
reliable modules



Strateole:
PV solutions for
stratospheric
balloons



Deployable lightweight
structures and PV modules
qualified in stratosphere!
Up to 35'
000 meters



Multiple Applications
For terrestrial PV



A new Neuchâtel
Start-up

LIGHTSEEDS 
SOLAR SOLUTIONS NEXT

.... THE T-TOUCH SOLAR CONNECT



Solar dials developed by CSEM,
production fully ramped-up by CSEM

MERCI POUR VOTRE ATTENTION !

christophe.ballif@csem.ch
Christophe.ballif@epfl.ch



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra



Swiss National
Science Foundation



EPFL

csem

