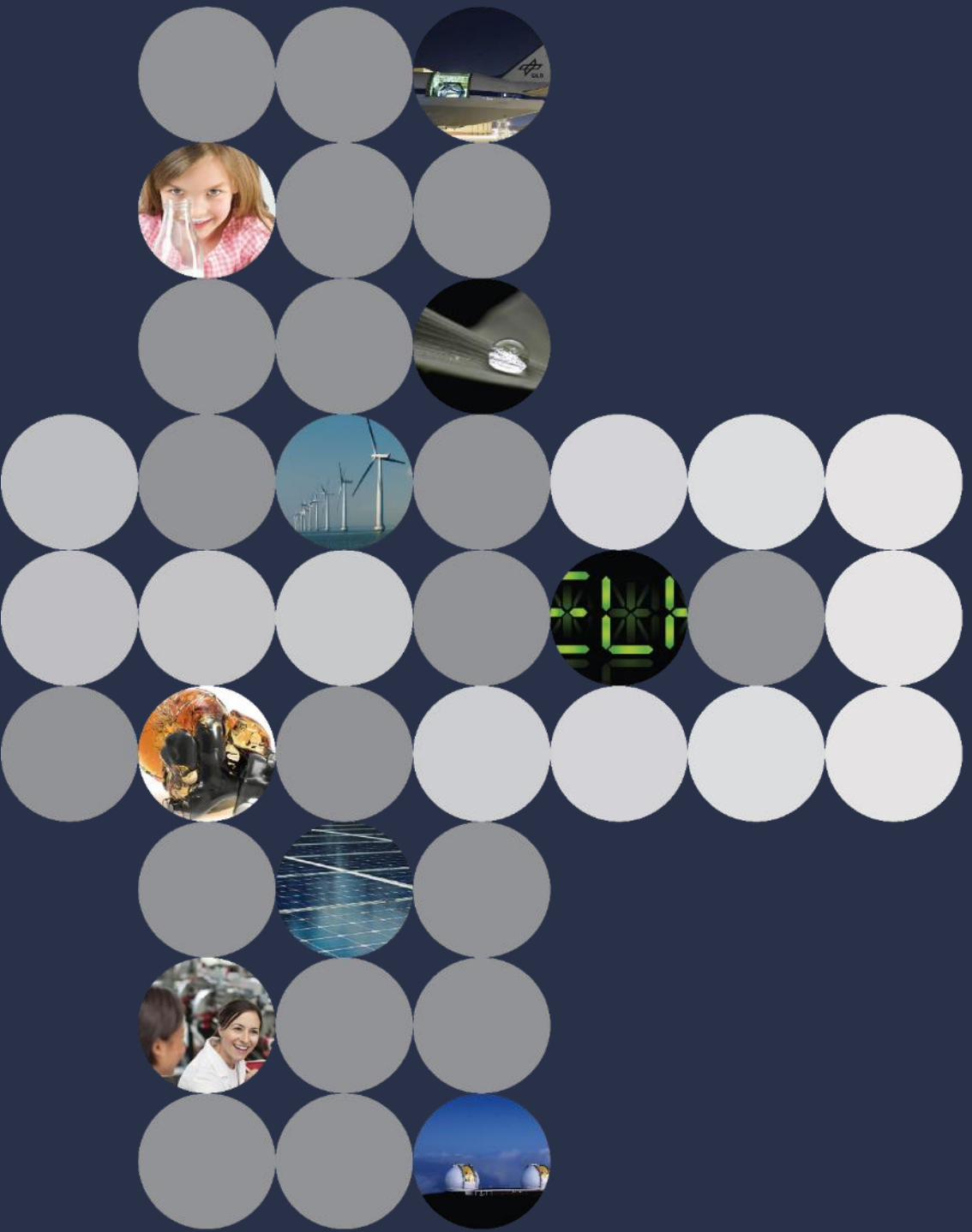
Nachhaltige Technologien für eine grünere Zukunft

David Schmid

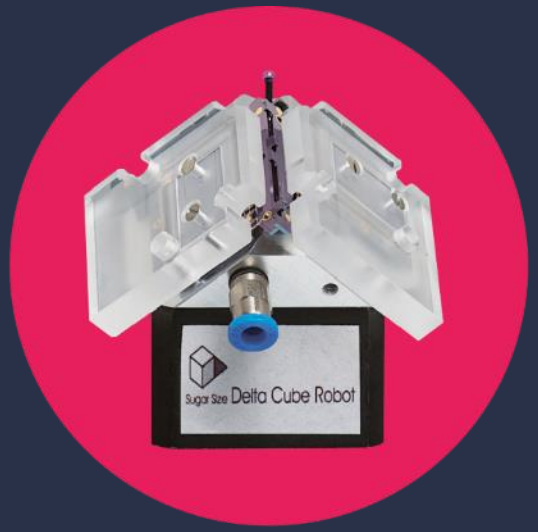
Coffee Lectures, 6. Oktober 2020



CSEM

technologies
that make ***the*** *difference*

Our **mission**



Development and transfer of world-class (micro-)technologies to the industrial sector – in Switzerland, as a priority – in order to reinforce its competitive advantage.

- Cooperation agreements with established companies
- Encouraging the creation of start-ups

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Close to **industry**, leveraging Swiss academic research

CSEM Zürich

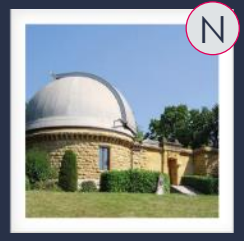
CSEM Muttenz

CSEM Neuchâtel

CSEM Alpnach

CSEM Landquart

CSEM Brasil



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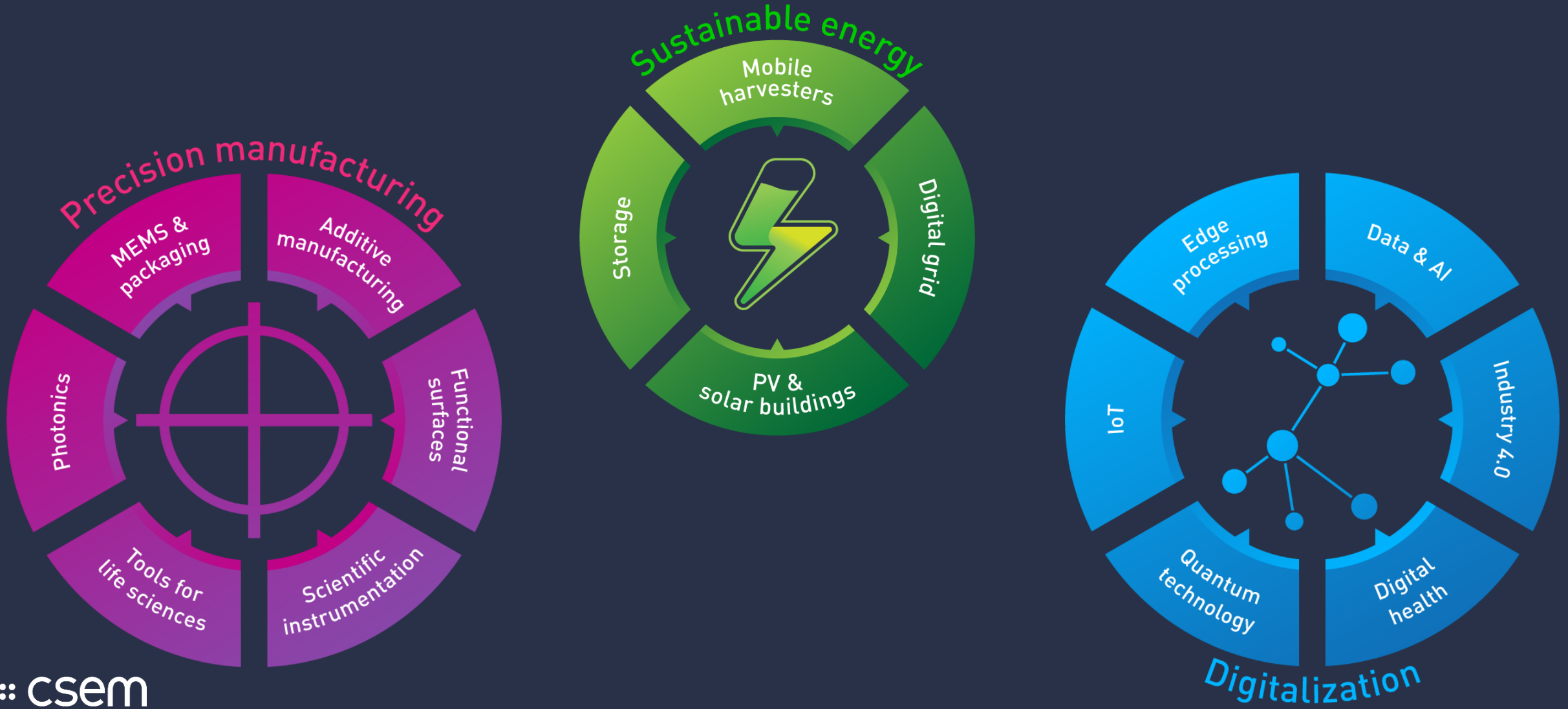
Technology **Focus** at CSEM



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Sustainability **10 years ago**..

- POKEN (Lausanne, CH), now VISIT by GES)
- ULP, NFC, low-cost, «touch marketing» platform
- Launched in 2010
- Annual paper savings of 21 metric tons at events, by replacing printed brochures and business cards with the Poken device

Renewable energy management: **MAESTRO**

Intelligent SW for managing and scheduling production & use of renewable energies in the entire neighbourhood.

- Heat pumps
- Solar panels
- Batteries
- Charging stations

Real time strategy to optimize energy costs

Online simulator

Renewable energy management: **MAESTRO**

CSEM - Maestro

Youtube demo

Parameters

Compute energy strategy

Heat production

Boiler max Power [kW]: 20

Biomass boiler Maximum Power [kW]: 10

Heat Pump max power [kW]: 15

Storage

Battery Capacity [kWh]: 10

Battery Max Charging Power [kW]: 5

Water tank volume [m3]: 2

Energy prices

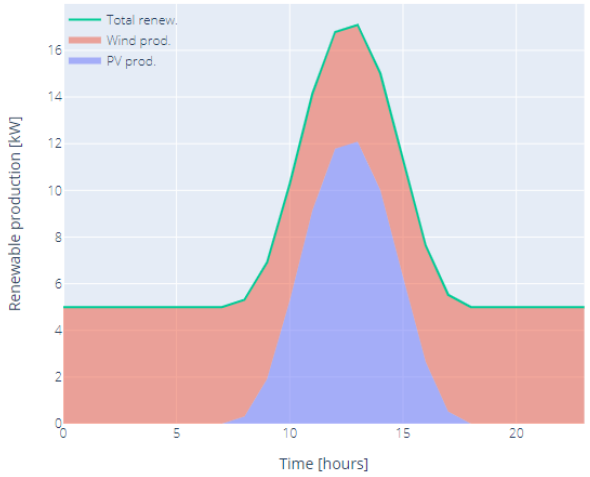
Electricity buy price [CHF/kWh]: 0.21

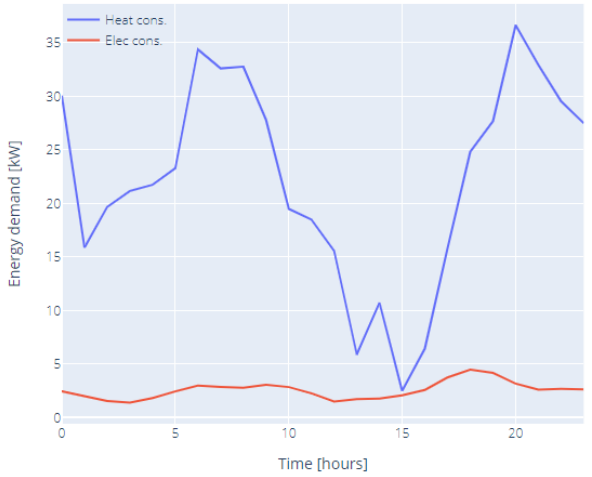
Electricity sell price [CHF/kWh]: 0.04

Simulation

KPI	value
Electricity bought [kWh]	0.00
Electricity sold[kWh]	0.00
Gas bought [kWh]	0.00
Gas sold [kWh]	0.00
Stored in battery [kWh]	0.00
Cost [CHF]	0.00

Day forecasts





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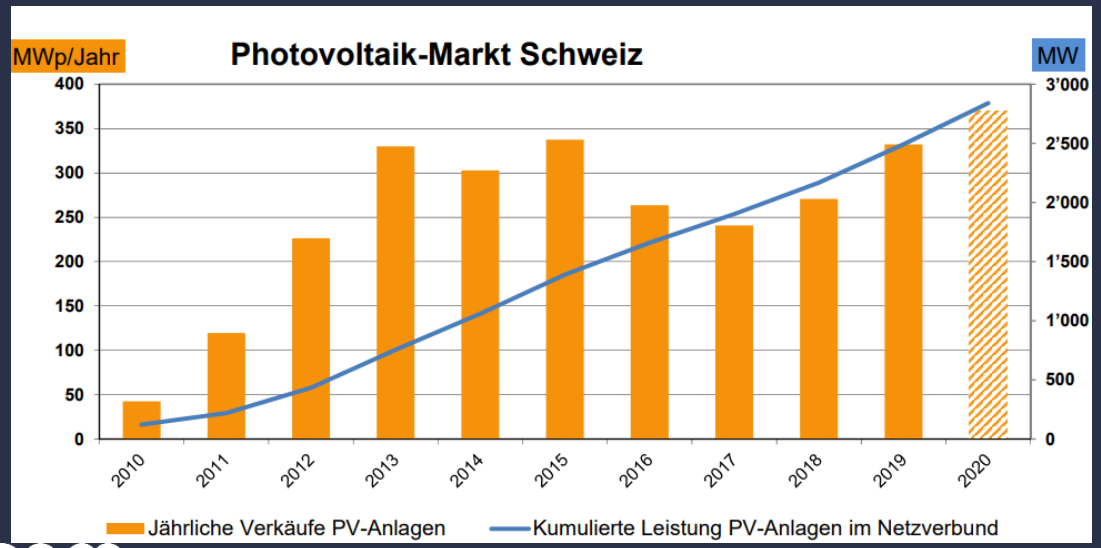
Photovoltaics: **White & colored solar panels**

Special polymer coatings enable white and colored solar panels, without cells or connections visible

- Infrastructure buildings, architecture
- Hidden ubiquitous energy source
- Simple, adaptable and low-cost
- 100-170 W_p/m^2 (50-85% of bare PV cell)



World's first white PV module (2014)

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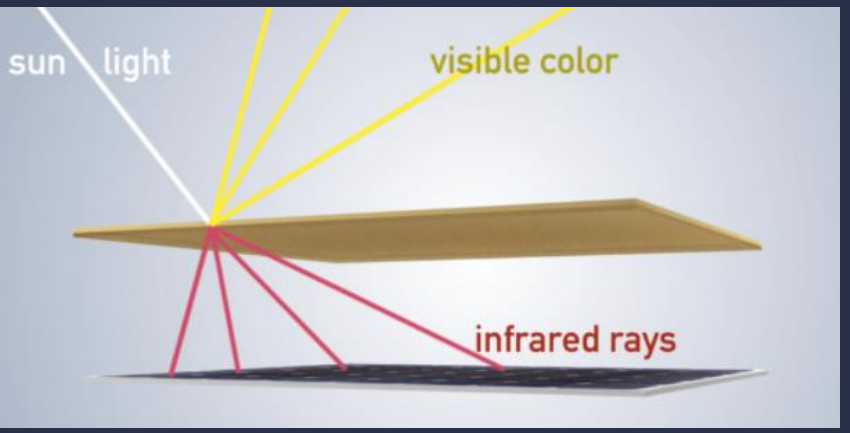
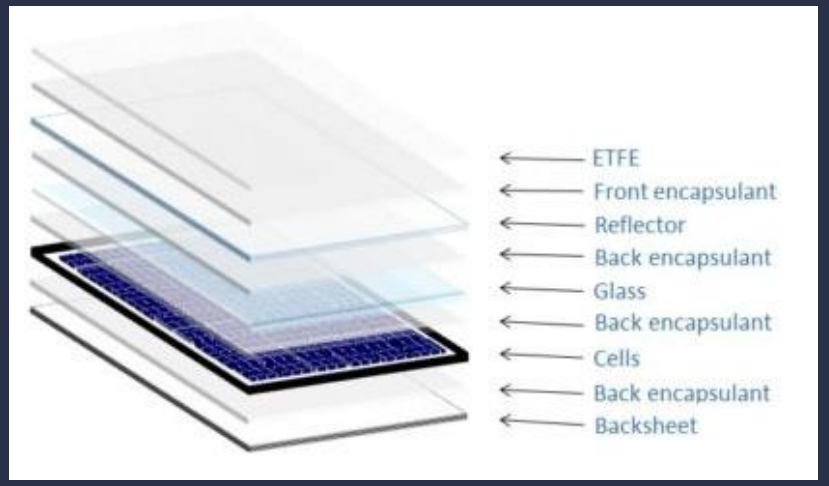
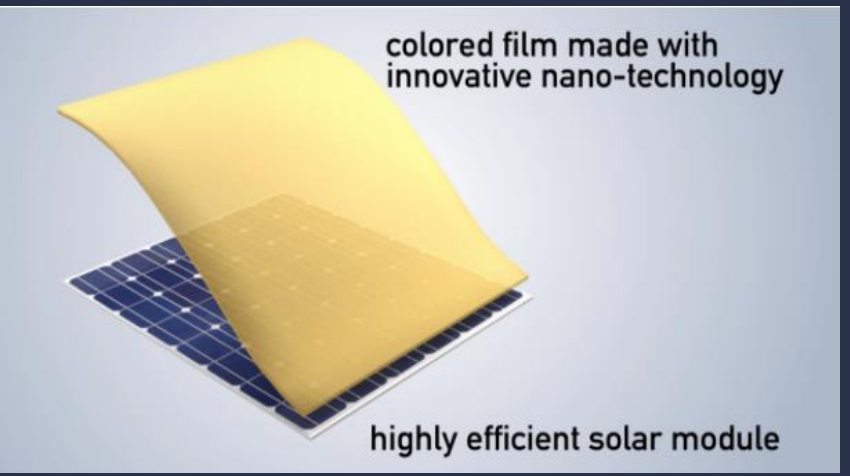
SOLAXESS

white solar technology

- Local energy production (40 m^2/family sufficient)
- New energy rules for buildings
- Millions of m^2 building surface available
- Proven technology – no tradeoff in aesthetics







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Nanostructured glass coating: **INFRASCREEN**

BCN Innovation Prize 2020

- Climate control for greenhouses
- CSEM optical filters development
- +15% more productivity
- -20% heating needed
- -200 t CO_2 emissions saved/year

Greenhouses vs. open-field farming

- 15x higher yields
- -99% less water consumption
- 0 chemicals & CO_2 emissions

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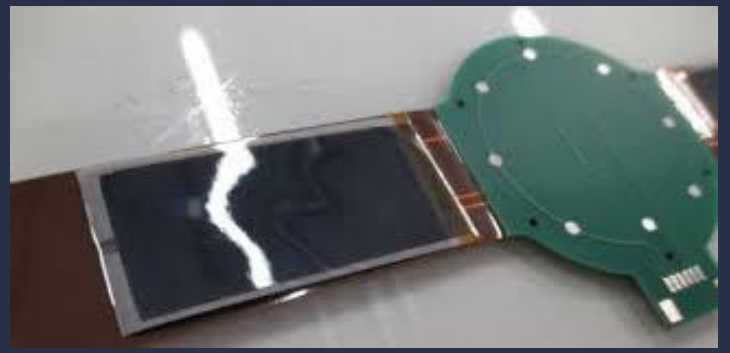
From flexible photovoltaics to **wearables**

Energy harvesting for zero battery solutions

- Flexible PV cells
- R&D polymer platform: Compounding, extrusion and processing
  - Long-term reliability
  - Specialty polymer design and manufacturing
- Low light high efficiency

Tissot T-Touch Solar

- 6 months autonomy
- BT connectivity
- Sapphire glass



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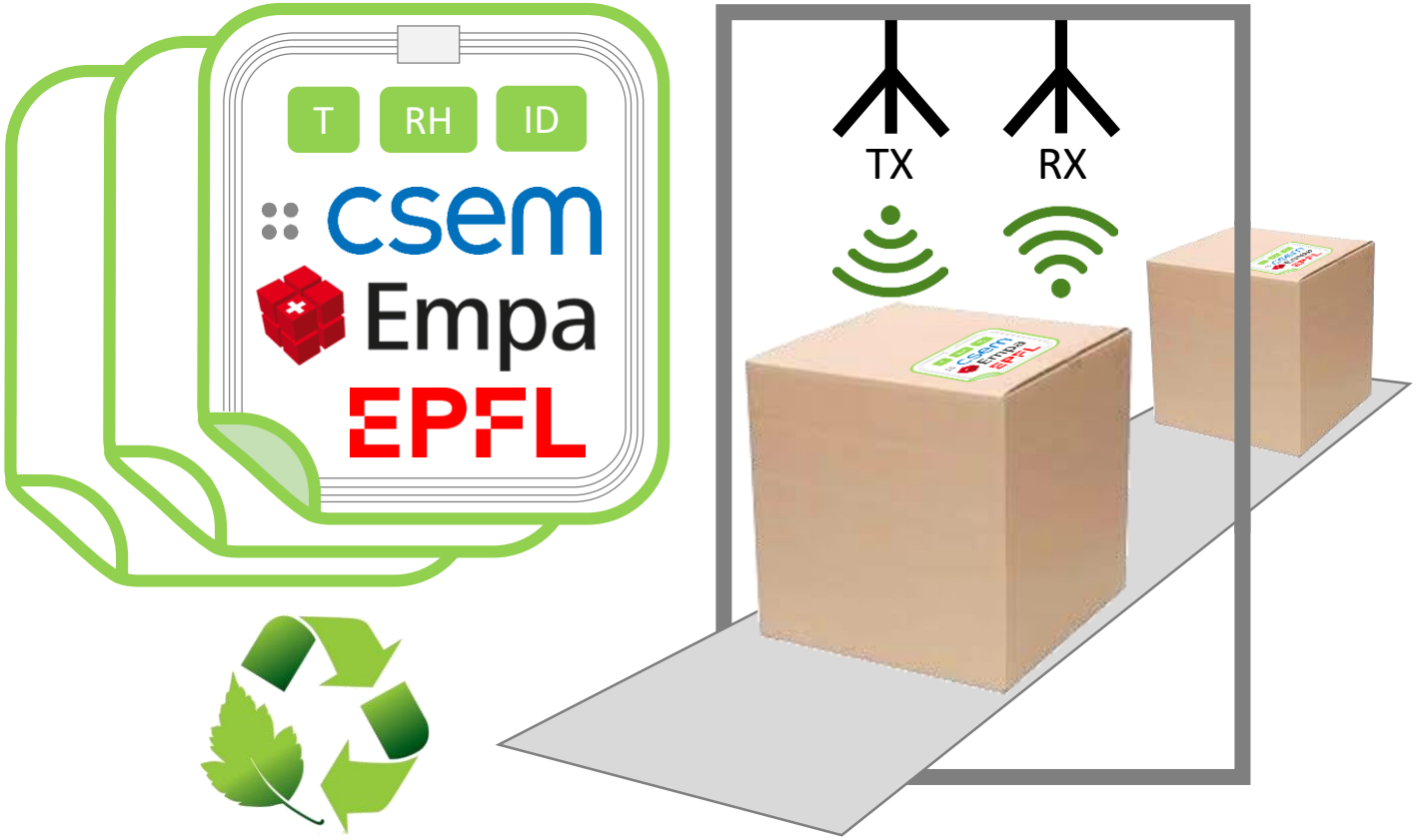
Bridge GREENsPACK

CSEM: David SCHMID,
Oleksandr VOROBYOV
Empa: Gustav NYSTRÖM
EPFL: Danick BRIAND



Green smart packaging

BRIDGE DISCOVERY 2020-2024

T RH ID
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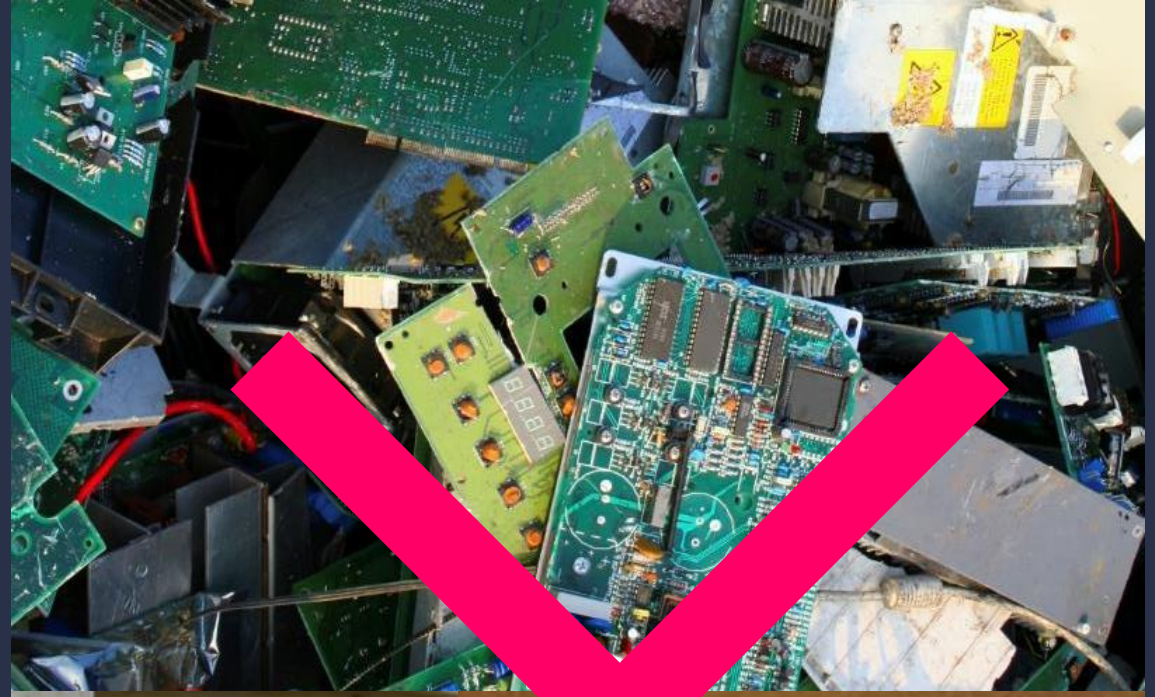
Empa
EPFL

Simple green tag for monitoring transport units without altering existing infrastructure and processes – a real game changer



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Simple green tag for monitoring transport units without altering existing infrastructure and processes – a real game changer

Perishable goods

- $35 billion annual loss in pharmaceuticals
- No return chain
- Low cost solution

✓ Biodegradable **ecotags**

✓ Identification

✓ Temperature & humidity

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GREENsPACK

Societal, economical & ecological impact

- Reduced medical, food & electronic waste
- Sustainable materials & processes
- Answers consumer & citizen demand for green tech
- Enable consumer market life cycle assessment

Future applications

- Food quality monitoring
- Construction and building safety
- Biological samples and organs
- Implantable devices -> Bioresorption

http://nih.gov

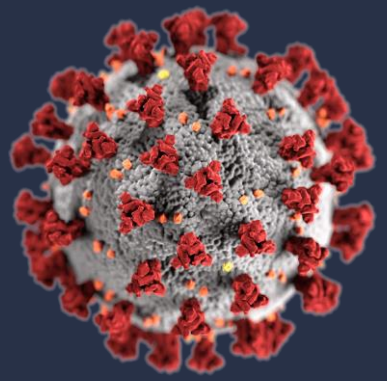
csem Empa Materials Science and Technology EPFL

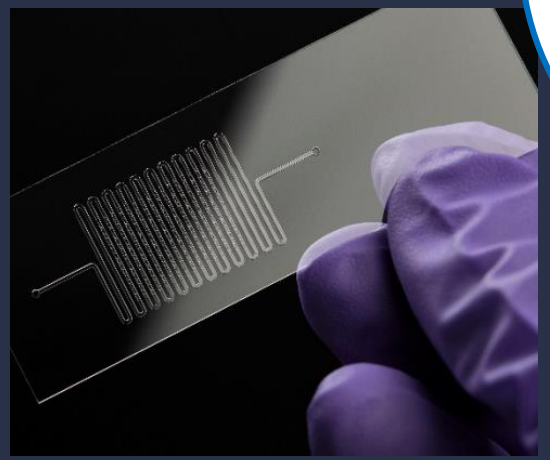
Photolinker polymer for more sensitive bioassays

- Dextran-photolinker – covalent binding by soft UV or heat activation
- Disposable glass microfluidics for bioassays
- Antibody screening: 20 different types of AB simultaneously/single chip
  - 1-2 hours detection time
  - Fluorescence based read out

→ COVID-19 relevant

- Coatings for woundpads & catheters





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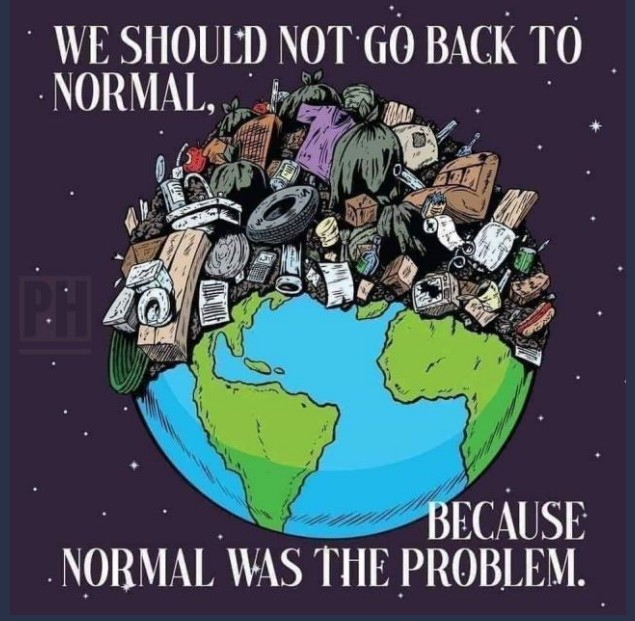
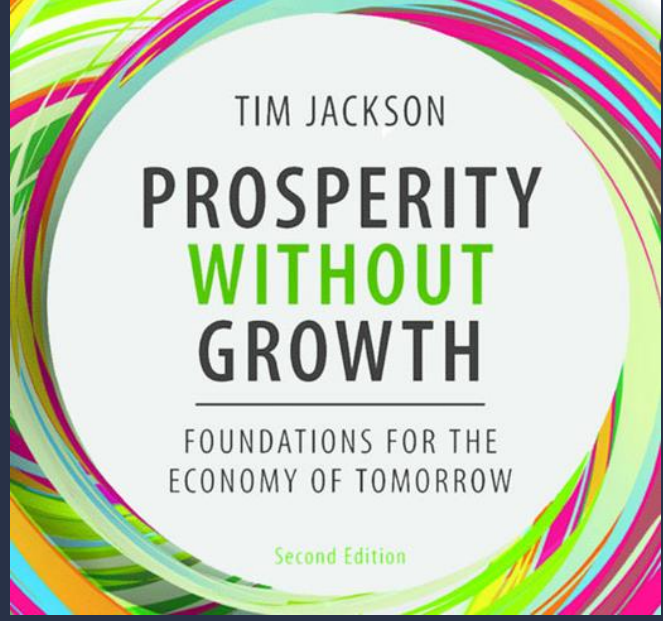
ADAMANT INNOTECH

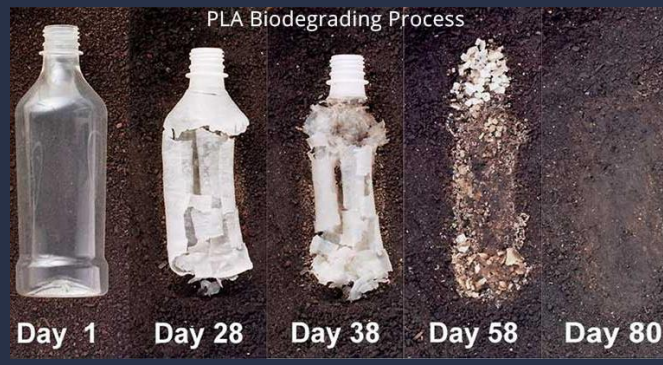
Future Developments

- **Ecological** & **economical** sustainability
- **Technology** driven
- **Efficient** use, **recycling**, **regrow**
- **European green deal**: From high to low carb economy
- Economy **without growth**?





Smart grid automation | Energy scavenging | AI | Edge computing | Battery storage | Emerging PV |



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CSEM social **responsibility**

- Limiting our **impact** on the environment
- **Committing** to our employees (gender equality, job sharing, part-time, telework)
- Acting **ethically** towards society while driving economic growth

IQNet

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and SQS
hereby certify that the organisation

CSEM SA
2002 Neuchâtel
Switzerland

Certified area
Whole Company and its Swiss Centers

Field of activity
Research, development and production in microtechnology and information technology

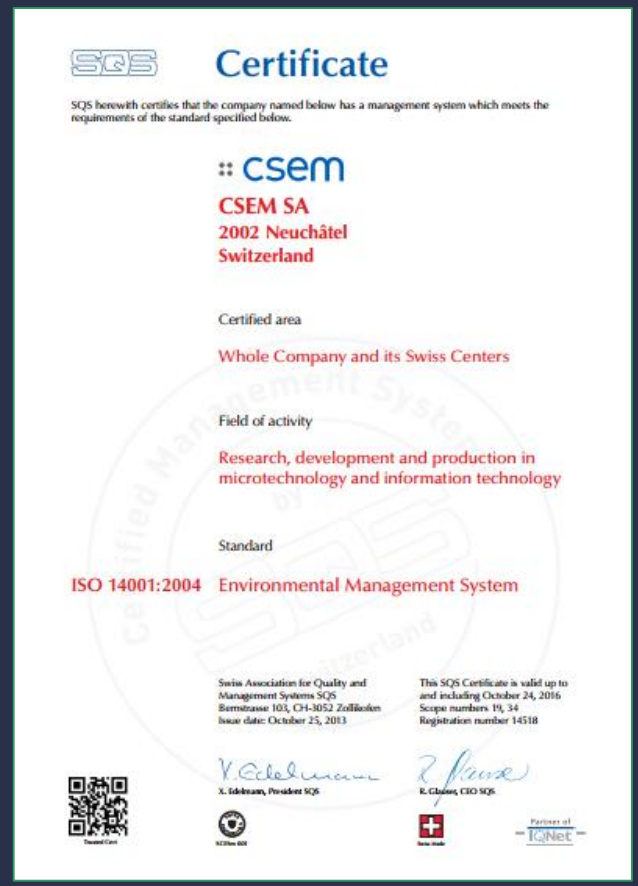
has implemented and maintains a
Management System
which fulfils the requirements of the following standard(s)

ISO 14001:2004

Scope No(s): 19, 34
Issued on: 2013-10-25
Validity date: 2016-10-24
Registration Number: *CH-14518*

Michael Drechsel
President of IQNet

Roland Glauser
CEO SQS



SQS Certificate

SQS herewith certifies that the company named below has a management system which meets the requirements of the standard specified below.

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CSEM SA
2002 Neuchâtel
Switzerland

Certified area
Whole Company and its Swiss Centers

Field of activity
Research, development and production in microtechnology and information technology

Standard
ISO 14001:2004 Environmental Management System

Swiss Association for Quality and Management Systems SQS
Bernstrasse 103, CH-8052 Zollikofen
Issue date: October 25, 2013

This SQS Certificate is valid up to and including October 24, 2016
Scope numbers 19, 34
Registration number 14518

X. Edelmann, President SQS

R. Glauser, CEO SQS

Limiting our impact on the environment (swissclimate.ch)

CSEM regularly implements infrastructure improvements that reduce energy consumption and its environmental impact. We've also put in place systems for optimizing accident prevention, for handling dangerous materials, and for recycling and waste management.

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Sustainability starts in our **heads**

- **Durabel**: Internal magazine for sustainable development (4x/J)
- **Bike** to work
- **CleaningDay**
- Repair Café
- Annual sustainable development **prize**
- CSEM **charta**

«Do good and talk about it»

DURABEL

Lettre d'information interne au CSEM sur le développement durable
CSEM interner Newsletter über Nachhaltigkeit
CSEM's internal newsletter about sustainability

csem
durabel@csem.ch

ENVIRONMENTAL | TECHNOLOGY | ECONOMICAL | SOCIAL | EMPLOYEE

EDITORIAL

Dear colleagues, Chers collègues, Werte Kollegen,

We knew it all the time: Corona will not go away like a miracle. We are negotiating a „new normal", with

Télétravail durable

Cette crise sans précédent, dont nous vous parlions lors de la dernière édition de Durabel, a permis de mettre en lumière que beaucoup de changements inimaginables deviennent possibles. Le télétravail fait partie de l'un de ceux-ci. Mais quel impact a réellement le télétravail sur l'environnement ?

En termes d'environnement, l'avantage principal, est la réduction des déplacements en voiture (pollution atmosphérique, congestion, pollution sonore). Travailler à domicile régulièrement permettrait, également, dans le futur

Si le télétravail ne s'accompagne pas d'un suréquipement, les émissions de CO_2 liées à l'usage plus intensif de l'informatique à la maison qu'au bureau suivraient de loin le CO_2 sur les déplacements qui lui est très significatif. Malgré cette bonne nouvelle, prendre du temps en télétravail (ou au bureau) pour trier nos e-mails est un défi que l'équipe Durabel vous lance … 1 e-mail stocké pendant un an correspond à 10 grammes de CO_2 !

Notre réponse à l'amélioration de la qualité de vie et à notre responsabilité sociale et environ-

Mit dem CSEM beteiligte sich erstmals ein einheimisches Unternehmen am Clean-Up-Day.

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Thank you for your attention!

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www.csem.ch