



OUR HISTORY

An **ambitious** initiative born out of the French State's desire to create a European industry...

IPVF (Institut Photovoltaïque d'Ile-de-France) was launched at the initiative of the French government in 2013.

We are a **global collaborative research platform** specializing in solar photovoltaic technologies, born out of a public-private partnership.



OUR HISTORY

... relying on the union of excellent academic laboratories...

The IPVF brings together research efforts from complementary units: IRDEP, with EDF and CNRS, and LPICM teams, with X and Total. **They give access to breakthrough technologies.**

By collaborating with 10 FedPV laboratories throughout the country, we can call on **a very wide range of skills.**



OUR HISTORY

... and private partners, covering most of the photovoltaic value chain.

The IPVF has on board **leading energy companies**, industrial gas specialists, equipment manufacturers and project developers.

These partnerships bring together **industrial and academic research teams**, with the ambition of contributing actively to the European leadership in the photovoltaic sector.



TotalEnergies



RIBER

HORIBA

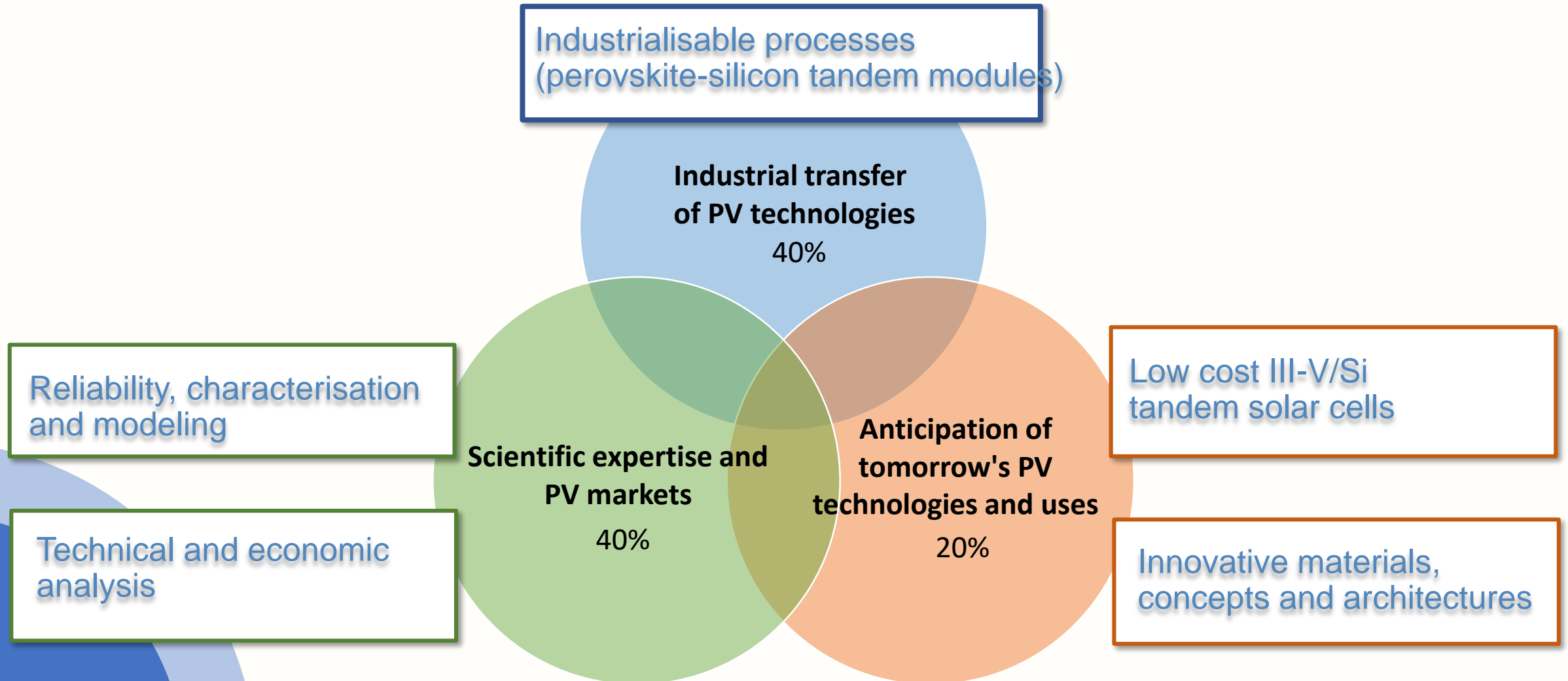
IPVF LABORATORIES

A building located in the heart of the Saclay Plateau, inaugurated in 2018, at the crossroads between academic and private research actors.

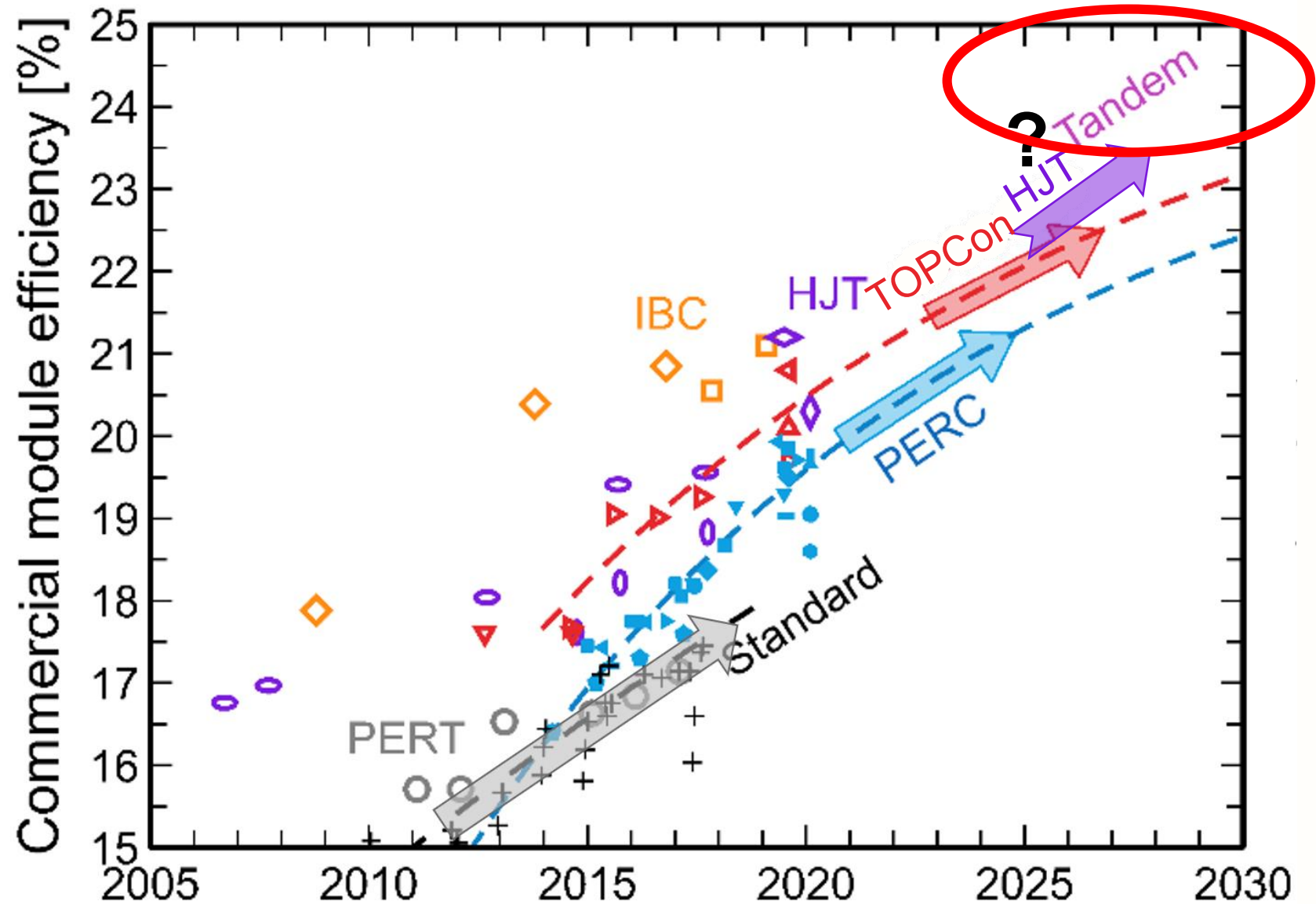
- 3500m² of dedicated clean rooms;
- Including 15 thematic laboratories;
- Equipped with more than 100 state-of-the-art machines and equipment;
- Bringing together 150 researchers, 25 nationalities;
- 25+ patents & invention disclosures.



IPVF pre-competitive Research Programmes (2023 – 2024)

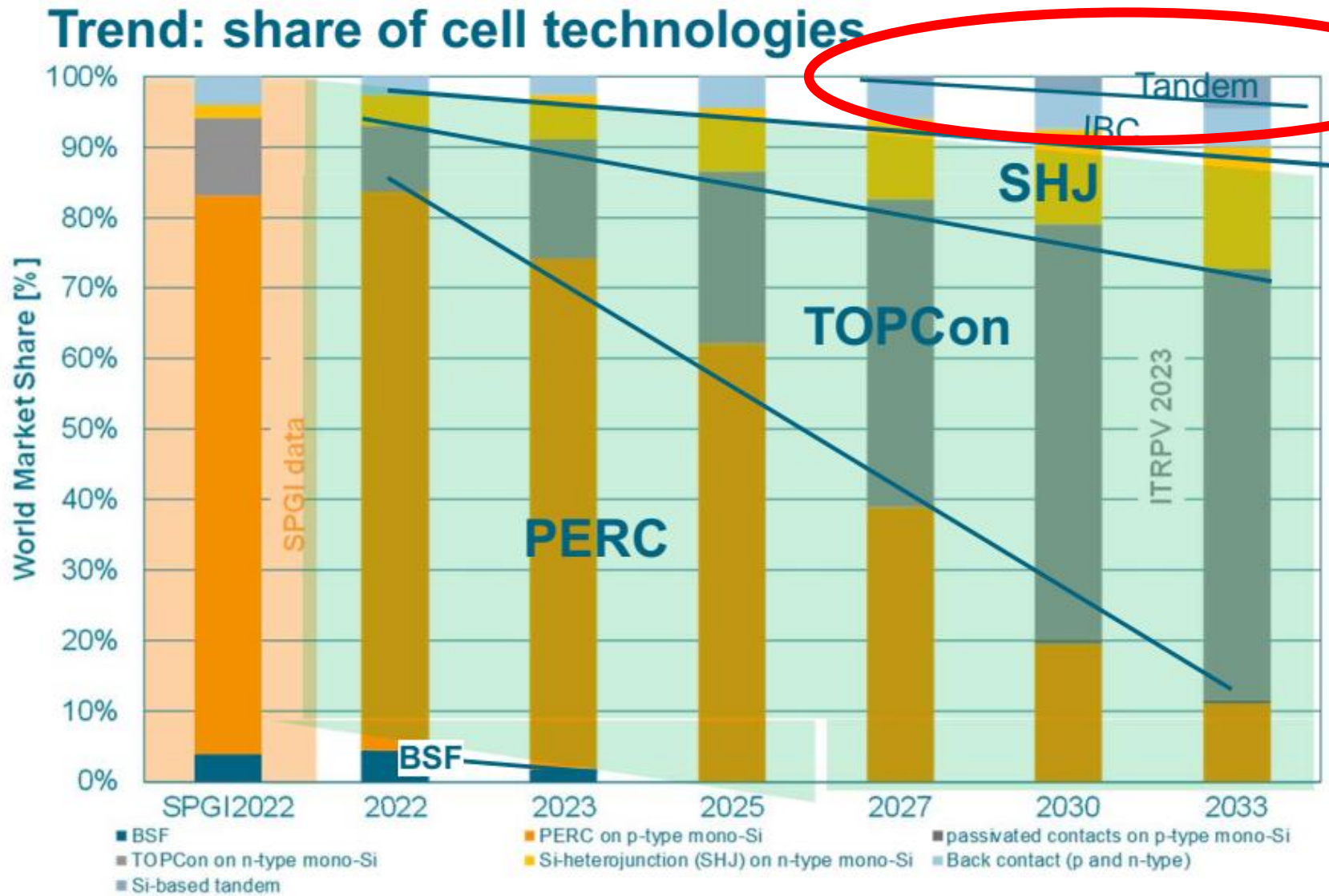


Solar PV R&I for the EU industry: trends in c-Si solar cell architectures

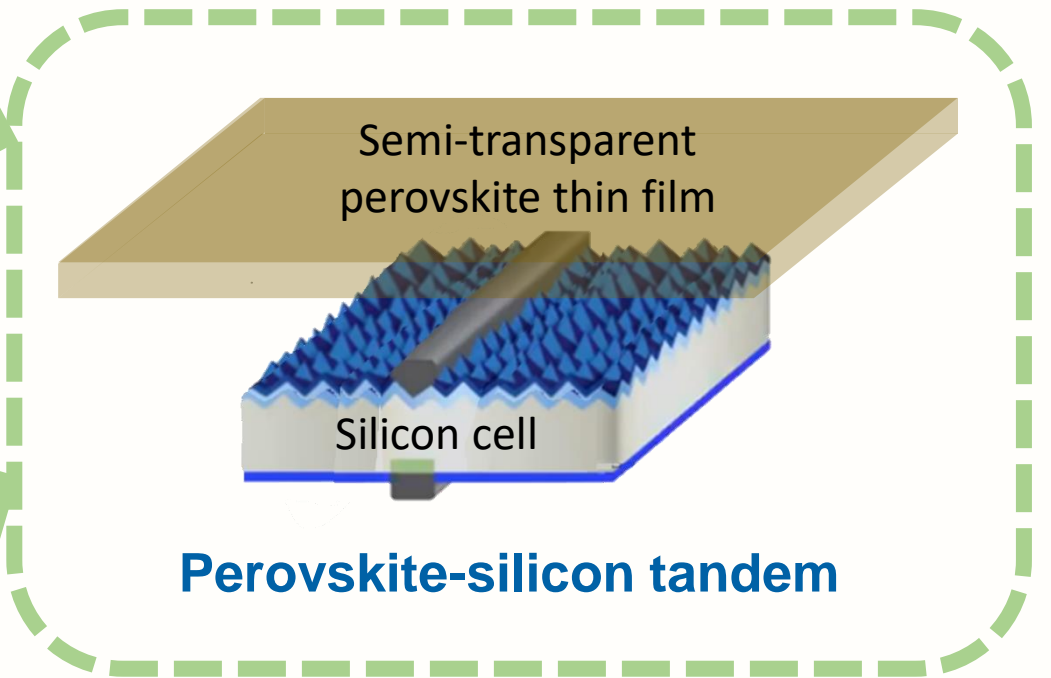
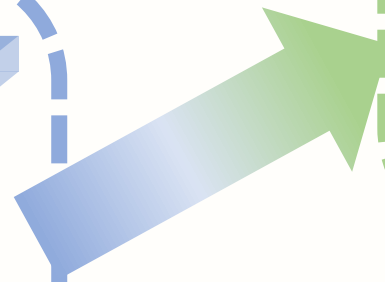
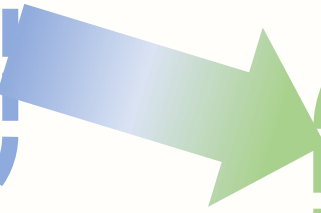
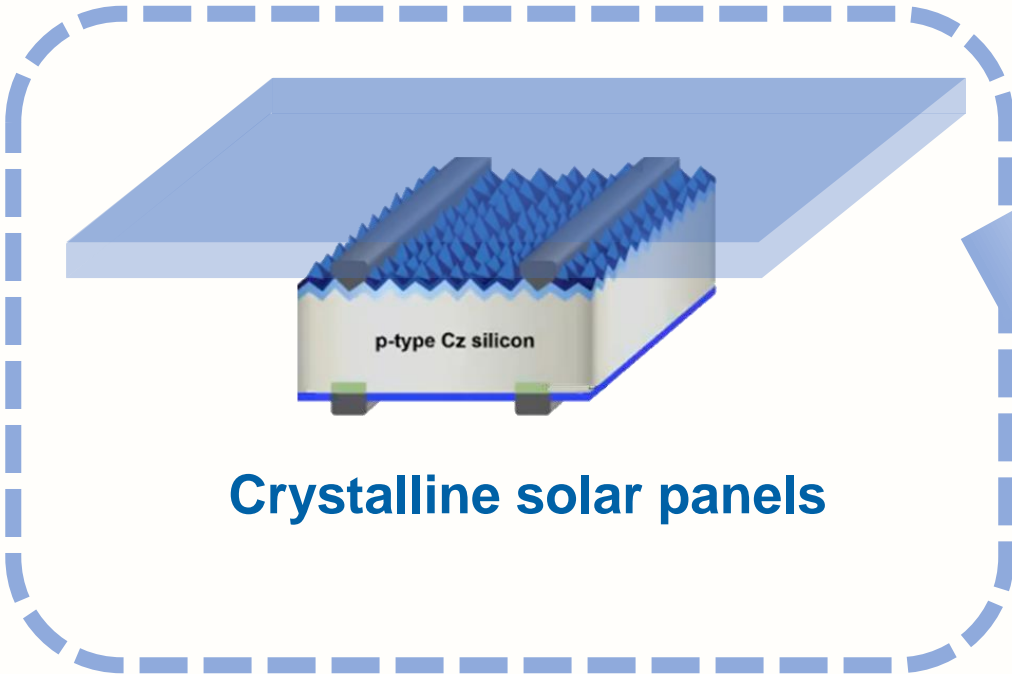
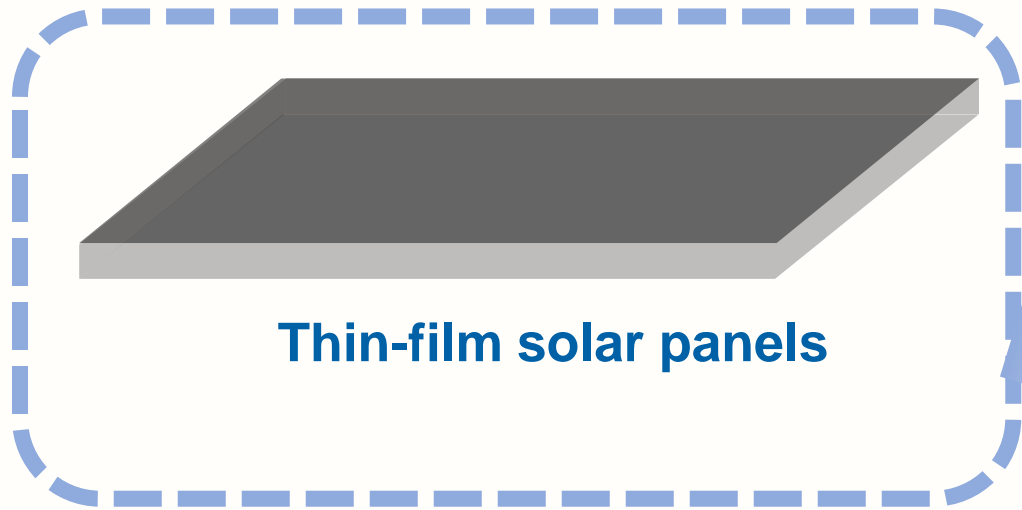


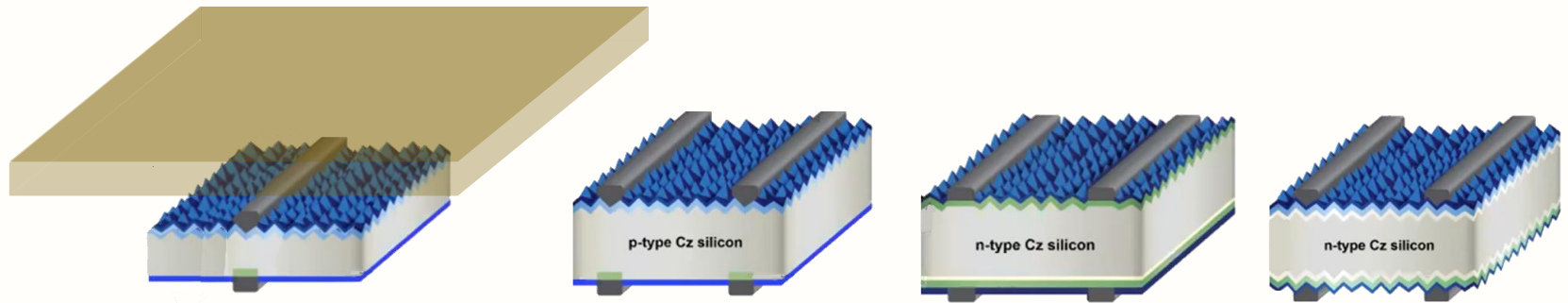
Source: Pietro Altermatt, Seminar IPVF April 2023

Solar PV R&I for the EU industry: c-Si Solar Cell Technologies market outlook



Source: ITRPV, March 2023





	Tandem	PERC	TOPCON	HJT
Efficiency	26%	22%	23%	23%
Hectare / GW	385	465	450	450
Manuf. capacity 2022 Chine	-	150 GW	50 GW	5 GW
Manuf capacity 2022 EU (cell)	-	0 GW	0 GW	0.6 GW
Silver Consumption t/GW	6 000	15 000	23 000	30 000

Perovskites can revolutionize the PV market

Remarkable physico-chemical properties for both *mainstream* and *custom* markets

- Classic prerequisite for a PV absorber: light absorption / electric charge transport
- Versatile properties thanks to its composition: ideal as the top layer of a Pk/Si tandem
- High performance in low or diffuse light: indoor applications, Internet of Things (IoT)

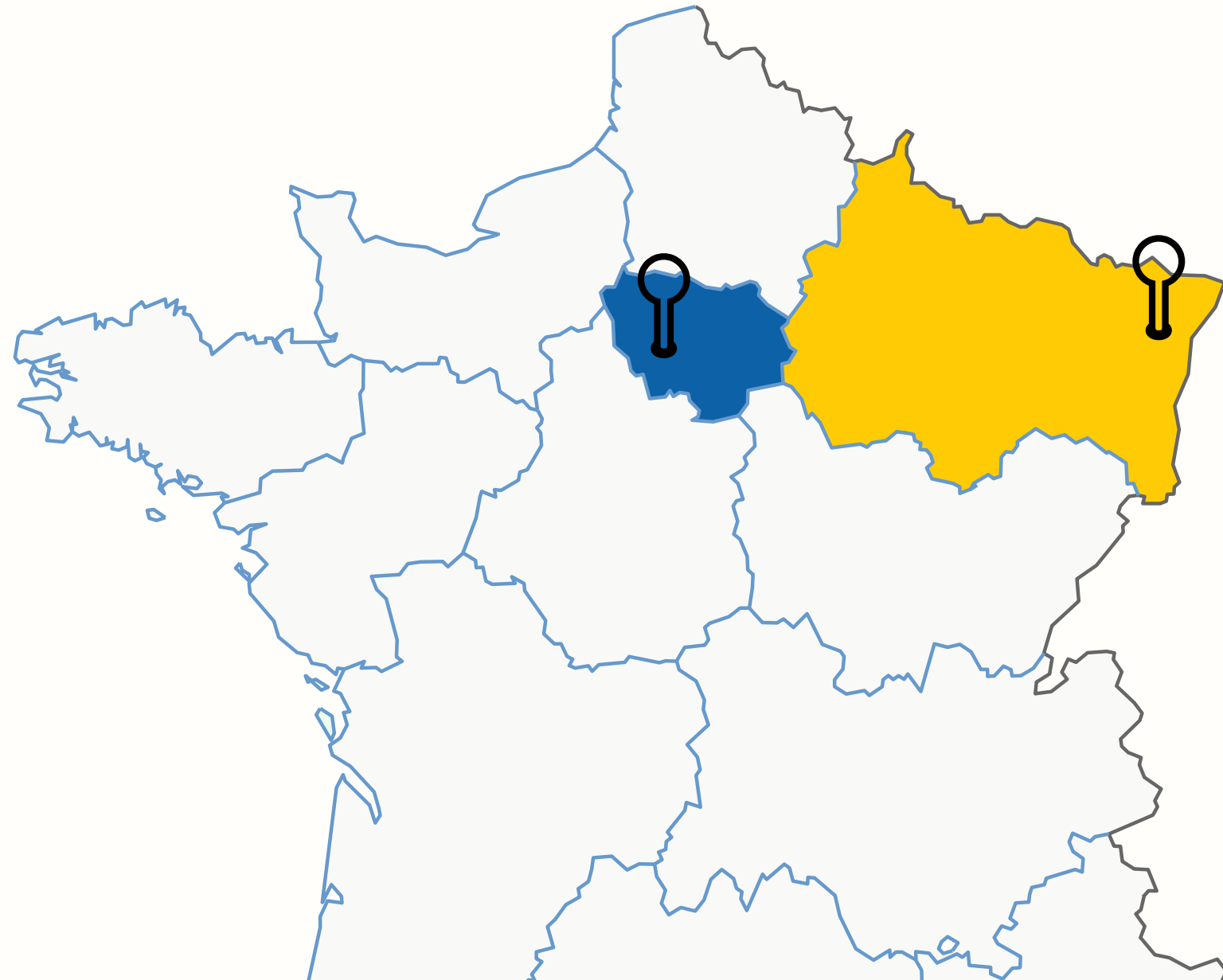
Can be chemically synthesized at low temperatures under atmospheric pressure

- Rapid energy payback (<6 months)
- Potentially low manufacturing costs (depending on materials and processes considered)
- Roll-to-roll deposition possible
- Compatible with complex or lightweight/flexible substrates, integrated frames, etc.

But some barriers need to be overcome

- Cell and module architecture not standardized --> potential impact on manufacturing costs
- Stability
- Industrial-scale production
- Presence of lead

VOLTEC Solar and IPVF to launch a cooperation dedicated to 4T Pk/Si



Member of



Member of



ETIP
Photovoltaics



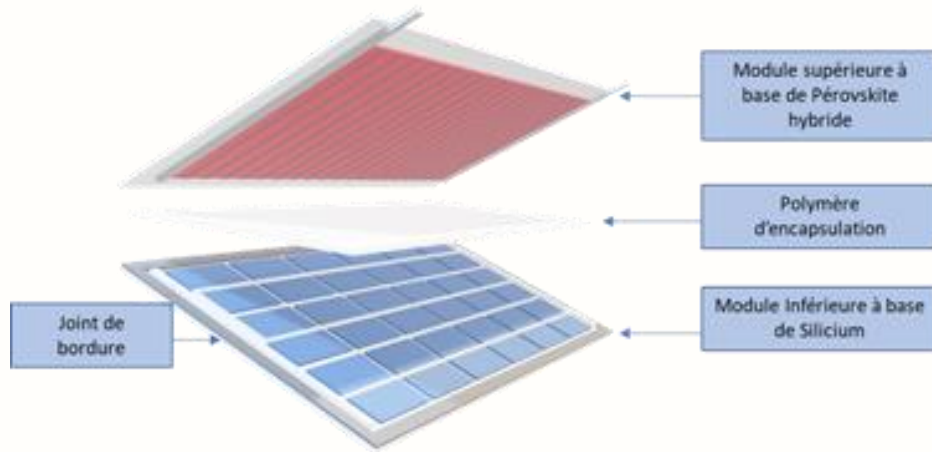
SolarPower
Europe



esmc

European Solar Manufacturing Council

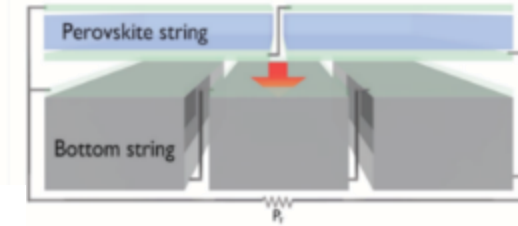
The technological choice: the 4T perovskite/silicon tandem



4T2C : Harmonisation des potentiels

$$P_{\text{tot}} = n_{\text{Si}} V_{\text{Si}} (I_{\text{Si}} + I_{\text{pk}})$$

$$= n_{\text{Pk}} V_{\text{Pk}} (I_{\text{Si}} + I_{\text{pk}})$$



Competitiveness

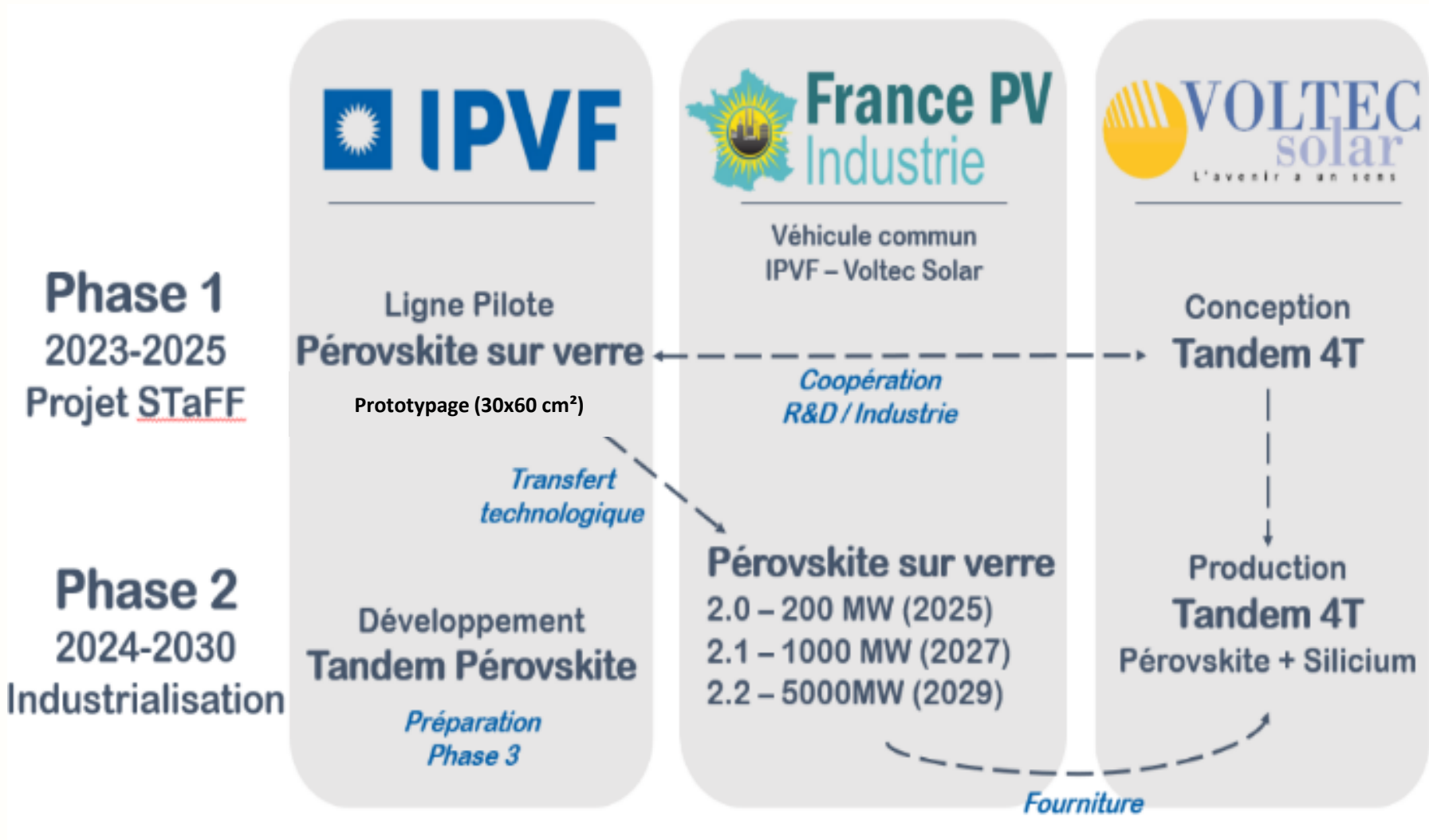
High product efficiency
Lower PV energy production costs
Cost control / value chain

Eco-efficiency & Circularity

Fewer materials per kW produced (Ag, Si, ...)
Reduced energy consumption for production
Use of recycled materials (glass and Si)

Sovereignty

EU-made perovskite top module
Equipment suppliers of European precursors
EU-made tandem cell
Versatility in bottom cell supply



They talk about the VOLTEC Solar x IPVF initiative



Reuters

Perovskite solar goes commercial as yield gains align with market forces

<https://www.reuters.com/business/energy/perovskite-solar-goes-commercial-yield-gains-align-with-market-forces-2023-02-02/>



Les Echos

Voltec Solar veut industrialiser une nouvelle technologie de panneaux solaires

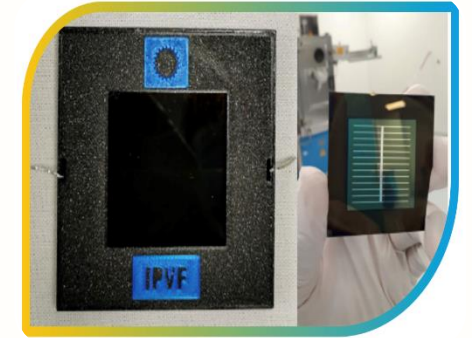
<https://www.lesechos.fr/pme-regions/grand-est/voltec-solar-veut-industrialiser-une-nouvelle-technologie-de-panneaux-solaires-1882350>



L'Usine Nouvelle

Voltec Solar et l'Institut photovoltaïque d'Ile-de-France prévoient une giga-usine de panneaux solaires en France

<https://www.usinenouvelle.com/article/voltec-solar-et-l-institut-photovoltaique-d-ile-de-france-prevoient-une-giga-usine-de-panneaux-solaires-en-france.N2063517>



PV Magazine

Voltec et l'IPVF lancent un projet d'industrialisation d'une nouvelle technologie tandem perovskite-silicium

<https://www.pv-magazine.fr/2022/11/10/voltec-et-lipvf-lancent-un-projet-d-industrialisation-d-une-nouvelle-technologie-tandem-perovskite-silicium/>



Stay tuned 

Thank you for your attention

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