APOLO project: modular flexible design of an envelope-integrated perovskite solar panel

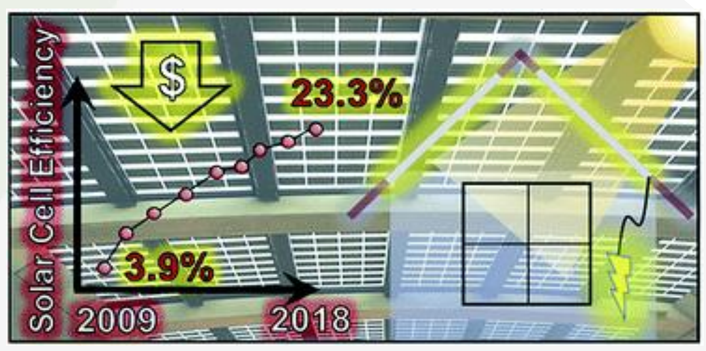
Ana Milena Cruz*, Michele Manca

LEITAT Technological Center, Carrer de la Innovació 2 , 08225 Terrassa (Spain) - *email: amcruz@leitat.org

BIPV GLOBAL SCENARIO

A large share of renewable energy research has been devoted to photovoltaic systems which harness the solar energy to generate electrical power. As an application of the PV technology, building integrated photovoltaic (BIPV) systems have attracted an increasing interest in the past decade, and have been shown as a feasible renewable power generation technology to help buildings partially meet their load. In addition to BIPV, building integrated photovoltaic/thermal systems (BIPV/T) provide a very good potential for integration into the building to supply both electrical and thermal loads.

CRITERIA for VIABLE BUILDING INTEGRATION



Sustainable Energy Fuels, 2018,2, 2378-2380

PV MODULE

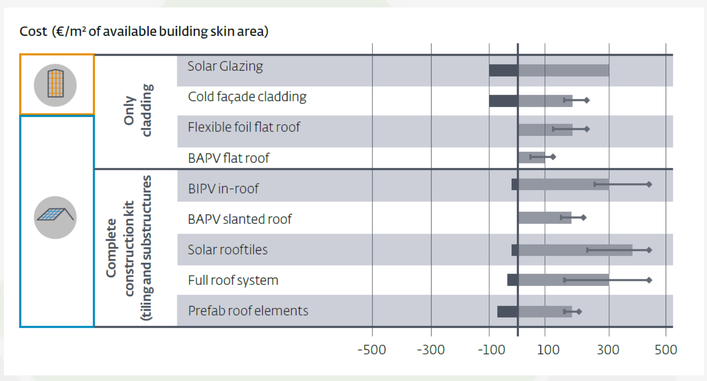
- ✓ Color
- ✓ Material
- ✓ Transparency
- ✓ Site
- ✓ Shape

PV INTEGRATION

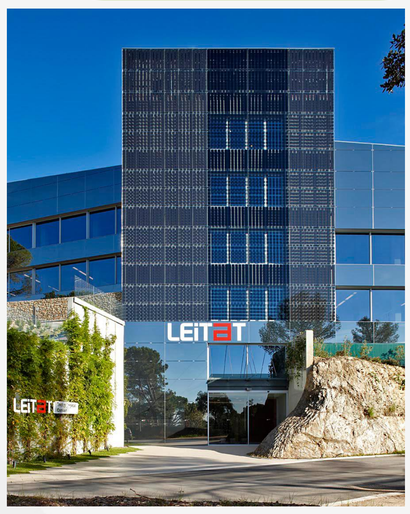
- ✓ Energy efficiency integration
- ✓ Multifunctional and Aesthetic integration
- ✓ Integration by elements

OUTLOOK

- ✓ Added value for buildings
- ✓ Actors in the process
- ✓ Role of architectures and designers
- ✓ Citizens consciousness



Source: BIPV STATUS REPORT 2015, SUPSI – SEAC



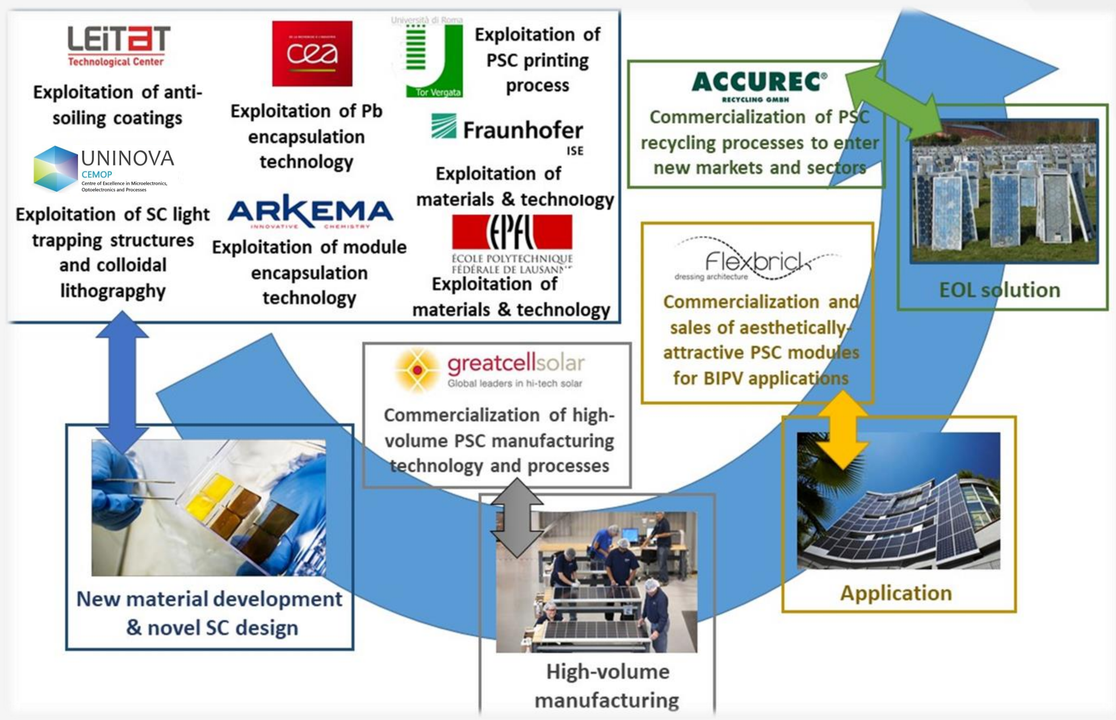
c-Si ➡ Dominant PV technology in BIPV today

Thin film PV ➡ 10-25% of BIPV Market (significantly higher than in the conventional, non-integrated PV market) with lower production costs

Emerging PV ➡ Big potential for BIPV applications → Low cost, color tunable, flexible

the APOLO PROJECT

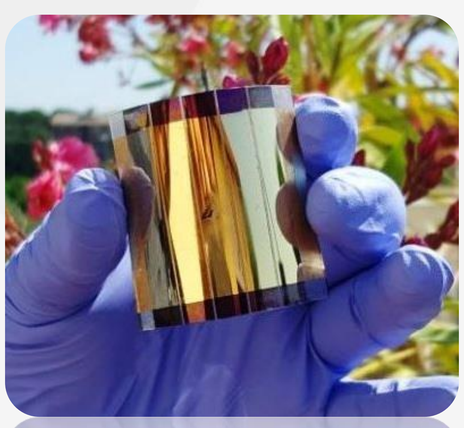
Perovskite solar cells (PSC) have shown an impressive learning curve in the last decades in comparison with 1st, 2nd and initial 3rd generation solar cells. This technology can use a palette of color and texture, using low and medium weight substrates. This is not possible with any PV technology with the PSC high efficiency. The project APOLO aims to improve the performances of flexible PSC as well as to develop new sustainable solutions by integrating the modules into the architecture design of buildings.



APOLO consortium covers the whole value chain PSC for BIPV, with industrial partners from materials providers (ARKEMA), cell designer and manufactures (GreatCellSolar) and final end users in the construction sector (FLEXBRICK) combined with social assessment (RELATIONAL) for market breakthrough and end of life solutions (AC). These companies collaborate with 6 RTOs (**LEITAT**, Fraunhofer, UNINOVA, CEA, EPFL and UNITOV) toward strengthening European Photovoltaic leadership in line with their business and strategy plan.

https://project-apolo.eu/

TOWARDS A NEXT GENERATION OF FLEXIBLE BI-PSC PANELS



- Reliable
- Fully printable
- High efficiency
- Stable in from ageing tests
- Low cost

FLEXBRICK®

- Flexibility and fast installation
- Large Scale formats
- Sustainable System
- Personalized design
- Many materials to combine

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