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**ETFETMFPM**

**DEVELOPMENT AND DEMONSTRATION OF FLEXIBLE MULTIFUNCTIONAL ETFE MODULE FOR ARCHITECTURAL FAÇADE LIGHTING**

**PROJECT OBJECTIVE**

To provide a PV module with embedded additional functionalities designed to be used in ETFE textile architecture for BIPV applications.

- ETFE (Ethylene tetrafluoroethylene)
  - This polymer, a plastic related to Teflon, is replacing glass and plastic in some of the most innovative buildings due to its special properties in terms of lightweight, transparency, self-cleaning, etc.

- OPVs (Organic Photovoltaics)
  - Photovoltaic modules based on organic semiconductors constitute a very promising technology for building integration. OPV technology has the potential to be integrated into ETFE-based architectural structures due to its low weight, high flexibility and unlimited design possibilities.

- Flexible PCBs and printed electronics
  - Polyimide-based flexible PCBs have been used for large scale demonstrators in parallel, the use of conductive inks for the direct printing of electronic circuits on ETFE has been demonstrated. Flexible OLED devices have been also integrated in the ETFE at laboratory scale.

- Electronics for façade energy management
  - Electronic devices (Fadecandy, Raspberry Pi, etc.) have been used for lighting management and have been integrated on the frames.

**DEMONSTRATIVE ETFE-MFM STRUCTURE**

A demonstrative structure composed by four individual ETFE-MFM modules has been manufactured and installed in real outdoor conditions at ITMA building façade.

**Final demonstrator characteristics:**

- 4 x ETFE modules 1.5mx1.5m (total area 9m²)
- Facade screen comprising 4 x (48x48 LEDs) = 9216 LEDs
- Pixel pitch: 30mm

**During the day:**

OPV elements produce energy which is stored on external batteries.

**During the night:**

The stored energy is supplied to the LED devices for:

- Lighting
- Display

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