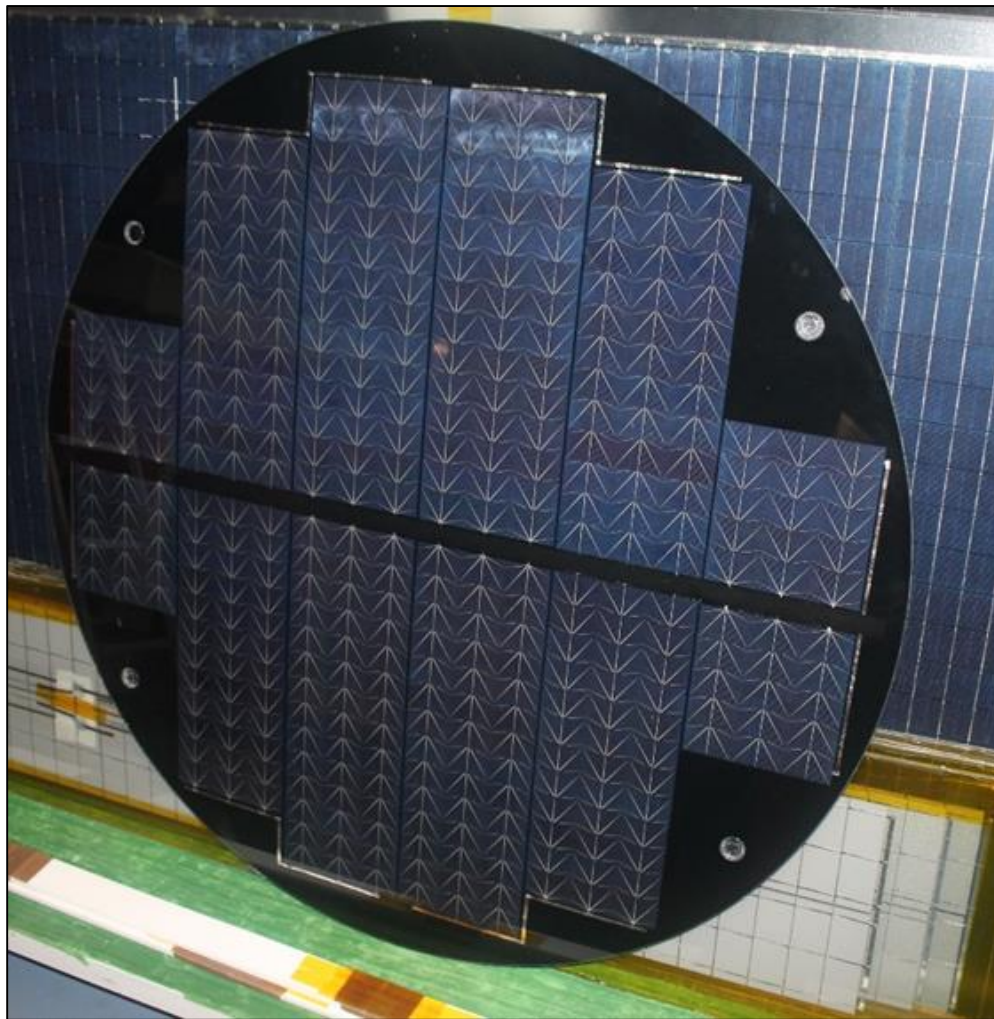


STILORMADE PV round module for integration in solar street lights

The STILORMADE PV glass round module is specially designed to be integrated in Solar Street Lights (SSL). The customized design, the optimized electrical configuration strategy and the advanced manufacturing procedure, implemented by the French manufacturer S'Tile and the University of Wien, achieve a high power performance through the active area increase, the hidden of the inter-cell connections and the improved effectiveness of the cells' ribbon pattern with a good aesthetical result, allowing a great integration in the Solar Street Lights.

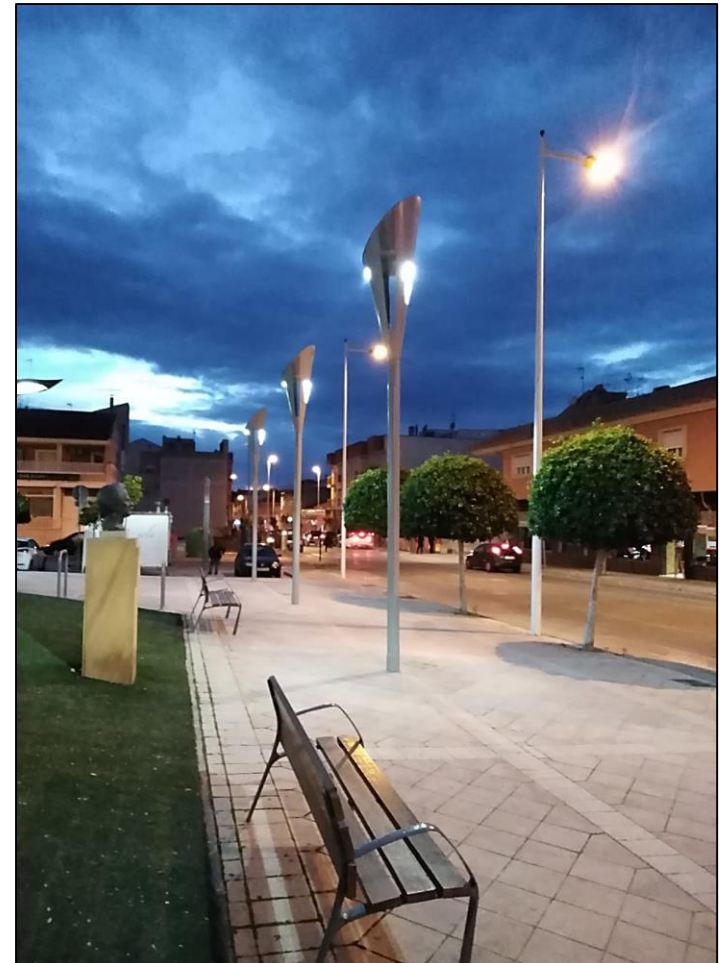
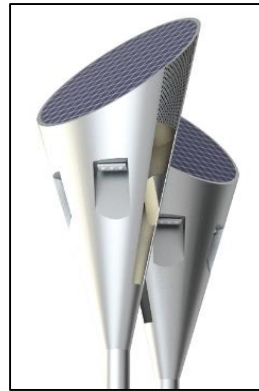
Physical properties	
Size	Ø1.045 mm
Thickness of laminate	5 mm / 25 mm with junction box
Colour	Blue on black background
Weight	14 kg
Attachment system	Anchorage button 50 mm
Electrical characteristics	
Pmpp	105 W (0 / +5 %)
Isc	3,50 A
Voc	38,3 V
Imp	3,28 A
Vmp	32,0 V
Materials	
Front side	Tempered glass 3,2 mm
Type of cell	Multi-Si
Design of cell	Sunrays
Size of active cell	156,75 x 31,5 mm
Encapsulant	EVA
Back side	PET based backsheet
Junction box	Two junction box / IP65
Cable length	80 cm



STILORMADE hybrid solar street light Model TULIP

TULIPAN SSL, designed by SIARQ, is an advanced solar street light capable of operating with a renewable energy source (photovoltaic) or directly from the public grid, thanks to the perfect combination of its elements: STILORMADE PV round module, LED modules, NiMh battery pack, inverter, grid connection and smart energy control system which allows to seasonally and daily program the on/off timing and the intensity of the lamps. The futurist design of the TULIP SSL makes it perfect to be implemented in modern architectural and urban projects.

TULIP Solar Street Light Data-sheet	
Metal structure	
Height of installation	6000 mm
Height of luminaire	5000 m
Pole dimensions	152Ø x 4000 x 4 mm
Base plate	400 x 400 x 8 mm
Material / Colour	Galvanized Steel / Polyurethane painting RAL 9006
Weight	160 Kg
Wind resistance	200 km/h
PV round module (STILORMADE)	
Power	105 Wp (multi-Si)
Dimensions / weight	1045Ø x 5 mm (25 mm with junction box) / 14 kg
Material	Tempered glass 3,2 mm
Attachment system	Anchorage buttons 50 mm (x4)
Lighting and electric components	
LED module (Sunna Design)	
Power	40 W / 18 V (2x20WLED modules)-driven at 10 W
Light distribution	Elliptical distribution (IESNA type III)
CCT / CRI / Luminous flux	Warm white 3200 K / 80 / 3500 lm
Efficiency	LED driver efficiency > 85%
Operating time/ Autonomy / Lifetime	All night long (8-14 hours) / Function is secured with No Black Out 24/7 thanks to auto dimming mode / 60000 h
Battery (Endurance L2, Arts Energy)	
Technology	NiMh high resistance climate/tropicalized
Lifetime	> 10 years of lifetime (4000 cycles), 6 years of warranties
Controller (Sunna Design)	
On/Off controller	Smart Energy System specifically designed for NiMh batteries, including a patented algorithm that control the state of charge of the batteries (SOC) and automatically climmers the light at different lighting levels (dynamic LED lighting profiles)
Inverter (Sunna Design)	
Voltage conversion	24 Vdc / 220 Vac



TULIP Solar Street Light Data-sheet

Contemporary aesthetic design

Demo-system implemented in the public library of Molina de Segura (Spain), with a total coverage of demand by PV

Demo-systems of TULIP hybrid solar street lights

Several demo-systems have been implemented in Spain with the aim of in order to demonstrating the feasibility of the product and gathering information from the final users and stakeholders of different sectors: construction, industry, energy, public, etc.:

- 2 TULIP units in the facilities of the Renault factory, close to Valladolid, Valladolid.
- 4 TULIP SSL units in the public garden located in the entrance gate to the new municipal library of Molina de Segura, Murcia.
- 4 TULIP SSL units in the facilities of Cosentino Factory, Cantoria (Almería), a marble manufacturer for design and architecture.
- 4 TULIP SSL units in the entrance gate to Hotel Calvia Beach The Plaza by Meliá in Calviá, close to Palma de Mallorca, Balears.
- 4 TULIP SSL units in one of the road access to the municipality of Tudela de Duero, Valladolid.



Renault factory, Valladolid (Valladolid)



Public library, Molina de Segura (Murcia)



Cosentino Factory, Cantora (Almería)



Hotel Meliá, Calviá (Balears)



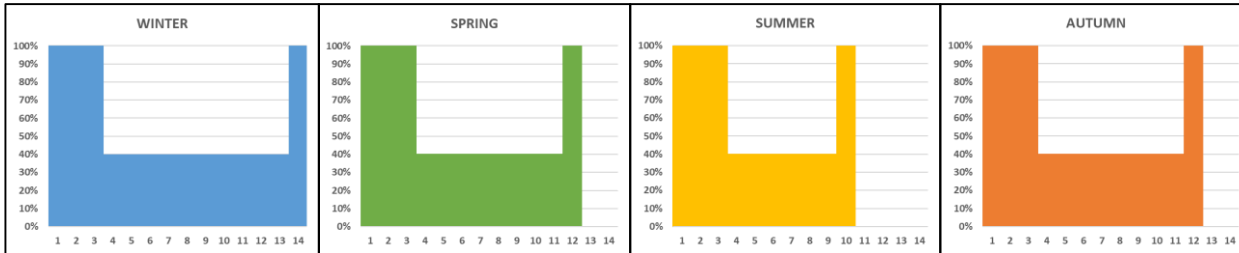
Road access to Tudela de Duero (Valladolid)



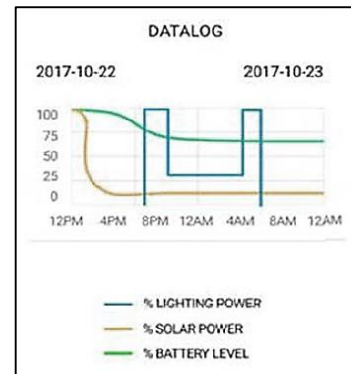
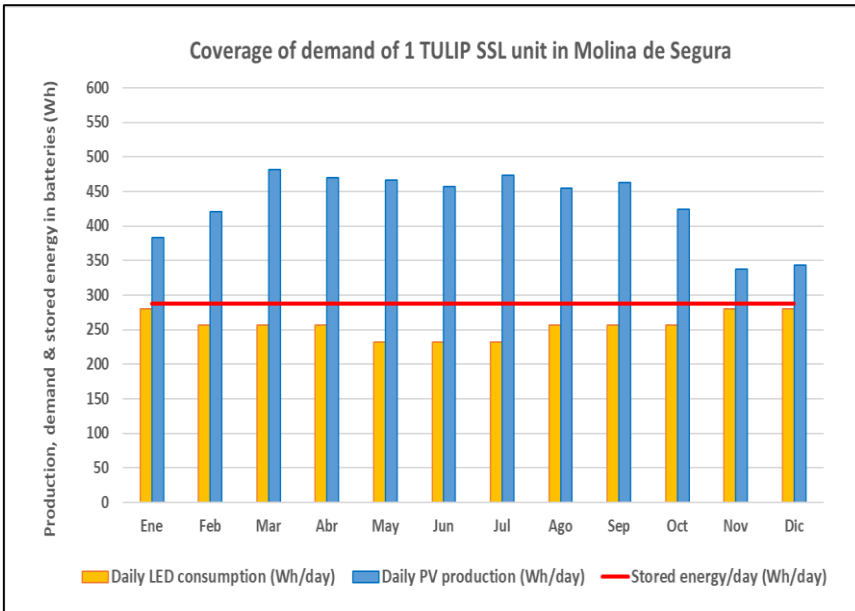
Installation works of TULIP SSL in Hotel Meliá

Operation and monitoring of TULIP hybrid solar street lights

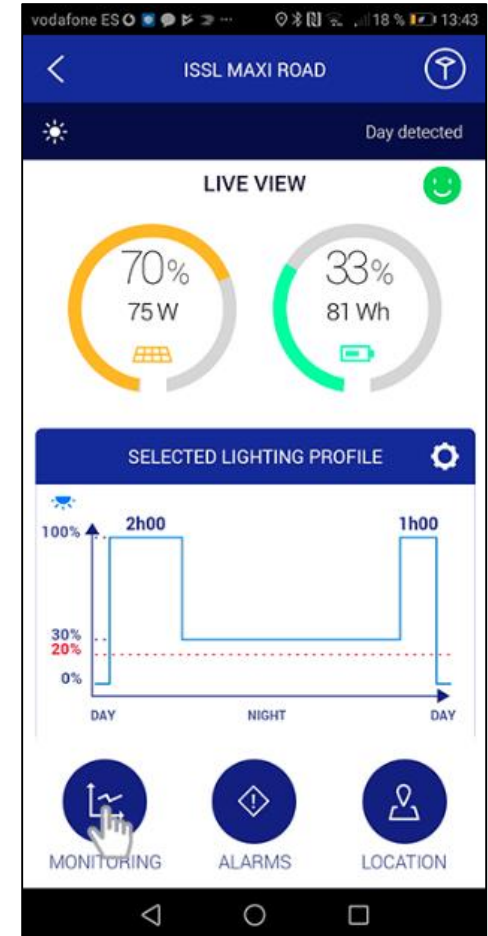
TULIP SSL integrates the smart and dynamic control systems Sunna Core, especially designed for NiMH batteries, which includes a patented algorithm that control the state of charge of the batteries and automatically dimmers the light at different lighting levels. The control system allows programming and managing the most suitable lighting profile, depending of the needs of the final user, in each season of the year. Remote management, real time monitoring and health diagnosis can be carried out with the help of the mobile application SunnApp.



Programmable seasonal hourly operation pattern: on/of time, number of operating hours and intensity



Coverage of demand: TULIP hybrid SSL might perform as an autonomous system under favourable irradiance conditions, as showed in this example



TULIP hybrid SSL includes the Sunna Core smart and dynamic control system, which can be monitored by SunnApp from a smartphone.