BLUE SOLAR
hybridizing the sun

2023

KOREA EUREKA Day

Meet with **SPAIN**

Jose Caparros

BlueSolar CEO

GOBIERNO DE ESPAÑA | MINISTERIO DE CIENCIA E INNOVACIÓN | CDTI INNOVACIÓN

Ministry of Trade, Industry and Energy | Eureka TURKIYE | beyond leading technology KIAT Korea Institute for Advancement of Technology | Keit Korea Evaluation Institute of Industrial Technology | KETEP Korea Institute of Energy Technology Evaluation and Planning

CONTENTS

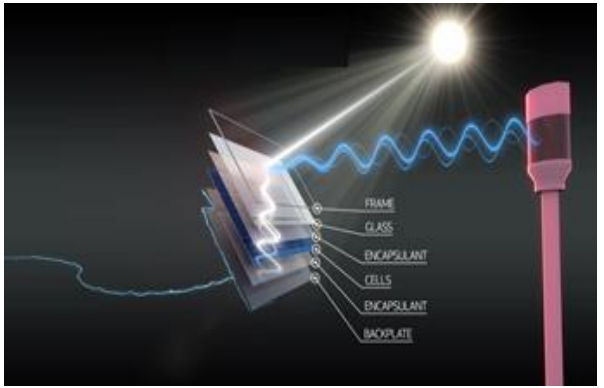
1- The BlueSolar company

- Company founded in 2019 as a **Joint Venture** between Ghenova Ingenieria (30%) and CAPSUN Technologies (70%)
- Both companies jointly developed the BlueSolar technology **from 2017** and created the company to commercialize it under a unique enterprise.
- While Ghenova is a major engineering company with a top expertise in Solar Engineering (staff over 500 employees and sales over €35), CAPSUN is a startup that integrates a top Knowledge in both Optical and Solar
- Awarded by CDTI Misiones Call for top strategic Technologie. Integration with H2 and development of a new patent.
- Recently awarded with HE Seal of Excellence SoE – BlueSolar project – 3M€ investment for Pilot

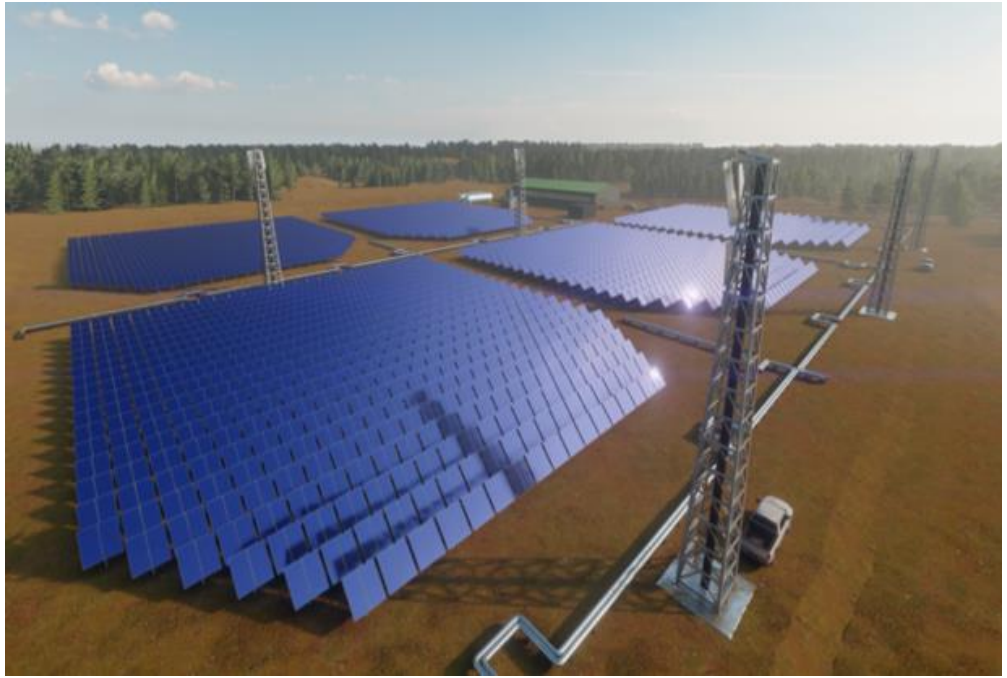



2 - The BlueSolar Technology

- BLUESOLAR Technology is the first worldwide concept about a Photovoltaic Plant with Thermal Cogeneration.
- A PV panel is converted into a mirror by using an integrated optical light selective filter, which will be used in a concentrated solar tower (CST) power plant, being able to cogenerate electricity as standard PV panel, as well as heat as a mirror.
- The filter transmits only useful light to the PV cell while reflecting between 40-55% of energy not used by the PV to a thermal receiver to generate heat. The PV performance is similar to 1 axis PV plant while a 50% of extra energy, which is currently wasted, is used in a CST. This achieves efficiencies close to 30% (versus current PV or CSP around 20% eff.)



3 - BlueSolar – a new Solar plant concept



BlueSolar doesn't work as a Standard CS Tower!

Much simpler design with technological redundancy

- Small solar field (600-700 m distance)
- Smaller tower (120-130 m)
- Simple receiver design (T aprox 400, uniform flux)
- Simpler heliostats
- **Technological redundancy**

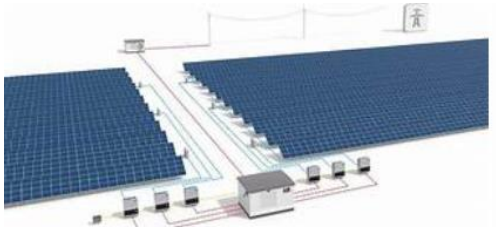
4 - BlueSolar figures – the efficiency is the key to decrease the costs

System configuration	Efficiency vs PV
BlueSolar standalone	156%
BlueSolar + e-heaters	> 100%
PV	100%
Batteries	85%
Hydro pumping	70-75%
Electrical heating Molten salt	42-43%
Hydrogen storage	35%

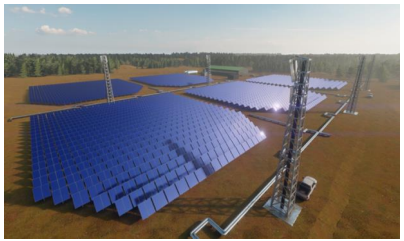
Energy storage	Dispatchability	LCOE (€/MWh)
PV	No	20-30
PV + batteries	YES	110 - 140 (*)
CSP	YES	70-100
Bluesolar	YES	40-45

- BlueSolar is a thermal battery of 100 $ / KWh with no degradation and 35 years of life cycle
- Works as a heat pump for a electrical heater application increasing the efficiency from 40% to over 100%

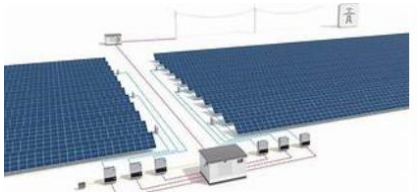
5 - BlueSolar – a technology for renewable integration

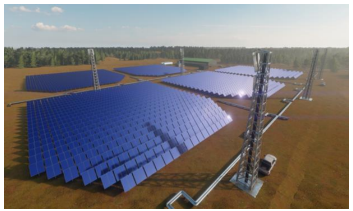


Standard PV plant < 2.000 hours of operation
No storage / IRR ~ 10% at spot average

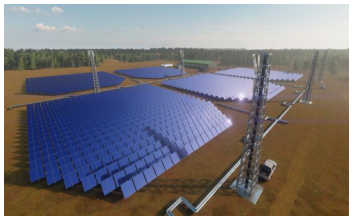


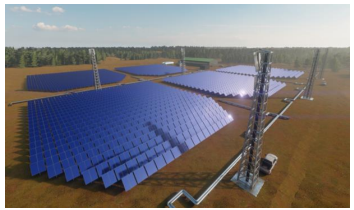
BlueSolar standalone ~ 4.000 hours of operation
6-7 hours of storage / IRR ~ 8-9% at spot average





BlueSolar hybrid PV (or Wind) > 6.000 hours of operation
Storage > 10 hours / IRR ~ 12-13% at spot average

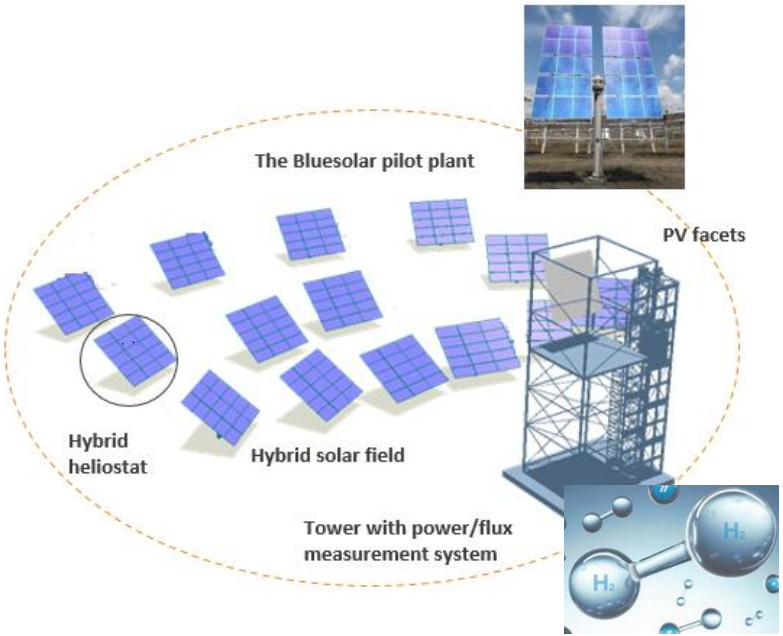




BlueSolar baseload > 7.000 hours of operation
Storage > 15 hours / IRR ~ 12-13% at spot average

6 - Ideas for a Korea – Spain collaboration (1/2)

R&D Collaborations around the Tech



Industrialization of new hybrid Panels

Magnetron Sputtering Line

6- Ideas for a Korea – Spain collaboration (2/2)

First of a Kind (FOAK) BlueSolar commercial power plant

It would consists in the first BlueSolar Plant in KOREA: 20MW - 10 storage capacity > $60M

- To be integrated in KOREA national grid or particular consumption (i.e H2)
- >100 Jobs in the construction phase (2 years); >10 permanent Jobs in operation (30 years)
- Increasing the benefits of existing renewables:
  - Synchonism
  - Hybridization
  - Storage
  - Social and economical impact
  - Self-consumption

Meet with SPAIN

2023 KOREA EUREKA Day

BLUE SOLAR
hybridizing the sun

Thank you!

GOBIERNO DE ESPAÑA · MINISTERIO DE CIENCIA E INNOVACIÓN · CDTI INNOVACIÓN

Ministry of Trade, Industry and Energy · Eureka TÜRKİYE · beyond leading technology KIAT Korea Institute for Advancement of Technology · Keit Korea Evaluation Institute of Industrial Technology · KETEP Korea Institute of Energy Technology Evaluation and Planning