



Gaztelueta, September 2021

SENER CHALLENGES



# Leading innovation through technological differentiation

With the strength of a global leader, SENER Group looks to the future by leveraging innovation and reinventing excellence, adapting it to new demands.

Our passion for technological challenge drives us to systematically consider how to offer a differential value in the realization of projects through new and better technologies.



# Global footprint

## Group 2021



### AMERICA

**ARGENTINA**  
Buenos Aires

**BRAZIL**  
São Paulo

**CANADA**  
Toronto

**CHILE**  
Santiago de Chile

**COLOMBIA**  
Bogota

**MEXICO**  
Mexico City

**USA**  
Los Angeles



### EUROPE / AFRICA

**SPAIN**  
Barcelona  
Biscay  
Madrid  
Valencia

**POLAND**  
Warsaw

**PORTUGAL**  
Lisbon

**UNITED KINGDOM**  
London

**MOROCCO**  
Rabat

**SOUTH AFRICA**  
Johannesburg



### ASIA

**QATAR**  
Doha

**CHINA**  
Shanghai

**SOUTH KOREA**  
Busan

**UAE**  
Abu Dhabi

■ Ingeniería & Aeroespacial  
■ Renewable Investments

# SENER

## Strategic Bussines Units

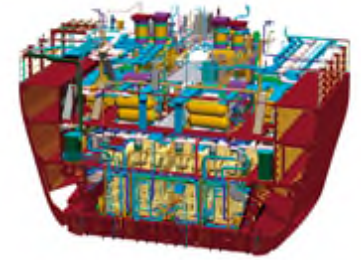
[https://www.youtube.com/watch?v=2zKC4wTy0SY&list=PL1OSFd\\_5g-4gxccLQB9YZ8pAwxAoznZuZ&index=8](https://www.youtube.com/watch?v=2zKC4wTy0SY&list=PL1OSFd_5g-4gxccLQB9YZ8pAwxAoznZuZ&index=8)



SENER  
AEROSPACIAL



SENER ENERGY



SENER MARINE



SENER  
INFRASTRUCTURE



- Space
- Defense
- Science
- High speed railways
- Freight & mainline railways
- Metro systems
- LRT's & tramways
- Roads & highways
- Airports
- Ports
- Architecture
- Water & environment
- Solar energy (CSP, PV)
- Biomass, Waste to Energy, Waste to Chemicals
- Energy Storage
- Offshore Wind
- Power (CCGT, CHP)
- Oil & Gas, LNG
- Industrial Plants
- Marine engineering
- FORAN





# SENER ENERGY

In SENER we create innovative engineering solutions.



SOLAR &  
STORAGE



WIND &  
HYDRO



BIOMASS &  
WTE

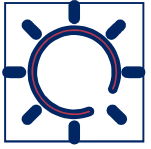


INDUSTRIAL

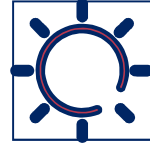


POWER

# CHALLENGE 1:



**How can be sold the benefits of the thermosolar energetic plants development and construction?**



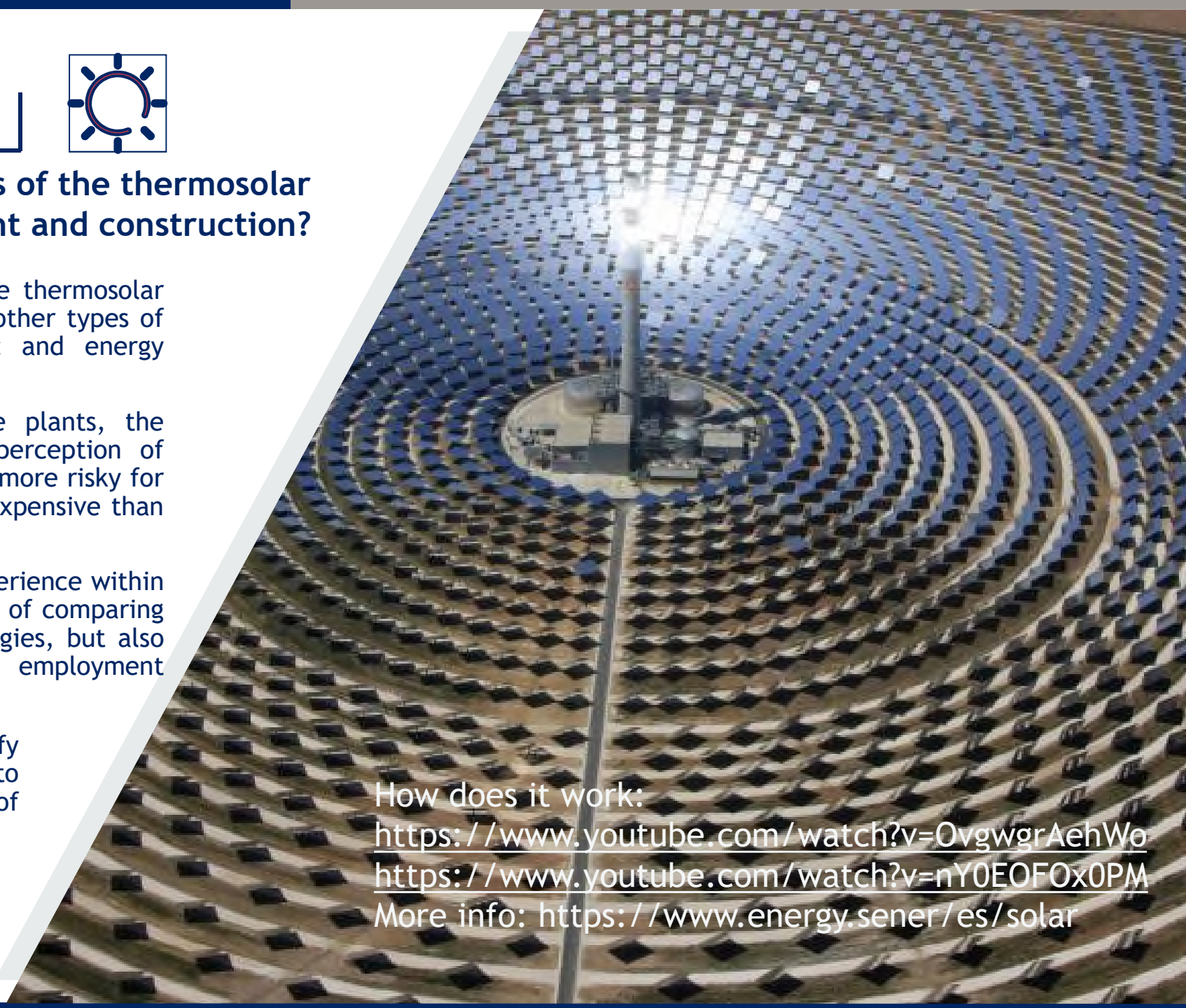
- In Spain and the rest of the world while the thermosolar energy is going backwards for some reason, other types of energy generation such as the fotovoltaic and energy storage are increasing their market share.
- Due to several problems occurred in these plants, the thermosolar technology has acquired the perception of being more complex, the perception of being more risky for investors and the perception of being more expensive than other technologies.
- Nevertheless SENER has an extraordinary experience within the executed projects. It is not only a matter of comparing the Euro/kwh generated with other technologies, but also other benefits such as the sustainability, employment generated, etc..
- The objective of this CHALLENGE is to identify what actions and measures can be adopted to try to change the aforementioned perception of this technology.

How does it work:

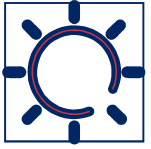
<https://www.youtube.com/watch?v=OvgwgrAehWo>

<https://www.youtube.com/watch?v=nY0EOFOX0PM>

More info: <https://www.energy.sener/es/solar>



# CHALLENGE 2:



How can we use natural energetic sources or re-use energy already used to minimize infrastructures energy consumption?

- In physics and chemistry, the law of conservation of mass or principle of mass conservation states that for any system closed to all transfers of matter and energy, the mass of the system must remain constant over time, as the system's mass cannot change, so quantity can neither be added nor be removed. Therefore, the quantity of mass is conserved over time.
- In SENER we have a great experience designing infrastructures such as roads, ports, bridges, railways, etc. And we know very well which are the energy costs of each one.
- Have in mind the European targets over the climate and energy framework
  - At least 40% cuts in greenhouse gas emissions (from 1990 levels)
  - At least 32% share for renewable energy
  - At least 32.5% improvement in energy efficiency
- Would we be able to think in a way to use the existing natural energy or to re-use the already consumed one to reduce the infrastructure energy consumption? In short, what we are looking for is to identify a natural energy source which can be used to re-use the
- Examples
  - PISTÓN EFFECT
  - One example of what we are looking for is the TUNEL ENERGY COMPANY.
  - Other examples are the use of the human body heat or the use of the train breaks heat





# CHALLENGE 3:



## How could we eliminate or reduce the air pollution in cities?

- Pollution in big cities is a reality and millions of people suffer from it. According to the OMS up to 3 million people die prematurely due to pollution. Currently all environmental policies are focused on reducing the sources of emissions in order to reduce pollution levels, but this process of change takes a long period of time to establish medium / long-term objectives.
- Is there a way to purify air in a way that reduces pollution levels in big cities?
- One of the policies established by the European Union is to expand green areas as they favor the reduction of pollution. Various studies affirm that trees are effective natural elements to reduce pollution levels. In this sense, the plants have a process that favors the elimination of contamination.
- We are looking for all kinds of ideas that allow to reduce pollution levels by attacking directly on the polluted air and not so much on the sources of emissions. Both global solutions (an entire city) and specific areas are valid.
- This solution, which would be in line with the Sustainable Development Goals, would benefit us all and would improve people's health and control pollutants emitted into the atmosphere.
- Pollution in cities is a reality. At SENER we have been able to generate complex processes in order to obtain energy. Could we generate some type of process that helps reduce pollution in the environment? Can you think of what things we could do to eliminate or reduce pollution in the environment?
- [https://ec.europa.eu/clima/policies/strategies/2030\\_en](https://ec.europa.eu/clima/policies/strategies/2030_en)







# SENER INFRASTRUCTURE

Leading innovation.

In SENER we create innovative Infrastructure engineering solutions.



RAIL



TRANSIT



HIGHWAYS



AIRPORTS



PORTS

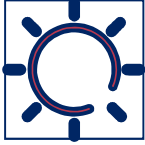


BUILDINGS



WATER &  
ENVIRONMENT

# CHALLENGE 4:



## How could we minimize the risk of virus contagion in public transport?

- The Covid-19 pandemic has changed our lives, and today it is an obvious challenge in many ways.
- One of the consequences of the pandemic has been a drastic reduction in the levels of use of collective means of transport (subway, bus, rail, plane, ship ...), not only and logically in moments of confinement experienced throughout the world, but throughout the subsequent period up to today. People are afraid to use public transportation in current circumstances.
- Many people are not willing to take the risk of sharing a closed space with others at short distances and for long periods of time, and are opting for the use of private vehicles or other means of transport.
- This circumstance is translating into a drastic reduction in the occupancy levels of the collective transport systems, which are facing an unprecedented crisis, both due to the reduction in income from ticket sales, and in some cases due to the loss of government grants that are tied to the degree of utilization.
- In parallel there are many trips that are being transferred to the private vehicle, which is much less efficient in terms of energy and more polluting, with which the planet is also being harmed.
- In this context, the challenge has two dimensions.
  - In the first place, it is about finding solutions that minimize the risk of virus contagion (today it is Covid-19, tomorrow it may be another) in public transport.
  - And secondly, and with relative independence from the above, to find ways to overcome the fear of users to use it in pandemic conditions like the ones we are experiencing.
- We look for solutions that are capable of generating a product or a service that we can offer to our clients, to help them overcome the extremely complicated situation in which they find themselves.





# CHALLENGE 5:



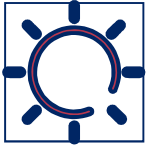
How could we help city councils to manage a city in a more efficient way and with less costs?

- The City Councils have among their competences the provision of numerous public services aimed at satisfying the needs and aspirations of citizens: water supply, public lighting, street cleaning, sewerage and wastewater treatment, collection and treatment of waste, public passenger transport, maintenance of parks and gardens, conservation of public roads, regulation of vehicle and human traffic on urban roads, safety in public places, civil protection, prevention and fire fighting, protection of public health, management of cemeteries and funeral services, urban planning, management, execution and discipline, promotion and management of housing, management of historical-artistic heritage, protection of the environment, social services and promotion and social reintegration, management of cultural activities and facilities and sports, free time and tourism
- To these services of a public nature must be added others of an auxiliary nature, necessary for the operation of the municipal facilities themselves, such as the supply of energy for public buildings, their lighting, heating, cleaning ...All these services, whether provided with their own means or through contracts, represent a very important cost for cities, and on the other hand, the level of quality with which they are provided has a very important impact on the day-to-day life of citizens and also on many other dimensions of the city, such as the ability to attract tourism, economic activities, etc.
- Improving efficiency in the provision of these services is one of the main objectives of Smart cities, which can be defined as an integrated system of systems that use the scientific-technical revolution and ICT to achieve the improvement of the quality of life, security for the population and the urban heritage, efficiency in the operation and urban services and productivity in its economic activities.
- From this point of view, the objective of the challenge is to identify technological solutions that allow the different urban services to be provided in a more efficient way, with lower operating costs for the City Council, and with better benefits for citizens.

## SMART CITY



# CHALLENGE 6:



How could we efficiently manage and integrate vehicular traffic, services and infrastructure to promote the use of public transport using the concept of Smart Cities?

- Currently in many big cities, vehicular congestion generates long delays in travel times and in the quality of life of people, having a good public transport system and an efficient management of vehicular traffic, would promote the use of public transport while maintaining a balance in the vehicular load in the streets of the city and the adequate use of public transport.
- The challenge has the following objectives:
  - Seek technological solutions related to smart cities for traffic management and the integration and improvement of public transport
  - Find the necessary methodologies for the integration of public transport and private vehicles
  - Conceptual design of the communications network that would support the project.







# IDEAS PROPOSAL

- Once the CHALLENGES have been identified, the starting point of the Innovation Process in SENER, it is time to propose IDEAS that provide solutions to the problems or needs identified through these challenges. As you know, these ideas will be evaluated and, if necessary, incubated, until they evolve into DEVELOPMENT PROPOSALS that can finally become INNOVATION DEVELOPMENTS.
- We remind you of our definition of an idea: A partial or total and different solution to a problem that can be a technical, methodological, equipment, applicable technology, market response... It must lead to an improvement in measurable parameters and must respond to and cover a specific need, either internal (improvement of internal processes) or external (marketable to a defined market) of SENER, providing a measurable value to the company.
- As Albert Einstein said, "If you are looking for different results, do not always do the same".
- We share 3 links that can help you:

<https://innolandia.es/generar-ideas-innovadoras/>

<https://inteligenciacreativa.com/la-generacion-de-ideas-solo-es-un-paso-del-proceso-de-pensamiento-creativo/>

<http://nei.com.co/que-es-una-idea/>

