

## Webinar

# *“Solar Heat for Industry in Morocco and Tunisia”, December 3<sup>rd</sup>*



**MENA CSP KIP : the Tunisian Solar heat program and CSH Initiative**

*Presented by: Ing. BACCOUCHE Abdelkader,  
Deputy Director, CSH Expert, ANME*



# The Tunisian Energy Balance

- Objective and National commitment
- National Final Energy Share, Industry Focus.
- **MENA CSP KIP CSH initiative in Tunisia**
- **The New Energy Transition funds, FTE**
- Conclusion

# Tunisia and ANME



Surface  
164 000 Km<sup>2</sup>

Population  
≈11 million

Drinking water  
77%

Electrification  
99%

Currency  
1EUR ≈ 3.25 TND

Per capita income  
(GDP)  
≈ 11700\$ (2017)

Factories  
6500 units

Hotels  
900 units



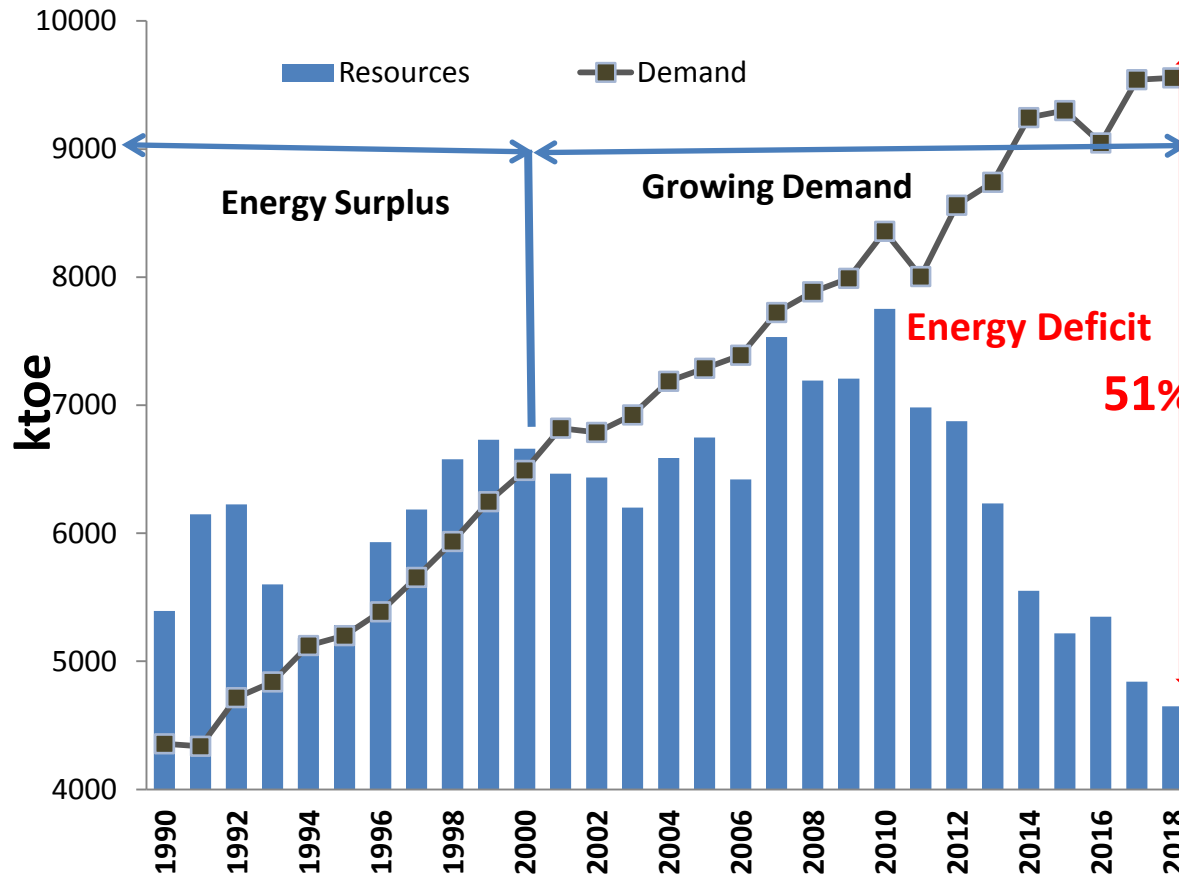
الوكالة الوطنية  
للتحكم في الطاقة  
ANME

✓ **Creation :** **ANME was created in 1985.**

✓ **Status :** ANME is a public institution placed under the aegis of the Ministry of in charge of Energy.

✓ **Mission :** **ANME's role is to implement the state policy for energy conservation through promoting energy efficiency, renewable energies and energy substitution.**

# The Tunisian Energy balance



**Continuous deficit  
since 2000  
4.9 Mtoe in 2018**

**Deficit of 51% in  
2018 against 49%  
in 2017 and 40%  
in 2016**

# RE state of the Art, 2018

➤ **245 MW**



➤ **Hydro** 65 MW (limited)

➤ **62 MW**  
**PV Connected**  
**to the grid**



➤ **1050000 m<sup>2</sup>**  
**SWH**



➤ **14 000**  
**off grid houses**  
**And 200 school**



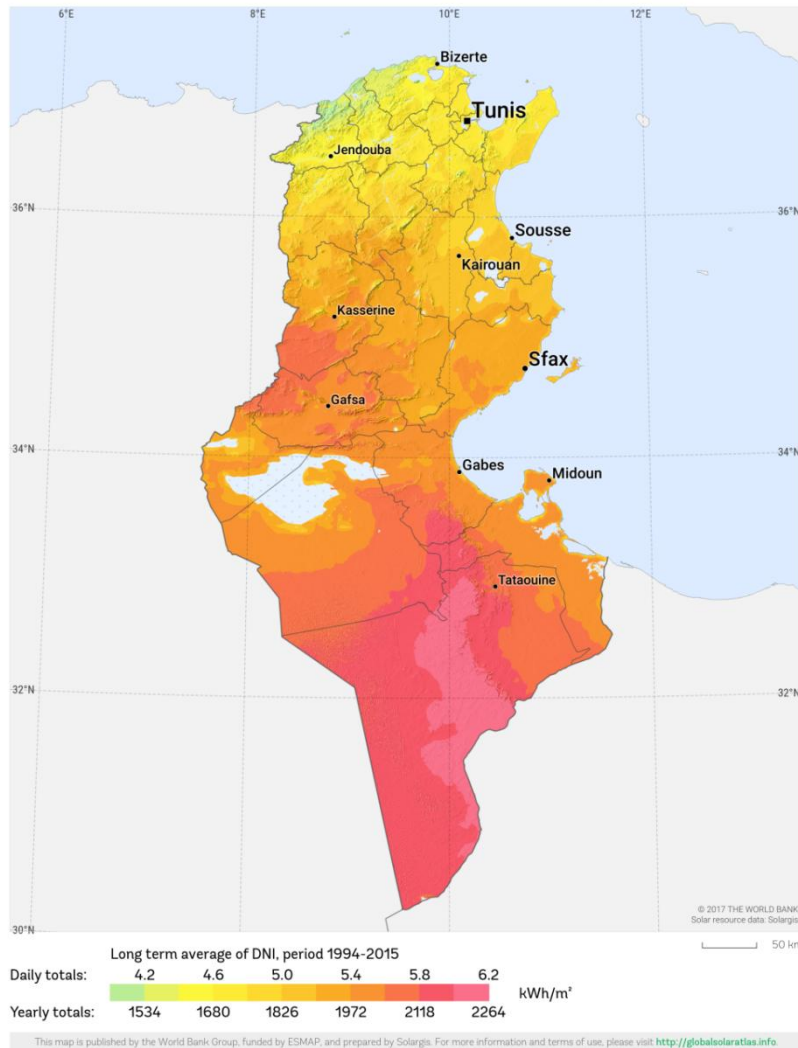
➤ **130**  
**PV pumping**  
**stations**



Photo choisie montée et retouchée pour le visuel







**Thermal : 5 Millions m<sup>2</sup> of solar collector**

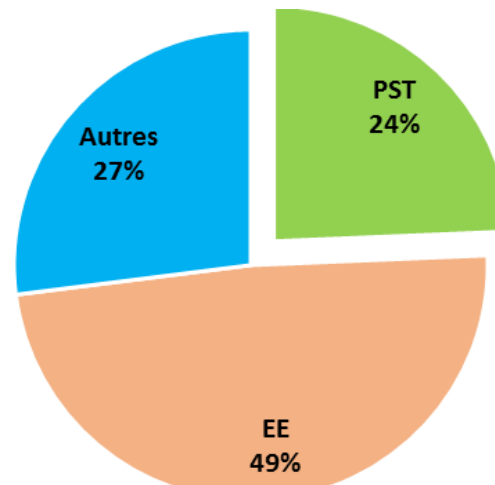
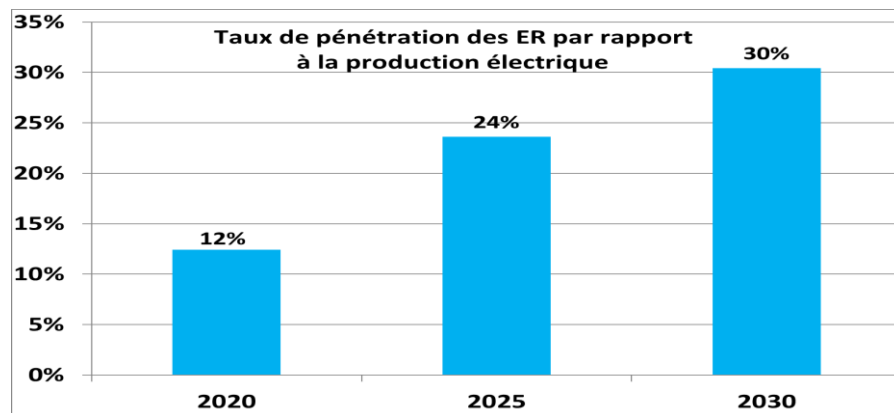
With a total surface of 1 Million m<sup>2</sup> of installed solar thermal collector achieved through PROSOL program, The PROSOL program has been selected by the IEA SHC program as one of the top FIVE best national solar thermal policies in the world, as part of the Solar Heating and Cooling Solar Award 2017 (<http://www.iea-shc.org/solar-award>).

**Electrical : 280 GW**

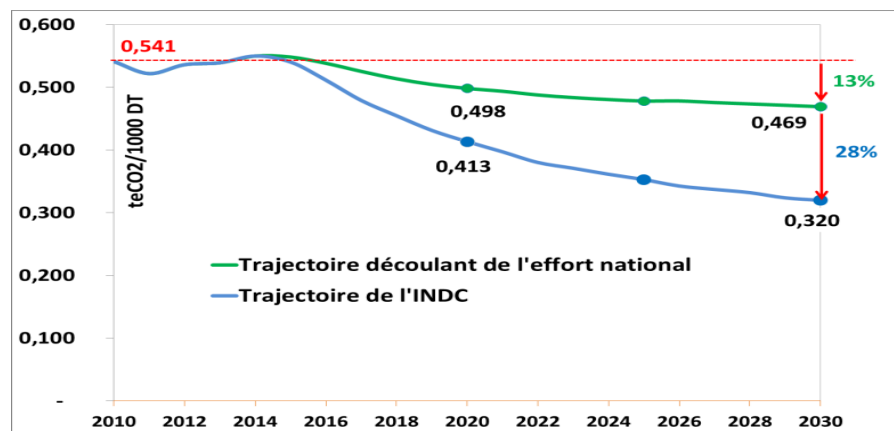
**Important potential, especially in the south region...**

# Objective & national commitment

## RE share electricity mix



The energy sector is the largest contributor to the NDC goal (EE & ER) with **73%** of emissions reductions.



National effort

International support

**NDC : 41% decrease of carbon intensity by 2030 referring to 2010**

# Objectif et engagement national



**3 MILLION m<sup>2</sup> by 2030**



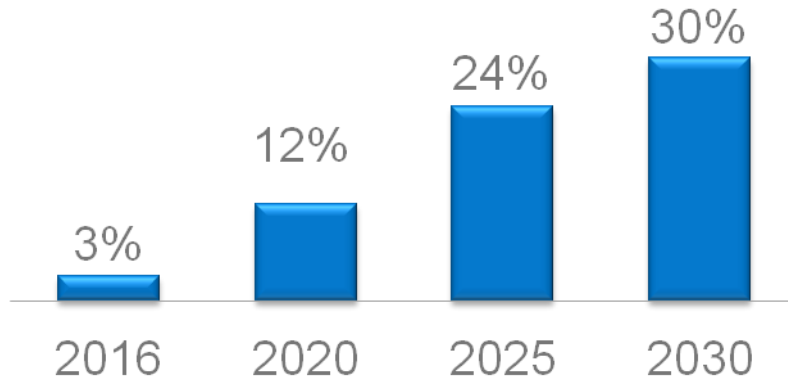
**350 000 m<sup>2</sup> to be installed in  
Tertiary and industrial sector  
by 2030**



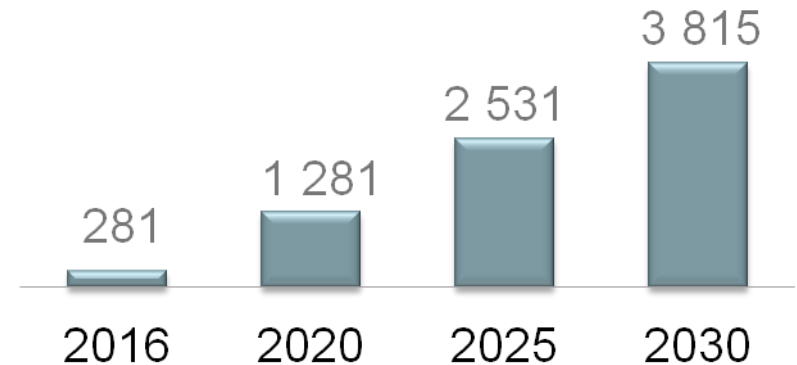
# The Tunisian Solar Plan

(Approved by the government, July 2016)

RE share electricity mix



Renewable installed capacity (MW)

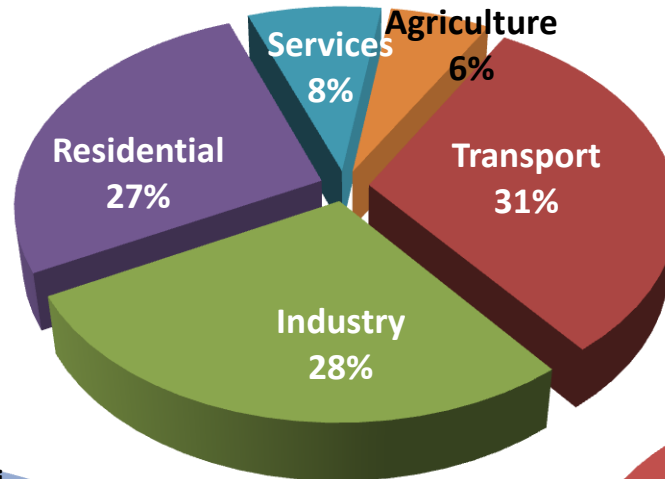


**30%** Renewable electricity produced by **2030**

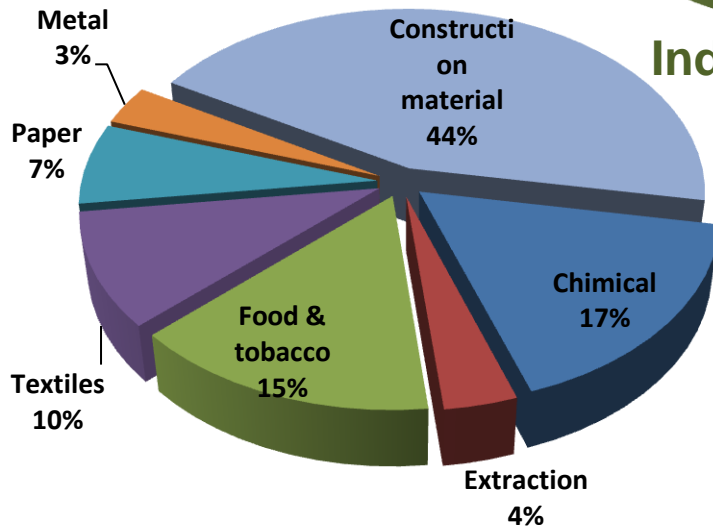
Ambitious Target et heavy Investment  
needed estimated to **14 000 Millions DT**

# National Final Energy Share –2016

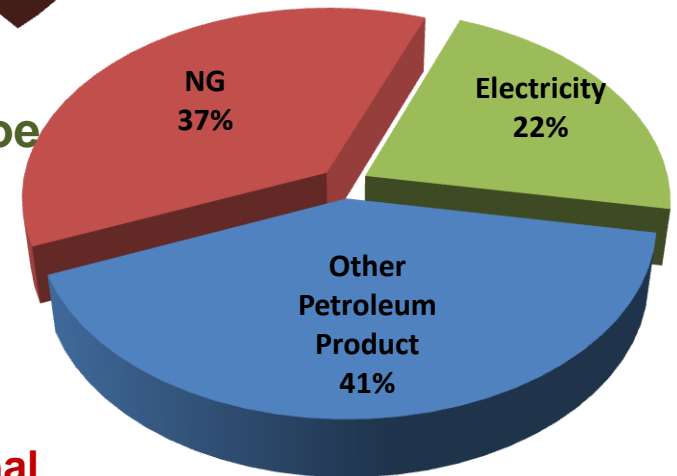
## Total : 7689 Ktoe



**Industry : 2124 Ktoe**

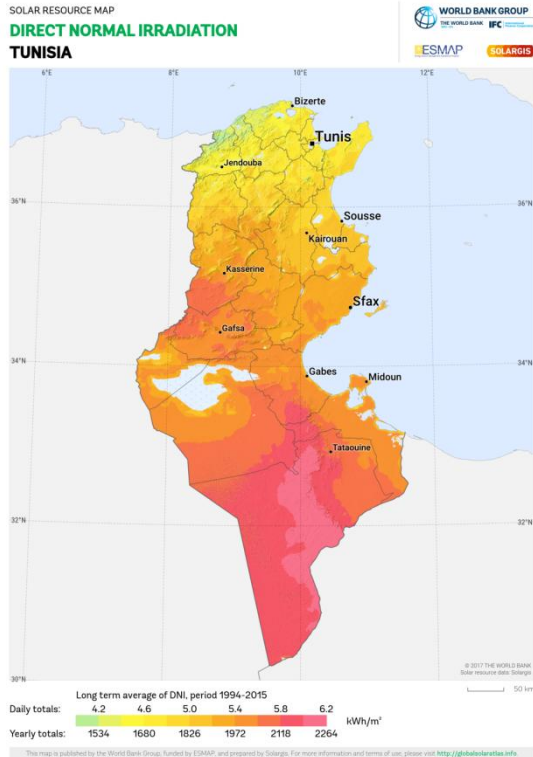


**78%**  
of industry final  
consumption is  
**HEAT**



Source : ONE

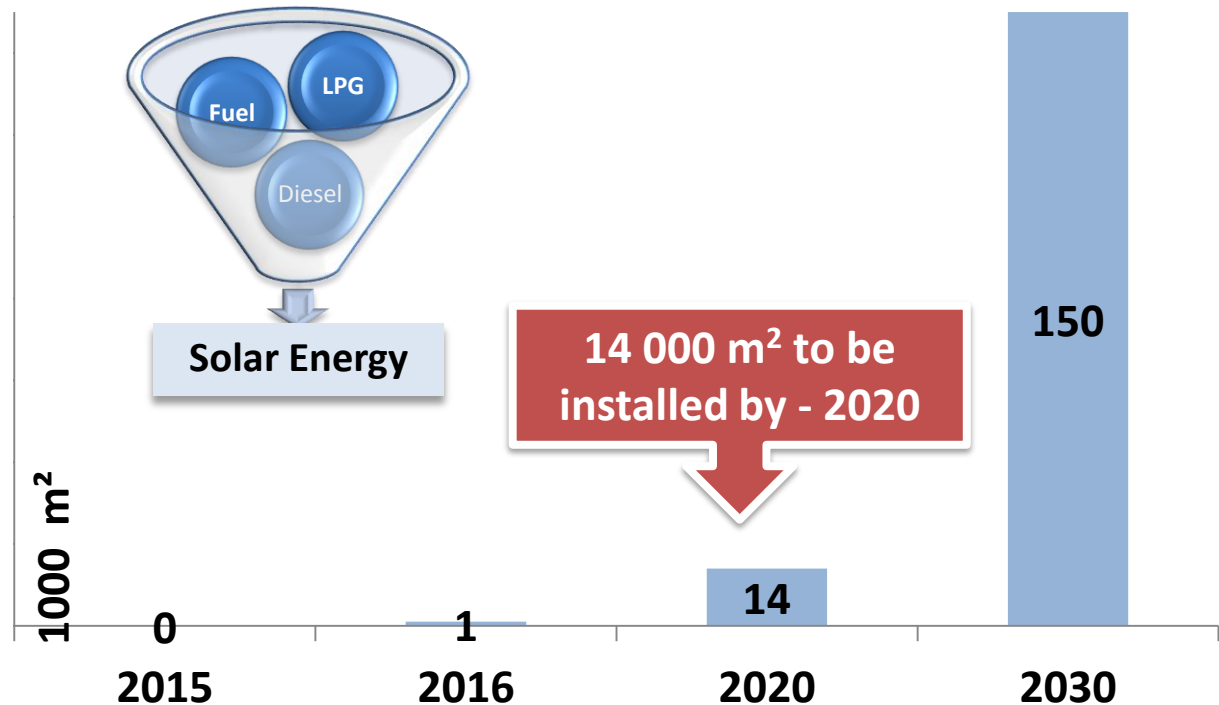
# Solar Heat in Industrial Process, SHIP, in Tunisia



The average of solar irradiation in Tunisia is about **2000 KWh / m² / year**

Tunisian industry has more than 75% of thermal Energy consumption with a major use with medium T°

**Cumulative objectives of solar thermal in industry in the short and medium term**



# Achievement

The first project using solar thermal energy in the industrial process



**1000 m<sup>2</sup> in BENETTON, Sousse (2018)**

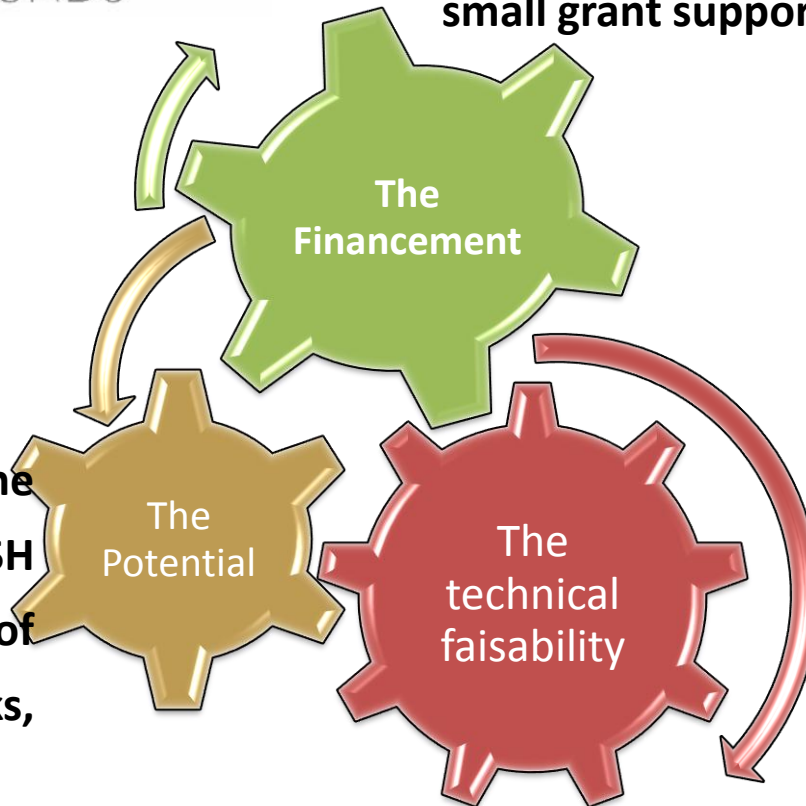
# MENA CSP KIP CSH INITIATIVE IN TUNISIA



- The Identification of some key CSH projects in the Tunisia for small grant support

## MENA CSP KIP

- The determination of the detailed potential of using CSH in the industrial branches of food, textile, chemical, bricks, and papers industry,



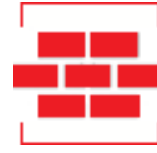
MENA CSP KIP : the  
Tunisian CSH Initiative



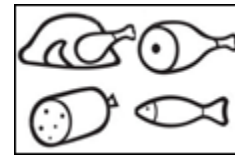
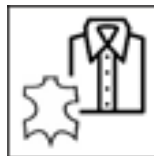
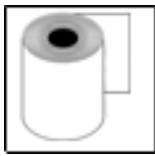
# MENA CSP KIP CSH INITIATIVE IN TUNISIA

## The potential study : Approach Adopted

1 Industrials selection : 130 manufacturers were selected



2 Data collection and preliminary studies for 30 manufacturers



3 Determination of detailed potential that can be mobilized and selection of 2 best cases where CSH can be implemented

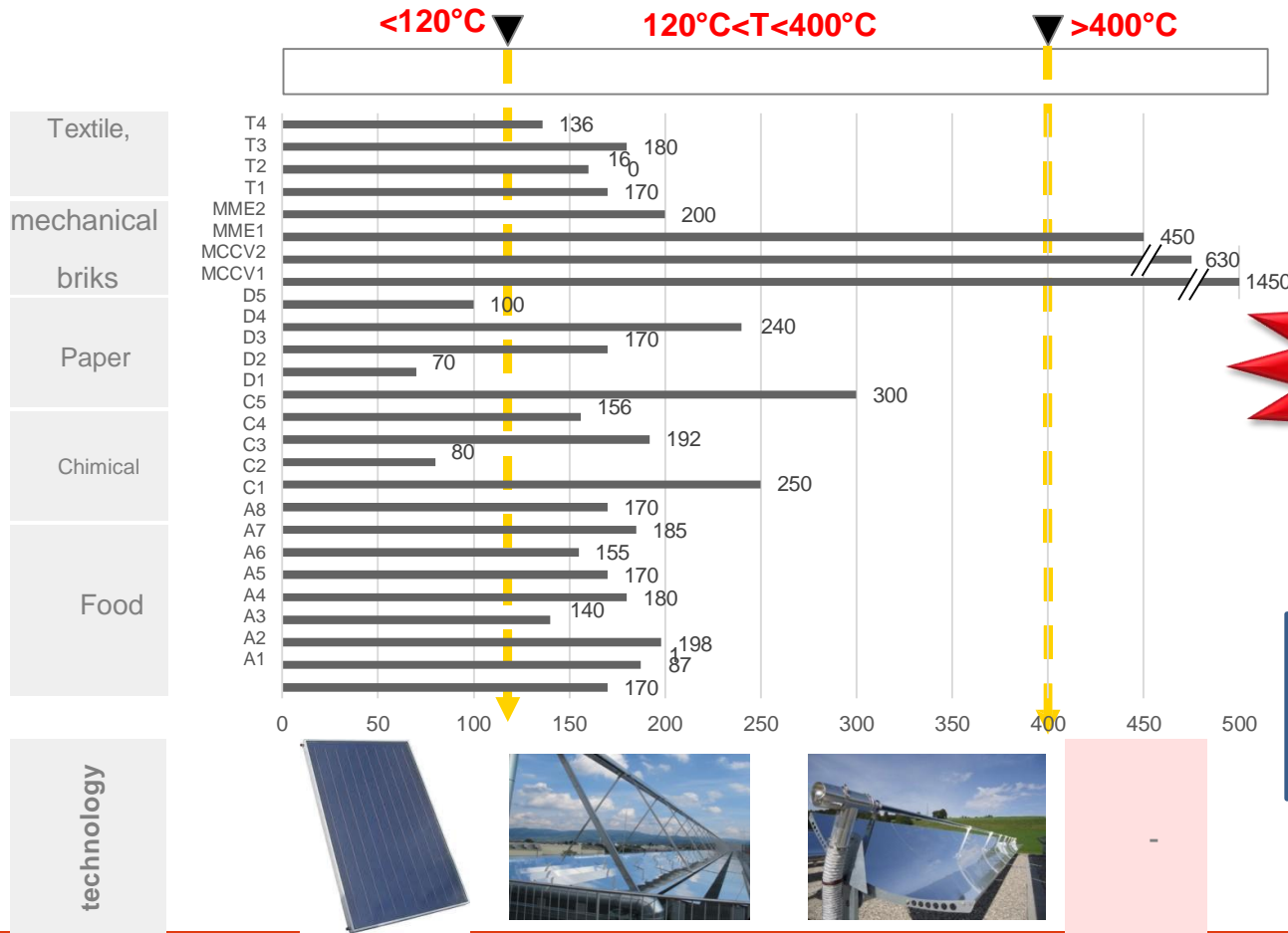
4 Site visit, data collection and Detailed feasibility study for 2 Industrials





# MENA CSP KIP CSH INITIATIVE IN TUNISIA

## The potential study : Approach Adopted



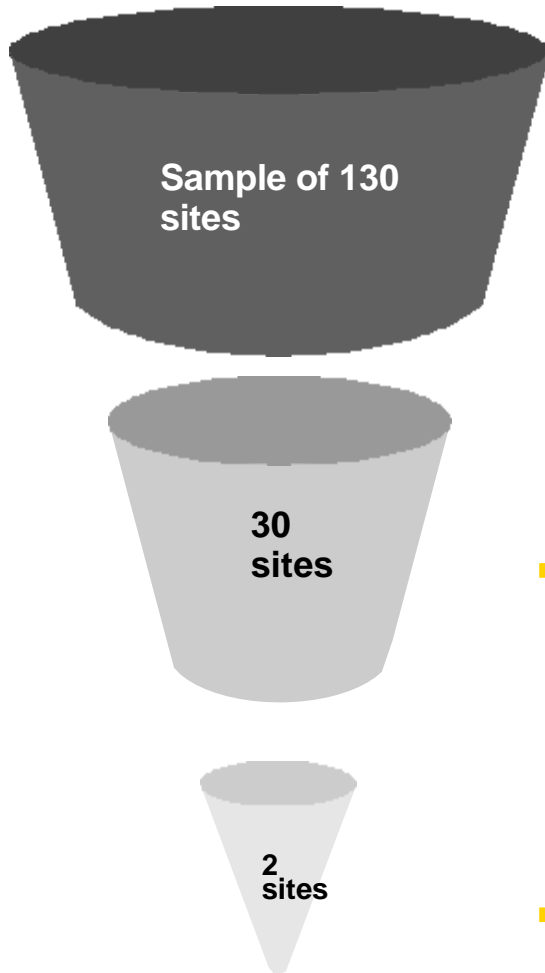
**A Real potential  
was confirmed**

**400 000 m²**

**340 000 m² (85%)  
Medium  
Temperature CSH**

**MENA CSP KIP : the  
Tunisian CSH Initiative**

# MENA CSP KIP CSH INITIATIVE IN TUNISIA



## Thermal energy share

An important part of the thermal needs

## Thermal energy demand

Thermal needs are expected to exceed 2 GWh / year and data availability

## Operating temperature

The operating temperature should be between 120 ° C and 400 ° C

## Applicability of processes

Integration possibility in the heat network of the company

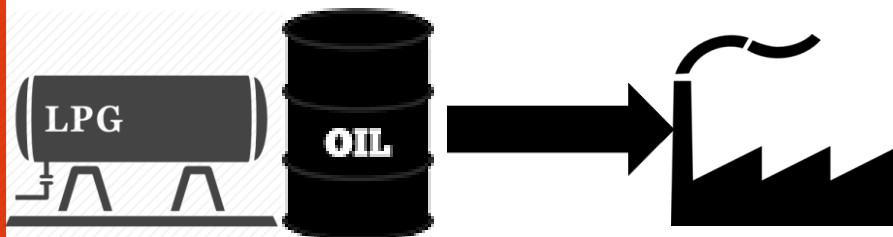
## Available surface

The space can accommodate a solar system of the needed capacity

## Strong commitment of the industrial



# MENA CSP KIP CSH INITIATIVE IN TUNISIA



**100% Fossil**

- ▶ Strong commitment to Kip CSH program
- ▶ Waiting to the final results of the feasibility study to be the first industrials implementing CSH in Tunisia



**„Solar Fuel Save “**



## The new Energy Transition Fund, FTE: a new Tool to stimulate the CSH Market

### Chapter 2

- **30%** of subsidy on With a ceiling of **250 DT/m<sup>2</sup>** of installed Solar collector
- **70 %** of the technical assistance cost with a max. of **70 kDT**
- **70 %** of studies cost with a ceiling of **30 kDT**

### Chapter 3

- **35%** of the investment as a loan with a ceiling of **350 kDT**
- **10%** of subsidy with a ceiling of **200 kDT**
- Plus immaterial Subsidies.
  - **70 %** of the technical support cost with a max. of **70 kDT**
  - **70 %** of the study cost with a max. of **30 kDT**

**Still insufficient to be attractive to industries for this kind of project**

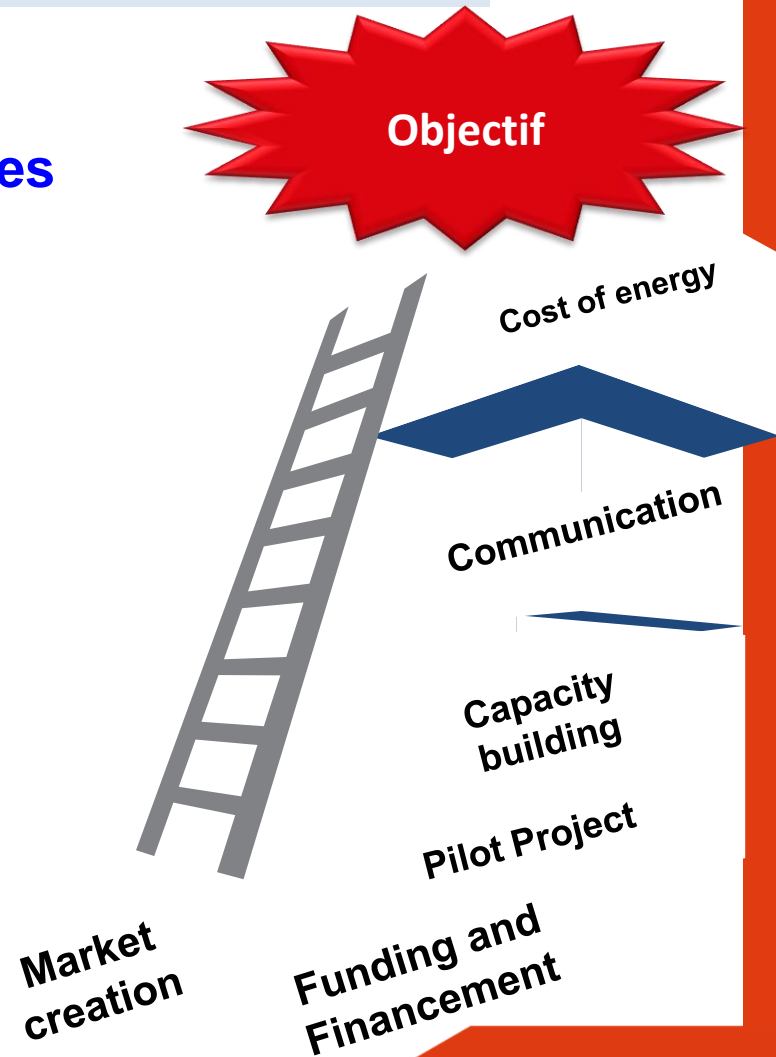
# MENA CSP KIP CSH INITIATIVE IN TUNISIA

**Next steps :** create a long-term and sustainable market for CSH technologies

## MENA CSP KIP



**WORLD BANK GROUP**



## Conclusion

- ▶ There is an important real potential of CSH in Tunisia, confirmed and detailed by MENEA CSP KIP
- ▶ Steam is widely used as heat transfer with a medium temperature in Tunisian industry, Concentrating collectors can produce steam, which can easily be integrated in the conventional energy infrastructure
- ▶ CSH Collector technologies are available
- ▶ More than 250 Ktoe of Fuel and LPG and Fuel, highly subsidized by the state, is used in several industrial branches. We can focus on these industries to increase profitability and avoid the impact of the cheap price of Natural gas
- ▶ We need to go to investment and pilot project to develop the market in Tunisia. That's what we are waiting from MENA CSP KIP



# Thank you for your attention



**Ing BACCOUCHE Abdelkader**

**Solar Energy deputy Director and Expert, ANME**

**Mail**

[abdelkader.baccouche@anme.nat.tn](mailto:abdelkader.baccouche@anme.nat.tn)