

Water–Energy–Food Nexus

for sustainable development

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Water–Energy–Food nexus

- The nexus concept encompasses vital needs of humanity and its most significant challenges over the coming years
- Global projections indicate that **demand for freshwater, energy, and food will increase significantly over the next decades** under population growth and mobility, economic development, international trade, urbanization, diversifying diets, cultural and technological changes, and climate change.
- **THE CHALLENGE**
 - **there is a complex interaction and competition between these needs, which usually require trade-offs.**
 - **The required solutions to meet the growing demand are still to be invented.**





What is the added value of a Nexus approach?

- Forces us to consider the impact of decisions in one sector on others.
- Help understand and use all the available leverages to address a particular challenge: for example, addressing water scarcity involves not only developing non-conventional water resources but also evolving agricultural practices to use less water through novel growing techniques or changing crops.
- Help structure well-balanced and viable solutions in the long run, especially for developing countries.



System design thinking for sustainable ecosystems

Water-Energy-Food nexus importance

evidence from past experiences



ELECTRICITY SUBSIDIES FOR FARMERS IN PUNJAB

The effect of electricity subsidies for farmers in Punjab during the last few decades is a well-known documented case study.

Access to cheap electricity benefited farmers in the short term (increasing yields through pumped irrigation) but negatively impacted water quality and availability and soil quality due to agriculture intensification.

The result is that farmers are struggling to maintain profits from agricultural production while at the same time they are over-exploiting natural resources.

BIOFUELS

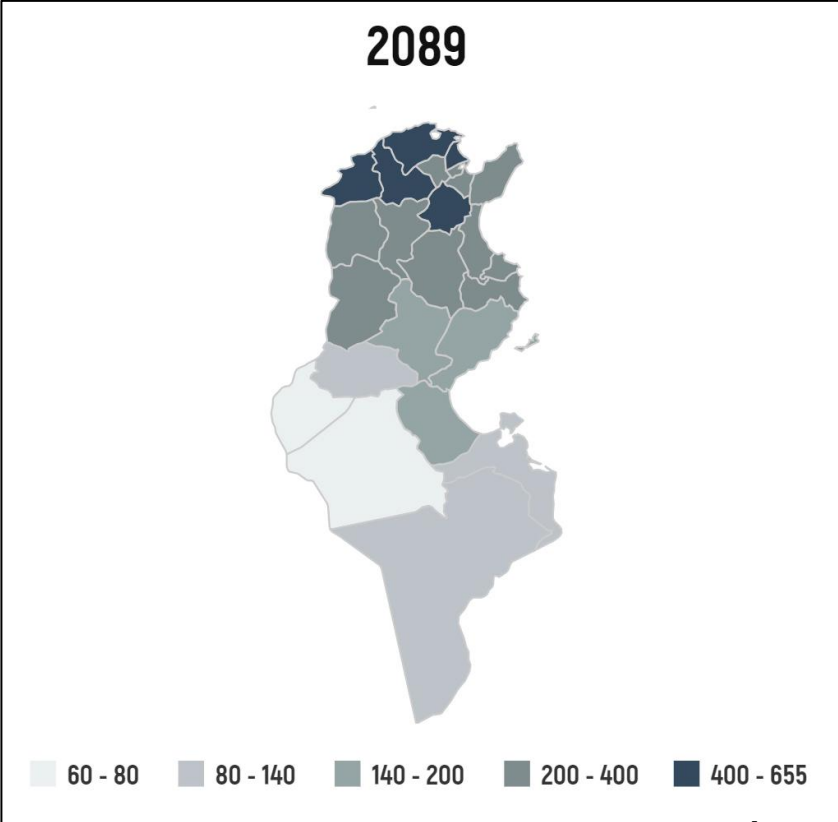
Biofuels, which is, from an energy perspective, an interesting idea consume large amounts of water for specific crop production (colza, soja...) and can affect food production because of land competition.

Agriculture for bioenergy production, especially biofuels, combines both the impacts of large-scale agriculture and the considerable effect on food availability and prices.

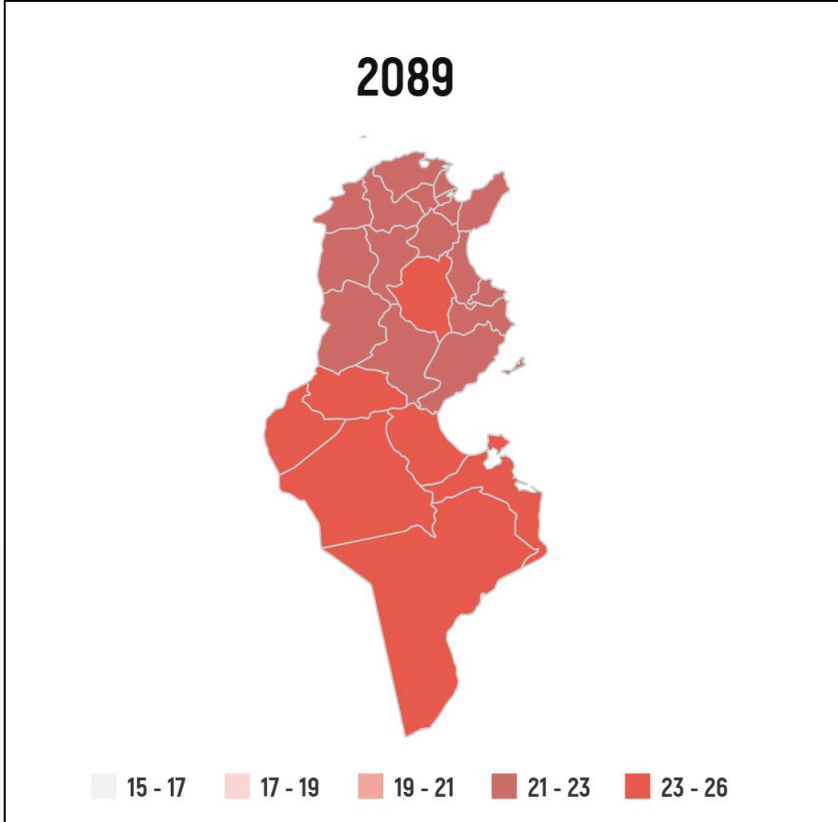
Climate Change

Tunisia is on the frontline.

Average **precipitation**
historical data and forecasts



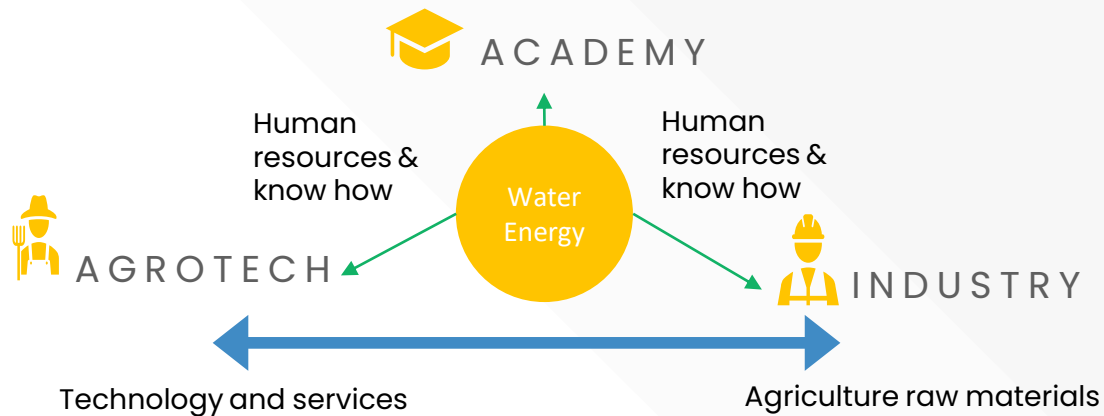
Average **temperature**
historical data and forecasts



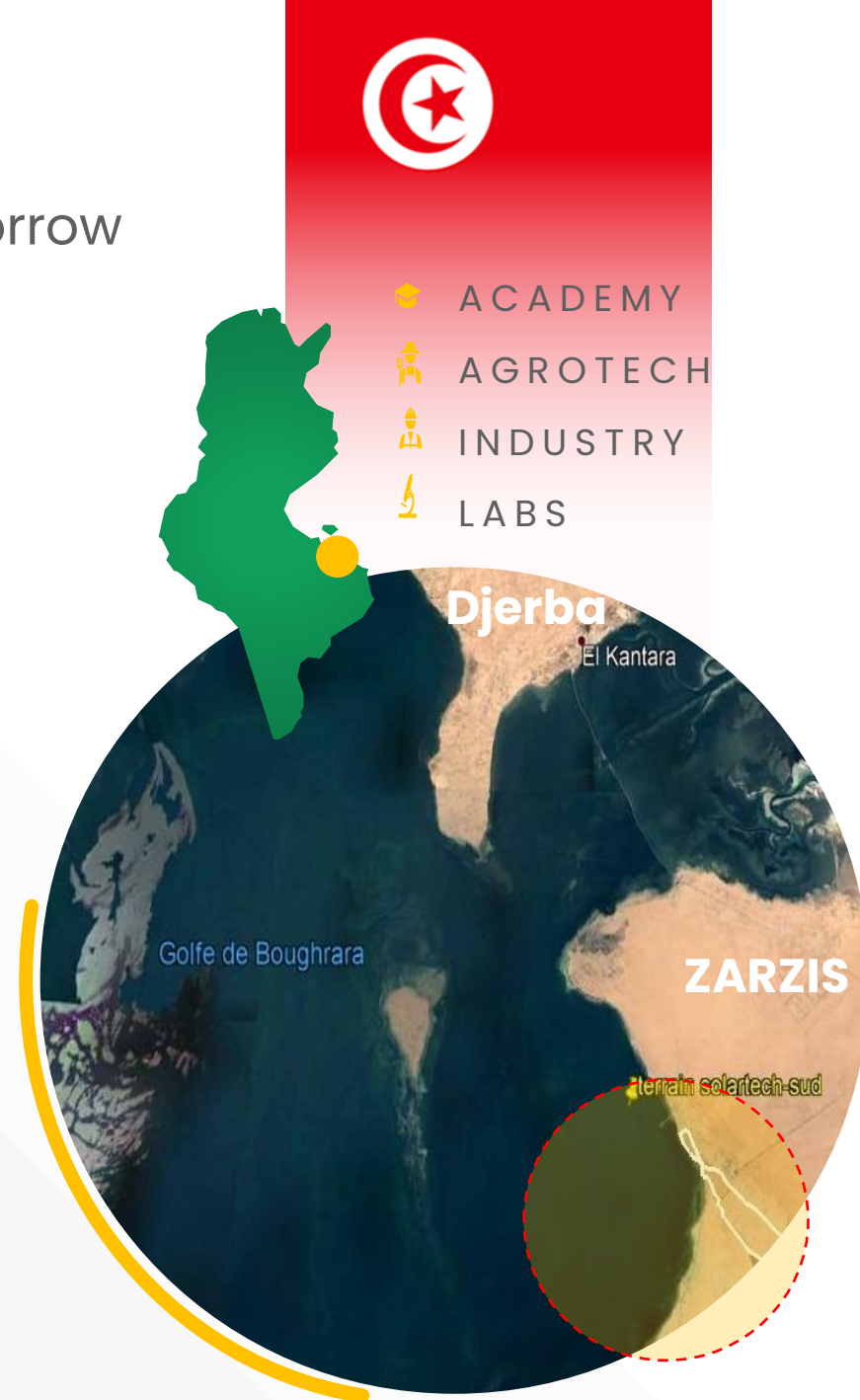
a Public-private partnership to enable the country for tomorrow

- Solartech-Sud is a public-private partnership that will develop a 170-ha Green living lab to **develop the nexus concept and vision**
- Solartech-Sud will be an integrated and **eco-friendly infrastructure** that will be self-sufficient in energy, water, and Waste management.
- The project will include training, R&D, incubators, and industrial facilities to boost the development of nexus-driven research, solutions, and industries.

The Solartech Ecosystem



- 🎓 ACADEMY
- 👷 AGROTECH
- 🏭 INDUSTRY
- 🔬 LABS





Timeline



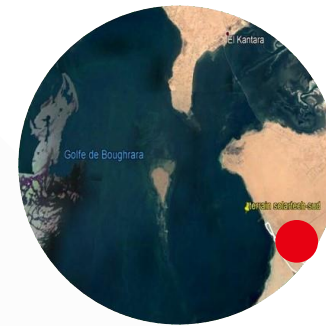
Official accreditation
As a « Technopôle »

2018



labeled « Project of
national importance » &
awarded several
advantages

2019



170ha of land selected
and secured for the
project under a long-
term lease agreement
(ongoing)

2022-2023



Financial closing and
start of construction
of the first phase

2024

170 ha
of land

€90 M
Investments

4,200 Jobs
created over 20 years

8 300

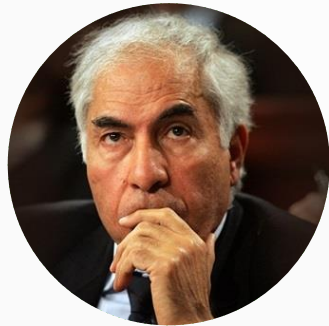
executive
education
certification to
be delivered
over 20 years

1100

Specialized
engineers
graduated over
20 years

- Solar power plants totaling 35 MWp
- 3000 m³/d seawater desalination units
- More than 20 ha of land for Cleantech industries
- 12,500 sq m of greenhouses
- 49 ha of land for agrotechnology and digital farming
- Engineering school
- Centre for Executive Education
- Datacenter & Cyber Park
- Startups Incubator and co-working space
- Administration and conference center

Management



D. Eng. Ahmed FRIAA
President, Founder

Doctor of Engineering
École Nationale des Ponts et Chaussée (France)

Former Dean of ENIT engineering school
Former Minister of Education
Former Minister of Equipment and housing
Former Minister of Telecommunication
Former Ambassador
Former minister of interior



Riadh BEN KHALIFA
General Manager

Graduated from Ecole Centrale Paris

PPP Expert working with the World Bank and African Development Bank

More than 20 years of hands-on experience in major infrastructure projects, including several renewable energy and desalination projects in Europe and the MENA region.

Nexus solutions already developed and tested

DESALTEC-Z1 : Smart desalination unit for agriculture



Nexus solutions already developed and tested

DESALTEC-Z0 : Solar thermal desalination / brine concentration unit





Thanks

www.Solartech-sud.com

Immeuble Kenzet, Apt A2, Bloc A,
Rue Lac Victoria,
Les Berges du Lac, Tunis Tunisie.