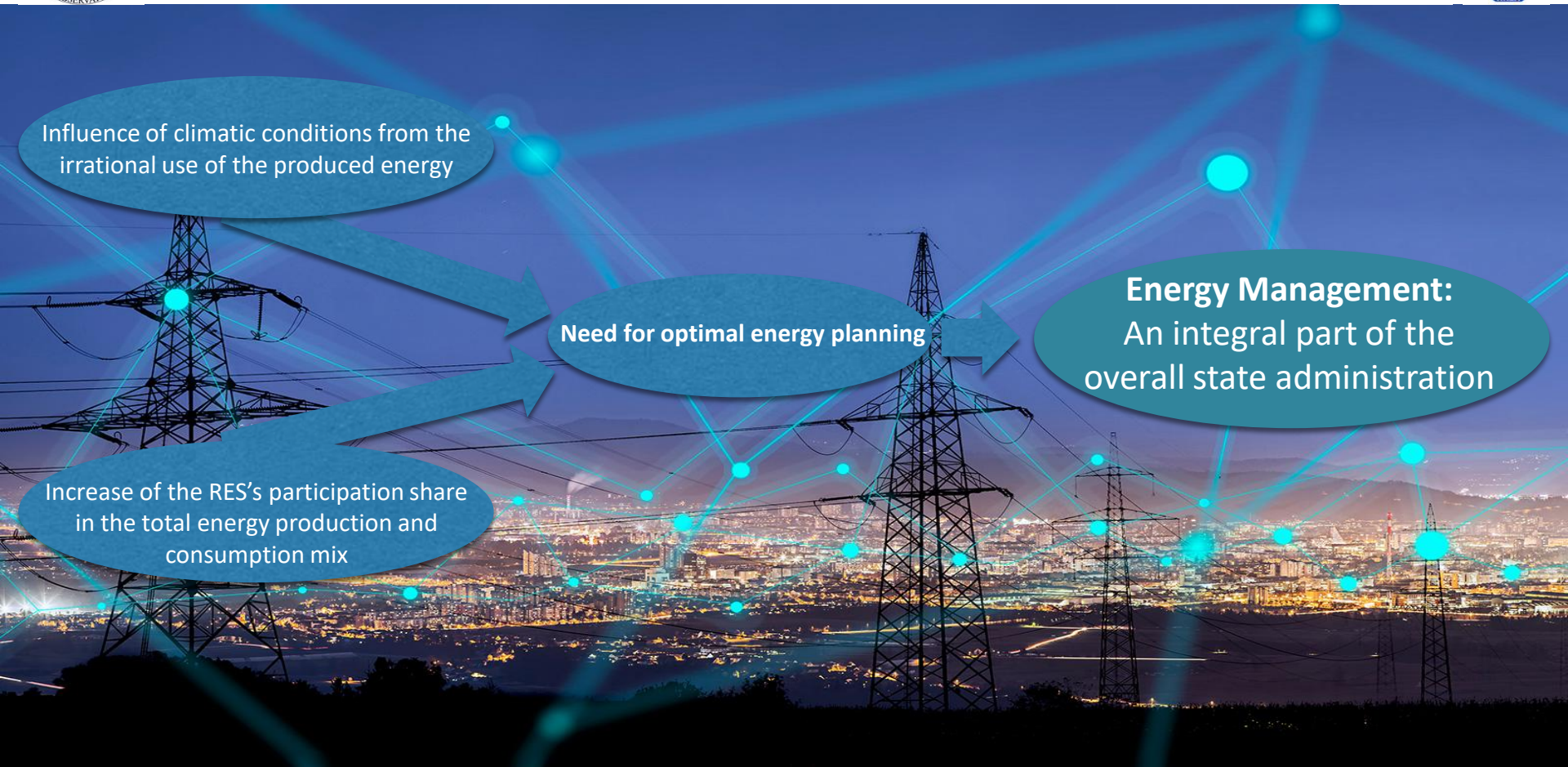
A web service to control and manage energy supply and demand, and integrate the energy produced from solar systems into cities' electricity grids. The examples of Athens (Greece) and Aswan (Egypt)

Panagiotis Kosmopoulos and Hesham El-Askary

Motivation


Influence of climatic conditions from the irrational use of the produced energy
Need for optimal energy planning
Energy Management:
An integral part of the overall state administration
Increase of the RES's participation share in the total energy production and consumption mix

Motivation

Weather

Monitoring Observation

Modelling

Forecasting

7 AFFORDABLE AND CLEAN ENERGY

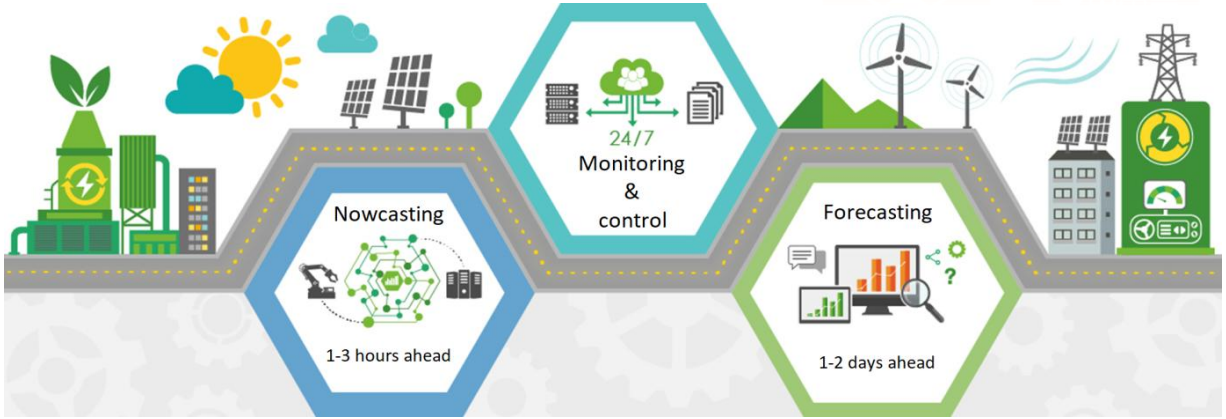
11 SUSTAINABLE CITIES AND COMMUNITIES

Users/Decision Making

Outcomes

Economic & social values

www.solea.gr ©



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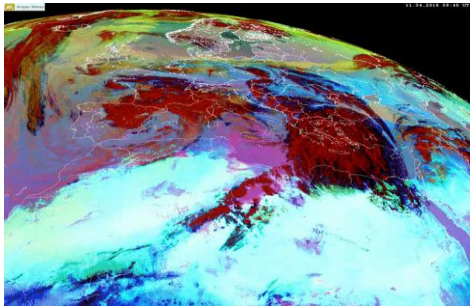
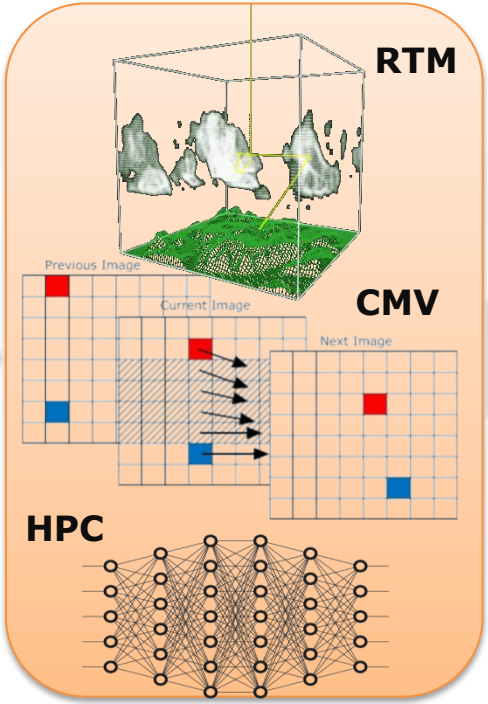
2019 – 2023 (€ 15.0 M)

The nextSENSE system

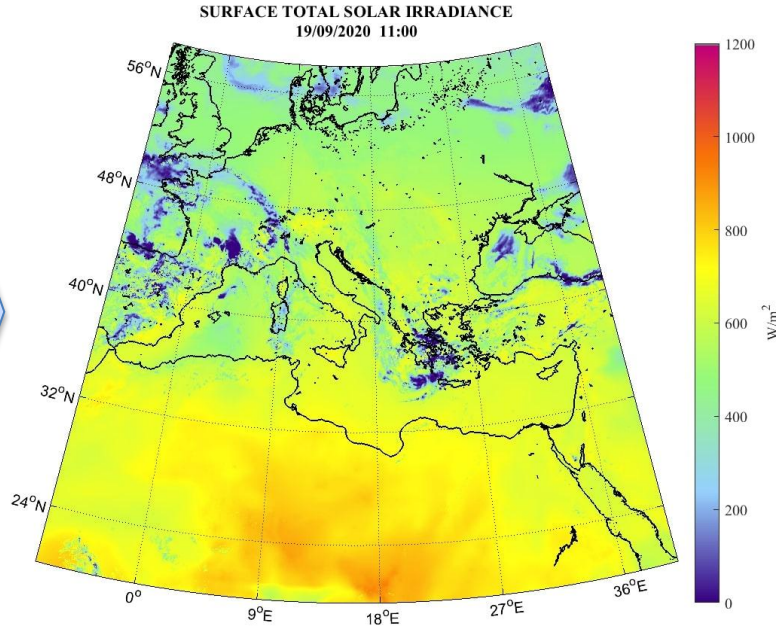
Satellite data



Numerical models



Surface Total Solar Irradiance



Inputs ⟶ nextSENSE ⟶ Outputs

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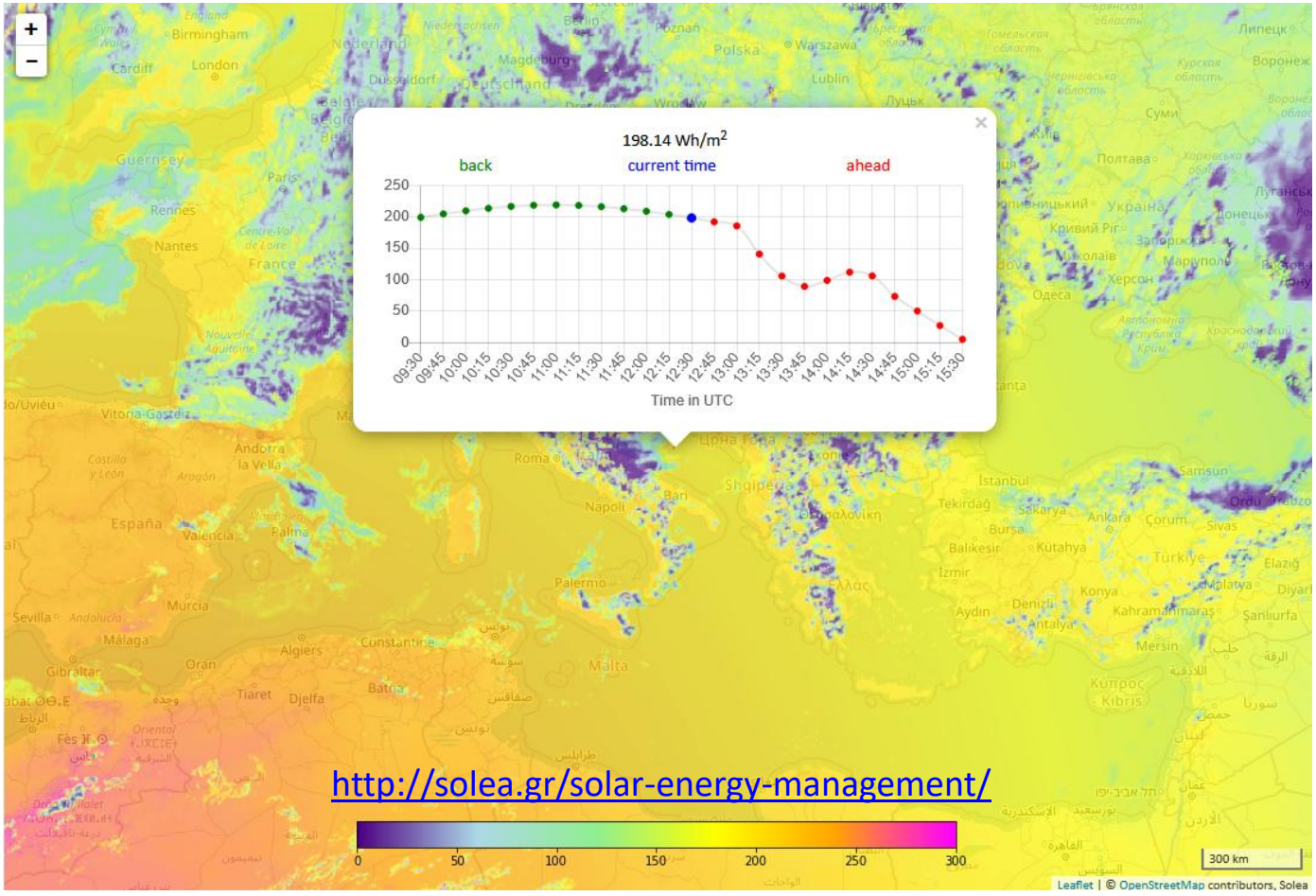
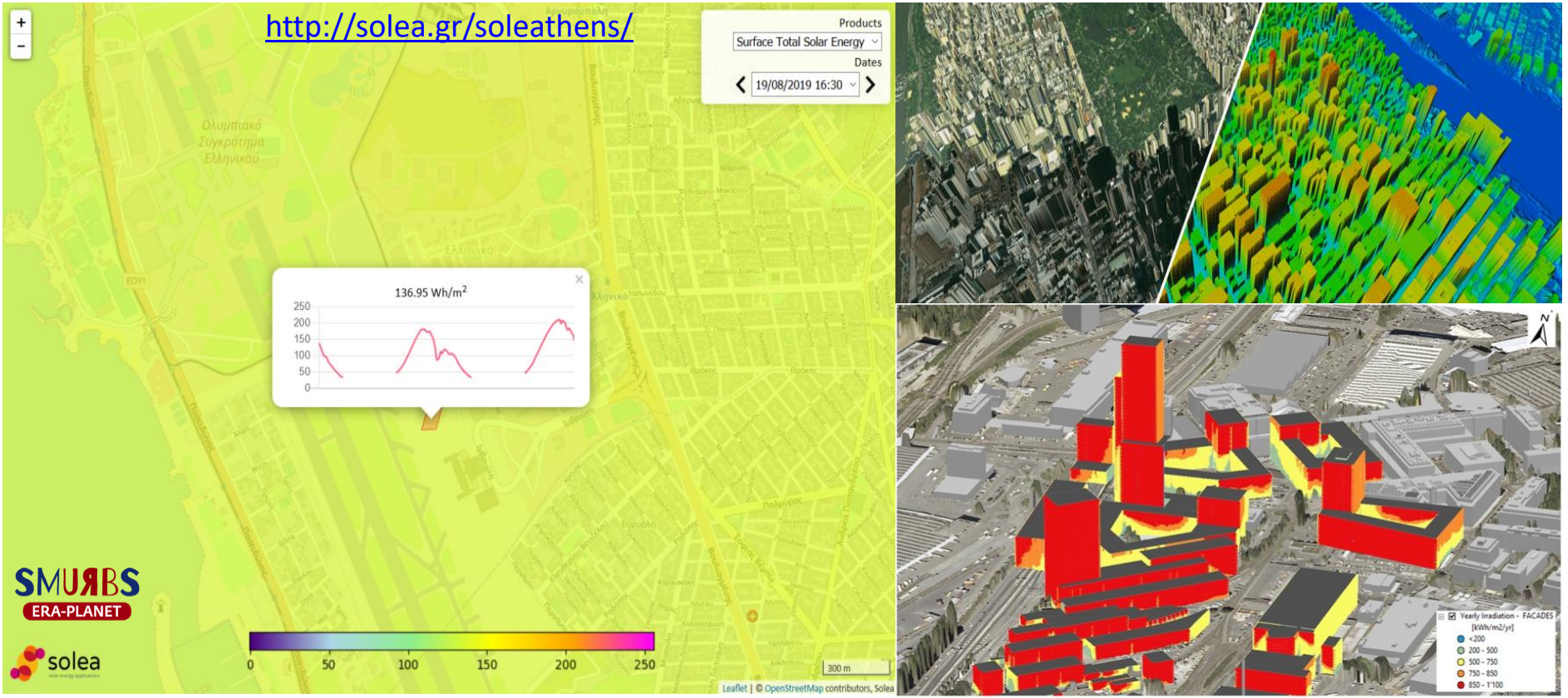
Kosmopoulos et al. 2018 @ Atmospheric Measurement Techniques © & 2020 @ Energies (under preparation)

The nextSENSE web service



http://solea.gr/solar-energy-management/

The example of Athens



The example of Athens

Efficient control and management of the energy supply and demands, and integration of the produced energy from solar systems into the electricity grid.

Total Discounted Cost for	2020 - 2030	[€billion]	30.5
Total Amount of Emissions for	2020 - 2030	[MTon CO_2-eq]	225.75

Current and potential benefits

The nextSENSE web service provides:

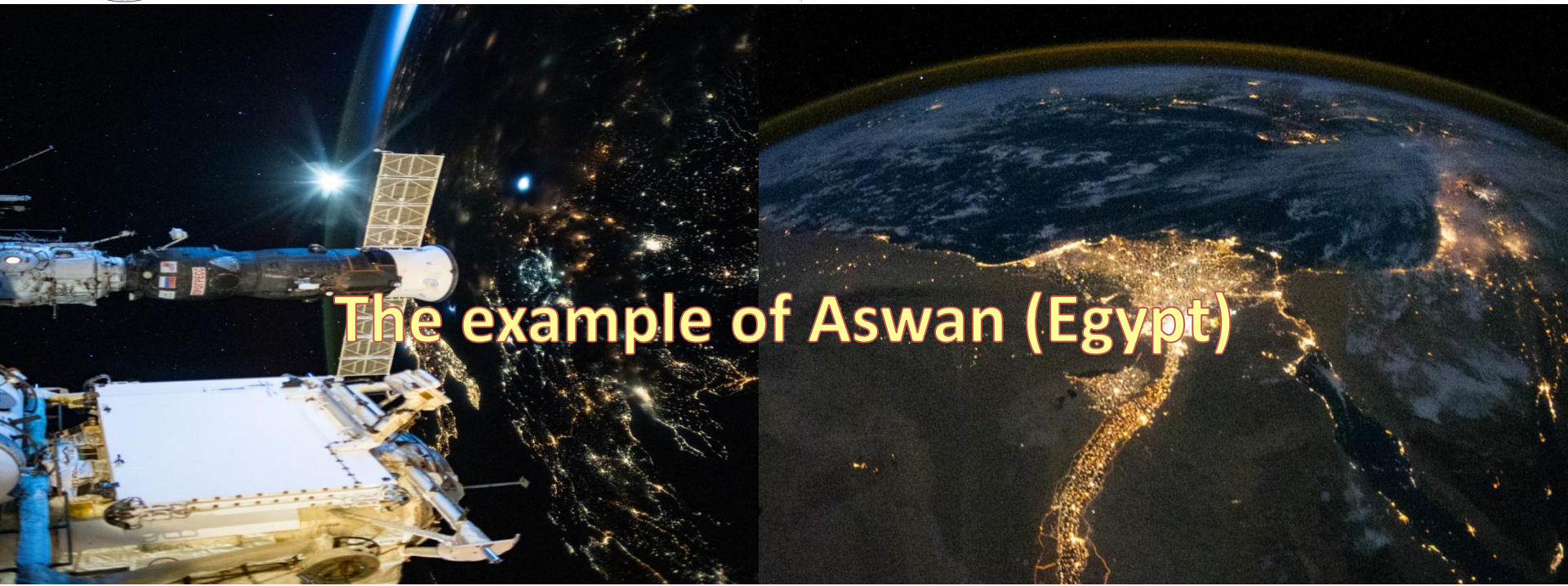
- Access to HD solar nowcasting and forecasting for smart energy management and grid stability.
- Adaptability to urban environment (roof-top PVs) for smart sustainable and renewable cities.

Exploitation sectors:

- Location studies for the placement of new PV and CSP plants (penetration in smart cities).
- Large scale and precise solar production calculations to assist public authorities in energy planning policy, TSO-DSO.
- Open access solutions for decision makers dealing with sustainable cities and communities, urban planning and affordable and modern energy for all.

Upgrade EO role in decision making.

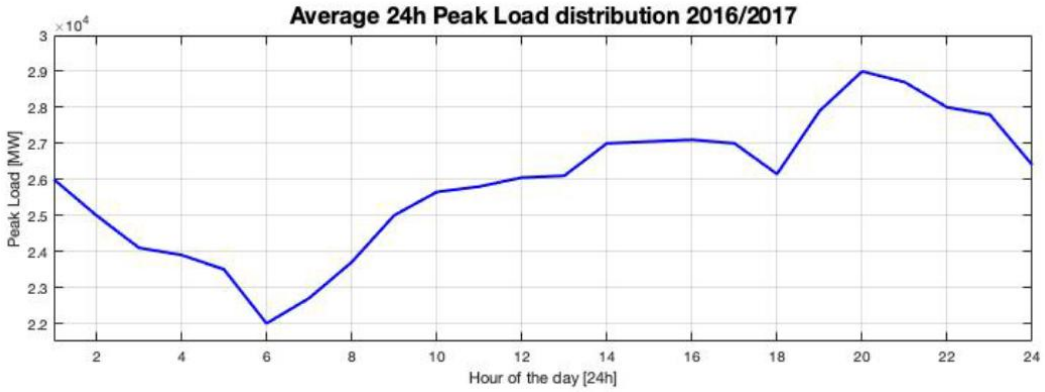
Energy Management System

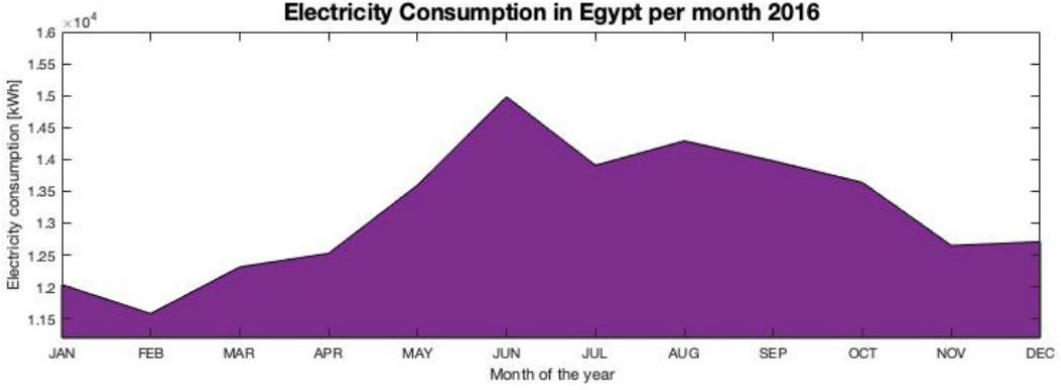


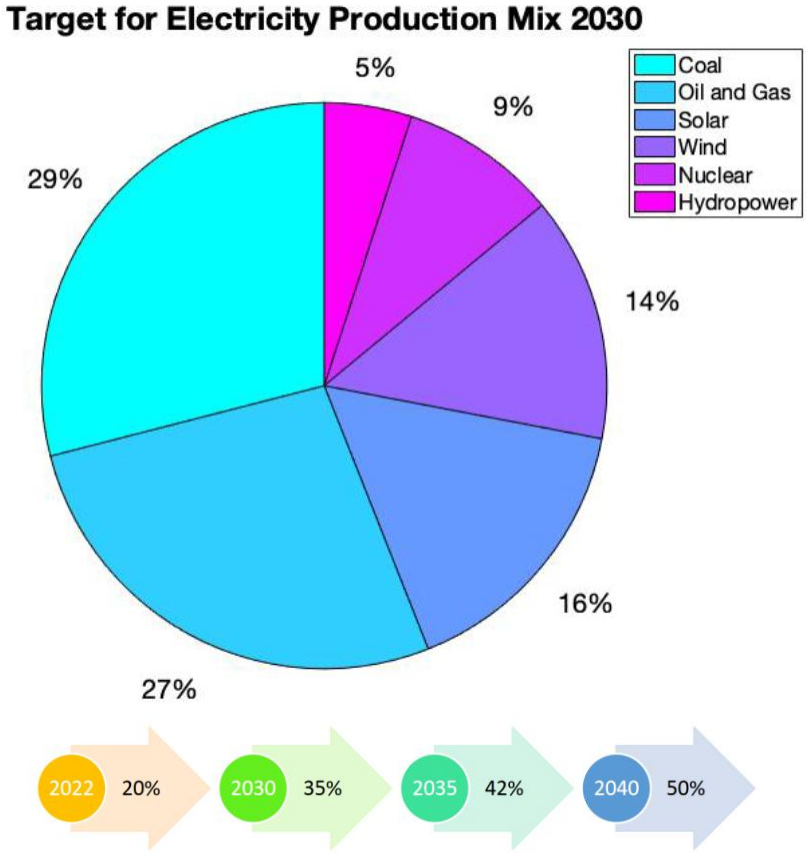
The example of Aswan (Egypt)

Panagiotis Kosmopoulos and **Hesham El-Askary**

The example of Egypt







Solar energy policy

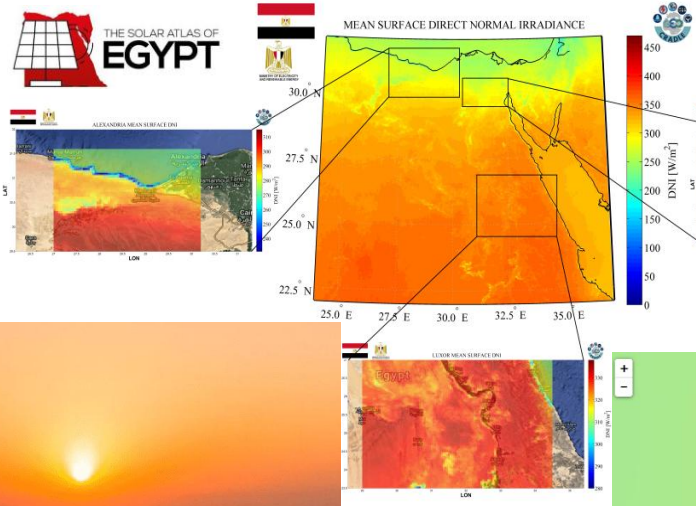
Prof. El-Askary delivering a talk at the Planet Earth Institute with the Royal Academy of Chemistry, London, UK on the Future of Renewable Energy in Africa With Rt Hon Lord Paul Boateng, Sir Magdi Yacoub and Ambassador of Ethiopia in UK

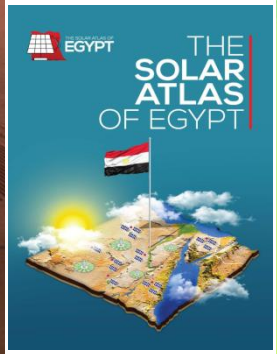
Presenting at the Ministries of Electricity and Military Production of Egypt to Minister's Shaker Cabinet and General Assar's Cabinet on Solar Projects

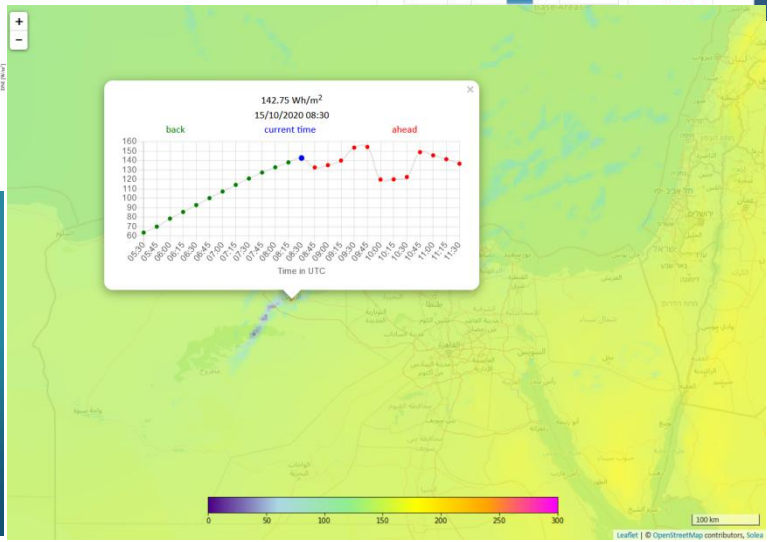
NextSENSE applications in Egypt

MINISTRY OF ELECTRICITY AND RENEWABLE ENERGY

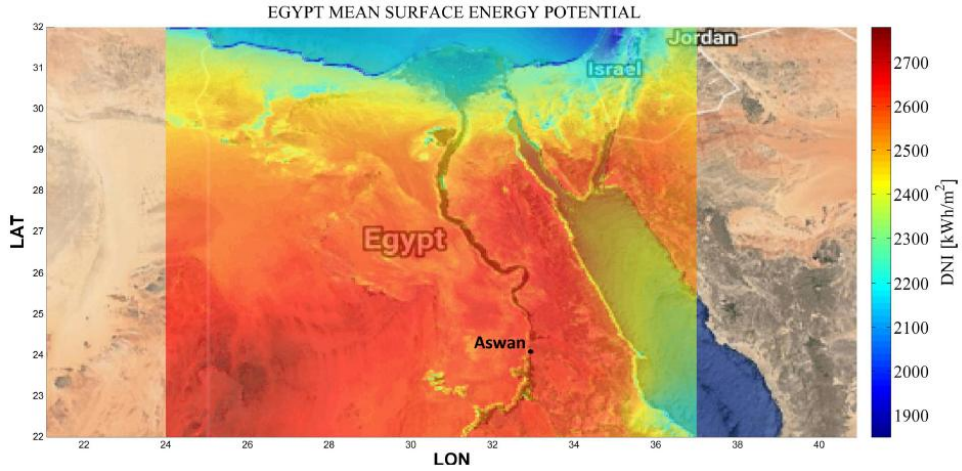
MAGDI YACOUB HEART FOUNDATION
ASWAN HEART CENTRE

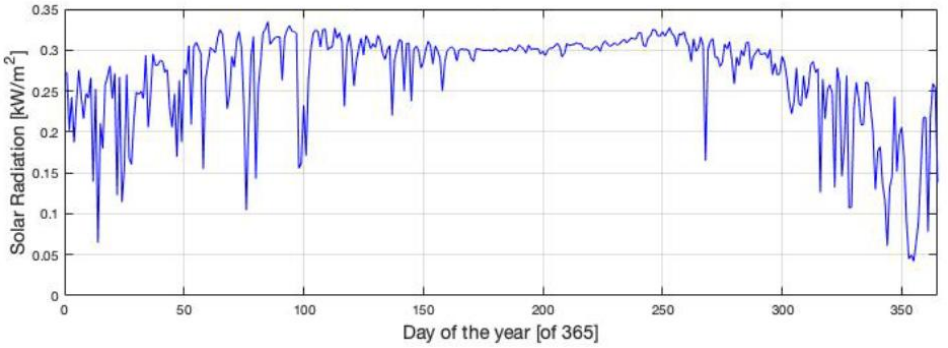


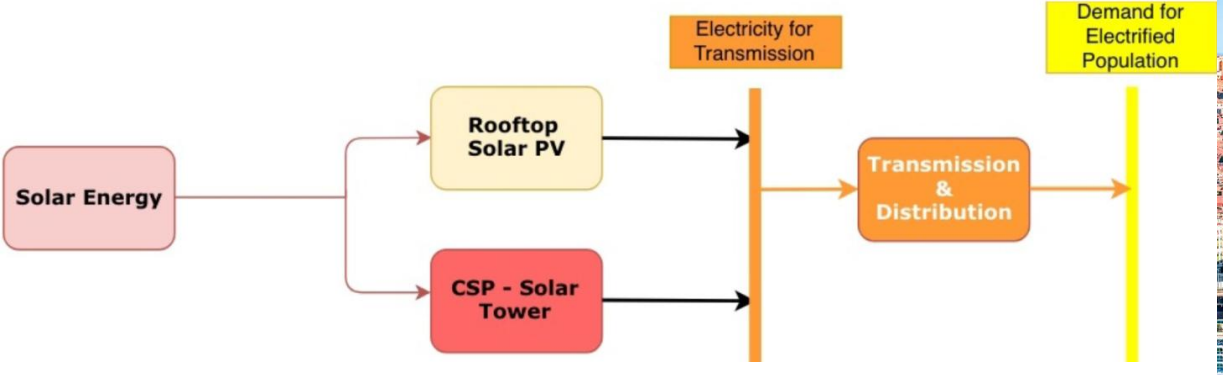




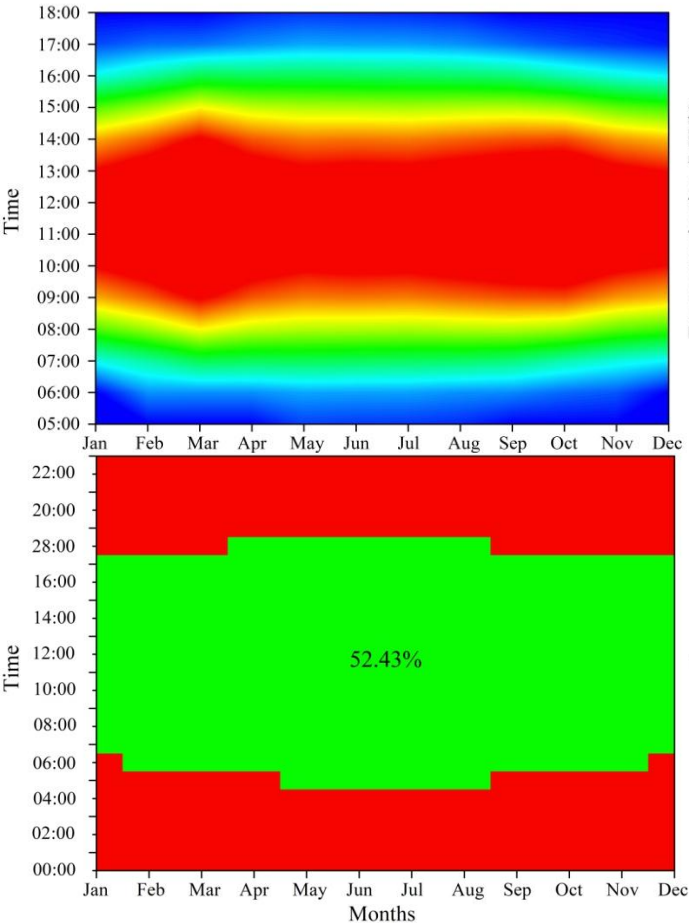
The example of Aswan



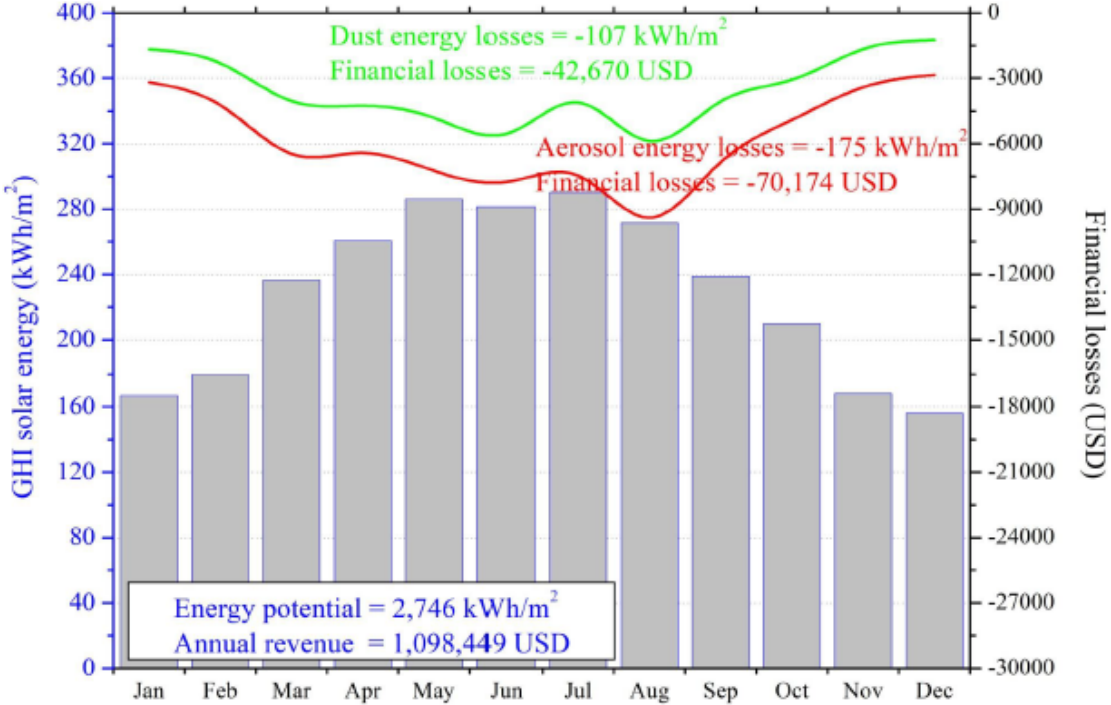




The example of Aswan



Simulated scenario 10 MW



required area = 130,000 – 150,000 m² for PV (e.g. rooftop)

Kosmopoulos and El-Askary et al. 2019 @ Remote Sensing ©

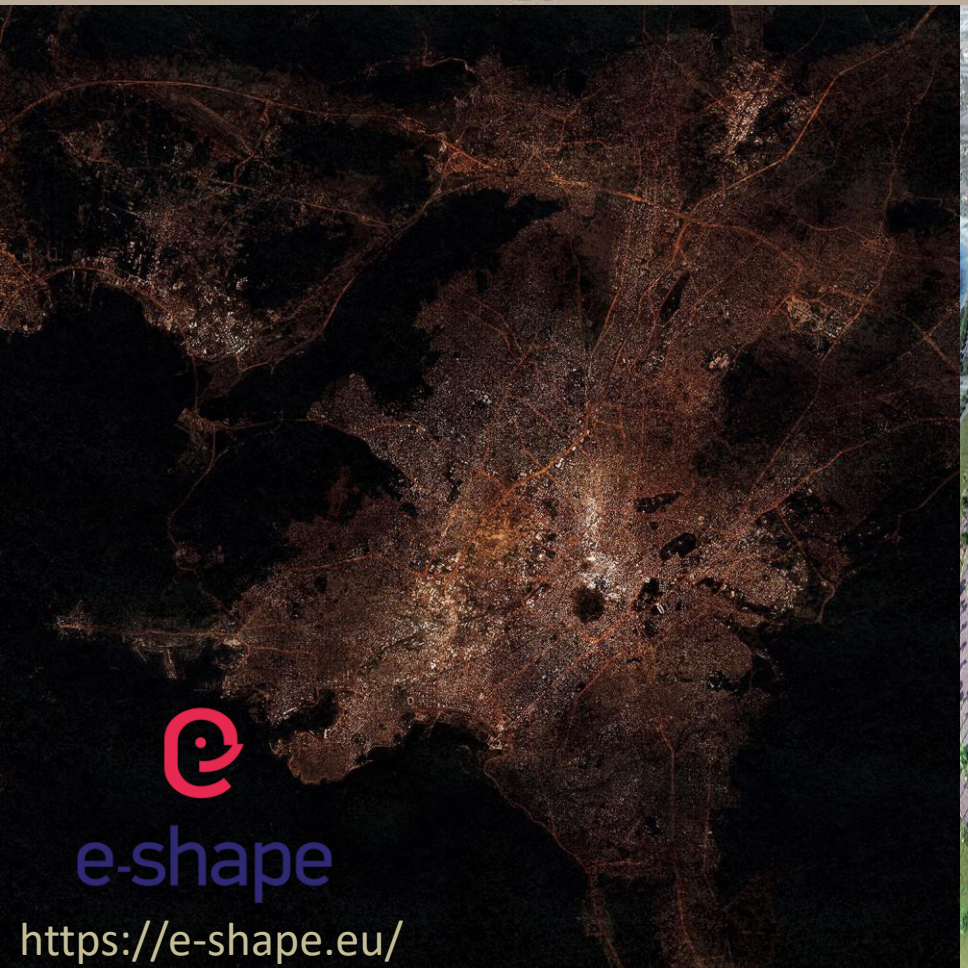
Smart renewable city adaptation

Al-Alamein New City

"The new and reinvigorated UN-Habitat has the power to make this paradigm shift. It has the specialized knowledge, the ability to innovate and the capacity to implement programs and projects with creative solutions."

(J.Clos, 2013/14)

In 14 and a half seconds, the sun provides as much energy to Earth as humanity uses in a day.



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