Air solar towers with gas turbines

International Energy Agency

Technology Roadmaps
Feb. 3, 2014

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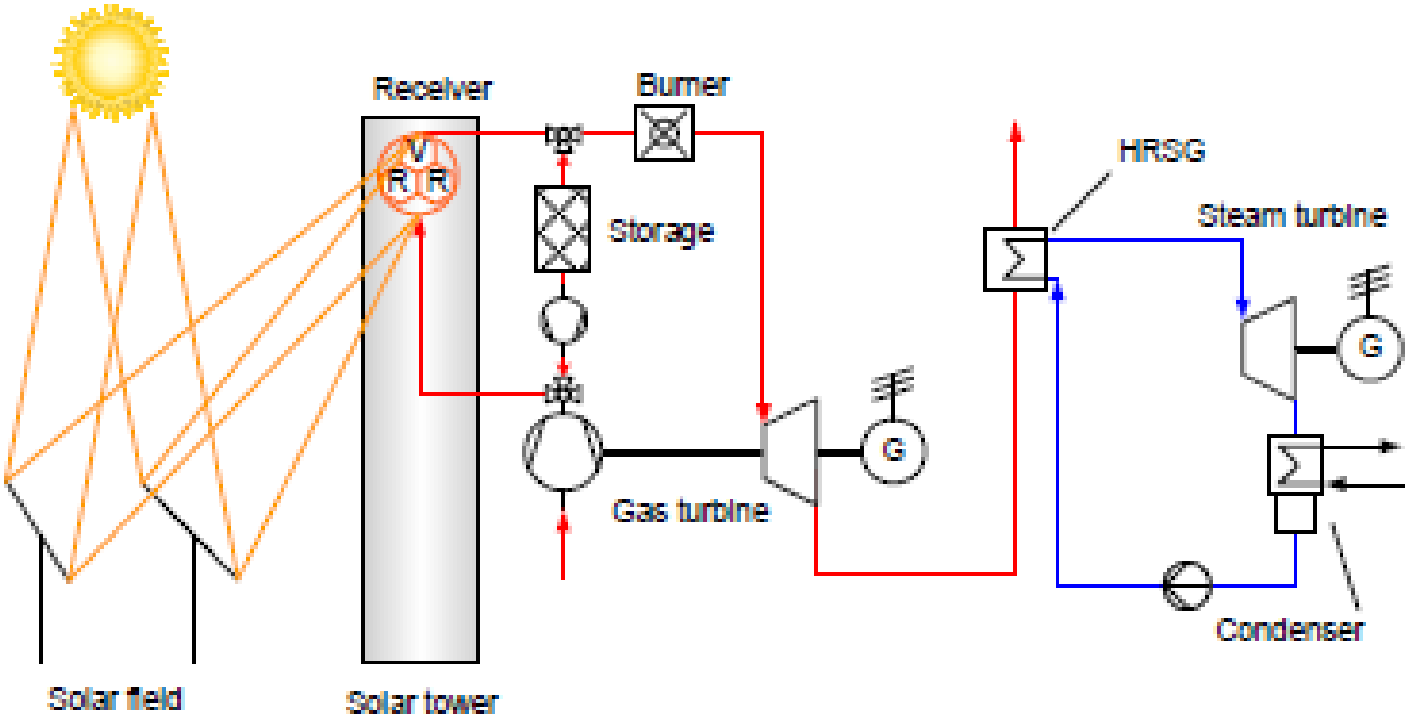
CNRS-PROMES

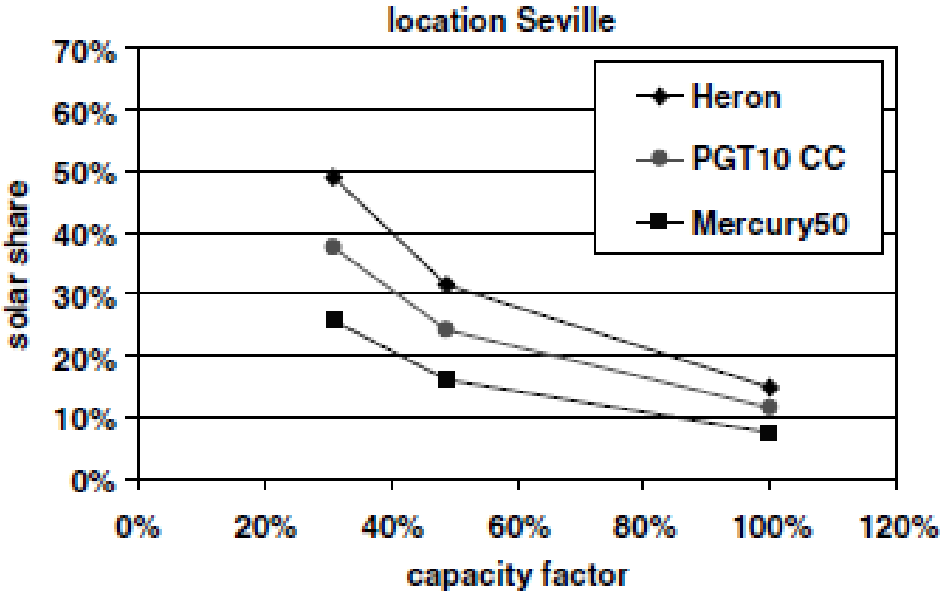
Principle

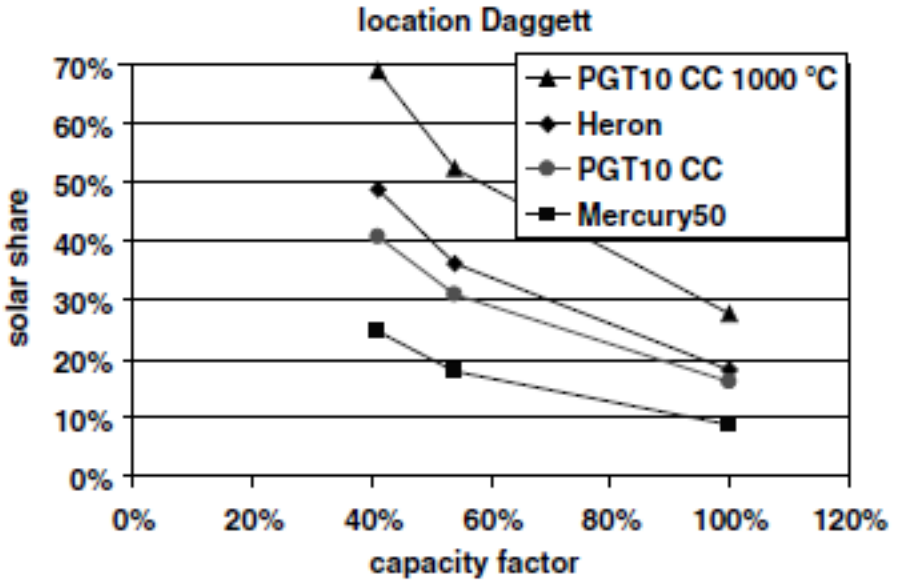


Only gas or combine cycles
Hybrid by design
Expected peak efficiency : 25 – 30%

Performances

Solar share (without storage) depends on the plant capacity factor and on the air temperature at the outlet of the solar receiver

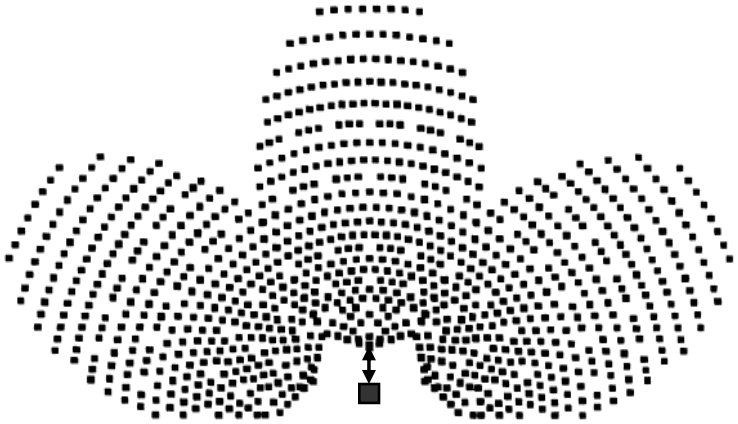




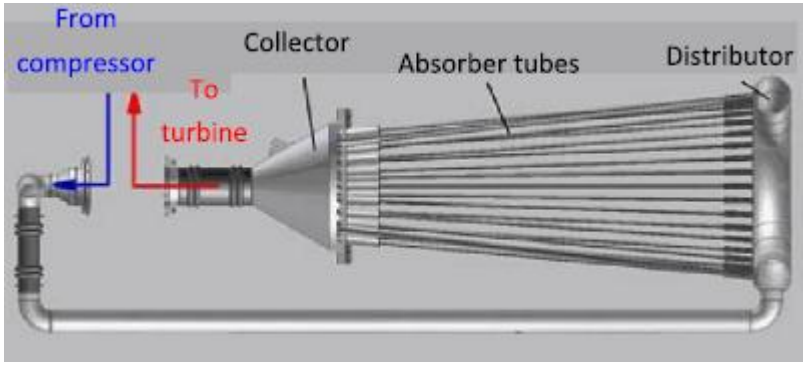
1.4, 4.2 and 16 MW for Heron, Mercury and PGT 10 respectively

After Schwarzbozl et al. (2006) Solar Energy, 80, 1231

Technology issues



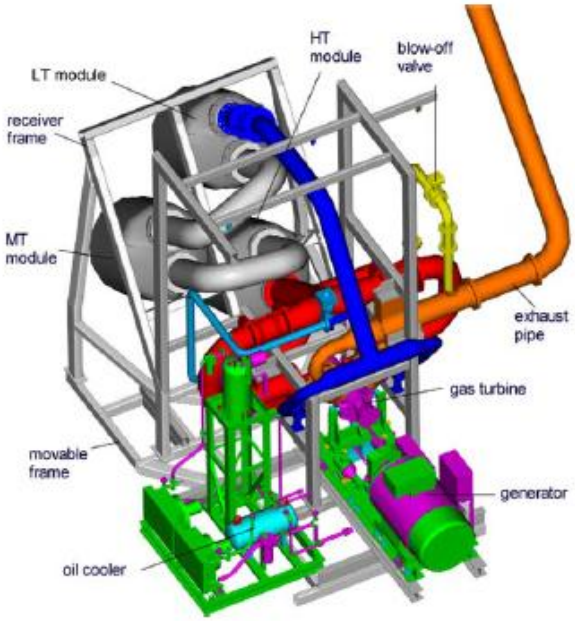
Heliostat optics and layout
(high concentration)



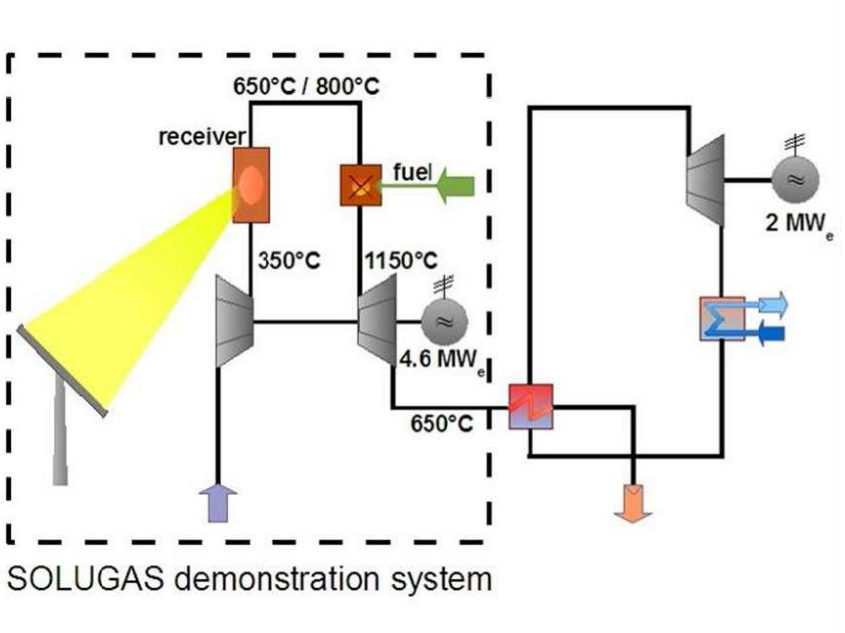
Solar receiver (temperature)

Solarized gas turbine (supplier)

Projects Products



SOLGATE
Pilot 200 kW,
EC project, 2003



SOLUGAS
Demonstration, 4.6 MW
EC project, 2013

Projects
Products

PEGASE
Demonstration, 2 MW
France, 2016

AORA
Product, 100 kW

Pros/Cons

Advantages	Drawbacks
High efficiency with combine cycle and air cooling of gas cycle	Very challenging technology issues (solar receiver in particular)
Solar share increases with receiver technology improvement	Sensitivity to pressure drop (high constraints for heat storage)
Efficient use of fuel (in the top cycle) in hybrid mode	Scaling up at high power