

# Characterization of components for CSP molten salt plants.

## The SolarPaces and Sfera III experience

### Electrical heat tracing characterization

Presented by:  
**PhD Walter Gaggioli**  
Working group  
ENEA  
walter.gaggioli@enea.it



Agenzia nazionale per le nuove tecnologie,  
l'energia e lo sviluppo economico sostenibile

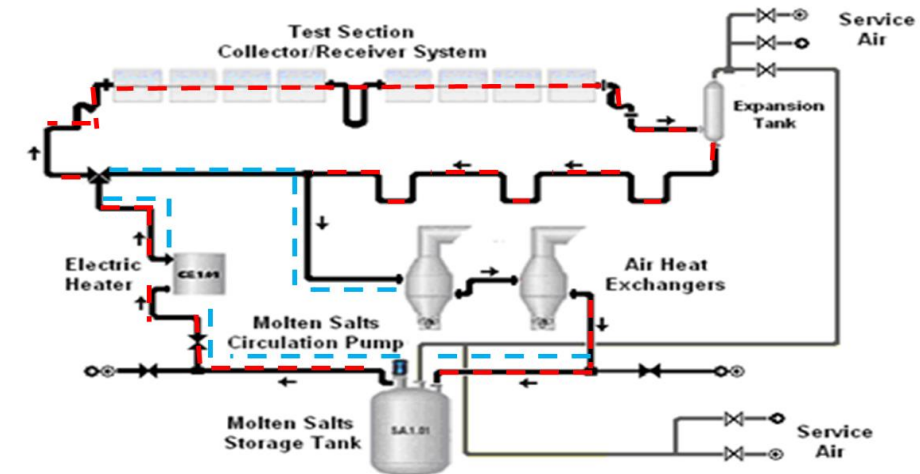
## Electrical heat tracing characterization

### ♦GOAL

- characterization of the thermal dispersions of the molten salt supply pipes connected with the TES Return pipe L 200 m
- to gain experience with measurement technology for industrial scale applications

### ♦Installation:

- 6 high-temperature thermal sensors;
- electrical cable heating feed with a AC power supply regulated in temperature, as to instantly supply the power necessary to compensate for the dispersions in progress;
- DCS tools to control tests and acquisition of the experimental data



## Electrical heat tracing characterization

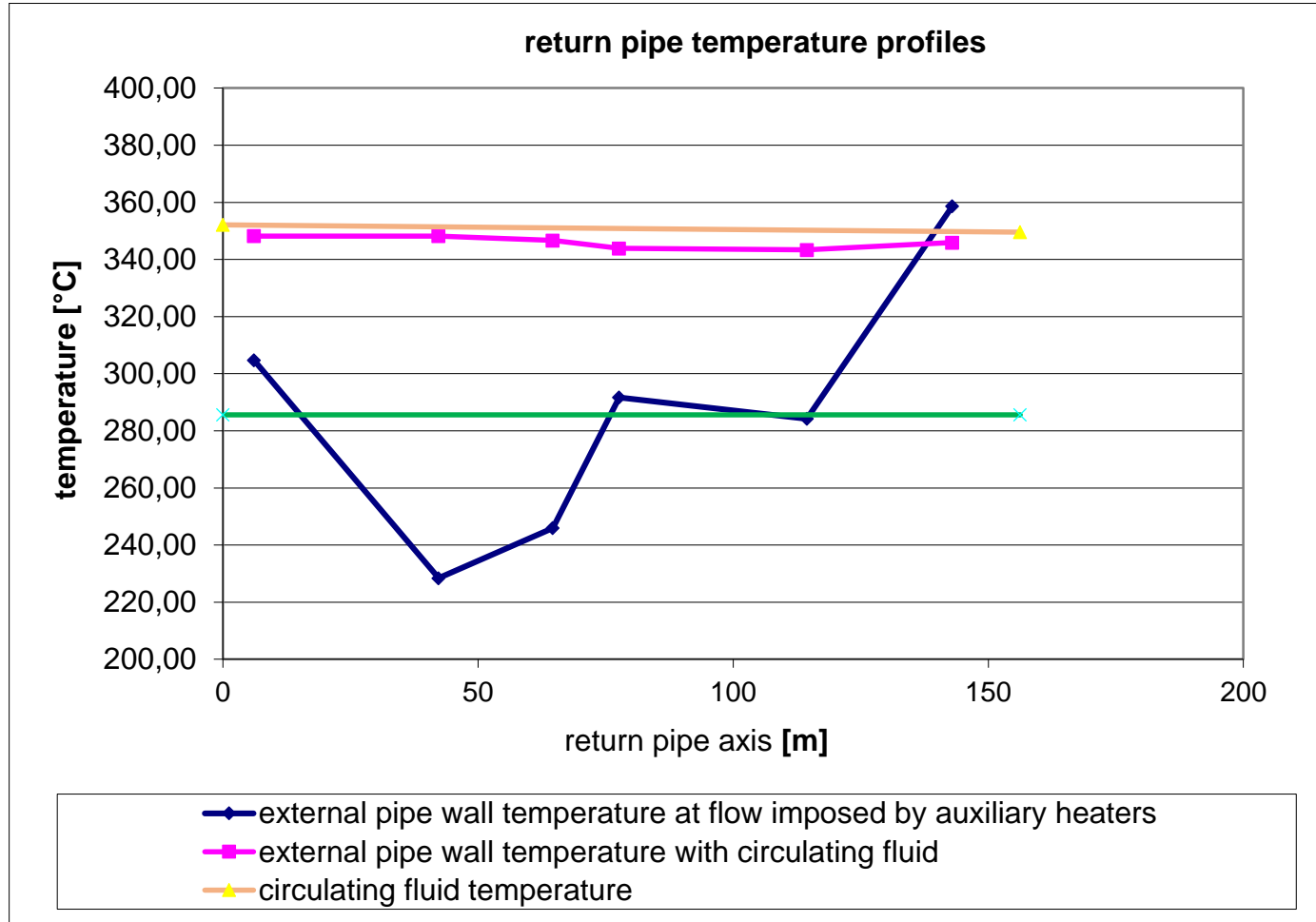
### HEATING CABLES ON PIPING PRATICAL EXEMPLES



Heating cables  
fixed by metal clamps

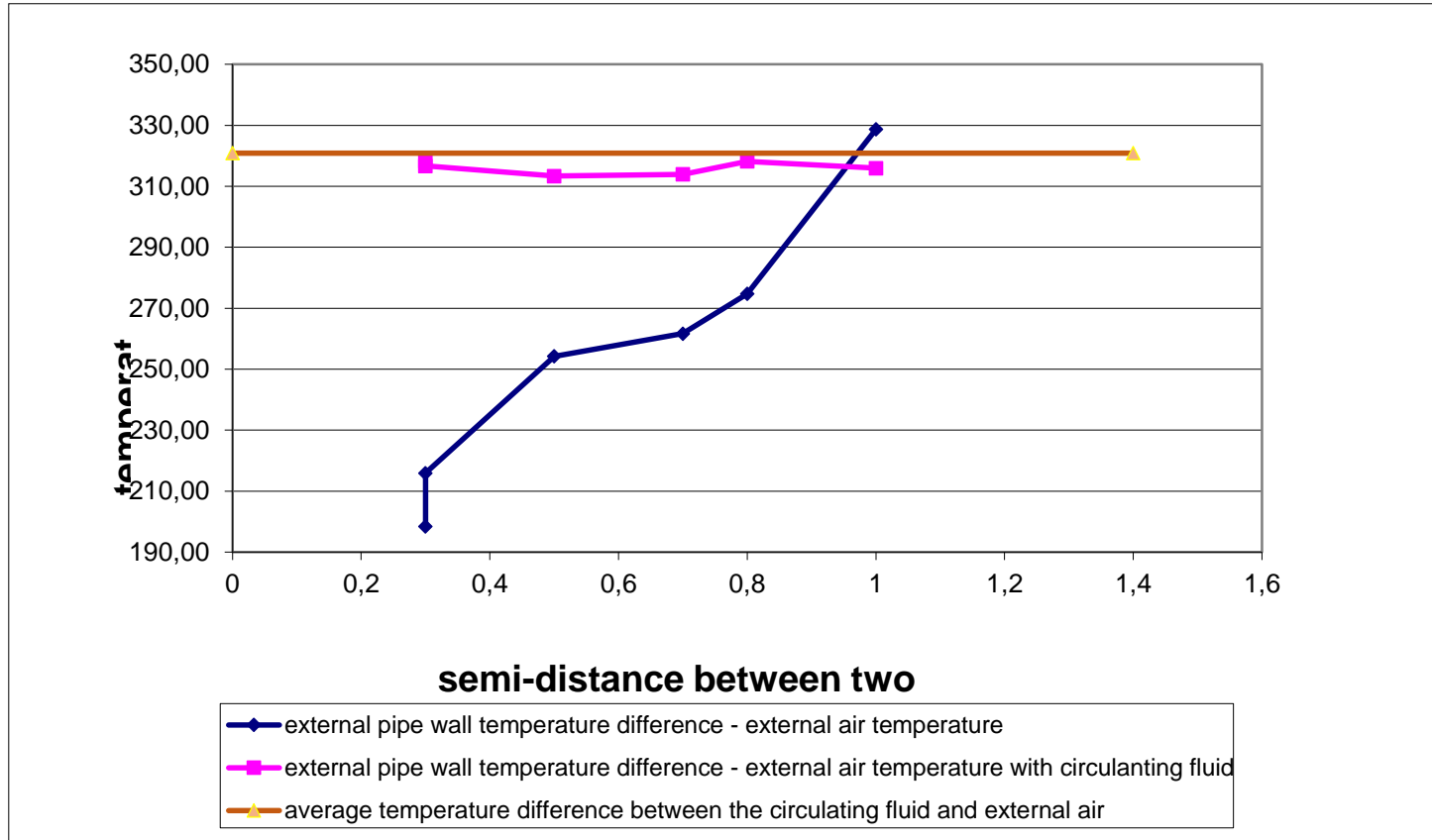


## Electrical heat tracing characterization



Wall temperature profile vs the axis of the return pipe in conditions of imposed temperature (circulating fluid) and imposed flow (non-circulating fluid, heating with heating cables)

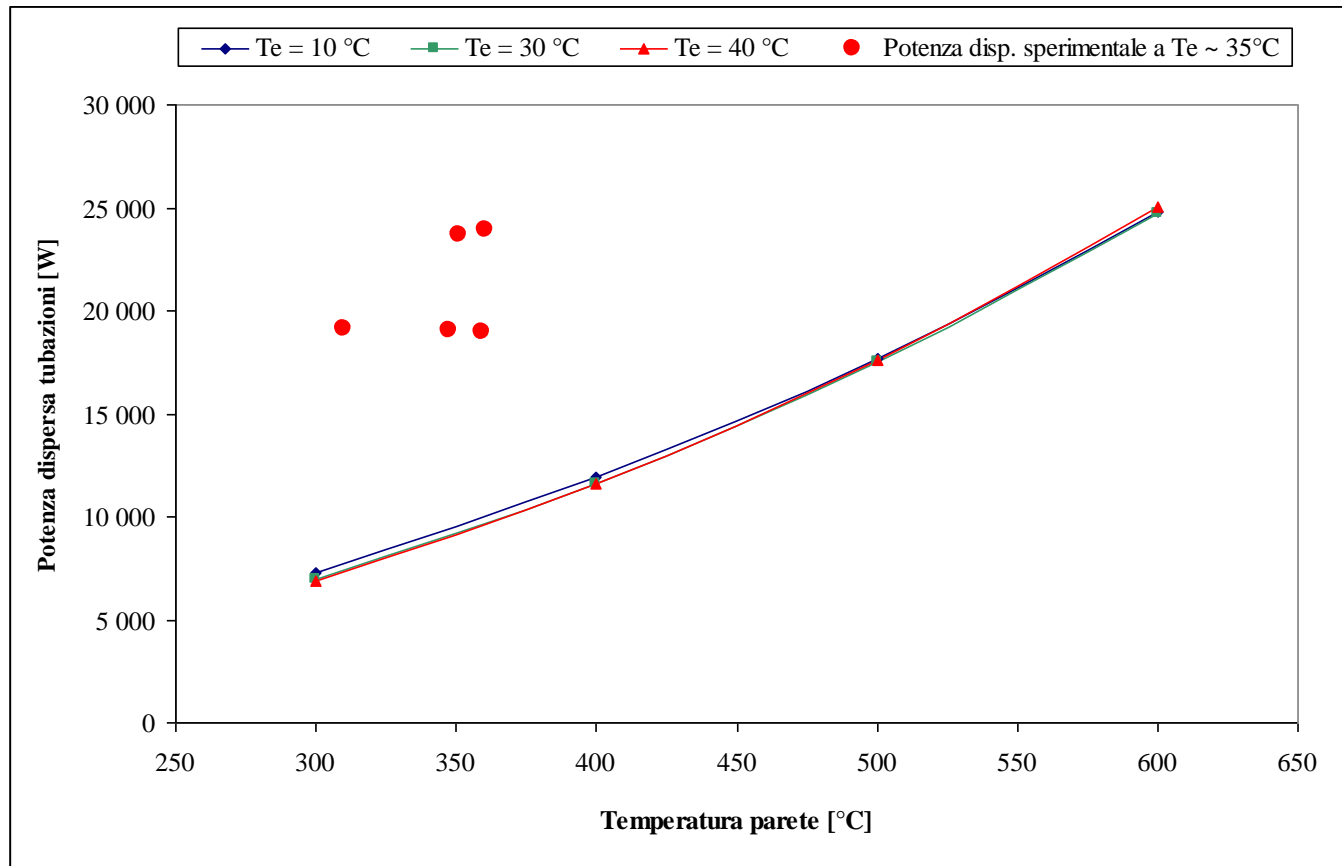
## Electrical heat tracing characterization



Wall temperature profile vs half of the distance between the poles of two consecutive supports (constraints) of the return pipe in conditions of imposed temperature (circulating fluid) and imposed flow (non-circulating fluid, heating with heating cables).

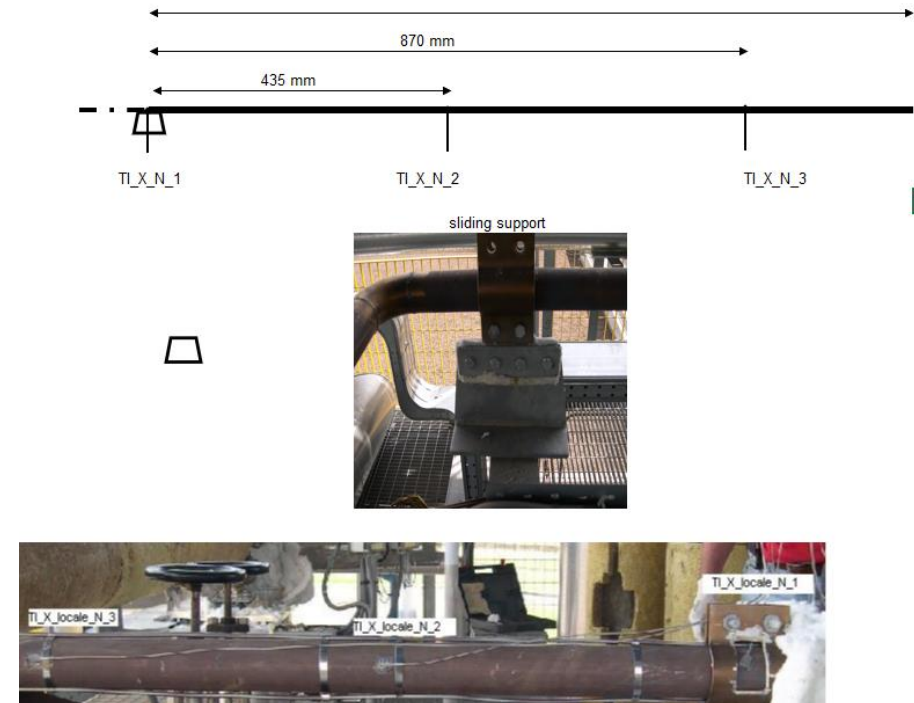
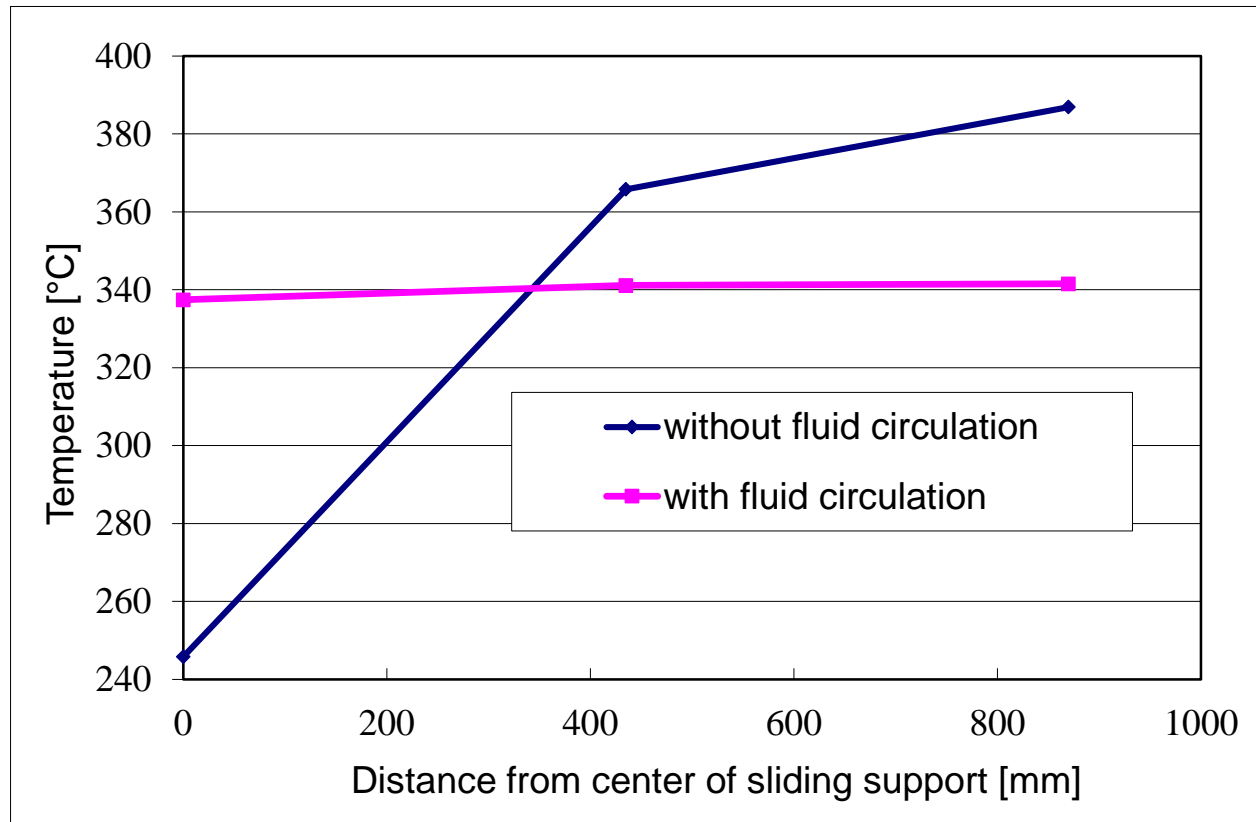


## Electrical heat tracing characterization



**Thermal power dispersed by the return pipe and the average wall temperature. Calculated values compared with experimental ones, in conditions of imposed temperature (circulating fluid).**

## Electrical heat tracing characterization



# Thanks for the attention

**PhD Walter Gaggioli**  
Working group  
ENEA  
[walter.gaggioli@enea.it](mailto:walter.gaggioli@enea.it)