

Geoscambio: pompe di calore acqua/acqua

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Regione Emilia-Romagna

EMILIA ROMAGNA
anci

**STRATEGIE DI ELETTRIFICAZIONE DEI
CONSUMI TERMICI NEGLI EDIFICI ESISTENTI**

CLUST-ER
GREENTECH
ENERGIA E SOSTENIBILITÀ

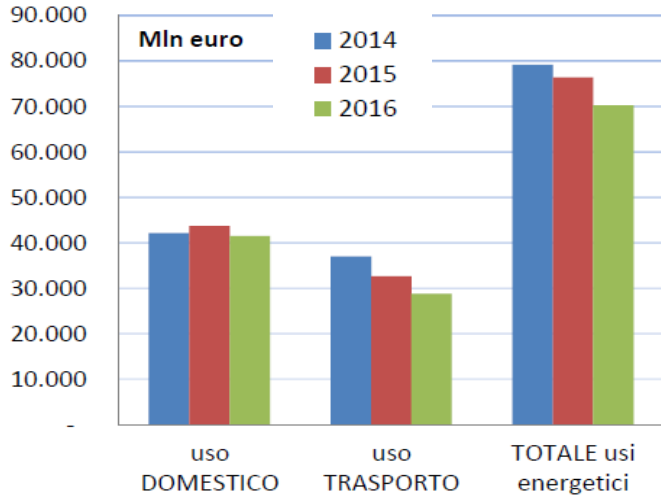
Con il patrocinio del Comune di Bologna

Comune di Bologna

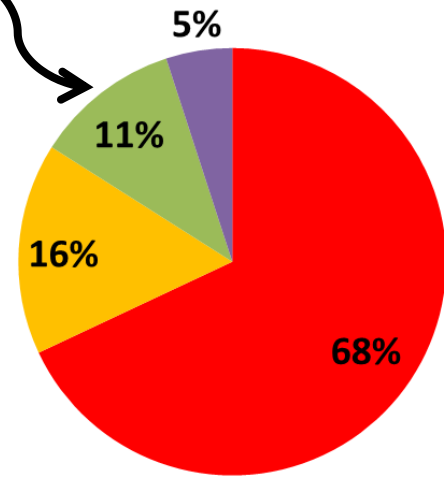
CLUST-ER
BUILD
ESTETICA E COSTRUZIONI

BOLOGNA | AUDITORIUM BIAGI
MERCOLEDÌ 11 OTTOBRE 2023 ORE 14.30 – 17.30
PIAZZA NETTUNO 3

aspetti economici ...

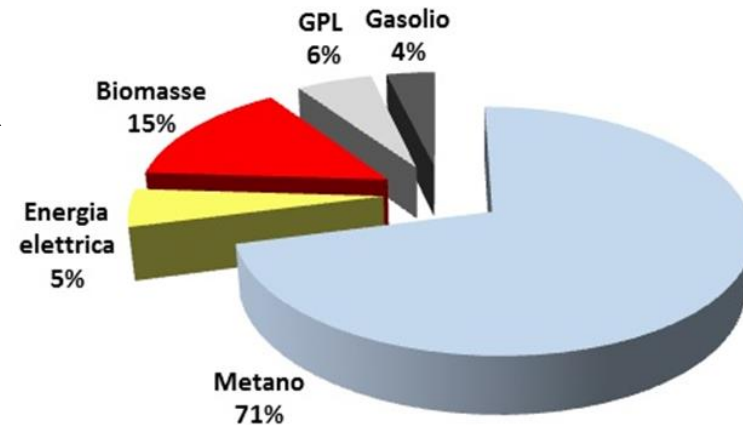


1. in Italia ogni anno vengono spesi circa 40 miliardi di euro per uso domestico (MISE, 2017)



- riscaldamento
- acqua calda sanitaria
- elettrodomestici e illuminazione
- per usi cucina

2. di questi l'84% per riscaldamento e acqua calda sanitaria (ISTAT, 2013)

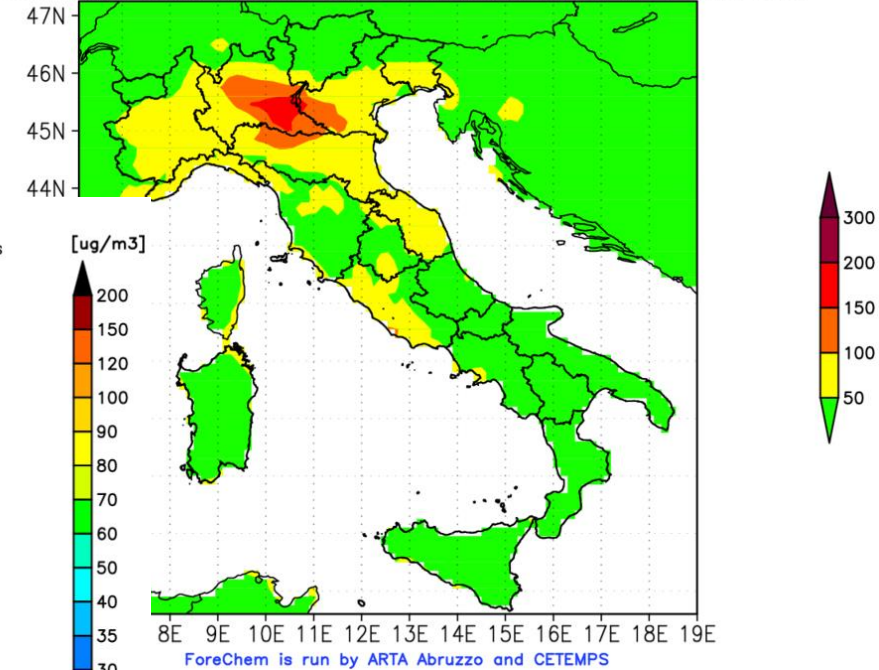


3. e il 81% degli impianti di riscaldamento utilizza risorse fossili (ISTAT, 2013)



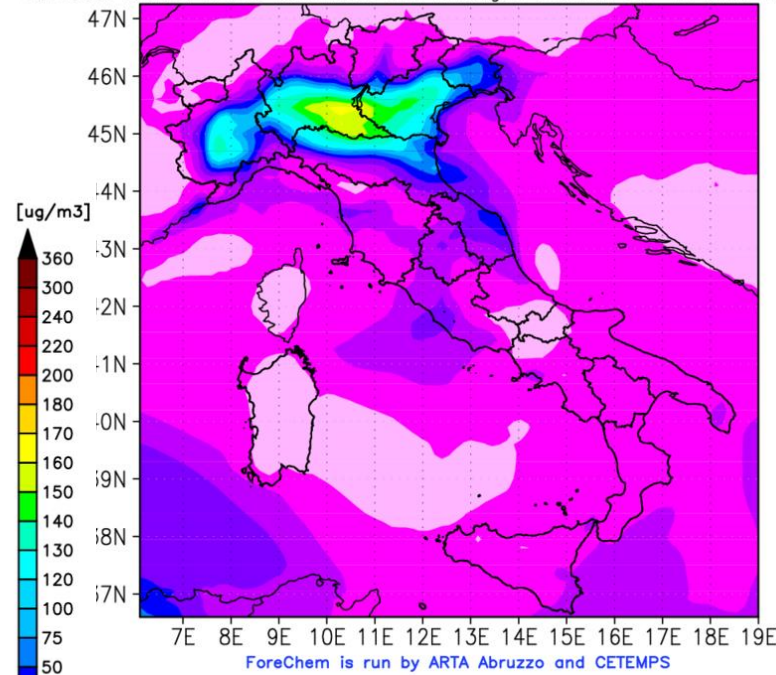
Air Quality Index – Thu 06 Oct 2022

Forecast started 00UTC 20221005 and AQI calculated between 25–48 time steps



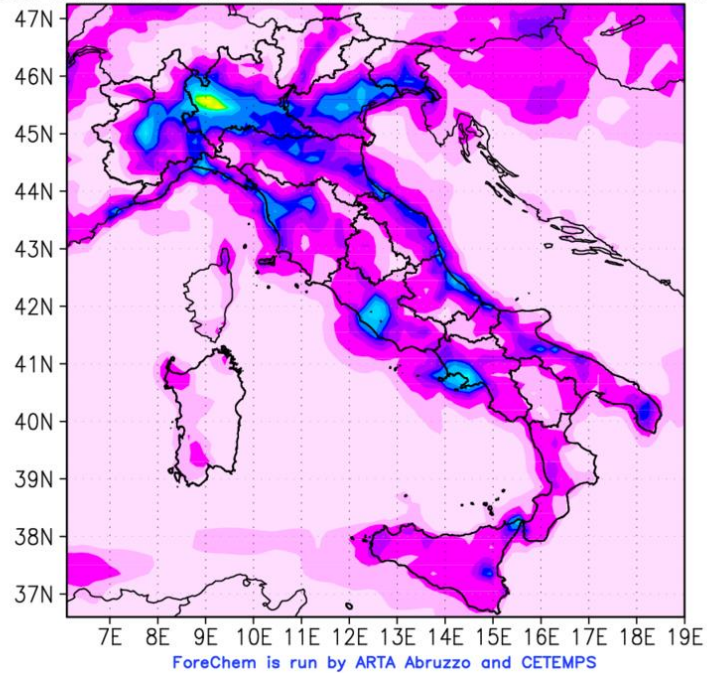
PM10 daily mean – Thu 06 Oct 2022

Forecast started 00UTC 20221005 and Averaged between 25–48 time steps

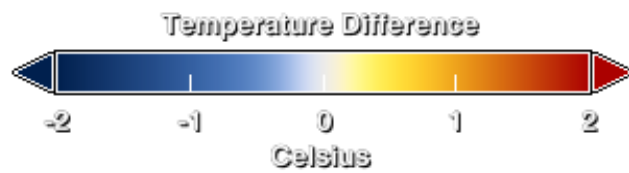
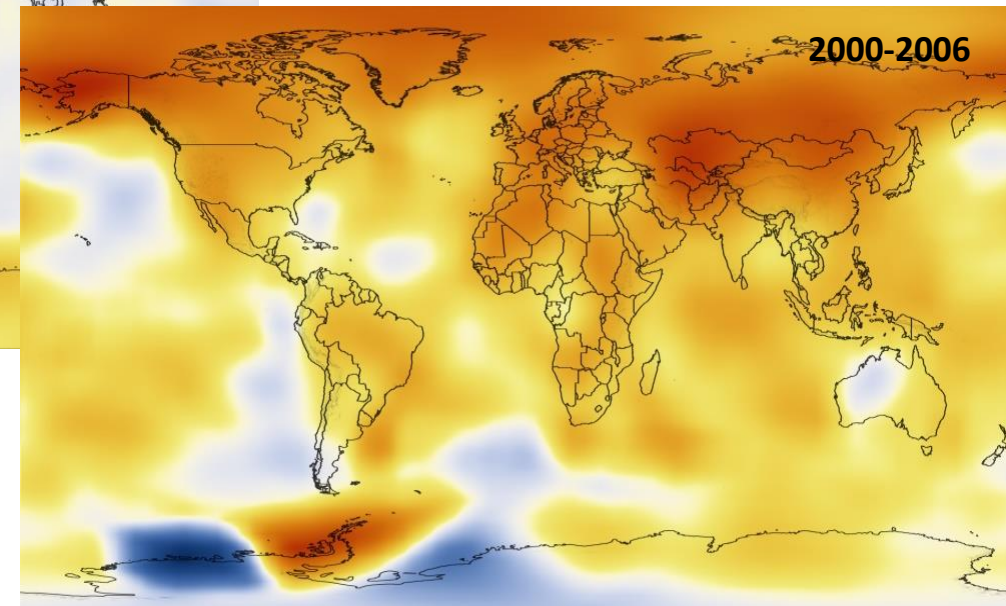
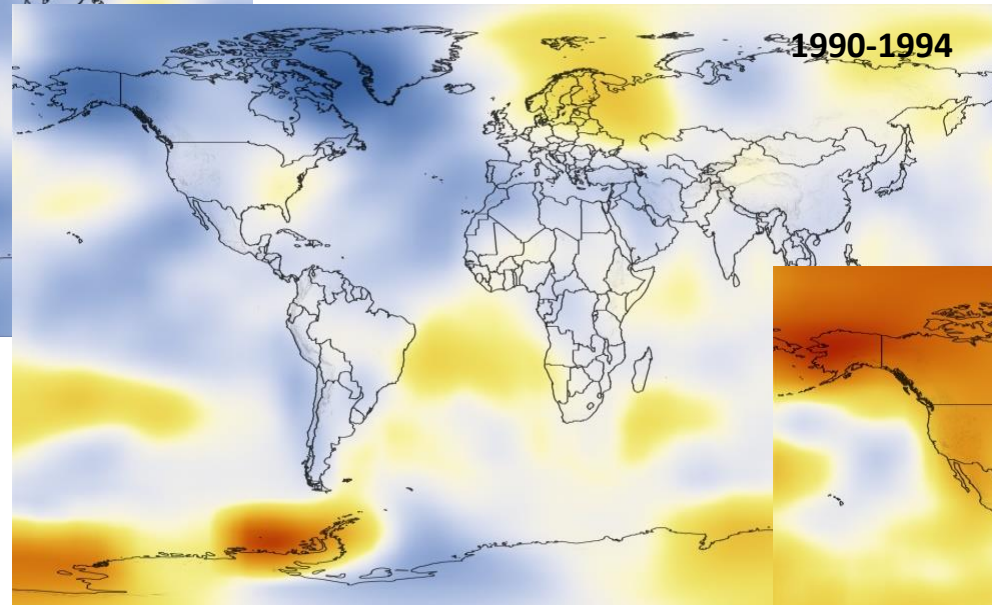
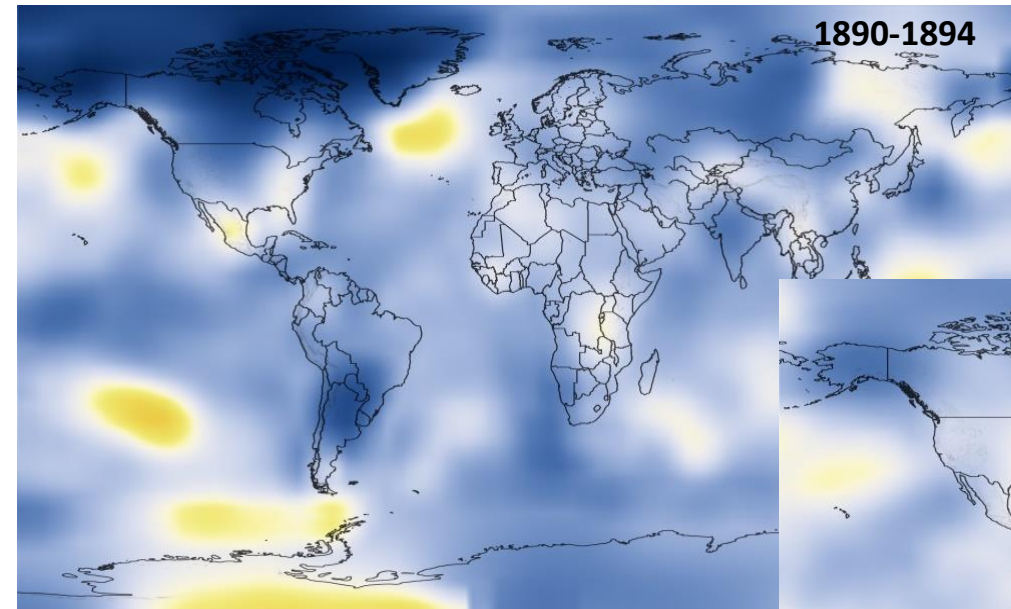


NO2 daily max-1h – Thu 06 Oct 2022

Forecast started 00UTC 20221005 and Maximum between 25–48 time steps



... e aspetti climatici ...





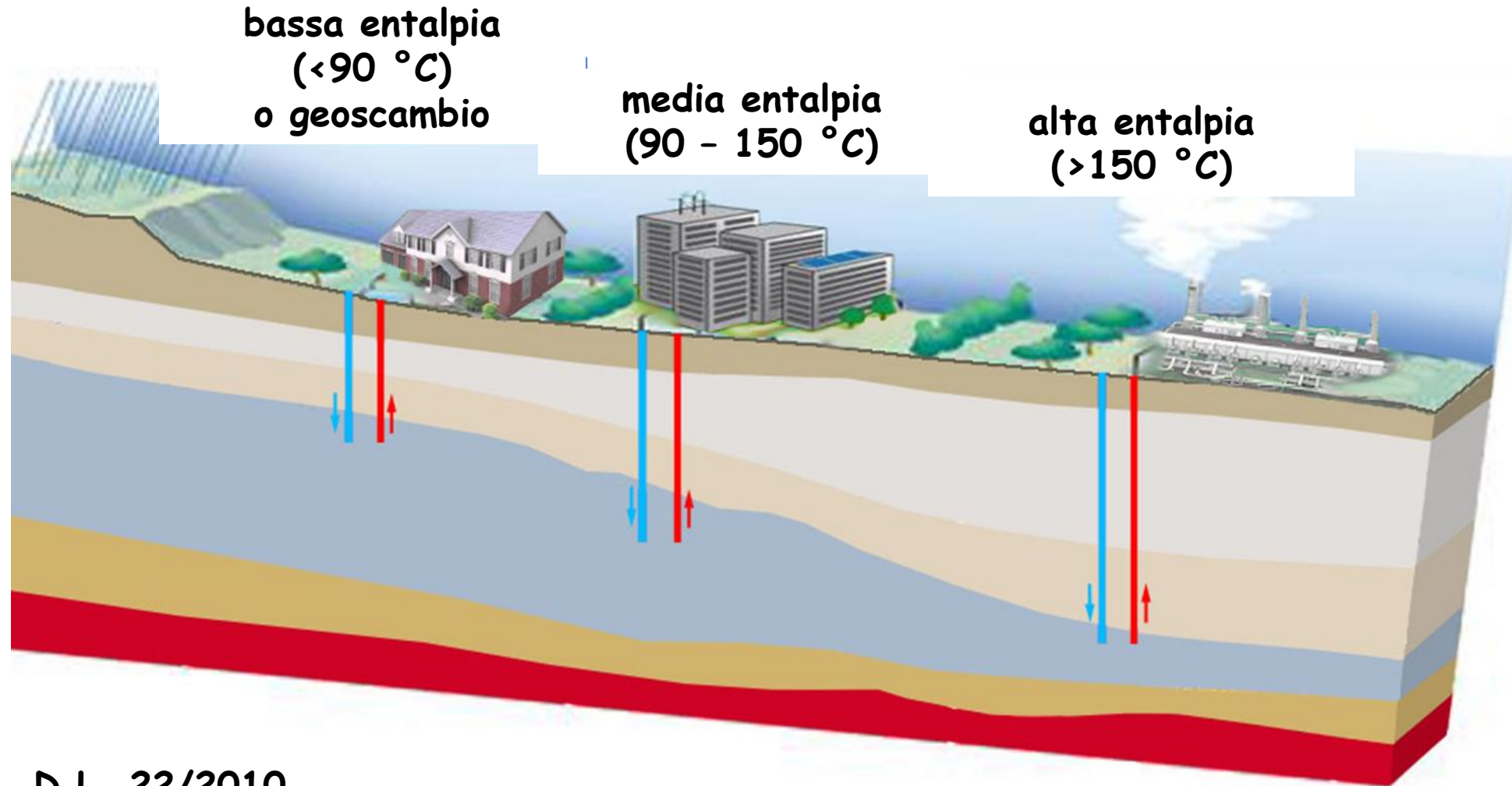


**è necessario adottare
soluzioni sostenibili**

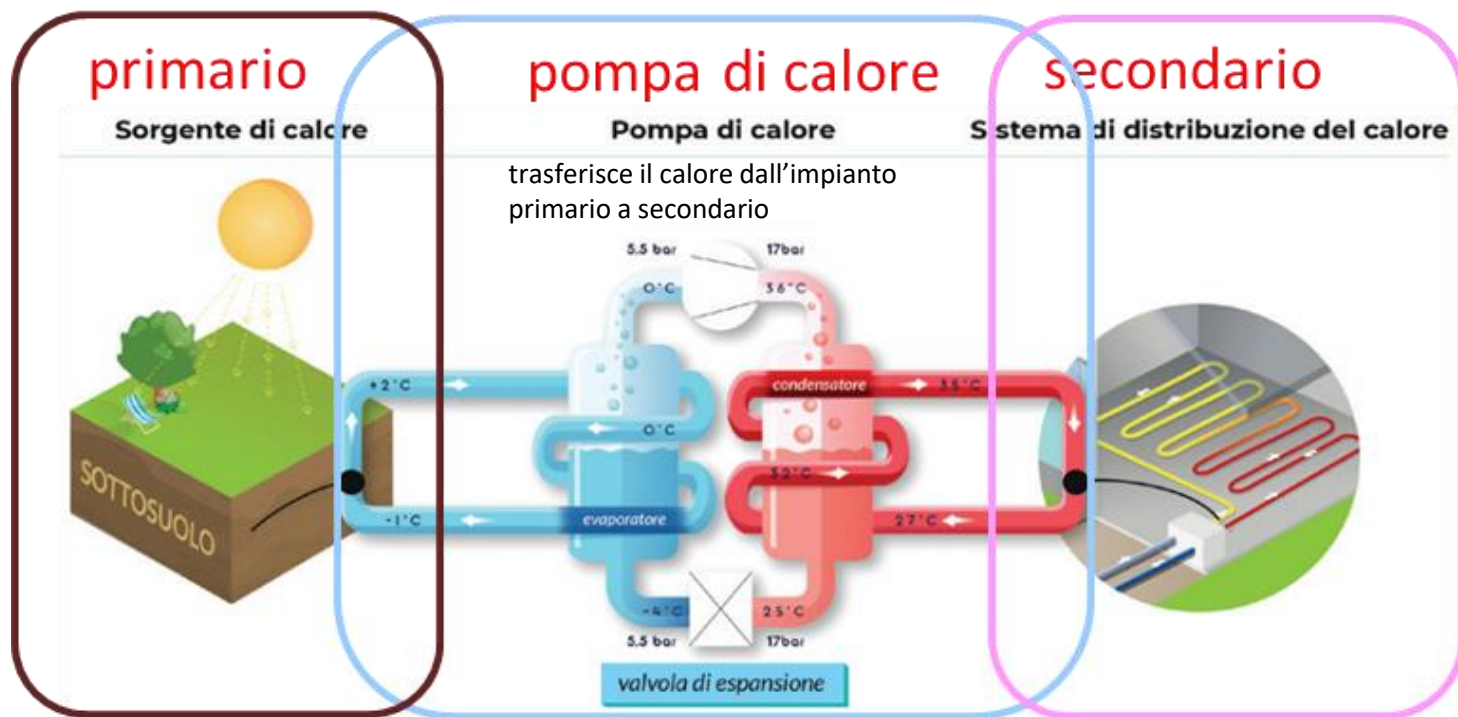


**utilizzo della
Energia Geotermica
(GE)**

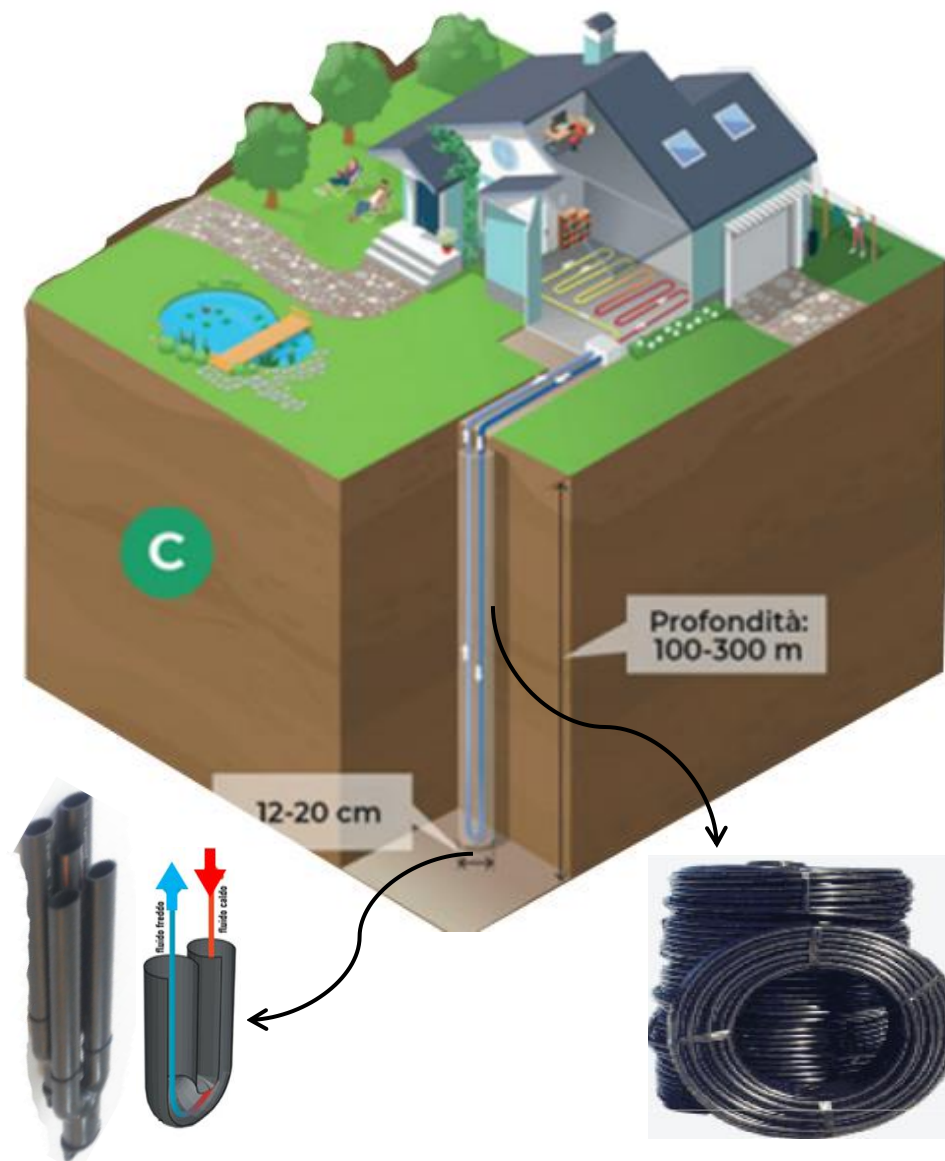
geo (γη) + termia (θερμος)



sistema geotermico a bassa entalpia



*... complesso e ben articolato
che vede il coinvolgimento diverse professionalità*





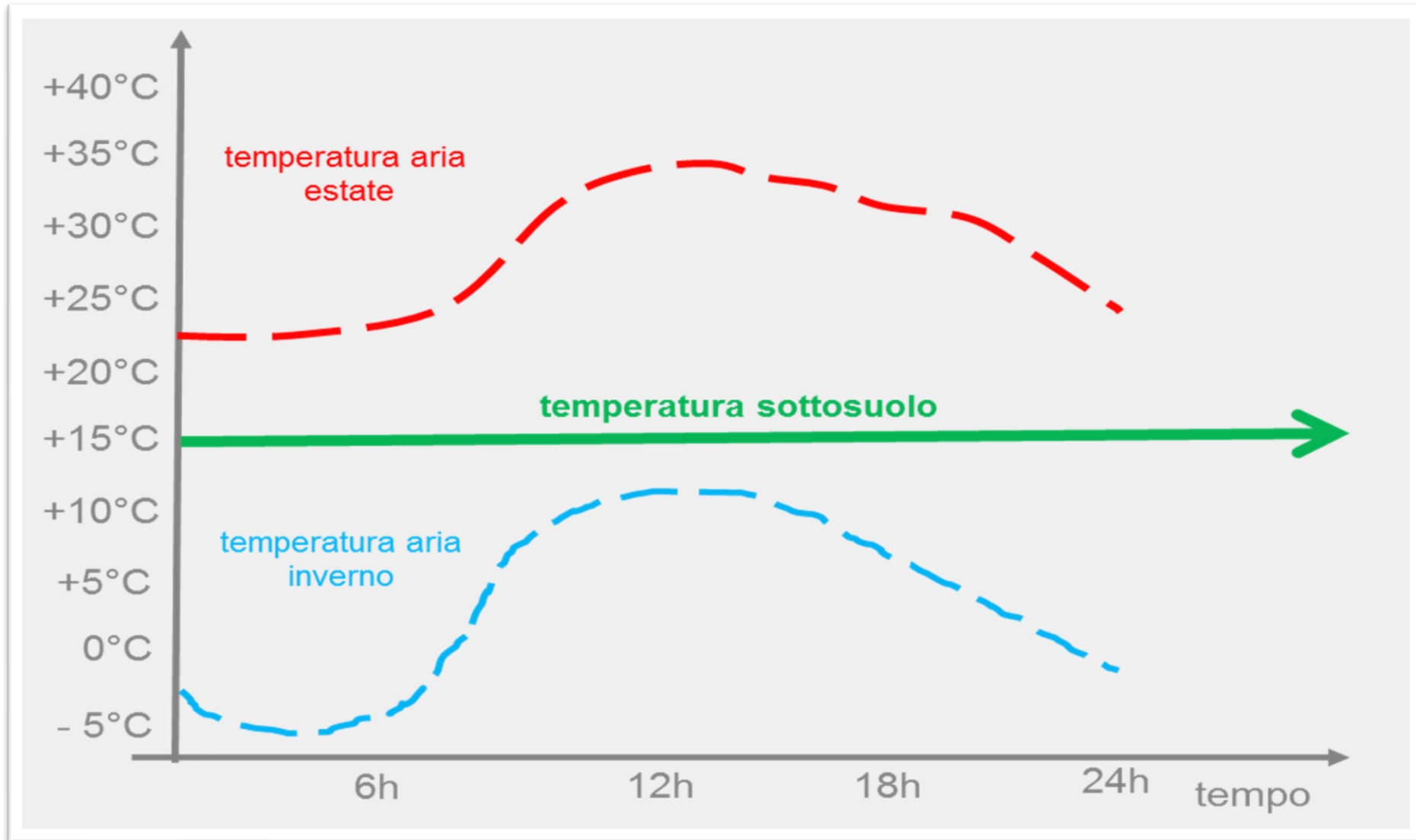
le caratteristiche del **sottosuolo**
costituiscono **la parte invariante**

la progettazione termotecnica e
architettónica si deve adeguare ad
esse

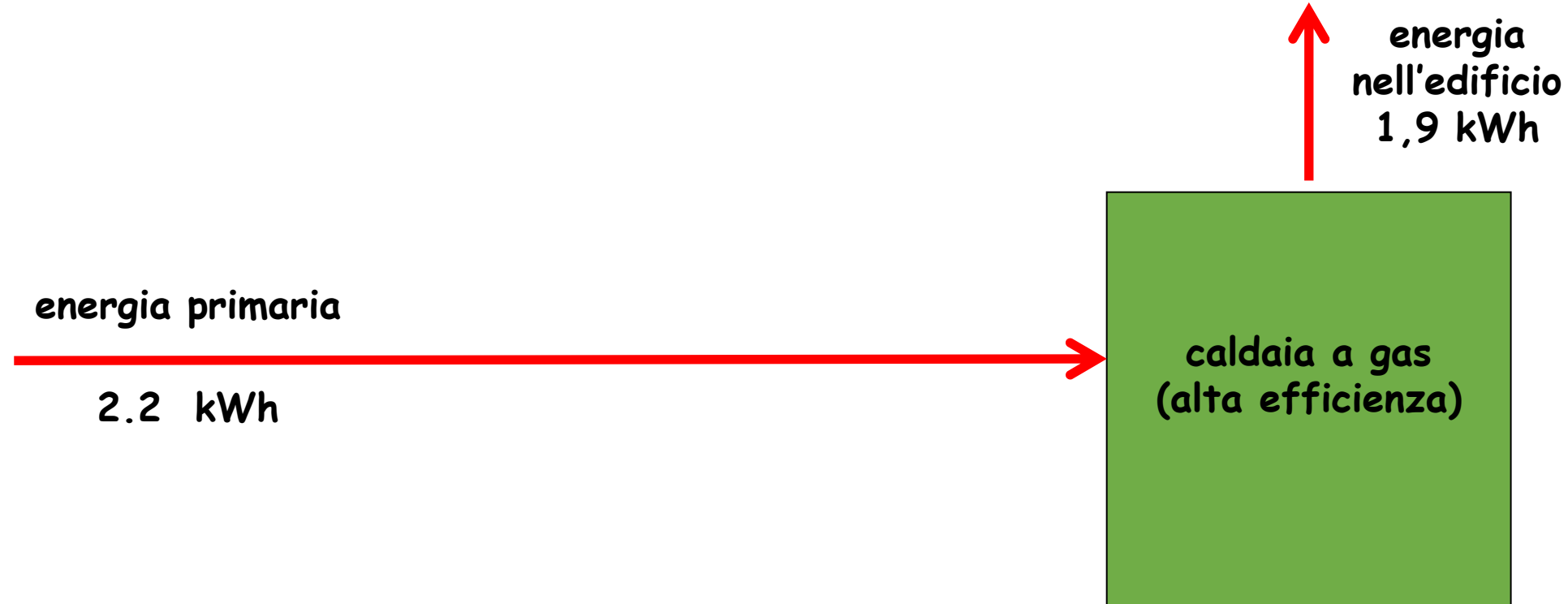
geoscambio: estate e inverno



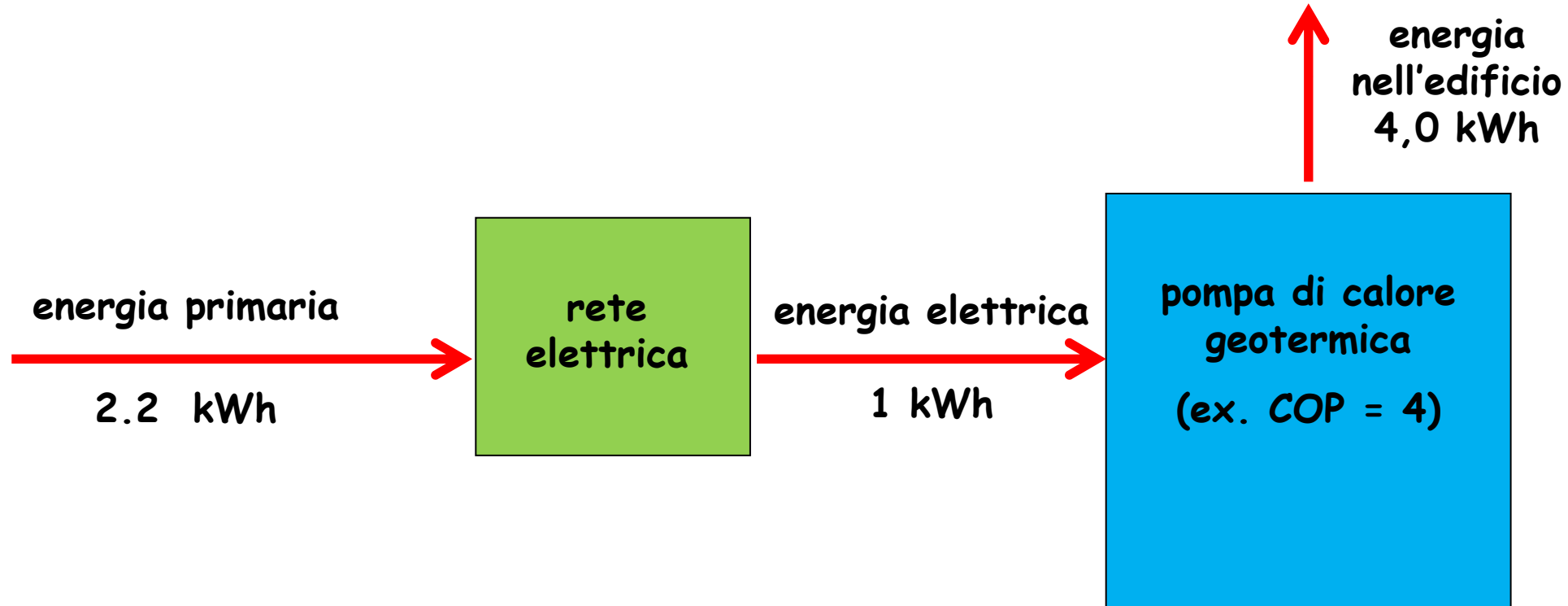
geoscambio: giorno e notte



bilancio energetico (ed economico...)



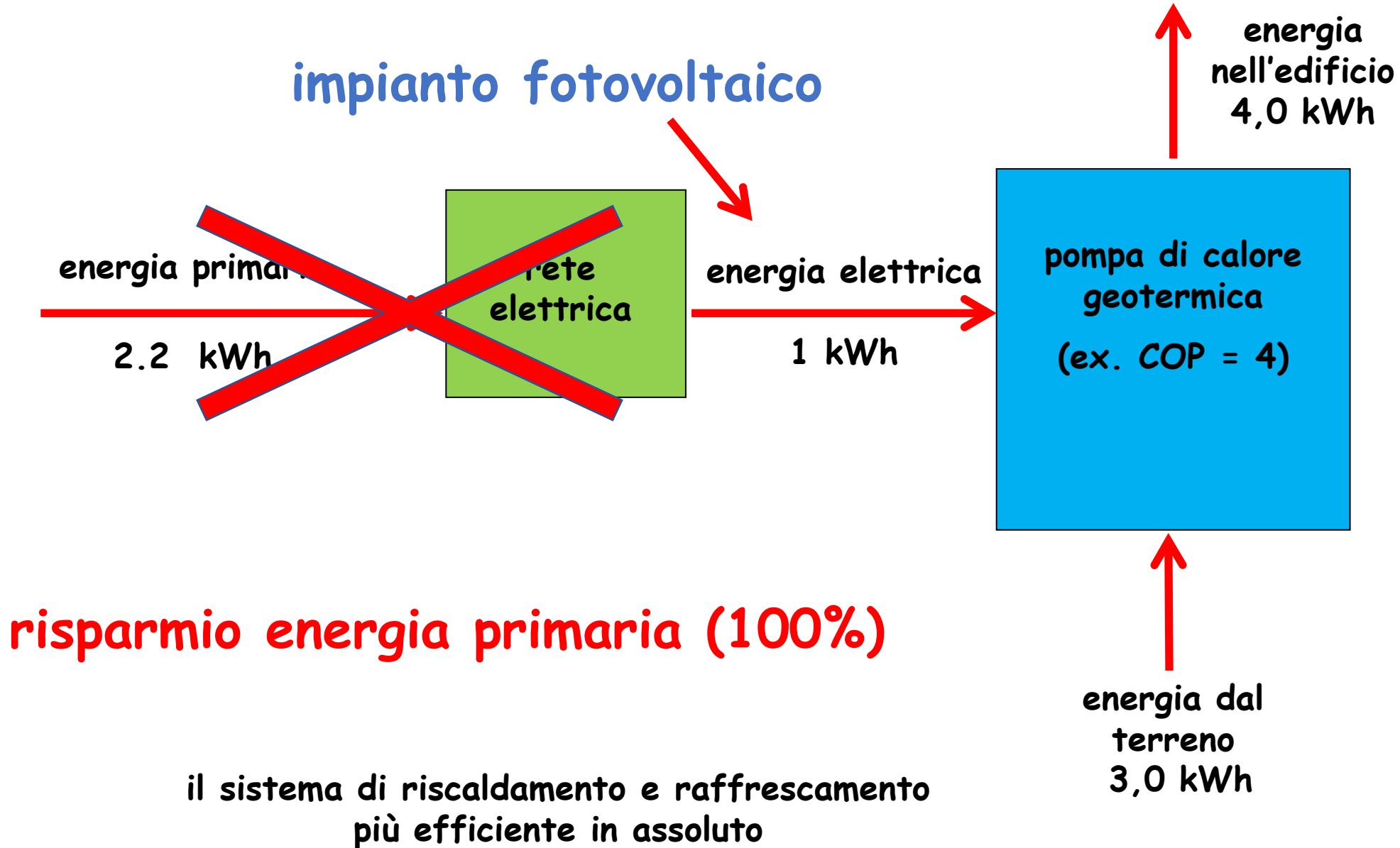
bilancio energetico (ed economico...)



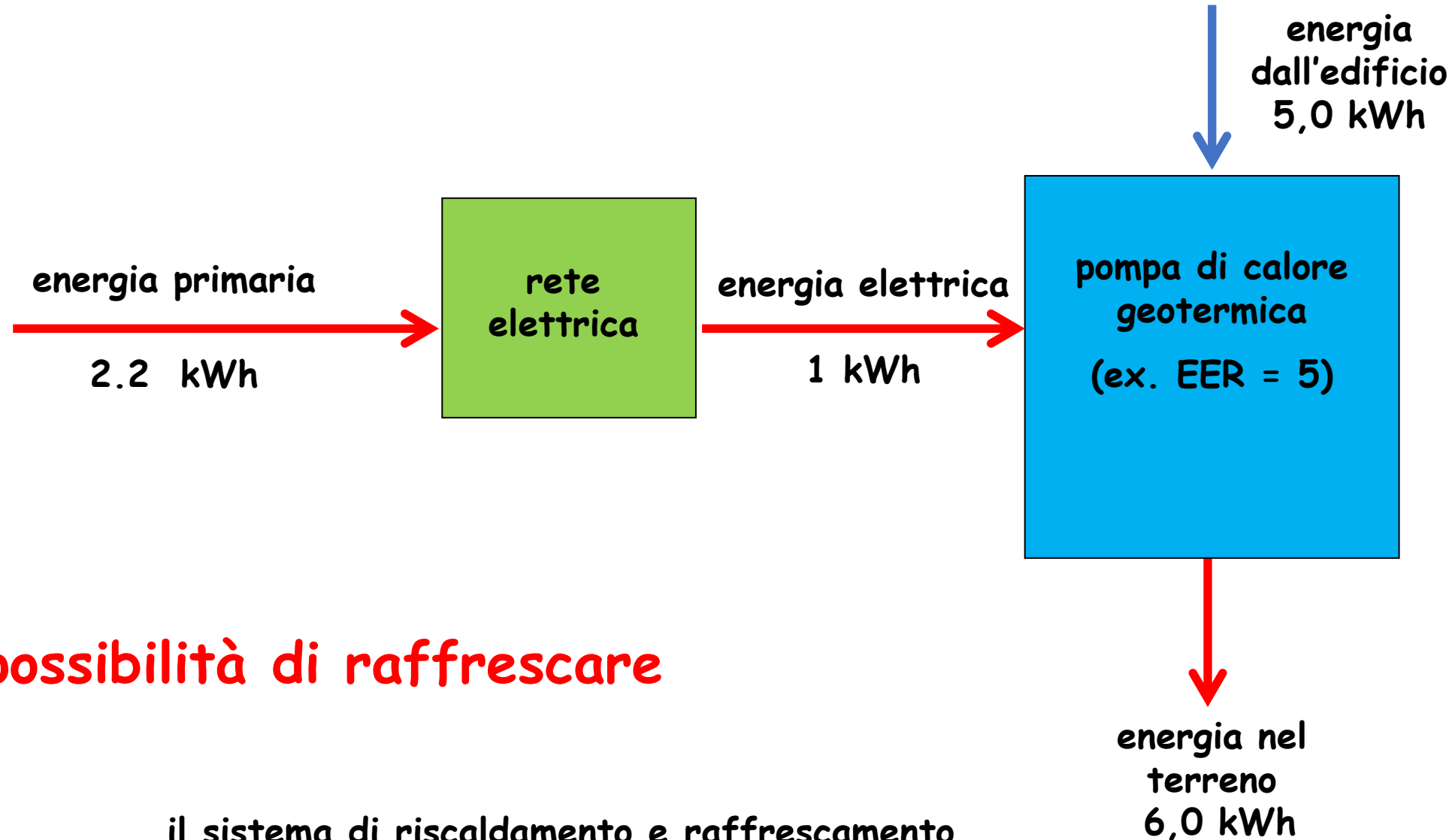
risparmio energia primaria (52%)

il sistema di riscaldamento e raffrescamento
più efficiente in assoluto

bilancio energetico (ed economico...)



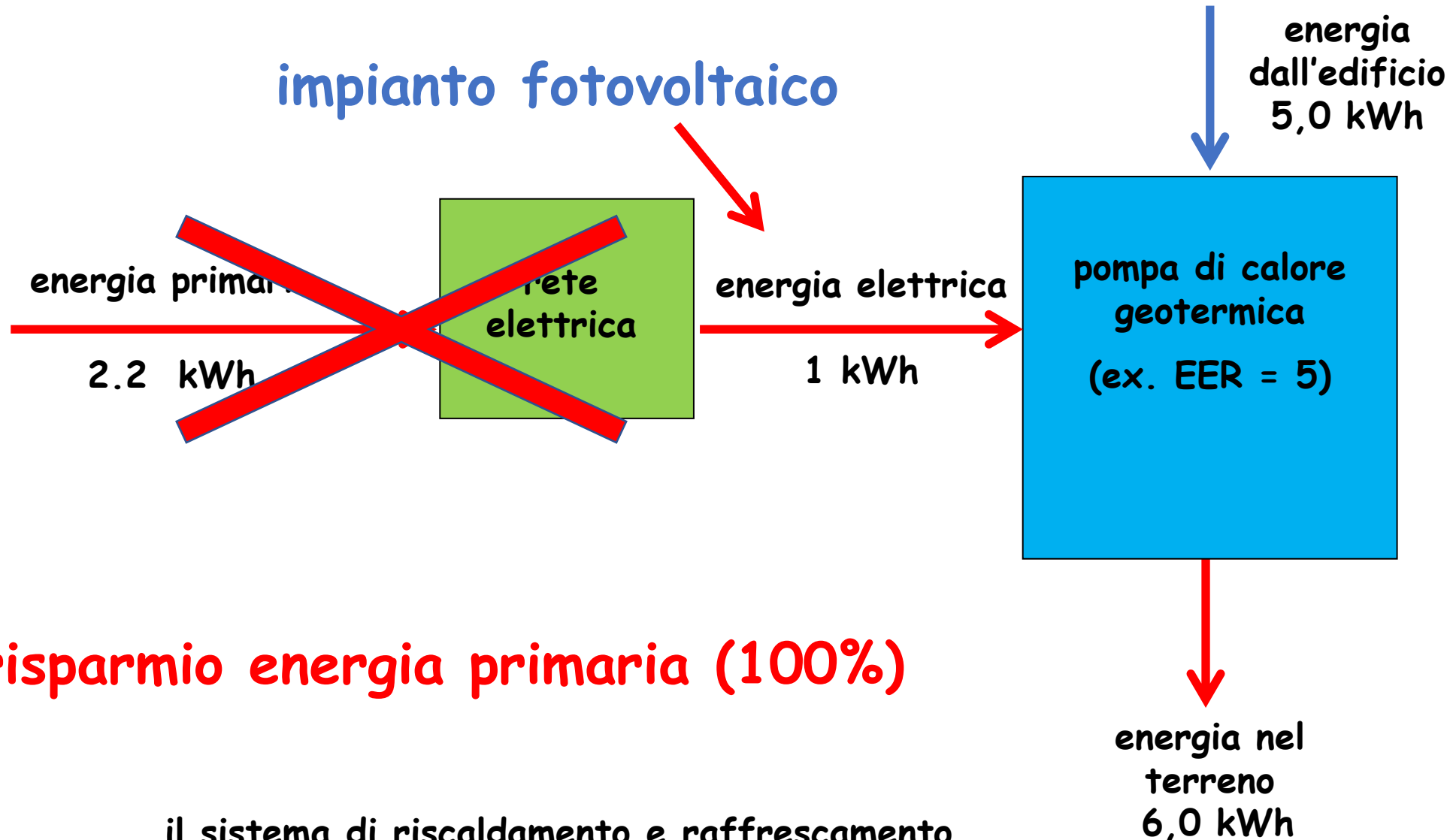
bilancio energetico (ed economico...)



possibilità di raffrescare

il sistema di riscaldamento e raffrescamento
più efficiente in assoluto

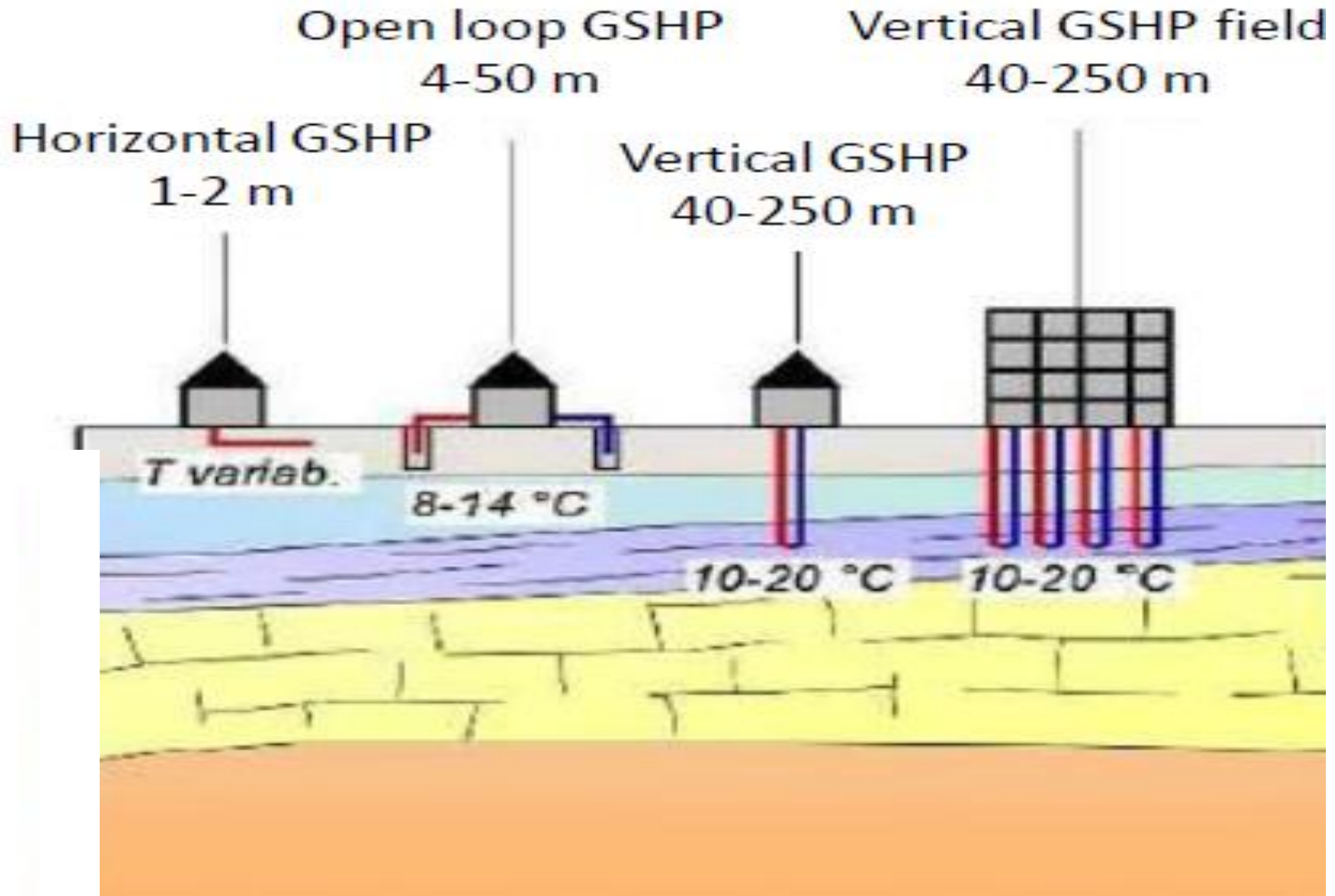
bilancio energetico (ed economico...)

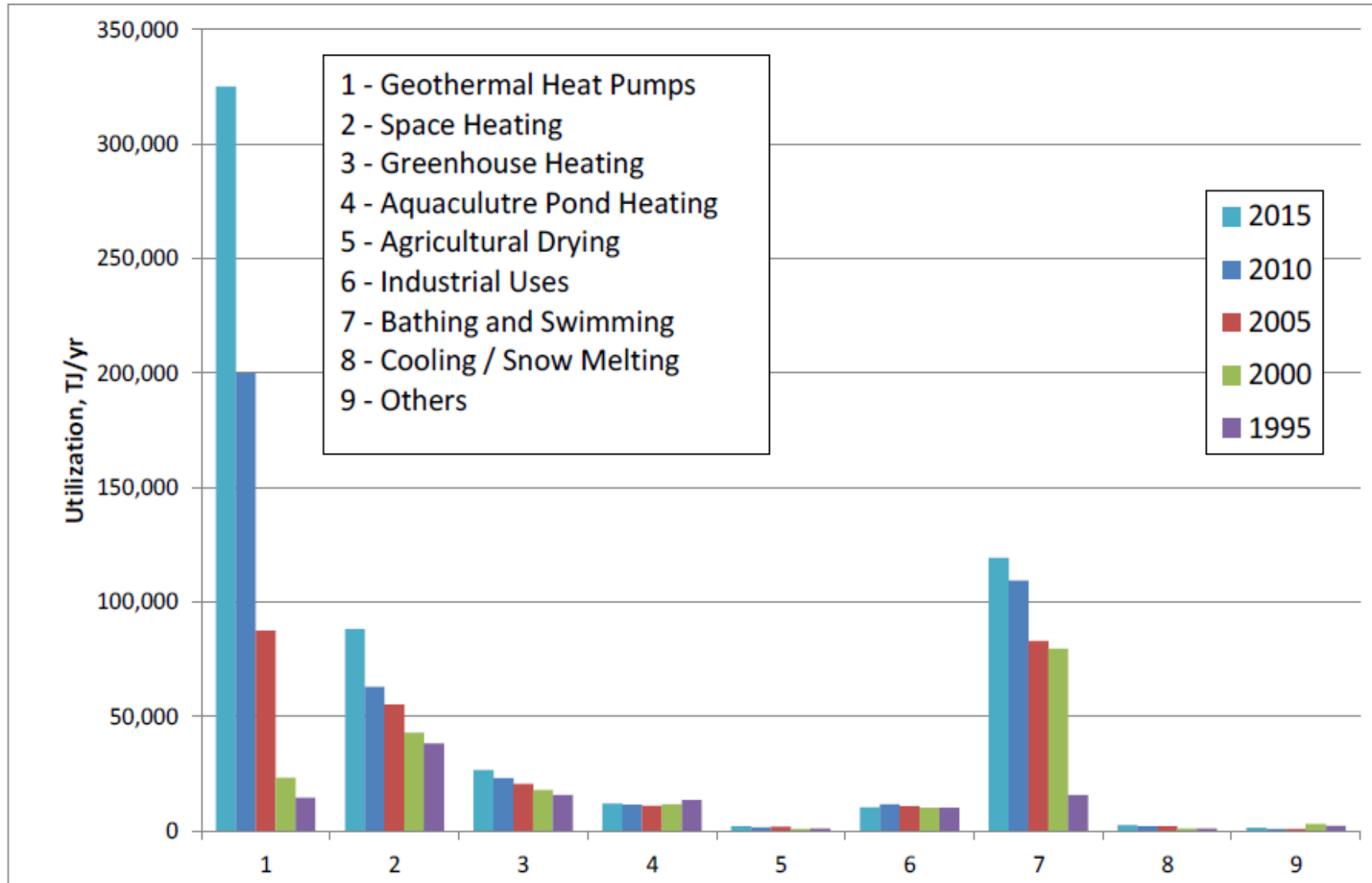


risparmio energia primaria (100%)

il sistema di riscaldamento e raffrescamento
più efficiente in assoluto

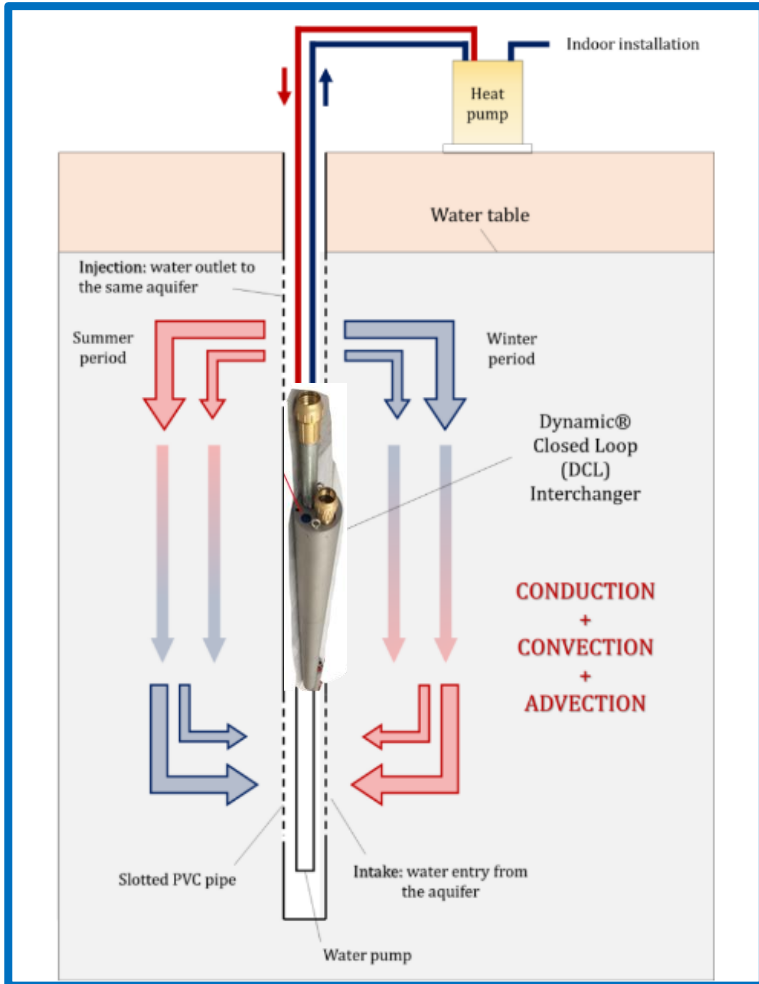
diversi contesti ... e soluzioni



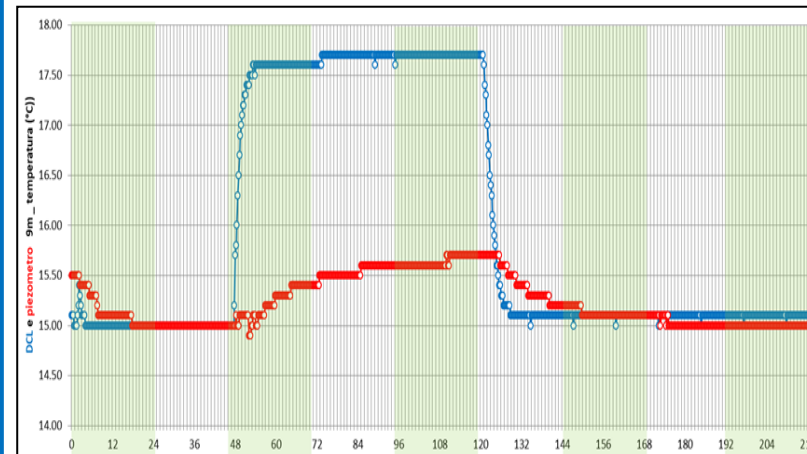
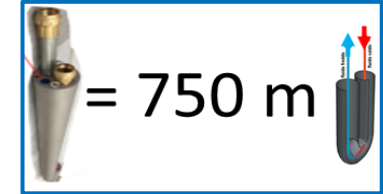
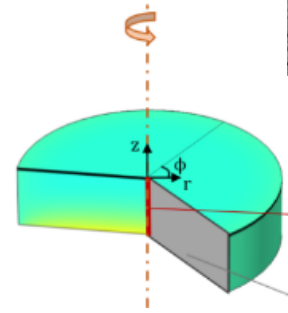


from Lund and Boyd, WGC 2015

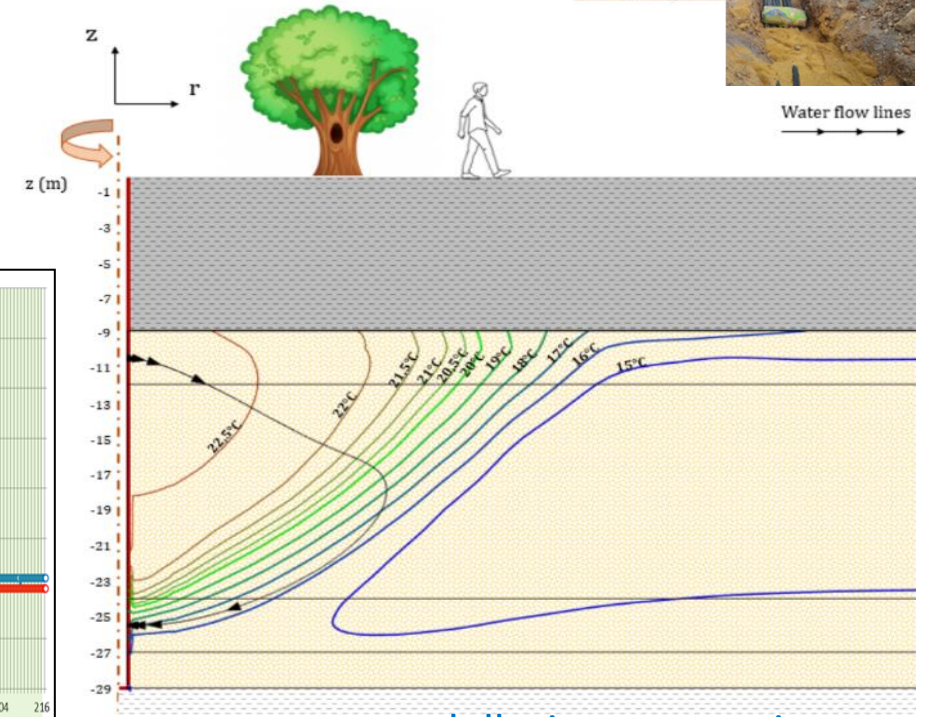
teleriscaldamento urbano



elevata
efficienza



monitoraggio durante TRT



modellazione numerica

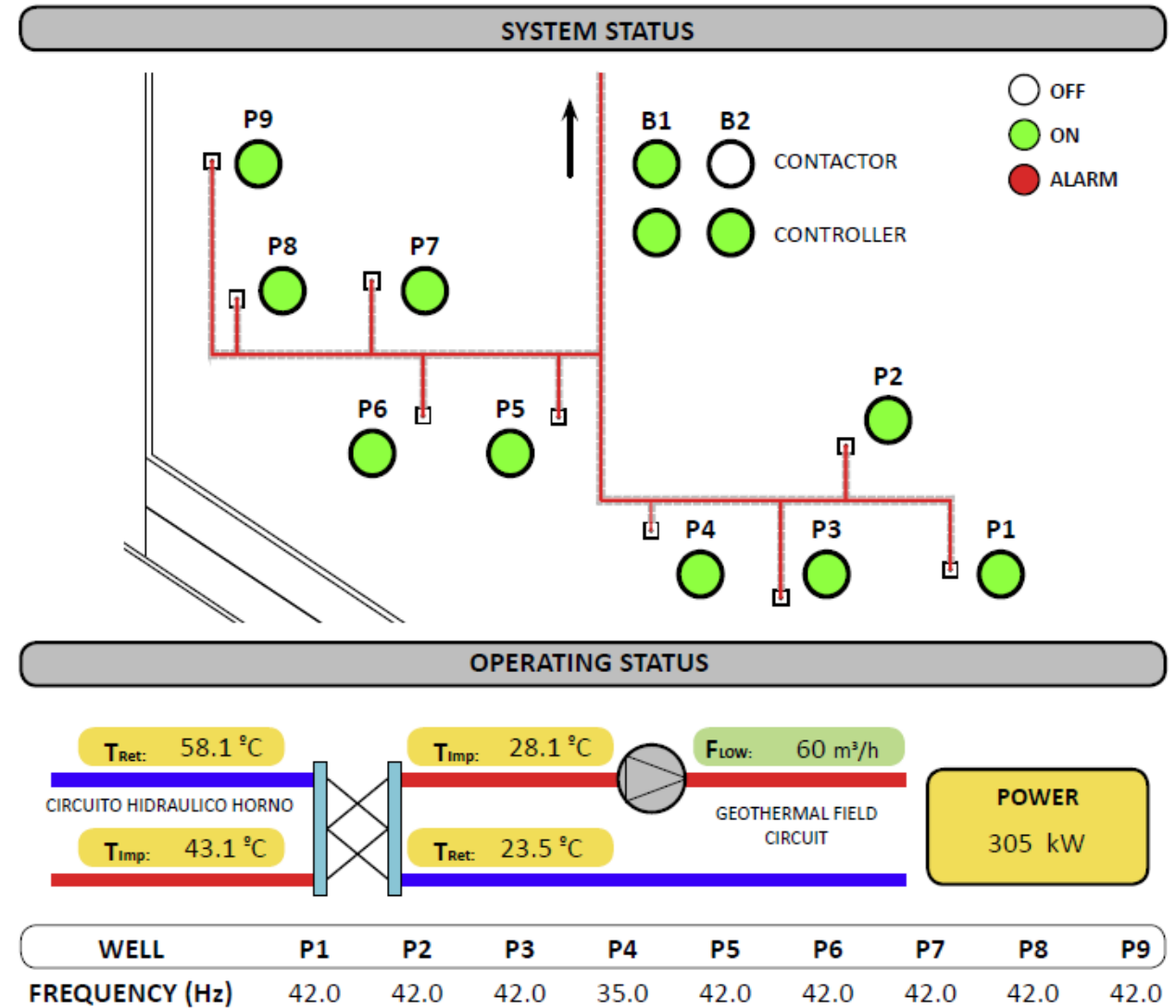
situazione pre-intervento:

- processo di essiccazione in impianto industriale
- dry cooler (400 kW)
- alte temperature di esercizio estivo
- ACS per impianti accessori (fino a 250 kW)

soluzione / intervento:

- 9 sonde DCL M3/140 45 kW
- 800.000 kWh fabbisogno soddisfatto
- performance DCL/dry cooler 2.5 -7.0
- 65% risparmio dei costi energetici

Alicante, Spagna

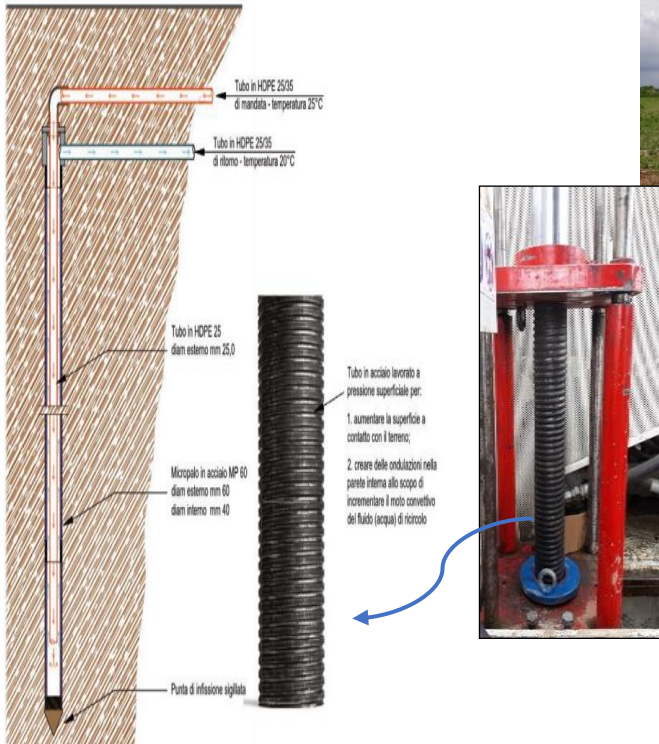
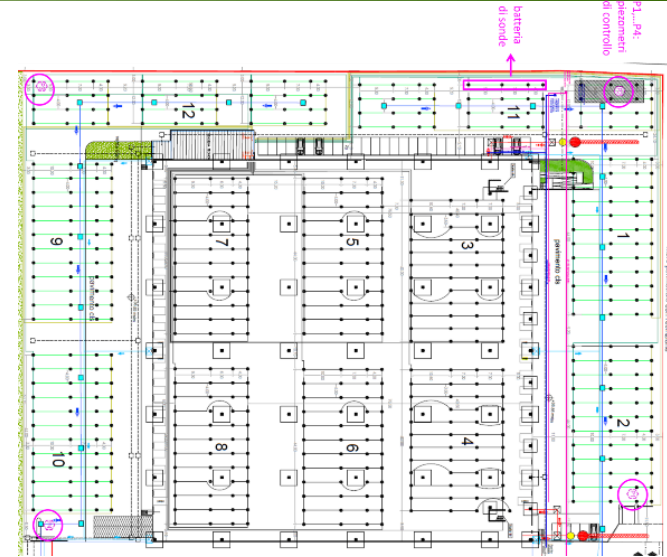




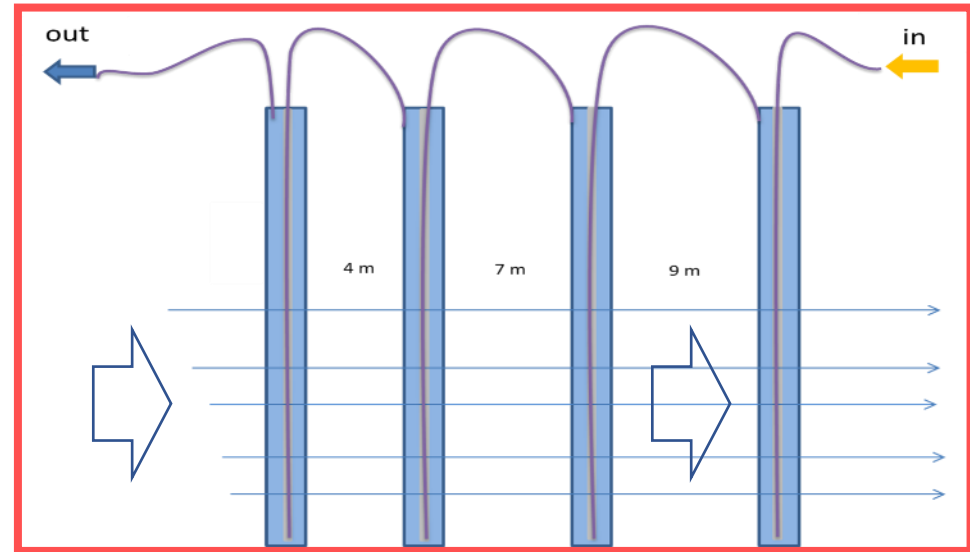
novità

i) a infissione

ii) geometria



coassiali
in acciaio

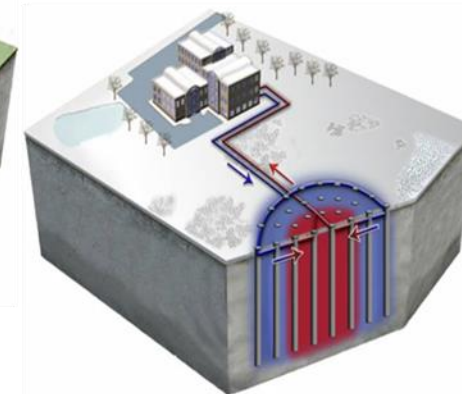
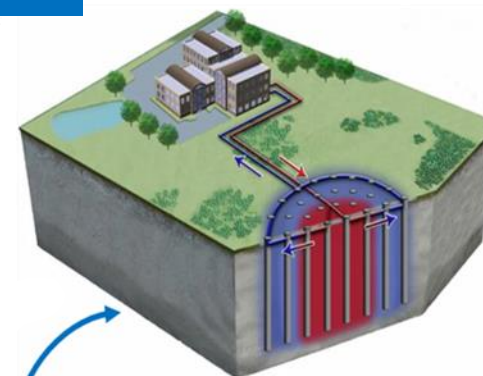
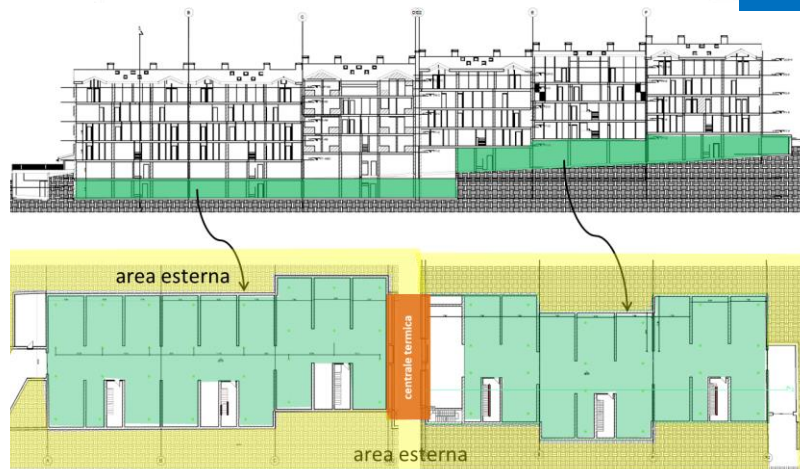
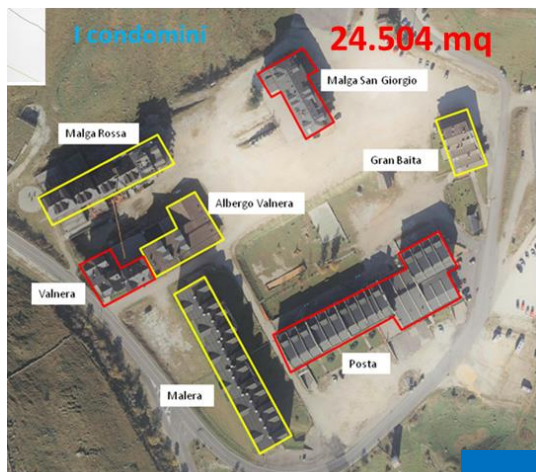


batteria 4 geoscalchangers

comunità energetica in alta quota

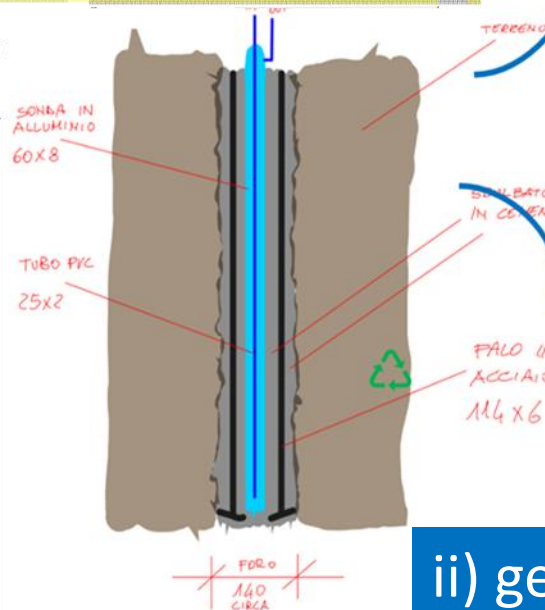
novità

riqualificazione energetica e
sismica



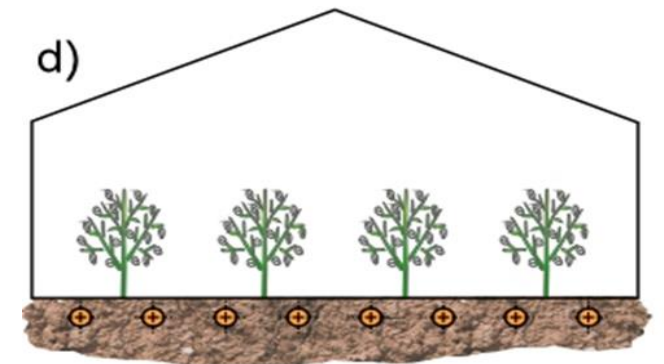
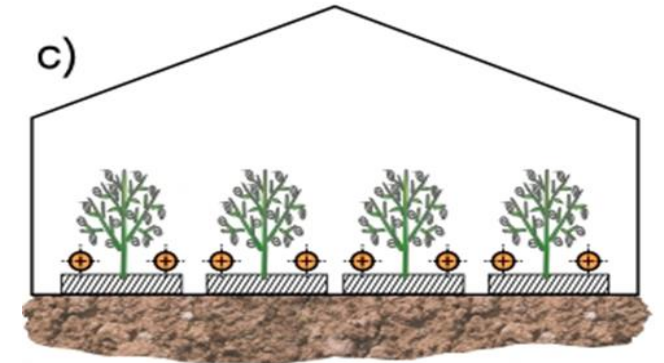
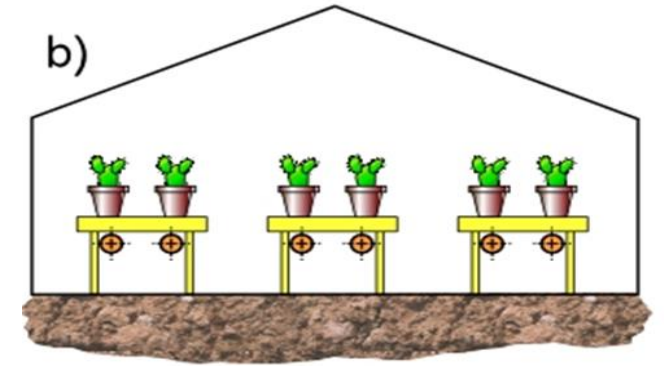
i) nei garage

ii) stoccaggio temporaneo calore



ii) geoscambiatori nei pali di fondazione

riscaldamento serre





IKEA stores at: Rimini, Milan and Parma

*1.0-1.5 MW each plant,
23.000 - 26.000 m of probes;
125-150 m-deep
reversible HP (heating and cooling)*

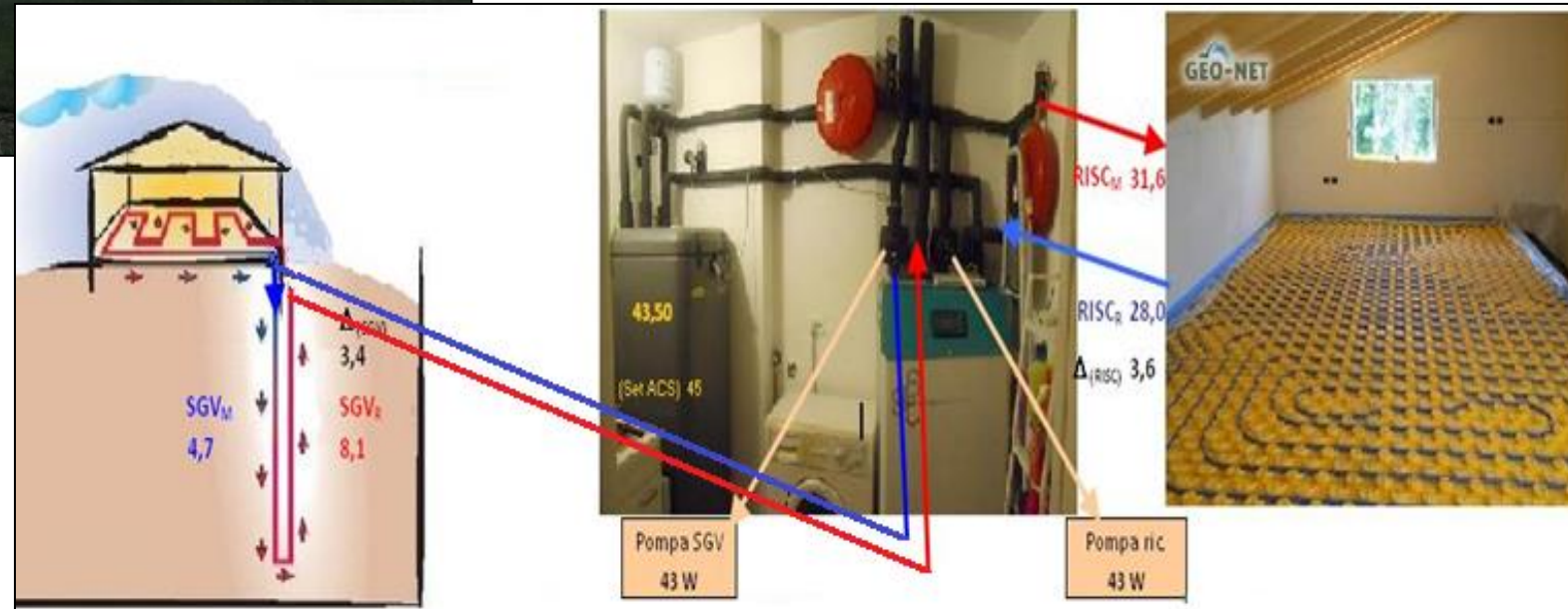
nZEB



15 kW₊
-24 ton/year CO₂
18 TEP/year from RES



2 x 8 kW
6.800 kWh/a
heating +
cooling +
hot water





Bufalotta (Rome), 1.5 MW

situazione pre-intervento:

- edifici vincolati
- pompe di calore aria/acqua
- limitazioni nell'impatto dell'impianto
- uffici, abitazioni e piscina

soluzione / intervento:

- 11 sonde DCL + GSHP 450 kW
- 350.000 kWh fabbisogno soddisfatto
- performance COP 5.1 / EER 4.2
- 62% risparmio dei costi di climatizzazione



Bomba de Calor Modulo estivo (verano) ORD EST ALR Modulo (verano) Volver →

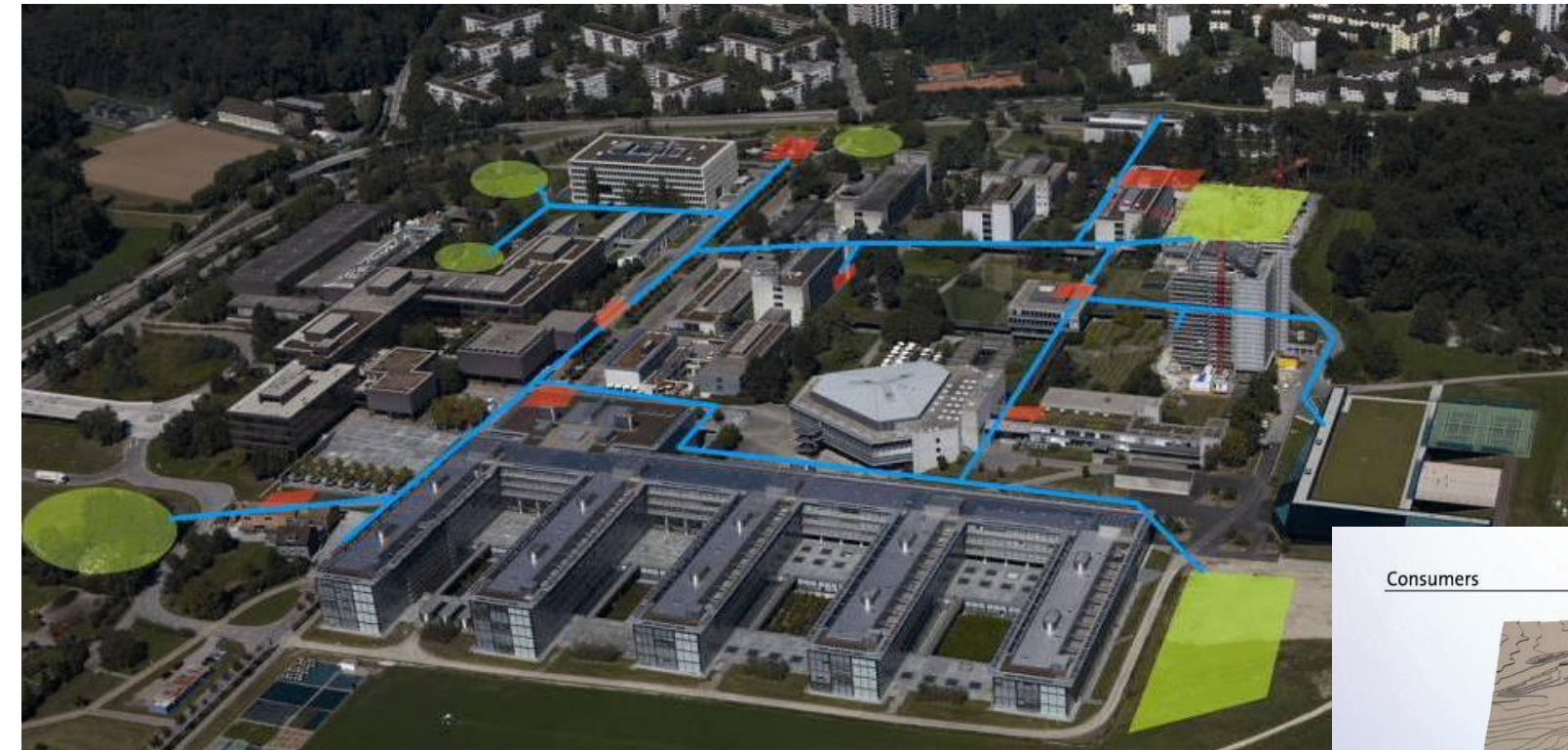
Temp Impulsión Condensación:	29.1 °C	Compresores:	
Temp Retorno Condensación:	25.3 °C	HORAS:	4527 h
Temp Impulsión Evaporación:	8.0 °C	CARGA:	40 %
Temp Retorno Evaporación:	11.4 °C		

Consignas

Consigna Activa:	8.0 °C
Consigna Frio:	0.0 °C
Consigna Calor:	0.0 °C

Volver →

Valencia, Spagna



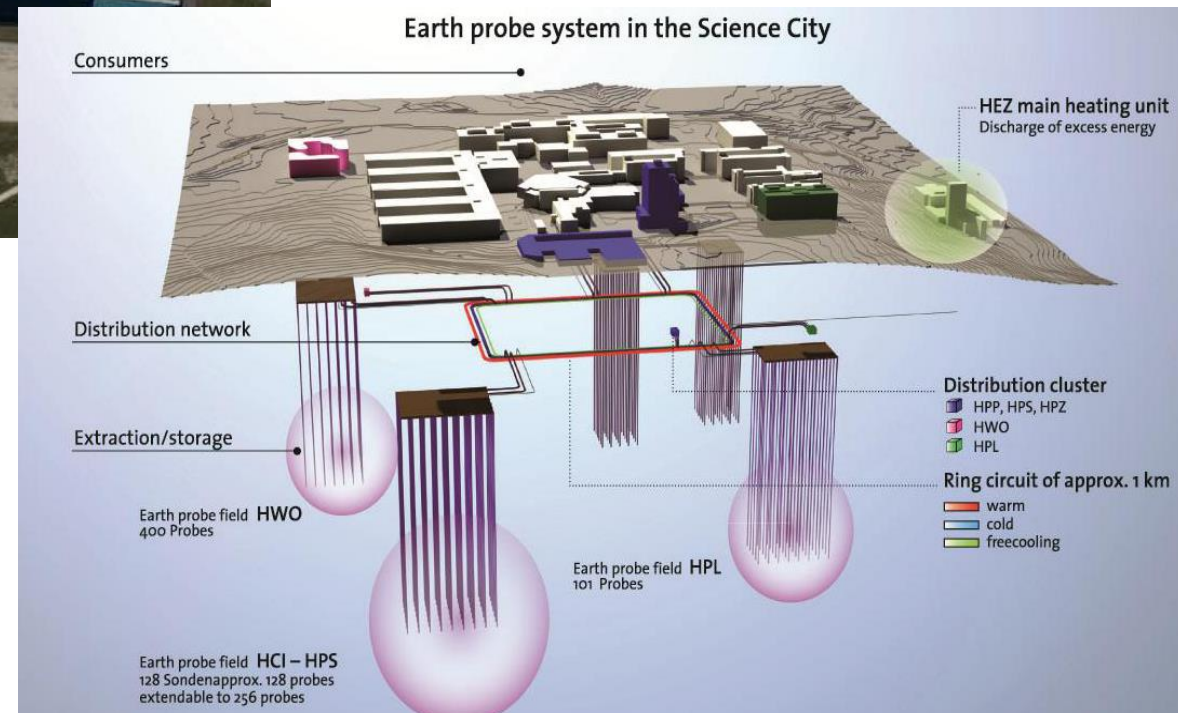
Federal Institute of Tecnology,
Zurich, Swiss

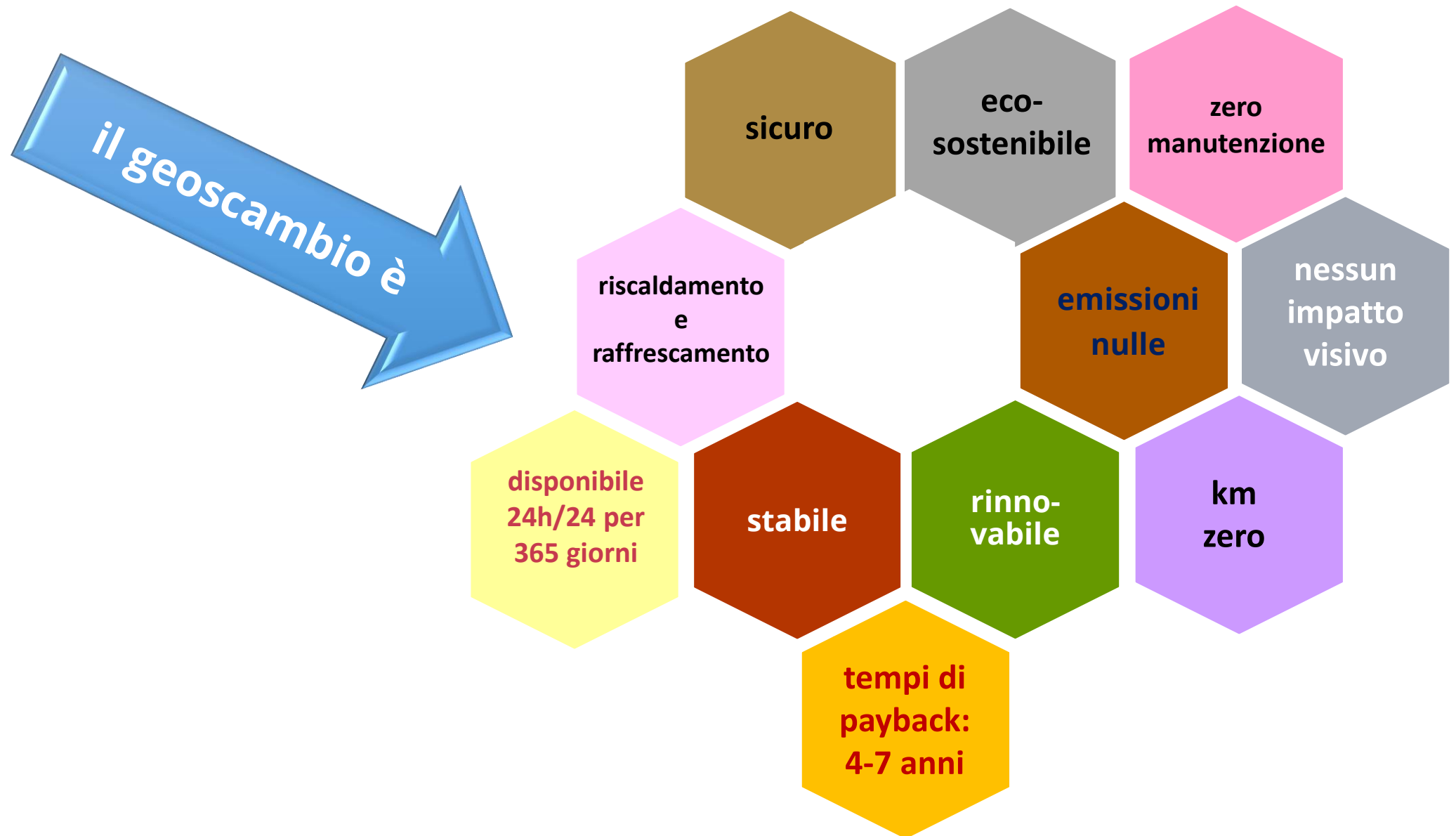
geothermal plant: 37 M€

10000 students

27000 MWh/a heat demand

16000 MWh/a cooling demand





Geoscambio: pompe di calore acqua/acqua

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Comune di Bologna

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