



# INCUBE

sustainable building innovations

Design and Implementation of Heating and Cooling Technologies in Santa Chiara Buildings B6  
and B1

TERA, ENEREN

8 October 2025 | Trento



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# Heating & cooling renovation for the Centro Servizi Culturali Santa Chiara (B6)



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# Introduction to TERA



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# Alcuni lavori eseguiti



## Progettazione di impianti tecnologici

Sostituzione impianto di refrigerazione dello stadio del ghiaccio di Pinzolo



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# Alcuni lavori eseguiti



## Progettazione di impianti tecnologici

Realizzazione del complesso scolastico "Scuola Elementare e Scuola Media in Via Bari (Bolzano)"



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# Alcuni lavori eseguiti



## Progettazione di impianti tecnologici

Nuova sede "Itas Forum" edificio H4 Quartiere le Albere (Trento)



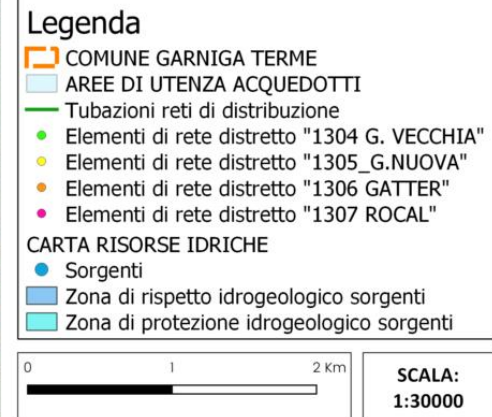
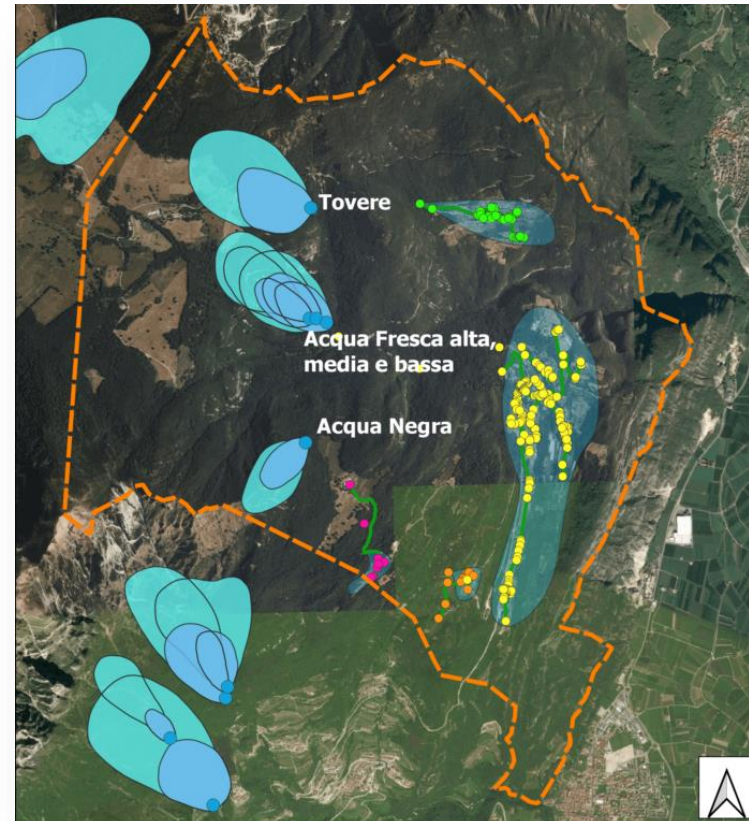
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# Alcuni lavori eseguiti

## Progettazione acquedottistica

Sistemazione delle reti di distribuzione degli acquedotti gestiti dal comune di Garniga Terme (TN)



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# E tanti altri!



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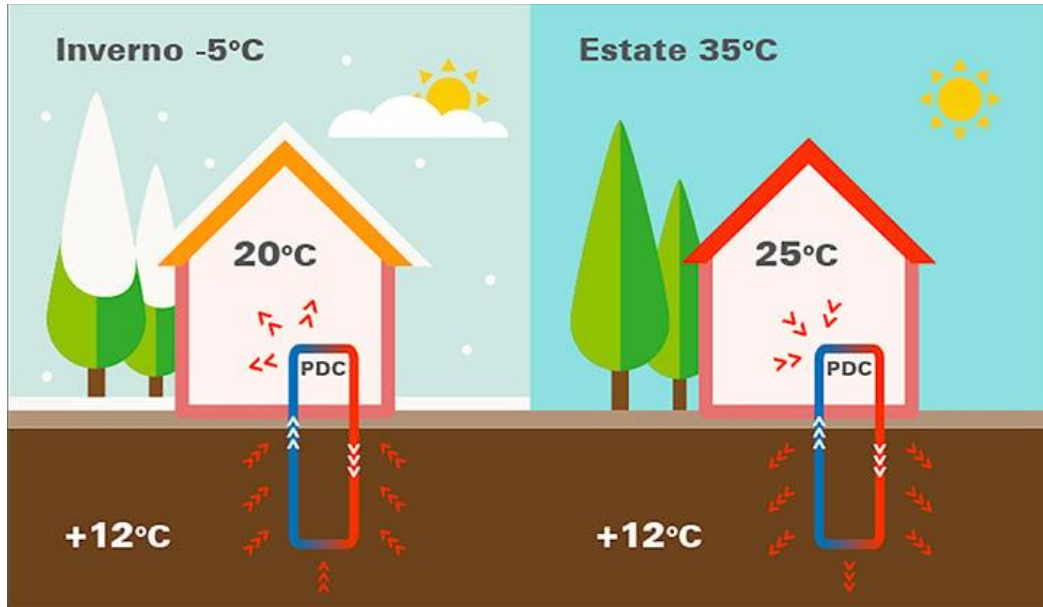


# Impianto geotermico in pompa di calore



# Progetto Europeo Incube

## Impianto geotermico in pompa di calore



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# PROGETTAZIONE



# Progetto Europeo Incube

## Analisi geologica

Analisi geologica preliminare



“Relazione geotermica di fattibilità” -  
progetto di ristrutturazione  
urbanistica area “EX-Sordomuti”



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# Progetto Europeo Incube

## Analisi geologica

### Perforazioni

Metodologia a distruzione di nucleo

Profondità di scavo: 130 m



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# Progetto Europeo Incube

## Analisi geologica

### Perforazioni

- Substrato roccioso non presente
- Conducibilità rilevate
  - A** -  $\lambda_A = 2.35 \text{ W}/(\text{m K})$
  - B** -  $\lambda_B = 2.25 \text{ W}/(\text{m K})$

SONDAGGIO A			
Profondità [m]		Descrizione litologica	Classe di conducibilità idraulica
da	a		
0	8	Ghiaia	Alta
8	80	Sabbia con limo	Modesta
80	95	Argille limose	Bassa
95	120	Ghiaia	Alta
120	130	Sabbie limose	Modesta

SONDAGGIO B			
Profondità [m]		Descrizione litologica	Classe di conducibilità idraulica
da	a		
0	8	Ghiaia	Alta
8	70	Sabbia con limo	Modesta
70	79	Argille limose	Bassa
80	113	Ghiaia	Alta
113	116	Sabbie limose	Modesta
116	130	Ghiaia	Alta



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## Il campo sonde

20 sonde totali

Profondità: 150m

Distanza tra sonde:  
14m

Nessuna  
interferenza tra  
sonde adiacenti

Doppie tubazioni di  
mandata e di  
ritorno

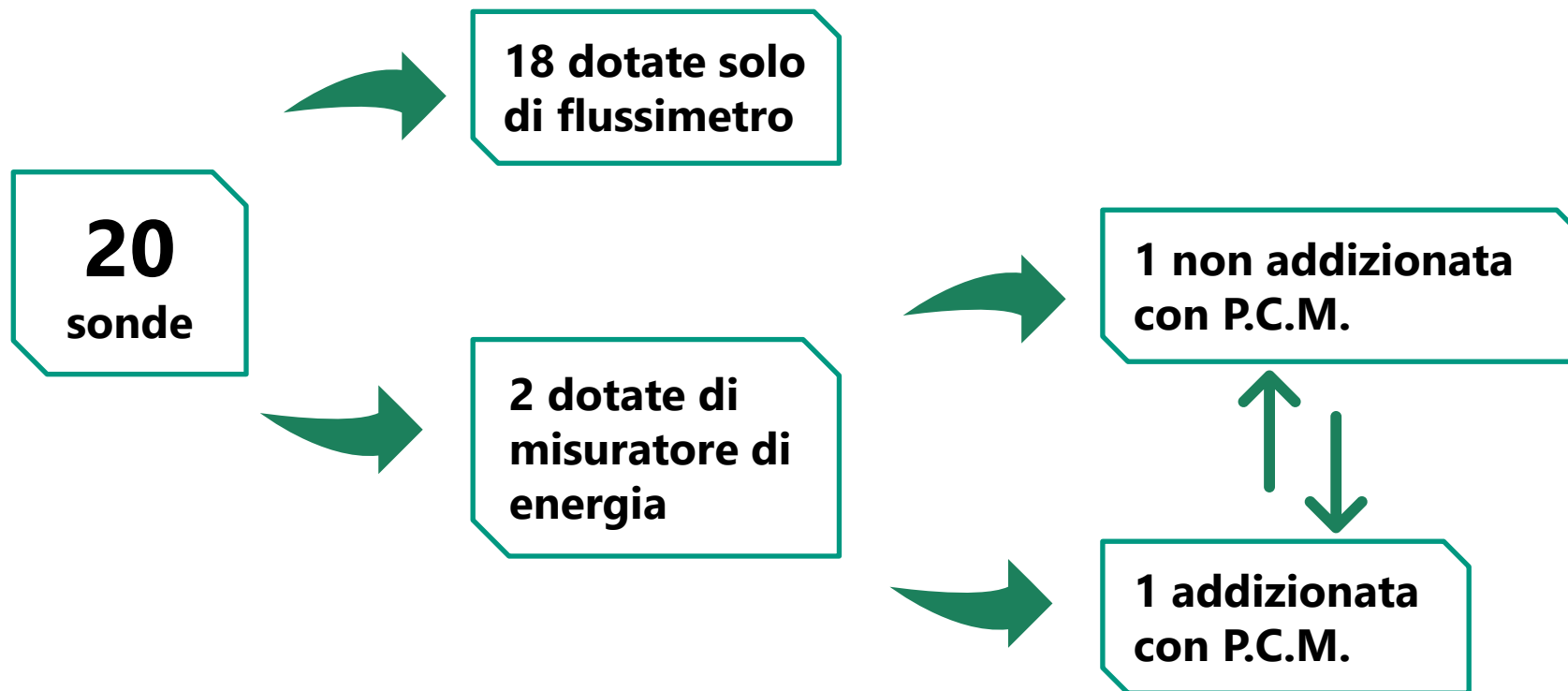
Collegamento alla  
base con giunto a «u»

Diametro  
tubazioni: 32mm



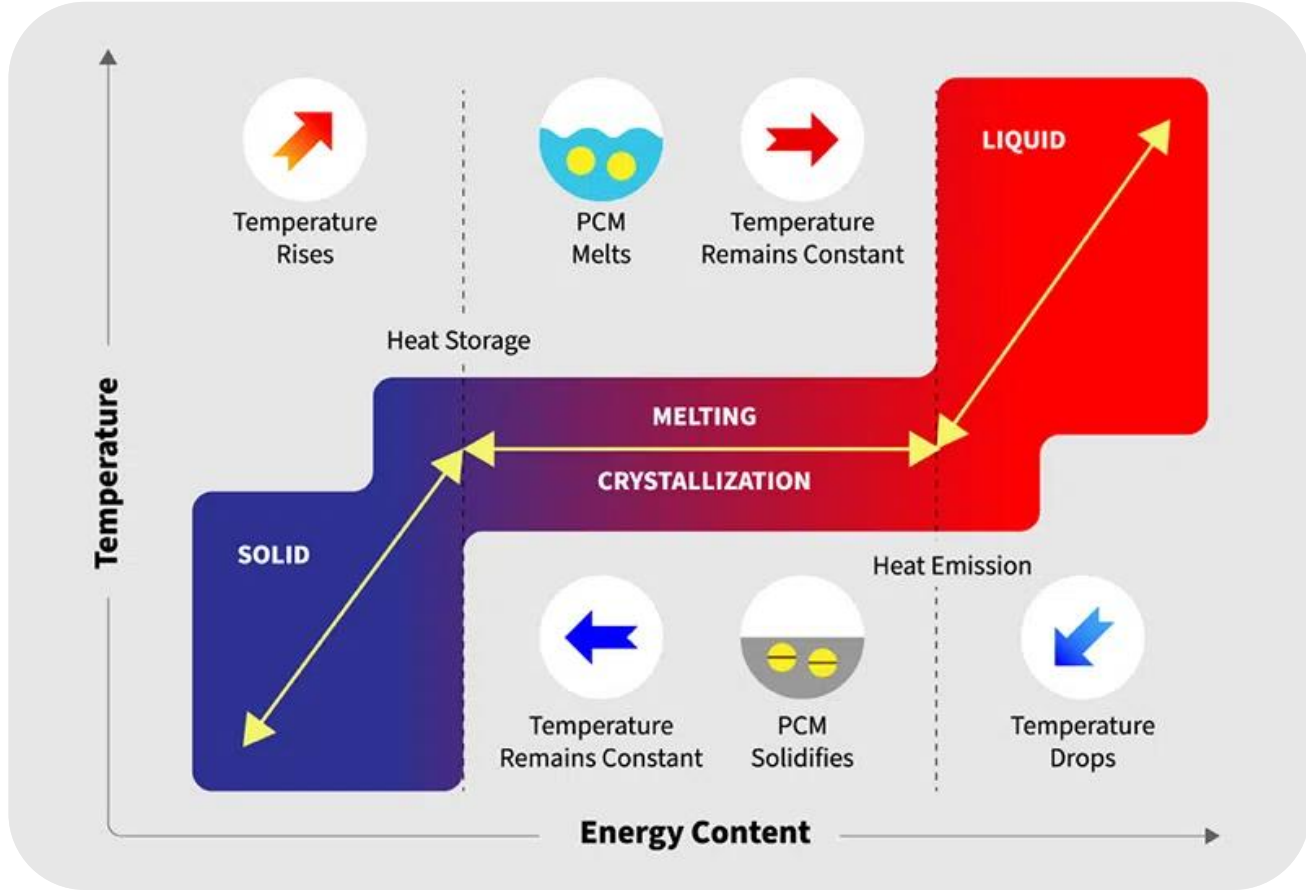
n.2 collettori





# Cosa è il P.C.M.?

**P** phase  
**C** change  
**M** material



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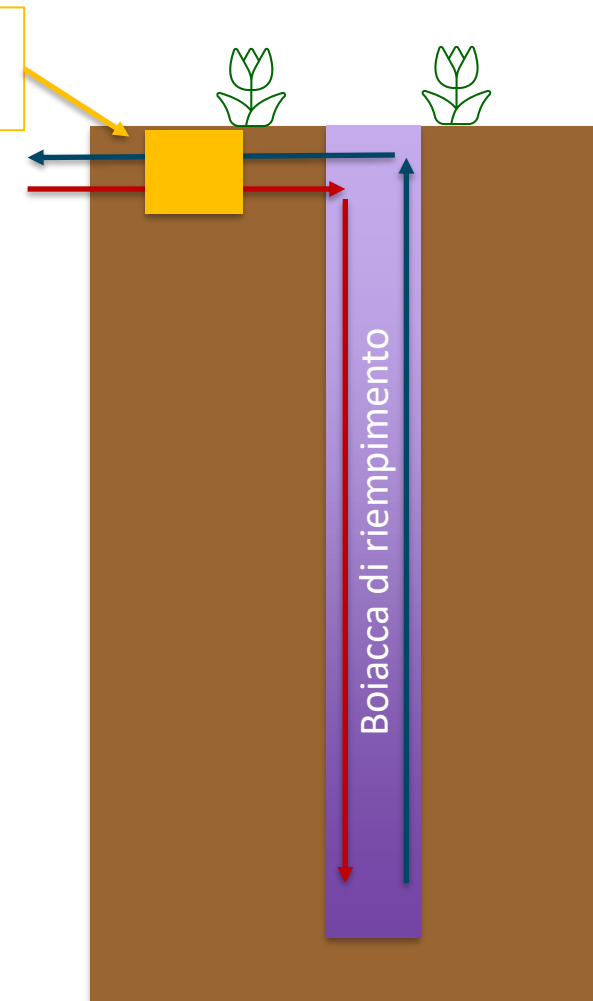
# Phase Change Material

SONDA CON  
PCM

BOIACCA DI RIEMPIMENTO  
ADDIZIONATA CON 15% DI PCM

Tipo	T di cambio fase [°C]	Densità [kg/mc]	Calore latente [kJ/kg]	Calore specifico [kJ/(kg K)]	Conducibilità termica [W/(m K)]	T max di funzionamento [°C]
1	5	768	170	2.18	0.22	150
2	20	770	160	2.2	0.22	200

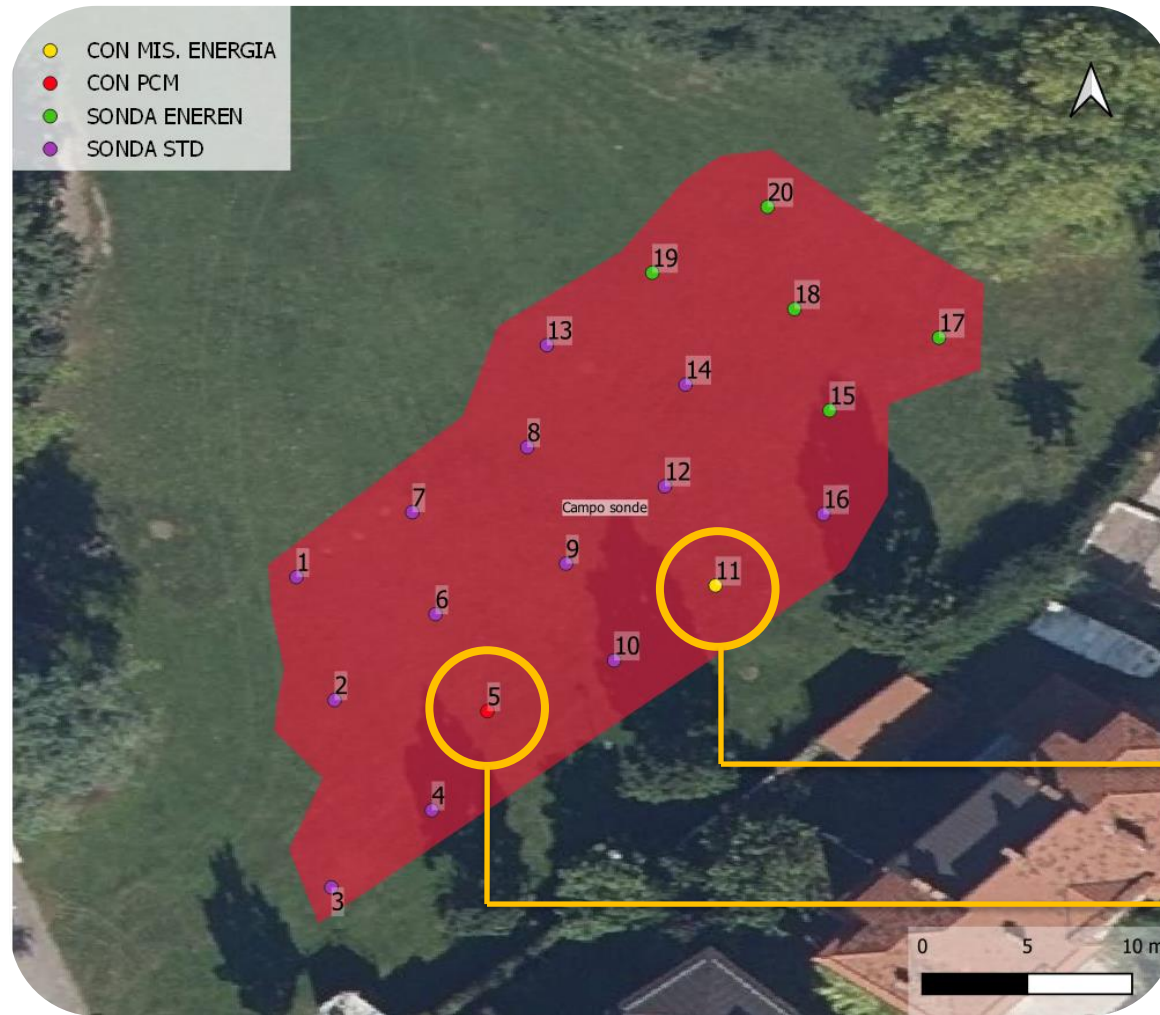
Misuratore di energia



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# Risultato



Con misuratore di energia senza P.C.M.

Con misuratore di energia e P.C.M.



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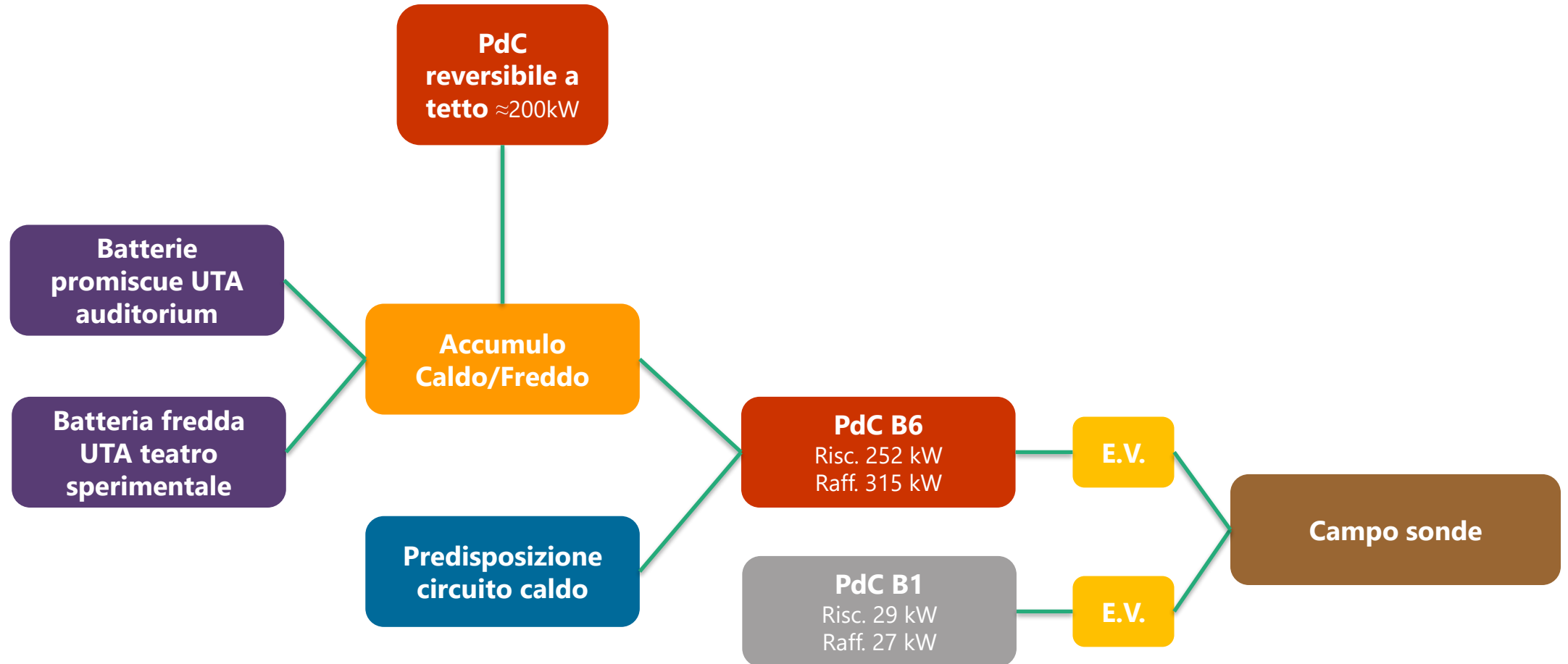
# Integrazione con impianto esistente



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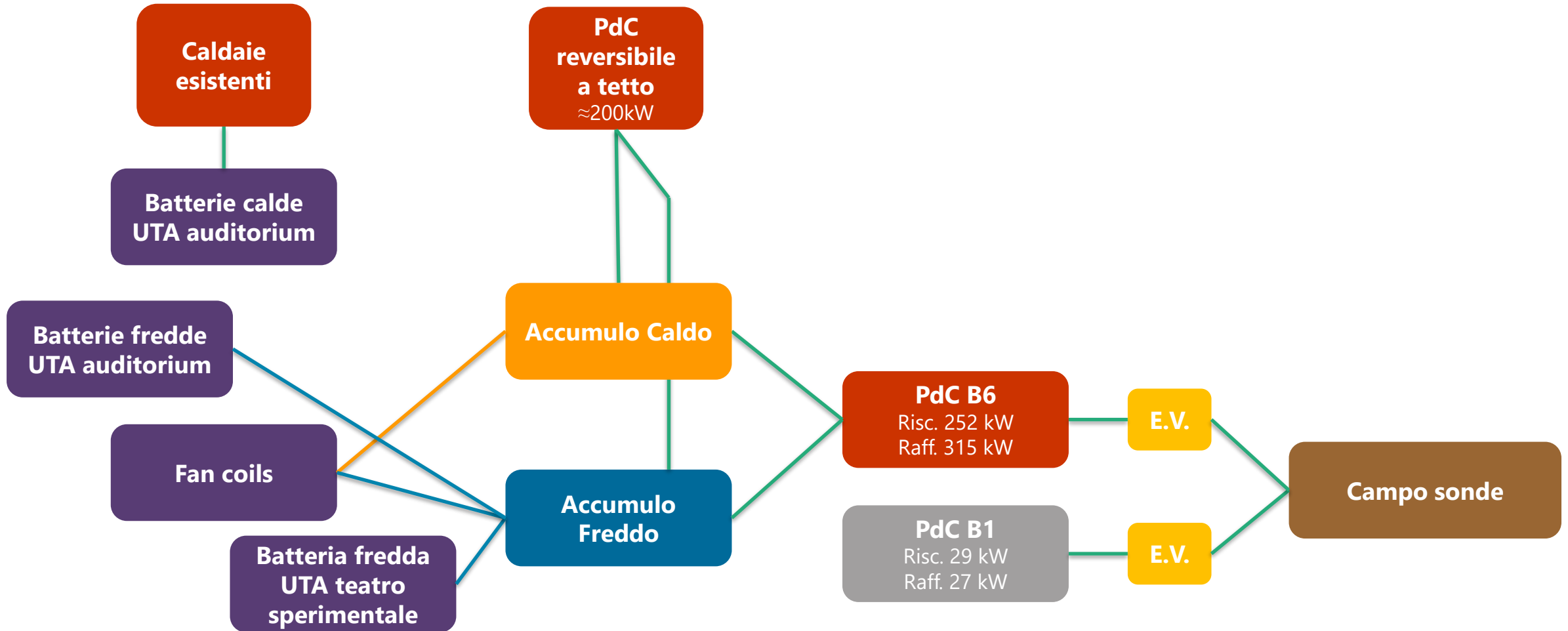
# Fase intermedia



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# Fase definitiva



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COMUNE DI TRENTO



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