

November 21st, 2018

 **AMBIENTEITALIA**

Solar District Heating best-practice examples from Italy

Riccardo Battisti



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 691624. The contents of this publication do not necessarily reflect the Commission's own position. The document reflects only the author's views and the European Union and its institutions are not liable for any use that may be made of the information contained here



AMBIENTEITALIA

we know green

Ambiente Italia is research, expert advice and planning for sustainability

In more than 20 years of activity, more than 2,000 projects in Italy and Europe

Environmental Due
diligence and permitting



Energy Efficiency and
Renewables



Waste Management &
Soil Remediation



Resources and
landscape management,
adaptation & resilience



Environmental, Social and
Governance (ESG)



@RiccardoBatt

AMBIENTEITALIA



SDH in the National Energy Strategy

Potrà essere esplorata, ad esempio, l'integrazione del **solare termico in impianti di teleriscaldamento**, con la finalità di individuare modalità di gestione su scala industriale che consentano, da un lato di ridurre i costi di installazione e esercizio, dall'altro di ottimizzarne le prestazioni. Il teleriscaldamento solare, inoltre, come dimostrato dagli impianti già operativi all'estero⁴³, può diventare particolarmente interessante per reti di teleriscaldamento intelligenti e flessibili, alimentate da più fonti.

⁴³ Si vedano, ad esempio, i risultati del progetto europeo "solar district heating" - <http://solar-district-heating.eu>

Source: Strategia Energetica Nazionale, November 2017





SDH is supported through a good incentive scheme

**‘Conto Termico 2.0’
supports plants up to
2,500 m²**



**In 5 years it is possible to recover
between 40% and 65%
of the investment**



@RiccardoBatt

AMBIENTEITALIA



How much does solar heat cost?

- 2,000 m² solar field
- Total investment: 800,000 €
- Total incentive: 500,000 €
- More than 60% of the investment
- 10-years loan

- Heat cost (**over 15 years**):
 - 53 €/MWh (interest: 6%)
 - 42 €/MWh (interest: 4%)
 - 31 €/MWh (interest: 2%)





Areas are there!

**20% of solar fraction
in the whole Italian
DH sector means...**



0.007% of agricultural land

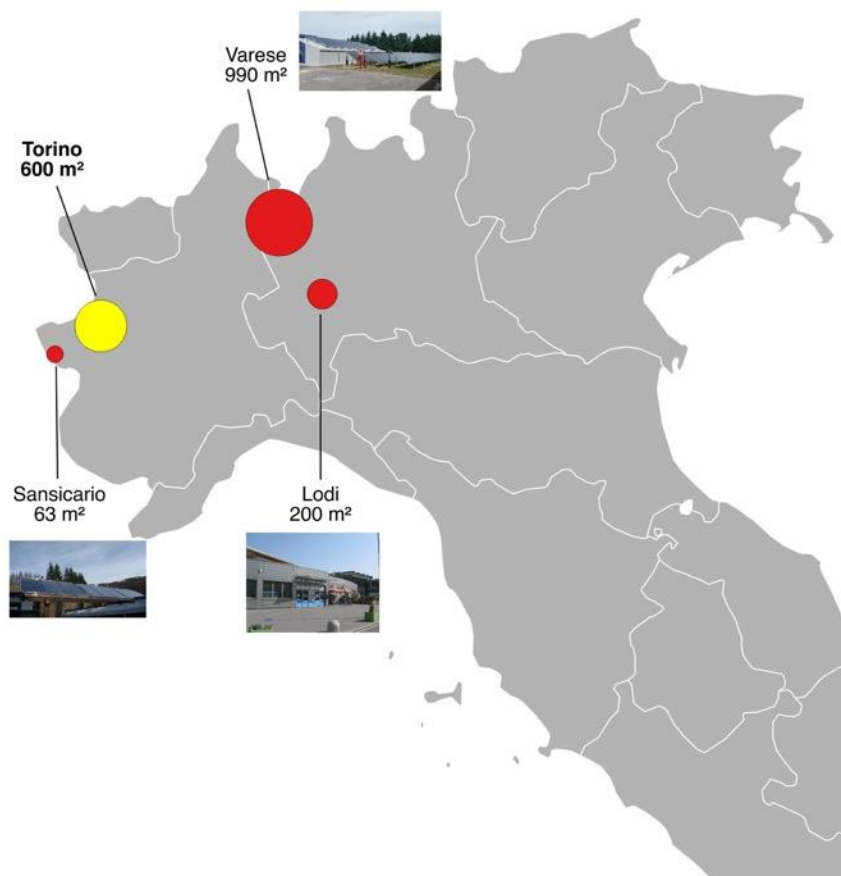


@RiccardoBatt

AMBIENTEITALIA



'Our' plants



SDH
solar district heating

IMPIANTI DI TELERISCALDAMENTO SOLARE

- In funzione (1253 m²)
- Pianificati (600 m²)

0 50 100 km



A cura di Riccardo Battisti, Ambiente Italia
Elaborazione grafica: Chiara Badaloni
Ultimo aggiornamento: ottobre 2017
Sito web: <http://solar-district-heating.eu/it>



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 691624.



@RiccardoBatt

AMBIENTEITALIA



SDH third-party access to the network

**Around 200 m²
solar field**



**Solar heat sold
to the utility**



Source: Linea Reti e Impianti



@RiccardoBatt

AMBIENTEITALIA



SDH...Hiking in the mountains – Sansicario



63 m² solar field

Source: ing. Luca Degiorgis

Two technologies



@RiccardoBatt

AMBIENTEITALIA



Urban SDH in Varese

Annual yield: 490 kWh/m² (+13%)



990 m² solar field



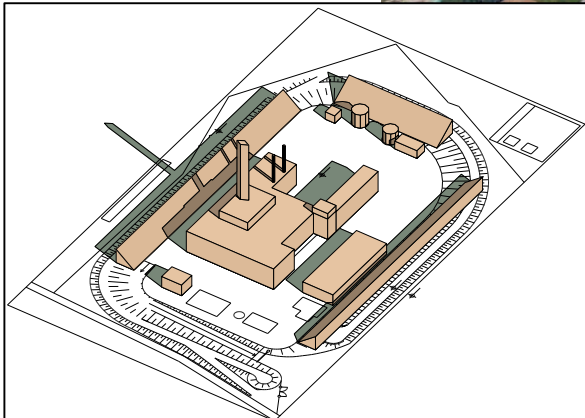
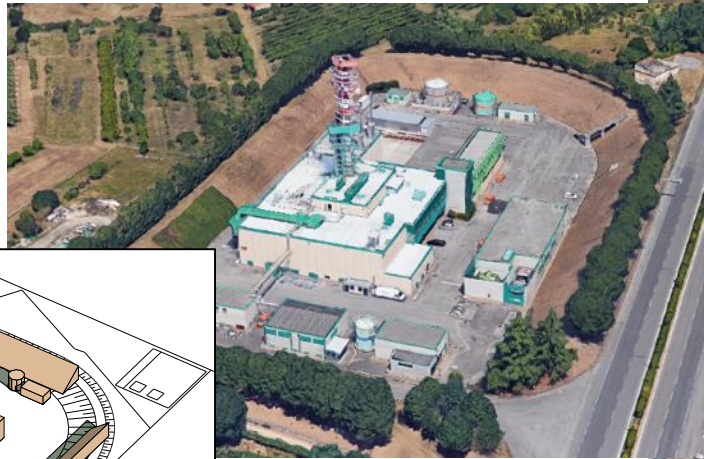
@RiccardoBatt

AMBIENTEITALIA

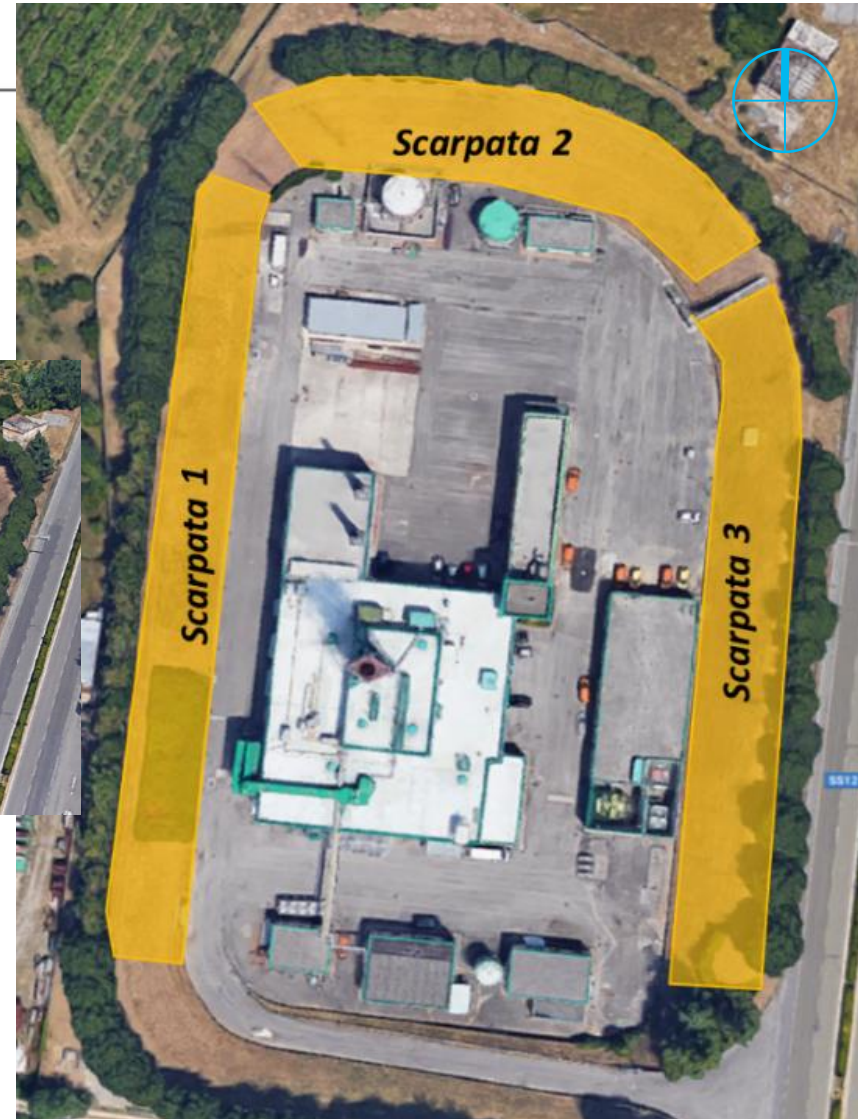


Feasibility study in Verona

- 2,500 m² solar field
- Incentive close to the 65% threshold



Source: *Politecnico di Milano*



@RiccardoBatt

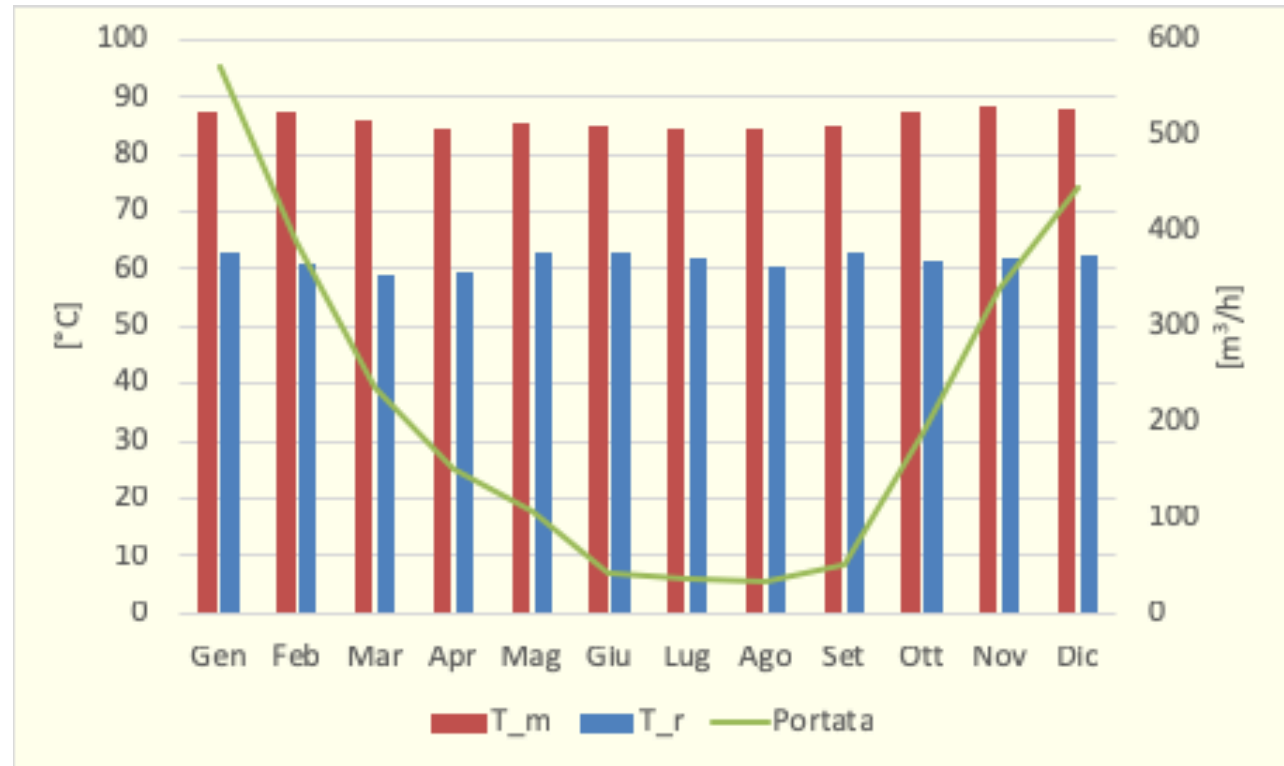
AMBIENTEITALIA



Feasibility study in Aosta



- 23.5 km
- 45 GWh/year
- It should double...
- Network T: 60-90 °C



Valori medi mensili di temperatura di mandata e ritorno e portata d'acqua

Source: Politecnico di Milano



@RiccardoBatt

AMBIENTEITALIA



Feasibility study in Aosta

- 400 + 1,600 m² solar field
- 1.6 GWh/year
- 3% solar fraction (25-30% in the summer)
- PBT around 15 years with 400 €/m²



Source: *Politecnico di Milano*



@RiccardoBatt

AMBIENTEITALIA



Feasibility study in Polverara (PD)

- 2 km, 133 users
- 1.2 GWh/year
- Wood chip boiler: 750 kW
- Network T: 65-75 °C
- Boiler efficiency: 74% (60% at 350 kW)



Source: Politecnico di Milano



@RiccardoBatt

AMBIENTEITALIA



Feasibility study in Polverara (PD)

- Solar plant: 220 m², 15 m³
- Output: 131 MWh/year
- Solar fraction: 7%



Source: Politecnico di Milano



@RiccardoBatt

AMBIENTEITALIA



Feasibility study in Lamen (Feltre, BL)



Source: Giulia Pauletti, 'L'ENERGIA DA BIOMASSA LEGNOSA: UN'OCCASIONE DI PROGETTO – La progettazione di una centrale di teleriscaldamento a Lamen (Feltre) come opportunità di riqualificazione e valorizzazione'



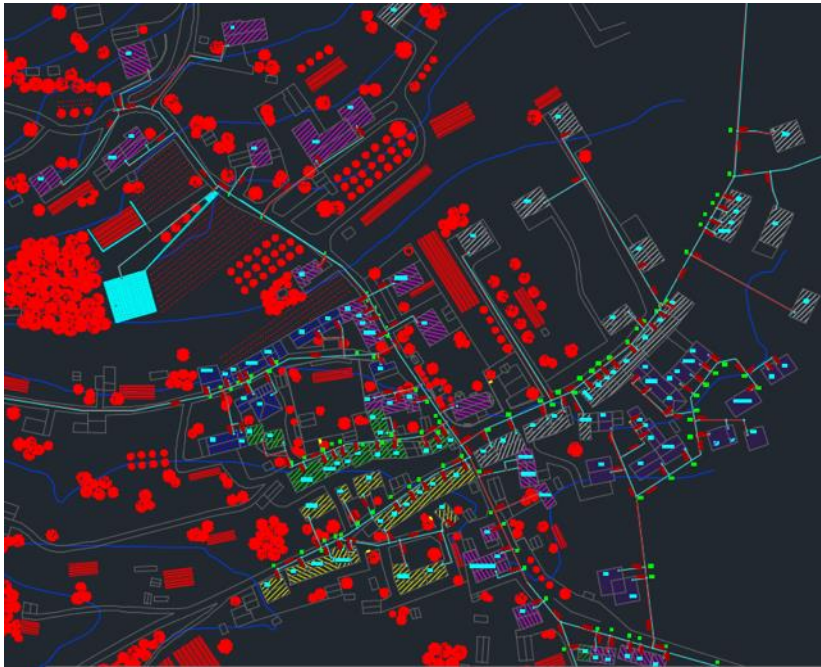
@RiccardoBatt

AMBIENTEITALIA



Feasibility study in Lamen (Feltre, BL)

- Heat demand: 9 GWh/year
- 3 biomass boilers (3*400 kW)
- 300 kW solar field (summer load)



*Source: Marco Panelli, FACOLTA' DEGLI
STUDI DI BRESCIA – LAUREA
MAGISTRALE IN INGEGNERIA
MECCANICA, CURRICULUM ENERGIA*





- **The Danish areas³ problem:** Not our case because we mainly target smaller plants because:
 - Utilities want to 'have a try' with SDH
 - The incentive scheme has a limit of 2,500 m²
- **Finding cheap areas:** Often utility-owned technical areas are available





- **‘Psychological’ overestimation of the area issue** also because of bad experiences with PV and of a restrictive legislation on visual impact
- **Competition with other ‘green’ investments**
- **The ‘Big Solar Barrier’:**
 - Conservative and short-term approach when calculating the heat cost
 - All the risk factors are attributed to the solar technology and not to the ‘enemies’ (rising carbon tax or fuel price, end of indirect subsidies for fossils...)
 - Sometimes linked to the grant period of the utility





That's simple...The opposite of the barriers:

- Increasing fuel prices
- Increasing Carbon Tax
- Reducing benefits (special VAT for gas in CHP units)
- More pressing EU legislation
- **Forward-looking developers**

Advice for newcomer countries in SDH:

- You need real & reliable data (<http://solarheatdata.eu/>)
- Show real land occupation and use satellite photos
- Look for simple projects to start with (land/roof available and owned, storage in place, low temperatures etc.)





My final advice

Don't waste time with conservative developers!

**Forget about the 'non-believers'...
"Thanks for listening but it's not for you"
(Seth Godin, 'Akimbo' podcast)**





Would you like to contact me?

Email: riccardo.battisti@ambienteitalia.it



<https://it.linkedin.com/in/riccardobattisti>

www.linkedin.com/company/ambiente-italia-srl



@RiccardoBatt

@AI_AIP

AMBIENTEITALIA
we know green



@RiccardoBatt

AMBIENTEITALIA