

# Ground source heating and cooling at the Aalto University Campus

**ACRE**  
Aalto University  
Campus & Real Estate



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# Structure of the presentation

1. Renewal energy production at the Otaniemi Campus
2. New Campus Building (A Bloc, ARTS & BIZ)
  - General information
  - Energy system
  - Distributed temperature sensing (DTS)

# Renewal energy production at the Otaniemi Campus

**Geothermal heat (roughly 2600 MWh, covers 5% of the heat consumption on campus):**

Dipoli:

- 19 pcs 300m heat wells
- Energy production 750 MWh
- Cooling provided by free cooling 170 MWh
- The system reduces the need for district heating by 75% and cooling electricity by 75%



New Campus Building:

- 77 pcs 320m heat wells
- Energy production 1700 MWh
- Covers 80% of heating demand (DHW not included)
- Also covers the cooling requirement 800 MWh



# Renewal energy production at the Otaniemi Campus

Additionally smaller geothermal heated properties:

- Konemiehentie 1/Saha 100 MWh
- Otaranta 4/Aalto Inn 100 MWh

Solar energy (total 500 MWh, covers 1% of the campus electricity consumption)

Some small scale solar heat & wind power



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# New Campus Building - General information

- Users
  - School of Arts, Design and Architecture (Väre)
  - School of Business (Ekonominaukio 1)
  - Shopping center - A Bloc
- Area 47 500 brm2
- The biggest single investment in Aalto University history, approximately 140 M€
- Designed by Verstas Architects
- Constructed as an alliance contract between Aalto University Properties and SRV Construction
- University premises: energy class A
- A Bloc: energy class B



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# New Campus Building - Energy System

## Geothermal energy:

- 74 pcs 320m energy wells, mostly under the building
- Covers:
  - 80% of the heating demand
  - 95% of the cooling demand
- District heating for the DHW and power reserve



## Solar energy:

- 1000 sqm solar panels
- Covers 5% of the electricity consumption





# Väre DTS

## Distributed temperature sensing (DTS)

Used to study the temperatures in the heat wells

- Optimizing the geothermal energy field utilization without sacrificing the life cycle energy

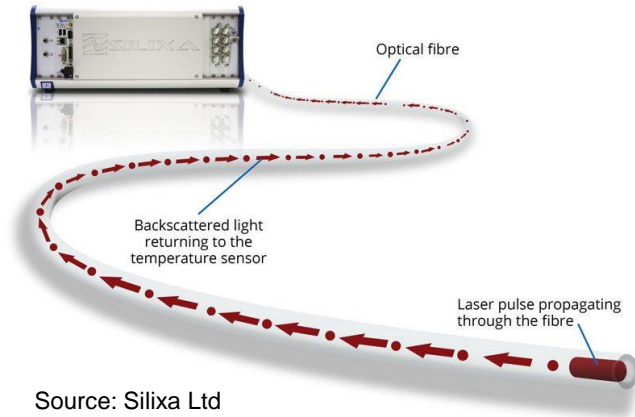
Optical wire installed to 6 energy wells

DTS measuring unit in the Väre control room

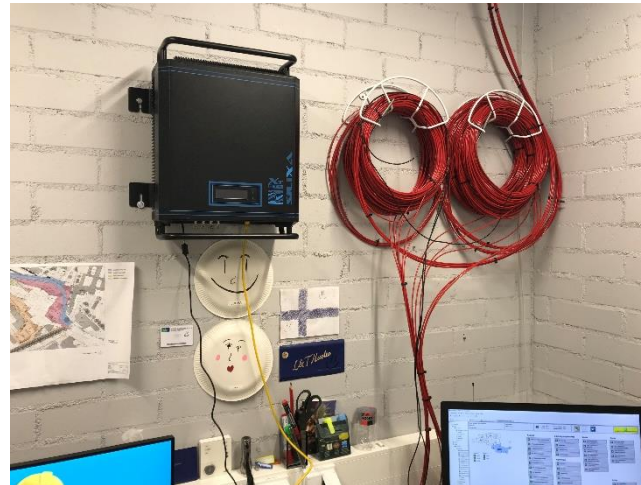
### Product Specifications

#### Sensing Capabilities

Range	Channels	Resolution		Measurement Time	Fibre Type	Referencing
		Sampling	Temperature			
0 -10km	4	25cm	0.01°C	≥5 sec	50/125µm multimode	x2 PT-100 probes

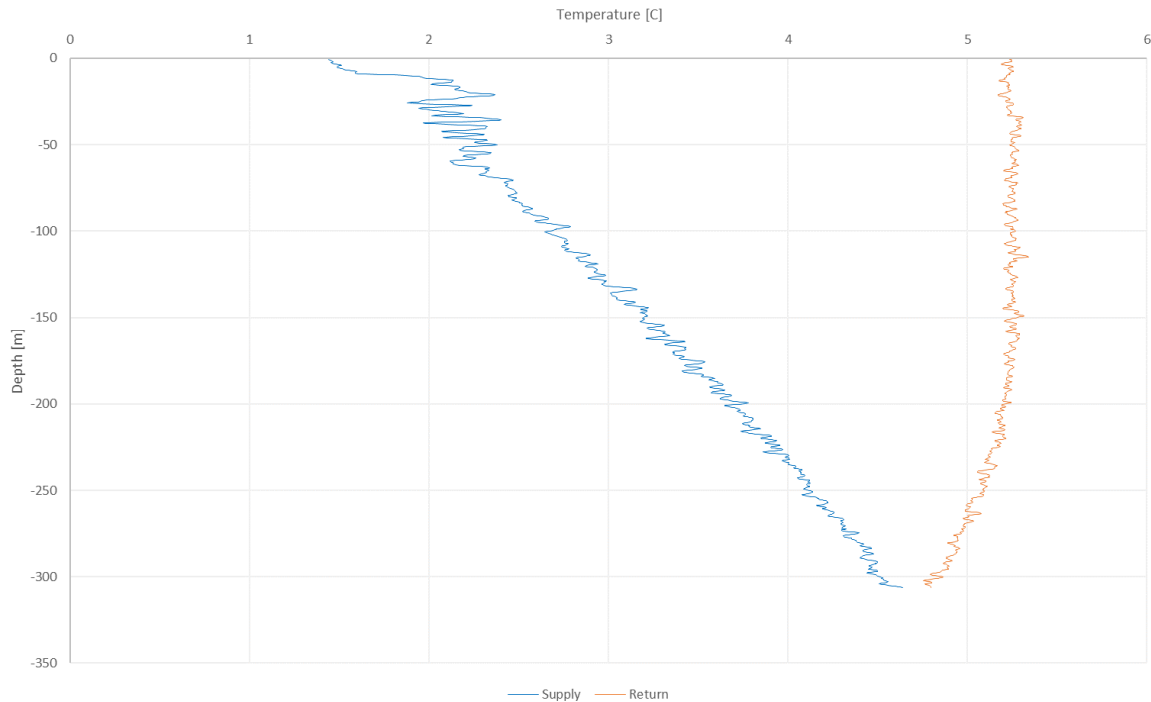


Source: Silixa Ltd



# Väre DTS

## Temperature measuring with the DTS system





# Thank you!

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