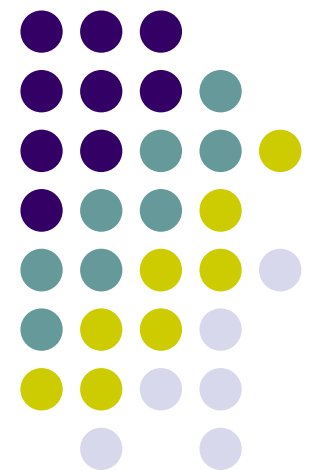


# Geothermal Heating Application in “International Village”

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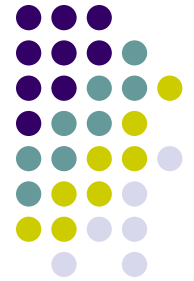


# Geothermal Energy



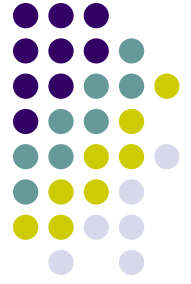
- Although Geothermal energy might be applied everywhere, it's thermal flux might vary...
- The values of thermal flux vary as: Dry Clay, Dry sand, Wet land, Granite-Rocky, Granite-Marble.





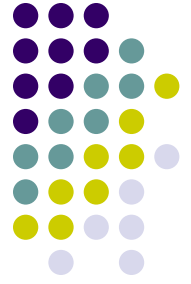
Type of Land	Dry Clay	Dry Sand	Wet Land	Granite-Rocky	Granite-Marble
Thermal flux (Watt/m)	35	25-30	60	60-70	80

# Geothermal application



- As of 2004, approximately 70 countries made direct use of a total of 270 PJ of geothermal heat in 2004. More than half of this energy went for space heating, and another for third heated pools. The remainder supported industrial and agricultural applications.

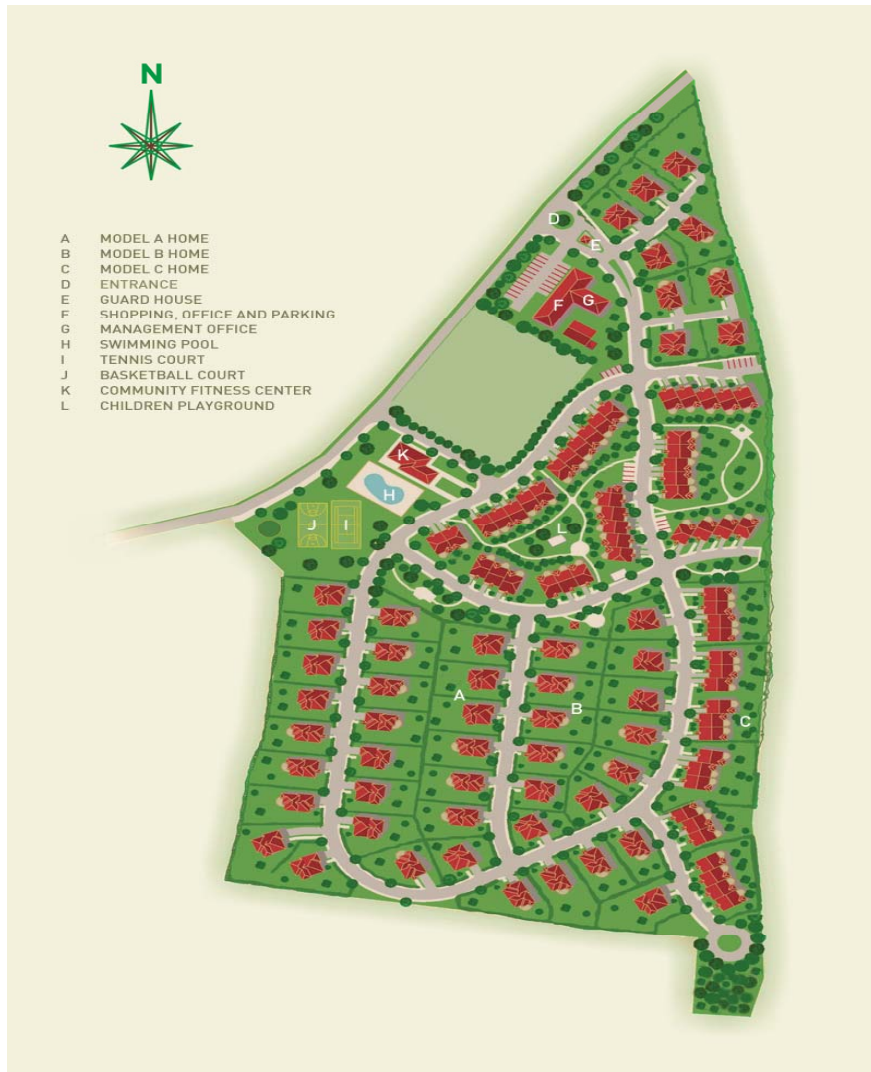
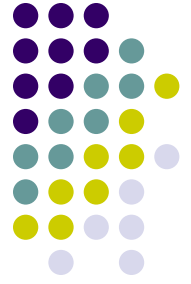




- Important point for geothermal applicers is that parameters needed for usage should be well coordinated with parameters form the source.
- Source should be given time (pause) for regeneration of thermal flux.

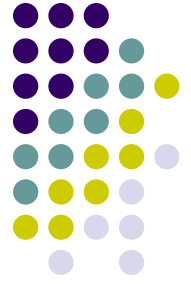


# International Village



Introduction:  
“International Village”  
is a community  
located 2 km from  
capital of Kosovo,  
Prishtina.  
It consist of 110  
houses of different  
size.





# International Village

- First test: 203 m deep for sanitary water, Temperature in that deepness was 23°C which is considered to be suitable for geothermal heating system.
- Parameters in that area were according to standards which means 1°C / 10 m.



- In international Village the thermal flux was 45 watt/m which was suitable for the start of the project and after one year of testing it is still the same.

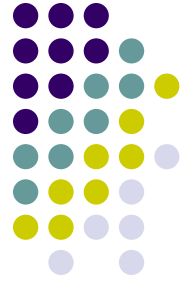






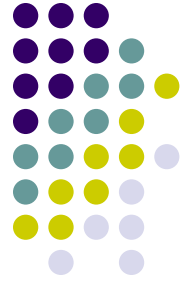
- Technical parameters for heating system temperature ( $T$  in entrance and  $T$  in return) should be suitable with fluid's temperature in sonde ( $T$  in entrance and  $T$  in return).
- 3 different drills:
  - 1) 130 m deep (130 x 45 watt) with 8 kW pumps
  - 2) 2x110 m deep (220 x 45 w) with 10 kW
  - 3) 2x100 m deep (200 x 45 w) with 14 kW





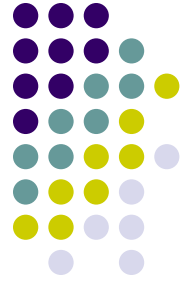
- During February 2009, when outside temp. was registered  $-21^{\circ}\text{C}$ , thermal pump managed to generate 3.9 MW energy from the ground during this month.





- Another advantage of geothermal energy is that in this case they used also cooling during the summer, this is because temp of water in sonde reaches 13°C which means that they managed to make a cooling of 400 m<sup>2</sup> house with 100 W/h.





## Some Facts

- For 110 houses, 140 km sonde pipe were used, the type of this pipe was 100 SDR 11.
- For 1 house, 2 sondes and approximately 100 m x 4 pipes.
- Geothermal energy in Europe is done with 135 €/m<sup>2</sup> while in Kosovo it was done with 65 €/m<sup>2</sup>.



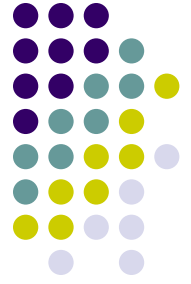


- Total Energy consumption

ENERGJIA E PERGJITHSHME E INSTALUAR								
Nr	Emertimi	Njesia	Energjia nga toka kW	Energjia nga ryma elektrike - kW	Energjia e pergjithshme - W	Energjia alternative nga pompa termike	Energjia alternative nga kamini - kW	Gjithsej energji te instaluar - kW
1	Tip A	1	11	4.7	15.7	6 kW	8	29.7
2	Tip B	1	9	3.4	12.4	6 kW	8	26.4
3	Tip C	1	6.5	2.7	9.2	6 kW	8	23.2

NGROHJA ME SISTEM GJEOTERMAL									
Nr	Emertimi	Njesia	Energjia e pergjithshme - kW	Energjia nga ryma elektrike- kW	Omimi i energj. elek. per avisni -kW	Kosto e shpenzimeve € / h	Pompa termike h / Pune	Kosto e ngohjes per nje dite € / dite	COP
1	Tip A	1	15.7	4.6	0.07	0.322	15	4.83	3.3
2	Tip B	1	12.4	3.4	0.07	0.238	15	3.57	3.6
3	Tip C	1	9.2	2.7	0.07	0.189	15	2.835	3.4

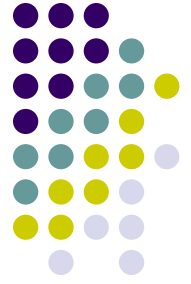
# Realization of geothermal heat system



- Timeline for realization of geothermal system including also heating system for one house is 6 days.
- From this: drilling 3 days, 1 day preparation of equipments and 2 days heating system preparation.



# Problems in implementation

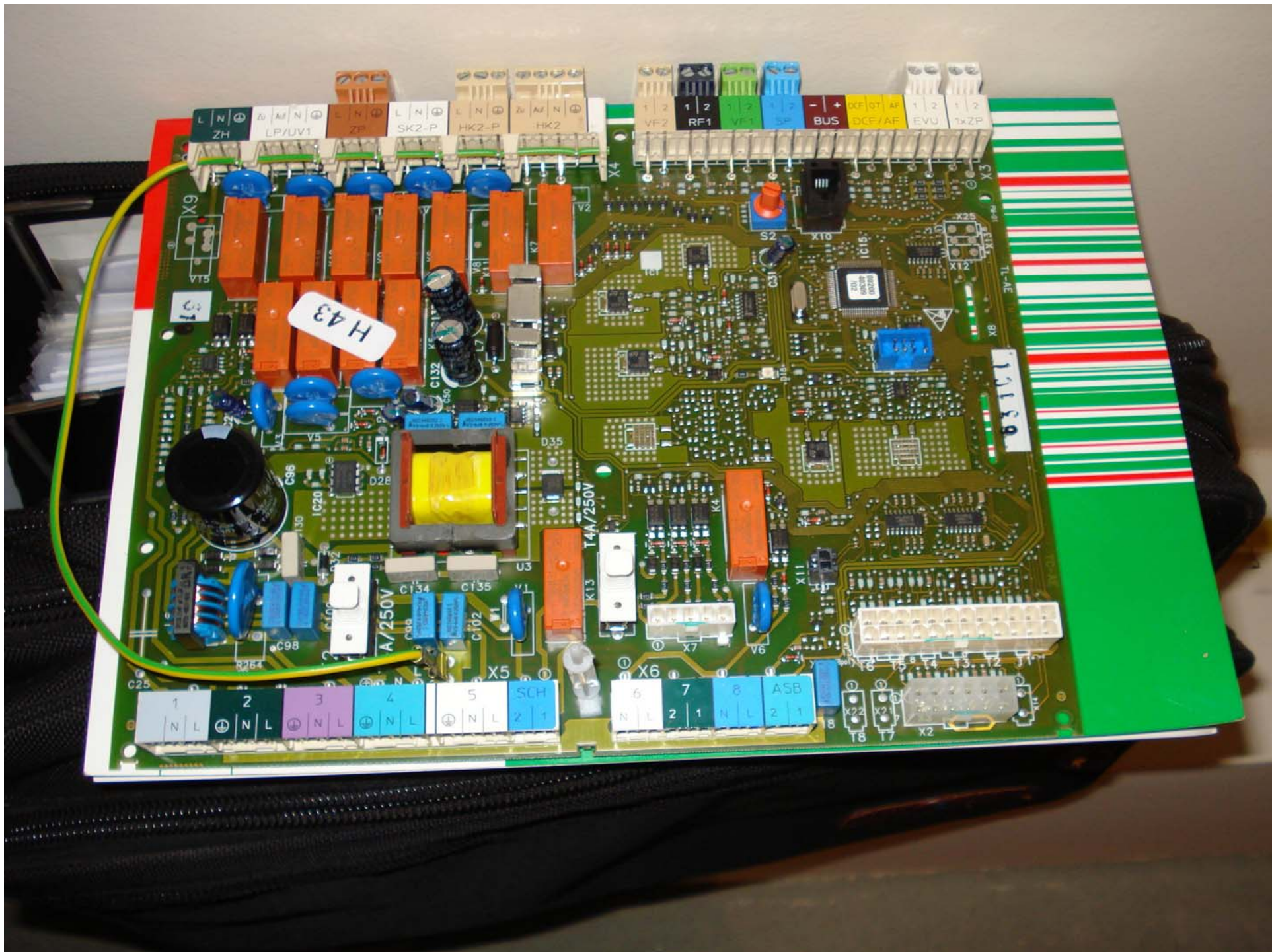


- During drilling there may be some unexpected barriers and may cause loses because of big pressures against axis and by this causing damage to drilling instruments.













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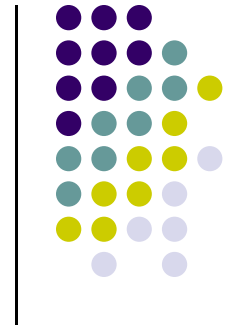












Questions???





## References:

- Mega Term (company responsible for project)
- [www.wikipedia.com](http://www.wikipedia.com)
- Energy and Environment by *Robert A. Ristinen and Jack P. Kraushaar* (textbook)

