

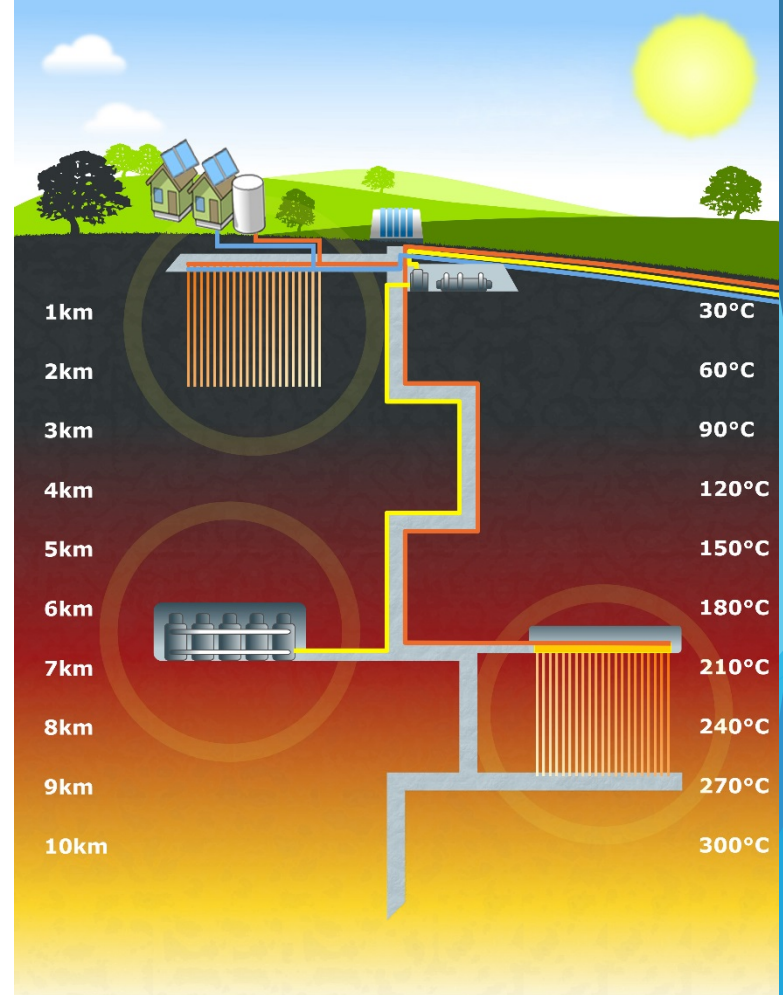
# The Concept of Energy System based on Deep Geothermal

## MULTIFUNCTION ENERGY SHAFT

„All that is necessary to open up  
unlimited resources of power  
throughout the world is to find some  
economic and speedy way of sinking  
deep shafts.“ Our Future Motive

Power, 1931.

Nikola Tesla



# Comparison of the Capacity of 1 Borehole and 1 Artificial Fracture

## 1 Borehole:

Temperature:  $200^{\circ}\text{C}$

Diameter: 0,16 m

Height: 200 m

Number of heat  
transferring surfaces: 1

Overall heat transferring  
surface: 100 m<sup>2</sup>

## 1 Artificial fracture:

Temperature:  $200^{\circ}\text{C}$

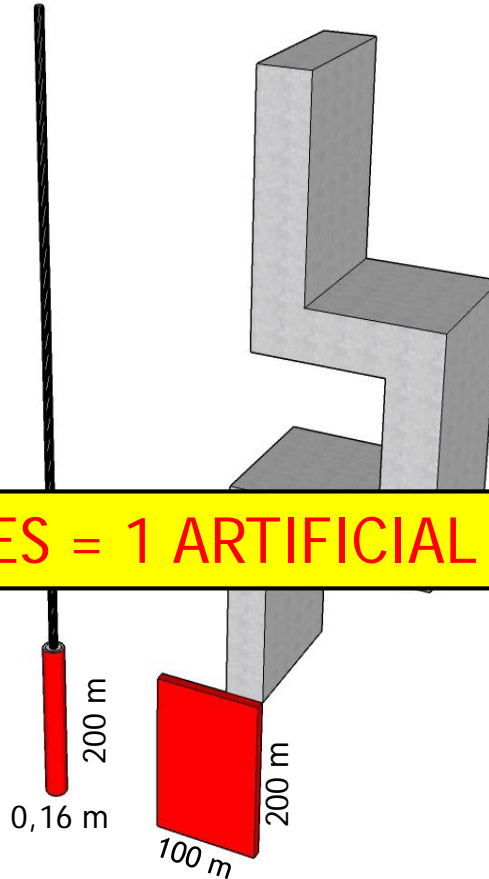
Length: 100 m

Height: 200 m

Number of heat  
transferring surfaces : 2

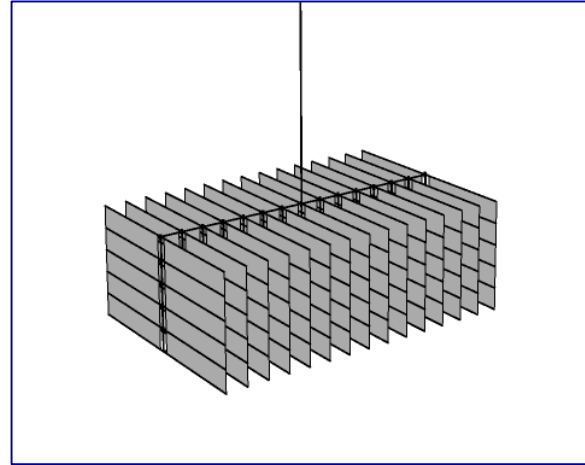
Overall heat transferring  
surface : 40 000 m<sup>2</sup>

**400 BOREHOLES = 1 ARTIFICIAL FRACTURE**



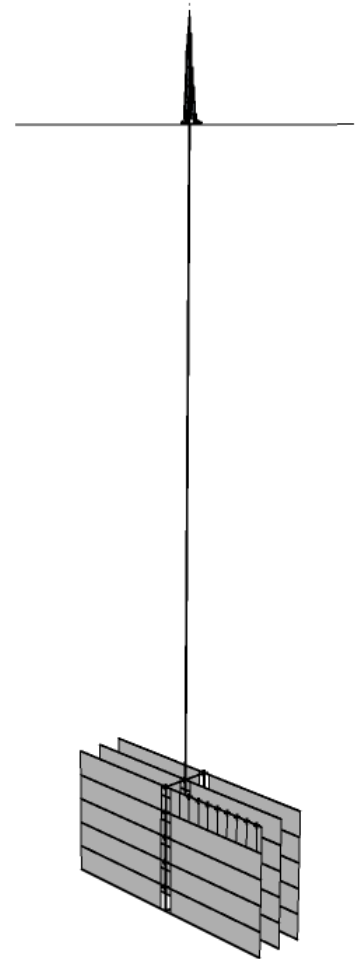
# Advantages of the Presented System

- ▶ Calculable
- ▶ Inspectable
- ▶ Serviceable
- ▶ Modularity, the shaft and fracture variability



1020 MW - 30 years

200 MW - 30 years



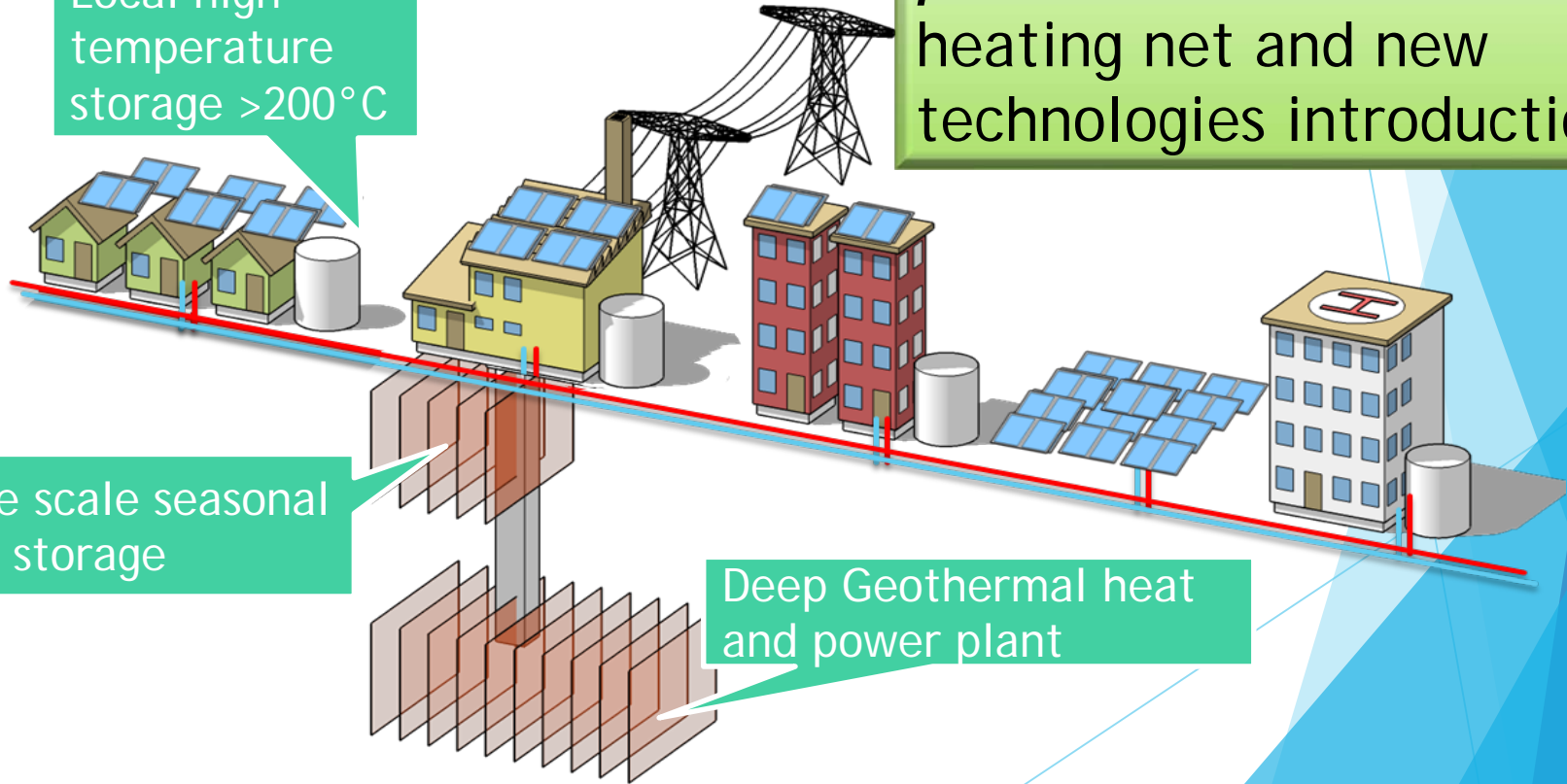
### 3. Introducing open energy systems

Local high temperature storage  $>200^{\circ}\text{C}$

Activated consumers - *prosumers* - on the district heating net and new technologies introduction

Large scale seasonal heat storage

Deep Geothermal heat and power plant



## *THE SHAFT-BASED ENERGY SYSTEM CONCLUSION*

- Energy Shaft is a realistic competitor to conventional drilling
- The block excavation method is ten times cheaper than conventional drilling:
  - The cost for 1 m<sup>3</sup> drilled or blasted material - 4 to 6 Euro
  - The cost for 1 m<sup>3</sup> material excavated by block method - 0.50 Euro
- Energy Shaft allows both utilization of shallow geothermal and deep geothermal energy
- Energy Shaft allows efficient connection to the district heating system and electric grid
- Energy Shaft provides the technical and economic feasibility of responding to commands from a grid operator



# Thank you for attention

[www.dividend.se](http://www.dividend.se)

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# Multifunction Energy Shaft Geothermal Energy System

ACCUMULATION  
OF RENEWABLE  
ENERGY ON THE  
SURFACE



HIGH POWER  
SEASONAL  
STORAGE

ELECTROCHEMICAL  
STORAGE

UNDERGROUND  
TECHNICAL  
FACILITIES AND  
POWERPLANTS

LARGE SURFACE  
GEOTHERMAL-  
HEAT  
EXCHANGER

