The new Plasma light arc propulsion Technology PLA - PT for the 21st century CO 2 free energy - we can improve the global climate.

Energy heat utilization 570 Cº from the earth crust from 15 KM depth, in order to operate old and new coal-oil atomic gas power plants with high pressure steam.

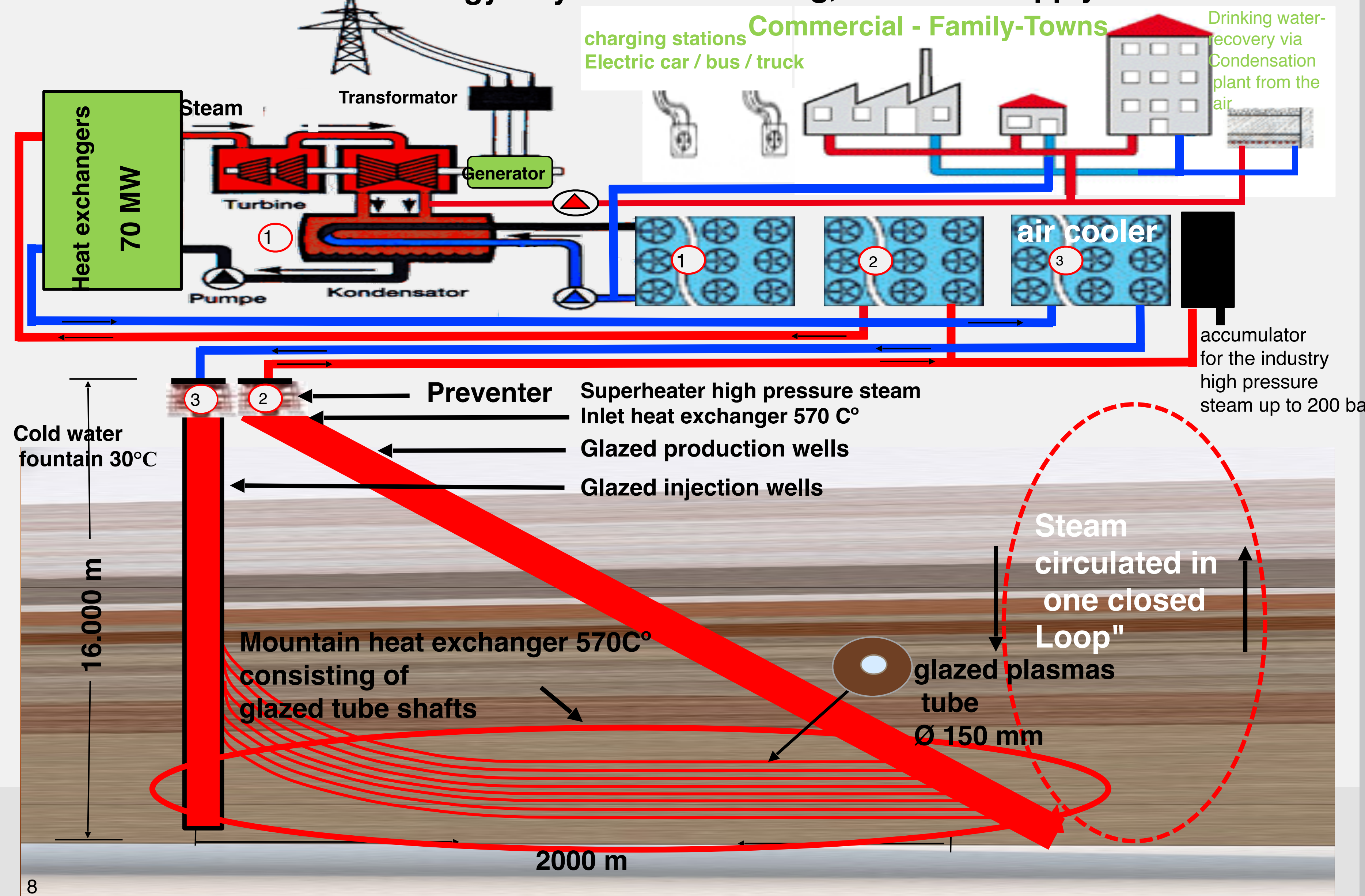
With a plasma propulsion head, drill without contact deeper than 15000 m, with a (at least 20m / h through hard rock granite) and a larger propulsion diameter (0.06m -1.5m), as well as to reach rock temperatures of 400 - 600 degrees Celsius and where? at any place in the world, except for areas of extreme seismic activity.

Hot Dry Rock System
HDR
is the dry heat stored in the crystalline rock and is therefore not dependent on aquiferous aquifers.

The technologies are with protective rights occupied

Sketch: Construction of a 70 MW geothermal energy Power station with geothermal energy Saturated steam CO 2 free energy 20 years

Drinking water supply from the air to Requirements 3 - 300 m³ / t - 45 - 4500KW Heating, Hot water supply



Plasma propulsion technology

The development project **PLB - VT** (Plasma Light Arc Propulsion Technology) is developing a new type of plasma - based propulsion technology for the development of deep geothermal resources and is to prove its field suitability

Compared to the conventional deep drilling method, this plasma propulsion technique has the advantages that the propulsion process is not mechanical and thus largely independent of parameters such as rock temperature, strength and rheology. Within the framework of the project, important scientific objectives are being pursued in addition to the technical developments necessary for the new advanced drive

These are particularly important in the areas of borehole stability, sensor technology, environmental compatibility and material properties and are indispensable for the further optimization of the process.

The successful completion of the development project is to be seen with a fundamental, exponential advance in drilling technology, as it did last at the beginning of the 20th century.

Since the conventional drilling technique is limited (approximately 12 km) due to various problems (essentially no stable flushing at high temperatures and very high costs), this new thermal plasma propulsion technology allows large depths, e.g. For the development of the deep geothermal reservoirs can be achieved quickly, safely, environmentally friendly and effectively.

This contributes to the attainment of the objectives of increasing energy efficiency by increasing its importance.

On the other hand, according to the results of the first laboratory results, the plasma rod on the industrial scale should allow the transmission of electrical energy in the MW range - in addition to the absorption of the relevant forces which still occur during drilling. This would make it possible, according to an initial assessment, to make a more effective drilling process possible in the range of tens of thousands.

Project description: PLB - VT

The development project PLB - VT (plasma arc propulsion technology) is developing a new type of plasma-based drilling technique for the development of deep geothermal resources and is intended to demonstrate their suitability for use in the field. This plasma propulsion technology has the advantage over conventional deep drilling methods that the propulsion process is not mechanical and is therefore largely independent of parameters such as rock temperature, rock strength and rock rheology. In addition to the technical developments necessary for the innovative propulsion technology, the project also pursues important scientific objectives. These are particularly in the areas of borehole stability, sensor technology, environmental compatibility and material properties and are indispensable for the further optimization of the process.Translated with www.DeepL.com/Translator

The successful completion of the final development project can be seen in a fundamental, exponential advance in drilling technology, as it was last achieved at the beginning of the 20th century. As the conventional drilling technique is limited due to various problems (essentially no stable mud at high temperatures and very high costs) (approx. 12 km), this new thermal plasma drifting technique allows great depths, e. g. for the development of deep geothermal reservoirs, to be reached quickly, safely, environmentally friendly and effectively. In this way, a contribution to the achievement of the goals for increasing energy efficiency is made, the significance of which cannot yet be estimated. Translated with www.DeepL.com/Translator

Up to now, energy transfer in conventional drilling methods has only been possible via weight-on-bit (WOB), torque (torque) and volume flow, i. e. density and pressure in the drilling mud. At the same time, in all previous approaches to the development of new (also thermal) drilling techniques, the amount of energy available at the drill head for rock destruction is limited. For example, an R&D project currently underway at the GZB for the development of thermal drilling methods using laser technology intends to transport additional energy in the KW range to the drilling head by means of fiber optic cable and laser technology. According to initial laboratory results, the plasma propulsion rods on an industrial scale should enable the transfer of electrical energy in the MW range - in addition to absorbing the relevant forces that still occur during drilling. According to initial estimates, this would enable a more effective drilling method in the range of ten times the potential. Translated with www.DeepL.com/Translator

Opinion of experts in deep drilling; universities and industrial companies via plasma propulsion technology

6. According to initial estimates, this would enable a more effective drilling method in the range of ten times the potential.

7. Die Stromerzeugung findet dabei kontinuierlich statt (grundlastfähig), kann an jedem Ort installiert werden und hilft bei der Umsetzung der Klimaziele der Bundesregierung.

8. further applications of deep wells with simultaneous large drilling diameters are in the extraction of knowledge in the field of exploration of deposits.

9. If the research project is successfully completed, a fundamental, exponential advance in drilling technology can be expected, as it was last achieved at the beginning of the 20th century. As the conventional drilling technique is limited due to various problems (essentially no stable mud at high temperatures and very high costs) (approx. 12 km), this new thermal plasma drifting technique enables large depths, e. g. for the development of deep geothermal reservoirs, to be reached quickly, safely, environmentally friendly and effectively. In this way, a contribution to the achievement of the goals for increasing energy efficiency is made, the significance of which cannot yet be estimated.

10. Another important aspect is the development, construction and testing of the plasma drill rods. This makes it possible for the first time to transport a large amount of additional energy to the drill head, except through flushing and purely mechanically (WOB and torque). And exactly this fact is the difference to other drilling processes (e. g. EIV drilling in Dresden), because so far this could not and was not realized due to the lack of drill rods.

11. Another accompanying technical aspect is the development and testing of measurement technology for data transmission (MWD and LWD). The installation of geophysical measuring probes on the drill head is an enormous advantage for optimum exploration of the subsoil during drilling. Thus, reaching the desired rock formation would be immediately recognizable and not, as is the case with today's usual technologies, only after the end or after an interruption of the drilling. This would prevent over-drilling, and it would be possible to track the required rock formations by means of steerable drill heads and thus obtain a much greater yield. This should make it possible to transmit physical, hydraulic and chemical data from sensors and measuring instruments during the entire drilling process.

How is the status of deep hole drilling Today and in Future ?

Today	in Future
- **max. drilling depth with conventional drilling technologies <5.000 m –soil temperature 150°C**	- **Drilling depth with Plasma Drill technology, deeper than 15.000 m –soil temperature >350° C**
- telescopic casing including cementation is needed for a stable drilled bore hole wall	- No casing is required due to a “glazed tube” with a very solid and integral bore hole wall
- Destruction of aquifers and massive soil contaminations	- Closed liquid water circulation, therefore no soil and aquifer contaminations
- Drilling speed approx. 1m/hour in hard rock, like Granite or Basalt	- Drilling speed approx. 20m/hour in hard rock, like Granite or Basalt
- „small“ bore holes (diameters up to 200 mm)	- „large“ bore holes (diameters up to 800 mm)
- Drilling costs between € 20 and € 50 million for each bore hole – up to a depth of 5.000 m	- Drilling costs between € 5 and € 10 million for each bore hole – up to a depth of 10.000 m
- Fracking can causes earthquakes due to high water pressure that will be pushed into the soil	- No Fracking is required, because we drill horizontal holes with the plasma drill string

Why is the new Plasma Drilling Technology so important for the World?

1.) We can produce very cheap electricity and it is CO_2-free power and we can produce it worldwide (we are able to supply 100% “Green Power” all over the world).

2.) We can produce electricity continuously 24 hours a day without any interruptions (no influences by less sunshine or less wind), that means we can produce basic load power for the grid.

3.) We do not require an expansion of the existing grid, we are able to set up a geothermal power plant in each city or close to an existing coal power plant.

4.) We are able to produce electricity per kWh for 2 Cent (0,012 Euro/kWh).

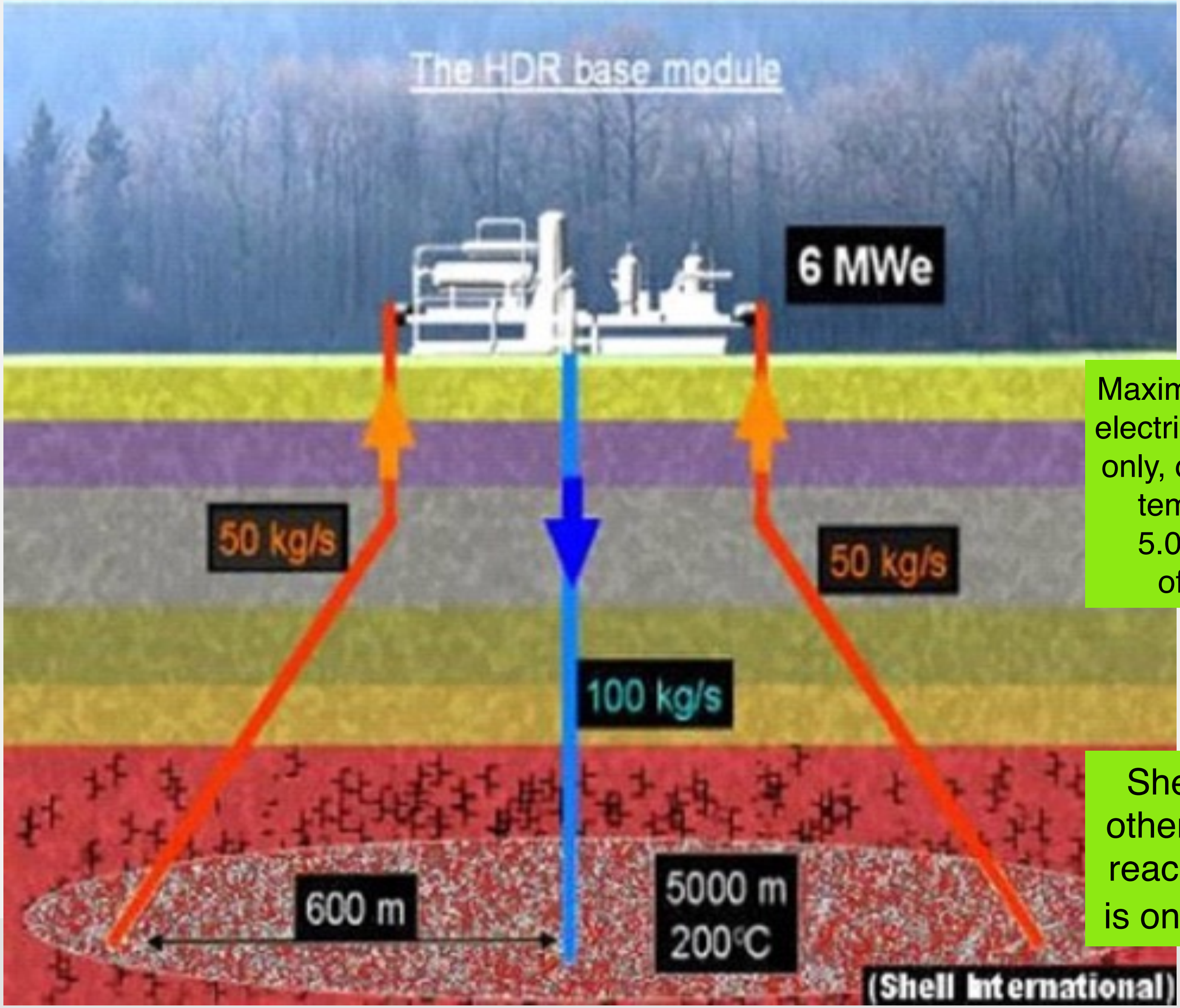
5.) We are able to help producers of existing coal power and gas power plants to run their old power plants more economical and supply carbon-free electricity to the grid. .)

6.) Geothermal power plants can start up directly become

6.) We have registered Patents in USA, Europe, China und Japan.

7.) The Return of Investment in a Geothermal Power Plant will be reached in approx. 3 years.

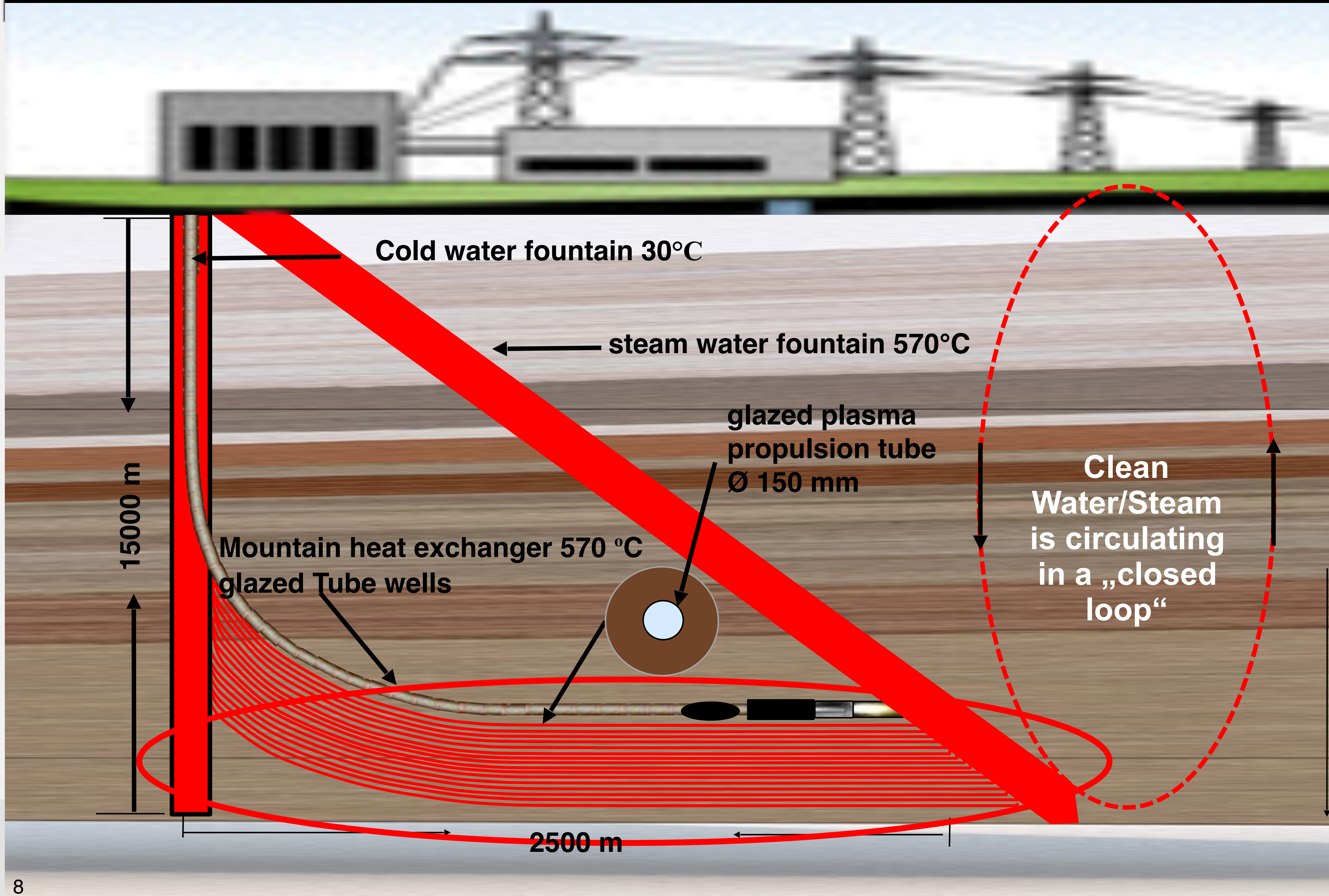
With conventional drilling technology



Maximum reachable electric power 6 MW only, due to low soil temperature in 5.000 m depth of ~ <200°C

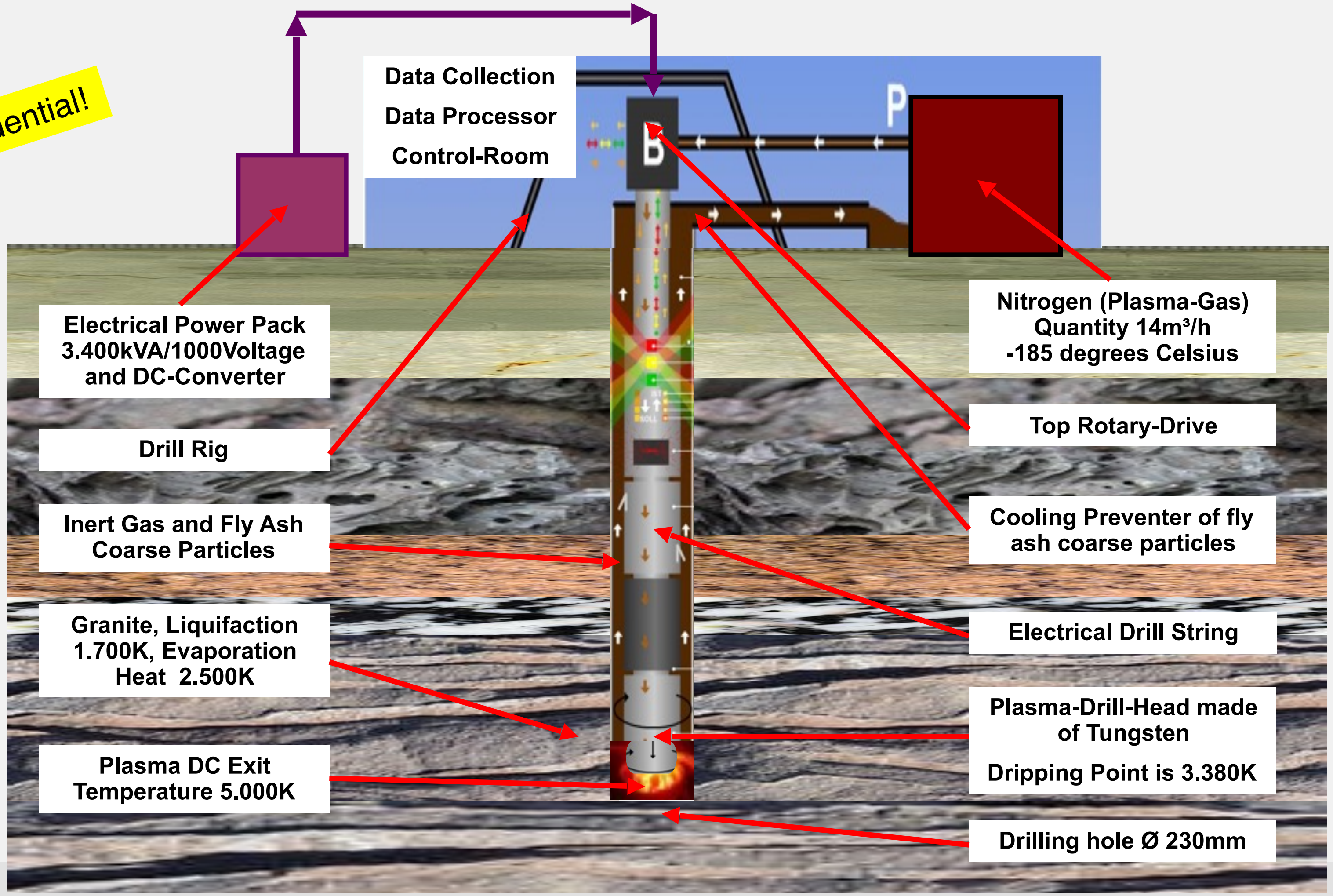
Shell's and all others maximum reachable depth is only -5.000 m

HDR Hot Dry Rock Power Station 220 MW electric. 70 MW Runtime 20 Years and more. C O 2 free

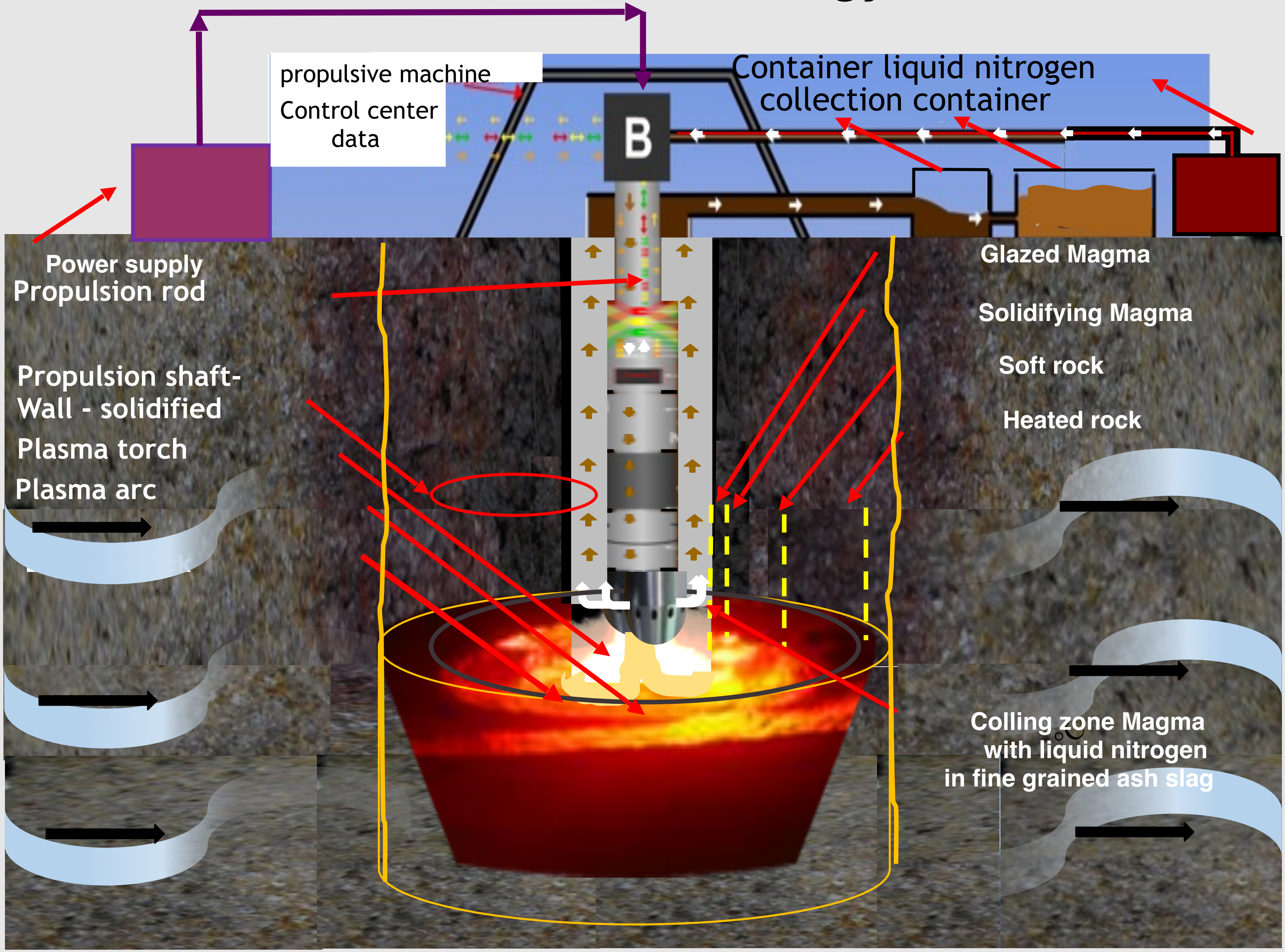


Sketch of a PlasmaDrill facility to drill a 1000m deep hole with ø 230 mm

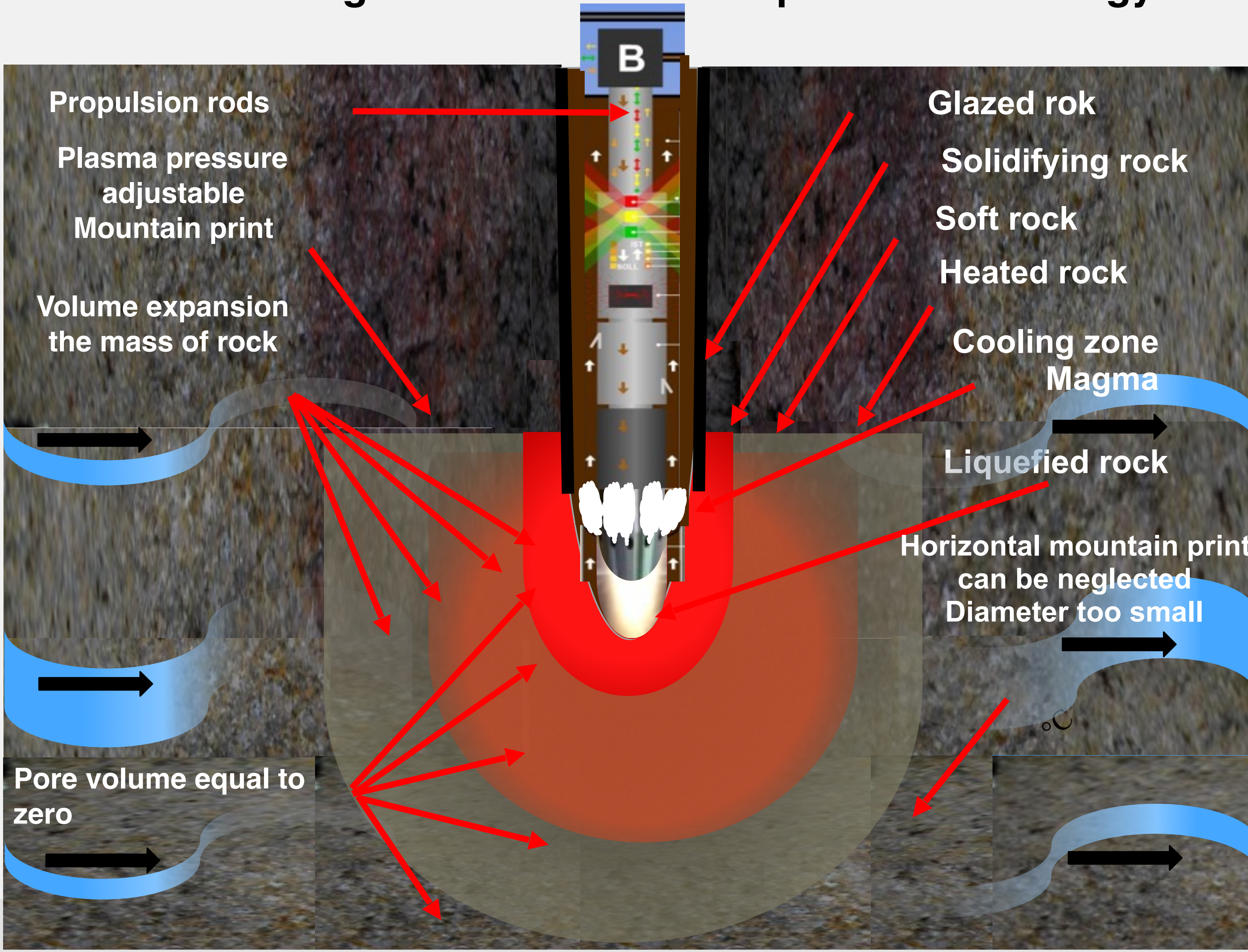
confidential!



Plasma arc technology



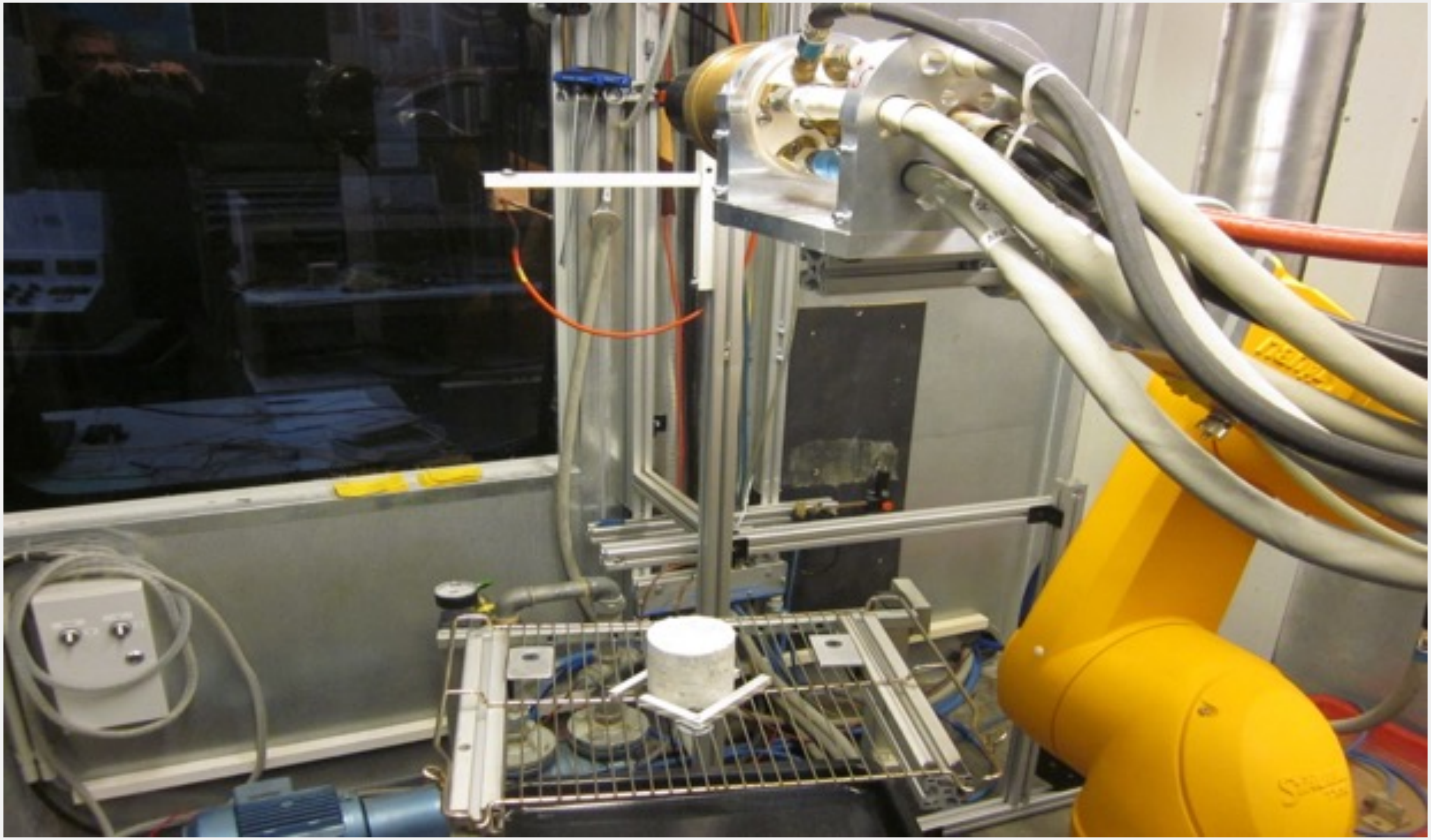
Plasma light arc – PLA - PT Propulsion technology



University of the Bundeswehr in Munich

Plasma test with Plasmatron 150 KW electrical power

Figure 2 Test rig with sample concrete cylinder 120 x 70 mm

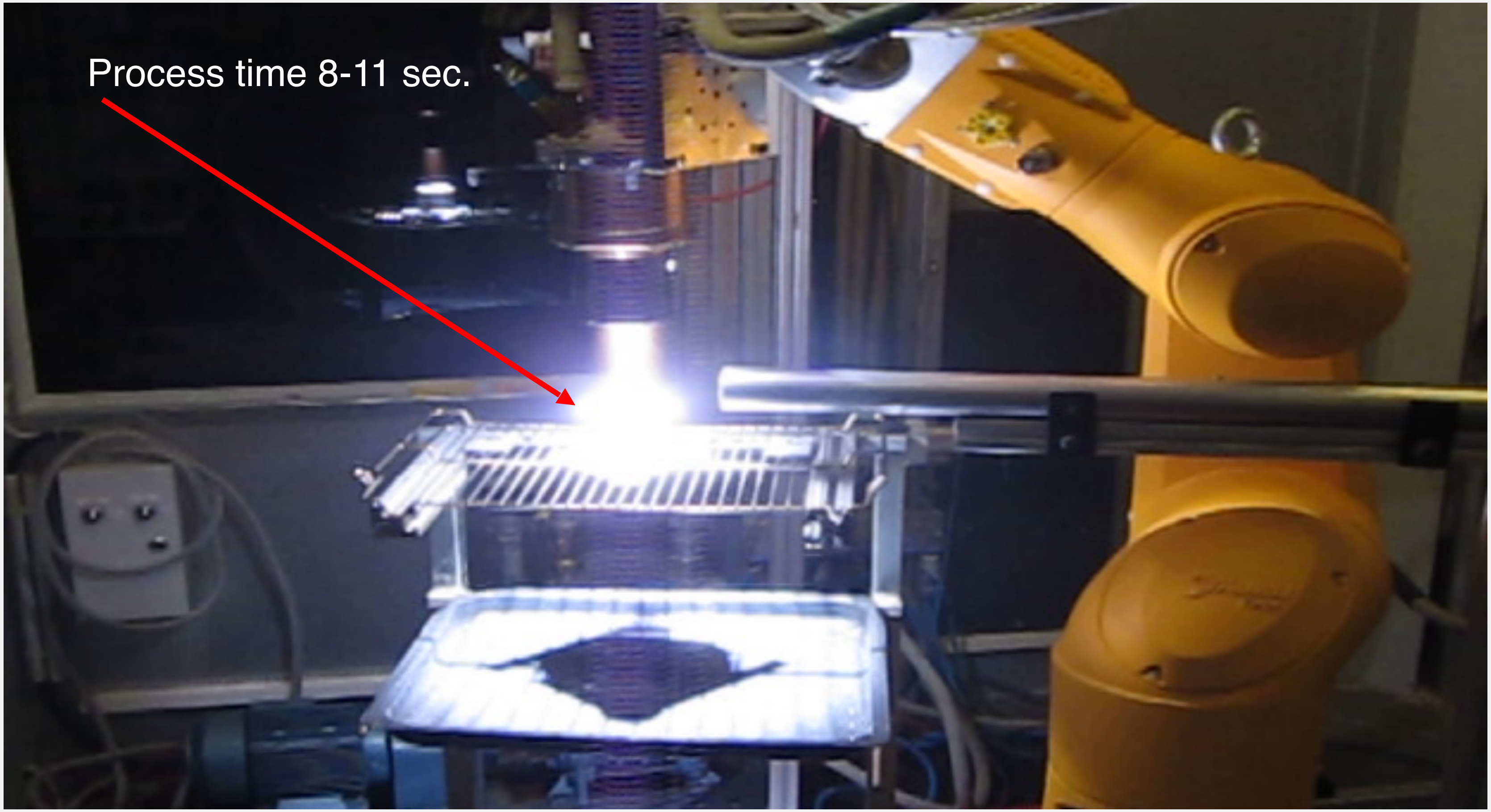


Institute of Plasma Technology and Mathematics

University of the Bundeswehr in Munich

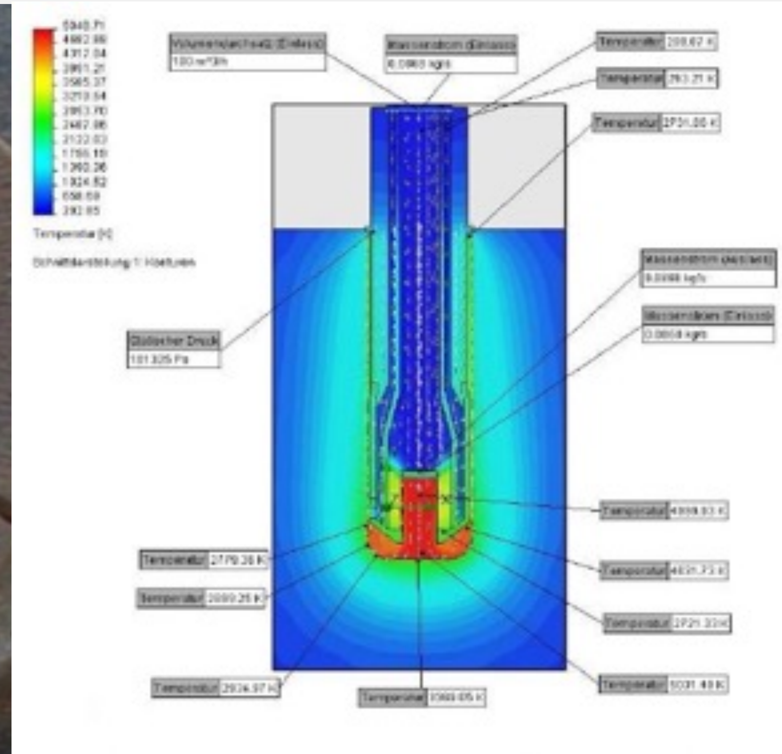
Plasma test with Plasmatron 150 KW electrical power

Figure 3 liquefaction process with plasmatron 150 KW el. Performance

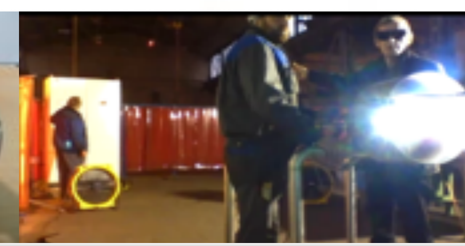


A sample of the liquefaction of rock by a plasma flame

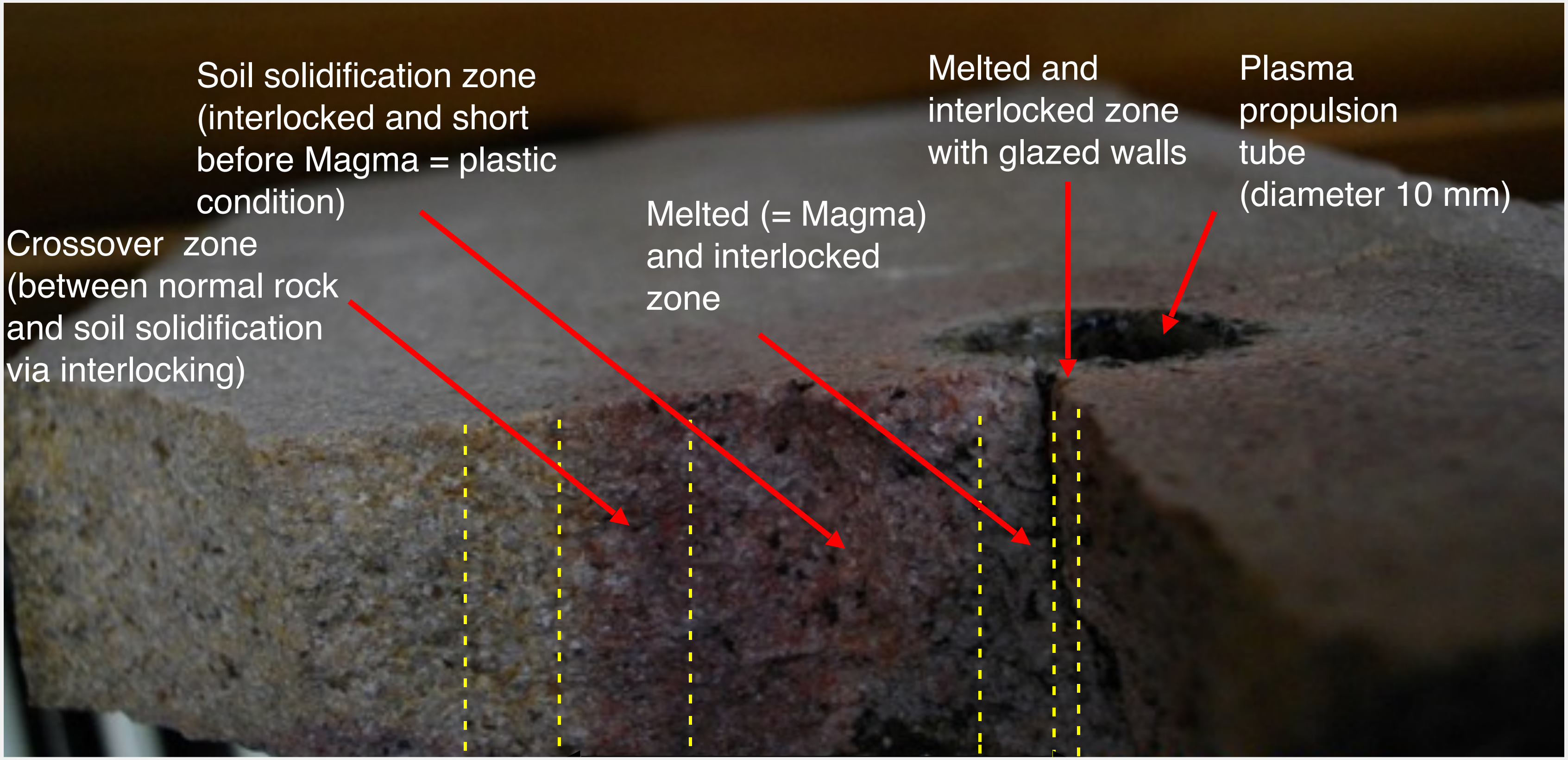
(Liquefaction found in sandstone high quartzite content instead, the temperature was 3,500 ° C)



With plasma energy of approx. 300 kW

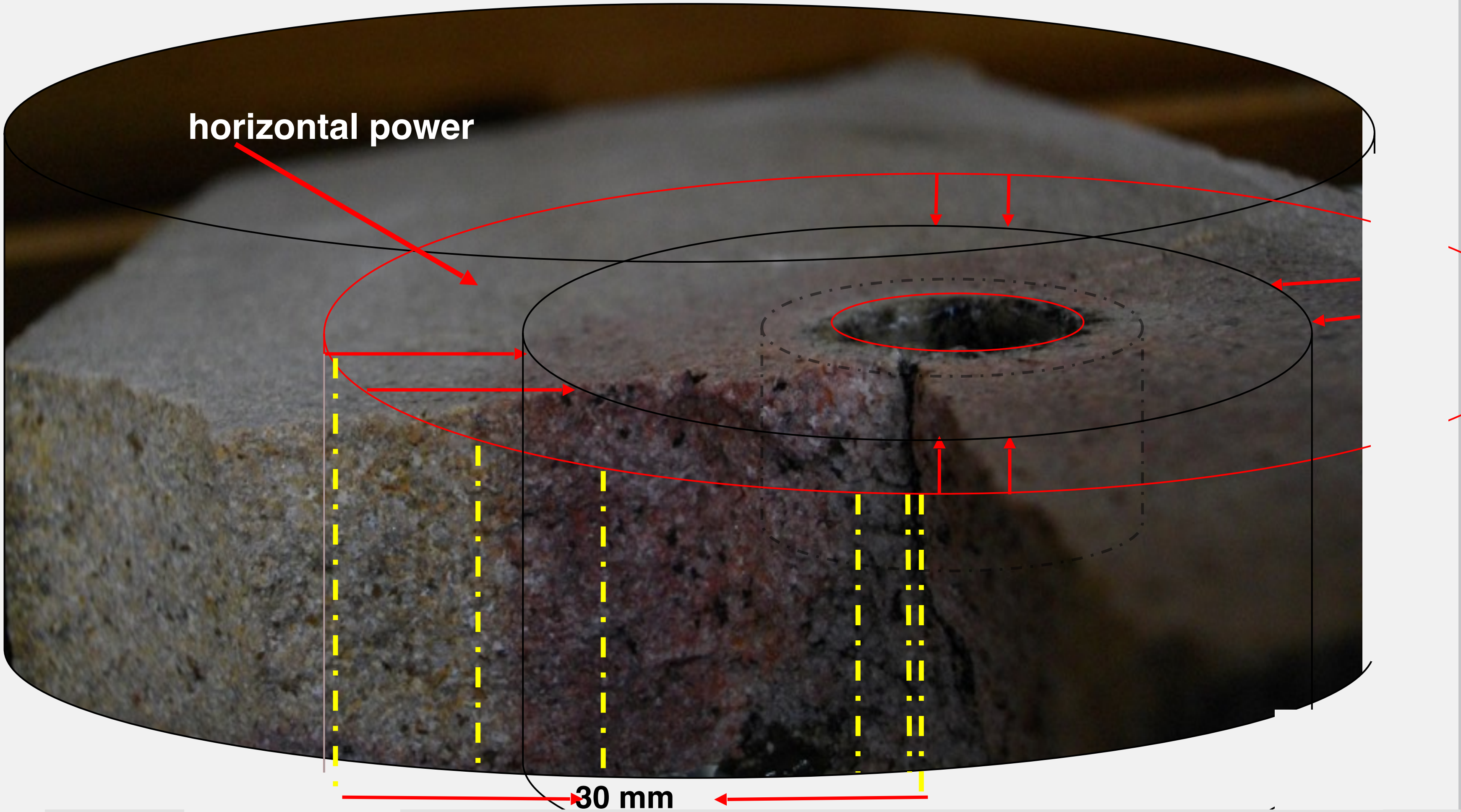


Sample of a hole - influenced by high temperature around the plasma propulsion tube

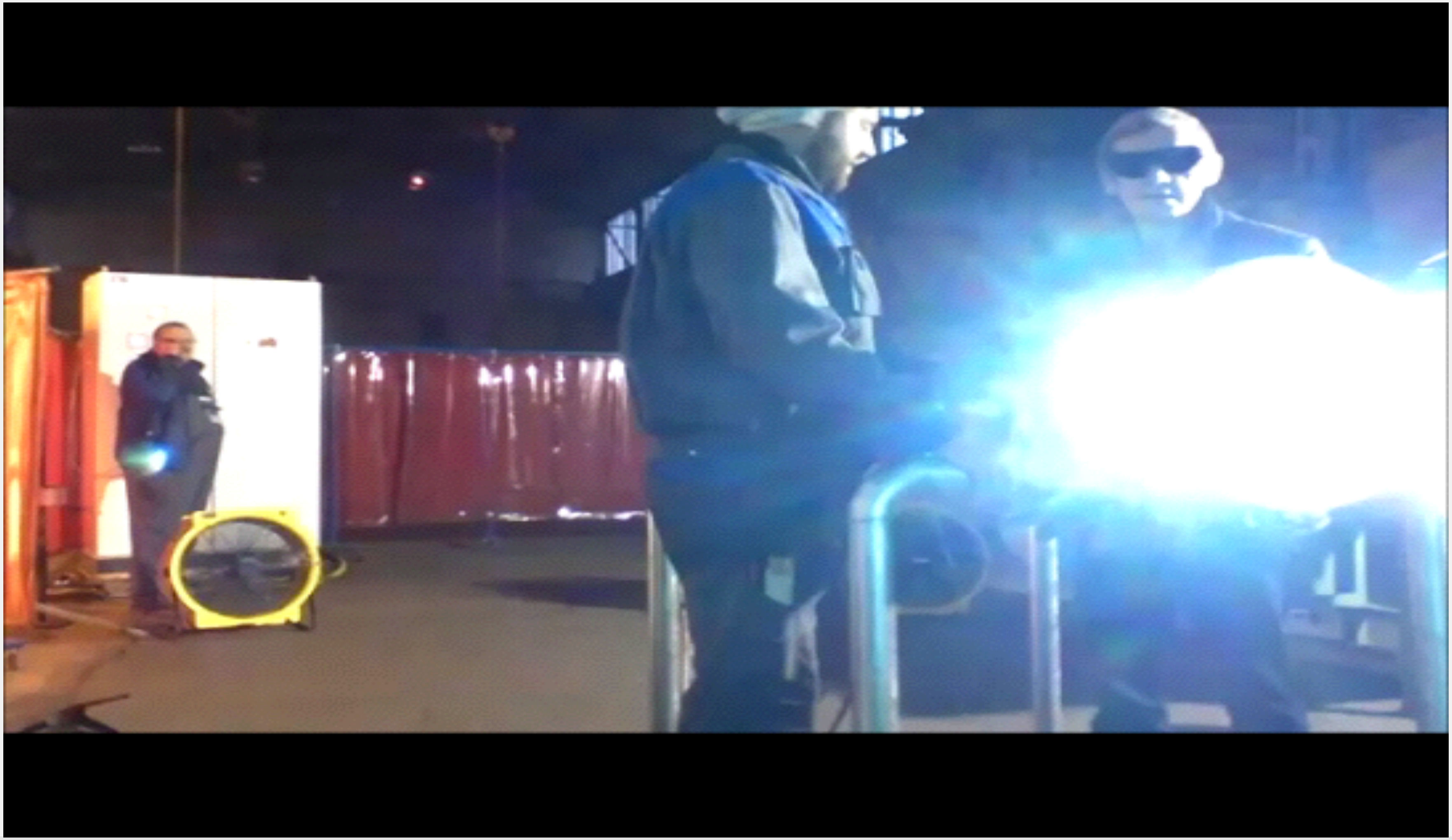


Influenced by temperature - approx. 25mm from wall of hole

3 D sectional view of plasma propulsion shaft tube and the temperature caused by self-locking - supporting glazed assisting toothed formation shaft wall



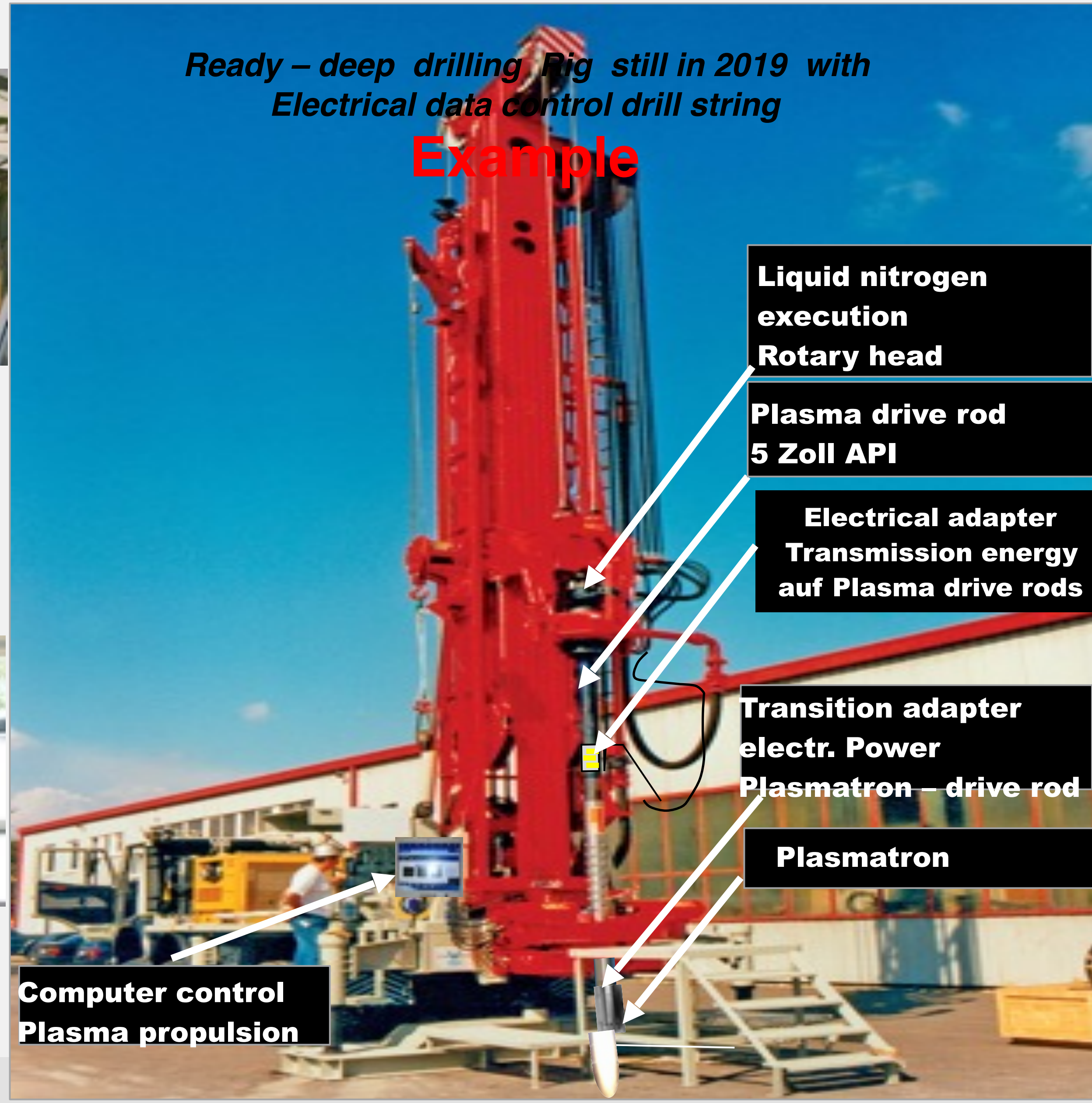
Commissioning
Plasmatron 1.3 MW electric. Power   test 3.



Electrical superconductors

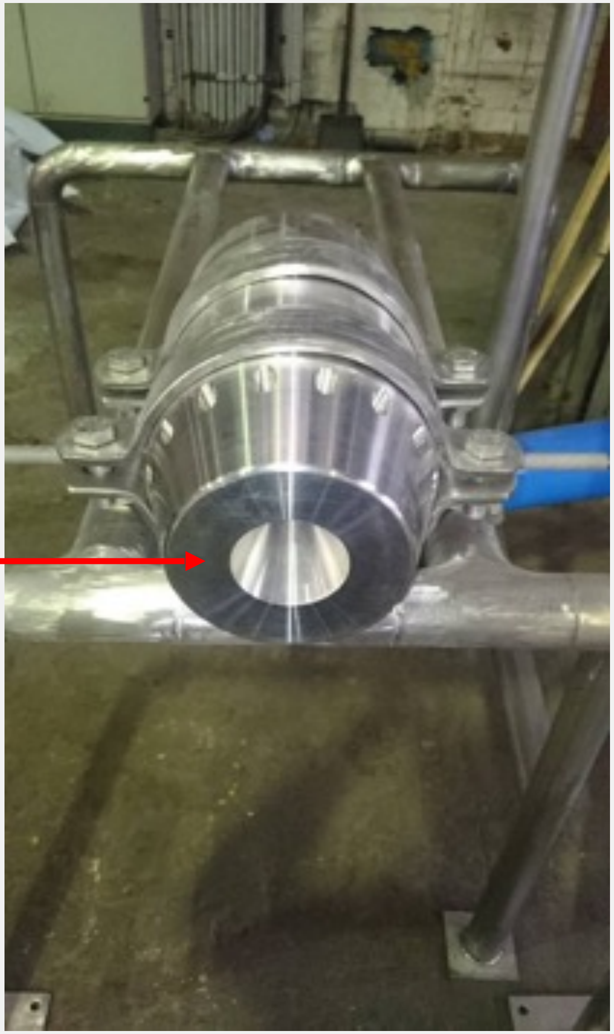
Plasma drive rod

5“ API



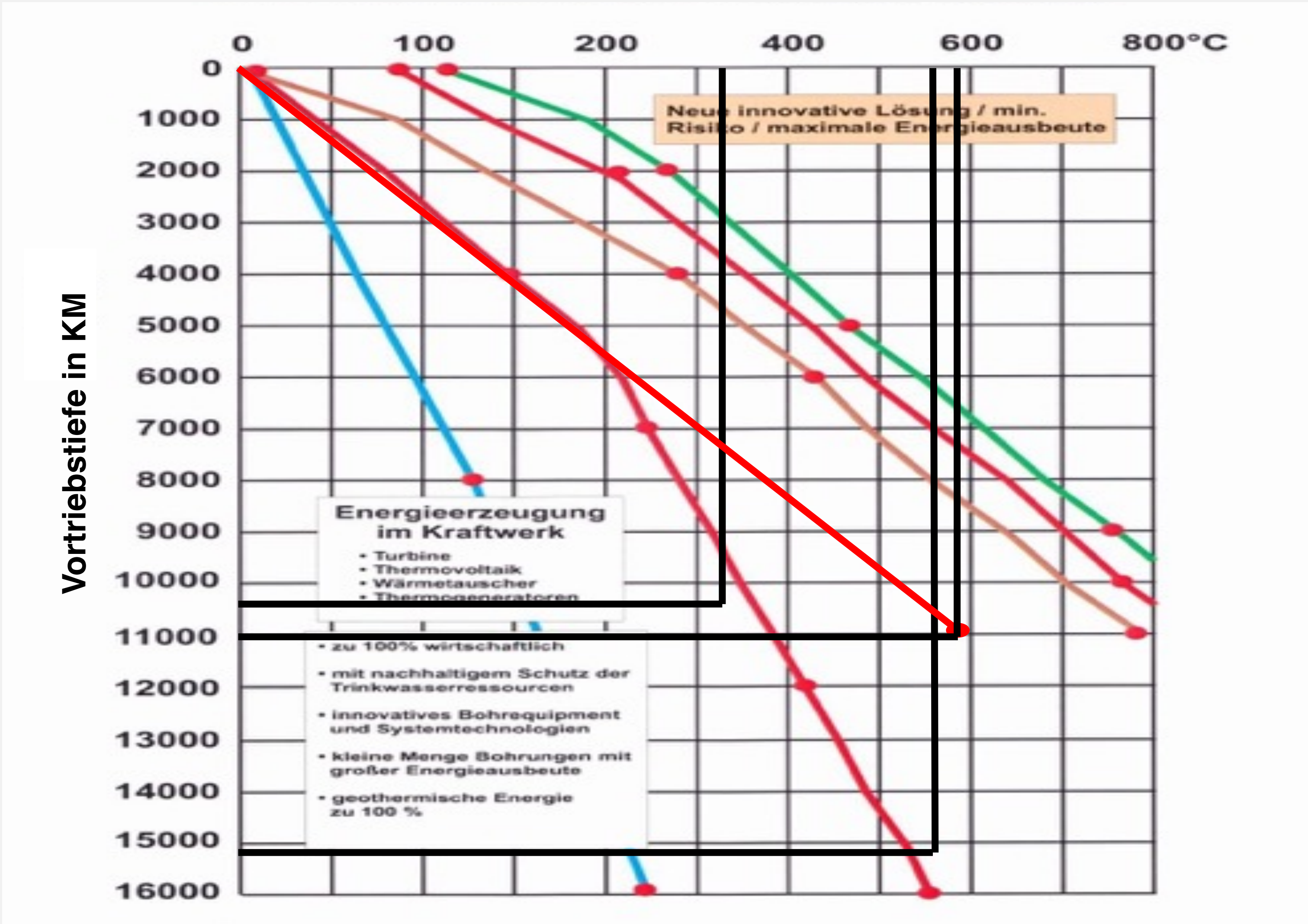
Plasmatron 1.3 MW built up for field tests 1. Date 22.10.2015
Electrical propulsion linkage - plasmatron

Superconductors
Plasma propulsion
Linkage API 5 inch

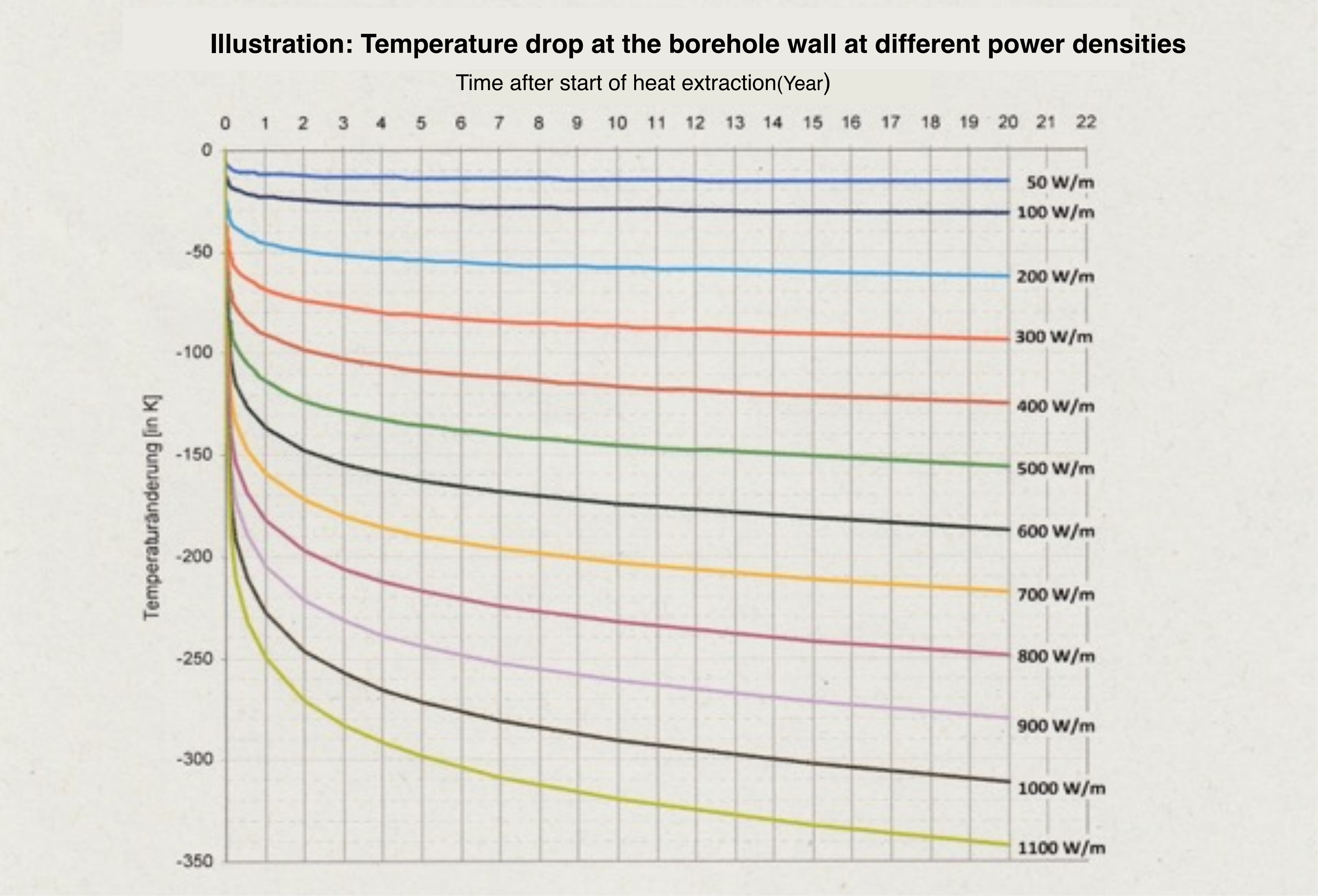


Plasma power head
1300 KW

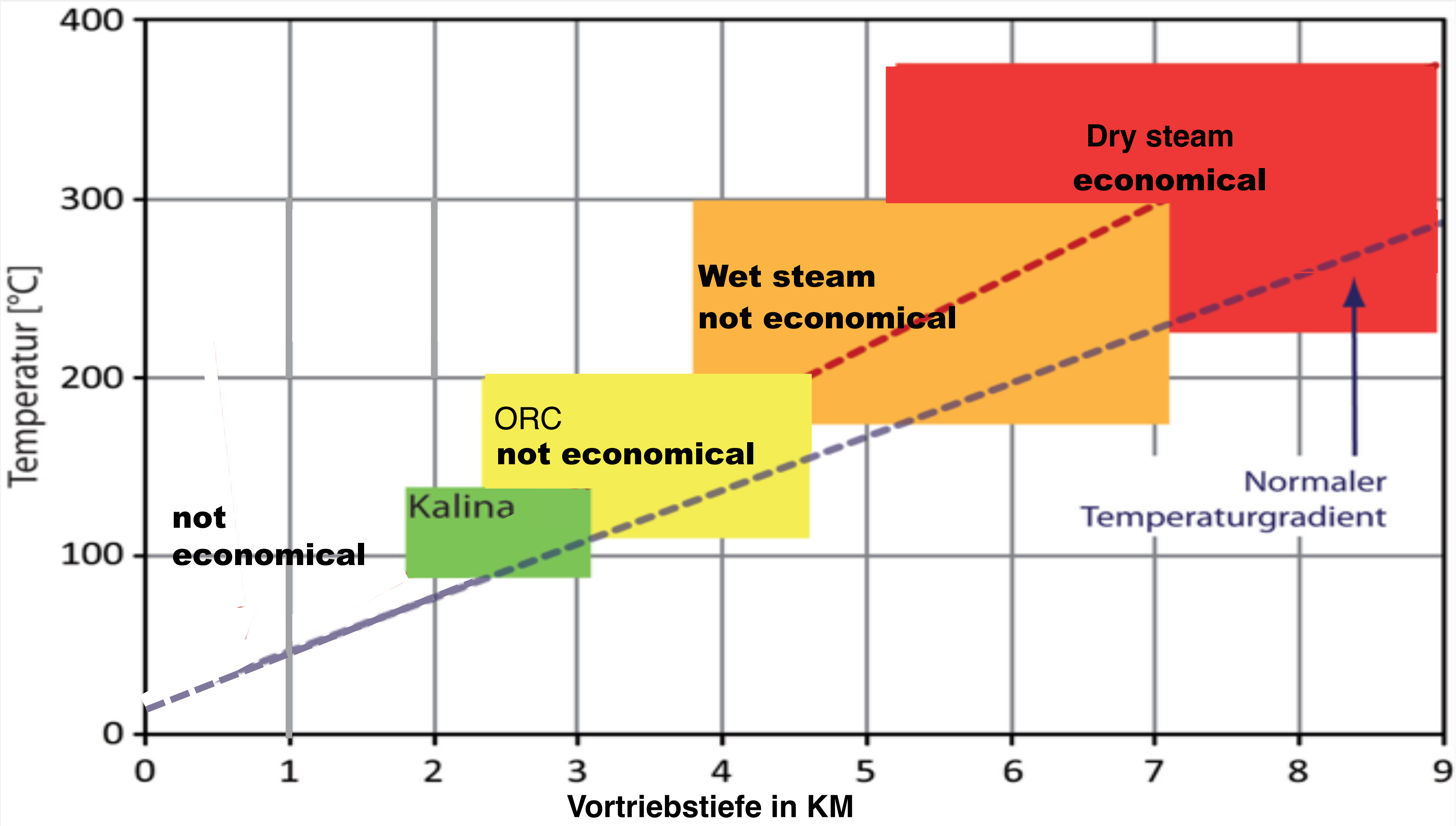
Effective usable temperature potential / dry steam turbine min 320 C ° for a deep geothermal borehole for electricity generation



Cooling of the rock by geothermal heat Investigation report / diagram 800 W/m



Forecast geotherm. Power generation with different procedures



Technical data: Geothermal power station electr. 70 MW

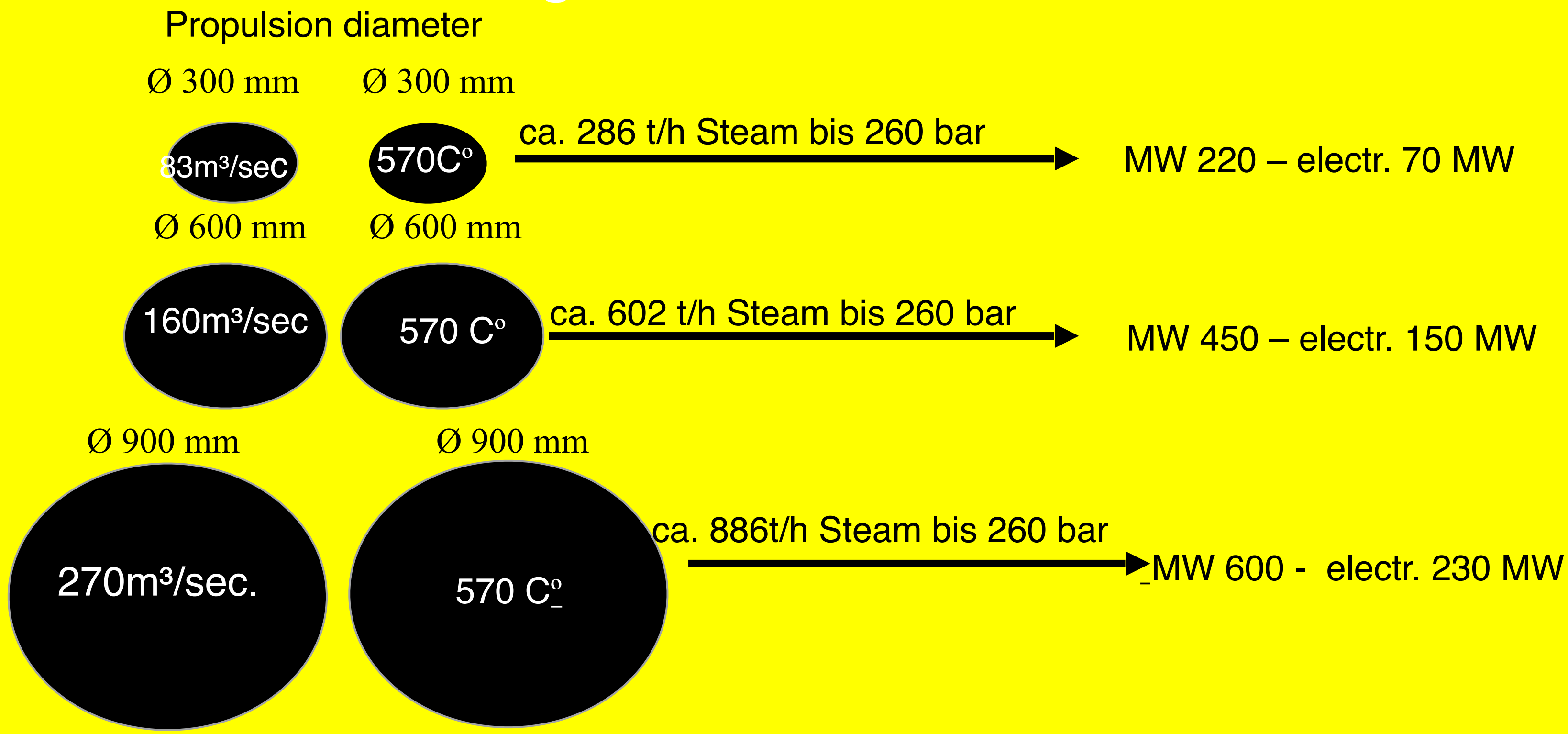
Operating data Turbine: Input

-	Fresh steam	bar/a	35
.	Temperatur	° C	350
-	Volume	kg/sec	83

Operating data Turbine: output

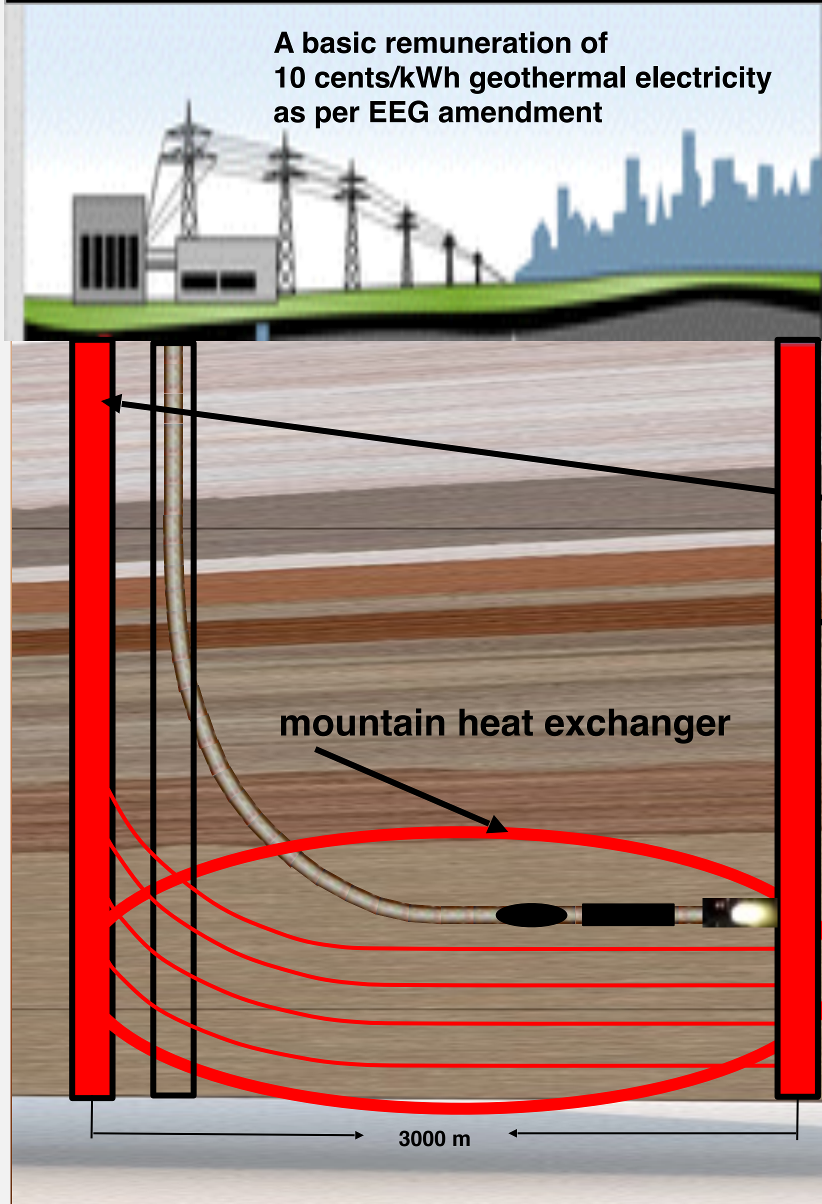
-	pressure	bar/a	0,1
-	Temperatur	° C	45,8
-	Volumen	kg/sec	83
-	Water inlet temperature	° C	30
-	Turbine speed	rpm	3000
-	Generator speed	rpm	3000
-	Power factor	-	0,85
-	Power at generator terminals	KW	70.000
-	Spannung	Volt	10.000
-	Frequenz	Hz	50- 52

Technical sizes and. Feasibility of the necessary pipe shafts - Mountain heat exchanger



If larger capacities are desired, the glazed tube shafts should be scaled at a distance of approx. 50 m parallel to the first tube shafts, the same procedure is carried out with the Mountain heat exchanger. The mechanical or electrical power can be adapted to the planned power station. The depth of the tube wells and the mountain heat exchanger depends from the fresh steam temperature which is desired.

H. D. R. geothermal part of the power plant 70 MW el. power
Running time of the power plant approx. 20 years

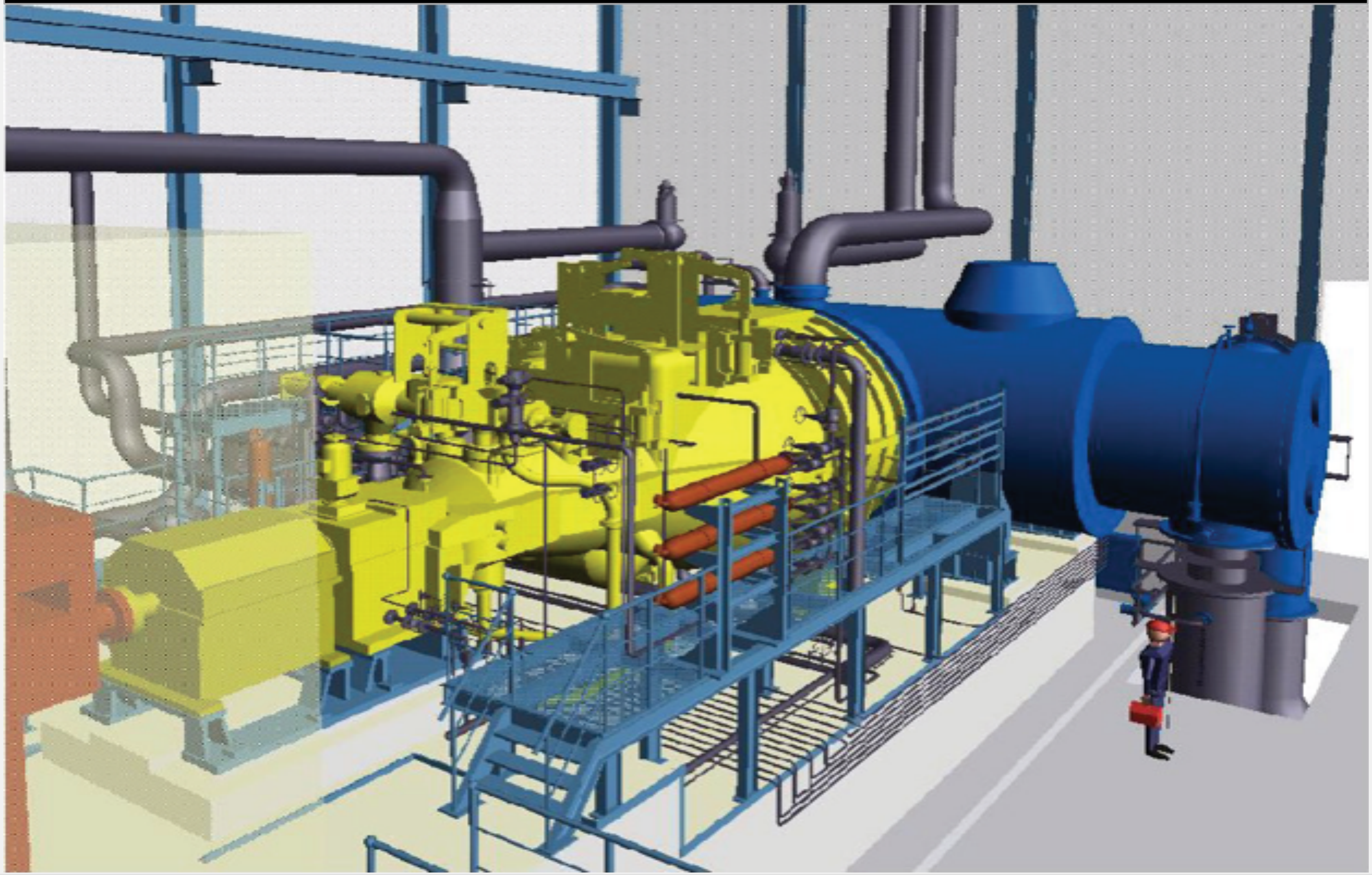


Generation of geothermal energy from new
energy sources
deep boreholes from approx. 9000 -15000 m
no matter on which place or environment.
Not for years. preliminary examinations more.
with a unique Investment, which pays off after approx. 2.5
years, will be maintained
You energy at almost (service costs) free of charge.
Old power plants convert to geothermal energy
As a result, the CO_2 values are reduced to zero percent.
Glazed ceramic injection chamber Ø 285 mm
Thermal injection approx. 350 m^3/h water
1 bar/ 30 degrees Celsius
Glazed shaft Ø 285 mm
approx. 286 t/h steam - 260 bar - during operation
570 degrees Celsius corresponds to
approx. 220 megawatt capacity
approx. 70 MW electrical power

e. g. power supply for approx. 150,000 inhabitants
Investment costs 2 Deep boreholes and
Mountain heat exchanger 85 KM - Ø 285mm ca. € 46 Mio.
Yield per year (at 4.0 cents/kW/h) approx. 21.5 million
We are also economic without state subsidies
against over solar energy; Wind energy and bioenergy,
as well as full base load capacity and are weather independent.
The power plant can be switched on adhoc.

Power Station 100 % CO 2 freie Energy

Steam Turbine Generator Set 70 MW electrical

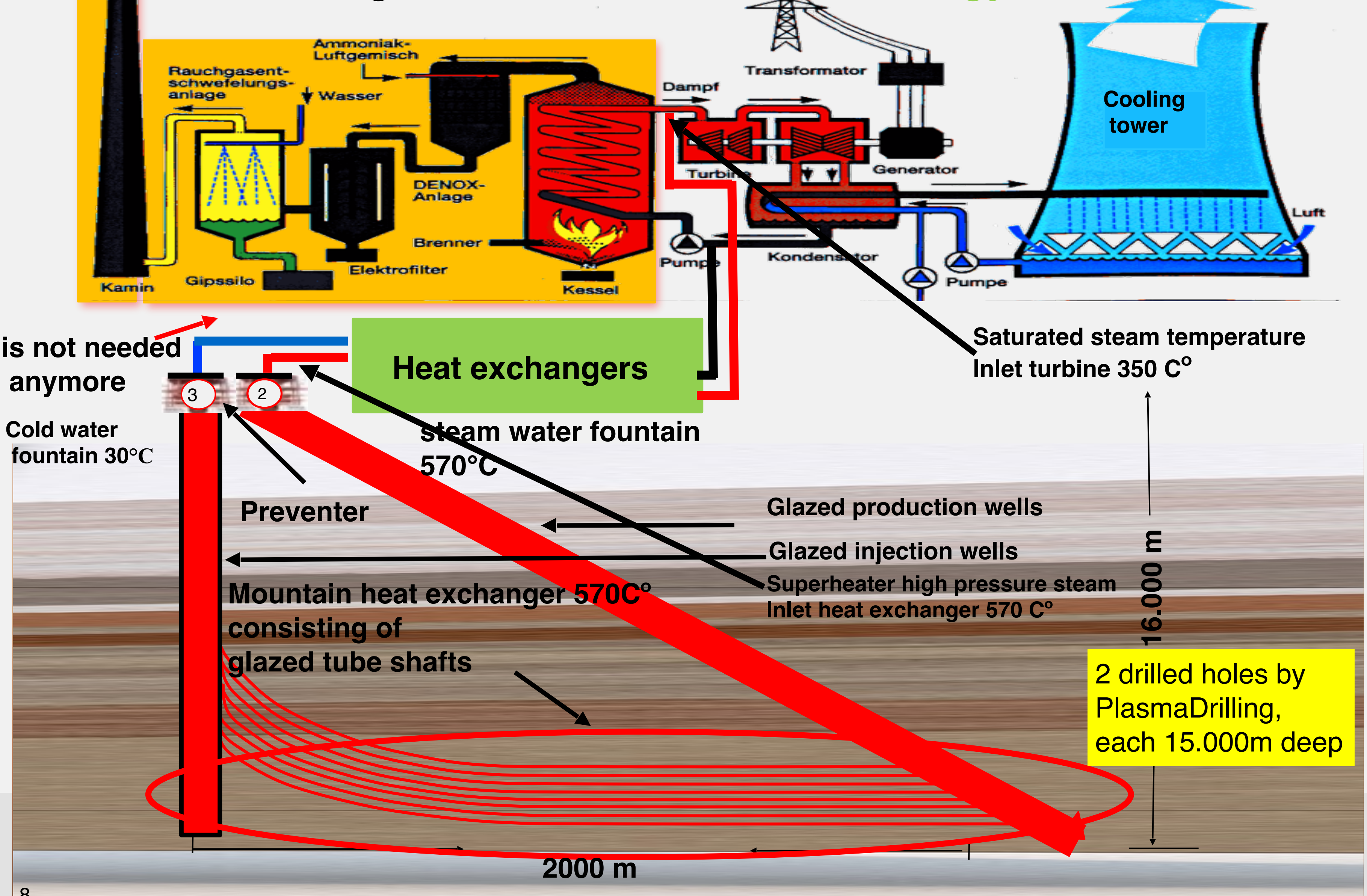


The geothermal part and the power station were, through calculated and planned in close consultation with Manufactures.

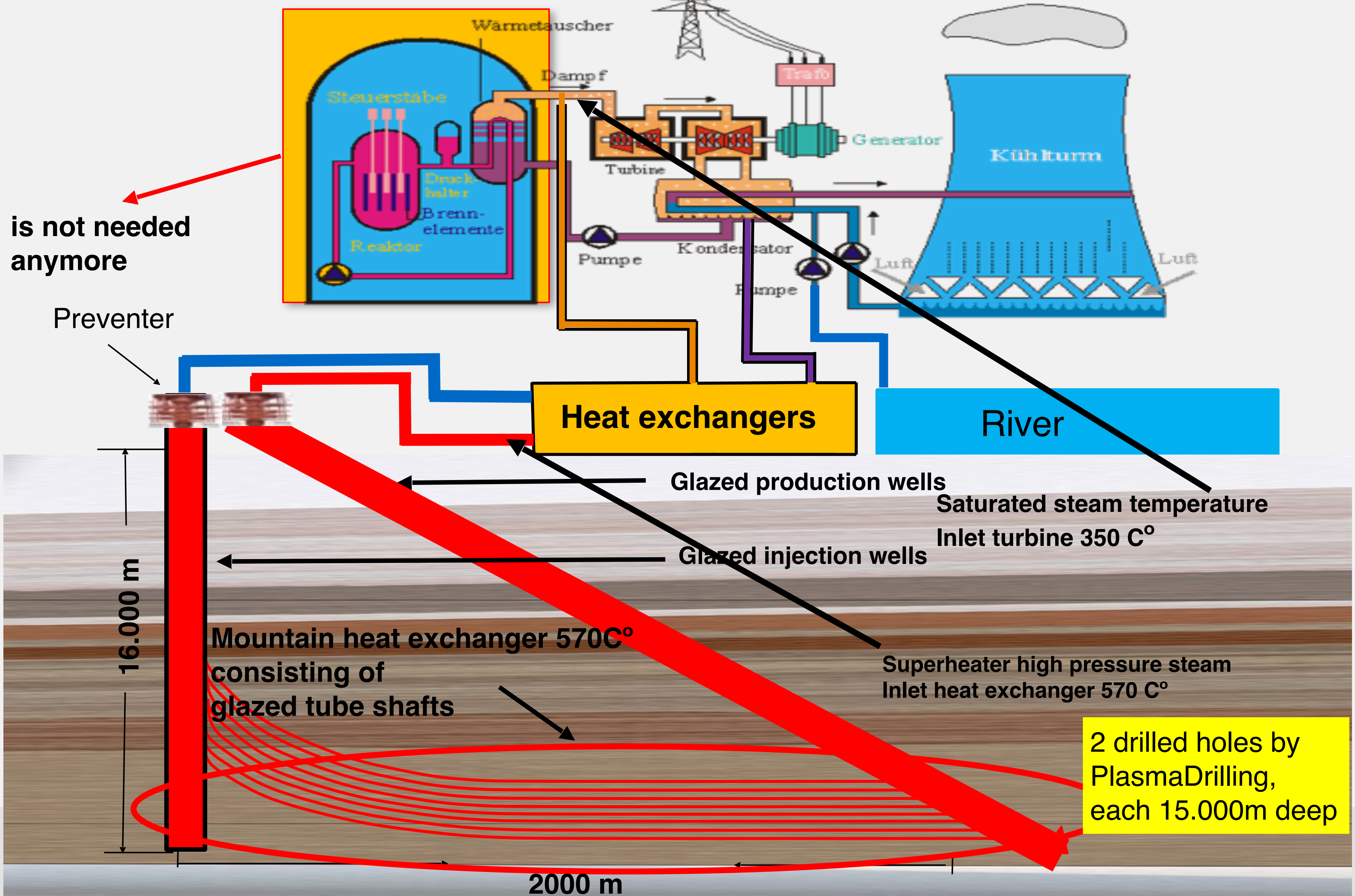
Water supply for third countries with the company Watergen

For our project with the mountain thermal storage - mountain heat exchanger is this Watergen
Plant the answer !! How do we get energy and water. With 100 systems, approx.
50,000 people a day are supplied with water. From our power plant with 70,000 KW then 4500 KW would be needed for the water supply of 50,000 humans. The electricity price for our power plant is approx. 0.03 ct / kWh.
Conclusion: Power plant and water supply (Watergen) help the third countries to build their infrastructure independently and we would participate twice.
Criticism of the procedure from the net
That sounds great. If I extrapolate the data - 350 watts per liter and 3,100 liters per day, that the system is 1,085 kWh per day of electrical current - or a connected load of 45.2 kW in continuous operation. If I start from an electricity price of only 10 ct / kWh, then I am already alone on the consumption costs at significantly higher costs than the specified 2 ct / liter. The depreciation of the purchase price of the plant is not even included!

Sketch of a coal power plant 100 – 1000 MW running with geothermal heat CO_2 free energy



Sketch - supply of a nuclear power plant 100 – 1500 MW with geothermal CO 2 free energy



Info patents and milestones

USA Patent: No. US9631433 B2 Method and apparatus for introducing or sinking cavities in rock.

Europe Patent: No. EP 2 825 715 Method and apparatus for introducing
or sinking cavities in the mountains.

EP- Patent Nr. 2 825 715 für Schweiz/Lichtenstein - Belgien - Deutschland – Spanien – Frankreich – Großbritannien - Irland - Italien - Österreich

Japan Patent: No. J 6 066 133 B2 Method and apparatus for introducing or sinking cavities in rock.

China Patent: No. 201380024380.6 Plasmadrilling

Milestones
The project is monitored and monitored by compliance with the specified milestones. Due to the time and content of the project, it possible to document the progress of the project on an ongoing basis and to recognize changes in time.

Six milestones were conceived:
Milestones 0: within 4 weeks evaporation of 1 piece of egg charcoal - granite - graphite - basalt - clay with plasma arc.
Milestones 1: Modification Plasma Propulsion Rods - Plasmatron 100 mm successful (7 months and 2 m of rock propulsion).
Milestones 2:Successful plasma propulsion through the mountains 10 m in 2 months diameter 250 mm.
Milestones 3: Successful plasma propulsion 100 m 7 months 250 mm diameter.
Milestones 4: with large partners a plasma tube down to 500 m dismantling & take deflection into operation.
Milestones 5: With large partners, two plasma tubes a 1000m, of which two plasma tubes, designed as a deflected plasma plasma propulsion, to produce the mountain heat exchanger with it.

Cost-effectiveness calculation - Part I 15000 m depth 70 MW electr. Driving speed 20 m / h

A. **Investment costs of plasma propulsion 2 X 15 km shafts and 1 mountain heat exchanger**
2.5 Km X 35 = 117 Km corresponds to 70 MW electr. Performance over a period of 20 years

- 1 900 to. Equipment - Rent a day 20.000., 00 €	X	320 days	6.4 million euros
- 5 engineers a hour 85 € x 10 hours	X	320 days	1.3 million euros
- 7th employee a hour 65 € x 10 hours	X	320 days	1.5 million euros
- 2 geologists a Std.150 € X10 hours	X	320 days	1.0 million euros
- 2 liquid nitrogen. 15 m / h - Rent a day 9800,00 €	X	320 days	6.2 million euros
- 2 diesel power units 4000 KVA a day 15.000,00 €	X	320 days	9.6 million euros
- 10 plasma propulsion heads 260 mm / 2000KW for 100,000 m X 100,000 €			1.0 million euros
- Diesel 3000 liters / h x 24x 200 days x 1.10 75% load			12.0 million euros
- Installation - Installation - Standpipe and other tasks			1.2 million euros
- General costs Operation: eg transport and assembly. Mining costs			1.0 million euros
- production of the drilling site (concrete foundation) and approach path - Pers.			1.0 million euros
- 2 Preventer - Conformity insurance and construction work - Collection container - Matel			1.5 million euros
Total investment costs Ivestition			**44.0 Mill. Euro**

Cost efficiency analysis - Part II

C. **Steam turbine generator - cost**	transfer	44.0 million euros
- Steam turbine with 350 ° C / 35bar with a volume of 83 kg / sec Superheater and generator to produce 70 MW electrical power		17.0 million euros
- Construction of turbine hall and the generator control room - control		2.0 million euros
- Heat exchanger made of stainless steel - input power 100 MW		2.5 million euros
- Air - Cooling system 80 MW, if water cooling is not possible.		2.0 million euros
Total for hall, steam turbine, generator and control room		**23.5. Million euros**
D. Profit J.G.P. About 6%		5.0 million euros
A. - D. Total costs for a 70 MWel. Geothermal power plant		**72.5 million euros**
District heating costs are not included.		
E. Service costs per year		
- Maintenance costs water pumps and turbines		1.0 million euros
- 7 employees (2 engineers and 5 skilled workers)		1.0 million euros
- Maintenance costs and spare parts for steam turbine generator		2.0 million euros
- Other costs operating		1.0 million euros
Total annual maintenance costs		**5.0 million euros**

“Third Step”: Producing $70MW_{electrical}$ Power from a Steam Turbine

A) – C) Total Investment Cost of a 60 MW Geothermal Power Plant **72.5 million Euro**

D) Operating Cost per year
Total sum of yearly operating cost **5.0 million Euro**

F) Power Output of a 70 MW Steam Turbine
Production of 70.000 kWh Electricity per hour x 24 hours x 320 days = 537.600.000 kWh per year
Earnings per year 537.600.000 kWh x 10 Cent per kWh **53.6 million Euro**

G) Yearly Earnings - Operating Cost: 54 - 4 = 50 million Euro

Total Net Profit per year: **minimum 50.0 million Euro**

German producers of geothermal energy will receive from the
German Government approx. 0,10 Euro per kWh (EEG-Umlage for 2019 depending on output kWh/year).
Earnings per year according to EEG: 537.600.000 kWh x 10 Cent per kWh = approx. 53.6 million Euro

Electrical power production costs at a 70 MW power plant with a mountain heat exchanger over a period of 20 years.

Produktion von 70.000 kW electricity per hour x 24 x 320 days =

535.600.000 KWh per year
Yield of 0.004 Euro / KWh proceeds

21,5 Mio. Euro per year
Yield with EEG surcharge of 0.10 Euro / KWh

53,6 Mi0. Euro per Year