



MINISTERSTWO
ŚRODOWISKA



Narodowy Fundusz
Ochrony Środowiska i Gospodarki Wodnej

The EEA Project GeoHeatPol

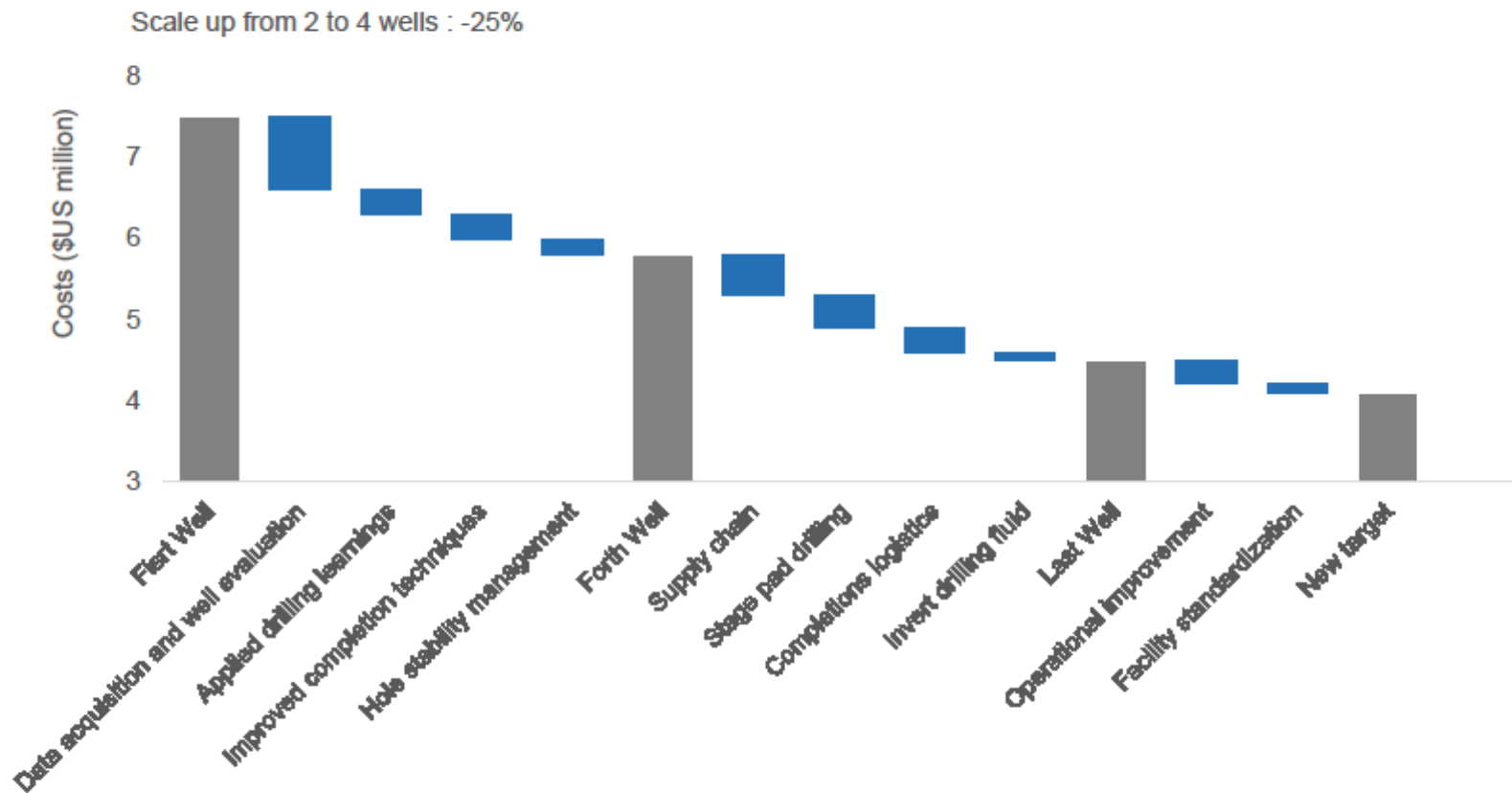
Iceland 
Liechtenstein
Norway grants

Deep drilling costs reduction

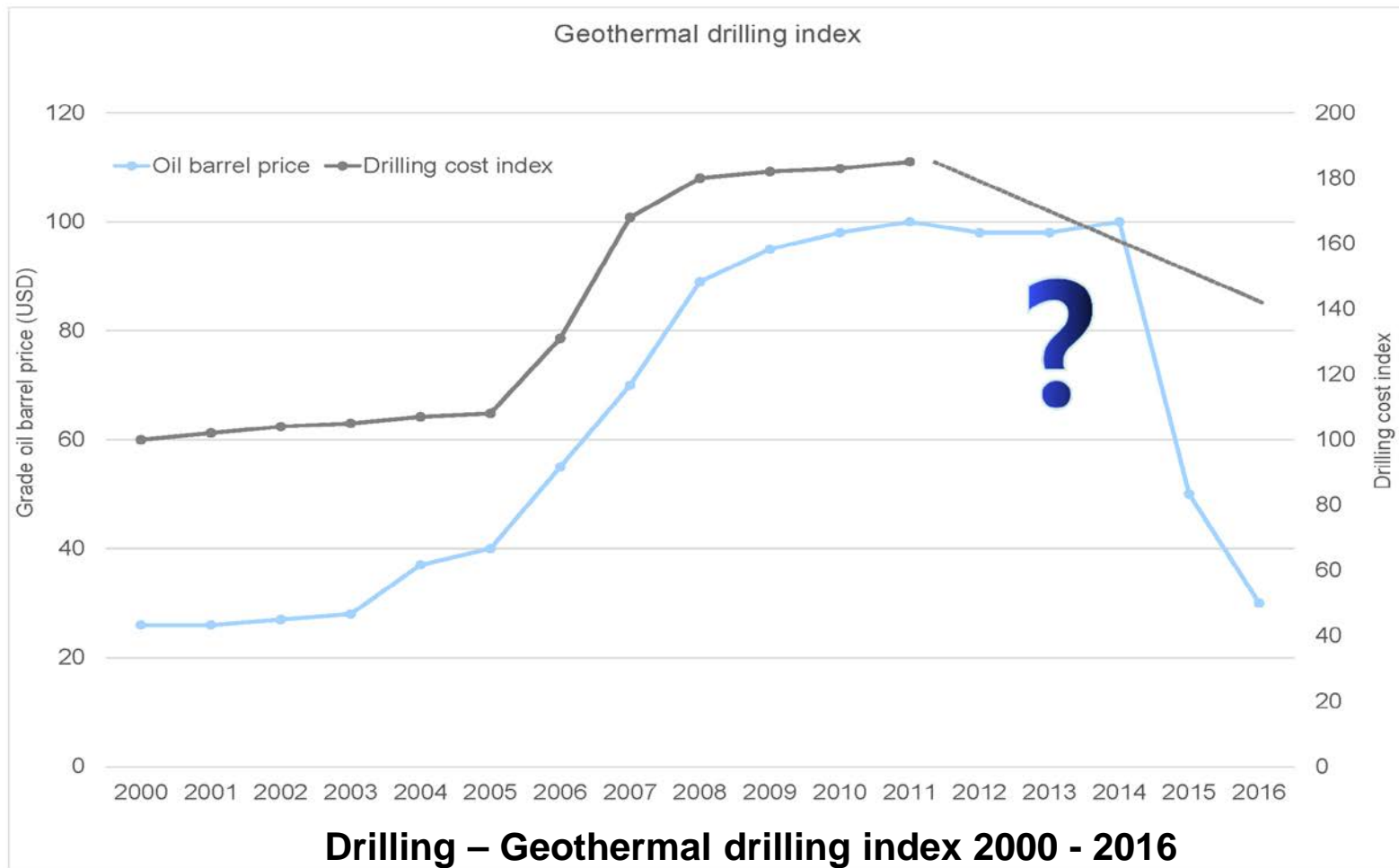
How Deep drilling costs can be reduced ?

- With RD&D activities
- With Learning by doing series of drilling
- With a better functioning drilling market

Reducing cost:
Scale up effects while drilling



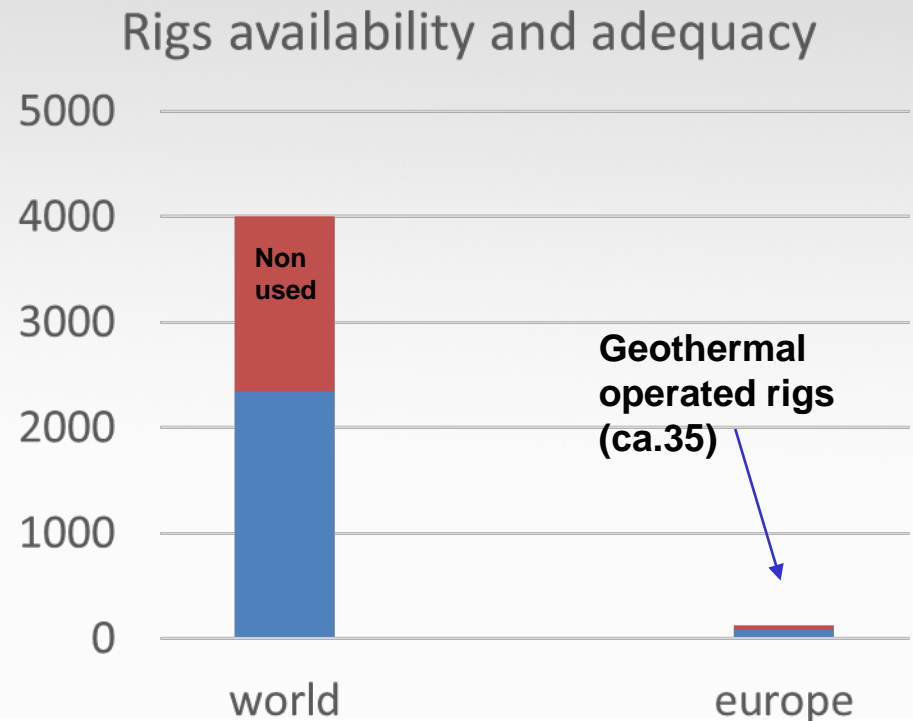
Market conditions



A better functioning drilling market

Drilling costs are dependent on:

- the rig demand (mainly for oil & gas, therefore dependant on crude oil prices),
- the drilling price (€/m),
- and the raw material cost.



Drilling costs comparison: GeoHeatPol project

country	Drilling contract	Drilling price €/m	Ponderation factors	Other factors
Iceland	Integrated meter rates contracts	<ul style="list-style-type: none"> •A: 250 m fresh water / low-temp well, 60 to 100 €/m Small rig •B: 1000 m geothermal well 350 to 550 €/m Medium rig •C: 2500 m high-temp well 1.100 to 1.400 €/m Large rig. 	Rig demand Raw material cost	Market maturity : n° of geothermal plants, n° of drilled geothermal wells N° of national drilling companies Drilling market open or not to foreign competitors Complexity of tender documentation
France	rig daily rate, lump sum	Under 1000m depth: 1000 €/m Below 1000 m depth: around 870 €/m		
Germany	metre rate, rig daily rate and lump sum	Below 2000m depth: 1100-1500 €/m		
Hungary (and similar in the Pannonian Basin)	Lump sum drilling contract	<ul style="list-style-type: none"> •<2 km: 350-500€/m, with “small” capacity, “old” rig •>2 km: 800-1000€/m, with “large” capacity rig 		
Netherlands	lump sum, rig daily rate			
Italy	rig daily rate			

Cost headings characteristic

- **Civil works for access and drilling platform**
- **Mob-demob drilling rig and auxiliary equipment**
- **Drilling**
- **Casing & installation**
- **Directional drilling**
- **Logging**
- **Stimulation, test and pumping**
- **Well head equipment**
- **Treatment and transportation of cuttings and waste material**
- **Engineering and supervision**
- **Insurance**
- **Unexpected**

Iceland

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B: 1000 m geothermal well 350 to 550 €/m Medium rig

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France

For the Dogger target, Example : One off the last doublet in 2016

Drilling cost alone with mob-demob at 2300 m = 860 €/m

Hungary

The price rate is strongly determined by the oil price. In the latest years there are **less and less hydrocarbon exploration** in Hungary, therefore free drilling capacities push down the drilling price. There are minimum 5-6 potential drilling contractors now instead of 2-3 formerly.

Drilling price depends on rig size (incl. 27%VAT):

<2 km: **350-500€/m**, with “small” capacity, “old” rig

>2 km: **800-1000€/m**, with “large” capacity rig

Drilling is implemented by old water rig, selecting always cheaper solutions.

“Large rig” technology comes from the hydrocarbon industry, with high standard solutions. Unfortunately, municipalities and greenhouse companies often unable to finance this cost level.

Conclusions

5 Key parameters to improve

- 1) Technical: new materials, experienced crew...
- 2) Technological: proper rigs and bits
- 3) Regulatory: nature and its local/national aspect
- 4) Financing
- 5) Economical and market conditions.