Obstacles and pitfalls in geothermal development

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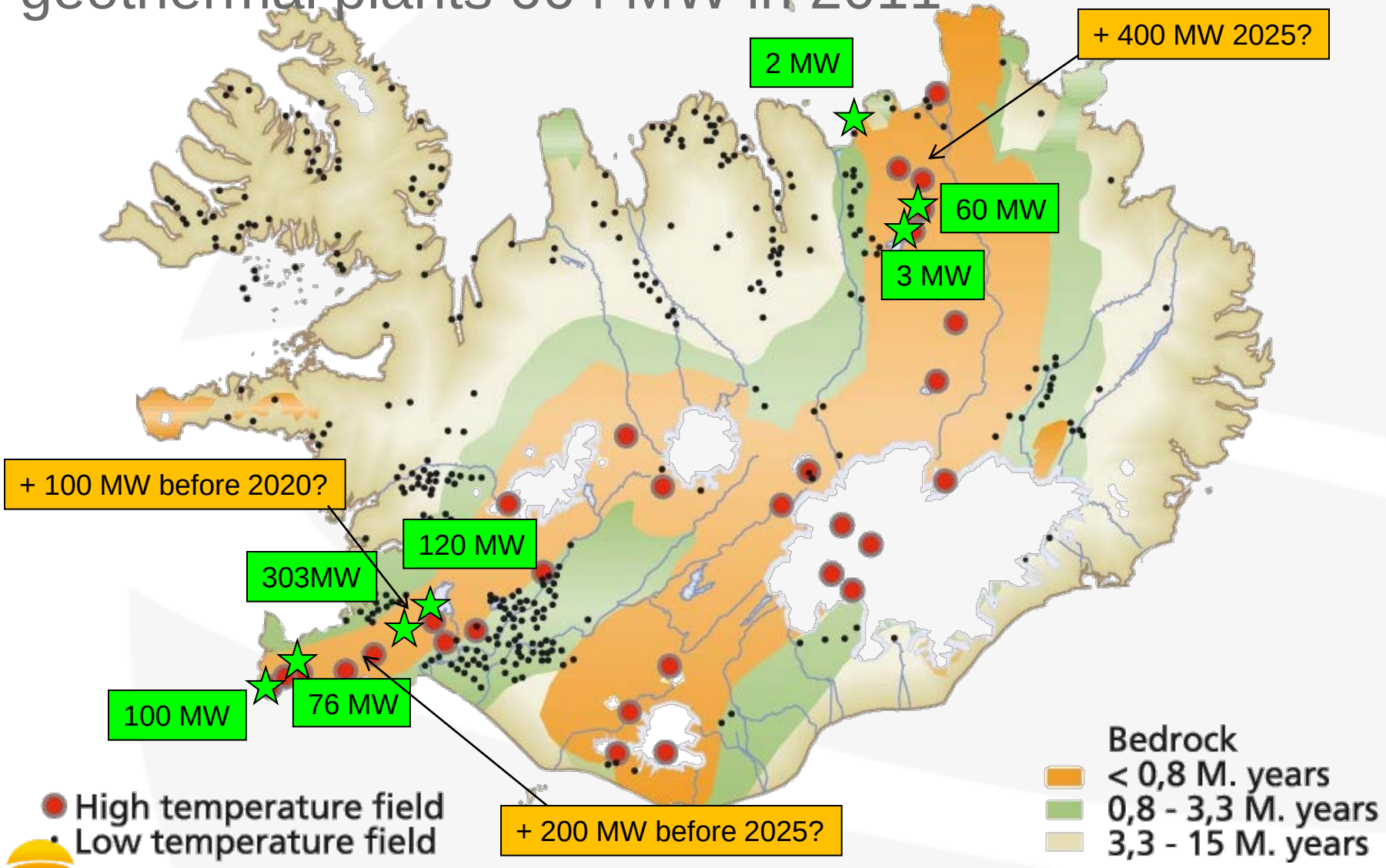
There are many success stories

Installed electrical capacity in geothermal power plants in 2010 (MW)

USA	3.093	Costa Rica	166
Philippines	1.904	Nicaragua	88
Indonesia	1.197	Turkey	82
Mexico	958	Russia	82
Italy	843	Papua New Gu.	56
New-Zealand	628	Guatemala	52
Iceland	575	China	24
Japan	536	Portugal	29
El Salvador	204	**The World**	**10.717**
Kenya	167		

Geothermal fields and installed power in geothermal plants 664 MW in 2011



Installed power geothermal power plants in Iceland in May 2012

Krafla	(electricity)	60 MW
Nesjavellir	(electricity & heat)	120 MW + heat
Svartsengi	(electricity & heat)	76 MW + heat
Bjarnarflag	(electricity)	3 MW
Húsavík	(electricity)	2 MW
Hellisheiði	(electricity & heat)	303 MW + heat
Reykjanes	(electricity)	100 MW
TOTAL		**664 MW**

Obstacles & pitfalls

- Lack of knowledge and understanding of geothermal energy
- Technical obstacles
  - Lack of knowledge of project development
  - Improper preparation
- Financial obstacles
  - Lack of understanding the geothermal energy
  - High upfront cost
  - Risk & risk mitigation
- Environmental obstacles
- Social & environmental obstacles

Lack of knowledge and understanding of geothermal energy

- Geothermal energy is now only providing a minor part of the total energy use in the world – but important in a few countries.
- The vast majority of people do not know anything about geothermal energy.
- Various kinds of misunderstanding, for example:
  - It is only accessible in a very few and special places, usually remote.
  - It is risky as this is connected to volcanic activity
  - It is easy to access, just bring in drill rigs
  - It will destroy natural hot springs and pollute the ground water
  - It is mining and it will be depleted shortly

Technical obstacles

- Lack of knowledge of project development
- Improper preparation
- Unrealistic expectations
- Must be developed in steps
- Unprofessional exploration work
  - Everybody think they can
  - Methods often not tailor-made
  - Lack of overview and interdisciplinary approach
- Geoscientists, engineers and financial people do not understand each other
- Chemical problems

Financial obstacles

- Lack of understanding the geothermal energy
- High upfront cost
- Unrealistic high expectations
- Risk and risk mitigation
- Feed-in tariffs
- High drilling and logging cost
- Needs patient capital

Social obstacles

- A lack of public awareness.
- Easy to frighten people with the unknown:
  - Geothermal pollution make men infertile
  - Holy places
- Mostly in remote areas.
- Often in national parks or protected areas.
- Competition with natural gas, mostly in the heating sector.
- Legislation and regulations do not fit geothermal development.

Concluding remarks

- The conventional geothermal energy has big potential, especially for certain parts of the world and with very competitive prices.
- The worldwide technical potential of geothermal energy is enormous, its use is a question of technology and prices.
- If future development of new technology like Enhanced Geothermal Systems and Supercritical Systems will be successful, the share of geothermal energy in the future energy budget will be of considerable importance.
- Strong research and demonstration activity with industrial and governmental participation supported by international organizations is needed to speed up the development.

Thank you for your attention

Photo: Gudmundur Steingrímsson