ETIP-DG
European Technology & Innovation Platform on **Deep Geothermal**

VISION FOR DEEP GEOTHERMAL

DESIGNING THE FUTURE OF GEOTHERMAL ENERGY

Renewable, secure, clean, versatile, distributed, reliable: the energy future that we imagine is solidly grounded on geothermal energy.

DEEP GEOTHERMAL IN EUROPE TODAY

With its long tradition of electrical power production, developed in Italy at the dawn of the 20th century, and of district heating, almost one century old in Iceland, geothermal is the foundation of the renewable energy system in Europe. Levelised Cost of Electricity (LCoE) from geothermal is one of the lowest in the renewable energies realm and heat applications largely contribute to energy efficiency.

Electricity. By the 1970s, only a few geothermal power plants had been installed in Europe (mainly in Italy and Iceland), but with the development of binary cicle technologies, which can produce electricity from lower temperatures, geothermal plants were then set up in other countries as well. Today, there are 102 geothermal power plants in seven European countries, with a total installed capacity of 2,5 GWe. Electricity generation from geothermal resources has a huge potential in Europe. Especially when the new generation technologies for enhancing heat extraction become competitive, electricity could be generated in most European countries.

Heating and cooling. In Europe, where the heating and cooling sector represents nearly 50% of the energy demand, the 280 geothermal district heating plants already in operation in 24 countries use just a minimal part of the enormous geothermal potential. With 163 plants under construction or investigation in 2016, the heating capacity from deep geothermal sources in Europe is expected to grow significantly and the same goes for industrial applications (i.e. food industry or bio-refinery, etc.).

A VISION FOR THE FUTURE

Alongside its already numerous and diversified applications, the geothermal sector has many more possibilities for further development. The Vision aim is to use deep geothermal to cover a large part of domestic heat and electrical power in Europe. It goes beyond the urban areas, by exploring the numerus applications already in operation producing heat for industrial and agricultural processes, for balneology and health spas.

As the scientific knowledge and the technological developments are moving forward, augmenting the efficiency and the accuracy of plants, the geothermal community is also expanding. Thanks to continuous innovation, geothermal resources that previously were out of reach will be explored and developed. The new technologies will make it technically and economically feasible to deliver hot fluids even in low temperature areas. The increase in the numbers of wells also means increased knowledge of the underground, which will in turn improve forecasting of underground conditions and the performance of applications, enhancing the resilience of the system.

RESOURCE POTENTIAL	FIT FOR PURPOSE	STABILITY & AVAILABILITY
GROWTH	COGENERATION & HYBRIDISATION	SUSTAINABILITY
FLEXIBILITY	OPTIMISATION	COOL & APPEALING
MARKET PENETRATION & SOCIAL DIMENSION		

THE "CITY OF THE FUTURE"

By 2030, almost 60% of the world's population will live in urban areas. The way in which cities are organized will play an always bigger role in terms of social, environmental, and economic sustainability of human societies. The Vision dreams about the "City of the Future": a combination of renewable energy sources, for local electricity and heating/cooling supply at house level, with or without storage facilities, and electrical cars integrated into the system. It envisions large heating networks fed by geothermal heat, with intelligent exchanges of energies between houses and the major supply pole. It will be a city that has 100% renewable sources in terms of electricity, heating/cooling and mobility, with zero impact on the environment (no pollution, no GHG emission, no long distance transportation of fossil fuels), where citizens will act as "prosumers" in a smart, clean, renewable and sustainable system.

CHALLENGES AHEAD

Of course, these ambitions cannot be realized without a collective commitment. As we have learned in the last decades, energy transition is not only a matter of techno-scientific innovation, but also of cultural habits, social issues and political choices, which are strongly interconnected. To redesign the European energy systems towards a more sustainable future, it is fundamental to put in place an interdisciplinary, open, 360 degrees approach, which cannot exclude the inexhaustible, renewable, and indigenous heat flow running under our feet.

To learn more about the future amibitions for geothermal energy in Europe, download the Vision for Deep Geothermal at www.etip-dg.eu

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