Name of the technology: 2.1 Geothermal / Heating, hot water and balneology

Stage of development:

Widely used technologies (the technology is used by many actors on global/EU level).

Technical application:

Typical applications to produce thermal energy for heating and domestic hot water.

Short summary (up to 200 characters):

Resources of geothermal energy range from the shallow ground to hot water and hot rock found a few miles beneath the Earth's surface.

Almost everywhere, the shallow ground or upper 5m of the Earth's surface maintains a nearly constant temperature between 10° and 16°C. Geothermal heat pumps can tap into this resource to heat and cool buildings.

Geothermal reservoirs of hot water (60-80°C or more), which are found beneath the Earth's surface, can also be used to provide heat directly. This is called the direct use of geothermal energy.

Geothermal direct use dates back thousands of years, when people began using hot springs for bathing, cooking food, and loosening feathers and skin from game. Today, hot springs are still used as spas. But there are now more sophisticated ways of using this geothermal resource.

Justification – why was this technology selected (up to 500 characters).

Bucharest has an important hydro-geothermal basin made of limestone and dolomite of superior Jurassic and inferior Cretaceous age.

These geothermal deposits can be found at a medium depth that varies between -800 and -1600 meters on SE-NV direction. Another aquifer lies at a higher level, between -90 meters and approximate -200 meters. The technology is highly versatile and can be implemented in any area of Bucharest, while being adapted to the needs of the consumers.

Characteristics (up to 500 characters):

In direct-use systems, a well is drilled into a geothermal reservoir to provide a steady stream of hot water. The water is brought up through the well, and a mechanical system - piping, a heat exchanger, and controls - delivers the heat directly for its intended use. A disposal system then either injects the cooled water underground or disposes of it on the surface.

Geothermal hot water can be used for many applications that require heat. Its current uses include heating buildings (either individually or whole towns), raising plants in greenhouses, drying crops, heating water at fish farms, and several industrial processes, such as pasteurizing milk.

For Bucharest, the use of geothermal energy can be coupled with the actual form of district heating, i.e. natural gas fired thermal plants.

Impact on the economy (up to 1000 characters):

Using geothermal resources can provide economic development opportunities for states in the form of property taxes, royalty payments and jobs.

Complementary, geothermal energy provides low cost, reliable, environmentally friendly fuel and has the potential to boost rural economies stabilize prices and diversifies the fuel supply.

Global development (up to 1000 characters):

The global geothermal market is expected to reach 12,000 megawatts (MW) of capacity by the end of 2013,

showing signs of steady expansion. Growth is led by progress in developing areas such as Africa and Latin America.

There are 11,766 MW of new capacity in early stages of development or under construction in 70 countries and territories around the world. Additionally, developers are actively engaged with and exploring 27 GW of geothermal resource globally that could potentially develop into power plants over the next decade.
This year some of the first demonstration Enhanced Geothermal System (EGS) projects provided electricity to grids in Australia and the United States.

Counties such as Uganda, France, Tanzania, Chile, and Rwanda have geothermal projects under construction or in the latter stages of development and will have their first operational geothermal power plants within the next few years.

World Bank Managing Director Sri Mulyani Indrawati called on donors, multilateral banks, governments and the private sector to join a Global Geothermal Development Plan (GGDP) to better manage and reduce risks of exploratory drilling to bring what is now a marginal renewable energy source into the mainstream.

Milestones[1] *(List at least one milestone per year against which the progress towards the achievement of the local/regional 2020 targets can be measured)*

Given the scope of the roadmaps (municipally or regionally based) technological improvements that would require major research and development processes would tend to fall outside of the scope of these roadmaps. This does not necessarily mean that such technological improvements cannot be used as milestones, but that before any such technological improvements are stipulated in the milestones, the capacity of the municipal and/or regional stakeholders, and the capacity of the municipality/region to collaborate with external partners, should be carefully considered.

Milestones more likely to fall within the scope of this roadmap are those that are able to help measure desired changes in the deployment and/or wider usage of the previously identified key energy technologies or those that measure the effects of this changed deployment or usage (i.e. production of thermal energy (GWh); increase of thermal energy production (%); installed capacity (GW or m2); increase of installed capacity (%); CO2 reduction (t)).

Year	2015	2016	2017	2018	2019	2020
Milestones		**1.25 MWt installed capacity**	**1.25 MWt installed capacity**			

The group assumed a hypothetical amount of 2.5 MWt of installed geothermal thermal plant until 2020. They assumed an installed capacity of 1.25 MWt per year in 2016 and 2017.

Financial Gaps
(List financially related challenges that need to be addressed in order to increase the uptake/wider usage of this technology)

1. **Lack of predictability when launching the financial instruments at national level.**
2. **Lack of institutional capacity of existing Programs Implementation Units (ESIF)**
3. **High bureaucratic public procurement procedures**
4. **Lack of cooperation between public authorities and private investors.**

Policy Gaps

(List important policy gaps that prevent the uptake/wider usage of the key technology)

1. **Contradictions and major issues in promoting, developing, implementing and operating RES in terms of financial and legal environment**
2. **Lack of interest and active involvement on behalf of local authorities**
3. **Lack of interest from projects developers for disseminating, sharing experience, know-how and best practice**
4. **Lack of awareness-targeting actions meant to increase knowledge on legislative provisions, financial and technical solutions**
5. **Lack of institutional transparency and high bureaucratic public procurement procedures.**

Financial Instruments and Period of Implementation

(List all relevant financial instruments that can address the above financial gaps and will contribute to the uptake/wider usage of the key technology. Please add the start year and years of important developments for the financial instrument.)

1. **Support Actions for public-private partnership (PPP)**
2. **Support schemes for legal entities (reinvestment of profit)**
3. **Support scheme for thermal energy (revising the tariffs calculation by National Regulatory Authorities)**

Policies and Period of Implementation

(List all relevant policies that can address the above policy gaps and will contribute to the uptake/wider usage of the key technology. Please add the start year and years of important developments for the policy.)

1. **Rising the level of importance and involvement of the local authorities**
2. **Creating an association of stakeholders for submission of applications to the energy funds and for building a reputation that may help in applying for public procurement contracts in the future**
3. **Transposition of the new Public Procurement Directive as well as the ex-ante conditionality on Public Procurement for accessing EU Structural funds 2014÷2020**

Stakeholders

(List all relevant stakeholders for the implementation of the policy and/or financial instrument above)

1. **Municipalities, administrations, ministries.**
2. **Building associations, corporations.**

Policy Recommendations

(*Relevant policies for this particular technology have already been identified above. This section aims to provide the steps needed for the practical implementation of the policies and financial instruments listed above.)*

1. **Identification of "Champions" that could be the motivated players in starting the association.**
2. **Organise meetings to develop the association.**
3. **Formally launch association and start procuring equipments at preferential prices.**