



Deliverable D1.6

# Long Term GeoEnergy Cluster Strategy

Authors:	GI: Jessica Allen / Thomas Garabetian		
Issue Date:	11 Oct 2021	Dissemination level:	Internal



The GEO-ENERGY EUROPE project was funded by the European Union's COSME Programme under Grant Agreement N° 951195. The content of this deliverable represents the views of the author only and is his/her sole responsibility; it cannot be considered to reflect the views of the

The European Commission and/or the Executive Agency for Small and Medium-sized Enterprises (EASME) or any other body of the European Union. The European Commission and the Agency do not accept any responsibility for use that may be made of the information it contains.

## Contents

<b>Executive Summary .....</b>	<b>1</b>
<b>1. Introduction.....</b>	<b>2</b>
1.1 GEO-ENERGY- EUROPE Meta-cluster & Target Markets.....	2
1.2 Objectives & Indicators.....	4
<b>2. Market Analysis &amp; Progression .....</b>	<b>6</b>
2.1 Kenya.....	6
2.2 Canada.....	7
2.3 Chile.....	8
2.4 Costa Rica.....	<b>109</b>
2.5 Future Target Markets .....	10
<b>3. Geo-Energy Europe Strand 2 .....</b>	<b><u>1211</u></b>
3.1 Challenges & Obstacles Faced .....	<b><u>1211</u></b>
3.1.1 Covid 19 Impacts .....	<b><u>1211</u></b>
3.2 GEE2 Progress .....	<b><u>1211</u></b>
3.2.1 Indicators.....	<b><u>1312</u></b>
3.2.2 Agreements made to date.....	<b><u>1413</u></b>
3.2.3 Capacity Building Activities.....	<b><u>1413</u></b>
3.3 Contingency Plan.....	<b><u>1514</u></b>
3.5 SWOT Analysis .....	<b><u>1615</u></b>
<b>4. Geo-Energy Europe beyond 2022.....</b>	<b><u>1716</u></b>
<b>5. Long term Objective: Export Agency.....</b>	<b><u>1716</u></b>
<b>5. Annexes.....</b>	<b>1</b>
Annex 1- Kenya Market Study Visit 30 Aug 2021 .....	1
Annex 2- Market Study Visit Canada 26 May 2021.....	2
Annex 3- Capacity Building Workshop 31 Aug 2021 .....	3

## Executive Summary

This document outlines the long term cluster strategy for the GEO-ENERGY Europe meta-cluster and the future objectives for the targeted third country markets outlined below, within the lifetime of the GEE project and beyond, including; progress made to date by GEE within its target markets and it's advancements into these markets in terms of direct contacts made to date, MoU's signed or in progress and objectives for the second year of the project, and beyond the lifetime of the project, as written in the grant agreement.

This long term strategy builds on the Internationalisation Strategy and Internationalisation Roadmaps outlines during the 2017-2019 period of the GEO-ENERGY Europe meta-cluster.

The countries targeted by the member companies of the GEE meta-cluster organisations are as follows:

**Kenya** has approx. 10,000 MW of geothermal resources which are predominately concentrated along its Rift Valley; presently geothermal energy supplies over 43% of Kenya's demand and, by 2030, Kenya expects to harness 5,000 MW of geothermal energy. Kenya is considered low risk market in terms of doing business; although the socio-economic, security and political climates should be monitored.

**Canada** does not generate geothermal electricity and remains the only Pacific Rim country not to do so; its first geothermal power facility is being developed in Saskatchewan. The country is considered a global leader in the Conference of Parties (COP) Climate Change framework. Canada is a donor country to International Financial Institutions (IFI) programs.

**Chile** has the only operational geothermal powerplant in South America, with a current installed capacity of 48 MW. The Chilean market is considered low-risk for doing business. Funding received by IFIs to date has been concentrated on risk mitigation for the geothermal development and the government has transposed statutory instruments to assist in advancing the high-potential geothermal industry.

**Costa Rica** is a region of volcanic activity and is a world leader in environmental protection; approx. 98% of Costa Rica's energy is generated by sustainable resources and there are currently two geothermal fields operation. Currently geothermal energy contributes to 15% of the country's energy resources. Costa Rica is a beneficiary of IFI funding for the development of renewable energy resources.

The impact of COVID-19 pandemic was particularly high on the objectives of GEE considering the focus on building international relations between the meta-cluster and the companies and organisations from the targeted international markets. These impacts were partly remediated with the implementation of a contingency plan that aims to circumvent the new barriers to internationalisation set by the global pandemic.

On the long term, GEE is looking to promote the international consolidation of European companies involved in the geo-energy sector. However, this needs the right economic and social environment as well as framework of global competitiveness, so that the activities of GEE to maintain the global competitiveness of the European geothermal industry can be implemented with the best results and impact. In that regard, the establishment of dedicated European organisations such as a European Renewable Export Agency appear to be a key step for the long term success of the GEE priorities.

# 1. Introduction

## 1.1 GEO-ENERGY- EUROPE Meta-cluster & Target Markets

The GEOENERGY EUROPE (GEE) meta-cluster comprises nine European cluster organizations or business cluster organisations with expertise and experience in geoscience, geo-energy and/or geothermal energy with the common goals: (1) of working together to export European expertise and knowledge, (2) to strengthen the European sustainable geo-energy sector, (3) promote Small & Medium Enterprises (SMEs), and (4) generate meaningful and long term relationships in third country markets in order to create a sustainable route to geothermal target markets for entities involved in the GEE cluster.

The core strategy for GEE2 consists of two main objectives:

1. Contributing to the industrial deployment and market uptake of sustainable & decarbonized geo-energy, starting with deep geothermal, in Europe and across the world;
2. Helping the European geo-energy SMEs increase their business and export the European know-how and experience outside Europe. The GEO-ENERGY EUROPE meta-cluster was established within the “GEO-ENERGY EUROPE- Geo-Energy for the XXI<sup>st</sup> Century “, funded by the EU COSME Programme (Competitiveness for Small and Medium Enterprises).

This document has its basis on the findings of the GEO-ENERGY EUROPE 2 project to date, as well as on the experience and lessons learnt from the GEE project which ended in 2019, and will outline the progress of the project, challenges faced and solutions, objectives for the remainder of the project and beyond as well as opportunities identified to reach said objectives. It also builds on the established Internationalisation Strategy and Roadmap that was adopted as part of the GEO-ENERGY EUROPE Strand 1 project. These documents notably allowed to layout the priorities of GEE in terms of activities to accelerate the internationalisation of European geothermal SMEs in target markets.

The priority axis for actions defined in GEE’s Internationalisation Roadmap and Strategy meta-cluster include:

- Capacity building: which aims at increasing the capacity for action of the meta-cluster and increasing the capacity of SMEs members to access international markets.
- Communication and Dissemination: with a focus on raising the awareness of the global geo-energy community about the European SMEs involved in the geo-energy sector.
- Market and Opportunity Analysis: identifying the target countries for internationalisation of the GEE meta-cluster and opportunities for internationalisation actions of GEE SMEs.
- Pursuit of the internationalisation of the meta-cluster: through the drafting of an internationalisation strategy and roadmap and the organization of actions aims at creating cooperation opportunities between GEE’s SMEs and actors in target countries.
- Sectorial and cross-sectorial cooperation: creating cooperation with clusters and key actors of the geo-energy sector in target countries and with relevant sectorial organisations.

The internationalisation of SMEs involved in the geo-energy sector requires the establishment of key market conditions as an enabler. The Geo-Energy Europe internationalisation roadmap aims to enable the establishment of these conditions through the removal of non-technical and non-regulatory market barriers, such as lack of internationalisation capacity and lack of awareness about market opportunities and solutions.

The main goal of this document is to highlight the long term cluster strategy envisaged for creating and developing cooperation and business opportunities within the geothermal energy sector in targeted third country markets, in order to guide the sustainable development of the meta-cluster and its contingency plan for exporting European SME expertise while building and maintaining long term relationships.

A targeted long term strategy shaped by the cluster member companies ambitions to export knowledge and technology to the agreed target markets is the backbone of the GEE meta-cluster's approach to form long lasting and meaningful connections with entities and authorities in said target countries as well as detecting contract opportunities for cluster members.

Building on the existing consortium insights and the abundant market information collected to date (since GEE) and made available to the consortium, and the collation of specific research on geothermal market opportunities in target countries, the GEE2 cluster has built a solid foundation for strategizing and obtaining clear objectives for going forward with and beyond the project.

## 1.2 Objectives & Indicators

The main objective of the GEO ENERGY EUROPE 2 project is to assist the European SME member companies, which belong to the meta-cluster, to make their business thrive and to export to third country markets. The consortium's progress and success is measured using the proposed indicators described in the table below.

**Table 1: Project Indicators**

Indicator title	Brief description	Target
I1 Number project meetings held	Project meetings include all physical and telephone conference meetings programmed to coordinate work packages and organise financial and administrative reporting. Projects meetings include kick-off, hallway, closing & regular progress meetings.	24
I2 GEE Business Metrics	Business metric which will evaluate the performance of GEO ENERGY EUROPE member SMEs in third country markets	2 Metrics Reports
I3 Cooperation Agreements	Number of cooperation agreements resulting from the supported actions	10
I4 Business Agreements	Number of business agreements resulting from the supported actions	10
I5 Capacity Building Workshops	Number of events (workshops/ matchmaking events/working group meetings) organised;	10
I6 B2B Events	Number of cluster and business matchmaking events supported;	10
I7 SME Benefits	Number of SMEs having directly or indirectly benefited from the supported actions, resulting in cooperation projects	300
I8 Market Intelligence Emails	Number of detailed geo energy procurement emails to be sent to GEO ENERGY EUROPE companies	30
I9 Cooperation Projects	Number of cooperation projects between international cluster and business network partners	5
I10 SME Employment	Increased Employment amongst European SMEs	50
I11 Cluster Benefit	Number of cluster organisations and business networks from different COSME participating countries having benefited from the supported actions	30
I12 SME Turnover	Increase in the percentage of the turnover from international activities, and employment in Europe, of the SMEs having benefited directly and indirectly from the supported actions, as measured through a survey by the end of the action	10% increase
I13	Outreach of communication materials (geographical scope and number of people reached)	600+ SMEs
I14	Positive impact of the project in terms of media coverage	N° of press articles
I15	Number of EU events organized by external (non-partner) entities where GEE is visible in the program	5

The core objectives of GEE's long term strategy are as follows:

- Continue to strengthen and to integrate the European geothermal energy sector by sharing a common database of members and providing capacity building workshops and support to members;
- Export European technology and expertise to target markets;
- Increase European geo-energy SMEs business overseas.

To continue the success of the first GEE project and the on-going progress of GEE2 in terms of exporting European knowledge to industries in third countries, the GEO-ENERGY EUROPE partners have agreed to:

- Promote the clusters expertise through a dedicated website and social media networks and through participation at events;
- Provide regular market intelligence regarding tender opportunities and events of relevance;
- Set up market study visits to target countries;
- Deliver capacity building support including workshops;
- Represent the EU and its resources within the geo-energy sector;
- Foster cooperation agreements with relevant authorities, universities and entities in target countries to build on existing relationships while creating new long lasting connections and opportunities for SMEs;
- Promote policies best practices to facilitate trade between the EC and the target markets.

## 2. Market Analysis & Progression

In order to export to the chosen target markets, the consortium must have a clear view, following extensive research into the markets of the market conditions and opportunities, including knowing country specific requirements for investing, the political and social status, as well as if there are potential investors and collaborators.

Research was done using various means including: using geo-energy focused news and information websites; using and engaging with existing in country contacts for the current state of the target markets including their political and social status; tender tracking; attending related conferences and online webinars to gather intel and using data and country information made available by International Financial Institutions such as World Bank and African Development Bank and gauging potential internally by way of conducting SME’s surveys. During the research period, the consortium representatives identified websites, online data sets and key market contacts of which became fundamental in optimising the strategic plan for the project.

Following the GEE project, the cluster have leverage the market intelligence and the experience gained from a successful first phase, to build on and progress its knowledge and contact base for GEE2 and beyond.

Below is presented an overview of each target market previously chosen and how the GEE will target new markets beyond the lifetime of the project.

### 2.1 Kenya

As of 2019, Kenya has 690 MW of installed geothermal capacity. Geothermal Development Company (GDC) was set up to manage Kenya’s geothermal objectives.

By 2030, Kenya aims to have 5,530 MW of geothermal power or 51% of total capacity<sup>1</sup>, becoming Kenya's largest source of clean energy. The national geothermal potential is estimated at between 7,000 and 10,000 MW<sup>2</sup>.

The Kenyan Electricity Generating Company (KenGen), which is 74% state owned, has built three operational plants to exploit the Olkaria geothermal resource. The region of Olkaria has an estimated potential of 2,000 MW. Additionally, a pilot wellhead plant of 2.5 MW has been commissioned at Eburru as well as two small scale plants. Approximately, 677 MWe has been harnessed at Olkaria and Eburru geothermal fields (developed by the Oserian Development Company) and used for electricity generation.

The total estimate of geothermal resources in the Kenyan Rift is over 10,000MWe<sup>3</sup>.

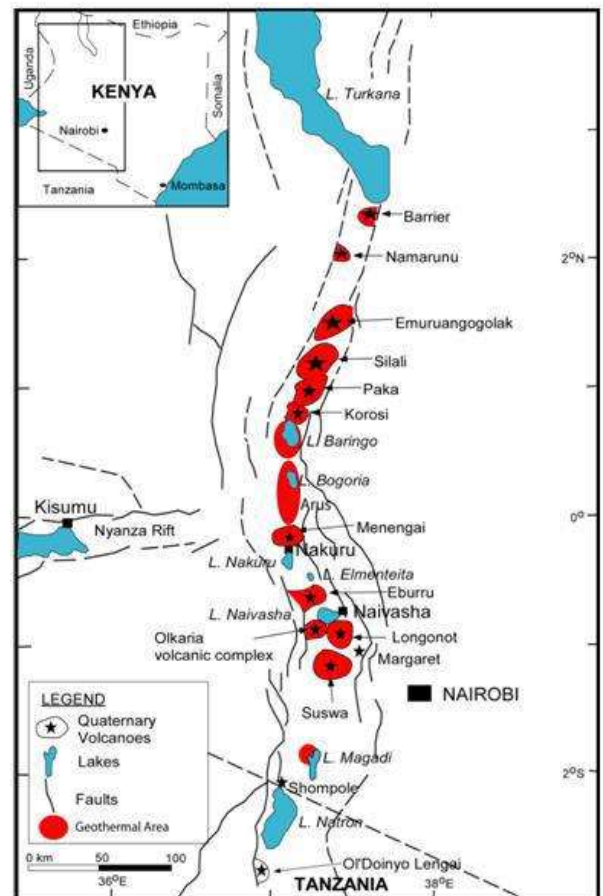


figure 1: Kenya Geothermal Map (IRENA, 2018).

<sup>1</sup> Sustainable Energy for All. Kenya Action Agenda ([link](#) to pdf)

<sup>2</sup> <https://renewableenergy.go.ke/technologies/geothermal-energy/>

<sup>3</sup> Geothermal Outlook in East Africa: Perspectives for Geothermal Development ([link](#) to ppt)



The World Bank Group is the largest development donor of geothermal power in Kenya and has been engaged in geothermal development since the 1970s. Through its International Development Association (IDA), the Bank has provided funding for feasibility studies, exploration, geothermal steam development and construction of power plants. The International Finance Corporation (IFC) has supported power generation by private investors, while the Multilateral Investment Guarantee Agency (MIGA) has provided investor risk mitigation.

In April 2018, the World Bank approved a \$180 million International Development Association (IDA) Guarantee to mobilise private sector financing to strengthen the financial position of KenGen and build energy security for all Kenyans<sup>4</sup>.

The developments at Olkaria are supported by the World Bank Group, which is one of the largest single geothermal investment projects in the world; other IFI partners in the Olkaria project include the Japan International Cooperation Agency, the European Investment Bank, Agence française de développement and Germany's KfW.

The Africa Development Bank (AfDB) is also a supporter of the development of geothermal energy in Kenya.

Kenya's population is estimated at 52.57 million (WB, 2019<sup>5</sup>). The country's gross domestic product (GDP) is USD 98.8 billion (WB, 2020<sup>6</sup>); its GDP growth for 2021 is expected to be 4.5% and growing to 5.3% by 2023.

## 2.2 Canada

Canada does not generate any electricity from geothermal sources and is currently the only country on the Ring of Fire not to do so, though has substantial potential for geothermal energy development<sup>7</sup>.

In 2012, the Geological Survey of Canada issued a report entitled, the "Geothermal Energy Resource Potential of Canada" (GSC)<sup>8</sup>. The Report concluded that "Canada's in-place geothermal power exceeds one million times Canada's current electrical consumption".

In 2017, the Canadian Federal budget addressed geothermal energy by way of Clean Energy tax and capital asset supports. To encourage greater use of geothermal energy, Budget 2017 proposed to:

- Extend accelerated capital cost allowance to a broader range of geothermal projects and expenses.
- Expand the range of geothermal energy project expenses that are eligible as Canadian renewable and conservation expenses, which can be fully deducted in the year incurred<sup>9</sup>.

In January 2019, the Canadian government announced it will provide CAD\$25.6 million in funding for the country's first geothermal power facility for a 5 MW project at a site near Estevan, Saskatchewan; it will be developed by the Deep Earth Energy Production Corporation and expects to generate enough energy to power 5,000 homes<sup>10</sup>.

<sup>4</sup> The World Bank News ([link to news](#))

<sup>5</sup> <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=KE>

<sup>6</sup> <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=KE>

<sup>7</sup> Geothermal library: <http://pubs.geothermal-library.org/lib/grc/1033865.pdf>

<sup>8</sup> [http://publications.gc.ca/collections/collection\\_2013/rncan-nrcan/M183-2-6914-eng.pdf](http://publications.gc.ca/collections/collection_2013/rncan-nrcan/M183-2-6914-eng.pdf)

<sup>9</sup> <https://www.budget.gc.ca/2017/docs/plan/budget-2017-en.pdf>

<sup>10</sup> <https://deepcorp.ca/prime-minister-announces-support-for-canadas-first-geothermal-power-facility/>

Canada has taken a central role in terms of COP21<sup>11</sup>; its ambitions in this regard reiterates points made by the Canadian Geothermal Energy Association (CanGEA) whereby the production of the estimated 5,000 MW in traditional shallow geothermal resources could displace an equivalent amount of coal-fired power yielding over 25 megatonnes (Mt) of offset CO2 emissions per year. CanGEA also estimated that its production could create approximately 8,500 operations and maintenance jobs as well as 20,000 part-time construction jobs<sup>12</sup>.

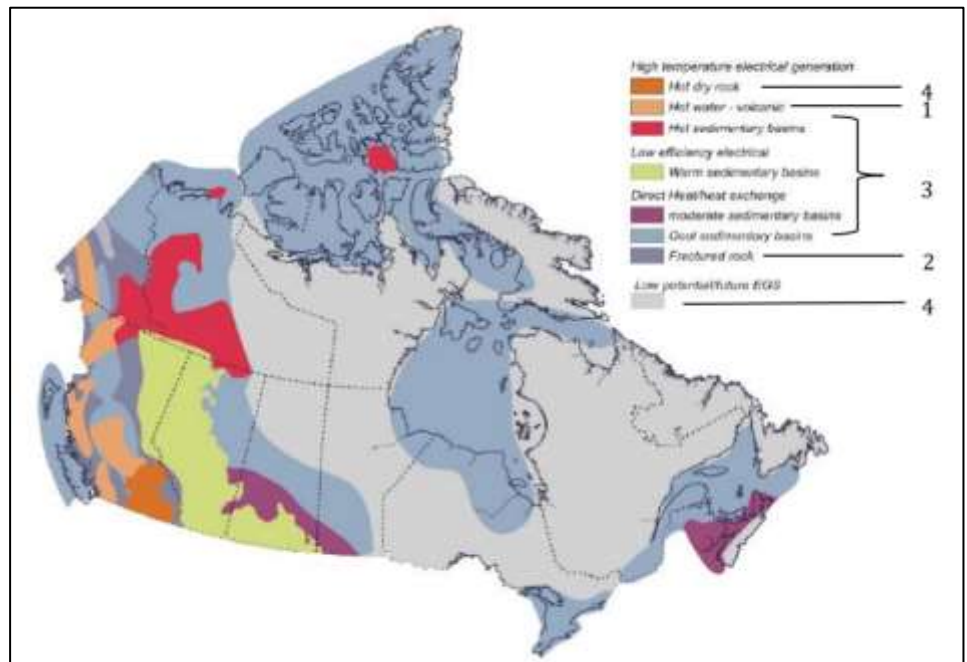


Figure 2: Canada Geothermal Map (CANGEA; 2016)

Canada is not a beneficiary in terms of receiving developing aid to assist in developing the sector. Conversely, Canada is a benefactor in assisting developing countries in advancing indigenous sectors. For example, Canada, in collaboration with the World Bank and the United Kingdom announced financial, technical and advisory support, by way of the Energy Transition and Coal Phase-Out Program<sup>13</sup>, for developing countries that are transitioning away from coal and accelerate the uptake of cleaner sources of energy. The Canadian government pledged up to CAD\$275 million in funding.

Canada’s population is estimated at 38 million (WB, 2020<sup>14</sup>). The country’s (GDP) is USD 1.643 trillion (WB, 2020<sup>15</sup>); its GDP 2021 shrank by 1.1% but is expected to grow by 1.7 in 2022.

### 2.3 Chile

Chile has one 48 MW high enthalpy binary geothermal powerplant, Cerro Pabellón, installed in Atacama Desert (Antofagasta Region), in 2017. It is the only operational geothermal plant in South America and it was built by Geotérmica Del Norte - GDN, a joint venture between Enel Green Power Chile and ENAP (National Petroleum Company). GDN plans to add a 33 MW third generating unit in 2021 to achieve a total installed capacity of 81 MW. The powerplant feeds the electricity generated to the national electricity grid<sup>16</sup>.

The Chilean energy sector is liberalized, whereas the energy and geothermal sectors are regulated and managed by the Government and the Ministry of Energy.

<sup>11</sup> <https://d36rd3gki5z3d3.cloudfront.net/wp-content/uploads/2016/01/Canadas-Role-at-COP21.pdf?x26783>

<sup>12</sup> <https://www.cangea.ca/location.html>

<sup>13</sup> <https://www.worldbank.org/en/news/press-release/2018/12/12/wb-canada-uk-to-assist-countries-in-transition-from-coal>

<sup>14</sup> <https://data.worldbank.org/indicator/sp.pop.totl>

<sup>15</sup> <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD>

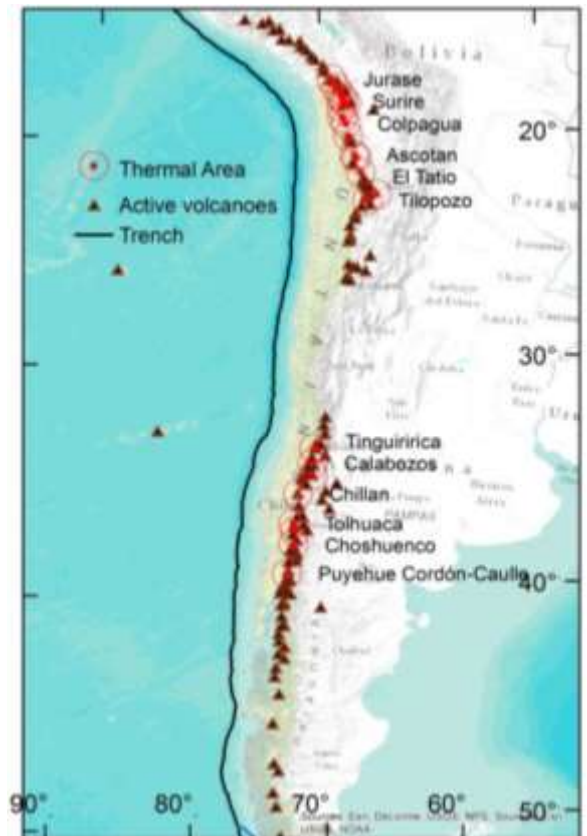
<sup>16</sup> <https://www.enel.cl/en/meet-enel/chiles-energy-is-transforming/cerro-pabellon-geothermal-power-plant.html>

Chile has a vast untapped potential for renewable electricity, which can help limit carbon dioxide (CO<sub>2</sub>) emissions and air pollution, and reduce energy import dependency. The government has set a target for a 60% share of renewable power by 2035 and 70% by 2050, aiming to become carbon neutral by that date. The country plans to dismiss all its 28 coal plants by 2040. The share is currently around 40%.

According to the International Energy Agency, Chile's generating capacity has already more than tripled over the past 20 years (from around 6 500 MW in 1997 to around 23 000 MW by the end of 2017), and the government sees electricity demand more than double by 2050<sup>17</sup>.

In 2013-14, the government obtained USD 53 million from the World Bank's "Clean Technology Fund" (CTF) which was largely directed at risk mitigation in geothermal exploration (MiRiG)<sup>18</sup>; USD 3 million was provided toward a technical assistance programme.

In 2015, the government and CTF agreed to add another USD 25 million to MiRiG. The World Bank contributed an additional USD 500 000 to the technical assistance project, from the Bank's Energy Sector Management Assistance Program (ESMAP). Chile also receives funding for green energy development from multiple IFIs. **Figure 3: Chile Geothermal Map (Aravaena D; 2015)**



According to Bloomberg NEF Climatescope, the country was the second-largest destination for new investment in clean energy in Latin America in 2019, overtaking Mexico<sup>19</sup>.

Chile's population is estimated at 19.1 million (WB, 2020<sup>20</sup>). The country's (GDP) is USD 252.94 Billion (WB, 2020<sup>21</sup>); its GDP growth is projected at 6.7% for 2021 and 3.5% in 2022.

<sup>17</sup> Energy Policies beyond IEA countries – Chile 2018 ([link](#) to pdf)

<sup>18</sup> [https://www.climateinvestmentfunds.org/sites/cif\\_enc/files/meeting-documents/chile\\_mirig\\_2\\_request.pdf](https://www.climateinvestmentfunds.org/sites/cif_enc/files/meeting-documents/chile_mirig_2_request.pdf)

<sup>19</sup> <https://global-climatescope.org/results/CL#clean-energy-investment>

<sup>20</sup> <https://data.worldbank.org/indicator/sp.pop.totl>

<sup>21</sup> <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD>

## 2.4 Costa Rica

Geothermal energy contributes approx. 15% of Costa Rica’s electricity requirements. The North Volcanic Mountain Ridge in Guanacaste is a volcanic area which hosts the most potential for geothermal power generation. The Miravalles Geothermal Field comprises five plants generating 14% of the National Electric System's power capacity, approx.163 MW. The Pailas Geothermal Power Plant, located near the Rincón de la Vieja National Park produces a total of 55MW.

Costa Rica's government approved legislation for a \$958 million geothermal project in the region to offset the country's reliance on hydropower.

**Figure 4:** Costa Rica Geothermal Map (IRENA 2015)

The Ministry of Environment and Energy of Costa Rica, is the governmental institution responsible for the management of the resources of Costa Rica in the environmental and energy field; Instituto Costarricense de Electricidad (ICE) is Costa Rica electricity utility. ICE has issued its Generation Expansion Plan 2020-2035, which is the framework for medium and long-term planning of the country's electricity sector<sup>22</sup>.

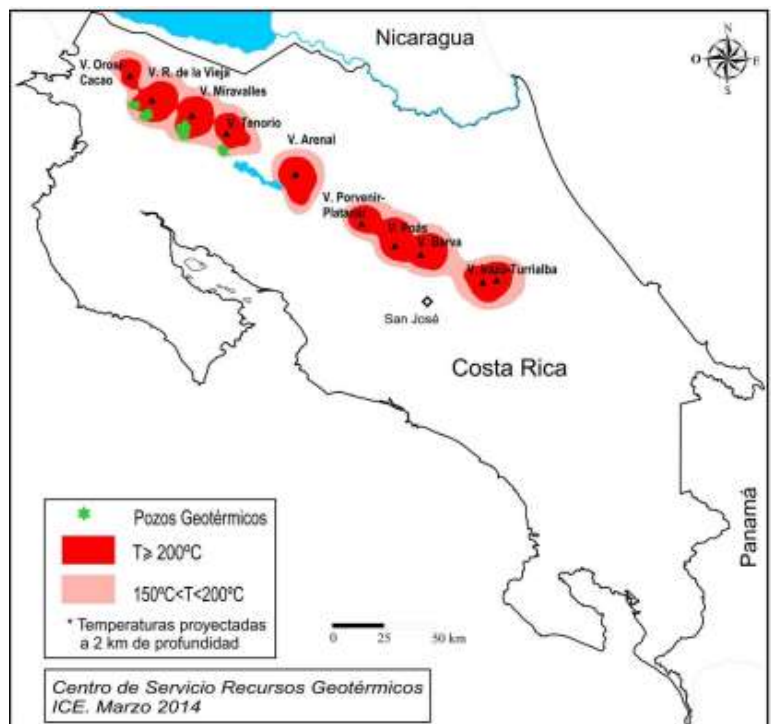
Costa Rica’s population is estimated at 5 million (WB, 2020<sup>23</sup>). The country’s (GDP) is USD 61.52b(WB, 2020<sup>24</sup>); its GDP growth will recover after a fall, gradually to 2.5% in 2021 and 3.4% in 2022.

## 2.5 Future Target Markets

The present strategy focus on the long term sustainability of the meta-cluster, which includes funding of activities and engaging with other sectors and international markets that require a sub-surface expertise.

New and economically interesting geo-energy markets for the meta-cluster will be pinpointed and outlined. Sources to procure and compile data regarding the new markets remain the same as used previously: (i) International Financial Institutions (IFIs) and multilateral donor agencies, (ii) National, Regional and Local government; (iii) Energy companies; and (iv) Research funding opportunities and agencies.

The data sheets regarding new potential markets will be disseminated to GEO ENERGY EUROPE



<sup>22</sup> Generation Expansion Plan 2020-2035 ([link to pdf](#))

<sup>23</sup> <https://data.worldbank.org/indicator/sp.pop.totl>

<sup>24</sup> <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD>

member companies. The focus of these market intelligence and surveillance activities will be on the identified target markets.

IFIs will remain as a key focus of this market intelligence gathering, due to their procurement regulations governing disbursement that ensures consistency for companies seeking to establish access to new markets.

### 3. Geo-Energy Europe Strand 2

The objective of the GEO ENERGY EUROPE 2 is to assist the European SME member companies to win and export business to third country markets. To achieve this goal, GEE2 consortium had to put in place a risk management plan and with covid-19 pandemic a contingency plan.

#### 3.1 Challenges & Obstacles Faced

The implementation of a project with the objective of internationalisation always faces challenges and obstacles. A summary of the main challenges is listed below:

- indicators achievement deviations due to Covid 19 pandemic;
- Travel restrictions due to Covid 19 pandemic;
- Social restrictions due to Covid 19 pandemic;
- Coordinator changes;
- Technical Issues during online calls and presentations;

##### 3.1.1 Covid 19 Impacts

The Covid 19 pandemic has presented many challenges to the GEE project, mainly when it comes to travel and social restrictions essential for the achievement of the main goals of the market visits to target countries.

The market study visits were to be carried out in person by project partners throughout the lifetime of the GEE2 project, due to the travel and social restrictions the consortium was not able to conduct such visits in person, and the online organization of the meetings faced difficulties, such as:

- time zone differences;
- remote connection and technical issues;
- issues agreeing common time slot for all participants;
- in person conferences adapted to virtual conferences which have been found to have less impact.

Restrictions worldwide have meant that market study visits to date have not taken place in person, as planned and agreed within the projects grant agreement. As well as not being able to conduct and work *in loco*, GEE partners internally have also faced challenges around working remotely and not conducting in person project partner meetings as scheduled; the team building element has suffered along with:

- reporting and goal setting
- motivation
- lack of human connection
- decision making

#### 3.2 GEE2 Progress

The GEO-ENERGY EUROPE project has progressed with its agreed tasks despite the unavoidable impacts of the COVID-19 pandemic. The GEE consortium has focused on the identification of business opportunities in the target markets and worked throughout the project to date to connect with those entities identified in the proposal phase, and plan a route to added-value markets in cooperative and business capacities.

To date, GEE2 has:

- Identified multiple entities for the conclusion of cooperation agreements between GEE and comparable organisations within each of the target markets and so the project has developed high level insights on the global geothermal energy markets through comprehensive research and networking.
- Established internal and external communication strategies. Internally, partners have communicated relevant tender opportunities and events, both commercial and informative, as well as geothermal news in the form of “Market Intel Alerts”, which are compiled monthly for distribution to the wider network. Externally, GEE has used various means of promoting the cluster including: (i) a project launch formal press release<sup>25</sup>, (ii) an upgrade of GEE website, social media and press packs. In addition, the project has submitted various articles such as the Think Geo Energy website<sup>26</sup> and the Business Post<sup>27</sup> (Ireland’s main business and finance focused newspaper).
- Carried out two of the four planned market study visits, Canada (May 2021) and Kenya (August 2021). The meetings were arranged virtually and included high level overviews from GEE partners to Canadian and Kenyan participants.
- Drafted a robust cooperation and business agreement template which can be used and implemented by any of the project partners and adapted to all four target market entities of interest.

The initial six months of project focused on establishing the best way to operate and manage the agreed deliverables and indicators given the above outlined challenges of the Covid 19 pandemic and its impact on the work plan. This included lending time to partners to agree on capacity building topics and what will be relevant and meaningful to the cluster and extended members, given that we are trying to operate digitally.

### 3.2.1 Indicators

The following table outlines key performance indicators, outlined in the GA, which will give a strong indication of progress and can be used for yearly updates:

Title	Brief Description
Cooperation Agreements	Number of cooperation agreements resulting from the supported actions.
Business Agreements	Number of business agreements resulting from the supported actions.
Market Intelligence Emails	Number detailed geo energy procurement emails to be sent to GEO ENERGY EUROPE companies.
B2B Events	Number of cluster and business matchmaking meetings supported.
SME Turnover	Increase in the percentage of the turnover from international activities, and employment in Europe, of the SMEs having benefited directly and indirectly from the supported actions.

<sup>25</sup> Link to the press release is available [here](#).

<sup>26</sup> Link to Think Geoenergy is available [here](#).

<sup>27</sup> Link to Sunday Business Post is available [here](#).

To better assess the GEE2 progress and indicators analysis, an internal partner review of the project is expected to take place in November. This review will allow the that solutions from lessons learnt are implemented and to identify gaps and opportunities for the meta-cluster, with a focus on the future of GEE.

### 3.2.2 Agreements made to date

**Kenya;** an MoU was signed in Feb 2020 between GEE2 & the Geothermal Association of Kenya (GAK).

Based on initial contacts and market visit report, GEE held its market study visit, with the assistance of the Kenyan Ambassador to Ireland, Amb. Mubea and his colleagues, which included participants from KenGen, GEE's main target entity for cooperation and business agreements in Kenya (Annex 1). The session included presentations from KenGen and GEE resulting in a very useful market intelligence regarding Kenya's current geothermal status as well as a spoken agreement with KenGen to progress an MoU. The MoU is due to be issued by GEE in September 2021.

**Canada;** GEE signed a MoU with CANGEA, the Canadian geothermal industry association during the GEE1; to build on this relationship, GI engaged with Dr Stephen Grasby, of Geological Survey Canada, in February 2021, in order to discuss the cluster and the potential for a MoU between GEE and other Canadian counterparts.

The planned market study visit to Canada took place on 26 May 2021. The session resulted in a spoken agreement to arrange a MoU between GEE and the Canadian participants (Annex 2). GEE is working to progress with the MoU between GEE and Canada and will continue on making connections with Canadian target entities.

GEE also engaged with fellow COSME member cluster EU Techbridge, by way of a virtual meeting on 3 Sept 2021; participants included GI, COSVIG and Pole Avenia. The aim of an alliance for both clusters is to gain further insights into the Canadian market and to build constructive relationships with in country connections.

**Ethiopia;** Although Ethiopia is outside the scope of the GEE project, GEE holds an agreement with Ethiopia which was signed between GEE and Ethiopian ministries of Mining and Petroleum and Water, Energy and Irrigation. This cooperation agreement was concluded in July 2020 and we envisage that it will assist in strengthening relationships with Kenya.

### 3.2.3 Capacity Building Activities

In the GEO ENERGY EUROPE context, capacity building activities will include both an internal component, aiming at consolidating the EU geothermal energy sector and an external component, aiming at developing a collaborative offer to provide missing skills, knowledge, tools, equipment, and other resources to its selected target markets. Both internal and external capacity building effort will focus on facilitating collaboration between the meta-cluster's SME members. Due to the Covid-19 pandemic, capacity building activities have, so far, taken place virtually.

GEE partners held a capacity building webinar on 31 August 2021 with the title "Direct Uses for Geothermal Energy" (annex 3). The webinar comprised presentations from industry, academia and government representatives giving a balanced and clear overview of geothermal energy and its uses.

The webinar was open to all cluster members and was attended by approx. 30 people. The feedback received was positive, the topics were well covered and GEE will use the lessons learned to ensure the next workshop webinars are also successful and reach a wider number of companies and people that work in the area of energy production and renewable sources of energy. It is envisaged that capacity building activities will take place approximately every two months for the remainder of the project.

A programme of webinars and workshops on the subject of geothermal energy and other sources of renewable energy is being thought and might be implemented beyond the lifetime of GEE2 project.



### 3.3 Contingency Plan

The impacts of Covid-19 on travel restrictions and social interactions started, more or less, at the same time as the GEE2 project, which meant the need to adapt the foreseen actions to the ongoing restrictions at the time. Due to the high impact of Covid-19 restrictions, the consortium developed a Contingency Plan in order to keep on track with the agreed timeline. The plan that aimed, mainly, the conversion of all offline activities to online, from the project meetings, the market visit studies, to the capacity building workshops.

GEE realizes that the impacts of Covid 19 pandemic are going to continue, for an indefinite period of time, to restrict travel and social interactions, therefore, the Contingency Plan is going to remain in place and as a backup plan for the future GEE activities, funded or not.

The Contingency Plan foresees a group of measures in which partners will:

- Continue to provide frequent coverage of the project activities and outputs across their multiple social media channels (LinkedIn, Twitter etc.) and the dedicated GEE website where all news and updates are and will be published;
- Take all opportunities to speak at conferences and webinars where they will provide high level overviews of the project;
- Maintain close linkages with connections made in Kenya and Canada; progress MoU's and continue to build up GEE network within those markets by way of:
  - Schedule follow up meetings to strengthen progress made from initial market study visits and progress MoU's;
  - Host informative and promotional webinars and conferences to support growth of European SME's;
  - Visit markets in person when Covid 19 restrictions lift and they are authorized to do so.
- Conduct the foreseen market study visits to Chile and Costa Rica, virtually unless otherwise advised by the relevant governments;
- Use online tools like Doodle and Zoom to organize GEE meetings;
- Utilise the knowledge gained over GGE1 and GEE2 to strengthen the clusters visibility and availability to provide services to third countries;
- E-assess SME international expectations by an online surveys (the first to take place before November 2021);

### 3.5 SWOT Analysis

The purpose of the SWOT analysis is to highlight where the GEE consortium can work together to leverage its strengths and identify opportunities in the markets it has agreed to focus on for business and collaborative purposes as well as identify and outline the clusters weaknesses and threats to the clusters objectives.

**Table 2: SWOT analysis**

S Strengths	W Weaknesses	O Opportunities	T Threats
<ul style="list-style-type: none"> <li>• Extensive market research carried out during GEE1 giving partners a strong base for planning the route to target markets and building relationships within the meta-cluster</li> <li>• Several MoU’s signed within target countries during GEE1 which provides opportunities to build on existing relationships in the different markets</li> <li>• Partners collaborative effort provides extensive experience</li> <li>• Experience of working together translates into GEE2 in terms of partner relationships and team moral</li> <li>• Knowledge and lessons learnt as a meta-cluster that seeks internationalisation</li> <li>• EU initiatives provides strong incentive for third countries to engage</li> <li>• Multilingual and multicultural</li> </ul>	<ul style="list-style-type: none"> <li>• Covid-19 pandemic impacts on planned project activities that required travel and social interaction, which represented a challenge on achieving the projects’ objectives</li> <li>• Technical issues regarding communications during meetings and conference presentations at online events</li> <li>• Encountering different laws and policies around energy in target countries</li> <li>• Issues engaging with target countries and making meaningful connections</li> </ul>	<ul style="list-style-type: none"> <li>• To further build on relationships in countries with existing MoU’s in place</li> <li>• Promote and represent GEE at major upcoming conferences such as World Geothermal Congress (Oct 21)</li> <li>• Analyse and choose other countries market targets, and continue to market intelligence reporting to European SMEs in the geo-energy sector</li> <li>• Represent the European Union and its policies</li> <li>• Well established meta-cluster with knowledge to search for new and other sources of funding for internationalisation activities</li> </ul>	<ul style="list-style-type: none"> <li>• Covid-19 pandemic social and economic impacts on third countries</li> <li>• Loss of communication with targeted entities in target countries based on lack of in person engagement and interaction</li> <li>• Change in national energy strategies in target countries</li> <li>• Changes in the meta-cluster</li> <li>• Lack of funding for GEE activities</li> </ul>

## 4. Geo-Energy Europe beyond 2022

On completion of the second strand of GEE, the consortium has a common objective to carry on in a unified capacity to continue efforts made during both projects and continue building relationships in third countries; as well as cooperating with existing target markets; the consortium will aim to extend its reach into other relevant third countries where there is potential to develop and explore geothermal energy. The consortium have already done research into Indonesia and Mexico markets, both of which have been identified as very good next steps.

Partners will carry on identifying opportunities for European SME's in the geo-energy sector and seek various funding opportunities to carry on with the meta-cluster into the future beyond its current phase.

The consortium agrees that it is a common objective and of joint interest to continue on as a cluster going forward, after this project has closed.

## 5. Long term Objective: Export Agency

Geo-Energy Europe meta-cluster has a main strategic policy that consist in developing a geothermal (or overall renewable source of energy) export agency at European level to facilitate coordination and communication between European energy SME's and industries, and to bridge the pathways between Europe and third country markets.

The main topics to be covered by the agency would notably include:

» Trade missions and policy: the agency would serve as a relay to help organise trade missions and promote policies best practices to facilitate the relations between European geothermal SME's/industries and those of third countries.

This priority is considered essential to consolidate the European industry, bridging the internationalisation gaps for international European clusters, when most export support for renewables is carried by national agencies in Europe. Obviously this European agency would serve as a complement to the already existing and quite effective network of national European export agencies – much like the EU complements many national programmes in areas from research and innovation support to cities decarbonisation planning.

The importance of a European export agency is crucial in light of global concurrence faced by European geothermal energy companies globally. While Europe currently has a 41% market share on the gloabl export market<sup>28</sup>, the EU is not provided as robust a framework as competing markets where geothermal companies can rely on a more structured and proactive export support schemes.

» Open third markets: a European export agency for geothermal and other renewable energy companies is crucial to help European companies, notably SMEs, with the administrative procedures, support schemes requirements, and standards and codes of their target third countries. The European agency will gather information on these issues to render and make it directly available to prospective exporters, but also to put European SMEs in touch with the right contacts to obtain informations about the specifics of their projects and business plans in their target countries

» Reciprocity, World Trade Organisation (WTO): The European Union also needs to reinforce its political presence on the global stage. There are many examples of European funded projects being awarded to consortia without European components, when competing European companies can benefit from earmarked funding for national consortia from non-European export and development agencies. This represents an issue of reciprocity when it comes to the openness of tenders.

<sup>28</sup> CEPS-COWI, EU's Global Leadership on Renewables, 2021

To maintain its global leadership on renewables, notably in areas such as geothermal energy where Europe boasts a 41% global market share, the European Union – via its export agency and the European Investment Bank (EIB) as a development bank – could act to be more proactively when enforcing reciprocity and boost the market share.

» Database: the export agency could be the european repository for renewable assessment reports<sup>29</sup>. This database could be a first step when identifying exports markets and promoting the European renewable industry in international markets.

---

<sup>29</sup> Examples of such databases are the International Trade Administration ([link](#)) and Mexico's National Renewable Energy Laboratory ([link to pdf](#)).

## 5. Annexes

### Annex 1- Kenya Market Study Visit 30 Aug 2021



Geo Energy Europe (GEE) Market Study Visit

**Kenya**

Monday 30 August, 2021 – Virtual

13:00hrs Welcoming Remarks – Koen Verbruggen, Director, Geological Survey Ireland

13:05hrs GEE Introduction and Overview – Jessica Allen, Market Advisor, Geoscience Ireland

13:10hrs KenGen Overview- Cyrus Karingithi, Asst. Manager Resource Development

**GEE Project Partners**

13:30hrs European Geothermal Energy Council (EGEC); Thomas Garabetian

13:35hrs Capes; Odon Kiraly

13:40hrs Cosvig; Dario Bonciani

13:45hrs Geoplat; Jessica Allen

13:50hrs GeoEnergy Celle; Jessica Allen

13:55hrs Geoscience Ireland; Sean Finlay

14:00hrs Jesder; Volkan Öztürk

14:05hrs Pole AVENIA; Emmanuelle Robins

14:10hrs GEODEEP; Virginie Schmidlé

14:15hrs Integrated Workflow for Geothermal Exploration- Joe Mongan, Geoscience Ireland Panel of

Experts

14:25hrs Questions and Closing Remarks – Geoscience Ireland

**Annex 2- Market Study Visit Canada 26 May 2021**



**Geo Energy Europe (GEE) and Canadian Webinar  
Wednesday 26<sup>th</sup> May, 2021 – Virtual**

1700hrs IST Welcoming Remarks - Geological Survey Ireland

1705hrs GEE Introduction and Overview – Andrew Gaynor, Business Development Manager,  
Geoscience Ireland

1710hrs Geological Survey of Canada - Dr Stephen Grasby, Research Scientist

1720hrs Geothermal Canada - Dr Catherine Hickson, Vice President

1730hrs Terrapin Geo - Marc Colombina, VP Operations

**GEE Project Partners**

1740hrs European Geothermal Energy Council (EGEC); Thomas Garabetian

1745hrs Capes; Odon Kiraly

1750hrs Cosvig; Dario Bonciani

1755hrs Geoplat; Paloma Pérez

1800hrs Geoscience Ireland; Andrew Gaynor

1805hrs Jesder; Volkan Öztürk

1810hrs Pole AVENIA; TBC/ Emmanuelle Robins

1815hrs Questions and Closing Remarks – Geoscience Ireland

## Annex 3- Capacity Building Workshop 31 Aug 2021



Geo Energy Europe (GEE) Capacity Building Webinar

### **Direct Uses for Geothermal Energy**

Tuesday 31 August, 2021 – Virtual

13:00hrs Welcoming Remarks – Geoscience Ireland

13:05hrs Uses for Geothermal Energy- Dario Bonciani, Geothermal and District Heating Project Officer; COSVIG

13:20hrs Using Mineral Exploration Industry Data to Identify Deep Geothermal Potential– Paul Gordon, Technical Director; SLR

13:30hrs Enabling deep geothermal energy use in Ireland– Rory Dunphy; Geological Survey Ireland

13:40hrs Geothermal Drilling - Jeff Meehan, European Operations Director, Meehan Drilling

13:50hrs The GEO-URBAN Project – Identification and Assessment of Deep GEOthermal Heat Resources in Challenging URBAN Environments - Paul Stafford, Geologist, Gavin & Doherty Geosolutions

13:55hrs Closing remarks, Geoscience Ireland