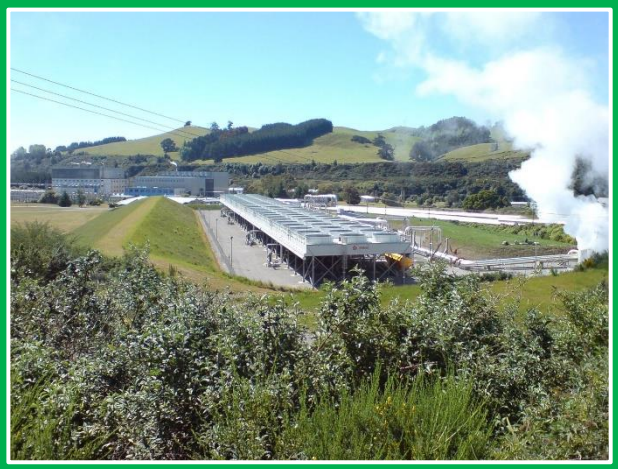
2016 GEOTHERMAL POWER: INTERNATIONAL MARKET UPDATE

OCTOBER 2016



GEOTHERMAL ENERGY ASSOCIATION

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The 2016 Geothermal Power: International Market Overview is a follow-up on data collected by the Geothermal Energy Association as of March 2016. This report is largely based upon observations made in the press and other public media, along with personal communications with GEA staff. Given this, it is intended to give a view of what has occurred in the world geothermal market in the five months that have passed between March and September 2016 and is not meant to replace more thorough analysis. Although geothermal energy production includes heat as well as power, this report primarily describes recent development in the power market.

GEA sincerely thanks its member companies, as well as other organizations and individuals, for their cooperation and assistance in gathering the information used in this report.

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WRITTEN AND PREPARED BY ANTHONY ROCCO, GEOTHERMAL ENERGY ASSOCIATION
OCTOBER 2016

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INTERNATIONAL MARKET HIGHLIGHTS

- Between March and September 2016, a total of 44 new geothermal power projects began development throughout 23 countries, adding 1,562.5 MW of developing capacity.
- 25.5 MW of electricity was brought online when Unit 3 of the Domo de San Pedro Geothermal field was commissioned in late April 2016. Located in the state of Nayarit, Domo de San Pedro is the first private geothermal field in Mexico.
- Croatia, Iran, and Malaysia are all currently developing their pilot geothermal projects, adding 45 MW of planned capacity to the global mix.
- Croatia's first geothermal plant at Velika Ciglena-Bjelovar is expected to reach COD in May 2017. It is expected to have 10 MW of planned capacity.
- Iran's 5 MW pilot geothermal plant at Meshkin Shahr is expected to reach COD in the first half of 2020.
- Apas Kiri-Tawau, Malaysia's first geothermal plant, is expected to reach COD by June 2018. It is expected to have 30 MW of planned capacity.
- Exploratory drilling began in August 2016 for Taiwan's project for geothermal development at Sanxing. It will take about 6 months to complete.
- The Caribbean island of Dominica is accelerating its plans for development by pushing a new geothermal-specific bill through its parliament and partnering with New Zealand to construct the country's first geothermal power plant.
- The IceLink subsea HVDC power cable, a proposed 1,000 km national grid interconnector between Iceland and Great Britain, is currently in its feasibility stages. If the cable is to be constructed, it is expected that 954 MW of new large hydrothermal and geothermal plants will be needed in Iceland by 2035 to meet new demand.
- In a new draft of official Indian geothermal energy development framework, the Indian government has set an ambitious 1,000 MW target for the coming years and up to 10,000 MW to be developed by 2030.
- The Indonesian Government is preparing to move to a fixed-price feed-in-tariff in an effort to accelerate geothermal development. The Energy and Mineral Resources Ministry is also working on cutting down the time of geothermal permitting to a process that could only take 3 hours, a similar process already in place for other industries.

TRACKING PROJECT DEVELOPMENT

While projects in the GEA's Annual U.S. Geothermal Power Production and Development Report are defined by several phases of development (Prospect and Phase 1-4) as defined by *GEA's 2010 New Geothermal Terms and Definitions,* this report uses much broader terms to define where a project tracks in its development because of the vastly different development models to construct geothermal power plants. These terms include Prospect, Early Stage, Under Construction, On Hold, Canceled, and Operational. The breadth and diversity of geothermal project tracking throughout the world makes labeling projects with specific phases incredibly difficult. Therefore, for the purposes of this report, projects are defined by much broader categories in order to maintain the integrity of the information regarding a project's forward progress.

Geothermal **'Prospects'** are defined to be areas in which little exploration has taken place, and the country's government has tendered the property to a private company, government agency or contractor to conduct further exploration. Although geophysical features or prior exploration might

indicate the presence of a geothermal resource at the site, past exploration may not have determined the economic feasibility of a geothermal power plant at the property tendered.

'Early Stage' projects are defined to be projects where some aspects of a resource are present and the initial stages of explorations and construction are underway. This could mean but is not limited to, the first exploration wells drilled, project funding, and/or significant knowledge of the geothermal resource attained.

Projects **'Under Construction'** are projects where physical work to build the actual power plant has begun. For the purpose of this report, this does not include production drilling. However, many definitions of 'Under Construction' do include production drilling. 'Under Construction' is roughly equivalent to GEA's Phase 4 of a project's development.

'Operational' plants are contributing electricity to a customer who agreed to purchase the power prior to the plant's construction. 'Under Construction' and 'Operational' in regards to a power plant are determined by information reported publically on company websites, press releases, government or academic reports, media articles, or other public sources of information.

Projects **'On Hold'** designate when forward progress on the projects has halted for any number of reasons not limited to land or religious disputes, loss of project funding, or an agreement that fell apart.

Projects **'Canceled'** are projects where the government, project developer, or contractor decided to make no more forward progress on a geothermal project in the immediate future and withdrew from developing that geothermal prospect into a power plant.

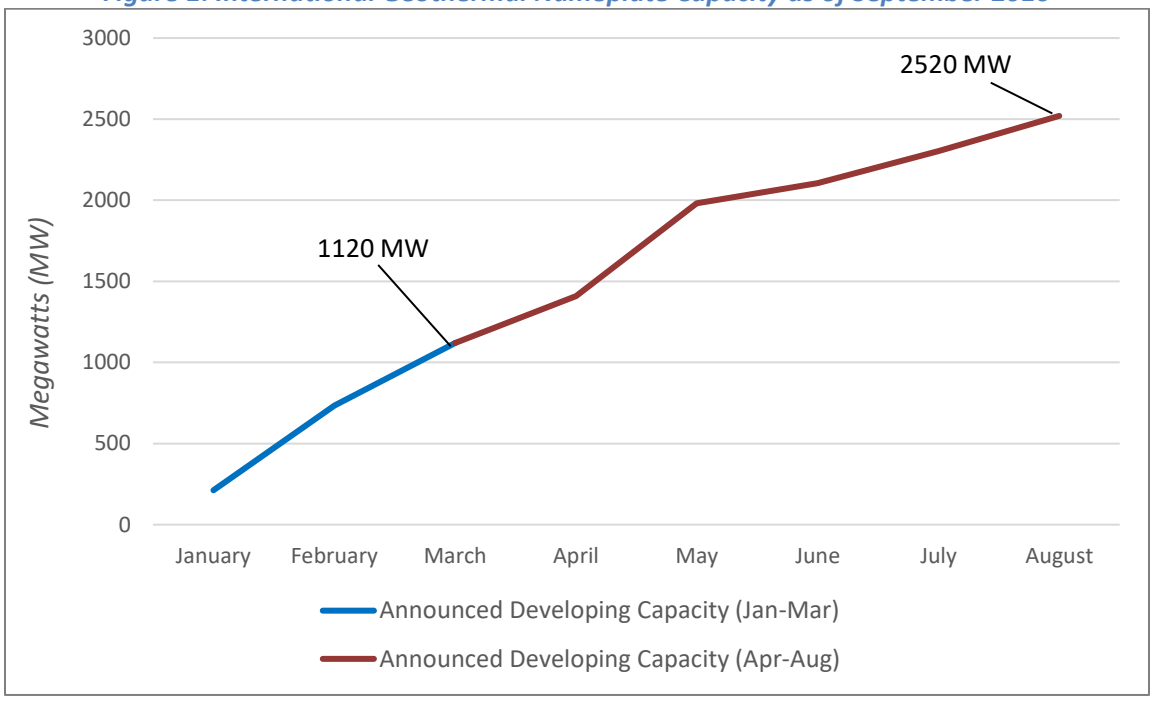
For this report, GEA collected two numbers for each project in cases where both were available. A "Resource Capacity Estimate" and a "Planned Capacity Addition" (PCA) estimate. At each project phase the geothermal resource capacity estimate may be thought of as the megawatt (MW) value of the total recoverable energy of the subsurface geothermal resource. It should not be confused with the PCA estimate, which is the portion of a geothermal resource that if the developer were to utilize the geothermal resource under its control to produce electricity, would be the power plants resulting estimated installed capacity. In other words, the PCA estimate is usually the expected power plant's installed capacity. In the case of an expansion to a conventional hydrothermal geothermal plant, the PCA estimate would be the estimated capacity to be added to the plant's current installed capacity.

INTERNATIONAL MARKET OVERVIEW

This interim report means to serve as a snapshot of the current state of geothermal resource development internationally since GEA published its previous Annual U.S. & Global Geothermal Power Production Report in March. The content of this report focuses on projects in development outside the United States in both emerging and industrialized economies. GEA's next Annual Industry Report to be published in early 2017 will include data on geothermal development in the United States.

Between March and September 2016, a total of 44 new geothermal power projects began development throughout 23 countries, adding 1,562.5 MW of developing capacity and representing a significant spike in projects worldwide. This rate of growth in the past six months exceeds annual development over the previous two years, showing international geothermal development rates more than doubling. If this rate of growth is sustained, world geothermal power production would grow from 13.8 GW today to over 23 GW in 2021. International developing capacity of geothermal power has grown steadily over the first eight months of 2016, as depicted in Figure 1 below. Nearly all of these projects have only been announced in recent months and are still in the early stages of development and have the potential for more capacity to be discovered over the coming months.

Figure 1: International Geothermal Nameplate Capacity as of September 2016



Note: "Announced developing capacity" is the estimated power plant capacity reported for specific sites by a private company, government agency or contractor associated with the site. Data for North America does not include the United States in this report.
Source: GEA & Author

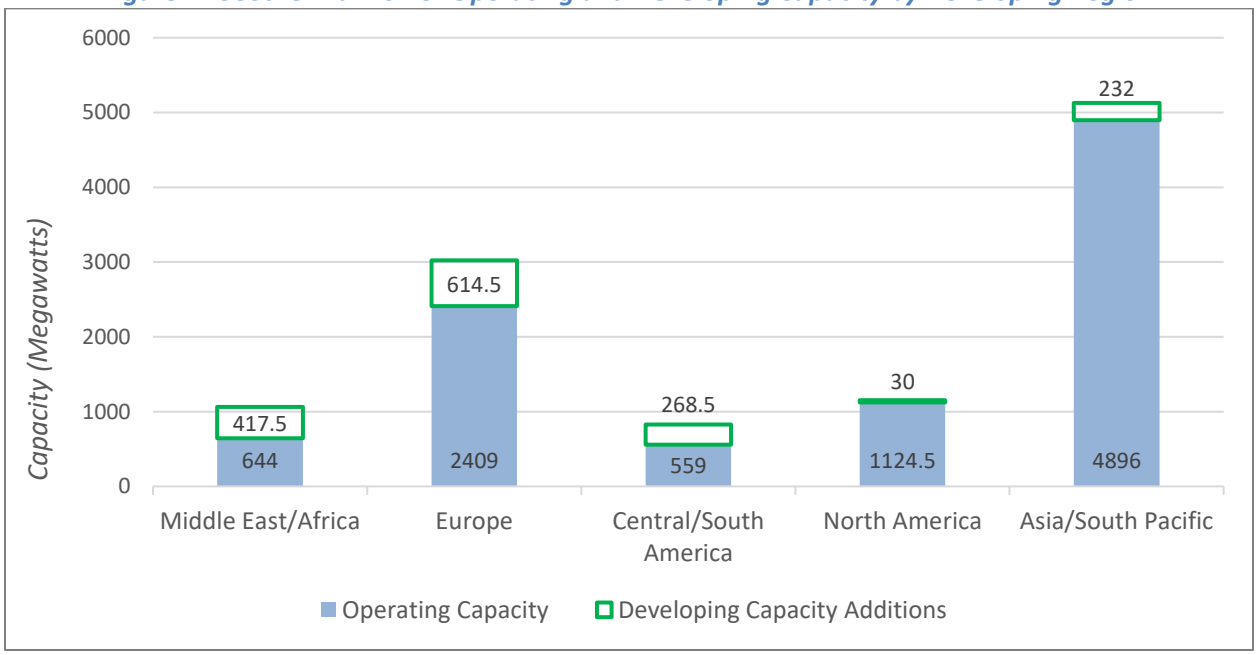
Developing nations in Central America, the Caribbean, Southeast Asia, and the South Pacific are accelerating their geothermal development through more attractive fiscal incentives and geothermal-specific legislation. Several new countries like Croatia, Iran, and Malaysia are entering the geothermal market with pilot projects in the works over the next five years. These countries understand that adding geothermal power to their grid can reduce their dependence on finite energy resources, reduce future

economic and geopolitical uncertainty, and benefit the overall health of their environment and the people who inhabit it.

It's not just industrializing nations that are realizing the countless benefits of investing in geothermal power. Thanks to its multi-annual energy plans, France is expecting its geothermal market to take off in the coming years as it has set a 53 MW milestone of high temperature energy generation by 2023. A project to trade energy between Iceland and Great Britain via a sub-sea power cable is currently in its feasibility stages. If the cable project is to go forward, it is estimated that nearly 1 GW of new geothermal plants will be needed in Iceland over the next two decades in order to meet increased demand. Many developed nations are realizing that geothermal energy is a powerful source of baseload power to bridge the gaps left by other renewables. This will become more vital as countries work towards reducing their carbon emissions and fulfilling their pledges under the COP21 Paris climate agreement.

Based on current knowledge and technology, there is over 200 GWe of conventional hydrothermal potential available globally. Therefore, only 6-7% of total worldwide geothermal power has been exploited. Figure 2 below shows the known operating capacity for each world region, as well as the potential capacity additions for projects that have been announced between March and September 2016. Overall, Europe saw the highest increase in development capacity, with 83% more capacity added since March. This is largely due to the announcement of 8 new projects in Iceland. Central & South America and the Caribbean came in close-second with an 82.5% increase in capacity development since earlier in 2016.

Figure 2: Geothermal Power Operating and Developing Capacity by Developing Region



Note: The figure above compares current installed geothermal capacity to "announced developing capacity." "Announced developing capacity" is the estimated power plant capacity reported for specific sites by a private company, government agency or contractor associated with the site. Data for North America does not include the United States in this report.
Source: GEA & Author

REGIONAL SUMMARIES

This section of the report contains brief summaries of regions where substantial news or progress to develop geothermal power capacity has taken place from March to September 2016. Not every country with projects is mentioned in these summaries. In total, GEA counted 20 countries developing new power plants by the end of August.

For more information on a select country, please refer to the International Geothermal Associations' *Geothermal Conference Paper Database*, ThinkGeoEnergy's *News Article Database*, or GEA's weekly newsletter *Geothermal Energy Weekly*.

For the complete list of developing projects, see GEA's website or contact GEA for an up-to-date list of developing projects.

MIDDLE EAST & AFRICA

As of September 2016, Iran, Kenya, and Turkey are all developing geothermal projects with four plants under construction and an estimated 317.5 MW of PCA. Iran is penetrating into the geothermal market with a key 5 MW pilot plant being built in the Meshkin Shahr region of the country near the base of Mt. Sabalan. Iran is seeking the help of New Zealand's KML Consulting Engineers to conduct a pre-feasibility study of the area. This is a great opportunity for Iran to diversify its energy portfolio away from fossil fuels.

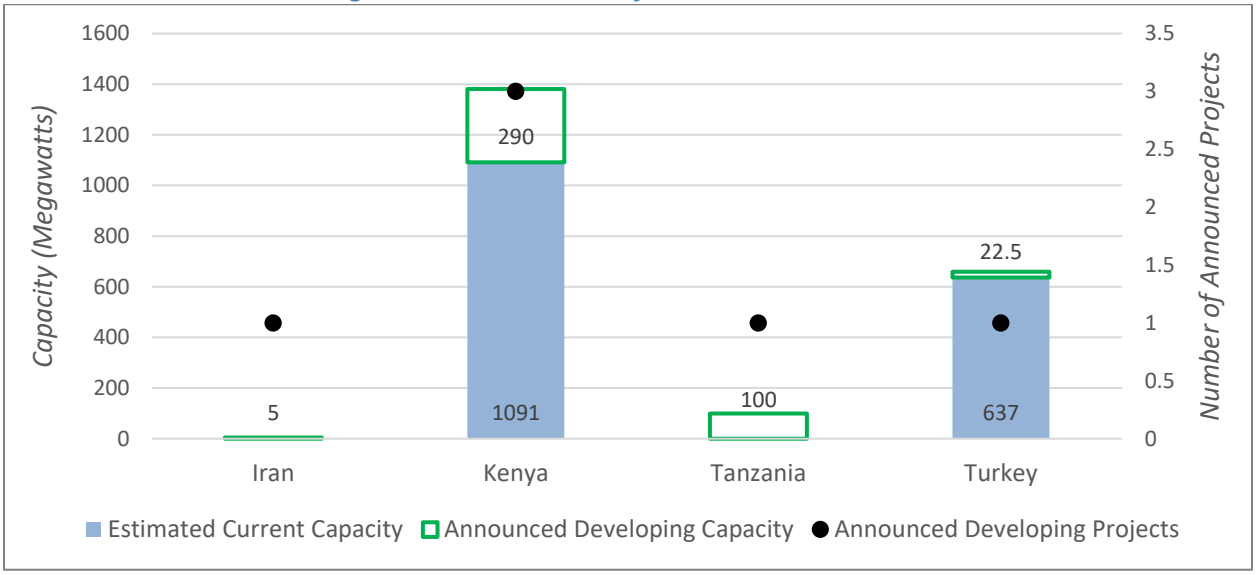
Kenya is currently drilling for its Akiira One binary power plant in two 70 MW phases, with the first phase expected to be in operation by December 2018. Akiira Geothermal Limited (AGL) sought the help of GeothermEx for exploratory and pre-feasibility studies of the Akiira Valley. The cost for total plant construction is estimated to be at US $300 million. 30% of this will be sourced from shareholders while the remaining 70% will be borrowed from Standard Bank. AGL also received a US $1 million grant from the Overseas Private Investment Corporation (OPIC) in October 2014 to meet its legal and technical expenses. The African Union Commission (AUC) also provided a grant of US $1.3 million to fund exploratory drilling works. The Akiira One project is also partly funded by US President Barack Obama's Power Africa initiative that aims to tap into renewable energy in Africa. The Geothermal Development Company of Kenya (GDC) is expecting to begin the development of a new geothermal power plant at the Suswa site, with a generous PCA of 150 MW. The Italian government has pledged to the fund part of the project, with the GDC already having received US $475 million in loans and grants from various development agencies. Kenya's Energy Act of 2006 created more specialized institutions for the energy sector, as all energy sector functions had been previously centralized within the country's Ministry of Energy.

Tanzania has announced plans to generate 100 MW from geothermal sources within the next seven years, making it on track to meet its goal of 100 MW installed capacity by 2025 as part of the Tanzania Development Vision. It has recently been established that there is a crude estimated potential of above 5,000 MW of electricity in the country. The Tanzanian Government established the Tanzania Geothermal Development Company (TGDC), a state-owned agency to facilitate the development of the country's geothermal resources. However, the regulatory framework for geothermal energy still is not well-developed, with no geothermal-specific legislation or policy currently in place.

Since March 2016, Celikler Holding Company has announced plans to develop a fifth expansion of their Pamukoren plant in Turkey, with a PCA of 22.5 MW. A US $42 million loan will be provided from Vakifbank. The Turkish Renewable Energy Law provides a 10-year official feed-in-tariff (FIT) of 10.5 U.S. cents per kW, guaranteed by the Ministry of Energy.

In the five months that have passed since March 2016, PCA from newly-announced projects in the Middle East and Africa has grown by approximately 38%, as shown in *Figure 2*.

Figure 2: Middle East & Africa Geothermal Power



Note: The figure above compares current installed geothermal capacity to "announced developing capacity." "Announced developing capacity" is the estimated power plant capacity reported for specific sites by a private company, government agency or contractor associated with the site.
Source: GEA & Author

EUROPE

Overall in Europe, there have been 15 new projects spread throughout four countries announced since March 2016, with a combined estimated PCA of 614.5 MW. There have been exciting developments in Europe over the past few months as Croatia has begun developing its first geothermal power plant in the Pannonian Basin with an estimated PCA of 10 MW. The plant's turbines will be supplied by Turboden. It is expected to reach COD in May 2017. In Croatia, geothermal plants with a nameplate capacity of over 1 MW are eligible for a FIT rate of 1.20, with the cost of the FIT mechanism being shifted to the final electricity consumers. The country's Renewable Energy and High Efficiency Cogeneration Act – in effect since January 2016 – utilizes a market premium model which will be available for a capacity defined by a quota in kW. This Act also requires all potential investors to go through a tender procedure in order to obtain a land lease agreement or a right to build.

France is ramping up its investment in geothermal energy with both power and thermal plants in development, totaling 64.5 MW in PAC. Fonroche Geothermal is developing a thermal unit and an electric unit at Strasbourg-Alsace, with both expected to reach COD in late 2018. Fonroche is also developing a plant at Lons-Pau, expected to be commissioned in 2020. France offers attractive

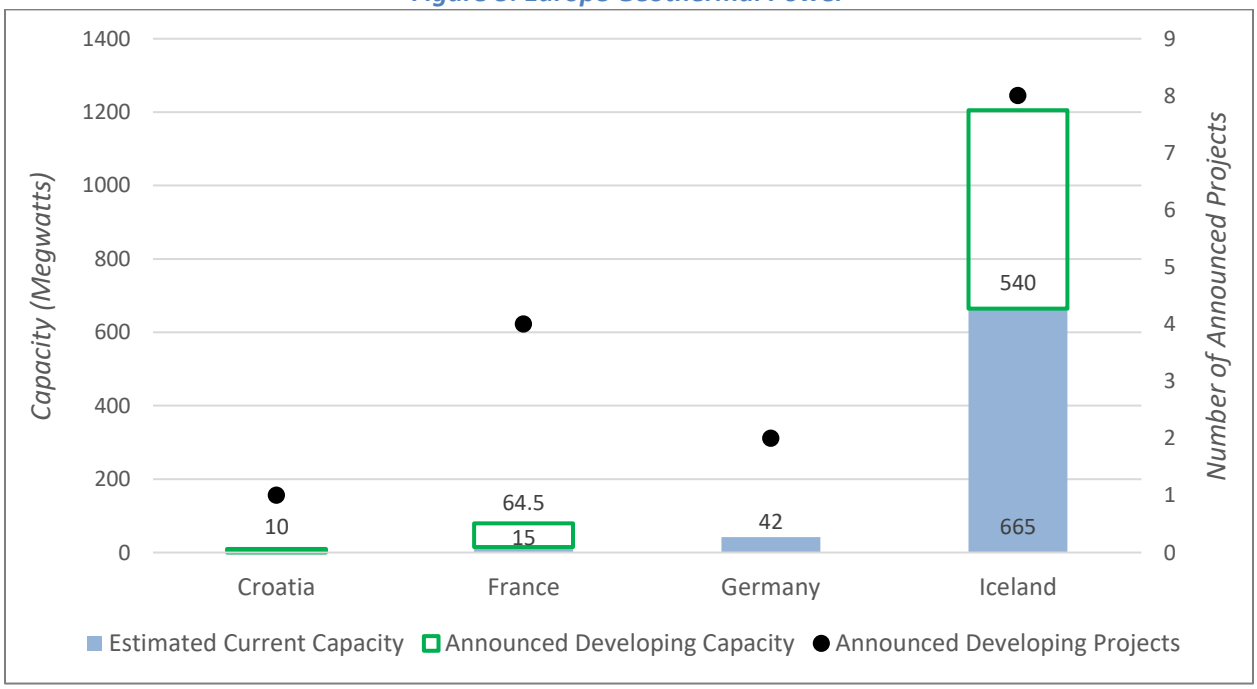
incentives for geothermal development. The country offers a tax credit for energy transition (CITE), where -25% is offered for the purchase of equipment and heating systems drawing the majority of their power from cogeneration or renewable sources. Under France's Electricity Law of 2000, FITs apply for contracts of 15 years, with 12 Eur cents/kWh, with an energy efficiency bonus of between 0 and 3 Eur cents for mainland France.

There are two plants in development in Germany, at Holzkirchen-Bavaria and Gross-Gerau. Although their PACs have not yet been announced, the Holzkirchen unit is expected to reach COD by the end of 2017. Germany offers a FIT of ct€25/kWh for all projects and additional ct€5 for EGS.

Iceland continues to serve as a model for geothermal development globally as the country has announced eight new projects since March, totaling 540 MW of developing capacity. Landsvirkjun, the national power company of Iceland, has agreed to a US $142 million loan with the European Investment Bank (EIB). This Is EIB's first loan in Iceland since 2011. National Grid Interconnector Holdings Limited is in the feasibility stage of developing the IceLink subsea HVDC power cable, a proposed link allowing Iceland and Great Britain to trade electricity. The developer is partnering with Landsvirkjun and Landsnet, the Icelandic Transmission System Operator. If development is to move ahead, it is expected that nearly 1 GW of new traditional hydro- and geothermal plants will be needed in Iceland over the next two decades. The project is currently projected to be operational in 2027 and would play a large role in facilitating renewables integration and reducing reliance on fossil fuels.

Since March 2016, the combined PCA estimates from new projects being developed has risen a considerable 83%, as shown in *Figure 3*.

Figure 3: Europe Geothermal Power



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Source: GEA & Author

CENTRAL & SOUTH AMERICA

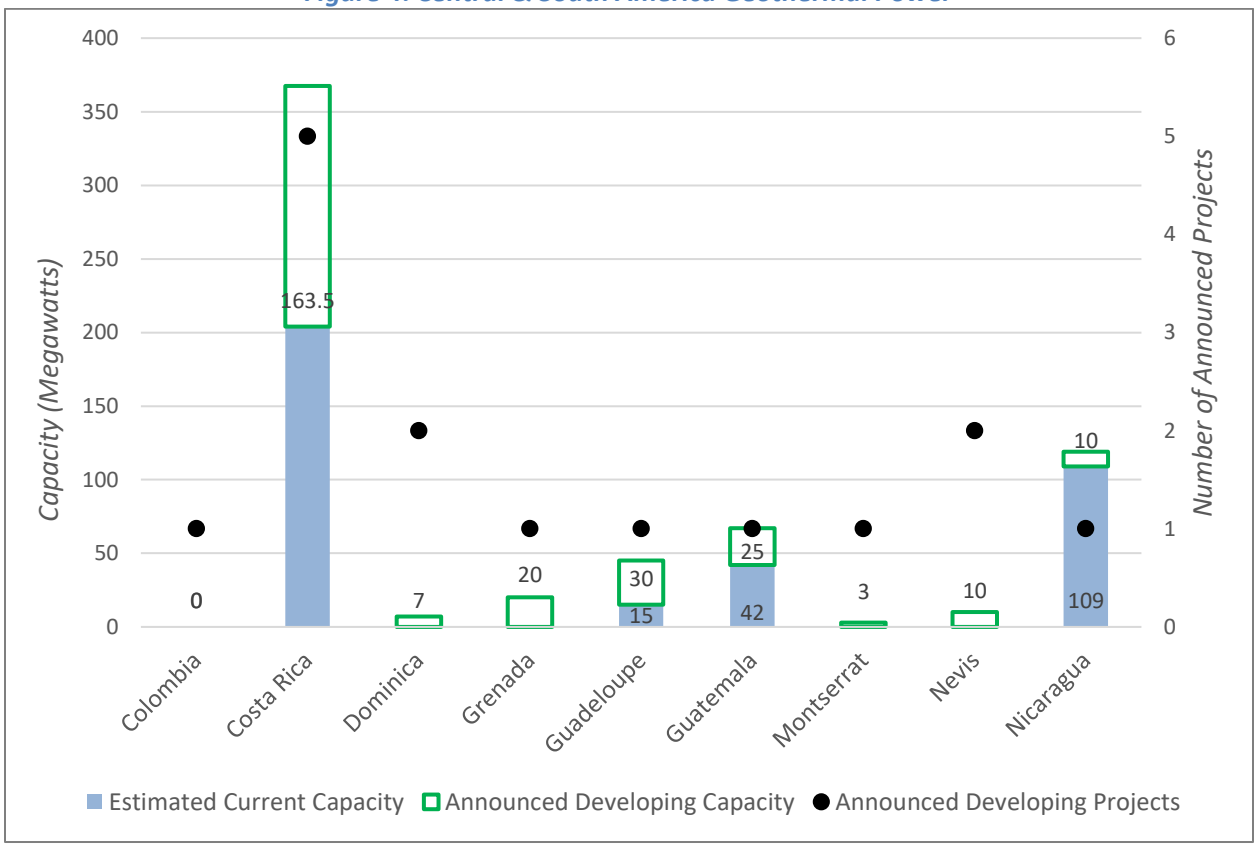
Central & South America and the Caribbean have seen an approximate 87% increase in announced geothermal projects in the 5 months between March and September, with 268.5 MW PCA. Costa Rica is accelerating its geothermal development with two plants in the pipeline, an extension at Las Pailas and the new Borinquen development. When completed, the plants will add 165 MW in operating capacity by 2024. In addition, Polaris Infrastructure has announced it is adding a 10 MW well to its San Jacinto-Tizate plant in Nicaragua, which will open in a phased approach over the remainder of 2016. Partial funding from the United States Trade Development Agency (USTDA) and expertise from Dewhurst Group, LLC, facilitated Colombia's utility company EPM to finalize and publish their feasibility study for the Nevado Del Ruiz project. The report was completed in the spring of 2016.

Currently in Central & South America, 10 countries have been targeted for development through the financial sector, particularly KfW's Geothermal Development Facility for Latin America (GDF - www.gdflac.com) which will provide risk mitigation for surface studies and confirmation drilling phases. The initial round will provide €50M and more funding in subsequent years. The 10 countries are: Bolivia, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, and Peru. This will provide a vehicle for interested participants to apply for funding in the highest-risk phases in geothermal development and expansion of established projects.

The Caribbean island of Dominica has begun developing its first geothermal power plant in two phases of 3.5 MW. The plant – located in Roseau Valley – has received wide support from the small nation's Honorable Prime Minister and Finance Minister since the plant will allow the island to become more energy independent. An upcoming Geothermal Development Bill is being rushed through Parliament to establish the legal framework for the development of geothermal energy in Dominica. Approximately US $46 million will be allocated to cover project costs over a 2 year period. The government has contracted a US $50 million loan from the World Bank to finance the plant. Caribbean nations are looking towards renewables to increase their resiliency to natural disasters. The geothermal project on Dominica was initially put on hold as the government tried to accommodate people who lost their homes during Tropical Storm Erika in 2015.

As more Caribbean nations are willing to explore their geothermal potential, Grenada has announced it will be proceeding with exploration work on a geothermal reservoir. Following pre-feasibility work by the Japan International Cooperation Agency (JICA) and Jacobs, a high temperature reservoir was discovered with a possible temperature of 220 to 240 degrees Celsius and an estimated development capacity of up to 20 MW.

Figure 4: Central & South America Geothermal Power

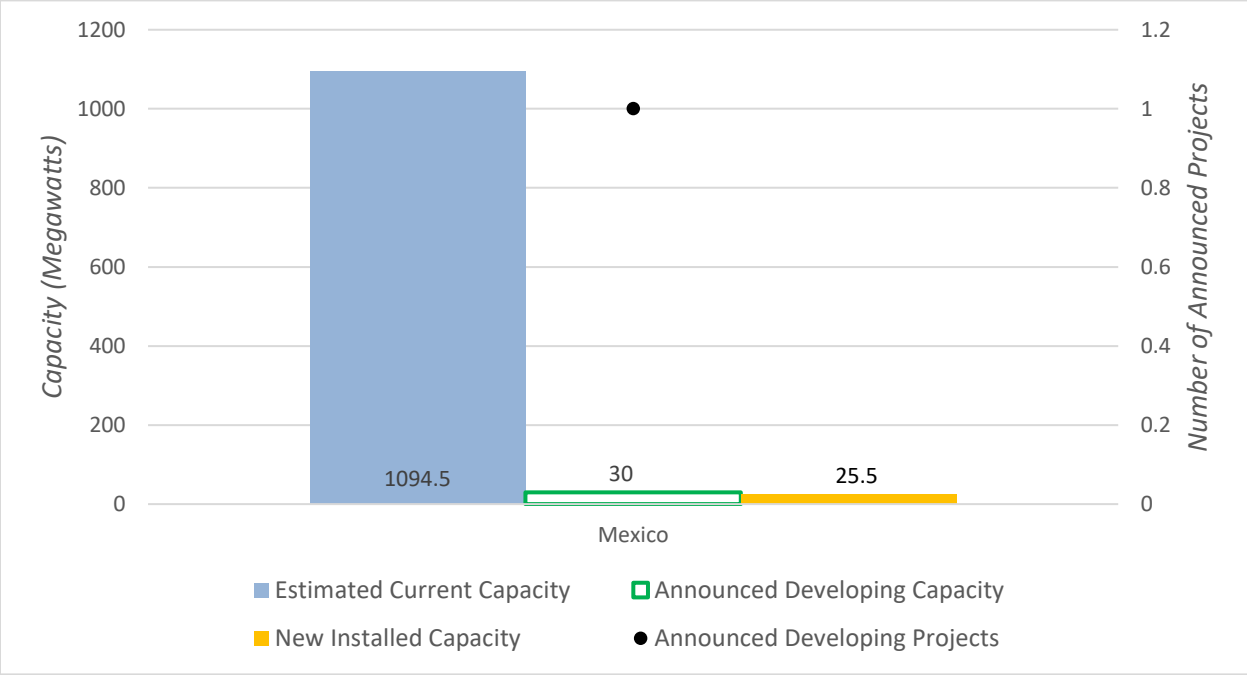


Note: The figure above compares current installed geothermal capacity to "announced developing capacity." "Announced developing capacity" is the estimated power plant capacity reported for specific sites by a private company, government agency or contractor associated with the site. Source: GEA & Author

NORTH AMERICA

The future of geothermal power development in Mexico is looking good with the announcement of the country's first private geothermal concession at Domo de San Pedro. Developer Grupo Dragon commissioned the plant in late April 2016, connecting 25.5 MW to the grid. The license for the project is for 30 years and includes 18 production wells to a depth of up to 3,500 meters and two water re-injection wells. Mexican-based consortium Mexxus RG has announced plans for its 30 MW Ceboruco plant in the Nayarit state.

Figure 5: North America Geothermal Power



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Source: GEA & Author

Constitutional reform in 2013 ended the state monopoly on power generation. Updated energy legislation means geothermal energy can be purchased on the wholesale market. Unfortunately, Mexico does not have any sort of FIT scheme or tax incentive in place for renewable development, meaning that there is direct price competition with fossil fuel plants.

ASIA SOUTH-EAST PACIFIC

Although developing capacity growth has slowed in Southeast Asia and the South Pacific regions since March (212 MW added PAC), it is exciting to see Malaysia entering the market with the announcement of its pilot geothermal project. Tawau Green Energy has taken the initiative to develop Malaysia's first geothermal plant at Apas Kiri-Tawau. The 30 MW binary plant will use turbines from Exergy and is expected to reach COD by June 2018. In May 2015, the FIT levels for Malaysian geothermal plants were announced. Plants up to 30 MW are eligible for FIT of MYR 0.45/kWh.

Exploratory drilling for Taiwan's new geothermal plant began in August 2016 and will take 6 months to complete. China National Petroleum Corporation, National Taiwan University, and the Industrial Technology Research Institute will all take part in developing the binary plant in Sanxing. An official PAC has not been announced yet by the developers. Under Taiwan's Renewable Energy Development Act, the government will exempt developers who import machinery from the customs duty. The government also provides subsidies of up to 50% of exploration costs or not exceeding TWD 50 million

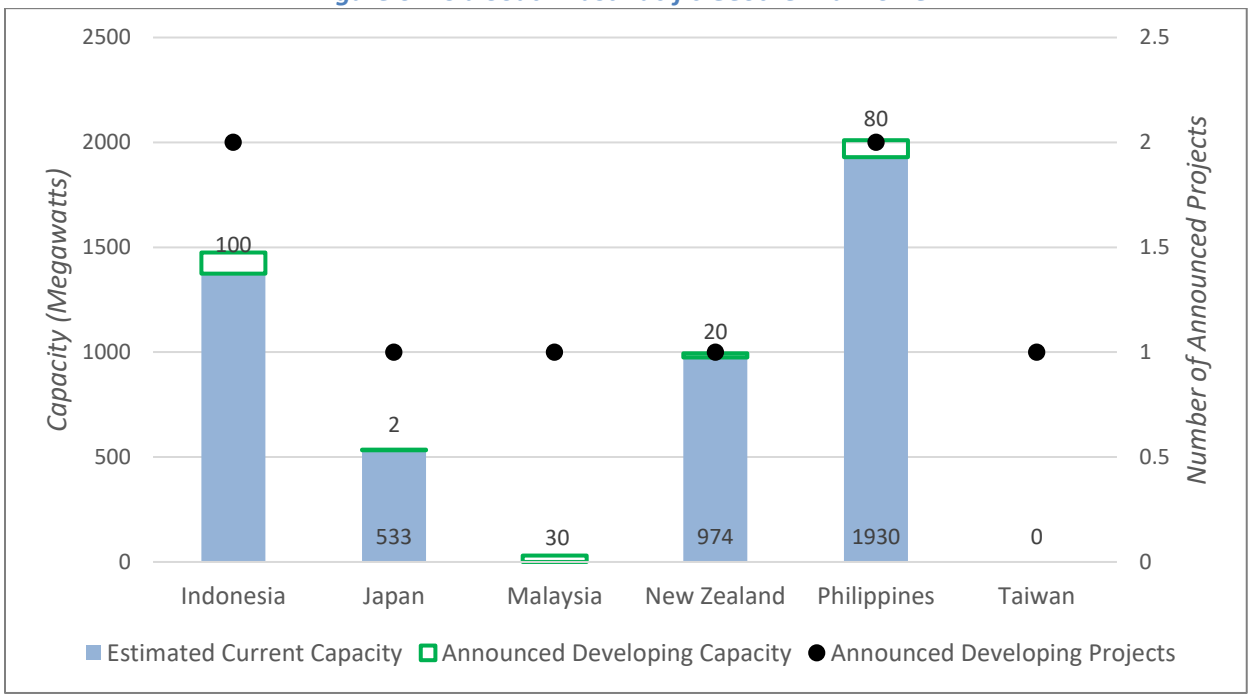
to the developer. The installed capacity must be over 500 kW for a FIT of TWD 4.9315 per kWh guaranteed for 20 years.

Sumitomo Forestry has announced it will be developing a small 2 MW power plant Kurikoma National Park in Japan. The developer is planning to invest around US $181 million in its renewable energy portfolio. Japan offers an enticing FIT rate for geothermal at 40 Yen/kW (~$.33/kW), so there is an advantageous policy framework already in place for further development.

Enel Green Power (EGP) announced it will be developing its first project in Indonesia. The Way Ratai plant in Lampung will have an expected 55 MW of generating capacity. US$60 million was financed from PT Geo Dipa Energy's own equity in the form of equipment and fresh funds. The remainder of the project is being financed by a consortium led by PT Bank Negara Indonesia Tbk [BNI]. In addition, PT Jabar Rekind Geothermal (JRG) has announced a new 45 MW project in Cisolok. Drilling for this project is expected to begin in September 2016, with a target COD in the first half of 2020.

The Indonesian Government is preparing a FIT mechanism to help geothermal developers in hopes to increase development in the country. The new tariff will adopt a fixed-price system where energy suppliers do not need to negotiate with the state-owned electricity firm PLN as the primary power-off taker. This new mechanism is targeted at power plants that fall within the capacity range of 5 to 220 MW. In addition, the Indonesian Energy and Mineral Resources Ministry is working on new legislation that would mean the geothermal industry would be entitled to priority investment services. Investors will also be able to obtain the necessary permits within three hours at the Investment Coordinating Board (BKPM), a privilege that other industries in the country already have.

Figure 6: Asia South-East Pacific Geothermal Power



APPENDIX 1-A: INTERNATIONAL PROJECTS UNDER DEVELOPMENT SINCE MARCH 2016 (AS OF SEPTEMBER 2016)

Country	*Field or Locality*	*Plant*	*Planned Capacity Addition (MW)*	*Project Progress*
Colombia	Nevado Del Ruiz	*N/A*	*TBA*	Early Stage
Costa Rica	Borinquen	Miravalles Unit I	55	Early Stage
Costa Rica	Borinquen	Miravalles Unit II	55	Early Stage
Costa Rica	Las Pailas	Miravalles Unit III	29.5	Prospect
Costa Rica	Las Pailas	Miravalles Unit V	19	Prospect
Costa Rica	Las Pailas	Miravalles backpressure unit	5	Prospect
Croatia	Pannonian Basin	Velika Ciglena-Bjelovar	10	Early Stage
Dominica	Roseau Valley	Phase 1	3.5	Early Stage
Dominica	Roseau Valley	Phase 2	3.5	Early Stage
France	Strasbourg-Alsace	Strasbourg - Thermal Unit	30	Early Stage
France	Strasbourg-Alsace	Strasbourg - Electric Unit	5	Early Stage
France	Lons-Pau	Lons-Pau	5.5	Prospect
France	Rittershoffen-Alsace	Rittershoffen - Thermal Plant	24	Under Construction
Germany	Holzkirchen-Bavaria	Holzkirchen Unit 1	*TBA*	Early Stage
Germany	Gross-Gerau	Trebur Unit 1	*TBA*	Early Stage
Grenada	Mt. St. Catherine	Mt. St. Catherine Project	20	Early Stage
Guadeloupe	Guadeloupe	Bouillante Extension	30	Early Stage
Guatemala	El Ceibillo	Well EC-9	25	Early Stage
Iceland	Reykjanes	Reykjanes Expansion 4	*TBA*	Prospect
Iceland	Theistareykir	Theistareykir I - Phase 2	45	Early Stage
Iceland	Theistareykir	Theistareykir II	105	Prospect
Iceland	Bjarnarflag	Bjarnarflag Phase 1	100	Early Stage

Iceland	Hengill	Gráuhnúkur	40	Prospect
Iceland	Hengill	Meitillinn	50	Prospect
Iceland	Krýsuvík	Sandfell	100	Prospect
Iceland	Krýsuvík	Sveifluháls	100	Prospect
Indonesia	Lampung	Way Ratai	55	Early Stage
Indonesia	Cisolok-Cisukarame	Cisolok Phase 1	45	Early Stage
Iran	Meshkin Shahr	Mt. Sabalan Pilot Plant	5	Early Stage
Japan	Kurikoma National Park	Sumitomo Forestry Plant	2	Prospect
Kenya	Akiira Valley	Akiira One - Phase 1	70	Early Stage
Kenya	Akiira Valley	Akiira One - Phase 2	70	Early Stage
Kenya	Suswa	Suswa Phase 1	150	Early Stage
Malaysia	Apas Kiri-Tawau	Phase 1	30	Early Stage
Mexico	Domo de San Pedro	Unit 3	25.5	Early Stage
Mexico	Nayarit	Ceboruco	30	Early Stage
Montserrat	St. Georges Hill	Well 3	*TBA*	Early Stage
Nevis	*N/A*	*N/A*	10	Early Stage
Nicaragua	San Jacinto-Tizate	Phase 2: Well SJ 9-4	10	Under Construction
Philippines	San Teodoro-Mabini	Mabini	20	Early Stage
Philippines	Valencia-Negros Oriental	Southern Negros Expansion	60	Early Stage
Taiwan	Yilan-Sanxing	Sanxing	*TBA*	Early Stage
Tanzania	Mbeya-Ngozi	Lake Ngozi	100	Under Construction
Turkey	Aydin-Pamukoren	Pamukoren 5	22.5	Prospect
		TOTAL	**1,562.5**	

Source: Author

APPENDIX 1-B: PROJECT DEVELOPERS AND PRE-FEASIBILITY

Country	Plant	Developer	Pre-Feasibility
Colombia	*N/A*	EPM – CHEC	Dewhurst Group, LLC
Costa Rica	Miravalles Unit I	Costa Rica Electricity Institute (ICE)	GeothermEx, Inc.
Costa Rica	Miravalles Unit II	Costa Rica Electricity Institute (ICE)	GeothermEx, Inc.
Costa Rica	Miravalles Unit III	Costa Rica Electricity Institute (ICE)	GeothermEx, Inc.
Costa Rica	Miravalles Unit V	Costa Rica Electricity Institute (ICE)	GeothermEx, Inc.
Costa Rica	Miravalles backpressure unit	Costa Rica Electricity Institute (ICE)	GeothermEx, Inc.
Croatia	Velika Ciglena-Bjelovar	MB Holding	Virkir Orkint Consulting Group Ltd.
Dominica	Phase 1	*N/A*	BRGM
Dominica	Phase 2	*N/A*	BRGM
France	Strasbourg - Thermal Unit	Fonroche Geothermal	ADEME
France	Strasbourg - Electric Unit	Fonroche Geothermal	ADEME
France	Lons-Pau	Fonroche Geothermal	ADEME
France	Rittershoffen - Thermal Plant	Électricité de Strasbourg (ÉS); Roquette; La Caisse des Dépôts	ADEME
Germany	Holzkirchen Unit 1	Geothermie Holzkirchen GmbH	ERDWERK
Germany	Trebur Unit 1	Geothermal Engineering GmbH (GeoT)	Geothermal Engineering GmbH (GeoT)
Grenada	Mt. St. Catherine Project	*N/A*	JICA; JACOBS
Guadeloupe	Bouillante Extension	Ormat Technologies	*N/A*
Guatemala	El Ceibillo - Well EC-9	*N/A*	*N/A*
Iceland	Reykjanes Expansion 4	HS Orka	Deep Vision
Iceland	Theistareykir I - Phase 2	Theystareykir/Landsvirkjun	Landsvirkjun
Iceland	Theistareykir II	Theystareykir/Landsvirkjun	Landsvirkjun
Iceland	Bjarnarflag Phase 1	Landsvirkjun	Landsvirkjun
Iceland	Gráuhnúkur	Rekjavik Energy/Our Nature	*N/A*
Iceland	Meitillinn	Rekjavik Energy/Our Nature	*N/A*
Iceland	Sandfell	HS Orka	*N/A*
Iceland	Sveifluháls	HS Orka	*N/A*
Indonesia	Way Ratai	Enel Green Power (EGP)/PT ONE	Pertamina Geothermal Energy (PGE)

Indonesia	Cisolok Phase 1	PT Jabar Rekind Geothermal (JRG)	ELC Electroconsult SpA
Iran	Mt. Sabalan Pilot Plant	Renewable Energy Organization of Iran	KML Consulting Engineer (New Zealand)
Japan	Sumitomo Forestry Plant	Sumitomo Forestry	*N/A*
Kenya	Akiira One - Phase 1	Akiira Geothermal Limited (AGL)	GeothermEx, Inc.
Kenya	Akiira One - Phase 2	Akiira Geothermal Limited (AGL)	GeothermEx, Inc.
Kenya	Suswa Phase 1	*N/A*	Geothermal Development Company of Kenya (GDC)
Malaysia	Phase 1	Tawau Green Technology	Minerals & Geoscience Department Malaysia (JMG)
Mexico	Unit 3	Grupo Dragon	The Japan Research Institute, Limited
Mexico	Ceboruco	Mexxus RG	Comisión Federal de Electricidad (CFE)
Montserrat	St. Georges Hill - Well 3	*N/A*	*N/A*
Nevis	*N/A*	Nevis Renewable Energy International (NREI)	*N/A*
Nicaragua	Phase 2: Well SJ 9-4	Polaris Infrastructure Inc.	INTERGEOTERM, SA
Philippines	Mabini	Basic Energy Corp.	Filtech Energy Drilling Corp.
Philippines	Southern Negros Expansion	PNOC-Energy Development Corporation (PNOC-EDC)	PNOC-Energy Development Corporation (PNOC-EDC)
Taiwan	Sanxing	National Taiwan University; Industrial Technology Research Institute	Taiwan Bureau of Energy (BOE)
Tanzania	Lake Ngozi	Tanzania Geothermal Development Company (TGDC)	*N/A*
Turkey	Pamukoren 5	Celikler Holding	ORME Jeotermal A.Ş.

Source: Author

APPENDIX 2-A: INTERNATIONAL PROJECTS UNDER DEVELOPMENT AS OF MARCH 2016

Country	Plant	Field or Locality	Planned Capacity Addition (MW)	Project Progress
Ethiopia	Phase 1, Plant 1, Unit 1	Aluto Langano	75	Under Construction
Germany	Mauerstetten (EGS)	Mauerstetten (EGS)	5	On Hold
Honduras	Phase 1	Platanares	17	Under Construction
Honduras	Phase 2	Platanares	18	Under Construction
Iceland	Reykjanes Expansion 3	Reykjanes	50	Under Construction
Iceland	Theistareykir I - Phase 1	Theistareykir	45	Under Construction
Indonesia	Sarulla Phase 2	North Sumatra	110	Under Construction
Indonesia	Sarulla Phase 3	North Sumatra	110	Under Construction
Indonesia	Lahendong Unit 5	Sulawesi - Lahendong	20	Under Construction
Indonesia	Ulubelu Unit 3	Lampung	55	Operational
Indonesia	Sarulla Phase 1	North Sumatra	110	Under Construction
Indonesia	Kamojang Unit 5/Karaha Bodas	West Java	37	Under Construction
Indonesia	Ulubelu Unit 4	Lampung	55	Under Construction
Indonesia	Patuha - Unit 2	West Java-Bandung	55	Under Construction
Kenya	Olkaria - Green Energy Group transfer	Olkaria	20	
Kenya	Olkaria 3 Unit 4	Olkaria	24	Under Construction
Mexico	Los Humeros III B	Los Humeros	27	Under Construction
Mexico	Los Azufres III - 2	Los Azufres	25	Under Construction
Mexico	Los Humeros III A	Los Humeros	27	Under Construction
Mexico	Phase 1	San Pedro Lagunillas	25	Early Stage
Mexico	Phase 2	San Pedro Lagunillas	25	Early Stage
Philippines	Montelago	Oriental Mindoro	40	Under Construction
Portugal	Pico Alto field	Terceira Island	4	Under Construction
Turkey	Jeoden	Denizli-Sarayköy	3	Operational

Turkey	Umurlu 2	Aydin-Umurlu	12	Under Construction
Turkey	Saraykoy 1	Denizli-Sarayköy	13	Under Construction
Turkey	Saraykoy 2	Denizli-Sarayköy	13	Under Construction
Turkey	Sultanhisar Unit 1	Aydin-Sultanhisar	14	Early Stage
Turkey	Dora IV	Aydin-Salavatil	17	Early Stage
Turkey	Pamukoren 3	Aydin-Pamukoren	22.5	Early Stage
Turkey	Pamukoren 4	Aydin-Pamukoren	22.5	Early Stage
Turkey	Kemaliye Alasehir 1 & 2	Manisa-Alasehir	24	Under Construction

Source: GEA & Author

APPENDIX 2-B: PROJECT DEVELOPERS AND PRE-FEASIBILITY AS OF MARCH 2016

Country	Plant	Developer	Pre-Feasibility
Ethiopia	Phase 1, Plant 1, Unit 1	Ethiopian Electric Power Corporation (EEPCO); Geothermal Development Associates (GDA)	Ernst and Young ShinNihon LLC; Japan External Trade Organization (JETRO); West Japan Engineering Consultants; and ELC Electroconsult SpA.
Germany	Mauerstetten (EGS)	Exorka GmbH	GFZ (German Research Centre for Geosciences); TUBAF (TU Bergakademie Freiberg)
Honduras	Phase 1	Ormat Technologies	Los Alamos National Lab., NM (USA)
Honduras	Phase 2	Ormat Technologies	Los Alamos National Lab., NM (USA)
Iceland	Reykjanes Expansion 3	HS Orka	Deep Vision
Iceland	Theistareykir I - Phase 1	Theystareykir/Landsvirkjun	Landsvirkjun
Indonesia	Sarulla Phase 2	Sarulla Operation Limited (SOL)	Pertamina Geothermal Energy (PGE)
Indonesia	Sarulla Phase 3	Sarulla Operation Limited (SOL)	Pertamina Geothermal Energy (PGE)
Indonesia	Lahendong Unit 5	Pertamina Geothermal Energy (PGE)	Pertamina Geothermal Energy (PGE)
Indonesia	Ulubelu Unit 3	Pertamina Geothermal Energy (PGE)	Pertamina Geothermal Energy (PGE)
Indonesia	Sarulla Phase 1	Sarulla Operation Limited (SOL)	Pertamina Geothermal Energy (PGE)
Indonesia	Kamojang Unit 5/Karaha Bodas	Pertamina Geothermal Energy (PGE)	Pertamina Geothermal Energy (PGE)
Indonesia	Ulubelu Unit 4	Pertamina Geothermal Energy (PGE)	Pertamina Geothermal Energy (PGE)
Indonesia	Patuha - Unit 2	PT Geo Dipa Energy	West Japan Engineering Consultants, Inc. (West JEC)
Kenya	Olkaria - Green Energy Group transfer	Ormat Technologies	West Japan Engineering Consultants, Inc. (West JEC)
Kenya	Olkaria 3 Unit 4	Ormat Technologies	West Japan Engineering Consultants, Inc. (West JEC)
Mexico	Los Humeros III B	Alstom	Comisión Federal de Electricidad (CFE)
Mexico	Los Azufres III - 2	TSK Electrónica y Electricidad	West Japan Engineering Consultants, Inc. (West JEC) ; Japan Bank for International Cooperation (JBIC)
Mexico	Los Humeros III A	Alstom	Comisión Federal de Electricidad (CFE)

Mexico	Phase 1	Grupo Dragon	The Japan Research Institute, Limited
Mexico	Phase 2	Grupo Dragon	The Japan Research Institute, Limited
Philippines	Montelago	Emerging Power, Inc.	Iceland GeoSurvey (ÍSOR) ; Bandung Institute of Technology (ITB)
Portugal	Pico Alto field	EXERGY	Sociedade Geoeléctrica da Terceira, S.A. (GeoTerceira)
Turkey	Jeoden	JEODEN Geothermal	MTA (General Directorate of Mineral Research and Exploration)
Turkey	Umurlu 2	EXERGY	ORME Jeotermal A.Ş.
Turkey	Saraykoy 1	Zorlu Energy Inc.	MTA (General Directorate of Mineral Research and Exploration)
Turkey	Saraykoy 2	Zorlu Energy Inc.	MTA (General Directorate of Mineral Research and Exploration)
Turkey	Sultanhisar Unit 1	Celikler Holding	ORME Jeotermal A.Ş.
Turkey	Dora IV	Menderes Geothermal Elektrik Uretim AS (MEGE)	MTA (General Directorate of Mineral Research and Exploration)
Turkey	Pamukoren 3	Celikler Holding	ORME Jeotermal A.Ş.
Turkey	Pamukoren 4	Celikler Holding	ORME Jeotermal A.Ş.
Turkey	Kemaliye Alasehir 1 & 2	Türkerler	Geologica Geothermal Group

Source: GEA & Author

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