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THE UNFCCC IN THE CONTEXT OF GEOTHERMAL DEVELOPMENT: CLIMATE NEGOTIATIONS, PACTS AND INSTRUMENTS

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ABSTRACT

The United Nations Framework Convention on Climate Change (UNFCCC) was adopted in 1992, which marked the first milestone in the international response to climate change. Since then the international community has progressed forward, and in 2015 a new agreement to the UNFCCC was adopted – the Paris Agreement. This paper reviews the history of climate negotiations, with a particular focus on the landmark Paris Agreement. The Paris Agreement and corollary activities are then put in context of the impact of the agreement on the development of geothermal power.

1. INTRODUCTION

Climate change is one of the most threatening environmental problems globally today. Since 1992, when the United Nations Framework Convention on Climate Change (UNFCCC) was adopted the international community has been negotiating how the burden of climate change mitigation should be shared, how we should address adaptation and who should finance mitigation and adaptation actions. Initially under the Kyoto Protocol of the UNFCCC only OECD countries had mitigation responsibilities but with the new Paris Agreement of 2015 all countries will be sharing the burden (<http://unfccc.int>). Market based solutions for carbon financing have since 1992 been encouraged, and the new Paris Agreement continues this emphasis. Furthermore, adaptation to climate change impacts is receiving enhanced attention. For example, in the Paris Agreement all parties to the UNFCCC are encouraged to plan and implement adaptation efforts and parties have committed to adaptation support for developing countries (for further reading see: <http://unfccc.int>).

As geothermal energy contributes both to mitigation of greenhouse gases (GHG) and adaptation (Ogola et al., 2012), any developments in the UNFCCC and its associated agreements, have implications for future investment in geothermal energy.

This paper briefly reviews the history of the UNFCCC and its associated agreements as well as its present status. It in particular focuses on the Paris Agreement and its implications for carbon financing and thus indirectly investment in the development of geothermal resources. The paper is largely derived from information given on the unfccc.int website.

2. HISTORY OF CLIMATE NEGOTIATIONS

2.1. United Nations Framework Convention on Climate Change

The first milestone of the international response to climate change was reached in 1992, at the Earth Summit in Rio de Janeiro, with the signing of the United Nations Framework Convention on Climate Change (UNFCCC). The Convention established a long-term objective of stabilizing greenhouse gas (GHG) concentrations in the atmosphere "at a level that would prevent dangerous anthropogenic interference with the climate system" (United Nations, 1992). The UNFCCC acknowledged the importance of assisting developing countries in combatting climate change through for example financial support for mitigation and adaptation actions. In that context a system of grants and loans was set up through the UNFCCC that is managed by the Global Environment Facility (GEF). The convention also addressed adaptation to climate change and calls for actions to reduce the impact of climate change in developing countries. Currently 197 countries are parties to the UNFCCC (UNFCCC, 2016a).

2.2 Kyoto Protocol

Recognizing that a binding action was needed to curb net GHG emissions, member countries of the UNFCCC negotiated the Kyoto Protocol, which was adopted in 1997. The Kyoto protocol set binding targets to reduce emissions 5.2 percent below 1990 levels in what was called the first budget period of the protocol or by 2008-2012. The Protocol entered into force on February 16, 2005, which made the Protocol's emissions targets legally binding for the countries that ratified it. Market-based approaches to GHG emission reductions were central to the design of the Kyoto Protocol. The approaches, called flexibility mechanisms were implemented to increase the flexibility of national options to reduce GHG emissions, reduce cost and to stimulate investment in low-carbon solutions in countries without mitigation commitment. The three flexibility mechanisms were (UNFCCC, 2016b):

- i) **International Emissions Trading**, which allowed countries that have reduced emissions below their set targets to sell extra allowances to countries whose emissions exceed their targets. This effectively established a carbon market. An example of such an international trading system and thus a carbon market is the European Union Emissions Trading System (EU-ETS).
- ii) **Joint Implementation (JI)**, which allowed countries with binding emission reduction targets to earn emission reduction units (ERU's) in other countries with mitigation commitments through investment in e.g. low-carbon energy solutions.
- iii) **The Clean Development Mechanism (CDM)**, which allowed countries with binding emission reduction targets to earn certified emission reduction (CERs) credits through investment in projects in developing countries that lead to "additional" emission reductions.

The Kyoto protocol also focused on adaptation to climate change and through the Adaptation fund, funding mechanisms for adaptation were established. In the first budget period of the Kyoto Protocol, share of the proceeds from the CDM activities financed the Adaptation fund. Later on, in 2012, it was decided to expand the funding of the Adaptation fund to include 2% of the proceeds as well from JI and international emissions trading (UNFCCC, 2016b).

2.3 Copenhagen meeting

As the end of the first budget period of the Kyoto Protocol approached pressure mounted for another agreement that would extend or replace the Kyoto Protocol. Hopes were high for a new agreement at the Conference of the Parties (COP15) in 2009 in Copenhagen. However a new agreement did not materialize. COP15 however advanced the negotiations on the infrastructure needed for effective global climate change cooperation, including improvements to the CDM mechanism of the Kyoto Protocol. It also produced the Copenhagen Accord, which focused on (UNFCCC, 2016c):

- A long-term goal of limiting the maximum global average temperature increase to no more than 2 degrees Celsius above pre-industrial levels, subject to a review in 2015. There was, however, no agreement on how to do this in practice.
- Developed countries' promises to fund actions to reduce greenhouse gas emissions and to adapt to climate change in developing countries. In that context developed countries promised to provide US\$30 billion for the period 2010-2012, and to mobilize long-term finance of a further US\$100 billion a year by 2020 from a variety of sources.
- The establishment of four new bodies: a mechanism on REDD-plus, a High-Level Panel under the COP to study implementation of financial provisions, the Copenhagen Green Climate Fund, and a Technology Mechanism.

The main topics addressed that related to CDM were linked to issues including: i) the need for improved efficiency, transparency and consistency of decision-making, ii) regional distribution of CDM projects which was highly skewed iii) inclusion of Carbon capture and storage (CCS). The meeting agreed to improve issues i and ii above with for example increased emphasis on CDM projects from countries that held less than 10 CDM projects.

2.4 The Cancun meeting

Following COP15, COP 16 was held in Cancun in 2010 at which the Cancun Adaptation Framework (CAF) was adopted. Within CAF, parties to the UNFCCC reaffirmed that adaptation must be addressed with the same level of priority as mitigation. The objective of the CAF was to “enhance action on adaptation, including through international cooperation and coherent consideration of matters relating to adaptation under the Convention”. A key element of the agreement was the notion that “Developed country Parties are to provide developing country Parties, taking into account the needs of those that are particularly vulnerable, with long-term, scaled-up, predictable, new and additional finance, technology, and capacity-building to implement adaptation actions, plans, programmes and projects at local, national, sub-regional and regional levels, including activities under the Cancun Adaptation Framework.” In this context a major step forward was the formalization of the commitment made in Copenhagen to mobilize \$100 billion a year by 2020 to address the mitigation and adaption needs of developing countries. The Cancun agreement also formally established the “Green Climate Fund,” which was to manage a portion of the pledged \$100 billion (UNFCCC, 2016d).

2.5 Paris Agreement

The negotiations toward the Paris Agreement were launched with the Durban Platform for Enhanced Action adopted at COP 17 in 2011. The Durban Platform called for “a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties,” to apply from 2020, but provided no further substantive guidance (UNFCCC, 2016e).

The progress moved substantially forward with COP 19 in Warsaw, which called on parties to submit “intended nationally determined contributions” (INDCs) to the UNFCCC before the Paris conference (UNFCCC, 2016f). The INDC’s were to describe mitigation and adaptation commitments that parties considered reasonable for them to commit to. This new bottom up approach of the emerging Paris Agreement stood in stark contrast with the top-down approach previously applied. The use of the bottom-up approach proved to be a great success and heading into COP21 in Paris, more than 180 countries that were responsible for more than 90 percent of global emissions had submitted INDCs. This expression of commitment led to then the landmark agreement reached in Paris on December 12th 2015. The new Paris Agreement ended the differentiation between developed and developing countries, which had characterized earlier efforts, and was replaced by a common framework that enabled all countries to commit to address climate change. Furthermore all committed to review their

commitment and enhance them over time, in addition for all parties to report on their emissions and mitigation and adaptation actions (UNFCCC, 2016g).

The main features of the Paris Agreement include (UNFCCC, 2016h; United Nations, 2015):

- The goal of limiting global temperature increase well below 2 degrees Celsius, while urging efforts to limit the increase to 1.5 degrees.
- Establishing binding commitments by all parties to make “nationally determined contributions” (NDCs), based on the INDC’s.
- The commitment of all countries to report on their emissions and mitigation process.
- The commitment of all countries to submit new NDCs every five years, clearly expecting an enhancement of efforts over time.
- Extending the goal from the Copenhagen Accord, of mobilizing \$100 billion a year in support by 2020 through 2025 for the Green Climate Fund, with a new, higher goal to be set for the period after 2025.
- Countries are authorized to negotiate "cooperative approaches" to achieve their NDC, including the use of "internationally transferred mitigation outcomes" (ITMO). This implies various forms of emissions credit trading schemes, carbon pricing mechanisms, transfers of technology and the provision of climate finance. In the future it is expected that this mechanism could evolve into a similar mechanism to the CDM but this has yet to be decided upon.
- The establishment of a separate sustainable development mechanism (SDM) similar to the current CDM mechanism. All GHG emission reductions achieved under the SDM must be **additional** to those that would have otherwise occurred in the host party's jurisdiction. The SDM is expected to follow the infrastructure established under the CDM. It is expected that it will be managed on the basis of: “(a) voluntary participation authorized by each nation involved; (b) real, measurable, and long-term benefits related to the mitigation of climate change; (c) specific scopes of activities; (d) additionality, (e) verification and certification of emission reductions resulting from mitigation activities by designated operational entities; and (f) experience gained with and lessons learned from existing market mechanisms”.
- The requirement of all parties, “as appropriate,” to plan and implement adaptation efforts.
- The encouragement to all parties to report on their adaptation efforts and/or needs including a review of progress and effectiveness every five years.
- The commitment of increased adaptation support for developing countries.

2.6 After Paris

To become a party to the Agreement, each country must express formal consent to be bound by it through a formal process of ratification, acceptance, approval or accession. Each country has its own domestic procedures for deciding whether to join the agreement.

The Paris Agreement, similar to the Kyoto protocol, establishes an activation rule for entry-into-force: For being activated it requires approval by at least 55 countries accounting for at least 55 percent of global GHG’s (UNFCCC, 2016h).

3. A BRIEF LOOK AT IMPORTANT INSTRUMENTS AND THE LINKS TO GEOTHERMAL DEVELOPMENT

3.1 Mitigation and adaptation

The Paris Agreement articulates two long-term emission goals: first, a peaking of emissions as soon as possible and then, a goal of “a balance between anthropogenic emissions by sources and removals by sinks”) in the second half of this century implying carbon neutrality. It furthermore expects all

countries to commit to mitigation actions through their **NDC's** and to communicate an update (a progression) to their NDC's every five years. The core mitigation commitments are common to all parties, but there is some differentiation in the expectations set between developed and developing countries. Developed countries are to commit to nation wide emission reduction targets, whereas developing countries are "encouraged" to do the same over time and will in addition receive administrative, technical and financial support to implement their commitments (UNFCCC, 2016h).

Unlike the earlier agreements, all countries will be able to engage in **ITMO's**, but at the same time must contribute to global mitigation. Additional mitigation beyond the NDC's will be governed by the rules of the new **Sustainable Development Mechanism**, whose structure is yet to be designed. This means that flexibility mechanisms will remain in place, but their structure will differ significantly from e.g. the CDM and JI mechanisms (UNFCCC, 2016h).

Adaptation efforts will be strengthened, and the parties committed to increased financial and technical support for developing countries (UNFCCC, 2016h).

The parties to the Paris Agreement agreed to make "finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development." Developed countries will provide "financial resources" to developing countries consistent with existing obligations but are "encouraged" to provide additional financial resources voluntarily. Furthermore, COP21 extended through 2025 the \$100 billion a year in in public and private resources already promised by developed countries and by 2025 the COP will set a "new collective quantified goal from a floor of" \$100 billion a year for climate financing. Separately, the Green Climate Fund received particular attention. It is encouraged to speed up deployment of financial resources for climate action, and to develop innovative programs to leverage additional investment from public and private entities (UNFCCC, 2016h).

It is clear that both direct and indirect use of geothermal energy is a necessary component of climate strategies, both in terms of adaptation and mitigation (Ogola et al. 2012). This was clearly articulated in Paris as during the conference 38 countries and over 20 industry partners launched the Global geothermal alliance (GGA). The GGA is an initiative that aims for 500% increase in power generation from geothermal energy and 200% increase in heating by 2030 as part of mitigation and adaptation initiatives under the Paris Agreement (United Nations, 2015).

3.2 Other initiatives

Other important initiatives at the Paris meeting that are relevant for geothermal development included (Braun and de Paula 2016):

- *The **African Renewables Energy Initiative** (AREI) includes 54 African States that are planning to build at least 10 GW of new and additional renewable energy generation capacity by 2020 and 300 GW by 2030.*
- *The Office of the Secretary-General of the United Nations and the UNFCCC Secretariat launched the "**renewable energy track**", which is showcased through a series of high profile events, notably the Energy Day. Its main goal is to mobilize partners and new actors to act through a platform that will demonstrate climate efforts before and after COP21.*
- ***Mission Innovation** is an example of a public-private effort to accelerate global clean energy innovation to boost renewable energy investments and improve affordability.*
- ***RE100** is an initiative of leading multinationals, which are committed to procuring 100% of their electricity from renewable sources of energy by a specified year.*
- ***During the Cities' Summit** held on the 4th of December, "Paris City Hall Declaration" presented mayors' commitments to reduce 80% of greenhouse gas emissions by 2050 and the plan to a transition towards 100% renewable energy.*
- *The **Investor Platform for Climate Action** lists a number of the most significant initiatives that are to invest in cleantech and renewables and/or to refrain from investing in coal projects or*

other fossil fuel activities. This initiative represents more than 400 institutional investors with \$24 trillion in assets under management.

- The **We Mean Business coalition**, aimed at accelerating the transition to a low-carbon economy, consists of almost 400 companies representing over \$8 trillion in revenue plus 183 investors representing over \$20 trillion in assets.

4. CONCLUSION

The Paris Agreement clearly shifted the international momentum towards forcefully addressing climate change both in terms of adaptation and mitigation in the context of sustainable development. As development of geothermal energy, if planned properly, simultaneously can be considered a mitigation and adaptation action as well as contribute to sustainable development, the prospects of widespread deployment of geothermal energy where possible look promising.

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