

Approved for tabling

REPUBLIC OF KENYA



Bot
SNA
5/12/18

PARLIAMENT
OF KENYA
LIBRARY

THE NATIONAL ASSEMBLY

TWELFTH PARLIAMENT

(SECOND SESSION)

REPORT OF THE DEPARTMENTAL COMMITTEE ON ENERGY
ON

THE ICELAND GEOTHERMAL CONFERENCE, REYKJAVIK
(APRIL 23 – 29, 2018)

THE NATIONAL ASSEMBLY PAPERS LAID		DAY: Wednesday (P)
DATE: 15 DEC 2018		
BY: Rachael Clem	Kain - Principal Assistant	
CLERK-AT THE-TABLE:		

Clerk's Chambers

Office of the Director, Committees Services
The National Assembly
Parliament Buildings
NAIROBI

DECEMBER, 2018

LIST OF ABBREVIATIONS

AGCE	-	African Geothermal Centre of Excellence
ESMAP	-	Energy Sector Management Assistance Program
GDC	-	Geothermal Development Company
GGA	-	Global Geothermal Alliance
GGDP	-	Global Geothermal Development Plan
HR	-	Human Resource
IGA	-	International Geothermal Association
IGC	-	Iceland Geothermal Conference
IGCI	-	Iceland Geothermal Cluster Initiative
KenGen,	-	Kenya electricity Generating Company

TABLE OF CONTENTS

FOREWARD	4
Establishment and Mandate of the Committee	5
Composition of the Committee	6
Committee Secretariat	6
Objective of the Study Visit	7
Delegation Membership	6
Adoption of the Committee Report	Error! Bookmark not defined.
Acknowledgment	8
LIST OF RECOMMENDATIONS	9
LIST OF ABBREVIATIONS	2
TABLE OF CONTENTS	3
1. Introduction	4
1.1. Background on Geothermal Development in Iceland	10
1.2. Contemporary Iceland Geothermal	10
1.3. The Iceland Geothermal Conference	12
2. THE AGENDA OF THE ICELAND GEOTHERMAL CONFERENCE	13
2.1. Iceland School of Energy	13
2.2. World Bank/ESMAP Global Geothermal Development Plan (GGDP)	13
3. COMMITTEE OBSERVATIONS	15
4. COMMITTEE RECOMMENDATIONS	16

FOREWARD

The National Assembly Standing Orders No. 216 establishes the Departmental Committee on Energy which is mandated to investigate and inquire into all matters relating to the assigned ministries and departments as they may deem necessary and as may be referred to them by the House. The Committee is also mandated to make reports and recommendations to the House as often as possible, including recommendation of proposed legislation. The Committee is therefore responsible for the oversight on all matters to do with Energy as an enabler of the government the big four agenda.

In its bid to enhance its capacity by understanding how best to discharge its mandate, the Committee attended the Iceland Geothermal Conference in Reykjavik between 23rd and 29th April, 2018. The delegation comprised of five Members and one Staff from Parliament. The main objective of the conference was to raise awareness of Geothermal Energy as one of the main renewable energy solutions. More importantly, the conference served as a platform upon which world leaders and professionals can come together and address the urgent, business-related topics.

Arising from the Iceland Geothermal Conference in Reykjavik, the delegation made the very pertinent observations and recommendations as contained in this report. The Committee is also indebted to the Ministry of Energy, the Geothermal Development Company in Kenya; the Ministry of Tourism, Industry and Innovation in Iceland; the Ministry of Foreign Affairs in Iceland; as well as the Conference organizers for their extraordinary organization skills and for making the conference seamless and fruitful.

Hon. (Dr.) Robert Pukose, M.P.

PREFACE

Establishment and Mandate of the Committee

The Departmental Committee on Energy is established pursuant to provisions of Standing Order 216 (5). Under the provisions of Standing Order 216 (5) the Committee is mandated to inter alia:

- (i) To investigate, inquire into, and report on all matters relating to the mandate, management, activities, administration, operations and estimates of the assigned ministries and departments;
- (ii) To study the programme and policy objectives of ministries and departments and the effectiveness of the implementation.
- (iii) To study and review all legislation referred to it;
- (iv) To study, assess and analyze the relative success of the ministries and departments as measured by the results obtained as compared with their stated objectives;
- (v) To investigate and inquire into all matters relating to the assigned ministries and departments as they may deem necessary and as may be referred to them by the House;
- (vi) To vet and report on all appointments where the Constitution or any law requires the National Assembly to approve, except those under Standing Order 204 (Committee on Appointments); and
- (vii) Make reports and recommendations to the House as often as possible, including recommendation of proposed legislation.

The Departmental Committee on Energy oversees the performance of the following State departments:-

- (i) Energy, and
- (ii) Petroleum.

The Departmental Committee on Energy was constituted by the House on Thursday, December 14, 2017. The Committee comprises of the following Members:

Composition of the Committee

The Committee comprises the following Members-

1. The Hon. David Gikaria, M.P. - **Chairperson**
2. The Hon. (Dr.) Robert Pukose, M.P. - **Vice Chairperson**
3. The Hon. Cecily Mbarire, M.P.
4. The Hon. Ekomwa Lomenen James, M.P.
5. The Hon. Joseph Wathigo Manje, M.P.
6. The Hon. Lemanken Aramat, M.P.
7. The Hon. Oscar Sudi, Kipchumba, M.P.
8. The Hon. (Eng.) Vincent Musyoka Musau, M.P.
9. The Hon. Amina Gedow Hassan, M.P
10. The Hon. Abdikhaim Osman Mohamed, M.P
11. The Hon. Clement Muturi Kigano, M.P.
12. The Hon. Elisha Odhiambo, MP
13. The Hon. Elsie Muhanda, MP
14. The Hon. Gitau Faith Wairimu, M.P.
15. The Hon. Julius Musili Mawathe, MP
16. The Hon. Ken Chonga, MP
17. The Hon. Tindi Nicholas Mwale, MP
18. The Hon. Walter Owino, MP
19. The Hon. Mohammed Ali Lokiro, MP

Committee Secretariat

The Committee is resourced with the following technical staff, representing the Office of the Clerk;

1. Mr. Benjamin Magut - First Clerk Assistant–Lead Clerk
2. Mr. Douglas Katho - Third Clerk Assistant
3. Ms. Brigita Mati - Legal Counsel
4. Mr. David Ngeno - Research Officer
5. Mr. Abdi Gorod - Fiscal Analyst
6. Mr. Joseph Okong'o - Media Relations Officer
7. Mr. John Ng'ang'a - Audio Recording Officer
8. Ms. Sheila Chebotibin - Searjent-at-arms

Delegation Membership

The delegation comprised of the following Members and staffers of the National Assembly:

- 1) The Hon. David Gikaria, M.P. - **Chairperson / Leader of the Delegation**
- 2) The Hon. Lemanken Aramat, M.P.
- 3) The Hon. (Eng.) Vincent Musyoka Musau, M.P.
- 4) The Hon. Amina Gedow Hassan, M.P
- 5) The Hon. Clement Muturi Kigano, M.P.
- 6) Mr. Douglas Katho, Clerk Assistant III/Delegation Secretary

Objective of the Study Visit

The delegation of the Members of the National Assembly to the Iceland Geothermal Conference was guided by the main objective, which was to raise awareness of Geothermal Energy as one of the main renewable energy solutions. More importantly, the Conference aim was to serve as a platform upon which world leaders and professionals can come together and address the urgent, business-related topics.

Acknowledgment

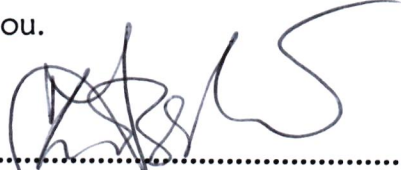
Hon. Speaker,

The Committee wishes to sincerely thank the Offices of the Speaker and the Clerk of the National Assembly for the support and services extended to the Members to enable the Committee complete this report.

I am grateful for the Members of the Committee whose support enabled the Committee to accomplish this task. Special thanks to the Secretariat for their technical support during the compilation of the report.

On behalf of the Committee, and pursuant to the Standing Orders of the National Assembly, It my honor and privilege to present the Committee Report on the Iceland Geothermal Conference in Reykjavik held between 23rd - 29th April, 2018 on the Table of House for consideration and approval by the House

Thank you.

Signed.....

Hon. (Dr.) Robert Pukose, M.P.
V/CHAIRMAN DEPARTMENTAL COMMITTEE ON ENERGY

DATE.....4/12/2018

LIST OF RECOMMENDATIONS

The Committee made the following recommendations with regard to the Iceland Geothermal Conference; That the Ministry of Energy should;-

1. Consider the Co-development of geothermal resources and wind as well as solar since there exist a high solar, wind, geothermal, and oil potential in the areas of northern Kenya.
2. Set aside funds to train the large shortfall of trained manpower in Kenya to bridge the skills gap revealed so as to help achieve their vision of developing geothermal resources.
3. Research on RE technologies and develop appropriate policies and incentives to support exploration and development of natural gas resources as well as for Spa and hot spring industry.
4. Support development of mini grids based on RE technologies and geothermal industry in Kenya to build expertise for international consultancies as it has a demanding expectations.
5. Promote sustainable energy development and implement effective regulations, financial incentives, and institutional reforms that promote energy efficiency, alternative fuel sources, and low-carbon growth.
6. Further the innovation in energy technology for increased efficiency in energy production; Review/establish regulatory frameworks and standards to promote effective urban planning for energy efficiency and reduced energy use;
7. The Ministry of Energy should move towards increased use of renewable energy sources e.g. wind, water, solar, thermo-solar, tidal, geothermal, and waste vegetation for biofuels; Lower-emission fossil fuel technologies such as clean coal or nuclear power; and engage in the climate change agenda as well as capacity building of the Human Resources.

1. Introduction

1.1. Background on Geothermal Development in Iceland

The geothermal sector in Iceland has been developing since the 18th Century. The development commenced when a hot spring area in Reykjavík was designated and constructed for open air laundering. At the same time, indirect utilisation took place by drilling in geothermal fields to mine sulphur. In 1900, experiments with drilling shallow geothermal wells and transferring hot water via pipelines for space heating began, and in 1908 a small-scale district heating system came on line. Later, other direct utilisation methods emerged and the first greenhouse in Iceland heated with geothermal heat commenced operation in 1924. The first steps towards eliminating Iceland's dependence on coal and oil for space heating were taken in 1928, when the city of Reykjavik initiated its drilling programme with the aim of gaining access to hot water.

In 1930, a district heating system was constructed in Laugardalur, Reykjavik. The system supplied a hospital, a swimming pool, a school and 60 homes with geothermal hot water, marking the beginning of the district heating revolution in Iceland. The next big step for Iceland was harnessing geothermal steam for power generation, and the first turbine in Iceland powered by geothermal steam commenced operation in 1944. Today, over 90% of all industrial facilities and residences in the country are heated by geothermal water and roughly 30% of all electricity generated in the country comes from geothermal power plants. The remaining electricity demand is supplied by hydropower plants, making Iceland's electricity 100% renewable.

1.2. Contemporary Iceland Geothermal

In October 2009, steps were taken to establish a geothermal cluster in Iceland. The mapping of the cluster was supported by a diverse group of companies and conducted by Professor Michael Porter and his team at Harvard Business School, US, and co-ordinated by the consultancy company Gekon. The output of the mapping process was a

recommendation for an optimal path to strengthen the infrastructure within the geothermal sector in Iceland by formalizing a cluster initiative.

Iceland Geothermal Cluster Initiative (IGCI) is a non-profit organization that aims to promote geothermal energy as a competitive renewable energy solution for businesses and society. Utilisation of high and low temperature geothermal resources creates high-value jobs and improves the quality of life and social wellbeing. Investment in geothermal utilisation is a long-term investment that offers baseload electricity and a diverse portfolio of other related revenue streams. It has turned out that by harnessing geothermal resources opportunities reveals for multiple utilisation methods among those cascading harnessing of the energy resource. Geothermal resources in general are renewable and ideally suited to supply baseload energy improving energy security and encourage growth.

The IGCI and its members participate in hosting events and workshops, receiving delegation, sharing knowledge and experience, and assist in promoting geothermal energy. The cluster takes an active part in defining best practice methodology for the sector and building up international collaborations to map best practice methods across the world, as well as performing energy related analyses and publishing reports and papers. IGCI is involved in international collaboration and is a member of the International Geothermal Association (IGA) and the Global Geothermal Alliance (GGA).

The previously mentioned mapping looked to the already mature energy sector in Iceland and its century of experience in utilizing hydropower and geothermal resources. Within the sector, a unique set of skills and knowledge had accumulated, especially regarding geothermal utilisation. Icelandic experts have also been active in sharing their knowledge with equipment manufacturers, geothermal specialists, and other countries through delegation visits. However, what was missing was focus of an unified platform on developing business and innovation opportunities. The Iceland Geothermal Cluster is business-driven and aims at sustaining the competitive advantage of the geothermal industry.

Several working groups were established under the Iceland Geothermal name and a workshop was held in Reykjavik in May 2011. Soon the idea of an international conference

emerged and it was decided that the cluster initiative would host such an event in its own name. It was determined that the conference should focus on business development and utilization. The quality of the conference was to be measured by the participation of industry leaders and influential speakers, and if possible, new business opportunities created. This was at the time in contrast to most other conferences that were focused on academic aspects, and their quality was often measured in the number of publications introduced at the event.

1.3. The Iceland Geothermal Conference

The aim of the IGC has been to raise awareness of geothermal energy as one of the main renewable energy solutions. More importantly, it aims to serve as a platform upon which world leaders and professionals can come together and address the urgent, business-related topics. Despite the opportunities for geothermal to contribute to energy transformation and to aid the international community in reaching climate change commitments, sector growth has been slow. The overall theme of the IGC is to share effective methods and to examine the best practices currently employed in geothermal projects, informing stakeholders on how to make the most out of a geothermal project, and to explore ways in which the value of a project can be increased.

Today, the IGC conference is an internationally recognized event that brings together industry leaders and policy makers. The quality of the conference and the experience of a visit to Iceland is carefully planned and monitored by the IGC committee. Lectures, exhibitions, field trips, and other recreational activities tailored to the themes of the conference are part of what is on offer at IGC. Few places in the world can provide access to six geothermal power plants with different installation and turbine setups, the geothermal fields, exciting new technology development, showcase various direct utilization options, and also exhibit the interaction between geothermal and other industries such as fuel cell technologies.

2. THE AGENDA OF THE ICELAND GEOTHERMAL CONFERENCE

2.1. Iceland School of Energy

Developing the world towards a sustainable and clean energy system is one of the foremost challenges of the next century. The Iceland School of Energy is a graduate school and research institution based in Reykjavik University that seeks to directly address the pressing challenge in the world's energy system. With over 60 researchers, faculty and staff, the Institution is actively engaged in promoting the application of Iceland's cutting-edge geothermal experience on an international scale. This session promoted ISE's work on exciting, innovative research projects and the important role academia can have in promoting the geothermal industry.

2.2. World Bank/ESMAP Global Geothermal Development Plan (GGDP)

The Energy Sector Management Assistance Program (ESMAP) is a global knowledge and technical assistance program administered by the World Bank. It provides analytical and advisory services to low- and middle-income countries to increase their knowhow and institutional capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth. ESMAP is funded by Australia, Austria, Denmark, the European Commission, Finland, France, Germany, Iceland, Italy, Japan, Lithuania, the Netherlands, Norway, the Rockefeller Foundation, Sweden, Switzerland, and the United Kingdom, as well as the World Bank.

The World Bank and its Energy Sector Management Assistance Program (ESMAP) were key sponsors of the 4th Iceland Geothermal Conference. Their engagement and presence at the event focused on a session held on April 26th organized jointly with the Icelandic Ministry of Foreign Affairs and Iceland Geothermal to commemorate the 5th anniversary of the Global Geothermal Development Plan (GGDP), launched at the IGC in Reykjavik in 2013.

The session showcased how the GGDP has helped de-risk the preliminary stages of geothermal development to unlock investment along the entire geothermal value chain. It

gave an overview of geothermal projects in the World Bank, and provided a platform for World Bank client countries to share their experiences highlighting the commonalities and the differences in approaches taken in a variety of markets.

The GGDP has to date been able to mobilize \$235 million of concessional financing which has been tapped into by multilateral development banks, including the World Bank, to finance upstream activities and help develop bankable projects; has been able to, the GGDP has influenced the design of geothermal operations and provided technical support to task teams preparing projects at the World Bank. Most of the ongoing geothermal projects and all the projects under preparation provide financing for up-stream activities to de-risk geothermal fields; and has helped craft a new approach to escalate the development of this important energy source and to contribute to the transition to renewable energy in developing countries.

It is important to note that One billion people still live without electricity and hundreds of millions more live with insufficient or unreliable service around the World. In addition, almost three billion people cook or heat their homes with polluting fuels resulting in widespread health and environmental impacts. The World Bank/ESMAP GGDP was designed specifically to address the special characteristics of the geothermal sector to unlock the investments needed to scale up geothermal development.

3. COMMITTEE OBSERVATIONS

The Committee made the following observations on the Iceland Geothermal Conference;

- a. The 4th Iceland Geothermal Conference hosted in Iceland offered an in-depth discussion of the barriers that hinder development of the geothermal sector and how to overcome them. It also focused on the business environment through three separate themes: vision, development, and operations.
- b. IGC 2018 offered field trips to the nearby geothermal areas with easy access to Icelandic geothermal experts. IGC also offered quality lectures delivered by carefully selected speakers from around the world coupled with a networking event is that was hosted where buyers and sellers get the opportunity to establish new relationships that could lead to new business opportunities.
- c. The founders of Iceland Geothermal Conference (IGC) recognizes that networking is an integral part of any good conference. Therefore, the attendees were able to use the of an interactive app to become more visible at the conference. This conference provided an opportunity for the Members of Parliament to learn and to network within the geothermal community.
- d. That the past IGC conferences have been a success, with roughly 700 participants on average. IGC is a nonprofit event sponsored by the Iceland Geothermal Cluster Initiative. The conference was set up as an international platform for the geothermal industry and project developers, to gather and share views on how to improve the business environment for geothermal projects.
- e. That there is no agency is established to promote development of hot-springs and spas for tourism and medicinal purposes and therefore Energy committee could champion the development of appropriate legislation to promote holistic development of hot-springs and spas since most of them would be associated with power projects and that Kenya could benefit immensely if the industry was established and properly regulated as part of tourist market.

- f. Kenya was nominated to host the centre of excellence since named “African Geothermal Centre of Excellence” AGCE • AGCE is owned by all countries of Africa and established as an AU Centre of excellence • AGCE is supported by UN Environment, Iceland MFA, NDF, BGR, KenGen, GDC, and Ministry of Energy as

4. COMMITTEE RECOMMENDATIONS

The Committee made the following recommendations with regard to the Iceland Geothermal Conference; That the Ministry of Energy should;-

- 1. Consider the Co-development of geothermal resources and wind as well as solar since there exist a high solar, wind, geothermal, and oil potential in the areas of northern Kenya.**
- 2. Set aside funds to train the large shortfall of trained manpower in Kenya to bridge the skills gap revealed so as to help achieve their vision of developing geothermal resources.**
- 3. Research on RE technologies and develop appropriate policies and incentives to support exploration and development of natural gas resources as well as for Spa and hot spring industry.**
- 4. Support development of mini grids based on RE technologies and geothermal industry in Kenya to build expertise for international consultancies as it has a demanding expectations.**
- 5. Promote sustainable energy development and implement effective regulations, financial incentives, and institutional reforms that promote energy efficiency, alternative fuel sources, and low-carbon growth.**

6. Further the innovation in energy technology for increased efficiency in energy production; Review/establish regulatory frameworks and standards to promote effective urban planning for energy efficiency and reduced energy use;
7. The Ministry of Energy should move towards increased use of renewable energy sources e.g. wind, water, solar, thermo-solar, tidal, geothermal, and waste vegetation for biofuels; Lower-emission fossil fuel technologies such as clean coal or nuclear power; and engage in the climate change agenda as well as capacity building of the Human Resources.
8. Facilitate changes in lifestyles and behavior patterns for energy efficiency.