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Assessing the status of women in geothermal development: A comparative study of Iceland and Kenya

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ABSTRACT

The world is seeking an acceleration of geothermal energy development. To achieve this massive deployment, increased work force capacity is required. Therefore, it is of utmost importance to incorporate both men and women professionals in the field to achieve sustainable geothermal development. Specific examples from Iceland and Kenya show that there are fewer women employees than men supporting the urgent deployment of geothermal resources in projects indicating an existing *gender gap*. In this paper the reasons why this *gender gap* exists in the sector are discussed and if there is a notable difference between a developed country (Iceland) with a high gender equality rating and a developing one (Kenya) with a low gender equality rating. Globally, science and engineering fields have been predominately male-dominated sectors, even in countries such as Iceland with the world's highest gender equality rating for the last decade. The following key research questions guide the study: What are the reasons why geothermal science and engineering is male dominated? Is there a *gender imbalance* in the geothermal sector and if so, why? What about the women already working within the sector, does their gender affect or even limit their careers, and if so, to what extent? What aspects of their gender affects their career? Is there a difference of aforementioned affects or reasons between the two countries?

An extensive comparison survey study was made collecting first-hand information from both male and female employees at several geothermal companies as well as university students in Kenya and Iceland. Questionnaires were used to collect data from a total of 120 male and female employees i.e. 60 employees per country and around 100 students. The main conclusions that can be drawn from the surveys are that gender seems to have an effect in both countries up to a certain extent. When asked if gender related factors had affected their career progressions in opportunities within the sector, the difference between the countries was not that notable but quite notable between the genders as women felt these had had more of an impact in their careers than the men thought. When asked if they consider their gender has affected their career progression, 56% of the women in Kenya feel it had, compared to surprisingly high 42% of the women in Iceland, the number one gender equality country in the world 10 years in a row. In Kenya, 19% of the men considered their gender had affected their career progression compared to a much lower 5,7% in Iceland.

Questionnaires were also sent to students in both countries to try to shed a light on some of the reasons why more women are not entering the geothermal field. In both countries, over 60% considered existing specific gender related opportunities and challenges in the geothermal sector. Generally, the students were positive towards the sector with some gender limiting considerations nonetheless.

This paper assesses the current status of gender mainstreaming in the geothermal sector in Kenya and Iceland.

1. INTRODUCTION

Gender equality has become a hot and often debated topic over the last years. Many terms have surfaced related to gender studies such as gender mainstreaming, gender equity, gender parity, etc. It has become an important element in both grass root NGOs as well as international organizations/institutes and governmental policies. In terms of economic growth and poverty reduction, the importance of gender equality has become widely accepted but gender consideration in the energy sector is much less known. The understanding of the relationship between energy projects and local communities, the natural environment, and overall prosperity is incomplete if the different perspectives of men and women are not taken into account (Ogola, 2010; ESMAP, 2019). This includes effects such as displacement and resettlement, gender-based violence, exposure to hazardous work conditions as well as missed opportunities to benefit from positive project impacts like employment, where women are underrepresented in technical and management positions (ESMAP, 2018). But why? Why this relatively recent focus on gender? Is focus on gender important?

At the turn of the Millennium, the United Nations put forth a set of goals for human development to be achieved by 2015. One of the goals was aimed at promoting gender equality and the empowerment of women. In fact, three of the eight goals were directly related to women specifically, namely the promotion of gender equality and empowerment of women; to reduce child mortality; and to improve maternal health. One may ask why this emphasis on women? Are they in such a dire state that they needed almost 40% of the MDGs specifically to focus on women related issues? In 2015, the Sustainable Development Goals were set to continue the human development goals in a sustainable way and set new targets to be achieved by 2030. SDG 5: Gender equality is aimed particularly at the empowerment of all women and girls. This time the goals set are 17 and only one focuses specifically on females. From this, it can be concluded that women's issues have improved to a certain extent or have they?

Presently, the Global Gender Gap score stands at 68%. This means that, on average, there is still a 32% gap to close. Still today female participation at the global work market is limited. Even in developed countries where the gender equality index is high (World Economic Forum, 2018). This is particularly true in science and engineering as well as other predominately male dominated sectors. What is the reason for this? Why is there a gender imbalance in the participation? And what about the women already working

within those sectors, does their gender affect or limit their careers, and if so, to what extent? What is it exactly about being female that affects their career? Societal views, childbirth, child caring, lack of initiative? Is there a difference in female participation or career affects in the geothermal sector in a developed country, where the gender equality index is high, and a developing country with a low gender equality index? In 2015, the final year of the MDGs, an extensive comparison survey study was made to try to answer these questions or at least shed some light on the reasons behind. Surveys collecting first-hand information were made from both male and female employees at several geothermal companies as well as university students in Kenya and Iceland. Questionnaires were used to collect data from a total of 120 male and female employees i.e. 60 employees per country. This paper presents the results from those surveys in an attempt to assess the gender gaps within the geothermal sector of the two countries.

2. GENDER AND THE GEOTHERMAL SECTOR

Limited reliable data exists on the exact number of women employed within the geothermal sector but it suggests that geothermal projects employ mainly men for both skilled and unskilled jobs. According to ILO (2018) women represent around 40% of the global workforce but they account for much less in sectors closely related to geothermal development, i.e. 12% of jobs in mining and quarrying, 21% in utilities, and 8% in construction. There are several suggestions why there is limited female participation in the geothermal sector. One is that international geothermal companies are likely subject to an industry-wide workplace culture and history that limits the engagement and retention of women in the sector (ESMAP, 2019) as was found to be the case in the fossil fuel sector where only 22% of jobs are held by women, but is nonetheless a percentage generally stable between countries irrespective of varying overall rates of female labor participation in those countries (Rick et al., 2017). The World Bank (ESMAP, 2019) suggests the reason for this is that international industries with many mobile workers have an outsize gender influence compared with local norms and market conditions. It further states that "social norms, legal restrictions, educational gaps, hostile work environments, and the inertia from more than a century of power sector labor segregation are all factors in women's exclusion with geothermal decidedly a male-dominated field, self-perpetuated by gendered professional networks".

The United Nations University Geothermal Training Programme (UNU-GTP) in Iceland aims to build capacity of geothermal experts in developing countries (Georgsson et al., 2019; Haraldsson et al., 2019). In its 41 years history of six month geothermal training in the country, encompassing 718 graduates, only 22% were women. The low percentage can be contributed to two things, i.e. few women entering the sector and no emphasis on a specific gender equality efforts until recently. Many of the female graduates say that there are many challenges in being a woman in the geothermal sector, ranging from lack of family support, lack of respect within male colleagues in the field, even discriminatory remarks from women. This starts from the beginning of the university when they express interest in entering the STEM field. Many women say that family support had a lot of influence over their decision to both enter the STEM fields and being able to stay within the respective field. Other reasons such as harassment, discrimination, gender-based violence, lack of sanitary facilities and quarters, ill-fitting and culturally inappropriate personal protective equipment have been named to make the geothermal sector particularly unattractive for women. Even in cases when it is possible to get women's workwear, companies still need to be convinced that it is a good investment (Clancy et al., 2014; ESMAP, 2018). Wang and Degol (2013) say that there are wider social factors that may influence engagement in STEM fields such as students' utility beliefs or the expected long-term value of the STEM academic path. Whichever reasons lie behind, research has shown that among power utilities for example, those with the most female executive and governance representation outperformed those companies with the least, measured by 1-1.5% higher returns to equity (ROE) for two years in a row (Ernst and Young (EY 2015, 2016)). When measures are taken to correct gender imbalance in the workplaces, examples have shown that this has led to high job satisfaction, retention of women in the workforce, and trust with the company and the public. The results not only improve project financial performance but also aid in complex decision-making and risk management tasks (ESMAP, 2018). Gender equality, therefore has much wider effects than to support and empower women. Therefore, it is to everyone's benefit to apply gender mainstreaming in the geothermal sector. The fellowships provided by UNU-GTP and funded by the Icelandic government, has been vital in increasing women's participation in geothermal development. Its recently implemented gender policy has led to a much higher percentage of graduated female trainees from the Programme since its establishment in 1979, or from 22 in 2000 to 38% in 2019 (NIRAS Indevelop, 2017).

3. SURVEY RESULTS AND DISCUSSION

In 2015, extensive comparison survey study was made collecting first-hand information from both male and female employees at several geothermal companies as well as university students in Kenya and Iceland to evaluate the status of the different effects that gender has had on their career choice and progression between the countries. A total of 120 questionnaires were used to collect data from male and female employees i.e. 60 employees per country and to around 100 students in both countries.

The field specialization distribution of the female participation in both countries was relatively even, i.e. most were in engineering, followed by geology, chemistry, environmental science, however notably only women in Iceland were geophysicists and none were in drilling in either country. A few signed their fields as *other* including GIS analysts and physicist. In the men's responses, engineering was also the most popular specialization followed by geology, chemistry, environmental science, however notably there were considerably more geophysicists in Iceland as was in the women's group but no Icelandic male environmental scientist. There was also a significantly a higher number of female Kenyan chemists compared to the other groups.

The employment position for the women varied between the countries with most women being employed as technicians in Kenya or 37% compared to only 4,2% in Iceland. The same trend could be seen for the men with 38,7% technicians and only 5,7% in Iceland. In Iceland most women and men were scientists, 62,5% and 48,6% compared to 31,3% and 32,3% in Kenya, respectively (Table 1). Notably none of the women or men were managers in Kenya but 20,8% of the women and 37,1% of the men in Iceland were managers. This could stem from the fact that the title manager means slightly different things between the two countries. It has more of a significance and authority related to it in Kenya than in Iceland. Similarly, the *other* section included one female director in Iceland.

The reason behind choosing a career in the geothermal sector the percentage was pretty even in both countries in the women's group. Close to 60% chose geothermal because they were interested in the subject and around 35% chose it as a job opportunity. However, in the men's group there was a notable difference between the countries. The groups were almost exact opposites as only 25,8% of the men in Kenya chose geothermal because of interest, and 74,2% chose it because of the job opportunity as opposed to 25,7 of the

men in Iceland chose the career because of job opportunity and 65,7% because of interest in the subject (Figure 1). From this it can be concluded that Kenyan women that chose geothermal as their career are more interested in the subject in general. Or at least at the point in time of choosing the subject.

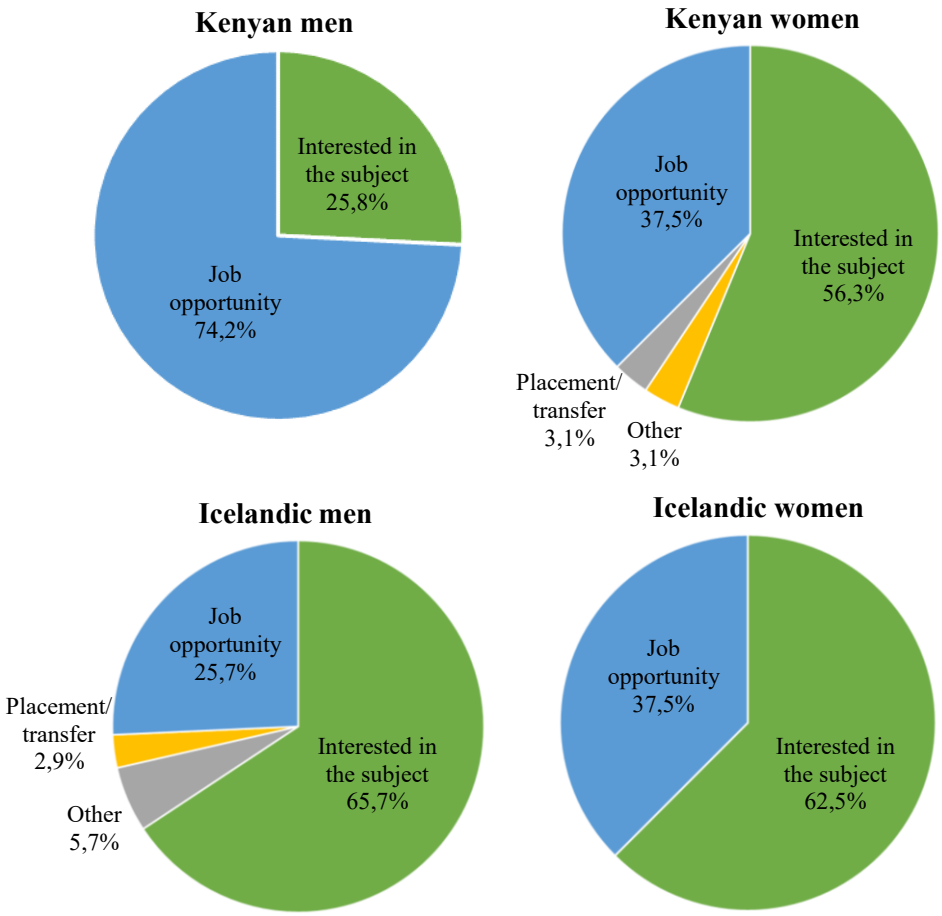

Figure 1: Reasons why the survey participants chose a career in the geothermal sector.

The participation of women within the geothermal sector is relatively new in Kenya as only 6 out of the 32 women, or 19% questioned had worked there for longer than 5 years compared to 62,5% of the women in Iceland. This is also reflected in the academic degrees of the women as only 16% had a master's degree in a related field in Kenya but 83% in Iceland. In Kenya, 42% of the men had worked within the sector for more than 5 years and 92% in Iceland (thereof, 40% having worked longer than 25 years). The division of academic degrees was notably different between the countries as with the women, where 13% of the Kenyan men had a master's degree compared to 43% of the Icelandic ones, which also completed a PhD after their masters. Surprisingly both the Kenyan and Icelandic women had proportionally higher percentage of master's degrees compared to the men. In general, they were more educated.

In terms of career opportunities such as number of trainings within the home countries, the number is fairly equal amongst the women. Regarding trainings abroad, the Icelandic women have a slightly higher percentages of attendance. The Icelandic men generally received more training opportunities than the Kenyans. The reason for this is difficult to conclude as these are internal decision of each company that estimate the benefit and need for training. Financial reasons most likely play a role also in this.

Interestingly when asked if they were given additional responsibilities without getting the pay for it, there is no relative difference between the women in Iceland and in Kenya as 40% say they have experienced that. There is no difference in the men's answers either between the countries but a notable difference between the genders as 60% of the men say they experienced being given more workload without the corresponding increase in wages. The reason for that is difficult to say for sure but it is possible that either men are simply given more responsibilities without the increase wages but that has to be rather unlikely as general consensus suggests men are more confident in asking for increase in payment than women. Another reason could be that as the geothermal sector is generally a male dominated world, women might feel they need to work harder to prove themselves and are therefore less likely to complain when they are given more responsibilities without the added payment. One respondent in the survey from Iceland wrote that she felt that she and her female colleagues are reluctant to seek promotions and added responsibilities due to childcare and family. She mentioned that sometimes it is the women themselves that are the barriers rather than the sector as they want to take responsibility in the upbringing of their children on the cost of their career.

In Kenya, 19% of the men considered their gender had affected their career progression compared to a much lower 5,7% in Iceland. The effects of gender for the men seem to be more prominent in the geothermal sector in Kenya, although it does register as having affect for men in both countries. However, a notable difference is seen when looking at the women's responses. In Kenya 56% of

the women considered their gender had affected their career progression compared to surprisingly high 42% in Iceland, the number one gender equality country in the world 10 years in a row (Figure 2). The difference between the two countries is much smaller than could be expected considering their different gender equality index status, with Iceland on the very top and Kenya only slightly above the world average (World Economic Forum, 2018).

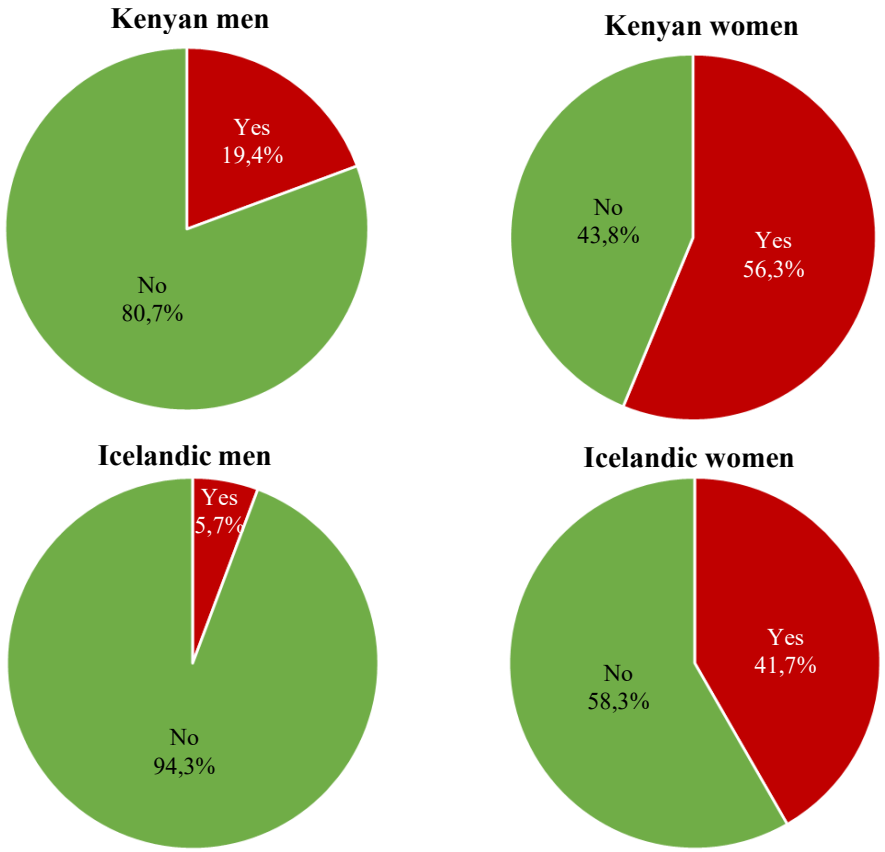

Figure 2: The survey participants' opinion if their gender affected their career progression.

The reasons for this are difficult to state exactly as there could be many but it is important to note that even though Iceland scored the highest in the Global Gender Gap Report 2018 (World Economic Forum, 2018), there is still an existing gap in the country and gender inequality is still prevailing in many sectors, and one would guess particularly in the male-dominated sectors such as the geothermal sector. Additionally, when the women were asked if they missed out on any career opportunities due to pregnancy, childcare, family responsibility, sexual harassment, the difference was not notably large between the countries in terms of promotion. Only when it came to the reason 'conventional view of women as the weaker sex' half the women answered positively in Kenya and only 21% in Iceland. When asked if they missed out on any career opportunities such as training opportunities, more responsibilities, conference participation, fieldwork opportunities these issues became more of a factor for the Kenyan women. These issues mentioned above did not seem to have been an inhibiting factor for the men in either country. The results seem to reflect the cultural and societal differences between the two countries in general and the two genders. These factors could also explain, to some extent, the difference the two genders have on whether their gender has affected their career progression or not.

Questionnaires were also sent to students in both countries to try to shed a light on some of the reasons why more women are not entering the geothermal field. More students had taken a course on a university level in geothermal science/engineering in Kenya than in Iceland. There seems to be more interest among students for the sector in Kenya as 86% of the students expressed interest in taking a course in geothermal science and 67% interested in a geothermal career and only 57% in Iceland in studying the subject and only 43% in a geothermal career. When asked if they took their gender into an account of the study/career choice 19% of the Kenyan students claim they did and only 7% of the Icelandic ones. In both countries, over 60% considered there to be specific opportunities and challenges in the geothermal sector. Generally, the students were positive towards the sector with some gender limiting considerations nonetheless.

Despite gender having an effect in limiting women's progression within the sector, 94% of the Kenyan women and 100% of the Icelandic ones said they would recommend the geothermal sector for women and 75% of them in both countries said they were more passionate about working in the sector than at the beginning of their career. It is safe to say that the geothermal sector is not demotivating for women who enter the sector and as their career progresses they become more passionate about it. That is a very encouraging result.

4. CONCLUSION

The main conclusion that can be drawn from the surveys is that gender seems to have an effect in the geothermal sector in both countries up to a certain extent. The extent varies between the countries, which can be related to the cultural and societal differences in terms of gender views. The surprising factor is that even though Iceland has been considered as the number one country for gender

equality in the world, in some of the gender issues, the difference between Kenya and Iceland is not that big. This indicates that even in the country with the highest gender equality index, gender equality in the geothermal sector is still not that far ahead from Kenya, which is in 76 position on the world gender equality index (out of 149 countries in total) (World Economic Forum, 2018).

However, ultimately it can be concluded that gender mainstreaming is beneficial for the geothermal sector as a whole as well as both genders and the society at large.

REFERENCES.

Clancy, K., Nelson, R., Rutherford, J., and Hinde, K.: Survey of Academic Field Experiences (SAFE): Trainees Report Harassment and Assault. PLoS ONE 9 (7): e102172 (2014). https://doi.org/10.1371/journal.pone.0102172

Ernst and Young: Talent at the Table: Women in Power and Utilities Index (2015). Website: http://www.ey.com/Publication/vwLUAssets/EY-women-in-power-and-utilities-index-2015/$FILE/EY-women-in-power-and-utilities-index-2015.pdf.

Ernst and Young: Talent at the Table: Women in Power and Utilities Index (2016). Website: http://www.ey.com/Publication/vwLUAssets/ey-talent-at-the-table-women-in-power-andutilities-index-2016/$FILE/ey-talent-at-the-table-women-in-power-and-utilities-index-2016.pdf.

ESMAP: Gender and Geothermal – Guidance note. Energy Sector Management Assistance Program for the International Bank for Reconstruction and Development and the World Bank Group. *Conference edition*, April (2018), 49 pp.

ESMAP: Gender Equality in the Geothermal Energy Sector: Road to Sustainability. Energy Sector Management Assistance Program (ESMAP) Knowledge Series 028/19. Washington, DC: World Bank (2019).

ILO: Data Finder - World Employment and Social Outlook (2018). Website: http://www.ilo.org/wesodata/?chart=Z2VuZGVyPVsiRmVtYWxlIiwiTWFsZSIsIlRvdGFsIl0mdW5pdD0iUmF0ZSImc2VjdG9yPVsiSW5kdXN0cnkiXSZ5ZWFyRnJvbT0xOTkxJmluY29tZT1bXSZpbmRpY2F0b3I9WyJlbXBsb3ltZW50RGlzdHJpYnV0aW9uIl0mc3RhdHVzPVsiVG90YWwiXSZyZWdpb249WyJXb3JsZCJdJmNvdW50cnk9W10meWVhclRvPTIwMTkmdmlld0Zvcm1hdD0iQ2hhcnQiJmFnZT1bIkFnZTE1cGx1cyJdJmxhbmd1YWdlPSJlbiI%3D.

NIRAS Indevelop: Evaluation of the UNU Programmes in Iceland: *Final Report*. Stockholm: NIRAS Indevelop (2017).

Ogola: Geothermal Energy, Climate Change and Gender in Kenya, *Proceedings World Geothermal Congress 2010*, Bali, Indonesia, 25-29 April (2010).

Rick, K., Martén, I., and Von Lonski, U.: *Untapped Reserves: Promoting Gender Balance in Oil and Gas*. The Boston Consulting Group & World Petroleum Council (2018). Website: http://imagesrc.bcg.com/Images/BCG-Untapped-Reserves-July-2017_tcm9-164677.pdf.

World Economic Forum: *The Global Gender Gap Report 2018*. Insight Report, ISBN-13: 978-2-940631-00-1, (2018). website: http://www3.weforum.org/docs/WEF_GGGR_2018.pdf