



ORGANISATION OF EASTERN CARIBBEAN STATES

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Online survey: The Role of Geothermal in the OECS Region

Executed: August 2016

1. BACKGROUND

All Countries of the Eastern Caribbean are almost totally dependent on imported fossil fuel despite their significant potential for renewable energy such as solar, hydro, wind and geothermal. In recent years geothermal energy has emerged as a priority for the sub-region and the scientific evidence shows a strong potential for development: Currently seven of the ten OECS Member States are working toward the development of their geothermal resources.

The OECS Commission is currently responding to this priority and is working to support OECS Member States in their geothermal energy efforts. The 2nd Council of Ministers Environmental Sustainability of the OECS held in Antigua and Barbuda on October 8th, 2015, mandated “*the OECS Commission to lead the process on the development of a regional strategy for geothermal development in the OECS*”. Subsequent to this, in May 2016 a geothermal workshop was held in St. Kitts, jointly organized by the CARICOM Secretariat and the OECS Commission, under the topic “*Opportunities and Synergies for Collaboration*”. At this workshop a regional strategy was discussed and it was suggested that an online platform could support the collaboration within the OECS Member States for geothermal energy.

2. EXECUTION OF A SURVEY

In July 2016 the Energy Unit of the OECS Commission developed a survey to gather information about the perceptions of geothermal energy from both regional and international energy stakeholders. The survey was administered to mainly energy personnel who have worked or are connected to geothermal energy in the region. The aim is to analyse the responses to help inform a regional strategy for geothermal including enhancing virtual collaboration through an online platform to support regional geothermal energy development..

The survey comprises 18 questions using the Google forms questionnaire facility. At the end of July through to the beginning of August 2016, invitations to participate in the survey were sent via email to known persons. The email contained a link to the Google forms questionnaire, which allowed for easy participation in the survey. The questionnaire also requested the respondents to provide the contact details of additional potential participants who could add value to the process.

The survey was further published through the CARILEC Renewable Energy Community –CAREC- online platform, the “New Energy Events LLC” – newsletter as well as the “ThinkGeoEnergy” newsletter. This helped to disseminate the survey and elicit additional responses which would not normally be captured based on the existing.

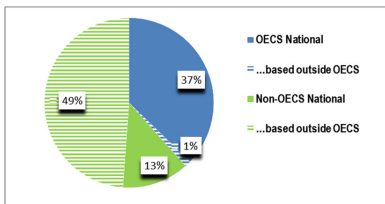
The survey was **closed on August, 29th**, having received **86 responses**.

3. SUMMARY OF RESPONSES

The questionnaire essentially sought to capture the respondents' views on the potential contribution of geothermal energy to the OECS region and what could be done to support the advancement of geothermal work in the region and support closer collaboration amongst the stakeholders. For ease of analysis, the questions and responses are grouped under sub headings and discussed below;

Question 1 and 2: Respondents' Nationality and Residence:

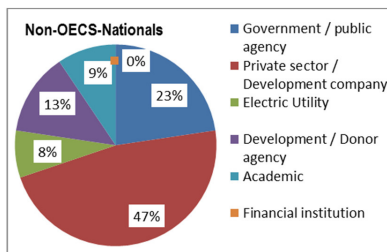
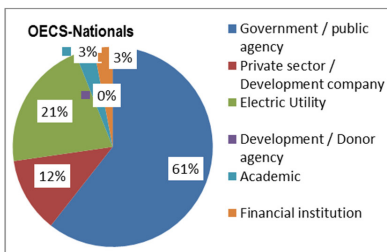
It was important to understand whether the nationality or place of residence of the respondent would signify any prevailing correlations or trends with their responses.



The results of the survey revealed that 38 % of the respondents are of OECS Nationality and just one of them is not living in the region. Some of the Non-OECS Nationals are also living in the region, so all together 50 % of the participants of the survey are currently based in the OECS region.

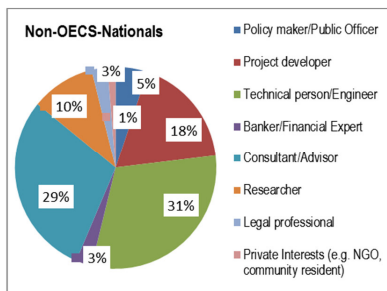
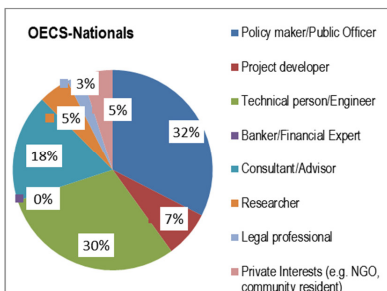
Q. 3: Respondents' Place of Employment:

A large majority of participating OECS Nationals are employed in Government (61%) or in an Electric Utility (21 %) whereas the majority of Non-OECS Nationals are members of the private sector or development agencies.



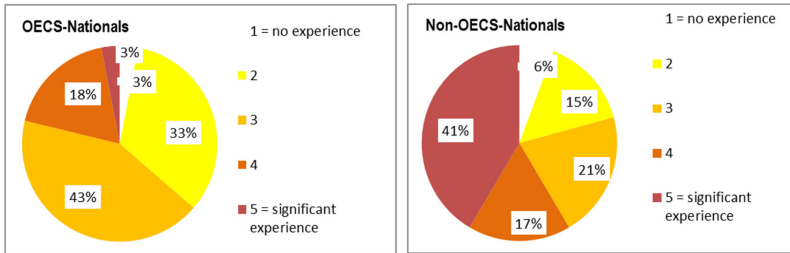
Q. 4: Respondents' Occupation:

(More than one answer was allowed for this question!)

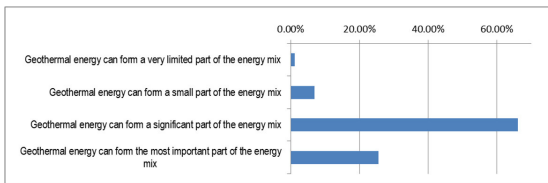


Q. 5: Geothermal Experience:

Participants were asked to rate themselves according to their own experience in geothermal energy on a scale where 1 = no experience to 5 = significant experience. Out of the 86 respondents just 4 persons responded “no experience” but around 45% of the participants rated themselves as experienced (rated 4 and 5). Interestingly to note, whilst only a small percentage (21%) of OECS Nationals gave themselves a high rating for this question, on the other hand a relatively high number of participating Non-OECS Nationals deemed themselves to have significant experience in geothermal energy (rated 4: 17%, rated 5: 41%).



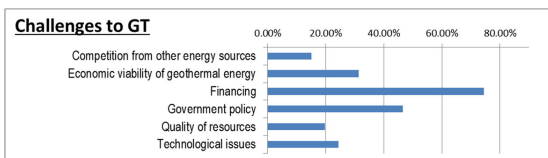
Q. 6: Role of Geothermal Energy in the Caribbean:



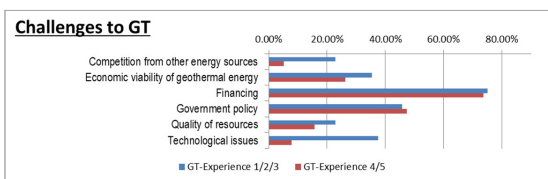
All participants are in agreement about the important role of geothermal energy for the OECS region. More than 90 % are of the opinion that geothermal energy can play a vital role (65 % “a significant” and 25 % “the most important” role).

Q. 7: Regional Challenges for Geothermal Development:

(More than one answer was allowed for this question!)



The most important challenges to geothermal energy development were identified as “Financing” (checked by 75%) followed by “Government policy” (checked by 50%)



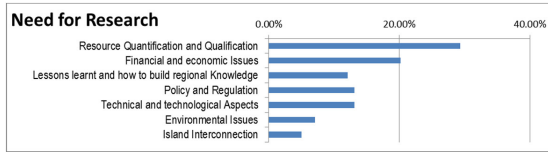
A detailed analysis achieved by dividing the respondents in two groups according to the stated experience in geothermal energy (see question 5) shows an interesting variation (Group B1 = rated themselves 4 and 5 regarding geothermal experience; Group B2 = rated 1, 2

and 3):

Regarding “Competition from other energy sources” and “Technological issues” one can see a big variation between the two groups: Approximately 5% of the “Geothermal experts” rated “Competition from other energy sources” as major challenge whilst 26% of the Group B2 respondents who had less experience in geothermal thought this was a major challenge. With respect to “Technological Issues” 8% of Group B1 respondents perceived that as a major challenge for geothermal as compared to 35% of the Group B2 respondents.

Q. 8: Request for Research:

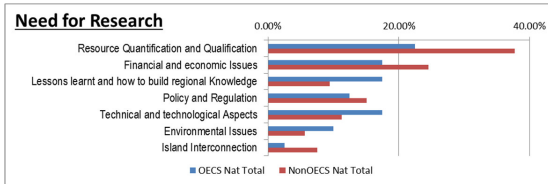
(More than one answer was allowed for this question!)



which was ranked at number 1 ahead of “Financial and economic issues” the most important challenge identified.

The responses to previous question (Q7) indicate that the participants of the survey did not see the “Quality of Resources” as a major challenge. Notwithstanding this, respondents highlighted the need for more research on “Resource quantification and qualification”, “Resource quantification and qualification”,

“Financial and economic issues” the most important challenge identified.



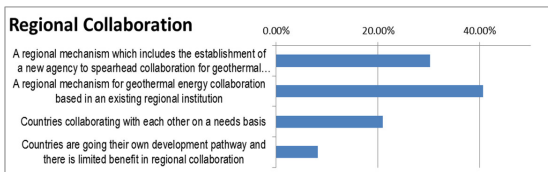
The “Non OECS Nationals” (Group A2) have a clear preference in requesting more “Resource” and “Economic” research. On the other hand, this preference is not seen with responses of the “OECS Nationals” (Group A1). The responses of the “OECS Nationals” seem evenly distributed for the provided areas except for “Island Interconnection” which received a relatively low response rate.

In depth analysis of the two responding groups B1 and B2, based on geothermal experience identified above, does not show any strong correlation in responses. However, the responses show a dependency on nationality.

The “Non OECS Nationals” (Group A2) have a clear preference in requesting more “Resource” and “Economic” research.

Q. 9: Best approach for Collaboration:

The second part of the survey speaks to a strategy for regional collaboration and about means to facilitate this.

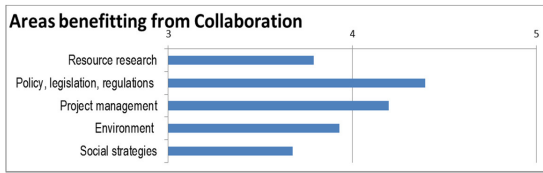


More than 70 % of the survey participants are supportive of a regional mechanism to spearhead the collaboration, whether it would be based in an existing regional institution (41 %) or to go along with the establishment of a new one (30%).

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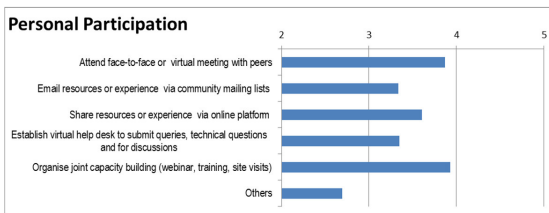
Q. 10: Areas for Collaboration:

The provided options for collaboration (Resource research; Policy, legislation, regulations; Project management; Environment; Social strategies) are all seen as beneficial to a joint approach (rated around 4 out of 5). Highest rated are “Policy, legislation, regulations”; “Project management”.



There is nearly no variation between the groups (OECS-Nationals/Non-OECS-Nationals and Geothermal Experts/Non-Experts). However, regarding “Resource research” the OECS Nationals rated much higher (4.1) than Non-Nationals (3.6).

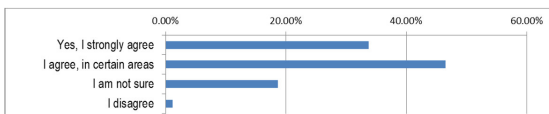
Q. 11: Individual Participation and Contribution to Collaboration:



The majority of participants is willing to contribute to a collaborative approach for the development of geothermal in the region. Each of the provided opportunities of collaboration was endorsed and it is noticeable (not shown in the graph!) that OECS Nationals are even more open to support.

Under the term “Others” it is noteworthy, that some participants requested more regional standardization and harmonization as this would also facilitate collaboration.

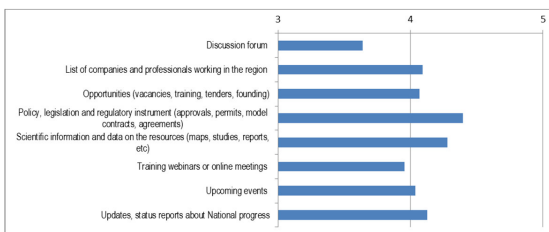
Q. 12: Role of an online Platform:



A dedicated interactive online platform for sharing information and resource materials was also endorsed by a significant majority of participants, as this graph is showing.

Q. 13: Tools and Resource Material to be on a Platform:

Respondents were provided with a list of tools and resource materials to be used on platform as asked to ascribe a rating to each.

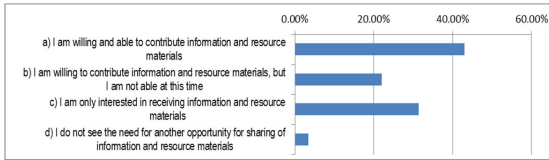


Regarding this rate of importance of materials, consensus can be seen on the high importance assigned to almost all of the proposed resources. It is worth noting that a “Discussion Forum” was given the least importance. In general, OECS Nationals are more supportive of collaboration than Non-OECS Nationals (not

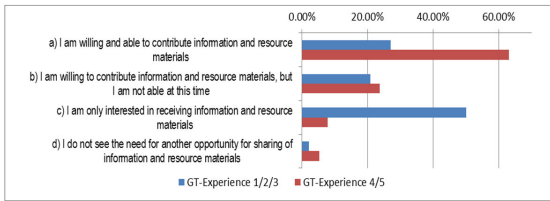
shown in the graph!).

Another additional suggestion was to include space for explanation of lessons learnt (good and bad).

Q. 14: Individual Contribution to a Geothermal platform:



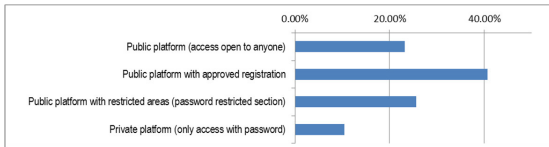
According to the responses to question 14 “What could be your contribution to the geothermal platform?” more than 70 % are “willing to contribute information” to the platform, although around one third of them are not able to contribute now.



But the second graph shows a different picture as it relates to the geothermal experience of participants. The vast majority (85%) of geothermal “experts” (Group B1) are willing to contribute. Whereas more than half of the less experienced participants (Group B2) are only “interested in receiving information and

resource materials”

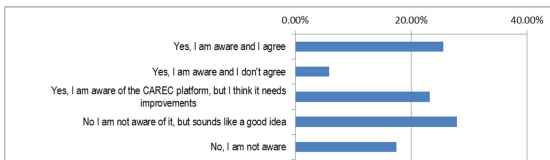
Q. 15 and Q 16: Platform privacy and restrictions:



The recommendation of participants of the survey was to create a “Public Platform” (90% in total), and the majority would like to see “approved registration” (41%) or some password restricted sections (26%).

Q. 17: The CARILEC Renewable Energy Community - CAREC online platform:

The majority of participants was aware of the CARILEC Renewable Energy Community - CAREC online platform (55 % of total and 67% of OECS Nationals) and just around 6 % of the total disagreed to the suggestion to use CAREC for hosting the geothermal platform.



On the other hand almost half (43%) of the supporters requested improvements to the platform to facilitate the hosting.

4. DISCUSSION

The distribution of present survey was led by the target to get as many as possible participants. It was not conducted with the intention to get a representative opinion. For this, email contacts of any persons having a relationship to energy have been gathered from various sources of OECS and other agencies in the OECS region. Each of them has been then invited by a personal email.

Secondly the CAREC, a 2016 launched online platform to support “a renewable energy community of practice”, and their newsletter was used to invite on a broader base.

Thirdly, two more newsletters asked for participation: i) New Energy newsletter from www.newenergyevents.com and ii) ThinkGeoEnergy newsletter from www.thinkgeoenergy.com!

Additionally some persons have been invited by additional emails through provided recommendations of participants.

Looking at the personal characteristics of participants (Question 1 – 5) it could be assumed that the two ways of invitations – i) email to regional contacts in the area of energy and ii) international newsletters, have found two clusters of participants:

1. Persons living and/or working in the region in the energy sector (majority working in Government or Utility) whose interest to participate was primarily driven by their interest in “general energy supply for the region”. Only a smaller part of these rated themselves as “well experienced in geothermal energy”!

2. International professionals, participating because of their affiliation to geothermal energy. The majority of these participants rated themselves “well experienced in geothermal energy”!).

Further analyses were undertaken to investigate whether the belonging to one of these two clusters has led to a certain answer. For this question all respondents were divided twice:

A1: OECS Nationals - versus – A2: Non OECS Nationals

B1: Geothermal “Experts”, rated themselves as well experienced in geothermal energy: rate 4 or 5 (out of 5) - versus - B2: Participants rated themselves 1, 2 or 3 regarding geothermal experience.

In those cases the following discussion will show these dependences and discuss possible reasons and conclusions.

There was clear consensus amongst all participants that the two top challenges to geothermal energy development in the region were “Financing” and “Government Policy”. However, on the issues of “Competition from other energy sources” and “Technological issues” there was clear divergence in opinion amongst the groups on the level of importance of these as challenges. Group B1 deemed the geothermal “experts” do not see these as important challenges for geothermal energy while Group B2 participants do. In this case the nationality of the respondents did not seem to influence their responses which means that the group of respondent with more experience share this opinion regardless of whether they are from the OECS or from outside the OECS region. Given the uniformity across the geography, it may be safe to infer that the increased level of geothermal experience would provide enough information to allow the responding geothermal “experts” to better assess the real influence of “Competition from other energy sources” and “Technological issues” on geothermal energy development.

With regard to question 8, concerning the “Need for more Research”, much more of the Non-OECS-Nationals than the OECS-Nationals requested more research in “Resource quantification and qualification” and “Island Interconnection”. This is independent of the geothermal experience of participants. In this case it may be safe to infer that Non-Nationals want research in these areas because they have less knowledge of the resources in the region, ongoing efforts in these areas and the interconnection possibilities.

Questions 9 to 11 were dealing with “Collaboration to support the Geothermal Development” in general and questions 12 to 16 specifically with a proposed online platform to support that collaboration. The request for more collaboration was outlined by most of the participants and there is no area which was not seen as benefitting from regional collaboration. The responses show nearly no dependency, neither on Nationality nor on experience in geothermal. On the willingness to personally contribute to the platform, the OECS-Nationals are in the majority, which is understandable, because of the stronger regional ties.

The proposed online platform is also seen as very beneficial for all of the suggested areas and means of collaboration. Persons with good experience in geothermal energy are willing to personally contribute much more than unexperienced participants, who wants to receive information, in the majority. This is also not surprisingly as only experienced persons can share experience.

5. SUMMARY

Under the headline “The Role of Geothermal in the OECS Region” an online survey has been conducted during August 2016. The majority of the 86 participants had experience in geothermal energy as 38 (= 44%) rated themselves as well experienced in Geothermal (rate 4 and 5, out of 5) and only 4 persons rated “no experience”.

It was not intended to get a representative opinion through this survey, but it should help inform the development of a regional strategy for geothermal including enhancing collaboration. For this reasons the survey was administered to mainly energy personnel, firstly by email and secondly via one regional and two international energy/geothermal newsletters.

Most of the participants acknowledge that there are notable geothermal resources in the region. Challenges to the development are seen in the first instance in financial issues and additionally in the policies of Governments, but additional research was requested similarly for almost each of the suggested areas.

The majority of survey participants are supportive of a regional mechanism to spearhead a regional collaboration which would support geothermal development. Most of them are willing to contribute personally in various means and they are convinced that such mechanism would be beneficial to almost each thematic area, but with a slight preference for “Policy, legislation, regulations” and for “Project management”.

The suggestion to use an interactive online platform to facilitate collaboration was endorsed by around 75% of the participants. A list of tools and applications such as, *inter alia*, a discussion forum, a list of companies, an event calendar or the opportunity to share various documents has been shared with the survey and it was requested to rate the importance. The responses show that none of them is seen as “unimportant”.

OECS Commission has already begun collaboration with the CARILEC Renewable Energy Community to seek out the opportunities for the recently launched “CAREC” online platform to integrate the suggested geothermal platform. The last question of the survey asked for thoughts about this possibility for

collaboration. Just around 10 % of participants disagreed to that suggestion. On the other hand almost half of the supporters requested improvements of the platform to facilitate the hosting.

6. NEXT STEPS

In acknowledgement of the outcomes of the survey, OECS Commission will soon contact the CAREC Community to discuss further opportunities of collaboration and of improvements of the platform. One of the next steps will then be to request contacts of experts and companies to set up the proposed list of experts.

7. ACKNOWLEDGEMENT AND THANKS

OECS Commission is very thankful to each of the participants for taking the time and answering the questions. The outcomes are very interesting and helpful in informing a regional strategy for the geothermal development.

Many thanks also to the managers of the various newsletters who supported this activity by distributing the link and encouraging persons to participate.

Special thanks to the colleagues who reviewed the draft survey and for all suggestions made upfront.