

INFORMED CONSENT

We invite you to participate in a research study entitled “Online Media and Attitudes toward Renewable Energy.” This study is a collaboration between the University of Utah, Utah Valley University, the University of Illinois, and the University of Georgia, and data will be shared between the research teams. This study is sponsored by the Department of Energy.

To make this study a valid one, you will not be made fully aware of the nature or purpose of the study. Before we begin, we want to assure you that all the information you give will be kept completely confidential and that none of it will be released in any way that would permit identification of you or your family. Your participation in this study is, of course, voluntary. All research will be conducted on the Internet using an online survey.

If you decide to participate in this research, you will be asked to complete an online questionnaire. Participation will require answering a series of questions and viewing a blog post. You will be asked to complete one survey or interview. While reading and answering the following questions, please do not visit other websites online.

The risks of this study are minimal. You may feel upset thinking about personal information related to your opinions. These risks are similar to those you experience when discussing personal information with others. If you feel upset from this experience, you can tell the researcher, and he/she will tell you about resources available to help. We anticipate a minimal risk to you from you participating in this study. Also, we do not anticipate any direct benefits to you from participating in the study. However, for your completion of the survey, you may receive an incentive through your agreement with Qualtrics.

Faculty, students, and staff who may see your information will maintain confidentiality to the extent of laws and university policies. Personal identifiers will not be published or presented. Questionnaire data will be accessible to only the primary researchers of the study to reflect this. In other words, all data obtained from participants will be kept confidential and will be used solely for the research purpose.

While all precautions have been taken to protect the security of your responses, the Internet does not allow for total security. The IP address of your computer, however, will not be a part of the data file used to analyze survey responses. Your de-identified information could be used for future research without additional informed consent. If you have any questions complaints or if you feel you have been harmed by this research, please contact the Principal Investigator:

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Contact the Institutional Review Board (IRB) if you have questions regarding your rights as a research participant. Also, contact the IRB if you have questions, complaints, or concerns which you do not feel you can discuss with the investigator. The University of Utah IRB may be reached by phone at (801) 581-3655 or by e-mail at irb@hsc.utah.edu. Utah Valley University IRB may be reached by email at irb@uvu.edu. The University of Illinois IRB may be reached by phone at (217) 333-2670 or by e-mail at irb@illinois.edu. The University of Georgia IRB may be reached by phone at (706) 542-3199 or by e-mail at irb@uga.edu.

It should take approximately 15-20 minutes to complete the questionnaire. Participation in this study is voluntary. You can choose not to take part or not to finish the questionnaire.

We recommend taking this survey on a computer or a laptop instead of a mobile device (e.g., cell phone, tablet).

By selecting “Yes” on the following question, you are acknowledging that you have read the information in this consent form and volunteer to participate in this study. Please print or download a copy of this consent form for your records if you so desire.

Thank you for your time and consideration in taking part in this research project.

Q1. I am at least 18 years old and agree to participate in this study and have read the consent form above.

Yes..... 1
No 2

Q2. Do you currently live in the United States?

Yes..... 1
No 2

Q3. How old are you?

[DROPDOWN MENU WITH OPTION RANGE 18 (1) to 100 (83)]

Q4. In which state do you currently reside?

[DROPDOWN MENU WITH LIST OF STATES]

Q5. What is your sex?

Male..... 1
Female 2
Other..... 3

Q6. Are you Spanish, Hispanic, or Latino?

Yes..... 1
No 2

Q7. Please choose one or more races that you consider yourself to be.

White 1
Asian 2
Black or African American 3
Native Hawaiian or Pacific Islander 4
American Indian or Alaskan Native 5
Other..... 9

Q8. What was your total household income before taxes during the past 12 months?

Less than \$25,000 1
\$25,000 to \$34,999..... 2

\$35,000 to \$49,999.....	3
\$50,000 to \$74,999.....	4
\$75,000 to \$99,999.....	5
\$100,000 to \$149,999.....	6
\$150,000 to \$199,999.....	7
\$200,000 or more	8

Q9. We are conducting a study on how people feel about science. We are asking people to answer questions about science and related issues to get an idea of what people think about them.

While reading and answering the following questions, **please do not visit other websites.**

MEDIA ATTENTION

10. Please read each item carefully and select the appropriate option to indicate your response. To start, here are a few questions about your typical use of media.

How much attention do you pay to each of the following?

None						A lot
1	2	3	4	5	6	7

- 1) International or national news
- 2) Local government or political news
- 3) Entertainment news
- 4) News about sports
- 5) News about science
- 6) News about the environment
- 7) News about renewable energy

Q11. How much attention do you pay to **science or environmental information** on the following platforms?

None						A lot
1	2	3	4	5	6	7

- 1) Facebook
- 2) Twitter
- 3) Instagram
- 4) Snapchat
- 5) TikTok
- 6) Reddit
- 7) YouTube
- 8) Pinterest

SELF-MONITORING SCALE

Q12. The next set of statements concern your personal reactions to a number of situations. Please consider each statement carefully and indicate how much you agree or disagree with them.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) It is my feeling that if everyone else in a group is behaving in a certain manner, this is probably the proper way to act.
- 2) When in a social situation, I tend not to follow the crowd but, instead, behave in a manner that suits my particular mood at the time.
- 3) It's important to me to fit into the group I'm with.
- 4) My behavior often depends on how I feel others think I should behave.
- 5) I try to pay attention to how others react to my behavior in order to avoid being out of place.

TRUST IN SCIENCE AND SCIENTIST INVENTORY

Q13. Now, we'd like to ask a few questions about how you feel about **scientists in general**. Please rate how much you agree or disagree with each of the following statements.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) We should trust the work of scientists.
- 2) We should trust that scientists are being **honest** in their work.
- 3) We should trust that scientists are being **ethical** in their work.
- 4) When scientists form a hypothesis, they are just guessing.
- 5) We **cannot** trust scientists because they are biased in their perspectives.
- 6) Scientists will protect each other even when they are wrong.
- 7) We **cannot** trust science because it moves too slowly.
- 8) Scientists ignore evidence that contradicts their work.

DEFERENCE TO SCIENTIFIC AUTHORITY

Q14. And how much do you agree or disagree with the following statements?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) Scientists know best what is good for the public.
- 2) Scientists should do what they think is best, even if they have to persuade people that it is right.
- 3) Science is the best way that society has for producing reliable knowledge.
- 4) Science is the best way to understand the world.
- 5) For quality control purposes, please select "Strongly disagree" in this row.

IF R SELECTS 2 THRU 7, GC = 0.

ENVIRONMENTAL CONCERN (NEP)

Q15. Below are some statements about the relationship between humans and the environment. For each statement, please indicate whether you agree or disagree.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) Humans are severely abusing the environment.
- 2) When humans interfere with nature, it often produces disastrous consequences.
- 3) The earth has plenty of natural resources if we just learn how to develop them.
- 4) Humans have the right to modify the natural environment to suit their needs.

- 5) Despite our abilities, humans are still subject to the laws of nature.
- 6) Plants and animals have as much right as humans to exist.

DEFINITIONS

Q16. [TIMING Q: NEXT BUTTON APPEARS AFTER 10 S]

Q17. Next, we are going to ask you about a host of science and environmental issues. For context, here are some definitions. Also note that for the remainder of the survey, moving your cursor over each of these terms will provide you with a definition of that term.

Solar energy is radiant energy produced by the sun. Solar technologies capture this radiation and turn it into useful forms of energy.

Geothermal energy is heat that comes from within the earth. Water and steam warmed by the earth's heat are used to generate electricity or can be used directly for heating.

Enhanced geothermal systems (EGS) are engineered reservoirs that have been created to extract heat from hard-to-access geothermal resources. EGS technologies can recover geothermal energy by creating a system of fractures through which water can circulate to be heated by contact with the rocks.

Nuclear energy is created from the splitting of uranium atoms. The energy released is then used to generate steam, which turns turbines that produce electricity.

Biofuels are any fuel made from plants or other organic materials. The two most common types of biofuels in use today are ethanol and biodiesel.

PERCEIVED FAMILIARITY

Q18. We would like to know how informed you feel about these science and environmental topics. How informed would you say you are about...?

Not informed at all						Very informed
1	2	3	4	5	6	7

- 1) Solar energy
- 2) Global warming
- 3) Nuclear energy
- 4) Biofuels
- 5) Geothermal energy
- 6) Enhanced geothermal systems (EGS)

KNOWLEDGE

Q11_14. Now, you are going to read some statements about **renewable energy**. Of course, it is impossible to know the answers to all of these, but could you tell us for each of the following statements if you think it is true or false?

Definitely true	Likely true	Likely false	Definitely false	Don't know
1	2	3	4	9

- 11) Geothermal energy is a source of renewable energy.

- 12) The largest geothermal power plant in the world is located in South Korea. (-)
- 13) Enhanced geothermal systems will potentially make geothermal energy accessible across the U.S.
- 14) Power plants built for enhanced geothermal systems emit significant amounts of carbon dioxide. (-)
- 15) Using biofuels in cars does not create air pollution. (-)
- 16) Biofuels can only be produced from food crops. (-)
- 17) Solar energy is the most abundant energy resource on earth.
- 18) In the 1950s, the space industry began to use solar technology to provide power aboard spacecraft.
- 19) Nuclear power plants emit significant amounts of carbon dioxide. (-)
- 20) There are over 60 operating nuclear reactors in the U.S.

STIMULUS 1

Q20. On the next page, **you will see a blog post about enhanced geothermal systems and geothermal energy**. Because this is a screenshot, you will not be able to click on any of the content. **Please read it carefully**. We will ask you more questions after viewing the post.

Q21-Q30. STIM INTRO, TIMING, STIMULUS 1

MANIPULATION CHECK 1

Q32. As best as you can remember, please indicate the number of **reads** the blog post you just saw generated.

- 0 to 9..... 1
 10 to 99..... 2
 100 to 499..... 3
 500 or more 4
 Cannot recall..... 9

Q33. And, as best as you can remember, please indicate the number of **shares** the blog post generated.

- 0 to 9..... 1
 10 to 99..... 2
 100 to 499..... 3
 500 or more 4
 Cannot recall..... 9

Q34. And what about the number of **comments** the blog post generated?

- 0 to 9..... 1
 10 to 99..... 2
 100 to 499..... 3
 500 or more 4
 Cannot recall..... 9

Q35. From your perspective, please tell us how many reads, shares, and comments the post generated.

Very few						A lot
1	2	3	4	5	6	7

- 1) The number of **comments** the post generated.
- 2) The number of **reads** the post generated.

- 3) The number of shares the post generated.

DISCRETE EMOTION 1

Q34. **While viewing the blog post**, please tell us the extent to which you felt...

Not at all							Extremely
1	2	3	4	5	6	7	

- 1) Afraid
- 2) Worried
- 3) Scared
- 4) Anxious
- 5) Hopeful
- 6) Optimistic
- 7) Inspired
- 8) Encouraged
- 9) Sad
- 10) Upset
- 11) Angry
- 12) Frustrated

DEPENDENT VARIABLES 1

Message Credibility 1

Q37. Please tell us how you would describe the **blog post you just saw** using the following pairs of words. The closer your selection is to a word, the more certain you are of your evaluation. The post was...

	1	2	3	4	5	6	7	
1) not accurate								accurate
2) not authentic								authentic
3) not believable								believable
4) not popular								popular
5) not well-liked								well-liked
6) not favored								favored

Sharing and Engagement 1

Q38. People participate in different types of information sharing and gathering online. **Thinking back to the blog post you just read**, please tell us how much you agree or disagree with the following statements.

Strongly disagree							Strongly agree
1	2	3	4	5	6	7	

- 1) I would share the blog post.
- 2) I would add my own comments to the blog post.

Information Seeking 1

Q39. People also participate in certain types of information sharing and gathering. **Thinking about the blog post you just read**, how likely would you be to do each of the following activities?

Not at all likely						Very likely
1	2	3	4	5	6	7

- 1) Seek out more information about the topic.
- 2) Share other blog posts related to the topic with others.
- 3) Pay closer attention to the topic when I encounter it in the news.
- 4) Pay closer attention to the topic when I encounter it on social media.
- 5) Discuss the topic with others.

Information Processing, Info Sufficiency Threshold 1

Q37. **Thinking back again to the blog post**, how much do you agree or disagree with each of the following statements?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1.0) I thought about what actions I myself might take based on what I read.
- 2.0) I found myself making connections between the information and what I have read or heard elsewhere.
- 3.0) I thought about how the information relates to other things I know.
- 4.0) I tried to think about the importance of the information for my daily life.
- 5.0) I tried to relate the ideas in the information to my environment.
- 6.0) I did not spend much time thinking about the information.
- 7) The blog post did not contain useful information on which to base my thinking about the issue.
- 8) While reading the blog post, I did not think about the details presented in the information.
- 9) I would need more information before I could make any decisions about the issue.

STIMULUS 2

Q41. Next, **you will see another blog post about geothermal energy and enhanced geothermal systems**. Because this is a screenshot, you will not be able to click on any of the content. **Please read it carefully**. We will ask you more questions after viewing the post.

Q42-Q51. STIM INTRO, TIMING, STIMULUS 2

MANIPULATION CHECK 2

Q53. As best as you can remember, please indicate the number of **reads** the blog post you just saw generated.

0 to 9.....	1
10 to 99.....	2
100 to 499.....	3
500 or more	4
Cannot recall.....	9

Q54. And, as best as you can remember, please indicate the number of **shares** the blog post generated.

0 to 9.....	1
10 to 99.....	2
100 to 499.....	3

Sharing and Engagement 2

Q35. People participate in different types of information sharing and gathering online. **Thinking back to the second blog post you just read**, please tell us how much you agree or disagree with the following statements.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

1.0) I would share the blog post.

2.0) I would add my own comments to the blog post.

Information Seeking 2

Q60. People also participate in certain types of information sharing and gathering. **Thinking about the second blog post you just read**, how likely would you be to do each of the following activities?

Not at all likely						Very likely
1	2	3	4	5	6	7

1) Seek out more information about the topic.

2) Share other blog posts related to the topic with others.

3) Pay closer attention to the topic when I encounter it in the news.

4) Pay closer attention to the topic when I encounter it on social media.

5) Discuss the topic with others.

Information Processing, Info Sufficiency Threshold 2

Q37. **Thinking back again to the second blog post**, how much do you agree or disagree with each of the following statements?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

1.1) I thought about what actions I myself might take based on what I read.

2.1) I found myself making connections between the information and what I have read or heard elsewhere.

3.1) I thought about how the information relates to other things I know.

4.1) I tried to think about the importance of the information for my daily life.

5.1) I tried to relate the ideas in the information to my environment.

6.1) I did not spend much time thinking about the information.

7.0) The blog post did not contain useful information on which to base my thinking about the issue.

8.0) While reading the blog post, I did not think about the details presented in the information.

9.0) I would need more information before I could make any decisions about the issue.

10) For quality control purposes, please select "Strongly agree" in this row.

IF R SELECTS 1 THRU 6, GC = 0.

Risks and Benefit Perceptions

Q62. How **risky** do you think each of the following is for society as a whole?

Not at all risky						Very risky
1	2	3	4	5	6	7

- 1) Solar energy
- 2) Nuclear energy
- 3) Biofuels
- 4) Global warming
- 5) Geothermal energy
- 6) Enhanced geothermal systems

Q63. How **beneficial** do you think each of the following is for society as a whole?

Not at all beneficial						Very beneficial
1	2	3	4	5	6	7

- 1) Solar energy
- 2) Nuclear energy
- 3) Biofuels
- 4) Global warming
- 5) Geothermal energy
- 6) Enhanced geothermal systems

Support: Use, Research, Funding

Q64. And how much do you agree or disagree with the following statements? Overall, I support...

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) the use of **geothermal energy**.
- 2) the use of **enhanced geothermal systems**.
- 3) research on **geothermal energy**.
- 4) research on **enhanced geothermal systems**.
- 5) federal funding of **academic research on enhanced geothermal systems**.
- 6) federal funding of **commercial research on enhanced geothermal systems**.

Geothermal Energy Purchasing Intentions

Q65. Next, we would like to know how much you agree or disagree with the following. If it were available...

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) I would purchase geothermal energy for my home in the next few years.
- 2) I would pay more for energy produced from geothermal sources than for energy produced from other sources.
- 3) geothermal energy would be a dependable source of energy for my home.
- 4) I would install a geothermal heat pump, which uses energy from the earth to heat and cool my home.

Q66. And how much do you agree or disagree with these statements? Purchasing geothermal energy for

my home would...

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) increase the value of my home.
- 2) save me money in the long run.
- 3) help me keep the environment clean.
- 4) help me reduce my carbon footprint.
- 5) make me less dependent on fossil fuels.
- 6) make me more self-sufficient.

Policy & Regulation

Q67. Continuing with the issue of **enhanced geothermal systems**, please indicate how much you agree or disagree with each of the following statements about regulation.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) Regulating research on enhanced geothermal systems will significantly slow down scientific progress.
- 2) Academic research on enhanced geothermal systems should be regulated.
- 3) Commercial research on enhanced geothermal systems should be regulated.
- 4) The federal government should do more to reduce greenhouse gas emissions and other potential sources of global warming.
- 5) State governments should do more to reduce greenhouse gas emissions and other potential sources of global warming.

DEMOGRAPHICS

Q68. Because we try to get responses and opinions from different people, we would like to ask you a few questions that help us to reach people of different ages, genders, and so on. Once again, these responses will only be used for academic research purposes.

How much guidance does religion provide in your everyday life?

No guidance at all						A great deal of guidance
1	2	3	4	5	6	7

Q69. The terms "liberal" and "conservative" may mean different things to people, depending on the kind of issue one is considering. In terms of **economic issues**, would you say you are...

Very liberal	Liberal	Somewhat liberal	Moderate	Somewhat conservative	Conservative	Very conservative
1	2	3	4	5	6	7

Q70. Now, thinking in terms of **social issues**, would you say you are...

Very liberal	Liberal	Somewhat liberal	Moderate	Somewhat conservative	Conservative	Very conservative
1	2	3	4	5	6	7

Q71. Generally speaking, do you consider yourself a(n)...?

Democrat	1
Republican	2
Independent	3
No preference.....	4
Other party	5
Don't know/Prefer not to answer	9

DEBRIEFING FORM

Q72. Thank you very much for participating in our study. The purpose of this study is to learn more about how people feel about geothermal energy and enhanced geothermal systems. The blog posts you viewed were taken or paraphrased from real online posts. However, the scientists referenced in the blog posts and the authors of the posts were fictional.

If you have questions about the research after today, you should contact the Principal Investigators.

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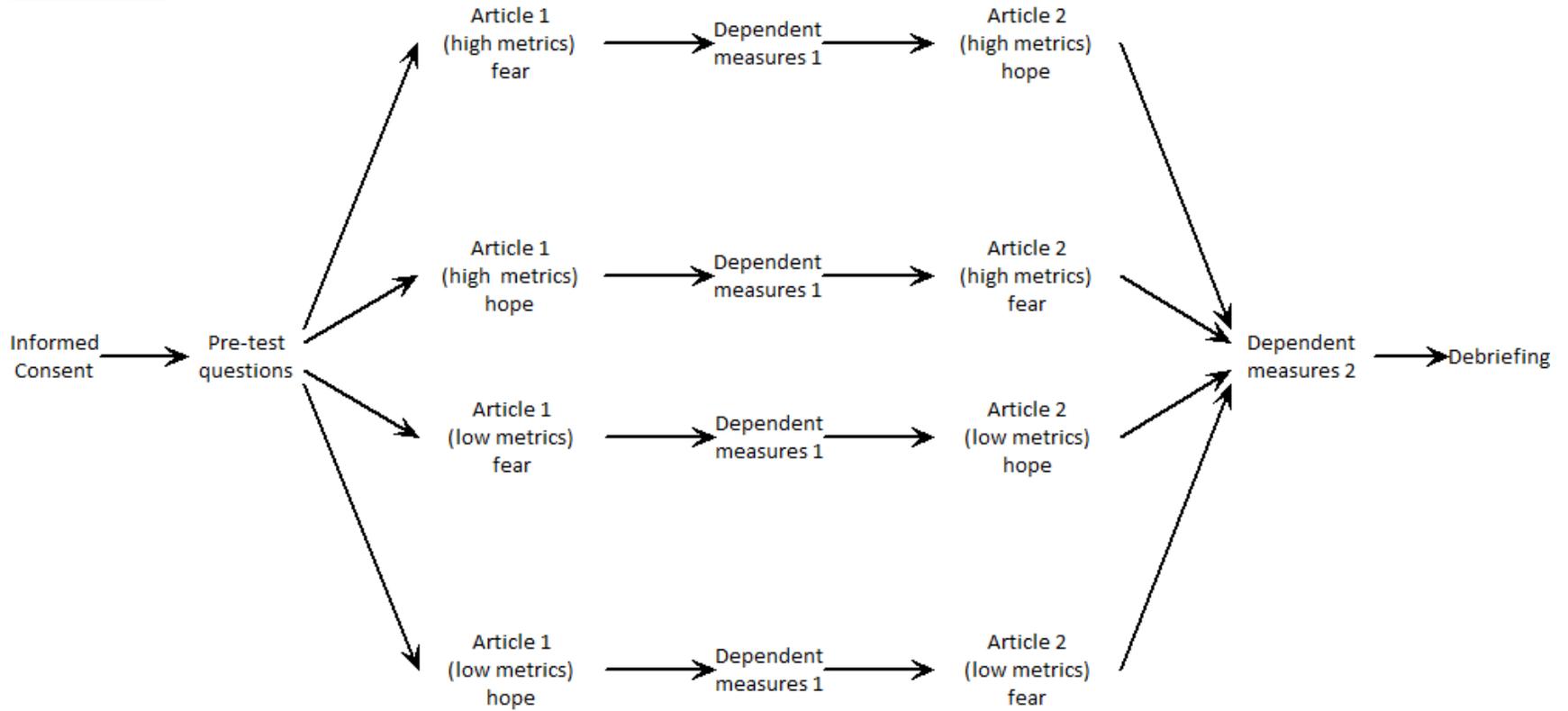
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We would like to remind you that your participation in this research is completely voluntary. If you would like to withdraw from this study, please let any of the Principal Investigators know and we will destroy any data collected about you during this study. The decision to withdraw from this research will involve no penalty or loss of any benefits to which you are otherwise entitled. This will not affect your relationship with the investigators. Your de-identified information could be used for future research without additional informed consent.

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SURVEY FLOW



HIGH METRICS

Stimulus 1, fear



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THE PROS AND CONS OF ENHANCED GEOTHERMAL ENERGY SYSTEMS (EGS)

By Alex McCarthy | December 10, 2020 | **6,754** READS | **734** COMMENTS **863**

Large geothermal energy plants are capable of producing 725 megawatts of electricity, enough to power 725,000 homes, and emit no greenhouse gases. Geothermal energy is heat energy derived and stored in the Earth.

Unfortunately, there are few places that are well-suited for geothermal energy, which requires areas with naturally occurring steam and a reservoir of hot water. That is why some experts are advocating for enhanced geothermal energy systems (EGS).

Enhanced geothermal systems work by pumping water into the ground to tap natural heat sources, creating conditions for geothermal energy in areas where it would otherwise be impossible. **... enhanced geothermal systems could lead to earthquakes."**

Casey Glazer, a systems engineering professor at UC Berkeley, has studied what scientists call "induced seismicity" in enhanced geothermal systems. In Glazer's view, enhanced geothermal systems are safe and would dramatically expand the number of places capable of producing geothermal energy. Enhanced geothermal systems are ideal in the climate change era: cheap, renewable, and predictable.

However, other experts warn that the techniques used by enhanced geothermal systems could lead to earthquakes. New research linked a 5.5 magnitude earthquake to enhanced geothermal systems in Pohang, South Korea. The Pohang earthquake caused US\$75 million in damages.

Avery Martin, a geoscientist at the University of California, Santa Cruz, says EGS has the potential to cause large earthquakes. Geologic conditions vary from site to site. No one can confidently indicate how much EGS might be speeding up the timeline of a major earthquake... or how bad that earthquake could end up being.

The International Energy Agency predicts 5% annual growth in the geothermal sector through 2023. A large part of that growth is expected to be enhanced geothermal systems.

734 Comments


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6,754 READS

863

Stimulus 2, hope

THINK ENERGY

SOLAR WIND HYDRO GEOTHERMAL

Geothermal Energy: What You Need to Know

By Taylor Brooks - 12/13/2020

657 Comments  713 6,458 Reads

 SEARCH

Geothermal energy is a kind of renewable energy that comes from the sub-surface of the Earth. You may not have personal experience with it, but large geothermal energy plants can produce enough energy to power three-quarters of a million homes. In some areas of the United States, 95% of buildings are heated by geothermal energy.

Geothermal energy can be produced domestically and uses less surface land area than wind or solar farms. It works especially well for heating and cooling, uses no fossil fuels, and geothermal power plants do not produce harmful emissions.

“... enhanced geothermal systems are safe with minimal environmental impact ...”

But not all areas have this natural resource. This is where enhanced geothermal systems (EGS) come into play. Enhanced geothermal systems offer great potential to expand the use of geothermal energy. These systems extract heat from the Earth by creating fractures into which water can be added.

Scientists at UC Berkeley have studied the relationship between earthquakes and enhanced geothermal systems. In their opinion, enhanced geothermal systems are safe and could supply a substantial portion of the electricity that the US will need in the future with minimal environmental impact.

However, other experts warn that the main drawback of enhanced geothermal systems are small earthquakes that could result from drilling. Some geoscientists say that micro-earthquakes could trigger larger quakes. There is even evidence of a 5.5 magnitude earthquake being linked to enhanced geothermal systems in South Korea.

Despite these risks, geothermal energy and enhanced geothermal systems have the potential to play a major role in the renewable energy mix of the future. Like many renewable resources, interest in it peaked in the 1970s but declined after the energy crisis abated.

657 Comments  713 6,458 Reads


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Stimulus 1, hope



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“Enhanced geothermal systems are ideal in the climate change era ...”

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Stimulus 2, fear

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Geothermal Energy: What You Need to Know

By Taylor Brooks - 12/13/2020

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Geothermal energy is a kind of renewable energy that comes from the sub-surface of the Earth. You may not have personal experience with it, but large geothermal energy plants can produce enough energy to power three-quarters of a million homes. In some areas of the United States, 95% of buildings are heated by geothermal energy.

Geothermal energy can be produced domestically and uses less surface land area than wind or solar farms. It works especially well for heating and cooling, uses no fossil fuels, and geothermal power plants do not produce harmful emissions.

“... the main drawback of enhanced geothermal systems are small earthquakes ...”

But not all areas have this natural resource. This is where enhanced geothermal systems (EGS) come into play. Enhanced geothermal systems offer great potential to expand the use of geothermal energy. These systems extract heat from the Earth by creating fractures into which water can be added.

Scientists at UC Berkeley have studied the relationship between earthquakes and enhanced geothermal systems. In their opinion, enhanced geothermal systems are safe and could supply a substantial portion of the electricity that the US will need in the future with minimal environmental impact.

However, other experts warn that the main drawback of enhanced geothermal systems are small earthquakes that could result from drilling. Some geoscientists say that micro-earthquakes could trigger larger quakes. There is even evidence of a 5.5 magnitude earthquake being linked to enhanced geothermal systems in South Korea.

Despite these risks, geothermal energy and enhanced geothermal systems have the potential to play a major role in the renewable energy mix of the future. Like many renewable resources, interest in it peaked in the 1970s but declined after the energy crisis abated.

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THE PROS AND CONS OF ENHANCED GEOTHERMAL ENERGY SYSTEMS (EGS)

By Alex McCarthy | December 10, 2020 | **8** READS | **1** COMMENTS Share **1**

Large geothermal energy plants are capable of producing 725 megawatts of electricity, enough to power 725,000 homes, and emit no greenhouse gases. Geothermal energy is heat energy derived and stored in the Earth.

Unfortunately, there are few places that are well-suited for geothermal energy, which requires areas with naturally occurring steam and a reservoir of hot water. That is why some experts are advocating for enhanced geothermal energy systems (EGS).

Enhanced geothermal systems work by pumping water into the ground to tap natural heat sources, creating conditions for geothermal energy in areas where it would otherwise be impossible.

“... enhanced geothermal systems could lead to earthquakes.”

Casey Glazer, a systems engineering professor at UC Berkeley, has studied what scientists call “induced seismicity” in enhanced geothermal systems. In Glazer’s view, enhanced geothermal systems are safe and would dramatically expand the number of places capable of producing geothermal energy. Enhanced geothermal systems are ideal in the climate change era: cheap, renewable, and predictable.

However, other experts warn that the techniques used by enhanced geothermal systems could lead to earthquakes. New research linked a 5.5 magnitude earthquake to enhanced geothermal systems in Pohang, South Korea. The Pohang earthquake caused US\$75 million in damages.

Avery Martin, a geoscientist at the University of California, Santa Cruz, says EGS has the potential to cause large earthquakes. Geologic conditions vary from site to site. No one can confidently indicate how much EGS might be speeding up the timeline of a major earthquake... or how bad that earthquake could end up being.

The International Energy Agency predicts 5% annual growth in the geothermal sector through 2023. A large part of that growth is expected to be enhanced geothermal systems.

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