

FY23 Q1 Quarterly Stakeholder Script (January 26, 2023)

Time (pm ET)	Topic	Speaker(s)	Slide # and Talking Points
2:01–2:02	Welcome	Jerry	<p>Slide 1: Good afternoon, everyone—or good morning or evening, depending on where you are! I’m Jerry Carr and I’m currently on detail to GTO as a Technology Manager for the Data, Modeling, and Analysis program. I’m here from the National Energy Technology Laboratory, where I manage subsurface R&D projects in diagnostic development, simulation capability, energy storage, reaction engineering and geologic exploration. I am a plasma physicist by background with a PhD from West Virginia University. Prior to joining NETL, I was an assistant professor at Texas Lutheran University, an ORISE research assistant for the Spallation Neutron Source at Oak Ridge National Laboratory, and an AmeriCorps youth development program coordinator in Boston and Atlanta. I’m excited to be working with GTO and to be your guest host today.</p> <p>On behalf of the entire GTO team, I’d like to thank you for joining our quarterly webinar. We look forward to these webinars, where we get opportunity to share all the great things happening in geothermal energy and around GTO.</p>
2:02–2:03	Agenda Overview	Jerry	<p>Slide 2: Here is our agenda for today. We’ll start off with news and updates from the Department of Energy and the Office of Energy Efficiency and Renewable Energy, and then move on to GTO-specific news and updates. We’ll get some program and project updates from our GTO program managers, including some spotlight projects in technical assistance, and we’ll finish off with a question-and-answer session. You can enter questions any time in the Q&A tab of Zoom and we’ll be ready to address them at the end.</p> <p>We have a lot of great updates to share today, so let’s jump right in!</p>

2:04–2:06	DOE/EERE News Updates	Jerry	<p>Slide 3: First, some highlights from the Department of Energy, DOE, and the Office of Energy Efficiency and Renewable Energy, or EERE, of which GTO is part.</p> <p>First—as we mentioned in our last quarterly webinar—the Bipartisan Infrastructure Law includes \$500 million to demonstrate the technical and economic viability of carrying out clean energy projects, including geothermal, on current and former mine lands. The Clean Energy Demonstration Program on Current and Former Mine Land seeks to carry out five clean energy projects in geographically diverse regions. The department plans to issue a funding opportunity announcement in 2023, and you can use the outreach tools on the next slide to stay connected if you’re interested.</p> <p>In early January, the Department of Defense released a Request for Proposal to prototype innovative, on-site geothermal solutions for energy resilience through geothermal electricity generation and distribution. The solicitation sought conventional or non-conventional pre-commercial geothermal technologies suitable for various geologic settings at DoD installations across the United States. The RFP closed last week and we’ll be watching for updates.</p> <p>Finally, we wanted to note that DOE published a year-end retrospective highlighting achievements across the clean energy spectrum, including the Request for Information for GTO’s Bipartisan Infrastructure Law EGS pilot demonstrations, and our recently announced Enhanced Geothermal Shot. The retrospective is a great way to catch up on recent successes and includes a link to Secretary Granholm’s appearance on the Stephen Colbert show—check it out!</p>
2:06–2:07	DOE/EERE News Updates	Jerry	<p>Slide 4: Of course, even the retrospective is only a hint of all that DOE and EERE are doing. To really stay informed about all the news coming out of DOE and EERE, you can sign up for EERE’s Weekly Jolt and follow Secretary Granholm, DOE, and EERE on social media using the information and handles shown here. Also, don’t forget to use GTO’s hashtag, Geothermal Everywhere, when you post your news so that we can all stay connected.</p>

2:07-2:09	GTO Recent Events	Jerry	<p>Slide 5: Speaking of being connected, GTO is having a terrific time meeting with stakeholders at events! In December, we attended the American Geophysical Union’s fall meeting in Chicago. With average attendance of over 20,000 people, AGU presented GTO a unique opportunity to share the vast and varied possibilities of the geothermal industry. We spoke with attendees from universities, start-ups, international research centers, and more, and handed out some fun new Geothermal 101 and GTO-related materials.</p> <p>Also in December, GTO sponsored and attended the International Ground Source Heat Pump Association’s Annual Conference in Las Vegas. The conference included topics ranging from technological advances to new tax credits, beneficial electrification, design and installation standards, and markets. GTO’s Arlene Anderson presented about the community geothermal funding opportunity, and our low-temperature and coproduced resources manager Alexis McKittrick shared GTO updates in her sponsor remarks.</p> <p>And just this morning, one of our enhanced geothermal systems technology managers, George Stutz, discussed geothermal and repurposing existing wells at a Society of Petroleum Engineers workshop in Texas. In virtual news, research partners recently hosted a webinar about the GTO-funded Geothermal Operational Optimization with Machine Learning, or GOOML. GOOML is a machine learning framework that allows geothermal operators to create digital replicas of operational environments to help optimize power production, steamfield configurations, and asset management.</p>
2:09-2:10	Upcoming Events	Jerry	<p>Slide 6: The events trend will continue as we move into the next quarter. GTO is attending and presenting at numerous conferences and meetings, including our acting director Lauren Boyd giving the opening plenary at the Stanford Geothermal Conference, which we hope many of you are attending. We will also be participating in a meeting to discuss the Western Governors’ Association’s Heat Beneath Our Feet initiative at the National Renewable Energy Lab in February. And plans are in the works for a hybrid virtual and in-person summit about the Enhanced Geothermal Shot later this year. We don’t have details for that yet, but we encourage you to sign up for email updates and The Drill Down so you’ll get the info when we have it.</p>
2:10-2:11	Staff Updates	Jerry	<p>Slide 7: Shifting gears back to what’s going on in GTO’s office, we wanted to share a few staffing updates since our last quarterly webinar. In addition to me joining the team on detail, Cory Grady joined our team as a project monitor, Kevin Jones has been selected as the acting program manager for our EGS team, and we are pleased to welcome back our data, modeling, and analysis program manager Sean Porse full-time.</p> <p>We’d also like to offer a sincere thank you to Jeff Winick for serving as the acting program manager for data, modeling, and analysis in Sean’s stead. We appreciate you keeping the team’s amazing work going while Sean was away!</p>

2:11-2:12	Recent Announcements	Jerry	<p>Slide 8: Now a quick recap on a few recent GTO announcements. In early December, GTO selected ten semifinalists in Phase 1 of the American-Made Geothermal Geophone Prize, a three-phase competition to address the challenges of operating seismic sensors in harsh geothermal environments. Each semifinalist team received a \$75,000 cash prize plus \$75,000 in vouchers to use with an industry expert or national laboratory to advance their concept. Those teams now move on to Phase 2, where they will advance their concepts and demonstrate the promise of their designs.</p> <p>Also in December, GTO’s hydrothermal program selected two projects aiming to reduce project timelines and costs for developing geothermal energy through at least a 25% improvement in geothermal drilling rates. In the first project, Occidental Petroleum and its partners will drill twin high-temperature geothermal wells using existing and novel drilling technologies in the Denver-Julesberg Basin. In the second project, The Geysers Power Company will work with its partners to test and deploy innovative drilling technology and methodologies of varying methods in a range of temperatures and conditions at The Geysers. These projects are essential to our efforts to reduce costs and expand geothermal deployment, and we’re excited to see them get underway soon.</p>
2:12-2:12	How to Engage with GTO	Jerry	<p>Slide 9: With all these GTO updates, it seems like a good time to note that we are busy developing and using new and revamped tools for outreach and engagement. We know we’re not the only ones critical to bring geothermal to the forefront in America’s energy picture, and we are continually looking for ways to engage with stakeholders, foster collaborations, and keep you all informed. We encourage you to go to our website at energy.gov/eere/geothermal to learn more about funding opportunities, sign up for our newsletter, and keep up with GTO projects and initiatives like our lithium research.</p>
2:12-2:13	Geothermal in the News	Jerry	<p>Slide 10: I’m sure most of you stay apprised of geothermal news, but we wanted to take a moment to highlight some of the terrific media coverage we’ve seen and been a part of recently. These are just some of articles we’ve tracked, running the gamut on geothermal’s benefits to the United States. As you all know, there’s awesome work going on across the geothermal sector right now, and we’re excited to see it being shared in the news.</p>
		Jerry	<p>Slide 11: With that, I’d like to turn things over to GTO’s acting director, Lauren Boyd, for an update on our enhanced geothermal systems research and the Enhanced Geothermal Shot.</p>

2:13–2:15	Enhanced Geothermal Shot Analysis	Lauren	<p>Slide 12: Thanks, Jerry. Really appreciate all the updates—so much happening in geothermal! And now I’ll zero in on enhanced geothermal systems, or EGS. These systems are humanmade reservoirs that we need to use in locations where subsurface rocks are hot enough to produce energy but lack the permeability or fluid to carry that heat to the surface. Advancing EGS is critical to our efforts to expand geothermal across the United States, and I’m excited to share an update that will help get us there.</p> <p>Our Enhanced Geothermal Shot is an aggressive department-wide effort to dramatically reduce the cost of EGS. We announced the Shot back in September, and we’re pleased to say that NREL has now released the accompanying analysis, which provides the data and modeling methods that led to this new target.</p> <p>To complete the analysis, NREL researchers started with the Technology Improvement scenario from the GTO’s 2019 <i>GeoVision</i> and then made adjustments to cost and resource assumptions based on recent work and technology advancements. The net effect of the Enhanced Geothermal Shot cost reductions, compared to current or business-as-usual EGS costs, is a 90% reduction in overnight installed EGS costs—to \$45 per MWH—and this is a game-changing target.</p>
2:15–2:16	Enhanced Geothermal Shot Analysis	Lauren	<p>Slide 13: NREL also used its Regional Energy Deployment System Model to project geothermal deployments using the Enhanced Geothermal Shot assumptions. The result is 90 GW of electricity-generating EGS by 2050, with deployment spanning the U.S. West but also including states east of the Mississippi River. The increased deployment would not only provide electricity on a broad scale; it would also help expand geothermal heating and cooling and provide opportunities to transition more workers into clean energy jobs.</p> <p>While the data tell us this target is possible, we know it won’t be easy. EGS is definitely viable—and already in use in limited locations—but expanding it is not without its challenges. To get there, we’ll continue to partner with researchers and stakeholders on issues critical to EGS, such as reducing costs, advancing subsurface engineering, collecting more and better-quality data, improving zonal isolation, and much more.</p> <p>We’re excited to see the Enhanced Geothermal Shot analysis publish and hope that you will all check it out. And, as Jerry mentioned, we’re planning to host an Enhanced Geothermal Shot later this year, so please keep an eye out for that.</p>
2:16–2:17	Office of Science Earthshot Lab Call	Lauren	<p>Slide 14: Also, in line with those research imperatives I just mentioned, DOE’s Office of Science—through its Energy Earthshot Research Center—is seeking proposals for \$200 million in research related to DOE’s Energy Earthshots. The request includes three topics related to the Enhanced Geothermal Shot, as noted on the slide. While proposals are open only to DOE’s national laboratories, partnerships with other institutions such as academia, other national laboratories, not-for-profit organizations, or industry are strongly encouraged.</p> <p>To get more information, scan the QR code on this slide or go to the Office of Science website and look under “Funding News” partway down the home page.</p>

		Lauren	<p>Slide 15: With that, I'll turn things over to Kevin Jones, acting program manager for our enhanced geothermal systems program, for some additional updates on EGS research.</p>
2:17-2:18		Kevin	<p>Slide 16: Thanks, Lauren. That's really great news about the Enhanced Geothermal Shot report. I hope everyone who tuned into this webinar will take the time to check it out.</p> <p>Now, let's move on to some updates in support of advancing that Energyspot goal, starting with our flagship EGS demonstration site—the Frontier Observatory for Research in Geothermal Energy, or FORGE, in Utah. Last August, the FORGE team released its second competitive solicitation. Under this solicitation, the University of Utah—which leads the FORGE project—plans on making up to 17 awards totaling up to \$44 million. We anticipate that this solicitation will result in projects that will test and evaluate new and innovative EGS tools and techniques. Ultimately, we envision that this work will improve EGS reservoir characterization, creation, sustainability.</p> <p>Full applications were due January 10, 2023, so stay tuned for updates about selections.</p> <p>FORGE is also working on plans to drill another deep highly deviated well, known as 16B. This well follows on the team's success drilling and stimulating of the first-ever highly deviated geothermal well in hot hard granitic rock (the 16A well). The 16B well will intersect the fractures created by the 16A stimulation to create an EGS injector-producer pair. We're looking forward to this exciting next step as FORGE continues to advance our understanding and capabilities in EGS.</p>
		Kevin	<p>Slide 17: And now we'll shift to Sean Porse, the program manager for our data, modeling, and analysis work. Welcome back, Sean.</p>
2:18-2:19	Hybrids Projects	Sean	<p>Slide 18: Thanks, Kevin. It's great to be back. As Kevin mentioned, I'm the program manager for GTO's data, modeling, and analysis team – or DMA for short. DMA focuses on analyzing barriers to geothermal adoption in the U.S., as well as measuring technical progress across the geothermal sector. This work includes things like evaluating trends and impacts of geothermal deployment, conducting resource assessments, and identifying best practices and priority investments in geothermal RD&D.</p> <p>As part of our work, we are looking at hybrid geothermal systems—that is, combining and linking geothermal energy with other generation technologies. We are assessing such systems as a way to drive operational synergies and optimize the combined benefits of multiple technologies. GTO's 2019 <i>GeoVision</i> Roadmap included action steps to investigate and understand the full value of and opportunities for hybridized systems. To help gain this understanding, GTO issued a lab call asking for proposals to research, analyze, and model hybridized geothermal power plants.</p>

2:19–2:20	Hybrids Projects	Sean	<p>Slide 19: From that call, we recently selected four lab projects to undertake this work, with a range of approaches that include hybridizing geothermal with solar PV systems, modeling, and thermal energy storage. We hope to achieve multiple goals with these projects, such as identifying new approaches to hybridize geothermal for near-term commercial deployment, expanding the amount and geographical reach for commercially deployable geothermal, and improving the economics for EGS to support widespread use of geothermal. The robust analyses expected in these projects will really help us build the case for commercial pathways to hybridizing geothermal power plants.</p>
2:20–2:22	DOE Community Projects	Sean	<p>Slide 20: Shifting gears a little bit now, we wanted to take some time in this webinar to talk about technical assistance and support for communities looking to use clean energy. GTO is receiving an increasing number of stakeholder inquiries about the opportunities for geothermal at multiple settings, including individual homes and businesses, and at the district or community level. While GTO does not provide technical assistance directly, we—as well as other DOE offices—have numerous initiatives that offer technical support for communities and others interested in clean energy. I’ll run through highlights on these and we encourage you to visit the listed webpages for more information.</p> <p>First, in the Energy Transitions Initiative Partnership Project, or ETIPP, competitively selected remote and islanded communities work with experts at DOE’s national laboratories to design and execute a 12–18-month technical assistance project that helps them meet their energy resilience goals—including by using geothermal, like in The University of Hawai’i’s ETIPP project to assess geothermal cooling in buildings across its 10 campuses.</p> <p>The Clean Energy to Communities program, or C2C, is a new \$50 million DOE program that connects local governments, utilities, and community groups with experts across the DOE national lab complex for technical support and analysis. C2C is designed to accelerate clean energy deployment in ways that align with each community’s needs, so the program offers support on a range of topics and using multiple structures: long-term support, peer learning cohorts lasting about six months, and short-term expert matches to address near-term questions. Applications for C2C are currently open using the link here.</p> <p>And, finally, the third program we wanted to mention is Communities Local Energy Action Program, or Communities LEAP, which targets low-income, energy-burdened communities that are suffering energy justice issues or disproportionately affected by the energy transition. Under Communities LEAP, DOE is working with 24 communities for planning and strategy in energy efficient buildings and beneficial electrification, clean energy development, resilient microgrids and energy storage, and other projects.</p>
		Sean	<p>So now I’ll turn to Alexis McKittrick, program manager for both GTO’s hydrothermal resources program and low-temperature and coproduced resources program, to discuss some related GTO initiatives and updates.</p>

2:22-2:24	FedGeo Partnerships	Alexis	<p>Slide 22: Thanks, Sean. Really appreciate the snapshot of DOE programs to help communities integrate clean energy. As Sean mentioned, GTO also has some initiatives geared towards communities and community-scale geothermal. I'll run through two today, starting with our FedGeo Partnerships. A joint initiative between the low-temp and DMA portfolios, Federal Geothermal Partnerships—FedGeo for short—pairs GTO with the Federal Energy Management Program to help federal agencies consider geothermal energy to heat and cool installations. Options in FedGeo include geothermal heat pumps, district and community heating and cooling systems, direct use systems, and hybrid systems.</p> <p>Oak Ridge National Lab is leading research and characterization activities at identified federal sites that might be viable for demonstration and deployment of on-site geothermal. In partnership with three other national labs, two universities, a state agency, and an industry partner, Oak Ridge will also provide technical assistance under FedGeo, including resource characterization, surveys and verification drilling, and system design. The goal is to lay the groundwork for federal agencies to lead by example in assessing geothermal systems for their buildings and installations.</p> <p>FedGeo work will be starting up at selected Department of Defense sites soon. GTO and Oak Ridge are working with those sites to establish a technical assistance framework and start data analysis, site surveys, and other activities. This initiative is a good way for us to expand our understanding of building-, district- or community-scale geothermal while helping the federal government meet its decarbonization goals.</p>
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2:24–2:27	Community Geothermal	Alexis	<p>Slide 23: Many of you are aware of our community geothermal funding opportunity, which we issued last year. We are currently reviewing applications for this opportunity and are unable to discuss potential selections or a selection date, but I wanted to take a moment to zero in on a few key goals we hope to achieve with this initiative. Our aim is to help communities implement community-scale geothermal systems that can reduce energy burden and fossil fuel use, increase grid resilience and stability, and improve environmental quality. Our plan is that this initiative will not only benefit the communities we select, but communities nationwide by providing us test beds and case studies we can replicate.</p> <p>One crucial aspect of the community geothermal initiative is the requirement for coalitions. All applications included a coalition that has four roles represented. These roles are intended to link the themes we’re covering today—community interest in geothermal, and the technical assistance needed to help them get it.</p> <p>As you can see, the coalitions were required to include a representative who can understand and communicate the needs of the community, including those from underrepresented populations and those experiencing environmental injustice. This role is particularly important given the community geothermal initiative’s role as part of the Administration’s Justice40, which sets the goal that 40% of the overall benefits of certain federal investments—including investments in clean energy and energy efficiency—flow to disadvantaged communities. We also asked for coalitions to include workforce and training expertise, such as that from a trade school, and experts who can model and design a geothermal district system.</p> <p>Those first two roles really ensure that we are meeting the “people” side of the projects by making certain community goals and any concerns are transparent, and that communities are prepared for local jobs to be created as systems are implemented. In the last two roles, we focus more on the technical “system” side of the projects, with skilled analysts who can offer technical and economic analysis capabilities, and experts with demonstrated experience deploying geothermal systems in relevant settings. Our goals in requiring coalitions were really to ensure the selected geothermal systems meet the needs of the community, while being designed for cost-effective and successful deployment. If you’re interested in learning more about this initiative, sign up for the Drill Down so you receive an update when we make selections.</p> <p>With that, I will turn things back over to Jerry for Q&A.</p>
2:27–2:28	Thank you	Jerry	<p>Slide 24: Thanks, Alexis. We hope you’ve enjoyed the webinar. If you haven’t already, now would be a great time to enter any questions you have in the chat. While we gather those for Q&A, I want to thank you all again for attending today. I know I speak for everyone when I say it’s been a pleasure to update you on GTO’s activities. As we’ve mentioned throughout, the best way to stay on top of GTO events and news is by signing up for The Drill Down newsletter. And remember we want to hear from you! Email us at DOE.Geothermal@ee.doe.gov to send us your resumes and CVs to be a merit reviewer, ask questions, and just share ideas about the future of geothermal energy with us.</p>

2:28-end	Questions	Jerry	<p>Slide 25: Okay, on to some questions.</p> <p>(Read Q&A in order. Answers will be populated in the Q&A document when ready to be answered.)</p>
	Dismissal	Jerry	<p>Slide 29: Ok, we are out of time today. We will be distributing today's slides and script next week. If you have any follow-up questions, or if we didn't get to your question today, please email doe.geothermal@ee.doe.gov. Thank you and have a great rest of your day!</p>