Spotlight on Women in Geothermal USA- April 2024

Lauren Boyd, Director of the Geothermal Technology Office, USA DOE

What's the pathway to securing a job with the Department of Energy?

Armed with a background in Geology and Earth Science from Vassar College, Lauren Boyd's journey initially started in physics. While studying physics and simultaneously exploring a geophysics class, she realized her inclination towards the geological side of physics. This realization prompted her transition from a Physics major to Geology, although she still finds enjoyment in reading about Quantum theory during her free time.

Vassar College is renowned for its exceptional arts and sciences programs and Lauren pursued her interest in using science to understand the physical world, immersing herself in the geoscience disciplines and ultimately focusing on geological oceanography. Continuing her academic journey in Geology, Lauren pursued a master's degree at the University of North Carolina at Chapel Hill. Her focus shifted to glacial geology, particularly in Antarctica, where she analyzed geophysical data, sediment cores, and diatom populations to understand glacial dynamics and to piece together the climate history of the region. Through the deep focus on environmental stewardship Lauren was immersed in at Vassar and this direct research connection to climate, Lauren adopted a mindset devoted to making a meaningful impact on climate action.

Has Geothermal Liftoff Finally Arrived?

It appears that every year brings the promise of geothermal energy taking off. Are we now entering an era where geothermal might finally reach maturity and significantly advance power generation?

Lauren believes so. Geothermal offers a clean and reliable energy source, which is crucial for meeting rising energy demand. With the advancements achieved through projects such as FORGE, and success at Fervo, and Eavor, including enhanced drilling techniques and cost reductions, these developments are playing a pivotal role in propelling geothermal power generation forward. Moreover, recent trends show that companies like Google, Microsoft, and Amazon are turning to geothermal energy to power their data centers, driven by the increasing demand for AI and cryptocurrency technologies.

Lauren is optimistic about overcoming previous hurdles to geothermal development, such as price and technology. Geothermal is price competitive with other forms of energy, and thanks to continued collaboration across energy sectors, the technology continues to advance.

Contrary to her colleagues, who pursued careers in oil and gas, Lauren's aspirations leaned towards public service. Her dedication to addressing climate change issues persisted, steering her career path towards government service.

In graduate school, Lauren targeted the Presidential Management Fellows Program, a leadership program designed to recruit and develop a cadre of passionate public servants and future government leaders. This endeavor involved a rigorous application and assessment process as well as nomination from the University of North Carolina at Chapel Hill. Her science background was not common among the primarily policy and legal backgrounds of the applicant pool but she was ultimately selected as a finalist amongst thousands of applicants.

In advancing to the "placement stage" of the process, Lauren crossed paths with Arlene Anderson, who presently holds the position of strategy lead for low temperature resources within the DOE's Geothermal Technologies Office. Arlene was actively seeking a scientist to join the small geothermal team, which ultimately led to the start of Lauren's journey with the DOE. Lauren attributes her success in catching the DOE's attention to her scientific background and fortuitous timing.

Early Years at the DOE

Upon Lauren's initial entry into the Department of Energy in 2008, the geothermal office budget emerged from near elimination following the assertion that geothermal was already commercially viable, particularly in reference to conventional hydrothermal and geothermal heating and cooling application. However, the pivotal moment came with recognition of the 2006 Massachusetts Institute of Technology report on Enhanced Geothermal Systems (EGS), which ultimately led to the allocation of a $5 million budget in 2007 (as opposed to the zero budget that was requested) to the Geothermal Technology Office, formerly known as the Geothermal Technology Program. The significance of the MIT report for restarting federally-funded geothermal research cannot be overstated; as a result of its compelling findings surrounding the potential of EGS, a mandate was issued to prioritize Enhanced Geothermal Systems. EGS origins can be traced back to the 1970s Fenton Hill project run by Los Alamos Scientific Laboratory in New Mexico. Initially termed the Hot Dry Rock project, it boasted a significant DOE budget at the time and kick-started interest in HDR around the world.

Starting her career amidst during a period of limited funding for geothermal energy in 2008 at the DOE, it's paradoxical that in 2009, under the Obama Administration, the American Reinvestment and Recovery Act was enacted and allocated a significant $368 million budget to the Geothermal Technology Program.The mandate encompassed all aspects of geothermal energy, from heating and cooling to EGS and conventional geothermal methods. This led to numerous research and development projects focused on technology advancement. However, the budget reverted to $43 million in 2010, highlighting the fluctuating nature of federal funding to support Geothermal research. Despite its importance, the now Geothermal Technologies Office consistently maintains one of the smallest budgets within the DOE's applied research programs.

During the Obama administration, a new Office Director (the position Lauren holds now), Douglas Hollett, was appointed, having previously worked for Marathon Oil. Doug is known for his tireless efforts to draw parallels between EGS technology and the shale revolution; purporting that EGS was ready to launch and could follow the same trajectory as shale if given a bigger opportunity. With that in mind, he empowered Lauren and her team to design the Frontier Observatory for Research in Geothermal Energy (FORGE) project and played a pivotal role in it's launch. However, amidst this progress, the rise of the Shale Revolution in the US overshadowed the geothermal industry. Geothermal technology remained relatively unknown to many, requiring significant efforts to educate policymakers. FORGE served as a platform to showcase technology advancements and garner support for increased funding. Currently, the budget for the Geothermal Technology Office stands at $118 million, maintaining this level for the past three years.

Work Life Balance

Outside of her work on Capitol Hill, Lauren enjoys spending her free time kayaking and gardening at her recently acquired home.

Notable Achievements

During Lauren's tenure at the DOE her notable achievements, aside from FORGE, is spearheading the EGS Collab project located in the US' largest former-gold mine, the Enhanced Geothermal Shot™, GEOTHERMICA, and the Geothermal Energy from Oil and Gas Demonstrated Engineering (GEODE) initiative.

Another notable achievement is the publication of the Next-Generation Geothermal: Pathways to Commercial Liftoff Report. This collaborative effort with the Office of Clean Energy Demonstrations, a newly formed group under the Bipartisan Infrastructure Law, the Office of Technology Transitions, and the Loan Program Office. The Geothermal Technology Office is actively collaborating with partners across the Department to facilitate more and larger geothermal research and demonstrations.

Specific Roles and Responsibilities as Director of the Geothermal Technology Office

As the Director of the Geothermal Technologies Office Lauren provides strategic leadership, direction, and oversight to all aspects of the Geothermal Technologies Office's (GTO) planning, research, development and deployment (RD&D) across four technical subprogram (EGS, Hydrothermal, Low Temperature, and Data Modeling and Analysis). She provides technical and strategic advice and guidance to DOE and government leaders on geothermal technology development priorities to further national decarbonization goals and she plans and manages the Office's annual budget in collaboration with the GTO team, Agency leadership, the Office of Management and Budget, and Congress.

On a typical day, Lauren's schedule is filled with meetings aimed at cultivating and expanding partnerships within and outside of government, briefing on GTO programs and successes, assessing or aligning budgets, designing future initiatives and engaging on technical and innovative advances. Furthermore, Lauren dedicates a considerable portion of her time to briefing various stakeholders on Capitol Hill and justifying the GTO budget.

Emerging trends within Geothermal?

Lauren sees emerging trends including the utilization of oil and gas technologies to implement next-generation geothermal applications, new machine learning techniques for identifying new geothermal resources, and

to the use of thermal energy networks to manage heat and loads efficiently across the U.S.

Mentorship and Personal Development

Lauren has consistently regarded Ann Robertson-Tate and Susan Petty as her informal mentors in the industry, a sentiment echoed by many other women in the geothermal sector. When Lauren entered the field in 2008, there were scarce female figures, and she has consistently admired and turned to them for guidance and encouragement. Lauren also credits WING in promoting the advancements and achievements of women and increasing the inclusiveness and awareness in the geothermal sector.

Personal development holds significant importance for Lauren, and she actively engages in various leadership programs to advance her skills as a leader. These include the Partnership for Public Service's "Excellence in Government" Fellows Program, Harvard's "Executive Fellows Program," and the Center for Strategic and International Studies, "Women's Global Leadership" Program.

Guidance for Fellow Women in Geothermal

For women embarking on their careers in geothermal, Lauren advises prioritizing self-awareness, embracing leadership challenges even when they are challenging and uncomfortable, fostering a growth mindset, and honing the ability to simplify complex concepts and communicate them effectively as key qualities that can lead to great success.

Additionally, Lauren reflects on her understanding of leadership, emphasizing trust, care for others, and continuously uplifting her team. She believes leadership entails making a conscious effort to lead every day, consistently striving for improvement, and setting an example through dedication and adaptability. Lauren acknowledges that she is always evolving and learning and remains committed to continuous growth and improvement.

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Please send your suggestions for future editions of Spotlight on Women in Geothermal directly to the authors.

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