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H.R. 3326 Public Land Renewable Energy Development Act of 2021
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Chairman and members of the committee, it is my honor to testify today on behalf of not only ORMAT Technologies, but also on behalf of Geothermal Rising.

By way of introduction, ORMAT Technologies is a New York Stock Exchange registered company (symbol "ORA"). With over five decades of experience, Ormat Technologies, Inc. is a leading geothermal company and the only vertically integrated company engaged in geothermal and recovered energy generation ("REG"), with robust plan to accelerate long-term growth in the energy segment market to establish leading position in the U.S. energy storage market. The Company owns, operates, designs, manufactures and sells geothermal and REG power plants primarily based on the Ormat Energy Converter - a power generation unit that converts low-, medium- and high-temperature heat into electricity. The Company has engineered, manufactured and constructed power plants, which it currently owns or has installed to utilities and developers worldwide, totaling approximately 3,200 MW of gross capacity. Ormat leveraged its core capabilities in the geothermal and REG industries and its global presence to expand the Company activity into the energy storage services, solar Photovoltaic (PV) and energy storage plus Solar PV. Ormat's current 947 MW of geothermal and Solar generating portfolio is spread globally in the U.S., Kenya, Guatemala, Indonesia, Honduras, and Guadeloupe and its 83 MW energy storage portfolio is located in the U.S. I have the pleasure of serving as Vice President of Business Development for the Americas.

Geothermal Rising, formerly the Geothermal Resources Council (GRC), is a 501(c)(3) non-profit organization. We empower the advancement of human understanding and practical use of geothermal energy through collaboration and communication of robust research, knowledge, and guidance in the United States and around the globe. Founded in 1972, and headquartered in Sacramento, California, we are the largest direct-membership professional and trade association serving the geothermal industry, with over 1,200 members representing a broad and diverse demographic from across the geothermal community. Our members include individuals, corporations, universities, national laboratories, government, and other nongovernmental organizations. The GRC Policy Committee is a separate part of the GRC, independently funded by interested organizations, to advocate on behalf of the geothermal community. I have the pleasure of serving as Chair of the Policy Committee.

We applaud Rep Mike Levin for introducing "Public Land Renewable Energy Development Act (PLREDA) of 2021" which will prioritize the siting and development of renewable projects on federal lands, unleashing the nation's geothermal potential. Ormat and Geothermal Rising enthusiastically support this Committee's and the Administration's efforts to combat climate change through the increased deployment of clean energy resources. Ormat and Geothermal Rising encourage this Committee to ensure that geothermal energy, a versatile and reliable energy resource, is a key pillar of our clean energy future.

PLREDA commits to improving and expanding renewable energy projects on public lands. If passed, this legislation would promote the development of wind, solar, and geothermal resources



on public lands by identifying priority areas and encouraging efficient and environmentally responsible permitting practices. Several changes to PLREDA have been made from last Congress to reflect the enactment of the Energy Act of 2020. We applaud Congress for passing this critical legislation that will expedite the deployment of geothermal and other renewable energy resources on public land.

Today's Geothermal Market

Geothermal is the renewable resource currently experiencing the most rapid change in comparative net costs. While not the lowest cost resource on a levelized cost basis, geothermal is now by far the highest economic value renewable resource in California and the surrounding region. Even as we see the contract prices for wind, solar PV, and lithium-ion battery prices decline, their continued penetration improves geothermal's comparative economic value, thus encouraging long-term procurement on a net cost basis. The industry has seen a record number of new long-term geothermal PPA's enacted recently at an average price of approx \$70/MWh.¹ Federal tax policies are also increasingly favorable to geothermal, and in fact the proposed provisions in Congress's GREEN Act pertaining to geothermal support a PTC extension through the end of 2021, an ITC extension of 30% through the end of 2026 (with subsequent incentives of 26% in 2026, 22% in 2027, and 10% thereafter), and an 85% direct pay optionality for either PTC or ITC. Geothermal energy provides significant value to justify a premium to intermittent resources. In a 2017 study on the comparative value of geothermal energy, it was found that energy value, capacity value, and potential value associated with flexibility and resource diversity should drive a value difference of at least \$37/MWh more than solar PV.²

How do we expedite development under the "Public Land Renewable Energy Development Act (PLREDA) of 2021"

On March 18, 2021, Geothermal Rising sent a letter to Secretary of the Interior Debra Haaland encouraging the Department to implement several common-sense regulatory reforms to meet the goals of the Energy Act of 2020 to deploy at least 25 GW of geothermal and other renewable resources on public land by 2025 in an environmentally responsible way.

Specifically, the letter recommended the following:

- 1) Expand the application of Casual Use Reviews, Determinations of National Environmental Policy Act (NEPA) Adequacy, and Categorical Exclusions (CX) in place of full Environmental Assessments (EAs) and Environmental Impact Statements (EISs);
- 2) Increase the transparency of permit tracking and agency delays;
- 3) Implement programmatic EAs and EISs to efficiently carry out the environmental review process; and
- 4) Allow the combination of environmental analyses for multiple phases of geothermal development.

for the American geothermal industry to grow rapidly, Ormat and Geothermal Rising recommend that the Department of the Interior (DOI) expand, clarify, and (1) **strengthen** CXs to reduce the permitting burden for geothermal resource confirmation and observation. This action would immediately unlock new projects and their associated economic impacts while ensuring a robust

¹Geothermal Power Purchase Agreements on the Rise (<https://www.geothermal-library.org/index.php?mode=pubs&action=view&record=1040017>)

²The Increasing Comparative Value of Geothermal—New Market Findings and Research Needs (<http://pubs.geothermal-library.org/lib/grc/1033898.pdf>)



environmental review process and an efficient use of Bureau of Land Management (BLM) staff resources.

Strengthening the administrative categorical exclusion for geothermal resource confirmation will enable the geothermal industry to deploy more megawatts on public lands, creating new jobs and royalty revenues for our local states, counties, treasury, and renewable energy resource conservation fund. This recommendation and subsequent testimony are the result of extensive consultation within the industry, whitepapers, and a review of geothermal permitting conducted in 2013 and 2014 by the National Renewable Energy Laboratory (NREL).

“Reducing the overall project time directly attributable to NEPA, whether by reducing the time of individual NEPA processes or reducing the frequency of NEPA analysis for a particular project, can alleviate some of the major barriers to geothermal development. Reducing NEPA timelines directly decreases overall project timelines which indirectly decreases the perceived risk profile—lowering three of the four barriers to geothermal development identified by industry. Lowering these barriers is in line with one of NEPA’s stated goals: to “enhance the quality of renewable resources.”

strengthening the administrative categorical exclusion for geothermal resource confirmation drilling will significantly relieve the permitting burden for the geothermal industry without undermining environmental stewardship.

In order for the geothermal industry to grow rapidly, Ormat and the GRC Policy Committee have requested that DOI or Congress issue a new rulemaking or memorandum to expand, clarify, and strengthen the administrative categorical exclusion (CX) from NEPA, to reduce the permitting burden for geothermal resource confirmation and observation. This action would immediately unlock new projects and their associated economic impacts, while allowing the hardworking BLM field staff to focus on appropriate permitting priorities.

Many geothermal resources that are commercially viable for energy production using today’s technologies are located on public lands. BLM manages all subsurface geothermal resource on federal lands, regardless of the federal agency that manages the surface estate (such as the Forest Service). Therefore, almost all geothermal development must conduct a National Environmental Policy Act (EPA) review. While geothermal is inexpensive to operate and maintain once a project is complete, during the resource discovery, phase developers must drill resource confirmation holes to determine the true quality and quantity of the underground resource. This means the industry has a disproportionate permitting burden at the “front end” of a project, before a revenue payback is guaranteed. A heavy permitting burden means a slow development cycle, and a slow development cycle means developers pay a lot for financing.

Geothermal resource confirmation wells are distinct from geothermal production wells, which are permitted and constructed differently from resource confirmation wells. Resource confirmation wells are needed for geothermal developers to assess the underground resource for project viability. While developers do what they can to determine the quality of the underground resource through mapping and surface observations, it simply is not possible for developers to characterize the resource without making physical contact with the geothermal fluid deep in the earth. At this time, most geothermal resource confirmation wells must be permitted with BLM via a detailed Environmental Assessment (EA), even though resource confirmation wells are very limited in scope, are reclaimed quickly after confirmation, and result in tiny surface disturbance. These resource confirmation wells also cannot be “repurposed” as production wells under the same permit. This means developers can’t access the heat resource they need to evaluate whether a commercial project would even be viable without undertaking significant, time-consuming environmental review. A Categorical Exclusion from NEPA for select types of geothermal resource



confirmation wells and other low-impact activities would help the industry tremendously, without undermining environmental stewardship. When developers are able to utilize a CX, they can avoid conducting a full Environmental Assessment and instead perform a CX review, which is far quicker and less costly. A more useable geothermal CX that allows developers to evaluate their energy resource for viability before undertaking extended environmental review could drastically improve timelines and cost profiles for project development. This step would also provide greater parity between geothermal and oil and gas, which is afforded a broad CX for exploration activities, including resource confirmation wells, under Section 390 of the Energy Policy Act of 2005.

(2) Increase the transparency of permit tracking and agency delays. Regulatory processes are essential to ensuring that geothermal development is carried out responsibly and consistently. Increasing transparency in permitting would assist in overcoming the complexity and uncertainty in costs and development timelines resulting from regulatory processes. Ormat has approximately 20 projects in the federal permitting process with the Bureau of Land Management. While the average permitting timeline is four years we have had geothermal projects take as long as six years and are still pending a NEPA determination. Tracking the permitting progress of different field offices would allow us to identify issues, increase education, and shorten permitting and regulatory processes significantly.

The DOE GeoVision³ analysis confirmed that shortening permitting and regulatory process times alone can result in increased exploration and a higher rate of geothermal project development over the status quo; increased deployment projected to occur through improved regulatory timelines would occur even in the absence of technology improvements. Because 90% of conventional geothermal resources in the United States are located on federally managed lands (Young et al. 2014), collaboration among agencies with land-management responsibilities will be essential to optimizing regulatory processes.

Geothermal projects that are on federally managed land and/or receiving federal funding may be subject to an environmental review process under the National Environmental Policy Act (NEPA) as many as six times—from the land-use planning phase through use of the geothermal resource (as determined through analysis of the geothermal NEPA review process in Young et al. 2014). The type of NEPA review process required (i.e., categorical exclusion, Environmental Assessment, Environmental Impact Statement) depends on the complexity of the activity being permitted; decisions about how the process is conducted can impact overall geothermal development timelines. Identifying opportunities to review the adequacy of lands designated for (and /or exempt from) renewable energy siting and development and **(3&4) updating the programmatic environmental impact statements** for geothermal leasing, solar energy development, and wind energy development as required in PLERDA would reduce project development timeline significantly.

NREL's *GeoVision Analysis Supporting Task Force Report: Barriers* analyzed nontechnical barriers to geothermal *deployment* and potential improvement scenarios. In part, this report highlighted that reducing project development timelines from 8 years to 4 years can increase resource discovery and (primarily because of improved financing costs) more than double geothermal deployment over the Business-as-Usual scenario by 2050, resulting in an additional 6.7 gigawatts of geothermal deployment.⁴

³ <https://www.energy.gov/sites/default/files/2019/06/f63/5-GeoVision-Chap5-opt.pdf>

⁴ Young, K., A. Levine, J. Cook, D. Heimiller, and J. Ho. 2019. *GeoVision Analysis Supporting Task Force Report: Barriers. An Analysis of Non-Technical Barriers to Geothermal Deployment and Potential Improvement Scenarios*. NREL/TP-6A20-7164. <https://www.nrel.gov/docs/fy19osti/71641.pdf>