YOUNG LEADERS PROGRAM

MAPPING HAWAII'S TRANSITION FROM FOSSIL-FUELS IMPORTER TO INDO-PACIFIC CLEAN ENERGY HUB

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Hawaii is making waves with its ambitious energy transition strategy. In 2008, it became the first US state to adopt a 100% clean energy target,[1] and in 2017, the first to adopt the Paris Agreement,[2] now mainstays of its growing reputation as a global leader on climate action. This strategy is a move toward energy security as much as it is a statement against carbon emissions. The state has long been highly dependent on imported oil, doubly vulnerable to global price shocks due to a grid largely sustained by oil-fired power plants. While this is common across island economies, the state is rapidly building out renewable energy capacity to reduce this reliance. Through policy adjustments and synergistic partnerships that leverage its unique location, Hawaii can accelerate its transition toward energy security, and with the right investments, lay the groundwork for becoming a clean energy technology innovator and even an exporter to the Indo-Pacific.

Examining Imports & Shoring Up Near-Term Energy Security

Russia's invasion of Ukraine rocked the world's perceptions of security, and even the distant Hawaiian Islands have not escaped its shockwaves. From 2017 through 2021, local utility buyers like the Par Pacific refinery in Kapolei were regular customers of Russian oil companies, purchasing several thousands of barrels per year to cover approximately 30-40% of the state's energy needs.[3] The summer prior to the invasion, Jeff Mikulina, executive director for the Blue Planet Foundation, a leading Honolulu-based climate advocacy group, expressed how we were "fostering corrupt regimes" by "sending our hard-earned dollars to those countries when we have alternatives."[4] Since President Biden's nationwide ban on Russian energy imports a few weeks into the war,[5] the gap has been filled mostly by Libyan and Argentinian oil.[6]

With the closing of Hawaii's final coal plant last September, Oahu Island has become even more dependent on its oil-fired plants to supply firm power. The Hawaiian Electric Company (HECO) originally planned for the coal plant's replacement with a giant battery project to be charged with renewable energy. However, due to significant delays in the buildout of solar and wind projects, the battery will have to be charged by oil-fired plants burning overtime to prevent grid blackouts. Public Utilities Commissioner

[1] Hawaii State Energy Office, "Hawaii Clean Energy Initiative," accessed Apr. 7, 2023, https://energy.hawaii.gov/hawaii-clean-energy-initiative/

[2] United Nations Framework Convention on Climate Change, "Hawaii Becomes First State to Enact Law That Aligns with Paris Agreement," Jun. 7, 2017, https://unfccc.int/news/hawaii-becomes-first-state-to-enact-law-that-aligns-with-paris-agreement

[3] Hawaii State Energy Office, "Publications & Reports: 2017-2021," accessed Apr. 5, 2023, https://energy.hawaii.gov/information-center/publications-and-reports/

[4] Emily Burr, "Half of Foreign Oil for Hawaii Comes from Russia and Libya," HawaiiBusiness Magazine, Jun. 22, 2021, https://www.hawaiibusiness.com/half-of-foreign-oil-for-hawaii-comes-from-russia-and-libya/

[5] The White House, "Fact Sheet: US Bans Imports of Russian Oil, Liquefied Natural Gas, and Coal" Mar. 8, 2022, https://www.whitehouse.gov/briefing-room/statements-releases/2022/03/08/fact-sheet-united-states-bans-imports-of- russian-oil-liquefied-natural-gas-and-coal/

[6] Hawaii State Energy Office, "Non-Renewable Energy Sources," accessed Apr. 5, 2023 https://energy.hawaii.gov/what-we-do/energy-landscape/non-renewable-energy-sources/

Chair Jay Griffin torched HECO for its "lack of urgency and foresight," likening the jump from coal to greater oil reliance as going from "cigarettes to crack."[7]

In light of these developments and with coal out of the picture (as mandated by Hawaii Senate Bill 2629 HD1),[8] the State needs to think strategically about the entities it supports and relies on for petroleum. Energy supply sources should be a highly visible subject of public deliberation since it is such a foundational block for an import-based island economy. The simple answer to aligning Hawaii's oil purchase dollars with its long-term interests while strengthening energy security would be to source from the mainland. Today, the US is the world's largest oil producer, thanks to advances during the 2000's in hydraulic fracturing or "fracking."[9]

Why doesn't Hawaii source from companies operating in the Permian Basin in Texas or the Bakken Formation in North Dakota? According to the Grassroot Institute of Hawaii, one answer is transportation costs, although it is not necessarily the cost of oil production but the cost of transportation, the Grassroot Institute of Hawaii argues.[10] An antiquated federal law known as the Jones Act obstructs Hawaii from taking advantage of being part of a larger union. Implemented in 1920, it requires that "all cargo transported between US ports be on ships that are US flagged, built and mostly owned and crewed by Americans."[11] While this protects local shippers like Matson and Pasha Hawaii, it makes domestic energy shipments prohibitively expensive – raising living costs for residents.

US Representative from Hawaii Ed Case recently petitioned the Biden administration for a waiver from the Jones Act.[12] Absent receiving a groundbreaking allowance on this front, Hawaii's next best option is to identify and build up partnerships with supplier nations that would add the least liability to its energy security dilemma. As a start, the State Public Utilities Commission could create a suppliers index in consultation with the US Departments of Energy, State, and Homeland Security reviewing traits such as geographic proximity, geopolitical risk, and shared strategic interests with the US. Rather than letting purchase orders flow to the marginally cheapest barrel of oil from autocratic petrostates as they currently do, the State can recalibrate to align for security and other priorities. Some communities have the luxury of relying entirely on global markets for oil. Hawaii should not be one of them.

Accelerating Local Renewable Energy Development with Policy and Partnerships

For thousands of years, the Hawaiian communities tapped into all that 'Āina and Kai provided, free from reliance on imports and foreign interests. Hawaii remains blessed and surrounded by an abundance of harnessable renewable energies that could allow it to return to an ideal level of self-sufficiency once again. Reviewing our dependence on imported oil can alleviate energy security concerns in the short term, but improving the situation over the long term is best addressed by ensuring the State's current mandated Renewable Portfolio Standards (RPS) targets of 40% clean energy by 2030, and 100% by 2045,[13] are met or surpassed by utilizing the full suite of technologies available. Doing so facilitates progress towards several converging aims, like mitigating climate change, developing energy independence, and building environmental resilience. It also allows Hawaii to align its actions with its values, and lead the

[7] Brian McInnes, "AES scrambles to find power as it shuts down the last coal plant in Hawaii," Pacific Business News, Mar. 23, 2021, https://www.bizjournals.com/pacific/news/2021/03/23/aes-coal-plant-scramble.html

[8] Hawaii State Legislature, "Senate Bill 2629 HD1," Jun. 30, 2020, https://www.capitol.hawaii.gov/sessions/session2020/bills/SB2629_HD1_.htm

[9] US Energy Information Administration, "FAQs," May 1, 2023, https://www.eia.gov/tools/faqs/faq.php?id=709&t=6

[10] Jonathan Helton, "Hawaii Needs Jones Act Waiver for Oil Imports" Grassroot Institute of Hawaii, Feb. 22, 2022, https://www.grassrootinstitute.org/2022/02/hawaii-needs-jones-act-waiver-for-oil-imports/

[11] Grassroot Institute of Hawaii, "Jones Act," accessed Mar. 15, 2023, https://www.grassrootinstitute.org/jonesact/?gclid=Cj0KCQjwj_ajBhCqARIsAA37s0yOVXDqKbvfgquMhhnLr4Tgt9TQunRsczJSy5jaqUKV1-sFhBObH38aAoSmEALw_wcB

[12] Charlie Papavizas, "Waiving the Jones Act for Hawaii Crude Oil Imports," Winston & Strawn LLP, Mar. 4, 2022, https://www.winston.com/en/maritime-fedwatch/waiving-the-jones-act-for-hawaii-crude-oil-imports.html

[13] Hawaii State Public Utilities Commission, "Renewable Portfolio Standards (RPS) 2018 Legislative Report," Dec. 2018, https://puc.hawaii.gov/wp-content/uploads/2018/12/RPS-2018-Legislative-Report_FINAL.pdf

Pacific Islands and the United States in doing so as well.

How could Hawaii accelerate the buildout of a fossil-fuel independent grid? Distributed photovoltaics (rooftop PV) have undoubtedly been a key success up to this point. Supported by federal, state, and local-level incentives for installation, Hawaii has led the nation in rooftop PV adoption and it represents the largest share of the state's renewable energy portfolio.[14] Utility-scale "solar farm" and "wind farm" projects have also been important drivers in clean energy adoption, but have encountered greater setbacks. While rooftop PV dual-purposes space that is already in residential or commercial use, industrial scale solar farms and wind farms require a great deal of land in comparison. On space-constrained islands where there may be many competing interests connected to the same parcel of land, this can lead to higher development costs, popular protests, and legal challenges stemming from residential groups, the Department of Hawaiian Homelands, or military or commercial interests. In recent years, lawsuits reached the Hawaii Supreme Court over the externalities caused by the Na Pua Makani wind farm in Kahuku [15] and the Paeahu solar plant on Haleakala.[16]

Rather than further strain land resources by betting fully on utility-scale solar and wind, Hawaii should aim for an eventual diversified mix of energy sources that also harnesses natural resources in the form of wave energy, tidal energy, and ocean thermal energy conversion.[17] The path towards economic viability and scale in these technologies has not yet been developed, but they could become a larger part of the local energy mix in the future. With hydropower from rivers currently comprising the world's largest component of clean energy, power generation from oceans is regarded as an underutilized resource with enormous potential. A 21st-century understanding of indigenous methodologies and knowledge systems (Kanaka 'Ōiwi Mo'olelo), implies that this direction may lead our state to a truly renewable future.[18]

An engaged community that is invested over the long term will be critical to optimizing the rapid buildout of Hawaii's energy independence. To enable new growth and a redirection of our economy, strong leadership and incorporation of diverse partnerships at scale are needed for job creation and climate justice. Better relations with federal entities like the Department of Energy and strategic international partners like Canada and Japan can further the progress of innovative energy infrastructures. The pursuit of external collaborations to develop green technologies can help shift our economy away from an overdependence on tourism while expanding high-value opportunities for broader engagement with international markets and further development into a world-class alternative energies sector.

One of the most underutilized renewable energy resources in Hawaii is geothermal.[19] Puna Geothermal Ventures' facilities on the island of Hawaii is the state's only geothermal energy conversion plant.[20] The 38-megawatt facility provides approximately 30% of the island's energy needs.[21] According to studies from the Hawaii State Energy Office in 2016, the amount of megawatts of geothermal reserves on Maui and the Hawaii Island would be sufficient to power Maui, Hawaii, and 60% of Oahu's energy needs. [22]

[14] Makena Coffman, Scott Allen, and Sherilyn Wee, "Determinants of Residential Solar Photovoltaic Adoption," The Economic Research Organization at the University of Hawaii (UHERO), Feb. 7, 2018 https://uhero.hawaii.edu/wp-content/uploads/2019/08/WP_2018-1.pdf

[15] Blaze Lovell, "Kahuku Wind Farm Case Goes Before Hawaii Supreme Court," Honolulu Civil Beat, Apr. 1, 2021, https://www.civilbeat.org/2021/04/kahuku-wind-farm-case-goes-before-hawaii-supreme-court/

[16] Anne Fischer, "Hawaii Supreme Court upholds PUC's approval of power purchase agreement." PV Magazine, Mar. 16, 2022, https://pv-magazine-usa.com/2022/03/16/hawaii-supreme-court-upholds-pucs-approval-of-power-purchase-agreement/

[17] National Oceanic and Atmospheric Administration, "Ocean Thermal Energy Conversion (OTEC) Technology," accessed Apr. 20, 2023, https://coast.noaa.gov/data/czm/media/technicalfactsheet.pdf

[18] Katrina-Ann Kapā'anaokalāokeola Nākoa Oliveira and Erin Kahunawaika'ala Wright, *Kanaka Oiwi Methodologies: Mo'olelo and Metaphor*, (Honolulu: University of Hawaii Press, 2016), Life-Sustaining Water of Kanaka Knowledge (pp. 72-85).

[19] Star Advertiser Editorial Board, "Letter: Expand geothermal energy in Hawaii," Star Advertiser, Apr. 2, 2023, https://www.staradvertiser.com/2023/04/02/editorial/letters/letter-expand-geothermal-energy-in-hawaii/

[20] Hawaiian Electric, "Puna Geothermal Venture (PGV)," accessed May 7, 2023, https://www.hawaiianelectric.com/clean-energy-hawaii/our-clean-energy-portfolio/renewable-energy-sources/geothermal/puna-geothermal-venture-(pgv)

[21] US Department of Energy, Office of Energy Efficiency & Renewable Energy, "Hawaii Geothermal Area,"accessed May 7, 2023, https://www.energy.gov/eere/geothermal/hawaii-geothermal-area

[22] Alice Kim,"Geothermal energy a 'no brainer' for Hawaii," Hawaii Groundwater and Geothermal Resources Center, University of Hawaii, Dec. 8, 2018,

According to Hawaii State Senator Chris Lee, former House chair of the Committee on Energy and Environmental Protection, geothermal is "safe, it's reliable and it's available in quantity."[23] With modern geothermal power production, there's a possibility Hawaiian Electric will move forward with their Power Supply Improvement Plan, which "forecasts 40 MW of new geothermal development on Maui by 2040 and an additional 40 MW of geothermal on Hawaii Island by 2030."[24] The current Puna Geothermal Venture (PGV) Repower Project coincides with Hawaiian Electric's aim. Phase 1 will increase power production of the geothermal power plant in the Puna District from 38 to 46 MW and Phase 2 will further increase production to 60 MW.[25] State Senator Donovan Dela Cruz said, "the more we can scale up firm renewables, then the cost efficiency also increases."[26] Once we are energy independent through the buildout of long-term inexpensive renewable energy systems, we can look toward building a hydrogen export industry.

Positioning Hawaii as a Clean Energy Technology Hub in the Indo-Pacific

Co-designed by dozens of collaborating public and private organizations, the Hawai'i Pacific Hydrogen Hub is another potential component to achieving decarbonization goals by maximizing synergies with a renewable energy-driven economy.[27] [28] Earlier this year, the state submitted an application to bring in up to $1 billion of federal and private investments for the development of a hydrogen production hub (H2Hub) as part of the US Department of Energy's broader plan to create regional green hydrogen networks. Green hydrogen could be the final piece to reach the State of Hawai'i bold energy agenda's crown achievement of 100% clean energy by the year 2045.[29] As stated by Governor Josh Green in his State of the State Address, this emerging clean fuel industry would position Hawai'i to "achieve long-term reductions in energy prices and emissions more than any other state" while also underpinning "national security objectives by providing energy security for Hawai'i and our strategic Pacific partners."[30]

A hydrogen ecosystem centered around the H2Hub holds promise for decarbonizing Hawaii's transportation sector while generating a portfolio of adjacent and downstream secondary industries. The new access to affordable and accessible energy will drastically affect working families, household energy costs, and critical transportation costs associated with living on an island in the center of the Pacific. The integration of green hydrogen energy technology into Hawaii's infrastructure will help stabilize the Pacific's energy resilience initiatives, defense infrastructure, cultural collaboration, and reduce dependence on fossil-based energy sources.

Our central geographic position would enable us to share this technology with countries in the Asia Pacific that have expressed interest alternative fuels like hydrogen to meet their net zero goals. The development of Pacific-centric green energy markets would result in stronger strategic relations. The shift to a clean energy market in Hawaii will bring about greater security, more competitive business, leadership and technology development, and net-zero emissions. Despite the political adjustments and infrastructural challenges that will no doubt continue to arise during this clean energy transition, Hawaii is in the process of becoming a regional clean energy

https://www.higp.hawaii.edu/hggrc/geothermal-energy-a-no-brainer-for-hawaii/

[23] Ibid

[24] Ibid

[25] Carlo Cariaga, "Puna geothermal site in Hawaii to expand capacity with Repower project," Think GeoEnergy, Jul. 25, 2022, https://www.thinkgeoenergy.com/puna-geothermal-site-in-hawaii-to-expand-capacity-with-repower-project/

[26] Hawaii News Now staff, "5 years after lava nearly destroyed it, Puna Geothermal announces expansion plans" Hawaii News Now, May 8, 2023, https://www.hawaiinewsnow.com/2023/05/09/5-years-after-lava-nearly-destroyed-it-puna-geothermal-announces-expansion-plans/

[27] Hawaii State Energy Office, "Integrated Hawaii Pacific Hydrogen Hub Completes Full Application for Federal Funding," Apr. 11, 2023, https://energy.hawaii.gov/integrated-hawaii-pacific-hydrogen-hub-completes-full-application-for-federal-funding/

[28] Hawaii State Energy Office, "Hawaii Pacific Hydrogen Hub Proposal Encouraged to Submit Full Application," Jan. 5, 2023, https://energy.hawaii.gov/hawaii-pacific-hydrogen-hub-proposal-encouraged-to-submit-full-application/

[29] Hawaii State Energy Office, "Decarbonization," accessed May 7. 2023, https://energy.hawaii.gov/

[30] Josh Green, "State of the State Address 2023," Office of the Governor of Hawaii, Jan. 20, 2023, https://governor.hawaii.gov/main/state-of-the-state-address-2023/

technology innovator, and will be well-positioned to lead the Pacific into a more climate-friendly future.

Looking to the Future

As a Pacific Island, our communities understand that the environment is directly tied to our well-being as a people and society. A focus on low carbon technology is essential to the sustainability of the State of Hawai‘i and the Pacific Islands region. The intersection of a changing climate with Hawaii's economy, the State's emission goals, military priorities, and environmental equity and justice will demand a multi-agency and interdisciplinary approach to develop a comprehensive, resilient and realistic clean energy future for our state.

Hawai‘i is positioned to represent itself as an energy-sovereign society, but also remain an international collaborator. The unique position Hawai‘i maintains in the Pacific Theatre cannot be overstated. Situated between the largest economies in the world, Hawai‘i's role in ensuring a secure, sustainable, and economically robust global market could extend beyond the Asia-Pacific. The constant push by foreign powers to control materials, supply chains, and modes of transportation only strengthens the argument to develop Hawai‘i's self-sustaining energy economy. It is time to transition from a reliance on fossil fuels to a future as an innovator, collaborator, and independent leader as an Indo-Pacific Clean Energy Technology Hub.

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