

Frequently Asked Questions

1. What is the Alternative Fuel, Repowering, and Energy Transition Study?

The Alternative Fuel, Repowering, and Energy Transition Study builds on more than ten years of related studies, providing engineering and economic analyses, and evaluation of permitting requirements. It is one part of a broader effort to develop an energy transition strategy to support national security, safeguard energy infrastructure, increase energy affordability, and accelerate renewable energy adoption.

The study included the following main tasks:

- Evaluating technology and functionality
- Conducting economic analysis
- Reviewing regulatory and policy frameworks

The study's focus was on assessing residual and diesel fuel alternatives. The fuels that were considered include methane/liquid natural gas (LNG), hydrogen, biomethane, biodiesel, e-methane, hydrogen, e-ammonia, e-diesel, and e-methanol. Solar, wind, and other renewable sources are a critical component of HSEO's work. Their buildout continues to be a priority; however, they were not considered in detail in this study.

The study is not a proposed plan the actions discussed will require further analysis, pursuit by the electric utility, and appropriate regulatory approval. If pursued, it is likely many of the actions and concepts of the reports would be adjusted to meet the needs of the utility.

2. How will residents, community members, and businesses get to participate in the process?

Public engagement will play a key role in any future project planning moving forward. Although community and stakeholder feedback was not solicited for this study, the study provides valuable data, background, and context to guide and inform future feedback. Future action will rely on input, collaboration, and support from residents, businesses, and community organizations. HSEO encourages anyone to submit comments and questions on HSEO's Feedback Survey available at <https://energy.hawaii.gov/alternative-fuels-repowering-and-energy-transition-study/>

Opportunities for public engagement may include:

- Community Meetings and Workshops - HSEO and others would host in-person and virtual meetings to gather input, share updates, and address concerns about the program's goals and impacts.

- Public Comment Periods - Residents will have opportunities to provide feedback on policies, proposed projects, and key components of the decarbonization strategy during both formal and informal public comment periods.
- Stakeholder Collaboration - HSEO will work with community groups, businesses, and other stakeholders to ensure the program meets the needs of Hawai'i's diverse communities.
- Equity-Focused Engagement - Special efforts will ensure that underserved and vulnerable communities have a voice in the process and equitable access to program benefits.

3. Why was this analysis completed now?

The subsequent downrating of Hawaiian Electric's credit rating after the Maui Wildfire has increased the cost of debt financing for the utility and independent power producers, challenging the financing of future renewable energy projects and necessary capital expenditures to continue moving the energy transition forward. The credit and capital crunch exacerbate the utility's increasingly low reserve capacity, raising the question of how these assets will be renewed in the near future.

Post-Maui Wildfires, a capital infusion into Hawaiian Electric over \$1 billion of debt and equity is urgently needed to restore market confidence in renewable energy power purchase agreements and other critical investments discussed in this study. Ideally, equity investments would be from entities that are completely aligned with Hawai'i's energy transition and decarbonization policy objectives. Suitable candidates among public utilities would include those in the United States and among strong U.S. allies with stated objectives to be fully decarbonized and fossil-free by 2050.

Additionally, the current plan involves fuel-switching to biofuels (biodiesel or renewable diesel) with higher costs and yet-to-be-determined lifecycle carbon savings. While the planned thermal capacity projects are critical to ensure grid reliability; HSEO asserts that, as proposed, the Stage 3 thermal projects and likely the IGP RFP thermal projects, will result in one of two outcomes: either (1) higher electricity prices if biofuels are available and their costs are approved by the Hawai'i Public Utilities Commission (PUC), or (2) the continued reliance on liquid oil-based fossil fuels, such as Low Sulfur Fuel Oil or ultra-low sulfur diesel.

Recognizing the unacceptable risks of continuing down the current pathway, Governor Josh Green, M.D., tasked the HSEO with developing a new energy strategy to reduce energy costs and carbon emissions in the electricity sector, post-Maui wildfires, while achieving two key objectives:

- Accelerate Hawai'i's energy transition to renewable and carbon-free energy.

- Evaluate options to replace residual fuel oil for power generation and create opportunities for capital investments in grid infrastructure and power generation to ensure and enhance energy system reliability and resilience.

Governor Green made it clear that the new energy transition strategy must ensure that all future investments in Hawai'i's growing integrated electricity system result in a portfolio of fuels, power generation assets, and infrastructure that provide affordable electricity, energy security, resilience, and reliability.

4. How will this impact my energy bill?

A crucial objective of the analysis is to identify how to lower energy costs when compared to the current plan, and to ensure any changes do not increase bills for residents. The impact of the larger energy strategy on ratepayer costs is a critical component of the analysis. Transitioning to LNG in the short term could lead to potential cost savings by displacing low-sulfur fuel oil, which is currently being used and is more expensive. Cost savings are more substantial if compared against the switch to biofuels. The full impact will be dependent upon any final contracts, regulatory approvals, and market conditions, including fluctuations in global LNG prices and transportation costs. Additionally, long-term cost implications should consider the infrastructure investments required for LNG facilities and the minimization of stranded assets as Hawai'i moves toward its renewable energy goals. With the assumptions included in the report, including the tight timeline, cost savings are projected.

Moving away from oil to natural gas can reduce household exposure to oil price volatility. Natural gas fuel contracts and the portfolio approaches commonly used in the industry can stabilize prices and reduce short-term fluctuations. Further, LNG tends to be used in the power sector, versus the transportation sector, which is generally more predictable, resulting in less influence from short-term market changes, which the oil market is more sensitive to, thus resulting in price changes driven by demand fluctuations.

Solar energy projects continue to be the lowest cost option, underpinning the importance of continued investments in renewable energy, and modern thermal power plants will complement low-cost solar on cloudy days.

5. What other options are there, what other options were evaluated?

HSEO carefully evaluated a variety of fuel options. Hawaiian Electric's proposed plan utilizes biofuels as the primary firm energy source to meet the Renewable Portfolio Standard mandates. HSEO's primary concern with biofuels is their additional cost to ratepayers. The uncertainty and variability associated with their lifecycle emissions are a

particular concern for imported fuels and first-generation biofuels most abundant on the market.

Technologies were evaluated based on Technological maturity and commercial viability (scalability, technical Readiness level, fuel availability, transportation logistics, cost-effectiveness, and lifecycle carbon intensity. Fuels that were not technologically mature, scalable, or immediately cost-effective were not considered for detailed analysis.

6. Why can't all energy needs be met with rooftop solar?

Rooftop solar is a critical component of the energy transition. The installation of rooftop solar, particularly for low- and moderate-income customers, as well as the businesses and households impacted by the public safety power shutoff program, is a priority. However, rooftop solar alone is not adequate to meet electricity demand and reliability requirements for several reasons including:

- **Intermittent nature of solar and storage needs:** While battery storage technology is advancing and rooftop solar installations paired with battery storage are becoming more common, solar is still an intermittent resource. It is only available when the sun is shining. Meeting demand during long periods without sunshine and peak demand hours is challenging and has technical limitations.
- **Limited roof space:** Estimates indicate that O'ahu has approximately [3,934 MW of rooftop capacity available of installable capacity](#). However, even if all available roof space was filled, the technical potential does not meet the need on O'ahu, which is projected to be about 4500 to 6500 MW in 2045 (estimated under aggressive energy efficiency and generous wind adoption assumptions in the [2024 HSEO Decarbonization Report](#), Chapter 4). Additionally, solar only works some hours of the day, and can be dramatically impacted by two or more consecutive days of cloud cover, even with battery storage.
- **Transmission and Distribution Limitations:** Rooftop solar systems are decentralized, which can present challenges for the grid in managing voltage fluctuations, ensuring adequate delivery from supply to demand, and maintaining grid stability. Technology is improving (e.g. smart inverters), and HSEO is working with national experts to push these technological boundaries. Hawai'i is a leader and pioneer in addressing this issue, and other electric utilities worldwide look to Hawai'i to learn how to integrate such a large amount of solar energy into the grid. For the time being, however, there are major technology and feasibility limitations that must be considered.
- **Cost:** while rooftop solar can lower costs for individuals who install the solar on their roofs, it is not as cost-effective as utility-scale developments.

7. What are the results of the Alternative Fuel, Repowering, and Energy Transition Study?

- Land availability and other factors indicate that local energy supply is insufficient to meet both current and forecasted demand. Accordingly, some energy imports will persist for both the electric and transportation sectors even after Hawai'i satisfies the 100% RPS.
- The current Hawaiian Electric grid and development plans have unnecessarily high carbon emissions due to powerplant inefficiency compounded by substantial reliance on LSFO, which will likely remain the primary fuel until the interim RPS mandates take effect.
- Power plants could be converted, and a new power plant could be built to run on natural gas supplied by a Floating Storage Regassification Unit (FSRU) and associated gas infrastructure.
- LNG emerged as the near-term fuel with the potential to cost-effectively reduce the State's greenhouse gas emissions during the transition to economywide decarbonization in 2045, but more analysis is needed to quantify a range of potential benefits and to identify how those benefits can be maximized to residents at the appropriate level of infrastructure buildout.
- Policy guardrails will be necessary to ensure that lower carbon fuels, such as LNG, will enable economywide decarbonization by 2045, not distract from it. There is a narrow but beneficial, path for the inclusion of LNG in the energy portfolio. Its build-out should not allow for backsliding on the RPS.

HSEO will need to integrate the results of this study into the overall energy transition plan for Hawaii, which will account for other fuels and power generation sources not included in this study. This is one piece of the larger energy puzzle needed to meet the 2045 goals. Full engineering and design will be necessary if any components of the project move forward.

8. How long will natural gas be a part of the generation portfolio? Will this prolong fossil fuel use in Hawai'i?

The renewable portfolio standard, as established by [HRS §269-92](#), will remain intact. Any fuel switching under this strategy must include safeguards, or policy guard rails, to ensure the use of natural gas will be temporary. The state has a constitutional obligation to ensure a healthful environment that includes reductions in carbon emissions that meet schedules based in science through available technology. HSEO analysis shows that, although O'ahu may need natural gas to seriously reduce its emissions, renewable acceleration targets for Kaua'i, Maui County, and Hawai'i Island are better than gas infrastructure to more quickly move those islands to a low carbon future.