

ENERGY FOUNDATIONS

POWER GENERATION

How does electricity generation work?

Electricity is generated by converting other forms of energy into electrical energy. This is often done by directing steam, water or wind to spin a turbine connected to a generator. Different resources require different methods for generating energy. For example, photovoltaic (PV) solar panels directly convert sunlight into electricity without spinning a turbine.

What happens to electricity after it's generated?

Once generated, electricity can be stored in batteries or sent through the grid, passing through transmission lines, substations and distribution lines to provide safe, lower voltage power to homes and businesses.

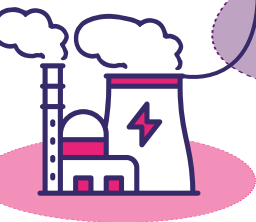
THE GRID

Wind & Solar Generation



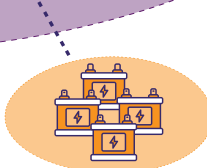
Substation

Power is changed to a lower voltage for safe distribution



Conventional Generation

Transmission Lines



Distribution Lines



Battery Energy Storage System

Battery Energy Storage Systems (BESS) are a key component of a clean energy grid. They store excess energy when demand is low and release it when demand is high or when renewable power supply drops. This keeps energy reliably flowing through the grid during times of fluctuation.

DID YOU KNOW?

Each island has its own separate electric grid to serve its communities.

There are no grid connections or power lines that flow between islands. This means that each island's power supply must be self-sufficient, relying on its own local generation and distribution systems. This unique aspect of our utility requires an extra focus on resilience and a diverse set of power generation methods.



ENERGY FOUNDATIONS POWER GENERATION



What resources does Hawaiian Electric use to generate electricity?

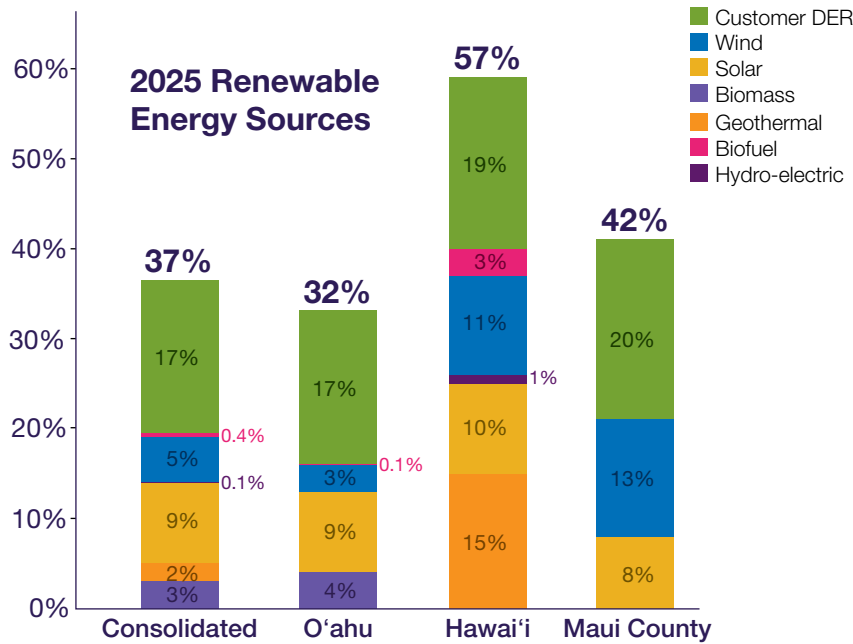
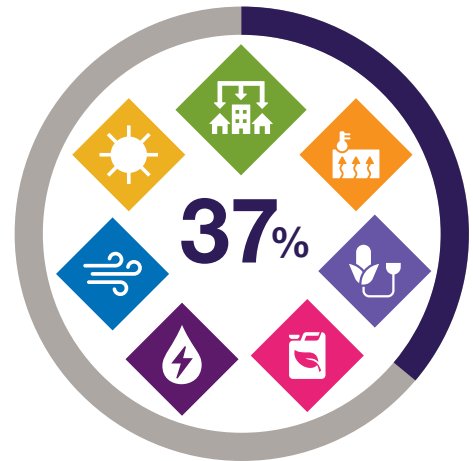
Hawaiian Electric currently generates and purchases electricity using a mix of fossil fuels (like oil and gas) and a growing number of renewable resources. The State of Hawai'i has set the goal of using 100% renewable resources by 2045. Renewable resources we use to generate electricity include:



How much of our energy comes from renewable resources?

Hawaiian Electric currently generates and purchases electricity using a mix of fossil fuels (like oil and gas) and a growing number of renewable resources. The State of Hawai'i has set the goal of using 100% renewable resources by 2045. Renewable resources we use to generate electricity include:

For example, O'ahu currently produces 1.5 times the renewable energy than the rest of the state combined, but Hawai'i Island leads the state with the highest proportion of renewable energy at 57% (see the graphic below).



For the latest information on our renewable energy generation, visit hawaiianelectric.com/clean-energy-hawaii/our-clean-energy-portfolio

What does power generation look like at different sizes?

Large power plants provide electricity for entire communities, while smaller systems like rooftop solar provide power at homes and businesses. Both play an important role. Together, they help meet growing energy needs and support the move to 100% clean energy.

What's the plan for transitioning to 100% renewable energy generation?

Our work to move toward a clean energy future is guided by a process called Integrated Grid Planning, or IGP. The IGP process brings many people together to build a resilient and reliable grid from local renewable energy sources with various technologies and scales.

We will need a diverse mix of renewable resources to generate enough electricity and ensure a safe, reliable and resilient grid. This includes on-demand and weather-dependent sources of power generation.

- **On-demand power:** Continuous, predictable sources of energy, such as power from a geothermal plant.
- **Weather-dependent power:** Intermittent sources of electricity such as wind turbines and solar panels.



Learn more about our pathway to a clean energy future at hawaiianelectric.com/igp