

What's the Difference Between Firm & Intermittent Energy?



Every energy resource and technology works differently. Some energy resources can be used to make electricity any time we need it – “firm energy” – while other energy resources only work when conditions are right – “intermittent energy.”

Hawai'i is working toward a goal of using 100% renewable energy. To get there, we need to make sure each island's power grid is safe and reliable, and that electricity is always available when people need it.

Firm Energy

Resources that can generate energy **24/7 and deliver on-demand** power to the grid.

We need firm energy to maintain a minimum power supply to each island.



Fossil Fuels



Geothermal



Biomass & Biofuel



Waste-to-Energy



Pumped Storage Hydropower



Nuclear

Currently, most of Hawai'i's firm power comes from fossil fuels, which will need to be replaced by both firm and intermittent dispatchable resources.

Intermittent Energy

Resources that only generate energy under certain conditions. The amount of energy generated depends on factors we can't control, like weather or time of day.

Intermittent energy is sometimes called variable energy.



Solar



Wind



Ocean



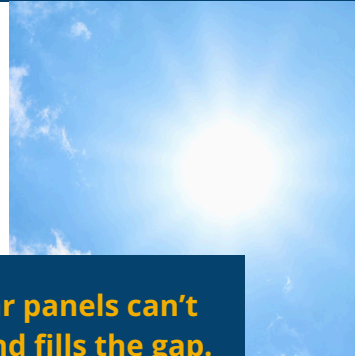
Run-of-River Hydropower

Some electricity from intermittent energy resources can be stored in batteries and used on demand, making it “dispatchable.”



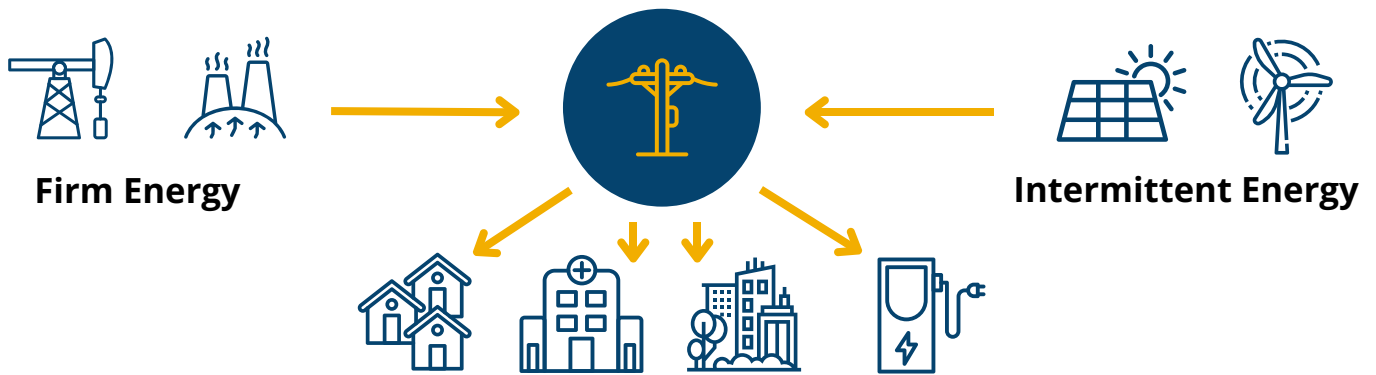
How Do Firm and Intermittent Energy Impact the Grid?

If we only use intermittent resources, we have **limited control over how much electricity we make or when it's made**, which can lead to grid damage and outages.



If clouds block sunlight for an extended period and solar panels can't make enough energy, firm power keeps our lights on and fills the gap.

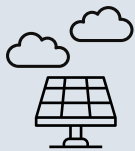
Our Future Must be Powered by Firm Energy and Intermittent Energy



Firm + Intermittent Energy = Safe and Reliable Grid

Every energy technology has pros and cons. By using a mix of firm and intermittent energy, we avoid being too reliant on one resource and create a safe, cost-effective, and reliable grid.

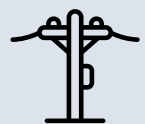
Firm vs. Intermittent Energy Takeaways



Firm energy is used when intermittent energy resources like wind and solar aren't available.



Each island's power grid needs a certain amount of firm energy.



Balancing firm and intermittent energy makes our grid stable and reliable.



Learn more about firm and intermittent energy at www.energy.hawaii.gov

