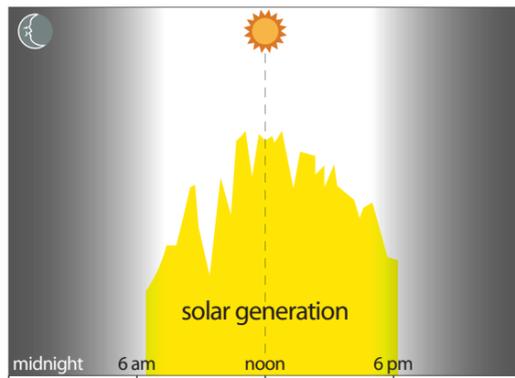


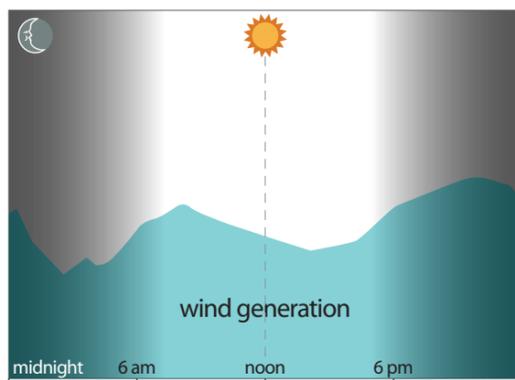
MOVING HAWAI'I BEYOND OIL

Balance of Power

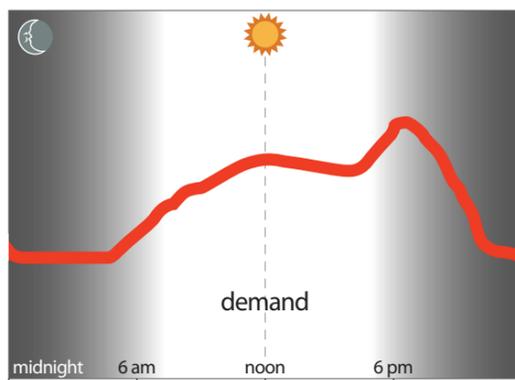
Matching supply and demand to make renewable power work 24/7.



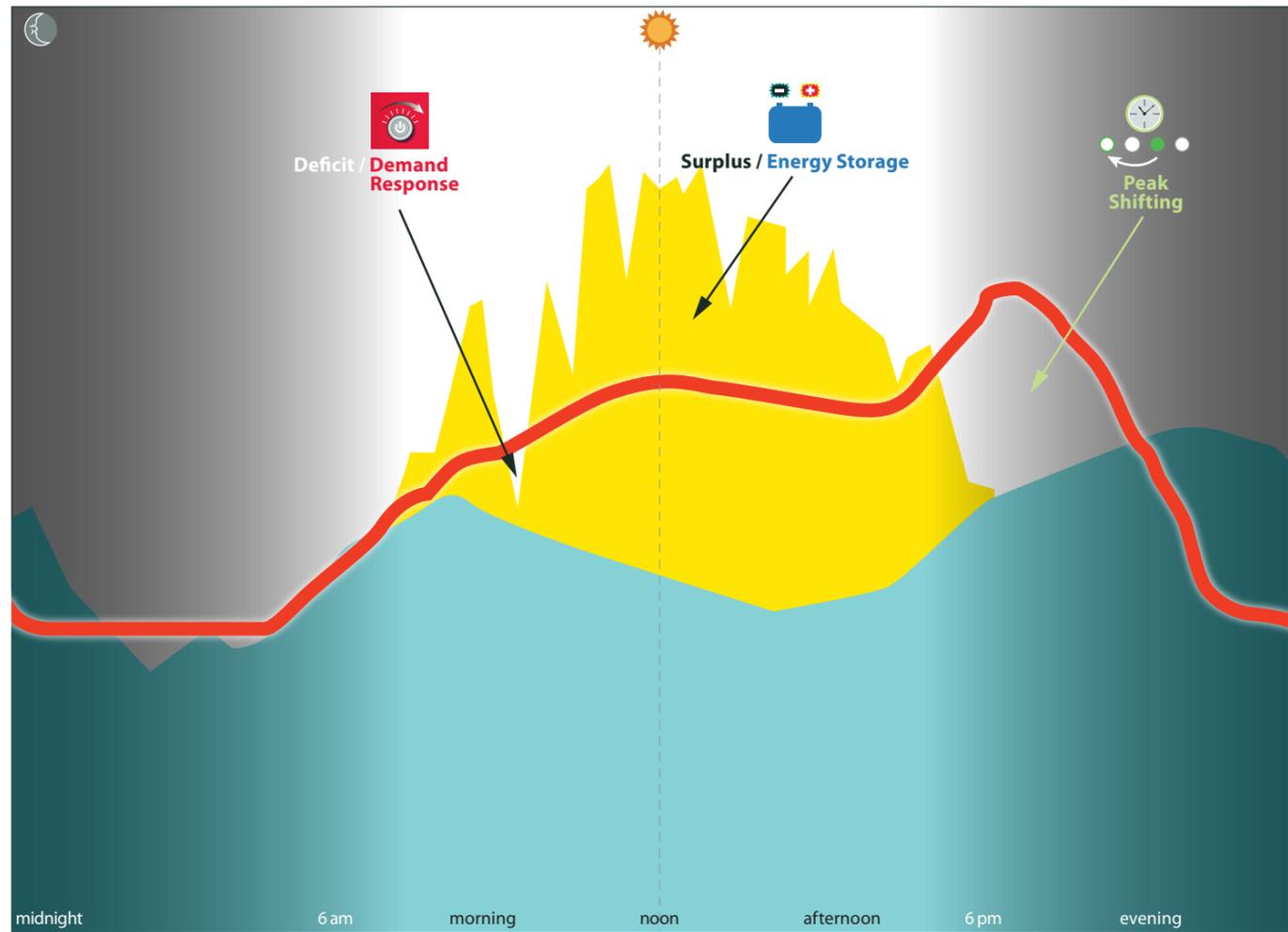
Solar power typically peaks in the middle of the day. Cloud cover can create sharp variations in power output.



Unlike the sun, tradewinds can blow around the clock. But wind power also varies over the course of a typical day.



Hawai'i's demand for electricity follows a predictable daily pattern, reaching its peak in the early evening.



Demand Response

Reliable power requires a delicate balance between energy supply and demand. An outdated power grid controls only the supply, turning the dial to power up or power down as needed. A modern smart grid can utilize demand, as well as supply, to maintain an even flow of electricity. Demand response allows the grid to borrow electrons from non-essential energy uses. For example, pausing EV charging, momentarily dialing back the A/C, or temporarily turning off a pool pump are the types of flexible demand that can help fill in unpredictable, momentary gaps in supply.

Energy Storage

When more renewable energy is produced than consumed, smart technologies can help us store that energy for later use. Excess energy can be stored using batteries, capacitors, flywheels, compressed air, pumped hydroelectric, or renewable fuels like hydrogen.

Peak Shifting

Peak electricity demand happens from 6pm to 9pm, when residents typically go home and turn on power-hungry appliances. Accommodating this electricity "rush hour" is wasteful because it requires us to maintain spinning reserves or turn on power plants that we don't need the rest of the day. Instead, we can optimize our energy use by shifting energy-intensive tasks—like running the dishwasher, doing laundry, or charging electric vehicles—to other times of the day. One solution is time-of-use rates, which discount electricity during non-peak hours. Such electricity "happy hours" can reward people for spreading out their consumption.