



# E<sup>3</sup>A: Understanding Energy

## Understanding Energy

### Energy Pyramid

Net Metering

Off-Grid Living

Green Building

Understanding Your Energy Consumption

Sources and Uses

Carbon and Energy

Importance Scale Survey

## The E<sup>3</sup>A pyramid

The E<sup>3</sup>A toolkit uses the Energy Pyramid for Home, Farm and Ranch to help you make informed energy decisions.

## Assessment

Assessment is the foundation of the pyramid because it is essential throughout the decision process, not just at the outset. It helps ensure that any actions taken are an appropriate solution to a problem. The E<sup>3</sup>A series recommends two types of assessment:

- **Importance scale survey** — First understand why you are interested in wind turbines or photovoltaic panels. The same holds true for energy. Being better informed about your objectives and planning your actions leads to a smarter investment.
- **Energy audit** — Better understand your energy consumption, efficiency and opportunities for change with an energy audit, which outlines costs associated with any recommended changes. Fill out a self-assessment checklist or consult an energy professional to complete an energy audit. Audits help you better understand your current situation to set appropriate priorities.

## Cost and complexity

Energy actions typically increase in cost and complexity as you move along the pyramid from conservation activities to energy-efficiency measures and finally to alternative energy projects.

## Conservation and efficiency

An alternative energy system's size is based on current energy consumption, so the benefits of conservation and efficiency measures are twofold. You see smaller energy bills and won't need as large of an alternative energy system. Take steps to conserve and use energy more efficiently, and you will probably be able to install a smaller system that costs less to purchase and operate.

### Conservation

Simple, everyday actions such as these can add up over time to conserve energy:

- **Hot water** — Set your water heater at or below the recommended 120 degrees F, and use the cold setting on your washing machine to conserve hot water.
- **Electricity** — Maximize pumping efficiency on existing irrigation systems. Turn off lights, electronics and other devices when they are not in use.
- **Space heating and cooling** — Adjust your thermostat to reduce energy use when you leave a building for more than a few hours. During summer, shade east-, west- and south-facing windows to reduce unwanted solar heat gain. In winter, allow solar heat gain.
- **Fuel consumption** — Operate tractors and other powered equipment at optimal efficiency, and shade fuel tanks to reduce loss to evaporation. At home, consider carpooling and check for proper tire inflation. Take steps to reduce the number of



miles traveled.

Consult the modules for *Home Energy* and *Farm Energy* in this curriculum for more detailed guidance on how to conserve energy.

### **Efficiency**

Efficiency measures call for use of a material or technology to reduce energy use, including but not limited to these areas:

- **Hot water** — Install WaterSense-labeled showerheads and fixtures. Insulate hot water pipes and water heaters.
- **Electricity** — Use variable speed drives on irrigation systems. Use surge protectors or power strips to completely turn off electrical devices that use standby power. These devices use electricity even when turned off. Install Energy Star-labeled appliances, machinery and equipment where available.
- **Space heating and cooling** — Add more insulation if necessary. Have an expert perform a blower door test

to find air leaks from doors, windows, electrical outlets and other fixtures. Install programmable thermostats to automatically adjust energy use. Plant deciduous trees and plants that shade your house from the summer sun but let sunlight in when they drop their leaves in winter.

- **Transportation** — Consider the purchase of a more fuel-efficient tractor or vehicle.

### **Alternative energy**

Consider alternative energy systems after taking steps to improve conservation and efficiency. There are many factors to consider before installing an alternative energy system. These guides are meant to help you gain a better understanding of the steps involved to become a more informed consumer. However, you should work with a qualified installer to design, site and install alternative energy systems.

Original work created by Montana State University Extension and the University of Wyoming.  
Adapted with permission by University of Missouri Extension.