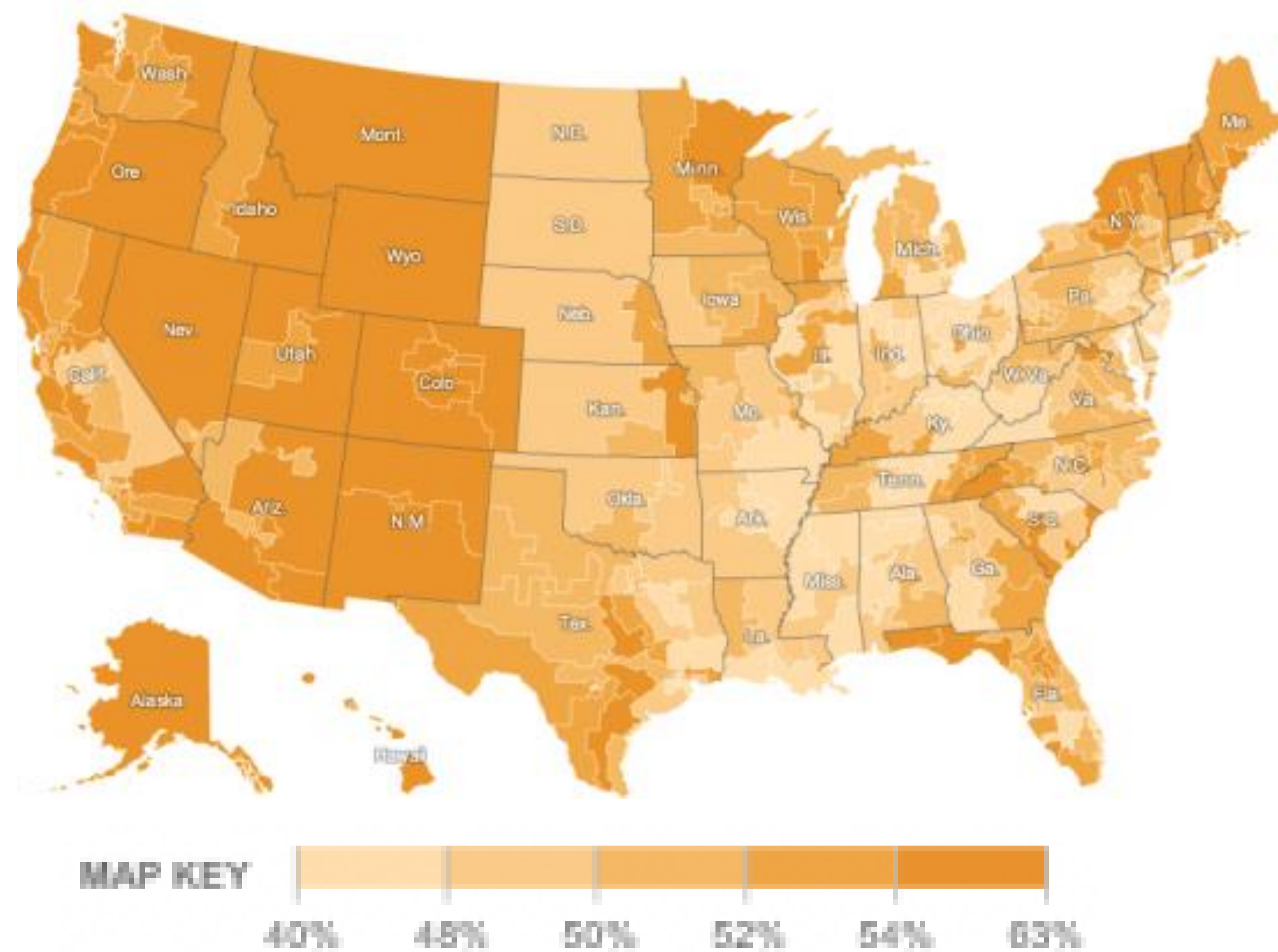


# Exercise to Renewable Energy

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The Gallup-Heathway Well-Being Index conducted a 3 year research. Each day they selected 1,000 random people about their exercise routines. Congressional districts condensed the reports for results shown in 2010. To be a percentage of the above map key one had to exercise a minimum of 30 minutes, for at least 3 days a week.

## Abstract

Fossil fuel supplies dwindling and prices rising, the need for more sustainable/renewable energy sources is pressing. Renewable energy sources are constant. Humans input energy in the form of food and export it by work. The interaction between the human and the work done is where renewable energy can be harvested. The human's emission of kinetic energy can be channeled into mechanical energy, the potential and kinetic energy together, in order to create electricity. The channelization comes by exercising. Humans doing work, exercising, on a bike or other machine have turned their kinetic energy into mechanical energy. An electric generator combines magnetism with the mechanical energy to produce electricity. Exercise machines need an electric controller to regulate this flow of electricity. A human exercising cannot always produce a constant level of output as the frequencies can rise and fall instantaneously. The electric controller prevents damage from a surge in the current, abruptly pedaling faster. However, it will quickly recalculate to the new input and increase the electrical output after resetting at zero. This electricity can be utilized for charging, storing, or immediate use. The amount of electricity produced is directly related to the duration of the exercise, and the resistance level of the machine. Multiple machines, for a longer duration, with a high resistance will result in larger levels of renewable electric energy. The average human can produce a constant rate of 150watts for the duration of their workout. This can be doubled during a peak outage.

## Renewable Energy



The humans turning of the pedals will rotate the chain, and instead of turning a wheel it will connect to a generator.



For an exercise class at a gym with 30 bikes we can calculate the potential electrical energy they can produce. The estimates are as follows: 30 bikes, 30 minute duration (with 4 minutes of peak), average person producing constant rate 150watts and peak 300watts.

$$30 \times 150\text{watts} = 4,500\text{watts for 26 minutes}$$

$$30 \times 300\text{watts} = 9,000\text{watts for 4 minutes}$$

This electricity must now go somewhere. The most difficult in bike electricity is storing. It is much more efficient at charging or immediate use. As depicted below the electricity is directly going to charging the computer. Another means would be to reroute the electricity to a building. Imagine if a gym used the machines inside to power the lights and air conditioner towards sustainability.

Kinetic Energy → Mechanical Energy → Generator → Electricity

