

Science

Exercise: helping your body, helping your planet

Roman Hladio, Contributing Writer | March 5, 2020

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Allegheny College became Pennsylvania's first college to reach carbon neutrality in 2020. On campus, the largest step being taken is the reduction of energy consumption in the campus facilities, according to the Sustainability Department's website.

In terms of energy consumption, gyms and recreational centers tend to be on the higher end due to their very large window of operating hours.

For example, the Meadville YMCA is open from 5 a.m. to 9 p.m. every weekday, and the David V. Wise Center on campus is open from 6 a.m. to 10:30 p.m. every weekday. Both buildings are open for about 16 hours daily with large sections of lights on the entire time and heating systems used to warm the entirety of the buildings, in addition to pools.

Taking all this energy use into account, gyms tend to have a fairly large carbon footprint, according to an article published by LiveScience. Many steps are being taken to ensure that the Wise Center breaks this mold.

"I don't remember specifically how long, but a few years ago we started reducing everything in Wise," said Director of Recreation and Facilities Jared Luteran. "We started with our hours; after doing counts and checking numbers, we determined when people were coming to the gym and when they weren't, and decided to close a little earlier on the weekends. That's the big one, but we reduced our energy usage overall by changing little things like lighting to be more efficient."

The Wise Center has seen a decrease in energy consumption through these methods, but gyms and other fitness centers have means to reduce consumption with a renewable resource that is often forgotten about: human movement.

Many newer cardio machines are being equipped with technology capable of turning human movement into electricity that is able to be put back into the electrical grid.

"It can be really easy if you are on a stationary bike to pedal and cause the shaft of an electric generator to rotate, creating that exact situation," said Assistant Professor of Environmental Science and Sustainability Ian Carbone.

Carbone, who holds a Ph.D. in applied physics, explained that this process is almost exactly the same as that of an electric generator.

“If you have a coil of copper wire and its moving across a magnetic field, those materials will interact in a way to create a current in the magnetic coil, and this is the basic idea behind an electric generator,” Carbone said. “You either have a bunch of coils of wire moving across magnetic fields created by one or more magnets, or you’ve got a bunch of magnets moving and changing the magnetic field that’s being experienced by a bunch of coils of wire.”

Chris Van Alstyne, director of peak performance and fitness, commented on how fantastic these machines are, but how at Allegheny’s current state, they are out of the Wise Center’s reach.

“All our cardio machines are on a lease for three, four or five years, so we aren’t able to update them ourselves,” Van Alstyne said. “Our treadmills were just replaced but the rest have been here since before (Luteran and I) got here. That being said, as these newer machines become more common, the odds of us getting them increase, since our lease provides us with the newest machines at the time.”

He said that while their current treadmills do generate electricity, it is usually only enough to power some of the machines functions, resulting in 30% less energy usage for the treadmill.

Carbone said that although any machine that involves the creation of a rotational force can be used to generate electricity, bikes are the most efficient.

“Bikes are very efficient machines,” Carbone said. “While you can use a treadmill or elliptical, bikes turn the vast majority of the energy you put into the pedals either into motion or rotational energy, and those generators are quite efficient and turn the vast majority of rotational energy into electricity.”

Carbone added that bikes using an electric generator type of system could be between 80 to 90% efficient — meaning they only lose 10% of the energy generated in the process — which would provide enough electricity to not only power the machine itself, but also parts of the Wise Center.

“That said, a lot of the machines I’ve seen on the market also need to be plugged in and I’m not sure how exactly they’re designed to use that energy, but often times they do still need to be plugged in,” Carbone said.

As the development of these technologies continue, gyms and the world only stand to benefit from them. Those who are seeking a way to save the Earth can at the same time save their bodies.

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