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The Green Machines

With increasing momentum behind the healthy life initiative, more people are using exercise machines to stay in shape. Obesity rates are also on the rise, and residents of America are considering gyms an ideal way to stay fit. In addition, the middle class is also becoming less and less able to afford these luxuries as average debt from student loans, mortgages, and other factors is also increasing. Now, there is a solution. Since people at gyms consume energy to perform various tasks that eventually lead to energy dissipation as heat, small generators could be installed exercise machines to harness that energy.

Carbon dioxide is the primary greenhouse gas that is emitted into our atmosphere. About eighty-two percent of the greenhouse gas emitted from the United States is carbon dioxide. The combustion of fossil fuels to generate energy in the United States accounts for thirty-seven percent of the total greenhouse gas emissions in the nation. Over ninety percent of the nation's energy consumption has been supplied from coal, oil, and natural gas. The demand for energy grows about three percent every year. Heating and cooling accounts for fifty-six percent of energy used in an average household. In an average household, lighting accounts for ten percent of energy consumed. A typical machine in a gym consumes about 2400 watts.

Simultaneously, obesity rates are are substantially increasing. In one day, only one out of three children are physically active. More than 80% of adults and adolescents do not meet the

guidelines for aerobic and muscle-strengthening activities. Children are now spending more than seven and a half hours a day in front of a screen.

Since people at gyms consume energy to perform various tasks that eventually lead to energy dissipation as heat, small generators could be installed exercise machines to harness that energy. In fact, this excess heat produced from the activity could be reused in buildings and homes. Gyms are in every elementary, middle and high school as well as several college campuses, offices and fitness centers. Imagine if every elliptical, treadmill and bicycle were able to power the gym itself and perhaps parts of the whole building. In addition, small exercise machines at airports could be used to charge various electronics such as cell phones and laptops.

The energy transfer of the green machine would be similar to that of a crank flashlight. Many flashlights use a mechanical crank to provide power for themselves, thus effectively allowing it to run infinitely. We will be applying the same principle to generate power from exercise bikes. When a permanent magnet is placed within a coil of wire that forms a closed circuit and rotated, the electrons in the wire will feel the force exerted, as they have an electric charge, and will move with the magnet. A crank is attached to the magnet to rotate it better, creating an electric current through induction and thus powers the light. However, in our case, the crank will be the bike pedals, generating a current that will be fed into the power grid, providing a clean, emission-free source of electricity.

A model of such a machine was created. We used an exercise bike, coils of wire, and a crank. We connected the crank to the wheel of the bike, so We found that a 30 minute workout period translates to 50 watt hours of carbon-free energy. These gyms would also be fortified with energy floors in order to generate the most amount of clean fuel possible. People walking or

running miles could self power small units attached to their legs or arms which can later be used for charging electronics at home/offices.

The benefits of such a system would be threefold. This would save electricity and in turn burn less fossil fuels. With tax benefits for adults participating at these gyms, this idea would help reduce citizen debt and curb the obesity rate all while reducing greenhouse gas emission leading to a healthier society and planet.