Generating Electricity Using the Energy in the Gym

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Abstract

The proposed product discussed is called the Gymectrify and its goal is to use the energy in the gym to generate electricity. There is a similar application of this project on bikes, but it can be more helpful if applied to more equipment. The Gymectrify is targeted to companies that make gym equipment and to facilities that would benefit from it. It has many benefits including: saving money for the facility, giving backup electricity in case of an emergency, and most importantly helping the environment. The paper explains the Islamic perspective of this product. It also talks about the mechanics of the Gymectrify and how it will work. There are examples of certain gym equipment and companies that the Gymectrify will be useful to. The financial aspect of the product is very simple as the idea is also very straightforward. This product can be adapted to fit certain gym equipment to optimize its effectiveness.

Generating Electricity Using the Energy in the Gym

People go to the gym every day, perform their workout, and leave in the hopes of maintaining a healthy lifestyle. Giving people another incentive to workout is a great way to allow them to understand that they can help the environment just by doing their regular routine. People can put their energy to use by connecting workout machines to a mechanism that generates electricity via the energy used in the gym. Using this machine assists the individual using the gym equipment and also helps the environment. Existing technology used on bikes that transfers kinetic energy generated by the pedalling of the bike into a battery can be adapted for other gym equipment. An electronic system will be connected on the gym equipment to produce electricity from the kinetic energy being created. This energy will be transferred to a generator and put in a battery that will store energy. Using this type of gym equipment to conduct electricity will help save money for the gym, give backup electricity in case of an emergency, and help the environment overall.

This mechanism, called the Gymectrify, works by connecting a generator that spins every time someone uses the gym equipment. It does this by connecting a thick cable, which withstands the weight for the machine, to the rotor inside the generator. The rotor spins wire coils around magnets which conduct electricity. This process is called magnetic induction and was discovered 200 hundred years ago by Micheal Faraday (Mahesh Shenoy, n.d.). Magnetic induction happens when a wire is moved through a magnetic field which generates electricity. The idea of this procedure is to convert mechanical energy into electrical energy (Mahesh Shenoy, n.d.). The generator then outputs the electricity which has been converted to an outside

source such as a battery. The wires will either connect to the gym's main electrical system or to a battery case.

This idea is currently applied to bikes. This project uses the same idea, but builds upon it. It expands this concept to the other gym equipment and plans to expand its uses and benefits. An example of this idea being used on a bike is in the Cyclerate. This machine, currently located in Michigan, is made to empower communities and "promote ongoing Detroit Eco-District sustainable initiatives." ("Cyclerate, USA", n.d.). The Cyclerate is displayed in a cube shape with an exceptional design. People enter and ride the bike in the middle of this cube shaped structure, which powers LED lighting throughout the cube. It also powers Bluetooth speakers and USB charging stations. Cyclerate is explained to be very simple and have limitless adaptations because the main idea is to give electricity, similar to the Gymectrify, as they are based off the same simple idea ("Cyclerate, USA", n.d.). The difference between these two though, is that the Gymectrify is specifically targeted towards companies that make gym equipment. Another difference is that the objective of the Cyclerate is to empower communities and spread support, while the goal of the Gymectrify is to supply electricity and help the facility.

The Gymectrify is aimed towards those who regularly go to the gym, thus, it is necessary to determine which companies would benefit most from this product. A perfect example of a company that would appreciate this product would be Precor. Precor designs their gym equipment so that the cable the generator would be connected to, is already a part of their gym equipment ("C026ES", n.d.). Figure 1 (below) shows the cable that the Gymectrify can be connected to on Precor's Pulldown/Seated Row.

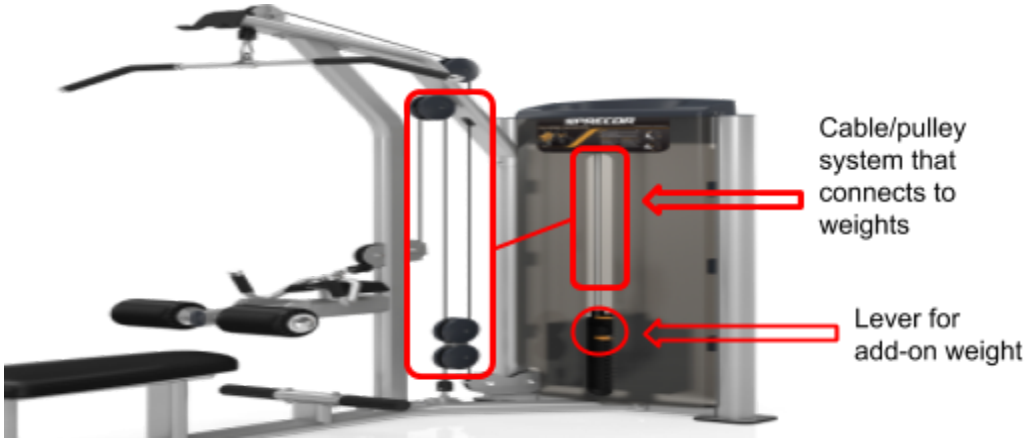

Figure 1. A photo of the Precor's Pulldown/Seated Row ("C026ES", n.d.).

This cable is being used as a part of the pulley system for the workout machine and is also used as a support for the weights. For the Gymectrify, this cable will extend downwards to connect to the generator and the mechanism in general. Also, if needed, the cable will be reinforced to support the extra weight. In the example of Precor's Pulldown/Seated Row machine, the equipment includes a convenient easy to reach lever, as shown in Figure 1, that engages an add-on weight. With the application of the Gymectrify, this extra weight can be the additional weight of spinning the generator.

Another application where this product can be used and be most convenient, is in the rowing machine that Concept provides. Concept is another company that specializes in making gym equipment. The rowing machine operates by an individual pulling a horizontal rod horizontally which is connected to a chain at the base of the machine. The person does this motion while sliding on a seat back and forth imitating the action of rowing, therefore called the rowing machine. The rowing machine spins a fan inside a cylinder-shaped object on the far side of the machine ("Indoor Rowers", n.d.). This can be seen in Figure 2 (below).

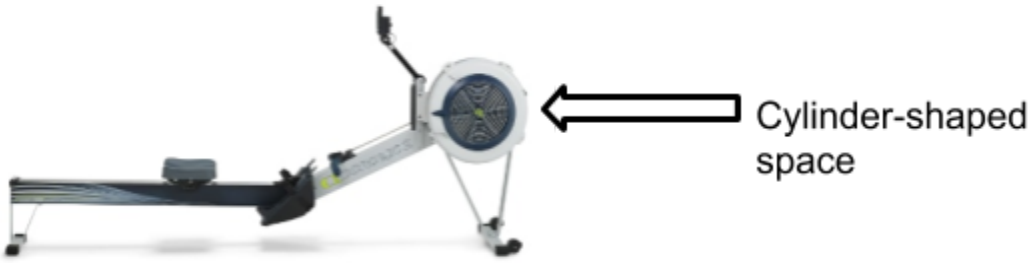

Figure 2. A photo of the rowing machine that is commonly found in gyms ("Indoor Rowers", n.d.).

Substituting the cylinder-shaped object at the far right with a generator can be a very good application of this product because the design of the machine would only necessitate slight changes. The only thing that might look different is the placement of the battery and the inner workings of the cylinder-shaped space at the base of the machine, and this wouldn't cause any problems because currently there is only a fan inside there blowing wind.

The two machines that were mentioned above are gym equipment that are commonly found in gyms across the world. To clarify, the Gymectrify can work with many different types of machinery as long as the machine does not rely on electricity to function, because then the product would not be able to connect to any cables.. That is a con of the Gymectrify because after all, it needs to be connected to machinery that constantly moves due to someone exercising and without using electricity. If the gym equipment does not fulfill these requirements, then it defeats the purpose of generating more electricity. An example of this are treadmills because they need electricity to work, so getting electricity from it, would be extremely useless.

Using Gymectrify has many benefits. One of the main benefits include generating electricity in a way that substitutes other forms of creating power. This helps the facility reduce its carbon footprint and may even attract people to a gym using this product and increasing its popularity. The mass use of fossil fuels is becoming an uncontrollable problem. According to Frederica Perera (2017), an American environmental health scientist, the use of fossil fuels also majorly affects society. Perera says:

> "A major theme of this commentary is environmental injustice: the disproportionately heavy health and economic burden that falls on the young, the poor, and certain minorities, especially those in developing countries who are most vulnerable to the impacts of toxic air pollutants as well as CO_2-driven climate change resulting from the combustion of fossil fuel" (pg. 1).

Making the world worse would not only affect the current generation, but also all the other ones after that. People are beginning to understand that fossil fuels are not a renewable resource and are taking steps to remedy their mistakes and even if this project is not significant, it is a step in the right direction.

Allah says in the Holy Quran, "Eat and drink from the provision of Allah, and do not commit abuse on the earth, spreading corruption."(2:60) Even though Allah (SWT) is specifically speaking to Bani Israel in this situation, people can still take a lesson from this. The Earth is supporting humanity, so it is man's duty to not cause corruption and ruin it, but instead treat it with love and caring hands.

With the gym producing more electricity with the help of the members, the gyms could also reduce the cost of membership fees because the individuals themselves are the ones helping

them produce more electricity. This is a very important aspect in Islam because it involves helping each other. It is said by Muhammad al-Bukhari, in his book Sahih Al-Bukhari:

> "Narrated Abu Musa: The Prophet (ﷺ) said, 'A believer to another believer is like a building whose different parts enforce each other.' The Prophet (ﷺ) then clasped his hands with the fingers interlaced. (At that time) the Prophet (ﷺ) was sitting and a man came and begged or asked for something. The Prophet (ﷺ) faced us and said, 'Help and recommend him and you will receive the reward for it, and Allah will bring about what He will through His Prophet's tongue.'" ("Chapter: The co-operation between the believers", n.d.)

The Prophet (PBUH) specifically told the Muslims that they are like the building blocks that support each other. So in another way, people are helping the environment and the gym, and in result, the environment helps them. This can ultimately attract more people, helping the facility and the community in general.

There are many arguments about why fossil fuels harm the environment and many benefits on why gyms should use the Gymectrify. One last reason is simply gaining reward and helping other people. It is narrated in Sahih Al-Bukhari:

> "Narrated Anas bin Malik: Allah's Messenger (ﷺ) said, 'There is none amongst the Muslims who plants a tree or sows seeds, and then a bird, or a person or an animal eats from it, but is regarded as a charitable gift for him.'" ("Chapter: Sowing seeds and planting trees", n.d.)

If an individual does his part and people benefit from him/her, then the individual who helped others gets good deeds. So when someone uses this product, he is receiving reward and not only benefiting this world, but is also benefiting in the Akhira (Hereafter).

Another use of the Gymectrify can be to generate back-up electricity in case of an emergency. For example, if a storm occurs and the power lines go down, people would have extra electricity to support themselves. Also, if it so happens that the facility is creating more electricity than needed, it can sell this additional electricity to make a profit.

With this product, the electricity does not have to always go back to the facility, but instead could go to the individual using the gym equipment. For example, the person can recharge his/her own battery just by placing it in the battery case while exercising. The gym can determine how it would like to use the Gymectrify. However, it is more beneficial if the product is connected to a battery because this would allow the product to be for personal use as well as be adjustable for other uses. The option of making the product attachable and detachable is still a work in progress. Making the Gymectrify universal would add a lot of value to it because if people can get electricity by attaching this product to something compatible anywhere at anytime, it will help the world save up on their fossil fuels and not harming the environment.

Whenever people make a product of some sort, they need to take into account the financial feasibility of it and how the product will be utilized. Considering how simple the product is, the Gymectrify would be financially feasible since it does not need any complicated materials, but very basic machinery that can be easily obtained. The essential materials include: a generator, wires, and a battery case. Additionally, there could be a flywheel which is based off a pulley system with a counterweight, so when a force is applied, the counter weight pushes back

allowing the user to repetitively pull and spin the rotor. Figure 3 (below) shows where the flywheel is placed on the rowing machine.

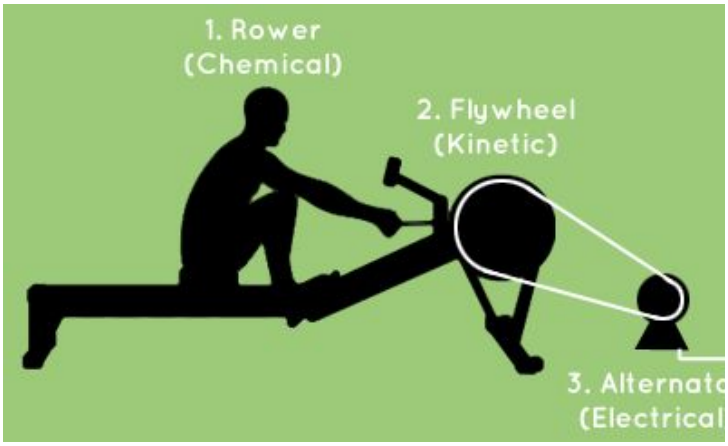

Figure 3. An explanation of where the flywheel can be found on gym equipment. (Jai Juneja, 2012)

The generator will be the main component of the product because after all, it is converting the mechanical energy into electrical energy. The extra wires are there to connect to the generator and, in this case, the battery case. It is also there to provide extra mobility in general and make the product more adjustable and adaptable to the situation, so that the generator is not restricted to a certain location, but instead letting it extend as long as the wires go. The use of the battery case is to output the electricity generated by the generator to a battery. Making the battery case interchangeable will allow for universal connectivity instead of restricting the battery to one specific type.

Different gym equipment will require different types of generators. Some workout machines do not require many sets, or repetitive movements, so these machines would not need a

better generator because they would not generate a lot of electricity. An example of a machine that does not require too much movement is the lat pulldown. The lat pulldown is a machine that is operated by pulling down on a contraption until the person's hands are the sides of his back while sitting down. This contraption is similar to the rowing machine, but instead you are pulling downwards. Another difference is that the lat pulldown has adjustable weights, so the individual can customize the machine to his/her liking. In the, The Mens Health Big Book of 15-Minute Workouts: a Leaner, Stronger Body--in 15 Minutes a Day!, Yeager suggests 2 sets of the rowing machine with 8-12 repetitions each (p. 162), but only 1 set with the lat pulldown machine with 10-12 repetitions each (p. 191). This is just one workout plan that requires more repetitions on the rowing machine. So having a better generator would be more useful because with more motion, more electricity can be generated. The difference between the rowing machine and the lat pulldown is that the lat pulldown machine only has one setting for weight, so this one setting can just be the weight to spin the rotor inside the generator. This is a helpful way to customize the amount of electricity and make it the most beneficial for the facility.

Overall, the Gymectrify will be useful to produce electricity and because of its many benefits including: reducing the carbon footprint, giving back-up electricity, and most importantly gaining good deeds. It also can help the facility and its members that are using the product because if the members are the ones reducing the carbon footprint of the gym, and the gym can give back by reducing costs of fees. This product's simple design will help it become easily adjustable to the facility's or the individual's use, whether it is connected to a battery case or the building electrical system. Ideas for making it a universal product are still in progress, but making it universal would be a major advantage because it poses many benefits including

generating electricity whenever the individual wants as long as the circumstances allow it. Furthermore, its simple design makes the product financially feasible as it is inexpensive. Different applications with slightly different parts aid the product to become the most fruitful and produce the most electricity.

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