Power Supply of Energy by the Human Gym

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ABSTRACT:
Nowadays, the use of renewable energy sources or other energy sources to replace non-renewable energy sources, has been welcomed by many groups of people or companies. One of the various forms of this energy can be use energy that is produced by humans. In this paper we will outline an approach to use of human energy resources to power our Gym. We will initially define human energy, followed by a brief history of the use of this energy and also we will study the use of human energy by providing the framework for the use of the consumed energy in the gym. And also by supply introduced statistics about the number of Gym in Tehran (as an example) and approximate calculation of power consumption, we will focus on new methods to show the importance of power supply of Gym. At the end of this article we will introduce new solution for power supply of Gym which uses the energy that is generated by athletes, the power supply uses the fitness machines, which we will refer to them in the final section.

Keywords: gym, Power supply, human energy, electricity, saving

1. INTRODUCTION
Nowadays because the non-renewable energy sources such as oil and gas are coming to the end, researchers and scientists have designed devices that they can carry out their work with renewable energy or have produced devices that have low power consumption. [1], [2], [3]

Electrical energy also has been quite impressed by shortage of renewable energy sources, so every day we face with advances in electric devices to reduce power consumption. But with all this, the amount of effort against threats that there are for humans are quite small: Threats such as all the latest renewable energies, pollution due to high consumption of non-renewable energy and many other problems are clear for everyone. Nowadays more than ever this need is sensed for human that employ a variety of methods for energy production, hence professionals have designed devices that have a high efficiency and also renewable energy sources are used about them. [4], [5]

One of the new methods for supply power requirements is the use of human energy, which means that we design ways to using generated energy by human activity can provide the required energy.

In this paper, we will discuss about focus on the use of human energy and continue to introduce one of the important application of this method to reduce the use of human beings in everyday life of electrical energy from renewable energy sources. [6, 7, 8, 9]

2. THE DEFINITION OF HUMAN ENERGY
Every energy that is produced power by humans we call it human energy that can involve in their production directly or indirectly. This energy can be produced in different ways, For example, by the heavy sport activities much more energy is produced which can be a huge source of energy. In this article we will introduce the ways of using this energy.

Any activity that humans are doing causes energy to be delivered to the environment but energy experts have been unable so far as it is appropriate to make use of these energies, So every day we go before we see that people who consume energy for their activities, But we have failed to find a way to make use of this energy. This increased consumption has caused more pollution, On the other hand the energies those human life is one hundred percent dependent on them are declining and the day comes that this energy will come to the end. All these points are important to point out that you need to consider use of other sources instead of non-renewable energy sources.

3. THE HISTORY OF USE OF HUMAN ENERG}
As mentioned in the previous section at the end of nonrenewable energy resources humans use different methods to take advantage of other sources of energy such as renewable energy. But sometimes they use these resources on high costs or even they need to spend a
very special tools that they are even expensive to exploit.[10,11, 12]

Many technology is designed to use renewable energy. For example, we will introduce a number of these technologies: energy production from float solar chimney power plants [2], Renewable energy in the production process of ethyl benzene [13], geothermal energy [14], solar energy [15], [16], [17] And lots of other ways to use renewable energy, but with all that in many cases the use of these resources is restricted Limitations such as restrictions of where, when and what, limits the widespread use of these resources.

By considering this point the energy experts are looking for ways to use energy that is produced by humans, when they are using the different tools because this energy in any place and at any time is available. Thus, much efforts has been made to these applications, we will continue to produce brief introduction of these efforts.

Such efforts are as follows; designed wearable generator for, the production of electricity by using human motion [7], use the stairs to generate electricity [8] And many other cases, but all these efforts that experts have claimed cannot be practical, logical and applicable. For efficient use of produced energy by humans, because they still have a lot of work to offer. It's going to be easily available to the public and that they would use their energy consumption, and will produce electricity by themselves.

4. NECCESSITY OF THE USE OF HUMAN ENERGY

As mentioned in the previous sections, renewable energy are coming to the end and making use of them by humans can cause a lot of damages. Damages such as pollution over-the-air, Temperature inversion, thinning of the ozone layer and other biological immense damage. on the other hand the use of renewable energies are expensive. And also use them for various reasons such as having limitations of place and time of their capacity had a little welcoming face. Therefore, it’s needed to introduce some plans and ideas for producing tools for humans to meet the human energy by using produced energy by themselves. This can be cheaper and cleaner ways to produce energy that do not threaten not only the environment also will improve the environment of human life by reducing consumption of unclean energy.

The human energy resources that don’t limits any part of the human space and time are available and we can have optimum use by the detailed design and planning of them.

5. INTRODUCING THE MOST IMPORTANT SOURCES OF HUMAN ENERGY

For using human energy we need to identify the most important sources of energy. Certainly, any activity that humans are accompanied by spending energy, but is this energy value same everywhere? The answer is definitely negative, because some places are rich sources of human energy. The definition of human energy don’t offer to direct human communication, so every area in which humans directly or indirectly engage in the activity and energy expenditure can be sources of human energy. For example the highways are a source of human energy because vehicles guided by humans indirectly, they have deal with human energy or in other words to move your car you spend the energy to produce a new energy source. This can be attributed that this energy is the kinetic energy of the vehicle or that they considered human energy generated indirectly.

Other sources of human energy can be spent on passages and shopping centers, and people of these places are very energy-intensive, that can be noted. spent energy on sport events (whether by athletes and by spectators) can also be a great source of energy. For example, in football games when one hundred thousand spectators gathered in a relatively small area. A huge source of energy have brought into that place and during the race also spend the energy to cheer their beloved team and also athletes deal with the energy to do the race.

In total any place where many people gather, Can be a source of human energy had this place can be a subway station or a local gym or sports such as cycling and many other examples.

One of another huge energy resources are Gym that some of the energy that they use much energy they consume; in the following sections we intend to introduce this energy and how to use it.

6. STATISTICS OF THE GYM

The importance of the mentioned cases in the previous sections identified when we check if the energy of human activity can be economically effective. Or whether it can decrease a significant proportion of energy consumption or not?

In this section, the amount of consumed power Gym statistics of these venues will be discussed.

For example, we use statistics in Tehran for our review.

In Tehran, according to official statistics 924 licensed gym are operating. [18] Open halls with small and large area as well as using various devices are operating. Calculating the cost of electricity this year, according to the Ministry of Energy Electricity tariffs on 02/12/1393 from paragraph A-2 is done. That includes tariffs of general purpose is to we get the amount of these costs from Table 1 that is followed in next sections.

Because electricity consumption of this hall is often more than 30 kW hence their tariffs is considered around 37300 to £ 44640 per kilowatt consumption.
Table 1: The cost of electricity consumption in paragraph A-2 tariff of electricity consumption

<table>
<thead>
<tr>
<th>Energy prices</th>
<th>Power Code</th>
<th>With the power of 30 kw or less</th>
<th>With more than 10 kilowatts of power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Load</td>
<td>Push hour</td>
<td>Between the hours of</td>
<td>Low Load</td>
</tr>
<tr>
<td>567</td>
<td>368</td>
<td>1034</td>
<td>-</td>
</tr>
<tr>
<td>367</td>
<td>1380</td>
<td>615</td>
<td>-</td>
</tr>
<tr>
<td>179</td>
<td>716</td>
<td>348</td>
<td>-</td>
</tr>
</tbody>
</table>

All these points determine that how much high can be the cost of electricity for every gym, now consider that in Tehran, there are 924 venues in the country, certainly will be much higher than this amount.

As a result, it can be concluded that Gym is one of the largest electricity consumers, and with this consumption, costs a lot to the economy of the country.

This point will be more important when we know how much energy is consumed by athletes at these venues; Every gym has a number of athletes, each of them is scheduled to perform exercises that engage use lots of tools and by mobilizing devices consume body's internal energy devices and the interesting thing is that we have failed to date properly use (Except for a few restricted in some developed countries) of this energy.

To conclude the discussion in this section this should be noted again that Gym although in general are one of the big consumers of electricity in the country, but it has capacity to be able to provide for their own power needs.

7. GYM CAPACITY TO GENERATE ELECTRICITY

The gym uses of the devices that often work with electricity and mostly have very high power and for various reasons such as high friction, they have low efficiency.

In the following we will pay to introduce some used devices in the gym and will consider them by different terms.

Treadmill: Treadmills are one of the most famous bodybuilding devices, those are used in most venues; These devices have different power from 2 to 4 horsepower and power are between 1.5 to 3 kW, each room according to your requirements uses from a number of these devices, on average, every room has only 3 to 4 treadmills, it means these devices on average can consume between 9 to 12 kW of electricity. Each athlete on Average time in each sport will use one of these devices, so these devices have a large proportion of Gym electricity consumption. On another hand this device is on of the most capacity devices that can be used to generate electricity; these devices have a belt which is used when speeds ranging from 1 to 20 kilometers per hour can move. With all of this we come to the conclusion that we can use these devices to provide part of the electricity Gym.

Cycling: Bikes those are used in the gym are divided in two types of fixed and mobile. Here we will introduce our stationary bikes. Electric and non-electric stationary bikes come in two types. These devices are another popular device among athletes especially between those who want to strengthen the muscles of their legs, so there are 2 to 3 number these devices in every gym and each involves a degree that they can work at different speeds. This is a stirrup-handling device that can reach a speed of 5 km per hour. According to all the tips we can say that this device is one of the devices those have High capacity of utilization in the production of electrical energy.

There are also many other devices those are used in most Gym with having moving parts After using energy and move it by athletes, can help to strengthen certain muscles that here is not necessary to discuss about all of them.

A review of the mentioned cases in this section can be used to conclusion that with the high power consumption Gym, the high capacity required for the operation of the generated energy by the athletes Who have the capacity to generate needed electrical energy to use the hall or even in case of excess production, the sale of this produced electricity can be get thought.

8. THE PROPOSED METHODS OF ENERGY PRODUCTION AND STORAGE

In this section, we introduce methods for optimal utilization of the generated energy by the athletes in the gym that can be get used.

Nowadays, new methods to produce and store energy from human motion have been designed and built that we will continue to introduce some of these devices.

Wearable generators Such as designed electromagnetic generators those can be carried and can convert the kinetic energy of the human body into electric energy [16]. We can exercise similar to the installed generators on a variety of devices and then use the kinetic energy of athletes’ activities to produce electrical energy. There are many devices in Gym, this generator can be placed on them and by moving these devices we can generate electricity, both treadmills and bicycles that were introduced in the previous section have the capacity of using these generators.
One of another method are flooring of the space, and also energy-saving belts, that can be made of Nano cellulose and conductive polymers. This flooring can put in places such as the treadmill or even to replace the flooring floor of consumed energy use and save them again to use them when they are needed, nowadays, much researches are being done on the flooring and some promising news are releasing that we can hope wrap up this investigation to use this method to save electricity in the near future.

Another proposed method for generating electricity from the renewable energy is using of materials with piezoelectric properties; Substances such as lead compounds, zircon, titanium quartz have piezoelectric properties and this means that substances that they can produce electricity by caused stress on them, We can also produce electricity for gym by using of these materials in different places, For example, they can be used in making the treadmill belts and even the floor of the halls and use them to generate a current in the event of any conflict, Then store the generated energy and then use it at the needed time.[19,20,21,22] Many researches on piezoelectric materials and piezoelectric effect are in progress, as well as the most up to date kids of these materials have been used to generate electricity. And it is hoped to wrap up of this investigation can be a practical strategy for use of these designed and implemented materials in various fields.

9. CONCLUSION
This paper outlines one of the large available capacity about electricity generation for the human of one of these days, and we saw that the large public consumers across the country are Gym and we stressed that these places have a very high capacity for power generation or at least have the capacity to supply electricity of gym. At the end of practice, we introduced how to use the consumed energy in this room and also provide electrical energy production. This idea is to implement the requirements such as analysis of the impact of these products on the network and check out all the other things that they cannot be included in this article, so that it’s better in this article to design and plan a quite practical and logical solutions those are examined to use human energy. Especially the energy that is generated by the athletes.

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