Self Sustaining Fitness Centers

Fitness Innovations for the 21st Century

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<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Market Drivers</td>
<td>4</td>
</tr>
<tr>
<td>Problems and Historical Approach</td>
<td>6</td>
</tr>
<tr>
<td>Specific Solutions</td>
<td>6</td>
</tr>
<tr>
<td>Call to Action</td>
<td>9</td>
</tr>
</tbody>
</table>
Have you ever had a roommate who refuses to flush the toilet because it saves water, but will let the shower run for ten minutes to warm up? Have you known someone that drives a lifted pick-up truck that gets fourteen miles per gallon but insists on rolling up the windows if the ac is on because it saves gas? These are examples of the daily contradiction that parallel driving to the gym in a Toyota Prius and failing to recycle any of the kinetic energy produced during an aerobic workout.

With the existing fossil fuel resources being depleted in conjunction with an increased awareness of global warming, there has never been a more essential need for businesses to implement sustainability. Schools across the nation have begun utilizing Leadership in Energy and Environmental Design also known as LEED standards in their construction, car manufactures are incorporating hydrogen fuel cell technology into a larger number of vehicles, and our government has established subsidies for an array of energy efficient products. Despite these recent trends, no one has capitalized on the energy potential that can be derived from bodily movement. Self Sustaining Fitness Centers (SFC) utilizes the energy produced by gym members during a
cardio workout and reintroduces it into the power grid, where it can be reallocated throughout the gym. By combining just one facet of energy conserving aerobic equipment with simple and efficient building designs, a gym can produce enough energy in 1 year to power the average American household for 6 months. Can recycling energy in a gym be a practical application of energy conservation, or is the concept to good to be true?

The Future of Fitness

The future of energy innovation is no longer on the horizon. It is here. Facility designs that address energy consumption will flourish while traditional models will continue to consume at their own peril. Sustainable Fitness Centers (SFC’s) are at the cutting edge of this movement toward energy innovation by implementing sustainability measures with one purpose in mind: to significantly reduce the long-term overhead cost of a traditional gym, which requires large amounts of energy and water to remain operational. Essentially, the more members a Self Sustaining Fitness Center has, the cheaper its utility costs per member become and the better the amortization of the costs of sustainable construction will be. Reducing a company’s overhead leads to better profitability and lower membership fees, which create a perpetual cycle that promotes business growth. In addition to a reduction in operating costs, tax write offs and government incentives are given to businesses who incorporate sustainable technologies into their infrastructure, which increases the return on investment for these upgrades.

SFCs will appeal to members of various gender and age who reside in a variety of locations. By providing society with an exercise facility that caters to a variety of different goals and objectives such as cost savings and cleaning the environment, individuals interested in physical health and wellness will be intrigued. Not only will this state-of-the-art facility appeal to die-hard fitness enthusiasts, SFCs will also appeal to the growing percentage of the population concerned with environmentally friendly antics. By reducing the facility’s overhead cost, the
Gym will become popular among another niche of society via the promotion of lower membership fees. The more calories burned, the greater the customer savings.

Self Sustaining Fitness Centers will be located in a few specific geographic locations. It will target areas that tend to be more socially liberal whose population consists of progressive thinkers. Individuals who are concerned with “green” issues will be the primary supporters of SFC ideology. Gym locations will be within equatorial states and cities. Solar energy is a large contributor to self-sustainability and without an adequate number of sunny days the facilities will not be able to run as efficiently. The third target location will be newly developed areas. It is easier to market to a young community than one that is already established.

Breaking into this market will not be difficult for SFCs. It offers the same amenities and environment as its main competitors (24 Hours Fitness and Golds Gym), but also reaches an unexploited demographic who is concerned with self-sustainability. By embedding itself in “green” standards, Self Sustaining Fitness Centers will set the trend for all gyms as well as be the first to attract consumers looking for an environmentally friendly and sustainable gym experience.

The market is large enough to support the introduction of SFCs. Not only does it target clients from the ever growing healthy lifestyle and fitness generation, but also the soon to be environmentally conscious population. It is important to notice that society is progressing towards alternative means of energy and companies that promote such ideas. SFCs will also have the advantage of being able to sell lower priced memberships once operational start-up costs have been recouped through sustainability. Customers who are not concerned with the sustainability aspect of SFC can be marketed to the high value quality services and value oriented prices from a great facility.

“Self Sustaining Fitness Centers will set the trend for all gyms...”
The Rise and Fall of Today’s Gym

Historically physical fitness is relatively young. It wasn’t until 1961 that President Kennedy made the President’s Council on Physical Fitness, advertising the importance of physical activity in the average American’s life. Furthermore, Arnold Schwarzenegger didn’t gain his popularity and create the enormous exercise buzz that promoted the importance of a healthy lifestyle until 1970. Since then, gyms and fitness centers have been sprouting up all over the country.

The trend for large gyms in the past 10 years has been to add more amenities to make working out more enjoyable and attract a more diverse group of customers. This was an extremely profitable marketing strategy for its time, but is no longer a feasible solution because of the economic downturn, new trends in physical activity and high costs of fossil fuels. Recently gyms across the country have been downsizing. The high costs of maintaining and keeping such large gyms operational is no longer compensated by the membership fees alone. Large corporations and even smaller locally owned fitness centers have had to find new revenue generating techniques to cover their expenses. Because of this market change, gyms will eventually have to incorporate energy efficient technology into their business plan. If not, smaller organizations with less invested costs are going to take over the fitness industry.

Twenty First Century Fitness Innovations

Self Sustaining Fitness Centers will promote a variety of energy saving strategies to reduce costs and support a “green” sustainable business including retrofitted treadmills, photovoltaic cells, vegetative roofing, solar lighting, reclaimed water, and non-flush toilets. The culmination of the energy saving systems implemented into the fabric of the SFCs will allow the gym to be a forerunner in the “green” movement as well as save money.

It is argued that energy saving technology is still too expensive to implement on a large scale for smaller companies. It is important to remember that the initial investment in SFCs facility construction will be considerably higher than that of comparable non-green facility. A reduction in membership costs will only happen after that initial investment in green technology has been amortized. However, with an adequate consumer base, the initial investment difference will be reduced within a few years at which time SFC will be able to lower its prices. SFC will work this into its initial promotional offering as a selling tool by offering all new members an “Energy Rebate” from their initial membership assessment to be paid after three years of continuous membership. Members may be rewarded for attending certain aerobic classes or spending an allotted amount of hours in the gym. This way the member will have a stake in the facility’s commitment to the sustainable environment movement and understand that they are making an investment in our common environment.

Another opposing view is that the energy produced by the aerobic equipment will not be substantial enough to make an impact on the total energy consumption. Although one treadmill does not have the ability to make a significant contribution to the facility, the culmination of many aerobic machines being used for multiple hours does.

As a treadmill is in operation, 90% of the potential usable energy is lost into the surrounding atmosphere in the form of heat. That same heat that forces other gyms to utilize more energy operating air-conditioning systems and fans will be utilized by SFCs to reintroduce electricity back into the building’s electrical grid. By retrofitting every treadmill, elliptical, stair stepper, and stationary bike with a few basic components, energy will no longer be lost as heat from the machine, but instead be used to generate electricity for SFCs. The methodology is the same as that used by commercial generators, which use water flowing through a dam or wind turning a propeller. A conducting wire is attached to the rotating axel of a treadmill between two fixed magnets. As the coil rotates, the two edges move in opposite directions through magnetic field. This motion through the magnetic field induces
Pedal power can significantly reduce a gym's overall energy costs. Spin class is the perfect venue to implement this technology.

“The average 30-minute cardio workout produces roughly 50 watts of power... this is enough energy to power a CFL light bulb for 2.5 hours.”

(Continued)

a current that is removed from the coil by a wire brush that comes into contact with the wire at the bottom of every rotation. The alternating current can be reintroduced into the local power grid where it is bought back by city or used as to power the gym.

The average 30-minute cardio workout produces roughly 50 watts of power. On an individual scale this is enough energy to power a CFL light bulb for 2.5 hours or desktop computer for approximately 1 hour. When the technology is implemented on a larger scale, the results become even more impressive. If 100 individuals perform the same 30-minute bout of aerobic exercise, the power output from the cardio machines alone is 50,000 watt-hours, or 50 kWh. By utilizing these same principles in a group spin class where the intensity, cadence and resistance is even greater, the resulting energy output is enough to make a substantial impact on the gym’s utility overhead. For example, a spin class containing 20 stationary bikes has the ability to produce 3.0 kWh of power. If the gym implemented 5 spin classes a day it has the potential to produce 15 kWh a day, 330 kWh per month, and 3,960 kWh per year. That is approximately the same amount of energy required to power the average American household for 6 months.

A standard 2.0 horsepower treadmill requires 1.5 kilowatts per hour to run itself. If 100 of the gym’s members undertake 30 minutes of cardiovascular exercise a day, the facility breaks even in terms of energy required to operate the machines vs. energy produced by the machines themselves. This even exchange in electricity expenditure eliminates the facilities largest electrical expense allowing revenue to be allocated elsewhere.

Photovoltaic cells will be the most expensive component of the SFC, but also but the affordability of PVCs is projected to drop substantially once the mass residential market begins to adopt the technology. The current average installed cost per watt for a photovoltaic system in California is approximately $8.10 per watt. The average tax credit per PV system however is $3.10 per watt, helping to compensate for the expensive investment costs. The process involves using the suns photons to excite electrons in a synthetic material, which subsequently move from a negative to positive locality via an electrical circuit. This is similar to the current generated from the treadmills. Photovoltaic cells create a one way direct current which is conducted to a battery where it is stored or converted to AC current and reintroduced into the eclectic grid. These cells produce 12 watts of energy per 1.0 square foot of photovoltaic (PV) system. 2,500square feet of roof system will create 30 kWh, 5,000 square feet will produce 60 kWh, etc.

Although not as state of the art as photovoltaic cells, vegetative roof covers have an undeniable impact on the overall sustainability of a facility. An engineered...
vegetative roof cover uses foliage and a soil mixture to promote energy conservation and control local air and water quality as well as runoff. The most basic design of a green roof consists of a single-ply waterproofing layer over the roof, filter fabric, drainage, engineered soil, and some sort of vegetation. Green roof assembly can be relatively inexpensive. With advancements in design, constructing a green roof can be comparable in cost to a conventional roof. The isolative qualities of the vegetative roof keep the air temperature cooler in the summer and warmer in the winter, reducing both heating and cooling costs by 26.0%. If a traditional 10,000 square foot gym spends $325 a month on heating their facility, that amount can be reduced to $240 because of the isolative properties of a vegetative roof system. In addition, the implementation of a green roof is expected to lengthen the life expectancy of a building's roof by two to three times.

Solar tube lighting is a cost effective substitute for traditional fluorescent lights. They work by transporting light via reflective tubing from the roof of a building to an internal location within the facility. Located at the internal outlet of the tube is a diffuser which is used to disperse the light evenly and outward from the source. A solar tube is a preferred source of light because of its reduction of directional light. Meaning it illuminates objects equally from all directions unlike a traditional light bulb. A solar tube with a diameter of 10.0 inches can distribute light up to 200 square feet and will cost approximately $200.

The final implementation of green systems into SFCs is recycled grey water and no-flush toilets. Grey water is the term used for water that is recycled from any domestic use other than toilets. Therefore water from the cooling systems, dishwashers, and sinks can all be reused by the building. Although grey water is not safe to drink, it can be reused for irrigation, sinks, and toilets. Up to 80% of water outflow from homes and businesses is classified as grey water. If even a small percentage of that is recycled and reused, there is potential to have dramatic reduction in water utility costs. Initial instillation costs for grey water are
relatively inexpensive and can be as simple as redirecting pipes from specific appliances or drains to a small filtration device that removes unwanted foreign agents in the water and pumps it back to the building. In addition, once the system is installed, there are no incurred expenses.

No-flush and dual flush toilets are very simple yet effective means to reduce water costs. Implementing just one waterless urinal in a facility can save between 20,000 and 45,000 gallons of water a year. If a fitness center converted four regular urinals to no-flush urinals, it has the potential to save approximately 180,000 gallons of water per year. 180,000 gallons of saved water a year, or 15,000 gallons a month reduces the monthly utility bill by $93. When combined with four dual flush toilets, which can save up to 18,000 gallons of water per year, the total monthly water bill is reduced by $100.

Taking Action

Energy conservation systems are not just an implementation of the future, but a movement of the present. Businesses of all industries are investing in green technology in order to appeal to a growing consumer base that has recognized the need for environmentally friendly and sustainable energy saving measures. It is imperative we take advantage of this insight and invest in the technology before it is too late. Together, we design the ideal Fitness Innovation for the 21st Century and beyond. Please contact personally with more information or with any questions, at (805)-305-3259 or visit www.danewayman.com.