Re: electricity from a gym: quick calcs

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- *From*: mrdarrett@xxxxxxxxx
- *Date*: Thu, 13 Sep 2007 15:29:04 −0000

On Sep 13, 7:41 am, ehsjr <eh...@xxxxxxxxxxxxxxxx> wrote:

> mrdarr...@xxxxxxxxx wrote:
>
> > I had a conversation with a co−worker about harnessing energy from folks dancing on a dance club, and from folks walking in a mall during the shopping season. I was skeptical, thinking the capital costs would outweigh any benefit, but decided to run the calcs just to be fair.
>
> > I was *sure* I'd posted similar calcs on sci.physics or sci.chem a few years ago, but can't find them. So, I re−derived them.
>
> > Let's say we have a gym with 100 pieces of equipment, with generators on each of them. And let's also say the gym is open 24 hours a day, fully packed at all times.
>
> > Let's say each person exercises at a rate of 100 W (pretty hard work), or 0.1 kW.
>
> > Let's say electricity costs $0.10/kW per hour. (More in the bay area, less here in wintertime...)
>
> > So, each person generates $0.10/kW/hr x 0.1 kW, or one cent per hour. (Much less than minimum wage, I might add.)
>
> > That's 24 cents/day/piece of equipment.

$0.24/day x 100 pieces of equipment = $24/day, or $8,760/year in electricity back to the grid.

Now for the equipment costs. Let's say that each generator thingie costs $100, including installation labor costs. $100 x 100 pieces of equipment = $10,000.

Breakeven time is just over a year.

Key assumptions:
− gym is fully packed at all times. Not gonna happen.

− each generator thingie, plus grid−intertie−converter, breaks down to $100/piece of exercise equipment. That's awfully generous. Probably more like $1,000/piece of equipment is closer to the mark...

− 100% credit from the electric company for electricity. Probably in Minnesota, but not here...

Any thoughts, folks?

Michael (I'm *not* an electrical engineer, by the way)

In a typical gym you wouldn't recover the energy needed
to light the place, let alone sell power back to the grid.

Yep. 10 kW *maximum*, assuming 100 pieces of equipment. That already is a lot. *Can* one pack more than 100 pieces of exercise equipment into a gym?

24 Hour Fitness is downright empty at times... not always fully packed, as my optimistic calcs assumed. If only 10% occupied, 1kW...

can that power the fluorescent lights...? It definitely won't keep the indoor pool heated...

Then it just boils down to the economics of reduced electricity purchases − never mind the grid intertie. Hmm... replace the inverter with a shelf of deep cycle batteries to store energy from the peak crowds, and just use that energy to heat the pool...???

M

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