Science Writing Competition 2016 – Runner-up entry

Below is the runner-up entry in the '17 and under' category for the 2016 international Science Writing Competition organised by the University of the West of England's [Science Communication Unit](#) ,[BBC Focus magazine](#) and [Royal Institution](#).

Runner-up: 17 and under

People Power

Stanley Lowres, aged 16

Wearable Technology. Without a doubt *the* next big thing; manufacturers and consumers alike are going crazy over everything from smart watches and fitness trackers to self-tying shoes. Wearable technology lets you text and call from your wrist; monitors your heart rate and stress levels; gives you personalised tips on improving your lifestyle and so much more. But this all comes at a cost. Apple claims that their smartwatch, the creatively named Apple Watch, will last for an average of 18 hours before requiring charging. (Of course, it will then run on 'reserve mode' - which *only* lets you tell the time – for a further 72 hours).

So how can we solve this issue? Well, in the near future we could expect to see new technologies that can generate power on the move, harnessing said power to charge our array of devices. One such idea, taking inspiration from Sci-fi classic *The Matrix,* is to use our body heat as power (if the machines do rise up and humanity is forced into a bitter war for its very survival, at least we'll receive tips on improving our lifestyle and reducing stress while doing so). Back in 2014, a team from the Korean Advanced Institute of Science and Technology developed a thin patch that can be applied to the body, which uses the difference between your body temperature and the outside air to induce a current and produce electricity. The only problem with this method is that the patch would have to cover a large area to produce any noticeable power, with an average output of 1 mW/cm^2. To put this in perspective, a phone uses between 2-6W (2000-6000mW) while charging. The average surface area of an adult male is about 1.9m^2, which translates to 19000cm^2. At this rate, a human entirely covered this material could produce about 19 Watts of power, or enough to power just about 2 household LED lightbulbs. So, not a lot, but it would be enough to charge your phone.

Another way to use ourselves as a human battery is by simply walking around. A German institute last year published two methods of potentially generating power in this fashion. Both of them come from the two accelerations that your legs

undergo when walking. One device generates power from the swinging motion of the foot, while the other gets its energy from the impact of the foot on the ground; known as the 'swing harvester' and the 'shock harvester' respectively. The former currently clips to the exterior of the shoe while the latter is small enough to fit in the heel (perhaps in the future we will see a return of the platform shoe so we can better charge our phones). In testing, the 'shock harvester' tended to generate more power, with an output of around 4mW at walking pace. So with one in each shoe, that's 8mW of power. While this could add up over time to charge a capacitor to charge your phone, don't expect much bonus charge from it.

So what can we expect from the future of personal energy? Well, for a start, don't get your hopes up. It's still in early stages and will have to become commercially viable before it's actually implemented. That said, I don't think it will be too long before we start to see this stuff in use, probably not as an alternative but rather as a booster, perhaps able to increase your device's battery life by a couple of hours. I can especially see this tech used alongside fitness trackers and running bands, as they often are quite low power and you'll be making full use of that shock harvester.

But honestly, who knows? Maybe we'll see new and crazy ideas, like miniature hand cranks to charge your phone or Heelys with built in dynamos? (That gets my vote). Still, whatever happens, this has the potential to change the world. Or should I say *charge* the world?