

## Creating Energy While You Walk

Difficulty:



Date of release:

Thursday 20th October 2011

### *Discussion activities to be done after completing this EA lesson*

Today's report was about how human energy can be used to power electrical devices. How does the system work? What type of devices could it power? When could it become available?

### *Extension discussion topics*

#### **A. Talking about and going over the specific topic / idea / issue in listening text**

*Introduction = What is the new method of capturing human energy? How will it be used? Who could it help?*

1. What do we learn in the report about the new technology?
  - Device is inside a shoe.
  - Part of the device is an energy harvester.
  - It has 2 containers filled with thousands of tiny droplets of fluid.
  - The droplets get pushed back and forth as a person walks.
  - Fluid is inside flexible plastic tubes.
  - Electrodes are embedded in the tubes, these convert energy into electrical power.
  - Tubes are covered with specially invented materials (*which protect from leaking, short-circuit, etc.*) (not in report - see [http://www.instepnanopower.com/9z\\_FAQ/FAQ.aspx](http://www.instepnanopower.com/9z_FAQ/FAQ.aspx)).
  - Energy is stored in tiny batteries the size of a cell phone battery.
  - System is always powered so no need for recharging.
  - Device can incorporate a hotspot for wifi internet which will save battery power (usage is one tenth of current power used for internet connection).
  
2. What type of devices could this technology be used for?
  - cell (mobile) phones.
  - laptop computers.
  - GPS systems.
  - flashlights (not in report).
  - infra-red goggles (not in report).

Can you think of any other equipment such technology could power?

3. What is the projected future for the technology?

- Commercial product within 2 years.
- Should make money.
- Will be useful in rural areas with no electrical grid.
- Will be useful for people who depend on laptops and cell phones.
- Will be useful for soldiers who have to carry battery-powered electronic devices into difficult territory.

What advantages would people in rural areas gain from this technology?

**B. Expanding on (one of) the topics / ideas / issues in listening text**

*Topic = Your personal electronic devices.*

1. Make a list of the number of electronic devices that you use on a regular basis. How often does each of these need to be recharged? Do you use a smartphone? How often does it need to be recharged? Does it bother you that surfing the internet uses so much battery power and that this contributes to pollution? Have you even thought about that at all? If not, what do you think now that you know?
2. Would you be prepared to use Professor Krupenkin's technology? Why / why not? Do you think the technology will be affordable or not? Would you use it? Would it depend on price? If yes, do you not think that paying for such technology in order to protect our planet is worth the extra cost? (*Teacher: possible discussion development - it is anticipated that the cost of the technology should not exceed the cost of the shoe, but many sensor trainers are very expensive already, i.e. Nike Plus*)
3. The device will be in a shoe, i.e. a trainer. Is this a type of shoe you currently wear? Do you walk a lot? Would this technology make you walk / run more? Do you think this technology could help the Western world become healthier as a side effect?

**C. Extending discussion of (one of) the topics / ideas / issues in listening text**

*Topic = Soldiers and Modern Warfare.*

1. The report said that Professor Krupenkin suggests that his technology could help soldiers who have to carry battery-powered electronic devices into difficult territory. How many devices can you think of that modern soldiers have to carry? (possible answers include: radio equipment, cell phones, GPS devices, night goggles...)
2. Thinking about technology (apart from weapons), do you think that in modern warfare soldiers are better off or worse off than say in the First or Second World War? Why / why not? Think about communication. Is it really an advantage to be in constant touch with everyone? TV coverage possible at all times. e.g. If everyone uses the same technology (infra-red night goggles, etc.), how can there be any advantage?
2. If you were a soldier at war in a foreign country, which devices do you think would be most valuable to you,
  - a) for professional use
  - b) for personal use

Why?

## *Audioscript*

Scientists in the United States are working on a technology that uses human energy to power devices like cell phones, laptop computers, and GPS systems. Tom Krupenkin teaches electrical engineering at the University of Wisconsin. He and his team want to reduce dependence on costly and polluting batteries. Instead of using batteries for power, they have turned to human beings.

"We humans are actually very powerful machines."

Professor Krupenkin and his team have placed a device in a shoe that collects and stores energy from human motion and turns it into electricity. One part of this device is an energy harvester. It has two small containers filled with thousands of very small drops of liquid. These droplets get pushed back and forth as a person walks.

"So it is essentially a flow of a fluid through flexible plastic tubes with embedded electrodes which are covered by special materials that we invented. These actually directly convert it into electric power. Now, output of this energy is stored in a battery, in a regular rechargeable tiny battery of the style that we have in cell phones."

The team has also developed a system to permit use of the stored energy by common mobile devices. It does not require connections with wires, and can be used to create a wireless signal. A cell phone that uses the wireless "hotspot" from the shoe would use much less power than if connected to a wireless telephone network.

The devices are about the size of a credit card. Professor Krupenkin says the system is always powered. So unlike a traditional battery, this energy harvester never needs to be recharged.

The professor says he does not expect this invention to replace traditional batteries. But it will help reduce dependence on them. He says there are a huge number of possible uses for this technology. Professor Krupenkin thinks the technology would be useful for people in rural areas where there is no electrical power.

He notes that it makes a lot of sense for people who depend on devices like mobile phones and laptop computers. And he says the technology could be used by soldiers who must carry battery-powered electronic devices into difficult territory.

Capturing human energy to power globally popular mobile devices could be both a technological and business success.

Professor Krupenkin expects to have a commercial product on the market within the next two years.

VOA Special English Science Report.