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## Energy Harvester From Breath-Associated Belly Movement

Tech ID: 27559 / UC Case 2016-755-0

### BRIEF DESCRIPTION

Researchers at UCI have developed a device that harvests enough energy from the human body to continuously power cell phones and other on-body devices.

### FULL DESCRIPTION

Converting the natural energy of the human body into usable power has long been a challenge for the biomedical field. This body power, if harvested at sufficient levels ( $>1$  W), can be used to internally power biomedical devices that would otherwise require removal and off-site charging. Typical methods for converting body energy into power rely on thermoelectric effects, which generate power based on the temperature difference between a body and its environment. The efficiency of these devices is limited by the maximum temperature difference, which is generally less than  $20^{\circ}\text{C}$ , confining the output power to the mW range.

To combat the low efficiency of thermoelectric devices, researchers at UCI have instead proposed a device that utilizes the belly motion associated with breathing. As this motion is continuous over a 24-hour period, it provides a constant, sustainable source of energy. In addition to being continuous, belly motion also generates fairly large powers – a typical breath that corresponds to  $\sim 1$  cm motion generates  $\sim 2$  W of power. Finally, this device (which can be integrated into a belt) directly converts the kinetic energy of motion into electricity and so is not limited by the same efficiency constraints as thermoelectric devices. In this way, powers of  $\sim 1$  W are easily attainable. Such a breakthrough in the portable power supply field enables much longer use of on-body electric devices and even cell phones, without the need for external charging sources.

### ADVANTAGES

- § Device is simple (can be integrated into standard belts)
- § Based on breathing – continuous and robust source of power
- § Strength of belly motion – generates high power outputs ( $\sim 2$  W)
- § High efficiency power conversion, which yields output power of nearly 1 W
- § Sustains much longer use of cell phones and on-body electric devices.

### PATENT STATUS

Patent Pending

### STATE OF DEVELOPMENT

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### OTHER INFORMATION

#### CATEGORIZED AS

- » **Biotechnology**
- » Other
- » **Energy**
- » Storage/Battery

#### RELATED CASES

2016-755-0

Proof-of-concept only. After obtaining a temporary patent, the authors will explore the technology and potential investors further.

Future Plans: once the temporary patent is approved, the inventor plans to:

- Talk with potential investors (e.g. COVE funds) for support
- Identify proper personnel to design the prototype and test it

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