

TRANSFORM

Energy Systems through Game-changing Technology

BUILDINGS | CARBON CAPTURE AND STORAGE | FUEL CELLS | NUCLEAR | POLICY | PLANNING
RENEWABLES | SMART GRID | STORAGE | SUSTAINABLE MOBILITY | SUSTAINABILITY ANALYSES



GOOD VIBRATIONS: HARVESTING ENERGY WHILE YOU DO THE CHORES

Mir Behrad Khamesee, Pratik Patel

If Mir Behrad Khamesee has his way, the snowblower you're hauling out yet again this winter could do more than just clear a path to your front door. The mechanical engineering researcher foresees a day when a small gizmo attached to that snowblower could capture vibrational energy from the motor and convert it into useful electricity.

Khamesee and his graduate student Pratik Patel recently developed a micro-energy harvesting system. The device is elegantly simple. At either end are stationary magnets. Sandwiched between them is a stack of moving magnets, arranged to repel one another. As external vibrations from the snowblower move the hovering stack of magnets up and down, a set of cylindrical coils surrounding the device generates an electromagnetic force.

While clearing your driveway won't create enough electricity to light up Las Vegas, it could be enough to power wireless sensors that currently rely on batteries, for example.

Nor do the benefits end when the snow melts. By adjusting the gap between the stationary magnets and the moving magnets, the researchers were able to tune the vibrational frequency to different power equipment like lawnmowers.

Now, Khamesee and Patel have taken things one step further, developing the world's first patent-pending energy harvester with converting multi-directional motion into linear motion. Unlike existing harvesting devices, which must be aligned with the direction of the vibrations in order to generate electricity, their 3D harvester can be mounted in any orientation and still capture energy.

Any way you look at it, these are electrifying breakthroughs.

Partner: Natural Sciences and Engineering Research Council of Canada