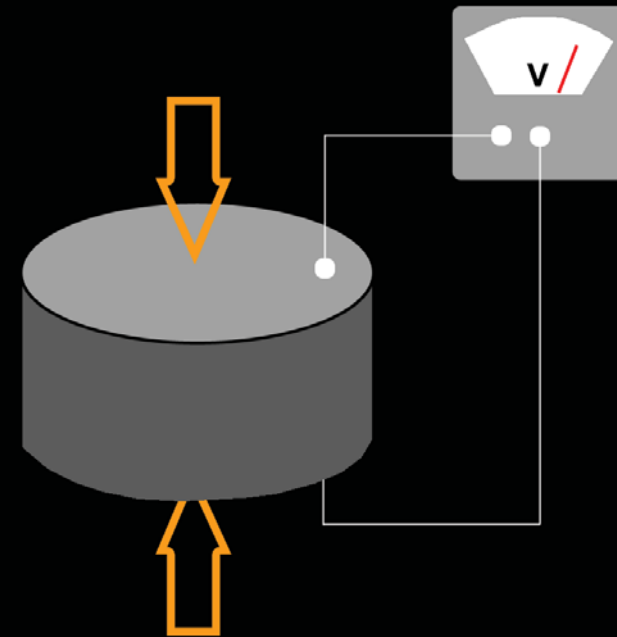


# drive safe<sup>green</sup>

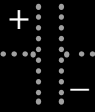
Busy tunnels can contribute in saving energy.  
Busy tunnels could be safer for drivers.



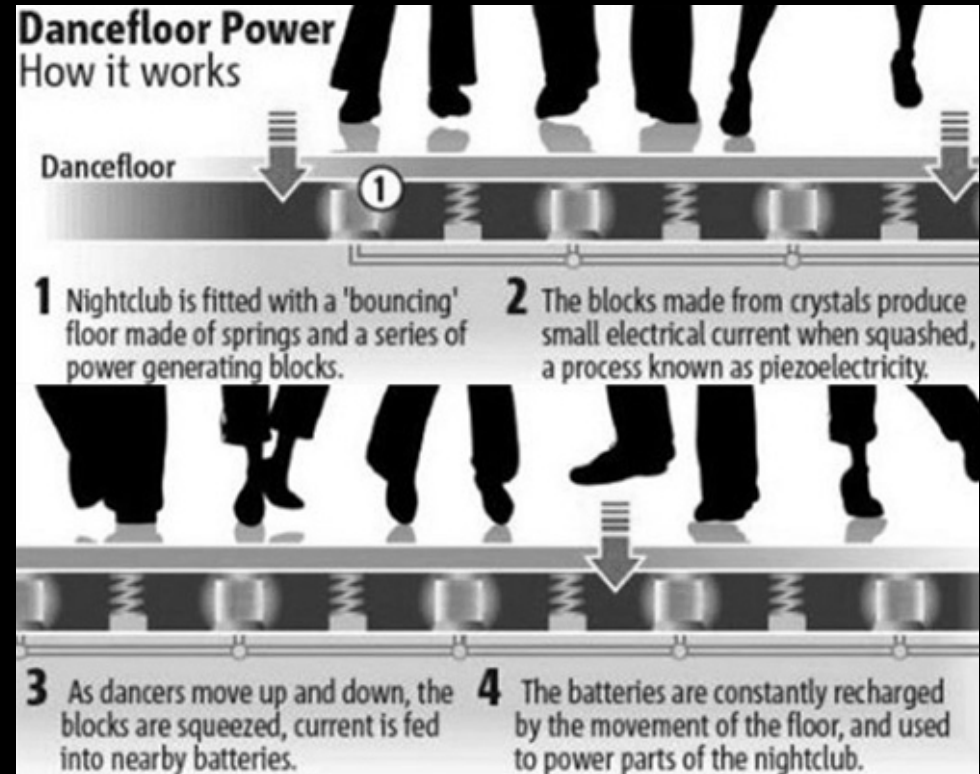
**Piezoelectricity** is the electric charge that accumulates in certain solid materials (notably crystals, certain ceramics, and biological matter such as bone, DNA and various proteins) in response to applied mechanical stress. The word piezoelectricity means electricity resulting from pressure.

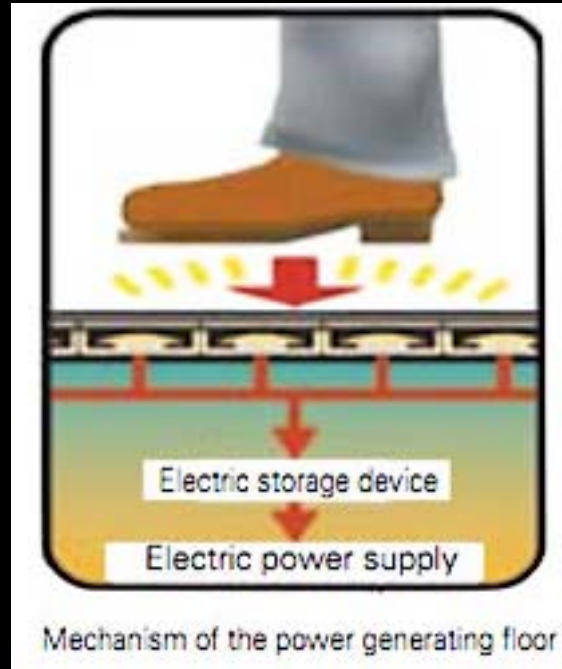


The stronger the pressure, the more energy it produces.

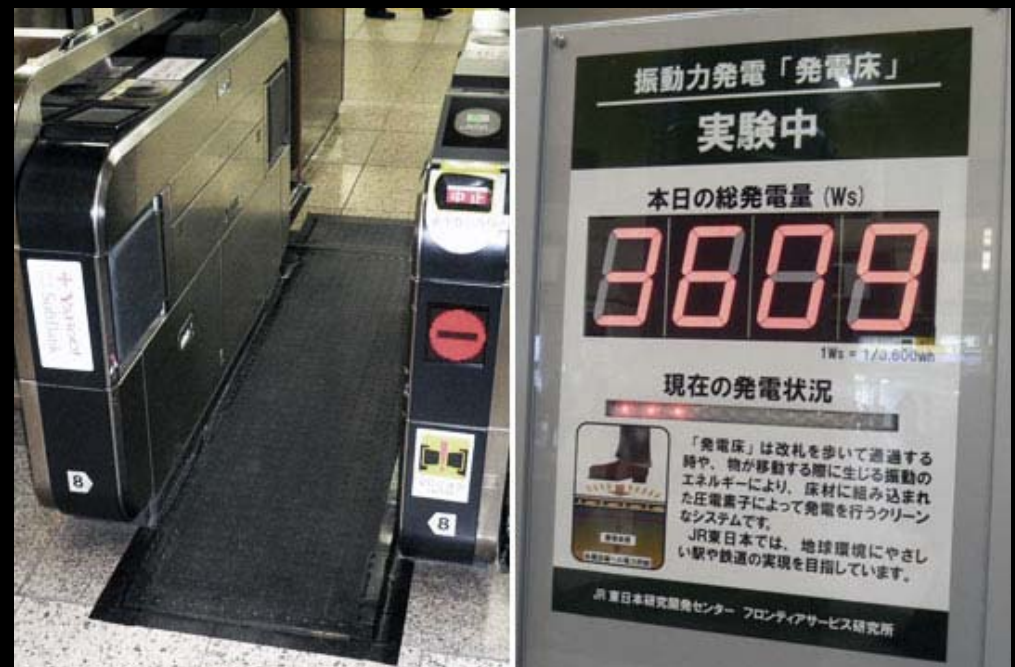


Club4Climate is the 1st eco-club which has installed piezoelectric dance floor and gains almost 60% of the electricity needed from that.





The East Japan Railway Company has installed piezoelectric floors that harvest the kinetic energy generated by crowds to power the electric systems. The total amount of floor-space is 25m<sup>2</sup>, and they obtain over 1,400kw per day – more than enough to power their systems.





## diagrammatic plan



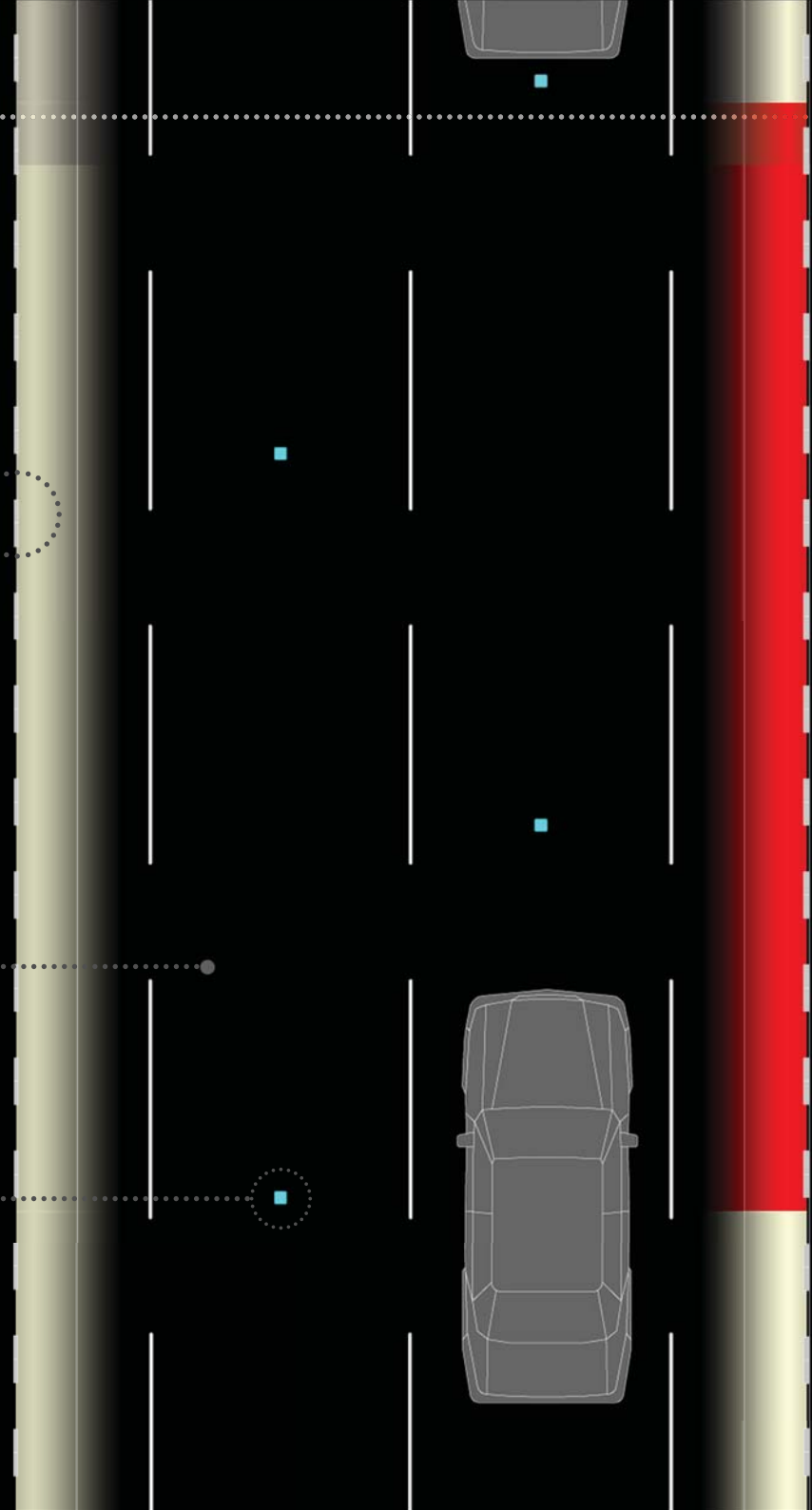
SwaroRail

According to the speed of the vehicle coming, lighting remains white or turns into red color in case the speed is too high to warn the driver.

Piezoelectric ground

Variable reluctance sensor

is used to measure position and speed of moving metal components.



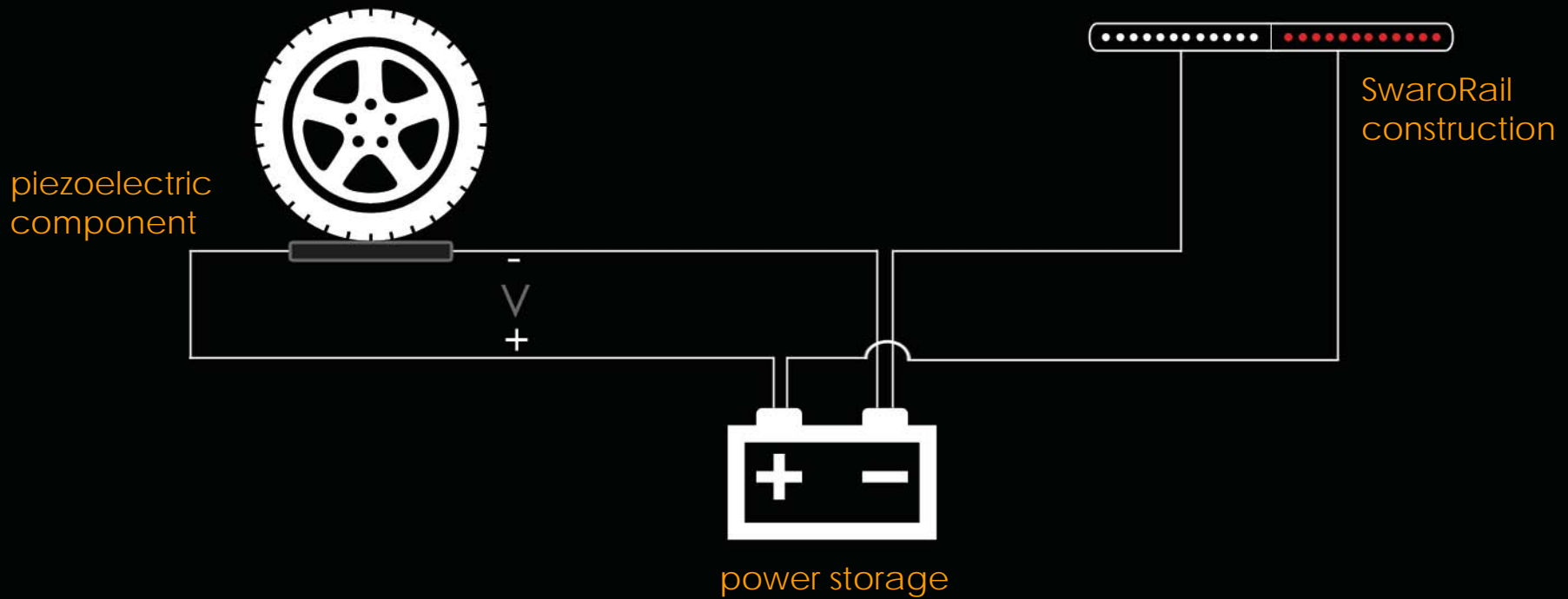


• SwaroRail

• Variable reluctance sensor

• Piezoelectric floor is consisted of piezoelectric crystals, which transform kinetic energy from passing vehicles into electric energy. That energy is used for the needs of the tunnel.

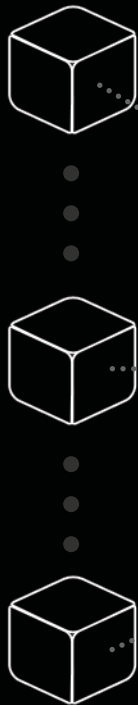




*The piezoelectric components transform pressure into power which is being stored for the lighting needs of the SwaroRail system and the tunnel.*



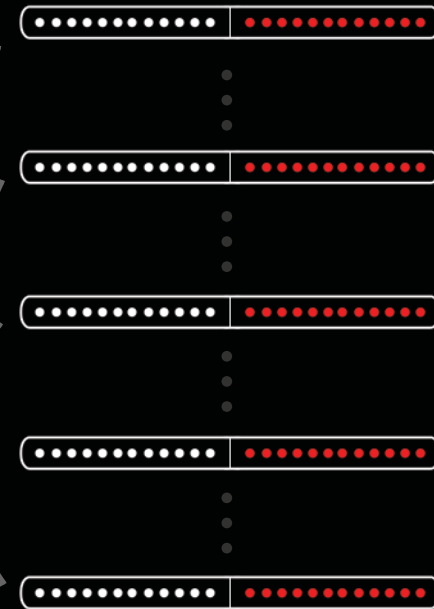
variable reluctance sensors



control unit



SwaroRail constructions



*The VRS send informations about speed and position of the vehicles inside the tunnel to the control unit which decides, in real time, which of the swarorails will be turned on, the white or the red ones.*



