

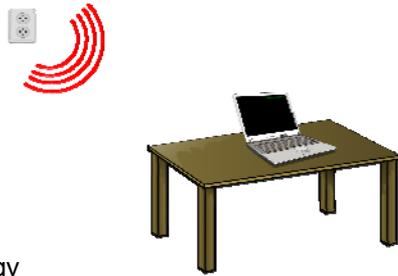


## Wireless Energy Transfer

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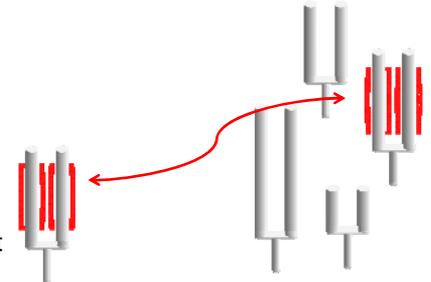
### Goal

To charge a cellular, MP3-player, digital camera, laptop or the like, you need a wall-plug, cable and power supply. Wireless energy transfer doesn't need all that. The energy in electromagnetic fields is transferred through the air.



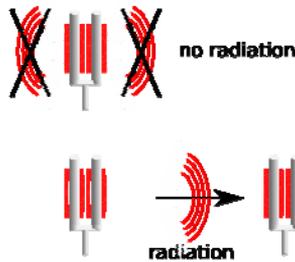
### Method

The transmitter and receiver are tuned to the same resonant frequency resulting in a strong non-directive coupling. Objects which are not resonant or have a resonance at another frequency are not coupled. "Resonant coupling" is more effective than the usual "inductive coupling".



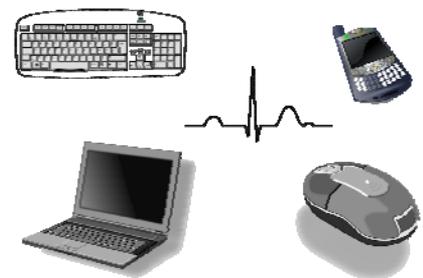
### Advantages

- Energy is not radiated into free space
- The transmitter can be tuned down if there is no receiver
- Other objects than the receiver consume only negligible amounts of energy
- The range of transfer is relatively large in the order of several times the emitting antenna



### Applications

Cellulars, MP3-players, digital cameras, laptops, mice and keyboards, biomedical implants, local and distributed networks and so on.



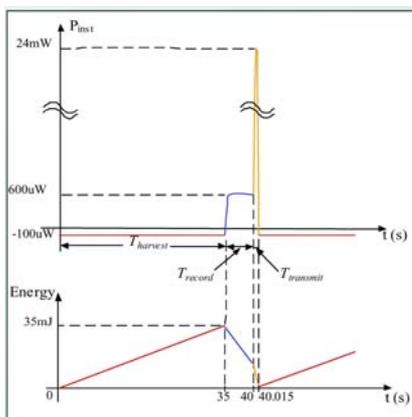
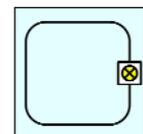
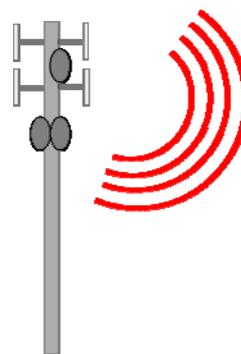
## Electromagnetic Energy Harvesting

### Goal

Radio, TV and communication transmitters create electromagnetic pollution in the environment. Ultra low power electronic systems can make use of the pollution and operate without an external power supply.

### Method

The system has a receiver with an antenna which is either small-band and tuned to a radio or TV band or wide-band. Special electronic circuits transform the low voltage of the antenna to the required values. A typical operational cycle consists of a harvesting, recording and transmitting period.



### Advantages / Disadvantages

Other harvesting methods are thermal, mechanical or solar. They can provide higher power levels but depend on temperature differences, motion or light. Electromagnetic harvesting is independent of that.

### Applications

All sort of independent sensors, for controlling temperature, illumination, patients, blood pressure biomedical devices and so on.