



Smart Cube

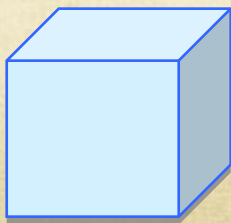
Preliminary concept

Problem statement

- Problem: Light (heating) in domestic houses are often on when not needed. This is an enormous waste of energy where people are not always aware of.
- Solution: Make people aware of this energy waste.
- HOW: Construct a simple device, that indirectly measures the energy waste of a room and indicates this in a easy to understand fashion.

Requirements

- Ecologic assumption: Light should only be on when people are in the room. So we need a device that can sense:
 - Movement
 - Light
- The device should also be capable to distinguish between artificial and natural light. Maybe with the help of a RTC (Real Time Clock)
- Indication should be easily understandable by means of surface LED's. To save power, the indication should only appear when in the neighborhood of the cube.



No indication



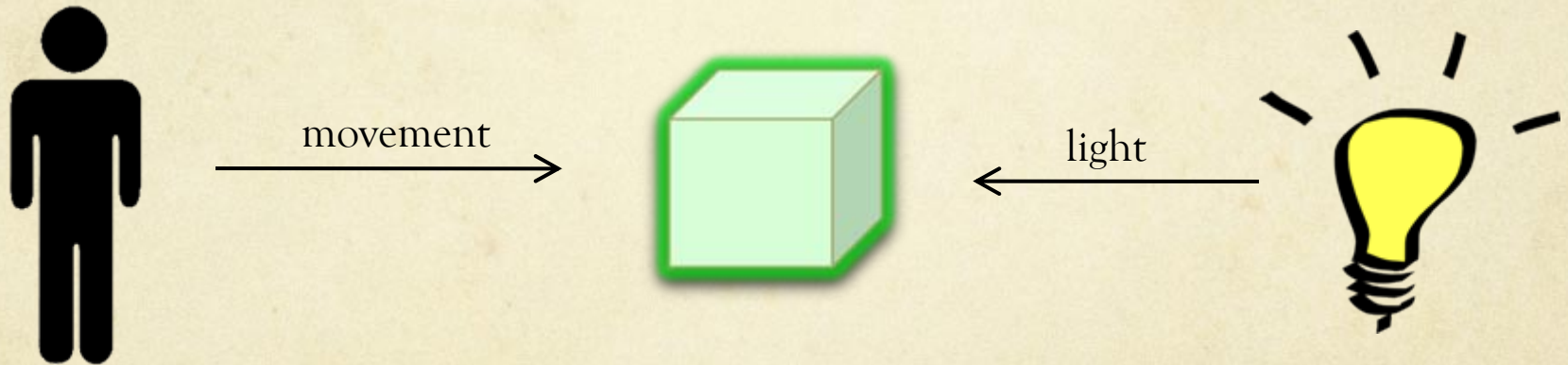
Wasting energy



Ecologic usage

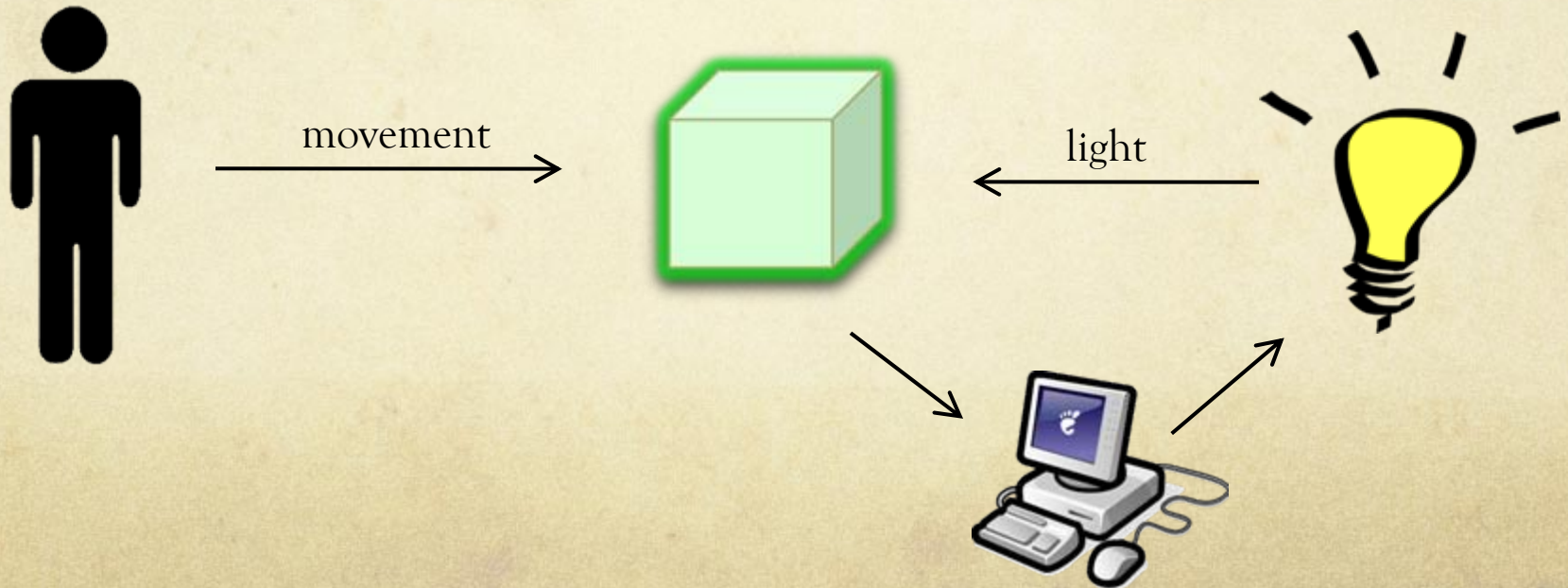
Use case 1: old houses

- Situation: No central control system for electricity
- Basic situation: Cube indicates by means of light the status of the energy consumption/waste



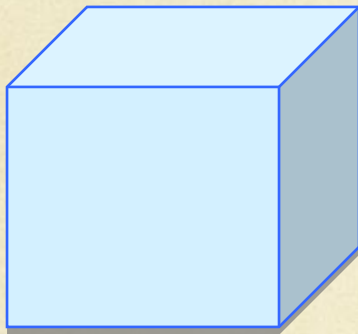
Use case 2: new houses

- Situation: Often a central control system for electricity
- Basic situation: Cube indicates by means of light the status of the energy consumption/waste AND communicate this to the central control system.

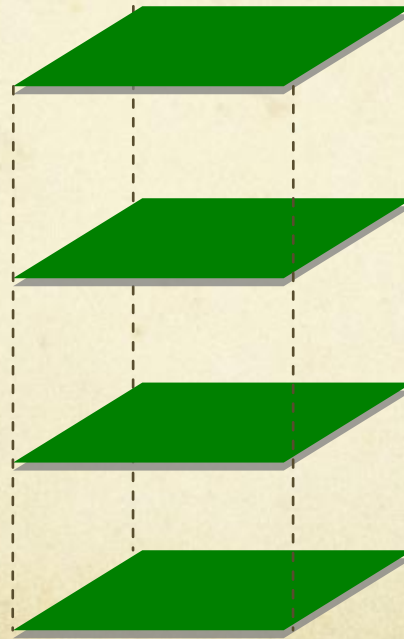


Implementation concept

The implementation should be modular, so that different versions of this cube can be easily produced



The exterior of the cube is a translucent material that can be given any color by a couple of RGB led's



Power conditioning board
e.g. solar panel connection

Microcontroller board
e.g. low power TI MSP430

Sensor board
e.g. motion & light detection

Low power Wireless link
e.g. Zigbee

Possible additions

- Complete self powering using solar panels or other energy scavenging methods
- Sensing of
 - Temperature
 - Air quality
 - CO
 - Smoke

Every side of the cube could have a dedicated information indication
- Communication with PC to generate charts.