Fraunhofer Portugal Challenge

October 20th, 2011

Design of a Battery-free Wireless Sensor Node

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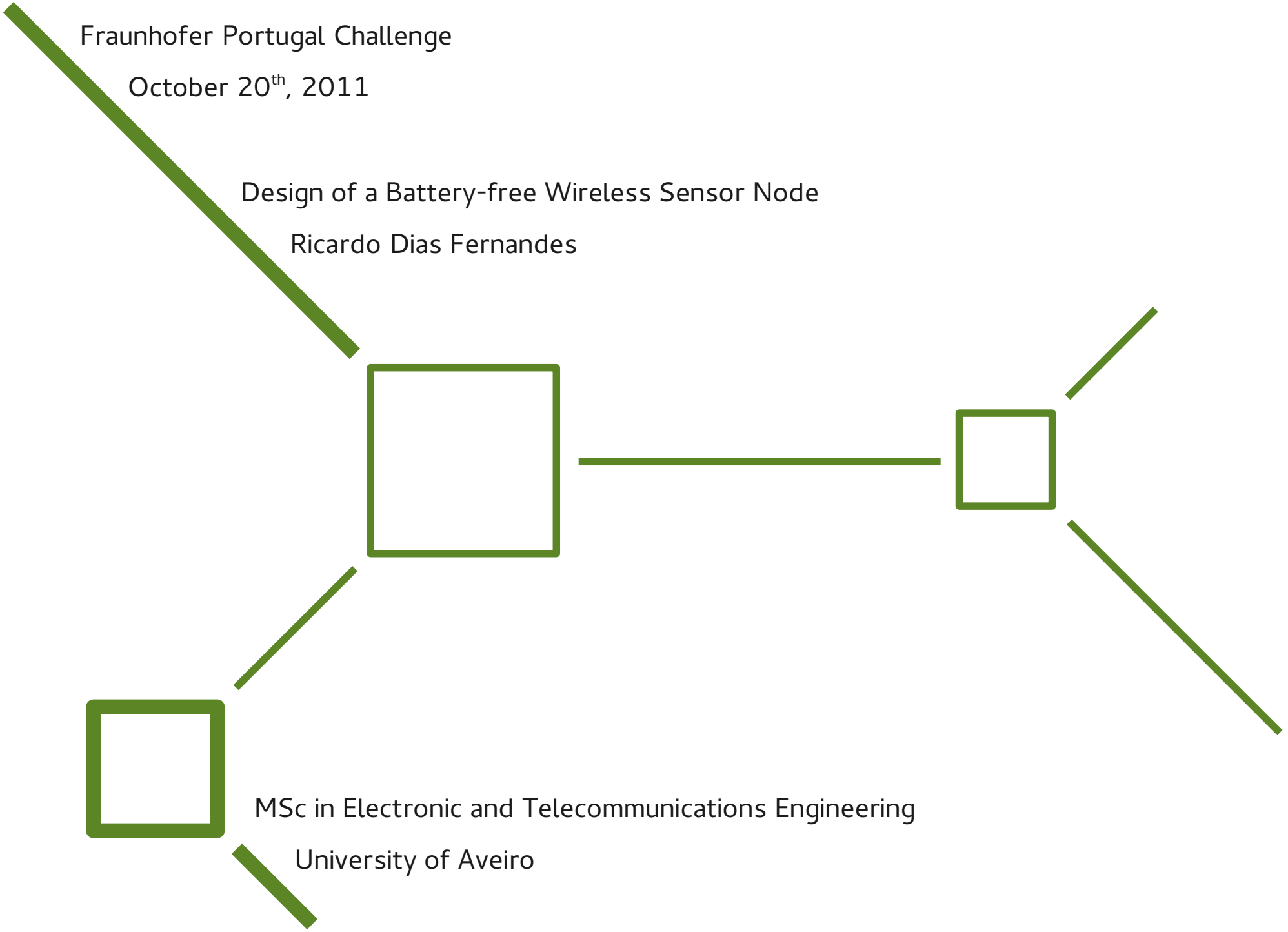
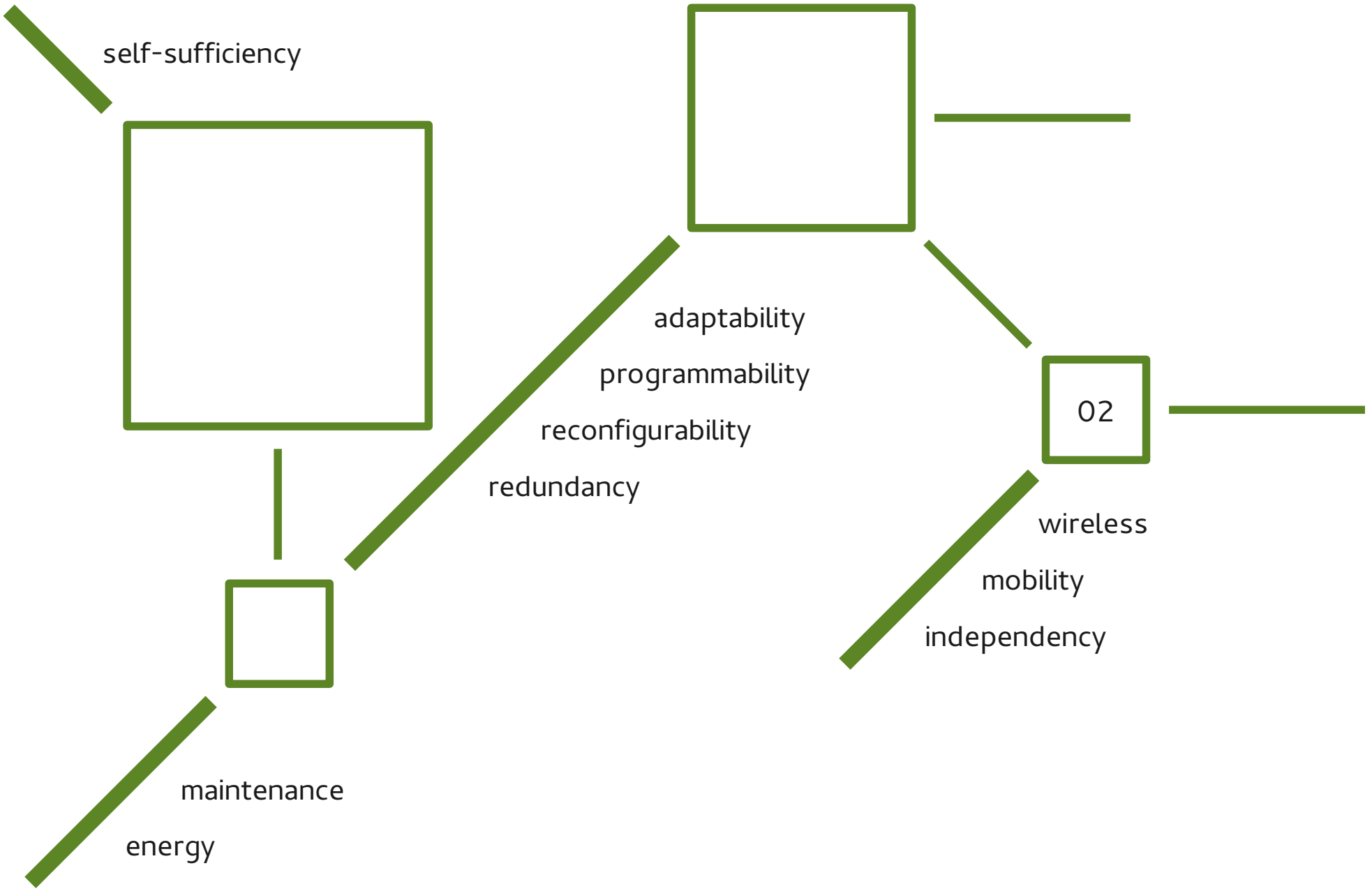
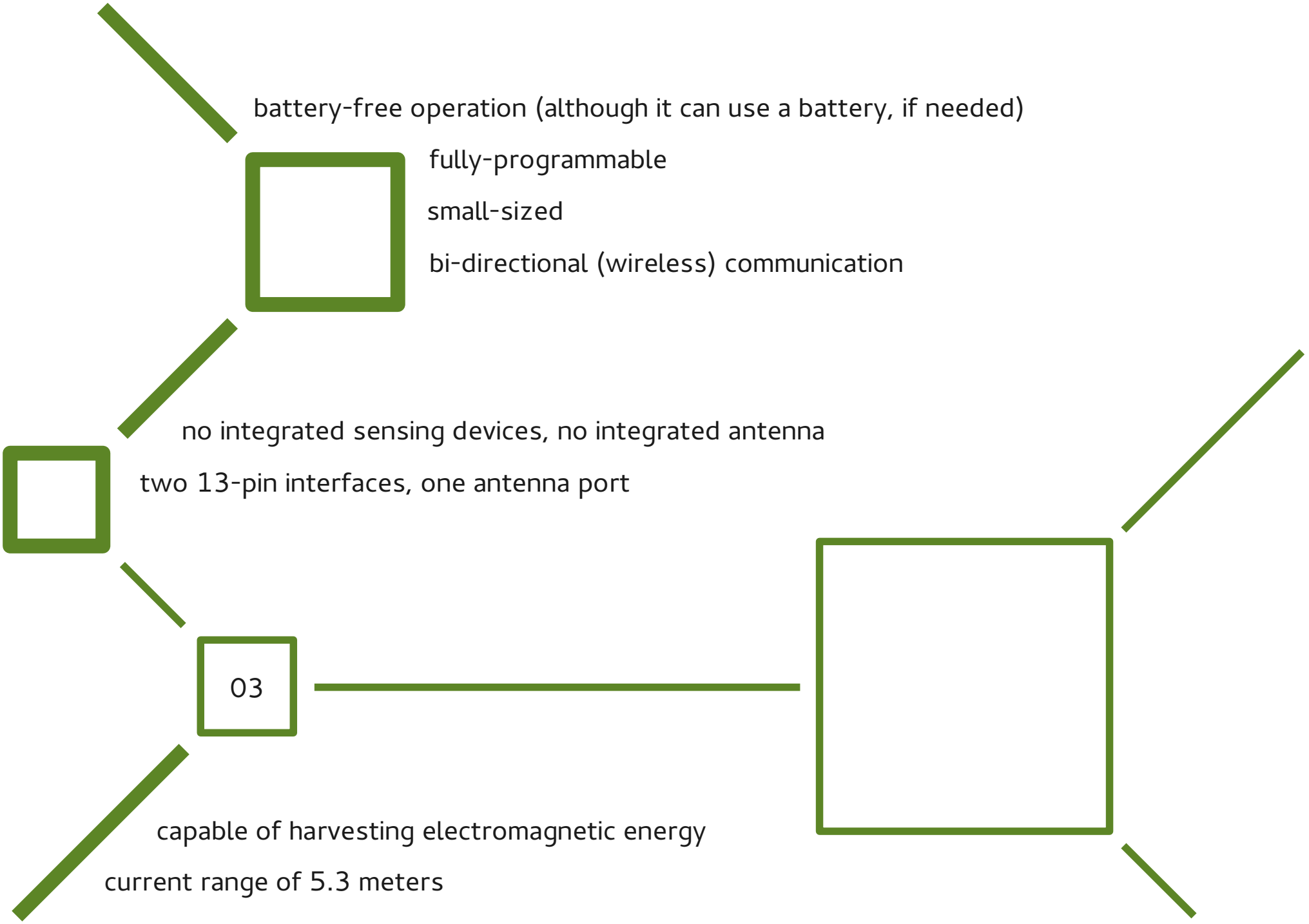
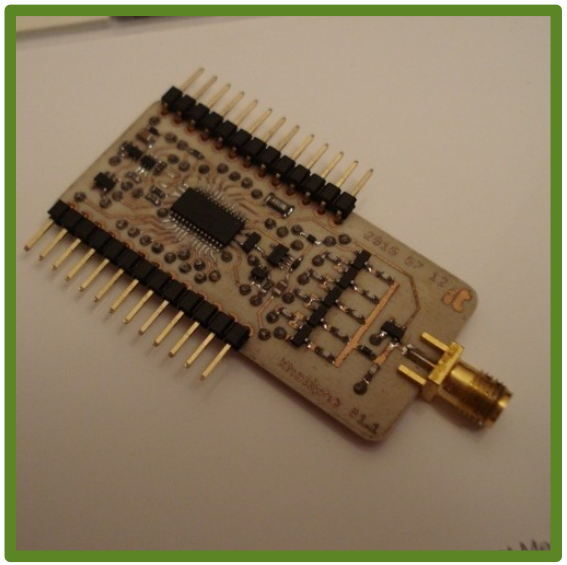
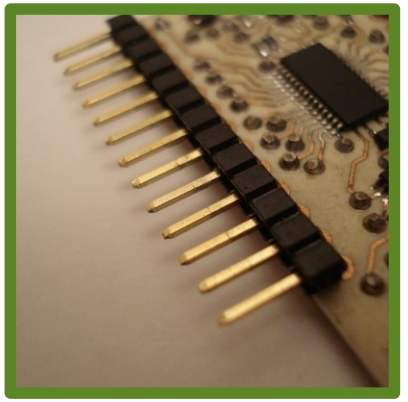


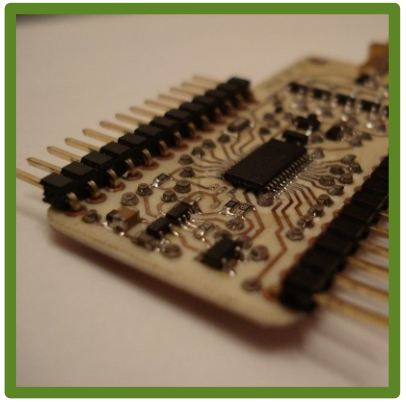

self-sufficiency
adaptability
programmability
reconfigurability
redundancy
02
wireless
mobility
independency
maintenance
energy

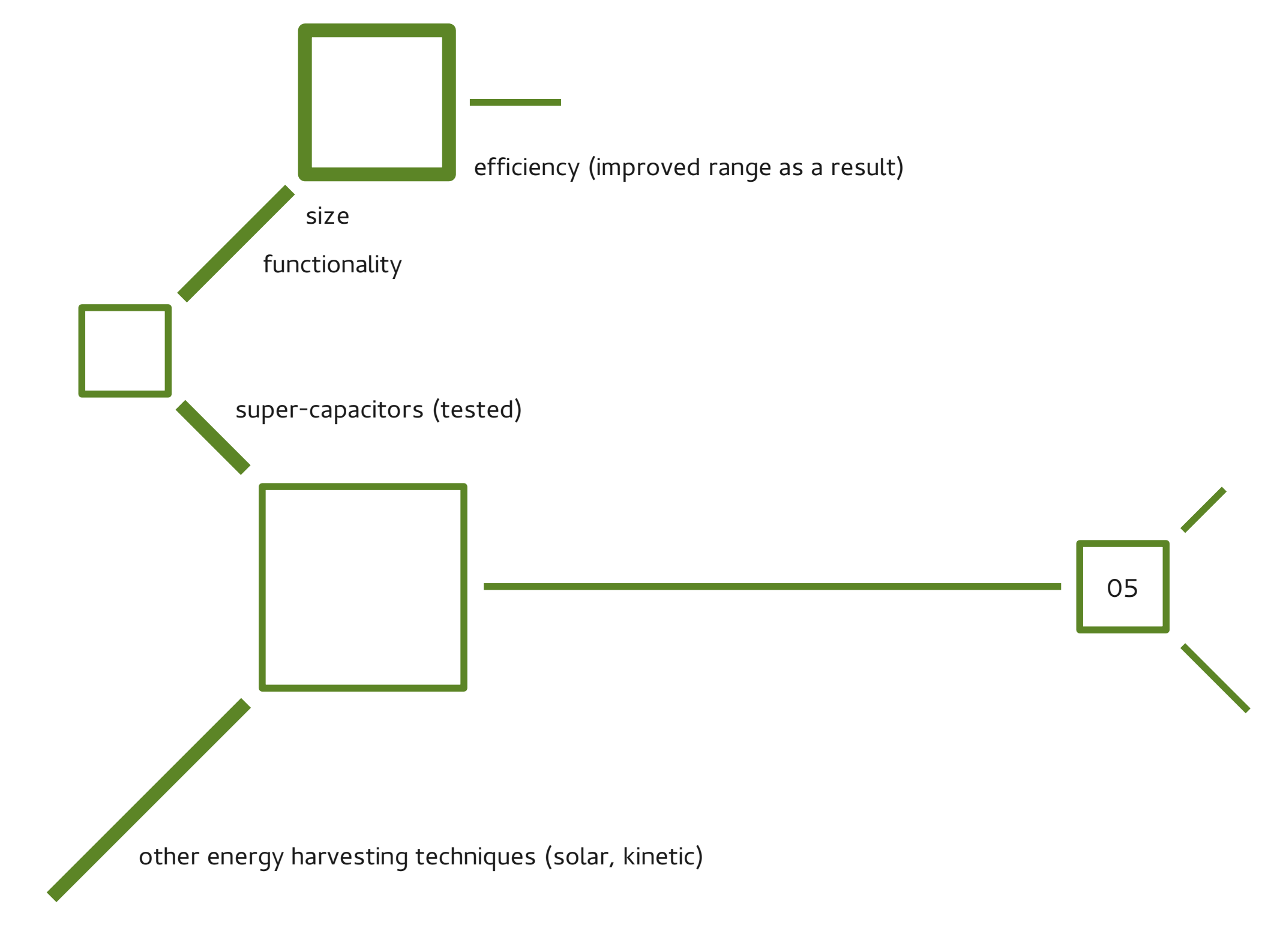

battery-free operation (although it can use a battery, if needed)
fully-programmable
small-sized
bi-directional (wireless) communication
no integrated sensing devices, no integrated antenna
two 13-pin interfaces, one antenna port
03
capable of harvesting electromagnetic energy
current range of 5.3 meters

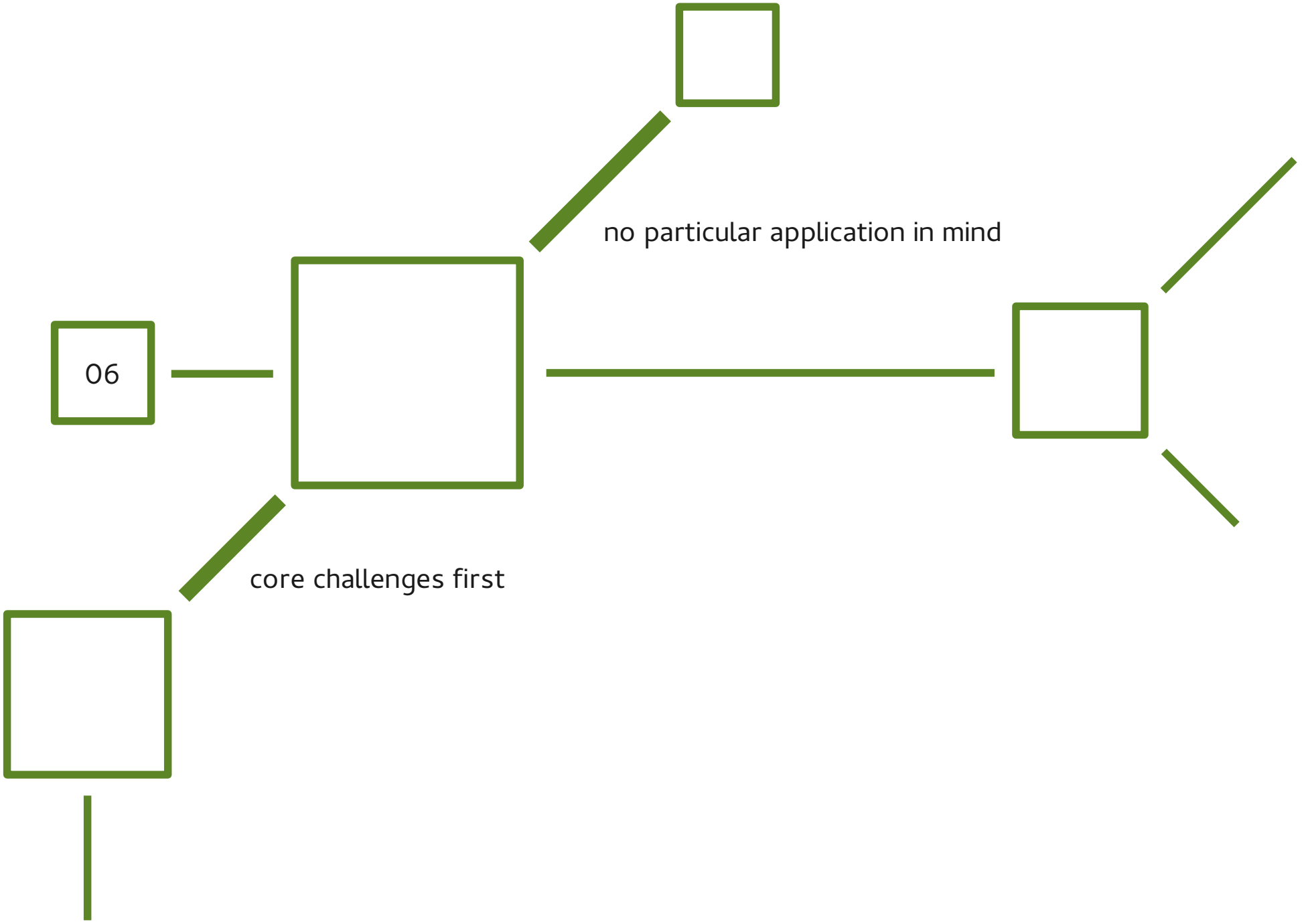


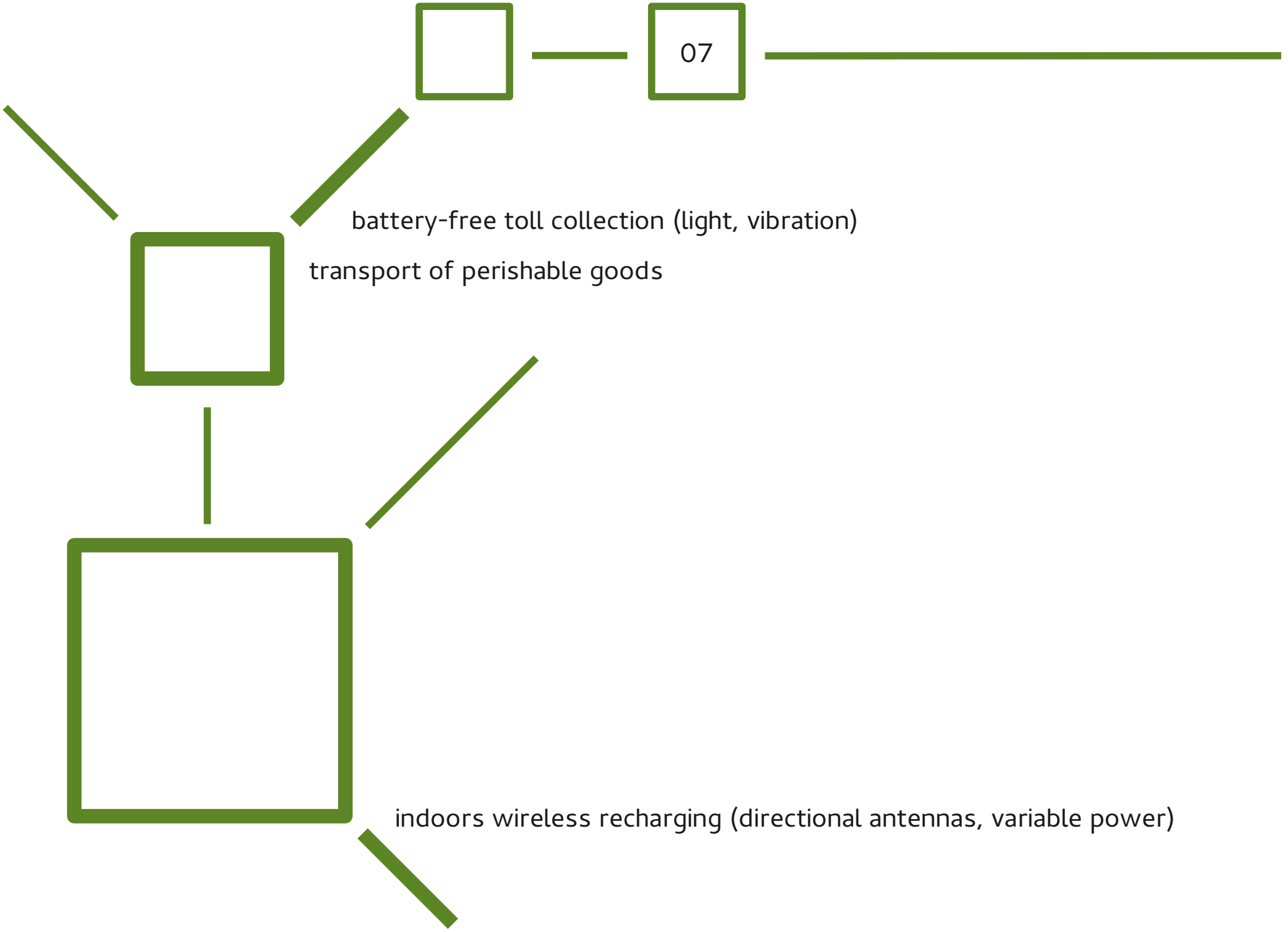
04






efficiency (improved range as a result)
size
functionality
super-capacitors (tested)
05
other energy harvesting techniques (solar, kinetic)

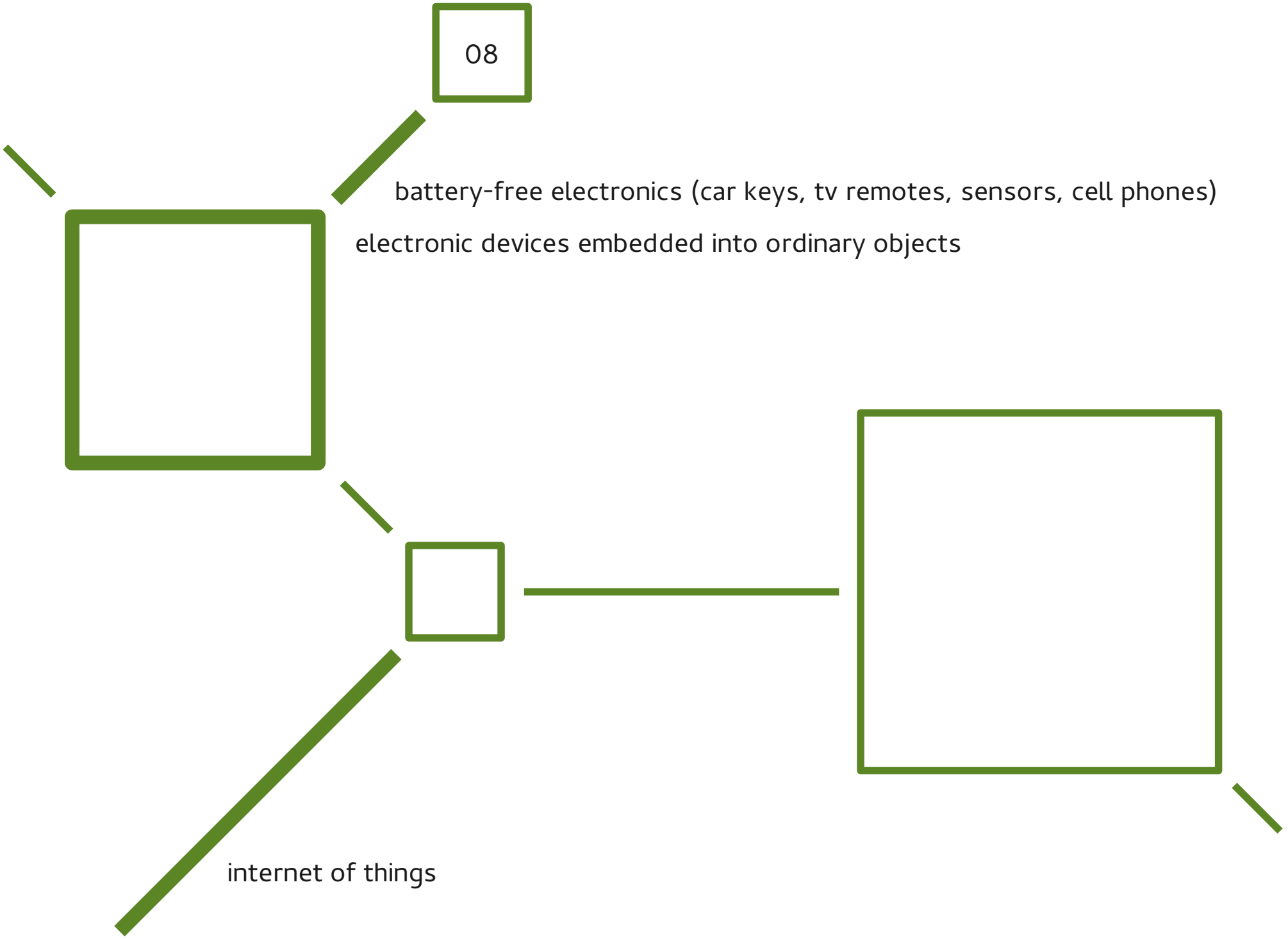

no particular application in mind
06
core challenges first


battery-free toll collection (light, vibration)
transport of perishable goods
indoors wireless recharging (directional antennas, variable power)

08

battery-free electronics (car keys, tv remotes, sensors, cell phones)

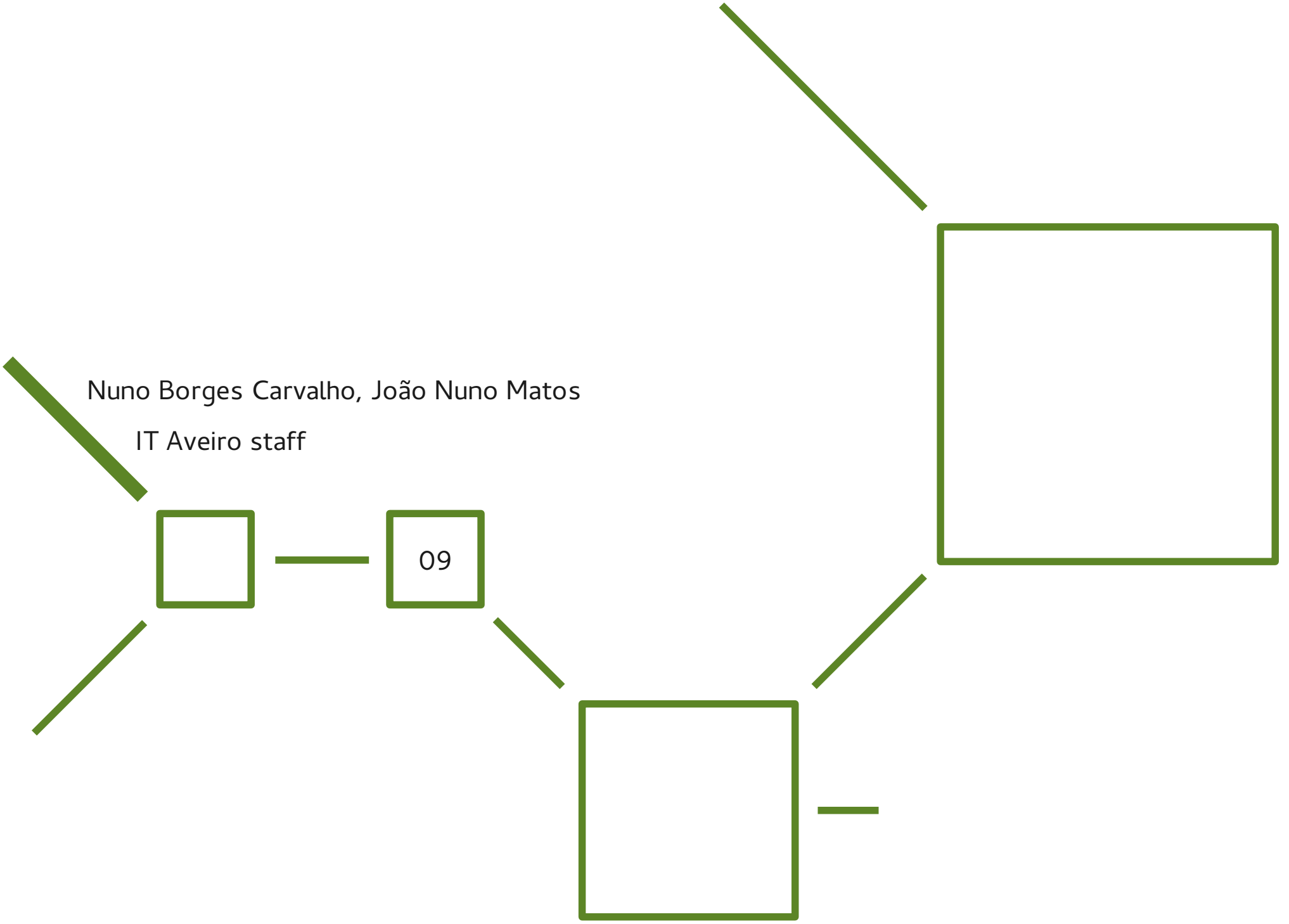
electronic devices embedded into ordinary objects



internet of things

Nuno Borges Carvalho, João Nuno Matos

IT Aveiro staff



thank you for your attention