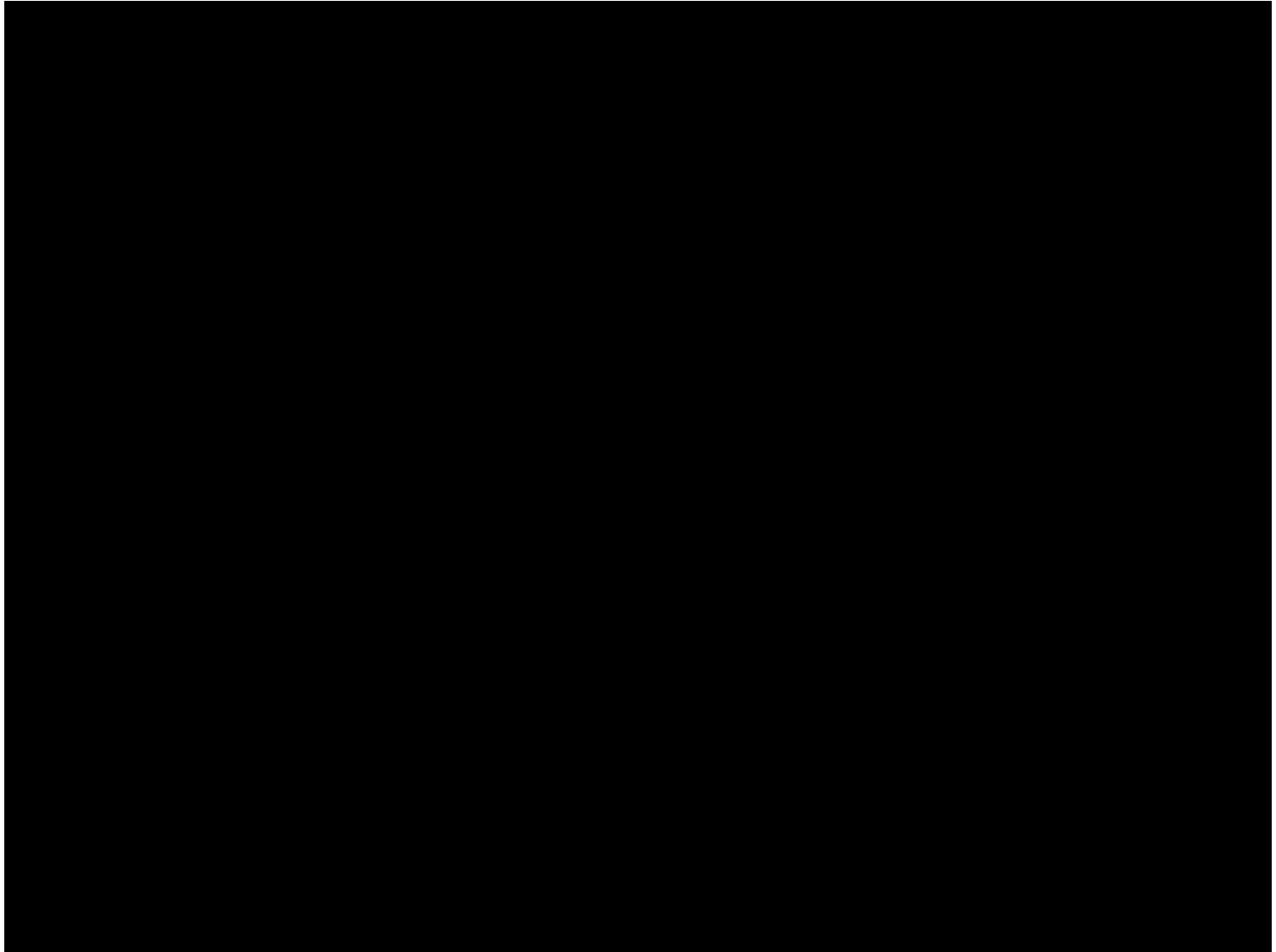




Innovative  
energy harvesting

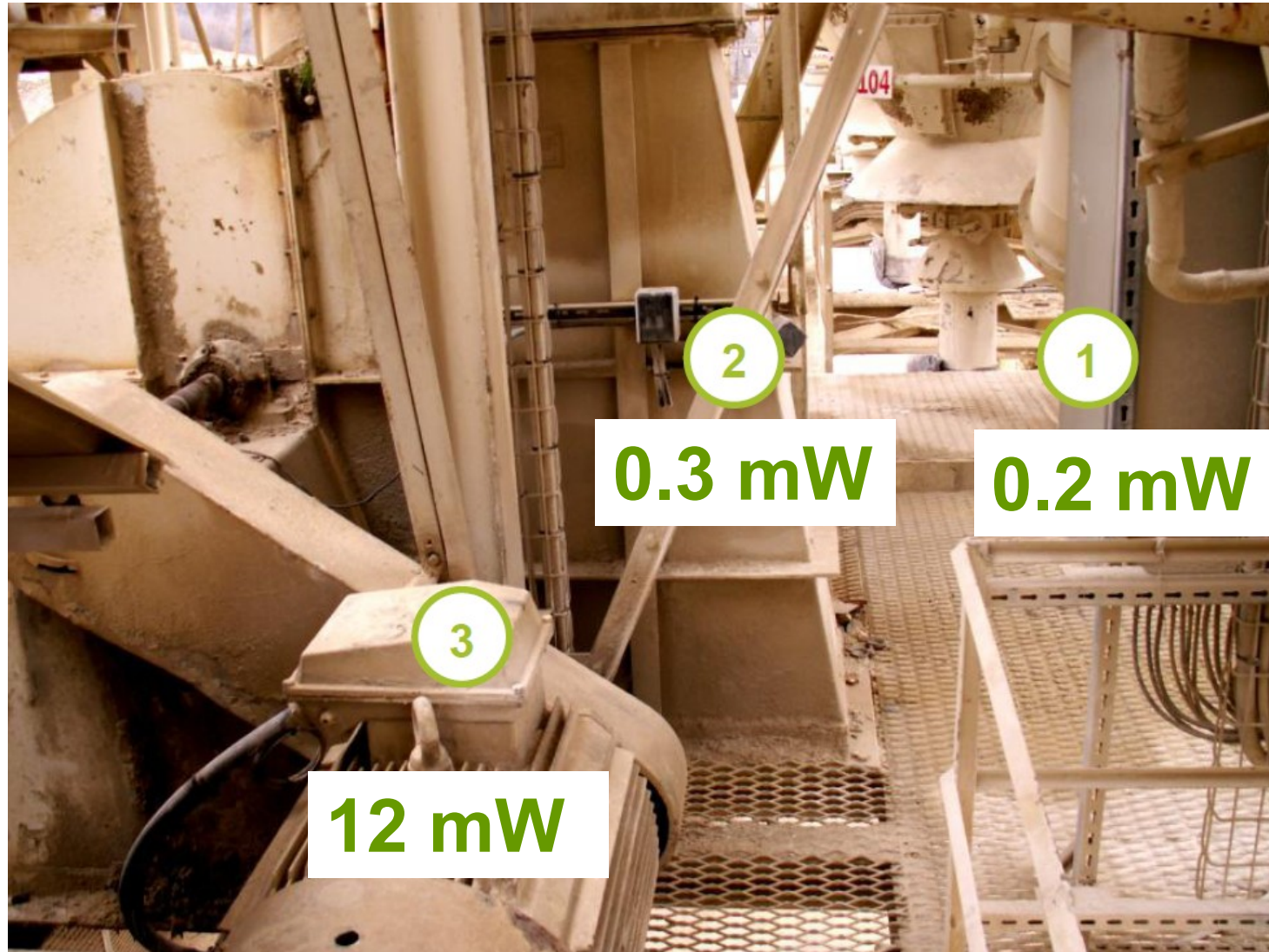
[www.arveni.com](http://www.arveni.com)

# VIDEO MULTIKEY REMOTE





# QUARY VIBRATION PILOT SITE





# TECHNICAL LEADERSHIP



World first single button **infrared remote** control for SFR (IP\_TV provider) in 2009

**World first multikey harvesting for radio TV remote control with PHILIPS**

**→ CES show Las Vegas in Jan '11**

Arveni awarded 3 times in 2010 for its innovative products:

- ✓ **Best of Sensor** Expo (Chicago)
- ✓ Special price of the Jury, 'Trophée' embedded electronic (Paris)
- ✓ most promising '60 silicon startups' by EE Times (**California**)

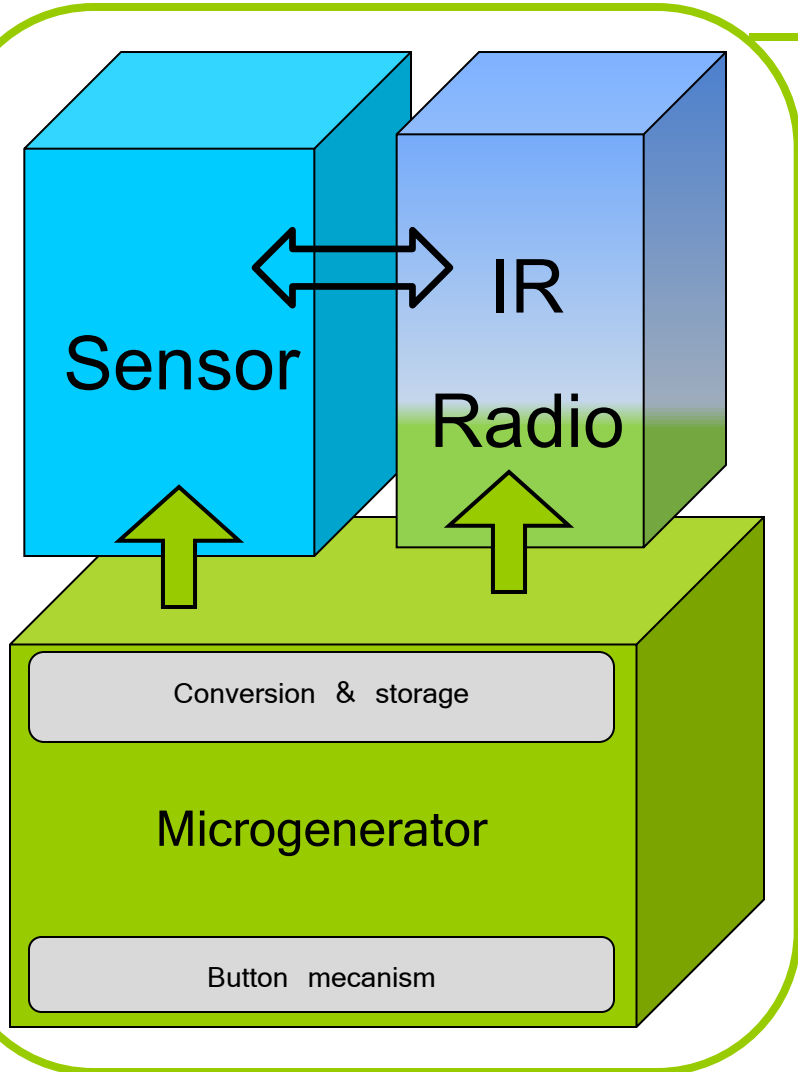


Strong IP & Patent strategy

- ✓ 5 patents Insa School of Engineering, unique licencee
- ✓ 7 patents filed, extended in Japan, US, Eu, China, Korea



# ARVENI PRODUCT OFFER



Wireless sensor

Arveni an industrial start up.

We sell:

✓ Reliable, Competitive, Green  
microgenerator → **H**igh efficiency of  
energy conversion

✓ Experienced R&D support for  
integration in your applications &  
**Zigbee** (Green Power)





# OUR PROJECTS & POTENTIAL

Remote controls



Opening detector for  
Surveillance &  
Green IT



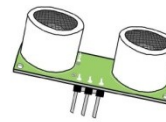
Home & Buildings  
automation



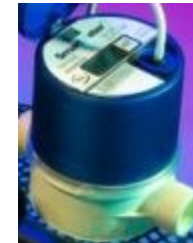
Transportations



Wireless sensors  
networks

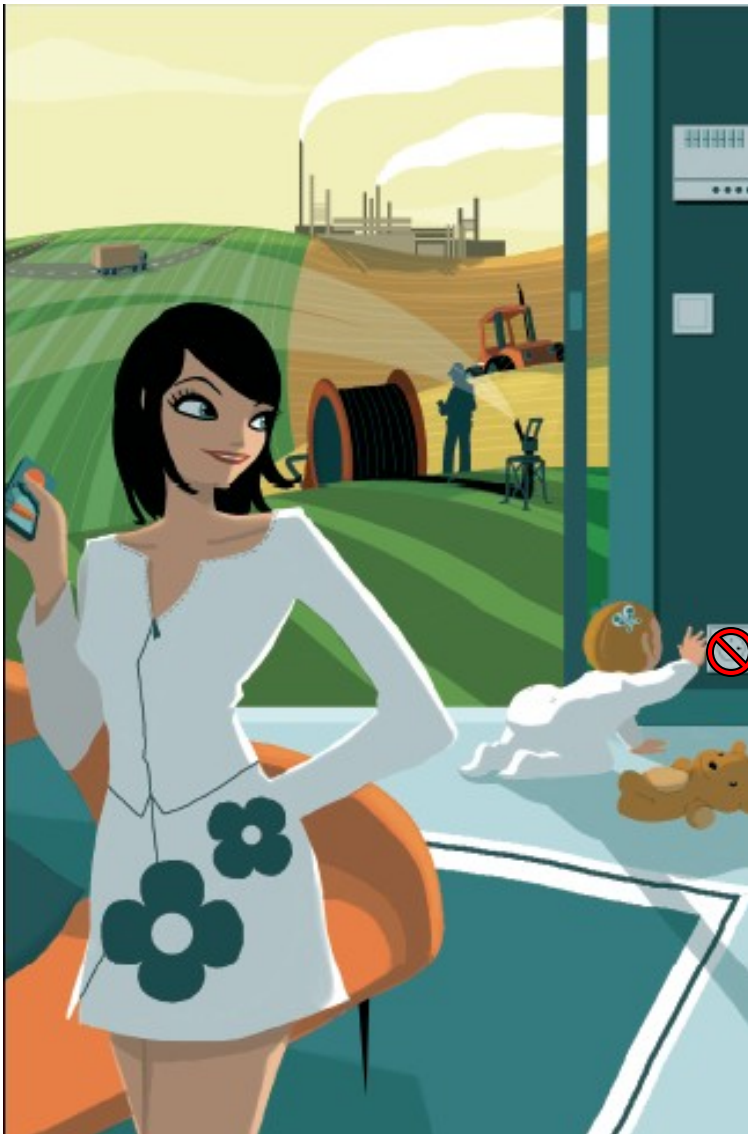


Industrial switches





# THANK YOU → QUESTIONS & ANSWERS



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# ARVENI INDUSTRIAL START UP

- Incorporated in 2007, located near Grenoble (France)
- Arveni develops his own technology of piezo energy harvesting
- Business model: selling of parts, ie microgenerator or complete batteryless & wireless applications. Arveni is fabless.
- **A team of experts :**
  - Sales : Jean-Frederic MARTIN, ME & MBA, president founder 15 years, successful european business experience (D, It, Si)
  - Technical team: Mechatronic Engineer, Electronic engineers...
  - Marketing: part time senior marketing professional
- **International business growth strategy**
  - Pro-active financing for business development: VC in 2011
  - Continuous technical leadership
  - Strong customer co-design support





# GREEN PROJECT DEPLOYMENT

Customer

Arveni

OEM

Customer launches a project ← *brainstorming*

✓ Feasability & prototyping

✓ Codesign

✓ Industrialisation

✓ Microgenerator production

✓ Integration





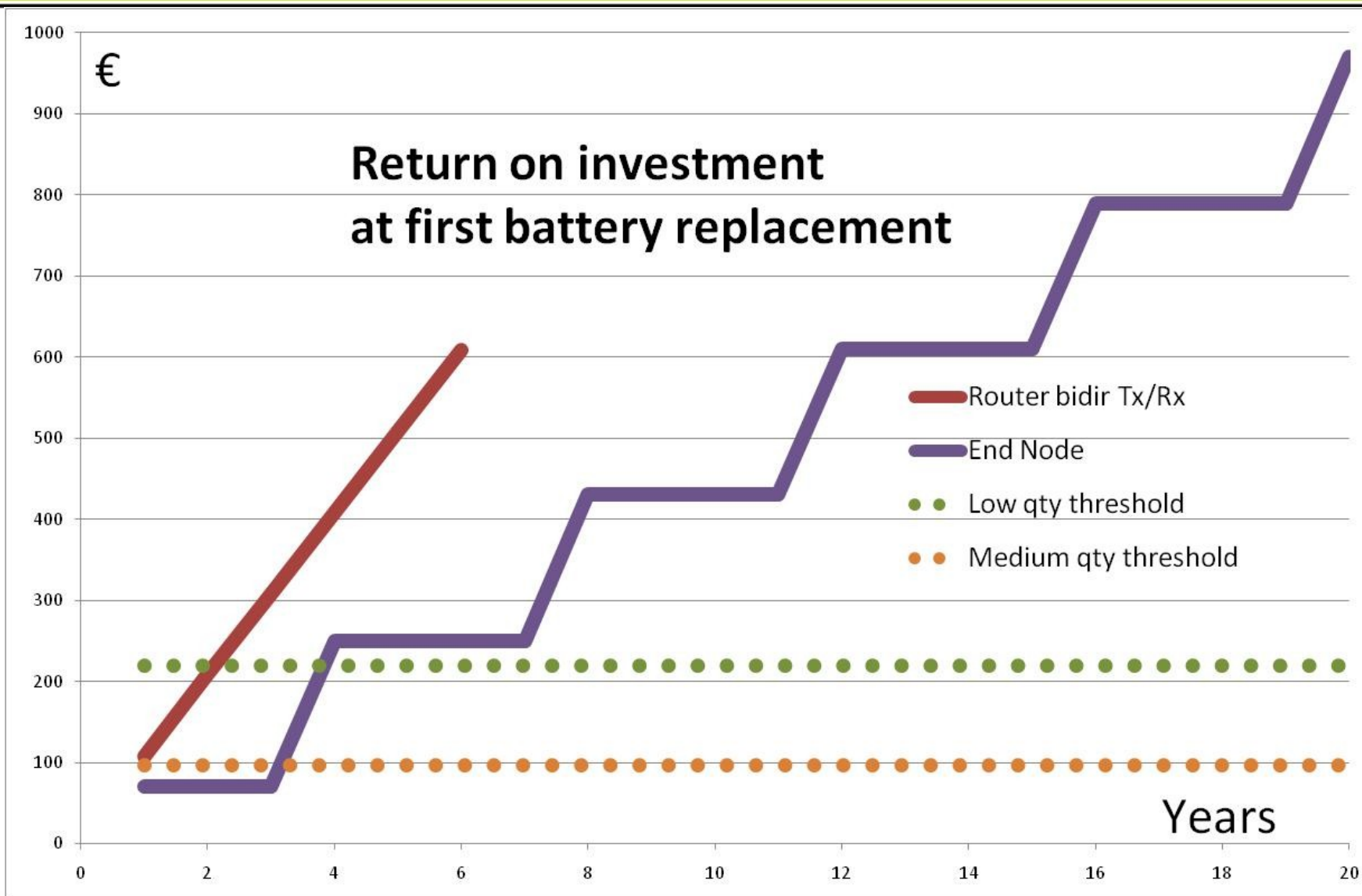
# CUSTOMER VALUE CREATION

- Microgenerator powered
  - **No wiring cost !**
  - **No life time limitation** for the wireless application
- No battery replacement
  - **No worry** for elder people
  - Easy to use for operators
  - **No maintenance costs**, ie lower total cost of ownership
- No battery trap
  - **Stronger design** for industry
  - Safer design for kids & workers
- High energy production
  - 5 to 10 times more energy than competitors
  - Ability to power most of radio protocols
  - **Ability to power low cost radio circuits**
  - Best power/weight rate, esp. in vibration
- Reliable
  - Very long life time > 700 000 pulses without loss
  - Tested from -17 C to +80 C
  - Solid state technology (piezo) no wear of core microgenerator





# WIRELESS SENSORS NETWORK





# ARVENI VALUE ADDED

Source	Main feature	Energy input (Ei)	Harvested power
Pedestrian	Sensitive	$E_i = W * \text{slab stroke}$	1 to 2 W (busy street)
Road/railway	Heavy	$E_i = W * \text{strain}$	100 W (busy lane)
Human movement	Ergonomic	$E_i = \frac{1}{2} M_h * v^2$	Lack data
<b>Vibration</b>	Wide frequency range	$E_i = \frac{1}{2} F a / 2 \pi f$ $= \frac{1}{4} M_d a^2 / \pi f$	0 to 50 mW, i.e. power up to 500mW
<b>Finger pushing a button</b>	Predictible	$E_i = \frac{1}{2} F * \text{stroke}$	0.2 to 5 mJ, i.e. power up to 70 mW

High power  
→ Highest mW/gram

Conversion rate  $\eta_{\text{harvester}}$  5 to 10%

**World class efficiency**



# PRICING & COMPETITIVNESS

PULSE EH	Dimension (mm)	Price in 100k volume	Price of energy
AR01 (2mJ)	55*15*15	<b>4.9 €/pc</b>	2.5 €/mJ
AR02 (1mJ)	30*10*10	<b>3.5 €/pc</b>	3.5 €/mJ
AR03 (0,6mJ)	40*6*6	<b>&lt; 3 €/pc</b>	< 5 €/mJ
Competition Coil/magnet	(0,2mJ) 30*20*14	2.5 €/pc ( <i>public data</i> ) Not available as stand alone !	12.5 €/mJ



Arveni is focused on the most demanding applications.