

# EURIPIDES Forum 2010 in Paris

September 30<sup>th</sup> – October 1<sup>st</sup>, 2010 in Paris

## ENERPACK MULTI LOW POWER ENERGY SOURCE PACKAGING

### Main objective

Packaging a new multi low-power energy source system with :

- High integration scale of multiple technologies : optic, silicon, mechanic, piezoelectricity, thermo engineering.
- Use of renewable energies : sun, wind, t°, mechanical vibrations and pulses.
- Improvement of the global efficiency by closed association of the different micro sources.
- Electrical energy production : up to 20Wh per day.
- Wireless control.
- Substantive cost cuts in regard with the usual hardwired solutions.
- Low cost and free maintenance.

### Challenge

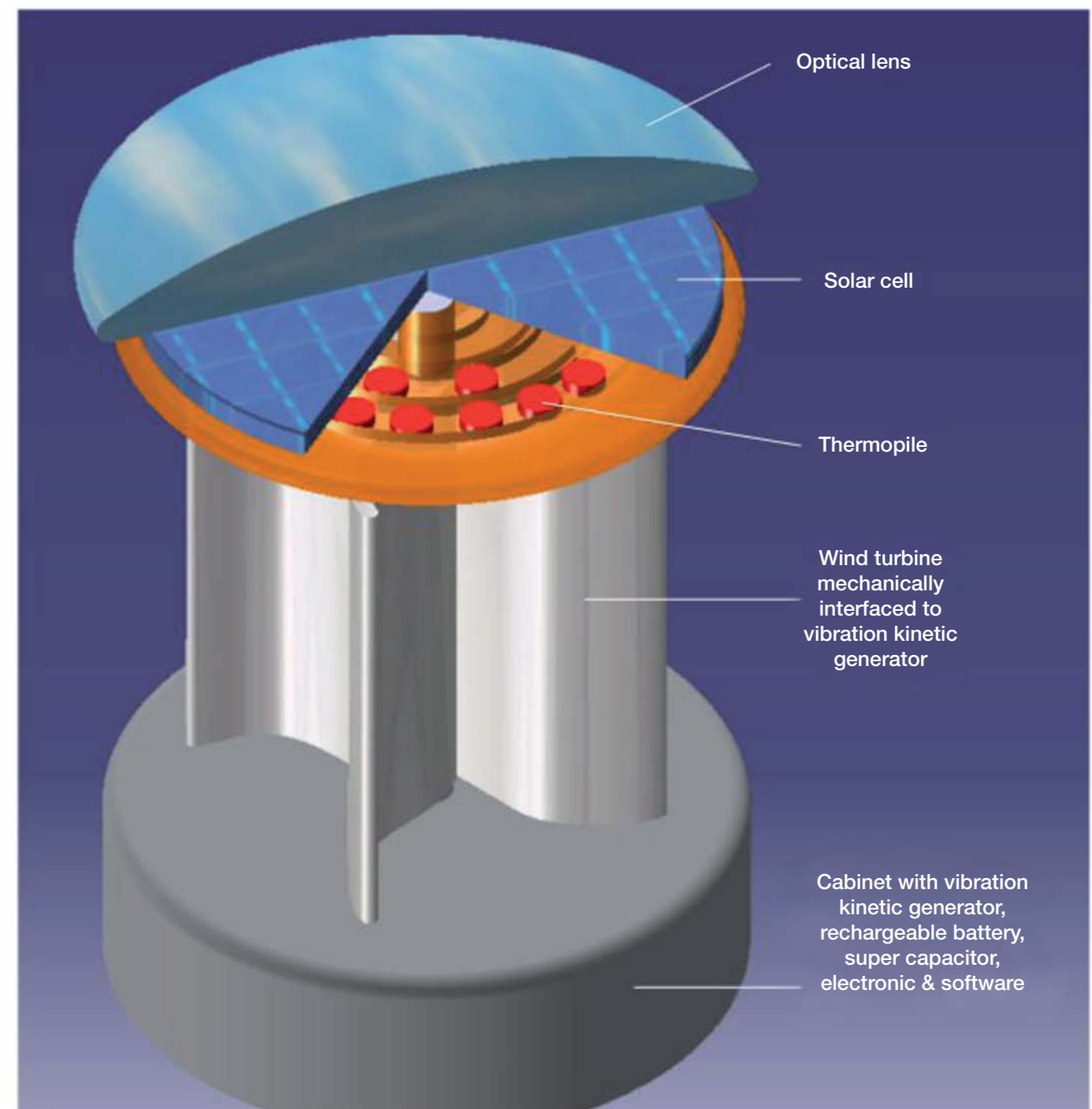
- Getting a smart and low cost package.
- Integration of all the necessary micro renewable energy transducers.
- Outdoor environmental constraint consideration.
- Regular energy production everywhere in the world.
- Multi function component and circuit interconnection.
- Embedded processing architecture.
- Research for efficient association of the micro sources.
- Research for efficient energy storage architecture.
- Use of low-power circuits and components.
- Use of CMOS technology.

### Solution

- Electronic core : low-power processor and wireless communication standard.
- Embedded software: Absolute Maximum Power Point Tracking algorithm.
- Micro renewable energy sources : solar cells, thermopiles, micro kinetic generator, original wind turbine, fuel cells.
- Energy storage components: complementary components like lead or lithium battery, super capacitor.
- Standard wireless communication for sensor data and meteorological forecast data to and from the supervisor.
- Closed association of the thermopiles and the solar cells.
- Integration in the same piezoelectric generator of the vibration transducer and the wind turbine.
- Thermal integration and interconnection for increasing the temperature delta inside the package.

### Applications

- Environment monitoring: quality and toxicity surveillance of the air and water, seismic surveillance, flood sensors, great infrastructure surveillance (bridge, ...).
- Surveillance and protection of sensitive sites : nuclear plants, atomic research centers, energy distribution networks, water tanks, Seveso industrial factories, pipelines, borders, containers.
- Outdoor public area surveillance and control : crossroad, highway, airport, harbor, train station.
- Nomad smart device supplying (smart phones, laptops, play stations, GPS, ...).



Project started in December 2009

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