Industrial Technologies 2014

SMART GROWTH THROUGH RESEARCH AND INNOVATION

HIGHLY EFFICIENT ELECTRICAL ENERGY PRODUCING NANOSTRUCTURE

GR 2014 eu

A GREEK EU PRESIDENCY EVENT, UNDER THE AUSPICES OF THE GENERAL SECRETARIAT OF RESEARCH & TECHNOLOGY (GSRT).

FUNDED BY THE EUROPEAN UNION - FP7

TABLE OF CONTENT

1.INTRODUCTION

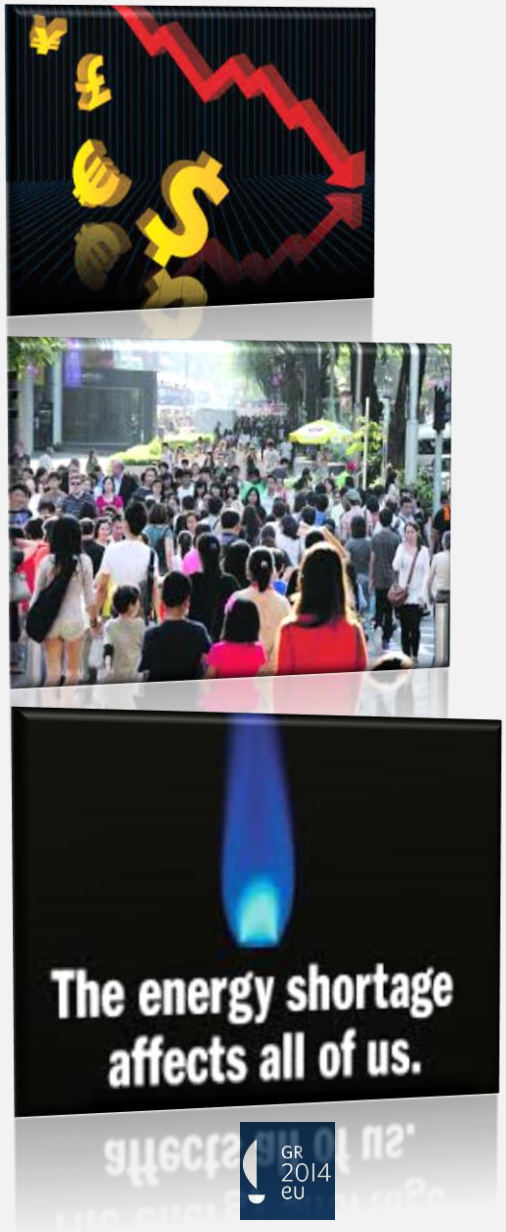
Reality today:

- International Economic Breakdown
- Rapid Population Growth
- Energy Shortage

Reality at our school:

- Minimum central heating
- NO air-conditioning
- Very low economic means

How can nanotechnology help in order to face all these vital issues?



WE SUGGEST

Exploitation of the ***constant movement*** and ***sound*** produced daily in our school, during lessons or breaks, in the gym or in the corridors, in order to generate the energy needed for its daily function.

How?

By exploiting three basic natural phenomena:

- Photovoltaic Effect
- Superconductivity
- Piezoelectric Effect

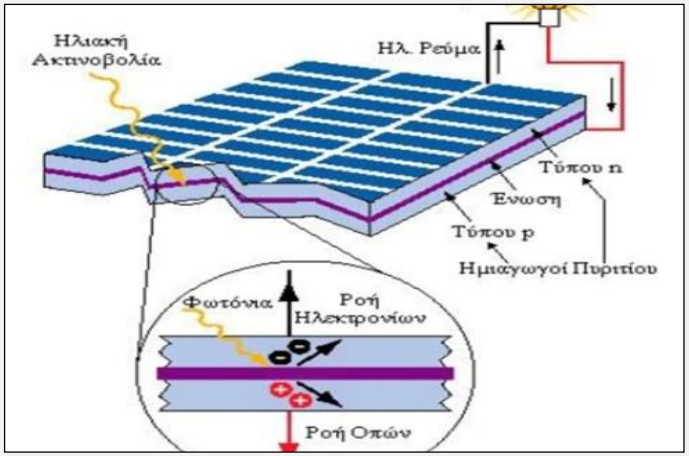
WHAT LEAD US TO THIS THOUGHT

A pressing need for:

- Alternative, environmentally friendly energy sources
- Financial flourish
- Self sufficiency
- More economical heating, lighting, and air-conditioning in areas of mass concentration , e,g, schools
- A radical reduction of fossil fuel use

2.PHOTOVOLTAIC EFFECT

The general term “photovoltaic”, refers to the industrial lining of more than one photovoltaic cells. In essence it is artificial semiconductors which are combined in order to create an electrical circuit in series.



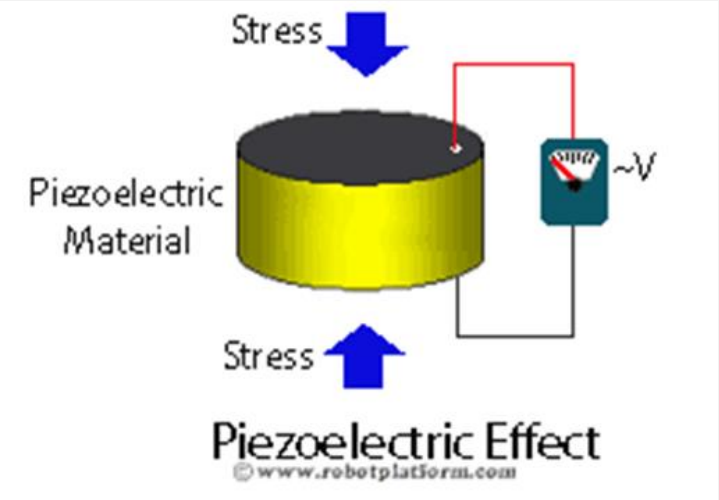
First Generation → is based on the traditional technology of silicon

Second Generation → is based on the use of thin films

Third Generation → is based on the use of thinner and smaller materials

PIEZOELECTRIC EFFECT

This term is described in the property of certain materials to produce electrical voltage as a result of applying certain mechanic pressure or oscillation



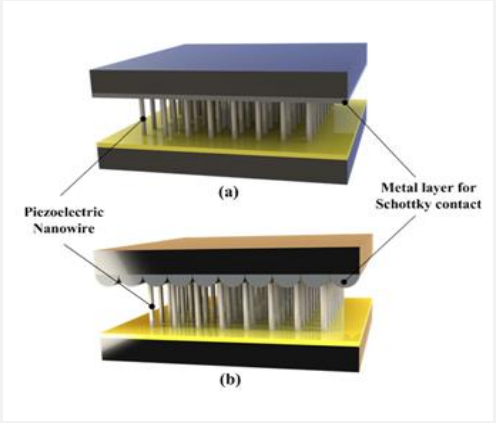
It appears in materials with crystal structure without center of symmetry

It needs to be placed in certain condition of temperature (Curie Temperature) in order to function

Under specific conditions it achieves polarization

SUPERCONDUCTIVITY

It refers to the state in which a material have zero ohmic resistance.



Interpretation

It is a quantum phenomenon where Electrons are the natural hosts of the electric current in the conductors and the scattering in the crystal lattice.

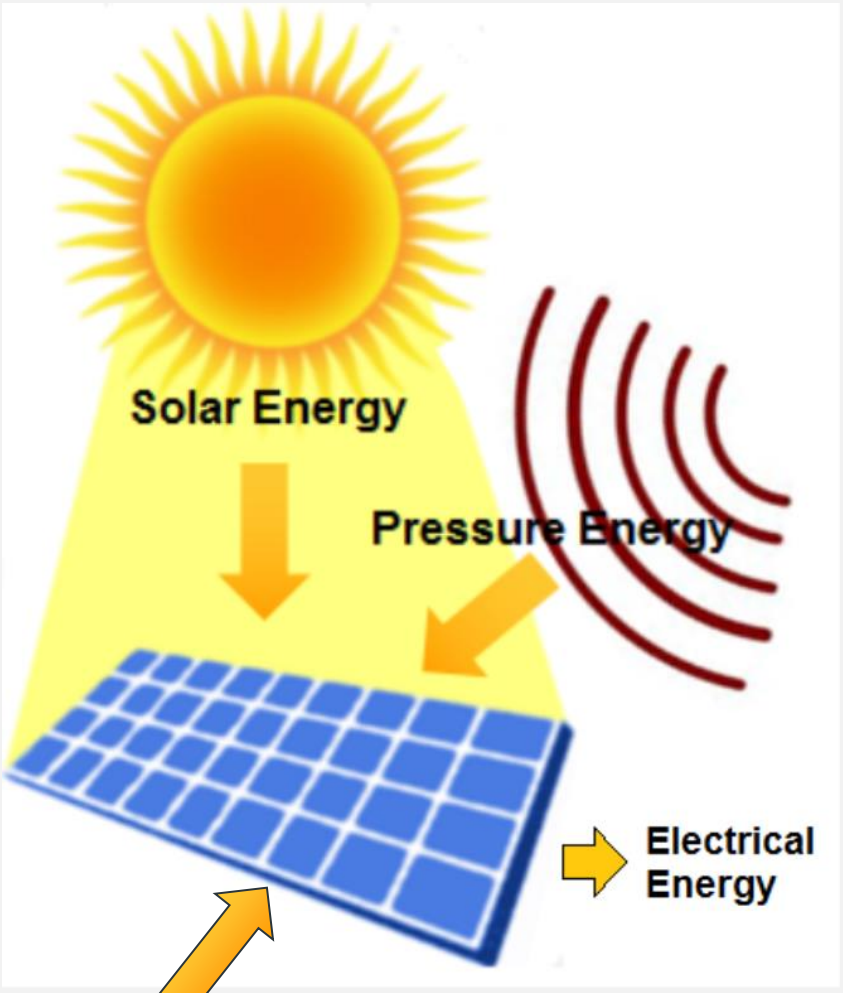
Properties

The basic properties are maximum amperage and magnetic field strength as well as repulsion of the magnetic fields.

Applications

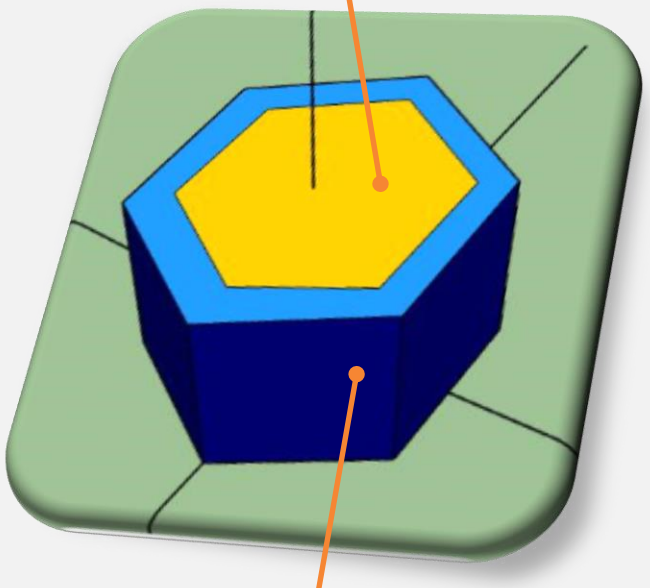
One application is the creation of a powder form. This powder is used for manufacturing superconducting wires of a relatively small length which are used in nuclear reactors

3.DESCRIPTION
CONVERTING THE ENERGY



Energy transportation part

Mechanical-to-electrical energy conversion part.

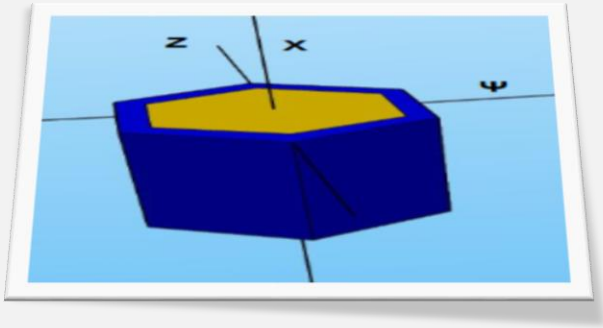


Solar-to-electrical energy conversion part

THE SHAPE OF THE NANOSYSTEM

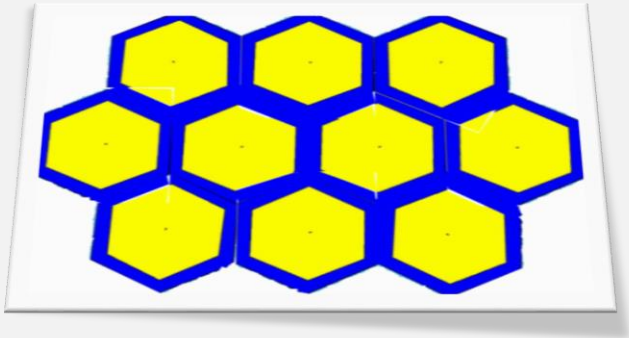
- Hexagonal prism

  Great mechanic properties

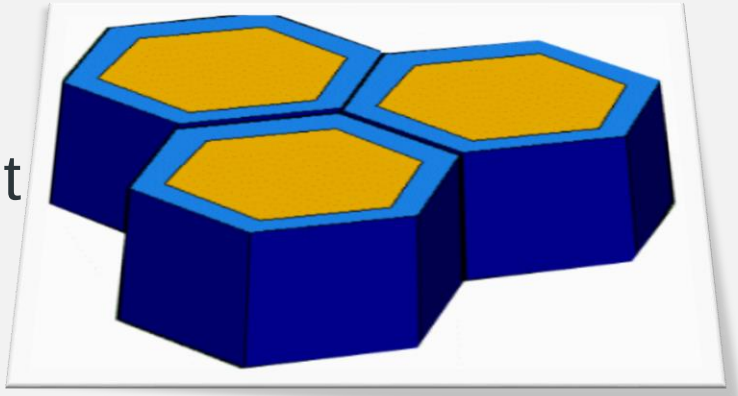


- No empty space

  High degree of strength



- According to the needs of the client

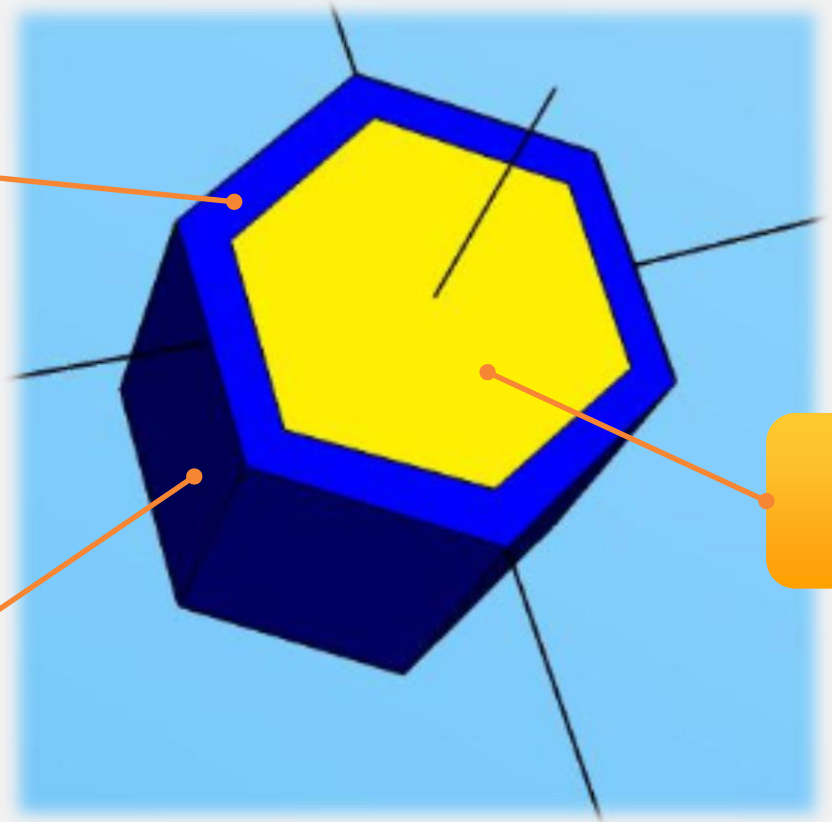


THE PARTS OF THE NANOSYSTEM

The photovoltaic and energy transportation system

The piezoelectric system

Superconducting polymer



Crystal-type material

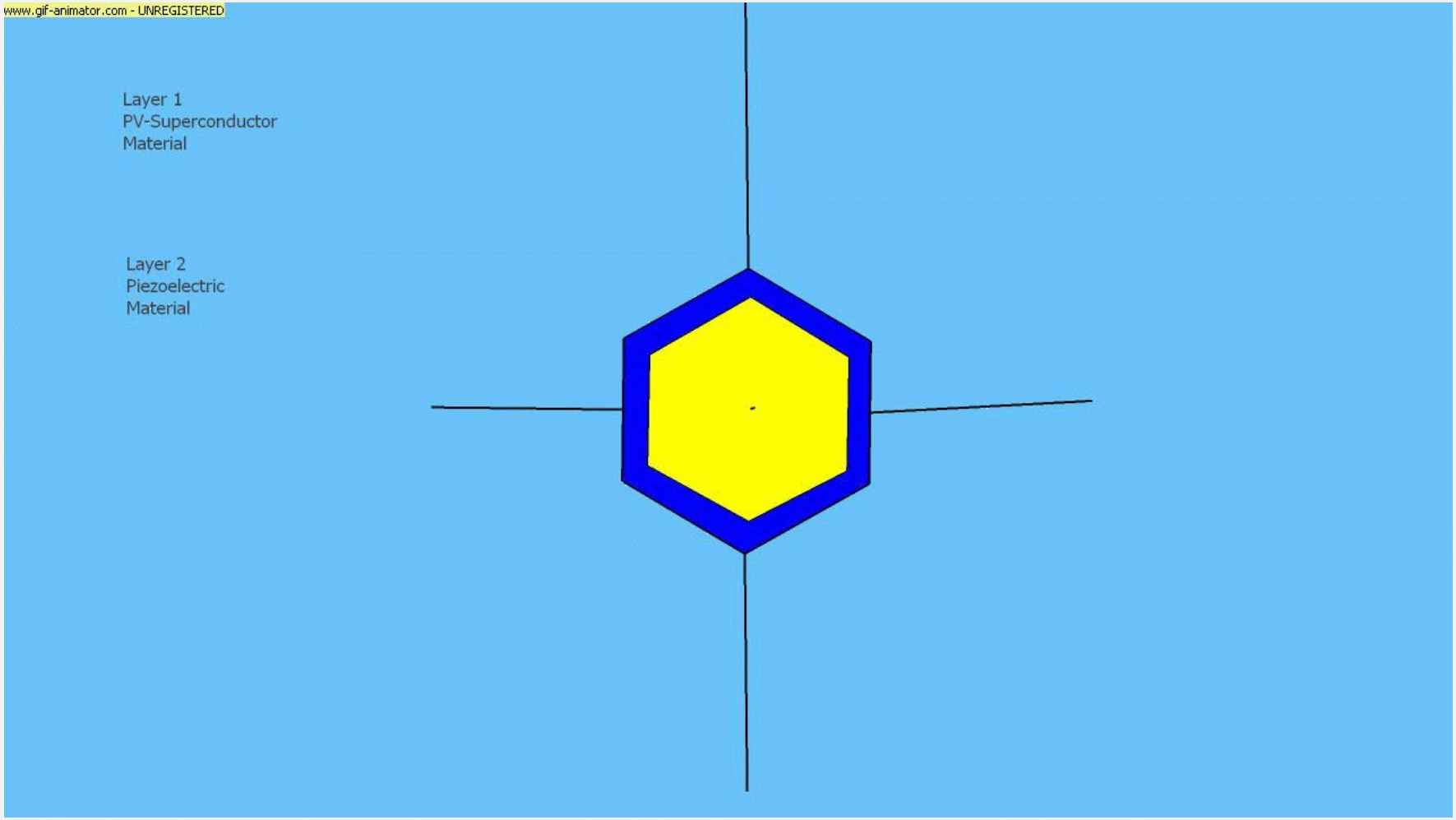
Photovoltaic polymer

DESCRIBING THE MODEL

The photovoltaic and energy transportation system

The piezoelectric system

The main Update



1.THE INDUSTRIAL MANUFACTURING

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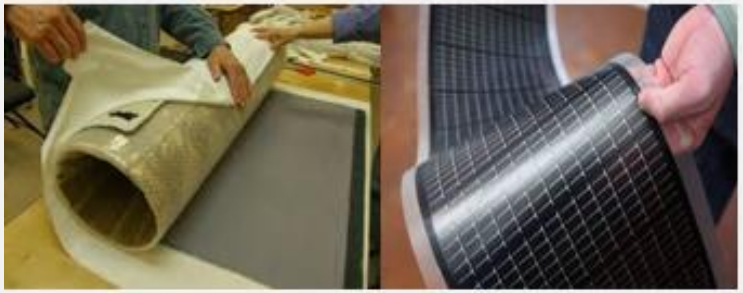
Coating Powder

Textile



Liquid solution

2.THE IMPROVEMENT OF THE NANOSTRUCTURE

Add-on Modules

Chemical Substances

5.APPLICATIONS

- The nanosystem is designed in such an innovative way, in order to be able to fit everywhere.

- The idea is based on a specific logic: By applying mechanical pressure on a surface, coated with the nanosystem, which can absorb solar rays at the same time, you are producing electrical power. It can be applied in all surfaces where maximum pressure and solar radiation are expected.

- Also, the nanostructure can be used as the main construction material for the power transportation network.

Just an example among the countless applications of the nanosystem is the school building: external walls, internal walls, corridors, staircases and classrooms are the recommended locations for coating

POSSIBLE APPLICATIONS

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Aeronautics

Civil engineering

Railways & Automobile

Electronics

Shipbuilding

POSSIBLE APPLICATIONS

Energy producing facilities

Clothing and shoes

5.CONCLUSIONS

- Inspired by the current heating problems in our school community, we designed and produced our nanoproduct.
- With the nanostructure we focus on the photovoltaic effect, the exploitation of the piezoelectric effect and the superconductivity.
- We do hope that our achievement is accepted in the global community, serving as the ultimate low-cost proposal for a “greener” and efficient electrical energy production.
- Nanotechnology can offer opportunities in terms of financial improvement and the creation of new industries.
- The exploitation of nanotechnology through entrepreneurial activity could be an opportunity for the Greek economy.