

# Energy Storage Using Thermal Processes and Nanotubes

Author: Marcello Pompa – Industrial Engineering – University “Campus Bio-Medico” of Rome

## 1. Theme description

Since 1970, the science had tried to find a solution at the energy crisis, developing new method to use and storage renewable energy<sup>[1]</sup>.

The United States Department of Energy has expected that the world’s energy consumption will be increased by 20% and that overuse fossil fuels will have a hard impact on climate<sup>[2]</sup>.

The hardest current global challenge is to use the renewable energy rather than fossil fuels, improving the storage energy efficiency<sup>[3]</sup>.

One of the most interesting technologies in the energy storage and conversion is the nanostructured materials for their mechanical and electrical properties<sup>[4]</sup>.

Carbon nanotubes (CNTs) are a kind of nanostructured material with very good electrical and mechanical properties thanks to their dimension and surface properties. Carbon nanotubes were discovered in 1991 as a minor byproduct of fullerene synthesis<sup>[5]</sup>. The research into CNTs has increased, reducing significantly the cost of this technology and improving the processability and scalability<sup>[6]</sup>. Nanotubes discovered are of two types: single-wall and multiwall.

In the following, an overview the thermal processes to store energy, in particular the using of Carbon nanotubes in energy field (with a description of this technology and a presentation of the major results obtained by CNTs) are reported.

**[1]** <https://www.history.com/topics/energy-crisis>

**[2]** Shukla, A. K. S. S., &Vijayamohanan, K. (2000). Electrochemical supercapacitors: En- ergy storage beyond batteries. Current Science, 79.

**[3]** Arico, A. S., et al. (2005). Nanostructured materials for advanced energy conversion and storage devices. Nat Mater, 4(5), 366-377.

**[4]** Chung, J., et al. (2004). Toward Large-Scale Integration of Carbon Nanotubes. Lang- muir, 20(8), 3011-3017.

**[5]** Lijima, S. Nature 1991, 354, 56-57.

**[6]** Sherman, L. M. (2007). Carbon Nanotubes Lots of Potential–If the Price is Right. 01/05/12]; Available from:, [www.ptonline.com/articles/carbon-nanotubes-lots-of-potentialif-the-price-is-right](http://www.ptonline.com/articles/carbon-nanotubes-lots-of-potentialif-the-price-is-right).

**To see more go to full text article**

