# ENERGY DYNAMICS & ENVIRONMENTAL HEALTH

# DINAMICA ENERGIEI ŞI SĂNĂTATEA MEDIULUI

**Lucreţiu DANCEA, Iuliana MERCE***

****Agricultural and Veterinary University of the Banat, Timişoara, Romania***
*Corresponding author: Lucreţiu Dancea, e-mail: danluc71@yahoo.com*

***Abstract:*** *By understanding the secret lives of energy -- how it exists, how it is created, how it acts and even where it can be found, we can better understand how to tap the world of energy available to meet our continuously increasing energy demands.*

***Rezumat:*** *Prin înţelegerea secretului "vieţii" energiei, cum există ea, cum este creată, cum acţionează şi unde poate fi găsită, vom putea ştii cum o vom putea capta pentru ane putea satisface cerinţele crescânde de energie.*

***Key words*****:** *energy dynamics, environmental health, coal*
***Key words*****:** *dinamica energetică, sănătatea mediului, surse de energie*

## INTRODUCTION

By understanding the secret lives of energy -- how it exists, how it is created, how it acts and even where it can be found, we can better understand how to tap the world of energy available to meet our continuously increasing energy demands. The issues really aren't about energy at all, but about how we try to get it and use it! The specific issues concern the fuels we use to create energy. All fuels have to go through either a chemical or physical change to create energy, whether it's the burning of oil (chemical) or the boiling of water (physical).

Yet, while using fuels such as fossil fuels as energy resources, not only is their kinetic energy potential released, but the very carbon molecules that make these fuels such powerful energy sources are also released. The end result is pollution, pollution that not only causes health problems but also directly contributes to today's global warming trends. The costs of these side-effects cannot be calculated but can only be measured in terms of the costs of lives and quality of living, environmental health, and climatic change.

## MATERIAL AND METHODS

*A Global Perspective*

Already, the world is making progress in tapping alterative forms of energy from solar, wind and water, to nuclear, biomass, geothermal and even new forms of fossil fuels. Currently, hydroelectric energy -- which is the kinetic energy of falling or moving water, is the world's largest source of renewable energy. Over 80 percent of the world's renewable energy is hydroelectric. Hydroelectric is followed by solar energy, biomass and wind in that order.

But let's this put this in its proper perspective. According to recently released data by the International Energy Agency (IEA), fossil fuels currently provide 81.0 percent of the world's primary energy supplies! Biomass and other combustible renewables and waste account for 10.0 percent, and nuclear energy accounts for 6.3 percent. Hydro (moving water) alone accounts for 2.2 percent with all other renewable resources meeting .5 (five-tenths) of a percent of the world's total energy appetite.

Total world electricity demand -- which is part of the total world energy demand -- still depends primarily on fossil fuels but to a somewhat lesser extent. Hydro and other renewable energy sources account for 18.2 percent of the world's total electricity needs. Fossil

fuels still account for well over half of the world's electricity supplies – 66.6 percent according to the IEA, while nuclear energy supplies 15.2% of the world's electricity.

## RESULTS AND DISCUSSIONS

*The Alternatives*

Renewable energy is the ultimate replacement for any non-renewable source. Certainly, the day will come when this fossil fuel era will pass and eventually fade totally into the history books. And what will life be like then? Even more important perhaps is what we will have to do -- and even endure -- to get there.

Despite nuclear energy's role as a significant power supply source, it is highly unlikely it will survive past the 21st century if that long. Many people are against it, storage of its highly radioactive wastes is difficult and costly, there are not enough ores available to maintain continued production of nuclear energy as it is being done today, and most of today's nuclear plants will reach the end of their life-span within the next 50 years.

Wind and hydro are two low-cost renewable energy sources that have been used for many generations. While hydro (right) provides about 2.3 percent of the world's total energy demands -- by far the greatest source of renewable energy, wind power technology has become a far more efficient renewable energy source. The challenge to using wind power primarily exists with location.

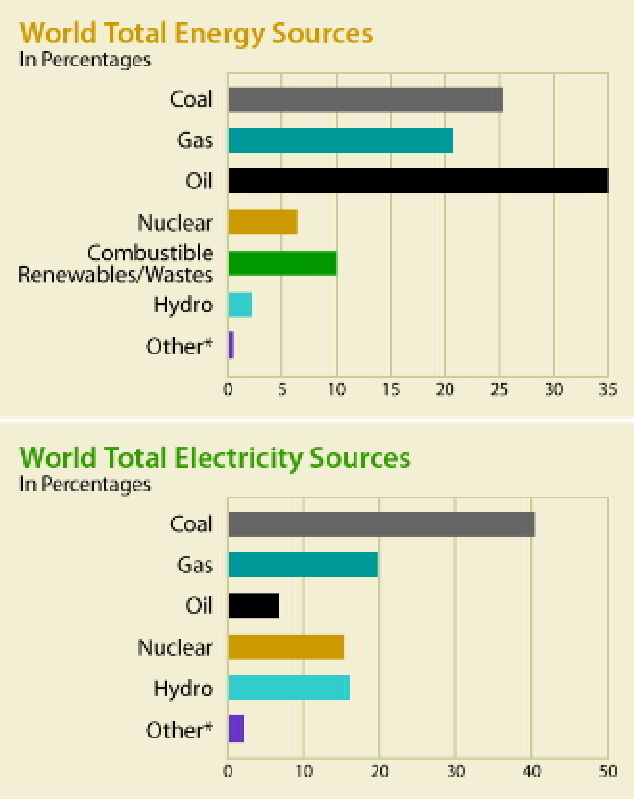


Figure 1. World total energy sources Includes Geothermal, solar, wind, etc.
(Source: IEA World Energy Statistics 2007 Edition)

While hydro, solar, wind (a very efficient energy source), geothermal are currently our most promising forms of renewable energy to develop for future use, there are sources that many scientists classify in the "surprise category" that theoretically hold great promise. These sources range from the mining of methane hydrates (a fossil fuel that exists under the oceans and are very difficult to reach and dangerous) and hydrogen fusion from simple H2O -- the same process that powers our Sun and all the stars of the universe, to sources we have yet to discover. The startling potential of hydrogen fusion is so great that the US government has launched an initiative to study whether it's feasible within the next 35 years to develop and use what's known as fusion energy.

And, yes, there are other fossil fuels that some scientists believe may be able to help contribute to the current energy pressures, but these forms have a low net energy yield, are difficult to process, and have serious pollution side-effects. They are oil shale and tar sands. Still, it appears unlikely that these forms will ever be used as significant sources of energy.

The Sun, no doubt, holds the greatest potential to meet the world's energy demands. But it will take a change in the technological, political and economic landscape for it to be realized. Still, the most plausible answer for our indefinite energy needs lies in a cohesive, sensible and ecologically sustainable combination of the resources available to us. The incentives must be there to be successful -- political, economic, and human intelligence -- and success can be achieved only through the use of renewable energy in ways that will ensure the healthy sustainability of Earth's life systems. As Nobel Laureate Sir George Porter so eloquently said in the late 1960s, "I have no doubt that we will be successful in harnessing the sun's energy If sunbeams were weapons of war, we would have had solar energy centuries ago."

## CONCLUSIONS

*Can Alternative Energy Meet the Demand?*

Despite exceptional progress in the development and application of alternative energy, increasing worldwide energy consumption is making it difficult for these new energy resources to replace fossil fuels. Alternative energy today meets only about 12.78% of the world's power demands -- including combustible renewables and wastes – (*Source: IEA, 2007*), and that's with nearly 6.8 billion people living on the planet. In 100 years, the population is expected to double. That's over 13 billion people living on the planet... at the same time... using the same power sources! The demand for energy then will be five times greater than what it is now. Considering current projections for world energy demand increases, by 2030, renewable energy is expected to meet only 8% of the world demand, according to the *Energy Information Agency*. Yet, the World Renewable Energy Network says that 70 percent of the world's energy ***could*** come from renewable sources by 2070 through innovation and advanced effort.

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