

## **DISCOVERY OF NEW, ENDLESS ENERGY SOURCE IN THE FUTURE**

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The world is facing with a difficult choice for sustainable development in the future when energy sources are gradually depleted. According to figures (in 1999) of MITI - Ministry of Trade and Industry of Japan, oil would be exhausted after about 50 years, respectively natural gas – 60 years; coal – 230 years; Uranium – 70 years. According to Edwin Cartlidge (Physics World 7/2007), the annual total consumption of energy sources by the world population is about  $1.4 \times 10^{17}$  kWh, of which the proportion of the fossil energy has accounted for 90% of the energy sources used. This is the most polluting source of energy, causing the warming of the Earth due to the greenhouse effect. Nuclear energy is not a long term choice because of not only being exhausted at the end of the century, but also lack of safety with radioactive incident as ever happens in Chernobyl (former Soviet Union) and Fukushima (Japan). So, the proportion of nuclear power will decline from the current level of 7.3% to 4.6% in 2030. Hydroelectric energy also changes climate and environment in regions. The focus toward renewable energies such as wind power, solar power, tidal power, biological energy, etc. is the topic discussed within a few last decades. However, the question about alternative energy fossil energy sources has been still open. Loss of energy security is not only the challenge for sustainable economic development worldwide, but also the potential reason causing regional conflicts such as the Gulf Region, East Sea, etc.

Solar energy is considered as one of forms of renewable energy selected. Each square meter on the Earth surface perpendicularly shined by the Sun when it is cloudless can deliver ~ 1kW light power, i.e. ~ 4,000 kWh/year. Performance to receive the energy from the solar battery is at 25%, so it is necessary to have 4 m<sup>2</sup> of area to acquire a capacity of 1 kW. So, to provide energy for the whole world within 1 year, it is necessary to have an area of about 100 million km<sup>2</sup>, equivalent to the total area of Europe, Asia and America, or two third of the total area of the continents – This is a utopian thing.

However, understanding about the source of solar energy so far has just stopped in physical knowledge at the early of the last century. It is said that the light is a collection of photons containing energy which is calculated according to the Plank's formula:  $E = h\nu$ , in which  $h \approx 6,63 \times 10^{-34}$ Js;  $\nu$  – the frequency of the

photon. In the "Photon structure" Report presented at the 6<sup>th</sup> National Conference on Optics and Spectroscopy, 2010 in Hanoi, which is accepted to publish in the Proceedings: "Advances in Optics, Photonics, Spectroscopy & Applications VI, 2011", the author proved that the photon was a particle structured from two basic particles namely electron and positron; the energy calculated according to the formula above is only the external energy of photon, rather than its total energy including the internal energy. Total energy of the photon, calculated fully, is not less than there is  $W_{ph} = 4m_e c^2$  in which  $m_e = 9.1 \times 10^{-31}$  kg – mass of electron;  $c = 3 \times 10^8$  m/s – the speed of light in vacuum. It means that for each photon, external energy is known only as a very small value compared to its total energy:  $h\nu/4m_e c^2$ . For example, with infrared rays with  $\nu = c/\lambda \approx 4,3 \times 10^{14}$  Hz., we get this rate of  $\sim 1/1.150.000$ , i.e. less than parts per million times compared to the unexploited energy source "hidden" in the photon. This makes us recall before Einstein invented the formula  $E = mc^2$ , it is assumed that the energy of all materials only included kinetic energy and potential energy (actually, it is the external energy) but exclude their internal energy. But the reality has proven how great the internal energy is and thanks to exploitation of internal energy, it opens the "Era of Atomic Energy". However, the exploitation of energy sources is also only to take advantage of parts per thousand total energy contained in the formula  $E = mc^2$ .

Now, if it is able to take advantage of the same level for photon with the structure discovered by the author, we will gain energy source thousands of times greater than what received currently from its external energy. And this nature is also only for photons, rather than any particle as known. It also means that each square meter surface of the Earth can be offered not only  $\sim 1$  kW power of sunlight, but also thousands of kW. Meanwhile, to provide enough energy for the whole world, it only needs an area of 1/30 times the area of the Sahara desert – a real condition. The more important thing is that it is never over out of (at least until the Sun is ceased its existence after next four billion years) and completely friendly to the environment. Moreover, due to taking advantage of internal energy of photons, so the elements of weather, location of the Meridian, the position of the Sun, etc. almost do not affect, since they only change the external energy of the photons. Therefore, the applicable scope will be extended to the polar regions, or under the sea for submarine, etc. even working conditions at night with infrared radiation, or microwave wave – these photons only vary primarily by wavelength, i.e. their external energy, while their internal energy are almost the same and approximately equal to  $4m_e c^2$ .

The only problem is which mechanism to collect that huge source of energy. The idea actually was very simple: to separate electron and positron in structure of photons. The nature has done that for the  $\gamma$  particle, when it flies close atomic nuclear – it is known as particle production reaction. However, due to  $\gamma$  particle size is approximate with nuclear size (about  $10^{-15}$ m), so the impact of the nuclear can work. Whereas, with regard to other photons, in the nature there is no mechanism to split their constituents, on one hand, because size of the corresponding photon is too large compared to atomic nuclear; on the other hand, because it is difficult to access to the atomic nucleus with the surrounding electronic fence. However, thanks to the scientific and technological advances of the early XXI century, the separation of electron and positron particles from each other could have done in principle. And so, there is a chance to take advantage of the internal energy of photon, opening up the "Photon Energy Era" instead of the "Atomic Energy Era" going closed. The prospect in the future: When the photon generator become reality, this planet will do not need the large-scale centralized power plants, therefore, column of high voltage electricity transmissions will not be necessary and instead of that, the own generator will appear in each family, in each transport, in each machine tool... ; the concept "electrical grid" will disappear from the technical vocabulary.

The most important thing to emphasize is that so far, we have never known this hidden power source of light, but only satisfied with its effects from the external energy according to the formula  $E = hv$  – a very small part of the light energy. So, it is able to say that ***photons are the main & endless energy source in the future of the humankind***; It is non-toxic to humans and the environment, does not cause global warming effects, but in contrast, helps balance the process of thermal radiation from the Earth's surface into space around. Essentially, it is the "an arrow hit multiple targets" such as energy security, prevention from environmental degradation and social stability.

They are also the most practical benefits that "The New Way of Physics" can bring to humanity, besides its really break-through new knowledge toward the natural world. It is aspired that the humanity focus facilities and manpower on the energy exploitation towards this way, to bring the practical benefits, but not waste your money to find "God's particle", which is actually in vain. Because once this new energy sources is found out, it also means that the mass is not caused by a certain Higg particle, but just the avoidable result of the interactions in the potential force fields between physical objects.