

TECHNOLOGICAL BREAKTHROUGHS IN PAST, PRESENT AND FUTURE

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Technological breakthroughs are moments of significant development or achievement that can revolutionize industry, society, the market, and others. Which leads to the creation of new products, analyses, and services for humanity. Technological breakthroughs have occurred throughout humanity’s history; one breakthrough in the past leads to more discoveries in the future. For example, the sphere of nuclear energy started great development in the early past; in the 20th century, up to this day, this sphere has developed and has great potential in the future.

One example of a technological breakthrough in nuclear energy in the past is the first controlled nuclear fission, which occurred on December 2, 1942, at the University of Chicago. Enrico Fermi and his team of physicists have built the World’s first nuclear reactor, called “Chicago Pile-1 (CP-1)” It used ultra-pure graphite and uranium, which created a self-sustained chain reaction of nuclear fission. The discovery of the ability to control nuclear fission has given humanity a new source of energy that we now use to provide a great amount of it for civilian use.

However, nuclear fission has downsides such as high production of radioactive waste, the chance of catastrophe, and less production of energy than nuclear fusion. Because of these circumstances, this led to research into potential nuclear fusion.

On December 13, 2022, a technological breakthrough in net energy gain from nuclear fusion was discovered. Scientists from the US announced that they were able to gain more energy from fusion reactions, then waste energy on rising temperatures for the fusion to start. However, nuclear fusion still has some challenges that have to be overcome before using it, one of which is the ability to sustain the nuclear reaction for a longer time.

But this gives humanity huge potential to use nuclear fusion in the future, considering that if other challenges are surpassed, this will lead to a great technological breakthrough. Nuclear fusion is considered to be “clean” compared to nuclear fission. Fusion doesn’t produce greenhouse gases, produces less radioactive waste, uses abundant and cheap fuel sources for producing energy, and also has less risk of accidents and catastrophes. From an energetic point of view, nuclear fusion also produces more energy than nuclear fission, which, as a result, means that nuclear fusion surpasses fission drastically.

Analyzing the information, we can say that technological breakthroughs give more space and ways for research and discovery now, which humanity uses for future benefits and gains.

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