

Fusion Energy

Presenting a new invention

<http://www.inertialfusion.energy/>

Introduction

Fusion energy is regarded as the pinnacle of energy production. Earth crust contain Lithium, and Sea water contain deuterium to supply the global energy needs for billions of years. It provides carbon free energy to solve global warming and it is not producing a significant waste.

History

For seventy years there was an intensive research to build a fusion reactor. To this date attempts failed, currently there is no working fusion reactor. All experimental reactor consumes more energy than what they produced.

Development Fields

Fusion research main fields are Magnetic confinement and Inertial confinement.

- In magnetic confinement a hot plasma is confined by strong magnetic fields to hold it distant from the apparatus walls. The separation of walls from the extreme heat of the plasma protects them from overheating and damage.
- In inertial confinement several lasers heat a small sphere containing deuterium and tritium.

Magnetic Confinement

The main magnetic confinement apparatus is the tokamak that has a donut shape. It produces donut shaped plasma held in place by a toroidal magnetic field. The magnetic fields are produced by strong electromagnets made of superconductors.



The Joint European Torus

Inertial Confinement

The main Inertial confinement experiment is the National Ignition Facility. A Powerful 192 laser beams are focused into the target chamber containing a deuterium and tritium 5-millimeter sphere.



A laser at the National Ignition Facility

ITER

The most powerful tokamak is now built in France by an international collaboration of 35 nations and is called ITER. It cost about 20 billion dollars. According to its designers ITER will produce 500MW of energy 10 time the energy it consumes. The ITER project started in 1988 and its construction will end in 2025.



ITER

New Startups

There are several new startups in the fusion field.

There is around 1.3 billion dollars invested in those fusion startups around the world.

The most prominent are:

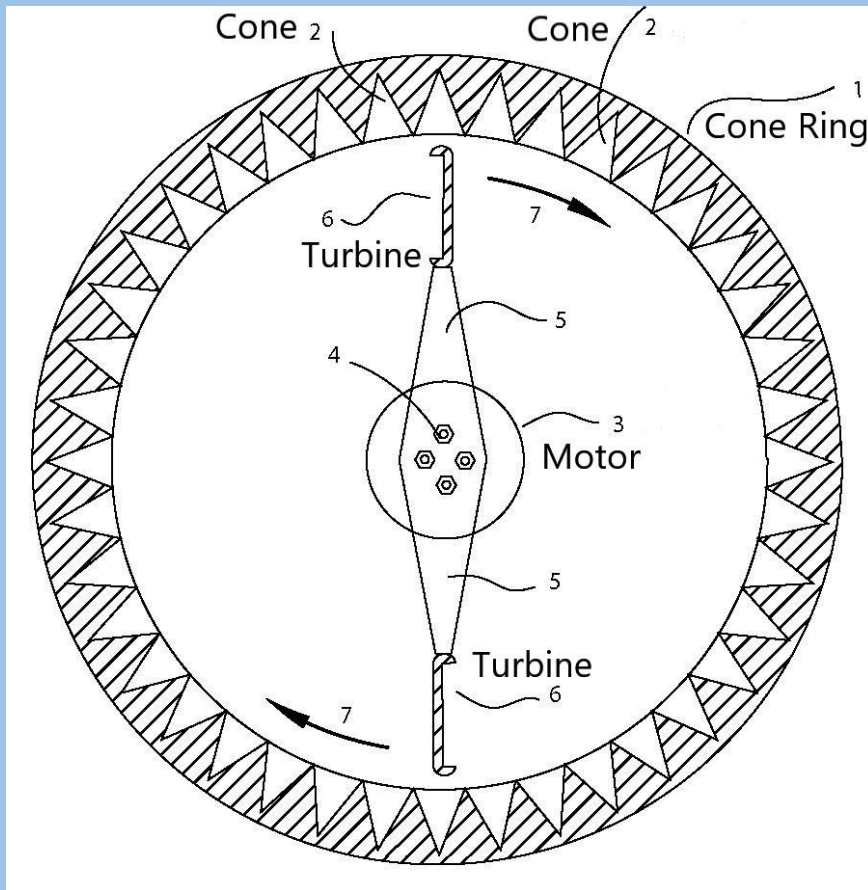
- General fusion that uses pistons to compress deuterium tritium plasma and is backed by Jeff Bezos.
- Commonwealth Fusion that builds a tokamak with a new generation of superconductor materials.
- TAE Technologies is based on rotating a plasma ring and is backed by google.

Operating Principle of the New Invention

The main component of the reactor is a fast rotating turbine. The turbine rotates inside a chamber filled with a Deuterium and Tritium gas. The tip of the turbine moves faster than the gas speed of sound. The high speed produces shockwaves in the gas. The shockwaves disperse and hit a cone like holes near the turbine to further compress the gas.

Drawing of the Turbine

The device main components include the turbine, the cone ring, and a motor to drive the turbine.



Advantages

- The turbine can be in any size from 20 inch or 50cm to 30 feet or 10 meters. The power output of one turbine can vary from 10 MW to 500MW. It is possible to combine several turbines in one powerplant.
- The device is small in size and can fit in buildings.
- There is no pollution from the device, it can be placed near cities.
- The device is cost effective in construction, maintenance and fuel.
- The device structure is simple, reliable, and easy to maintain without long downtime.
- The turbine can be switched on almost instantly and can replace gas turbine as backup for solar and wind power stations.

Patent Application

- The device is a PCT patent application No. PCT/IL2020/051163
- The PCT search did not find any competing items.
- PCT published the patent application
https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2021111432&_cid=P21-KPUXPW-32824-1

Research

There are two obstacles to overcome to make this idea work:

- The first is to get the high temperature required for fusion. A preferred solution to that is to induce resonance in the gas by shaping the turbines and the surrounding walls.
- The second problem is overheating of the turbine and cone ring. This can be solved by water cooling system or liquid nitrogen cooling system, integrated in a mesh of pipes inside the cone ring and turbine.

Dominate the Energy Sector

Successful development of this fusion device will enable to dominate the energy sector. It will eliminate and replace fossil fuel power station including coal and gas. Nuclear fission power stations will also be replaced. This fusion reactor can be scaled down to power cargo ships. The total value of the market can reach trillions and the return for the investors will be substantial.

Boost to Global Economy Solve Global Warming

For the word economy, a successful fusion reactor will lead to increased growth for several decades. The economic benefit from decreasing the effect of global warming will also lead to growth and prosperity.

Inventor

I am Dan Bar Zohar I worked as a programmer for about ten years in companies like ECI, Tel Aviv stock exchange, and New Applicom. I had a startup for a search engine. I also invented about ten other invention, for instance, an osteoporosis prevention device and sleep apnea prevention device. Visit project site at <http://www.inertialfusion.energy/>

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