

generalfusion

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TRANSFORMING THE WORLD'S ENERGY SUPPLY

FUSION QUICK FACTS

FUSION IS A GAME CHANGER

It has the potential to handle the world's future energy demands, cleanly, safely and inexpensively.

FUSION ENERGY IS CLEAN

Fusion will generate no greenhouse gases that produce climate change. Compare that to coal, which sends 1000 kilograms of greenhouse gas carbon dioxide into the atmosphere for every megawatt hour of electricity produced. Coal is still responsible for supplying 40% of the world's electricity.

FUSION IS CLOSER THAN YOU THINK

Since the 1970s, progress in fusion energy has been moving at a pace similar to Moore's Law – which states that computer processing power doubles every two years. Around the world, countries are launching programs to design the first demonstration fusion power plants.

THE FUSION FUEL SUPPLY IS UNLIMITED

Fusion is powered by deuterium and tritium. Deuterium is an isotope of hydrogen found in the oceans, and tritium is made in a fusion power plant from abundant lithium. Deuterium and lithium resources on earth could supply the world with energy for hundreds of millions of years.

- Lithium is the earth's 25th most abundant element. The total lithium content of seawater is very large and is estimated as 230 billion tonnes. Concerns regarding lithium availability for hybrid or electric vehicle batteries or other foreseeable applications are unfounded.

FUSION IS NOT YOUR FATHER'S NUCLEAR POWER

Compared to nuclear power, fusion is safe:

- Fusion power plants cannot melt down.
- A fusion plant would produce no long-lived radioactive material; at any given time it would contain only about as much radioactivity as a cancer radiation treatment machine.

GLOBALLY, THERE IS UNPRECEDENTED ACTIVITY IN FUSION DEVELOPMENT

- Public and private fusion projects are currently underway in more than three dozen countries;
- China plans to train 2,000 fusion scientists in this decade;
- When completed in 2023, multi-national fusion project in France called ITER will produce 500 MW of energy from 50 MW input.

GENERAL FUSION

Based in the Vancouver area (Burnaby), privately-funded General Fusion is a world leader in the development of a relatively low-cost, practical form of fusion called Magnetized Target Fusion (MTF).

- Team of 62 scientists and engineers;
- Investors include Jeff Bezos, Cenovus Energy, Chrysalix Energy Venture Capital, Braemar Energy Ventures, Business Development Bank of Canada, Entrepreneurs Fund, SET Ventures, and Growthworks.

Where projects such as ITER in France are exclusively doing fundamental scientific research, General Fusion is also focused on economic commercialization, with its practical approach to fusion and converting heat into power.

- Low fuel and plant costs enable estimated energy production at \$0.05-\$0.08/kWh.
- Compare to current alternatives:
 - Natural Gas: \$0.064
 - Hydro: \$0.085
 - Coal: \$0.095

Once in operation, a modular General Fusion 100 MW power plant could power a community of 75,000 for a cost of \$0.07/kWh, including the capital cost of the plant.

- General Fusion's design economically captures the heat energy produced as steam to drive electrical generators.

HOW FUSION WORKS

Fusion produces energy when two hydrogen atoms are combined, “fused” together to create helium. This process is what powers the sun, and requires very high temperatures.

Most fusion research has been done using either machines called tokamaks, or giant laser systems. Tokamak fusion systems are big magnetic bottles to contain superheated gas for a long time. Laser fusion systems create fusion by with an extremely fast laser pulse focused on a small hydrogen pellet, compressing and heating it to extreme temperatures and density in a billionth of a second, one at a time.

General Fusion’s method, Magnetized Target Fusion, is a hybrid approach, with some magnetic confinement and some compression. Magnetized Target Fusion, however, is more efficient as it only requires plasma (superheated gas) to be and confined by magnetic fields for micro-seconds. That plasma is then compressed, and instead of using lasers, compression can be accomplished using a shock wave induced by hundreds of pistons firing simultaneously, over and over again. Because there is no need to sustain the superheated plasma, prohibitively expensive magnetic confinement strategies such as the tokamak are not required. Because the compression uses compressed gas instead of lasers, it is also more practical and less expensive.

This heat energy from fusion is used to produce steam, which in turn drives electrical turbines, generating power for the grid.

Fusion is different than today’s nuclear power plants which are powered by nuclear fission. Fission splits heavy atoms instead of combining light ones, and the byproducts left over from fission are highly radioactive waste that requires secure storage for thousands of years.

Compared to fission, fusion cannot occur spontaneously, so there is no possibility of a meltdown or runaway reaction.

CLEAN ENERGY. EVERYWHERE. FOREVER.

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