

OPPORTUNITY #6

WHAT IF ENERGY WAS LIMITLESS?

ENERGY WITHOUT END

Daily life transformed by
a limitless supply of energy
through nuclear fusion

WHY IT MATTERS TODAY

Global energy consumption has risen by around 60% since 1990 with associated carbon dioxide emissions doubling since then.⁴⁵

Around 37% of power generation was from coal followed by 23% from gas and around 3% from oil. The total share of power generation from combustible fuels in 2019 was 63%.⁴⁶

The share of low carbon sources (wind, solar, nuclear, hydro) in power generation has been steadily increasing to stand at 32.2% of global supply in 2019.⁴⁷

Even though the price of renewable technologies remains high for some countries, costs have been falling⁴⁸ by an estimated 13% for onshore wind projects, 9% for offshore wind projects and 7% for solar photovoltaics (PV).⁴⁹ The cost of large-scale solar projects has decreased by 85% in the last decade.⁵⁰

Closing all coal power plants would cut emissions by around 3 billion tonnes of CO₂ a year.⁵¹ This represents around one-fifth of the reduction in emissions needed to halve emissions by 2030 compared with 2010 as required to limit the temperature rise to 1.5°C.⁵² It would also reduce costs of energy by an estimated \$32.3 billion per year.⁵³ It is projected that emerging and developing economies will need to increase investments in clean energy by more than 7 times to \$1 trillion by 2030 to reach the global goal of net-zero emissions by 2050.⁵⁴

The lower cost of renewables provide a strong business case to move past coal while pursuing net zero emissions.⁵⁵

SECTORS

AGRICULTURE & FOOD · ADVANCED MATERIALS & BIOTECHNOLOGY · AUTOMOTIVE, AEROSPACE & AVIATION · CHEMICALS & PETROCHEMICALS · EDUCATION · ENERGY, OIL & GAS · HEALTH & HEALTHCARE · INFORMATION & COMMUNICATION TECHNOLOGY · INFRASTRUCTURE & CONSTRUCTION · LOGISTICS, SHIPPING & FREIGHT · MANUFACTURING · MEDIA & ENTERTAINMENT · METALS & MINING · REAL ESTATE · TRAVEL & TOURISM · UTILITIES



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THE OPPORTUNITY TOMORROW

Nuclear fusion has the potential to accelerate the energy transition beyond the changes made possible by renewables by providing a source of energy that is emissions-free, cheap, safe and almost limitless. Fusion reactors require no hazardous materials such as uranium or plutonium and produce no greenhouse gases. Their fuel, seawater, is readily available. Fusion can potentially provide energy independence for numerous countries and decarbonise energy use.

Research and demonstration projects are developing rapidly, such as the ITER device, supported by 35 countries.⁵⁶ As many as 74 experimental fusion reactors are currently operating, with 15 more proposed or planned.⁵⁷

Potential advances include floating⁵⁸ low-temperature reactors that can extract hydrogen isotopes from seawater while burying low-level radioactive waste deep in the seabed. In combination with ultra-low latency energy transmission through high temperature superconductors, this near infinite form of clean energy could become available very widely.

BENEFITS

Limitless power enables the growth of new industries. Travel and logistics can become both cheaper and less environmentally damaging, as can electricity, heating and cooling. People can live more comfortably, efficiently and productively, increasing their quality of life.

RISKS

Risks include accidental or deliberate incidents with the handling of radioactive waste from fusion, even though it has a short half-life.