

Employing nuclear energy in the fight against climate change

The rest of nature is at odds with humans, and it is losing. From the original equilibrium of 10 million to a projected 10 billion by the year 2100, nature just can't sustain this sudden escalation in population. We need to alter this trend, and that's where energy comes in. The best birth control in recent history has been access to energy.¹ A ten-fold increase in energy consumption has shown to result in a 3-fold decrease in fertility rates and a 3-fold decrease in unwanted pregnancies.²

However, attempting to meet this energy demand by conventional means isn't without its own challenges and side effects. Human activity and greenhouse gas emissions are – with 95% certainty – the dominant cause of current climate change. The warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia.³

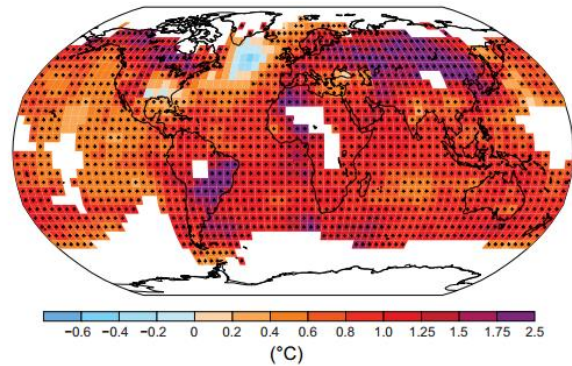


Figure: Map of the observed surface temperature change from 1901 to 2012. Changes need to be made in our energy generation methods in order to limit the increase in global temperature.³

*The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased.*³

The 2°C Scenario (2DS) is a climate change mitigation plan that lays out an energy system deployment pathway and an emissions trajectory consistent with at least a 50% chance of limiting the average global temperature increase to 2°C. It reduces CO₂ emissions by almost 60% by 2050, with carbon emissions being projected to decline after 2050 until carbon neutrality is reached.⁴ Since 1990, CO₂ emissions, far from decreasing, have actually continued to increase.⁵ If the electricity mix continues to be dominated by fossil fuels, the average global rise in temperature will be 6°C,⁶ well beyond the objective.

We urge world leaders and decision makers to strongly consider the following messages communicating the urgent need to expand nuclear energy in order to limit the rise in the average temperature of the planet to no more than 2°C.

Nuclear energy is:

1. **Clean**

The world needs to take immediate steps towards reducing greenhouse gas emissions by using all low-carbon energy sources available in order to meet the sustainable development goals and limit climate change.

2. **Reliable**

Nuclear energy is a time-tested low-carbon option, available today.

3. **Indispensable**

The contribution of nuclear energy to the total energy generation needs to increase from 11% to 25% by 2050 to ensure IEA 2°C scenario.

¹ James Conca, Forbes: <http://goo.gl/PhiCWd>

² UN Human Development Index: <http://goo.gl/ZnqzfA>

³ IPCC, 2013: Summary for Policymakers: <http://goo.gl/hhMXa7>

⁴ IEA Scenarios and projections: <http://goo.gl/ThD7Ah>

⁵ Global Carbon Project: <http://goo.gl/WOPzPW>

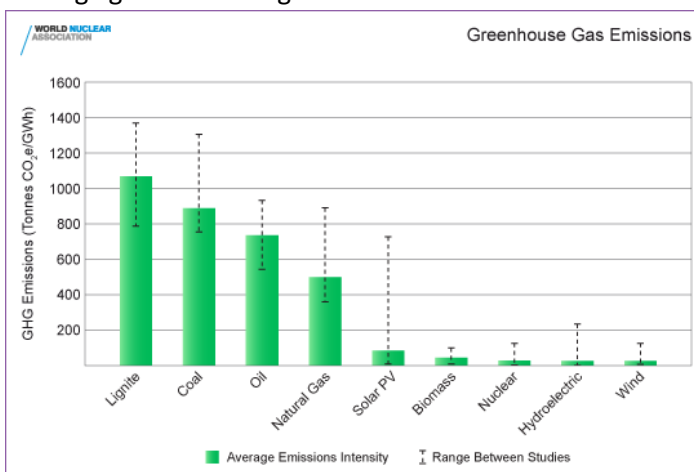
⁶ Energy Technology Perspectives 2014, IEA: <http://goo.gl/tluekl>

CLEAN: The world needs to take immediate steps towards reducing greenhouse gas emissions by using all low-carbon energy sources available in order to meet the sustainable development goals and limit climate change.

A significant part of the CO₂ released remains in the atmosphere for a long time. Once released, it is exchanged between the atmosphere, the ocean and the land. Part of the CO₂ dissolves in the ocean making it more acidic. It is estimated that nearly half of the CO₂ emitted remains in the atmosphere for a century, with about 20 percent remaining for as long as several millennia.⁷ According to the “carbon budget”, there is a limited amount of cumulative CO₂ emissions⁸ that must not be exceeded in the future if we are to keep CO₂ concentration under a certain level and limit average global warming to 2°C. It is estimated that we have already used nearly two-thirds of this amount.

We need to start reducing CO₂ emissions now.

However, the fight against climate change should not jeopardize the development of countries: Today, approximately 1.2 billion⁹ people—the equivalent of the population of India or Africa—do not have access to electricity nor to the development benefits that it brings. Increasing electrification will help lift these people out of poverty and improve their quality of life. Low-carbon electricity is also expected to play a major role in decarbonizing other sectors as well.¹⁰



History tells us that energy transitions take decades to achieve. Progress in the field of energy efficiency, no matter how significant, will not be sufficient to meet rising electricity demand. We need to leverage the full breadth of low-carbon options available today while continuing to develop advanced technologies that can be implemented by 2050. Among low-carbon sources of electricity, nuclear is available for large-scale industrial deployment and has proven effective.¹¹

RELIABLE: Nuclear energy is a time-tested low-carbon option, available today

Nuclear energy is one of the few currently available energy options that is effective and can be implemented on a large scale. It can serve as an uninterrupted base load power supply, not subject to climatic conditions or market volatility. It must also be noted that the alternatives to nuclear are far more dangerous – even including the accidents.¹²

With 438 nuclear reactors in operation¹³, nuclear energy is available in 30 countries – accounting for greater than two-thirds of the world’s population. Nuclear power has demonstrated its effectiveness: Since 1971¹⁴, nuclear power has avoided the equivalent of two years of total global CO₂ emissions at current rates. In Europe, nuclear power avoids annual CO₂ emissions equivalent to those produced every year by all the cars on the roads in Germany, Spain, France, the United Kingdom and Italy.¹⁵

Currently, only six countries meet or exceed the recommendations of the IPCC electricity mix (80 percent of low-carbon electricity). Three of them — Switzerland, Sweden and France— have an electricity portfolio that includes a notable share of nuclear power; nuclear energy accounts for 77 percent of electricity production in France and 40 percent of electricity in Switzerland and Sweden.¹¹

Nuclear energy has also been proven effective in how fast it can achieve massive results. As of now, the countries that have managed to decarbonize their electricity supplies the fastest – such as Sweden and France – have done so primarily by increasing the proportion of nuclear energy.

⁷ Fifth Assessment Report - IPCC (2013-2015) <https://goo.gl/K3bf0m>

⁸ Carbon Brief according to the IPCC data: <https://goo.gl/jxVScy>

⁹ Energy Poverty - IEA <http://goo.gl/w6L0AO>

¹⁰ Energy Technology Perspectives 2014, IEA <http://goo.gl/bcWxDd>

¹¹ World Nuclear Association: <http://goo.gl/HTgqfs>

¹² World Nuclear Association – <https://goo.gl/Kza8jt>

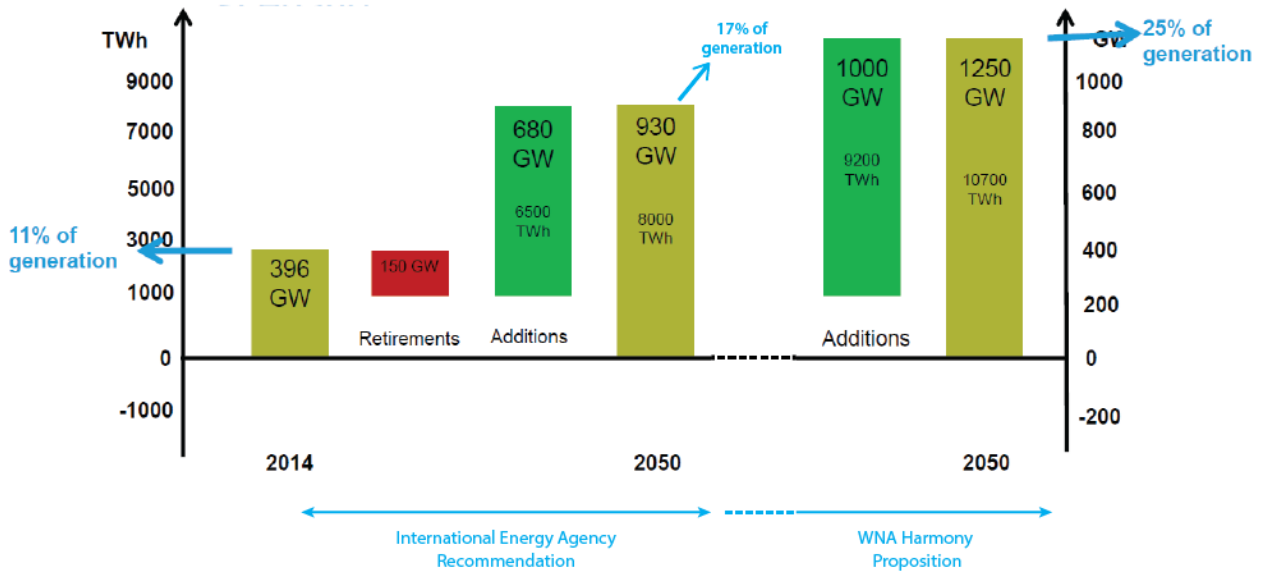
¹³ International Status and Prospects for Nuclear Power – IEA (2014) <http://goo.gl/8VE5jh>

¹⁴ World Energy Outlook – IEA (2014) <https://goo.gl/MrRS05>

¹⁵ Eurostat - (2014)

INDISPENSABLE: The contribution of nuclear energy to the total energy generation needs to increase from 11% to 25% by 2050 to ensure IEA 2°C scenario.

The IEA recommends that the nuclear generation capacity is increased from 11% of total electricity generation to 17%. However, we must aim to develop a reasonable plan following which we increase the nuclear generation capacity to 25% of total electricity generation, staying safely above the critical level.¹⁶



In OECD¹⁷ countries, nuclear power plants are the primary source of low-carbon electricity. Investment in these assets needs to continue in order to achieve our climate goals. Operating nuclear power plants longer, where technically feasible, or restarting nuclear plants that have been temporarily shut down, provides immediate additional low-carbon capacity. It prevents progress from stalling or even, as former nuclear capacity may be replaced by fossil fuels, from retreating. It enables countries to further reduce CO₂ emissions by concentrating reduction efforts on the share of fossil fuels.

In China, coal represents 70 percent of total electricity; in India, it is as high as 80 percent. China has the most ambitious nuclear energy growth program with more than 20 reactors under construction.¹⁸ The emerging economies have recognized the role nuclear energy has played in the development of countries, and are now following suit.

According to IAEA,¹⁹ several studies have demonstrated the relationship between nuclear investments and economic growth. Finally, beyond the effects of the creation of a local nuclear industry, nuclear energy has positive implication at the macroeconomic level, through providing reliable, affordable electricity to the whole economy.

The need to expand nuclear capacity has thus been demonstrated

With many nations racing to make nuclear energy completely renewable via Uranium seawater extraction,²⁰ we can rest assured that nuclear holds a great promise not just now, but even decades after.

¹⁶ World Nuclear Association – The Harmony Program <http://goo.gl/UOmQmu>

¹⁷ Organization for Economic Cooperation and Development (OECD)

¹⁸ IAEA 2014 <http://goo.gl/aYSrxM>

¹⁹ 28 Climate Change and Nuclear Power – IAEA (2015) <https://goo.gl/NOZUQV>

²⁰ James Conca, Forbes - <http://goo.gl/jEm25H>