



Achieving UN Sustainable Development Goals

Improving the world's understanding of nuclear power

The New Nuclear Watch Institute, a London-based internationally focused think-tank

NNWI is an industry supported think-tank, focused on the international development of nuclear energy as a means for governments to safeguard their long term sustainable energy needs. We strongly believe that nuclear power is vital to achieving binding Paris Climate Agreement objectives and tackling the challenge of climate change.

We believe that the right way to secure widespread recognition of the beneficial contribution of nuclear energy is to encourage the widest possible and best informed debate about energy and climate change. This debate should acknowledge the benefits of nuclear power in medical and other areas beyond energy.

In pursuit of this goal NNWI organises a range of events in the UK, the EU and further afield. Some of these are invitation-only private round-table discussions with industry leaders, policy makers and opinion formers. On other occasions we speak out publicly at conferences, seminars and in the media.



Tim Yeo

Chairman

Tim has a longstanding commitment to the nuclear energy industry dating back three decades to when he was Minister of State for the Environment with responsibility for climate change policy in the UK Government. He later served in the Shadow Cabinet as Shadow Secretary of State for Trade and Industry before being elected as chairman of the UK Parliament Energy and Climate Change Select Committee.

Tim is Chairman of ElecLink Limited, a subsidiary of Getlink SE, which owns and operates a 1GW electricity interconnector between France and Britain. He is a consultant and former Executive Chairman of Powerhouse Energy Group plc, a listed UK company developing technology to convert plastic waste into hydrogen. Tim is the Honorary Ambassador of Foreign Investment Promotion for South Korea and has worked in China on climate related projects including the design of China's carbon trading markets and on carbon capture utilisation and storage with the UK-China (Guangdong) CCUS Centre.

Chairman's Foreword

One message above all unites the scientists and climate activists at COP26 this week in Glasgow. Time is not on humanity's side. The talking must end and the action begin.

Cutting greenhouse gas emissions by the largest possible amount in the shortest possible time is the only thing which matters. Those cuts must start now, not in 2025 and certainly not in 2030.

If substantial progress isn't made in this decade then top of the agenda at COP36 in 2031 will be which countries are ready to accept their share of the hundreds of millions of climate refugees who will soon be forced to flee homes rendered uninhabitable by climate change.

The energy industry has a huge responsibility. It must and can lead the world's transition to net zero. Industries like transport, construction, agriculture, steel, cement and many others must all play a part. But without complete decarbonisation of the electricity generation industry net zero will never be achieved.

The technologies needed to get this sea change in the energy industry under way already exist. However much we yearn for economically viable carbon capture utilization and storage and affordable large scale long term electricity storage to be available we can't wait any longer for research breakthroughs. We must get on with the job using the tools which are to hand.

And there are plenty of tools around. Wind, solar, hydro, energy efficiency, carbon pricing will all make a difference. But one more tool is needed, one which has been neglected for too long. That is nuclear power. The sterile debates about whether emissions reductions are best achieved by more renewables or by nuclear are now irrelevant. All of the above are required.

An overdue sense of urgency has at last entered the climate debate. This offers nuclear, a proven supplier of reliable baseload very low carbon electricity, its best opportunity for decades. There are encouraging signs that policy makers are waking up to how nuclear energy can help avert dangerous irreversible climate change.

The UK for example, host to COP26, has a pro-nuclear government for the first time in thirty years. This year the European Commission, whose attitude to nuclear has veered from ambivalence to outright hostility, released its Joint Research Council's report strongly

endorsing nuclear on safety, health and environmental grounds.

The first step in nuclear's revival is to stop shutting down reactors which are currently operating safely. Life extensions for existing nuclear plants are one of the easiest, fastest and cheapest ways to cut emissions.

Secondly, the world must press on with building new large scale plants, as the UK is already doing at Hinkley Point and hopefully will soon start to do at Sizewell and other established nuclear sites.

Thirdly, alongside the development of large new nuclear reactors, support must be actively given to the introduction of new small and advanced nuclear reactors.

The faster that investment in new nuclear capacity takes place the greater the likelihood that cost reductions will be achieved, enabling nuclear to compete on cost grounds with renewable technologies such as offshore wind.

The rollout of nuclear is aided by the range of credible vendors. These offer customers a genuine choice, albeit one which in practice is constrained by politics as recent UK experience shows. EDF and Hitachi have been welcomed and South Korea's KEPCO is now believed to be in discussions with the government again after being given the cold shoulder some years ago.

By contrast the UK's flirtation with CGN seems poised to end despite the fact that the size of China's domestic market enables it to achieve substantial economies of scale. Similarly Rosatom's very impressive technical advances which coupled with attractive finance packages are winning customers around the world remain resolutely ignored in the UK for reasons which can only be political.

The benefits of nuclear power go far beyond low carbon energy as other sections of this brochure explain so this forward ends with a reminder that historically only two countries, France and Sweden, have ever cut emissions as fast as every major country must now do. Both achieved these cuts by rapid deployment of new nuclear capacity.

How valuable it would be for the future of the human species and all those others whose survival is threatened by climate change if COP26 concluded with recognition of that fact.

2021 joint initiative #YESTONUCLEAR



This year we have launched a new initiative 'Yes to Nuclear Perspectives', backed by the Nuclear-21, Nuclear Innovation Alliance (NIA), and World Nuclear Transport Institute (WNTI).

The aim is to explore how nuclear science and technology can help mankind to achieve the 17 UN Sustainable Development Goals by the target date of 2030. These SDGs were set by the UN General Assembly in 2015, the same year that COP21 led to the signing of the Paris Climate Accord by almost 200 countries. During 2021 NNWI has evaluated the role of nuclear power in relation to each of the SDGs in a series of monthly publications leading up to COP26 in November.

Welcoming this initiative NNWI Chairman Tim Yeo said "We want to improve the world's understanding of nuclear power and its far-reaching applications. The benefits of nuclear go far wider than simply the provision of low carbon electricity to tackle climate change. They extend to a wider set of energy services decarbonising transport, heating and industrial applications while continuing bringing high value solutions in agriculture and medicine."

Nuclear-21's founding partner and managing director Luc Van Den Durpel said "The coming decade is crucial in tackling sustainability challenges. Nuclear science and

technology solutions are crucial to get us effectively on this path towards a more prosperous future for us all. At Nuclear-21 we strongly embrace this initiative seeking to bring science-based decisional support information on how the nuclear community can ensure this future."

NIA executive director Judi Greenwald noted "NIA's mission is to bring economically competitive advanced nuclear energy to the world in support of decarbonization. Next generation nuclear technologies can support Sustainable Development Goals – providing modern energy services and enabling emerging economies to industrialize without emissions."

Welcoming the opportunity to collaborate in this initiative, Captain Simon Chaplin, WNTI, said "that with the right information, from trusted and reliable sources, people can understand the benefits and overwhelming evidence that support the nuclear industry."

Martin Porter, Secretary General, WNTI added "Climate change is a current global challenge and how we address it will shape the future of the whole planet. Advances in new nuclear technologies offer us the opportunity to adopt safe, clean, and affordable solutions that will take us towards a sustainable, thriving environment and provide opportunities to all communities of the world."

Partners



Media Partner



Website

www.newnuclearwatchinstitute.org/yestonuclear

Improving the world's understanding of nuclear power and its impact on Sustainable Development Goals

1 No Poverty

Energy poverty, or lack of access to reliable electricity, poses a barrier to human health and economic mobility. Universal access to low-cost, clean electricity from nuclear energy can help developing nations to provide basic human needs such as food and clean water, create access to educational and economic opportunities, and develop critical infrastructure to promote sustainable development. As electricity from nuclear energy enables communities to access food and water readily, this not only provides for the health and wellbeing of citizens, but also reduces time previously spent on time-consuming manual processes used to obtain these resources.

2 Zero Hunger

Like many other crucially important goals, sustainable food production can only be secured if dangerous and irreversible climate change is avoided. The first contribution of nuclear energy to this goal is therefore to help achieve the complete decarbonisation of the global power industry as quickly as possible. Certain nuclear techniques introduced in the 1960s have been critical in helping to combat unsustainable pressure on food systems. In fact, some of the most innovative ways wherein nuclear technologies can help to improve the overall food system - from production to distribution.

3 Good Health and Well-being

The nuclear industry works towards the promotion of sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all. Global economic growth has been generally slowing down for the past decade; however, nuclear power can help increase long-term economic growth and meet key SDGs objectives. Energy supply security and energy independence objectives have accelerated advancements in technological innovation and creation of a diverse range of decent jobs, in engineering, technical other specialist roles within especially safe workplaces. In addition, the nuclear industry is committed to attracting and retaining qualified women and men, including young people and persons with disabilities to the nuclear sector.

4 Quality Education

Nuclear energy can play a huge role in bringing quality employment to regions of the world where previously there may have been little prospect of good education and employment. Small modular reactors are being sited in locations that would not previously have had such technology. These complex facilities require a well-trained and professional workforce, supported by a community with a modern system of education for all ages, from early childhood development, through primary and secondary education, and on to higher education.

5 Gender Equality

The nuclear energy industry is traditionally seen as a maledominated engineering field, where men currently outnumber women. However, the nuclear community is actively and publicly addressing the gender balance by committing to attracting and retaining qualified women to the nuclear science and technology sector. Providing women with equal opportunities in all levels of the field, not only mid-level management positions will help achieve a more gender-balanced nuclear workforce.

6 Clean Water and Sanitation

The problems of climate change and population growth are placing a greater pressure on access to fresh drinking water, which is becoming increasingly difficult to overcome in many parts of the world facing natural water shortages and increased fresh water demands. Nuclear desalination provides a clean, economic, safe, reliable, and readily available solution, and has the potential to become a major sustainable source of fresh drinking water. Though nuclear science is known by many as the basis for generating clean, carbon-free electricity, nuclear and isotopic techniques can be used to support the sustainable management of freshwater resources, to improve soil health, and to enhance farming practices and livestock health in support of food production and societal wellbeing.

8 Decent Work and Economic Growth

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10 Reduced Inequalities

Energy poverty, or lack of access to reliable electricity, poses a barrier to economic mobility and vitality in developing nations. Universal access to low-cost, clean electricity can help to reduce socio-economic inequalities as well as curb reliance on sources of electricity that contribute to global climate change and air pollution. Additionally, nuclear energy is a compliance-driven industry that places emphasis on accountability, safety, and strong workplace culture. These facilities can help play a role in government-led or social initiatives for the enforcement of anti-discrimination policies within the workplace.

7 Affordable and Clean Energy

World energy consumption is predicted to rise nearly 50 percent by 2050, with developing countries projected to become the largest electricity users. The challenge is how to meet growing demand without substantially contributing to climate change. As a low-carbon electricity source, nuclear power can play an important role in limiting global emissions. Nuclear power complements intermittent renewable energy sources because nuclear plants provide affordable and reliable low-carbon electricity able to meet 24-7 demand. Operating at a high capacity factor of 90%, they also contribute to grid stability and reliability. The goals established in the Paris Agreement will be more easily met if nuclear power and the benefits of the synergies between nuclear and other low carbon energy sources and technologies are harnessed now.

9 Industry, Innovation and Infrastructure

Innovation has defined the success of the nuclear energy industry in the past and remains essential for the sustainable future. Development of innovative nuclear technologies has shaped national and international efforts to define climate goals consistent with overall sustainable development goals. Considering the world energy demand and sustainability related constraints (economic, environmental, and social), nuclear energy represents an ideal option to meet the projected increase in global future energy needs in a sustainable manner and replace ageing infrastructure based on fossil fuels. Therefore, investments in new nuclear are a driving force behind building resilient infrastructure, promoting inclusive and sustainable industrialization, and fostering innovation.

11 Sustainable Cities and Communities

Efforts to make cities and human settlements inclusive, safe, resilient and sustainable need to address prospects for good housing, clean water and sanitation, reliable and affordable energy, and a good transport network. One of the causes of substandard urban areas is the difficulty to provide clean and affordable energy. However, nuclear energy can support urban development and is well-suited to supplying cities where there is 24-7 energy demand. Furthermore, nuclear energy assists in the electrification of public transport, and especially rail networks, without contributing to air pollution.

12 Responsible Consumption and Production

Generally, nuclear energy requires fewer mineral inputs than other energy sources, and these mainly include copper, nickel, chromium, with uranium being its primary input mineral widely used to produce energy. However, current processes allow some uranium to be re-enriched or recycled which reduces the amount of mining, extracting and processing needed. Thanks to nuclear's low material intensity and current innovations, the efficiency of nuclear power plants can increase and the amount of minerals and materials needed can be reduced even further. In addition, nuclear power generation requires comparatively low land use intensity. According to the IAEA, most renewable energy sources are more land intensive than nuclear power.

14 Life Below Water

The carbon emissions from burning fossil fuels has multiple consequences of great concern, among which is ocean acidification, resulting from the carbon dioxide dissolving in and reducing the water's pH-level. The implications of such acidification are manifold, but in large part relate to the reduced availability of carbonate ions in ocean water. Phytoplankton, crabs, mussels, corals, and many other species experience a decreased capacity to make shells and skeletons, reducing their chances of survival and successful reproduction. Additionally, studies project that by the end of this century, rising water temperatures brought on by climate change will jeopardize ocean species in such a way that global seafood supply may decline by 50% on average.

16 Peace Justice and Strong Institutions

Nuclear technology for peaceful uses has significantly expanded beyond the generation of electricity. There are prospects for further development to meet future challenges and growing needs for water, non-electrical power, food, and other industrial processes (oil extraction, art preservation, etc.), in addition to medical applications. Nuclear energy can also contribute to district heating or cooling systems and more importantly to hydrogen production. In general, nuclear science and technology applications provide a daily tangible contribution to the wellbeing of this planet and an increased use of such nuclear applications could ensure our path towards sustainability.

13 climate Action

The need for very rapid decarbonisation of energy and the complete replacement of fossil fuels is now widely acknowledged. But progress towards these critically important aims remains dangerously slow. Technical improvements, including progress on advanced and small modular reactors, are cutting the cost of new nuclear plants. Nuclear power provides reliable and dispatchable energy by generating electricity at a large scale, usable in residential and industrial areas as well as transport, hydrogen production, and many other sectors. Alongside other renewable energy technologies and combined with appropriate energy storage solutions, it can guarantee a rapid transition towards a decarbonised energy pathway for all. The industry's commitment to helping deliver climate action is unequivocal. The only barrier to nuclear power increasing its global role is the reluctance of some policy makers to treat it equally with other low carbon energy sources.

15 Life on Land

Loss of biodiversity is caused by many factors, but two of the major causes are habitat degradation and loss. This is often caused by urbanisation, agriculture expansions, logging activities and pollution from industry, transport, and human populations. Today's nuclear power plants require a relatively small land mass footprint to produce a similar amount of power as other clean energy sources. Additionally, advanced reactors such as a small modular reactor require a fraction of the area that even conventional plants occupy. Nuclear power can provide a constant, reliable, and clean source of energy, without having to sacrifice natural habitats or compromise biodiversity priorities.

17 Partnerships for the Goals

Exciting new partnerships will be created in countries where investment in new nuclear plants is being made for the first time. These include Bangladesh, Egypt, Turkey and Poland. By making the construction of new nuclear plants part of their post-Covid recovery strategies these countries can ensure that sustainability is a foremost priority. These countries will have access to support from the global nuclear energy community, and a recognition that providing all communities with affordable clean energy needs both nuclear and renewable energy could give rise to other productive global partnerships.

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