

FISA/EURADWASTE 2022
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- Thanks to the French Presidency and the European Commission for the invitation to appear today and for their work in assembling this important conference.
- Thanks to all of you for surviving the pandemic and returning to the business of saving the planet. That is, after all, why we are here.
- The world faces many challenges today. Political, environmental, economic. Our world is rife with conflicts and uncertainties, the likes of which we have not seen in nearly a century. Nations face the challenge of reducing carbon emissions to “net zero” in less than 30 years. Humanity faces the challenge of a billion people seeking to rise from poverty and a generation in OECD countries who fear that the quality of their lives may not be as high as that of their parents.
- As in decades past, certainly since the industrial revolution, the availability of affordable, reliable supplies of energy lay at the core of many of these challenges.
- Energy, even more than in the past, will be the greatest determiner of economic and social success in the decades to come. Countries that are able to provide clean, economic, and reliable energy to their people and their industries will be more successful and more prosperous than those that cannot.
- Recent events have retaught the lessons that leaders should not have forgotten – that assuring reliable energy is one of the most important missions of any government. Hope and mysticism, ideology and sloganeering work best when there is a lot of energy available. When supply is constrained, controlled by others, or simply too expensive, real energy policy takes the center stage.
- Today, because of the challenge to reach net zero, energy policy is no longer simply the game of thrones played with reserves of oil and gas, but a race to innovate and create prosperity based on new concepts and new technologies. And, as more and more countries around the world are finding, the nuclear sector is running hard in that innovation race.

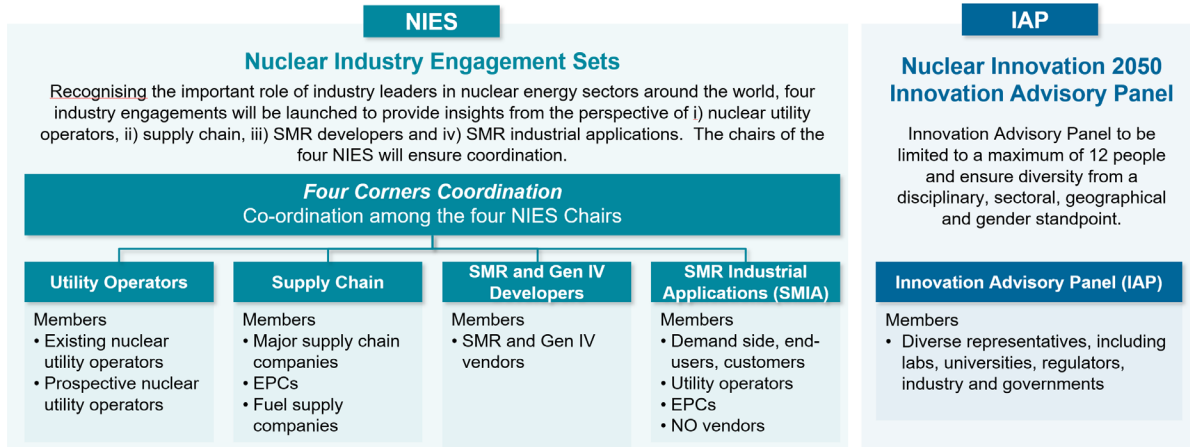
- We here today are part of a sector that has been the sleeping giant in global energy for too many decades. Nuclear energy provides most of the non-emitting electric capacity in OECD countries, is reliable and available 24 hours a day and 365 days a year, but until very recently, was not included in many discussions about the future of energy. In part, we are to blame for this. For many years, the nuclear sector was happy to stay in the background, quiet and profitable.
- We were collectively too satisfied with the status quo, too willing to rest on the long success of proven technologies when other industries innovated and pushed new boundaries. Eventually, leaves and moss covered the comatose giant and it slipped out of sight and out of mind.
- In the minds of the public and many policymakers, the most advanced form of energy production on the planet was viewed as a relic of the dim past. Old outside cities with aging staff, pen charts and vacuum tubes.
- Finally, the giant has stirred.
- With some 70 projects around the world seeking the early deployment of SMRs and Generation IV systems, we are in a new era of nuclear technology innovation. One would have to look to the 1950s and 1960s to see a period of exciting and far-sighted research and development comparable to what we are seeing today. And it comes not a moment too soon.
- Countries around the world have set an ambitious target to reach net zero by mid-century in order to avoid reaching the much-discussed 1.5-degree C threshold that climate scientists believe is necessary to avoid a tipping point in climate change. In the aftermath of Glasgow, some analysts found heroic assumptions to point to progress—insufficient progress, but progress. Others, including the NGO Climate Action, say we are on path for 2.7 degrees C by the end of the century.
- Whatever your assumptions about the future, it is clear that we are not on track. Recent evaluations show that rather than slowing, global CO₂ emissions reached their highest level in history in 2021, after two years of lower emissions in the midst of the pandemic.
- Governments are coming to realise that the approaches and strategies that have been most popular in recent years are falling short. This is why many of them are turning to nuclear energy.
- The work of the IPCC itself shows us why. In its 2018 special report, the IPCC reviewed 90 pathways with emissions reductions sufficient to limit average global warming to less than 1.5°C. When we reviewed these pathways, we

found that on average, the scenarios reflect the need for global nuclear capacity to triple by 2050 to 1160 gigawatts, up from 394 gigawatts in 2020.

- The NEA's own analysis verifies this. Taking into account not simply electricity but also difficult-to-abate energy needs such as process heat, our recent publication released in May 2022 on [The Role of Nuclear Power in Meeting Climate Targets](#), finds that nuclear capacity needs reach around 1200 GW by 2050.
- Doing so will require long-term operation of the existing fleet, the construction of new large Generation III reactors, as well as the success of SMRs and Gen IV technologies.
- And innovation is important in all of these areas. With many lessons learnt and the advent of digital technologies that hold the potential to enhance both efficiency and safety, long term operation of existing plants—for 60 or 80 years—is both practical and desirable. Construction of Gen III LWRs can be as successful in Western Europe as it has been in UAE. These existing, well-understood technologies can underpin the future.
- But the opportunity for the game to truly change rests with entirely new technologies.
- We must see Generation IV systems shift from concept to reality. After 20 years of work, the extensive of research and accumulated knowledge of the Generation IV International Forum could help industry to accelerate deployment with first demonstration projects. This is the objective of the GIF Industry 2022 conference that will be held in Canada in October.
- SMRs, which encompass a wide range of technologies, have captured the attention of capitals around the world, in both OECD and non-OECD countries. Based on our analyses, about a third of the nuclear capacity that is required by 2050 to meet global Net Zero will be new SMR designs, providing electricity, heat, clean water, and hydrogen.
- These technologies will be on-grid and off-grid. They will be light water and Generation IV. They will be mid-sized and microreactors. They will be land-based and marine-based. They will be mobile and multi-module configurations.
- And that is both the challenge and the potential of SMRs – they can fit in a wide range of applications and provide many services that are not possible for conventional reactors.
- These possibilities lay before us. The Generation IV International Forum and other activities can support the technology development and regulatory

verification required of new technologies. But increasingly in our framework, we are concerned about whether our technical infrastructure can still meet our needs.

- In this context, the NEA launched a multinational framework for in-pile fuels and material testing: The Framework for Irradiation Experiments (FIDES). The main objective of FIDES is to strengthen our collective nuclear fuel and material experimental expertise and capabilities. Most of the countries represented here today are participating in this vital international platform.
- FIDES includes the study of the current nuclear fuel technology in extended conditions as well as the study of innovative nuclear fuel technology. But FIDES is not just generating key data to characterise these fuel materials, it is also designed with a holistic perspective of sustainability and continuous improvement.
- FIDES carries a commitment to compiling and retaining research data in a centralised manner. With the development of a central and systematic process for capturing research results, we can also obtain a clear picture of where gaps remain. Research efficiency is improved when we are truly clear about what we already know.
- Beyond the R&D of new technologies and systems, it is clear that the complexities of development, financing, licencing, and deployment of many diverse designs will present us with tremendous challenges. The public and private sectors will need to come together in a practical and focused manner to achieve success.
- For this reason, the NEA is launching its SMR Strategy, to coordinate the actions underway and identify the gaps related to the successful deployment of SMRs. With this strategy and the engagement of the thousands of member countries experts with whom we work, we will set a path to assure that as many of these new technologies as possible are ready to help us meet the net zero challenge.



- Because the centre of gravity of nuclear innovation has shifted towards the private sector, the NEA is now launching a new engagement mechanism, the NEA Nuclear Industry Engagement Sets (NIES) to engage with industry leaders and practitioners from utility operators, supply chain, fuel cycle, SMR and Generation IV developers, and SMR end-users including heavy industry users.
- Invitations will be sent out soon. But I warn you – this is not an exercise in press releases and high-minded statements. This is a practical effort to identify and address barriers and to bring the attention of our member governments to the hard task of clearing away decades of underbrush. The giant is stirring, but he is not yet on his feet!
- Staying focused on what needs to be done and working with countries that will be part of this advanced technology future will help us all to accelerate the deployment of nuclear innovation – in support of LTO, Generation III new builds, SMRs, Generation IV concepts, and non-power applications such as heat and hydrogen – we need to work together to assure that these innovations are brought to deployment as soon as practical.
- Finally, we are the NEA are placing significant attention on the development of attention on the development of the next generation of nuclear technologists. Saving the planet will take longer than one career, so it is vital that our countries foster new scientists and engineers to design and develop further innovations, address legacy wastes and sites, and guide the nuclear sector into its second century.
- The NEA created the Nuclear Education, Science and Technology (NEST) Framework to build the capacity, skills, and knowledge of the nuclear leaders of tomorrow and additionally accelerate the deployment of nuclear innovations. NEST is a multi-national framework focused on developing the skills of the young generation through hands-on training activities while

working on challenging, real-world research projects. I'm pleased to note today that Romania will join the Framework in the next few weeks and others are soon to follow.

- We have also launched the Global Forum on Nuclear Education, Science, Technology and Policy, giving the world's academic institutions their first standing international platform for cooperation and fostering fresh thinking on challenging issues confronting the nuclear sector, particularly with regard to the development of human capital.
- In addition to its programme of work, the Global Forum is supporting discussions within member countries about strengthening nuclear education and will also hold a Global Commencement for the world's graduating nuclear technologists on 29 June. Former Microsoft Chairman Bill Gates will provide the keynote address. Please join us for this online event.
- I will end my remarks today with three closing thoughts:
 1. The future for which we strive cannot be a future of scarcity and low ambition. People in OECD countries and in emerging economies expect and deserve better. We must provide both a prosperous future for all our people and a healthy environment for the generations to come. Nuclear energy in combination with renewables and other technologies provides the world with a clear and walkable path to achieve this.
 2. As such, we in the nuclear sector hold one of the keys to the future in our hands. Our success is the world's success. The failure of our sector to achieve all of which we are capable will quite likely see net zero recede from society's reach.
 3. The window to act is short and there is an urgency to act now or the window will close. We have slumbered. We have waited. But the sun has risen and is lighting the path ahead. It is morning and the time is now.