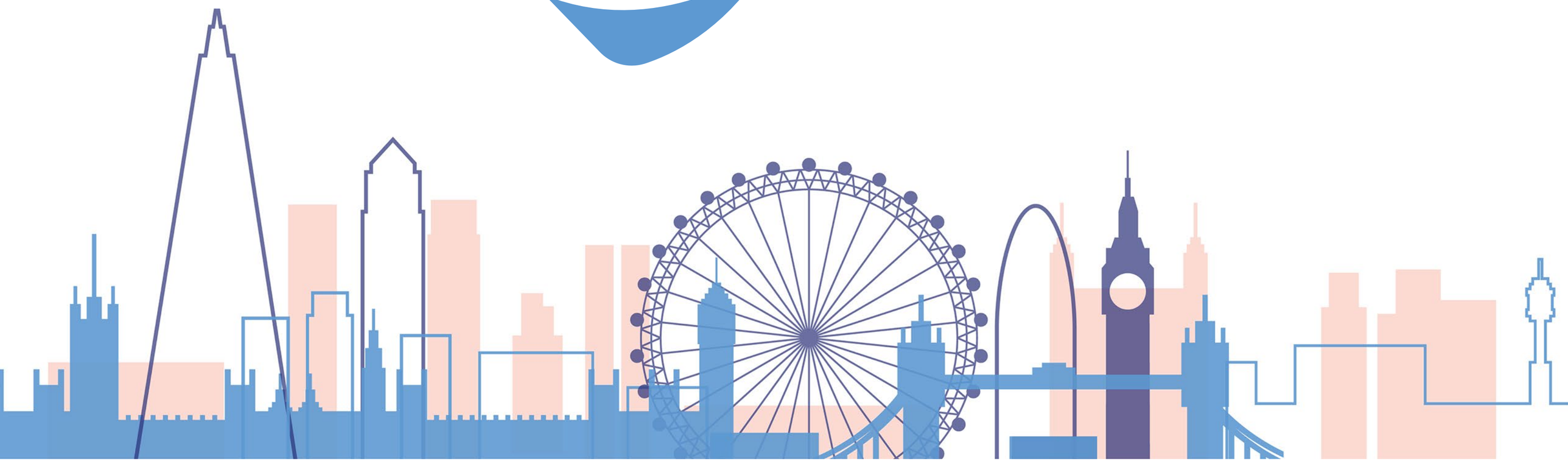
GLOBAL FORUM FOR NUCLEAR INNOVATION

2022 INSIGHTS



eDF EPRI IAEA International Atomic Energy Agency NATIONAL NUCLEAR LABORATORY NEA NUCLEAR ENERGY AGENCY

We brought together people from all over the world as catalysts for change, helping to create the right environment to drive us forward.

The Global Forum for Nuclear Innovation is an enduring global effort to accelerate nuclear innovation for a better future, helping to solve some of the world's biggest challenges.

Taking place in London, UK, on the hottest days on record, our vision for the 2022 Forum was to create a cultural shift within the nuclear sector, to enable innovation while keeping a strong positive culture of safety at its heart.

The Global Forum was led by EDF, EPRI, the IAEA, NNL and the OECD-NEA. We brought together people from all over the world as catalysts for change, helping to create the right environment to drive us forward. Over the course of a two-day immersive event, we explored four key behavioural drivers and worked together to start to solve four 'grand challenges' for the sector.

Ultimately, we want to drive a new enthusiasm for innovation at all levels, as we continue to play our part in the clean energy future. For this we must encourage learning from other industries in an environment that supports ideas to be developed and deployed at pace, while growing and attracting a diverse workforce with a broad range of skills and perspectives.

This report gives an overview of the event, with a focus on the outcomes of those challenge discussions. We've also included details of the behaviours we explored and the tools we used to understand and address challenges. A true international collaboration, the ideas generated at the event have been captured with the hope that delegates will continue to challenge, to seek diversity of thought, to be a role model and to have courage.

It was important for us to include some practical, deployable actions we can all take to keep us moving forward, until we meet again in 2024 for the next Global Form for Nuclear Innovation.

You are all agents of change, it's up to all of us to make it happen.

Tom Hughes
EDF

Rob Whittleston
NNL

Phillippe Guiberteau
OECD-NEA

Ed Bradley
IAEA

Heather Feldman
EPRI

AGENDA FROM THE EVENT

DAY 1

TOP 4 INNOVATIONS PANEL

Host: Neil Wilmshurst, Senior Vice President, Energy System Resources, Electric Power Research Institute (EPRI)
Panel: Steve Jones, NAMRC, CTO, Advanced Manufacturing expert
Audrey Zibelman, Vice President, X, the moonshot factory
Jennifer Uhle, Vice President, Generation and Suppliers, NEI
Wynter McGruder, Principal Technical Leader, EPRI

KEYNOTE: HARNESSING THE POWER OF DATA TO DRIVE CHANGE IN THE NHS

Ming Tang, Chief Data and Analytics Officer, NHS England and NHS Improvement

BREAKOUT SESSIONS THE FOUR BEHAVIOURS

• Challenge • Diversity • Role model • Courage

KEYNOTE: IT'S YOUR TURN, YOU CAN BE AN AGENT OF CHANGE

Sama Bilbao y Leon, Director General, World Nuclear Association

DAY 2

WELCOME BACK

WORKSHOPS - GRAND CHALLENGES

- Beyond Electricity
- No Talent, No Sector
- Safe Doesn't Have to be Slow
- Operating a Lean Machine

EXPERT REFLECTIONS PANEL

Beyond Electricity: **Paul Nevitt**, Science and Technology Director, NNL
Safe Doesn't Have to be Slow: **Ed Bradley**, Team Leader NPP Operation & Engineering Support, IAEA
No Talent, No Sector: **Callum Thomas**, CEO, Thomas Thor
Operating a Lean Machine: **Jennifer Uhle**, Vice President, Generation and Suppliers, NEI

CLOSING MOMENT

GFNI RAP

Verse 1

There's a crisis with the climate that's affecting the globe,
And we're looking for solutions that are ready to go,
But as you know, they take a little time to evolve,
So let's grow and innovate until the problem is solved,
We've gotta be bold, become the agents of change,
And think about the four behaviours that we can arrange,
It starts with you, so let's keep the target in view,
And gather all our energies to make the future nu-cleeaaaar
Yeah I'm talking to you and you and you...
...well actually the whole of the room.
We've tried all the other ways to cut the carbon back,
But now society is needing you to pick up the slack,
Because for energy production the evidence is clear
To achieve clean goals, then we need nuclear,
And so it really is incredible you're here together,
Because to succeed it will need a team endeavour.

Chorus

Let's Challenge the norms and "the way we do"
>Are you clear nuclear? < What we're here to do!
Encouraging a diverse perspective too
>Are you clear nuclear? < What we're here to do!
Let's lead by example and become a role model
>Are you clear nuclear? < What we're here to do!
And it's gonna takes courage, to escape the bubble
>Are you clear nuclear? < What we're here to do!

Verse 2

So on the one hand there is safety, in the other is innovation,
One relies on caution and the other inspiration,
But the two must function hand in hand for any operation
To succeed, how to find the balance is the vital question,
We need the brightest minds, but we have to build them first,
Through an education system that is thriving and diverse,
Then attract them to the sector and make room for them to grow,
So they broaden the perspective and challenge the status quo.
We've had enough of the same old, approaches and views,
The old solutions, that need to be refreshed and renewed,
And there's a multitude of industries that should be reviewed,
To assess what can be learnt from the methods they use,
And it's true, that you can also learn a lot from each other,
By sharing the goals and ambitions, that you're here to discover,
So what's the role you're gonna play, to set agendas today,
And bring about a new tomorrow in the boldest of ways.

Chorus

Let's Challenge the norms and "the way we do"
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WATCH THE RAP HERE

We need the brightest minds, but we have to build them first, through an education system that is thriving and diverse"

OVERVIEW

DELEGATES

168 agents of change

COUNTRIES

From 15 countries, over 6 continents:

- Argentina, Austria, Australia, Belgium, Brazil, Canada, France, Hungary, Japan, Netherlands, Pakistan, South Africa, Switzerland, UK, US

The GFNI initiative has now engaged 24 countries across two events

CAREERS

From academics, through early careers to senior leaders and CEOs

SECTORS

Nuclear sector, regulators, government, energy, health, academia

FOUR BEHAVIOURS

Challenge

How adopting a challenger mind-set drives positive disruption

Diversity

How diversity of thought can leverage intelligence to innovate

Role Model

How being a role model enables passive innovation

Courage

How unconscious bias affects our ability to be courageous and innovate

FOUR GRAND CHALLENGES

Beyond Electricity

How do we play a bigger role in decarbonising the global energy system?

Operating a Lean Machine

How do we make sure efficiency and agility are at the heart of the nuclear industry?

Safe Doesn't Have to be Slow

How do we create a culture where safety, security and environmental protection are viewed through the lens of innovation?

No Talent, No Sector

How do we attract and retain the best talent in the nuclear sector?

BEHAVIOURS

CHALLENGE

How adopting a challenger mind-set drives positive disruption

The textbooks call it a Challenger Mindset, Driving Positive Disruption, but we call it a questioning attitude. The confidence to disrupt the status quo to achieve changes for the good.

Asking questions like:

'HOLD ON, HOW ABOUT THIS' ... 'OR THIS'...'OR THIS'

Whilst not being afraid to fail.

It's more than 'building a better version of what already exists'.

In every part of our industry – at every level – we absolutely need our challengers.

People who are never afraid to look at the norm and say...

'HOLD ON, HOW ABOUT THIS'...

DIVERSITY

How diversity of thought can leverage intelligence to innovate

Edward de Bono's Six Thinking Hats open up our minds by guiding us to think about a challenge from different perspectives.

The Blue Hat. Process. How do we organise our thinking to achieve Thought Diversity?

The White Hat. The facts. What's the actual situation now? Where will we get the information we need to establish facts we don't yet know?

The Red Hat. Instinct/gut feeling. What makes me happy about the situation? What makes me angry and frustrated?

The Green Hat. Ideas. Even if they seem impossible or wild. What ifs and maybes. No negativity here.

The Yellow Hat. Benefits. What are the positives of each idea we're coming up with? Which feel most useful? What are the logical reasons they could work?

The Black Hat. Negatives. What are the weaknesses and dangers of ideas we're coming up with? Where are the risks? What are logical reasons for concern?

ROLE MODEL

How being a role model enables passive innovation

Exploring the power of role models by expressing the strengths that contribute to their overall character.

Each successful role model is influenced by their individual recipe of strengths. Not all role models have the same combination of strengths.

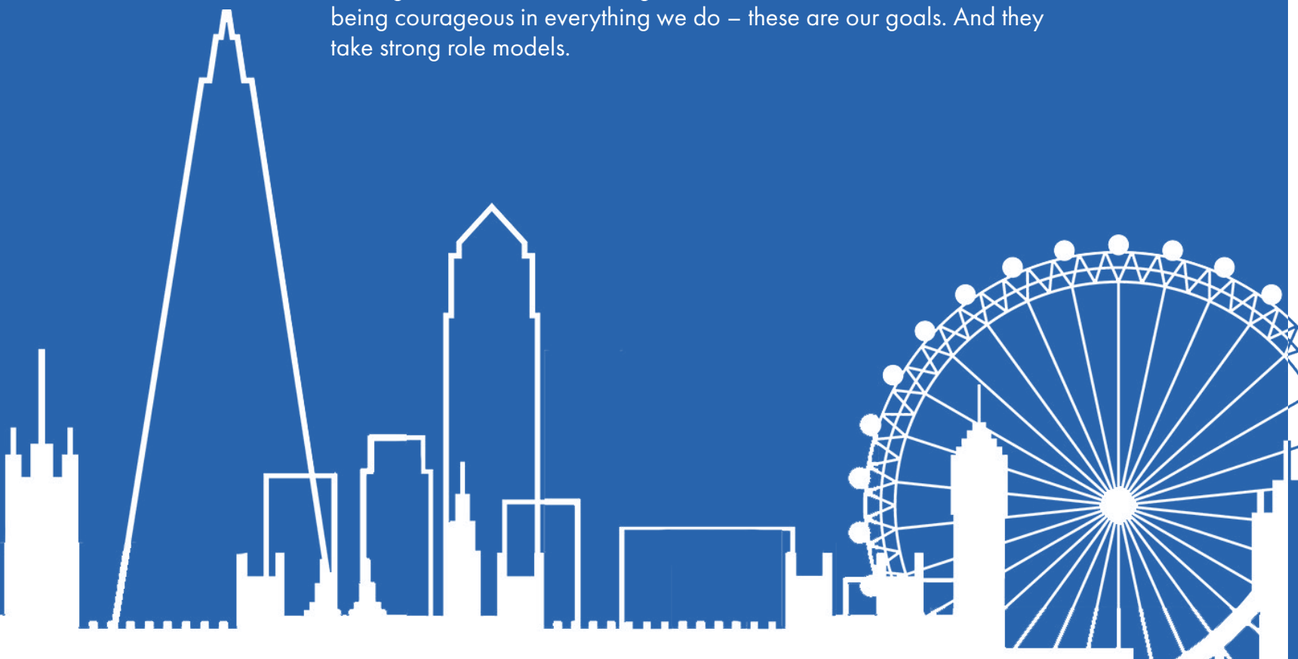
Using research we identified the key strengths in three great role models we all recognise.

For Marie Curie, we have an analytical mind, a fine learner with exceptional discipline.

For Oprah Winfrey, we have someone brilliant at communication, being a relator to others and being able to win people over – or to woo them.

For Richard Branson it's strategic thinking, self-assurance and the willingness to be a risk taker.

The role models across our industry will be the agents for change in a world that demands more of us than ever before. New ideas, new ways of working, new solutions to familiar challenges. Thinking differently, moving out of our silos, listening to vibrant new voices in our teams and being courageous in everything we do – these are our goals. And they take strong role models.



COURAGE

How unconscious bias affects our ability to be courageous and innovate

Do we play safe too often? Do we have the courage to take unnerving decisions? It's not easy to step outside our comfort zones.

In our own teams, we're sometimes challenged to calculate risk. But it takes courage to make brave choices and do what we believe is the right thing. That may disrupt accepted thinking. It may challenge the way we've always done things. But with courage comes innovation - the innovation the world is expecting from us if we're going to tackle climate change.

It takes courage to do the right thing. To overcome the negative power of loss aversion. Sometimes, that means brave individuals acting within their organisations. Or an entire organisation can base its culture on courage.

Innovation cannot be an option for our industry. It has to be a necessity - if we're going to deliver on our responsibility to tackle climate change. Quite literally, the world is waiting for us to deliver. To change our own thinking. To change our team's thinking. To change our whole organisation's thinking.

Responsibility for disruption means different things at different levels. But if we have courage, every single one of us can make change happen.

TOP 4 INNOVATIONS UPDATE

Neil Wilmshurst, Senior Vice-President, Energy System Resources at EPRI moderated the panel discussion on the Top Four Innovations identified during the 2019 Global Forum for Nuclear Innovation. Neil was joined by four panellists: Steve Jones, NAMRC, CTO - Advanced Manufacturing expert, Audrey Zibleman, Vice President, X, the moonshot factory, Jennifer Uhle, Vice President, Generation and Suppliers, NEI, and Wynter McGruder, Principal Technical Leader, EPRI.

Neil looked back to how the Global Forum for Nuclear Innovation (GNFI) came to be. GFNI was formed in 2018 where there was a meeting of the minds of leaders from EPRI, NNL, IAEA, and NEA during a dinner at the margins of the World Nuclear Exhibition in Paris. The discussion focused on how the nuclear sector had an uncertain future and that innovation was needed to drive a change. Those leaders felt it was their responsibility to try to make change happen. Therein, the Global Forum for Nuclear Innovation was born.

This culminated in the first Global Forum for Nuclear Innovation in June of 2019 in South Korea, which was a ground-breaking event. The event focused on technology which would move nuclear forward, but also brought in people from other sectors. Delegates heard from a former NASA astronaut who had worked for both NASA and SpaceX and learned about how their different approaches impacted the rate of innovation. They also heard a story from the pharmaceutical industry, about how smaller innovate companies brought forward innovations which the larger more risk adverse companies could not.

The 2019 event culminated in the creation of a Top 4 Innovations list, which are some of the most important and impactful technologies to be taken forward over the next few years and where advancements would create the largest impacts for the global nuclear industry.

READ THE 2019 REPORT **WATCH THE 2019 HIGHLIGHTS**

MACHINE LEARNING | **DIGITAL TWINS** | **INNOVATIVE FRAMEWORKS FOR SHARING COMPARABLE DATA** | **ADVANCED MANUFACTURING**

Progress since 2019

The global nuclear industry made progress in all four top innovations in combination with a range of companies and industries across the globe by coming together to accelerate innovation. The results from these collaborations are detailed on the next page.

Machine Learning

Machine learning for inspection, maintenance and operation – computational models interpret and/or extract information from an image or other dataset. AI is being used for predictive maintenance, corrective action report reviews, work scheduling, natural language processing and more

Research inspections of nuclear fuel assemblies, reactor pressure vessels (and internals) dry cask storage systems

Deployment used to reduce manual data processing and analytics help and decision making. Helps people to focus on the most important tasks while machines take care of mundane tasks that are dull, dirty, or dangerous to humans

Digital Twins

Shorten design, fabrication and qualification times – reducing costs and supporting licencing while obtaining additional understanding of operational conditions and control

Research using digital twins to update the current water chemistry tools to improve long term asset protection as well as real-time understanding to control plant operating conditions more efficiently

Deployment pairing digital twins with machine learning to train operators in a realistic digital training environment

Advanced Manufacturing

Production of components - for next-generation nuclear reactors that can be manufactured faster, safer, and cheaper than components today

Research can also be used for pressurisers, steam generator shells, headers, valves, turbine discs and more

Deployment fabrication of major components of an SMR pressure vessel using powder metallurgy hot isostatic pressing and electron beam welding, significantly accelerating production and reducing costs while maintaining or improving quality

Data Sharing

Combining data from different sources - to enable deeper, more accurate analysis

Research Collaborative efforts to develop common analytics needs and models to classify images as structural defects, with utilities contributing the images for the model

Deployment utilities are using natural language processing to develop insights from operator rounds and condition reporting systems based on shared data from different sources

Take Aways from the Panel

- The Nuclear industry needs deep radical innovation – to solve the challenges that can change the world
- Innovation is key to reducing time, cost, waste and emissions
- For any industry to be successful, it needs data, information, and a single source of truth to enable evidence-based decisions to find the right solutions
- We need to reduce the nuclear premium to enable manufacturing to work with us, as lots of what we can utilise is not new – it is just new to our sector
- Technologies available today are allowing us to innovate in ways that were not possible 10-15 years ago, which means the next few years will be really exciting
- When speaking to people, we need to be ambassadors for nuclear – to start to change the public conversation
- Nuclear provides many benefits to society, such as
  - Carbon free power
  - High power density (low land footprint)
  - High reliability
  - Safety (safest form of energy production)
  - Energy security and resilience

The 2022 GFNI demonstrated that 2019 GFNI was not a 'one and done' event – a lot has happened since then to move the top 4 innovations forward, and The CULTURE that enables innovation is key to the future of nuclear.

The Global Forum for Nuclear Innovation is a catalyst for change, driving the nuclear sector forward to ensure we are at the forefront of pioneering technology fit for a cleaner future.

IT'S YOUR TURN, YOU CAN BE AN AGENT OF CHANGE

SAMA BILBAO Y LEON
Director General of World Nuclear Association

We need to be courageous to save the planet

The climate continues to change in a radical manner. 30 years after we drafted the UN framework convention on climate change, a blueprint to protect the planet, little has changed.

What is the nuclear industry doing? We're producing 10% of all global electricity and avoiding 2m gigatonnes of CO2 every year.

In 2021, the global nuclear fleet bounced back from the COVID 19 downturn to produce 100 terawatt-hours more than we did in 2020 – that's good, but it's still less than 16 years ago (a record year for nuclear).

In a world where we need a massive increase in low-carbon energy, we still have a billion people without access to electricity, and in 2050 we will have a billion more people needing it. We need to do more. By 2025 we'll need 3, 4, or even 5 times more nuclear power than we do today.

However much we complain or get frustrated with politicians, regulators, media, the public - ultimately the thing that needs to change is us – it's our responsibility to ensure the success of nuclear, no one else's.

I see nuclear as an absolute gamechanger: it's an opportunity to decarbonise the entire economy, not just electricity. Heat for industrial processes, domestic heating, shipping, hydrogen, fresh water – so many opportunities!

If we continue doing what we're doing a lot of this won't happen.

The rate of innovation must rise if we are to face the challenges and opportunities ahead, and I don't just mean technological innovation, I mean innovation in everything.

Innovate in the way we think, work, collaborate (both inside and outside nuclear) and communicate

We need to incorporate disruptive activities into our everyday work – in licensing, in regulation in how we present ourselves to the world. We could innovate the way we finance nuclear, the products and services we provide, and how we communicate. We can learn from the healthcare industry; from the way they came together to release a lifesaving vaccine in record time.

Take the example of sailboats – evidence suggests we've been sailing for over 10000 years. Yet until the mid-2000s, the fastest and most sophisticated sailing boats were not very different to old Viking ships, with a maximum speed of 10-12 knots. The 2010s saw a leap in innovation, with support of advanced modelling tools and new materials (and a completely open mind) designers came up with the idea of foiling ships, which fly over the water – in less than 10 years, sailboat speed was multiplied by 4, reaching more than 45 knots.
Can we do the same? Deliver nuclear energy at the scale and speed that is needed to tackle climate change in a way that is equitable, with everyone around the world accessing 24/7 reliable and affordable electricity?

We will only succeed if every one of us is accountable, and empowered to lead the change

To the leaders in nuclear, you have the responsibility to be a role model and inspire others to be their best, but you also need to be courageous.

As a leader, you have worked incredibly hard, demonstrated your talent and experience and are truly the best amongst your peers. But now, you must have the courage to proclaim that even all that, hasn't been enough. The industry you lead needs to do so much more! Allow yourself to catch the winds of change and use your position to let new ideas fly. Give yourself permission to encourage others to try their ideas and even to fail, but without fear.

What we're doing now is not enough, not doing more would be an even bigger failure

When leading a team, success should be measured by not what you're personally achieving, but by how well you enable and empower your team to reach its full potential.

My own innovation

In 1999, I had the pleasure of teaming up with other brilliant young professionals to start the North American Young Generation in Nuclear (NA-YGN).

At that time, nuclear was not in the positive position it has now – the industry was not showing the vitality and importance it shows today and we were losing lots of our talent and knowledge.

A few of us youngsters would sit on the periphery of conferences and complain about the lack of opportunity and the lack of direction we saw. How could leaders not see it? Someone should do something about it!! Then we realised that the 'someone' was us, 8 young professionals working across the sector.

We worked together to create NA-YGN to share our passion for nuclear with the public.

It wasn't always easy, we didn't get everything right, but our diverse backgrounds and experiences led a movement that brough a fresh perspective and sense of optimism to the nuclear and inspired young generation teams across the globe.

If you saw the impact our young generation had at recent COP meetings, you'll know these groups continue to have an impact today, with a fresh approach on how to represent the industry, positively influencing the debate. But you don't have to start a new organisation, or be young, to make change. Fresh ideas can come from anyone, from anywhere.

Some innovation will bring enormous change, some change might not be as visible, but it's all important.

Let's keep our eyes and minds open to opportunities to innovate

All this enthusiasm and energising vision can only be made real if the industry as a whole works together and reinvigorates itself and embraces that optimism and clarity of thought.

The mission we have is very clear – we must work together collaboratively across silos, continents and organisations to link together the voices and different perspectives we have, with the experience and empowerment from leaders, then this industry will become greater than the sum of its parts.

This transformation is absolutely possible. Nuclear has the power to transform the world, to improve lives, transform the environment – but first we have to transform ourselves.

Embracing the diversity of ideas from those all around us will give us the perspectives and opportunities we need to innovate. We must have the courage to challenge our own mindsets and our own preconceptions to enable us to consider all these new possibilities.

So let's do it! Let's all have the person we want to become be the role model for the person that we are today.

HARNESSING THE POWER OF DATA TO DRIVE CHANGE IN THE NHS

MING TANG
Chief Data and Analytics Officer, NHS England and NHS Improvement

Ming Tang is the Chief Data and Analytics Officer for NHS England, and winner of the Women in Science and Engineering COVID Unsung Hero Award.

Her work quickly established an 'on the ground truth' across the NHS during the early days of the COVID pandemic. This ensured that the right staff, medical supplies and protective equipment were routed to the places they were needed most. Ming broke down barriers throughout the complex NHS structure, building a national team with a diverse skill set with a focus on innovation.

Key takeaways:

- Crisis was a catalyst for change
- The NHS is a huge ecosystem, a collection of multiple organisations including regulators, practitioners, support staff and professional services
- A key principle was 'badges off'! Removal of hierarchy led to more productive joint working
- Much of what was learned through the pandemic was not so much about tools or data, but about ways of working
- You have to know what outputs you're trying to achieve before you know what questions to ask
- Putting together diverse teams – multidisciplinary skills and experience were vital to solve the problem – even different generations in the same profession work in different ways
- Every voice was equal, but challenge was still required. Regularly ask 'what is the art of the possible'?
- It allowed creativity, even creative tension – but those debates led to better answers
- The process is iterative – it isn't beautiful, but it works (make it as good as you can, then develop it as you go). Iteration and success is the way to build trust
- Make sure whoever speaks about it is credible and relatable
- Having a protocol, focusing on a few key things, testing them and failing fast was key to driving the innovations needed to support the NHS through Covid

Change is complex and hard but challenge yourself to be realistic about 'what's the worst that can happen', it might well be worth the risk!

GRAND CHALLENGES

BEYOND ELECTRICITY

The Challenge

This is the decisive decade for a shift away from fossil generation towards low carbon energy solutions. This demands the complete transformation of the global energy system, and nuclear has a key role at the heart of that transition; including for those sectors where decarbonisation cannot be easily achieved through electrification.

What's Required?

Need to build trust in delivery.

Need to communicate in an understandable and accessible way about nuclear. With a focus on the positives, not on concerns.

Collaboration across industries is key to putting nuclear at the heart of the integrated energy solution, e.g: working with the shipping industry, which needs to find a solution to decarbonisation, which may include hydrogen-based fuels.

This can only be done as part of an integrated solution; we cannot work in isolation.

Aspirations

- Engaging - Policy and legislation – work with policy makers, work with end users, work across industries
- Enabling - Technology development and deployment – need to get to deployment as fast as possible, be economically sustainable at the demonstration stage. Technology available now should be deployed (it has to be proven, manufacturable, supply chains in place)
- Educating - Communication – nuclear 'everywhere', personal advocates, wider role of nuclear in school education

Potential Actions

- Consider what innovation is missing from energy, wider focus than nuclear
- Create 'IGNITE network' to enable a collective and build nuclear influencers
- Engage with decision makers across the globe to spread the understanding of nuclear beyond electricity. Provide material to enable individuals to have these discussions. Eg invite political leaders to the next GFNI
- Develop case studies with end users of where nuclear beyond electricity could be a solution, these should be written by the end users and not by the nuclear sector
- Undertake an assessment of the 50 largest private industrial organisations in the world with net zero commitments and understand what role nuclear plays in their net zero commitments
- Support the development of early career individuals in key areas specific to enabling beyond electricity
- Second nuclear professionals into key organisations to ensure nuclear is represented in the discussions around future energy solutions
- Share international data on the economics of nuclear in non-electric applications to provide datasets for energy system modelling from trusted sources
- If there is 'spare' or more money put it into more communication and marketing to enable others to visualise a future with nuclear

SAFE DOESN'T HAVE TO BE SLOW

The Challenge

Adopting innovations whilst efficiently ensuring high standards of safety, security and environmental protection. There is a general perception within the nuclear sector that the 'cost of compliance' is prohibitively high, but could be reduced through innovation; including the adoption of demonstrated innovations from other sectors.

What's Required?

Streamlining processes, including the application of tailored approaches; adoption of new practices for joint regulatory and industry early engagement on innovation such as 'regulatory sandboxes'; implementing structural changes to organizations; and more generally improving early engagement to accelerate the deployment of innovative solutions.

Aspirations

- Apply the key behaviours explored during the Global Forum to deliver tangible change
- Develop and/or strengthen efficient, impactful collaboration across borders and across sectors

Potential Actions

- Deploy technology to enable remote monitoring, applying pandemic experience where appropriate
- Foster broad stakeholder collaboration [regulator-utility-R&D-academia] to develop fail-fast opportunities that can be mined for lessons and improvements
    - This will involve cultural as well a technical innovation
- Continue regulatory benchmarking via peer reviews
- Develop the concept of 'Licensing Readiness Levels' to be applied with 'Technology Readiness Levels' during R&D processes
- Secondments
- Stakeholders within the industry, including regulators, should become more open to engaging those outside the nuclear industry and take advantage of opportunities to share their knowledge and experience
- Adjust the narrative to reduce public and/or political pressure that challenges change within regulatory organisations
    - Emphasise benefits of nuclear power
    - Avoid introducing 'safety' and 'security' as a topic in public dialogue and/or political rhetoric, but remain prepared to respond if questioned
    - Improve the use of social media influencers as mechanisms to inform and deliver change
- Develop school curricula to improve engagement and understanding from an early age
- Acknowledge that responsibility for change on this topic rests with the whole system including regulators, industry, R&D organisations and the wider supply chain. For example, improvements in some time-consuming processes, such as fuel qualification, will come primarily from innovation at R&D organizations and nuclear utilities
- Continue to explore successes from other sectors, including aviation, oil & gas and healthcare

NO TALENT, NO SECTOR

The Challenge

The nuclear sector will only achieve its transformation goals by attracting, recruiting, developing and retaining the diverse talent and thought leaders capable of driving it forward. Ultimately, we need to inspire people to embrace nuclear as a primary career choice, and a ground-breaking sector with a bright and positive future.

What's Required?

We must express an exciting vision of the future, increasing awareness of the nuclear industry and the career opportunities within it. Increasing education about nuclear, at all ages but particularly at school age would support the talent pipeline, along with reducing barriers including visa processes, security clearance and the remote locations of many nuclear sites.

Aspirations

- Replace the vicious cycle with a virtuous one of advocacy with a continuous presence communicating the vision of the sector and enhancing recruiting power
- Transforming the image of the sector through advocacy, including people working in the industry advocating as well as developing and supporting a network of influencers from outside of the sector
- Confidence (or courage) to engage with external stakeholders, to communicate more and to actively encourage mobility of talent between organisations and countries in order to develop and retain people in the sector.

Potential Actions

- Create a global ambassadors or advocates programme, learning from existing programmes that work
- A global nuclear playbook – including reliable data, facts, figures and rebuttals of common objections that anyone communicating about nuclear would be able to call upon. Something similar was developed for COP26, and the World Nuclear Association offers its members a messaging handbook called 'Talking Points' which fits this description but it is not freely available
- Skills passport programme operating globally to enhance mobility, development opportunities and retention
- A sector wide portal for all jobs in nuclear
- The development of fast-track visa and security clearance processes
- Ensure that nuclear energy is fairly represented in school curriculums
- To attract more diversity in job applicants, identify and use the channels and platforms that are more visible and accessible to the desired target audiences
- Be more courageous in putting forward our own vision of the future

OPERATING A LEAN MACHINE

The Challenge

Operating more efficiently. Many aspects to nuclear, we could focus in on critical safety functions, to see how things like AI and machine learning can help. Could we do the things we need to do in a different way.

We focus a lot of time and effort on safety, but not everything we do is safety significant. Do we grade functions and apply a scale to our rigour?

Getting past the assumption that the regulator won't allow it, so more ideas are kept 'on the table'.

What's Required?

Conditions need to exist to create more efficiency within the nuclear industry, by replacing people in human-intensive operations with beautiful, smart automation.

This approach can be adopted in various parts of the nuclear industry, e.g. different reactor types, policies, procedures and regulations, with an understanding of the main areas and reasons for inefficiencies. For example, if a country has capacity issues due to power outages, how could these be minimised by carrying out maintenance online.

Aspirations

- Learning from other sectors and listening to new voices coming into the industry
- The industry challenges itself to focus on what's really necessary
- Considering efficiency across the entire industry, rather than a narrow focus on specific areas of work – with innovation always thought about and applied across workstreams

Potential Actions:

- Asking relevant challenger questions such as "Does this require a human or could innovative technology be adopted?", "Why is it done that way, could it be done differently?"
- Sharing proven innovative ideas and best practice for the benefit of the sector
- Connecting across the sector to share ideas
- Creating opportunities for people to gain experience across a range of roles, to have input beyond their own specialism
- Mentoring – learning from the mentee as well as the mentor, leveraging diversity of thought

HOW CAN WE CHALLENGE OURSELVES?

All of the tips and techniques in this session are best applied in groups to maximise diversity of thought.

CLEARLY DEFINE YOUR CHALLENGE

What do you think the challenge is? Then test this by **asking 'the 5 Whys'**

This is a technique used to explore the cause-and-effect relationships underlying a particular problem. The aim of this technique is to determine the root cause of a problem by repeating the question "Why?" at least five times.

ADDRESSING THE CHALLENGE

Initial Ideas

Take 5 minutes to write down as many ideas to address a challenge as possible. Then group them into categories, to start to find a way forward.

Develop Further

Take an idea (or think of a new one) and write it down, then pass it to another member of the group to write down why that idea will fail. They in turn pass it to another member of the group to build on the idea and address the potential failure. This then moves again for the next person to note why they think it won't work. You start to refine your ideas by doing this.

A different perspective

Think of some inspiring examples of how a similar challenge has been solved, from outside of the nuclear sector. What was unique about their approach? How can this be applied to your own challenge?

Role models

Think of your role models. How might one of them approach this challenge?

What would success look like?

Imagine it's 20 years in the future and your challenge has been solved, the nuclear sector is having a huge positive impact on the world.

What might a news headline say about this? What does the world look like? How has the nuclear sector evolved? What is it famous for?

Be bold, even if your idea might seem impossible.

REFLECT

What do we need to do to make the headlines a reality?

What old ways of thinking do we need to break free from?

What are the steps we need to take in the short term, and what personal commitments do we need to make?

How do we step out of our comfort zones to bring the vision to life?

GFNI BRAINSTORMING PLAYBOOK

1) Discuss the issue surrounding a particular challenge, to enable you to clearly define it

2) Challenger Mindset

Ask 'The 5 Whys' - to get to the root cause of the problem.

- Write this challenge statement on blank card.

3) Diverse Thinking

Test thinking using 'MindSpin' - to identify ideas and measures which might prevent them.

- Write an idea to solve the challenge on a blank card, pass it to the right, why might the idea you've received fail? Pass right again, how might you address that potential issue? Keep passing to the right for inspiration.

4) Role Model

Use 'Analogy Thinking' - has a similar challenge been faced elsewhere?

- Identify two inspiring examples of how a similar challenge was resolved in a different industry.
- Identify learnings from that industry.

Try 'RoleStorming' - put yourself in the shoes of a role model

- Ask - how might a famous role model approach this challenge.
  What could you learn or use from that approach?

5) Courage

Create 'Headlines from the Future' – what would success look like?

- Draft a headline from 20 years from now. Big, bold ideas that seem impossible today.
- Discuss headlines with team.

6) Present findings back to the group, include:

- Introduction
- Approach
- Next Steps

HOW DID WE DO?

FEEDBACK AT THE EVENT

Day 1 survey feedback

We asked a short 3 question survey at the end of day 1 to get a mid-way mood check from our delegates.

64 PARTICIPANTS

4.4/5 AVG. RATING

ENGAGING INSPIRING INSPIRED

Brilliant day, I love its disruptive nature.

Loved the creativity. Ready to implement it tomorrow!

FEEDBACK AFTER THE EVENT

Post event survey feedback

After the event we emailed out a post event survey to all delegates. Key objective was to not only get general feedback but understand more about delegate's hopes for the future and how they plan to drive change in their organisations.

23 RESPONSES

85% SCORING THE EVENT EXCELLENT OR VERY GOOD

89% WOLD BE INTERESTED IN ATTENDING THE NEXT FORUM

SUSTAINABILITY

With a focus on helping to solve some of the world's biggest challenges, it was important that we delivered an event which was mindful of our impact on the planet. Sustainability was built into the event, from venue sourcing through to the materials produced over the two days.

- Venue holds current accreditations for sustainable practices
- Locally sourced and in-season food was used for all event catering
- Lanyards and name badges were recycled
- All card/ printing/ handouts from the event were recycled
- Venue branding recycled afterwards
- Sustainable materials sourced for the drop boxes and drop wooden vouchers - all recycled after the event
- All leftover food was donated
- All breakout materials were donated to the Whitechapel Centre post event:
    - Character kitchen blenders
    - Utensils, glassware, bowls
    - Excess carpet protector
    - De Bono hats donated
- Remaining water bottles and notebooks distributed to charity

NEXT FORUM

The steering group are now planning the next Forum:

MIAMI BEACH UNITED STATES JUNE 2024

Scan for more details

EDF EPRI IAEA International Atomic Energy Agency NATIONAL NUCLEAR LABORATORY NEA NUCLEAR ENERGY AGENCY