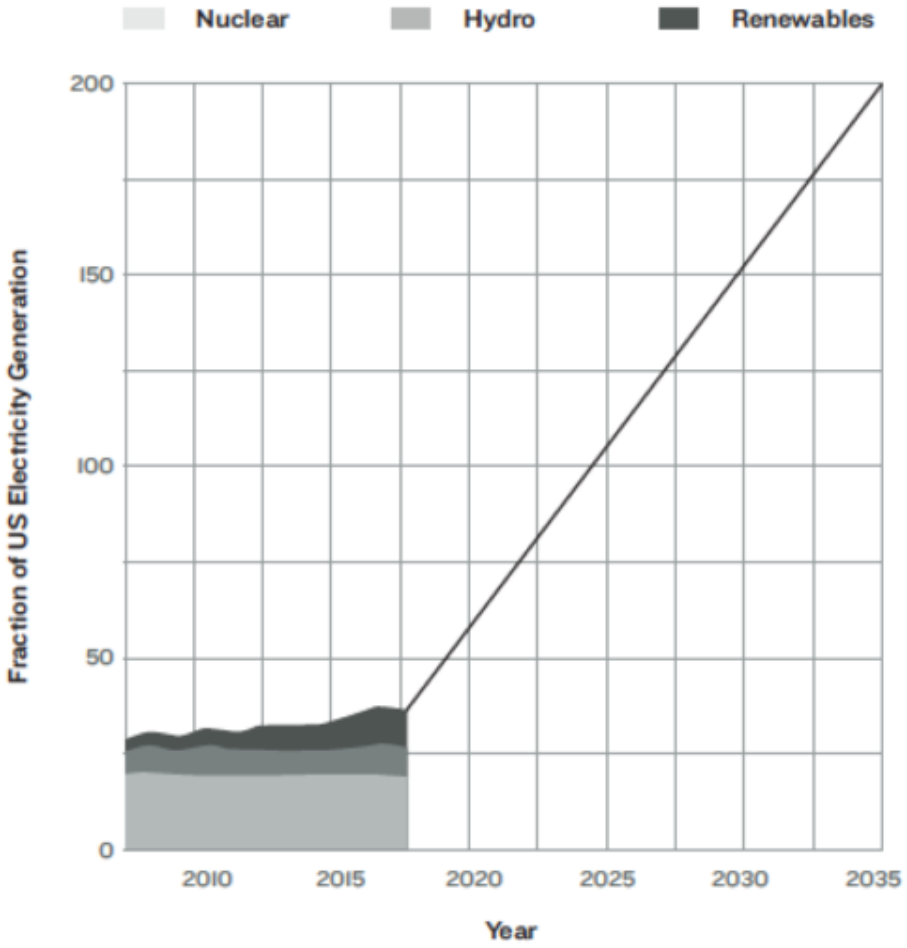
Mission: To energize and empower today's generations to fight for an atomic future.

GENERATION ATOMIC

Generationatomic.org
facebook.com/generationatomic
@Gen_Atomic

Eric G. Meyer - Executive Director
eric@generationatomic.org

NARWHAL CURVE FOR 100 PERCENT CLEAN ENERGY BY 2035



Choose Amount to Replace: World Electricity Demand, 2050 (40,000 TWh)

☐ Advanced Mode

Choose Electricity Mix:

- Nuclear and Wind/Solar Mix

100% Wind/Solar — 100% Nuclear

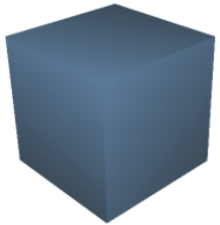
- 100% Wind and Solar Mix
- 100% Wind vs. 100% Solar vs. 100% Nuclear

Raw Materials Required:

STEEL | CONCRETE | COPPER

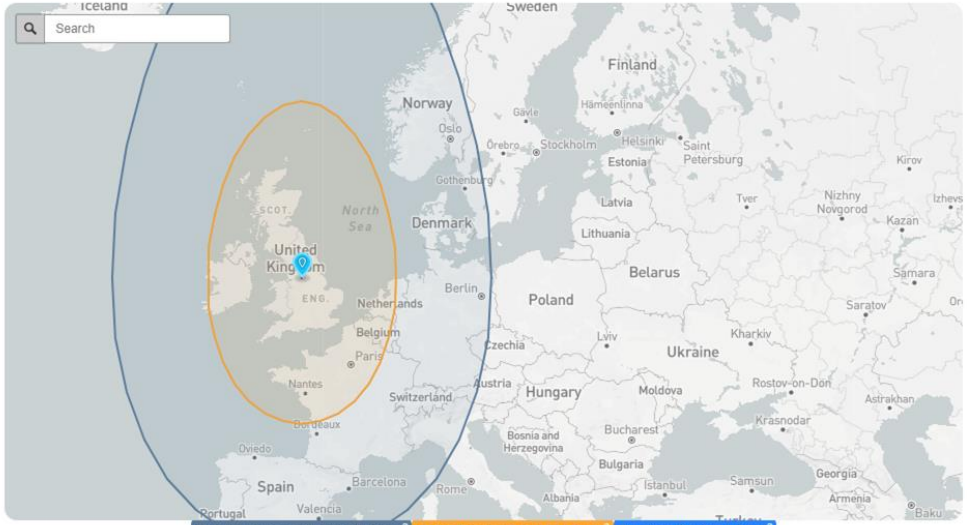
Wind Turbines : 9,354,208 kt | Solar Panels : 7,441,096 kt | Nuclear Plants : 0 kt

150,000 Golden Gates + 120,000 Golden Gates



Golden Gate Bridge, 2,737m

Area Required:



Graph of Raw materials

Years to decarbonize using fastest historical build rates per capita: 18.75 years

Years to produce copper at 2019 rate: 36.85 years

Choose Amount to Replace: World Electricity Demand, 2050 (40,000 TWh)

☐ Advanced Mode

Choose Electricity Mix:

- Nuclear and Wind/Solar Mix

100% Wind/Solar — 100% Nuclear

- 100% Wind and Solar Mix
- 100% Wind vs. 100% Solar vs. 100% Nuclear

Raw Materials Required:

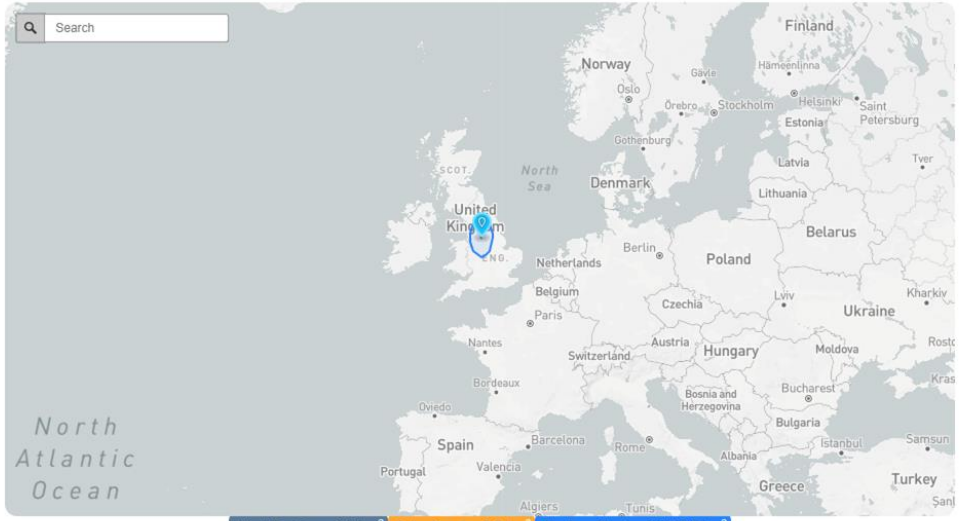
STEEL	CONCRETE	COPPER

Wind Turbines : 0 kt | Solar Panels : 0 kt | Nuclear Plants : 688,122 kt

11,000 Golden Gate Bridges

Golden Gate Bridge, 2,737m

Area Required:



Wind Turbines : 0.0 km² | Solar Panels : 0.0 km² | Nuclear Plants : 37,512.0 km²

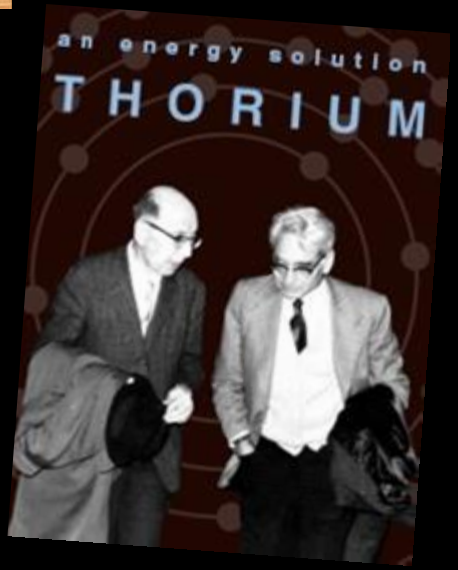
Graph of Raw materials

Years to decarbonize using fastest historical build rates per capita: 6.32 years

Years to produce copper at 2019 rate: 0.49 years

Topic: How do people get in to nuclear?

Opera singer



Nuclear advocate

Governance Board

Heather Hoff

Nick Touran

Kristin Zaitz

Gene Grecheck

Canon Bryan

Advisory Board

Emma Redfoot

Katie Mummah

Ishita Trivedi

Andrew Richmond

Timothy Crook

Nicholas Thompson

Emma Redfoot

Worked on an organic permaculture farm in Ecuador, did research in Peru.

"I came to the conclusion that energy is the soil from which everything from clean water, to literacy, to women's rights can grow."

"I evaluated the waste, safety, and cost issues associated with nuclear energy. I came to the conclusion that nuclear energy is clean and can be produced at the scale needed to allow for economic growth in developing countries."

"Nuclear appealed to me as a field because of the incredible environmental and social benefits.

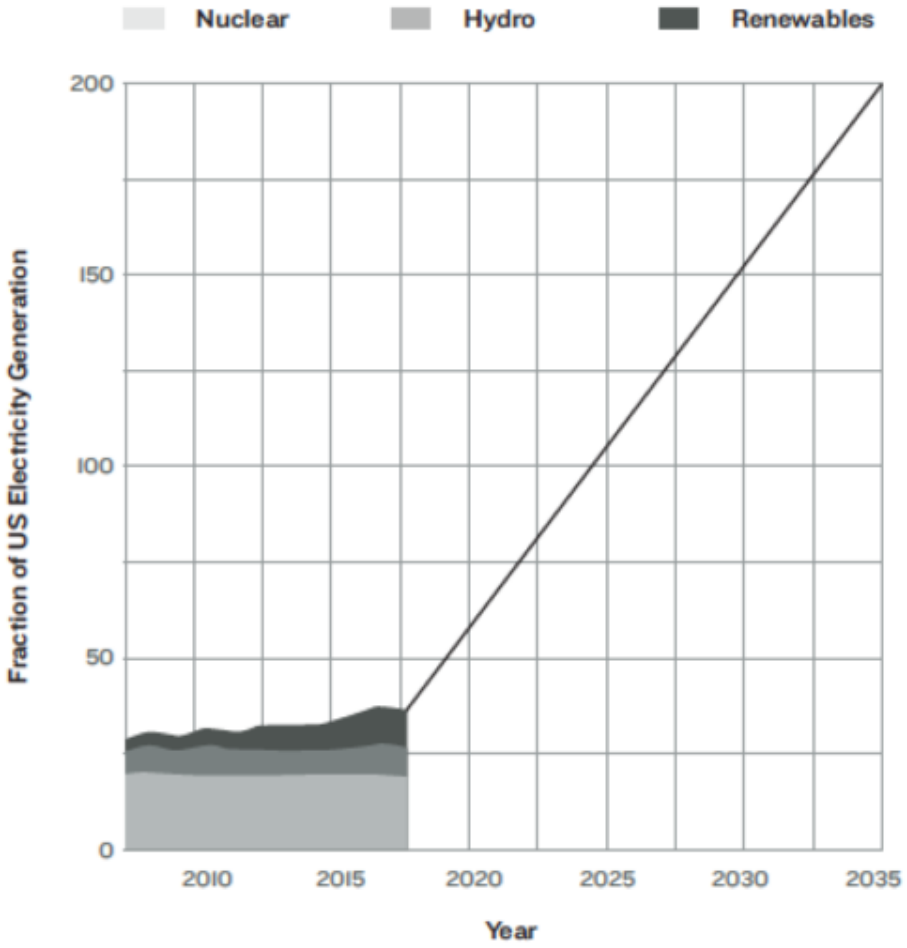
Micro problem solving vs. macro problem solving.

Emma now works at Oklo.

OKLO

Today
discovering nuclear energy
is too often
left to serendipity.

NARWHAL CURVE FOR 100 PERCENT CLEAN ENERGY BY 2035



The New Nuclear Watch Institute (NNWI)

Attracting Talent Into The Nuclear Energy Industry

GET INTO NUCLEAR

Andrew Crabtree

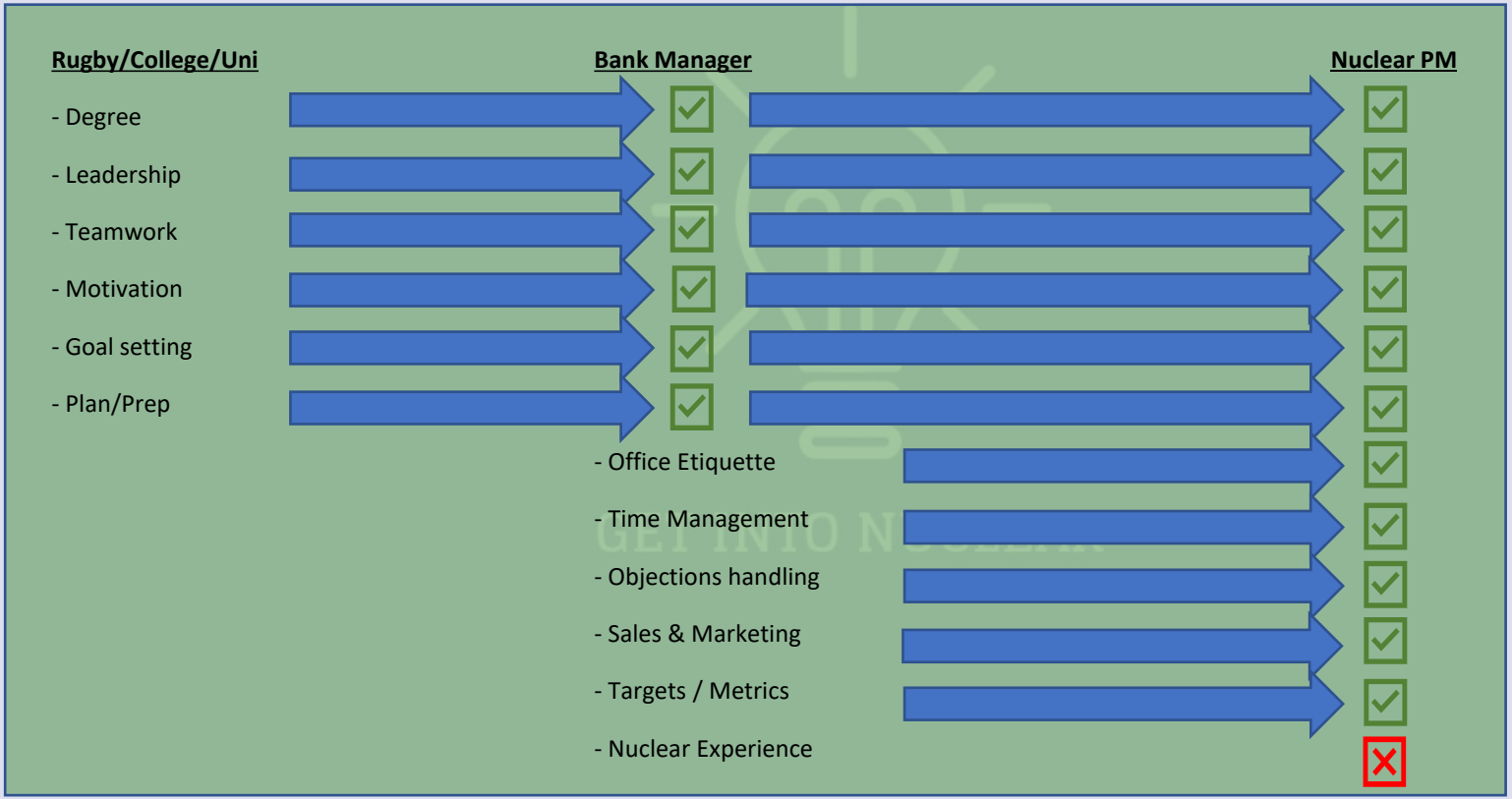
8th December 2020

Content

- How I got into nuclear
- Why I created getintonuclear.com
- Why there is a need to attract talent into the nuclear energy industry
- What we are doing about it

GET INTO NUCLEAR

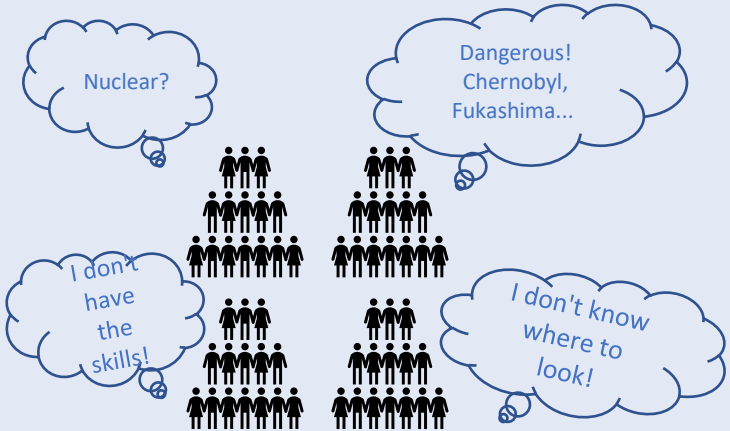
How I got into the nuclear industry



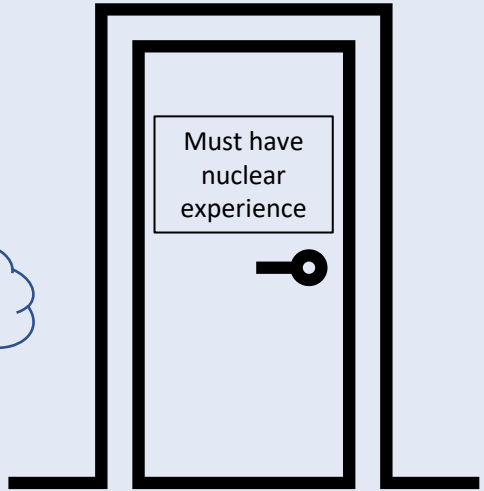
Why getintonuclear.com

- "How did you get into nuclear?"
- "How can I get into nuclear?"

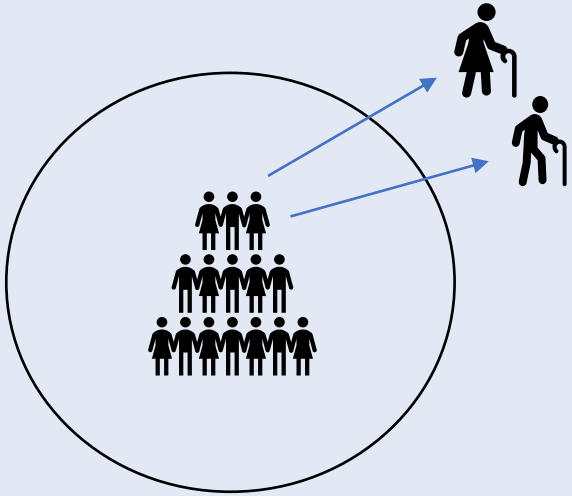
The need to attract talent into nuclear



General Workforce



Barriers to entry



Nuclear Workforce

What we are doing about it

Next generation	Sector Jumpers
• Nuclear Live broadcast into classrooms providing factual, positive perceptions of the industry • Point them in the direction of YGN, NSSG, NSAN, NCFN, nucleargraduates	• Consistent messaging provided via social media, jobs boards, blogs, podcasts, TV, Radio. • Provide factual perceptions, the belief they can land a role, help on where to find work. Help them develop a CV to showcase their transferable skills. Inspire them to take action.

- Gi2N aims open the door to the nuclear industry
  - The go-to for people looking to get into nuclear
  - The go-to for nuclear employers looking inspire and attract new talent as part of their social impact strategy

IYNC

NNWI, Energy Policy Panel, Dec. 8 2020, online

Attracting talent into the nuclear energy industry

Lena Andriolo, Ph.D.
IYNC President
lena.andriolo@iync.org

IYNC in a Nutshell

The mission

IYNC (International Youth Nuclear Congress) is the global network of a **new generation** of nuclear professionals whose mission is to:

- Communicate the **benefits of nuclear science** and applications, including nuclear power as a low carbon energy source, as part of a balanced energy mix;
- Promote the **peaceful uses** of nuclear power
- Provide a platform for **networking**
- Facilitate **knowledge transfer** between generations and across boundaries

NUCLEAR
YOUTH
NETWORK

The structure

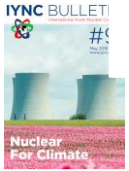
IYNC is a **non-profit organization** run by:

- 14 Officers
- 46 National Representatives (e.g.: YGN)
- 15 Members at Large
- 6 committees
- A dedicated team for IYNC2022

80 + volunteers

The activities

Newsletter Bulletin App



Mentoring Program

Grants program

Biennal Congress

Annual Board of Directors

NICE Future Initiative

Nuclear for CLIMATE

YGN Startup & support

4N Innovation for Nuclear

Active Conf. Participation

iync.org

YGN (Young Generation Network)

Group of young professionals and students interested in nuclear science and technology

Activities

- Topical Lectures
- Outreach to school, the general public
- Technical tours
- Mentoring & coaching
- Interviews with leaders and C- executives

Benefits

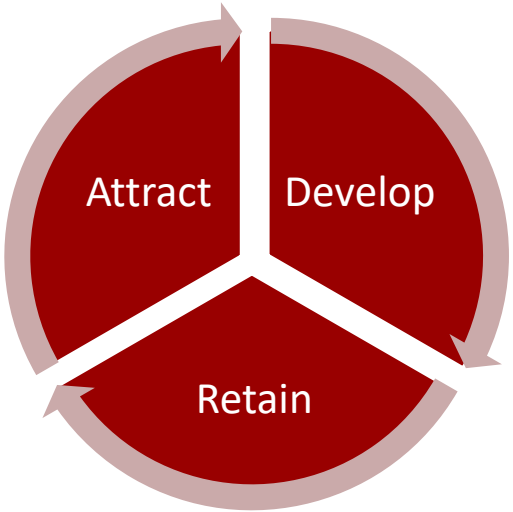
- Knowledge transfer
- Train the future international leaders
- Networking
- Attracts, develops and retains young professionals

iync.org

YGNs support Organizations to Attract, Develop and Retain Talents in Nuclear

Attracting

- Communicate: Highlight the role & opportunities in nuclear science and applications
- Analyze: anticipate needs and expectations
- Hire: find the best candidates



Developing

- Knowledge transfer opportunities
- Technical training
- Leadership training
- Networking opportunities
- Experience diversity

YGNs offer a unique opportunity for organizations to attract, develop and retain talents in nuclear science and applications

Retaining

- Inspire talents
- Volunteer experience
- Reward

Understanding the young generation

- Constantly changing and uncertain environment → Young generations are moving within this ecosystem
- Trends are going towards :
  - Digitalisation
  - Start-up economy
  - Open communication
  - …

→ Organizations must constantly adapt

- Central question of climate change : nuclear is a solution, as part of a low carbon balanced energy mix → communication is key !

To ensure a sustainable workforce, you need to communicate, train, innovate and global cooperations to ensure knowledge transfer and best practice sharings

COP & COY

- Climate is a central concern for the youth today
- Workshops, engaging with hundreds of young professionals from energy and outside
  - Participants more open to accepting nuclear energy as an interim source of energy
  - Low carbon advocacy and art based workshops
  - Why nuclear workshop
  - Low carbon choir and demonstration during COP24
  - Have a banana advocacy campaign

GENERATION ATOMIC

iync.org

I4N- Innovation for Nuclear

Why?

- To propose and reward innovative ideas focused on nuclear technologies, applications or systems that will contribute to **sustainable development goals**
- To support young energy in **thinking of innovative solutions**

What?

- **Support National/Regional innovation contest** in nuclear science and applications
- **International contest**:
  - I4N 1st edition final was **held @IYNCWiN18, Bariloche, Argentina**
  - I4N 2nd edition final was **held @IYNC2020, Sydney, Australia**
  - **I4N 3rd edition to be held @IYNC2022, Russia**

Historic partners &

's

Innovation for Nuclear

iync.org

Cooperation with External Organizations

Why?

- To recognize that **organizations can complement each other** in promoting the **safe use of nuclear science and applications**;
- To enhance the cooperation between organizations in the field of **nuclear knowledge transfer**;
- To work together concerning nuclear for **climate change initiatives**.

IYNC external cooperation status

- Memorandum of Understanding (MoU) signed with **Women in Nuclear** (WiN) Global in 2016, **joint IYNCWiN18 conference in Argentina, 2018.**
- MoU signed with the **International Union of Veterans in Nuclear Energy and Industry** (IUVNEI) in 2016
- MoU signed with **World Association of Nuclear Operator** (WANO) in 2017
- Practical Arrangement signed with the **IAEA** in 2018
- **Strong cooperation with Thomas Thor Associates and Rosatom Youth Council**
- Regular ad-hoc cooperation with **WNA/WNU, OECD/NEA**

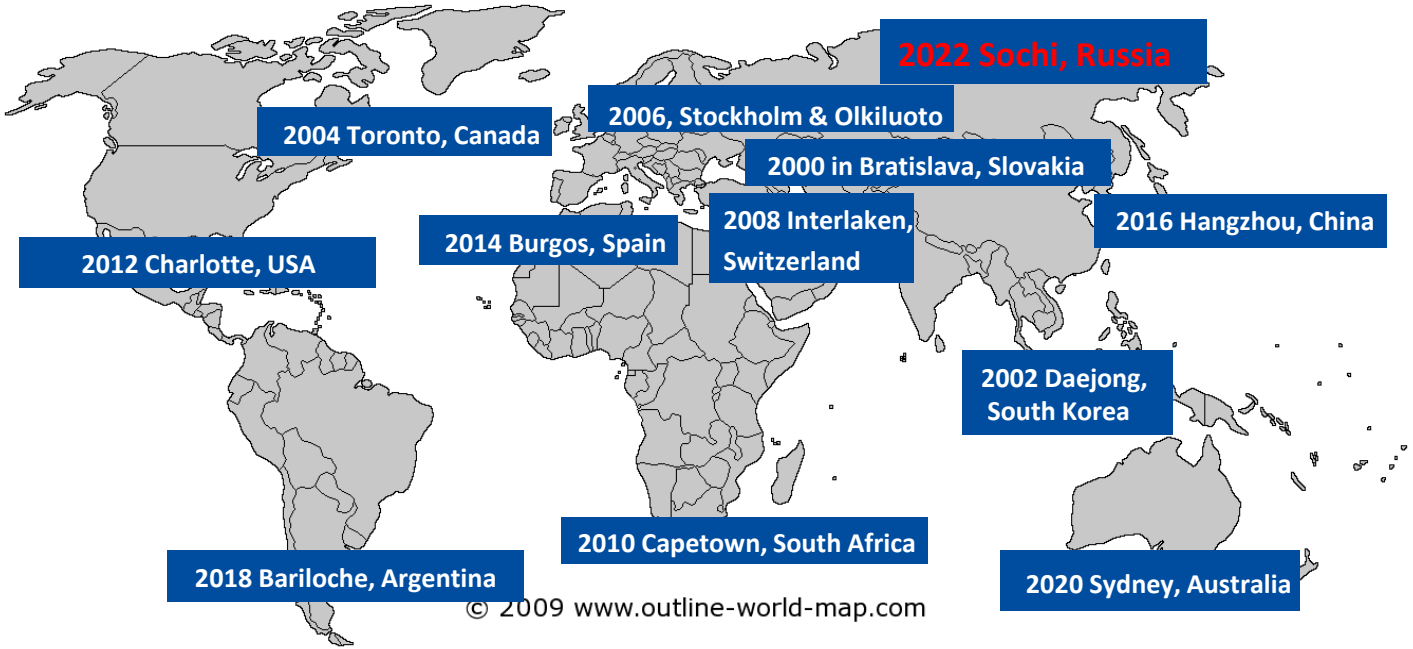

IAEA
International Atomic Energy Agency

Investing in Youth: IAEA, International Youth Nuclear Congress Sign Agreement

Tuesday 13 March 2018 14:45 CET
Shant Krikorian, IAEA Department of Nuclear Energy

(https://www.iaea.org/sites/default/files/styles/hd_1920x1080/public/iyncwin2018meeting.jpg?itok=EyD-ieOK)

IYNC Congresses



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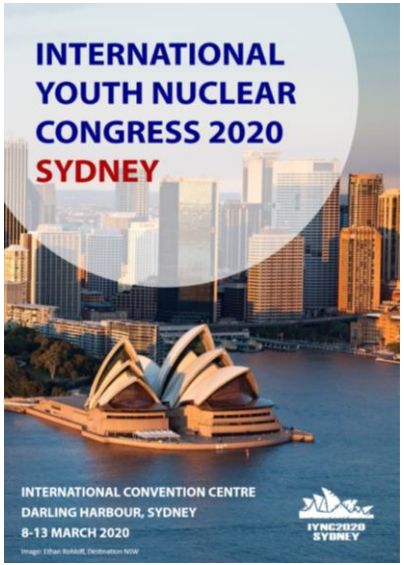
IYNC2020

Key info & figures

- Theme ‘ **Diversity in Nuclear’**
- Sydney, Australia, March 8-13, 2020
- Joined by about **300 participants from 42 countries**
- **Strong technical program**: 135 technical track contributions, 12 WS sessions, 6 panel sessions etc.
- **High level speakers** (physical or online)
- **Diverse technical tours**
- Significant engagement from **non-power sector**
- **Strong grants program**
- Covid-19 context
- **Very positive feedback from participants**



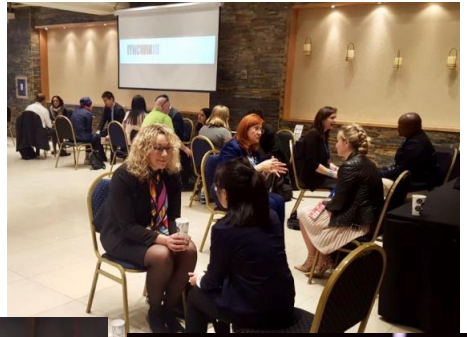
AusYGN

Knowledge Transfer at IYNC congress

- Speakers: top managers and nuclear experts
- Publication of technical papers
- Face-to-face with keynote speakers
- Workshops
- Mentoring program

Mentoring Program

- Inaugural IYNC mentoring program @IYNCWiN18 :
  - Career advice
- 2nd edition held at @IYNC2020
- 3rd one to be held @IYNC2022
- Towards a long term mentoring program:
  - develop an ongoing relationship



IYNC2022

- IYNC2022 will be held in Russia, under the theme « You are core ! ». Join us !

iync.org

IYNC

NNWI, Energy Policy Panel, Dec. 8 2020, online

Attracting talent into the nuclear energy industry

Lena Andriolo, Ph.D.
IYNC President
lena.andriolo@iync.org

ATTRACTING TALENT INTO THE NUCLEAR ENERGY INDUSTRY: ROSATOM'S PERSPECTIVE

Gulnara Bikkulova
Deputy General Director
Rosatom Corporate Academy

08.12.2020

WHERE ARE WE NOW: KEY FIGURES

ROSATOM

KEY FIGURES

>274 000
Employees
(3H 2020)

>45
Countries where
Rosatom is present

350
Enterprises and
scientific organizations

2,5 mln
Residents in the
cities of Rosatom

PERSONNEL DIVERSITY

>88 000
Of employees are
women
*30% vs world 12%

22%
Of top-managers
are women
*vs world 5,1%

>85 000
Youth under 35

>50 000
Silver age
employees

>5 800
Ph.Ds and Doctors
of Science, 2020

>70 000
Blue collars

WHERE ARE WE NOW: A STRONG HR BRAND

- Best employer by HeadHunter and AON Hewitt
- Best youth employer by Universum in ‘Engineering and production’ category
- Best Corporate University – Rosatom Corporate Academy by Global Council of Corporate Universities and Russian HR Summit

HAPPY EMPLOYEES

82%

Engagement rate

**on the level of best global employers by Kincentric methodology*

GLOBAL TRENDS KEEP SHAPING THE FUTURE

Change driver	Megatrends	Selected examples
Shifts in Technology and Digital Productivity	Automation and Technological Innovation Big Data and Advanced Analytics	1/3 of work automated by 2035 with 3/4 of jobs substantially impacted
Shifts in Resource Distribution	New Demographic Mix Shifting Geopolitical and Economic Power Megacities & Agglomerations	Multi-generational workforce with over 25% of Generation Z by 2025 Another 2,5 Bln people will move to cities by 2050
Shifts in Workforce Values and Culture	Diversity and Inclusion Entrepreneurship and Well-Being Green mindsets	Workforce mobility doubled during the last 20 years Up to 45% of workers already involved in gig platforms 88% feel satisfied if their job makes impact

Growing pressure from skills redundancy, shifting demographics, rise of new forms of employment, etc require dramatic changes in skills formation

Source: Analysis of BCG research, media and publications

In OECD countries skills gap affects 2 out of 5 employees

	Labor force affected by 2030, bln ppl	Lost Global GDP by 2030, bln USD
Skills mismatch – Qualifications do not meet those generally required for the job	1.4	6%
Talent deficit – Hard to find people with required skillset to fill the vacancies	0.1	2%
Skills redundancy – Jobs disappear, employees are no longer in demand	0.1	3%

Talent deficit and skills redundancy are fueling skills mismatch

Sources: OECD World Indicators of Skills for Employment, Mismatch – National Statistics (2016); G20 Employment Plan 2014 Russian Federation; World Bank, labor force statistics

HR VISION-2030

HR VISION-2030
To become the best at unlocking people's potential

GOAL
Creating an environment for discovering, developing and applying the potential of everyone

From a school kid… …To a profound professional

TALENT PIPELINES

ROSATOM

5-17 year old: Early career guidance for school students

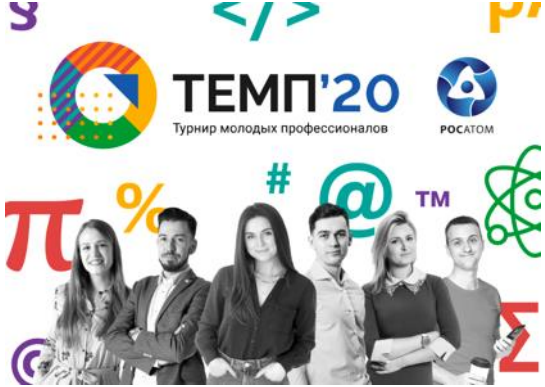
School of Rosatom Initiative, 82 000 kindergarden kids, 133 500 pupils

Youth Social Project Accelerator, 3 000 kids in 2019

Engineering championships, 300 participants, 150 trainers

Engineering camps for teens, 5000 kids annually

18+ year old: Development in colleges and universities



Startup Competition, 2 000 students, 230 universities annually

Career services and communication, 5 000 annually

Partnership with National youth events and initiatives

HUMANCENTRIC APPROACH IN FOCUS FOR 2030

ROSATOM

Environment for continuous learning

- Skills development
- Technology-enabled education
- Co-learning

Open culture

- Digital Culture and Client Centricity
- Safety culture
- Diversity & Inclusivity

Contribution to sustainable development

- Health and Well-Being
- Arts and culture
- Volunteers and community work

EMPOWERED LEARNER IN THE CENTER

ROSATOM

Technical skills development

- 345 000 educated in 290 Technical Academy courses since 1967

Leadership, Professional & Self Skills Development

- > 350 000 educated in 320 Corporate Academy Courses since 2012

Learner

Co-learning & Sharing Knowledge

- Rosatom to Rosatom
- Mentorship program
- AtomSkills championship
- SkillsTalks

Digital learning

- ➢ 43 000 people participated in digital skills programs in 2019
- ➢ Record e-learning apps launched in 2019

OUR STORY

We know that when talented people work together, everything becomes possible. Our ambition is to unite talents all over the world to reinforce sustainable development in the nuclear industry and help make lives of people better.

Our shared values drive our progress. We strongly believe in the power of sharing insights, empowering talents, co-creating change and supporting diverse communities.

Together, we can collaborate and innovate for a more safe, equal, and better world.

THANK YOU

Gulnara Bikkulova

Deputy Director General
Rosatom Academy

GZBikkulova@rosatom-academy.ru

Engineering Net Zero and Digital Innovation in Nuclear

By Ben Reynard CEng, Atkins Digital Engineering Lead, Nuclear & Power, UK & Europe

8th December 2020

Presentation Agenda

- Net Zero backdrop
- The application of digital innovation to support the reduction in capital cost for nuclear development.
- What can we take from the internet and technology giants?
- How can we make better decisions, and empower humans to do the things they love?

Engineering Net Zero

- With over 10,000 UK based staff, and more than 40,000 globally in the SNC-Lavalin group, Atkins was already working to understand the impact of climate change on its business and its clients.
- The UK commitment to Net Zero prompted us to ask: How can this be done?
- With our detailed knowledge from working across the energy sector we soon realised that, though the CCC had convinced government this was feasible, risk-based engineering assessment would say this is a very ambitious target with a high risk of failure, containing both significant…

Technical Risk and Commercial Risk

Our Analysis

Diagnostic approach for system interdependencies

Our Engineering Assessment

What technologies?

Are they Proven?

Can they be deployed at the required rate?

What are the Technical & Commercial Risks?

Risk Framework

Overall risks to successfully delivering Net Zero by 2050

+ **Conclusions and Recommendations**

Engineering Net Zero Toolkit for Policy Makers

The application of digital innovation to support the reduction in capital cost for nuclear development?

Large Scale and Small Modular Nuclear – Low Technical Risk?

Western Democracies have shown in the past that we can deliver Nth of a Kind NPPs at a reduction in capital cost which makes them feasible economically...

…Convergence of opportunity….Standards….Technology…Problem Statements….


ATKINS
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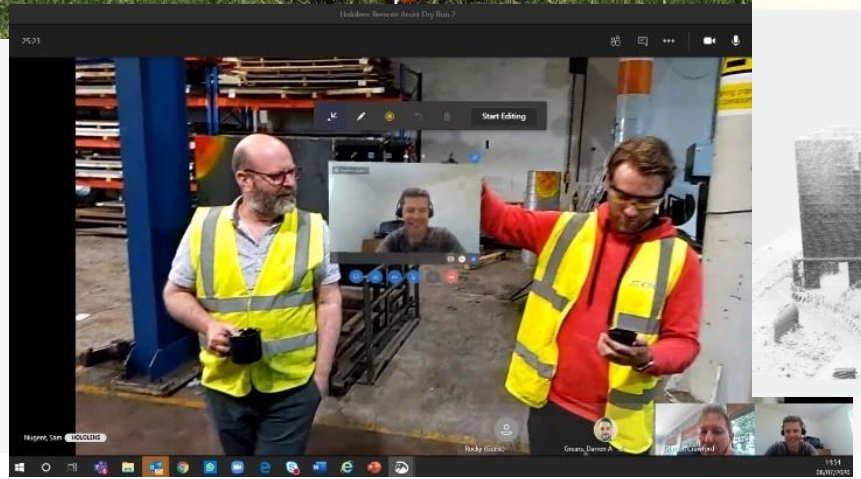
1821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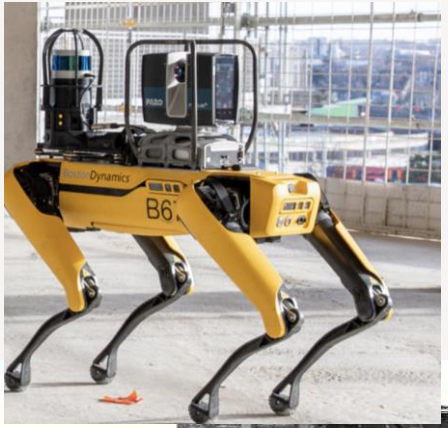
Boston Dynamics

What can we learn from the Internet and Technology Giants?

- Culture….?
  - *Ways of working – Agile, Standards, Business Models.*
- Technologies….?
  - *E.g., Social Communication Networks, Gaming Visualisation Platforms, Information Management Systems.*

How can we make better decisions, and empower humans to do the things they love?

- Some view digital approaches purely to reduce CAPEX/OPEX costs….through better decision making and automation
- I think a more useful vision is that they free humans from boring jobs and empower them to do this things they enjoy.

Let the robots be bored.


SNC·LAVALIN
ATKINS
Nuclear in a digital world
Digital transformation means business as usual


ENGINEERING
NET ZERO

Our values are the essence of our company's identity.
They represent how we act, speak and behave together,
and how we engage with our clients and stakeholders.

SAFETY	*We put safety at the heart of everything we do, to safeguard people, assets and the environment.*
INTEGRITY	*We do the right thing, no matter what, and are accountable for our actions.*
COLLABORATION	*We work together and embrace each other's unique contribution to deliver amazing results for all.*
INNOVATION	*We redefine engineering by thinking boldly, proudly and differently.*