

Nuclear Innovation: Clean Energy Future NICE Future Initiative

Harnessing the potential of nuclear energy in integrated, clean energy systems

Goals

The NICE Future initiative envisions clean energy systems that take advantage of emission-free nuclear energy in new and innovative ways to accelerate progress towards clean energy goals. The NICE Future initiative helps policy makers understand the technology options that could be available to them, from today's large light water reactors to the small modular reactors (SMRs) and other novel designs that will soon reach commercial markets. The initiative offers information on technical feasibility, economics and financing, and perspectives from a number of communities and stakeholders that will be helpful for governments considering the roles that nuclear energy can play in their clean energy futures.

Rationale for being included in the CEM

Nuclear energy provides one-third of the world's emission-free electricity. Solar, wind, and nuclear energy are all emission-free, but of these only nuclear energy provides clean electricity 24/7, and it has the smallest footprint. Recognising there is no one-size-fits-all solution to the energy mix of each country, the NICE Future initiative was launched to show interested CEM members a range of options to consider for their clean energy systems relevant to their own domestic and international priorities.

Nuclear energy can be integrated with other clean energy technologies in many ways to create a thriving, emission-free economy, such integrated nuclear-renewables, desalination for drinking water, process heat, flexible electricity grids, hydrogen production and energy storage, advanced smart designs (e.g. SMRs, Gen-IV), and nuclear waste reduction.

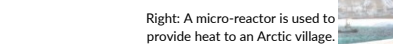
An expanding suite of nuclear technologies can help tackle challenges such as rapidly scaling-up clean power in the developing world, providing flexible support for variable renewables, bringing energy access to remote communities, and decarbonising processes that are vital to economic progress including manufacturing, hydrogen production, water desalination, and district heating.

Key accomplishments

- **Established a dialogue** on the different roles nuclear energy can play in clean energy systems of the future. Engaged nuclear and non-nuclear experts and policy makers in a discussion on how nuclear energy supports broader clean energy goals. Webinars, workshops, and coordination with other CEM initiatives have promoted this dialogue.
- **Developed and disseminated resources** to inform policies and planning. Developed reports to provide plain-language briefings for policy makers on the roles that nuclear can play in the clean energy mix.
- **Built partnerships** and worked with different stakeholder groups. Worked with nongovernmental groups, including youth and women engaged in clean energy advocacy, to share information with the public.



Left: Nuclear technology integrated with solar photovoltaics and wind turbines to provide both electricity and clean drinking water.



Right: A micro-reactor is used to provide heat to an Arctic village.



Left: Nuclear technology integrated with solar photovoltaics and wind turbines to power a modern data center.

Photos Courtesy of Third Way: <https://advancednuclearenergy.org/blog/nuclear-reimagined>

Lead CEM
Member(s)



Canada



Japan



United States

CEM Member
Participant(s)



Russia



United Arab
Emirates



United
Kingdom

Non-CEM Member(s)



Argentina



Poland



Romania

“ Nuclear energy's vitally important but under-recognised contributions to clean air are made even greater by constant innovation...The NICE Future initiative highlights these contributions by re-imagining nuclear's advanced uses and applications. ”

– US Secretary of Energy, Rick Perry

Key actions

- Exploring innovative applications for advanced nuclear systems both electric and non-electric.
- Engaging policy makers and stakeholders regarding energy choices for the future.
- Pooling experience on economics, including valuation, markets structure, and ability to finance.
- Communicating nuclear energy's role in clean integrated energy systems and developing the nuclear workforce of the future.

Highlights and deliverables since CEM9

The NICE Future initiative has had a strong first year of activities, establishing the foundations for a successful work stream under CEM. Highlights include:

- NICE Future initiative discussions have engaged individuals from nearly 35 countries and 80 organisations, including environmental and energy groups.
- Broader engagement of non-nuclear clean energy groups.
- Development of high-impact communications and briefing products, including the Breakthroughs: Nuclear Innovation in Clean Energy Systems book, which showcases innovative uses of nuclear energy that also promote clean energy goals.
- Integration of the NICE Future initiative work with existing Clean Energy Ministerial (CEM) initiatives and campaigns, including the Clean Energy Solutions Center's Ask an Expert Service, the Equal by 30 Campaign on gender diversity, the new Hydrogen initiative, and we are exploring linkages with power system flexibility work streams.



Key activities have included:

Organisation of high-profile events to raise the profile of nuclear in the clean energy debate

- In June 2018 Canada, the United States, other CEM members and the International Energy Agency (IEA) hosted their **first ever high-level event on nuclear energy in Paris**, featuring NICE Future themes.
- In November 2018, NICE Future **co-sponsored a high-profile event with the International Framework on Nuclear Energy Cooperation (IFNEC) in Japan** on the challenges and opportunities for nuclear innovation in an energy transitions context.

- In December 2018, NICE Future **convened an official event (positively-received) at the United Nation's COP24 Climate Change Conference in Poland** titled "Advancing Clean, Reliable: Accelerating Emissions Reductions and Energy Security Through Innovative Technology and Uses of Advanced Nuclear Energy." The COP event fostered "new thinking" about nuclear technology options, including innovative and integrated energy systems.

Engagement of youth and women

- NICE Future has **partnered with the International Youth Nuclear Congress (IYNC)** to build capacity among youth networks and develop communication products in the lead up to the next Ministerial.
- In March 2018, Argentina hosted the **IYNC/WIN2018 conference in Bariloche** that included a **NICE Future event led by high level officials from Argentina, Canada, and the United States**. We hope to leverage UAE youth outreach experience in NICE Future as was noted in the IYNC/WIN2018 Youth Circle initiative event.
- In November 2018, **NICE Future joined forces with the Millennial Nuclear Caucus and IYNC and Japanese ministries** to host a discussion at the Tokyo Institute of Technology on the role of youth, their vision for the future, and jobs.
- **Women in Nuclear (WiN)** and partner organisations are collaborating with the NICE Future initiative to spearhead actions that could expand accomplishments of the **CEM C3E initiative** and **Equal by 30 Campaign** to promote gender diversity.

NICE Future webinar series

- The NICE Future initiative has launched a new webinar series, which has been delivering at the rate of 6-8 sessions per year.
- The webinar has reached hundreds of viewers worldwide, especially leveraging the replay of the webinars via YouTube.

Operating Agent(s) /
Coordinator(s)

Funding
Government(s)/
Organisation(s)

Global and
In-Country Technical
Partner(s)



National Renewable Energy Laboratory

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