

## Message from the Chair

Recent months have brought renewed attention to HTR technology, substantial progress in building a coalition for nuclear cogeneration, as well as promising prospects for further NC2I development. We would like to inform you about these new opportunities and I am pleased to introduce this issue of the NC2I Newsletter, which provides a summary of the NC2I activities that have taken place in 2016.

And the year is not yet over. I believe that the NC2I Information Session on 30 November 2016 in Bratislava (more information is available in the newsletter) will mark a new momentum for NC2I and will allow us to reaffirm the importance of the nuclear cogeneration path.

Kind regards,  
*Grzegorz Wrochna (NCBJ), Chairman of the NC2I Task Force*

## NC2I NEWS 2016

### 8-10 March 2016 Meetings in Washington DC on International HTGR Project



The GEMINI initiative, created in 2014 by NC2I and its twin US organisation the NGNP Industrial Alliance, organised its fourth meeting from 8-10 March in Washington DC. High level governmental officials attended the meeting, including Michał Kurtyka, Deputy Minister of Energy from Poland, John Kotek from the US Department of Energy and James Gavigan, Minister-Counselor Research & Innovation, Delegation of the European Union to the US. This was a great opportunity for bilateral discussions to build cooperation between Europe and the US.

Special attention was given to the progress made in Piketon, Ohio, which is a potential site for the first HTGR (High Temperature Gas-cooled Reactor) in the US. The site hosted a uranium enrichment plant which is now decommissioned and local authorities are looking for new ways to revitalise the area.

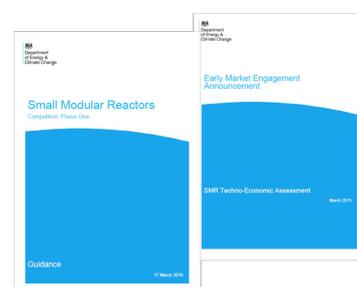
Several HTGRs delivering low-cost electricity and heat could be very attractive to various industries. Steve Kuczynski, CEO of US-based utility Southern Company, presented the long-term plans of his company and expressed a strong interest in operating such an HTGR fleet.

Delegations from Korea and Japan also joined the meeting. HTGR programmes in these countries target very high temperature operations suitable for the supply of hydrogen and hydrogen-based fuel production. R&D on HTGR technology, in particular on materials, is a common interest encouraging intercontinental cooperation.

The meeting concluded with a plan to launch the PRIME international project which aims at designing a prismatic block HTGR with 750°C core temperature and power in the range of 300 MWth, with the first reactors to be built simultaneously in US and Europe.

### April 2016 NC2I submits proposal to the UK SMR competition

In April the UK Department of Energy and Climate Change (DECC, now BEIS) launched a competition for the design of a Small Modular Reactor (SMR) concept. The BEIS intends to publish an SMR



Roadmap later this year, which will summarise the evidence so far, set out the policy framework, and assess potential pathways for SMRs to help the UK achieve its energy objectives while delivering economic benefits. GBP 250 million are foreseen to speed up the development of the most promising technologies.

NC2I submitted an HTGR proposal that was prepared jointly with the US NGNP Industrial Alliance under the GEMINI initiative. Entering this first phase of the competition enables NC2I to engage in discussions with the British government on the best value SMR design for the UK.

The GEMINI Partnership believes that the HTGR is the most suitable SMR for the UK's needs. Indeed, it responds to all assessment criteria, ranging from financing feasibility to compatibility with UK regulations and the short deployment timescale.

The competition follows an earlier DECC action called SMR Techno-Economic Assessment (TEA), under which NC2I and NGNP IA also submitted a common proposal under the GEMINI label.

Other HTGR projects were proposed, confirming that this technology is very promising and represents a new opening for nuclear technology in Europe.

#### 24-25 May 2016 Poland-UK HTGR talks



For the first time, possible cooperation between Poland and the UK on HTGR technology was discussed on 17 February 2016 at ministerial level during a visit of Amber Rudd, Secretary of State for the UK's Department of Energy and Climate

Change (now called BEIS), in Warsaw.

For Poland, HTGRs represent a reliable and clean source of process heat for industry. For the UK, HTGR is one of the technologies considered to fulfil the need for small modular reactors (SMR).

During a following visit in the UK in May, Deputy Ministers of Energy, Michał Kurtyka and Andrzej Piotrowski, met with Secretary of State Amber Rudd and her team, in order to discuss the details of the project. The Polish delegation described the progress achieved on the implementation of high temperature nuclear reactor technology and the Polish plans for nuclear energy, and emphasised the need for further bilateral cooperation.

The Polish delegation also visited a new High Temperature Facility in Warrington and met with the representatives of the British nuclear sector, including URENCO, AMEC Foster Wheeler, Rolls-Royce, U-Battery and the National Nuclear Laboratory.

#### 25 May 2016 Signature of a letter of intent between NCBJ and U-Battery

The first practical result of the Polish-UK cooperation on HTGR technology could be the construction of a U-Battery reactor at the National Centre for Nuclear Research (NCBJ) in Poland. U-Battery is a micro-reactor being developed by a British consortium including URENCO, AMEC FW, ATKINS, Cammell-Laird, Laing O'Rourke et al. It is designed to deliver 10 MWth of which 4 MW is converted to electric power.



The U-Battery at NCBJ will be equipped with advanced measuring apparatus to serve as a research reactor. It intends to be an important milestone in the Polish HTGR programme and should help speed up capacity building to develop skills and facilitate the licensing of a larger industrial HTGR.

The project was initiated with the signature of a letter of intent between U-Battery, represented by Dominic Kieran, URENCO CEO, and Professor Krzysztof Kurek, NCBJ Director General. The signature completed the visit of Polish Ministry of Energy officials in the UK.

In addition to the first research reactor, the U-Battery consortium is looking to commercially deploy the micro-reactors in the UK, Canada and other countries.

#### 20 July 2016 Establishment of Minister of Energy's Advisory Committee for HTR in Poland



Krzysztof Tchórzewski, Polish Energy Minister, established an Advisory Committee that will analyse and prepare the conditions for the implementation of high temperature nuclear reactors in Poland.

The first Committee meeting was held on 20 July. During this gathering, committee experts from valuable organisations, such as the National Centre for Nuclear Research (NCBJ), Energoprojekt-Warszawa S.A. and Prochem S.A, were officially nominated. Under the presidency of Professor Grzegorz Wrochna from NCBJ, they are expected to produce a roadmap for the most efficient use of national scientific and business potential in this enterprise, as well as analyse the domestic market needs and export potential.

## 29 July 2016 HTR in Polish Strategy for Sustainable Development

The Polish government published a strategic document which underlines the role of nuclear in the country's modernisation.

The "Strategy for Sustainable Development" also known as "Morawiecki-Plan", named after the Deputy Prime Minister and Minister of Economic Development Mateusz Morawiecki, is a detailed plan for the economic development of Poland.



Among the projects of strategic priority, it includes the nuclear cogeneration programme with an HTR project for energy efficiency and diversification (in addition to the basic programme for LWR of 6000 MWe), and a nuclear materials laboratory NOMATEN. The Plan is currently in a consultation phase. Governmental support to HTRs will allow to speed up the work on the implementation of this technology in Poland.

## October 2016 HTGR at conferences



NC2I was present at the European Nuclear Conference held this year in Warsaw on 9-13 October. During the first day's Plenary Session, Dominique Hittner from NC2I delivered a speech on a US/EU joint effort to demonstrate industrial high temperature nuclear cogeneration with HTGR technology.

On 12 October, together with Professor Grzegorz Wrochna from NCBJ, they chaired the session on High Temperature Reactors & Cogeneration. Papers submitted to the session covered a broad range of applications from district heating to space propulsion engines.



On 18-19 October, the second annual SMR UK Summit gathered around 200 senior decision-makers and industry experts in London, including NC2I experts. This year's edition was an opportunity to hear the UK

Department for Business, Energy and Industrial Strategy (BEIS) and the Environment Agency outline the government's progress and objectives for the UK SMR industry, to meet with the leading UK and international SMR vendors, and to examine the cutting-edge Generation IV reactor designs.

Several speakers reviewing different technologies pointed out that small PWR reactors seem to be the closest to practical realisation.

However, HTGRs are considered to have technical readiness levels and a time to deployment that are very close to that of PWRs. Advantages of cogeneration in general and HTGR technology in particular were underlined in the presentation titled "HTGR – the SMR for UK, Poland and the World" given by Mr Wrochna on behalf of NC2I.

## 5 October 2016 Submission of GEMINI+ Project



An international consortium, composed of over 20 members, presented the GEMINI+ project proposal under the Euratom Horizon 2020 programme. In line with the strategy defined with NC2I and the

NGNP Industry Alliance in the GEMINI Initiative, the approach chosen for the project is based on the assumption that modular HTGR technology is sufficiently mature to design the first of a kind (FOAK) industrial system for high temperature nuclear cogeneration, without any need for an intermediate step. Indeed, several industrial prototypes have already been built and operated around the world. What still needs to be demonstrated is the viability of use of such an industrial HTGR system in a cogeneration mode, for supplying heat to industrial processes on top of power generation.

In this context, the GEMINI+ project aims to provide a conceptual design of a high temperature nuclear cogeneration system, based on modular HTGR technology, for the supply of process steam to industry, a framework for the licensing of this type of system and a business plan for a full scale demonstration.

### ABOUT NC2I

The European Nuclear Cogeneration Industrial Initiative (NC2I) is one of the three SNETP pillars. It aims at demonstrating an innovative and competitive energy solution for the low-carbon cogeneration of heat and electricity based on nuclear energy. The targeted outcome is the commissioning within 10 years of a nuclear cogeneration prototype to deploy this low-carbon energy technology in several energy-intensive industries.

**To join NC2I, please contact the SNETP Secretariat:**  
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**More information:** [www.nc2i.eu](http://www.nc2i.eu)



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