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ENERGY IN BUILDINGS

EMEA 2024

Europe, the Middle East & Africa

FRIDAY - SATURDAY

NOVEMBER 22-23, 2024

@ 9:00-18:00

SESSIONS:

- SUSTAINABILITY
- HEALTH & SAFETY
- DECARBONIZATION
- TECHNICAL SOLUTIONS
- DIGITAL ENVIRONMENT
- POLICIES & LEGISLATION
- ENERGY EFFICIENCY FIRST
- RESILIENCE TO CLIMATE CRISIS

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Greece and Nuclear Energy

Nuclear energy in a buildings conference

Last months 3 technological giants

- Google,
- Amazon and
- Microsoft

Decided to look to nuclear energy for the power needs of their data centers. Google and Amazon partnering with SMR companies, Microsoft contracting to revive a shut down nuclear power plant

Data centers are of course sophisticated buildings.

Is it a sign that the technological giants included nuclear energy as a tool for their further development?

Is that signaling the metamorphosis of the new energy mix to achieve the 2050 targets with a sustainable way?

International environment

At COP28 in Dubai, countries launched the Declaration to triple nuclear energy capacity by 2050, recognizing the key role of nuclear energy in reaching Net Zero and inviting inter alia World Bank and International and Regional Financial Institutions to include nuclear energy in their organization's energy lending policies.

These countries are: USA, Armenia, Bulgaria, Canada, Croatia, Czech Republic, Finland, France, Ghana, Hungary, Jamaica, Japan, Republic of Korea, Moldova, Mongolia, Morocco, Netherlands, Poland, Romania, Slovakia, Slovenia, Sweden, Ukraine, UAE and UK.

In September 2024 at New York Climate Week, 14 of the world largest banks and financial institutions from five countries signaled their support for tripling global nuclear capacity.

At COP 29 in Baku as of Wednesday 13th of November 2024, another six countries endorsed the Declaration to triple nuclear energy: El Salvador, Kazakhstan, Kenya, Kosovo, Nigeria, Turkey.

Green taxonomy and EU - virtuous energy form

The European Union aims to be climate neutral by 2050 and therefore wants to encourage investment in "sustainable" activities to help it get to net-zero by 2050.

To help that process it has come up with a system to "facilitate sustainable investment". The Taxonomy Regulation provides investors with guidance on economic activities that can be considered environmentally sustainable. It also obliges European companies to report their level of taxonomy-aligned undertakings. Any activity excluded from the list faces being cut out of sustainable finance products and will find itself at odds with long-term EU policy objectives.

There has been a split within the European Union over whether or not nuclear power - and natural gas - should be included as being "sustainable". Nuclear energy was left out of the initial Delegated Act pending further assessment. But this further assessment by the EU Joint Research Centre, reviewed by two further expert bodies, concluded that the technology is sustainable. As a result, the Commission has now taken steps to include nuclear energy as a transitional activity in the taxonomy by adopting a Complementary Delegated Act (CDA).

Green taxonomy and EU - virtuous energy form (continued)

Why has it been controversial?

Supporters of nuclear power, including 12 EU member states who publicly backed its inclusion, say that nuclear is a low-carbon power source that must be part of any energy mix to tackle climate change, and does not cause more significant harm than other industries included in the taxonomy. They say that the science, and evidence-based policy support its inclusion. Opponents say that it should not be included because radioactive waste means it is not sustainable. For the European Union it has been one of the highest profile recent issues where France - which backs nuclear - is on the opposite side to Germany.

Small Modular Reactors (SMRs)

Small modular reactors (SMRs) are advanced nuclear reactors that have a power capacity of up to 300 MW(e) per unit, which is about one-third of the generating capacity of traditional nuclear power reactors. SMRs, which can produce a large amount of low-carbon electricity, are:

Small – physically a fraction of the size of a conventional nuclear power reactor.

Modular – making it possible for systems and components to be factory-assembled and transported as a unit to a location for installation.

Reactors – harnessing nuclear fission to generate heat to produce energy.

Prefabricated units of SMRs can be manufactured and then shipped and installed on site, making them more affordable to build than large power reactors, which are often custom designed for a particular location, sometimes leading to construction delays. SMRs offer savings in cost and construction time, and they can be deployed incrementally to match increasing energy demand.

Micro Modular Reactors (MMRs)

Microreactors - a subset of SMRs designed to generate electrical power typically up to 10 MW(e) - have smaller footprints than other SMRs and will be better suited for regions inaccessible to clean, reliable and affordable energy.

Furthermore, microreactors could serve as a backup power supply in emergency situations or replace power generators that are often fueled by diesel, for example, in rural communities or remote businesses.

In Greece this could play a pivotal role for energy supply of non-interconnected, small islands.

SMRs

26 billion Refurbishment project of big Nuclear Energy Reactors:

Although PM. Justin Trudeau since he came in power in 2015 was against nuclear energy, due to the fact that the 26 billion refurbishment program for the nuclear reactors was on time and on budget, changed opinion and proceeded with the order of new SMRs.

Canada ordered 4 SMRs for Ontario and another 4 SMRs (300 MW each) for other regions.

Poland ordered another 8 SMRs.

The fact that SMRs are developed based on the same technology with big reactors doesn't mean that there will be an analogous decrease of its price. Nevertheless, as referred above, new orders are being placed.

Downscaling is not leading necessarily in the analogous decrease of price, thus creating expectations for price decrease when more SMRs will be ordered in the international market.

EIB and SMRs

EIB has received a lot of criticism for its intention to support for the first ever Research and Development for SMRs (21st of June a roadmap from EIB for the support of R&D for SMRs has been adopted).

The criticism that was expressed:

The criticism, not to mention safety risks and the radioactive waste issue, is always based on budget overruns, construction delays and reliability problems in the operational phase and that often leads to a loss of investors' interest. Hidden cost are also often not included in initial calculations, such as liability insurance, decommissioning and waste management.

Modern 3+ generation of nuclear powerplants and especially SMRs are the antidote to such criticism.

Nuclear energy and Greece

31 July 1961

Inauguration of the scientific reactor of Democritus reactor at the presence of the political and scientific leadership of the country.

21 September 2023

IAEA Mission in Greece says that Greece committed to managing Radioactive waste safely, sees areas for improvement

3 July 2024

PM of Greece at the Economist conference stated:

“Nuclear Energy Europe was and still is a leader in nuclear technology. Greece is not a country that has nuclear energy. There is no way that we will reach carbon neutrality without nuclear. Are we investing us Europeans in the next generation of SNRs? Have we really placed our chips where we should in this transition, at least identifying three, four critical industries? Are we investing in our interconnections to the extent that we should?”

THE DISCUSSION HAS BEEN OPENED IN GREECE.

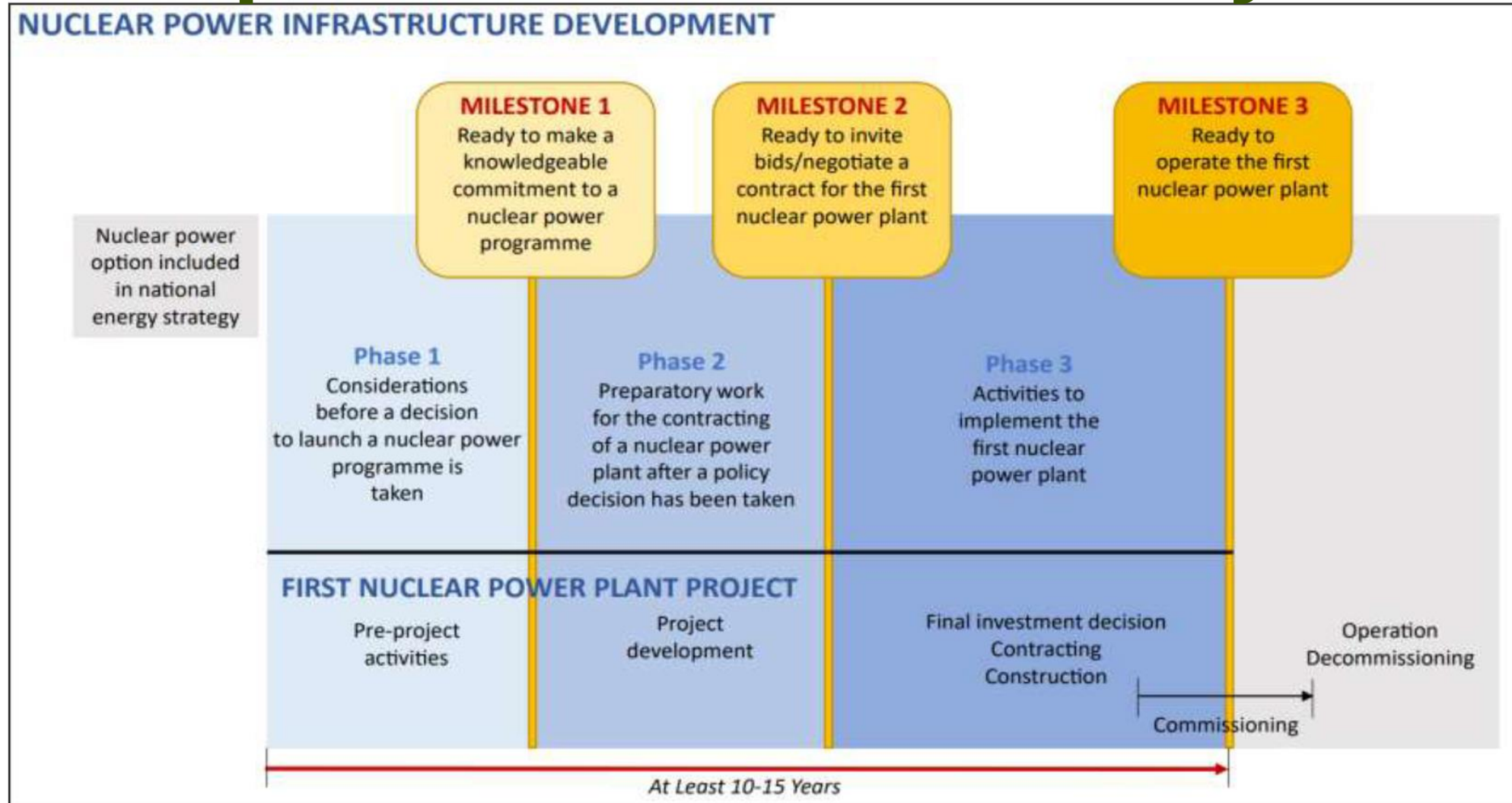
Nuclear energy and Greece

- 18 September 2024 first conference at Democritus premises for Nuclear Energy organized by the Institute of Foreign Affairs (Lukas Katsonis).
- 21 October 2024 First workshop organised by Athlos Energy, a startup company established by two Greek nuclear scientists Dr Stathis Vlassopoulos and Dr. Dionusios Chionis with the aim of sensitise the public opinion in respect to the nuclear energy as well as the development of the first nuclear project in Greece.

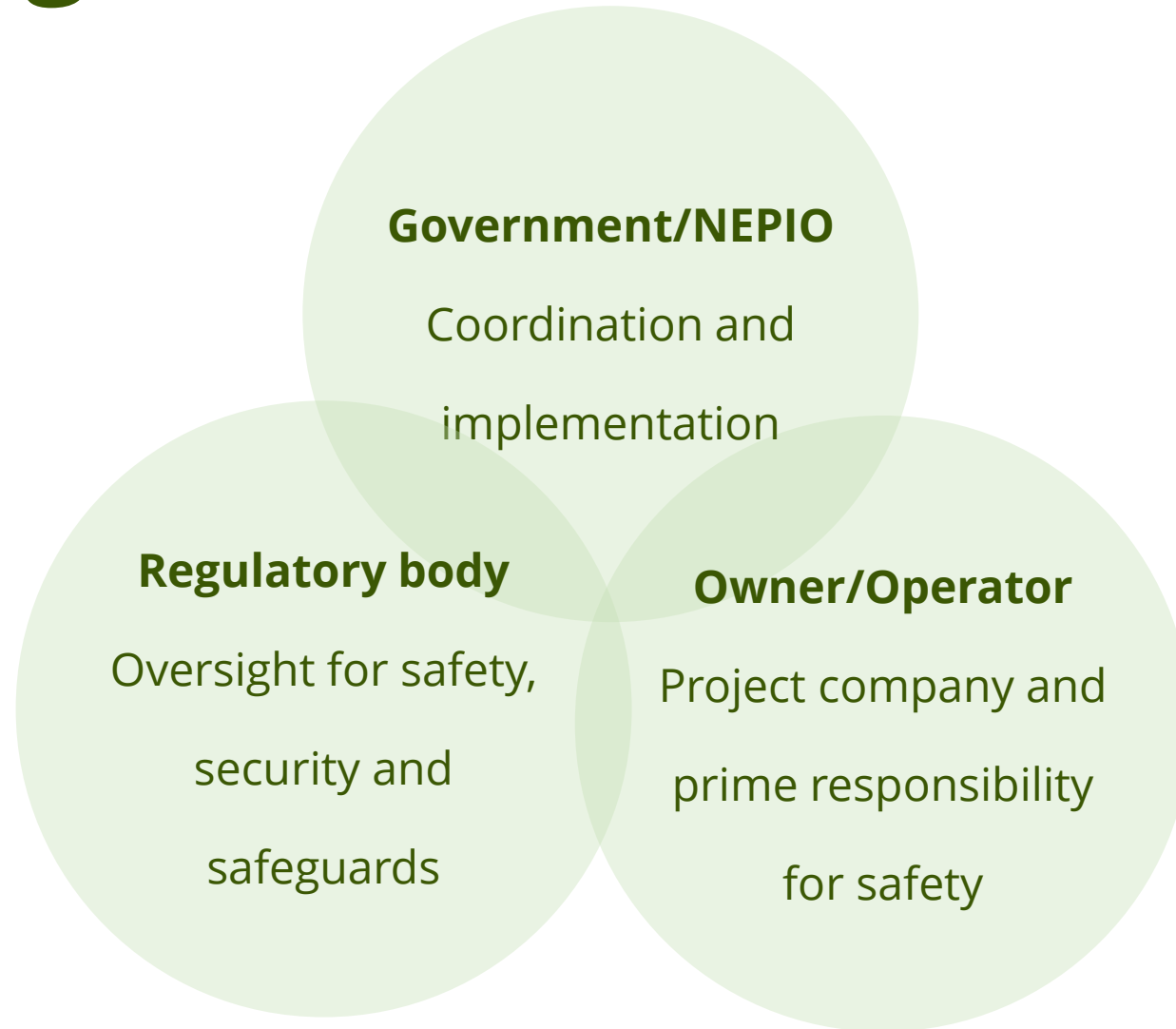
During that Workshop Nikolaos Tsafos, the energy advisor of the Greek PM said inter alia that the Government may evaluate the possibility of investing in the nuclear power plant of a neighboring country or even sign a PPA agreement with a nuclear power plant established in a neighboring country.

Kindly note that such a discussion is already existing in our neighboring countries Bulgaria, Turkey, Romania, Serbia and Kosovo and nuclear plant projects are under development.

IAEA - Nuclear power infrastructure development timeline (10-15 years)



3 key organizations



National commitment and strong Leadership

Why Nuclear Power?

The answer of the Leadership must be credible and well perceived by the population.

Nuclear power is a long-term national commitment that requires strong Leadership and continuous efforts regardless of the unescapable changes in the Government.

Nuclear Power's characteristics require special and permanent attention for a very long period.

- Long pre-investment, preparatory period;
- Long investment and construction period;
- Extremely long operation and maintenance period;
- Provisions for long-term waste management and decommissioning.

Capacity building

- Strong and well organized cooperation between Government, Universities and other stakeholders, including the industry
- The capacity building requires long time preparation and cooperation with universities from abroad in view of bringing the state of art knowledge in the country
- A great chance for Brain Gain in Greece of Greek nuclear experts

The case of UAE

- Maybe the most successful ever case of a fast-track nuclear program development.
- Every country interested in development a nuclear power program has to examine the successful example of the UAE nuclear power program, where despite the IAEA estimate of 10-15 years for the development of a nuclear program, with the advice of the Greek-origin American lawyer George Borovas, all the pre-investment period and construction (up to a ready-to-operate state) **was finalized in 8 years.**
- An extraordinary example that we in Greece, should carefully examine as well.

The Greek challenge

- Greece is willing to attract big Data Centers.
- As we started our presentation, technology giants are interested in reliable base load power units for their electricity supply, which apparently is huge.
- The eventuality of receiving nuclear generated electricity via PPAs from our neighboring countries, does not warrant the security of energy supply required for such an investment, thus making Greece a weaker competitor in attracting the big Data Center's investors.
- The preparation from now on for the Greek nuclear program is giving a further additional advantage in negotiating PPAs and/or participation in the investment into the nuclear power units with our neighboring countries.
- The results of the latest technology for SMRs will be known before our Nuclear power program is finalized, rendering us ready by the time the results concerning all associated risks (including prices risk) are known from the international community.
- The heavy industry of the country (cement, steel, shipyards) could be also interested in such a development as well as water desalination for the islands and hydrogen production appears as a challenging area.

Maritime industry

- Is a unique opportunity for Greece to start an initiative in a cooperation between the Hellenic Republic and the Hellenic maritime industry in view of using MMRs and SMRs for the commercial fleet, thus marking the beginning of a national effort for the decrease of emissions in our commercial fleet as the Greek Initiative for Green Seas.
- This may convince the European Union to provide its financial support, including EIB's support, for the relevant R&D.



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THANK YOU! Q & A

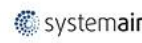
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NAME: Thomas Lamnidis
EMAIL: Thomas.lamnidis@lamnidislaw.eu

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