

Current status of SMR deployment and Nuclear Power Programme in Poland

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Agenda



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Disclaimer

The information contained in the presentation represents the opinion of an employee of the PAA Nuclear Safety and Security Department.

The information contained in the presentation does not represent the official position of the President of the National Atomic Energy Agency.



Introduction

Regulatory framework: Regulators



National Atomic Energy Agency (PAA)		Central body of government administration that acts as an independent nuclear regulatory body.
Technical Supervision Office (UDT)		Perform technical supervision tasks, in their entirety – perform technical inspection of equipment.

National Atomic Energy Agency in Poland (PAA)

The President of the National Atomic Energy Agency (**PAA**) is the central government administrative body responsible for nuclear safety and radiological protection.

The President of **PAA** is supervised by the minister responsible for energy.

PAA headquarters: Warsaw



National Atomic Energy Agency in Poland



Oversight of nuclear safety and radiation protection in Poland for over **40 years**

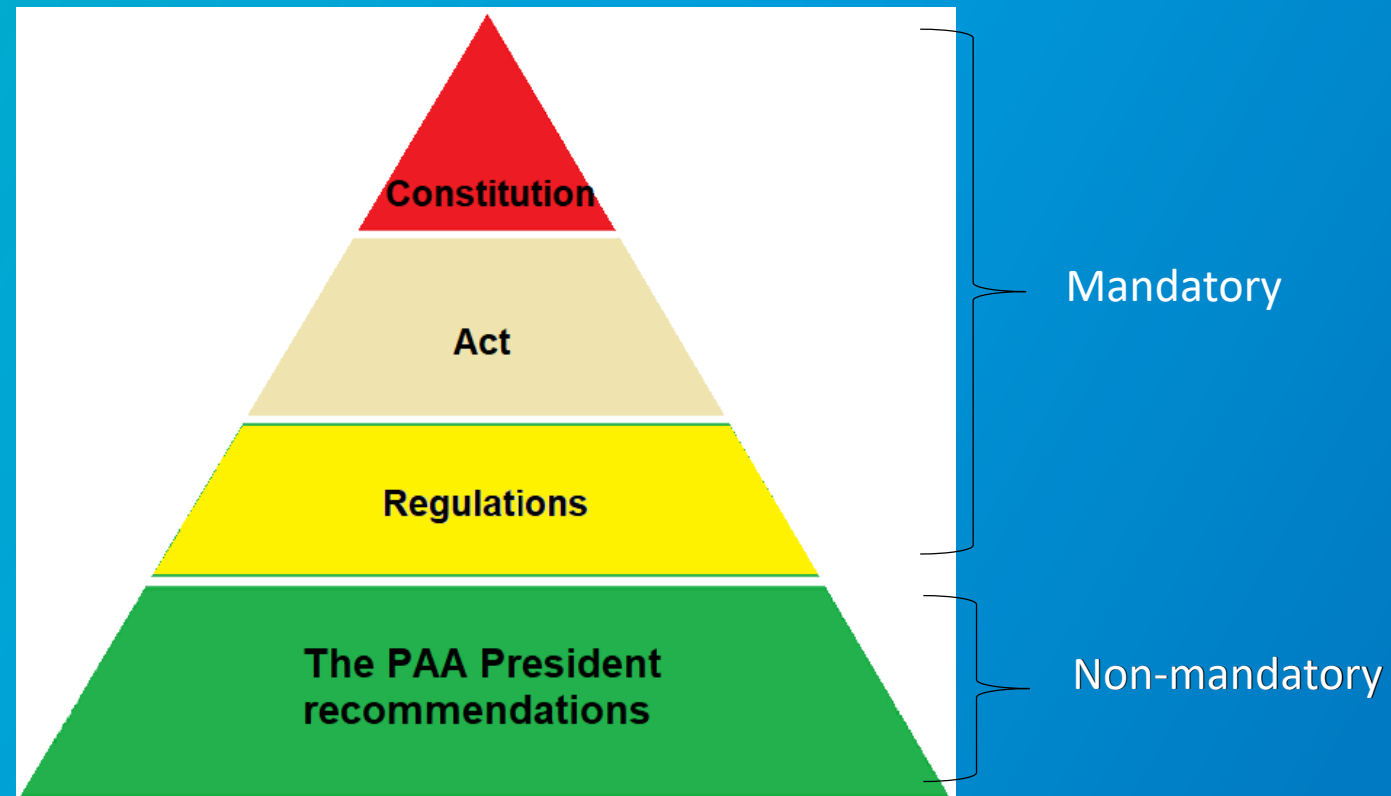
Licensing and inspections of **nuclear facilities** and **activities** with **ionizing radiation sources**

Systematic assessment of the radiation situation and conducting **radiation monitoring**

Involvement in the **Polish Nuclear Power Program**



Regulatory framework: Hierarchy



Act	<i>Act on Atomic Law, Act on The Technical Inspection</i>
Regulations	<i>Regulation on nuclear safety and radiological protection requirements which must be fulfilled by a nuclear facility design</i>
Recommendations	<i>Technical recommendations of the PAA President: Determination of emergency planning zones and emergency planning distances</i>



Nuclear Power Programme in Poland

Nuclear power programme in Poland: History

- March 1982 – Start of construction the first Polish nuclear power plant.
- December 1989 – The Polish government decided to stop construction for one year in order to collect opinions and information necessary to decide the fate of the NPP.
- December 1990 – The Polish government adopted Resolution on placing the „Żarnowiec NPP under Construction” into liquidation.



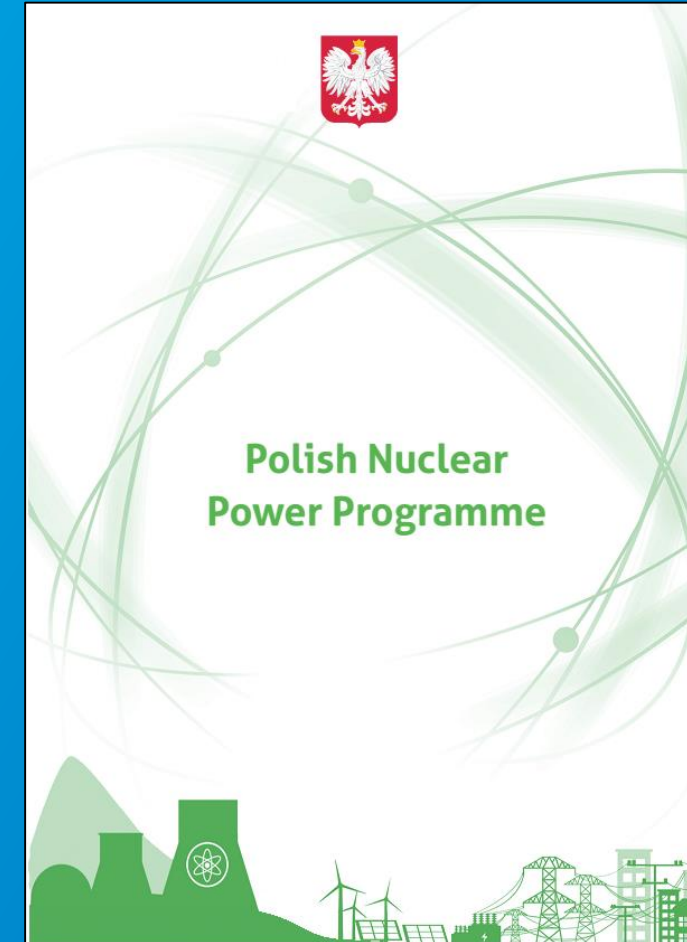
Nuclear power programme in Poland: Current status

In 2009 the government decided to start work on the **Polish Nuclear Power Programme**, with the goal of **starting a nuclear power plant in 2020**.

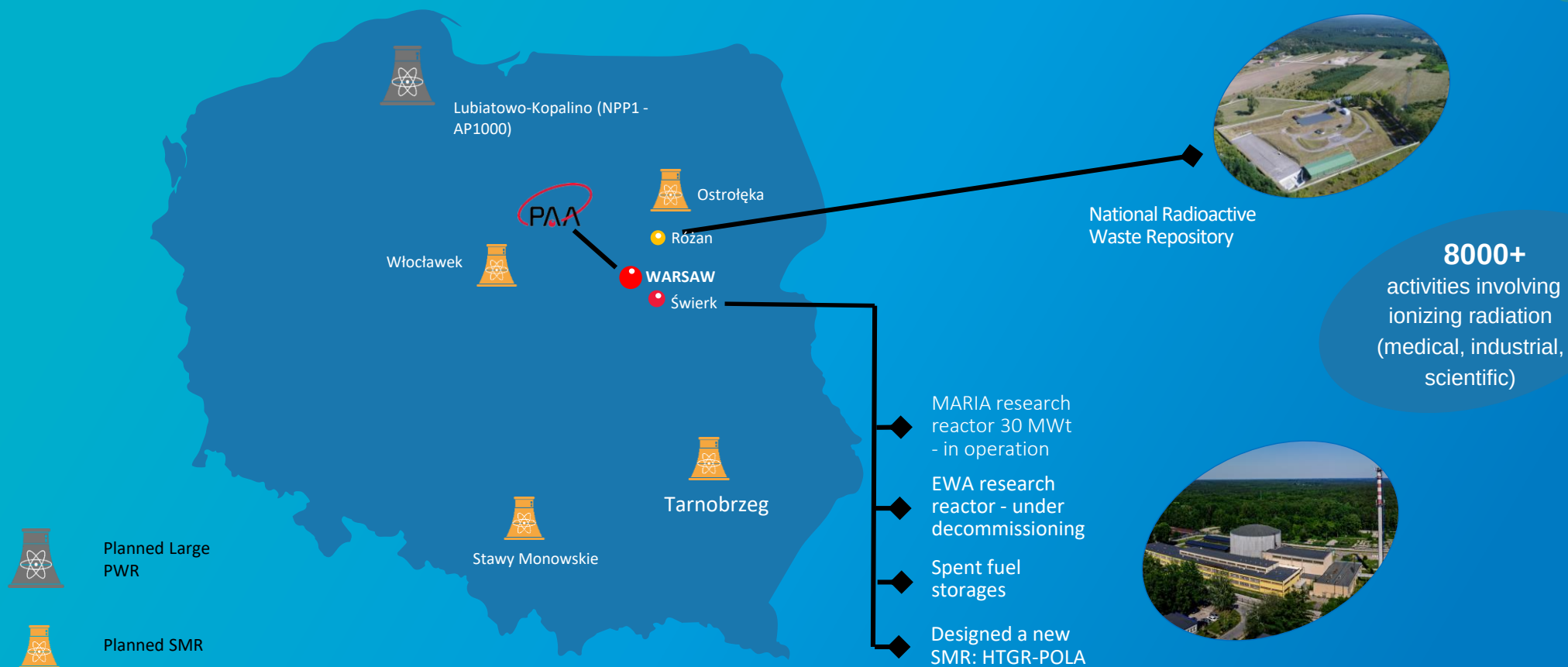
In 2014 the **Program was adopted** by the government (in 2020 the **Program was updated**).

Objective of the Polish Nuclear Power Programme is to build **6 – 9 GWe** of installed nuclear capacity based on **large pressurised water reactors**. The Programme provides for **single unit capacity of over 1000 MWe**.

The PNP Programme assumes that in the period from 2030 to 2040, all three nuclear units of NPP1 operating on the basis of the load on the national **in the energy mix of 2045 is predicted to be about 20%**.



Nuclear facilities in Poland: Operated and planned investments



Polish Nuclear Power Program: AP1000

- AP1000 technology for 3 units
- In September 2023 Polish power company Polskie Elekrownie Jądrowe (PEJ) signed an **engineering services contract** with Westinghouse Electric Company and Bechtel consortium (18 months).
- Commissioning of the first reactor scheduled for **2033**



AP-1000 reactors: Site preparation works



Source: <https://www.skyscrapercity.com/threads/pomorskie-elektrownia-j%C4%85drowa-lubiatowo-kopalino-realizacja-inwestycje-towarzysz%C4%85ce-polityka-inne-technologie-lokalizacje-w%C4%85tki-og%C3%B3lne.2363803/page-23#replies>

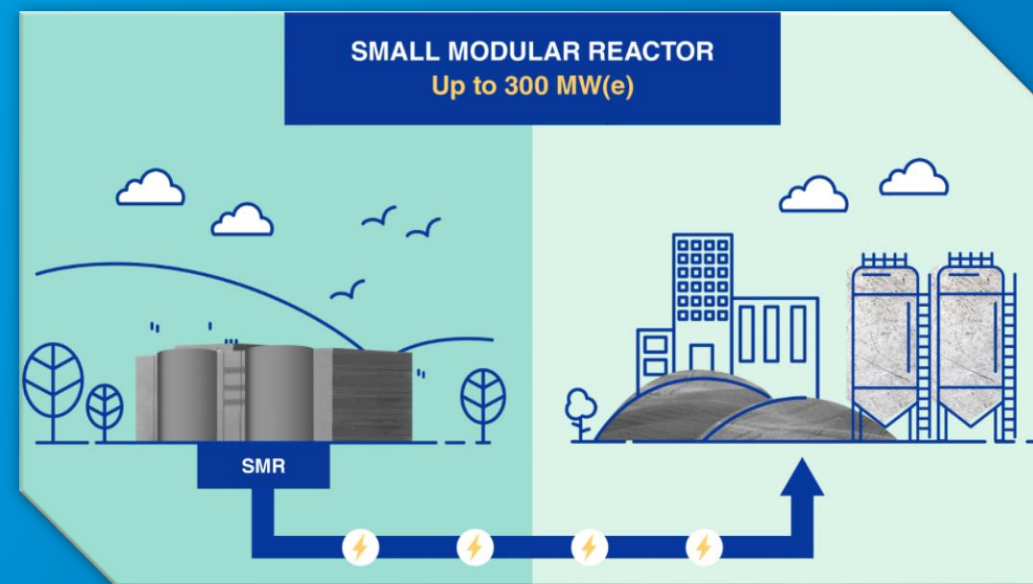
SMR

What are SMRs?

Small Modular Reactors (SMRs) are compact, factory-built nuclear reactors designed for scalability and enhanced safety features.

Why SMRs in Poland?

- Enhance energy security and diversify the energy mix
- Support decarbonization and industrial development
- Complement large nuclear power projects in the country



Source: IAEA

OSGE General Opinion

BWRX-300 (300 MWe – Boiling Water Reactor) –GEH Technology



Investor: ORLEN Synthos Green Energy (OSGE) - Joint venture company established by ORLEN S.A. and Synthos Green Energy S.A.



History of contacts:

- In July 2022, OSGE applied to the National Atomic Energy Agency for the **PAA President's general opinion** on the BWRX-300 technology.
- In April 2023 OSGE applied to the Ministry of Climate and Environment for the **issuance of decision in principle** to build 6 NPPs with BWRX-300 reactors in Poland.
- In May 2023 PAA President issued a general opinion on selected technical aspects for the BWRX-300 reactor technology.
- Currently works on PSAR

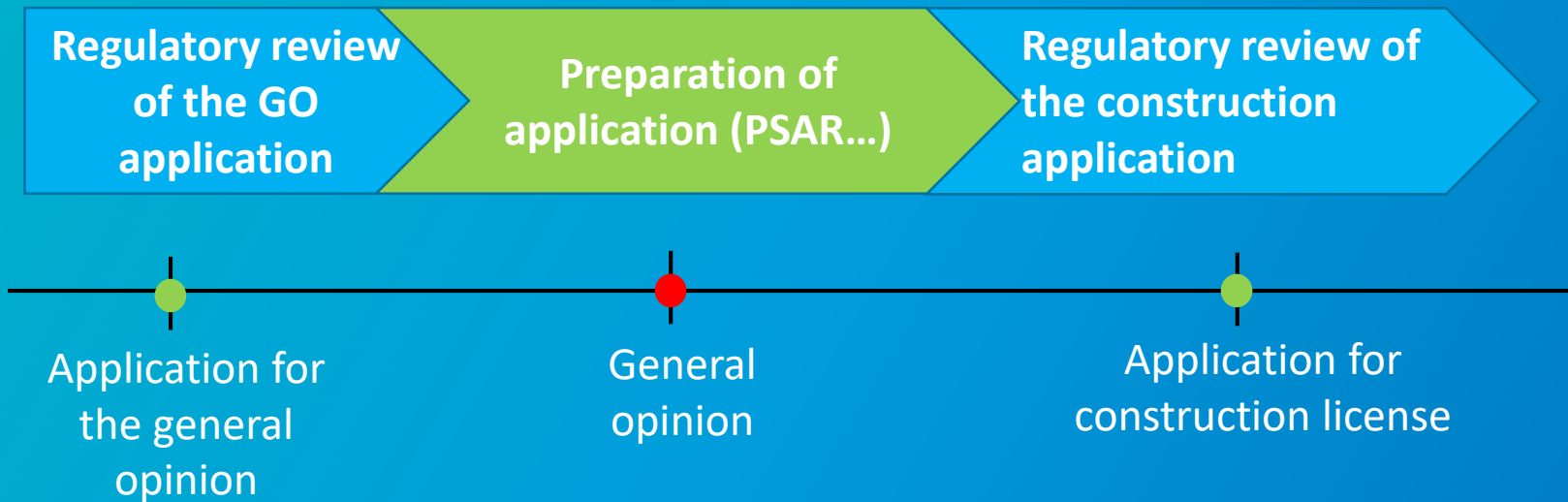


Preparation of PAA to the tasks from Polish Nuclear Power Programme



Prelicensing process

General opinion of the PAA President



General opinion of the PAA President: About

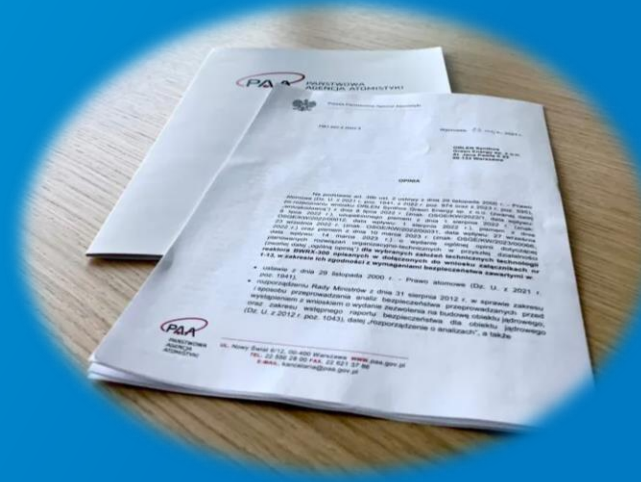
- **General opinion of PAA President** on the planned organizational and technical solutions or planned organizational drafts of documents:

- **Scope is defined by applicant**

- **Opinion is not mandatory**

- **Applicant should also pay fee for issuing GO: 350 000 PLN (~90000 \$)**

- **Time for the review is fixed at maximum 9 months regardless of the scope**



General opinion of the PAA President: Benefits

For vendors:

- to identify **barriers to licensing** (non-compliance with regulations in Poland).
- to **avoid disagreements** with the regulatory body.
- results of the general opinion can be used in preparing the application for construction license.
- possibilities to identify legal obstacles or noncompliance of design with the requirements at an early stage of licensing.

For PAA:

- to identify **possible gaps in regulatory requirements**.
- to **become familiar with the technology**.
- to improve, update or prepare internal work instructions related to the review of license application.
- **plan the work of the teams** during licensing.

For both:

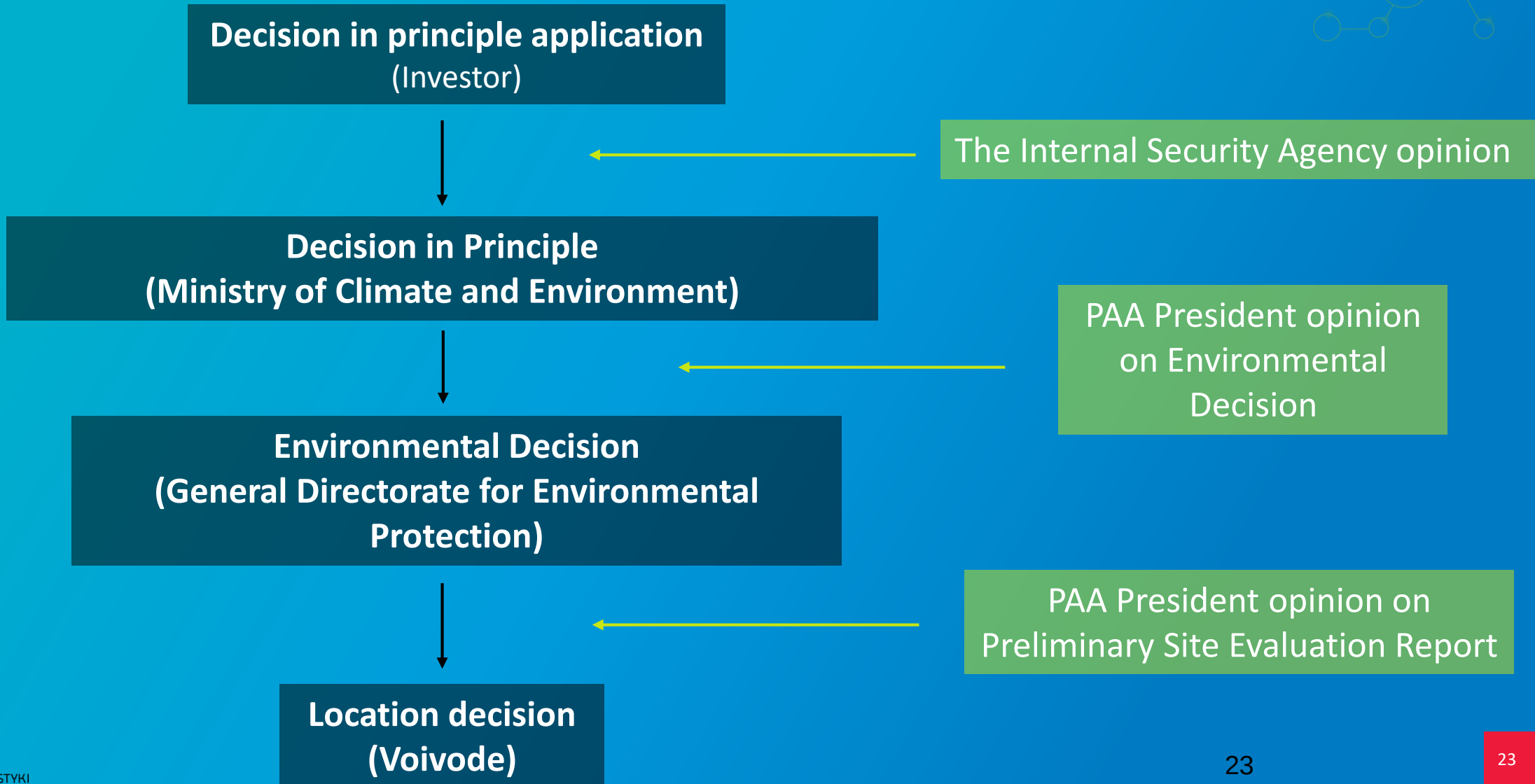
- regulatory assessment process becomes **more effective** and **less time consuming**.



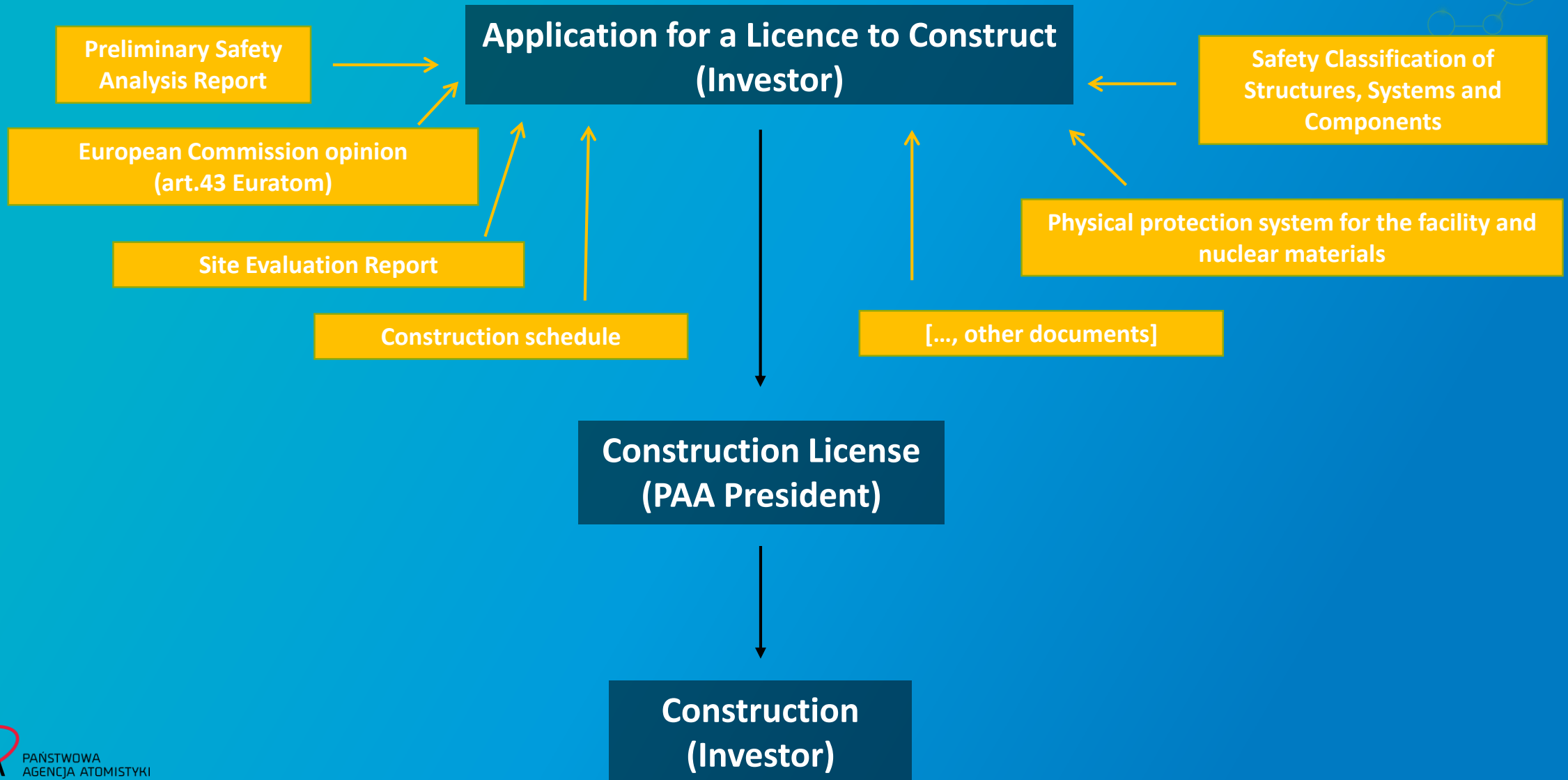


Licensing process

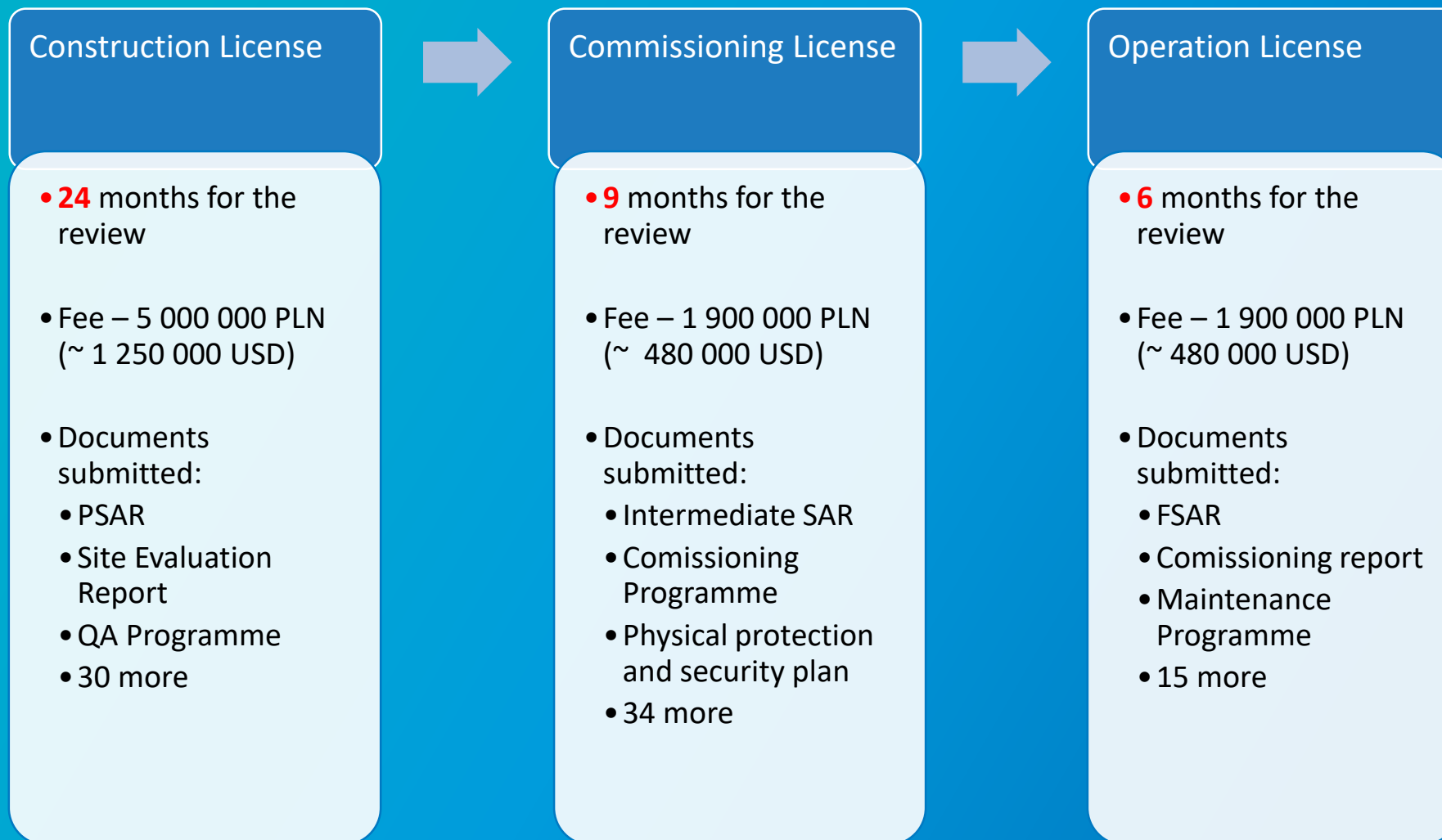
Licensing Process in Poland: Road to construction



Licensing Process in Poland: Road to construction



PAA Licenses during the process





International cooperations

How to leverage cooperation with foreign partners

PAA develops **cooperation** with regulatory authorities with the vendor countries – recent activities:

US NRC:

- on-the-job trainings
- national workshops with NRC experts
- bilateral exchange of regulatory experience in specific technical areas
- cooperation in safety assessment (joint PAA-NRC licensing simulation)

Republic of Korea KINS and NSSC:

- development of nuclear safety training for PAA
- PAA study visit to Republic of Korea

Canadian CNSC:

- on-the-job trainings
- regulatory exchange in specific technical areas



Source: US NRC

Next steps for the PAA licensing preparation (with foreign partners)

- Leverage the NRC's experience with safety verification of the AP1000 reactor and the CNSC's experience with safety verification of the BWRX300 reactor
- Obtain good knowledge of design technologies before applications are submitted
- Review of regulatory framework and development of guidance before the licensing (including international review)



PAA On-the-Job-Training Programme



OJT Project launched in 2015, in cooperation with Regulatory Cooperation Forum, IAEA and bilateral partners.

Implemented in 8 countries: Canada, Czech Republic, France, Republic of Korea, Slovakia, South Africa, UK, USA.



Regulatory challenges for SMRs

Regulatory Challenges for SMRs



Challenges at national level:

- Staffing
- Adjust regulatory capabilities to deal with increasing number of licensees in industry, research, and medical applications
- Introduce new staff to regulatory safety culture
- Authorization of expert organizations and laboratories – TSO
- Plan public communication activities for licensing process
- Verification of our regulatory requirements and comparison with other countries
- Harmonization of international regulations with polish polish regulations

Summary



- Poland is developing a nuclear energy programme, including both large PWR reactors (AP1000) and Small Modular Reactors (SMRs).
- SMRs will enhance energy security, support decarbonization, and complement large nuclear power plants.
- The licensing process is a complex proces, requires time.
- Key challenges involve regulatory adaptation, staffing, and harmonization of regulations.
- PAA actively collaborates with international partners to streamline licensing and share good practices.



Bonus: case study!

Example: comparison of two articles, why there is no compliance?



<i>Act on Atomic Law</i>	Article. 36b. In the design and construction process of a nuclear facility, no solutions or technologies shall be used which have not been demonstrated to be appropriate in practice in other nuclear facilities , or by means of tests, research and analyses .
<i>Convention on nuclear safety</i>	Article 18. ii. Each Contracting Party shall take the appropriate steps to ensure that technologies incorporated in the design and construction of a nuclear installation are proven by experience or qualified by testing or analysis .

in practice in other nuclear facilities ≠ **are proven by experience**

tests and research and analyses ≈ **testing or analysis**

Thank you for your attention!

See you in Poland!

Let's cooperate!

Find us!



Find me!



„The greatest strength and power in the world is conversation...”

Y.N.Harari