



The first Polish NPP build project

Investor's preparatory works status

PGE EJ 1 Sp. z o.o.

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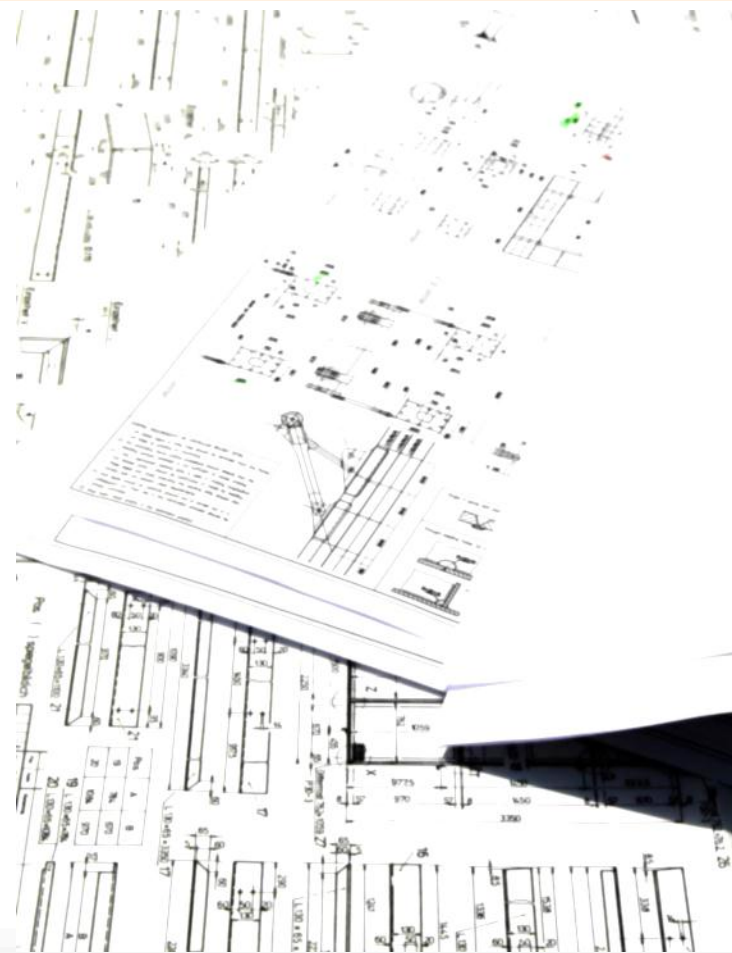


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Agenda

- **Key activities**
- Site characterization
- Integrated Proceedings
- Communication
- Technical Advisor
- Other topics



Selected key PGE activities



Financing

- Work on the possible financing structures and models (incl. debt financing by ECAs and commercial banks, partners and role of the State)
- Potential NPP build and operations support system in Poland - analyses

Technology/ O&M / Fuel



- Gen. III/III+ reactor technology and EPC services – assumptions and requirements update
- O&M services contracting – development of approaches and guidelines
- Nuclear fuel and nuclear fuel cycle management - development of approaches and guidelines
- **Owner's Engineer** – contract to be awarded



Project management/ Integration

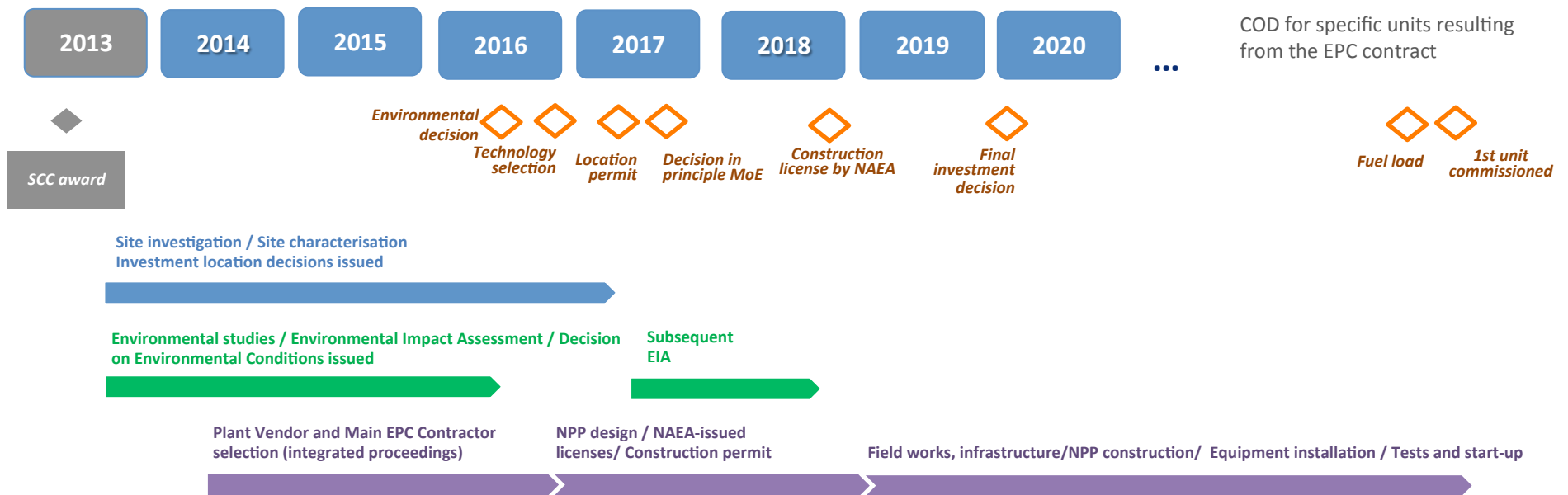
- Development of assumptions for the implementation of IMS, in compliance with IAEA and NAEA requirements
- Project schedule update
- Further work on **Integrated Proceedings** implementation and execution model

Site



- Conclusion of the agreement with SCC
- Closing contracts with land owners and acquiring the right to access Choczewo and Żarnowiec sites
- Mobilization stage accomplished; work planning; **first stage of site characterization works launched in Choczewo and Żarnowiec**

Preliminary schedule for start-up of unit 1 of first Polish NPP accounting for the integrated procedure (selected elements)



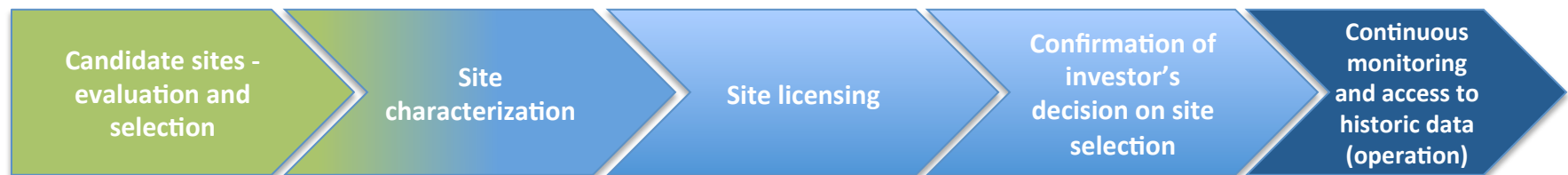
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- **Site characterization**
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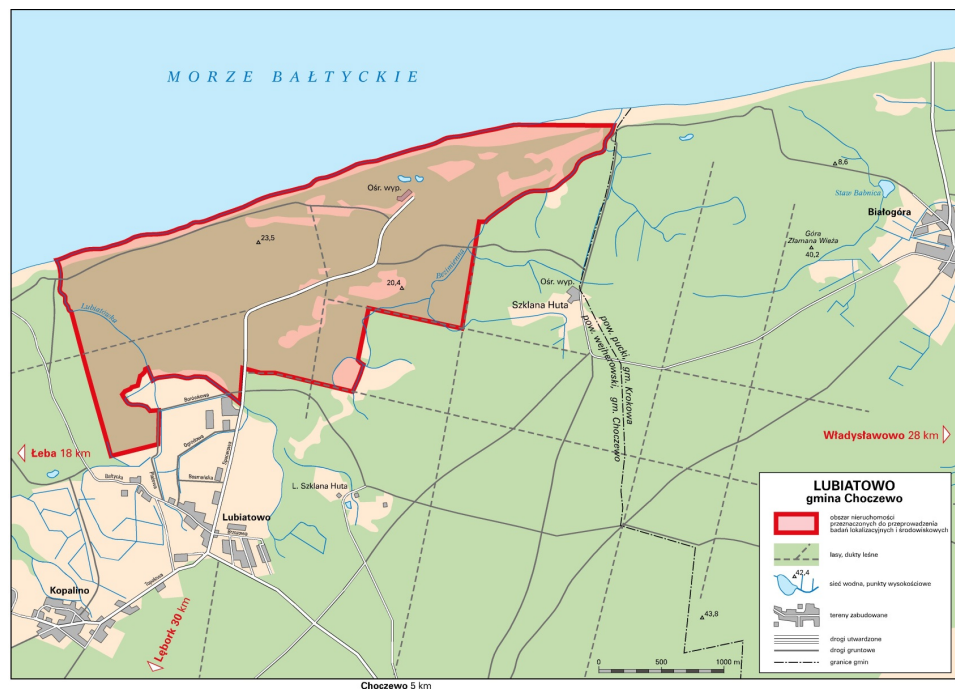
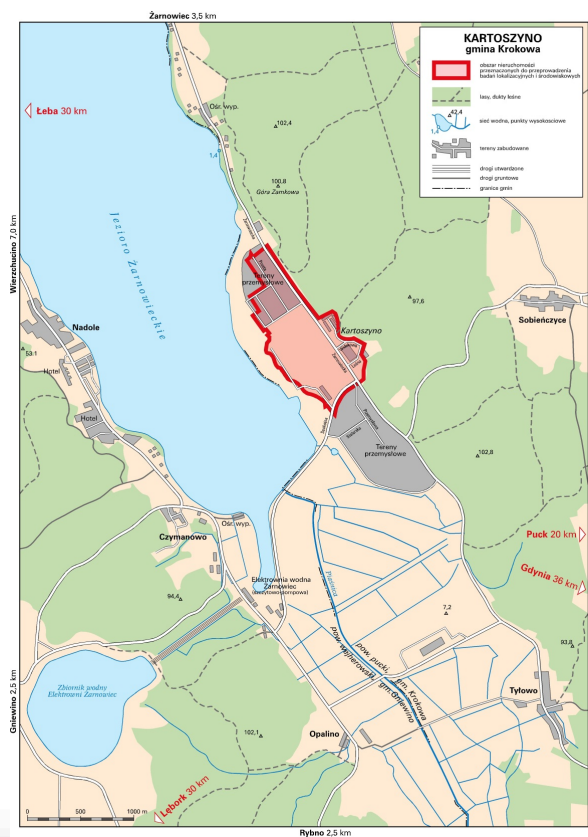


NPP site project

- **Identification of an appropriate and safe site to host an NPP;** receipt of relevant permits and permissions as well as gathering and management of data pertaining to the site and required at the stage of NPP operations and beyond
- Process based on national regulations, incorporating international guidelines, best international practices and standards, as well as requirements and recommendations pertaining to NPP site selection and licensing – **transparent, robust and well-documented process meeting the requirements set by the nuclear regulator (President of NAEA) and IAEA who will review the process in the future**
- Process has been developed and implemented with the support of national and international engineering companies, with the use of all available data (including the use of Polish as well as international sources of scientific and technical knowledge); **it guarantees compliance with the leading practices and recommendations on NPP site selection processes**



Two sites: Żarnowiec and Choczewo



Site characterization works

Environmental survey

- Environmental survey confirms suitability of a given site for hosting an NPP from an environmental perspective
- Environmental conditions research and nature inventory take at least 12 months
- Research was launched at the beginning of autumn 2013 and will last at least until the end of summer 2014
- Area surveyed: area where all planned NPP elements will be sited and neighbouring areas in Choczewo and Żarnowiec sites



Site investigation

- Site investigation confirms suitability of a given site for hosting an NPP from the nuclear safety perspective
- Meteorological measurements and analyses, seismic, hydrogeological, hydrological and geotechnical studies take min. 24 months
- Area surveyed: area where all planned NPP elements will be sited and neighbouring areas in Choczewo and Żarnowiec sites



Agenda

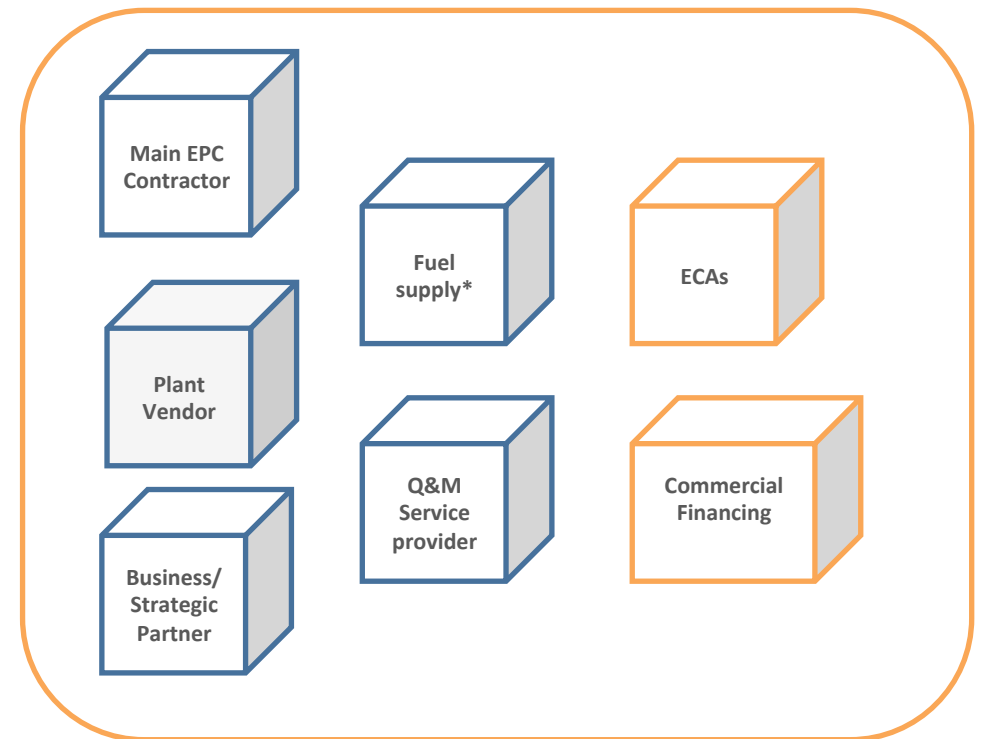
- Key activities
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Integrated Proceedings

Under the integrated procedure, the potential vendors will be required to include the following in their tender offers:

- Strategic Partner's equity interest and the related energy off-take
- Nuclear technology for an NPP of 3000 MWe installed capacity – 2-4 units based on a gen. III/III+ technology, together with the delivery of main EPC services
- O&M support services, together with the knowledge transfer program to benefit PGE EJ 1 (O&M)
- Nuclear fuel supply
- Declaration of intent to provide debt financing by ECAs and commercial banks (letters of intent and preliminary financing arrangements at the technology selection stage)



 Required

 Required (in the form of declaration of intent)

* The question of including fuel supply in the integrated proceedings is subject to further analyses

Integrated Proceedings – major steps and schedule

Phase I Ongoing

Preliminary dialogue

- Stage 1 – Information meetings
- Stage 2 – Preliminary dialogue*

*meetings ongoing

Phase I is conducted based on general rules and principles governing business negotiations (approx. 12-18 months)

Phase II*

* launch planned upon Phase I closure and receipt of corporate governance approval

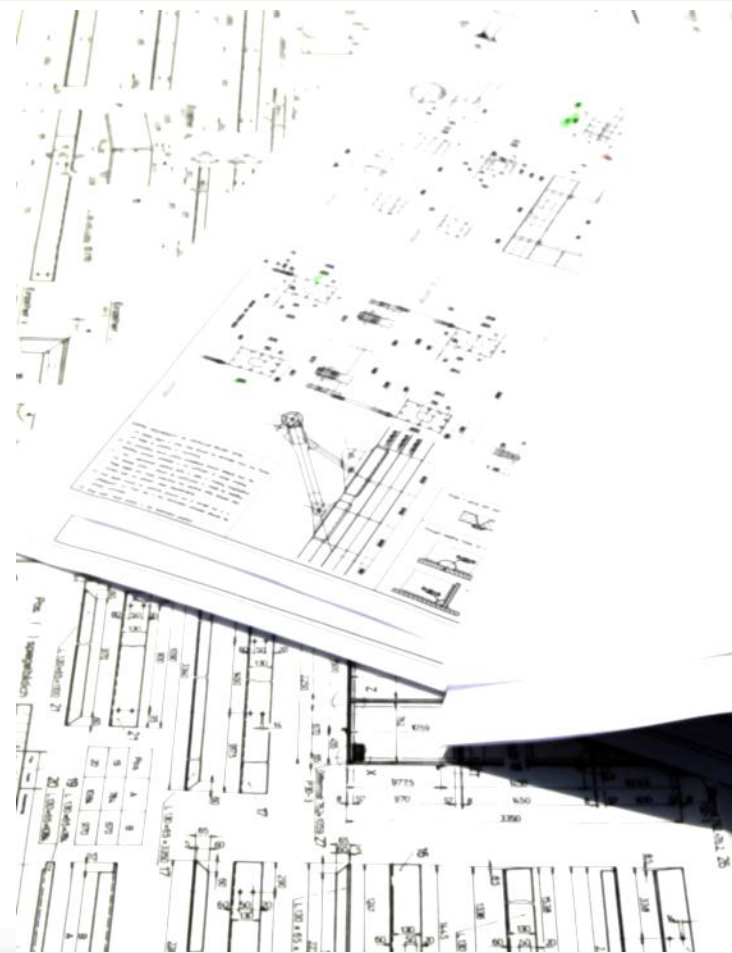
Competitive procedure

- Stage 1 – Qualification of the consortia
- Stage 2 – Competitive dialogue and development of the bid specification
- Stage 3 – Submission of offers, selection of the winning consortium and conclusion of the conditional agreements

Phase II is conducted under the Code of Proceedings (approx. 24 months)

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Communication and External Affairs

Education and information activities targeting the local communities

- **Site characterization - communication:**
 - Workshops for local residents (selected groups)
 - Distribution of publications to households in the area
 - Thematic series in local media, workshops for journalists and heads of communes
 - Participation in local events – multimedia education stand, meetings with experts, knowledge contests
 - Education project for schools – environmental lesson module
 - Research plans exhibited
- **Continued presence on location:**
 - Local Information Centres (multimedia content) events and meetings with experts: mobile Centre in the summer
 - Art courses in community centres, sailing school project at Jezioro Żarnowieckie
 - Cooperation with local associations and organisations

- **Education portal**
www.swiadomieoatomie.pl – development of visuals, news section, media section, project archive
- **Academic cooperation program** (supporting the development of human resources for nuclear power)
- **Education materials and publications, expert reports** building the understanding of nuclear power)



- **30 Jan. 2014 – Conclusion of the „Cooperation Agreements”** with hosting communes (Krokowa, Choczewo and Gniewino communes) and Pomeranian Voivodeship (Marshall Office)

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- Other topics



Technical Advisor (Owner's Engineer)

- **Technical Advisor** (also: Owner's Engineer) plays a key role in the NPP build project. TA's organization is embedded within the Investor's organizational structure. TA supports the Investor at all stages of the project execution process, providing the Investor with skills and competencies required to execute a complex NPP build project.

- Four bidders/consortia have submitted their offers during the tendering process:
 - ❖ Exelon Generation Company, LLC,
 - ❖ URS Polska sp. z o.o. and Tractebel Engineering S.A.,
 - ❖ AMEC Nuclear UK Ltd.,
 - ❖ Mott MacDonald Limited and AF-Consult Ltd.

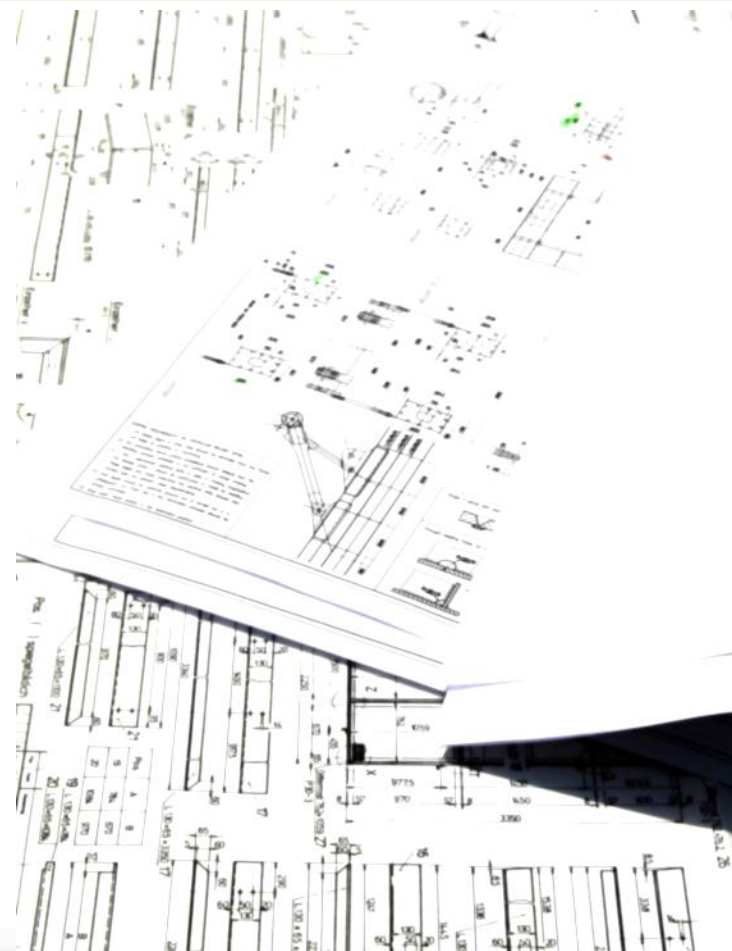
- The final submission date, and final tender offers opening date, in the procurement process „Providing Technical Advisor (Owner's Engineer) services to support PGE EJ 1 Sp. z o.o.'s first Polish nuclear power plant development program with an installed capacity of approximately 3000 MWe”, was **17 Feb. 2014.**

- **The process is going on**

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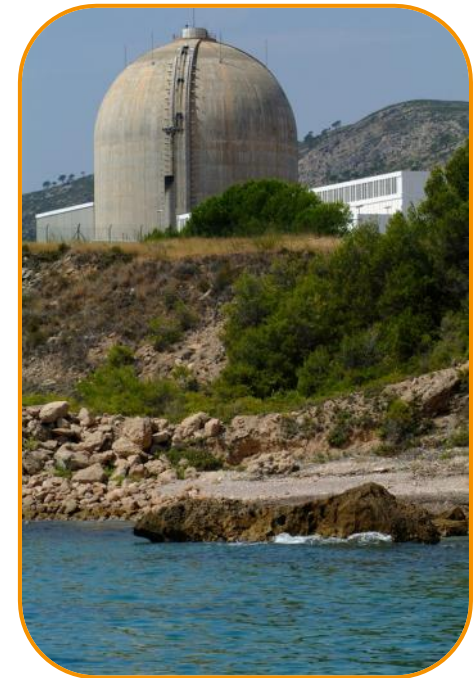
- **Other topics**



Other topics

- **Grid analysis** – for three exemplary scenarios of the grid development
- **General plan of the employment development** – under preparation
- **Education and training** – internal trainings, international trainings (e.g. ENETRAP III program)
- **The cooperation with national institutes and universities:**
 - National Centre for Nuclear Research
 - Warsaw University of Technology
 - Gdańsk University of Technology
 - ...

Thank you!



- **Particularity of the nuclear project in Poland**



Particularity of nuclear projects (1/2)

- **Necessity to develop comprehensive, nuclear-specific regulatory solutions** that allow to ensure the quality and the highest levels of nuclear safety and radiological protection during the preparatory phase, construction and operations of an NPP and that embed the requirements and guidelines set by international organizations (IAEA, UE, EUR, WENRA) as well as all available operational experience and experience gained from NPP accidents worldwide (Fukushima).
- **Requirement to prepare and carry out, both at the national and international level, all appropriate consultations**, including environmental consultations, that precede consultations with the European Commission (Euratom, i.a. Art. 41).
- **Closing the financing for the project is highly time-consuming due to specific requirements and expectations** imposed by, among others, financing and insurance sectors as well as due to the requirement to obtain potential government support (p.ex. robust energy policy, guarantees, market model).
- **Robust preparations and successful completion of tendering procedures** depend on the ability to mobilize and access nuclear-specific knowledge, experience and know-how as well as on the ability to fully integrate all the requirements, especially with regards to the Integrated Proceedings.
- **Necessity for close cooperation with the TSO (PSE Operator)** in order to implement grid modifications in a timely manner so that the grid can support the evacuation of power (units of over 1.000 Mwe capacity) and provide stable and assured power supply to the NPP (to meet, among others, the cooling system's needs).

Particularity of nuclear projects (2/2)

- **Site characterization works are comprehensive and time-consuming (over 24 months).** They are governed by the provisions of the Atomic Law, ordinances thereto as well as the Investment Act. Results of site characterization works are the basis for the receipt of location permit issued by the governor of the voivoidship and for the construction license issued by the President of the NAEA.
- **Licensing processes for an NPP are complex and time-consuming**
 - ❖ Nuclear-specific reports, incl. Location Report and PCSAR
 - ❖ Nuclear-specific decisions and licenses, including:
 - ✓ Decision on environmental conditions– issued by the General Director for Environmental Protection
 - ✓ Location Permit – issued by the appropriate Governor of the Voivoidship
 - ✓ Decision in Principle (issued by the Minister of Economy) – required to apply for construction permit
 - ✓ Construction license issued by the President of the NAEA, combined with the reactor technology licensing process; pre-requisite for the receipt of the „regular” construction permit; according to laws in force, issuance of the construction license takes up to 24 months.
- **Delivery of the long lead equipment,** p.ex. the reactor vessel, requires a lot of time - up to 5 years from the order placement, which has a direct impact on project schedule and capital expenditure required until financing for the project is closed.
- **Pre-requisite for the receipt of operating licence issued by the President of the NAEA is the development of an effective and competent operating organization** (ab. 1000 personnel for an NPP of approx.3000 Mwe installed capacity) in possession of a long-term training and certification program for the NPP operators (5 to 7 years).

- **Key activities**



Key activity areas related to PNPP approval – prep works and execution

According to PNPP - approx. 3000 MWe is to be installed

Approval of PNPP allows for, among others:

- ❖ Opening of the bids and contract award in **the Owner's Engineer selection process** – 17 Feb. 2014
- ❖ Development and launch of **the Integrated Proceedings** with the view to select the strategic partner, technology provider, EPC contractor, fuel and O&M services supplier
- ❖ Purchase of PGE EJ1 shares by **the National Partners**: KGHM Polska Miedź S.A., Tauron Polska Energia S.A., ENEA S.A. – upon approval by the Office for Competition and Consumer Protection

Key activity areas related to PNPP approval

- ❖ Definition of the scope of cooperation with the strategic partner during the execution of the nuclear project
- ❖ Development of the financing model as well as various options of NPP support mechanisms
- ❖ Development of the final and binding procedure for the Integrated Proceedings and technical requirements
- ❖ Nuclear skills and capacity building within PGE Capital Group - planning and implementation

Main activities related to the NPP build project



Polish Nuclear Power Program (PNPP)

- On 28 Jan. 2014 the Council of Ministers passed the resolution approving the Polish Nuclear Power Program
- PNPP had been developed by the MoE, by the Government Commissioner for Nuclear Energy



Regulatory framework

- Public consultations on new EU/Euratom regulations on, i.a., public support (EEAG) and nuclear liability
- Drafting opinions on the review of nuclear safety directives (2009/71/Euratom)



Transmission system (PSE S.A.)

- Cooperation agreement with PSE S.A. has been concluded and cooperation has been established
- Cooperation with PSE Innowacje on grid variance analyses for the identified sites and technologies has been launched and first results achieved

Strategic and business partnership



- Letter of Intent pertaining to purchase of shares in the SPV PGE EJ 1 Sp. z o.o. has been signed by PGE, Tauron, KGHM and Enea
- PGE remains the leader of the project
- Conclusion of the Shareholders' Agreement and purchase of shares in SPV PGE EJ 1 Sp. z o.o. planned for 2Q/3Q 2014

- Site characterization



Site characterization works

- Data gathered during the site characterization works will be basis for:
 - **Environmental Impact Assessment report (EIA report)** attached to the environmental decision request;
 - **Location report** attached to the location permit request for a nuclear facility (siting decision).
- The two decisions, environmental decision and location permit, are required for the issuance of subsequent decisions:
 - **Construction license for a nuclear facility issued by the President of NAEA;**
 - **Construction permit for a nuclear facility issued by the Governor of Pomeranian voivodeship.**

SCC project - accomplishments

- **Feb. 2013** – conclusion of the Agreement with WorleyParsons
- **Sept. 2013** - mobilization stage closed with regards to planning for, i.a., the following:
 - Quality management,
 - Occupational safety and health,
 - Risk management,
 - Stakeholder management,
 - Subcontractors,
 - Environmental protection,
 - Development of detailed NI methodologies,
 - Development of the project execution plan and work execution schedule.
- Launch of field works: Sept. 2013
- Sites: Choczewo and Żarnowiec
- Ongoing at present (i.a.):
 - Binding Conditions Envelope and Binding Footprint
 - Land utilisation plan
 - Report on the existing environmental conditions,
 - Met towers installation,
 - Stage I of the research and drafting the report with Stage I research results,
 - Hydrology: report as a result of the 12 months-long monitoring,
 - Characterization in terms of fatal flaws.

- **Communication**



Communication and external affairs




Regular public opinion polls – allow to monitor local support levels and local communities’ level of knowledge on nuclear power




- Support for the NPP build in local communes

The construction of the NPP enjoys the highest support among the residents of the Gniewino commune.

- Support remains strong in Krokowa and Choczewo.





3rd round of survey by TNS Polska for PGE EJ1 (Oct. 2013) – local qualitative survey, local opinion leaders, quantitative survey – 2400 interviews altogether


Local support for the NPP build (pro)	2013 (October)	2013 (May)
Krokowa	58%	58%
Choczewo	 57%	55%
Gniewino	 74%	72%
Mielno	 12%	11 %

-  Increase since previous results
-  No significant change since previous results
-  Decrease since previous results


Communication and external affairs

■ Demand for education and information activities in local communes

Demand for education and information activities	2013 (October)	2013 (May)
Krokowa	 70%	67%
Choczewo	 85%	70%
Gniewino	 73%	82%
Mielno	 50%	39%

 Increase since previous results

 No significant change since previous results

 Decrease since previous results

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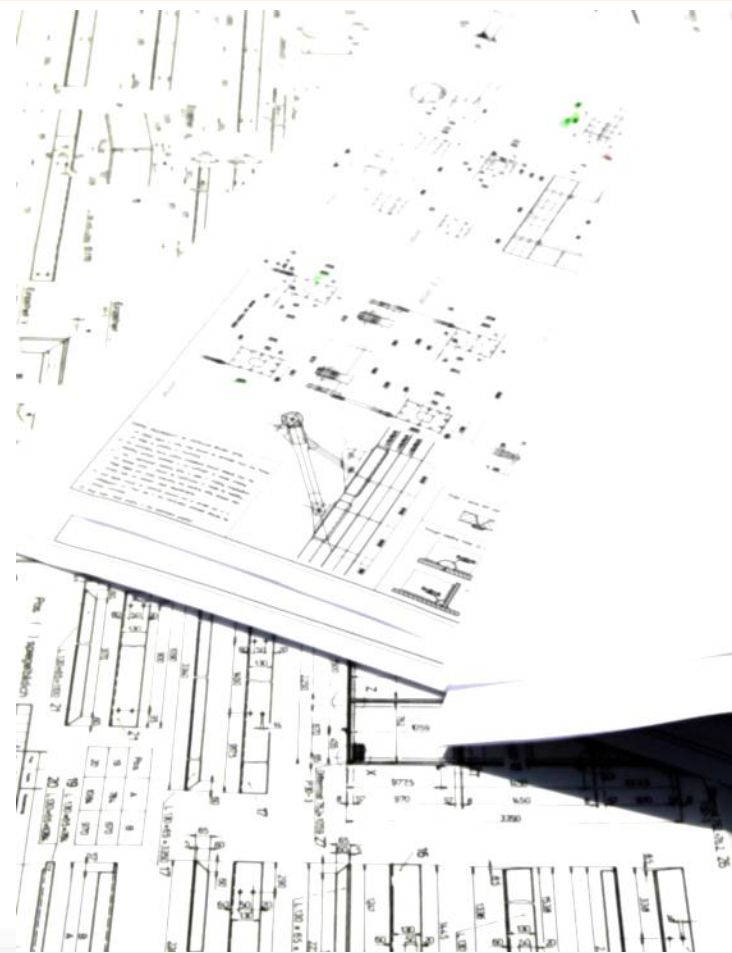
✓ Majority of residents (70%) believe **there exists a substantial need to consult** the construction of the NPP with the residents of communes indicated as potential locations.

✓ True demand for information and knowledge has been observed among residents of the selected communes.

■ Demand for education and information activities in the Pomeranian and West Pomeranian voivodeships

✓ Vast majority of the residents of the Pomeranian and West Pomeranian voivodeships declare understanding of nuclear power, nuclear plants, their role in the economy and influence on natural environment. 7 out of every 10 respondents declare the need for more information and education on nuclear power.

- **Grid analysis**

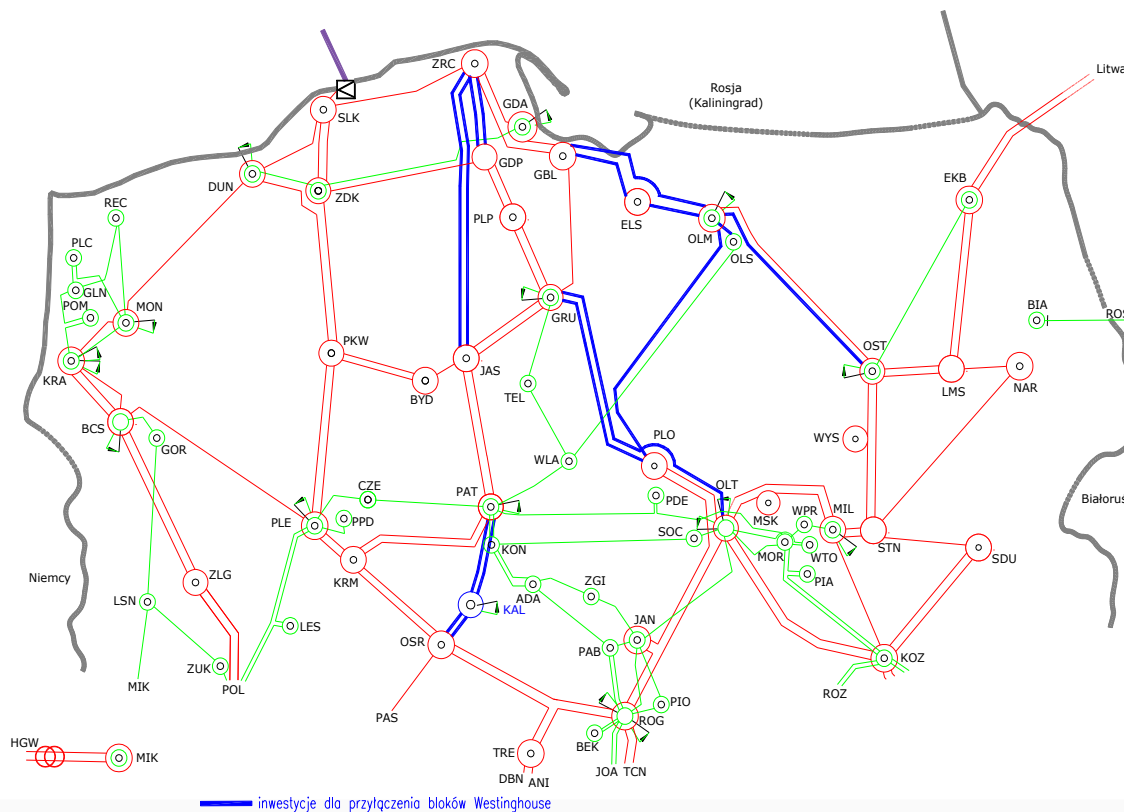


Grid analysis

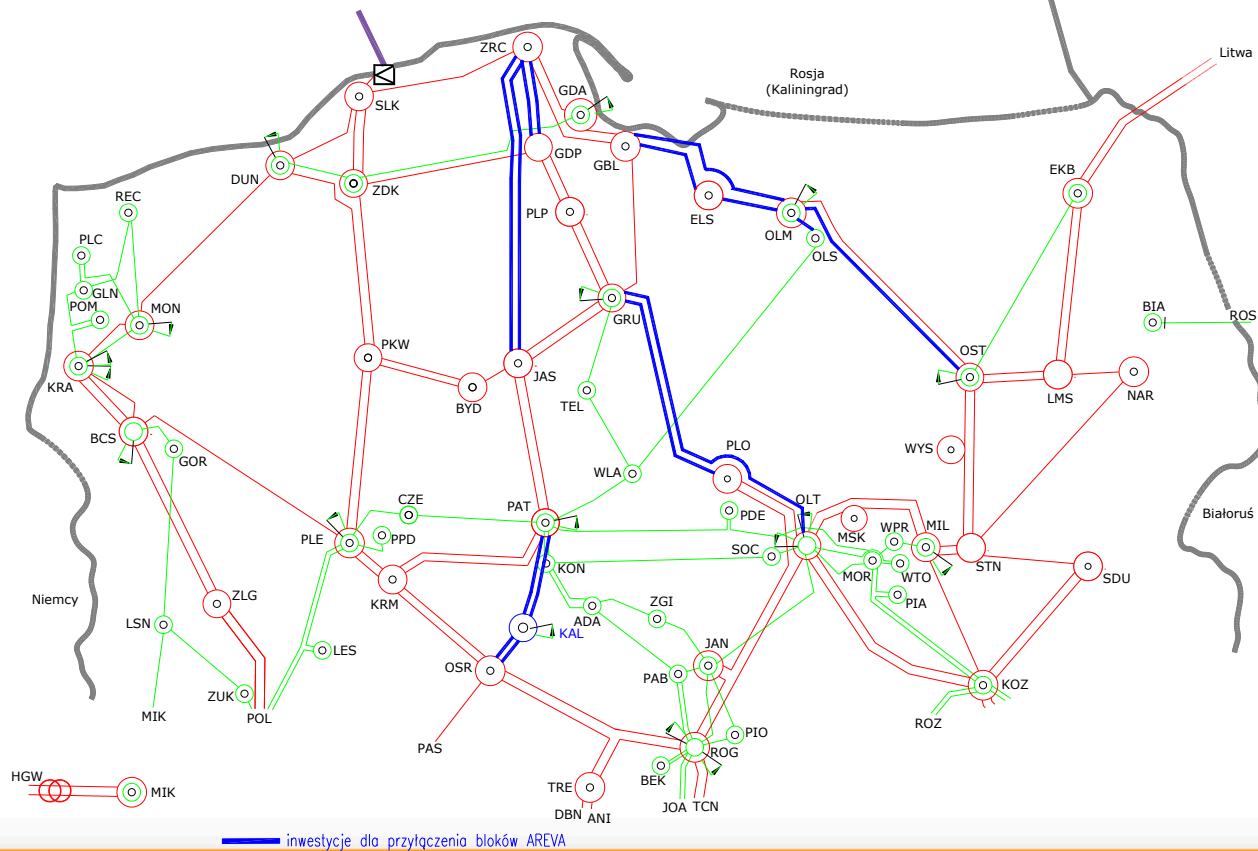
Three scenarios (the Consortium with PSE Innowacje as a leader)

- AP1000 Westinghouse – Toshiba, 3 units AP1000, 1290 MWe each, assumed starting dates:
 - first unit – end of 2024,
 - second unit – end of 2026,
 - third unit – end of 2028.
- EPR AREVA, 2 units EPR, 1750 MWe each, assumed starting dates:
 - first unit – end of 2024,
 - second unit – end of 2026.
- CANDU, 4 units, 740 MWe each, assumed starting dates:
 - first unit – end of 2024,
 - second unit – end of 2026,
 - third and fourth unit – end of 2029.

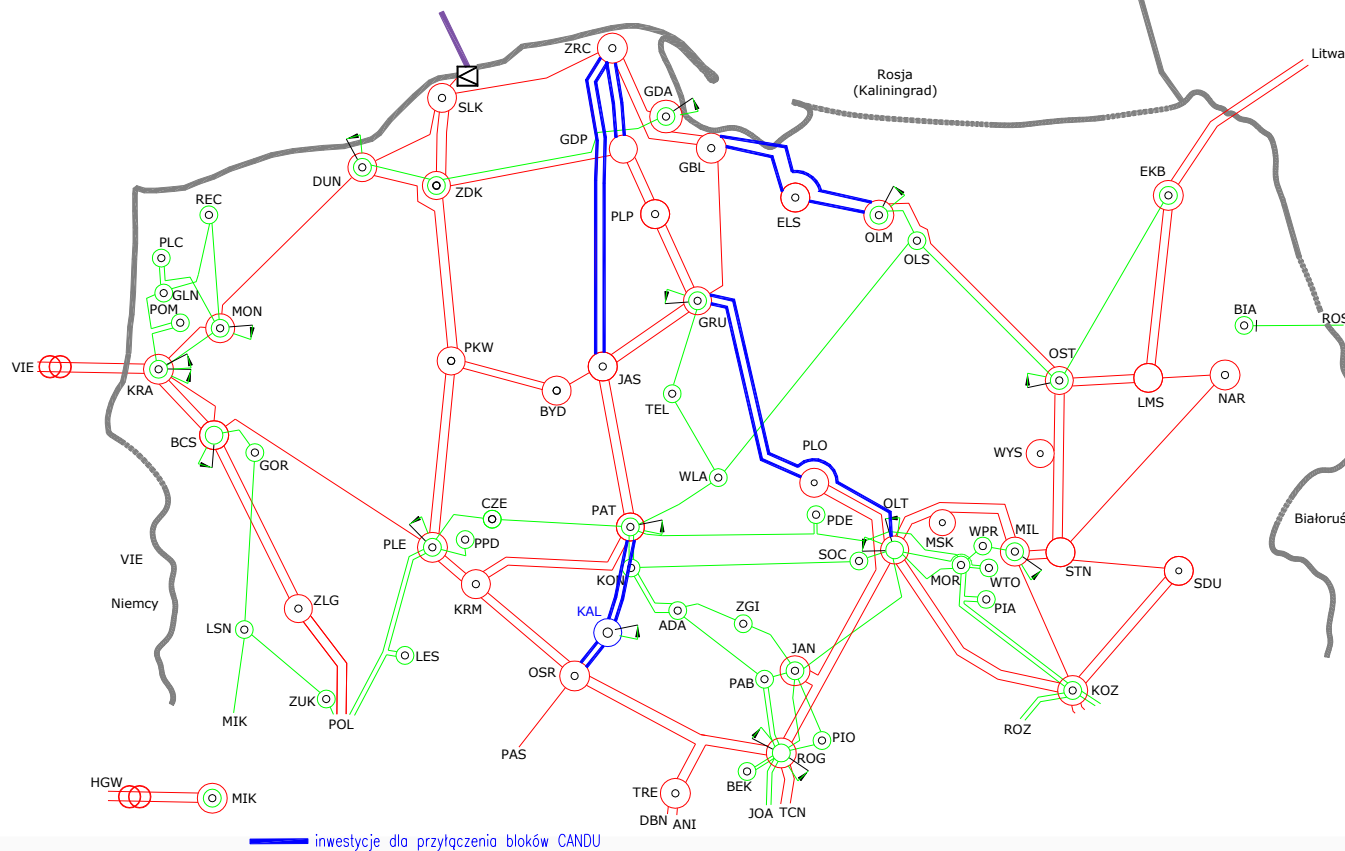
Scenario #1 – Westinghouse-Toshiba (final grid)



Scenario #2 – AREVA (final grid)



Scenario #3 – CANDU (final grid)



Three scenarios – costs

Investment	Scen. #1 [mIn PLN]	Scen. #2 [mIn PLN]	Scen. #3 [mIn PLN]
Building of single and double 400 kV tracks	1 190	1 190	1 190
Rebuilding single lines into double ones	1 770	980	895
Rebuilding the NN line for higher temperatures	45	50	50
Building and rebuilding of 400 kV stations	275	260	255
Total	3 280	2 480	2 390
Investment cost per MW of connected power [mIn PLN/MW]	0.85	0.70	0.81