



National Workshop on Industrial Involvement



Ministry
of Energy
Republic of Poland

Nuclear power programme in Poland

1. Current status of NPP project
2. Local content/global supply chain
3. Nuclear codes and standards in Poland

Sosnowiec Poland, 16-17 October 2018

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Polish Power System

December 2017	In operation [Mwe]	In construction [Mwe]
Coal-fired power plants	20 989	3 710
Lignite-fired power plants	9 286	450
Gas power plants	1 236	450
Industrial power plants	2 751	
Hydroelectric power plants	2 306	
Renewable resources	6 853	various projects implemented
Nuclear	0	in implementation
Total	43 709	4 610

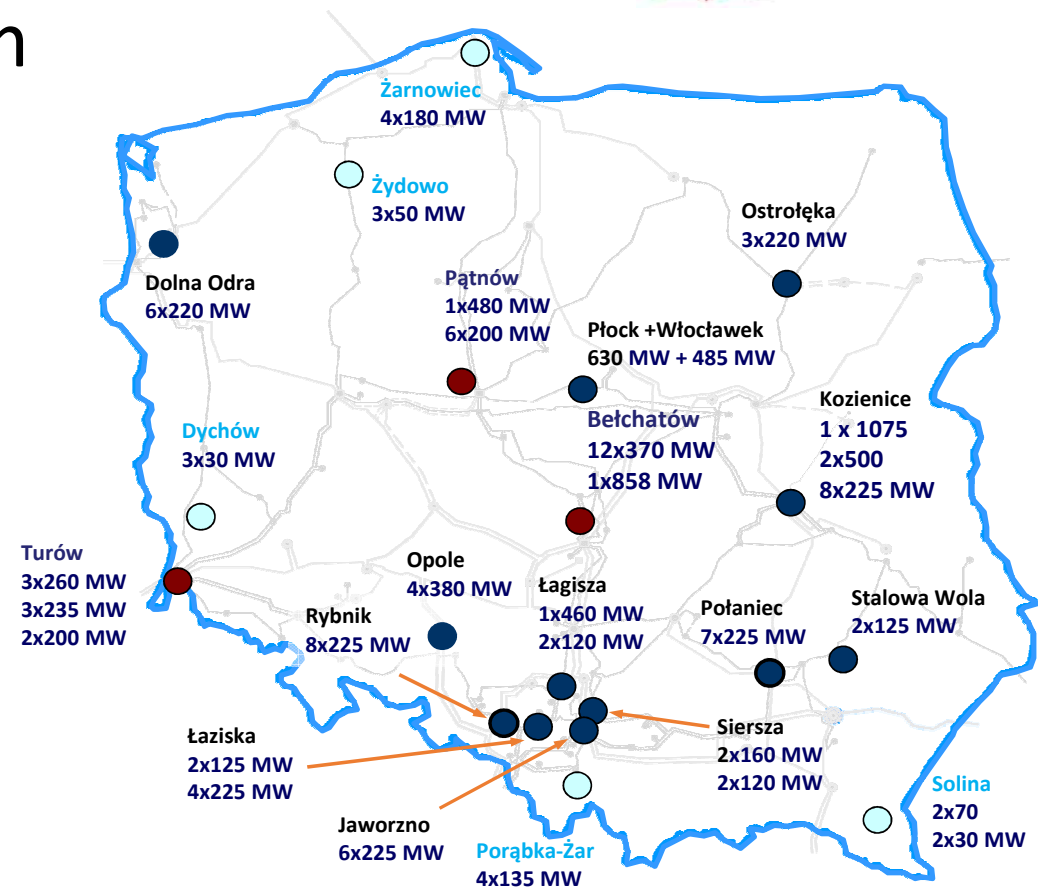
1 research nuclear reactor (30 MWt), radioisotope production (M99), export to 80 countries (6-18% of world production)

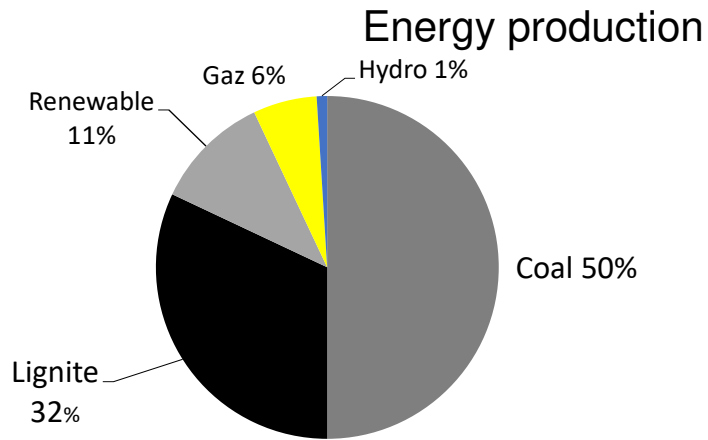
Energy consumption:

168 139 GWh/year (2017), 2016 + 2,13%
3,2 MWh/per citizen/year; the lowest in OECD.
According to all estimations energy consumption in Poland will grow in coming decades.

Transmission grid - 14 069 km:

- 1 line of 750 kV (114 km),
 - 89 lines of 400 kV (5 984 km),
 - 167 lines of 220 kV (7 971 km),
- Under-sea 450 kV DC connection between Poland and Sweden(245 km)



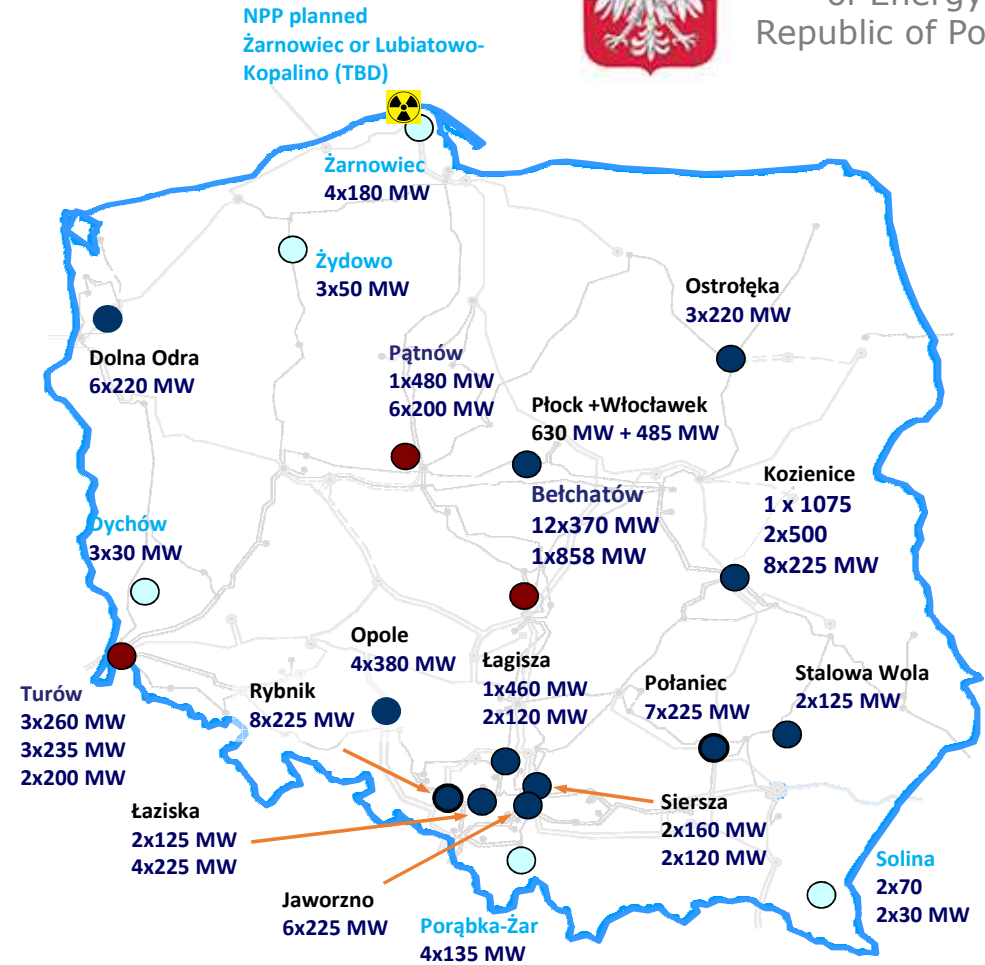


Energy Policy of Poland (until 2050) in preparation (expected publication for public consultation end of 2018):

- graduate decrease of coal/lignite
- increase of renewables
- nuclear

2018

2050



Polish Nuclear Power Program (PNPP)

PNPP was approved on January 28th 2014 by the Council of Ministers. Its key goals resulting from the Energy Policy of Poland until 2030 are following:

- assuring long-term security of electricity supply
- maintaining electricity prices at levels acceptable by the national economy and the society
- reducing emissions of CO₂ and other air pollutants

2 NPPs planned with total installed capacity: +/- 6000 Mwe. Only proven technologies (Gen III/III+) are considered

Currently PNPP under revision by Government (end of 2018):

- Change of business model/project's finance
- Revision of time schedule

Local content (1/6)

- Target of Government in PNPP (chapter XV): graduate increase of local content: 30% of project value at first stage, up to 60 % to be localized by Polish industry.
- Government and subordinated agencies is responsible for implementation of industry related activities in order to prepare own industry for nuclear project.
- Initial phase for a.m. activities: comprehensive assessment of national competences (gap analysis) has been carried out:
 - Direct dialogue: Government – Polish Industry (continuous activity)
 - Specialized additional analysis ordered by Polish Government (2015)



Local content (2/6)

Classification*	BOP	T/A island	Nuclear island
Electric	Most of equipment	Auxiliary equipment	In reach of Polish industry in near future
I&C	Most of equipment	Auxiliary equipment	In reach of Polish industry in near future
Mechanical	Most of equipment	-	In reach of Polish industry in near future
Civil works	All	N/A	Yes
Assembling/Erection	Most of equipment	Yes	Yes
Engineering/design/Project management	Important part can be done by Polish industry	Some parts	-

* 292 sub-packages of works – possibly subcontracted by Polish industry (according to PKD) have been identified

Polish industry has sufficient capabilities to deliver most of products/services in BOP, some of T/A components.

Some components of NA (manufacturing/erection) is in reach but requires additional investments in Polish industry.

Local content (3/6)

Gap analysis results:

- 59 Polish companies with nuclear experience in past 10 years (for NPP and fuel cycle facilities, nuclear laboratories, CERN, ITER, Polish research nuclear reactor Maria, other),
- Another 25 Polish companies are in advanced preparation for nuclear cooperation,
- Another 21 Polish subsidiaries of foreign companies with nuclear experience in past 10 years,
- Another 220 Polish companies with sufficient capabilities/competencies for nuclear industry. Those companies will require only minor adjustments proces to fulfill nuclear requirements (Tier 3 and 4 according to WNA).

Most of identified companies are small and medium (up to 50 and 250 experts)

Polish companies already delivered products/services to most of EU NPP. Some other NPP with Polish involvement (NPP in Ukraine, Russia, Canada, Mexico, Japan, India).

To prepare average Polish company to non nuclear part of project – 1-2 year

To prepare skilled Polish company for nuclear part of NPP – 4-7 years

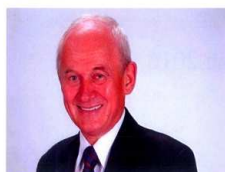


Local content (4/6)

Edition 2016

Polish Industry for Nuclear Energy

Page 1



Ladies and Gentlemen,
I am pleased to present you the catalog entitled "Polish Industry for Nuclear Energy". This is the first document in Poland to identify enterprises having competences in the area of nuclear power. The document has been prepared based on a comprehensive analysis of Polish industry carried out upon the commission of the Ministry of Energy.

We are convinced that the catalog will serve as a guide for you regarding Polish enterprises operating in the area of broadly understood power engineering, and not only nuclear energy.

Polish industry has gained significant experiences and competences in implementing nuclear power projects - mainly within the EU. Polish enterprises also implemented contracts for nuclear power plants outside of Europe. The competences and experiences of our enterprises from related sectors (conventional power engineering, chemical and petrochemical industry) can also be successfully used for the purposes of nuclear power.

Our country is preparing for the construction of the first nuclear power plant. The company responsible for the implementation of the project is PGE EJ1 Sp. z o.o., which is currently preparing the location of the power plant and has entered the preliminary stage of choosing the technological partner. While preparing for the development of nuclear power, Poland has implemented relevant legal provisions, and extensive actions have been carried out in the field of gaining and maintaining public acceptance for the nuclear power as well as the proper preparation of the personnel.

Ensuring the participation of national industry in the construction, and afterwards in the operation of nuclear power plants will serve as one of the key areas guaranteeing the successfulness of this project in Poland.

I truly hope that Polish industry will find international partners and that cooperation ties will be established for the purposes of engaging Polish entrepreneurs in international nuclear power projects, and that partners of Polish entrepreneurs will also efficiently cooperate for the benefit of the Polish nuclear power program

Wishing you a lot of success in the performance of ambitious tasks in the area of nuclear power,

Krzysztof Tchórzewski
Minister Energii
Rzeczypospolita Polska



Page 2

First edition of catalogue
of **Polish industry with
nuclear experience** is
already available,

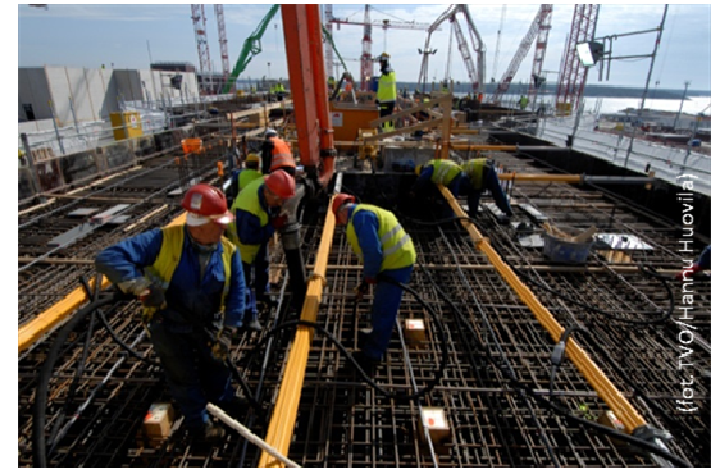
if interested please
contact:

przemysl.jadrowy@me.gov.pl

Local content (5/6)

Conclusions:

- Polish industry has strong capabilities/competences gained in power sector but implementation of nuclear program requires additional and joint effort – of companies, chambers of industry, utilities, Government and other stakeholders.
- Future involvement of national industry for Polish NPP project goes through the current cooperation with global nuclear industry (participation in global supply chains).
- In 2015 Government has initiated industry related activities in order to build up competences: trade missions and training events (5-7 events/year).



Local content (6/6)

Industry related activities (by Ministry of Energy) - training

2015:

- Workshop with UK nuclear industry (NIA, DECC, NAMRC, NNL),
- **3 days workshop on welding (with AFCEN, ASME, CSA),**
- **Manual on nuclear quality systems and welding of reactor's liner,**
- Trade mission to nuclear Finland

2016:

- Polish pavilion on WNE Paris,
- Trade mission to nuclear Canada,
- Polish-Spanish nuclear supplier forum,
- **Manual on nuclear piping systems,**
- **Workshop on nuclear welding activities,**

2017:

- **Workshop and manual on nuclear instrumentation,**
- **Workshop and manual on nuclear civil works,**
- Polish-British nuclear supplier forum,
- **Manual and workshop on electric part of NPP,**
- **Manual on application of ionizing resources in industry (spin off effects of nuclear),**
- **Manual and workshop on NDT/DT in Nuclear**



Local content (6/6)

Industry related activities (by Ministry of Energy) – global supply chain

2015:

- **Workshop with UK nuclear industry in Great Britain,**
- 3 days workshop on welding (with AFCEN, ASME, CSA),
- Manual on nuclear quality systems and welding activities,
- **Trade mission to nuclear Finland**

2016:

- **Polish pavilion on WNE Paris,**
- **Trade mission to nuclear Canada,**
- **Polish-Spanish nuclear supplier forum (Warsaw),**
- Manual on nuclear piping systems,
- Workshop on nuclear welding activities,

2017:

- Workshop and manual on nuclear instrumentation,
- Workshop and manual on nuclear civil works,
- **Polish-British nuclear supplier forum (Warsaw)**
- Manual and workshop on electric part of NPP,
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- Manual and workshop on NDT/DT in Nuclear



Local content (6/6)

Industry related activities (by Ministry of Energy)

2018:

- **Polish pavilion on WNE Paris,**
- **16-17 October – Sosnowiec:** „Supply chain in the fabrication of welded structures and NDT servicing during building of the first Polish NPP” session, Welding Institute, IAEA support

In preparation

18 October – Warszawa: Spin off effects of nuclear Energy in manufacturing proces training, ICHTJ, IAEA support

http://www.ichtj.waw.pl/drupal/pliki/szkolenie_2018.pdf

Next ones for 2019 in preparation



Nuclear codes and standards in Poland

Nuclear legislation - current status:

* **Polish Nuclear Regulator based on Atomic law: Prawo atomowe** (Ustawa z dnia 29 listopada 2000 r.), up to dated in 2011),

• **Preparation and implementation of nuclear investments:** Ustawa z dnia 29 czerwca 2011 r. o przygotowaniu i realizacji inwestycji w zakresie obiektów energetyki jądrowej oraz inwestycji towarzyszących

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• **Decree of Counsel of Ministers identifying 21 safety components requiring special inspection by UDT in NPP**(Rozporządzenie Rady Ministrów z dnia 17 grudnia 2013 r. w sprawie rodzajów urządzeń technicznych podlegających dozorowi technicznemu w elektrowni jądrowej): containment, pressure vessel, primary pump, first, second loop, polar crane....

• **Decree of Ministry of Economic Development on technical conditions of inspection for (21) safety related components in NPP** (Rozporządzenie Ministra Rozwoju z dnia 20 maja 2016 r. w sprawie warunków technicznych dozoru technicznego dla urządzeń technicznych lub urządzeń podlegających dozorowi technicznemu w elektrowni jądrowej). 3 yers to prepare this document.

- Future licensee must prove to Regulator that NPP will be safe and will satisfy all safety requirements (using internationally recognised codes/standards (ASME, RCC, ISO, IEEE) + additional regulator's requirements) – NON DESCRIPTIVE APPROACH
- Those requirements licensee must flow down to technology vendor and (his) subcontractors



Nuclear codes and standards in Poland

Questions / Issues to be solved in Poland in future:

- Non descriptive approach versus descriptive approach ? What strategy should be adopted by Nuclear regulator in Poland,
- Level of inspections by PAA/UDT: licensee / technology vendor / 1,2,3 level if subcontractors.....deeper level ?
- Dual model of inspections: UDT will check conformity of each components and PAA (based on UDT reports) will issue the licence?



No perfect solution in global level, no harmonised rules in UE
(contrary to non nuclear projectsPressure directive 97/23/UE – welding in European union perfectly harmonised)



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Thank for Your attention