



EXPERIENCE AND CAPABILITY OF THE ROMANIAN NUCLEAR INDUSTRY FOR CERNAVODA 3 AND 4 FINALIZATION

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WHO IS ROMATOM?

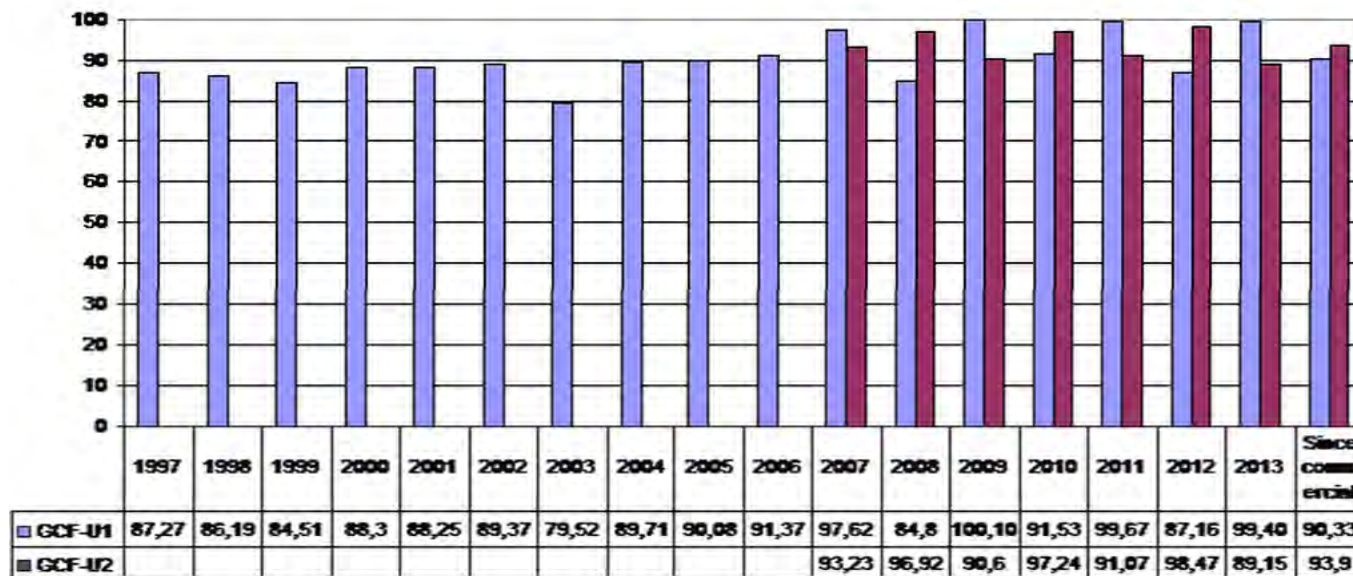
- ✓ **“ROMANIAN ATOMIC FORUM” Association – ROMATOM** is a Romanian legal entity, non-governmental, non-profit, apolitical, consisting of Romanian or foreign legal entities involved in the national nuclear power program.
- ✓ **ROMATOM scope:** peaceful use of nuclear energy in Romania and promoting national nuclear power program and the interests of the Association members.
- ✓ General Assembly establishing ROMATOM: **January 10, 2001.**
- ✓ Since the establishment, ROMATOM joins the **European Atomic Forum FORATOM**, making an important contribution to the process of accession to the European Union, supported by the quality of Romanian nuclear industry.
- ✓ ROMATOM currently has **35 members** (companies) involved in the national nuclear power industry.



NUCLEAR POWER IN ROMANIA

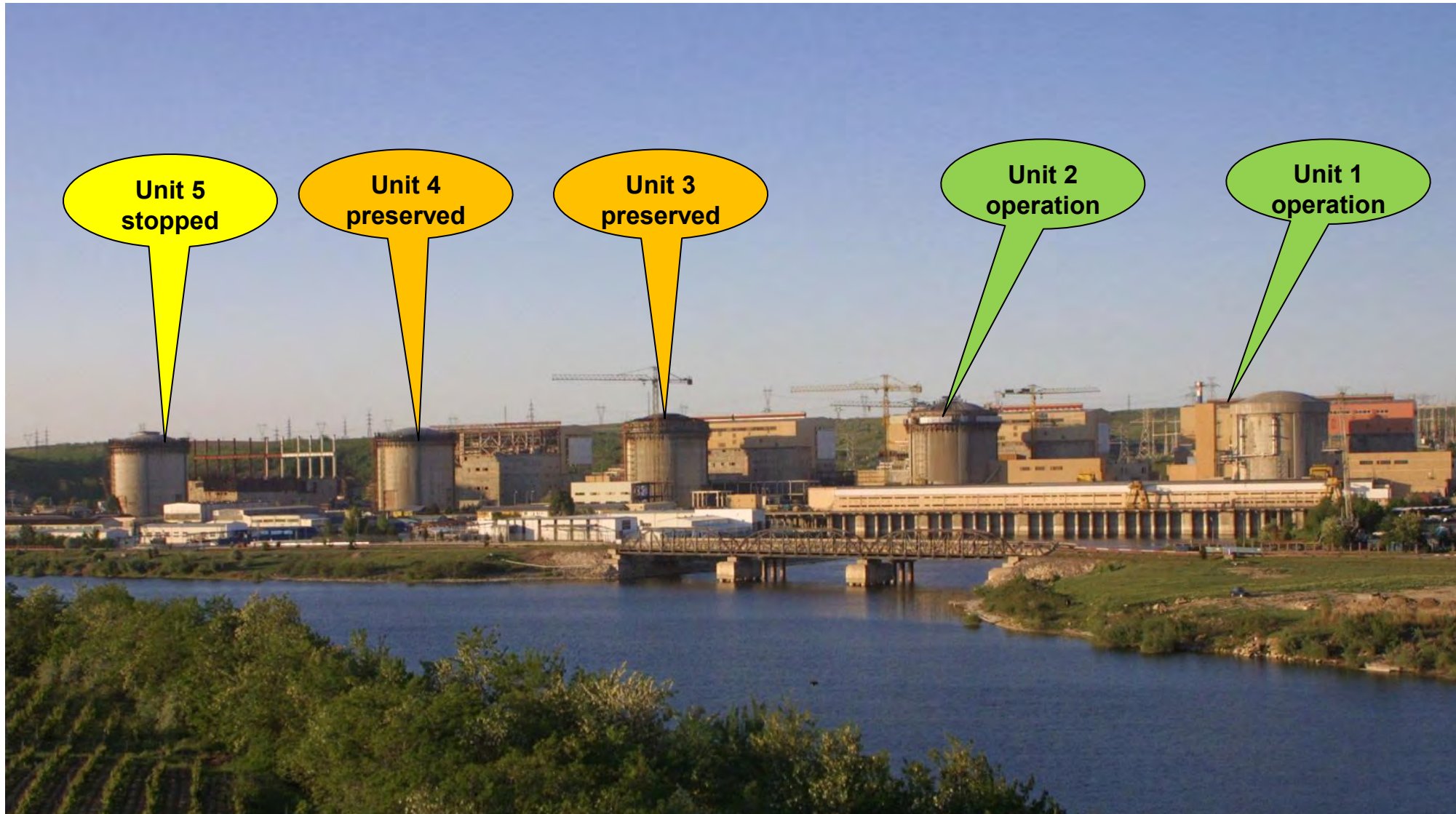
- ✓ **CNE Cernavodă Units 1 and 2** CANDU 6 type are under commercial operation since December 1996 and respectively October 2007.
- ✓ **Installed power** of each nuclear power unit from CNE Cernavoda is 705 MWe.
- ✓ **Annual electricity production** of a nuclear unit from CNE Cernavoda was between **4.90 TWh** (in 2003, a very droughty year) and 6.15 TWh, the best performance being recorded in 2009, when Unit 1 generated **6.15 TWh**, respectively Unit 2 with 6.08 TWh in 2012.
- ✓ CNE Cernavoda generated in 2014 approximately **20 % of the total energy production in Romania.**
- ✓ CNE Cernavoda also supplies the **heating of Cernavoda town**, delivering approximately **40,000 Gcal annually**, at the lowest generation price in the country.

CERNAVODA NPP PERFORMANCES

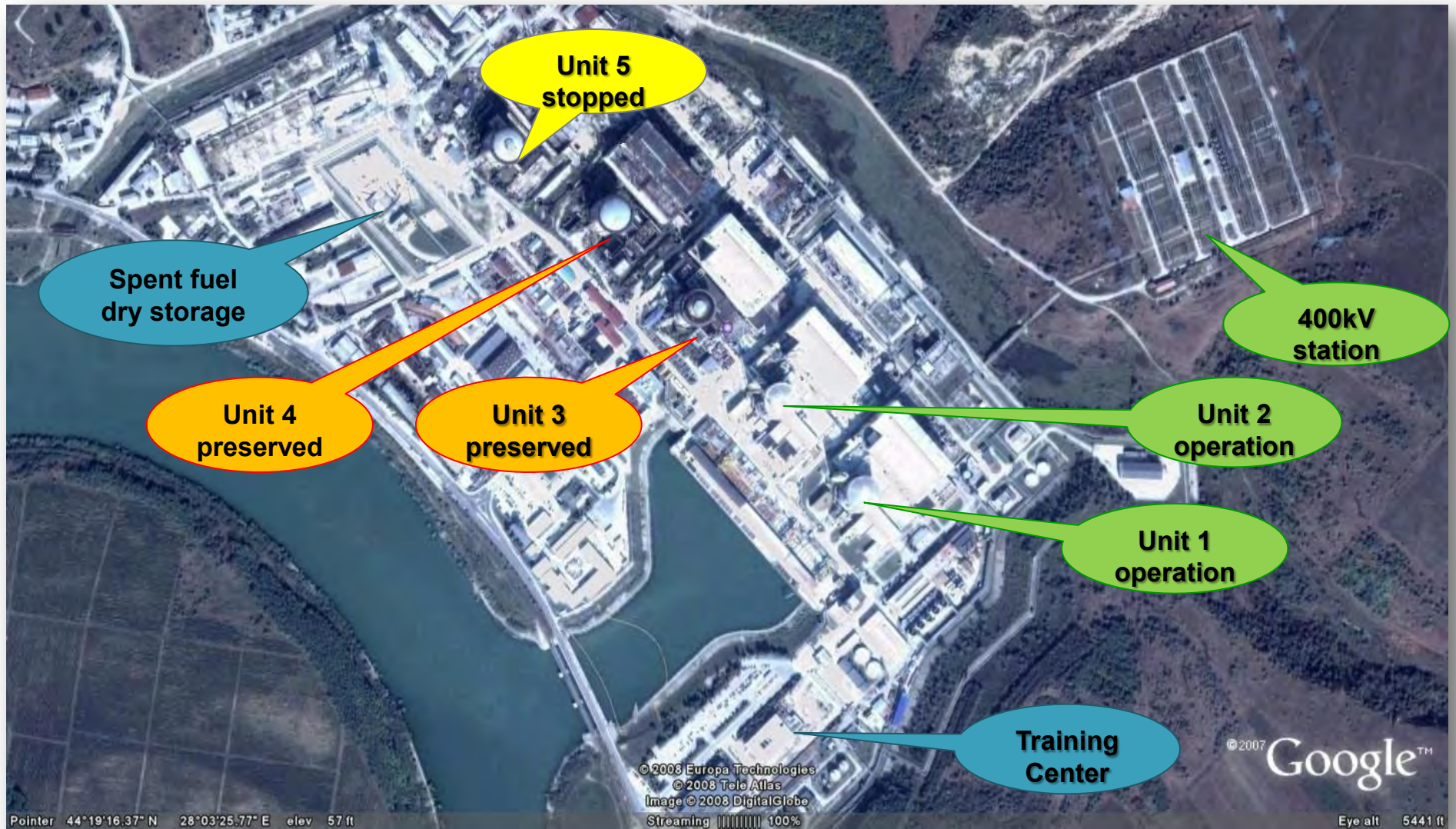


- ✓ Excellent **Gross Capacity Factor** (above figure)
- ✓ **Reduced radiological impact on the population and environment**, with an average of 0.57% for the last 15 years of the maximum limit value required by the national and international legislation.
- ✓ **Doses accumulated in the operation of the two units being significantly under the legal professional regulations** and far below the worldwide average in nuclear plants of the same type (CANDU).

CERNAVODA NPP



CERNAVODA NPP SITE



ACTUAL STATUS OF UNITS 3&4



ROMATOM SUPPORT FOR CERNAVODA 3&4

- ✓ **2003-2004:** Performed the study ref. to the "Romanian industry capability to participate in the Cernavoda Unit 3 with goods and services" based on the responses of 76 of out 94 contacted Romanian companies.
- ✓ **2008 February 22:** Together with Forum for the Future of Nuclear Energy of the European Parliament and FORATOM Bulgarian Atomic Forum (BULATOM) organized a roundtable in Strasbourg with the participation of 31 members of the European Parliament (MEP), to support the resumption of work on Cernavoda 3 & 4.
- ✓ **2009 October 30:** Along with FORATOM organized in Bucharest a round table with 115 participants, including MEPs, policy makers and representatives of the nuclear industry in Romania.
- ✓ **21 aprilie 2010:** Together with Forum for the Future of Nuclear Energy of the European Parliament and FORATOM organizes the event "Cernavoda 3 and 4 project, a viable economic solution for development of Romania".

ROMATOM 2013 STUDY METHODOLOGY

- ROMATOM performed in 2013 a related to actual capabilities of the Romanian nuclear industry to participate to the Cernavoda Units 3 and 4 finalization.
- Methodology used for the development of this study:
 - a) Identification** of the 71 commercial companies as potential participants to Cernavoda UNITS 3 and 4 finalization, based on the different sources of information (members and non-members of ROMATOM, with CNCAN valid licences, qualified by the Romanian nuclear operator: NUCLEARELECTRICA, etc.).
 - b) Drafting a questionnaire** (included in the study), sent to all 71 identified potential participants.
 - c) Visits** to some potential Romanian suppliers for goods and services furnizori de bunuri și servicii din România, de către o echipă de specialiști ai Grupului de lucru ROMATOM.
 - d) Summarizing information and conclusions** based on the answers to the questionnaires provided to the industry, together with the result of visit at sites, where necessary.

MAIN RESULTS OF THE STUDY(1)

- ✓ 47 companies, representing approximately 65% of those identified by ROMATOM, responded to the questionnaire:
 - a) 20 specialized company in **the manufacture of components and equipment**;
 - b) 14 companies specialized in **construction and erection works**;
 - c) 13 companies specialized in **engineering, design, research and consultancy**.
- ✓ Major interest of the Romanian companies to participate in the completion of Units 3 & 4, depending on their specific activity.
- ✓ Majority of these companies had experience in completing Cernavoda 1 and 2.
- ✓ Approx. 10% of companies hold "know-how" or manufacturing licenses from prestigious foreign companies (Siemens, General Electric, CANDU, etc.).
- ✓ Engineering, design and research companies (CITON, SERTO, AMEC, ICN Pitesti, IPROCHIM, ICSI Rm. Valcea, etc.) had experience and capabilities to participate for project completion.

MAIN RESULTS OF THE STUDY (2)

- ✓ Most of the analyzed companies have implemented **Integrated Management Systems** (quality, environment, health and safety) and hold specific **licenses issued by CNCAN** or are prepared to obtain these permits, if required.
- ✓ Some companies such as Doosan IMGB, WALTER TOSTO-FECNE, GRIRO, POPECI UTILAJ GREU, etc. currently **have orders for nuclear power plant** in other countries, either in the production bases in Romania, either in the parent companies.
- ✓ **Skill level, training and authorization of the staff** in the analyzed companies is very good.
- ✓ Most of the respondent companies recorded in 2012 a notable turnover (total > 2.4 billion lei), having profits.

EXISTING CAPABILITIES IN ROMANIA

- 1. Supply of mechanical, electrical and C&I equipment**
[List of these equipment are included in the study.]
- 2. Execution of construction, erection and installation activities (including materials procurement)** [i.e Nuclear Construction and Erection Companies Association -ACMN]
- 3. Services for commissioning, operation and maintenance** [S.N. NUCLEARELECTRICA (SNN)]
- 4. Heavy water and nuclear fuel** [FCN Pitesti and ROMAG]
- 5. Design, engineering, consultancy and research activities** [CITON, ANSALDO NUCLEARE, SERTO, AMEC, ICN Pitesti, IPROCHIM, ICSI Rm. Valcea etc.]

MAIN CONCLUSIONS OF THE STUDY

- ❖ Romania already has the appropriate **national nuclear infrastructure** including a favourable industrial and economic environment, able to sustain Cernavoda Units 3 and 4 finalization and their subsequent operation for a period exceeding 50 years.
- ❖ There are important capacity and capability in Romanian economy, open for participation to finalization of Cernavoda Units 3 and 4 project.
- ❖ ROMATOM estimates that the potential participation of the Romanian nuclear industry to the completion of the Cernavoda NPP Units 3 and 4 with the goods and services identified within this study, can be assessed at approximately **40-45% of the total project value**, which represents an important contribution, with a special impact on the national economy.
- ❖ Romanian nuclear industry has more than **8.300 workers** supporting national nuclear power program and if the Cernavoda 3 and 4 should be finalized, more than **7,800 new jobs** will appear, leading to at least **16,000 total jobs** involved in the domestic nuclear industry.

RECOMMENDATIONS FOR THE DECISION-MAKERS

- ❖ Completion of Cernavoda NPP Units 3 and 4 project is a process which must provide trust to all potential participants (investors, technology provider, goods and services suppliers, public, etc.) .
- ❖ This trust can only be offered by the Romanian Government, by continuing to support and assist the Romanian nuclear power program.
- ❖ Main issue for completing the Cernavoda NPP Units 3 and 4, as well as in other large energy projects in Europe and worldwide, is represented by assurance of the necessary financing.
- ❖ Romanian Government should identify the specific patterns and mechanisms necessary to solve this financial issue and promoting local suppliers for goods and services.

OUR PAST EXPERIENCE IN CERNAVODA 1 AND 2

✓ Engineering:

- ❖ **Detail engineering** based on the conceptual design prepared by Design Authorities (AECL and ANSALDO NUCLEARE).
- ❖ **Support for Project PMT Engineering Department:** for site engineering including technical solutions for nonconformities.
- ❖ **“As built”** documentation finalization, based on “as constructed” drawings.

✓ Procurement/Supply:

- ❖ **Equipment:** tanks, HXs, pumps, fans, valves, MCR panels, electrical transformers, MCR panels, etc.
- ❖ **Bulk material:** concrete, reinforced bars, piping, piping supports, ducting, piping insulations, paints, local panels, electrical cables, cable trays, junction boxes, conduits, etc.

✓ Construction:

- ❖ **Support for Project PMT Construction Department** in planning and management of the local contractors
- ❖ **Several civil, mechanical and electrical/C&I local contractors**
- ❖ **Different packages** with scope defined by the Project PMT

LOCAL PARTICIPATION IN CERNAVODA 3 &4 (1)

ROMATOM members already had:

- ✓ Know-how in the field of engineering, manufacturing, procurement, construction, erection and installation of CANDU units, learned/turnover from traditional partners (AECL Canada and ANSALDO NUCLEARE Italy).
- ✓ Suitable, qualified and well-skilled man-power and ability to attract the man-power with experience in nuclear power field.
- ✓ Familiarity with engineering, fabrication, construction, erection and installation procedures applicable for NPP.
- ✓ Capability and ability for leading & outstanding QM/IMS programs.
- ✓ Required licenses for Quality Management/Integrated Management Systems in accordance with Romanian standards and norms issued by CNCAN and international standards (ISO).
- ✓ Necessarily licenses and permits as per Romanian regulations, standards and norms (ISCIR, ANRE, etc.).

ROMATOM members are familiar with Cernavoda NPP site and Romanian environment.

LOCAL PARTICIPATION IN CERNAVODA 3 &4 (2)

- ✓ Essential to the success of the project:
 - ❖ Politically
 - ❖ Economically
- ✓ Beneficial to the Romanian economy and industry:
 - ❖ Advancement of technology
 - ❖ High paying jobs
- ✓ Expands the Romanian companies' activities in the export market.
- ✓ ROMATOM members are potential qualified partner due to repetitive nature of the CANDU project implementation in Cernavoda (Cernavoda Unit 2 reference project).

PROJECT TIMELINE

- ✓ Pre Project activities, including all arrangements with CGN China: 2015
- ✓ Set-up of the new Project Company (PC)
- ✓ CGN to start of the discussions for the potential scope of the Romanian companies in the following area:
 - ❖ Engineering
 - ❖ Equipment and materials fabrication/delivery
 - ❖ Construction, erection and installation
 - ❖ Commissioning
- ✓ Depending on the identified scope, the Romanian companies are available to discuss with PC potential solutions for financing of the agreed scope.

CONCLUSION

- ✓ ROMATOM is a strong supporter of the Cernavoda Units 3 & 4 Project finalisation.
- ✓ European Atomic Forum FORATOM also sustains the ROMATOM efforts.
- ✓ It is our expectations that, based on our experience and qualification, CGN China will treat us as real and useful partners for Project finalisation.
- ✓ CGN, SNC Lavalin (CANDU Energy Inc.) and their Partners are requested to try to maximize the Romanian content into Units 3 and 4 Project finalisation.
- ✓ ROMATOM members are ready, able, flexible and willing to contribute to the successful completion of this Project!



Thank you for your attention!