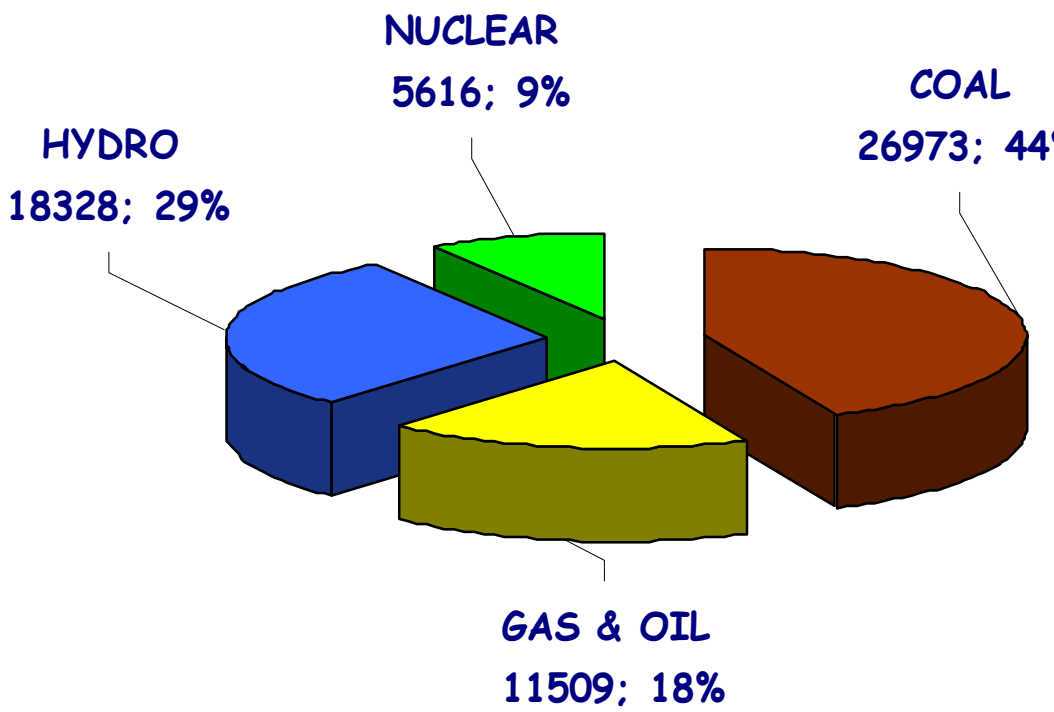
SOCIETATEA NATIONALA "NUCLEARELECTRICA" SA

FINANCING EXPERIENCE FOR FINALISATION OF NEW NUCLEAR UNITS IN ROMANIA

Dr. IOAN ROTARU

Technical Meeting on Milestones for Nuclear Power Infrastructure Development,
Vienna, 5-9 November 2007

ROMANIA 2006
GENERATION OF ELECTRICITY
[MWh]



NUCLEAR POWER AS PART OF THE ROMANIAN ENERGY STRATEGY

- Romania is closely observing the energy policy of the European Union.
- The Ministry of Economy and Finance already proposed this year and the Romanian Government approved in July 2007 the new energy strategy by 2020.
- The Romanian energy strategy considers the importance of improving:
  - ✓ security of supply,
  - ✓ competitiveness,
  - ✓ environment protection,
  - ✓ optimization of the domestic resources utilisation.
- The gross power generation is forecasted to increase from 62.7 TWh in 2007 up to 100 TWh in 2020.
- Nuclear represents a significant part of the Romanian Energy Strategy. The new energy strategy includes completion of Units 3 and 4 of Cernavoda NPP and clearly indicate the long-term commitment to nuclear energy.

WHY NUCLEAR POWER IN ROMANIA ?

- As a proven and safe technology, nuclear power has an important role to play in terms of ensuring secure electricity generation without any CO2 emissions.

- Nuclear power is an excellent source of base-load power and potential electricity source for the Balkan region.
- Well-developed nuclear infrastructure in Romania:
  - ✓ Heavy water plant
  - ✓ Nuclear fuel fabrication plant
  - ✓ Technically qualified and experienced staff
  - ✓ Domestic uranium resources
- Excellent performance in 10 years of Cernavoda Unit 1 operation and recent finalization of Unit 2 (October 2007-start-up of commercial operation)

CERNAVODA NPP

Left: Unit 1 (in operation), Unit 2 (in operation)
Center: Unit 3 (in preservation)
Right: Unit 4 and 5 (in preservation)

NATIONAL INFRASTRUCTURE FOR NUCLEAR POWER

- **Ministry of Economy and Finance:** responsibilities for the national strategy in the energy field and for NPP project implementation and NPP operation, as well for technical support (research & engineering), nuclear fuel and heavy water.
- **Romanian Nuclear Agency:** responsibilities for promotion of nuclear energy in Romania and strategies for development of nuclear field and peaceful application in Romania.
- **Romanian Nuclear Safety Regulatory Body** (CNCAN): responsibilities of licensing and control the nuclear facilities operation and up-dating of the nuclear safety norms, standards and regulations.
- **Romanian Agency for Radioactive Waste Management** (ANDRAD): responsibilities for final disposal and decommissioning, including the development the secondary legislation related to waste management, final disposal and decommissioning of nuclear facilities.

MAIN ACTORS IN ROMANIAN NUCLEAR POWER INDUSTRY

- NUCLEARELECTRICA (SNN) – national company, owner and operator of Cernavoda Unit 1&2, finalization of Cernavoda Unit 3&4 and nuclear fuel fabrication (FCN Pitesti).
- Regia Autonoma for Nuclear Activities (RAAN) – national company for heavy water fabrication (ROMAG), nuclear research (SCN Pitesti) and nuclear engineering (SITON Bucharest Magurele) -TSO.
- National Company for Uranium (CNU) – responsible for uranium extraction and purification – supplier of Romanian nuclear fuel manufacturer.
- Romanian Supliers for Goods and Services – involved in Cernavoda Unit 1 & 2 finalization and in preparation for Unit 3 an 4 construction.
- ROMATOM-forum of Romanian nuclear industries, member of FORATOM –NGO.
- AREN –association of engineers & professionals working in nuclear energy field in Romania –NGO.

CERNAVODA UNIT # 3 & 4

CONSTRAINTS IDENTIFIED IN PROMOTING UNITS 3 & 4 OF CERNAVODA NPP

- ✓ Unavailability of the Romanian Government's direct financial support in compliance with the Government policy of withdrawing from the electric power sector, considering the liberalization of the electric power market.
- ✓ Unavailability of sovereign guaranties for the required loans, based on the same specific regulations concerning the subsidies granted by the Government.
- ✓ Insufficient financial capability of NPP utility (SNN) to finance and attract the needed financing resources, taking into account the loans borrowed for Cernavoda Unit 2 finalization and the lacking of Romanian Government financial support and sovereign guaranties.

CERNAVODA UNIT 3 AND 4
PROJECT DESCRIPTION

The main characteristics of the project (based on the Feasibility Study finalized in March 2006) :

➢ Installed capacity:	2 x 720 MWe
➢ Nuclear reactor type:	Improved CANDU 6
➢ Yearly electricity production:	2 x 5,239 TWh
➢ Capital expenses (evaluation):	2,5 billions Euro
➢ Equity/loans:	30/70%
➢ Tentative schedule for finalization:	64 month per unit
➢ Unit lifetime:	30 years (possible 40)
➢ Electricity selling price:	28,2-32,2 Euro/MWh
➢ Equity Internal Rate of Return:	9-11%

THE OPTIMAL SOLUTION FOR FUTURE NUCLEAR POWER IN ROMANIA

- The Cernavoda Unit 3 & 4 can be completed by setting up a partnership with private investors, associated with SNN SA within a joint venture, developed as an IPP (Independent Power Producer) on the Romanian electricity market.
- This partnership with foreign investors would ensure the required financing for the project completion, through the initial cash participation in setting up the joint venture (equity) and subsequent loans without sovereign guaranties but with corporate guaranties.
- The selected solution tries to prove the efficiency of such a partnership designed to major investments in the Romanian electric power sector.

THE CHOSEN MODEL FOR CERNAVODA UNIT 3 AND 4 FINALIZATION

- Joint venture made up of more shareholders (private investors), including SNN SA (the so-called "finish model"), with no majority shareholders.
- SNN SA will contribute to the nominal capital with the existing assets (including documentation, existing materials, studies, etc.), following the process of negotiations, based on an evaluation report verified by an independent evaluator.
- Heavy water and nuclear fuel are to be provided from domestic sources.
- Shareholders will be the electricity off-taker ("take or pay"), directly proportional to the shares of the new company nominal capital each shareholder holds (pro-rata).
- Shareholder agreement and electricity off-take contracts shall be tools for debt financing (loans).

ADVANTAGES OF SELECTED MODEL FOR CERNAVODA UNIT 3 AND 4 (1)

1. The selected model is already accepted by the European Union (used in Finland for Olkiluoto 3) and comply with the regulations of the liberalized electricity market.
2. Financing sources (initial equity and loans) provided by investors.
3. The "legitimate" needs of the intensive energy industry – representing 35% of Romania's GDP – can be solved [as the European Union recommends in the Electricity Green Book, chapter 2.1 (v)].
4. The large number of shareholders of the Project Company, in their quality of energy suppliers, enhance and help the competition on the electricity market, avoiding the control on over 10TWh/year electricity production.

ADVANTAGES OF SELECTED MODEL FOR CERNAVODA UNIT 3 AND 4 (2)

5. Project implementation risks will be managed by the structure created by the private investors, without the contribution of the Romanian State.
6. SNN will have the role of commercial operator of Cernavoda Units 3 and 4, using its good practices and experience. The operation and maintenance contract for Cernavoda Unit 3 and 4 will lead to a low electricity production cost (scale effect) and benefits for the shareholders.
7. The actual SNN's debts resulting from Cernavoda Unit 2 loans (due in the next 10-15 years) will have a very limited impact over the project success.

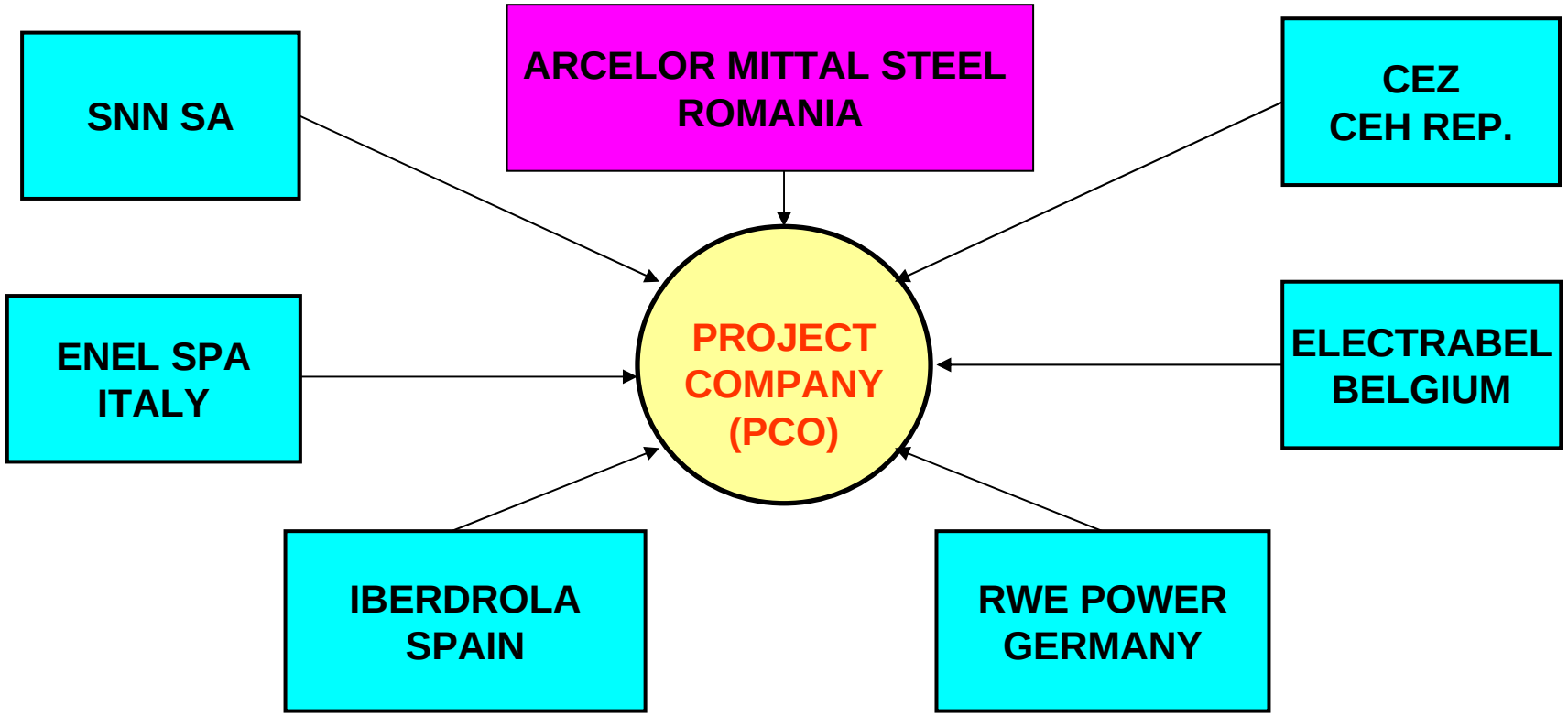
FUTURE PARTICIPATION OF PRIVATE INVESTORS

- The shares of the new company is assumed to be held by experienced, financially strong and internationally recognised players in the electricity industry and market, whose motivation for investing in the Project is to secure access to sources of power.
- Feedback from potential stakeholders indicates that Romanian Government's involvement will likely be required in the following major areas:
  - Discriminatory changes in law;
  - Force majeure;
  - Nuclear incident and liability;
  - Operational risk not covered by traditional insurance policies;
  - Final management of nuclear waste and decommissioning.

PROCESS DESCRIPTION

- Announcement for the Letter of Intention for investment (Mai 2006)
- Received 16 Letter of Intention (June 2006)
- Bilateral discussions for Project model definition and clarification of the potential investors requirements (July-August 2006)
- Approval by the Romanian Government of the specific strategy for Cernavoda Unit 3 and 4, including the management of the process by an Inter-ministerial Committee (end of June 2007)
- Establishment of the Negotiation Commission (July 2007)
- Approval of the documentation for Binding Offer preparation- Project Model Description (including Risk Allocation matrix) and draft of the Investor Agreement for association and transparent invitation (August 200&)
- Binding Offers, including the financial proposal for project finalization and comments on the draft of Investors Agreement received from potential investors (October 25, 2007)
- Binding offers analyses and selection of the investors (November 5, 2007)

CERNAVODA UNIT 3 AND 4
FUTURE PROJECT COMPANY STRUCTURE



FUTURE STEPS FOR PRIVATE INVESTORS PARTICIPATION

- The formation of the new company will involve the following steps:
  - Starting of negotiation (end of November 2007)
  - Finalization of the negotiation (end of January 2007)
  - Investors Agreement to be approved by Romanian Government (end of February 2007).
- Once the Investors Agreement will be executed the process to conclude agreements with the other key stakeholders such as contractors for project finalization and financiers should commence (2008). Pre-project activities.
- The ultimate goal is to set-up the commercial and financial frame of the project finalization and to start works at the beginning of 2009.
- Project finalization: Unit 3 -2014 and Unit 4 -2015

ROMANIAN EXPERIENCE IN IMPLEMENTING NUCLEAR POWER PROGRAM -LESSONS LEARNED-

- ✓ Romania started the implementation of the national nuclear power program earlier in 1970.
- ✓ Core group (critical mass): Engineering group/section – 60 persons (Project management, site selection, civil, mechanical, electrical, C&I, nuclear safety): Preparation of studies required by the national authorities for decisions. Many consultants were used.
- ✓ Main issues identified in the initial stage:
  1. **Define and implement efficient infrastructure**
  2. **Implement appropriate legal frame work**
  3. **Implement strategy for human resources**
  4. **Selection of the nuclear technology**
  5. **Definition of the local participation**

ROMANIAN EXPERIENCE IN IMPLEMENTING NUCLEAR POWER PROGRAM -LESSONS LEARNED-

- ✓ Identified issues were solved successfully by:
  1) Earlier selection of the nuclear technologies (1975)
  2) Common studies with selected nuclear reactor vendor and suppliers to determine the applicable requirements for infrastructure, regulatory framework and to determine local capabilities for goods and services for the first unit of NPP (1976-1977)
  3) Contractual arrangement for the first unit of NPP:

     -management of the entire Project by the integrated Project Management Team (AECL Canada, ANSALDO Italy, GE USA and local NPP utility – SNN)/transfer of knowledge management and skills.

     -training of the operation team in Canada in a similar NPP unit (Point Lepreau) for period between 6 month-2 years.

     -initial operation of the first NPP unit by supplier (AECL) operation team (for 7 month) with Romanian team co-piloting.

     -inter-governmental arrangements for co-operation between Romanian and Canadian Regulators for training and technical support in the licensing process of the first NPP unit.
- ✓ Experience of Cernavoda NPP Unit 1 create the bases form long term co-operation with traditional partners (AECL Canada, ANSALDO NUCLEARE Italy and GE USA), applicable also in the operation and maintenance of the unit.

SUCCES OF THE IMPLEMENTATION OF THE NEW NPP PROJECT -LESSONS LEARNED-

- ✓ **Political and Governmental support for nuclear power**, based on the excellent performance of the existing nuclear power capacities and minimum impact on the environment and public.
- ✓ **Properly planning of the energy sector**, reflecting the specific needs of the country and taking into account the actual situation (security of supply, competitiveness, climate change).
- ✓ **Financing of the large power project**, in the condition of the electricity market, with no involvement of the State, based on the long-term power purchase arrangement or specific agreements ("take or pay")
- ✓ **Succes of Cernavoda Unit 1&2 finalization.**
- ✓ **Technological improvement and design optimization**, using operational feedback, reference plant knowledge data base and up-graded technologies
- ✓ **Optimization of construction schedule**, based on the modern construction methods and modern tools and software to be implemented for the management of the Project in all specific phases.
- ✓ **Good cooperation with public and local communities and transparency in information and decision**, for better acceptability of nuclear power.

COOPERATION WITH THE LOCAL COMMUNITIES

- Acceptability of nuclear power is dependent of cooperation with local community.
- Benefits to the local community (social program, cheap heat to the community supply by Cernavoda NPP, substantial taxes for the local budget, etc.).
- Public information centres at Cernavoda and Constanta.
- Public debates for the Unit #2 Environmental Impact Assessment (EIA) Study, Dry Storage Facility, Units #3&4 EIA Study – Cernavoda, Constanta, Medgidia and Bucharest.
- Cooperation protocol was recently concluded with the local authorities from the Cernavoda area for the benefit of the town development.

COOPERATION WITH THE LOCAL COMMUNITY. SOCIAL PROGRAM [bridge, school, hospital]

CONCLUSIONS

- Romanian Government: long term commitment for nuclear energy.
- Romania developed the proper national infrastructure for implementation, management and supervision of the nuclear power projects and associated activities.
- Nuclear power is part of the energy policy promoted by the Romanian Government to develop the nuclear energy as part of the European policy, considering
  - ✓ sustainable development,
  - ✓ security of energy supply
  - ✓ competitiveness.

CONCLUSIONS (cont'd)

- Coherent national nuclear safety policy, consistent with the European initiatives, represents a strong guarantee for a reliable nuclear program.

- The Romanian Nuclear Power Program has an important international dimension, representing a good example of cooperation with partners from Europe and North America.

- The private investors will play an important role for the future of nuclear power in Romania.


Thank you for the attention !