

“ROMANIA’S EXPERIENCE IN NUCLEAR ENERGY FOR POWER GENERATION”



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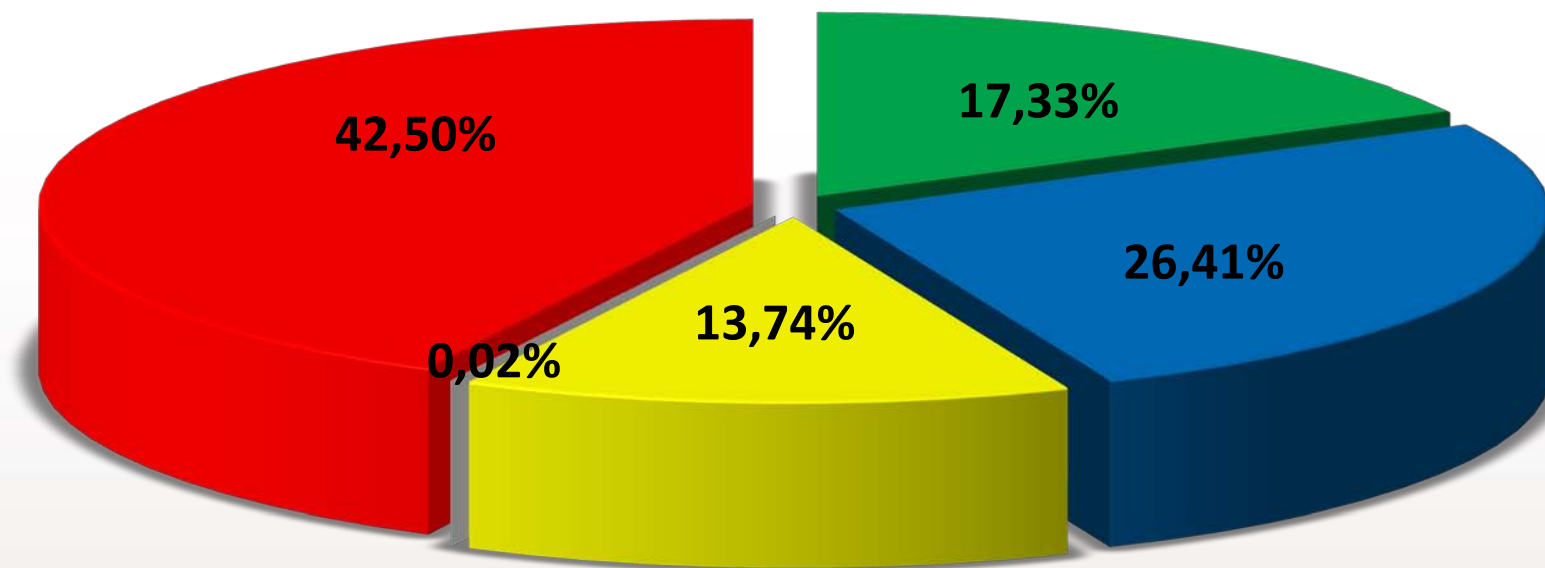
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THE ROLE OF NUCLEAR POWER IN EUROPE



- **Europe's heavy dependency on external energy supplies (50% today and more than 70% in 2030);**
- **The European energy sector currently faces three major challenges:**
 - Ensuring security of energy supply;
 - Establishing and even reducing greenhouse gases emissions, and
 - Maintaining economic competitiveness by keeping energy prices at an affordable level
- **Nuclear Energy represents part of the answer to the above challenges, considering that:**
 - Nuclear safety is no more a major issue to the general public;
 - Nuclear Waste Management issues have to be better addressed to the general public and decidents.

ROMANIAN ENERGY SECTOR STRUCTURE IN 2008



■ Nuclear ■ Hydro ■ Gas&Oil ■ Wind ■ Coal

MAIN ACTORS IN ROMANIAN NUCLEAR INDUSTRY



- **RAAN**

- Heavy Water Plant – Drobeta Tr. Severin
- Research and Development – Pitesti
- Engineering – Magurele

- **“Nuclearelectrica” Nuclear Company**

- Nuclear Power Plant – Cernavoda
- Nuclear Fuel Plant – Pitesti

- **Uranium National Company**

- 4 branches

LOCATION OF THE MAIN ROMANIAN NUCLEAR POWER INDUSTRY



NATIONAL COMPANY “NUCLEARELECTRICA” (SNN)



Shareholders Romanian State – 90.28% & Property Fund – 9.72%;
Main Activity: Electrical Power and Heat Production,
NPP Construction and Commissioning and Nuclear Fuel Fabrication.

SNN SA

CNE (NPP) CERNAVODA
Cernavoda – Units # 1 & 2

Nuclear Fuel Plant
Pitesti

SAFE & EFFICIENT OPERATION OF
UNITS 1 & 2 – CANDU-6: 700 MWe

NUCLEAR FUEL FABRICATION
FOR TWO UNITS

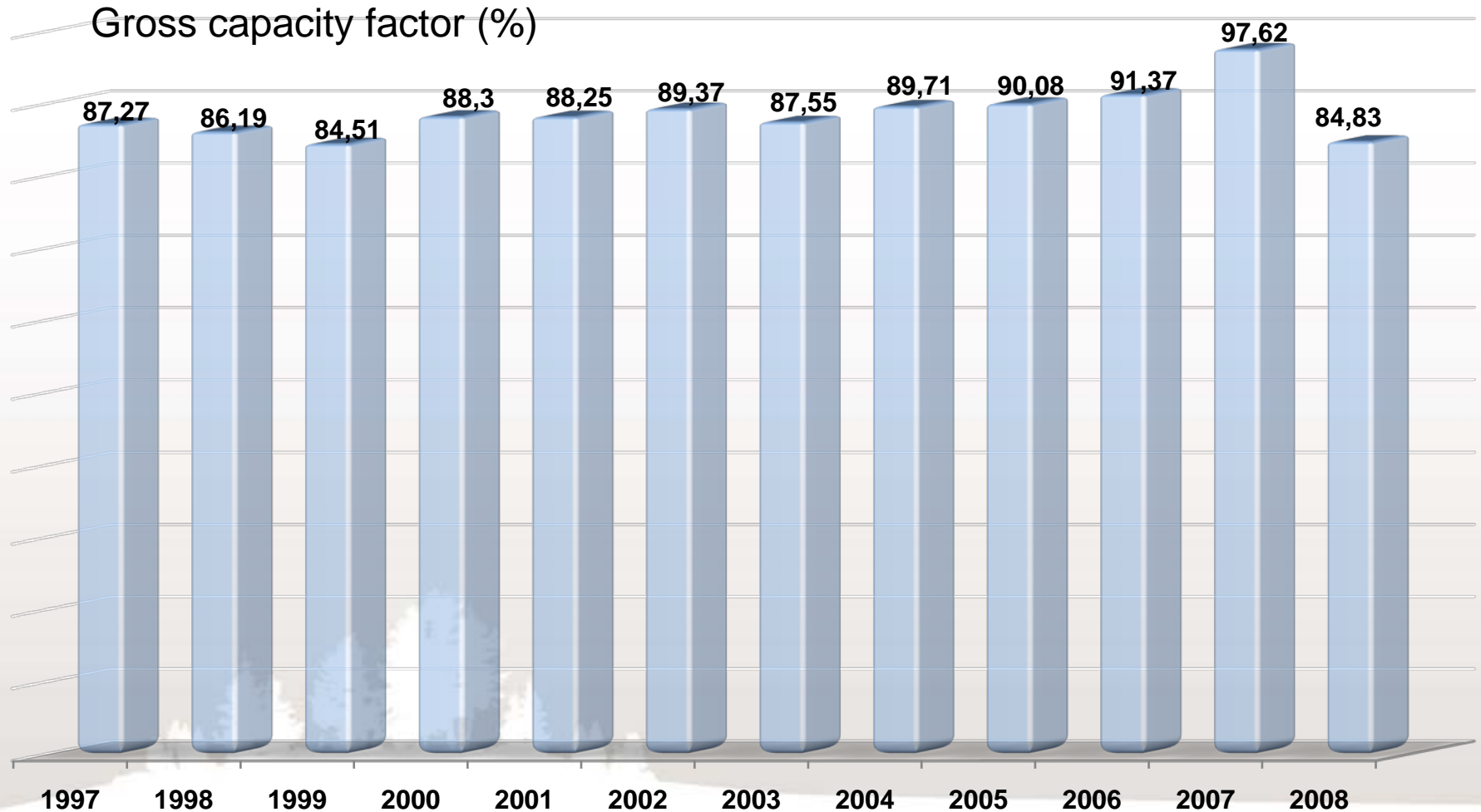


CERNAVODA NPP – UNIT 1 (cont'd)

In commercial operation since December 1996



NUCLEARELECTRICA



CERNAVODA NPP – UNIT 2



IMPACT OVER ELECTRICITY PRICE STABILITY!



Excellent commissioning experience achieved by SNN staff:

Unit 1: criticality to commercial – 229 days

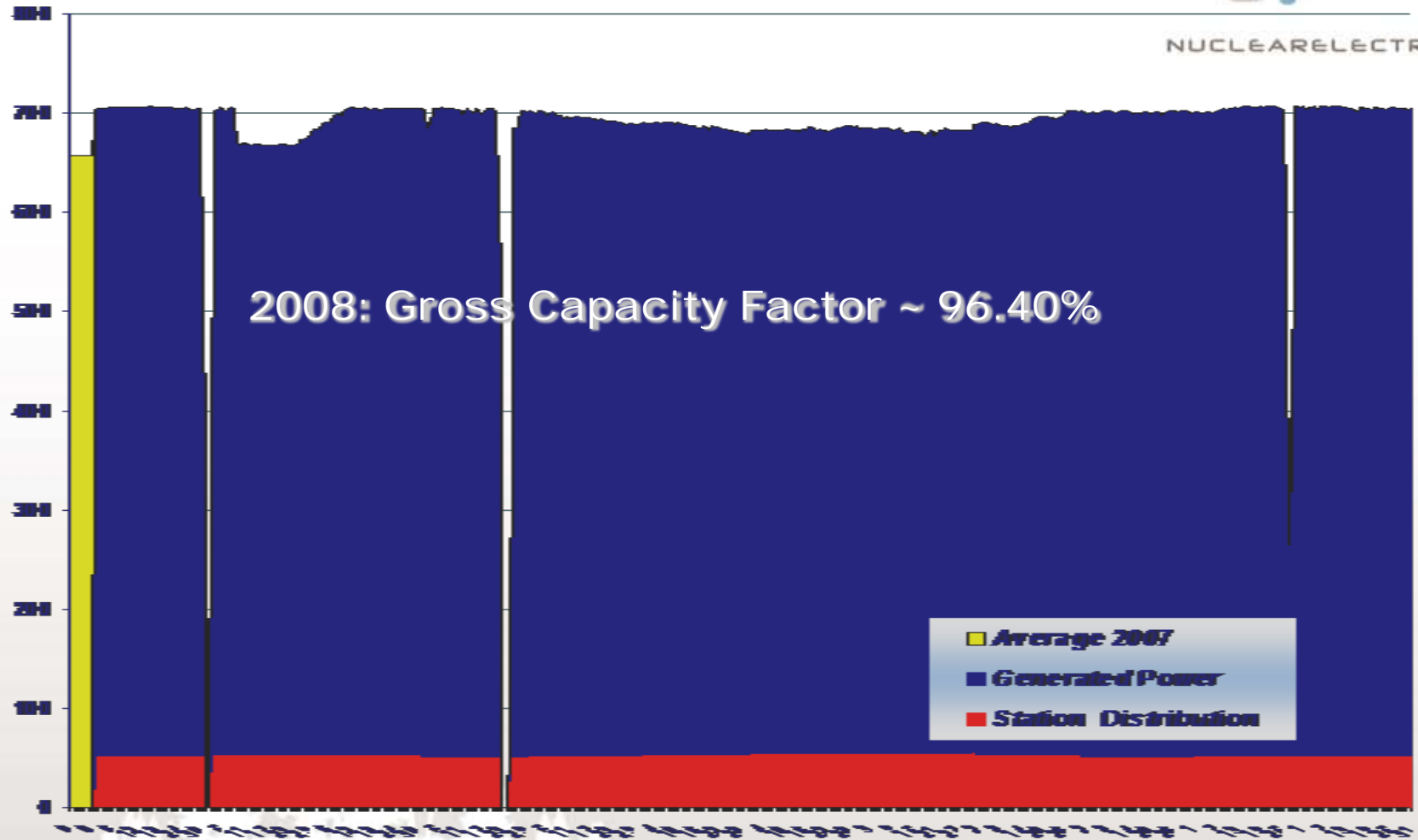
Unit 2: criticality to commercial – 145 days

CERNAVODA NPP – UNIT 2 (cont'd)



NUCLARELECTRICA

In commercial operation since October 2007



NUCLEAR FUEL PLANT BRANCH - PITESTI



NUCLEARELECTRICA

Present & Future

➤ In this moment, Nuclear Fuel Plant (FCN) is producing nuclear fuel for two units (approx. 10.000 fuel bundles / year / 2 Units)

➤ Plans to double capacity for Cernavoda NPP Units 3 and 4 future operation.

➤ The projected growth of production, requires actions to prepare the safety of uranium supply

➤ Therefore Nuclear Fuel Plant (FCN) begin the qualification process of some UO₂ suppliers (others than National Uranium Company)



INTERIM STORAGE ON CERNAVODA NPP SITE



Until their disposal, the direct liability for the management of the spent fuel and radioactive waste is of the nuclear permit holders, during the life time, inclusively during the decommissioning of nuclear and radiological installations.

Presently, on CNE Cernavoda site exist the following interim storages:

- Solid Radioactive Waste Storage Facility (DIDR)
- Interim Nuclear Spent Fuel Storage (DICA)

SOLID RADIOACTIVE WASTE STORAGE FACILITY (DIDR)



Presently, the radioactive waste resulting from Operating CNE Cernavoda is stored in the Solid Waste Interim Storage (DIDR) Cernavoda, that includes the following storage facilities:

- Storage facility for low level waste
- Cellular storage facility for intermediate level waste
- Storage facility for spent filter cartridges

NUCLEAR SPENT FUEL STORAGE (DICA)

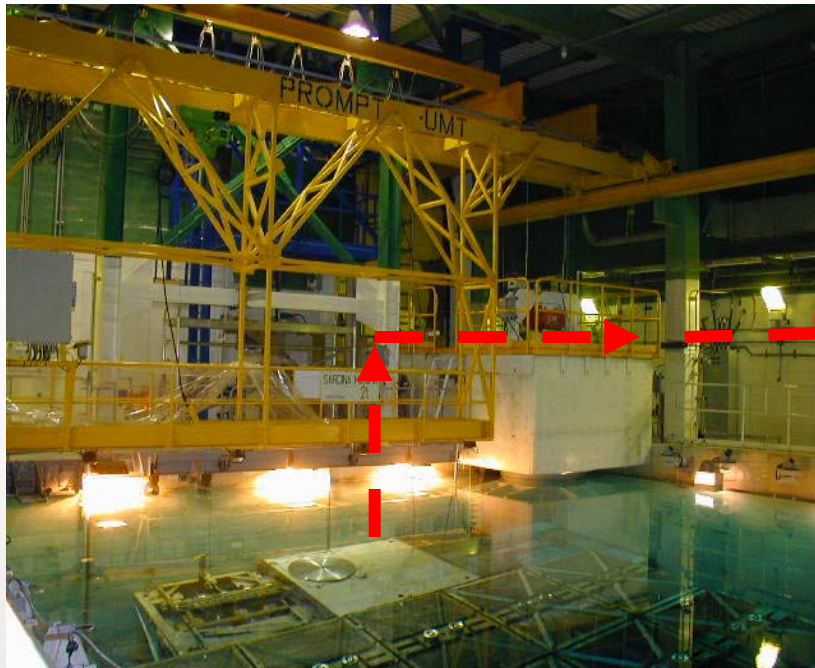


- MACSTOR Type (AECL Canada)
 - first module operational from 2003;
 - second – 2006;
 - third - 2007;
 - fourth – under licensing process
- Final profile:
4 small modules and 34 big modules –
40 years of storage for 4 Units;

NUCLEAR SPENT FUEL STORAGE (DICA)



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Spent Fuel Bay

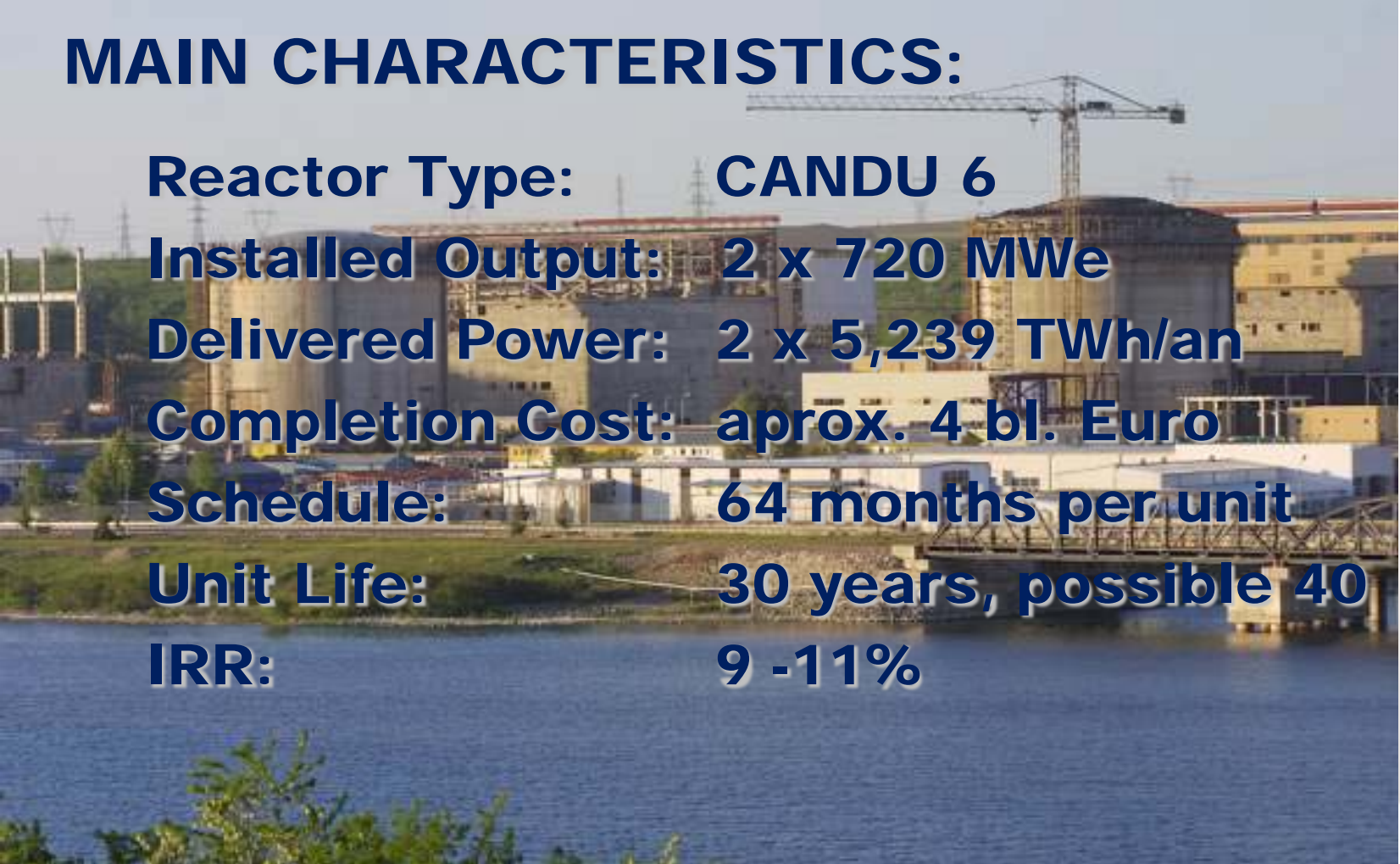


Interim Nuclear Spent Fuel Storage

CERNAVODA UNITS 3&4 PROJECT



MAIN CHARACTERISTICS:



Reactor Type:	CANDU 6
Installed Output:	2 x 720 MWe
Delivered Power:	2 x 5,239 TWh/an
Completion Cost:	aprox. 4 bl. Euro
Schedule:	64 months per unit
Unit Life:	30 years, possible 40
IRR:	9 -11%

CERNAVODA UNITS 3&4 PROJECT (cont'd)



- The project is in accordance with the **Romania's newest energy strategy** which assumes output from nuclear power plants in 2020 to reach 21.6 TWh (compared with 7 TWh in 2007) out of total estimated 100 TWh;
- Romania had a well developed nuclear infrastructure:
 - Heavy Water Plant;
 - Fuel Fabrication Facility;
 - Proven experience in construction, commissioning and operation of NPPs
 - Technically Qualified CANDU Experienced Staff;
 - Nuclear R&D Program

This places Romania in an excellent position to optimize their resources and nuclear infrastructure with the construction and the operation of Cernavoda 3 and 4

- Negotiation Team mandate - Government Decree Nos. 643/2007 & 691/2008 referring to the Investors' selection strategy, considering Nuclearelectrica's stake of 51% in the Project;

CERNAVODA UNITS 3&4 PROJECT (cont'd)





Project Model

- SN Nuclearelectrica SA will participate jointly with the six selected investors (*Arcelor-Mittal, CEZ, GDF-Suez, Enel, Iberdrola and RWE*) in the process of establishing a Project Company (PCO) for the purpose of developing, constructing and operating Unit 3 and Unit 4 of the Cernavoda Nuclear Power Plant.
- The PCO's objective will be to produce energy for its shareholders. In return, they will commit through long term contracts to purchase 100% of their pro-rata share of the power on a take or pay basis. In return for receiving power the investors/off-takers will need to undertake to cover the variable and fixed costs incurred by the PCO;
- Currently negotiations are completed with the six investors and the registration process of the new company "EnergoNuclear" is finished.

LOCAL COMMUNITY



- Benefits: substantial contribution to the budget, social program, low cost heating etc.;
- Public Information Centers: Cernavoda and Constanta;
Public Debates:
 - 2002 – 2003: EIA for Unit 2
 - 2003: Interim Dry Storage Facility
 - 2004: Environmental Balance Report for Unit 1;
 - 2007: EIA for Units 3 & 4
- Cooperation Memorandum Concluded between the Cernavoda Area Local Community and Nuclearelectrica;
- Local Community Representative – member of the Board of Directors of Nuclearelectrica.

PUBLIC ACCEPTANCE IN ROMANIA



- 55% of the Romanian citizens support the energy produced by NPPs *versus* 37% for the EU citizens;
- Cernavoda area - 75% support to the nuclear energy;
- 47,1% (13,7 % without hesitation) would accept the building of a Radwaste repository nearby their community (near the current NPP), compared to 33,7% at national level (3.5 % without hesitation);
- Mass media: attitude of the domestic articles:
 - negative – 54%, and
 - positive or neutral – 46%

CONCLUSIONS



NUCLEARELECTRICA

- The Nuclear Program in Romania, part of the national and European energy policy: sustainable development, security of energy supply and competitiveness;
- Romania has a proven experience in construction, commissioning and operation of NPPs, as well as the necessary support infrastructure:
 - Unit 2 completion represents the major project of Nuclearelectrica during its first decade of existence;
- Innovative approach of Nuclearelectrica related to Cernavoda NPP Units 3 and 4 completion:
 - Major project for the second decade of company life;
 - Risks management and allocation – major tool for project management and financing closure;
- Support from the political class is crucial, considering that the completion of such projects are covering more than one elections cycle;
- Importance of the International Cooperation.

Thank you!

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