

Case study from of nuclear power experience from Romania

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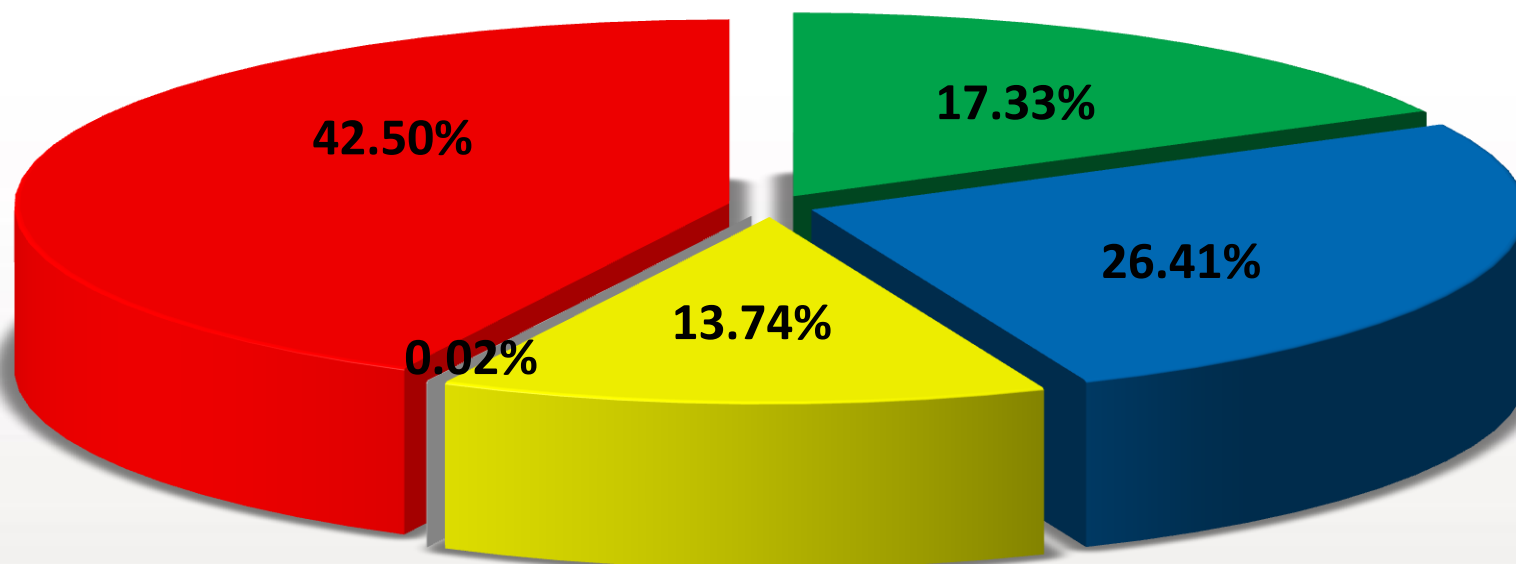


**Nuclear Power – Middle East& North Africa 2010
29th of September, Vienna**

Romania 2008 - Energy Structure



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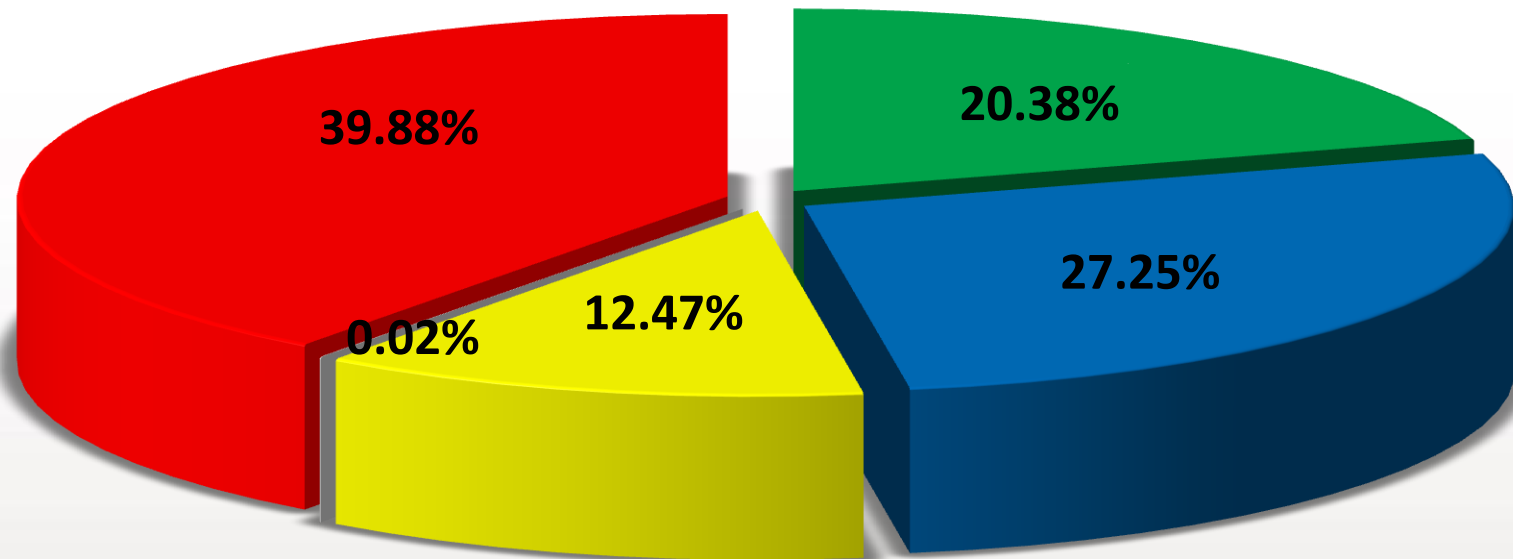


■ Nuclear ■ Hydro ■ Gas&Oil ■ Wind ■ Coal

Romania 2009 - Energy Structure



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

Nuclearelectrica's Structure



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 S.A.

Cernavoda NPP – Units 1&2

**Safe & Efficient operation of
Units 1&2 – CANDU-6: 700 MWe**



Nuclear Fuel Plant Pitesti

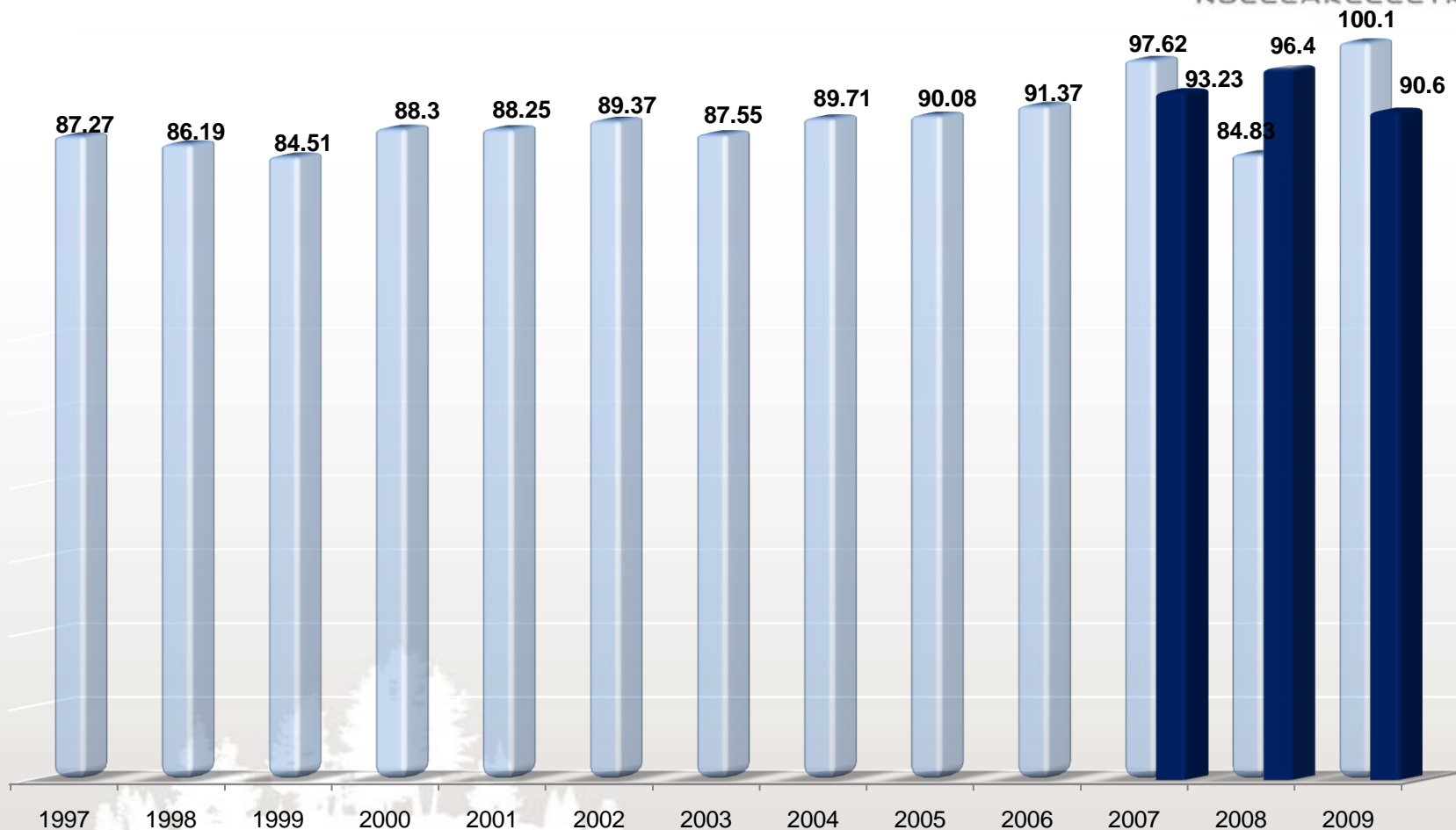
**Nuclear fuel fabrication for
two units**



Gross Capacity Factor for Units 1&2



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Performance of CANDU type reactors – 2009



Unit	Gross Rating MW(e)	Gross Capacity Factor (%)				Ranking-Since-in-Service
		Current Rank	Previous Rank ¹	%	12 Months Rolling (Q1 - Q4 2009)	
Bruce 3 ²	750	18	5	78.6%		26
Bruce 4 ²	750	21	10	74.7%		27
Bruce 5 ²	817	4	7	95.4%		14
Bruce 6 ²	817	17	13	84.6%		16
Bruce 7 ²	817	13	6	90.3%		13
Bruce 8 ²	787	20	20	75.3%		15
Cernavoda 1	706.5	1	3	100.1%		7
Cernavoda 2	704.8	12	11	90.6%		3
Darlington 1	935	14	14	89.7%		11
Darlington 2	935	16	15	87.9%		20
Darlington 3	935	22	21	74.0%		9
Darlington 4	935	15	16	89.2%		8
Embalse	648	2	18	98.8%		10
Gentilly 2	675	24	22	65.4%		17
Pickering 1	542	11	19	91.3%		25
Pickering 4	542	25	25	36.5%		24
Pickering 5	540	23	23	70.2%		23
Pickering 6	540	19	4	77.8%		19
Pickering 7	540	7	24	94.3%		18
Pickering 8	540	10	17	91.8%		22
Pt. Lepreau	680	N/A	N/A	N/A	Shutdown for refurbishment	21
Wolsong 1	622	N/A	N/A	N/A	Shutdown for refurbishment April 1, 2009	12
Wolsong 2	730	6	2	94.8%		4
Wolsong 3	729	5	9	95.3%		2
Wolsong 4	730	9	8	92.5%		1
Qinshan 4	700	8	12	93.9%		6
Qinshan 5	700	3	1	97.3%		5
Average				85.2%		81.4%

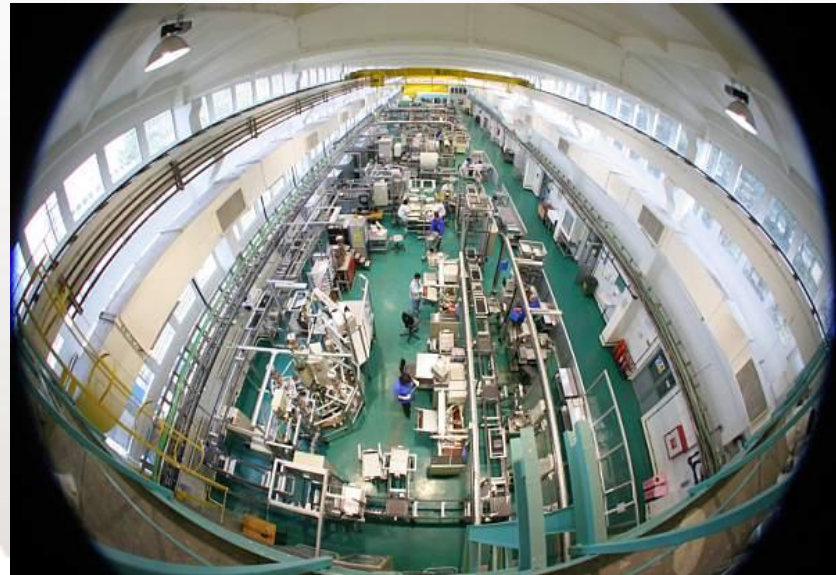
Nuclear Fuel Plant - Pitesti



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1980 - started the fabrication of the CANDU nuclear fuel started through Fuel Pilot Plant - Pitesti.

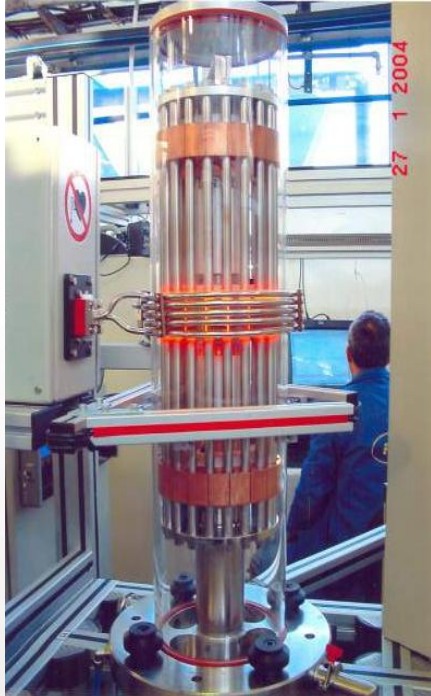
1994 - AECL and Zircatec Precision Industries Inc. (Canada) qualified the Nuclear Fuel Plant (FCN) as a CANDU 6 fuel manufacturer.



Nuclear Fuel Plant - Pitesti



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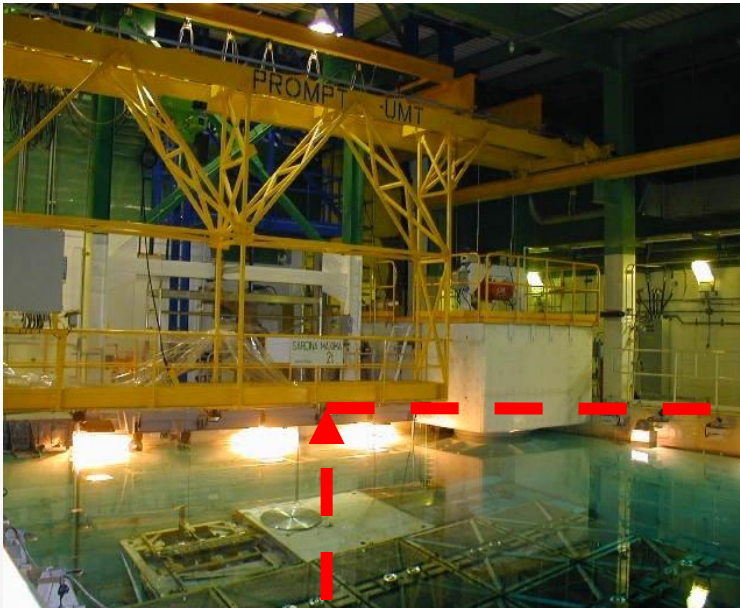


Present - Nuclear Fuel Plant (FCN) is producing CANDU 6 type nuclear fuel for Cernavoda Units 1&2 (approx. 10.000 fuel bundles / year)

Excellent behavior of the nuclear fuel



Nuclear Spent Fuel Storage



Nuclear Spent Fuel Storage (AECL Canada) – Macstor 200

- 1st module 2003;
- 2nd module 2006;
- 3rd module 2007;
- 4th module September 2010

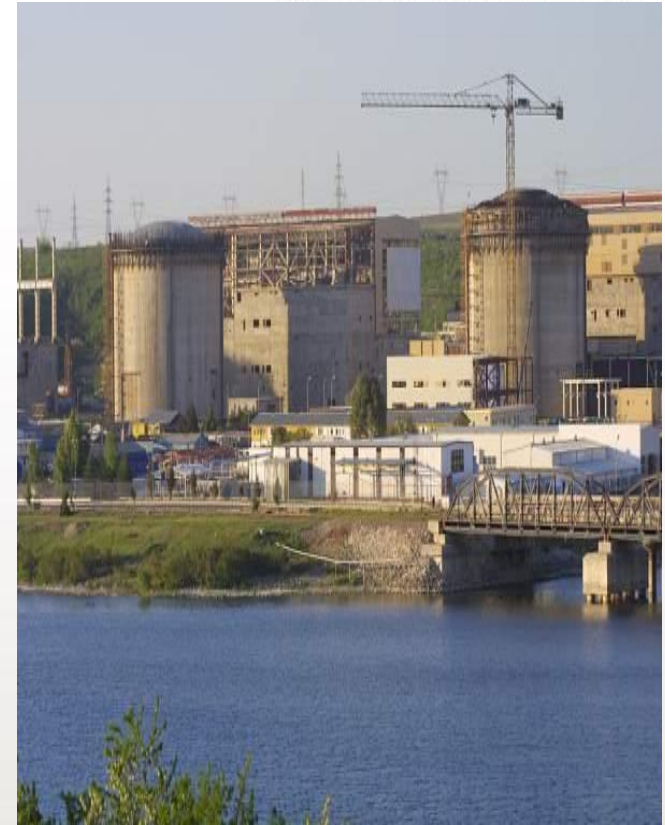
Cernavoda Units 3 and 4 Project



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MAIN CHARACTERISTICS:

Reactor Type:	CANDU 6
Installed Output:	2 x 720 Mwe
Delivered Power:	2 x 5,239 TWh/year
Completion Cost: (preliminary)	aprox. 4 bl. Euro
Schedule: (preliminary)	77 months per unit
Unit Life:	30 years, possible 50



Cernavoda Units 3 and 4 Project



INVESTORS

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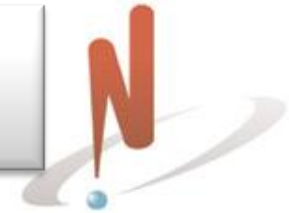
**EnergioNuclear
PCO
UNITS 3 & 4**

**Cernavoda NPP
UNITS 1 & 2**

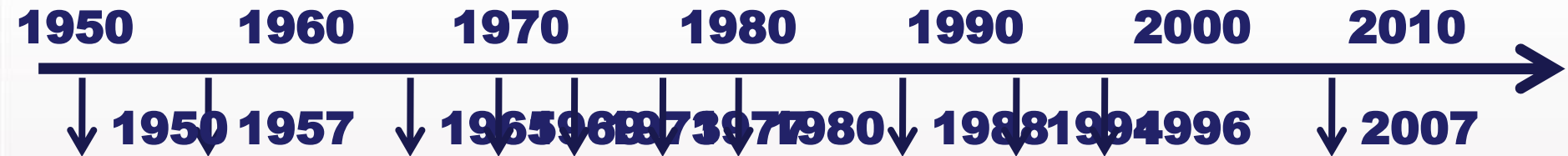
Location of the main Romanian nuclear industry actors



Important steps of Romanian nuclear program



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Plan for
the first
nuclear
reactor
in Romania
to produce
electricity
and heat
for the
Nuclear
Division



operation

Conclusions



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Human Resources is a decisive factor for the succes of the National Nuclear Power program.

Cernavoda NPP (Units 1&2) performances (more than 18% of electricity produced yearly in the country, capacity factor above 90%, high level of nuclear safety, etc.), create the real bases for continuation of the Nuclear Power Program in Romania.

Cernavoda Units 3&4 will be finalize based on the learned lessons and using an inovative financing approach.



Thank you for your attention!

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