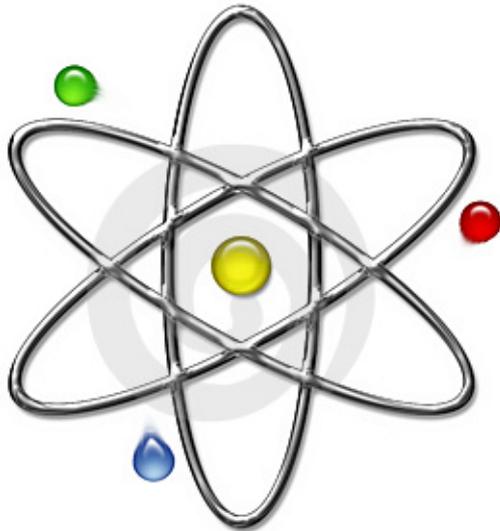


# Romanian Nuclear Energy – features for sustainable development

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Dr. Ing Rodin Traicu  
Pitesti, 22-24 May 2013



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*Is nuclear energy a sustainable source of energy? To answer this question we must answer another: " Can nuclear energy cover the energy needs of the society without compromising the chances of future generations ? I believe both questions have a simple answer: YES!*

*Nuclear energy used to produce electricity and ambient heat must be seen as an alternative, considering both the advantages and disadvantages that it has, in such a way that through an objective analysis it should be placed first in the hierarchy of energy producers, considering local conditions, material conditions and human conditions.*

*Academician Marius Peculea*



# Agenda

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- Sustainable development for energy production
- Energy scenarios
- Electricity sector
- Global energy perspective up to 2050 and beyond
- Factors favoring the development of nuclear energy in Romania
- Energy strategies in Romania for the IIIrd millennium
- Official positions of Romanian Government
- Conclusions

## Sustainable development for energy production

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According to Brudtland Commission, sustainable development means satisfying the needs of the present generation without compromising the chances of future generation for satisfying their own needs.

To evaluate the contribution of different technologies for producing electricity certain factors should be taken into consideration:

- The consumption of non-renewable resources (energetic and non-energetic)
- Environment emissions
- Health impact
- Economic performance



“Scenarios are tools that help us take a look in a world full of uncertainties” - P. Schwartz

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Scenarios are not foresights, because future cannot be foreseen, and also are not forecasts because they present alternative images of the future and not only projections of current trends.

Scenarios can be of two types:

- Exploratory or descriptive (which show us what might happen)
- Normative or strategic (which help us decide what we are doing or what we should do)

The following analysis elements should be used:

- Technologies and the speed of change of technologies
- Environment protection
- Economic growth and population increase
- Globalization and the level of availability of the market
- The structure of the political power, government type and security issues

“il faut, dans la vie, partir du point où l’on est arrivé. Un fait est un fait. – Chateaubriand

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The electrical energy sector is of such importance for the economic and social security of a state that it cannot be treated simplistic, based only on conventional experiences and without taking into consideration the radical changes that have affected this field in the last 2 decades.

- What should be the role of the state: that of strategist and neutral regulator or administrator?
- Which are the most appropriate forms of ownership and sector structure?
- Electricity supplying is a public sector or a business? Can you make a market for electricity?
- Is competition in electricity production and distribution a solution? What is the policy of subsidies?
- What are the risks in the energy sector and how can we deal with them?

# Global energy perspective up to 2050 and beyond

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- This is a scenario made by the International Institute for Applied Systems Analysis (IIASA) for the World Energy Council (WEC)
- Six scenarios have been developed, each using a different set of political assumptions. Three of them, called A1, A2 and A3 imply a high rate of economic growth and rapid technological progress.
- A3 considers the gradual reduction of fossil fuel in favor of nuclear energy and biomass
- The scenarios B and 2 of the C scenarios take into account environmental protection and equity of access to resources
- C1 implies that nuclear power is phased out by 2100
- C2 takes into account the emergence of a new generation of smaller and safer nuclear reactors.

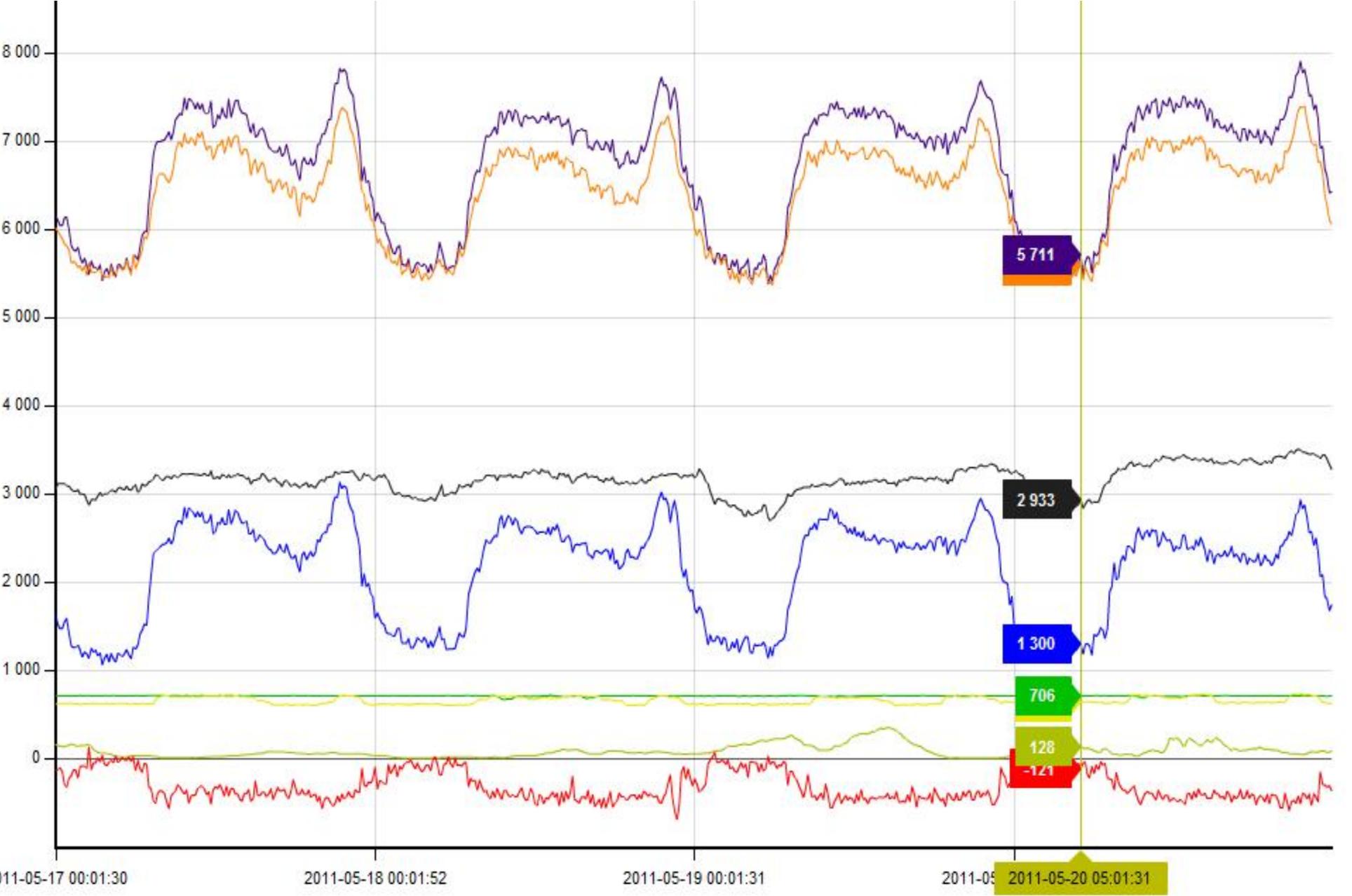


“Anticipating the future by extrapolating the past is dangerously myopic”- Rodin Traicu

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If we want to see where electricity is heading we should see where it is now (See next slide)

- The only prediction that can be made with certainty is that the future will be different.
- In Romania, as in other Eastern European countries like Russia, Ukraine and Belarus the consumption of electricity is now in decline due to the fact that heavy industry, formerly the most important use, is currently being removed contributing to the economic decline of the area.
- These energy systems are large but outdated, obsolete and worn out.
- Inside the national border the policies concerning various aspects of electricity are incoherent, inconsistent and arbitrary.



Productie

Consum

Carbune

Hidro

Nuclear

Eolian

Hidrocarburi

Sold

# RAPORT OPERATIV

privind funcționarea Sistemului Energetic National in data de **Sambata 27.04.2013**

Date SEN		U.M.	Notificat		Realizat	Abateri	
Consum	mediu		MW	5461	*	5540	79
	interval 22	maxim	MW	6400	*	6565	165
		Fmed la cons. max.	Hz	50,000		50,005	0,005
		Sold <sub>import/export</sub> la consum <sub>max</sub>	MW	-96		-107	-11
	interval 07	minim	MW	4800	*	4839	39
		Fmed la cons. min.	Hz	50,000		50,011	0,011
		Sold <sub>import/export</sub> la consum <sub>min</sub>	MW	16		13	-3
Rezerva de putere la varful de sarcina		carbune	MW	1927		1927	0
		hidrocarburi	MW	1663		1663	0
Putere redusa de agregate aflate in reparatii programate si accidentale		carbune	MW	2314		2314	0
		hidrocarburi	MW	1180		1180	0
Frecventa medie zilnica		Hz	50,000		50,004	0,004	
Sold mediu: import (+) / export (-)		MW	-110		-112	-2	
Putere medie produsa		Total	MW	5899		5652	-247
		din care carbune	MW	1242		764	-478
		din care hidrocarburi	MW	487		492	5
C.E. HUNEDOARA		MINTIA	MW	146		80	-66
		PAROSENII	MW	124		124	0
TERMoeLECTRICA		MW	0		0	0	
ELECTROCENTRALE BUCURESTI		MW	211		216	5	
C.E. OLTENIA		ROVINARI	MW	224		245	21
		TURCENI	MW	419		0	-419
		CRAIOVA	MW	123		128	5
		ISALNITA	MW	0		0	0
C.N.E. CERNAVODA		MW	1434		1425	-9	
C.E. EOLIENE		MW	973		1026	53	
HIDROELECTRICA		MW	1762		1943	181	
Productie prioritara, termoficare urbana si industriala		Total	MW	208		217	9
		din care CET Galati	MW	21		20	-1
		din care CET Govora	MW	60		71	11
AUTOPRODUCATORI		Total	MW	274		246	-28
		din care CCPP Brazi	MW	0		0	0
		din care CET Drobeta	MW	118		87	-31
COMBUSTIBILI		gaze	milNm3/zi	-		4,8	-
		pacura	tone/zi	-		157	-

# RAPORT OPERATIV

privind funcționarea Sistemului Energetic National in data de **Luni 20.05.2013**

Date SEN		U.M.	Notificat		Realizat	Abateri	
Consum	mediu		MW	5846	*	5938	92
	interval 22	maxim	MW	6740	*	6790	50
		Fmed la cons. max.	Hz	50,010		50,001	-0,009
		Sold <sub>import/export</sub> la consum <sub>max</sub>	MW	177		160	-17
	interval 03	minim	MW	4450	*	4603	153
		Fmed la cons. min.	Hz	50,010		50,014	0,004
		Sold <sub>import/export</sub> la consum <sub>min</sub>	MW	333		315	-18
Rezerva de putere la varful de sarcina		carbune	MW	1344		1344	0
		hidrocarburi	MW	1762		1762	0
Putere redusa de agregate aflate in reparatii programate si accidentale		carbune	MW	2208		2208	0
		hidrocarburi	MW	680		680	0
Frecventa medie zilnica			Hz	50,010		49,997	-0,013
Sold mediu: import (+) / export (-)			MW	305		292	-13
Putere medie produsa	Total		MW	5717		5646	-71
	din care carbune		MW	1454		1499	45
	din care hidrocarburi		MW	970		890	-80
C.E. HUNEDOARA	MINTIA		MW	191		194	3
	PAROENI		MW	124		122	-2
TERMOELECTRICA			MW	0		0	0
ELECTROCENTRALE BUCURESTI			MW	146		149	3
IERNUT			MW	69		0	-69
C.E. OLTENIA	ROVINARI		MW	466		500	34
	TURCENI		MW	375		382	7
	CRAIOVA		MW	88		105	17
	ISALNITA		MW	0		0	0
C.N.E. CERNAVODA			MW	708		702	-6
C.E. EOLIENE			MW	520		467	-53
HIDROELECTRICA			MW	2065		2086	21
Productie prioritara, termoficare urbana si industriala	Total		MW	204		204	0
	din care CET Galati		MW	21		21	-1
	din care CET Govora		MW	63		72	9
AUTOPRODUCATORI	Total		MW	761		733	-28
	din care CCPP Brazi		MW	484		460	-24
	din care CET Drobeta		MW	116		98	-18
COMBUSTIBILI	gaze		milNm3/zi	-		6,5	-
	pacura		tone/zi	-		78	-

## Maintaining the status quo is not an option

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- The technology is declining. Good maintenance can prolong its life, but sooner or later, technology should be replaced.
- Nuclear energy is a proven alternative to fossil fuels
- Although hydroelectric energy, wind and geothermal energy have an important contribution to reducing fuel consumption, without nuclear energy the carbon emissions would have been 1.7 times higher than the existing ones.
- In addition to reducing the greenhouse gas emissions and the dependence on fossil fuels, the nuclear power offers two more crucial environmental benefits:
  - A practical way for the “hydrogen economy”
  - A solution for the freshwater crisis for human consumption and irrigation

## Factors favoring the development of nuclear energy in Romania

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- The two oil shocks of 1973 and 1979 made the price of a barrel of oil to increase from 1.5 to 12 U.S dollars per barrel and from 12 to 67 U.S dollars per barrel in less than 20 years.
- The current price of oil which varies around 100 dollars per barrel and the price of natural gas 400-500 dollars/1000 Nm<sup>3</sup> together with the lack of modern technologies of extraction, combustion and environmental protection in coal-fired power transform the issues raised by investments in nuclear energy become acceptable in the current context in Romania.
- The existing infrastructure for research, design, installation and commissioning of nuclear power equipments and the good experience in exploiting the two existing nuclear units at Cernavoda are factors favoring the private financing of such energy.

## Difficulties and problems that have to be solved to develop the nuclear energy sector

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- Technical features:
  - How big should the new capacity to produce nuclear energy be and what nuclear channel should be used?
- Financing:
  - Should investment come from the government – from public taxes?
  - Should investments come from private investors including international investors?
  - Should prices be set by government or regulatory body or a competitive market?
  - Should the risks be beard by population and consumers or shareholders?
- Political features:
  - State patronage generates corruption which can be found in personnel appointments, investment and acquisitions decisions as well as in permits, licenses and fees.
  - Centralized power systems represent direction levers of political processes leading to the advantage of those in power.

## Energy strategies in Romania for the IIIrd millenium

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- All energy strategies published so far are characterized by incoherence and incapacity of analyzing the existing economic reality.
  - The published strategies analyze a centralized power system although consumers tend to become energy independent.
  - Those strategies draw energy contours using PowerSat program taking into account existing capacities and their related primary energy resource without any parallel analysis of the 100% private investments and the emergence of a new class of eligible customers
  - They analyze only investment programs which are in progress for more than 20 years and are not yet completed but do not take into consideration the current trends in nuclear technology
- *Because this analysis is completely devoid of substance **the proposed administrative reorganization and technological solutions are unacceptable** to the business and financial environment.*



## Future begins today

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- Nuclear power development in Romania represents the priority factor that ensures the stability of a power system that can cope with the challenges of the economic development that needs to predict the inputs so that it can respond to a changing product market.
- The price of solid fuels which is in a continuous variation depending on factors such as political interests and global interests on which Romania has no influence together with the cost of renewable energies and their dependence on random climatic factors lead to the appreciation of the quality of nuclear energy.
- The capitalization of investment made in research, design, management and operation of nuclear facilities made over the last 30 years place Romania in a favorable position in the competition to attract investments in the nuclear sector.

### ***Statement of Prime Minister Victor PONTA:***

“A country depending on energy imports is a weak country; I really think Romania has a natural opportunity to become energy independent. Romania to take the actions for saving all generation systems. We have potential on hydro, coal, nuclear, renewable and we have to carefully avoid that one direction eliminates another one.

Romanian Government encourages the private capital to be involved in all public energy companies for performing management.”

***Statement of Ministry of Economy Varujan VOSGANIAN:***

“Even if the energy price is getting down on the spot market, investment in nuclear power field are correct as a prevention of the other sources depletion”

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Thank you for your attention

