



THE ROLE OF NUCLEAR ENERGY IN BULGARIA'S ENERGY POLICY

SOFIA MAY 19, 2009

**ALBENA TRASSIEVA
STATE EXPERT, ENERGY STRATEGY DIRECTORATE
MINISTRY OF ECONOMY AND ENERGY**



THE PROJECT FOR BULGARIAN ENERGY STRATEGY BY 2020

THE NEW BULGARIAN ENERGY STRATEGY by 2020 is the basis and the first important step toward high efficient and low carbon energy systems

The next steps are to be developed (first on the European and then on national level) a policy **PROGRAMME by 2030** and a **VISION by 2050**.

THE SCOPE is to be reached the optimal balance between the energy objectives and the economical growth as precondition for complex social benefits.

BULGARIAN ENERGY STRATEGY BY 2020

DISCUSSION AND ADOPTION OF THE NEW EU ENERGY POLICY





MAIN TARGETS

◆ SUSTAINABLE DEVELOPMENT

- improving energy efficiency in generation and consumption
- improving the energy mix by increasing the share of low-carbon energy
- accelerated technological progress, inc. improvement of new technologies (clean coal)

◆ COMPETITIVENESS

- free energy market will guarantee better services and lower prices

◆ ENERGY SECURITY

- diversification of energy resources by type, source, suppliers and routes
- solidarity - enhancing partnership and cooperation between EU members states



THE BULGARIAN ENERGY MIX

| PRODUCTION OF INDIGENOUS ENERGY RESOURCES IN BULGARIA, thousand toe | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Coal | 4341 | 4520 | 4497 | 4428 | 4645 | 4537 | 4177 | 4307 |
| Crude oil | 44 | 46 | 34 | 38 | 31 | 31 | 30 | 28 |
| Natural gas | 22 | 12 | 18 | 16 | 13 | 270 | 384 | 375 |
| Other solid fuels | 413 | 550 | 532 | 627 | 671 | 717 | 691 | 735 |
| NPP and HPP | 4591 | 5154 | 5426 | 5652 | 4854 | 4716 | 5257 | 5566 |
| TOTAL | 9411 | 10282 | 10507 | 10761 | 10214 | 10271 | 10539 | 11011 |

Source: NSI



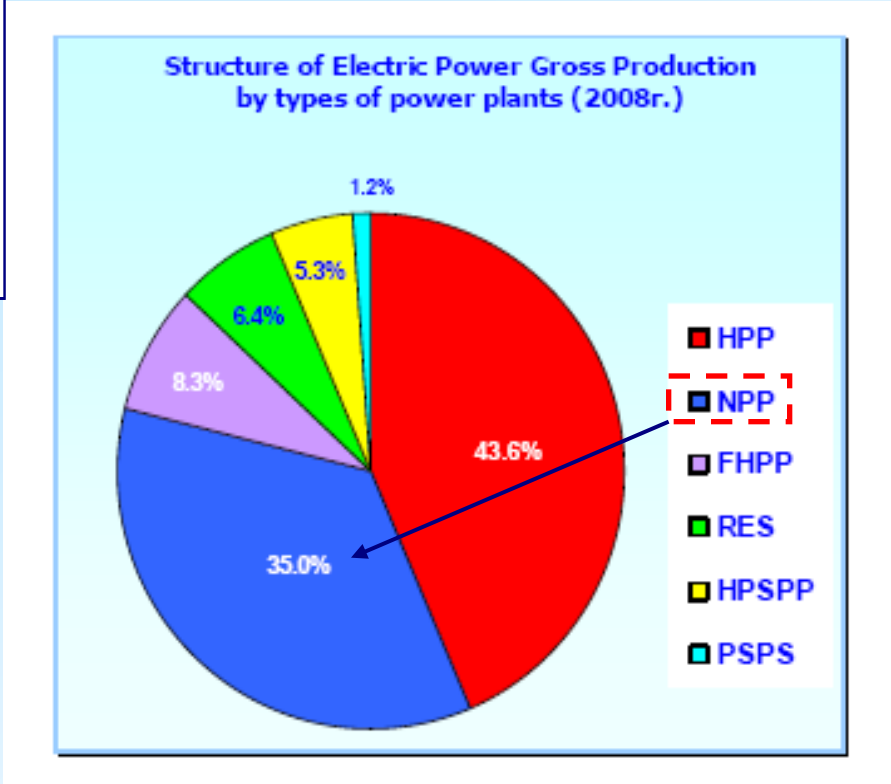
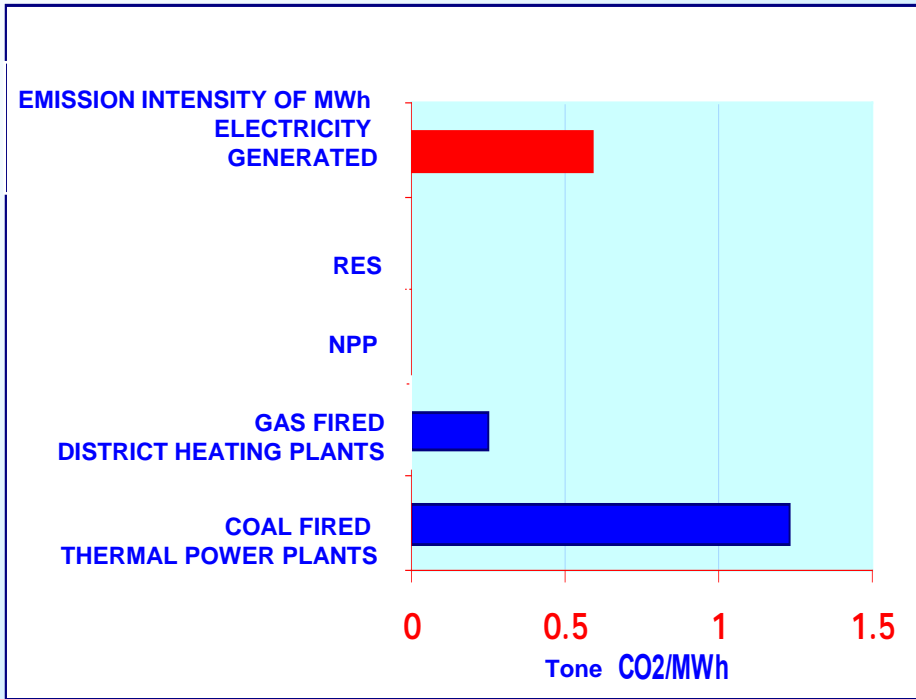
RELIABLE ENERGY MIX

| Energy resource | Cost 2005 (EURO/MWh) | Cost 2030 (EUR/MWh, CO2= 20-30 EUR/ton) | Emissions (kg CO2/MWh) | Import dependence EU - 27 | | Efficiency | Price sensitivity | Reserves/ annual generation |
|-----------------|----------------------|---|------------------------|---------------------------|------|------------|-------------------|-----------------------------|
| | | | | 2005/ | 2030 | | | |
| NATURAL GAS | 35 - 70 | 40 - 85 | 400 - 440 | 57% | 84% | 40 - 50% | Very high | 64yrs |
| OIL | 70 - 80 | 80 - 95 | 550 | 82% | 93% | 30% | Very high | 42yrs. |
| COAL | 30 - 50 | 45 - 70 | 750 - 800 | 39% | 59% | 40 - 48% | Medium | 155yrs. |
| NUCLEAR FUEL | 40 - 45 | 40 - 45 | 15 | 100% uranium ore | | 33% | Low | 85yrs. |
| BIOMASS | 25 - 85 | 25 - 75 | 30 | 0% | 0% | 30 - 60% | Medium | RES |
| WIND | 35 - 175 | 28 - 170 | 10 - 30 | 0% | 0% | 95 - 98% | None | |
| HYDRO | 25 - 95 | 25 - 90 | 5 - 20 | 0% | 0% | 95 - 98% | None | |
| SOLAR | 140 - 430 | 55 - 260 | 100 | 0% | 0% | - | None | |

Source - International Energy Agency



NUCLEAR ENERGY- balance between Ecology and Energy Security





NUCLEAR ENERGY: STATUS AND NATIONAL POTENTIAL ANALYSIS

ADVANTAGES

and...



DISADVANTAGES

1. A reliable and emission-free source for energy generation
2. Has a big contribution towards meeting the electricity demands of the country's economy and households.
3. Nuclear fuel is consider as an indigenous energy source. The price of the nuclear fuel is relatively predictable.
4. The share of the fuel costs in the prime NPP generated electricity cost is stable (about 18%)
5. Bulgaria fully support the Convention on Nuclear Safety
6. Two special nuclear funds have been established in the country (1995):
"Decommissioning of nuclear facilities" and "Safe storage of nuclear waste"
7. Kozloduy International Fund was set up with the financing from European commission and Donors' Assembly

1. Early decommissioning of units 1-4 of NPP "Kozloduy" resulted in complex economic, environmental and social consequences
2. The generation of nuclear energy is not flexible and entails certain substantial permanent expenses
3. The prime cost of electricity from NPP will increase...
4. The two nuclear funds "Decommissioning of nuclear facilities" and "Safe storage of nuclear waste" were set up in 1995 but money started being transferred to them at the end of 1999
5. The storage of RAW from nuclear plant has not yet been solved



NUCLEAR ENERGY: STRATEGIC DECISIONS AND DOCUMENTS

1. A LOWER CARBON ENERGY MIX, STABLE PRICES AND OPPORTUNITIES FOR GROWING EXPORT CAN ONLY BE ACHIEVED THROUGH THE SUSTAINABLE DEVELOPMENT OF NUCLEAR ENERGY.
2. INTRODUCTION OF THE HIGHEST POSSIBLE NUCLEAR SAFETY STANDARDS AND MANAGEMENT OF RAW AND SNF ARE ELEMENTS OF THE NATIONAL SECURITY AND WILL REMAIN A TOP PRIORITY OF THE COUNTRY'S ENERGY POLICY.
3. SETTING UP AND MAINTENANCE OF A MODERN SYSTEM FOR TRAINING AND RE-TRAINING OF NUCLEAR ENERGY EXPERTS IS A CRUCIAL PRECONDITION FOR RELIABLE AND SAFE OPERATION OF NUCLEAR PLANTS.
4. BULGARIA IS ACTIVELY PARTICIPATING IN THE MOST INTERNATIONAL INITIATIVES FOR SUSTAINABLE DEVELOPMENT OF NUCLEAR ENERGY
5. THE NEW EUROPEAN ENERGY POLICY IS SUPPORTING THE DEVELOPMENT AND THE USE OF NUCLEAR ENERGY

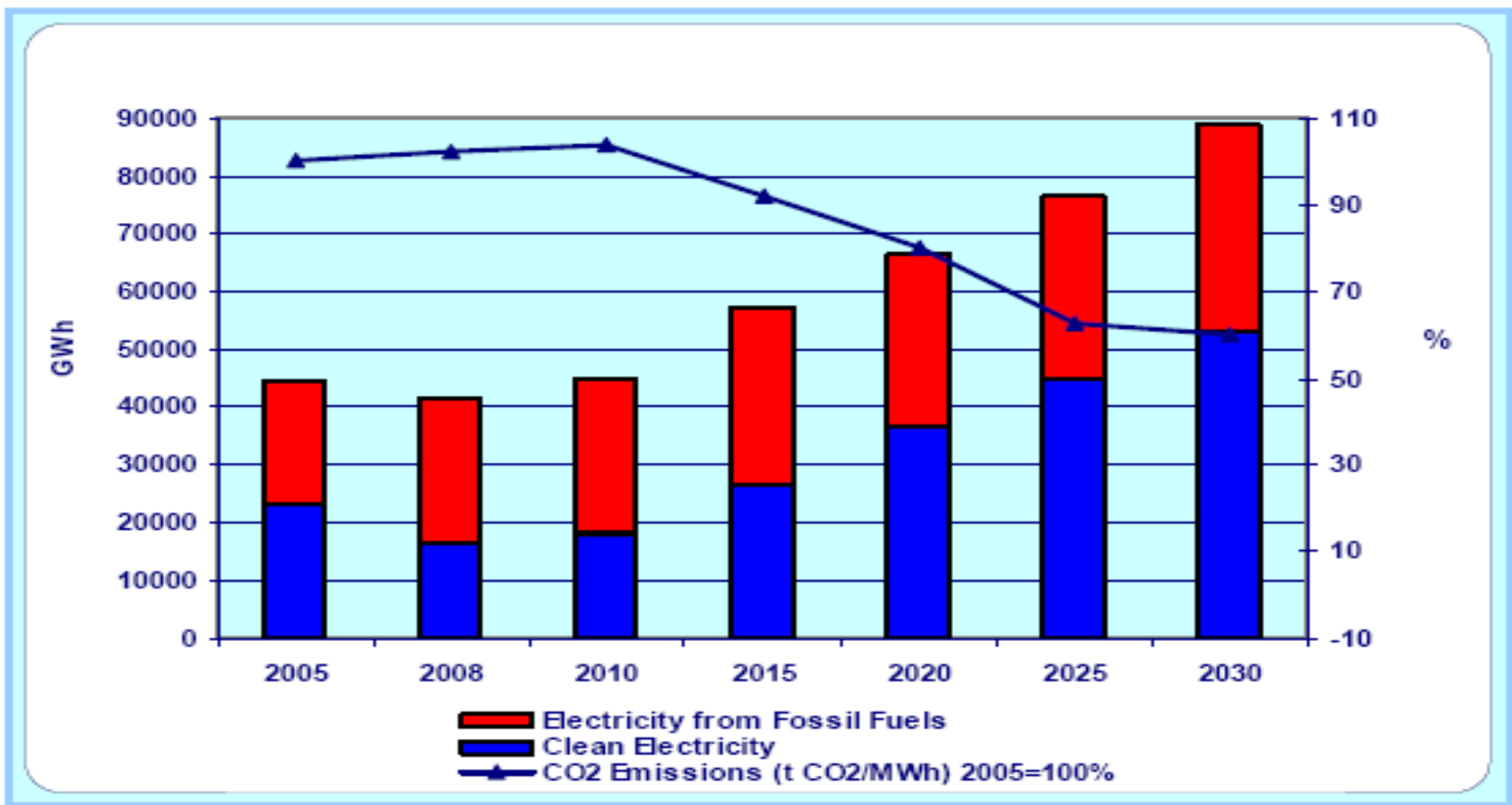
STRATEGIC DOCUMENTS

1. UPDATING THE SNF AND RAW MANAGEMENT STRATEGY
2. PROGRAMME FOR EFFICIENT USE OF INDIGENOUS /ENERGY RESOURCES, inc. OPTIONS TO RESTART URANIUM MINING
2. PROGRAMME FOR TRAINING AND QUALIFICATION OF EXPERTS AND NEW TECHNOLOGIES



DEVELOPMENT FORECASTS AND EXPECTED RESULTS 2020 - 2030

The share of the generated clean energy (RES and nuclear) will increase from 41 % in 2008 to 55% in 2020 and up to 60% in 2030. As a result, CO2 emissions emitted for the generation of 1 MWh electricity will decrease by 40%

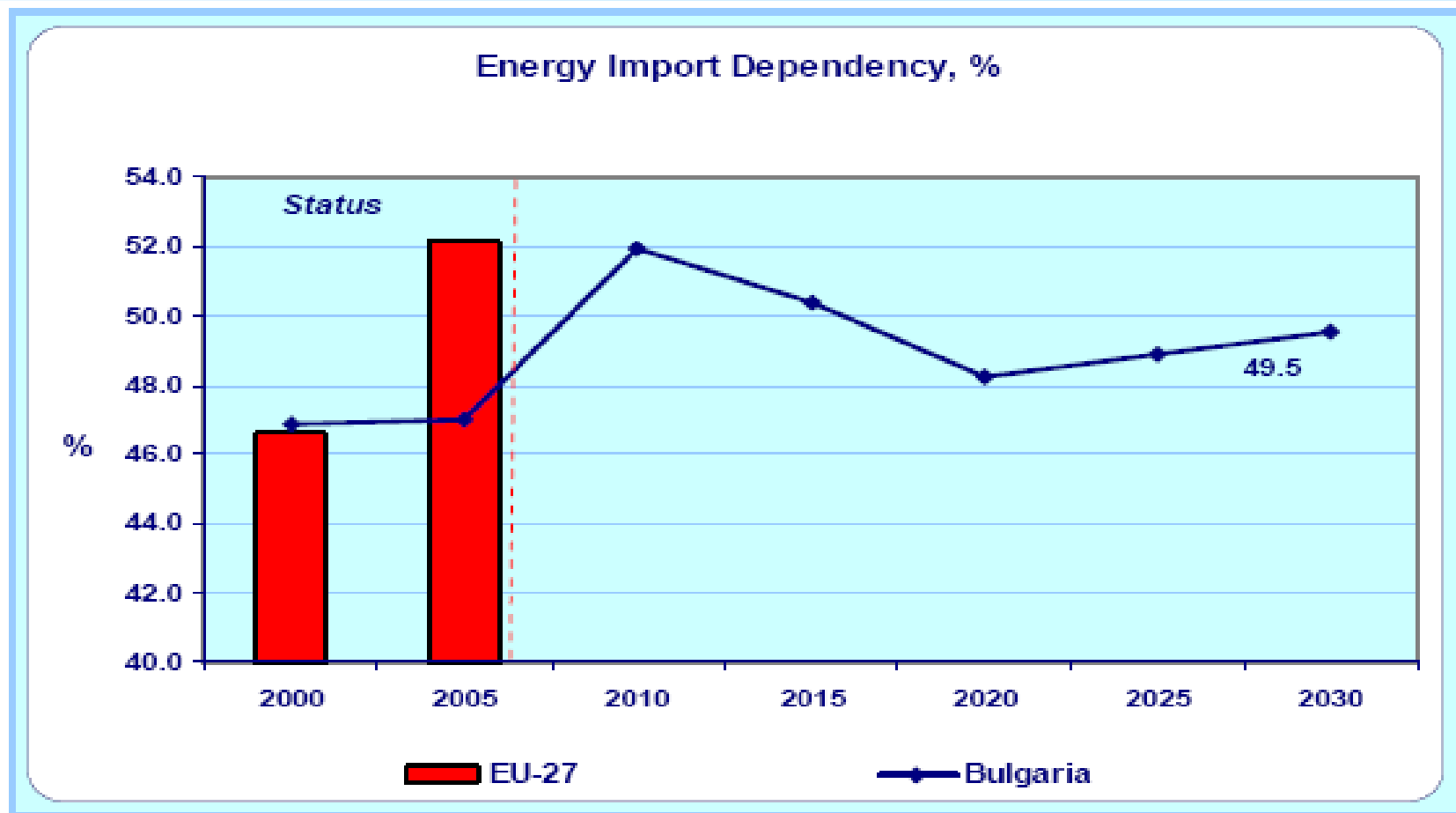


Source: MEE, NEC EAD



DEVELOPMENT FORECASTS AND EXPECTED RESULTS 2020 - 2030

Thanks to the development of nuclear power plants and power plants on local coal, the country's dependence on imported energy sources remains stable and below the average level for EU-27



Source: MEE, Eurostat



IN CONCLUSION ...

- **NUCLEAR ENERGY CONTRIBUTES TO THE EU'S SECURITY OF ENERGY SUPPLY AS A MAJOR SOURCE OF BASELOAD ELECTRICITY, NOT INCREASING GREENHOUSE GAS EMISSIONS AND THUS COMBATING CLIMATE CHANGE**
- **ONE THIRD OF ELECTRICITY GENERATION IN THE EU COMES FROM NUCLEAR ENERGY**
- **IN THE CONTEXT OF THE EU CO₂ REDUCTION OBJECTIVE THE DECISIONS ABOUT NEW INVESTMENTS AND LIFETIME EXTENSION OF NUCLEAR PLANTS BECOME MORE PRESSING**
- **THE EU MAINTAINS THE HIGHEST SAFETY, NON-PROLIFERATION, SECURITY AND ENVIRONMENTAL PROTECTION STANDARDS FOR NUCLEAR GENERATION. THE EU NEEDS TO DEVELOP A COMMON LEGISLATIVE FRAMEWORK WITH RESPECT TO THE SAFETY OF NUCLEAR INSTALLATIONS AND THE MANAGEMENT OF NUCLEAR WASTE.**
- **A DIRECTIVE SETTING UP A COMMUNITY FRAMEWORK FOR NUCLEAR SAFETY IS UNDER PREPARATION, FOLLOWING THE ESTABLISHMENT OF THE HIGH LEVEL GROUP ON NUCLEAR SAFETY AND WASTE MANAGEMENT AND THE DISCUSSIONS WITHIN THE EUROPEAN NUCLEAR ENERGY FORUM.**



Thank you for the attention!

a.trassieva@mee.government.bg
+ 359 2 92 63 262