National Centre for Nuclear Research



Grzegorz Wrochna

www.ncbj.gov.pl



- The largest research institute in Poland • 1073 employees, inc. 56 prof. & 117 PhD
- Mission:
 - Conduct basic and applied research in international cooperation
 - Provide research infrastructure for Poland and international community
 - Develop nuclear technologies and products for various applications
 - Support Polish nuclear power programme

• Incomes:

- statutory fund ~20%, grants/projects ~30%
- commercial activities ~50%



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Research reactor MARIA at Swierk



- neutron beam research, material irradiation, radioisotope production
- ⁹⁹Mo for medical use 15% of world production
- 1 week of Maria irradiation = 100 000 medical procedures

- built 1974, upgrade 1992
- pool type
- H₂O, Be moderated
- 30 MW thermal power
- neutron flux:
 - thermal 4-10¹⁴ n/cm²s
 - fast 2·10¹⁴ n/cm²s



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Radioisotope Centre





Development of new technologies and manufacturing:

- radioactive isotopes
- chemical compounds marked with radioisotopes
- isotope radiation sources

Applications:

medicine, industry, science

Export for 72 countries worldwide

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POLATOM



• Basics research:

nuclear & particle physics, material research

 Fermilab, Brookhaven, Jefferson LAB, others through CERN

• Nuclear energy

- NRC & DoE on safety analysis
- **GE**: safety analysis, experiments, radioisotopes, ...
- Westinghouse: safety analysis, SMR, ...
- **NGNP**: nuclear cogeneration
- \circ through international organisations: IAEA, NEA, ...



Nuclear security, non-proliferation issues common projects within Global Threat Reduction Initiative

- Reactor MARIA conversion 80% → 36% → 19% enriched uranium supported by US DoE
- GTRI trainings, courses & conferences



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- Molybdenum provides 90% of medical procedures with radioisotopes
 - Today it is produced with High Enrichment Uranium targets
- NCBJ plans to convert to Low Enrichment
 Uranium targets
 - Standard AI LEU plates give 2× more rad. waste
 - We consider innovative technology of Si plates
 - We look for partners



- Energy (especially nuclear) is an engine driving more than just economy:
- Innovative research and development of new technologies for many applications:
 - WWW was invented at European Centre for <u>Nuclear</u> Research
 - Homeland security (scanners etc)
 - Medical diagnostics and therapy
 - radiation saves millions of lifes

We look forward to vivid cooperation with US on nuclear research and applications