

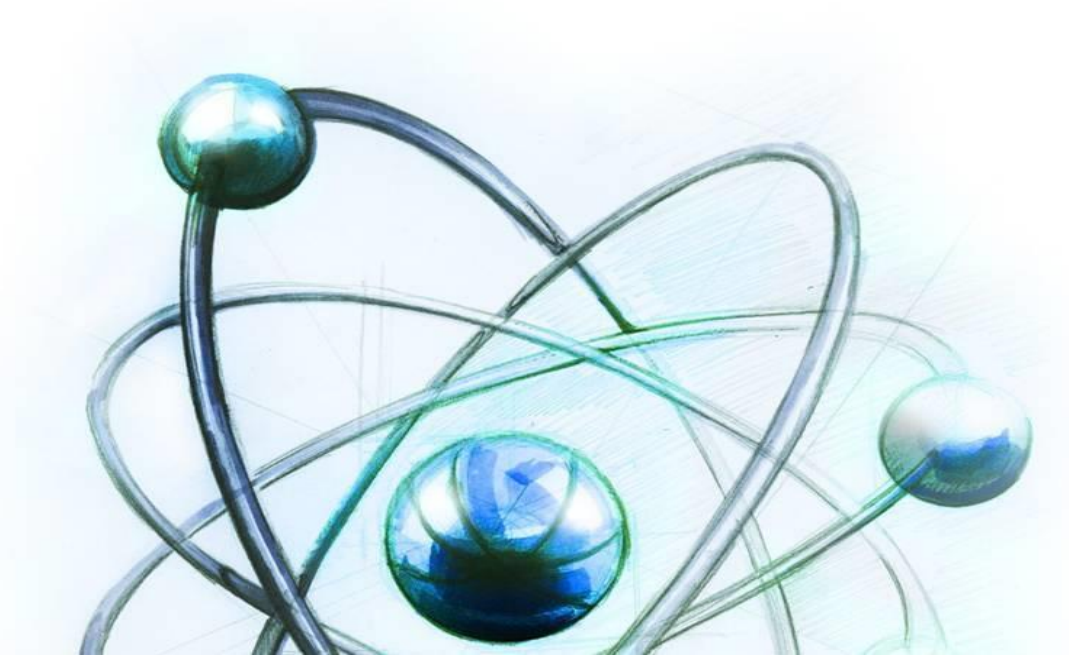


Company Introduction

2019

ÚJV Řež at a glance

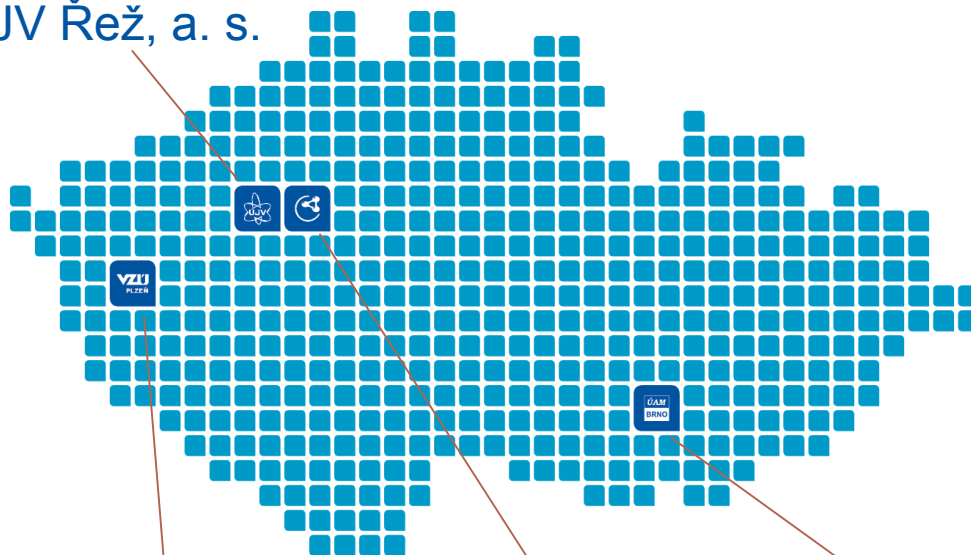
- Who we are – history, shareholders, assets
- Products and services
- Key projects / references



UJV Group revenue in 2017 – € 71 mil



ÚJV Řež, a. s.



Research and
Testing Institute
Plzeň



Research
Center Rez



Institute of
Applied
Mechanics, Brno

Nuclear Safety and Reliability

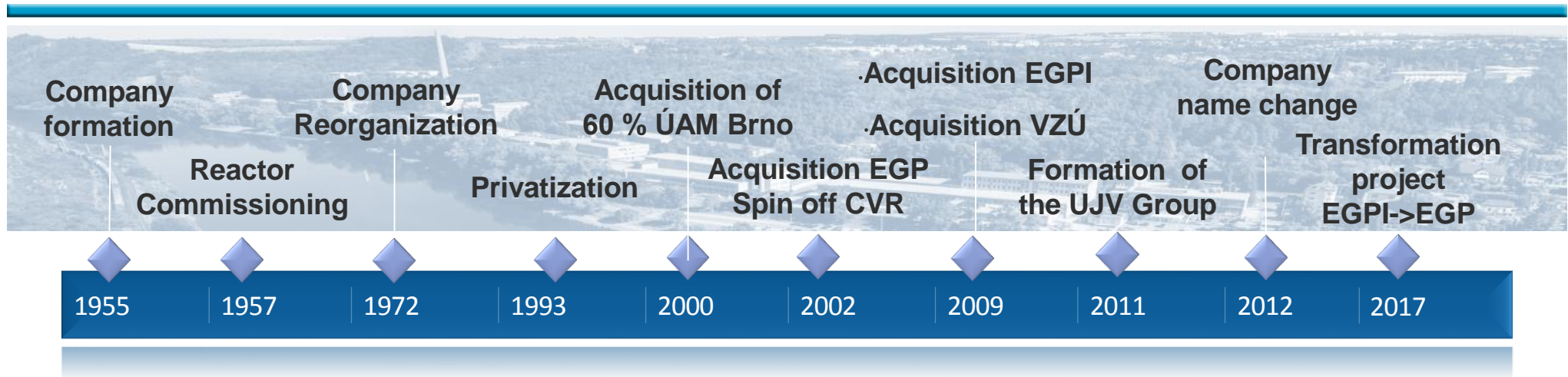
Integrity and Technical Engineering

Radioactive Waste and Decommissioning

ENERGOPROJEKT PRAHA

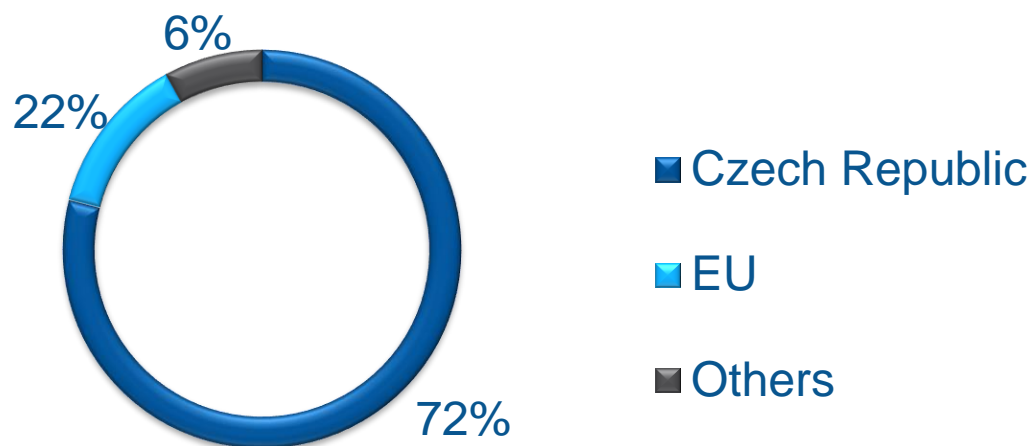
Radiopharmaceuticals

History of the UJV Group



- .1955** ———— .Formation of the Institute of the Nuclear Physics
- .1957** ———— .Commissioning of the first research reactor in the CR VVR–S with power output of 2 MWt
- .1972** ———— .Reorganization of the former Institute and formation of the Nuclear Research Institute
- .1993** ———— .Privatization of NRI and formation of a joint stock company
- .2000** ———— .Acquisition of the 60 % share in the ÚAM Brno – acquiring 100% share in 2004
- .2002** ———— .Formation of the R&D focused subsidiary Research Center Rez
- .2002** ———— .Acquisition of the ENERGOPROJEKT PRAHA
- .2009** ———— .Acquisition of the EGP INVEST, spol. s r.o.
- .2009** ———— .Acquisition of the Research and Testing Institute in Pilsen
- .2011** ———— .Formation of the UJV Group
- .2012** ———— .Change of the company name to ÚJV Řež, a. s.
- .2017** ———— .Transformation project - EGP INVEST, spol. s r.o. split up,
merging with ENERGOPROJEKT PRAHA division

■ Geographical revenue breakdown, 2017

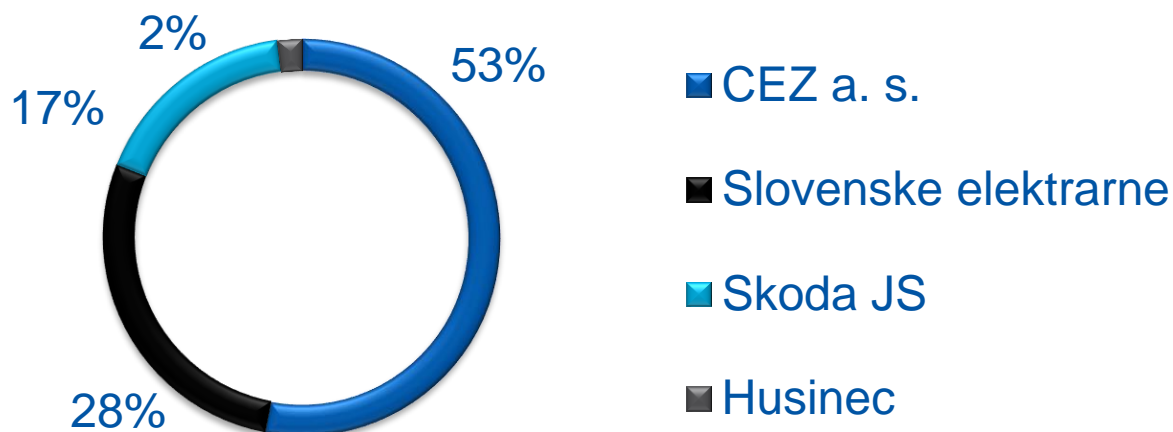


Revenue – 62,3 mil EUR

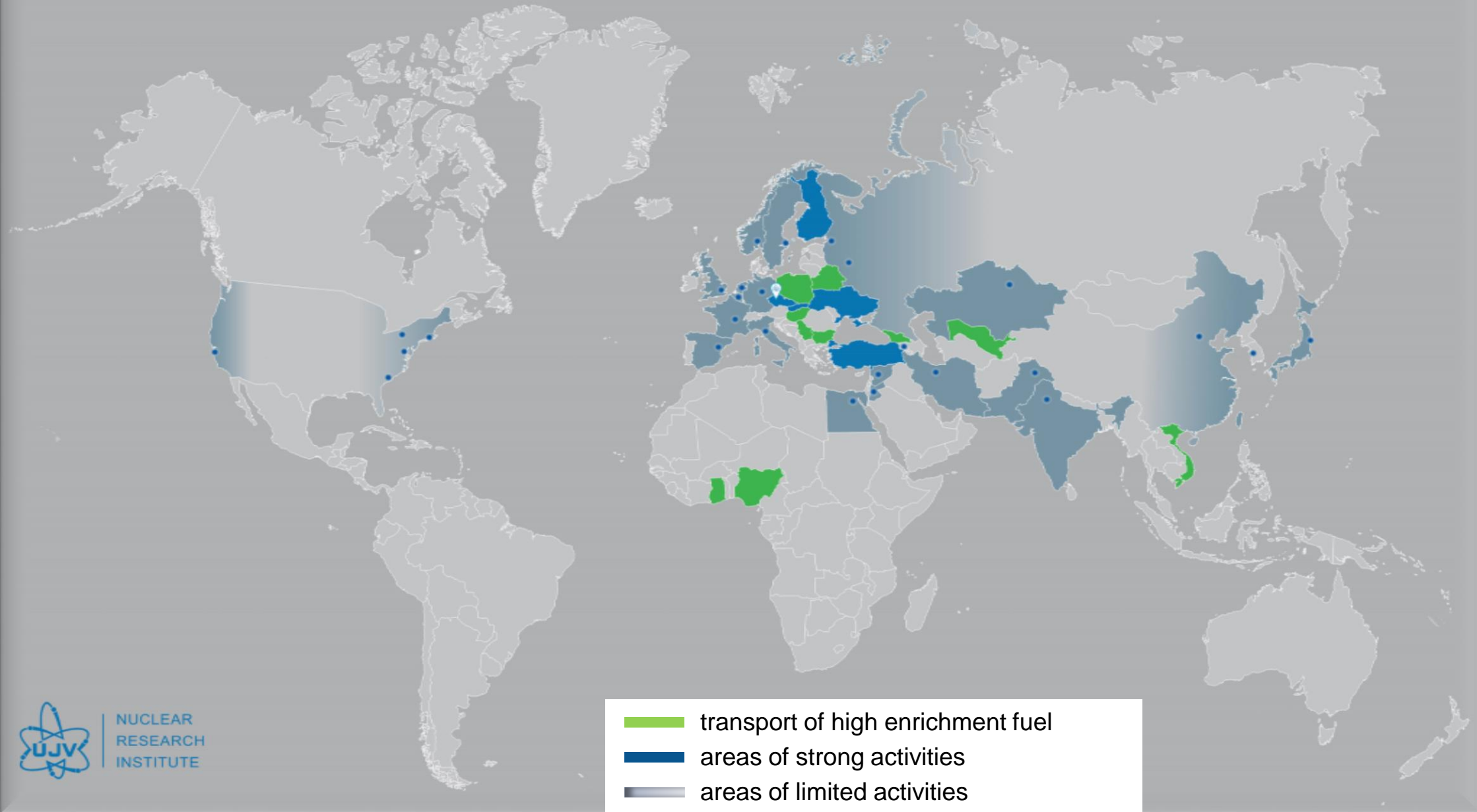
EBITDA – 8,14 mil EUR

Total Assets – 101,2 mil EUR

■ Shareholder structure



UJV Rez WORLDWIDE ACTIVITY



ARMENIA, BELGIUM, BELARUS, BRAZIL, BULGARIA, CHINA, EGYPT, FINLAND, FRANCE, GHANA, GEORGIA, CROATIA, INDIA, ITALY, JAPAN, SOUTH KOREA, JORDAN, HUNGARY, GERMANY, NIGERIA, NETHERLANDS, NORWAY, NEW CALEDONIA, POLAND, RUSSIA, PAKISTAN, SLOVAKIA, SPAIN, SERBIA, SWEDEN, TURKEY, UKRAINE, USA, UZBEKISTAN, GREAT BRITAIN, VIETNAM

Portfolio of Products and Services

■ Designing and engineering activities

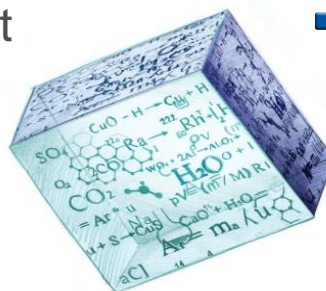
- Feasibility and conceptual studies
- Construction site surveys and specifications
- Documentation within the scope of current legislation

■ Support for the operation of conventional power stations and heating plants

- Optimization of operation and infrastructure
- Greening and modernization studies and projects

■ Support for the operation of nuclear power plants

- Lifetime and efficiency improvement
- Safety, reliability, diagnostics and equipment qualification



■ Radioactive waste and decommissioning

- Radioactive waste management and repositories, spent fuel transportation
- Decommissioning, fragmentation and decontamination services

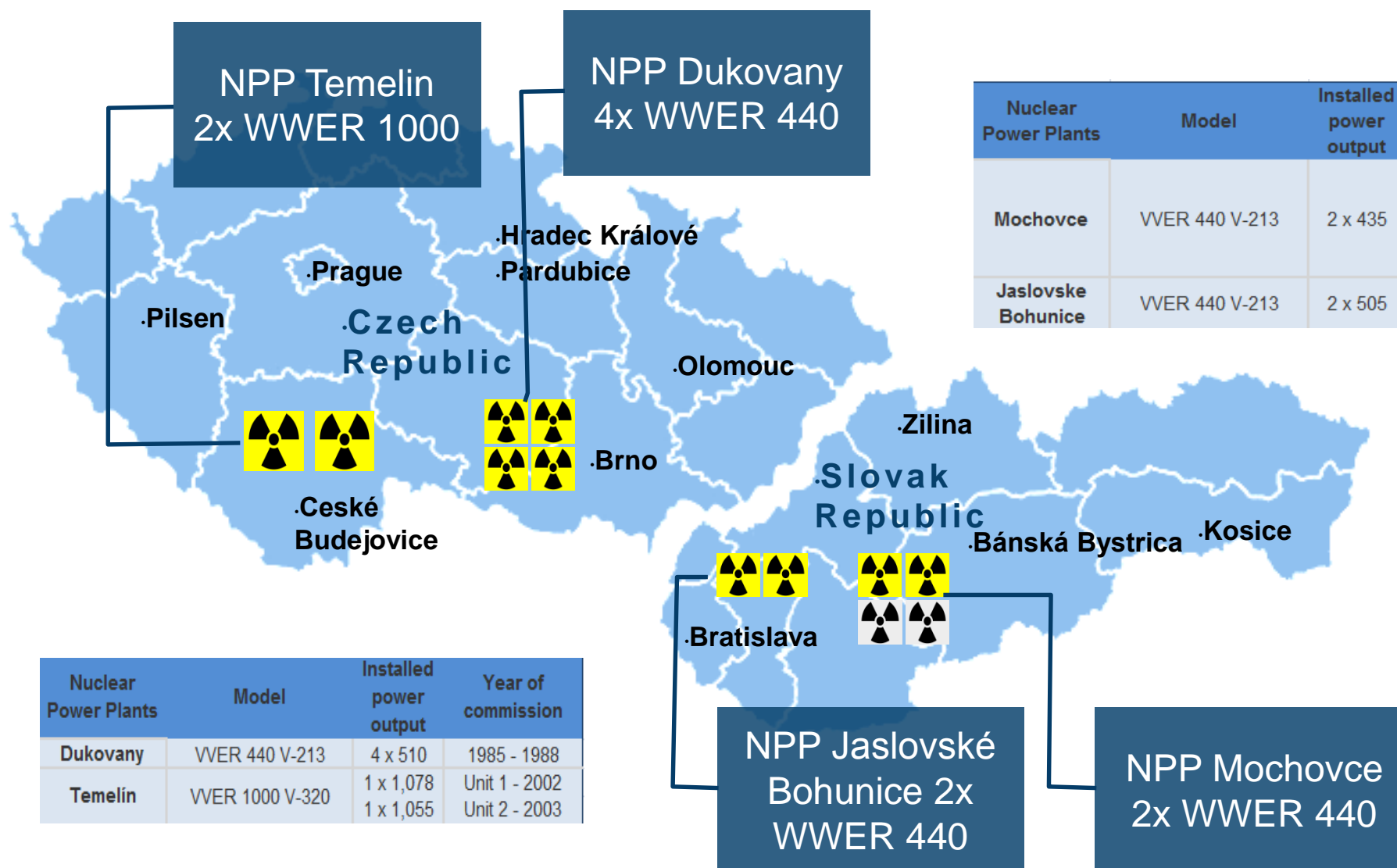
■ Radiopharmaceuticals

- PET and SPECT manufacturing and distribution
- Complete PET centres construction and operation

■ Applied research and development

- Services in the field of nuclear energy and ionizing radiation utilization

Nuclear Energy Sector CR and SR



Nuclear Safety and Reliability

Safety Analysis

- Safety analysis and NPP Licensing support
- Design and Development of new NPP safety evaluation methods including “Best Estimate Approach”

Reactor Physics and fuel cycle support

- Sub-criticality analyses of nuclear fuel transport and storage systems (analyses of storage pools and transport container racks with the implementation of the burn-up credit)
- Development of software solution for monitoring and surveillance of the reactor active zone (SCORPIO)

Diagnostics and Radiation Safety

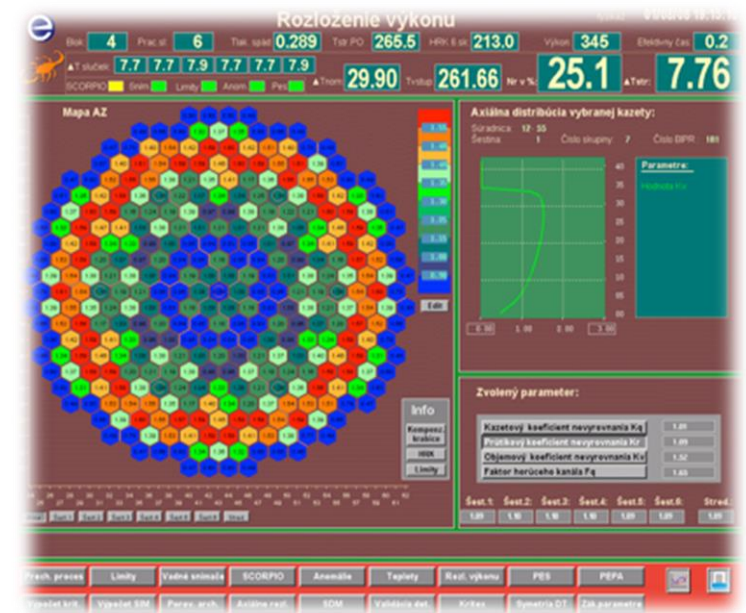
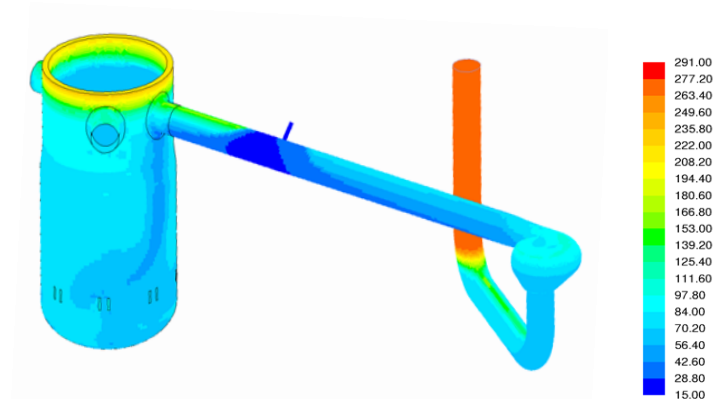
- Operating parameter optimization utilizing mathematical modeling

Severe accidents and Thermo-mechanics

- Analyses, accident management procedures and verification of measures to improve safety
- Thermo-mechanical analyses of fuel rods

Reliability and risks

- Reliability and risk analyses of complex technologies by utilizing of probabilistic methods (PSA)



Fennovoima Long-term Framework Contract

Hanhikivi NPP, VVER-1200,

PWR Reactor AES-2006 Finland

- Investor - Fennovoima Oy
- Supplier - Rosatom Overseas
- Construction - 2018-2023

Provided services

- Evaluation of the safety reports (Preliminary Safety Analyses Report)
- Support for Fuel licensing valuation
- Design of the Severe Accident Simulation model
- Complex analysis of the Fuel rod radioactivity



Integrity and Technical Engineering

Aging management and development of the design analysis documentation

- Strength and lifetime assessment of the NPP critical parts
- Design performance and adjustment of Ageing Management programs
- Design and development of supporting database applications

Material structural and mechanical characteristics and corrosion

- Assessment of the component fatigue lifetime with utilization of the complex infrastructure covering hot and semi-hot cells
- Assessment of the defect root causes

Operational control and control qualification (NDT Controls)

- Long term experience with the performance of the NPP operational controls for critical parts of the primary circuit

Technical support and NPP Maintenance

Radiation chemistry and environment qualification



South-Ukraine and Rovenska NPP

**Successful prolongation of reactor operation Unit 1
South-Ukraine NPP(VVER 1000/302)**

**Expected prolongation of the reactor operation of
Rovenska NPP – Unit 3 (VVER 1000/320)**

- Preparation of the new licensing documentation –strength and lifetime
- Design of the new life time management program

**Enhancement and recalculation of the number of
operational regimes Unit 1 and 2 Rovenska NPP
(VVER 440)**



Long Term Operation Strategy of the Ukraine NPPs

Client: NAEK Energoatom

- ÚJV Řež – Leader of the advisory consortium
- Assessment and recommendation regarding the lifetime and aging methodology documentation
- Processing of 12 aging management programs for 12 components of the South Ukraine and Zaporizhia NPP
 - Pressure vessel and inner reactor parts
 - Steam-generator
 - The body of the main circulation pump
 - Spent fuel storage pool
 - Prestressing containment system and others



Radioactive Waste and Decommissioning

RAW Management

- Complex services including collecting the waste at the customer's, transfer,
- dismantling, processing, conditioning, storage and disposal
- Processing and solidification of RAW (90% institutional RAW in the CR)

Transport of spent nuclear fuel from research reactors

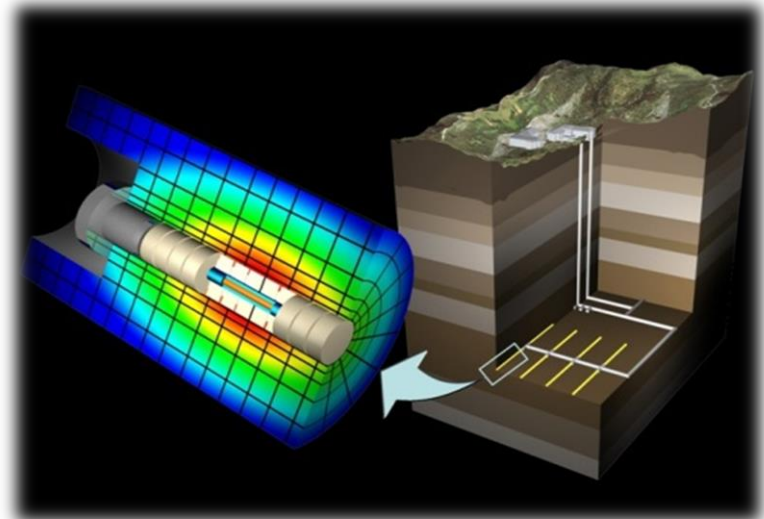
- Long term contract with the US Department of Energy covering repatriation of HEU to Russia and China



Decommissioning, fragmentation and decontamination

Permanent deep geological repository in the CR

- Head technical advisor to the national RAW disposal authority SURAO



Radiochemical analyses, radiation monitoring

- Accredited measurements to determine activity

Shipment of Spent Nuclear Fuel

Support for shipment of high enriched spent fuel from research reactors to the country of its origin

US DOE – Russian Federation – IAEA program

Executed shipments from countries:

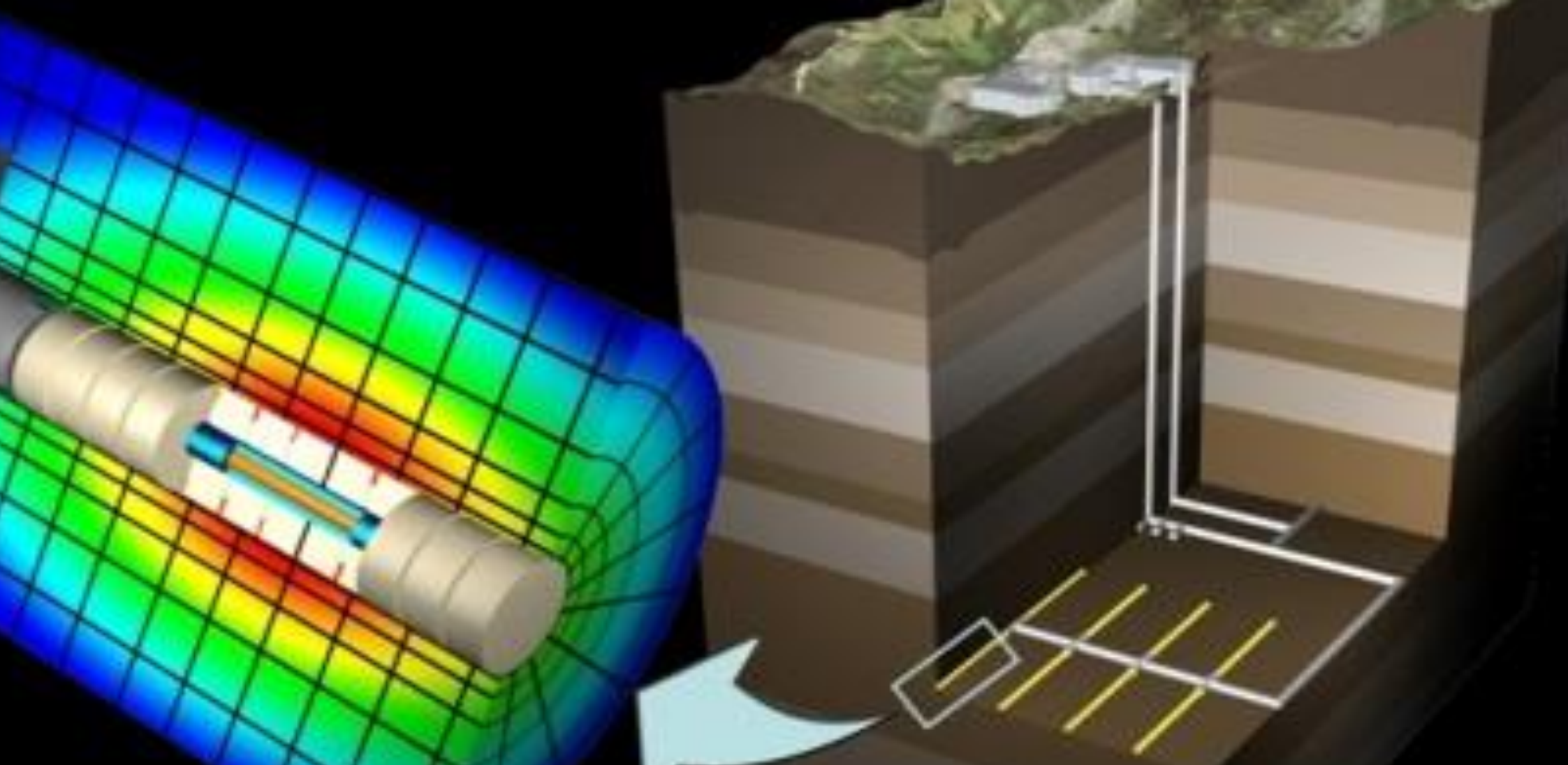
- Czech Republic,
- Poland, Ukraine, Belarus,
- Serbia, Hungary,
- Bulgaria, Vietnam,
- Uzbekistan, Georgia, Ghana

Shipment under preparation

Chinese MNSR reactors

- 2017 Nigeria
- 2017+ Pakistan, Iran, Syria





Fuel Cycle Chemistry and Waste Management

Permanent deep geological repository for radioactive waste

Design, Construction, Engineering Services

Feasibility and conceptual studies

- Design of the technical concept solutions across various sectors

Basic and Detail Design

Technical calculations and analyses using special SW products in:

- Nuclear, strength, hydraulic and thermo-hydraulic calculations
- Economic and financial analyses
- Electrical calculations
- Calculations of civil structures, statics and dynamics
- Project management, budgets, database graphics and design

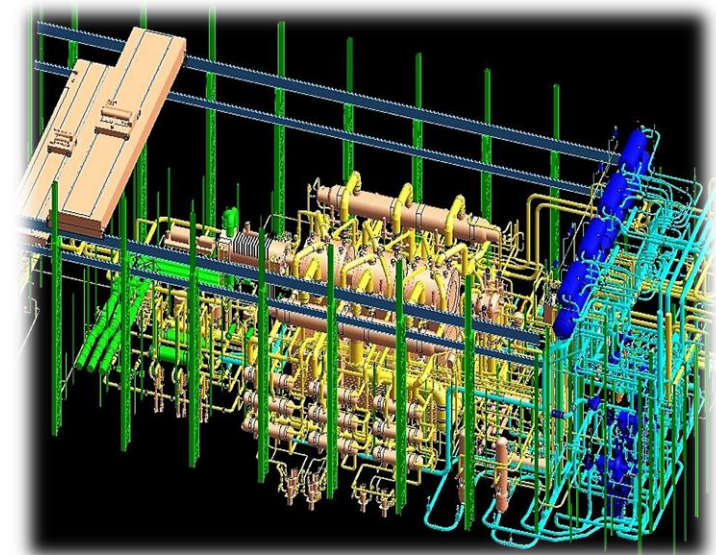
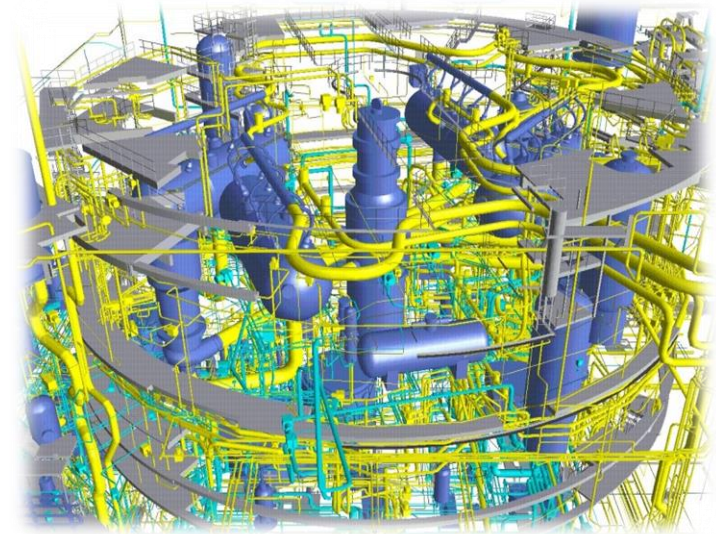
Technical support services for Nuclear Authorities

As-Built documentation in all professions

Elaboration of the EIA and IPPC documentation

Investor technical support and supervision

Data processing and associated services



NPP Temelin, NPP Dukovany

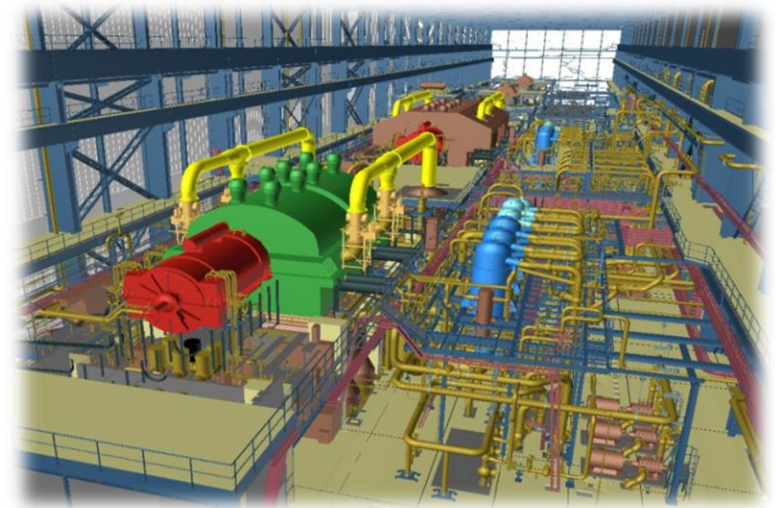
General Designer of both NPPs Dukovany and Temelin

Provided services

- Design and development of the complex technical documentation (feasibility study, land and construction permit documentation, basic and detail design of specific parts etc.)
- Elaboration of the safety reports and studies together with all the necessary analysis)
- Investor supervision services

Additional services

- Technical documentation for the I&C system replacement
- Operational technical support
- Feasibility study– decommissioning
- Conceptual study for RAW treatment
- HV Grid connection



NPP Mochovce – Unit 3,4

Client: Slovenské elektrárne, a.s.
Enel Ingegneria s.p.a.

Role: General Designer

Duration: 2006-to date

Total investment cost est: €5.1bn

Direct contract value: €40 mil

Provided services :

- Detailed Safety Concepts and update of the Basic Design (DOSMO Consortium)
- Technical and consulting services during the detail design, construction, erection, commissioning and start up phase.
- Author Supervision Services
- Conventional Island – Multidisciplinary Engineering Services



Radiopharmaceuticals

Production and distribution of radiopharmaceuticals

- PET radiopharmaceuticals(FDG - glucose labeled ^{18}F)
- 3 cyclotrons representing the largest production capacity of the positron emitters in the CR
- Largest provider of the FDG in the CR

Radiopharmaceuticals production processes quality control

- Assessment of the chemical and physical processes

PET centers in the CR

- Operation of three PET center in the CR(Prague, Brno, Rez)
- Training and education of the PET center operator staff

Complex delivery of tailor made PET center design

- Providing complex design and relevant certification of the whole production center
- PET center employee training

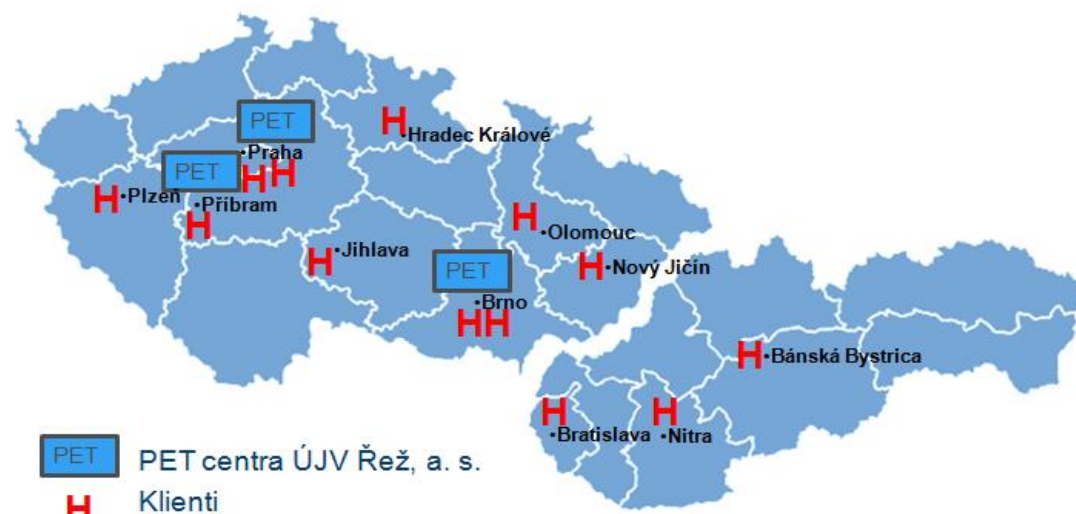
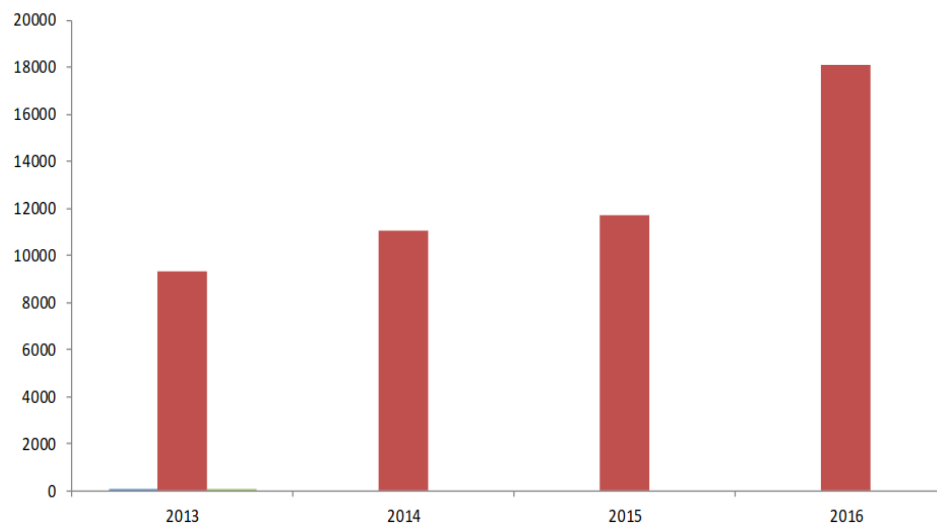


Radiopharmaceuticals

Research and Development of new radiopharmaceuticals

- ^{11}C – Methionin in the registration process
- ^{18}F – Chaolin in the registration process
- ^{18}F – NaF registered

Production and sales of the since 2013 Fludeoxyglukosy [GBg]



Operation Support to Conventional Power and Heating plants

Optimization of the PP and HP operations

- Studies and documentation for complex units or individual parts

Environmental studies, greening and modernization studies and projects

- Reducing the environmental impact and increase efficiency
- All documentation levels and related engineering services

Optimization of the network infrastructure

- Optimization of electrical networks and its security
- Optimization of the fuel transportation

Cogeneration of electricity and heat and SMART energy

Water construction, reclamation

- Studies and environmental analysis



R&D and Innovation Activities

Corium retention, stabilization and ensuring the long-term integrity of the Temelin NPP containment

- Finalization of the calculation model for the In Vessel Retention strategy, construction of the THS-15 experiment

Hydrogen Technologies

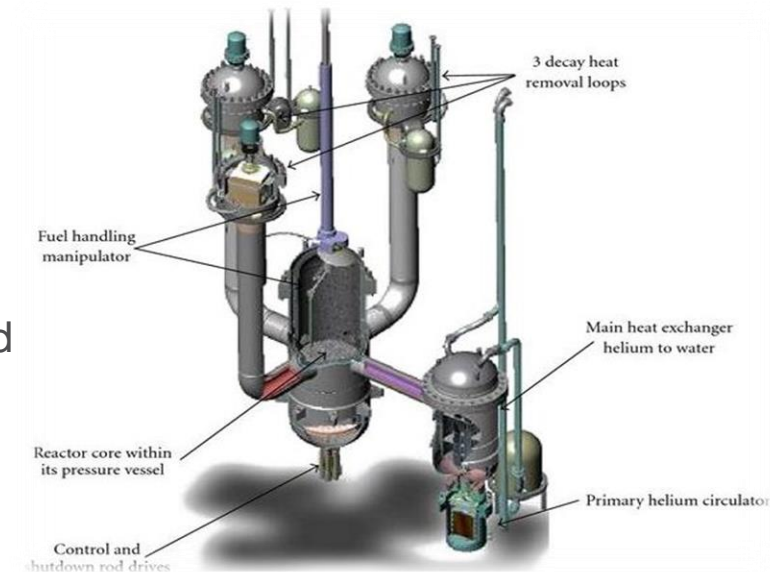
- Use of hydrogen in the field of transportation - Hybrid vehicles and vehicle control systems (TriHyBus)
- Energy accumulation
- Systems for CO₂ capture – CCS
- Founding member of the Czech Hydrogen Platform (HYTEP)

Research and development of materials for nuclear and non-nuclear use

- Evidence and temporary storage of irradiated construction materials and specimens from irradiation experiments, RPV surveillance programs and decommissioned NPPs
- Material experiments in the hot and semi-hot cells

IV Generation Fast Reactors

- Allegro project –technical solution of a demonstrator for the Fast Gas Cooled IV Generation Reactor



■ Projects

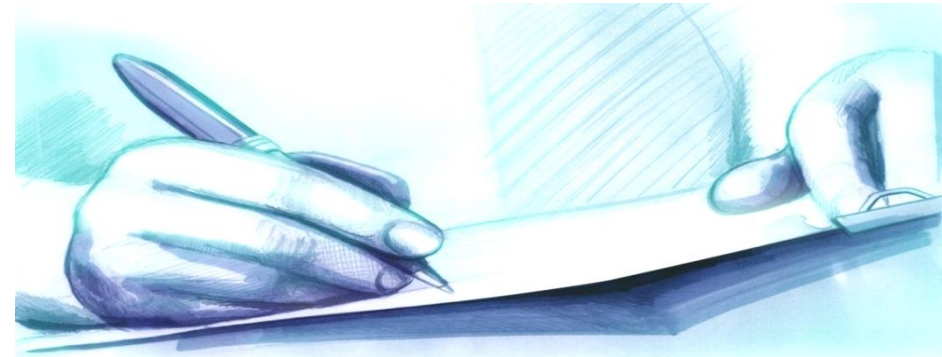
- International Atomic Energy Agency (IAEA), Vienna
- Nuclear Energy Agency OECD/NEA, Paris
- EuropeAid projects

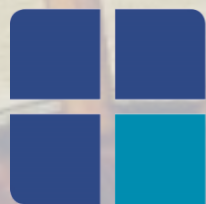
■ Members

- NUGENIA association (founding member)
- SNETP (Sustainable Nuclear Energy Technology Platform)

■ EU programs

- Horizon 2020
- Nuclear Safety Cooperation Instrument Projects
(former PHARE and TACIS)





UJV Group

TECHNOLOGY | INNOVATION | PEOPLE

Hlavní 130 Rez, 250 68 Husinec
Czech Republic
+420 266 173 427
+420 798 330 423