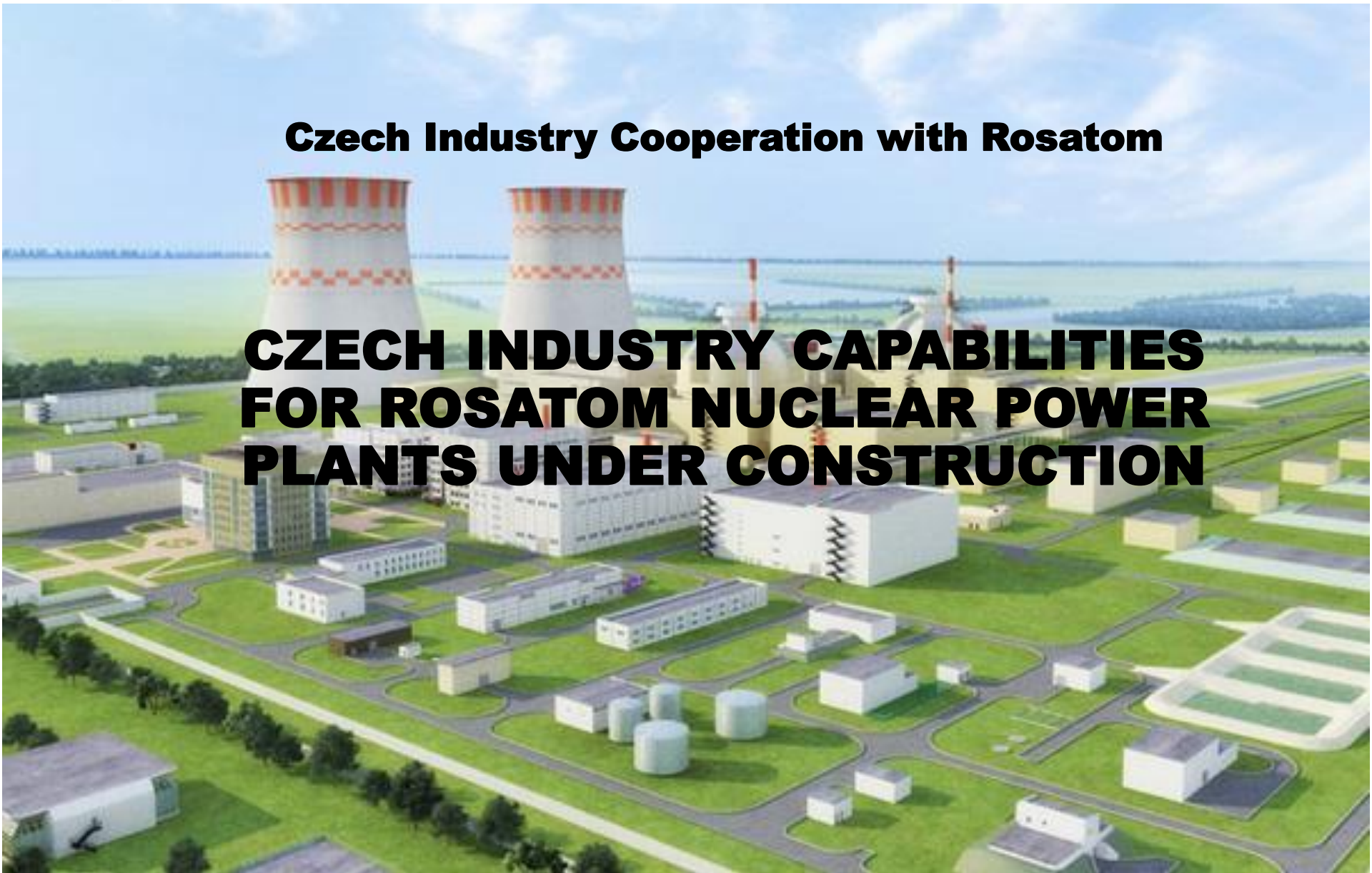


Czech Industry Cooperation with Rosatom

**CZECH INDUSTRY CAPABILITIES
FOR ROSATOM NUCLEAR POWER
PLANTS UNDER CONSTRUCTION**



DEEP HISTORY OF COOPERATION

NPP	Number and type of reactors	Present state
Bohunice A1, Slovakia	1 x HWGCR (150MWe)	under decommissioning
Paks, Hungary	4 x VVER 440 / V-213	in operation (Unit 1 - 1983, Unit 2 - 1984, Unit 3 - 1986, Unit 4 - 1987)
Bohunice V2, Slovakia	2 x VVER 440 / V-213	in operation (Units 1&2 - 1985)
Dukovany, Czech Republic	4 x VVER 440 / V-213	in operation (Unit 1-1985, Unit 2 - 1986, Unit 3 - 1987, Unit 4 -1987)
Nord, Germany	3 x VVER 440 / V-213	under decommissioning
Zarnowiec, Poland	4 x VVER 440 / V-213	project cancelled
Mochovce, Slovakia	4 x VVER 440 / V-213	Units 1,2 in operation since 1998, 2000, resp. Units 3,4 - to be completed in 2018-2019
Belene, Bulgaria	1 x VVER 1000 / V-320	project cancelled, reactor installed in Unit 4 at Kalinin NPP, Russia
Temelín, Czech Republic	2 x VVER 1000 / V-320	in operation (Unit 1 - 2002, Unit 2 - 2003)

Further projects executed by Czech Industry

- Maintenance activities for these NPPs
- Modernization projects in I&C area
- Power output increasing projects
- Post-Fukushima improvements
- Spare-parts manufacturing and deliveries

RECENT ROSATOM PROJECTS



**Russia, Rostov NPP
Unit 2 - 1000 MW**

2010



**Russia, Kalinin NPP
Unit 4 - 1000 MW**

2012



**Russia, Rostov NPP
Unit 3 - 1000 MW**

2014



**Russia, Novovoronezh
NPP II, Unit 1 - 1200 MW**

2016

2011

**Iran, Buser NPP
Unit 1 - 1000 MW**



2013

**India, Kudankulam NPP
Unit 1 - 1000 MW**



2015

**Russia, Beloyarsk NPP
Unit 4 – 864 MW**

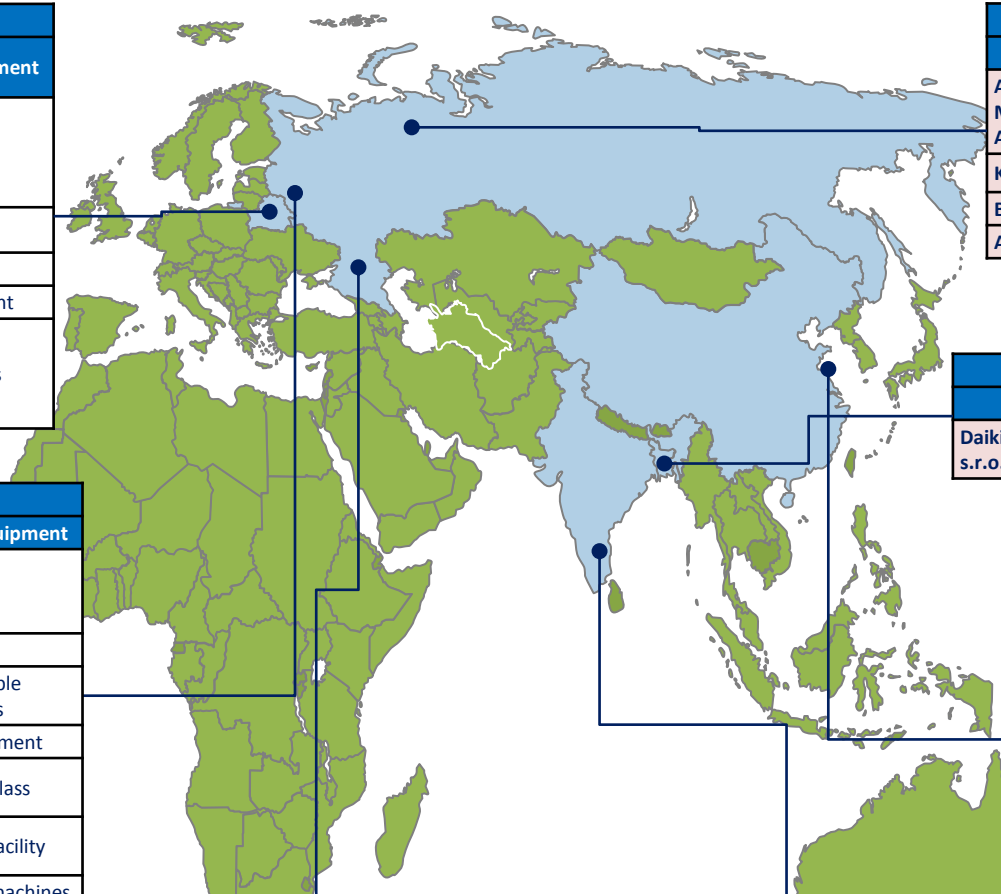


2016

**India, Kudankulam NPP
Unit 2 - 1000 MW**



PROJECTS WITH CZECH PARTICIPATION



Ostrovets NPP	
Company	Type of equipment
ARAKO spol. s r. o. MOSTRO a. s. ARMATURY Group a. s. MSA, a. s.	armature
SIGMA GROUP a. s.	pumps
LAVIMONT BRNO, a.s.	piping
KRONA	lifting equipment
SKLÁRNÝ MORAVIA, a.s. KAVALIERGLASS, a.s. VITRUM, spol. s r. o. PRECIOSA ORNELA, a.s.	laboratory glass

Kalinin NPP	
Company	Type of equipment
ARAKO spol. s r. o. MOSTRO a. s. ARMATURY Group a. s.	armature
KAVALIERGLASS, a.s.	laboratory glass
Belet a.s.	lifting equipment
ABO valve, s.r.o.	filters

Rooppur NPP	
Company	Type of equipment
Daikin Device Czech Republic s.r.o.	HVAC

Tianwan NPP – 1,2	
Company	Type of equipment
MSA, a. s.	armature
LUTOS	compressors
Modřanská potrubní	pipeline components

JE Tianwan-3,4	
Company	Type of equipment
MSA, a. s.	armature
LUTOS	compressors
SIGMA GROUP a. s.	heat transfer equipment
Brno	electrodriives to compressors

Novovoronezh NPP-II	
Company	Type of equipment
ARAKO spol. s r. o. ARMATURY Group a. s. MSA Rimera group	armature
SIGMA GROUP a. s.	pumps
KABELOVNA KABEX a. s.	hermetic cable penetrations
KRONA	lifting equipment
SKLÁRNÝ MORAVIA, a.s. KAVALIERGLASS, a.s.	laboratory glass
Kavalier Brněnská Druževa	laboratory facility
PROMA	machining machines

Rostov NPP	
Company	Type of equipment
ARAKO spol. s r. o. MSA, a. s.	armature
Sigma	reagents

Kudankulam NPP-1,2	
Company	Type of equipment
ZPA Pečky, a.s.	electrodriives
MAPOL s.r.o. MSA, a. s. Minerva	armature

It represents almost 190 M Euro contractual basis and cooperation

Mochovce NPP 3&4 Completion Project:

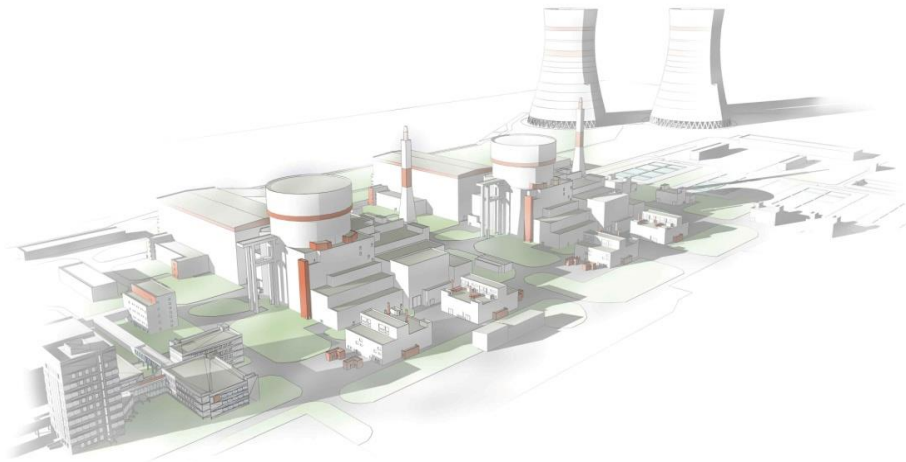
- Customer – Slovenské elektrárne /ENEL
- Main Czech participants: UJV/EGP, EGP-INVEST, ŠKODA JS, Vítkovice, Modřanská potrubní, Sigma Lutín, ČKD DIZ, Doosan Škoda Power, ZAT, Chemcomex, AF Consult and many others,
- Scope of supply:
 - adjustment of the Russian design to meet the Slovak and EU legislative
 - elaboration of the safety documentation for the Slovak regulatory body (UJD)
 - preparation of documentation for the respective state administration bodies
 - DD development
 - component procurement and manufacturing
 - site installation
 - testing and commissioning



Consortium ŠKODA JS – JSC Atomstroyexport – OKB Hidropress

In co-operation with Rosatom there have been prepared Temelin 3&4 Bid parts as follows :

- adjustment of the Russian design to meet the Czech and EU legislative
- elaboration of the safety documentation for the Czech regulatory body (SUJB)
- preparation of documentation for the respective state administration body
- preparation of Supplier's model and negotiation with suppliers
- Basic Design adaptation acc. to customer's requirements
- elaboration of DD, site/installation design, start/up documentation, respective calculations
- project management incl. IMS (on Intergraph products basis)
- qualification documentation of supplies
- on-site facilities
- site management
- QA management



CPIA members have the required resources for EPC Project execution covering the following disciplines:

- Mechanical, Electro, I&C and Civil Design
- 3D Model for Design Development and Coordination (PDMS)
- Installation Design
- Calculations – all key disciplines (thermohydraulic, strength analyses, physics, radiation safety)
- Quality Assurance
- Quality Surveillance and Expediting
- Scheduling
- Project Controlling and Reporting
- Contract Management
- Site Management
- Commissioning
- Project Office Concept for effective Project Administration and Management
- Legal Services

CPIA members have the required resources for EPC Project execution covering the following disciplines:

- The core teams consist of senior engineers with sizeable, 25 years continuous experience on NPP projects in the Czech and Slovak Republic,
- this valuable and seldom knowledge is being transferred to a large number of young engineers representing the new generation of nuclear experts ready to take on new challenges,
- in all disciplines the know-how is not limited to design and delivery of standard CPIA products but is able to realize complex project structures
- The engineering capabilities are not only substantially enlarged by the number of resources but also by the new functions required for modern and effective management of large projects

CPIA members implement new, modern engineering and management tools and principles & procedures for the engineering and project management

- Design development and engineering coordination by using the 3D models
- All engineering SW tools implemented and properly connected between each other (CAD systems, IDEA-S, AutoPipe, PDMS, Intergraph etc.)
- Engineering planning and management supported by EPS system
- Today EPS tool is already properly connected with planning tool
- Compliance management system to assure that all Contract requirements (technical, regulatory, commercial, functional) will be met
- Controlling and risk management system using SW tool
- In accordance with the current quality management requirements, all processes are structured and managed as a part of one integrated enterprise management system

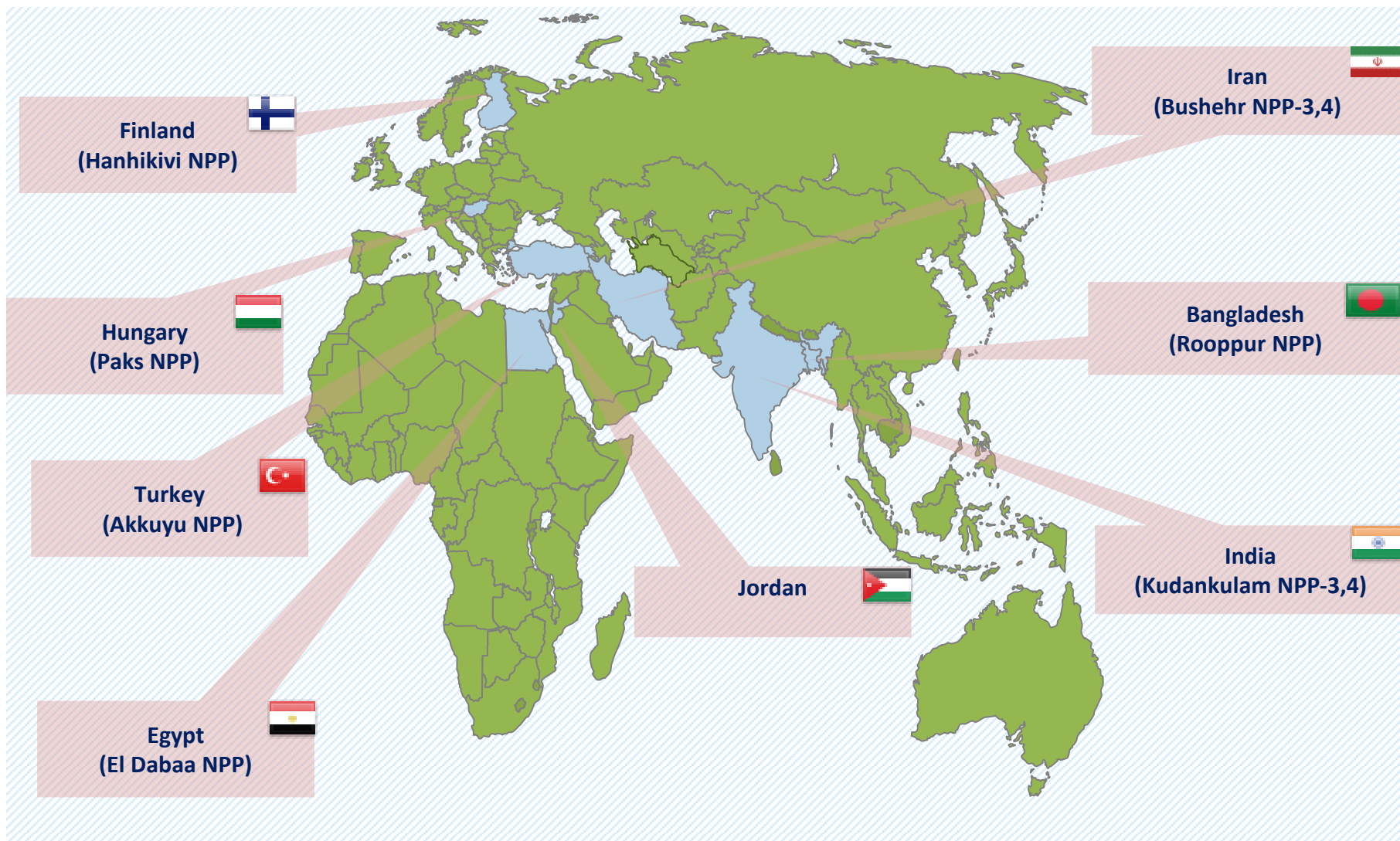
CPIA aims at:

- further integration of essential suppliers in the Czech nuclear industry
- defining, developing and implementing modernized project and engineering management across the overall nuclear supplier model in order to prepare future management system
- preparing Czech nuclear suppliers for the future nuclear projects in Europe

Czech nuclear industry

- is capable to manufacture all essential primary circuit components excl. main circulation pumps,
- has a wider coverage area than piece supplies only, i.e. ensures „turn-key“ supplies of complete capital plants incl. engineering and project management
- has learned experience with modernization and services of operating NPPs in the Czech Republic, Slovakia, Hungary, Bulgaria, Finland, Armenia and the Ukraine,

POTENTIAL PROJECTS FOR COOPERATION



- We are always respecting the local industry and capabilities it can be provided**
- We are ready to modify our deliveries to be in line with the local requirements and local needs**
- We are ready to modify the supplier models as well**
- We are even ready to establish new supplier models if necessary and required**
- We are ready to help in local industry development**
- To provide professional services and real added value**

Premise:

The Paks-II NPP Project must be prepared in accordance with the European and local legislation to be acceptable in the EU

- We are ready (UJV Řež/ EGP, SKODA JS) to provide consulting services for harmonization of the project documentation being elaborated by the Hungarian party in accordance with the Hungarian and European legislation,
- we will use our experience learned from the preparation of the Temelín NPP/3&4 Completion Project and the Mochovce NPP/3&4 Completion Project (currently in progress),
- we expect cooperation with the competent Hungarian partners, who know in detail the local customs and regulations.

Czech party is able to provide the necessary support to this extent:

- Evaluation of the content and formal structure processed documentation in accordance with the requirements of the Hungarian nuclear regulatory body (HAEA),
- review of the documentation compliance with the requirements of the European and Hungarian legislation incl. harmonized EN standards,
- review of technical documentation in respect of specific processes and selected technical equipment according to EU legislation,
- elaboration of guidelines for adaptation of the documentation to be submitted to the Hungarian state regulatory body,
- interaction with the General Designer in adapting the design and licensing documentation
- final assessment of the documentation before submitting to HAEA and other respective state supervisory authorities
- verification calculations
- analysis of possible comments from the concerned authorities and HAEA, recommendations for incorporation.

LIST OF POSSIBLE DELIVERIES FROM CPIA

NUCLEAR ISLAND, TURBINE ISLAND AND BoP

- Primary circuit system
- Fuel handling system
- Nuclear auxiliary systems
- Emergency systems
- Radwaste treatment and storage station
- Emergency diesel-generation station
- Essential service water system, Intermediate cooling circuit
- Internal connecting piping
- HVAC
- Lifting equipment



- Turbogenerator with auxiliaries
- Condensate system
- Regeneration system
- Feed water system
- Condensate polishing system
- TI cooling water systems
- TI Inside and outside pipelines
- Self consumption heating station
- Fire-fighting system
- HVAC
- Cranes and Hoists



- Pump station of cooling water
- Water treatment system
- Chilled water plant
- Demineralisation water plant
- Boiler auxiliary plant
- Pumping station of fire-fighting and charging water
- Compressor station
- Gas management system
- Non-safety diesel generator station
- Diesel and oil management systems

Czech firms are capable to offer supplies of systems and particular components for both nuclear and non-nuclear NPP parts in the following scope:

- Elaboration of Detail Design, site-installation, testing and commissioning documentation
- Support in Multi-D coordination – schedule, EPS planning, procurement plan, site management etc.
- Safety analyses
- Calculations and analyses (thermohydraulic, stress analysis, neutron physics, radiation safety, verification analysis)
- Qualification documentation for supplied equipment
- Data management (CMIS)
- Component procurement
- On-site facilities
- Site management
- Elaboration of erection documentation
- QA management



-Full I&C Systems Integration

- definition of appropriate supplier model**
- safety systems deliveries in cooperation with the world serious partner**
- normal operation delivery**
- Configuration Management System delivery (CMIS)**
- special systems delivery**
- engineering and licencing documentation elaboration**
- architecture adaptation**

EPC I&C Delivery

THANK YOU FOR YOUR ATTENTION