



{ POWER OF ALLIANCE }

ALLIANCE OF CZECH SUPPLIERS  
FOR NUCLEAR POWER PLANTS







## CZECH POWER INDUSTRY ALLIANCE z.s. (CPIA)

CPIA was established in September 2015 as a non-exclusive partnership of companies, who are active in design, manufacturing, deliveries and installations in nuclear power plant projects. Czech industry has a long record of activities in nuclear sector, in history 90% of NPP equipment were produced domestically. The know-how and craftsmanship remained, so the companies are capable of deliveries of various commodities for NPP worldwide.

CPIA is lead by ŠKODA PRAHA, a leader with unique experience of being the EPC contractor of all domestic nuclear units. CPIA is also supported by Czech government as it meets the official requirements from National Action Plan for development of nuclear power.

## EXPORT COORDINATOR OF CZECH DELIVERIES FOR NUCLEAR POWER PLANTS



### REGULAR MEMBER

### ASSOCIATE MEMBER

 Doosan Škoda Power	 I.B.C. PRAHA spol. s r.o.	 MODŘANY power	 MSA RIMERA GROUP
 SIGMA	 ŠKODA JS a.s.	 VÍTKOVICE MACHINERY GROUP	

 ALTA	 EKM	 KRÁLOVOPOLSKÁ RIA
 OSC	 ZAT	 ZVVZ



# CONTENT

INTRODUCTION .....	2
ŠKODA PRAHA .....	5
ALTA .....	6
DOOSAN ŠKODA POWER .....	7
ELEKTRO KROMĚŘIŽ .....	8
I.B.C. PRAHA .....	9
KRÁLOVOPOLSKÁ RIA .....	10
MODŘANY POWER.....	11
MSA .....	12
OSC .....	13
SIGMA GROUP .....	14
ŠKODA JS.....	15
VÍTKOVICE .....	16
ZAT .....	17
ZVVZ GROUP .....	18

## ŠKODA PRAHA a.s.

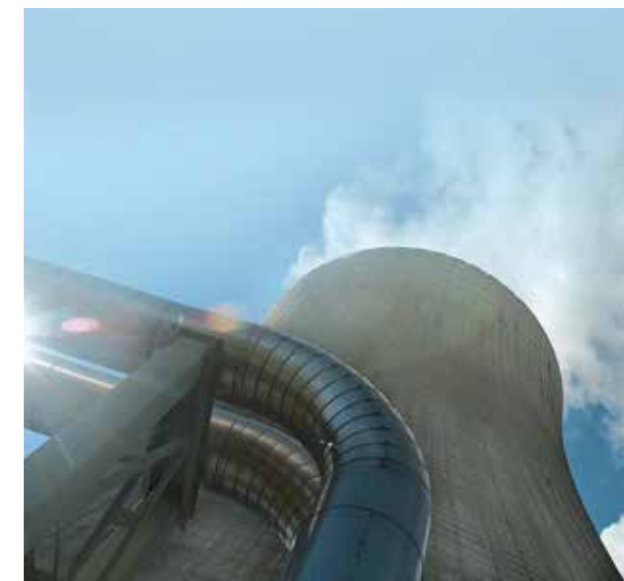


Škoda Praha a.s. (ŠP) is a traditional Czech EPC contractor, which supplies both conventional and nuclear power plants projects, preferably its conventional islands. Its scope includes design, equipment supply, construction and commissioning. ŠP was the supplier of all Czechoslovak nuclear units and acted as contractor for safety improvements and power uprating program in recent years.

ŠP provides adequate know-how and human resources for either consulting services or construction of partial deliveries for nuclear power plants. Its foreign projects are often supported by export financing.

### REFERENCES

1980	EPC deliveries Jaslovské Bohunice 2x440MW
2000	Mochovce 2x440MW
2002	Dukovany 4x440MW (1985), Temelin 2x1000MW)
2012	Power uprate Dukovany 440-500MW
2013	Safety measures Temelin and Dukovany







**ALTA, a.s. INCLUDED COMPANIES**

- ŠKODA MACHINE TOOL a.s.
- TOS KUŘIM-OS, a.s.
- ČKD BLANSKO-OS, a.s.
- SE-MI Technology, a.s.
- ALVEL, a.s.
- DMS, s.r.o.

ALTA – Czech commercial-engineering company, operates mostly in mechanical engineering, metallurgy, power engineering and also supplies technological equipment for energetics and water management.

ALVEL – The company provides top scientific and engineering services in section of nuclear power industry (cooperation with russian company TVEL and with subsidiaries of TVEL).

DMS – international transport of hazardous materials and radioactive materials, including nuclear materials, RAO and irradiated nuclear fuel.



**REFERENCES**

- Since 1993 Supply of nuclear fuel for Nuclear Power Plants in Czech Republic and in Slovakia, in 2014 also for Ringhals Nuclear Power Plant (Sweden)
- 2007–2015 Support developmental program fuel TVSA-T and modernization of equipment for controlling and repairing irradiated nuclear fuel for Temelín Nuclear Power Plant (TVEL)
- 2009–2014 Repatriation irradiated nuclear fuel of research reactors (ÚJV Řež, US DoE, FCJaRB RF)



**DOOSAN ŠKODA POWER, Ltd.**

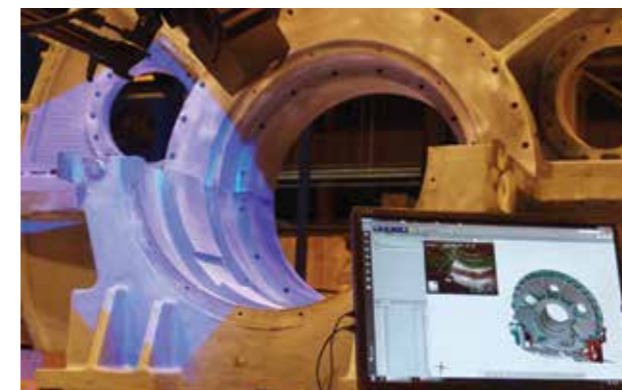
Member of Doosan Group

- Global leader in steam cycle design and high performance steam turbines
- Wide range of steam turbines from 10 MW to 1200 MW
- For all types thermal power plants in various applications including CSP
- Supplies saturated steam turbines for nuclear power plant from the sixties of the last century
- Since 2005–September 2015 to DSPW won new orders with an output of 11.8 GW, which makes 4.1% of the available world market (285.4 GW)
- High efficiency combined with extreme reliability and operational flexibility

- Non OEM retrofit and modernization
- Cooperation with premiere global EPC contractors
- Investment into the own global R&D centre to develop our technologies, products and systems
- More than 110 years of experience of producing steam turbines in own design

**REFERENCES**

Supply of turbines for units VVER 440 (Jaslovské Bohunice, Mochovce, Dukovany) and VVER 1000 (Temelín)







## SUBJECT OF ACTIVITY

- Manufacture of switchboards
- International transport
- Designing work
- Assembly and servis of specified electrical equipment

## PRODUCTION

- Switchgear rooms deliveries including bridges
- Transitional and corner fields
- Supply transformers
- Compensation switchboards
- Secondary switchboards
- Network analysis

## SPECIFIC SOLUTIONS

- Branch standards
- Container switchgear rooms
- Stainless steel cubicles
- Special surface treatment
- Vibration and shake resistant devices
- Protection to IP 67
- Space segregation of the circuits with degree of separation EKM-F2A, up to EKM-F4B
- High safety for the staff instant replacement of components during operation
- Switchboard is made for danger of explosion area. In year 2010 – 2013 has EKM produced cca 500 pieces of these switchboards
- According to standards for traction vehicles
- Manufacture cabinets Halogen free
- Execution for tram Škoda 15T for city Prague

## REFERENCES

### NPP Dukovany

- 2001-4 exchange of switchboards for dieselgenerators
- 2004-7 exchange of essential switchboards
- 2007-9 Modernisation of I&C

### NPP Temelín

- 2007 switchboards of data center
- 2008 data center

### ÚJV Řež

- 2005 switchboards for dieselgenerators
- 2008 reconstruction of the switchboard in the building 254



## PRODUCT RANGE FOR NUCLEAR POWER PLANT

- Gate valves (board, wedge) up to DN 1200, PN 40 MPa
- Ball valves (trunnion, floating ball) up to DN 1000, PN 16 MPa
- Globe valves from DN 3/8" to 12", PN 1,6 to 40 MPa
- Butterfly valves (centric, 2-eccentric, 3-eccentric)
- Valves (shut-off, change over, control)
- Non-return, swing check valves DN 15-1200, PN 1,6 to 40 MPa
- Filters, fittings, actuators and gearboxes
- Stainless steel, carbon steel, steel alloys







## KRÁLOVOPOLSKÁ RIA

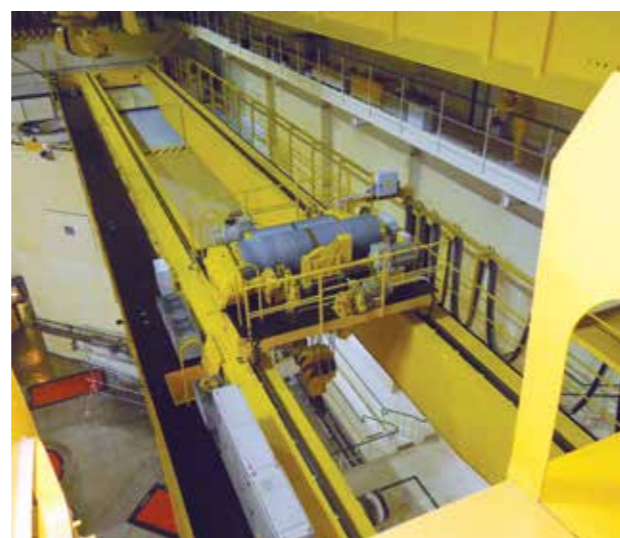
continues in the established longstanding tradition of the company founded in 1889.

The company is focused on the preparation and implementation of turn-key operations, deliveries of technological units and operation equipments in the following areas:

- Power Energy and Nuclear Energy
- Petrochemical, Chemical Industry
- Water and Waste Water Industry

## REFERENCES

- 2014 NPP Dukovany – replacing oil engine separators for operation of DG stations 4-6
- 2013 NPP Dukovany - implementation of modifications in the solution of severe accidents (prevention of the leakage of the melt out of the hermetic space)



- Leading Czech supplier of piping systems for power engineering
- 100 years of experience in piping systems
- Historical names: SIGMA Modrany, Modranske Strojirny, Modranska Potrubni
- Experience in nuclear power since 1958
- Piping systems supplied for more than 330 power plant units with total output exceeding 50 000 MW
- Complex services from detail design to installation and service
- All material grades including hi-alloy and stainless steel
- Specialist for supercritical steam parameters and nuclear power piping
- Production according to European, American and Russian standards

## CERTIFICATES

### Quality Management Systems

- ISO 9001:2008
- ISO 14001:2005
- KTA 1401

### Product Certificates

- ASME CODE – Stamps U and S
- PED 97/23/ES – Modul G
- DIN EN ISO 3834-2:2006
- ADM 2000 – HP0, EN 13445, TRD100, TRD201

### National Certifications

- Belorussia - „GOSPROMNADZOR“
- Ukraine - „NAEK Energoatom“

## REFERENCES

### Supplies of piping and valves for 22 NPP units

- 2014 NPP Mochovce 2x440 MW (design, prefabrication and installation of piping in turbine and nuclear island including primary loop, volume compensation and intermediate cooling systems)
- 2010–2012 Supply of valves for NPP Kursk, Rostov, Kalinin, Smolensk
- 2001 NPP Temelin 2x1000 MW (design, prefabrication and installation of piping in turbine and nuclear island including primary loop, volume compensation and intermediate cooling systems)







MSA, a.s., member of RIMERA Group, ranks among the world leading manufacturers of industrial valves. Production program includes ball valves, gate valves, swing check valves and globe valves according to internationally recognized standards such as ČSN, API, ANSI, DIN and GOST.

**MSA industrial valves are designed for:**

- oil distribution and processing
- natural gas distribution and processing
- nuclear and conventional power plants, heat distribution
- water plants

Our production program also includes special valves for nuclear power plants that we have been supplying to some countries since 1970s.

Company facilities provide extensive production and technological capacities equipped with high capacity modern production lines. Valves meet the most demanding production and quality requirements including testing of valves in high-pressure testing room and facilities for non-destructive



tests. MSA, a.s. owns and continuously expands series of internationally approved attests and certifications which allows us to access markets all over the world. Industrial valves from MSA, a.s. production are included in projects all around the world and were supplied to every continent to more than 70 countries.

**REFERENCES**

- 2013 NPP Rostovskaja – gate valves A00, size 300-500, pressure 40-250
- 2014 NPP Novovoronežskaja – gate valves A00, size 400-600, pressure 160
- 2015 ZORLU JEOTERMAL ENERJI ELEKTRIK URETIMI Turkey– valves according to ANSI DN 50-600, pressure PN 20-100
- 2015 PT.MULTI SUPERINDO MANUNGGAL, Indonesia – valves according to ANSI DN 50-400, pressure PN 20-250
- 2015 KOREA GAS CORPORATION – ball valves DN 250-650, pressure PN 50-100



- Development and delivery of simulation and technology trainer systems, up to replica type training simulators
- Operational adjustment and optimization of power plants
- Technical assistance during commissioning
- Development, implementation and deployment of special electronic modules
- Preparation of power plants to provide ancillary services including certification measurement
- Development of real-time applications
- Service and technical customer support for delivered systems and equipment

**REFERENCES**

- NPP Temelín, NPP Dukovany – Full scope replica type training simulators
- NPP Temelín – Implementation of design modifications in Plant Control System (WDPF - Westinghouse)
- ČEZ – Distributed system for remote production control from the producer's Dispatch Centre





# SIGMA GROUP a.s.



The joint-stock company SIGMA GROUP a.s. is a modern and dynamically motivated engineering company which is the most significant producer of pumping machinery in the Czech Republic.

Today the company concentrates on researching, developing and producing mid-size, heavy and one-off specialized pumps and pumping sets for industrial applications. In this sector the company ranks among the best in the world successfully continuing the tradition of pump production, dating back many years, in central Moravia.

Our key customers consist of both domestic and foreign industrial companies working in light and heavy engineering, the nuclear and non-nuclear energy industries, petrochemical industry, oil exploration, mineral mining and processing and water management.

Many years of application, combined with its own research departments, production plants with latest equipment and its extensive service facilities, SIGMA GROUP is able to offer its customers the best and most comprehensive packages

involving pumping technology on a turnkey basis.

SIGMA GROUP a.s. is a bearer of the Quality Certificates according to EN ISO 9001 (including EN ISO 3834-2), EN ISO 14001 (EMS) and EN ISO 18001 (OHSAS).

SIGMA GROUP a.s. is the leader of the Czech Pump Manufacturers' Association and member of EUROPUMP, the European Association of Pump Manufacturers.

## REFERENCES

- 2011-2013 NPP Mochovce 2 x 440 MW (36 pumps - mainly CJAV, CVEV, CVFV types)
- 2010-2012 NPP Novovoronezkaja (pumps of raw water, cooling water, essential service water, steam generators' cooling emergency pumps,...)
- 2012 NPP Leningradskaja (cooling water pumps, hot water circulating pumps)



# ŠKODA JS a.s.



ŠKODA JS a.s.



## ENGINEERING, COMPONENTS MANUFACTURING AND SERVICES FOR NPPs.

### Construction of the VVER units, upgrade and renovation of operating VVER units

(project management, detail design, safety analyses, research works, component manufacture, procurement, construction management, on-site installation, system testing and commissioning)

### Production of equipment for VVER type NPPs

(control rod drive mechanisms, stud tensioners, hermetic cable penetrations, neutron flux measurement channels, fresh fuel components, termocouples)

### Production of equipment for PWR and BWR type NPPs

(reactor internals, stud tensioners, special structures)

## REFERENCES

- 1965–1993 21 reactors of VVER 440 type (Paks, Bohunice, Dukovany, Nord, Mochovce) and 3 reactors of VVER 1000 type (Belene, Temelín)
- 2001–2016 I & C System Refurbishment of Dukovany NPP
- from 1980 control rod drive mechanisms (more than 3000 pcs) – Czech Republic, Slovakia, Ukraine, Hungary, Poland, Germany, Bulgaria







VÍTKOVICE, a. s. is the member of VÍTKOVICE MACHINERY GROUP (hereafter "VÍTKOVICE") - one of the largest engineering groups in Europe is a partner with modern production facilities, with global reach and business visions that influence not only the Czech business environment, but also significantly interfere in foreign investment and the development of new projects. The flagship of the production is power engineering in both conventional and nuclear energy sectors as mentioned below:

## CONVENTIONAL ENERGY

- **Engineering, Procurement and Construction (EPC) of coal power plants**  
VÍTKOVICE has experiences with EPC projects, refurbishments of thermal power-plants and turnkey deliveries of subcritical boilers and pressure and pressure-less sections for supercritical boilers.
- **Supplies of components**  
Supplies of components Power Plant Engineering are based on the level of mastered know-how, potential of own production sources, design assurance of the branch and predicated trends – the market requirements.
- **Material treatment and processing equipment for coal power plants**  
Bulk material handling systems, dumping machines, crushers e.g. bucket-wheel stacker/reclaimer, bridge-type bucket-wheel reclaimer, bridge-type scraper, angle scrapers, homogenizing portal stacker, portal bucket loader reclaimer, ship loader, ship stacker, coal mills.
- **Mechanical installation of technologies, pressure and non-pressure parts of energy generation and regeneration boilers**

## NUCLEAR ENERGY

- Manufacture, delivery and maintenance of pressure vessels for the primary circuit of nuclear power stations plants (including spare parts), especially steam generators, volume compensators pressurizers and piping systems for the primary circuit of VVER reactors
- Manufacture and delivery of pressure apparatuses of the secondary circuit of nuclear power plants, especially high-pressure and low-pressure steam heaters and pressure piping for the secondary circuit
- Manufacture and delivery of dump condensers, condensate coolers, steam drums and other pressure and non-pressure apparatuses of nuclear power plants
- Deliveries and installations of heavy technological structures for the primary and secondary circuits of nuclear power plants of all types
- Deliveries of other equipment for nuclear power engineering e.g. reactor vessels, pressurizers, collectors, colons

## REFERENCES

1981-85 JE	Dukovany - 20 steam generators, 3 volume compensators
1986-1990	NPP Mochovce - 24 steam generators, 4 volume compensators
1986-1992	NPP Temelín - 8 steam generators, 2 volume compensators
2014	Kalininskaja - 4 HPH
2014-2015	Rostovskaja - 7 LPH
2015	Balakovskaja - 7 LPH tube bundles



- World-class control systems for conventional and nuclear power engineering and industrial processes manufactured in the Czech Republic
- High-tech solutions for sophisticated technologies requiring a long life cycle
- Fourth generation of control systems with high quality and with an impact on safety and reliability of services
- Innovative system sandra applicable for robust as well as minor applications
- Research, development and manufacturing in accordance with customer needs
- Designing, manufacturing, installation and service of supplies based on know-how of manufacturing technologies
- 53 years of experiences, 50 000 supplies on 5 continents

## REFERENCES

**131 working units in Europe and more than 25 % has been delivered by ZAT:**

- **Czech Republic:** Temelin NPP (2x VVER 1000), Dukovany NPP (4x VVER 440), Řež Research Reactor (LVR-15)
- **Slovakia:** Jaslovské Bohunice NPP (4x VVER 440), Mochovce NPP (2x VVER 440)
- **Ukraine:** South-Ukraine NPP (3x VVER 1000), Khmel'nitskaya NPP (2x VVER 1000), Zaporizskaya NPP (3x VVER 1000), Rovenskaya NPP (4x VVER 1000)
- **France:** Paluel NPP (1x PWR 1330) and **Hungary:** Paks NPP (4x VVER 440)





# ZVVZ GROUP



The holding company ZVVZ GROUP with tradition of 67 years is the owner of know-how, manufacturer and supplier of following investment projects and products:

- Plants for treatment of waste gases to remove solid and gaseous pollutants (dedusting, FGD systems, DeNOx etc.) and following ash handling systems
- Equipment for air-conditioning and ventilation of nuclear power stations
- Equipment for air-conditioning of buildings and ventilation of industrial workshops, mines, tunnels and undergrounds
- Industrial radial and axial flow fans and unique flow fans for wind (aerodynamic) tunnels
- Semitrailers for transport bulk materials and fluids, special containers, pressure valves etc.
- Other manufacturing according to own or customer's drawing documentation

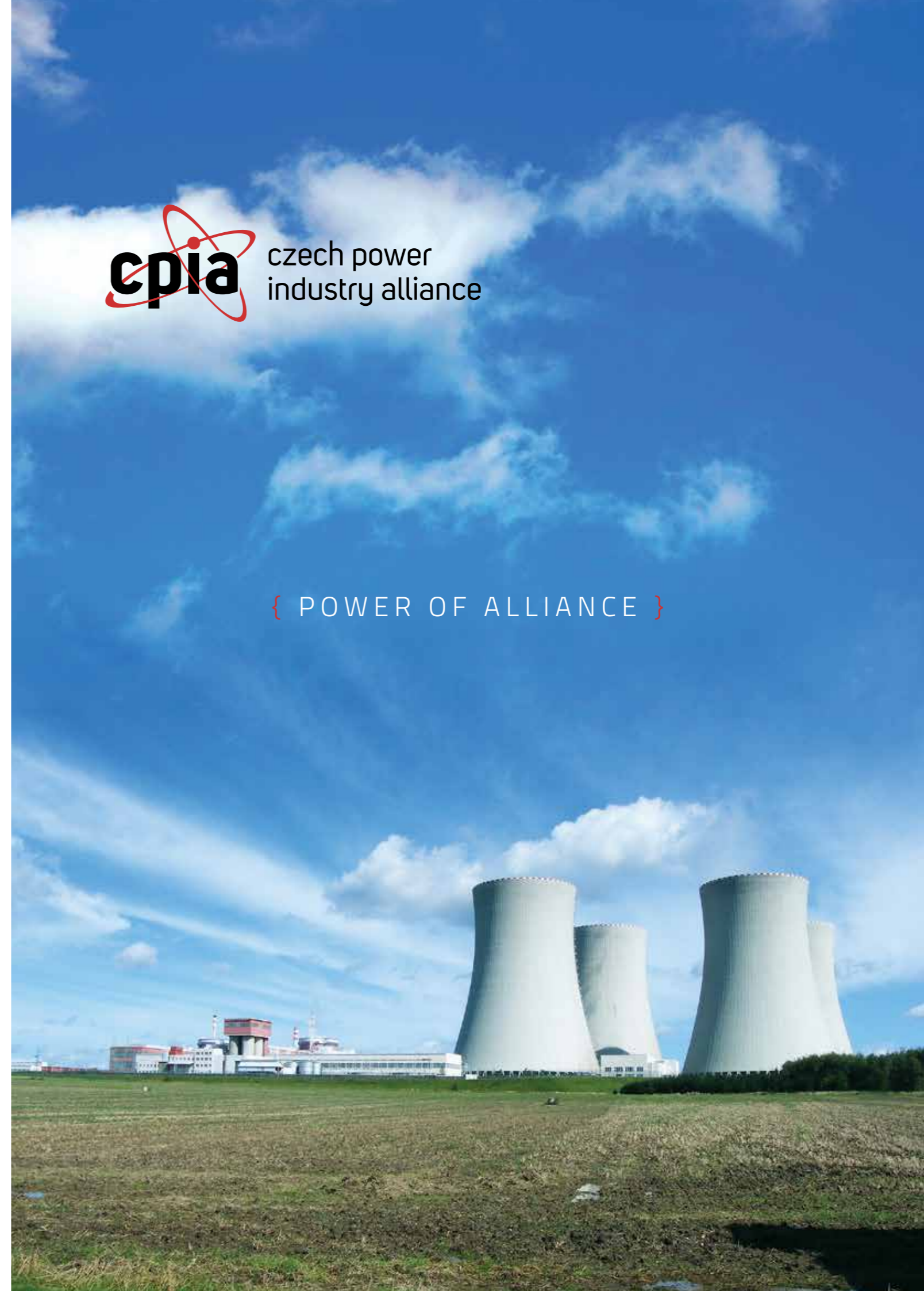
## REFERENCES

Complex supplies of ventilation equipment for nuclear power plants:

- 1987-2003, 2010-11 NPP Temelín
- 1983-1987, 2004 NPP Dukovany
- 1981-1984, 2009 NPP Jaslovské Bohunice
- 1989-2002, 2008-11 NPP Mochovce



{ POWER OF ALLIANCE }







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