CZECH REPUBLIC

CZECHINVEST
Investment and Business Development Agency

ENERGY & ENVIRONMENT

Doosan Corporation´s belief that "together, little grains of sand add up to make a mighty mountain" is fully demonstrated in its Doosan Škoda Power partnership where both partners have a record of manufacturing excellence and innovation dating back more than one hundred years and forming the basis of the company´s global R&D centre for turbine technologies based in the Czech Republic.

Jiří Šmondrk,
General Director,
Doosan Škoda Power

INTRODUCTION

The Czech Republic is abiding by the EU strategy for sustainable development that stands for “Smarter and Cleaner Europe”. The adopted policies are supported by both the EU and national budgets and create a broad range of opportunities for investors to design, manufacture and deliver new technologies for environmental protection and energy savings for more than 700 million consumers in the European market.

Technologies for reusing industrial waste in new products, increased use of renewable energy sources and support for energy savings through the introduction of new products and technologies in smart energy-distribution systems are of paramount importance. The Czech Republic offers investors in these areas both technical competence and manufacturing excellence that, combined with cost effectiveness, create favourable conditions for new investments.

Competitive markets Benchmarking for a Renewable Energy Centre

Labour Availability and Quality Index

Czech Republic	43.77
Poland	41.42
Hungary	38.96
Slovakia	31.56
Bulgaria	28.56
Romania	25.72

Presence of an Industrial Cluster Index

Czech Republic	54.24
Poland	47.52
Hungary	30.91
Bulgaria	29.75
Romania	29.32
Slovakia	18.25

Operating costs (in mill. EUR)

Switzerland	3.08
Japan	2.57
Germany	2.19
Sweden	2.05
USA	1.82
Finland	1.7
UK	1.51
Czech Republic	0.94

Source: fDI Intelligence, from the Financial Times Ltd (2013)

IF R&D IS WHAT YOU NEED

The Czech Republic has a strong academic background which consists of nine main technical universities providing natural-sciences study programmes, including energy technologies. Added value derives from cooperation with leading Czech companies focusing on R&D projects involving advanced technology products. Another aspect of success in research is that the Czech Republic is home to a broad range of science and technology parks and innovation centres. These aspects give the Czech Republic a leading position among its main competitors in the region, according to fDI intelligence source.

R&D AT UNIVERSITIES

Czech Technical University, AIR House project

www.airhouse.cz

The AIR (Affordable, Innovative and Recyclable) House is an energy-self-sufficient experimental project with which a team of students from the Czech Technical University competed in the final of the “Solar Decathlon 2013 U.S.” international competition organised by the U.S. Department of Energy and the National Renewable Energy Laboratory. This prototype of future housing not only advertises Czech architecture and engineering skills around the world but it is also raising awareness among the general public about energy efficiency and sustainable development.

Brno University of Technology rewrote the technical encyclopaedia

www.fme.vutbr.cz

A unique turbine was developed at the Department of Fluid Engineering of Brno University of Technology – the place where Victor Kaplan developed his “Kaplan turbine”, which was patented in 1912 and is still widely used throughout the world in high-flow, low-head power generation. In cooperation with the major Czech energy producer ČEZ, a new original vortex turbine with propeller blades in a cascade arrangement on two counter-rotating wheels has been developed and introduced in pilot applications. The turbine’s higher efficiency, lower investment costs and higher operational reliability combined with the wide range of flow and water level applications make it a unique opportunity for increased renewable energy production.

1277

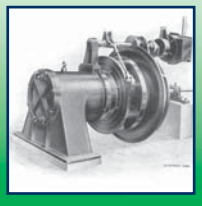
Construction of the first windmill in the Czech Republic

1707

The Czech Technical University in Prague is the oldest non-military technical university in Europe

1888

The first hydropower plant in the Czech Republic



1919

The first prototype of the Kaplan turbine developed in Brno and produced by the Czech company Ignac Storek

University of West Bohemia expands its research centre

www.rice.zcu.cz/

The RICE project aspires to provide a full range of research activities, from new materials to new solutions for power-generation drive systems and processes for increased efficiency and optimised operation of power or heat generation. Cooperation between the academic and industry partners should ensure support for challenging research projects, timely application of new technologies and delivery of research results in the form of product prototypes to manufacturing companies that would eventually bring the new products to the market.

CASE STUDIES

Successful Czech Companies

Mavel

www.mavel.cz

Mavel is a leading supplier of turbines and related equipment for hydroelectric power projects around the world. In 1998, Mavel raised investment capital from a consortium of European and American investors. With continuing growth, Mavel is maintaining its program of new product development and expansion of its manufacturing capability. Mavel is one of the premier international engineering and manufacturing companies providing hydro turbines for small hydroelectric power plants worldwide with more than 400 installations (covering Europe, former Soviet republics, Asia, America, Africa and Oceania). Their success is based on Czech engineering, Czech innovation and the Czech values of the company.

Tedom

www.cogeneration.tedom.com

Tedom is an example of a successful Czech company developing and manufacturing equipment for combined heat and power production and operating technologies for utilisation of renewable energy sources. Since its establishment in 1991, the company has been focused on the production of cogeneration units with gas combustion engines. Over its more than twenty years in existence the company has implemented more than 2500 installations in Europe, North and South America, Asia and Australia. Tedom's R&D centre supports not only the company's position as the leading manufacturer and supplier of cogeneration units, but also helps the company to diversify its product portfolio, which includes products such as biogas-fuelled combustion engines or gas-engine driven heat pumps for efficient production of heat and cooling.

Successful Foreign Companies

Doosan Skoda Power

www.doosan.com/skodapower

In 2009 Škoda Power, a Czech producer of steam turbines since 1904, became part of Doosan Heavy Industries & Construction, a leading provider of clean, efficient, flexible and integrated solutions for energy production, which uses the latest technology and relies on cutting-edge engineering knowledge – from boilers and turbines to turnkey power-plant projects. Doosan Škoda Power combines Škoda Power's history of excellence in steam-turbine manufacturing (from 10MW up to 1200MW), documented by installations with over 65GW total output worldwide, with the production of boilers and knowledge in the regulation of air pollution from Doosan Group. In 2013 the Doosan Škoda Power global steam-turbine R&D centre was established in the Czech Republic with the aim of supporting Doosan's global energy-equipment market share.

Vyncke

www.vyncke.com

Established in Belgium in 1912, Vyncke designs and develops power plants with patented combustion technologies for biomass and recovered solid fuels such as industrial and municipal waste to produce thermal energy from 1 to 100 MWh and electrical output from 0.5 to 15 MWh. The company has close to 4,000 references worldwide. In 2012 Vyncke opened a new manufacturing facility in the Czech Republic which together with operations in Belgium, Germany, Canada, Brazil, India, Malaysia, Thailand and China contributes to the company's global footprint.

REASONS TO INVEST IN THE CZECH REPUBLIC

- Long tradition in design and manufacturing of technologies for the energy sector
- Well-developed supplier chain
- World-class academic community and strong research base with outstanding results in applied research
- Close ties between universities, research and industry
- Availability of skilled and experienced industry-specific staff
- State aid available for development, testing and manufacturing activities

1989

Start of development of initial solar-cell technology at the Czech company TESLA

2010

The Czech Republic fulfils the target of 8% energy consumption from renewables

2015

Sustainable Energy (SUSEN) project will become part of the European R&D infrastructure for energy research

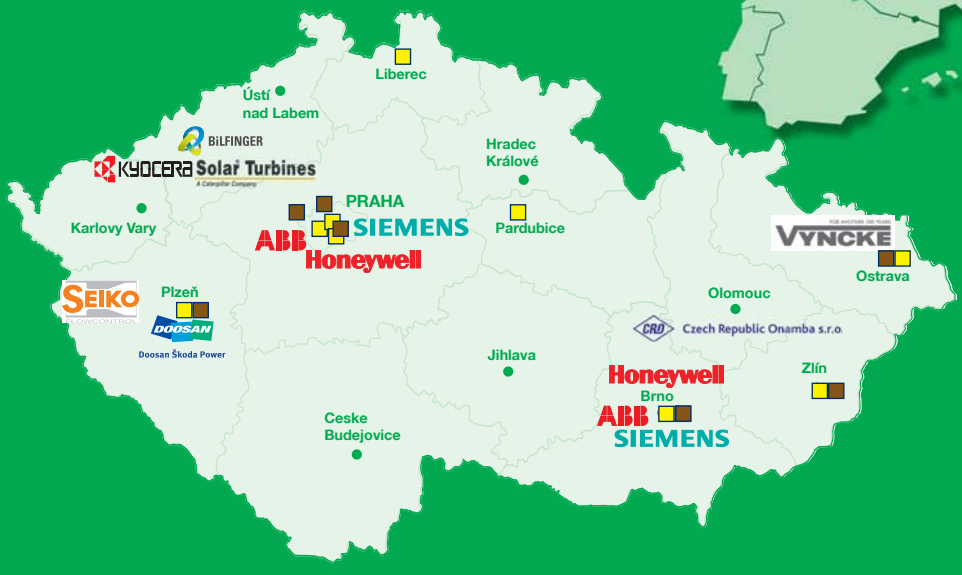
2014 – 2020

Start of the new programming period for EU structural funds

CZECH REPUBLIC

SELECTED FOREIGN INVESTORS IN THE CZECH REPUBLIC

- TECHNICAL UNIVERSITIES
- R&D CENTRES



Source: Ministry of Education, Youth and Sports, CzechInvest 2013

Centre for Research and Utilization of Renewable Energy

CVVOZE – CENTRE FOR RESEARCH AND UTILIZATION OF RENEWABLE ENERGY

www.cvvoze.cz

CVVOZE is a research centre at the Faculty of Electrical Engineering and Communication, Brno University of Technology. The centre's activities are focused on a whole range of disciplines in the field of electrical engineering such as electrochemistry, electromechanics, electrotechnology and power engineering, and links them to the topical subject of renewable energy sources and their efficient use in production, transport and power engineering.

The centre consists of three research divisions:

1. Electromechanical Energy Conversion
2. Chemical and Photovoltaic Energy
3. Generation, Transmission, Distribution and Use of Electrical Energy

UCEEB

UCEEB – UNIVERSITY CENTRE FOR ENERGY EFFICIENT BUILDINGS

www.uceeb.cz

The University Centre for Energy Efficient Buildings (UCEEB) is an interdisciplinary research facility of the Czech Technical University in Prague that brings together a wealth of knowledge from civil engineering, mechanical engineering, material science, electrical engineering and biomedicine. UCEEB is focused on complex holistic research on sustainable buildings and providing high-quality research facilities for researchers and doctoral students.

UCEEB provides support for transfer of technologies and new knowledge to industry and society. This is achieved via standard outlets such as training seminars, publications in trade journals, special publications, patents and joint projects with industry.

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