

# Bioenergy in Czech Republic

## OVERVIEW

The Czech Republic is a relatively small landlocked country in Central Europe bordering with Germany to the W, Austria to the S, Poland to the N and Slovakia to the S-E. It is sovereign in the present geographical scope since 1993 and a EU-MS since 2004. Playing a significant role in European history for many centuries, at the end of WWI, the territory of present-day Czechia concentrated most of the industrial capacity of the Austro-Hungarian Empire: this legacy and the substantial accompanying knowledge and innovation capacities still are decisive factors in the country's prosperity.



The economy of the Czech Republic is a developed export-oriented social market economy based on services, innovation, and manufacturing, with the latter playing a particularly relevant role in supplying the European machinery and automobile industries. Germany is, therefore, quite naturally the country's principal trade partner, totalling approx. 1/3rd of exports and 1/4th of imports, followed by neighbouring Poland and Slovakia. According to the WB, the Czech Republic joined the "developed countries" club in 2006. With a GDP per capita of approx. 42k USD, Czechia is placed very close to the EU-27 average, while, by doubling this value, Prague metropolitan area currently ranks 3rd in European NUTS2 regions. Czechia has the highest HDI in the region and possibly the lowest unemployment rate in EU-27.

The country covers 78.871 sq. km, landlocked, mostly hilly, with more extensive plains in the centre and southeast. The climate is predominantly temperate-continental or oceanic. The country is rich with internal waters, with the three principal rivers being Elbe, Oder, and Vltava. The country has a comparatively high agricultural area of 3.5 million ha (slightly less than 1/2 total area); nearly 25% of the population live in rural areas. Forested areas cover approximately 2.7 million ha, about 1/4th of the total, mainly located close to the country's perimeter.

Weighing 2,5% of the country's economy, which is above the EU average, the Czech agricultural sector is otherwise broadly comparable with the European in terms of area per capita, employment and output. At the same time, it differs significantly in average farm size (17ha in EU-27 vs 130ha in CZ), which probably testifies to a peculiar pathway to de-nationalisation. However, from the biomass valorisation perspective, this could represent an advantage, as the number of players involved in the value chain would be significantly reduced. The most important crops in the Czech Republic are cereals, green harvested crops, sugar and starchy crops, and oil crops. On average, yields are higher than in most of the EU, yet persisting intensive monocultural practices contribute to soil degradation and erosion, which some perceive as a growing threat in the medium term. Sustainable biomass potentials appear significant with regards to cereal and rapeseed straw and food processing residues; notwithstanding the competing uses, it seems that about 10 MtDM/year could be channelled towards bioeconomy value chains,

including bioenergy and intermediates. However, there are concerns determined by the low development of innovative industries for the utilisation of residual biomass and the apparent lack of political will to strengthen the bio-based and bioenergy sector. Similar concerns apply to the wood residues potentials: forestry representing a strong traditional sector and a major employer, both primary and secondary residues are generally underused. According to some estimations, the primary residues could provide approx. 11 KtonDM/year, with a significant growth potential determined by optimisation and innovation. Notwithstanding the constant increment in the growing stock, however, climate change is perceived as a latent threat to the security of supplies in the medium term.

Indicators related to energy supply and consumption also show the alignment of the Czech Republic to most developed European economies, with per capita energy consumption and carbon intensity very close to the values of other industrialised European countries with comparable climate (DE, AT, AT, FR). However, the country's energy mix is still significantly imbalanced towards fossil fuels that total up to 78%. Similar to other countries from the region, coal is experiencing a long and constant decline, yet still plays a significant role weighting approx. 30%, followed by oil, gas and nuclear that total up to between 15 and 20% each. The share of renewables has been increasing steadily and reached approx. 14% in TPES and 11% in TFC, with a distinct predominance of biofuels and waste over marginal wind and solar.

## BIOFUELS POLICY, REGULATIONS, MARKET DEVELOPMENT

Czech Republic	
Population	10.6 million
GDP (per capita)	\$23.000
TFC	28 Mtoe
Transport in TFC	6.6 Mtoe
Biofuels in TFC	0.1%

The National Energy and Climate Plan of the Czech Republic foresees reaching 22% of RES in 2030 with a +9% trajectory from the 2020 target. In the coming decade, the share of RES in the transport sector is expected to grow from 8.8% to 14%. This will be achieved mainly with Biofuels under Annex IX that are currently not deployed but will make almost 1/2 of the planned  $\approx 40k$  TJ. Quite reasonably, the key contributor is expected to be biodiesel, followed by biogas and then bioethanol at approx. 1/10th of the former. The NECP

foresees that nearly half of the biodiesel will be imported, while domestic production shall satisfy the demand for other carriers. Indeed, this implies wide margins for new production.

Based on recent research carried out in the framework of the CELEBio project ([www.celebio.eu](http://www.celebio.eu)), there is currently only one producer of advanced biofuels from animal fat with a declared capacity of 62,000 Mton per year. The production is estimated to be lower and mostly exported to other European countries. Production capacities for biodiesel consist of 5 major plants and a few small-scale ones, totalling at slightly over 400,000 Mton/year potential. In 2015 only 3 of them produced biodiesel. Czech biodiesel production in 2015 reached 167,646 Mton, with rapeseed being the main feedstock. The biofuel industry supports 8 000 jobs with an annual turnover of 420 M €. Conventional ethanol production reached 104,715 Mton in 2015, based on sugar beet and corn. Production capacities involve four ethanol plants that could together produce nearly 300,000 MT of bioethanol annually. E85 consumption in 2014 totalled 23,288 MT. In 2015 it dropped to 12,329 MT. A recent increase in biofuel excise taxes increased the price of E85, resulting in a significant drop in demand.

## ADVANCED BIOFUELS DEMO AND R&D PROJECTS

Due to the combination of limited political interest, prosperity of the agricultural sector that ensures above EU-average incomes and a disbalance of the industrial sector towards exportable manufacturing, there are no emerging demo or advanced R&D projects on biofuels in the Czech Republic, notwithstanding relevant know-how and research capacities. On the other hand, Czechia partakes in several EU-funded research projects on the quantification/valorisation of biomass.

### LINKS

- Ministry of Agriculture - <http://eagri.cz/public/web/en/mze/>
- Ministry of Industry and Trade - <https://www.mpo.cz/en/>
- National Cluster Association - <http://nca.cz/en>
- Association of Chemical Industry - <https://www.spcr.cz/>
- Association of Research Organizations - <http://www.avo.cz/>
- CZECHINVEST - <https://www.czechinvest.org/cz>

