

# COAL ENERGY IN THE CZECH REPUBLIC

**Meeting with Analysts and Investors** 

October 4, 2019



### THE CLIMATE TARGETS IN EUROPE ARE BECOMING MORE AND MORE AMBITIOUS...

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	2020	2030*			
Reduction of greenhouse gas emissions from 1990 levels	<ul> <li>20%</li> <li>Binding EU-wide target</li> <li>Target already accomplished thanks to the economic crisis, rising RES and inexpensive gas</li> </ul>	<ul> <li>At least 40% (40%)</li> <li>Binding EU-wide target</li> <li>Can be reached as a side effect of fulfilling other two targets</li> <li>Pressure to increase the ambition to 50-55%</li> </ul>			
Share of renewable energy sources (RES) in total final energy consumption**	<ul> <li>20%</li> <li>Binding on national level in the form of specific national targets</li> <li>Great chance to meet the target on EU level</li> </ul>	<ul> <li>At least 32% (27%)</li> <li>Binding at EU-wide level, effectively national targets will be specified</li> <li>Fulfilment in electricity, heat, and transportation</li> <li>RES electricity in the EU should grow to 55%</li> </ul>			
Energy savings (EED***) compared to business-as-usual predictions from 2007	<ul> <li>20%</li> <li>Indicative on national level</li> <li>Mandatory energy-saving measures in final consumption</li> <li>Until recently, little attention from the EC</li> </ul>	<ul> <li>At least 32.5% (27%)</li> <li>Indicative at EU-wide level</li> <li>Binding annual savings of 0.8% of consumed energy at national level</li> <li>Both sub-targets will be similar for the Czech Republic and require a slight decrease in energy consumption by 2030</li> </ul>			

#### **CEZ GROUP**

### ... THE NEW EUROPEAN COMMISSION PRESIDENT PLANS TO INCREASE THE AMBITIONS EVEN FURTHER



Reduction of greenhouse gas emissions from 1990 levels

Share of renewable energy sources in total final energy consumption

Energy savings (EED\*\*\*) compared to business-as-usual predictions from 2007

### **Declaration of "Green Deal for Europe":**

- Increase the emission reduction target for 2030 from 40% to 50%-55%
- Europe will be the first greenhouse gas emission neutral continent by 2050 (relevant legislation will be provided in first 100 days in office)
- Consider implementation of CO<sub>2</sub> tax on goods imported from countries with weak climate policies
- Partial transformation of the European Investment Bank into a "Climate Bank" to unlock 1 trillion euros for climate investments in the following decade
- Financial support for less developed regions (so called "Just transition fund")
- Energy savings mentioned only implicitly

- Pressure on decarbonization will grow further
- Strong long-term incentive for CO<sub>2</sub> price growth

### **CEZ GROUP SIGNIFICANTLY REDUCED EMISSIONS** FROM ITS COAL FLEET

**-97%** 

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2018







During 1990's CZK 111 bn has been invested by ČEZ into complex modernization of power stations, desulphurization, denitrification and efficiency upgrades.

1 965 MW of old units have been decommissioned.

In 2002-03 nuclear power plant Temelín was commissioned and further contributed to reduction of coal output.

Tušimice and Prunéřov TPP's went through compehensive renewal and new supercritical unit at Ledvice was built. Investment of more than CZK 100 bn has led to further increase in efficiency of the power generation and emission reductions.

# THE PRICE OF ELECTRICITY HAS GROWN IN RECENT YEARS, BUT MAINLY DUE TO $CO_2$



Breakdown of Cal 20 electricity price changes over the last two years (01/08/2017-01/08/2019) EUR/MWh



## THE PRICES OF CO<sub>2</sub> ALLOWANCES GROW PRIMARILY DUE TO THE EU'S DECARBONISATION EFFORTS



### HOWEVER, COAL POWER PLANTS ARE UNDER ECONOMIC PRESSURE DUE TO THE GROWTH OF CO<sub>2</sub>





### THE ECONOMY OF COAL-FIRED POWER PLANTS IS HIGHLY DEPENDENT ON THEIR EFFICIENCY AND INTEGRATION WITH MINE





Standalone coal power plants are still under significant economic pressure and are very sensitive to requirements set by the emission reduction legislative (BREF/BAT) and other external factors.

The economy of power plants integrated with mine is more robust.

Apart from the above mentioned illustrative gross margin, **it is also necessary to cover other variable costs and fixed costs** (wages, maintenance and other items excluding depreciation) in the amount of **8-15 EUR / MWh** depending on the type, age and capacity of the plant.

Note: The gross margin also needs to cover investments, the amount of which depends on technical condition and especially on changing regulation and legislation (e.g. emission limits)

### OUR STRATEGY FOR COAL-FIRED POWER PLANTS VARIES BY THEIR CATEGORY



### ČEZ strategy

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- Effectively manage the portfolio of basin coal plants, heating plants and mines (design-to-value), as well as electricity supply
- Develop backup sources based on the needs of the Czech Republic and the development of capacity markets

 Effectively operate and gradually phase out the portfolio of nonbasin plants based on economic criteria

#### Application of the strategy in the generation portfolio

New basin plants	ELE ETU EPR	CEZ Group <b>basin plants</b> are operated in <b>base load.</b> Thanks to the low operating costs, their high availability is crucial. Heat supply is an upside.
Locality of Mělník	EGT EME2 EME3	The largest heating plant of CEZ Group, which supplies the capital city Prague with over 10 PJ of heat per year. Partial modernization of the heating plant is planned after the old units phase out.
Old standalone	EDE	For the hard coal power plant Dětmarovice, the electricity production is crucial, profitability of which strongly depends on the development of commodity prices. Heat supply is an additional income.
power plants (CDS- dependent)	EPC	Profitability of the Počerady plant depends on market commodity prices, including lignite (based on the prices of hard coal). The power plant is on the edge of the technical life and does not meet the BREF/BAT emission limits. In 2019, ČEZ has to decide about potential withdrawal from the sale of the power plant.
Biomass heating plants	EHO EPO ECJH	Sources with <b>significant heat supply</b> . <b>Incentives</b> for production of electricity from clean biomass burning <b>is of crucial importance</b> .
Other heating plants	TETR TDK	Planned greening of the Trmice heating plant and construction of a new heating source (biomass/gas) in Dvůr Králové in order to fulfill the BREF/BAT limits.

### ČEZ PLANS TO DECOMMISSION A SIGNIFICANT PART OF THE COAL CAPACITY BETWEEN 2035-40...



Installed capacity of CEZ Group's coal plants in the Czech Republic (GW)



This is the best estimate based on the current assumptions. The values may change depending on the development of various legislative and economic factors (e.g. conclusions of the Coal Commission).

### ...AND INTENDS TO REDUCE ITS CARBON FOOTPRINT



Development of the gCO<sub>2</sub>/ kWh indicator for electricity produced is based on the conservative assumption of maintaining today's nuclear and renewable sources production (i.e. growth of new RES is not included).

### FURTHER DECARBONISATION CAN BE REALIZED FOR INSTANCE THROUGH A NEW GAS POWER PLANTS AS A REPLACEMENT FOR COAL POWER PLANTS



Possible other locations for the development of gas sources of ČEZ

The following ČEZ locations can be considered for possible construction of new gas plants:

ČEZ location	Estimated installed capacity $*$ (MW <sub>e</sub> )	Gas connection length (km)
Prunéřov	800	11
Tušimice	2 x 850	10.8
Mělník	800**	5
Počerady	up to 800	1.4

Possible development in the Počerady location even after the sale of coal-fired Počerady Power Plant

- According to the above, the possibility of constructing a new gas source in Počerady remains:
  - Sufficient capacity of the existing gas connection owned by ČEZ
  - Electricity connection (reservation of capacity) is associated with a cost of 0.5 m CZK/MW (i.e. CZK 400 m for 800 MW),
    - The connection is not an entitlement by default, ČEPS shall assess the application and either approve it or determine the conditions under which the source can be connected.
    - The capacity of the connection should be sufficient, as it has recently been doubled
- There will be sufficient space for a new source, even after the sale of the lignite power plant and its related lands, including the land for construction of a new coal plant by Vršanská uhelná.

### KEY SUBSTANTIVE AND GENERAL FINANCIAL OBJECTIVES IN THE UPDATED STRATEGY



Strategic Priorities	Key Substantive Objectives and Ambitions for 2025	Additional 2025 EBITDA* Goal
Efficient Operation, Optimum Utilization & Development of Generation Portfolio	<ul> <li>Safe and efficient generation by nuclear plants (WANO's assessment of ČEZ's nuclear power plants above the global nuclear operators median; annual generation above 31.5 TWh).</li> <li>Long-term NPP operation (Temelín units at least until 2060 and 2062, Dukovany units until 2045 and 2047).</li> <li>Value maximization in mining and conventional generation, efficient generation by power and heating plants in mining regions. Controlled phaseout of plants outside mining regions.</li> <li>Negotiating a framework for the construction of a new nuclear unit at Dukovany, which would cover the regulatory and market risks of the project. Commencing project preparations according to the approved contractual framework</li> </ul>	(CZK bn) +1 to +2 beyond the effect of market prices **
Modern Distribution & Care for Customers' Energy Needs	<ul> <li>Distribution CZ: Increasing revenues by way of increased investments in the context of changes induced by decentral energy; increasing efficiency and reducing operating expenses.</li> <li>Sales CZ: Maintaining current profitability by way of: maintaining the current customer base, increasing customer satisfaction, and expanding offerings in the portfolio of noncommodity products and services.</li> </ul>	+2 to +4
New Energy Sector Development in Czechia	<ul> <li>ESCO CZ and SK: 25%+ share in the growing market with target EBITDA margin &gt; 7%.</li> <li>RES CZ: Playing a major role in the growth of renewables in Czechia. Total potential for Czech solar installed capacity estimated at up to 5 GW, including about 0.5 GW on land currently owned by CEZ Group.</li> </ul>	+2 to +3
Energy Services Development in Europe	<ul> <li>Continuing with quick organic and acquisition expansion in Germany, northern Italy, and Poland.</li> <li>Maximizing synergies from the consolidation of activities in target markets.</li> <li>Becoming a Top 3 ESCO player in these markets by 2025, with target EBITDA margin &gt; 7%.</li> </ul>	+2 to +3
Divestment Strategy	<ul> <li>Return of capital invested in RES assets in Germany and France.</li> <li>Completion of sale of assets in Bulgaria, sale of generation and distribution assets in Romania, Poland, and Turkey sell those assets by the end of 2022. The assets' contribution to CEZ Group's annual 2018 EBITDA was CZK 5.5 b</li> </ul>	

The goal of additional 2025 EBITDA\* demands significant investments in new assets, primarily in RES in Czechia, ESCO abroad, and distribution in Czechia. Investments in RES development in Czechia and ESCO development will be financed by income from divestments.

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## REALIZATION OF THE STRATEGIC PRIORITY "EFFICIENT OPERATION, OPTIMUM UTILIZATION & DEVELOPMENT OF GENERATION PORTFOLIO"





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## POČERADY POWER PLANT DESCRIPTION AND TECHNICAL PARAMETERS



#### **Executive Summary**



- The power plant was commissioned between 1970-77 and passed the first wave of greening (desulphurisation) in the years 1994-96.
- Over 80 % of the produced VEP (especially the fly ash) is transported to the mine of Vršanská uhelná.
- In the site of coal power plant, the gas power plant is also situated, the ownership of which is separated and the common equipment (e.g. water feeder) is owned by ČEZ.
- The power plant has already exhausted the usual life of units (~ 240 thousand hours), the average number of hours per unit as of 2018 is about 290 thousand (see right).

#### Compliance with IED emission limits (06/2020)

 The units will meet the IED limits after certain operational and technical measures are taken

#### Compliance with BREF/BAT emission limits (08/2021)



Average values of continuous emission measurements for 2018 (boilers B2-B5)
BREF/BAT limits valid from 08/2021 (average annual values)

 Further operational and technical measures are planned to comply with the BREF/BAT limits

#### Technical parameters and unit operating hours

Capacity 1000 MW<sub>e</sub> (5 x 200 MW<sub>e</sub>)
 Unit B2
 Unit B3
 Unit B4
 Unit B5
 Unit B6
 271 th. hours

Operating hours of the unit as of the end of 2018

- - Typical life by number of operating hours (approx. 240 ths. hours)

### A NUMBER OF DISPUTES BETWEEN 2005-2012 LED TO THE SALE OF CHVALETICE AND SIGNATURE OF A LONG-TERM CONTRACT WITH VUAS IN 2013



#### **2005** • An agreement between ČEZ and Czech Coal, a.s. about future long-term cooperation.

2007 Czech Coal refused to sign a contract for long-term supply of lignite (due to a dispute about the price of coal, which ultimately lasted until the end of 2012) and prevented ČEZ from building a new power plant in Počerady, ČEZ decided to sue Czech Coal regarding this decision.

• Czech Coal reached an agreement with E.ON to build a new plant for coal from the Vršany mine.

2009 The European Commission raided the ČEZ headquarters on suspicion of restraining competition. In July 2011, an investigation of ČEZ was initiated. Among other things, ČEZ was suspected of blocking capacity in the transmission network in order to restrain competition. All suspicions, except for this, were disproved. ČEZ faced a possible fine up to tens of billions CZK, or forced sale of a part of its assets.

Settlement agreement with the European Commission. ČEZ committed to sell an 800 MW source.
 ČEZ prepared four options of the sale (Počerady, Chvaletice, Dětmarovice, Tisová + Mělník 3), a tender was declared for 3 of them (complicated combination Tisová + Mělník 3 was a backup). Czech Coal and EPH were interested in the lignite plants. More parties were interested in Dětmarovice (e.g. Gascontrol).

At the end of the year, conditions of a new agreement with Czech Coal were negotiated (see last point).

- 2013 ČEZ chose the most advantageous offer: selling Chvaletice to Czech Coal, via Litvinovská uhelná, and hereby resolved its obligation to the EC.
  - Other power plants were not sold. The value of Počerady was higher than the best bid in light of the new coal deal. The same was true for Dětmarovice.
  - ČEZ signed a long-term coal purchase contract for Počerady with Vršanská uhelná, the agreement ended all bilateral disputes and significantly contributed to the settlement of the above-mentioned EC investigation.

### CONTRACT PARAMETERS FROM 2013 AND ITS BENEFITS



- Take or pay contract for 5 m tons of lignite for ČEZ until the Vršany mine is exhausted (about 2060)
- Starting price of coal 38.8 CZK/GJ, which gradually increases to the level of 0.65 ARA until 2023
- Sale option for 100% of shares in EPC to Vršanská uhelná in 2016 (option 1);
- Sale option for 100% of shares in EPC to Vršanská uhelná in 2024 (option 2);
- In case EPC is sold, also the contract for 5 m tons of lignite is transferred to VUAS
- Agreement on the reciprocal settlement of relations, withdrawal of the complaint at the European Commission

- Termination of trade disputes with VUAS, enabling settlement with the European Commission
- Ensuring secure long-term fuel supply for ČEZ sources: EPC and Energotrans
- Contribution to stabilization of EPC economy by linking the fuel price with black coal price, resulting in a price advantage over black coal plants
- In case of unfavorable developments in the energy markets, the possibility to terminate the contract using predefined unilateral options of ČEZ

### EXERCISE OF THE OPTIONS BASED ON THE NEGOTIATED CONTRACT WAS CONSIDERED, THE NEXT MILESTONE IS ON JANUARY 1, 2020

- ČEZ had a chance to exercise the 1st Put option in 2016. After valuation and consideration of the circumstances, ČEZ decided to withdraw from the contract for sale of the Počerady plant in 2016. The reason for not exercising the option 1 were the expected benefits of further EPC operations, which according to the market predictions exceeded the potential one-off sale price at that point.
- Already in 2017, Vršanská uhelná contacted ČEZ to discuss the possibility of selling EPC to manage the technical condition of the plant on its own. At the end of 2016, ČEZ started negotiations to verify the profitability of the earlier sale of Počerady. In April 2017, ČEZ negotiated with VUAS an alternative option that brought additional economic value. The sale was not approved by the ČEZ Supervisory Board.
- 2020: 2nd Put Option and an opportunity for ČEZ to withdraw from sale of EPC (until 31/12/2019). If ČEZ does not withdraw, the sale of EPC becomes effective as of 2/1/2024. The sale would also terminate the contract for 5 million tons/year.

#### **19** Note.: spread – difference between power price, margin costs of $CO_2$ price and coal

### **PROFITABILITY OF LESS EFFICIENT POWER PLANTS DECREASES SIGNIFICANTLY OVER TIME**

\* Illustrative calculation based on market forward prices of power and CO<sub>2</sub> prices during previous year (Y-1) related to delivery in the year 2015 and 2020. The efficiency of the production source used for the illustrative calculation is comparable with the Počerady power plant.





Illustrative

The rising price of the CO<sub>2</sub> allowance increases the price of electricity only partially.

Growth of electricity prices due to rising CO<sub>2</sub> allowance price has material negative impact on less efficient plants (such as EPC).

The resulting gross margin and operating profit declines significantly over time.

### POČERADY POWER PLANT ECONOMIC CONTRIBUTION TO THE CEZ GROUP'S RESULTS



EPC contribution to the consolidated results of CEZ Group\*

		2015	2016	2017	2018	E 2019
Sale of electricity inc. AS	bn CZK	5.4	5.3	4.6	4.6	5.1
Electricity supply	TWh	5.1	5.6	5.4	5.3	4.7**
Costs of coal	bn CZK	-2.4	-2.6	-2.5	-2.5	-2.4
Costs of CO <sub>2</sub>	bn CZK	-1.1	-0.7	-1.0	-1.1	-1.4
CO <sub>2</sub> allocation	bn CZK	0.5	0.3	0.2	0.2	0.1
Gross margin	bn CZK	2.2	2.1	1.2	0.9	1.2
Avg achieved power price	EUR/MWh	40.4	34.8	32.0	31.2	37.3
Avg CO2 achieved purchase price	EUR/t	7.7	4.6	6.7	7.9	11.0
Avg coal achieved pur. price (incl. logistics)	CZK/GJ	41.8	40.6	40.3	41.3	43.8
Fixed operating costs	bn CZK	-1.2	-1.0	-1.1	-1.1	-1.3
EBITDA	bn CZK	1.1	1.1	0.1	-0.1	-0.1

\*Financial results reported for separate company Elektrárna Počerady, a.s. ("EPC") differ from the stated contribution to consolidated results mainly due to the inter-company tolling agreement between ČEZ, a. s., and EPC, which enables efficient operation of separate power plant in the ČEZ portfolio. This agreement transfers risks and opportunities from development of power prices and CO<sub>2</sub> allowances to CEZ and it guarantees fixed profitability set on the power price and CO<sub>2</sub> emission allowances from 2015 for EPC. Moreover, ČEZ Group reports its financial results in accordance with IFRS, while EPC reports in Czech accounting standards CAS.

\*\* Lower volume of estimated electricity supply in 2019 is due to the planned general overhaul of unit 3.

### EPC IS HIGHLY SENSITIVE TO CO<sub>2</sub> PRICE

Power Supply Hea (TWh)	t supply Heat supp (TJ) ratio <sup>1)</sup>	bly Emissions of CO₂ per EE and HE <sup>3)</sup> produced	
Hodonín <b>O.3</b>	453 12%	129 g CO₂/kWh	
Poříčí 2 0.6	1,312 19%	547 g CO₂/kWh	Partly biomass
Počerady 2 🔥 1.8	0 0%	356 g CO₂/kWh	Gas
Energotrans () 0.9	9,575 80%	428 g CO₂/kWh	
Trmice 0.3	2,929 59%	506 g CO₂/kWh	Heating Plant
Dvůr Králové 💮 0.0	164 68%	542 g CO₂/kWh	······
Mělník 2 💮 1.3	2,250 19%	699 g CO₂/kWh	
Ledvice 3 0.5	898 19%	731 g CO₂/kWh	
Ledvice 4 💮 2.7	347 2%	765 g CO₂/kWh	
Dětmarovice 1.4	534 4%	826 g CO₂/kWh	
Prunéřov 2 💮 2.8	262 1%	826 g CO₂/kWh	
Tušimice 2 💮 5.2	460 1%	833 g CO₂/kWh	
Prunéřov 1 💮 2.2	598 3%	909 g CO₂/kWh	
Počerady 💮 5.3	172 <sup>2)</sup> <1 %	948 g CO₂/kWh	Power plant
Mělník 3 () 1.0	0 0%	974 g CO₂/kWh	ļ

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Note: CO<sub>2</sub> only from coal part of power plant, except PPC

**CEZ GROUP** 

### FURTHER OPERATION OF EPC WOULD DEMAND CONSIDERABLE INVESTMENTS MAINLY TO FULFIL ENVIRONMENTAL REQUIREMENTS



	fulfillment				E: <u>m</u>
Operation	until 2	024		until 2029**	C
SO <sub>x</sub>	<ul> <li>Operational and technical measures</li> </ul>			Overhaul of desulphurisation	
NO <sub>x</sub>	<ul> <li>Increasing dosage of additives</li> <li>Possibly getting a exemption</li> </ul>	of s / an	t	Exception or technical measures need to be added	
РМ	<ul> <li>Overhaul of electro separator</li> </ul>		9 (	Overhaul of electro separator, desulphurization modification	
Hg	<ul> <li>DeHg basic capture measures</li> </ul>			DeHg greater capture range	
<b>Overhaul</b> (renewal)	<ul> <li>Maintenance (overhaul B3 only)</li> </ul>		I	Major renewal required (of all units)	Ca
		effect from	202	f BREF / BAT with 9 is addressed by mption until 2030	On On

#### Estimated outlays for investment, operation and maintenance of the plant CAPEX + OPEX (normal maintenance and specific actions) [bn CZK]



Operation beyond 2030 is not considered due to the limited residual life of the source and its ability to meet emission limits and other future conditions following the subsequent revision of BREF with effect from 2029.

### NOT WITHDRAWING FROM THE SALE CONTRACT WILL ENABLE ČEZ TO NEGOTIATE OTHER CONDITIONS

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Given the economic disadvantages of retaining EPC, ČEZ can only accept:

- Sale of EPC as of 2024, i.e. not to withdraw from the sale until 31/12/2019
- Renegotiation of DKS\*



 It will be possible to negotiate with the counterparty regarding the change of DKS (and also the ownership of EPC) only if the option to withdraw from the sale of EPC as of 2024 is not exercised (with decision by 31/12/2019)