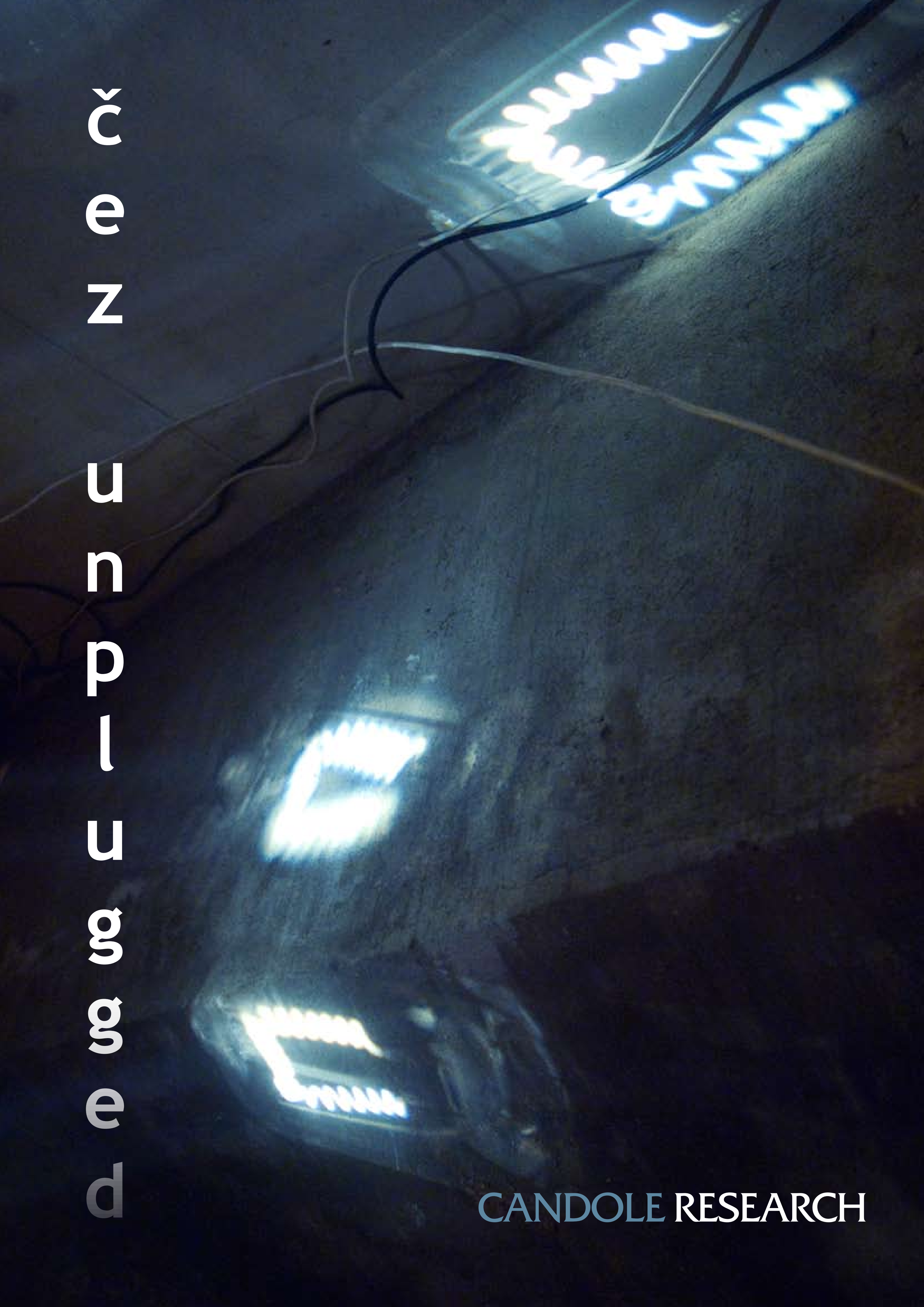

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Introduction

Claims that ČEZ abuses its market power are not new. The European Commission's anti-trust probe launched in November 2009 lends weight to such claims. We examine the theoretical underpinnings and empirical evidence for market abuse in the Czech energy sector, demonstrating that the potential for abuse is real.

We set ČEZ in its regional and domestic market context. We argue that market structure and policy decisions at home and abroad explain the firm's remarkable profitability since 2004. We establish five variables that determine ČEZ's profitability and argue that successful renewal of the Czech generation fleet is critical for maintaining such profitability, whereas foreign acquisitions are not. We conclude that future value depends on efficient execution of Czech CAPEX and that the risk of government failure to challenge value dilutive decisions of a management it appoints remains high.

Market structure

In this section, we argue that market structure has had a significant impact on the ability of firms to generate a profit over a normal profit in a competitive industry, what is called 'economic rent'. We argue that ČEZ's economic rent is attributable to five variables that determine Czech and central European market structures. We dispute the view of ČEZ as price taker on a competitive market without dominant market power.

The five variables we identify as the largest contributors to ČEZ's economic rent are the decision to create a vertically integrated utility (in particular to bundle coal mines with generation which makes ČEZ's coal-fired plants mostly fixed cost); the decision to increase Czech nuclear capacity (low variable cost of production); the moratorium on construction of nuclear power plants in Germany (price setting power plant in Germany tends to be a gas-fired power plant); insufficient market integration that allows ČEZ to sell at a price determined by German marginal power plant, but makes it difficult to import cheaper electricity from Poland, and impossible from the Nordics; and finally, rising commodity prices.

Relevant Market

What is the relevant market for ČEZ: Czech or European? And what are the implications of each for ČEZ? We shall compare the Czech, Austrian, Swedish, Finnish, German, French, Polish, Slovak and Romanian markets using variables such as market concentration in generation and sales, fuel mix, price formation, regulation, market liquidity, interconnectedness (cross-border electricity flows), prevailing price and spread against EEX price.

The definition of relevant market has profound implications for competition policy as well as for the regulatory approach to price formation. If a company has a dominant market power in a relevant market and is left to operate as if the market was competitive, then the firm would exploit this power at the expense of consumers, leading to significant welfare loss. European electricity markets have been dominated by dominant national champions. The European Commission's approach to dealing with dominant market power has been market integration (facilitating cross-border electricity flows) which would create a liberalised (free of burdensome regulation) competitive market. The European Commission's argument has been that the creation of a regional market would increase competition by diluting the market power of those national champions and increase efficiency due to better allocation of resources, for example in terms of fuel mix.

Defining relevant market is complicated. This is caused by the complexity of the electricity market, stemming from the fact that electricity cannot be stored and the fact that supply and demand must be balanced in real-time. And it is difficult to analyse electricity markets due to the lack of publically available market data, access to which is often controlled by incumbents. As a study on some EU 15 markets by London Economics notes, "electricity market participants can display behaviour that can appear similar or even identical, whether they have market power or not."

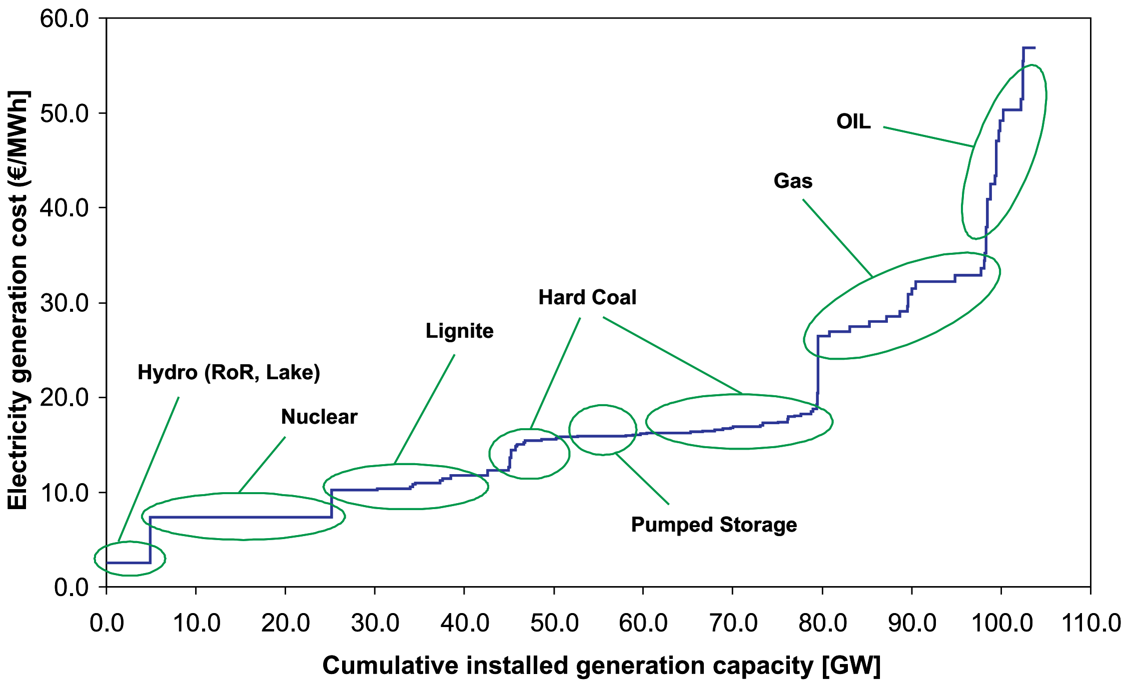
We start from the assumption that there is a liquid regional market with electricity. If there are no constraints (physical such as weak connection or political such as tariffs and other administrative barriers) on free trade we can expect to observe convergence of electricity prices and the emergence of a regional equilibrium price, given as an aggregate of local demand and supply functions. Under this assumption, electricity is sold for a price that equals to marginal cost of producing additional MWh. Marginal revenues equal marginal costs and firms are unable to generate economic rent.

Market participants are price takers under this assumption. Either they supply if their marginal costs of production equal current market price or they do not. In reality the situation is more complex due to significant cold start-up costs of producers, the necessity to hold spinning reserves and provide ancillary services to the system and other factors caused by the fact that electricity cannot be stored and supply and demand must be balanced in real time. Yet firms competing in a perfectly free market would not consistently be able to generate mark-ups over the long run marginal costs of the system and we would observe only marginal differences between prices among countries.

If however we observe persistent price differences between countries and an ability of firms to generate mark-ups over marginal costs, we would have to reject the assumption of a perfectly competitive regional market.

The market equilibrium price is determined by the merit order rule. The merit order rule expects the market price to be equal to the variable cost of a marginal power plant. This means the variable cost of the last power plant whose marginal cost to generate one additional kWh equals price given specific demand. Chart 1 shows a simplified merit order curve for Germany. The merit order curve shows available generation capacity by fuel given demand at a particular time. The chart shows that renewable sources and nuclear power plants have the lowest variable costs of production, followed by coal-fired plants, CCGT and conventional gas-fired plants.

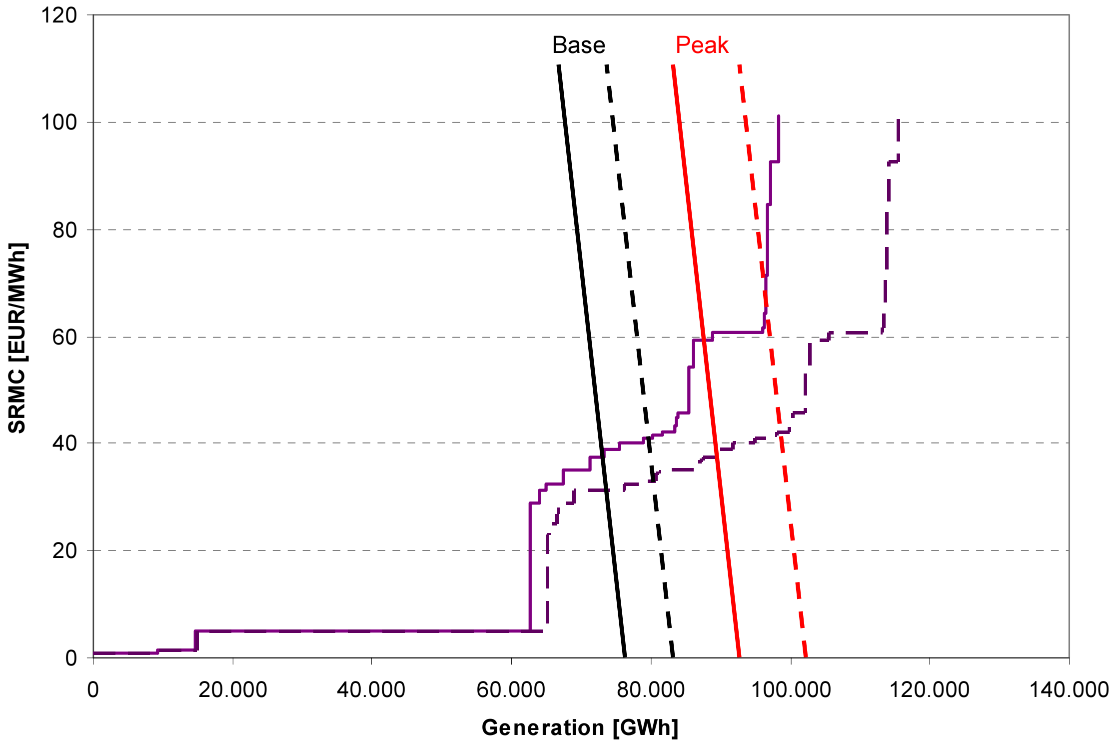
Chart 1: Germany's Merit Curve



Source: Ellersdorfer (2005)

Germany's merit order curve is important for the formation of central European electricity price for at least three reasons. Firstly, because of the sheer size of the German market. Secondly, because improving cross-border connections allow for price arbitrage. And finally, because German marginal power plants have relatively higher marginal costs than those in most central European markets. In consequence, the price setting marginal power plant for central Europe tends to be German coal or gas-fired power plant due to the relatively low share of nuclear power in total German output (Percebois, 2008).

Chart 2: Merit Order Curve for the EU-4 Electricity Market (AT+CH+DE+FR, solid lines) and for the EU-4+2 Market (AT+CH+DE+FR+CZ+PL, dashed lines) for May 2006 and Corresponding Electricity Demand



Source: Haas (2008)

Without cross-border connection, the Czech marginal power plant for large parts of the day would be the nuclear power plants Temelín and Dukovany. Given that ČEZ sources approximately 60% of coal from its own coal mines, which makes those plants mostly fixed-cost (UBS, 2009), Czech merit order curve is estimated to be significantly below the German one. Chart 2 illustrates the gap between merit order curves of central European markets including (solid lines) and excluding (dashed lines) Germany. This gap is caused by the relatively high share of gas-fired capacity on German output. Without international trade, Czech consumers would therefore benefit from relatively low electricity prices due to low variable costs of Czech marginal power plant.

However, due to interconnections between Czech Republic and Germany, German coal or CCGT plant is the marginal power plant for the Czech Republic and therefore Czech price depends on the variable costs of German coal or gas-fired power plant. Given that natural gas is supplied to Germany on the basis of long-term supply contracts indexed to prices of oil, the price of Czech electricity is highly correlated with oil prices despite the fact that gas accounts for only 2.1% of Czech available generation capacity. The gap between Czech and German merit order curves can be described as economic rent, which is a mark-up on marginal costs of Czech power plants. This mark-up is a profit ČEZ earns over the normal profit in the industry. We will analyse whether and how ČEZ realises this economic rent in more detail in our peer analysis.

Our research falsifies the perfect competition argument. We demonstrate that insufficient cross-border capacity together with technical and administrative hurdles limit free trade. We show that, even allowing for interconnector capacity, European markets remain rather concentrated and the largest firms retain their market power. Numerous market studies suggest that models based on oligopolistic market assumptions rather than perfect competition assumptions are better able to explain the European electricity market. In particular, Cournot Competition appears to be a good approximation of the European market (Hobbs et al, 1999; Borenstein and Bushnell, 1999).

Market participants are able to generate profit above their marginal costs, which they would not be able to do under assumptions of perfect competition. Studies investigating the structure of European electricity market have demonstrated that there is a correlation between market concentration measures and the size of the mark-up over marginal costs of production. This suggests that the European market is better described as oligopolistic not perfect competition. Therefore European electricity price is not a competitive price in the sense that it would be equal to firms' marginal costs.

A study by London Economics found that concentrated markets tend to produce high mark-ups over a competitive price (economic rent). For example, French price-cost mark-up was 149.6% and Lerner index[1] was 59.9% in 2005. In Germany, which has among the least concentrated markets in Europe, average price-cost mark-ups were 15.2% in 2005 and Lerner index 13.2% (London Economics, 2007). These results indicate that market participants can earn considerable profits in wholesale electricity markets.

1 Lerner Index is a measure of a firm's ability to exercise market power. Lerner Index is calculated as a difference between price and marginal costs divided by price: L= (P-MC)/P. In a perfectly competitive market the Lerner Index is zero and in a pure monopoly it is equal to one. The more the Lerner Index differs from zero, the greater is measured market power.

Market concentration

We use Herfindahl-Hirschman Index (HHI)[2] and First Four concentration ratio to measure market concentration in the Czech Republic to see whether Czech market structure explains the ability of ČEZ to generate economic rent. This appears to be the case.

HHI is used to measure market concentration in various industries by regulators, including the European Commission. HHI of 1000 is generally considered competitive. The European Commission for example tends to scrutinize mergers in markets where HHI is between 1000 and 2000 and the merger results in the change of HHI of more than 250, or in markets where HHI is over 2000 and the transaction leads to the change of more than 150.[3] The US Justice Department scrutinises any merger of firms where HHI is between 1000 and 1800, and considers markets to be uncompetitive where HHI is above this range.[4] Therefore, we may consider a market to be uncompetitive if HHI is over 2000. Since the HHI index is difficult to interpret directly, we calculated First Four concentration ratio in addition to HHI to illustrate the point.

Table 1 shows that the Czech Republic has one of the most concentrated markets in Europe, second only to France. Given the positive association between market concentration measures and the firm's ability to earn economic rent, we can infer that ČEZ's potential economic rent is closer to that of EDF than to that of German producers.

Table 1: Market concentration

Country	HHI based on output	HHI based on net installed capacity	C4 (%)
Czech Republic	5,980	4,940	91
Germany	700	1,341	48
Finland + Sweden	741	853	55
France	7,933	6,931	96
Poland	1,300	1,363	51
Romania	904	1,398	50

Source: Company filings, Candole Research calculations

2 We calculate HHI based both on output and installed net capacity to account for potential bias which may be introduced by varying generation efficiencies, necessity to hold spinning reserves or must-run power plants Boisseleau (2004).

3 Commission Notice – Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings, DG COMP, 28 January 2004.

4 U.S. Department of Justice and Federal Trade Commission, Horizontal Merger Guidelines.

Although some research indicates HHI and concentration measures may not best explain whether market participants abuse market power at a specific time, they are useful for comparing market structures. Some studies (Küpper et al., 2009; Boisseleau, 2004) argue that HHI may not be an appropriate market concentration measure in the electricity sector since it is sensitive to assumptions about allocation of cross-border and transmission capacity (Küpper et al., 2009). London Economics however found that traditional measures of market concentration are correlated to industry-specific measures such as Residual Supply Index[5] or Pivotal Supply Index[6] and therefore we think that the traditional measures are appropriate for descriptive purposes, for example to illustrate status quo as opposed to predicting market outcomes based on market structure.

In addition, several studies (London Economics, 2007; Percebois, 2008; Bunn and Zachmann, 2009 and Küpper and Willems, 2007) found that interconnectors do not necessarily decrease market power of incumbents. Percebois even suggests that ex-ante allocation methods of limited interconnector capacity may actually affirm the market power (2008). Specifically, those studies found that interconnectors have little effect on market concentration where incumbents have large market shares such as in France. On the other hand, Germany, with relatively low market concentration, was found to be sensitive to interconnector and transmission capacity assumptions (London Economics, 2007). We believe that interconnector allocation is unlikely to have significant effect on Czech market concentration since its structure is very similar to the French market and therefore the cross-border and transmission capacity is likely to be allocated to the incumbent at least proportionally to the incumbent's local market share. Therefore, we can assume HHI to be a good estimate of Czech market concentration.

Cross-border trade

ČEZ frequently argues that, since electricity can be traded across borders, the relevant market is not national but European. This is misleading. As we explain above, the European price is a product of oligopolistic market structure rather than perfect competition. And the European market can exist only to the extent that there is free interconnector and transmission capacity. Interconnector capacities are often congested (see Table 2). This means that demand for interconnector capacity far exceeds supply of available capacity.

5 Continuous measure of how pivotal a market participant is on average

6 Binary measure of whether a supplier is pivotal in a given hour

For example, the Central Allocation Office (the organisation that organises joint auctions of interconnector capacities for Germany, the Czech Republic, Poland and Slovakia) reports that requests for interconnector capacity for 2010 exceeded by 5.5 times offered capacity in an annual auction. Our analysis of monthly auctions reveals similar patterns.

Table 2: 2010 Interconnector Auctions

Profile Direction	Total Requested Capacity (MW)	Total Promised Capacity (MW)	Number of Participants	Number of Bids	Auction Price (EUR/MW)	Total Requested to Promised Capacity
PSEO > CEPS	645	45	12	97	18,921	14.3
VE-T > CEPS	865	195	22	89	2,011	4.4
TPS > CEPS	1,070	200	26	102	2,015	5.4
CEPS > PSEO	0	0	0	0	0	n/a
CEPS > VE-T	1,800	305	26	167	17,082	5.9
CEPS > TPS	2,116	450	30	189	18,221	4.7

Source: Central Allocation Office, Candole Research calculations

In addition to market concentration, we analyse the extent to which electricity prices in our sample of countries converge. High correlations and small differences between prices would indicate that traders are able to exploit arbitrage opportunities, whilst prevailing spreads and low correlations between market prices would suggest that trading between countries remains difficult. In order to analyse patterns, we calculated moving averages of order five (5 MA) for daily closings on spot and futures markets[7] in our sample of countries. In total, we analysed more than 3 000 observations from a time period 2007-2010.

Table 3 below supports our argument about the importance of the German market for Czech prices. The most correlated markets are the Czech-German and French-German

Table 3: Spot price correlations

	Germany	Czech Republic	France	Nordics	Poland
Germany	1.00	0.97	0.97	0.66	0.91
Czech Republic	0.97	1.00	0.93	0.51	0.81
France	0.97	0.93	1.00	0.64	0.84
Nordics	0.66	0.51	0.64	1.00	0.68
Poland	0.91	0.81	0.84	0.68	1.00

Source: Exchanges, Candole Research calculations

7 We analyse prices for 1 year delivery contracts for one-year ahead. For example, 2009 prices are for 2010 delivery futures contract.

markets. The Polish market is more correlated with the German market than with the Czech market, supporting our findings from the interconnector analysis that trading between Poland and the Czech Republic may not be as easy as between the Czech Republic and Germany. As we expected, the Nordic market is relatively uncorrelated with central European markets. Our analysis suggests that ČEZ is able to react flexibly to changing demand and supply conditions in Germany.

Czech and German spot markets however constitute only a fraction of total electricity trade. Approximately 80% of volumes are traded on the futures market. Therefore, we compiled a correlation matrix for futures markets (see Table 4) in addition to spot markets. Futures market correlation show a similar pattern to spot market correlation. Apart from the Czech Republic and Germany, results for other countries must be taken as indicative only since the liquidity of their futures markets is relatively low. In France, trading volume on the futures market is more than four times lower than on the spot market. Poland is an extreme case with the lowest futures market liquidity of our sample. In Poland, volumes on the spot market exceed the futures market 24 times. Therefore, those prices are biased and have little explanatory power. The low liquidity of French and Polish futures markets are caused by the fact that most electricity is traded over the counter in these countries.

Table 4: Futures price correlations

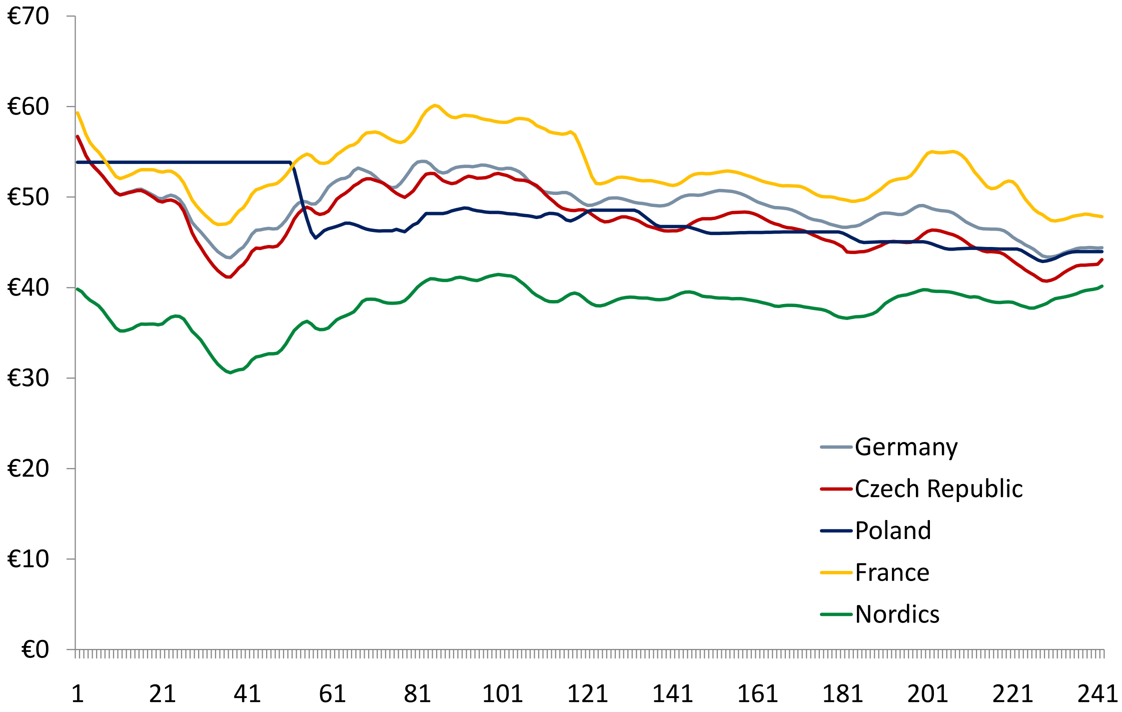
	Germany	Czech Republic	France	Nordics	Poland
Germany	1.00	0.96	0.88	0.48	0.31
Czech Republic	0.96	1.00	0.87	0.39	0.31
France	0.88	0.87	1.00	0.56	0.05
Nordics	0.48	0.39	0.56	1.00	-0.59
Poland	0.31	0.31	0.05	-0.59	1.00

Source: Exchanges, Candole Research calculations

Given relatively low liquidity of these markets, some authors speculate that a profit maximising strategy for an incumbent may be to withhold generation capacity in order to curb available supply and increase prices on the spot market (Borenstein and Alii, 2002; Crampes, 2002). Percebois (2008) finds evidence of this for the French market and concludes that an integrated dominant incumbent selling most of its output on long-term contracts is not motivated to intervene to drive prices down.

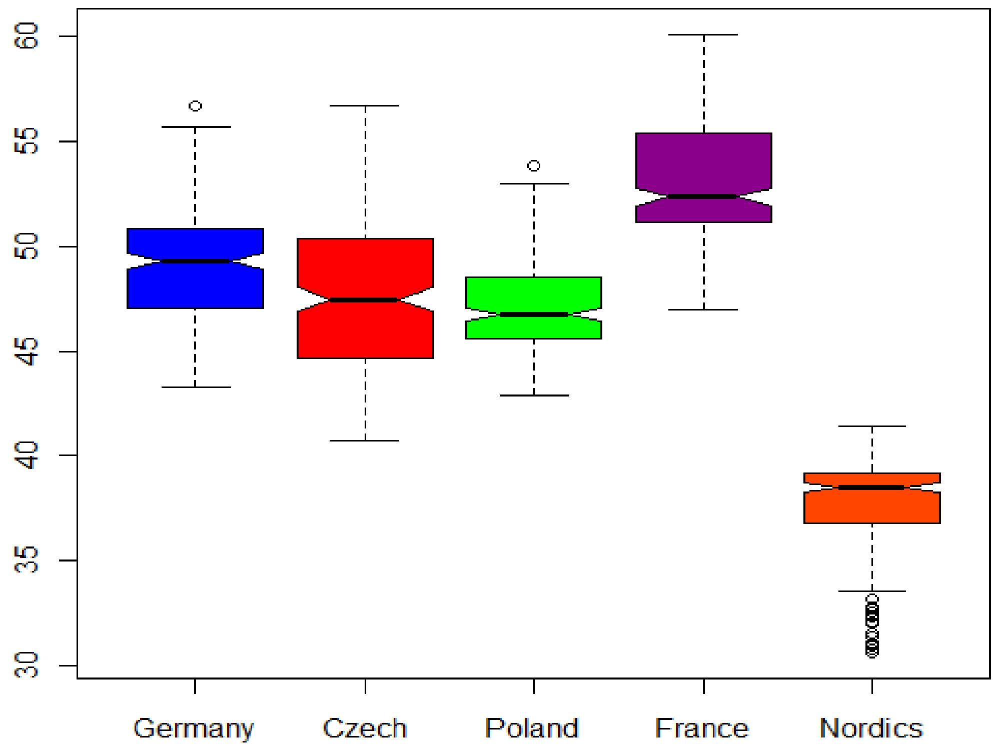
Chart 3 again demonstrates that Germany is the price setting market for the Czech Republic. The Czech forward market has had the highest correlation with the German market. The Polish market has traded in discount to the Czech market most of the time.

Chart 3: Forward markets, 1 year delivery (2009, EUR/MWh)



Source: Exchanges, Candole Research calculations

Chart 4: Futures prices and variance (2009, EUR/MWh)



Source: Exchanges, Candole Research calculations

These results are tentative due to low liquidity of the Polish market. Chart 4 shows that distribution of Czech and Polish prices is closest to distribution of German future prices. Nordpool's prices are least volatile and are below EEX's levels most of the time. France on the other hand tends to trade at a premium to EEX and has among the most volatile prices.

Recently the premium between Czech and Polish prices narrowed. This development is best explained by the uneven distribution and the differing timing of the impact of the economic crisis. The overall effect of the crisis was to decrease spreads between countries as a result of a collapse in demand.

The decrease in the premium of Czech prices over Polish prices is explained by the contraction of Czech real GDP (and thus electricity demand) in 2009, while Polish real GDP expanded (EIU estimate is 1.2%) and Polish Zloty appreciated against Euro by 13.9% year-on-year at the same time (electricity is traded in Zloty in Poland and in Euro in the Czech Republic).

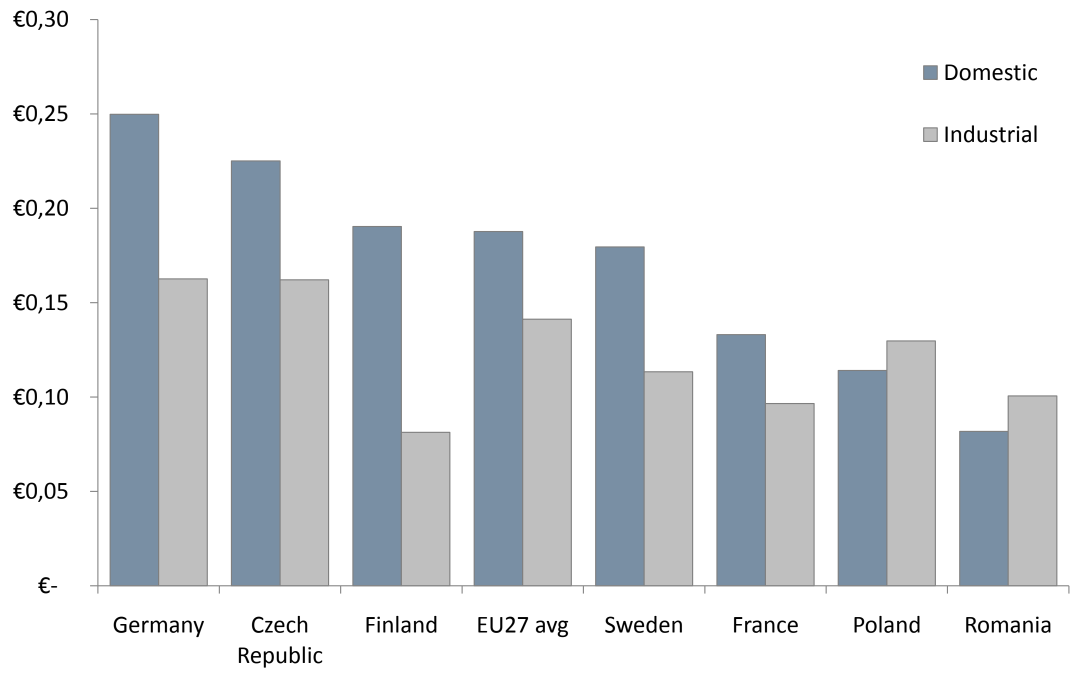
In conclusion, the prevailing price differentials over the EEX price and inadequate capacity grid and interconnector capacity show that one cannot yet speak of a well integrated European electricity market. This means that concentration ratios (such as RSI or HHI) based on local markets are still relevant for determining market power. High correlation between Czech and German prices supports the argument that German marginal power plant sets prices at which ČEZ sells electricity.

Regulation

Whereas differentials between wholesale prices are becoming smaller, they remain significant in the retail sector. Most countries use some version of price-cap and revenue-cap regulation to regulate distribution and transmission, which are assumed to be natural monopolies. Therefore, price differential may be caused by differences in parameters that regulators use for setting distribution and transmission tariffs.

Some characteristics can objectively explain differences in parameters of the regulatory formula, for example length of networks, number of transforming stations, support for renewable sources and relative price levels. Local regulators have significant discretion over the setting of other parameters which influence the final tariff calculation. These include recognition of justifiable costs, revaluations of regulatory asset base, guideline on

Chart 5: Retail prices to industrial and domestic consumers (H1/2009, EUR/kWh, w/o taxes)



Source: Eurostat

desired investment level, desired efficiency factors and WACC calculation. Chart 5 shows household and consumer prices in our sample of countries in 2009.

It is noteworthy that Czech household and industry electricity prices are among the highest from our sample. We speculate that higher household and industry prices may be explained by the fact that Czech revenue-cap regulation stimulates investment into transmission and distribution grids comparatively more than regulation in other countries (Cambini and Rondi, 2009).

The Czech Republic has one of the most sophisticated regulatory regimes in Europe. The Czech regulator sets distribution and transmission tariffs using incentive-based revenue-cap methodology.[8] Under this methodology, firms are allowed to earn a return on their investments equal to weighted cost of capital (WACC), which is decreased by an efficiency factor. Both WACC and the efficiency factor are set by the regulator for the regulatory

8 First, the regulator determines the total value of revenues a firm can earn over a period based on a number of parameters, including return on regulatory asset base (RAB), which is determined as regulated weighted average cost of capital times RAB. The amount of determined revenues is then divided by expected volumes of electricity transmitted over a period.

period. Under Czech regulation, WACC is adjusted annually to reflect changes in the company's cost of capital. The efficiency factor tends to be determined by a benchmarking analysis of peer companies.[9]

Whilst many of the regulatory parameters are objective, regulators still have some discretion over values of WACC, efficiency factor, value of regulatory asset base and allowed depreciation. WACC is particularly sensitive to assumptions about capital structures, cost of debt and equity and perceived investor risk of the respective industry. The value of the efficiency factor may be affected by assumptions such as choice of a peer group, choice of input variables and choice of the benchmarking method. Given the sensitivity of WACC and efficiency factor to numerous assumptions and choices of analytical methods, Plagnet (2006) concludes that regulated tariffs in the end can be determined as much by bargaining between a regulator and an operator as by other objective parameters. We can speculate that the more powerful an incumbent is on a local market, the more leverage it has over a regulator. Even so, the relative investor-friendliness of Czech regulation of transmission and distribution tariffs explains only a small part of ČEZ's profitability, as we demonstrate below. While the regulation does not create ČEZ's profitability, we conclude that at least it does not hamper ČEZ's generation margins.

France is an outlier in our sample and it falsifies our speculation about the incumbent's dominance increasing its strength over a regulator. Despite the fact that the French spot market trades at a premium to EEX most of the time, French consumers pay on average less than German consumers.[10] This is because French regulation still allows households and small businesses to benefit from a fuel mix dominated by cheap nuclear and pump-storage output through regulated integrated tariffs. Approximately 97% of French households benefit from integrated tariffs (CRE, 2009).

These tariffs are legal under EC law as long as they are not discriminatory and cover long-term marginal costs of the system. This means that regulated tariffs must not prohibit entry of a new operator by pricing below long-run marginal costs of production. The European Commission investigated the French tariff scheme and concluded that integrated tariffs for households and small businesses were compatible with EC law. The European

9 Usually, regulators tend to use either Data Envelopment Analysis (DEA) or Corrected Ordinary Least Squares (COLS)

10 Only about half of French consumption is traded on the exchange. Approximately half of the consumption is traded over the counter (CRE, 2009).

Commission requires France to phase out only tariffs offered to large and medium-sized firms because they are too low to cover marginal costs of production, and the so-called TARTAM (or return tariff), which allows certain French consumers who had opted for market-price contracts rather than regulated contracts to return to regulated contracts (CRE and EC, 2009).

Conclusion

We conclude that the Czech electricity market is far from competitive. The Czech market is the most concentrated from our sample and this concentration is unlikely to be lessened by international trade given interconnector congestion. Connection with Germany allows ČEZ to sell its output at a price determined by German marginal power plant, which is often gas or coal-fired. Given the low variable costs of ČEZ's nuclear and lignite production and significant market concentration, we may assume that ČEZ is earning mark-ups over its marginal costs, which generate economic rent. A number of studies analysing European electricity market found that the market is best described as an oligopoly and that incumbents sell for prices that significantly exceed their marginal costs. In short, we find untenable the argument that ČEZ is a price taker on a competitive market.

The Czech Republic has state-of-the-art regulation that encourages distribution firms to invest in maintaining their grids and allows them to earn profit. However, this regulation hardly creates opportunities for ČEZ to extend the economic rent it earns on its generation assets. We show below the relatively unimportant contribution of ČEZ's regulated distribution and unregulated sales business to profitability. But unlike the French regulatory scheme, the Czech one allows ČEZ to keep the economic rent it earns on its generation assets. ČEZ's ability consistently to earn economic rent means that its producer surplus increases, while the consumer surplus of Czech consumers, which would have existed under perfect competition, decreases (it is transferred to ČEZ). This situation is unlikely to change as long as the wholesale electricity market remains concentrated.

Peer analysis

The objective is to compare companies with different margins and cost curves. We will do a peer analysis of ČEZ, RWE, E.ON, Fortum, EDF and PGE. The purpose is to establish whether ČEZ is an outlier among its peers. We will determine what creates value in ČEZ today and what is likely to be the driver of future value. In particular, we will compare the contribution to ČEZ's enterprise value of various business lines such as foreign or domestic generation.

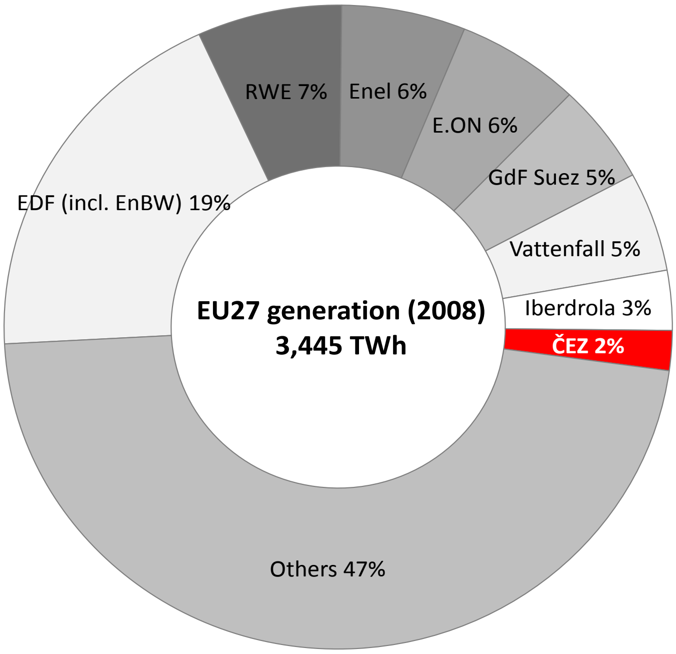
We compare ČEZ with its peers using five factors, summarised in Table 5 below. Chart 6 below compares output of selected European generators.

Table 5: Peer analysis for the latest fiscal year

Indicator	ČEZ	Fortum	EDF	RWE	PGE	E.ON
Operations						
Installed capacity (MW, 2008)	14,288	13,576	124,800	44,937	12,400	74,366
Generation (TWh, 2008)	67.60	64.20	595.10	334.20	56.00	317.60
Employees	27,133	12,054	155,931	70,990	46,453	90,418
Profitability						
Gross margin	62.71%	62.17%	41.68%	34.03%	26.53%	24.26%
Operating margin	35.27%	33.12%	13.11%	13.65%	23.42%	8.29%
Net profit margin	26.57%	27.03%	4.83%	6.98%	9.32%	1.24%
Financial strength						
Quick ratio	0.78	1.59	0.86	1.13	0.71	0.82
Current ratio	0.83	1.80	1.02	1.19	0.87	0.91
Long-term debt/equity	0.38	0.81	1.06	0.90	0.19	0.72
Debt/equity	1.73	1.54	7.68	7.06	1.06	3.55
Management effectiveness						
Return on equity	26.99%	18.81%	13.53%	24.69%	6.36%	3.33%
Return on assets	11.22%	8.41%	1.65%	3.89%	5.77%	1.18%
Valuation						
Price/earnings	10.11	11.04	21.13	11.01	11.48	11.48
Price/cash flow	7.11	7.68	9.25	5.56	7.80	9.74
Consensus recommendation (1= Buy; 5 = Sell)	2.48	2.90	2.14	2.27	3.00	2.44

Source: Reuters, Company filings

Chart 6: Electricity production in EU27 (2008)



Source: RWE 2008 annual report

Operations

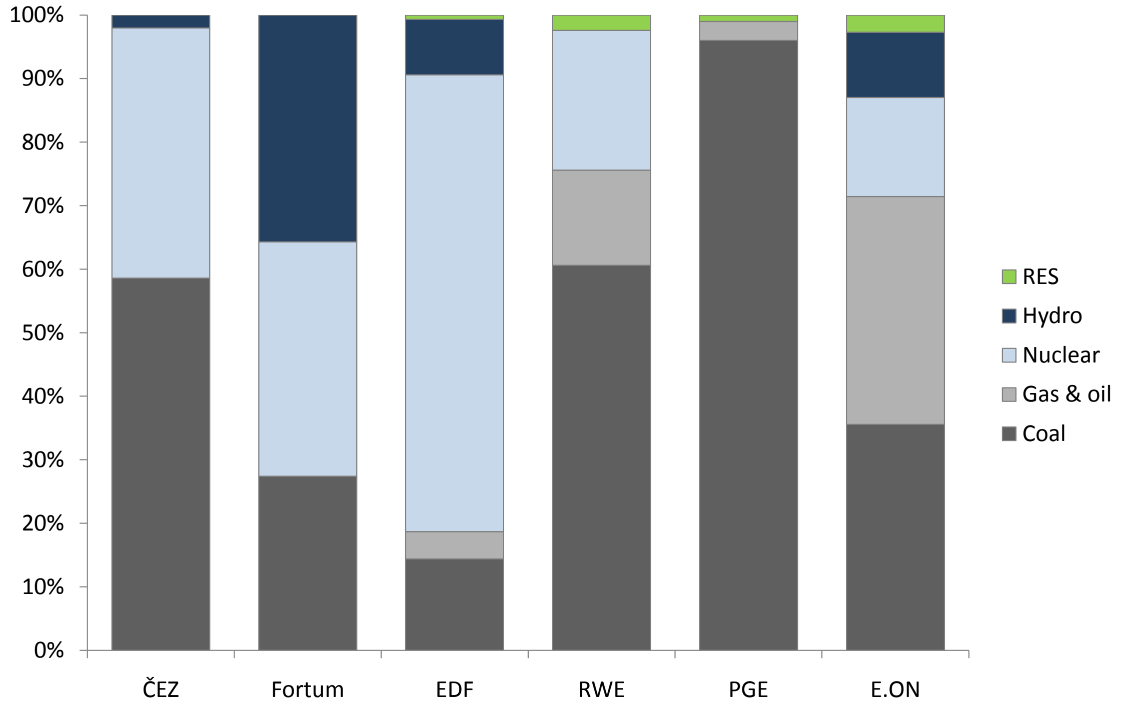
ČEZ generates between 4.2-4.8GWh of electricity from 1MW installed capacity, which is similar to its peers. Yet compared to them, ČEZ has an excessively large workforce. Notwithstanding headcount reduction of 13% in 2006 – 2008 while maintaining production levels, ČEZ still employs proportionately more people than E.ON, EDF, RWE and Fortum. Only PGE (Polish Energy Group) performs worse but given the fact that PGE only became a public company in October 2009, it is too early to make this comparison.

ČEZ needs 401 employees to generate 1MWh compared to between 180-290 needed by its peers (830 for PGE). The number of employees necessary to support 1MW installed capacity is 1.90, while the range is 0.9-1.5 (3.7 for PGE) with its peers. Our argument that ČEZ's success rests on market structure is supported by the fact that the firm achieves the highest profitability with the second most bloated workforce.

Profitability

Chart 7 shows that ČEZ margins are unusually high for an integrated utility generating more than half of its electricity from coal. In H1 2009, profitability was even higher than 2008. ČEZ had an operating income margin of 42%, twice the average of our peer group. In fact, the only company which comes anywhere close to ČEZ's profitability is Fortum, which reported 34% operating income margin in the same period. Fortum is able to achieve such margins because it generates almost half of its electricity from water, which means with almost zero variable costs. PGE's profitability is helped by the fact that its assets are largely depreciated. A 2008 common-size income statement shows that PGE's depreciation expense is only 0.3% of its total revenues, compared to 4.6% for E.ON and RWE, 8.8% for Fortum, 8.9% for EDF and 12% for ČEZ.

Chart 7: Company fuel mix by generation



Source: Eurostat

EDF is an interesting case. Although it has relatively high gross margins mostly due to its favourable fuel mix of nuclear and pump-storage plants, it has among the lowest operating margins, which are mostly depressed by its distribution and sales figures. These are lower than the industry's average due to the existence of regulated tariffs (so-called integrated tariffs) for households as well as industry. Industry tariffs in particular distort EDF figures since they account for 57% of electricity consumption (CRE, 2009) and are lower than the long-term marginal costs of the system (EC, 2009). Despite recent liberalisation, EDF margins have been depressed by the introduction of the so-called TARTAM tariff. TARTAM tariff is a return tariff for consumers who had opted for market-price contracts and decided to return to regulated contracts. This measure is attacked by the European Commission as market distorting and should be phased out in 2010 (EC, 2009). Almost all TARTAM customers are large or medium-sized industrial customers (CRE, 2009).

Financial strength

ČEZ is relatively illiquid compared to its peers due to its heavy reliance on short-term debt. The quick ratio (this measures a company's ability to cover its short-term liabilities by cash and cash-equivalents) was the second lowest after PGE, while the current ratio was the lowest of all. The figures improved in H1/2009 (quick: 0.85, current: 0.90), but ČEZ is still among the least liquid of all six companies, followed by PGE. Nevertheless, ČEZ is relatively underleveraged and could boost its liquidity and ROE by increases in borrowing.

Management effectiveness

ČEZ has the highest return on equity among its peers (26.9%) but uses very little leverage. Its total debt-to-equity ratio is more than 50% below the average of EDF, E.ON, RWE and Fortum. Only PGE uses less leverage than ČEZ, on average 10% less debt than ČEZ. The respective ratios remain similar even if we assess the companies' leverage only on long-term debt-to-equity rather than on total liabilities. In addition to return on equity, ČEZ generates the highest returns on asset among its peers. ČEZ's ROA of 11.22% is three times the average of our peer group.

Break down of ROE into components measuring firms' profitability, efficiency in managing assets and leverage all support our argument that ČEZ benefits from the market structure

Table 6: Du Pont analysis

	ČEZ	Fortum	EDF	RWE	PGE	E.ON
Net profit margin	25.61%	26.29%	5.29%	5.31%	9.32%	1.24%
Asset turnover	38.39%	28.93%	32.06%	51.55%	43.65%	64.91%
Leverage factor	2.73	2.55	8.64	8.06	1.56	4.55
Return on equity	26.85%	19.39%	14.66%	22.08%	6.36%	3.67%

Source: Company filings, Candole Research calculations and its legacy generation fleet. ČEZ's ability efficiently to run assets is not much different to its peers. As we point out above, PGE's asset turnover ratio is relatively high given the low book value of its assets.

Where is the value generated in ČEZ?

Most value in ČEZ is generated by its legacy Czech generation fleet, which accounts for more than 70% of the group's EBITDA. The composition of ČEZ's generation portfolio allows ČEZ to react flexibly to changing demand along the entire load curve. When the demand is low, ČEZ benefits from its nuclear power plants (its pump-storage plants may shave off some load if the demand falls too low). As the demand increases, ČEZ coal-fired power plants become in-merit and are dispatched. And because ČEZ has lower marginal costs than German producers, its coal-fired power plants become in-merit sooner than the German ones, which allows ČEZ to make a significant mark-up. This is possible due to the fact that more than 60% of coal is sourced from ČEZ's own mines, which makes its coal-fired fleet mostly fixed-price, as Crampton and Lekander (2009) point out.

The most valuable assets of ČEZ are Temelín and Dukovany nuclear power plants. 35% of ČEZ enterprise value comes from Temelín and Dukovany alone. Approximately 24% of ČEZ enterprise value is attributable to its coal-fired plants (UBS, 2009). As a result, load factors of ČEZ's nuclear fleet and the achieved price at which ČEZ sells are the dominant drivers of ČEZ's profitability. As we show above, high correlation between German and Czech prices means that an increase in demand for electricity in Germany directly translates into higher profits of ČEZ.

The Czech government allocates free CO2 allowances to ČEZ and it will continue to do so even after the beginning of the 3rd trading period (from 2013-2020) because the Czech government transposed an opt-out from full auctioning of allowance starting 2013. This means that around a quarter of ČEZ's value may continue to be generated by its lignite-fired fleet. Free allocation benefits ČEZ because the cost of these allowances is passed on to final consumers in the form of higher electricity prices. As London Economics (2007) point out, the fact that allowances were allocated for free is irrelevant. Firms are able to price-in their cost provided there is an opportunity cost of using them (for example selling them) and for as long as they remain scarce.

ČEZ may wish to be seen as an integrated central European utility but it is very much a Czech business. ČEZ generates more than 90% of its EBITDA in the Czech Republic and its most valuable assets in terms of enterprise value contribution are its Czech generation assets. Much touted acquisitions in the Balkans and in Poland represent only 9% of the group enterprise value, as Table 7 shows. In addition, as Table 8 below illustrates, ČEZ's margins abroad are in line with margins achieved by its peers. Czech operations are clearly the largest contributors to ČEZ's overall profitability. This picture is unlikely to change even with ČEZ's ambitious investment plans abroad (ČEZ plans to match every 1MW built abroad with at least 1MW at home).

Table 7: Division contribution to ČEZ's enterprise value

Country/division	% of ČEZ Group's EV	% of ČEZ Group's EBITDA
Czech generation	71%	94.96%
Czech distribution	12%	
Czech supply	2%	
Bulgarian distribution	3%	2.06%
Bulgarian generation	1%	
Romanian distribution	3%	1.86%
Polish generation	2%	2.11%
Other	7%	0.65%

Source: Crampton and Lekander (2009), Company filings, Candole Research calculations

Table 8: Profitability of ČEZ in selected countries (2008 combined results)

Country	Operating margin	Net profit margin
Czech Republic	27.08%	21.80%
Poland	21.81%	10.86%
Bulgaria	2.60%	3.29%
Romania	4.40%	2.79%
Germany	2.34%	-1.80%
Slovakia	8.23%	6.84%
Hungary	7.54%	6.71%
Serbia	-0.90%	-2.24%

Source: ČEZ annual report, Candole Research calculations

Conclusion

The fact that ČEZ is able consistently to generate economic rent weakens its claim to operate in a competitive market. If the market was competitive, ČEZ's marginal costs would equal its average total costs and price, and price determines its marginal revenue. If we assume ČEZ to be a price taker in a market that is close to perfect competition (price = marginal revenue = marginal costs) and taking into account the fact that ČEZ earns economic rent, we would expect its average total cost function to be well below that of its competitors. This would lead to new entrants pushing prices down and/or increasing prices of inputs that are not freely traded. And this would reduce ČEZ's economic rent.

The fact that new entrants are not entering the Czech market suggests that there are barriers to entry, such as insufficient capacity in the grid, shortage of fuel that can be supplied to new entrants and other administrative barriers such as construction permits. ČEZ may not be able to abuse its market power in the wholesale electricity market, but it may be able to exert its significant buying power in the market for inputs. The barrier to entry is caused by ČEZ's effective control over those inputs which cannot be freely traded. This prevents new entrants from taking advantage of the cost competitiveness of the Czech Republic.

Such behaviour is described as vertical foreclosure. ČEZ may seek to benefit from its privileged position on some segments of the energy supply chain in order to block potential new entrants from entering the market by distorting available capacities of inputs. ČEZ may be tempted to distort the market for inputs given its control over sites used to build new power plants, access to the distribution grid and fuel sources, and where ČEZ does not enjoy such control, it has a significant buying power. ČEZ's privileged access to information and policy makers raises the entry barrier still further.

Summary and Recommendations

Some observers of the Czech energy market assert that ČEZ is able to outperform its peers because of incestuous relations it enjoys with local politicians and public authorities, and that any conflicts of interest thus created are excusable given the favourable market and regulatory conditions they secure for the national energy champion.

The assertion is flawed. Market structure and events beyond the immediate influence of local decision makers explain ČEZ's profitability. The management has no need to corrupt public officials in order to boost results. Any corruption that may occur dilutes rather than enhances shareholder value.

We investigate the competitiveness of the Czech energy market in a regional context and benchmark ČEZ with its foreign peers in order better to understand what drives ČEZ's profitability. We conclude that the firm's recent success may be attributed to five structural variables. By far the greatest contribution is made by the firm's Czech generation assets, in particular the nuclear power plants, followed by Czech lignite generation, which takes advantage of coal sourced from ČEZ's own mines. Two local policy decisions taken in the past laid the foundation of the firm's success under CEO Martin Roman: The decision to complete Temelín and the decision to create a vertically integrated firm with coal mines bundled into the structure.

ČEZ would hardly be such a success if these domestic decisions had not coincided with developments outside the Czech Republic. An integrating European market allows ČEZ to charge prices determined by German marginal power plant. Marginal power plant is either coal or gas-fired along a significant part of German load curve due to the moratorium on the construction of nuclear power plants in Germany. Had Germany generated more of its electricity from nuclear rather than from gas-fired plants, ČEZ would not have been able to earn such a significant mark-up over its marginal costs.

The magnitude of this mark-up is determined by another exogenous factor, the commodity boom. Czech price setting power plant tends to be German gas-fired plant due to the relatively good export connection with Germany. Germany imports much of its natural gas on the basis of long-term contracts. These long-term contracts are indexed to oil. As a result, variations in oil price have a direct effect on Czech electricity price. Given ČEZ's operational leverage (share of fixed-to-variable costs) and given the low marginal costs of

Czech production, increases in oil prices over the last five years have translated directly into ČEZ's operating income. While all generators benefited from economic growth and rising oil prices in the last five years, ČEZ benefited disproportionately more due to the combination of all the above.

The results of our analysis throw doubt upon the notion of ČEZ as a regional giant. Foreign acquisitions account for just 10% of the firm's enterprise value. And ČEZ's returns on these acquisitions are in line or below industry averages, and far below returns generated on its Czech assets. The fact that the firm's management struggles to find projects in which to invest free cash flow generated in the Czech Republic, projects which would match ČEZ's returns from its local legacy generation assets, is further evidence for our argument that the firm's profitability is driven by the specific structure of the Czech market.

Our analysis questions the existence of a competitive European wholesale market. One should speak about a competitive market only to the extent that there is capacity to trade electricity both across and within borders, in other words no bottlenecks in the transmission network. We show that interconnectors are congested. The demand exceeds available capacity by a factor of five. Our analysis of prevailing spreads over spot markets suggests that traders cannot take advantage of all available arbitrage opportunities despite the grid operators' efforts to increase efficiency of capacity allocation methods.

Our research thus corroborates findings of other studies that the European wholesale market is closer to an oligopoly than to perfect competition. We demonstrate that the Czech market is very concentrated, second only to France, notwithstanding the capacity of interconnectors.

The combined effect of the relatively good connection between the Czech Republic and Germany and low variable costs of production in the Czech Republic, is that Czech consumer surplus becomes the producer surplus of ČEZ, which is to say that ČEZ generates economic rent, a profit over the industry's normal profit.

The fact that the price setting power plant for the Czech Republic is German power plant means that Czech consumers are not benefiting from the cost advantages of the Czech Republic. Nor do German consumers benefit since ČEZ's output is too small to have any meaningful impact on German wholesale prices.

The existence of administrative and technical hurdles to free trade between European countries and the fact that no other market participant seeks to exploit the incumbent's economic rent, together expose as hyperbolic ČEZ's claims about free competition.

In addition to an analysis of wholesale markets, we review the regulated distribution business of European utilities. We conclude that differing approaches of European regulators do not explain ČEZ's profitability, in spite of the fact that Czech household prices are among the highest in our sample. Czech regulation is relatively business friendly and even so, ČEZ's regulated distribution business represents only 12% of its EBITDA. The Czech regulator uses state-of-the-art revenue-cap regulation, which motivates Czech distribution firms to behave somewhat more efficiently and invest more into the grid than distribution firms under rate-of-return regulation. The cost of that investment is directly passed onto Czech consumers by virtue of the regulation. Whereas the Czech regulator can set various regulatory parameters to motivate distribution firms to invest, thereby increasing the consumer price, the regulation is rather mechanical and leaves distribution firms with little room to negotiate the final price.

Based upon these findings, we conclude that ČEZ's future profitability depends on the efficient execution of its Czech CAPEX plan. Protracted and overpriced extension of the firm's nuclear capabilities and renewal of its lignite-fired fleet may burden free cash flow, parts of which are now tied up in financing foreign acquisitions of questionable value to investors. And given the government's cavalier approach to scrutiny of the management it appoints, the risk to the investor that management may be tempted to seek rents while executing the investment plan remains high. As observers note, recent procurement decisions such as the choice of contractor to construct a temporary nuclear storage facility strengthen doubts about management commitment to maximising shareholder value. We believe that wasteful procurement and investment may become a burden on free cash flow in the near future.

Recent public debate on ČEZ's profitability revolves around the idea of a 'super' dividend payment from the firm's retained earnings. The idea is flawed. Retained earnings are an accounting measure and do not represent the amount of free cash companies hold in hand at a given time. As we show above, ČEZ is already weighed down with current liabilities and would most likely have to borrow to finance such a dividend, burdening its free cash flow at a time when this is required to renew the Czech generation fleet. And even though such a dividend may appeal to voters, it fails to address the welfare loss of Czech consumers and it may aggravate the problem of inadequate supervision by the majority shareholder. A 'super' dividend would deliver a one-off gain for the state budget, but it may threaten ČEZ's Czech CAPEX directly by burdening free cash flow and indirectly by reinforcing incestuous relations with local politicians and public authorities.

A more effective way to deal with welfare loss of consumers would be to adopt some parts of the EDF model described above. And a more effective way to deal with the failure of supervision would be to list 100% of ČEZ shares. This is the alternative policy makers should be considering, not the 'super' dividend idea with all the rent-seeking temptations it brings.

Adopting parts of the EDF model would allow Czech consumers to share in the benefits of Czech cost competitiveness through regulated integrated tariffs modeled on the French system. This solution would comply with EC legislation as long as integrated tariffs covered long-term marginal costs of the system and applied only to households and small businesses.

Listing 100% of its shares would fix the accountability problem. If ČEZ was a private company, public authorities should quickly learn to treat ČEZ as any other dominant private company. They should be less motivated to protect ČEZ, and more willing to demand and to publish information, for instance on whether ČEZ abuses it dominant position. The public authorities would become the independent arbiters they cannot be today as they struggle to regulate and to hold accountable a company in which their superiors are shareholders. And shareholders would be motivated to hold the management accountable for value-diluting decisions through the supervisory board. The management could then focus on maximising shareholder value and resist pressure to support possibly competing objectives of the state as dominant shareholder, such as the pursuit of national security or social policy. Rent-seeking behavior and wasteful spending would become the shareholders' problem, not that of Czech taxpayers, who today implicitly underwrite ČEZ through the state's shareholding.

It is not an easy choice. Either way will require the government to acknowledge the limitations of the policy of grafting a private firm onto a dominant public utility. As with plants, it takes time to discover whether scion and stock have formed a healthy union. Evidence is mounting that, in the case of ČEZ, they have not, with the resulting hybrid unable to achieve its full potential either as a public utility or as a private firm.

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