

## Possibility of profitable capacity withdrawal by British Energy in winter 2000/01 and summer 2001

### General

1. This appendix examines the circumstances under which a withdrawal of capacity might be profitable for British Energy. Our calculations were inspired by Ofgem's chart of the minimum price increase a generator would have to effect in order to profit from a 500 MW capacity withdrawal, given assumptions on avoidable costs and prevailing market prices (see paragraphs 8.224 and 8.225 as well as Figure 8.1). The appendix does not address the question of whether companies, acting alone or together, could cause and maintain such increases in price. It merely looks at the effect that would be necessary to make such actions profitable.

2. For illustrative purposes, we used a typical withdrawal of 500 MW, which is approximately the size of a genset of Eggborough. British Energy gave us fuel cost estimates of the order of £[ ]/MWh for that station. We took this value to be a reasonable estimate of its avoidable costs even though the actual value is probably slightly higher for withdrawals longer than a week, when costs such as maintenance and some labour costs might be avoided as well as fuel costs.

3. In the first instance, we assumed that the capacity withdrawn was previously running at the same load factor as the remaining uncontracted portfolio. Our approach was to look at the frequency of different price levels during summer 1999 and winter 1999/2000, and see what price increases would have been necessary for a generator to break even on capacity withdrawal strategies of different duration. We used these price levels and frequencies as proxies for the winter 2000/01 and summer 2001. We assumed for this purpose that the Pool would still be in operation in summer 2001.

### Profitability

4. It will be profitable for a generator to withdraw capacity only if the loss in profit from the capacity withdrawn is more than offset by increased profits for its remaining uncontracted capacity as a result of higher prices. This is relevant only to portfolio generators because a generator with a single genset is very unlikely to profit from the partial withdrawal of its capacity.

5. It is possible to calculate the increase in prices that would be required for the withdrawal of a given amount of capacity to be profitable for any size of uncontracted portfolio. Ofgem did so and its results are illustrated in Figure 8.1.

6. Ofgem's calculations assumed that the increased price is realized across the entire uncontracted portfolio, that the price effect is immediate, and that this average price increase is sustained throughout the duration of the withdrawal. Our calculations are subject to the same caveats, except that we have taken into account the fact that capacity withdrawals would not affect capacity payments during the first seven days. (For example, a 30-day capacity withdrawal would only affect the capacity payments during 23 days as the LOLP would not be affected in the first seven days.)

7. Furthermore, we assumed that there would be no impact on SMP during the first seven days of the withdrawal. In practice, the SMP would always be affected by withdrawal of in-merit generation capacity even though the impact on capacity payments would not be felt until seven days had elapsed. This means that our results will tend to overestimate, albeit slightly, the price increase necessary to break even. However, this effect is partly offset by the fact that we consider £[ ]/MWh to be the avoidable costs, even though they are likely to be higher than this value for the reasons given in paragraph 2.

8. Our formula gives us the price increase necessary during those 23 days in order to break even over the entire duration of the withdrawal.

9. The three general principles affecting the profitability of capacity withdrawals are the following:
- (a) The larger the size of a generator's uncontracted portfolio, the more likely it will be that that generator would benefit from a capacity withdrawal.
  - (b) The closer the prevailing market prices are to a genset's marginal cost, the more likely it will be that a withdrawal of that genset would be profitable.
  - (c) The tighter the plant margin is, the greater the impact on prices will be.

## Contract cover

10. We were told by British Energy that it was currently contracted for approximately [ ] per cent of its expected output during the winter 2000/01, and that it had already achieved [ ] per cent contractual cover for the summer of 2001. [

*Details omitted. See note on page iv.*

]

11. Given these risks and considering that the EFA market may offer limited opportunities to unwind large contractual positions in the short term due to its limited liquidity, we have considered, for the purposes of this analysis, scenarios in which the company's uncontracted generation capacity ranged from 1 GW to 4 GW, out of a portfolio totalling some 9 GW.

12. The upper bound of 4 GW would be equivalent to running Eggborough as a totally merchant plant and leaving approximately [ ] GW of nuclear capacity exposed to Pool prices (given that one set at Eggborough is due to undergo statutory overhaul for part of the period). The company could leave more of its output exposed to Pool prices if it so chose but British Energy told us that the size of its uncontracted portfolio would usually fall within the range of [ ] GW in the short term and would rarely, if ever, exceed [ ] GW. It also said that leaving large portions of its portfolio uncontracted was contrary to its risk-management policies.

13. Ofgem told us that the upper bound of 4 GW was questionable because a company wishing to exercise market power would presumably unwind its contracts in the market before withdrawing capacity.

## Results

14. We calculated a series of rolling averages of PPP for the winter and the summer of 1999/2000 and used them as proxies for the prices in winter 2000/01 and summer 2001.

15. The purpose of these calculations was to see how frequently a profit-maximizing generator able to predict future prices might have expected a 30- or 60-day capacity withdrawal to be profitable. In reality, of course, generators do not have the precise knowledge of future prices we assumed.

16. The full results are presented in Tables 1 to 4.

17. We also tested other hypotheses in terms of the load factors achieved by the uncontracted portfolio and the withdrawn capacity. If the remaining portfolio were to run at higher load factors than the withdrawn capacity, the price increases required for the withdrawal to be profitable would be lower. In the case of British Energy, this situation would arise if the company withdrew units at Eggborough while leaving some nuclear output uncontracted. However, our analysis suggested that the reductions in the required price increases would be small, so that the results presented in Tables 1 to 4 were robust estimates of the magnitude of the price increase that the company would need to achieve in order to break even from a capacity withdrawal of 500 MW.

TABLE 1 Necessary price increase to break even during a 30-day capacity withdrawal of 500 MW given price levels observed in summer 1999

Summer 1999

<i>30-day capacity withdrawal</i>																		
Duration of the price effect	23 days																£/MWh	
Market price (30-day rolling average PPP)	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
	<i>per cent</i>																	
Frequency	11	6	18	4	1	3	3	6	2	4	6	4	5	11	10	5	1	
Cumulative frequency	11	18	35	39	40	43	46	52	54	58	64	68	73	84	94	99	100	
	<i>Necessary price increase in order to break even</i>																	
<i>Size of the uncontracted portfolio</i>																		
1 GW	26	33	38	43	48	52	56	59	62	65	68	70	72	75	76	78	80	
1.5 GW	13	16	19	22	24	26	28	30	31	33	34	35	36	37	38	39	40	
2 GW	9	11	13	14	16	17	19	20	21	22	23	23	24	25	25	26	27	
2.5 GW	7	8	10	11	12	13	14	15	16	16	17	18	18	19	19	20	20	
3 GW	5	7	8	9	10	10	11	12	12	13	14	14	14	15	15	16	16	
3.5 GW	4	5	6	7	8	9	9	10	10	11	11	12	12	12	13	13	13	
4 GW	4	5	5	6	7	7	8	8	9	9	10	10	10	11	11	11	11	

Source: CC calculations based on Ofgem data.

TABLE 2 Necessary price increase to break even during a 60-day capacity withdrawal of 500 MW given price levels observed in summer 1999

Summer 1999

<i>60-day capacity withdrawal</i>													
Duration of the price effect	53 days												<i>£/MWh</i>
Market price (60-day rolling average PPP)	16	17	18	19	20	21	22	23	24	25	26	27	28
	<i>per cent</i>												
Frequency	12	17	2	2	2	2	4	7	14	11	16	9	2
Cumulative frequency	12	29	31	33	35	37	41	48	62	73	90	98	100
<i>Necessary price increase in order to break even</i>													
<i>Size of the uncontracted portfolio</i>													
1 GW	28	33	38	42	45	49	51	54	57	59	61	63	65
1.5 GW	14	17	19	21	23	24	26	27	28	29	30	31	32
2 GW	9	11	13	14	15	16	17	18	19	20	20	21	22
2.5 GW	7	8	9	10	11	12	13	14	14	15	15	16	16
3 GW	6	7	8	8	9	10	10	11	11	12	12	13	13
3.5 GW	5	6	6	7	8	8	9	9	9	10	10	10	11
4 GW	4	5	5	6	6	7	7	8	8	8	9	9	9

Source: CC calculations based on Ofgem data.

TABLE 3 Necessary price increase to break even during a 30-day capacity withdrawal of 500 MW given price levels observed in winter 1999/2000

Winter 1999/2000

<i>30-day capacity withdrawal</i>	23 days														
Duration of the price effect	<i>£/MWh</i>														
Market price (30-day rolling average PPP)	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	<i>per cent</i>														
Frequency	5	3	1	10	10	27	14	5	5	2	1	3	3	6	5
Cumulative frequency	5	8	10	19	30	57	71	77	81	83	84	87	90	95	100
	<i>Necessary price increase in order to break even</i>														
<i>Size of the uncontracted portfolio</i>															
1 GW	43	48	52	56	59	62	65	68	70	72	75	76	78	80	82
1.5 GW	22	24	26	28	30	31	33	34	35	36	37	38	39	40	41
2 GW	14	16	17	19	20	21	22	23	23	24	25	25	26	27	27
2.5 GW	11	12	13	14	15	16	16	17	18	18	19	19	20	20	20
3 GW	9	10	10	11	12	12	13	14	14	14	15	15	16	16	16
3.5 GW	7	8	9	9	10	10	11	11	12	12	12	13	13	13	14
4 GW	6	7	7	8	8	9	9	10	10	10	11	11	11	11	12

Source: CC calculations based on Ofgem data.

TABLE 4 Necessary price increase to break even during a 60-day capacity withdrawal of 500 MW given price level observed in winter 1999/2000

Winter 1999/2000

<i>60-day capacity withdrawal</i>											
Duration of the price effect	53 days										
	<i>£/MWh</i>										
Market price (60-day rolling average PPP)	20	21	22	23	24	25	26	27	28		
											<i>per cent</i>
Frequency	1	4	15	21	12	6	6	23	12		
Cumulative frequency	1	5	19	40	52	58	65	88	100		
	<i>Necessary price increase in order to break even</i>										
<i>Size of the uncontracted portfolio</i>											
1 GW	45	49	51	54	57	59	61	63	65		
1.5 GW	23	24	26	27	28	29	30	31	32		
2 GW	15	16	17	18	19	20	20	21	22		
2.5 GW	11	12	13	14	14	15	15	16	16		
3 GW	9	10	10	11	11	12	12	13	13		
3.5 GW	8	8	9	9	9	10	10	10	11		
4 GW	6	7	7	8	8	8	9	9	9		

Source: CC calculations based on Ofgem data.