Period	1	2	3	4	5	6
Load Forecast (MWh)	120	230	310	240	135	110
Average cost ($/MWh)	22.5	24.5	29.3	25.2	23.1	21.9
Actual load (MWh)	110	225	330	250	125	105
Spot price ($/MWh)	21.6	25.1	32	25.9	22.5	21.5

4.1 a)

Period	1	2	3	4	5	6	
Flat Rate ($)	24	24	24	24	24	24	
Actual Load (MWh)	110	225	330	250	125	105	
Revenue ($)	2640	5400	7920	6000	3000	2520	**$ 27,480.00**

Period	1	2	3	4	5	6	
Load Forecast (MWh)	120	230	310	240	135	110	
Actual Load (MWh)	110	225	330	250	125	105	1145
Difference (MWh)	-10	-5	20	10	-10	-5	

Spot Price ($/MWh)	21.60	25.10	32.00	25.90	22.50	21.50	
Spot Market ($)	**-216.00**	**-125.50**	**640.00**	**259.00**	**-225.00**	**-107.50**	**225.00**

Load Forecast (MWh)	120	230	310	240	135	110	
Average Cost ($/MWh)	22.50	24.50	29.30	25.20	23.10	21.90	
Forward Expense ($)	**2700.00**	**5635.00**	**9083.00**	**6048.00**	**3118.50**	**2409.00**	**29218.50**

Profit = Revenue - Cost	**-1738.5**

4.1 b)

Rate that it should have charged to its customers to break even
Total Cost/Total Actual Load

$$\frac{Total\ Cost}{Actual\ Load} = \frac{\$\ 29218.5}{1145\ MWh}$$

25.518 $/MWh

The input–output curve of a gas-fired generating unit is approximated by the following function:

$$H(P) = 120 + 9.3\,P + 0.0025\,P^2 \text{ MJ/h}$$

This unit has a minimum stable generation of 200 MW and a maximum output of 500 MW. The cost of gas is 1.20 $/MJ. Over a 6-h period, the output of this unit is sold in a market for electrical energy at the prices shown in the table below.

Period	**1**	**2**	**3**	**4**	**5**	**6**
Price ($/MWh)	12.5	10	13	13.5	15	11

4.2 a)

$$C(P) = H(P) * (Gas\ Cost) = (120 + 9.3 * P + 0.0025 * P^2) * (1.20)$$

Cost function $144 + 11.16 * P + 0.003 * P\text{^}2$

Marginal Cost $$MC(P) = \frac{dC(P)}{dP} = 11.16 + 0.006 * P$$

Optimal Dispatch $MC(P) = Market\ Price$

Production $$P = \frac{Market\ Price - 11.16}{0.06}$$

Period	Price ($/MWh)	Output P (MW)	Revenue ($)	Cost ($)	Profit ($)
1	12.50	223.33	2791.625	2786.03	5.630
2	10.00	200	2000.000	2496.00	-496.000
3	13.00	306.67	3986.710	3848.53	138.130
4	13.50	390	5265.000	4952.70	312.300
5	15.00	500	7500.000	6474.00	1026.000
6	11.00	200	2200.000	2496.00	-296.000
					$ 690.060