

## BESS Optimisation report - Pyomo

**Objective:** To increase the net revenue

**Decision variables:** Discharge capacity, Charge capacity, SOC

**Conditions:**

- The BESS cannot charge and discharge energy in the same hour in any market.
- Each discharged MWh from the BESS results in a degradation cost of \$10 to the BESS.
- Maximum discharge MWh from the BESS is limited to 180MWh.

**Constraints:**

- Maximum Power the BESS can charge and discharge in an hour – 10MW.
- Maximum energy the BESS can store at any hour – 40MWh.
- The charging efficiency of the BESS – 90%
- The discharging efficiency of the BESS – 100%
- At any hour, the BESS should have at least 5% of the Maximum energy stored in the BESS.

**Results:**

Day	Hours	Price data (\$)	Charge (MWh)	Discharge (MWh)	SOC (MWh)
Day 1	1	66.92	0	0	0
	2	66.26	0	0	0
	3	63.35	0	0	0
	4	62.62	0	0	0
	5	64.58	0	0	0
	6	73.41	0	0	0
	7	83	0	0	0
	8	61.23	0	0	0
	9	2.78	10	0	9
	10	17.93	10	0	18
	11	20.85	10	0	27
	12	25.73	0	0	27
	13	27.16	0	0	27
	14	27.32	0	0	27
	15	27.82	0	0	27
	16	28.22	0	0	27
	17	23.47	0	0	27
	18	16.4	10	0	36
	19	53.45	0	0	36
	20	84.94	0	10	26
	21	85.38	0	10	16
	22	75.02	0	10	6
	23	67.1	0	6	0
	24	60.53	0	0	0

Day 2	1	59.62	0	0	0
	2	58.92	0	0	0
	3	58.23	0	0	0
	4	57.28	0	0	0
	5	59.68	0	0	0
	6	64.34	0	0	0
	7	67.08	0	0	0
	8	48.54	0	0	0
	9	10.4	10	0	9
	10	27.72	10	0	18
	11	34.06	0	0	18
	12	32.48	0	0	18
	13	29.96	0	0	18
	14	33.2	0	0	18
	15	30.59	0	0	18
	16	31.8	0	0	18
	17	21.3	10	0	27
	18	5.76	10	0	36
	19	66.15	0	0	36
	20	82.02	0	10	26
	21	86.31	0	10	16
	22	78.52	0	10	6
	23	67.45	0	6	0
	24	62.38	0	0	0
Day 3	1	58.77	0	0	0
	2	56.07	0	0	0
	3	55.27	0	0	0
	4	54.64	0	0	0
	5	55.76	0	0	0
	6	61.28	0	0	0
	7	91.88	0	0	0
	8	76.5	0	0	0
	9	0.03	10	0	9
	10	16.78	0	0	9
	11	12.73	10	0	18
	12	15.34	0	0	18
	13	18.96	0	0	18
	14	19.43	0	0	18
	15	19.47	0	0	18
	16	14.84	0	0	18
	17	0	10	0	27
	18	13.02	10	0	36
	19	75.72	0	6	30
	20	93.25	0	10	20
	21	91.12	0	10	10
	22	84.22	0	10	0

	23	74.68	0	0	0
	24	66.88	0	0	0
Day 4	1	71.36	0	0	0
	2	68.61	0	0	0
	3	68	0	0	0
	4	70.73	0	0	0
	5	73.03	0	0	0
	6	84.23	0	0	0
	7	100.14	0	0	0
	8	45.39	0	0	0
	9	17.59	10	0	9
	10	34.8	0	0	9
	11	28.38	0	0	9
	12	26.7	0	0	9
	13	28.77	0	0	9
	14	22.37	0	0	9
	15	28.76	0	0	9
	16	14.18	10	0	18
	17	21.07	10	0	27
	18	14.79	10	0	36
	19	72.32	0	0	36
	20	92.32	0	10	26
	21	94.9	0	10	16
	22	88.75	0	10	6
	23	75.46	0	6	0
	24	74.33	0	0	0
Day 5	1	91.46	0	0	0
	2	91.52	0	0	0
	3	93.84	0	0	0
	4	93.84	0	0	0
	5	102.55	0	0	0
	6	120.49	0	0	0
	7	149.29	0	0	0
	8	108.81	0	0	0
	9	21.09	0	0	0
	10	19.31	0	0	0
	11	17.27	10	0	9
	12	17.05	10	0	18
	13	16.17	10	0	27
	14	17.82	0	0	0
	15	18.31	0	0	0
	16	17.75	0	0	0
	17	0.2	10	0	36
	18	46.96	0	0	0
	19	108.59	0	6	30
	20	128.38	0	10	20

	21	123.39	0	10	10
	22	115.45	0	10	0
	23	106.14	0	0	0
	24	102.03	0	0	0

**Total Revenue in \$:** 13737.22