ESF II project of the University of West Bohemia in Pilsen, reg. number: CZ.02.2.69/0.0/0.0/18_056/0013239

Example 6:

Assessment of the economic efficiency of investment

Task:

Decide which type of gas turbine (option 1 and 2) is more profitable to build for steam-gas power plant block in terms of economic efficiency for:

a) Criterion of updated profit (NPV)

b) Criterion of updated production costs

c) Criterion of internal interest rate (IRR)

Known parameters:

- Time of construction: $\mathbf{T_v = 5}$ **years**
- Construction launch delay: $\mathbf{\Delta T = 2}$ **years**
- Interest rate: $\mathbf{p = 10\ \%}$
- Lifetime: $\mathbf{T_Z = 15}$ **years**
- Block performance: $\mathbf{P_e = 105}$ **MW**
- Price of energy: $\mathbf{c_W = 950}$ **CZK / MWh**
- Price for system services: $\mathbf{c_P = 3{,}2 * 10^6}$ **CZK / MWrok**

Distribution of investment costs:

year	1	2	3	4	5
N_{it1} [10^9 Kč]	0,6	0,5	0,5	0,3	0,1
N_{it2} [10^9 Kč]	0,6	0,6	0,4	0,25	0,05

Fuel costs for each year of operation:

year	1. - 6.	7. - 11.	12. - 15.
N_{fuel1} [10^6 Kč]	230	2%	4%
N_{fuel2} [10^6 Kč]	310	350	390

Wages for each year of operation:

year	1. - 15.
N_{wage1} [10^6 Kč]	45
N_{wage2} [10^6 Kč]	50

Peak time usage in each year of operation (same for both options):

year	1. - 5.	6. - 10.	11. - 15.
T_m [h/year]	3000	5%	-2%