German Environment Agency

Energy management systems in practice

Annex

Exemplary calculation of the net present value of an energy efficiency action

In order to approve investment-related energy efficiency actions, companies usually need preceding economic feasibility studies. The procedure used to transparently determine economic efficiency is explained in detail in the main document of the guide in chapter 3.4. The tables in this document show the model calculation depicted in the main document, whereby Table 2 contains the respective formulas to explain the calculation in Table 1 in more detail. Table 1 can also be found in the same form in the guide as Table 5: "Determination of net present value; example: Replacement of cooling pumps".

Table1: Net present value calculation table

A	B	C	D	E	F	...	S
2	Calculation interest rate "i"	7.0%					
3	"Energy" price increase rate	3%					
4	"Other" price increase rate	2%					
5	Current specific energy price	0.18 €/kWh					
6	CO_2 emission factor electricity	0.486 kg/kWh					
7	Cash flows	Basic values	End of period t				
8			0	1	2	...	15
9	Payouts						
10	Investment expenditure for new pumps	€60,000	- €60,000				
11	Planning costs	€5,000	- €5,000				
12	Production downtime during installation	€3,000	- €3,000				
13	Inpayments						
14	Annual energy saving (electricity)	150,000 kWh		€27,810	€28,644	...	€42,065
15	Reduced maintenance and repair costs	€250			€260	...	
16	Scrap value of the old pumps	€1,500	€1,500			...	
17	Results						
18	Total		- €66,500	€27.810	€28,904	...	€42,065
19	Present values		- €66,500	€26,000	€25,265	...	€15,332
20	CO_2 savings per year			72,900 kg	72,900 kg	...	72,900 kg
21	CO_2 savings total		**-1,093,500 kg**				
22	Net present value of the investment		**€238,202**				

(Source: Own illustration)

Table 2: Net present value calculation table (with visible formulas)

A	B	C	D	E	F	...	S
2	Calculation interest rate "i"	7.0%					
3	"Energy" price increase rate	3%					
4	"Other" price increase rate	2%					
5	Current specific energy price	0.18 €/kWh					
6	CO_2 emission factor electricity	0.486 kg/kWh					
7	Cash flows	Basic values	End of period t				
8			0	1	2	...	15
9	Payouts						
10	Investment expenditure for new pumps	€60,000	=−C10				
11	Planning costs	€5,000	=−C11				
12	Production downtime during installation	€3,000	=−C12				
13	Inpayments						
14	Annual energy saving (electricity)	150,000 kWh		=$C$14×$C$5 ×(1+$C$3)^E8	=$C$14×$C$5 ×(1+$C$3)^F8	...	=$C$14×$C$5 ×(1+$C$3)^S8
15	Reduced maintenance and repair costs	€250			=$C$15×(1+$C$4)^F8	...	
16	Scrap value of the old pumps	€1,500	=C16			...	
17	Results						
18	Total		=SUM(D10:D12) +SUM(D14:D16)	=SUM(E10:E12) +SUM(E14:E16)	=SUM(F10:F12) +SUM(F14:F16)	...	=SUM(S10:S12) +SUM(S14:S16)
19	Present values		=(D18)÷(1+$C$2)^D8	=E18÷(1+$C$2)^D8	=F18÷(1+$C$2)^F8	...	=S18÷(1+$C$2)^S8
20	CO_2 savings per year			=C14x$C$6	=C14x$C$6	...	=C14x$C$6
21	CO_2 savings total		**=SUM(D20:S20)**				
22	Net present value of the investment		**=SUM(D19:S19)**				

(Source: Own illustration)

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