Appendix D: Profitability and cost calculation

Technical procurement of heat recycling systems in existing apartment blocks

1 Profitability calculation –Current value model

For the technical procurement a model is used where the current value of savings and costs during a calculation period is recalculated to a new current value taking account of interest calculated and increased energy prices. The model is based on energy savings, increased energy costs, investment costs, maintenance costs and reinvestment. The requirement is to show that the cost savings through maximising energy efficiency are greater than the total costs of the heat recycling plant during a calculation period (i.e. that investment has paid for itself during the period). Calculations are made for periods of 12 and 8 years.

During the 12-year period, the following requirements must be fulfilled:

Current value (Savings - Investment) > 0

During the 8-year period the following requirements should be fulfilled:

Current value (Savings - Investment) > 0

Where:

$$\textbf{Savings} = \textbf{Curr}_{\textbf{Sav\_htg}} - \textbf{Curr}_{\textbf{Energy\_hw}} - \textbf{Curr}_{\textbf{maint.}}$$

The current value of cost savings through maximising energy efficiency for heating and domestic hot water:

$$\text{Curr}_{sav\_htg} = \sum (p_o * \text{energy price} * \text{annual energy saving})$$

p_o = the curr sum factor for the difference between the real interest calculated and the real energy price increase for the calculation period:

The current value of cost of energy for the heat recycling plant

$$\text{Curr}_{Energy\_hw} = \sum (p_o * \text{energy price} * \text{annual energy consumption})$$

The current value of maintenance costs:

$$\text{Curr}_{maint.} = \sum (p_o * \text{annual maintenance costs})$$

$$\textbf{Investment} = \textbf{Investment cost} + \textbf{Installation cost} + \textbf{Curr}_{\textbf{reinv.}}$$

The current value of reinvestment for replacing components during the calculation period:

$$\text{Reinvestment} = \text{Cost}_{component} * f_{curr}$$

f_{curr} = current value factor for interest calculated and consumption time.

2   Cost calculation – Current value model

The current value of all costs for the heat recycling plant during the 20-year period must be stated (i.e. the life cycle cost (LCC) of the heat recycling plant)

Current value$_{hw}$ = Investment + Installation + Curr$_{reinv.}$ +Curr$_{Energy\_htg}$ + Curr$_{Energy\_hw}$ +Curr$_{maint.}$

Where the current value of costs for heating and domestic hot water:

Curr$_{Energy\_hw}$ = $\sum$ (p_o* energy price * annual energy consumption)

3   Input data for calculations

The following input data must be used for calculations:
Real interest calculated 4 % (according to SABO rebuilding)
Electric energy price inc. network levy and taxes 1.00 SEK/kWh
Heating energy price inc. VAT 0.60 SEK/kWh
Real price development electric energy 4 %/year
Real price development heating energy 2 %/year

Current sum factors for 12-year calculation period:

p_o (heating energy) = 10.58
p_o (electric energy) = 12.00
p_o (maintenance) = 9.39

Current sum factors for 8-year calculation period:

p_o (heating energy) = 7.33
p_o (electric energy) = 8.00
p_o (maintenance) = 6.73

Current sum factors for 20-year calculation period:

p_o (heating energy) = 16.35
p_o (electric energy) = 20.00
p_o (maintenance) = 13.59

4   Statement of calculation

Profitability calculations for **12 years** are set out below:

Savings/Investment	SEK
Total investment cost (tooling, ventilation ducts, units, accumulator tank, devices, fans, control and regulator, etc.).	
Installation costs including any extra costs for building measures and linking in to the control and monitoring system.	
The current value of reinvestment. I.e. costs for replacing components. To be entered together with components' useful working life.	
Current value of future annual maintenance costs (servicing, cleaning and regular replacement of filters, etc.) for 12 years.	
Current value cost savings through energy effectivisation for heating and domestic hot water for 12 years.	
Current value of cost of energy for the heat recycling plant for 12 years.	
Current value (Savings – Investment)	

Profitability calculations for **8 years** are set out below:

Savings/Investment	SEK
Total investment cost (tooling, ventilation ducts, units, accumulator tank, devices, fans, control and regulator, etc.).	
Installation costs including any extra costs for building measures and linking in to the control and monitoring system.	
The current value of reinvestment. I.e. costs for replacing components. To be entered together with components' useful working life.	
Current value of future annual maintenance costs (servicing, cleaning and regular replacement of filters, etc.) for 8 years.	
Current value cost savings through energy effectivisation for heating and domestic hot water for 8 years.	
Current value of cost of energy for the heat recycling plant for 8 years.	
Current value (Savings – Investment)	

Cost calculations for **20 years** are set out below:

Savings/Investment	SEK
Total investment cost (tooling, ventilation ducts, units, accumulator tank, devices, fans, control and regulator, etc.).	
Installation costs including any extra costs for building measures and linking in to the control and monitoring system.	
The current value of reinvestment. I.e. costs for replacing components. To be entered together with components' useful working life.	
Current value of future annual maintenance costs (servicing, cleaning and regular replacement of filters, etc.) for 20 years.	
Current value cost savings through energy effectivisation for heating and domestic hot water for 20 years (Quantity of domestic hot water consumption is the same for the bloc as before the installation of the heat recycling plant).	
Current value of cost of energy for the heat recycling plant for 20 years.	
Current Life Cycle Cost LCC	