



CASE STUDY 8

Using an Environmental Upgrade Agreement to finance an energy efficient compressed air system

SCENARIO **End of life replacement**

TECHNOLOGY TYPE **Compressed air**

How does the energy efficiency system compare to the standard system?

The company first determines which system to install by calculating the expected cash flows and financial impact of each system. The lifetime cash flows are based on the following costs, electricity use and lifetime for each system.

Situation

A processing plant is looking at replacing their existing air compressor with a new unit. The compressor runs 8,400 hrs. p.a. at an average load of 50%. They have the option of purchasing a standard screw compressor (55kW) with load/unload type of control or an energy efficient VSD compressor (55kW) with the following characteristics:

- Equipped with premium efficiency motor
- Speed control capability
- Integrated high efficiency dryer
- Heavy-duty air intake filter.

The energy efficient compressor is more expensive, but has lower running cost due to the higher efficiency of its components and the energy savings achieved through speed reduction when the compressor runs at low loads.

Equipment type	Standard	EE
Cost to install (\$)	\$27,000	\$50,000
Operation and maintenance cost (\$ p.a.)	\$6,300	\$4,800
Electricity use (kWh p.a.)	333,667	256,667
Equipment life (years)	15	15
Electricity cost reduction in first year from EE (\$)		\$15,400
Simple payback period for EE (years)		4.7
Simple payback period for EE, with marginal capital (years) ⁹		2.2

⁹This is the payback period for the EE option using the difference in capital outlay between the standard and EE equipment, rather than the full capital outlay for the EE equipment.

“ The company determined that it would be better off by about **\$90,000** over 15 years if it invested in the energy efficient system ”

Annual cash flows comprise the following:

- In the first year, the cost of installing the equipment
- In all years, the operating costs (including operation and maintenance, plus electricity costs) and tax impact of purchasing the equipment. The tax impact is the change in tax payable due to the change in operating costs and depreciation, which are tax deductible
- Electricity rate of \$200/MWh in year one, increasing each year by 2% (excluding inflation).

The company used these annual cash flows to calculate the following NPV of installing each system.

Item	NPV
Standard system	-\$494,742
EE system	-\$404,640
Difference	\$90,102

The company determined that it would be better off by about \$90,000 over 15 years if it invested in the energy efficient system. Even though the energy efficient system is more expensive to install, it results in much lower electricity costs and lower operation and maintenance costs throughout its life.

Based on this financial analysis, the company chooses to install the energy efficient system.

What is the effect of Energy Savings Certificates?

If the company installs the efficient compressed air system it could generate additional value by creating ESCs through the NSW Energy Savings Scheme.

The company calculated the number of ESCs it could create and the money it would receive from these certificates, less the tax it would need to pay on the sale of the ESCs. It used the Project Impact Assessment with the Measurement and Verification Method to determine the number of ESCs it could create. The potential net revenue from the ESCs was estimated at about \$3,700, further increasing the value of the energy efficient system.

For more details on the assumptions and calculations the company used, refer to the cash flow model accompanying this finance guide.

How do the various energy efficiency and renewables finance options compare?

The company calculated the expected cash flows and their NPVs for each finance option, including and excluding the expected value of generating ESCs. The results were as follows.

Finance option	NPV, no ESC	NPV with ESCs	NPV rank	Comment
Environmental Upgrade Agreement	\$38,580	\$43,908	1	
On-bill financing	\$33,161	\$38,490	2	
Commercial loan	\$31,644	\$36,973	3	
Capital lease	\$30,713	\$36,042	4	
Self funded	\$30,723	\$34,453	5	
Operating lease	-\$5,553	-\$224	6	
Energy Efficient Loan	N/A	N/A		Not considered as the project does not meet the minimum finance amount criteria

The company decides to seek an Environmental Upgrade Agreement to finance its energy efficiency compressed air system, as this would result in the highest expected NPV.

FINANCE OPTION SELECTED

Environmental Upgrade Agreement

NEXT STEPS

Refer to the process outlined in Section 5.1