

Green Cleaning™ Systems

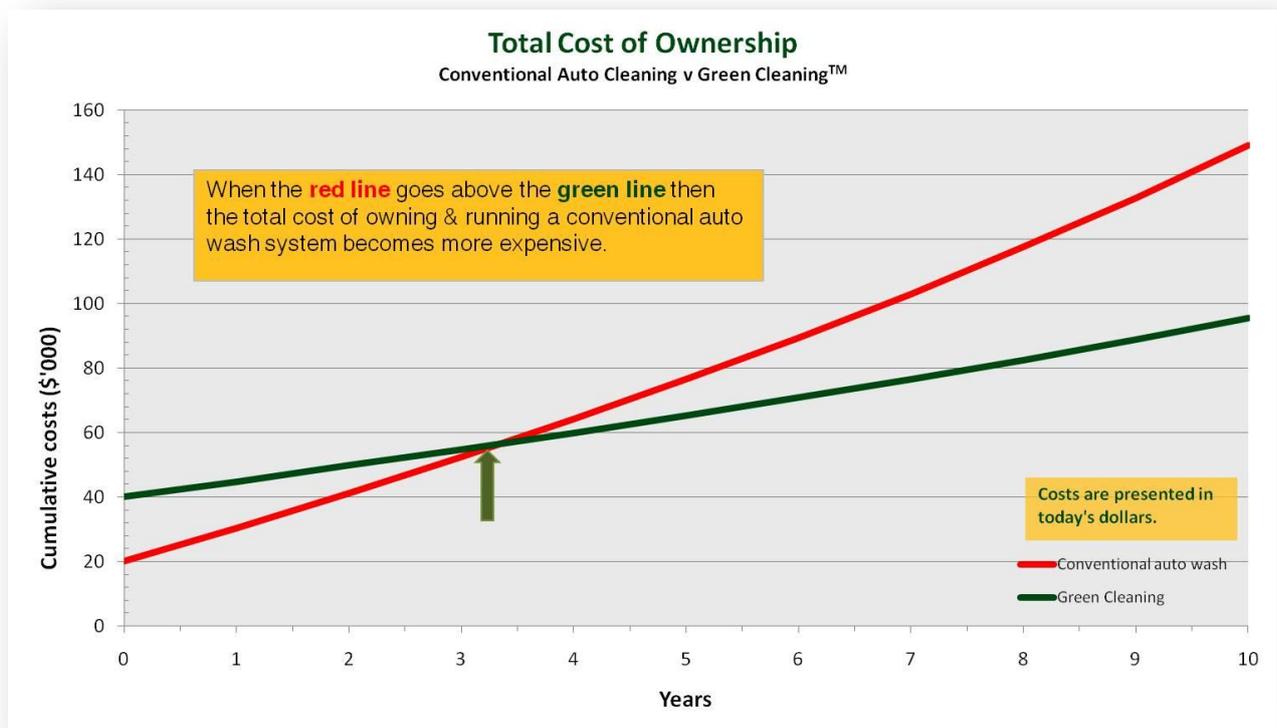
low temperature ♦ re-use ♦ energy efficient

Fact Sheet #6. The total costs of milking machine cleaning

A good way to compare the financial merits between a conventional cleaning system and a Green Cleaning™ system is to work out the total cost of ownership (TCO) for each option. The TCO is a financial tool that can help determine the total cost of a piece of equipment over its lifetime. It includes the initial capital cost as well as the operating costs during its practical service life.

Example 1: Building a new dairy

The graph below shows an example of the cumulative total costs – in a new 50 unit rotary – for a conventional auto cleaning system and a Green Cleaning™ system. In this example, the initial capital costs of the conventional cleaning system and the Green Cleaning™ system are \$20,000 and \$40,000 respectively.



The estimated operating costs for each year are then added. For the first three years the total costs for the conventional cleaning system are less than that of the Green Cleaning™ system. But since the operating costs of the Green Cleaning™ system are much lower, the total costs for this system are overtaken by those of the conventional cleaning system after 3.25 years. After ten years the conventional cleaning system has cost \$53,752 more to own and operate – despite it initially being cheaper to purchase.

After 3.25 years the conventional cleaning system begins to cost more to own and operate – despite it initially being cheaper to purchase.

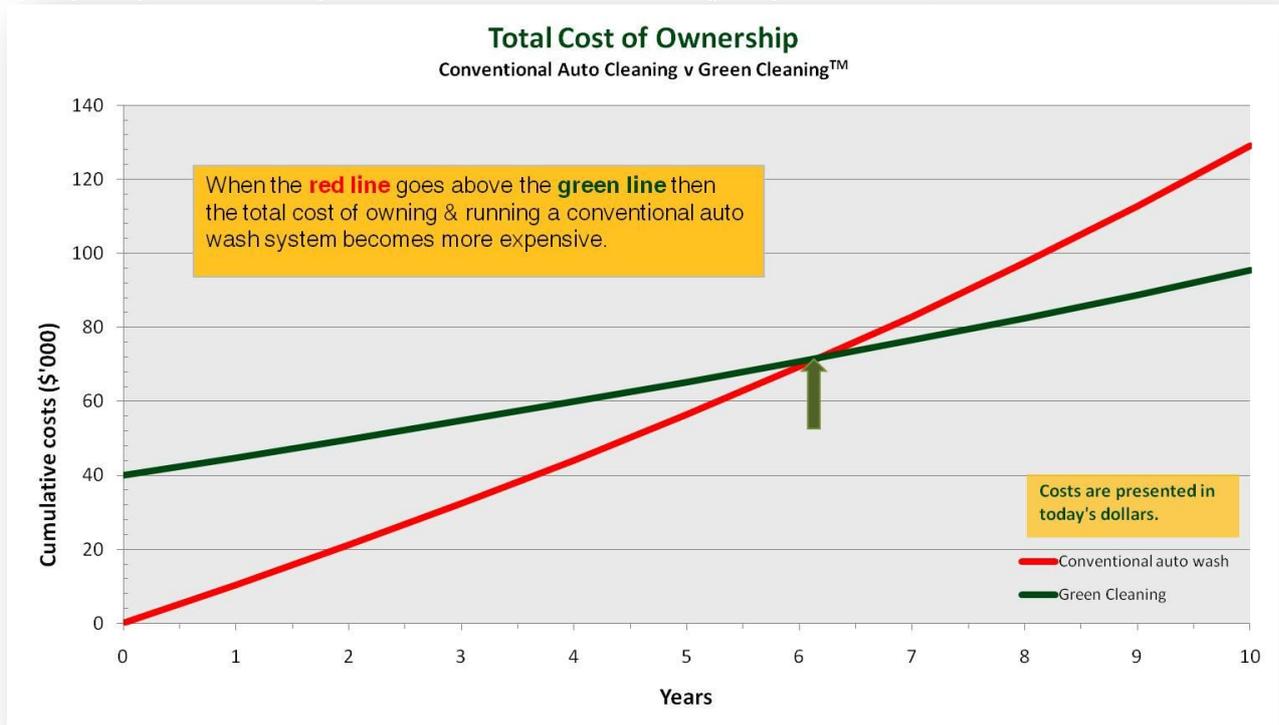
The details of what the operating costs comprise are presented in the table on the next page. It shows the cost components; heating,

chemical and water. Chemical & water costs are expected to follow the Consumer Price Index (CPI) whereas electricity prices are anticipated to rise substantially in the future. In this example prices are expected to rise 15% per year over and above the CPI. The cumulative total costs are presented in today's dollars.

| Conventional auto cleaning system | | | | | | | | | | | |
|-----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|
| Year | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Capital outlay | \$ 20,000 | | | | | | | | | | |
| Annual costs | | | | | | | | | | | |
| Heating | | \$ 6,257 | \$ 7,195 | \$ 8,274 | \$ 9,516 | \$ 10,943 | \$ 12,584 | \$ 14,472 | \$ 16,643 | \$ 19,139 | \$ 22,010 |
| Chemicals | | \$ 3,500 | \$ 3,500 | \$ 3,500 | \$ 3,500 | \$ 3,500 | \$ 3,500 | \$ 3,500 | \$ 3,500 | \$ 3,500 | \$ 3,500 |
| Water | | \$ 1,207 | \$ 1,207 | \$ 1,207 | \$ 1,207 | \$ 1,207 | \$ 1,207 | \$ 1,207 | \$ 1,207 | \$ 1,207 | \$ 1,207 |
| Total annual costs (TC) | | \$ 10,963 | \$ 11,902 | \$ 12,981 | \$ 14,222 | \$ 15,650 | \$ 17,291 | \$ 19,179 | \$ 21,350 | \$ 23,846 | \$ 26,717 |
| TC Present value (PV) @ 5% | \$ 20,000 | \$ 10,441 | \$ 10,795 | \$ 11,214 | \$ 11,701 | \$ 12,262 | \$ 12,903 | \$ 13,630 | \$ 14,450 | \$ 15,371 | \$ 16,402 |
| TC Cumulative PV @ 5% | \$ 20,000 | \$ 30,441 | \$ 41,237 | \$ 52,450 | \$ 64,151 | \$ 76,413 | \$ 89,316 | \$ 102,946 | \$ 117,397 | \$ 132,768 | \$ 149,170 |
| Green Cleaning system | | | | | | | | | | | |
| Capital outlay | \$ 40,000 | | | | | | | | | | |
| Annual costs | | | | | | | | | | | |
| Heating* | | \$ 2,271 | \$ 2,612 | \$ 3,004 | \$ 3,455 | \$ 3,973 | \$ 4,569 | \$ 5,254 | \$ 6,042 | \$ 6,948 | \$ 7,991 |
| Chemicals | | \$ 2,100 | \$ 2,100 | \$ 2,100 | \$ 2,100 | \$ 2,100 | \$ 2,100 | \$ 2,100 | \$ 2,100 | \$ 2,100 | \$ 2,100 |
| Water | | \$ 713 | \$ 713 | \$ 713 | \$ 713 | \$ 713 | \$ 713 | \$ 713 | \$ 713 | \$ 713 | \$ 713 |
| Total annual costs (TC) | | \$ 5,084 | \$ 5,425 | \$ 5,817 | \$ 6,267 | \$ 6,785 | \$ 7,381 | \$ 8,067 | \$ 8,855 | \$ 9,761 | \$ 10,803 |
| TC Present value (PV) @ 5% | \$ 40,000 | \$ 4,842 | \$ 4,920 | \$ 5,025 | \$ 5,156 | \$ 5,316 | \$ 5,508 | \$ 5,733 | \$ 5,993 | \$ 6,292 | \$ 6,632 |
| TC Cumulative PV @ 5% | \$ 40,000 | \$ 44,842 | \$ 49,762 | \$ 54,787 | \$ 59,943 | \$ 65,259 | \$ 70,767 | \$ 76,500 | \$ 82,493 | \$ 88,785 | \$ 95,418 |

Example 2: Upgrading an existing cleaning system

In some instances the dairy may already have a perfectly functioning conventional cleaning system. The choice to install a Green Cleaning™ system will mean that the difference in the initial capital costs will be greater than that for a new dairy. In this instance there is no initial capital cost for the conventional cleaning system (as it is already in place), whilst the capital cost for the Green Cleaning™ system is \$40,000 – a difference of \$40,000



rather than the \$20,000 difference seen in Example 1. The same assumptions are used here as in Example 1, and the total costs of ownership (capital and on-going costs) of each system are shown graphically below.

After 6.1 years the conventional cleaning system begins to cost more to own and operate – despite there being no additional capital cost for staying with the conventional system.

The \$40,000 difference in the initial capital outlay means that it takes just over 6.1 years before the total cost of ownership of the conventional system overtakes that of the new Green Cleaning™ system. After ten years the conventional cleaning system has cost \$33,752 more to own and operate – despite there being no additional up-front capital costs for staying with the conventional cleaning system. The table below shows the breakup of costs over the ten year period.

| Conventional auto cleaning system | | | | | | | | | | | |
|-----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|
| Year | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Capital outlay | \$ - | | | | | | | | | | |
| Annual costs | | | | | | | | | | | |
| Heating | | \$ 6,257 | \$ 7,195 | \$ 8,274 | \$ 9,516 | \$ 10,943 | \$ 12,584 | \$ 14,472 | \$ 16,643 | \$ 19,139 | \$ 22,010 |
| Chemicals | | \$ 3,500 | \$ 3,500 | \$ 3,500 | \$ 3,500 | \$ 3,500 | \$ 3,500 | \$ 3,500 | \$ 3,500 | \$ 3,500 | \$ 3,500 |
| Water | | \$ 1,207 | \$ 1,207 | \$ 1,207 | \$ 1,207 | \$ 1,207 | \$ 1,207 | \$ 1,207 | \$ 1,207 | \$ 1,207 | \$ 1,207 |
| Total annual costs (TC) | | \$ 10,963 | \$ 11,902 | \$ 12,981 | \$ 14,222 | \$ 15,650 | \$ 17,291 | \$ 19,179 | \$ 21,350 | \$ 23,846 | \$ 26,717 |
| TC Present value (PV) @ 5% | \$ - | \$ 10,441 | \$ 10,795 | \$ 11,214 | \$ 11,701 | \$ 12,262 | \$ 12,903 | \$ 13,630 | \$ 14,450 | \$ 15,371 | \$ 16,402 |
| TC Cumulative PV @ 5% | \$ - | \$ 10,441 | \$ 21,237 | \$ 32,450 | \$ 44,151 | \$ 56,413 | \$ 69,316 | \$ 82,946 | \$ 97,397 | \$ 112,768 | \$ 129,170 |
| Green Cleaning system | | | | | | | | | | | |
| Capital outlay | \$ 40,000 | | | | | | | | | | |
| Annual costs | | | | | | | | | | | |
| Heating* | | \$ 2,271 | \$ 2,612 | \$ 3,004 | \$ 3,455 | \$ 3,973 | \$ 4,569 | \$ 5,254 | \$ 6,042 | \$ 6,948 | \$ 7,991 |
| Chemicals | | \$ 2,100 | \$ 2,100 | \$ 2,100 | \$ 2,100 | \$ 2,100 | \$ 2,100 | \$ 2,100 | \$ 2,100 | \$ 2,100 | \$ 2,100 |
| Water | | \$ 713 | \$ 713 | \$ 713 | \$ 713 | \$ 713 | \$ 713 | \$ 713 | \$ 713 | \$ 713 | \$ 713 |
| Total annual costs (TC) | | \$ 5,084 | \$ 5,425 | \$ 5,817 | \$ 6,267 | \$ 6,785 | \$ 7,381 | \$ 8,067 | \$ 8,855 | \$ 9,761 | \$ 10,803 |
| TC Present value (PV) @ 5% | \$ 40,000 | \$ 4,842 | \$ 4,920 | \$ 5,025 | \$ 5,156 | \$ 5,316 | \$ 5,508 | \$ 5,733 | \$ 5,993 | \$ 6,292 | \$ 6,632 |
| TC Cumulative PV @ 5% | \$ 40,000 | \$ 44,842 | \$ 49,762 | \$ 54,787 | \$ 59,943 | \$ 65,259 | \$ 70,767 | \$ 76,500 | \$ 82,493 | \$ 88,785 | \$ 95,418 |

*Assumptions: Electricity tariffs: off-peak 13 c/kWh, peak 22.3 c/kWh; convention wash program involves 3 x 350 L cycles, warm pre-rinse, hot detergent wash & hot sanitizer cycles. Green Cleaning™ program involves warm pre-rinse, warm detergent wash and warm sanitizing cycles. Benefits from renewal energy sources (solar, heat recovery) are not included in the calculations.

Taxation and Financing considerations

The impact of financing costs, and taxation considerations (such as depreciation) have been excluded from these examples as they depend on the specific financial circumstances of each dairy business. Your accountant should be consulted to work through the implications for your business prior to committing to purchase a system.

Further information

Contact your local milking machine equipment or dairy detergent supplier for more information. Also refer to the following fact sheets about Green Cleaning™.

- Green Cleaning™ Fact Sheet #1. What are Green Cleaning™ systems?
- Green Cleaning™ Fact Sheet #2. Green Cleaning™ systems – a closer look
- Green Cleaning™ Fact Sheet #3. Frequently asked questions

Green Cleaning™ Fact Sheet #4. Economics of Green Cleaning™ systems
Green Cleaning™ Fact Sheet #5. Summary report – On farm trial

More information is available at www.agvetprojects.com.au/greencleaning.

Disclaimer:

The information contained in this publication is generic in nature and has not been provided at the request of any particular person. Whilst every effort has been made to ensure its accuracy, the figures used to estimate the future 'total costs of ownership' are based on figures provided by third parties as well as predictions about the future costs of power, water and chemical inputs (which are uncertain).

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