

## Pumping systems 101:

# Landlords and pumping systems

In this month's Pumping system 101 column, Harry Rosen of TAS Online and 2KG Training, compares his experience of getting his landlord to refund overbilled utility expenses with the approach that needs to be taken to optimise a pumping system.



At the beginning of every pump training session, I include a couple of slides that compare the costs of owning a vehicle with the lifecycle costs of operating a pumping system. This makes the issues easier to relate to for delegates who either own a car or know a fair bit about the costs associated with running a vehicle.

When purchasing a car, about 55% of the lifecycle cost is related to energy. This is a relatively large portion of the pie, thus we make a conscious decision to purchase a vehicle that has lower ongoing costs (fuel and maintenance), and are often willing to pay more as a result. An example of this would be opting for a diesel engine, which costs more to purchase than the petrol equivalent, but has far greater fuel consumption. Therefore the long term running costs are lower. This is a conscious decision to spend more capital up front, in return for ensuring long-term energy savings.

In the case of a pumping system, total costs over five years are completely dominated by the costs of energy. Even in its first year of use, the operating costs of a new pump amount to almost four times the purchasing cost. And

over the five-year life of the pump, energy costs amount to nearly 90% of the total cost of ownership.

In spite of this fact, however, most companies purchase the cheapest pump they can and continue to strive for the best discount, even though the operating costs are going to be far higher over the life of the pump.

Why does this happen? One reason at the design or purchase stage is that the initial purchase cost is covered under the capital budget, whereas the future energy and maintenance costs fall under operating expenses. The design consultants or purchasing departments are tasked with reducing costs in their area, and do not see the benefit of reduced energy or maintenance costs. Once the plant has been built or new equipment commissioned, the energy cost of running the pump is hidden from the user, buried away in the plant's monthly bills. However the ongoing costs of operating our car are only too apparent, when we fill up at the petrol pump, or are forced to take an additional bond on our house to cover a repair bill.

Which brings me to landlords and another real world example that might help people better relate to the problems and opportuni-

ties when optimising a pumping system.

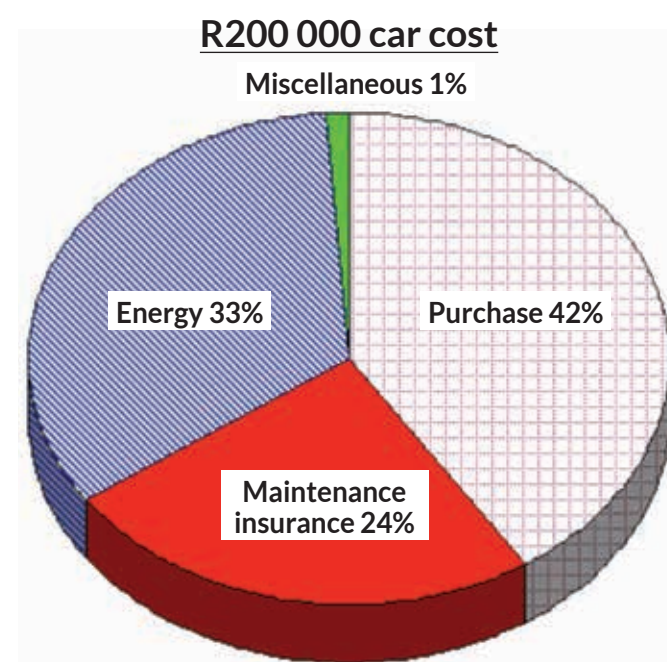
We moved offices recently, one of the major reasons being the appalling lack of service from our landlord/managing agents. After nearly 18 months of continual fights, dozens of emails back and forth, and hours and hours of wasted time, we have finally been refunded a portion of what has been incorrectly charged over the years, although the fight to get back all that is owed still has while to go.

So what has this to do with pumping systems? Looking back, I can see that I have subconsciously taken a similar approach to investigating our billing issues as I would when optimising a pumping system.

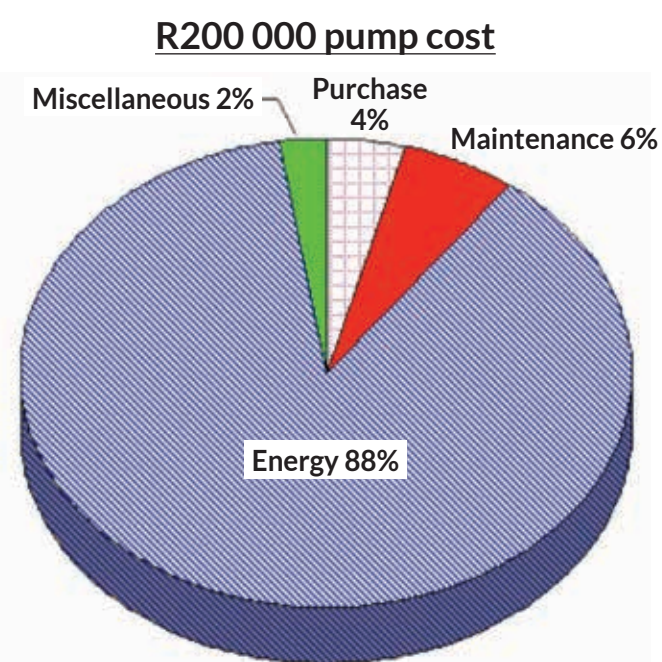
Here is an outline of the approach:

### Step One: sourcing and analysing the relevant data, or lack of visibility

**In the case of our landlords:** The monthly rental bills did not have the level of detail required to check whether the charges were correct or not. It took almost a year of requesting this information before I had sufficient detail to pick up the inconsistencies and mistakes in their monthly billing.



For a R200 000 car that consumes 12 km/ℓ of fuel and is used to travel 32 000 km/year, the fuel cost for the first year is R32 000 and across its five-year life, fuel will account for 33% of the total costs.



On a 75 kW pump with an initial cost of R200 000 and maintenance cost of R60 000, the energy cost in the first year amounts to R770 000, while over the pump's five year, the energy costs will account for 88% of the total lifecycle costs.

This included detailed water and electricity consumption reports, as well as information about the system such as the rentable area of the office, common use charges for utilities, etc.

**Pumping systems:** The biggest obstacle to improving energy efficiency is minimal instrumentation on the pumps. Or where there are suction and discharge pressure gauges or flow meters installed, these are often inaccurate or not working. Electricity consumption figures are only broken down into major areas of the plant, which also includes many other non-pumping uses of electricity. It is rarely possible to get individual energy consumption figures for pumps. Often, the only option is to install portable instrumentation and power meters yourself and then to independently collect the data needed.

### Step Two: Identify cost-saving opportunities:

**Landlords:** Now you have all the data at your fingertips, the next step is pretty easy. Identify and quantify all billing errors and start counting the rands and cents that should soon be coming your way.

**Pumping systems:** This is the hard part. It requires a thorough understanding of the system and the intimate workings and operation of your pumps. I have investigated well over 50 pumping systems over the last 12 years and I am still learning new ways to save energy every day. Essentially, the idea is to find ways to reduce the losses in the pumping systems and/or to change the operating points of the pumps in order make the pumps run as efficiently as possible within the operating system.

### Step Three: Implement recommendations

**Landlords:** Convince the landlord of their billing errors and get them to refund these charges. In most cases the only response you will get is deathly silence, but with a bit of perseverance (and possibly the threat of legal action thrown in), you should finally be seeing the fruits of your labour in terms of a substantial refund on your rental bill.



Suction and discharge pressure gauges and flow meters are essential in order to determine accurate energy consumption figures for pumps.

**Pumping systems:** There is no point going to all the time and effort to identify and quantify these opportunities if they never get implemented. Start with the low hanging fruit – simple, inexpensive changes to the operation of the pumps or system that lead to substantial savings in energy. These savings can then be used to fund the longer term and more expensive capital projects. In both cases we will need the buy-in and active support of both management and shop floor personnel in order to implement these changes, and ensure the system doesn't slip back to its inefficient state over time.

In our consulting engineering business, rent, water, electricity, etc make up a substantial portion of our operating costs and, in the end, all the time and effort was worth it. To date we have been refunded over R80 000 in incorrect billing, with another R125 000

still in the pipeline. This, for a moderate size office in a large commercial office block, is a substantial savings in operating cost, and will ultimately help keep us in business and possibly even inflate our profits for the year. Most people give up in frustration and abandon the project long before achieving any monetary reward – something the landlords out there are counting on.

So when comparing landlords and pumping systems, the ultimate goal is the same – to reduce unnecessary costs and improve the profitability of our businesses.

For clients with pumping systems, electricity and maintenance costs are one of the biggest components of ongoing operating costs. Saving money on your pumping system will go a long way to making your business more profitable, ensuring you are around for many years to come. □

**Even in its first year of use, the operating costs of a new pump amount to almost four times the purchasing cost. And over the five-year life of the pump, energy costs amount to nearly 90% of the total cost of ownership.**



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