Tools to help you plan and record (and remember to celebrate success)

The steps above will help you decide what actions to take. You also need to decide who will be responsible for getting the job done. Here is a simple way to plan this.

Example action plan

Investigation	Action needed	Desired outcome	Who's responsible/ deadline
How many pumps do we have on site? What are they costing us? What could we save?			
What condition are they in? Are we using them properly? Are they sized and installed correctly?			
Are pumps and pipelines maintained regularly, in good condition and free of leaks?			
Do we need to replace any pumps? If so, who is our company's preferred pump provider?			

Example recording chart

Who	Action taken/when	Impact

Remember

Cut pumping energy by 50% and save 50 tonnes of carbon or £10,000!

HOW-TO GUIDE

Pump water as you go, not just when you reach the bottom

HOW-TO GUIDE

What this guide is about

This guide is designed to complement the water pumping toolbox talk. It focuses on:

- Why it makes sense to save energy on pumping water
- Practical steps to make your site's water pumping system more efficient
- Tools to help you plan and record

The purpose of the guide is to help you make a business case for changing inefficient pumps, controls or pump maintenance plans on your site, as well as create a specific site action plan. Keep the guide as a reminder for yourself, hand it out to the person on your site who may take charge of this action plan, or simply write on it to keep a record of all actions taken.

Why it makes sense to save energy on pumping water

- Hidden energy users on many sites are the pumps required for removing water from the working area. These pumps operate out of sight, often 24 hours a day, with little thought to their efficiency, as long as the water level is controlled.
- A 30 kW pump operating continuously all year round emits more than 100 tonnes of carbon, and costs over £20,000 to run.
- Some pumping is unnecessary – you can leave water at the bottom of a pit if it does not cause flooding, and when it's above the water table it may drain away naturally.
- Reducing the height water has to be lifted saves energy. Pumping from a point 50% higher saves 30% of your energy – do not wait for water to get to the bottom of the quarry before pumping it out.
- Electricity is often cheaper at night – running pumps only at night will save money.
- Pumps wear with time, typically losing 10–15% efficiency over 10 years working life.
- Some pumps operate at a flow rate or head more than 20% from the original design – getting the right sized pump is cheaper than running an inefficient one.

Did you know?

Reducing the height water has to be lifted saves energy. Pumping from a point 50% higher saves 30% of your energy – do not wait for water to get to the bottom of the quarry before pumping it out.

Practical steps to make your site's water pumping system more efficient

Every site's action planning will differ. Please consider the steps below as a suggested route and adapt the actions under each step to your site's specific needs.

Step 1: Investigate pumping costs and estimate the savings potential.

- Investigate how much fuel or electricity you use on pumping.
- Calculate how much the energy costs. Be sure to calculate how many hours pumps run at night and how many during the day.
- Work out how much pump maintenance costs.
- Estimate what you could save by changing flow rate, heads, and pump speed. Use these rules to give rough estimates:
  - Energy required is proportional to flow rate to the power of 3
  - Energy required is proportional to head to the power of 1.5
  - Energy required is proportional to speed to the power of 3

Step 2: Take action to make pump operation more efficient.

- Configure all pumps correctly.
  - Use the lowest lift route for water disposal.
  - Estimate the water velocity in the pipeline – it should be approximately 2 m/s.
  - List pipe fittings on the line, including valves, bends, etc., and identify unnecessary and high pressure drop fittings.
- Ensure flow controls are efficient.
  - If using on/off control, ensure a non-return valve is fitted and maintained.
  - If using a throttling valve, use a smaller pump or variable speed to be more energy efficient.
  - If variable speed drives are always working at the same speed, consider replacing them with smaller, more efficient pumps.

Step 3: Maintain the system.

- Repeat step 2 above at regular intervals.
- Watch out for leaks – a leak means you pump the same water twice when it returns to the pit from the leak!
- Check pumps run at their optimum flow rate, and avoid switching on and off too frequently.
- Replace worn out pumps.