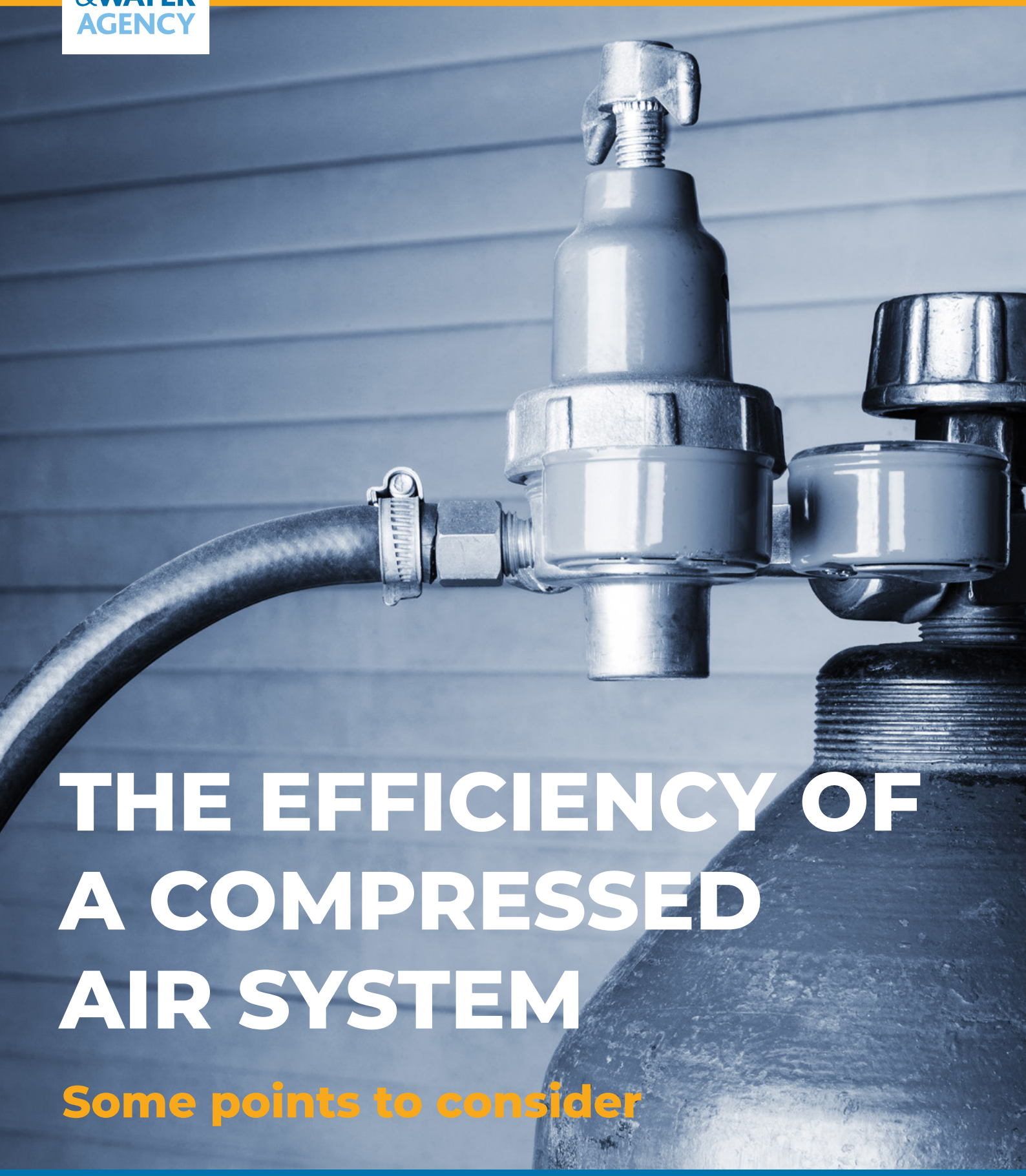
THE ENERGY &WATER AGENCY



THE EFFICIENCY OF A COMPRESSED AIR SYSTEM

Some points to consider

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CHECK FOR THE BEST USE OF COMPRESSED AIR

Compressed air generally comes from the conversion of electricity. It's a highly energy-consuming process, and only about 10 to 20% of the process energy required reaches the point of end-use. The remaining is generated as heat which is wasted. So compressed air is costly, and **the overall efficiency of a typical compressed air system can be as low as 10%-15%**.

Before embarking on a compressed air system, check if better options are available for specific jobs. If an application can be powered more efficiently by alternative methods, these methods should be identified and considered. **Staff should be educated NOT to use compressed air for blow-offs (e.g. cleaning benches)**.

2 TEST FOR AND FIX LEAKS

20 to 30% of compressor output can be attributed to leaks. So, a leak assessment can be helpful, and energy saving practices scheme can be done to assess the demand requirements. This can reduce run time, increase equipment life cycle and lowers maintenance. **Fixing leaks can save the company thousands of euros**. Locate them by listing, soap or ultrasonic detectors.

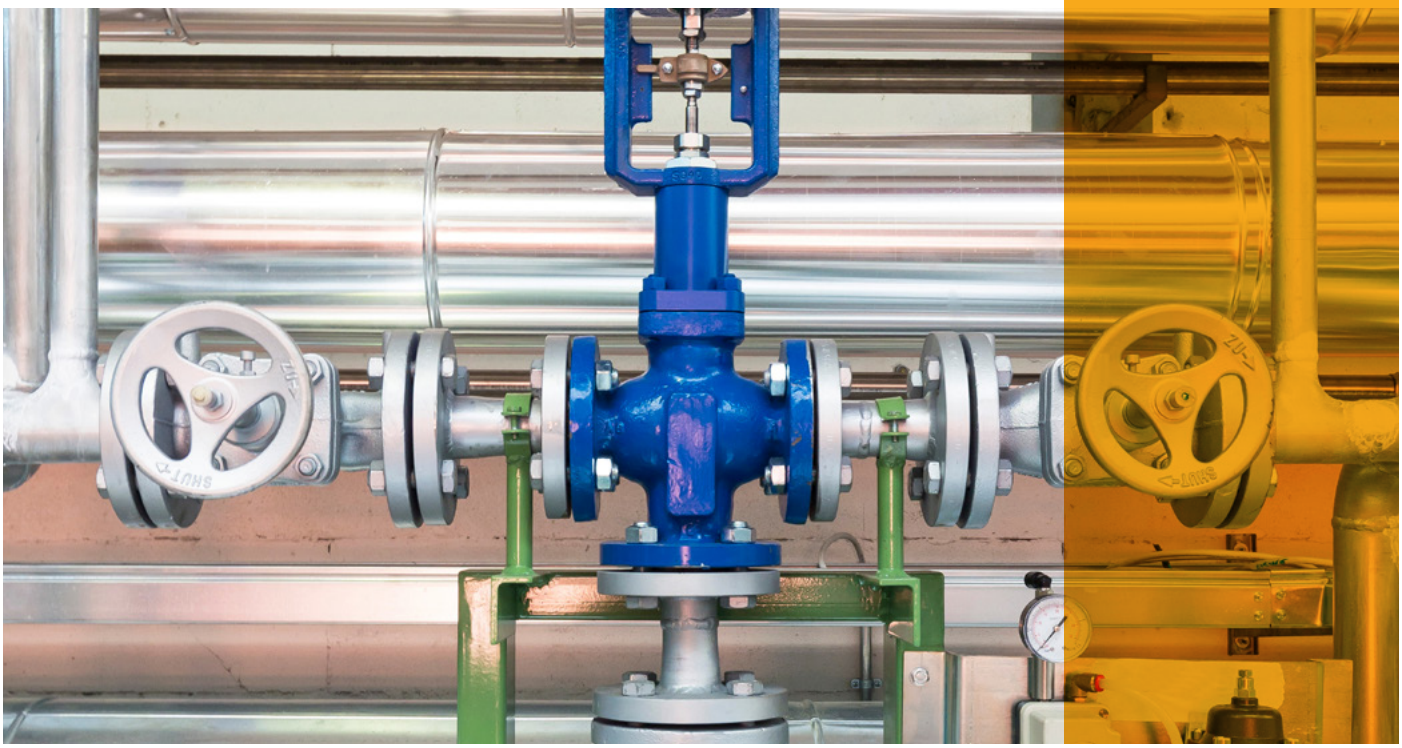
3 REDUCE THE OPERATING PRESSURE

Operate at the correct pressure. Running compressors at higher pressures than required increases energy consumption and system costs. Reducing the system supply pressure in small intervals can determine if a compressed air system's pressure is set higher than optimal. For every 0.14bar reduction, one can save 1% in energy. Or better still, **for every 10% reduction in supply, air pressure can lead to 5% in energy savings**.

THE EFFICIENT DESIGN OF THE COMPRESSED AIR SYSTEM

4

Identify supply points and requirements and use a professional design layout with adequate pipe sizing diameters and velocities for low-pressure drops. Using water traps as adequate to reduce water hammer and kinetic energy loses. Ring circuits can produce better designs. Don't use open-ended pipes: **fitting a supply gun with a venturi-type nozzle can use 30% less compressed air and make operation much quieter, improving the work environment**.



PUMP AT THE PROPER TIME

In medical laboratory air or ICs production, one of the characteristics required of compressed air is that it needs to be specifically very dry. This very expensive process can be done through refrigeration or absorption chemical driers to remove moisture. On the other hand, the outside air is driest because of solar radiation around midday. **Check to see if it's better to increase storage capacity and reduce pumping time during late evenings or early mornings**.

5

6 HEAT RECOVERY

About 80 to 90% of the electrical energy used by an air compressor is converted to heat. **A properly designed heat recovery unit can recover 50 to 90% heat for heating air or water**.

Approximately 15.6kW are available per 50l/s of compressor capacity when running at full load. This can easily be recovered and converted to space heating for comfort during our mild winters.

7 COOLER AIR INTAKE

Using cooler air, which is denser, allows compressors to use less energy to produce the required pressure. For example, if 32°C intake air is modulated with cooler air from another source to 22°C, the 10-degree C temperature drop will lower operating costs by almost 3.8%.

8 MEASURE AIR USE

They say, **“if you can’t measure it, you can’t manage it”**. So, a flow meter can be installed quickly, even when equipment is operating.

SWITCH OFF AIR PLANT WHEN NOT IN USE

An idling compressor uses around 40% of its full load. To save energy, it is essential to switch the compressors plant off when they're not being used (e.g. during breaks and certainly overnight periods).

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