

# Compressed Air Energy & Smart Technology

**Roy Brooks**

Technical Development Officer  
British Compressed Air Society

The background of the entire image features a network of glowing blue lines and nodes overlaid on a photograph of high-voltage power transmission towers and lines against a cloudy sky. The nodes are represented by small circles, some of which are larger and more prominent, creating a digital or data network aesthetic.

Reduce your compressed air  
energy consumption

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Come and join our 10% Taskforce.

Make a stand against wasted  
compressed air energy.

Download our  
**FREE**  
energy-saving  
report here

10% of global industrial energy is used in  
compressing air for industrial use

**Scale the issue**

# Compressed Air – The Numbers

Scale the issue



Used in **90%** of manufacturing sites



**5-30%** of a sites total electricity bill



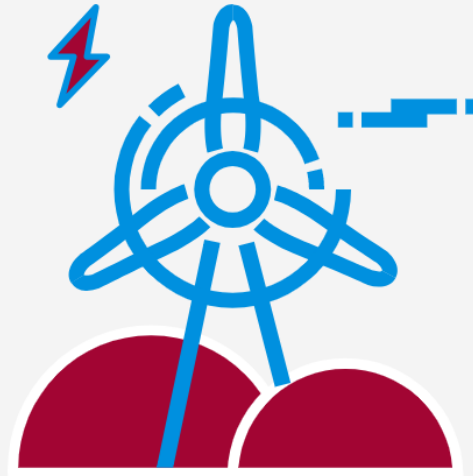
**11.71 TW** energy consumption UK alone

Source BCAS compressor statistics & European commission report Save program project XV11/4)

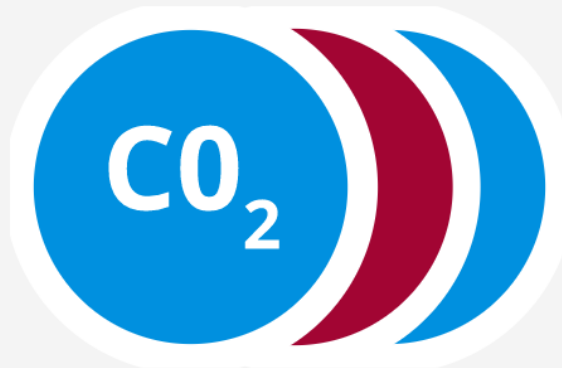
# THE 10% TASKFORCE



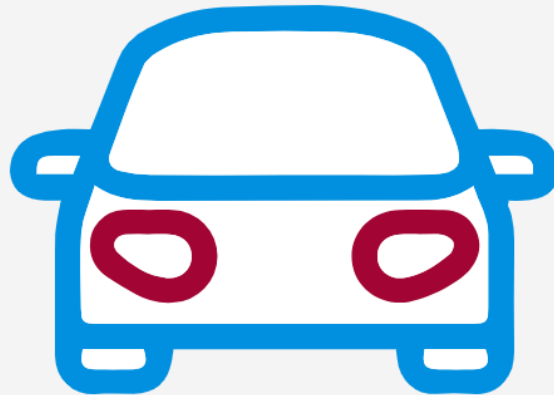
Reduce energy  
usage by 10%



Save over 411  
thousand tonnes  
of CO<sub>2</sub>



Take the equivalent  
of 317 thousand  
cars off the road

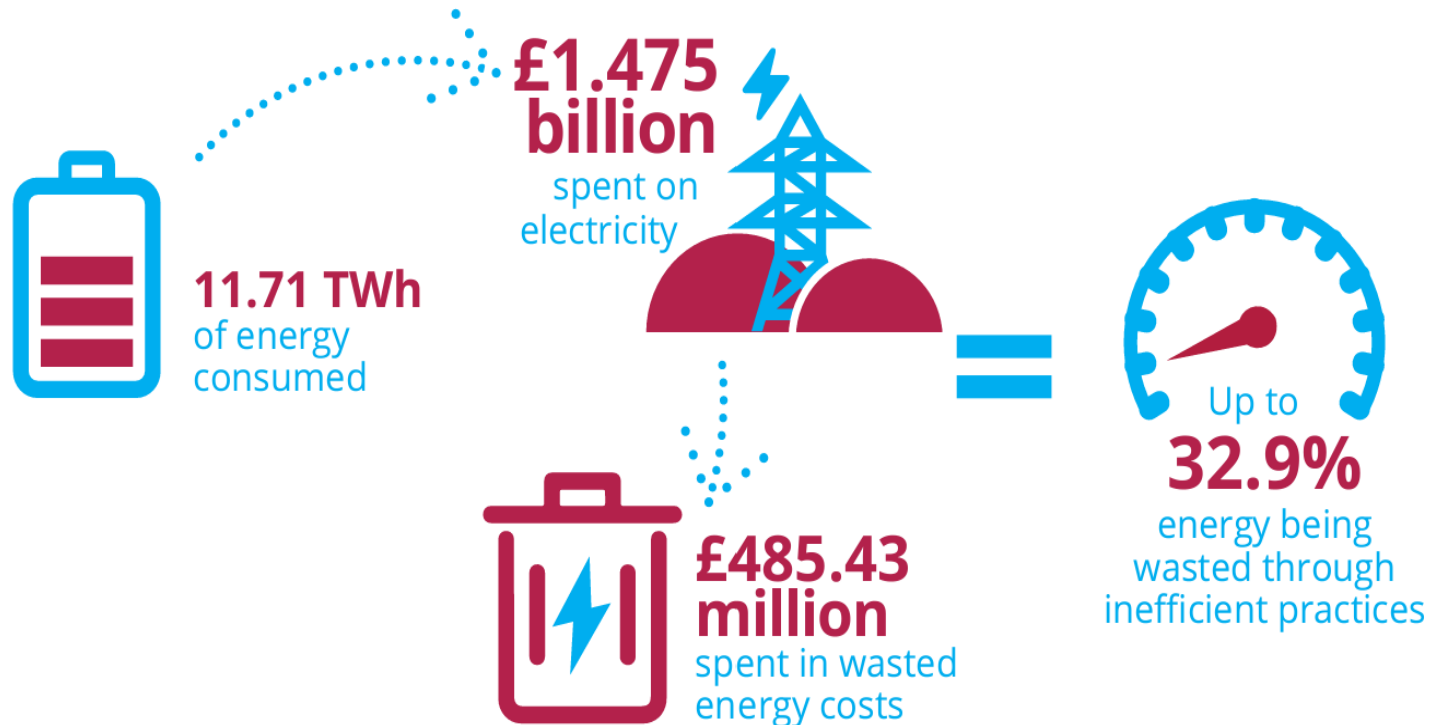




# Compressed Air – The Numbers

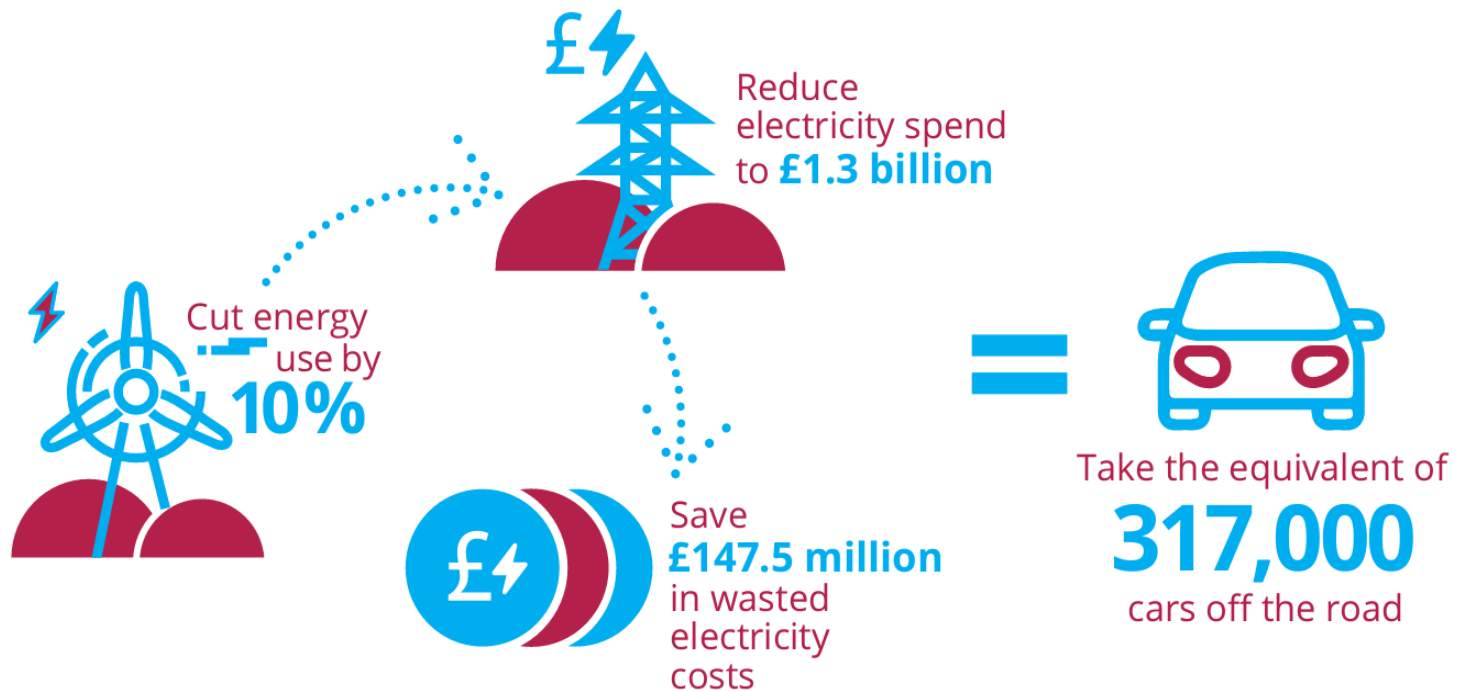
In January 2022 when we conceived the campaign

## The Facts



# Compressed Air – The Numbers

## The 10% Taskforce



# Today's energy costs @0.34/kWh

- Spent on Electricity
  - 2021 £1.475 billion - 2022 £3.835 billion and rising !!
- Wasted energy costs
  - 2021 £485.43 million - 2022 £1.26 million and rising !!
- Save wasted spend on electricity
  - 2021 £147.5 million - 2022 £383.5 million and rising !!
- An ever-growing issue – which focuses the mind

**Where are the savings possible**

# Simple steps to easy savings



Energy saving measure	% Applicability (1)	% Gains (2)	Potential Contribution (3)
<b>System installation or renewal</b>			
Improvement of drives (high efficiency motors, HEM)	25%	2%	0.5%
Improvement of drives (adjustable speed drives, ASD)	25%	15%	3.8%
Upgrading of compressor	30%	7%	2.1%
Use of sophisticated control systems	20%	12%	2.4%
Recovering waste heat for use in other functions	20%	20%	4.0%
Improved cooling, drying and filtering	10%	5%	0.5%
Overall system design, including multi-pressure systems	50%	9%	4.5%
Reducing frictional pressure losses	50%	3%	1.5%
Optimising certain end use devices	5%	40%	2.0%
<b>System operation and maintenance</b>			
Reducing air leaks	80%	20%	16%
More frequent filter replacement	40%	2%	0.8%
<b>Total</b>			<b>32.9%</b>

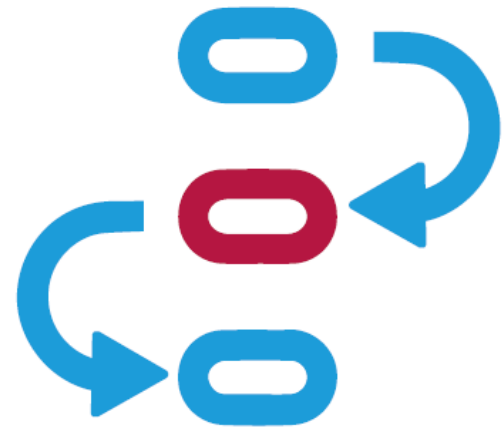
(1) % of CAS where this measure is applicable and cost effective (2) % reduction in annual energy consumption (3) Potential contribution = Applicability \* Reduction

# **Your essentials for compressed air savings**

## Change behaviours

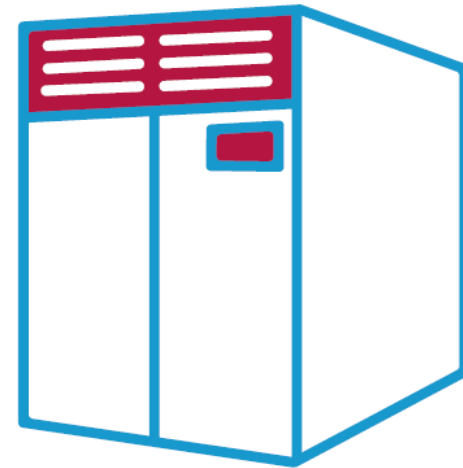
Many actions will require elements of maintenance or equipment/system upgrade, but the human element should not be overlooked.

You can make substantial efficiency improvements by implementing new processes and encouraging staff to use compressed air more efficiently and safely.



## Specify correctly

If you are considering upgrading your existing compressed air system, always speak to an expert. Our BCAS members can advise on the best equipment and system for your needs. This could include incorporating fixed and variable-speed drives or a combination of both as well as efficient downstream equipment. Where suitable, sophisticated control systems can help proactively manage the supply of air.



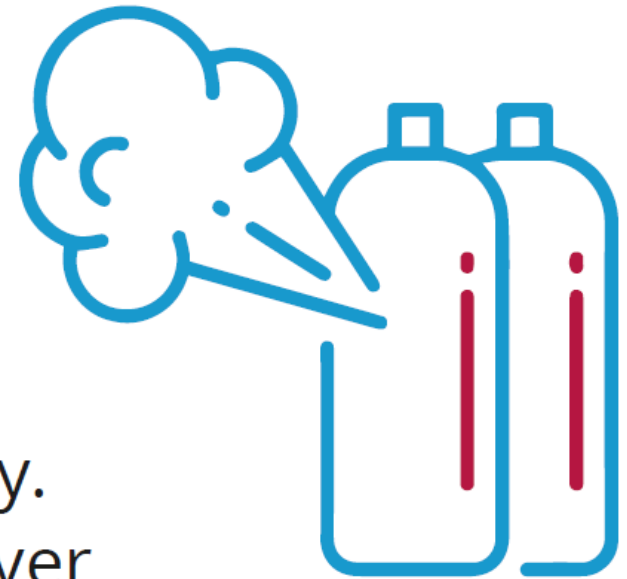


## Fix leaks

Reducing air leaks is the single most important energy saving measure you can make.

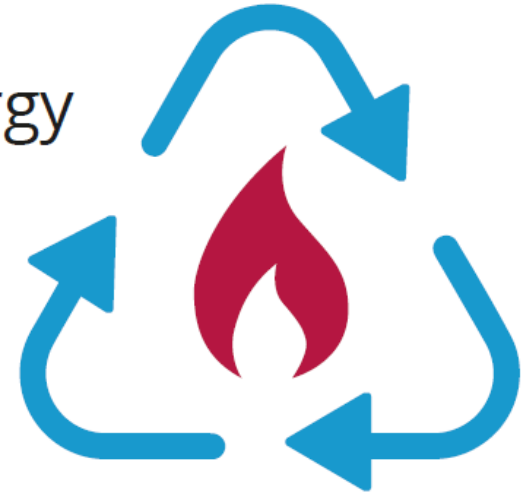
An ongoing leak test and repair programme will save you money.

Just one 3mm hole could cost over £600 a year in wasted energy. A leak survey can help you to size the issue – and to tackle the largest leaks first.



## Recover heat

As much as 95 per cent of the energy consumed by a compressor is converted to heat and, unless captured, will be wasted to the atmosphere. Many manufacturers offer heat recovery systems, which can often be retrofitted. This allows you to recycle this excess heat; re-directing the hot oil to an oil-to-water heat exchanger.



## Design a system

A compressed air system is just that; a system, and every element of it impacts on its energy consumption. When discussing efficiency and the potential savings that could be realised, it is important to take a full, system approach, – from generation to air treatment to distribution and finally, the point of use. Why not have a compressed air system assessment in line with ISO 11011:2013.



## Control better

Reducing pressure at the point of use, switching off compressors when there is no demand for air and installing energy management systems can all help you identify wastage and take action.



## Manage air downstream

Treating air to remove dirt, water and oil is necessary but can use a lot of energy. Your process is likely to only need a proportion of the compressed air to be treated to a very high purity. In these cases, excellent savings are achievable by treating all the generated air to the minimum acceptable level and improving the purity (quality) to the desired level at the usage point.



## Improve maintenance

Low cost, regular maintenance will help retain low leak rates and reliability of equipment. You should also consider a policy that specifies that energy efficient options are purchased when replacing all equipment – whether it is a basic drain valve, the use of genuine spare parts through to the actual compressor unit itself.



Ensure you are informed – compare  
specific energy of your new package

## Specific energy

Existing program in USA 10 Years

- CAGI **60Hz** datasheets
  - Rotary screw compressors up to 500hp (375kw)
    - Lubricated & Oil-Free
    - Fixed & variable speed
  - Refrigerant dryers up to 1000cfm (30m<sup>3</sup>/min)
- CAGI Verification
  - Compressor testing 5-200hp
  - Refrigerant dryer 50-1000cfm
  - Capacity to test up to 150hp
  - Typically 3 (random) units per year per manufacturer tested independently by Intertek

BCAS creates a set of datasheets for the **50Hz** market starting late 2022

Ask your supplier for the specific energy of the compressor to enable accurate comparison

This is not always in the brochures

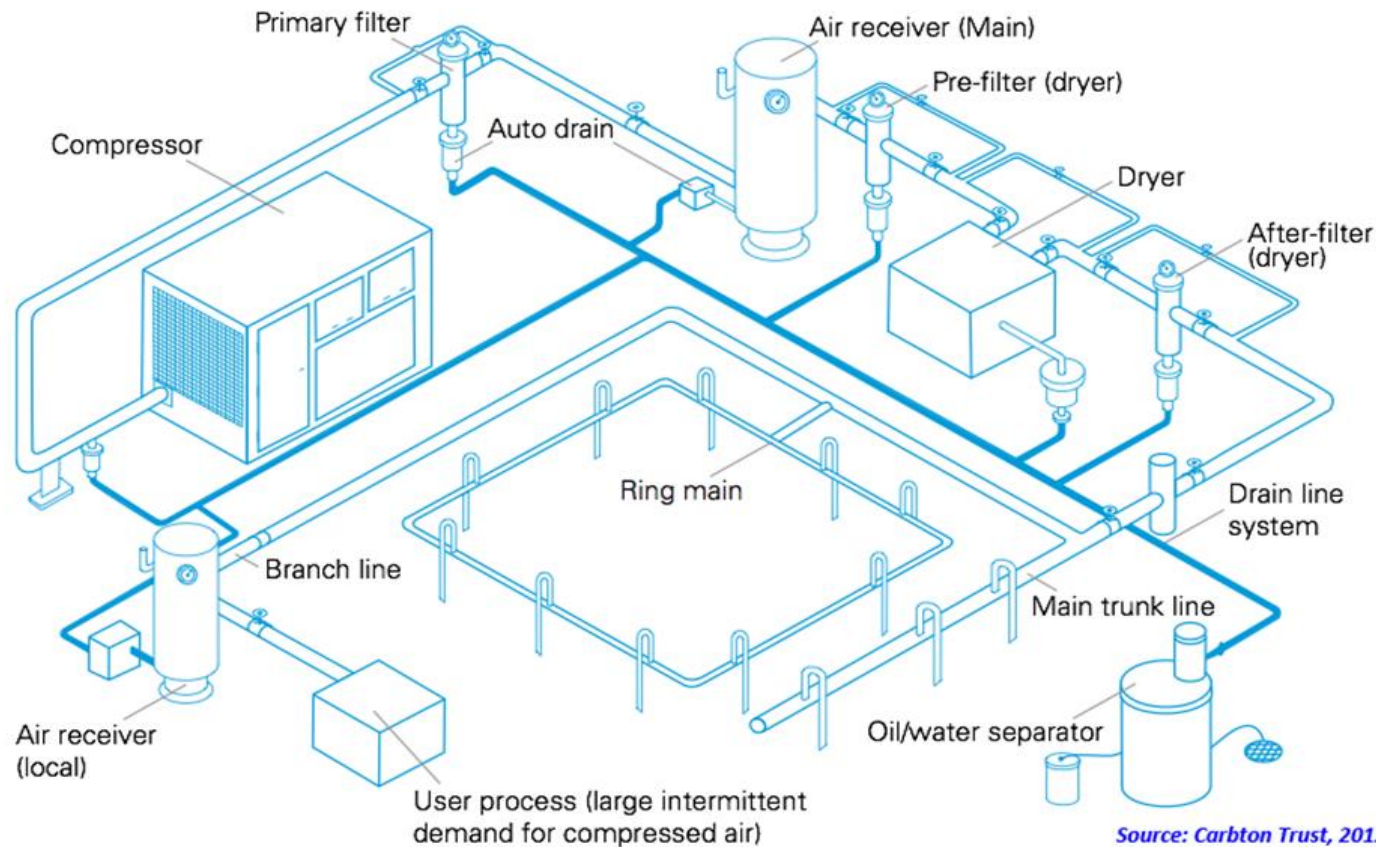
BCAS are campaigning to have this available



**Take a systems based approach**

# Take a system approach

## A Typical Compressed Air System



Source: Carbton Trust, 2012.

**Request an energy audit and a  
performance guarantee**

# Energy Audits ISO11011

- Energy Audits ISO11011
- Certification program for compressed air system assessors (professionals who perform assessments or “audits” of compressed air systems)
- Confidence to system owners and a means of verifying an auditors understanding of and ability to apply the ISO 11011 standards. To assesses an individual’s understanding of well accepted standards and concepts

# Smart technology

# IoT: a New Efficiency Paradigm

## **“LEGACY”**

- **Reactive to periodic audits**
- **Scheduled maintenance**
- **Unplanned breakdown**
- **Energy waste (over capacity)**

## **Industrial IoT**

- **Continuous monitoring & control**
- **Predictive maintenance**
- **Automatic pre-alerts**
- **Dynamic sequencing**

# Periodic Audits VS Continuous Monitoring



**“LEGACY”**



**Industrial IoT**

## Notifications

🚫 Block (0) ⚠️ Warning (1) ⚙️ Service (1) 💡 Insight (1)



Compressor 2  
Energy efficiency is low  
24Kw/100cfm



Compressor 2  
Oil change required in 125 hours.



Compressor 4  
Already ran 78,903 Hours,  
has a low EcoRating (35%),  
and should be replaced.



# Static Sequencing VS Dynamic Control



## Static

- Theoretic Efficiency Calculations
- Control is based only on target pr.
- Control is based on “timer”
- Programming done by specialist

## Dynamic

- Real time data from sensors
- Real time tuning of each comp.
- AI Control based on learning
- Auto programming



# Energy is a business issue

Are businesses proactive - Yes

Energy cost and carbon footprint mean all savings should now be revisited

Do not leave ££££ on the table....with an **incomplete** energy review

# A new resource



- 10% task force web site <https://taskforce10.bcas.org.uk/>
- Downloadable resources - <https://taskforce10.bcas.org.uk/simple-steps/>
- Numerous energy saving case studies <https://taskforce10.bcas.org.uk/case-studies/>



## Case studies

Filter by: >500 MWh Savings 0-49 MWh Savings 100-499 MWh Savings Control air better Design a system  
Manage air downstream Specify correctly

<b>Unique ref n°</b> JB1	<b>Category</b> Manage air downstream	<b>Unique ref n°</b> THS	<b>Category</b> Design a system	<b>Unique ref n°</b> SYN	<b>Category</b> Manage air downstream
<b>kWh/MWh Annual Savings</b> 1,223,600 kWh	The logo for Atlas Copco, featuring the company name in a blue, sans-serif font with a stylized blue graphic element above it.	<b>kWh/MWh Annual Savings</b>	The logo for Direct Air, featuring the letters "DA" in a stylized blue font followed by the words "Direct Air" in a smaller, blue, sans-serif font.	<b>kWh/MWh Annual Savings</b>	The logo for Direct Air, featuring the letters "DA" in a stylized blue font followed by the words "Direct Air" in a smaller, blue, sans-serif font.

# Customers of BCAS Members



- 25% discount on training
- Free associate membership of BCAS
- Review website for Compressed air user member benefits

**Ask for your support**

**We would love to add your energy saving  
stories to our new site**

**Visit**

**<https://taskforce10.bcas.org.uk/support/>**

**or email**

**taskforce10@bcas.org.uk**