

# Achieving more with less

The industrial benefits  
of synthetic lubricants

FILL WITH **Mobil**<sup>™</sup>

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# Foreword

**Out of sight, maybe. Out of mind, never.**

Unless you're a maintenance professional, you could be forgiven for thinking that all lubricants are the same. Many industrial operators assume that if their equipment is up and running their lubricants must be working fine. With oils and greases only accounting for a fraction of operational costs, this is perfectly understandable. But it's not necessarily the case.

My role as a Mobil™ Field Engineer brings me into contact with customers from a wide range of industrial sectors. In addition to the Planned Engineering Service (PES) work we conduct, we're often called in to help solve an operational challenge – from component wear to unplanned downtime, to sudden increases in oil consumption. All maintenance issues with a broader business impact. Often, the challenge can be solved by upgrading to a high-performance, synthetic lubrication solution.

When costs drop and productivity surges, you don't need to be an engineer to see the benefits. But the gains don't stop there. As all sectors of industry strive to decarbonise, synthetic lubricants can also help advance an operator's sustainability ambitions. Throughout this paper, we'll provide examples of how their use can lower energy consumption and extend oil drain intervals, which in turn can help reduce greenhouse gas emissions.

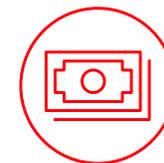
That's why we're on a mission to ensure that stakeholders in all industries understand the value of synthetic lubricants. This paper is designed to help demystify the category and give all business decision-makers a basic understanding of the synthetic advantage.



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The Mobil™ Field Engineering team spend much of their time with customers in the field, tailoring innovative solutions to address specific challenges. This collaboration helps operators across the EMEA region deliver more for less: lower operational costs, less waste, and greater safety.

In 2023, we documented<sup>1</sup>



**€38.5M**  
 Customer savings



**1.6M**  
 Litre reduction in waste



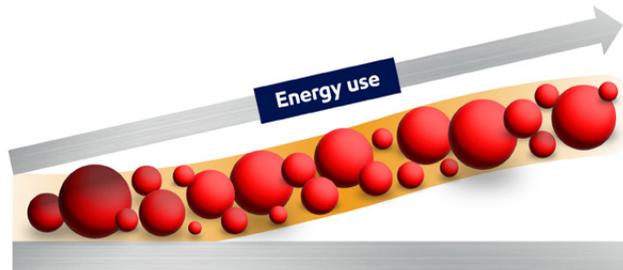
**52K hours**  
 less human-machine interaction

# Synthetic technology: What's it oil about?

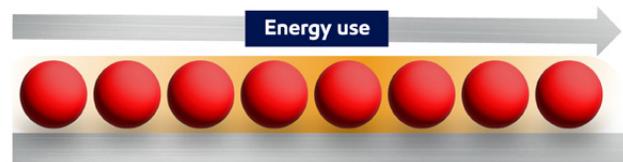
Years ago, 'conventional oil' or 'mineral oil' was simply known as 'oil' because there was no other kind. That changed with the advent of synthetic technology.

Whereas conventional oil is just refined crude oil, synthetic base oils undergo more advanced processes that enable them to be tailored to meet specific performance requirements. Synthetic-technology base oils are built from the ground up to create an end product with a more consistent molecule size, higher purity and quality than conventional oils.

## Uniform molecule structure enhances efficiency



**Mineral oil:** Irregular molecules → More friction, greater energy use



**Synthetic oil:** Even molecules → Less friction, lower energy use

The base stock makes up 75-99% of the finished product. It helps determine the oil's viscosity—the most important property for lubrication—and contributes vital performance advantages such as low-temperature fluidity and oxidative stability.

The base oil is then enhanced with additives such as:

- Detergents and dispersants
- Viscosity and friction modifiers
- Rust and corrosion inhibitors
- Anti-wear and extreme pressure additives
- Demulsifiers and defoamers
- Antioxidants and pour point depressants

Together, these additives help synthetic quality lubricants deliver:

- Better wear protection and uptime
- Extreme temperature and pressure performance
- Improved deposit control
- Enhanced energy efficiency
- Extended oil drain intervals

## Enhanced deposit control



Mobil SHC Cibus™ 46:  
pass after 1,250 hours



ISO VG 46 Mineral Hydraulic Oil:  
result after 1,000 hours  
(actual initial failure at 500 hours)

**Mobil SHC Cibus™ Series** food machinery lubricants demonstrate long oil life and enhanced system cleanliness vs. standard circulating oils. As demonstrated in the proprietary Mobil Hydraulic Fluid durability (MHFD) test rig, when comparing ISO VG 46 oils, the level of deposits in the reservoir is significantly less with Mobil SHC Cibus than with the mineral hydraulic oil.



## Why lubricants are the ultimate multitaskers?

Lubricants have a far longer job description than you might think. They work behind the scenes in your equipment to:

1. Separate and lubricate metal surfaces by forming a thin film that reduces friction and wear, enabling machinery to run better and last longer.
2. Dissipate heat generated by friction and combustion, helping combat oxidation.
3. Remove and suspend wear debris along with oxidation and combustion by-products to prevent damage while reducing sludge, corrosion and surface deposits.

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**These benefits can translate into specific operational gains which we'll cover in subsequent sections of this white paper:**

1. Enhancing productivity
2. Reducing operational costs
3. Advancing sustainability ambitions
4. Helping close the skills gap

Hundreds of Mobil™-branded formulations are blended each month at our ExxonMobil Technology and Engineering centres in New Jersey, Canada, Prague and Shanghai.

Our flagship products consist of about 15 to 20 hand-selected components.

Candidate formulations are put through extreme tests in rigs, engines and vehicles which simulate high-speed, high-load and high-temperature environments. After testing, machines are disassembled and digital microscopes are used to inspect part surfaces for wear.

Enhancing productivity

# Fact not friction

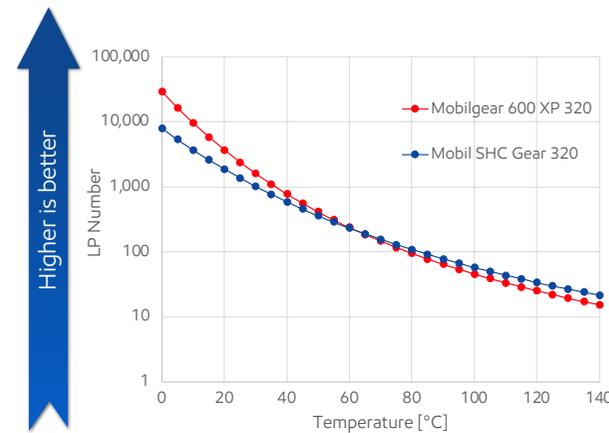
We all know that energy demand is increasing. So is the need to lower greenhouse gas (GHG) emissions. To meet these challenges, original equipment manufacturers (OEMs) must produce equipment that can deliver improved energy efficiency. But this equipment subjects lubricants to more severe operating conditions—from higher speeds and temperatures to smaller oil reservoirs. High-quality, reliable products are a must. That's why operators are increasingly choosing synthetic over mineral oils and greases.

Synthetic lubricants offer multiple advantages over mineral-based alternatives, including:

- Increased wear protection:** Synthetic lubricants possess superior fluid film protection, which guards against metal-to-metal contact, while their high shear stability helps retain film strength at high loads and high temperatures. They can also reduce scuffing, pitting and rolling contact fatigue.
- Wide temperature range:** Synthetic lubricants have a high viscosity index, helping retain viscosity when temperatures change. Their wax-free formulation helps maintain fluid film protection at high temperatures, while their lower pour point helps ensure greater fluidity at low temperatures.

## Dual benefit of synthetics

Lubrication Parameter estimate correlates with the relative EHL film thickness results with equilibrium at ~65°C



In this comparison, synthetic gear oil offers better protection than mineral at temperatures above 65°C. In addition, synthetics can help run the machine several degrees cooler—further improving the oil's lubrication performance.<sup>2</sup>

## The advantages of a lower pour point



Synthetic oils are engineered to flow more freely than conventional oils, even as temperatures drop. Their lower pour point helps equipment to start-up faster, fully protected, without pre-heating the oil.



## Did you know that 1/3 of the world's energy is lost through friction?<sup>3</sup>

Friction is the resistance that one surface encounters when moving over another. In industrial equipment, it leads to energy loss, which can reduce productivity and create wear.

~70% of equipment failures can be put down to lubrication breakdown and wear loss.<sup>3</sup>

**Synthetic lubricants work harder to deliver superior performance.**

- Enhanced productivity and improved safety:** The combination of wear protection and in-service performance can help reduce costly and unscheduled maintenance. This not only enhances equipment productivity but can also improve safety by reducing human-machine-interaction (HMI).
- Extended oil life:** Synthetic lubricants offer excellent resistance to oxidation, even under extremely high temperatures, helping ensure a long service life. This extends oil drain intervals, saving on maintenance downtime, oil and disposal costs. Their superior oxidative and thermal stability help reduce deposits and corrosion, while low volatility results in reduced oil consumption.

A mining-metallurgical plant was experiencing issues with the drive of their ball mill which was lubricated with mineral oil and required days of manual cleaning.

By switching to synthetic **Mobil SHC™ Gear 22M**, the customer has been able to significantly reduce HMI, is using 40% less oil and has increased production by 8%. That's a €160,000 revenue improvement.<sup>4</sup>

### View of lubricated open gears



From left to right:  
Solid Grease with Graphite, Oil and Solvent, Mobil SHC™ Gear 22M

A paper mill needed long-lasting solution to protect the heavily loaded dryer bearings in their state-of-the-art paper machine. After transitioning to **Mobil SHC™ PM 320** synthetic paper machine oil, the customer was able to triple oil life vs. a conventional mineral oil. The original fill oil lasted over 18 years, generating company-estimated savings of over €90,000 per year.<sup>4</sup>



Synthetic lubricants can last many years. To extend oil drain intervals as far as possible, it's important to implement a robust monitoring regime – throughout the life of the lubricant and your equipment.



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### Monitoring the lifeblood of your business

When you go to the doctor for a check-up, a blood sample is taken to help assess your health and potentially detect ailments that may require treatment, sometimes even before they develop. In a similar way, in-service used oil analysis is essential for assessing the health of your equipment. It can help further extend oil drain intervals and make predictive maintenance a reality.

Mobil™ Lubricant Analysis (MLA) offers used oil analysis options uniquely applied to your needs.

## Reducing operational costs

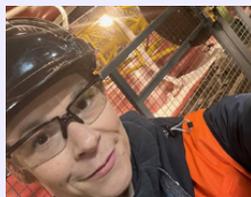
# It can pay to switch

All industries are facing rising material and energy costs, along with the need to invest in achieving net zero goals. To remain competitive, operators are under pressure to reduce their expenditure while increasing productivity. This puts the spotlight on every component, no matter how small, in the quest for OPEX savings.

Here too, synthetic lubricants offer significant advantages over conventional oils and greases. However, while lubricants only represent a fraction of operating costs, the initial investment involved in making the switch can often be seen as a barrier. In our experience, this is more than offset by the benefits.



Paper machines operate in extremely harsh conditions, at speeds of over 2,000 metres per minute and with steam temperatures exceeding 200°C. Meanwhile, downtime comes with a significant price tag. Advanced synthetic oils have the potential to withstand these stresses and guard against unplanned stoppages.



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Switching to synthetic lubricants can help save money in several ways:

- Lower maintenance costs:**  
Synthetic lubricants typically offer better wear protection and longer-lasting performance compared to conventional oils, meaning less intervention is required.


**Delivering 'fill for life' solutions**

Given that operations and maintenance costs account for 18-26% of the lifetime cost of wind energy,<sup>5</sup> wind turbine operators need gear oils that are 'fill-for-life' capable. Our new wind turbine gear oil technology, **Mobil SHC™ Gear 320 WindPower**, is DNV-certified to deliver outstanding performance and protection for the lifetime of a wind turbine.

- Savings on oil and waste disposal:**  
Synthetics generally ensure better thermal and oxidative stability, allowing for longer oil change intervals. This means fewer oil changes and less waste to manage.



A food manufacturer had been experiencing air compressor issues, impacting uptime and costs. An upgrade to **Mobil SHC Cibus™ 46** helped them double oil drain intervals (ODIs), halve machine interactions and reduce energy consumption delivering annual savings of €36,000.<sup>4</sup>

- Reduced energy and fuel consumption:**  
High-performance oils and greases often have lower friction coefficients, which can result in improved energy efficiency—allowing operators to produce more while using less energy and/or fuel.



When a ceramics mill was looking to make energy savings, we recommended **Mobil SHC™ Gear** synthetic gear oil and ongoing oil analysis. This solution improved the energy efficiency of tested gearboxes by 2.4%, yielding annual energy cost savings of €272,000.<sup>4</sup>

- Avoid costly repairs:**  
Because synthetic lubricants perform well in a wide range of temperatures and operating conditions, they can reduce the likelihood of equipment failure due to lubrication issues. This is particularly important in remote locations and hazardous environments.



We were called in by a steel manufacturer who was experiencing an average of four costly thrust bearing failures each year, which is abnormally high. By upgrading to **Mobilith SHC™ 460** high-performance synthetic grease, they reduced this to zero, generating estimated annual savings of €121,000.<sup>4</sup>

And so, while synthetic lubricants may have a higher upfront cost compared to conventional oils, the potential long-term savings—with regards to maintenance, energy efficiency, and equipment longevity—often outweigh the initial investment.

Advancing sustainability ambitions

# Achieving more with less

Across industries, regulatory compliance and net zero goals are requiring operators to rethink what, and how, they manufacture. In today's competitive marketplace, it's critical to be able to meet environmental goals while preserving, or improving, efficiency. High-performance oils and greases can help here too.

This is because of their 'in-use' benefits, i.e. the additional advantages gained by using advanced lubricants with the potential to help operators achieve more with less. At Mobil™, we regularly conduct joint activity with customers to help them document the in-use efficiency benefits of new lubrication management systems we design.

- Reduced energy consumption:** As outlined in the previous sections, synthetic lubricants maintain their viscosity more effectively, which helps reduce friction. The more effective the lubricant, the less energy is lost. Beyond the obvious benefits, this can support operators in achieving energy management standards, such as ISO 50001, and conform with energy efficiency legislation, such as the EU's Energy Efficiency Directive (EED).



**Mobil SHC™ Gear** synthetic gear oils protect industrial gearboxes and help extend oil life while helping to significantly reduce energy consumption in many gearboxes—up to 3.6 percent versus conventional oils.<sup>6</sup>



Industrial gearboxes operate under challenging conditions. When implementing synthetic solutions, we recommend starting with the gears using the most energy and operating under the greatest stress. Designs with high slippage and high tooth surface pressures typically offer the greatest potential for energy savings, but all high-efficiency modern gearboxes stand to benefit.



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Calculate the savings you can expect from switching to a synthetic lubricant using Mobil's calculator [here](#).

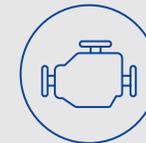


## Zero Waste to Landfill: Gold Validation

We successfully divert over 95% of the waste produced across our global lubricants network of blending and packaging plants from local landfills. We received an Environmental Claim Validation—Zero Waste to Landfill: Gold level—from Underwriter’s Laboratory (UL) in 2023, becoming the first petroleum products company to secure this validation.

- Reduced waste:** Beyond the economic benefits, synthetic oils’ and greases’ long-life properties can also help reduce oil waste. Oil drain intervals can be further extended with regular oil condition monitoring programmes such as Mobil Lubricant Analysis. Many manufacturers also offer smart packaging solutions to help reduce packaging waste.

- Potential to reduce GHG emissions:** By helping reduce energy consumption and waste, synthetic lubricants have the potential to help operations lower their GHG emissions, while enhancing productivity.



Mobil™ lubrication solutions have helped our gas engine customers in EMEA advance their sustainability ambitions by documenting a reduction of more than 1 million litres of used oil over 5 years.<sup>7</sup>



Switching to **Mobil SHC™ 632** helped a leading corrugated packaging company increase gearbox efficiency by 6.5%, reducing their carbon footprint by nearly 20 metric tons of CO<sub>2</sub> equivalent annually.<sup>4</sup>

# Tangible long-term benefits

The GHG emissions associated with the lubricant production phase of synthetics are higher than for conventional alternatives due to their higher component complexity (advanced synthetic base oils and additives). The situation is reversed, however, when you consider the use of the product over a longer period.

This is because a synthetic lubricant can be used for far longer than a mineral product, delivering numerous in-use benefits—in particular energy efficiency. In the longer-term, this offers the potential for lower GHG emissions from the production phase versus mineral alternatives.

To show how, we've compared one of our leading synthetic gear and bearing oils—Mobil SHC™ 632—with mineral Mobilgear 600 XP 320.<sup>8</sup>

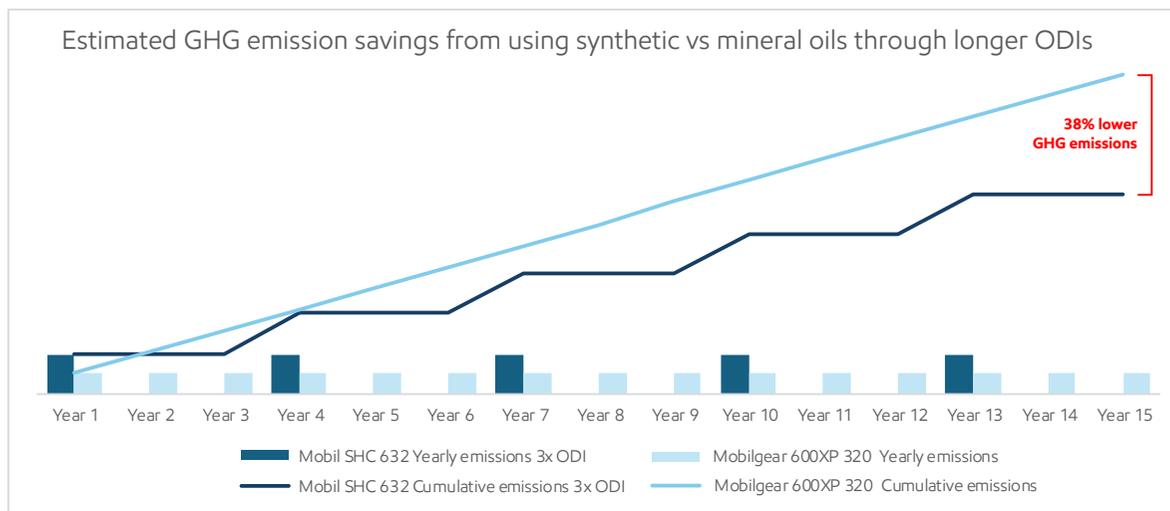
## Longer oil drain intervals = lower GHG emissions

As shown in our model example below, a mineral oil can need replacing every year, generating a consistent level of lubricant product-related emissions. The synthetic oil, however, has the potential to offer three times longer drain intervals, in the right applications and with ongoing condition monitoring.

Over 15 years, this represents the **potential for 38% lower cumulative GHG emissions** (see chart below)\*.

For customers who rely on renewable energy sources, extending finished lubricants' oil drain intervals will deliver higher savings than energy efficiency.

**Oil drain intervals can be extended in certain applications by five times or more.**



\*For longer oil drain interval examples with customers, see [link](#).

Graphical illustration based on ExxonMobil internal calculation. CFP estimates calculated based on ISO 14067 methodology using the 100-year time horizon global warming potential (GWP 100a). Assumes the synthetic oil has a 3x longer drain interval vs conventional oil. Actual results can vary.



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### Additional energy-saving benefits

But what about the additional performance benefits to be gained by upgrading to synthetics? To demonstrate the in-use efficiencies, we ran a trial for a large UK-based paper mill. A gearbox was filled first with mineral Mobilgear 600 XP 320 and run in standard plant operations. It was then replaced with synthetic Mobil SHC™ 632, before reverting to the mineral product. Energy consumption was measured throughout.

The synthetic oil's superior flow and friction-reducing properties significantly increased the energy efficiency of the customer's gearbox. An average of 6.5% less energy was required, vs. the mineral grade. We also recorded an 8.4°C drop in operating temperature, prolonging the life of both the oil and the equipment.

With an operating period of 8000 hr/year, the total amount of energy saved annually equates to 32,000 kWh, and a Carbon Footprint (CFP) reduction of 7 tonnes CO<sub>2</sub> eq per year. And that's for just one gearbox!<sup>9</sup>

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### Oil waste reduction

Longer oil drains also mean less waste and the potential for lower GHG emissions from oil management (refer to page 12 for an example demonstration).

According to the [European Commission's 2018 study](#), at present, only ~60% of collected waste oils in the European Union are recycled or re-refined. Approximately 39% are directed towards energy recovery pathways, which include both conversion to fuel and direct incineration.

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# A small change for industrial-size savings

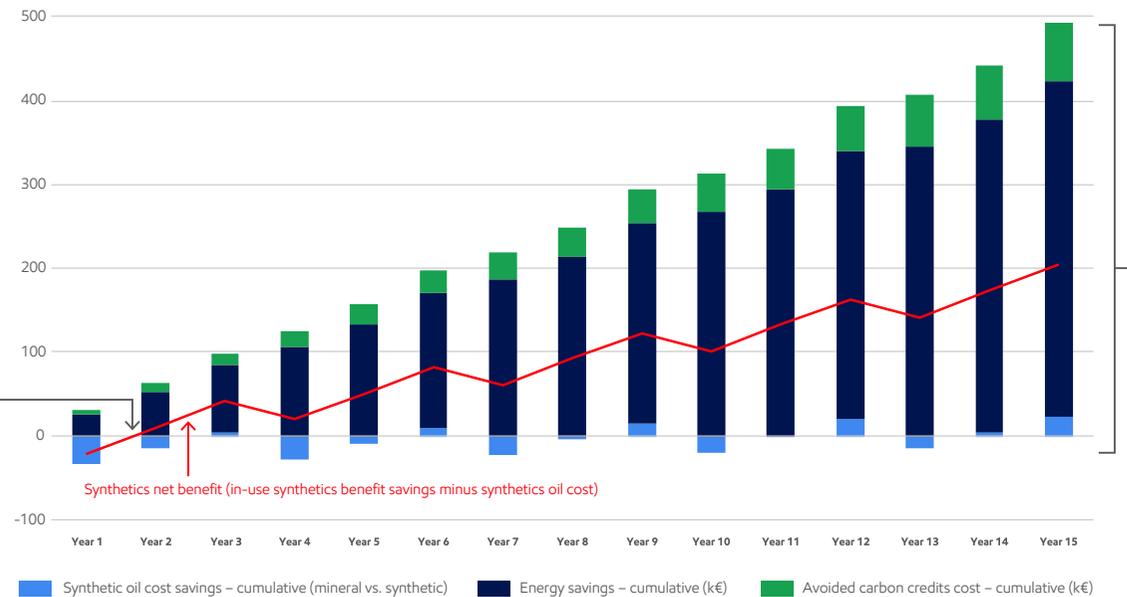
We've modelled the potential savings from an upgrade from mineral to synthetic oil over 15 years using the following assumptions:

 <b>10</b> high efficiency gear boxes	 <b>400-600</b> litres of oil per gear box	 <b>8,000 hours</b> operation/year	 <b>15 years</b> duration	 <b>€0.1665/kWh</b> industrial energy price <sup>10</sup>	 <b>0.4kg CO<sub>2</sub> eq/kWh</b> emissions factor <sup>9</sup>	<b>3x</b> oil drain interval of synthetics vs. mineral <sup>11</sup>	<b>0.5%</b> energy saving potential	<b>Model Gear oil price</b> Mineral €4 /l Synthetic €11 /l	<b>€65.47 Ton CO<sub>2</sub> eq</b> EU Carbon credit price <sup>12</sup>	<b>400kW</b> Gearbox power
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## An investment in synthetics can pay back in just over 1 year.

Based on energy savings alone, the potential financial savings generated by investing in a synthetic instead of a mineral lubricant can pay back in just over a year.

Cost and savings chart – mineral (Mobilgear 600 XP 320) vs. synthetic (Mobil SHC 632)



## Synthetics can more than pay for themselves.

Though the initial cost is higher, it is outweighed by potential energy and carbon credits savings over 15 years. As shown in the graph above, the combined in-use benefits far exceed the lubricant cost over the machine's lifetime!

## Reduction in energy use

Assumes conservative 0.5% energy efficiency

**-€400k<sup>10</sup>**  
(-2.4GWh)



Even in this conservative scenario, **reduced energy use is the highest potential GHG saving driver.**

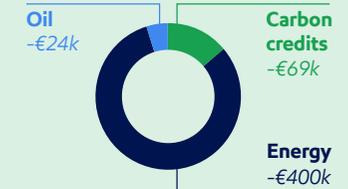
## Reduction in oil consumption and waste

Assumes 3x longer ODIs for synthetic oil

**-44 t<sup>11</sup>**



## 3 major savings drivers



Despite savings in oil costs over 15 years, these are dwarfed by potential energy savings and avoided carbon credit costs.

## Cost avoidance

Includes savings in gear oil purchase, energy costs and carbon credits

**-€493k<sup>12</sup>**



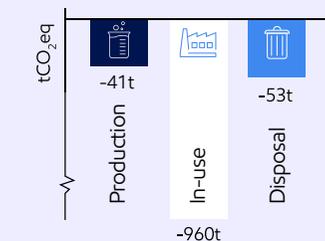
## Reduction in GHG emissions

Includes savings from the production, use and disposal<sup>13,14</sup> phases

**-1,054 t CO<sub>2</sub> eq<sup>13</sup>**



## GHG savings per lifecycle phase<sup>15</sup>



The impact of in-use energy savings is **23x** greater than the oil production phase.

Helping close the skills gap

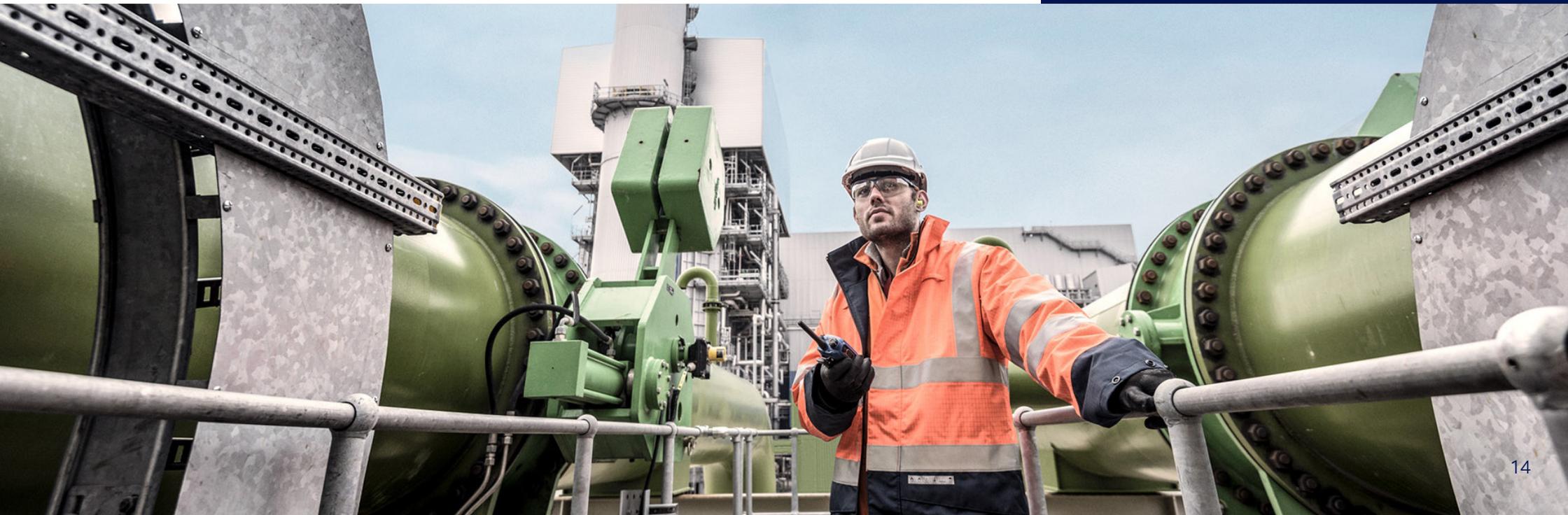
# Bridging the skills gap

Switching oils can be a daunting exercise, particularly as qualified engineering staff retire, and maintenance teams become increasingly stretched. Decades of experience in the field, however, prove that—with the right support—the benefits of upgrading to synthetics can help bridge any skills gap, enhancing safety and allowing maintenance teams to generate more value for their company.

- **Reducing man hours:** As operators today strive to conduct the same maintenance programmes with smaller, less experienced teams and/or remote service solutions, the enhanced reliability and extended oil drain intervals offered by high-performance lubricants can help reduce the involvement of maintenance staff.
- **Honing your team's expertise:** To reduce costs, machine operators are increasingly being expected to conduct routine lubrication interventions. From both a reliability and safety point of view, this makes training critical. We support many of our customers by delivering specialist training sessions for all levels of maintenance and technical staff.



By upgrading to synthetic **Mobil SHC™ 824**, we helped an energy customer operating industrial gas turbines to reduce human-machine exposure by 1,300+ hours. In fact, the oil is so robust that it's been delivering protection for over 25 years, and counting...!<sup>4</sup>





Maintenance staff shortages have led to an increase in operator lubrication, where machine operators manage oil-related interventions. Without proper training, this can result in using the wrong products or applying them incorrectly causing increased maintenance costs, downtime and waste.



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- **Leveraging tailored guidance:** To ensure the right products are applied in the right situations, operators need to be able to rely on tailored lubrication solutions. Mobil's Field Engineering Services (FES) team have decades of experience. They understand customers' industries, equipment and applications and can give support—on the ground or virtually—in almost any situation.
- **Generating critical insights:** Regular oil condition monitoring provides a critical early-warning system, allowing maintenance teams to identify potential problems before they hamper production. While lab-based used oil analysis remains the gold standard, the introduction of sensor technology gives industrial operators real-time insights into oil condition and equipment performance without the need for sampling, helping bridge gaps between service and oil sampling intervals.



With the support of Spectrolytics' IR sensor technology, we were able to help a steel rolling mill pick up ingress of water a full two days before the standard physical oil sampling technique for lab analysis. The team was able to take quick action to remove the water, protecting the oil and, therefore, extending the drain interval.

# Why should you care about synthetic lubricants?



Studies show that the majority (60%+) of machine failures are down to improper lubrication. This puts a great deal of pressure on maintenance teams to keep machines running—and support the company’s business goals—by ensuring effective lubrication.

**In this context, there are four very tangible potential benefits to using synthetic oils and greases:**

- 1. Performance benefits:** Safeguard your equipment performance by ensuring you are using the most appropriate lubricant for the job.
- 2. Bottom-line benefits:** Reduce downtime and your maintenance spend with products that can help protect against wear, extend equipment life, and improve efficiency.
- 3. In-use efficiency benefits:** Optimise your operational efficiency while supporting your sustainability ambitions with solutions that can help you achieve more with less.
- 4. Team benefits:** Upgrade the safety and value of your team with solutions that reduce human-machine interaction.

At Mobil, we leave nothing to chance. Our experts are here to help yours whenever and wherever needed, with training and consultancy, on top of high-performance lubrication solutions.



If you’d like to discuss how advanced lubrication solutions might be able to help your operation, visit [mobil.eu](https://www.mobil.eu). You can speak directly to our technical operators using MobilChat.<sup>16</sup>

## End notes

1. Customer saving, waste oil reduction and less human-machine interaction are based on Engineering Benefit Reports which use customer data and are documented by Mobil engineers. Actual benefits may vary depending upon the type of equipment used and its maintenance, operating conditions and environment, and any prior lubricant used.
2. Actual results can vary depending upon the type of equipment used and its maintenance, operating conditions and environment, and any prior lubricant used.
3. [United States Congress, Resolution #916 of September 29, 2016.](#)
4. Based on experience of a single customer. Actual results can vary depending upon the type of equipment used and its maintenance, operating conditions and environment, and any prior lubricant used. <https://www.mobil.eu/en-gb/lubricant-expertise/resources/mobil-shc-pm-320-triples-oil-life-increases-uptime>.
5. Stehly, T., Duffy, P., & Mulas Hernando, D. (2023). [2022 Cost of Wind Energy Review](#).
6. Energy efficiency relates solely to the fluid performance when compared with conventional reference oils of the same viscosity grade in gear applications. The technology used allows up to 3.6 percent efficiency compared with the reference when tested in circulating and gear applications under controlled conditions. Efficiency improvements will vary based on operating conditions and applications.
7. Waste lubricant reduction is based on Engineering Benefit Reports (EBRs), which use customer data and are documented by Mobil Serv engineers – following the lubrication solutions provided by Mobil - for Gas Engine customers across Europe, Africa and the Middle East during the period of May 2017 – April 2022. Actual benefits may vary depending upon the type of equipment used and its maintenance, operating conditions and environment, and any prior lubricant used.
8. CFP estimate based on IPCC 2021 GWP 100 year impact factors.
9. Equipment efficiency can translate to reduced power consumption or increased machine output. Efficiency improvements will vary based on lubricants previously used, operating conditions and application. Data source (Europe): Country level greenhouse gas emission intensity of electricity generation sourced from the European Environment Agency EEA of the European Union: [https://www.eea.europa.eu/data-and-maps/daviz/co2-emission-intensity-9/#tab-chart\\_2](https://www.eea.europa.eu/data-and-maps/daviz/co2-emission-intensity-9/#tab-chart_2) with National emissions reported to the UNFCCC and to the EU Greenhouse Gas Monitoring Mechanism provided by European Environment Agency (EEA). Complete energy balances provided by Statistical Office of the European Union (Eurostat) COM 562 final and SWD 176 final provided by European Commission. Data source (UK): Government of United Kingdom Greenhouse Gas Reporting: Conversion factors 2021, <https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting>. This analysis is based on the data and experience of a single customer. Actual results can vary depending upon the type of equipment used and its maintenance, operating conditions and environment, and any prior lubricant used. Please note emission coefficients vary by zone and additional validation is required if changed. Effective January 1, 2023.
10. Energy saving calculated using German average industrial electricity price of €0.1665/kWh as of July 2024 ([link](#)), and applied on total energy consumption of 480 GWh – assuming a conservative 0.5% energy savings via use of the synthetic gear oil over 15 years.
11. 3x ODI is an assumption based on actual experience of individual customers and on market available laboratory tests ([example](#)). Our calculation assumes a paper factory in Germany with 10 high-efficiency gearboxes (using 400-600 litres of oil per gearbox), operating for 8,000 hours/year over 15 years.
12. Calculation includes savings in gear oil purchase, energy costs and avoided carbon credits. Price of EU Carbon credits taken from Oct 31 2024 ([source](#)) and using a 3.1 (Kg CO<sub>2</sub>/Kg waste oil) emissions factor ([source](#)).
13. Figure calculated using cumulative total of GHG savings in production (through longer ODIs and oil use), in-use (through reduced energy consumption) and disposal phases. Disposal data assumes a 39% incineration rate, based on [European Commission's 2018 study](#), and that 100% of used oil is collected.
14. [Life Cycle Assessment of Used Oil Management, API, 2017.](#)
15. While the mineral product has a carbon footprint 1.4 kg CO<sub>2</sub>eq/kg lower than the synthetic oil, an upgrade can still generate production phase GHG savings given the potential for 3x longer oil drain intervals – allowing you to use approx. 44 tonnes less oil over 15 years.
16. Functional cookies must be enabled.

