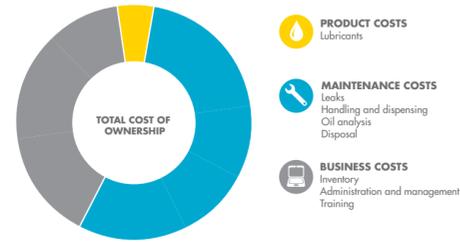


## CHOOSING THE RIGHT LUBRICANTS AND SERVICES FOR YOUR WIND TURBINES CAN HELP TO MAKE A REAL DIFFERENCE TO THE EFFICIENCY OF YOUR ENTIRE OPERATION.



### LUBRICANTS – SMALL COST, BIG IMPACT

Buying low-quality lubricants can be a false economy. Lubricant costs are typically less than 5% of a power generation business's total maintenance budget. We focus on providing performance products that can help to reduce maintenance requirements and increase reliability, and services that are designed to improve maintenance and business practices, and thus lower your overall costs.

### DESIGNED TO IMPROVE PROFITABILITY

Keeping wind turbines working efficiently and reducing operating costs can be critical for a profitable business. At Shell Lubricants, we appreciate that turbines operate in tough conditions, and that to be competitive you need them to be reliable and have high availability. Your lubricants must protect your equipment to help reduce operating and maintenance costs. Choosing the right lubricants and services for your business needs can help to make a real difference to your power generation operation.

Our technology-leading wind turbine lubricants, which are developed, researched and supported by our international team, can help you to reduce your operating and equipment-ownership costs by providing

- enhanced protection of critical components to reduce replacement costs and extend turbine life
- reduced lubricant consumption and maintenance through extended-life products
- improved operational efficiency through synthetic oil technology.

### UNDERSTANDING YOUR NEEDS

Because of our experience of wind power generators across the world, we understand the crucial role that lubricants play in turbine operation. We also understand that operating turbines in remote on-shore and offshore areas with extreme climatic conditions and difficult access adds to the challenge. Whether you want to extend maintenance intervals and increase reliability with purpose-designed, low-temperature hydraulic oils or to protect blade bearings from fretting corrosion and false brinelling using specialist greases, we have a wide range of lubricants to choose from.

Wherever your wind turbines are located and whatever your needs, our international network of experts can design a package of products and services for your business to help to increase your profitability. Not only do we supply an extensive range of lubricants, we also aim to help you to

- choose the right products
- store, handle and apply your lubricants correctly
- achieve continuous improvement through equipment performance monitoring.



### DELIVERING VALUE

Wind energy production is growing at record levels in response to the need for diversification of energy sources through the increasing global demand for electricity. Shell Lubricants can provide products and services for the entire wind value chain from component manufacture and turbine assembly, through transportation, construction and installation to service. By designing the right package of lubricants and services for your requirements, we can help you to substantially reduce your total operating and equipment ownership costs. Using high-quality, appropriate lubricants and services correctly can lower operational and maintenance costs, extend component life and increase turbine availability.

### LOCALLY SUPPORTED GLOBAL PRODUCTS AND SERVICES

Our international organisation, which has experienced turbine lubrication experts, can deliver lubricants with proven performance and multiple equipment manufacturer approvals wherever you operate. Our experts can work with you to analyse your needs and solve your problems. They can provide and help to implement a lubrication plan designed to unlock your wind farm's generating potential.

We offer a wide range of lubricant-related services to help you maximise the positive impact of lubricants on your operation. These services can include

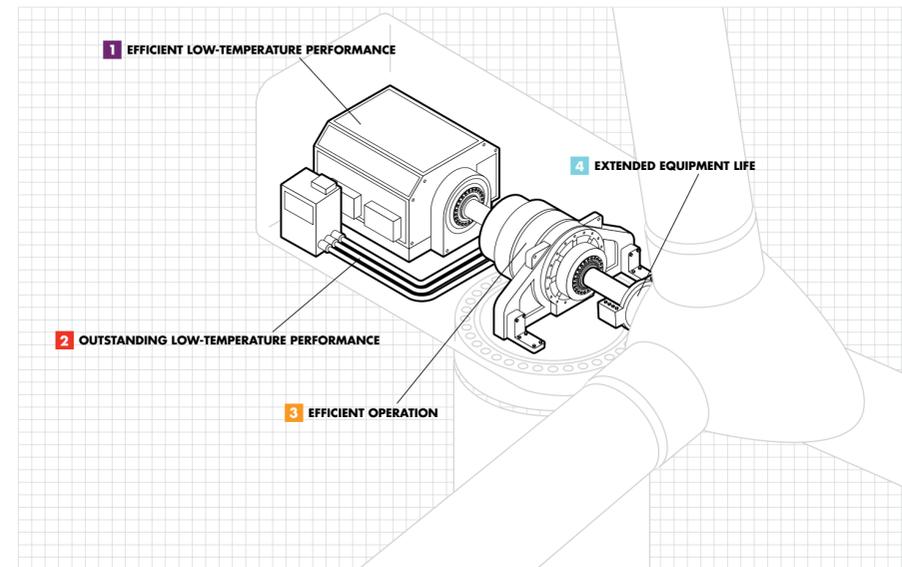
- **Shell LubeAdvisor** lubricant surveys and recommendations
- **Shell LubeAnalyst** oil condition monitoring
- **Shell LubeExpert** specialist lubricant advice.

For example, the Shell LubeAnalyst service can be a vital tool in extending component life and the time between services. This health check for lubricants and vital components is designed to reduce costs and add value by

- identifying potential oil or component failures before they become critical
- extending lubricant life, thus reducing change-out downtimes and procurement costs
- reducing risks and contributing to safe and reliable operations.

## WHERE LUBRICANTS CAN ADD VALUE

Some examples of ways that lubricants can help your operation to run more efficiently



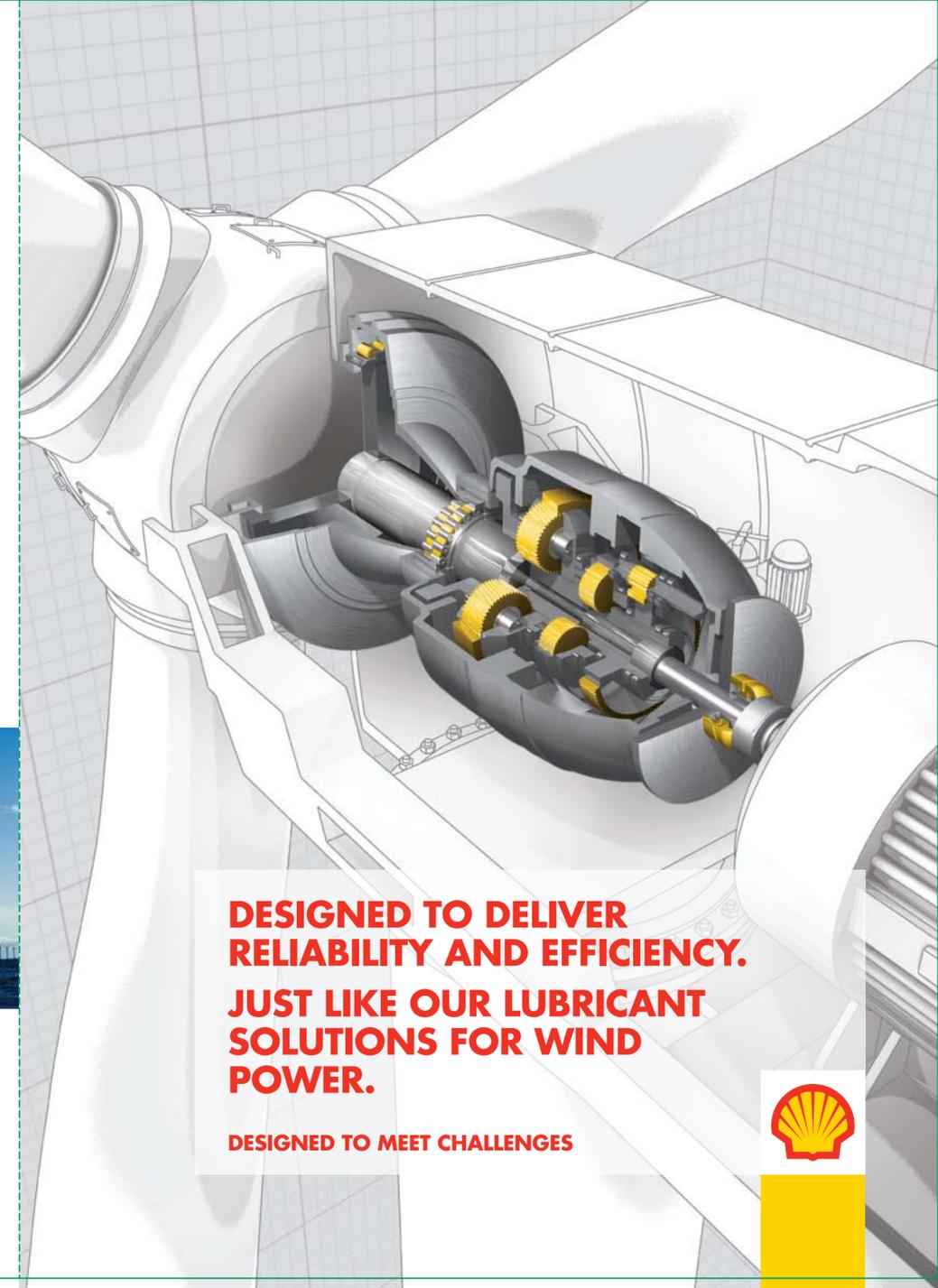
- 1 **EFFICIENT LOW-TEMPERATURE PERFORMANCE** with Shell Gardus S5 V100 2 high-speed generator-bearing grease
- 2 **OUTSTANDING LOW-TEMPERATURE PERFORMANCE** with Shell Tellus S4 VX hydraulic oil
- 3 **EFFICIENT OPERATIONS** and extra protection using Shell Omala S4 GX gearbox oil
- 4 **EXTENDED EQUIPMENT LIFE** and operational efficiency with Shell Rhodina BBZ blade-bearing grease



## WORKING WITH THE WIND GENERATION INDUSTRY

So that you get the most from your wind turbines, we work closely with turbine manufacturers and their component suppliers to make sure that our products help to enhance operational efficiency and offer increased component protection and extended oil and equipment life. Shell lubricants are either approved or meet the specifications of many equipment manufacturers, including

- |                        |                       |
|------------------------|-----------------------|
| ■ Acciona              | ■ Liebherr            |
| ■ Bonfiglioli          | ■ Lincoln             |
| ■ Bosch Rexroth        | ■ Rollix              |
| ■ Brevini              | ■ Rothe Erde          |
| ■ Dongfang             | ■ Siemens Wind Power  |
| ■ Gamesa               | ■ Sinovel Wind Group  |
| ■ GE Energy            | ■ SKF                 |
| ■ Hansen               | ■ Svendborg           |
| ■ IMO                  | ■ Vestas Wind Systems |
| ■ Jahnelt & Kestermann | ■ Winergy             |



**DESIGNED TO DELIVER RELIABILITY AND EFFICIENCY. JUST LIKE OUR LUBRICANT SOLUTIONS FOR WIND POWER.**

**DESIGNED TO MEET CHALLENGES**



## TECHNOLOGY WORKING FOR YOU

Our international organisation, which has experienced turbine lubrication experts, can deliver lubricants with proven performance and multiple equipment manufacturer approvals wherever you operate.

They are the people who develop products that make a difference to your business, even under the most challenging conditions. From the Panama Canal and the Airbus A380 to Ferrari, what we learn in our collaborations, we use to create lubricant solutions to fulfil your business needs.

And we do not just have the best lubricants, we also have the world's leading field experts working with customers every day to apply these solutions. The result? Technology that delivers value to your operation.



**IMPROVED RELIABILITY:** Gearbox reliability is critical for wind turbine reliability, and Shell Omala S4 GX 320 synthetic gear oil provides excellent protection against common failure modes, including micropitting and bearing wear. Offering excellent low-temperature fluidity and long oil life, Shell Omala S4 GX 320 provides benefits for difficult-to-maintain wind turbine gearboxes.

**GREATER PROTECTION:** The massive blades of a wind turbine are adjusted using grease-lubricated blade bearings, which, if insufficiently lubricated, can fail through fretting and false brinelling. Shell Rhodina BBZ grease is designed to provide protection to bearings against fretting corrosion, moisture contamination and false brinelling at temperatures as low as -55°C.

Shell Rhodina BBZ is lubricating the blade bearings of many wind turbines globally through our listings with leading blade bearing suppliers such as IMO, Liebherr, Rollix and Rothe Erde, and wind turbine manufacturers including Vestas, Acciona, Gamesa, Dong Fang New Energy Equipment, Sinovel Wind Group and Siemens Wind Power.

## EFFICIENCY FOR YOUR WIND FARM

Over many years of working with the world's leading wind farm operators, our lubricants experts have developed a deep understanding of your industry challenges. We can use our knowledge and experience to create a lubrication plan for your business and tailor our technology-leading products and services to help you meet the needs of your business.

Challenge us to demonstrate how we can add value to your operations by **contacting your local Shell Lubricants customer service centre.**



[shell.com/power](http://shell.com/power)

\*Shell Lubricants\* refers to the various Shell companies engaged in the lubricants business.

**A LUBRICATION PLAN DESIGNED TO UNLOCK YOUR POWER GENERATION POTENTIAL**

