



**OVAKO**

# **CLEAN STEEL** **IN HIGH PERFORMANCES**

**STEEL FOR WIND POWER APPLICATIONS**

# OVAKO KEEPS OUR WORLD IN MOTION

Ovako's steel cleanliness meets the performance demands of wind turbine applications such as gearboxes, transmissions, fasteners and bearings. Fatigue life is essential for low maintenance cost.

## Wind power

Combined with modern technology, wind power – an ancient source of energy – offers a wide range of opportunities in the areas of capacity and sustainability.

Wind energy is available globally. Wind power is fuel free energy, which does not generate emissions into the air, water or ground. Almost all parts of a wind power plant can be recycled.

Ovako participates actively in furthering a more sustainable use of energy, by developing and supplying long special steel products for wind turbine structures, and by developing a more environmental friendly steel production.

## Steel for high performance

Wind power is a demanding force. Our steel's key performances are fit to endure these harsh conditions. Ovako has developed steel cleanliness to meet the highest demands.

High performance wind turbines begin and end with Ovako. We support the long-term endurance of the wind turbine, producing energy efficiently – energy that we need in our own production.

### Steel for extreme performances

- Endurance
- High performance
- Impact toughness
- Mechanical strength
- Corrosion resistance
- Machinability
- Tolerances
- Uniform and repeatable properties

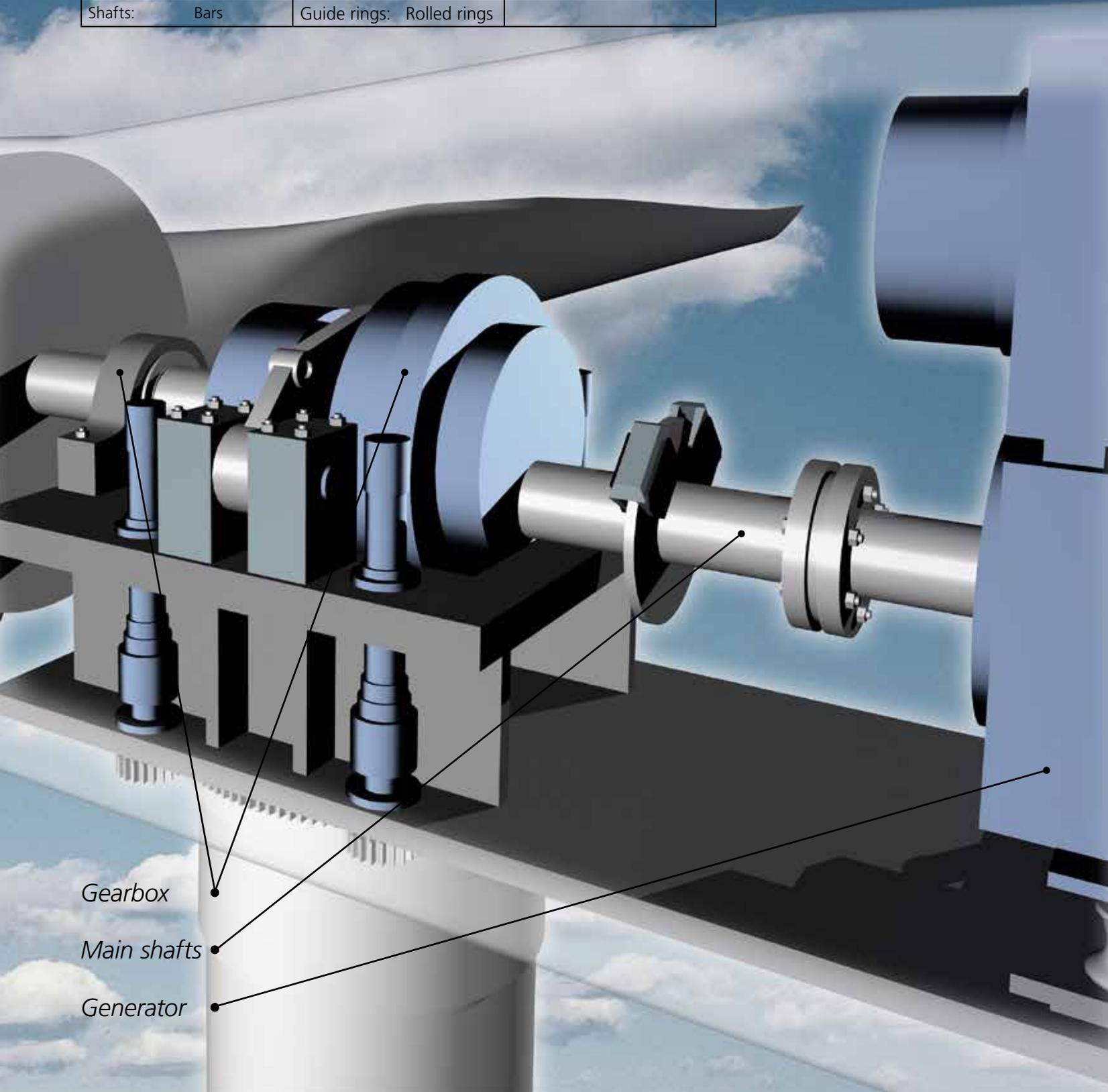
### Know how and services

- Capacity
- Timely deliveries
- Local supply
- Quality
- Technical services



**EXAMPLE OF APPLICATIONS**

<b>Gearbox</b>		<b>Main shafts</b>		<b>Generator</b>	
Bearings:	Rolled rings Bars	Bearings:	Rolled rings Bars	Shafts:	Bars
Gears:	Tubes Bars Rolled rings	Couplings:	Rolled rings Tubes Bars	Bearings:	Rolled rings Tubes Bars
Shafts:	Bars	Guide rings:	Rolled rings		



*Gearbox*

*Main shafts*

*Generator*

# POWER TRAIN AND ROTATING ELEMENTS

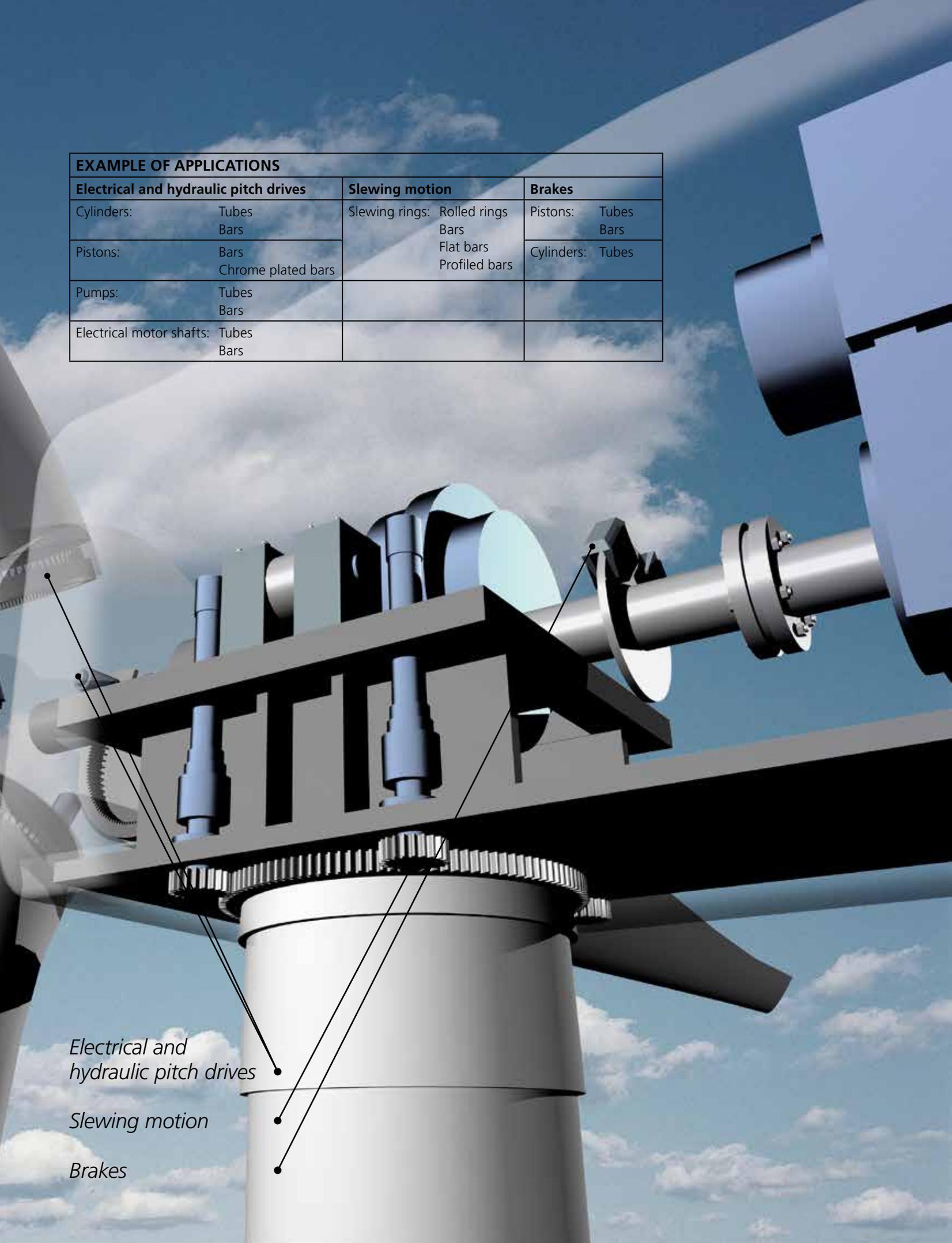
Ovako has a wide range of high performance steel products, which means that we can offer the optimal product for most power train applications and rotating elements. Our steel is used when extra performance is demanded, typically for parts in gearboxes and transmissions.

We can offer our customers an edge when it comes to properties such as cleanliness, formability, machinability, high fatigue strength or hardenability, always maintaining the search for cost efficiency.

Our production systems are designed to meet the customers' requirements for product optimization. We also have the resources for manufacturing pre-components in various stages.



EXAMPLE OF APPLICATIONS		
Electrical and hydraulic pitch drives	Slewing motion	Brakes
Cylinders: Tubes Bars	Slewing rings: Rolled rings Bars Flat bars Profiled bars	Pistons: Tubes Bars
Pistons: Bars Chrome plated bars		Cylinders: Tubes
Pumps: Tubes Bars		
Electrical motor shafts: Tubes Bars		



*Electrical and hydraulic pitch drives*

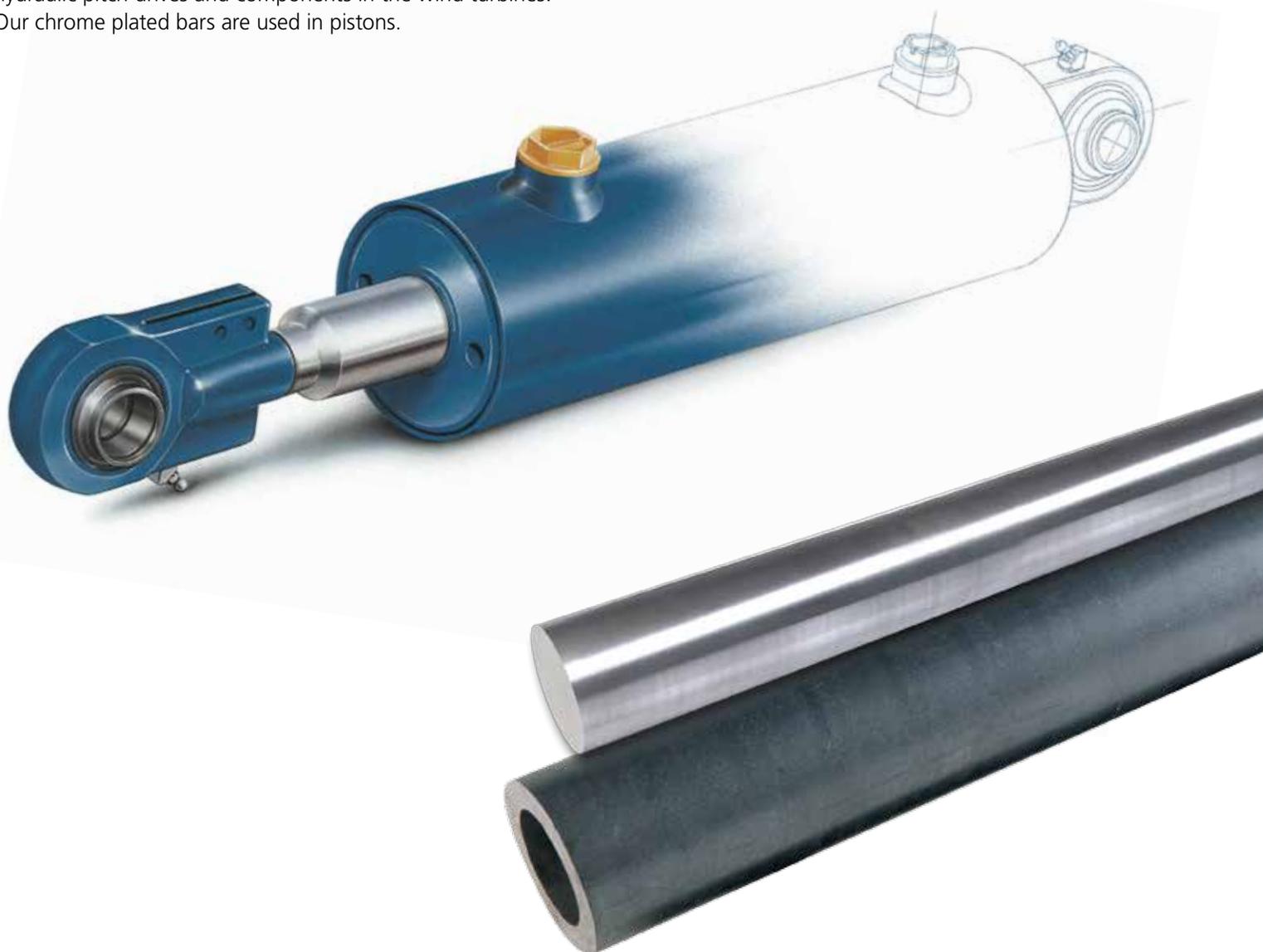
*Slewing motion*

*Brakes*

# STEEL FOR GUIDING AND MOTION CONTROL

Ovako has expert knowledge of the demands on hydraulic applications within the wind power industry. We offer special solutions even for the most difficult conditions.

We deliver special steel in the shape of bars and tubes for hydraulic pitch drives and components in the wind turbines. Our chrome plated bars are used in pistons.



# FASTENING AND ANCHORING

Wind turbine construction requires connecting elements and fasteners in order to anchor the wind turbine to the ground, to assemble the modules of the tower and to fasten the wings to the body.

Ovako supplies steel for the manufacturing of bolts, inserts and, in case of offshore wind turbines, anchoring chains.

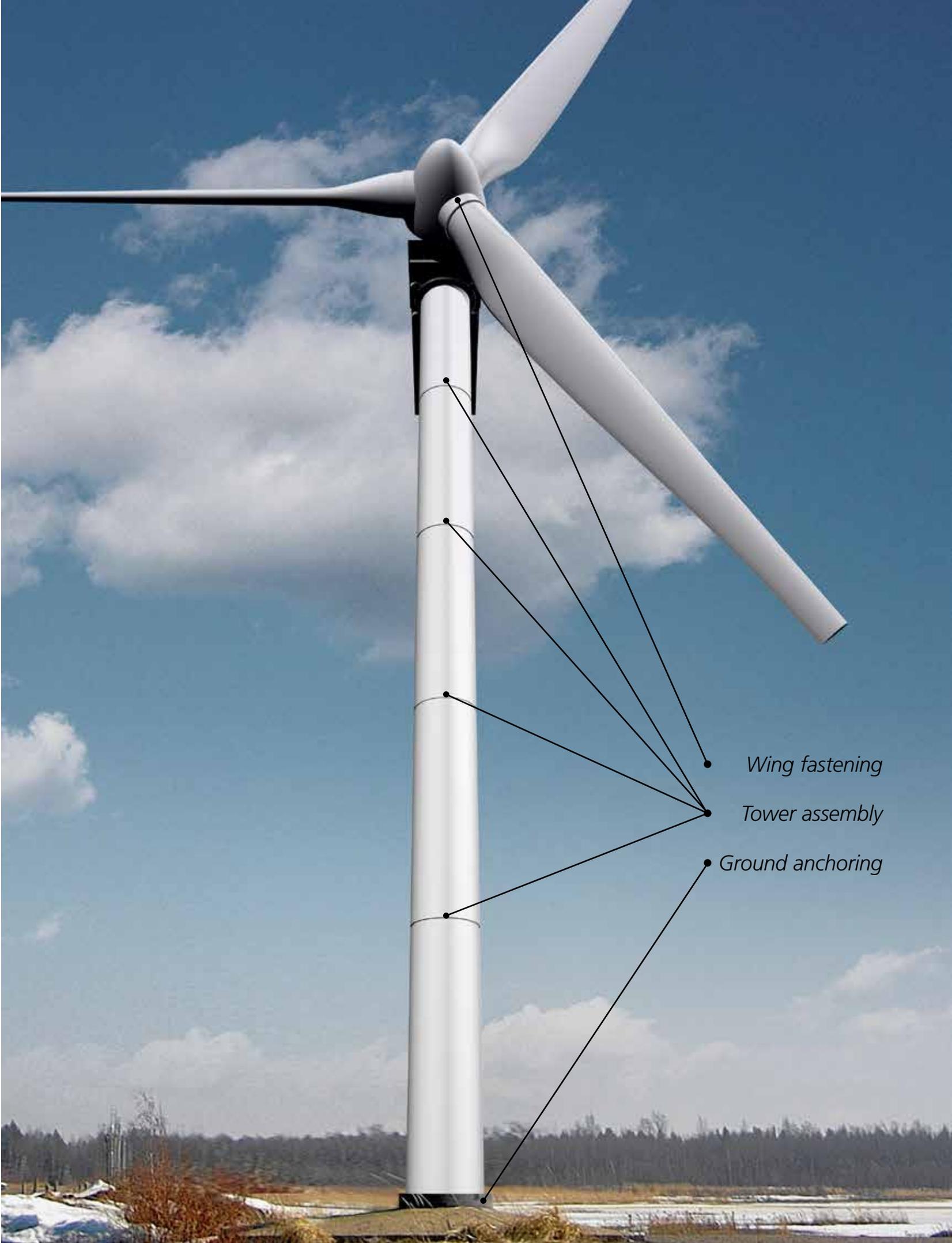
In order to get the most out of wind energy, wind turbines are located in places with demanding weather conditions. Ovako can provide steel that withstands these conditions, including low temperatures.



Courtesy of LM Wind Power, [www.lmwindpower.com](http://www.lmwindpower.com)



EXAMPLE OF APPLICATIONS		
Wing fastening	Tower assembly	Ground anchoring
Bolts: Bars	Bolts: Bars	Chains for offshore applications: Bars
Inserts: Bars		Anchor bolts: Bars



*Wing fastening*

*Tower assembly*

*Ground anchoring*

# OUR SIZE IS YOUR STRENGTH

**Size matters – and focus too! As global steelmakers go, we are not a giant. But as a niche-oriented European player with 10 production sites focused on premium engineering steel, we have the resources and portfolio to meet your needs.**

Today, you can choose from over 200 steel grades – from bar and tube to rings and pre-components. We also provide these in a wide range of formats that are near net shape, making machining easier and less costly.

## **Three major steelworks – at your service**

Unlike distributors or steel companies with a single mill, we operate three major mills in the Nordic region, which means there is a strong likelihood that we'll have both the grade and capacity you require. More than this, since we control every batch of steel in a carefully monitored process, we can ensure batch-to-batch consistency. This further simplifies manufacturers' production processes and helps to reduce costs.

## **Seamless logistics and support**

From grade selection to on-time delivery, our ambition is to make working with us easy. Our Steel Navigator, for example, helps you to select just the right grade based on steel designation, chemical composition or application. For machining, our M-Steel Calculator gives you data about recommended cutting conditions. Once you have ordered, our OvaTrack online tool lets you monitor your orders and process other information relating to your business activities.

## **Just the way you want it**

Depending on your specific needs, our steel service centers in Sweden, Finland, Germany, United Kingdom and US can perform cutting and chamfering of different pre-components. The product is packed, marked and delivered according to your specifications. All the while, our technical customer support gives advice on product choice, adaptability to the customer's process and other technical information.

All of our service systems and interactive tools can be accessed through our web site at [www.ovako.com](http://www.ovako.com)

## **OVAKO HOFORS-HÄLLEFORS STEELWORKS, SWEDEN**

Premium-quality steel products of high cleanliness and fatigue strength. Used primarily for components in bearings, diesel engines, oil & gas, mining and other special products. New ring mill for bearing steel and other demanding applications.

## **OVAKO TWENTE PRODUCTION, THE NETHERLANDS**

Part of the Cromax division. Specialists in hard-chrome plated bars and tubes, mainly for hydraulic applications.

## **OVAKO MOLINELLA PRODUCTION, ITALY**

Production of induction-hardened and hard-chrome plated bars for hydraulic cylinders.

## **OVAKO REDON PRODUCTION, FRANCE**

Part of the Cromax division. Specialists in nickel-plated bars and tubes for challenging hydraulic applications.

**OVAKO SMEDJEBACKEN-BOXHOLM  
STEELWORKS, SWEDEN**

Primarily alloyed engineering steel produced using advanced rolling to very tight tolerances. Products such as bolts and fasteners are used for transport, agriculture, rail and other demanding industries.

**OVAKO IMATRA  
STEELWORKS, FINLAND**

Long steel products such as bar and rod for machining and forging. Consistent high quality designed for high-productivity cutting. Forged precision parts, including bolts and fasteners, for use in mining, offshore, shipping and automotive industry.



Ovako is a leading European producer of engineering steel for customers in the bearing, transportation and manufacturing industries. Our production is based on recycled steel and includes steel in the form of bars, tubes, rings and pre-components. Ovako is represented in more than 30 countries and has sales offices in Europe, North America and Asia. Sales in 2014 amounted to EUR 862 million and the company had 2,925 employees. For further information please visit us at [www.ovako.com](http://www.ovako.com)

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