



## Contact-free bearings with proven environmental benefits



### Environmental benefits

- Reduced CO<sub>2</sub> emissions
- Reduced flaring
- Reduced fire risk, increased plant safety
- Smaller footprint
- No oil spills
- Reduced noise level

**Replacing the conventional bearings in a 10 MW natural gas compressor with SKF S2M Magnetic Bearings can save 220 tonnes of CO<sub>2</sub> emissions every year.**



### SKF S2M Magnetic Bearings are meeting new demands for reliability, safety and sustainability in oil and gas exploration

Driven by increasing demand for energy, oil and gas exploration and production companies are moving into increasingly remote land and subsea environments. Manufacturers and end-users need reliable, low-maintenance solutions that can handle these harsh operating conditions while meeting stringent environmental and safety regulations.

SKF S2M Magnetic Bearings offer a proven solution to these challenges. Switching from conventional bearing arrangements to SKF S2M active magnetic bearing systems in both newly designed and retrofitted equipment can deliver several environmental and operational benefits.

Because SKF S2M Magnetic Bearings operate with no metal-to-metal contact, there is virtually no bearing friction generated and no bearing wear. Their simplified hermetic design eliminates the need for seals and lubrication systems, reducing maintenance, potential contamination and flaring gas.

Such advantages keep the bearings' Total Cost of Ownership low, even as they reduce the industry's environmental footprint. Currently, SKF S2M Magnetic Bearings are doing so at more than 1,000 installations worldwide, across all sectors of oil and gas development and hydrocarbon processing. The expanding application range for SKF S2M Magnetic Bearings now includes:

- Gas storage compressors
- Gas treatment turboexpanders
- Ethylene turboexpanders
- Gas lift or reinjection compressors
- Subsea compressors
- Gas transport compressors
- Polyethylene compressors
- Industrial air compressors
- Power generation turbogenerators
- Pressure let down turbogenerators

SKF BeyondZero solutions can help reduce CO<sub>2</sub> emissions, preserve limited resources and protect the environment from the use and spread of toxic substances. For more details, including documentation of reduced environmental impact, visit [www.beyondzero.com](http://www.beyondzero.com).



## Increase reliability while reducing carbon emissions with SKF S2M Magnetic Bearing system

### Operational benefits

- Reduced maintenance and Total Cost of Ownership
- Reduced wasted energy from gas flaring
- Improved reliability and increased service life
- Oil-free operation cuts risk of contamination and fire and eliminates oil spills
- Withstands severe operating conditions and environments
- Smaller footprint requires less infrastructure and logistics
- Enhanced diagnostics and monitoring performance

### Energy saving example

Comparison of SKF S2M Magnetic Bearing system in compression of natural gas with a 10 MW compressor for duration of one year

#### Baseline:

Hydraulic oil bearing solution for stand-alone motor-compressor solutions with dry gas seal

#### SKF Solution:

An active magnetic bearing arrangement enables the construction of a compressor solution in which the motor and compressor are integrated and both run within the compressed natural gas. In the baseline system (hydraulic oil bearings) the motor and compressor are in two separate units, which results in some leakage of gas at the shaft going into the compressor from the motor. A dry gas seal collects the natural gas that leaks; this gas is flared without energy recovery.

Additionally, the magnetic bearing application does not require a hydraulic system which is needed for a hydraulic oil bearing system. This leads to energy savings from elimination of pump, reduced oil use and reduced solution mass.

#### Assumptions:

CO<sub>2</sub>e factor for gas flaring 2,51 kg CO<sub>2</sub>e/m<sup>3</sup> gas

Source: The Canadian Association of Petroleum Producers (CAPP)

Leakage in baseline case 10 m<sup>3</sup>/hr

Running of compressor 8 760 h/year

#### Results:

Per year savings

220 tonnes CO<sub>2</sub>e in 10 MW natural gas compressor

