

## TECHNOLOGY

## Support pays off for Norway

**New oilfield products** on view at ONS point to the **success** of state **R&D investment**

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**I**n an anonymous office building in eastern Oslo, Erik Floberg is polishing a 45-kilogramme super duplex valve.

After six years of late nights and hard work, his patented invention is ready to be presented to the world at the ONS oil and offshore conference in Stavanger.

The road from idea to reality has been long for the 41-year-old engineer. Since the thought of an overrideable dual-plate check valve first took shape six years ago — about the same time as the youngest of his three sons was born — Floberg has spent most of his spare time developing the idea on top of his day job as an offshore engineering consultant.

“I saw that stagnant zones in water, chemical and hydrocarbon systems was a problem that causes frost expansion, bacterial growth and pitting corrosion, but I could not find a solution that worked well enough,” Floberg says.

“With an overrideable check valve it is possible to completely drain the pipe during shutdowns, while saving costs for parallel drain pipes, heat tracing, coating and insulation, and reducing welds and potential leakage points.”

With his background as a tool-maker, Floberg was able to make parts of the prototype himself. He enlisted established suppliers Westad Industri and Rotork Norge to help manufacture a valve that



Testing ground: Hi Flo founder Erik Floberg tests his overrideable check valve at Equinor's Heroya facility

satisfies offshore standards. Thanks to a government grant, he earlier this year completed a cycle test at Equinor's Heroya test site to verify that the valve is robust and fit for purpose, and had it type approved by DNV GL.

Now, the final hurdle is to get an

operator to take a chance on his product.

Floberg's one-man company Hi Flo is one of 61 projects that received grants from Norway's state-funded DEMO 2000 programme in the past two years.

The scheme specifically targets

testing, demonstration and piloting of new technology that can help cut costs and emissions in the offshore oil and gas industry.

Cost-cutting through new technology and simpler solutions has been key to allow new Norwegian projects to go ahead.

As an example, Equinor's recently approved Johan Castberg development now has a break-even price of \$35 per barrel, down from an initial concept costing more than \$80 per barrel in 2013.

Projects supported by DEMO 2000 range from subsea hardware to computer programmes, and are developed by small start-ups as well as major players such as Aker Solutions, NOV, Schlumberger and ABB.

#### Countering the slump

In 2016 and 2017, the Research Council of Norway handed out Nkr389 million (\$46 million) in DEMO 2000 funding after the government boosted the budget as a measure to counter the oil-industry slump.

The council also oversees the wider research and development programme Petromaks 2, which has awarded more than Nkr500 million in the same period.

In addition, Norway has channelled Nkr7.5 billion to start-up companies across all industries through its Innovation Norway agency in the past two years.

The policy seems to have helped. The oil-industry downturn after 2014 has resulted in a faster pace of innovation and has triggered higher private-sector investments, according to a recent survey commissioned by Abelia, Norway's business association for knowledge and technology-based enterprises.

Comparing Norway with 28 other countries, the survey by analysis firm Ny Analyse on the status of restructuring efforts found that Norway jumped to eighth place this year from 15th place in 2017 when it comes to the rate of innovation activity, particularly for market innovation and processing and product innovation.

The increased rate of innovation through the oil-market crisis “means that the basis for restructuring is improved, which is very good news”, Abelia said.

While the oil industry scores high on innovation, the trend is less positive for Norway as a whole.

The country dropped to seventh place from fourth when measuring overall public spending on research and development, and is lagging behind its peers for some information technology indicators, the Ny Analyse survey showed.

On the global innovation index by Cornell University, INSEAD,

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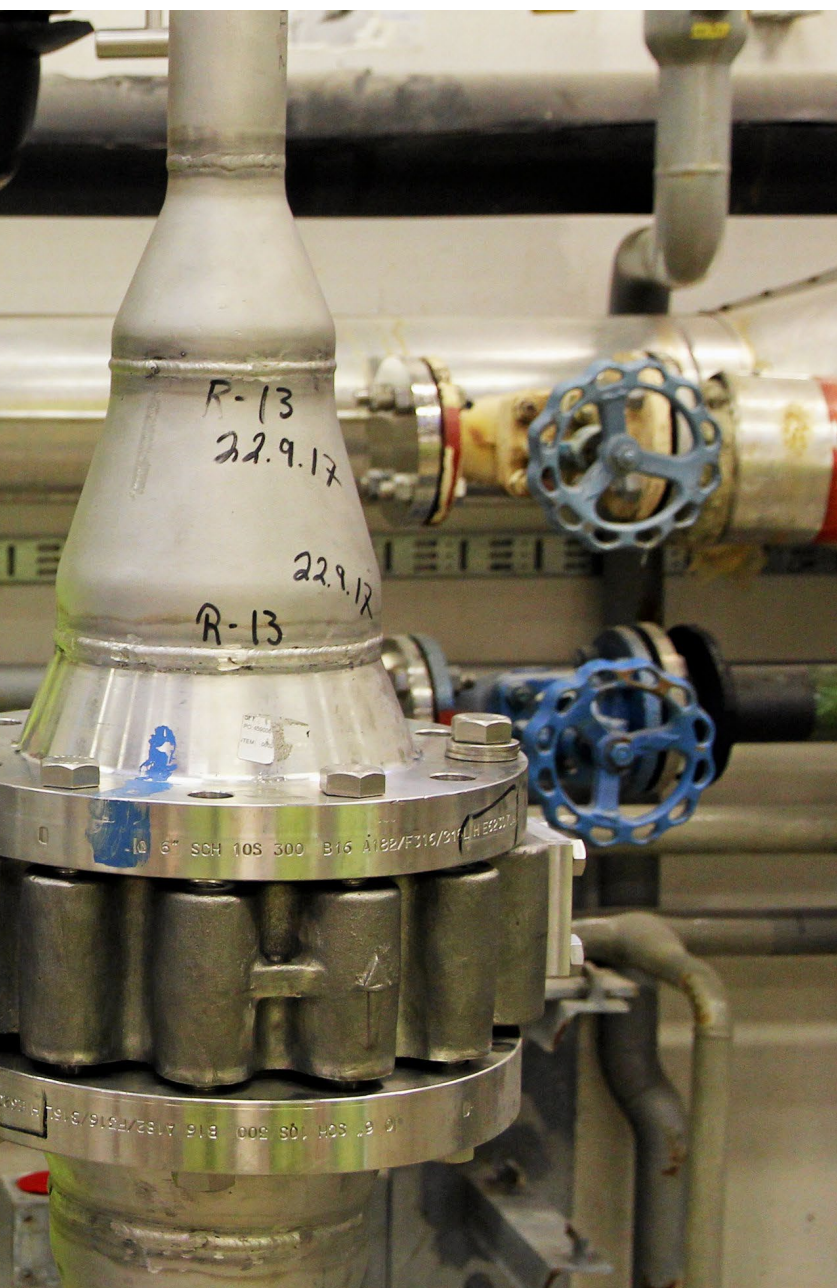


Photo: HI FLO

**When public investments fall, it could adversely affect the industry's contribution and thereby the rate of innovation.**

**Abelia managing director Haakon Haugli**

and the World Intellectual Property Organization, Norway remained in 19th place this year, well behind neighbouring Sweden, Finland and Denmark, which are all in the top 10.

Public spending is key, according to Abelia.

"We know that public research and development investments often contribute to higher industry R&D spending. When public investments fall, it could adversely affect the industry's contribution and thereby the rate of innovation," Abelia managing director Haakon Haugli said.

The potential for Norwegian oil innovation is great. Both in 2016

and 2017, companies applied for three times the amount that DEMO 2000 had available, according to the Research Council.

Even with the increased government funding, dozens of oil and gas innovators have had to look elsewhere for help to bring their products through the testing phase.

For those who pass muster, the state is helping with more than money. At ONS in Stavanger, 18 grant recipients will get to show their wares to oil-industry buyers under the auspices of the Research Council.

In addition to Hi Flo, they include Fuglesang Subsea, which has developed an autonomous subsea pump, coring systems innovator CoreAll, and Interwell P&A with its wireline-based technology for well plugging.

Support from Innovation Norway, DEMO 2000 and a regional agency has been "absolutely crucial" during the six-year development phase, says Floberg.

He is currently awaiting decisions from two operators on equipment-package contracts that include his valve, and also hopes to get a foot in the door for upcoming new developments.

These are "very exciting days," says Floberg.

"It has been very tough, and expensive — but now I can see that it is going somewhere."

## New players set to push innovation

NORWEGIAN oil-equipment innovators could get an extra push as new operators on the Norwegian continental shelf look for ways to bring oil and gas discoveries on stream as fast and as cheaply as possible, writes Beate Schjolberg.

In the past few years, supermajors such as ExxonMobil, Total and Shell have scaled back their operated activities in Norway, making room for less established players to take a larger share of development and operation.

National champion Equinor (formerly Statoil) still rules the roost with about 70% of the country's operated production and the majority of ongoing development projects.

However, aggressive mid-sized companies such as Aker BP and Lundin Petroleum, and smaller players looking for growth, are busy maturing discoveries that are likely to reach the development phase in the coming years.

Both established and fledgling operators are keen to use new technology to keep ageing

fields and platforms pumping profitably for as long as possible.

Of 13 projects currently in the execution phase, four are operated by players having their first go as head of a Norwegian offshore development — Spirit Energy is heading up the Oda development, Repsol operates the redevelopment of the Yme field, and VNG and DEA are in charge of the Fenja and Dvalin projects, respectively, in the Norwegian Sea.

Though the latter two companies are set to combine with players that already operate producing fields — VNG with Neptune Energy and DEA with Wintershall — they nevertheless represent a diversification on the Norwegian continental shelf that is likely to give suppliers a wider group of potential customers, analysts say.

New development operators also include Faroe Petroleum and Austrian operator OMV, which are working on plans for the Brasse discovery in the North Sea and the Wisting find in the Barents Sea, respectively,

and Okea with its operated Grevling licence.

In addition to these come expected future projects by established operators such as Lundin's Alta and Gohta discoveries in the Barents Sea, and a major new development in the north of Alvheim area, also known as Noaka, where operators Aker BP and Equinor are wrangling over which player should be in the driving seat.

All in all, Norway currently has 48 discoveries that the Norwegian Petroleum Directorate considers to be in a clarification phase for development or likely to be developed.

Though most of them are small tie-back candidates and the industry keeps hoping for larger discoveries, they still represent promising opportunities for the supplier industry in the years ahead.

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