



# Entry Strategies for Onshore Wind

NHH  Case Competition

History in the Making:

# Setting the Scene

You are part of history in the making. NHH's first international case competition. Twelve teams from the world's top-ranked business schools. In a city founded in 1070. Solving a real world business challenge for Statoil as they aim to break new ground in onshore wind.

Statoil believes it is the passion of their employees that will enable the transition to a new energy future. In this low carbon future, wind and other natural resources have replaced the previous unsustainable reliance on fossil fuels. Statoil has revised its strategy to include a focus on turning sustainable resources, like sun and wind, into profitable results for their energy business. To retain a market leading position as an energy company, Statoil, through its New Energy Solutions business unit, is always looking for new ideas to ensure low carbon emission and sustainable operations.

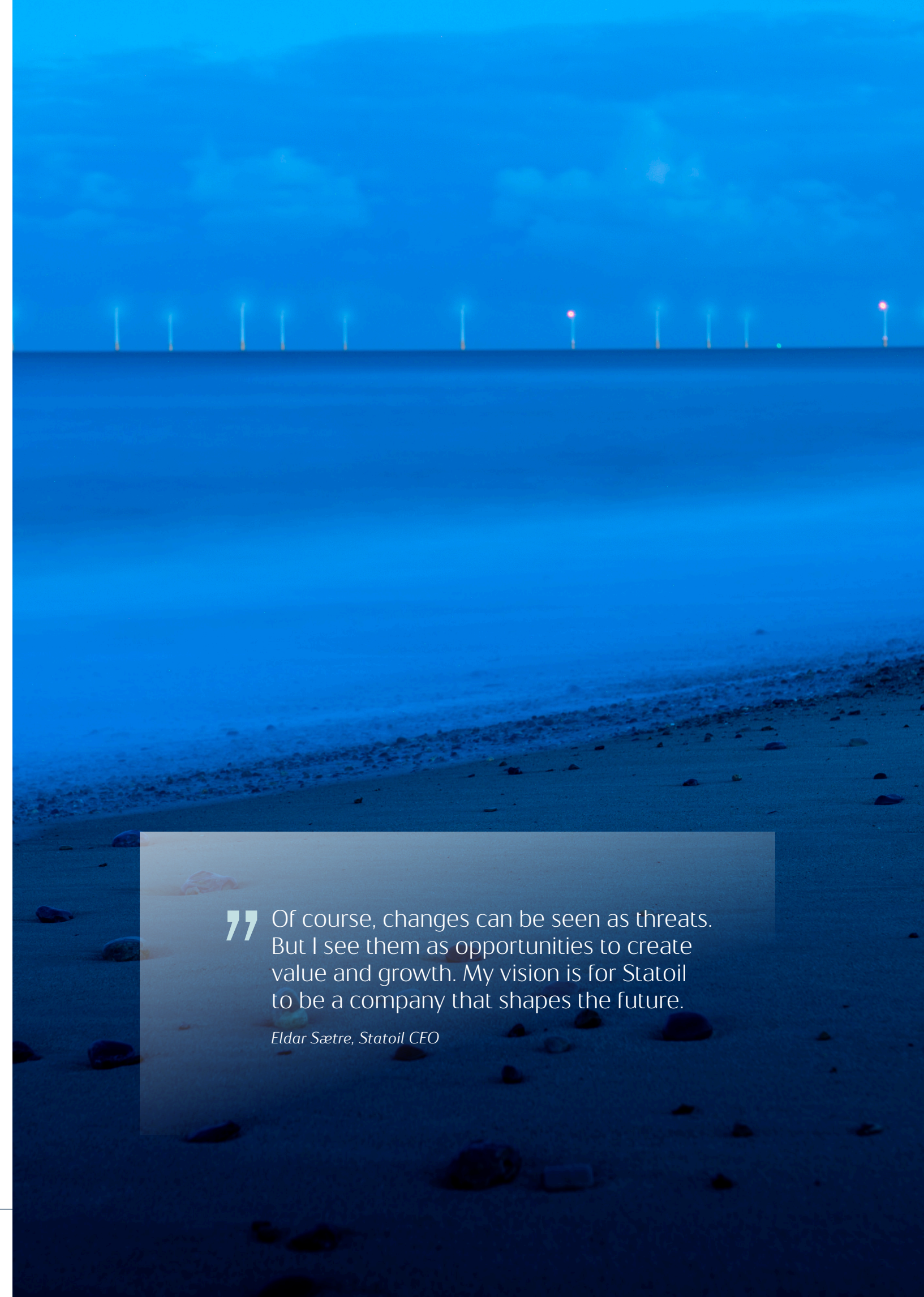
Being an important player in the energy market, Statoil delivers oil, gas and wind power to energize the lives of more than 170 million people. As the winds are changing, Statoil has recently increased its focus on renewable energy, complementing their oil and gas portfolio while also contributing

to lowered CO<sub>2</sub> emissions. Statoil has already entered into the offshore wind market and now wants to continue towards the onshore wind market. This is a market with huge potential, but it is also a market where entry may be challenging.

As a young and assertive student, you are key to unlocking the door Statoil has to walk through to transition into the new energy future. With your knowledge, Statoil is looking for a strategy for entering the onshore wind market.

In 24 hours, you will hold a 15 minute presentation with your strategy pitch on how to enter the onshore wind market. Finalists will present to Hans Jakob Hegge, Chief Financial Officer in Statoil. Decisions have to be made quickly. Do you have what it takes?





” Of course, changes can be seen as threats. But I see them as opportunities to create value and growth. My vision is for Statoil to be a company that shapes the future.

*Eldar Sætre, Statoil CEO*

From the Beginning:

# Building a Legacy

Statoil is, this year, celebrating 50 years in the Norwegian oil and gas industry. It is a company with a strong legacy in Norway: A legacy which the company wants to take good care of as they move into new areas of the world, and new technologies like wind energy.

In the 1960s it became clear to the Norwegian government that there could be oil and gas on the Norwegian Continental Shelf (NCS). When the first production licenses were awarded in the mid-1960s, hardly anyone realized the impact it would have on the Norwegian economy. In the early days, foreign companies dominated the Norwegian oil and gas industry, and developed the first oil and gas fields. However, the Norwegian government was convinced that building domestic expertise was important. As a result, the Norwegian State Oil Company, today known as Statoil, was established in 1972.

Statoil was the first Norwegian company to obtain an operating license for a oil- and gas field on the NSC, and has since then taken a leading role in exploration, production and innovation in the Norwegian oil industry. Today, Statoil is the world's largest offshore operator with 20.500 employees and operations in more than 30 countries.

Although it is publicly traded on the Oslo and New York stock exchanges, the Norwegian government still owns 67 percent of the stocks.

Statoil's company purpose is to turn natural resources into energy for people and progress for society. They create value through safe and efficient operations, developing, innovative solutions and technology. Statoil has shown a willingness to try new novel solutions and cutting-edge technology by leading the testing and use of carbon capture and storage, as part of its efforts to be part of the low carbon solution.

Going forward, Statoil wants to be known as an energy company with a broad portfolio and increased focus on renewable energy. Building momentum for profitable growth is the key motivation for its New Energy Solutions business unit.





The Company:

## Statoil in the World

Since 1972, Statoil has been pushing the boundaries of imagination and technology - a quest that has taken them to greater depths, deeper waters and new frontiers. In modern challenging times, Statoil is going the extra distance to work simpler, smarter and more cost-effectively—and to help shape the future of energy.

Working in an industry experiencing fundamental challenges, from climate change to complex geopolitics to fluctuating energy markets, Statoil believes it can turn challenges into opportunities. Statoil is constantly looking for new ways to utilize its expertise in the energy industry, exploring opportunities in new energy as well as driving innovation in oil and gas around the world.

What began as a Norwegian oil adventure has become a global story. Statoil has developed a 'can-do' attitude based on decades of experience from working in one of the harshest, most inhospitable climates on earth.

Statoil's goal is to develop new projects and growth with clear focus on safe, sustainable and profitable operations. With a presence in several of the world's most important oil and gas provinces, and a growing presence in renewable energy opportunities in several international wind farm projects, exploration and production will account for most of Statoil's future growth.

Statoil is present in more than 30 countries around the world. As of 2017, Statoil engaged in production in 12 countries: Algeria, Angola, Azerbaijan, Brazil, Canada, Libya, Nigeria, Norway, Russia, the UK, the US, and Venezuela. Production outside Norway accounted for some 39% of its total equity production of oil and gas.

Statoil's most important development projects are in Algeria, Angola, Azerbaijan, Brazil, Canada, Ireland, Norway, the UK and the US. Statoil has exploration licenses in Angola, Australia, Brazil, Canada, Colombia, Greenland, Indonesia, Libya, Mozambique, Myanmar, Nicaragua, Norway, Russia, South Africa, Suriname, Tanzania, the UK, USA, and New Zealand.

Countries where Statoil has ongoing productions are supported by large offices, while exploration areas have smaller country offices without operations. Statoil's goal is to develop new projects and growth with clear focus on safe, sustainable and profitable operations. Though not a requirement to enter projects where Statoil has a presence, a lack of presence may require a nuanced entry strategy for project development. The opportunities for market entry must be carefully evaluated, and it is essential to provide in-depth analysis to support business decisions.



SELECTED DATA FROM STATOIL'S 2016 ANNUAL REPORT

Revenue: 45,873 USD Million

21 % decrease in revenue from 2015 to 2016

Net income: -2,902 USD Million

How & Why:

# Their Vision and Strategy

As one of Europe's largest companies, Statoil has years of experience when it comes to offshore production of oil, gas and wind energy around the world. Statoil has the ability and knowledge to lead the transition into a low carbon future, and renewable energy is a key part of Statoil's vision and strategy.

## Vision

Statoil has a desire to "Shape the Future of Energy", and through this vision, Statoil has set a clear direction and highlighted what it wants to achieve. Statoil is determined to set an example for how the oil and gas industry should transform by showing leadership to deliver energy in a low-carbon future. It aims to be the company others look to for bold and better solutions.

Statoil is a values based company and believes that in order to achieve its vision it needs to be "Open, Collaborative, Courageous, Caring". These values help set direction, guide future decisions, and create the mindset of radical change. Statoil believes this direction will enable them to develop technologies and break new ground to work in a smarter, better way. How Statoil delivers is as important as what it delivers: meaning that collaborative team efforts are required.

## Strategy

Statoil's overarching strategy is to ensure long-term value creation in a low-carbon future.

In 2015, as part of Statoil's efforts to build a more resilient and future orientated company, Statoil made the decision to establish a separate business unit, New Energy Solutions (NES) reporting to the CEO. Today, NES makes up one of the four key pillars of Statoil's strategy, reflecting its aspirations to complement its oil and gas portfolio with profitable renewable energy.

As a starting point, NES is responsible for developing and expanding offshore wind farms and exploring carbon capture and storage. The employees in NES incubate new business ideas by identifying and developing new business models and related technologies through venture capital investments, R&D and their very own "Innovation Lab".

Statoil's current focus within the energy value chain is as a primary energy developer, producing several different energy products. NES has chosen a step-wise disciplined approach by focusing on a few concrete key areas based on a clear strategic fit, in order to seize opportunities where its core competences create competitive advantages.

” We are an energy company committed to long term value creation in a low carbon future. We expect 15-20% of our investments to be directed towards new energy solutions by 2030.

*Eldar Sætre, Statoil CEO*



**New energy solutions**

Create a material new industrial position

**Norwegian continental shelf**

Build on our unique position to maximise and develop long-term value

**Always safe**

**High value,  
low carbon.**

**International oil & gas**

Deepen core areas and develop growth options

**Midstream and marketing**

Secure premium market access and grow value creation through cycles



Renewable Energy:

## New Opportunities

As the world's population grows and becomes more prosperous, more energy is needed to heat and light homes, fuel transport and power the economy. While concerns of climate change impacts are growing, a dramatic cost reduction in renewables has given more countries the ability to generate energy from their own resources, creating strong demand growth in renewable energy.

Statoil wants to take part of the growing renewable energy market, and is already working actively to develop reliable new energy solutions that are low carbon and cost-efficient. As the largest deep water offshore oil and gas operator, entering the offshore wind market was a natural move for Statoil. Today, Statoil is taking its decades of offshore experience and applying its project execution capabilities to safely and efficiently develop large-scale offshore wind farms. Its current offshore wind portfolio consists of four large-scale conventional wind projects off the coasts of the UK and Germany.

Statoil's first commercial offshore wind investment was Sheringham Shoal, completed in 2012, located 17 km off the coast of Norfolk. With 88 wind turbines and a capacity of 317 MW, Sheringham Shoal provides renewable energy to 220 000 UK homes.

Dudgeon is the company's second large-scale offshore wind park currently under construction 32 km off the coast of Norfolk, with production set to start late 2017. Dudgeon made use of more efficient wind turbines at a capacity of 6 MW each, which allowed Statoil to increase the value of the wind farm. Dudgeon's 67 turbines

have a capacity of 402 MW, and providing 410 000 UK homes with renewable energy; far above Sheringham Shoal's capacity of 317 MW. This demonstrates a trend not uncommon in renewable energy - technology is becoming more effective and companies are able to increase the profitability from each individual project.

Statoil has a 50 percent stake in the Arkona wind farm, 35 km northeast of Rügen Island in Germany, southwest of Bornholm Island in Denmark. Production is set to start in 2019, and with a capacity of 385 MW is secured through total investments of EUR 1.2 billion, Arkona will provide renewable energy to 400 000 German homes.



650k

BRITISH HOMES POWERED

Statoil's offshore wind projects provide renewable energy to thousand of families in the UK



40 - 70%

COST REDUCTION

Statoil has achieved large cost improvements in comparable offshore wind projects from 2010 - 2017



Innovation:

# A Key Driving Force for Success

Statoil believes that innovative ideas and solutions are essential to improve results and expand their business. In wind energy, the right innovation is key to bring down costs and capitalise in new markets.

## Driving innovation in offshore wind

Statoil is not just an investor in offshore wind — it is also an innovator – pioneering new technology through its unique next generation floating wind concept Hywind. After years of research, testing and combining known technologies in an entirely new setting, Statoil is set to start production of “Hywind Pilot Park”, the world’s first floating wind farm in late 2017. The concept was based on experiences from offshore oil and gas floating spar platforms, showing Statoil’s innovative spirit and ability to apply technologies in new ways.

The Hywind floating wind concept is revolutionizing the offshore wind market as its floating structure sets the possibility for capturing wind energy in previously inaccessible deep-water environments. Instead of having to construct fixed turbines limited to water depths of 20-50 meters, this means Statoil can use the technology to enter new markets without shallow continental shelves, with depths of more than 100m, which are not an option for fixed bottom offshore wind.

The technology also mitigates one of the largest development risks for fixed bottom offshore wind farms: namely avoiding installation delays caused by windy and poor weather, through pre-assembling in shallow waters and towing the floating wind farm to its desired location.

The Hywind Pilot Park is an example of Statoil’s aspiration to lead Statoil into this new low-carbon future. The ambition is to grow profitably

and expand into other sources of renewable energy such as onshore wind while continuously focusing on delivering attractive returns through technology and business innovation.

## Aspirations in onshore wind

Statoil had previously been involved in onshore wind with a development portfolio of approximately 1 GW, as well as a producing wind farm at Havøygavlen in Northern Norway. Statoil divested this portfolio in 2011 to focus on its offshore wind portfolio.

Given that onshore wind technology and development risks are far less than offshore wind, it would appear to be a surprising, if not paradoxical, choice for Statoil to have chosen more difficult offshore environment as a starting point.

At the time, the prospect of low electricity prices in the Nordic power markets resulted in low returns and uncertainty in the Norwegian/Swedish green certificate system. Since then, the onshore wind market has matured and the Paris Climate Agreement has secured a huge global momentum for renewables.

Through its offshore wind portfolio, Statoil has developed core competences in key technologies that are relevant to both on- and offshore wind, such as turbine knowledge, operational knowledge, and the electricity sales market. Statoil’s confidence in renewables has grown and Statoil is now ready to re-enter the onshore wind market.



UP  
TO **11%**

MARKET GROWTH PER YEAT

The demand for new renewable energy is expected to grow rapidly towards 2040



**18%**

WIND POWER

Onshore and offshore wind farms can supply 18% of the world's electricity by 2050

Onshore Wind Market:

# Key Characteristics

Humans have harnessed wind power for millennia. It has been utilized ever since the first sailing ships were used on the River Nile in Egypt 3400 BC, to wind powered machines used to pump water and grind grains, to modern day grid electricity.

The spur for modern industrial wind turbines first escalated on a large scale in 1970's Europe, prompted by the oil crisis. The wind power technology has since then developed dramatically, and we are now experiencing a mature industry with more than 250 000 onshore wind turbines installed, producing a total global capacity of over 400 GW.

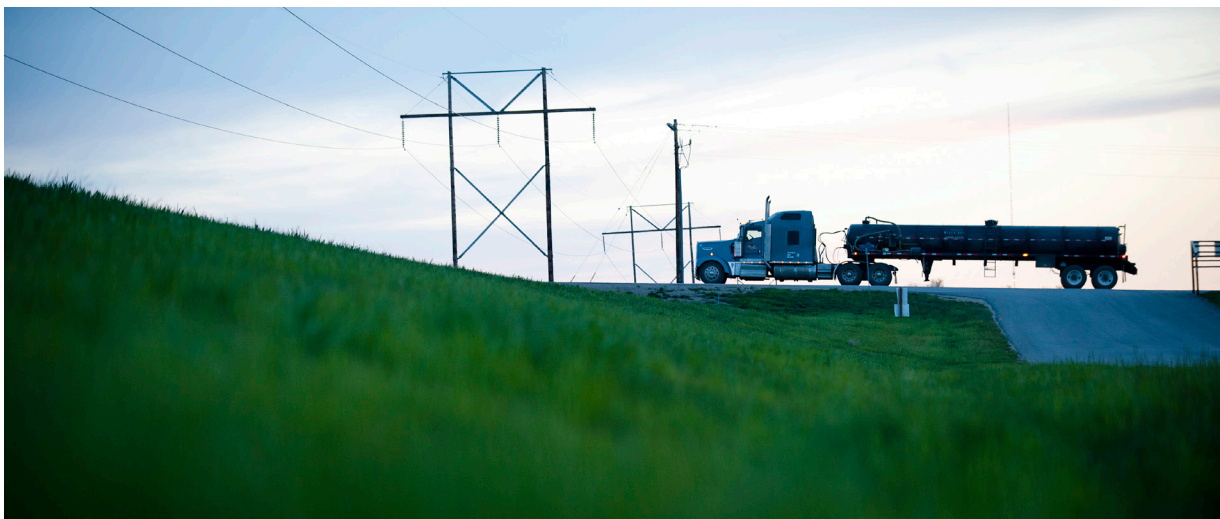
Yearly investments are in the range of 50 billion USD, and are increasing. With a presence in all main markets around the world, onshore wind's global supply chain and cost of energy levels are now competing with fossil fuels. In recent onshore wind auctions in the Middle East and North Africa, the outcome resulted in prices in the range of 0.04 - 0.03 USD/Kwh, demonstrating that onshore wind power supply, in some regions, is very competitive to almost all alternative energy sources.

Power sources are often measured in levelized cost of electricity (LCOE), which assesses the average total cost to build and operate a power-

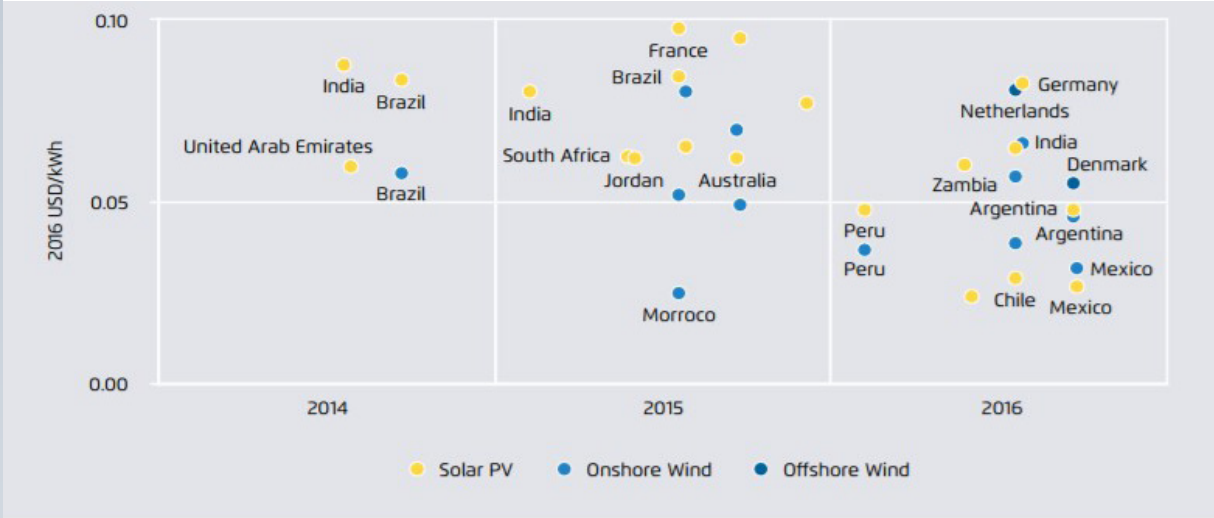
generating asset over its lifetime divided by the total energy output of the asset over that lifetime. The LCOE can also be regarded as the minimum cost at which electricity must be sold in order to break-even over the lifetime of the project.

In recent years, onshore wind has become competitive to power production from coal, nuclear and gas in several markets. This is due to the 40% drop in LCOE the last 10 years, which has mainly come from reduced capital expenditure triggered by larger turbines, fierce supplier competition and mass manufacturing of towers.

Additionally, the capacity factor (or production efficiency) has increased by approximately 20% the last 10 years because of higher towers with better layouts, the introduction of increased rotor diameters for low wind applications and improved accuracy in estimating the future energy production of a wind farm.



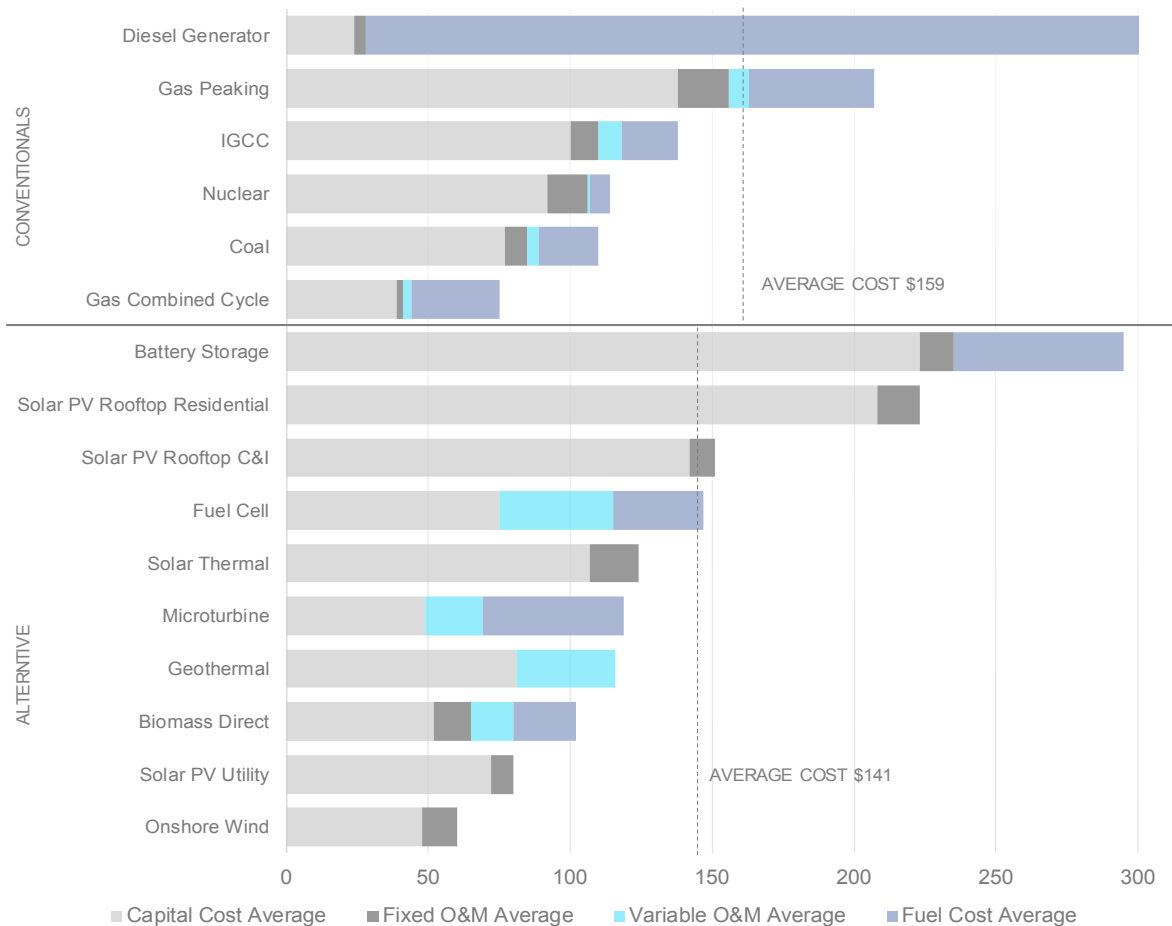
## Worldwide auction results for onshore wind, offshore wind and solar PV from 2014 to 2016 in USD/kWh



IRENA (2017b)

## Components of levelized cost of energy

(Source: Energy Innovation, Lazard's Levelized Cost of Energy Analysis V8, 2014)



Onshore Wind Market:

# Global development

The onshore wind market has developed into a diverse industry with multiple sets of characteristics that are dependent on location, power market structure, available infrastructure and type of developers.

A typical utility scale onshore wind power plant is either a small wind farm in the 20-50 MW range located close to consumers, operated by local consortia's, local utilities or private companies; or larger 50-200 MW wind-farms in more remote areas with plenty of space, connected to a central grid and operated by utilities or independent power producers. In some markets like the US, India and China, there has also been development of mega wind-farms or combination of wind-farms with a capacity up to 6 GW. As a comparison, a typical power plant has a capacity of around 500 MW.

The technology used in a wind farm is relatively low-tech, with the wind turbine being the most complex item covering approximately 61% of the capital expenditure. The remaining components are roads, cables and balance of plant including project development cost. The operations and maintenance (O&M) expenses are representing 20% of the cost of energy over the project lifetime, being typically 20 years. The O&M cost

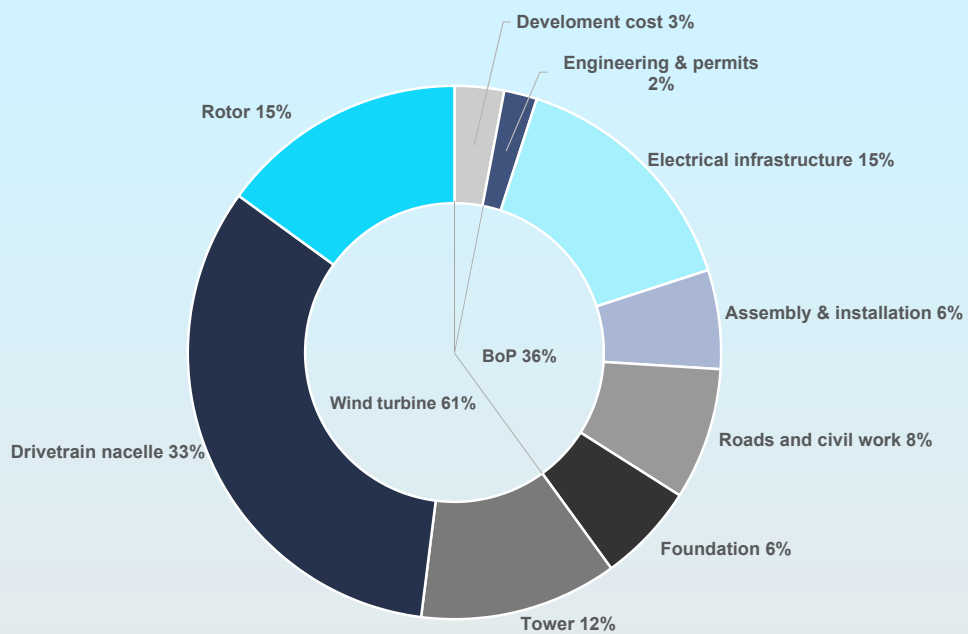
has dropped significantly due to more reliable turbine technology, larger turbines and better systems for surveillance and control.

Cost of capital in the onshore wind market vary and is very dependent on the market and entry risk profiles. In mature markets weighted average cost of capital (WACC) is in the 5-6% range; whilst in emerging markets it can increase considerably and up to double digit numbers due to political, infrastructure and regulatory risks.

Some markets have incentive schemes for onshore wind. Examples are tax credits (i.e. USA), green certificates (Norway, Sweden, UK), investment support, and above market power purchase agreements (PPA's). Onshore wind is, in many markets, still dependent on some sort of financial support. However, as the costs come down, there has been an increased trend towards an auction based system, where actors bid for unsubsidized long-term PPA's.



### Wind project, capital cost breakdown assumption (%)



# Regional development

In the early phase, onshore wind was dominated by European countries like Germany and Denmark with governmental support and a local supply chain. However, early developments were fragmented because of small developers, strong wind turbine suppliers and state owned grid operators.

After 2005 the market developed into a global business as China, India and the US took over, building huge wind farms as well as developing an industrialized supply chain. The onshore wind market is today a global market with wind turbines installed in all parts of the world.

## Asia

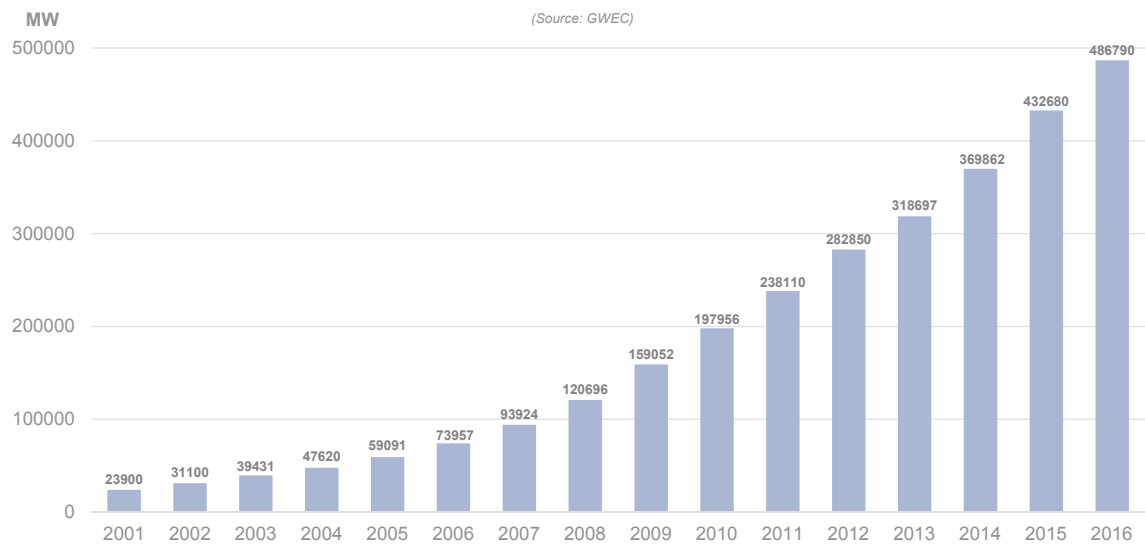
The development has been driven by the respective governments, backed by supplier industry development, and based on European technology. Due to the fast development, quality has suffered, while a lack of infrastructure (i.e. grid) developments has created a misalignment in the industry resulting in a slow-down in growth recent years. The slow-down has put pressure on turbine prices due to overcapacity in the supply chain, which has made the Chinese supplier industry look abroad with increased focus on quality. However, although Chinese companies have started to look for international opportunities, the Chinese home market will remain the dominant driver for the Chinese players.

The rest of Asia will in the coming decade be dominated by India with their targeted 5 GW/annum ambitions towards 2020, while Japan and Korea will focus on offshore wind markets due to the limited onshore acreage. Pakistan, Thailand, Taiwan and Philippines are among the strongest emerging markets with key underdeveloped potential in Asia.

## Europe

The European market remains dominated by Germany. However, the wind-farm developments are mostly small farms (10-50 MW per wind farm) with low profit margins and lack of competitive edge. Markets like Sweden, Turkey, Poland and France will continue to deliver strong developments, however they too are becoming increasingly saturated, dominated by strong incumbents with existing asset base and established O&M structure. Emerging markets with key underdeveloped potential include countries like Greece and Italy.

## Global Cumulative installed wind capacity 2001 - 2016



# Regional development

## North America

The North American market has the ability grow with additional 44 GW towards 2020, however it is a high degree of uncertainty in the numbers. With a solid pipeline of projects constructed under incentive arrangements of the Obama administration, 2015 and 2016 were good years. The existing installed capacity of 9 GW the US has a well-developed market characterized by strong local players and a well-developed supply-chain. Though there is still plenty of available acreage, it is often far from the load centers and faces strong competition from recent oil and gas developments, which has made gas power increasingly competitive. The development is highly political sensitive due to the uncertainty to what degree the Trump administration will undo the Obama administration's pro-renewable policies.

In Canada and Mexico, there are developments ongoing with strong growth targets. There has also been pro-renewable developments at a provincial / regional level, such as recent policies in Alberta.

## South-America

The Latin American market is expected to grow with 12-15 GW the next 5 years with several new emerging markets like Chile, Peru and Uruguay in addition to Brazil being the dominant players. Brazil will continue to grow and onshore wind is expected to be the second largest power source in the country. There is still uncertainty related to the political and regulatory framework and caution should be made while considering an entry strategy.

## Africa and the Middle East

Africa and the Middle East can be considered emerging markets with approximately 3 GW installed altogether. Until now the dominant markets have been South Africa and Egypt with newcomers like Tanzania, Morocco, Ethiopia, Kenya, Ghana and Nigeria emerging as upcoming countries. Political support and a need for economic growth drives the development, while high prices on alternative sources of power makes renewable investments attractive. High profit margins and IRR levels above 10% can be achieved, especially for early entrants. However, the infrastructure is weak in many places, and local unstable political and regulatory framework makes many regions difficult to enter. The weak grids might open up for off-grid solutions and a more business to business approach supplying plants, small communities or local infrastructure with power. Combined with a storage solution this could add on a premium profit margin or make the investments more robust.



# Key Trends

Development in key areas like technology, financing models and business models will play a key role in the success of onshore wind going forward. Onshore wind technology is expected to improve as more efficient, reliable and adoptable turbines are being developed, making low wind and complex terrain wind sites more attractive.

## Financing

Improved aerodynamic blades, new type of towers and better wind assessment tools will increase output, while component standardization, better control systems and lower failure rates will drive both CAPEX and OPEX further down. In this context there exist potential technology upsides which can be approached by a venture investment, either alone or in partnership with main suppliers like GE and Siemens.

Improvements in these areas will help attract low cost financing, maintain stable political support, develop the supply chain. Development in these areas will also govern onshore winds competitiveness towards other renewable alternatives as well as fossil fuel alternatives. In the end, onshore wind will out-compete the alternatives like nuclear, and potentially coal and gas dependent on the market characteristics.

LCOE is expected to fall with additional 18% the next ten years based on improved capacity factors of 12%, lower O&M (-9%) and falling turbines prizes (-6%). An additional 4% reduction in supporting components like turbines can also be expected due to professionalism in project development. This will make onshore wind among the lowest-cost power-producing alternatives in almost all markets with infrastructure where average wind speeds above 6 m/s and acreage is available.

It is expected that we will also see more turbines able to produce cost competitive electricity at lower wind speeds. In power-production, an intermittent energy source is one that's not continuously available due to some factor outside

direct control: wind does not blow all the time. In high-end markets with high penetration (>30%) of intermittent power production, a system cost of 10% might be added on top of the LCOE for onshore wind to compensate for the unstable nature of wind. However, this might be mitigated by storage solutions like battery, pumped storage and compressed air. This could also open up for off-grid or weak grid applications.

## Business models

The business models of onshore wind varies from company to company in three distinct categories, each with their own advantages and disadvantages, including different types of financial risk exposures. The vast majority utilise a traditional approach where players are concentrating their efforts on early phase developments securing land, permits, measurements, and potentially PPA's, with the intention of fully or partially exit prior to the execution phase.

Other players concentrate on the O&M phase harvesting value through optimization of efficient operations, maintenance and financial optimization.

The third business model is to develop a presence throughout the whole value-chain. In some parts of the value chain we see some degree of vertical integration as suppliers, landowners, grid operations or other stakeholders take a share of the development and operational risk. Long term O&M contracts are often handled by the turbine supplier backed by some sort of guarantees.



# Your task

Potential for value creation exists where Statoil's competence can be a differentiator and add value in the wind value chain: Statoil believes young minds can bring new and fresh approaches on how to move forward.

The world will need a lot more energy and lower emissions in the years to come, and Statoil is determined to be part of the solution to this challenge. Based on the above analysis of the onshore market landscape, onshore wind represents a attractive entry opportunity for Statoil.

Your task is to establish an entry strategy for Statoil in onshore wind.

Suggested entry strategies for onshore wind that could be evaluated are:

- Enter into emerging markets with existing Statoil operations like Mexico, Canada, Indonesia, Brazil
- Enter into market segments in emerging markets to create business to business opportunities combining onshore wind with oil & gas operation or similar industrial activities
- Enter into a partnership with a financially strong partner with local presence in some of the emerging markets
- Develop a saleable new business model for medium scale wind development in emerging countries backed by competence, wind assessments, and project packaging

You should pick one of these and explain why you think this could be the winning strategy. Remember to focus on quality over quantity. Consider what steps are necessary for your onshore wind entry strategy and how it might unfold in the coming years.

*Good luck!*









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### Disclaimer

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