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EWEA THE EUROPEAN WIND ENERGY ASSOCIATION

MAKE

Research NOTE

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EWEA 2015 Floating Wind Power Debate

Summary Polling Results

7 December 2015

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Contents

Polling methodology

- The EWEA conference was held in Paris, 17-20 November, 2015
- During the conference, on November 18, 2015, Recharge and MAKE jointly chaired a panel discussion on floating wind under the title ‘A Floating Wind Power Debate – Moving the sector towards industrialisation’, with a total of around 100 attendees
- The panel discussion brought together some of the leading industry experts and thought leaders, including former chief technology officer at Siemens Wind Power, **Henrik Stiesdal**, head of asset management at Statoil Renewable Energy (Hywind), **Trine Ingebjørn Ulla**, project director at Fukushima Forward, Marubeni, **Tomofumi Fukuda**, technology chief, **Dominique Roddier** at WindFloat, head of business development, **Cian Conroy** at ORE Catapult’s, and offshore renewable energy service line leader, DNV GL – Energy, **Johan Sandberg**
- During the panel debate, participants were invited to take part in an on the spot poll, concerning the prospects for floating wind
- Around 40 people took part in the poll and answered the 10 questions on floating wind that were presented

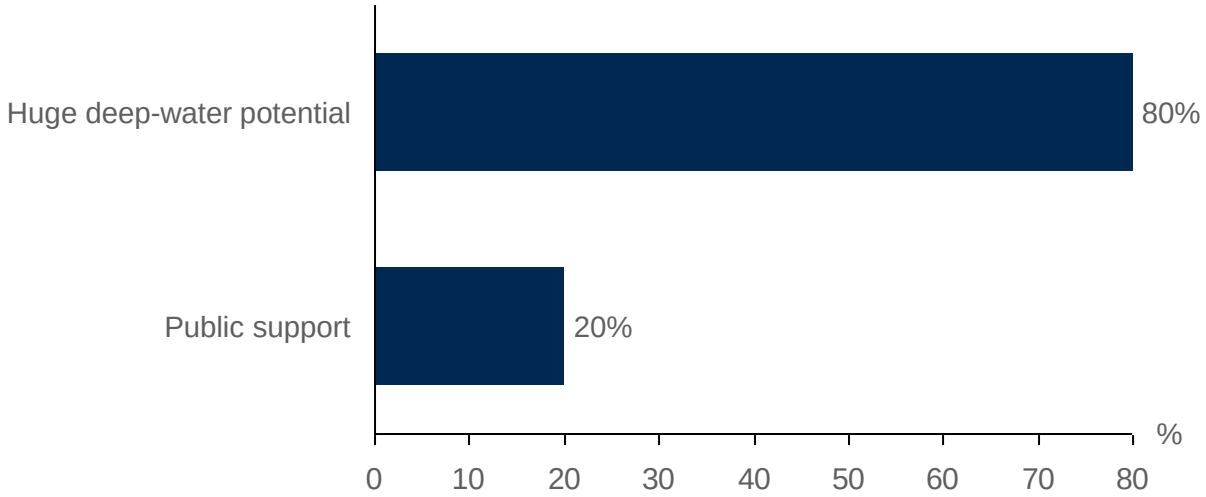
Introduction

- Floating wind power is on the treshold of a great leap forward into industrial reality
- Five years ago, the floating sector was represented by a solitary 2.3MW turbine, Statoil's Hywind 1 unit, installed in the Norwegian North Sea. Today, three arrays are under development around the world off Scotland, Portugal and Japan, which will make the case for the utility-scale commercialisation of the sector
- Prototypes of the three main floating technology concepts – the spar, the semi-submersible and the tension leg platform – continue to develop, and the performance of demonstration units off Norway, Portugal and Japan has widely convinced the industry and many developers of the viability of the technology
- Japan is on track to become first mover in the mid-term though the market hinges on the four-unit Fukushima Forward project being developed by a Marubeni-led consortium, said to be progressing smoothly in technology terms but facing meaningful commercial challenges because of cost overruns to-date
- Europe's North Sea, the home of offshore wind, also hold considerable promise for floating wind. Norwegian oil giant Statoil recently took a financial investment decision on its 30MW Buchan Deep project off Scotland, while off Portugal, consortium WindPlus' 25MW WindFloat Atlantic project is moving ahead
- France, where not a kilowatt-hour of offshore wind power has been generated so far, has nonetheless set an aspirational target of having 600MW of floaters turning by 2030, starting with 100MW in pre-commercial units
- The long-term prospects are strong. Make estimates some 3.4GW of floating projects will be brought online by 2030, pointing the way toward harnessing hundreds of gigawatts of energy with floaters anchored around the world in the decades that follow

Conclusion

- Huge deep-water potential in certain markets, where the technology holds the key to exploit otherwise unaccessible wind resources, however, continued public support is also stressed as important
- Public support should come in the form of both feed-in tariffs and support for research and development
- Reduced installation costs is viewed as the main advantage of floating wind compared to bottom-fixed solutions. Limited vessel requirements for certain floating concepts as well as OPEX reductions based on towing the structure to shore for major repairs are also highlighted as attractive features
- Japan is on track to first mover in the mid-term and is far and away the market viewed as offering the best opportunities for floating wind development, though the market hinges on the four-unit Fukushima Forward project being developed by a Marubeni-led consortium
- The US, the UK and France are also viewed as strong markets for floating wind in the long-term
- The overarching barrier to floating wind development is the high cost level. But with costs being driven down, the economics of floating wind power is improving markedly, setting the example for the first bona fide commercial arrays. The LCOE level for commercial operations in 2025 is likely to be EUR 85–120/MWh. Supply chain innovations, such as, manufacturing in other places than yards, will also contribute to cost-out
- Other pressing technical challenges include foundation weights, complexity of structures and ensuring platform stability. All parameters considered, tension-leg platforms and spar-buoys seem slightly disadvantaged compared to semi-submersible concepts
- Floating wind will predominantly be deployed in water depths above 60m, but could also be seen in areas with water depths ranging between 40m and 60m in the long term
- Floating wind power’s next generation has its work cut out for it, however, it is gathering momentum, refining its engineering, and moving unflaggingly toward commercialisation

What are the key drivers of floating wind?

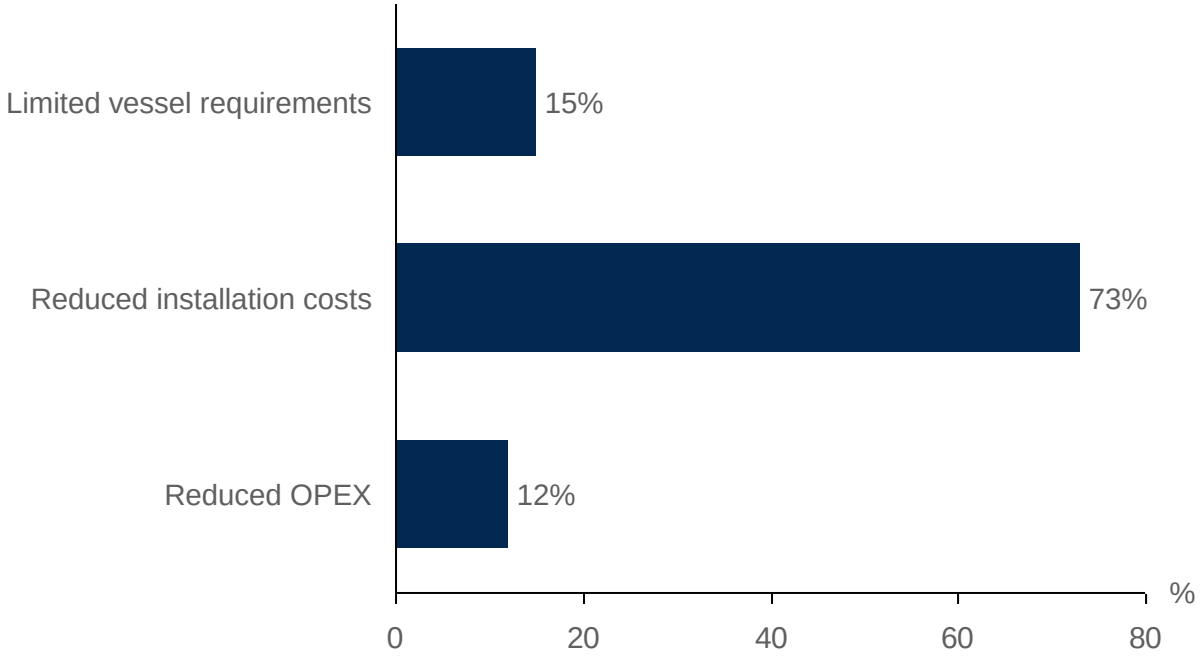


Source: MAKE

Floating wind foundations play a crucial role in unlocking additional offshore wind growth in deep-water locations

Key advantages of floating wind

What are some of the main advantages of floating wind compared to conventional foundations?

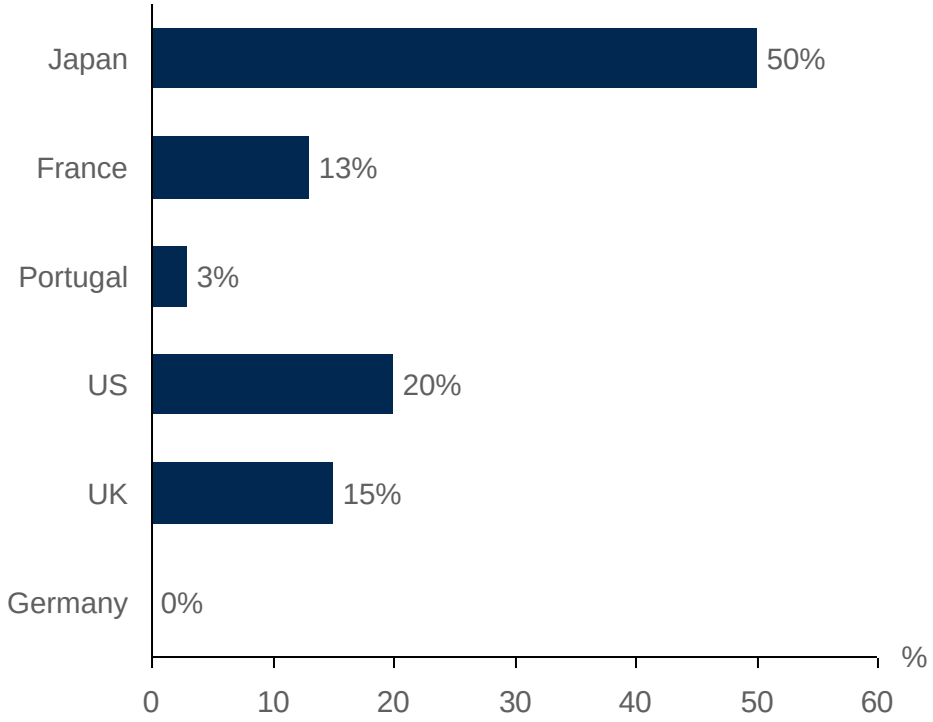


Source: MAKE

Simple installation with reduced dependence on weather windows is viewed as the key advantage of floating wind vis-à-vis competing types of foundations

Key markets of floating wind

In which markets do floating solutions offer the best opportunities?

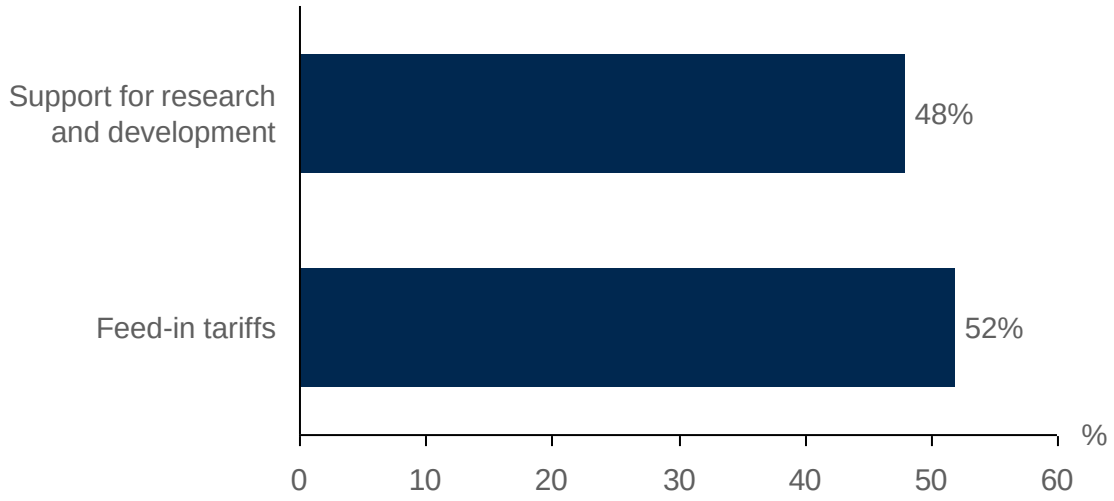


Source: MAKE

Floating wind is a must-have in Japanese deep water areas, whereas the U.S., the UK and France also stand to benefit from this technology

Key support for floating wind

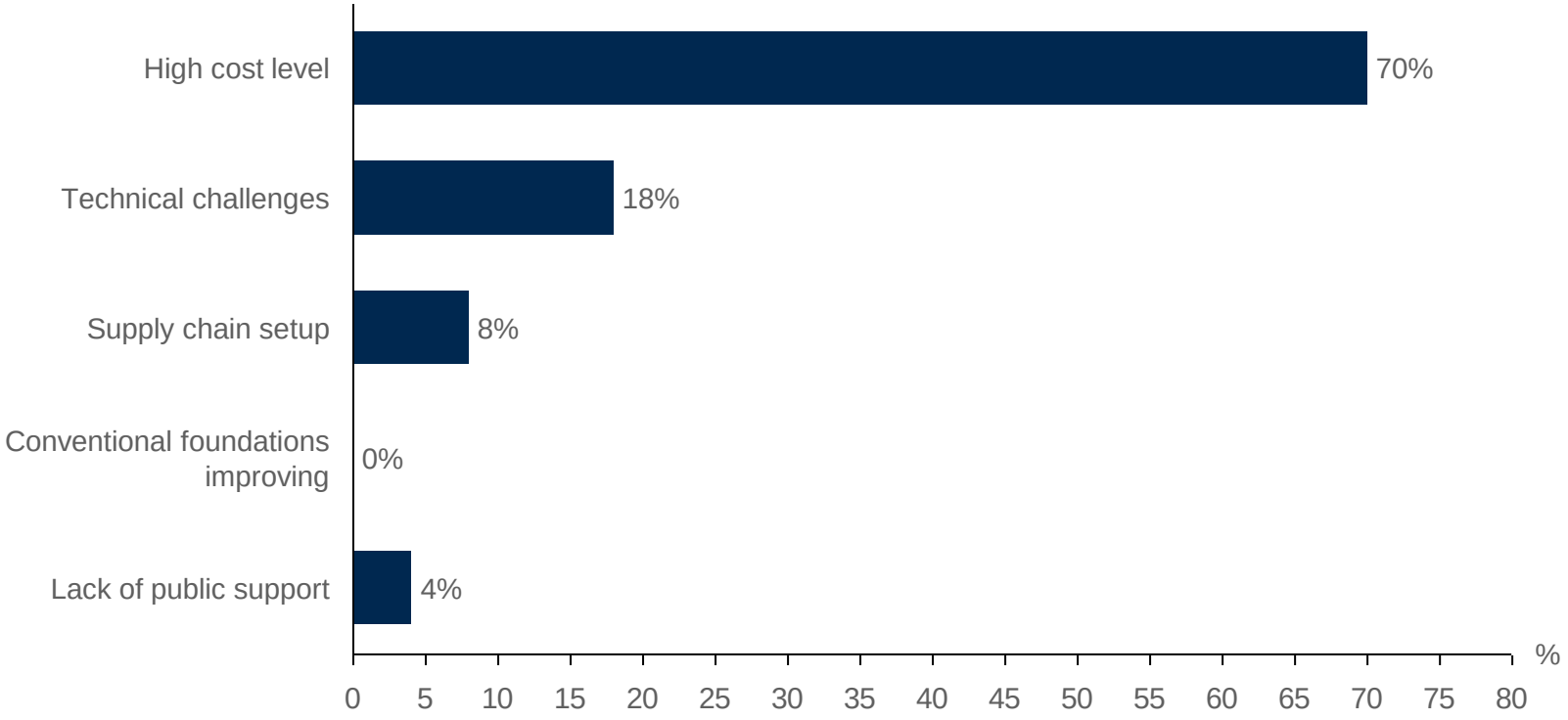
What types of political support are needed to advance floating?



Source: MAKE

Support for research and development and feed-in tariffs viewed as equally important measures in spurring demand for floating wind

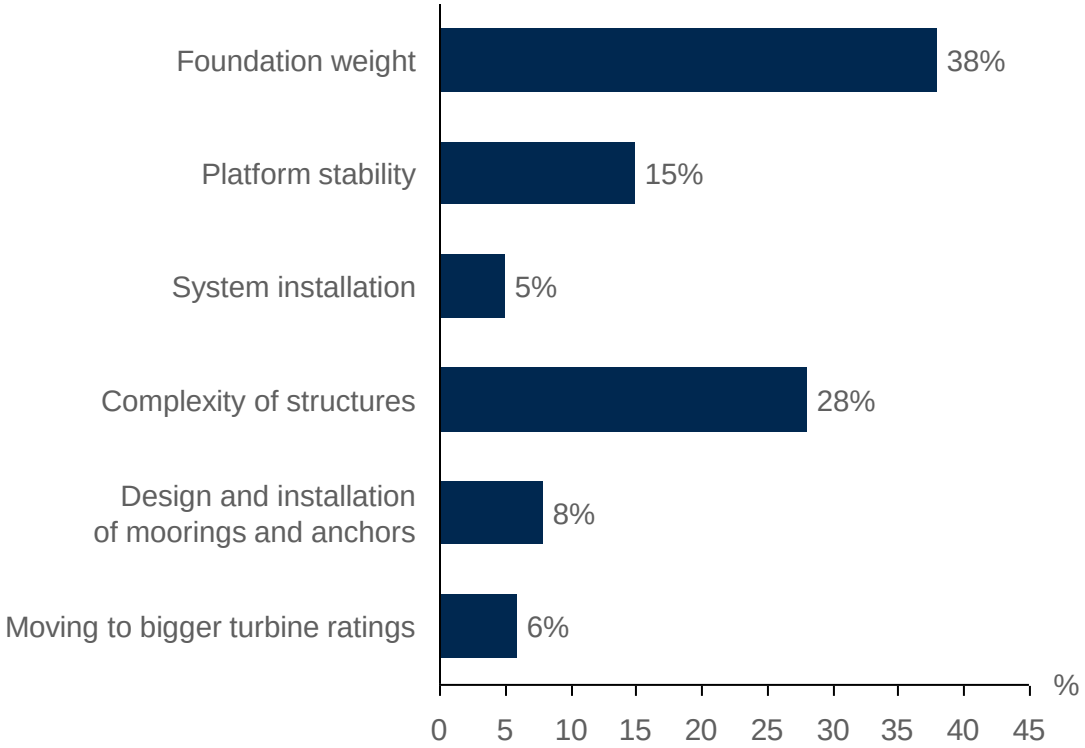
What are the key barriers of floating wind?



Source: MAKE

Cost level needs to be reduced significantly to unleash global floating offshore wind potential

What are the main technical challenges that need to be overcome?

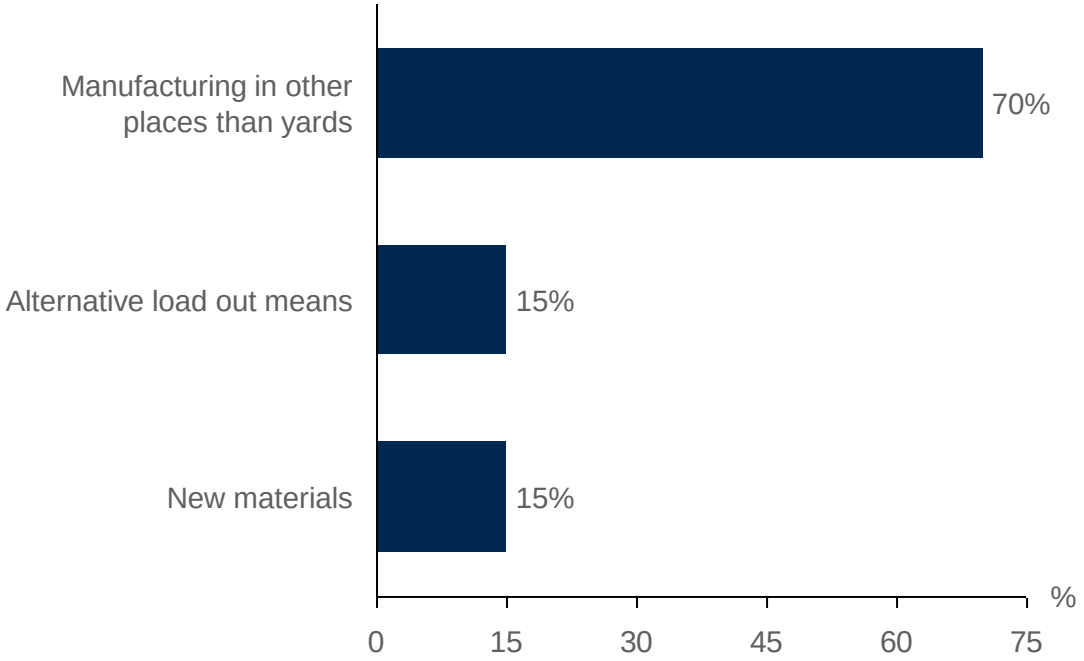


Source: MAKE

Reducing foundation weights and simplifying structures are the most important key success factors for developers looking to advance floating wind

Key supply chain innovations for floating wind

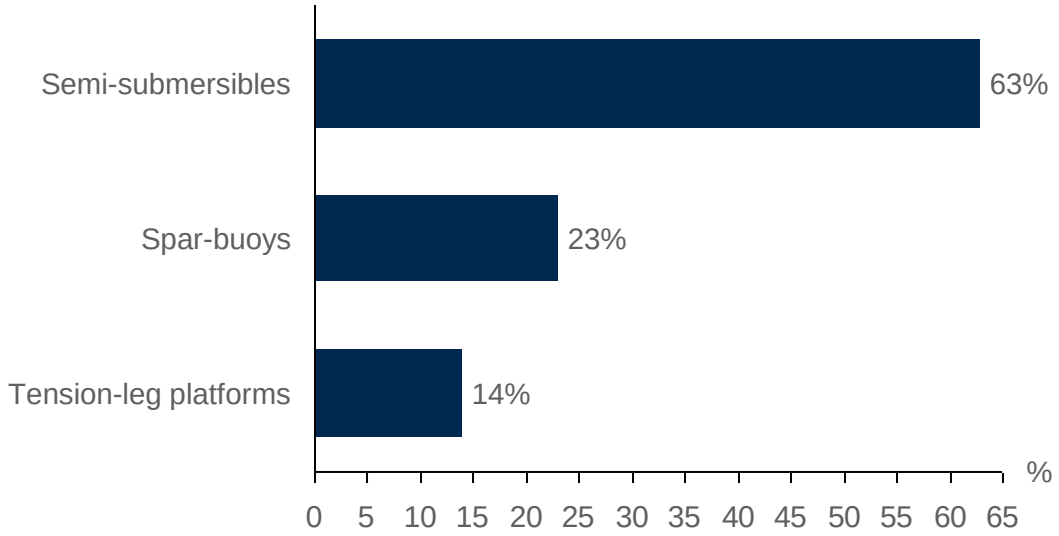
What innovations in the supply chain do you think are needed to achieve cost reductions?



Source: MAKE

Increasing the number of fabricators by manufacturing in other places than yards is a key enabler of cost reductions

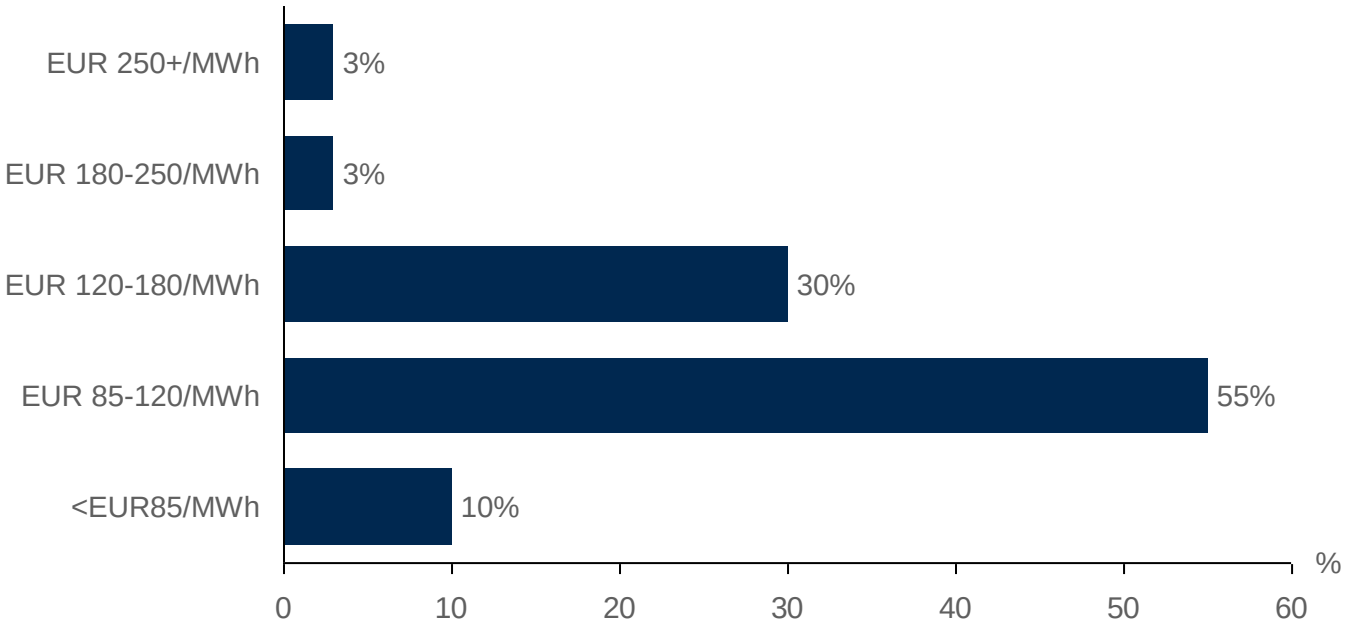
Which types of floating foundations offer the best possibilities to increase commercial floating wind deployments?



Source: MAKE

Despite challenges with weights, semi-submersible concepts clearly outperform spar-buoys and TLPs and emerge as the most suitable concept for commercial deployments

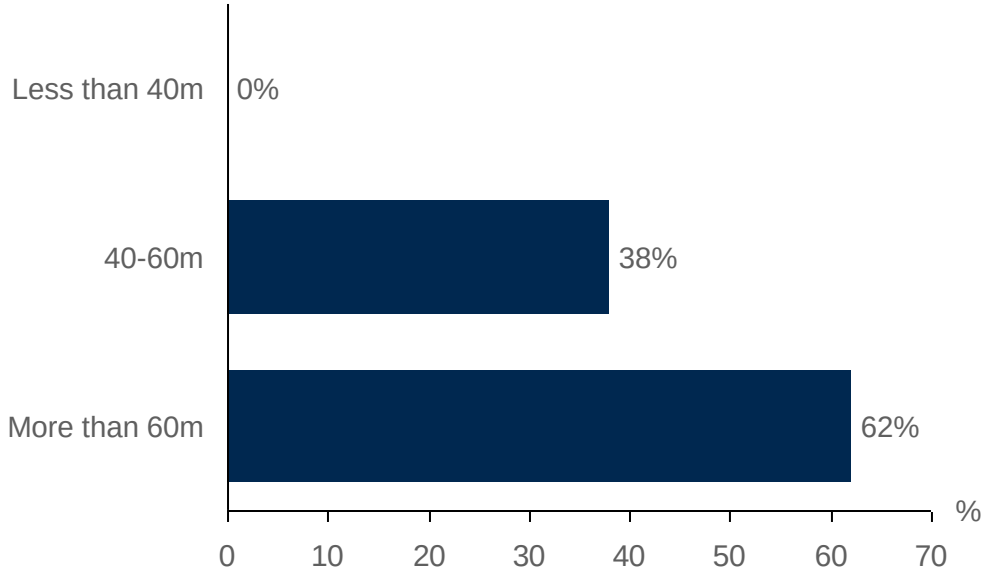
Where do you expect cost competitiveness of floating offshore wind to be in 2025 in terms of LCOE?



Source: MAKE

Cost levels could reach EUR85/MWh by 2025, hence putting floating wind in a strong position to compete with conventional foundations towards the end of the next decade

At which water depth will we see floating foundations commercially applied before 2025?



Source: MAKE

Floating wind to unlock potential in deep waters (+60m), but with potential to compete with conventional foundations in water depths between 40m and 60m

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