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# TASK 26 REPORT 2020

## Wind power

Wind power serves as a key source of low-cost, clean energy in markets around the world. However, the wind industry's future depends on a sophisticated understanding of cost reduction opportunities, as well as a robust understanding of the means by which society can maximize the value of wind energy in the electricity and energy sectors.

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**T**ask 26 generates data and insights that inform the potential role for wind power in the future energy system. Specifically, Task 26 seeks to analyze trends in wind power costs, identify opportunities for future cost reduction potential of

wind power technologies and plants, and explore the value that wind power can offer to energy systems. The work of the task considers the full array of land-based and offshore wind power applications but focuses primarily on utility scale technologies and plants. Phase four of the task began in October 2018 and will continue through September 2021. Industry stakeholders regularly collaborate on work products



and participate in the task's in-person meetings. Nine IEA Wind TCP Members, representing 12 distinct organizations with participation from 16 individuals, contributed to the task in the last year (Table 1).

Collaborators observing the work of the Task in the past year include the International Renewable Energy Agency (IRENA) and University College Cork (UCC). Any array of additional research organizations and stakeholders have participated in events organized or coordinated with the work of Task 26. A few of the experts participating in the Task are shown in Figure 1.

## Progress and achievements

In the past year, Task 26 continued collecting land-based wind project-level statistics for an assessment of the cost and value of energy among participating countries. These data include trends in wind power plant and turbine technology, investment and operating costs, and capacity factors through 2019. The data from this activity are available in an interactive online data viewer [1] and are intended to help analysts understand differences in technology trends for land-based wind projects over time. In addition suggest 'under or affiliated with this work of the task were published by two technical journals:

- 'Land-based wind energy cost trends in Germany, Denmark, Ireland, Norway, Sweden and the United States'; published by *Applied Energy* (November 2020) [2]
- 'Multifaceted drivers for onshore wind energy repowering and their implications for energy transition'; published by *Nature Energy* (November 2020) [3].

Additionally, the Task completed work in two research areas. The Task also completed work comparing prices from auctions or power purchase agreements to project revenue and monetized value, and exploring of forecast methods, expectations, and factors that may influence the cost of wind energy in the future. Both these research areas led to the submission or acceptance of technical journal articles:

- 'Toward global comparability in renewable energy procurement' submitted to *Joule* and published May 2021 [4]
- 'Wind power costs driven by innovation and experience with further reductions on the horizon' published in *WIREs* in March 2021 [5].

Ongoing work efforts are expected to provide new insights around technology trends, innovation drivers, and characterization of the levelized revenue of energy for onshore and offshore wind projects among the participating countries.

## Highlight

In addition, in 2020, a significant amount of work was done to analyze the data collected from the expert elicitation survey on future costs of land-based, fixed-bottom offshore, and floating offshore wind technologies. The survey is among the largest energy-technology expert elicitations performed in terms of participants with 140 of the world's foremost wind experts and gained insights on possible magnitude of future cost reduction, underlying drivers, and anticipated wind technology trends and trade-offs. The results of the survey were focused primarily on changes in the LCOE from 2019 to 2025, 2035 and 2050

TABLE 1. COUNTRIES PARTICIPATING IN TASK

Table 1. Task 26 Participants in 2020		
	Country/Sponsor	Institution(s)
1	Denmark	Technical University of Denmark (DTU), EA Energy Analysis
2	European Commission	Joint Research Centre (JRC)
3	Germany	Deutsche WindGuard, Fraunhofer IEE
4	Ireland	Sustainable Energy Authority of Ireland
5	Japan	University of Tokyo
6	Norway	Norwegian Water Resources and Energy Directorate (NVE)
7	Sweden	Swedish Energy Agency (SEA)
8	United Kingdom	Offshore Renewable Energy (ORE) Catapult
9	United States	Lawrence Berkeley National Laboratory (LBNL) , National Renewable Energy Laboratory (NREL)





FIGURE 1. EXPERTS PARTICIPATING IN IEA WIND TASK 26. PHOTO CREDIT: ERIC LANTZ, NREL

under low/median/high scenarios (Figure 2) that were composed into a manuscript and submitted to the journal Nature Energy. Since then, the article entitled ‘Expert elicitation survey predicts 37% to 49% declines in wind energy costs by 2050’ [6] has been accepted and published by Nature Energy in April 2021.

### Outcomes and significance

The work of Task 26 aims to inform the analysis, policy, and regulatory communities of the current and future cost of wind energy for land-based and offshore wind technologies and the technology’s value proposition within an evolving power system.

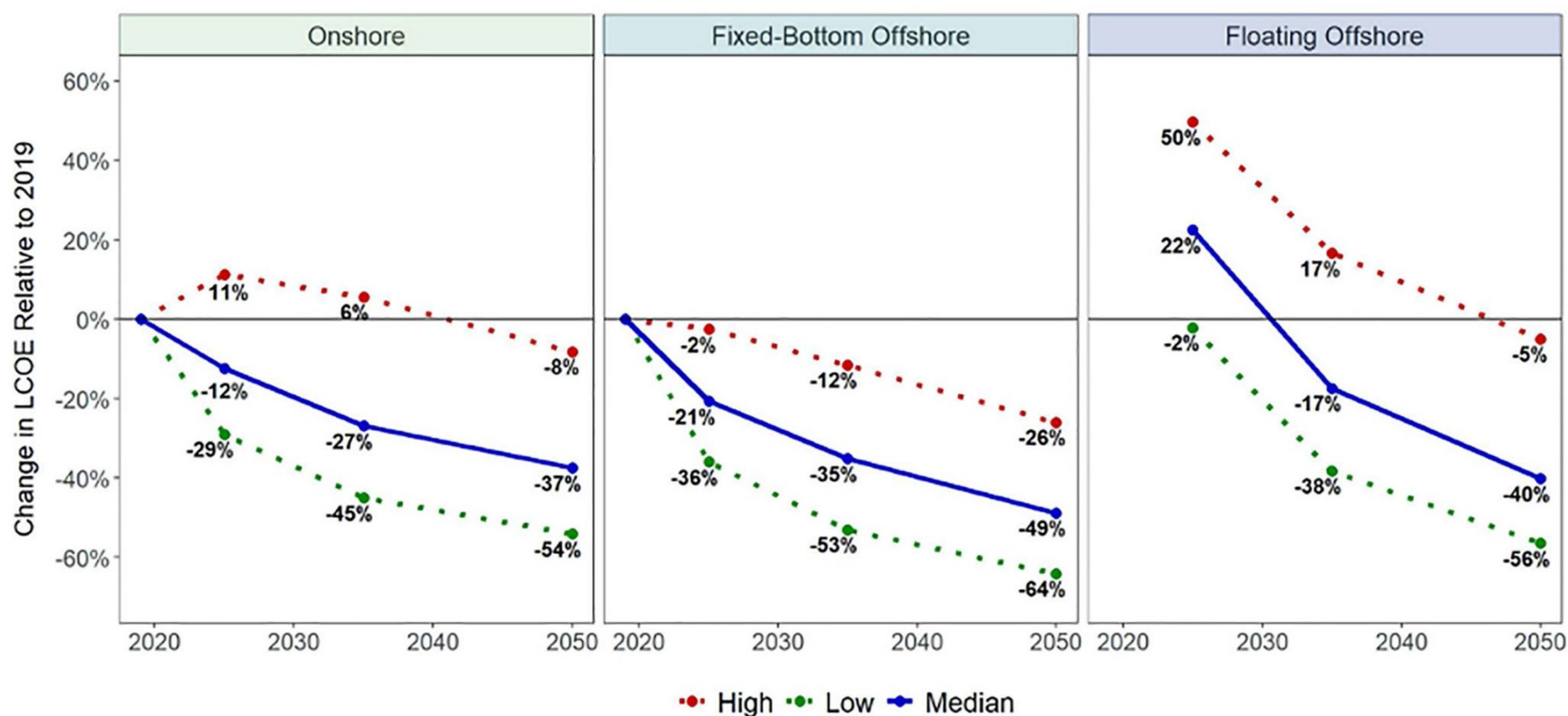


FIGURE 2. ESTIMATED CHANGE IN LCOE OVER TIME ACROSS ALL THREE SCENARIOS FROM THE 2020 ELICITATION. FIGURE SOURCE: [6]



By providing high-quality data and published analyses that inform our understanding of cost of wind energy, the Task enhances the broader energy community's efforts to plan for the future. The Task also develops novel approaches and insights that can be applied by key stakeholder groups and industry. Organizations such as IEA and the International Renewable Energy Agency have used Task 26 wind project cost and performance statistics and participants regularly use these data for internal and external purposes. Task 26 members are frequent presenters at conferences and industry leading events around the world.

### Next steps

Work activities in the Task are ongoing across multiple fronts. Highlights from Task 26 for 2020 include continued exploration of the following work areas:

- Update the land-based wind project statistics through 2020 in the interactive online data viewer
- Conduct analysis and develop draft onshore and offshore wind technology cost and trends technical reports expecting to be published in 2021
- Complete journal manuscript on the 'Expert perspectives on the wind plant of the future' which draws from a recent survey of 140 of the world's foremost wind experts, and identifies expectations of future wind plant design in 2035, both for onshore and offshore wind
- Plan and execute potential European dissemination event to close out current phase of the Task and continue development of next Task extension proposal.

### References

- [1] "Data Viewer," IEA Wind website. <https://iea-wind.org/task26/data-viewer/>.
- [2] Duffy, A., M. Hand, R. Wisser, E. Lantz, A. Dalla Riva, V. Berkhout, M. Stenkvist, D. Weir, R. Lacal-Arantequi (2020). "Land-based Wind Energy Cost Trends in Selected Countries: Germany, Denmark, Ireland, Norway, Sweden and the United States". <https://doi.org/10.1016/j.apenergy.2020.114777>.
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