

**PIENAAR ENERGY (PTY) LTD**

# **Offshore wind power generation and onshore wind power generation costs**



## Overview

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Onshore wind projects typically involve capital costs ranging from \$1,000–1,700 per kW. Operational expenditures are lower for onshore turbines. The 13th annual Cost of Wind Energy Review uses representative utility-scale and distributed wind energy projects to estimate the levelized cost of energy (LCOE) for land-based and offshore wind power plants in the United States. – Data and results are derived from 2023 commissioned plants. This comprehensive analysis, compiled from IRENA's extensive renewable cost database of over 25,000 projects, highlights how 91% of newly commissioned utility-scale renewable capacity in 2024 delivered power at a lower cost than the cheapest new fossil fuel-fired alternative.

## Offshore wind power generation and onshore wind power generation

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### Cost of Wind Energy Review: 2024 Edition

The 13th annual Cost of Wind Energy Review uses representative utility-scale and distributed wind energy projects to estimate the levelized cost of energy (LCOE) for land-based and offshore wind ...

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### THE COST OF OFFSHORE WIND POWER

Compared to electricity from large scale land-based wind parks and solar photovoltaic parks, offshore wind electricity is more expensive. However, offshore wind is a relatively new developing industrial ...



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### Onshore vs Offshore Wind Energy - What You Need to Know in 2025

Onshore wind projects typically involve capital costs ranging from \$1,000-1,700 per kW. In contrast, offshore installations can exceed \$3,000-5,000/kW.



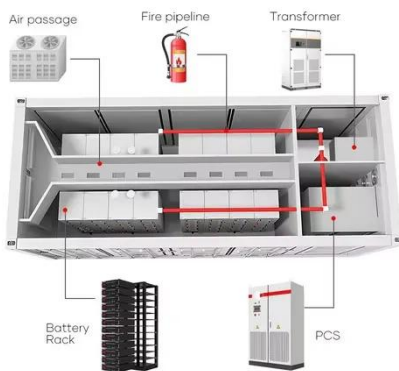
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## Onshore vs offshore wind energy: types of wind energy, ...

Discover the key differences between onshore and offshore wind energy, including costs, efficiency, turbine size, benefits, and global market trends.

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## Onshore versus offshore wind power trends and recent study ...

However, recent projections of onshore & offshore wind energy systems indicate that further improvements are continuously required in terms of the deployments, capacity factors, costs, ...

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## IRENA Report: onshore and offshore wind -- the most cost ...

Onshore wind has consistently proven its affordability, retaining its position as the most affordable source of new power generation globally with a weighted average Levelised Cost of ...

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## Wind Turbine Cost Guide 2025: Complete Pricing Breakdown (\$700 ...

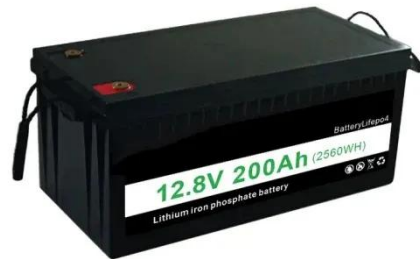


Wind turbine prices range dramatically from \$700 for small residential units to over \$20 million for the largest offshore turbines, with total project costs varying significantly based on size, ...

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## Comparative analysis of offshore and onshore wind turbines: ...

Offshore systems, exemplified by Hywind Scotland's 56% capacity factor, offer scalability but involve higher levelized cost of energy (LCOE) of \$80/MWh and potential marine ecosystem ...



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## Comparative Analysis of Global Onshore and Offshore Wind Energy

This study addresses these gaps by comparing onshore and offshore wind turbines worldwide in terms of installed capacity, levelized cost of electricity (LCOE), total installed cost (TIC), ...

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