

# Climate Hero Spotlight: Wind Turbine Techs

## Opening Activity: Personal Protective Equipment (PPE)

Why would each displayed item be necessary to keep wind turbine technicians safe?

## The Big Question

How are wind turbine technicians essential to the offshore wind industry and our energy goals in Massachusetts?

## My Climate Goals

When you complete this lesson, you'll be able to

1. Understand wind turbine technician roles and contributions to clean energy
2. Recognize the link between climate goals and the need for wind turbine technicians
3. Explore the skills, training, and pathways for wind turbine technician careers
4. Connect personal interests to possible roles in wind turbine technology.

**Notes:**

# Turbine Troubleshoot Challenge

## Instructions

Your group has been assigned a specific wind turbine issue. Work together to analyze the provided details. For each scenario, you are provided a description of what is currently known about the issue and three common causes. It is up to you to decide whether any of these causes apply in this specific case.

Identify the possible issue(s) based on the scenario, list the key safety considerations your team needs to remember, identify the skills and expertise required to address the problem, create a detailed plan to resolve it, and present it to the class.

## Project Details

### Scenario 1: Power Drop

The wind turbine has experienced a sudden drop in power output and is not generating electricity as expected. It is still operational, but its efficiency has decreased significantly. Recent wind speeds have been steady and within the optimal range for generating electricity. During a routine maintenance check, workers noticed unusual vibrations coming from the gearbox, but there have been no interruptions in the power grid.

#### Common causes:

- Electrical system issues: A fault in the electrical wiring or components could interrupt power transmission.
- Gearbox fault: A mechanical issue in the gearbox may be reducing the turbine's ability to convert wind energy into electrical energy.
- Wind conditions: Wind speed or direction changes may affect performance, though the turbine is designed to handle moderate variations.

### Scenario 2: Blade Imbalance

A vibration sensor has triggered an alert about a possible turbine blade imbalance, which could cause damage if not addressed quickly. Residents nearby have reported unusual noises during high winds, and recent weather has included rain and sleet. From the ground, one blade appears slightly discolored.

#### Common causes:

- Blade wear: Physical wear or damage to one blade might have created the imbalance.
- Debris accumulation: Dirt, ice, or other debris may have built up unevenly on the blades.
- Mechanical issue: The connection between the blade and the hub might be loose or faulty.

### Scenario 3: Control System Error

The turbine has shut down, and the control panel displays an error code indicating a communication failure. Operators have not been able to determine the exact issue using remote diagnostics. Data from the sensors stopped updating shortly before the shutdown. A recent software update was skipped, and upon inspection, some wiring connections in the control panel are loose.

#### Common causes:

- Software glitch: The turbine's control software may need an update or a reset.
- Wiring issue: A loose or damaged connection might interrupt the information flow between the sensors and the control system.
- Sensor malfunction: A faulty sensor may send incorrect data, causing the turbine to shut down.

### Scenario 4: Weather-Related Shutdown

The turbine shut down automatically during a recent thunderstorm with high winds and lightning. Lightning was reported to have struck nearby power lines. The turbine's safety system logs show a sudden spike in power just before the shutdown, but no external damage is visible from the ground. Although the turbine is designed to handle extreme weather, it requires an inspection before it can resume operations.

#### Common causes:

- Lightning damage: Lightning strikes may have damaged electrical components.
- Mechanical stress: High winds might have caused stress or minor damage to the blades or tower.
- Safety system trigger: The turbine's safety system may have initiated the shutdown to protect it from damage.

## Discussion Prompts

Use the prompts below to guide your discussion and plan your solution as a team.

**What do you believe caused the issue?**

**What steps should your team take to ensure safety while inspecting and fixing the issue? Consider height, weather, and any hazards specific to your scenario.**

**Which roles and skills are required to fix this issue?**

**Write a plan to address the problem. Include steps your team will take to diagnose and fix the issue, the tools or equipment needed, and the impact this might have on energy output or performance.**

## Lesson Key Points

- Wind turbine technicians are essential to expanding wind energy in Massachusetts.
- They need a combination of technical skills and physical endurance.
- Demand for technicians is growing due to the state's clean energy goals.

**Additional key points:**

## Closing Activity

**What is one aspect of the wind turbine tech role that matches your skills or interests?**

**How do wind turbine techs contribute to Massachusetts's status as a climate leader?**

**Careers of interest you heard about in this lesson:**