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TECHSHEETS.DEV

GREEN TECH SERIES

# John B. Goodenough

*The Power Behind the Green Revolution*

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Look at the smartphone in your hand, or the electric cars driving quietly down your street. None of them would be possible without a brilliant physicist named **John B. Goodenough**. In 2019, at the age of 97, Goodenough became the oldest person ever to receive a Nobel Prize. He won it for a world-changing invention: the **lithium-ion battery**.

Before Goodenough's work in the 1980s, rechargeable batteries were heavy, bulky, and didn't hold a charge for very long. Goodenough made a massive scientific breakthrough by discovering a new cathode material (the positive side of a battery) made of cobalt oxide. This allowed lithium-ion batteries to store incredible amounts of energy while remaining incredibly lightweight and compact.

While Goodenough was originally just trying to make better electronics, his invention accidentally became the most important piece of modern "**Green Technology**." Because lithium-ion batteries are so powerful and lightweight, they finally made Electric Vehicles (EVs) a realistic alternative to gas-powered cars, helping to reduce the carbon emissions that cause climate change.

Today, his batteries do something even more important: **Grid Storage**. Renewable energy sources like wind and solar power are considered "intermittent." This means they only generate electricity when the wind is blowing or the sun is shining. But what happens when we need to turn on our lights at night? Thanks to John B. Goodenough's high-capacity lithium-ion batteries, we can capture the sun's energy during the day, store it in massive battery farms, and power our homes cleanly all night long.

## Part 1: Reading Comprehension

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1. What prestigious award did John B. Goodenough win in 2019 for his scientific work?

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2. What specific part of the battery did Goodenough improve, and what were the results?

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3. How did Goodenough's battery breakthrough help make Electric Vehicles (EVs) a reality?

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4. What does it mean when renewable energy is called "intermittent"? Give an example.

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## Part 2: Critical Thinking

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5. Imagine a world where John B. Goodenough never invented the lightweight, rechargeable lithium-ion battery. Describe how your daily life, and the world's approach to technology and transportation, would be different today.

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## Part 3: The Grid Storage Challenge

A solar-powered town produces energy during the day, but uses energy all day and night. They need a giant lithium-ion battery to store the extra energy!

**Task: Calculate the town's energy math for one day.**

*Hint: Add the "Energy Produced" to the battery, then subtract the "Energy Used".*

Time of Day	Solar Energy Produced	Energy Used by Town	Battery Level (Total Saved)
Morning (8 AM - 12 PM)	+ 50 units	- 20 units	Example: $50 - 20 =$ <b>30 units saved</b>
Afternoon (12 PM - 4 PM)	+ 60 units	- 40 units	Previous $30 + 60 - 40 =$ _____
Evening (4 PM - 8 PM)	+ 10 units	- 50 units	_____
Night (8 PM - 8 AM)	+ 0 units (No sun!)	- 10 units	_____

**Did the town make it through the night without the power going out? Why or why not?**

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