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4 Shifts Needed to Decarbonize the Energy Sector

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For the world to shift away from the destructive effects of the climate problem, it must decarbonize the industrial sector.

All sectors are responsible for greenhouse gas emissions, but the energy sector is a major contributor. According to the World Resources Institute, it produced 75.7% of greenhouse gas emissions worldwide. That includes emissions from electricity and heat (29.7%), transportation (13.7%), manufacturing and construction (12.7%) and buildings (6.6%).

The bottom line: decarbonizing it is important. Or reaching net zero around 2050 won't be possible.

Here are some of the key shifts that can help decarbonize the energy sector effectively.

#1 Clean Up the Grid

How is it possible to decarbonize the energy sector until the grid isn't cleaned?

A **clean energy grid**, Americans for a Clean Energy Grid explain, is a modern high-voltage network supporting reliable electricity, climate protection, and sustainable economic growth in the U.S.

Right now, most grids are old-school, built for centralized power plants running on fossil fuels like natural gas and coal to produce electricity. Burning them emits greenhouse gases, which trap heat and overheat the planet.

To decarbonize, it is important to transition to renewables like solar, wind, and hydropower. The Australian government has introduced renewable energy zones—windiest and sunniest places—to ramp up the renewable electricity base.

Renewable energy can be a bit unpredictable, however. The sun does not always shine, nor does the wind always blow. That's where energy storage comes in. Batteries, pumped hydro, and even newer tech like hydrogen storage can help smooth out the supply-and-demand hiccups.

Smart grids are another excellent option. As per Insight, they use technology and two-way communication to balance energy supply and demand efficiently. These are outfitted with sensors and automation to gather real-time data on energy usage as well as grid conditions.

#2 Invest in Carbon Capture

To achieve the Paris Agreement's goal of limiting temperature increases, the Intergovernmental Panel on Climate Change highlights that deploying technologies to remove CO₂ from the atmosphere is important.

Carbon capture is one of those technologies. In recent years, it has garnered significant attention as a vital energy in eliminating carbon emissions globally.

Instead of letting carbon dioxide (CO₂) escape into the atmosphere, this technology captures it right at the source—like power plants or factories—or even directly from the air.

Once captured, the CO₂ is either stored deep underground or used to improve oil extraction efficiency. This provides hard-to-decarbonize industries and companies in heavy-emitting with a scalable and efficient solution, as they can use or store captured carbon, notes Atoco.

Possible storage sites for CO₂ emission include depleted oil and gas reservoirs or saline aquifers, which should typically be 0.62 miles (1km) or more under the ground.

#3 Electrify Everything

To move away from fossil fuels, it's important to electrify as many systems as possible.

This means transitioning vehicles, heating systems, and even industrial processes to run on electricity instead of gas, coal, or oil.

In 2022, the U.S. greenhouse gas emissions from transportation were 28%. That made it the largest contributor of greenhouse gas emissions in the country.

Electric vehicles (EVs) are becoming the new norm, from compact cars to semi-trucks. Replacing vehicles running on fossil fuels with electric vehicles can significantly reduce this. EVs produce no tailpipe emissions and can be powered by renewable energy, drastically lowering their carbon footprint.

Heating is another huge area. Traditional gas furnaces? Out. Electric heat pumps? In. They can heat and cool your space efficiently without burning a drop of fossil fuel.

Electrification technology can also be deployed for processes like manufacturing and smelting. Electric-powered machinery and furnaces can replace traditional methods that rely on fossil fuels. That will help to decarbonize these energy-intensive sectors.

#4 Rethinking Energy Policies

Rewrite the rulebook for how everyone powers their lives. Old policies were designed around fossil fuels, but it's time to prioritize clean, sustainable energy.

Setting clear targets is important. Governments need to commit to ambitious goals, like achieving net-zero emissions by a specific date, and then stick to them.

The Biden administration is a case point. In 2021, it set a clear target for the U.S. power sector to achieve net-zero emissions by 2035. Achieving this target is important to limit global warming and

avoid the most severe consequences of climate change.

There is carbon pricing, then. Carbon pricing basically puts a price on carbon emissions, which are the main cause of climate change. When emitting CO₂ gets expensive, companies are more likely to switch to cleaner alternatives.

Members of the **Energy Community** are planning to propose a carbon pricing model by mid-2025.

Decarbonizing the energy sector isn't just about cutting emissions. But it's about creating a healthier, more resilient future for everyone.

Technology is there, and so is knowledge. What's needed now is the collective will—governments, businesses, and individuals working together to accelerate this transition. Once everyone joins hands together, the energy sector can be decarbonized. The payoff? That will be enormous—cleaner air, sustainable jobs, and a livable planet for future generations.

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