



# The Opportunities & Obstacles of Energy Decarbonization

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**We are amid one of the most consequential revolutions the energy sector has ever seen: decarbonization of the industry. In this paper, we'll explain the concept and its expected impacts on the downstream fuel industry.**

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## What is decarbonization?

Our use of fossil fuels releases carbon into the atmosphere as a byproduct of the chemical reactions that provide our energy. From refined fuels to natural gas, the combustion of fossil fuels is the lifeblood of modern society. We couldn't transport goods without diesel and jet fuel. We couldn't keep medicine and food at safe temperatures without electricity produced by natural gas, not to mention burning natural gas also heats our homes and cooks our food.

As common as these energy sources are, there's a problem: the carbon dioxide they release into the atmosphere is a major contributor to climate change, as it traps solar energy, heating the atmosphere. As the earth warms, there are [major consequences](#), including the increased severity of fire and hurricane seasons, record-smashing droughts (and floods), rising sea levels, and the migration of plants, animals, and even diseases into places they weren't before.

The industry is creating new energy sources to help reduce carbon dioxide emission and its associated risks. Decarbonization is this process of gradually transitioning from fossil fuels to sustainable energy.

Of course, a change of this scale and complexity will be as significant as the Industrial Revolution. There will be no aspect of daily human activity that will be untouched. While it presents enticing new opportunities, invariably, there will also be significant challenges to overcome.

### Common climate change impacts

- Increased wildfire risks
- More active hurricane seasons
- Record droughts and floods
- Rising sea levels
- Migration of plants, animals, and diseases

## Opportunities

As with any large societal transition, previously unimagined opportunities will present themselves. Consider these historical examples. The Apollo program yielded shock-absorbing material used in practically every athletic shoe worn today. And most of us would be lost without the Global Positioning Satellite system. [Both of those innovations](#) were adjacent to the main objective of the program: landing a human on the moon. The iPhone spawned an entire generation of wireless accessories, including portable credit card swipers, battery cases, and earbuds — all of which came about to fulfill needs consumers never knew they had.

What opportunities can we look for as the energy sector begins this change? We'll start with the obvious motivator: money. Sustainable profit is the end-all, be-all of nearly every corporation. Fiduciary responsibility requires business leaders to produce long-term, continued success to maintain investment. How to achieve that goal is what preoccupies the minds of senior energy leaders. As the world shifts away from burning fossil fuels, demand will fall for most refined fuels. While this will take decades, and there will always be a need for downstream products, this change is inevitable. Downstream fuel companies that begin shifting and retooling to address the growing market instead of the shrinking one will find firmer financial ground than those who wait for an inflection point.

### Decarbonization-driven opportunities

- Sustainable profits
- Potential for increased investment
- Positive consumer sentiment
- Trade and growth opportunities

Recently, several investment firms have deliberately — and publicly — moved their money [from fossil fuel-based energy companies](#) to sustainable energy producers. Although this trend slowed during the pandemic, leaders of publicly traded energy companies would do well to plan for this continued divestment over the long term. Moving capital investments into sustainable energy from carbon-producing energy will be increasingly viewed as a standard posture in the industry. Late adopters could find themselves scrambling to find investors, while those ahead of the curve may find themselves with new resources to fund innovation.

Increased positive consumer sentiment is another opportunity. Just about everybody wants to save the planet. Companies that take active steps toward mitigating climate change risks will enjoy favorable attention from consumers, leading to increased brand loyalty. They'll also be considered desirable employers by the next generation of talent.

There are, of course, other financial opportunities in a world with less extreme fire seasons, severe weather, and other disruptions; instead of spending money to prepare for and rebuild from those events, companies can dedicate those resources toward their growth goals.

This could lead to increased global trade and innovation. China has set an ambitious goal to release [zero carbon dioxide within 40 years](#). However, that's easier said than done. China's need for continued hypergrowth to keep its economy running requires substantial amounts of cheap energy, which keeps the nation [highly dependent on coal](#). The closer the world works together to move into a sustainable energy future, new partnerships and trade opportunities will appear.

## Obstacles

Unlike petroleum, which has been used safely and reliably for over a century, many energy sources that could fuel the future of the industry consist of unknown, untested technology. Hydrogen fuel cells [looked promising](#) at one point (their only byproduct is water), but no one has yet figured out how to scale the technology at a reasonable cost (platinum is a key ingredient). Cold fusion is still more fiction than science. Also, does anybody remember [Solyndra](#)?

Of particular interest to the downstream fuel industry is the challenge of consumer reticence to adopt electric vehicles (EVs). The desirable ones (e.g., Tesla, Lucid) are too expensive for most households. The affordable ones (e.g., Toyota Prius or Nissan Leaf) don't meet the demands of many drivers, such as extra room for luggage or sports equipment, the ability to tow cargo, or a high-performance experience.

### Decarbonization challenges

- Unknown, untested technology
- The ability to scale affordably
- Potential consumer resistance
- Costs associated with shifting/retooling
- New infrastructure requirements

The cost to retool a company (or even one part of it) is not insignificant. The entire energy industry was quite literally built on the extraction, refinement, and consumption of fossil fuels. Individual companies who make the first transitions will pay the highest prices as the new foundation of sustainable energy is laid. As with most fundamental industry shifts, economies of scale will eventually make the cost of entry less

expensive. However, that won't change the price tag for early adopters, who will have to explain to their investors why dividends may be lower for a while.

Legacy infrastructure may not fully support new energy sources. In terms of power transfer efficiency, renewable energy doesn't pack the same punch as carbon-based fuels. If we're going to build an electric power grid that fully supports EVs [without releasing carbon at the source of production](#), we'll need those sources of power (and a lot of them) much closer to the end-user.

Solar and wind energy plants require huge land footprints compared to the relatively small real estate taken up by natural gas or nuclear power plants. Since land is always at a premium for purchase, buying up acres of it for energy production is a sizable investment.

This also brings up the consumer-level challenge of so-called NIMBYs. The acronym stands for "not in my back yard." These are people who don't want their ocean view spoiled by offshore wind farms or who complain about the noise. People who complain about the glare of sunlight and heat generation of solar farms. People who worry about the storage of nuclear waste. Convincing them that the rewards outweigh the risks will be a long and difficult process.

### Unintended consequences

Ironically, combating climate change through decarbonizing global energy production and service could harm some aspects of the environment. An example: large wind farms installed in migration corridors are [extremely dangerous to birds and bats](#), while also displacing land animal habitats, destabilizing entire ecosystems. Solar farms large enough to replace fossil fuels as the principal source of electricity generation for large cities would have [climate-changing effects of their own](#), many of them negative.

## Conclusion

What does this mean for the downstream fuel industry? Clearly, the march of innovation is unstoppable. Whether the transition to sustainable energy sources is complete by the very aggressive timelines set by some companies and countries — or it takes decades longer — it assuredly will happen. Oil and gas executives need to establish a seat at the table to shape their role in this rapidly approaching future. If the industry waits to be told what we need to do, it will be much more expensive and potentially damaging to business interests. Instead, downstream fuel leaders must find ways to partner with private and public organizations to map a realistic, business-friendly path towards decarbonization.

Meanwhile, consumers still require affordable energy, particularly as we come out of the COVID-19 pandemic, and travel (both business and leisure) approaches its historical norm. In practical terms, downstream leaders must realize they will soon move fewer molecules and need to find alternate revenue stream sources in renewable energy. Of course, as noted, not every new technology is worth heavy investment up-front, so executives must perform due diligence before moving away from the relative safety of refined fuels selling and buying.

Oil and gas companies [will need government assistance in these efforts](#). Creating compelling messaging to address fears, [retraining employees](#), standing up whole new infrastructure systems (or repurposing existing ones), and other as-yet-unforeseen costs cannot be borne solely by those who make the bold choice to move quickly into the future. Therefore, it is imperative that downstream energy leaders proactively engage with government at every level. They can help shape the discussion and ensure there are guardrails to prevent replacing an ecological disaster with an economic one. The energy industry is [roughly 6% of U.S. GDP](#); a negative impact on its economy would reverberate across every part of the rest of the economic landscape. If industry leaders get ahead of these trendlines, they'll more easily surmount the obstacles in decarbonization and more quickly seize the opportunities.