

Managing the Transition from Fossil Fuels to Renewables



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A Position Paper from Verified Credits LLC, a Community Shield Company

Position Paper – Reporting on the Transition from Fossil Fuels to Renewables

Transitioning away from fossil fuels and toward renewable forms of energy is a critical step for addressing climate change, improving public health, and ensuring global sustainability. This position paper discusses the process of transitioning away from fossil fuels in favor of renewable forms of energy. Timing is important as emissions continue to grow.

As background, fossil fuels are considered non-renewable energy sources because they take millions of years to form and cannot be replenished quickly. On the other hand, renewable sources such as wind, solar, geothermal, and hydropower can be harnessed without depleting any finite resources.

Renewables produce significantly lower amounts of carbon dioxide (CO₂) emissions than their fossil fuel counterparts. The shift away from fossil fuels and toward renewables therefore has the potential to reduce air pollution, improve public health outcomes, create new jobs, and reduce dependence on imported energy sources.

The good news is that investors continue to show strong interest in renewables. Bloomberg Green Daily reports that, “2023 will bring an 18% growth in carbon-free energy. That should add up to more than 500 gigawatts of wind, solar, electricity storage, nuclear and geothermal power in 2023, but clean electricity additions need to reach 1.4 terawatts per year by 2030 to get on track for a net-zero pathway.” Interestingly, the war in Ukraine, sanctions on Russian oil and gas, and the energy crisis in Europe are increasing the use of coal.

This paper explores the issues with the need to transition from fossil fuels to renewables in an ecologically responsible manner while recognizing the continued, near-term reliance on petroleum products.

Managing the Transition Away From Fossil Fuels

Energy production is one of the main contributors to greenhouse gas emissions and it is increasingly evident that energy production from fossil fuels needs to be reduced drastically to protect the environment. This transition away from fossil fuels in favor of energy sources such as solar, wind and hydropower will require careful management to ensure a smooth shift with minimal disruption.

The energy sector is an essential part of any country’s economy, so it is important to ensure that a transition away from fossil fuels does not significantly reduce energy availability. Governments and energy providers must work together to develop an energy policy that meets the needs of all citizens while also reducing dependence on non-renewable energy sources.

In addition to energy needs, managing the transition away from fossil fuels also includes ensuring that energy costs remain stable and affordable. A sudden shift in energy sources could lead to an increase in energy prices, which would disproportionately affect lower-income households. Governments must consider the potential impact of these energy policies on those living below the poverty line and develop strategies to minimize any negative effects.

Energy transition policies must also consider the environmental impact. Moving away from fossil fuels requires energy sources that do not contribute significantly to pollution or climate

change. Renewable energy sources such as solar and wind are becoming increasingly popular, but other alternatives like nuclear energy can also support a balanced energy supply.

Managing the energy transition away from fossil fuels is an urgent priority, and it requires a comprehensive approach that considers energy needs, affordability, and environmental sustainability. With careful planning and management, energy providers can ensure that this energy transition is successful. Unless energy production is shifted away from burning fossil fuels and towards renewable energy sources such as solar, wind or hydropower, the environmental consequences will be severe.

The time for energy transition is now. Fast action in this area has the potential to create a cleaner energy system that is affordable, reliable, and environmentally sustainable for future generations. It likely will take decades for the world to move away from fossil fuels on a global scale and we need to recognize this reality. Importantly, the transition needs to be managed to minimize the environmental impact.

Harnessing the Power of New Technologies

With solar, wind and other technologies coming online to supplement power demands in a timely manner there remain concerns about how we can best prepare for the future. The industry needs scale up dramatically but there aren't even enough raw materials available.

As an example, when California's electric vehicle mandate by 2035 mandate begins to be enforced there will have to be significant advancements made towards battery efficiency or new plants built. Furthermore, New York State Governor Kathy Hochul announced in September 2022 that New York would follow in California's footsteps by requiring all new passenger cars, pickup trucks and SUVs sold in New York State to be zero emissions by 2035. The solar industry is booming, but there aren't enough materials available to meet demand.

New battery technologies (and maybe nuclear power) will take time to become fully commercialized and contribute to significant carbon reduction efforts. In the meantime, we urgently need policies that support clean energy development. The new capacity that is coming online is not even keeping up with the growth rate. New battery technologies - and maybe a new generation of nuclear power - will take time to be commercially viable.

The Quest for Energy Sovereignty

The quest for energy sovereignty is a critical issue for most countries. This is because most countries are not energy independent and rely on other sources for their energy needs. This has been exacerbated by the Ukraine war, which has led to the loss of Russian oil and gas exports to

many European countries. As a result, these countries will have to rely on coal, heating oil, diesel fuel, and gasoline for their energy production and transportation needs for the foreseeable future.

To achieve energy independence, countries must invest in renewable energy sources such as solar, wind and geothermal power. This will help reduce their dependence on imports of fuel from other nations. They also need to implement policies that encourage the use of cleaner energy sources such as electric vehicles and green buildings. In addition, they must ensure that their energy infrastructure is efficient and resilient to withstand any external shocks.

Finally, countries should pursue international agreements with other nations to gain access to new sources of energy and technology. This will help them diversify their energy sources and reduce the reliance on imports from a single source. By investing in renewable energy, implementing policies that encourage cleaner forms of energy production, and entering into international agreements, countries can improve their energy sovereignty and become more energy independent.

Carbon Remediation Infrastructure: The Future of Clean Air

As carbon dioxide levels continue to increase, the need for carbon remediation infrastructure is becoming more and more crucial. Carbon remediation technologies are designed to capture carbon from the atmosphere and store it away safely. This could help limit the effects of global warming, thus improving air quality and reducing the carbon footprint of human activities on the planet.

The world's nations must find a way to create incentives that drive adoption of carbon remediation infrastructure. The current climate change policy seems geared towards eliminating internal combustion engines. As a practical matter, the internal combustion engine and fuel-powered turbines will be the primary source of power in most of the world for at least another generation. Credits that reduce or avoid CO₂ emissions from fossil fuels would be powerful drivers in bringing new technology into being.

There are several approaches being developed, such as carbon capture and storage, carbon mineralization, direct air capture, biochar production, soil carbon sequestration, and enhanced weathering processes. Each has its own benefits and challenges that must be taken into consideration when evaluating options for carbon remediation infrastructure projects.

Further investments in carbon remediation infrastructure will be necessary to reduce emissions and protect our environment. The sooner carbon remediation infrastructure is put into place, the better our chances of mitigating the worst effects of climate change. Investing in carbon

remediation infrastructure now will help ensure a safer and healthier future for generations to come.

The Negative Externalities of Hydrocarbon Combustion

The use of hydrocarbons as a fuel source has been integral to the development of human civilization. However, the combustion of hydrocarbons also releases pollutants into the atmosphere, which can have deleterious effects on both the environment and human health.

One of the most harmful pollutants emitted from hydrocarbon combustion is particulate matter (PM). PM is a type of air pollutant that consists of extremely small particles that are released into the atmosphere. These particles can be either solid or liquid, and they can come from a variety of sources, including power plants, automobiles, and agricultural activities. The black soot that is emitted from truck exhaust pipes and industrial smokestacks are visible examples of PM.

When PM emissions are released into the atmosphere, they can absorb and scatter sunlight. This absorption and scattering can lead to a reduction in the amount of solar radiation that reaches the surface of the Earth. Additionally, PM emissions can have a direct impact on human health. Studies have linked PM exposure to dozens of different health conditions, including heart disease, stroke, lung cancer, and respiratory infections.

Despite the well-documented negative effects of particulate matter emissions, there are no major incentives in place to reduce them. This is because current pollution abatement technologies are very costly and may not provide enough benefit to justify their cost. For example, installing scrubbers on power plant smokestacks can cost billions of dollars and only result in a small reduction in particulate matter emissions.

According to a Goldman Sachs report, “Europe's energy crisis has highlighted the weaknesses in the region's energy system that must be overcome on the way to net zero. “We're at the beginning of a very long path,” says Michele Della Vigna on the latest episode of *Exchanges at Goldman Sachs*. “We think we need to unlock an extra \$1 trillion dollars per annum of global investment in energy over the next five years.”

Given the high cost and relatively low benefits of particulate matter reduction strategies, it is unlikely that any major progress will be made in reducing these emissions soon. However, as pollution abatement technologies continue to improve and become more cost-effective, it is possible that we will see more regulations put in place to reduce particulate matter emissions in the future.

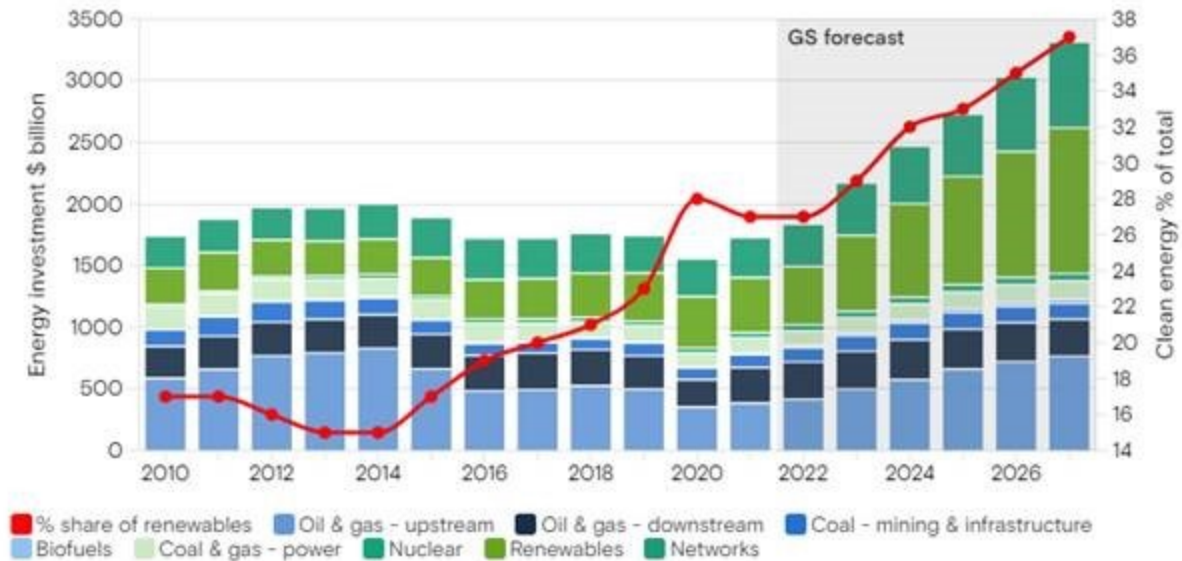
Trillions in New Infrastructure and the Fight Against Climate Change

The world is in the process of addressing the impact of pollution on the climate but it's going to take an unprecedented amount of investment to finance the transition to a cleaner, more sustainable economy. According to a recent report from the International Energy Agency (IEA), \$50 trillion in new infrastructure will be required by 2030 to meet global energy demand and put the world on a path to net-zero emissions by 2050.

This is a daunting figure, but it's important to remember that the private sector will play a crucial role in meeting this investment need. Oil, gas, and chemical companies are expected to provide \$30 trillion over the next 15 years, with the remainder coming from other sectors such as power generation, buildings, and transportation.

A major increase in energy investment is required to resolve energy affordability and security

Global energy investments in energy (\$ billion): fuel supply in blue, power supply in green

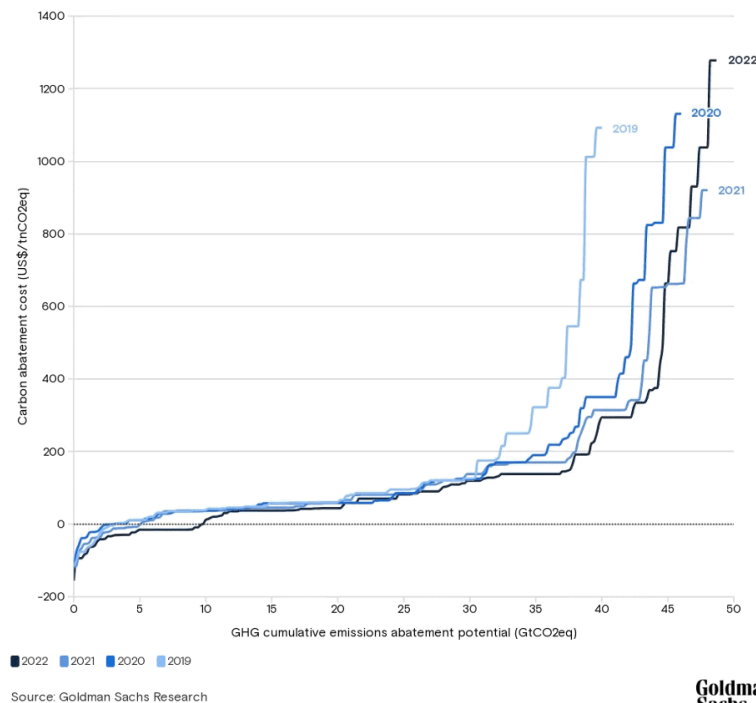


Source: IEA WEI, Goldman Sachs Research

**Goldman
Sachs**

Net Zero gets cheaper as cost curves fall

The 2022 de-carbonization cost curve paints a mixed picture vs. 2021



There are several reasons why these companies are well-positioned to lead the charge in financing the transition. First, they have the mandate from their customers and investors to decarbonize their operations. Second, they have the expertise and experience in developing long-term projects with high upfront costs – such as renewable energy projects, which typically have a payback period of decades. And finally, they have a vested interest in ensuring that the transition is successful, as they will be among the biggest beneficiaries of a low-carbon economy.

Of course, there are many issues that need to be addressed. For example, most oil and gas companies currently rely heavily on fixed income financing, which may to be replaced with equity as access to debt gets restricted. But with the right policies and regulations in place, there is no reason why these companies cannot be at the forefront of financing the transition to a net-zero emissions future.

A recent report issued by Bloomberg Green reiterates that credit risks also present a challenge as they “keep creeping higher for the world’s biggest polluters. In fact, the companies facing perhaps the largest climate crisis-related losses have more than twice as much rated debt as they did when the Paris Agreement was announced almost seven years ago, according to an analysis by Moody’s Investors Service. To be more specific, the 16 industries considered to have “very high” or “high” environmental credit risks have about \$4.3 trillion of rated debt (roughly equal to Germany’s gross domestic product), up from \$2 trillion in November 2015.

Kickstarting Carbon Sequestration

A clear need exists for financing short-term projects and processes that can help kickstart carbon sequestration, which captures and secures atmospheric carbon dioxide from power plants and industrial sources and stores it in the earth. Commercially-ready projects already exist that are well-positioned to help reduce emissions in support of a transition to 100 percent clean energy.

A prime example is fuel additives. Transportation is the fourth largest source of greenhouse gas emissions. Certain high molecular weight polymers blended with diesel fuel make the droplet size more uniform. The result is a more homogeneous air-to-fuel equivalency ratio, which increases fuel economy, permanently avoids a portion of the carbon dioxide emissions as well as emissions of particulate matter, NO_x, and SO_x.

Investing in biochar technology is another opportunity with the potential to create significant returns for investors while providing tangible environmental benefits. Biochar is a type of charcoal created from organic materials such as wood and other plant matter. It has been used around the globe since ancient times, but modern science is now developing its use to fight global climate change. Biochar captures and sequesters carbon emissions, producing energy while simultaneously reducing pollution and waste. As a sustainable resource, biochar has numerous other practical applications that can be leveraged for economic benefit.

Afforestation and reforestation also represent effective strategies for reducing global emissions and restoring ecosystems. These projects offer numerous environmental benefits - from sequestering carbon dioxide from the atmosphere to providing essential habitat for biodiversity. Moreover, these initiatives can also lead to tangible economic outcomes by creating employment opportunities as well as generating new income sources such as biofuels or timber products.

Atmosphere Group Ltd. is one example of a platform that has opportunities for individuals and businesses to offset their carbon footprint to achieve their “net zero” goals. Those who are seeking to offset their carbon footprint, create carbon credits on the platform from land they own, and who want to learn how to access new credits and projects, rely on Atmosphere Group Ltd. to make a difference.

In the face of ever-increasing global temperatures and expanding carbon footprints, direct carbon capture also has come to the forefront as a viable solution for reducing our CO₂ emissions. Direct carbon capture technology represents a major opportunity for investors looking to balance out their portfolios with environmentally sustainable investments, as it is an innovative strategy that offers direct financial and environmental benefits. With its potential to help us meet our sustainability goals while providing secure returns on investment, direct carbon capture is compelling.

Investing in renewable energy is another environmentally sustainable choice, and investments in this field also present compelling opportunities with the potential for impressive short and long-

term returns. With the ever-increasing demand for renewable energy sources, investing in projects such as solar, wind turbines, geo-thermal projects, and more present ways to realize maximum returns with minimal risks.

Consumer Trends Must Change

Consumer trends must change quickly for progress to be made in the fight against climate change. There is an urgent need for the average consumer to get involved, which is best achieved by individuals committed to offsetting their personal carbon footprint via platforms such as Atmosphere Group Ltd. There are several carbon calculators available that can evaluate an individual's carbon footprint and determine how much of an offset he or she needs to make during the transition process.

Historically, the onus has been on industry and government to solve these pressing issues. It's essential to note, however, that if everyone was a stakeholder (which we are) then a collective effort will radically expedite the pathway to net zero. Governments will continue to play their part, of course, by providing mechanisms to incentivize the consumer to incrementally decrease his or her personal carbon footprint via tax credits, subsidizing solar, and similar programs.

In today's world, the future of our planet is intrinsically linked to solving the problem of climate change. Individuals have an important role to play in this fight as active participants in making positive change and creating a sustainable future for generations to come. Investors are uniquely positioned to make meaningful impacts with their investments by investing into companies that care about sustainability and reducing their carbon footprint. Investing capital for good and proactively contributing towards fighting climate change is always the best decision.

Conclusion

The transition away from fossil fuels in favor of renewable forms of energy is essential for addressing climate change, protecting public health, and ensuring sustainability. Governments must take proactive steps to incentivize the adoption of renewable sources of energy by providing financial incentives for businesses and individuals who switch to cleaner forms of energy. Moreover, more research must be conducted on renewable technologies to ensure that a successful transition can be effectively achieved. Ultimately, this position paper concludes that transitioning away from fossil fuels in favor of renewables is an important step forward in combating climate change and creating a better future for all.