From fossil fuels to renewables

Key takeaways

• Energy transitioning from fossil fuels to renewables is a trend that is here to stay

• The most efficient route to decarbonisation is to have more things running on renewable electricity

• The transition will create investment opportunities across multiple sectors

In this paper, François Beaudry and Natalya Zeman consider the key long-term investment implications of the transition towards sustainable energy.

Decarbonisation is an important structural trend, but is not without challenges

Decarbonisation – the term used for the process of removing or reducing the carbon dioxide output of a country’s economy - is an important structural investment trend that is here to stay. It is important because greenhouse gas emissions are causing global warming, and this is having unsustainable effects on our environment. Many countries and companies across the world have responded by committing to remove as many emissions as we produce, in other words, to reach “net zero”.
The challenge with getting to net zero is that greenhouse gases are part of all human activities. Achieving net zero does not just entail ceasing to run coal fired power plants and switching to electric vehicles. The challenge is much broader: ranging from transportation, agriculture and forestry, to the boxes used for Amazon deliveries.

Energy consumption is highly positively correlated to wealth and energy demand will continue to rise as emerging nations develop. Solar and wind are currently a small part of the overall mix, although cost competitiveness, government policy, innovation and professionalisation are increasingly driving scale and investment in these technologies. There are comparisons with energy transitions that have taken place in the past, such as the rise of oil in the 1920s, or coal in the 1830s. We are at the beginning of the renewable phase, the key drivers are already in place, and this transition is a survival imperative.

**We consume a large and growing amount of energy**

Global primary energy consumption by source

![Primary energy consumption by source](image)

**Electrification is the route to net zero**

Achieving net zero means reducing fossil fuel use and finding renewables to replace them. The most efficient route to decarbonisation is to have more things running on renewable electricity (either through wires or stored as green hydrogen), because this is where we have the most mature, low-carbon technologies in place.

Hydrogen is a molecule that can be made through electricity by splitting water, which is why it can be considered ‘green’ if it is made with electricity from renewable sources. This is still very nascent; the current green hydrogen capacity is very limited and it’s in the early stages from a commercialisation point of view. Because not everything can be run directly on electricity, the option to run on hydrogen will become a larger consideration in the future. Consider industries that can’t be connected into the grid - such as shipping companies. They will need to transition to an alternative to fossil fuels and green hydrogen has the potential to power their ships around the world.

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1 Data as at 13 May 2021. Source: Vaclav Smil (2017) & BP Statistical Review of World Energy. Published online at OurWorldInData.org

Primary energy is calculated based on the ‘substitution method’, which takes account of the inefficiencies in fossil fuel production by converting non-fossil energy into the energy inputs required if they had the same conversion losses as fossil fuels.
25% of our world’s energy is currently running on electricity and that needs to grow to almost everything. According to the International Energy Agency, the full transition to electricity for the global economy is likely to cost around US$1.5-1.8 trillion per year for 30 years\(^2\) (roughly the gross domestic product of Australia). This could be an overestimation for a couple of reasons. First, there are some fairly mature technologies already in place to support this transition. Second, renewable energy has historically been perceived as expensive and unprofitable but all that is quickly changing. Scale, innovation, and professionalisation have driven down the cost of renewables and some of our analysts are expecting green hydrogen costs to fall by about 75% over the next decade\(^3\).

**Balancing social issues with environmental issues in the transition to renewables**

There are distribution issues in the way we transition to renewables. One example is net metering, whereby people who have the resources to place solar panels on the roof of their house can opt out of grid fees. That causes a problem because people who cannot install solar panels on their roof – on average poorer people – subsidise the cost of grid access for richer people who have solar panels on their roof. This regressive redistribution will eventually have to change.

Carbon abatement areas such as electric vehicle subsidies can also be viewed as being unfair as most of the benefits go to high income households.

Overall, the social and environmental goal of the energy transition are closely connected. The greatest single impact of climate change is social, with estimates by the IPCC of between 25 million and one billion displaced people by 2050 as a result of climate change driven shoreline erosion, coastal flooding and agricultural disruption. Poor countries are expected to be disproportionately affected. So continued investments in renewable technologies are more likely to limit this widespread social risk.

**Companies that have the potential to win through the transition**

Looking at earnings streams rather than simply at a company level can provide a useful framework for considering how companies will fare amid the transition to renewables. Many companies must balance declining fossil-fuel based earnings and growing renewable investments. The market will foresee the end of life of fossil fuels well before revenues go to zero and that is reflected in company valuations.

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3 Source Capital Group analyst estimates
Renewables and conventional generation deserve different valuations because their growth prospects differ

UK power generation by technology

Companies with structurally declining earnings are seldom attractive long-term investments. Companies need to be forward looking and develop growth businesses. The impact of the energy transition places companies along a continuum: you have some pure-play companies that only have the upside of renewables and you have some traditional players that have the headwind of having to transition from fossil fuels and the tailwind of replacing them with renewables. All the big renewable developers today that are developing several gigawatts\(^5\) of fossil-based energy a year were once big polluting utilities, and they’ve been investing in developing renewables for over a decade.

One example is Denmark-based Ørsted, the largest developer of offshore wind farms in the world with 90% green share of heat and power\(^6\). The company was once a traditional utility dominated by oil and coal-powered plants, but over several decades reinvented itself to become a leading renewable energy company. What is important is for companies to build a skills base to develop renewables. The learning curve is steep and companies that will succeed in this transition are those who are able to adapt and adopt a serious approach with capital discipline.

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\(^4\) Estimates shown for illustrative purposes only. Sources: Eurostat for 2000-2018 data. 2019-2020 data are estimates from Ember/Agora

\(^5\) Net zero requires replacing roughly 145,000 terawatt hours (TWh) of fossil-based energy with renewables

\(^6\) Source: Ørsted
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