Recycling and waste-to-energy: turning ‘trash’ into treasure

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We've seen decades and decades of rising greenhouse gas emissions and we’re at a point where governments and companies around the world are looking for ways to reduce greenhouse gas emissions. We need to figure out how to decarbonise. We’re all familiar with current methods of decarbonisation like fossil fuel substitution, wind and solar farms, and replacing combustion engine vehicles with electric vehicles (EVs). It is widely touted that, to battle climate change and decarbonise, we’re going to need an ‘all of the above’ approach. So, what other technologies are at play?

Recycling for decarbonisation

A key area is recycling - let’s dive into this. As a society, we are currently operating on a linear model: we take natural resources, turn them into consumer-driven products, and then dispose of them. This isn’t sustainable. By transitioning to a circular model, where you take natural resources, make consumer products but then recycle them after use you can, essentially, return those resources back to their original form to be used again.

Creating this circular economy is paramount and there has been huge progress in this area, especially in chemical recycling. Let’s look at plastics as an example. One of the complicating factors with plastics is that there are different types of polyethylene plastics (high density, low density, traditional etc.) which means that, when you put them all together, it becomes very difficult to recycle. To combat this, certain companies are using different chemical methodologies to break down those plastics back to their original form. So, you take the raw plastic, break it down to its original form – back to the original ethylene (which is the raw material use in most plastics) – and then reuse that ethylene to make new plastics. Whilst the concept of recycling is not a new one, employing it on an industrial scale and ‘closing the loop’ in the manufacturing process of many consumer goods, can have a profound impact.

Waste-to-energy

There are four primary greenhouse gases: carbon dioxide, fluorinated gas, methane, and nitrous oxide. The former gets a lot of attention, but it is actually methane that has the biggest impact on global warming: methane is 25 times as potent as carbon dioxide at trapping heat in the atmosphere1. There’s a lot of naturally occurring methane from farm animals and waste, so what can we do about it? One solution is to produce renewable fuels, in particular renewable gas, from methane. Let me give you an example that shows how this not only creates a circular economy, but also decarbonises in a major way. There are landfill companies that are capturing the methane that their landfills are releasing and turning it into transportation

fuel in the form of natural gas. They can then convert their trucks to use that natural gas as fuel, replacing fossil fuel-based diesel. We call this ‘waste-to-energy’.

Another, perhaps better-known example is an approach taken by McDonalds in the Netherlands. McDonald's takes it’s used cooking oil and gives it to a company called Neste who turn that used cooking oil into renewable diesel. That renewable diesel then powers McDonalds’ trucks. This process saves a significant amount of carbon emissions and these examples of renewable natural gas and renewable diesel just scratch the surface.

Capturing future opportunities

Firstly, as the energy transition gains momentum and energy systems electrify, we’re going to see an increased need for batteries, especially for things like electric vehicles. That’s going to require a lot of lithium and a lot of cobalt. There are companies today that have patents in place to take EV batteries that don’t work, or don’t pass inspection, and break those back down to their original components in their factories. Here, the lithium, cobalt, and some plastic associated with the battery is recycled and reused. As EVs become more prevalent, we’re going to see increased demand for the recycling of EV batteries.

The second potential growth area is carbon capture and sequestration and the big factor here is infrastructure. You need infrastructure, like pipelines, to be able to capture the carbon and sequester it. There are companies that actually own carbon dioxide pipelines because they are the companies that can take the carbon dioxide that comes from facilities (like cement factories or steel factories), capture the carbon, run it through these pipelines, and sequester this carbon dioxide in an old oil well and prevent it from reaching the atmosphere again.

A lot of work is being done - in the US, in particular, there are some tax credits that are in place as part of the inflation reduction act that are going to really accelerate the pace of technology and direct air capture and carbon capture in general.

Conclusion

Decarbonisation is a global megatrend and, at TortoiseEcofin, we have identified over 3000 companies within the recycling and waste-to-energy investable universe. The growth potential in the energy space right now, for these type of stocks, is tremendous. I've been investing in the energy space for 30 years and the current opportunities in energy across the board are probably some of the most exciting that I've ever seen in my career. No one knows what the future holds, but we do know that global decarbonisation is a top priority and policymakers around the world are committing to targets to tackle climate change and protect our planet. With such a huge transformation happening, globally, there is a potential investment opportunity for investors to consider.

1 Source: United States Environmental Protection Agency, February 2023 (https://www.epa.gov/gmi/importance-methane#:~:text=Methane%20is%20more%20than%2025,due%20to%20human%2Drelated%20activities)

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