WASTE-TO-ENERGY AND IMPLICATIONS FOR DECARBONISATION EFFORTS

Christopher Gannatti – Global Head of Research, WisdomTree.
26 Apr 2022

Energy Solutions are a Spectrum, not a Perfect Answer

Electricity, in many ways, powers the world. Even as I type these words, there is a dependence on electricity to ensure that they show up on the screen and can be stored (hopefully not lost) in the cloud. But how is electricity generated?

There are many ways, but the common thread tends to be something needs to rotate, and as long as there is energy to keep the rotation going, there can be electricity. A common approach is that some process (nuclear power, natural gas, coal) is used to heat water into steam and then the steam is used to rotate a turbine.

One of the biggest debates of the day regards how to value the different trade-offs between the different ways of rotating these turbines. Wind has no carbon emissions, but it doesn't blow all the time. Nuclear generates heat with no carbon emissions, but it leaves radioactive materials. Fusion power has gotten some headlines of late and would generate no carbon AND no radioactive wastes, but in most cases it still requires more energy to be operated than it gives off for power generation.

As yet, no energy source is perfect.

The Waste-to-Energy Plant

While the idea of heating water to steam and rotating a turbine is the same as many other approaches, a waste-to-energy plant will use municipal solid waste as the fuel which would then heat the water to generate the steam. It is estimated that in the United States, for every 100 pounds of municipal solid waste, about 85 pounds can be burned as fuel that could generate energy. One of the primary benefits of this approach would be that 2,000 pounds of 'garbage' would be reduced to ash that would likely weigh between 300 and 600 pounds. The volume of the waste could be reduced by about 87%[1].

An important step for a waste-to-energy plant would be how the exhaust fumes would be dealt with. There could be different pollutants generated from the burning of municipal solid waste, but technologies do exist to filter the exhaust fumes. It is also the case that technologies do exist that could aid in reducing or removing the carbon emissions. Taking these technologies from 'existing' to being 'widely deployed' is a critical step on the journey if waste-to-energy plants will achieve wide adoption and limited controversy.

European Union (EU) Developments in the Waste-to-Energy Space

Data from the EU indicates that about 2.4% of the total energy supply in 2018 came from waste-to-energy plants. The average European is responsible for roughly 500 kilograms of municipal solid waste per year. There have been changes in legislation that have led to less use of landfills and more incineration of municipal solid waste. In 1995, roughly 32 million tonnes were incinerated, and this figure more than doubled to 70 million tonnes by 2018[2].

Energy generation from the burning of waste was the highest in Germany, but the United Kingdom, France, Italy and the Netherlands were also participating[3].

A Delicate Balancing Act within Waste-to-Energy

What is worse: burning waste to generate electricity and releasing carbon dioxide, or not burning waste but then needing to place the waste within a landfill? It is not a simple question.

The EU is seeking to become carbon-neutral by roughly 2050. The desire to phase out the burning of coal, oil and natural gas has been fairly clear. Whether or not there is also a phase out of waste-to-energy in relation to this could depend on whether there is a belief that there is less carbon emission from burning the waste than by letting it sit in an landfill.

It is also the case that the by products of incineration are not useless—they can be used in building construction. Waste-to-energy plants can operate 365 days per year, and they can help balance solar power and wind power, which we know do not generate power at all times. Currently, 18 million European citizens receive electricity and 15 million receive heat from these plants[4].

In 2019, EU-based incinerators emitted 52 million tonnes of carbon dioxide. It is possible that, over time, the carbon dioxide could be collected and used. In the Netherlands, a waste-to-energy facility in Duiven is supplying a local horticultural greenhouse with carbon dioxide to promote plant growth. One cannot say that all carbon dioxide is even close to being collected today, but the concept is quite interesting[5].

Conclusion: Carbon Neutrality will be a Journey

A brief look at power generation through the waste-to-energy process envisages a microcosm of the broader issues around climate change. A perfect solution—unlimited energy without any emissions or other wastes—is not yet accessible. As a society, we must choose how we value the other trade-offs. Waste-to-energy has drawbacks, but it also has positive elements—for example limiting the space needed in landfills. We look forward to continuing to see how the waste-to-energy space evolves and if the carbon dioxide being produced can be more effectively captured for actual, economic use.

Sources

[1] Source: www.eia.gov/energyexplained/biomass/waste-to-energy-in-depth

[2] Source: Hockenos, Paul. "Waste to Energy—Controversial power generation by incineration." Clean Energy Wire. 26 May 2021.

[3] Source: Hockenos, 2021.

[4] Source: Hockenos, Paul. "EU climate ambitions spell trouble for electricity from burning waste." Clean Energy Wire. 26 May 2021.

[5] Source: Hockenos, 2021.

Related blogs

+ Decarbonisation: Using Urgency to Create Action
+ Energy transition commodities: Riding the wave of new demand drivers

Related products

+ WisdomTree Energy Transition Metals (WENT)
+ WisdomTree Carbon (CARB/CARP)
+ WisdomTree Battery Solutions UCITS ETF - USD Acc (VOLT/CHRG)

View the online version of this article here.

Important Information

Marketing communications issued in the European Economic Area ("EEA"): This document has been issued and approved by WisdomTree Ireland Limited, which is authorised and regulated by the Central Bank of Ireland.

Marketing communications issued in jurisdictions outside of the EEA: This document has been issued and approved by WisdomTree UK Limited, which is authorised and regulated by the United Kingdom Financial Conduct Authority.

WisdomTree Ireland Limited and WisdomTree UK Limited are each referred to as "WisdomTree" (as applicable). Our Conflicts of Interest Policy and Inventory are available on request.

For professional clients only. The information contained in this document is for your general information only and is neither an offer for sale nor a solicitation of an offer to buy securities or shares. This document should not be used as the basis for any investment decision. Investments may go up or down in value and you may lose some or all of the amount invested. Past performance is not necessarily a guide to future performance. Any decision to invest should be based on the information contained in the appropriate prospectus and after seeking independent investment, tax and legal advice.

The application of regulations and tax laws can often lead to a number of different interpretations. Any views or opinions expressed in this communication represent the views of WisdomTree and should not be construed as regulatory, tax or legal advice. WisdomTree makes no warranty or representation as to the accuracy of any of the views or opinions expressed in this communication. Any decision to invest should be based on the information contained in the appropriate prospectus and after seeking independent investment, tax and legal advice.

This document is not, and under no circumstances is to be construed as, an advertisement or any other step in furtherance of a public offering of shares or securities in the United States or any province or territory thereof. Neither this document nor any copy hereof should be taken, transmitted or distributed (directly or indirectly) into the United States.

Although WisdomTree endeavours to ensure the accuracy of the content in this document, WisdomTree does not warrant or guarantee its accuracy or correctness. Where WisdomTree has expressed its own opinions related to product or market activity, these views may change. Neither WisdomTree, nor any affiliate, nor any of their respective officers, directors, partners, or employees accepts any liability whatsoever for any direct or consequential loss arising from any use of this document or its contents.