Most businesses currently operate in the linear economy. Mining and drilling companies exhaust natural resources to supply raw materials to the manufacturing sector. Manufacturers strive to produce goods on a mass scale to reduce their production costs. Products are then distributed to retail outlets to be purchased by customers. At the end of their life cycle, products are either wasted at the expense of the environment or partly recycled with an average recycling rate of 45%, according to recyclingbins.co.uk. The linear economy model is not sustainable, as natural resources will be depleted at some point in the future, at the expense of businesses and consumers. A transition to the circular economy can reverse this trend.

The circular economy is an economic system aimed at eliminating waste and the continual use of resources. It employs remanufacturing, reuse, sharing, repair, refurbishment and recycling to create a closed-loop system. This minimises the use of resources and the creation of waste, pollution and carbon emissions. For instance, instead of mining, companies can process waste and transform it into raw materials. This approach helps the environment by reducing waste while also lowering input costs. To put this into context, the Electricity Production industry generates approximately 46.4% of electricity by burning fossil fuels. Most fossil fuels are ultimately sourced from the Crude Petroleum and Natural Gas Extraction industry. Although the Oil and Gas Authority estimates that the United Kingdom has enough oil reserves to sustain production over the next 20 years, the BBC claims that these natural resources are bound to be depleted in the long term. However, the Waste-to-Energy (WTE) Plant Operation industry can come to the economy’s rescue.

WTE plants convert solid waste into electricity and/or heat by burning waste at high temperatures and using the heat to make steam. The steam then drives a turbine that creates electricity. In addition, the plants reuse the waste derived from their operational processes. Moreover, waste combustion in WTE facilities does not generate methane as landfills do. According to the United Nations Environment Programme’s 2019 WTE report, thermal WTE can reduce the volume of waste entering landfills by 75-90%. For each tonne of municipal solid waste incinerated in a thermal WTE plant, the equivalent of 1,010 kilograms of CO2 can be avoided by diverting waste from landfills without methane gas utilisation, while reducing reliance on fossil fuel power.
generation and the associated emissions. Although greenhouse gases such as CO2 are emitted from waste incineration, thermal WTE plants with advanced emission control technologies have minimal impact on public health compared with fossil fuel power plants.

Electricity producers can redirect their investment from fossil fuel-burning power plants to WTE plants in order to ensure an abundant supply of electricity in the long term as there will always be waste to burn. According to the Confederation of European WTE Plants, up to 50 million tonnes of emissions of CO2 are avoided in Europe annually, as WTE recovers about 39 terawatt hours (TWh) of electricity and 90 TWh of heat from waste, saving up to 50 million tonnes of imported fossil fuels that would have been used in conventional power plants. Preliminary investments in WTE plants will ensure that when natural resources are depleted, industry operators will be able to smoothly complete their transition to the circular economy by producing energy from an abundant supply of waste. For WTE plants, electricity producers would need to source waste from operators in the Non-Hazardous Waste Collection industry instead of sourcing from operators in the Crude Petroleum and Natural Gas Extraction industry, substantially reducing their input costs at the expense of the latter.

However, such a transition does not come without its challenges. On the supply side, electricity producers have established operational processes that took years to develop. WTE projects would require these operators to alter their project life cycles and regulatory compliance processes, as well as re-train their engineers to ensure proper functionality and maintenance. Therefore, firms could be reluctant to adopt new operational processes that could prove to be costly. According to Waste to Energy International, the cost of a WTE plant that handles 40,000 tonnes of waste per year would be £800 per tonne, amounting to £32 million annually. However, the cost per tonne of annual capacity drops alongside increasing capacity. There are also regulatory factors that would need to be taken into account, such as the Feed-in Tariff. Another challenge that is likely to occur concerns the shareholders in the Electricity Production industry that have invested into fossil fuel-burning power plants that take years to break even. With their capital being tied to such investments they might be reluctant to invest in WTE plants. On the demand side, consumers would need to incentivise electricity producers to adopt a circular supply chain by purchasing electricity only from those that have invested in circular initiatives. Although there are challenges to and costs for adoption, a WTE plant can substantially reduce costs for electricity producers. Further, adopting this circular approach would contribute towards minimising the use of natural resources and the creation of waste.
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