Aegon Asset Management

COMMODITIES AT WAR SERIES: SHORTAGE OF NEON GAS DIMS TECH OUTPUT

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Higher prices supported by a considerable percentage of global production coming from Russia and Ukraine have caught many commodities in the crosshairs of the Russia-Ukraine war. Concerns are growing over the ability to source these commodities from outside of Ukraine and Russia. In this series, we explore the implications of the war on specific sectors and the possible ripple effects that may potentially be felt throughout other industries.

Neon gas

One commodity negatively impacted by the war is neon gas, a key input used in the semiconductor process. Bulk neon gas is a byproduct of the steel industry (primarily the Russian steel industry), which is captured and filtered to achieve 99.9% purity. Neon gas is an essential input to support lasers used in deep ultraviolet lithography (DUV), the process used to etch silicon wafers creating the foundation of a microchip. It's estimated that 80% of semiconductors currently being manufactured use neon gas. Semiconductor managers are hesitant to replace neon gas with new sources, as the manufacturing process typically takes six months of adjustments to get production back to optimal levels.

It is difficult to get an accurate estimate of the amount of neon gas sourced from Ukraine and Russia which is used in the semiconductor process, but industry experts suggest as high as 70% and as low as 25%. The range is somewhat large due to the historical conflict between Russia and Ukraine as chipmakers intentionally looked for new alternative sources outside of the region following previous neon gas disruptions caused by Russia's invasion of Crimea in 2014. During the invasion of Crimea, neon prices soared to around 600%, according to Ars Technica. Because of this, chipmakers may be better prepared this time.

Multiple disruptions in the production of neon gas have created opportunities for new suppliers to enter the market, the largest producer being China. The majority of China's supply supports Asian chipmakers. Some experts believe chipmakers in the US and Europe are more at risk of neon shortages in the near-term, as an estimated 70% of its neon gas is still being sourced from Eastern Europe.

Multiple chipmakers have publicly stated that over the near-term, production will not be impacted by the Russia-Ukraine war, as management teams have built neon gas inventories ranging from three to six months. It should also be noted that older/legacy nodes (older technology) and newer nodes (EUV) do not require neon gas, so depending on the end-market, it is possible that neon gas shortages would have little to no impact. That said, it has been reported the largest Ukraine producers of neon gas have halted production.

Unlike in the past, the semiconductor Industry could be less dependent on Ukraine for neon gas. However, the country still represents 25% of the total neon gas market. Therefore, if the war continues and/or equipment is destroyed, it will likely have a significant impact on the supply chain within the next six to nine months. Possible neon gas shortages, coupled with increasing Covid-19-related shutdowns in China, make it less likely the semiconductor supply chain will be able to meet the ongoing elevated demand anytime soon.

If neon gas reaches shortage status, large, well-known companies would likely experience little impact; however, the smaller customers (less frequent production runs/smaller volume) will be cut to support larger customers. From a consumer perspective, we believe the shortage of neon gas and subsequent price increase will likely have a minimal impact on overall end-market pricing (i.e., laptops); however, there could be significantly lower production of certain chips creating greater supply shortages to some industries like automotive.

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