



INSIDE THIS ISSUE

Electrical Substations

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Core Inflation Rate (YoY) – Oct 24

USA	3.3%	China	0.2%
Europe	2.7%	UK	3.3%
Singapore	2.8%	Thailand	0.77%
South Korea	1.7%	UAE	2.38%
Japan	2.4%*	Australia	3.5%*

* Sept 24

Source: Trading Economics

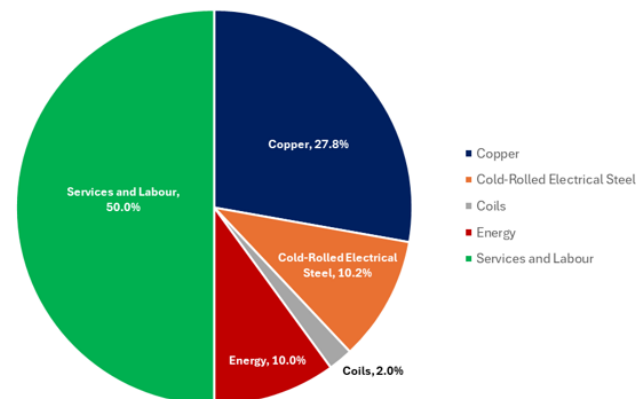
Major Components

- **Transformers:** Step down high voltage from transmission lines to a safer and more manageable level for distribution. This allows for efficient power delivery over shorter distances.
- **Circuit Breakers:** Monitor current flowing through the system and they automatically trip the flow if it exceeds safe levels.
- **Switches:** Isolates specific sections of the grid for maintenance or repairs without disrupting power delivery to other areas.
- **Capacitor Banks:** Correct the power factor lag and phase shift in AC power supply.
- **Busbars:** Distributes electrical power from incoming feeders to outgoing feeders.
- **Protection Relays:** Monitor various parameters such as current and voltage. If they detect an abnormality, they will send a signal to trip the circuit breaker.

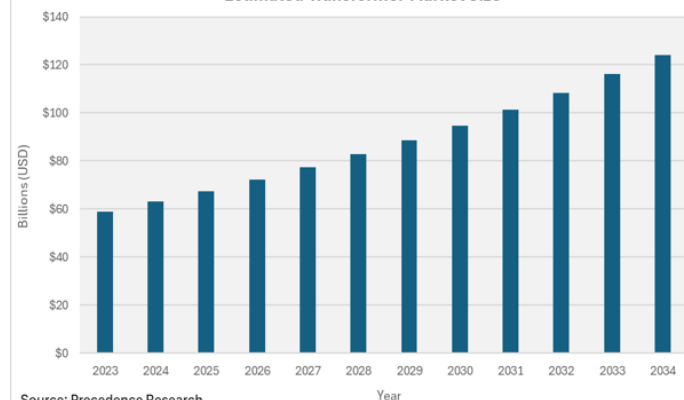
Transformer Delivery Concerns

- According to Wood Mackenzie, the lead time for power transformers and generator step-up (GSU) transformers has surged from 120 to 210 weeks and the price of transformer has increased 60% to 80% between first quarter of 2020 and fourth quarter of 2023.
- According to Precedence Research, the global estimated transformer market will reach 124 billion USD in 2034, expanding at a CAGR of 7% annually

Capital Cost Breakdown for a Typical Dry-Type Transformer

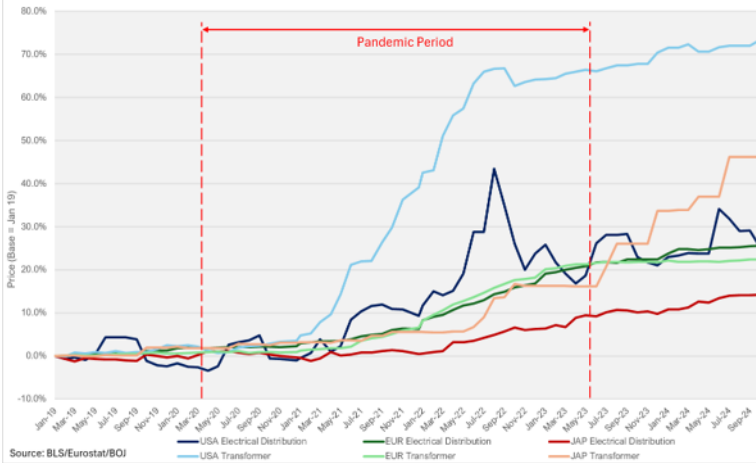


Estimated Transformer Market Size

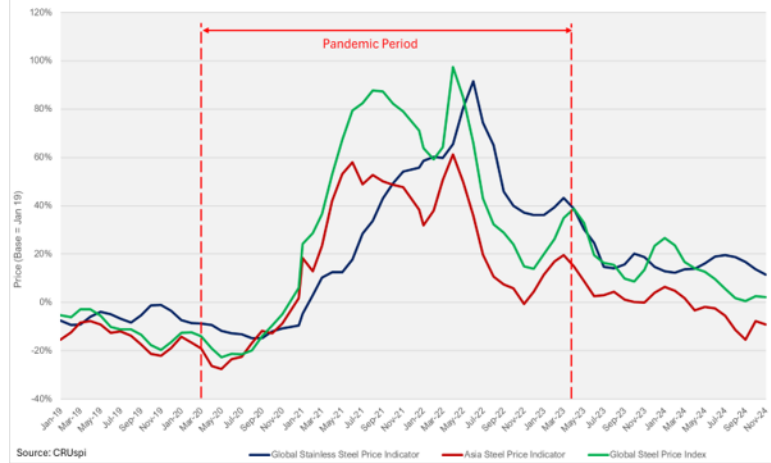


Source: Precedence Research

Electrical Distribution and Transformer Price Indicators



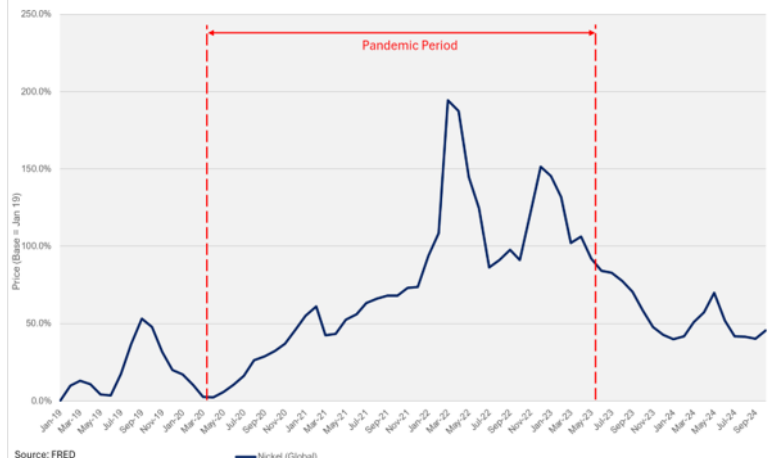
Global Stainless Steel and Steel Price Indicators



Aluminium Price Indicators



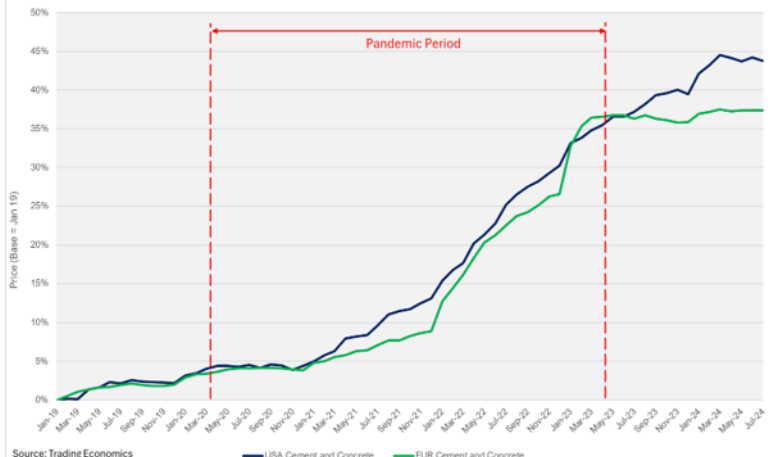
Nickel Price Indicators



Copper Price Indicators



Cement and Concrete Price Indicators



Transformer Delivery Concerns

- Steel, aluminium, nickel, copper, cement and concrete are the main commodities used in constructing an electrical substation
- Global Steel price has marginally increased 2% in Nov 2024 as compared to Jan 2019
- Aluminium price has increased 40% from Jan 2019 to Nov 2024
- Nickel price has increased 45.5% from Jan 2019 to Oct 2024
- Copper price has increased 50.4% from Jan 2019 to Nov 2024
- Cement and concrete prices have increased 43.7% in United States and 37.4% in Europe from Jan 2019 to Jul 2024



Higher demand, supply chain issues and the increase in raw material prices has caused the price and lead time for electrical distribution to rise dramatically

Electrical Machinery & Equipment



Price

Market Forces

Low Supply

Lack of Skilled Labour

High Demand

Supply Chain Issues

Inflation

The Future of Substations

The traditional substation, a vital component of a power grid, is entering a new era. Western Sydney, Australia, is an example. With the digital transformation of its main substation for the new airport, it is a showcase of the future of substations.



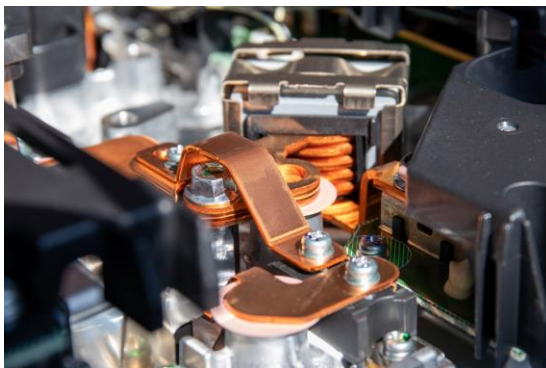
A digital substation is a substation that has had its secondary system digitalised by replacing most of the analogue secondary circuits between the instrument transformers and protection relays with digital ones. Secondary equipment is equipment that controls, regulates, protects, and monitors primary equipment.

This Era Will Deliver

Smaller Footprint: Digital technology can reduce the physical size of substations due to less complex wiring and smaller control rooms. It has been suggested by an established OEM that copper cable reduction can be up to 80%, which is validated by them that there is a significant reduction in copper cables as they are replaced with a few fiber optics cables.

Remote Monitoring and Control: Operations can be monitored and controlled remotely, reducing worker exposure to potentially hazardous situations.

Faster Fault Detection: Real-time monitoring allows for quicker identification and response to grid issues, minimising outages and improving power reliability.



The information in this newsletter does not constitute valuation advice. For specific valuation advice, please contact us at enquiries@johnfoord.com