

Supply Chain Disruption Outlook and What to Do About It

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**LARGE COMPANY
CEO ROUNDTABLE**

Agenda

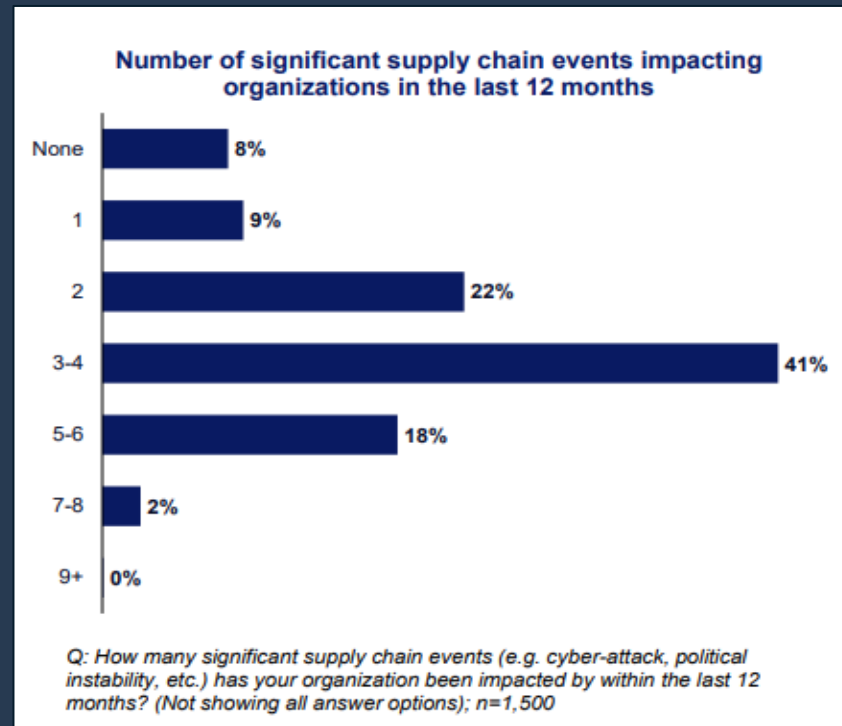
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- ▶ Russia Sanctions Impacts, Way Ahead
- ▶ Additional Imposed Risk
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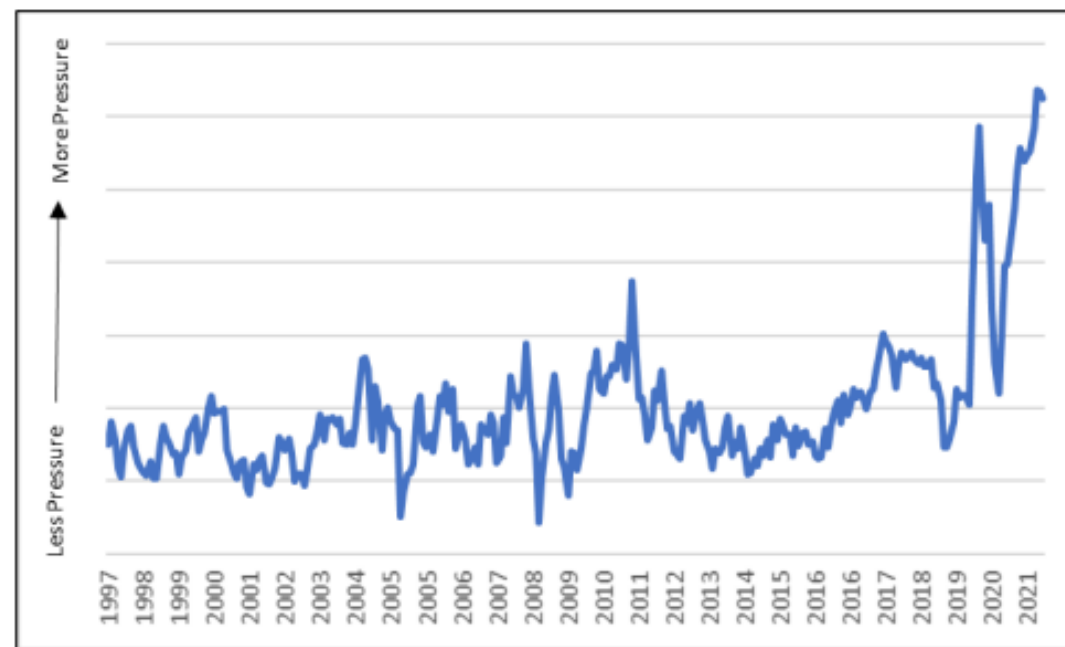
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Disruption Outlook



- Supply chain disruption continues to be a significant, costly risk.
- In 2021, organizations on average were impacted by **three significant supply chain disruptions** during the past year costing, costing a combined **\$182 million in lost revenue, or about 1.74%** of their annual revenue

Figure 1. Global Supply Chain Pressure Index
September 1997 to December 2021



Source: Federal Reserve Bank of New York.

- Rates of disruption increased in 2021 worldwide as a result of a wide variety of risk events:
 - computer chip shortages
 - port congestion/logistics impediments
 - ongoing impacts of COVID-19
 - Sanctions impacts
 - Geo-economic tensions and instability
 - Environmental factors

Disruption Drivers



Internal

- Financial failure of key suppliers
- Single sourcing or diminishing suppliers for critical materials
- Limited supplier risk visibility
- Reliance on analog tools
- Labor skills shortages
- Poor risk management frameworks

Internal drivers are usually under your control, can be detected and tracked using supply chain risk analytics tools, and are typically more manageable.



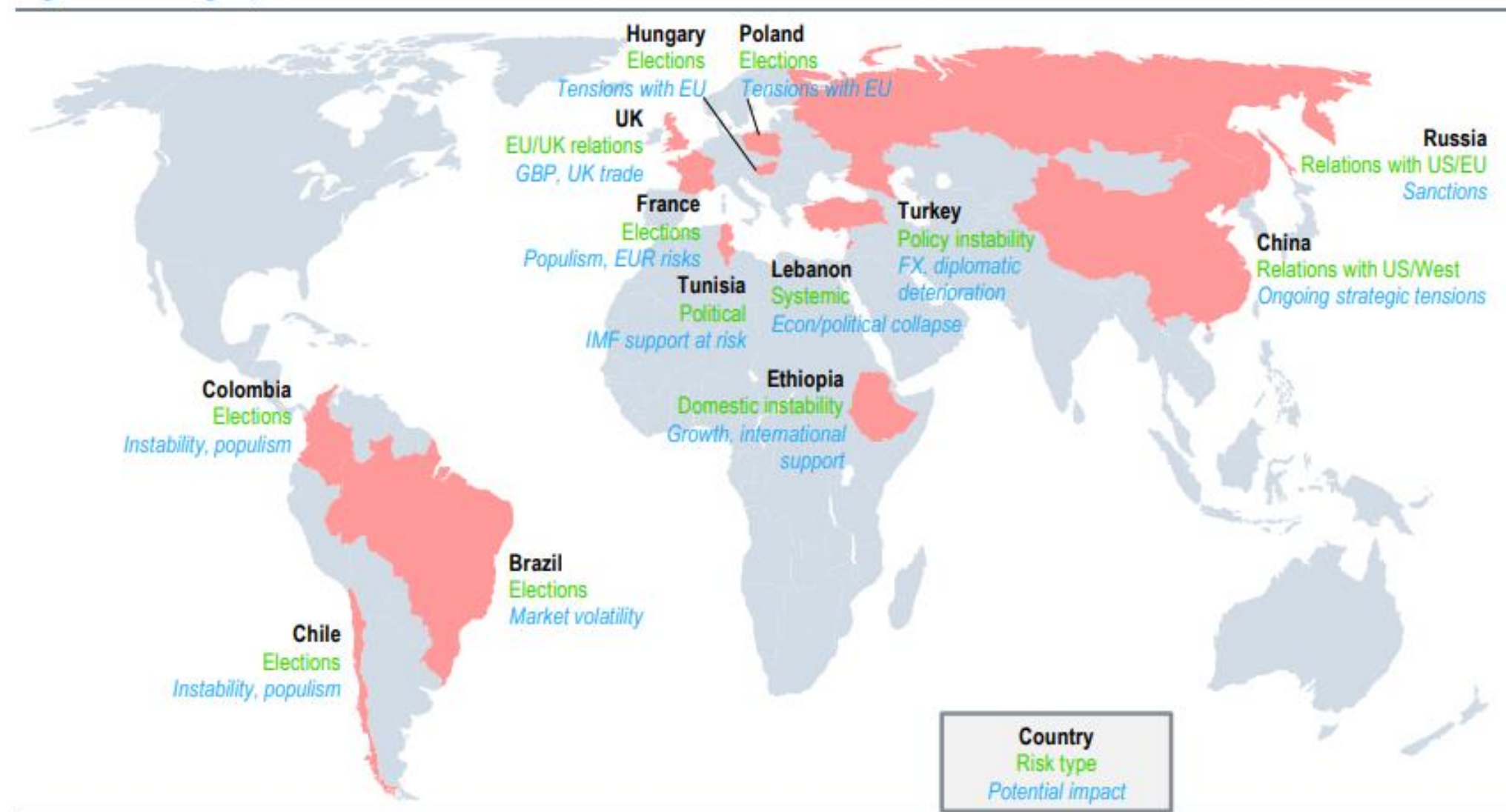
External

- Natural disasters
- Catastrophic Weather Events
- Public health issues
- Global political or government changes
- Regulatory and compliance environment
- Trade wars
- Commodity variability

External drivers are more difficult to predict and often require additional resources to overcome.

External Risks

Figure 1: 2022 geopolitical risks



Source: Standard Chartered Research

- Geopolitical/Geo-Economic Risk- Deteriorating relationship with China
- Sanctions/Regulatory Risk- Fallout from current Russia-Ukraine Conflict
- Additional Environmental Factors

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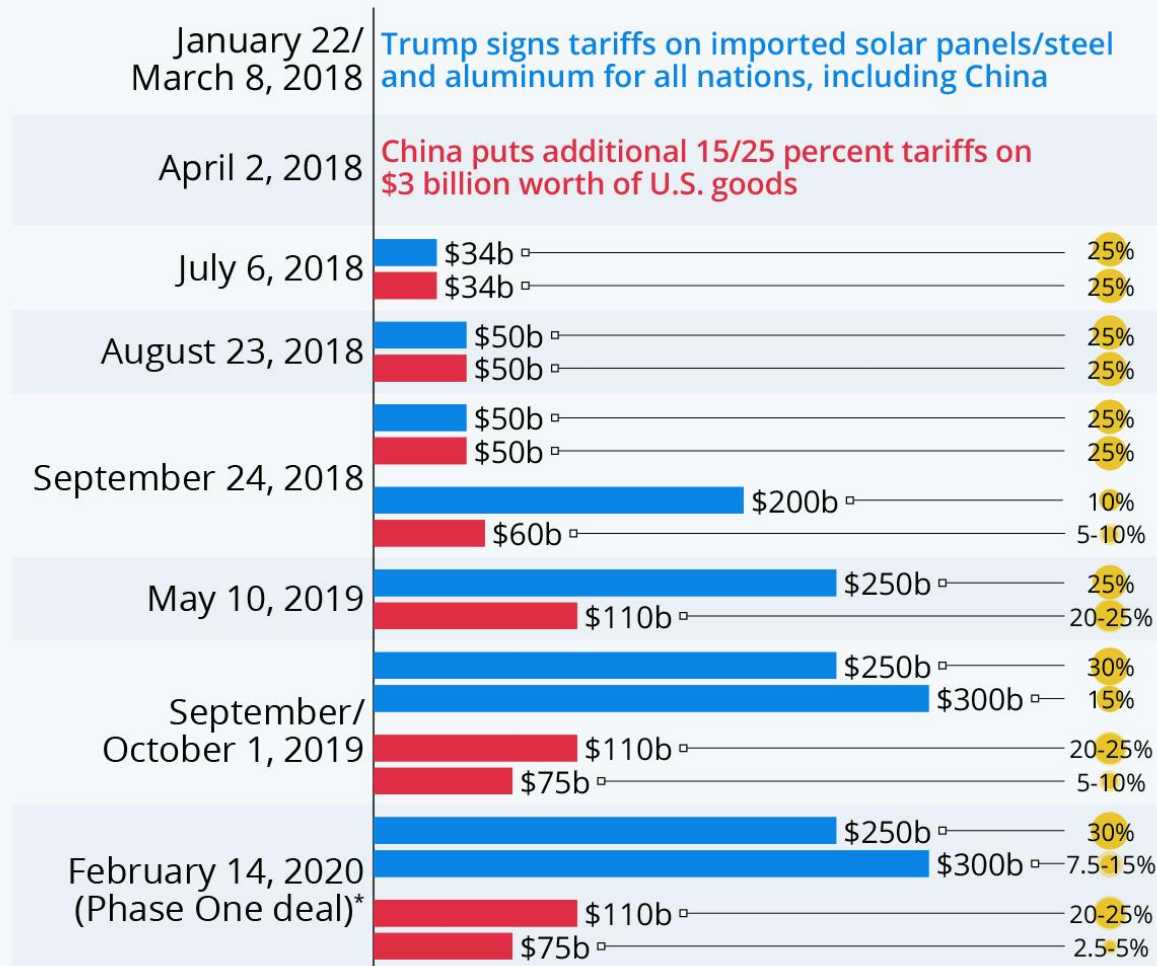
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US-China Relations

U.S.-China Trade War: A Timeline

Cumulative tariffs between the U.S. in China in 2018-2020

■ US tariff action ■ Chinese tariff action ● Tariff rate



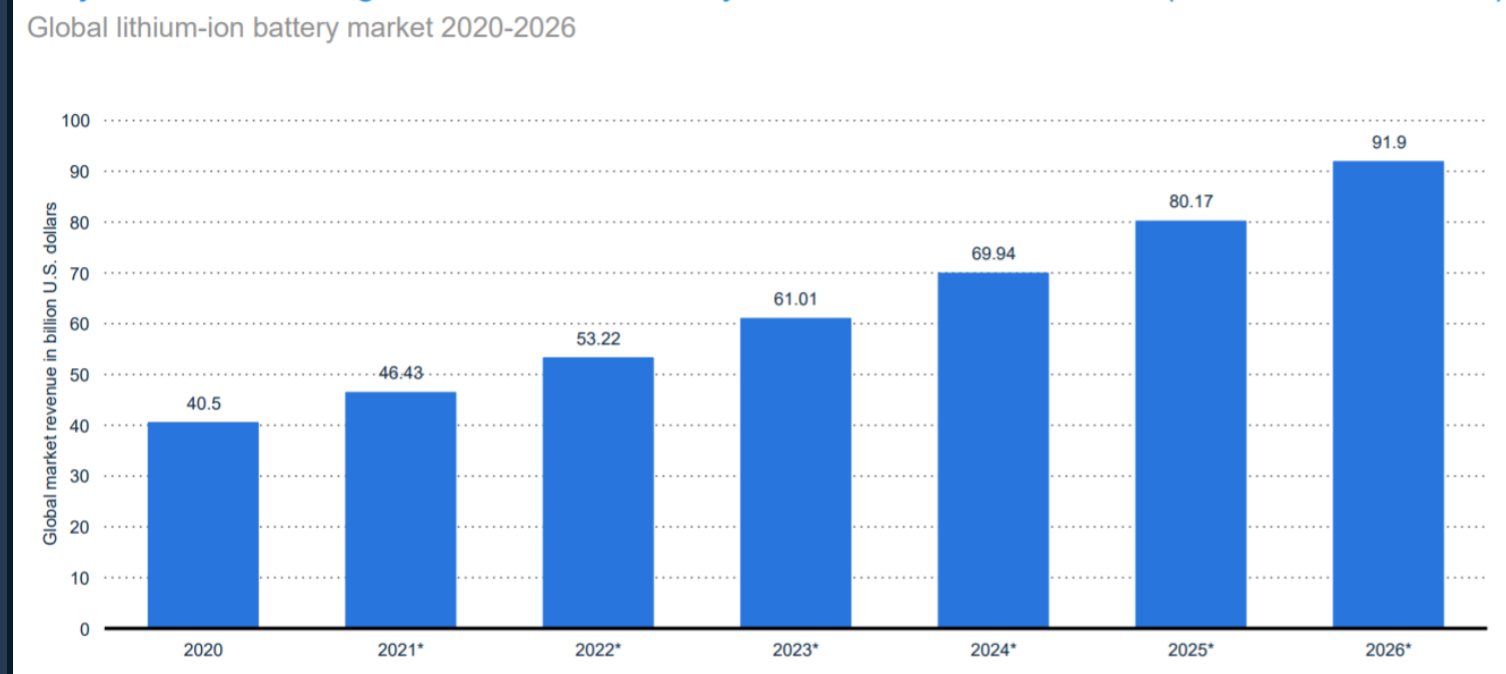
* China/the U.S. have also been accepting tariff exemption applications for a range of products

Source: Media reports

- Changes to US-China relationship affect global flows of data, people, and capital- all impacting supply chain
- Two primary scenarios:
 - Strategic Competition- China and the United States using restrictive trade practices to gain advantage in high-tech industries
 - Decoupling- contentious reduction in interdependence is more urgently pursued across most industries.

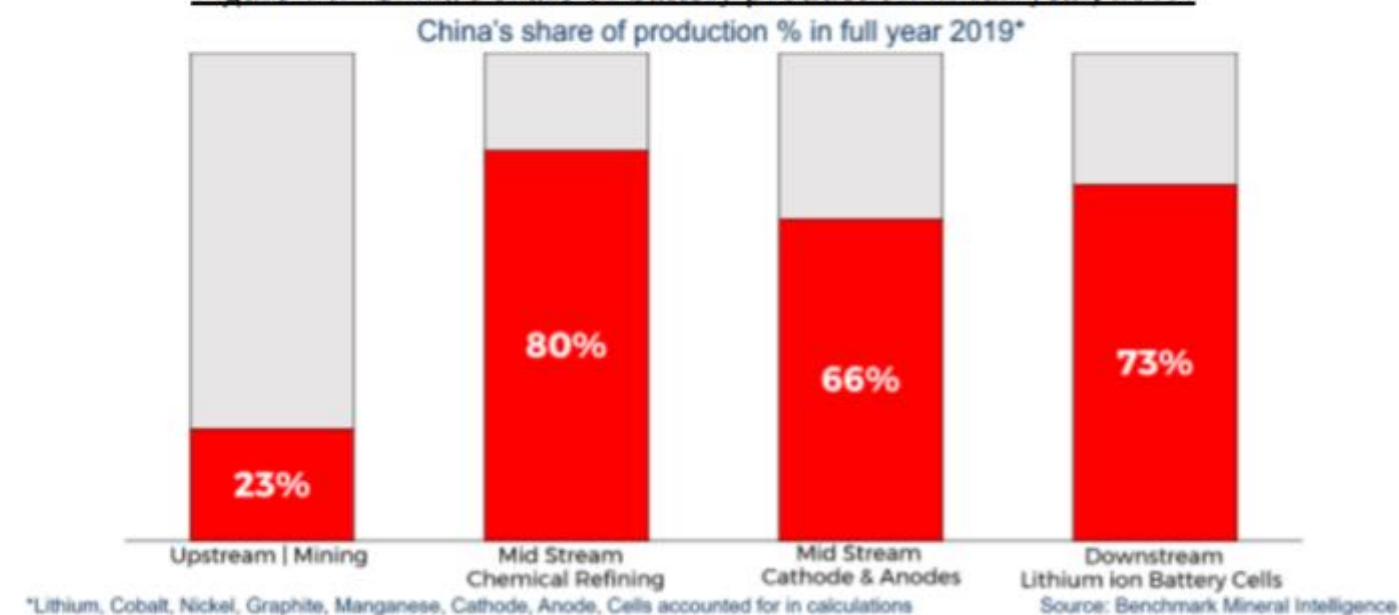
Example- Li-ion Batteries (1 of 2)

Projected size of the global lithium-ion battery market from 2020 to 2026 (in billion U.S. dollars)



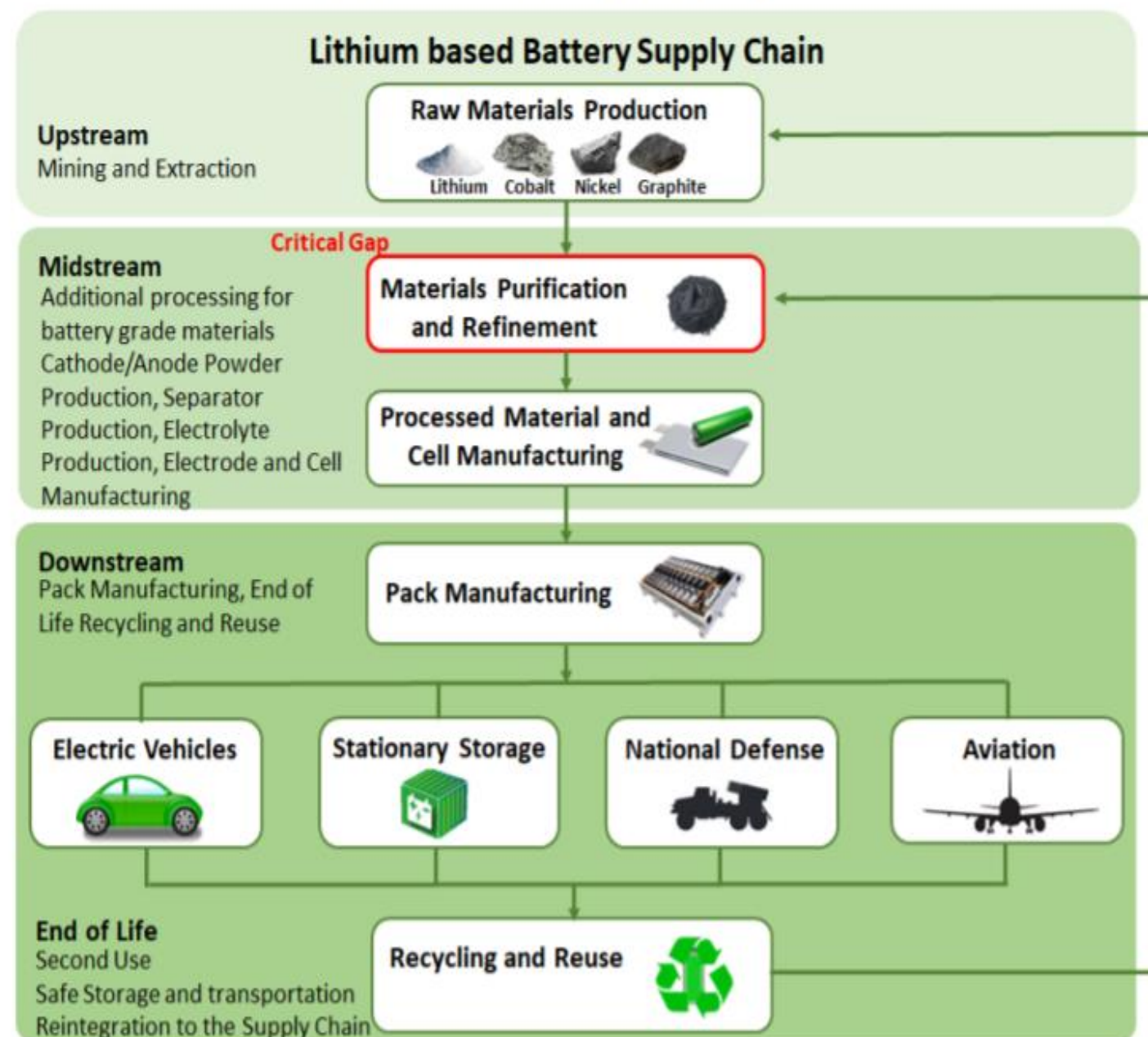
- China is dominant at **all stages of the lithium-ion battery supply chain**. It controls most of the production for midstream processing, downstream cell manufacturing, and end-of-life recycling, and has made aggressive moves to acquire upstream mining assets globally.
- China could disrupt supply and abuse its leading market position to harm U.S. industry and interests.
- Given that it controls key stages of the supply chain, China can also hoard supplies if expected shortages for key inputs like cobalt and nickel come to fruition in the coming years.

Figure 14. China's share of battery production in full year, 2019.¹¹⁴



Example- Li-ion Batteries (2 of 2)

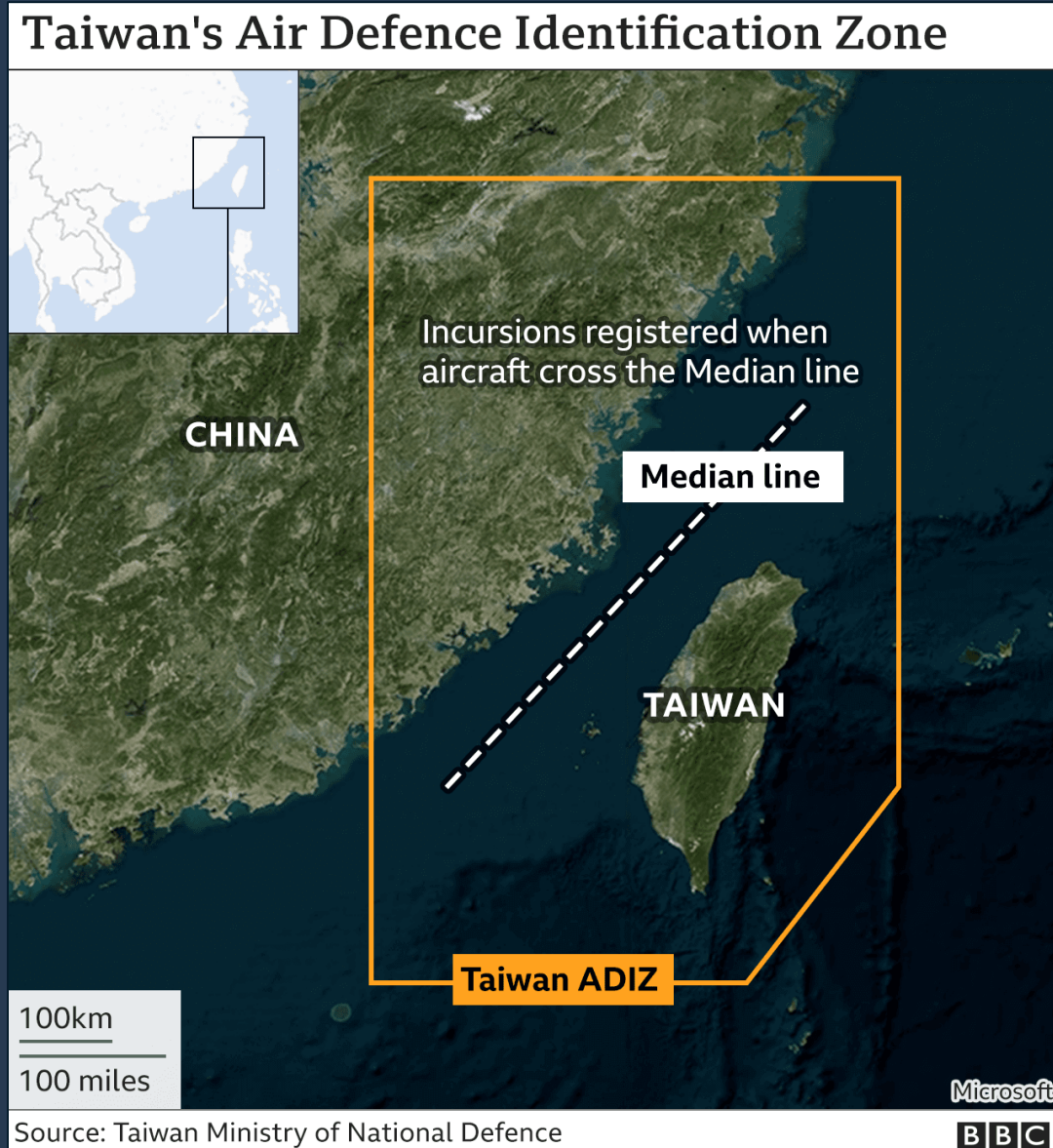
Figure 3. Lithium-Based Battery Supply Chain



Source: DOE Vehicle Technologies Office (VTO)

- Though a combination of **aggressive mergers and acquisitions, partnerships, and anti-competitive market practices**, China dominates all aspects of the Li-ion battery supply chain.
- China is well placed to **use its dominance** of both the supply and demand side of the battery supply chain to engage in anti-competitive behavior that **could disrupt and harm U.S. industry**.
- China not only uses its dominance to manipulate the market but has also weaponized it against adversaries.

China-Taiwan Tension & Advanced Chips



How the Computer Chip Shortage Could Incite a U.S. Conflict With China

A war game and study by a think tank illustrate how dependent the world is on Taiwan's semiconductor foundries.

- Today, Taiwan hosts 63 percent of global foundry revenue and produces 92 percent of the world's most advanced chips
- U.S. designs most of the world's most complex chips, but disproportionately contracts with foreign firms to manufacture them, **primarily in Taiwan.**
- US believes that "China wants the ability to invade and hold Taiwan within the **next six years** but might not intend to do so in the near term" based on a speech by President Xi that challenged the People's Liberation Army to accelerate their modernization programs to seize Taiwan from 2035 to 2027.

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Russian Sanctions Impacts

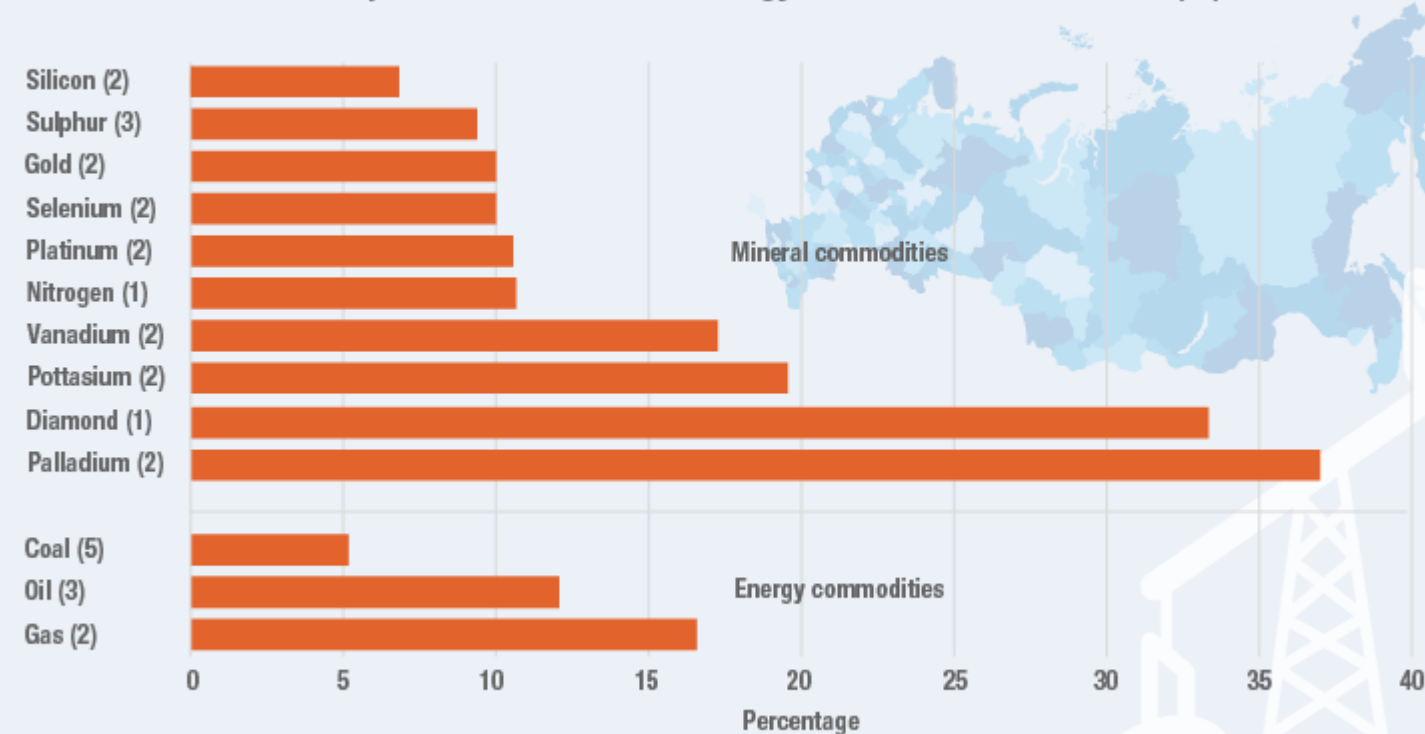


- In the aftermath of its invasion of Ukraine on February 24, 2022, Russia has faced over 2,700 new global sanctions, surpassing Iran as the most-sanctioned country in the world.
- The Russian economy could shrink by as much as 7%; inflation could rise as high as 19%
- The European Union is dependent on Russian energy imports for
 - 40% of their collective gas needs
 - 27% of oil imports
 - 46% of imported coal

Russian Sanctions Impacts- Way Ahead

Russia's top positions in energy and mineral production will exacerbate global supply chain pressures

Russia's production of selected energy and mineral commodities (%)



Notes : Figures indicate percentage of world total. Data on energy commodities as of 2020 and mineral commodities as of 2021. Figures in brackets denote Russia's position globally against other producers.
Source: TABInsights, BP Statistical Review of World Energy, US Geological Survey of Mineral Commodities

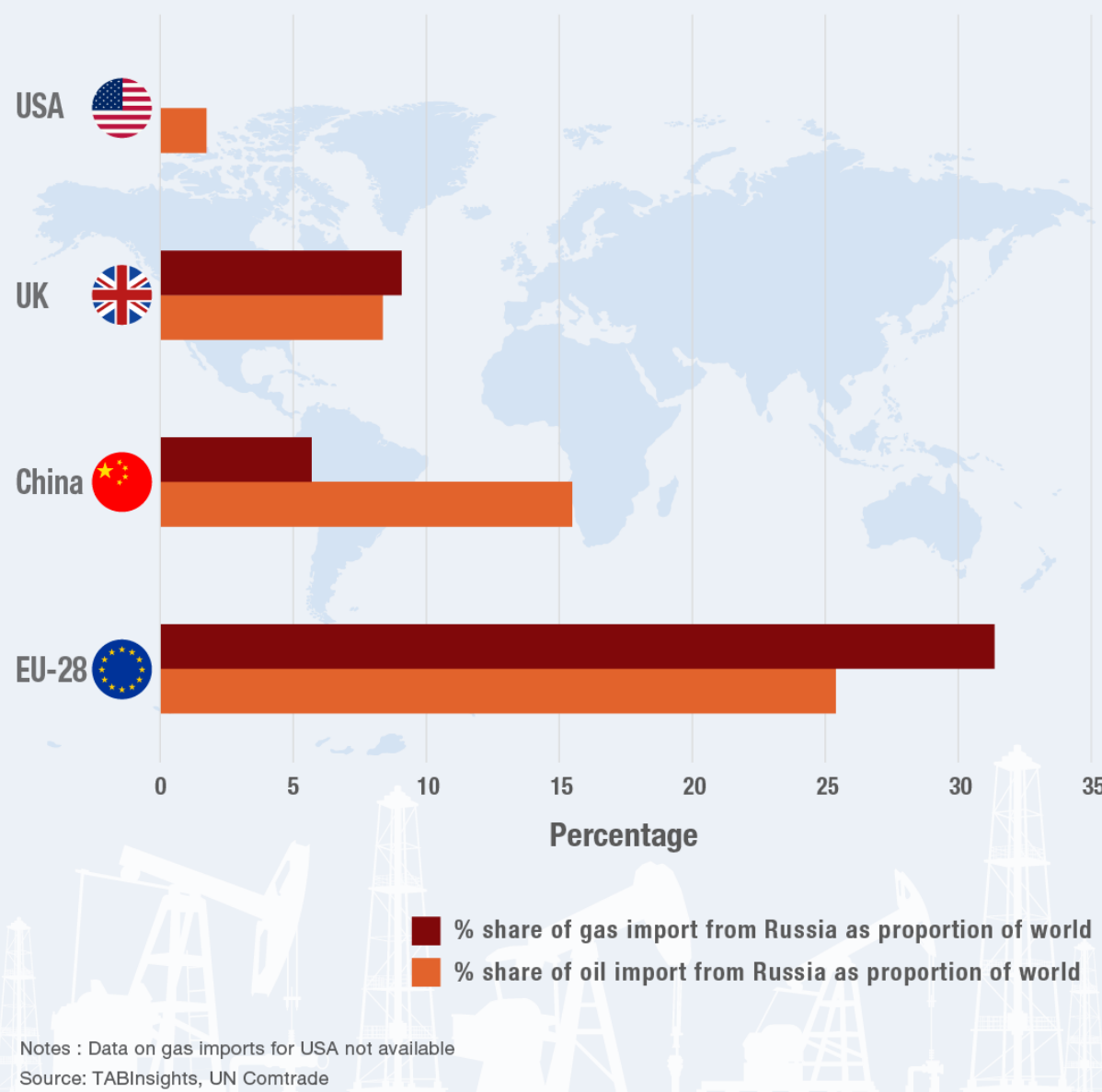
Ukraine has asked for support to “end the conflict by 2023” but analysts believe this is unlikely, and the current war of attrition is likely to last for several years.

- Russia's dominant role in global energy, industrial metals and soft commodities supply has already pushed commodity price inflation to the highest levels since around 1960.
- Slow global growth, rising oil prices, and rising commodity inflation. Significant energy supply disruptions.
- Disruption of traditional freight routes (highlights need for flexibility in logistics ops). Exacerbated pressures from COVID-19 closures like port congestion, container shortages, long lead times, and record high ocean freight rates.

Energy Crisis in Europe

EU, China and UK have significant oil and gas exposures to Russian suppliers

Figure 2: Selected countries import of Russian oil and gas as percentage of world's total (%)



- Heightened energy prices may drive numerous companies out of business and shutter entire European industries, a byproduct of Russia weaponizing Europe's energy dependence.
- U.S. energy prices will rise this winter as we divert liquid natural gas (LNG) to Europe to help compensate for Russia's absence.
- Efforts to transition away from oil/gas run into separate issues:
 - Critical energy transition materials including copper, lithium and rare materials used to make clean energy technologies have already been affected by supply chain disruptions.
 - China has been named a 'gatekeeper' to the energy transition as it produces a large share of the materials needed

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Additional Imposed Risk



- **Extreme weather and natural disasters** jeopardize the supply chain's ability to function normally.
- **Earthquakes, floods, wildfires,** and severe hot and cold temperatures can all hamper the movement of goods through the supply chain.

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Mitigation Outlook

- External risks are extremely difficult to predict and equally difficult to respond to.

Proactive Risk Framework

- Predictive datasets
- Continuous evaluation/ risk assessment
- Maturity Model

Transparency/ Visibility

- Map impact of geoeconomic conditions on sub-tier suppliers
- Regulatory compliance at all SC levels

Agility

- Take action early
- Stakeholder buy-in
- Realistic scenario planning

Resilience & Diversification

- Onshoring
- Diversify suppliers regionally
- Emerging Market Investment

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Questions

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