

# Coatings In Europe Trends and Perspectives



CEPE 2022

Presented By: The ChemQuest Group, Inc.  
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# Main Market Trends

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# Global Economic Outlook—IMF Global Growth Projection

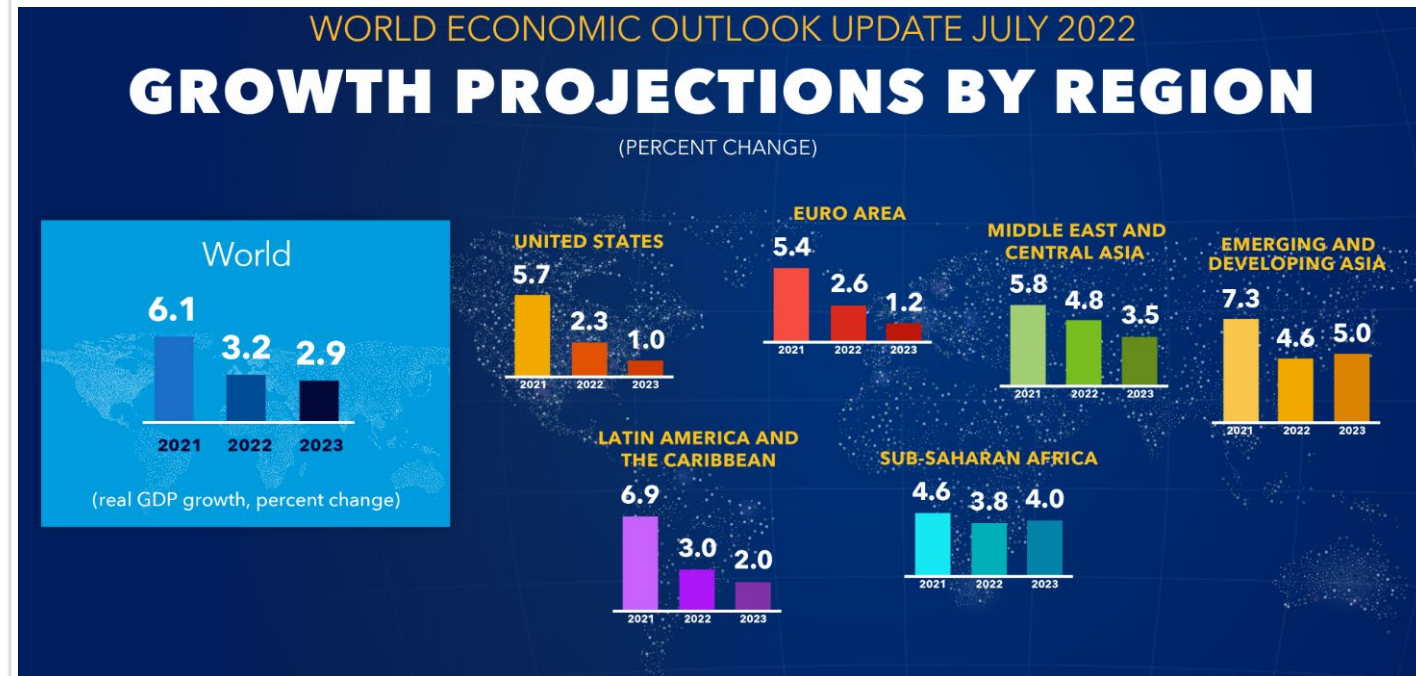
A tentative recovery in 2021 has been followed by increasingly gloomy developments in 2022 as risks began to materialize. Global output contracted in the second quarter of this year, owing to downturns in China and Russia, while consumer spending undershot expectations.

Several shocks have hit a world economy already weakened by the pandemic:

- **Higher-than-expected inflation worldwide**—especially in the United States and major European economies—triggering tighter financial conditions;
- A worse-than-anticipated **slowdown in China, reflecting COVID-19 outbreaks and lockdowns**;
- And further negative spillovers from the **war in Ukraine**.

The baseline forecast is for **growth to slow from 6.1% last year to 3.2% in 2022**, 0.4% point lower than in the April 2022 World Economic Outlook.

- Lower growth earlier this year, reduced household purchasing power, and tighter monetary policy drove a downward revision of 1.4% points in the United States.
- In China, further lockdowns and the deepening real estate crisis have led growth to be revised down by 1.1% points, with major global spillovers.
- In Europe, significant downgrades reflect spillovers from the war in Ukraine and tighter monetary policy.



# Conflict in Ukraine

## GAS

- Europe depends on Russia for 40% of its gas
- Record shipments of liquified natural gas (LNG) to Europe so far in 2022
- Russia insist of gas payments in Russian Ruble and threatens with supply cut, Poland and Bulgaria did reject
- Russia resumed flows through Nord Stream I pipeline, but at reduced levels
- EU plan calls for a 15% cut to consumption, industry may face much higher reductions

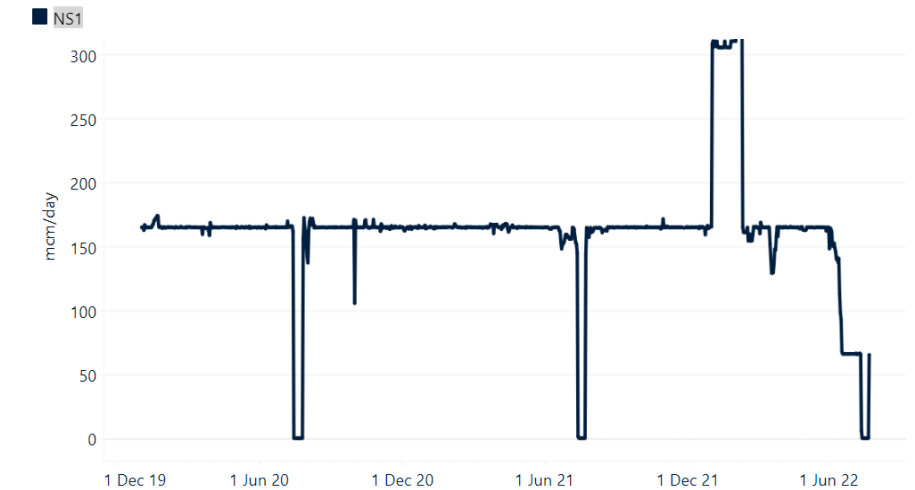
## OIL

- Friendship oil pipeline flows through Ukraine
- Russian oil feeds around a quarter of Europe demand
- Oil prices could spike to triple digits in wider conflict
- EU is implementing an (partial) oil ban against Russia
  - Around half of Russia's 4.7 million barrels per day of crude exports go to the EU, supplying about one-fourth of the EU's oil imports in 2020.
  - Druzhba pipeline is taken out of the decision
  - Some economists have warned, however, that it could have the effect of helping Moscow in the short term, as Russia benefits from high prices

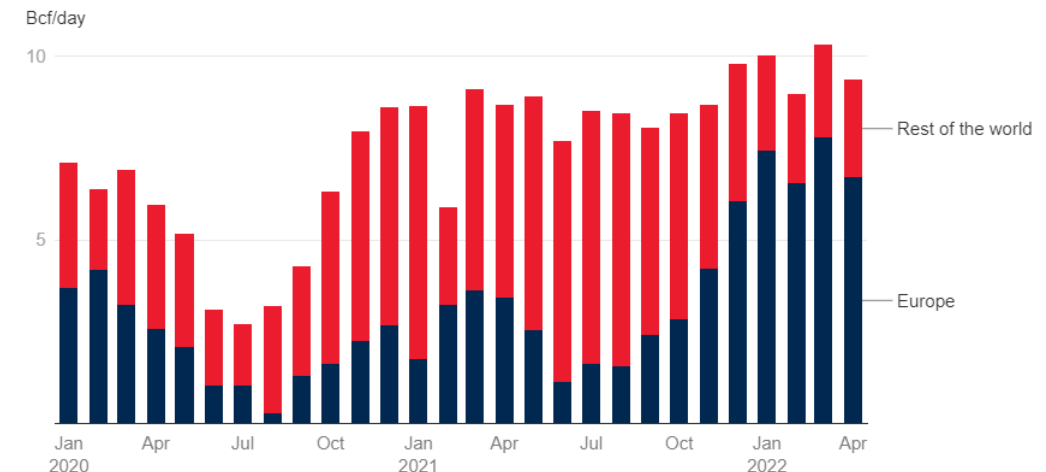
## CHEMICALS

- High Europe gas and electricity prices force energy surcharges
- Soaring oil prices dent chemical producer margins
- Elevated oil prices dent consumer confidence and demand
- BASF says it will have to close Ludwigshafen site if gas supplies fall below 60% for a prolonged period

Russian gas flows via Ukraine, Poland and NS1

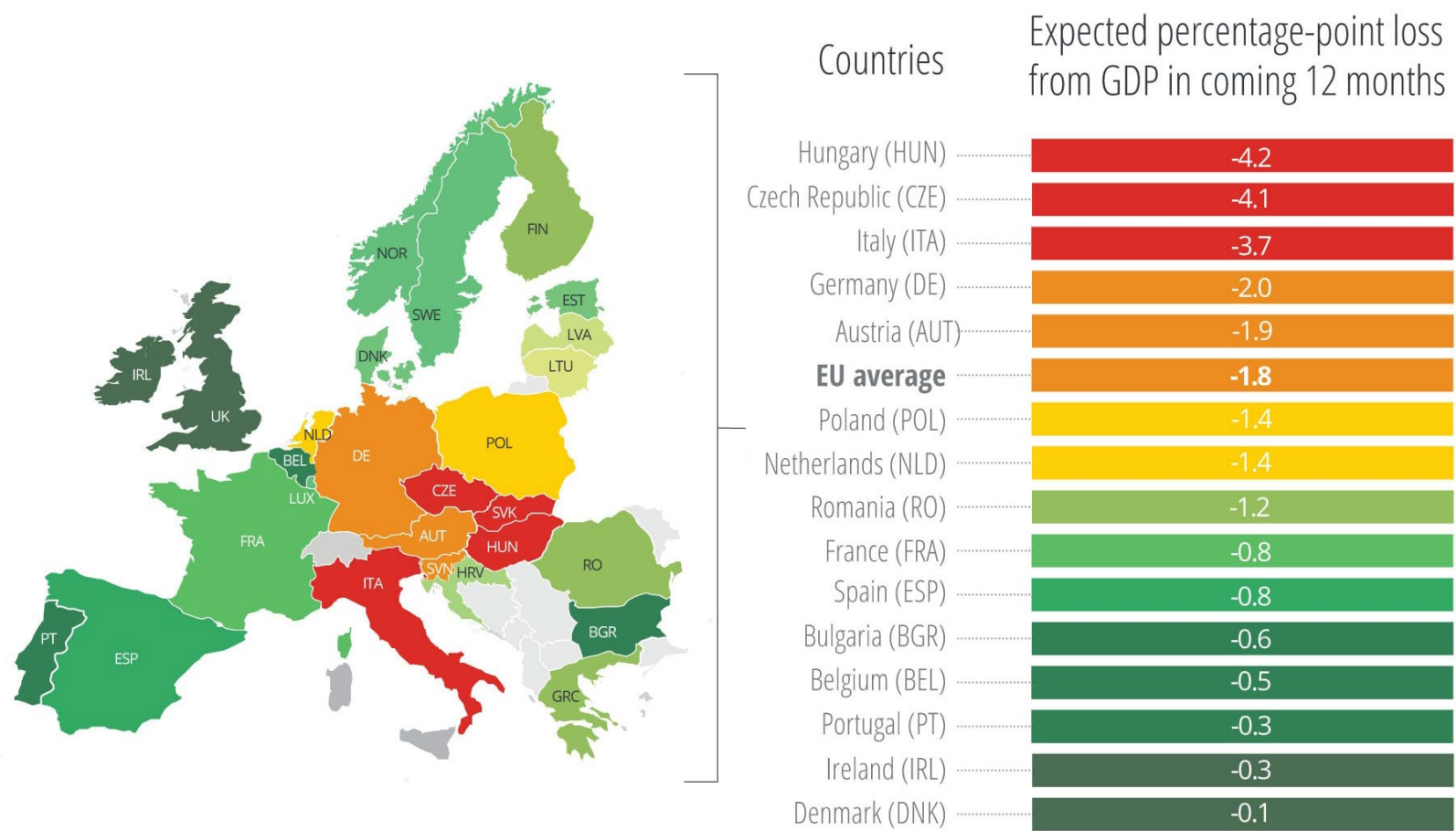


United States exports of LNG



# In a recent study, the IMF calculated the potential effects of a complete and immediate stop of Russian gas supplies on the economies in the Eurozone

## Potential GDP effects of a full and immediate stop of Russian gas supplies



Key results of the study show that over the next 12 months, the EU would lose 1.8% points of GDP growth compared to the baseline scenario.



# Europe is far from immune from the impact, with players already warning about the effect of gas supply disruption

Even before Russia announced that payment for gas deliveries from some countries must be in rubles, the scale of the task for the EU to wean itself off of supplies for the country seemed ambitious to the point of impossibility in the timeframe set out.

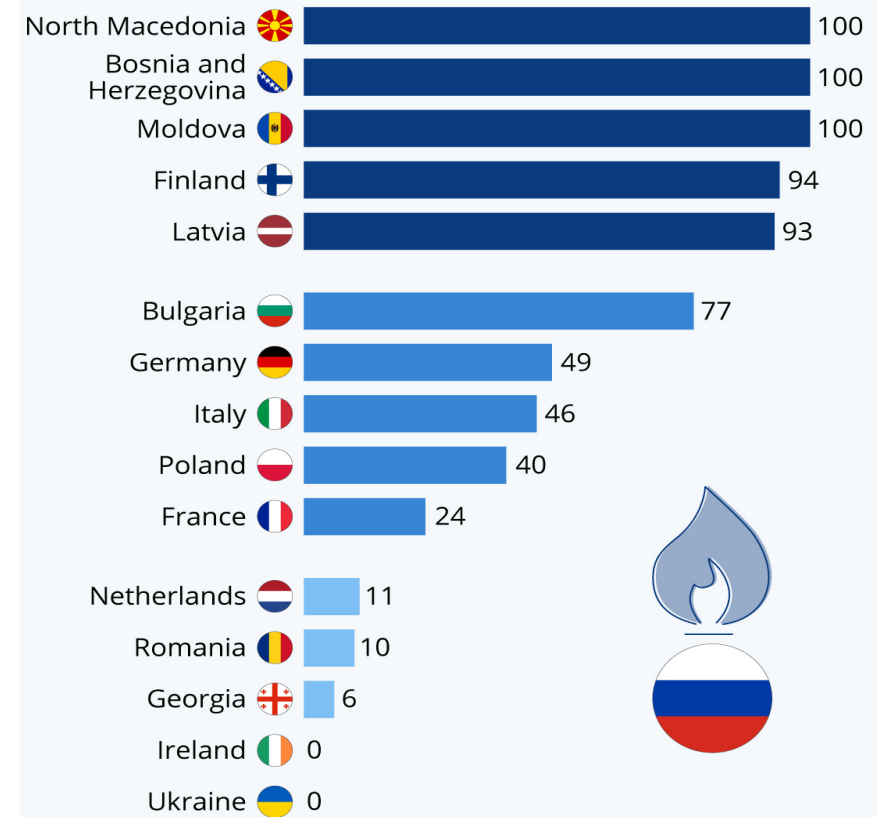
While the UK and US announced plans to eliminate oil supplies from Russia entirely, the European Parliament could only commit to hopes of potentially phasing out two thirds of its Russian gas orders by the end of the year.

The measures set out to accomplish that so far – redrafting energy plans, increased renewables deployment, stronger energy efficiency measures – do not seem likely to meet the scale of the challenge in the timeframe set out.

Fault lines in the European consensus, with member states in the east calling for more dramatic action faster, and policymakers in the west taking a more conservative stance, also looks set to slow the progress of any coordinated policy response.

## Which European Countries Depend on Russian Gas?

% share of gas supply from Russia in selected European countries (2020 or latest available)



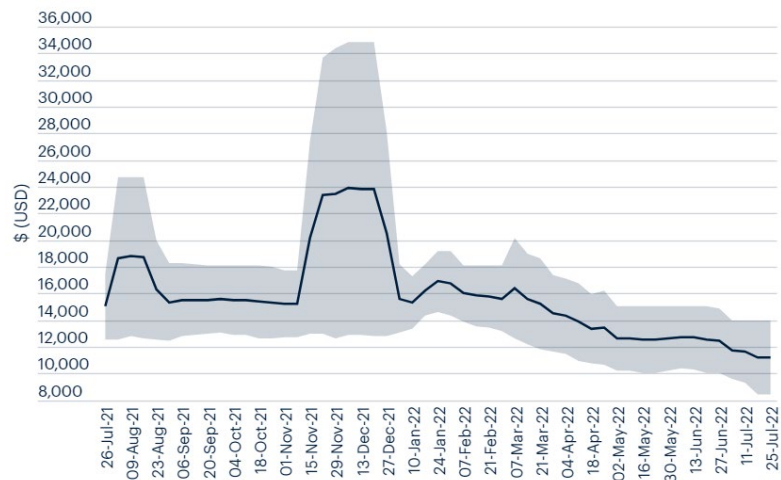
Ukraine buys its gas from the EU since 2015.



# Logistic Update—Shipping rates have tempered since 2020 however still elevated

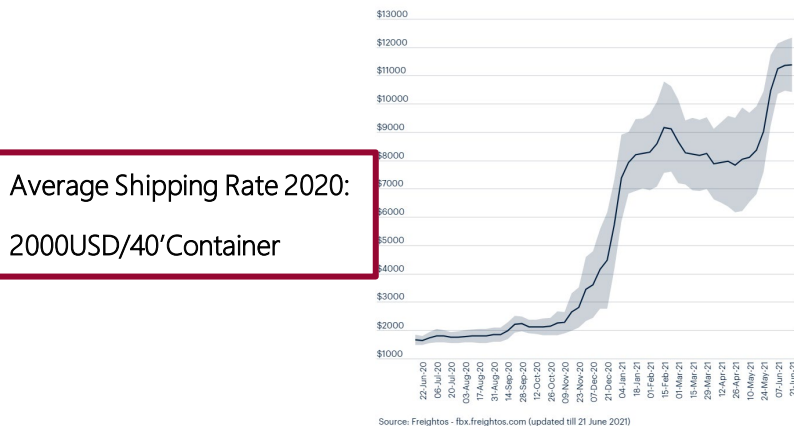
## Asia to Europe shipping

FBX China/East Asia - North Europe weekly freight pricing range for 40' containers (FEUs)



SOURCE: Freightos - fbx.freightos.com (updated till 25 July 2022)

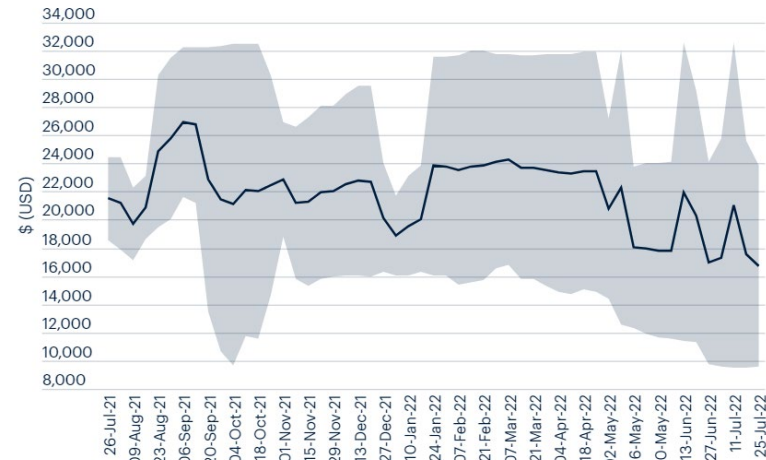
Average Shipping Rate 2020:  
2000USD/40'Container



Source: Freightos - fbx.freightos.com (updated till 21 June 2021)

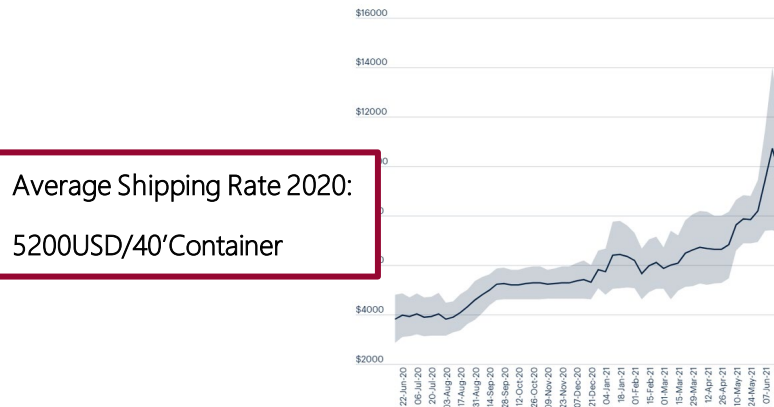
## Asia to North America shipping

FBX China/East Asia - North America East Coast weekly freight pricing range for 40' containers (FEUs)



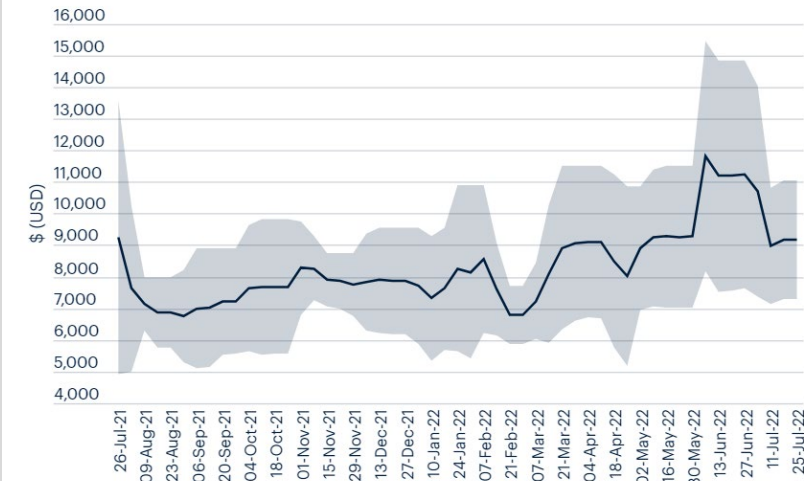
SOURCE: Freightos - fbx.freightos.com (updated till 25 July 2022)

Average Shipping Rate 2020:  
5200USD/40'Container



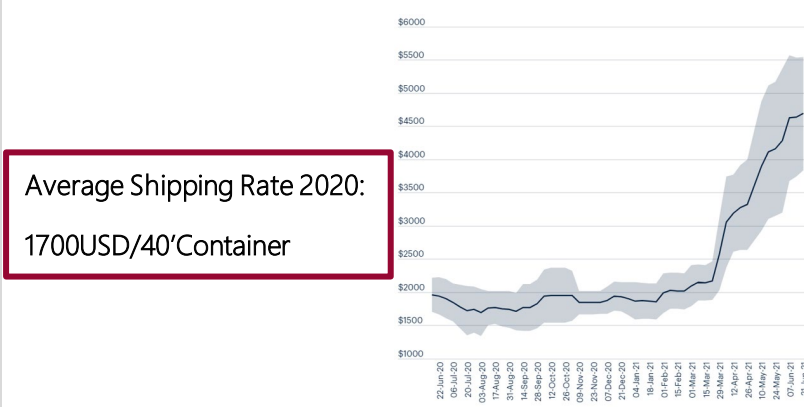
## Europe to North America shipping

FBX North Europe - North America East Coast weekly freight pricing range for 40' containers (FEUs)



SOURCE: Freightos - fbx.freightos.com (updated till 25 July 2022)

Average Shipping Rate 2020:  
1700USD/40'Container



Source: Freightos - fbx.freightos.com (updated till 21 June 2021)



# Industry dynamics 2022 vs. 2021—supply chain recovery, normalizing margins and demand slowdown

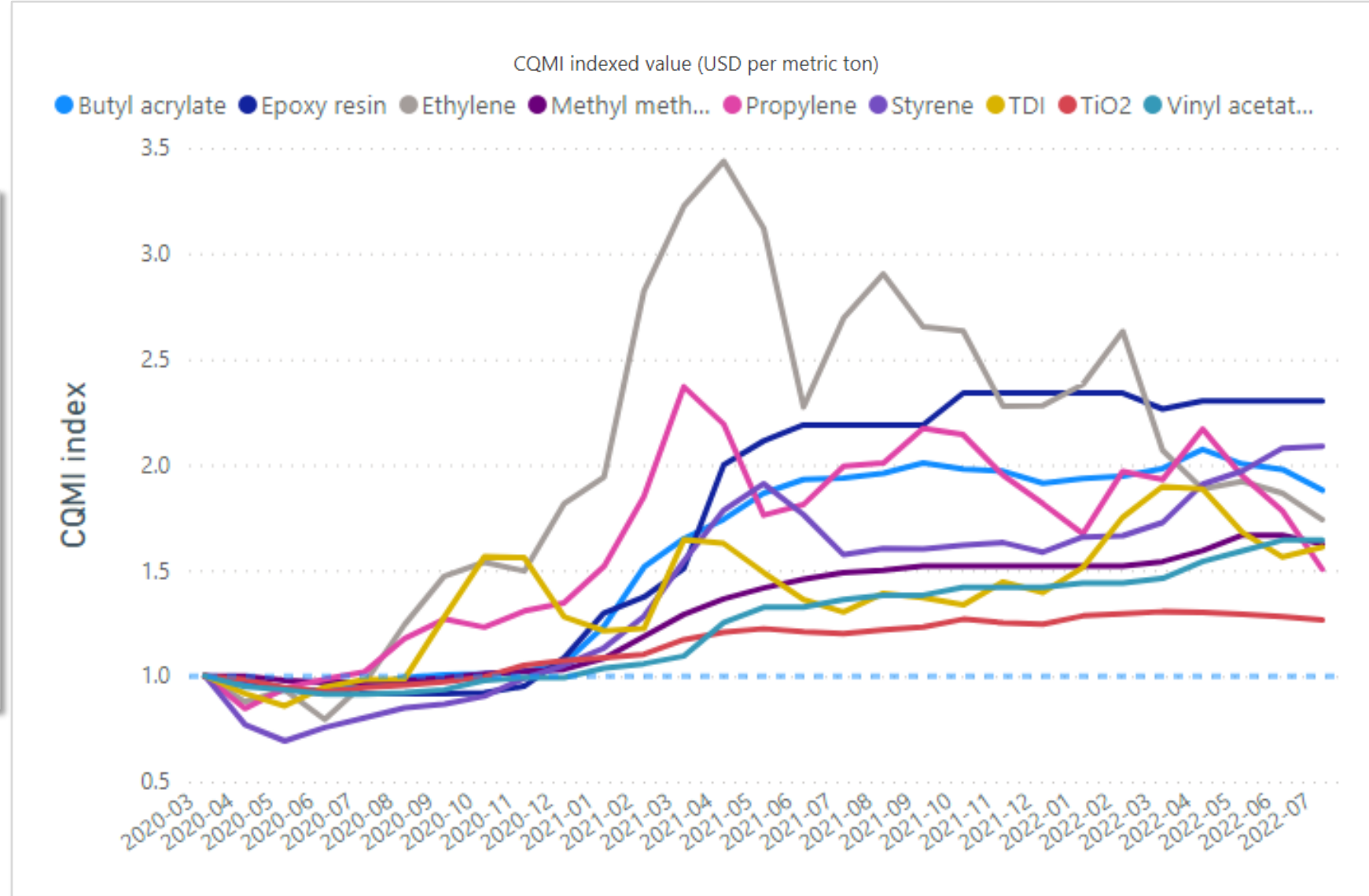
- High demand to slowing demand
- Shortages of raw materials to excess inventory averaging 60 days
- Major feedstocks under pressure to more stable supply (beginning to see minor downward price movement)
- Rising raw material costs to continuing escalation averaging 15%-18% higher costs
  - LARGE UNCERTAINTY - Energy shortages, rolling blackouts, surcharges
- Reduced margins to margin recovery (pending impact of demand in Q3, Q4 and 2023)

*Dangerous period of stagflation – low demand with high inflation*

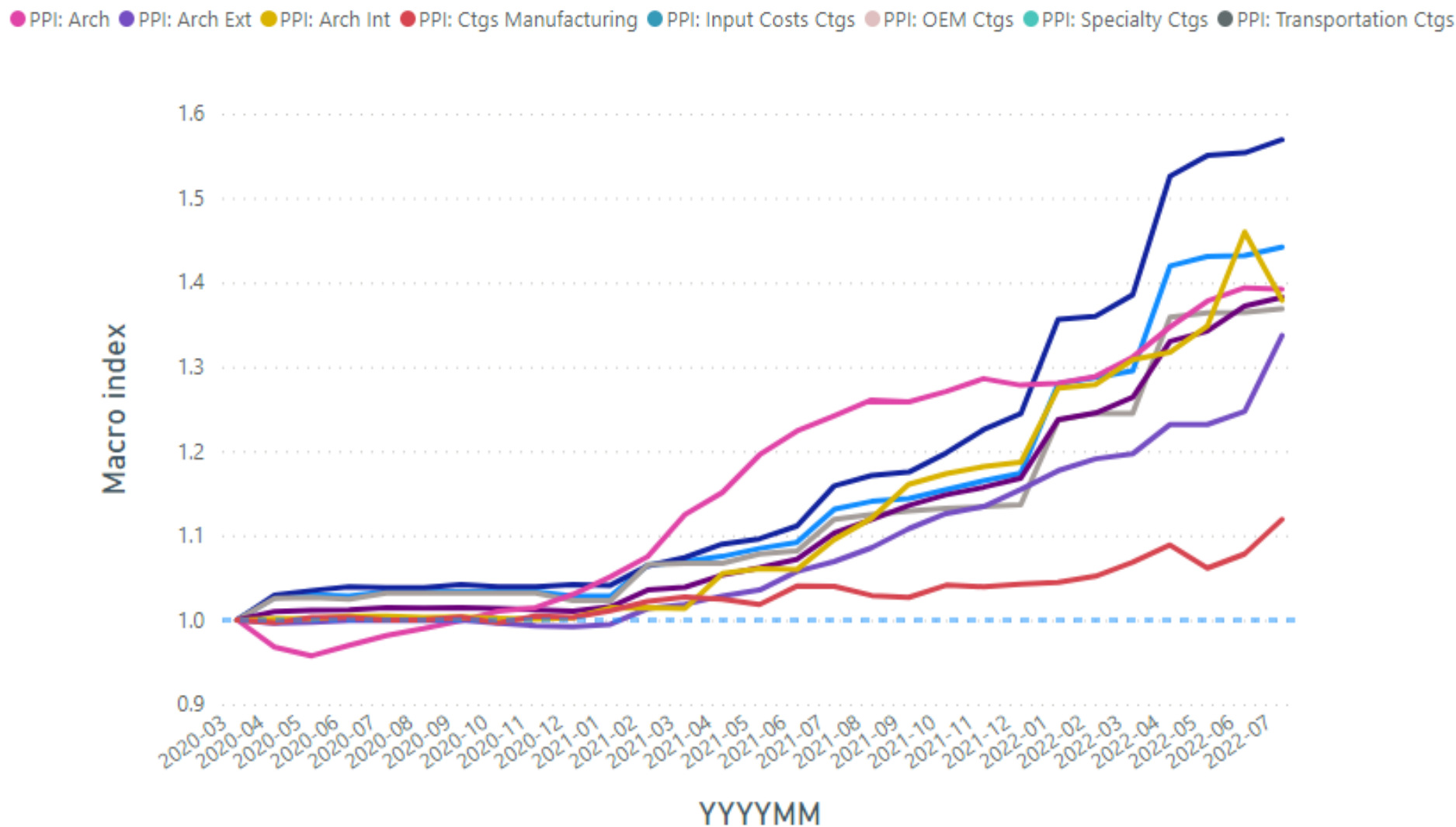


# Steep increase in raw material costs due to supply-demand constraints (Indexed to March 2020)

- Raw material costs from Europe increased in early 2022 and again in Q4 2022 with energy surcharges being applied on most if not all products.
- However, we are witnessing the reverse from China now with prices of Chinese raw materials dropping significantly across the board in Q3 2022, the same for shipping costs from China.



# Coatings PPI's (Producer Price Index) inflation since COVID (Indexed to March 2020)



# Architectural Coatings—Key Trends

Trend	Implications/Opportunities
<b>Color and styling</b>	Because architectural coatings market revolves around color trends, color-based research is constant
<b>DIY:PRO mix</b>	The mix will depend on recovery in DIY market which is tied to residential home sales. Commercial maintenance market is relatively stable. New construction market is growing and residential repaint and remodeling markets are stable.
<b>Coatings turning from decorative to functional</b>	<ul style="list-style-type: none"> <li>• <b>Conductivity through paint technology</b> for lighting and dynamic effects</li> <li>• <b>Sensors</b> transform walls into giant touchpads</li> <li>• <b>Odor absorbing/Radon blocking, anti-microbial, antiviral</b></li> <li>• <b>De-polluting coatings</b>, destroys “organic” dirt sticking onto surfaces – keep buildings cleaner</li> <li>• <b>De-Nox</b> – Nitrogen oxides / particulates contribute to “smog”</li> </ul>
<b>Convenience/Value add/Energy efficient</b>	<ul style="list-style-type: none"> <li>• Targeting DIY users to save time or number of steps in surface preparation and painting (e.g., less need for separate primers)</li> <li>• <b>Lower building energy needs</b> “solar &amp; heat reflective” - solar glass coatings, ultra cool building &amp; roof coatings</li> <li>• <b>Improve</b> customer <b>comfort</b> levels</li> </ul>
<b>Greener coatings (waterborne dominates)</b>	<p>Offer more functionality (odor control, bacteria resistance), more robust attributes (color, opacity, and brightness), and satisfy stricter regulations</p> <p>Sustainability goals are research drivers.</p> <p>Greater demand for eco-premium products</p>
<b>New formulas reducing TiO<sub>2</sub> usage</b>	Continuing to seek ways to reduce reliance on this raw material and its contribution to paint cost.

# OEM Coatings—Key Trends

Trend	Implications/Opportunities
<b>Operational Efficiencies</b>	<p>Improve productivity at customers' painting operations, for example, wet-on-wet applications, reduced labor, faster cycle times, etc.</p> <p>Increase paint shop productivity and profitability – compact process</p> <p>Lower energy processes</p>
<b>Relocation of Supply Chain</b>	<p>Decoupling of Western supply chains from China accelerating, prompting Chinese suppliers to find alternative channels for its products and providing the rationale behind its reduced pricing</p>
<b>Innovative Solutions</b>	<p>Auto – matte finishes, glamour clear coats</p> <p>Solar heat management – enable darker colors, increase passenger comfort, reduce external substrate temperatures, reduce cost</p> <p>Premium vivid colors with uniform pigment distribution – nano pigments where pigment is embedded into polymer – extremely durable</p> <p>Enable printed electronics/graphene</p> <p>Self healing / self cleaning</p> <p>Coating technology for energy saving (low temperature cure) and storage</p>
<b>Robust Functionality Across Multiple Substrates</b>	<p>Coatings are a common link across many substrates - coat mixed material substrates, enable coating on composites, alloys and plastics to replace metal, contributes to light-weighting, energy efficiency and reduced corrosion</p> <p>Drive toward weight reduction to achieve “fuel efficiency” requires robust look and performance across diverse substrates, for example steel, metal alloys, plastics, and composites.</p>



# Specialty + Protective Coatings—Key Trends

Trend	Implications/Opportunities
<b>Infrastructure Spending Outlook</b>	<p>Inflation will hit the scope of projects for the monies earmarked for new roads, rail and broadband funding.</p> <p>On a global basis, governments are expected to reign in spending in the face of inflationary pressures</p>
<b>Oil &amp; Gas Outlook</b>	<p>Oil &amp; Gas is about 1/3 of protective coatings volume and were heavily impacted in 2020. Shift towards LNG for Europe and embargo of Russian oil &amp; gas are affecting spending, but overall impact of high oil and natural gas are net positives for the industry</p>
<b>Refinish Outlook</b>	<p>Autonomous vehicle research and the trend of collision avoidance systems will continue to lower the rate of accidents. CCC Information Services is forecasting that technology will reduce accident frequency by ~30% in the next 25 years. In the meantime, more miles driven brought accident rates up globally in 2021</p>
<b>Innovative Solutions</b>	<p>Faster return-to-service of assets</p> <p>Intelligent surfaces - repair assets only when needed, lower maintenance costs, improved safety</p> <p>Utilize structural health monitoring to extend asset life and reduce maintenance costs - Provide real-time asset assessment utilizing "Internet of Things"</p> <p>Corrosion protection in extreme environments – increase infrastructure longevity</p>





# European Coatings Market

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# Uncertainty depresses economic sentiment

## Economic uncertainty in Europe has reached record highs since the start of the Ukraine war

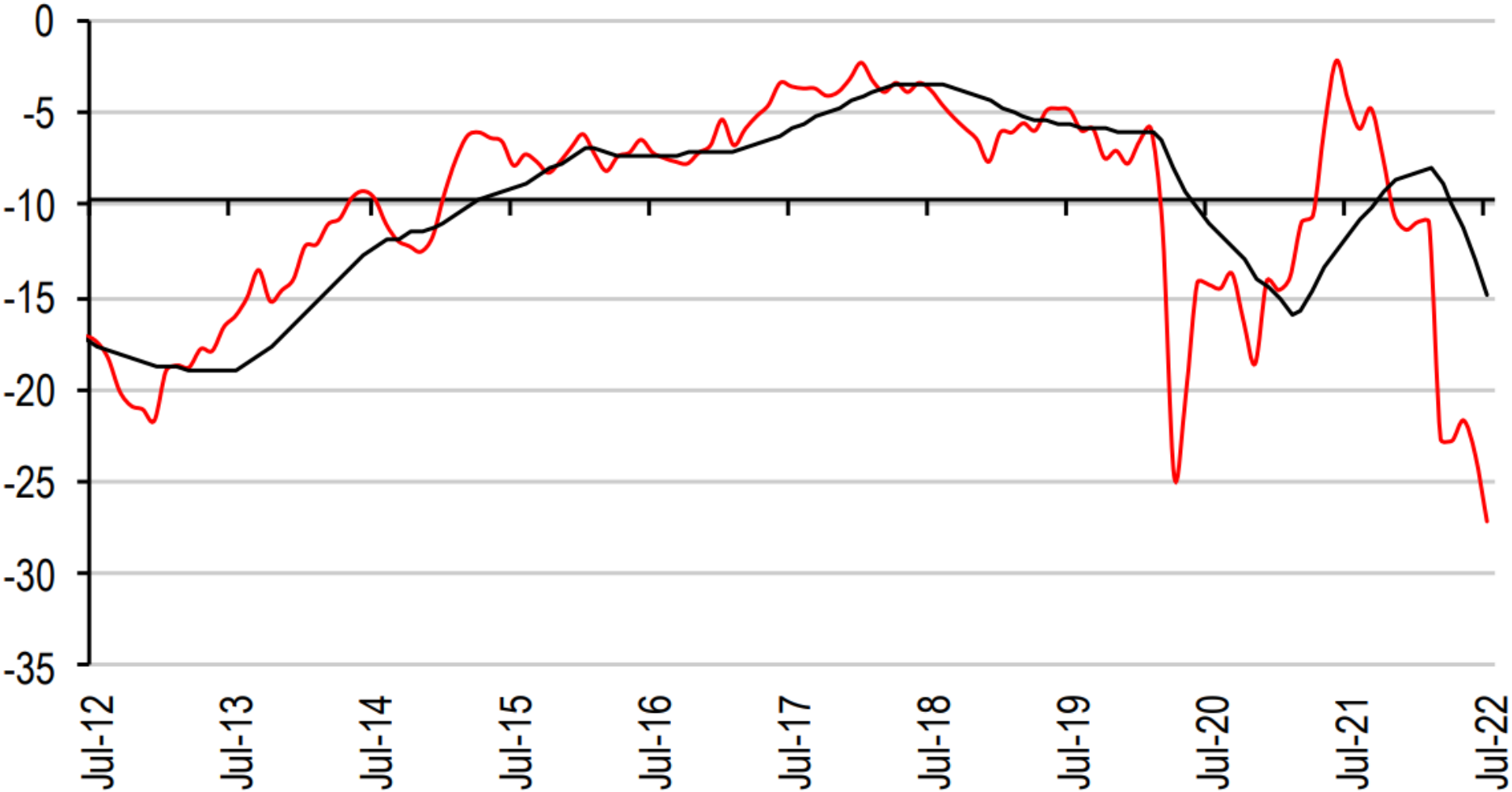
Economic policy uncertainty index Europe



*The economic policy uncertainty index, a newspaper-based indicator for measuring uncertainty, reached a new peak following the war in Ukraine and continues to remain elevated.*

One key reason for the decline is the drop in consumer confidence

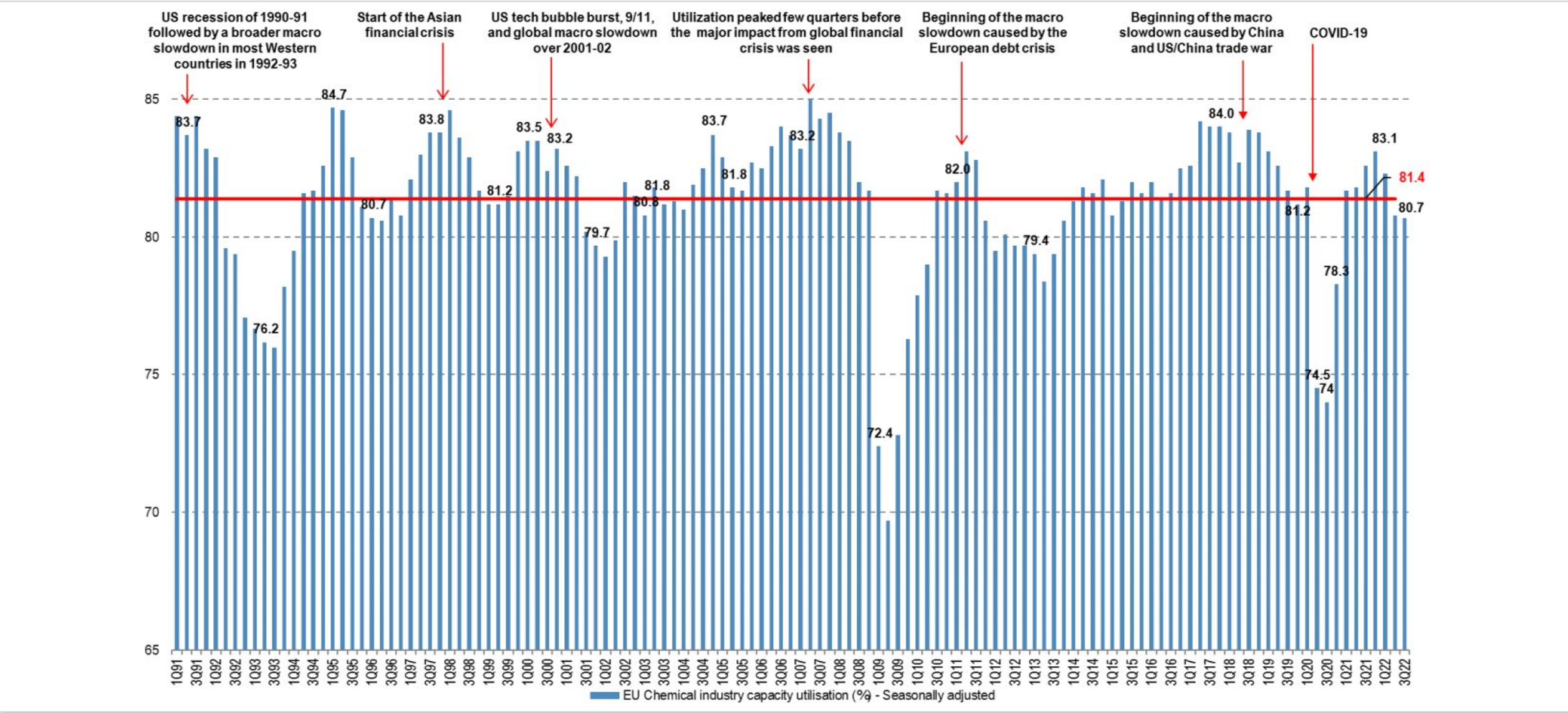
**EU 25: Consumer confidence index**



*Consumer confidence now is considerably lower than during the first wave of COVID-19.*



# European chemicals industry utilization has fallen sharply due to weaker macro and likely optimization of global production by companies due to high EU energy prices

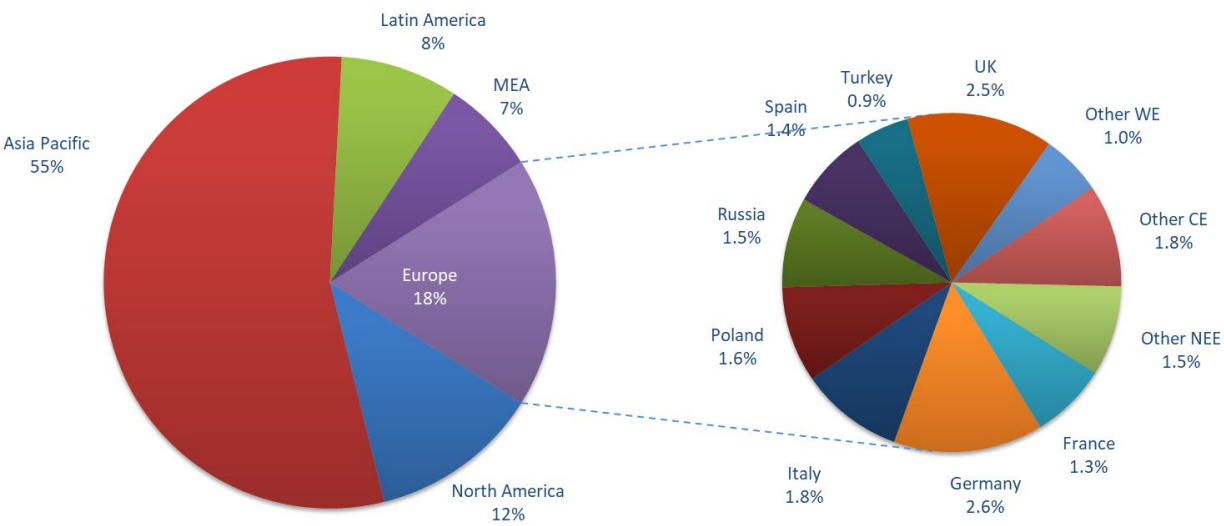


Source: Bloomberg Finance L.P., J.P. Morgan

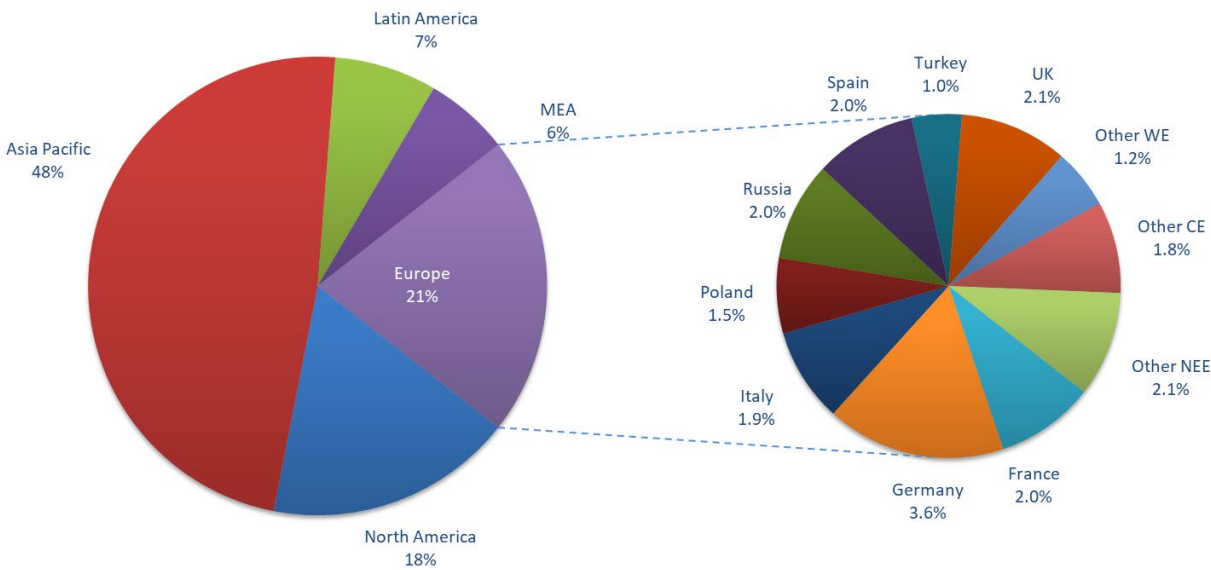


# Europe Coatings represents 21% of the Global Market 2021 (value)

Europe Volume (8.4 BN liters)

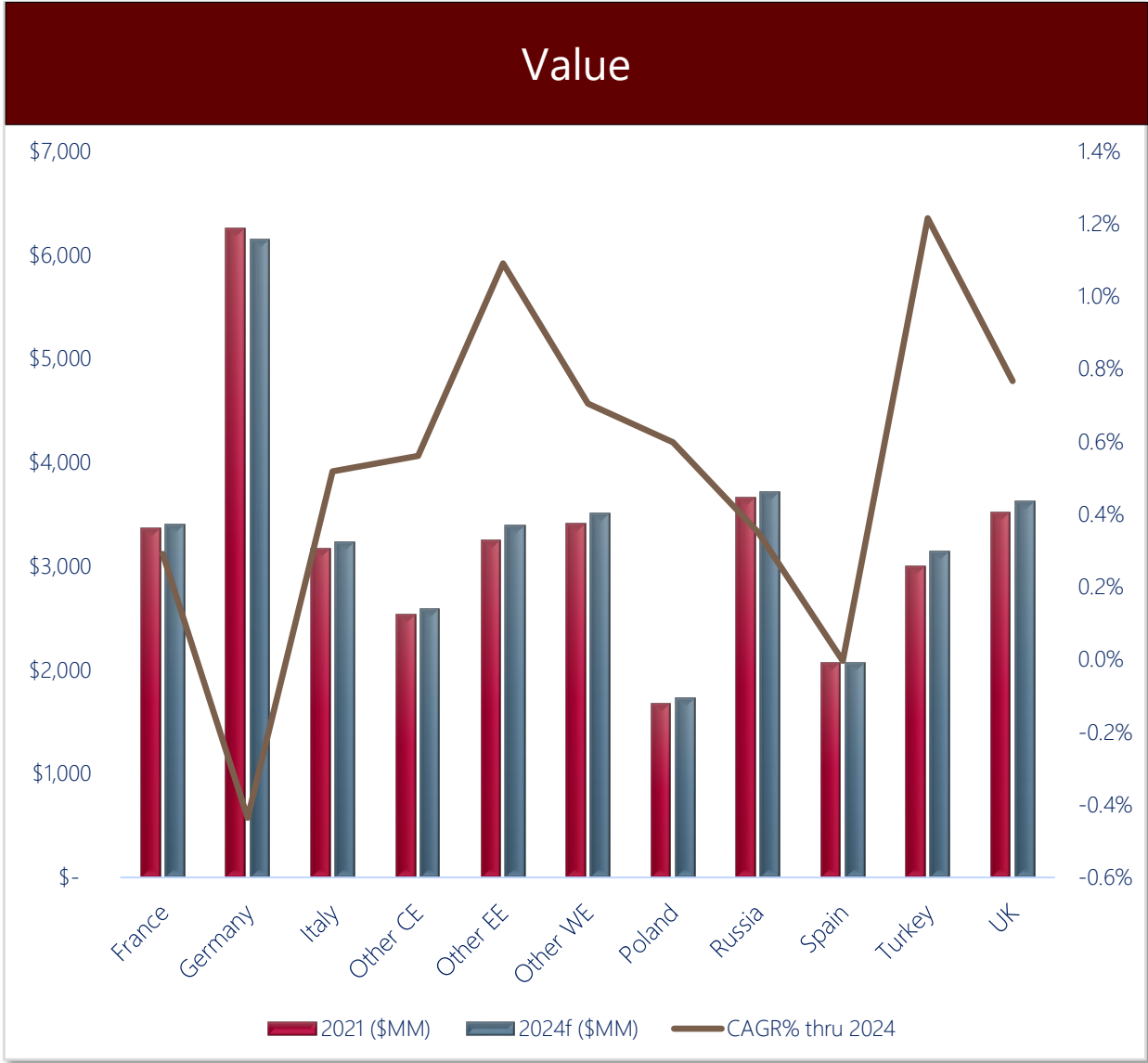
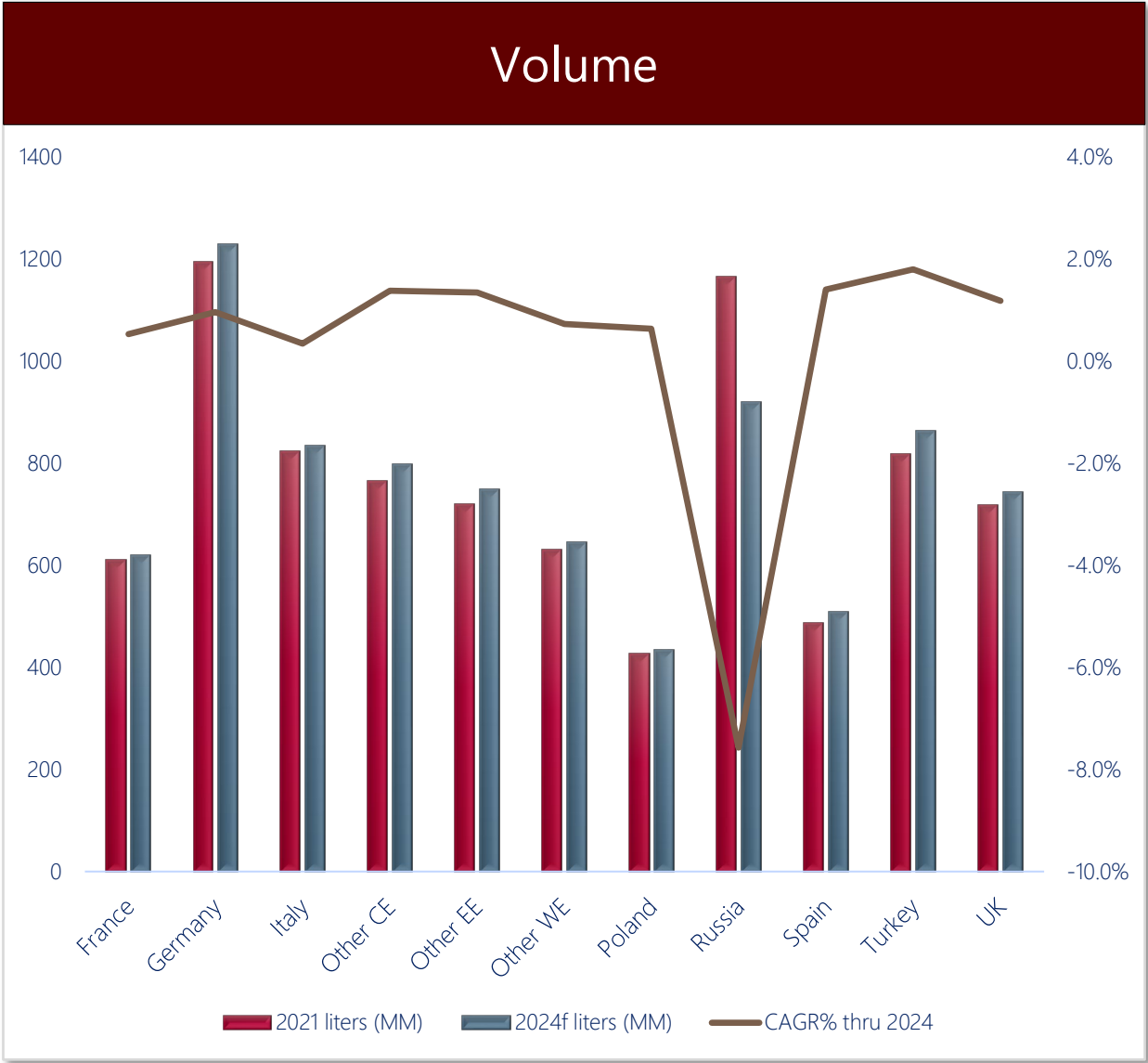


Europe Value (\$36.6 BN)





# Europe Coatings Volume and Value by Country



Source: ChemQuest, Coatings TraQr™



# Low growth expected for the EU construction sector

The higher building material costs, skyrocketing energy prices, continuing material shortages, higher interest rates and international risks **make forecasts less optimistic.**

Specifically, significant declines in output for Austria (-6.3%) and Germany (-4.5%), where labor and materials shortages are hitting the construction industry hard.

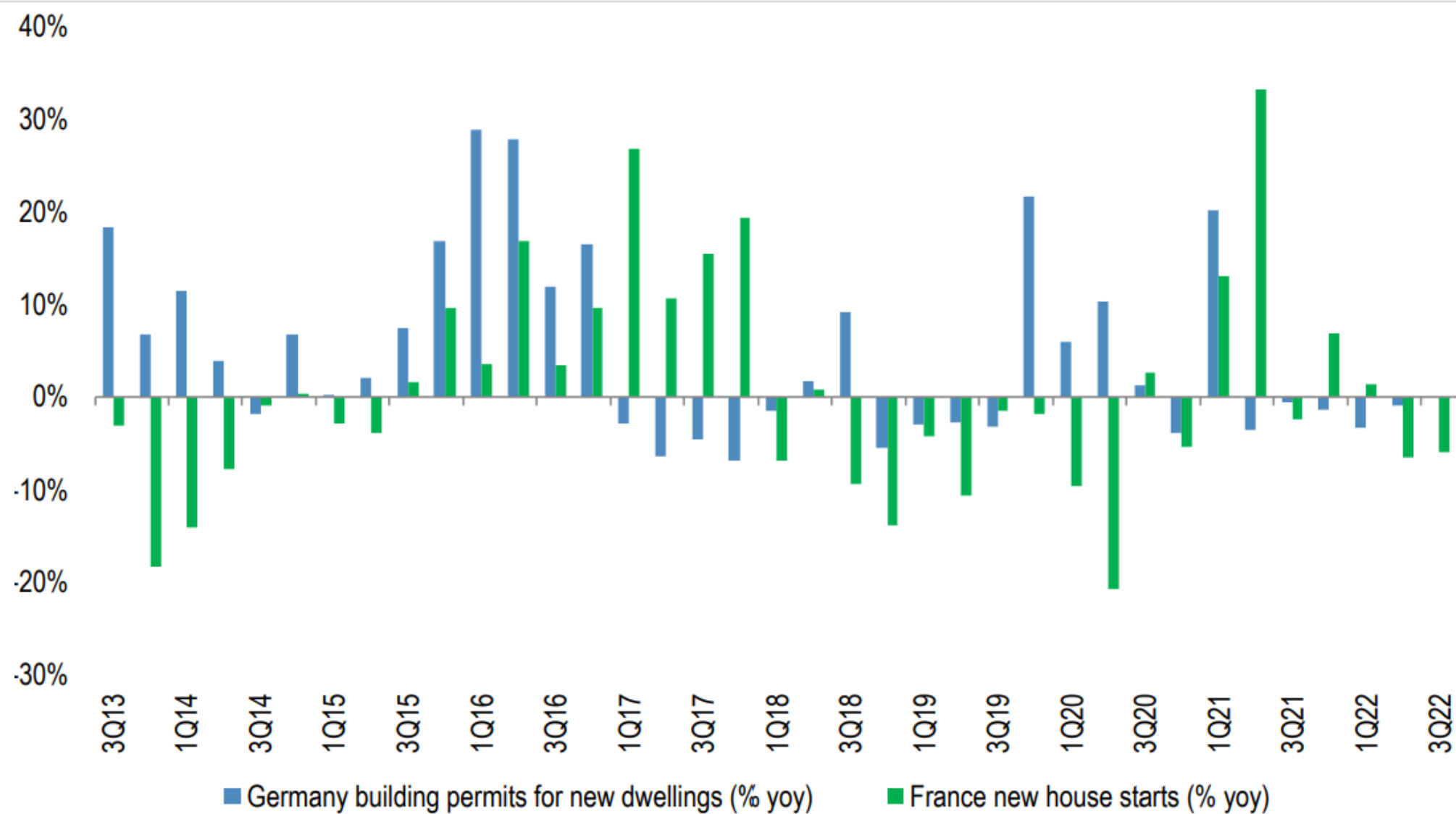
The highest year-on-year growth is seen in Poland (6.7%).

## Slow growing or declining construction volumes in most EU countries

Volume output construction sector, % YoY

	2020	2021*	2022*	2023*
 Austria	-3.0%	5.0%	1.5%	0.5%
 Belgium	-8.2%	4.2%	2.5%	0.0%
 France	-14.7%	11.2%	-0.5%	-0.5%
 Germany	3.0%	-1.6%	-1.0%	0.0%
 Netherlands	-0.2%	2.7%	2.5%	1.0%
 Spain	-12.9%	-6.2%	-2.0%	1.0%
 European Union	-4.9%	4.9%	1.0%	0.5%
 Turkey	-5.5%	-1.0%	-5.0%	-1.0%

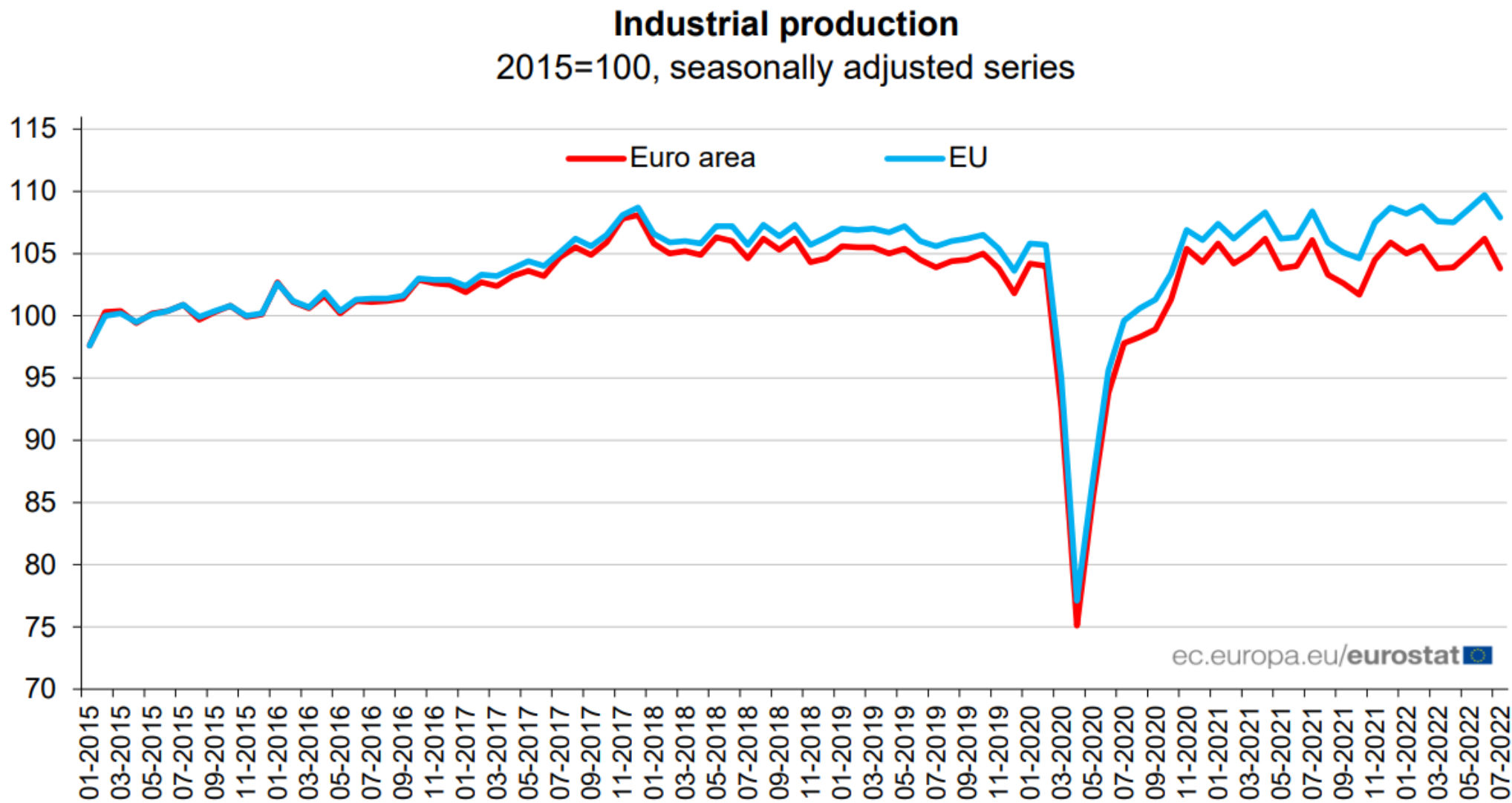
# Europe housing starts/permits remain depressed



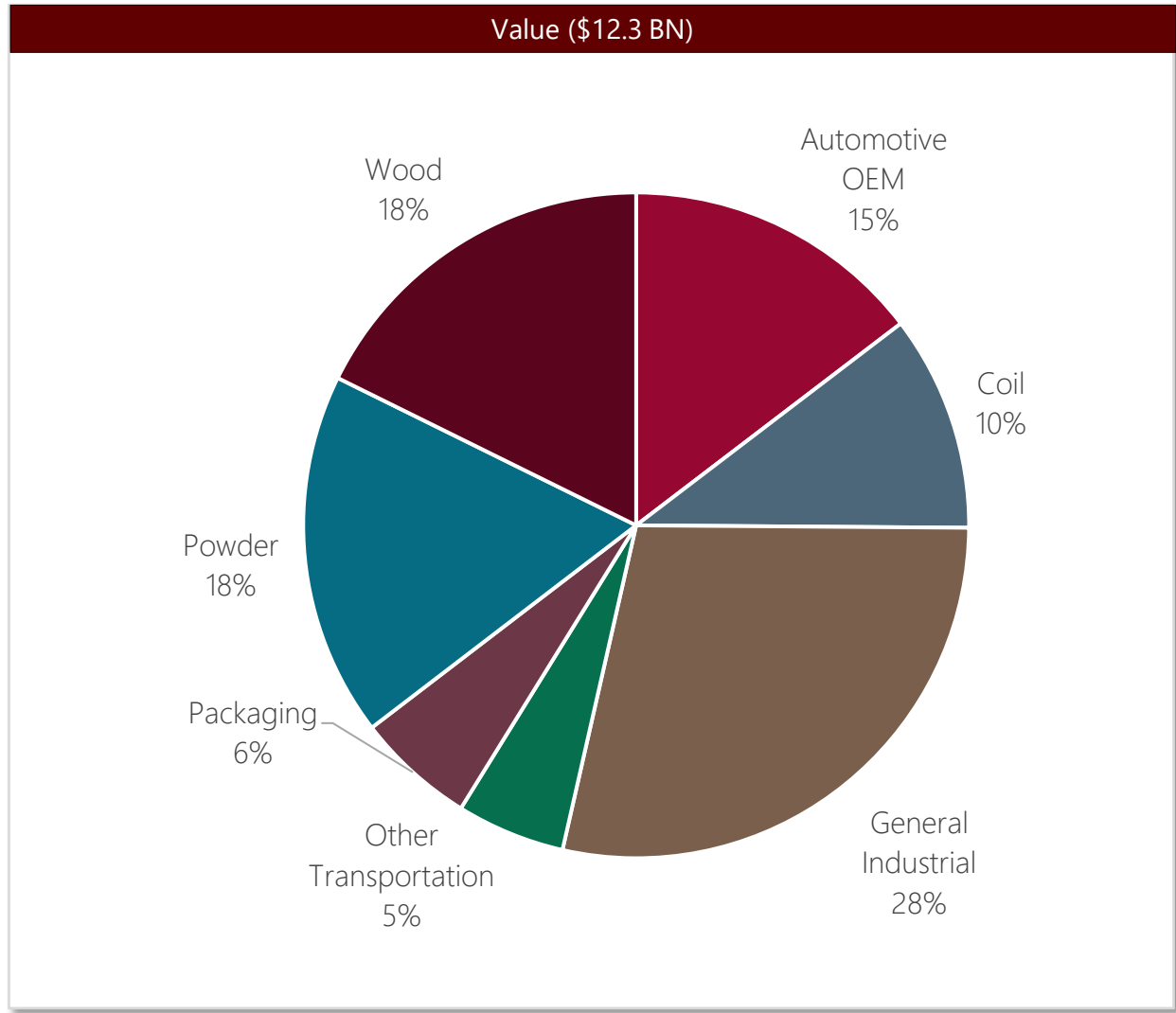
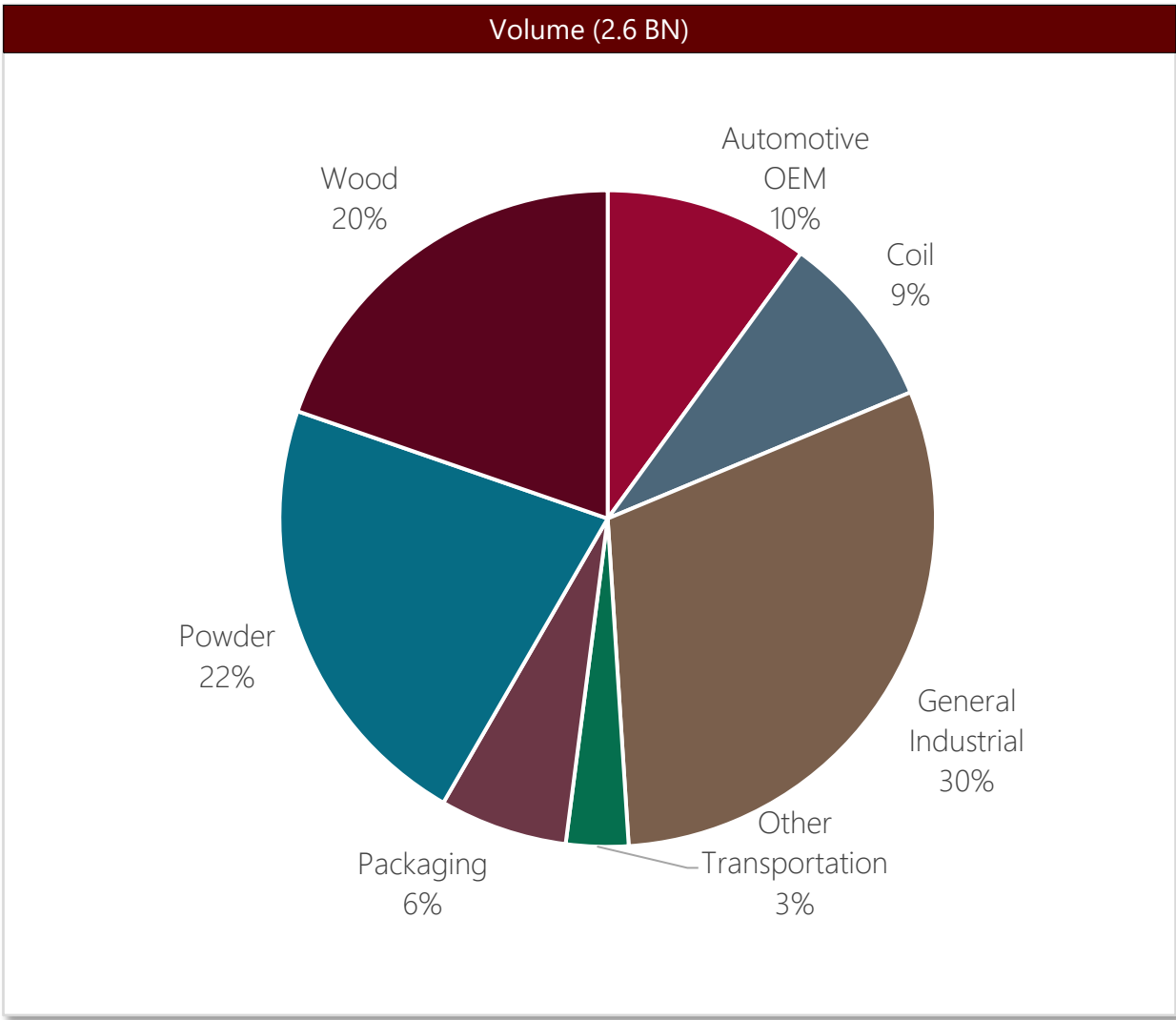
Source: Bloomberg Finance L.P., J.P. Morgan



# Industrial production down by 2.3% in the euro area and by 1.6% in the EU



# Europe by OEM Coatings—2.6 BN liters valued at \$12.3 BN in 2021





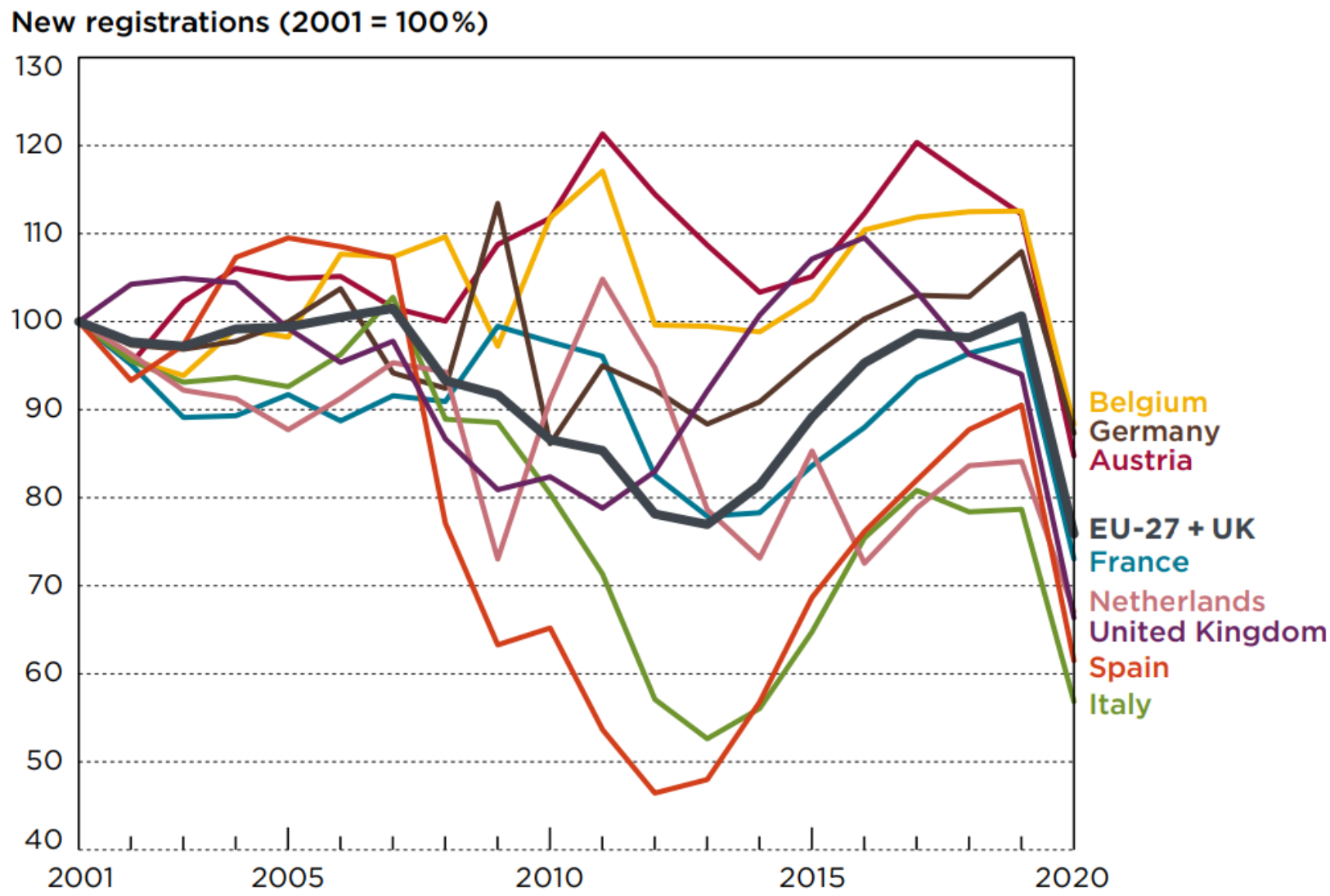
# Europe by OEM Coatings 2019 thru 2024

\$12.3B in 2021 will grow to \$13.7B in 2024

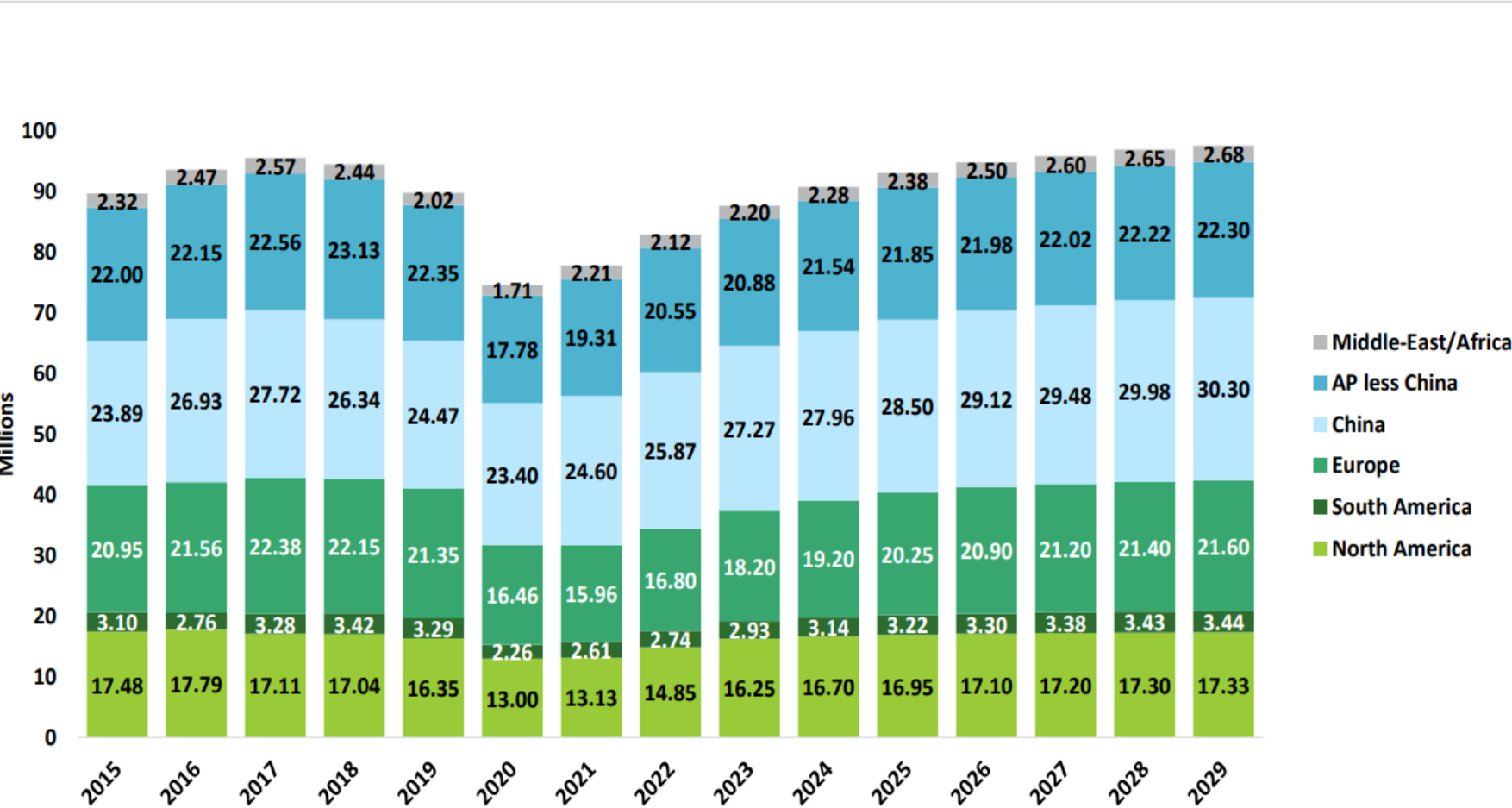
Mrkt Area	2019	2020	2021	2022	2023	2024
Automotive OEM						
USD	\$2,239M	\$1,790M	\$1,800M	\$1,804M	\$1,841M	\$1,901M
Liters	354M	278M	267M	250M	252M	256M
\$/liter	\$6.33	\$6.44	\$6.75	\$7.22	\$7.32	\$7.43
Coil						
USD	\$1,271M	\$1,202M	\$1,290M	\$1,412M	\$1,469M	\$1,545M
Liters	239M	224M	231M	232M	234M	238M
\$/liter	\$5.32	\$5.36	\$5.58	\$6.08	\$6.28	\$6.48
General Industrial						
USD	\$3,453M	\$3,269M	\$3,499M	\$3,628M	\$3,715M	\$3,843M
Liters	834M	783M	805M	777M	785M	801M
\$/liter	\$4.14	\$4.18	\$4.35	\$4.67	\$4.73	\$4.80
Other Transportation						
USD	\$663M	\$589M	\$649M	\$684M	\$702M	\$720M
Liters	87M	77M	82M	81M	82M	84M
\$/liter	\$7.61	\$7.63	\$7.94	\$8.49	\$8.57	\$8.62
<b>USD</b>	<b>\$12,610M</b>	<b>\$11,460M</b>	<b>\$12,300M</b>	<b>\$12,900M</b>	<b>\$13,260M</b>	<b>\$13,700M</b>
<b>Liters</b>	<b>2,837M</b>	<b>2,573M</b>	<b>2,661M</b>	<b>2,600M</b>	<b>2,625M</b>	<b>2,677M</b>
<b>\$/liter</b>	<b>\$4.44</b>	<b>\$4.45</b>	<b>\$4.62</b>	<b>\$4.96</b>	<b>\$5.05</b>	<b>\$5.12</b>

Mrkt Area	2019	2020	2021	2022	2023	2024
Packaging						
USD	\$652M	\$672M	\$711M	\$754M	\$777M	\$803M
Liters	162M	165M	168M	166M	169M	172M
\$/liter	\$4.04	\$4.07	\$4.24	\$4.54	\$4.61	\$4.66
Powder						
USD	\$2,135M	\$1,960M	\$2,178M	\$2,306M	\$2,364M	\$2,418M
Liters	605M	549M	584M	576M	581M	592M
\$/liter	\$3.53	\$3.57	\$3.73	\$4.01	\$4.07	\$4.08
Wood						
USD	\$2,200M	\$1,977M	\$2,177M	\$2,309M	\$2,394M	\$2,468M
Liters	558M	497M	524M	518M	523M	534M
\$/liter	\$3.94	\$3.98	\$4.15	\$4.46	\$4.58	\$4.63

# Passenger cars: New registrations by country



Each new vehicle contains ~\$3,200 of chemical processing and products (including >330 pounds of plastics)



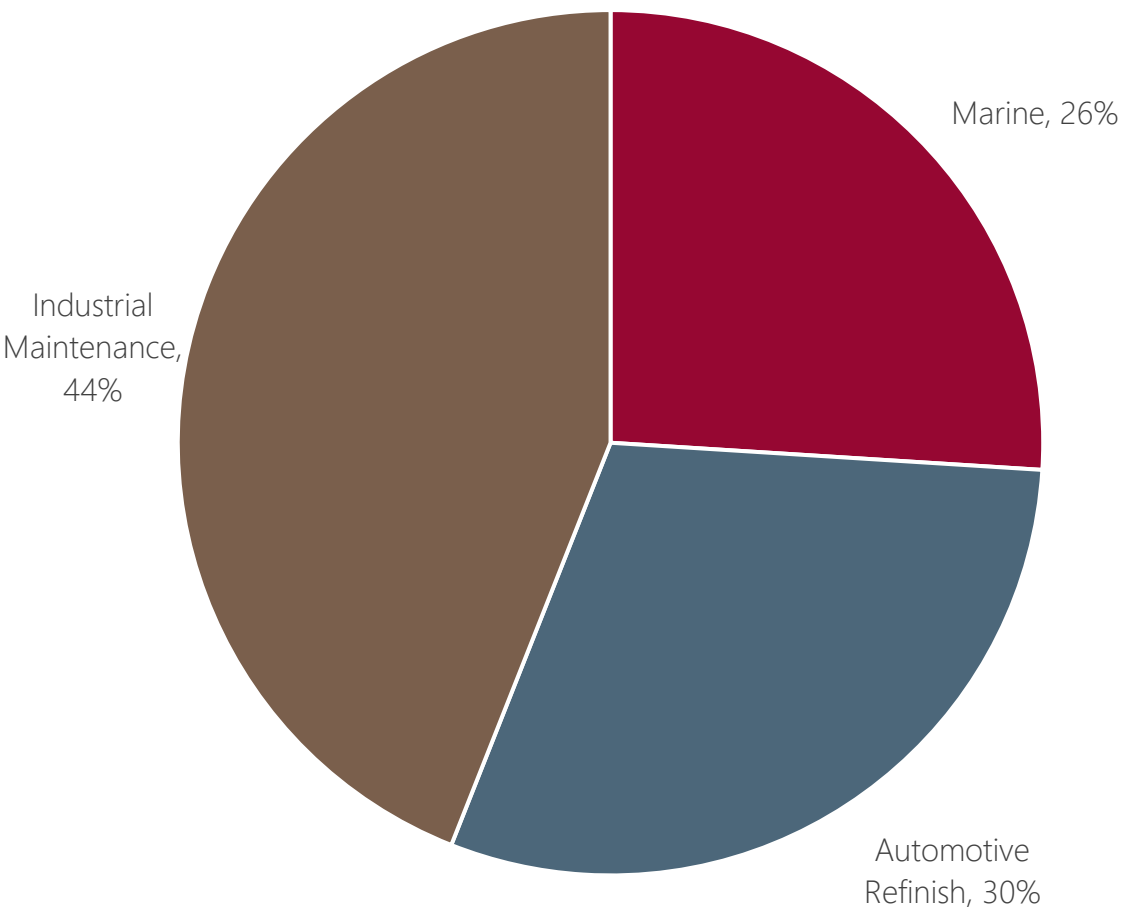
Global auto production in Q2 is projected to be down 4% YoY driven primarily by continued semiconductor chip, auto components and supply-chain challenges with declines led by Europe (-3.8% vs +83.9% in Q2'21).

European light-vehicle production is estimated to total 4.0MM (down 4% YoY and up 2% QoQ) in Q2 and 4.0MM (up 34% YoY and flat QoQ) in Q3. On full-year basis, it is estimated to total 16.5MM units for '22E (up 4%) and 18.1MM units for '23E (up 9%).

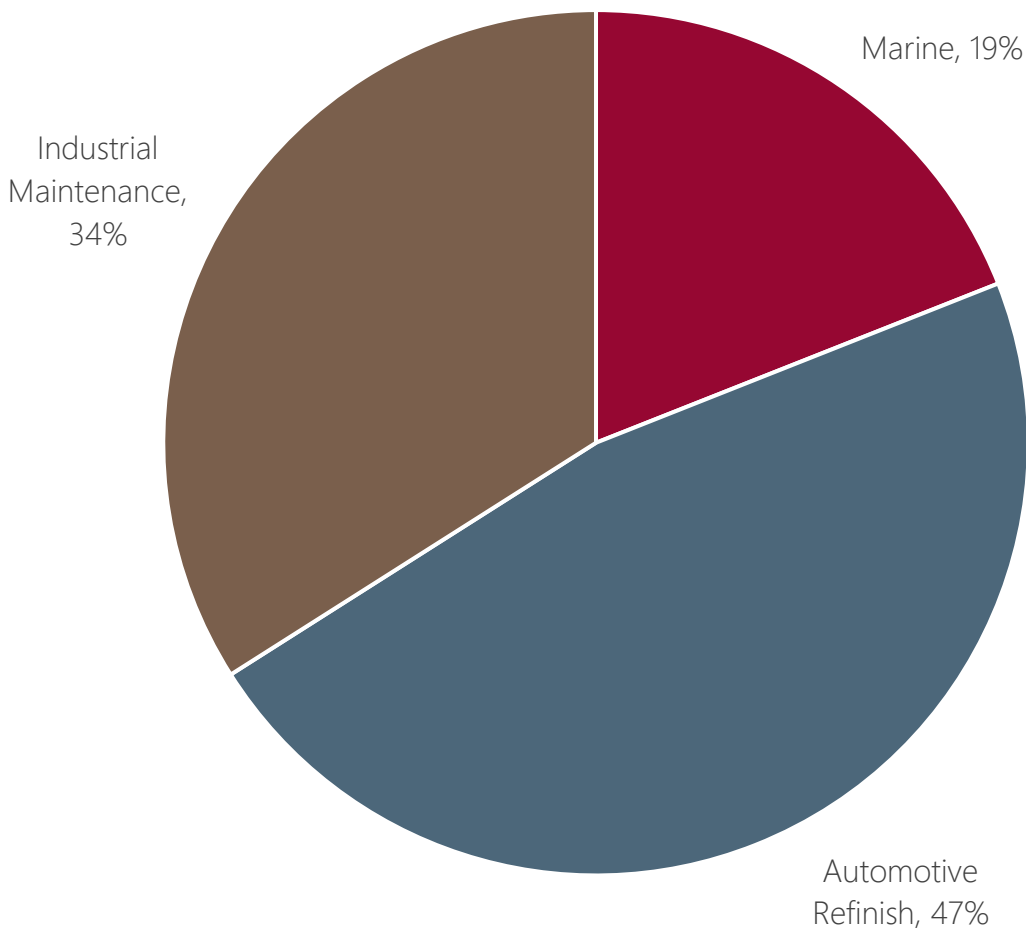


# Europe by Specialty & Protective Coatings - 435 M liters valued at \$4.7 BN in 2021

Volume (435 million of liters)



Value (\$4.7 BN)





# Europe by OEM Coatings 2019 thru 2024

\$4.7B in 2021 moving to \$5.5B in 2024

Mrkt Area	2019	2020	2021	2022	2023	2024
Automotive Refinish						
USD	\$2,456M	\$1,931M	\$2,250M	\$2,546M	\$2,662M	\$2,773M
Liters	148M	115M	129M	128M	130M	132M
\$/liter	\$16.64	\$16.75	\$17.50	\$19.83	\$20.51	\$21.04
Industrial Maintenance & Protective						
USD	\$1,720M	\$1,523M	\$1,601M	\$1,633M	\$1,669M	\$1,717M
Liters	215M	189M	190M	181M	182M	185M
\$/liter	\$8.01	\$8.08	\$8.43	\$9.03	\$9.17	\$9.31
Marine						
USD	\$889M	\$841M	\$893M	\$963M	\$984M	\$1,012M
Liters	122M	115M	116M	117M	119M	122M
\$/liter	\$7.30	\$7.34	\$7.69	\$8.21	\$8.28	\$8.33
USD	\$5,065M	\$4,295M	\$4,745M	\$5,143M	\$5,315M	\$5,502M
Liters	484M	419M	435M	427M	431M	438M
\$/liter	\$10.46	\$10.26	\$10.91	\$12.06	\$12.34	\$12.57





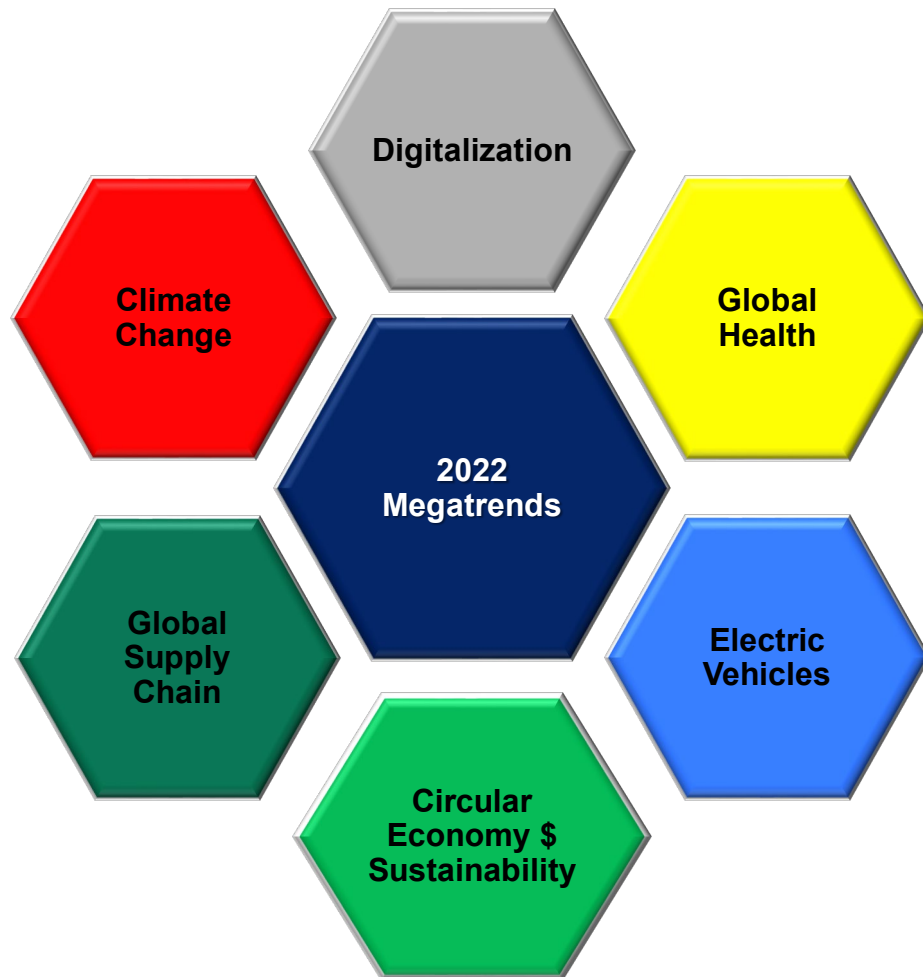
# Technology Outlook

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# Global Megatrends Drive Innovation & New Product Development



*Look at megatrends as influencers in favor of disruptive innovation and new product opportunities*

- **Digitalization**
  - Data Security
  - Artificial Intelligence
  - Big Data Analysis
  - Augmented Reality
  - 3D Printing
  - Robotics
- **Health**
  - Antiviral Research
  - Prevention
  - Antimicrobial Paints
  - Regulatory
- **Electric Vehicles**
  - Battery Technology
  - Heat Management
  - Light-weighting
  - Sensor Technology
- **Circular Economy**
  - Bio-based
  - Reduced Carbon Footprint
  - Sustainability
  - Plastic Pollution
- **Global Supply Chain**
  - Domestic Source of Supply
  - New Competitors
  - Shifts in Commodities
  - Supply Chain Instability
- **Climate Change**
  - Water Scarcity
  - Flooding
  - Resource Scarcity
  - Fire Damage

# 3D Printed Structures

- 3-D printed houses use concrete framing instead. The printer squeezes out concrete in layers, like toothpaste out of a tube
- If 3-D printing succeeds, it could address a chronic shortage of homes for sale and deliver them faster to the market
  - Mortgage-finance company Freddie Mac estimated that the national deficit of single-family homes stood at 3.8 million units at the end of 2020.
  - A two-bedroom house in the development was priced at \$450,000 and sold for \$530,000
  - A four-bedroom 3-D printed home, sold for nearly \$800,000.
  - The homes were priced slightly below comparable houses in the area

“3-D Printed Houses Are Sprouting Near Austin as Demand for Homes Grows”



Source: Wall Street Journal Oct 26, 2021, Apellix.com

# Robotics for Paint Application

- One of the most innovative new methods for coating application uses aerial robotics or drones.
- Apellix, a Florida-based startup, has developed and demonstrated drones for coatings testing.
- Apellix is developing a drone for spray paint application and cleaning and won the Akzo Nobel Paint the Future Competition.

Apellix Drone for Spray Paint Application and Cleaning



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# Expanding Opportunities in EV

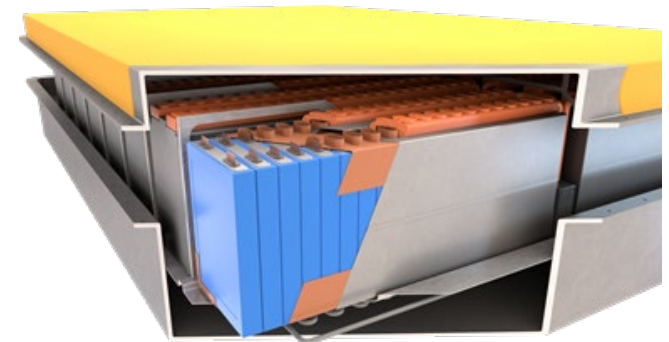
- Proliferation of electronic components that control vehicle propulsion, safety and comfort and convenience systems
- Electric vehicles currently average 100 more Electric Control Units than gas-powered vehicles
- Coatings used for:
  - battery cells
  - power conversion components
  - the electric drive system
  - battery packs that power the vehicles



# Coatings for EV Batteries

- Electric vehicle batteries depend on coatings to maintain optimal temperatures, reduce the risk of fire damage and electrical interference.
- Each battery pack design has its own set of needs and challenges that need to be addressed, which is why flexibility and diversity of offerings is essential for coatings providers in the EV space.
- They all need fire protection, corrosion and impact protection, temperature management and electrical shielding.
- In order to maintain batteries at the best functional temperatures, OEMs employ battery thermal management systems (BTMS), which are supported by coatings.
- Lithium-ion battery cells are full of flammable solvents, so intumescent coatings help protect batteries from fire damage.
- Dielectric coatings are used to prevent arcing between metal parts.

Battery packs require protection from heat overload and electromagnetic interference



## ...so, the main challenges in the years to come

- Russia Ukraine war
- Inflation/Stagflation
- Restricted Panel of Raw Materials due to EHS regulations
- E-Commerce impact on Sales/Mktg/Manufacturing
- Registration costs (UK REACH?/Others)
- Innovation: EHS, multifunctional properties, sensors & robotics
- Future digitalization and digitization strategies

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