



North American Castor Outlook
02-23-2024
Dr. Matthew Kriech



Performance | Sustainability | Technical Excellence | Commercial Scale

**WHERE SUSTAINABILITY AND
PERFORMANCE CONVERGE**

Our Vision

To deliver high-performing, innovative solutions for a sustainable future.

Our Mission

To be the concierge oleochemical provider to specialty and commodity markets.



North American Castor Outlook Agenda

- North American Energy and Demographic Landscape Shaping Growth
- Global Logistics = Short Term Disruption
- North American Castor Imports and 2024 Forecast
- Sustainability in North America – Castors Continued Role
- Conclusions



Hello from the BT Team in North America

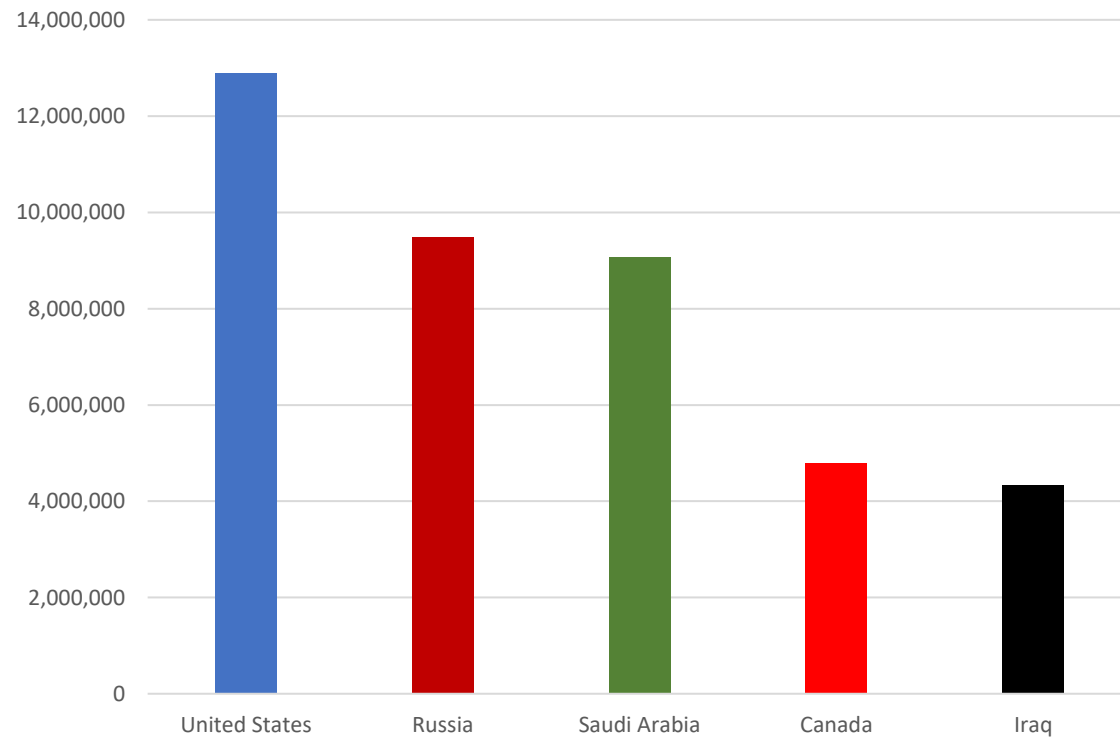
Sorry that's corn not castor being distilled!

The background of the slide features a dynamic, artistic splash of golden liquid. The liquid is captured in mid-motion, with several thick, flowing streams and numerous smaller droplets suspended in the air. The color is a rich, metallic gold, and the lighting creates bright highlights and deep shadows, giving the liquid a three-dimensional, glossy appearance. The splashes are concentrated in the upper and lower portions of the frame, framing the central text area.

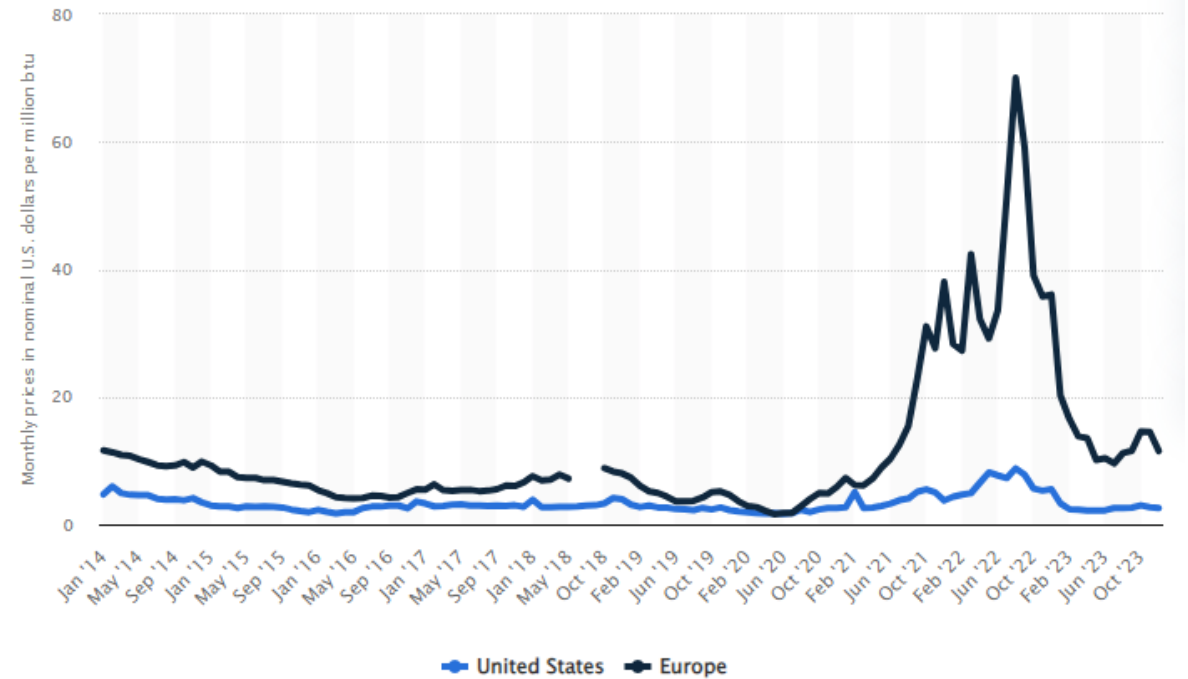
Economic Data – Long Term Growth

Energy Production in North America

Top 5 Oil Producers

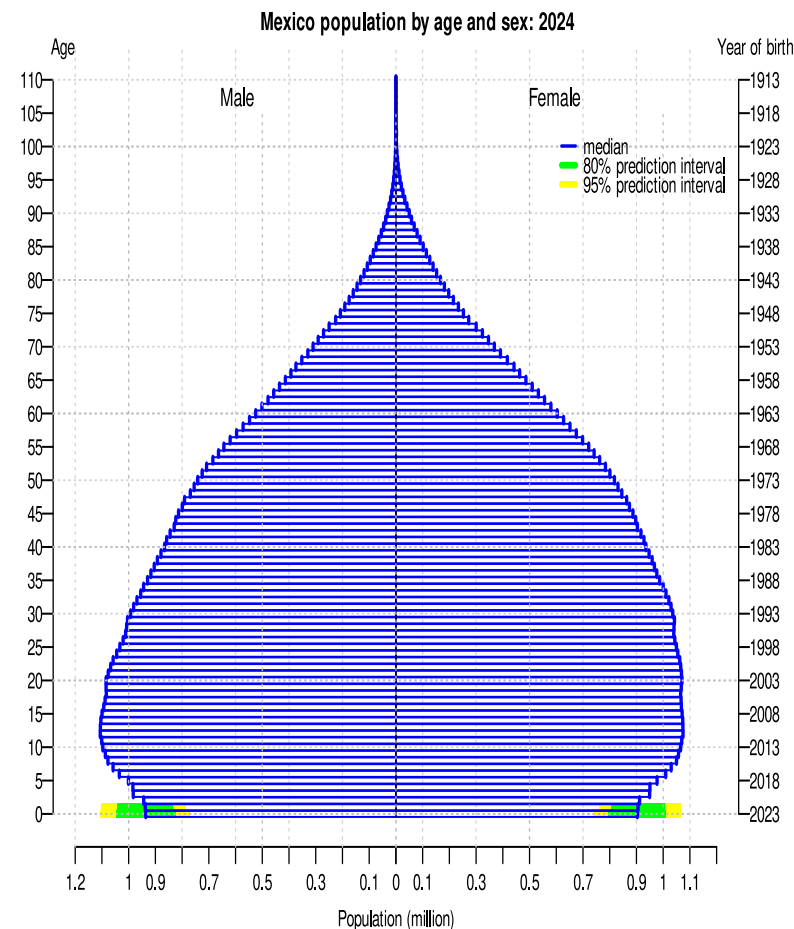


Natural Gas in US Dollars per MMBTU

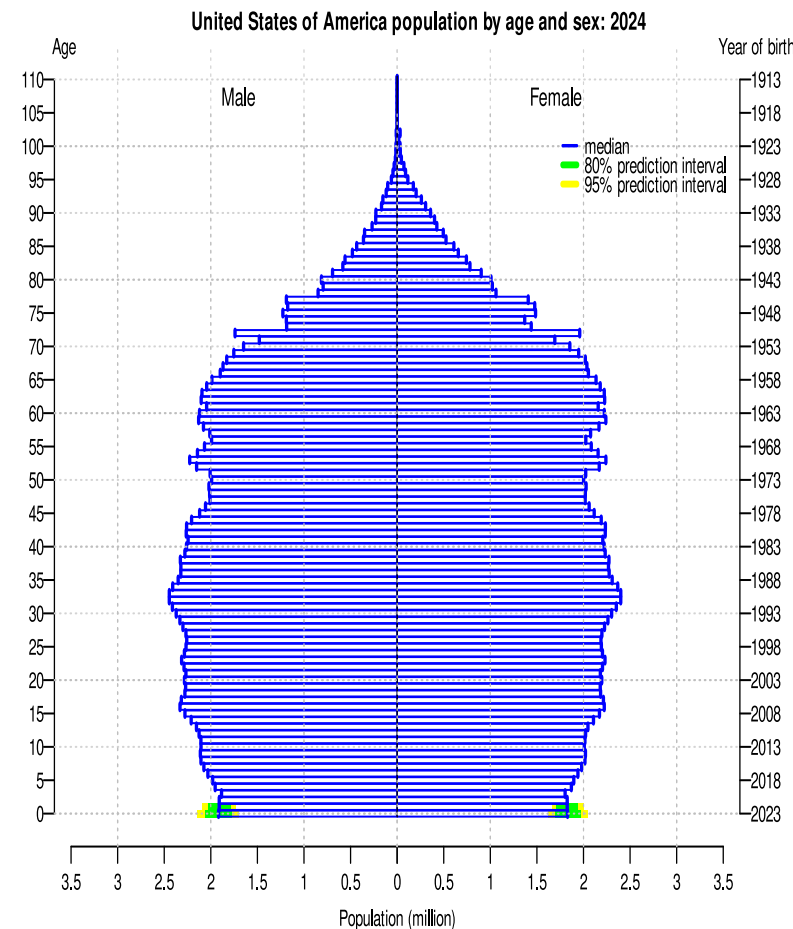


Source: EIA and IEA Databases

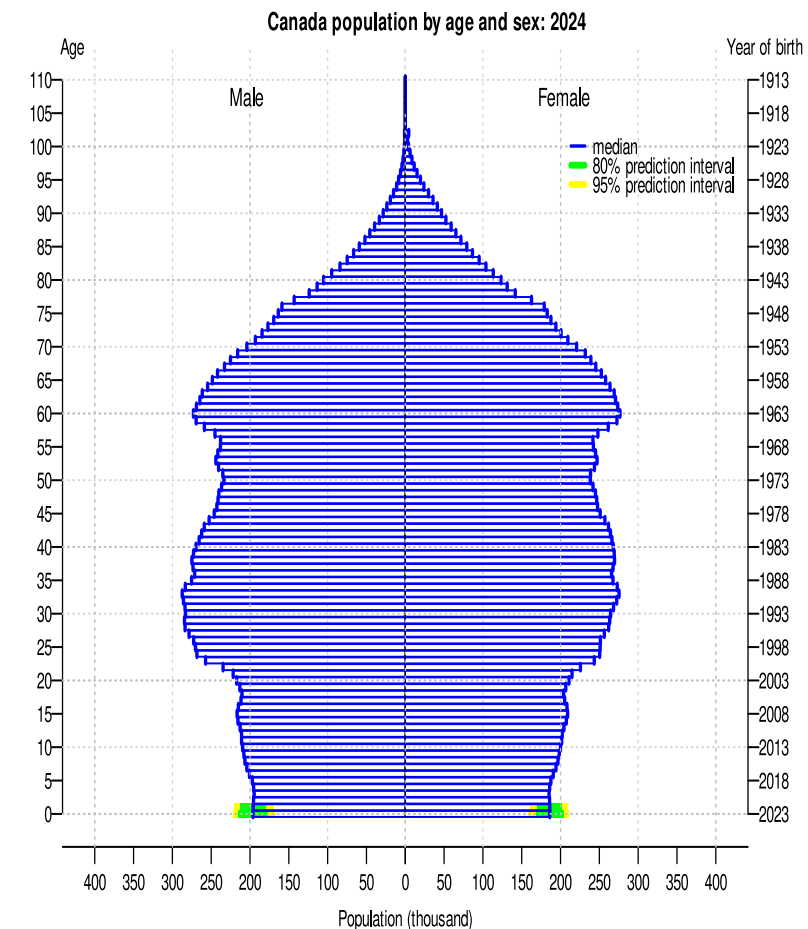
North American Demographics



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United Nations, DESA, Population Division. *World Population Prospects 2022*. <http://population.un.org/wpp/>

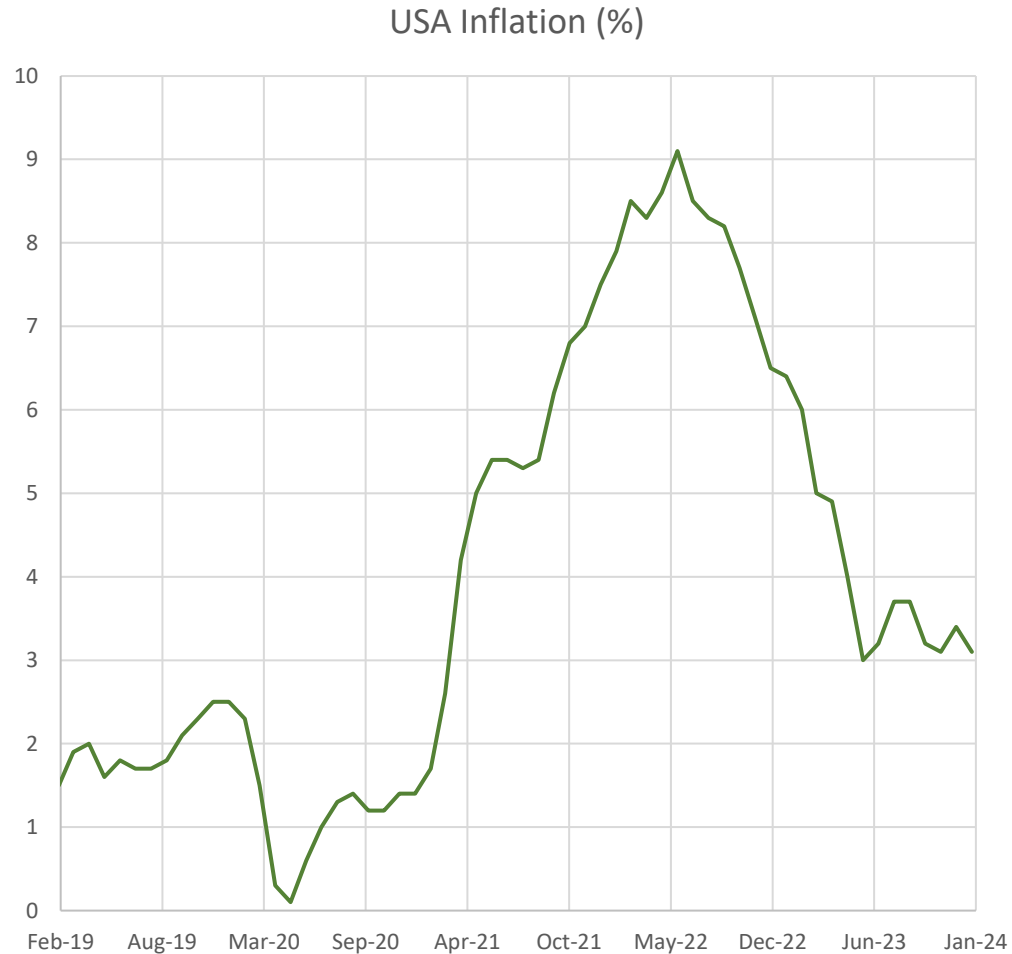


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United Nations, DESA, Population Division. *World Population Prospects 2022*. <http://population.un.org/wpp/>

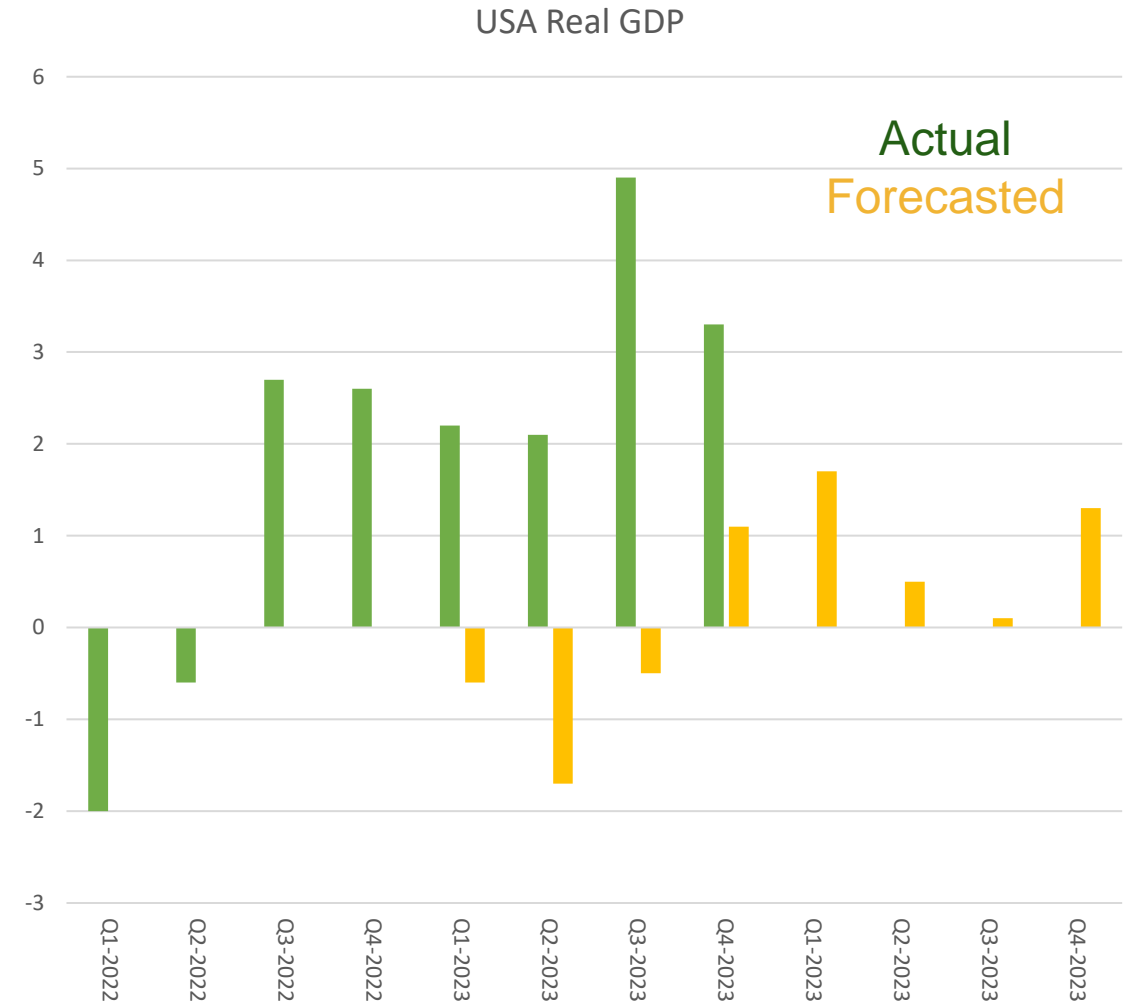


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United Nations, DESA, Population Division. *World Population Prospects 2022*. <http://population.un.org/wpp/>


US Economic Data



Source: US Bureau of Labor Statistics
www.bls.gov

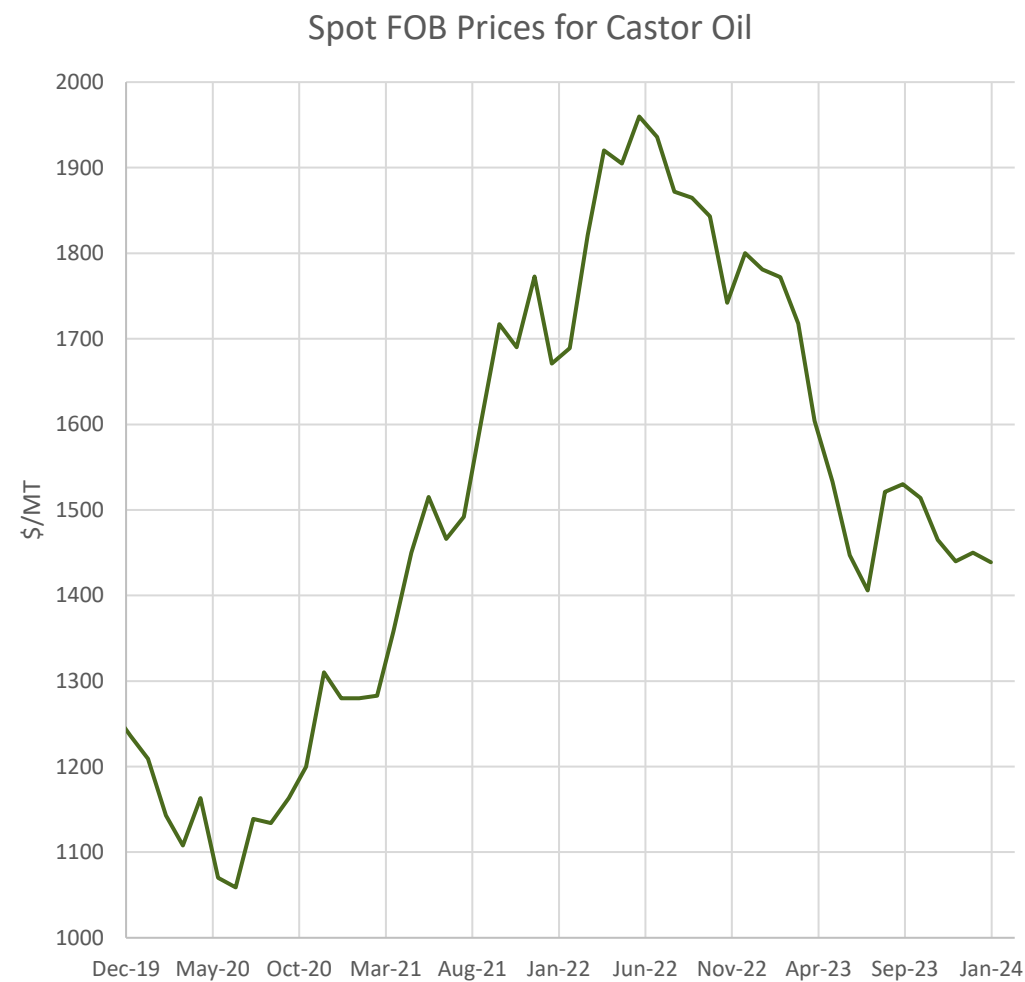


Source: The Conference Board
www.conference-board.org

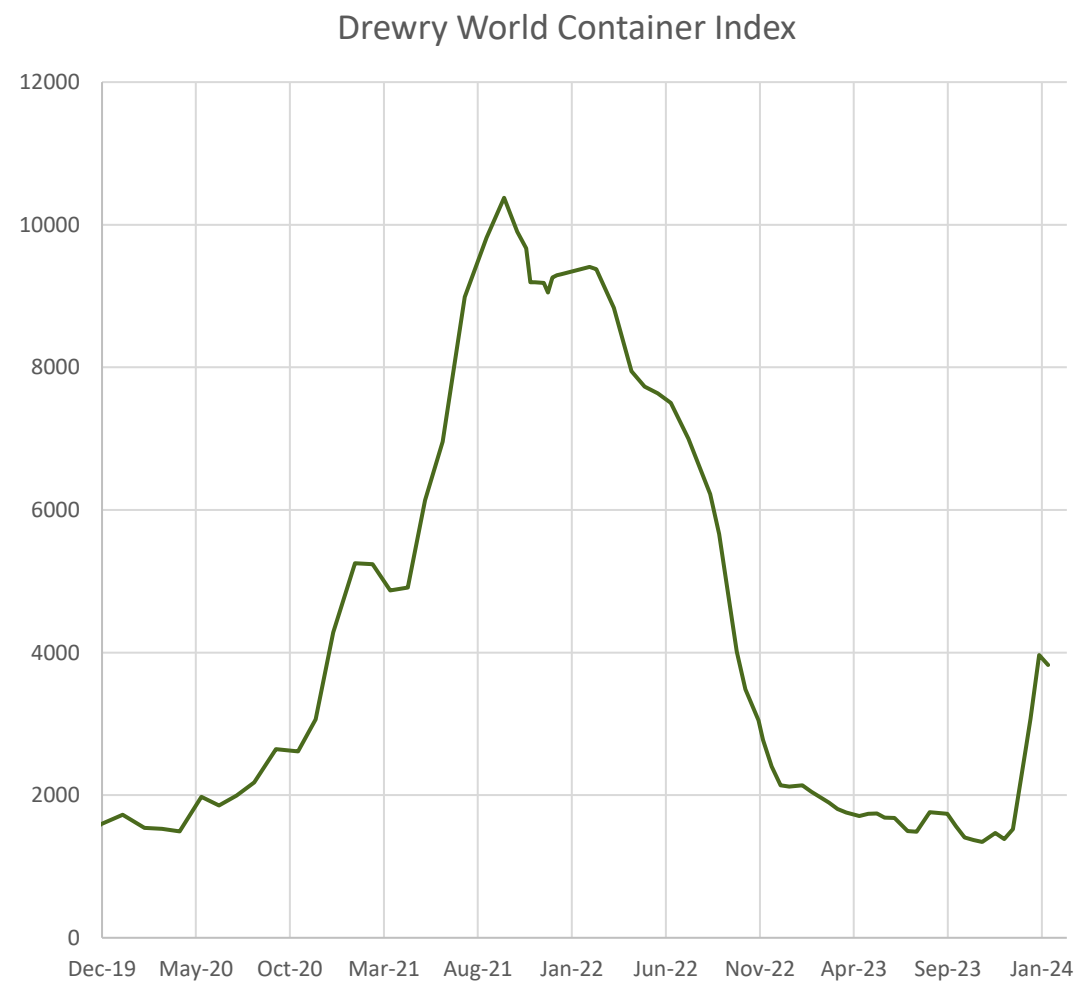
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Logistics Data – Short Term Pain

Supply Chain Price Indicators

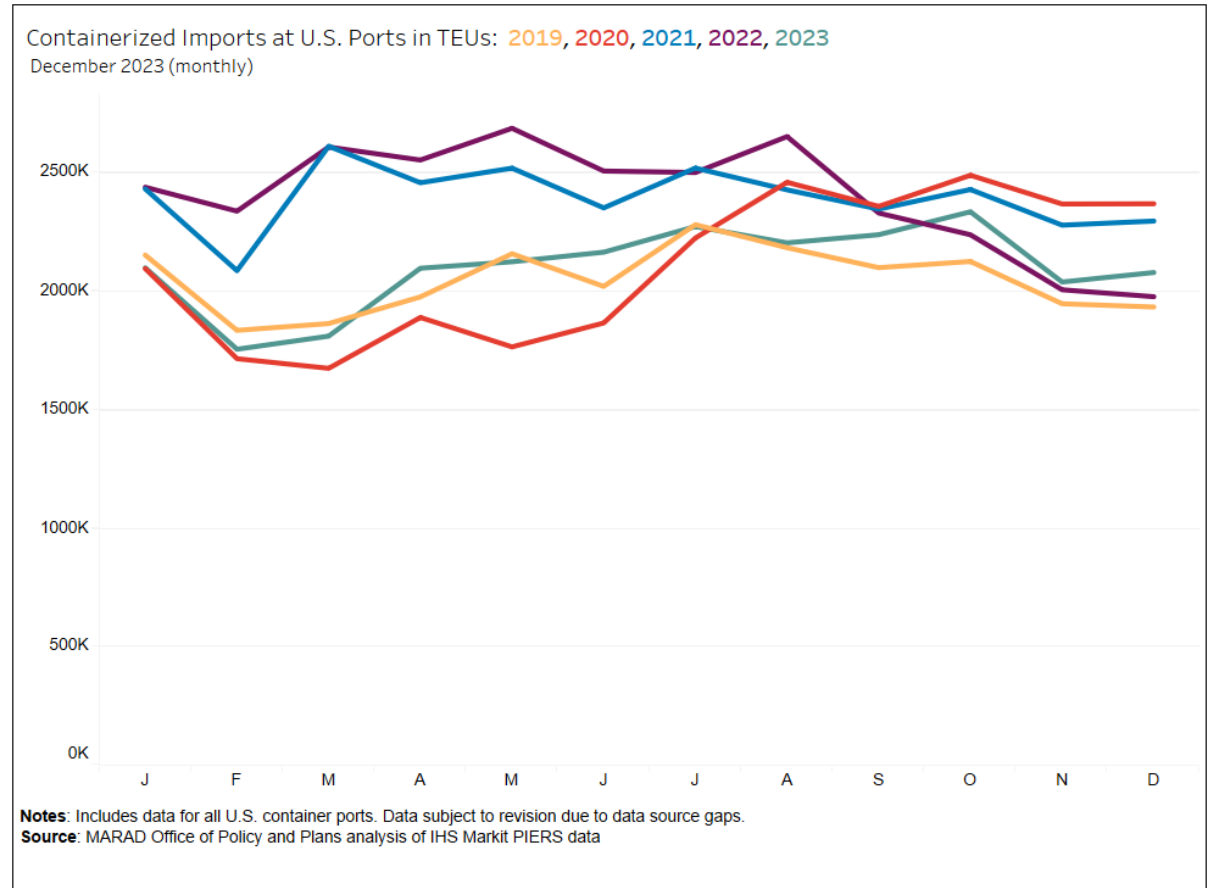
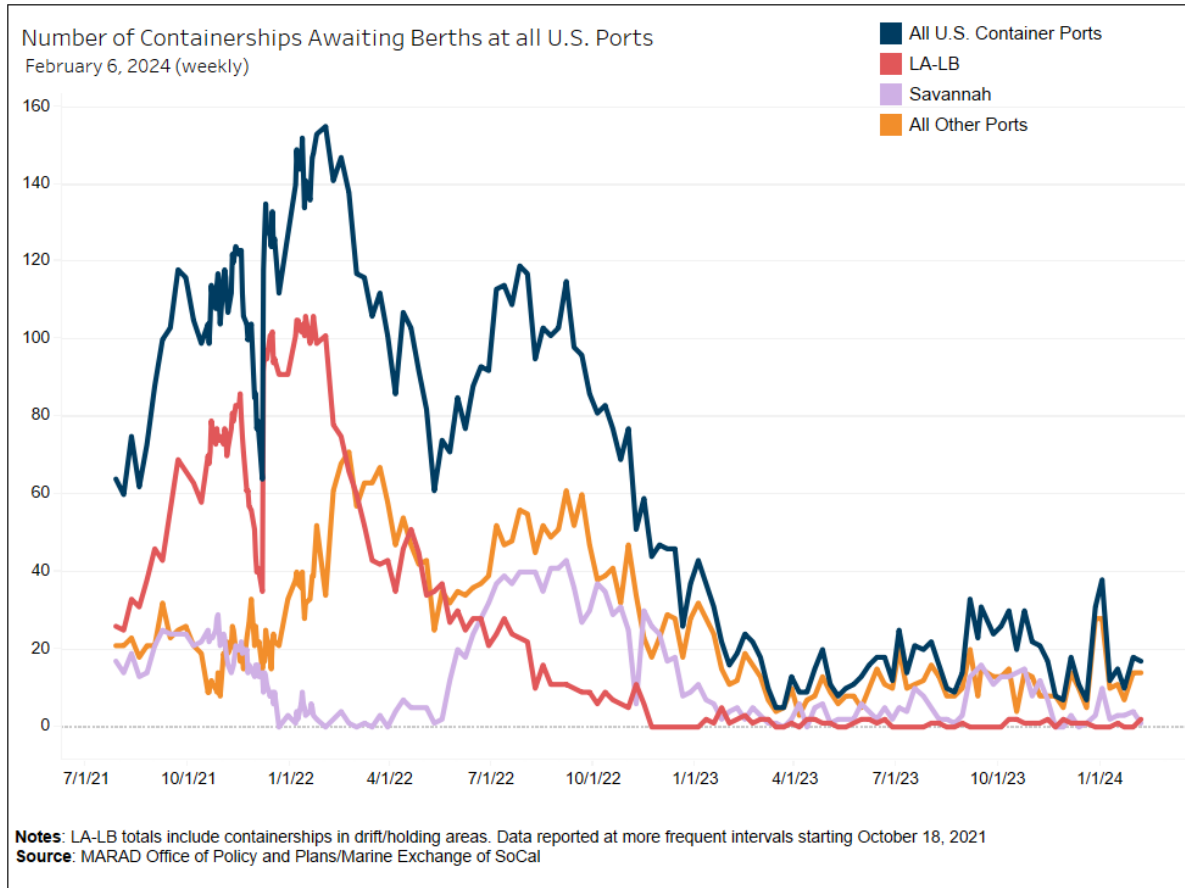


Castor price stability has been good for business



Red Sea delays IMPACTING business

US Port Congestion and Imports 2019-2023

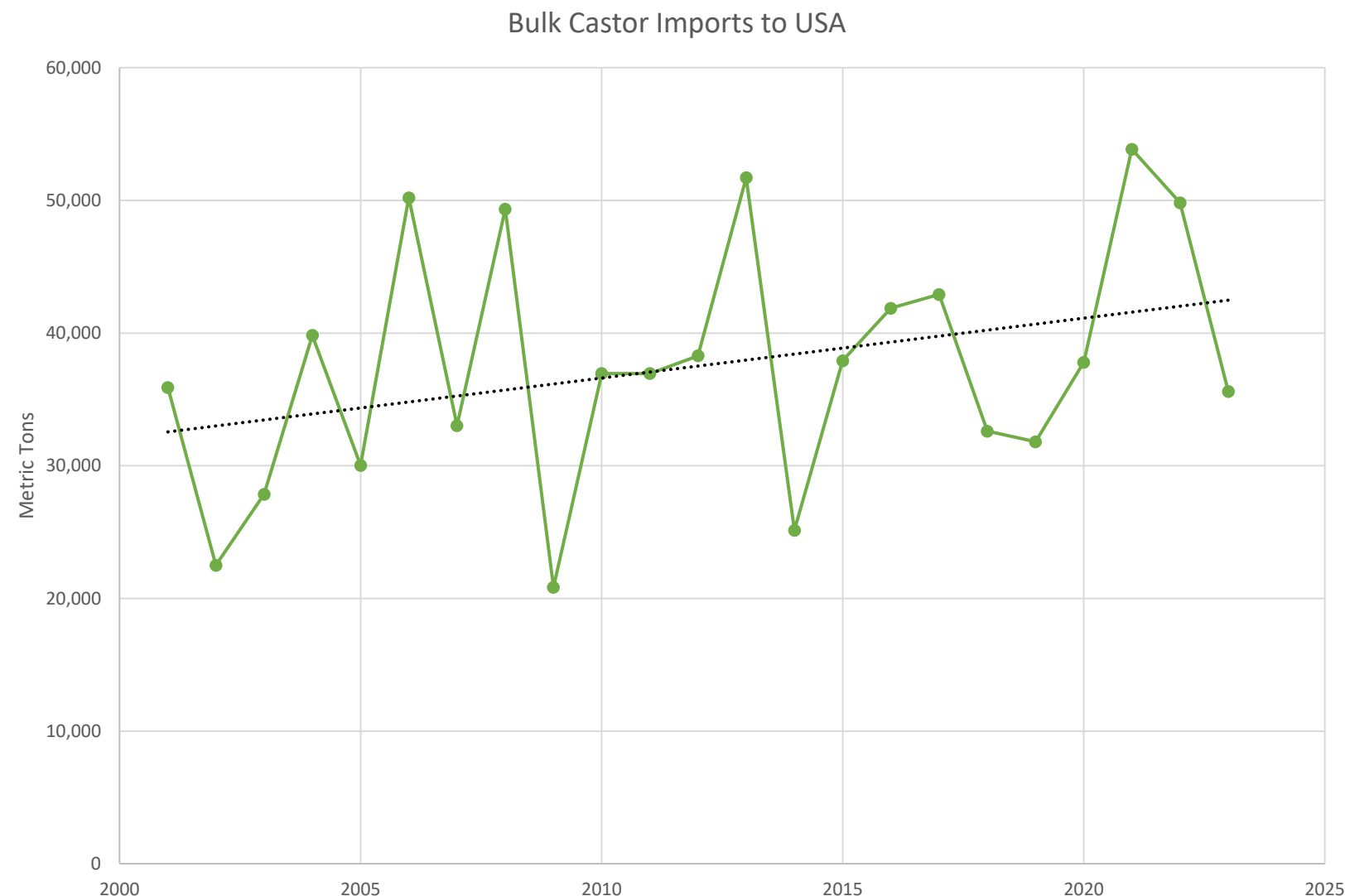


* US Bureau of Transportation Statistics – www.bts.gov

The background of the slide features a dynamic, artistic splash of golden liquid. The liquid is captured in mid-motion, with several large, flowing streams and numerous smaller droplets suspended in the air. The color is a rich, metallic gold, and the lighting creates bright highlights and deep shadows, emphasizing the liquid's viscosity and movement. This decorative element frames the central text area.

Castor Imports and 2024 Forecast

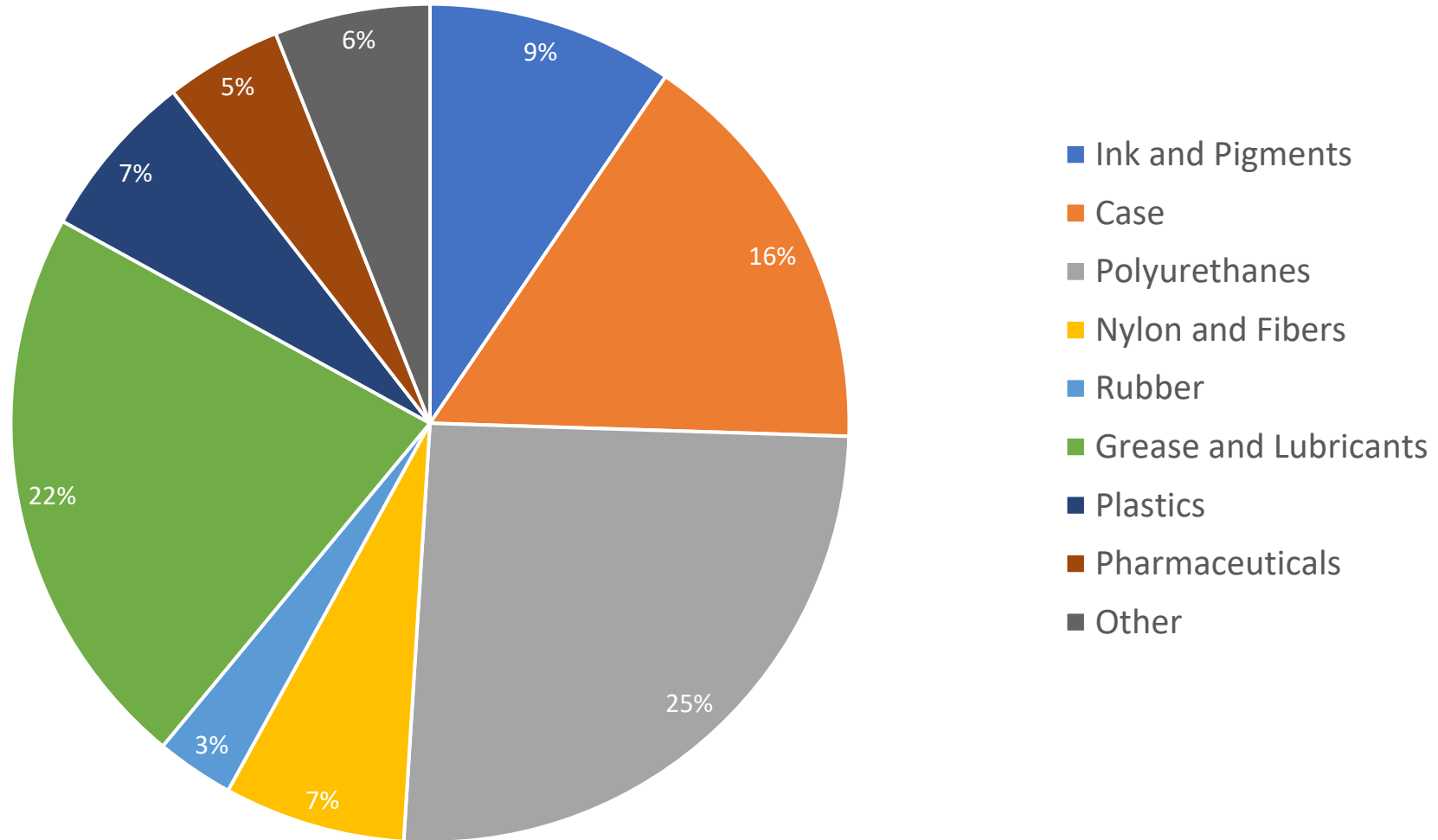
USA Bulk Castor Imports



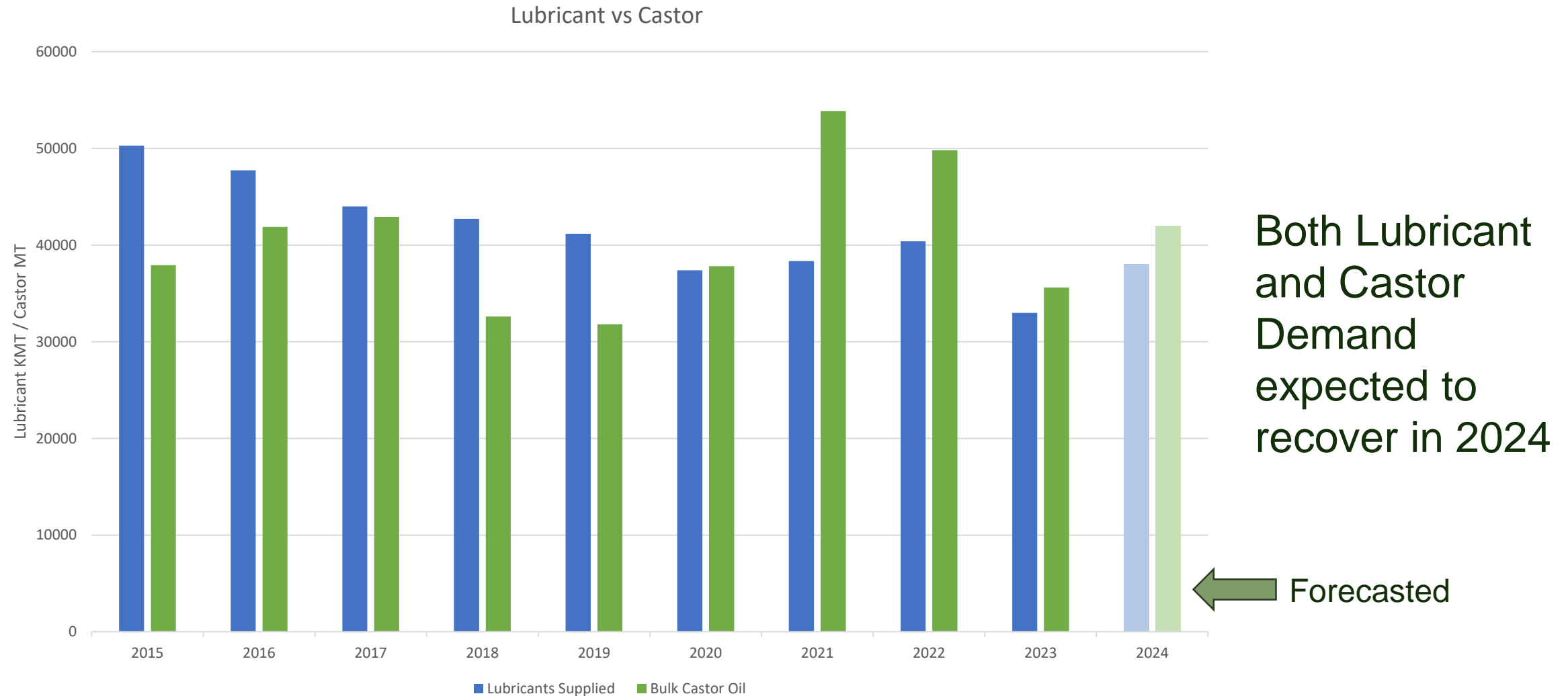
On average Castor Oil imports have been increasing by ~500 MT a year over the last 23 years

* Special Thanks to Andy Pollack from Alnoroil for Supplying Import Data

Castor Uses in North America



Lubricant Demand as Example



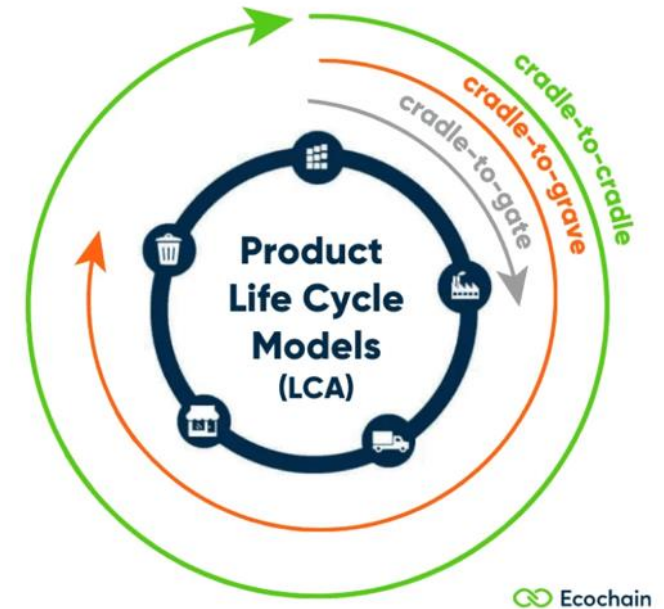
* EIA Lubricant Supplied USA data www.eia.gov

The background of the slide features a dynamic, artistic splash of golden liquid against a white background. The liquid forms various shapes, including elongated, flowing ribbons and smaller, more spherical droplets, creating a sense of movement and elegance. A solid dark green horizontal bar is positioned across the middle of the image, serving as a backdrop for the title.

Sustainability

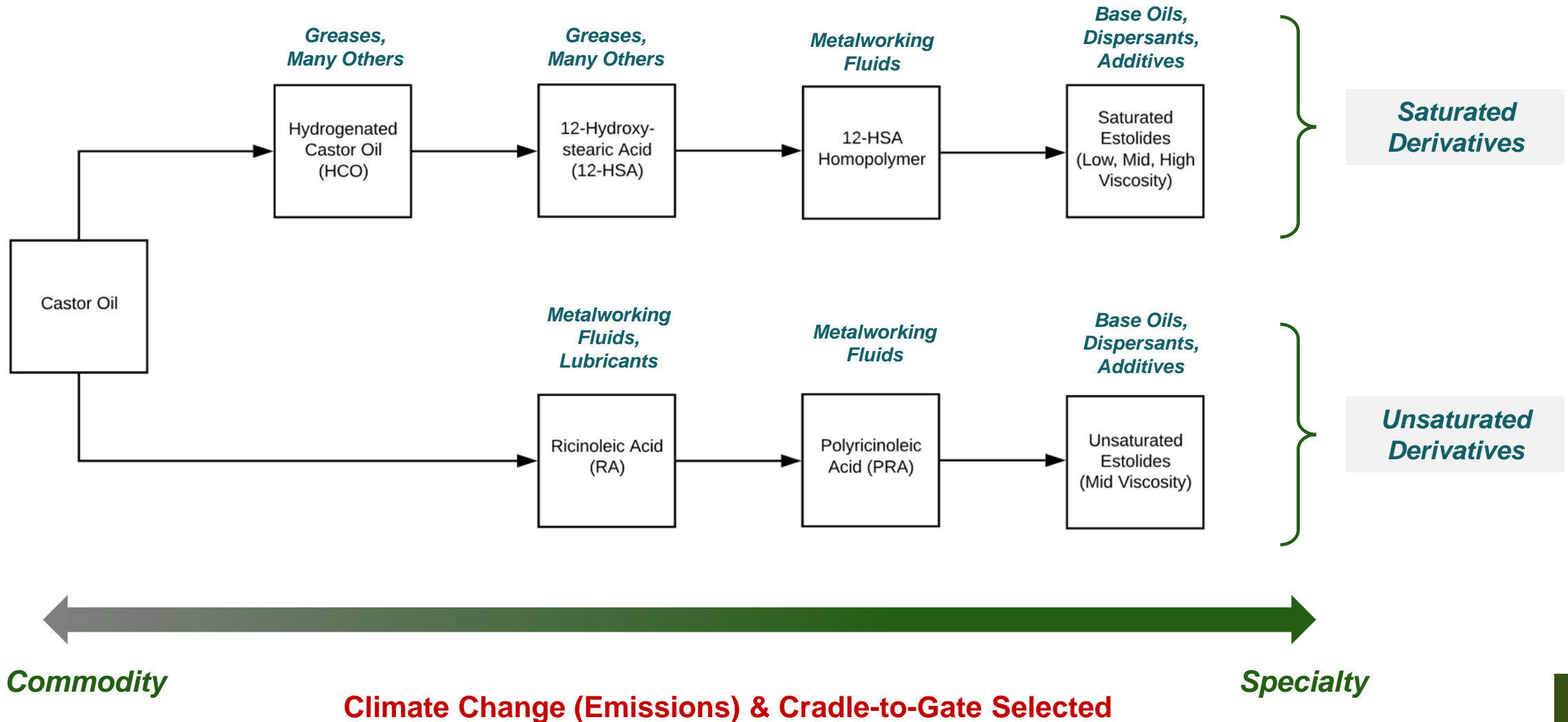
Sustainability – Life Cycle Assessments

- North American Customers are making Sustainability part of the buying a procurement decision
- **WE BELIEVE Castor is one of the MOST SUSTAINABLE Oleochemical Sources**
- The Life Cycle Assessment is the Gold Standard for Proving Sustainability
- There are some IMPORTANT rules to follow for an LCA to be accepted
- LCA needs to follow the internationally recognized standards (ISO 14040, ISO 14044, and ISO 14067)
- ISO standards require **3rd party critical review of LCA**, if data is intended to be used to support marketing claims or make comparative assertions
- LCA completed by Environmental Resource Management and Audited by Dr. Matthias Finkbeiner from Technical University Berlin, Germany



Background on Products

Value Chain

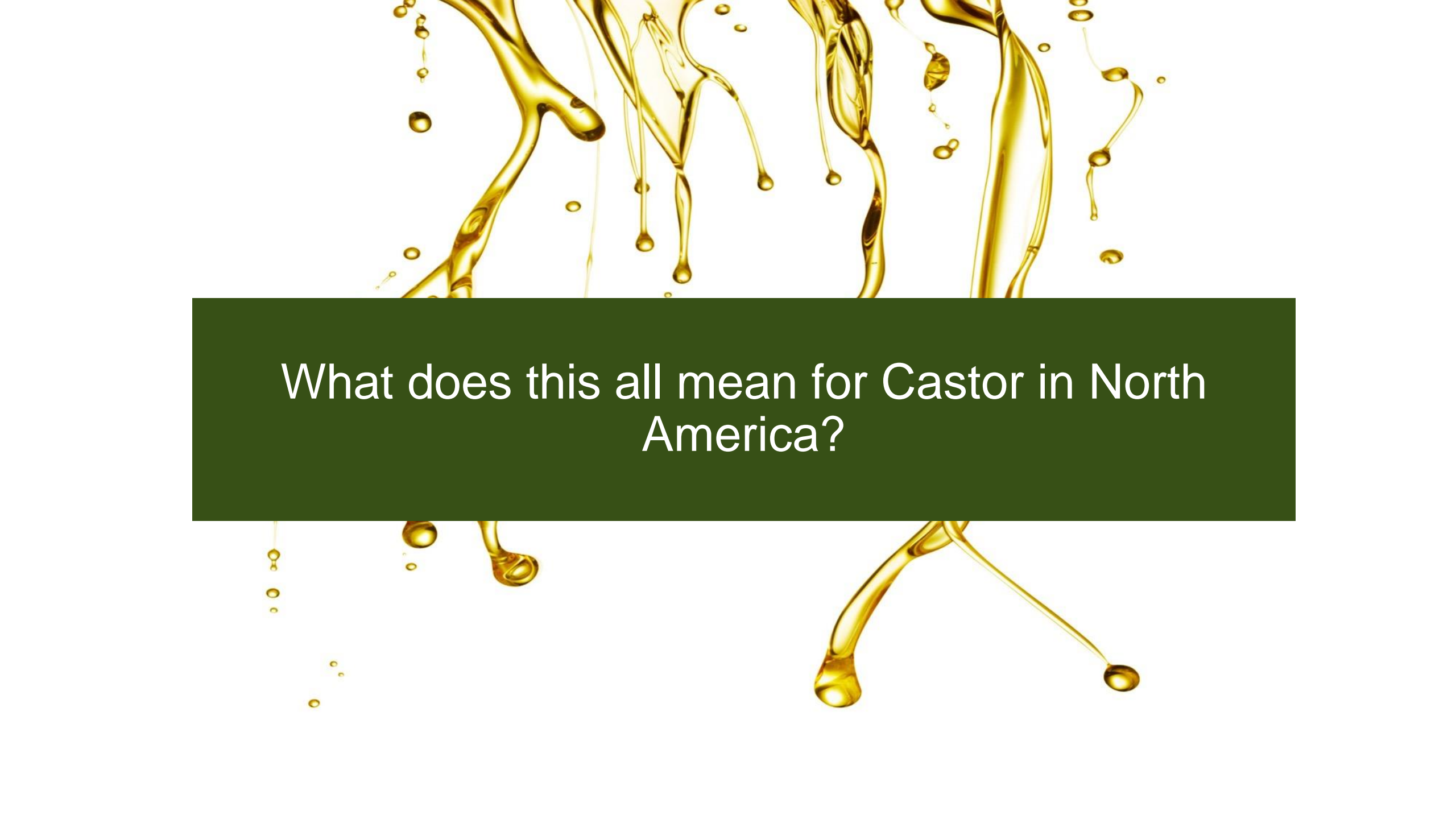


Summary of Emissions

Numbers shown are “kg CO2e” units (GWP100), associated with production of 1 MT product

Castor Oil	-648 kg CO2e
Hydrogenated Castor Oil	-145 kg CO2e
12-Hydroxystearic Acid	533 kg CO2e
Saturated Estolide, Low Vis	1954 kg CO2e
Saturated Estolide, Mid Vis	1802 kg CO2e
Saturated Estolide, High Vis	1712 kg CO2e
Ricinoleic Acid	-1 kg CO2e
Polyricinoleic Acid	695 kg CO2e
Unsaturated Estolide, Mid Vis	1622 kg CO2e

- The further downstream from castor, the higher the emissions due to added energy and chemicals, scale of production also matters
- The largest contributors to fossil emissions were **(1) castor oil (fertilizers)** and **(2) electricity** used in the process
- For biogenic emissions, the use of biomass (castor cake) in the on-site steam boiler provides positive impact
- **Impacts associated with waste activities/treatments were found to be <1% of all impacts for all products modeled**, since most co-products and side streams are sold back into other markets

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What does this all mean for Castor in North America?

Conclusion

- The North American energy landscape, demographics, and current economic condition have it posed for good long-term growth
 - Expect more “on-shoring” of manufacturing as companies look to shorten supply chains
- Logistics costs and dwell times have dramatically improved since COVID but current Red Sea issues are causing short-term supply chain disruptions
- Castor demand has been steadily growing over the last 25 years in North American and is forecasted to recover slightly in 2024, based on demand projections in target markets (lubricants)
- Sustainability is becoming more important in North American Customers buying decisions, and Castor has a strong Sustainability Story



THANK YOU

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