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# SURFACTANTS: THE BIG PICTURE, PUTTING AG IN CONTEXT

**Neil Burns**
Managing Partner, Neil A Burns LLC

# Neil A Burns LLC

NEIL A BURNS LLC

# For whom the bell tolls

**No man is an island,**
**Entire of itself.**

**...**

**...**

**Each man's death diminishes me,**
**For I am involved in mankind.**
**Therefore, send not to know**
**For whom the bell tolls,**
**It tolls for thee.**

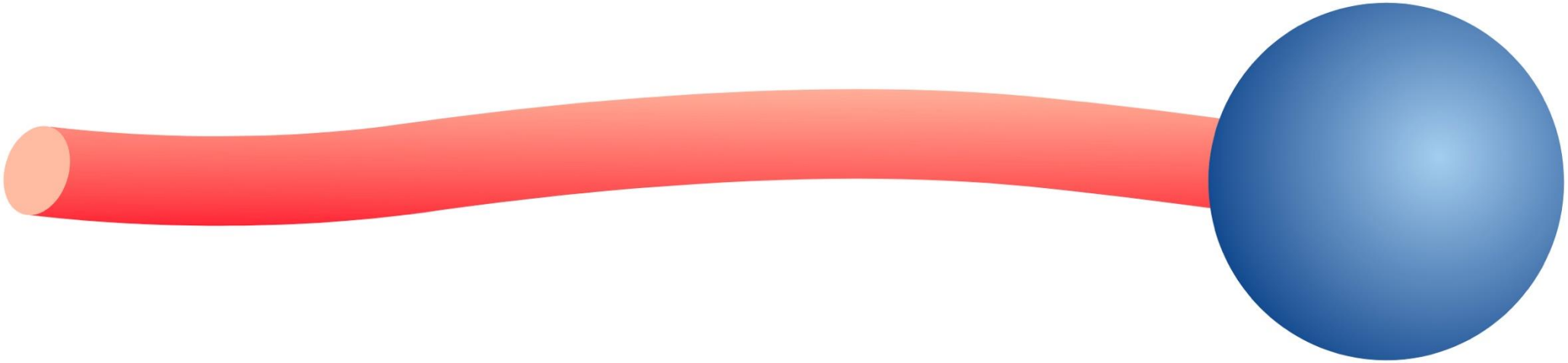
# Agenda

- Surfactants Overview
- Hot Topics
- What's New
- Q&A

# Hydrophobe + Hydrophile = Surfactant



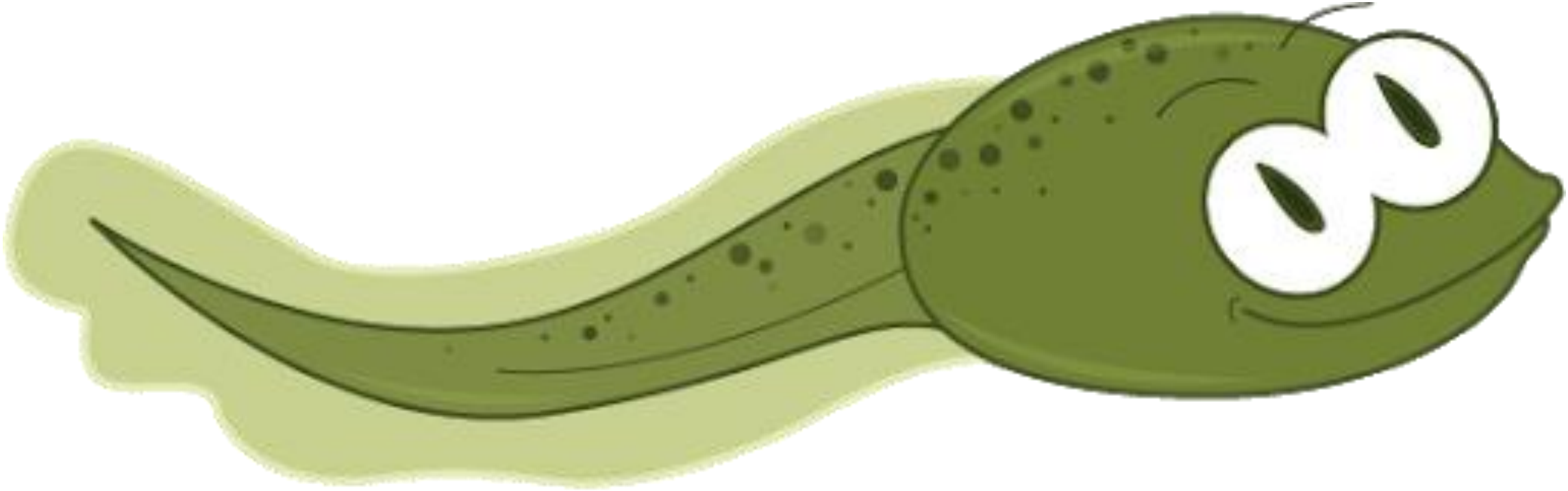
**Hydrophobe – "Water Fearing"**



**Hydrophile – "Water Loving"**

# The Tadpole

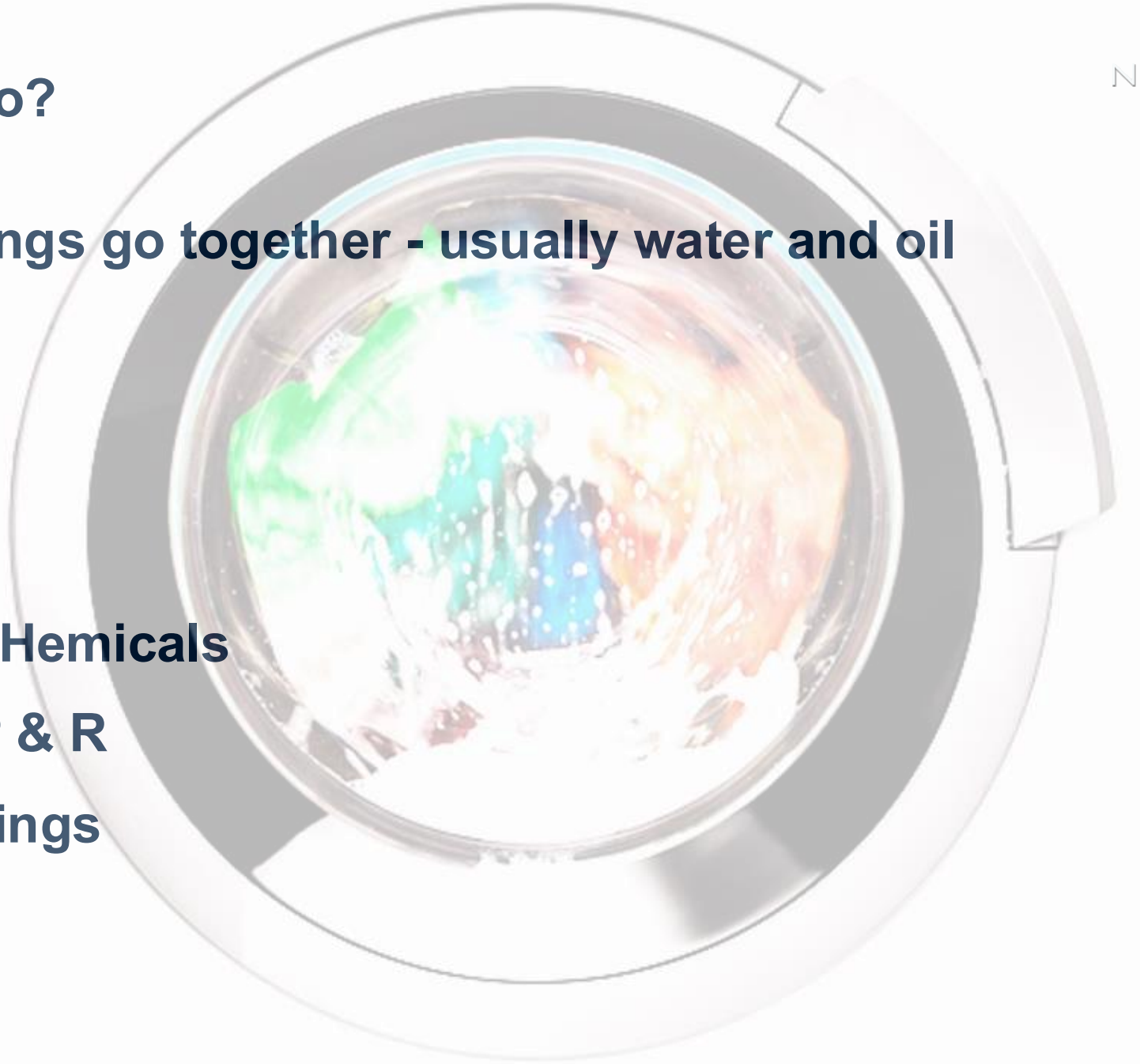




## What do they do?

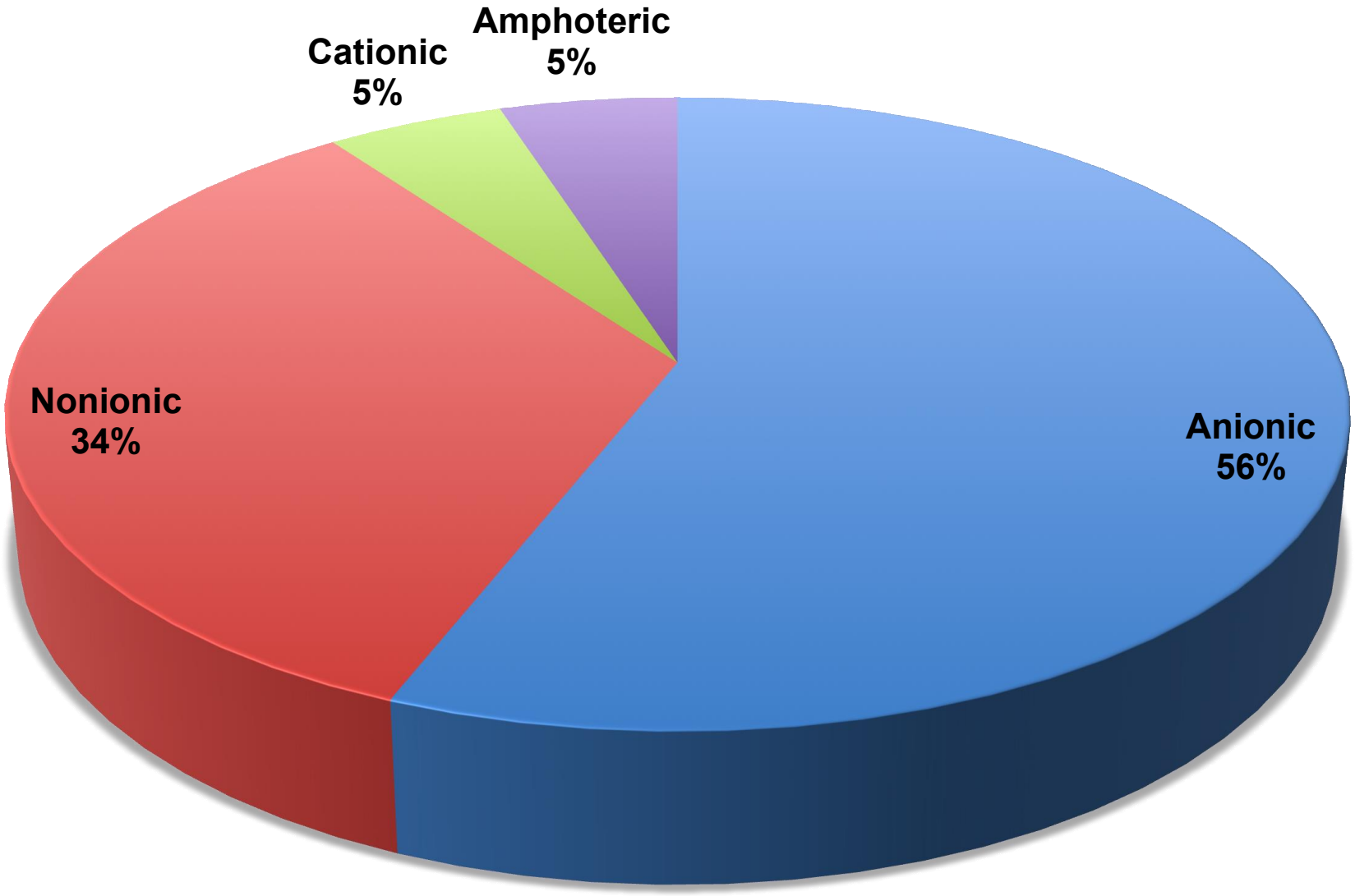
**Help un-like things go together - usually water and oil**

- Cleaning
- Food
- Metalworking
- Agricultural CHemicals
- Oil & Gas E, P & R
- Paints & Coatings



# Anionics and Nonionics are about 90% of the market tonnes

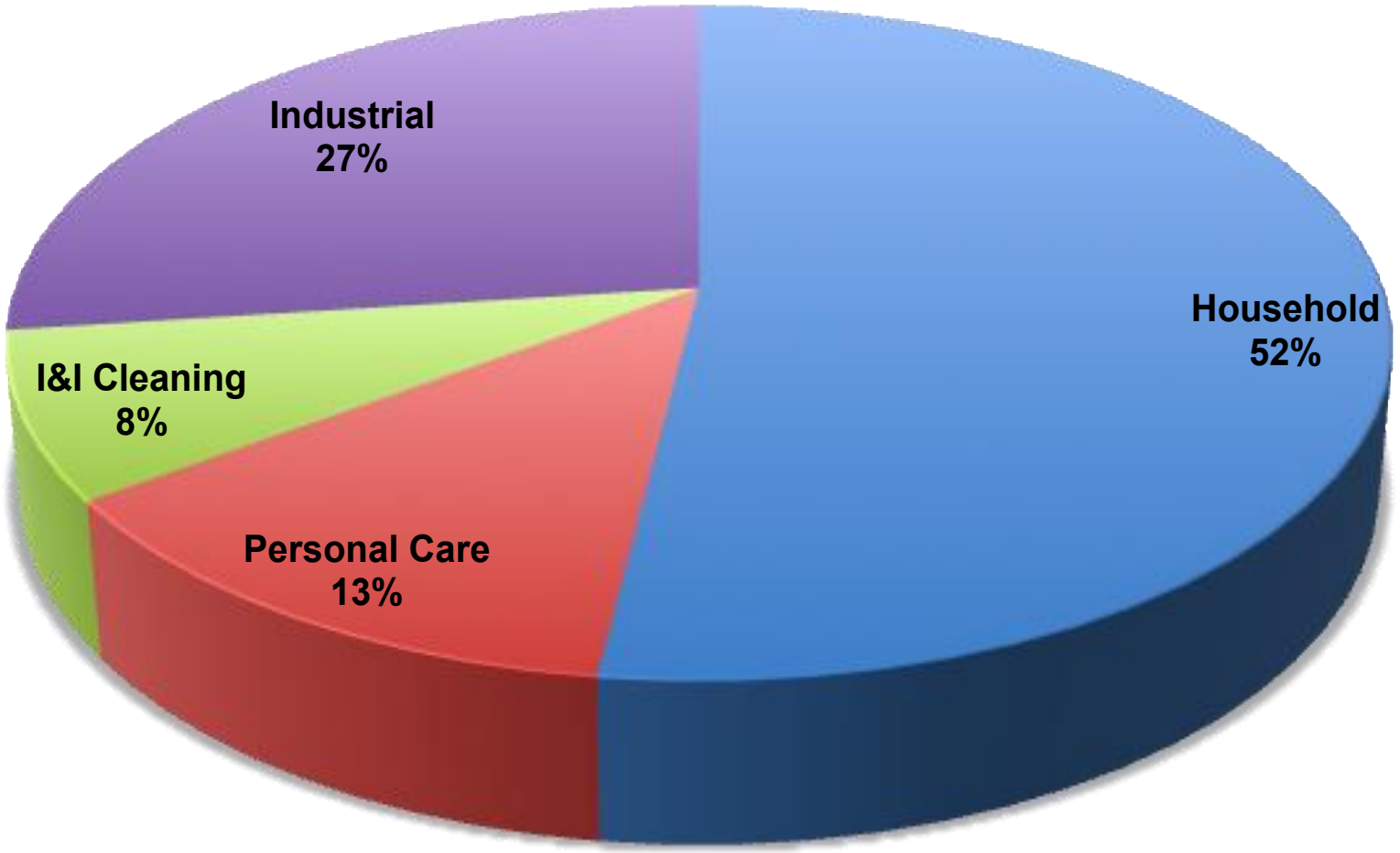





- 20 Million MT
- USD 48 - 50 Billion
- ~USD 2.40 – 2.50 / Kg
- Growth ~ 3.3% / yr

# Major Applications and Markets

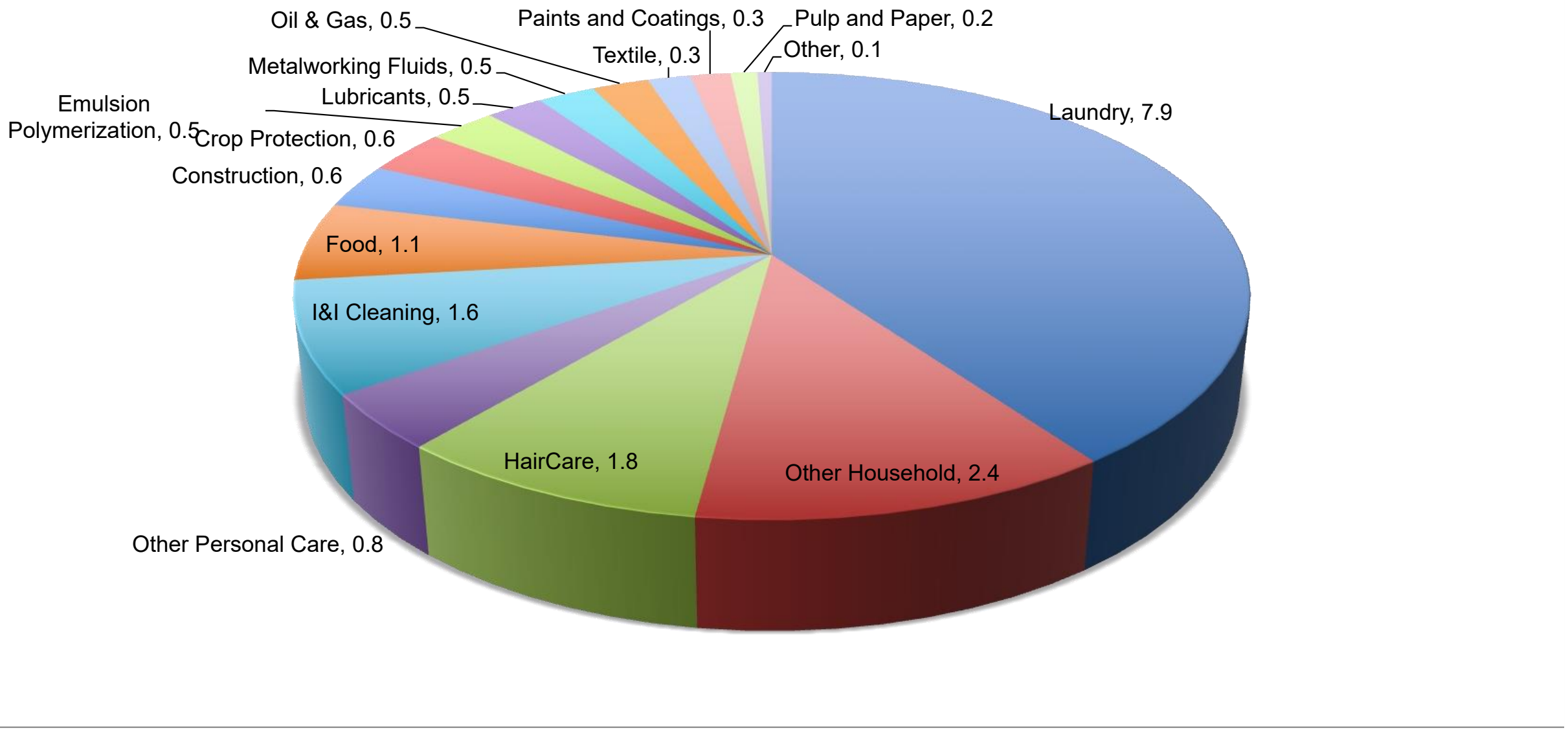





- Cleaning is ¾ of the tonnes
- About 60% of the $
- Industrial (non-cleaning) is a highly diverse segment

# Application Markets by Volume (Millions of MT/yr)





## Household Cleaning - $140 Billion Retail

## Laundry and everything else in the home

- *HDL* (Heavy Duty Liquid) = Laundry Liquid
- *Fabric Care* = Ancillary to cleaning (e.g. conditioning)
- *Monodose* (tablets and sachets, sheets: e.g. Tide® Pods)and sheets
- *LDL* (Light Duty Liquid) = Hand Dish Detergent
- *ADD* (Auto Dish Detergent) = for your dishwasher
- *HSC* (Hard Surface Cleaners) = Tub & Tile, Floor, Window..
- Carpet Cleaners, wipes etc.…

# Personal Care- $675 Billion Retail

## Rinse Off and Leave On Products

- Shampoo
- Body Wash
- Facial Cleansers
- Liquid Soaps
- Hair Conditioner
- Skin Creams and Lotions
- All other Cosmetics

# Industrial & Institutional (I&I) Cleaning- $60 Bn in Materials



## Restaurants, Hotels, Schools, Hospitals etc..

- *Warewashing* – Washing dishes in restaurants
- *Janitorial* – General cleaning in buildings
- *Dairy / Food Processing* – Facility Cleaning
- *Cars and other Vehicles* – Consumers and Fleet
- *Institutional Laundry* – Hotels, hospitals etc.
- *Metal Cleaners* – Factories, Precision Cleaning

# Industrial Applications

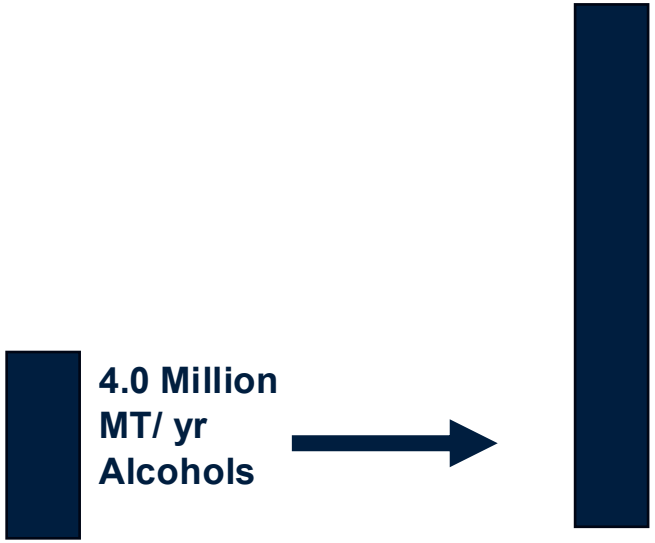
## A very diverse set of uses – many valuable slices of the 25 – 27% of the MT

- Agrochemical (*Transitioning from commodity tank-mix adjuvants to specialized, built-in delivery systems (e.g., high-load multi-active dispersants).)*
- CASE (*Coatings, Adhesives and Sealants)*
- Construction *(Cement and Wallboard - Dispersants )*
- Emulsion Polymerization *(Styrene Butadiene Rubber Latex)*
- Food *(Emulsifiers for Cakes, Biscuits etc.)*
- Medical *(e.g. for premature babies)*
- Mining *(Ore floatation and separation)*
- Oil & Gas *(Drilling, extraction, Fraccing, EOR)*
- Paper *(de-inking etc.)*
- Textiles *(dyeing, weaving, spin-finishing)*

# 2 Intermediates + 3 Feedstocks ➡ 75% of Market

- **Quarter of the market**
- Made from Benzene & Kerosene
- **Crude Oil** Feedstock

## Linear Alkyl Benzene




- **Half of the market**
- SLS, SLES, AE, Quats, Esters
- Oleo Alcohols
- **Palm** Kernel Oil Feedstock

- EO and Petro Alchols from Ethylene
- **Natural Gas** and **Crude Oil** Feedstocks

## Detergent Range Alcohols

Hot
TOPICS

# Why such a Solemn Opening?

1. Regulations
2. Supply Chain
3. Trade Wars
4. War on Carbon
5. War on Palm
6. War on EO
7. Actual War

# Regulations



- **Dioxane**
  - NY State 1 ppm in the consumer product
  - Means about 5 ppm in SLES (100% active basis)
  - Proposed EU limit of 1 ppm in surfactant
    - Shelved for further study
- **EUDR**
  - **Eu**rope's **D**umbest **R**egulation
  - With a Containership size loophole
- **EPA & EFSA** Inert Pruning: Phase-outs of legacy inerts (including certain ethoxylates and endocrine disruptors)
- **EU Microplastics** Ban: Threatens traditional polymeric surfactants, seed coatings, and controlled-release encapsulates.

## Supply Chain

- **Parrafins (for LAB) shortage** – Imminent
  - With startup of integrate LAB capacity
  - Shortage of merchant n-paraffin capacity

- **Palm Kernel Shortage (for alcohols)** – Imminent
  - Yields plateauing
  - Aging Trees
  - Labor shortage
  - Disease
  - Kernel size
  - Indonesian plantation seizures & export taxes

- **Ag (and other) Chem Localization**

# But wait! …. Just let that last slide sink in!

- Rember I told you:
  - Quarter of the market relies on LAB and half the market on detergent range alcohols
- Yeah well…
- LAB = Benzene + n-paraffins
- **Looming shortage of n-paraffins**
- And…
- Most detergent range alcohols come from Palm Kernel Oil
- **Looming shortage of PKO**

# Trade Wars



- **2025 April Tariffs:** 32% for Indonesia and 25% for Malaysia,
- Before April ‘25 – Zero tarrifs applied.

- **Conditional Zero-Tariff Pathway:** A September 2025 US Executive Order (Annex III) designated **PKO and fatty alcohols as essential goods** . Created a pathway for these imports to return to a 0% tariff, contingent upon finalized bilateral trade agreements.

- **Supreme Court Invalidation**: On February 20, 2026, the US Supreme Court ruled that the President lacked the authority to impose tariffs under **IEEPA**.

- **Current Section 122 Surcharge:** invoked Section 122 of the Trade Act to implement a universal **10% global import surcharge.**

- **The administration has threatened** to increase this Section 122 rate to 15% later in the year.

# War on Carbon



- Strictly petrochemical or “non-biogenic” carbon
- Pressure has backed off a bit but big consumer product companies still have target  - and more flexibility
- Sustainability? Yes but…. You know.. cost
- Still two thirds of surfactants mass

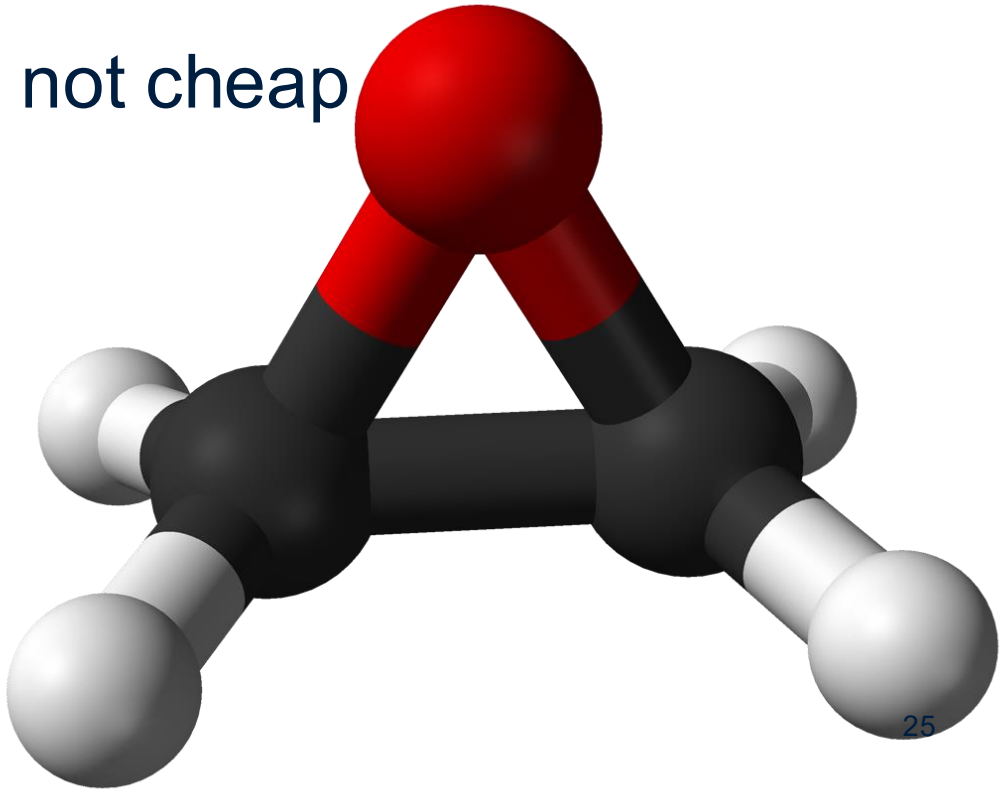
## War on Palm

- Monoculture replacing peat bogs
- The Orang Utan didn't help
- RSPO
- Palm-Free Marketing
- BUT….
- Professionally managed palm plantations yield 3.5 and 5 metric tons of oil per hectare per year.
- Soy farms yield about 0.4 to 0.5 metric tons of oil per hectare per year.
- Soy farm requires up to 10 times more cleared land area than a professionally managed palm plantation.

# War on EO



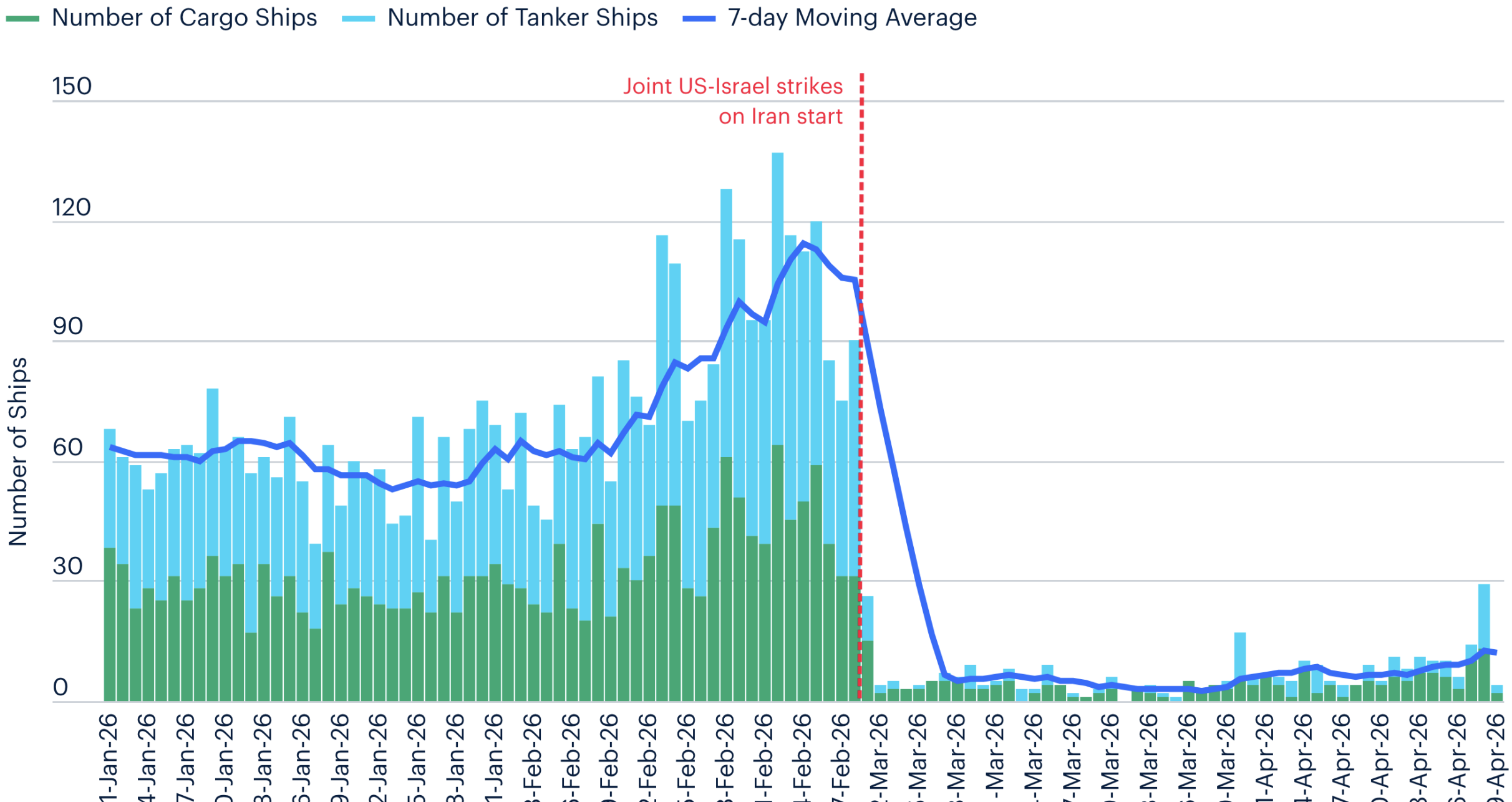
- EO is used in hundreds of medical sterilization centers
- Linked also to Dioxane regulations
- Transportation gets harder. Pipelines are not cheap
- EO-Free marketing
- Potential adjuvant disruption

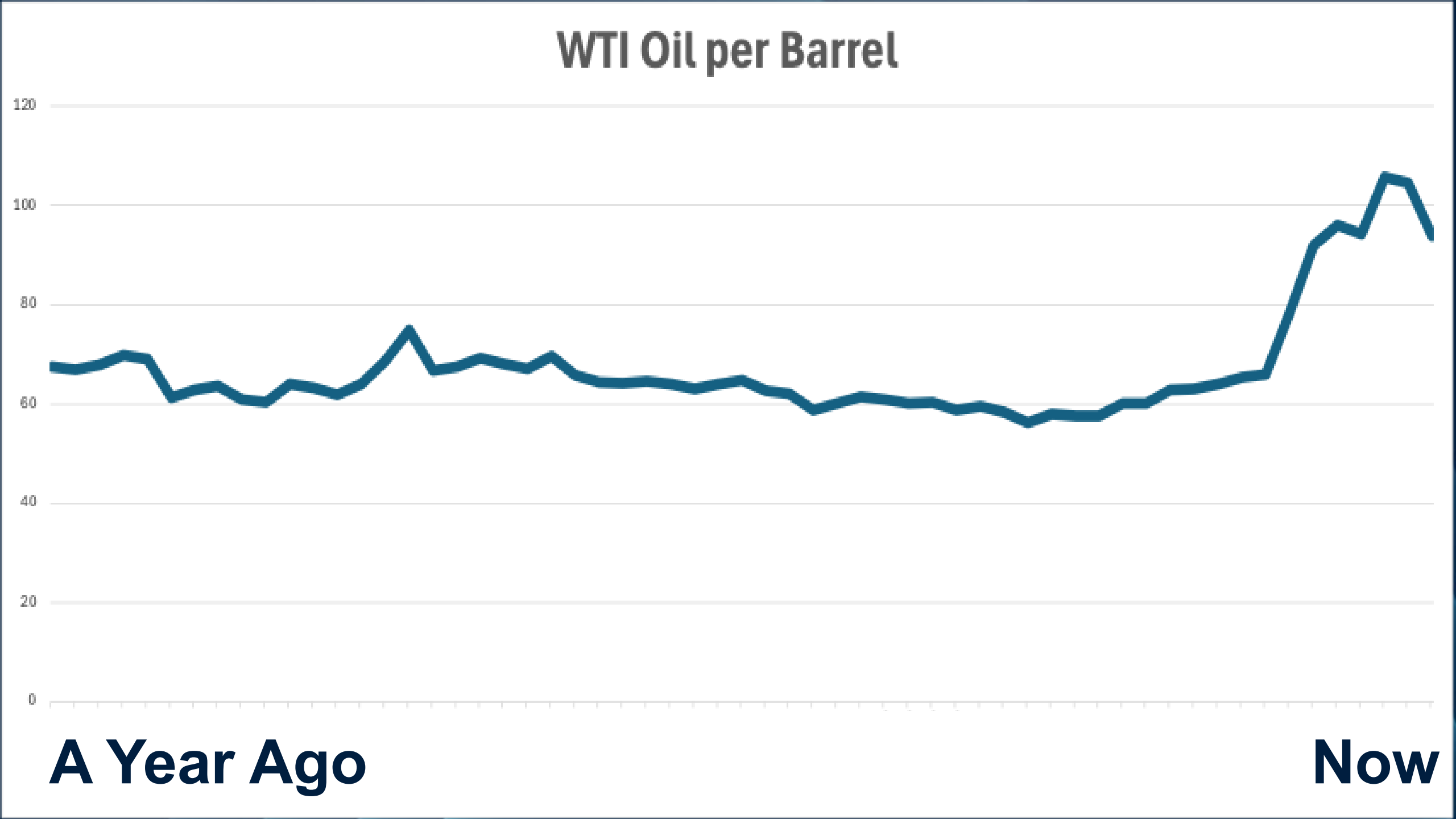


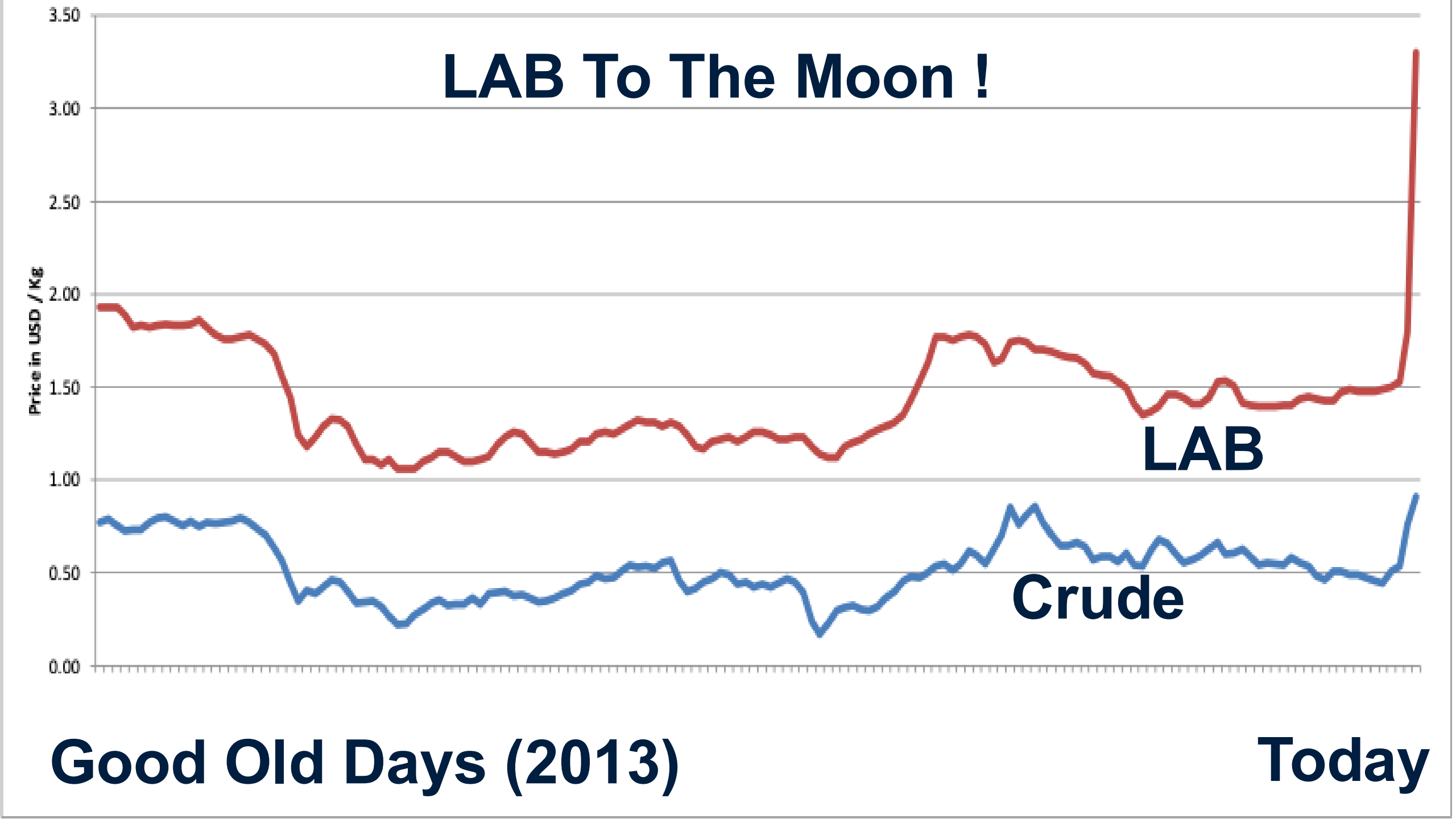
# What else is happening…?

- There’s an actual war on
- So check oil price twice a day
- Because…

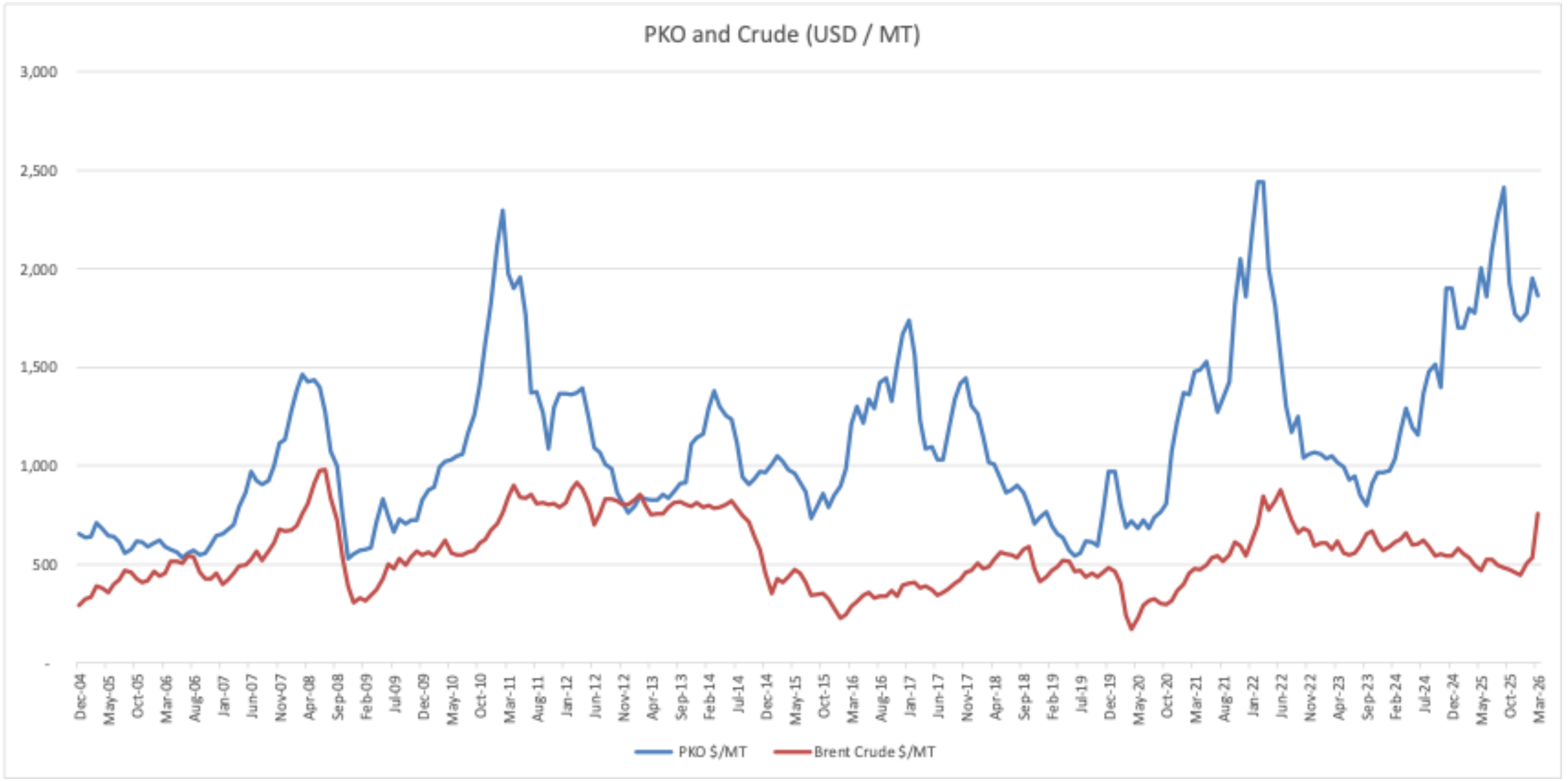
**Daily transit calls of cargo and tanker ships at the Strait of Hormuz since January 2026**

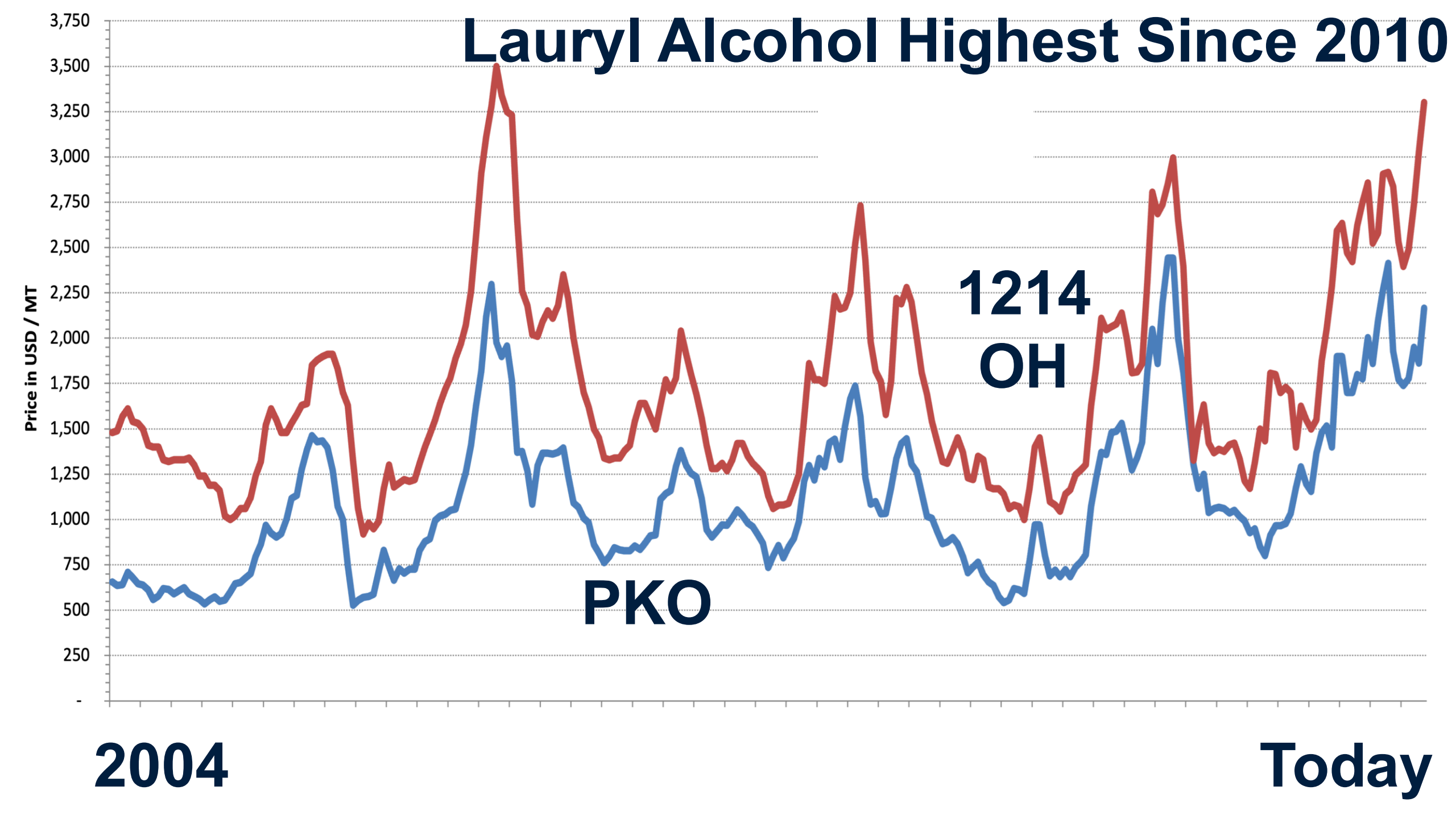



WTI Oil per Barrel
120
100
80
60
40
20
0
A Year Ago
Now

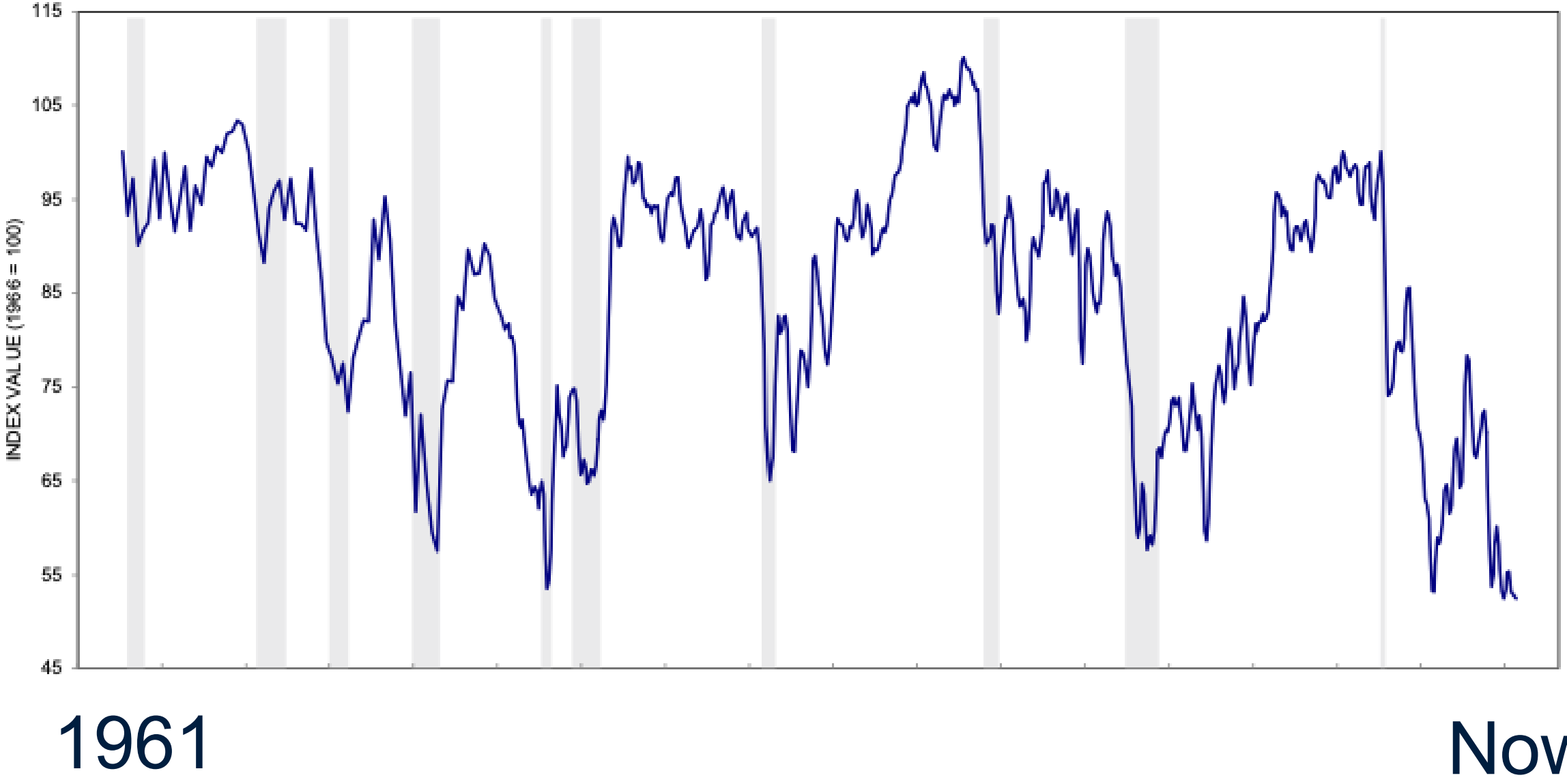

LAB To The Moon !
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Price in USD / Kg
LAB
Crude
Good Old Days (2013)
Today

# PKO vs Crude (USD / MT)




Lauryl Alcohol Highest Since 2010
Price in USD / MT
3,750
3,500
3,250
3,000
2,750
2,500
2,250
2,000
1,750
1,500
1,250
1,000
750
500
250
-
1214
OH
PKO
2004
Today

# Consumer Sentiment Lowest Since May 1980



# So what to do…?

- Drink heavily & throw up your hands in despair ?
- Yes….
- And….
- After that ….
- We do what we've always done

in·no·vate

/ˈinəˌvāt/

verb

make changes in something established, especially by introducing new methods, ideas, or products.

WHAT'S NEW
SCOOBY-DOO?

# There's a lot of innovation going on…

- **Lauric oils not from a palm tree**
  - Fermentation - C16 Bio and others
  - Insect oils – Sasol
  - Engineered Crops – Nufarm / Unilever

- **Direct fermentation of alcohols**
  - Future Origins (E. Choli)
  - Acies Bio (Methanol)

- **Carbon Dioxide Based Surfactants**
  - Econic
  - Viridi

# And more innovation…

- **Biosurfactants**
  - Surfactants made by fermentation
  - Sophorolipids and Rhamnolipids
  - Over 35 companies involved globally
  - Evonik is the commercial leader
- **Biocompatible Ag-Surfactants**: Rhamnolipids and sophorolipids are being adopted as mild, non-lytic wetting agents
- **Biobased Surfactants**
  - Novel renewable surfactants made via chemistry
  - Carbohydrate esters – Integrity Biochem
  - Enzymatically catalysed esters – Norfalk
  - Furan based surfactants – Sironix and Puresurf (and Unilever)

# And even more…

- **Novel concepts**
  - Cellulose nano-particles - Dot Ingredients

- **What's old is new again**
  - APG's – BASF and others
  - AOS – many
  - MES
  - Petrochemical Alcohols

- **Bio Mass Balance - everything**
  - EO, LAB, Alcohols, amines etc..

# Inerts Innovation

## Biocompatible Surfactants for Biologicals

- Mild, pure wetting agents (including biosurfactants) engineered to provide dispersion without lysing microbial cell walls or degrading living actives.

## Ultra-Low Volume (ULV) Drone Adjuvants

- Next-gen tank-mix adjuvants combining drift-control (rheology modifiers), anti-evaporation humectancy, and spreading for highly concentrated droplets.

## Microplastic-Free Polymeric Dispersants

- Commercialization of readily biodegradable polymeric dispersants and seed-coating binders that match the high-electrolyte tolerance of legacy petrochemical polymers.

## High-Load, Multi-Active Systems

- Advanced steric stabilizers capable of suspending 3+ incompatible active ingredients in a single, high-load suspension concentrate (SC) or suspoemulsion (SE).

# What's with "For whom the bell tolls" ?



- Chemical Industry (including surfactant) problems are our problems.
- If you happen to be in the new renewables sector
- Think about how you communicate

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# www.neilaburns.com

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# THANK YOU

# Appendix

### 1 Biocompatible Surfactants for Biologicals

**The Strategic Context:** Traditional agricultural wetting agents (like standard ethoxylates or harsh sulfonates) are highly effective at penetrating waxy plant cuticles, but they will rapidly lyse the cell walls of living microbes or denature delicate protein-based biostimulants. The market requires "biocompatible" surfactants that provide necessary dispersion and shelf-life stabilization without compromising the viability (CFU count) of the living active ingredient.

**Key Innovators & Products:**

**Evonik:** Their BREAK-THRU® SP 133 and broader biosurfactant portfolio are leading this space. They utilize **polyglycerol esters** and microbial-derived **glycolipids (rhamnolipids and sophorolipids)**. These ultra-mild, 100% bio-based surfactants provide excellent wetting and act as humectants to keep microbes alive on the leaf surface without disrupting their cellular integrity

**Croda:** TheTween™ and Atlox™ biocompatible lines are heavily utilized in biologicals. Croda leverages highly purified **polysorbates** and specialized **alkyl polyglucosides (APGs)** to create stable, non-toxic aqueous suspensions for delicate fungal and bacterial spores.

### 2. Ultra-Low Volume (ULV) Drone Adjuvants

**The Strategic Context:** A traditional tractor boom sprayer applies 15–20 gallons of water per acre; a drone applies 1–2 gallons. This means the surfactant concentration in the droplet is exponentially higher, and the fine droplets are highly susceptible to wind drift and rapid evaporation before they can penetrate the crop canopy.

**Key Innovators & Products:**

**Syensqo (formerly Solvay):** TheirAgRHO® Aeromate 320 is specifically engineered for drone application. Syensqo utilizes **guar-based polymeric rheology modifiers** combined with **vegetable oil emulsions**. The guar polymer increases the extensional viscosity of the droplet as it leaves the nozzle, snapping it into a larger, uniform size that resists wind drift and prevents the droplet from shattering/rebounding when it hits the leaf.

**Evonik:** TheirBREAK-THRU® MSO MAX 522 and TEGO® XP 11134 tackle the spreading and evaporation challenge. They utilize highly specialized **polyether-trisiloxanes (organosilicones)**. These super-spreaders reduce the surface tension of the droplet to near 0° contact angle, ensuring that a tiny volume of water can rapidly sheet across the entire leaf surface before evaporating.

# Appendix Contd



### 3. Microplastic-Free Polymeric Dispersants

**The Strategic Context:** The European Union's REACH restrictions on intentionally added microplastics are forcing the phase-out of legacy polymeric dispersants, seed-coating binders, and encapsulates (e.g., traditional non-biodegradable styrene-acrylics or certain block copolymers). The race is on to develop polymers that match legacy performance but meet strict biodegradability thresholds.

**Key Innovators & Products:**

**Croda:** Their Atlox™ 4917is a breakthrough in this space. It is a **modified styrene-acrylic co-polymer**[, but it is engineered with a specific water-solubility profile that allows it to fall entirely outside the scope of the EU microplastic legislation. It acts as both a high-performance aqueous dispersant and a microplastic-free film-former/binder for seed treatments.

**Nouryon:** Their Agrilan® 1015 and Adsee® Flex 960[ lines are aggressively targeting this whitespace. Agrilan 1015 is a fully **biodegradable polymeric dispersant**[] designed to replace legacy polymers in aqueous crop formulations, providing robust steric stabilization without the regulatory overhang of microplastics.

### 4. High-Load, Multi-Active Systems

**The Strategic Context:** To save fuel and labor, farmers want to spray 3 or 4 different active ingredients (AIs) in a single pass. Formulators must pack massive amounts of incompatible, hydrophobic solid AIs into a single Suspension Concentrate (SC). If the dispersant fails, the AIs undergo Ostwald ripening (crystal growth) and turn into a solid brick at the bottom of the jug.

**Key Innovators & Products:**

**Stepan:** TheirSTEPSPERSE® kit represents the cutting edge of **High-Performance Polymeric (HPP) nonionic dispersants**. Stepan engineered these polymers with specific 1-tail, 2-tail, and 3-tail comb architectures[. The anchoring groups lock onto the hydrophobic AI particle, while the multi-tail segments extend into the aqueous phase, providing massive steric hindrance that physically blocks crystals from growing or agglomerating in high-load environments.

**Ingevity:** Their Polyfon® and Reax® lines dominate the high-electrolyte, multi-active space using **highly modified Kraft lignosulfonates**. By precisely controlling the degree of sulfonation and molecular weight of the lignin backbone, these surfactants provide an incredibly robust, cost-effective mix of electrostatic and steric repulsion that synthetic polymers often struggle to match in high-salt tank mixes[.