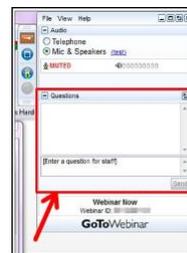




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“Why am I muted?”

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#HeroesofChemistry ACS Heroes of Chemistry Award



Inspiring Hero Stories



Heroes of Chemistry winner BMS: Carl Decico presenting the story behind Dakinza® and Sunvepra™
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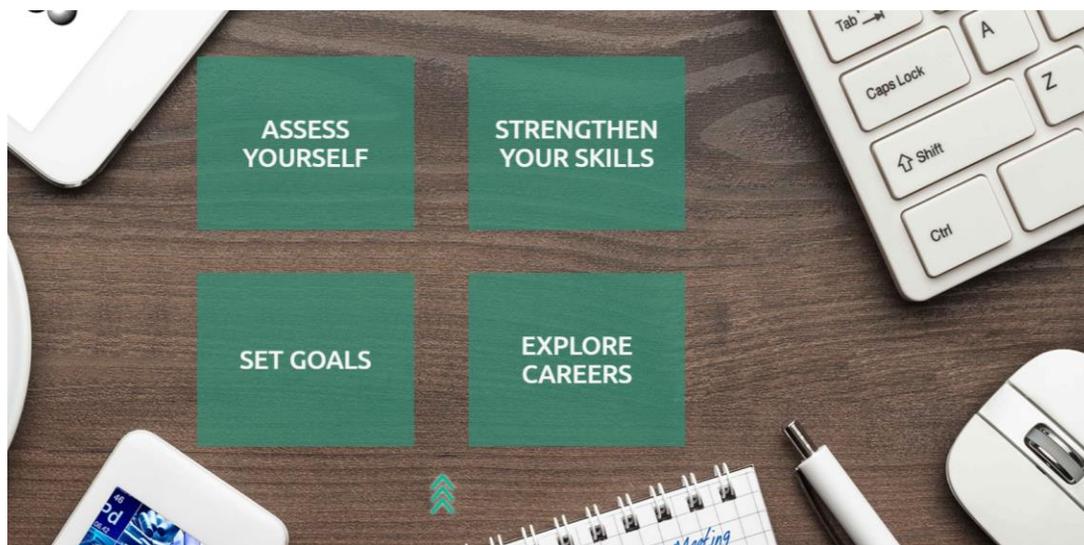
2018 Winners:



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An individual development planning tool for you!



<https://chemidp.acs.org>

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ACS Industry Member Programs

Chemistry and the Economy

2020 Outlook



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Chemistry and the Economy: 2020 Outlook



William Carroll

Founder, Carroll Applied Science

Paul Hodges

Chairman, International eChem

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Not with a bang, but a whimper

12 December 2019



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International eChem (IeC) is a London-based strategy consultancy advising Fortune 500 and FTSE 100 companies, investment banks and fund managers.

Our value proposition is based on viewing the economy through the lens of the chemical industry, the best leading indicator for the global economy. Our approach is data-driven, and we focus on areas where we have long-term expertise:

- ❖ The key value chains in petrochemicals/plastics – C2, C3, C4, C6, C7, C8
- ❖ Their key end-uses – autos, housing, consumer products, electronics
- ❖ Upstream developments in oil/energy markets and geopolitics
- ❖ Impact of the US-China trade war and Brexit on supply chains
- ❖ Challenges and opportunities created by moves to the circular economy

Notable successes include timely forewarnings of the 2008 Global Financial Crisis, and the oil market collapse in 2014.

Paul Hodges is a trusted adviser to major companies and investors, and publishes The pH Report. He serves as a Global Expert with the [World Economic Forum](#). He is a regular speaker at international conferences, and writes regularly for the Financial Times and other leading media.



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Agenda

- *Recap from December 2018, June 2019*
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Globalisation provided “stuff” for baby boomers: Sustainability is service-led and provides “solutions”



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Six Key Questions for 2019

HOW DO WE ENSURE THAT OUR BUSINESS WILL SURVIVE AND PROSPER?

MANAGING RISKS

1. How will our P&L be impacted by a sustained period of low global GDP growth?
2. How might trade wars and China's slowdown impact key customers/supply chains?
3. What is our contingency plan for a return to major oil/interest rate volatility?

INVESTING TO BUILD THE BUSINESS

4. How will we compete profitably as sustainability rises up the agenda?
5. Can we create new service-led offerings to meet emerging market needs?
6. Can we gain first-mover advantage whilst others hope for "business as usual"?



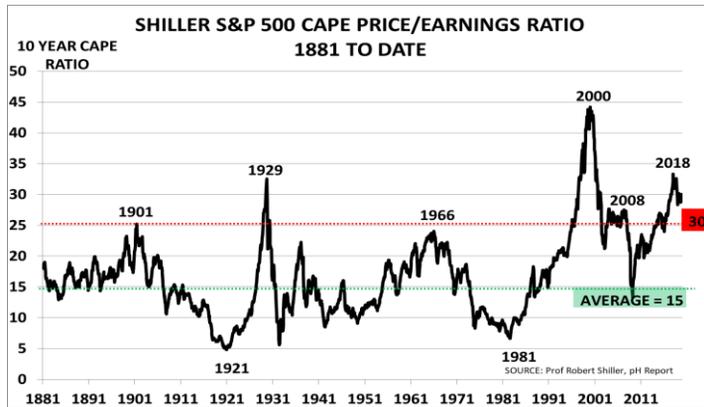
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Stock markets are close to all-time highs in terms of valuations

- Investors believe the Fed will never let markets fall



❖ In the past, central banks saw their role as being “to take away the punch bowl just as the party gets going”. They focused on a range of economic indicators, and rejected the idea that a single indicator could be a guide to policy

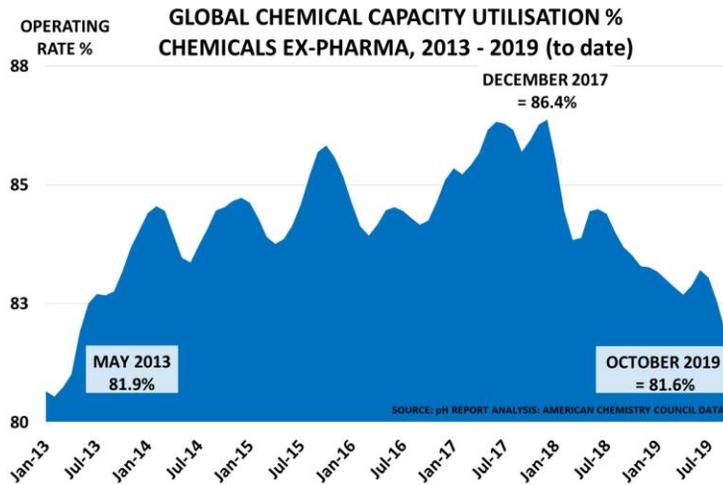
❖ Today, they believe that “higher stock prices will boost consumer wealth and help increase confidence”. They focus on printing more cash whenever stock markets weaken, and then congratulate themselves on a job well done



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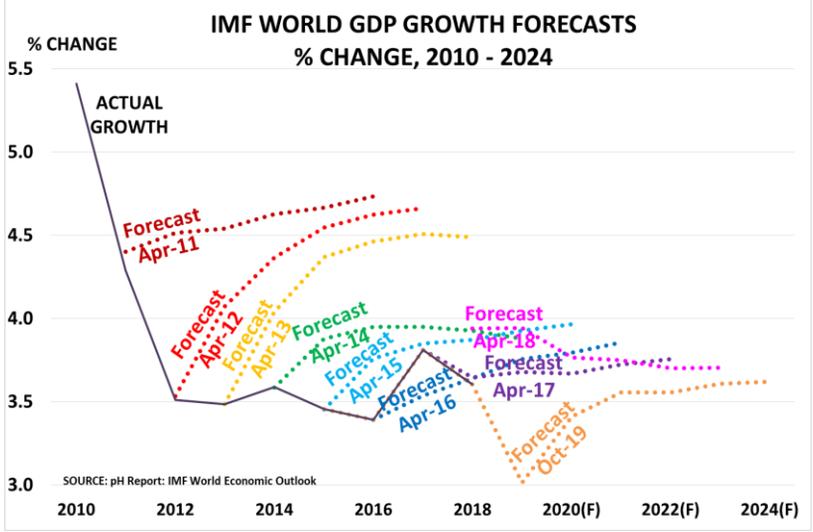
Capacity Utilisation is the best leading indicator for the global economy, and is steadily weakening



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The IMF continues to ignore the real world with its forecasts



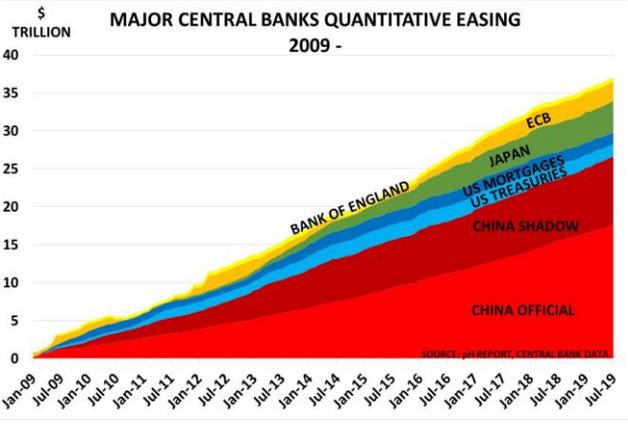
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THE CORE OF THE DEBATE China did 50% of stimulus, and now believes it didn't work



*"Why are the effects of these unconventional monetary policies in developed countries worse than expected? First, fundamentals such as economic growth trends are determined by important economic structural variables. For example, an aging population will lead to slower potential economic and productivity growth, increase savings, lower consumption and price levels; technological progress will also lead to lower price levels, and the degree of economic globalization will also have an important impact on the decline in labor costs. But **none of these factors can be changed by monetary policy and low interest rates.**"*

Yi Gang, Governor of the Peoples Bank of China, December 2019



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As in August 2014, oil is preparing for a major move – up or down

The bulls benefit from the hope that economic recovery is underway and that central banks will flood markets with more stimulus.

The bears expect a sharp slowdown in demand as a result of the US-China trade war and the general slowdown in the global economy.



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Audience Survey Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



Where do you think oil prices will be in one year's time?

- \$100 a barrel
- \$80 a barrel
- \$60 a barrel
- \$40 a barrel
- Below \$40 a barrel



** If your answer differs greatly from the choices above tell us in the chat!*

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U.S. producers have expanded on the basis of 4 false assumptions

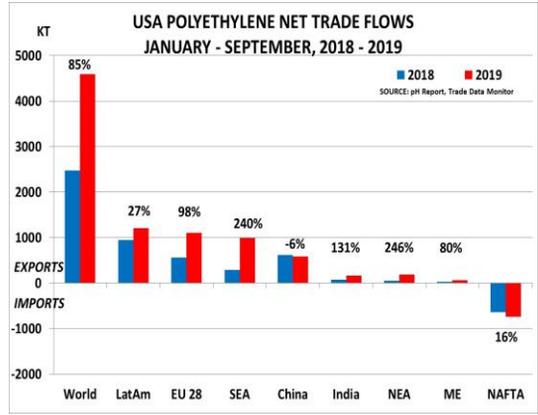
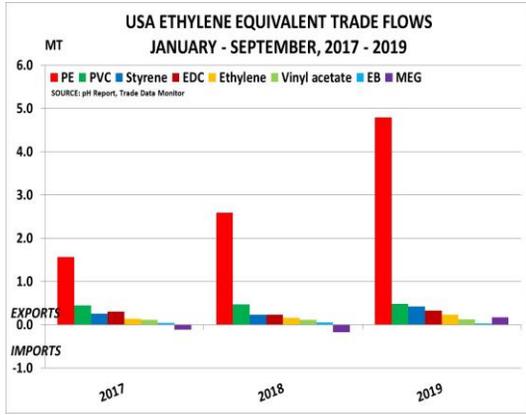
- X** Oil will always be \$100/bbl, giving them a feedstock advantage with shale gas.
- X** China will always be growing at double-digit rates, and its petchem imports will always grow.
- X** Globalisation will continue and so plants can be sited half-way across the world from their market.
- X** Plastics will always be the material of choice for single-use packaging applications.



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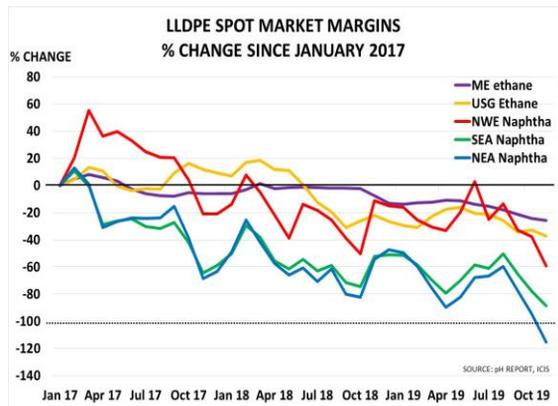
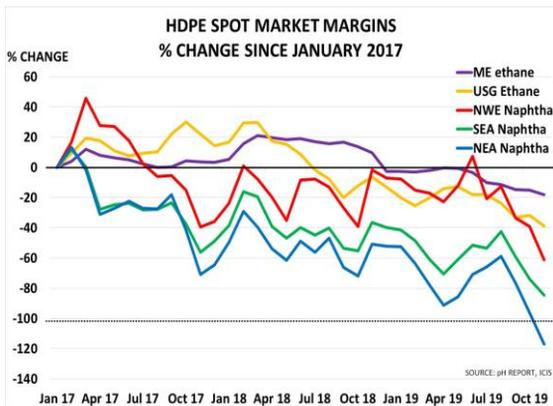
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US PE can't go to China – but has to go somewhere



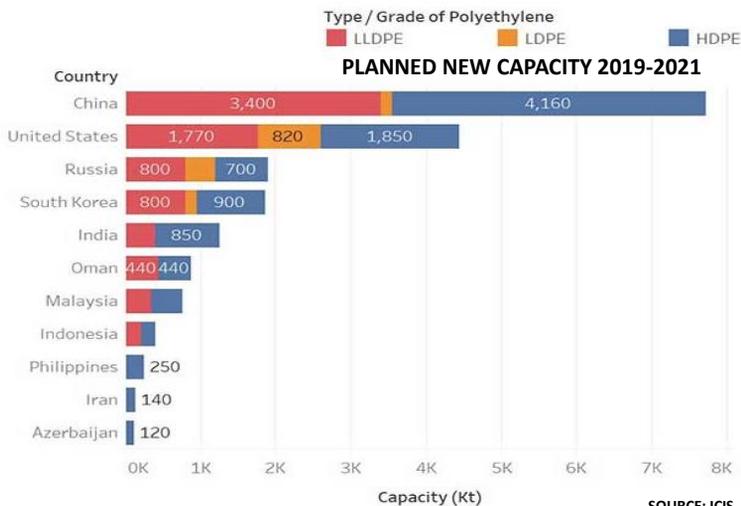
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PE margins have begun a global collapse



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PE over-supply is continuing to increase

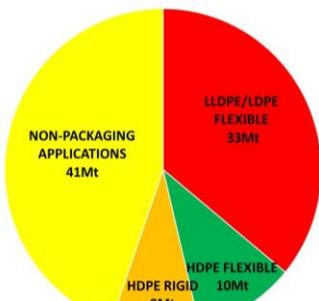


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Concerns over single use packaging reduce demand More than half of all PE is used in packaging

POLYETHYLENE USE IN PACKAGING
MILLION TONNES, %, 2016



Reuse can...

Cut costs
Packaging and transportation costs can be reduced by supplying refills for reusable containers in compact form, such as in concentrates or solids e.g. as tablets.

Adapt to individual needs
Individual needs can be accommodated by reuse models that let users mix and match flavours, personalise packaging or choose desired quantities.

Optimise operations
Economies of scale for distribution and logistics can be achieved through sharing reusable packaging across brands, sectors or wider networks.

Build brand loyalty
Brand loyalty and customer retention can be achieved through deposit and reward schemes for reusable packaging.

Improve user experience
User experience can be improved by enhancing the look, feel or functionality of reusable packaging (which can be more high-end as its initial production cost is divided over many uses).

Gather intelligence
Information on user preferences and system performance can be gathered by incorporating digital technologies such as RFID tags, sensors, and GPS tracking into the reusable packaging system.



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Audience Survey Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



According to the FDA, which of the following are root causes for drug shortages?

(select all that apply)

- **A)** Lack of market incentives to produce less profitable drugs
- **B)** Market does not incentivize mature quality management systems leading to greater risk of manufacturing problems
- **C)** The complexity of logistical and regulatory challenges in the international supply chain make it difficult to recover after a disruption
- **D)** None of the above

<https://www.fda.gov/media/132058/download>

** If your answer differs greatly from the choices above tell us in the chat!*

Pharma shortages are multiplying due to supply chain issues

Newsweek
CONGRESS, GRAPPLING WITH TAINTED CHINESE DRUGS, IS BAFFLED BY LACK OF FDA OVERSIGHT IN U.S. PHARMACEUTICAL SUPPLY CHAIN

FDA Issues Drug Shortage Report Identifying Root Causes and Potential Solutions

1. Lack of incentives for manufacturers to produce less profitable drugs;
2. Market failure to recognize and reward manufacturers for "quality systems" that focus on continuous improvement and early detection of supply chain issues; and
3. Logistical and regulatory challenges that make market recovery from a disruption difficult.

FDA blames market failures for drug shortages

U.S. hospitals, FDA grapple with shortages of lifesaving drugs

"I never thought we would get to a point... where we wouldn't have essential medicines," said a doctor at Massachusetts General Hospital.

Why Lifesaving Drugs May Be Missing on Your Next Flight

Citing chronic shortages, airlines have received exemptions from regulations requiring that flights carry five drugs on board.

Global Drug Suppliers Challenge FDA as Safety Fears Rise

Regulators want to reduce U.S. dependence on foreign-made pharmaceutical ingredients, as a wave of recalls has raised questions about the safety of the global drug-supply chain.

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Pharma manufacturing needs to move into the modern age

NiTech Solutions

From Laboratory



through Pilot



to Production-scale



Continuous processing – reaction & crystallisation technology solutions

Modernising pharma manufacturing

Reducing CO2 emissions



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Chemistry and the Economy: 2020 Outlook



William Carroll
Founder, Carroll Applied Science



Paul Hodges
Chairman, International eChem

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