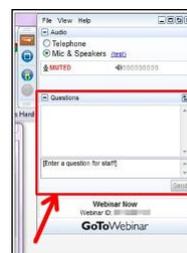




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Type them into questions box!

**“Why am I muted?”**

Don't worry. Everyone is muted except the presenter and host. Thank you and enjoy the show.

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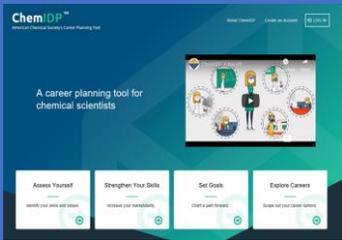
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Tuesday, November 17, 2020 at 1-2pm ET

Speaker: Vijay Kapur (retired), International Solar Electric Technology  
Moderator: Bill Tsuzynski, Science History Institute

Register for Free!

What You Will Learn

- A brief history of photovoltaic technology, its current status, and its future
- How innovators worldwide are working to further improve PV technology and develop new applications to solve global problems
- Possible approaches to using PV technology in Philadelphia to make this UNESCO World Heritage City a green city

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Moderadora: Lena Ruiz Azuara, Sociedad Química de México

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- How to become aware why healthy competition is the key to a healthy work-life balance and job satisfaction
- Understanding the value of mentorship and openness to reverse-mentoring
- How to discover ways to pursue a research problem beyond your comfort zone

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\* This ACS Webinar is produced for Spanish speaking target audience.



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Speakers: Michael Hefey, Merck / Jim Monroe, Merck / Wen Kang, Merck  
Moderator: Kaushik Mitra, Janssen Research & Development

Register for Free!

What You Will Learn

- The role of key hepatic transporters in drug-induced liver injury and strategies to derisk molecules with transporter-inhibition liability
- Development of a bioactivation gene signature-based model in detecting hepatotoxicants and its in vivo application in real time to make safe drugs
- Establishment of an in vitro transcriptomic signature of bioactivation using a micropatterned coculture system (HEPATOPACB) to derisk compounds early in discovery

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## Chemistry & the Economy Series

Every 6 months we are joined by our resident expert economist, Paul Hodges for a survey of the chemical industry. Take a look back at the rises and falls in the economy and gain an understanding of what underlying forces are driving the market.



### Chemistry and the Economy: 2020 Mid-Year Update

Paul Hodges of International E-Chem and Bill Carroll of Carroll Applied Science have their bi-annual discourse regarding the chemical market and what companies can do to adapt in these difficult times including COVID-19.



### Chemistry and the Economy: 2020 Outlook

Join Paul Hodges of International eChem and Bill Carroll of Carroll Applied Science for an update of what has been affecting the chemical market and what might be coming down the pipeline in 2020.



### Chemistry and the Economy: 2019 Mid-Year Update

Paul Hodges of International eChem and Bill Carroll of Carroll Applied Science share an update of what has been affecting the chemical market and what companies can do to adapt to this changing world in 2019.



### Chemistry & the Economy: 2019 Outlook

Paul Hodges of International eChem and Bill Carroll of Carroll Applied Sciences will provide an update of what has been affecting the chemical market and what companies can do to adapt to this changing world in 2019.



### Featuring



Paul Hodges  
Chairman,  
International eChem

### Blog Posts by Paul on Industry Voices

- What are the best renewable, green solutions for our industry? Let me hear from you!
- Would a Pfizer-Allergan deal spell bad news for the industry?
- Staying Warm through the "China Chill": Threat of Winter allows petrochemical industry to Spring forth new business models
- Commodities Bubble, Oil in Trouble: China's Economic Slowdown Could Mean a "Crude" Awakening for the Petrochem Industry

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# Chemistry and the Economy

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## 2021 Outlook

THIS ACS WEBINAR WILL BEGIN SHORTLY...

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## Chemistry and the Economy: 2021 Outlook



**Paul Hodges**  
Chairman, International eChem  
Analyst, New Normal Consulting



**William Carroll**  
Founder, Carroll Applied Science

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Helping you navigate the New Normal

[www.new-normal.com](http://www.new-normal.com)

*New Normal is a Swiss-based strategy consultancy advising Fortune 500 and FTSE 100 companies, investment banks and fund managers.*

Our consulting work focuses on the major paradigm shifts taking place in the global economy as a result of today's ageing populations



**DEMAND PATTERNS:** The lockdowns have broken down the inertia surrounding work and home-based routines. Travel, leisure, construction, real estate and other industries will likely see major change as a result.



**RESHORING SUPPLY CHAINS:** Global supply chains have proved very fragile during the pandemic. They have collapsed not only because of the uncoordinated nature of the lockdowns around the world, but also due to volatility in demand patterns.



**ENERGY ABUNDANCE:** Q2 2020 provided a taste of the world to come. The issue is that it now makes economic sense in some regions to 'scrap and build' – scrap older, fossil fuel-based infrastructure, and replace it with modern renewable-based power sources.



**CIRCULAR ECONOMY:** The need to reshore supply chains in a world of potential energy abundance suggests that moves towards a circular economy will accelerate. We need new business models to be created, covering the entire value chain from collection to resale.



**ADVANCED MANUFACTURING:** Many manufacturing operations still operate as they would have done 50 years ago. It makes no sense to reshore using centuries-old equipment when digital, continuous & biotech-enabled technology is safer, greener, faster and cheaper.



**Paul Hodges** is a trusted adviser to major companies and investors. He publishes The pH Report and New Normal Insight, and serves as chairman of NiTech Solutions and of the Advisory Board of Infinity Recycling. He is a Global Expert with the [World Economic Forum](http://www.weforum.org) and a regular speaker at international conferences, and appears regularly on Real Vision and other leading media.

## Audience Survey Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



**How has the COVID-19 pandemic and other economic factors in 2020 personally affected you?**

- I am doing great and remain positive for next year
- I'm doing okay but uncertain about the future
- I have been negatively impacted, but have hope for 2021
- This year has been awful and 2021 will likely be the same
- Other (Tell us more in the chat)



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## Elisabeth Kübler Ross' Paradigm of Loss model in relation to the COVID-19 pandemic and ensuing economic crisis

### DENIAL

Governments – refuse to make hard choices  
Populations – resist the need to change behaviour

### ANGER

COVID-19's economic/health impact obvious  
Social unrest – governments blamed for the disaster

### BARGAINING

Governments – debt defaults, political instability  
Public – behavioural changes, focus on family life

### DEPRESSION

Reality begins to be confronted  
Growing awareness of what has been lost

### ACCEPTANCE

Finally people accept what has happened



THE NEW

NORMAL



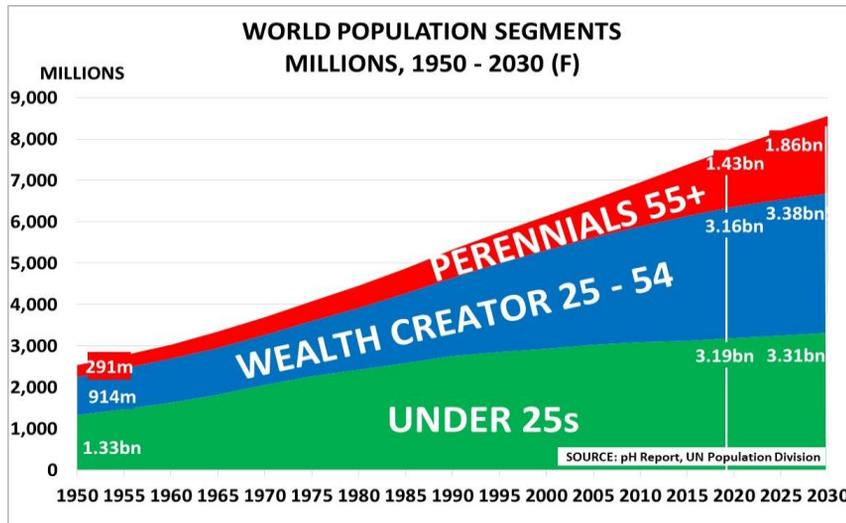
## Welcome to the New Normal

- Demographic challenges/opportunities
- The impact of the Presidential election
  - China's move to self-sufficiency
  - Impact of energy abundance
  - What to do about the debt
- 'Biting the bullet' – investing in recycling

Globalisation provided “stuff” for babyboomers:  
Sustainability is service-led and provides “solutions”



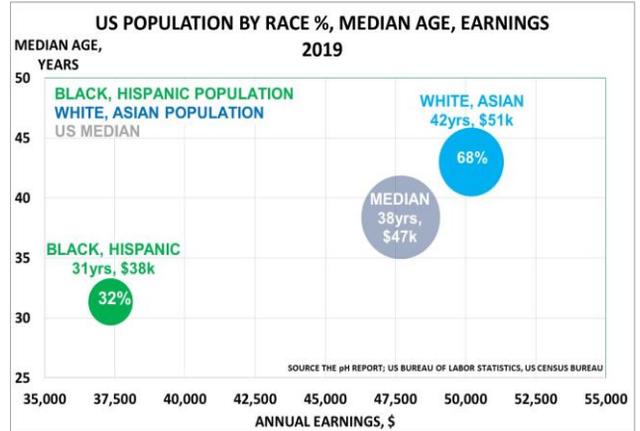
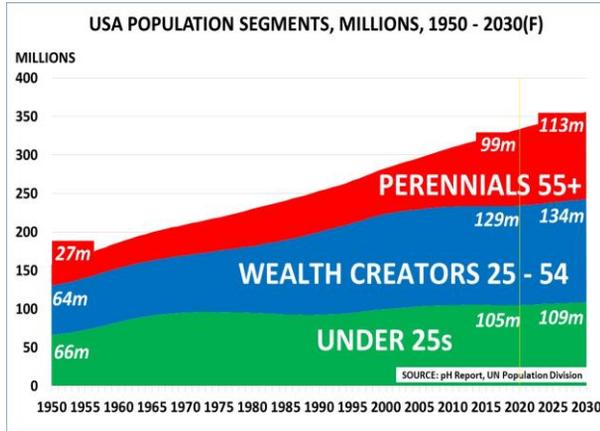
## A completely new generation has developed since 1950: The Perennials 55+ are >50% of world population growth to 2030





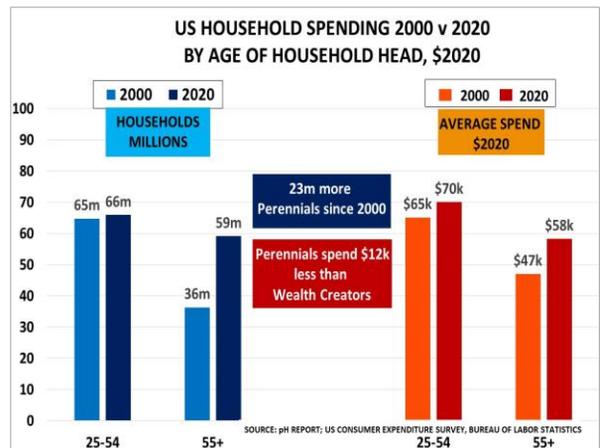
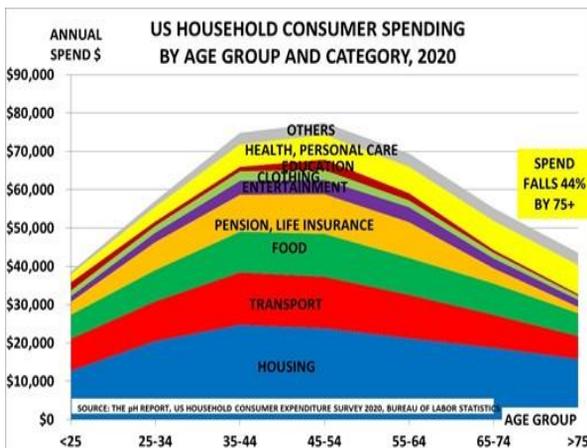
## Perennials are the majority of US population growth to 2030

White population has European age/income profile, and is declining; Black/Hispanic population is younger, poorer and growing



## Wealth Creators 25 – 54 dominate consumer spending

The rise of the Perennials means US spend is seeing major change - and consumption is 70% of US GDP





## Welcome to the New Normal

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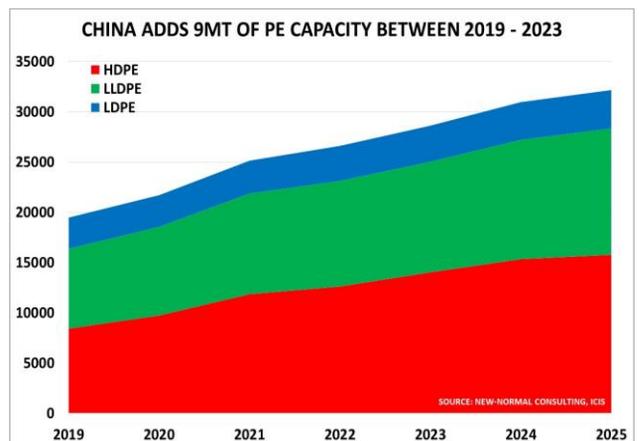
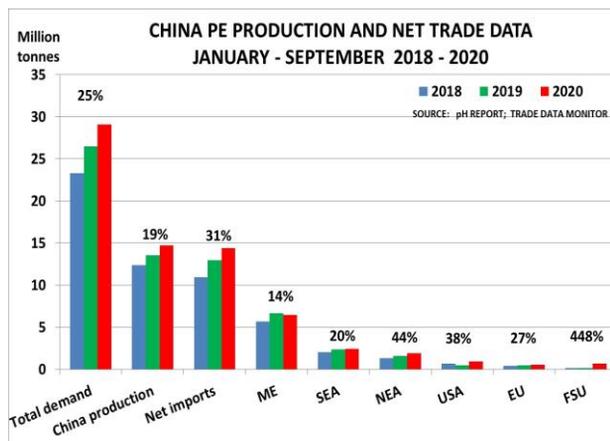
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SOURCE: THE PH REPORT

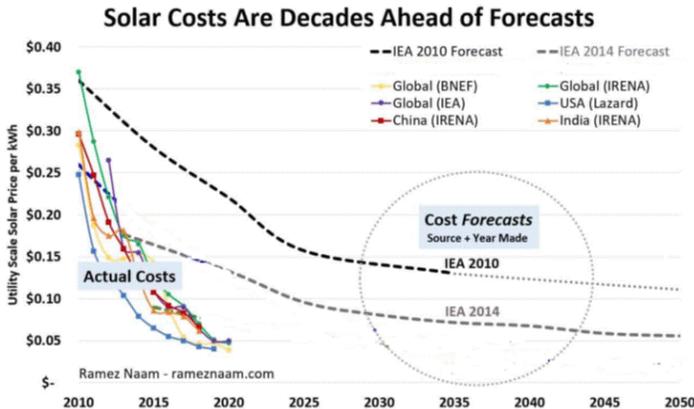


## China remains the world's largest polyethylene market, but is heading towards self-sufficiency





## Energy abundance: Solar prices are <25% of the IEA's 2010 forecast

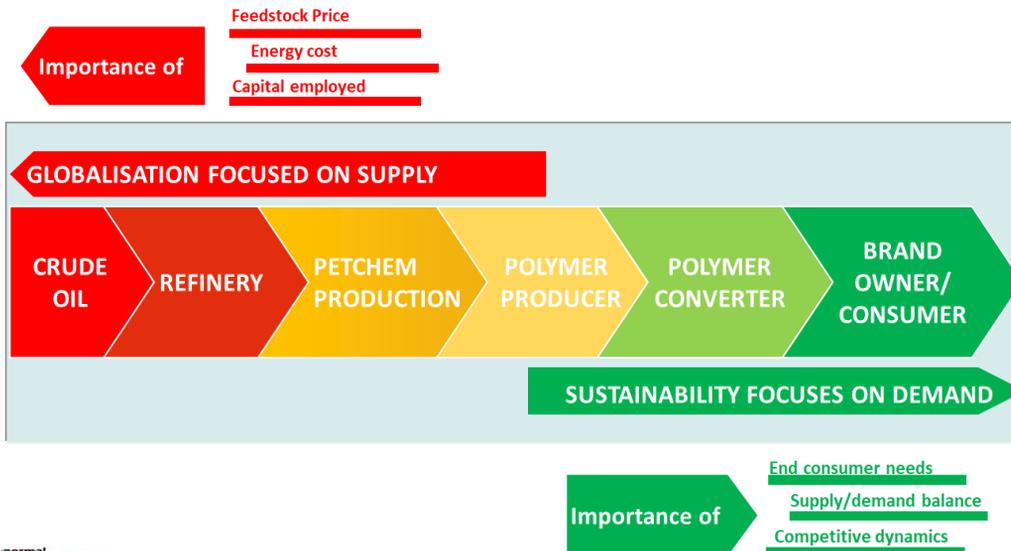


It now makes economic sense in some regions to 'scrap and build' in terms of scrapping older, fossil fuel-based infrastructure, and replacing it with modern renewable-based power sources. Portugal recently bought PV power generation for just €13.16MWh.

Cost-curves are therefore becoming irrelevant, especially with BP forecasting \$100/t carbon taxes by 2030. Companies need to develop a laser-like focus on market segmentation and customer intimacy as demand patterns change.

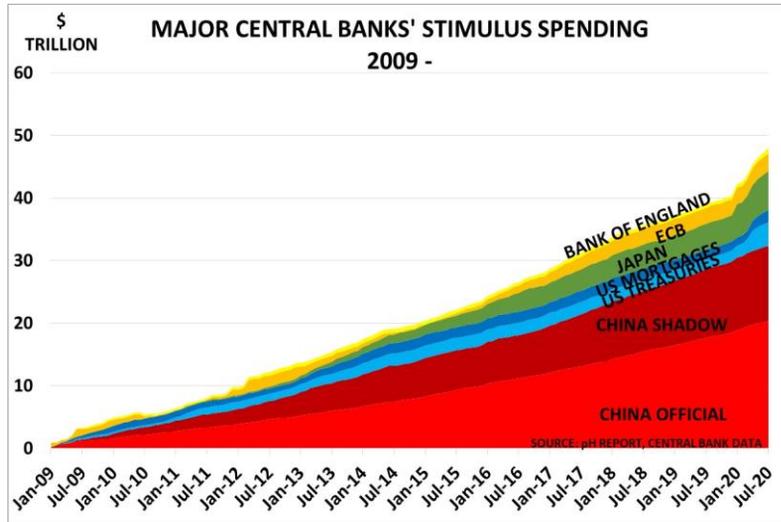


## Customers rather than cost-curves are now critical for profitability





## Central banks have been busy “printing babies” to compensate for the impact of the Perennials

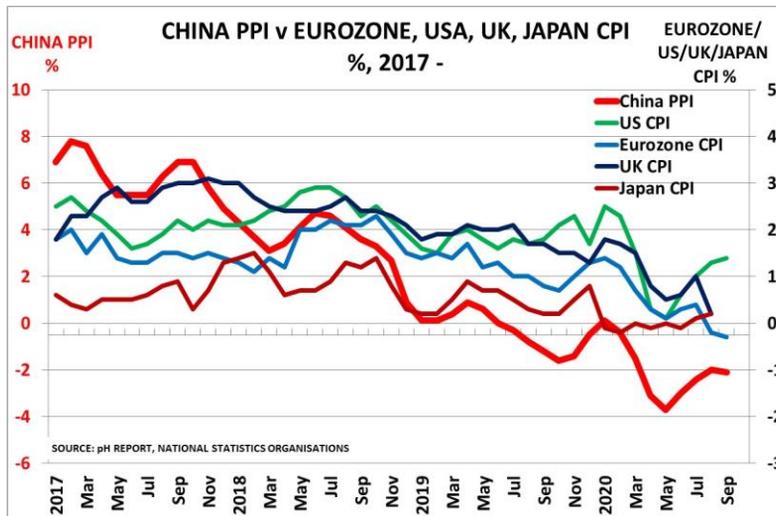


Welcome to the New Normal

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## The Eurozone has now tipped over into deflation as the influence of the Perennials outweighs central bank stimulus



Welcome to the New Normal

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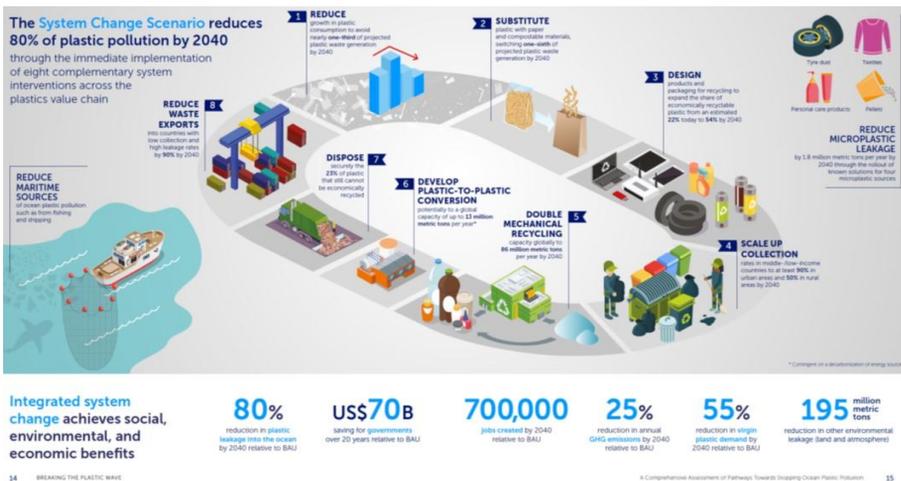
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## The Circular Economy – The New Vision for Oil & Petchems



The need to reshore supply chains in a world of potential energy abundance suggests that moves towards a circular economy will accelerate. Local Waste Sites, for example, will need to be turned into Resource Centres.

New business models will be created, covering the entire value chain and based on digital, continuous & biotech-enabled technology – which is safer, **greener**, faster and cheaper.



## CEOs in the World Economic Forum’s Chemicals & Advanced Materials Industry Action Group want to accelerate recycling

### Recycling technology startups

Technology readiness	Syngas & pyrolysis oil	Monomers & intermediates	Purified polymers	Plastic products	Post cons. waste
Concept		<ul style="list-style-type: none"> <li>University of Massachusetts-Lowell</li> <li>Karlsruhe Institute of Technology</li> </ul>	<ul style="list-style-type: none"> <li>Trash2Cash</li> </ul>		
Lab	<ul style="list-style-type: none"> <li>Illinois Sustainable Technology Center</li> </ul>	<ul style="list-style-type: none"> <li>Axens</li> <li>Biocellfection</li> <li>Tyton BioSciences</li> <li>University of Portsmouth &amp; U.S. Department of Energy’s National Renewable Energy laboratory</li> </ul>	<ul style="list-style-type: none"> <li>University of Ulsan</li> </ul>		
Pilot	<ul style="list-style-type: none"> <li>Climax Global Energy</li> <li>Jepian</li> <li>Polycycl</li> <li>Reclaimed EcoEnergy</li> <li>Resynergi</li> </ul>	<ul style="list-style-type: none"> <li>Carbias</li> <li>Gr3n</li> </ul>	<ul style="list-style-type: none"> <li>Next Generation</li> <li>Polystyvert</li> <li>Resinate Materials Group</li> <li>Worn Again Technologies</li> </ul>		
Early commercial	<ul style="list-style-type: none"> <li>EcoFuel Technologies</li> <li>Enerkem</li> <li>Enval</li> <li>Fulcrum</li> <li>GreenMantra Technologies</li> <li>Golden Renewable Energy</li> </ul>	<ul style="list-style-type: none"> <li>New Hope Energy</li> <li>Nexus Fuels</li> <li>Aglyx</li> <li>Pyrowave</li> <li>Recycling Technologies</li> <li>ReNew ELP</li> <li>Renewlogy</li> <li>RES Polyflow</li> <li>Sierra Energy</li> <li>Vad</li> </ul>	<ul style="list-style-type: none"> <li>Ionica</li> <li>Loop Industries</li> </ul>	<ul style="list-style-type: none"> <li>APK</li> <li>Cadell</li> <li>Dainking</li> <li>CreoCycle</li> <li>Ecopack</li> <li>Equipolymers</li> </ul>	<ul style="list-style-type: none"> <li>Galactic</li> <li>Geo-tech Polymers</li> <li>Natureorks</li> <li>PureCycle Technologies</li> </ul>
Growth	<ul style="list-style-type: none"> <li>Anhui Oursun Environmental Technologies</li> <li>Blest</li> <li>Klean Industries</li> <li>Plastic Energy</li> </ul>	<ul style="list-style-type: none"> <li>perPCTual</li> </ul>	<ul style="list-style-type: none"> <li>Aquafil</li> <li>SABIC Innovative Plastics</li> </ul>		

“In the recycling space alone, there are hundreds of relevant start-ups across the world that are working with new technologies – but these cannot scale without additional funding. The time is ripe for a new wave of corporate and public venturing to accelerate the process of bringing these technologies to the market.”

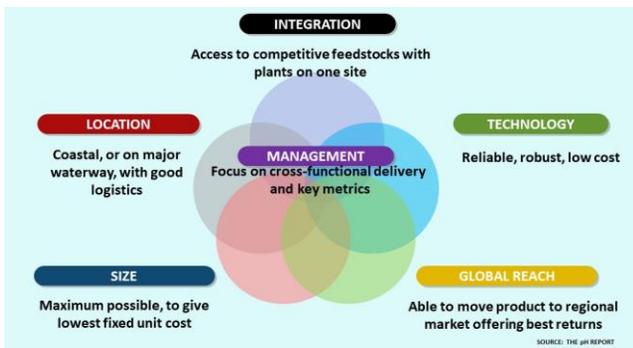
Source Closed Loop Partners – Accelerating circular supply chains for plastics; Accenture analysis



## Critical Success Factors are Transforming

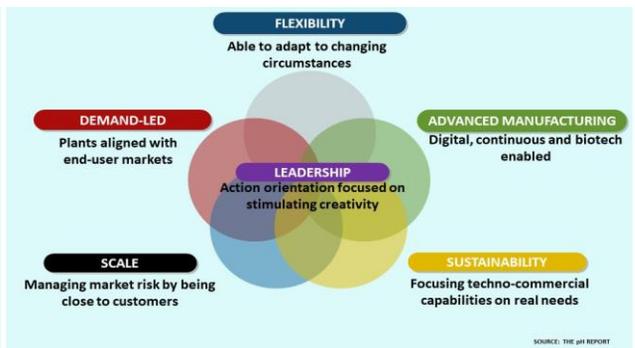
### The Boomer SuperCycle

Supply-driven, product focused



### The New Normal

Demand-led, solution-oriented



## Audience Survey Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



**Which critical success factors have your organization or business embraced in the “New Normal?”** (Select all that apply)

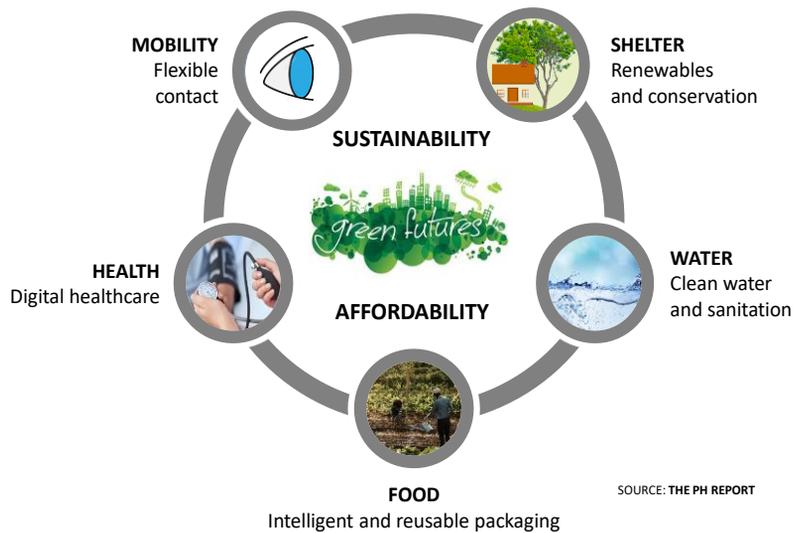
- Flexibility
- Sustainability
- Scale that favors proximity to customers over size
- Advanced manufacturing that is demand-led
- Action-oriented leadership that stimulates creativity



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**Globalisation provided “stuff” for baby boomers: Sustainability is service-led and provides “solutions”**



SOURCE: THE PH REPORT

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Co-produced with: ACS Division of Chemical Toxicology, ACS Division of Medicinal Chemistry, American Association of Pharmaceutical Scientists, and ACS Publications



## Chemistry and the Economy: 2021 Outlook



**Paul Hodges**  
Chairman, International eChem  
Analyst, New Normal Consulting



**William Carroll**  
Founder, Carroll Applied Science

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### Upcoming Broadcasts



Tuesday, November 17, 2020 at 1-2pm ET

Speaker: Vijay Kapur (retired), International Solar Electric Technology

Moderator: Bill Tsuzynski, Science History Institute

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#### What You Will Learn

- A brief history of photovoltaic technology, its current status, and its future
- How innovators worldwide are working to further improve PV technology and develop new applications to solve global problems
- Possible approaches to using PV technology in Philadelphia to make this UNESCO World Heritage City a green city

Co-produced with: Science History Institute



Miércoles, 18 de Noviembre a las 2-3pm ET

Ponente: Juan Raúl Álvarez Idaboy, Universidad Nacional Autónoma de México

Moderadora: Lena Ruiz Azuara, Sociedad Química de México

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#### Lo Que El Público Aprenderá

- How to become aware why healthy competition is the key to a healthy work-life balance and job satisfaction
- Understanding the value of mentorship and openness to reverse-mentoring
- How to discover ways to pursue a research problem beyond your comfort zone

Co-producido con: Sociedad Química de México y *Chemical & Engineering News*

\* This ACS Webinar is produced for Spanish speaking target audience.



Thursday, November 19, 2020 at 2-3:30pm ET

Speakers: Michael Hefey, Merck / Jim Monroe, Merck / Wen Kang, Merck

Moderator: Kaushik Mitra, Janssen Research & Development

[Register for Free!](#)

#### What You Will Learn

- The role of key hepatic transporters in drug-induced liver injury and strategies to derisk molecules with transporter-inhibition liability
- Development of a bioactivation gene signature-based model in detecting hepatotoxicants and its in vivo application in real time to make safe drugs
- Establishment of an in vitro transcriptomic signature of bioactivation using a micropatterned coculture system (HEPATOPACB) to derisk compounds early in discovery

Co-produced with: ACS Division of Chemical Toxicology, ACS Division of Medicinal Chemistry, American Association of Pharmaceutical Scientists, and ACS Publications

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