OUTLOOK FOR CHEMISTRY AND THE ECONOMY

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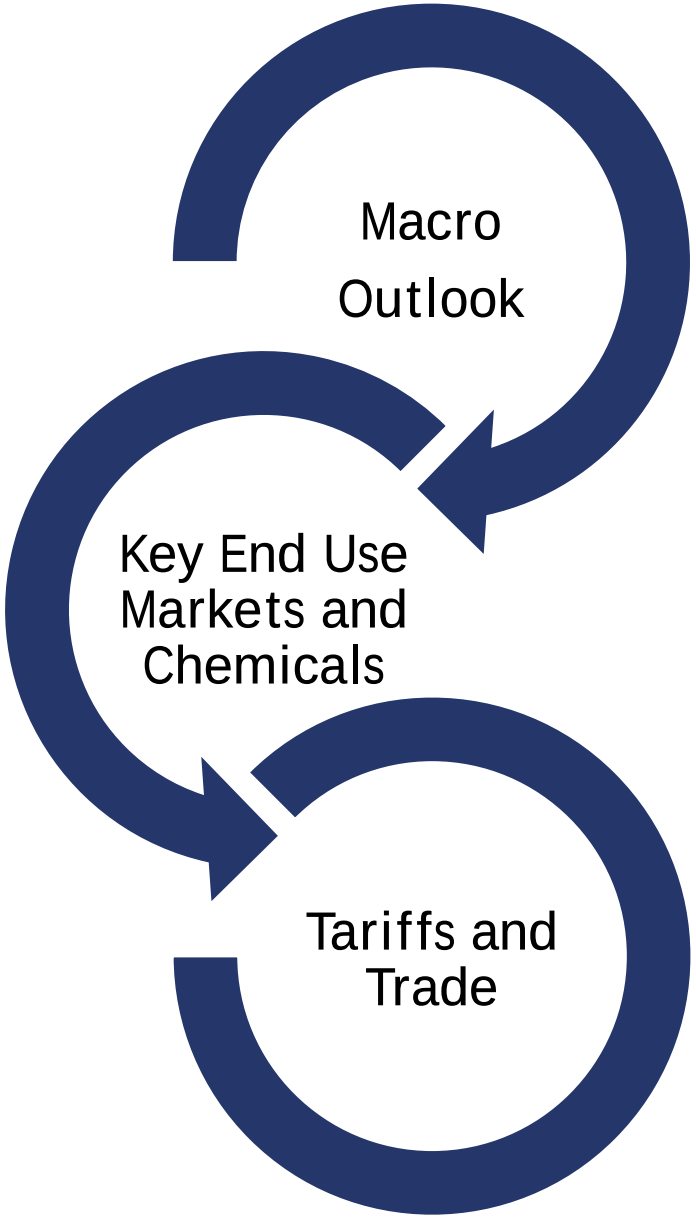
Michigan Chemistry Council

Lansing, MI

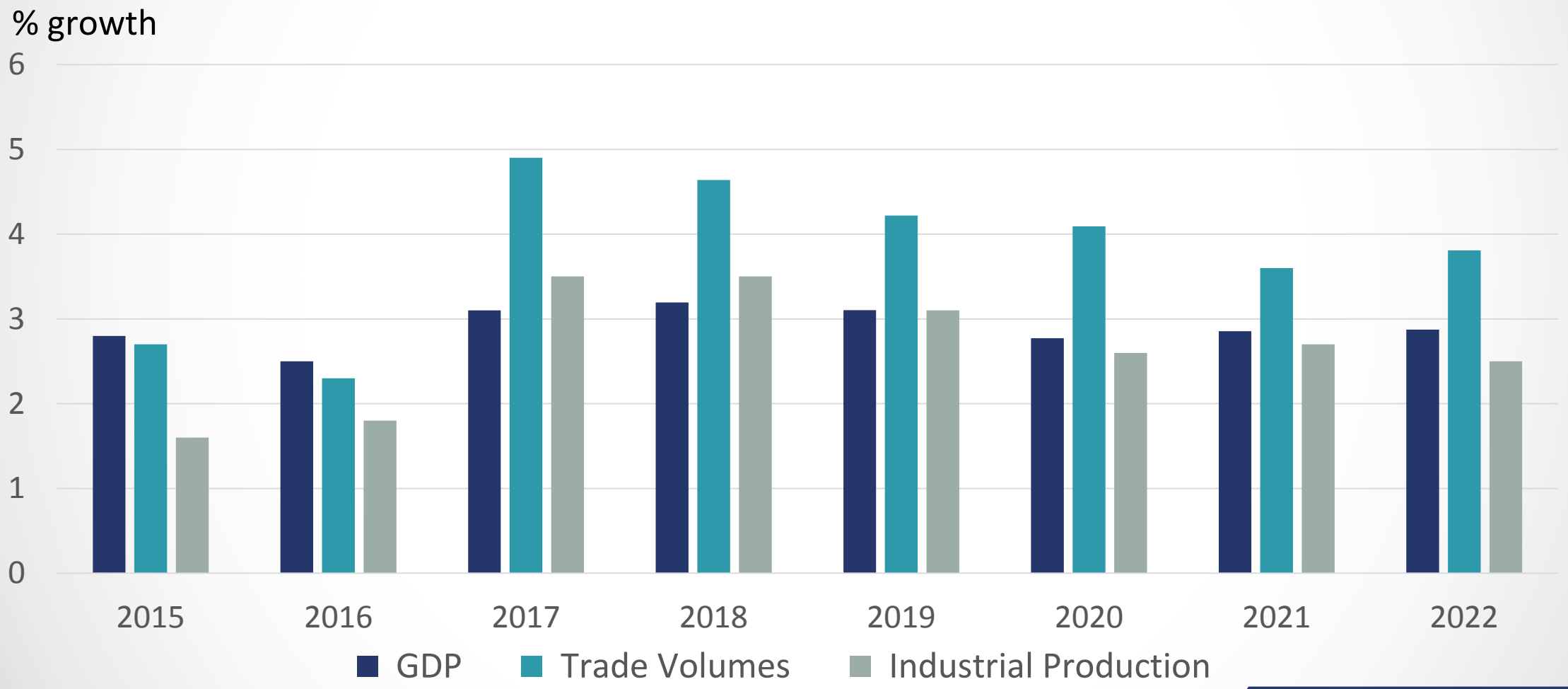
Martha Gilchrist Moore
Sr. Director – Policy Analysis and Economics

American® Chemistry Council

Presentation Overview

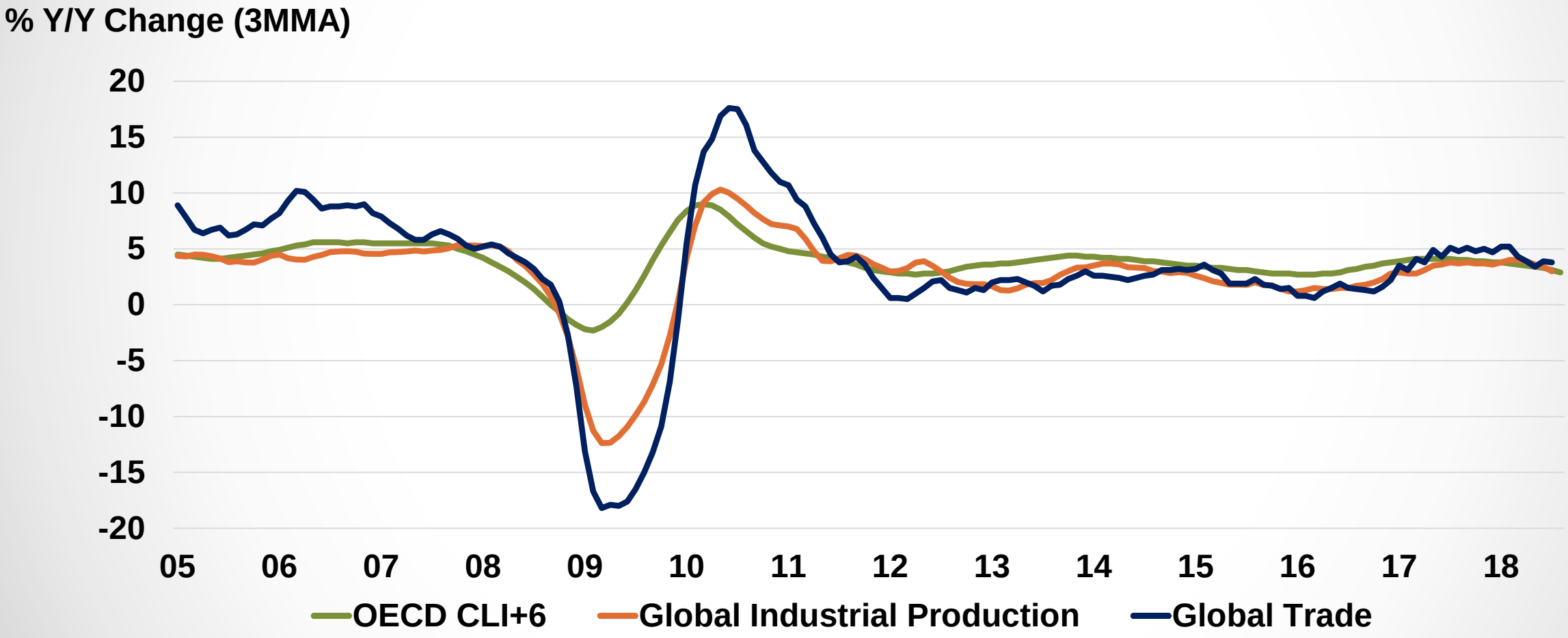


Global Deceleration after 2018



Source: ACC Survey of Forecasters

The OECD CLI + 6, Global Industrial Production, and Global Trade



Source: OECD, various national statistical agencies, ACC analysis

Global Macroeconomic Situation

- Going into the end of 2018, global economic expansion remains resilient. Data through Q2 shows solid growth across many countries.
- World economic growth expected to edge higher to 3.2% in 2018. Expansion continues into 2019 with growth of 3.0%.
- Monetary tightening in most economies (except China), but still accommodative.
- Growth in global trade volumes peaked in 2017. Even without recent trade tensions, trade easing as global expansion matures.

Global Macroeconomic Situation

But, risks are intensifying

- Oil prices rising
- Rising trade tensions and protectionism are major threat.
- Emerging markets remain under pressure; U.S. dollar is strengthening and interest rates rising
- Potential crisis in Turkey

Longer term, underlying demographics and disruptive technologies reshaping global economy.

U.S. Economy Continues to Accelerate

- Q2 growth surged on higher investment, consumer spending, and trade.
- Moving into H1, positive momentum from inventories, spending, and investment
- Growth across multiple sectors in U.S. economy
- Vehicle sales slowing, but remain robust (17.0 million in 2018; 16.8 million in 2019)
- Housing starts continue slow climb hampered by shortages of materials and labor (1.33 million in 2018; 1.39 million in 2019)
- Confidence high among consumers and businesses
- Tax reform and budget act providing stimulus
- Business investment rising
- Manufacturing growth expanding; energy production reaching new records

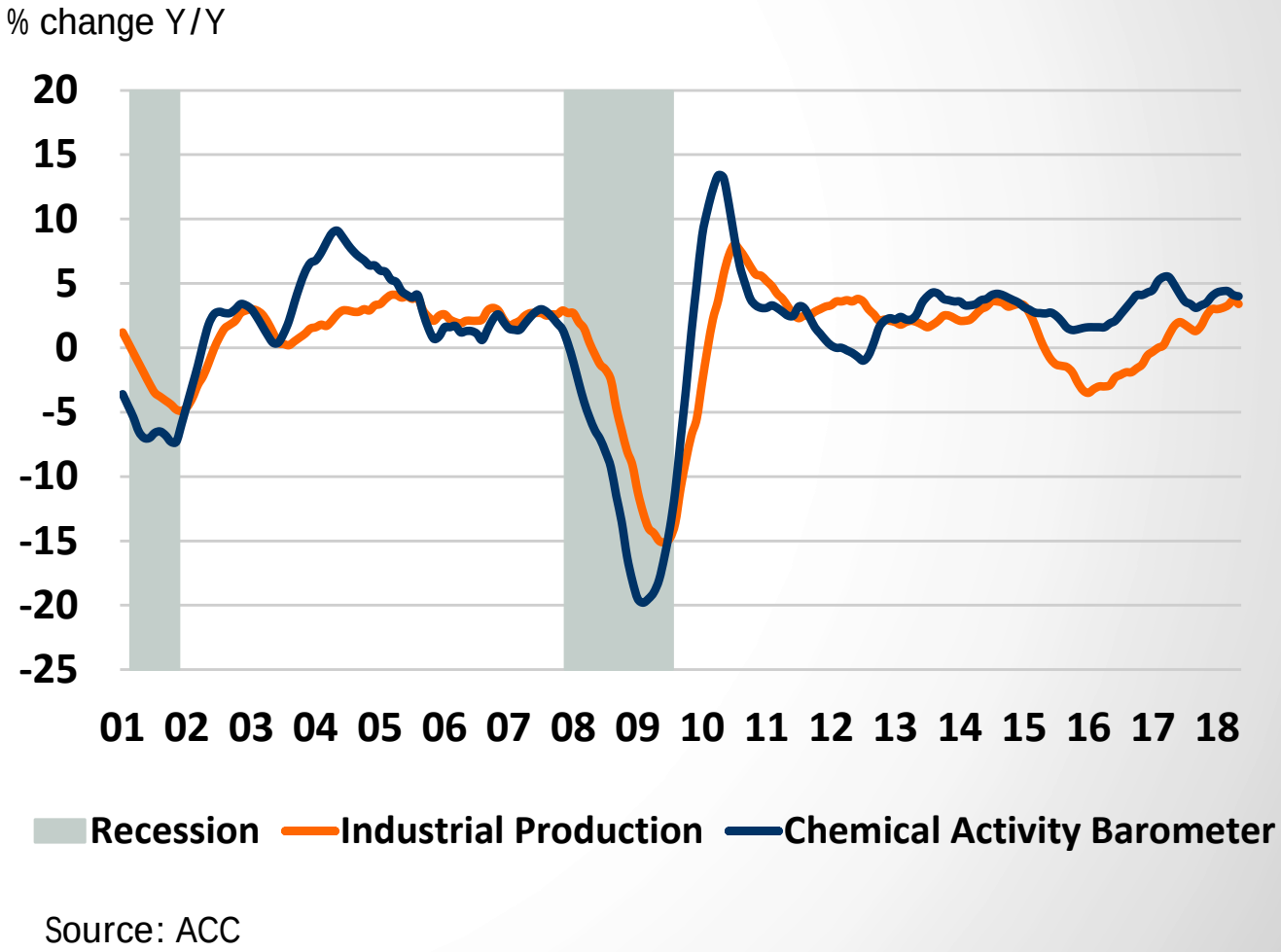
U.S. Economy Continues to Accelerate

- Tightening labor market; wage growth accelerating
- Inflation and wage growth firming → Fed tightening
- U.S. recovery/expansion is now the 2nd longest in post-war period
- U.S. GDP growth of 2.9% in 2018 and 2.6% in 2019
- Key risk from trade tensions – higher cost of imports; retaliation against U.S. producers

Outlook for End-Use Markets

Chemical Activity Barometer (CAB)

- Developed by ACC, the CAB is a leading indicator of broader industrial activity.
- CAB accelerated in September (following flat growth in August)
- Key production and inventory indicators remained positive
- CAB suggests further growth in business activity through the end of 2018



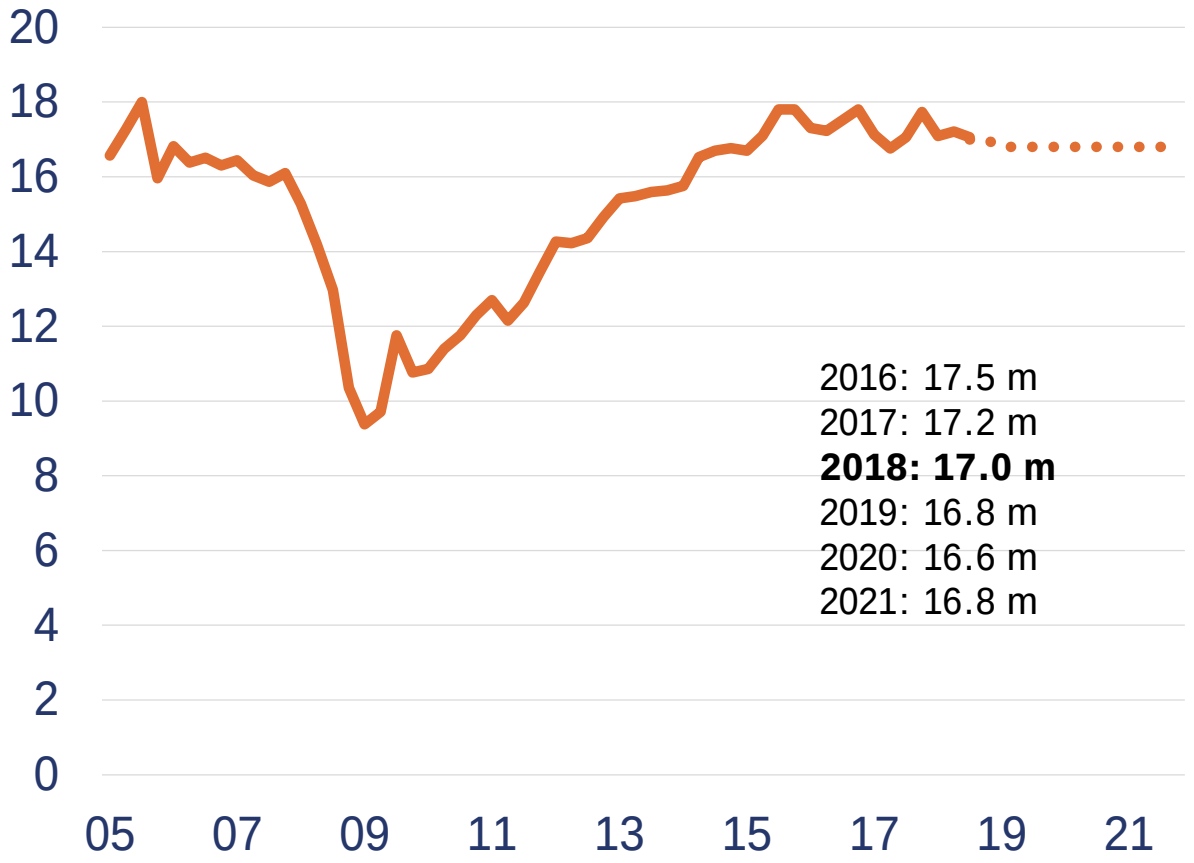
Source: ACC

Housing and Vehicles Outlook

Housing Starts (thousands)

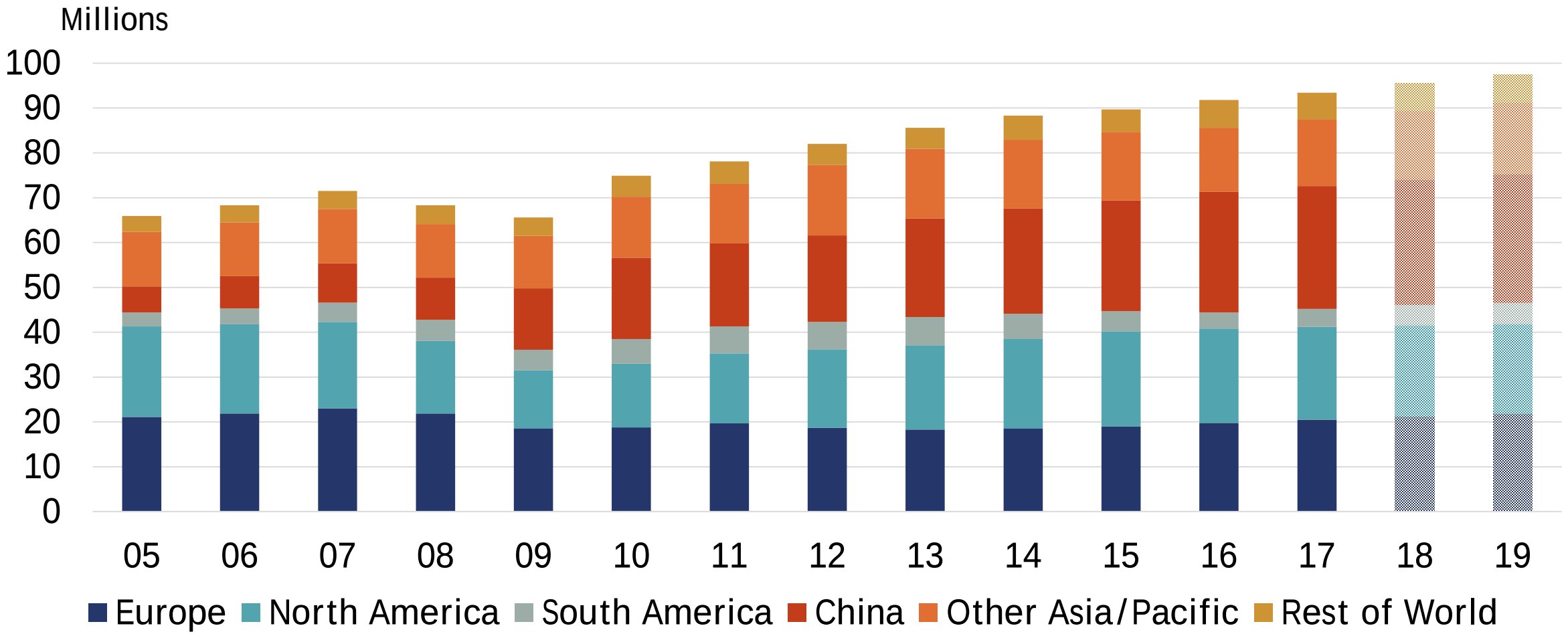
Sources: Census Bureau, ACC Survey of Economic Forecasters

Millions of Units (SAAR)



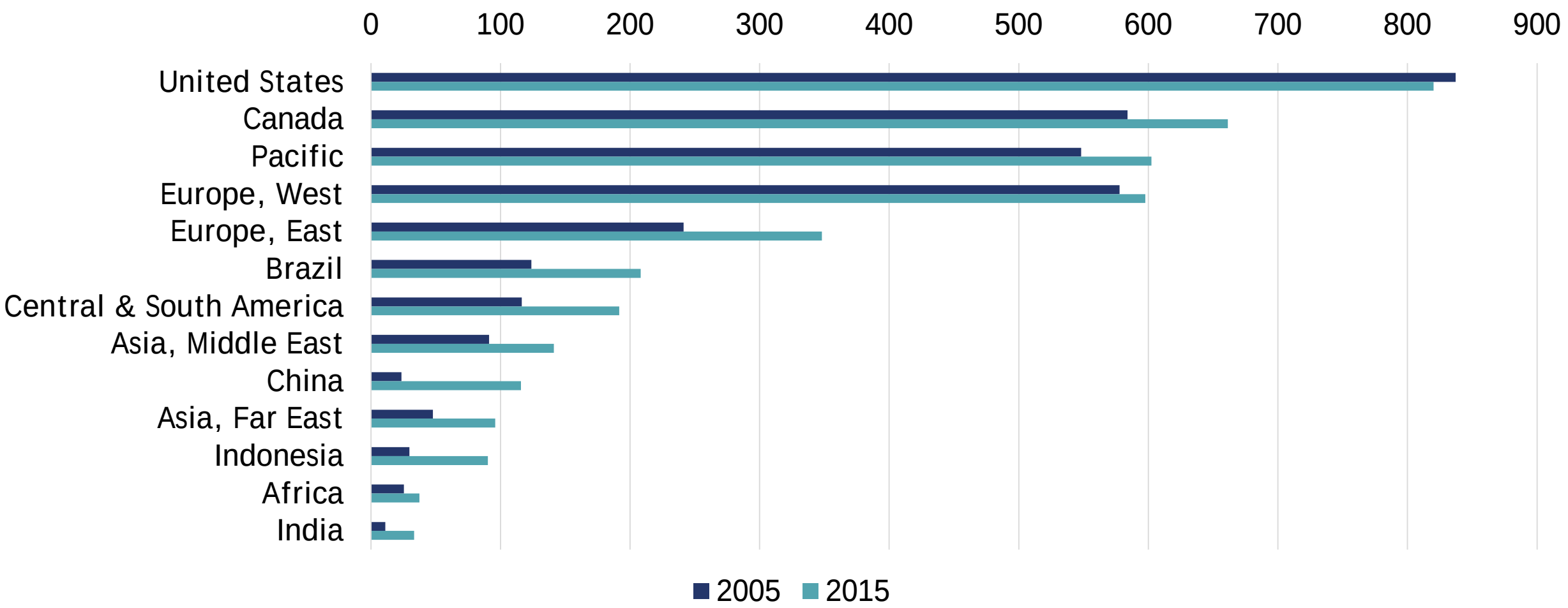
Sources: Bureau of Economic Analysis, ACC Survey of Economic Forecasters

Global Light Vehicle Sales by Region



Sources: OCIA (International Association of Motor Vehicle Manufacturers), Wards Intelligence

Vehicle Ownership per 1,000 People

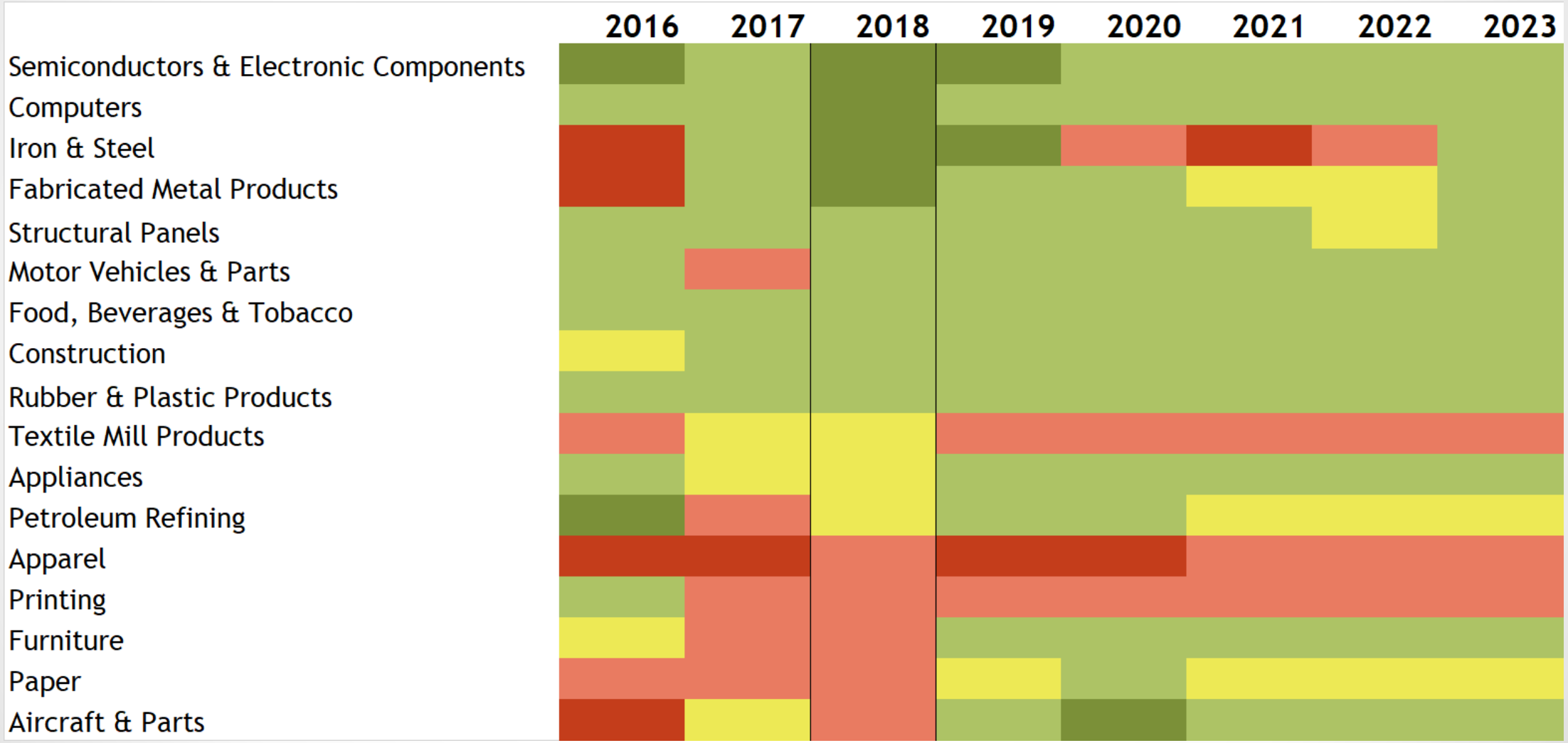


Source: Transportation Energy Data Book (Oak Ridge National Laboratory)

Key trends in Global Motor Vehicle Growth

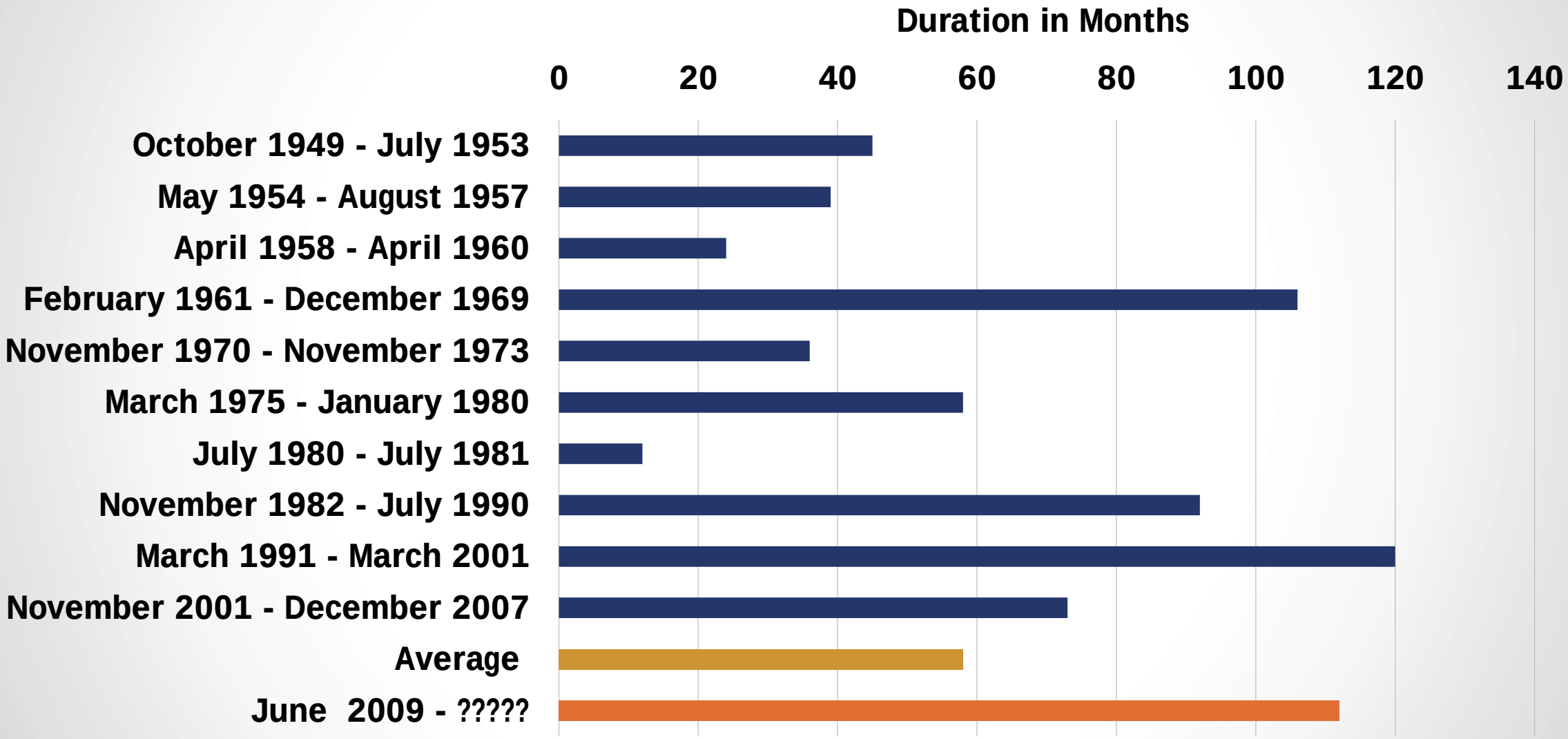
- In the U.S. more than $3,500 of chemistry in every light-vehicle (including 342 pounds of plastics and composites)
- More than 1 billion cars on the road today (plus 400 million trucks), doubling by 2040.
- Majority of growth coming from emerging economies
- Disruptive technologies reshaping vehicle supply chain
- Transition to electric vehicles
- Requires broad expansion of road infrastructure

Outlook for End Use Markets in U.S. (Consensus)



Source: ACC (October 2018)

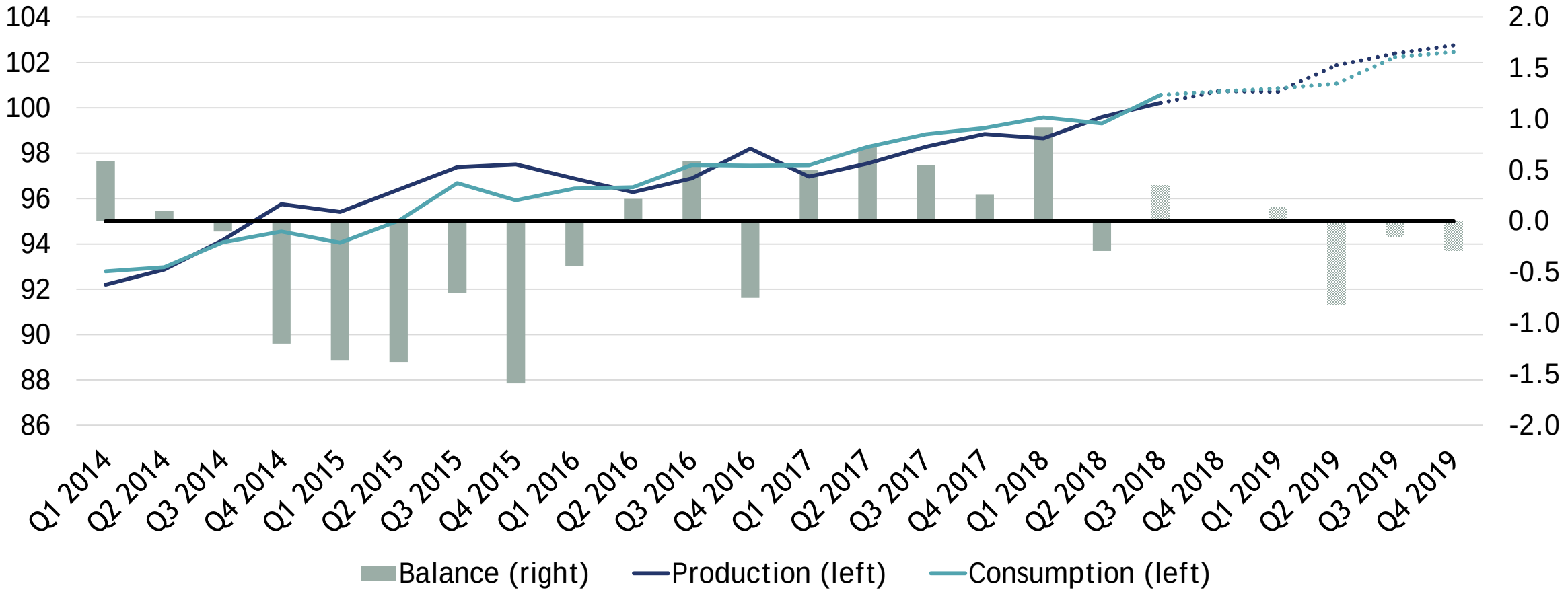
US Recoveries/Expansions in History



Sources: NBER and ACC analysis

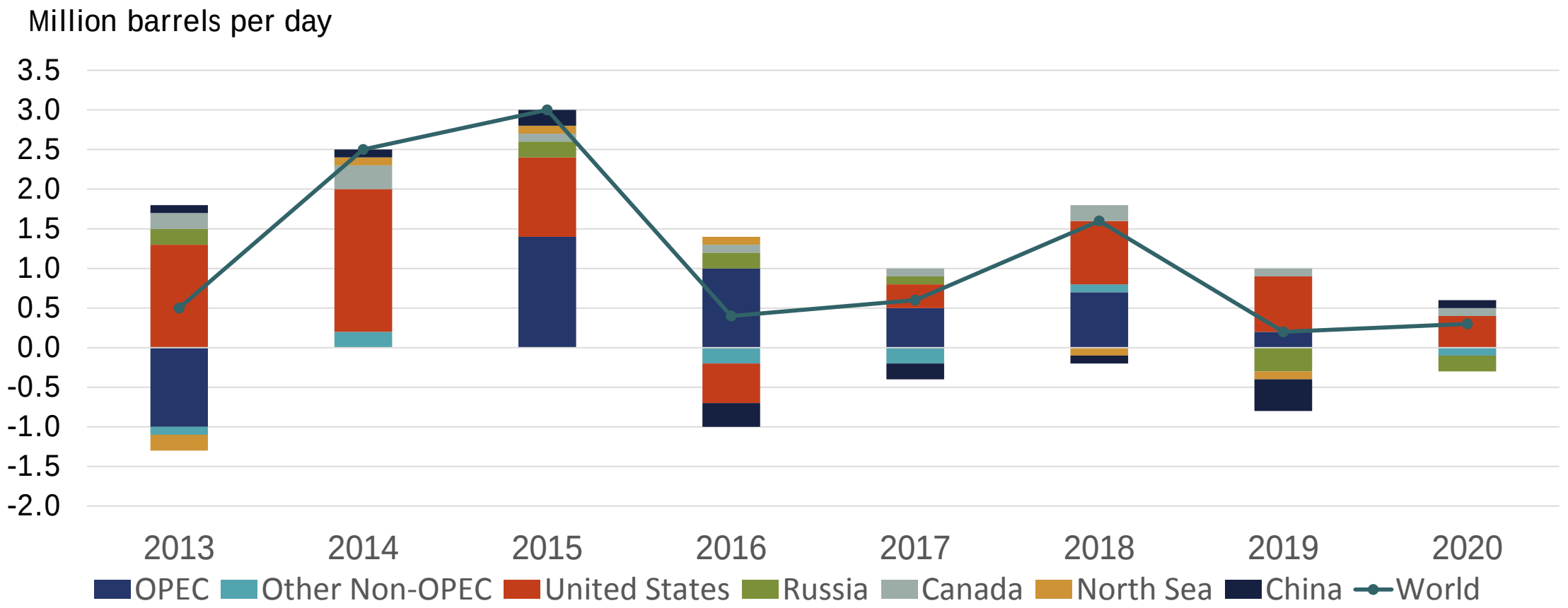
Outlook for Energy & Chemicals

Global Oil Supply and Demand



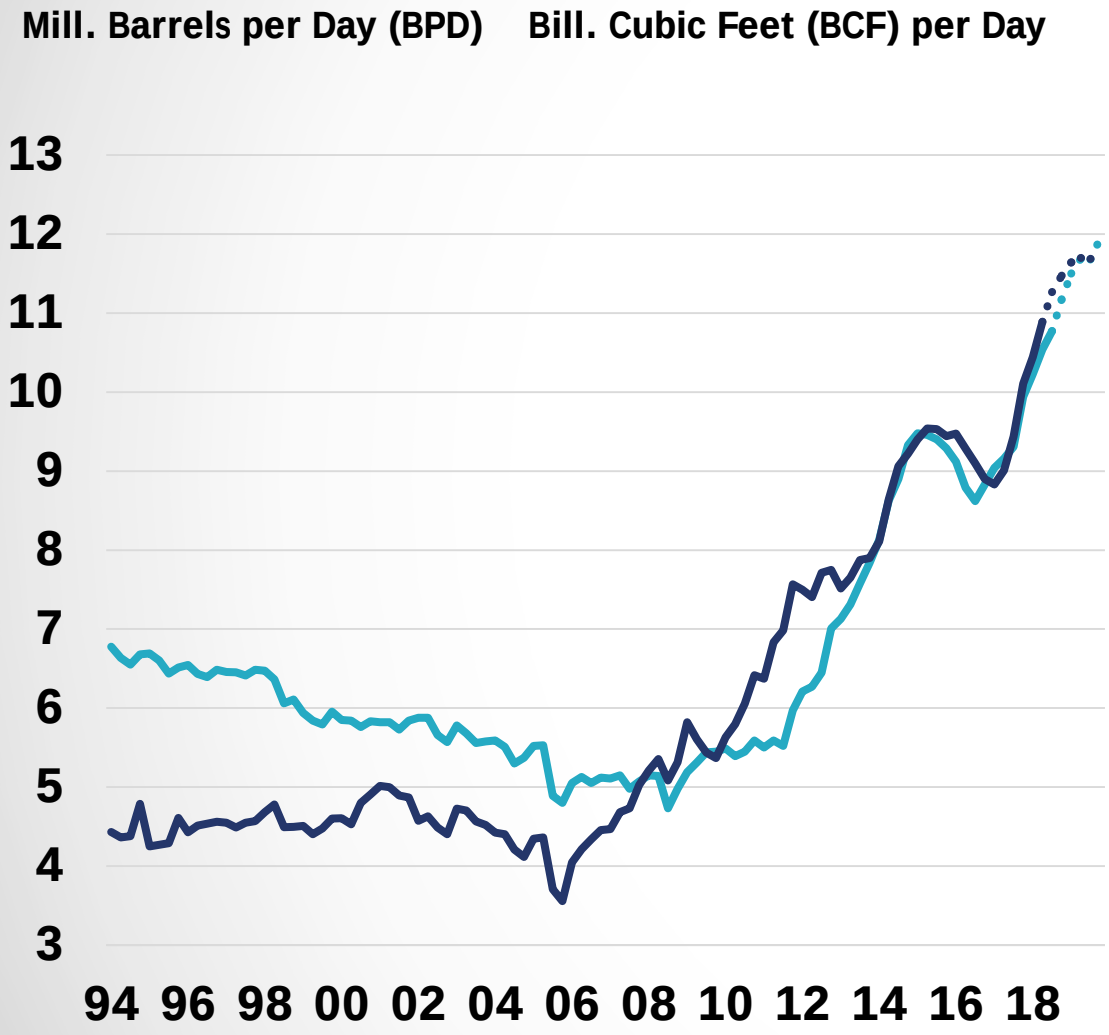
Source: EIA Short-Term Energy Outlook (October 2018)

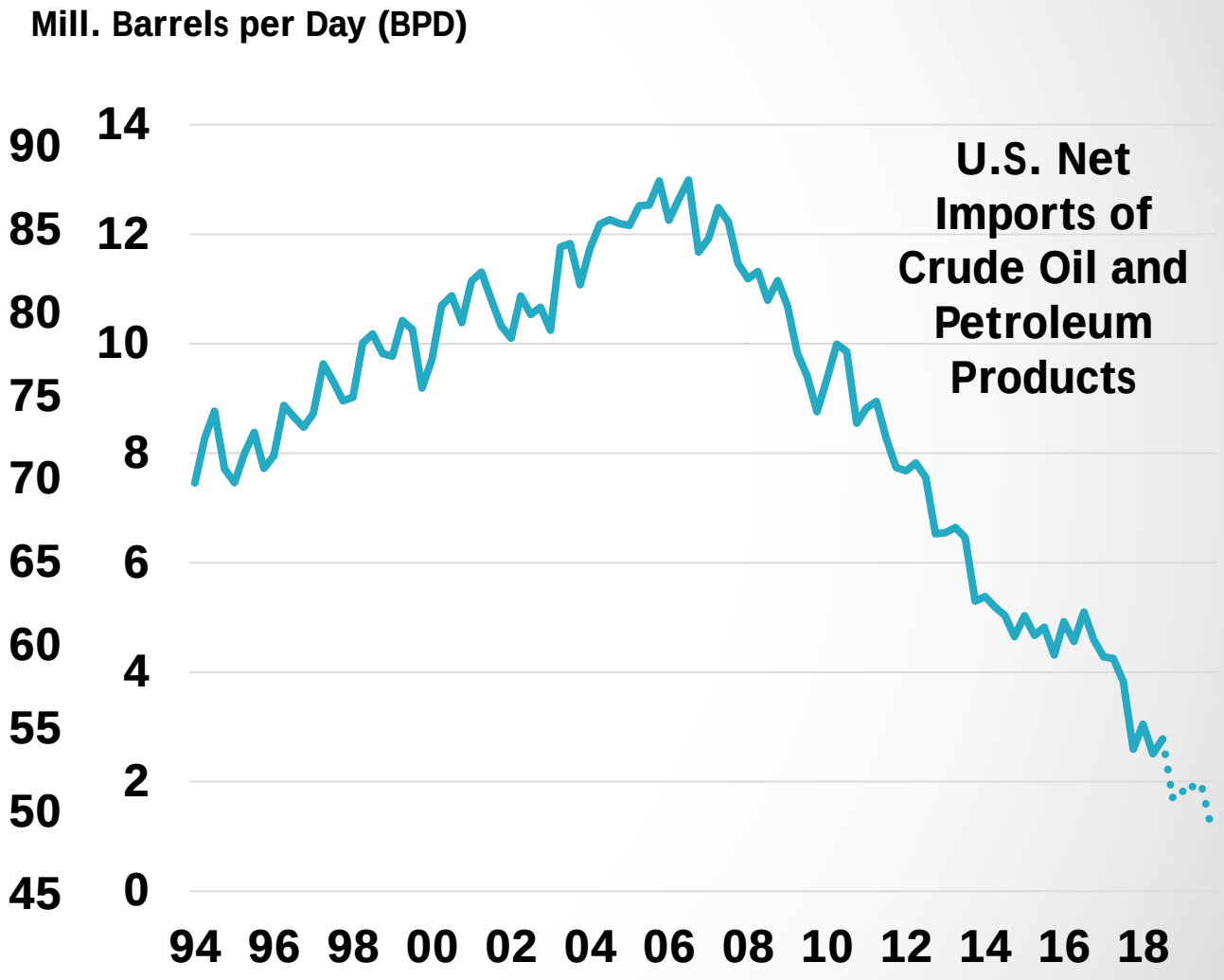
Incremental Change In Oil Production



Source: U.S. Energy Information Administration

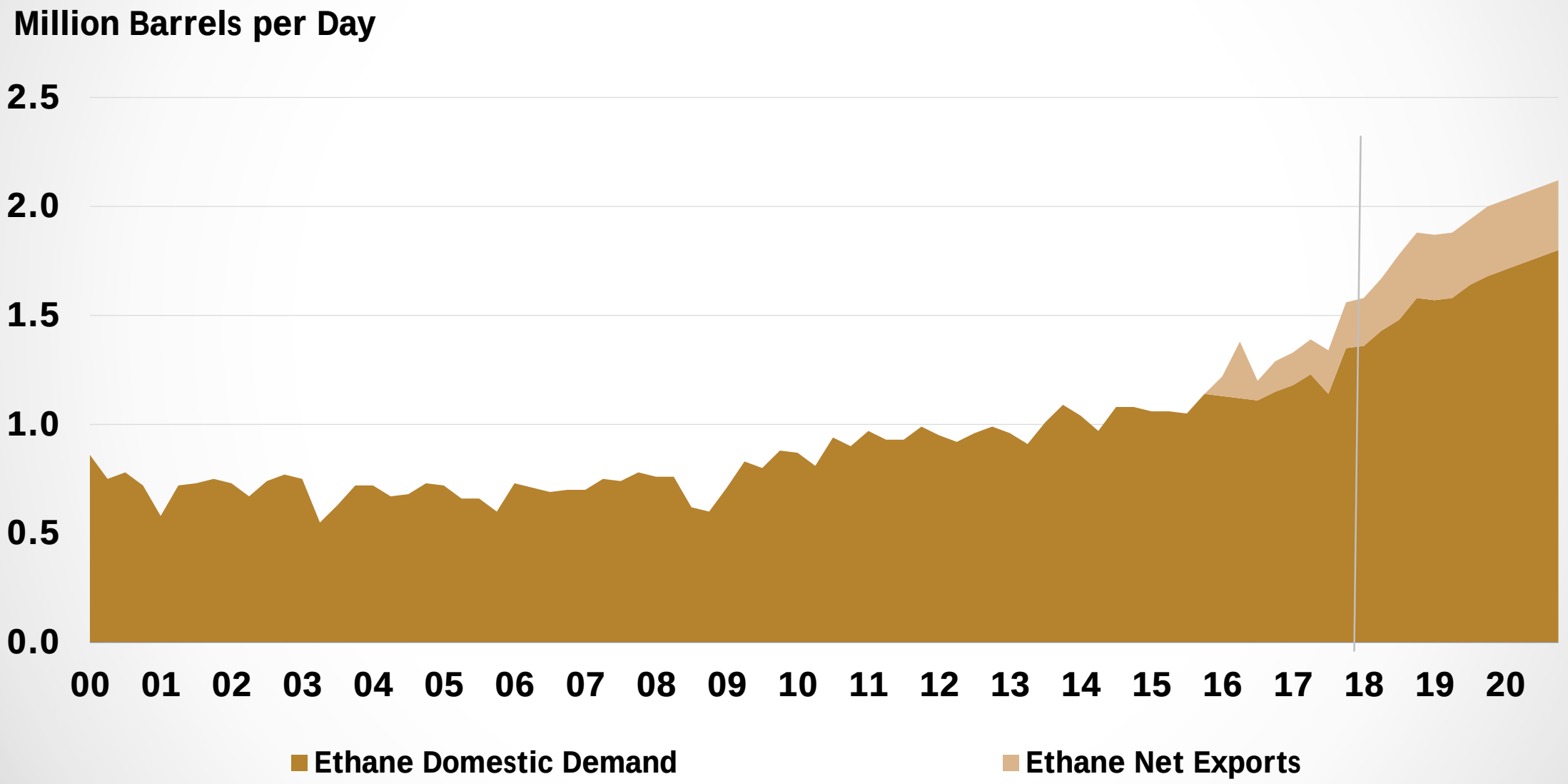
U.S. Becomes Leading Energy Producer





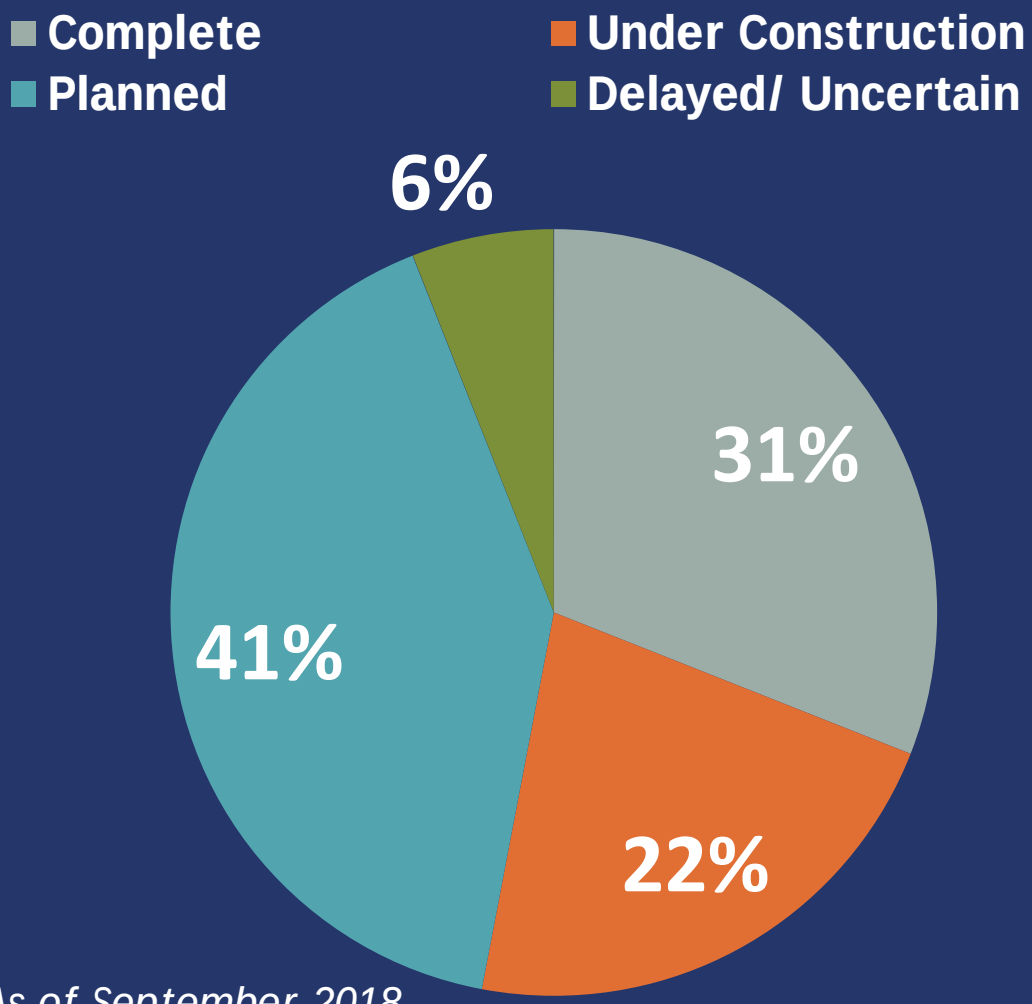
Source: EIA Short-Term Energy Outlook (August 2018)

Resulting in Surging Ethane Supply and Ethane Exports



Sources: U.S. Energy Information Administration and ACC analysis

Shale-Advantaged Chemical Industry Investment

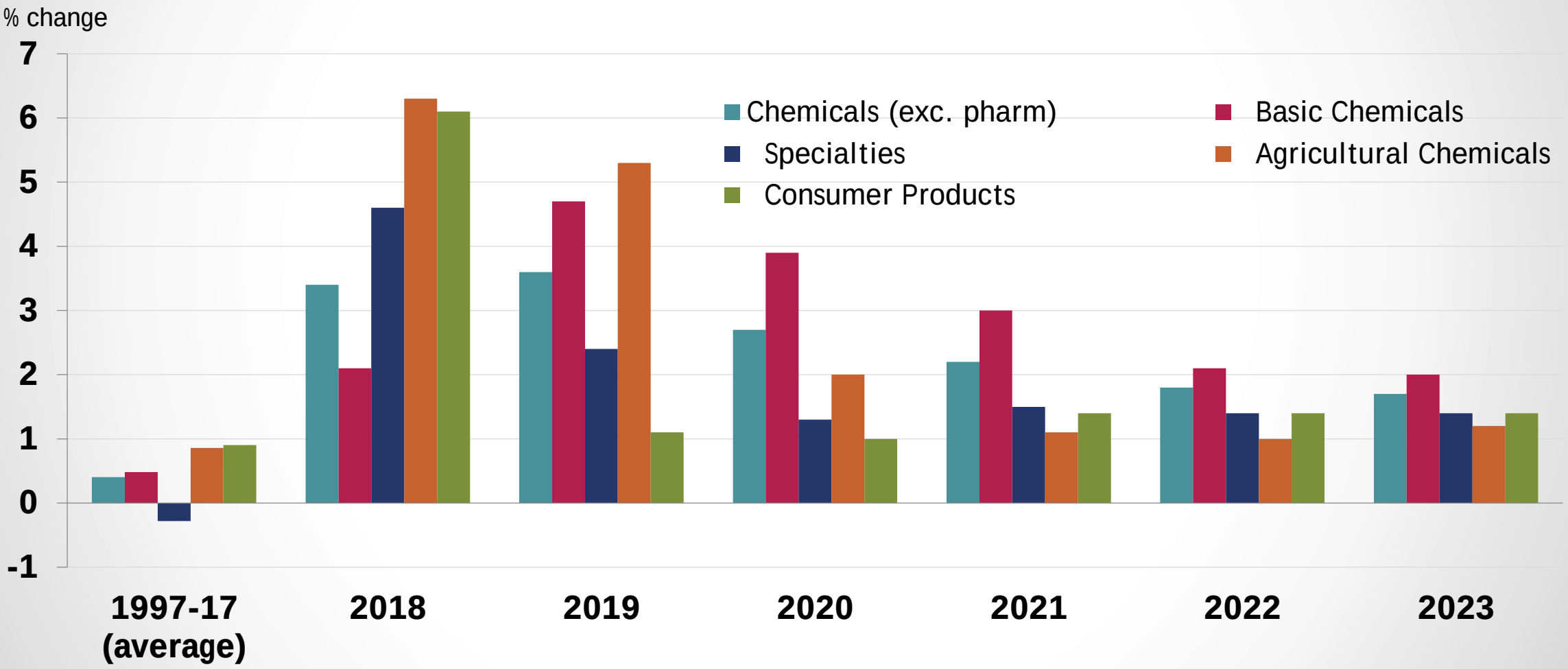


As of September 2018

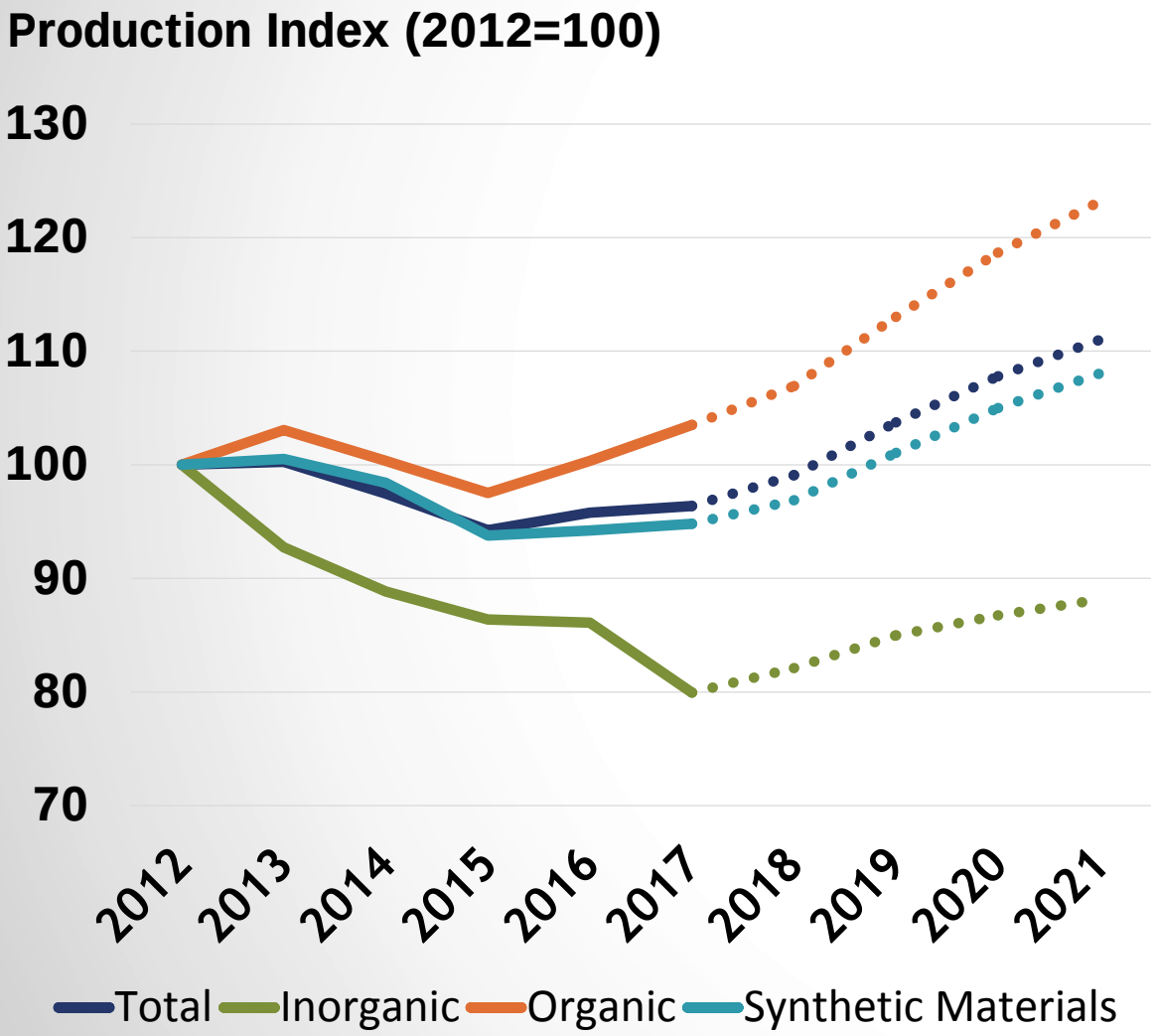
Nearly $202 billion in new projects

68% is foreign direct investment

US Chemistry Accelerating



US Basic Industrial Chemical and Synthetic Materials Production Outlook by Segment

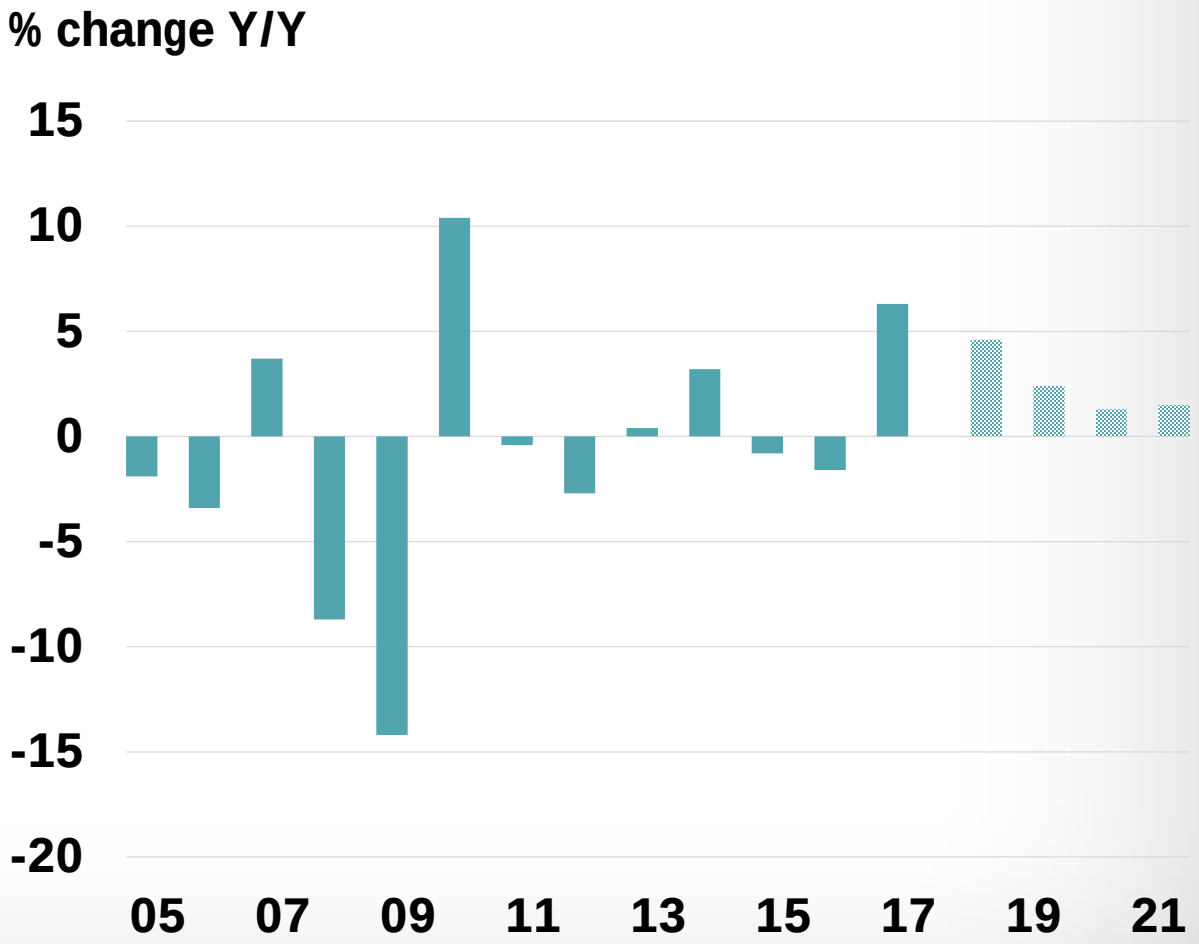


Year	Total	Inorganics	Organics	Synthetic Materials
2016	1.6%	-0.3%	2.9%	0.6%
2017	0.6%	-7.1%	3.1%	0.6%
2018	2.8%	-0.4%	1.5%	4.4%
2019	4.7%	3.5%	5.7%	4.3%
2020	3.9%	2.1%	5.0%	3.9%
2021	3.0%	1.6%	3.8%	2.9%

Source: ACC Mid-Year 2018 Situation & Outlook

U.S. Specialty Chemicals

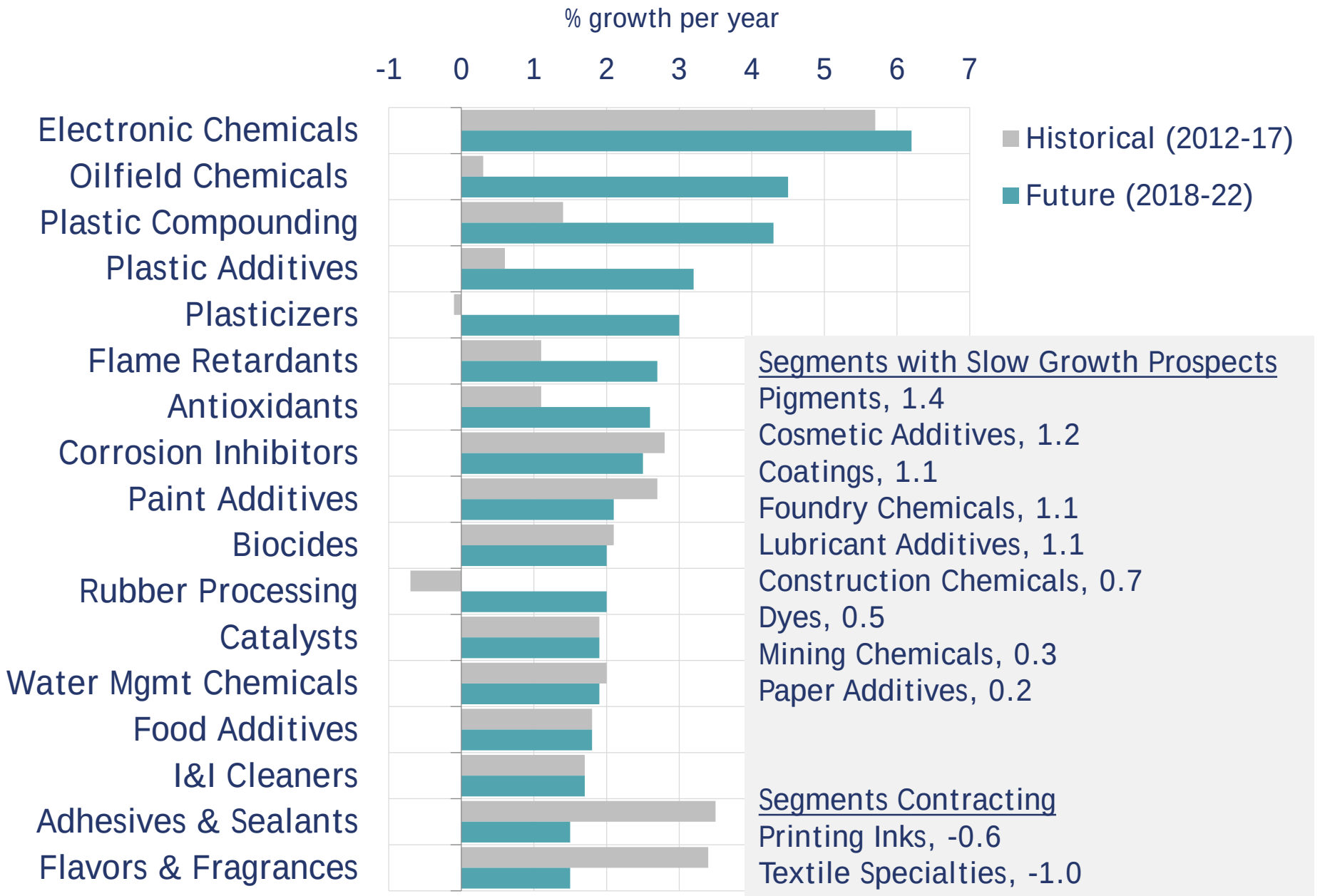
- **With improved manufacturing growth in U.S. and abroad and recovery in oilfield & mining, specialties production surged in 2017, up 6.3%.**
- **Looking ahead, 4.6% growth expected in 2018.**
- **Strong manufacturing and mining sectors have boosted demand for specialty chemicals in 2018 with the largest YTD gains in: oilfield chemicals; electronic chemicals; cosmetic chemicals; corrosion inhibitors; flavors & fragrances; plasticizers; plastic addtives; biocides; coatings; foundry chemicals; and adhesives & sealants.**



Source: ACC Mid-Year 2018 Situation & Outlook

U.S. SPECIALTY CHEMICALS LONG TERM OUTLOOK

Average Annual % Change Year-over-Year



Segments with Slow Growth Prospects
Pigments, 1.4
Cosmetic Additives, 1.2
Coatings, 1.1
Foundry Chemicals, 1.1
Lubricant Additives, 1.1
Construction Chemicals, 0.7
Dyes, 0.5
Mining Chemicals, 0.3
Paper Additives, 0.2

Segments Contracting
Printing Inks, -0.6
Textile Specialties, -1.0

Thoughts on Trade

U.S. Trade Actions and Trade Partner Retaliation

- USCMA
- SEC 232:
  - ALUMINUM & STEEL
  - AUTOS & AUTO PARTS
- SEC 301:
  - US-CHINA TRADE
- WTO

U.S. Trade Actions and Trade Partner Retaliation

USMCA

Sec. 232 Tariffs

Aluminum & Steel

Autos & Auto Parts

Sec 301

U.S.-China Trade

WTO

U.S.-Mexico-Canada Agreement (USMCA)

- Strengthened Rules of Origin
  - 75% value regional content (up from 62.5%)
  - Strong content requirement for core parts (i.e., transmissions and engines)
  - Labor value content requirement – 40-45% must be produced by workers earning at least $16/hour
  - Strengthened ROO for auto parts
  - New rules phased in over 2-5 years (in line with model design lead times)
- Interstate Dispute Settlement Mechanism (ISDS) mechanisms preserved
  - New ISDS only covers investments in Mexico in certain sectors
  - Prevents any member from entering into a free-trade agreement with a "non-market" economy, i.e., China.
  - Strengthens intellectual property protections
- Dairy and agricultural market access

U.S. SECTION 232 TARIFFS
ALUMINUM & STEEL

IMPACTS

$3.5B

U.S. Chemicals & Plastics Exports exposed to Retaliatory Tariffs

Due to U.S. Tariffs on Imports:

…increased costs to maintain and expand capital… direct impact to chemical plant maintenance and construction costs
→investments put on hold and/or cancelled; particularly painful consequences to projects in progress

…increased cost of essential inputs into downstream products
→decline in demand for U.S. chemicals → decline in U.S. chemicals production, lost jobs, offshoring, investments put on hold and/or cancelled

Due to Retaliation on U.S. Exports:

$3.5 B in chemicals exposed to retaliatory tariffs
→decline in U.S. chemicals production, lost jobs, offshoring, investments put on hold and/or cancelled

Tariffs on exports of downstream chemistry-containing products
→decline in demand for U.S. chemicals → decline in U.S. chemicals production, lost jobs, offshoring, investments put on hold and/or cancelled

U.S. SECTION 301 TARIFFS ON US-CHINA TRADE

AND CHINESE RETALIATION

$11B

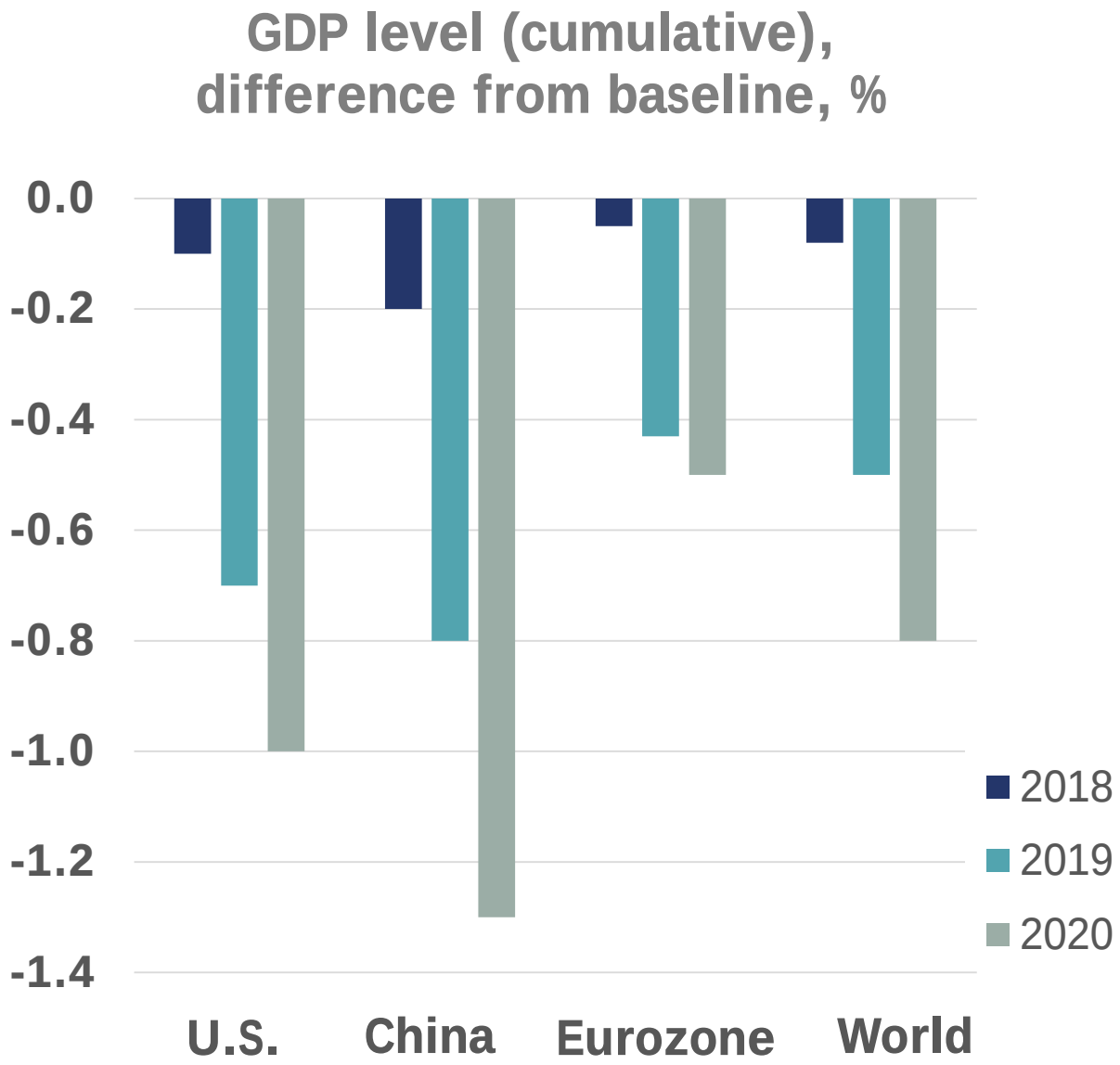
U.S. Chemicals & Plastics Exports exposed to Retaliatory Tariffs

Aug 2017	U.S investigation into unfair trade practices by Chinese initiated
Mar 2018	Commerce releases findings that China is conducting unfair trade practices related to technology transfer, IP, and innovation
April 2018	U.S. announces 25% tariffs on 1,300 Chinese products, 2 lists: $34B + $16B
July 6 2018	U.S. tariffs on $34B (no chemicals) imposed; Chinese tariffs on 545 products (**no chemicals**)
July 10 2018	U.S. announces 10% (*or 25%!*) tariffs on $200B, 6,000 products (**1,505 chemicals**)
July 20 2018	U.S. threatens tariffs on up to $505B (basically ALL imports from China)
Aug 3 2018	Chinese tariffs on $60B announced (**987 of 5,207 products are chemicals**)
Aug 23 2018	U.S. tariffs on $16B imposed (includes **$2.2B chemicals**); Chinese tariffs on $16B imposed (includes **$2.0B in chemicals/ plastics)**
Late Sept/ early Oct	U.S. tariffs on $200B (**$16.4B chemicals**) likely imposed; Chinese tariffs on $60B expected includes **$8.8B in chemicals and plastics**

ECONOMIC IMPACT OF US-CHINA TRADE WAR

25% tariffs on US$50 B
+
10% tariffs on US$200B*
+
Response from China that causes equivalent impact

*note it could be 25% tariffs on US$200B



Source: Oxford Economics, 8/23/18