

Opportunities and Challenges in Sustaining Our Competitive Advantage in Elastomers

ACS Rubber Division

January 25, 2022

Cleveland, OH

Paul Boulier

Vice President, Industry & Innovation

Over the past couple of years-the size of the boat is irrelevant...



Keeping things upright is challenging enough, let alone navigating the rest of the storm...

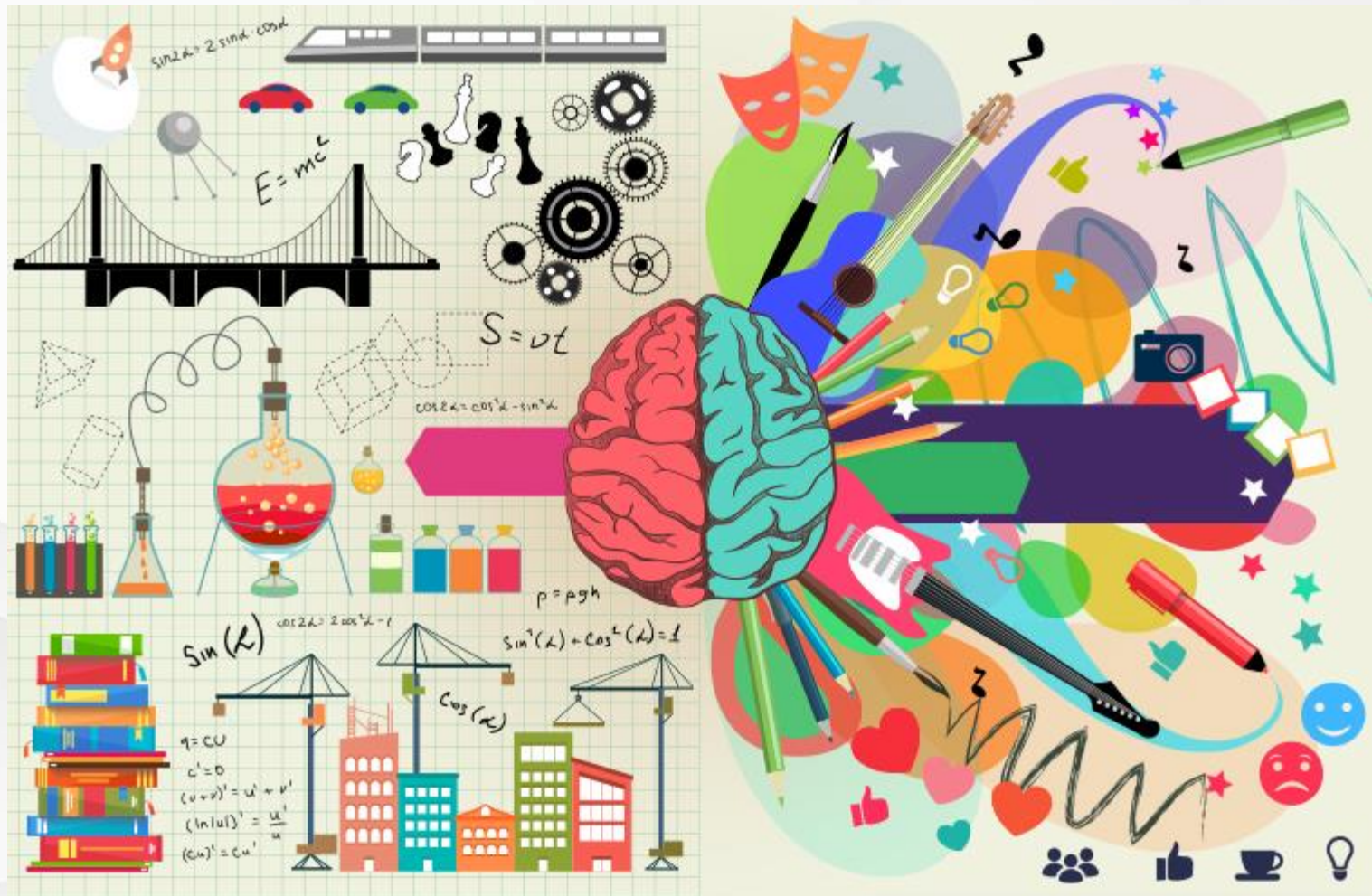


Running the
Business

Growing the
Business

“Running the Business”

“Growing the Business”



“Sustaining our Competitive Advantage in Elastomers”

- Market Demand & Industry Dynamics
- Our Advanced Materials Ecosystem
- Some Opportunities and Issues
 - Leveraging existing & new relationships in the Value Chain

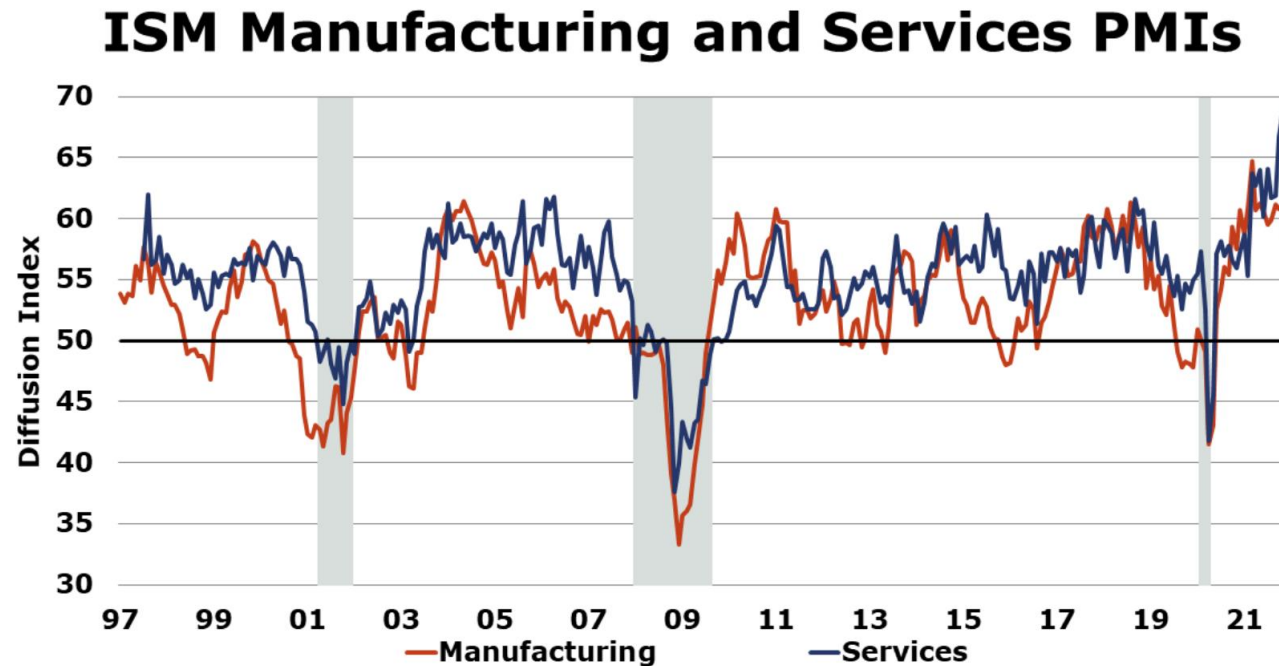
INDUSTRY DYNAMICS

- Factory orders increased 12.9% over last year*
 - Increases computers, electronics, transportation equipment
 - Decreases in machinery, electrical equipment, appliances and components
- Manufacturing added 26,000 jobs in December
 - 2021 (Durable Goods Manufacturers accounted for 20,000 of those**
 - Still down 219,000 jobs from pre-Covid 2020

*Reuters

**Bureau of Labor Statistics

Demand is solid across most sectors



Source: Institute for Supply Management

		Change W/W or M/M			
Chemical Exports, SITC basis (Nov)		▼ 4.5% to \$15.2B			
		Change M/M		Change Y/Y	
Chemical Employment (Dec)		~	0.0%	▲	2.8%
Chemical Shipments (Nov)		▲	0.7%	▲	12.3%
Chemical Inventories (Nov)		▲	1.3%	▲	11.0%
Chemical Construction Spending (Dec)		▲	0.1%	▲	12.5%
	Carloads	Change W/W		Change Y/Y (13-wk MA)	
Railcar Loadings (1/1)	32,374	▲ 6.2%		▲ 5.7%	

According to data released by the Association of American Railroads, chemical railcar loadings rose by 1,884 carloads to 32,374 for the week ending 1 January. Loadings were up 5.7% Y/Y (13-week MA), up 5.6% YTD/YTD and have been on the rise for 6 of the last 13 weeks.

US CHEM VOLUMES & US GDP

US chemical volumes are expected to grow around 1.5% in 2021 and 3% in 2022, while shipments will likely increase 8% in 2021 and 2022, following a 13.5% decline in 2020.

High inflation has led to the US Federal Reserve to accelerate its tapering of asset purchases as it prepares to raise interest rates. A slowdown of economic growth in the US and global economy could put pressure on sensitive sectors such as chemicals.

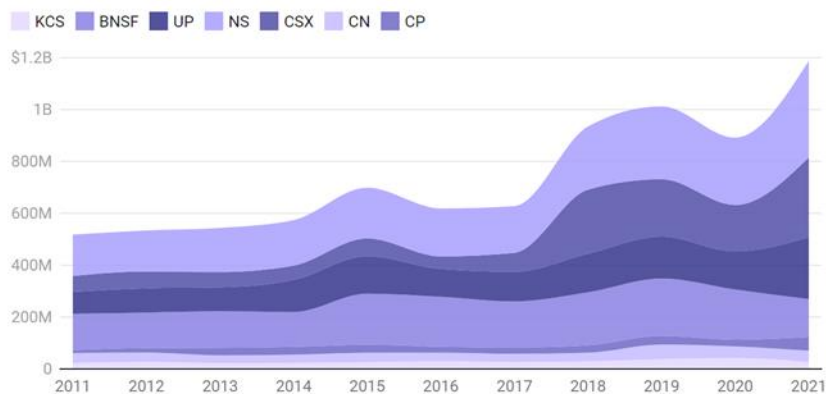
US GDP is **expected** to grow by 4.4% in 2022, according to an end-year outlook by the American Chemistry Council (ACC). US industrial production will grow by 4.0% in 2022, after industrial production rose 5.5% in 2021, driven by a rebound in demand for goods.

Chemical demand is sensitive to GDP, so a slowdown or an uptick in the economy could impact stock prices for chemical companies in 2022.

Rail Demand (and Cost) increasing

Class I railroads hit a new record in 2021

Annual demurrage revenues reported by railroads since 2011



Note: Data prior to 2018 was collected from railroads' annual R-1 reports. Q4 demurrage revenues for 2021 have not been reported yet.

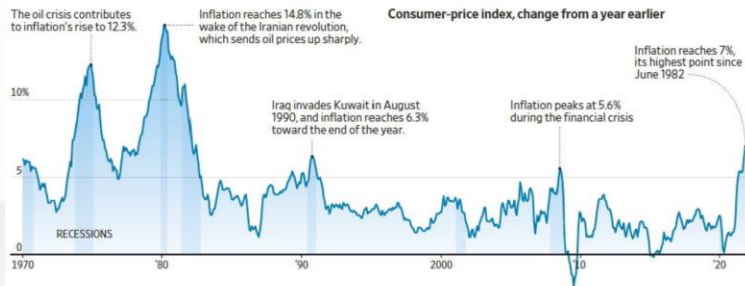
Chart: Edwin Lopez / Supply Chain Dive • Source: [Surface Transportation Board](#) • [Get the data](#) • Created with [Datawrapper](#)

How individual railroads charge for demurrage varies

Railroad	Range of daily demurrage fees
BNSF	\$150 to \$500, depending on container dwell time and facility
CN	\$100 to \$450, depending on container dwell time and facility
CP	\$75 to \$350, depending on container dwell time, facility and who owns the equipment
CSX	\$100 to \$500, depending on container dwell time, facility and whether the equipment is for domestic or international use
KCS	\$100 per day after free time expires, in all cases
NS	\$100 to \$300, depending on container dwell time and facility
UP	\$100 to \$225, depending on container dwell time, facility and whether the equipment is for domestic or international use

SOURCE: Letters in response to the STB, as linked. Union Pacific did not disclose its specific fees in the letter, but its rates are available online.

Inflation Hits Fastest Clip Since '82



Consumer-price index for select categories, change from a year earlier



Source: U.S. Labor Department via the Federal Reserve Bank of St. Louis

Kurt Wiberding/THE WALL STREET JOURNAL

Consumer prices rise by 7% as pandemic disruptions, consumer demand stay strong

By GWYNN GUILFORD

U.S. inflation hit its fastest pace in nearly four decades last year as pandemic-related supply and demand imbalances, along with stimulus intended to shore up the economy, pushed prices up at a 7% annual rate.

The Labor Department said Wednesday the consumer-price index—which measures what consumers pay for goods and services—rose 7% in December from the same month a year earlier, up from 6.8% in November. That was the fastest since June 1982 and marked the third straight month in which inflation exceeded 6%.

The so-called core price index, which excludes the often-volatile categories of food and energy, climbed 5.5% in December from a year earlier.

Please turn to page A2

- ◆ Greg Ip: Biden's inflation fix starts at micro level..... A2
- ◆ Stocks gain after high inflation data..... B9
- ◆ Heard on the Street: Watch for wage spiral..... B10

December Budget Deficit Shrank

By AMARA OMEOKWE

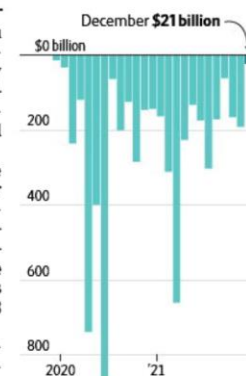
The federal government ran a \$21 billion deficit during December, the smallest monthly gap in two years, as the government took in more tax revenue while spending edged higher.

Government receipts for the month rose 41% from a year earlier to \$487 billion, not adjusting for calendar differences, the Treasury Department said Wednesday. The Treasury said federal outlays in December rose 4% to \$508 billion.

In December of the previous fiscal year, the government ran a deficit of roughly \$144 billion.

The monthly deficit last

Federal deficit



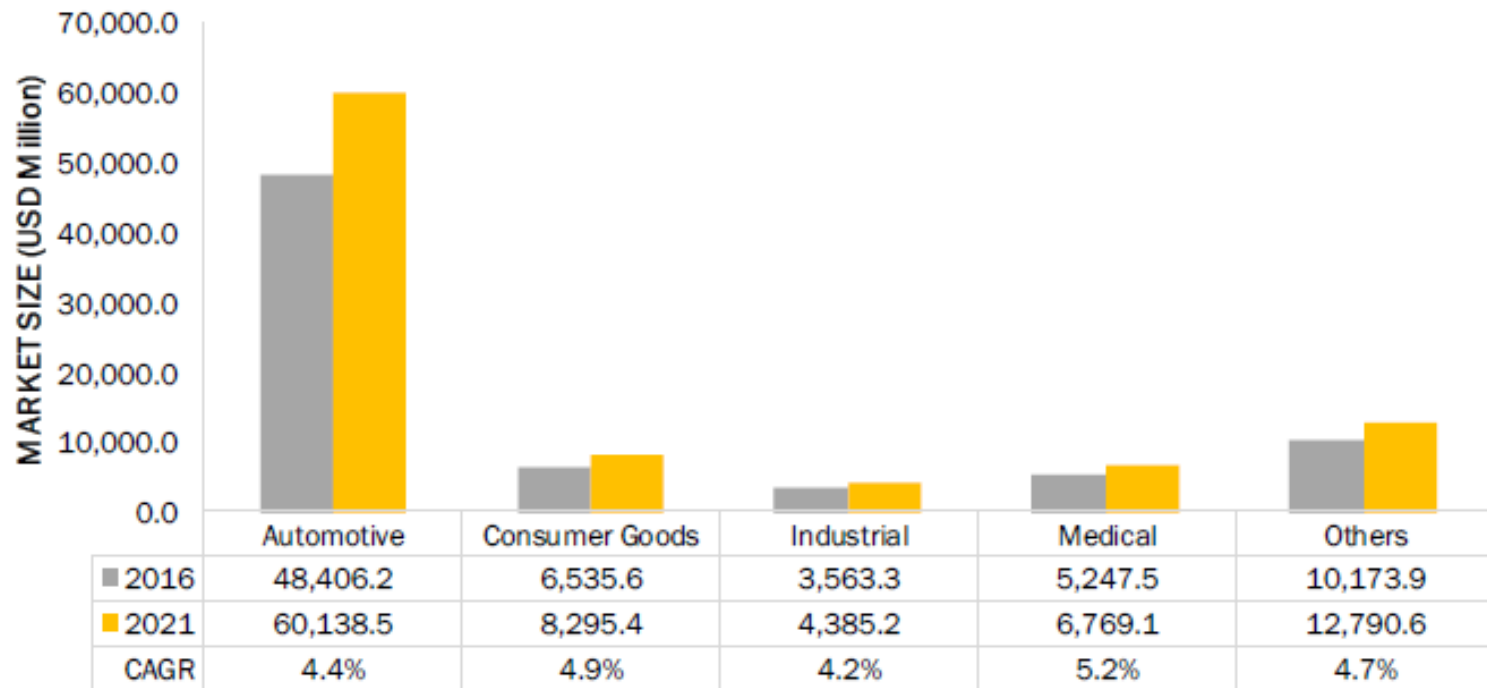
Source: U.S. Department of the Treasury via the Federal Reserve Bank of St. Louis

players nearing a deadline to pay payroll taxes they had been allowed to defer as part of federal coronavirus relief.

Wednesday's data show the U.S. is running a smaller deficit so far in the current fiscal year, which began in October, than in the previous one. The cumulative deficit in the first three months of the fiscal year stood at \$378 billion compared with \$573 billion at the same point the prior year.

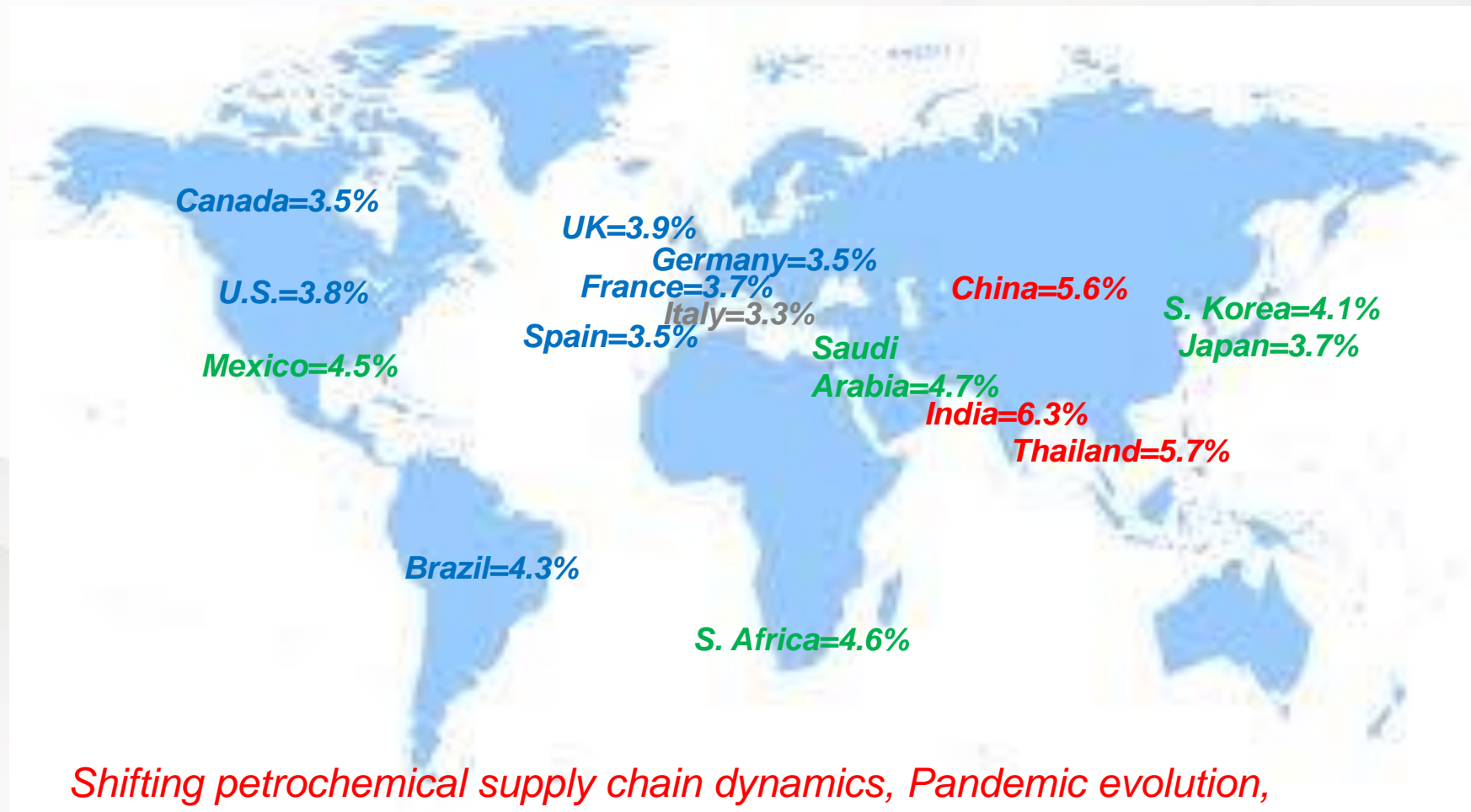
Federal receipts have risen at a faster rate than outlays during the first quarter of the fiscal year, partly reflecting an increase in workers' taxable wages and salaries. The federal government so far in the fiscal year doled out more in refundable tax credits, accord-

Global Elastomer Industry*, Solid Growth Across Most Sectors



Automotive applications still dominate, but innovation in other markets enabling diversification and future growth

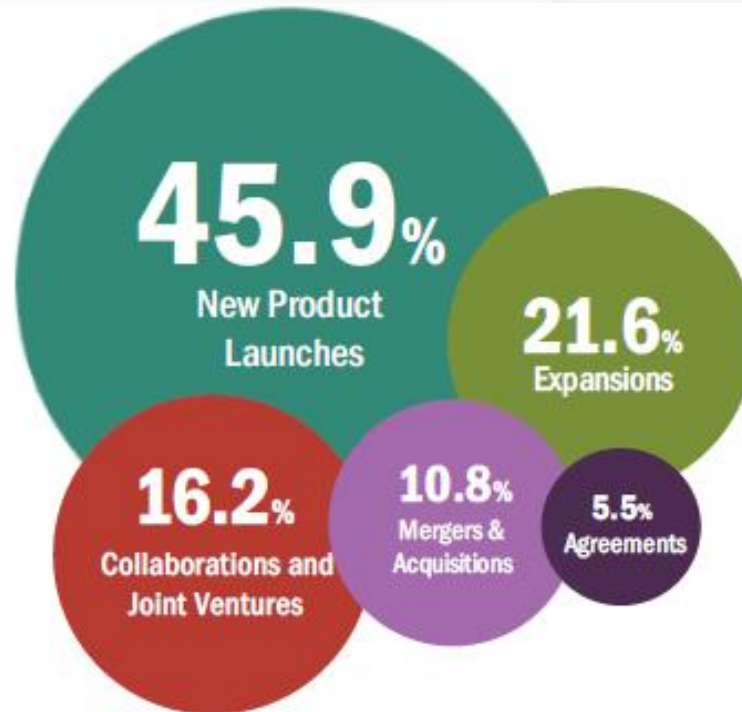
Growth in Elastomers, by Region*



Shifting petrochemical supply chain dynamics, Pandemic evolution, Environment (Like Harvey, Irma, Maria), Global Political environment sure to impact this-both up and down

*"Elastomer Market, Global Forecast till 2021", MarketsandMarkets Inc., 2017

*For Top Elastomer Companies, Innovation & New Product Development Still Key to Drive Growth**



Source: Press Releases, Expert Interviews, and MarketsandMarkets Analysis

***Elastomer Market, Global Forecast till 2021", MarketsandMarkets Inc., 2017*

Opportunities_(not exhaustive)

Automotive Growth

Medical Device Growth (Hospital, In-Home Diagnostics, etc.)

Industrial Applications

Emerging Markets/Applications-fuel cells, Energy Storage, **Smart Devices & Systems**

Reshoring

Shale & Downstream Development: feedstock costs, new materials,
utility costs (?), sustainability, security (vs. both “National & Natural”)

“Hybrid” Intermaterial Solutions-elastomers, plastics, metals, ceramics

New Process Technologies (e.g., **Additive Manufacturing**)

GHG emissions

Lightweighting

Hydrogen Hubs and development

Big Data=New Business Models and approaches to value delivery

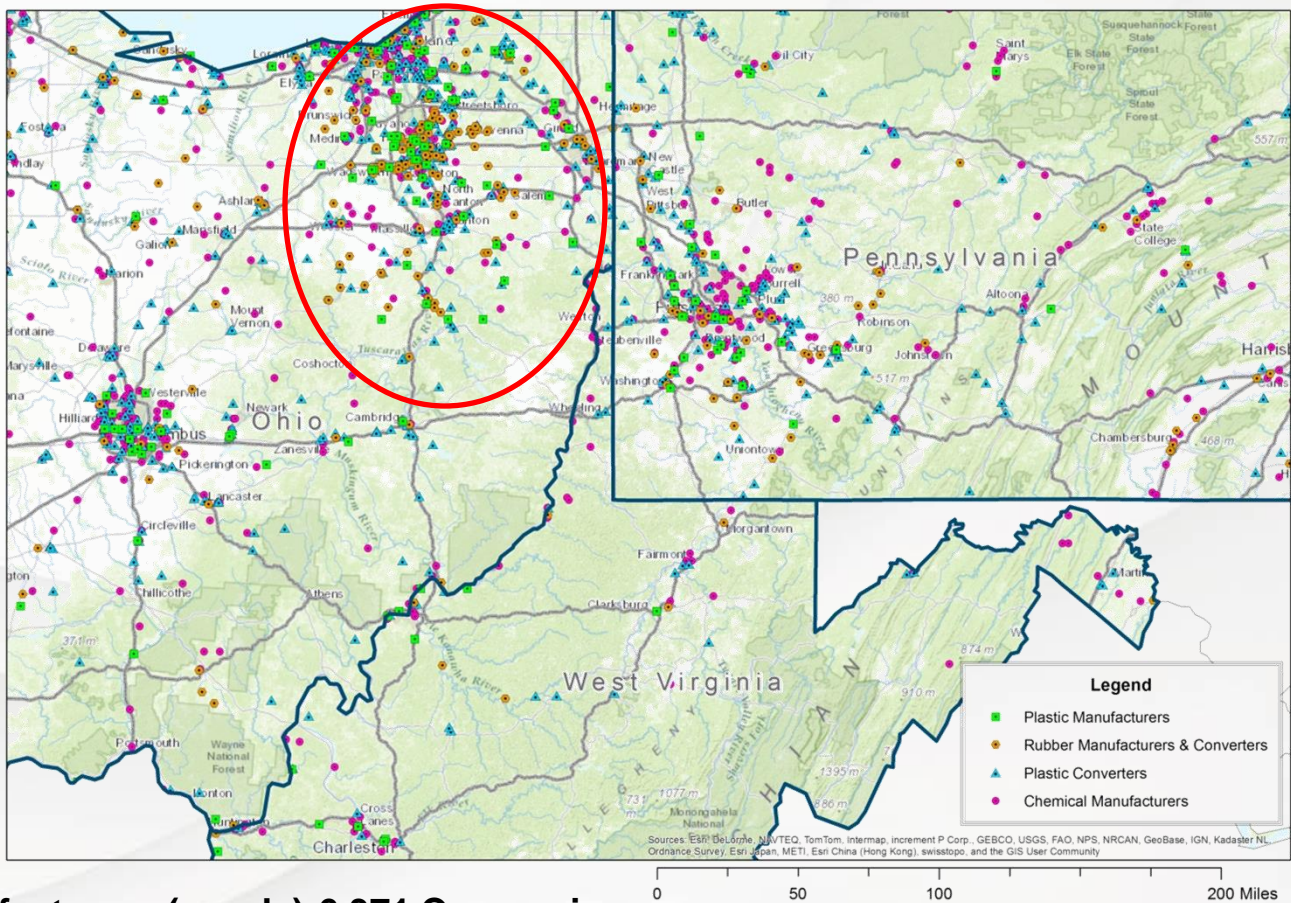
Robotics=approach to integrate Big Data and Talent Pipeline

Talent Pipeline Development-Education, Training, Sustainability

NEO'S ADVANCED MATERIALS ECOSYSTEM

Petrochemical & Downstream Manufacturers within 400 Miles: > 17,000

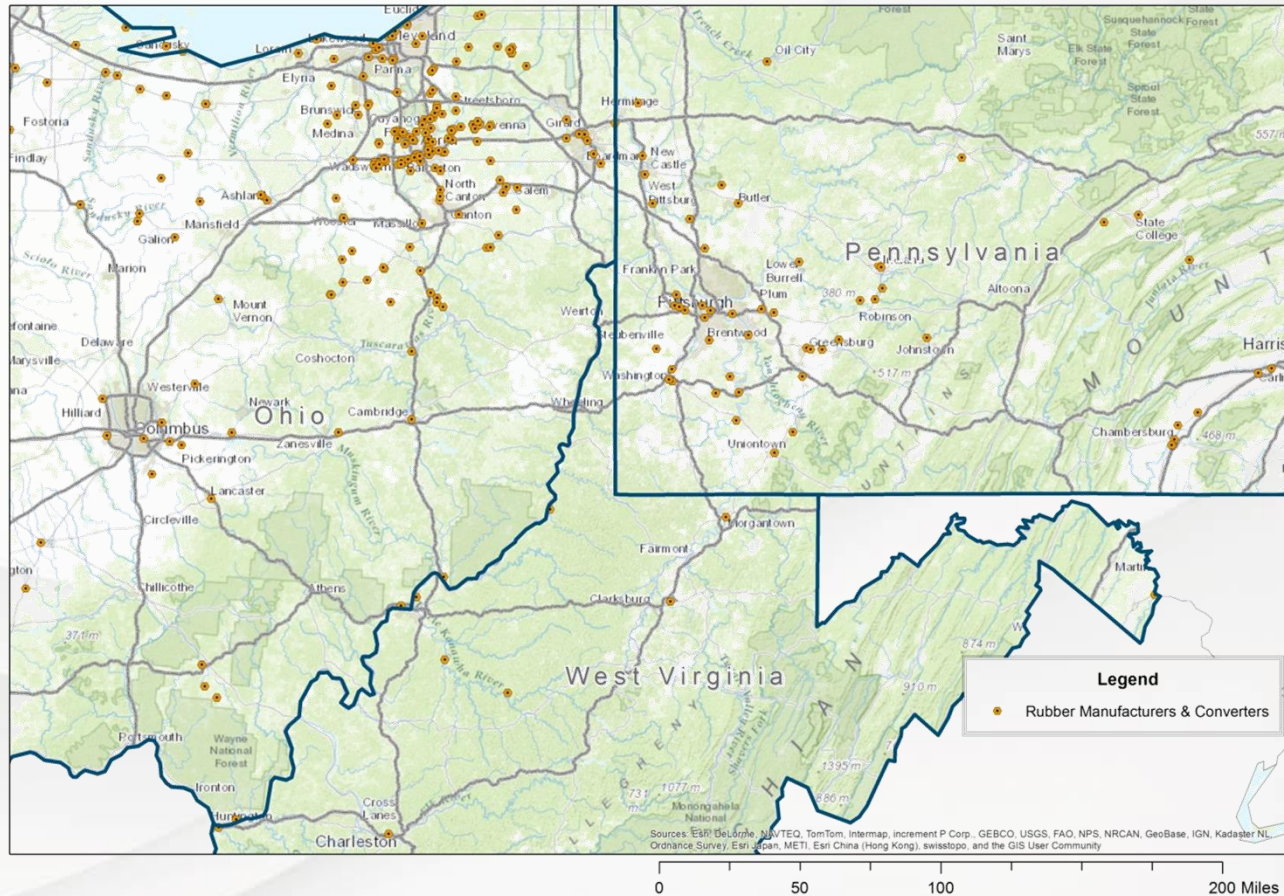
A tremendous opportunity for the local value chain and Foreign Investment



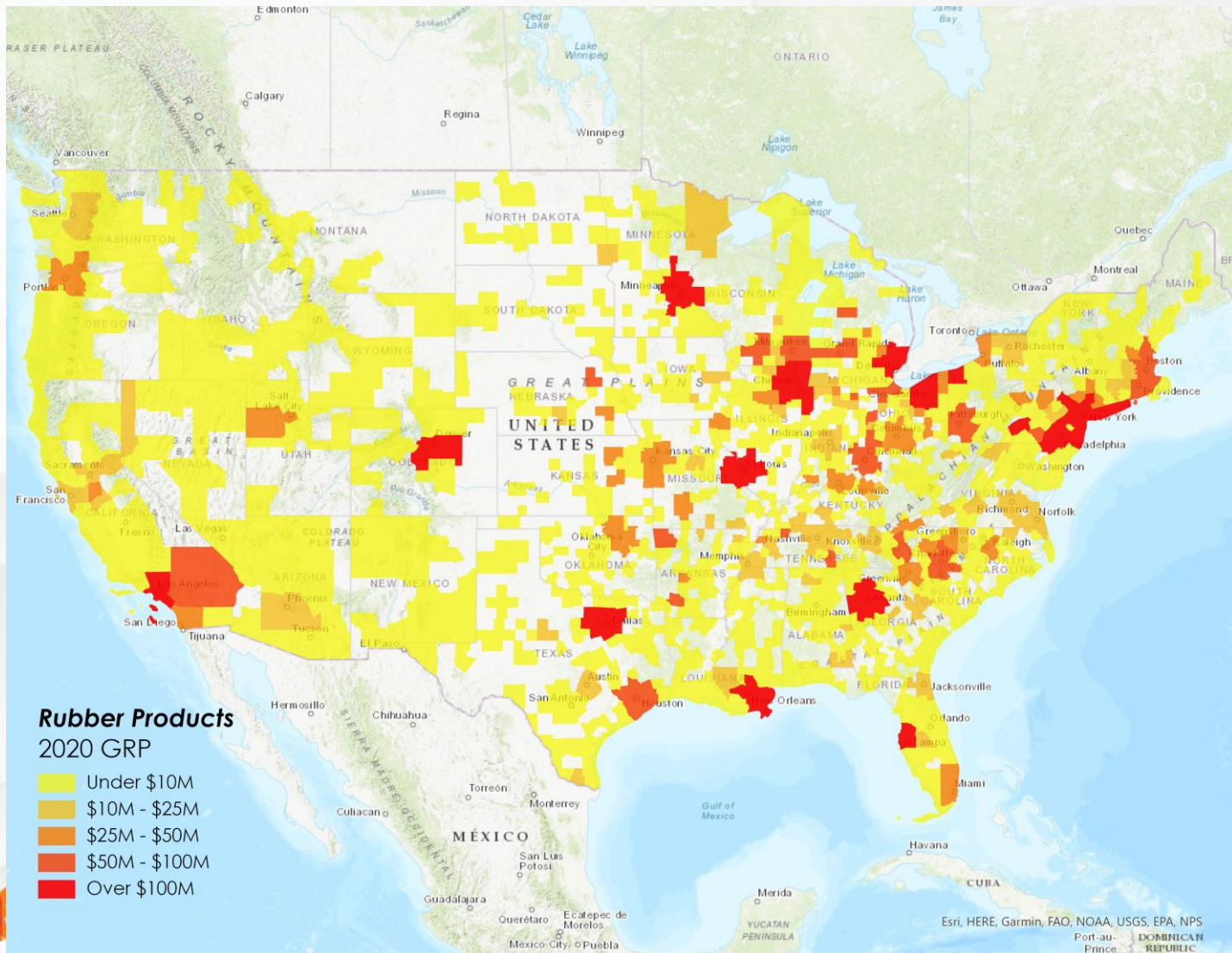
Chemical Manufacturers (purple): 6,371 Companies
Plastic Converters (blue): 8,147 Companies

Rubber Mfg. & Conv. (brown): 1,812 Companies
Plastics Mfg. (green): 1,147 Companies

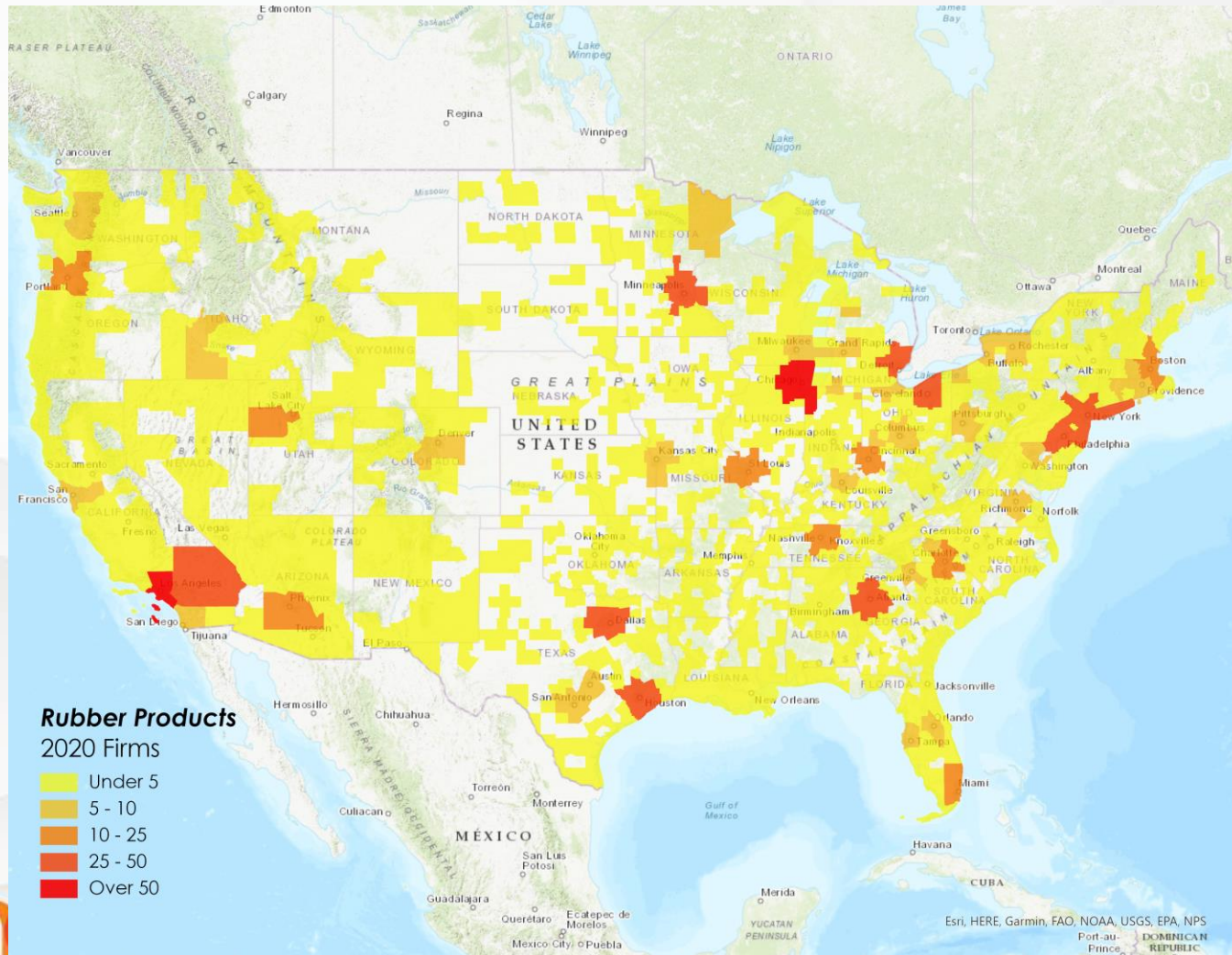
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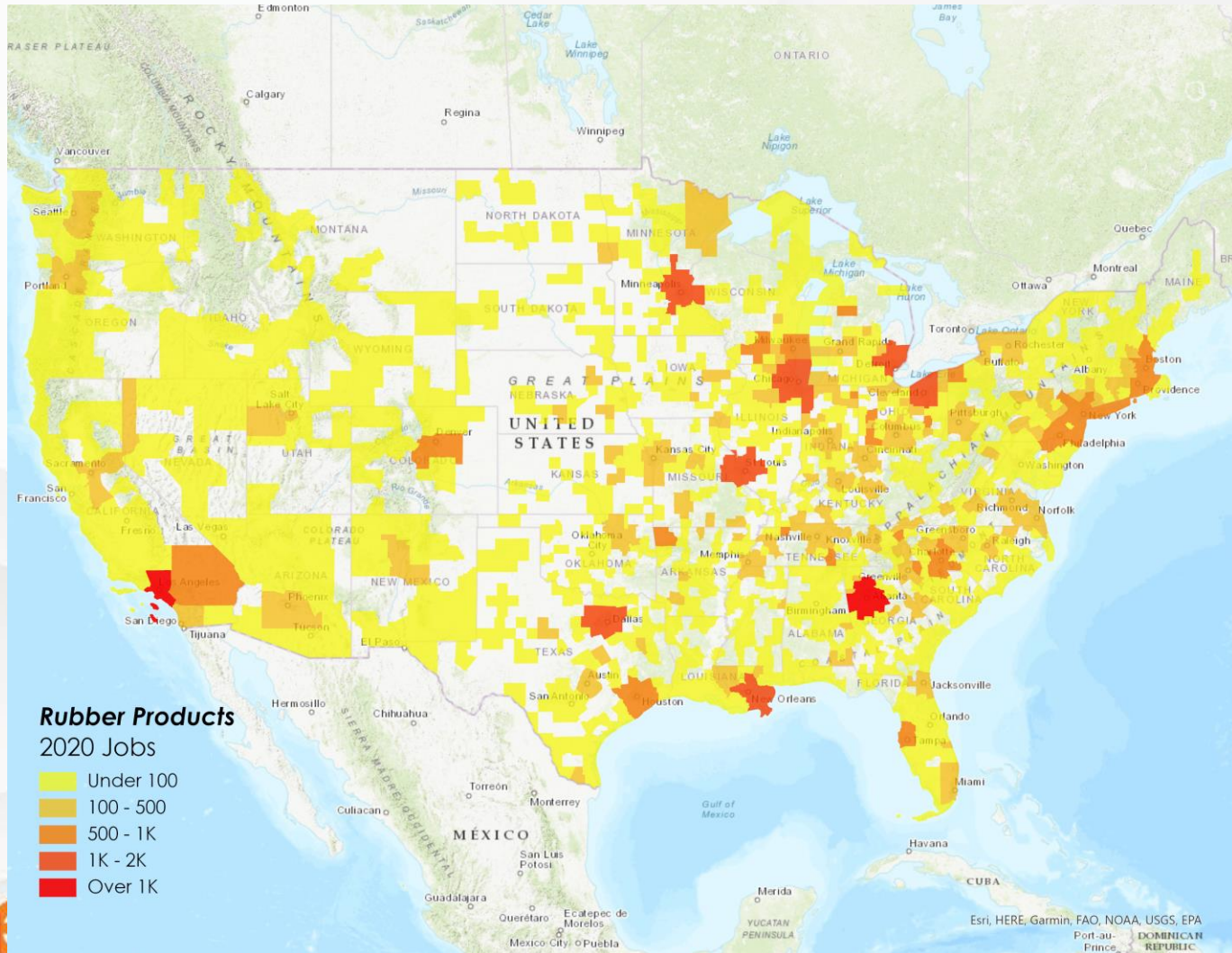
Rubber Products Heat Maps, by GRP



Rubber Products Heat Maps, # of firms



Rubber Products Heat Map, # of jobs



Issues (not exhaustive)

Talent Pipeline-How to Build & Sustain in new “covid” environment
“Gen Z” through “Boomers”, shifting the work/life balance,
“Great Resignation”, etc.

Perception vs. Reality-work conditions, growth potential, etc.

Hurricanes & Other Natural Disasters

Global Economies-“Headwinds” and “Tailwinds”

Energy & Power-Oil & Natural Gas, Shale & Downstream Development,
Renewables, Hydrogen

Inter-material Competition

Security: Cyber, Terrorism, Anti-counterfeiting

Big Data:

How to understand fit with operations, processes, hardware

How to integrate & coordinate, best approach(es) to add value

Tracking the “Innovation Explosion”

SOME THOUGHTS ON LEVERAGING OUR ECOSYSTEM

(STRENGTH IN NUMBERS)

A network with unique, strategic and coordinated capabilities

Market entry

- Identify customer and supply networks
- Public/private partnership development
- Connections to public relations and media relations services
- Relocation assistance

Talent and Demographics

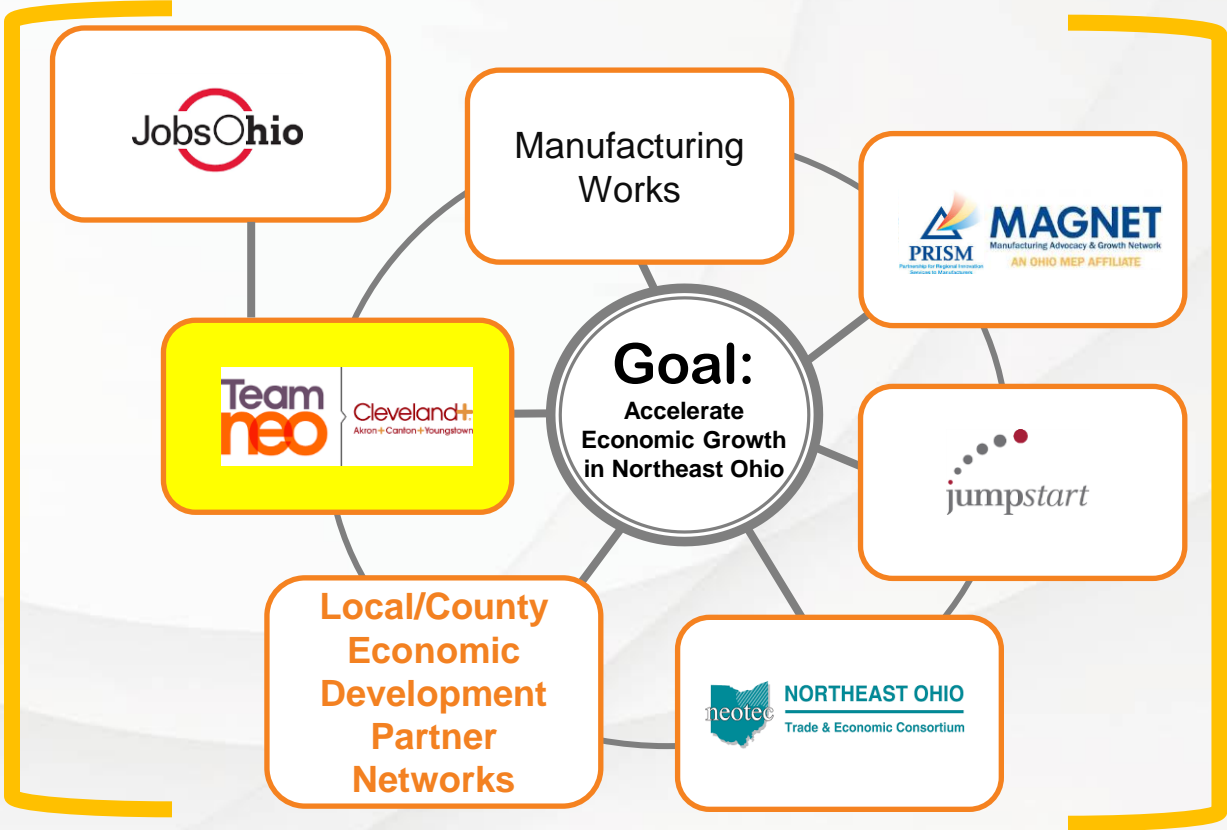
- Market, demographic analysis
- Talent availability and recruitment
- Wage/compensation analysis
- Training and recruiting support
- Workforce trends and comparison analysis

Site Search

- Land and building options
- Site history
- Zoning and land use
- Permits
- Environmental assistance
- Utilities
- Transportation and logistics

Taxes, Incentives and Financing

- Tax comparison analysis
- Local tax structures
- State and local incentives/grants
- Financing alternatives



Ohio & Northeast Ohio (NEO) Economic Development Metrics for 2021

- **Team NEO (Northeast Ohio only)**
 - 279 Projects, 104 Project wins
 - \$1.5 B Capital Investments
 - 7,469 Jobs
 - \$439+Million in new annual payroll

JobsOhio 10-Year Results (2011 - 2020)

- More than 2,800 Economic Development Projects
- Attracted 500 Companies from Outside of Ohio to Establish Operations in Ohio
- More than 210,000 New Jobs Created
- More than \$10 Billion in New Payrolls Added
- More than 590,000 Ohio Jobs Retained
- More than \$35 Billion in Retained Ohio Payrolls
- Helped Companies Invest \$64 Billion on New Capital Assets in the State
- More than \$380 Million in Profit-Sharing Payments to the Ohio General Fund
- Resulting Jobs Generate More than \$1.35 Billion in Ohio State Income Taxes Annually

***January 2022:
Intel announces
\$20B chip
manufacturing
facility in Ohio***

Workforce Examples

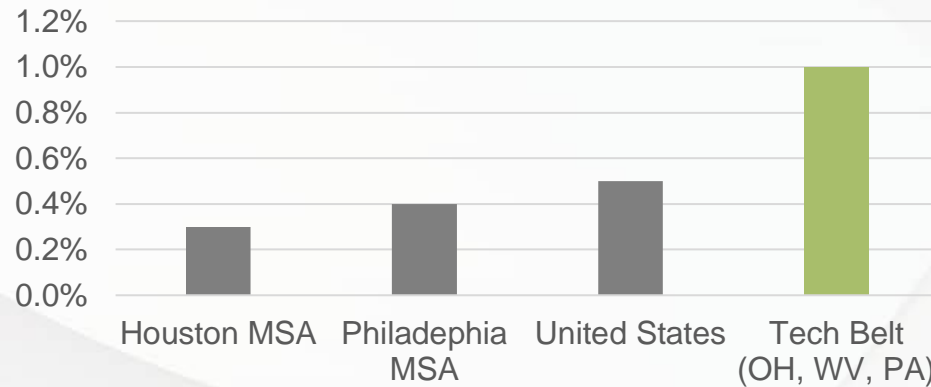
Understanding the Incumbent Talent Pool,

the Pipeline,

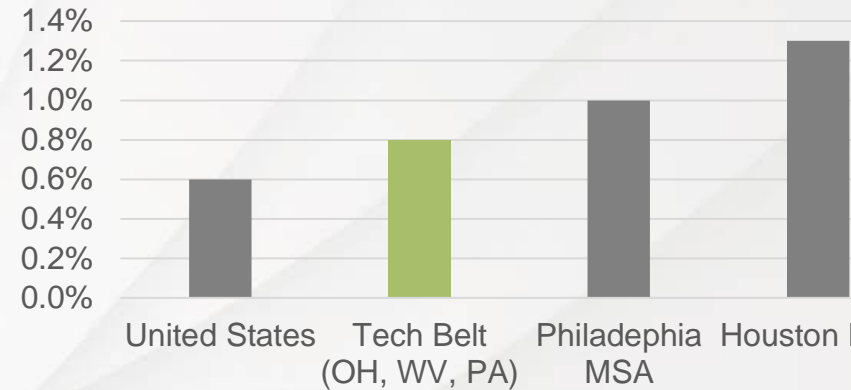
and support in developing Sustainability for it

Understanding our Experienced Talent Pool

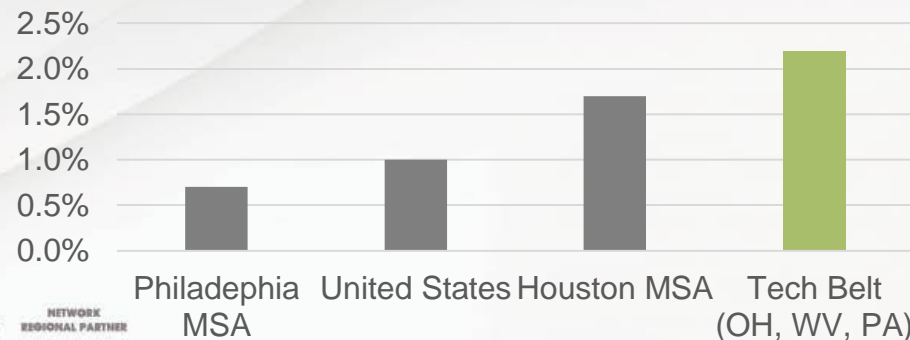
Percent of Workforce Employed in
Plastic and Rubber Product
Manufacturing



Percent of Workforce Employed in
Chemical Manufacturing



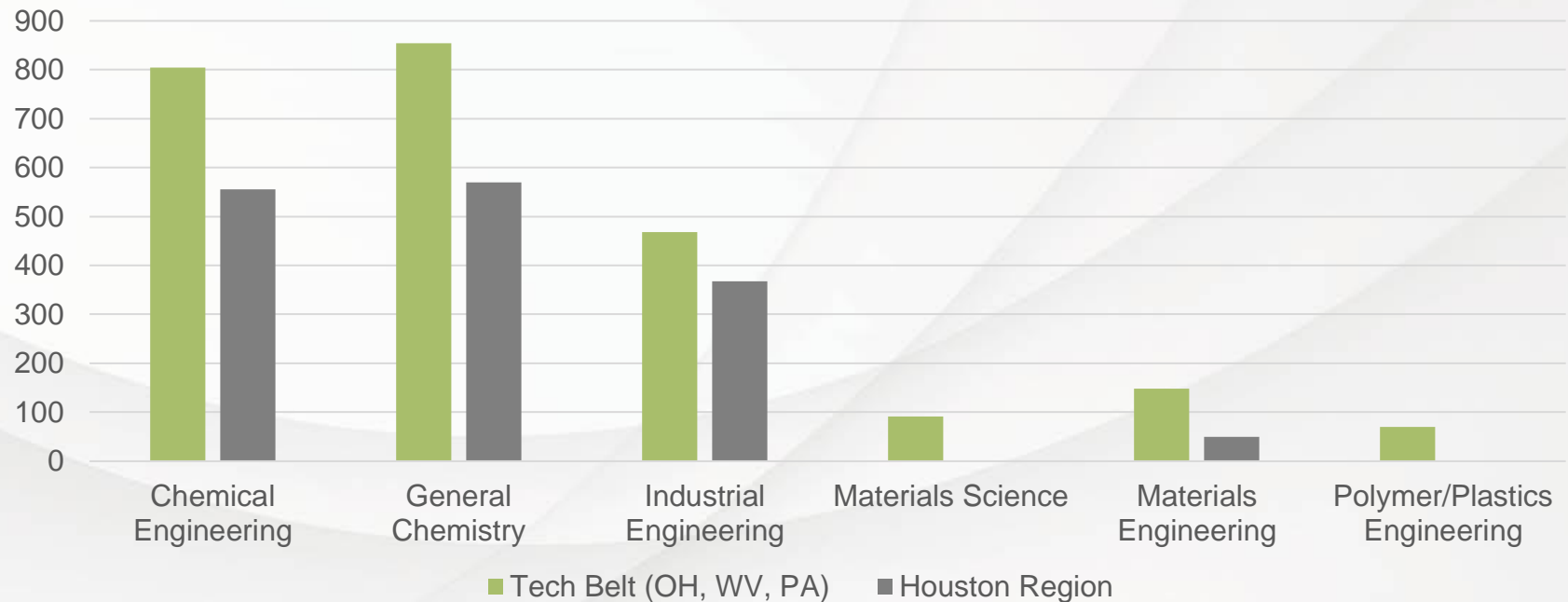
Percent of Workforce Employed in
Fabricated Metal Product
Manufacturing



* Source: Team NEO Research

Ample Pipeline of Talent from 51 Colleges & Universities

Degrees Awarded 2014-2015



*TechBelt data includes degrees from Ohio State University and Penn State University

**Houston data includes degrees from University of Texas – Austin

* Source: Team NEO Research

Source: EMSI

Team NEO “Aligning Opportunities” Reports...

Our Talent Gap is Large, it demands action, Company Participation/Leadership and Regional focus

Occupation Group		Total Demand 2020	Entry-Level Demand 2020	Credentials Awarded 2019	Alignment	Entry-Level Alignment
IT	Computer & IT Workers	12,884	5,102	2,717	(10,167)	(2,385)
Manufacturing	Metal & Plastic Workers	3,405	1,223	502	(2,903)	(721)
	Installation, Maintenance & Repair Occupations	6,353	2,700	1,678	(4,675)	(1,022)
	Skilled Production Workers	15,114	4,215	1,658	(13,456)	(2,557)
Health Care	Health Diagnosing & Treating Practitioners	28,967	12,718	7,567	(21,400)	(5,151)
	Health Technologists & Technicians	13,119	6,177	3,388	(9,731)	(2,789)
	Health Care Therapist Aides & Support Workers	1,254	407	1,011	243	604
	Nursing, Psychiatric & Home Health Aides	9,570	3,320	2,815	(6,755)	(505)
Life Sciences/ Education/ Engineering	Architects & Engineering Technicians	3,492	1,603	2,445	(1,047)	842
	Education	11,739	2,550	8,695	(3,044)	6,145
	Engineers	3,290	1,438	3,410	120	1,972
	Life Science Workers	2,329	905	7,086	4,757	6,181
Finance & Business Services	Financial Clerks	5,472	3,089	2,069	(3,403)	(1,020)
	Financial Specialists	5,758	2,819	5,669	(89)	2,850
	Information & Record Clerks	15,508	6,255	582	(14,926)	(5,673)
	Secretaries & Administrative Assistants	6,466	2,800	673	(5,793)	(2,127)
Management	Managers, Professional & Health	13,883	5,927	13,537	(346)	7,610
	Supervisors of Skilled Workers	4,566	2,251	917	(3,649)	(1,334)

There is more demand than supply of credentials

Demand and supply appear in relative balance

There is more supply of credentials than demand

 There is more demand than supply of credentials
 Demand and supply appear in relative balance
 There is more supply of credentials than demand

SOURCE: Burning Glass Labor Insight/Jobs, EMSI 2020, Ohio Department of Job and Family Services, Team NEO Calculations

NOTE: Our demand supply model does not accurately capture every pathway to employment, i.e., non-registered apprenticeships, temp agencies, etc. The academic pathway and state registered apprenticeships have been our focus.

Workforce

Shortages in the amount of and cost of talent is the #1 challenge companies tell us.

We all play a role to improve our situation. Here is how we work together:



Team NEO & Economic Development: Direct Support

- Referrals to local/state workforce entities and programs such as OhioToWork, Virtual Career Fairs, FindYourOhio
- Connection to training dollars (JOW, TechCred, OMJ)
- Referrals to postsecondary educational partners
- Technology adoption guidance and referrals
- Assistance with recruitment for qualified growth projects via JobsOhio Talent Acquisition incentive



Businesses: Strengthen Your Talent Competitiveness

- Culture
- Wages & Benefits
- Flexibility in schedules (i.e. part time or weekends)
- Safety
- Training/upskilling
- Branding
- Internships/Co-Ops
- Technology Adoption such as automation
- Diversity



Workforce Development & Higher Education: Strategic, Future Focused Initiatives

- Prospectus on match between future jobs and educational programs (i.e. Aligning Opportunities Report)
- Workforce mobility initiatives (i.e. Paradox Prize)
- Talent Development Council
- Ohio to Work
- Cleveland Innovation District workforce & upskilling goals
- Talent attraction initiatives such as JO Coastal Campaign (Find Your Ohio), NFL Draft talent attraction pilot (TN/DC/EC), or Global Cleveland immigrant and refugee assistance.
- Manufacturing Blueprint/Smart MFG Cluster – Talent initiative and Sector Partnerships

Thank you!

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“The entrepreneur always searches for change, responds to it, and exploits it as an opportunity.”

[Peter Drucker](#)

Acknowledgements:

- Team NEO: Sondra Palivoda
- MarketsandMarkets Inc.