



**TiPMC Consulting**



# **Current and Future Mineral Sands Industry Perspectives from TiPMC Consulting**

NYC Mining Club • March 1, 2019



**Consulting**

**Welcome**



**Gerry Colamarino**


**Managing Director**

**TiPMC Consulting**



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# What We Do


A silhouette of a group of business professionals sitting around a large conference table in a modern office with large windows. A bright light source, possibly a screen or a lamp, is positioned in the center of the table, creating a strong lens flare effect. The background shows a view of the sky through the windows.

Educate & deliver insights & knowledge  
on the TiO<sub>2</sub>, Pigments,  
Minerals & Chemicals Industries  
to help Business Leaders & Financial Analysts  
make decisions.



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# What We Do

A silhouette of a group of business professionals sitting around a large conference table in a modern office with floor-to-ceiling windows. A bright light source, possibly a screen or a lamp, is positioned in the center of the table, creating a strong lens flare effect. The background shows a view of the sky through the windows.

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## Forward Looking Statement



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- **Consulting for Industry Leaders & Financial Analysts**  
in the  $\text{TiO}_2$ , Pigments, Minerals & Chemicals Industries
- **Education through Publications & Engagements**
  - *Ti Observer™ Insights for Analysts*, monthly industry reports
  - $\text{TiO}_2$  (Quarterly) and Mineral Sands Price Forecasts ( Semi-Annually)
  - Industry Data and Analysis (Import/Export, Historical Pricing, cost analysis)
  - Customized industry and company analysis (Reports and Verbal Consultation)
  - Webinars & Seminars
  - Customized One-on-One or Group Sessions



# Mineral Sands: Primary Markets



2018: 7.3MT  $\text{TiO}_2$

Titanium Feedstocks

- $\text{TiO}_2$  Pigment (90% + of all feedstock)
- Sulfate
- Chloride
- Titanium Metal
- Titanium Chemicals



End Uses

- $\text{TiO}_2$  Pigment
- Coatings
  - Plastics
  - Paper
  - Specialties



2018: 1.2MT

Zircon

- Ceramics
- Tile
- Sanitary Ware
- Refractory
- Foundry
- Zirconia chemicals

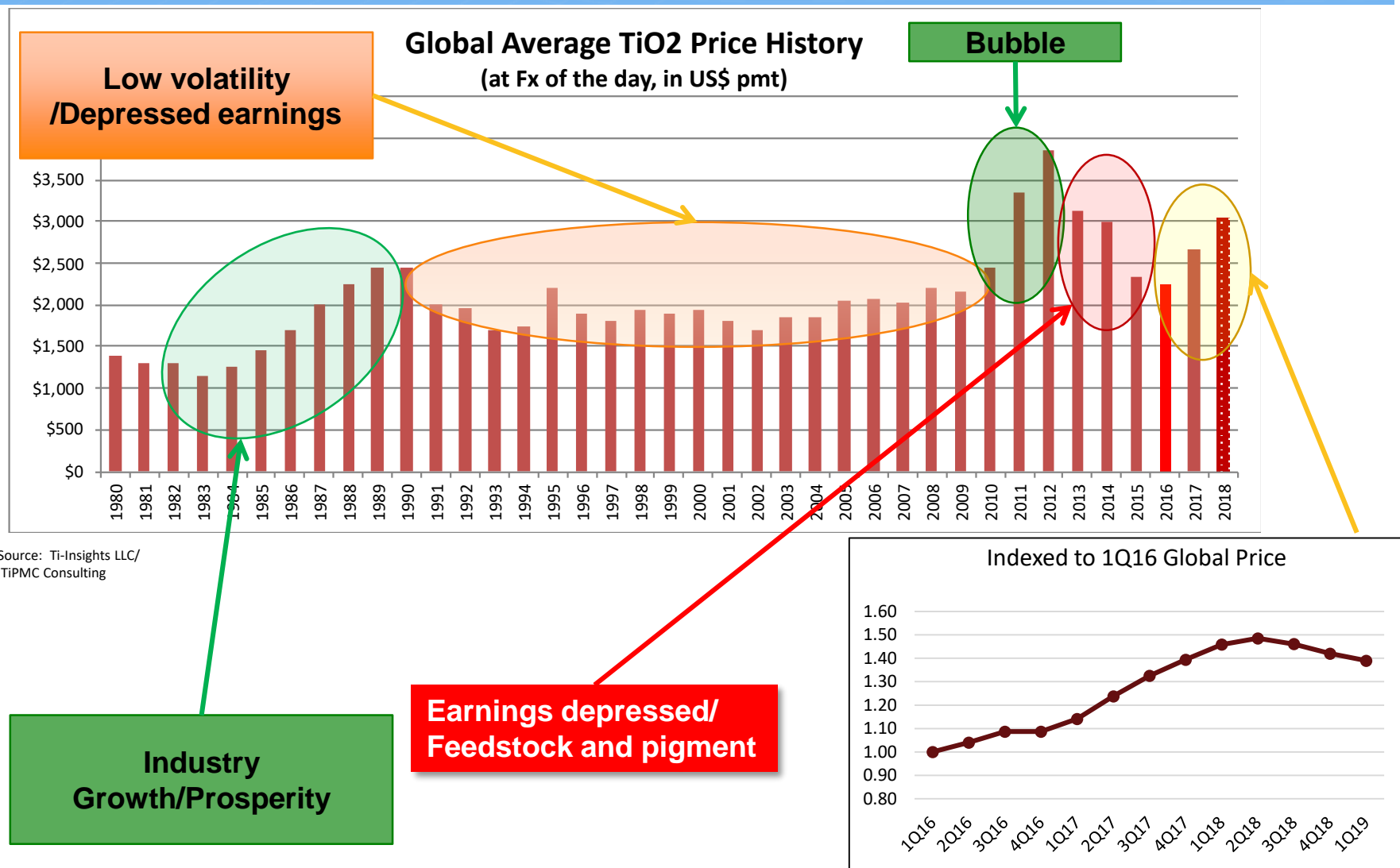


Highly correlated to housing and construction  
Correlated to GDP  
Fastest Growth in Asia and Developing World



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# TiO<sub>2</sub> Cycles: Brief History





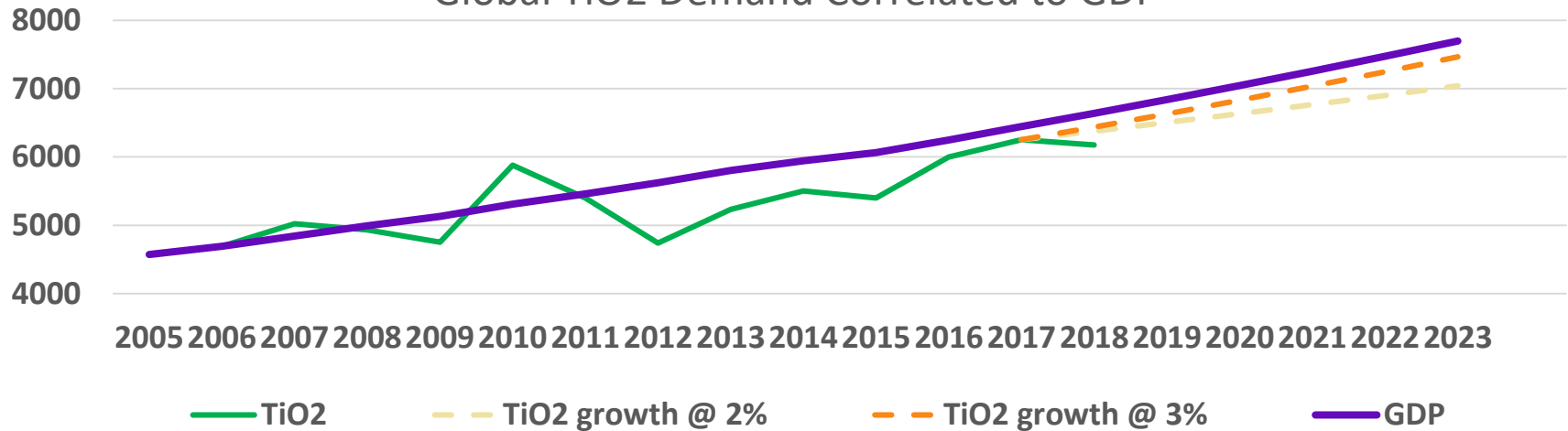


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# TiO<sub>2</sub> Industry Fundamentals

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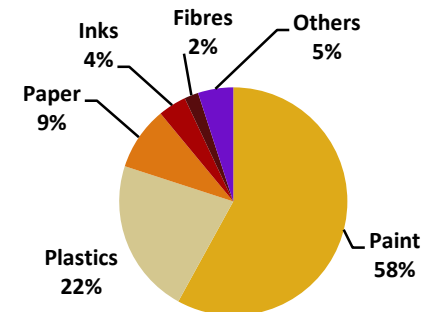
Global TiO<sub>2</sub> Demand Correlated to GDP



Source: TiPMC Estimates/Ti-Insights

- Quality of Life Product
- No real substitute
- Traditionally grow with global GDP

Titanium Pigment Consumption by End-use Sector



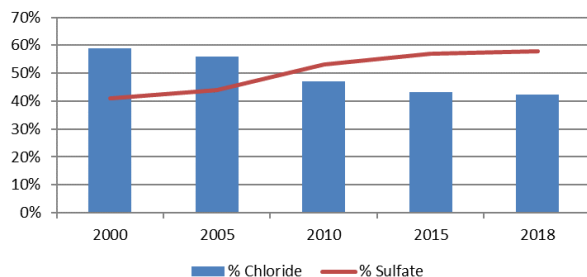


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# Regional /Technology Dynamics

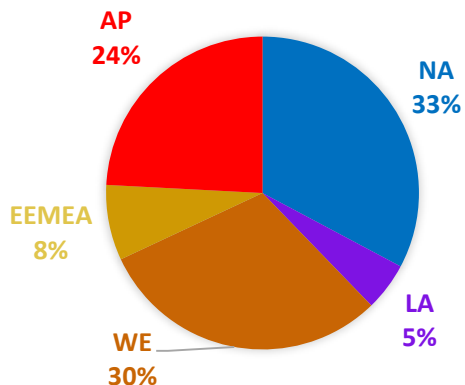
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TiO<sub>2</sub> Technology Changes

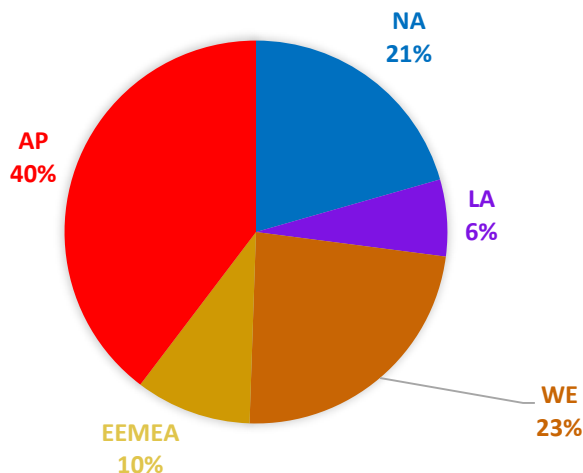


WE/North America dominant

2000 DEMAND  
3.9M TONNES



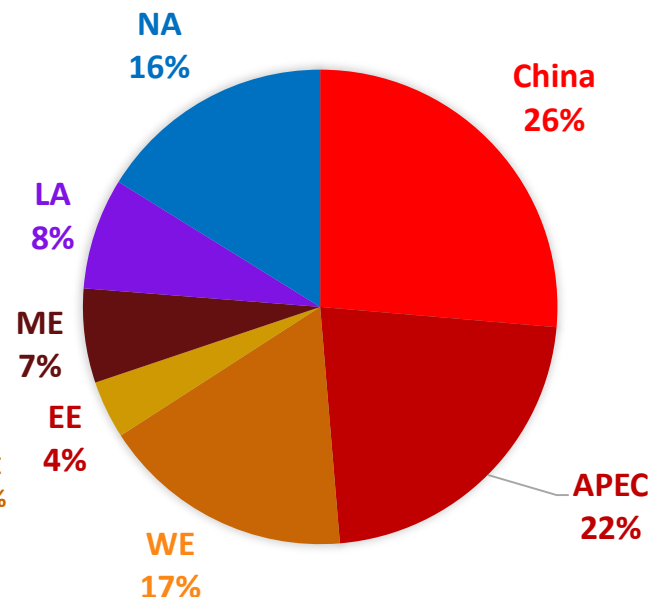
2010 DEMAND  
5.0M TONNES



Asia nearly 50% of demand/Developing Nations growth

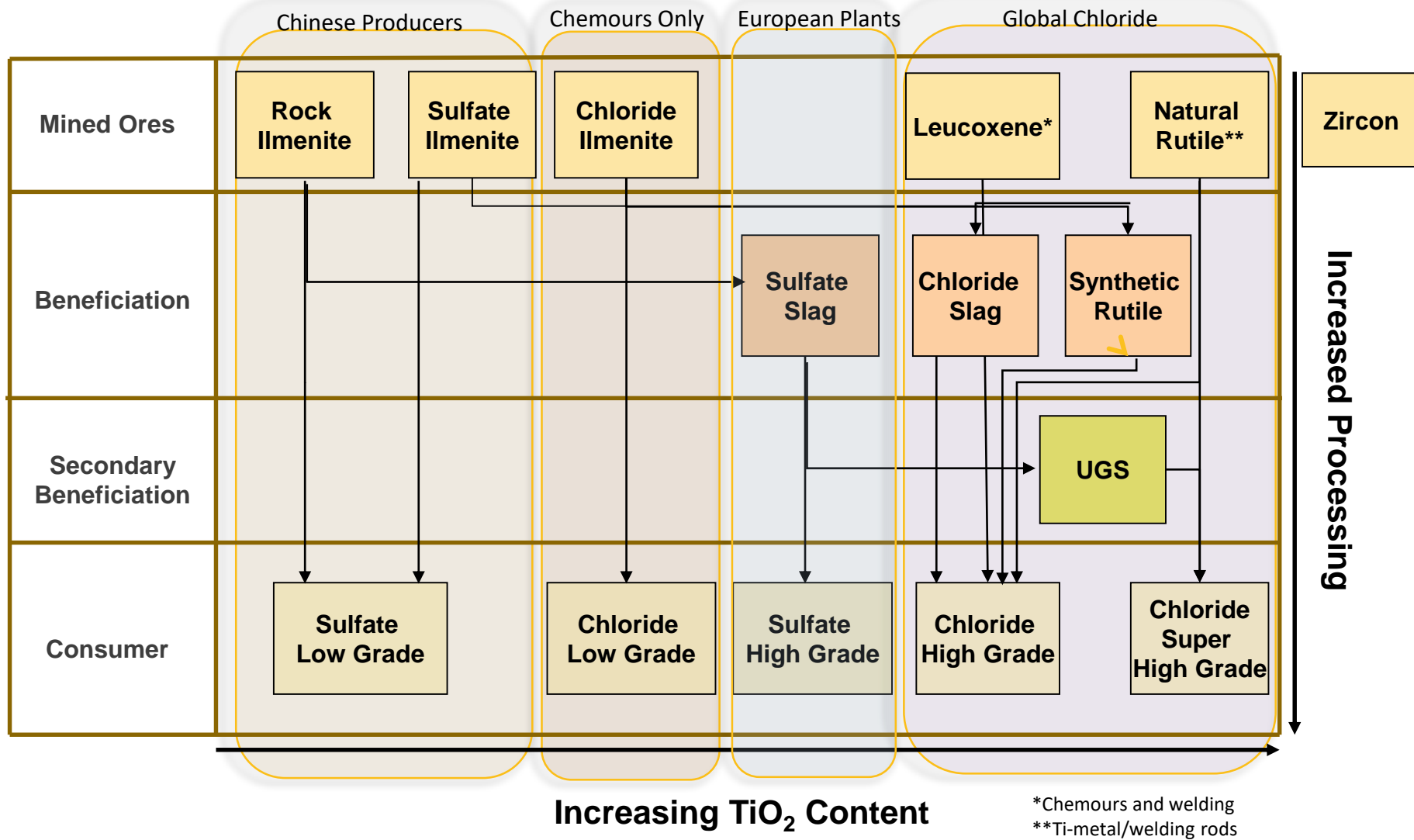
Americas/EMEA still majority

2017 REGIONAL DEMAND  
6.2M TONNES



Source: "Trade Map (or Market Access Map), International Trade Centre, [www.intracen.org/marketanalysis/](http://www.intracen.org/marketanalysis/) / Ti-Insights

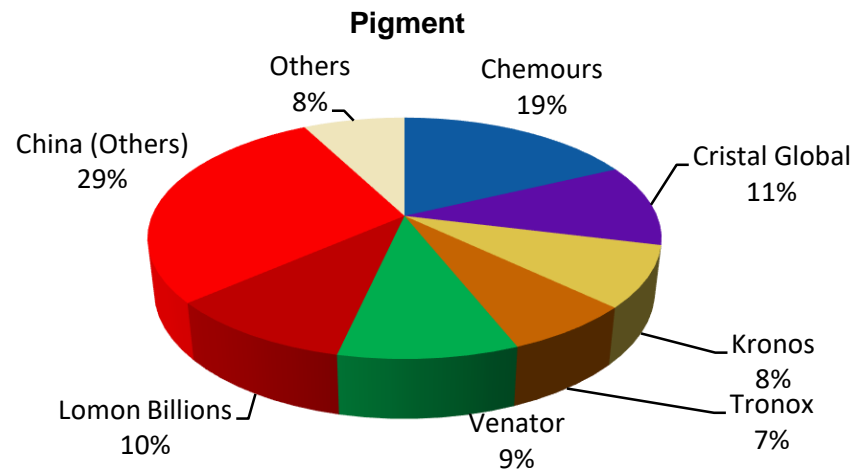
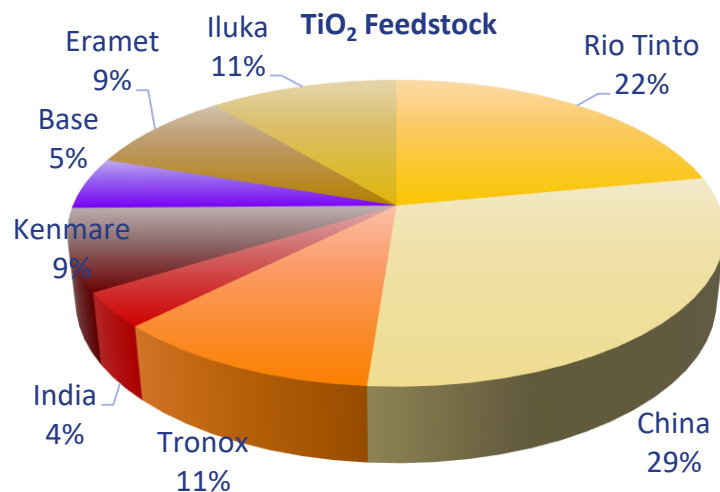
# Feedstock Driven by Plant Design & Operations





# Worldwide Top Suppliers

(Estimated Market Share)



## Feedstock Suppliers

- Chloride High Grade
  - Rio Tinto (Slag)
  - Iluka (Natural Rutile/SR)
  - Tronox (Back Integrated)
  - Eramet (Acquisition)
- Ilmenite
  - Fragmented
  - Multiple Juniors

## Pigment Suppliers

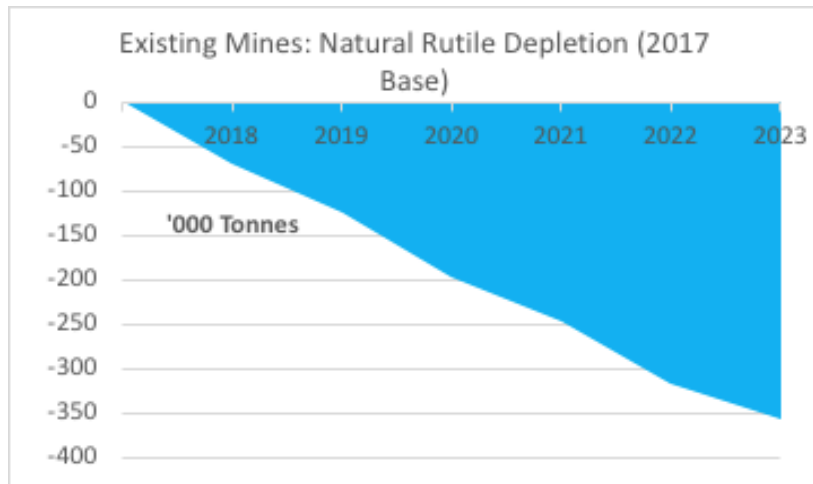
- MNPs – Consolidated
  - Low Capacity Growth
- Chinese
  - Sulfate (Currently)
  - Moving to Chloride/Beneficiation
  - Back-integration
  - Majority of new capacity



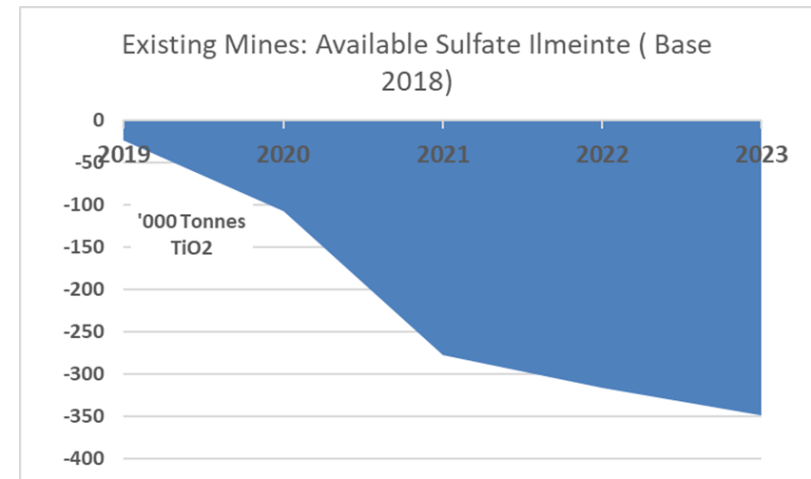
# TiO<sub>2</sub> Feedstocks

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## Existing Operations Depleting



Source: Company Reports/TiPMC Estimates



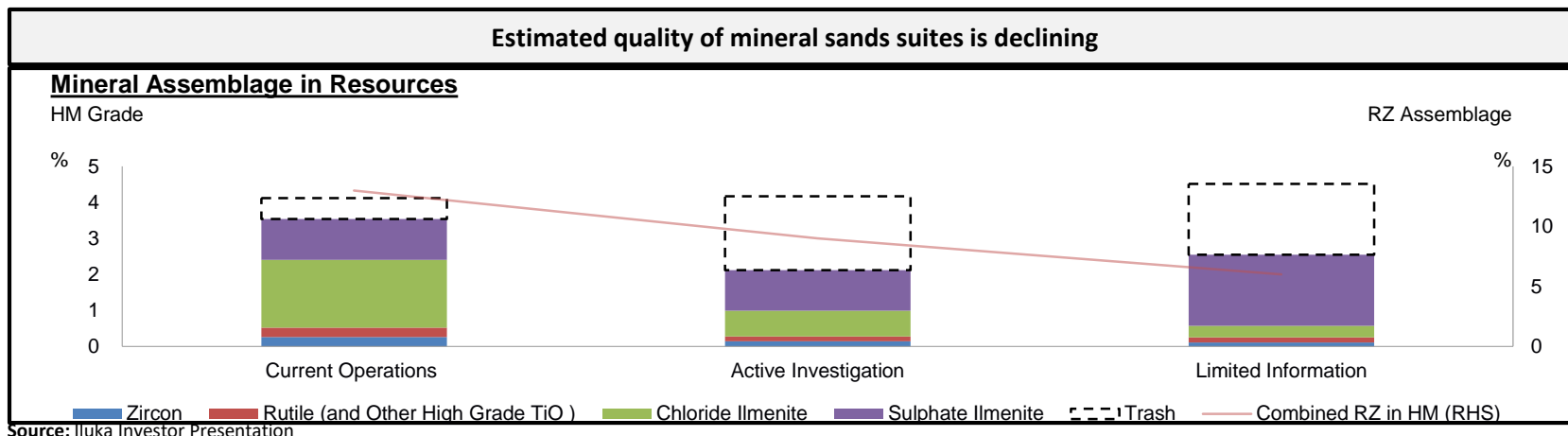
Source: Company Reports/TiPMC Estimates

Large Volume Reduction  
New Projects: Difficult to meet requirements

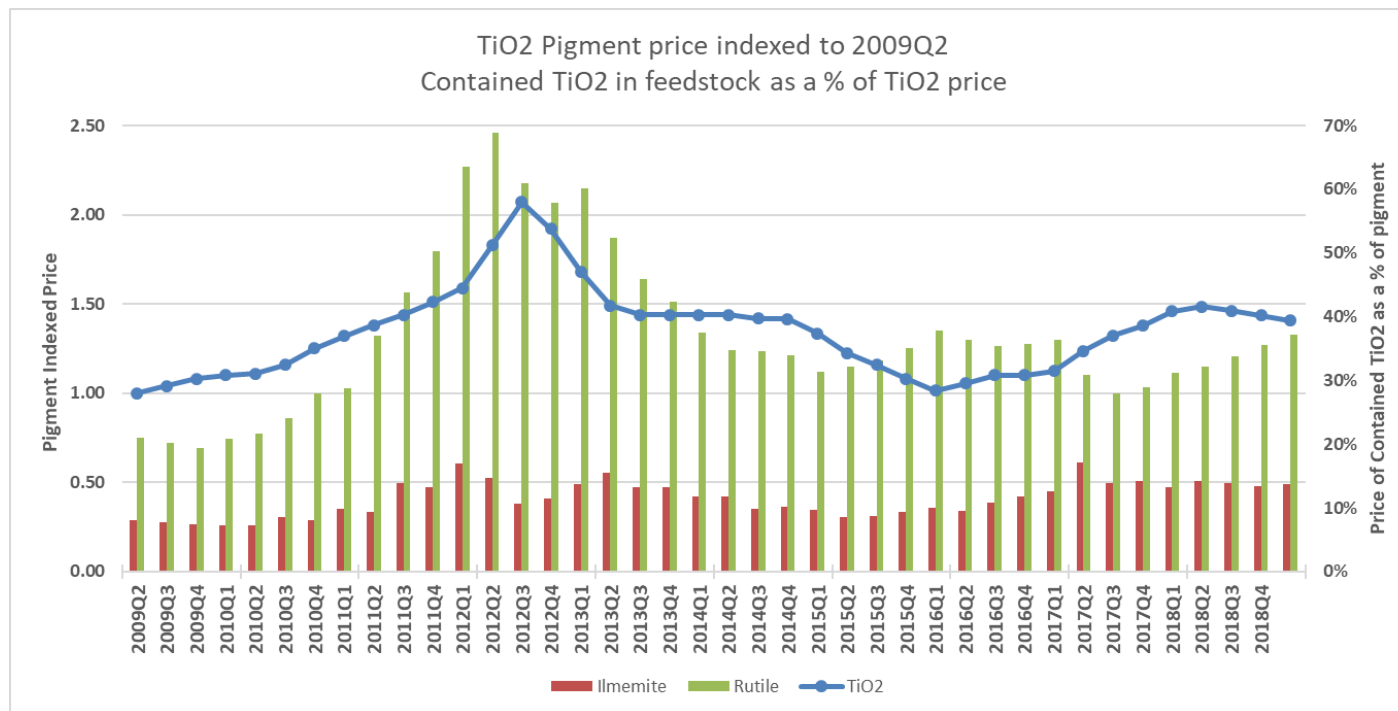




# Decline in Quality Reserves



Metric	Trend	Result
HM Grade	↓	Higher mining costs
Rutile/Zircon assemblage	↓	Lower margins
Trash/overburden	↑	Higher mining costs/Capital
Risk return needed: Investors/Lenders	↑	Drain on cash



Source: "Trade Map (or Market Access Map), International Trade Centre,  
[www.intracen.org/marketanalysis](http://www.intracen.org/marketanalysis)" and TiPMC Estimates

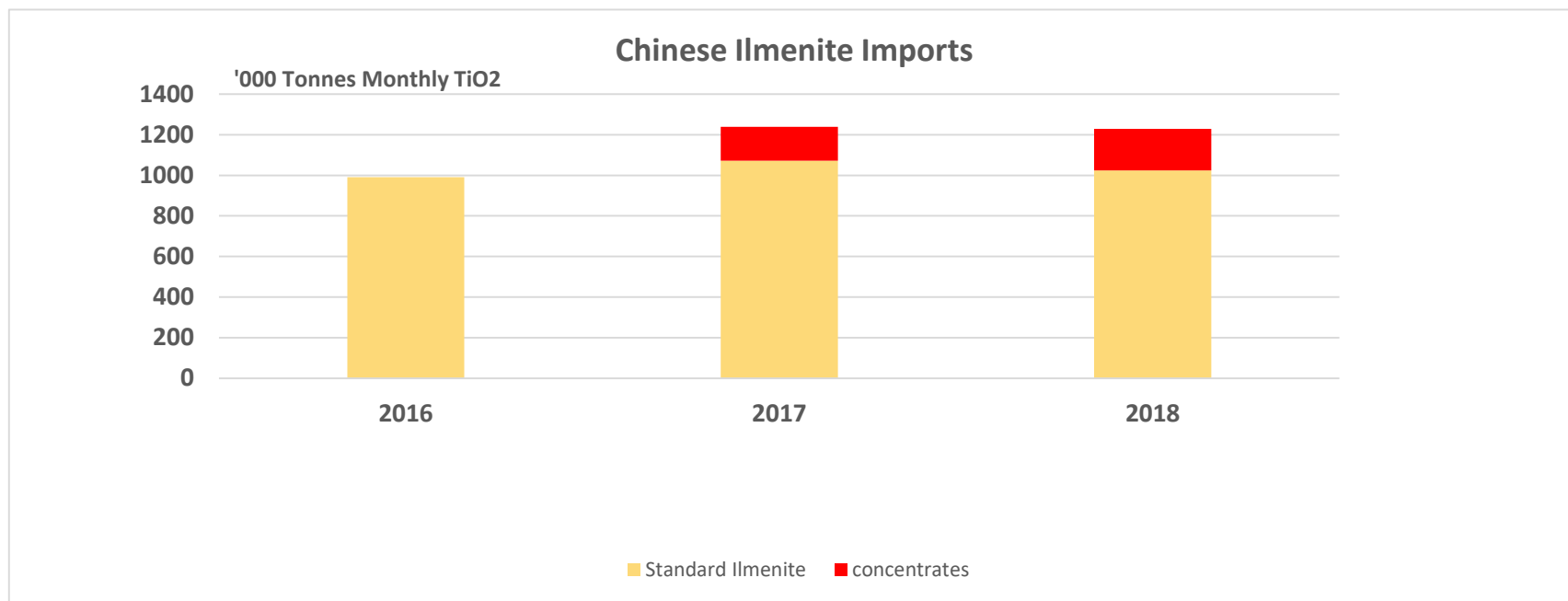
2018

Numerous Disruptions in High Grade Chloride Production  
Inventory low throughout the supply chain (Chemours Exception)



# Growing Trends in Mineral Sands

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TiO<sub>2</sub> Feedstock units from imports is reduced vs. 2017 ( stabilize ilmenite prices)

New Projects: Ship Concentrate to China: MSP in country

Reduce Capital Expenditure

Keep all minerals in China

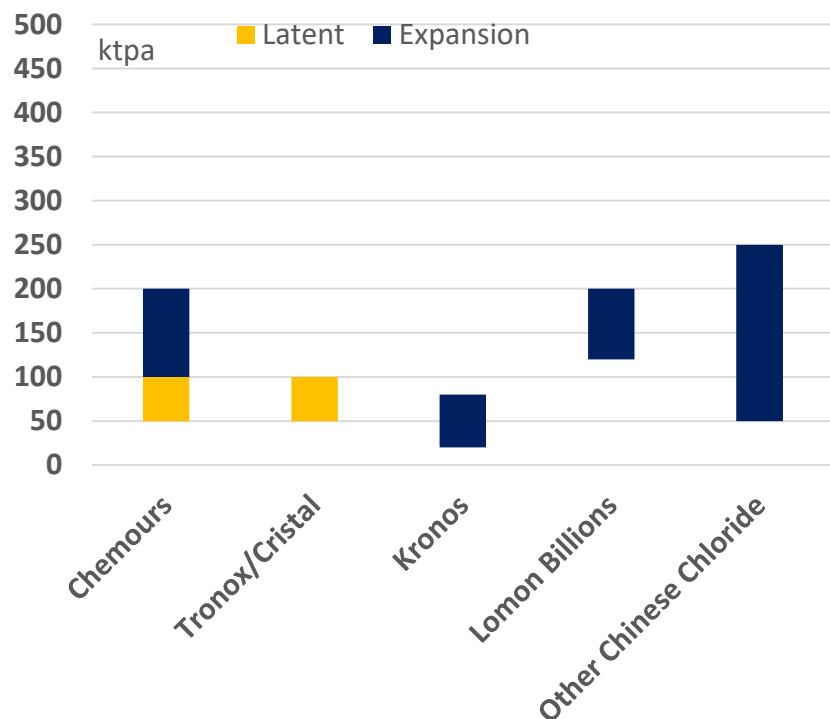
Support growing Chinese TiO<sub>2</sub> production (Natural Rutile, Chloride Ilmenite, Sulfate Ilmenite)

Sales of other minerals in China (Zircon, Garnet, Rare Earths)

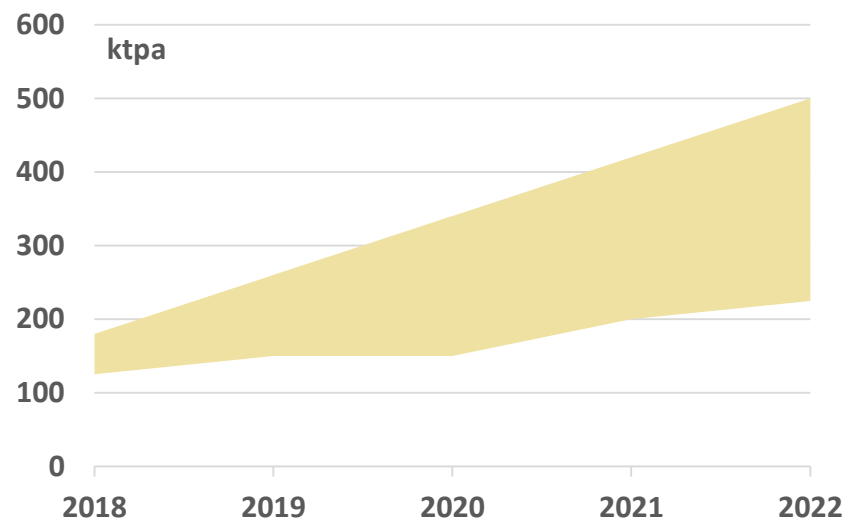
Chinese Beneficiation to chloride feedstocks set to grow



Range of Latent Capacity/New Expansions: MNPs and Chinese Chloride



Chinese Sulfate Available Capacity Increase (2017 base)



## Expansion Plans

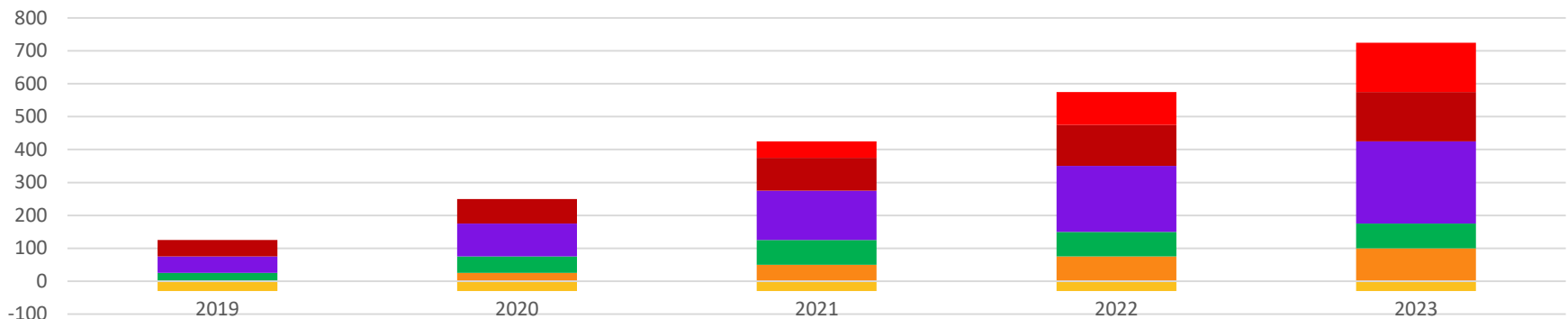
- MNPs favor "Value over Volume"
- China: Large plans for chloride (little progress to date)
- Sulfate: "Net Expansion"
  - Larger more sustainable producers expand
  - Smaller/Less environmentally friendly close



# TiO<sub>2</sub> Industry Growth Scenarios

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Estimated Cumulative Capacity Additions (2018 Base)



Source: TiPMC Estimates

■ Pori SD ■ Chemours ■ Tronox ■ Chinese Sulfate ■ Lomon Cl ■ Chinese Chloride

- Chinese Growth Intended on chloride
  - Import Ilmenite/Beneficiate to chloride slag and SR
  - Limited Success to this point
  - Likely to require Natural Rutile and UGS
- All growth outside China expected to be based on High Grade Chloride Feedstocks





# TiPMC Consulting Summary

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- TiO<sub>2</sub> industry expected to recover in 2019 from recent demand downturn
  - Recovery in AP
  - Destocking
- MNPs face challenges to maintain profitability
  - Pace of Chinese and APEC growth
  - NA/EU Recession concerns
  - Feedstocks
  - “Value over Volume”
- Most new capacity will come from China
  - Chloride/Sulfate mix to be determined
  - Back-integration: Beneficiation
  - Focus on low/mid-grade quality products



**Please stay in Touch!**

**Gerry Colamarino**

+1 610.274.1603 (O) +1 408.368.7759 (M)

[gcolamarino@tipmcconsulting.com](mailto:gcolamarino@tipmcconsulting.com)

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**Thank You!**