Global Soda Ash Overview

Global supply/demand overview and how Mexico fits into the global picture

GLASSMAN LATIN AMERICA 2018

Wednesday 21 March 2018
### Soda Ash Capacity Dynamics are Constantly Shifting

#### 2000

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>Caps MMT/Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Solvay</td>
<td>6.79 / 15.5%</td>
</tr>
<tr>
<td>2</td>
<td>FMC</td>
<td>3.50 / 8.0%</td>
</tr>
<tr>
<td>3</td>
<td>General Chemical</td>
<td>2.55 / 5.8%</td>
</tr>
<tr>
<td>4</td>
<td>Sterlitamak</td>
<td>2.30 / 5.2%</td>
</tr>
<tr>
<td>5</td>
<td>OCI Enterprises</td>
<td>2.09 / 4.8%</td>
</tr>
<tr>
<td>6</td>
<td>Brunner Mond</td>
<td>1.48 / 3.4%</td>
</tr>
<tr>
<td>7</td>
<td>IMC Global</td>
<td>1.36 / 3.1%</td>
</tr>
<tr>
<td>8</td>
<td>Ciech</td>
<td>1.10 / 2.5%</td>
</tr>
<tr>
<td>9</td>
<td>Lianyungang Soda</td>
<td>0.90 / 2.1%</td>
</tr>
<tr>
<td>10</td>
<td>Shandong Haihua</td>
<td>0.90 / 2.1%</td>
</tr>
</tbody>
</table>

**Top10**

23.0 / 52.4%

#### 2017

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>Caps MMT/Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Solvay</td>
<td>7.32 / 10.7%</td>
</tr>
<tr>
<td>2</td>
<td>Tata</td>
<td>3.73 / 5.5%</td>
</tr>
<tr>
<td>3</td>
<td>Tronox (FMC)</td>
<td>3.68 / 5.4%</td>
</tr>
<tr>
<td>4</td>
<td>Ciner Group</td>
<td>3.06 / 4.5%</td>
</tr>
<tr>
<td>5</td>
<td>Shandong Haihua</td>
<td>2.85 / 4.2%</td>
</tr>
<tr>
<td>6</td>
<td>NIRMA</td>
<td>2.70 / 4.0%</td>
</tr>
<tr>
<td>7</td>
<td>Ciech</td>
<td>2.41 / 3.5%</td>
</tr>
<tr>
<td>8</td>
<td>Sanyou Chemical</td>
<td>2.30 / 3.4%</td>
</tr>
<tr>
<td>9</td>
<td>Hubei Yuhua</td>
<td>2.10 / 3.1%</td>
</tr>
<tr>
<td>10</td>
<td>Sisecam</td>
<td>1.93 / 2.8%</td>
</tr>
</tbody>
</table>

**Top10**

32.1 / 47.0%

#### 2018

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>Caps MMT/Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Solvay</td>
<td>7.32 / 10.3%</td>
</tr>
<tr>
<td>2</td>
<td>Ciner</td>
<td>4.60 / 6.5%</td>
</tr>
<tr>
<td>3</td>
<td>Tata</td>
<td>3.73 / 5.2%</td>
</tr>
<tr>
<td>4</td>
<td>Genesis Alkali</td>
<td>3.68 / 5.2%</td>
</tr>
<tr>
<td>5</td>
<td>Shandong Haihua</td>
<td>2.85 / 4.0%</td>
</tr>
<tr>
<td>6</td>
<td>NIRMA</td>
<td>2.73 / 3.8%</td>
</tr>
<tr>
<td>7</td>
<td>Ciech</td>
<td>2.43 / 3.4%</td>
</tr>
<tr>
<td>8</td>
<td>Sanyou Chemical</td>
<td>2.20 / 3.1%</td>
</tr>
<tr>
<td>9</td>
<td>Hubei Yuhua</td>
<td>2.10 / 2.9%</td>
</tr>
<tr>
<td>10</td>
<td>Sisecam</td>
<td>1.93 / 2.7%</td>
</tr>
</tbody>
</table>

**Top10**

33.6 / 47.0%

---

**Note:** Calculated on a shareholder basis.
World Capacity Changes

Net Decrease

- NAM
- West Europe
- CIS
- Africa
- S.E. Asia

Net Increase

- SAM
- CEP
- Middle East
- ISC
- N.E. Asia

Includes Turkey

Annual Net Change
Cumulative Total
Capacity by Geography and Type

World Capacity Change

- Europe
- Asia
- Africa/ME
- US
- ROW

US has biggest commercial reserves of natural soda ash. The newest commercial natural production is in Turkey.

Hou process is mostly in China, co-produces NH₄Cl (a low grade fertilizer).

Source: IHS Markit
Capacity by Geography

NAM 13.5 MMT
SAM 250 KT
AFR 700 KT
MDE 4.4 MMT
CEP 3.8 MMT
CIS 4.6 MMT
NEA 31.3 MMT
SEA 0 kt

NAM 20%
SAM 0.4%
ISC 6%
NEA 46%
AFR 1%
WEP 8%
CEP 6%
MDE 6%
Soda Ash Use Patterns Change

The biggest end use is flat glass, is driven by Construction

2nd biggest end use is Container glass. Niche for Alcoholic Beverages

World Demand 2017 = 58.9 MMT

World Demand by End Use

China, WEP, U.S., CIS, India, Mexico, SAM, CIS, World
Demand by Geography

- **NEA**: 27.3 MMT
- **SEA**: 6.3 MMT
- **WEP**: 1.5 MMT
- **AFR**: 4.4 MMT
- **MDE**: 2.3 MMT
- **CIS**: 1.4 MMT
- **SAM**: 2.6 MMT
- **NAM**: 6.6 MMT
- **PERCENTAGE**

Confidential. © 2017 IHS Markit™. All Rights Reserved.
Demand by Geography

- Much of the world’s demand is in China, 44%
- Driven by housebuilding
- WEP and US are mature markets
- SAM growth driven by Lithium
- ISC growth has been driven by soaps & detergents – Potential for Glass
- SEA growth is mixed but includes a lot of new glass capacity
- Africa growing but from a very low base
Outlook for Global Supply vs Global Demand

Soda Ash Demand, China vs ROW

Source: IHS Markit
© 2018 IHS Markit

World Capacity Changes

Source: IHS Markit
© 2018 IHS Markit
Shifting Market Dynamics

- Markets seeing increased volatility
- Soda ash supply/demand dynamics shifting
- Chinese market has matured and new environmentally focus impacting on supply
- Volatility in energy/raw materials
- A new supply source, Turkey, entering the market
- Flat glass still drives demand, also some traditional & new demand sectors supported by environmental concerns
Soda Ash Trade
Soda Ash Trade has Grown Faster than Demand

- Trade is very important in soda ash industry
- 25% of production is shipped to be consumed in other regions
- World trade has grown faster than demand
- Since 2010 World demand has grown by 3.5%/y vs trade growth of 4.3%/y
- The biggest change is in the Middle East
- Net exports from Turkey are growing as new capacity comes on stream
Net Exports by Region

- NAM: +5.6 MMT
- SAM: -2.3 MMT
- AFR: 902 KT
- MDE: +926 KT
- ISC: -884 KT
- WEP: +1.8 MMT
- CEP: +32 KT
- CIS: +189 KT
- SEA: -2.9 MMT
Top Exporters, Turkey becoming a Major Player

- Natural soda ash producer, the US, is dominant exporter
- China historically 2\textsuperscript{nd} largest exporter
- Turkey becoming a major player
- Beypazari (expansion) and Kazan (new plant)
- 3 MMT new capacity on stream in 2017/18
- New natural capacity has low production costs
- Now the 2\textsuperscript{nd} largest exporter in the world
Major Import Markets

- Three most significant importers are SEA, SAM and WEP
- All regions are being targeted by new Turkish capacity
Supply

Cost Volatility & Impact on Supply
Chinese Price Volatility

• Price volatility in China influenced by availability
• And also by changes in costs
• China is a significant exporter and thus can impact Rest of World
• Exports fell from 1.98 Million Mt in 2016 to 1.52 Million Mt in 2017
Changes in China

- China’s government is moving to greener economy
- Reducing pollution through government checks
- Implementing stricter controls on industrial capacity
- Incentivising air/water waste emission reduction
- Decrease energy consumption by 15% by 2020
- Reduce VOC emissions by 10% by 2020
Environmental restrictions in China helped push up prices from Jan 2016 to Dec 2017

Thermal coal: ¥399 to ¥748 per ton

Coke: ¥629 to ¥2204 per ton

Metallurgical coal: 536¥ to 1418¥ per ton

Power: ¥0.47/kWh to ¥0.60/kWh

Steam: ¥62.1 to ¥107.4 per ton

Ammonia: ¥326 to ¥451 per ton

Steel: output grew 5.7% in 2017
Raw material/energy costs saw increases in 2017 driven by environmental checks.
Delivered Costs to Major Import Regions

**Delivered to Brazil**

- **US**
- **WEP**
- **China Solvay**
- **Turkey**

**Delivered to the Mediterranean**

- **WEP Coal**
- **WEP NG**
- **Turkey**
- **US**

Source: IHS Markit © 2017 IHS Markit
Regional Market Dynamics
Regional Demand

<table>
<thead>
<tr>
<th>Region</th>
<th>AAGR 12-17</th>
<th>AAGR 17-22</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAM</td>
<td>+0.6%</td>
<td>+1.6%</td>
</tr>
<tr>
<td>WEP</td>
<td>+1.0%</td>
<td>+0.8%</td>
</tr>
<tr>
<td>CEP</td>
<td>+0.8%</td>
<td>+2.4%</td>
</tr>
<tr>
<td>SAM</td>
<td>+0.9%</td>
<td>+4.5%</td>
</tr>
<tr>
<td>AFR</td>
<td>+3.3%</td>
<td>+3.4%</td>
</tr>
<tr>
<td>ISC</td>
<td>+3.9%</td>
<td>+4.4%</td>
</tr>
<tr>
<td>MDE</td>
<td>+1.0%</td>
<td>+1.8%</td>
</tr>
<tr>
<td>CIS</td>
<td>-0.3%</td>
<td>+1.3%</td>
</tr>
<tr>
<td>NEA</td>
<td>+2.7%</td>
<td>+1.1%</td>
</tr>
<tr>
<td>SEA</td>
<td>+3.2%</td>
<td>+3.6%</td>
</tr>
</tbody>
</table>
How Turkey Competes

**Eti Soda – Beypazari**
- 1MT/Y Trona based
- Expansion: 0.5MT/Y, March 2017
- Trona based

**Kazan Soda – Kazan**
- 2.5MT/Y, Aug 17 / Q1 2018
- Trona based

**Sisecam – Mersin**
- 1.3MT/Y
- Solvay based

**Turkey % Share in MDE**
- 3.6 MMT Exports
- 6.0 MMT Capacity
- 2.4 MMT Demand

- 99%
- 87%
- 44%
Europe Challenges

Imports to West Europe

- Turkey
- CEP
- CIS
- United States
- ROW

Source: IHS Markit © 2018 IHS Markit

CEP Capacity vs Demand

- Capacity
- Demand

Source: IHS Markit © 2017 IHS Markit
China is the biggest & most Dynamic Market in the World

- Largest, fastest growing market in last 20 years, but growth has slowed
- China dominates its own domestic market
- Has built capacity to meet demand
- 90% synthetic capacity, Hou process dominates
- Capacity exceeds demand - exports to surrounding regions
- Historically World’s 2nd biggest exporter now 3rd
- Greater focus on environmental issues
US Historical Context

- US capacity far exceeds demand
- Domestic demand fell after the financial crisis
- But exports have grown
- US dominates North America (Canada, Mexico) region thanks to its low production costs
- US also has influence in other parts of the world
- No 1 exporter in the world
US rail costs reduce competitiveness

- **Exports** are 58% of production; have grown by 6%/y since 2010
- Exporters saw significant rail freight increase since 2016
- Turkey has better freight to east coast
- **Domestic demand** is below pre-recession levels
- **Container glass**, largest end use, is declining
- 11 float-glass plants shut between 2007-2014, demand has recovered but local glass plants struggling to keep up
- No major **soda ash capacity** expansions scheduled
US dominance in NAM is absolute but its influence in other markets is threatened

US Export Destinations

Source: IHS Markit

US exports by region
Mexico supplied through the US via rail – Some local production exists

Mexico is home to natural Trona reserves that yet to be exploited

Industria del Alcali

1 local synthetic producer – meets approximately 19.5% of total supply in Mexico

Port Laredo – Largest Soda Ash Rail Gateway

Mexico is the world's 2nd largest importer of soda ash – mostly from the US

Rail Costs

Much of Mexico’s supply comes via Union Pacific Rail - costs are increasing

Domestic 19.5%
US Imports 80.1%
Other Imports 0.4%
Mexico demand is seeing changes through investments

**Bacanora Lithium**
Set to be the first Lithium project to extract from clay

**Timmins Gold**
San Francisco mine Gold output increase planned this year – new mine in Sanora

**O-I/Constellation**
Ambitious plans to expand container glass

**Vitro Expansion Monterrey**
Expansion plans currently on hold

**Saint Gobain Saltillo**
Plans to build new float plant

**Auto Glass**
Automobile production grew 8.9% driving flat glass demand

**Demand Growth**
- 2012 – 2017 %AAGR: 1.7%
- 2017 – 2022 %AAGR: 3.7%

**Map**
- **Lithium Project**
- **Gold Project**
- **Flat Glass**
- **Container Glass**

**Demand Breakdown (2017)**
- **Flat Glass** 38%
- **STPP & Detergents** 17%
- **Chemicals** 4%
- **Metals/Mining** 8%
- **Other Glass** 4%
- **Others** 7%
- **STPP & Detergents (Percentage)**

**Notes**
- Auto Glass
- Automobile production grew 8.9% driving flat glass demand

Confidential. © 2017 IHS Markit™. All Rights Reserved.
South America Market Profile

### South America Per Capita Demand

<table>
<thead>
<tr>
<th>Country</th>
<th>Demand (Kg per Capita)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>25</td>
</tr>
<tr>
<td>Chile</td>
<td>20</td>
</tr>
<tr>
<td>Argentina</td>
<td>15</td>
</tr>
<tr>
<td>Colombia</td>
<td>10</td>
</tr>
<tr>
<td>Peru</td>
<td>5</td>
</tr>
<tr>
<td>Venezuela</td>
<td>0</td>
</tr>
</tbody>
</table>

**Source:** IHS Markit

### South America Supply Demand

- **Capacity** and **Demand** graphs showing projected supply and demand trends from 2000 to 2024.

**Source:** IHS Markit
South America is an Attractive Market for Exporters

Imports to Brazil, Argentina, Brazil, Market Share

Soda Ash Imports, Brazil, Chile, Argentina

Source: IHS Markit

© 2017 IHS Markit
Summary & Conclusions
Global Soda Ash Outlook

- Strong demand outlook
- Short term there is excess capacity
- Markets may be competitive
- China should resume exports but China is very influenced by government policy
- New Turkish capacity will influence a shift in global trade patterns
2000 – 2018 has seen significant shifts in profile of key soda ash market players

Growth in China has influenced global volatility

New trona based capacity in Turkey will challenge existing suppliers

Strong prospects for demand in Mexico and South America
Contact details

**Marguerite Morrin**
Executive Director \ Chemicals
+44 (0) 208 544 7858 tel
+44 (0) 773 9939893 mob
Marguerite.Morrin@ihsmarkit.com
London

**Matthew Hancock**
Senior Analyst \ Chemicals
+44 (0) 20 3159 3728 tel
+44 (0) 7973 935129 mob
Matthew.Hancock@ihsmarkit.com
London