Chemical Industry Deep Dive & Market Assessment

By Debby Wadsworth
Integrated Marketing Manager

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Note: This example only contains parts of the entire presentation and report.
Confidential or sensitive information has been omitted.

Chemical Industry

Chemical Industry

- **Forecast & Trends**
  - For pressure transmitters, the **Basic Chemicals segment** is expected to hold the greatest opportunity from a revenue standpoint according to Frost & Sullivan (F&S): ~ $400.00 billion by 2020)

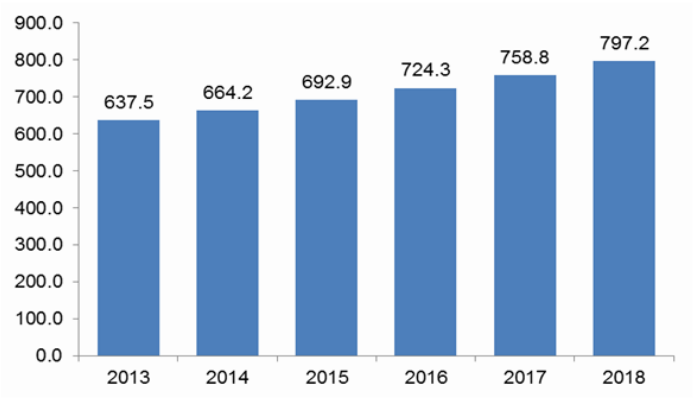
    Basic Chemicals includes petrochemicals, fertilizers and polymers.
  - For **multi-variable** technology, an increasing number of manufacturers in North America are adding multi-variable transmitter units to their production lines according to F&S.

    The trend is being driven by the continual emphasis on **cost reduction** in process plants.

Market Forecast Group Figure 4-10

Total Shipments of Pressure Transmitters for Chemical

Figures in Millions of US Dollars, Total Market CAGR = 4.6%



Source: Pressure Transmitter Global Market Research Study ARC 2014

Total Shipments of Pressure Transmitters by Technology

Figures in Millions of US Dollars

Technology	2013	2014	2015	2016	2017	2018	CAGR
Absolute Pressure	128.2	133.0	138.1	143.6	149.7	156.4	4.1%
Differential Pressure	1,284.1	1,329.3	1,377.6	1,430.1	1,487.4	1,550.8	3.8%
Gauge Pressure	1,311.6	1,361.4	1,414.7	1,472.8	1,536.5	1,606.9	4.1%
Multivariable	197.6	212.2	228.0	245.6	265.2	287.3	7.8%
Total	2,921.5	3,035.9	3,158.5	3,292.1	3,438.8	3,601.5	4.3%

Source: Pressure Transmitter Global Market Research Study ARC 2014

Chemical Industry

- **Leading Producers**

GLOBAL TOP 50

BASF retained the lead, but Sinopec overtook Dow Chemical to claim the number two spot

RANK 2013	RANK 2012	COMPANY	CHEMICAL SALES ($ MILLIONS) 2013	CHANGE FROM 2012	CHEMICAL SALES AS % OF TOTAL SALES	HEAD-QUARTERS COUNTRY	CHEMICAL OPERATING PROFITS[a] ($ MILLIONS)	CHANGE FROM 2012	CHEMICAL PROFITS AS % OF TOTAL OPERATING PROFITS	OPERATING PROFIT MARGIN[b]	IDENTIFIABLE CHEMICAL ASSETS ($ MILLIONS)	CHEMICAL ASSETS AS % OF TOTAL ASSETS	OPERATING RETURN ON CHEMICAL ASSETS[c]
1	1	BASF	$78,615	-4.6%	80.0%	Germany	$6,317	-6.2%	65.4%	8.0%	$69,676	81.5%	9.1%
2	3	Sinopec	60,829	5.0	13.0	China	103	71.9	0.6	0.2	25,427	12.3	0.4
3	2	Dow Chemical	57,080	0.5	100.0	U.S.	4,715	6.6	100.0	8.3	69,501	100.0	6.8
4	5	SABIC	43,589	3.1	86.5	Saudi Arabia	12,795	1.7	86.7	29.4	84,207	93.1	15.2
5	4	Shell[d]	42,279	-7.6	9.4	Netherlands	na	na	na	na	na	na	na
6	6	ExxonMobil	39,048	0.8	9.3	U.S.	5,180	6.0	9.1	13.3	27,475	7.9	18.9
7	7	Formosa Plastics[e]	37,671	5.9	60.2	Taiwan	2,352	67.2	62.8	6.2	43,060	66.6	5.5
8	8	LyondellBasell Industries	33,405	1.7	75.8	Netherlands	5,087	17.5	99.7	15.2	na	na	na
9	9	DuPont[d]	31,044	2.7	86.9	U.S.	5,234	11.6	97.5	16.9	18,113	66.2	28.9
10	12	Ineos	26,861	-10.8	100.0	Switzerland	2,137	-6.3	100.0	8.0	na	na	na
11	10	Mitsubishi Chemical	26,685	14.8	74.4	Japan	507	121.1	44.8	1.9	23,411	65.7	2.2
12	11	Bayer	26,636	0.9	49.9	Germany	4,409	1.0	39.5	16.6	25,571	37.5	17.2
13	13	LG Chem	21,142	-0.5	100.0	South Korea	1,592	-8.8	100.0	7.5	15,938	100.0	10.0
14	14	AkzoNobel	19,376	-5.2	100.0	Netherlands	1,193	-3.5	100.0	6.2	21,332	100.0	5.6
15	16	Air Liquide	19,153	-0.8	94.7	France	3,569	1.1	96.9	18.6	29,595	95.2	12.1
16	17	Braskem	18,994	15.4	100.0	Brazil	1,370	140.1	100.0	7.2	22,414	100.0	6.1
17	19	Mitsui Chemicals	18,916	11.5	100.0	Japan	306	597.1	100.0	1.6	13,634	100.0	2.2
18	23	Linde	18,554	11.0	83.9	Germany	5,108	13.0	97.0	27.5	na	na	na
19	15	Sumitomo Chemical	18,116	16.3	78.8	Japan	688	136.9	66.6	3.8	18,163	63.6	3.8
20	18	Reliance Industries	17,778	10.4	23.3	India	1,436	17.4	35.2	8.1	9,844	13.4	14.6
21	21	Evonik Industries	17,097	-3.7	100.0	Germany	1,653	-22.5	100.0	9.7	21,113	100.0	7.8
22	20	Toray Industries	16,665	17.9	88.5	Japan	1,152	22.5	106.8	6.9	18,734	86.3	6.1
23	26	Lotte Chemical	15,017	3.4	100.0	South Korea	445	31.1	100.0	3.0	9,763	100.0	4.6
24	24	Yara	14,472	0.6	100.0	Norway	1,963	-23.1	100.0	13.6	15,140	100.0	13.0
25	25	PPG Industries	14,044	-0.9	93.0	U.S.	2,134	-3.0	97.4	15.2	11,900	75.0	17.9
26	22	Solvay	13,768	-19.2	100.0	Belgium	1,179	-24.0	100.0	8.6	24,479	100.0	4.8
27	27	Chevron Phillips	13,147	-1.2	100.0	U.S.	na	na	na	na	10,533	100.0	na
28	30	DSM	12,773	5.3	100.0	Netherlands	580	-11.9	100.0	4.5	15,959	100.0	3.6
29	28	Shin-Etsu Chemical[d]	11,945	13.7	100.0	Japan	1,781	10.7	100.0	14.9	22,530	100.0	7.9
30	32	Praxair	11,925	6.2	100.0	U.S.	3,734	7.9	100.0	31.3	20,255	100.0	18.4

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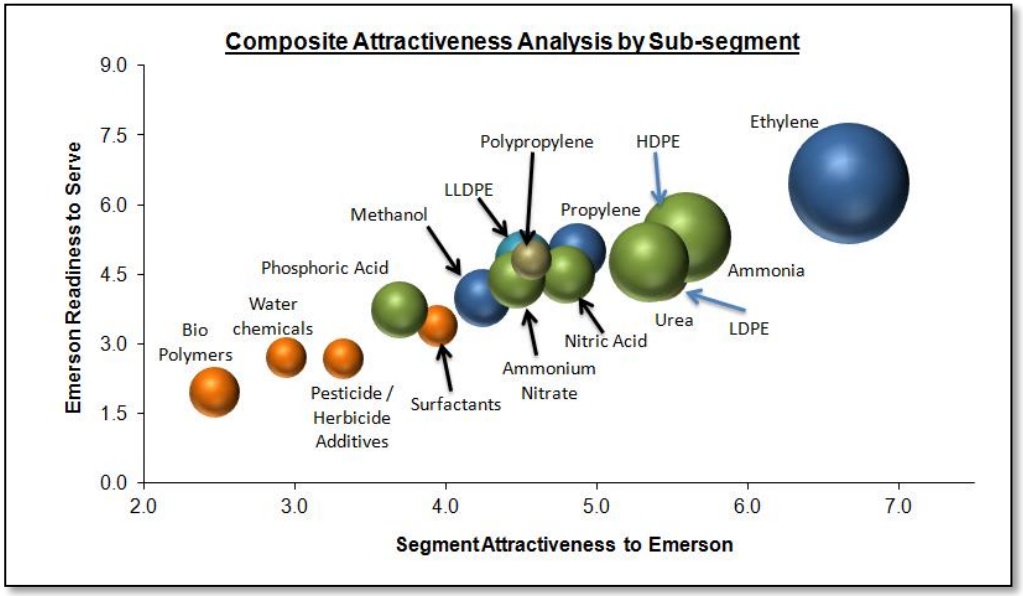
- **Emerson Overall Segment Focus**

  Phase 1: FY14/FY15
  Ethylene, Methanol, Urea

  Phase 2: FY15/FY16
  Agrichem, Propylene

  Phase 3: FY16/FY17
  Polymers

  Phase 4: FY17/FY18
  Specialty Chemicals



Source: Emerson Chemical Industry Report 6/18/2014

- **Pressure Group Segment Focus**

  Urea Recommended

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- **Regional Breakout**

North America has the highest potential for Pressure in FY14/FY15

	AP $2.4B	EUR $1.7B	NA $3.3B	MEA $0.9B	LA $0.2B	Comment
Speciality Chem	$400	$349	$560	$223	$42	Slow recovery in Auto & Residential, Growth in O&G lubricants and surficants
Petro Chem	$580	$372	$808	$174	$35	AP Olefin expansion, NA Shale & Derivitive Investment
Plastic & Polymer	$459	$292	$641	$140	$28	MEA Integrated plant & NA Derivitive plant investments ramping up
Agri Chem	$571	$417	$795	$226	$44	Low cost feedstock/energy & plant localisation driving new investment
Inorg. Bulk	$209	$136	$288	$61	$12	Marginal Polisilicon growth, Investment in chloralkali and synthetic Rubber
Ind. Gas	$168	$110	$232	$49	$10	Modular gas plants drives sustained profits

Source: Emerson Chemical Industry Report 6/18/2014

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- **Target Audience – All Segments**

Operations Manager
The Operations Manager is typically responsible for meeting the production plan and maintaining the license to operate for one or more olefins plants.

Challenge: Unable to consistently meet production plan

Challenge: Difficulty avoiding health and safety incidents, and showing continuous improvement in the reduction of the company's environmental footprint

Reliability Manager
The Reliability Manager is typically the person responsible for identifying and tracking all the underlying causes of unavailability of equipment within a facility. He/she utilizes the application of various root cause analysis techniques and applicable maintenance technologies to recommend solutions addressing high priority areas.

Challenge: Unplanned shutdowns eat into production capacity

Maintenance Manager
The Maintenance Manager is typically the person responsible for keeping all the equipment running in good working order within a manufacturing facility. He/she coordinates with Operations to schedule and execute work orders in such a manner that equipment and human resources are efficiently deployed to minimize the impact on the production plan.

Challenge: Equipment is not performing well enough

Technology Manager
The Technology Manager is typically the person responsible for the engineering activities in a manufacturing facility, including process-, project- and process-automation engineering. He/she monitors and tracks the daily performance of the operating units and recommends short-term and long-term solutions to both stabilize and optimize a facility.

Utilities Manager
The Utilities Manager is typically the person responsible for the production of energy in the form of multiple steam pressure levels, the production of plant cooling water, and wastewater collection and treatment. Electrical energy production through local cogeneration facilities may also be on this individual's list of responsibilities if these unit operations exist within the plant boundaries.

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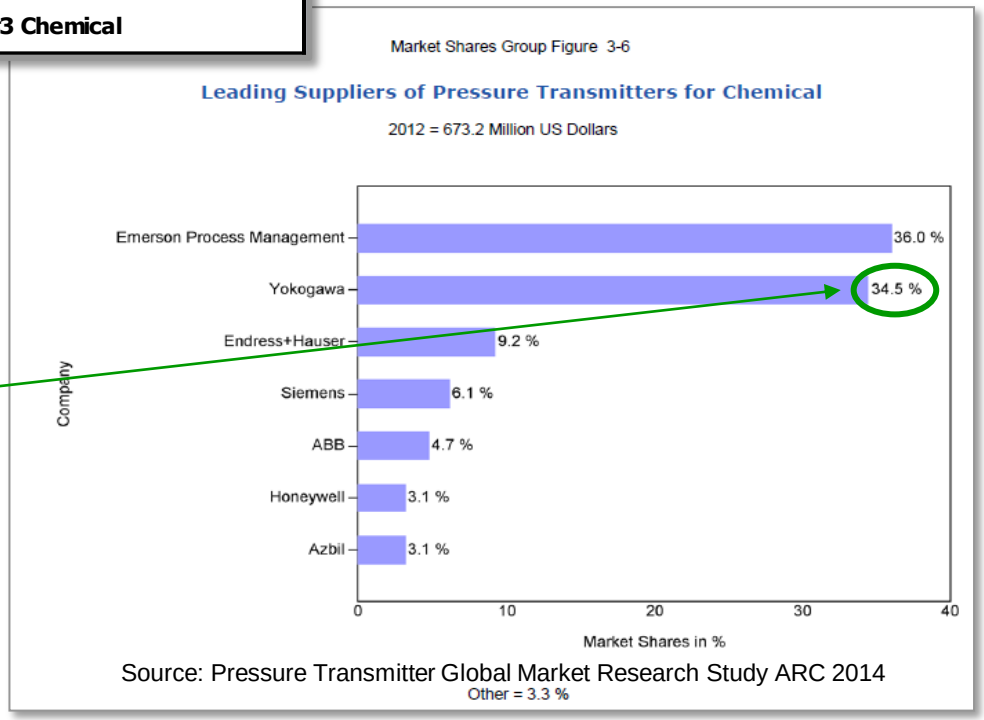
- **Competitor's Focus**

2013 Worldwide Revenues for Pressure Transmitters Industries			
Emerson	**#1 Oil & Gas**	**#2 Pulp & Paper**	**#3 Metals**
Yokogawa	**#1 Chemical**	**#2 Refining**	**#3 Power**
ABB	**#1 Power**	**#2 Oil & Gas**	**#3 Chemical**
Honeywell	**#1 Refining**	**#2 Oil & Gas**	**#3 Pulp & Paper**
E&H	**#1 Food & Bev**	**#2 Water & WW**	**#3 Mining**
Siemens	**#1 Water & WW**	**#2 Pharm & Bio**	**#3 Chemical**

Source: Pressure Transmitter Global Market Research Study ARC 2014

Yokogawa's has been focused upon the Chemical industry for years and is gaining ground. Their market share has grown from 11% back in 2000, to 34.5% in 2013.

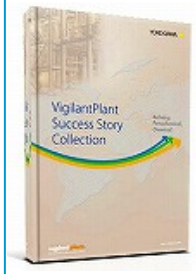


Source: Pressure Transmitter Global Market Research Study ARC 2014

Chemical Industry

- **Yokogawa = Multi-Channel Approach**

  eBook, Case Histories, PR/Scholarship Awards, PR/Business Announcements, Application Notes, White Papers (Chemical Processing Magazine), Training Partner Programs & Certifications, Trade Articles (Chemical Processing Magazine),



The success stories gathered together in this eBook describe how Yokogawa has helped leading companies in the Refinery, Petrochemical & Chemical industries address specific challenges. You can use keywords to search this collection.

→ Success story e-book

→ **Nippon Shokubai, Hyogo, Japan**
CENTUM CS 3000, PRM, FOUNDATION fieldbus, EJA, EJX, DYF, YVP, InsightSuiteAE

- Fieldbus technology introduced to realize predictive and preventive maintenance.
- ISAE to improve the reliability of diagnosis and parameter setting, utilizing data collected by PRM.

Yokogawa Offers VigilantPlant Solutions Partner Program (News)
By: **Chemical Processing Staff** Date: **September 22, 2011**
Yokogawa Offers VigilantPlant Solutions Partner Program -- Program provides partners with training and certification for customer support.

Yokogawa Awards Student Scholarships (News)
By: **Chemical Processing Staff** Date: **September 27, 2014**
Yokogawa awarded scholarships to five students who aspire to become leaders in engineering, automation and related fields.

Application Notes

Pressure Transmitters/Differential Pressure Transmitters | Magnetic Flowmeters | Vortex Flowmeters

Pressure Transmitters/Differential Pressure Transmitters

→ Autolevel

Industry: Oil & Gas, Refining, Chemical, Power, Iron & Steel, Water & Wastewater
Product: Pressure Transmitter, DPharp EJA and EJX Series
→ PDF Download (250KB)

WORLD NEWS AND VIEWS :: PROJECTS 84%
November 14, 2013
Yokogawa selected as main automation contractor for CPChem's USGC petrochemical project
Yokogawa Electric (Tokyo) has been selected as the main automation contractor for Chevron Phillips Chemical's (CPChem; The Woodlands, TX) US Gulf Coast (USGC) petrochemicals...
http://www.chemweek.com/home/projects/56693.html

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- **Competitor & Messaging**

Endress+Hauser

Competing Product: PMD75

Endress+Hauser is a full-line pressure transmitter supplier. The company is also focusing on digital transmitter technology and utilizing long-life ceramic measuring diaphragms in its transmitters.

- **Strengths:** Focus on instrumentation for process industries with a broad product range, particularly in the chemical and food and beverage industries; Increasing focus in oil & gas; Investment in SIL-rated transmitters
- **Challenges:** Expanding North American business and minimizing the adverse effect of currently unfavorable exchange rates; Winning projects without PAS system, this is largely addressed, however, by E+H's strong relationships with Honeywell and Rockwell Automation.
- **Key Industries:** Chemical; Food & Beverage; Mining; Oil & Gas; Refining; Electric Power Generation; Pulp & Paper; Water & Wastewater
- **Messaging:**
  - Brand: People for Process Automation
  - Experience: Simply Reliable
  - Process Safety
  - Application Know-How / Industry Expertise / Lifecycle Management

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- **Competitor & Messaging**

ABB

Competing Product: 266MST

ABB is among the world leaders in the fields of power and automation technologies. The company offers a wide array of products and services to an even wider group of industries, including automotive, chemical, electric utilities, gas utilities, life sciences, logistic systems, oil & gas, petrochemicals, pharmaceuticals, power generation, pulp & paper, refining, and water utilities.

ABB's 266 family of pressure transmitters includes absolute, gauge, differential pressure, and multivariable devices and accessories.

- **Strengths:** Strong reputation and global base; Broad product range; Founding member of FDT organization.
- **Challenges:** Increasing market share for field instruments and expanding PAM solutions
- **Key Industries:** Chemical; Food & Beverage; Mining; Oil & Gas; Refining; Electric Power Generation; Pulp & Paper; Water & Wastewater
- **Messaging:**
  - Brand: Power and productivity for a better world

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- **Competitor & Messaging**

Honeywell

Competing Product: STD800

Honeywell supplies a full line of pressure transmitters. It has expanded its portfolio of field instruments to include Lifetime Transmitters for pressure measurement, which carry a 15-year warranty and tout a 470 year MTBF.

- **Strengths:** Large installed base in process industries; strong industry domain knowledge and service capabilities; Early provider of wireless transmitter; Ability to quickly identify and act upon developing market trends
- **Challenges:** Increasing pressure transmitter market share; Successfully leveraging wireless technology
- **Key Industries:** Chemical; Mining; Oil & Gas; Refining; Electric Power Generation; Pulp & Paper
- **Messaging:**
  - Brand: Honeywell's SmartLine® smart measurement system sets the standard for total performance.

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- **Competitor & Messaging**

Siemens

Competing Product: SITRANS P500

Yokogawa is a full-line pressure transmitter supplier with a global network of 88 companies that spans 55 countries.

- **Strengths:** Global presence with strong brand recognition as well as strong expertise in SIL-rated transmitters gained from acquisitions. The SITRANS P500 has been developed to meet the highest expectations for measuring accuracy, ruggedness, and user-friendliness.
- **Challenges:** Leverage synergies from acquisitions to improve its position in the process automation market; Increasing investment in FOUNDATION fieldbus-enabled transmitters.
- **Key Industries:** Chemical; Food & Beverage; Oil & Gas; Pharmaceutical & Biotech; Electric Power Generation; Pulp & Paper; Water & Wastewater
- **Messaging:**
  - Brand: From A to Z, Siemens is the world's single-source leader of automation technology products engineered and manufactured for all industrial sectors

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Urea Segment

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Chemical Industry

- **Competitor & Messaging**

Yokogawa

Competing Product: EJX

The company offers a comprehensive range of pressure transmitters for general and application specific applications. The SITRANS P500 has been developed to meet the highest expectations for measuring accuracy, ruggedness, and user-friendliness, and guarantees accuracy of ≤ 0.03 %.

- **Strengths:** Global presence with strong brand recognition as well as strong expertise in SIL-rated transmitters gained from acquisitions. The SITRANS P500 has been developed to meet the highest expectations for measuring accuracy, ruggedness, and user-friendliness.
- **Challenges:** Increasing market share in North America
- **Key Industries:** Chemical & Petrochemicals; Food & Beverage; Metals; Mining; Oil & Gas; Oil & Gas Refining; Pharmaceutical; Power; Pulp & Paper; Water & Wastewater
- **Messaging:**
  - Yokogawa makes use of its rich industry experience and knowhow to help companies achieve their business objectives.
  - VigilantPlant helps to ensure a sustainable future for your plant
  - Vigilance – It's our mindset, It's our behavior, It's our commitment

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Urea Segment

- **Considerations**
  - Urea is expected to become a **$96 billion** global market by 2019.
  - The IFA estimates around ***220 fertilizer projects worldwide*** are planned between 2013-2017 at a total capital cost of +$150 billion.
  - There are several places within the process where pressure transmitters can help **alleviate problems like crystallization, erosion and corrosion**.
  - Emerson is already focusing upon the segment which may provide opportunities for marketing in partnership as well as leverage brand equity.

3051S would bring reliability to the process despite the volatile environment

*A study published by the State of New York Department of Health reported 107 serious ammonia spills that occurred in New York State between 1993 through 1998. Most of the releases occurred in food/beverage processing (29%) or at **chemical**/metal/equipment manufacturing facilities (27%). **Equipment failure caused 58% of the releases**.*

Akbar Ali

continuous failure of urea grade diaphragm seal with Pressure transmitter in urea plant.

Akbar Ali C.
Instrument Technician at IBN RUSHD (A Sabic Company)

Hello Everyone

can any tell what are possible cause of continuous failure of urea grade diaphragm seal with Pressure transmitter in urea plant.

Diaphragm material is 316L SS

Thanks,
Akbar

Urea Segment

- **Basic Facts**
  - For use in industry, urea is produced from synthetic ammonia and carbon dioxide by chemical plants.
  - There are many uses for Urea including ***agricultural***, pharmaceutical and production of chemical compounds such as plastics, adhesives, and potassium cyanate. It is the world's most commonly used ***nitrogen fertilizer***.
  - Urea plants are complicated, delicate operations, with many interacting variables and interdependent loops.
  - Product costs are high and when **equipment failures are too frequent**, or operator performance is inconsistent, the effect on capacity and profits can be quick and dramatic.
  - The urea process is easily influenced by ambient conditions, and it involves highly interacting variables, **high pressures**, exothermic reactions, and corrosive conditions.

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Urea Segment

- **Demand Forecast**
  - Demand for urea is growing worldwide at an average annual growth rate of **3.5%** according to the International Fertilizer Association (IFA).
  - Urea will reach **200.5 millions tons in 2018** according to the Food and Agriculture Organization of the United Nations.

- **Industry Players**
  - SKW Pieteritz in Germany has developed a reliable pressure transmitter specifically for the high pressure **synthesis section** in any urea plant.
  - Omega is marketing a pressure transmitter for absolute and seal pressures.

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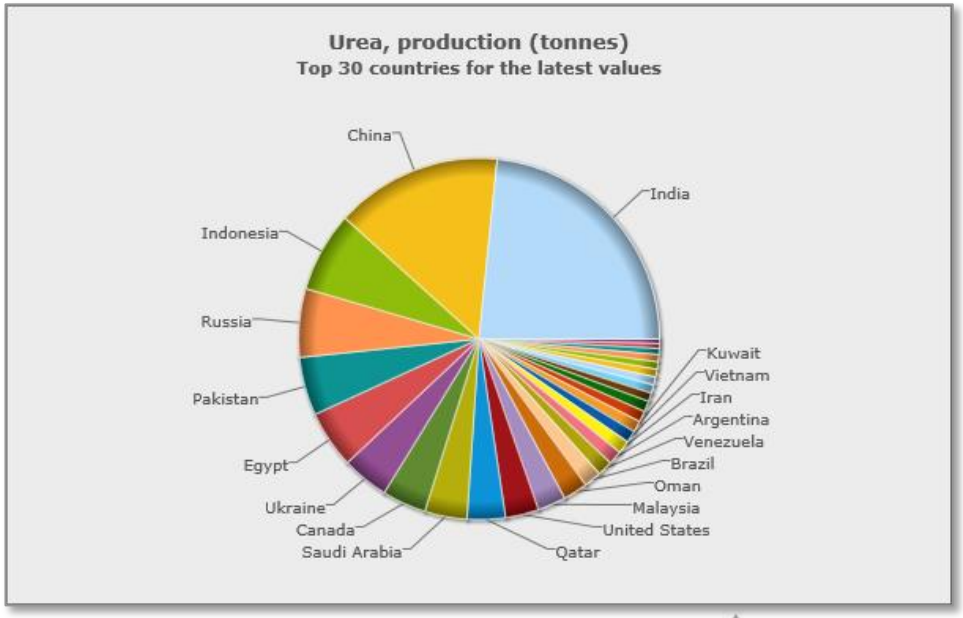
Urea Segment

- **Production**
  - The IFA estimates around ***220 fertilizer projects worldwide*** are planned between 2013-2017 at a total capital cost of +$150 billion
  - Close to 60 new urea plants are planned to come on stream by 2018 in East Asia, Africa and North America.
  - US Companies including **CF Industries** (US largest) and **Black & Veatch** have announced plans to expand their urea production capacity.
  - Falling price for natural gas have contributed to expansion and increased urea/ammonia production profit margins.



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Urea Segment

- **New Facilities In-Process**

Wallaceburg, ON

by Trevor Brown • March 31, 2015

OWNER: **None, yet**

PROJECT: **Greenfield urea plant**

SUMMARY STATUS: **Concept phase**

A regional economic development proposal, seeking an investor. The municipality of Chatham-Kent is spending significant time and money to encourage a company to build a new fertilizer plant in this location. In development since 2013. No schedule for future announcements, but progress continues.

Killona, LA – AM Agrigen

by Trevor Brown • July 16, 2014

UPDATED: 03/17/2015 — see Change Log

OWNER: **AM Agrigen Industries**

PROJECT: **Greenfield ammonia-urea plant**

SUMMARY STATUS: **Planning Phase**

Air permit application submitted October 2014, public comment period ends March 2015. AM Agrigen announced this greenfield in May 2014, although it has been in development since October 2012. The company has publicly announced almost no details, but permit documents and other sources provide details regarding scale, technology licensors, and ownership (the project's backer is well established in the international fertilizer industry). AM Agrigen's final investment decision is expected in mid-2015. 30 month construction period could begin Q4 2015.

Taylor County, FL — BioNitrogen

by Trevor Brown • August 28, 2014

OWNER: **BioNitrogen**

PROJECT: **Greenfield urea plant**

SUMMARY STATUS: **Planning Phase**

Announced in March 2014, county financing incentives approved July and August 2014. This plant will be based on the design of BioNitrogen's first plant in Hendry County.

Belle Plaine, SK — FNA (ProjectN)

by Trevor Brown • June 19, 2014

UPDATED: 03/28/2015 — see Change Log

OWNER: **Farmers of North America** (FNA)

PROJECT: **Greenfield nitrogen fertilizer plant**

SUMMARY STATUS: **Planning phase**

FNA is "moving steadily" towards building its own nitrogen fertilizer plant, starting with the establishment of a fertilizer and grain sales and distribution business. FNA announced the plant location in June 2014. Pre-FEED study is complete. FNA will continue to raise seed capital from farmers until it can announce a major equity investor. FNA is also seeking a partner to operate the plant.

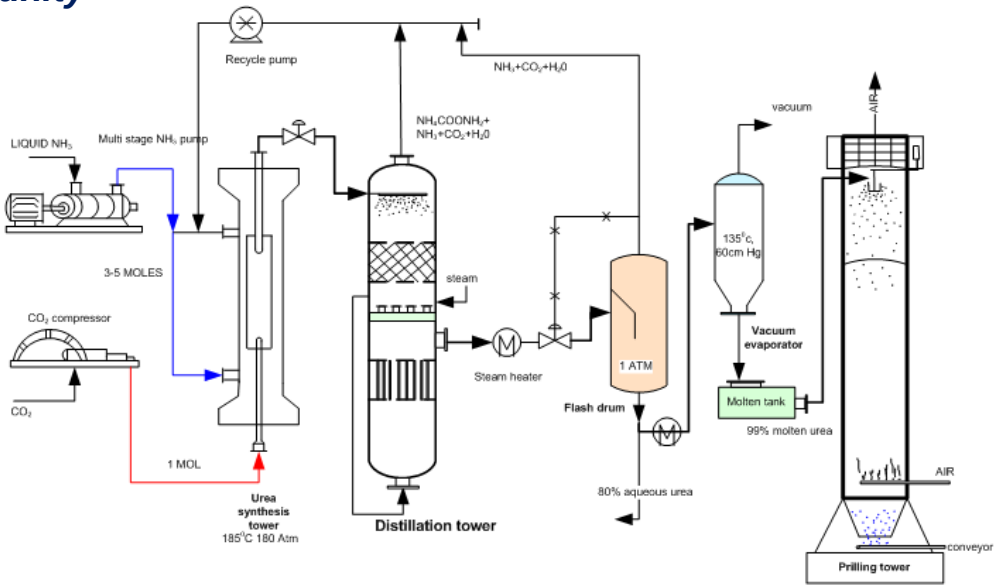
Source: http://ammoniaindustry.com/tag/urea/

Urea Segment

Production Process Points

The urea plant consists of six main areas:

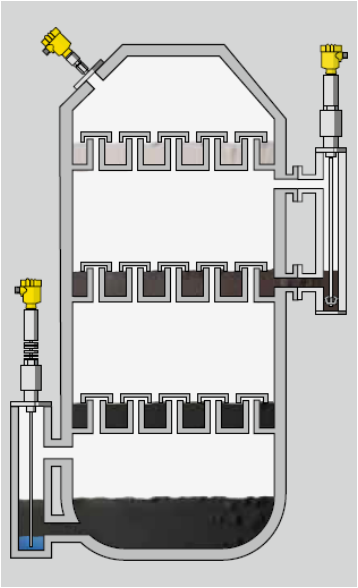
1. **Ammonia Pumping** - liquid ammonia is pumped from the multi-stage pump which maintain the reaction pressure in the vertical stainless steel vessel
2. **Carbon Dioxide Compression** - plant directly boost the carbon dioxide from the compression section
3. **Urea Synthesis Tower** - catalyst bed is placed in the inner side of the autoclave structure and 180- 200 atm pressure and a temperature about 180-200 deg centigrade is maintained
4. **Distillation Tower and Flash Drum** - high pressure slurry is flashed to 1 atm pressure and distilled to remove excess ammonia and decomposed ammonia carbamated salts are removed and recycled - ***Level Opportunity***
5. **Vacuum Evaporator** - solution is fed to vacuum evaporator for concentrating the slurry
6. **Prilling Tower** - dryer where the molten slurry is passed from top of the tower into a bucket which rotates and sprinkles the slurry and air is passed from the bottom to remove moisture as the urea forms into granules during it journey to the bottom of the tower



Urea Segment

- **Recommended Process Point - Synthesis Tower**

The temperature and pressure of the synthesis reaction are closely linked since the ammonium carbamate first forming must be maintained at least at its saturation pressure in order to prevent its immediate decomposition.



Effectively maintaining high pressure also reduces the level of damage from crystallization carbamate and condensation corrosion caused by condensed carbamate.

Pressure transmitters are used to:

1. Measure the level in the urea reactor (2 transmitters)
2. Measure the pressure of the urea synthesis section close to the safety valves
3. Measure the pressure of the Support Loaded System Safety Valve
4. Provide an instrumentation safeguard

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Urea Segment

- **Challenges - Lost Production**

According to a study of 27 urea plants by Indian Journal of Fertilizer from 2008–2011, the average production lost over that period was equivalent to 34,238 metric tons per plant, or a total of 2.6 million metric tons.

Plant related problems was the leading cause for shutdowns, forced downtime and loss of production. Of those, 62.7% were due to internal factors with mechanical failures seeing the highest year-to-year increase (8.8 DDPY).

Increase was also noticed in the downtime in instrumentation due to problems such as **malfunctioning of transmitters**, false alarms, etc.

Table 2 – Reasons for loss of production in ammonia plants

Sl. No.	Category	No. of shutdown (SPY)	Downtime days (DDPY)	Loss of production (MT/plant/yr)
1	Plant related problems	4.7	10.6	11920
2	Power plant/supply	0.6	0.6	630
3	Shortage of raw materials	0.3	2.0	2445
4.	Labour problems	0.0	0.0	0
5.	Water problem	0.02	0.2	108
6.	Other reasons	0.4	3.5	2569
	Total	**6.1**	**16.8**	**17672**

Table 7 – Downtime in urea plant due to major reasons (DDPY)

Reasons	2002-05	2005-08	2008-11
Mechanical	5.9	4.0	6.9
Electrical	0.5	0.6	0.3
Process	0.5	0.2	0.4
Instrumentation	0.4	0.3	0.3
Miscellaneous	23.7	0.2	0.3
Total	31.0	5.3	8.1

Urea Segment

- **Pain #1**

  "Quality problems limit my plant's capacity."

  Reason:

  "Our process control strategy cannot adequately handle abnormal conditions."

Observation:

Abnormal conditions in the finishing area or elsewhere in the plant can prevent you from making a consistently high-quality urea product. Whether the culprit is excessive variability, instrument problems, or another factor, you need to be able to handle it quickly. Otherwise, you might waste a lot of time and effort reworking product that should already be ready for market.

What if you could match the right measurements with a quick, appropriate control strategy?

Emerson Difference:

Working with Emerson, you'll give your control room the ability to respond more quickly and more appropriately to abnormal conditions, using the right measurements and the right control tuning to hold down variability. And with access to a wide range of reliable instruments, digital valve controllers, and other devices, your operators can rely on effective, appropriate automatic control responses.

Urea Segment

- **Pain #2**

  "Environmental conditions are causing us too much process variability causing losses in yield."

  Reason:

  "Our current technology cannot effectively monitor and manage our environments pressure."

Observation:

Outside humidity, ambient temperature, and other conditions can quickly—and significantly—alter your process, so you need to compensate with fast, measured control responses.

What if you could improve your control strategy, your response time, and your control loops?

Emerson Difference:

Using Emerson solutions, you'll be able to use first-rate control solutions to rapidly respond to process changes, while improving your control models and control loops. And with better control, you'll contain variability and uphold urea quality—and plant capacity.

Urea Segment

- **Pain #3**

  "Ineffective process management is hindering our ability to hit quotas."

  Reason:

  "We often need more process insight."

Observation:
In delicate processes like urea manufacturing, it's difficult to find out exactly what factor—or set of factors—is responsible for damaging your ability to produce quality urea granules.

What if you could quickly get any measurement you want?

Emerson Difference:
Working with Emerson, you'll be able to monitor critical and secondary equipment health, you'll know what performance problems you face, and you'll be able to calculate their costs. You'll also put measuring devices wherever you need them in order to understand how your process is performing, and what you can do to improve it.

Chemical Industry

- Organizations
  - International Fertilizer Society
  - American Chemical Society
  - American Chemistry Council
  - American Institute of Chemical Engineers (AIChE)

- Publications
  - Chemical Processing Magazine
  - Chemical Engineering Magazine
  - Processing Magazine
  - CEP Magazine (AIChE)
  - IHS Chemical Week
  - Plant Engineering
  - Chemical & Engineering News
  - Journal of Chemical Engineering & Process Technology\Manufacturing & Technology News
  - AWE International (Europe & Middle East)

- Information Sources

UreaKowHow.com – workshops, technical training, roundtable discussions,

Chemical Industry

- **Events**

IFA 83rd Annual Conference
25 May 2015 - 27 May 2015
IFS Technical Conference, 23-24 June 2015
23 Jun 2015 - 24 Jun 2015

March 22-26, 2015
ACS National Meeting and Exposition 2015
Organizer: ACS (American Chemical Society)
Location: Denver, CO
Phone: TBC
Email: nationalmeetings@acs.org

March 24-27, 2015
30th Annual World Petrochemical Conference
Organizer: IHS (IHS Chemical Week - chemical, petrochemical, and specialty chemical publication)
Location: Galveston Island Convention Center at the San Luis Resort
Phone: +1 855 816-4938
Email: WPC2015@ihs.com

March 29-31, 2015
2015 AFPM International Petrochemical Conference (American Fuel & Petroleum Manufacturers)
Organizer: AFPM
Location: San Antonio, TX

June 24-25, 2015
ChemSpec Europe 2015
Organizer: Quartz Chemicals
Location: Cologne, Germany
Phone: 44 (0) 1737 855 076
Email: johnlane@quartzltd.com

May 25-27, 2015
83rd International Fertilizer Association Conférence
Istanbul, Turkey
http://ifa-istanbul2015.org//Home.aspx

Nov 30-Dec 2, 2015 Atlanta, GA
3rd World Congress
Petrochemistry and chemical Engineering

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