

NC STATE UNIVERSITY

**POOLE** COLLEGE OF  
MANAGEMENT

**SCRC**

REPORT

SCRC REPORT | Spring 2013

# Global Chemical Industry Analysis

Ryan Smith, Weston Held, Neal Rosenberger

# Global Chemical Industry Analysis

PUBLISHED SPRING 2013

---

## AUTHOR

Ryan Smith, Weston Held,  
Neal Rosenberger

---

## Executive Summary & Industry Overview:

Through the analysis of the various chemical and manufacturing companies, there was a common theme of sustainability addressed. The global chemical industry generates revenue of about \$3 trillion and produces precursors and intermediates for most other consumer industries. The chemical industry is highly regulated with major contributing regions being Europe, North America, and Asia. With new regulations such as REACH, the industry framework is changing to adapt to innovative solutions. The main constraints on the global chemical industry are energy costs, feedstock changes, labor costs and regulations. Despite these limitations, the industry is expected to grow at a fairly high rate over the next five years and thereafter. While many of these companies have extensive sustainability plans they are still lagging behind other industries.

The global chemical industry consists of a very diverse and complicated range of products. In terms of revenue, it is one of the world's largest markets. The majority of consumer products that are used every day have at least some tie to the products of the chemical industry. There are a few large players with a lot of smaller, specialized, companies.

Across the chemical industry, expected worth is estimated to be around \$3 trillion per year with relatively flat revenue growth in the EU and US. The compound annual growth rate (CAGR) over the five years spanning 2006-2010 has been 5%. At the low end, Europe only grew at about 1% in 2010 with Asia representing the region with the largest CAGR at 10% in 2010. From the years 2010-2015, the chemicals market is expected to gain momentum and is forecasted to grow at a 8% compound annual growth rate.

The chemical market is recognized as being divided into five distinct segments; base, consumer, pharmaceutical, specialty and fine, and agriculture chemicals. The base chemicals segment consists of the largest of the five with 41% of the total value. A far second, pharmaceuticals comprise of about 28%. The remaining 31% is split between the remaining three segments.

The segmentation of the geography of the chemical industry overwhelmingly resides in the Asia-Pacific region. In 2010 the Asia-Pacific accounted for 46% of the industry. The remaining is split mostly between the Americas and Europe with 28% and 25% respectively. Very little is found in the Middle-East.

The majority of the raw materials, or ingredients, in the chemical industry are derived from oil and natural gas. Therefore prices of the products fluctuate greatly according to the supply and demand of these inputs. The threat of substitutes is very low because the buyer typically needs a very specific chemical composition that is not available everywhere. However, in the base chemical

markets, margins are rather thin as these products are very commoditized and available from multiple market players. The industry has high barriers to entry and exit primarily due to the large costs of production plants.

The global chemical industry is very large and competitive. It is expected to grow at a considerable rate in the future, especially with the development in the Asia-Pacific. The market for chemical products is very diverse and is seen as an input in almost all industries.

## Company Overviews:

### Air Products & Chemicals, Inc.

Air Products & Chemicals Inc. produces numerous gases and performance materials, which are sold to a variety of diverse industries. Within their industry, they are currently ranked in the top 10 percent on the Dow Jones Sustainability World Index. They consider safety one of their top priorities and have a detailed code of conduct that is taken very seriously. The company is not considered in the Newsweek Green Score tracking. Air Products & Chemicals Inc. has over 20,000 employees operating in 50 different countries. In 2012 their revenue totaled \$10 billion.

### Dow Chemical

Dow Chemical is a worldwide leader in the manufacturing of diversified chemicals used in a variety of products. With 2012 revenues topping \$57 billion, they keep sustainability at the forefront of their business practices. They are recognized on the Dow Jones Sustainability World Index and received a Green Score of 46.8 from Newsweek.

### El Dupont De Nemours

DuPont is a chemical company that focuses on a variety of industries and helps to promote sustainability through their products. They are very involved in the supplier monitoring activities and are recognized in the Dow Jones Sustainability World Index. Their Newsweek Green Score is 52.4, which increased DuPont's ranking 35 spots from 2011.

### Emcor Group, Inc.

EMCOR Group is an industry leader in electrical and mechanical construction. They have been recognized as one of the best managed and worlds most admired companies. Their diversity and professionalism in construction management allows them to focus on "green" requirements. They are a sustainable company listed on the Dow Jones Sustainability World Index as well as attaining a score of 50.1 as a Newsweek Green Score.

### Fluor Corporation

Fluor Corporation is a global engineering, construction, procurement and operations company that provides services in the public and private sector, including the US government. Fluor Corporation was been ranked number one in Engineering News-Record Magazine's 2012 list of Top 100 Design-Build Firms and number two on its Top 400 Contracts List. Fluor Corporation has also been ranked number one on Fortune 500 Industry: "Engineering, Construction" in 2012. According to the Federal Contractor Misconduct Database, Fluor Corporation had a total of 34 instances of misconduct including such instances as breach of contract, failure to post radiation notices, and radioactive/

nuclear safety deficiencies.

Fluor Corporation has published its Business Conduct and Ethics for Suppliers and Contractors, which outlines Fluor Corporation's commitment to "unyielding integrity and the highest standard of business conduct." This document highlights Fluor's self-expectations as well as suppliers and contractors including such areas as Health, Safety and Environment, and human rights and employment practices. Fluor also has in place a Compliance and Ethics Hotline. Fluor employees, clients, suppliers, subcontractors and partners can call this global, toll-free compliance hotline at any time and ask questions related to Fluor's code of conduct or anonymously report any suspected misconduct. Fluor Corporation also requires every employee to undergo Code of Conduct training. In addition, Fluor also provides training programs in Compliance and Ethics in Action.

Fluor Corporation is listed on the Dow Jones Sustainability Index and had Newsweek Green Score of 61.8 in 2012, which was down from 71 in 2011. This 9.2-point drop is significant however we have observed more severe drops when analyzing other companies in the sector.

## International Paper

International Paper is the largest pulp and paper company in the world with 61,500 employees, headquartered in Memphis, Tennessee. International Paper was named number one in the forestry and paper products industry in Fortune Magazine's "Worlds Most Admired Companies" in 2012. International Paper has a Supplier Code of Conduct in place that covers workplace, labor and human rights; business conduct and ethics; health, safety and the environment; and accountability and compliance. International Paper conducts an audit of its suppliers as described in the California Transparency in Supply Chains Act of 2010 Disclosure Statement. International Paper reserves the right to audit and ensure that all suppliers are complying with its code of conduct as well as the laws of every country in which they conduct business. International Paper has internal audits of its supply chain that meet third party standards. For example, International Paper has certification to a number of independent standards including the Sustainable Forestry Initiative, the Program for the Endorsement of Forest Certification, the Forest Stewardship Council and the Brazilian Forest Certification Standard. 2012 was also the first year that International Paper published its global sustainability goals.

International Paper regularly trains its employees in the standards of ethical behavior, policies, procedures and legal requirements that reinforce the manner in which they intend to conduct business. They also have a "Chairman's Diversity Council" that promotes "an environment that is progressive, flexible, and inclusive." International Paper is also very active in the community. International Paper believes that it is important to maintain high standards as a good neighbor as observed in their commitment to the International Paper Foundation and Coins 4 Kids.

International Paper is listed on the Dow Jones Sustainability Index and received a Newsweek Green Score of 45.2 in 2012. This is down significantly from a score of 75.3 in 2011.

## Monsanto Company

Monsanto Company is a multinational agricultural biotechnology company headquartered in Creve Coeur, Missouri. Monsanto Company is a leading producer of genetically modified seed and seeks to apply innovation and technology to help farmers around the world produce more from less. Monsanto was ranked eighth on the "Top 50 Employers" in Workforce Diversity for Engineering and IT Professionals Magazine. Human Rights Campaign also recognized Monsanto as having 100 percent on their 2012 Corporate Equality Index, a score they also received in 2010 and 2011. Monsanto also recognizes its superior suppliers through its Supplier Quality Award.

Monsanto has a Human Rights Policy that displays their commitment to the protection and advancement of human rights, which it expects its suppliers to adhere to. The Universal Declaration on Human Rights guides Monsanto's Human Rights Policy as well as The International Labor Organizations Declaration on Fundamental Principles and Right to Work. In July of 2012 Monsanto became involved in a lawsuit with a group of migrant farm workers who accused Monsanto of paying them less than minimum wage, putting them in substandard housing and charging them rent they were told would be free. In 2011, Monsanto was also accused of turning a blind eye to child labor; contaminating entire communities with harmful chemicals; and bribing foreign government officials. That said,

Monsanto has a Human Rights Metrics that it uses to achieve measurable results and monitor their progress in implementing their Human Rights Policy moving forward. In addition to the stated lawsuits, dozens of family farmers from across the country are suing Monsanto because they claim they have been forced to stop growing their crops to avoid genetic contamination and potential lawsuits from Monsanto itself.

Monsanto is listed on the Dow Jones Sustainability Index and had a Newsweek Green Score of 25.3 in 2012. This is down from 28.19 in 2011. While this score is low, there was little change in the scores they received in 2012 compared to 2011.

## PPG Industries

PPG Industries is a global supplier of paints, coatings, glass, fiberglass, chemicals, optical products and specialty material headquartered in Pittsburgh, Pennsylvania. PPG has been recognized and received awards in Sustainability including the European Union Eco-label Communication Award 2011, US Department of Energy grant, Tianjin TEDA Environmental Protection Bureau "Outstanding Enterprise with Environmental Excellence" recognition and Rexam PLC- "Supplier of the Year" and "Supply Chain Excellence" Award.

PPG is committed to carry out its business with integrity and ensure that every employee's behavior is in line with the PPG Global Code of Ethics, A Guide to Corporate Conduct. The code of conduct is supported by an extensive system of policies and procedures, including training and communications programs. PPG also has an Ethics Hotline that is available to employees as well as third parties including, customers and suppliers, to report any illegal actions or ethics violations. In 2011 PPG Industries was sued for retaliation against an employee and classifying this employee as "exempt" from overtime provisions of federal labor law.

PPG Industries is committed to the environment, health and safety. PPG believes that their products can be developed, produced, distributed, used and disposed of in an environmentally safe manner by providing training and advice to its employees, partners and customers. PPG Industries as integrated these ideas into their business activities. They train, equip and support its employees in the management of environmental, health and safety activities at all of its locations. In March 2012; a lawsuit was filed against PPG Industries accusing the company of unpermitted and untreated discharge of pollutants in an area in Cadogan Township, PA. This lawsuit claims PPG Industries violated the Federal Water Pollution Control Act and the Pennsylvania Clean Streams Law. In 2011, PPG was accused of dumping more than one million tons of cancer causing hexavalent chromium.

PPG Industries is listed on the Dow Jones Sustainability Index in 2012. PPG Industries had a Newsweek Green Score of 43.3 in 2012, down roughly 25 points from 2011 (68.6).

## Praxair, Inc.

Praxair Inc. is the largest industrial gases company in North and South America and one of the largest worldwide, providing products in more than 50 countries. Praxair has been recognized around the world for employer excellence and social responsibility as highlighted in its 2012 Sustainable Development Report. Praxair is committed to the safeguarding and recognition of human rights in all of the countries in which they operate as outlined in the Praxair Human Rights Policy. This policy outlines Praxair's guidelines on compensation, work, harassment, safety, freedom of association, child labor, and forced labor. In 2011, a lawsuit was filed against Praxair, Inc. by a whistleblower that claimed that he was fired because of his repeated complaints about the company's unlawful and unsafe practices. This whistleblower claimed that employees had to inhale silica dust that put employees in danger, violated OSHA regulations as well as FAA regulations. For fiscal year 2011, Praxair Inc. reported total environmental fines of \$36 thousand.

Praxair Inc. evaluates its suppliers based on six criteria including total cost of ownership, assurance of supply, responsiveness, global reach and human rights, environment and safety, and technology. Praxair suppliers must ensure compliance in these areas as well as Praxair's Standards of Business Integrity and Compliance.

Praxair, Inc. is committed to corporate responsibility through the Praxair Foundation. This foundation supports non-profit organizations primarily in the communities in which Praxair oper-

ates. Praxair focuses its community support on four areas including community health, environment, higher education and diversity, and employee volunteerism. Furthermore, Praxair matches employee donations to colleges, United Way and other community organizations.

Praxair was selected for the Dow Jones Sustainability World Index in 2012. This was the 10th straight year that Praxair had been selected for the index. Praxair's Newsweek Green Score for 2012 was 58.2, which was down from a score of 79.4 in 2011.

## Pulte Homes

Pulte Homes is a homebuilder based in Bloomfield Hills, Michigan. The majority of Pulte homes are single-family detached homes that are targeted for first-time and move-up buyers. Pulte Homes has been ranked among the Top 100 on InformationWeek 500 as well as being named to the FORTUNE 40 list of "Best Stocks to Buy Now." In 2009, Pulte homes was accused of firing a construction worker for wearing a pro-union t-shirt while claiming that the worker was fired for misconduct and poor performance.

Pulte Homes has a code of conduct that outlines the code of ethics for the Principle Officer, Financial Officer, Principle Accounting Officer, or persons performing similar functions.

Pulte Homes is listed on the Dow Jones Sustainability Index for 2012. Pulte Homes was not scored in the Newsweek Green Score for 2012.

## Sherwin Williams

The Sherwin-Williams Company is a Fortune 500 company engaged in the manufacture, distribution, and sales of paints and coating products. They offer products in different lines, such as professional, commercial, industrial, and retail markets. The majority of the company's sales are North and South America and Europe. Sherwin-Williams has environmental goals to reach by 2016 that per 100 pounds to reduce gas emissions by 20%, electricity usage by 25%, non-hazardous liquid waste generated by 25%, non-hazardous solid waste generated by 25%, and hazardous was generated by 50%.

Sherwin-Williams is listed on the Dow Jones Sustainability Index, and had a Newsweek Green Score of 52.3 for 2012, which is unchanged from 2011. Sherwin-Williams have a Good Company grade of C.

## URS Corporation

The URS Corporation is a construction engineering and design firm and government contractor headquartered out of San Francisco, California with operations throughout the world. URS Corporation is ranked number 275 on Fortune's list of America's 500 largest companies and employs over 46,000 employees in 50 countries. They are ranked as the number one Green Design firm in the United States by Engineering News-Record. URS Corporation employs hundreds of LEED (Leadership in Energy and Environment Design) and (BREEAM BRE Environmental Assessment Method) certified engineers and assessors.

URS Corp is on the Dow Jones Sustainability Index, and had a Newsweek Green Score of 57.2 for 2012, which has improved from 54.4 in 2011. URS Corp has a Good Company Grade of C.

## Waste Management

Waste Management is a comprehensive waste, and environmental services company based out of Houston, Texas. Waste Management operates a network of 367 collection operations, 16 waste-to-energy plants, over 350 transfer stations, and over 270 landfill disposal sites. They have the largest trucking fleet in the waste services industry with more than 21,000 vehicles. Waste Management is currently working on initiatives to help consumers and cities set and reach goals of "Zero Waste," which is a philosophy to increase recycling and reduce landfill waste disposal.

Waste Management is on the Dow Jones Sustainability Index, and a Newsweek Green Score of 47.1, which is down from its 42.3 score in 2011. Waste Management has a Good Company score of D.

## Weyerhaeuser

Weyerhaeuser is one of the world’s largest pulp and paper companies. They are the largest private sector owner of soft timberland, and second largest owner of the timberland in the United States. Weyerhaeuser employs almost 20,000 employees in 13 countries, including the United States, Canada, Ireland, France, New Zealand, China, and Mexico. Weyerhaeuser has an extensive sustainability plan and in 2011 were ranked number 31 in the Global 100 Most Sustainable Corporations in the World report.

Weyerhaeuser is on the Dow Jones Sustainability Index, and has a Newsweek Green Score of 53.8, which is down from its 2011 score of 55.7. Weyerhaeuser has a Good Company Score of C.

Company	Ticket	Industry	Year 2012							
			Spend Management-12	Strategic Sourcing-12	Category Management-12	SRM-12	Weighted SCM-12	LHR-12	Sustainability-12	
Air Products & Chemicals, Inc.	APD	Chemicals	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	2	2
Dow Chemical	DOW	Chemicals	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	2	2
El Dupont De Nemours	DD	Chemicals	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	2	1
EMCOR Group, Inc.	EME	Engineering, Construction	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	2	2
Fluor Corporation	FLR	Engineering, Construction	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	2	2
International Paper	IP	Forest and Paper Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	2	1
Monsanto Company	MON	Chemicals	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	3	1
PPG Industries	PPG	Chemicals	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1	3
Praxair, Inc.	PX	Chemicals	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	2	2
Pulte Homes	PHM	Homebuilders	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1	1
Sherwin-Williams Company	SHW	Chemicals	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	2	2
URS Corp.	URS	Engineering, Construction	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1	2
Waste Management	WM	Waste Management	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	2	1
Weyerhaeuser Company	WY	Forest and Paper Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	2	2

## Conclusion:

The global chemical industry is huge sector of the global economy with some larger players generating sales of more than \$50 billion in a single year. These companies convert raw materials including, oil, natural gas, air, water, metals, and minerals into more than 70,000 different products. Throughout our research we have found that global chemical companies face many challenges in the areas of sustainability and human and labor rights. It appears that some of the larger challenges occur in ensuring that company policies are adhered to in all the countries and regions in which they operate. All of the companies we studied had a detailed Code of Conduct that outlined company policy when it comes to such issues as health, safety, environment and labor laws. Some of the companies we studied had more detailed codes of conduct, specific to human and labor rights as well as sustainability. It appears that the companies we studied are active in trying to ensure that all aspects of their code of conduct are adhered to across their businesses as well as with their partners and suppliers. Many of these companies provide training and support to employees, suppliers, partners and customers to ensure that these policies are known and enforced.

Many of the companies analyzed in this study make their sustainability efforts as visible and transparent as possible by producing yearly sustainability reports. These reports are compiled as a means of publicizing the company’s achievements as well as outline their sustainability goals moving forward. In fact, many of these organizations have been producing sustainability reports to combat image problems that many chemicals companies faced in the 1980’s. We found that the majority of these companies provide sustainability reports to provide a means of being transparent and accountable to improve internal processes, while engaging stakeholders and persuading potential investors.

We also studied these companies’ sustainability efforts by analyzing their Newsweek Green Score as well as their listing on the Dow Jones Sustainability World Index. We found that all of the companies studied were listed on the Dow Jones Sustainability World Index. However, when we analyzed each companies Newsweek Green Score we found that the majority of their scores dropped,

---

**Global Chemical Industry Analysis**

some more drastically than others. Overall we feel that the chemical industry has intentions of addressing issues related to sustainability and human rights, however they often times fall short of enforcing and gaining compliance of their policies related to these issues.

**Citations**

MarketLine. (2011, July 2011). Global Chemicals. [Industry profile]. Retrieved from <http://han.dmz.basf-ag.de/han/Onesource/globalbb.onesource.com/Web/Reports/ReportMainIndustry.aspx?SicCodeID=220516&Report=DATAMONITORINDUSTRYPROFILE&Process=IP&Type=GetReport&FileFormat=PDF&ReportID=62417&FileName=0199-2021-2010.pdf&VendorName=Datamonitor>

---

**VISIT OUR SCM RESOURCES ONLINE**

SCM PROFESSIONAL RESOURCES  
<http://scm.ncsu.edu/scm-professionals>

SCM WHITE PAPERS  
<http://scm.ncsu.edu/scm-whitepapers>

SCM TUTORIALS  
<http://scm.ncsu.edu/scm-articles/scm-tutorials>

THE BASICS OF SCM  
<http://scm.ncsu.edu/scm-articles/scm-basics>

SCM INDUSTRY PARTNERSHIPS  
<http://scm.ncsu.edu/industry-partnerships/>

**THE SCM PROFESSIONAL  
eNEWSLETTER**

Get supply chain articles, whitepapers, and research sent directly to your email inbox. Sign up online for newsletter at <HTTP://SCM.NCSU.EDU/>

Sign-up from your phone

**CONTACT THE SCRC**

Poole College of Management  
NC State University  
2806-A Hillsborough Street  
919.513.4488