

Worldwide Urea Plants Overview

Vincent Wang
Hofung Technology

Mark Brouwer
UreaKnowHow.com

Content

1. Introduction
2. Urea Plants per continent
3. The actual plant capacity of Urea Plants
4. The technology of Urea Plants

1. Introduction

UreaKnowHow.com, together with Hofung Technology in China, have compiled a complete overview of all urea plants in operation worldwide including all urea plants in China. These plants are plotted in a Google maps application on UreaKnowHow.com, where key data of these plants like owner, plant capacity, technology etc are shown. Please find the overview in the picture below. In red the plants are indicated where the Members of UreaKnowHow.com work.



Figure 1: Overview of all urea plants worldwide

Totally some 460 urea plants are currently in operation with a total actual plant capacity of some 175 million metric tons of urea annually.

2. Urea Plants per continent

Figure 2 shows the share of these 460 urea plants over the different continents when counting the number of plants, while Figure 3 shows the share when counting the actual plant capacity.

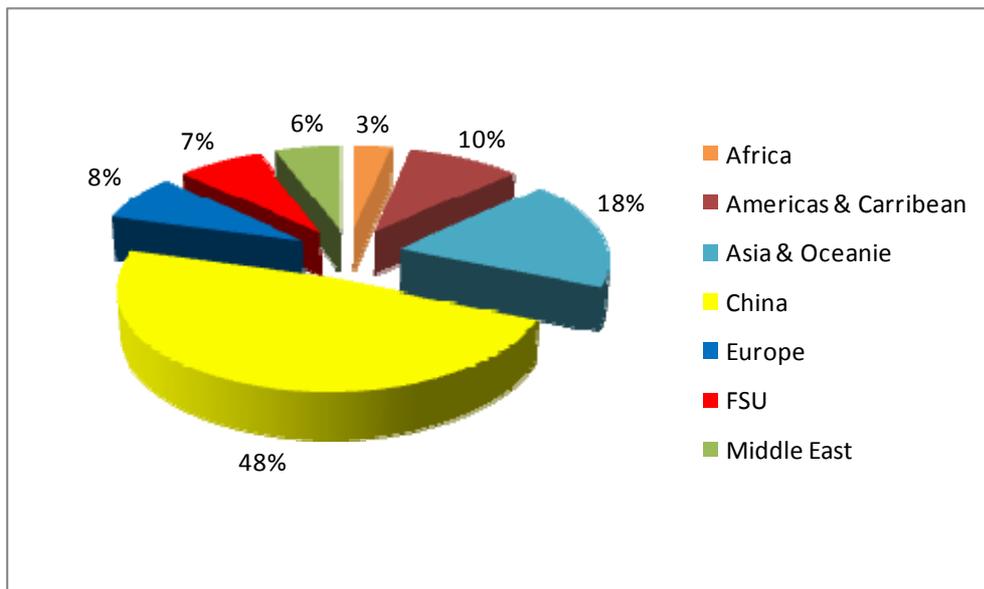


Figure 2: Location of urea plants on the various continents based on number of plants.

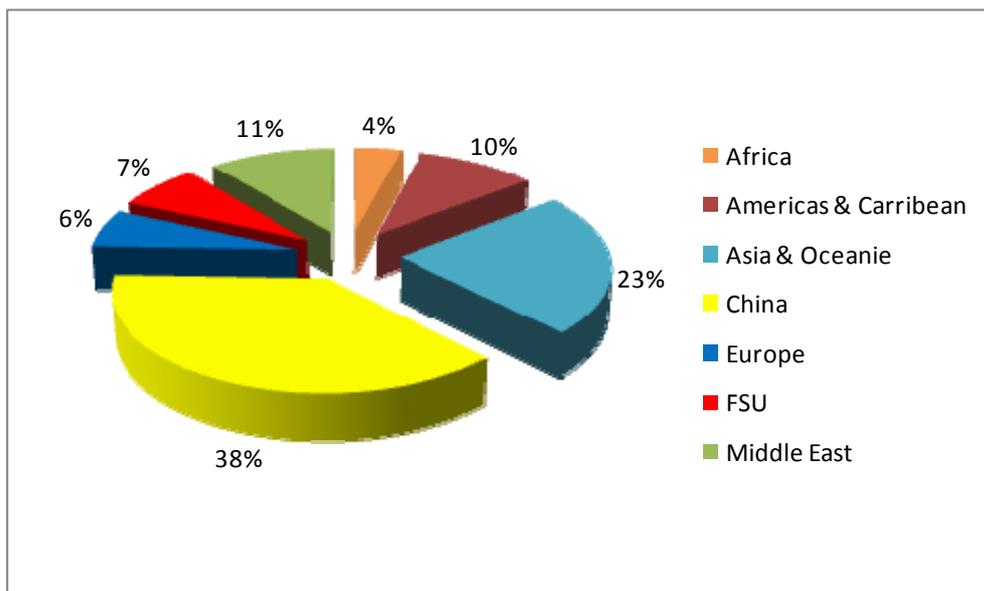


Figure 3: Location of urea plants on the various continents based on actual capacity.

Remarkable to see is that nearly half (48%) of all urea plants worldwide are located in China and from Figure 3 one can see that these represent nearly 40% of all metric tons of urea produced worldwide.

The Figure below shows the location of all 233 Chinese urea plants currently in operation.



Figure 4: The Chinese urea plants currently in operation.

Asia and Oceania is the second largest urea producing continent representing 18% of all urea plants and 23% of all metric tons of urea produced worldwide. Major urea producing countries on this continent are India, Pakistan, Bangladesh and Indonesia.

Interesting to see is that the Middle East is producing 11% of all metric tons of urea worldwide with only 6% of all urea plants worldwide. The major producing countries here are Iran, Qatar and Saudi Arabia.

3. The actual plant capacity of Urea Plants

In Figure 5 we have sorted all the urea plants worldwide on their actual plant capacity from small (left) to large (right). The horizontal axes shows the number of urea plants (in percentage of the total number) and the vertical axes shows the actual plant capacity in metric tons per day.

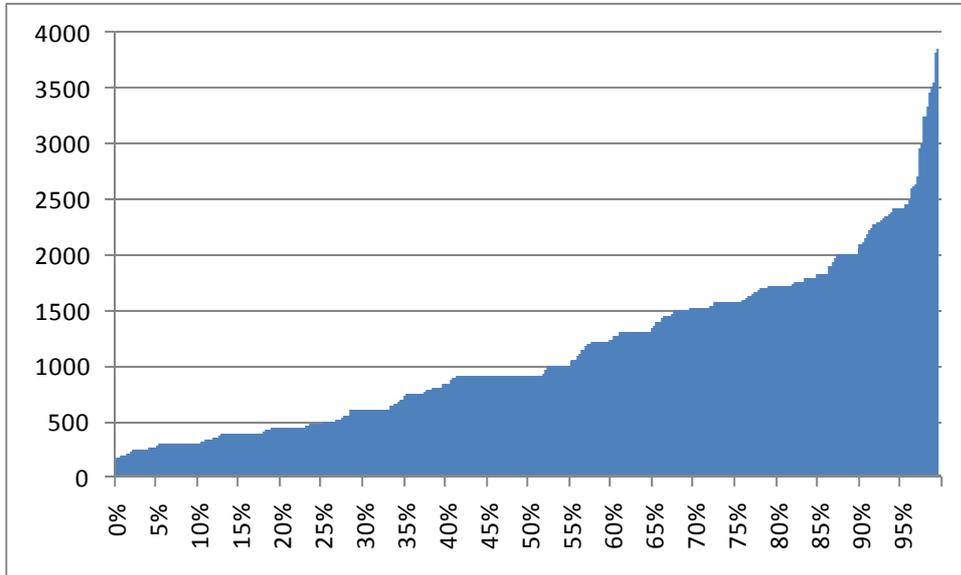


Figure 5: Actual urea plant capacity [mtpd] of all urea plants worldwide.

The above figure learns us that still today about 55% of all urea plants worldwide have an actual plant capacity of 1000 mtpd and below. Some 90% of all urea plants worldwide have an actual plant capacity of 2000 mtpd and below.

In Figure 6 we have again sorted all the urea plants worldwide on their actual plant capacity from small (left) to large (right). The horizontal axes shows the number of urea plants (in percentage of the total number) and the vertical axes shows the total actual plant capacity in percentage of the total actual plant capacity of all the plants worldwide.

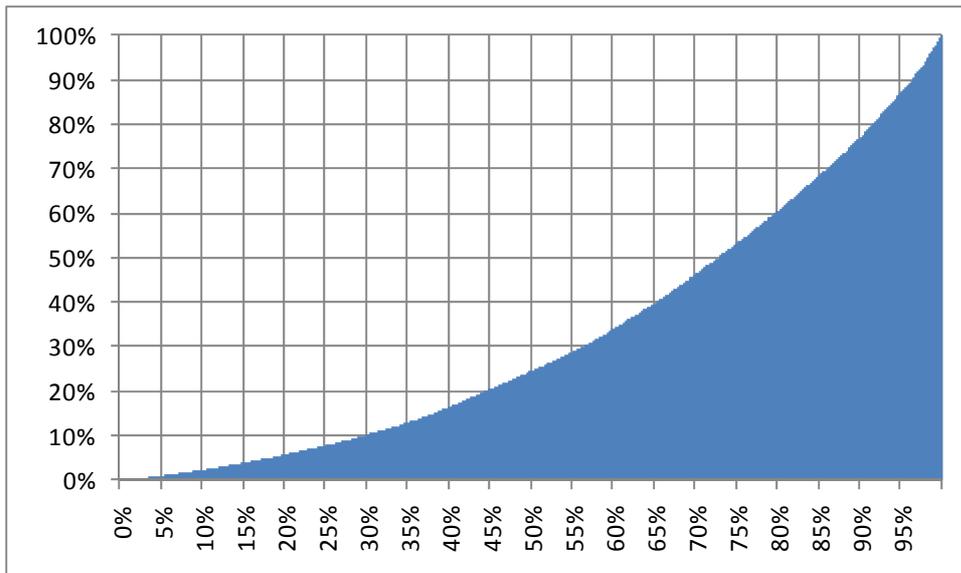


Figure 6: Total urea plant capacity versus number of urea plants.

From Figure 6 we can learn that the half of all urea plants worldwide with the smallest actual plant capacity produce some 20% of the urea worldwide. And 80% of all urea plants worldwide with the smallest actual plant capacity produce 60% of the urea worldwide. 5% of all urea plants worldwide with the largest actual plant capacity produce some 13-14% of all urea worldwide, which equals some 22 mln mtpa.

From these data one is also able to calculate the average actual urea plant capacity worldwide, which is 1150 mtpd.

Figure 7 shows the average actual urea plant capacity for each continent.

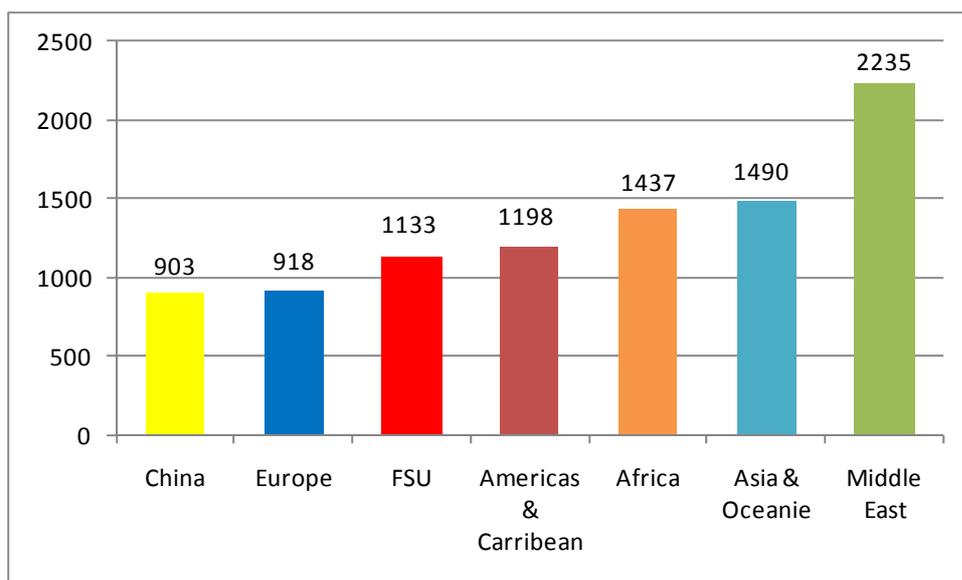


Figure 7: Average actual urea plant capacity for each continent in metric tons per day.

From Figure 7 one can conclude the average urea plant size is related to the age of the plants. Most new urea plants have large capacities are constructed in Middle East while the older ones are located in China and Europe. However be aware of the current large number of construction activities of new urea plants in China: More than twenty new urea plants are under construction currently and the average plant capacity in China will increase significantly within the next years.

4. The technology of Urea Plants

In Figure 8 & 9 below one can see how the different technologies are divided over all these 460 urea plants when counting in number of plants and the actual plant capacity.

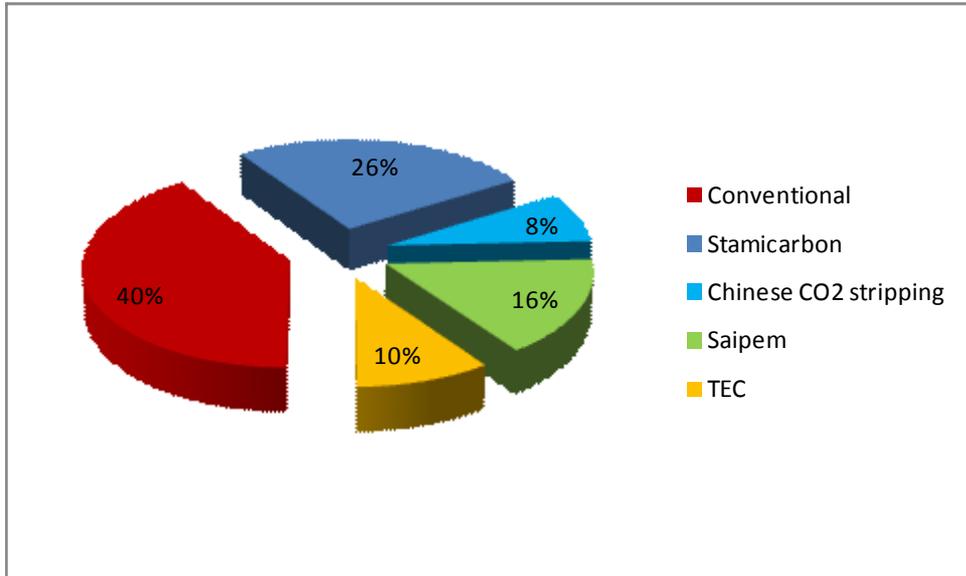


Figure 8: The technologies applied in all urea plants worldwide counting the number of plants.

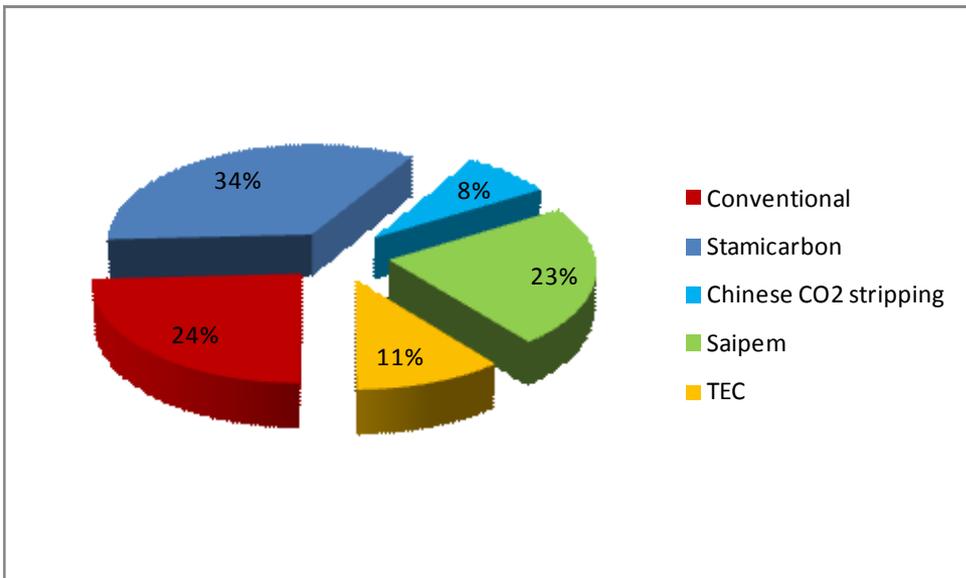


Figure 9: The technologies applied in all urea plants worldwide counting the actual capacity of the plants.

Conventional technology in these figures are considered total recycle urea plants without any stripper and not licensed by Stamicarbon, Saipem or TEC, so for example urea plants designed by Chemico, Vulcan, Montedison, NIIK and Chinese technology.

Still today 40% of all the plants worldwide operate with conventional technology, so without a high pressure stripper. Although this technology is already quite old (1960's) and the energy consumption figures are relatively high, still today these kind of plants are under construction in China and some other Asian countries because of their simplicity and relatively low investment costs. These plants

have typically a small capacity, like 300-500 mtpd, and together count for 24% of all urea produced worldwide.

Stamicarbon technology is applied in 26% of the plants while Saipem technology is applied in 16%. When looking at the actual plant capacity 34% of all urea worldwide is produced with Stamicarbon technology and 23% with Saipem technology.

TEC technology is applied in 10% of all the plants and produces 11% of all urea produced worldwide.

Further it is significant to note that 8% of all the plants worldwide are according the Chinese CO₂ stripping technology, which produce also 8% of all urea worldwide. And also this figure will increase during the next years, disregarding the fact that 8 is the lucky number in China. In one of our future Technical Papers we will elaborate on the urea producing industry in the People's Republic of China.

Vincent Wang was born on February 2, 1973 in Inner Mongolia, the People's Republic of China. He graduated in 1995 from the Department of Mechanical Engineering, Zhengzhou Grain College (present Henan University of Technology).

After University he worked in the field of grain storage and rice processing in the subsidiaries of Beijing Grain Group Co., Ltd until 2002, acting as the Assistant Engineer and the Equipment Maintenance Engineer and the Production Vice Factory Director and the Factory Director.

From the end of 2002, he worked in the field of surface engineering technology (repair of equipment wear and surface hardening treatment) in the steel & iron and mining industries etc., as the Regional Manager.

In February of 2007, he joined Hofung Technology acting as the Sales Manager of chemical equipments, mainly focusing on the ammonia and urea industry. Because of this Vincent knows very well the market, the Chinese ammonia and urea industry, including the information of existing plants and revamp, new and planned projects and keeps good contact with the end users.



Hofung Technology

Hofung Technology specializes in marketing and sales of technology and equipment for the chemical, petrochemical, power and energy industries. We have been operating in China since 1992. By successfully combining western management and local know-how, we have become the strategic partner for many well-known multinational companies, both Chinese and foreign.

We assist our foreign partners in developing the Chinese market for their products and services, and at the same time introduce to our Chinese clients state of the art equipment and technology. With our extensive network of sales people and sub-agents, we can confidently say that we cover all major clients and markets in China.

Building on its experience and thorough understanding of local business practices, Hofung Technology has in its field built a leading position in the transfer of technology to China. And as China's development continues, Hofung Technology is focusing more and more on export of local technology and equipment to foreign markets.

For more information of Hofung Technology, please visit www.hofung-technology.com.

Mark Brouwer was born on July 6, 1966 in Groningen, The Netherlands. He graduated in 1988 at the Technical University of Eindhoven at the faculty of Chemical Engineering. His thesis was about the production of ethylene by partial oxidation of natural gas.

After University Mark joined Military Services, Dutch Royal Navy where he was working at the Prins Maurits Laboratory of TNO in Rijswijk. In this period he was involved in Process simulation studies on the absorption of poisonous gasses on active carbon.

In 1990 he joined DSM, working for the Ethylene Plant No.4 as a Process Engineer. In these seven years he was involved in the Basic Engineering of a debottlenecking project of the ethylene plant at Stone & Webster in London and in the implementation of the first of its kind styrene extraction process (from conceptual engineering up to the successful start up).



Early 1997 he joined Stamicarbon as Licensing Manager Urea Revamps active in several countries like China, Russia, Iran, India and the Arab countries. Later he became Manager Stamicarbon Services responsible for all Stamicarbon's activities in existing urea plants, such as After Sales Services, Plant Inspections, Debottlenecking Projects, Reselling projects etc. In these nearly twelve years he did visit more than one hundred urea plants worldwide and was involved in numerous revamp, relocation, debottlenecking and grass root projects.

Since January 1, 2009, Mark Brouwer left Stamicarbon and started up UreaKnowHow.com. UreaKnowHow.com is an independent group of urea specialists with an impressive number of years experience in designing, maintaining and operating urea plants. UreaKnowHow.com's mission is to support, facilitate and promote the exchange of technical information in the urea industry with the target to improve the performance and safety of urea plants.

Please feel welcome at UreaKnowHow.com, the website where the urea industry meets.

www.ureaknowhow.com

features

- ✓ Largest network in the urea industry with more than 1250 engineers from over 210 urea plants
- ✓ Bi-weekly the distribution of a Technical Paper
- ✓ World's largest Urea E-Library with nearly 500 technical documents including 350 patents
- ✓ Round Table discussions including ammonia and other fertilizers
- ✓ Job Portal for urea engineers
- ✓ Gallery with nearly 400 pictures and videos
- ✓ Incidents Database
- ✓ Used Equipment Market
- ✓ Urea Plant Overview of all the urea plants in the world
- ✓ Partnership with UreaNet.cn: the Chinese urea network
- ✓ Partnership with Stainless Steel World
- ✓ Partnership with Nitrogen & Syngas
- ✓ Partnership with thePetrostreet

And much more to come