

The Sulfuric Acid Market

The Ethanol Boom Revisited

This year is not only the 10th anniversary of NorFalco, it is also the fifth year since we started publishing the NorFalco Newsletter. Looking back through the prior issues we decided it was time to revisit the sulfuric acid market topic we wrote about back in 2006, namely the boom in production of ethanol in the USA and the new demand for acid it generated. Ethanol production today is far greater than we foresaw five years ago so it has become an even more important end use for acid than we expected, with the potential for even greater demand in the years to come.

Ethanol is an alcohol produced principally by fermenting plant sugars and starches. Its profile as a biofuel has grown in the past decade: as an additive listed on the pumps at your local gas station; as a home-grown answer to dependence on imported fossil fuels; or as an eco-friendly way to feed our cars and trucks.

Ethanol is a high-octane motor fuel which is mainly marketed in two forms, E10 and E85:

- E10 is a blend of 10% ethanol and can be used for all automobiles and small engines without modification.

Continued on page 4 ...

WHAT'S INSIDE

Product Stewardship	2
Quality Fact	3
Safe Shipping Awards	3
The Ethanol Boom Revisited	4 - 6

Message from the President: Paul Shaw, NorFalco Inc.

NorFalco consistently maintains safety as our number one priority. Over the years we have focused our efforts at providing industry-leading product stewardship as one of the major parts of our value equation. When we talk about product stewardship we include sustainability and Responsible Care as cornerstones to our approach.

Over the years we have developed initiatives to enhance the ability to safely distribute, handle, and use sulfuric acid. These include our "on-line" safety training, first order forms, pre-delivery checks and assistance, on-call technical service team, customer site visits and safety audits, rigorous trucker/terminal training and auditing, leading tank car design and safe performance, regional safety seminars, customer on-site safety training, and a comprehensive emergency response system. All of these things are complimentary as part of NorFalco's value offering to our customers.

Our goal is zero harm to people or the environment from the production, distribution, and use of sulfuric acid. To achieve that goal we all need to work together to ensure that we follow proper handling procedures, including the use of personal protective equipment at all times.

I know that if we maintain high standards related to safety training and safe handling then we can minimize the risks associated with sulfuric acid, so please take advantage of the services NorFalco offers and also please continue to provide us with your feedback so we can maintain continuous improvement in these areas. Our strong focus on safety is all part of NorFalco "Delivering More than H₂SO₄".

NorFalco Customer Satisfaction Survey

Since 2006, each summer NorFalco has asked its customers to participate in our annual on-line customer satisfaction survey. The goal of this survey is to gain insight as to our customer's awareness of and the value they place on the numerous value added services we provide at no additional cost. Through this venue customers have the ability to rank our services, provide comments on areas where we do well and ways in which we can improve.

Thank you to all who had taken the time to complete this survey. If you were not contacted and would like to be added to our list, please e-mail Christina Lundblad, Marketing Manager at CLundblad@xstratazinc.us.

Product Stewardship - “Delivering More than H₂SO₄”

As part of our Product Stewardship program, the NorFalco Safety and Technical Seminar was held in St Louis, MO at the Double Tree Hotel on Thursday, May 5th. The turnout was tremendous, with 80 participants joining NorFalco. The seminar was offered free of charge. Participants came from a wide range of customers, carriers, and terminals, with personnel from all levels and departments including management, operations, sales, purchasing, maintenance, HSE and ER and others.

A wide range of topics were covered, including acid market trends, acid properties, personal safety and protective clothing, first aid, emergency response, tank design/repair, offloading design/safety, tank cars, trucks, equipment and materials of construction. In addition, a number of vendors also participated including, personal protective equipment supplier, hose supplier as well as trans-loading equipment manufacturer.

The complimentary one-day session is a key part of “Delivering More than H₂SO₄”. The live presentations were interactive with lots of Q & A allowing opportunity to provide extra value. The information also helped provide compliance with OSHA and DOT training requirements. Personalized training certificates were provided to those registering in advance.

Presentations were also made to NorFalco road carriers, who met stringent criteria to receive our Motor Carrier Safety Award. This year’s winners were **Regional Enterprises Inc.** and **Groendyke Transport Inc.**

The next seminar, offered in French, will be held October 20th at Espace Rive-Sud in La Prarie, Quebec.

For additional information, please contact your NorFalco commercial representative or go to www.norfalco.com under What’s New - News and Events tab.

Tom Hobbs, Director, Technical Services & Risk Management



Espace Rive-Sud



Responsible Care[®]
Our commitment to sustainability.



Groendyke Transport Inc.

Left to Right: Elisa Ann Wilson (NorFalco), Geoff Cowell (NorFalco), David Ramage (Groendyke), Paul Shaw (NorFalco), Tom Hobbs (NorFalco) and Marie-France Rollin (NorFalco)



Regional Enterprises

Left to Right: Elisa Ann Wilson (NorFalco), Geoff Cowell (NorFalco), Bill Sanders (Regional), Paul Shaw (NorFalco), Tom Hobbs (NorFalco) and Marie-France Rollin (NorFalco)



Safe Shipping Awards

NorFalco is the proud recipient of five safe shipping awards for 2010 shipments from the following railways: Canadian National (CN) Gold Award, Canadian Pacific Railway (CP) Chemical Shipper Safety Award, Burlington Northern Sante Fe Railway (BNSF) Product Stewardship Award, Union Pacific (UP) Pinnacle Award and Kansas City Southern (KCS) Hazmat Shipper Safety Appreciation Award.



Quality Fact: Particulates in Sulfuric Acid

Sulfuric acid is normally a clear product when produced, but the handling and transportation equipment involved (lines, pumps, gaskets, storage tanks, tank trailers, tank cars, etc.) can generate particulates that may be visible in the sulfuric acid.

As examples,

- Steel storage tanks always generate some iron sulfate when in contact with sulfuric acid. Iron sulfate can accumulate in the tank bottom and eventually be seen in the acid when exiting the tank. As the acid temperature is higher during the summer months, more sulfates will be generated in steel tanks.
- Transportation equipment (tank car, tank trailer) whether lined or not, can also generate a certain amount of particles. The linings in such equipment provides a considerable amount of protection, it does however, have a limited life and will slowly deteriorate over time releasing small pieces of lining into the acid.

It is important to recognize that even if the sulfuric acid is particle-free at the time of shipment, particles can be generated in transit. It is not unusual for a small amount of particles to be visible in the acid upon delivery.

Consumer tolerance to particles varies widely. For some, such particles do not affect the acid utilization, while for others minute amounts represent an issue. For processes or applications that require particle free product, acid filtration is recommended. Filter location, size and type depend on the user's requirements, but as a rule of thumb the closer the filter is to the point of acid consumption the better. For more information on sulfuric acid filtration, contact the NorFalco Technical Services group, or your Commercial Account Manager.

Jocelyn Arcouette, Manager Quality Assurance

Example of a sulfuric acid filtration system



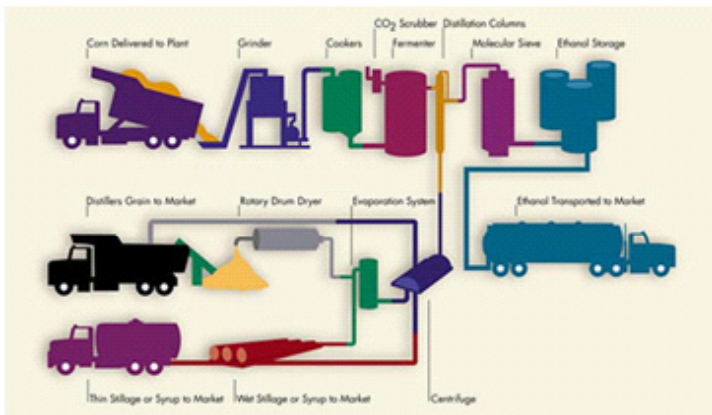
The Ethanol Boom Revisited

Continued from Page 1...

- E85, classified as an alternative fuel by the U.S. Department of Energy, contains 85% ethanol and 15% unleaded gas which can be used in Flexible Fuel Vehicles (FFV).

Most ethanol produced in the USA is based on corn as a feedstock. In the most widely used, dry milling process, the corn is milled, mixed with water and then the slurry is treated with enzymes to convert the corn starch into sugars. Yeast is added to ferment the sugars into ethanol, which is captured by distillation, then denatured with a small amount of gasoline so it cannot be diverted to non-fuel use. About one-third of the weight of the corn is converted into ethanol: the balance is sold as animal feed, and corn oil may be extracted and sold separately. Each bushel of corn yields 2.8 gallons of ethanol and 17 pounds of livestock feed.

The Ethanol Production Process - Dry Milling



Source – Renewable Fuels Association

Other feedstocks for conventional ethanol production can include wheat, milo, sorghum and barley, however the main alternative to corn is sugar cane, which is the principal feed for Brazil's large ethanol industry.

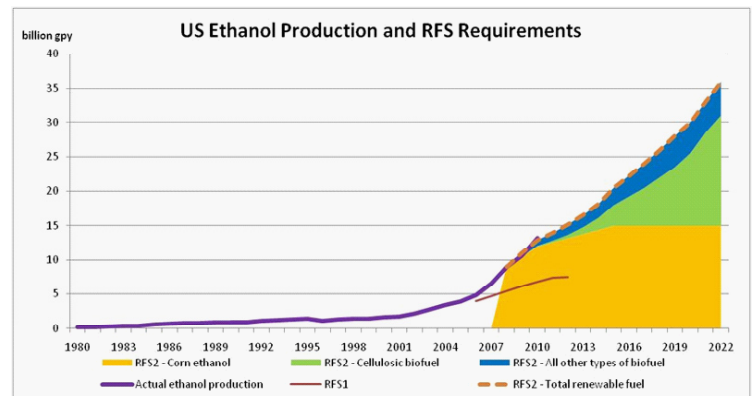
Drivers of Ethanol Growth in the USA

The ethanol market share in the U.S. gasoline supply by volume has grown from just over 1 percent in 2000 through less than 4 percent in 2006 to a peak of almost 10 percent in 2010. Domestic production capacity has increased fifteen times since 1990, from 900 million of gallons back then,

through 1.63 billion in 2000, reaching 13.5 billion gallons in 2010. Although tax incentives to spur ethanol production for local jobs creation date back to 1990, growth in ethanol demand was accelerated after 2005 by the need to replace MTBE as a oxygenate additive to gasoline to improve air quality under the 1990 Clean Air Act. MTBE was deemed to be a persistent toxic groundwater contaminant, and was progressively replaced by ethanol by mid-2006.

In 2005, the U.S. Energy Policy Act adopted the nation's first Renewable Fuels Standard ("RFS1"). This law required an increasing amount of renewable fuels to be used to replace gasoline. For ethanol the targets rose from 4 billion gallons in 2006 to almost double that level, 7.5 billion gallons, by 2012. Initially, this requirement was met by the use of ethanol in gasoline at the 10 volume % level, commonly referred to as E10. In late 2007, the Energy Independence and Security Act was passed, whose Renewable Fuels Standard ("RFS2") dramatically raised the targets for required renewable fuel use and specified certain types of renewable fuels. RFS2 requires 36 billion gallons of annual renewable fuel use by 2022, of which production from corn ethanol is capped at 15 billion gallons by 2015, and 16 billion gallons is mandated ethanol from cellulosic feedstocks. Thus far these requirements have been met by expanding the use of E10, and in early 2011 over 90 percent of the nation's gasoline was E10.

Ethanol production and RFS Targets

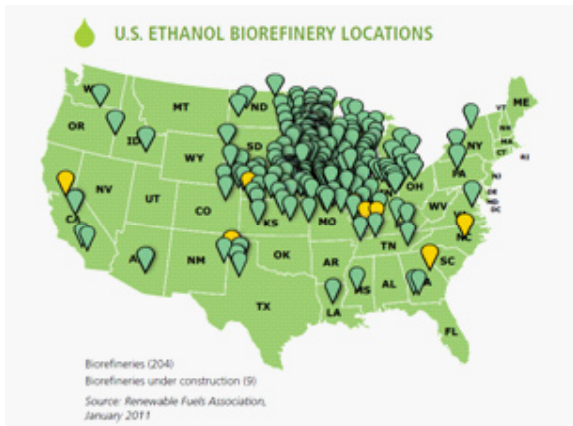


Government incentives and support have been vital in helping to establish ethanol as a new alternative to petroleum fuels. Federal subsidies to fuel blenders, tax incentives to

automakers, and tariffs on imported fuel ethanol have been supplemented by incentives by some States, as well as by State mandates for ethanol levels in gasoline, and Federal and State policies to require that government vehicles be FFVs. Several federal production tax incentives and tariffs that were scheduled to expire at the end of last year received a one-year extension to the end of 2011, but no further extensions have been confirmed.

Ethanol Production in the United States

Ten years ago there were only 56 ethanol plants in the USA, with less than 2 billion gallons annual capacity, but five years later there were 94, with production capacity of over 4 billion gallons. Production capacity continued to boom. Although some plants closed in the aftermath of the economic collapse in 2008, by the beginning of this year many of them had reopened, more new plants came on-stream and others expanded, so there were 204 plants in operation in 29 states, with production capacity totaling 13.5 billion gallons annually according to the Renewable Fuels Association (“RFA”). Nine plants were under construction.



The RFA estimates that in 2010, nearly 70,400 jobs were directly involved in the production of ethanol and the delivery of goods and services to ethanol producers and the ethanol industry added \$36 billion to household income and contributed \$53.6 billion to the Gross Domestic Product (GDP). It also estimates that the industry’s federal, state and local tax revenue contributions of \$11 billion far outpaced the cost of federal tax incentives for ethanol in 2010, estimated at \$6 billion.

Ethanol plants consume sulfuric acid for several purposes, principally for water treatment and for equipment cleaning. The large number of plants and the growth in ethanol production

volumes have made this industry an important acid consumer and an important customer base for NorFalco. To better understand and support the ethanol industry, NorFalco has joined the ethanol industry’s largest trade group, the Renewable Fuels Association. NorFalco estimates that direct acid consumption by the ethanol industry has risen to over 400,000 tons of acid annually. Moreover, the growth of corn demand for ethanol production has boosted the consumption for acid used in the production of phosphate fertilizers for corn farmers. Ethanol production has grown to represent over 40% of total domestic corn demand. To meet this growth, American farmers have increased their fertilizer use, which has contributed to increased crop yields, enabling them to double the US corn harvest between 1980 and 2009 with just 3% more planted acres.

Future Growth Potential

Ethanol faces two challenges in meeting the targets set by RFS2 – marketing and technical. As the volume of ethanol mandated by RFS2 increases faster than gasoline use, the required total ethanol volume will exceed 10% of the total gasoline volume used. Since most gasoline is sold as a 10% ethanol blend (E10), this presents a marketing barrier to attaining the mandated target, which is likely to be reached in 2011. Moving beyond this ‘Blend Wall’ means allowing for the use of blends above E10 for all vehicles, expanding the fleet of FFVs able to use up to 85 percent ethanol (E85), and ensuring the infrastructure exists to dispense these fuels. The EPA has recently approved the use of 15% ethanol in gasoline blends (“E15”) for vehicles produced in 2001 and later, which represent over 60% of the current light vehicle fleet. Once logistics and infrastructure issues for E15 distribution and use are resolved the Blend Wall limit to ethanol use will be deferred for several years. However, to achieve the ultimate goals of the Renewable Fuel Standard, the USA will eventually need more than 25 percent of the gasoline market to be comprised of renewable fuels.

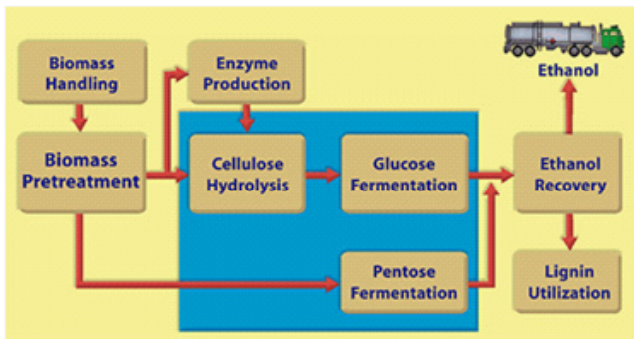
The technical challenge relates to meeting the RFS2 mandates that 21 billion gallons of the required 36 billion gallons of renewable fuel use be from non-corn starch feedstocks, broken down as 16 billion gallons of cellulose-based feedstocks and 5 billion gallons of other feedstocks. Cellulosic ethanol is ethanol produced by turning the sugars in cellulose from trees, grasses and other biomass or wastes into alcohol fuel. At present there are more than 20 demonstration and pilot-scale operations utilizing a wide array of technologies to produce cellulosic

ethanol. Several of the leading projects use sulfuric acid as a key input in preparing the feedstock for processing, or to convert the cellulose into fermentable sugars, and even if just 15% of the mandated volume of cellulosic ethanol was produced with these acid-intensive technologies then acid consumption would grow by over 200,000 tons annually by 2016 and potentially by over 800,000 tons by 2022, the final year of the RFS2 growth target. However, despite having proven technologies the timetable for these new technologies is at risk of slipping. Many of the companies developing cellulosic ethanol projects are facing a lack of availability in investment capital to begin construction on commercial-scale, multi-million gallon per year biorefineries. Financial support from the Departments of Energy and Agriculture will continue to be essential to enable these initial projects to attract capital.

Ethanol has had a much greater impact on the acid market, as a direct consumer, and as a driver of fertilizer demand, than many would have imagined five years ago. Corn-based ethanol production will grow modestly and then flatten in the next few years and provide a continuing steady demand for acid. Once marketing and technical challenges for further growth in ethanol production and distribution are overcome, demand for acid could rise even higher as acid-intensive processes for cellulosic ethanol are commercialized.

Kim Ross, Director of Marketing

The Production of Ethanol from Cellulosic Biomass



Source – Renewable Fuels Association



NorFalco Inc. is one of the largest merchant marketers of sulfuric acid in North America, selling and distributing about 1.7 million tons per year. NorFalco's extensive multi-modal distribution network, supplied by the metallurgical facilities of parent company Xstrata, serves customers from a wide variety of industries.