

# “We are seeing the biggest dynamic in chemicals in 40 years”: How to survive the contraction of adhesive raw material supply

## Overview:

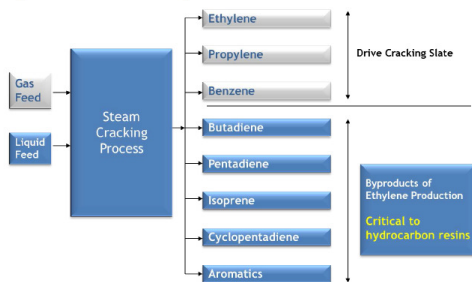
- A contracting monomer supply in North America is affecting imported monomer and polymer supplies and prices into Europe
- Europe is expected to see some supply contraction due to ethylene rationalisation there
- European hot melt PSA producers will be increasingly reliant on expanding monomer and polymer supplies from Asia.

[View the complete slide presentation](#)

## 2<sup>nd</sup> article in Afera’s Sicily conference presentation series

Tom Brewer’s presentation “Surviving the Contraction of Adhesive Raw Material Supply” was one of the two highest-rated items at Afera’s recent Annual Conference in Sicily. Currently Vice President of Business Development for Argus Media, Mr. Brewer is a worldwide expert in chemical raw materials for adhesives with over 38 years of experience. He updated the audience of tape producers, suppliers and other related organisations on current trends in raw materials supply affecting their businesses.

### Significance of Ethylene to Adhesives



The bottom line: As Asian producers of monomers and polymers increase production and quality, European HMPSA producers will become more reliant on Asian supplies.

### Main trends of the last 3 years

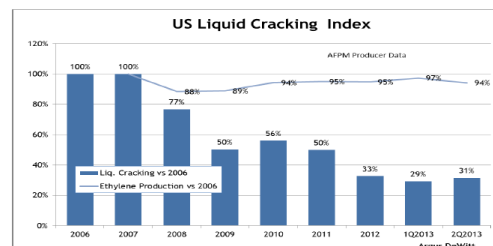
Since Mr. Brewer last addressed Afera in 2010, growth has been slow in the Western world. Availability of imported feeds to Europe has remained relatively constant. Availability of North American feeds and polymers has decreased. Availability of Asian feeds and polymers, that had been expected to increase, has been affected by the economic conditions of the last few years. Adhesive polymer prices, which have been higher, have begun to decrease. Mr. Brewer explained that the current look of these trends is “cosmetic” as they are being covered up by a slower economy.

## What is happening with chemicals that affects you and your business?

### Shale gas: High level of dependency on ethylene by-product imports from North America

There are 6 steps in the supply chain: naphtha or gas > ethylene > crude streams > purification > polymers > adhesives. Most or all of the action is happening way upstream, i.e., at the beginning of the supply chain above. Currently shale gas, which is used to produce ethane, a highly cost effective feed, is only recovered in North America. There is opportunity for shale gas recovery almost everywhere in the world, but efforts are hindered by problems such as lack of access to technology, nationalisation of assets, environmental issues, access to water, and/or lack of infrastructure.

### Shale Gas Impact on N. America



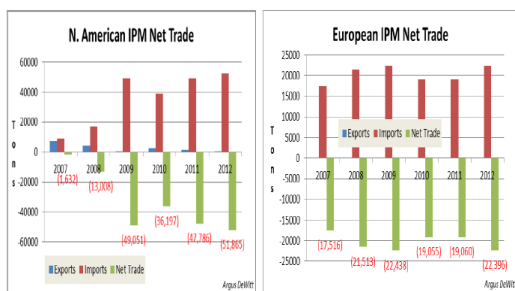
A 70% reduction in liquid feed in N. America

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This will be a key trend to watch, because the extent to which shale gas is recovered will affect the availability and price of ethylene and its by-products. Europe feeds naphtha at ~\$1,000/ton, while shale gas feeds at ~\$400/ton, and this is against a product, ethylene, which sells at \$1,500/ton. Many may not realise in their parts of the business that tape producers buy in a significant amount of monomers (60-80 kt/year) and polymers (~70 kt/year) into Europe mainly from North America. The Western world has been intertwined on supply, but as North America contracts and has fewer ethylene by-products available for export, Europe will experience problems. The only reason that European companies are not already feeling this is that slow growth has dampened demand.

There has been a significant climb in naphtha fed in North America since shale gas hit in 2008. Mr. Brewer recalls a drastic change in cost presetting he saw take place on 15 February 2008. This climb has a 1-to-1 correlation in monomers it takes to make hot melt PSAs (the monomers, the feed, the resins, etc.). This and other changes will eventually be felt by European producers.

### Monomer Imports Happens First



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13

### How will you survive the North American contraction?

Isoprene went short about 7 years ago. Currently ~80 kt of isoprene is brought into Europe and the US. The US imported ~60 kt last year and will import ~70 kt this year. This is one of the monomers you do not see, because when you buy an SIS molecule, the bags says "made in Europe", but the monomer comes from China. Producers have experienced escalated prices because of the imported feed and the shortness of feed in world markets. European producers are starting to see some relief on prices, a trend which will hopefully stimulate growth.

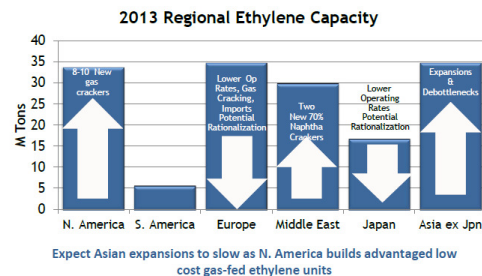
There is almost no growth in ethylene capacity anywhere except for Asia and the Middle East. 8-10 million tons in new world-scale ethylene use is predicted, adding 5% to the world's growth. While the building of a number of gas-fed plants marks a change in the marketplace, the real opportunity for European producers lies in Asia, where they are building liquid-fed ethylene plants.

### Europe is under pressure because of the cost crunch

In terms of total regional ethylene capacity, Europe, North America and Asia are currently about the same size. As the lower-cost ethylene and polyethylene products come to market, some rationalisation is expected, especially in Europe. Companies are going to get gas feeds from somewhere in the world where they are less expensive and make ethylene in Europe at gas feeds. INEOS, for example, has built a million-ton polyethylene inbound facility.

The products tape producers need are generally not made on purpose, because they are made relatively inexpensively from ethylene production. If gasses are consistently used to produce ethylene, however, the by-products needed will not be available. There is increasing talk of making products (i.e., the monomers producers need) on purpose, because these molecules are expected to be short and higher-priced in the future.

### Regional Ethylene Trends



Expect Asian expansions to slow as N. America builds advantaged low cost gas-fed ethylene units

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15

### Downstream monomers: Natural vs. isoprene rubber

Natural rubber output is relatively small and unpredictable, because it is labour intensive and planning involves too many unpredictable factors: a 5-7-year time period of initial maturation of trees, thousands of small farmers,

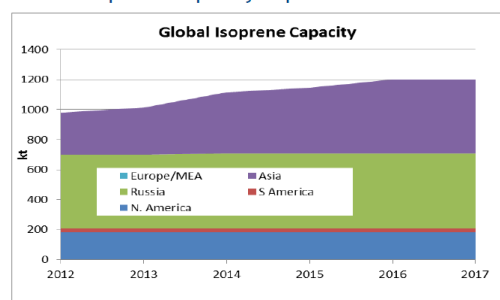
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and a lack of clear information about future market growth and capacity in Europe. In addition to these factors, the price of natural rubber has been low compared to that of crude oil. Because of this, new isoprene rubber units have sprung up next to new ethylene units in Asia. A number of these isoprene units are still in start-up mode and are choosing not to run because of the low prices. A delicate balance: It is important that natural rubber prices are high enough to drive the building and running of these units, but not so high that European producers cannot be competitive in making their adhesives.

Natural rubber should therefore be treated as an unknown. The industry expects that natural rubber will be short, so they are looking into alternatives, such as Gauyule and (Russian) dandelions. A chemical analogue to natural rubber, isoprene (synthetic) rubber is a key alternative, and there is much focus on recovering the by-products out of ethylene units in Asia. So the trend: Natural rubber is going to drive isoprene rubber, which is going to drive many of the monomers the tape industry is interested in.

## Isoprene trend toward Asia

Global Isoprene Capacity Expansions



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New isoprene purification facilities are being planned for and built in Asia at a cost of \$100-\$300 million, depending on size and location. The units produce styrene isoprene rubber (SIS), which sells for \$2,500/ton, and piperylenes, which sell for \$1,300/ton and go into C5 tackifiers, that are both needed to make a hot melt adhesive. Reliable supply and reasonable prices are most important to European tape producers, and the price in particular has been very volatile. Anecdotal data has established that \$2,500/ton is the price at which plants in Asia can run and is considered reasonable for rubber in the adhesive market.

The trend: The Western world is going to be short on rubber and therefore dependent on Asia for monomers, the basic building blocks that make the polymers and resins European tape makers want. Natural rubber prices will remain supported but not too high against the decrease in demand. It is questionable that they will be high enough to allow Asian monomer purification capacity to operate economically.

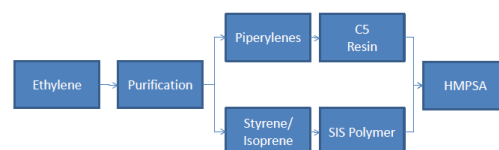
## Polymers: Western world's increasing dependency on imported isoprene

Two key high melt polymers are C5 aliphatic tackifier resins and SIS styrenic block copolymers. Production is evolving consistent with the supply of monomers, and capacity has remained relatively constant. Mr. Brewer estimates that there have been capacity reductions in the Western world and increases in Asia. Actually there are many more Asian producers than documented, but they do not produce in Western world usable quality. As their quality improves, however, they will find themselves added to analysts' lists.

The Western world continues to see hard times with low SIS capacity utilisation rates. It is short feed and increasingly seeing its capacity repurposed in order to increase profitability in its units. So, due to higher isoprene costs and lower operating rates, there are no capacity additions on the horizon here. Asia, on the other hand, has added about 60-80 kt in new or expanded capacity and one or two new competitors. Capacity for SIS is not a worry as any basic styrene-butadiene-styrene (SBS) block copolymer unit can be converted to SIS. This has had an impact on the Western world as products have started to flow and are increasingly accepted as being of reasonable quality.

A worrisome trend for polymer producers is that their appears to be a few different pricing systems—something to be expected—in Asia. If you buy a monomer in Asia, it is more expensive to import it to the US and convert it than it is to buy the same polymer product in Asia. Asia's

HMPSA Supply Chain



- Reduced supplies plus freight costs to get them moved inter-regionally has driven costs up
- At times making HMPSA defensive against acrylate based PSAs

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pricing for domestic production is problematic for everybody.

Based on market information, Mr. Brewer said that prices for C5 aliphatic tackifier resins and SIS styrenic block copolymers have been declining in the face of weak demand and more competition. The system of manufacturing a HMPSA tends to be more competitive today than it was 1.5-2 years ago when you compare it to the production of an acrylate adhesive.

### **What to watch: How to assure yourself of your supply long-term**

European tape producers should keep their eye on growth rates. HMPSA demand growth will set the rate and pace of change. Growth is predicted to be slow over the next few years, but the situation is like an iceberg: it will gradually reveal itself the closer you get to it. There is a pivot producers will be making, if they haven't already, from a supply of monomers and polymers from North America to Asia. This solution will be long-term, so the sooner producers start looking at this as a possibility, the sooner they will assured of their supply going forward.

Watch shale gas providing low cost feed for ethylene production. In terms of ethylene, watch feed slate changes when it comes to Europe (primarily in North America reducing monomers), potential ethylene capacity rationalisation in other regions, and capacity expansions in Asia. Watch monomer purification capacity expansions in Asia, natural rubber pricing affecting new isoprene purification operating rates, and new SIS and C5 tackifier resin capacity expansions in Asia. These factors will all have an impact on your business.

Wild cards: Costs could rise on hot melts versus acrylates, changing the growth scenario. Another issue is that Asia is heavily acrylate today. If prices come down and become reasonable enough, the Asians might use up the monomers and polymers existing there and switch to an HMPSA-type system.

### **About Tom Brewer**

Currently Vice President of Business Development for Argus Media, Tom Brewer is a worldwide expert in chemical raw materials for adhesives with over 38 years of experience. A majority of his career was spent with ExxonMobil Chemical, mostly in their adhesive industry business unit holding a variety of management positions. For his last assignment, Mr. Brewer held the position of President of Dexco Polymers. In 2003, he started his own consulting business specialising in monomers, polymers, synthetic rubbers and tackifying resins for adhesives. The following year he became Vice President of DeWitt's Hydrocarbon Resin newsletter service.

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### **Questions and comments?**

Tom Brewer  
Vice President, Business Development  
[Tom.Brewer@ArgusMedia.com](mailto:Tom.Brewer@ArgusMedia.com)  
+1 (713) 562 - 1109  
[www.dewittworld.com](http://www.dewittworld.com)

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