



By: Paul Blanchard, Director-Engineering Resins, North America

Supply chain managers are called upon to estimate costs in times of great uncertainty. Peter Drucker, the often quoted management consultant, believed that the most reliable indications of what will happen in the future can be found in a careful examination of the present. Two trends are affecting the petrochemical and plastic supply chains which have dramatic, inescapable effects on cost and will be with us for several years.

The first trend, a movement of production to Asia, has deep roots. For years consumer and industrial goods makers in North America have been sourcing production offshore. As China became the “world’s workshop” what started as manufacturing with imported raw materials evolved into investment in product design, world-class production facilities and local production of many of the upstream plastic materials and petrochemical intermediates to support them. What’s new is the awakening of China’s consumer demand. In 2009 and 2010 China’s domestic demand grew dramatically as a result of government incentive plans for automobile and appliance purchases. This action succeeded in replacing falling exports with domestic consumer demand and stabilized China’s economy during the global recession. With global economic recovery, China’s export demand for consumer goods has returned and high levels of domestic demand continue despite the ending of incentives and implementation of higher interest rates. Supplies of key materials have tightened, revealing some global supply chain gaps. Rising raw material prices in China are attracting available global supplies and causing supply constraints and increasing prices in North America and Europe. Nylon 6 and its precursor, caprolactam, are among the materials seeing price pressure as demand for the polymer has begun to approach the global supply of its monomer. In this case, the present situation predicts several years of high prices for nylon 6 since planned caprolactam capacity additions are not large enough to get ahead of nylon demand.

The second trend is closer to home but has global implications for petrochemicals and plastics. The availability of natural gas in North America and its pricing at a large discount to crude oil has encouraged ethylene producers to shift their mix of feedstocks to gas derived feeds versus crude oil based naphtha. Lighter feedstocks for the steam crackers result in higher ethylene yields but produce less of the byproducts which other materials rely on as feedstocks. One such byproduct material, crude C₄, is the precursor for butadiene, a key element in production of synthetic rubber, ABS and nylon 6,6. The reduction in butadiene supply in North America is significant enough to cause the global market to grow tight and prices to rise dramatically. If you have bought replacement tires in last year you have experienced the effect firsthand. Propylene monomer, another byproduct of ethylene production, has also seen lower yields. However, in this case there are “on purpose” routes which are feasible replacements for byproduct propylene. For butadiene there are no viable “on purpose routes”. Some relief in this case will come only as ethylene production grows in Asia and Europe, regions that depend on naphtha feedstock. This will take several years. **Meanwhile we can expect butadiene to support high prices for its derivatives.**