



# ICIS

Powered by data.  
Driven by insight.

## US GULF PETCHEM BOOM MADE HARVEY THE FIRST GLOBAL HURRICANE



BY AL GREENWOOD



# INTERACTIVE INSIGHT

## US GULF PETCHEM BOOM MADE HARVEY THE FIRST GLOBAL HURRICANE

BY AL GREENWOOD AUGUST 2018

Powerful hurricanes have hit the US Gulf Coast in the past, but Hurricane Harvey was the first to strike after petrochemicals producers began a wave of expansion projects in the region, making the storm the first to have a significant effect on the global petrochemicals markets.

The petrochemical industry did a remarkable job of restarting production plants after Harvey, especially when compared with Hurricane Ike, the last big storm that hit Houston in 2008.

But despite all of their preparations, companies still shut down plants and declared force majeure as a result of Harvey. Tightened supplies led to persistently higher prices for petrochemicals.

Hurricanes are still going to strike the Gulf Coast, and companies have still not finished expanding capacity in the region. The next major storm could be even more disruptive.

This vulnerability extends beyond petrochemicals. The US is now a large exporter of petrochemicals feedstocks such as crude oil, ethane and liquefied petroleum gas (LPG). The country was exporting none of these products in significant amounts during Ike or Hurricane Katrina, another big storm that hit Louisiana in the late summer of 2005.

On the one-year anniversary of Harvey, it is clear that companies around the world will still be vulnerable to what happens in the Gulf of Mexico.

Hurricane Harvey made landfall late on 25 August 2017 near Corpus Christi, Texas, according to the US National Weather Service.

By then, several ports, refineries and petrochemicals plants had shut down in preparation for it.

Harvey then stalled in southeast Texas, producing enormous amounts of rain, the weather service said. Cedar Bayou in Houston received a total of 51.88 inches (131.8cm) of rain, setting a record in North America.

Some plants suffered flood damage.

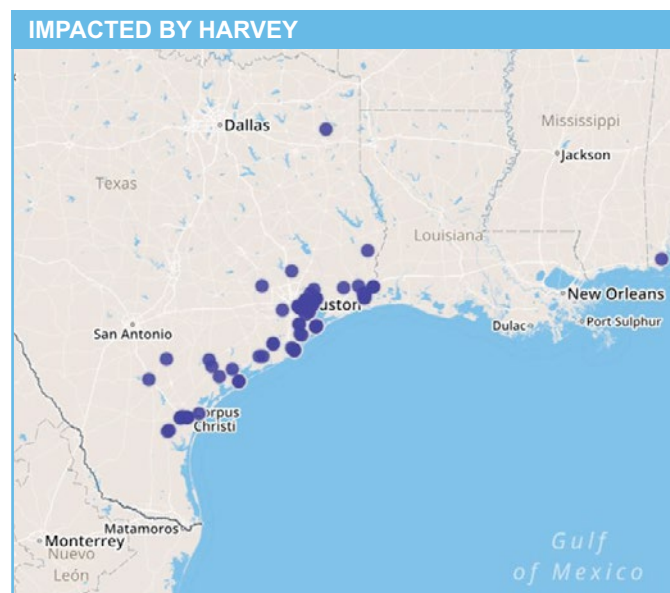
At Arkema's plant in Crosby, Texas, trailers storing organic peroxides caught fire after the complex lost power.

Other plants were down briefly, but had to contend with logistical disruptions. In mid-October, Celanese's plant

in Bay City, Texas, was relying on trucks and rail for deliveries because debris on the Colorado river had prevented barges from accessing the site.

In the immediate aftermath of the storm, even those modes of transportation were out.

The map below shows the plants that suffered from disruptions as a result of Harvey.



The disruptions extended well beyond the state of Texas. Right before Harvey, Mexichem and Occidental Chemical (OxyChem) had started up a cracker near Corpus Christi. That cracker provided Occidental with the ethylene it needed to produce vinyl chloride monomer (VCM).

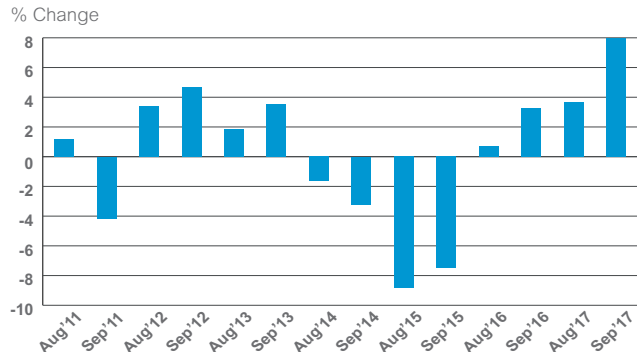
OxyChem then shipped the VCM to Mexichem's vinyl plants throughout the hemisphere.

The two companies shut down the cracker in anticipation of the storm. Mexichem would later declare force majeure on vinyl products made at its plants in Mexico, Colombia and the US. Those plants relied on the VCM shipments made possible by the cracker.

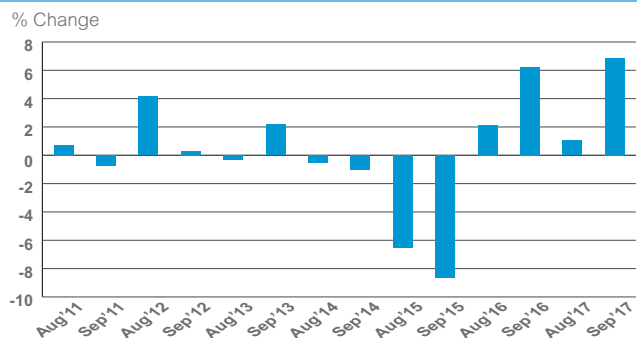
The storm had a significant effect on global prices for petrochemicals, according to the ICIS Petrochemical Index (IPEX). The index tracks the movement of 12 major petrochemicals and polymers.

The charts below show the month-to-month changes in the Global and US IPEX for August and September since 2011.

#### GLOBAL IPEX

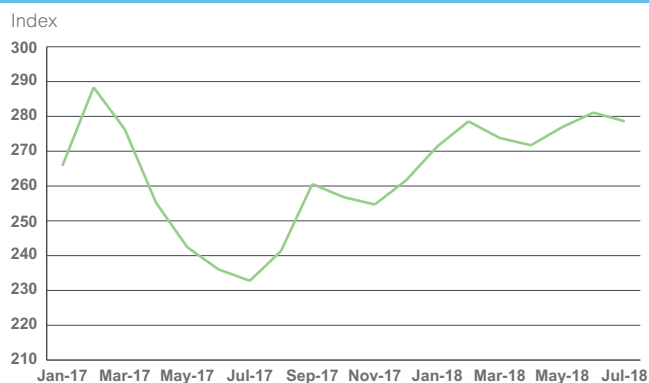


#### US IPEX



The Global IPEX has remained elevated since a second run-up during the winter of 2018, as shown below.

#### GLOBAL IPEX



That winter-time increase was caused by unusually cold weather on the Gulf Coast, which again illustrates how weather in that region can affect prices around the world.

Although Harvey certainly affected the petrochemicals markets when compared with previous hurricanes of similar magnitude such as Alice, the price escalation was lower, according to ICIS senior consultant, James Ray.

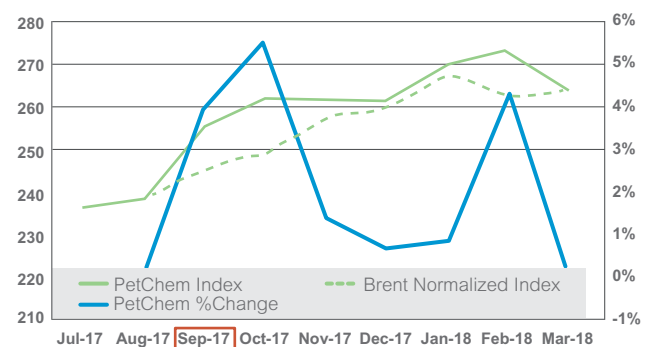
This was due to the particular nature of Harvey and the widespread flooding that it caused, Ray said. These floods disrupted demand and logistics as well as supplies.

Prices rose by about 14%, driven primarily by higher crude oil. The hurricane's effect contributed up to 5.5% of this, as measured by tracking the US IPEX, Ray said.

This impact from the hurricane continued until March 2018. In other words, it took five months before prices returned to normal relative to crude oil.

The chart below compares the actual US IPEX to the typical IPEX as normally related to Brent.

#### US IPEX BEFORE/AFTER HURRICANE HARVEY

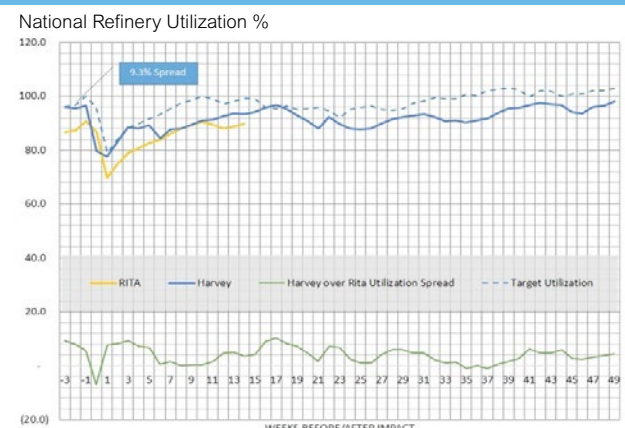


Another factor that reportedly mitigated the price escalation was due to the fact that producers were better prepared for Harvey than for past hurricanes, so the damage was less, Ray said.

Still, refinery utilisation rates did not return to pre-Harvey levels until June 2018, demonstrating the long-term effects of such a storm, he said.

The table below compares refinery utilisation rates associated with Harvey and Rita, another powerful

#### HURRICANE RITA VS HARVEY RECOVERY



hurricane that shut down a similar number of refineries.

The Gulf Coast is no stranger to bad weather, but during previous storms the region was a very different place. Hurricanes Ike, Rita and Katrina made landfall before the advent of shale gas, which has transformed the US petrochemical industry, leading to a wave of new projects. Before shale gas, the US chemical industry was in retreat.

Suddenly, the US had a growing supply of low-cost natural gas liquids (NGLs), the predominant feedstocks for the nation's crackers.

The technological advances that made shale gas possible were later applied to crude production, which led to a surge in oil output.

The result was an export boom in every category of hydrocarbons in the US, as shown in the table below. The statistics are listed in thousands of barrels per day. Liquefied natural gas (LNG) is listed in millions of cubic feet.

US ENERGY EXPORTS		
	2007	2017
<b>Crude</b>	27	1,118
<b>Oil Products</b>	1,247	3,329
<b>Propane</b>	42	905
<b>Ethane</b>	NA	181
<b>LNG</b>	48,485	707,542

Source: Energy Information Administration (EIA)

The table below compares petrochemical exports during the same period.

US PETROCHEMICAL EXPORTS				
	2007	2017	Units	%
<b>HDPE</b>	1,532,052,698	2,027,256,197	kg	32.3
<b>LLDPE</b>	672,017,925	646,881,879	kg	-3.7
<b>LDPE</b>	812,269,071	789,880,731	kg	-2.8
<b>PVC</b>	1,016,668,991	2,729,529,131	kg	168.5
<b>Methanol</b>	252,538,899	1,489,789,767	litres	489.9
<b>Styrene</b>	1,905,308,633	1,913,519,512	kg	0.4
<b>Total (kg)</b>	5,938,317,318	8,107,067,450	kg	36.5

Source: US International Trade Commission (ITC)

Although exports for low-density polyethylene (LDPE) and linear-low-density polyethylene (LLDPE) declined, this was more than offset by increases in high-density polyethylene (HDPE), polyvinyl chloride (PVC) and styrene. This caused total exports by mass to rise by 36.5%. Methanol was excluded from the total because it is measured in litres, not in kilograms.

In one decade, the US became the world's largest exporter

of ethane and liquefied petroleum gas (LPG), as well as a major source of crude oil and LNG.

For petrochemicals, companies such as LyondellBasell were quick to expand existing units, which allowed them to rapidly increase capacity and take advantage of the surge in cheap feedstocks before the new plants could come online.

Other markets like PVC realised that the feedstock advantage in the US has given them a huge cost benefit in foreign markets. Exports exploded even though these companies added little new capacity for these products.

Hurricanes are not going away and companies are not done building new plants in the US.

Already, companies have started up several plants since Harvey, with some units beginning operations just weeks after the storm.

The table below lists the start-up announcements made so far for the Gulf Coast region. Figures are in tonnes.

PLANT START-UPS				
Company	Capacity	Product	Location	Start-up
<b>Chevron Phillips Chemical</b>	500,000	Bimodal HDPE	Old Ocean, Texas	Sep-17
<b>Chevron Phillips Chemical</b>	500,000	mLLDPE	Old Ocean, Texas	Sep-17
<b>Dow Chemical</b>	1.5m	Ethylene	Freeport, Texas	Sep-17
<b>Dow Chemical</b>	400,000	PE	Freeport, Texas	Sep-17
<b>ExxonMobil Chemical</b>	650,000	PE	Mont Belvieu, Texas	Oct-17
<b>Sasol/INEOS</b>	470,000	HDPE	La Porte, Texas	Q4 17
<b>Enterprise</b>	750,000	propylene	Mont Belvieu, Texas	Q1 2018
<b>Dow Chemical</b>	350,000	LDPE	Plaquemine, Louisiana	Q1 2018
<b>Dow Chemical</b>	200,000	EPDM	Plaquemine, Louisiana	Q1 2018
<b>Chevron Phillips Chemical</b>	1.5m tonnes	ethylene	Baytown, Texas	Mar-18
<b>Oxiteno</b>	170,000	surfactants	Pasadena	Q2 2018
<b>OCI</b>	1.8m	methanol	Beaumont, Texas	Jun-18
<b>ExxonMobil Chemical</b>	1.5m tonnes	ethylene	Baytown, Texas	Jul-18

Companies are on track to start up more plants later this year on the Gulf Coast. Looking ahead, companies have announced plans to start up more than 30 individual units in the next 10 years.

Many of these plants are premised on exports, meaning that global markets will become even more vulnerable once these plants are up and running and when the next storm strikes.

Again, the map below shows the plants that have started up in the months after Harvey, and projects that are expected to begin operations in the years ahead.

For Harvey, petrochemicals companies did a tremendous job in responding to the storm. They created communication hubs to keep customers, employees, the government and the public informed about their operations. Companies helped employees recover from the storm so they could get back on their feet and return to work.

Still, plant outages and force majeure declarations will happen during future storms regardless of how well

companies prepare.

That's because many of the causes of shutdowns are beyond their control.

For ports, storms can make it too dangerous to allow ships to enter and leave. Bays as well as rivers leading to plants can become silted up and filled with debris. Rail lines shut down. Roads become inundated.

Petrochemicals companies cannot improve drainage, heighten roads or bolster rail lines. They can prepare for Mother Nature, but they cannot control it.

That preparation, once restricted to the US, will now spread around the world.

#### Additional reporting by James Ray

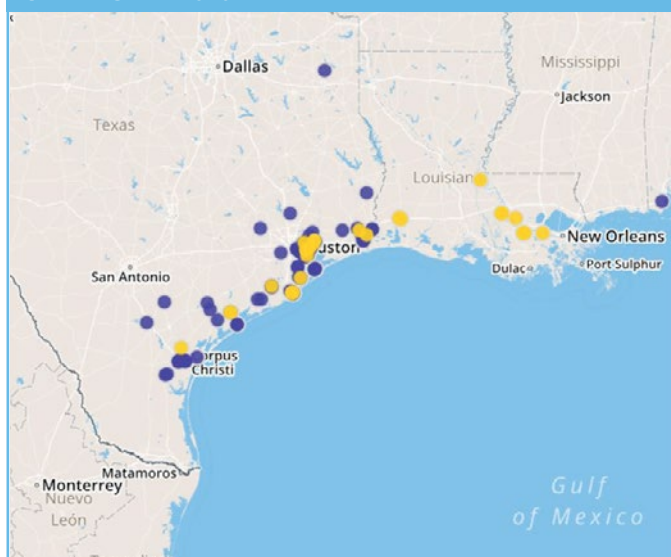


### ABOUT THE AUTHOR

**AL GREENWOOD**  
DEPUTY EDITOR

Al Greenwood joined ICIS in 2007 and is now a Deputy Editor at ICIS, covering North and South America. Over the years, he has covered Latin America, litigation, mergers and acquisitions and corporate affairs for the major petrochemicals producers in the hemisphere. He can be reached at [Al.Greenwood@icis.com](mailto:Al.Greenwood@icis.com)

#### START-UP IN 2020 AND LATER



## INDUSTRY NEWS

Our global network of local experts report breaking news stories that impact chemical markets, influence commodity prices and affect your daily business decisions.

#### ICIS NEWS PROVIDES:

- Real-time news round-the-clock
- Analysis and likely market impact
- Production news and force majeure

Request a free trial 

