

# Harvey's Toll on Energy Industry Shows a Texas Vulnerability

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A vessel, the Signet Enterprise, sinking on Saturday near Port Aransas, Tex.; its crew was rescued. The narrow shipping channel near Port Aransas may be the most threatened choke point on the Gulf Coast. Credit U.S. Coast Guard, via Getty Images

HOUSTON — For years, much of the nation's refinery capacity and chemical production have been concentrated along the swamps and narrow inlets of the Gulf of Mexico, risking devastation in a monster storm.

The pounding being endured by coastal Texas will probably be the biggest test of that risk so far, and energy experts say it raises questions about the area's role as a hub for such crucial and environmentally sensitive industries.

“The hurricane did what terrorists could only dream of and take a third of U.S. refinery capacity off line for days on end,” said Michael E. Webber, deputy director of the Energy Institute at the University of Texas at Austin. “Over the long term, the energy sector will have to consider the costs of additional hardening of the infrastructure on the Gulf Coast versus moving

to a different location like the Eastern Seaboard.”

The Texas and Louisiana coasts took on their vital role because they link vast oil and gas resources, both inland and offshore, with Caribbean and Atlantic shipping channels. But the damage from Harvey, which arrived with hurricane force, has exposed a downside: vulnerability to storms that experts say are becoming more extreme because of climate change.

The damage, detailed in state and federal regulatory filings, is wide ranging: escaping gasoline from a submerged roof at a Phillips 66 storage tank; a sinking tank roof at Exxon Mobil’s vast refinery in Baytown, which resulted in the release of hazardous gases including volatile organic compounds and benzene, above permitted levels; and a lightning strike that disrupted operations and led to toxic-gas releases at a Dow Chemical plant in Freeport.

The full implications are potentially even larger. The environmental fallout could worsen, and if oil and natural gas prices spike because refineries and pipelines are crippled, renewable energy sources like wind and solar power, along with electric cars, could get a major lift. The United States could be forced to import more gasoline and other refined products. And a chemical industry that has been expanding rapidly because of cheap natural gas from shale fields could be slowed, or even stalled.

Such a chain of events is for the moment pure speculation since it will take weeks to fully assess the storm damage. But the damage will undoubtedly be extensive. Nearly every major Texas and Louisiana refinery has been partly or completely shut down because of damage or for safety reasons, suppressing the daily production of at least 2.6 million barrels of refined petroleum products. At least seven major refineries are out of commission, and Morningstar on Tuesday estimated that 11 more refineries, with a combined capacity to produce 1.3 million barrels per day, risked closing, including the Saudi Aramco-Motiva refinery in Port Arthur, Tex., the nation’s largest.

The port of Houston is closed until at least the end of the week, a major hit to both energy imports and exports. The situation may be far worse in the port of Corpus Christi, which may be crippled for some time since a drill ship broke loose from some tugboats and ran aground in the narrow shipping channel near Port Aransas, perhaps the most threatened choke point on the entire coast. The giant shale oil fields of West Texas have not been affected by the weather, but several long-haul pipelines that take the crude from the Permian Basin to coastal refineries have shut down, and that could eventually force production companies to slow their operations.

“I don’t know if you will see a mass exodus from the Houston area,” said Harald Jordan, vice president for engineering at Peak Energy, an oil and gas exploration company based in Colorado. “From a strategic perspective, any company that is invested in a volatile region like that might want to rethink their concentration of critical assets and people there.”

But other parts of the country are much less supportive of the oil and gas industry, one of the primary reasons that refineries and natural-gas import and export facilities were concentrated in the region in the first place. Texans and others in the region have depended on the industry for their livelihoods for generations.

So far, oil and gas price increases have remained muted because so much oil and gasoline was in storage around the country when the storm hit and because most drivers along the coastal gulf areas are staying at home. The national average for regular gasoline on Tuesday was \$2.38 a gallon, only 4 cents above a week ago, according to the AAA motor club. Texas prices were \$2.19 a gallon, 6 cents above a week ago. A bigger problem for many drivers is the flooding of gasoline stations.

But prices are likely to shoot up in the coming weeks, many experts say, as the damage to refineries begins to be felt in reduced deliveries.

At the Baytown refinery, one of the biggest in the country, workers were racing to empty the tank with the damaged roof and repair the roof itself, Exxon Mobil said in its filing. Phillips 66 said it was drawing down gasoline levels to a minimum at its tank. And Dow said it was taking precautions at its Freeport chemical plant to minimize emissions after the lightning strike.

Separately, at least a dozen facilities were flaring or burning off excess gas that had nowhere to go, because production at the sites had stalled, or because other gas plants in the area had shut down. Flaring from the Baytown refinery, among many others, is emitting excess levels of nitrous oxides.

The damage underscores how the companies often held responsible for contributing to global warming could increasingly suffer from its effects. Hurricanes Katrina and Rita in 2005 were a precursor, causing spills of 750,000 gallons of petroleum products from offshore platforms, rigs and pipelines, according to estimates by the Bureau of Ocean Energy Management.

Some critics have suggested the havoc also highlights what critics have called oil companies' lack of transparency on their readiness to weather the effects of climate change. Exxon Mobil, the world's largest refiner, said in a 2015 "corporate citizenship" report that it designs its structures with changes of weather in mind. "The company is aware of the risks posed by extreme weather events and recognizes the risks that climate change could potentially introduce for facilities exposed to changes in extreme weather events over the life of an investment," the report said.

This week the company said in a statement that "our Baytown complex has completed the safe shutdown of the majority of its operations," and that "Exxon Mobil's primary focus continues to be the safety of our employees, contractors and the communities in the affected

areas.”

But a 2015 report by the Union of Concerned Scientists, a nonprofit advocacy group, identified the Baytown facility as one of the country’s refineries most vulnerable to flooding. Using storm-surge modeling, it showed that a Category 3 hurricane could inundate parts of the site and leave some structures under 15 feet of water. (Harvey made landfall with even greater force, as a Category 4 event.)

Exxon Mobil remains under criticism for not fully disclosing the climate risks of its assets around the world. “We know so little about what these companies are doing, or prepared to do,” said Gretchen T. Goldman, the research director for the Union of Concerned Scientists. “History tells us something will spill.”

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