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STORM HARVEY RAISES AWKWARD QUESTIONS OVER US ENERGY AMBITIONS

哈維颶風對美國的能源野心帶來了棘手的問題

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The desolation visited by tropical storm Harvey on the US Gulf Coast, the heart of the nation's oil and gas industry, summons memories of Hurricane Katrina and the devastation it brought to New Orleans and the region 12 years ago. Like Katrina, Harvey shows how exposed the US energy sector remains to the risk of weather disruptions. As global warming raises the threat of catastrophic weather events, this vulnerability may be rising.

On the surface, the US energy situation couldn't be more different today than it was in 2005. Since then, the shale revolution has unleashed

本期摘要(KEY INFORMATION)

◎今年夏季，哈維颶風重創美國墨西哥沿岸石油與天然氣產業的核心地區，哈維颶風暴露出美國能源部門面對天氣破壞的弱點，隨著全球暖化，災難性天氣所造成的威脅可能繼續攀升。頁岩油革命的出現讓美國成為一個成熟的超級能源大國，美國天然氣和可再生能源供應也激增，但繁榮的背後，意想不到的後果是複雜的綜合能源系統出現越來越多的漏洞，進入市場所仰賴的沿海煉油廠、輸送管道和出口設施暴露在天氣攪局的風險裡。儘管在過去十年來，美國能源自給自足的情形已急遽改善，但颶風哈維造成的災害是一個強而有力的啟示：無論是多大的能源產出國，都可能成為一個能源孤島。

◎拜頁岩油革命所賜，美國現在是天然氣淨出口國，並向國外出口大量原油，墨西哥灣沿岸能源基礎設施，諸如煉油、石油化工廠、倉儲碼頭、港口等日益集中，然而，在哈維颶風的侵襲下，墨西哥灣沿岸的能源系統飽受衝擊，導致石油產品價格上漲，美國以外的能源市場也受到波及。哈維颶風帶給政策制定者哪些啟示呢？首先，建立新的基礎設施，應考慮到氣候變化的未來影響。第二，運作良好而靈活的市場有助於加強能源安全，消除出口限制等能源貿易的障礙，可使市場更有效地發揮作用。第三，價格上漲會對消費者和經濟造成損害，政府可以通過戰略儲存來因應價格上漲和供應中斷問題。第四，持續降低經濟對石油的依賴，以弱化未來能源供應中斷和價格上漲的影響，這對川普政府而言並非明智之舉。最後，哈維颶風帶來的極端降雨和洪水，提醒我們要更迅速地應對氣候變化的威脅，海平面上升、溫暖的水域和濕度上升的大氣，將加劇極端天氣的嚴重性。

the fastest production boom in oil history, turning the US from the largest importer into the leading exporter of refined products, and into a fully fledged energy superpower. As revolutions often do, shale impacts have spread worldwide. Oil prices have plunged as a new feeling of abundance has replaced old scarcity fears. Global oil inventories have soared. To top it all, US natural gas and renewable energy supplies have also surged.

While it is too early to fully assess the full scope of Harvey's damage, it is already becoming clear that far from getting stronger, the country's energy resilience may in fact in some ways be downgraded.

The concentration of oil and gas infrastructure in flood-exposed parts of the US Gulf Coast has also reached unprecedented levels over the past decade. Gulf crude production for, example, has more than doubled since 2005, leading a 75 per cent nationwide increase, and now accounts for almost two-thirds of total US crude production, up from 54 per cent in 2005.

With domestic consumption down slightly and exports surging, US oil import dependency plunged to a mere 25 per cent last year from as high as 60 per cent in 2005. On paper, that sounds like a big step for energy security. But the flipside is higher reliance on potentially vulnerable Gulf Coast infrastructure. On the downstream side, operating refining capacity in coastal Texas and Louisiana jumped by almost a quarter from about 7m barrels per day on the eve of Katrina to 9.7 bpd at the latest count, even as capacity elsewhere edged down, lifting the Gulf's share of US refining activity to nearly half of the total.

The same dependency on the Gulf applies for logistics. Rising exports and falling imports turned the US into a net exporter of gasoline (including both finished product and blending components) last year. Roughly 90 per cent of gross exports came from the Gulf. The region leads the US surge in virtually all other types of oil exports by a wide margin: as of 2016, the Gulf accounted for 54 per cent of US exports of crude, 68 per cent of natural gas liquids, 86 per cent of diesel and 75 per cent of jet fuel — a much higher share of a much higher total.

One of the unexpected consequences of the US shale boom is the rising co-vulnerability of its increasingly complex and integrated energy system. Even inland plays such as the Permian, the shale industry's star performer, seemingly out of harm's way, have become exposed to the risk of weather disruptions at coastal refineries, pipelines and export facilities on which they depend for market access.

Despite the steep improvement in US energy self-reliance of the past decade, US-bound oil products are now being rushed from around the world to make up for the supply loss caused by Harvey, The latest devastation is a powerful reminder that no country, no matter how large a producer it may be, is an energy island.

And US strategic oil reserves may prove of little direct use if they cannot easily be accessed or used in the event of a domestic disruption, as happened during Katrina.

As calls mount in Washington for cutting the size of the reserves on account of rising US oil production, and for using the proceeds of a sale to plug budget holes elsewhere, Harvey reminds us of the continued, if not growing, uncertainty of all oil production. While market changes certainly warrant a thorough re-examination of precautionary measures designed decades ago, simply resorting to a hasty fire sale of "excess" stocks without further study would be decidedly ill-advised.

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5 LESSONS US ENERGY MARKETS MUST LEARN FROM HURRICANE HARVEY'S DEVASTATION

哈維颶風帶給美國能源市場的 5 項教訓

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As Houston and other Texas communities begin taking stock of the deadly devastation left by Harvey, the storm's impacts on the energy sector are being felt far and wide—in ways not seen before, reflecting how dramatically the U.S. energy landscape has changed in the last decade.

The U.S. Gulf Coast energy hub is no stranger to extreme weather. In 2005, Hurricanes Katrina and Rita ravaged the region's refining capacity, production and pipeline operations. The industry learned critical lessons about resilience from the deadly storms, but the years since have seen massive changes to the sector that have altered the U.S. economy, the nation's energy outlook and global markets. It has also brought new risks to all three, some of which are only now being realized.

Consider that when Katrina and Rita hit, the U.S. was the world's largest importer of refined petroleum products and was importing record high volumes of oil. Dozens of projects were also being proposed to import costly liquefied natural gas (LNG). Thanks to the shale revolution, the U.S. is now the leading exporter of refined products and net oil exports have tumbled. We are now a net exporter of natural gas and are shipping large volumes of crude abroad as well.

The growing concentration of energy infrastructure – production, refineries, processing and petrochemical plants, storage terminals, ports and more— in the Gulf Coast creates a vulnerability for the U.S. and the world. Roughly half of U.S. refined product exports go

to Latin America, and Mexico depends on the U.S. for half its imports. Harvey's disruptions caused European and Asian petroleum product prices to rise, as traders diverted cargoes to meet needs in the Americas. When the Gulf Coast's energy system takes a hit, it is now felt everywhere. And in the next few years, several new natural gas export facilities will come online, meaning the next disaster could have a big impact on global gas markets as well.

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To be sure, there have been some clear resilience improvements since Katrina. Much progress has been made to harden energy infrastructure and improve the resilience of the fuel supply chain. A larger share of oil production now comes from onshore shale wells that are much better protected than large offshore platforms. The increase in supply options and infrastructure routes means markets can more quickly signal supply disruptions and respond to them through price movements.

It will take time to fully assess the impacts of Harvey on the energy system. But policymakers would be well-advised to consider some preliminary lessons:

First, while much progress has been made, much more remains to be done to harden energy infrastructure. This may prove especially true for new facilities built quickly to respond to the rapid shale boom. And new infrastructure should be built taking into consideration the future impacts of climate change, which is why it was so short-sighted of the Trump Administration to streamline the process for approving infrastructure two weeks ago by eliminating the need to plan for climate change.

Second, well-functioning, interconnected, and flexible markets bolster energy security. Removing barriers to energy trade, like export restrictions, allows markets to function more effectively. Increased pipeline, storage and port capacity, allows the system to respond more flexibly. Policymakers should ensure an efficient infrastructure permitting process.

Third, while price spikes can divert needed supplies and thus resolve shortages, higher prices take a toll on consumers and the broader economy. These costs are not borne by private firms. Government thus has a role to temper price spikes and physical supply disruptions with strategic stocks.In recent years, Congress has sold off large quantities of the U.S. Strategic Petroleum Reserve to fill short-term budget holes, assuming (incorrectly) that declining oil imports cut our vulnerability to supply disruptions. The Trump Administration has proposed selling off half the SPR. We should not get rid of this national security asset, but rather should modernize strategic stocks to match the risks we now face, including swapping a portion of oil for refined petroleum products and ensuring the infrastructure exists to bring both to market.

Fourth, it is clear that even if we import less, our vulnerability to oil disruptions is proportional to our economy's oil-dependence. Continued policy efforts to reduce the economy's oil-intensity will lessen the impacts of future outages and price spikes—a critical reason the Trump Administration's proposal to reduce the scheduled increases in fuel economy standards is unwise.

Finally, Harvey, along with the floods in southeast Asia that killed 1,200, remind us of the importance of acting more urgently to address the threat of climate change, which increases the risks of catastrophic weather events. Hurricanes are not new, of course, but climate change can increase the severity of their impacts, like the extreme rainfall and flooding seen during Harvey. Rising sea levels, warmer waters, and increased moisture in the atmosphere exacerbate the severity of extreme weather events.

The devastation wrought by Harvey reveals many new risks and impacts of the changed U.S. energy landscape. As the Gulf Coast recovers and rebuilds, we should heed the lessons of Harvey to prepare better for next time.

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