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Coke markets increasingly volatile

Galveston, Texas

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Highlights

- The US remains the core of global coke supply, but an end to coker expansions and changing crude slates have halted its rise
- US coke production is becoming more unpredictable, both in volume and quality
- Saudi Arabia and Canada threaten US market share among high-sulphur buyers, who are increasingly concentrated in India
- Mid-sulphur prices are closely tied to Venezuelan supply, which is volatile for logistical and political reasons
- Potential sulphur limits on coke imports to China would add an additional wrinkle to the uncertainty surrounding sulphur spreads
- With these ever-shifting fundamentals, pricing is more unpredictable than ever, creating greater need for transparent, frequent market evaluation, which Argus provides

Argus Media: global, market-focused, independent

- World's largest independently held energy markets PRA, with offices in 20 countries and a team of 750

- Publish 10,000 daily commodity price assessments and market intelligence

- Services
  - Market reporting and price indexation
  - Consulting
  - Conferences

- Covers a wide range of coke-related commodities
  - World coal markets
  - Global metals
  - Freight
  - US crude oil
  - US and European refined products
  - US and European natural gas

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Market basics overview

Key petroleum coke specifications			
Trade hub	Delivery	Sulphur	HGI
USGC	fob	6.5pc	40
USGC	fob	4.5pc	40
USWC	fob	<2pc	45
Venezuela	fob	4.5pc	70
India	cfr	6.5pc	40
China	cfr	6.5pc	40

- US Gulf and west coasts are the major supply sources
- China a large producer but also major consumer
  - New sulphur import limits could trap coke within China

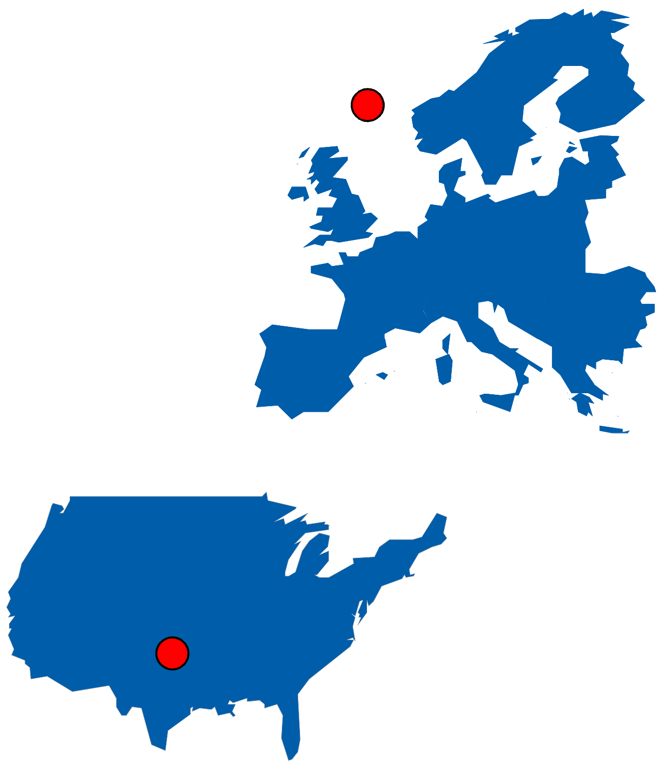
- Typically sold in handymax or supramax cargoes
  - Occasionally Panamax and some baby Capes
- Major traders include:
  - Oxbow (especially USWC)
  - Koch
  - TCP
  - Capex
  - Tricon (newcomer to market)
- Major producers include:
  - Phillips 66
  - Valero
  - ExxonMobil
  - Shell
  - Tesoro

Sulphur is the main price driver for fuel coke

- As environmental regulations have multiplied while technical limitations have declined, sulphur has become the most important specification determining price
- Spreads between sulphur specs could become even more volatile as China may announce new sulphur limits, as yet undetermined
- Changes in crude dynamics in the US mean that sulphur is no longer a stable specification, with supply variable
- Argus offers more than a decade of history of indexes based on sulphur rather than HGI
- Argus offers weekly price transparency and insights into this variable market

What makes a good price index

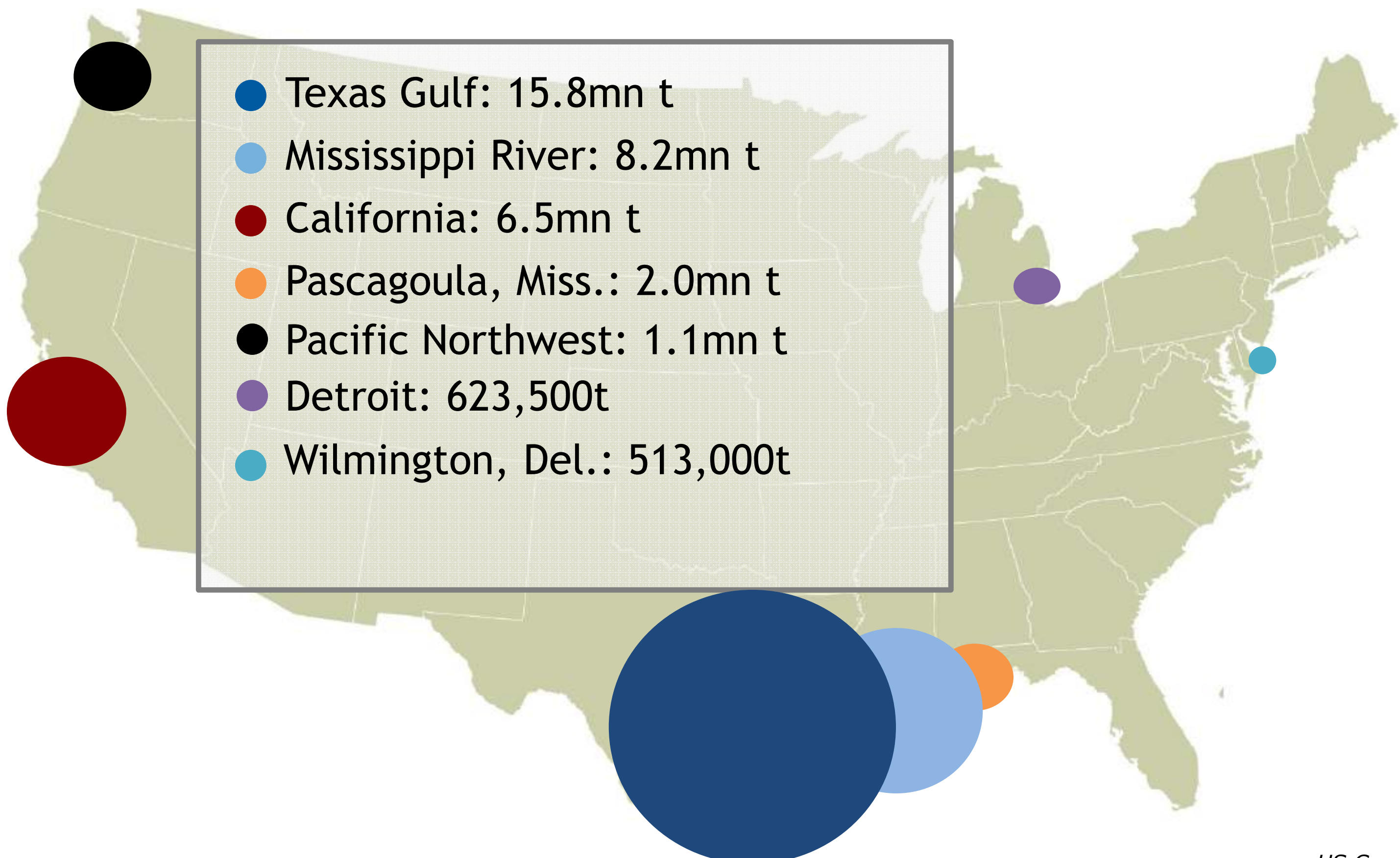
- Transparency: transactions are confirmed and kept within minimum acceptable levels to consider them relevant
- Represents the fair, real, complete value of the commodity
- Minimizes basis risk, allowing market participants to neatly hedge price risk into liquid markets
- Methodology: how prices are collected and handled by PRAs is extremely relevant



How Argus creates indexes

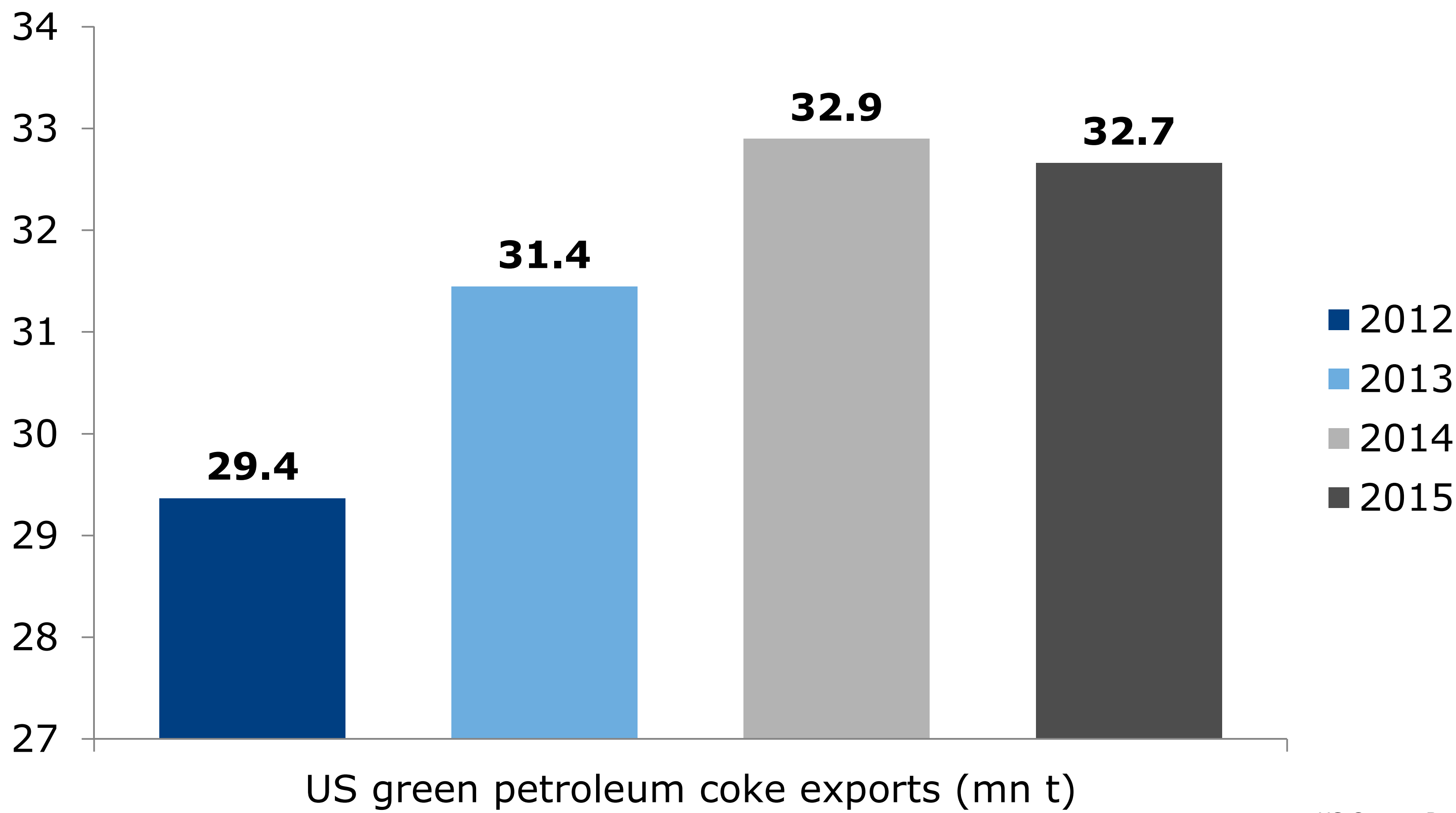
- Argus contacts a wide cross section of coke market participants by telephone, instant messenger, and email
- Balance is maintained between refiners, cement and utility buyers, and trading companies
- Reporters verify deals when possible and remove deals that do not meet the assessment criteria
  - Not traded at arm's length
  - Deviate significantly from the mean of all transactions submitted
  - Fall outside typical volume or specification parameters
- Team of correspondents in Washington DC, Singapore, Beijing, London follow market on weekly basis to capture market info in increasingly volatile market

Top US export regions 2015



— US Census Bureau

2015 breaks trend of export growth



— *US Census Bureau*

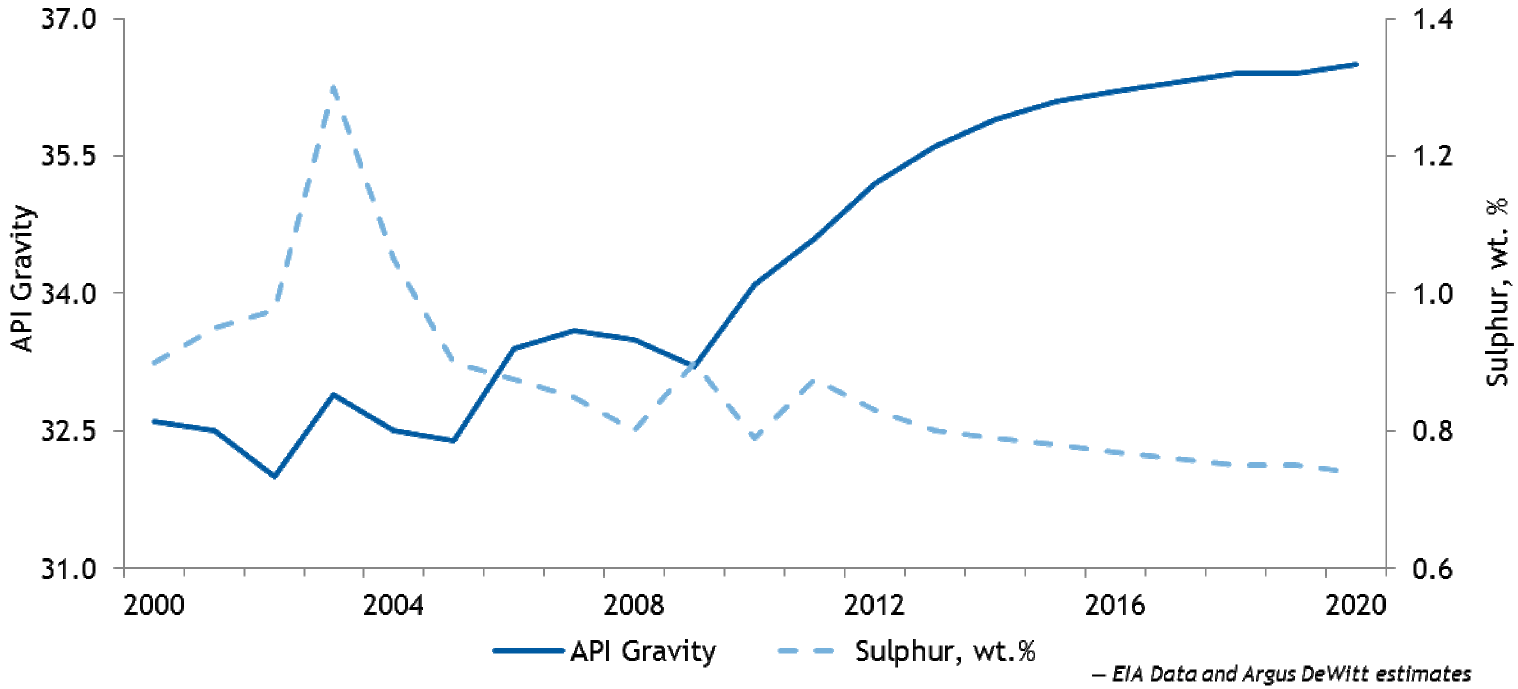
US coke supply more volatile

- Coker expansions have finished for foreseeable future
  - Even some upgrades that were on the books, like Husky's Lima, may not be going forward as companies look to save on capex

- Lighter US crude production has led to a decrease in coke production at some refineries

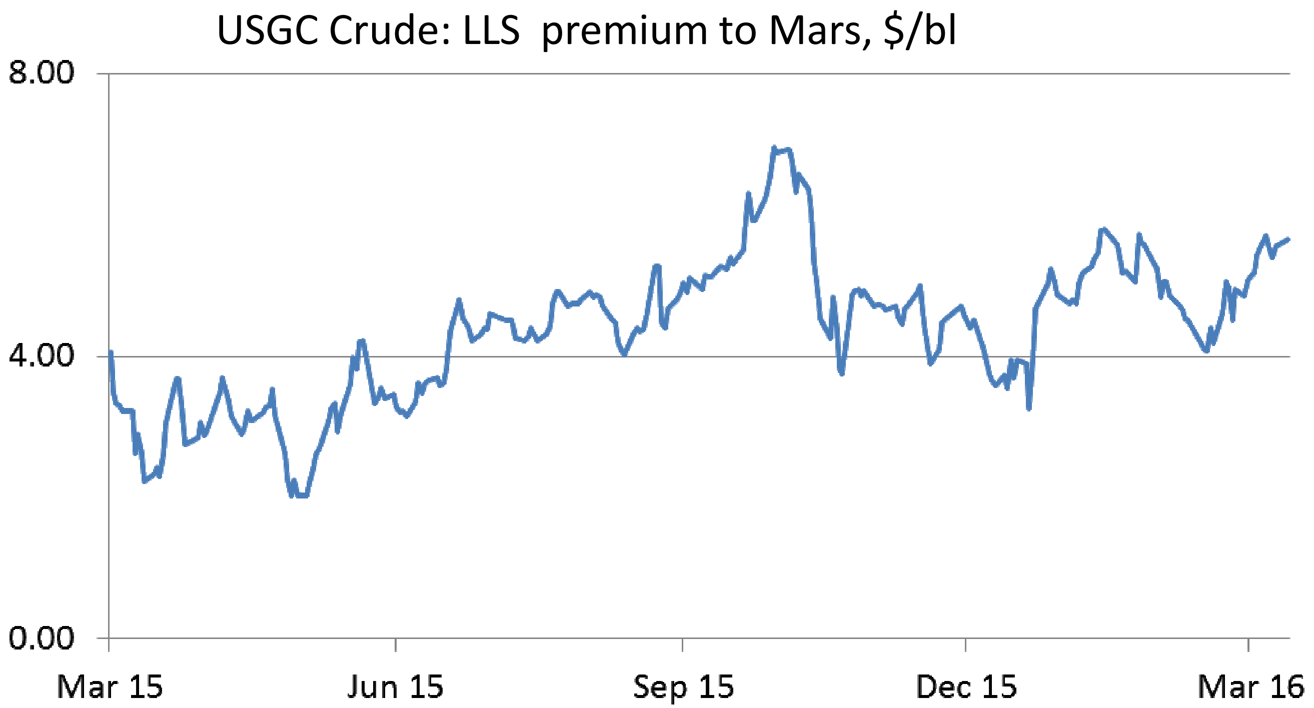
- Coke qualities and volumes likely to fluctuate as refiners adapt to more variable crude availability and changeable crude spreads

US crude oil production lightens up



- As proportion of shale crude rises, production is lighter (higher API) with lower sulphur

Coke production tracks changing crude spreads



Source: Argus

- As LLS/Mars crude spreads narrowed in the first half of 2015, coke exports lagged prior year levels. Exports caught up with 2014 levels as spreads widened later in the year.

Crude exports could change the game

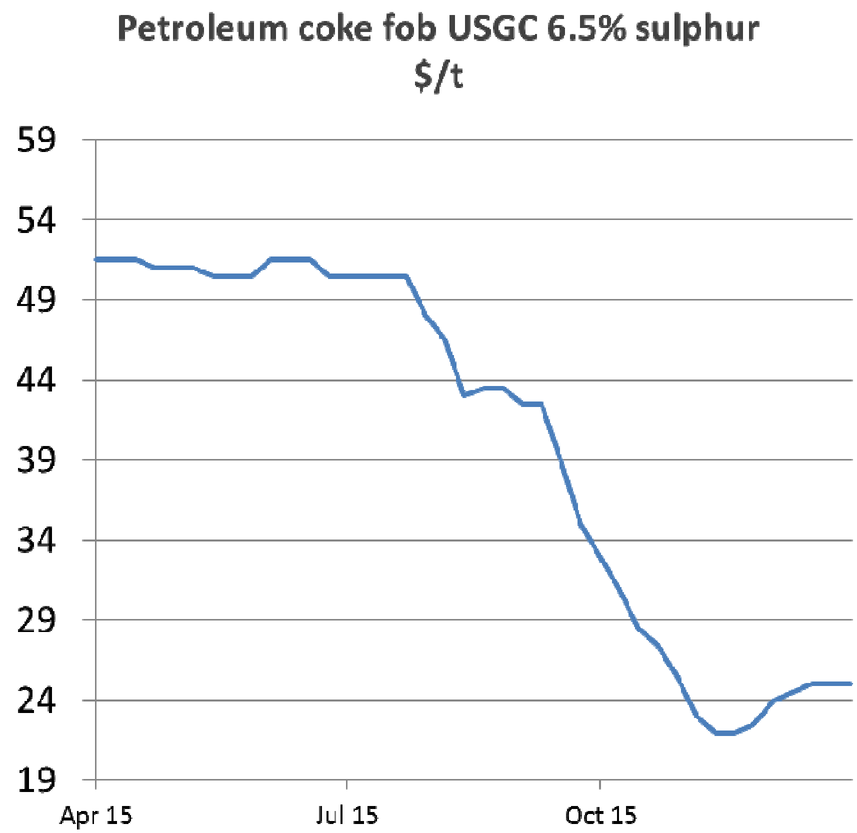
- Rule change approved in December could make refiners focus more on imported heavy crudes and reverse the lighter trend that has been reducing coke production
- This may be more of a long-term effect as low global prices for light crude mean US crudes are struggling for market share
- Bottom line: Crude prices — and thus US coke production — are volatile and likely to remain that way

US losing market share to Saudi Arabia regardless

- Two new refineries in Jubail and Yanbu began shipping in 2015
- Capacity to each produce 2.4mn t/yr
- Freight advantaged:
  - Shipping time to India for Jubail only 8-10 days
  - 12-13 days from Yanbu
- Beginning to grab market share mainly in India, but some other Asia-Pacific destinations as well

Low demand, Saudi competition sinks 6.5pc prices

- Crude changes in the US Gulf kept supply shorter than expected, keeping fob pricing steady in the first half
- But as Saudi exports ramped up, buyers turned to a new source
- Saudi began shipping particularly successfully in July
- Demand from China, Europe, Brazil remains weak, leaving sellers with few options but to compete in India



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Canada: Constrained by logistics, not supply

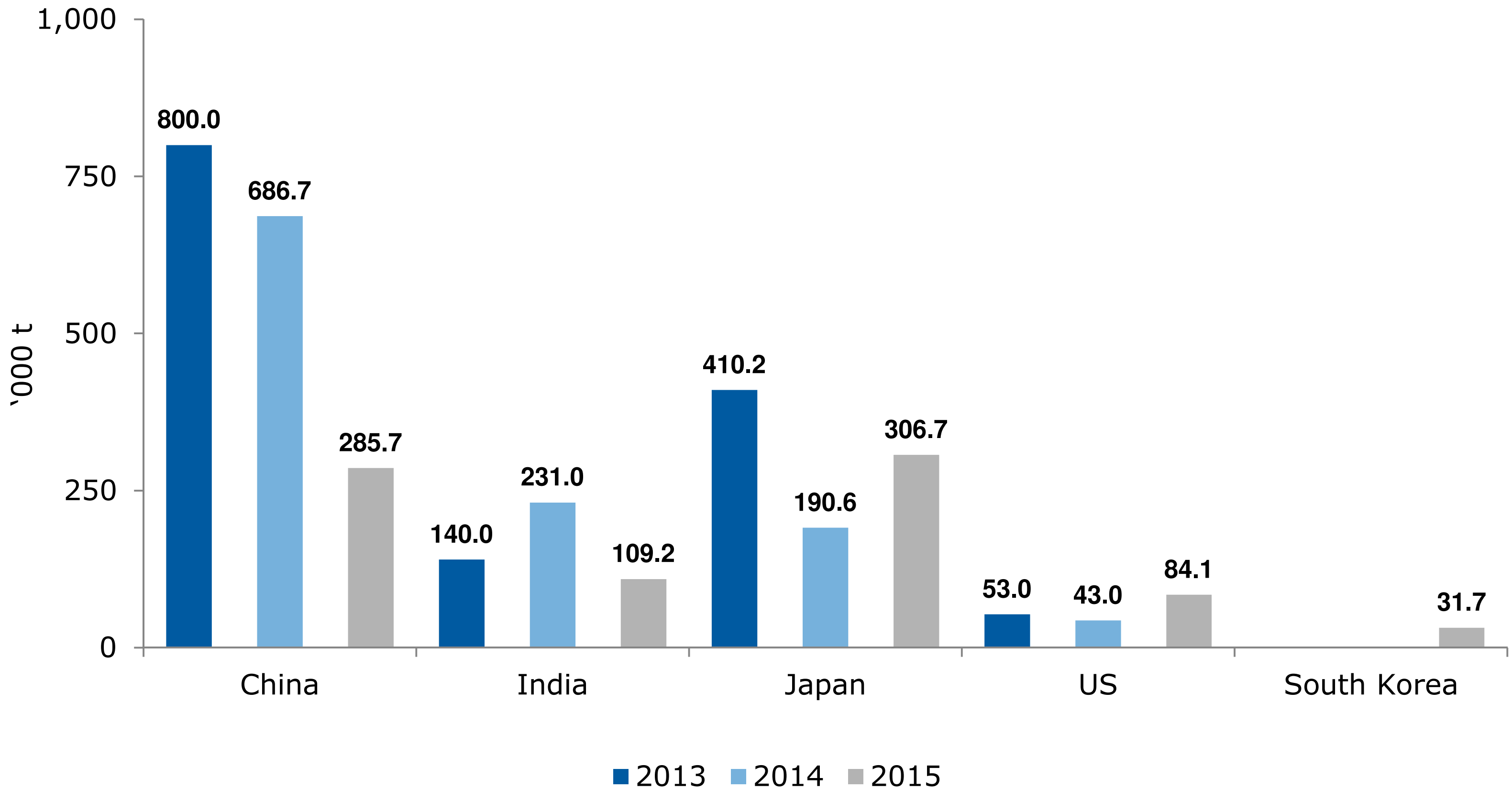
- Could supply much higher volumes than it has been in current market
  - Unlike USGC, no obligation to ship because of ample storage
  - Stockpiles exceed 30mn t — roughly a full year of US exports
  - But costs to ship from upgraders to port can reach as high as $80/t depending on rail rates, a limiting factor

- Major exporter Suncor announced last November it was suspending shipments from its coke stockpiles until pricing improves. But it is a source of much overhanging supply if pricing allows.

- Higher sulphur and ash than US Gulf, but low in sulphur in comparison with Saudi, which could mean it will ultimately be viewed more favorably

Canadian green coke exports to China, India lower

2015 exports to China and India fell by more than half from the prior year. Japan, the US and South Korea made up some of the difference, but total exports still fell to just 817,000t from 1.15mn t in 2014 and 1.40mn t in 2013.



— *Statistics Canada*

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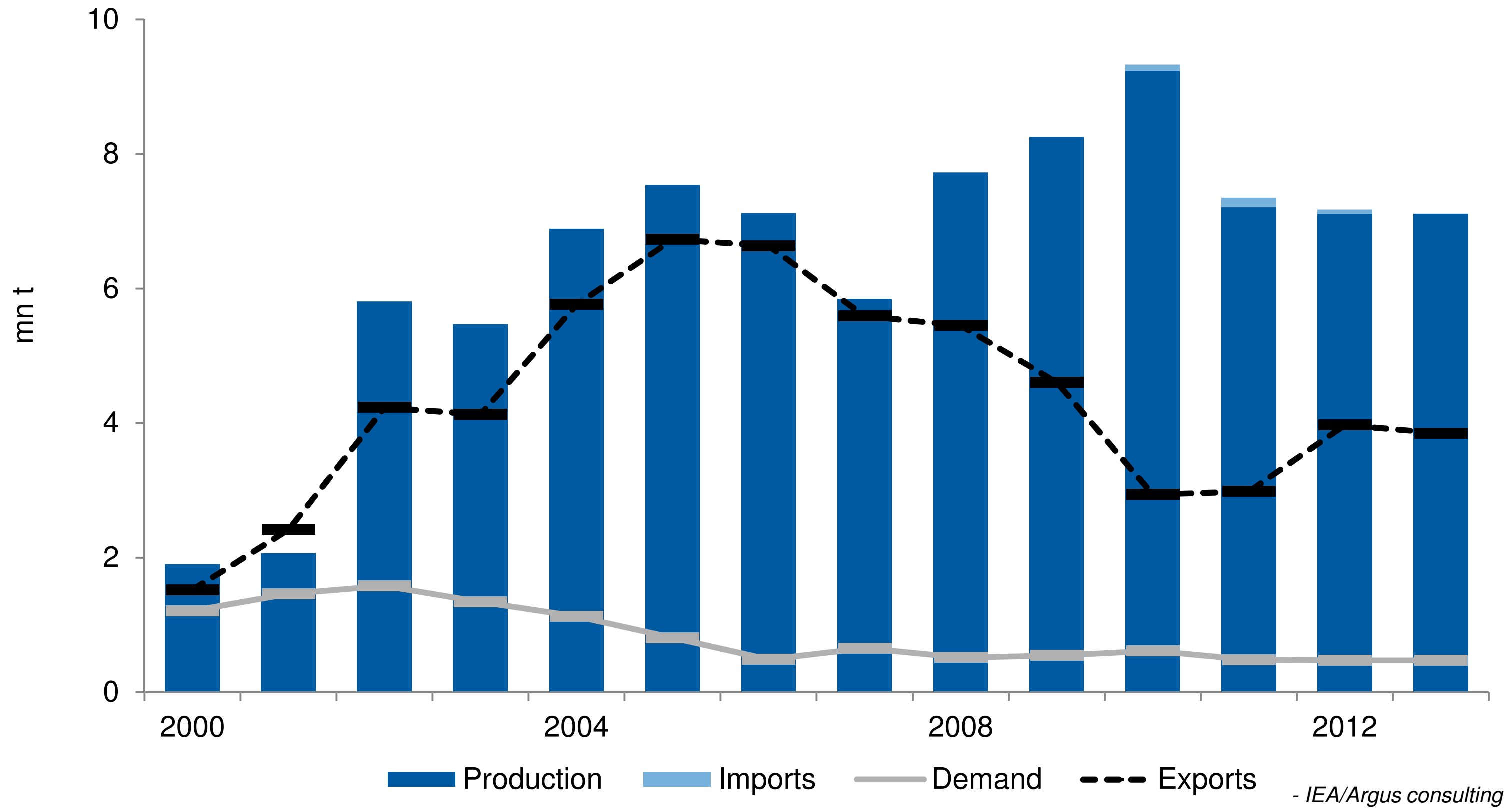
Venezuela: Exports decoupled from production

Venezuelan exports fell in 2007-2011 even as production rose



- IEA/Argus consulting group

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Failing equipment/bureaucracy hold up shipments

- Aging infrastructure, lack of cash for repairs are major obstacles
- In some months Venezuela ships four cargoes or less from its four piers
- Major terminal Petrocedeno was down from May-Dec 2015 awaiting repairs after a fire
- Opposition party's win being challenged by president, creating further political upheaval and shipping risk

Massive stockpiles have accumulated as a result of logistics failings

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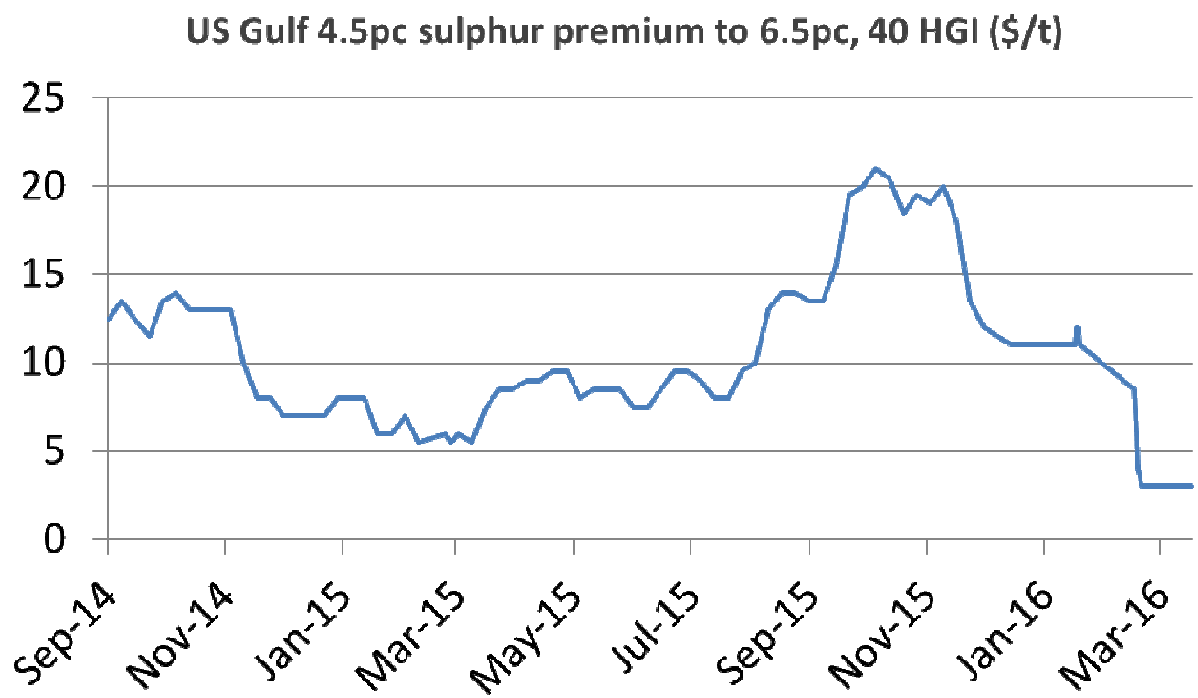
Uncertainty makes high/mid-sulphur spread volatile



- HGI is the same, but prices diverge based on sulphur
- HGI-based index distorts market prices and disadvantages coke buyers

Takeaways

- Coke market is increasingly unpredictable, driving the need for greater transparency
- Crude slate changes are making US production volatile
- Venezuelan political upheaval creating further risk of sulphur spread volatility
- These supply instabilities increase need for independently assessed cfr pricing, which Argus provides, rather than only US Gulf fob
- Widening sulphur spread makes high sulphur priced on a sulphur spread basis increasingly out of step with spot market
- China's sulphur limits could throw sulphur spreads further out of balance

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