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Short term outlook for the fertilizer market
Supply, demand and price trends

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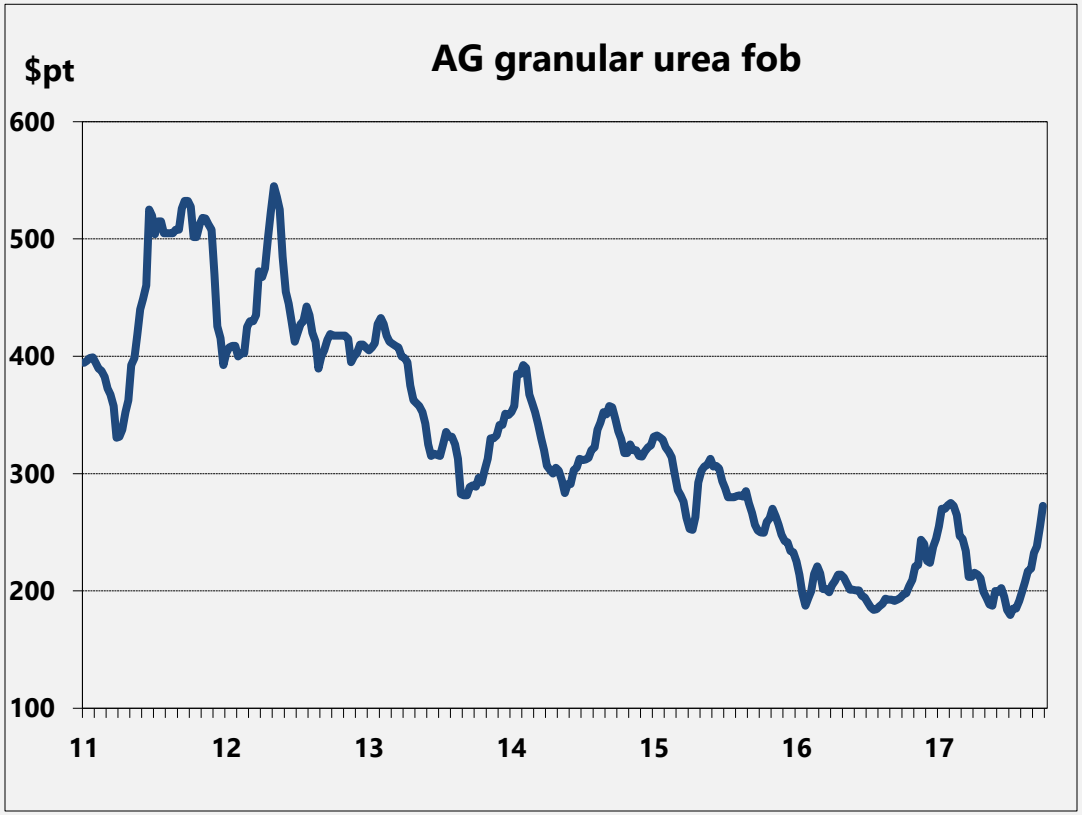
Avignon
November 2017

Nitrogen
- recovery phase
Phosphates
- Morocco vs Saudi Arabia
Potash
- overcapacity

Nitrogen
- recovery phase

Where we are today - Nitrogen

- Slow recovery phase beginning, after five year down-trend
- Market floor $180-185 fob in 2016 and 2017
- Chinese exports unprofitable in 2016
- Seeking a new equilibrium to absorb US capacity in 2017



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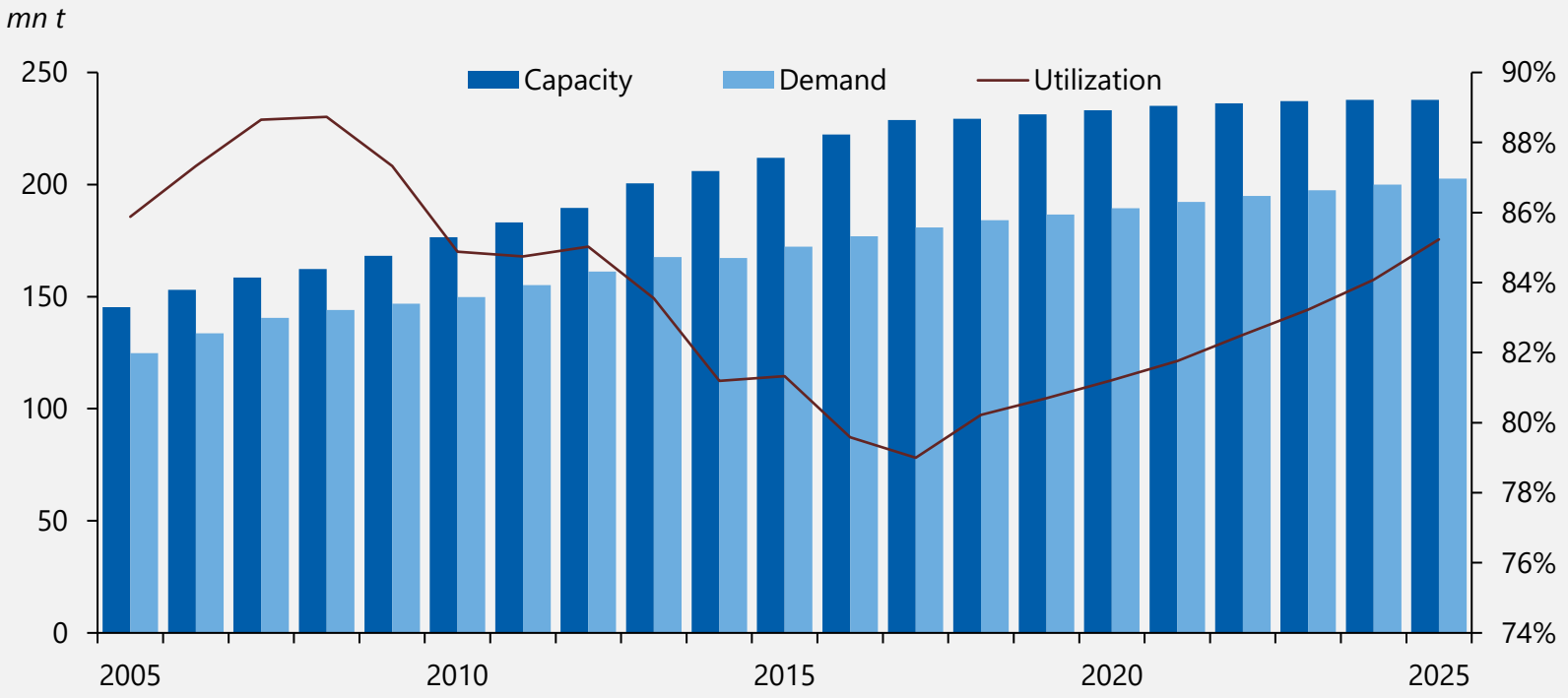
Urea Supply-Demand Balance



— *Argus FMB Strategy Report 'World Urea Outlook to 2030*

Nitrogen Supply-Demand Outlook

- **Urea capacity growth is slowing**
  - Major expansion phase is almost complete
  - Closures in China and elsewhere balancing new capacity
- **Capacity utilisation forecast to rise**
  - This should permit higher average prices than in 2016-17
  - Utilisation not expected to reach 2012 level
- **Demand growth is modest, averaging about 1.5pc a year**
  - Many markets are mature, growth concentrated in a few regions and non-fertilizer uses

Urea capacity	mn tonnes
2012	190
2017	229
2021	235
Capacity Utilisation	percent
2012	85
2017	79
2021	82
Urea demand	mn tonnes
2012	161
2017	181
2021	192

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Firm (non-China) large-scale urea projects

Granular urea m t/yr

	Company/location	M t/yr	status
2017			
Iran	NPC, Pardis 3	1.1	On-stream
Bolivia	YPFB, Cochabamba	0.7	Ramping up
Russia	PhosAgro, Cherepovets	0.5	On-stream
US	Koch, Enid	1.0	Ramping up

2018			
India	BVFCL, Namrup Assaam (net urea)	0.6	
Turkmenistan	Turkmen Chemical , Garabogaz	1.2	
Azerbaijan	SOCAR, Sumgait	0.7	
India	Chambal, Gadepan	1.4	
Nigeria	Dangote Phase 1	1.2	
Total expansions 2017-2018		9.4	
Closures predicted in China 2016-2017		8.2	
Closures elsewhere		1.0	

Argus FMB Strategy Report: World Urea Outlook to 2028

2019 and beyond

• Iran – Lordegan project under construction	• 1.1mn t/yr gran urea
• Nigeria – Dangote project under construction	• 2 x 1.27mn t /yr gran urea
• India – proposed revival of sick units	• Indeterminate
• Russia – Nahodka project construction start in 2018	• 2mn t/yr gran urea
• Brunei – EPC contract signed for ammonia-urea unit	• 1.1mn t/yr gran urea

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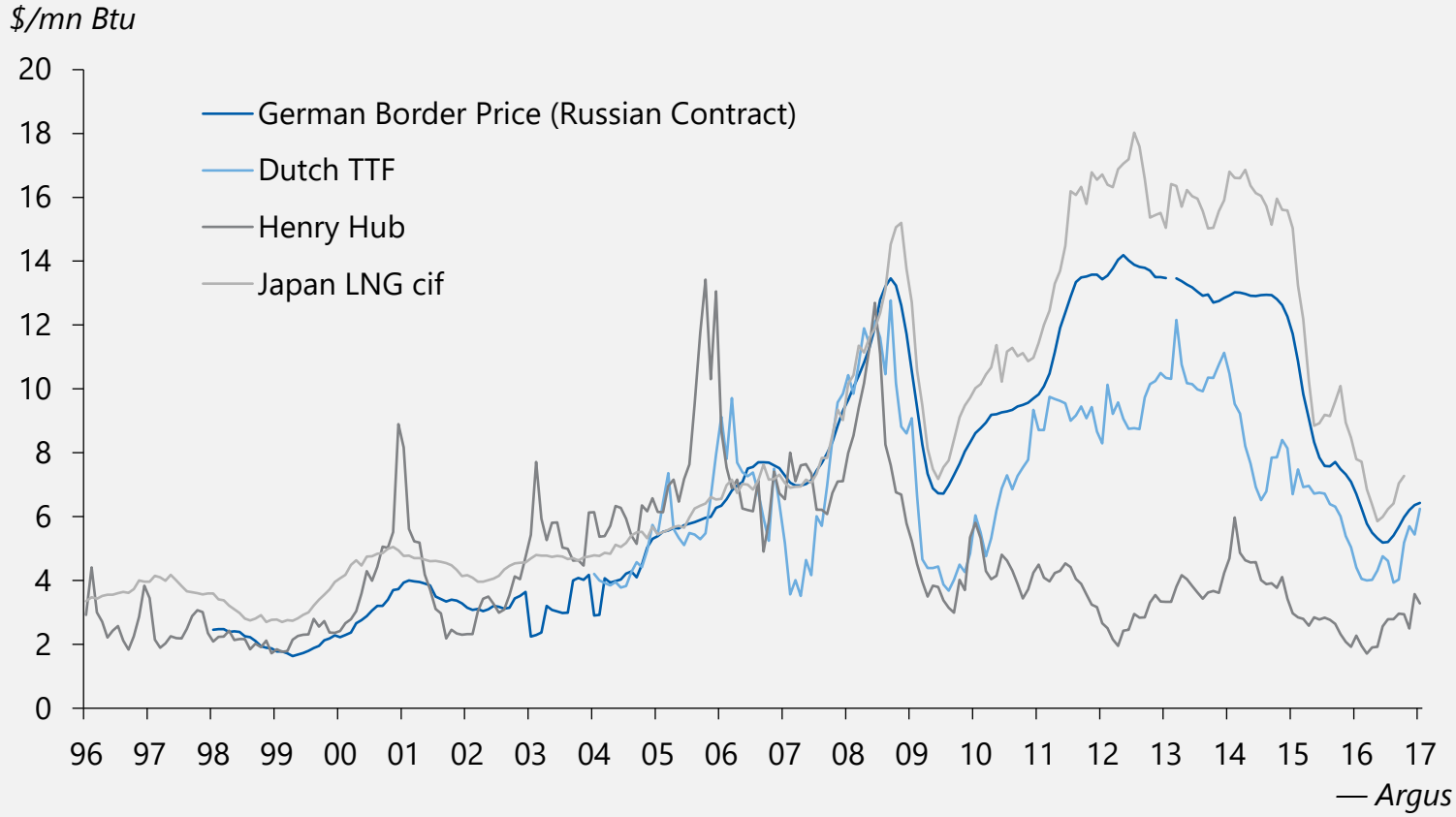
Nitrogen Supply – Energy

- Supply developments are driven by energy costs, except for a few import substitution units, e.g. India
- Gas prices have been converging in a low oil price world and are likely to remain low
- This is led to lower-than-expected nitrogen fertilizer prices
- Companies are continuing to launch ammonia-urea projects, despite current pricing, where there is low-cost gas – below $2.50/mnBtu

Natural Gas price convergence

- Oil price decline and the globalization of natural gas markets – *via* a flood of new LNG supply – have been key



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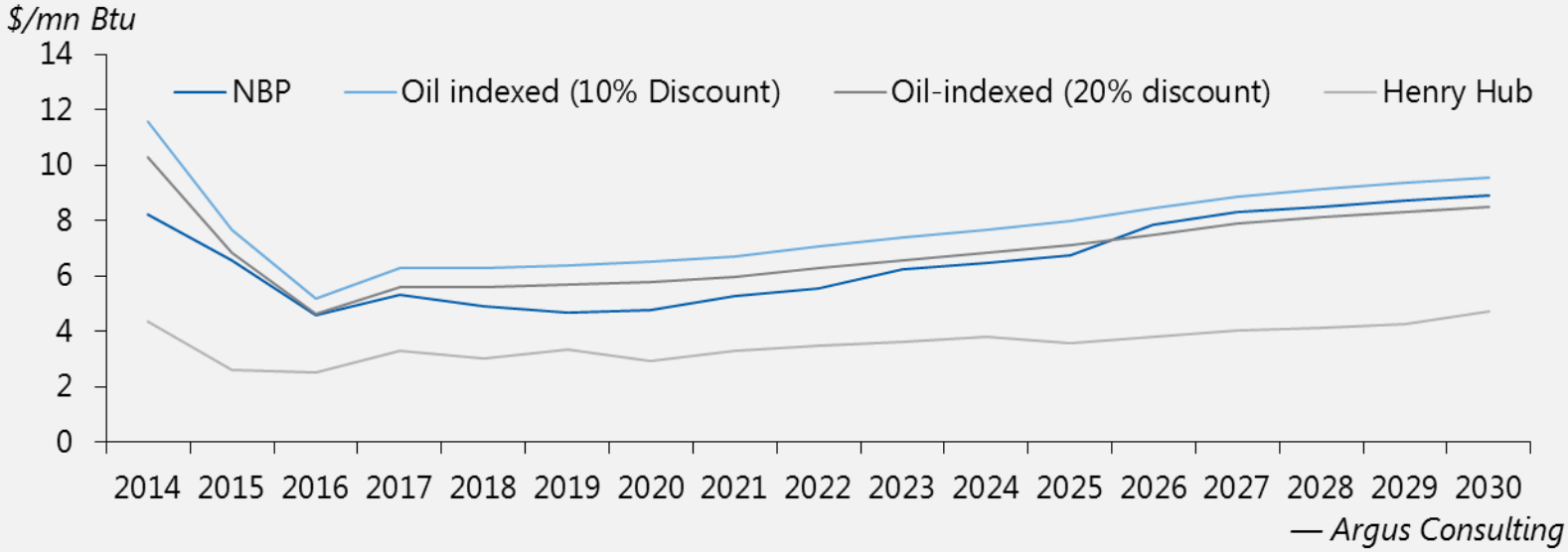
Henry Hub and northwest European gas prices to 2030



Shale gas glut pushes US LNG exports to Europe

US LNG exports leading to convergence with European and other global gas markets

Slow oil price recovery and growth in LNG keeps gas prices low to 2020.

Post-2020: rising oil prices and lower global gas surplus (decline in EU gas production and growing gas-based power in China & India) will drive up global gas prices

Oil: Structural shifts in ammonia and urea pricing

- +/- $15/bl shift in long-term oil prices leads to +/- $35/t in ammonia prices
- +/- $15/bl shift in long-term oil prices leads to +/-$25/t shift in urea prices
- New long-term oil price $70/bl in constant dollar terms is $40/bl below expectation in 2014…Therefore structural break in oil pricing results in:
  - $90-95/t downward shift in ammonia
  - $60-65/t downward shift in urea prices

Nitrogen demand

- Consumption growth concentrated in key sectors

- Urea consumption estimated at about 176mn tonnes in 2016
- Long-term average growth in urea demand 1.4pc a year
- Equivalent to 2.5mn product tonnes annually
- Agricultural demand has reached a plateau in many countries
- But some large markets continue to grow, as does industrial usage

Growth areas

- Eastern Europe/FSU
- Brazil
- Argentina
- Africa
- Non-fertilizer uses

Growth areas – FSU/Eastern Europe

- **Russia**
- Sanctions forced the expansion of Russian agriculture
- AN deliveries up 24pc in 2016 to 4.1mn tonnes
- Increased AN production in Russia has not resulted in increased exports
- Urea production up 1mn t in 2016 to 7.2mn t, for export

- **Eastern Europe**
- Urea imports up 30pc in 2016

	2015	2016
Bulgaria	299	341
Romania	196	461
Serbia	175	324
Hungary	100	125
Slovenia	27	42
Slovakia	134	154
Czech	300	336
Total	1,230	1,782

Growth areas - 2

- **Brazil/Argentina**
- Record imports in Brazil in 2016 – 4.6mn t. Up from 3mn t 2012
- Consumption 5.5mn t and rising
- Domestic production 1mn t, Project on hold
- Argentina recovering as agri outlook improves
- Growth 5-8pc forecast

- **Non-fertilizer uses**
- Currently estimated at about 12pc of total urea consumption
- Approx 21-22mn tonnes a year
- Forecast to grow to 16pc of total urea consumption over the long term – 33-34mn t
- Main driver is adoption of DeNOx technology in vehicle engines, power plants and shipping

Urea Trade

- Decline in US and Indian imports balanced by rises elsewhere

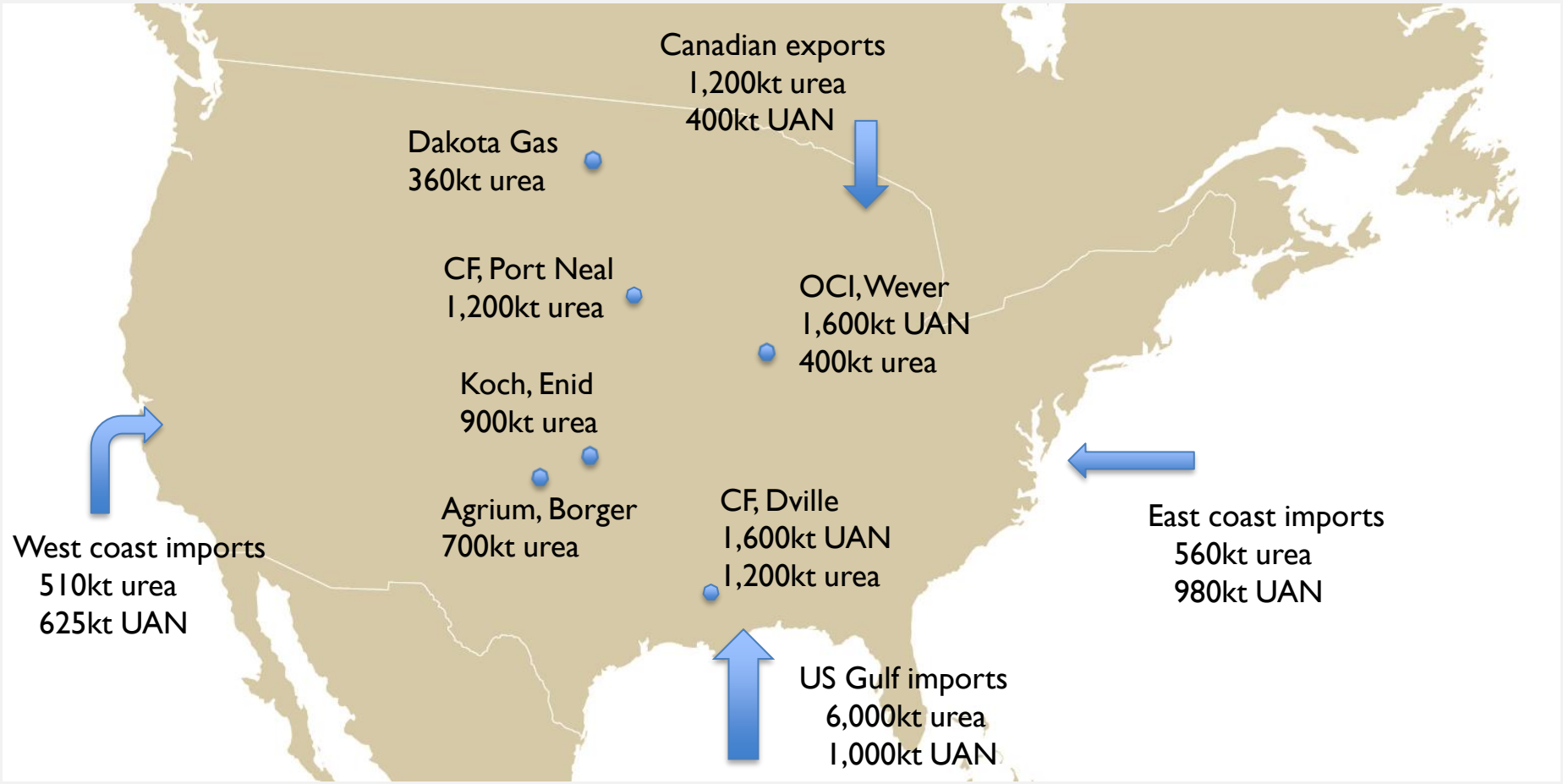
- Top 10 import markets account for approx 61pc of world trade
- Six out of ten increased imports in 2016-17
- Turkey, Australia and probably Thailand will fall in 2017-18
- Indian imports static, but US will fall further

Top 10 urea import markets		
000t	2015-16	2016-17
US	8,299	6,907
India	8,474	5,481
Brazil	3,463	4,975
Australia	1,795	2,613
Thailand	2,048	2,650
Turkey	1,915	2,645
Mexico	1,370	1,722
France	1,567	1,520
South Africa	840	831
South Korea	780	801
Total	30,551	30,145

Key market developments

US market evolution

- new production will have most impact in 2017-18



Imports have to fall in 2017-18
- but where from?

- Industry estimates are that imports need to fall 2.5mn t from 2016 level
- Total non-AG imports were about 2mn t in 2016
- AG shipped 3.75mn t to the US in 2016, 52pc of total imports
- Low cost producers in the Middle East will seek to maintain a market share

US urea imports by vessel	
2013	5,311kst
2014	6,928kst
2015	7,032kst
2016	5,988kst
2017 Jan-Sep	4,540kst

Source: US Dept of Commerce

Indian imports shrank in 2016 - and may fall again in 2018

- Sales fell 7.5pc in 2016-17, first time for many years
- Imports via DOF tenders fell to 3.4mn t last year
- Production stable, new capacity still 1-2 years off
- New DBT roll out could affect sales, trials have seen falls of 10-20pc in offtake

India: urea production, sales, imports - mn tonnes

	2015-16	2016-17	2017-18 forecast
Production	24.5	24.2	24.2
Imports	8.5	5.5	6.0
Sales	32.0	29.6	30.0
Stocks	0.93	1.3	1.5

Source: FAI *April-February

China's capacity falling

- high cost plants closing

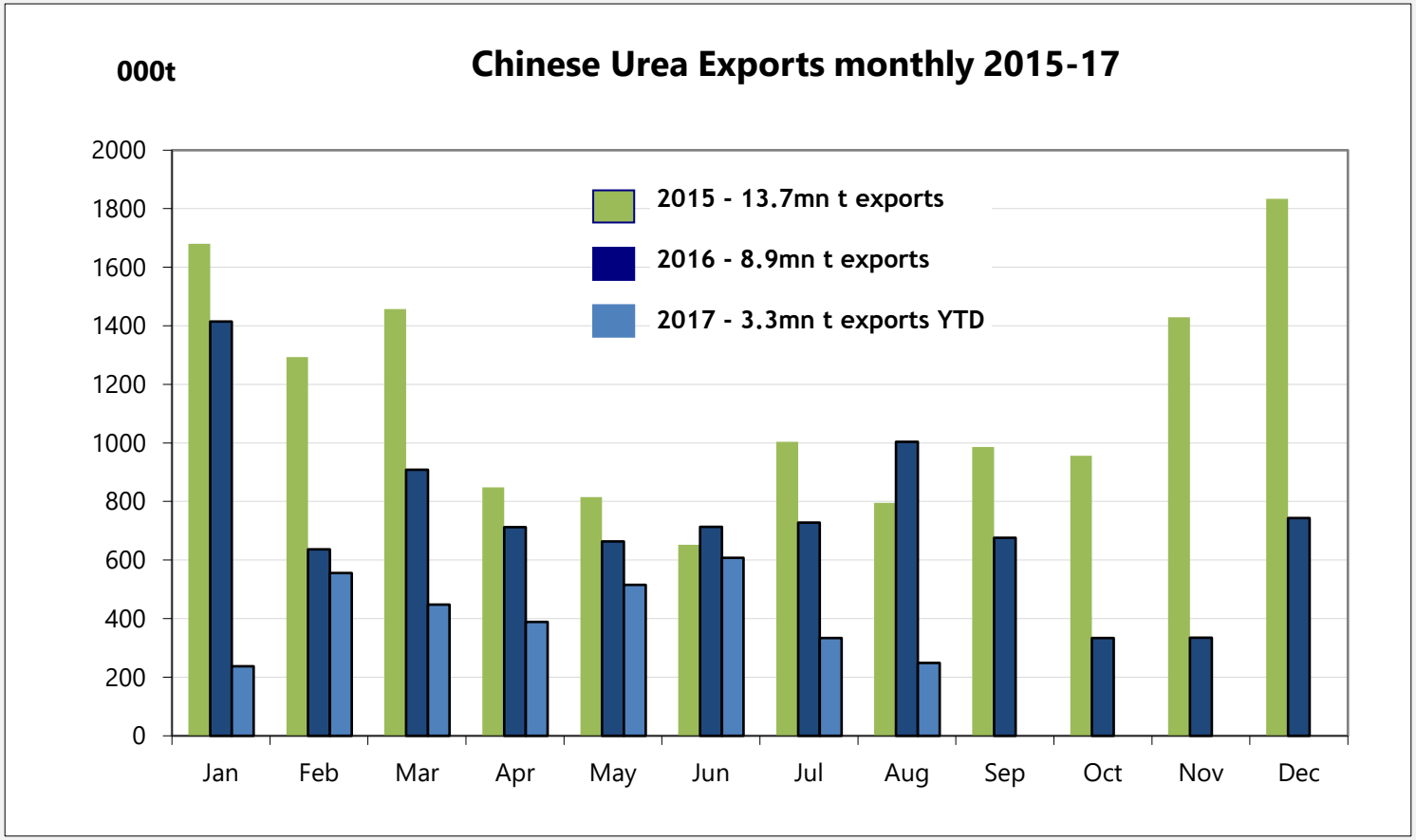
- Capacity peaked in 2014, 70pc coal-based
- Old, inefficient plants are being closed permanently
- Production fell to 62mn tonnes in 2016, 77pc operating rate at the active units
- Urea demand estimated at 50mn tonnes in China

Chinese urea capacity/output - mn tonnes

	2015	2016	2017
Capacity	80.23	80.63	77.10
Production	70.59	61.92	
Closures	3.94	4.33	5.00
Start ups	3.98	0.80	0.30

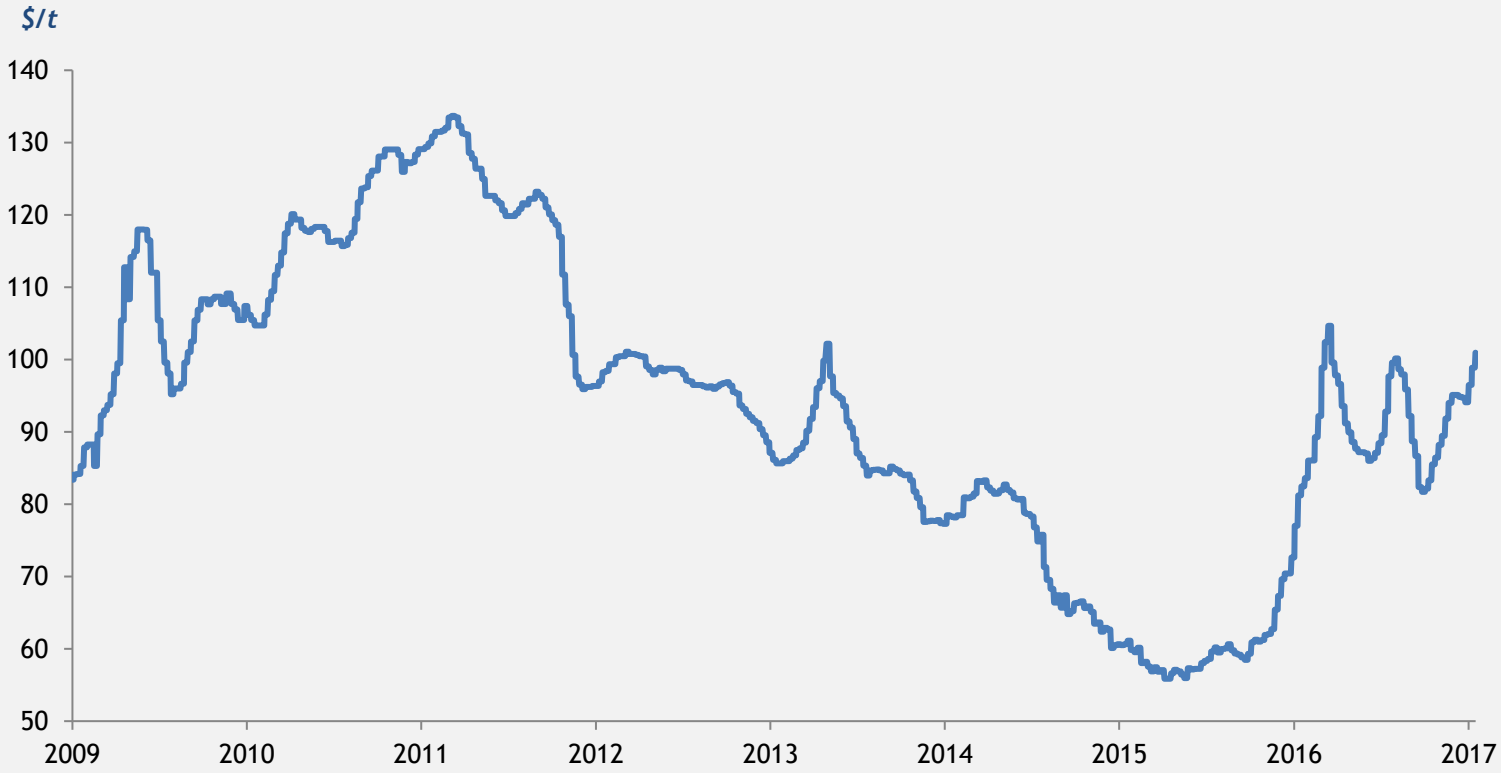
Source: CNFIA

Exports shrink nearly 5mn t in 2016



China coal prices

- cost of coal up $30-40/t to fert plants



Notes: 5500 fob: Qinghuangdao - China domestic within 90 days prompt, London close mid-point - Argus Media

Price Outlook

Average prices higher in 2017

- oversupply mitigated by lower Chinese exports

- Prices bottomed out at similar low to summer 2016
- Higher energy costs expected to keep floor above $200 fob China in future
- Highest prices of the year in January and Q4
- Readjustment to new capacity means US market is lagging
- Further improvement in prices foreseen 2018 onwards

AG gran urea average	$pt fob
2011	448
2012	433
2013	349
2014	329
2015	281
2016	206
2017 YTD	227

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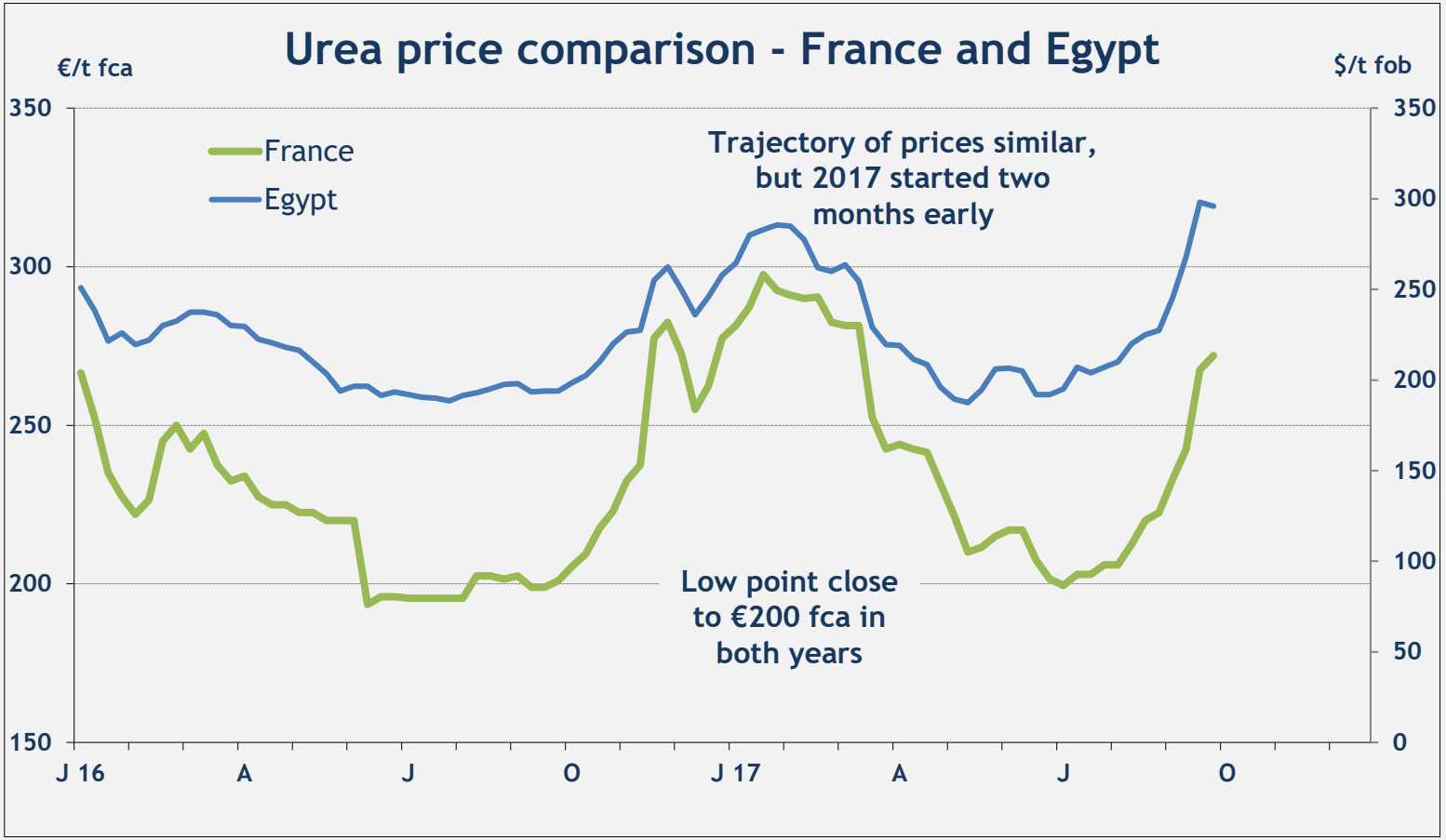
Prices following the same seasonal pattern



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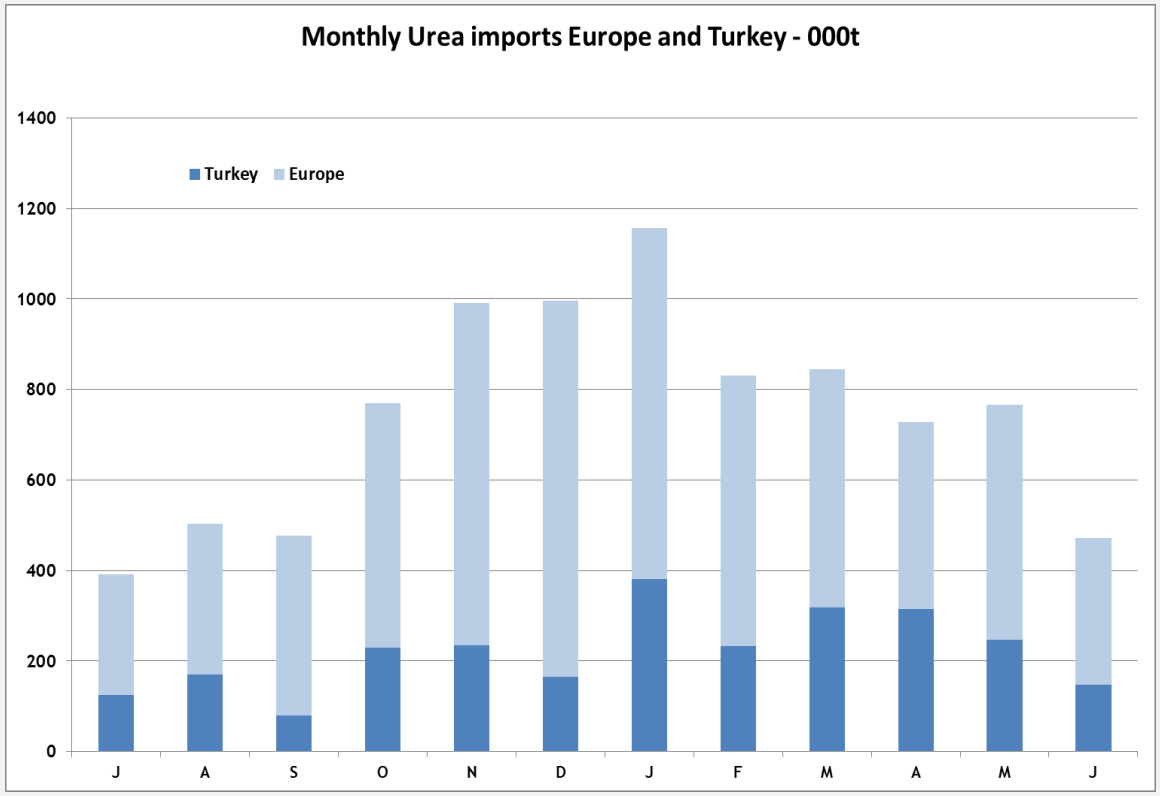
European imports close to 7mn t annually

Europe and Turkey account for nearly 20pc of world trade

Peak imports around 1mn t/month

80-85pc of Egyptian exports move to Europe and Turkey

Forward selling a feature of European markets

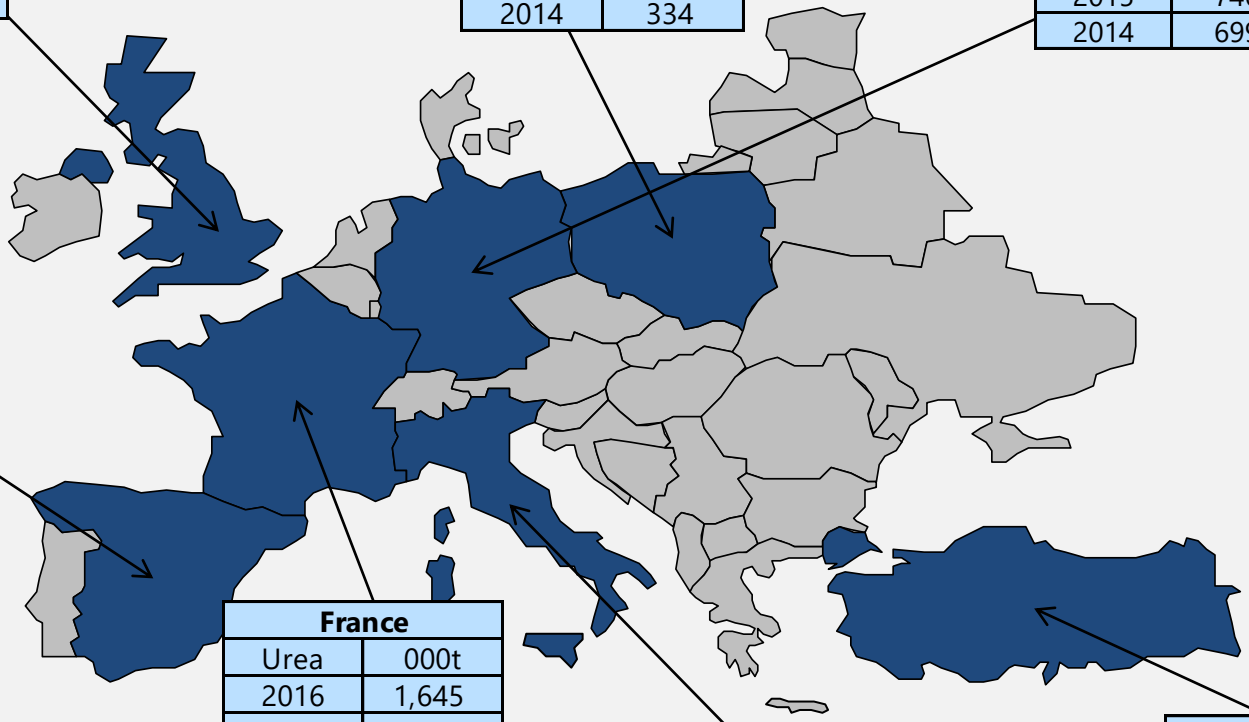


Europe

United Kingdom	
Urea	000t
2016	1,125
2015	924
2014	879

Poland	
Urea	000t
2016	637
2015	475
2014	334

Germany	
Urea	000t
2016	985
2015	746
2014	699



Spain	
Urea	000t
2016	771
2015	877
2014	919

France	
Urea	000t
2016	1,645
2015	1,445
2014	1,645

Italy	
Urea	000t
2016	963
2015	845
2014	839

Turkey	
Urea	000t
2016	2,261
2015	1,570
2014	1,641

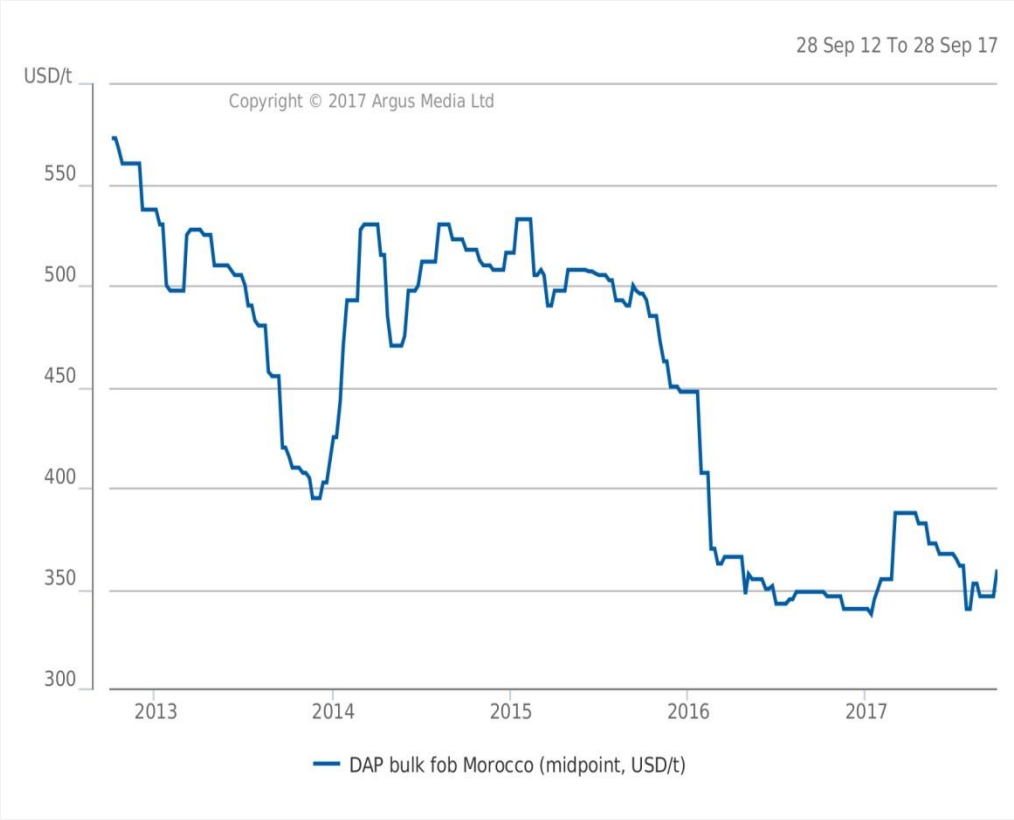
Phosphates

- Morocco vs Saudi Arabia

Where we are today - phosphates

- Supply consolidating in China & US
- OCP Morocco and Saudi new superpowers
- Trader influence receding as producers sell direct or invest down supply chain
- Market oversupplied – rise of China and stagnating Indian DAP market
- Price floor reached January 2017 at $340/t fob
- China talks of environmental curbs leads to market rebound

DAP Morocco fob



Outlook for phosphate market set by expansions in Morocco and Saudi Arabia

- OCP will add 4.5mn t P2O5 in new capacity
- Ma'aden will add 3.2mn t P2O5 in new capacity
- Global demand for DAP/MAP currently approx 26mn t P2O5, trade 12mn t P2O5
- Demand forecast to rise at 1.1pc/yr long-term, concentrated in South America, South Asia and sub-Saharan Africa
- Major swing factors India and Latin American import purchases and Chinese exports

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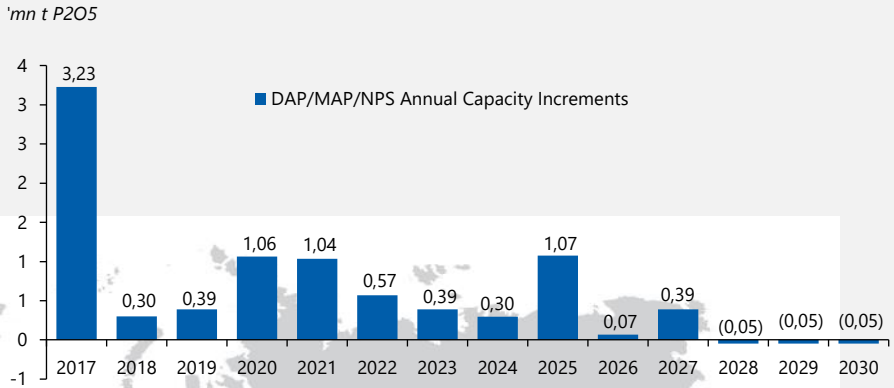
DAP/MAP/NP expansions

2017-2030 firm capacity additions

mn t/yr P_2O_5



OCP JPH – *trade*
↑ **3.8**

OCP SPH – *trade*
↑ **0.2**

OCP Boucraa – *trade*
↑ **0.5**

MWSPC – *trade*
↑ **1.5**

Ma'aden Phos3 – *trade*
↑ **1.7**

China – *local/trade*
↓ **0.6**

Unspecified project
↑ **0.45**

PT Pupuk Kaltim – *local*
↑ **0.2 (Acid fo NPK production)**

PT Pusri – *local*
↑ **0.2 (Acid fo NPK production)**

Yara/Galvani Serra do Salitre – *local*
↑ **0.2**

CMOC Goias – *local*
↑ **0.4**

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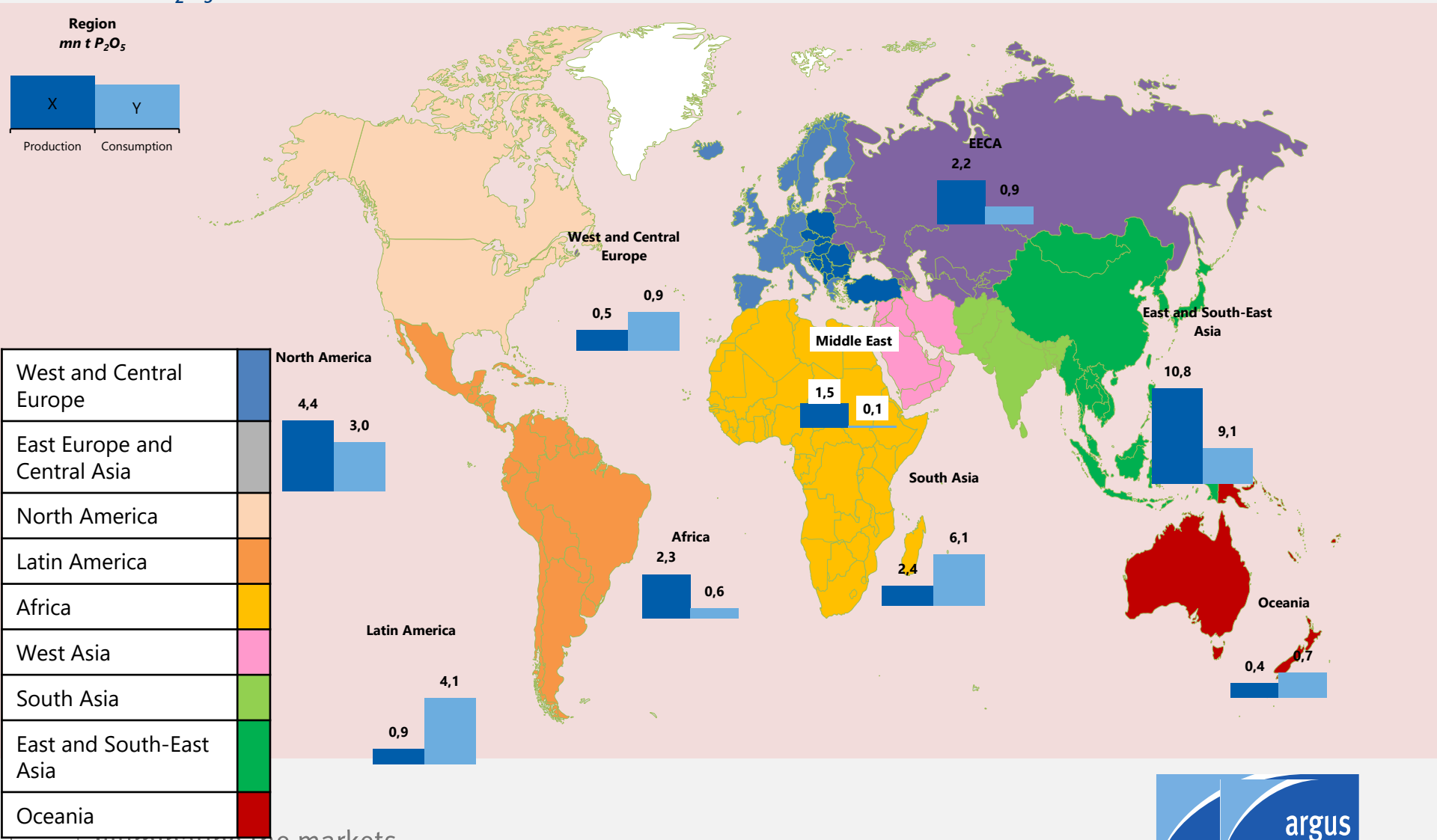
illuminating the markets

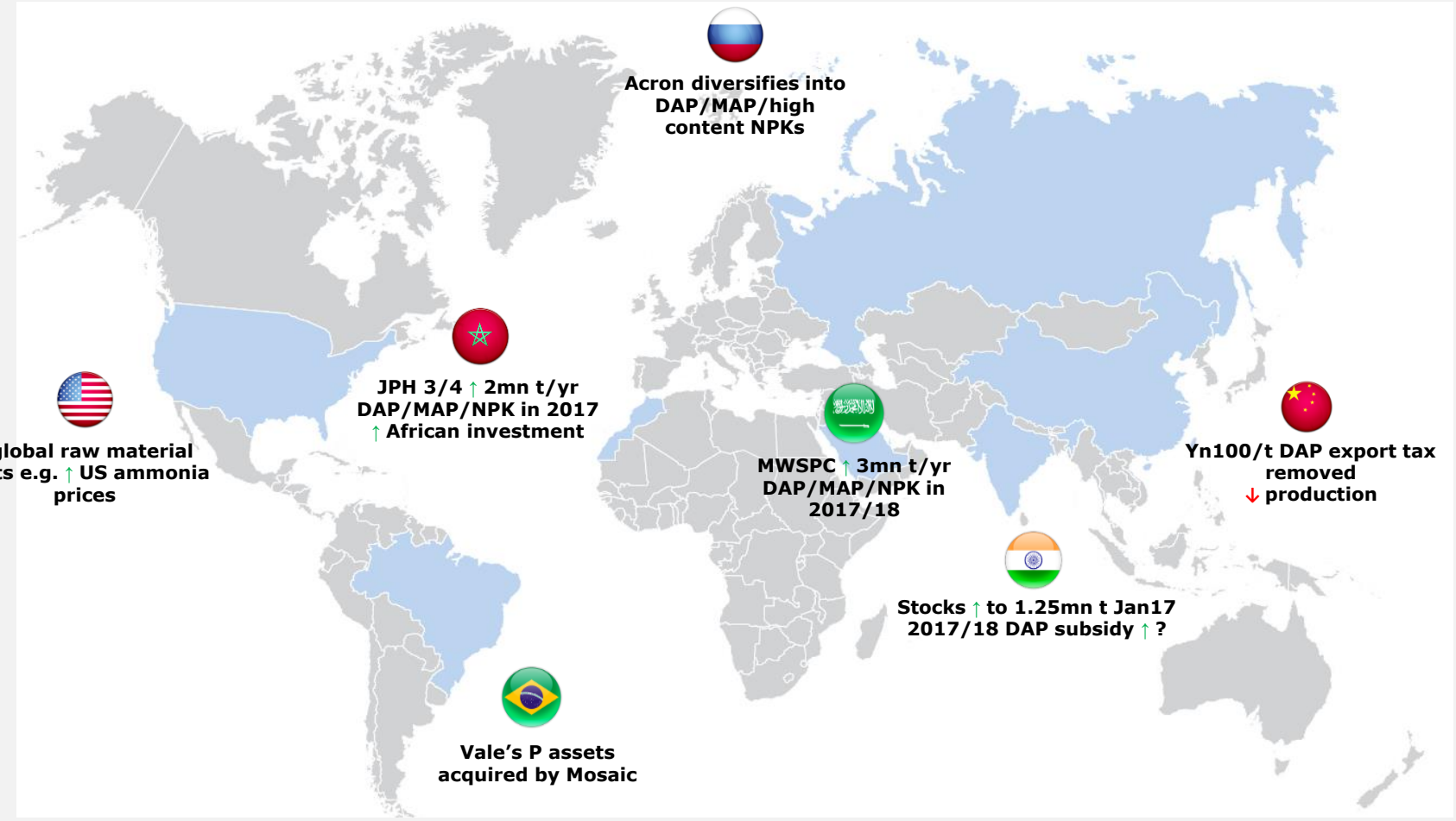
2016 global DAP/MAP production & consumption

mn t P_2O_5



illuminating the markets

Factors affecting short term supply/demand balance from 2017 – DAP/MAP

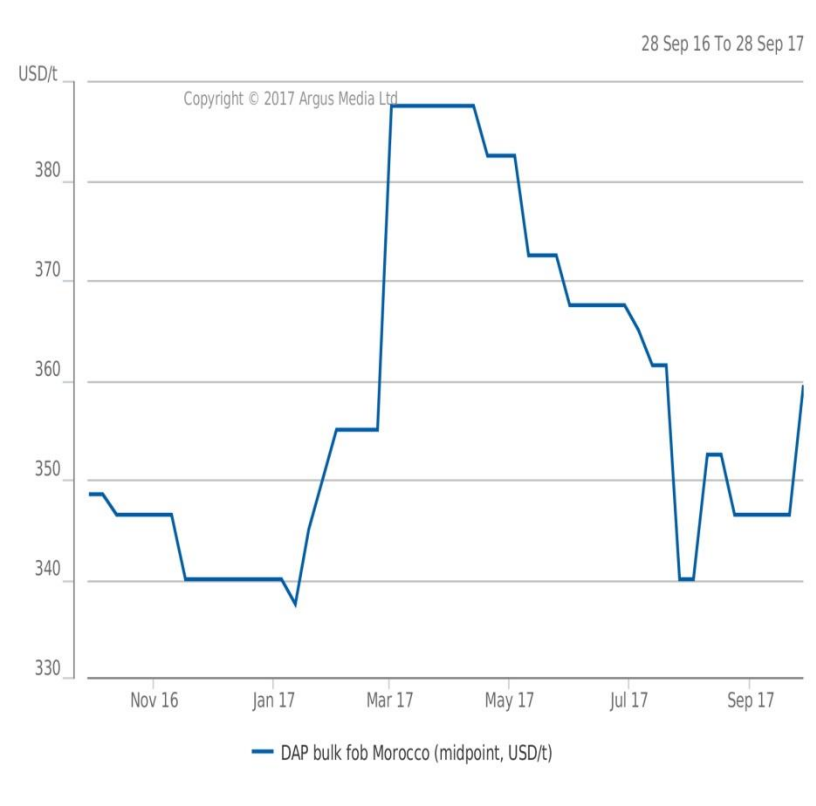


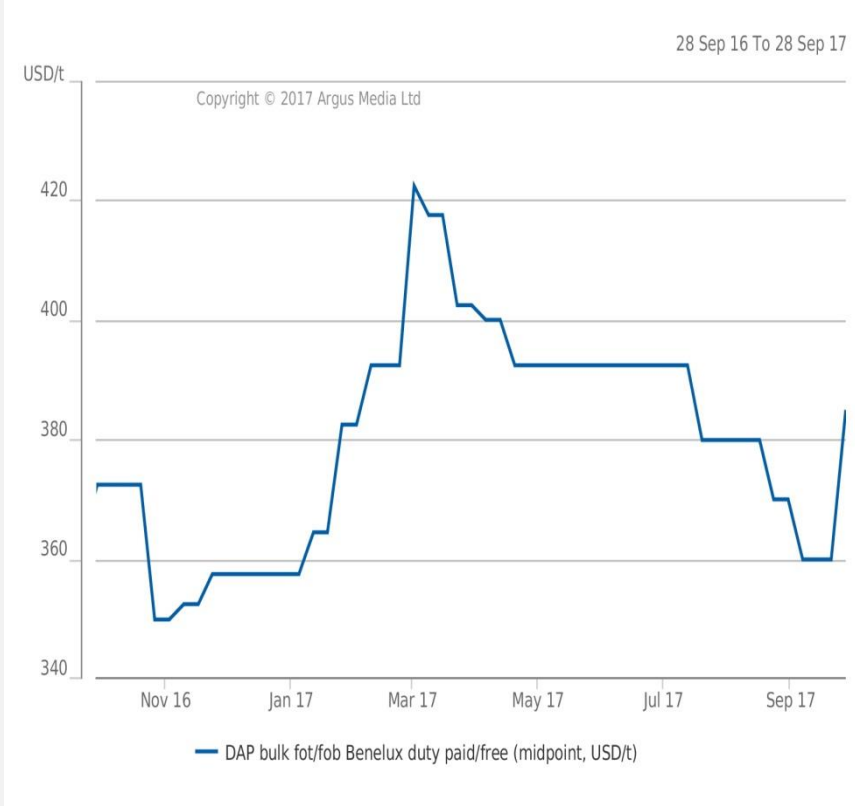
Argus Monthly Phosphates Outlook – February 2017

Phosphate prices

Morocco fob and NW Europe fca

… rate of new capacity utilisation in Morocco/Saudi Arabia will be key to shaping prices





…with further Chinese restraint required to balance the market

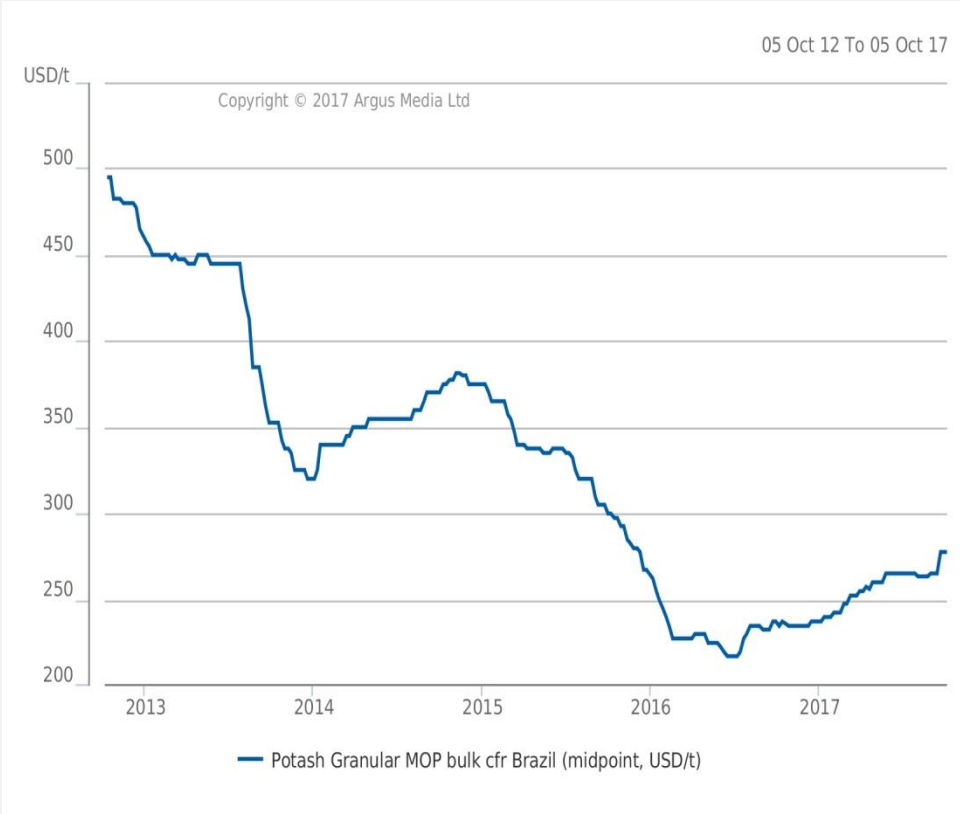
Potash

- overcapacity

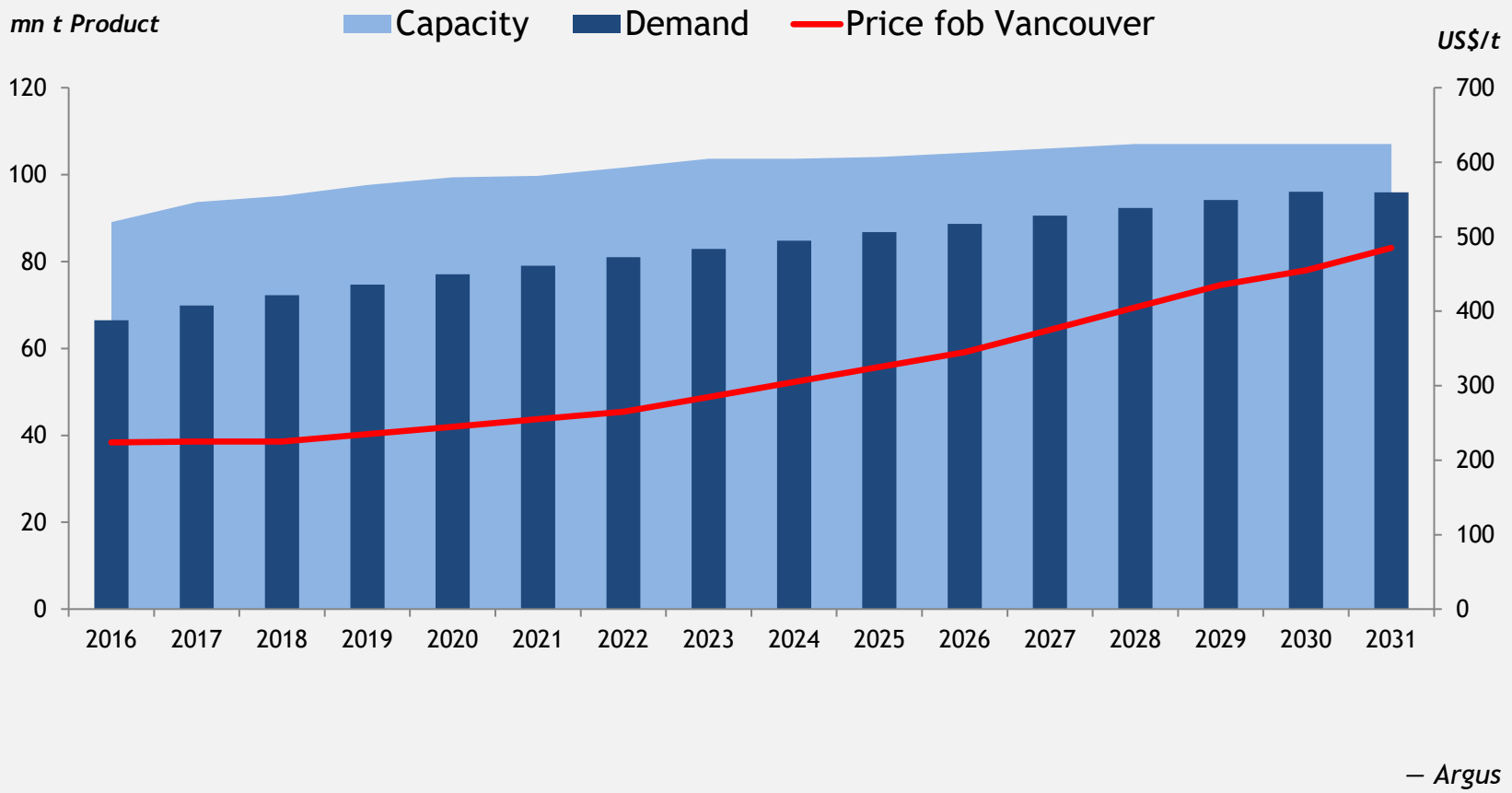
Where we are today - potash

- Prices bottomed out in mid 2016 around $220 cfr
- Capacity rose by nearly 20mn t – 28pc – between 2012 and 2016
- Another 21-22mn t could start up over the next 5 years
- Supply forecast to rise 3.8pc/yr and demand at 2.5pc/yr
- Market oversupplied; producers will have to reduce operating rates

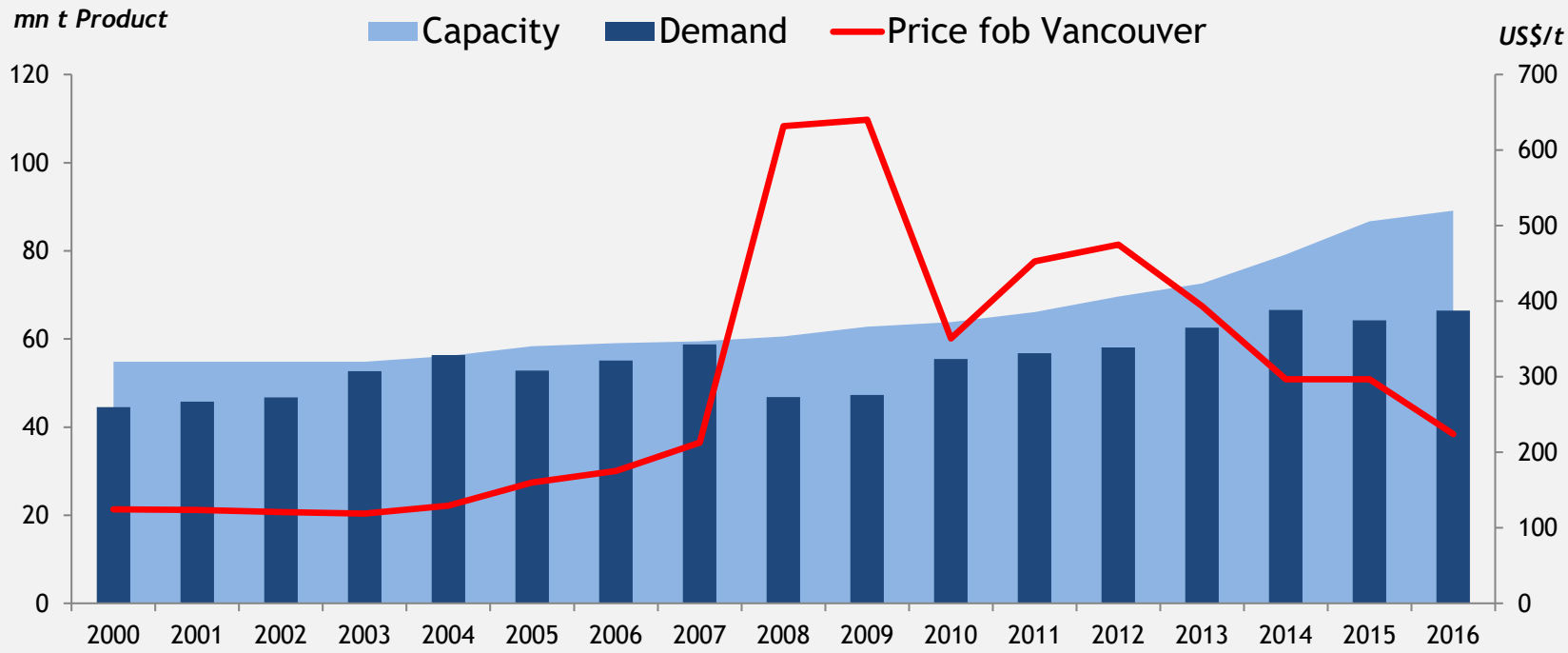
GMOP Brazil cfr



Potash - global capacity, demand and price forecast to 2031



Potash - global capacity, demand and prices 2000-16



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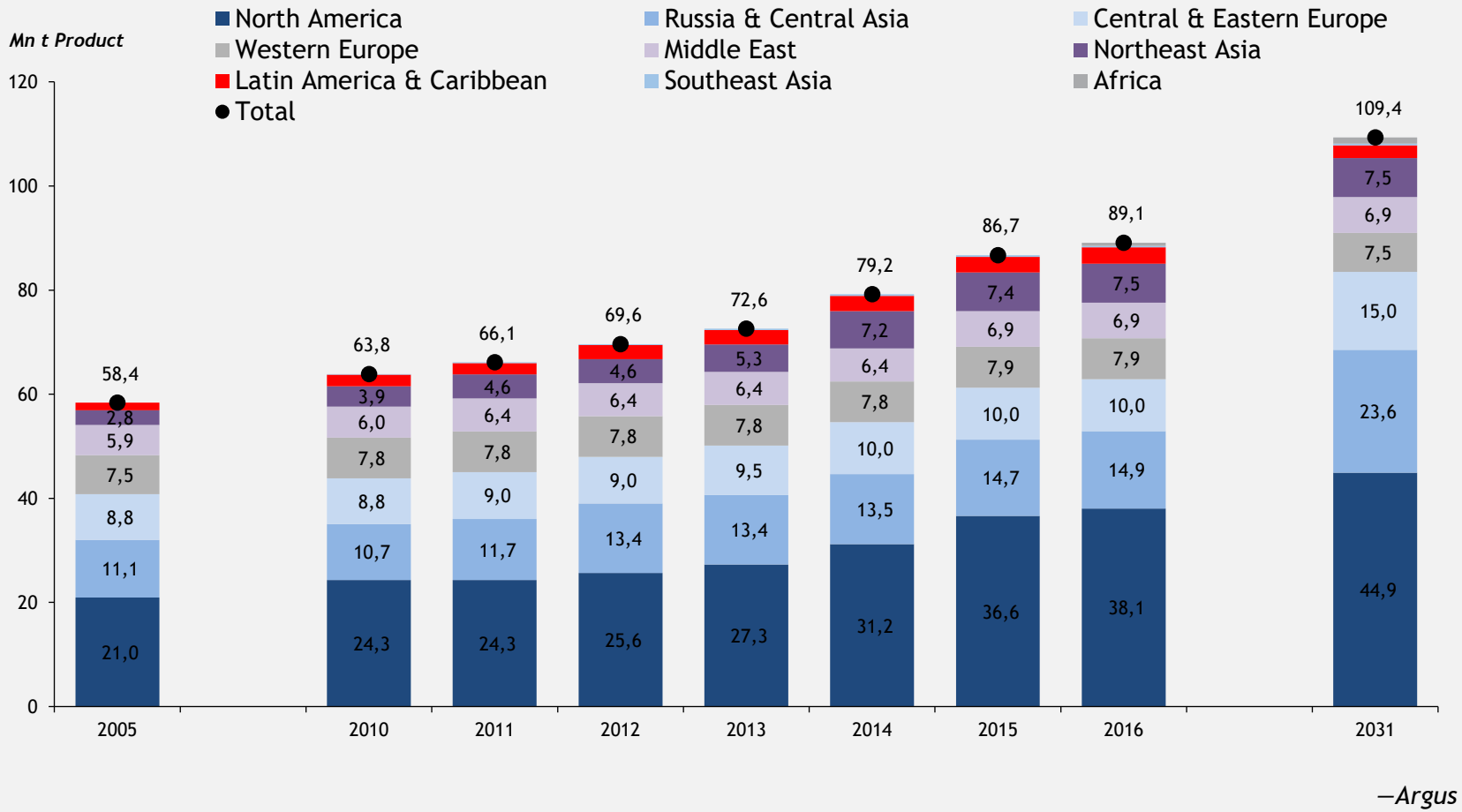
World MOP Capacity



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New MOP capacity

Company/project	Location	Commissioning	Capacity t/yr MOP
Turkmenhimiya	Garlyk, Turkmenistan	1Q17	1,400,000
K+S Kali, Bethune	Bethune, Saskatchewan, Canada	2Q17	2,860,000
Eurochem, Usolsky	Palashersk, Russia	Late 2017	3,700,000
Mosaic, K3	Esterhazy, Saskatchewan, Canada	2017	900,000
Eurochem, VolgaKali	Kotelnikovo, Russia	2018	4,600,000
Belaruskali	Petrikovsky, Belarus	2019	1,500,000
Uralkali	Ust Yaiva, Russia	2020	2,800,000
Uralkali	Solikamsk 2, Russia	2020	2,300,000
Acron - VPC	Talitsky, Russia	2021	2,000,000
Slavkali	Nezhinsky, Belarus	2022	2,000,000

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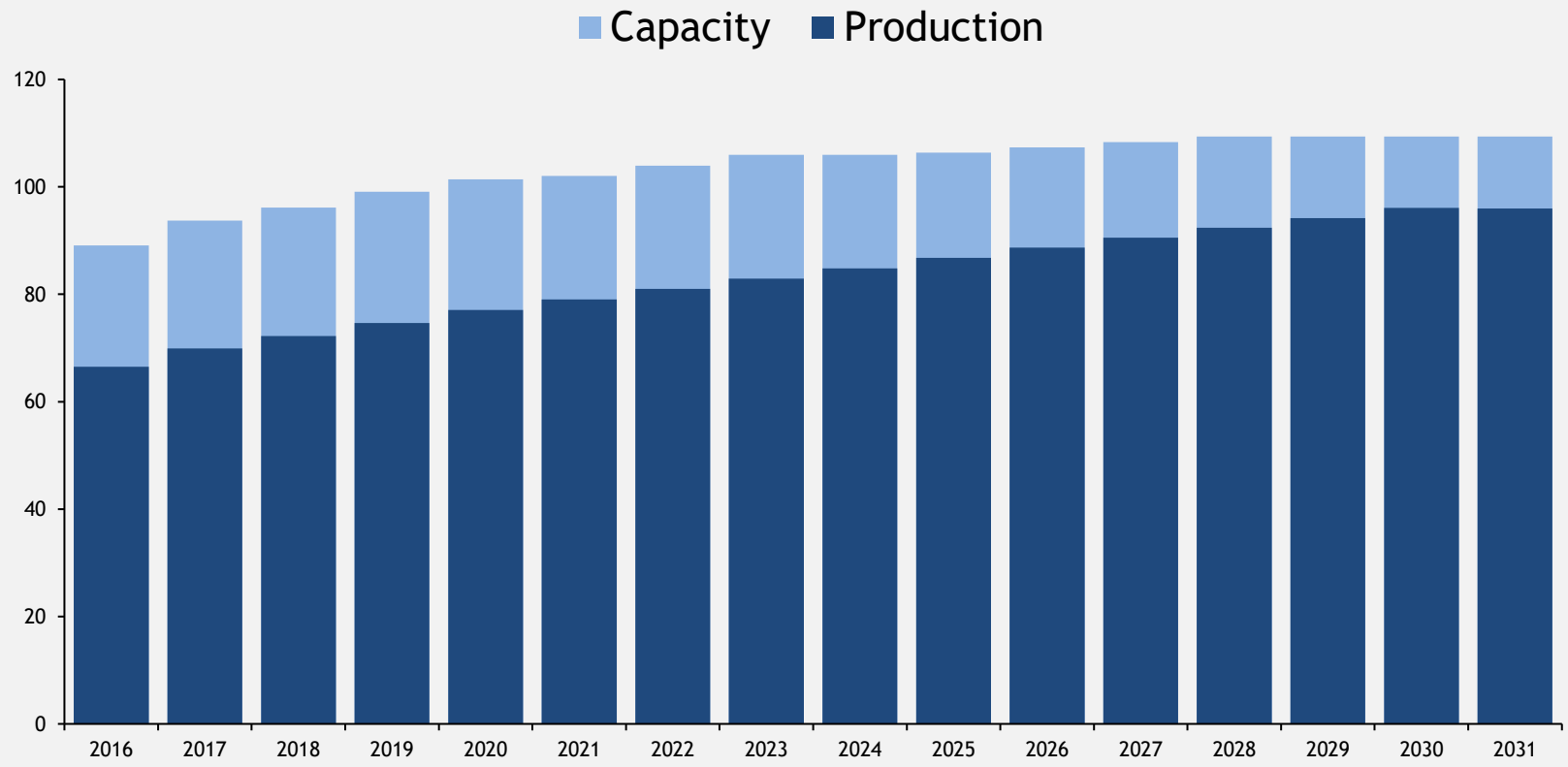
Global MOP capacity and production forecast



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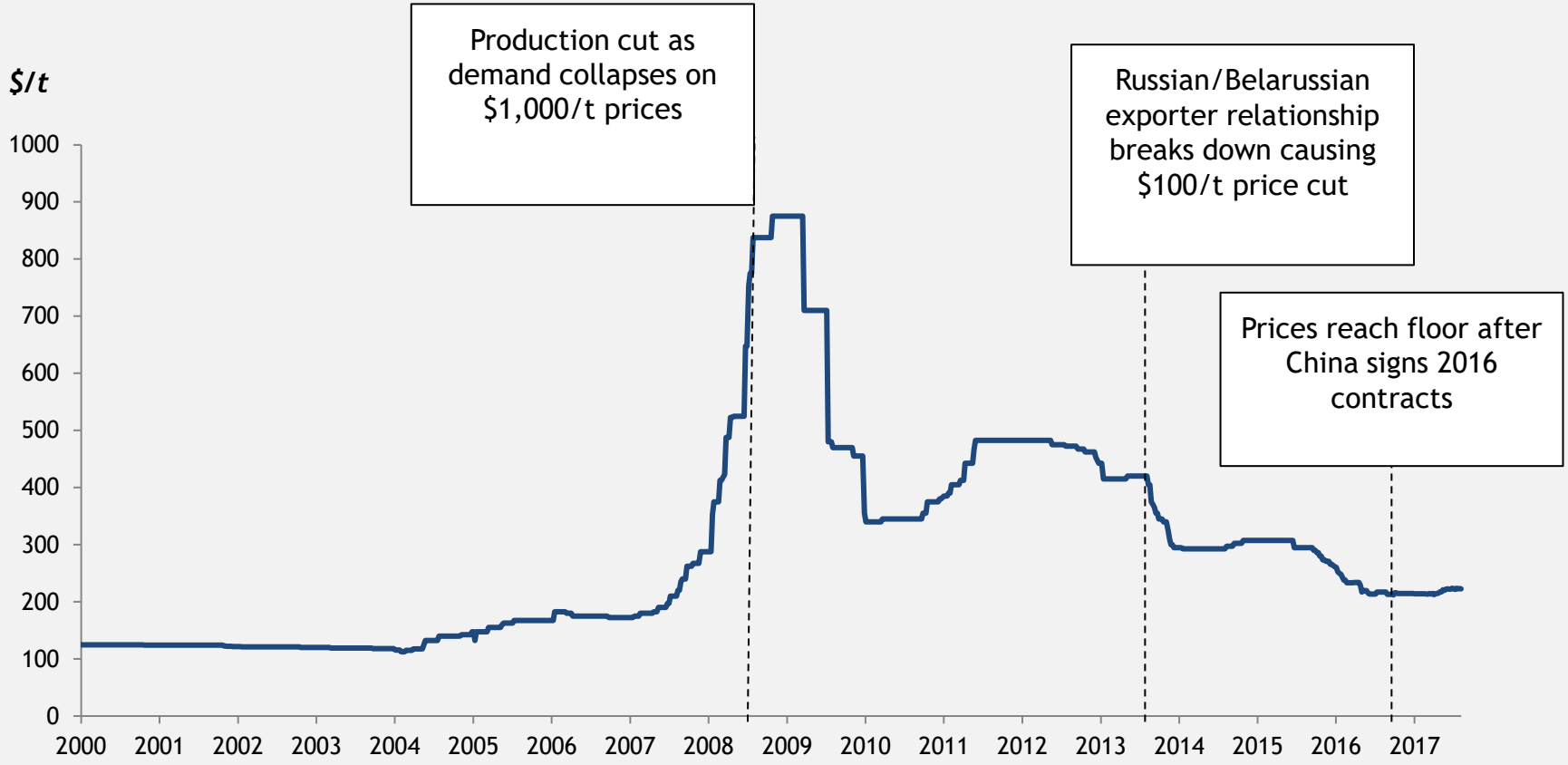
MOP prices fob Vancouver 2000-17



Demand 2015-2031 - mn t KCl

	2015	2031	Change/yr
World	64.26	95.94	2.5%
Northeast Asia	15.10	30.78	4.6%
Latin America & Caribbean	12.58	19.80	2.9%
Southeast Asia	8.92	11.99	1.9%
North America	10.45	9.77	-0.4%
South Asia	5.98	7.68	1.6%
Central & Eastern Europe	3.33	4.78	2.3%
Western Europe	4.11	3.87	-0.4%
Africa	1.68	3.42	4.5%
Russia & Central Asia	0.95	2.21	5.4%
Middle East	0.46	0.82	3.6%
Australasia	0.70	0.83	1.0%

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