

Nitrogen fertilizer industry in transformation

"Two decades in review and journey ahead"

Dr Dimitrios Dimitriou

Senior Business Advisor Middle East Energy & Chemicals Advisory



Megatrends and Fertilizers



There are five major socio-economic driving forces

- Rapid urbanisation
- Climate change and resource scarcity
- Shift in global economic power
- Demographic and social change
- Technological breakthroughs













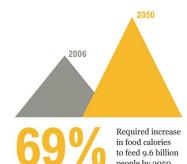




Combined population and GDP growth fertilizer consumption growing ~10 times since 1960's

Every day the world's population increases by





₩ WORLD RESOURCES INSTITUTE

Sources: http://ow.ly/rpfMN



FERTILIZERS

















Implications for the fertilizer industry

Fertilizer industry:

- 1. Urbanization results in less land available for agriculture.
- 2. Production of energy using hydrocarbons directly competes with producing hydrogen/nitrogen based fertilizers. A change in energy policy might free-up reserves for fertilizer production?
- 3. A growing population driven by birth rates and aging dramatically increases overall demand for food.
- 4. Demand for (higher quality) food increases dramatically with population rich countries (China and India) becoming more wealthy (increase in GDP per capita).
- 5. Digital technology solutions are appearing to help farmers increase efficiencies which may push down demand (e.g. digital soil mapping, precise agriculture, accurate weather forecast etc.)
- 6. Environmental implications of fertilizers production and use drive regulation and fertilizer production (eg. green ammonia) and crop technology (eg. nitrogen fixation)



The journey



Industrial nitrogen production has increased 85 times since WWII

Timeline of ammonia industry development

19th century 1910-1913 1913-1934 1946-2018











First ammonia synthesis commercial plant



From 1 plant in 1913 to >1000 ammonia and urea plants in 2018

1910 0.35 million tons 1913 <1 million tons

1934 2 million tons 1946 3 million tons

2010 165 million tons 2018 251 million tons

2% Haber Bosch

64% Haber Bosch

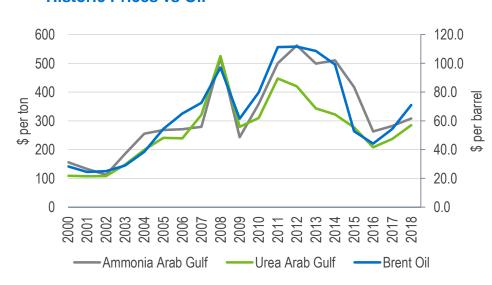
>99% Haber Bosch

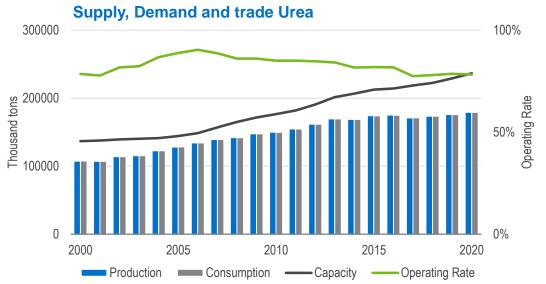


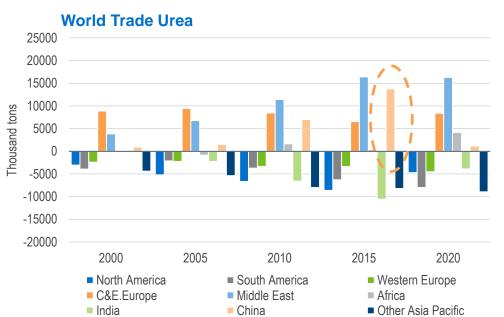
Some key trends over past decades – Global



Historic Prices vs Oil









Some outcomes of overuse





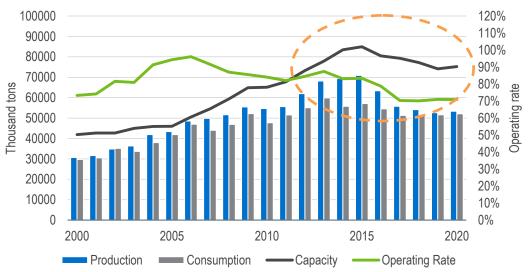


Some key trends in China

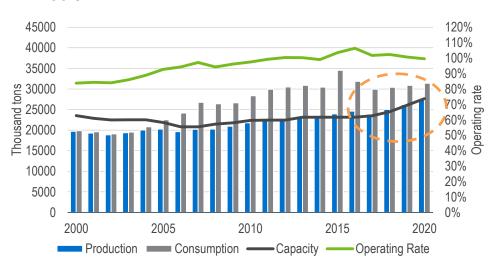




Supply, Demand and Trade Urea, China



Supply, Demand and Trade Urea, India

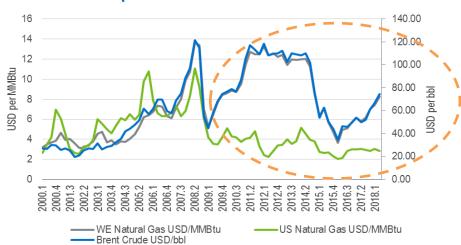




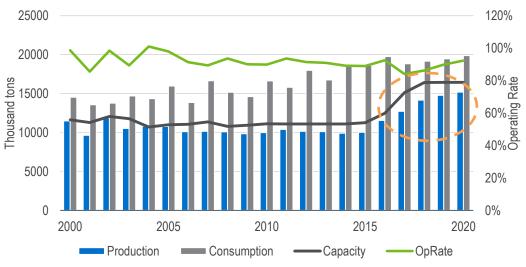
Some key trends in North America



Natural Gas prices vs Oil



Supply, Demand and Trade Urea



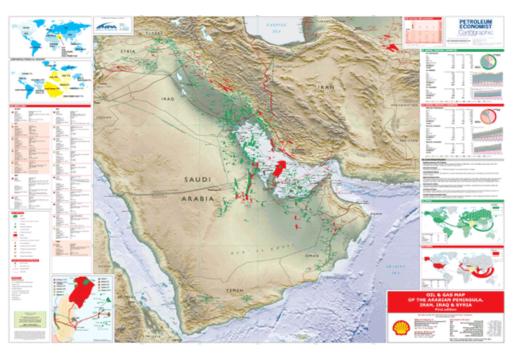
Cash Cost Margins Development



Nexant

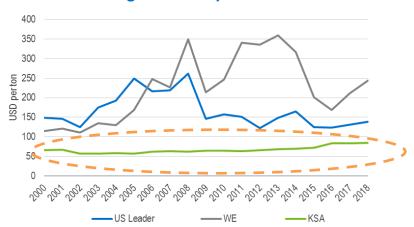


Some key trends in the Middle East

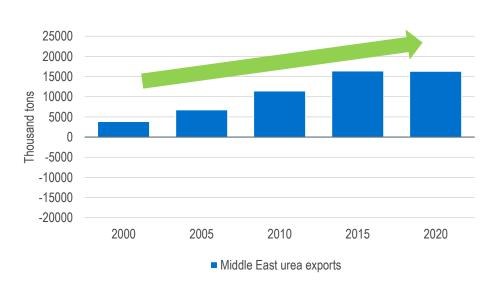


Supply, Demand and Trade Urea 35000 100% 90% 30000 80% 25000 70% Thousand tons 20000 15000 30% 10000 20% 5000 10% 2000 2005 2010 2015 Consumption ——Capacity ——Operating Rate

Cash Cost Margins Development

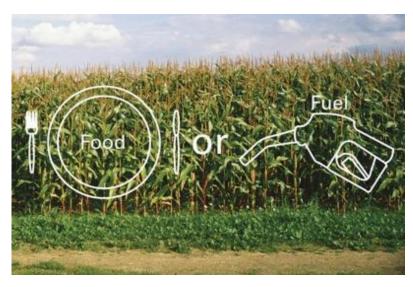


Urea Trade from Middle East

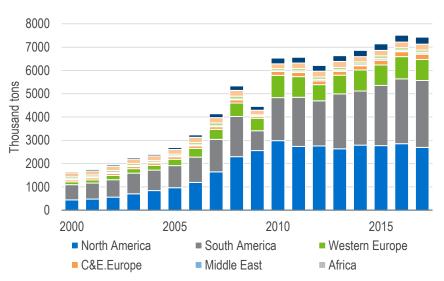




Some key trends over past decades –New applications

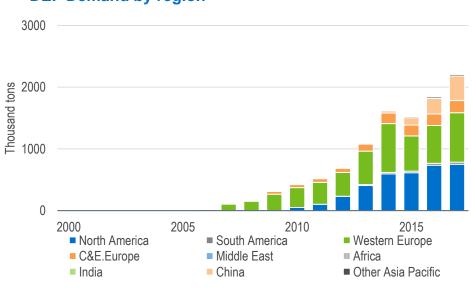


Biodiesel Demand by region



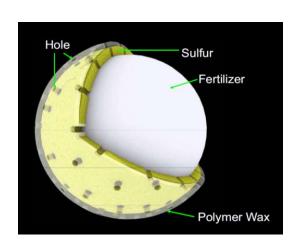


DEF Demand by region





Some key trends over past decades –New products

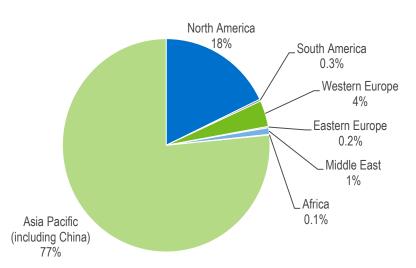
























Nexant views - past

- Fertilizer overuse and environmental impact!
- Shale gas development and significant decoupling of natural gas prices in the US from crude oil
- Competitiveness position of US producers improved significantly
- Producers in KSA enjoy a strong advantage on a cash cost basis due to low gas cost, but limited gas resource for new projects and threat from other exporters rising
- China become a large net exporter of urea threating global market net exports recently declined; supply and demand side reforms.
- India and SEA main importing markets
- Africa in focus: under application, large resources and population growth
- From a buoyant market in until mid 2010's to an oversupplied market today



The road ahead?

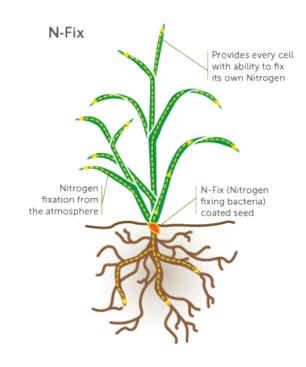


Some key trends to follow?











Nexant views - future

- Consistent long term growth due to rising population but at lower rates due to fertilizer over-application, regulation and nutrient stewardship in major consuming markets
- New products/new markets and new strategies for players in effort to create and capture value
- Digitalisation impacting demand and supply?
- India emerging as a key producer?
- China further capacity rationalisation, growing environmental drive and lower exports;
- Middle East continued position as low cost, volume exporter but competitive threat rising; need for new business strategies!
- Protectionism impacting market Government changes can lead to trade tensions
- Policy developments are a major driver of future fertilizer supply and demand
 - China, fertilizer consumption growth has been capped and supply decreasing
 - India, the government is considering options to improve the effectiveness of its fertilizer subsidy scheme and become self sufficient
- Africa emerging a major consuming and producing centre?



1 King's Arms Yard, London, EC2R 7AF

Telephone: +44 20 7950 1600 Facsimile: +44 20 7950 1550

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