

CRU

Fertilizers & Chemicals



FINAL BROCHURE

5-8 March 2013, Estrel, Berlin, Germany

Ammonia | Urea | Nitrates | Methanol | GTL | Hydrogen

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Market Trends and production drivers

- **Hear** what the future holds for the global nitrogen industry
- **Understand** the butterfly effect of US shale development to the global nitrogen market
- **Get** the latest news about nitrogen capacity expansion in North America
- **Learn** of the of big changes in the Chinese nitrogen market

PLUS – Pre-conference Workshop Maintaining, Operating and Revamping Urea Plants

Improve plant performance and cost savings throughout production chain

- Syngas gas technology and operations
- Ammonia energy revamps and efficiencies
- Urea operations and technology
- Nitric acid environment and technology
- Nitrogen fertilizer finishing

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PLUS – Simultaneous English/Russian interpretation/ Синхронный перевод на английский/русский

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Introduction

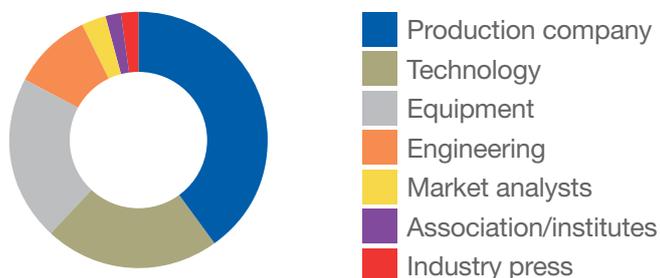
The big news in nitrogen is shale gas. The last few years have seen a declining US nitrogen industry get a real adrenalin shot following the exploitation of unconventional gas deposits and the systemic shift to lower domestic gas pricing. With billions of dollars of brownfield and greenfield investment on the drawing board, the US nitrogen industry is preparing to undo the collapse in production capacity experienced over the last 20 years. Indeed, if all of the planned capacity was to come online, the US would take a big step towards self sufficiency in nitrogen. There is even talk of a surplus for export! Nitrogen 2013 will open with a session that looks at the developing US situation in more detail, determining the extent of North American capacity expansion, discussing the implications for global trade flows and, ultimately, what this shift in the US competitive position will mean for your operations. CRU's global nitrogen outlook will provide a five year outlook into future global nitrogen supply and demand dynamics and changes occurring in the Chinese nitrogen market. This introductory session of production drivers sets the scene for the next few days of technical papers giving you the latest information on new technology announcements and innovations to apply to your operations to increase efficiencies, save costs and energy and improve of environmental performances.

Who should attend?

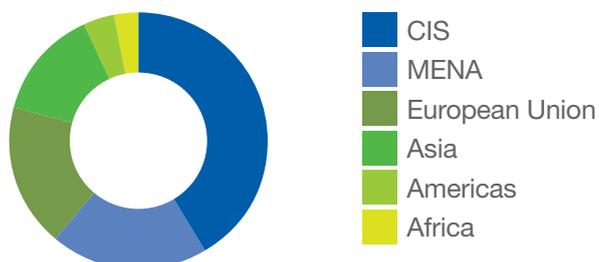
Executives and engineers involved in:

- plant operations
- technology procurement
- project finance
- feedstock supply and purchase
- logistics
- product marketing
- technology development and licensing
- equipment design and supply
- catalyst and auxiliary chemicals supply
- process design and engineering
- FEED, EPC and EPCM contracting

Typical breakdown of attendees: Who attends?



Production company locations



Pre-Conference Workshop - Tuesday, 5 March

Workshop: Maintaining, Operating and Revamping urea plants

This half-day workshop offers you the opportunity to discuss operational and maintenance topics with experts in the industry and fellow urea producers. The workshop will have the format of round tables and will be moderated by UreaKnowHow.com. The aim of the workshop is to facilitate an open discussion between all participants in order to learn from each other's experiences and to improve the performance, reliability and safety of urea plants.

Key topics will highlight critical aspects of urea production technology and include:

- Revamping urea plants
- Corrosion phenomena in urea plants

This workshop is separately bookable and an **additional cost** to conference participants. Please tick the appropriate box on the registration form if you like to register for the workshop. **Places are limited to 40 with priority to personnel of operating companies.**

Simultaneous English/Russian
interpretation available





Schedule of Events

Tuesday 5 March

- 13:00 - 18:00 **Pre-Conference Workshop**
- 15:00 - 20:00 **Registration** sponsored by 
- 15:00 - 20:00 **Exhibition**
- 18:30 - 20:00 **Welcome Reception** sponsored by 

Wednesday 6 March

- 08:00 - 17:30 **Registration** sponsored by 
- 08:00 - 17:30 **Exhibition**
- 09:00 - 10:40 **Market outlooks session**
- 10:40 - 11:10 **Refreshment break** sponsored by 
- 11:10 - 12:10 **Market outlooks session**
- 12:10 - 13:25 **Lunch** sponsored by  
- 13:30 - 15:15 **Synthesis gas technology and operations**
- 15:15 - 15:45 **Refreshment break** sponsored by 
- 15:45 - 17:30 **Synthesis gas technology and operations**
- 17:30 - 19:00 **Drinks Reception** co-sponsored by      

Thursday 7 March

- 08:00 - 17:30 **Registration** sponsored by 
- 08:00 - 17:30 **Exhibition**
- 08:30 - 10:50 **Stream A – Ammonia revamps**
- 08:30 - 10:50 **Stream B – Nitrogen fertilizer finishing**
- 10:50 - 11:20 **Refreshment break** sponsored by 
- 11:20 - 13:00 **Stream A – Ammonia energy efficiencies**
- 11:20 - 13:00 **Stream B – Nitric acid environmental and technology**
- 13:00 - 14:20 **Lunch** sponsored by  
- 14:20 - 16:00 **Urea operations and technology I**
- 16:00 - 16:20 **Refreshment break** sponsored by 
- 16:20 - 17:30 **Urea operations and technology I**

Friday 8 March

- 08:00 - 12:30 **Registration** sponsored by 
- 08:00 - 12:30 **Exhibition**
- 09:00 - 10:35 **Stream A – Ammonia operations, technology revamps and catalysts**
- 09:00 - 11:20 **Stream B - Urea operations and technology II**
- 10:50 - 11:20 **Refreshment break** sponsored by 
- 11:20 - 13:00 **Ammonia operations, technology revamps and catalysts**
- 13:00 - 14:00 **Lunch**

Preliminary Programme

Wednesday 6 March

- 08:00 **Welcome Coffee** sponsored by 
- 08:00 **Registration desk** sponsored by 
- 09:00 **Welcome from CRU**

Session: Nitrogen North American Renaissance - opportunities and challenges

- 09:10 **Nitrogen capacity expansion in North America**
 - North American nitrogen trade balance
 - Natural gas environment in North America
 - CF Industries' nitrogen system and capacity expansion projects
 - Other announced capacity expansions
- Anthony Will**, Senior Vice President, Manufacturing & Distribution **CF Industries Holdings, Inc.**
- 09:40 **North American Shale Gas Outlook: Supply, Demand, and Changing Flow Dynamics**
 - Changing supply fundamentals by basin
 - How drilling economics are driving changes in drilling activity
 - Long-term outlooks for supply growth
 - Demand shifts in power generation from gas
 - How prices are likely to respond in the future
- Jennifer Robinson**, Manager, Oil and Gas Analysis, **BENTEK Energy**
- 10:10 **Challenges and opportunities for investors planning new ammonia – urea plants in USA**
 - Securing the optimum site location and deciding on product mix
 - Technology choices in line with future environmental regulations
 - Selecting feedstock and looking at by-product production possibilities
 - Project financing options, tax/ trade facilities, marketing, transportation and distribution
- Pan Orphanides**, Technical Advisor, **Orphanco**

- 10:40 **Refreshment & Network Break** sponsored by 

Global overview and regional focuses

- 11:10 **The CRU View: What does the future hold for nitrogen?**
 - How have shifting nitrogen cost fundamentals affected capital investment in nitrogen?
 - US producers are achieving record margins, but where is today's marginal capacity? And where will it be in 2015?
 - Prices have been resilient throughout 2012, but what will the economic slowdown in China mean for the nitrogen market in 2013?
 - Demand analysis – forecasting consumption trends and the risk of market oversupply.
 - Pricing outlook for the medium- and long-term.
- Alistair Wallace**, Senior Consultant, Nitrogen, **CRU**
- 11:40 **The Chinese nitrogen market: eve of a big change**
 - Outlook for capacity with Chinese new plants.
 - What will be the impact of the 2013 export tariff regime? What is the role of port bonded warehouses?
 - Understanding the price drivers for the domestic market and the role of the export window
 - What measures are being taken by the Chinese producers facing rapid expansion and global competition?
- Gavin Ju**, Senior Consultant, **CRU**

- 12:10 **Lunch** sponsored by  

Wednesday 6 March

Session: Synthesis gas technology and operations

13:30 TOYO's New syngas technology – Micro-GTL

The production of liquid fuels from coal (CTL) and gas (GTL) based on Fischer-Tropsch hydrocarbon synthesis is currently only economic in extremely large installations. This paper will present the features of microchannel process technology (MPT) and will show how it can revolutionize the economics of smaller-scale CTL/GTL.

Yasuhiko Kojima, Deputy General Manager, Process Engineering Division, **Toyo Engineering Corporation**

14:00 Development of equipment design tools from experimental data using the example of autothermal reforming

ThyssenKrupp Uhde is maintaining an ATR development programme and has been operating a pilot plant since June 2009. The paper briefly covers the design of the pilot plant, the experimental programme and data acquisition and describes in some detail the development work for equipment design tools for industrial-scale reactors.

Katja Poschlad, Research and Development
ThyssenKrupp Uhde GmbH

14:30 A holistic view on steam reformer maintenance "reformer care" for the hydrogen, ammonia and methanol industries

An integrated inspection and assessment methodology minimizes the risk of unplanned shutdowns due to tube failure, allows reformers to be operated more aggressively and provides a wealth of diagnostic information. This paper will discuss the importance of an integrated life management solution enabling syngas plant operators to make confident decisions to return the steam reformer to service or schedule tube replacement.

Barry Fisher, Director, Global Business Development,
Quest Integrity Group

15:00 Questions and answers

15:15 Refreshment & Network Break sponsored by



15:45 Energy efficiency improvements through the application of high emissivity refractory coating

The fundamentals of emissivity will be outlined and challenges involved in the application of refractory coating during a major plant turnaround in 2011 will be explained. The paper will also highlight how other plants could apply similar refractory coatings in steam methane reformers.

Venkat Pattabathula, Ammonia Technology Manager, **Incitec Pivot Ltd**,
John Bacon, Senior Technologist, **Cetek Limited**

16:15 Design and operational experience for Haldor Topsøe Exchange Reformer

HTER provides a means of utilizing the sensible heat in the process gas coming from a primary steam reformer to convert an additional amount of hydrocarbon feedstock into process gas. It is now in industrial operation in a synthesis gas plant in South Africa and in two new grass-roots hydrogen plants in India. The paper will discuss the design challenges for HTERs, such as metal dusting, operability and the interaction between catalyst performance and heat transfer, and will examine the feedback from start-up and operation of existing HTERs.

Niels Ulrik Andersen, Technology Supervisor - Process Development Department, **Haldor Topsøe A/S**

16:45 Carbon capture from flue gases for industrial use

The presentation will review the status and operational experience of the available CO₂ recovery technologies and, in particular, the Chilled Ammonia Process (CAP) which is best suited for integration into an ammonia-urea complex.

Peter Arnold, Sales Director, **Alstom Carbon Capture GmbH**

17:15 Questions and answers

17:30 After-Session Drinks Reception (Exhibition Area)



Thursday 7 March

Stream A

08:00 Welcome Coffee sponsored by



08:30 Registration desk

sponsored by



Session: Ammonia revamps

08:35 New "dynamic equipment" modernization project for increasing ammonia production in CIS countries

Alstom and Entechmach will present a new common conception of modernization Dynamic Equipment /compressors and turbines, increasing productivity and capacity and reducing energy consumption as well as securing reliability of retrofitted machines and accuracy in operation.

Malec Aleksander, Sales Director, **Alstom Power sp z.o.o.**;
Entechmach

09:05 Experience with revamps, troubleshooting and failures in GNFC's ammonia synthesis loop

This paper presents detailed 30 year experience of GNFC's ammonia synthesis loop through a journey of revamps, failures, repair and progressive improvements to raise production and productivity, reduce energy consumption and extend equipment life.

Girish Shah, Chief Manager (Operations) Ammonia Plant,
Gujarat Narmada Valley Fertilisers Company Ltd

09:35 Unique experience in relocation, commissioning and operation of a 40-year old C F Braun ammonia plant in Pakistan

This paper will present the unique experience gained in dismantling, relocating, reconstructing and commissioning a 40-year old plant and in the first two years of its operation. Numerous challenges were faced during each phase which was resolved with systematic and innovative approach. Lessons learnt from the hugely valuable early operating experience will be shared.

Abdul Ghaffar, **Fatima Fertilizer Company Limited**

10:05 Secondary reformer with all-refractory combustion chamber technology proves highly reliable in CFCL ammonia plant

The paper describes the results of an inspection of the CFCL secondary reformer and demonstrates the high reliability of the all-refractory combustion chamber, its mechanical robustness, and its ability to withstand severe operational transients, all of which contribute to sustained high process performance without increasing the need for maintenance entailing shut-down. This technology can benefit both new ammonia plants and revamps.

Shashi Singh, Senior Process Manager - Ammonia & Syngas, **KBR**

10:35 Questions and answers

10:50 Refreshment & Network Break sponsored by



11:20 Solving the problem of hot walled ammonia synthesis converter

Luca Redaelli, Manager, Equipment Design Section, **Casale Group**

Session: Ammonia energy efficiencies

11:50 Improving energy efficiency in ammonia production plant

European regulation laws that will be applied in 2013 will oblige the fertilizer industry to pay new emission taxes for CO₂. This paper will show the results of energy-efficiency projects developed for the ammonia plant in a fertilizer production factory, including those for equipment such as the cooling water system, steam traps, furnaces, boilers and compressors.

Francesco Rossi, Project Engineer, **DVA Global Energy Services; Fertilberia S.A.**



12:20 Energy-efficiency considerations for stand-alone ammonia plants

This paper discusses results from recent KBR engineering studies that look at various process schemes for improving energy-efficiency of ammonia plants without increasing steam export. Where natural gas availability is limited, such process schemes would help to maximize ammonia production from a given quantity of natural gas.

Shashi Singh, Senior Process Manager - Ammonia & Syngas, **KBR**

12:50 Questions and answers

13:00 Lunch sponsored by  **CLARIANT** 

Thursday 7 March

Stream B

08:00 Welcome Coffee sponsored by

08:30 Registration desk

sponsored by



Session: Nitrogen fertilizer finishing

08:35 Compound fertilizers including Urea+ and NPK production in High-Speed Drum Granulator

NIIK's High Speed Drum Granulator is a compact and efficient unit with attractive CAPEX and OPEX for production of granular ammonium nitrate, NP, NPK, and urea-based fertilizers with or without added secondary and micronutrients. It is the first drum granulator in the world that than be used for granulation of ammonium nitrate directly from solution.

Elena Aksenova, Lead Engineer, **R&D Institute of Urea (NIIK)**

09:05 Urea + Ammonium-Sulphate: A premium enhanced fertilizer produced by Sandvik Rotoform pastillation

The paper explains how a low-value product (ammonium sulphate) is mixed with a high-value product (urea) to produce a premium enhanced fertilizer with high nutrient value by the Urea+AS Sandvik pastillation process. The process offers much greater flexibility than traditional compound fertilizer finishing techniques for varying product compositions and production rates in response to varying agronomic requirements.

Kumar Swamy, GPM, Fertilizers, **Sandvik Process Systems**

09:35 Innovative scrubbing technology for urea granulation plants

Uhde Fertilizer Technology (UFT) has developed an emission reduction scheme which complies with the most stringent environmental regulations and is economically attractive. Part of this is based on an optimized scrubber design, developed jointly with Kimre, which exploits Kimre's high-efficiency, low-pressure drop separation media, allowing a design tailored to the needs of the individual project.

Matthias Potthoff, Managing Director, **Uhde Fertilizer Technology b.v.; Kimre Inc.**

10:05 Questions & answers

10:20 Refreshment & Network Break sponsored by 

10:50 Requirements and solutions - meeting latest N₂O and NO_x emission and abatement requests of US-authorities

Klaus Ruthardt, Head of Process, Hydrogen & Nitrates Division, **ThyssenKrupp Uhde GmbH**

Session: Nitric acid environment & technology

11:20 Evolution of the ammonia oxidation and N₂O abatement catalysts

This paper will review the quite dramatic developments of recent years in primary catalysts for ammonia oxidation, which have resulted from improved understanding of the chemical reactions operating in the process, and the likely future fruits of continuing development work. Although N₂O abatement remains necessary, adopting a holistic approach to catalyst design and deployment allows the synergies between the two catalyst functions to be exploited to maximize operational performance.

Torsten Bünnagel, Product Specialist - Nitro Technologies, **Johnson Matthey Noble Metals**

11:50 Primary and secondary N₂O emission reduction technologies

The last few years have seen further emission restrictions put in place in various parts of the world. This paper presents technologies for N₂O emission reduction in nitric acid plants including catalyst gauze systems and secondary catalyst technologies for further N₂O reduction downstream of the catalyst gauze system.

Thorsten Keller, Technical Manager Nitro Technologies, **Heraeus Materials Technology GmbH & Co. KG**

12:20 Maintenance free determination of mass and flow in nitric acid and ammonium nitrate production

Accurate monitoring of the concentration, flow and mass flow is a vital part of the control of most processes, but highly aggressive media present a challenge for any instrumentation that depends on an immersed detector. The paper describes an economical non-intrusive ultrasonic clamp-on monitoring system that is essentially maintenance-free and outperforms competing technologies such as Coriolis meters.

Jörg Wylamrzy, **FLEXIM GmbH**

12:50 Questions and answers

13:00 Lunch sponsored by  **CLARIANT** 

Session: Urea operations and technology

14:20 Engro's 20 years' experience with a relocated urea plant

The paper will present Engro's cumulative experience with its urea plant, which was relocated from ICI Billingham (UK) in 1992. It explains how major bottlenecks have been removed, adding 350,000 tonnes to the plant's annual capacity, how site energy consumption has been improved and how environmental conservation measures have been consolidated. Problems encountered, incidents and key lessons learned in the course of 20 years will be discussed.

Muhammad Idrees, Urea 2 Plant Head, **Engro Fertilizers Ltd**

14:50 The Stamicarbon low energy urea melt plant

Stamicarbon's concept for a low energy urea melt plant is based on direct heat integration between the HP pool condenser and the MP rectifying heater and between the MP condenser and the 1st-stage evaporator heater; this lowers steam consumption considerably.

Hans van den Tillaart, Senior Process Engineer, **Stamicarbon**

15:20 Effective way to boost your urea plant

Case studies of recently completed projects which apply Split FlowTM and Full CondenserTM technology to revamp existing CO₂ stripping urea plants and the Medium-Pressure Split Flow Technology, revamping tool for cases where the capacity increase is linked to an integrated melamine unit.

Andrea Scotto, Head of Process Division, **Casale Group**

15:50 Questions and answers

16:00 Refreshment & Network Break sponsored by 

16:20 The first OmegaBond® tubing technology stripper in Saipem's licensed urea plant at GPIC's plant-site

This paper will describe GPIC's operating experience since the initial start-up of the plant in 1998 and will review the work that led to GPIC's selection of the Saipem's stripper design, highlighting the important features and advantages of OmegaBond® tubing technology, its development by ATI Wah Chang, and its major product attributes. Finally, it will review the operational experience and results achieved using the first-ever example of this innovative equipment.

Abdulmunem Alnajjar, Urea Plant Superintendent, **Gulf Petrochemical Industries Co.**; Saipem S.p.A., ATI Wah Chang

16:50 Pop-A-Plug® eliminates welding, reduces downtime and increases safety and reliability

EST Group has developed Pop-A-Plug® in urea-grade materials for sealing leaks in urea plant heat exchangers. The design incorporates a Virgin Teflon® O-ring to achieve the best possible seal between Pop-A-Plug® and the weld overlay of the tube sheet. The paper will describe the detailed design features, test results and references of this revolutionary innovation in the urea industry.

Ron de Rijk, Director EMEA Sales & Operations, **EST Group**

17:20 Questions and answers**17:30 Close of session****Friday 8 March****Stream A**

08:30 Welcome Coffee sponsored by



08:30 Registration desk
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**Session: Ammonia operations and technology revamps and catalysts****09:05 Back-to-Basics: Maximizing plant performance through a better understanding of the basics in catalytic reactor operation and problem avoidance**

Understanding the basic chemical and physical principles of the catalytic reactions involved in an ammonia plant allows the operator to achieve maximum performance, avoiding premature catalyst failure or impaired catalyst efficiency caused by such circumstances as poisoning, bad flow distribution, or improper operation.

Michele Anderson, Account Manager, **Clariant Produkte GmbH; Süd-Chemie Inc. – A Clariant Group Company**

09:35 Catalyst deactivation in ammonia plant

The most common cause for catalyst deactivation in ammonia plant is poisoning. As well as discussing and proposing measures for avoiding that kind of misfortune, this paper will look at recent research to optimize catalyst structure so as to reduce susceptibility to deactivation.

Mohamed Abdel Aaty, Ammonia and Utilities Department Manager, **Misr Fertilizer Production Company (MOPCO)**

10:05 Ammonia synthesis loop modelling simulations and the impact of catalyst activity on loop performance

Simulation models that include ammonia converter, syngas compressor and turbine, refrigeration section and loop heat exchangers, allows key performance indicators to be measured over the life of a catalyst. In an actual case, modelling of an ammonia customer's loop demonstrated the impact of different catalyst activities on the loop and any operating issues or limitations that would arise as a consequence.

Kevin Mowbray, Technical Sales Manager, **Johnson Matthey Catalysts**

10:35 Questions and answers

10:50 Refreshment & Network Break sponsored by

**11:20 Innovative solutions for today and the future**

Customer needs is the key focus for Topsøe's catalysts and processes for the chemical industry. With more than half a century's experience as technology licensor and catalyst supplier, Topsøe translates cutting-edge research to innovative solutions for today and the future. **Kristina Svennerberg**, General Manager - Marketing Synthesis, Chemicals **Haldor Topsøe A/S**

11:50 Sustainable operation of the high-temperature shift duty in an ammonia plant

This case study demonstrates the effect of sustainable operation of the HTS on the overall performance of the ammonia plant at MISR Fertilizer Production Company.

Saied Meshaal, Ammonia Utilities Production Manager, **Misr Fertilizer Production Company (MOPCO)**

12:20 Impact of a low-methanol low temperature shift catalysts at Ina Petrokemija

This paper will look at how the operators of an ammonia plant selected their LTS catalysts and the criteria that they used when comparing catalysts, including legislation and operational constraints. This case study will present the design conditions and will compare the expected performance of the catalyst with its actual performance in respect of both methanol formation and the water gas shift reaction.

Ina Petrokemija

12:50 Questions and answers**13:00 Lunch****Friday 8 March****Stream B:****Urea operations and technology II****09:05 CO₂ pressurized box-up – a new technique to averting shutdowns on corrosive service leakages**

This paper shares Engro's experience in containing a leak of highly corrosive high-pressure ammonium carbonate that developed in the high-pressure synthesis loop of a Toyo Aces urea plant.

Muhammad Idrees, Urea 2 Plant Head, **Engro Fertilizers Ltd**

09:35 Condensation corrosion in the HP synthesis of urea plants

Condensation corrosion in gas phase areas of High Pressure Equipment and Piping systems plays a significant role in the safety and reliability of urea plants. This paper discusses engineered heating solutions to address these risks leading to a higher safety standard, higher reliability and longer lifetime.

Jim Hartman, Corporate Business Development, **Controls Southeast Inc.**

10:05 Increasing Operating Reliability and Stability

The paper would discuss emerging technologies for "Process Analytics" which integrates with your DCS system to identify and evaluate abnormal conditions and identify the cause of the abnormality for the operator.

James Gremillion, Agrichem Program Lead, **Emerson Process Management**

10:35 The dynamic training simulators for Toyo's urea granulation process

This paper presents on operation and maintenance assisting technologies to reduce production expenses by keeping urea plant under stable and optimum condition, prevent equipment damage and prolong plant life.

Shuhei Nakamura, Senior Process Engineer, **Toyo Engineering Corporation**

11:05 Questions & answers**11:20 Refreshment & Network Break**

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Nitrogen+Syngas 2013

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