

Overview of Industrial Urea Markets: Applications and Opportunities

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Research

TFI Fertilizer Technology and Outlook Conference
Philadelphia, PA
November 13th, 2012

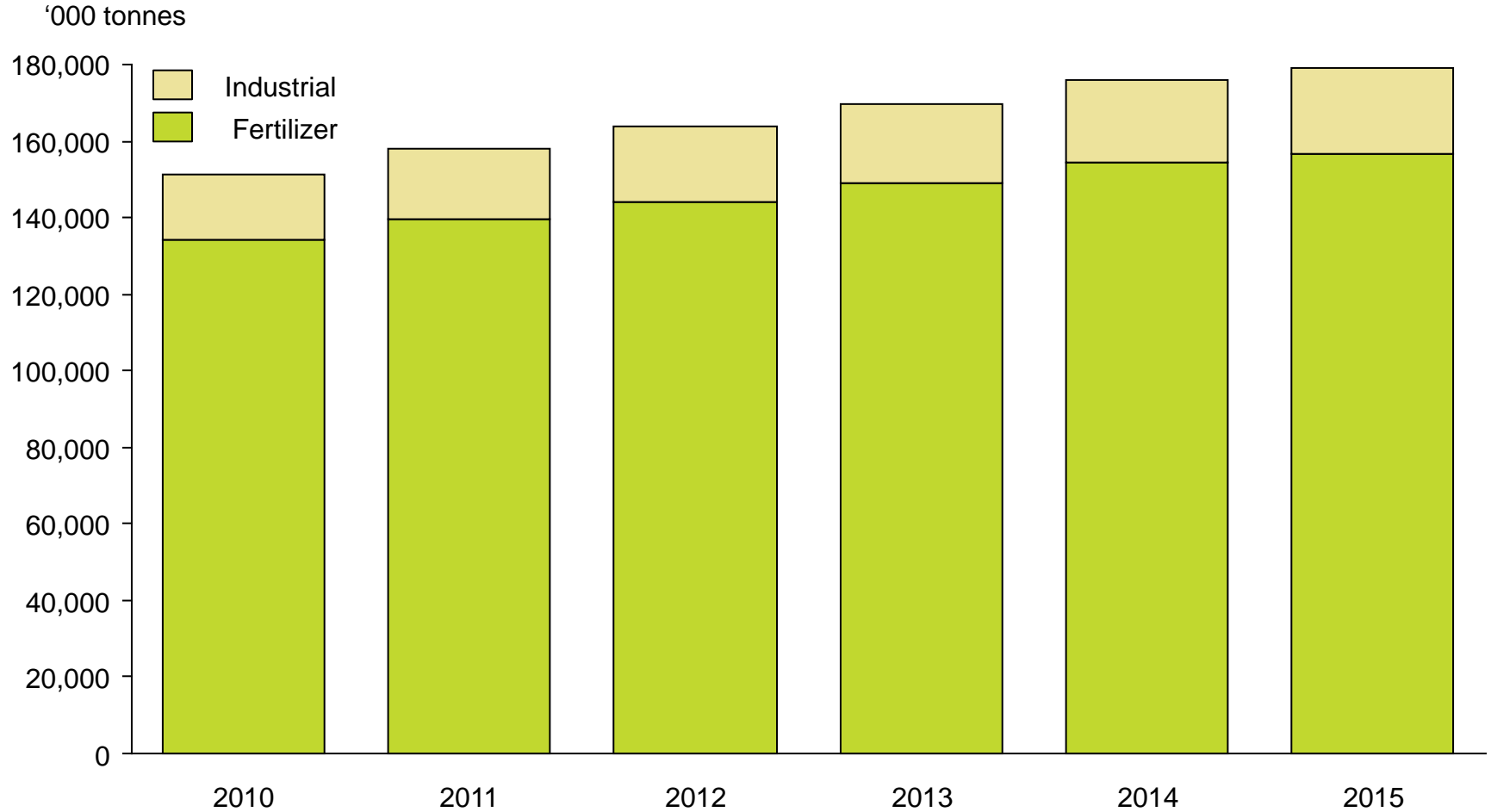
- **Industrial urea markets:**
 - How big is the market?
 - Key applications: resins, NO_x controls, feed and others
 - Global and regional breakdown
 - North American market drivers
 - Europe's integrated structure
 - Influencing factors: legislation
- **Opportunities:**
 - Future opportunities and challenges

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Market size and breakdown

Non-fertilizer urea represents 11% of global urea consumption



Source: IFA, Integer

Applications

- Resins and adhesives;
- Melamine;
- Environmental controls;
- Animal feed;
- Pharmaceuticals;
- Cosmetics;
- Foliar applications;
- Hydrazine;
- Cyanuric acid

Industries

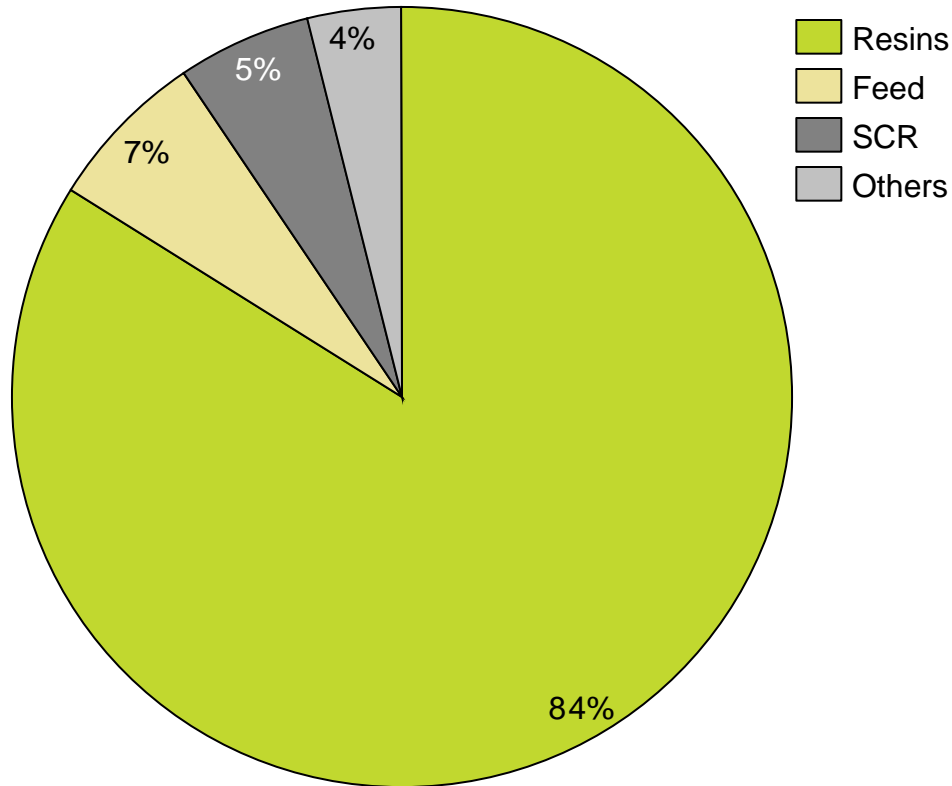
- Chemicals;
- Wood-working;
- Textile and paper;
- Automotive;
- Industrial pollution controls;
- Agriculture;
- Medicine;
- Cosmetics;
- Specialty fertilizer

Industrial urea demand drivers by region: legislation & economic growth

	North America	South America	Europe	Asia Pacific
1	Mobile (on and off-highway) and stationary NO _x abatement legislation	Construction industry growing strongly	On and off-highway and stationary NO _x abatement	Resins market to grow strongly driven by investment in the region
2	Economy and construction industry looking up and immigration trends underpinning resins rebound	On-road heavy-duty trucks NO _x abatement legislation kicked in in Brazil 1 Jan 2012	Resins are strong but have suffered a setback. Increasing activity in Russia?	Pull from NO _x abatement legislation has been strong in Japan, Korea and Australia and NZ, and China is moving
3	Legislation and lobbying on formaldehyde content in wood-based furniture	Cattle feed consumption to increase with disposable income and more meat-based diets	Cattle feed and pharmaceuticals to remain resilient	Cattle feed use is growing but unevenly according to disposable income. Weather is a strong variable.
4	Cattle feed and pharmaceuticals to remain resilient	Pharmaceuticals also developing strongly in some countries	Pharmaceutical industry to develop in the East of the region	Pharmaceutical use is resilient in advanced economies, has potential in developing countries

Source: Integer

UF and MUF resins represent just over 80% of the industrial urea market globally

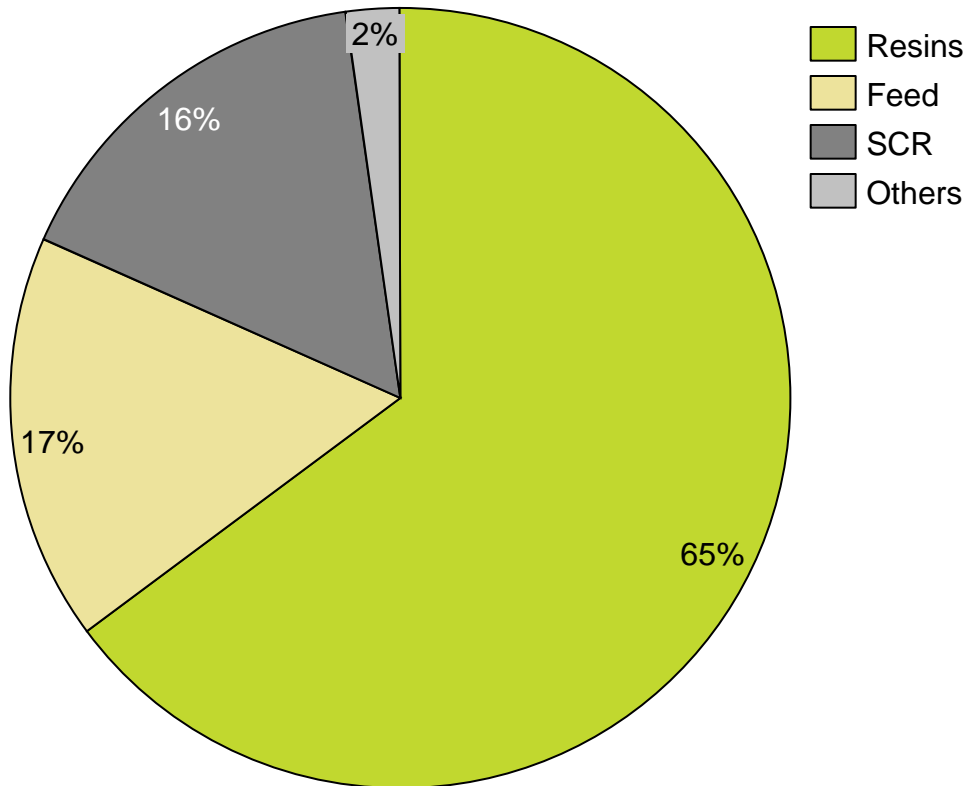


2010: 17.2 million tonnes

Source: Integer

- Just over 80% of consumption is represented by resins. UF and MUF resins are used by the wood-working industry as adhesives and glues in furniture and buildings.
- The second largest use for urea in industrial applications is as a protein supplement in animal feed and, growing fast, the third use is as urea solution or AUS 32 in SCR-equipped vehicles, targeted at lowering NO_x emissions from on and off –highway vehicles, as well as from stationary sources such as power stations, cement factories and industrial boilers and incinerators. SCR is also a good choice to meet 2014 GHG targets.
- Other uses include pharmaceuticals and other minor segments.

In North America, the share of resins has shrunk since the peak of urea consumption in 2006/2007. Environmental use is the fastest growing



2010: 1.7 million tonnes

Source: Integer

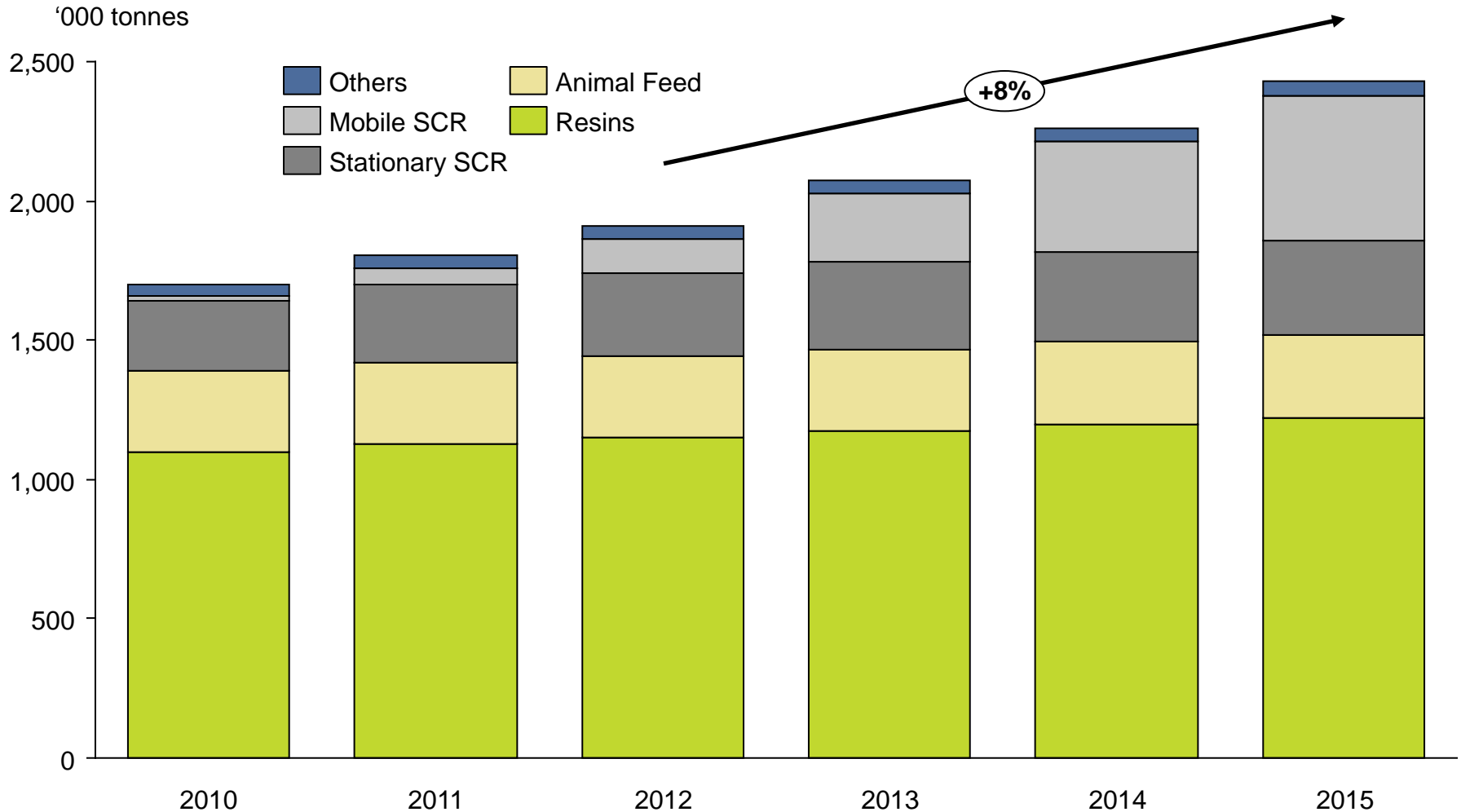
- Resins and glues/adhesives used to represent 80% of the market for industrial-grade urea in North America before the recession of 2008/2009 took hold of the building and construction industries, prompting a major step change in consumption for these products.
- Demand for all types of resins, adhesives and sealants used in the building and construction sectors peaked in 2006-2007, with the abrupt end of the housing boom and has shrunk dramatically since 2008 and 2009, in some extreme cases even by as much as 50% in some areas of the region, and at least by 30% in others.
- SCR applications - stationary and mobile - are now a larger segment for urea consumption and represent around 16% of the market. Cattle feed comes in at around 17% and pharmaceuticals and others at 2% - with pharmaceuticals accounting for around 1.4%.

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Market drivers in North America

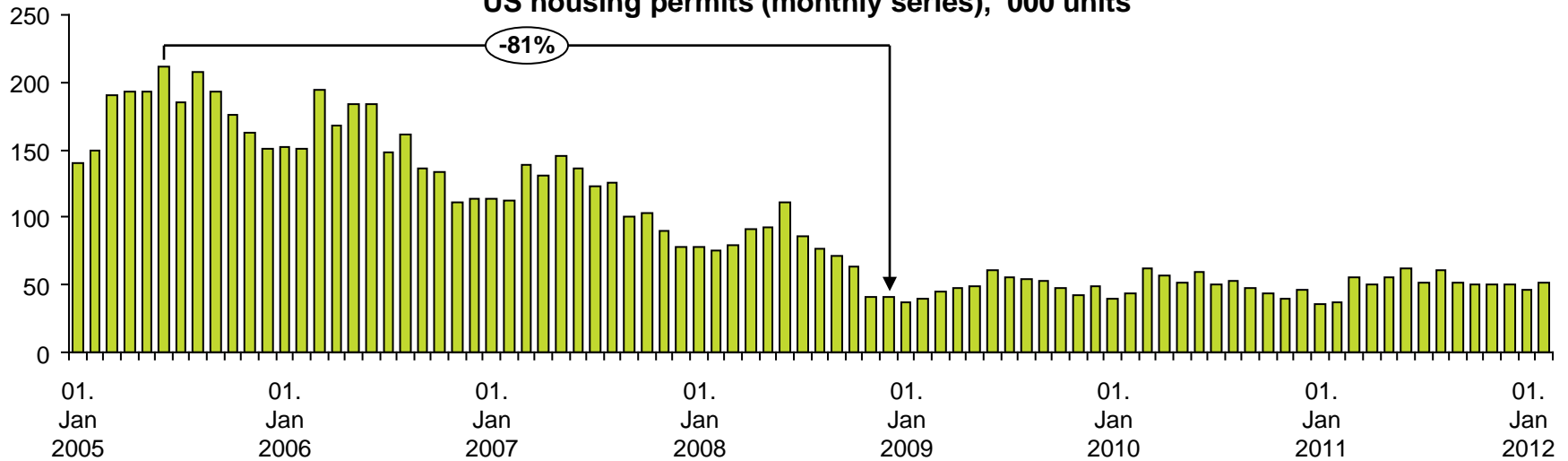
Environmental uses have been and are likely to continue to drive industrial urea growth in North America



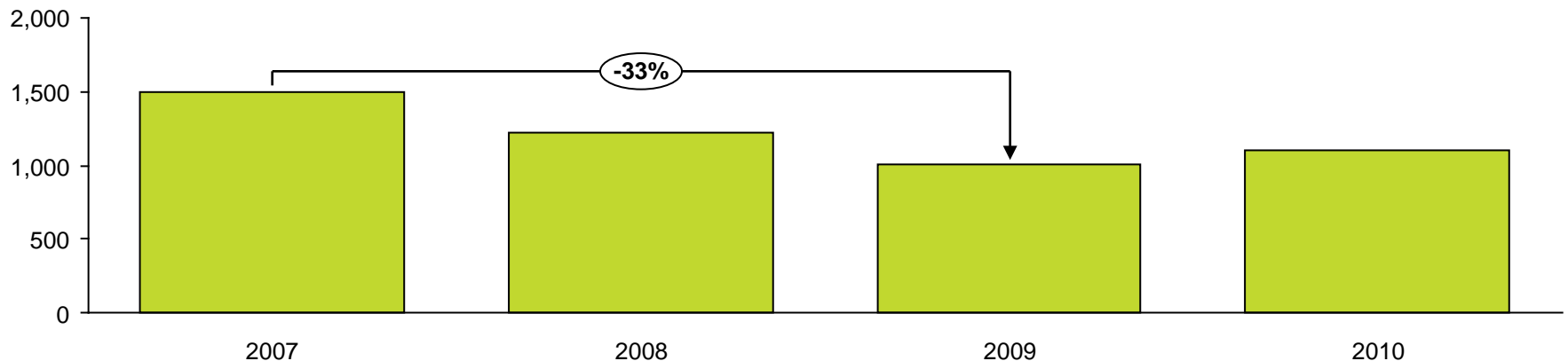
Source: Integer

USA – Urea consumption into resins falls in 2008-2009

US housing permits (monthly series), '000 units

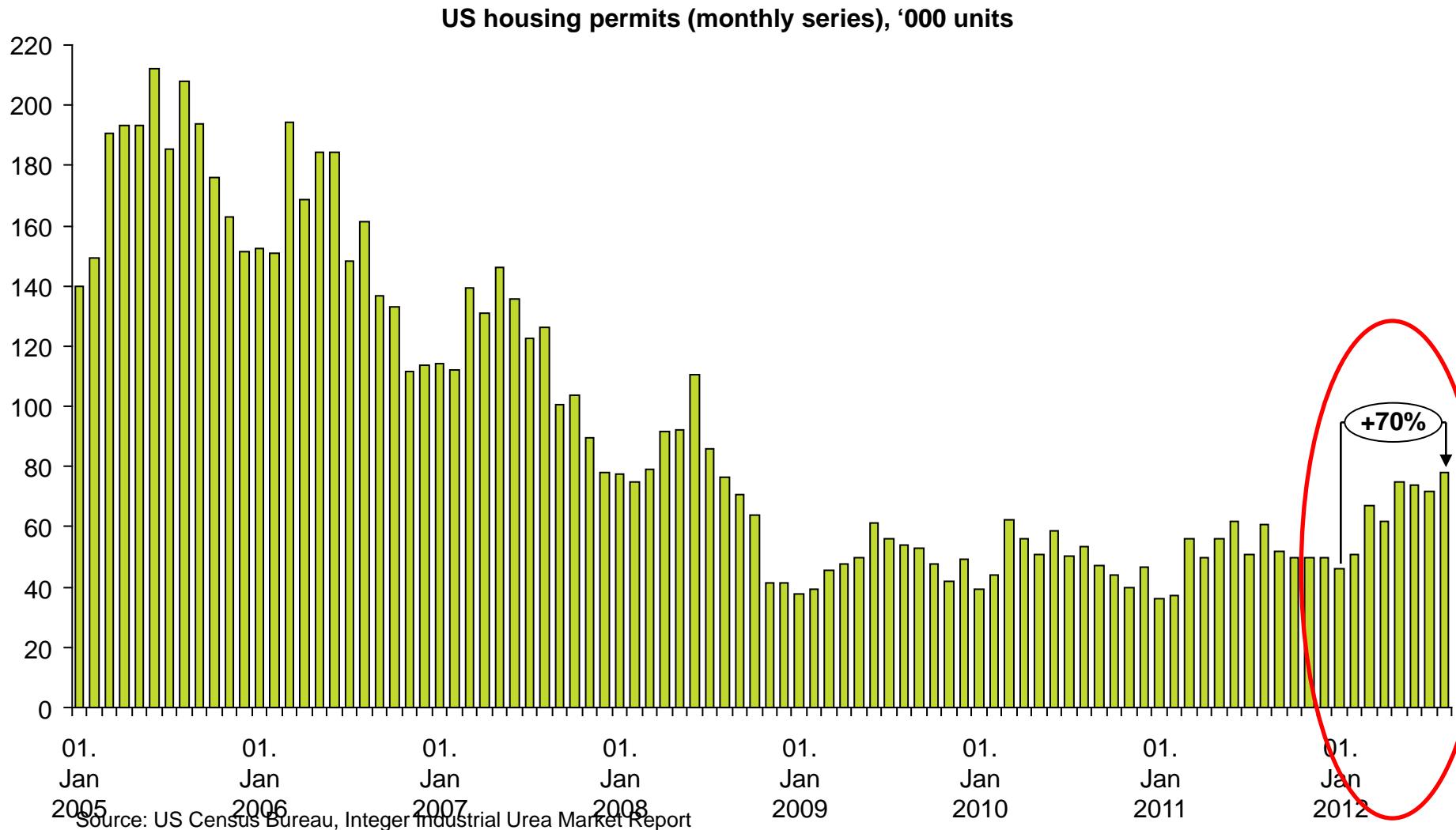


Urea consumption into resins, '000 tonnes

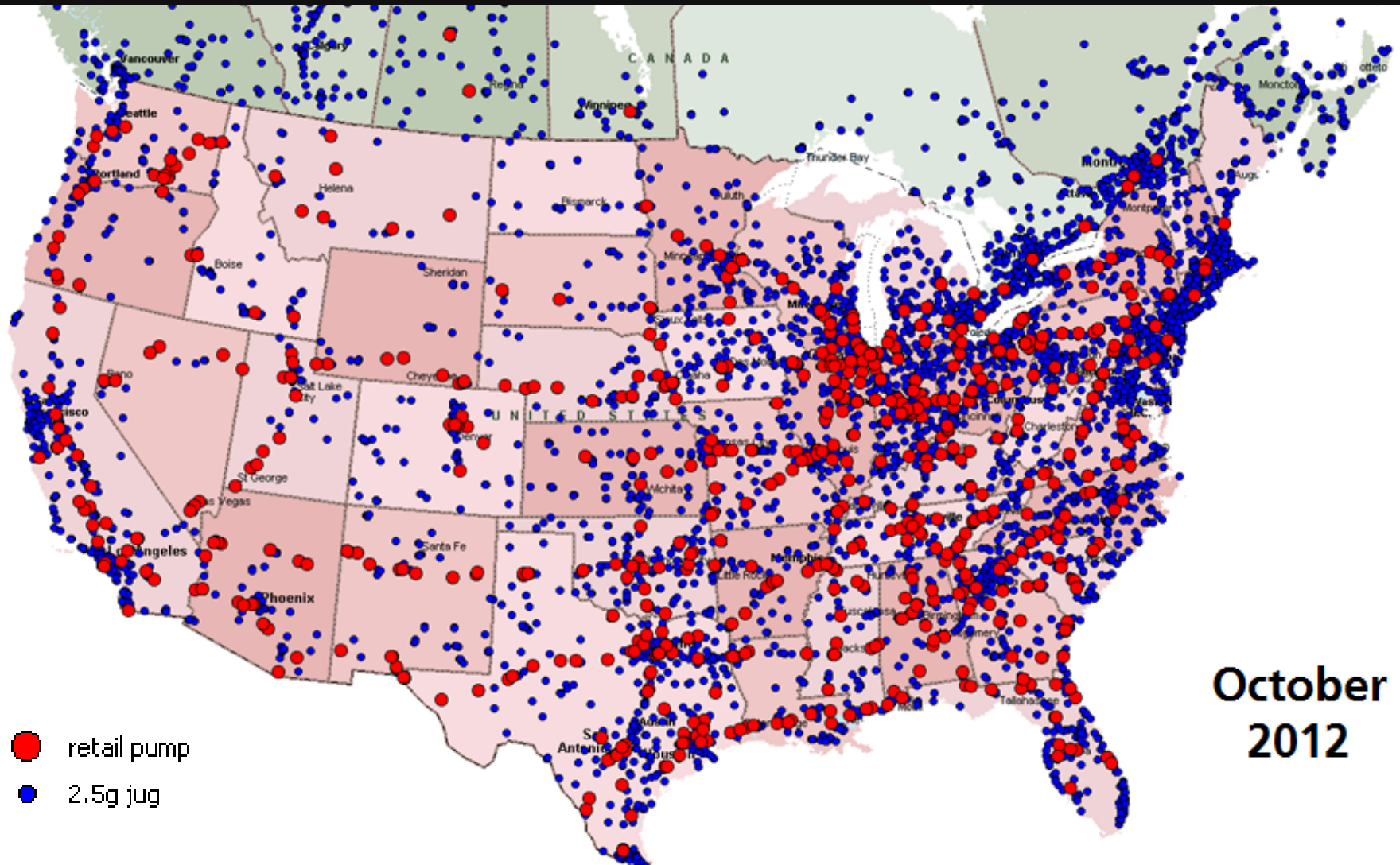


Source: US Census Bureau, Integer

Going forward? Towards a five-year high for housing permits



DEF supply infrastructure



Urea consumption into Diesel Exhaust Fluid (DEF) in the USA



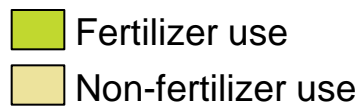
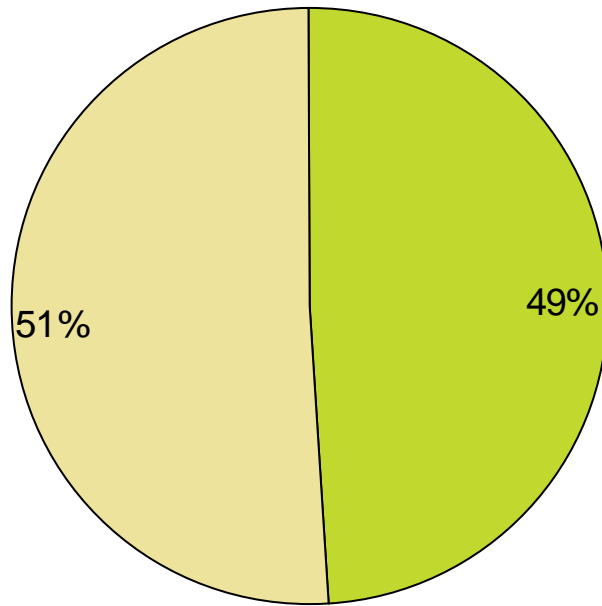
Source: Integer, excludes stationary, rail, marine and barge

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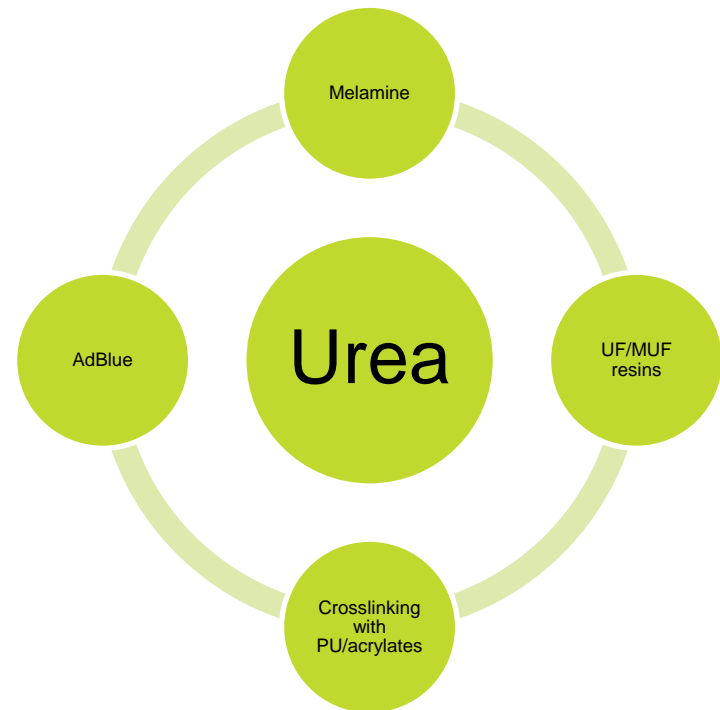
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Europe's integrated structure

Fertilizer vs non-fertilizer use

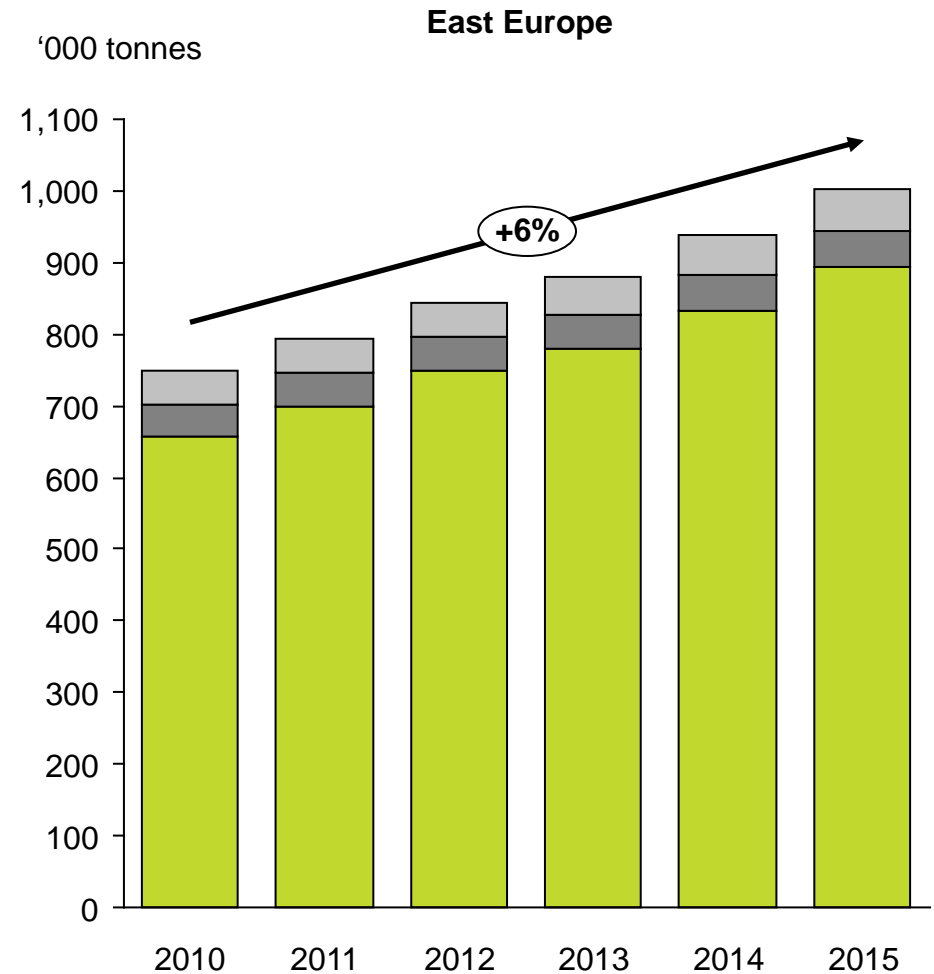
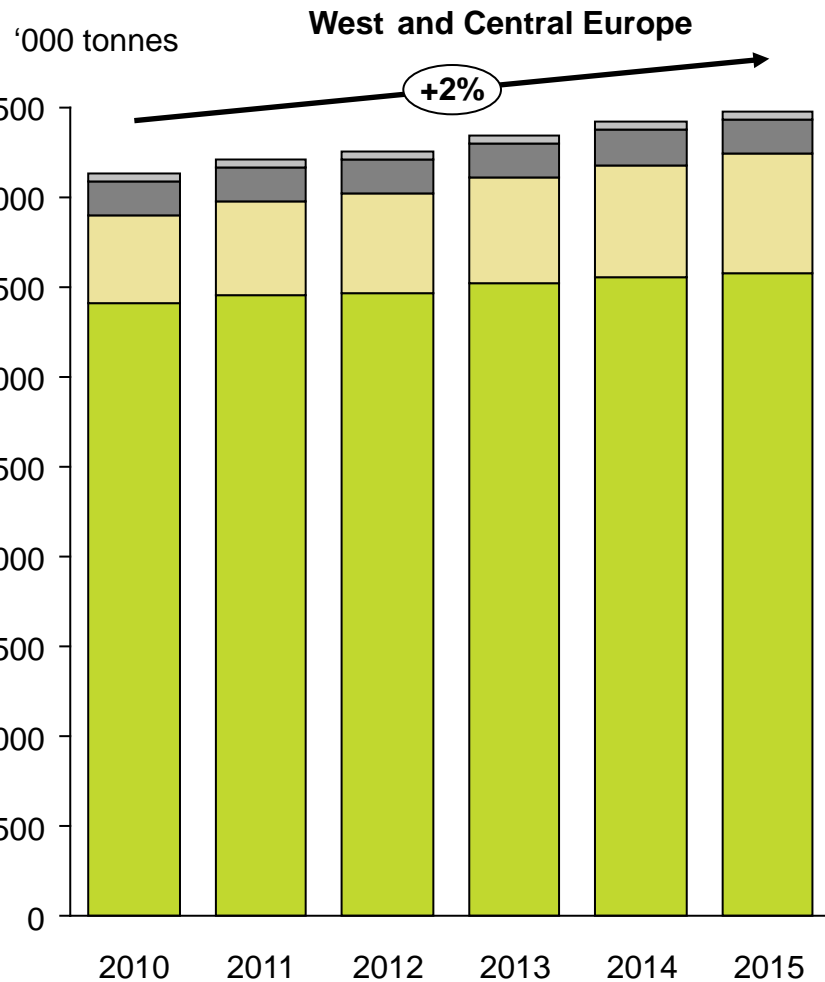


The BASF model



Source: Integer

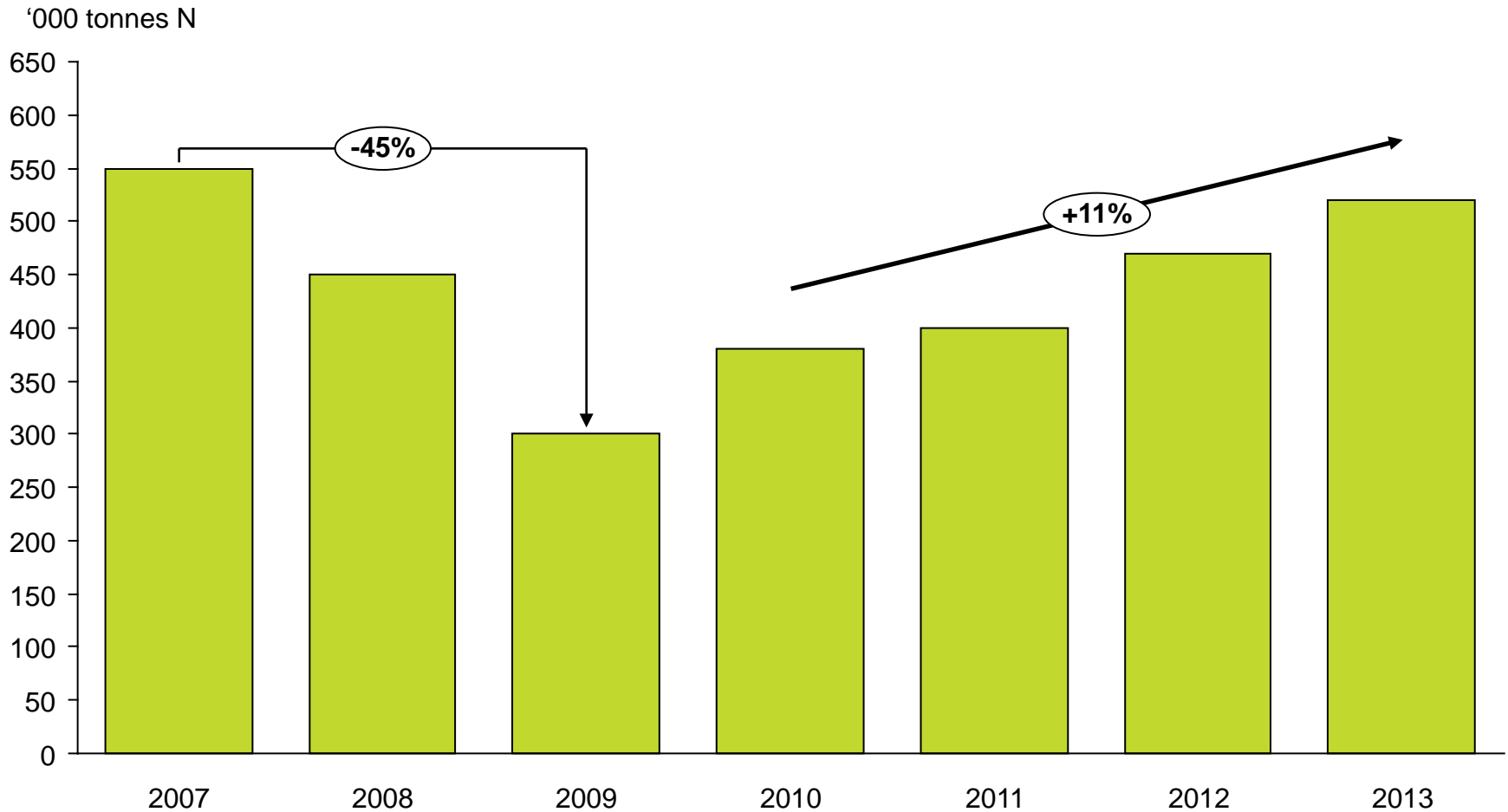
Environmental uses to drive West European demand growth, while resins look strong in East Europe



Source: Integer

Others Feed SCR Resins

Russian industrial N markets are recovering



Source: Azotecon

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Influencing factors

Legislation limiting formaldehyde use in wood

Japan

- JIS/JAS F**** (0.05mg/m²h)

Europe

- E1 (<0.75ppm)
- E0 (<0.07ppm)
- Formacare

USA

- CARB (<0.75ppm)
- Greenguard

NOx Abatement Legislation timeline (USA)

Application	Legislation	Targets	Start date
ON-HIGHWAY APPLICATIONS	Use of DEF compulsory to reduce NO _x emissions	New heavy-duty vehicles	EPA 2010 - January 2010
OFF HIGHWAY APPLICATIONS	Reduction of NO _x and other pollutants	Ag/construction and mining machinery	Transition 2010-2014 from T4 interim to T4 final
STATIONARY APPLICATIONS	NO _x and mercury emissions reduction	Power plants	'Transport Rule' approved 2010 and aiming to reduce NO _x emissions by 52% by 2014
	NO _x and mercury emissions reduction	Cement factories	Approved 2010 to reduce mercury, soot, smog and NO _x emissions. Comes into effect 2013
	NO _x and mercury emissions reduction	Industrial boilers and waste incinerators	Approved 2011 to establish work practice standards. Public review closing July 2011
MARINE APPLICATIONS	Reduction of NO _x and other pollutants	Ships and ocean-going vessels	US EPA Tier 4 from 2016 for US flagged vessels

Source: U.S. EPA, Integer

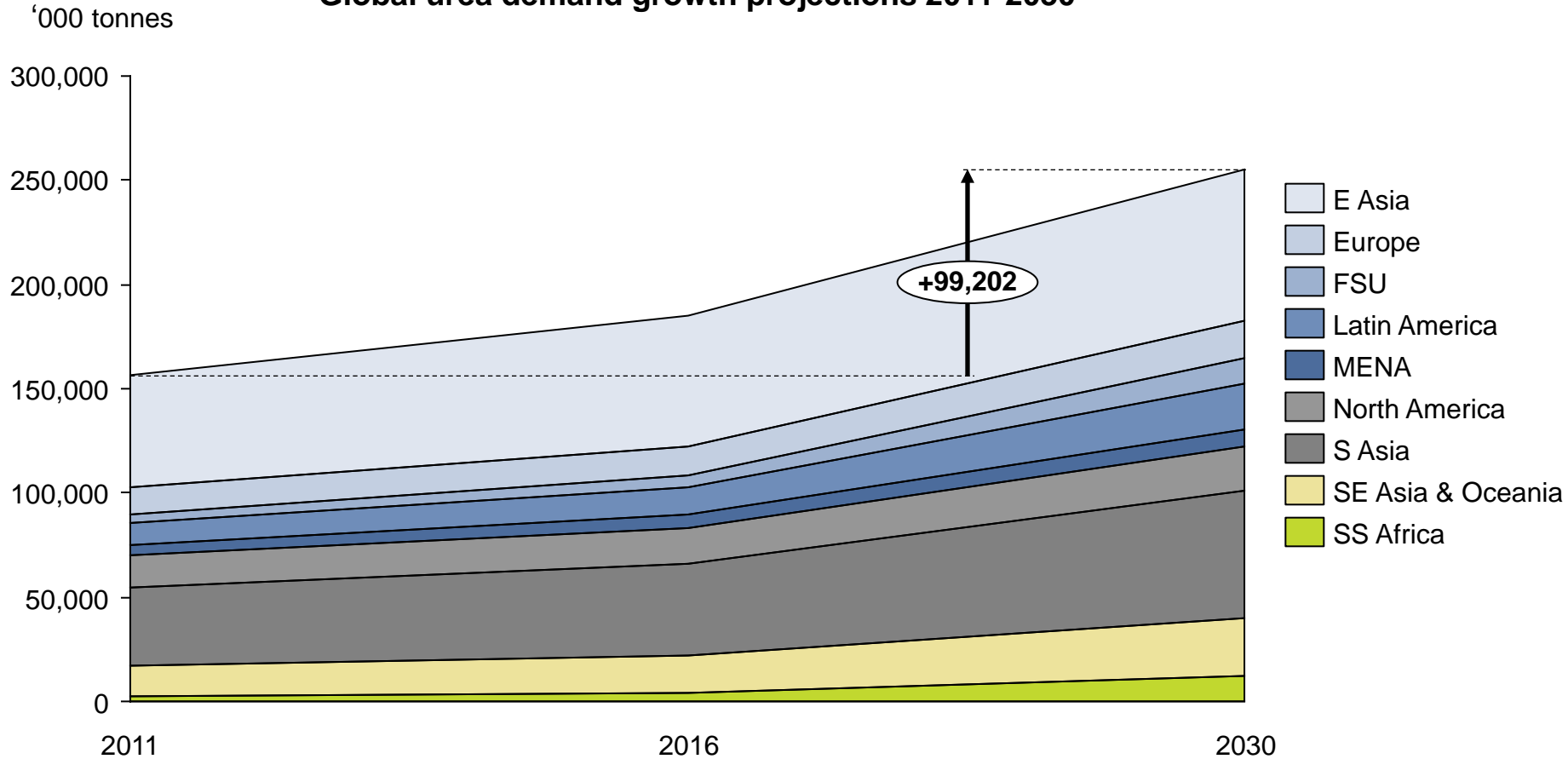
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Opportunities & challenges

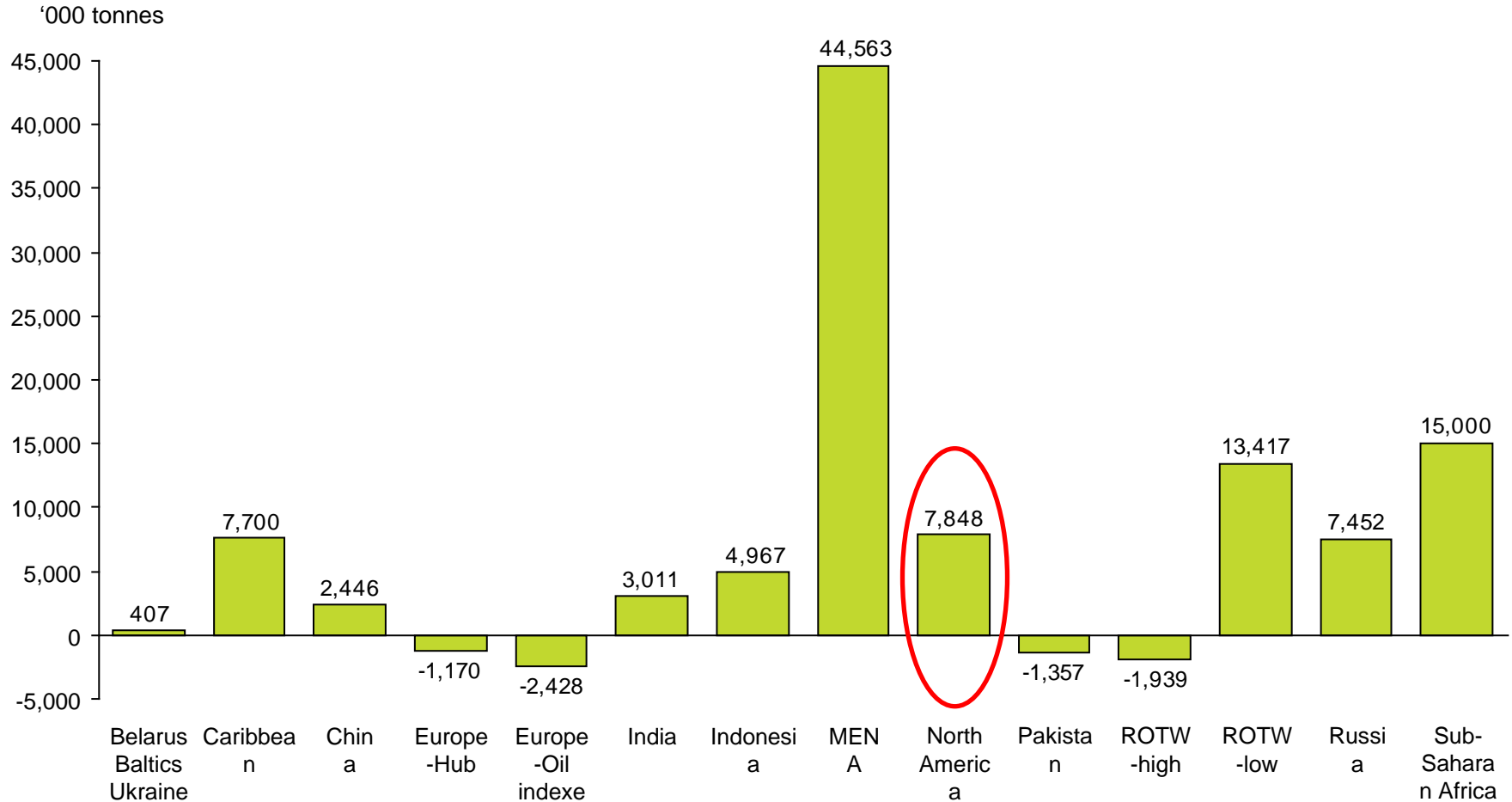
- Strongest industrial urea markets are still North America and Europe in terms of diversification and margins
- Environmental uses have taken over as the main driver for industrial urea growth
- Fastest developing markets for industrial urea are Latin America, Turkey, Russia, Southeast Asia and East Asia, chiefly China
- Industrial urea fetches a premium to fertilizer-grade urea for high-purity grades
- Legislation and strict standards are important drivers for most applications
- Opportunities for growth in the resins and environmental sectors
- What does the supply/demand balance look like?

Global urea demand growth projections 2011-2030



Source: Integer Nitrogen Cost and Profit Margin Service

Projected urea capacity changes by region 2011-2030



Source: Integer Nitrogen Cost and Profit Margin Service

- Total net capacity additions are likely to total 99 million tonnes 2011-2030, responding strongly to demand growth in fertilizer and industrial applications
- Most of the additions will take place in low-cost locations, with some closures taking place in high-cost locations
- North America is attracting strong interest for N investment and industrial applications are on existing producers' and newcomers' lists
- ETS III will impact N costs in Europe and is prompting closer scrutiny of the region's nitrogen assets
- Overall, demand growth will be met by expansions or new builds

Thank you!

For more information:

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Data and analysis from:

Industrial Urea Market Survey

AdBlue & DEF Monitor/DEF Tracker

The Emerging DEF Market

Nitrogen Cost & Profit Margin Service
