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Fertilizer market expectations

Developments impacting the (urea) fertilizer market

Maureen Vermeule

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Jaarbeurs, Utrecht

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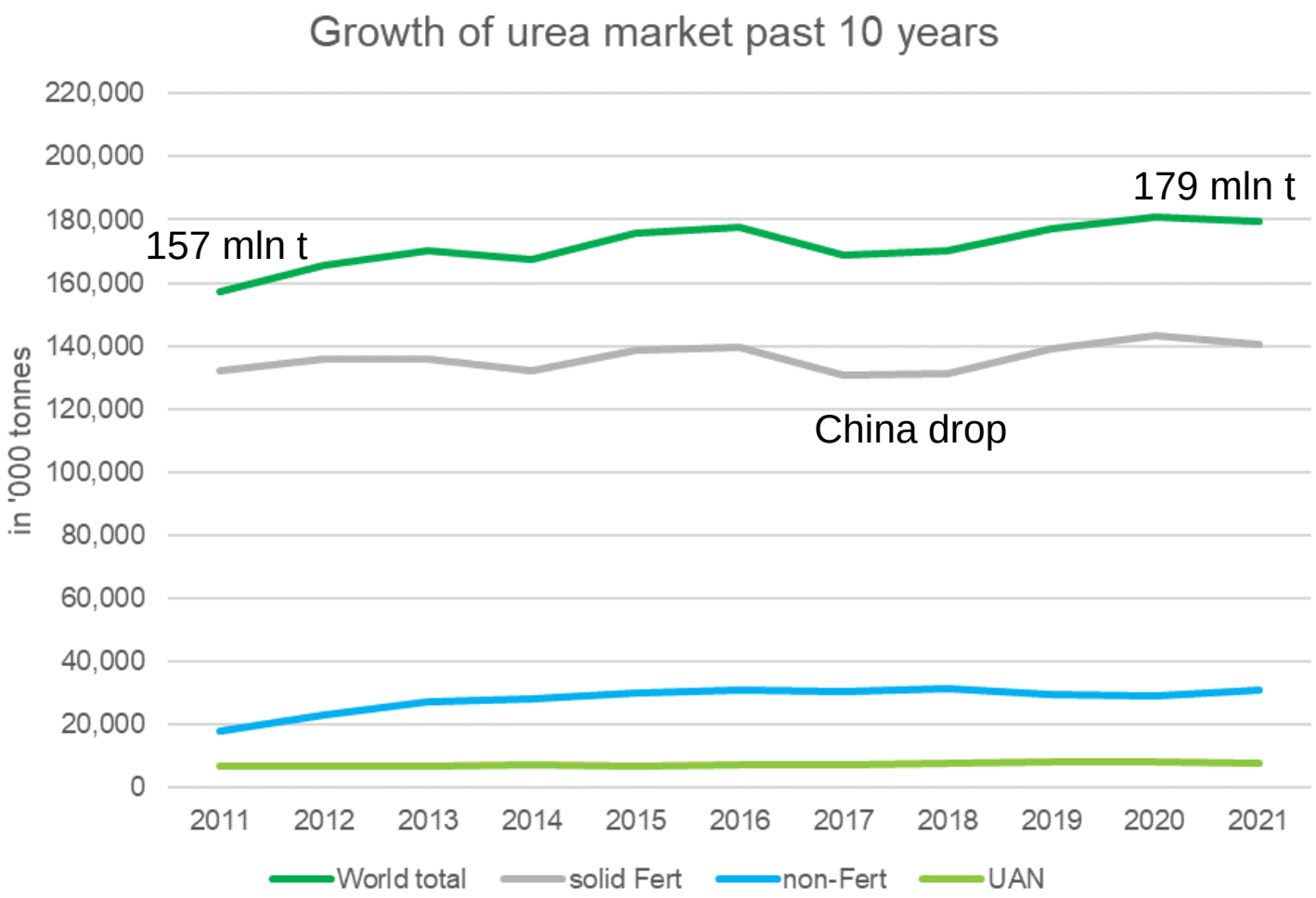
Agenda

- Urea market today
- Urea outlook
- Long-term developments
- Sustainability
- Conclusions

Sources

Data on supply, demand and pricing are obtained from Fertecon Urea Outlook by IHS Markit and Argus Urea Analytics and have been interpreted by Stamicarbon

The global urea market has grown to 179 mln t today



Global trade 30%

Extremely high prices in 2021 and 2022

Supply down

Plant maintenance

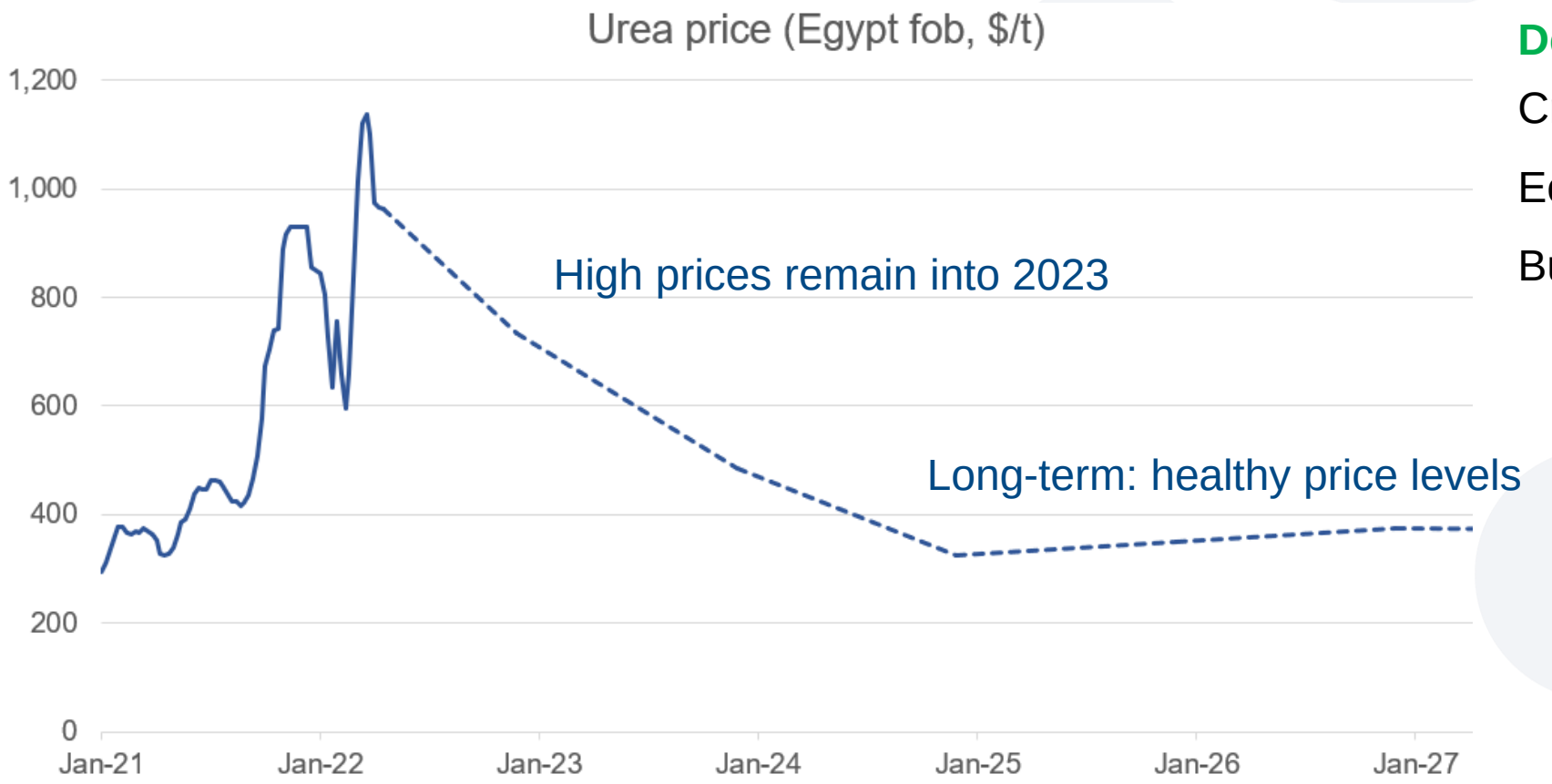
Capacity delay

Hurricane Ida

Low export China

Gas prices

Russia-Ukraine



Demand up

Crop prices

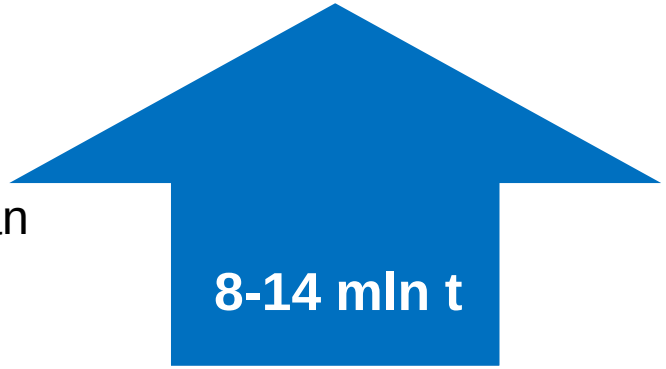
Economic activity

Buyers panic

Urea market will adjust to geopolitical situation

Supply possibly (partly) at risk:
7.1 mln t Russia
1.5 mln t Ukraine
5 mln t China

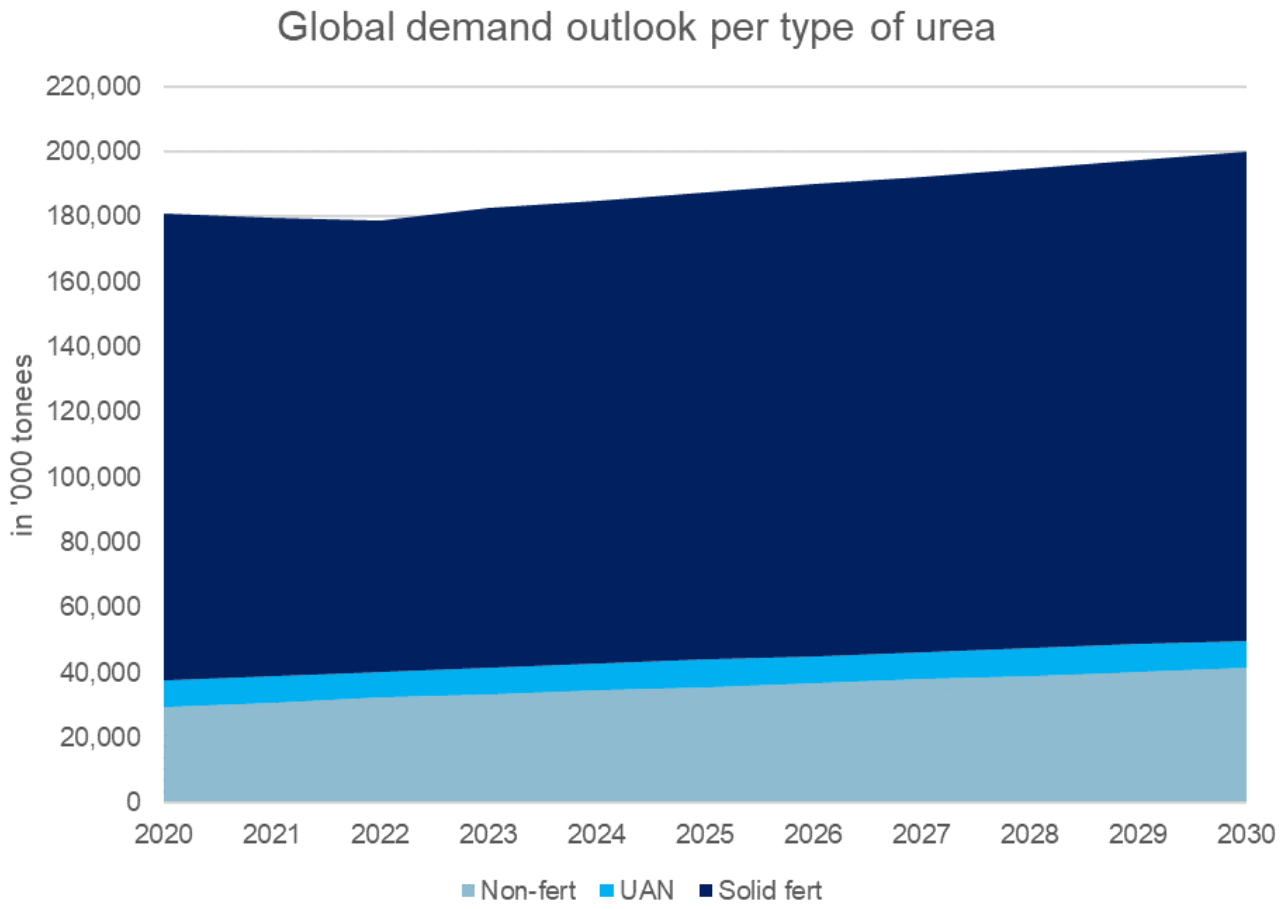
New capacity 2022:
14 mln t total
6 mln t Russia, China, Iran
8 mln t easily accessible



Watch outs:

- Financing of new Russia projects
- Changing trade flows
- Demand disruption due to high prices (-> food crisis)

Urea demand to 2030 will grow at CAGR 1.2%



Total CAGR: 1.2% + **20.3 mln**

Fertilizer solid: CAGR 0.7% + **9.2 mln**

Fertilizer UAN: CAGR 0.5% + **0.6 mln**

Non-fert: CAGR 3.3%* + **10.5 mln**

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**Analyst opinions between 1.8% and 4.1%*

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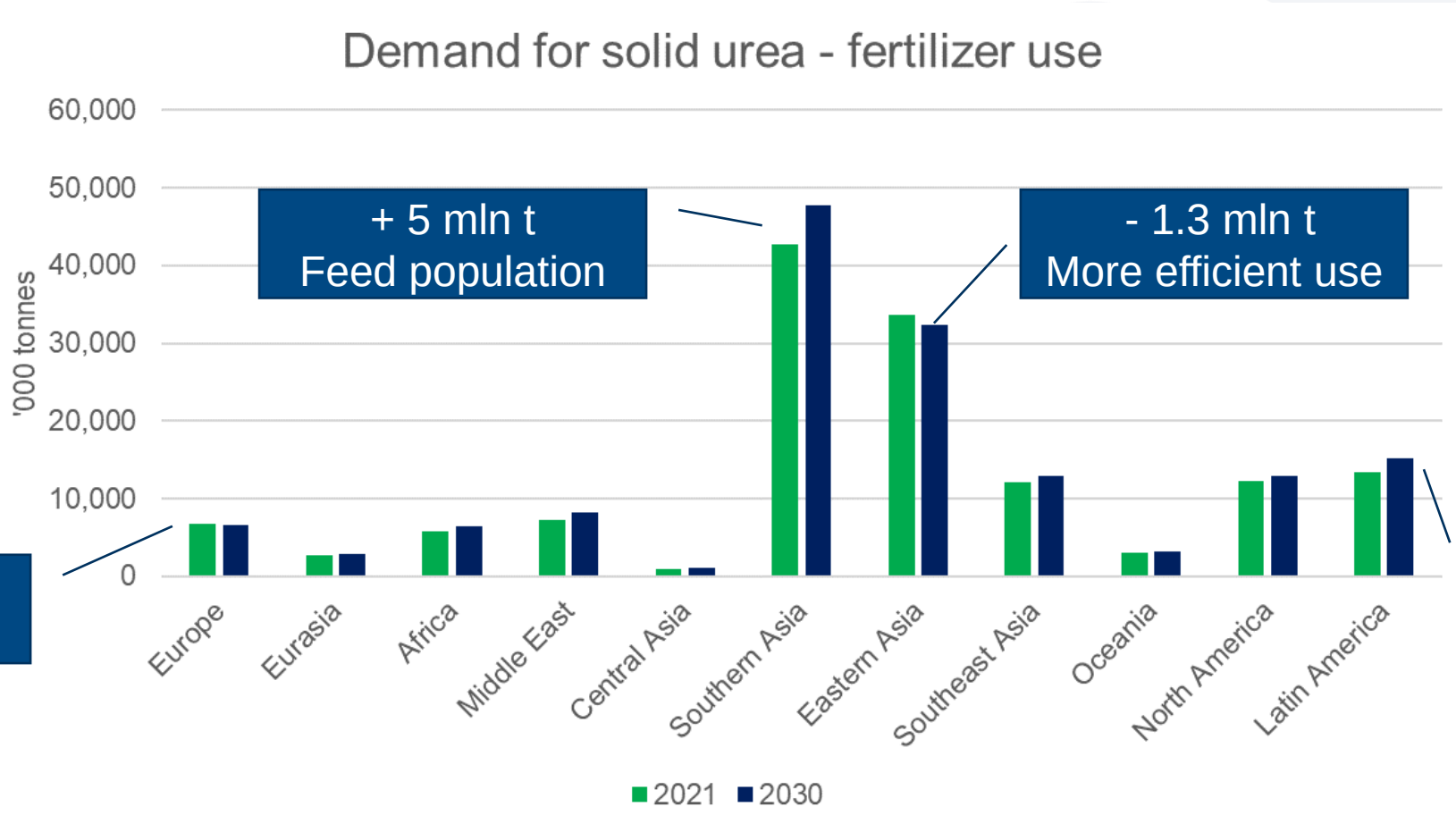
Solid fertilizer growth modest at CAGR 0.7% (2021-2030)



+ 5 mln t
Feed population

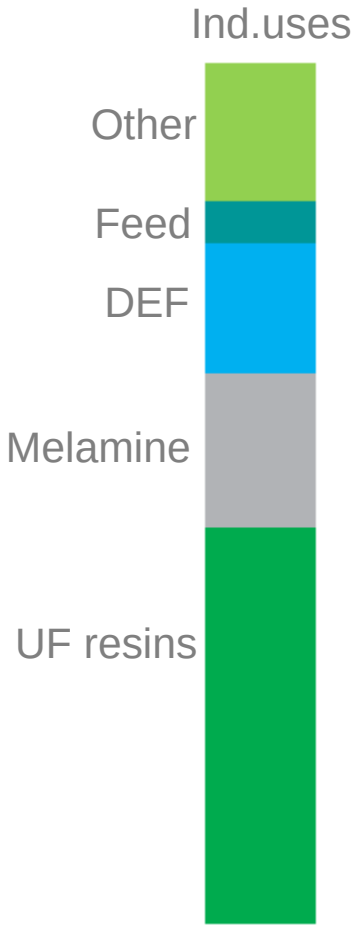
- 1.3 mln t
More efficient use

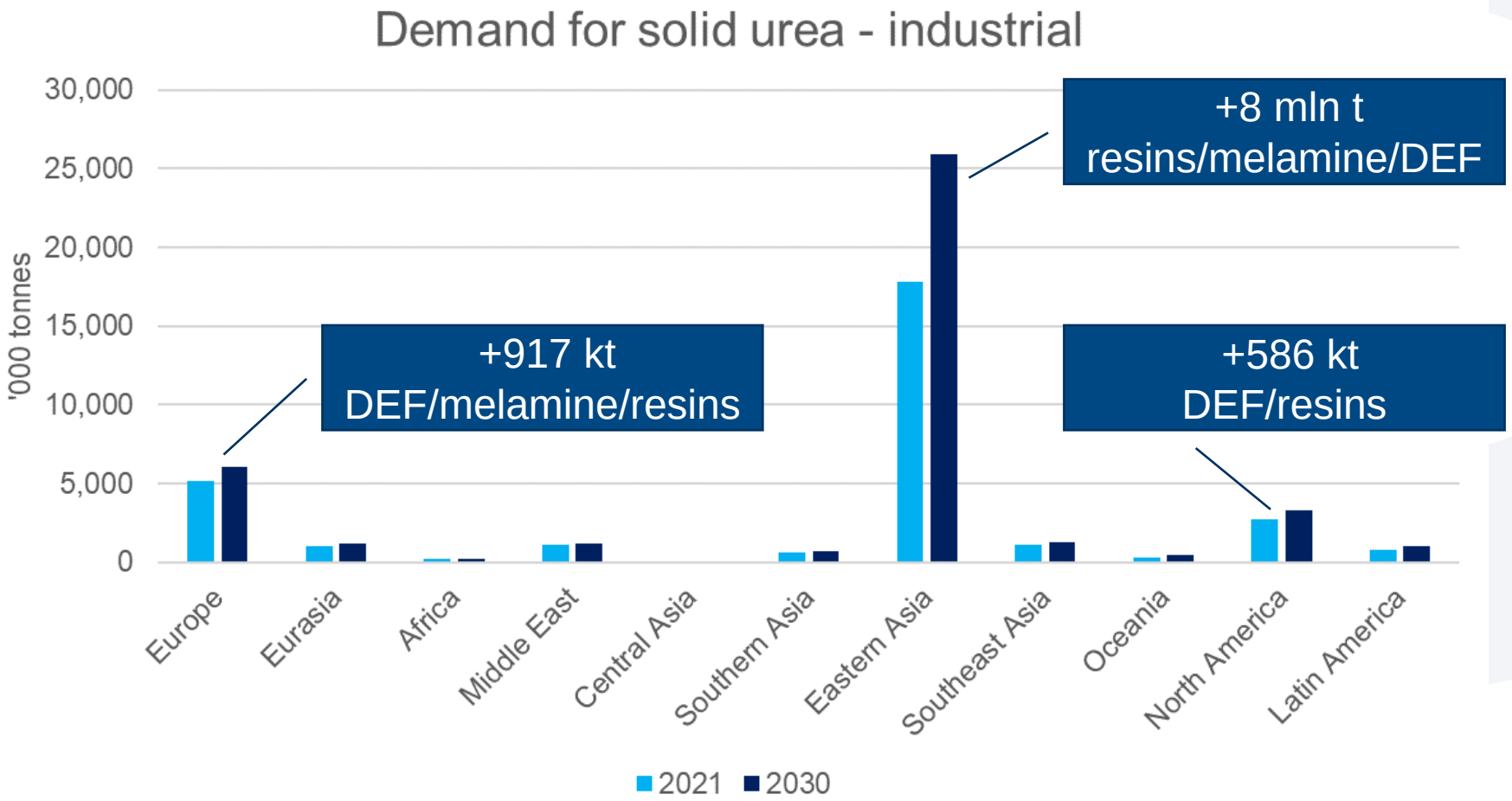
Restricted use

+1.7 mln t
Agriculture growth

Growth in all regions except Europe and China

Strong industrial growth at CAGR 3.3% (2021-2030)





Growth in melamine/resins for woodboard production

Replacement capacity will require additional plants

Incremental demand growth 2.3 mln t/yr → 2-3 plants of 2,750 mtpd

Substitution of old / polluting plants → 2-3 plants of 900-1,000 mtpd (or revamps)

Elevated gas prices can lead to additional closures

Long-term developments impacting the market

- **World population**: more people to feed
- **Global economy**: growing, leading to increased demand for fertilizer and industry
- **Wealth and protein-rich diets**: more protein-rich food production
- **Available arable land per capita**: decreasing, need for more yield per ha and higher efficiency
- Last-but-not-least: **sustainability**

Source: UN

Source: IMF

+14% until 2030

Source: OECD

0.36 ha.(1961) -> 0.18 ha. (2018)

Source: FAO

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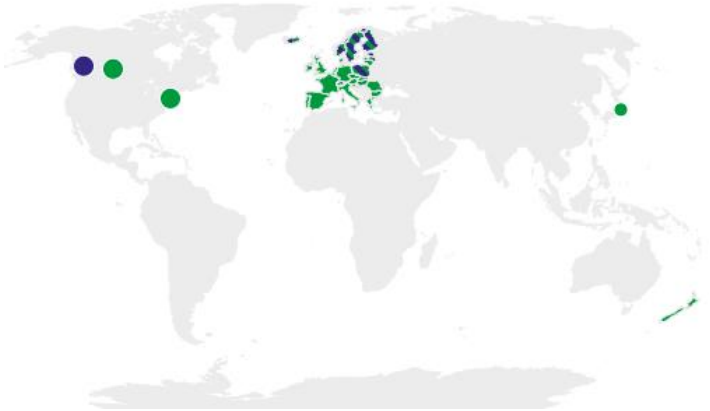
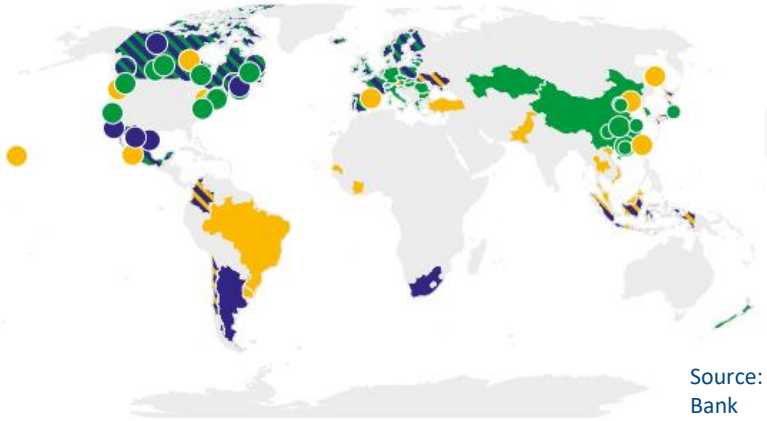
Sustainability: carbon will come at a cost, making carbon-based fertilizer more expensive

- Carbon pricing initiatives

2010



2021



Source: The World Bank

Carbon prices

April 2022:

EU $ 85.96/t

UK $ 94.14/t

China $ 9.22/t

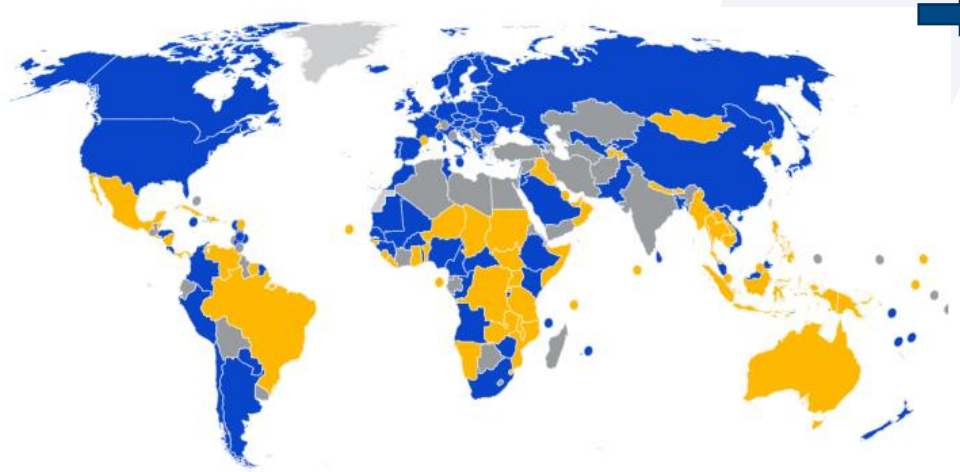
Source: ICAP

- Wide impact because of global trade – urea 30% - and measures like Carbon Border Adjustment Mechanism (CBAM)
- Development of parallel markets: products with x carbon content and green certificates

Sustainability: emission policies will ask for changes in production and fertilizer use

Targets and measures

- **Europe:** cut emissions by 55% in 2030
- **Germany:** inhibited urea
- **China:** emission peak 2030, climate neutral 2060
- **US:** cut GHG emissions by 50-52% in 2030



Source: Climate Watch

Consequences

- Need to reduce carbon intensity in production
- Revamp/substitution, incl carbon recycling (CCU)
- More efficient fertilizer use
- Development of carbon-free fertilizers
- Financing of green projects preferred

Sustainability: ‘new’ types of fertilizers

Chances for new fertilizers

- **Carbon-free production** of fertilizers, using renewable feedstock: **green ammonia-based** fertilizer like (calcium) ammonium nitrate
- **Lower carbon** in production of existing plants **CC(U)S**
- **More efficient fertilizers** like slow/controlled release fertilizer, **stabilized (inhibited) fertilizers** and compound fertilizers
- Green NH3 **new markets**: bunker fuel, power generation, H2 carrier

Challenges for a transition

- **Acceptance** of nitrates (explosion risk)
- **Regional differences** in legislation
- Urea **not easy to replace**
- **Chicken-and-egg** problem: the market needs investments, but the investments need a market (take-off)
- Need for **incentives**
- What is “green”? Or “blue”? Need for **legislation and certification**

Major developments in sustainable fertilizer but market will not change overnight

Conclusions

- Demand for urea grows at a CAGR of **1.2%** until 2030
- The urea market will **re-balance** with industrial demand fastest growing
- **High prices** could last well into 2023 and lower to healthy levels after that
- **Uncertainty** remains due to gas price and geopolitical situation
- **Sustainable developments** will impact the fertilizer market, especially **long-term**
- Unique opportunity for the industry to **re-position** in a changing market place

Our expectation until 2030: major developments in sustainable fertilizer and legislation /certification, but these are not expected to translate into a major shift from urea to other fertilizers