



EUROCHEM

**Potash Market Analysis
Nantes
October 2019**





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EuroChem Group Overview

Transformational projects further anchor cost leadership



Mining

1. Kovdorskiy GOK
2. EuroChem VolgaKaliy
3. EuroChem Usolskiy
4. EuroChem Fertilizers

Fertilizer production

5. Novomoskovskiy Azot
6. Nevinnomysskiy Azot
7. EuroChem Antwerpen
8. Lifosa
9. Phosphorit
10. EuroChem Northwest
11. BMU
12. EuroChem Migao JV

Logistics

13. Tuapse
14. Murmansk
15. Sillamäe
16. EuroChem Antwerpen Jetty

Highlights

02

EuroChem VolgaKaliy

In addition to a high KCl content and modern mining operations, a distance of only 500km to our Tuapse port facilities will provide us with unmatched cost advantages. Planned annual capacity of 4.6 MMT of KCl

03

EuroChem Usolskiy

Our potash mine in the Verkhnekamskoe deposit at Usolskiy is operating in test mode. It has a useful mine life of at least 60 years at today's planned annual production capacity of 3.7 MMT of KCl

10

EuroChem Northwest

EuroChem has built an ammonia plant in Kingisepp, Russia, close to the Group's Phosphorit phosphate fertilizer facility. The plant has a design capacity of 2,700 tonnes per day or 1 MMT p.a.





- **Vertical integration:** own raw materials, port terminals, rail stock, construction/repair works, Europe/CIS/Americas distribution capacity
 - **4 Nitrogen plants** (3 in Russia, 1 in Belgium) – nutrient capacity of 3.5 MMT of N.
 - **3 Phosphate plants** (2 in Russia and 1 in Lithuania) – nutrient capacity of 1.3 MMT of P₂O₅ (phosphoric acid)
 - **Apatite** (Russia) – P₂O₅-rich (37%-38%) and low-MER⁽¹⁾ content (0.057) apatite ore (2.8 MMT per year) covers c.75% of own production needs, with additional volumes from Kazakhstan mining operations
 - **Iron ore** as a co-product of apatite mining: up to 5.8 MMT of iron ore (Fe content 63.5%)
 - **Logistics** assets include transshipment capacity of >10 MMT, of which c.3.5 MMT in the EU, own rail stock/depot
 - **Sales:** global platform anchored on European and CIS presence with expanding footprint across the Americas

- **Projects**
 - **Potash (K): 2 greenfield projects in Russia** with targeted capacity of over 8.3 MMT of KCl per year (5 MMT K₂O).

Fertilizer sales volumes 2018

14.1 MMT

Sales 2018

\$5.6 bn

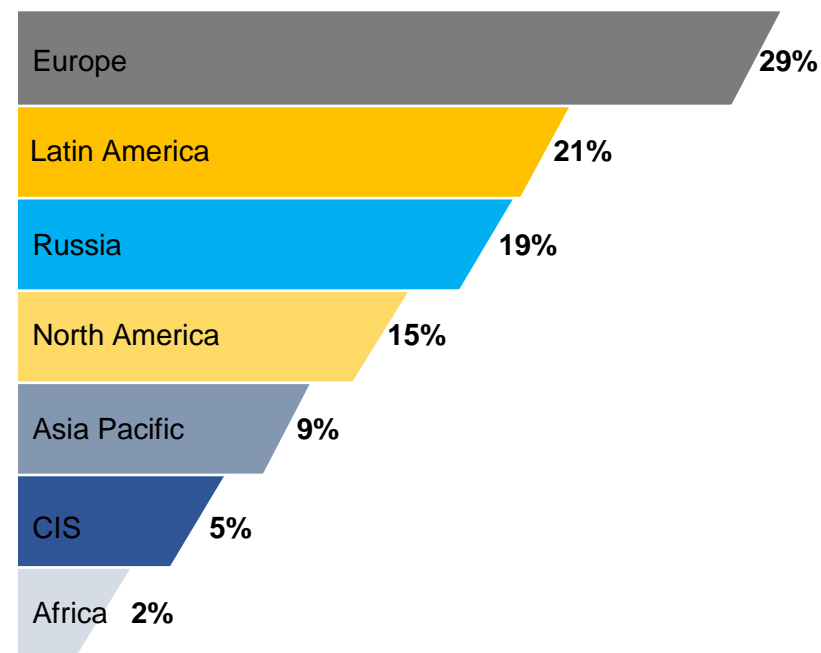
People 2018

>26,500

EBIDTA 2018

\$1.52 bn

Sales geography breakdown 2018 (\$)



⁽¹⁾ Minor element ratio



Essentials



- AN
- AS coarse
- AS fine
- ASN
- CAN
- DAP
- MAP
- MOP granular
- MOP standard
- NP
- NPK
- UAN
- UAS
- Urea granular
- Urea prilled

Premium crop nutrition

Internationally recognized brands, trusted quality and performance

N-products



NP-products



NK-products



All nutrients in one granule. The pioneering SOP- and MOP-based homogeneous compound fertilizer



The stabilized mineral fertilizer for improved nitrogen efficiency



Higher urea performance with urease inhibitor.



Water-soluble fertilizer products for effective fertigation and foliar feeding



Selected product visuals





Overview of Fundamentals

Potash Supply

Potash Demand

Market Balance and Scenarios

French Potash Market



What is potash?

A form of potassium, another one of the periodic elements

Li	Be																	B	C	N	O	F	Ne
Na	Mg																	Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr						
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe						
Cs	Ba	LANTHANIDES		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn					
Fr	Ra	ACTINIDES		Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Uut	Ff	Uup	Lv	Uus	Og					
Lanthanides		Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu								
Actinides		Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr								

- Atomic number: 19
- An alkali metal solid – silvery-white in pure form
- Forms 1.5% of earth's crust
- Forms 0.2% of human body
- Essential for all plant and human life!

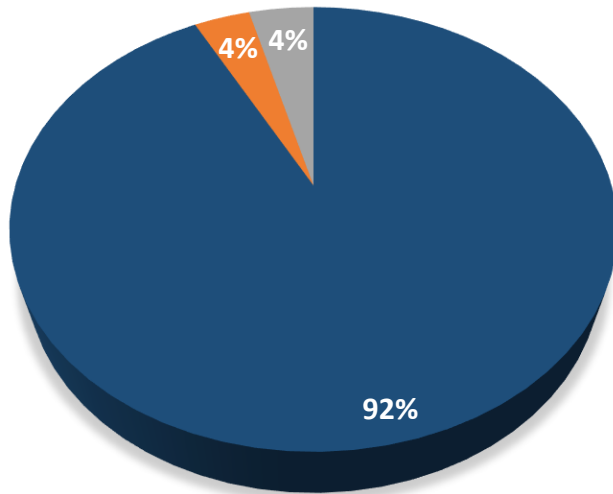




What is it used for?

Most potash is applied as an agricultural fertilizer

Potash production*



■ MOP ■ SOP ■ Other

92%



Potash fertilizers

- Ensures efficient nitrogen and water uptake
- Increases tolerance to disease and drought

8%



Industrial applications

- Medical applications
- Glass-making
- Potassium hydroxide used in wide range of applications



Role of potassium in the plant

Potassium: the quality nutrient

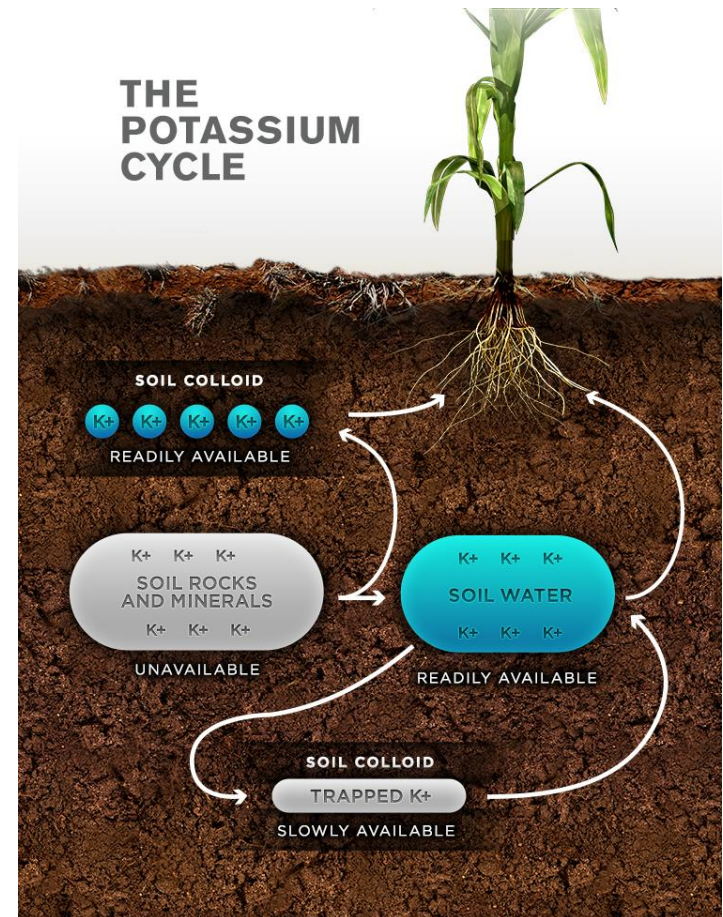


Balanced potassium applications vital for:

1. efficient nitrogen and water use
2. drought tolerance
3. frost resistance
4. resistance to pests and diseases

Potassium plays a major role in many aspects of quality such as:

- grain size
- appearance
- tuber size
- oil content
- dry matter
- starch content
- percentage sugar
- fruit ripening and quality



Detrimental effects of 'potash holidays'

Yield and quality can be impacted before effects are visible



In the short-term, effects of omitting potash applications unlikely to be noticeable because of:

- replenishment from reserves
- seasonal variation in yields
- effects of soil cultivation
- uptake of K from the subsoil

Longer-term, declining soil K will inevitably result in declining yields. Lack of potash also results in:

- inefficient use of other nutrients (especially N)
- a financial cost
- environmental pollution through nitrate leaching and emissions of nitrous oxide

Too little K causes ineffective use of N and the potential for N losses to the environment. Effects include:

- enhanced susceptibility to crop diseases
- less natural vigour and resistance to stress from pests, diseases and adverse weather
- weaker straw with greater risk of lodging
- reduced grain quality



POTASSIUM *deficiency*

SIGNS:

Leaves with brown spots, brown or yellow veins or yellow edges. This deficiency is more susceptible to disease and drought.

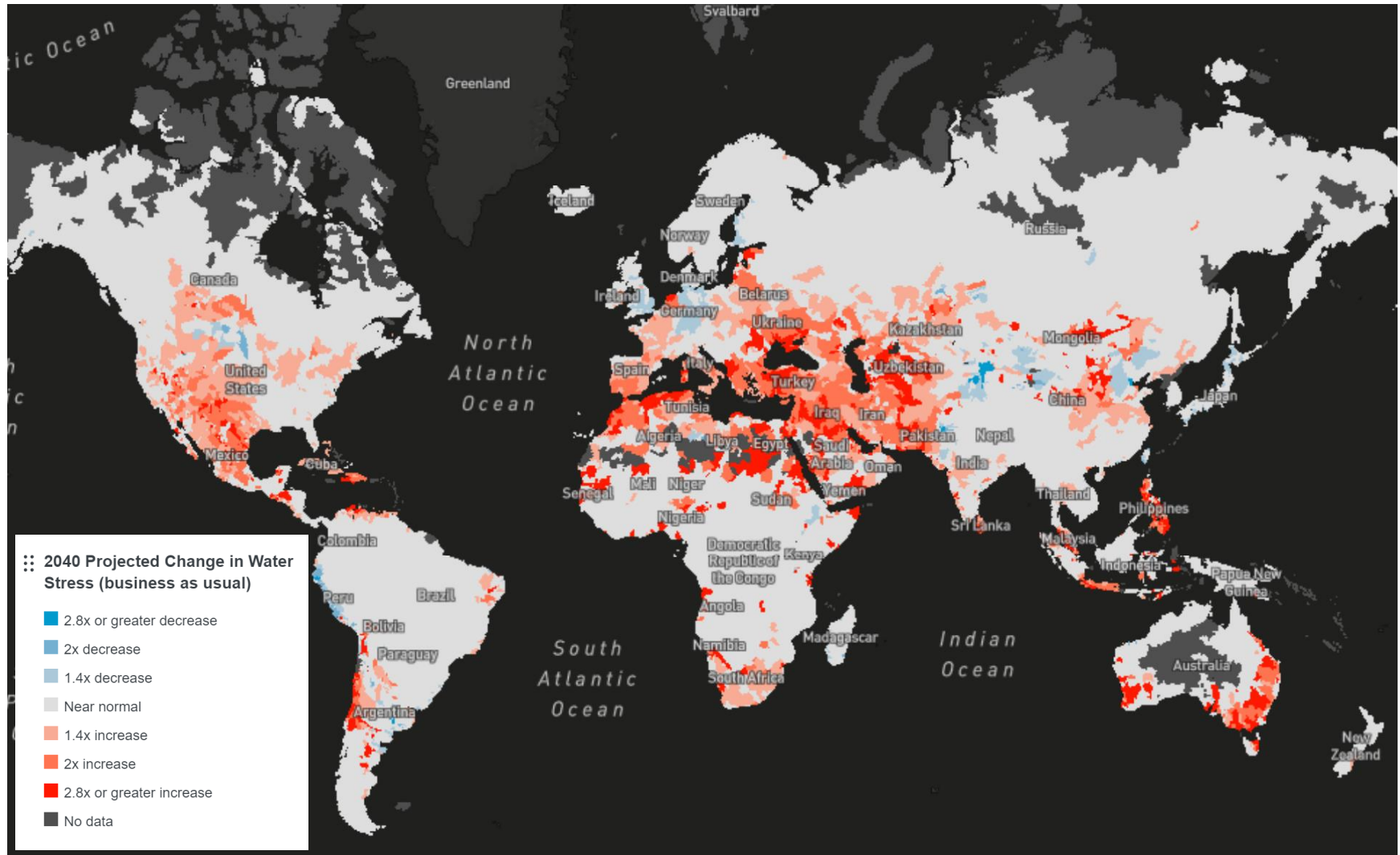
SOULTION:

Bury banana peels an inch into your soil. Peels take a while to rot, so this is a method that will slowly help your plants. Banana peels also deter aphids.

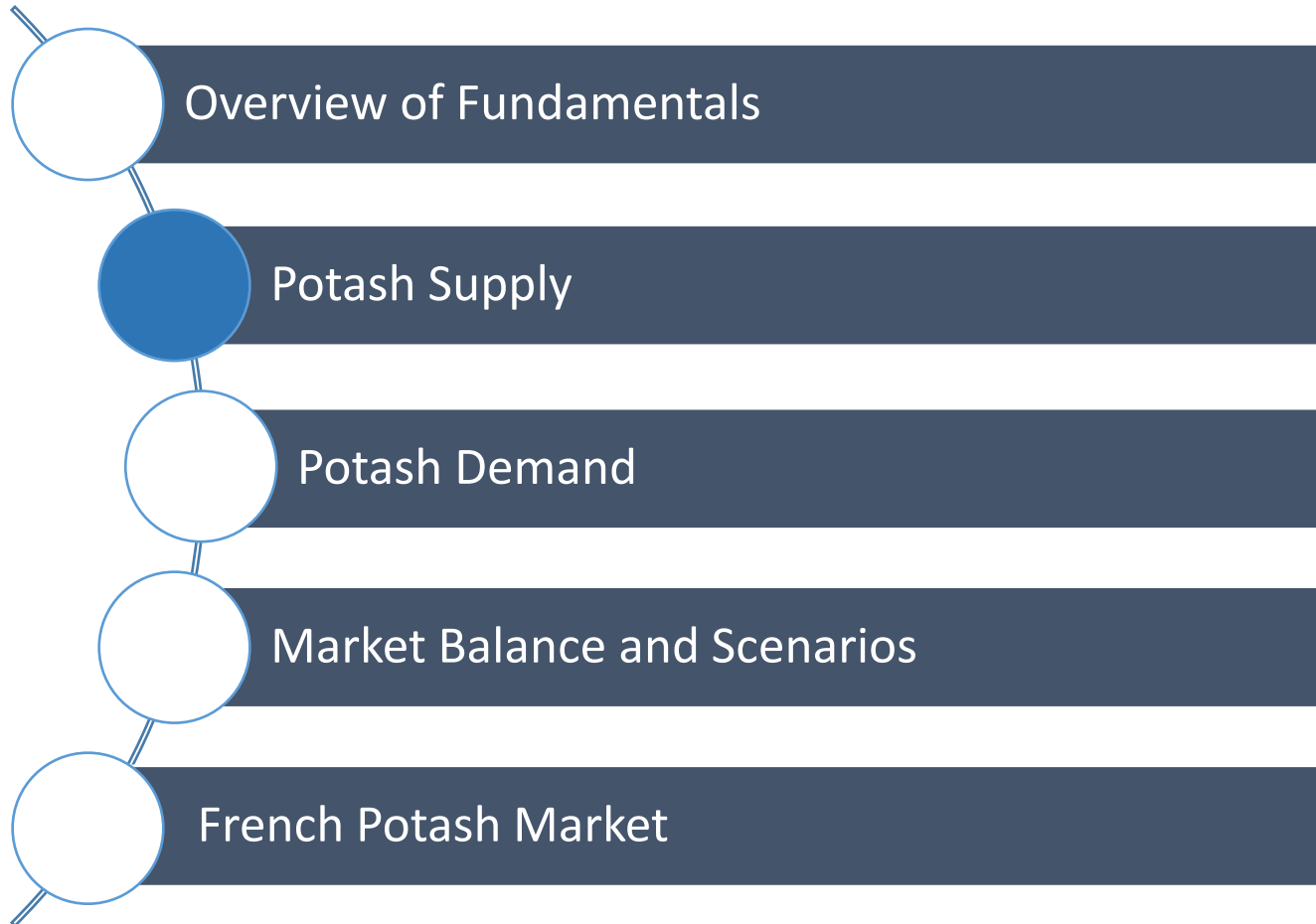


Climate change is also increasing the frequency of droughts

... with significant implications for agriculture, fertilizers and potash demand



Source: Bloomberg; the Economist; Resource Watch

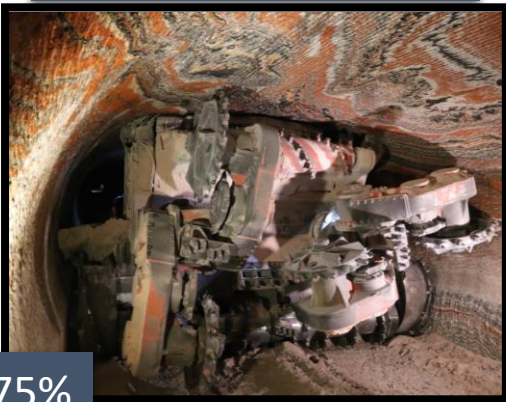


Where does MOP come from?

The majority is produced through underground mining and flotation



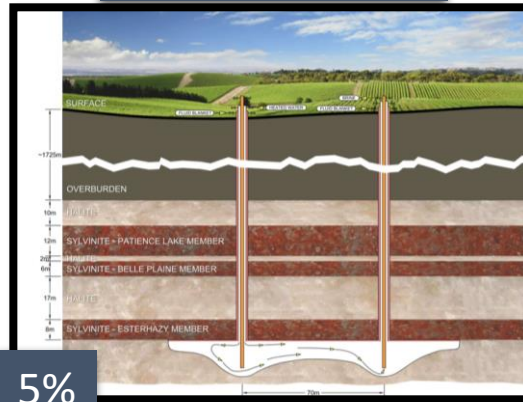
Underground mining



75%

- Conventional underground mining of sylvinite; crushing and flotation of ore
- Examples: EuroChem (Usolskiy; Volgakali)

Solution mining



5%

- Pump hot water through bore holes to dissolve sylvinite; brine pumped back to surface for processing
- Examples: Canada (K+S Bethune)

Natural Brines



20%

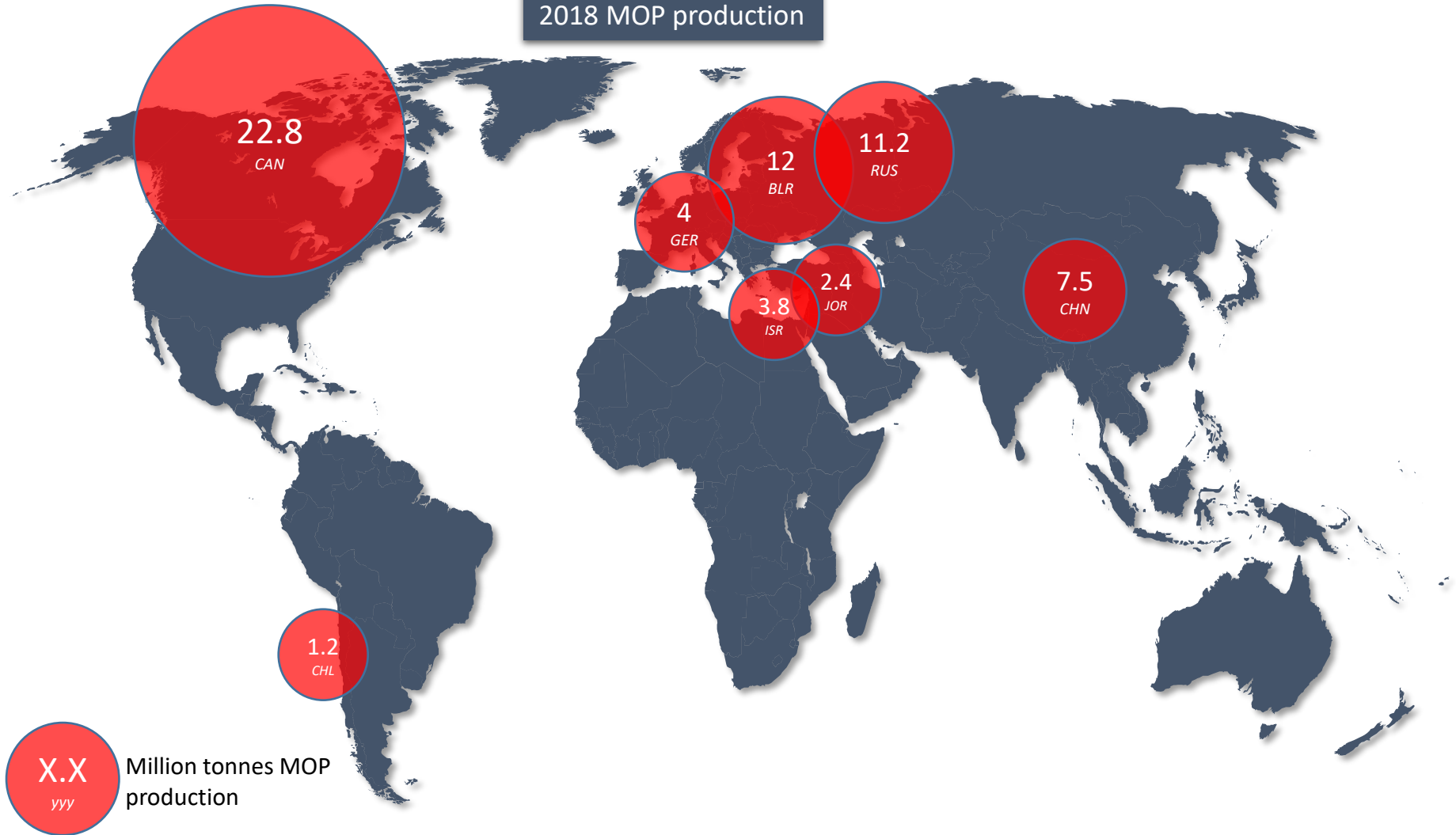
- Solar evaporation of potash crystals from lake brine; harvested by dredges or machines
- Examples: China, Chile

Where is MOP produced?

67.7Mt MOP produced in 2018



2018 MOP production



*Featuring countries producing >1Mt only

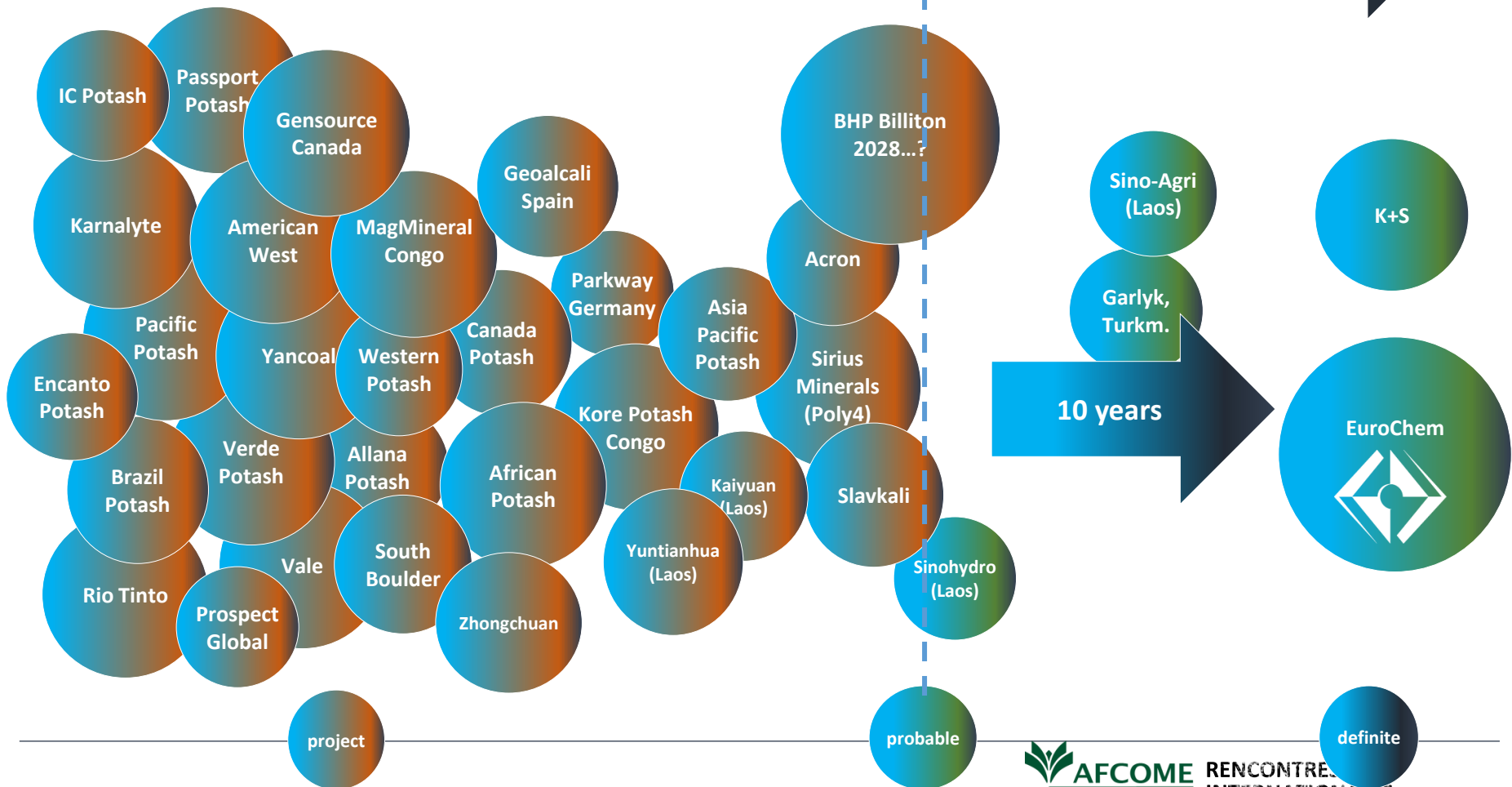
A large group of potash projects are competing for financing
 With few so far succeeding in crossing the line



EXPLORATION

FEASIBILITY

CONSTRUCTION



EuroChem K photos

... to be selected



EuroChem K photos

... to be selected



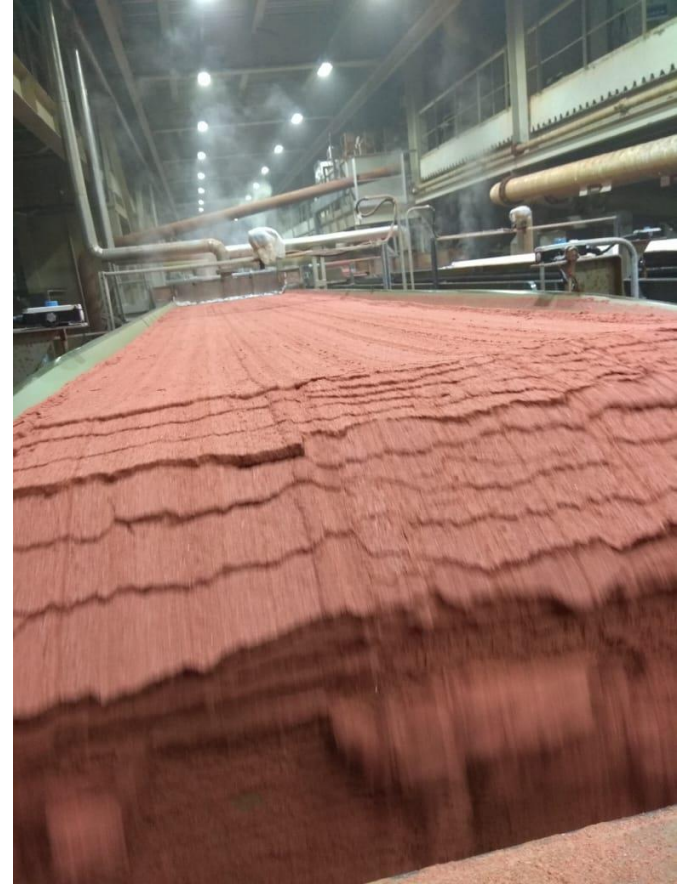
EuroChem K photos

... to be selected

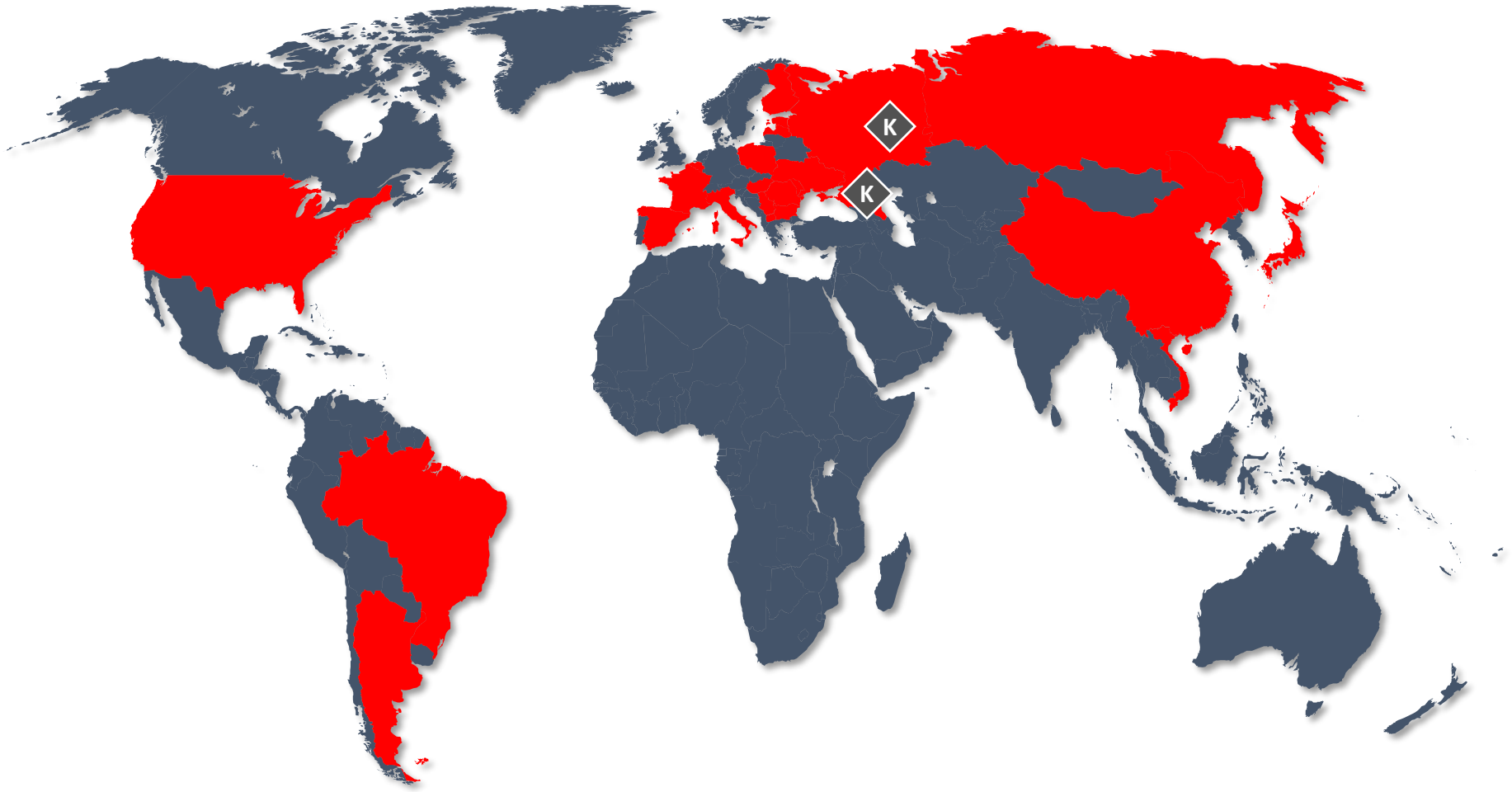


EuroChem K photos

... to be selected



We are already selling our MOP output far and wide
... and utilizing our strategic global distribution network



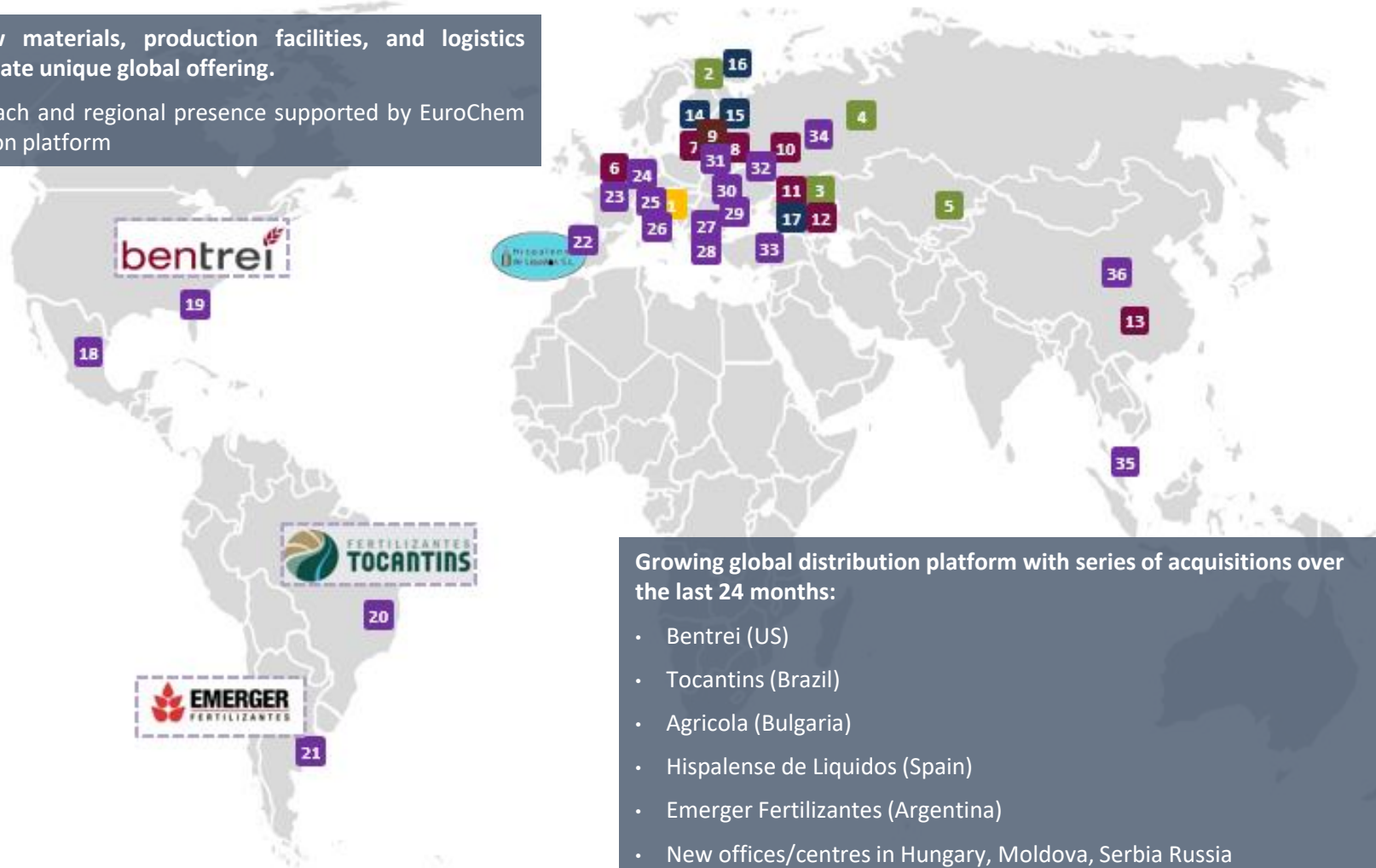
Recorded EuroChem potash sale



However, a significant share of our MOP supply is integrated
Into downstream production and our strategic distribution network

Own raw materials, production facilities, and logistics
assets create unique global offering.

Global reach and regional presence supported by EuroChem
distribution platform



Growing global distribution platform with series of acquisitions over
the last 24 months:

- Bentrei (US)
- Tocantins (Brazil)
- Agricola (Bulgaria)
- Hispalense de Líquidos (Spain)
- Emerger Fertilizantes (Argentina)
- New offices/centres in Hungary, Moldova, Serbia Russia

We expect internal consumption will increase sharply
Through downstream production and our integrated global network



2018 :
> 700 KMT KCI
consumption

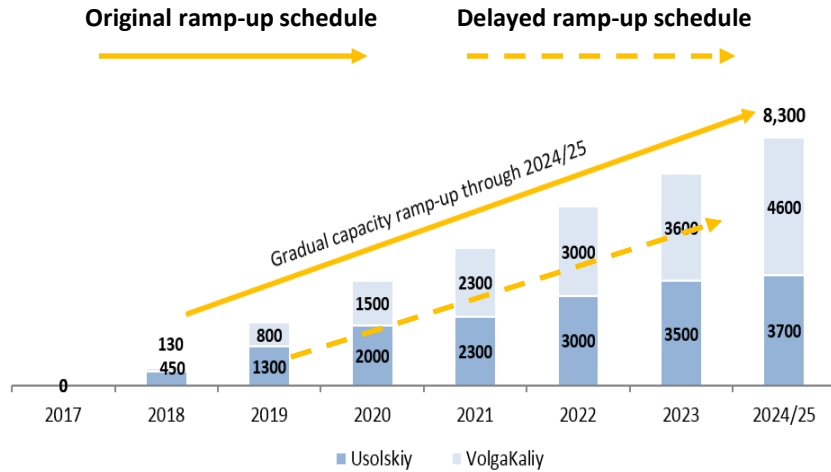
2022 :
2.850 KMT KCI
consumption

MOP outlook: EuroChem is rapidly becoming a leading global supplier

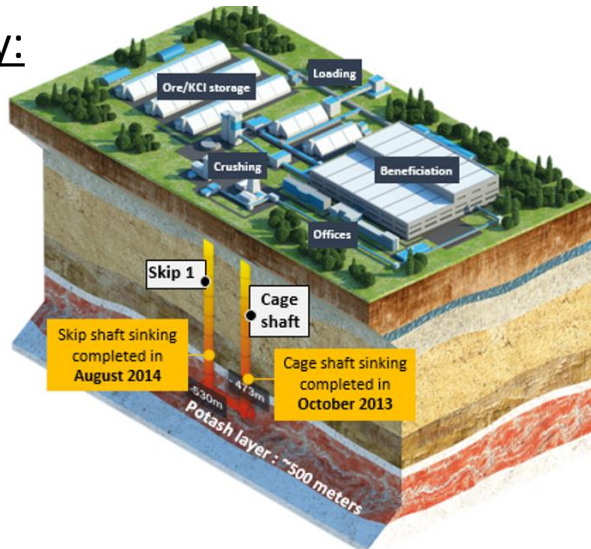


Our first two mines will take us to 8.3Mt MOP capacity

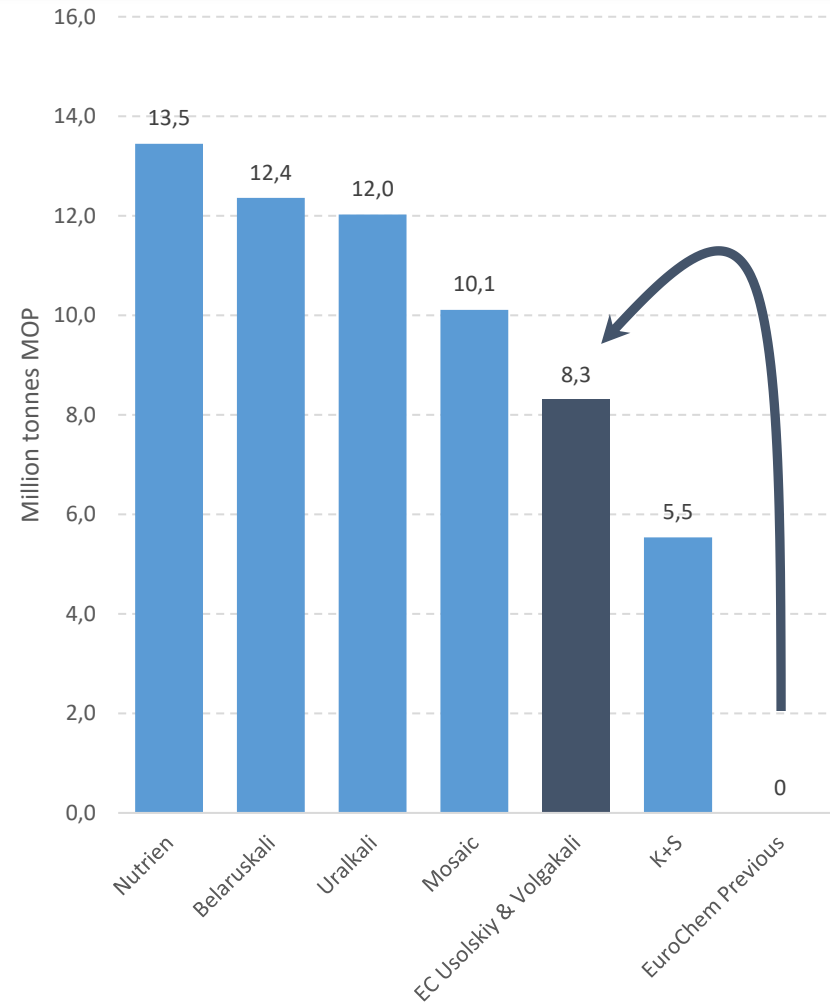
Original Usolskiy and Volgakali Ramp-up Schedule



Usolskiy:



Operational MOP Capacity at World's Largest Producers

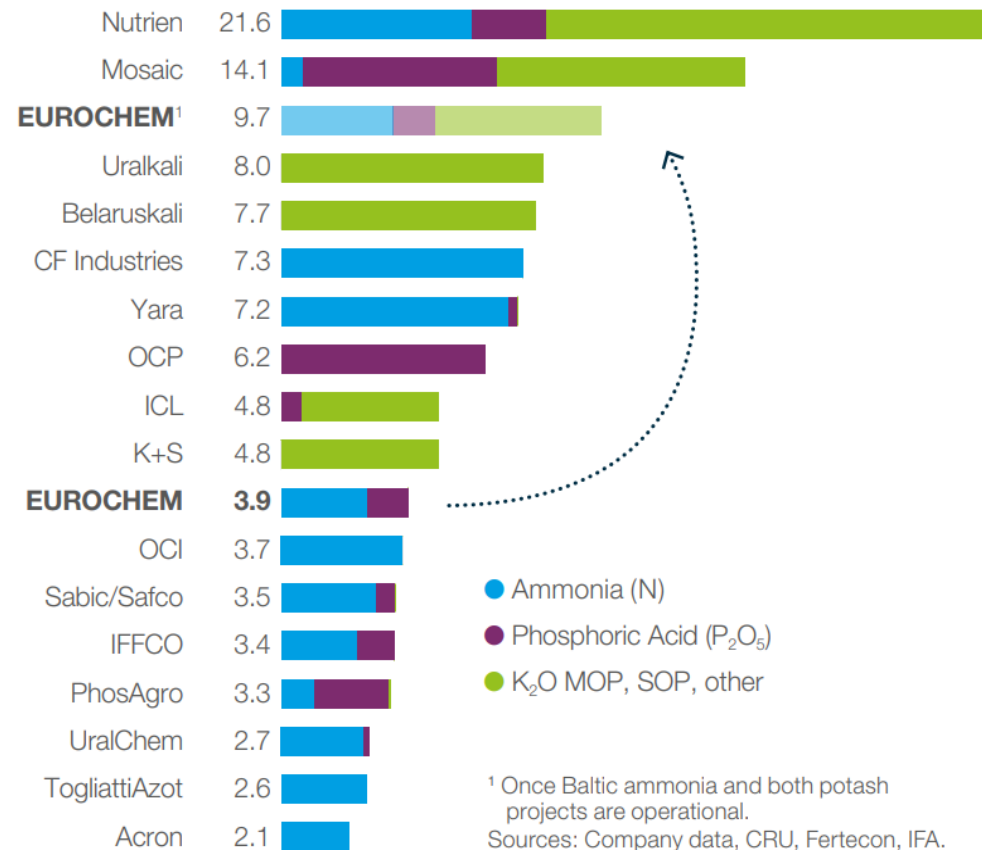


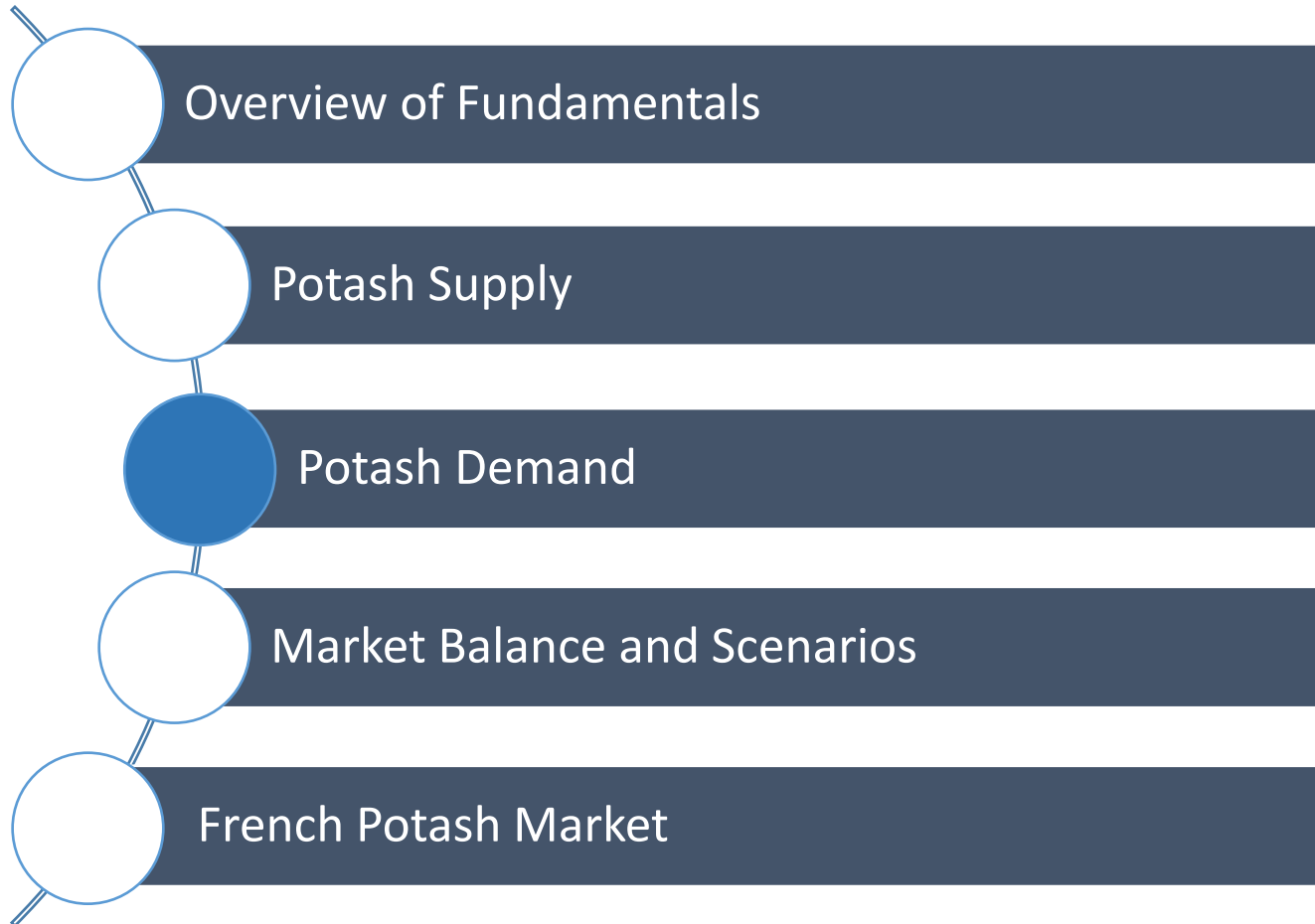
MOP production will transform EuroChem into a global Top 3 player

... with a complete portfolio of nitrogen, phosphate and potash production assets



Selected ranking by nutrient capacity (MMTpa)



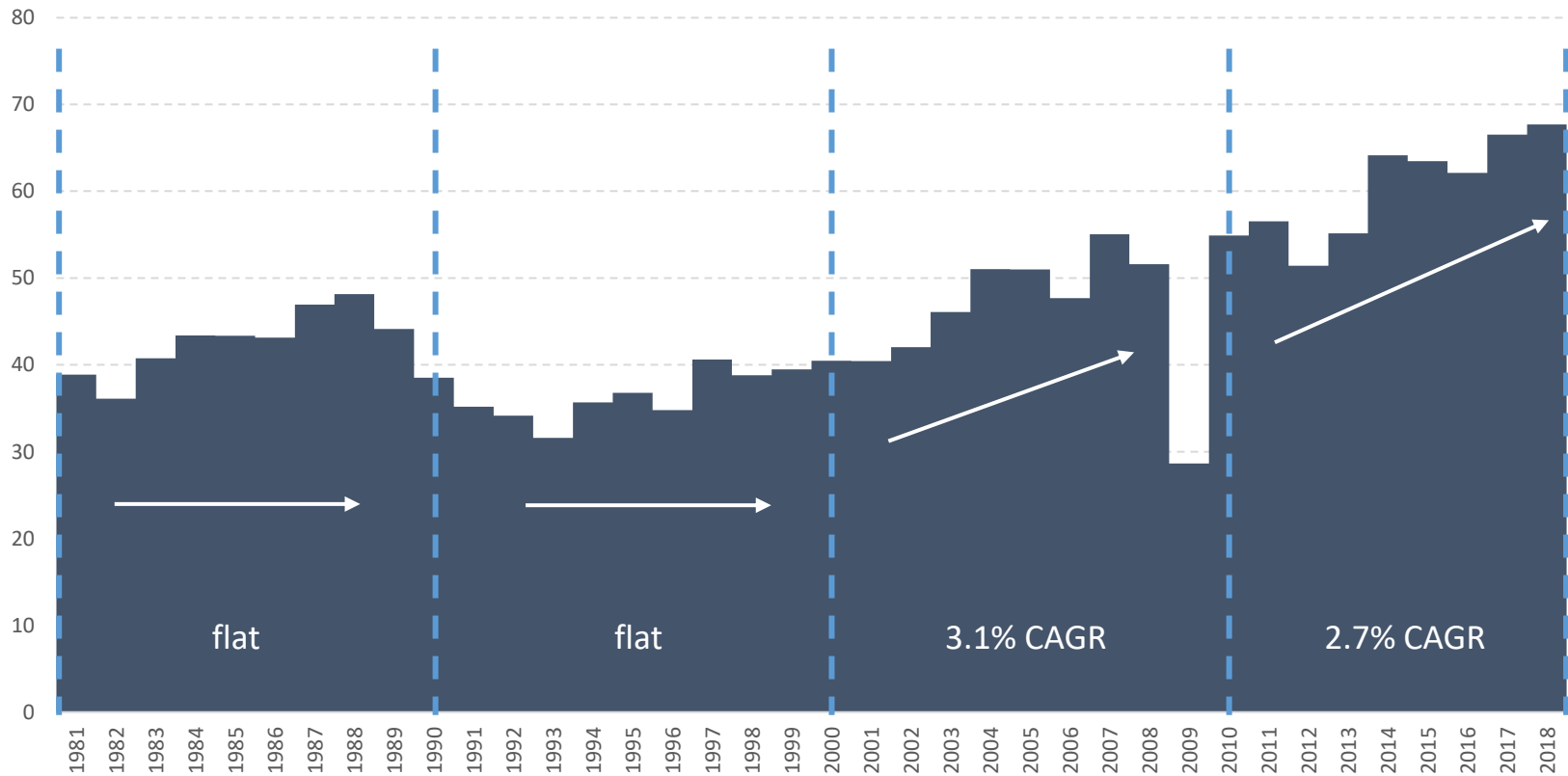


We are experiencing sustained strong MOP demand growth since 2000

2018 demand represented historic record of 67.7Mt



Global KCl demand



Outlook for fertilizer demand is underpinned by strong fundamentals

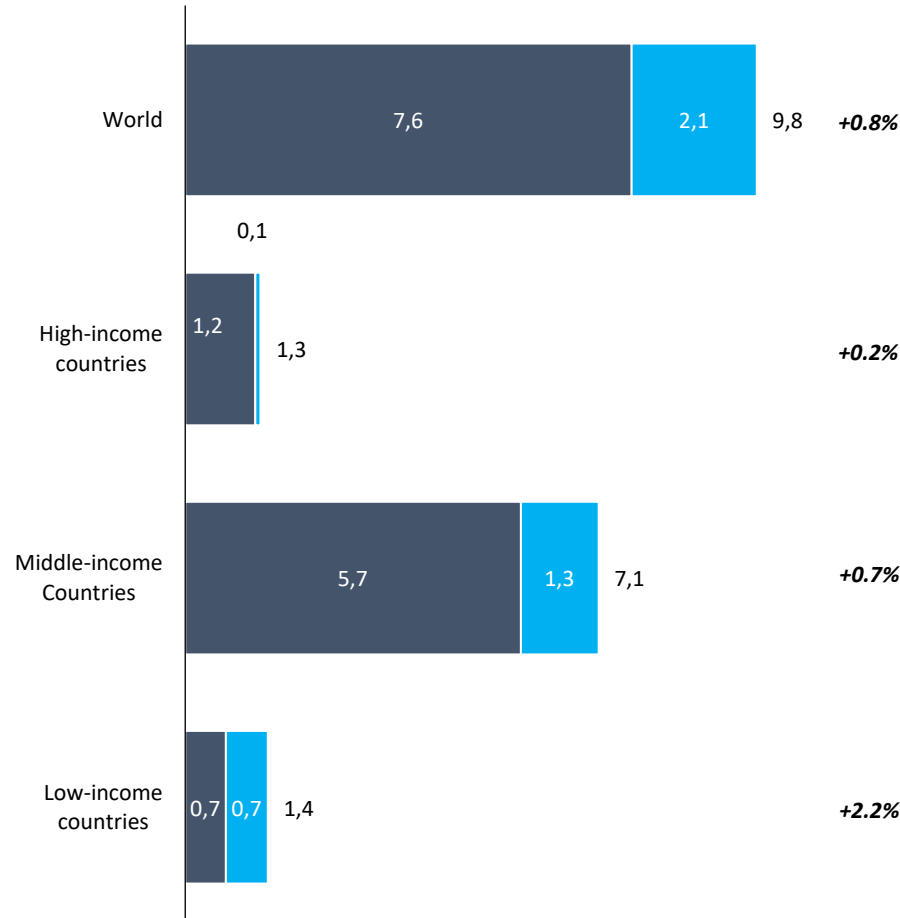


Increasing global population demands more intensive agricultural production

World population growth is concentrated in middle & low income countries...

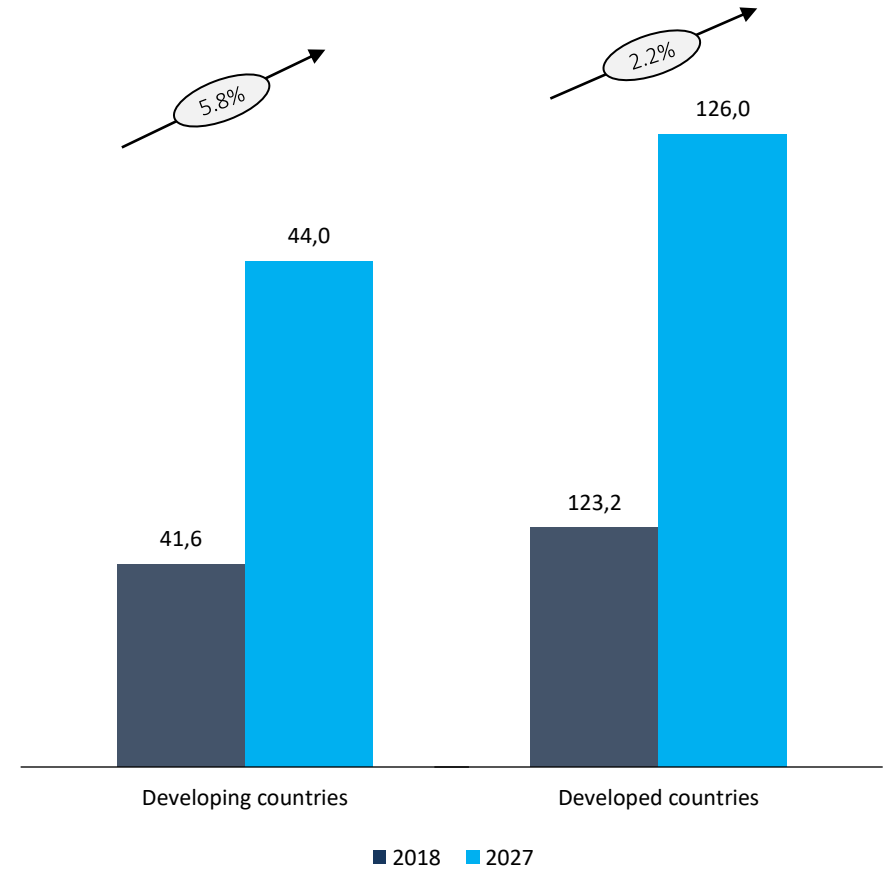
Global population (bn)

CAGR



... where consumption growth remains strongest ...

Forecast of daily protein intake per capita (g/day/person)



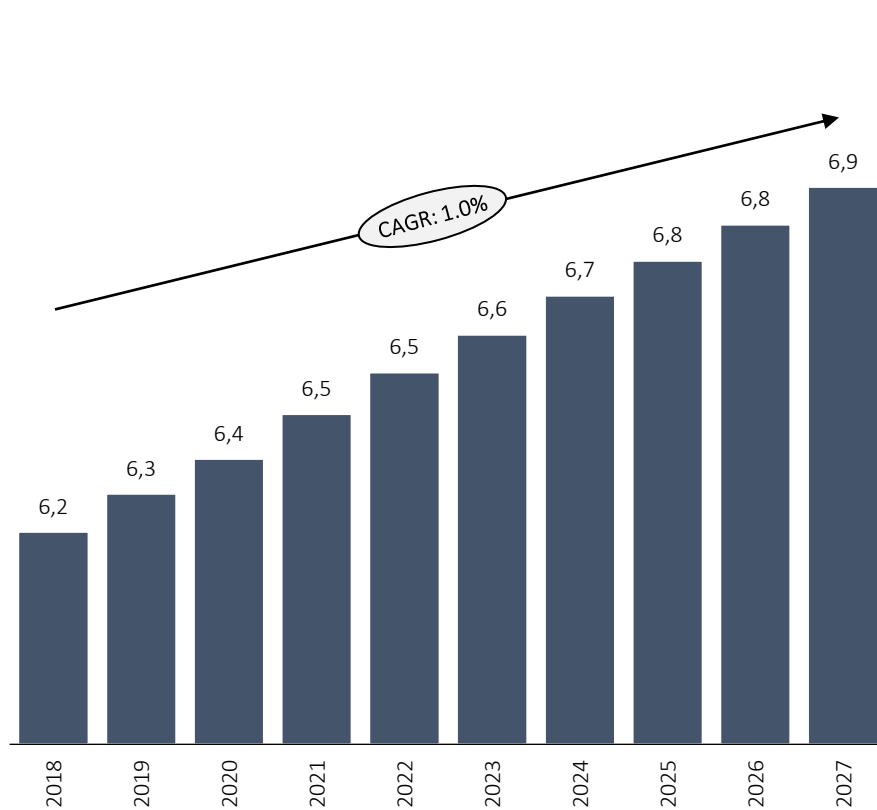
Fertilizer demand will grow at sustained rates in the long term

... to feed a growing population with limited scope for expansion in arable land

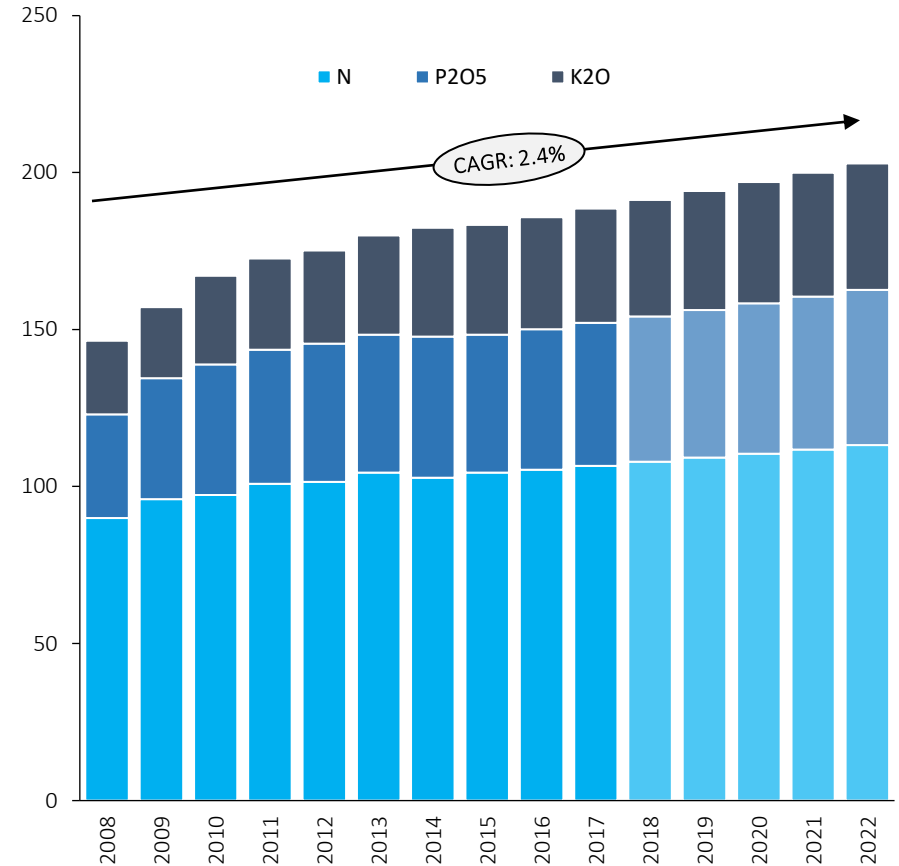


... driving demand for agriculture production ...

Agriculture production ('BMT- Grains, Oilseeds, Sugar)



... which in turn results in higher global fertilizer consumption⁽¹⁾, MMT

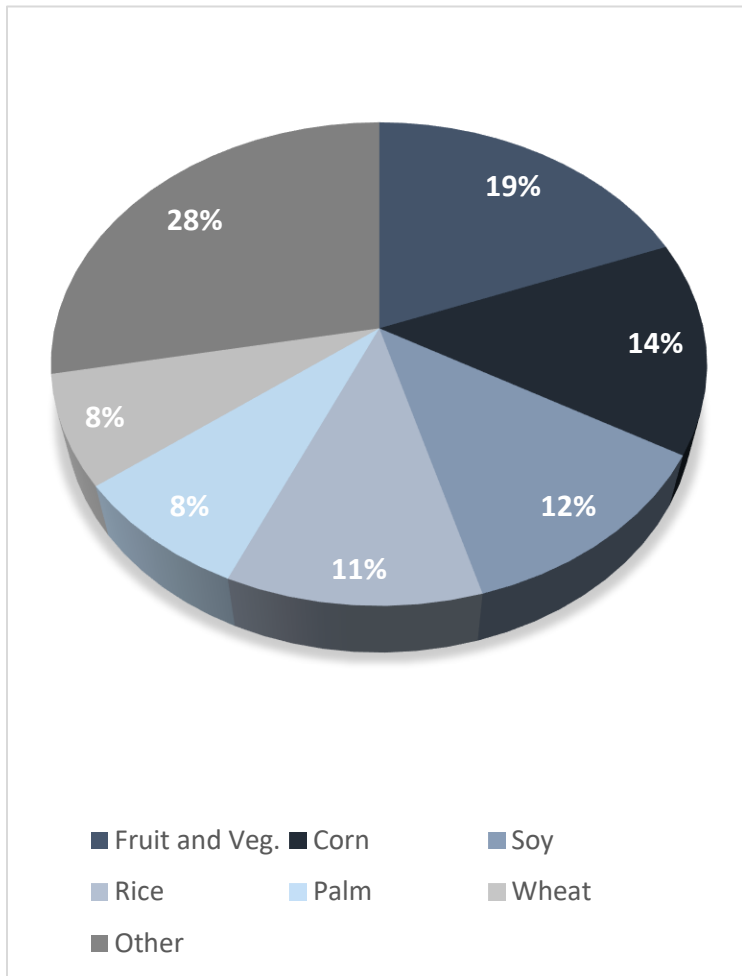


Agronomic fundamentals particularly favorable to potassium

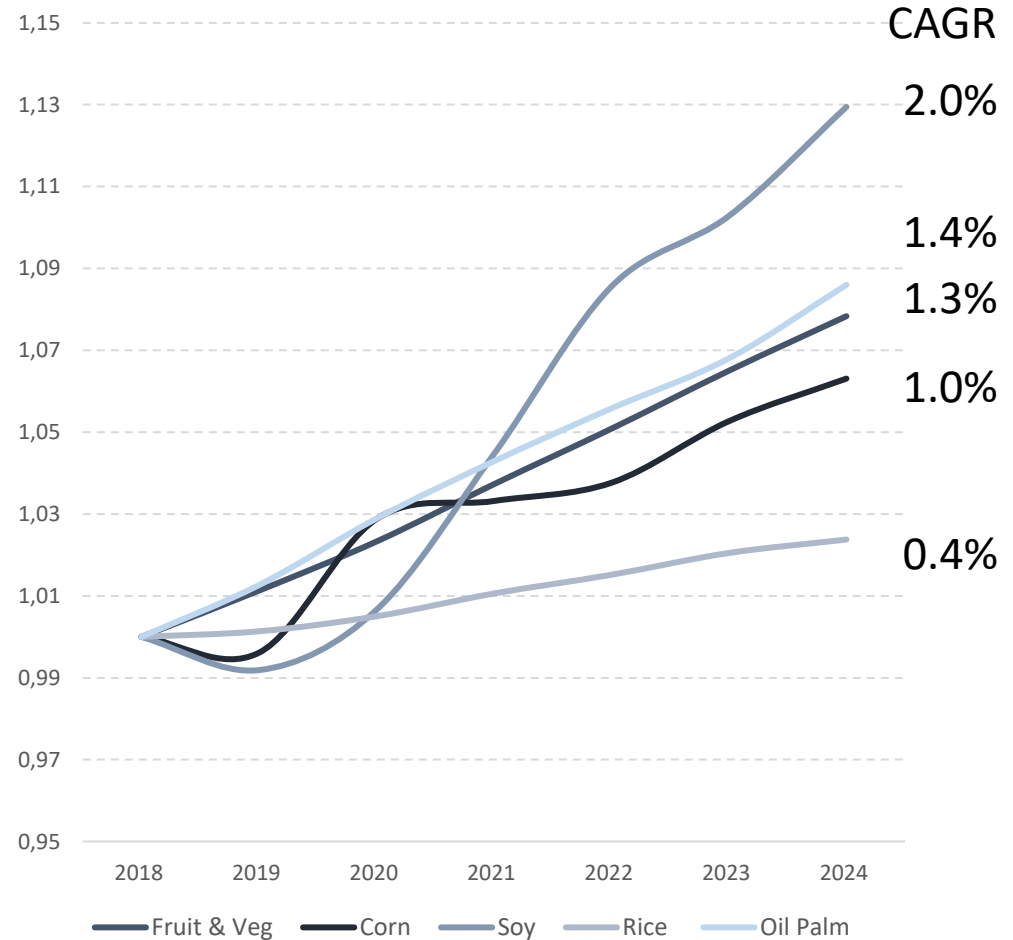
Soy, fruit and vegetables will drive potassium demand in the medium-term



Global K₂O demand



Global K₂O demand growth by crop

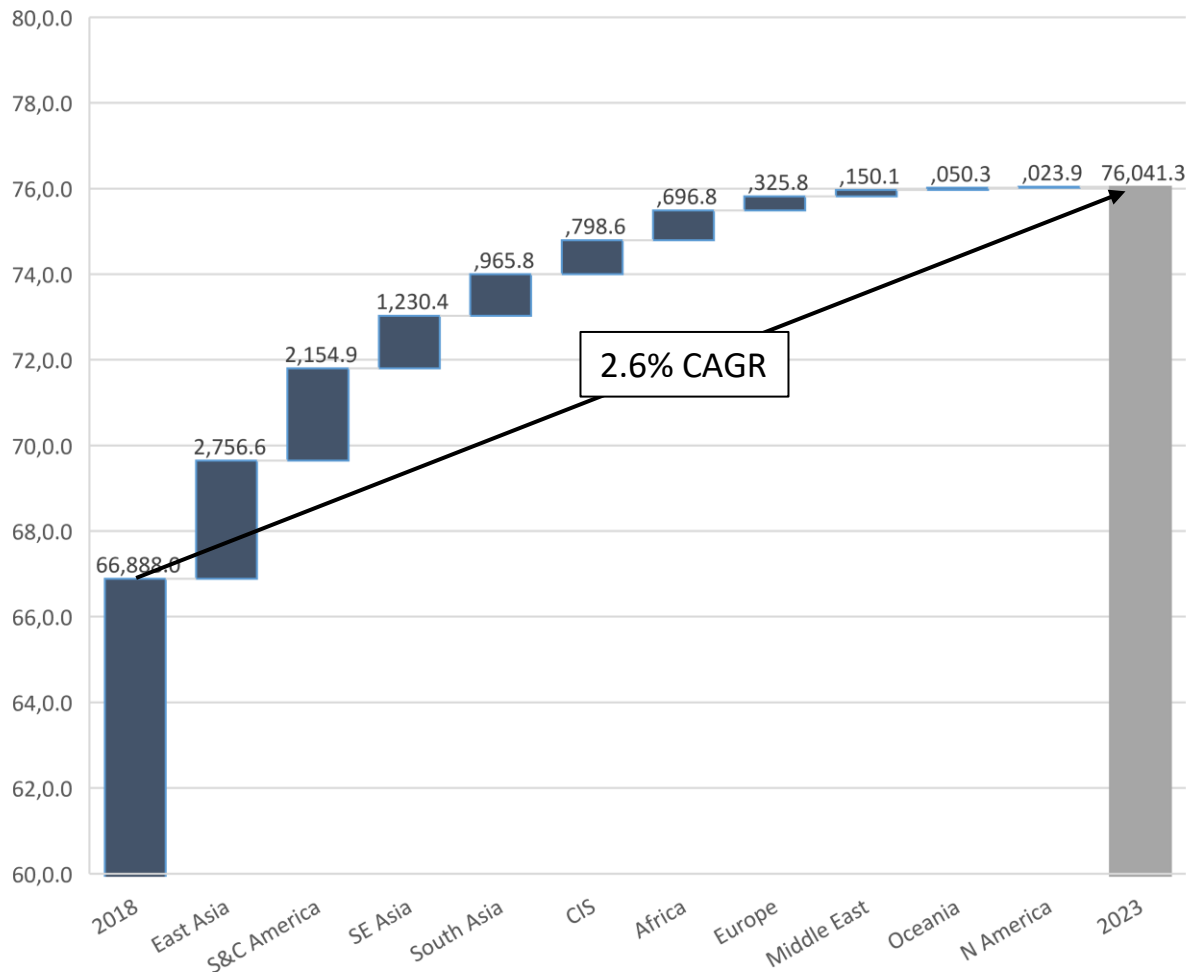


Asia and Brazil will be the engines of potash demand growth

... with significant upside demand potential globally



Global potash deliveries



China: re-balancing of nutrient ratio; Increase in cultivation of K-consuming crops

Brazil: continued expansion of planted soy area

SE Asia: improved MOP affordability signals upside demand potential

India: growing urgency of re-balancing of nutrient application ratio

Russia: major under-application of nutrient potassium

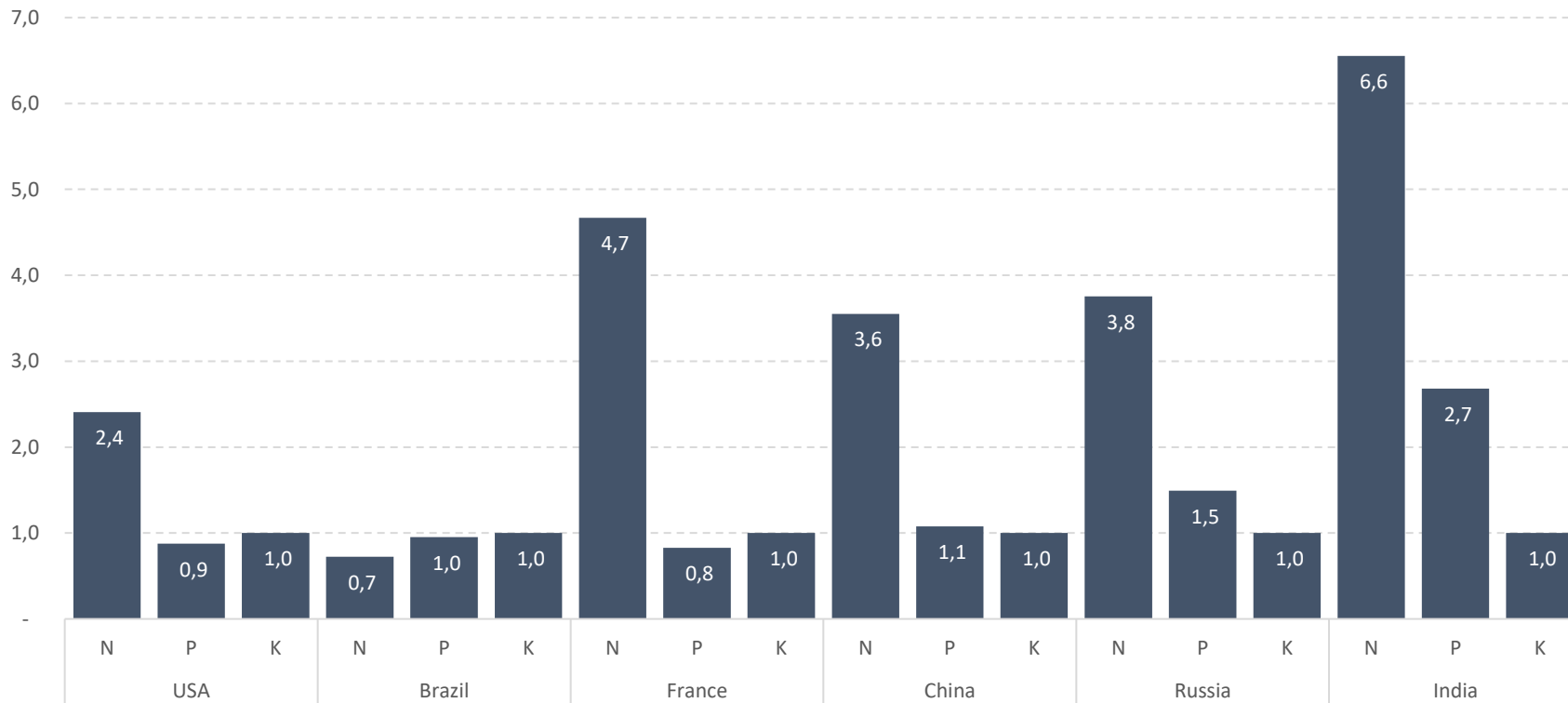
Africa: nascent expansion offers hope for huge upside demand potential (direct or via NPKs)

However, we see significant upside potential in major markets

Nutrient balance heavily skewed towards N in a number of key markets



2018 nutrient applications per hectare (ratio to K₂O/ha = 1)



Mature, sophisticated ag economy – well-balanced

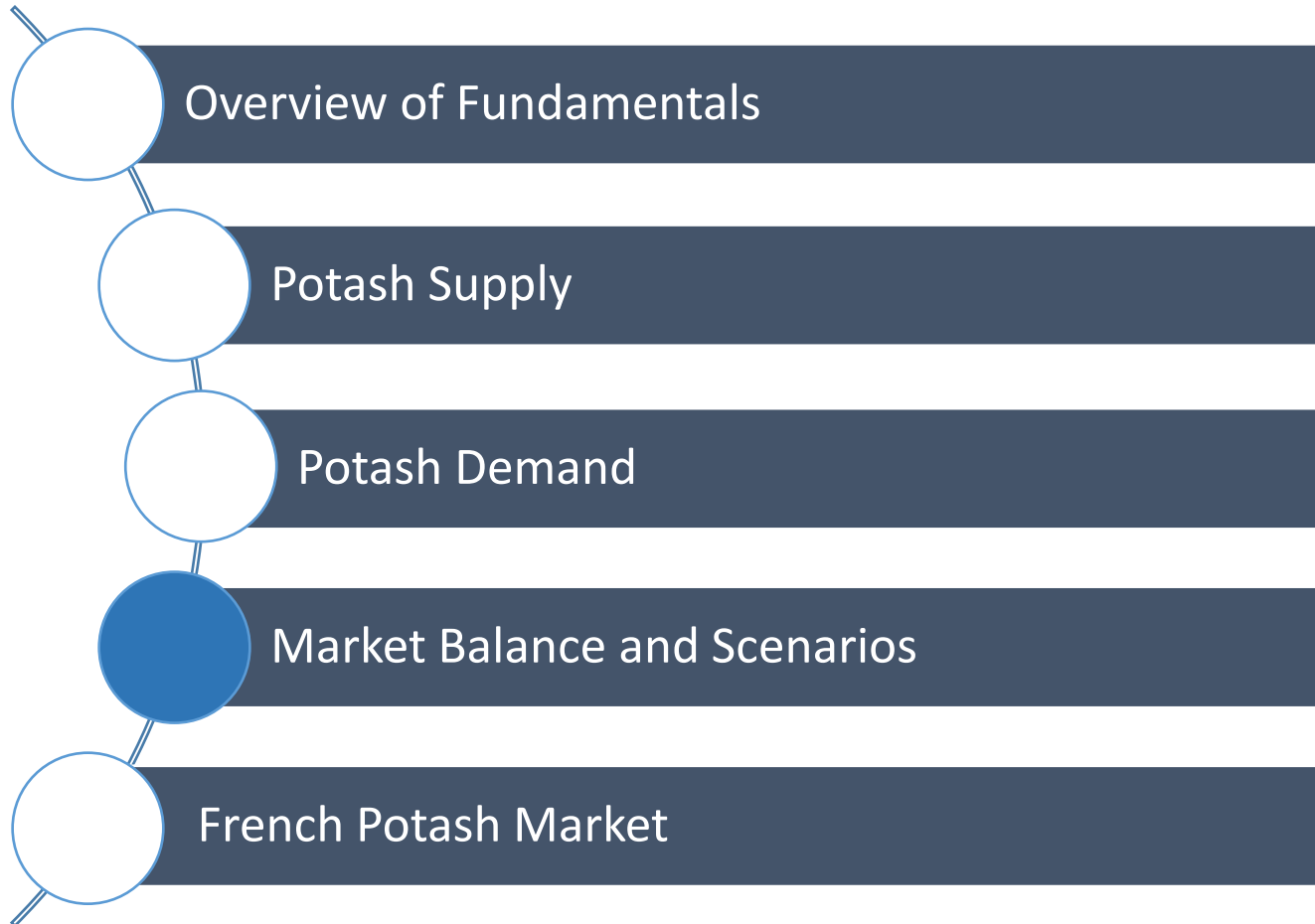
Low N reflects strong focus on soy

Mature, sophisticated ag economy – well-balanced

Despite rebalancing since 2010 K still significantly under-applied relative to ag profile (F&V)

Significant scope remains to rebalance nutrient application ratios

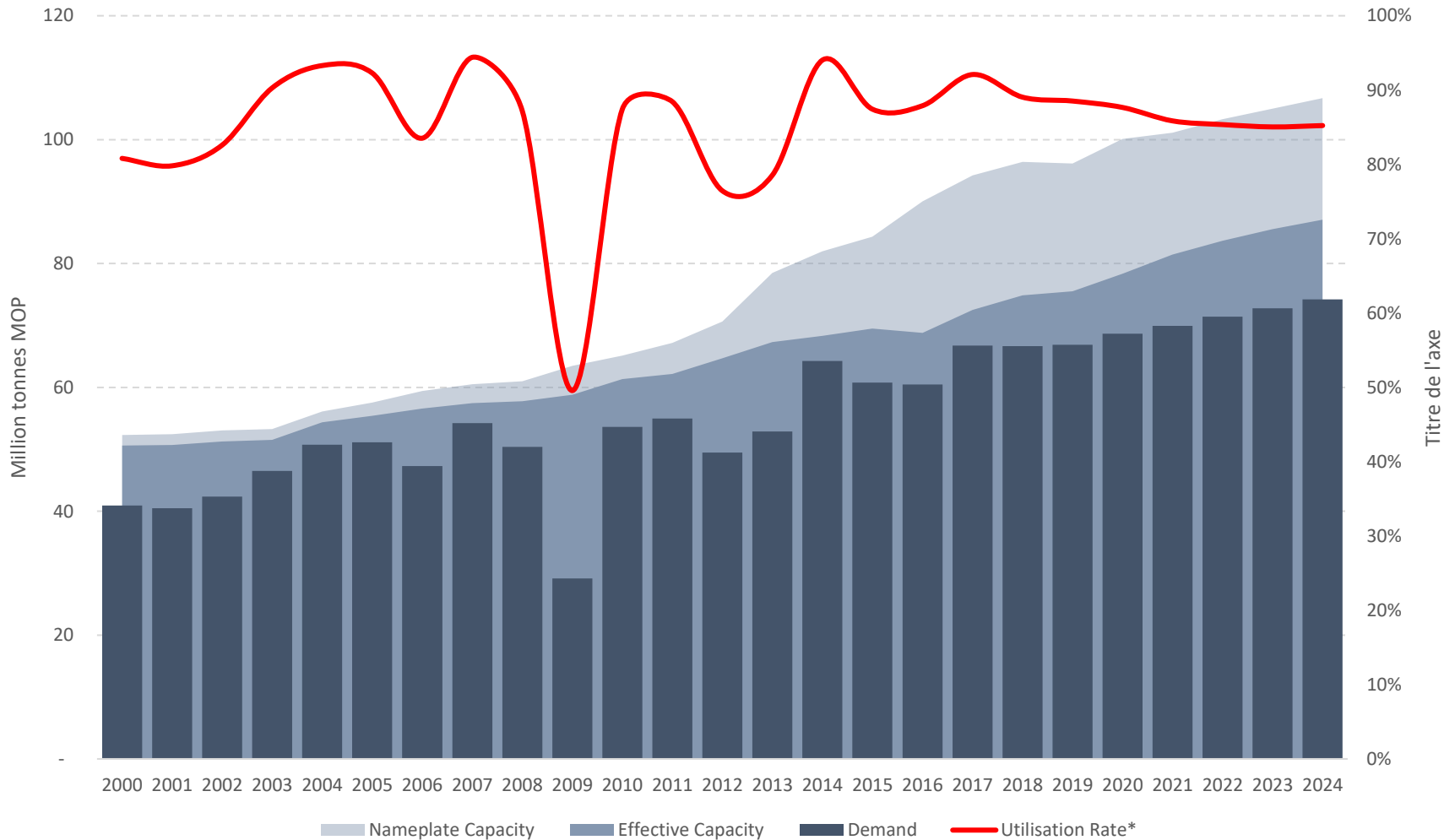
Highly un-balanced nutrient application; re-balancing marks significant upside for K



Global utilization rates are forecast at 85% - 89% in the medium term
However, significant risks are present on the supply side



Global MOP Market Balance



EuroChem expects a tighter market balance than those forecast
China will be central to the outlook of the potash market



1. Supply risk: unplanned disruptions and delays currently excluded from the market balance

- Analysts' forecasts exclude the voluntary and involuntary supply disruptions arising from flooding, engineering problems, etc., especially among ageing mines.
- EuroChem's own delays demonstrate the probability of future delays and disruptions among other potash producers.

2. Supply risk: Chinese domestic potash production has peaked and its sustainability is under question

- We believe 2019 is a turning point for Chinese MOP production.
- Long-term sustainability of high-cost Chinese potash producers are in doubt.

3. Demand risk: EuroChem sees major potential for Chinese potash demand

- Our earlier analyses demonstrates the significant upside potential for Chinese potash demand as growers' switch from grains to fruit and vegetables.
- China market still in need of rebalancing its nutrient application ratio in favour of potassium.

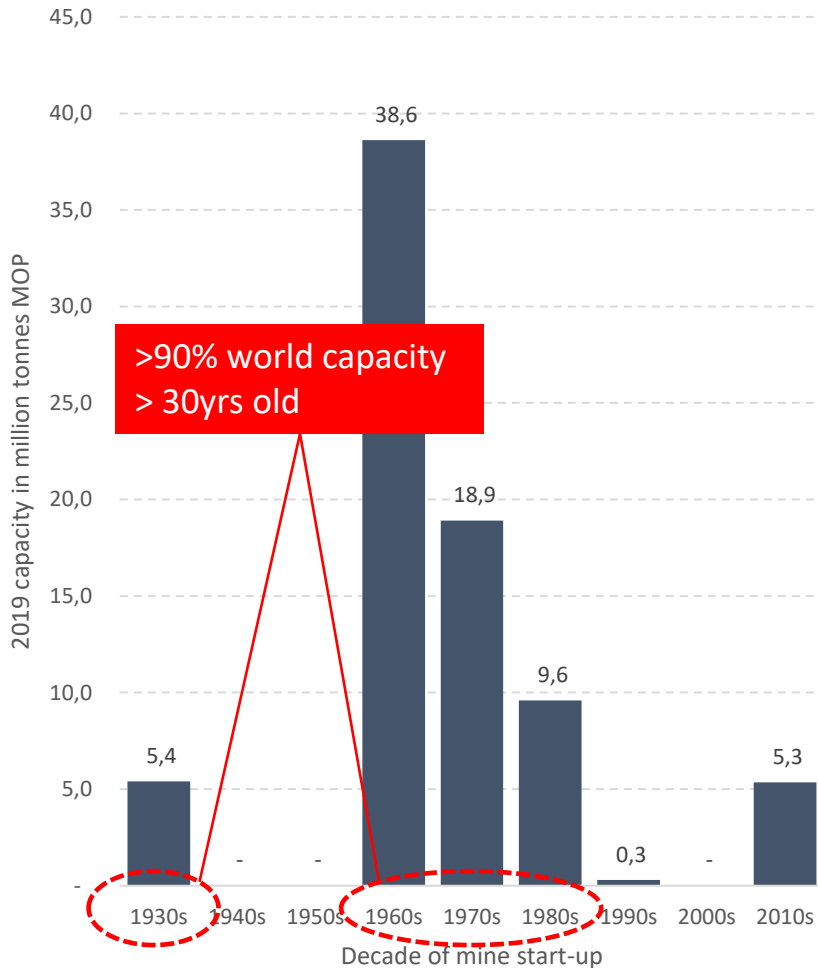
The ageing profile of global potash supply raises risk of disruptions

Arising from ore depletion, flooding and engineering problems

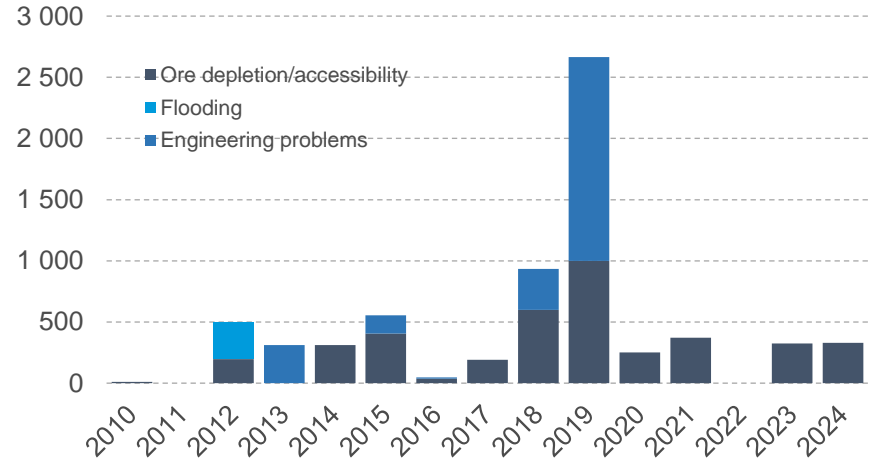


Risk 1

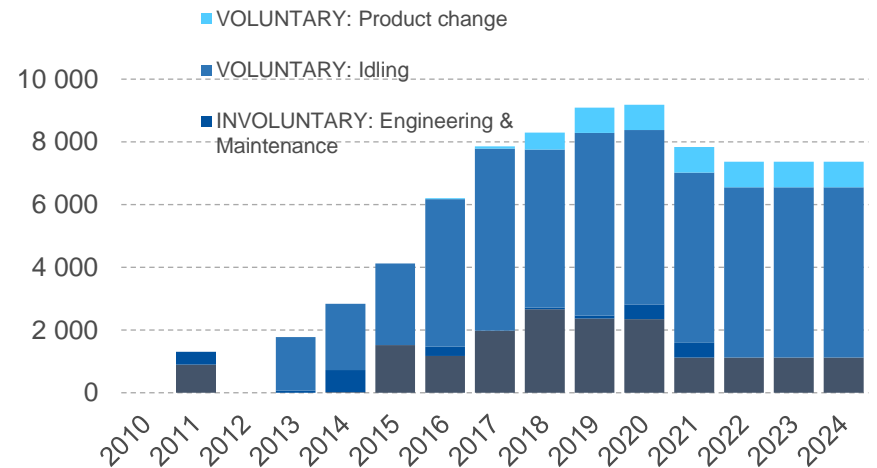
Start-up of potash mines operational in 2019



Permanent MOP closures by category (2000 - 2024)



Non-permanent MOP closures by category (2000 - 2024)



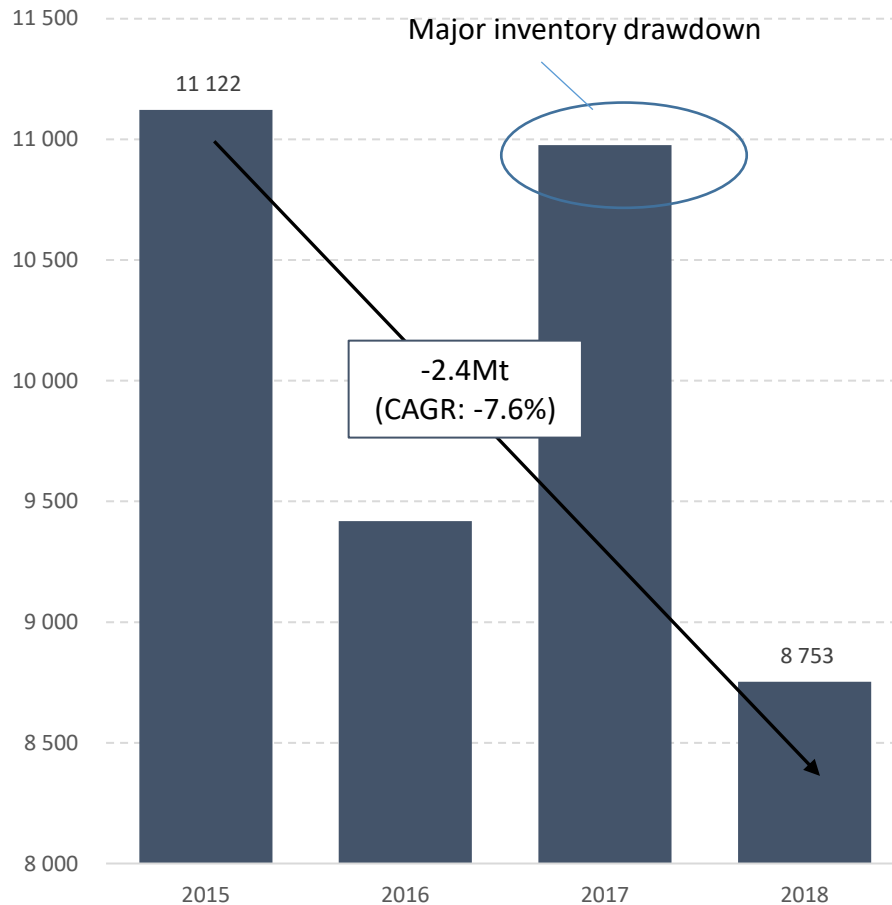
Russian exports curtailments demonstrate unplanned supply disruption



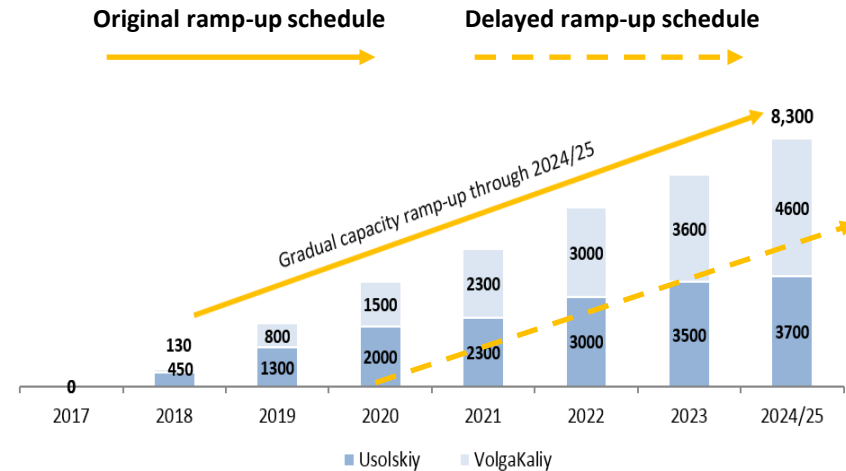
Ever present risk of flooding continues to plague ageing mines

Risk 1

Russia supply disruptions: MOP exports



EuroChem Potash Capacity (KCL, MMT)



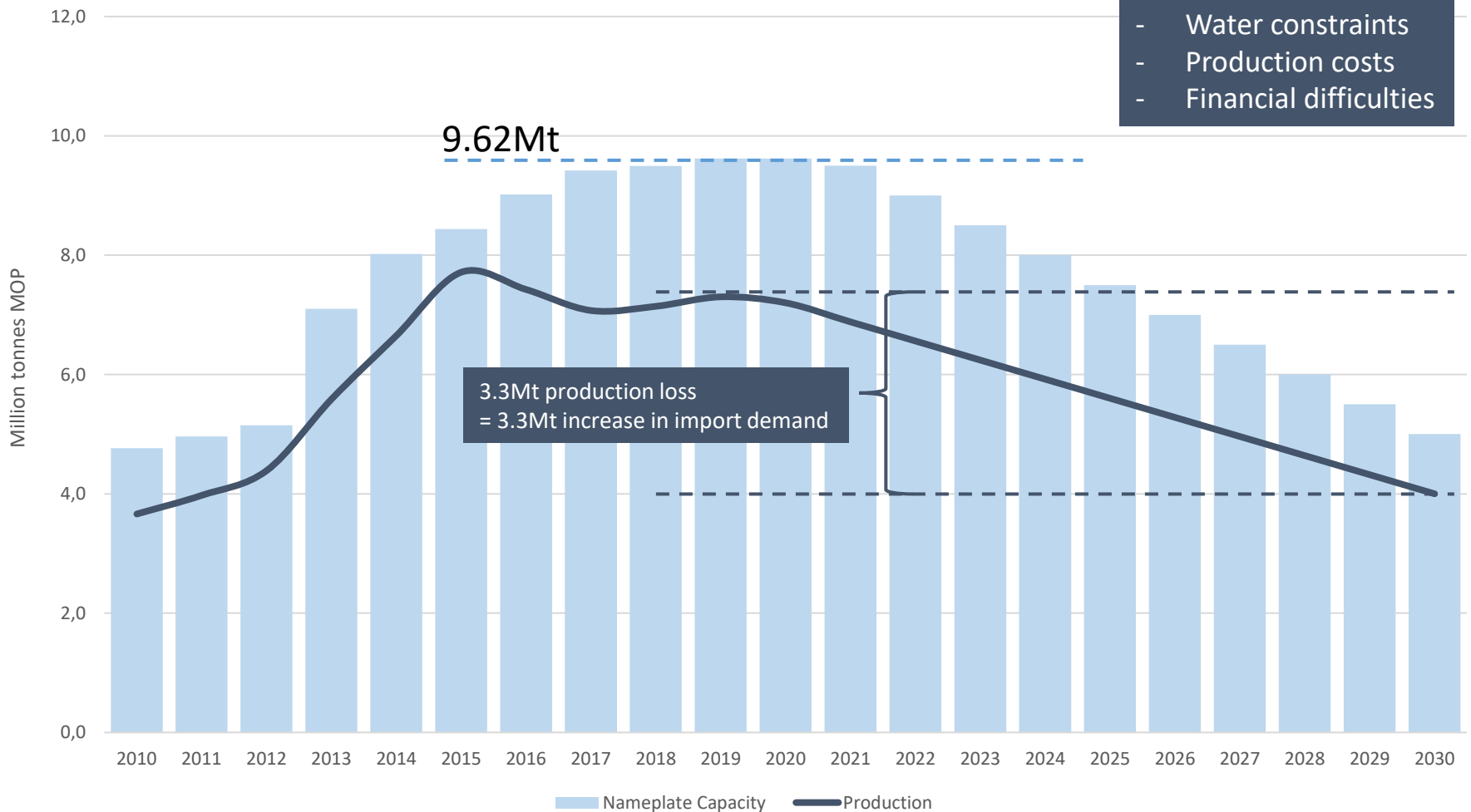
2019 marks a turning point for Chinese MOP production

Nameplate capacity peaks at 9.62Mt; no significant projects in the pipeline



Risk 2

China MOP Supply



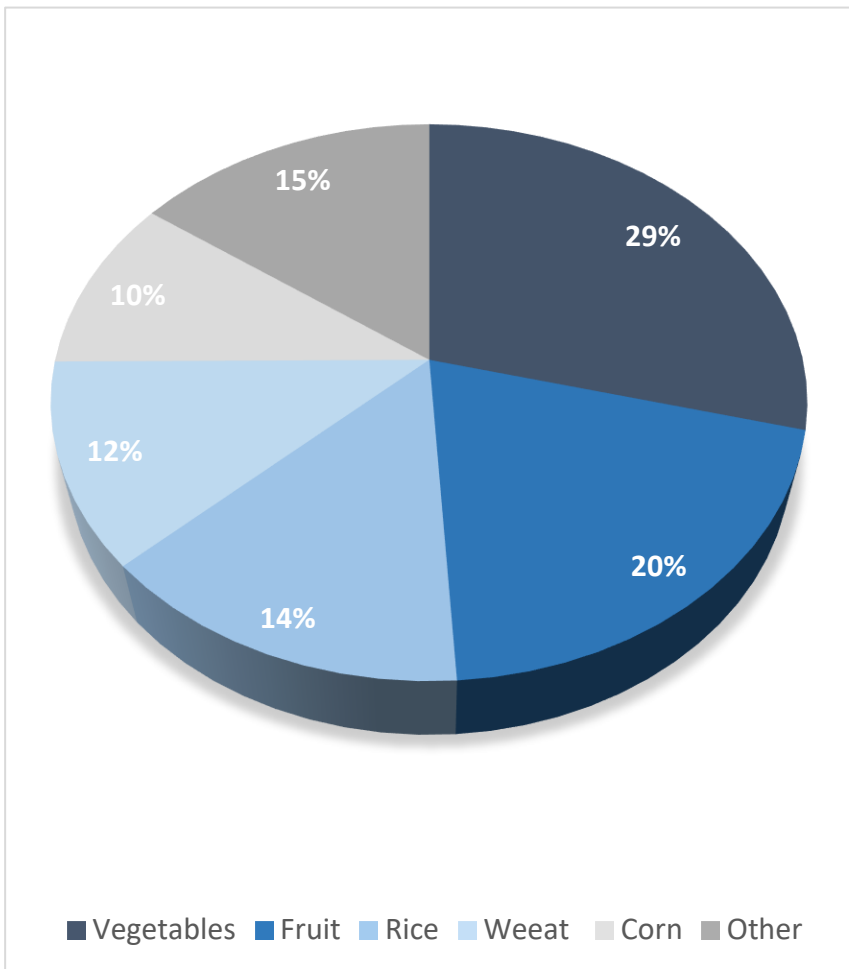
Chinese potassium demand dominated by fruit and vegetables

Growers switching to high potassium-consuming crops as price supports for broad acreage crops removed: additional boost to K demand

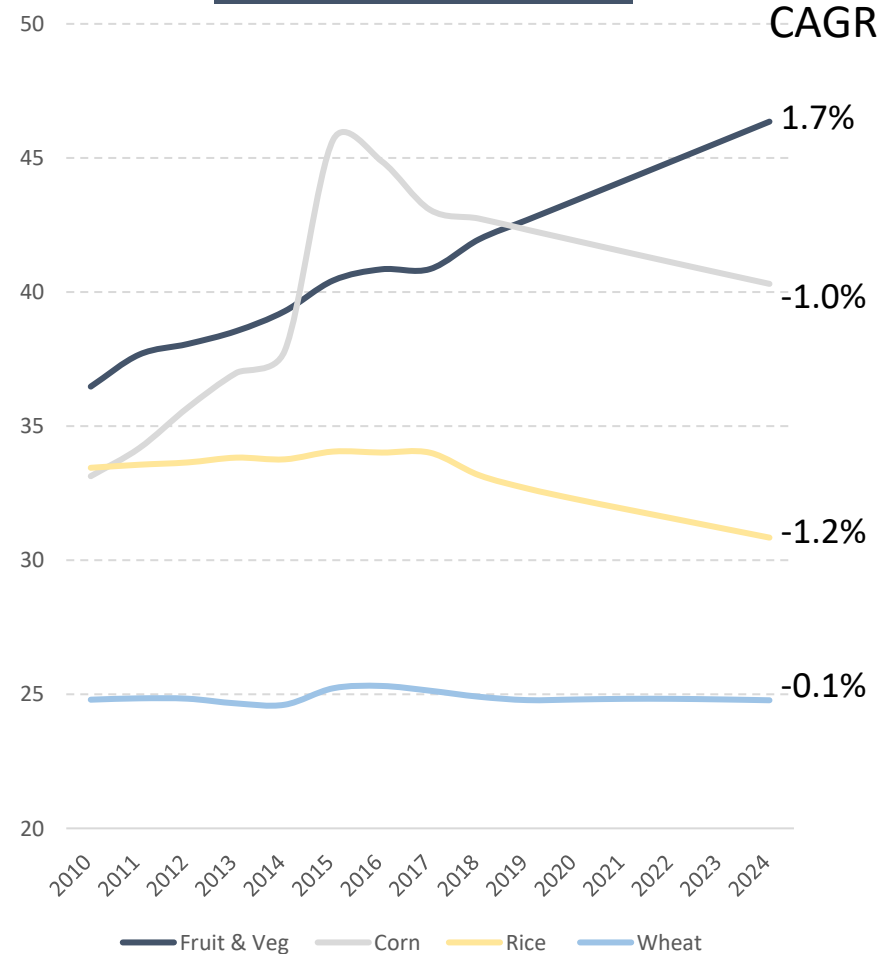


Risk 3

China K₂O demand



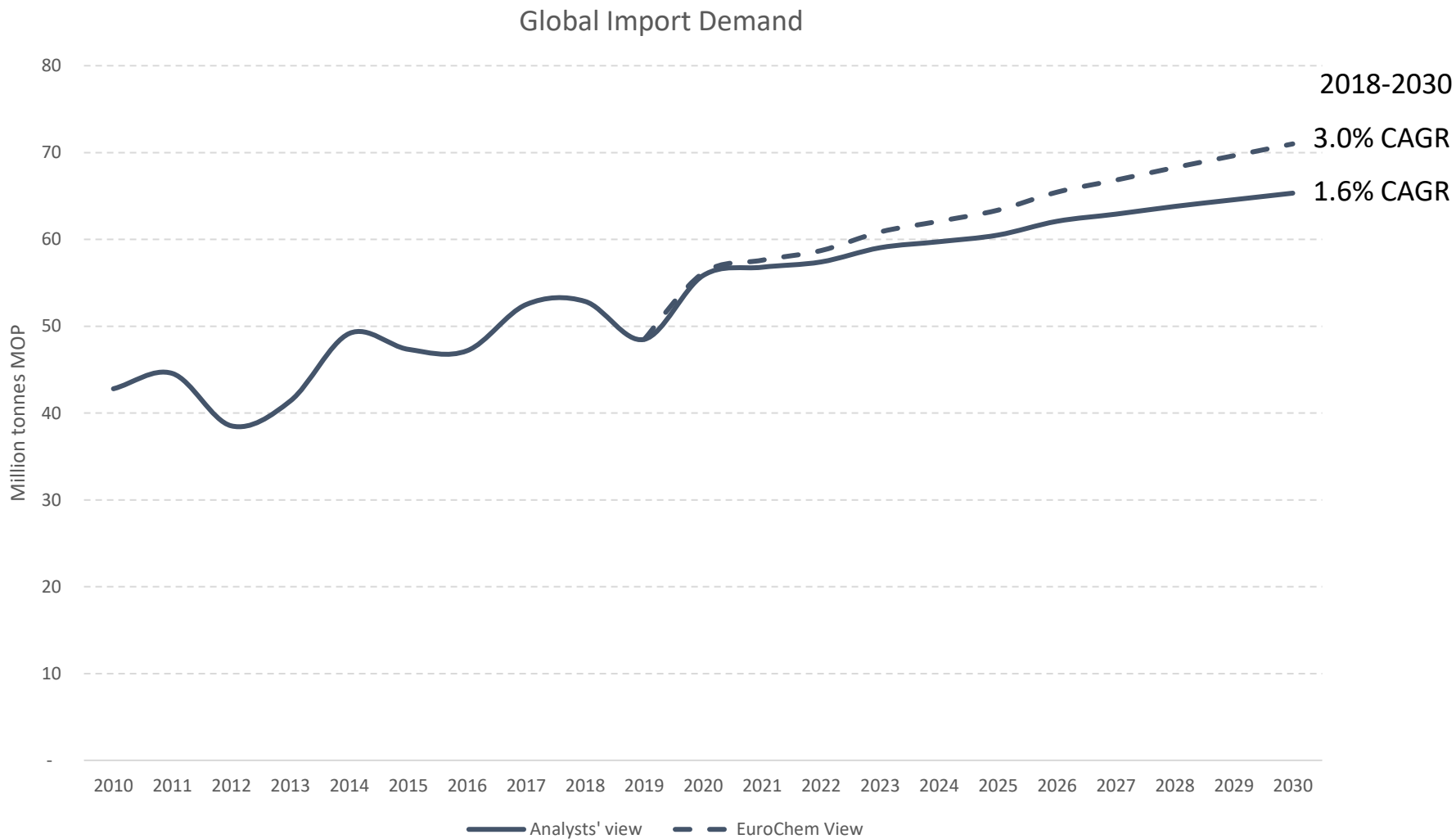
East Asia Crop Area

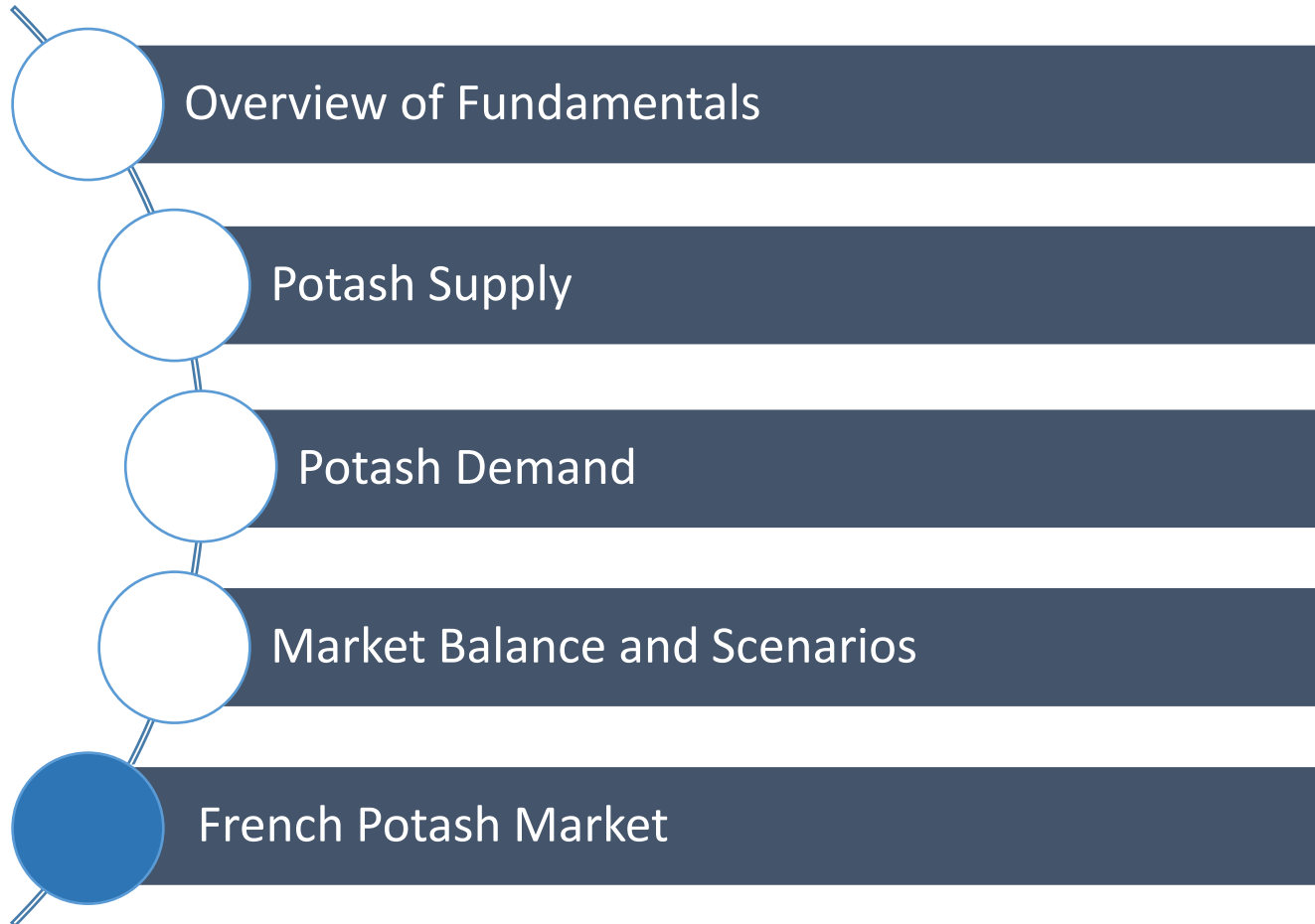


EuroChem's view results in utilization rates exceeding 90% early 2020s



Our view is for China to be a major driver of global potash import demand to 71Mt



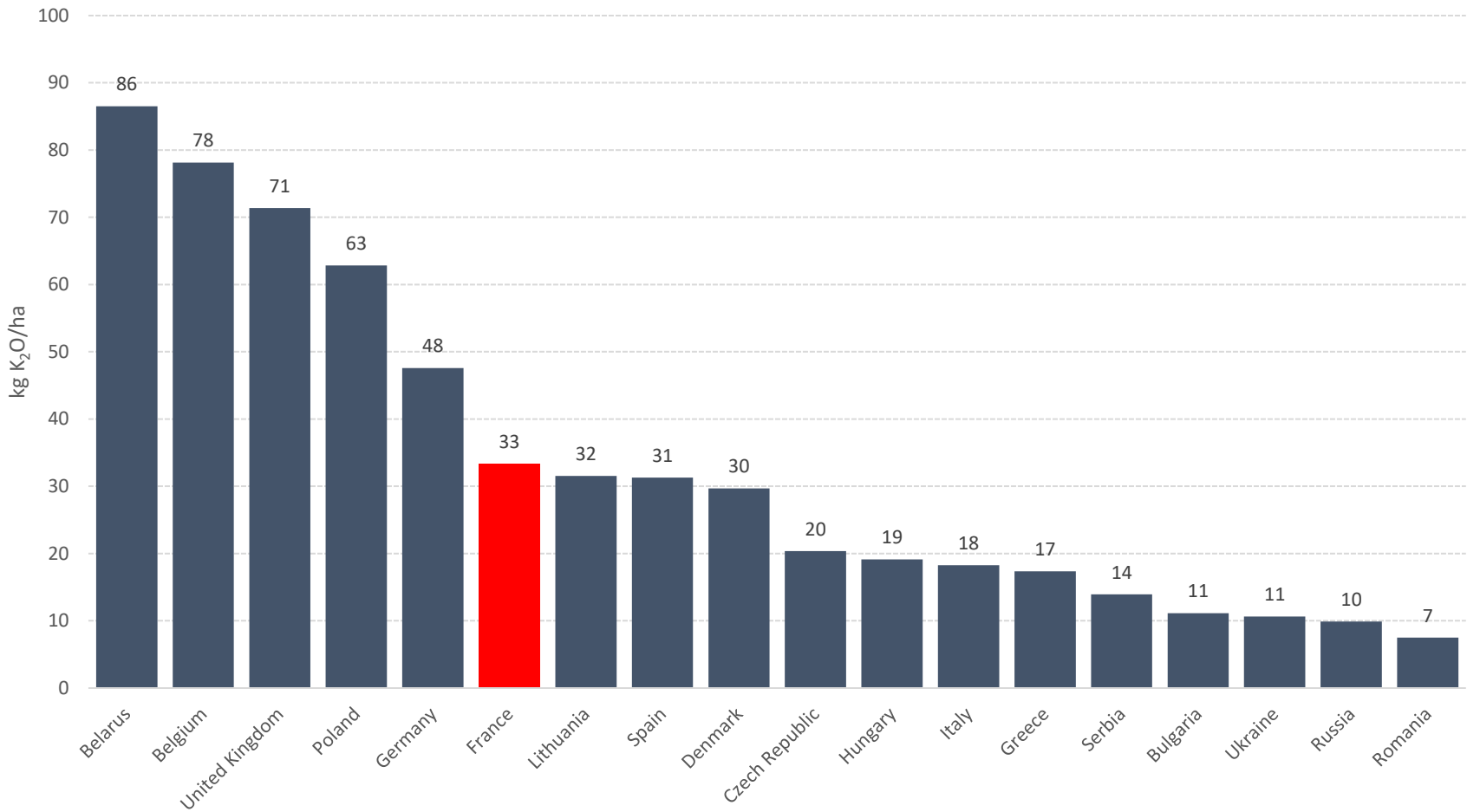


France is the second largest potash market in Europe

However, application K_2O rates lag behind other major markets



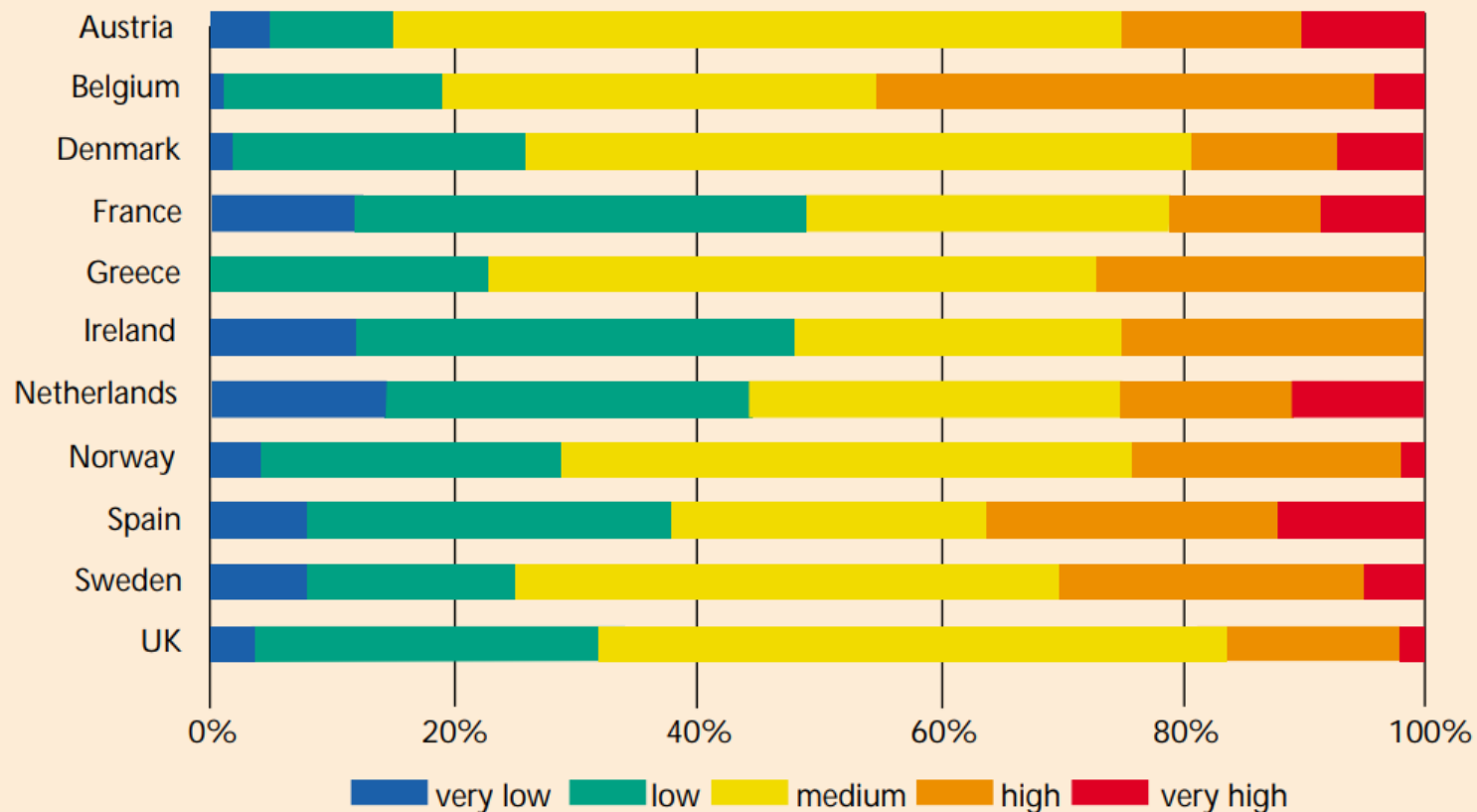
EU-CIS K_2O application rates in major MOP markets



50% of French soils are now low or very low in potassium



Estimated National Potassium Status of European Soils



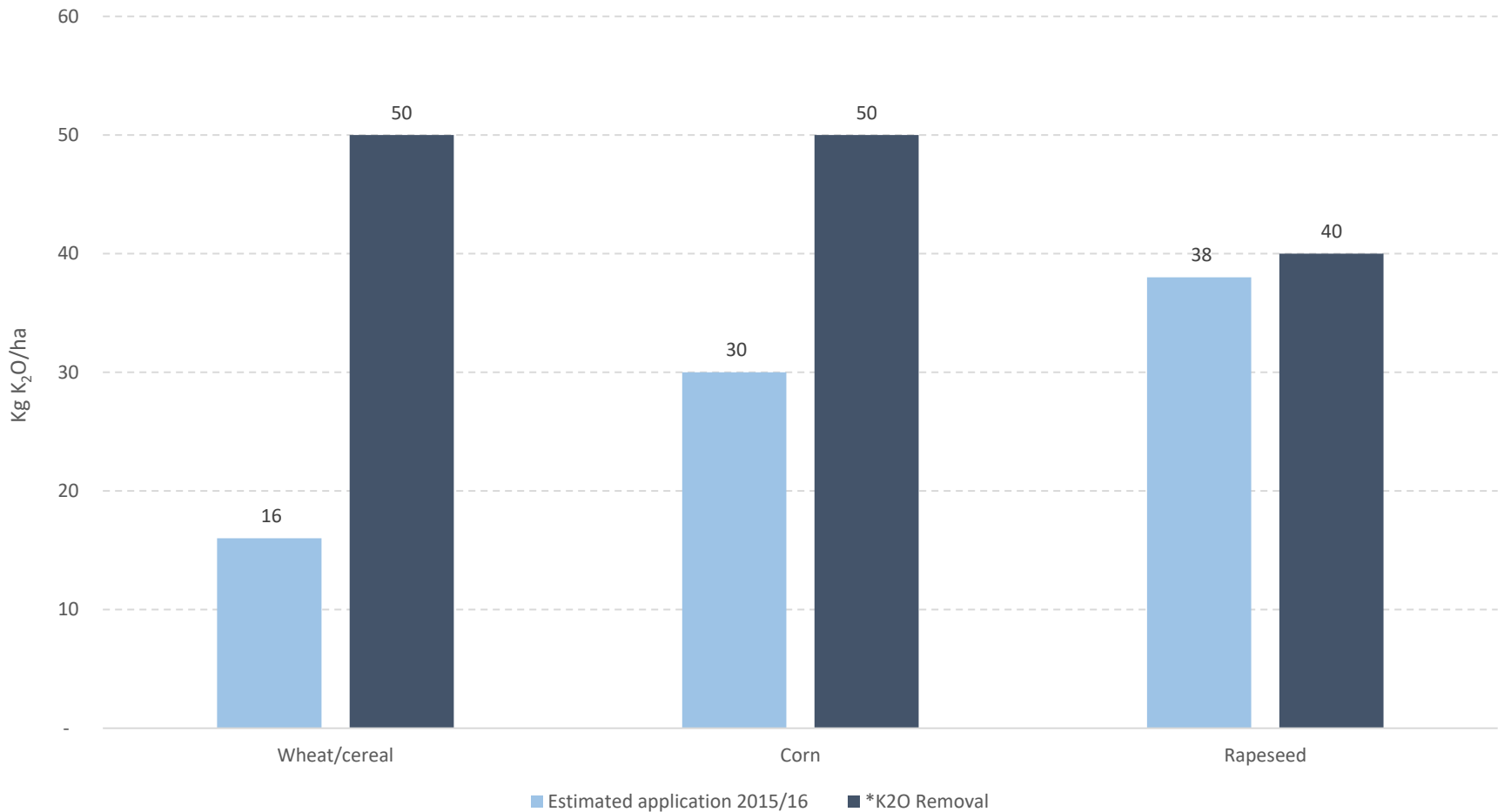
Source: Data from an EFMA survey

France is estimated to significantly under-apply potash

Particularly for its wheat and corn crops



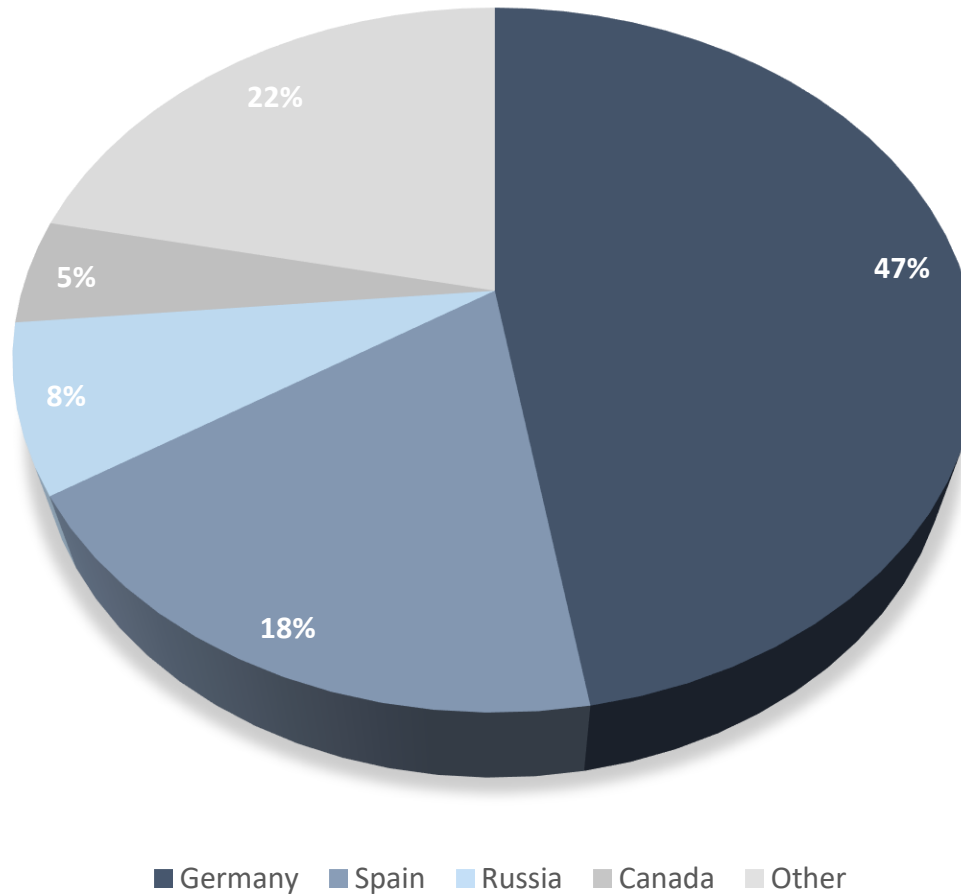
Applied and removes K₂O applications for major crops



Russia has so far remained a small part of French MOP imports
Supply has instead been dominated by neighboring German and Spanish MOP



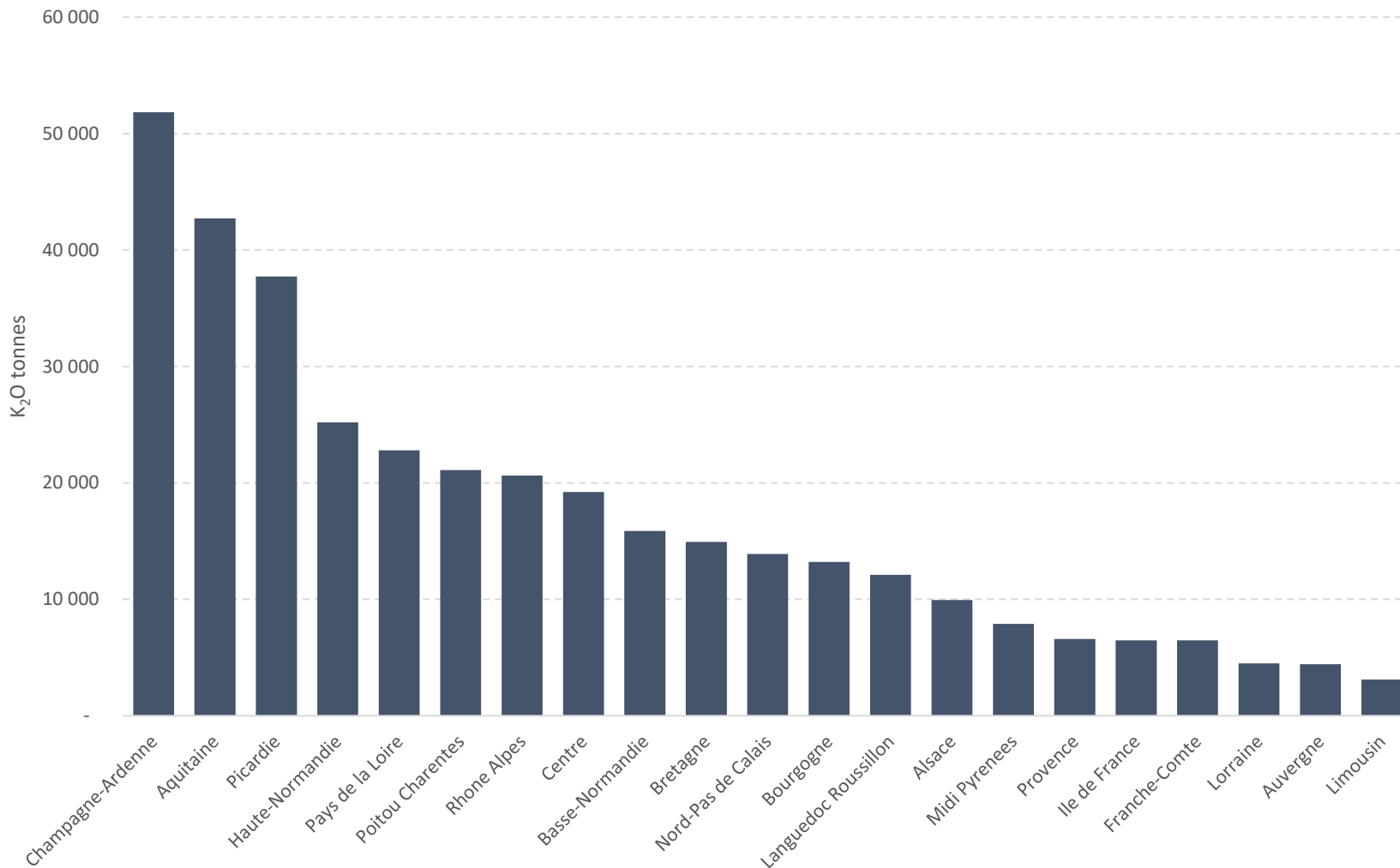
Average share of French market 2014-2018



French potash demand



2017/2018 demand (K₂O tonnes)





Thank you