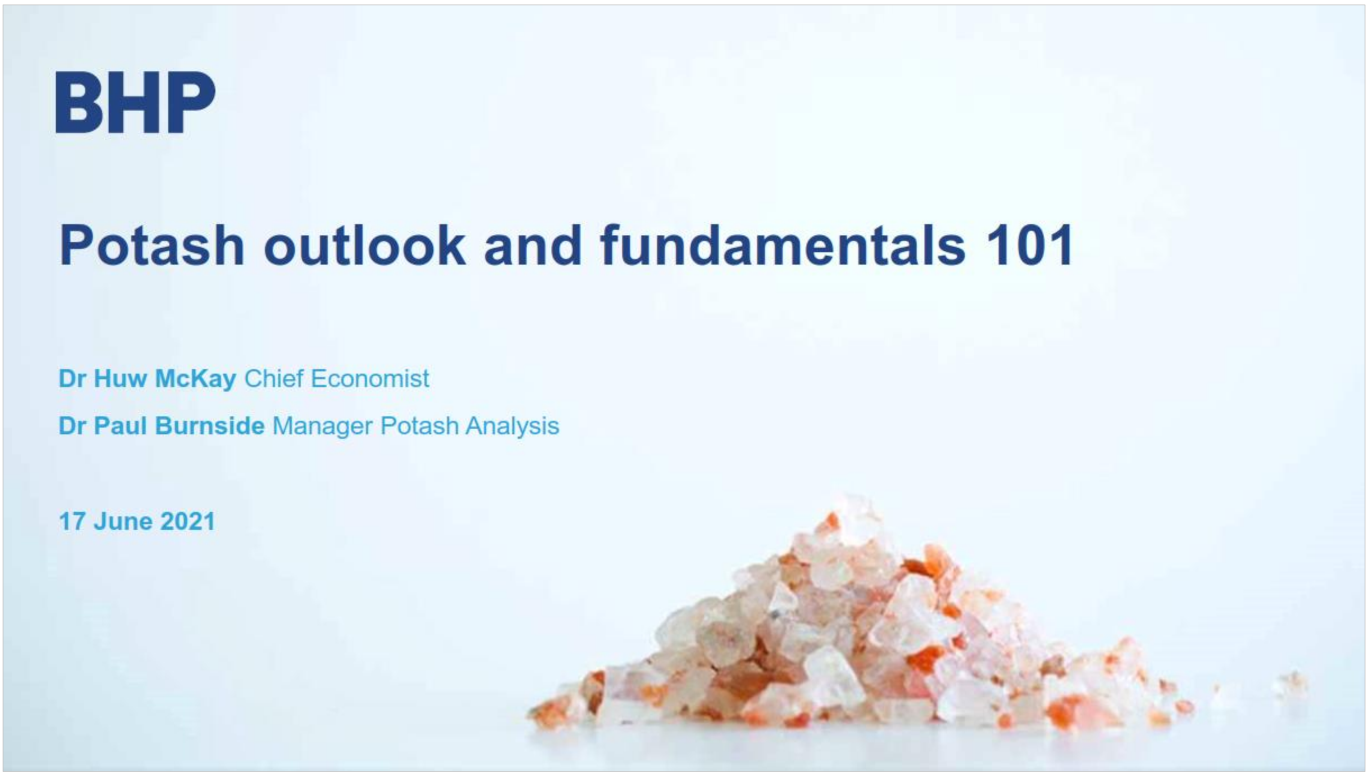
BHP

Potash outlook briefing

Speech

17 June 2021



Huw McKay

Welcome everyone.

It is a pleasure to be here with you to discuss the outlook for potash.

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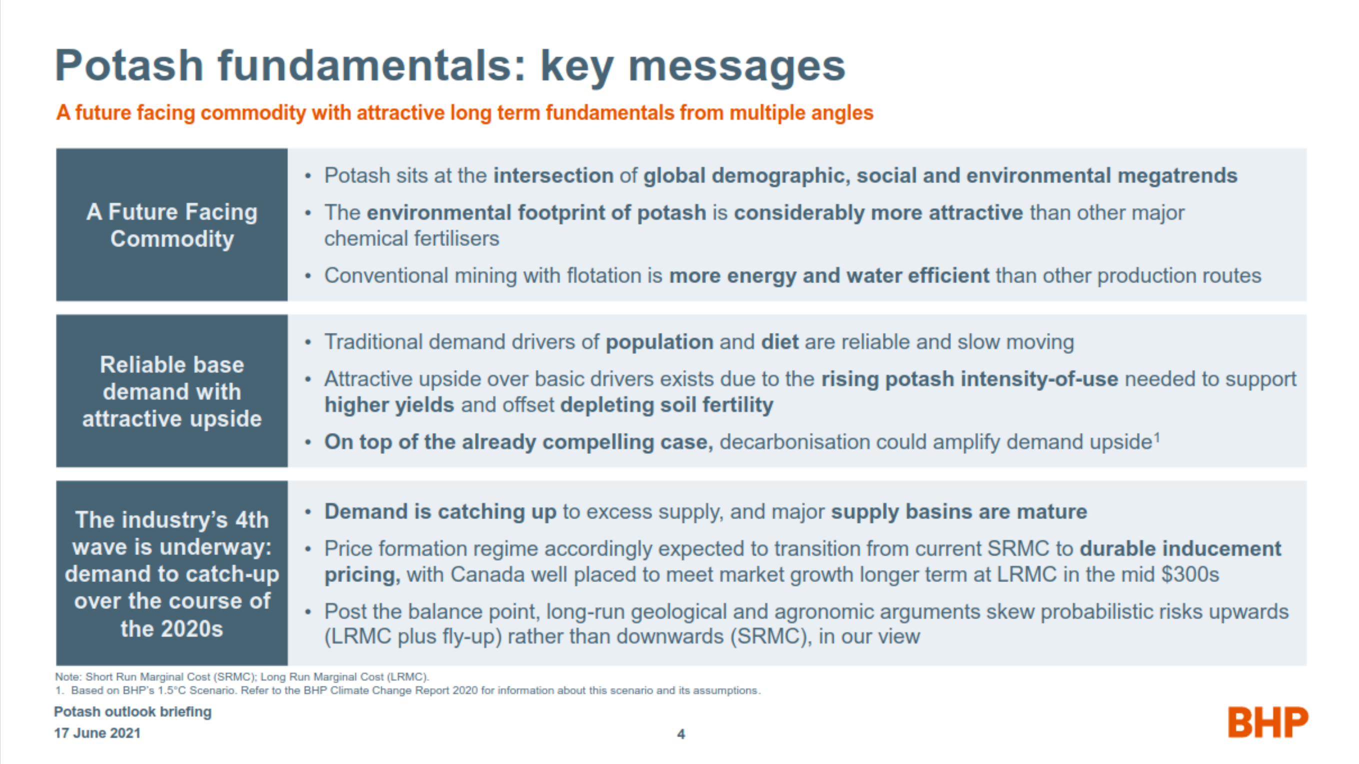
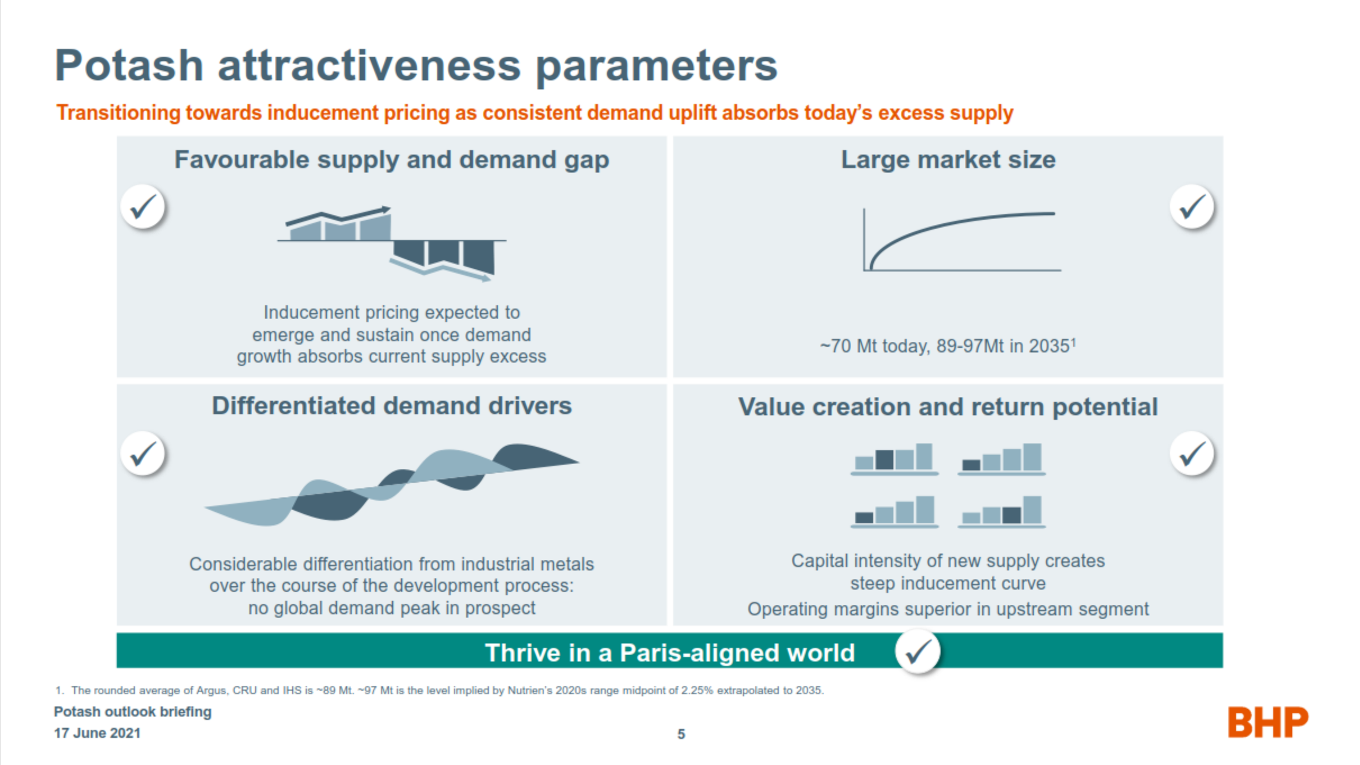
We have two simple objectives today.

- Firstly, to share our views on the medium and long term attractiveness of potash.
- Second, to provide some practical insight into the fundamentals of the commodity and the industry for those of you to whom it is relatively new.



The key messages that I hope you will take away on the outlook are these:

- Potash is a future facing commodity that is positively leveraged to global mega-trends, including decarbonisation.
- Base demand is underpinned by very reliable drivers, with attractive, plausible upside readily identifiable.
- While the industry is currently subject to excess capacity, the demand trajectory is expected to absorb this overhang over the course of this decade.
- When that process has played out, with the market very likely to continue expanding in the following decades, a durable inducement pricing regime centred on solution mining in the Canadian basin is the most likely operating environment for the industry in the 2030s and beyond.
- The fact that higher quality conventional development opportunities globally are mostly already executed, underscores this view.



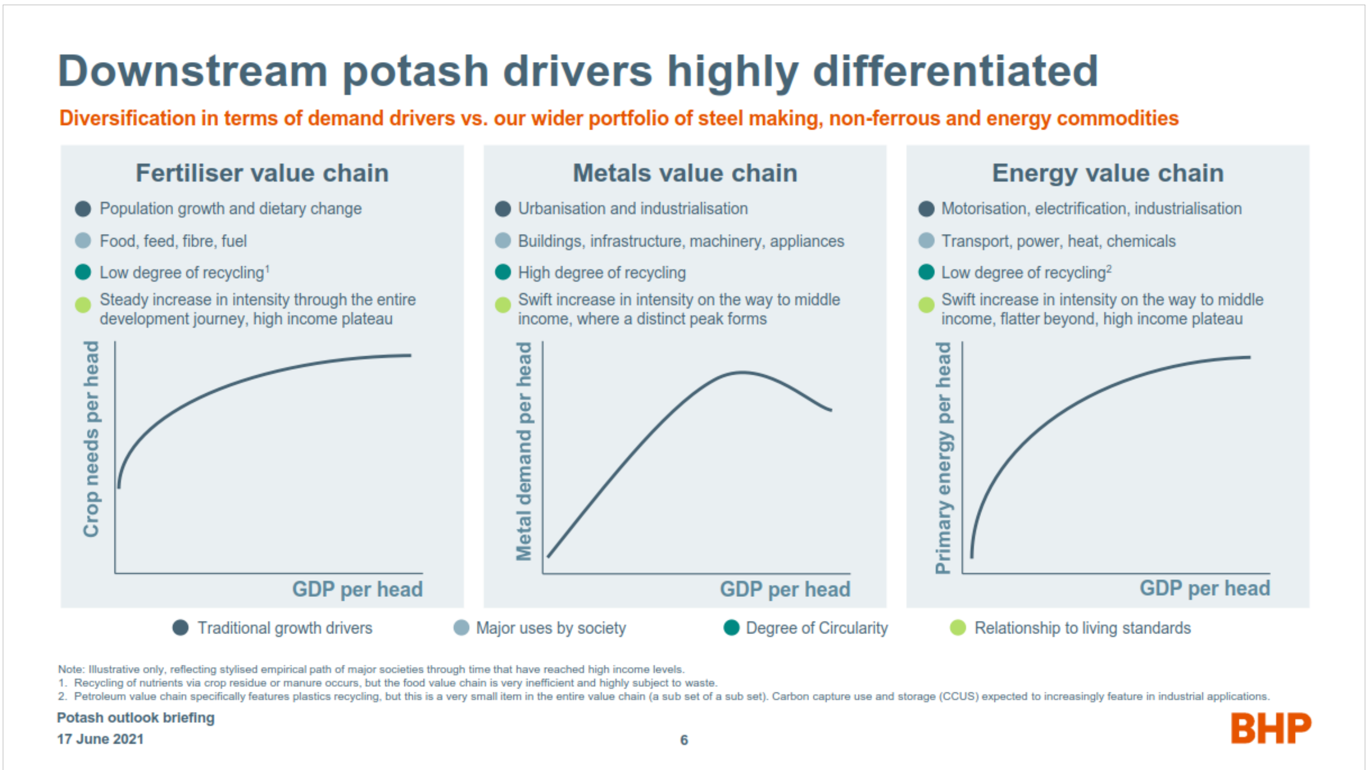
At BHP we are very deliberate about the commodities we choose. We are especially deliberate about those commodities where we choose to grow. Those commodities which are clearly future facing, are the natural place to seek growth in today's environment.

When a future facing commodity is also:

- part of a large value chain;
- expected to transition towards durable inducement pricing;
- is offering attractive upstream operating margins in absolute terms – , andmargins that are significantly more favourable margins in relative terms than those available in the downstream segments of the fertiliser value chain– thus matching our capabilities; and
- it is differentiated from the rest of the portfolio – be that differentiation expressed through demand drivers, the geographic distribution of the resource, the location of customers, or the way that it leverages the decarbonisation opportunity – then it will have our utmost attention.

You can see from this slide that potash scans very well on these criteria.

Let's begin with differentiated demand drivers.

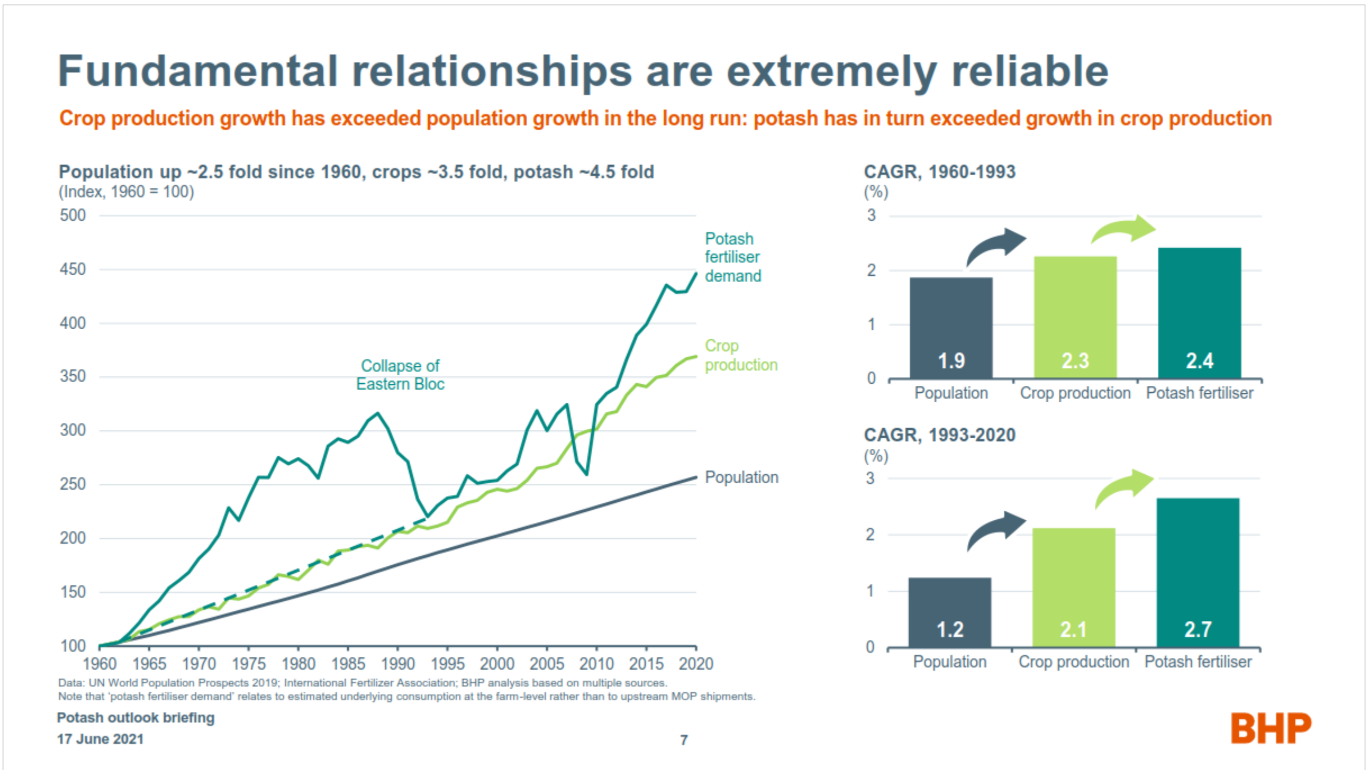


This slide shows representative curves depicting the intensity of use of upstream products from the three most important value chains in the BHP portfolio – from right to left: Energy, Metals and Fertilisers. Each is integral to the functioning of our society.

The traditional drivers of energy and metals demand are well known: Urbanisation. Industrialisation. Electrification. Motorisation. Consumerisation.

Potash on the other hand sits within a value chain where the fundamental drivers are more basic, slower moving and boringly consistent across decadal time spans:

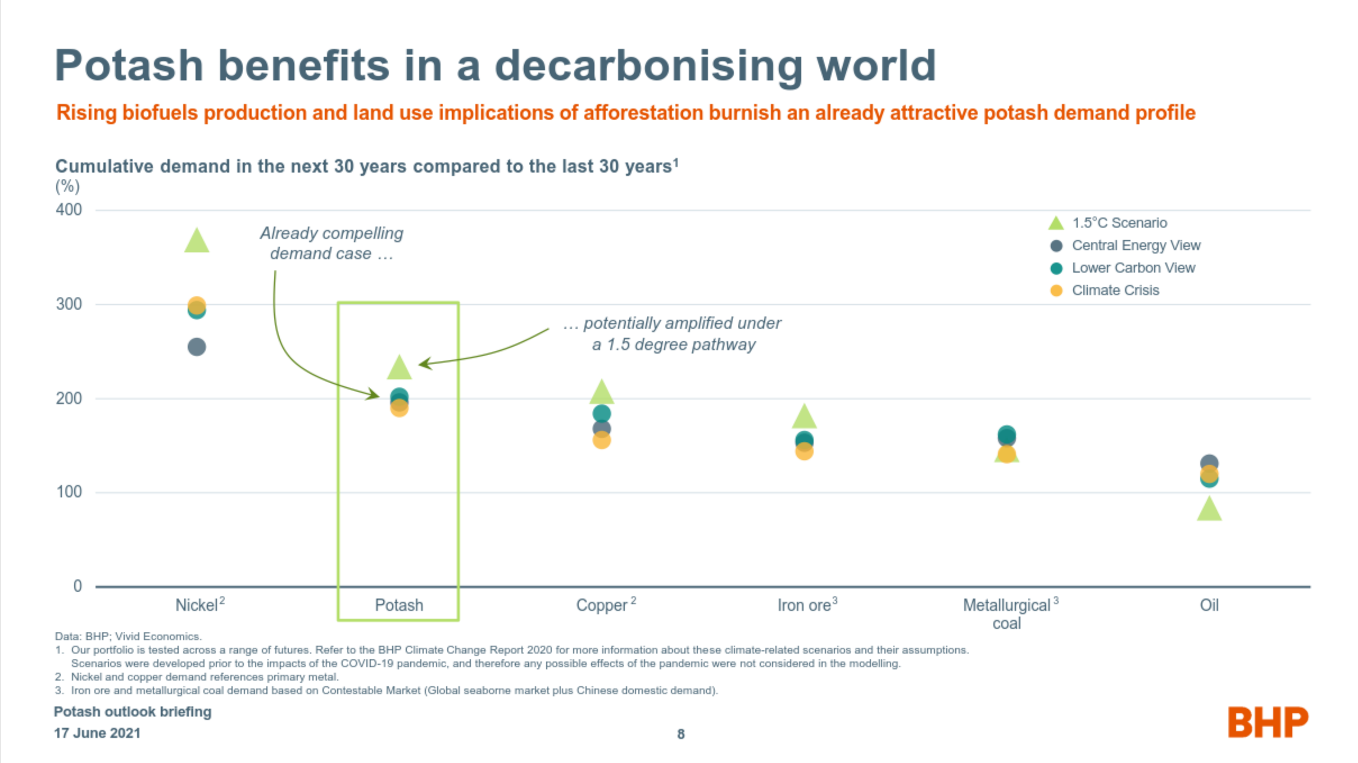
- the number of mouths to feed;
- the scale and scope of diets; and
- long-run trends in soil fertility and the associated interplay with fertiliser application rates.



Given the relative simplicity of these basic drivers, it should come as no surprise that the historical record of population growth, crop production and potash demand provides a very reliable basis for projecting future fertiliser needs.

All in all, population is up roughly 2.5-fold since 1960, crops are up 3.5-fold and potash demand is up 4.5-fold. These relationships are as “law like” as it gets in the commodity domain.

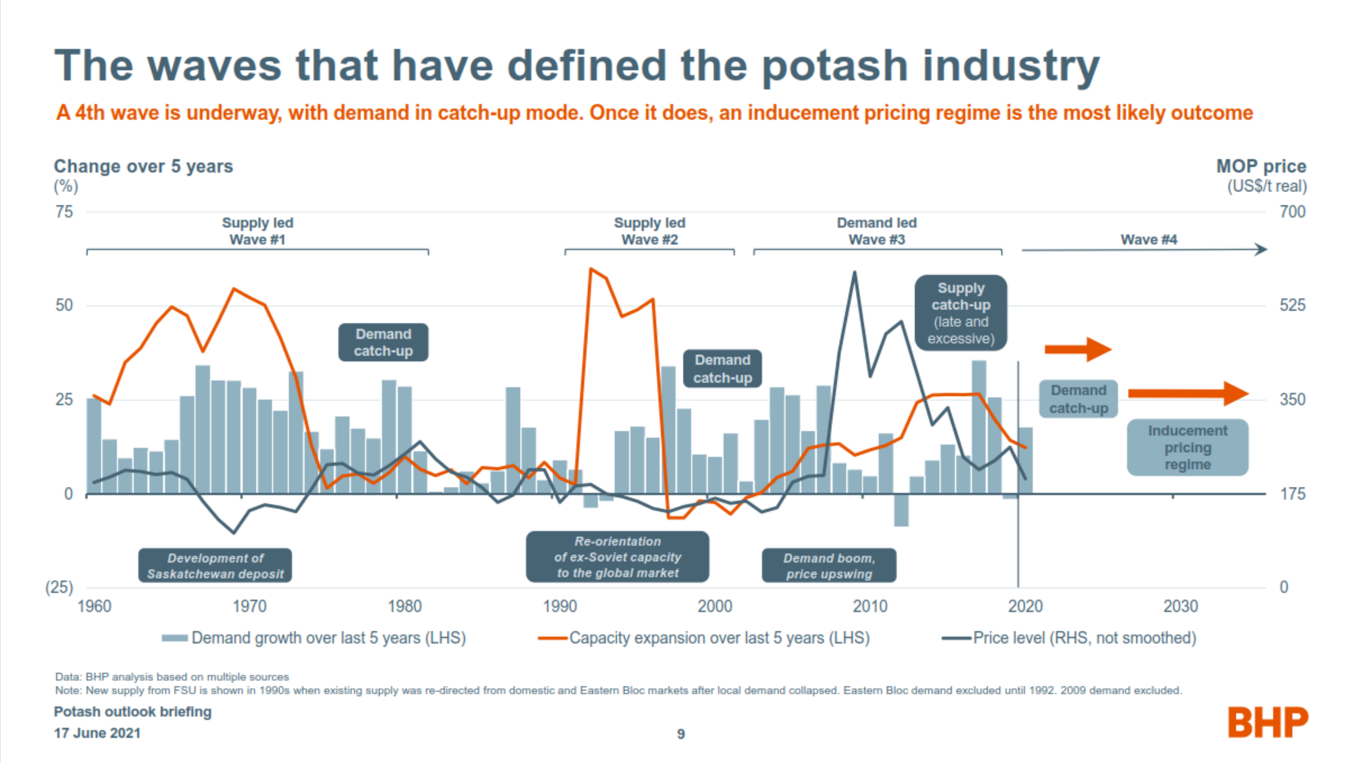
There is a paradox here though. While the demand trend is extremely reliable over five to 10 year periods, potash demand is at times subject to considerable year-to-year variations due to shifting farm economics, weather, policy and the ability of soils to retain potassium from one season to the next. We will come back to this point later in more than one context.



Under our 1.5 degree scenario, potash stands to be a winner, with increased biofuel production and intensified competition for land due to afforestation.

However, the impact of deep decarbonisation on potash demand is best characterised as attractive upside on top of an already compelling demand case. That can be easily seen from the robust demand emanating from the other scenarios depicted on the chart.

Further, it does not generate some of the negative environment impacts of the other two major fertiliser nutrients. The major issues here are leaching into and polluting waterways and the release of greenhouse gasses in the application process. Excess nitrogen and phosphorus flows to the biosphere and oceans have been identified as critical “planetary boundary” parameters.



Turning now to the market. The post World War 2 history of the potash industry can be summarised as a series of four waves. The first began around 1960. The most recent of the four has arguably just got underway.

Let me quickly explain the chart. The orange line depicts the change in production capacity over the five years prior to the date in question (inclusive). The columns are the same metric for demand. The blue line is price.

The first 40 years cover two waves that were both instigated by major supply impulses. These impulses were then followed by extended periods of demand catch-up.

- Wave #1 was characterised by the opening of the enormous Saskatchewan basin in Canada.
- Wave #2 was characterised by the disruptive entry of ex-Soviet capacity into the world market after the collapse of the USSR.
- Wave #3, dating to the early 2000s, was, by contrast, demand led. Producers were forced into catch-up mode for the first time in at least half a century and prices flew up sharply.

Ultimately though, supply “catch-up” to the price signal proved excessive, and now demand is in catch-up mode once again. Calendar 2020 was a strong instalment on that front.

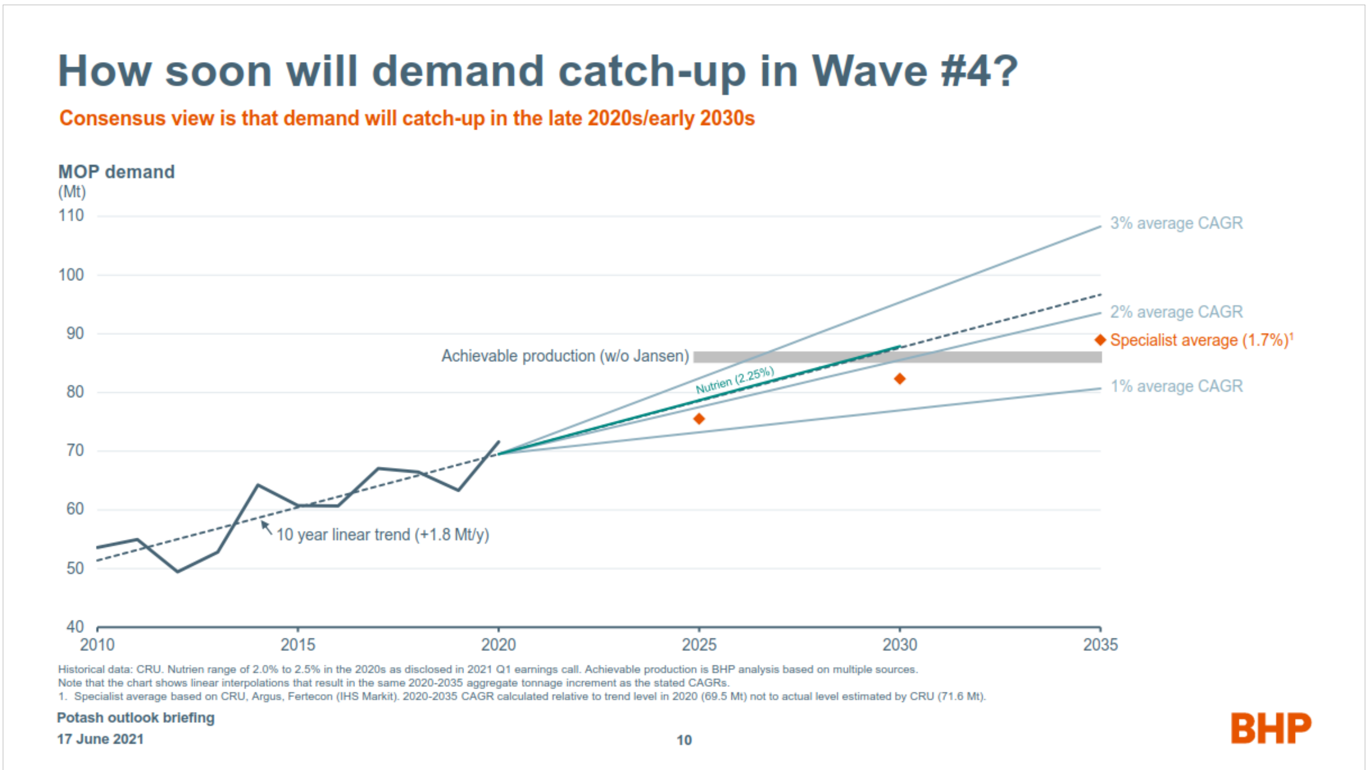
What then, might Wave #4 bring?

The first question is, of course, when will excess capacity be absorbed?

The second, is what might be expected in terms of inducement pricing when new supply is required to balance the market?

The third, is what sort of supply response is most likely under inducement pricing? Will a new “supply-led” wave emerge, driving pricing back down towards short-run marginal cost (SRMC) for an extended period? Or will we see a durable, disciplined inducement environment, with the possible additional benefit of occasional fly-up pricing?

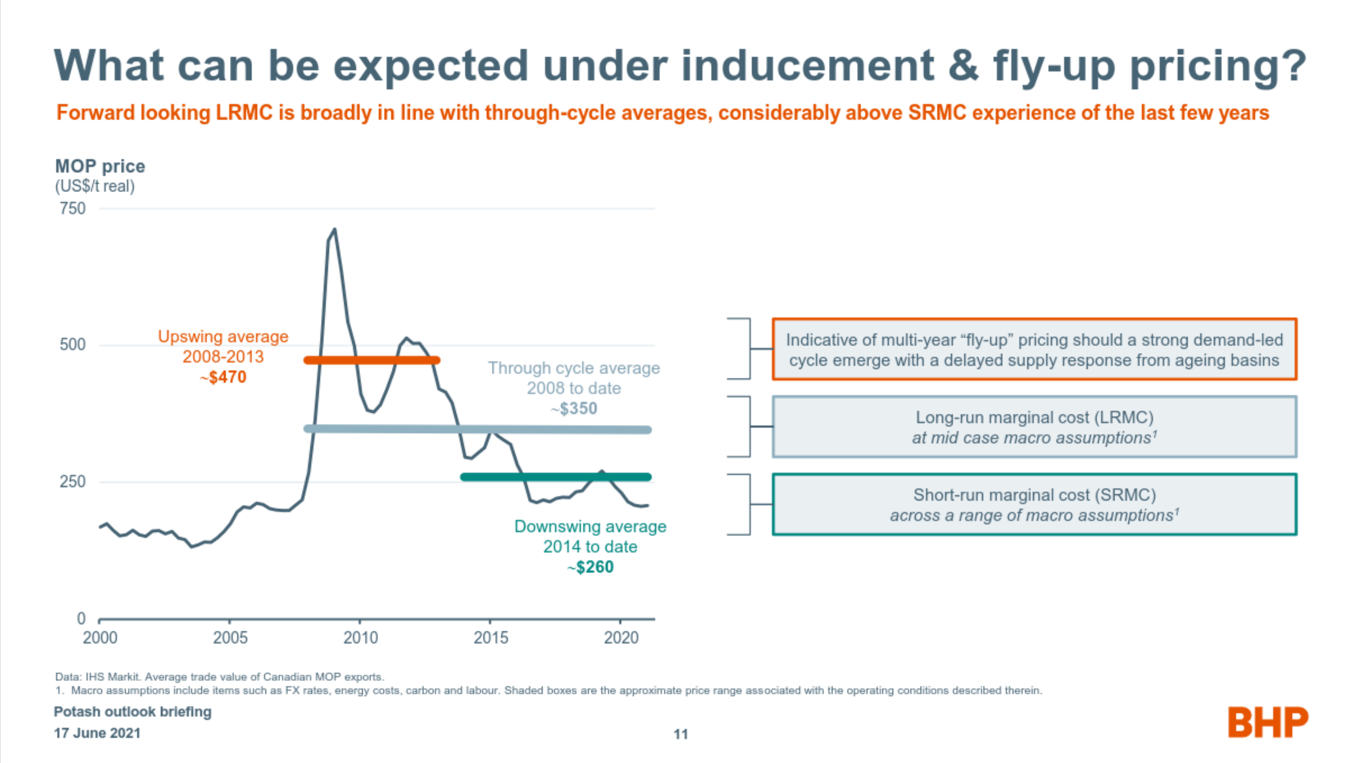
Let me address each of these in turn.



This chart provides an indicative range of demand outcomes by way of round figure compound annual growth rates CAGRs, an extension of the 10 year linear trend, the average forecast of specialist consultants and the mid-point of incumbent producer Nutrien’s publically stated range of 2.0% to 2.5% for the 2020s.

We have superimposed our estimate of achievable production across the demand range. Paul will define and quantify what we mean by achievable production shortly.

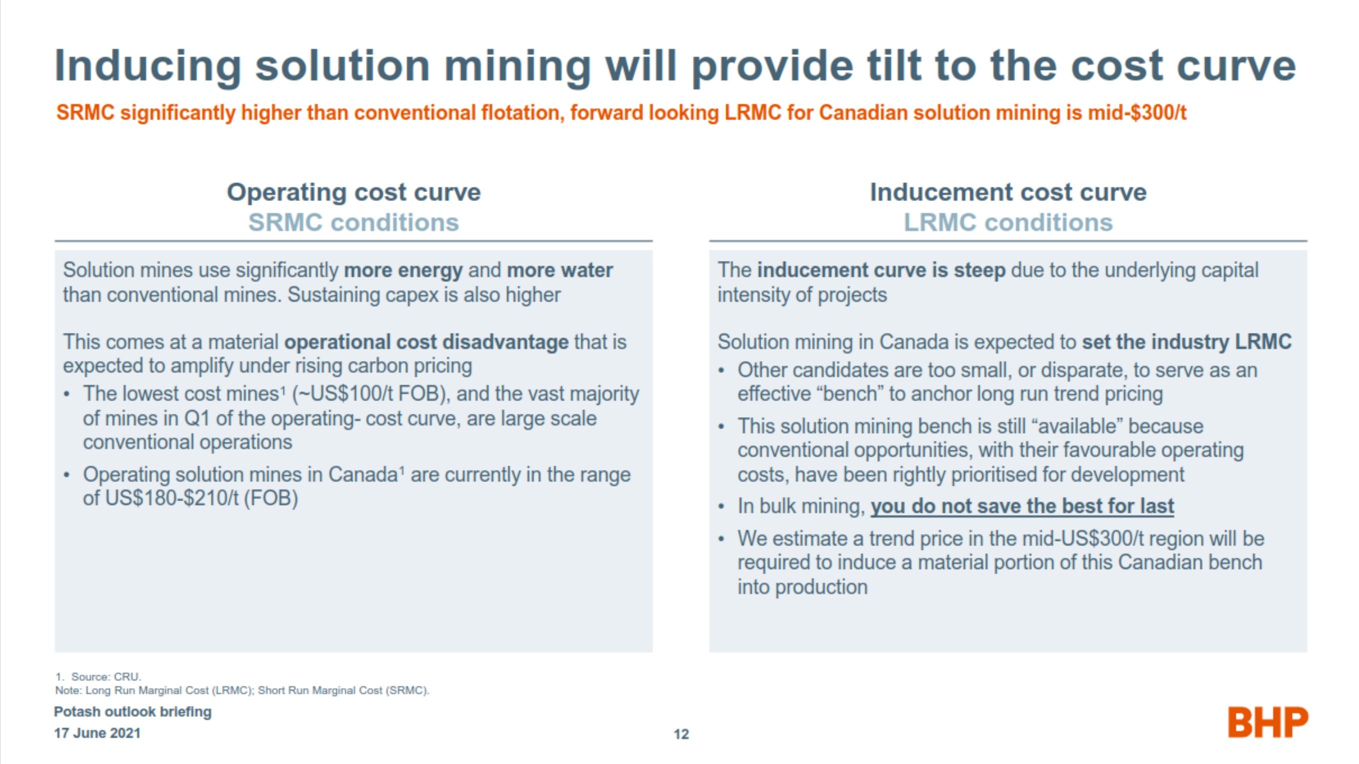
Our central view is that demand will have “caught-up” by the late 2020s or early 2030s. The chart illustrates clearly that this timing is not controversial. It is essentially consensus.



Prior to structural balance being achieved, we expect prices to cycle at or slightly above forward looking estimates of SRMC, which are similar to the average prices seen since 2014. This does not preclude the possibility of price upswings – we are the midst of one right now after all. It just implies that while excess capacity is present, prices are unlikely to sustain at inducement levels.

Once structural balance is achieved though, with demand continuing to move upward, new supply will obviously be required. At mid case macro assumptions, our estimate of the inducement price for the most likely consistent source of greenfield supply (which we have identified as a large bench of Canadian resource suitable for solution mining) turns out to be similar to the average price realised over the last dozen years.

Our view is that average prices for the period 2008 to 2013 are a reasonable proxy for what could emerge under a future episode of fly-up pricing in this industry.



Why emphasise solution mining? For the simple reason that this is a material factor for assessing the future characteristics of the operating and inducement cost curves.

Solution mines use significantly more energy and more water than conventional mines. This comes with higher operating costs – a disadvantage that will only increase under higher carbon pricing. Sustaining capex is also higher due to the ongoing needs to replace old caverns.

The vast majority of the first quartile of the operating cost curve are large scale conventional mines. The lowest cost operations today are around US$100/t (FOB, not mine gate). These are conventional operations. Currently operating solution mines in Canada are presently in the vicinity of US$180/t to US$210/t on the same basis. Simply put, even under short-run marginal cost conditions, there is some tilt in the cost curve, whereby large scale conventional operators can earn substantial margins.

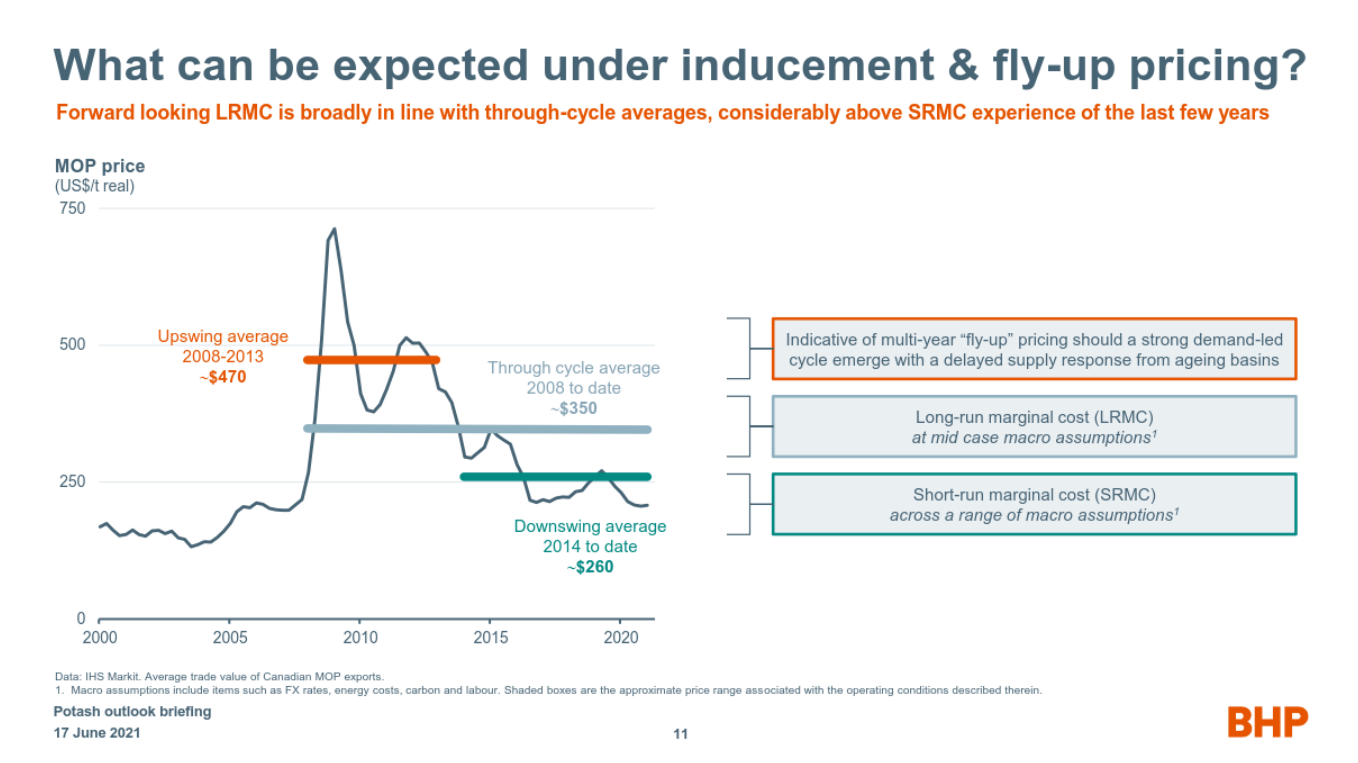
Moving onto the long run, the potash inducement curve is steep, due in part to the underlying capital intensity of projects. Solution mining in Canada is expected to set LRMClong-run marginal cost for the industry. Other potential candidates for this role are either too small, or disparate, to serve as an effective "bench" to anchor long run trend pricing.

Canada's solution mining bench is still "available" at scale simply because conventional opportunities, with their favourable operating cost curve position, have been rightly prioritised for development. In bulk mining, you do not save the best for last.

That is why we emphasise the scarcity of high-quality conventional development opportunities throughout our remarks.That is why we emphasise the scarcity of high quality conventional development opportunities throughout our remarks.

We estimate that a trend price in the mid US$300/t region will be required to induce a material portion of this Canadian bench into production.

Turning back price now.



Our view is that average prices for the period 2008 to 2013 are a reasonable proxy for what could emerge under a future episode of fly-up pricing in this industry.

WhyWhy then might prices fly-up? The first reason is that by the time the industry reaches the balance point we discuss above, there will be few high-quality conventional development opportunities available should demand then surprise to the upside.

Why then might demand surprise to the upside? The future yield impacts of soil depletion, and all that may follow from that – that's why. We know natural soil fertility has declined. What we do not know is when this fact will begin to influence farm behaviour, and how smooth or abrupt the this change might be. If farm behaviour were forced to change "overnight", due to a disruptive event like a major crop failure, that in turn could lead to a step wise increase in potash demand.

That would take producers a considerable time to catch-up to, given the maturity of these large but "venerable" basins, where the vast majority of the available brownfield and lower-cost greenfield opportunities were executed in response to the last price upswing.

To be clear, we are not planning for precisely the above scenario to occur, or bold enough to time it, but we are certainly cognizant of the possibility.

To us, when seeking to identity the skew of risk around the central case, the upside case seems like a far more reasonable hypothetical than the one where a new supply-led wave emerges.

The geological and agronomic cases for this "back to the future" vision of potash, which we do encounter from time to time, those cases, are weak.

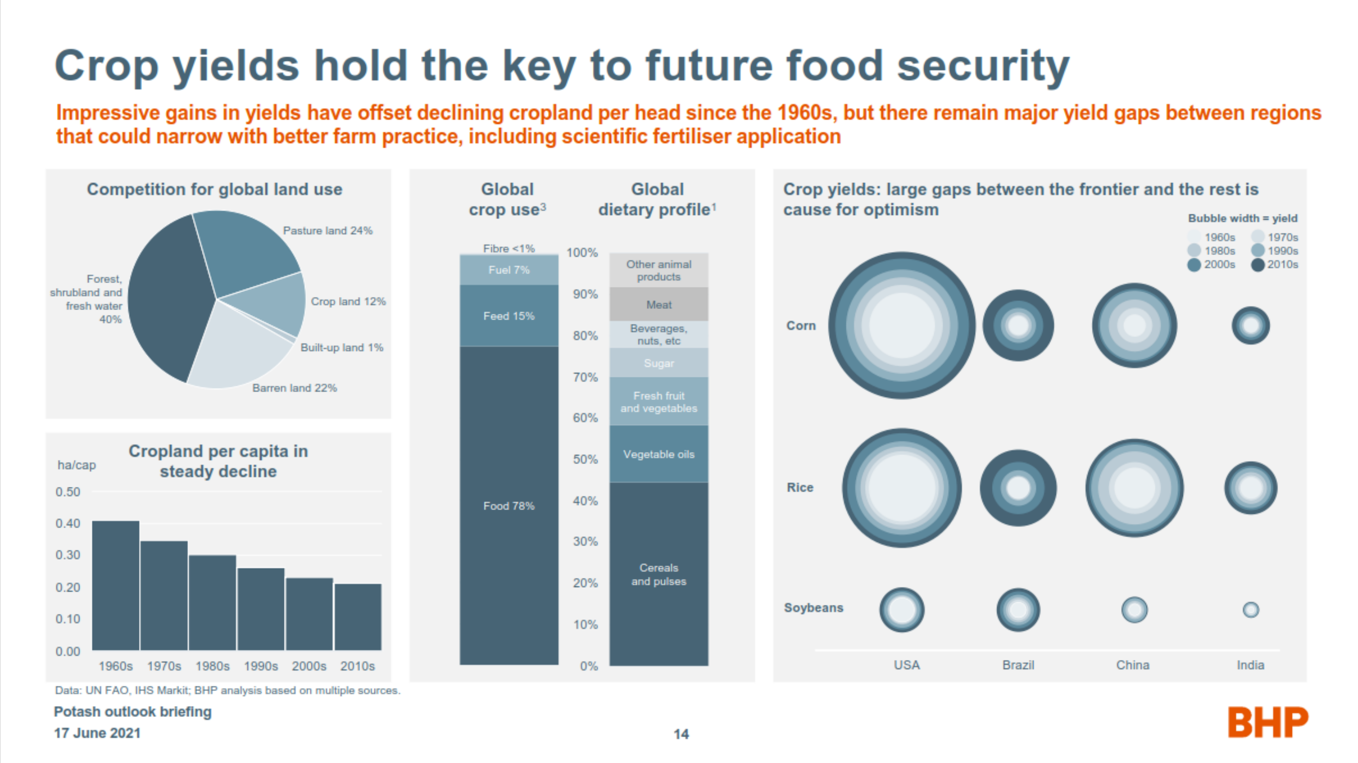
That, then, is our summary view of the potash outlook.

Paul, over to you.

Paul Burnside

Thank you, Huw.

Okay. For the next section of the presentation, I'd like to talk about potash fertiliser and its place in the global food supply chain. Then we'll move on to how we build our supply and demand forecasts.

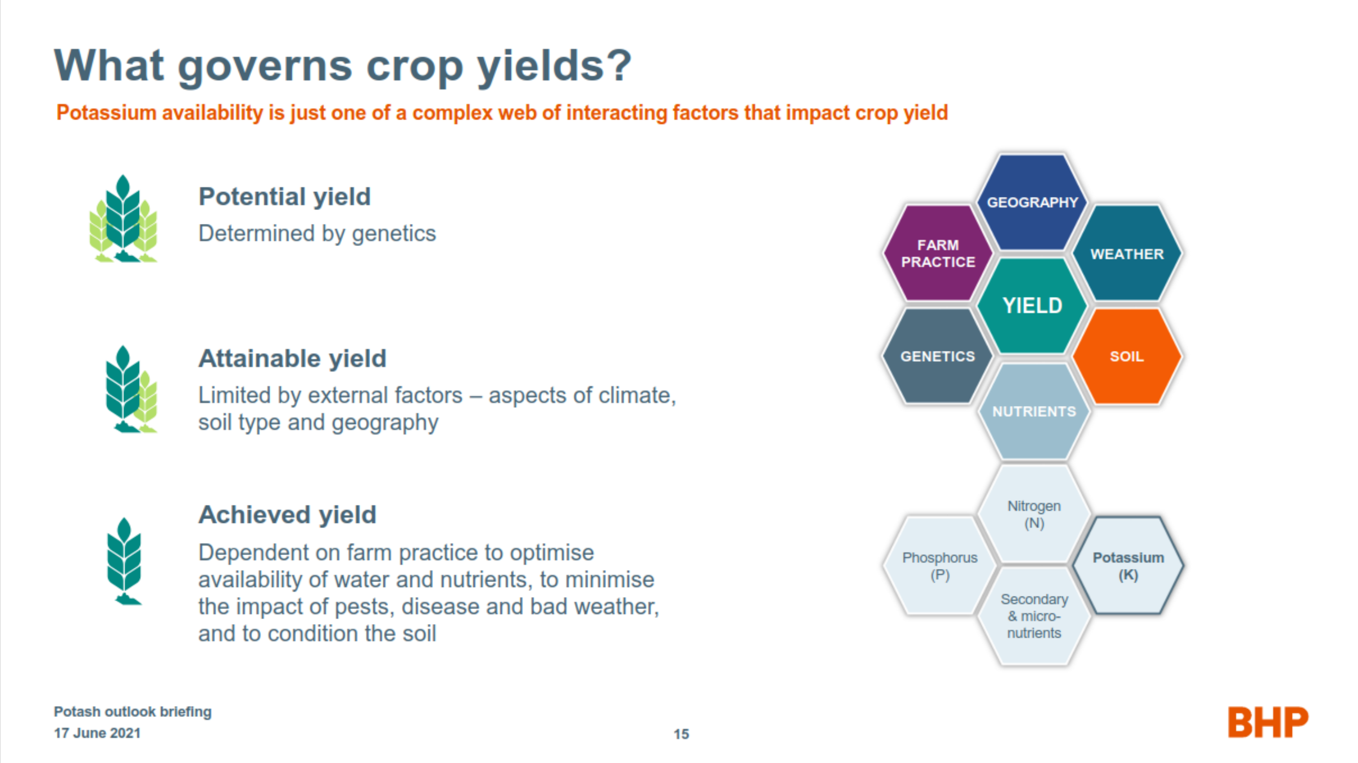


Let's start with some key facts and figures about the global agriculture system. I won't go through each chart here in detail, but there are some important points I'd like to draw out.

First, around one-third of global land is used for agriculture, but pasture land for livestock is twice the size of cropland. We grow crops for the '4Fs': food, feed, fuel and fibre. As shown in the middle chart here, nearly 80% goes directly into food, with a further 15% fed to livestock. Production of biofuels contributes less than 10%, but it is much more significant in some areas, particularly the US and Brazil.

Cropland per capita is declining, and has been declining for many decades. That means that it's yield, not area, that drives incremental crop production.

The chart on the right shows that big improvements in crop yields have been made over the last sixty years, but there are still huge regional variations. As an example, corn yields in the US are nearly double those in China and three-to-four times those in India. So separate from efforts to further raise yield potential, there is still huge opportunity to achieve higher crop production by closing the yield gap between average and optimum yields today.



So if crop yield is important, how do we increase it?

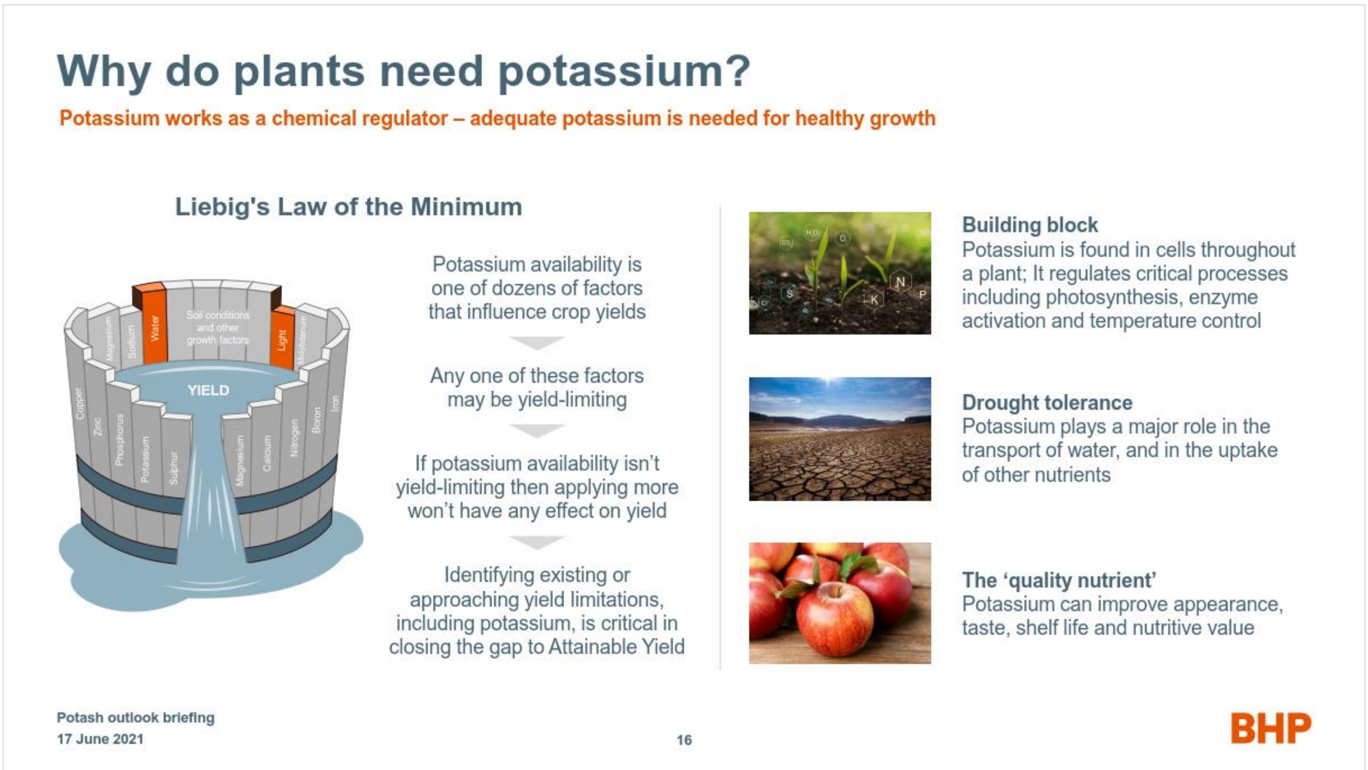
Well, crop yield is governed by a complex web of many interacting factors, some of which are physiological and some of which relate to external conditions.

The Potential Yield of a particular crop – so, the yield in perfect controlled conditions – is governed by genetics. We seek to increase potential yield through development of new cultivars, either by crop selection or through bioengineering.

The Attainable Yield takes into account the external environment – aspects of soil type, climate and topology – it's the best possible yield given those environmental conditions.

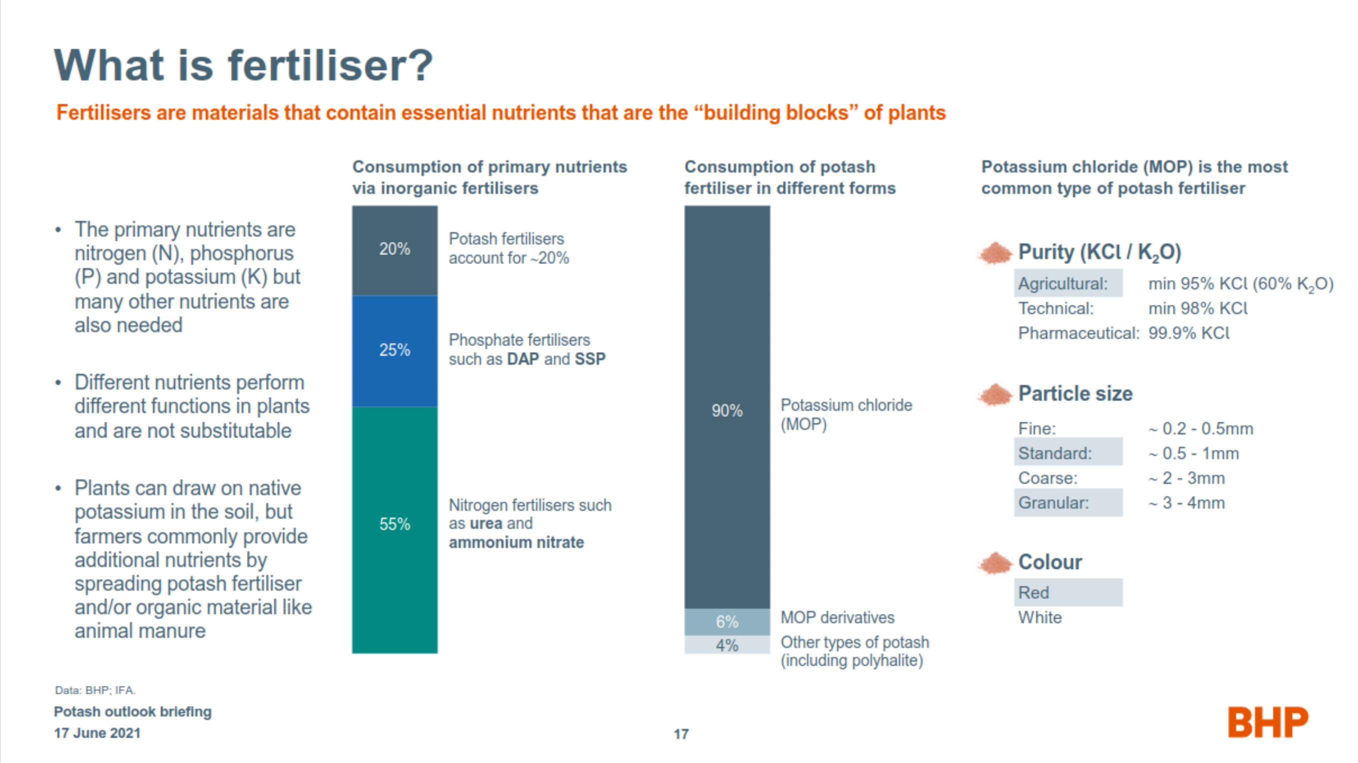
The actual Achieved Yield is then further dependent on the availability of water and nutrients, the vagaries of weather, and the presence of pests and disease.

So some limitations on yield are either partly or wholly within the control of the farmer, and that includes the adequate provision of nutrients. Potassium – which has the chemical symbol K – is one of the many nutrients that are essential to plant growth.



So, potassium is one of the 'building blocks' of a growing plant. It's got a role in many physiological processes, it can't be substituted with other nutrients and the bigger a plant grows the more potassium it needs. And potassium doesn't just contribute to yield, it also aids drought tolerance and improves crop quality.

But as I've explained, potassium is just one of many factors that influence crop yields. If potassium availability isn't yield-limiting, adding more won't have any effect on yields – or, to look at it another way, yields might be improved without adding extra potassium. But conversely, potassium can become limiting over time, even at a constant yield, if the potassium in the soil isn't being replenished.



The most important nutrients that plants draw from the soil are nitrogen, phosphorus and potassium, each of which has its own specific functions.

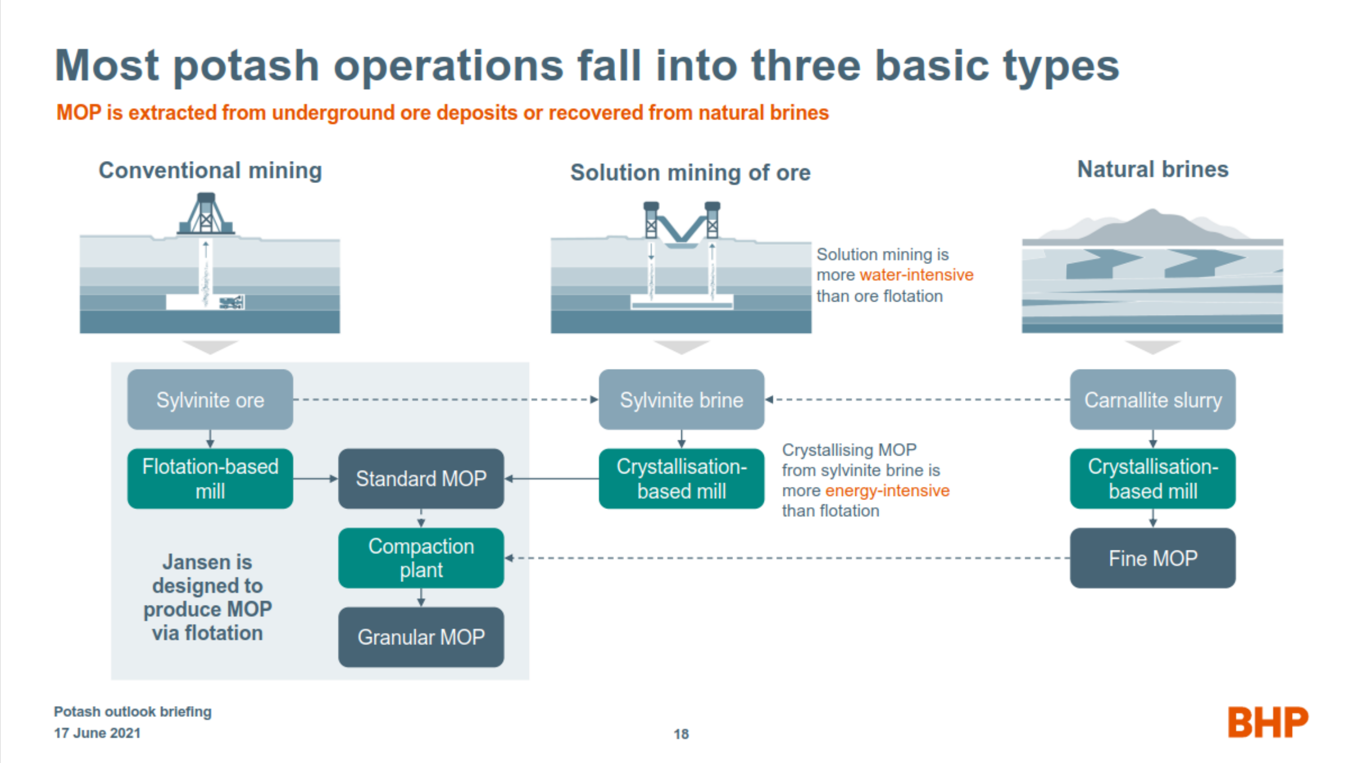
Fertilisers are materials that contain these essential nutrients. Modern agriculture relies heavily on what are known as "mineral" or "chemical" fertilisers that are manufactured from inorganic sources and contain high concentrations of nutrients.

Soils contain natural potassium minerals, in widely varying amounts, but potash fertiliser is commonly applied to ensure plants can access all the potassium they need.

By 'potash' I mean generically any fertiliser containing potassium, but the term is often also specifically applied to potassium chloride or 'muriate of potash', which I'll refer to as MOP.

MOP is by far the most common potash fertiliser. MOP fertiliser products are usually specified with reference to nutrient content, particle size and colour. Jansen is designed to produce red standard and red granular MOP with a minimum potassium nutrient content of 60%.

Other forms of potash include potassium sulphate and various potassium-magnesium fertilisers. These other products are typically more expensive per unit of potassium nutrient, and used either when a low-chloride product is required or for their additional content of secondary nutrients, like magnesium. They are consumed in much smaller quantities: MOP and its derived products account for more than 90% of all potash fertiliser.

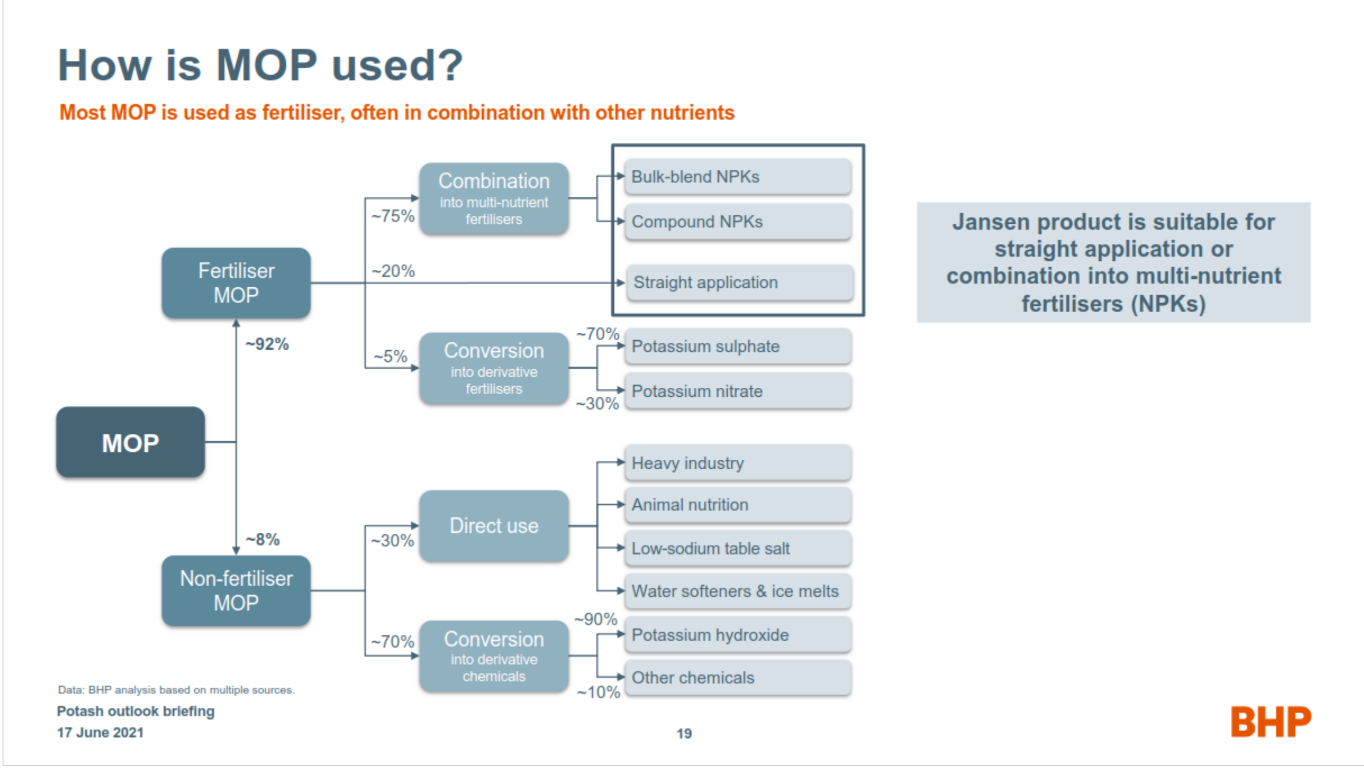


About three-quarters of MOP production comes from underground ores – usually that's sylvinite, a mix of potassium chloride and sodium chloride. Ore grades are much higher than you'd find for metallic ores: sylvinite can contain as much as 40% potassium chloride.

The most common form of extraction is conventional underground mining, but solution mining is also possible. Recovery is most commonly recovered through flotation. That yields a product that is pink or red and usually about 95% pure. Jansen is designed to employ the mining and flotation route. It's simple and established technology, it's low-cost and it's energy-efficient.

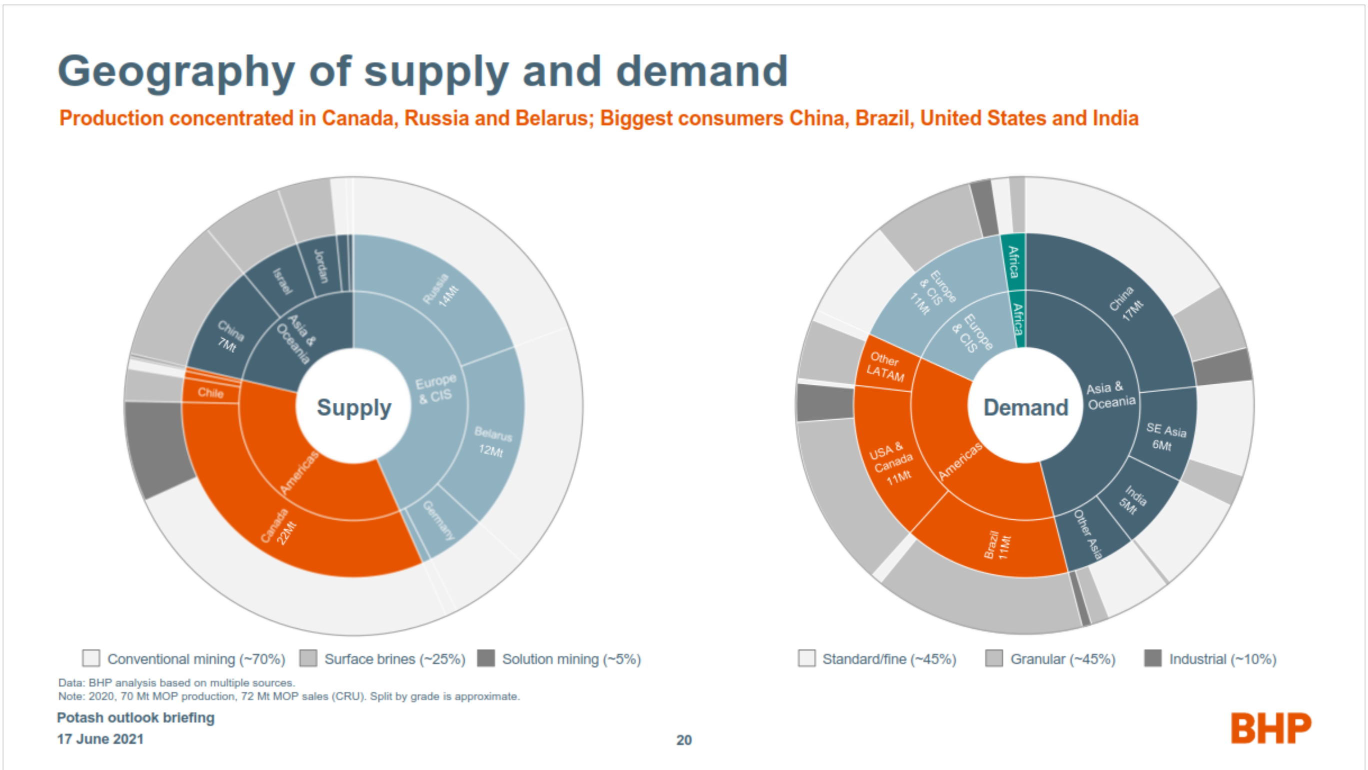
About 40% of MOP is made via crystallisation from brine. This can come from a natural brine deposit, or a solution mine, or by dissolving mined ore. This route makes a white product, but it can be dyed red. It's usually at least 95% pure, but higher purity product can be achieved with this route. But it's more energy intensive than flotation, making it higher opex and more sensitive to carbon tariffs. It also has much higher water consumption.

MOP is produced as a crystalline powder, called "fine", "standard" or "coarse" depending on the particle size. The powder can be compacted to make granular grade MOP. Granular attracts a small price premium over standard that compensates for the additional processing cost. Jansen is designed to produce both standard and granular grades.



More than 90% of MOP is used as fertiliser. It can be directly applied to fields as is, combined into multi-nutrient fertilisers or chemically converted into other forms of potash.

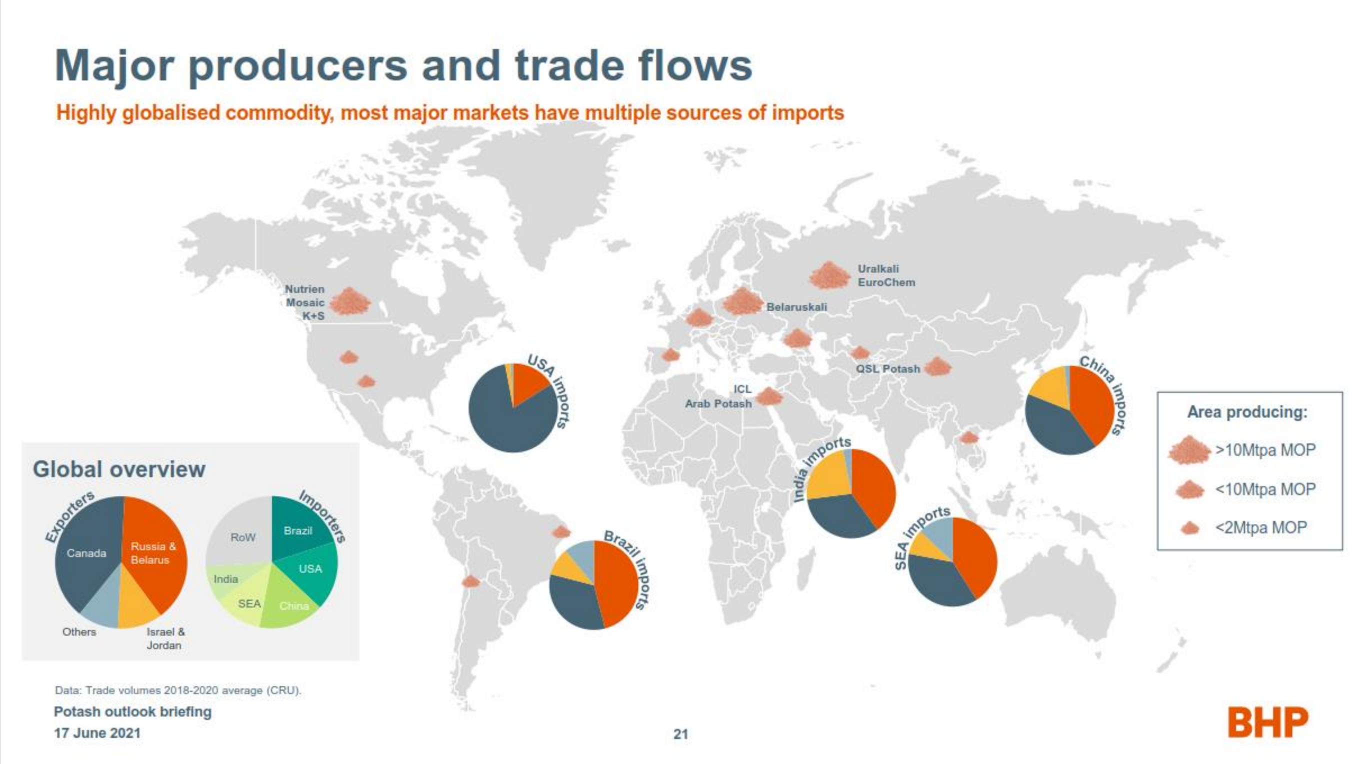
The figures shown here are approximate, but you can see that the products planned for Jansen Stage 1 provide access to the vast majority of MOP demand.



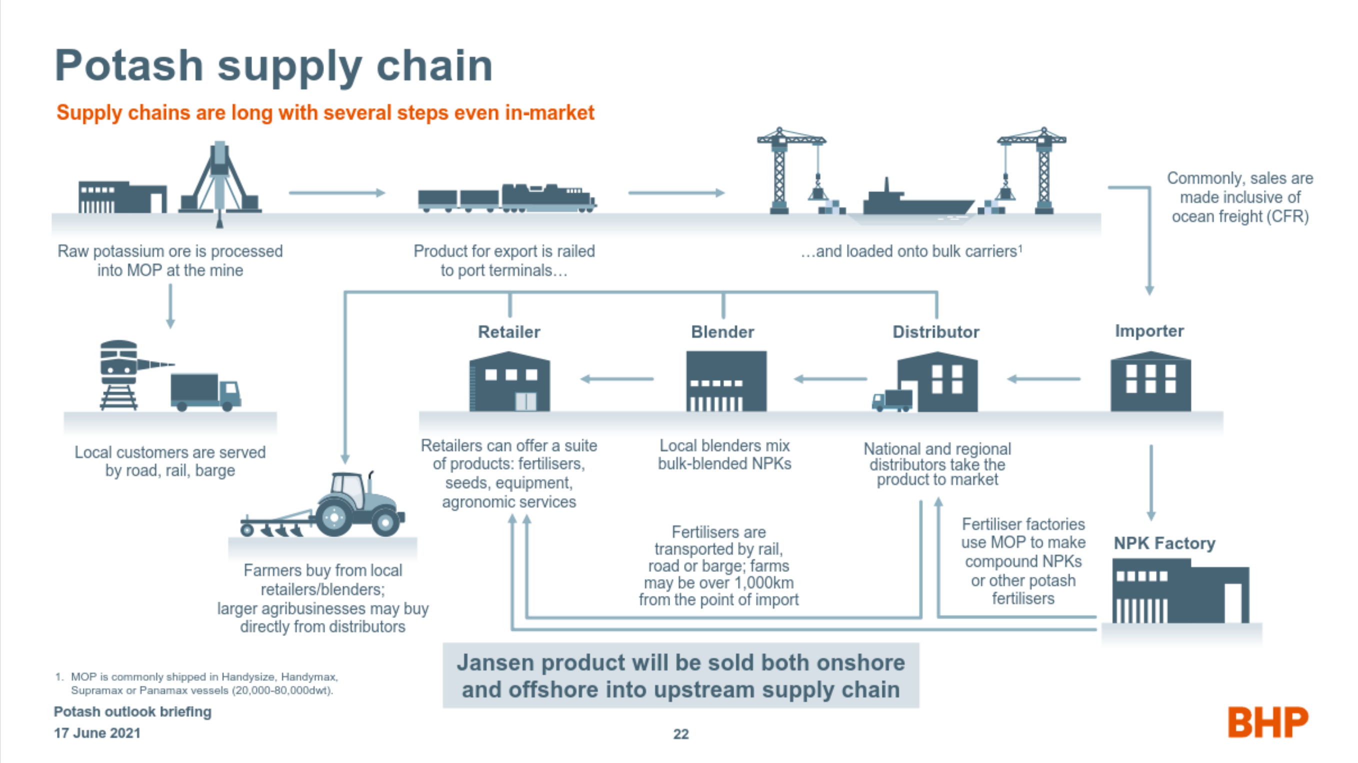
Supply is highly concentrated geographically, according to the location of natural resources. Canada accounts for roughly a third, as do Russia and Belarus together. Add China, Israel and Germany and you have around 90% of production.

There's limited geographical overlap between supply and demand – MOP is actually the biggest internationally traded fertiliser commodity by volume.

China, the United States, Brazil and India together account for about 60% of demand. Standard grade and granular grade have roughly equal global market share, but granular is favoured in the Americas, where bulk-blending of granular fertilisers is commonplace, while standard, both for direct application and for the manufacture of compound NPKs, is favoured in Asia.



Potash trade flows, then, are highly globalised. Major export routes are from the Pacific Northwest, the Baltic Sea and the Red Sea, with most big exporters shipping to all major import markets. Brazil, not China, is the biggest import market for this commodity.



Another point to note is that supply chains are long. Sales are commonly made on a CFR basis, so it's the producer that manages the seaborne freight. After the potash has arrived at the import point, it may change hands several times in-market – between importers, national and regional distributors, blenders and retailers – before it finally reaches the field.

Some potash producers have assets downstream in the supply chain, but most focus on selling MOP upstream where margins are highest. This also suits BHP's strengths in cost-efficient bulk materials distribution.

Potash: a low emission, biosphere friendly fertiliser

MOP is a critical nutrient with a modest environmental footprint, with conventional flotation route advantaged over solution mining

	MOP (flotation-based)	MOP (solution mining)	Nitrogen fertilisers	Phosphate fertilisers
Production footprint				
Low Scope 1+2 emissions (<100kg CO_2e/t)	✓	✗	✗	✗
Low water consumption (<1t/t)	✓	✗	✗	✗
Consumption footprint				
High nutrient content, minimises relative transportation emissions	✓	✓	●[1]	●[1]
No energy-intensive downstream processing required	✓	✓	✓	✓
No N_2O/CO_2 release upon use[2]	✓	✓	✗	✓[3]
No risk to waterways	✓	✓	✗	✗
Enables higher crop yields, reducing need to cultivate virgin land[4]	✓	✓	✓	✓

1. Varies for different fertilisers.
2. Nitrogen fertiliser use releases N_2O directly via leaching/volatilisation and indirectly through microbial denitrification. This contributes 10% of CO_2-equivalent emissions from the global food system.[5]
3. Some common phosphate fertilisers also contain nitrogen, which generates N_2O upon use.
4. Land-use and land-use change (LULUC), mainly in the form of deforestation, contributes 32% of CO_2-equivalent emissions from the global food system and 11% of all anthropogenic emissions.[5]
5. Crippa, M., Solazzo, E., Guizzardi, D. et al. *Food systems are responsible for a third of global anthropogenic GHG emissions*. Nat Food 2, 198–209 (2021). https://doi.org/10.1038/s43016-021-00225-9.

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Let's take a moment here to think about the emissions footprint of that supply chain. I'll also make some comparisons with nitrogen and phosphate fertilisers, which are very different to potash fertilisers in terms of their environmental impact of both their production and their use.

Flotation-based MOP is a dry bulk material mined from high grade ores and requiring only basic beneficiation to yield a finished product. As such, Scope 1 and 2 emissions are of a similar magnitude to other bulks.

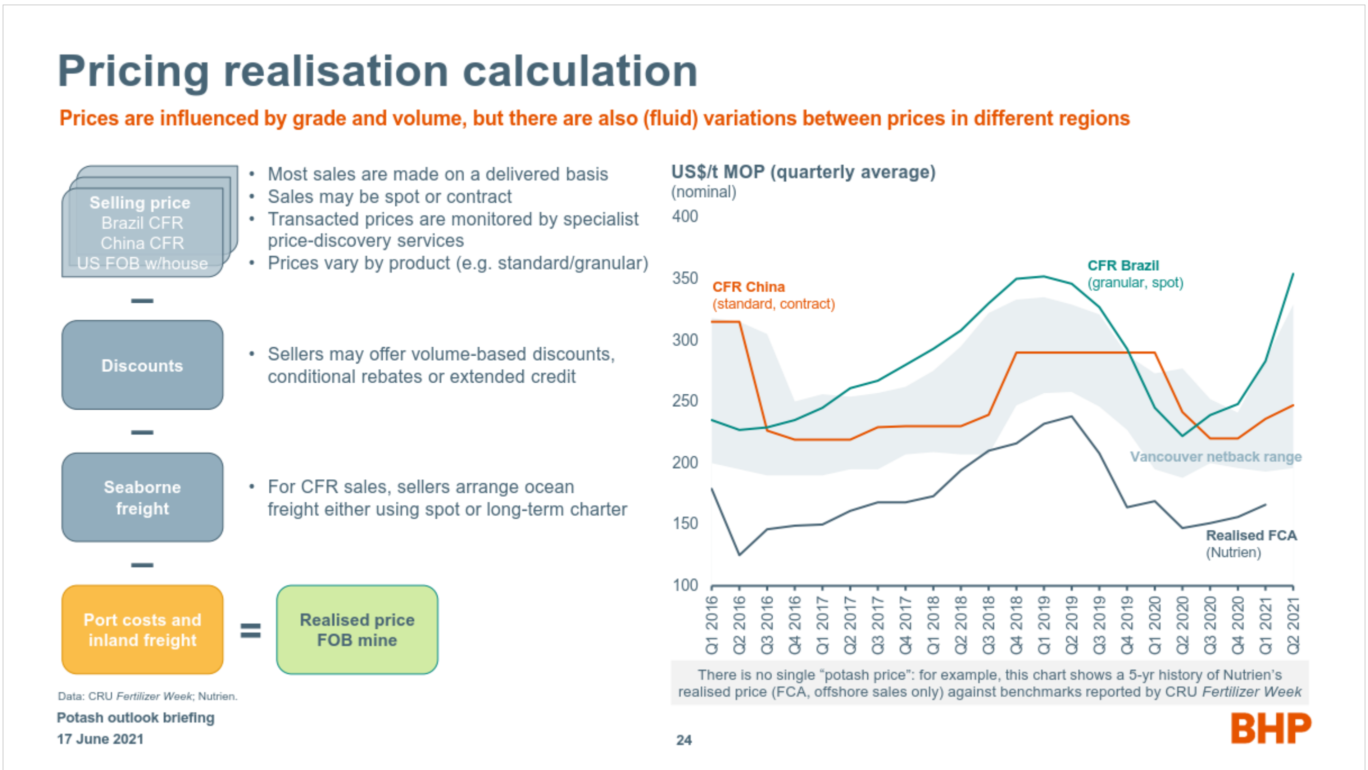
It's also the most concentrated form of potash fertiliser available, which minimises the impact of onward transportation and there's no energy-intensive downstream processing required.

The biggest source of Scope 3 emissions from the fertiliser industry as a whole is the release of CO_2 and N_2O when nitrogen-containing fertilisers are applied to fields. But there are no such emissions associated with the use of potash.

And it doesn't pose the water pollution risk that you have from nitrogen and phosphate fertilisers.

More generally, the appropriate use of fertilisers is about sustainable intensification of agriculture – getting more from the cultivated land that we have. If we can do that, we can tackle the huge amount of emissions that come from deforestation and other unsustainable practices.

So, for us, potash ticks a lot of boxes in terms of low emissions, low pollution and sustainable development.



Finally in this section, let's take a look at how potash is priced. It's not exchange-traded, so there isn't a widely accepted single global benchmark that everyone refers to. Instead, there are a number of specialist publications that monitor transacted prices through conversations with buyers and sellers.

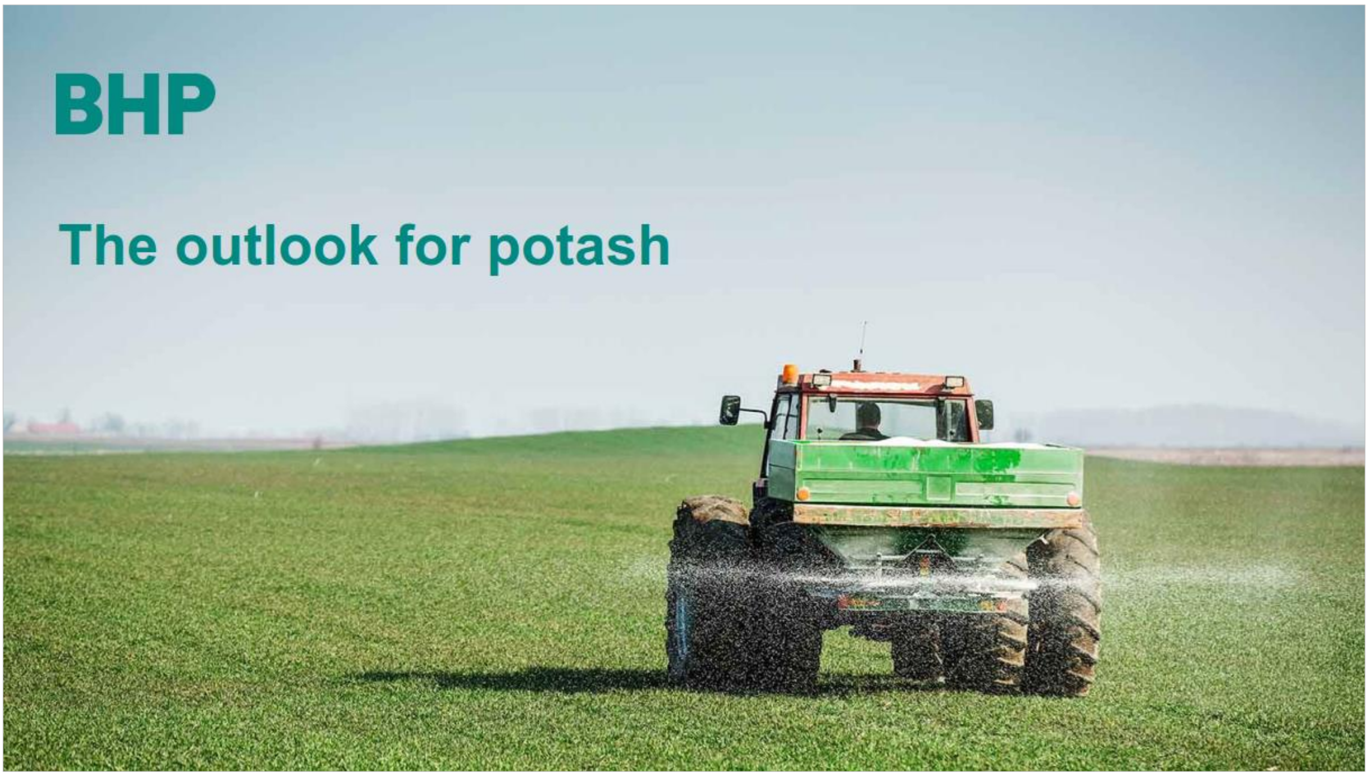
Because most potash sales are made on a delivered basis, you'll see price benchmarks like granular MOP CFR Brazil or standard MOP CFR China. Regional differentials aren't always quick to arbitrage – in fact today we've got a particularly wide range between prices in the Americas and prices in Asia, and it will likely take a while for benchmarks to converge again.

These published benchmark prices have the advantage of being prompt and high frequency, but they don't readily give you insight into net realised prices. If you want to estimate a mine netback from a particular benchmark, there are a couple of things to consider. Firstly, the rebates or discounts that suppliers often offer against the headline selling price. Then there's the delivery costs – that's ocean freight, port transit and the inland transportation from the mine.

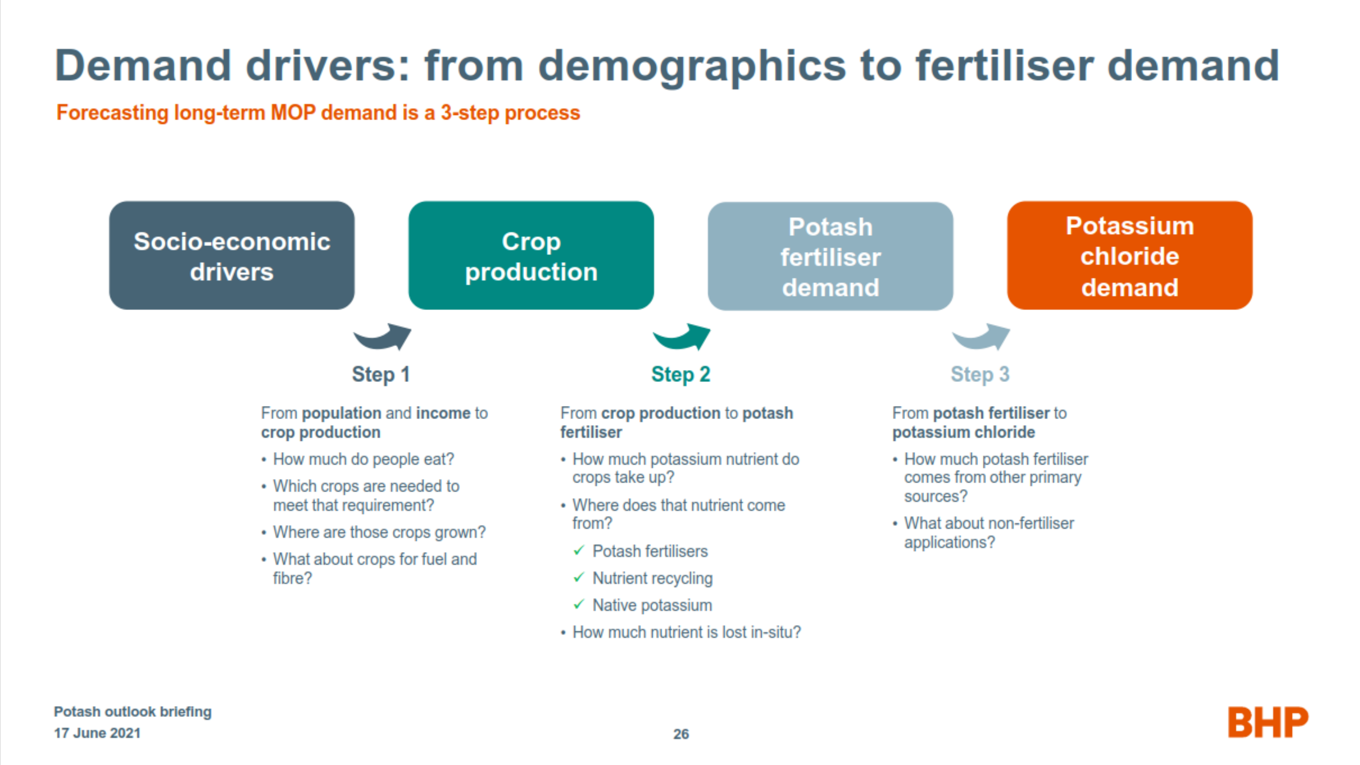
On the chart here we can see the import price of MOP to Brazil against the roughly annual contract price that is fixed for imports into China. The shaded area shows the implied range of netbacks FOB Vancouver after deducting ocean freight from these and other delivered benchmarks. There's not much business that's actually transacted FOB Vancouver, but it is a useful to have a single reference price point for our purposes.

The lower line is the mine-gate netback that Nutrien has reported. That's a realised price, so it's going to be net of any discounts and rebates. In the case of offshore sales, it's also net of marketing costs. And it also reflects the geographical make-up and mix of grades of Nutrien's sales in any given quarter.

So the takeaway here, is just be careful to distinguish between different price series. Think whether it relates to a specific grade or a weighted average; whether it's a headline price or net of discounts; and where along the supply chain the price is taken.



I hope I've set the context for you, by talking through the basics of how this industry operates. Now I'd like to turn to the outlook, starting with demand.



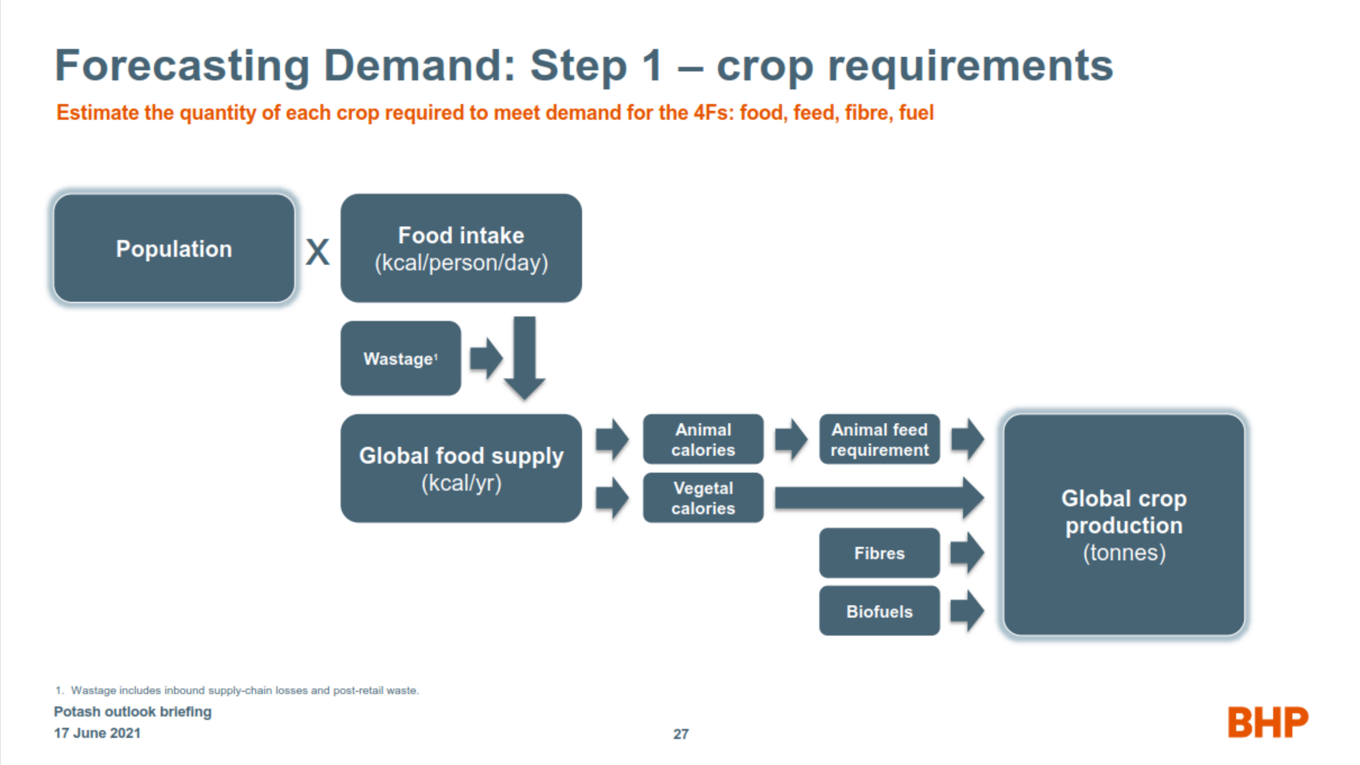
In the short-term, potash demand can be pretty volatile, often several million tonnes above or below trend. There are year-to-year fluctuations in on-farm consumption – thanks to the fact that potassium stays in the soil after it's applied, with weather conditions and farm economics key to short-term buying decisions. Stock change through that long supply chain adds another layer of variation.

But our focus is on what shapes potash demand over the long-term, and to understand this we need to consider factors all the way from population, through crop production and fertiliser requirements, until we get to MOP demand itself.

We know that ultimately, most fertiliser is being used in order to meet food demand. Population – how many people there are – is the most important socio-economic driver here, followed by *how much* they eat, and to a lesser extent *what* they eat. But these trends are relatively predictable and slow-moving, particularly over a single generation.

We think that greater uncertainty in potash demand over the long-term actually comes from the second step here: the contribution of potash fertilisers to total crop uptake of potassium. I'll come back to this in a moment.

The final step is relatively simple. Potash fertiliser requirement is actually quite a close proxy to MOP demand, at least on a trend basis. Account for different types of primary potash and the demand from industry and you end up with your MOP demand forecast.

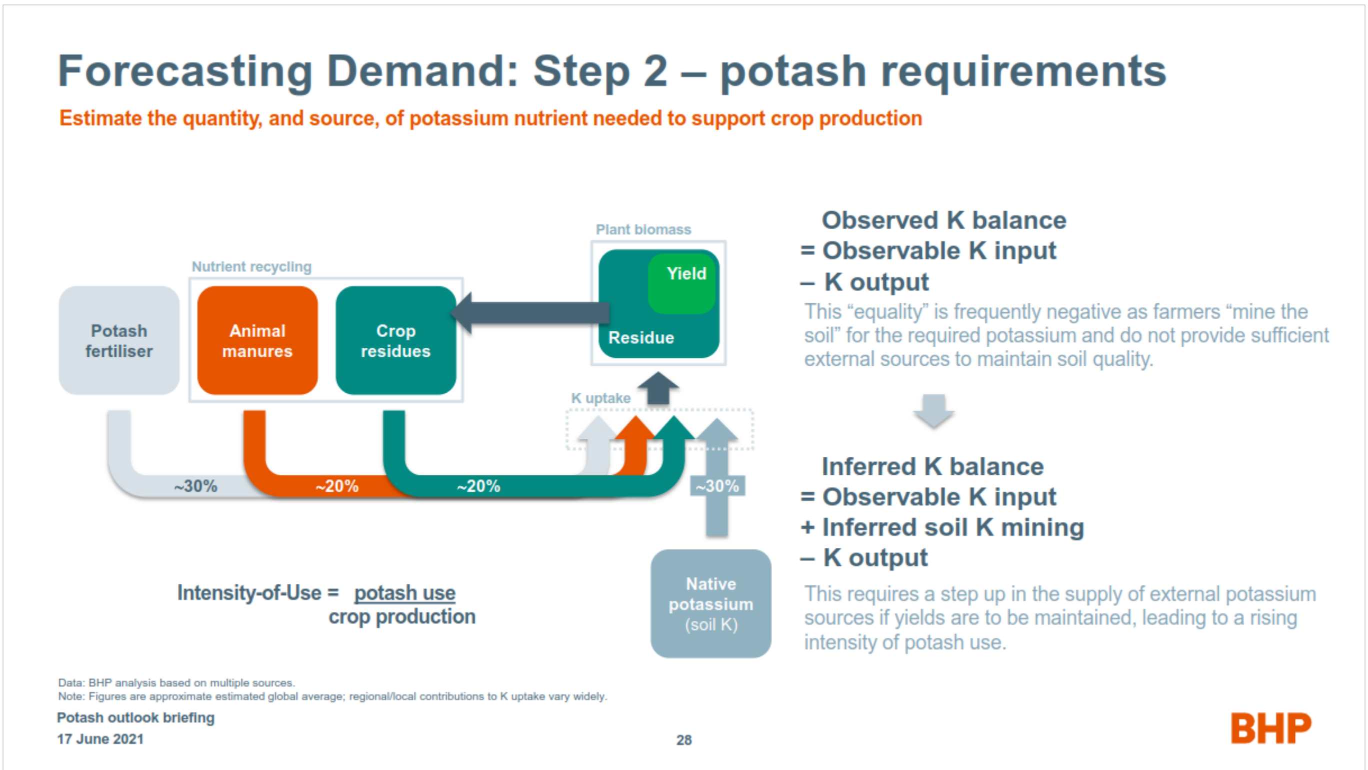


Let's take a look at the first two steps in a little more detail.

Required global food supply is a function of population, food intake and the amount of waste within the food supply chain.

Remember that nearly 80% of crop production goes directly into food supply, with a further 15% used for animal feed. The use of cultivated crops is just one source of animal feed – others include pasture and fodder, and many waste or residue products from the food supply chain and industrial process like ethanol production.

Industrial crops are much less significant. So it's population and per capita food intake that are the biggest influences over the quantity of required crop production.



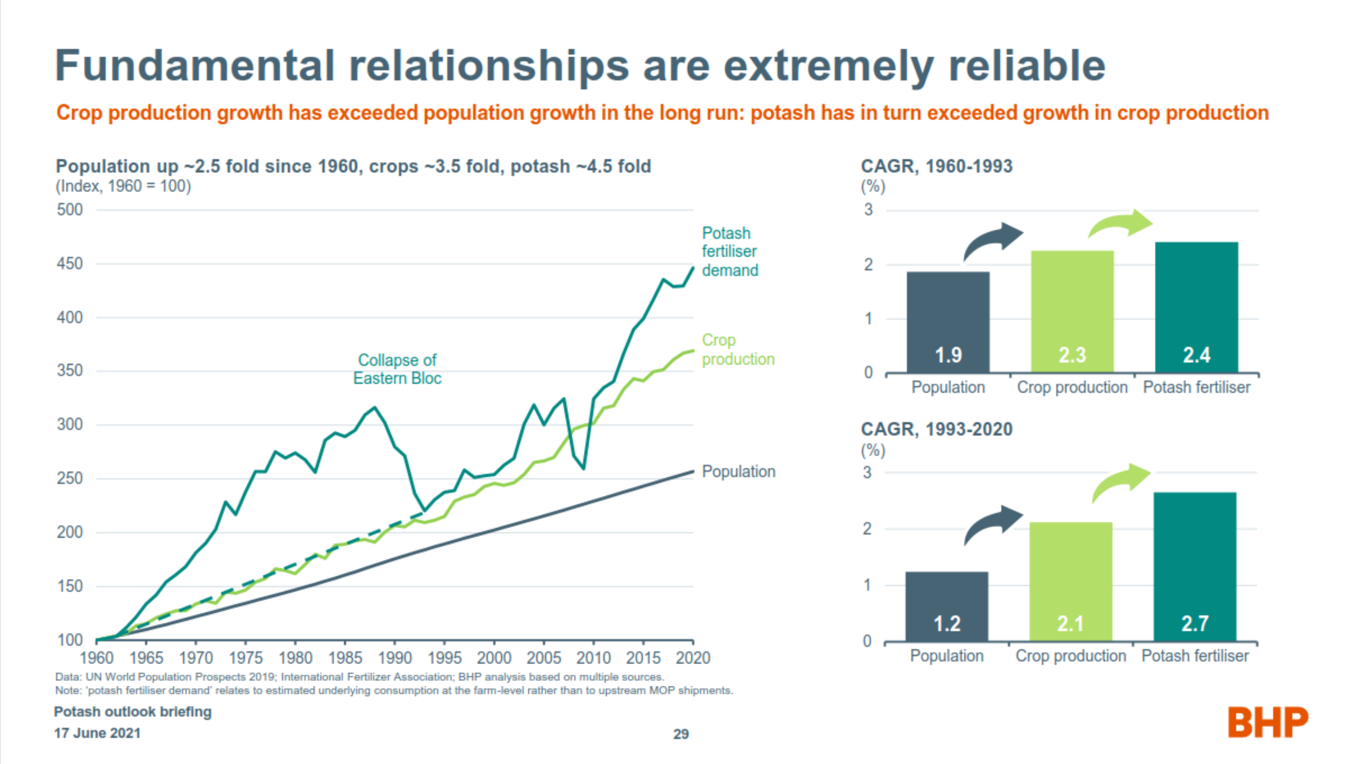
Having established a forecast of crop production, the second step is to estimate how much potash will be required to support that production.

K uptake is the amount of potassium that a crop draws from the soil. This depends on the type of crop and the crop yield. Farmers can apply potassium in the form of potash fertiliser, or lower-concentration organic matter. The annual 'potassium balance' is the difference between the K applied and the K removed.

A negative K balance, or deficit, implies that 'native' K in the soil is being depleted. Soil chemistry is a very complex subject, and the 'reserve' of native potassium can vary hugely depending on the soil type, how it has been managed historically, and how intensively it is farmed. There are big variations at the local level but, as a whole, global agriculture has historically relied heavily on effectively 'mining' native potassium from the soil. Even land that has needed little potash in the past may find yields becoming limited by K availability. Rising yields increase crop K requirements and accelerate this process.

In the short-term, farmers can make a call when to cut potash application and rely more on K reserves in the soil – that's one of the drivers of short-term demand volatility – but, over the long-term it's agronomics that dictate potash use. Exactly when, and how quickly, a shift in behaviour will occur across the world's different agricultural regions is uncertain. But if potash has to shoulder a greater share of crops' uptake of K, it means 'intensity-of-use' – by which I mean the average amount of potash applied per tonne of crop production – will also have to rise.

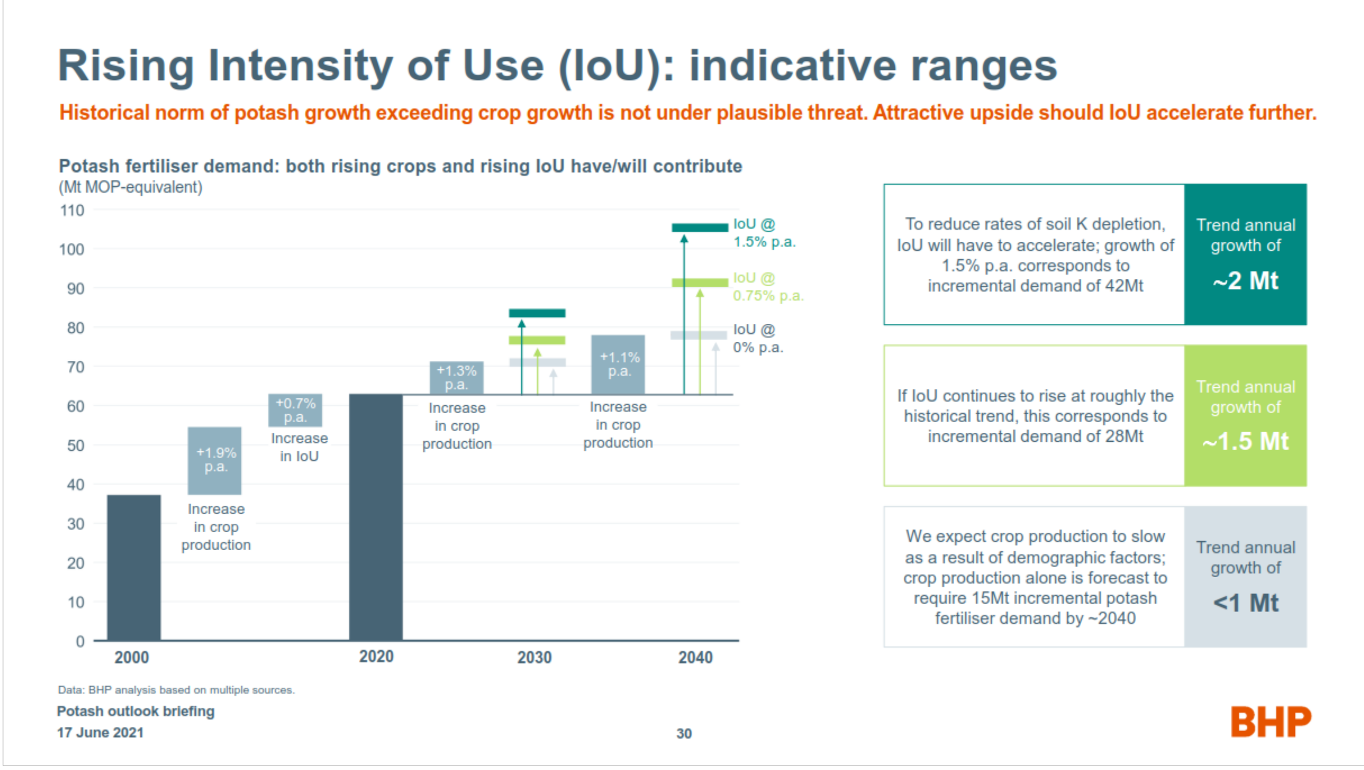
In fact, this is already happening. At a minimum I'd expect the trend to continue, but to really tackle soil depletion it will actually have to accelerate from here.



We can see some of these ideas in this chart, which Huw presented earlier.

When potash fertiliser demand rises faster than crop production, it implies rising intensity-of-use. You can see that prior to 2000, potash fertiliser demand increased only slightly faster than crop production. So as crop K uptake was increasing, so too were the annual K deficits of the world's soils. But since 2000, that has started to change with potash use really pulling ahead of crop production.

Socio-economic drivers are slowing down in percentage terms, but this is being offset by the agronomic requirement for higher intensity-of-use. Global agricultural output today is about 9 billion tonnes, so even a 100g/t increase in potash intensity-of-use corresponds to nearly a million tonnes of additional demand.



Huw McKay

Thanks Paul. Since 2000, we estimate that around three-quarters of incremental potash fertiliser demand globally can be attributed to increasing crop production. One-quarter has been attributable to increasing intensity-of-use.

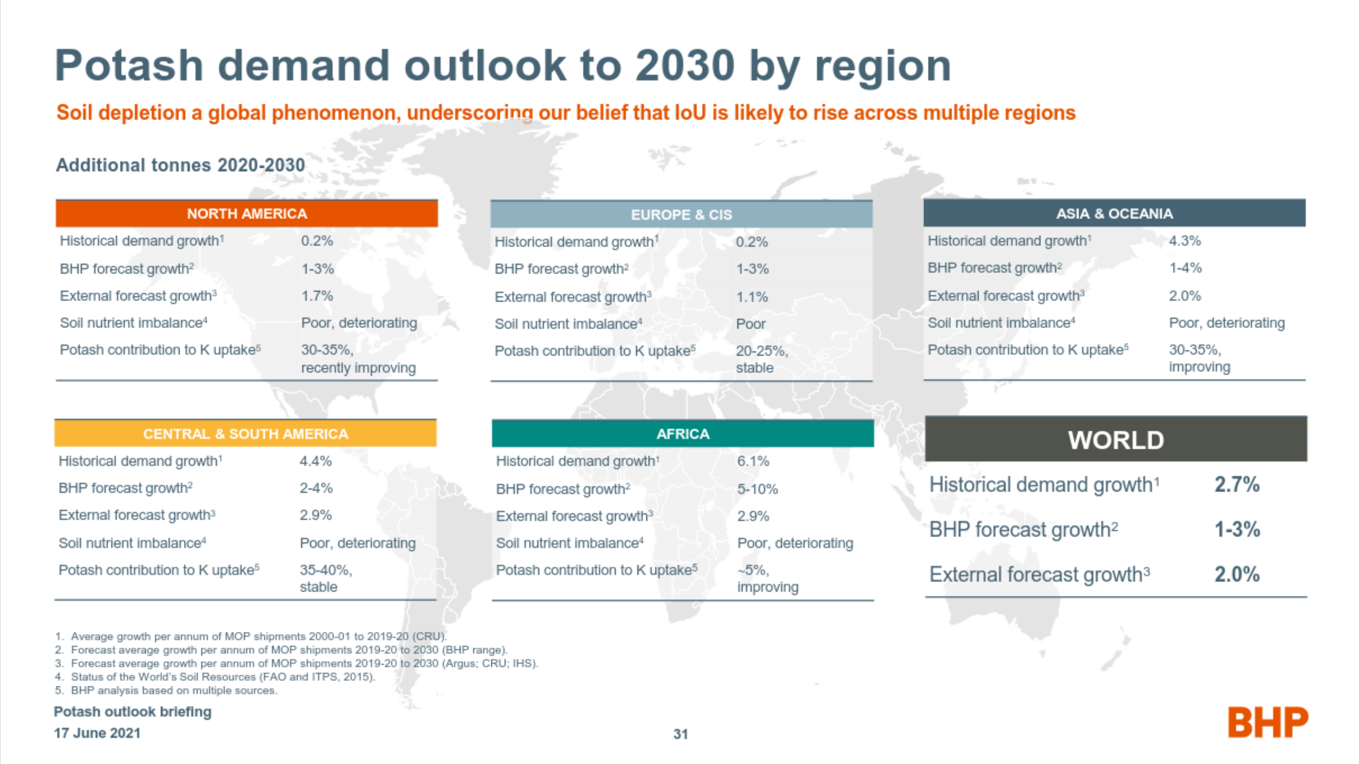
Even if you completely reject the argument for a continued increase in intensity-of-use (IoU), crop production alone would still support about 15 million tonnes (Mt) of incremental potash demand, over the next 20 years.

A continuation of the existing IoU uptrend would add another 12 to 13 Mt on top of that.

If, as we consider is very realistic, it becomes necessary for major regions to significantly lift application to tackle negative K balances, then intensity-of-use gains would accelerate, and there would be substantial upside beyond these figures.

We believe that unsustainable farming practices will be subject to Stein's Law: "if something cannot go on forever, it will stop".

Hopefully these practices will stop due to improved farmer education, policy support and technology adoption. The alternative, where the global farm system sleep walks into a yield short fall, would have far-reaching negative consequences, and should be avoided at all costs.



Here we present demand ranges for the world, and the major regions, for the 2020s. There is a lot of data here.

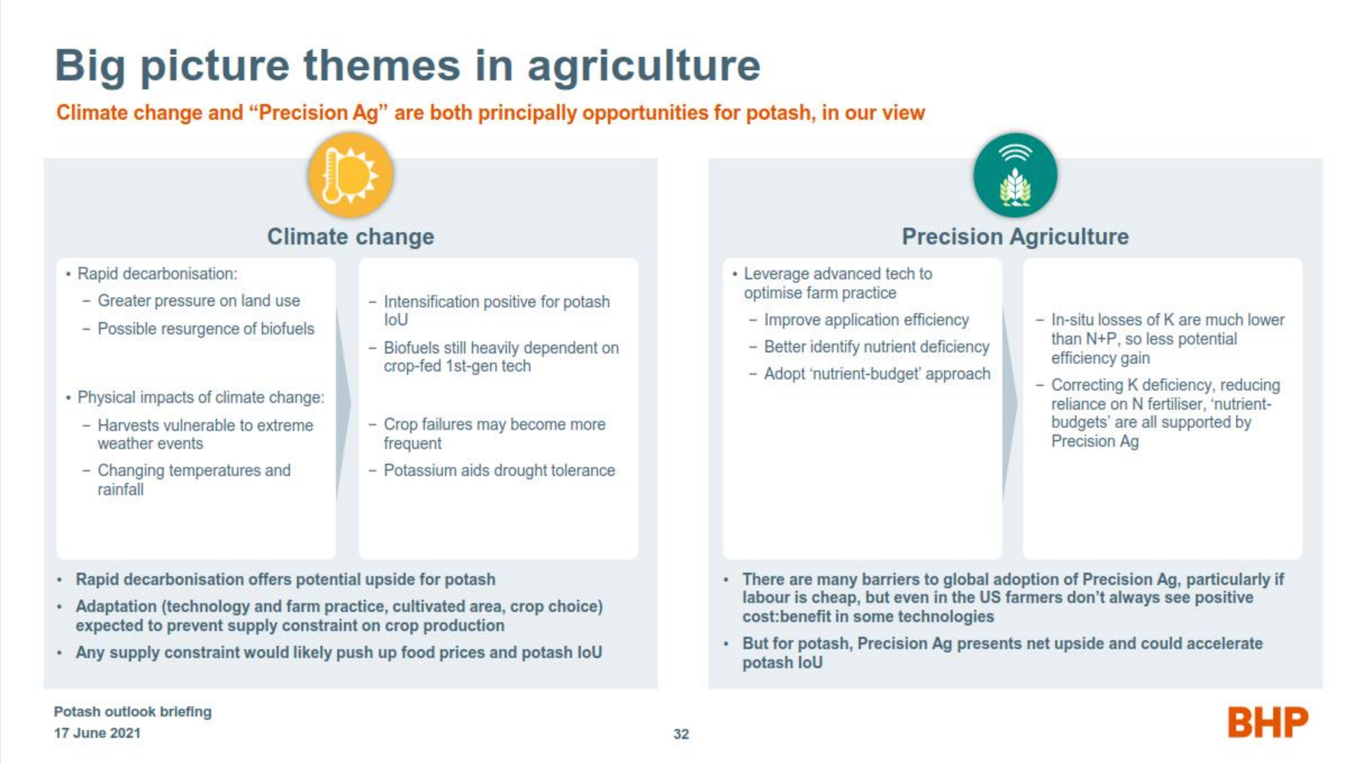
The key take-aways are these:

- Growth in MOP demand this century has been driven by the major agricultural systems of Asia and South America, particularly India, China and Brazil.
- Overall, we expect aggregate demand growth in these regions to continue at a healthy pace but to ease somewhat from the rapid 4% plus seen over the last 20 years.
- In Europe and North America, there has been very modest MOP demand growth over the last 20 years. But the big increases in yields that have been achieved over this time have correspondingly increased uptake of K.
- In the US, K balances have become increasingly negative, enabled – for now – by some naturally highly fertile soils.

At some point though, this is going to have to be addressed with higher K application. Of course the timing and pace of such a correction is difficult to predict. We conservatively range global demand growth over the next decade roughly between 1% and 3%.

Historical growth since 2000 has been about 2.7% per annum on average, with the most recent 10 year period coming in around 2.4%.

Note that the growth rates vary a little according to your choice of base years. For comparison, the average growth forecast from the speciality consultants is about 2% per annum, while Nutrien has disclosed that it expects demand of 2% to 2.5% in the 2020s and 2-3% in the "long term".



There are several big picture themes that frequently come up in conversations about potash demand. These issues are complex, and regional context is often just as important as the global trend.

There's a slide with some further commentary in your packs, but let me take you through the key points at a really high level.

In the case of climate change and the adoption of precision technologies, we see both of these principally as opportunities rather than threats.

How can potassium help make agriculture more resilient to climate change? We know it has a role to play in drought tolerance.

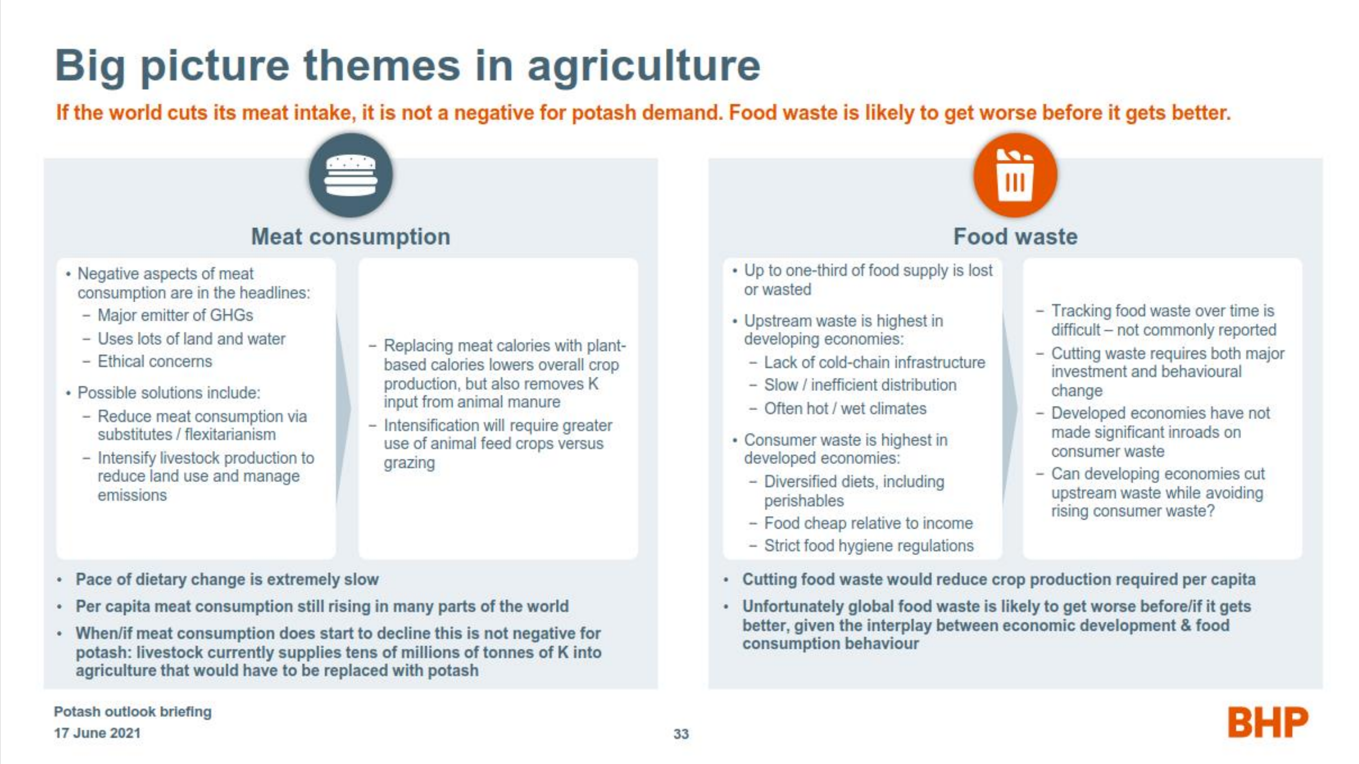
How can technology aid better, evidence based decision making on the farm? Helping growers identify nutrient deficiency and take a data driven nutrient budget approach would be a huge benefit.

I should also point out here that there are big differences between the use of nitrogen, phosphate and potash that are relevant for the impact of technology. In-situ losses of K are much lower than N and P so the potential for physical efficiency gains from precision techniques are also less.

We also know that potash is more often under-applied than nitrogen is; that K deficiency is harder to spot; and that depleting potassium 'reserves' in soils are a hidden danger for future crop yields. Technology definitely has a role to play in meeting each of these challenges.

Additionally, current adoption of precision ag techniques is focussed on regions where potash application rates are already quite high. Bringing lower technology farm systems in populous emerging markets up the sophistication curve can only assist to raise intensity of use on a global scale.

I would remind you at this point that India's corn yields were roughly 30% of those in the US in 2019, while potash intensity of use in India was 34% of the US'. That gives a sense of the gap between the productivity frontier in agriculture and where a typical developing economy sits.



In the case of dietary change, we don't expect to see meat disappearing any time soon. Add to that the fact that land pressures are driving intensification of livestock (i.e. less grazing) and feed crop demand is going to be rising for a while yet.

But let's assume for a moment that we did get to a point of zero meat. Feed demand worth 15% of total crops goes away – but so too does the manure that provides around one-fifth of crop K uptake globally. That means much higher potash intensity-of-use to sustain the remaining crop, the food portion of which will have to expand to replace the lost calories that were coming from meat. Somewhat counter intuitively, potash demand may well absorb overnight veganism with aplomb.

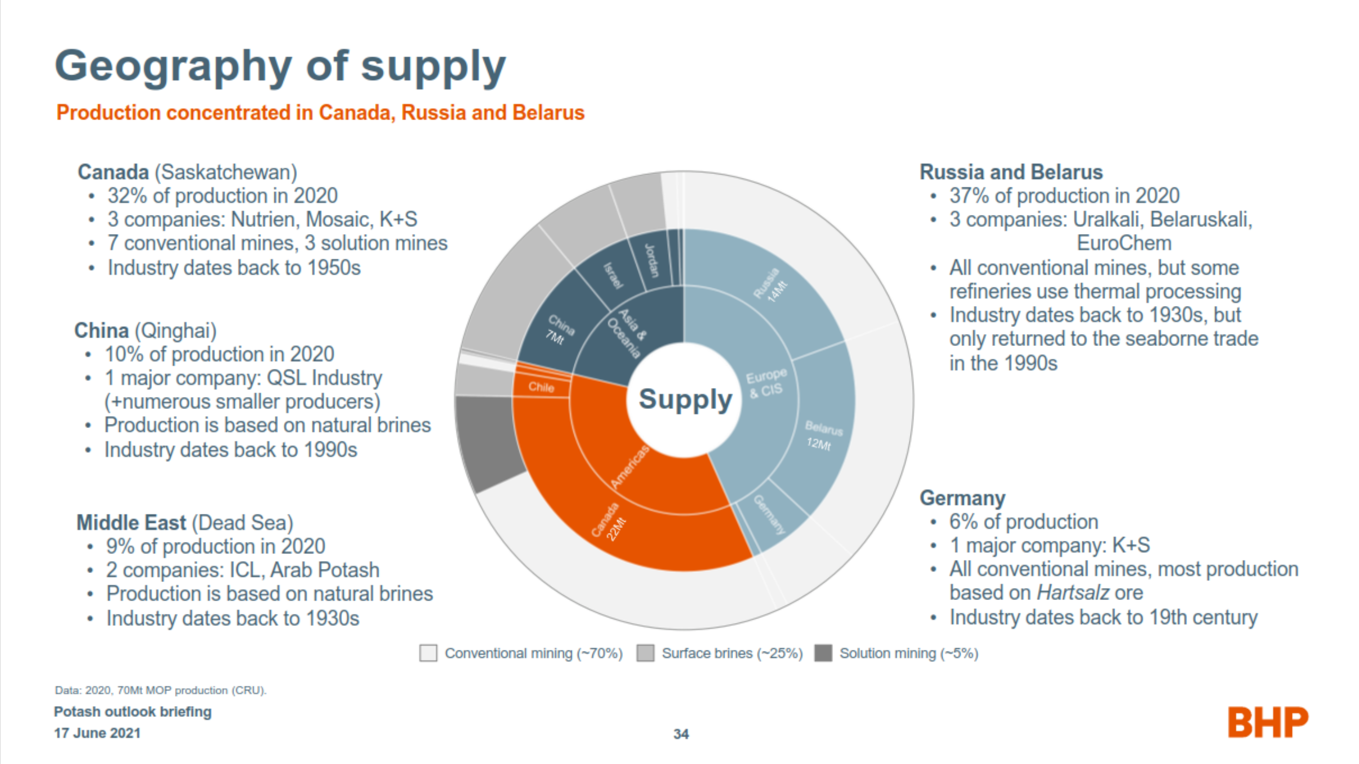
Food waste is a big problem for society. There are large upstream losses in developing countries and large downstream losses in the developed world. First of all, we need to stop it getting worse. It is reasonable to expect that improved infrastructure will reduce distribution losses in developing economies over time. Offsetting that, without a decoupling of the historical link between rising living standards and behavioural changes with respect to food consumption, there will be escalating consumer waste in those same countries as incomes rise, lifestyles are altered through urbanisation and the consumption of perishable foods increases.

Can we reduce the very high levels of consumer waste in Europe and North America? Some energetic and ingenious start-ups are trying to do just that. It is, however, a daunting task given how dramatically behaviour needs to change.

Long-term, making our food system less wasteful could make a vital contribution to feeding the world at an affordable price, while limiting emissions from land-use. But so too will the optimisation of crop production in the first place, and that's where potash comes in.

The bottom line remains that if we need to grow more crops, that a larger, wealthier population will require, then those crops will require more potassium. For a long time, we've consciously or unconsciously depleted soils to make up a lot of the incremental K requirement. But the rising intensity-of-use we've seen over the last decade indicates that the trend is shifting for the better, albeit there is a long way to go.

Paul, back to you.

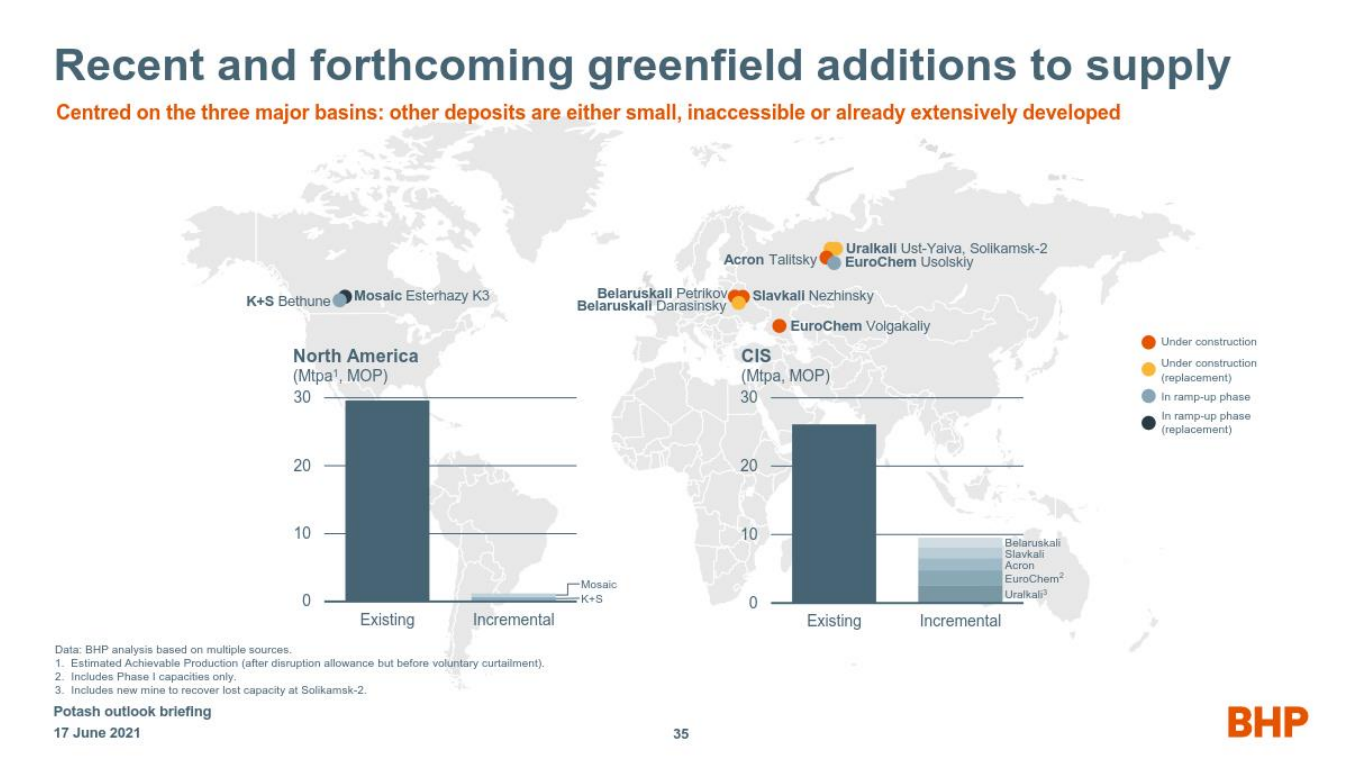


Paul Burnside

OK, so we've talked though our approach to understanding the prospects for demand. Now let's switch to supply.

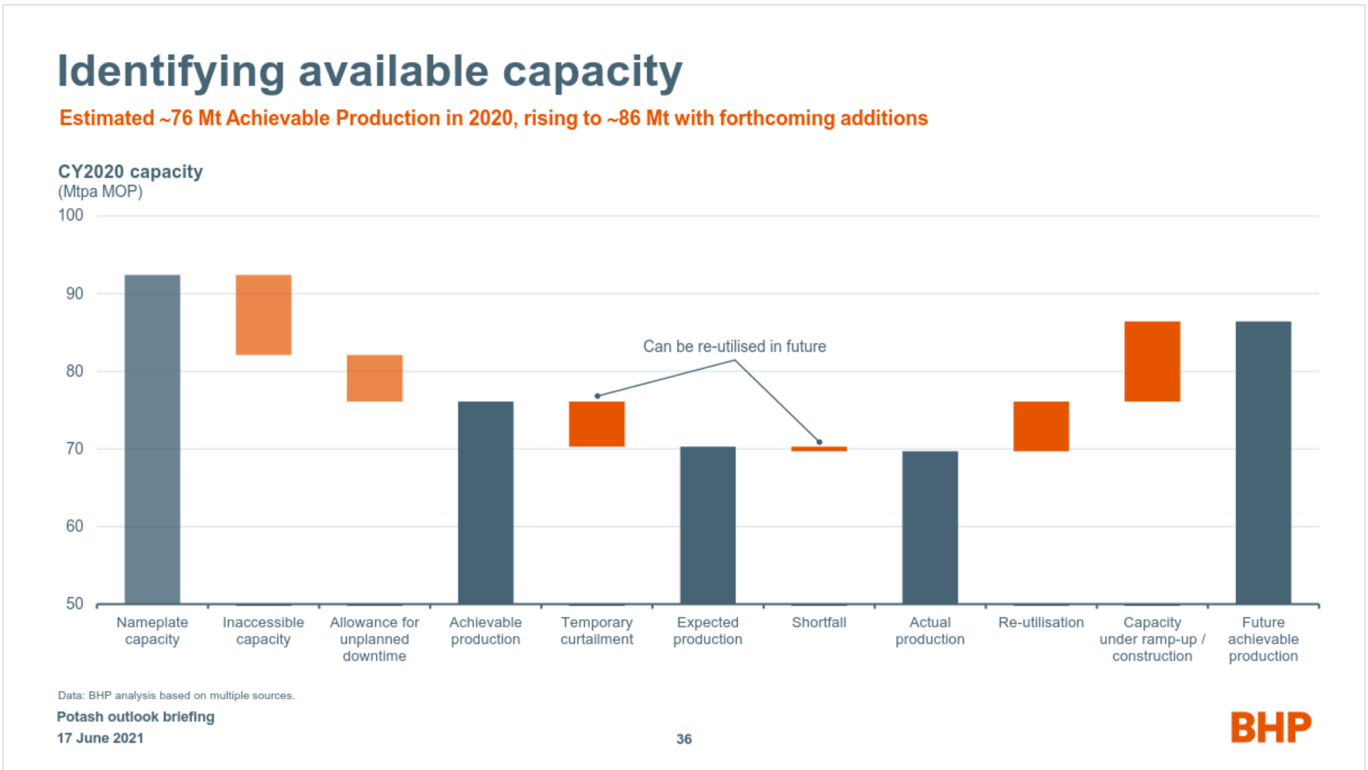
A reminder: the majority of MOP production is from underground ore deposits in Canada, Russia and Belarus. Much of the remainder is extracted from natural brines in China and the Dead Sea. Today, there are only two large-scale solution mines, both in Canada.

Most potash operations produce between 1 and 4 Mt. The mines in Canada mostly date back to a period of rapid development in the 1960s and 70s, while much of the capacity in Russia and Belarus was built in the Soviet era.



In addition to extant supply, there are 10 major MOP projects under construction or already ramping-up. Four of these are replacing exhausted reserves and will feed existing refineries. If successfully executed, these projects will add about 10 million tonnes per annum (Mtpa) of net incremental supply versus calendar 2020.

This doesn't consider resource depletion. Potash mine lives are long but we do expect to see significant depletion in Russia, Belarus and China over the 2030s, 40s and 50s. That means producers (if they have available resources) will need to build additional mines – as some are already doing – if they wish to maintain their existing production levels.

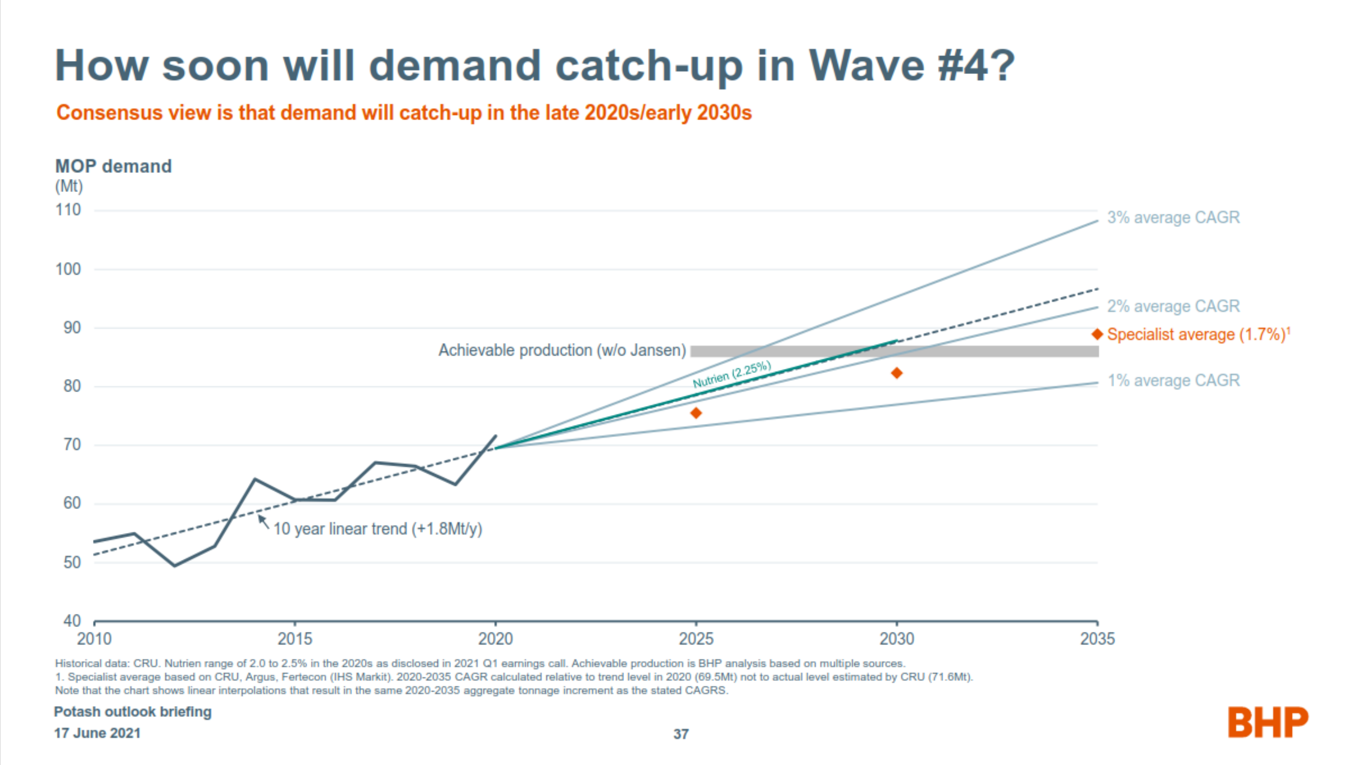


Now I'd like to clarify some of the terminology around capacity, which can sometimes be a source of confusion. Unfortunately there is no clear, single definition by which different producers report their capacity, if they report it at all.

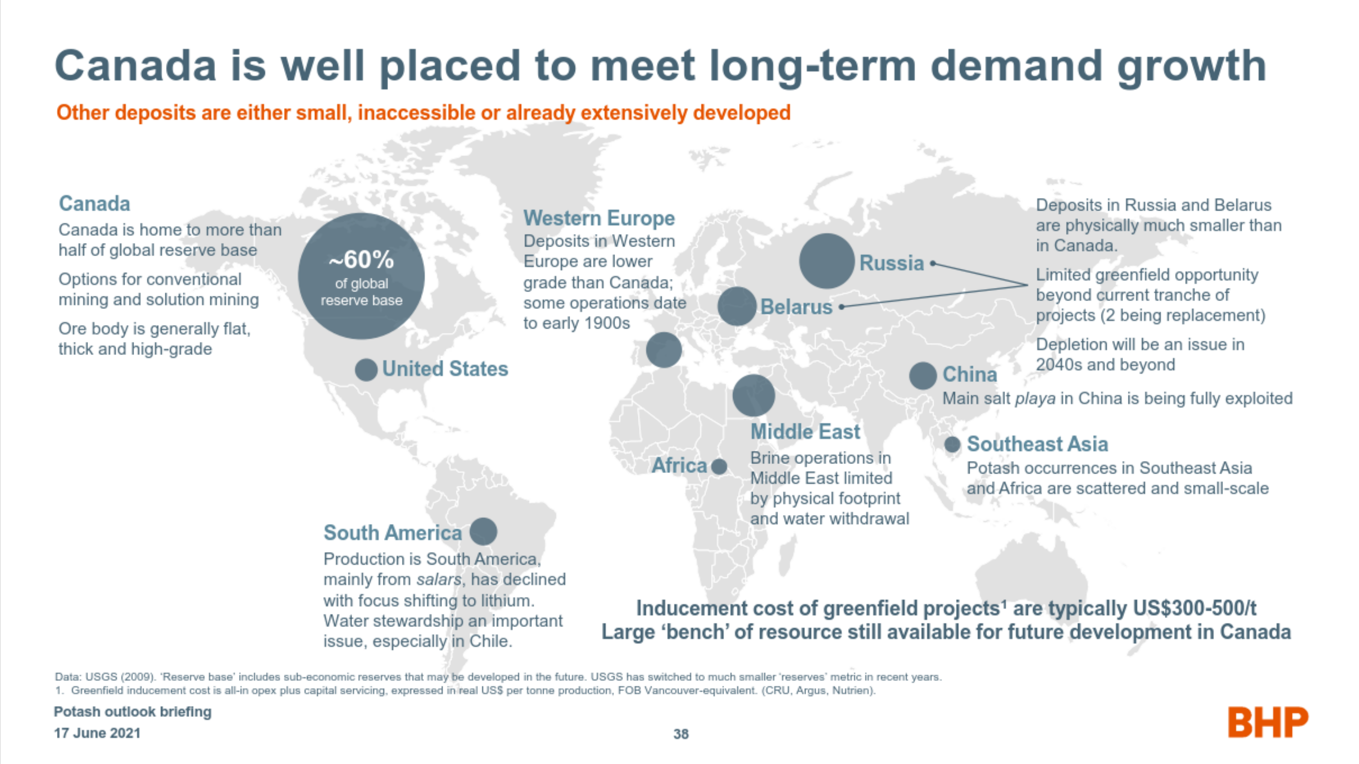
"*Nameplate capacity*" is sometimes based on annualising a 'sprint' capacity. Or it can fail to reflect limitations that have appeared over time. Accounting for this, we estimate that what we call *Operable Capacity* today is around 82 Mtpa. But unplanned downtime – which can be for a variety of reasons – means that across the industry as a whole, output is usually lower. Allowing for such disruption, we estimate the *Achievable Production* of the industry at about 76 Mtpa.

Then we have some capacity that is under voluntary curtailment, most of which is in Canada, and a little that is currently uneconomic. That takes us to *Expected Production,* after estimating all limitations on output, of only 71 Mt last year. Actual production in calendar 2020 was nearly 70 Mt, which shows just how hard available capacity was being run to meet the big jump in demand.

So, looking forward, there is clearly still spare capacity that can be re-utilised. Plus there is new capacity either under construction or already in ramp-up. Working on the assumption that all this becomes available, we think that future achievable production could be up to 86 Mtpa, without Jansen or other capacity investments. That's without factoring in depletion in the 2030s and beyond.



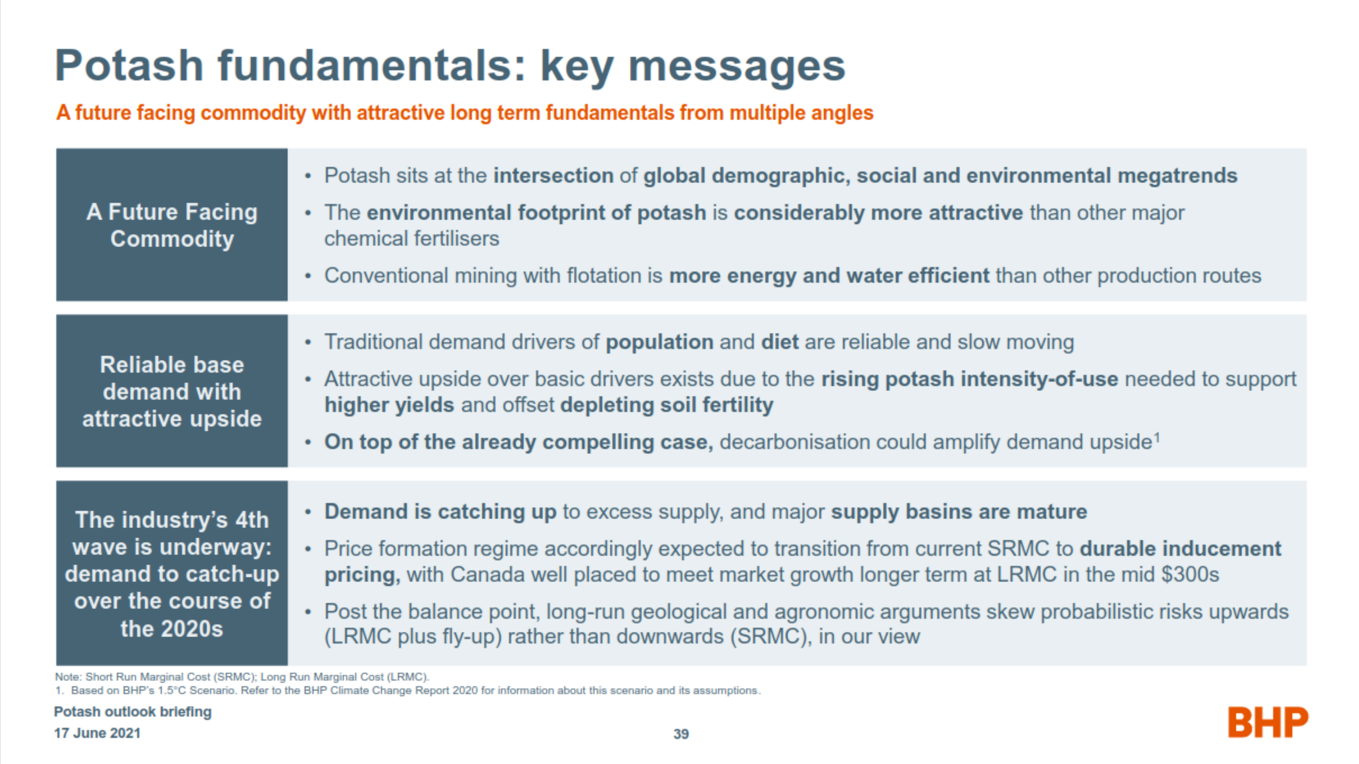
Coming back to this slide that Huw showed earlier; at linear trend growth, that 86 Mtpa of supply will be absorbed by the late 2020s. If the pace of demand we've seen over the last 18 months keeps up, it will be much sooner than that. Or taking the average forecast of three specialist analysts, it happens in the early 2030s. But sooner or later, further capacity is going to be needed.



So the next question is, where can that incremental capacity come from? The major production areas in Europe, the CIS, the Middle East and China are mature: greenfield opportunities, and brownfield expansion options, are dwindling. There may be some sites that can eke out some brownfield expansion, but the low hanging fruit was all taken in the last investment cycle. Then you have recent greenfields, which in some cases have "phase 2" optionality. But it's likely that the next round of investment is going to be tilted much more towards greenfield development than what we saw in the 2000s and 2010s. There are individual projects outside the major basins that we may see in production one day. But from a multi-decade perspective, they aren't the answer to long-term demand growth.

But Canada is home to more than half of the global reserve base and is able support multiple new mines in the future. It's this large 'bench' of resource that we think is going to be the biggest contributor to meeting demand over the long term. That will likely include the development of relatively high-opex solution mines in the southern part of the Saskatchewan basin. And we think its reasonable to expect that the through-cycle trend price of potash in the long-term will reflect the cost of inducing more of this bench into production.

Prices will always fluctuate: sometimes driven down to short-run marginal cost, sometimes pushed up by tight supply and profitable farm economics. Structurally though, when you look at the availability of resource and the growing size of the market you see that it is very unlikely that the industry ever returns to the conditions we saw in the second half of the 20th century. And over time, we expect trend prices that will support development of necessary incremental greenfield supply.



Huw McKay

Thanks, Paul.

We hope that our remarks have provided you with some useful insights.

To recap:

- Potash is a future facing commodity.
- Base demand is reliable, with attractive, plausible upside.
- Excess capacity is expected to be absorbed over the course of this decade.
- Beyond the 2020s, we expect the long-run marginal cost of the Canadian resource suitable for solution mining will set long-run prices.
- The alternative book end – trading at short-run marginal cost more often than not due to a perpetual supply overhang – is far less plausible given the narrow range of high quality conventional development options the industry has available to it.
- Neither the geological nor the agronomic case for this view stack up on a probabilistic basis.

With that I will hand back to Tristan who will facilitate the Q&A.