telescope
Investment magazine
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Raw materials

No progress without them

VP BANK

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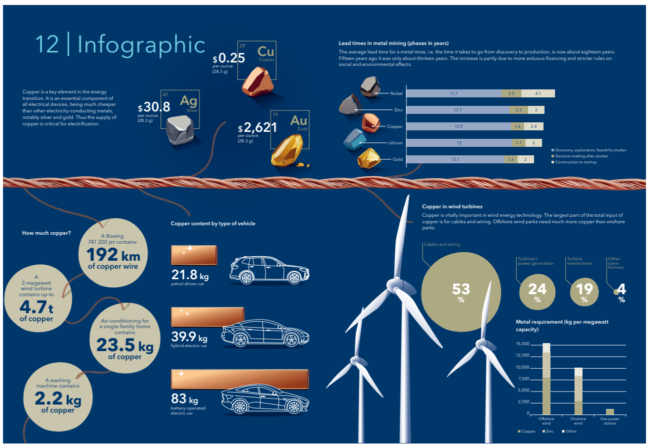


12 | Infographic
Cu
$0.25
Ag
$30.8
Au
$2,621
192 km of copper wire
4.7 t of copper
23.5 kg of copper
2.2 kg of copper
21.8 kg
39.9 kg
83 kg
53 %
24 %
19 %
4 %

Raw materials and high tech

Dear Reader

The relative importance of different types of raw material has changed dramatically over the centuries. Alaric, king of the Visigoths, demanded peppercorns as a ransom when he besieged Rome in 408 AD. Pepper was a scarce and valuable commodity in Europe at that time. But when the sea route to India was discovered, such spices became widely available. Pepper is now in everyone's kitchen. But the fundamental relationship between price, demand and supply remains the same now as it was then.

The high-value commodities in today's world are not peppercorns but minerals such as rare earths and lithium. The price of these raw materials will decide how quickly the world achieves the green transition away from fossil fuels (→ page 16). It is not the first time in human history that technological progress has created new favourites in the commodity markets (→ page 3). Also relevant is recycling, which helps reduce our dependence on primary raw materials (→ page 8). Did you know that your smartphone is a gold mine?

As always, this tenth edition of our investment magazine also includes wider-ranging articles. I recommend the portrait of paraclimber Amruta Wyssmann, who was born without a left forearm (→ page 14). And we also describe how the Nobel Prize came about (→ page 19).

I trust that this not-so-raw reading material will provide you with valuable new insights.

Dr Felix Brill
Chief Investment Officer VP Bank

Copper mine in Rio Tinto in the southern region of Andalusia, Spain.

Progress and scarcity

Innovation and technological progress generate economic growth but also create a greater need for raw materials. Can supply respond adequately to demand, and if so how quickly? And who will profit? Economic aspects are not the only factor here.

Felix Brill

Everything has become so convenient. Take out your smartphone, activate it by face recognition, put a question to an AI assistant like ChatGPT or Claude, and – bingo! – you've got the answer. Or leave the phone in your pocket and operate it via a watch and voice control. Artificial intelligence (AI) is no longer a plaything for geeks; it's a part of everyday life. And where will it lead? The possibilities are vast, not just at the personal level, but in industry, medicine, research – everywhere!

AI applications are exploding. ChatGTP and its like, whether in a smartphone or helping to drive an electric car, need an infrastructure. The related computer centres require electricity and cooling systems, and an endless supply of microchips. Meeting these needs involves not only know-how but also a huge input of raw materials. But are these materials available? And on what timescale? Do adequate reserves exist? What is the demand picture? Where are the raw materials obtained and processed? And what does all this mean for countries that possess these resources and for those that do not?

Optimists versus pessimists

In today's world the potential for progress seems unlimited. Optimism is unbounded. Half a century ago everything looked so different. In 1972 the Club of Rome, a non-profit organisation devoted to addressing global issues, published a report titled "The Limits to Growth". It contains the famous sentence: "If the present growth trends in world population, industrialisation, pollution, food production, and resource depletion continue unchanged, the limits to growth on this planet will be reached sometime within the next one hundred years."

This verdict was issued more than half a human lifetime ago. Most of today's computer developers in Silicon Valley and other technological hotspots had not been born. Nor did they experience the oil crises of the 1970s and 1980s, or at least only as toddlers. Now these adventurers are blithely stretching the bounds of possibility, never worrying that one day their efforts might be stymied.

In fact, however, the questions raised by the Club of Rome's report have become more topical than ever. Progress and scarcity go hand in hand. An innovation appears and finds ever wider use, leading to increased demand for components and the materials of which they are made. AI and the microchips used to power it are a case in point. The story starts with silicon. This chemical element is abundant on our planet, accounting for a quarter of the weight of the Earth's crust. But making it usable for chip manufacture is a complicated process. Laborious refining techniques extract the raw element from quartz sand, culminating in the production of crystalline silicon in the form of cylindrical rods that are then cut into the thin wafers of which microchips are composed.

From quartz sand to microchip. It is a fine example of innovation and the way in which technological progress affects economic growth. History abounds with such examples, with raw materials almost always playing a central role. The relationship is vividly illustrated by the growth of per capita GDP in Great Britain over the last thousand years when juxtaposed with milestones in economic and industrial history (→ chart on page 4).

The time taken for per capita GDP to double has become progressively shorter and is now around forty years. Thus technological advance goes hand in hand with rising prosperity. Not only that; the two have a reciprocal positive effect, each strengthening the other. Not surprisingly, there is a theoretical model to explain why this is so: the growth model of the US economist and Nobel laureate Robert M. Solow (→ Telescope No. 8 "Workforce shortage").

// The growth of demand for metals has closely tracked the increase in GDP. //

Unleashed demand for energy

We can see this process in action if we look at the story of the spinning jenny, the revolutionary multi-spindle spinning machine invented in England in the 1760s. It led to the transformation of the textile industry and an explosion of demand for cotton. Whereas previously it took four to eight spinners to keep one weaver supplied with cotton thread, the spinning jenny reduced that number to one. But that was only the start. Soon people were wondering whether productivity could be improved still further. After the spinning jenny with its eight spindles came the spinning mule with 1,000 spindles powered by a steam engine – another epoch-making invention of the Industrial Revolution.

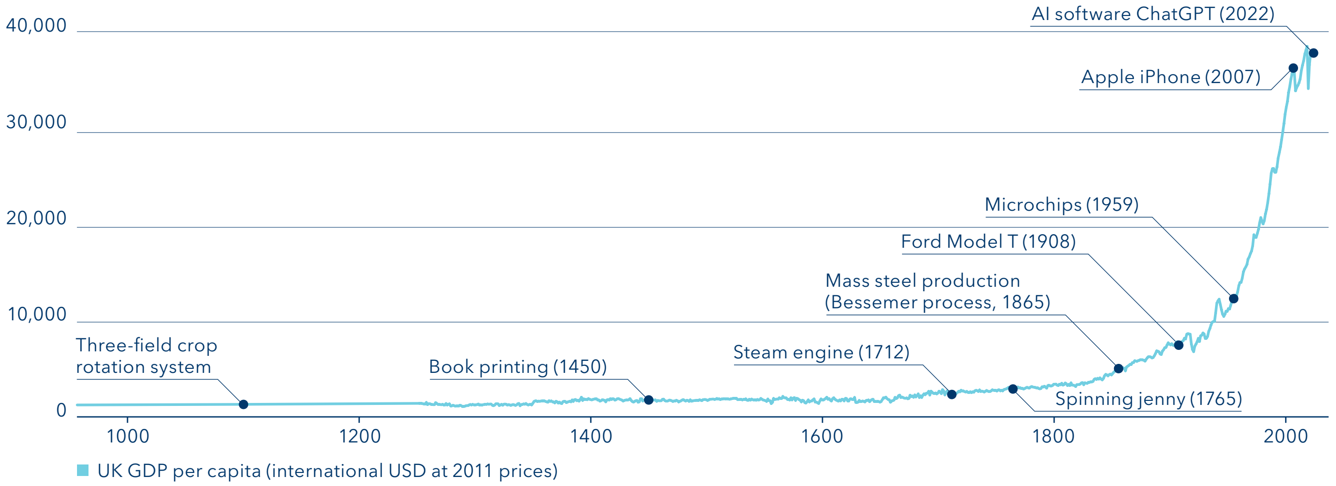
Steam engines typify a major factor in technological progress: energy. Whether it is the textile industry in the 18th century, the steel industry in the 19th century or the automobile industry in the 20th century, the breakthrough could not have occurred without energy. Energy sources have changed over time, but fossil fuels still dominate (→ page 16). But their deposits are not infinite, which was one of the reasons why the Club of Rome came to its conclusion about the limits to growth.

Simple principle, big effect

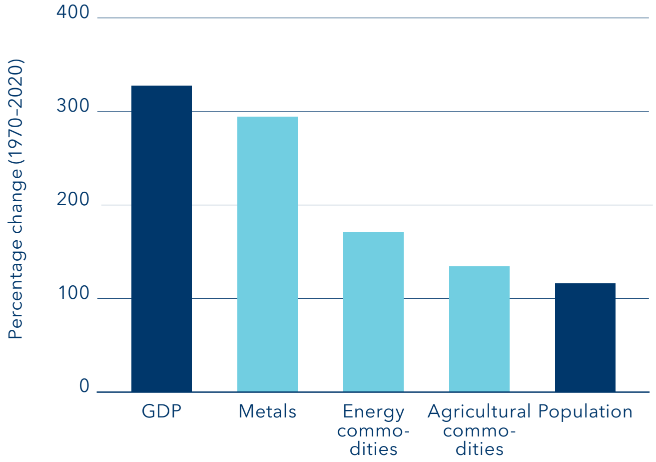
Strong demand for something that is in short supply tends to push up the price. That is a basic law of economics, and we can find numerous examples in the markets for raw materials. Take oil, for example. The uses of oil have multiplied, pushing up demand. The result is that a barrel of oil costs more today than a hundred years ago, even allowing for inflation. The price would probably be even higher without technological progress in oil extraction and in the manufacture of textiles, automobiles and other goods. A lot of industrial activity has become less energy-intensive over the years, and motor vehicles now consume less petrol than they used to.

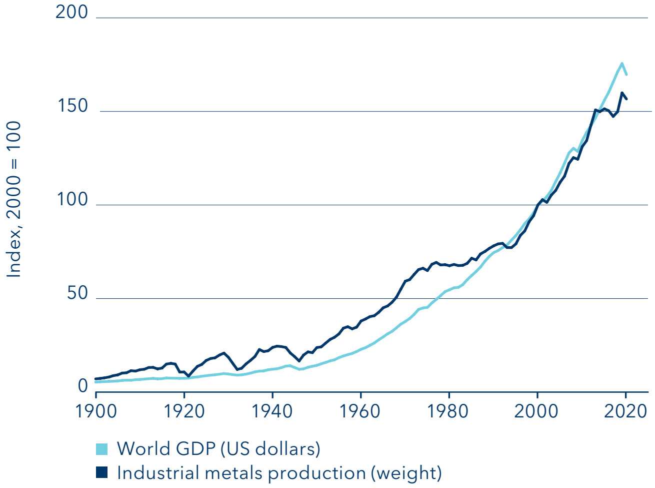
This explains why demand for energy in the period 1970 to 2020 climbed less steeply than overall demand in the world economy as measured by global GDP (→ left-hand chart opposite). The trends for other types of commodity have been different. The growth of demand for metals has closely tracked the increase in GDP, while demand for agricultural commodities, unsurprisingly, has mirrored the growth of the world population. The right-hand chart opposite traces the relation between global GDP growth and the production of industrial metals over a longer period, starting at the beginning of the last century.

GDP growth driven by innovation



GDP growth and commodity requirements





Interestingly, investments in the transition away from fossil fuels are likely to cause a structural rise in demand for industrial metals, which could therefore even outpace the growth of global GDP in the coming years. This is exemplified by demand for metals that are critical for electric vehicles and the generation of alternative energies, e.g. wind power. A typical electric vehicle contains at least twice as much copper as an average petrol-driven car, while an onshore wind turbine requires 2.6 times as much copper per megawatt capacity as a gas-fired power plant (→ page 13). As the production of raw materials usually reacts to rising demand only after a delay, upward pressure on prices could well be the result (→ page 7).

A small but important distinction

Rising demand, rising prices. Neither is a bad thing for countries that possess the raw materials concerned. That is why commodities are usually regarded as a blessing that benefits a country's prosperity. The announcement of the laureates for this year's Nobel Prize for Economics has highlighted this theme. Daron Acemoğlu, James Robinson and Simon Johnson have examined the proposition that countries with similar conditions – geographical position, climate, culture, religion and social institutions – should experience comparable economic development. The example of Sweden and Norway, where this was long the case, is frequently cited. In the mid-1970s, however, Norway started to take oil from the North Sea. Reserves were discovered in the early 1960s, and after the first oil crisis in 1973 it became economically viable to exploit them. The impact on the country's economic development is impressive (→ chart on page 6). Thanks to oil, Norway's per capita GDP has rocketed fourfold since 1975, whereas Sweden's has "only" doubled.

Greater prosperity thanks to natural resources sounds attractive, but a raw materials bonanza can have side effects. Take the Netherlands, for example. In the 1960s, after the discovery and development of the huge Groningen natural gas field, Dutch manufacturing industry was plunged into crisis. Gas exports spawned a large foreign trade surplus, the guilder appreciated and Dutch manufacturers' international competitiveness was seriously eroded. The Economist magazine unflatteringly called it the Dutch disease. Things were different in Norway, which tackled this problem at the outset by setting up an oil fund in 1990 to channel the country's oil export earnings into foreign investments.

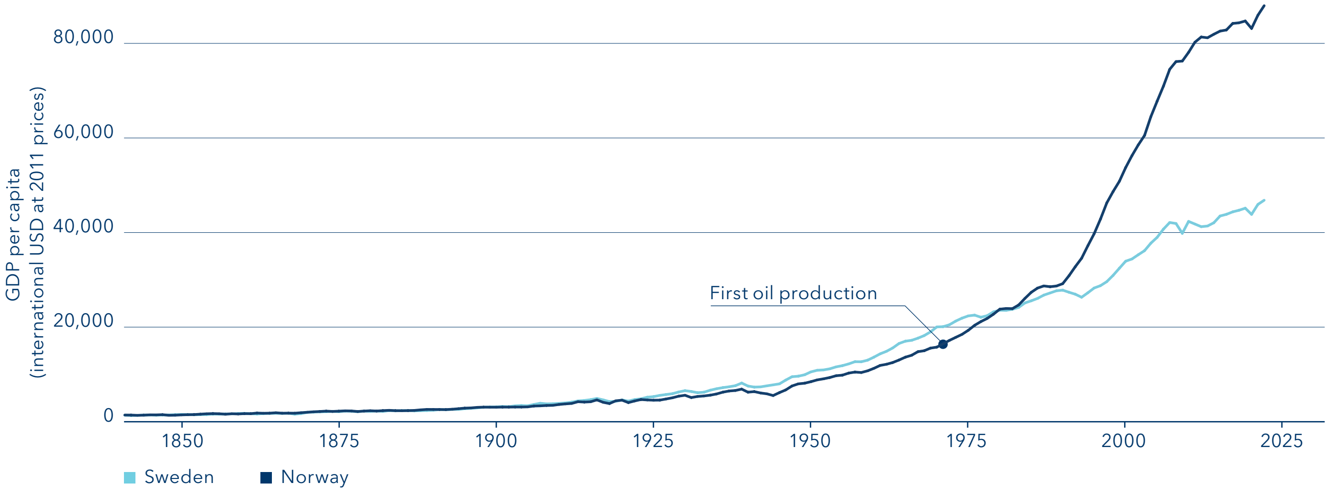
Strategic importance

Alongside the Dutch disease, the presence of abundant raw materials can also be associated with other undesirable side effects and risks. A study by three British academics in 2015 concluded that the probability of a foreign country intervening in a military conflict becomes greater if large reserves of oil are involved and the intervening country is oil-thirsty. Examples cited include the Soviet Union's intervention in Indonesia in 1958, Great Britain's in Nigeria

Three groups of commodities

- **Agricultural commodities:** plant and animal products like corn (maize), soybeans, wheat, coffee and even pork bellies.
- **Energy commodities:** these include coal, natural gas and crude oil.
- **Industrial and precious metals:** including copper, iron ore, nickel, aluminium and lithium as well as gold, silver and platinum.

A crude difference



at the end of the 1960s and the Gulf War at the start of the 1990s (USA in Kuwait).

Oil reserves still have enormous strategic importance. That is one reason why conflicts like that between Israel and oil-rich Iran cause such international anxiety. But in the modern age of digitalisation, artificial intelligence and green transition, oil has to compete with other commodities as a geopolitical force to be reckoned with.

Access to rare earths and other vital raw materials for the production of microchips and battery cells can be a key factor in deciding who sets tomorrow's agenda and reaps the rewards. The concentration of production is therefore cause for concern. According to the International Energy Agency (IEA), the three biggest producers of rare earths account for 92% of supply. For lithium and cobalt (both needed for the production of electric vehicle batteries) the figures are 90% and 85% respectively. Refinery capacity is also concentrated, notably in China. Thus a limited number of production locations and supply chains are becoming increasingly important. Quartz sand is widely available, but semiconductor production is heavily concentrated in Taiwan.

Raw materials therefore also have an important political dimension. The European Union (EU) has recognised this. Its new Critical Raw Materials Act is intended to reduce the EU's dependence on other countries, safeguard supply and bring a larger part of the manufacturing process back into the EU. The critical materials in question include lithium, cobalt and nickel. Climate objectives and digitalisation were the main incentives behind this initiative.

> // Abundant raw materials can be associated with undesirable side effects and risks for the countries that possess them. //

Price rules almost everything

In the raw materials sector, the basic economic principle linking scarcity and price leads directly to complex issues of geopolitical strategy and power politics. Prices cannot govern everything, but they are an important factor. If the price climbs sufficiently, either supply will grow or, if that takes too long, alternatives will be found that reduce dependence. Crises function as catalysts of change. Without the 1973 oil shock, North Sea oil would not have become profitable until later – or perhaps never. Here again we see the link between scarcity and progress.

Investors do not have to be passive spectators of events on the commodity markets (→ page 20). By investing in commodities they can take advantage of the fact that prices of scarce goods tend to rise as demand grows.

Pork cycle

Felix Brill

Supply reacts to price, but normally with a time lag. Cyclical fluctuations in the pig industry exemplify what happens in the commodity markets as a whole.

The iron law of a free market economy is simple and clear: prices bring supply and demand into equilibrium. If sellers have too much of something, they lower the price in order to stimulate demand. One-off special offers or year-end bargain sales in the apparel sector are conspicuous examples of how this is done.

Market equilibrium is not a permanent state. It describes the interaction between supply and demand at a particular point in time. If supply fails to react fast enough to a change in demand, the price will move. The German economist Arthur Hanau described this process in his paper entitled "Forecasting pig prices" published in 1928. He showed that a change in demand, caused for example by population growth or rising affluence, can push the pork market out of equilibrium and result in years of fluctuating prices.

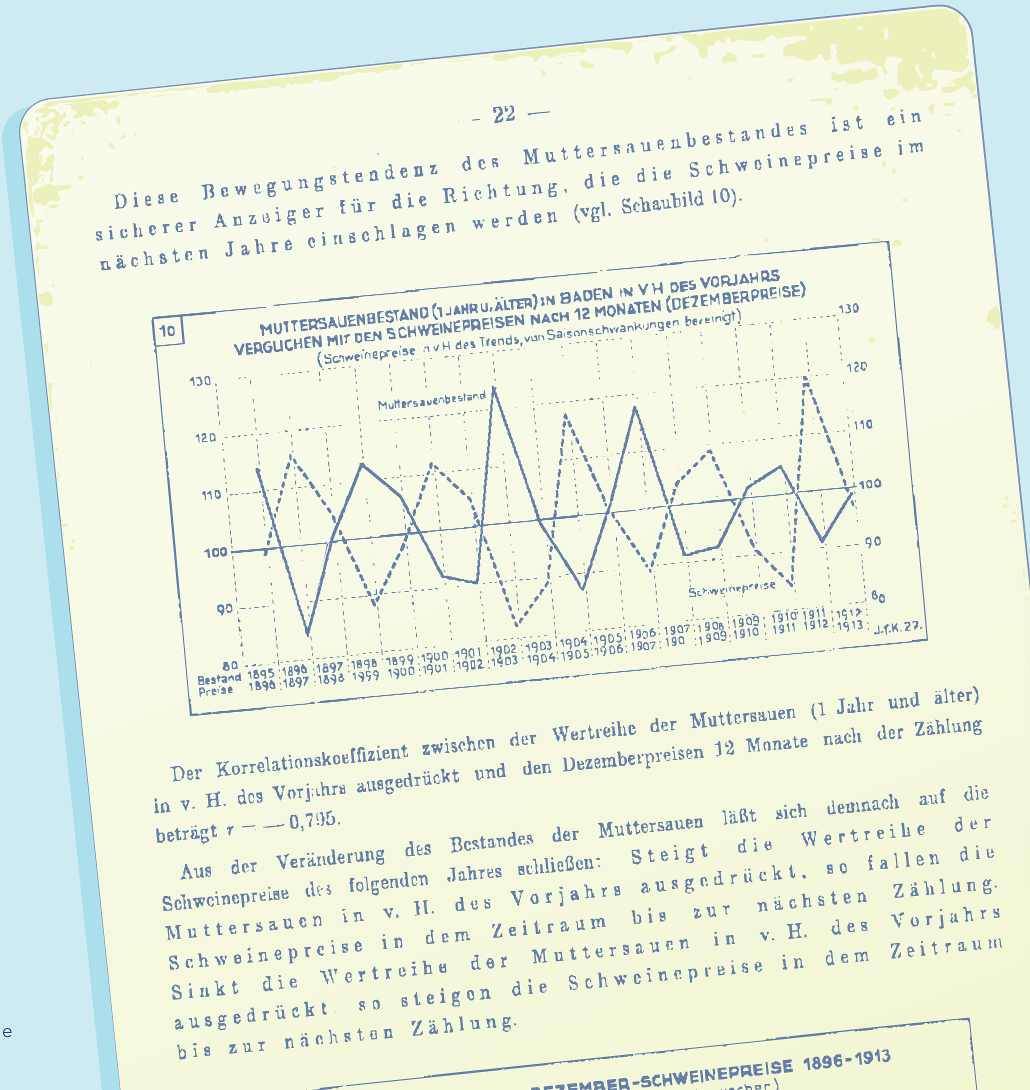
At first pig farmers merely see that demand for pork is going up. As the pig population cannot be increased immediately, the price rises. All else being equal (as economists are fond of assuming in order to keep their models simple), it then makes financial sense to rear more pigs. It takes about a year for the increased number of pigs to be ready for slaughter.

As all farmers have the same idea, a year later the market will experience a surge in pork supply. That usually means too much. The supply of pork outstrips demand, and the price falls. It suddenly becomes uneconomical to have so many pigs, and farmers react by slamming on the brakes and reducing their pig numbers. The following year therefore sees a fall in supply, and the price rebounds. The cycle starts all over again.

Almost a hundred years later, the pork cycle and its consequences as described by Hanau can still be observed – not only in the pork market but wherever an expansion of supply involves a delay. Capital investment and break-even points are important factors here. In the manufacturing sector, factories have to be built or repurposed before output can be increased. In the case of mineral commodities, new mines must be established in order to profit from higher prices. That takes time and money.

People are currently wondering whether sufficient industrial metals like nickel, cobalt and lithium can be produced to satisfy future demand in the wake of the revolutionisation of energy production. It is the same old story: as long as prices of these metals do not rise significantly, mining companies will wait before investing. Just as pig farmers do.

The picture below shows one of Arthur Hanau's original charts. The solid line is the number of breeding sows, and the dotted line represents the movement of pig prices.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Diese Bewegungstendenz des Muttersauenbestandes ist ein sicherer Anzeiger für die Richtung, die die Schweinepreise im nächsten Jahre einschlagen werden (vgl. Schaubild 10).

Der Korrelationskoeffizient zwischen der Wertreihe der Muttersauen (1 Jahr und älter) in v. H. des Vorjahrs ausgedrückt und den Dezemberpreisen 12 Monate nach der Zählung beträgt r = — 0,795.

Aus der Veränderung des Bestandes der Muttersauen läßt sich demnach auf die Schweinepreise des folgenden Jahres schließen: Steigt die Wertreihe der Muttersauen in v. H. des Vorjahrs ausgedrückt, so fallen die Schweinepreise in dem Zeitraum bis zur nächsten Zählung. Sinkt die Wertreihe der Muttersauen in v. H. des Vorjahrs ausgedrückt, so steigen die Schweinepreise in dem Zeitraum bis zur nächsten Zählung.

DEZEMBER-SCHWEINEPREISE 1896-1913

“Urban mining continues to grow”

Discarded electronic devices are a richer source of gold than a gold mine, says Jon Fanzun, CEO of Swico, the Swiss industry association for companies in the fields of information and communications technology and online services. Recycling of raw materials from waste electronic equipment also has important environmental advantages.

Interview: Clifford Padevit

The recycling of electronic devices in Switzerland is run by the private sector. The collection, transport, sorting and processing of waste appliances has been operated for the last thirty years under the aegis of Swico, which represents the interests of Switzerland’s software and hardware providers. The system is financed by an up-front recycling fee levied on the purchase price: ten Swiss cents for a smartphone and six Swiss francs for a laptop.

The recovery of recyclable materials in the urban environment is known as “urban mining”. It has huge environmental advantages. Since the Swico system was established 30 years ago, it has handled the recycling of metals weighing the equivalent of 51 Eiffel Towers.

Mr Fanzun, what sort of electronic devices are especially worth recycling?
All those that have a green circuit board. These printed circuit boards contain gold, palladium and other valuable substances. Large-scale disposals of old computer systems, for example when a computer centre replaces a whole batch of servers, are an especially fruitful source. But laptops and smartphones also contain many valuable materials.

What else do we get out of these devices?
Various industrial metals like iron, aluminium and copper. It’s fascinating to see how meticulously the devices are dismantled in the recycling process. Every gram of metal is recovered, right down to the last nut and bolt.

This form of metal recycling is known as urban mining. However, the quantities being recovered from electronic equipment are in decline. Why is that?
It’s true. The weight of processed electronic equipment in our system has been falling since 2012 and now amounts to around 40,000 tonnes a year. Television sets, for example, used to be much heavier. That is a major reason why recycled weight is falling. Miniaturisation plays a big part here. In fact, the number of devices that we recycle has risen. Households are using more and more electronic appliances.

What numbers are we talking about here?
The number of recycled devices has climbed continuously from about 7 million in 2012 to around 10 million in 2023. The annual increase is over three times the growth rate of Switzerland’s population.

Do you have data on the lifespan of electronic devices, for example mobile phones?
It takes about eight years before a smartphone comes to us. But this figure needs to be treated with caution. Many people hang on to their old phone when they buy a new one. And I imagine that the declining momentum of technological advance in the smartphone sector, combined with heightened awareness of sustainability issues, will encourage people to use the same phone for somewhat longer in future.

What is the recycling rate for all electronic equipment?
Over 90% of electronic devices sold in Switzerland end up in our recycling system. That’s a good rate. We believe this is only possible because the system is so easily accessible, with over 6,000 take-back facilities.

And what do you extract from your urban mine?
Over half of the retrieved volume consists of metals. Plastics and metal/plastic composites are also important. And we currently retrieve over 900 kilograms of precious metals a year.

What are these precious metals contained in?
Gold, palladium and silver are embedded in electronic circuit boards. From each kilo of recovered devices, we get around 18 milligrams of silver, 4 milligrams of gold and 2 milligrams of palladium. That is what makes urban mining so exciting. A tonne of smartphones yields 150 grams of gold, a much higher extraction rate than in a traditional gold mine, which might get 8 grams of gold per tonne of ore. So it's certainly worth going full circle and recovering precious metals in this way.

How does the cycle work?
The waste material is transported from collection points to sorting facilities. These facilities, many of which are welfare operations that give socially or physically disadvantaged people a second chance in the labour market, do the initial sorting. The material is then passed to one of nine certified recycling firms which handle mechanical recovery as well as the extraction and disposal of harmful substances.

That sounds like a lot of manual work.
At present that is the case, but artificial intelligence is increasingly being used to identify valuable substances. The challenge for recyclers is the diversity of the objects involved, from old cathode ray tube TVs to super-modern devices that they are seeing for the first time. How has the device been assembled? Glued or screwed? Innovation is essential here. That's where Gyro Gearloose comes in.

A Disney cartoon character? What do you mean?
Process engineers play a key role in the recycling business. These modern Gearlooses are masters at finding the best available technology for transforming the recycling process into a mining and refining operation. We have set up an innovation fund to encourage creative solutions in this field.

Do manufacturers do anything to facilitate recycling when they design their products?
Some do. One useful adaptation would be to use screws instead of glue. That would make dismantling easier. I believe that the trend towards a "circular economy" will eventually be reflected more strongly in the production process.

Consumers still get a new power cord with each device they buy, which is often unnecessary. Is that something that is being looked at?
In an attempt to reduce this proliferation of cables, the EU has specified that all portable electronic devices should be equipped with a USB type-C charging port. Switzerland will adopt this standard in 2026. That might help. Cables do not contain much in the way of useful recyclable material, so no recycling fee is charged on their sale.

Back to the recycling loop: does the final recycling happen in Switzerland?
In the case of iron recycling and thermal waste processing for energy recovery, the answer is yes. For other substances the task is taken over by specialist companies in Europe. They process the metals and put them back on the market.

How does urban mining perform with respect to CO_2 emissions?
Compared with primary mining, the saving is enormous. For precious metals the total reduction is 98%, mainly from gold. There are also substantial reductions on iron, aluminium and copper. The total saving of 40 tonnes CO_2 equivalent per year is equal to a third of Switzerland's total freight transport emissions.

And recycling and re-use versus manufacturing?
Research shows that manufacturing is by far the biggest cause of emissions, while emissions from recycling and energy recovery are almost negligible. Longer use of equipment is also an efficient way of reducing emissions. Swico is conducting a pilot project on the re-use of electronic devices. Ultimately it is a matter of closing the materials loop as tightly as possible so as to encourage the shift towards a circular economy.

Profile

Jon Fanzun, 54 years old and from the Swiss region of Engadine, has been CEO of Swico since August 2024. He was previously General Secretary of the Free Democratic Party of Switzerland (FDP), and before that he was Special Envoy for Cyber Diplomacy at the Federal Department of Foreign Affairs (FDFA) and personal assistant to two federal councillors in the FDFA and the Federal Department of Home Affairs (FDHA). He studied political science at the University of St Gallen in Switzerland, specialising in international relations and graduating with a doctorate.

Note: The opinions expressed in this interview may differ from those of VP Bank.

Higher output thanks to new mining methods

Picks and shovels are a thing of the past. Mining is now driven by modern technology. Techniques are becoming increasingly sophisticated, while the search for new deposits opens up adventurous horizons.

Jérôme Mäser

The quantity of a mineral that can be obtained from a mine with a given outlay of capital, labour, energy and other resources (e.g. water) has changed significantly over the decades. One problem is that the time taken to progress from geological exploration to actual production is getting longer and longer. Moreover, average ore grades, i.e. the proportion of usable mineral contained in the mined ore, have deteriorated. In other words, mines are extracting a rising volume of ore but getting proportionately less mineral. That also means that more energy and water are being used without a corresponding rise in income. Renaturation, i.e. the process of returning the mining site to its natural state, is also becoming more laborious and expensive.

The mining industry seeks to confront these problems with the help of technology and more sustainable approaches. But that is not enough. As has already happened in the oil sector, new extraction locations are being sought, e.g. beneath volcanoes, on the seabed or even in space.

In this article we look at four examples that illustrate what the future of mining might look like.

Smart mining

Digitalisation is key

Smart mining refers to the use of digital solutions across every phase of the mining life cycle. Automation, internet-linked equipment, virtual reality and artificial intelligence are key aspects here. New types of sensor and software can revolutionise the exploration process by speeding up the gathering, processing and representation of geological data. It currently takes a huge amount of time to progress from discovery to production. According to the market intelligence provider S&P Global, the average "lead time" during the period 2002 to 2023 was just under 16 years.

Once a mine is operative and metal can be extracted, autonomous machines and vehicles can be employed. That leads to enhanced productivity, reduced costs and improved safety. At the same time, intelligent and networked systems make the mining process less wasteful and more sustainable.

Green mining

Reducing emissions and exploiting volcanoes

Various metals have an indispensable role to play in the transition to greener energy, but the way they are mined attracts considerable criticism. Mining involves a huge input of energy and water and is destructive to the landscape. Metal recycling (→ page 8) can make a significant contribution to alleviating this environmental damage, but the volume of recyclable metal is not enough to cover demand. Chile, the world's leading producer of copper, aims to establish itself as a trailblazer in green mining, i.e. mining techniques that use ecologically sustainable technology. Mining companies are being encouraged to switch to solar energy and desalinated or recycled water.

// The asteroid Psyche could keep the world supplied with iron and nickel for millions of years. //

Volcanoes can also be mined for minerals. Scientists at the University of Oxford have developed a low-emission method of extracting copper, gold and lithium from hot metal-bearing fluids (volcanic brines) under dormant volcanoes. The process also involves the capture of geothermal energy, thereby drastically reducing the negative impact on the environment.

Deep sea mining

Harvesting mineral-rich nodules from the seabed

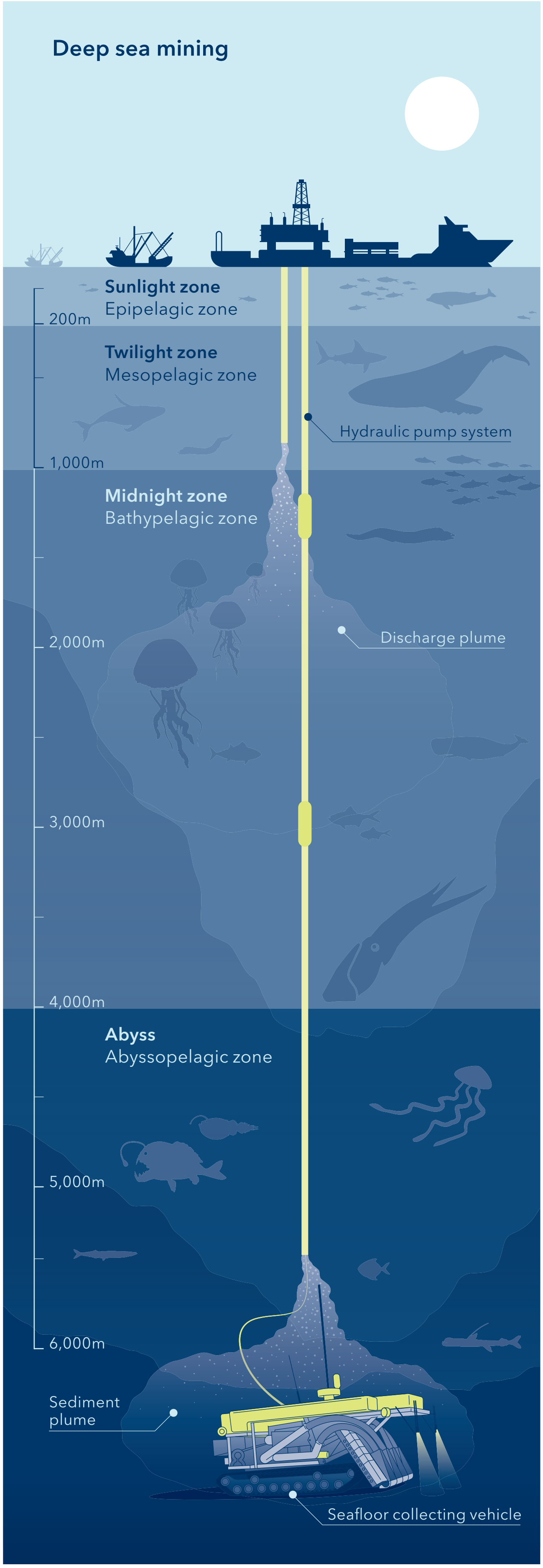
Offshore drilling rigs are an established method of extracting crude oil and now account for a third of global oil production. In view of the decline in the grade of terrestrial mineral ores, deep sea mining for metals could likewise become a viable technology.

The focus here is on deposits in the form of polymetallic nodules on the seafloor. These fairly small nodules can be collected by underwater vehicles down to a depth of 6,000 metres and pumped up to a ship on the surface (→ illustration). This technique is highly controversial, however, due to the resultant possible ecological damage and loss of biodiversity in the world's oceans. The International Seabed Authority (ISA) is responsible for activities in international waters and intends to publish rules for these activities by July 2025. Norway and Nauru are among the leading countries in this field.

Space mining

Mineral resources in space

When Mother Earth fails, humans look to the heavens. Space mining refers to the possible extraction of resources from celestial bodies: planets, moons and asteroids. Asteroids often contain high concentrations of iron, nickel and precious metals. The asteroid Psyche, for example, which measures over 200 kilometres across, contains enough iron and nickel to keep the world supplied for millions of years. In 2023 the US National Aeronautics and Space Administration (NASA) launched a mission to explore Psyche. Given the technological difficulties of extraction, transportation and energy supply, however, space mining is likely to remain a pipe dream in the near future. There are also outstanding ethical and legal issues. The Outer Space Treaty of 1967, which has now been ratified by 112 countries, states that space belongs to all the world's nations. Nevertheless, starting this year the Freiberg University of Mining and Technology in Germany is offering a bachelor's degree programme in space resources and space technologies.

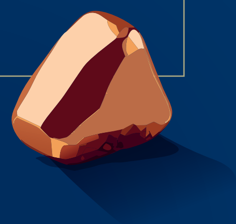


Irreplaceable copper

Copper is a key element in the energy transition. It is an essential component of all electrical devices, being much cheaper than other electricity-conducting metals, notably silver and gold. Thus the supply of copper is critical for electrification.

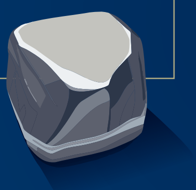
29 **Cu** Copper

$0.25 per ounce (28.3 g)



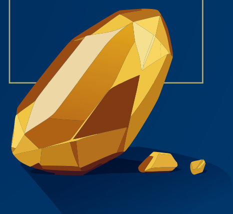
47 **Ag** Silver

$30.8 per ounce (28.3 g)



79 **Au** Gold

$2,621 per ounce (28.3 g)



How much copper?

A Boeing 747 200 jet contains **192 km of copper wire**

A 3 megawatt wind turbine contains up to **4.7 t of copper**

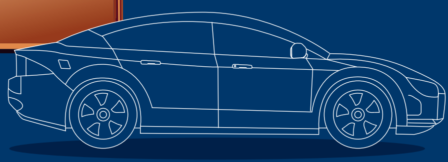
Air-conditioning for a single-family home contains **23.5 kg of copper**

A washing machine contains **2.2 kg of copper**

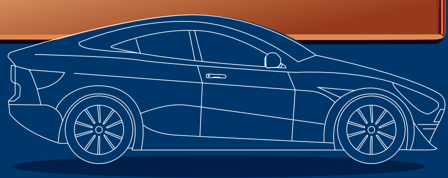
Copper content by type of vehicle

21.8 kg petrol-driven car

39.9 kg hybrid electric car



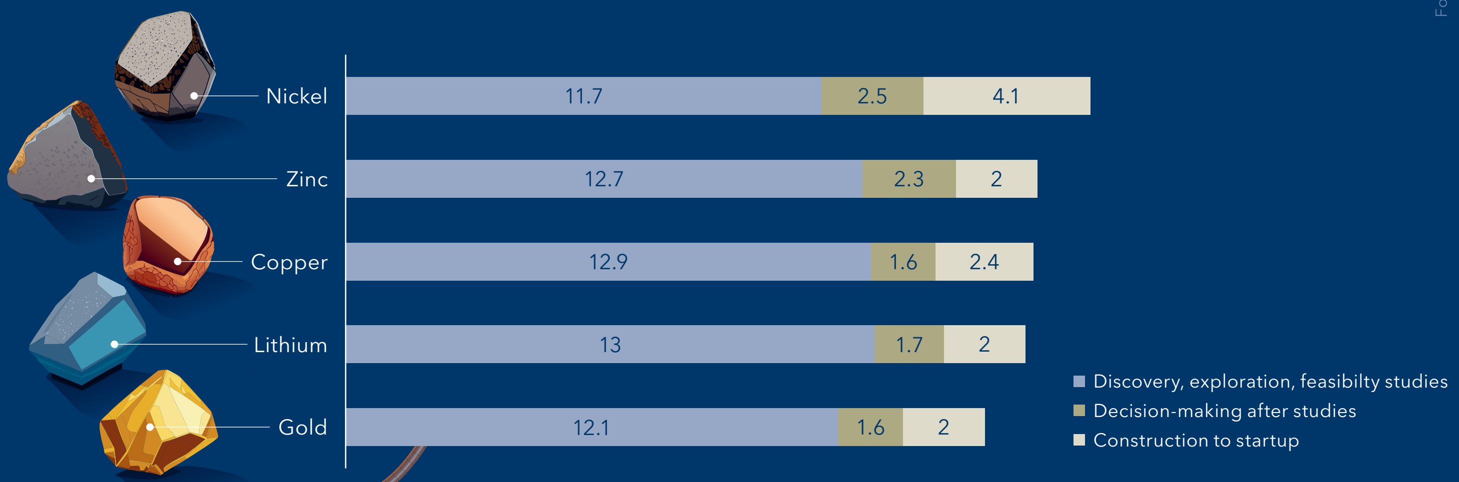
83 kg battery-operated electric car



Lead times in metal mining (phases in years)

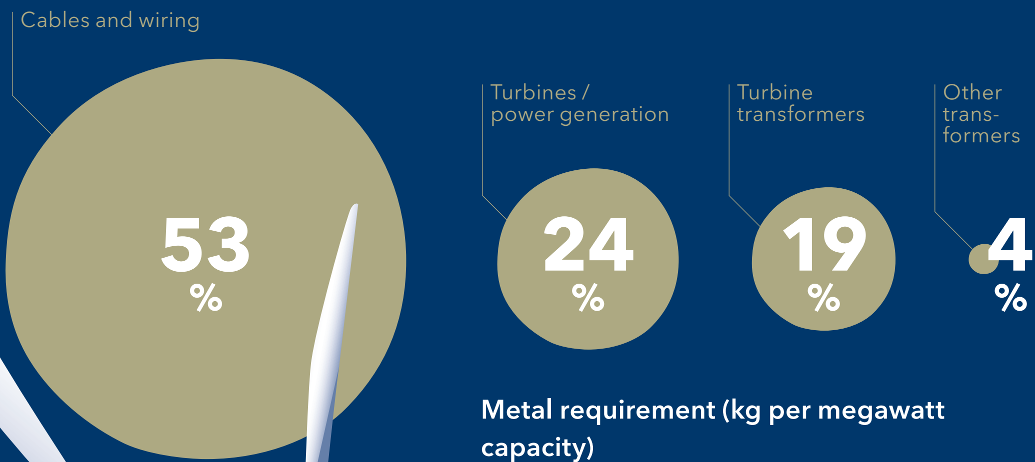
The average lead time for a metal mine, i.e. the time it takes to go from discovery to production, is now about eighteen years. Fifteen years ago it was only about thirteen years. The increase is partly due to more arduous financing and stricter rules on social and environmental effects.

For sources see page 24

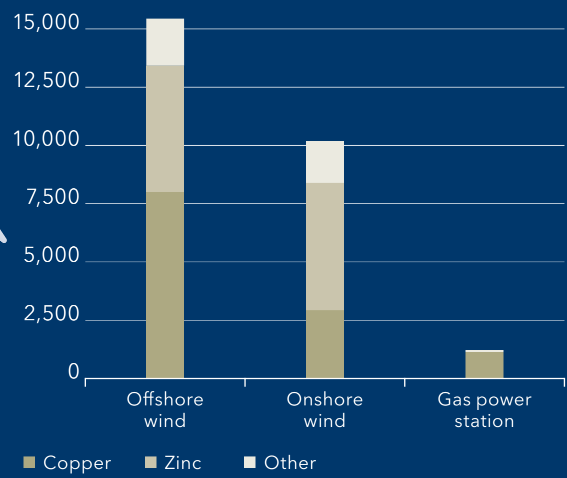


Copper in wind turbines

Copper is vitally important in wind energy technology. The largest part of the total input of copper is for cables and wiring. Offshore wind parks need much more copper than onshore parks.



Metal requirement (kg per megawatt capacity)



"I can do it because I want to"

Amruta Wyssmann knows no limits. That's what makes her one of the world's top paraclimbers.

Christina Strutz

Her big dream is to qualify for the 2028 Paralympics in Los Angeles. She trains hard, four to six times a week. But ambition can be a double-edged sword. Sometimes the wish to succeed has been so overwhelming that it made her sick in the stomach. Thanks to professional coaching she now has it better under control. "These days my ambition stays in my pocket and motivates me, rather than sitting on my shoulders and weighing me down."

Amruta Wyssmann was born in India without a left forearm. Adopted by a Swiss couple at the age of one, she grew up the mountainous Swiss canton of Grisons with her two sisters, who also came from India. Now 32 years old, she says that being with two siblings of the same origin made it easier to cope with being in a European family. A common heritage helps cement relationships.

Amruta developed a passion for sports early on, especially athletics, snowboarding and horse-riding. Her favourite was snowboarding, and her love of the snow is reflected in some of her many tattoos, like a snow crystal and the silhouette of an imaginary mountain chain.

After a commercial apprenticeship, she worked for over ten years in the catering sector. The working hours helped her combine snowboarding and earning a living, with time off during the day when she could pick up her board and do her stuff on the slopes. Catering work can be hard and exhausting, but it taught her some crucial lessons: "I no longer put up with whatever comes. I have more stamina, am more assertive and at the same time more able to read people correctly," she says.

It was six years ago that she discovered climbing. Her enthusiasm for it developed into a passion that was sometimes overwhelming, but it soon paid off. In May 2021 she became the first ever female member of the Swiss national team and has stayed in the team ever since. She has competed in several world cups and came eighth in her category in the 2023 IFSC Paraclimbing World Championships. Her eyes are now set on an even higher goal: the Paralympics.

Amruta laughs a lot, and yet there are days when she does not feel like laughing at all – when she has back pain, for example, or has slept badly; or when she simply has too much on her plate. But that does not distract her from her big objective. She copes with these situations by letting her emotions fly free. And if that doesn't work, she trains so hard that her whole body aches. That leaves no room for black thoughts, and she starts laughing again, this time at herself.

Stares and remarks in the climbing gym are something she has got used to. Prejudice-driven reactions are now much less common, although public attitudes are still not what she thinks they should be. These days she tries to understand people and educate them. She explains that life with only one arm is not as bad as it looks. It was different when she was a child. She used to get offended, sad and angry.

Amruta now works in the membership service of the Swiss Alpine Club. What with work and training, she has little free time. So genuine relaxation is important. Her favourite recreation is intensive cooking, sometimes for a half or whole day. Reading, too, helps her unwind. Her favourites are fantasy novels that transport her into other worlds and giver her mind free rein to wander. Competitive climbing involves a lot of travel in Europe and takes up most of her holidays. She dreams of experiencing the world beyond climbing gyms and athletes' accommodation. She would love to explore new horizons, go to Japan and New Zealand. And she will do it – because she wants to.

My best investment

"The 24 Swiss franc **entrance fee** for my first ever visit to a climbing gym – six years ago on the recommendation of my best friend."

My worst investment

"Every single **cigarette** I've ever smoked. I was 17, rebellious and thought it was cool."

Consequences of the energy transition

The transition away from fossil fuels makes us more dependent on other resources. Raw material prices and the availability of critical metals are major factors here alongside the financing aspect.

Jérôme Mäser

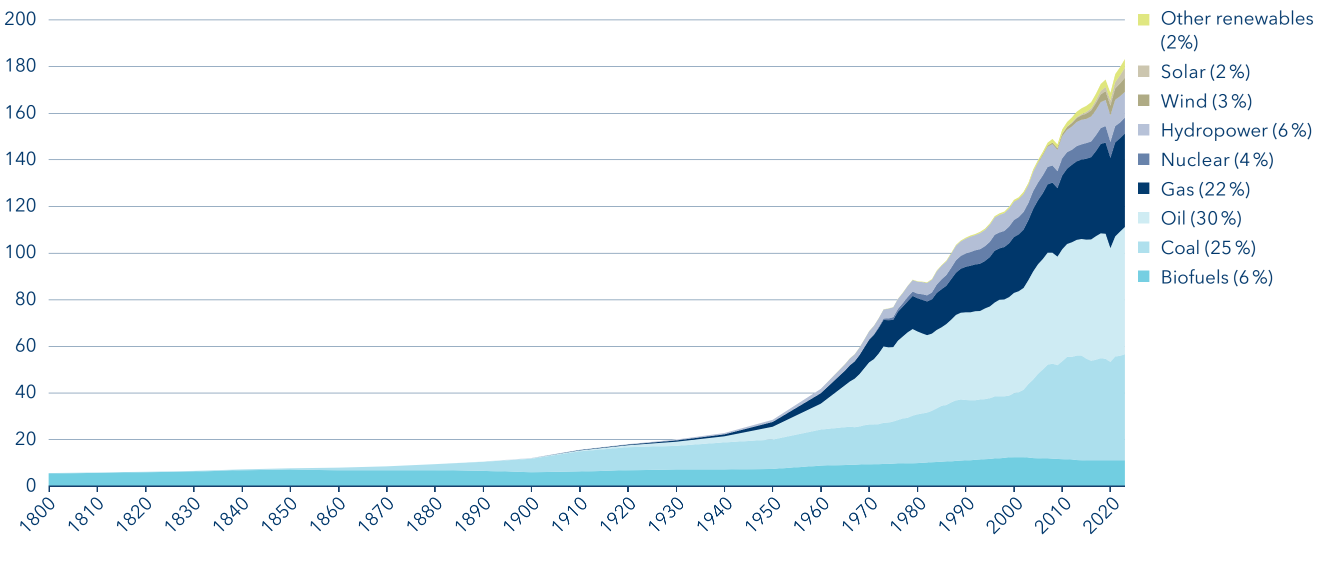
The world is thirsty for energy. Demand rises incessantly, now driven also by new technologies like digitalisation, cryptocurrency trading and artificial intelligence, which turn out to be gobblers of electric power. This is not the first time in human history that innovation and growth have generated increased demand for energy. Energy consumption exploded in the wake of the Industrial Revolution and was further boosted by the growth of shipping, the advent of air travel and the expansion of private car ownership after World War II.

The global energy mix has since been dominated by fossil fuels (→ chart below). Oil was a driving force behind globalisation, while natural gas has assumed a major role in heating and power generation. Coal, too, is still important in the electricity sector. These three fossil fuels are attractive because extracting them is relatively cheap. They are available worldwide and have many applications. Thanks to these qualities they have made a vital contribution to prosperity, progress and society's growing energy use. According to a study by the Organisation for Economic Co-operation and Development (OECD), in the wake of the Industrial Revolution the percentage of human beings living in extreme poverty has fallen from 75% in 1820 to 10% today.

How much longer?

About three-quarters of the world's energy needs are currently met by fossil fuels. Their future role is uncertain, however. Fossil reserves are, by definition, finite. And crucially their use creates huge amounts of pollutants, notably CO_2, which are harmful to the environment. Knowledge of the resultant greenhouse effect is nothing new, but for a long time the phenomenon was ignored. The building of carbon-neutral hydroelectric and nuclear power plants proceeded only hesitantly. The development of hydropower has been especially slow due to its specific

Global energy consumption by source (in thousand terawatt-hours)



geographical requirements. Thus there has been more emphasis on nuclear power, because the fuel involved – uranium – offers an extremely high energy density.

A comparison with petrol will illustrate this. A car can travel about 20 kilometres on a litre of petrol, whereas a kilogram of uranium theoretically provides enough energy to travel more than 1.77 million kilometres. That is twice the distance from the Earth to the Moon and back. Even so, the problem of the final disposal of nuclear waste and the potential for catastrophic effects in the event of a reactor failure has meant that nuclear power has remained peripheral in the global energy scene.

Growing awareness of climate change and its effects has resulted in a shift of focus. Wind and solar energy have become competitive in recent years and are now emblems of a carbon-neutral future. But despite the ambitious official goal of achieving net zero by 2050, the contribution of green energy is still small.

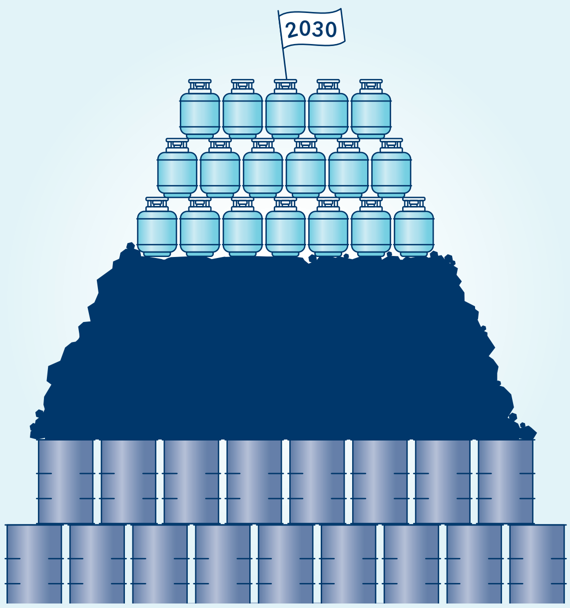
Thus a rapid energy transition does not seem to be on the cards. Even so, it is estimated that the coming decades will see a decline in demand for fossil fuels for the first time in human history (→ infobox right). It is no surprise that the transition is taking so long. History shows that moving away from established energy sources is a sluggish process. And there are also specific reasons why the green revolution is not happening faster.

High prices are painful but helpful

Switching away from cheap fossil fuels is a huge challenge. Demand for energy is still on the up. Per capita energy use has risen two and a half times over the last hundred years and is now around 22 megawatt-hours a year (1 MWh would power around 1,330 dishwasher cycles). Energy consumption is being pushed up not only by population growth and increased economic activity but also by digitalisation and artificial intelligence. According to the International Energy Agency (IEA), however, the growth rate has been slowing recently thanks to technological advances, efficiency improvements and higher productivity in the services sector of the industrialised countries.

The main factor behind the ongoing growth of energy consumption is increased affluence and population growth in the emerging and developing countries. That will cause the global thirst for energy to continue to rise until 2050. Data from the US Energy Information Authority (EIA) and the World Bank show that higher economic output per person goes hand in hand with disproportionately higher per capita energy consumption. Per capita GDP in higher-income countries is 27 times greater than in lower-income countries but energy consumption is 46 times higher (→ chart page 18). Thus the energy infrastructure will still have to be substantially enlarged.

But that is not all. Reducing dependence on fossil fuels will involve the increased electrification of energy supply. And that is no small deal given the costs of new and revamped infrastructure, notably power plants, buildings, transport and manufacturing facilities. Cost estimates vary greatly, ranging from USD 100 trillion to 300 trillion by 2050. Annual global GDP at present is around USD 100 trillion. Accomplishing this restructuring process and making the necessary investments will not only require huge financial outlays and firm resolve on the part of



Close to the fossil peak

The share of fossil fuels – coal, crude oil and gas – in the global energy mix has edged down from 80% to 77% over the last ten years. The fall is due largely to reduced use in the industrialised nations, thanks to investment in renewables, increased efficiency and the reduced share of manufacturing in these economies. But the growth of fossil fuel consumption in the emerging and developing economies continues apace. Per capita consumption of such fuels in those countries is only half as high as in the industrialised world. If it were at the same level, global demand for fossil fuels would be almost twice as high as it is now.

Nevertheless, the latest edition of the International Energy Agency's World Energy Outlook reckons that demand for coal, oil and natural gas will peak before the year 2030. Others are less optimistic, including the US bank Goldman Sachs, which puts the peak for crude oil five years later and natural gas five years after that.

policy makers but will also depend on high energy prices and low metal prices. The dynamics of supply and demand are an obstacle here. Fossil fuels are still cheap and therefore attractive in comparison with renewables. That will delay the necessary investment in alternatives. At the same time, political initiatives for meeting 2050 climate targets are pushing down demand for oil and oil derivatives and thus dampening their price, thereby putting a brake on the transition process.

Meanwhile, demand for the metals and rare earths that are vital for the development of alternative energies is growing. This applies especially to copper, nickel and lithium, which are critical in this context. A megawatt of output capacity in an offshore wind turbine requires 8,000 kilograms of copper. The corresponding figure for a gas-fired power station is only 1,100 kilograms (→ infographic on pages 12/13). But the supply of these critical materials (the extraction and processing of which require a huge input of energy and water and are therefore not without controversy) will grow only if prices climb, as in the example of the pork cycle (→ page 7). Only then would the necessary investment be worthwhile.

Fossil fuels still dominant

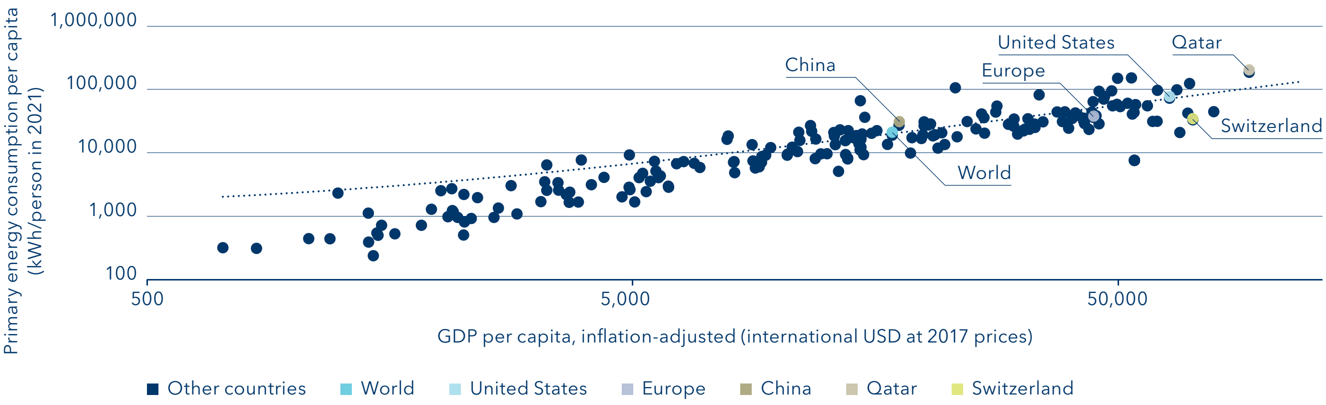
In addition to more efficient production techniques and the expansion of distribution networks, it will also be necessary to find cost-effective ways of storing renewable energy. This is a huge challenge for suppliers. The energy output of solar and wind installations is highly variable and cannot be accurately forecast. It can cover the base load but is unsuitable for meeting peak period demand, which requires flexible and reliable sources. Alongside nuclear power stations, which offer flexible output but require uranium as a raw material, the most efficient solution so far is to store surplus energy by means of pumped storage hydropower. However, this technology involves an energy loss of around 10% and requires special geographical conditions.

Over the past decades some industrialised nations have shown that a transition to more environmentally friendly energy sources can be achieved fairly quickly. France opted for an expansion of nuclear power, while Great Britain switched from coal to gas. Globally, however, this is unlikely to happen. In the energy sector, the world is split into two camps: the industrialised nations on one hand and the emerging and developing nations on the other. Outside the industrialised world the demand for cheap energy continues to grow. Thus fossil fuels will continue to dominate the energy mix for some time to come and compete with renewables for investment input. Emissions from fossil fuels are not going to disappear overnight. Even so, carbon emission per dollar of economic output is on the decline, even in China.

Nuclear power is still the most stable and efficient carbon-free alternative to fossil fuels. However, according to the IEA's net zero roadmap it will account for only about 11% of the energy mix by 2050. A breakthrough in the field of small modular reactors (SMRs) could change that, enabling nuclear energy to play a more important role again in countries that apply SMR technology. An example of the nuclear rethink is provided by Microsoft, which recently decided to reactivate the mothballed Three Mile Island nuclear generating station in Pennsylvania in order to meet the growing demand for energy in the field of artificial intelligence.

Solar and wind are still on the advance. The IEA's net zero scenario sees them possibly accounting for 36% of the global energy mix by 2050. The related infrastructure investments would not only help cut emissions but would also be positive for metal producers. To put it another way, demand is shifting from one commodity to another. For a long time coal was king, but the crown could soon pass to others.

Increasing wealth lifts energy consumption disproportionately (logarithmic scales)



Explosive philanthropist

Alfred Nobel devoted his life to research into explosives and made his fortune with dynamite. Nobel laureates benefit from his success.

Clifford Padevit

Nobel's younger brother Emil and four employees were killed in an explosion in 1864. The accident resulted in the banning of experiments with nitroglycerin within the City of Stockholm. But that did not stop Alfred Nobel. He was fascinated by explosives. A year earlier he had invented a detonator, later followed by a blasting cap designed to make the use of explosives in tunnel making and mining safer. Nobel found out how the high explosive nitroglycerin could be made more stable and manageable by the addition of other substances. The result was the invention of dynamite, a much more powerful explosive than the previously used gunpowder. Nobel was the first to manufacture dynamite industrially.

There were several factors that turned Alfred Nobel, born in 1833, into an explosives expert. His father Immanuel was an inventor who went bankrupt and then tried his luck in St Petersburg, where he manufactured explosive mines for the Russian military. Alfred learned the basics of chemistry from him, while his general education was in the hands of private tutors. In 1850 he left Russia and spent a year in Paris, where he worked in a laboratory and met Ascanio Sobrero, who had invented nitroglycerin in 1847 by treating glycerol with a mixture of saltpeter and sulphuric acid. Sobrero thought that nitroglycerin was too unstable and dangerous to have any practical application. Nobel changed that – to Sobrero's chagrin.

The invention of dynamite came in 1866. By that time Nobel's workshop was on a raft in the middle of the River Elbe in the city of Geesthacht near Hamburg – his factory in Geesthacht had gone up in flames. On the raft he mixed liquid nitroglycerin with a powder called kieselguhr, a form of silica composed of the shells of microscopic aquatic plants. Kieselguhr had previously been used as a storage medium for blasting oil. Whether it was a chance discovery is not known. The resultant elastic explosive substance did not react so sensitively to vibrations and could therefore be more easily transported.

Nobel patented his invention in a number of countries. Together with the almost simultaneous invention of the pneumatic drill, dynamite contributed importantly to the construction of roads, railways and mines, making such work cheaper and safer. It was famously used in the construction of the Panama Canal and the Gotthard Tunnel through the Swiss Alps. Armed forces also had an obvious interest in Nobel's dynamite sticks, as did numerous assassins.

The industrial success of dynamite laid the foundations of Alfred Nobel's fortune, which still exists today. The whole world partakes of Nobel's bequest every December when the Nobel Prizes for Physics, Chemistry, Physiology or Medicine, Literature and Peace are awarded. Nobel established the prizes in his will, which was contested unsuccessfully by relatives: "The capital […] is to constitute a fund, the interest on which is to be distributed annually as prizes to those who, during the preceding year, have conferred the greatest benefit to humankind." There has been much speculation about his motives, but they remain unclear. Alfred Nobel, who never married, died on December 10, 1896. Since 1901 the Nobel Prizes have been awarded every year on the day of his death, augmented in 1969 by the Economics Prize donated by the Swedish central bank.

To meet the huge demand for dynamite, Nobel built a network of factories and marketing companies in Europe in the 1870s and 1880s and later also in the USA, where Dyno Nobel continues to manufacture explosives for civilian use. Nobel continued to develop and refine explosives throughout his life. At his death he held more than 350 patents.

In a class of their own

It pays to include commodities in an investment portfolio. But this asset class is special in many respects. Here we look at various ways of investing in the commodity markets.

Clifford Padevit

Key characteristics

Advantages

Inflation hedge: A look at the Bloomberg Commodity Index (BCOM) shows that commodities have fared well during periods of high inflation. The index drifted sideways during the five low-inflation years up to 2021 but subsequently climbed as inflation accelerated.

Diversification: Portfolio fluctuations can be reduced by including asset classes that behave differently from the core components of the portfolio (equities and bonds). Commodities meet this criterion. Their correlation with equities is low, and with bonds it is even lower.

Disadvantages

Investment costs: Commodity investments involve special costs, notably rollover costs when a futures contract is renewed, or storage and perhaps minting costs (physical precious metals). Such costs can be reduced by choosing an appropriate form of investment, but they cannot be avoided completely.

Volatility: Commodity prices can fluctuate strongly. The price of crude oil, for example, frequently reacts to geopolitical uncertainty in oil-producing countries. Prices are normally determined by supply and demand. If supply cannot keep up with consumption, the price will rise.

Basics: how futures work

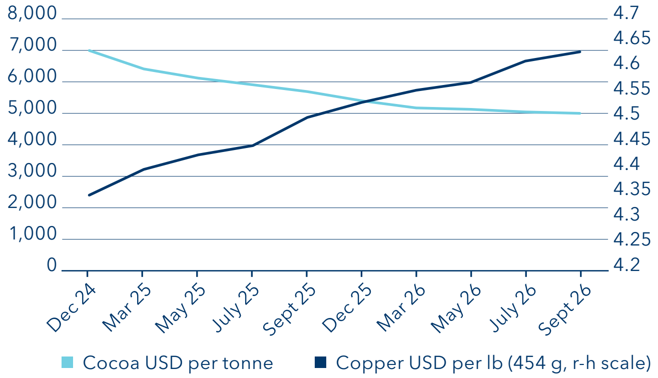
Anyone thinking of investing in commodities should familiarise themself with the futures markets. **Futures** are exchange-traded financial products that originated in the agricultural sector. A producer sells his harvest in advance so as to get an assured price at delivery, while the buyer knows in advance what the purchase will cost. Both are therefore detached from the market price when the future delivery takes place. Commodity futures are contracts for standardised quantities and qualities (e.g. Brent crude oil) and have a limited lifetime. An iron ore contract, for example, might say iron ore 62% Fe June 2025, meaning that the ore contains 62% iron and the contract expires next June. When the future expires it is settled in cash. What matters then is the difference vis-à-vis the current market price (spot). Or the contract can be sold before expiry.

To maintain a continuous position in a commodity, a contract has to be closed shortly before expiry and a new contract opened with a later expiry date. This process is called rolling over. If the price of the new futures contract is lower than the old one (see the futures curve for cocoa below), the investor makes a profit; if it is higher (copper, below), the result is a cost. "For long-term investments, this factor should not be underestimated," says Viktor Beck, investment fund specialist at VP Bank.

1. Physical investments

Physical investments in the commodities markets are possible in the precious metals sector. Investors can gain an exposure by buying bullion or coins. "The price at which gold is bought and sold is the spot price per ounce. If you buy a gold coin, for example, this is what determines the price," explains Jérôme Mäser, equity analyst and commodities expert at VP Bank. Another possibility is to invest in a gold or silver mutual fund, i.e.

Futures curves (copper in contango)



a fund that invests its assets in precious metals. "Some of these funds offer to settle with investors by making payouts in the form of bullion," says Beck. However, such funds are not permitted in all countries.

2. Certificates

Investors can find it impractical to take positions in the futures market on their own account. Banks and other financial service providers therefore offer exchange traded products called certificates, which offer exposure to a single commodity or a commodities basket. The special structure of these instruments is a response to the regulations on collective investments, which limit the concentration risk in a way that would not be feasible for individual commodities. An example is VP Bank's "Responsibly Sourced Gold" certificate, which is classed as an exchange traded commodity (ETC). "It is important to know," explains Beck, "that certificates can be structured in such a way as to offer investors a high degree of security and address all the risks involved." Another such product is WisdomTree's Energy Transition Metals, which tracks a specific index.

3. Index-based investments

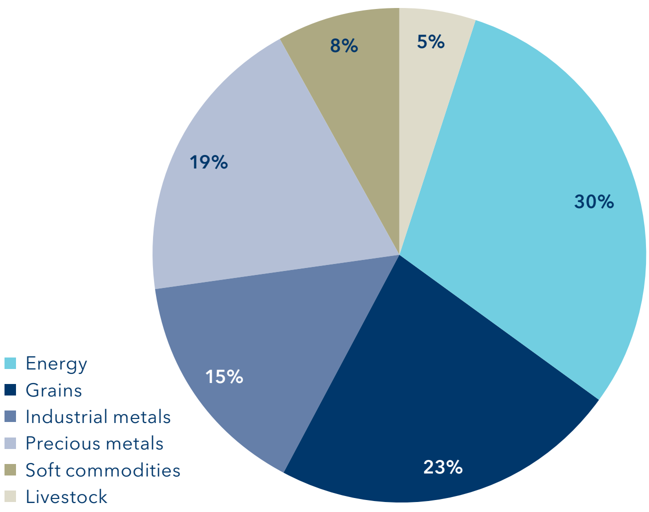
Indices that mirror the commodities markets and are investable via exchange traded funds (ETFs) have been part of the investment landscape for many years. But there are important differences between one index and another. The S&P GSCI, for example, has a 60% weighting in the energy complex, whereas the Bloomberg Commodity Index is more evenly spread (→ chart). Rollover costs (see above) affect the performance of index-based investments. "But there are also products that optimise the rollover costs," explains Beck. These include two products that VP Bank currently recommends, one from Goldman Sachs and the other from UBS. The latter has a rather different approach to defusing the rollover cost problem, but the aim is ultimately the same: to enable investors to profit from price movements.

4. Equities

A commodities exposure can also be achieved via equity investments. There are various possible approaches, as equity analyst Mäser explains. "We recommend several mining firms but also firms that sell services and equipment to mining companies." Mining firms do not limit themselves to just one commodity. The British and South African company **Anglo American**, for example, makes its money mainly from copper, iron ore, coal and diamonds. The Australian firm **Rio Tinto** is active in the mining of iron ore, bauxite, copper and titanium. Oil companies are also diversified in the sense that they produce not only crude oil but also natural gas. Moreover, their business models usually include not only extraction but also refining, transport and petrol pump sales. Examples are **Equinor, BP** and **Total**. "Mining and oil companies naturally benefit when the price of their products rises," says Mäser, "but other factors are also important. How much useful ore does a mine yield? How productive are the firm's oil fields? How high are the extraction costs? How large are the confirmed reserves?" A special case in this sector is **Norsk Hydro**. This Norwegian company covers the whole aluminium value chain, from the mining of bauxite to refining and the production of finished aluminium in various forms.

Among suppliers to the mining industry, VP Bank recommends three shares in particular. The engineering firm **Sandvik** supplies mining machinery and is increasingly involved in the provision of digital solutions that enhance mines' safety and efficiency. **Metso** offers a range of equipment for metal ore mining companies, including conveyor belts and crushing machines. And **Subsea 7** operates a fleet of marine vessels for the exploration of new oil and gas fields. "These shares are exciting, but they depend on capital spending by raw materials producers," says Mäser. Oil and mining companies typically invest on a large scale only when the price of their products is high.

Bloomberg Commodity Index (target weightings 2025)



New in VP Bank's Strategy Fund portfolios

Demand for **industrial metals** will continue to grow. This provides an opportunity for long-term investors. The VP Bank Investment Committee has therefore decided to include industrial metals in the strategic asset allocation under the heading alternative investments. This does not affect the allocation in gold, which not only serves as a diversifier but also made a significant contribution to performance in 2024.

Little giant

Switzerland is a global trading hub for physical raw materials and gold. How come?

Clifford Padevit

Fewer than ten million inhabitants. Lots of mountains and water, but nothing to suggest that this country was destined to become a major player in global commodities trading. Indeed, few people would associate Switzerland with this sort of business at all.

Figures from the Swiss commodity trading association Suissenégoce show how important Switzerland's position in commodities dealing has become. 65% of global cotton trading, 60% of trade in metals and wheat, 55% of traded coffee and four out of ten traded barrels of oil are transacted via Switzerland. The volumes and the range of commodities involved are truly amazing. Significantly, the oil and industrial metals trading company Glencore, founded in the city of Zug in 1974, has a larger business volume than any other firm in Switzerland, and close on its heels comes Vitol, the world's biggest independent oil dealer. Cargill, one of the world's major suppliers of wheat, oilseed and other commodities, established its trading arm in Geneva back in the 1950s.

Key player

Officially, something over 700 commodity dealers are headquartered in Switzerland, most of them in Geneva and Zug. But it would be wrong to think that the commodities being traded pass physically through Switzerland. In practice, they go directly from the production site to the buyer. Even so, this transit trade is economically important. Net sales, i.e. goods sold minus goods bought, contribute to Switzerland's current account. The latest figures tell us that net income from transit trade, two-thirds of which pertains to commodities, accounts for around 8% of Switzerland's GDP.

The trading process is different for gold. In this case the physical metal is imported, refined, processed (watch and jewellery sectors) and exported again. 34% of refined gold worldwide comes from four refineries in Switzerland. About a quarter of the country's total imports and exports consists of gold.

So what does Switzerland have that others have not?

Market access: Switzerland is a politically stable and neutral country. Until 2002 it was not even a member of UNO. It had also stayed outside UNO's predecessor, the League of Nations formed in 1920, even though the League's headquarters were in Geneva. Among those attracted by Switzerland's position as a safe haven were the Egyptian cotton merchants who decamped from Nasser's Egypt in the 1960s and set up shop in Geneva.

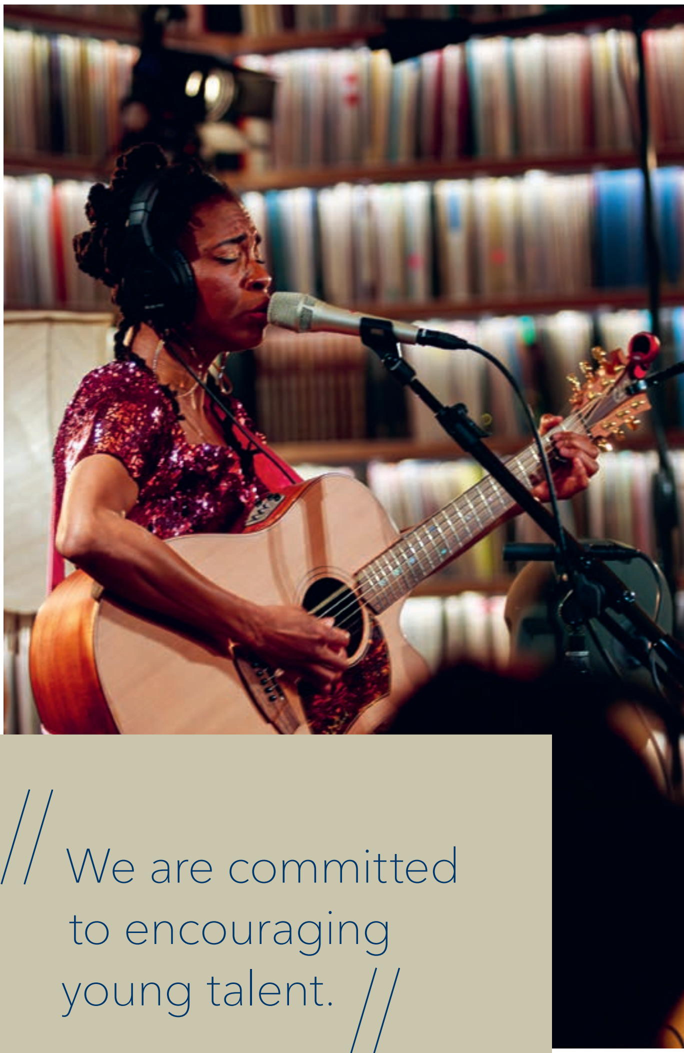
Tax advantages and financing: For many years trading companies and holding companies enjoyed tax privileges in Switzerland. The main attraction, however, was that after World War II there were no Swiss controls on capital movements. The Swiss franc was freely convertible. Added to that was the reliable availability of finance. Looking at Switzerland's illustrious banking system, traders knew that they were in competent hands.

Geography and specialisation: Switzerland is located at the heart of Western Europe. The Orient Express from London to Istanbul had a stop in Lausanne. Also helpful was the presence of the food multinational Nestlé, founded in 1866, which is a major buyer of wheat and coffee. The presence of large trading companies in Switzerland since the 1850s ensured that there was no lack of specialised service providers such as insurers, inspection agencies and logistics firms.

The question of transparency

Commodities trading involves issues concerning the transparency of delivery chains and origin. Switzerland's authorities have understood the importance of this. Commodities often become a plaything of global politics, especially where sanctions are involved. This was seen recently after the Russian invasion of Ukraine. G7 countries were soon accusing Switzerland of doing too little to enforce sanctions against Russia. The fact is, however, that Switzerland is implementing the sanctions imposed by the European Union (EU) even though it is not a member.

The image of Switzerland as a country of mountains, banks, cheese and chocolate is not a false one. But the cliché needs to be augmented by emphasis on the country's importance as a trading hub for commodities.



VP Bank Demo Tape Sessions

Tamara Spiegel

> // We are committed to encouraging young talent. //

Music plays a big part in VP Bank's sponsoring activities. As a co-sponsor of the "Demo Tape Sessions" project run by LITTLE BIG BEAT (LBB), we support talented artists in their exciting journey through the world of music.

Musicians apply to participate in this project by sending in videos and recordings. The best are selected by LITTLE BIG BEAT and its mentors and invited to a Demo Tape Session, where their performance is recorded by professional sound and video engineers in front of an audience. Finally, the most convincing performers are invited to a livestreamed session in the LITTLE BIG BEAT STUDIOS in Eschen (Liechtenstein), resulting in an analogue recording on tape and vinyl disc.

Encouraging young talent

The Demo Tape Sessions are just one example of the way VP Bank encourages talented youngsters through dedicated sponsoring programmes in the fields of music, sport and gastronomy. VP Bank is aware of its social responsibilities and is proud to contribute to the development of the next generation – not only by its sponsoring activities but also by encouraging youngsters in the world of work.

Upcoming Demo Tape Sessions

On January 30, 2025 the American musician Adam Rafferty will take the stage in the LITTLE BIG BEAT STUDIOS. Two other bands are already scheduled for the popular "Gold Sessions", which can offer a springboard into the international music scene. Junipa Gold from Vorarlberg will play on February 14, 2025, and Wallrap Collective from Bavaria is scheduled for May 23, 2025.

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Page 6: Maddison Project Database 2023, VP Bank
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