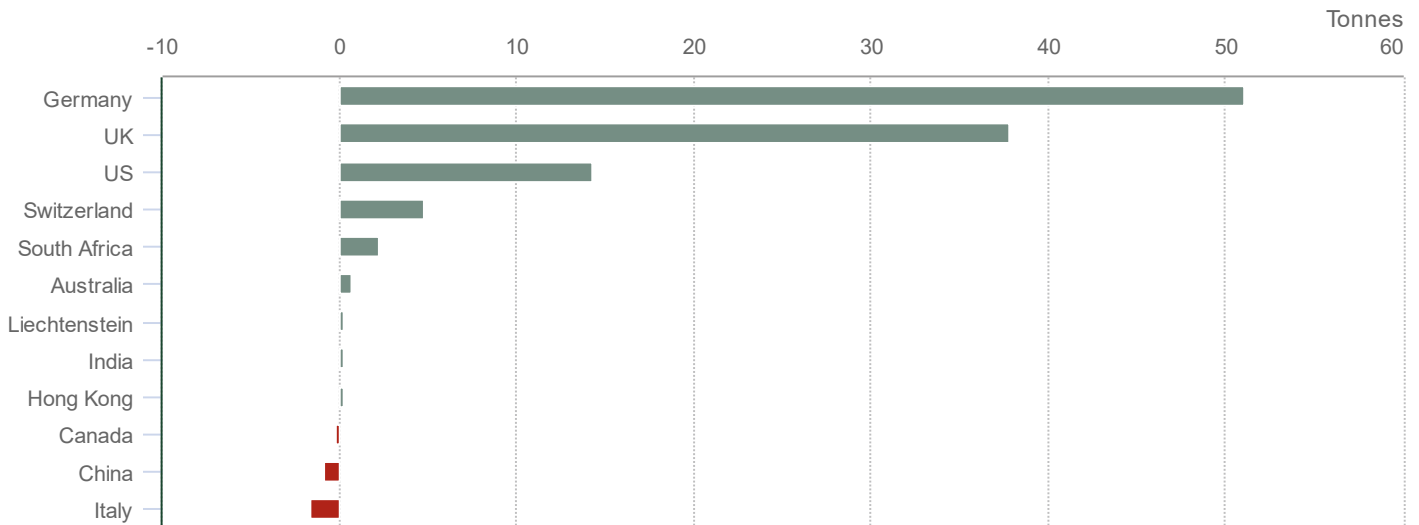


Q1 gold demand: down 18% from last year's exceptional high

Global gold demand in Q1 2017 was 1,034.5t. The 18% year-on-year decline suffers from the comparison with Q1 2016, which was the strongest ever first quarter. Inflows into ETFs of 109.1t, although solid, were nonetheless a fraction of last year's near-record inflows. Slower central bank demand also contributed to the weakness. Bar and coin investment, however, was healthy at 289.8t (+9% y-o-y), while demand firmed slightly in both the jewellery and technology sectors.

Germany and the UK led ETF inflows in Q1



Source: Respective ETF providers; Bloomberg; ICE Benchmark Administration; World Gold Council

Highlights

Inflows into gold-backed ETFs of 109.1t were concentrated in Europe. Although inflows were just one-third of the extraordinary levels seen in Q1 2016, demand was firm. European-listed products were the most popular, due to continued political uncertainty in the region.

Investment in gold bars and coins grew by 9% y-o-y. Much of this growth came from China, where retail investment was up 30%, breaching 100t for only the fourth time on record.

First quarter jewellery demand was steady at 480.9t, marginally up on Q1 2016. Gains in India were the main reason for the slight y-o-y increase, but global jewellery demand remains relatively weak in a historical context.

After a whirlwind end to 2016, Indian consumers enjoyed a period of relative stability in the domestic market, buoying demand. Continued remonetisation by the RBI lifted consumer sentiment, which encouraged demand ahead of the auspicious wedding season, albeit from a very low base.

Central bank demand for gold continued to slow: 76.3t were added to reserves. Central banks showed a diminished appetite for gold purchases; China's purchasing programme was on pause during the quarter as its foreign exchange reserves remained under pressure. Sales, once again, were sparse.

Contributors: Louise Street, Krishan Gopaul, Mukesh Kumar, Carol Lu, Alistair Hewitt.

Contact: marketintelligence@gold.org.

Technology

Gold used by the technology sector grew 3% y-o-y, led by electronics, where gains in the wireless sector were partly offset by shrinkage in demand for LEDs.

- **Electronics demand rose by 4% on a yearly basis, but the usual seasonal Q4 –Q1 dip in demand was again observed with a 8% fall**
- **Bonding wire was resilient, thanks to strong demand for memory chips, but continued progress in reducing wire diameters suggests the sector will decline throughout 2017**
- **The growth of wireless charging in the smartphone sector should lead to increased demand for gold via the incorporation of additional sensors in handsets and charging stations**

Tonnes	Q1'16	Q1'17		YoY
Technology	76.4	78.5	▲	3%
Electronics	59.9	62.1	▲	4%
Other Industrial	11.9	12.1	▲	1%
Dentistry	4.6	4.3	▼	-5%

Overall demand for gold in technology was marginally firmer at 78.5t in Q1. This was slightly exaggerated, however, by Q1 2016 having been the lowest quarter on record (at 76.4t).

Electronics

Gold used in electronics grew 4% y-o-y to 62.1t in Q1. Growth came from the increasing wireless capabilities of smartphones, as well as robust demand for gold bonding wire. After a period of heightened activity in the second half of 2016, demand for gold bonding wire remained resilient in the first quarter of 2017. Strong demand for memory chips helped to offset the negative impact of 3D packaging¹³, which uses much lower volumes of bonding wire. Continued progress in reducing the diameter of bonding wire and advances in 3D packaging are, however, likely to dominate the sector over the coming quarters.

Developments in the wireless sector were positive for gold usage, many of which were related to smartphone technology. Increasingly, smartphones are expected to offer wireless charging capability. This bodes well for demand for Printed Circuit Boards (PCBs), a component of wireless chargers. Additionally, a more high-end application of gold in smartphones involves the inclusion of vertical-cavity surface-emitting lasers (VCSEL)¹⁴, which are used in gesture recognition, 3D sensors and 3D video applications. The iPhone 8 – expected to launch later this year – is rumoured to include this technology. These positive trends should offset the effect of the downturn in demand for smartphones.

The LED sector underperformed in Q1, hit by thrifting as miniaturisation continued to take hold. Growth in demand for infrared LED automobile lighting was not enough to offset the effect of the switch to Chip Scale Packaging (CSP)¹⁵ in the sector.

Several key Asian markets saw a y-o-y recovery in electronics demand: China grew around 7%, albeit from a low base, while Taiwan was steady, marginally firmer by around 1%. South Korea benefitted from the growth in PCB and memory production, turning in growth of around 3%.

Scientists worldwide continue to uncover new applications for gold that will lead to future sources of demand for the metal. US and UK researchers published a seminal paper in the leading journal Science describing insight into the working of an important gold catalyst currently in production in China.¹⁶ The research identified how gold particles within the catalyst

drive the formation of an industrially important feedstock chemical. This insight promises to lead to the development of improved gold catalysts for the chemical industry.

Separately, researchers at Missouri University of Science and Technology have developed a new way of using gold to transform “flexible” or **wearable technology** ¹⁷. By growing thin layers of gold on a single crystal wafer of silicon, they discovered that they could preserve all the positive characteristics of silicon while adding the benefit of gold’s greater durability and flexibility.

Supply

Gold supply contracted sharply in Q1: down 12% y-o-y to 1032t. Lower levels of recycling and continued net de-hedging by producers explain the drop; mine production was virtually unchanged.

- Mine production of 764t was little changed from Q1 last year (767.8t), supporting our view that production will remain broadly steady before tailing off

- A third consecutive quarter of de-hedging by producers reduced the global hedge book by a further 15t

- The 21% y-o-y fall in recycling was largely due to the comparison with a very strong Q1 2016

Tonnes	Q1'16	Q1'17	YoY
Total supply	1,175.2	1,032.0	▼ -12%
Mine production	767.8	764.0	▼ 0%
Net producer hedging	47.5	-15.0	-
Recycled gold	360.0	283.0	▼ -21%

Mine production

Miners supplied 764t of gold to the market in the first quarter of the year, fractionally below the 767.8t produced in Q1 2016. There were areas of growth, largely from new mines: the US and Suriname both saw increases from projects that came on stream over recent months. The additive impact from these markets, however, was offset by weakness elsewhere.

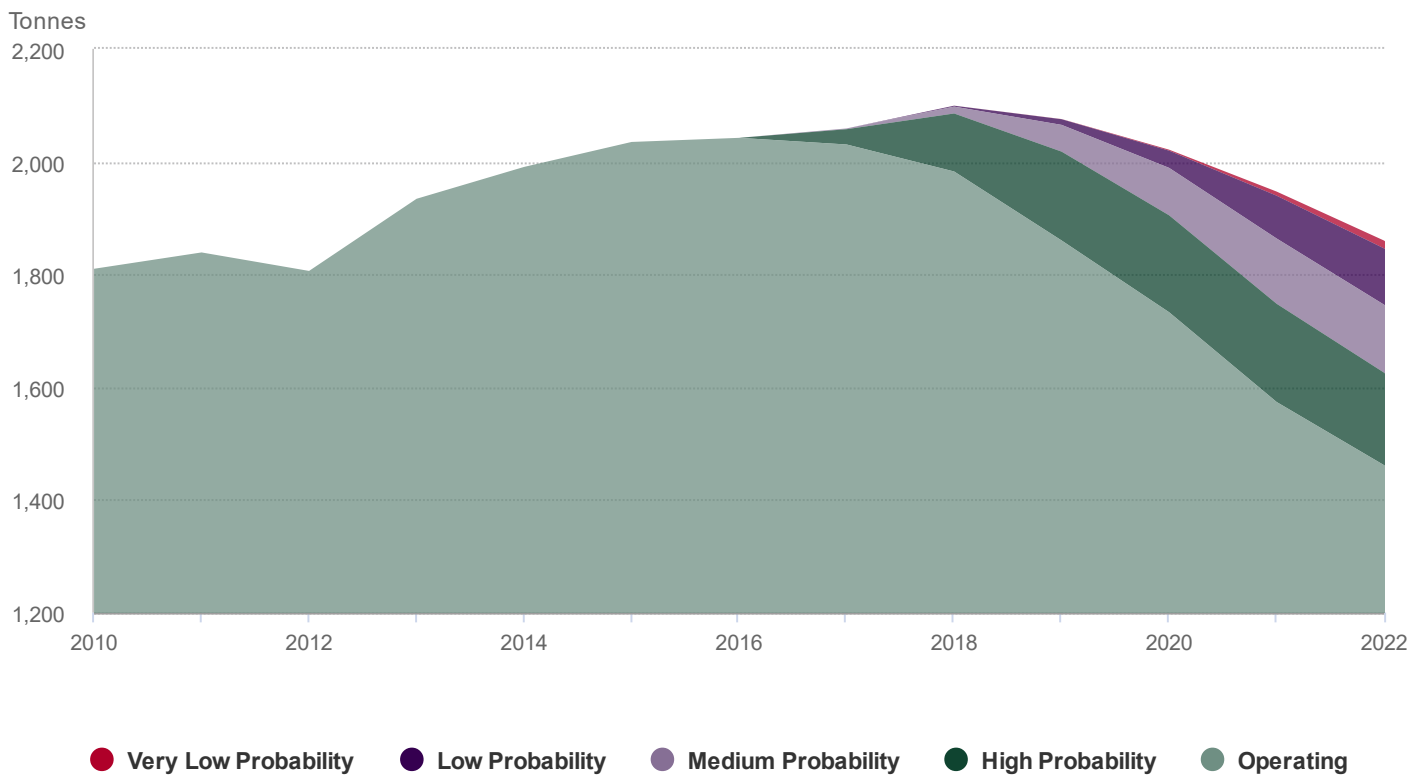
Mining lower-grade ore at Mongolia's Oyu Tolgoi copper mine resulted in a gold output reduction of around 3t. In China, extended New Year holidays at some refineries and mining companies cramped supply, as did the imposition of strict environmental management restrictions: together, these two factors knocked around 2t off Chinese gold production y-o-y.

But by far the largest impact on Q1 mine production came from Indonesia, thanks to a more than 8t fall in production from Grasberg. Production was cut back by around 60% to match domestic smelting capacity, after Indonesia introduced new restrictions on exports of unrefined metal.¹⁸ Freeport-McMoRan – Grasberg's operator - was granted a reprieve on 21st April in the form of a six-month temporary export licence. But this issue is far from resolved, and negotiations between the two parties continue.

Despite the wrangling, Grasberg is moving into a period of high-grading and will ramp up production over the next several quarters. This, along with a few smaller projects coming on-stream – particularly in Canada and Australia – will nudge global production higher in 2017 and 2018. But the effect will only be temporary.

Having plateaued in recent years, mine production will soon enter a period of decline. The production profile of currently operating mines shows a relatively steep drop-off over the next 5 to 10 years. Even factoring in high-probability projects (those highly likely to reach commercial production), the fall in production is still significant.

Mine production likely to drop beyond 2018 as the project pipeline is squeezed



Note: Probability weighting is as follows: operating (99.5%), high (95%), medium (50%), low (25%) and very low (15%). This chart comprises data for 700 mines and projects, collectively accounting for around 60-65% of global mine supply between 2010 and 2016. Unidentified and informal/artisanal gold production is excluded.

Source: Metals Focus Database of Mines; World Gold Council

This is largely a consequence of sharp cuts in capital expenditure over recent years (total capex for companies in the HUI Index¹⁹ declined 65% between 2012 and 2016²⁰), as well as a lack of significant discoveries. We have seen this before: lower prices in the late 1990s and early 2000s also negatively impacted production and exploration in the years that followed. And while there are signs of renewed interest in brownfield development and extending the life of existing mines, these are not yet sufficient to offset the steep cuts in project development spending of recent years. Inevitably, the supply pipeline will be squeezed.

The speed at which production will fall is uncertain. As existing reserves are depleted, the current project pipeline will be unable to replace them fully. Over the long-term, the global production profile will depend on the trajectory of the gold price and potential exploration upside, particularly the speed with which brownfield exploration can be brought into production.²¹

Net producer hedging

Gold producers reduced their overall net hedge positions by 15t in Q1. This compares with positive net hedging of 47.5t in Q1 2016.

In the first half of 2016 a rising dollar gold price coupled with weakening local currencies encouraged greater levels of net hedging as gold producers sought to lock in higher prices for their output. But the increase in the Q1 2017 gold price provided little temptation, particularly as prices stayed below average 2016 levels.

Project financing and/or debt repayment are key reasons why many miners opt to hedge, despite the practice being generally opposed by many shareholders. Our view is that while higher price levels may elicit more producer hedging, it will remain tactical in nature and small by historical standards. Any hedging would likely remain in line with the annual average of 16.7t

since 2011, vs the 344.8t average between 1995-1999. At the end of Q1, the global hedge book stood at 237 tonnes, an almost insignificant level when compared to the 3,000t plus hedge book of the late 1990s.

Recycling

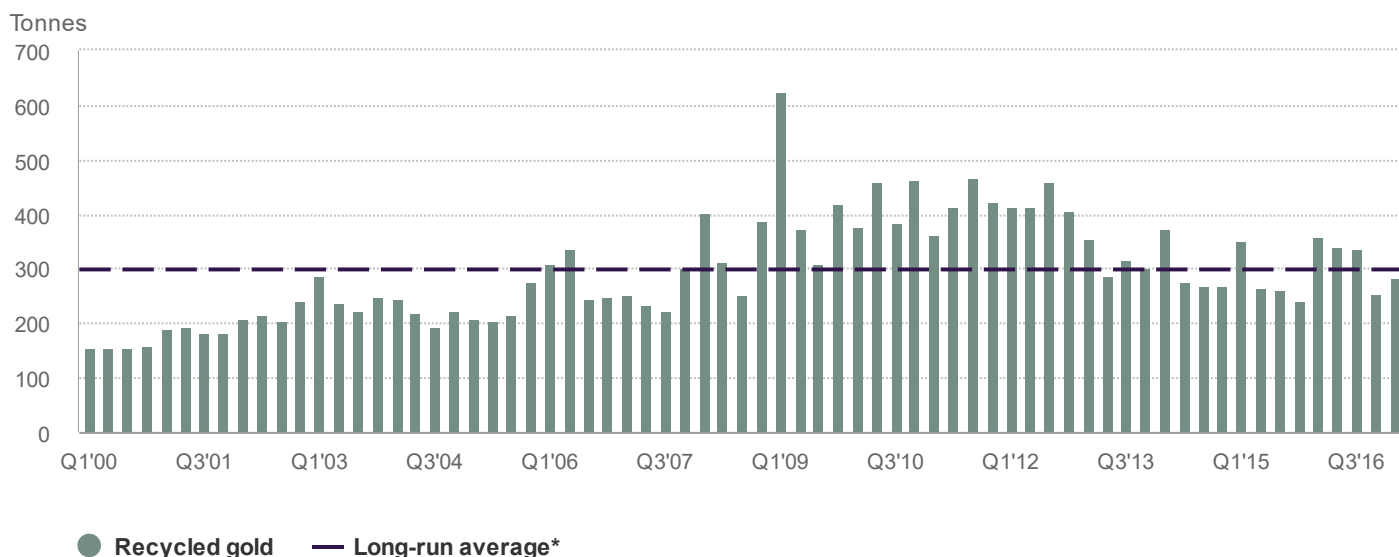
Recycling contributed 283.0 tonnes to supply in the first quarter, a drop of 21% from Q1 2016. The steep y-o-y decline is largely due to recycling having jumped in Q1 2016 in response to sharply rising gold prices at that time. At 283.0 tonnes, recycling is below its long-run average (since Q1 2000) of 296.2 tonnes.

Much of the decline in recycling activity came from Southeast Asian markets – Thailand and Indonesia in particular – where local currency weakness in Q1 2016 exaggerated the rise in the US\$ price. Turkey also witnessed far lower levels of recycling during the most recent quarter. Price and currency moves played their part here too, but the constitutional referendum was also a factor: the populace was reluctant to sell its gold holdings in the face of an uncertain political outcome.

Indian recycling has been remarkably subdued since November’s shock demonetisation. Retailers remained short of cash for some time, slashing their available funds to buy back holdings of old gold. The market remains in something of a holding pattern ahead of the government’s GST decision. Once that becomes evident we could see a resurgence in recycling.

Recycling levels during the first quarter can be seen as something of a ‘normalisation’ in the absence of sharp price moves. Given that recycling supplies were elevated throughout much of last year, negative comparisons are likely over the next two quarters at least.

Q1 recycling was 21% down on last year's relatively high level



*Long-run average covers Q1'00 to Q4'16.

Source: Metals Focus; GFMS, Thomson Reuters; World Gold Council

Footnotes

1. In November 2016, the Indian government implemented a surprise demonetisation that removed Rs15.44trillion (or 86% of the currency in circulation) from India's economy. For a review of India's recent policy initiatives and the likely implications for gold demand, see our [Market Update: Indian demand will recover from 2016's lows](http://www.gold.org/research/indian-demand-will-recover-from-2016-lows)
<http://www.gold.org/research/indian-demand-will-recover-from-2016-lows>
2. Read more: <http://corporates.bseindia.com/xml-data/corpfiling/AttachHis/4822c9d4-9583-4ce1-be76-a5c1a8a8499a.pdf>
3. The new lunar 'year of the rooster' contains a leap month in order to bring it into line with the solar calendar. This means that it encompasses the 'Start of Spring' day in both February 2017 and February 2018.
4. World Gold Council, 2016: [China's gold market: new perspectives on consumer behaviour](http://www.gold.org/research/china-jewellery-market-new-perspectives)
<http://www.gold.org/research/china-jewellery-market-new-perspectives>
5. Agility Research & Strategy; [Affluent Insights Luxury Study 2017](http://www.luxurysociety.com/en/articles/2017/04/top-3-priorities-affluent-asian-millennials/)
<http://www.luxurysociety.com/en/articles/2017/04/top-3-priorities-affluent-asian-millennials/>
6. Read more: <http://www.decent9999.com>
7. Read more: <http://www.pressreader.com/thailand/bangkok-post/20170209/281973197396310>
8. World Gold Council, November 2016; [Gold Demand Trends Q3 2016](http://www.gold.org/supply-and-demand/gold-demand-trends/back-issues/gold-demand-trends-q3-2016/focus-us-jewellery) <http://www.gold.org/supply-and-demand/gold-demand-trends/back-issues/gold-demand-trends-q3-2016/focus-us-jewellery>
9. Read more: <http://www.gold.org/supply-and-demand/gold-demand-trends/back-issues/gold-demand-trends-q1-2017/jewellery>
10. Read more: http://news.xinhuanet.com/english/2017-02/08/c_136041055.htm
11. Read more: <http://www.gold.org/statistics#reserves-statistics>
12. Read more: <http://www.reuters.com/article/turkey-cenbank-gold-idUSL5N1H53VN>
13. 3D packaging increases the memory capacity of a flash chip in a smaller space, offering lower cost per gigabyte and greater durability.
14. A vertical-cavity surface-emitting laser (VCSEL) is a type of semiconductor-based laser diode that emits a highly efficient optical beam vertically from its top surface.
15. Chip Scale Packaging (CSP) is suitable for use in automobile lighting as it can more easily withstand a vibrating environment. It also has the advantages of reduced size and, as it does not use gold, costs less.
16. Malta et al., Science 31 Mar 2017: Vol. 355, Issue 6332, pp. 1399-1403. DOI: 10.1126/science.aal3439
17. Read more: <http://gadgetsandwearables.com/2017/03/20/gold-wearable-technology/>
18. The restrictions applied to exports of copper concentrate and anode slimes, among other things. As Grasberg is primarily a copper mine, with gold produced as by-product, production of gold was affected.
19. HUI Index is an equally-weighted index of some of the world's largest gold mining companies. Its full title is the NYSE Arca Gold BUGS Index.
20. Bloomberg

21. Please see Full Year/Q4 2016 Gold Demand Trends <http://www.gold.org/supply-and-demand/gold-demand-trends/back-issues/gold-demand-trends-full-year-2016> for more detail.