

Financing the Transition: Energy Supply Investment and Bank-Facilitated Financing Ratios 2022

Comparing low-carbon and fossil-fuel activity
Summary Report

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Executive summary

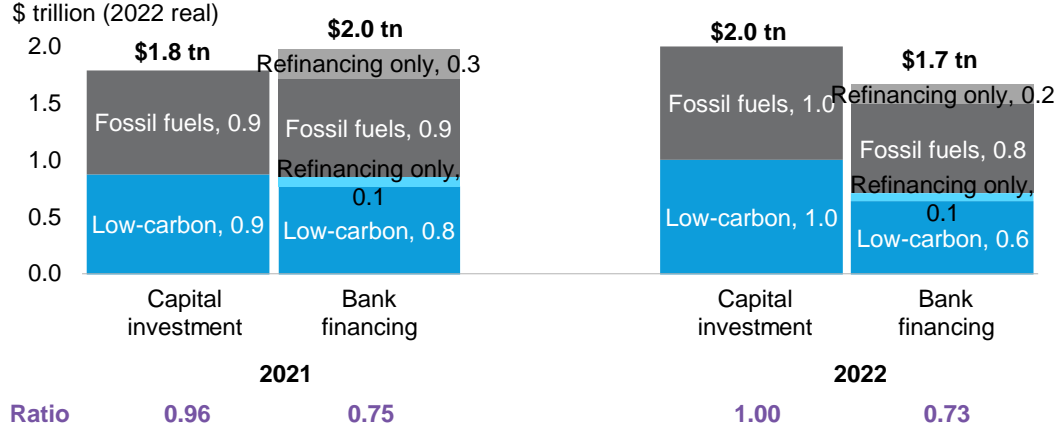
Investment in energy supply, including low-carbon sources, increased last year as the recovery from the Covid-19 pandemic and Russia’s invasion of Ukraine triggered a spike in commodity prices and capital investment in energy assets. Simultaneously, many economies – both developed and developing – hiked interest rates to address inflation, which affected financing volumes. As a result, the volume of bank financing diverged from capital investment in 2022. Various secondary factors, such as higher operating cash flows and the growing share of small-scale solar compounded this.

In this second edition of our annual report on energy supply financing, we analyze the factors affecting both capital investment and financing, and update our analysis of bank-facilitated financing. In 2022, financing for low-carbon energy was 73% of that for fossil fuels – meaning that **for every dollar supporting fossil-fuel supply, \$0.73 supported low-carbon energy**, a slight decline from \$0.75 in 2021. Despite improvements in the ratio of real-economy investment, neither this nor bank financing is changing at the pace or scale required to hit the minimum 4:1 ratio needed this decade, as implied by commonly referenced climate scenarios that limit global warming to 1.5C.

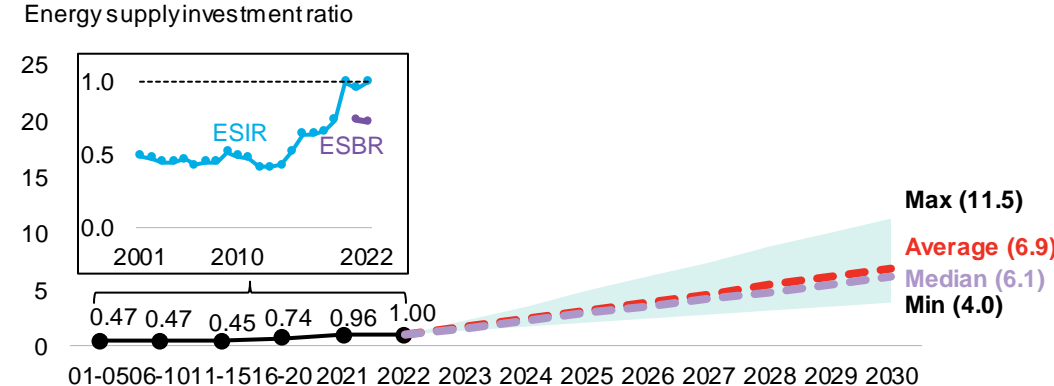
- **Real-economy investment activity** reached parity between fossil fuels and low-carbon supply, and grew in volume in 2022 to \$2 trillion. But bank-facilitated financing diverged. Elevated energy prices bolstered operating cash flows, enabling higher capital expenditure that was independent of bank-facilitated financing, the latter of which was less economically attractive due to higher interest rates. Finally, small-scale solar grew to 20% of low-carbon capex and as this is not captured in banks’ financing or real economy corporations, we believe it contributed to the divergence.
- At 0.73:1, the 2022 **Energy Supply Banking Ratio**, or ESBR, declined slightly from 2021, when it stood at 0.75:1. Overall energy supply financing volumes also fell. Bank financing for energy supply totaled \$1.7 trillion, down from \$1.95 trillion in 2021. Meanwhile, low-carbon financing dropped more than for fossil fuels, from \$851 billion to \$708 billion.
- **The ratio of coal investment to fossil fuels** is currently at 0.18:1 but needs to decline to 0.06:1 this decade to be on track for 1.5C warming. For bank-facilitated financing of coal, the ratio to fossil fuels is at 0.13:1, or \$122 billion, 76% of which is within China.

For more BloombergNEF analysis on energy transition investment ratios, see *Investment Requirements of a Low-Carbon World: Energy Supply Investment Ratios* ([web](#) | [terminal](#)). For institution-level volumes and ratios, see *Financing the Transition: Energy Supply Investment and Bank-Facilitated Financing Ratios* ([web](#) | [terminal](#)).

Global energy supply investment vs. energy supply financing, 2021-22



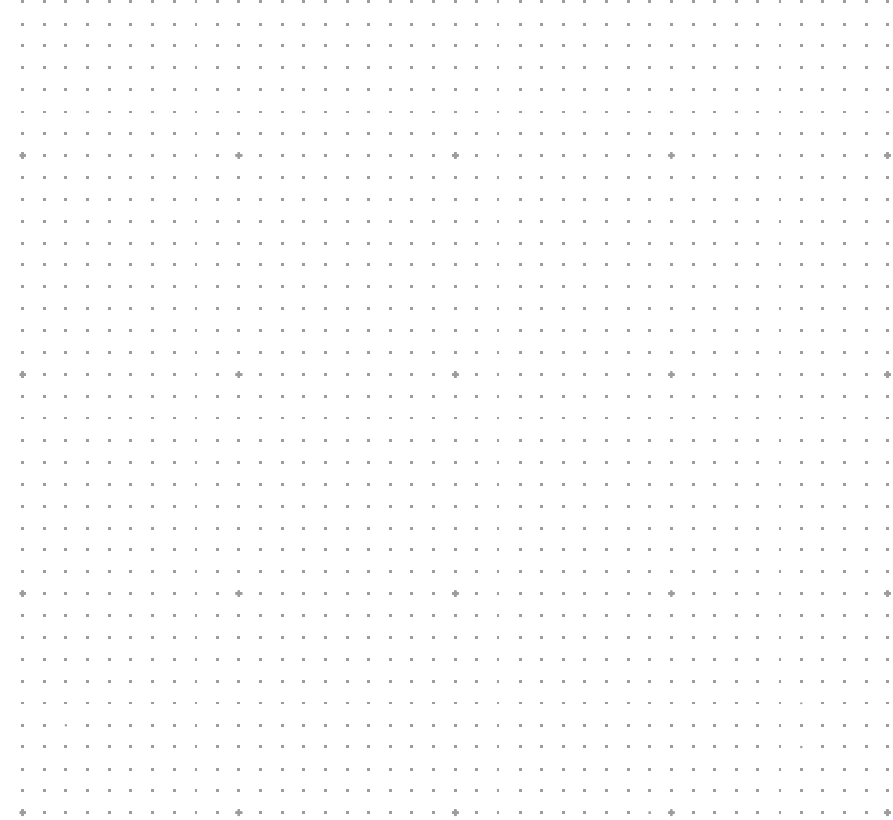
Range of Energy Supply Investment Ratios to 2030 implied by commonly referenced climate scenarios consistent with 1.5C warming



Source: BloombergNEF, International Energy Agency, UN Intergovernmental Panel on Climate Change, Network for Greening the Financial System, Bloomberg LP, RAN, Urgewald, IJGlobal. Note: Ratios from 2000 to 2022 are based on historical investment levels from the IEA World Energy Investment reports. The average ratio and range for each decade have been rounded to the nearest whole number. ESIR refers to Energy Supply Investment Ratio; ESBR refers to Energy Supply Banking Ratio. Both are ratio of low-carbon to fossil-fuel supply.

Methodology overview

Bank-facilitated financing: Energy Supply
Banking Ratio



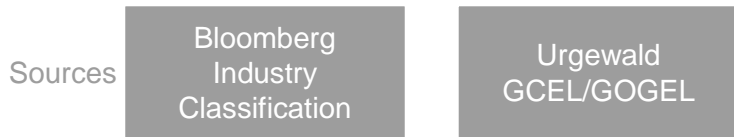
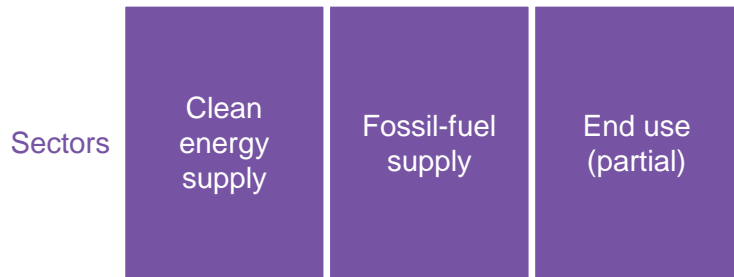
Our analysis spans the energy value chain

Focus of this report	1 Energy Supply		2 Energy Demand	
	<p>Company revenue driven by the development, extraction, transportation or generation of energy.</p> <p>Production and supply</p>	<p>Company revenue driven by the manufacture of clean technologies.</p> <p>Manufacturing</p>	<p>Company revenue driven by the manufacture and financing of transportation technologies.</p> <p>Consumption</p>	<p>Not included: Adjacent sectors</p>
Low-carbon	<p>Company revenue driven by low-carbon sources of energy production. This includes renewables, storage, biofuels and nuclear.</p> <p>Grid technology upgrades often tend to accompany cleaner capacity and also allow the smoother integration of renewables, so transmission and distribution is considered green.</p> <ul style="list-style-type: none"> Solar Wind Geothermal Hydropower Storage Marine power Biofuels and biomass Nuclear Electricity grid Hydrogen and CO2 transport/storage 	<p>Company revenue driven by the development of plants/facilities manufacturing low-carbon energy equipment. This includes equipment and services, such as modules, turbines and components.</p> <p>We include smart grid equipment due to the direct enablement of clean power on the grid.</p> <ul style="list-style-type: none"> Plant development <ul style="list-style-type: none"> Solar, biomass, wind Smart grid equipment Clean energy equipment <ul style="list-style-type: none"> Solar cells/modules, inverters Wind turbines Geothermal equipment Hydro equipment Fuel cells Nuclear equipment 	<p>Company revenue driven by the manufacturing of clean transportation technologies, primarily electric vehicles (passenger vehicles and trucks). Also includes financing and leasing.</p> <ul style="list-style-type: none"> Electric passenger vehicles Electric trucks Leasing electric vehicles Electric-vehicle financing 	<p>Metals and mining relevant to batteries/EVs, but tracked too broadly in Bloomberg Industry Classification System (BICS) system.</p> <p>Materials avoided – focus on energy.</p> <ul style="list-style-type: none"> Recycling and waste management Sustainable materials Pollution control equipment Metals and mining
Fossil Fuels	<p>Company revenue driven by fossil-fuel-based sources of energy production. This includes coal, oil and gas, and utilities' fossil-fuel power generation for electricity and heating/cooling. This also includes transportation and refining businesses.</p> <ul style="list-style-type: none"> Utilities <ul style="list-style-type: none"> Fossil-fuel power generation Heating and cooling Coal <ul style="list-style-type: none"> Mining Rail/freight Oil and gas <ul style="list-style-type: none"> Exploration and production Transport Refining Marketing/trading Filling stations 	<p>Company revenue driven by the equipment used to support power generation from fossil-fuel-based sources. This includes equipment, parts and services, such as generators and boilers.</p> <ul style="list-style-type: none"> Equipment and infrastructure <ul style="list-style-type: none"> Generators Power generation equipment, parts and services Power boilers and heat exchangers Oilfield chemicals 	<p>Company revenue driven by the manufacturing of traditional internal combustion engine transportation technologies (passenger vehicles and trucks) and other fossil-fuel-based forms of transportation, such as ships and aircraft. Also includes financing, leasing and rental services.</p> <ul style="list-style-type: none"> Passenger/commercial vehicles <ul style="list-style-type: none"> Manufacturing and leasing Engines and parts Trucks Shipbuilding Aircraft engines and parts <ul style="list-style-type: none"> Vehicle financing (passenger, commercial, railcar) Vehicle rental 	<p>Use of fossil-fuel vehicles excluded to avoid double counting; focus is on manufacturing instead.</p> <p>Chemicals/materials avoided – focus on energy.</p> <ul style="list-style-type: none"> Rail (agriculture, chemicals, industrial products, etc.) Trucking freight Bus transit Taxi services Hydrogen and ammonia

Our methodology is built on transactions underwritten by banks for the energy sector and other relevant issuers

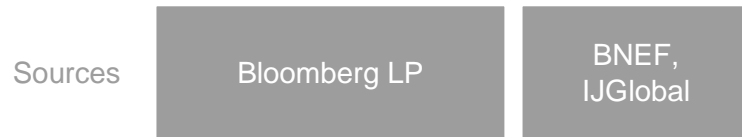
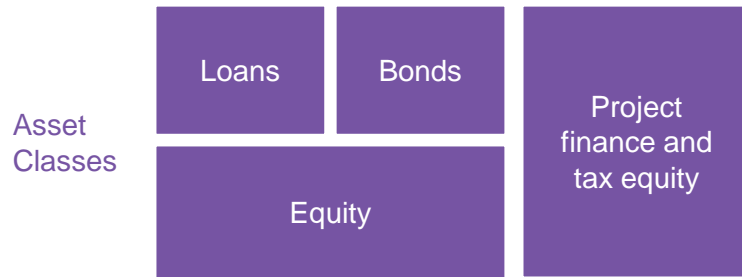
① Select company universe

Issuers
~16,000 companies with energy sector revenue



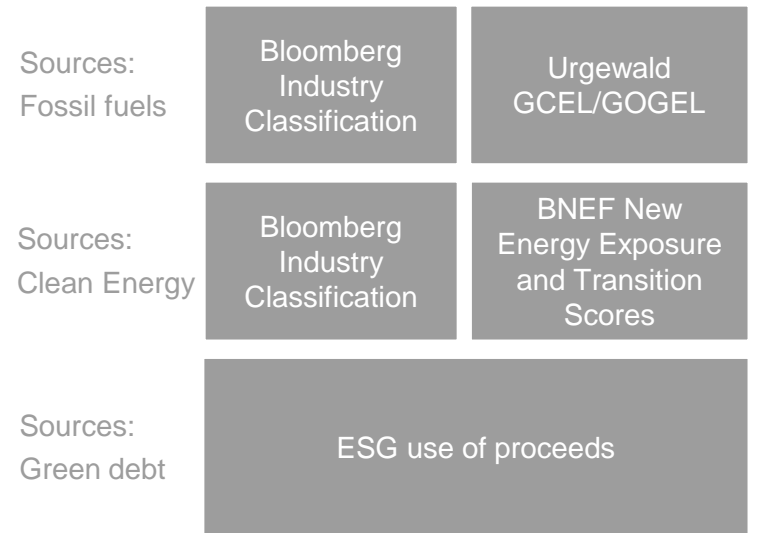
② Pull financing activity

Gather transaction data
issued by relevant companies



③ Adjust transactions

Adjust transaction data
for general corporate financing, by multiplying by percentage exposure to fossil fuels or clean energy



Add full value of transactions
for project finance and renewables tax equity

Our analysis spans four main bank financing activities and focuses on energy supply

Type of financing	Recourse debt issuances			Equity issuances			Non-recourse project finance		Tax equity	Not Included	
Asset class or type	Bonds	Loans	Green debt	IPOs	Additional share offerings	Rights offerings	Fossil fuels	Clean energy	Tax credit investment	Direct lending	Bilateral loans
Source	Bloomberg LP			Bloomberg LP			IJGlobal	BNEF	BNEF	No reliable, consistent disclosure	
Role	Underwriting			Underwriting			Underwriting		Direct investment	Balance sheet	
Energy supply results <i>Focus of this report</i>	~\$1.4 trillion total \$584 billion low-carbon, \$836 billion fossil fuels Energy Supply Banking Ratio = 0.7			~\$0.07 trillion total \$32 billion low-carbon, \$35 billion fossil fuels Energy Supply Banking Ratio = 0.9			~\$0.17 trillion total \$76 billion low-carbon, \$96 billion fossil fuels Energy Supply Banking Ratio = 0.8		~\$0.02 trillion total \$16 billion low-carbon		
Energy demand results	~\$0.5 trillion total \$210 billion low-carbon, \$255 billion fossil fuels Energy Demand Banking Ratio = 0.8			~\$0.03 trillion total \$16.2 billion low-carbon, \$14.8 billion fossil fuels Energy Demand Banking Ratio = 1.1			N/A		N/A		

Additions for 2022

Source: Bloomberg LP, BloombergNEF, RAN, Urgewald, IJGlobal. Note: Banks serve their clients in the energy sector in numerous other roles that are not the focus of this report. These include but are not limited to serving as an arranger or agent on a debt issuance, direct lending as opposed to underwriting, tax equity investing, asset management, and retail banking (in other words, loans for electric vehicles). Most of these omissions are due to data limitations.

Impact of methodological decisions on results

Interpreting year-on-year changes in these results requires distinguishing between *changes in the market* (in other words, decisions banks make and macroeconomic trends) and *changes in measurement* (in other words, methodology). Here, we approximate the influence of the methodological changes on results. The number of arrows is proportional to degree of impact on results.

Change	Description	Impact on 2021 energy supply results		Impact on 2022 energy supply results	
		Volume	ESBR (all else held equal)	Volume	ESBR (all else held equal)
Addition of tax equity	We collected tax equity investment data directly from known tax equity players. Several banks disclosed data for the first time. Also included are a small number of known deals for other banks from BNEF's renewables asset finance database. Combined, the \$16 billion reported here represents 80% of the approximately \$20 billion market.	None – not included	None	↑↑	↑↑
Clarification of energy efficiency sustainable debt instruments	We clarified that use-of-proceeds-based sustainable debt tied to energy efficiency projects tends to more accurately reflect <i>energy demand</i> levers (in other words, green and LEED-certified buildings, and Energy Star products) rather than investments in energy supply. As a result, we have shifted energy efficiency-labeled sustainable debt to energy demand and out of energy supply. This results in closer alignment with the 1.5C scenarios work (see <i>Investment Requirements of a Low-Carbon World: Energy Supply Investment Ratios</i> (web terminal)).	↓↓↓ Shift to low-carbon energy demand	↓↓↓	↓↓↓ Shift to low-carbon energy demand	↓↓↓
More precise corporate structure	Previously, we only were able to include a deal in our analysis if we either knew the issuing company's energy sector revenue or that of its ultimate parent. Now, we are able to dissect each issuing subsidiary company's individual corporate ownership chain, identify its nearest parent company with known energy sector revenue, and apply those adjustment factors . This results in both the inclusion of additional deals and more accurate adjustments to other transactions.	None – analysis not performed due to challenges with tracking all changes in company ownership.	None	↑	↓ Disproportionate impact on visibility into fossil-fuel deals with mid-level companies
Changes in adjustment factors	We use data from BNEF's Clean Energy Exposure Ratings (CEERs) for additional companies. We now include companies with bucketed (A1-A4) ratings in addition to those with a precise estimated percentage exposure, taking the median in those cases. For example, an A3 company (25-49%) would be given a 37% adjustment factor. This is prioritized over other data sources where applicable.	None – imprecise scores excluded from analysis.	None	↑	↑
	We prioritize Clean Energy Exposure Ratings (CEERs) over Urgewald data where possible. For example, if Urgewald assigns a company 100% fossil-fuel revenue but at BNEF we know that company has exposure to clean energy business, we give that low-carbon exposure precedent.	None – shift in allocation	↑	None – shift in allocation	↑
	Where Urgewald has designated a company's revenue exposed to either coal or oil and gas as "NA" or "NI", we now prioritize Bloomberg revenue data and BNEF's Clean Energy Exposure Ratings where possible, whereas we previously applied 100% fossil fuels in these cases. This includes several private equity companies with unknown ownership of fossil-fuel and low-carbon companies and assets, which are now excluded from this analysis as issuers unless we have alternate data.	↓↓ Less financing volume assumed to be attributable to energy	↑↑	↓↓ Less financing volume assumed to be attributable to energy	↑↑
Split out fossil fuels	We split out results by coal, oil and gas where possible for 2022 data.		None		None

Financing the real economy transition

Energy supply capital investment versus bank-facilitated finance, 2021-22

Low-carbon capital investment is increasing, irrespective of methodology

BNEF (based on IEA)

Low-carbon energy supply: Nuclear, renewable power generation, carbon capture and storage abatement technologies, electricity grids, battery storage

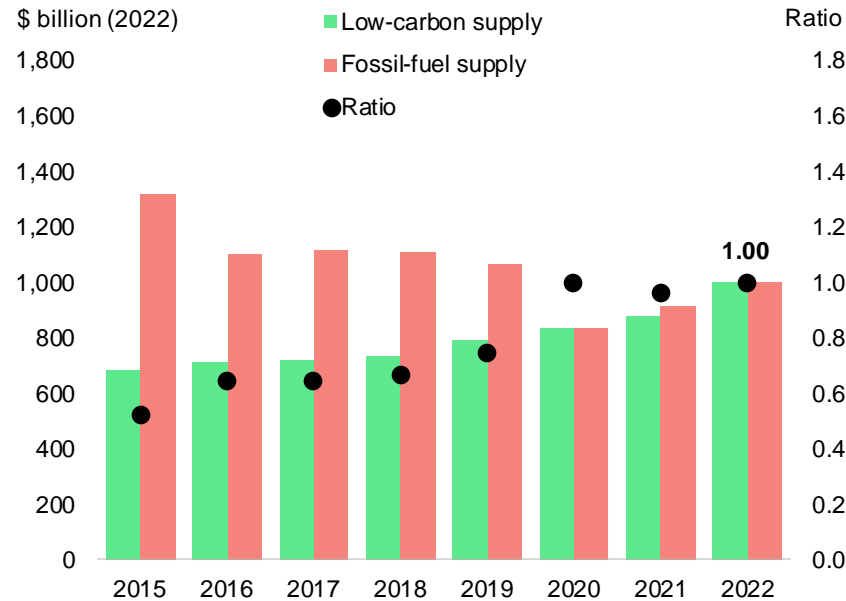
Fossil-fuel energy supply: Upstream, midstream and downstream segments for oil and gas, and coal mining and transport

International Energy Agency (IEA)

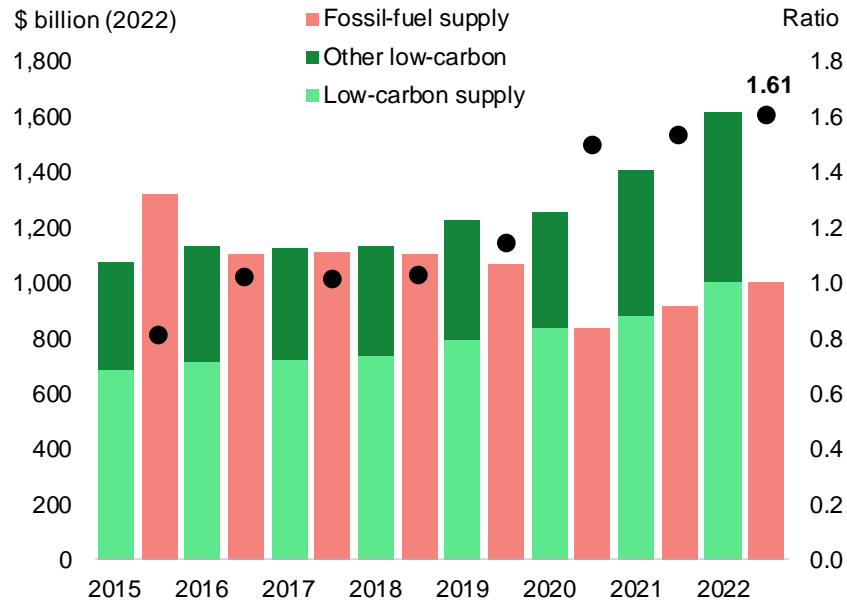
Low-carbon and **fossil-fuel energy supply** classification is the same as those categorized by BNEF

Other low-carbon supply and demand: Low-carbon fuel such as liquid biofuels, and energy efficiency, electrification and renewables for the buildings, industry and transport sectors.

Energy supply investment and ratio – BNEF



Energy supply investment and ratio – IEA

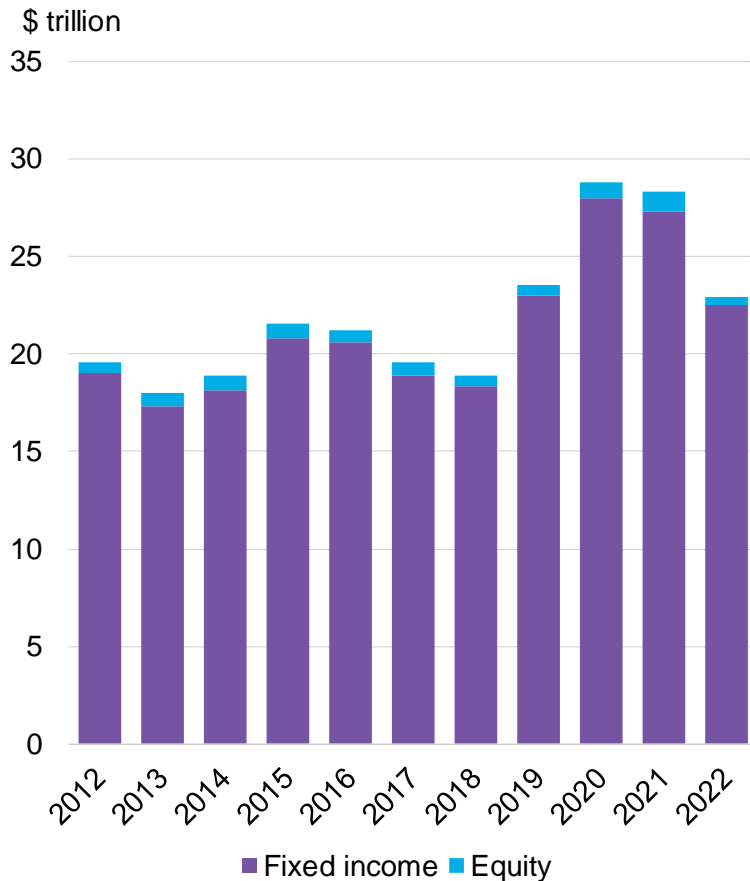


- BNEF looks at energy investment **through the supply-side lens**, referencing the physical assets and systems deployed for the different energy technologies.
- The data for energy supply is given for both fossil fuels and low-carbon counterparts, which allows for a fair evolution to track the state of their investment trends and allocation.
- The International Energy Agency further includes investment in energy efficiency, which it defines as the incremental spending to acquire equipment that consumes less energy than would otherwise have been used to provide the service and electrification (heat pumps and electrical efficiency etc.) for the buildings, industry and transport sectors.
- BNEF classifies the additional scope above, alongside low-carbon fuels (though these have historically made up less than 1% of overall energy investment), as ‘Other low-carbon supply and demand’.
- While this gives a broader view of the energy investment landscape, it likely results in an overly positive view skewed towards funding for ‘clean’ energy. This classification misses out on the counterfactual areas of these ‘other low-carbon’ scopes, such as internal combustion engine (ICE) vehicles, and measures an incremental, rather than a net, change in capital investment.
- The IEA’s incremental addition of ‘other low-carbon’ scopes in the clean energy bracket sees its 2022 energy supply investment ratio stand at around 1.6:1, as opposed to BNEF’s 1:1.

Source: BloombergNEF, International Energy Agency’s World Energy Investment 2023 report. For a more detailed breakdown, please see the IEA’s [technical document](#).

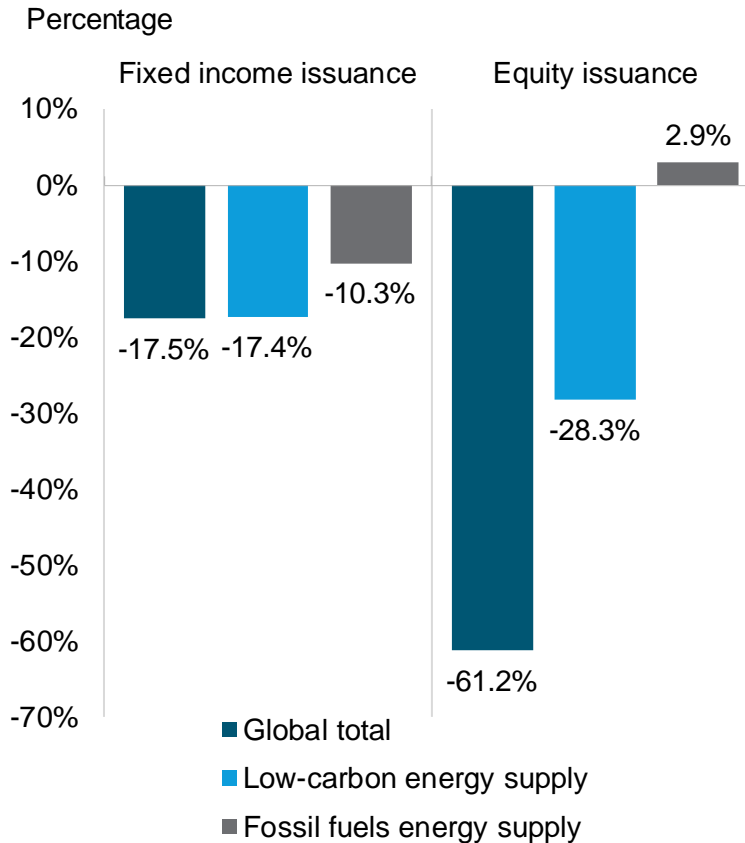
Whole economy capital market activity has fallen more than the energy sector

Total debt and equity security issuance, 2012-22



Source: BloombergNEF, Securities Industry and Financial Markets Association (SIFMA).

Change in security issuances, 2021-22



Source: SIFMA, Bloomberg LP, BloombergNEF, Urgewald.

Broader capital market activity has fallen globally

- Fixed-income security issuance decreased from \$27.3 trillion in 2021 to \$22.5 trillion in 2022, an 18% decline.
- Equity issuances saw a steeper drop from \$1.1 trillion to \$0.4 trillion, a 64% fall.

Low-carbon energy supply capital market activity was muted compared to the broader market

- Low-carbon energy supply-linked fixed-income security issuance shrank by 17.4% from 2021 to 2022.
- Equity issuances saw a 28% decrease. While this is a steeper fall than with fixed income, it is a considerably smaller drop than the broader equity market experienced in 2022.

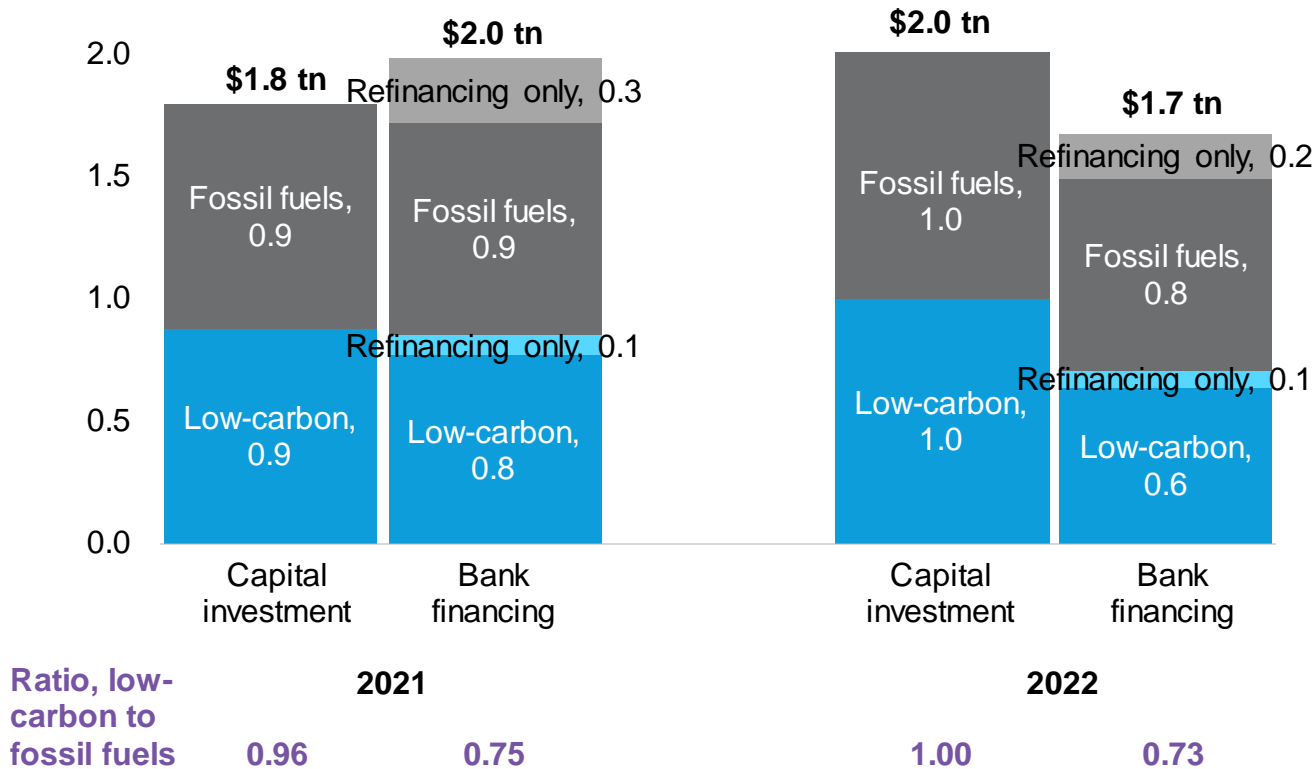
Fossil-fuel energy supply capital markets defied the decline seen in the wider security market

- Fossil-fuel-linked fixed-income issuances experienced a modest drop of 10.3% from 2021 to 2022.
- Fossil-fuel equity issuances grew by nearly 3%, in complete contrast to the movements seen in the broader equity markets.
- One potential explanation is that fossil-fuel companies have sought to exploit the higher share prices seen in the industry versus the market movements for global sector-neutral stocks and low-carbon energy firms.

Bank financing volumes for energy supply diverged from real-economy capital investment in 2022

Global energy supply investment vs. energy supply banking in 2021-22

\$ trillion (2022)

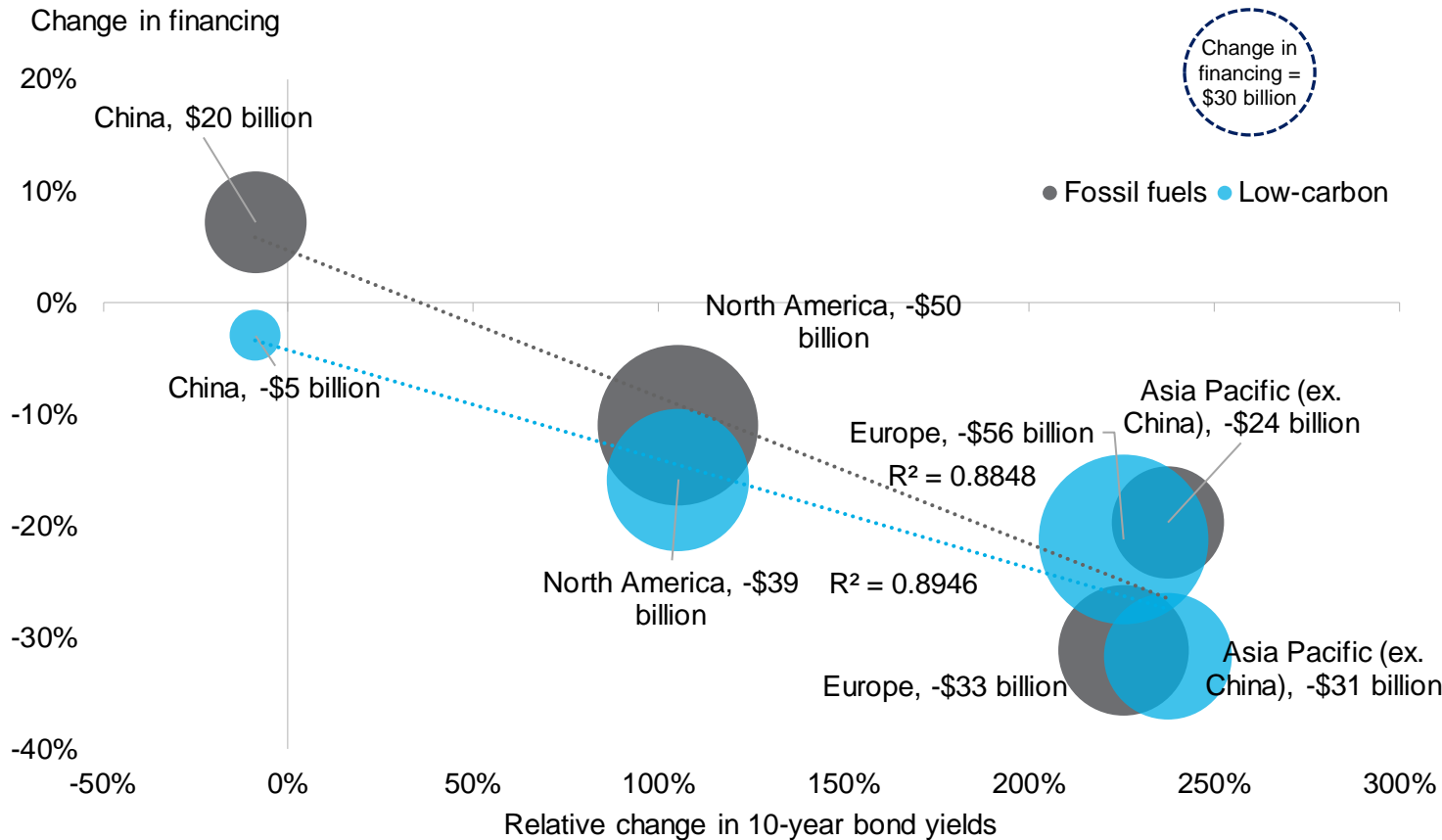


- The low-carbon to fossil-fuel **Energy Supply Investment Ratio (ESIR)** remained largely steady from 2021 to 2022, increasing slightly from **0.96:1 in 2021 to 1:1 in 2022** globally. This measure is derived from capital spending on energy infrastructure.
- Among banks, the low-carbon to fossil-fuel **Energy Supply Banking Ratio (ESBR)** decreased slightly from **0.75:1 in 2021 to 0.73:1 in 2022**. The ESBR is BNEF’s estimate of global banks’ capital facilitation of the energy sector. This is measured by the underwriting of debt and equity instruments issued by companies active in energy, as well as energy project finance.
- The ESBR broadly mirrors trends in global capital investment. However, it is not precisely aligned.
- Factors that affect alignment include the spending and finance decisions of major companies as operating and market conditions change, in particular the impact of interest rates and energy prices, and the growth of sectors such as small-scale solar not captured in corporate finance data.
- In both 2021 and 2022, financing earmarked in use of proceeds explicitly for refinancing only comprised around 20% of fossil-fuel bank financing and 10% of low-carbon bank financing.

Source: Bloomberg LP, BloombergNEF, IEA, Urgewald, Rainforest Action Network, IJGlobal. Note: All numbers adjusted for inflation and reported in \$2022. ‘Refinancing only’ refers to debt/project finance deals earmarked solely for refinancing.

Energy financing is sensitive to changes in borrowing rates

Relative change in regional government bonds vs. regional financing change



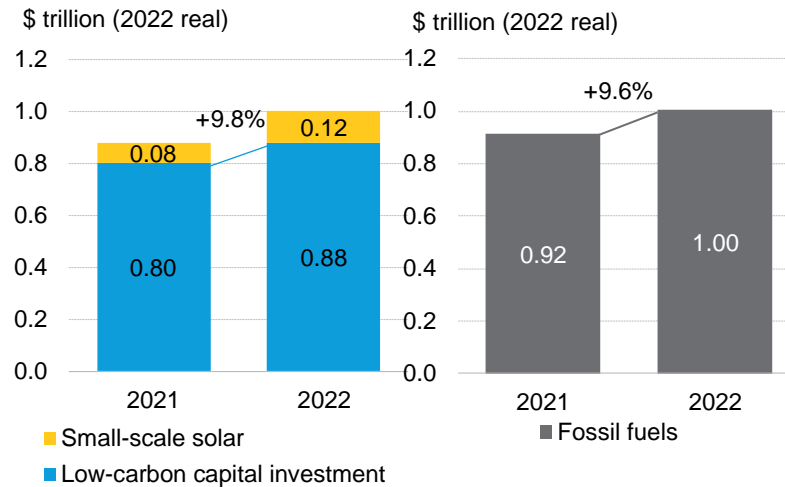
Source: Bloomberg LP, BloombergNEF. Note: The bubble sizes and labels refer to the absolute annual change in financing from 2021 to 2022. Changes tracked represent the percentage difference (not percentage points) in average monthly 10 year sovereign bond yields from 2021 to 2022 and the total change in financing tracked for energy supply purposes from 2021 to 2022.

Regional differences reveal the sensitivity of financing to interest rates

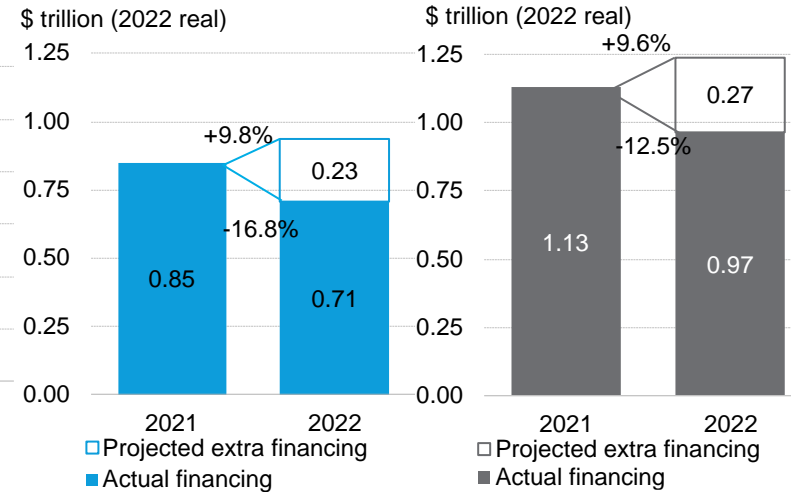
- The level of finance raised on capital markets or through direct lending is sensitive to changes in the cost of borrowing.
 - Globally, interest rates rose steeply from 2021 to 2022, spurred by central bank responses to increases in global inflation. China is the notable exception, where borrowing rates fell.
 - Low-carbon energy supply and fossil-fuel financing saw similar sensitivity to interest rates.
 - In regions where rates rose, energy financing fell:
 - In **North America**, average US 10 year treasury yields **increased 148 basis points (bps) from 2021 to 2022**. In that period, low-carbon financing dropped by 11%, while fossil-fuel finance declined by 16%.
 - In **Europe**, average German and UK 10-year government yields both **rose by 146bps and 163 bps from 2021 to 2022**, respectively. Low-carbon energy supply financing decreased by 21% and fossil-fuel financing by 31%.
 - In **Asia Pacific (excluding China)**, Japanese 10-year sovereign **yields rose by 15bps**, a more than threefold increase from 2021 to 2022. Low carbon financing fell by 32% and fossil-fuel financing by 20%.
 - In **China**, average 10-year government **yields fell by 27bps**. Correspondingly, this is the only major region where total energy financing rose, with fossil-fuel financing growing 7%. Low-carbon financing dropped slightly by 3%, or \$5 billion.
- Rate rises in 2023 may see continued energy finance decline**
- Government bond yields increased further in 2023. The average yield on a 10-year government bond has risen for the US, UK, Japan and Germany year to date. In China, the yield is flat.
 - This may lead to further declines in bank-facilitated financing in 2023.

Gap between change in capex and bank financing can partly be explained by small-scale solar and cash flows

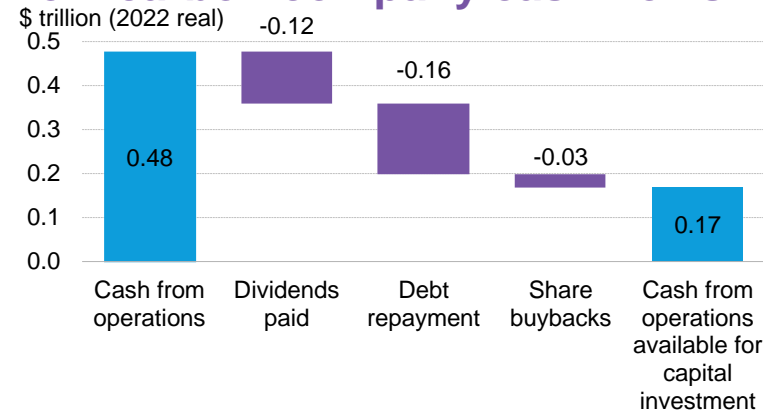
Change in capex, 2021-22



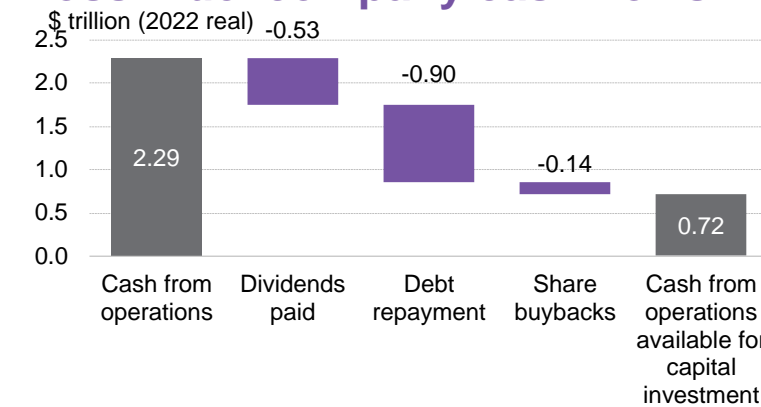
Change in bank financing, 2021-22



Low-carbon company cash flows



Fossil-fuel company cash flows



Increases in small-scale solar and corporate cash flows affect capital investment and financing needs

- Low-carbon capital investment grew 14% over 2021-22, with **small-scale solar seeing a 57% surge**. Where banks are involved in these transactions, it is most often on their retail loan book or via unconventional financing structures, not reflected in this analysis.
- **Excluding small-scale solar, low-carbon capital investment increased by 9.8%**. Projecting this growth rate onto the \$851 billion of low-carbon financing in 2021 would result in a projected financing volume of \$935 billion in 2022. Actual low-carbon financing fell by \$143 billion to \$708 billion.
- Similarly, if fossil-fuel financing grew by the same rate as the comparative capex, then it would have resulted in an increase of \$272 billion in financing volumes. The recorded change was a \$163 billion, or 14.4%, fall.
- When adjusting for proportion of revenues exposed to **low-carbon energy supply, the ESBR company universe had cash available to spend in 2022**, despite lower financing volumes. These firms generated \$478 billion in operating cash flows last year. After accounting for cash dividends, debt repayments and share buybacks, they were left with \$170 billion to use for other activities, such as capital expenditure.
- **The ESBR company universe, adjusted for fossil-fuel revenue exposure, saw extraordinary cash flows in 2022**, with a rise from \$1.7 trillion to \$2.3 trillion. Dividends, debt repayment and share buybacks grew by 41%, 21% and 234%, respectively, leaving \$721 billion for other purposes.

Several further factors may also affect financing volumes

- The **time lag between an organization raising finance or gaining revenue and spending it** could cause capex to spill over to the period(s) after financing is raised.
- **Bilateral lending activity and private credit markets** are not tracked in this report. Any shifts away from capital markets to these activities could feasibly lead to an increase in capex that is not replicated by the finance activity tracked in this report.
- **Project finance capital structures may be evolving**. The ESBR captures bank lending activities with respect to project finance, but not the equity provision of sponsors, or lending from less conventional debt funds that may have a small impact on overall volumes. See BNEF's report *Wind, PV Investors Demand Higher Returns, May Not Get Them* ([web](#) | [terminal](#)) for more.

Source: Bloomberg LP, BloombergNEF, Urgewald, IJGlobal. Note: Cash flows for low-carbon versus fossil-fuel companies is determined using the same company universe and adjustment factor methodology used in the bank financing analysis.

Capital investment differs from bank financing activity by region

Energy supply investment vs. financing in 2022, by region

\$ billion (2022 real)	Capital investment by location	Financing by region of risk	Difference
China	553	464	89
Europe	417	281	136
North America	407	613	-206
Asia Pacific	279	166	113
Africa and Middle East	230	86	144
Latin America and Caribbean	98	41	57
Multi-region or not specified	22	24	-2
Total	2,007	1,676	
<i>Notes</i>	<i>Aligned to ESIR</i>	<i>Aligned to ESBR</i>	

- There is a loose correlation between financing activity and capital investment (also referred to as capital expenditure, or capex). However, they are fundamentally different measures – in 2022, energy supply capital investment totalled **\$2 trillion**, while bank financing was about **\$1.7 trillion**. The differences are further revealed through a geographic lens.
- Financing activity refers to the funds raised by corporations, governments and supranational entities in capital markets, or from banks in the form of recourse and non-recourse debt and equity issuance. Capex is the money those entities then invest – from financing and their own cash flows – in fixed assets such as land, buildings and equipment.
- The table on the left compares capital investment and financing activity by region of financial risk, where there are significant regional disparities.
- These disparities are driven by a wide range of factors, including but not limited to: highly developed fixed-income markets that lead to large volumes of publicly disclosed capital markets transactions (such as the US), significant corporate profits/retained earnings reducing the need to raise capital from third parties (such as the Middle East), and the time difference between capital being raised and money being invested in fixed assets (such as Europe). Funds are also raised to repay existing debt – known as refinancing (see [slide 11](#)).

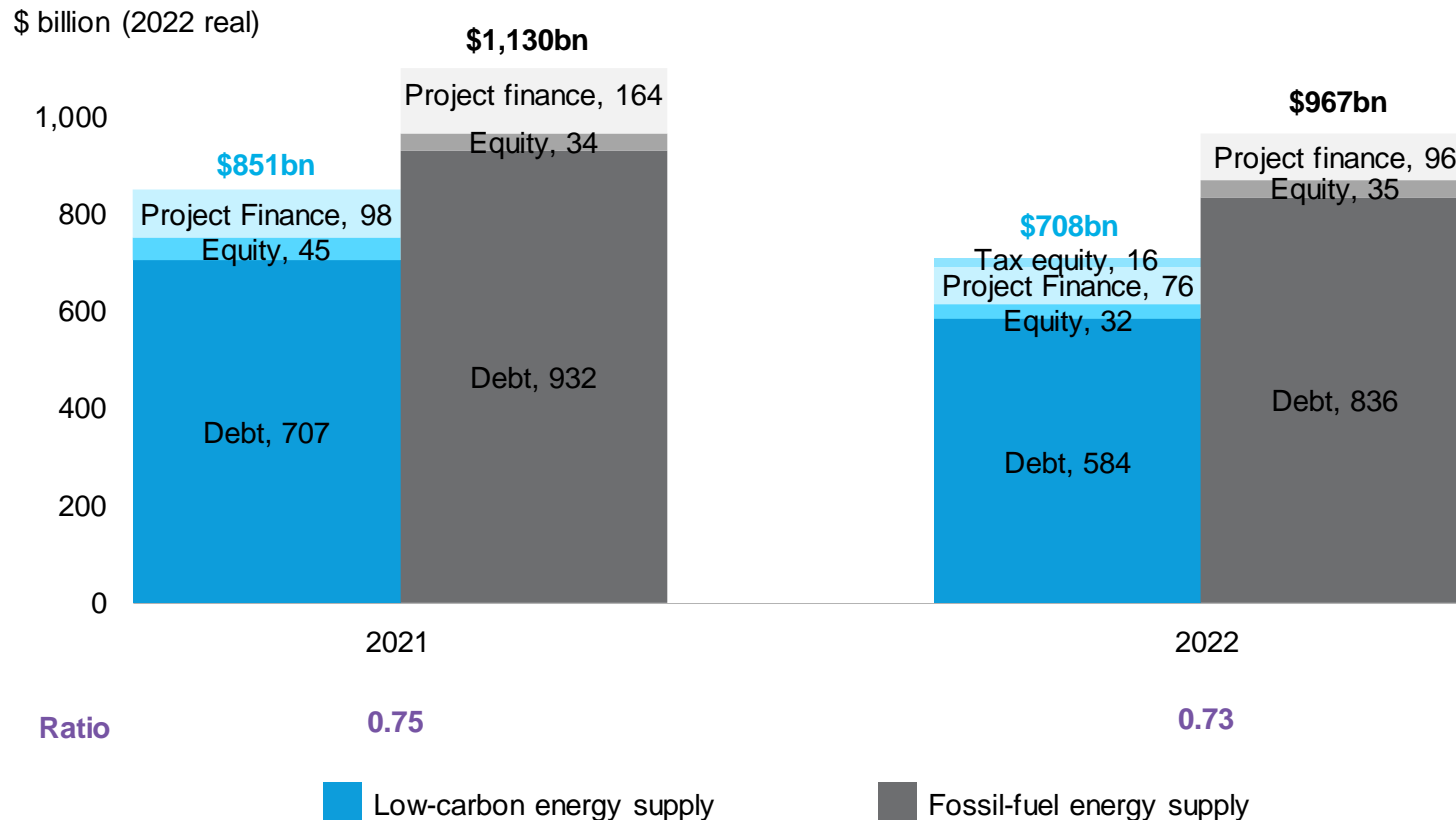
Source: Bloomberg LP, BloombergNEF, RAN, Urgewald, IJGlobal, IEA World Energy Investment 2022. Note: Table shows energy supply investment and financing. ESIR refers to Energy Supply Investment Ratio; ESBR refers to Energy Supply Banking Ratio.

Bank-facilitated financing

Instrument, regional and sectoral Energy
Supply Bank Ratios, 2021-22

Energy financing declines slightly in 2022; ratio remains similar at 0.73:1

Global energy supply banking 2021-22

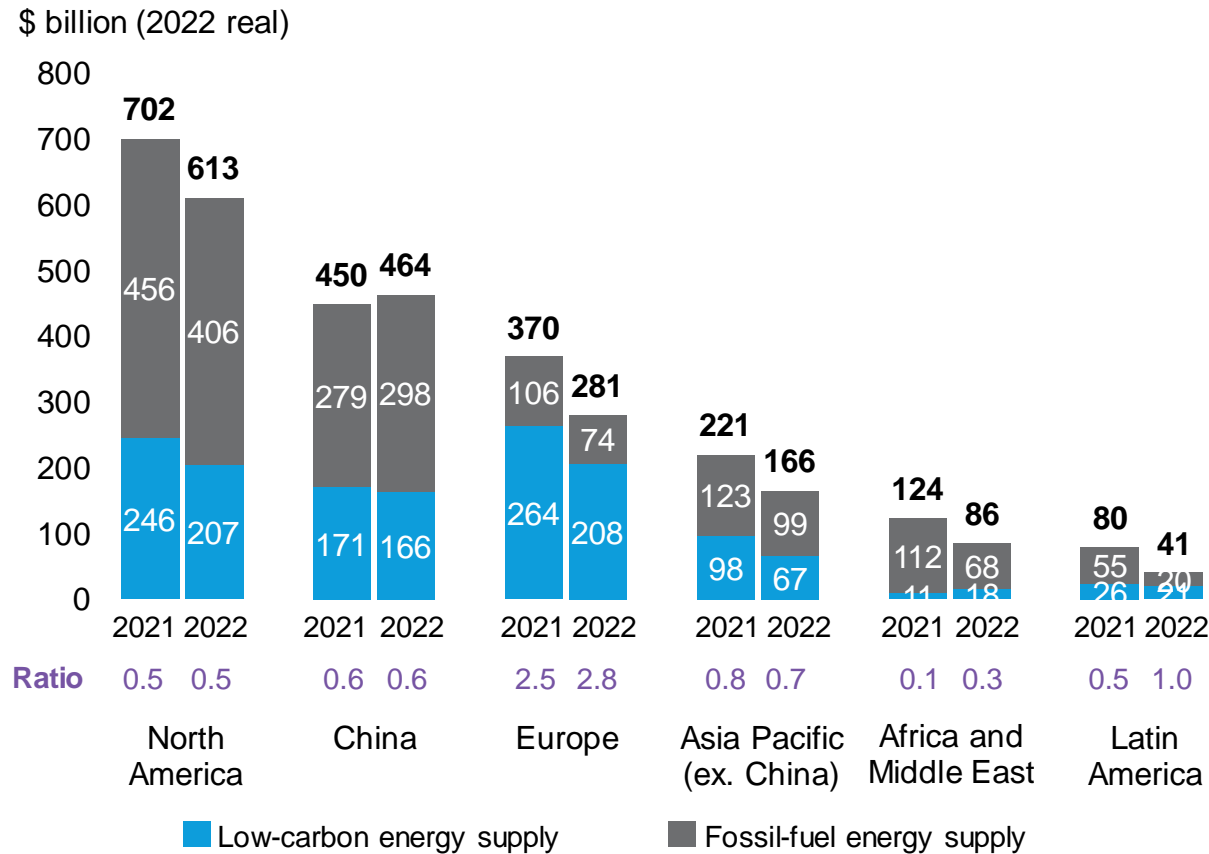


Source: BloombergNEF, IJGlobal, RAN, Urgewald. **Note: 2021 low-carbon energy supply values net energy efficiency labeled sustainable debt, which has been shifted to energy demand according to the reasoning outlined on slide 6. All numbers adjusted for inflation and reported in 2022 US dollars.

- The 2022 low-carbon to fossil-fuel Energy Supply Banking Ratio was **0.73:1** across all 1,100 banks engaged in some form of energy supply underwriting in this dataset.
- The 2021 low-carbon figures were revised due to an updated treatment of energy efficiency use-of-proceeds-based sustainable debt financing and treatment of some issuers (see [slide 7](#)). This resulted in a revision in the ESBR from **0.81:1 to 0.75:1**.
- While the decline in the ESBR from 0.75:1 to 0.73:1 is marginal, year-over-year this does not indicate the type of dramatic ramp-up implied by 1.5C-consistent climate scenarios, which signal that overall energy sector investment needs to reach a minimum of 4:1 by 2030.
- In aggregate, these banks underwrote **\$1.7 trillion** of energy supply transaction activity in 2022 (**\$708 billion** for low-carbon energy and **\$967 billion** for fossil fuels). Of this, \$1.5 trillion went to capital underwriting and \$0.2 trillion to project finance and tax equity.

Regional ratios remain largely similar to 2021, but increase in emerging markets

Energy supply financing by issuance region of risk, 2021-22



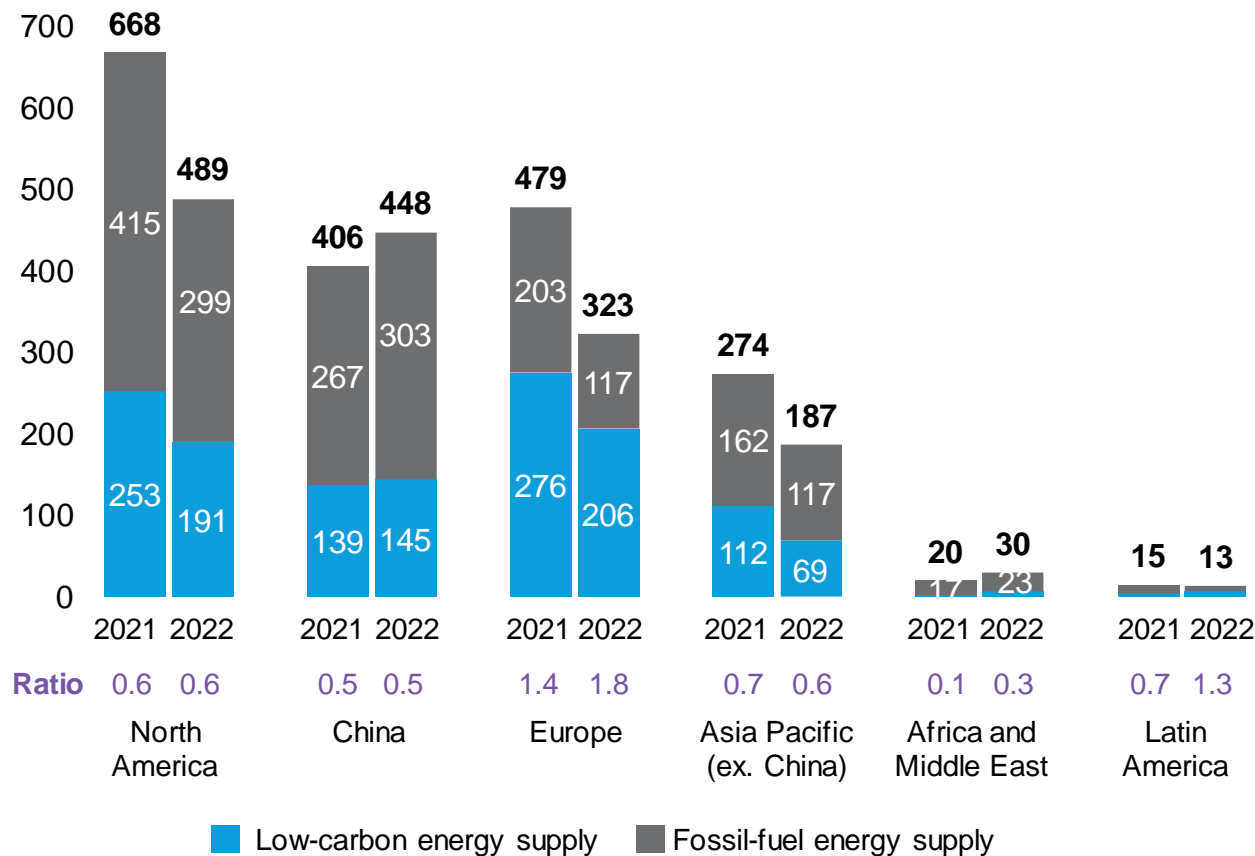
Source: Bloomberg LP, BloombergNEF, RAN, Urgewald, JGGlobal. Note: All 2021 numbers adjusted for inflation and reported in 2022 US dollars.

- The location of the capital raising entities is defined by the region of risk.
- North America saw **\$613 billion** of energy supply financing and facilitation in 2022, of which \$207 billion was for low-carbon energy and \$406 billion for fossil fuels, resulting in an ESBR of around **0.5:1**. This reflects the US, Canada and Mexico’s major role in the supply of energy, particularly oil and gas, for domestic use and export.
- China saw **\$464 billion** of energy supply financing, of which \$166 billion was for low-carbon energy and \$298 billion for fossil fuels, resulting in an ESBR of approximately **0.6:1**, similar to 2021.
- Europe saw **\$281 billion** of energy supply financing in 2022, down 24% from 2021, of which \$208 billion was for low-carbon energy and \$74 billion for fossil fuels, resulting in an **ESBR of about 2.8:1**. The relative paucity of oil and gas supply in Europe and the continent historically having the most favorable regulatory environment for low-carbon energy investment is reflected in its high ESBR. It is the only region with more low-carbon than fossil-fuel financing in 2021 and one of two in 2022.
- Asia Pacific (excluding China) saw **\$166 billion** of energy supply financing and facilitation in 2022, of which \$67 billion was for low-carbon energy and \$99 billion for fossil fuels. This resulted in an ESBR of around **0.7:1**.
- Ratios in smaller, emerging markets increased from 2021. Africa and the Middle East saw **\$86 billion** of energy supply financing, of which \$18 billion was directed to low-carbon energy and \$68 billion to fossil fuels, resulting in an ESBR of approximately **0.3:1**. That is triple the region’s 2021 ratio of 0.1:1.
- Latin America and the Caribbean saw **\$41 billion** of energy supply financing, of which \$21 billion was directed to low-carbon energy and \$20 billion to fossil fuels, resulting in an ESBR of around **1.0:1**, more than double the region’s 2021 ratio of 0.5:1.

Banks headquartered in North America, Europe and Asia Pacific (excluding China) saw large volume declines

Energy supply financing by bank headquarters, 2021-22

\$ billion (2022 real)



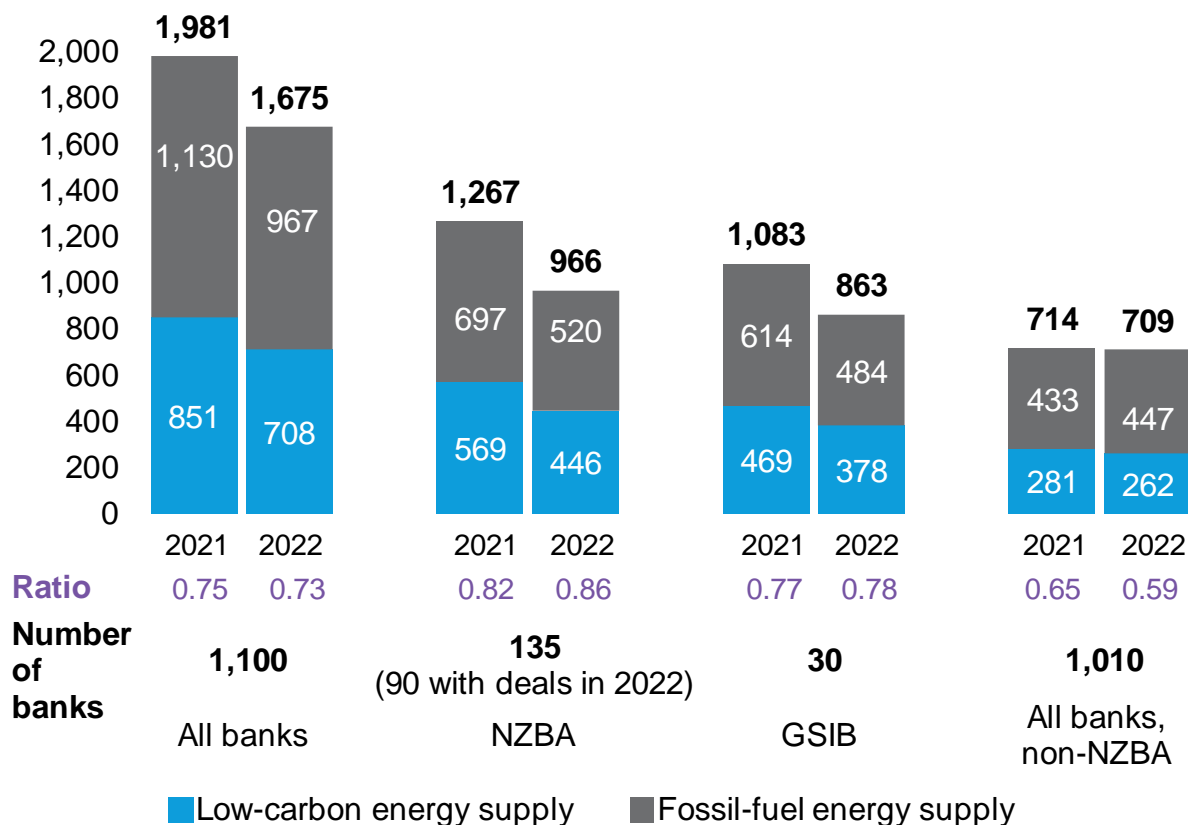
Source: Bloomberg LP, BloombergNEF, RAN, Urgewald, IJGlobal. Note: All 2021 numbers adjusted for inflation and reported in 2022 US dollars.

- Banks headquartered in North America engaged in **\$489 billion** of energy supply financing and facilitation in 2022, of which \$191 billion was for low-carbon energy and \$299 billion for fossil fuels, resulting in an ESR of approximately **0.6:1**. This reflects both the leading nature of North American banks globally, as well as the region's role in the supply of energy for domestic use and export.
- China-headquartered banks surpassed those in European by total volume in 2022, engaging in **\$448 billion** of energy supply financing, of which \$145 billion was for low-carbon energy and \$303 billion for fossil fuels. This translated to an ESR of around **0.5:1**, the same as 2021.
- Banks headquartered in Europe engaged in **\$323 billion** of energy supply financing, of which \$206 billion was for low-carbon energy and \$117 billion for fossil fuels, resulting in an **ESR of about 1.8:1**. This reflects the relative paucity of oil and gas investment in Europe and the historically favorable regulatory environment for low-carbon energy investment.
- Excluding China, Asia Pacific-headquartered banks engaged in **\$187 billion** of energy supply financing and facilitation in 2022, of which \$69 billion was for low-carbon energy and \$117 billion for fossil fuels. This resulted in an ESR of around **0.6:1**.
- Banks headquartered in Africa and the Middle East engaged in **\$30 billion** of energy supply financing, of which \$7 billion was directed to low-carbon energy and \$23 billion to fossil fuels, resulting in an ESR of approximately **0.3:1**. Similar to region of risk, this is triple the ratio of 2021.
- Latin America and Caribbean-headquartered banks engaged in **\$13.5 billion** of energy supply financing, of which \$8 billion was directed to low-carbon energy and \$6 billion to fossil fuels, resulting in an ESR of about **1.3:1**. This is a significant increase from 0.7:1 in 2021.

Analysis of prominent banking groups reveals differences

Banks' energy supply financing by subgroup, 2021-22

\$ billion (2022 real)



Source: Bloomberg LP, BloombergNEF, RAN, Urgewald, IJGlobal. Note: GSIB refers to global systematically important banks. Net-Zero Banking Alliance (NZBA) membership as of October 23, 2023. All 2021 numbers adjusted for inflation and reported in 2022 US dollars.

- Banks underwrote a total of **\$1.7 trillion** of energy supply transaction activity in 2022, with **\$0.7 trillion** being for low-carbon energy and **\$1 trillion** for fossil fuels. This translates to an ESBR of 0.73. ESBRs vary widely among all banks measured, from 0 to over 100, with some banks financing only low-carbon energy or only fossil fuels.
- While this report aims to capture the whole universe of banking activity in 2022, several subgroups are worth further examination:
- **Global systematically important banks (GSIB):** These comprise 30 banks determined by the international Financial Stability Board to be of such “size, interconnectedness, complexity or lack of substitutability” that they are too big to fail. Of the 30 GSIB banks, 24 have joined the **Net-Zero Banking Alliance**. In 2022, the GSIB as a whole underwrote **\$0.9 trillion** of energy supply financing (50% of the total) with a ratio of **0.78:1** for low-carbon energy to fossil fuels.
- **Net-Zero Banking Alliance (NZBA):** Some 135 banks have committed to net-zero financed emissions by 2050 under the wider umbrella of the Glasgow Financial Alliance for Net Zero (GFANZ). In 2022, the NZBA collectively underwrote **\$966 billion** of energy supply financing (58% of the total) with a ratio of **0.86:1** for low-carbon energy to fossil fuels. The NZBA represents 63% of all low-carbon energy supply financing and 54% of all fossil-fuel financing in 2022.
- Banks that have **not joined the NZBA** underwrote **\$709 billion** of energy supply financing (42% of the total) in 2022, with a ratio of **0.59:1** for low-carbon energy to fossil fuels – lower than those of the NZBA or GSIB banks.

Energy supply: Top deals

Top low-carbon energy supply deals in 2022

Asset class	Issuer	Total deal amount (\$ billion)	Low-carbon supply (\$ billion)	Fossil-fuel supply (\$ billion)
Loan	National Grid	6.0	6.0	N/A
Green loan	Champlain-Hudson Power Express	5.2	5.2	N/A
Loan	RWE AG	6.8	3.9	2.9
Equity	Centrais Eletricas Brasileiras	6.2	3.7	2.2
Green bond	Bank of China	4.8	3.4	N/A
Loan	Duke Energy	9.0	3.3	5.7

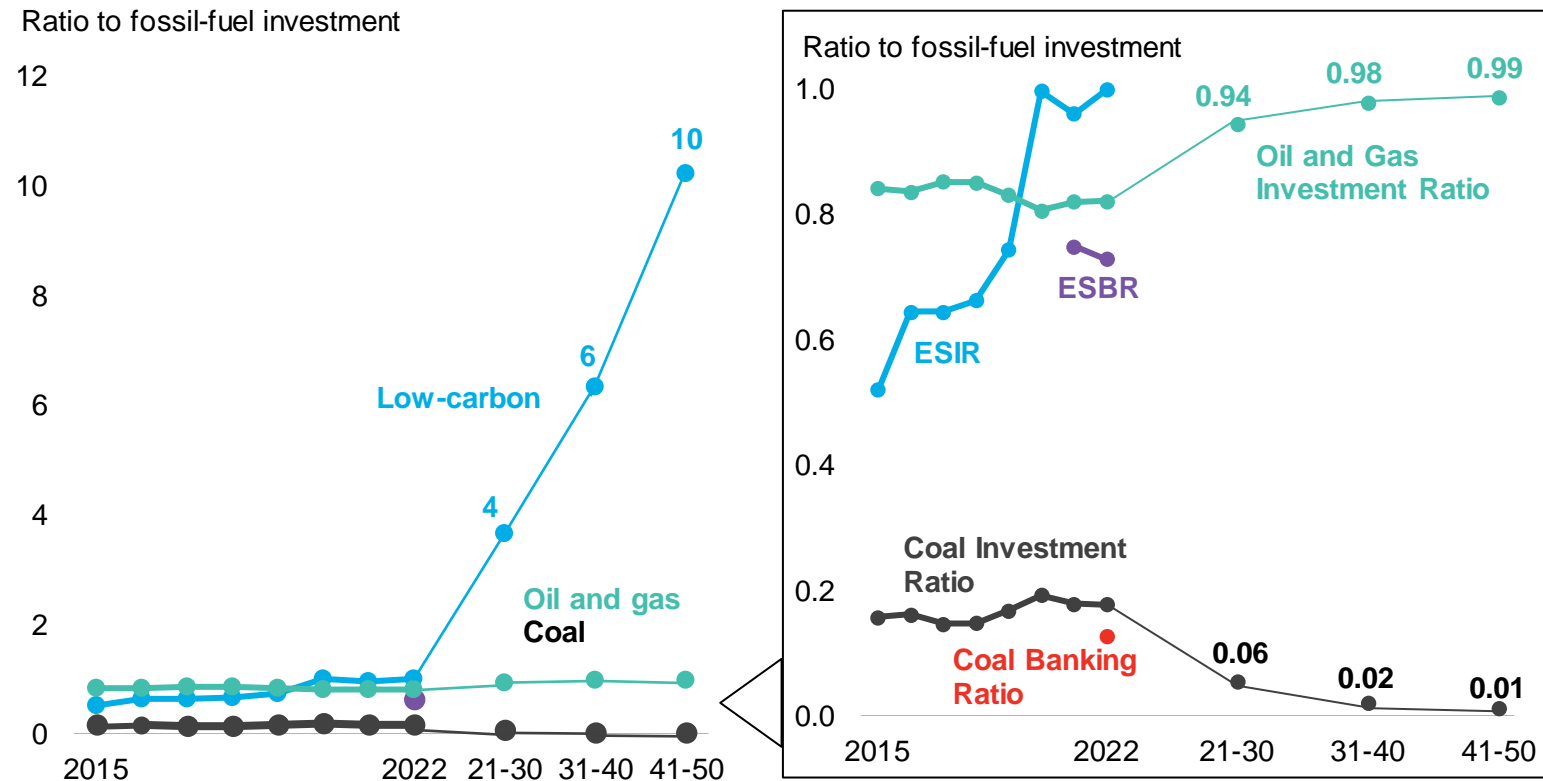
Source: Bloomberg LP, BloombergNEF, RAN, Urgewald, IJGlobal.

Top fossil-fuel energy supply deals in 2022

Asset class	Issuer	Total deal amount (\$ billion)	Low-carbon supply (\$ billion)	Fossil-fuel supply (\$ billion)
Loan	Saudi Arabian Oil Co	8.0	0.01	7.99
Loan	Trans Mountain Corp	7.7	N/A	7.7
Loan	Totalenergies SE	8.0	1.6	6.4
Loan	ENI SpA	6.1	0.2	5.9
Loan	Duke Energy	9.0	3.3	5.7
IPO	Dubai Electricity and Water Authority	6.1	0.5	5.6

Commonly referenced climate scenarios imply a rapid decline for coal investment

Ratio of low-carbon energy, oil and gas, and coal investment to fossil fuels



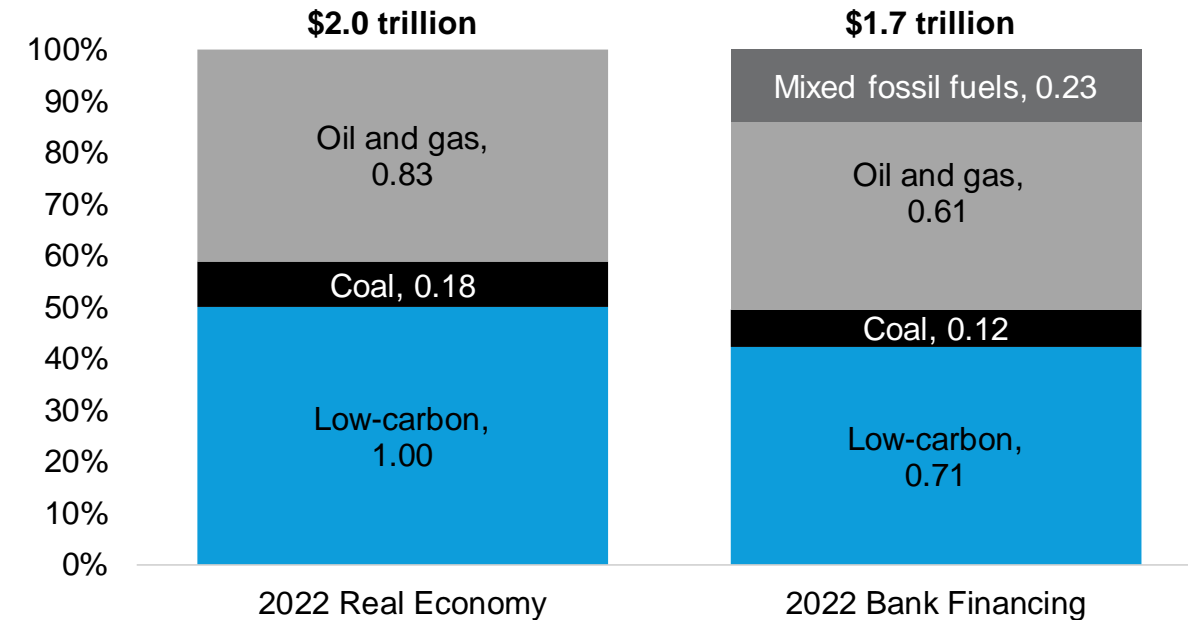
- The ratio of investment in oil and gas to total fossil fuels has hovered between **0.8:1 to 0.85:1** since 2015, with coal making up the remaining share of capital spending. In 2022, for every \$1 invested in total fossil fuels supply, only **\$0.18** went into coal, giving a coal investment ratio of 0.18:1.
- These levels represent the overall capital spending incurred in a given year, based on supply, demand, trade and industry dynamics from the IEA's World Energy Investment reports. However, they differ from financing, and **capex does not necessarily reflect the financing required for managed phase-outs**.
- Aligning to a 1.5C warming and net-zero trajectory implies the ratio of coal investment to total fossil fuels dropping from 0.2:1 to 0.06:1 this decade and **0.01:1 by the 2040s**, while the oil and gas investment ratio increases to **0.99:1**. In tandem, the low-carbon to fossil-fuel investment ratio rises significantly to a minimum of 4:1 by 2030, 6:1 in the 2040s and 10:1 by 2050.
- **The coal banking ratio (0.13:1) – the ratio of bank facilitated coal financing to total fossil fuels – is 72% of the coal investment ratio (0.18:1) suggesting a significant portion of coal capex comes from sources other than bank-facilitated financing, such as equity from corporate balance sheets.**

Source: BloombergNEF, International Energy Agency, The Network for Greening the Financial System, UN Intergovernmental Panel on Climate Change. Note: Investment into oil and gas supply includes the upstream, midstream and refining (downstream) sectors. Coal supply investment pertains to the mining and transport of both coking and steam coal. ESIR stands for Energy Supply Investment Ratio. ESBR stands for Energy Supply Banking Ratio.

Low-carbon financing similar to oil and gas volumes, and five times coal

Breakdown of energy supply investment and bank financing in 2022, by source

Percentage share, \$ trillion (2022 real)



Ratio, Low-carbon to fossil fuels

1.0

0.73

Ratio, Coal to fossil-fuel total

0.18

0.13

- Commonly-referenced climate scenarios imply a target coal to total fossil-fuel ratio of **0.06:1** this decade, and a further reduction to **0.01:1** in the 2040s. **The ratio of real economy investment in coal to fossil fuels in 2022 was 0.18:1, while for bank-facilitated financing of coal the ratio was approximately 0.13:1.**

Investment

- In 2022, capital investment in low-carbon energy supply matched fossil fuels 1:1 with a total of **\$1 trillion**. Some **\$825 billion (83%)** of fossil-fuel investment was in oil and gas. **North America and the Middle East and Africa** accounted for around **50%** of this.
- Some **\$179 billion (18% of all fossil fuels, 9% of all energy supply investment)** went into coal, **\$120 billion (65%)** of which was in **China**.

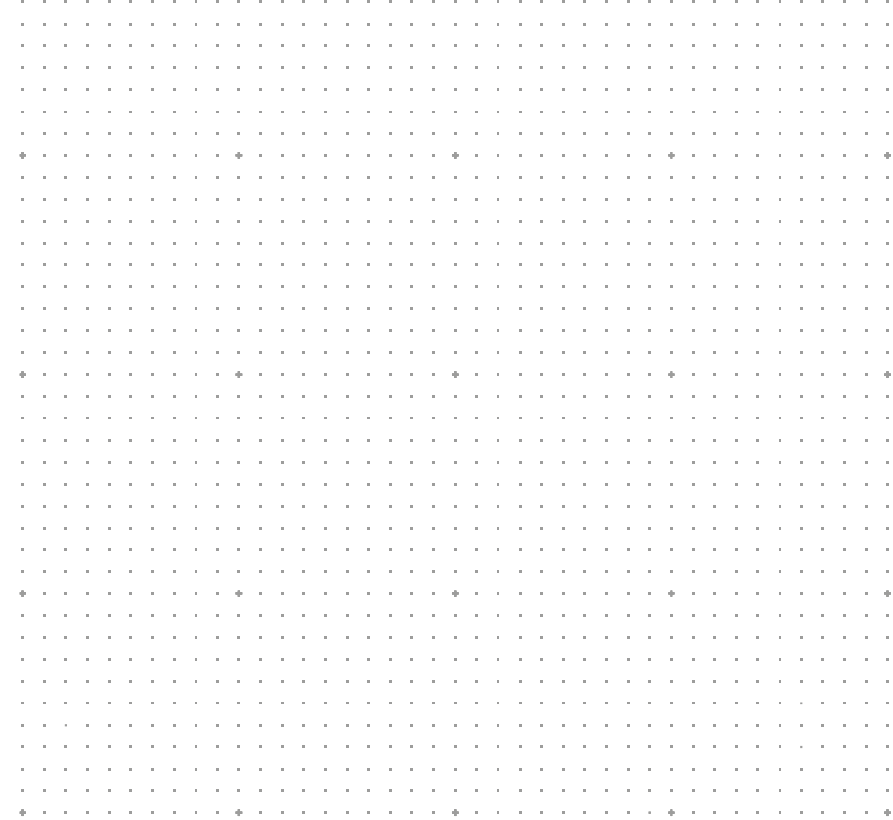
Facilitated financing

- Oil and gas made up the majority (**63%**) of fossil-fuel financing at **\$611 billion** in 2022. This was about five times bank financing of coal, which was less than **13%** of the total for fossil fuels and **8%** of energy supply financing, at **\$122 billion**. Some **\$234 billion** of fossil-fuel finance is made up of an undetermined breakdown between coal and oil and gas.
- Some **\$93 billion (76%)** of measured coal financing took place in **China**. A distant second was the **US (\$10 billion)**, followed by **India (\$3 billion)** and **Germany (\$3 billion)**.

Source: BloombergNEF, JGlobal, RAN, Urgewald. Note: Labels on bar segments refer to investment totals in trillions of 2022 real US dollars.

How this relates to banks' targets

Selected comparisons



Banks are setting ambitious green financing targets

Many of the world's largest banks have set ambitious goals to direct capital toward sustainability and climate-related projects. These green finance targets serve as a complement to net-zero financed emissions targets. As this report aims to characterize the low-carbon energy financing volumes of major banks, we examined how a selection of banks present their sustainable finance targets.

	JPM Chase	Citi	Bank of America	TD Bank	HSBC	MUFG
Green financing commitment <i>Total figures banks have publicly announced</i>	<ul style="list-style-type: none"> \$2.5 trillion in sustainable development by 2030 through capital provision and underwriting \$1 trillion for green/climate initiatives specifically 	<ul style="list-style-type: none"> \$1 trillion sustainable finance by 2030 through lending, investment, and facilitation \$500 billion for environmental causes specifically 	<ul style="list-style-type: none"> \$1.5 trillion in sustainable development goal (SDG)-focused financing by 2030 \$1 trillion climate-related specifically 	<ul style="list-style-type: none"> C\$500 billion (\$368 billion) by 2030 to "support the low-carbon economy" through lending, financing, underwriting and asset management 	<ul style="list-style-type: none"> \$750 billion to \$1 trillion by 2030 to support clients in net-zero goals 	<ul style="list-style-type: none"> ¥35 trillion (\$240 billion) sustainable finance by 2030 ¥18 trillion for environmental causes specifically
Reported progress <i>In areas most relevant to this report</i>	<ul style="list-style-type: none"> \$176 billion green finance since 2021 \$70 billion in 2022, \$106 billion in 2021 	<ul style="list-style-type: none"> \$239 billion environmental finance since 2020 \$87 billion in 2022, \$124 billion in 2021 	<ul style="list-style-type: none"> \$235 billion environmental finance since 2021 ~\$78 billion in 2022, \$157 billion in 2021 	<ul style="list-style-type: none"> C\$108 billion since 2017 C\$22 billion in 2022, C\$30 billion in 2021 	<ul style="list-style-type: none"> \$211 billion since 2020 \$84 billion in 2022, \$82 billion in 2021 	<ul style="list-style-type: none"> ¥5.6 trillion since 2019 To be determined in 2022, ¥1.9 trillion in 2021

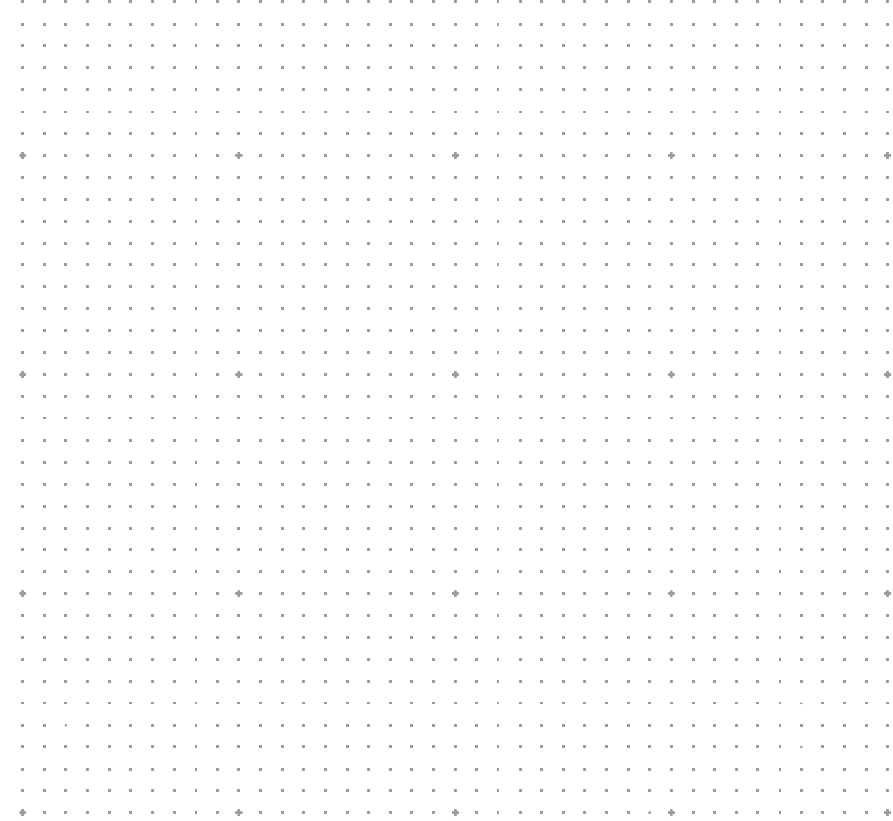
What this report tracks versus what banks count in their long-term goals

Feature		This report	JPMorgan Chase	Citi	Bank of America	TD Bank	HSBC	MUFG	
Financial instruments or mechanisms	Debt	Direct lending	x	✓	✓	✓	✓	?	✓
		Underwriting	✓	✓	✓	✓	✓	?	✓
		Sustainable debt	✓ *Energy use of proceeds	✓	✓	✓	✓	✓	✓
	Project finance	Direct lending	✓	✓	✓	✓	✓	?	✓
		Underwriting	✓	✓	✓	✓	✓	?	?
	Equity	Tax equity	✓	✓	✓	✓	x	x	x
		Asset management	Portfolio	x	x	✓	✓	✓	✓
	Retail	Insurance or banking	x	✓	✓	✓	✓	✓	✓
	Internal	Corporate programs	x	✓	✓	✓	✓	?	✓
Sector or technology	Energy supply	Renewables	✓	✓	✓	✓	✓	✓	✓
		Nuclear	✓	✓	✓	✓	✓	?	?
		Electric grid	✓	?	?	?	✓ *Limited	?	?
	Energy demand	Transport	✓ *Only in energy demand	✓	✓	✓	✓	✓	✓
		Energy efficiency	x *Except green debt, in energy demand	✓	✓	?	✓	✓	✓
	Non-energy	Land use	x * Not energy supply	✓	✓	✓	✓	?	x
		Water/waste	x * Not energy supply	✓	✓	✓	✓	?	x
Key metrics	Exposure	Financed emissions	x	✓	✓	✓	✓	✓	
	Transition enablement	Energy supply facilitation	✓	✓	✓	✓	✓	✓	

Source: Banks, BloombergNEF.

How this relates to NGO and other research

Selected comparisons



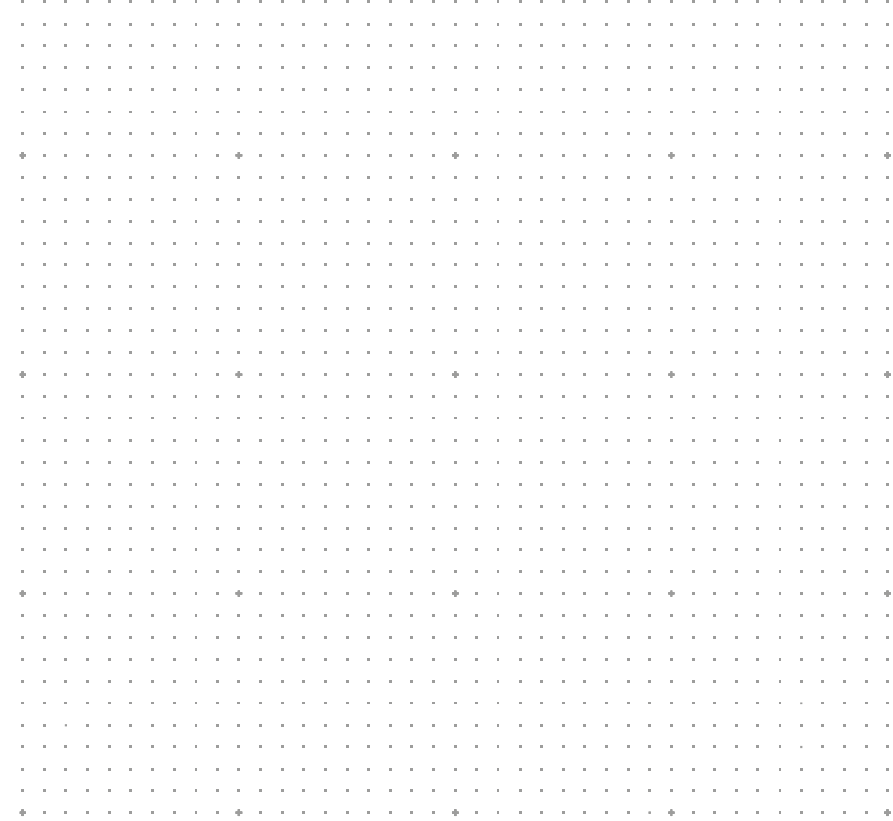
Existing research provides a range of estimates due to methodological differences

Research organization	Report	Note	Scope			Coal	Oil and gas		Fossil fuels total value	Low-carbon total value
			Years	# of banks	Value	Sectors	Value	Sectors		
Rainforest Action Network	<i>Banking on Climate Chaos (BoCC)</i>	Our report uses adjustment factors to parse transactions – an approach borrowed from RAN's work in <i>BoCC</i> .	2016-2022, by year	60 banks	\$43 billion (2022)	Mining, power	\$626 billion (2022)	Tar sands, Arctic, offshore, fracked, liquefied natural gas	\$669 billion (2022), \$742 billion (2021)	
Urgewald	<i>Financing the Coal Exit List</i>	We use Urgewald's research on companies' fossil-fuel share of revenue through its Global Coal Exit List and Oil & Gas Exit List.	2019-21 aggregate	705 banks	\$1.5 trillion	Mining, power		Not measured	\$1.5 trillion (2021)	Not measured
InfluenceMap	<i>Finance and Climate Change</i>		2020-21 aggregate	27 banks	\$42 billion	Mining	\$697 billion	Up-, mid-, downstream	\$739 billion	
Reclaim Finance	<i>Throwing Fuel on the Fire</i>		~1 year through September 2022, varies by bank	56 banks	\$54 billion	Mining, power, expansion only	\$215 billion	Up- and midstream, expansion only	\$269 billion	
Profundo	<i>Just 7% of Global Banks' Energy Financing Goes to Renewables</i>		2016-2022, by year	60 banks			Not split out		\$299 billion (2021)	\$35 billion (2021)
Federal Reserve	<i>What are Large Global Banks Doing About Climate Change?</i>		2016-2021, by year	60 banks (fossil fuels), all (sustainable debt)			Not split out		\$750 billion (2021)	\$700 billion (2021, green debt only)
BloombergNEF	<i>Financing the Energy Transition (this report)</i>		2021-22	1,100 (2022) 1,161 (2021)	\$122 billion (2022)	Mining, power	\$611 billion (2022)	Up-, mid-, downstream	\$967 billion (2022) \$1,130 billion (2021)	\$708 billion (2022) \$851 billion (2021)

Source: BloombergNEF, RAN, Urgewald, InfluenceMap, Reclaim Finance, Profundo, Federal Reserve. Note: Years, ranges and activities are not directly comparable. For repeated reports, values represent most recent edition.

How this relates to other bank assessment frameworks

Selected comparisons



How does the ESBR compare to other frameworks for assessing banks on climate progress?

	Energy Supply Banking Ratios	Green Asset Ratio (EU Taxonomy)	Financed emissions accounting and net-zero targets	Green financing targets and progress
Description	Ratio of <i>low-carbon to fossil-fuel</i> energy supply banking activity	Mandatory reporting of ratio of <i>green assets</i> : <i>total assets</i> on bank balance sheets	Emissions associated with on-balance sheet financing activities	\$ volume of finance and facilitation toward “green” companies and projects
Framework developer	BloombergNEF	European Banking Authority European Commission	Partnership for Carbon Accounting Financials (PCAF) Science-Based Targets initiative (SBTi)	Organic – individual banks have defined their own
What is included?	<ul style="list-style-type: none"> • Underwriting activity • Corporate bonds and syndicated loans • Equity issuances • Project finance and tax equity 	<ul style="list-style-type: none"> • Corporate and project loans • Equity holdings • Household auto and mortgages 	<ul style="list-style-type: none"> • On-balance sheet corporate and project loans • Equity and bond holdings • Household auto and mortgages • Sovereign debt 	<ul style="list-style-type: none"> • Corporate and project loans • Underwriting activity • Equity and bond holdings • Tax equity • Household electric vehicle loans
What is not included?	<ul style="list-style-type: none"> • Corporate bilateral or otherwise private loans • Retail (in other words, household) lending 	<ul style="list-style-type: none"> • Facilitated financing (in other words, underwriting) • Exposure to governments, central banks • Assets under management • Loans to small companies and non-EU corporates not subject to Non-Financial Reporting Directive (NFRD) (<i>but included in denominator</i>) 	<ul style="list-style-type: none"> • Facilitated financing (in other words, underwriting) – <i>standard in development</i> 	
Limitations	<ul style="list-style-type: none"> • Relies on commercial databases and estimates, rather than company reporting • Focused on two of the GFANZ four financing strategies: “climate solutions” and “managed phase out”, partial coverage of aligned or aligning in other words, ‘transition’ finance 	<ul style="list-style-type: none"> • Not tied to any benchmark rooted in science • Not growth-oriented; based on “stock” or balance sheet, rather than tracking new financial flows • Broad “green” bucket not focused on specific goals (in other words, climate) 	<ul style="list-style-type: none"> • Focused exclusively on emissions rather than solutions/new investment in low-emission assets • Incentivizes divestment – can lead to emissions being shifted off balance sheet • Anchored in sectoral emissions pathways 	<ul style="list-style-type: none"> • Not tied to a benchmark rooted in science • Broad “green” bucket not focused on one goal (in other words, climate) • Can be interpreted as a vanity metric
What has it added to the conversation?	<ul style="list-style-type: none"> • Focused on new investment and finance facilitations required for the energy transition • Rooted in 1.5C climate scenarios 	<ul style="list-style-type: none"> • Focused on balance sheet exposure of institutions to particular asset types • First mandatory reporting metric that focuses on the “green” side of the energy transition • Reporting increases transparency and data availability 	<ul style="list-style-type: none"> • Addresses the unique impact financials have, contrasted with real economy companies • Enabled financials to set net-zero targets • Backbone of many global sustainability reporting mandates, such as the CSRD (EU) and Securities and Exchange Commission proposals (US) for banks 	<ul style="list-style-type: none"> • Growth and opportunity oriented • Acknowledges the important role that facilitated finance plays

Ensuring data accuracy

How to ensure an institution's transactions are properly tracked

How to ensure an institution's transactions are properly tracked

This analysis is based on existing commercial and not-for-profit databases, not primary data collection. Though the authors will share underlying data where possible, if transactions are missing from underlying databases or require corrections, they are unable to add or edit these directly. In those circumstances, the following channels can be contacted to address the issue. Each team has rolling deadlines throughout the year – please contact them to ensure your institution's data is up to date.

If you wish to be informed of the timelines on submission, review and final data cut-off for the next iteration of the report, please contact the corresponding author, Trina White (kwhite202@bloomberg.net).

Financing mechanism	Source	How to get in touch about discrepancies
Debt	Bloomberg LP, SRCH <GO> function	<p>Bonds</p> <p>Submit or reach out to newissues@bloomberg.net for North American bonds and emeacapmkt@bloomberg.net for EMEA bonds. Appropriate addresses for other regions can be identified using NIM99 <GO> on the Bloomberg Terminal.</p> <p>Loans</p> <p>Submit or reach out to loansleag@bloomberg.net for US loans, europeanloan@bloomberg.net for EMEA loans, and aploans@bloomberg.net for APAC loans. Use NIM99 <GO> for other appropriate addresses.</p>
Equity	Bloomberg LP, IPO <GO> function	Submit missing deals or discrepancies to the IPO desk at calendar@bloomberg.net
Project Finance – Low-Carbon	BNEF Clean Energy League Tables team	Contact BNEF Clean Energy League Tables at cleanenergy@bloomberg.net to receive submission templates.
Project Finance – IJGlobal	IJGlobal	Contact leaguetables@ijglobal.com for submission forms to be submitted to the same address; or visit https://www.ijglobal.com/league-tables to download submission forms.

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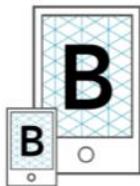
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