

# Financing the Transition: Energy Supply Investment and Bank Financing Activity

## Comparing low-carbon and fossil fuel activity: Summary Report

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# Foreword

Investment in low-carbon energy supply (excluding electricity grids) increased by 15% in 2022 to \$550 billion, according to BloombergNEF's annual *Energy Transition Investment Trends* report. That's the fastest rate of growth since 2015. While a bounce in fossil-fuel investment is expected to counter the disruption caused by Russia's invasion of Ukraine, the underlying economics of low-carbon energy supply mean its growth will be sustained.

However, there remains considerable uncertainty about the magnitude and composition of global energy investment required to achieve net-zero emissions. In previous analysis, BNEF found that for the most frequently referenced climate scenarios, under which the average global temperature rises by no more than 1.5°C above pre-industrial levels, the ratio of investment in low-carbon energy supply to fossil fuels increases from around 1:1 in 2021 to a minimum of 4:1 at the end of the decade. This means that in 2030 for each dollar invested in fossil-fuel energy supply, at least four would need to be invested in low-carbon energy sources.

BNEF tracks technology changes, commodities and capital flows in the energy transition, answering questions of importance to the market. If the ratio presents a meaningful indicator of progress, then what does financing activity say about how the banking community is supporting this investment?

This report is our attempt to answer that question – to have a more rounded understanding of banks' financing activity than is currently available and to establish strong analytical foundations for future work. It examines activity for low-carbon and fossil-fuel energy supply in such a way that at a high level it can be compared to the ratio required by 1.5°C scenarios.

The findings are important. They shine a light on an area that has caused tension between key partners in the energy transition; they give a view on where the finance industry was in 2021 (which, for many institutions, marked the first year they committed to achieving net zero); and highlight the crucial relationship to the real economy, despite the difference between investment and financing, and between financing in regions that supply oil and gas versus those that consume them. Most significantly, this report provides an analytical framework on which to build the discussion of how we accelerate from the current 1:1 to the minimum 4:1 ratio for low-carbon to fossil-fuel supply investment in 2030.

By doing so, we believe it will help progress the discussion for all parties involved.



**Jon Moore, CEO, BNEF**

# Acknowledgements

Work of such an ambitious scope is not completed in a bubble. To put this report together, we have drawn on the accumulated expertise of a wide range of specialists, both internally at Bloomberg and externally. In particular the authors would like to thank:

[The Rainforest Action Network \(RAN\)](#) for their work and the methodological development behind the *Banking on Climate Chaos* report; [Urgewald](#) for their detailed research on the *Global Coal Exit List* and the *Global Oil and Gas Exit List*, and permission to use their data on the share of revenue from fossil fuels; [IJ Global](#) for their fossil-fuel project finance data; [InfluenceMap](#) for their report *Finance and Climate Change*; [Reclaim Finance](#) for their report *Throwing Fuel on the Fire: GFANZ financing of fossil fuel expansion*; and [Profundo](#) for their report *Just 7% of Global Banks' Energy Financing Goes to Renewables*, which was a first attempt at tracking both low-carbon and fossil-fuel financing activity – by doing so, they recognized the importance of the energy investment/financing ratio concept. The [Federal Reserve](#) has also done valuable initial work in this space in their report *What are Large Global Banks Doing About Climate Change?*, which further progresses the ratio concept.

We would also like to thank the teams at [Bank of America](#), [Citi](#), the [Glasgow Financial Alliance for Net Zero \(GFANZ\)](#), [HSBC](#), [JPMorgan Chase](#), [MUFG](#), the [Net Zero Banking Alliance \(NZBA\)](#) and [TD Bank](#), who reviewed early copies of this paper and provided feedback. We'd also like to thank the [IEA](#) for their work on capital investment and ratios. Thank you as well to the fixed-income teams at Bloomberg LP Global Data and Engineering for methodological support. Finally, we would like to thank [Carl Pope](#) for the original energy investment ratio concept and his feedback and encouragement.

Any errors remain the responsibility of the authors:

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# Executive summary (1)

In 2021, banks financed 81% as much low-carbon energy supply as fossil fuels – for every dollar of bank financing activity supporting fossil-fuel supply, **0.8** supported low-carbon energy. While financing is a different metric to capital invested, this ratio broadly reflected real-economy investment activity at **0.9:1**.

The pace at which low-carbon energy supply is scaled up will dictate the rate at which fossil fuels are phased down. The most frequently referenced climate scenarios indicate that, on average, to adequately displace fossil fuels to limit the average global temperature rise to no more than 1.5°C, we need to increase the Energy Supply Investment Ratio (new investment in low-carbon to fossil-fuel supply) from the current ~1:1 to a minimum of 4:1 by 2030. This means for every dollar invested in fossil fuel supply in 2030 this should be matched with four times as much being invested in low-carbon energy supply.

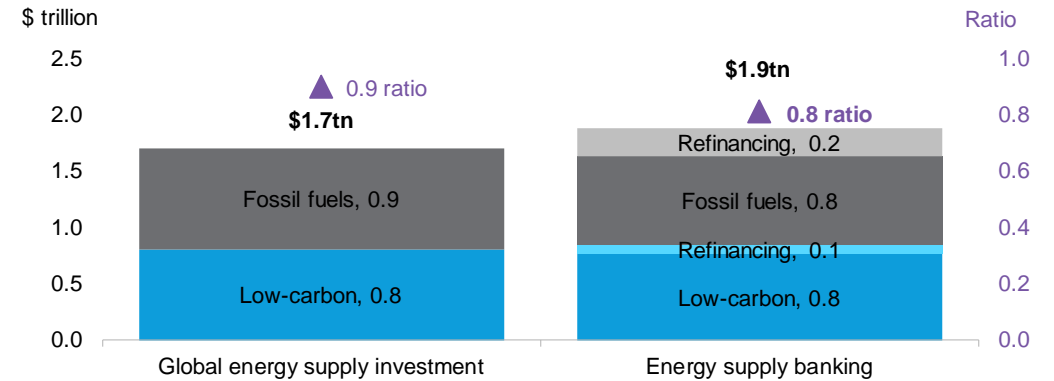
In this analysis, we use existing public and commercially available data to assess banks' energy sector financing activity in 2021 and its allocation between low-carbon supply and fossil fuels. By generating a ratio for this, we can approximate the extent to which banks' financing activity is aligned to investment in the real economy and by extension to that needed by 1.5°C-aligned climate scenarios.

To align the specifications across climate scenarios and financing activity, this analysis focuses on **energy supply** (the infrastructure built to extract, generate and distribute energy from fossil fuels or low-carbon resources) and differentiates this from **energy demand** (the consumption of energy through transportation, industrial or other energy use). This approach adheres to the definitions used to derive the 4:1 ESIR and enables a comparison between investment and financing. We conclude the following:

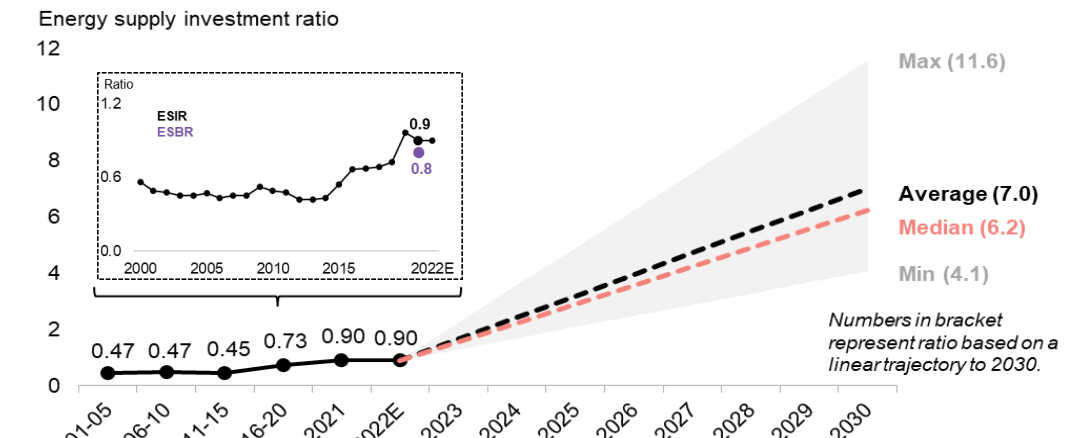
- At 0.8:1 the 2021 **Energy Supply Banking Ratio**, or ESBR, is broadly in line with that of the real-economy investment activity of 0.9:1. Bank financing for energy supply totalled \$1.9 trillion. Of that, \$842 billion went to low-carbon energy projects and companies, and \$1,038 billion went to fossil fuels.
- Bank financing mainly goes to companies and projects in North America, China and Europe. The ESBR, varies between these regions with North America and China tied at 0.6:1, and Europe at 2.6:1. In part, this reflects the role that each region plays in global energy supply and consumption.

For more BNEF 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: Full Report* ([web](#) | [terminal](#)); for underlying data see *Energy Supply Banking Ratio Tool* ([web](#) | [terminal](#)).

## Global energy supply investment vs. energy supply banking in 2021



## Range of Energy Supply Investment Ratios to 2030 implied by commonly referenced 1.5°C-consistent climate scenarios



Source: BloombergNEF, IEA, IPCC, NGFS, Bloomberg LP, BloombergNEF, 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.

# Executive summary (2)

## Energy supply financing in 2021, by bank groups

	All banks	GSIB	NZBA	All banks, non-NZBA
<b>Scope (number included in analysis)</b>				
Banks	1,142	30	126*	1,016
Issuing companies	2,895	184	1,796	1,926
Transactions	8,279	3,701	3,766	6,121
<b>Financing (\$ billion)</b>				
Low-carbon energy supply	842	499	586	256
Fossil-fuel energy supply	1,038	581	638	400
<b>Total energy supply financing</b>	<b>1,880</b>	<b>1,081</b>	<b>1,224</b>	<b>656</b>
<b>Energy supply bank ratio (ESBR)</b>	<b>0.81x</b>	<b>0.86x</b>	<b>0.92x</b>	<b>0.64x</b>

Source: Bloomberg LP, BloombergNEF, RAN, Urgewald, IJGlobal. Note: There is overlap between these banking groups on certain deals, since many of these transactions were underwritten by a syndicate of several banks. \* NZBA membership as of February 4, 2023.

## Different perspectives on the banking community

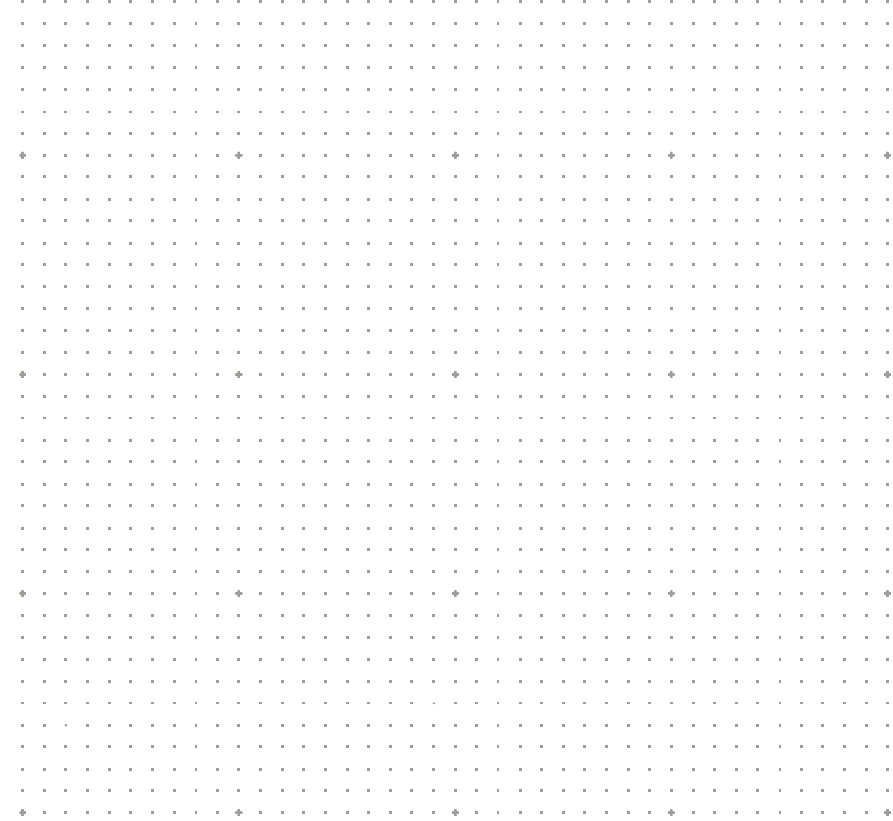
While this report aims to capture the whole universe of banking activity in 2021, several sub-groups are worth analyzing further:

- **Global Systemically Important Banks (GSIB):** This includes the 30 banks determined by the international Financial Stability Board to be of such “size, interconnectedness, complexity or lack of substitutability” that they are economically too big to fail. In 2021, GSIBs underwrote **\$1.1 trillion** of energy supply transactions, with \$499 billion being low-carbon and \$581 billion for fossil fuels. This translates to an ESBR of **0.86:1**.
- **Net-Zero Banking Alliance (NZBA):** This includes 126 banks\* committed to reaching net-zero financed emissions by 2050 under the wider umbrella of the Glasgow Financial Alliance for Net Zero (GFANZ). In 2021, the NZBA collectively underwrote **\$1.2 trillion** of energy supply financing, of which \$586 billion was low-carbon and \$638 billion for fossil fuels – an ESBR of **0.92:1**.
- **Banks not in the NZBA** underwrote **\$656 billion** of energy supply financing, with \$256 billion being low-carbon and \$400 billion for fossil fuels, giving an ESBR of **0.64:1**.

## Notable exclusions and uncertainties

Banks serve their clients in the energy sector in numerous ways not covered in this report. For example, tax equity (US only, ~\$20bn p.a. in 2021 or ~10% of low carbon financing), serving as an arranger or agent on a debt issuance and others. Estimating adjustment factors is also constrained by data availability. We have sought to manage this through a prioritisation logic (see pages 8, 30, 31).

# Methodology overview





# Our analysis spans the energy value chain

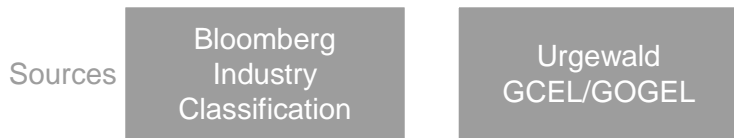
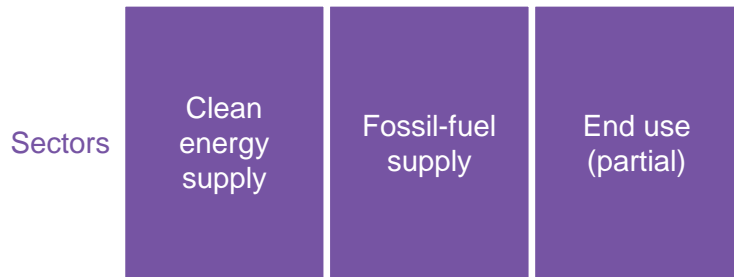
Focus of this report	1 Energy Supply		2 Energy Demand	
	<p>Company revenue driven by the development, extraction, transportation or generation of energy.</p> <p><b>Production and supply</b></p>	<p>Company revenue driven by the manufacture of clean technologies.</p> <p><b>Manufacturing</b></p>	<p>Company revenue driven by the manufacture and financing of transportation technologies.</p> <p><b>Consumption</b></p>	<p><b>Not included: Adjacent sectors</b></p>
<b>Low-carbon</b>	<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"> <li>Solar</li> <li>Wind</li> <li>Geothermal</li> <li>Hydropower</li> <li>Storage</li> <li>Marine power</li> <li>Biofuels and biomass</li> <li>Nuclear</li> <li>Electricity grid</li> <li>Hydrogen and CO2 transport/storage</li> </ul>	<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"> <li>Plant development                             <ul style="list-style-type: none"> <li>Solar, biomass, wind</li> </ul> </li> <li>Smart grid equipment</li> <li>Clean energy equipment                             <ul style="list-style-type: none"> <li>Solar cells/modules, inverters</li> </ul> </li> <li>Wind turbines</li> <li>Geothermal equipment</li> <li>Hydro equipment</li> <li>Fuel cells</li> <li>Nuclear equipment</li> </ul>	<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"> <li>Electric passenger vehicles</li> <li>Electric trucks</li> <li>Leasing electric vehicles</li> <li>Electric-vehicle financing</li> </ul>	<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"> <li>Recycling and waste management</li> <li>Sustainable materials</li> <li>Pollution control equipment</li> <li>Metals and mining</li> </ul>
<b>Fossil Fuels</b>	<p>Company revenue driven by fossil-fuel-based sources of energy production. This includes coal, oil and gas, and utility fossil-fuel power generation for electricity and heating/cooling. This also includes the transportation and refining businesses.</p> <ul style="list-style-type: none"> <li>Utilities                             <ul style="list-style-type: none"> <li>Fossil-fuel power generation</li> <li>Heating and cooling</li> </ul> </li> <li>Coal                             <ul style="list-style-type: none"> <li>Mining</li> <li>Rail/freight</li> </ul> </li> <li>Oil and gas                             <ul style="list-style-type: none"> <li>Exploration and production</li> <li>Transport</li> <li>Refining</li> <li>Marketing/trading</li> <li>Filling stations</li> </ul> </li> </ul>	<p>Company revenue driven by the equipment used to support power generation from fossil-based sources. This includes equipment, parts and services, such as generators and boilers.</p> <ul style="list-style-type: none"> <li>Equipment and infrastructure                             <ul style="list-style-type: none"> <li>Generators</li> <li>Power generation equipment, parts and services</li> <li>Power boilers and heat exchangers</li> <li>Oilfield chemicals</li> </ul> </li> </ul>	<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"> <li>Passenger/commercial vehicles                             <ul style="list-style-type: none"> <li>Manufacturing and leasing</li> <li>Engines and parts</li> </ul> </li> <li>Trucks</li> <li>Shipbuilding</li> <li>Aircraft engines and parts                             <ul style="list-style-type: none"> <li>Vehicle financing (passenger, commercial, railcar)</li> <li>Vehicle rental</li> </ul> </li> </ul>	<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"> <li>Rail (agriculture, chemicals, industrial products, etc.)</li> <li>Trucking freight</li> <li>Bus transit</li> <li>Taxi services</li> <li>Hydrogen and ammonia</li> </ul>



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

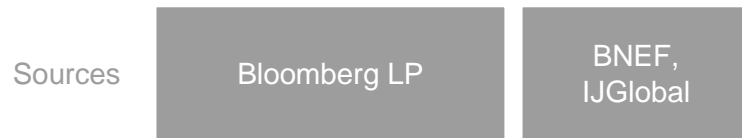
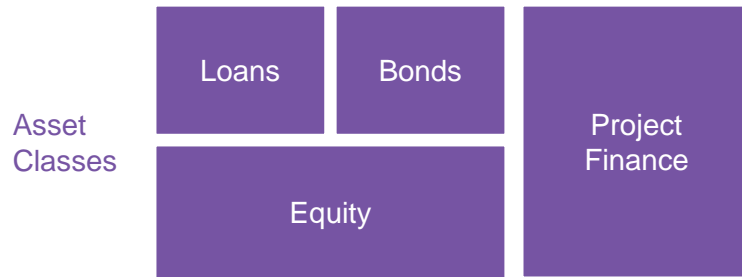
## ① Select company universe

**Issuers**  
~15,000 companies with energy sector revenue



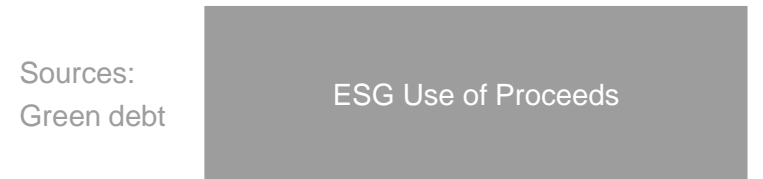
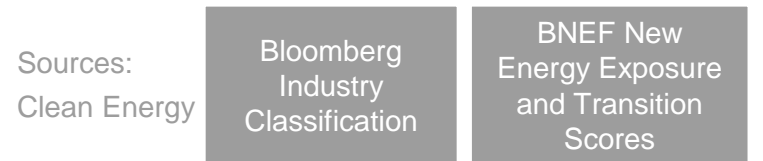
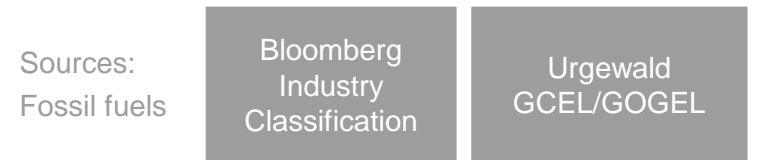
## ② Pull financing activity

**Gather transaction data**  
issued by relevant companies



## ③ Adjust transactions

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



**Add full value of transactions**  
for project finance

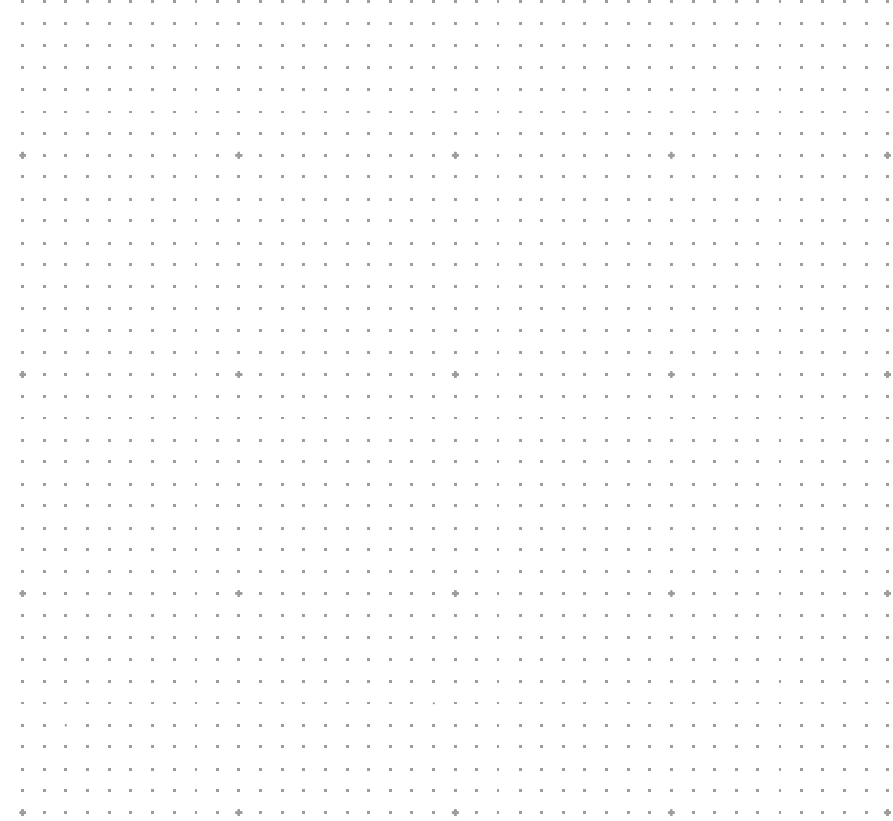
# Our analysis spans three main bank financing activities and focuses on energy supply

Type of financing	Recourse debt issuances			Equity issuances			Non-recourse project finance	
Asset class or type	Bonds	Corporate loans	Green debt	IPOs	Additional share offerings	Rights offerings	Fossil fuels	Clean energy
Source	Bloomberg LP			Bloomberg LP			IJGlobal	BNEF
Energy supply results <i>Focus of this report</i>	~\$1.6tn total \$715bn low-carbon, \$873bn fossil fuels Energy Supply Banking Ratio = 0.8			~\$0.07tn total \$38bn low-carbon, \$29bn fossil fuels Energy Supply Banking Ratio = 1.3			~\$0.22tn total \$90bn low-carbon, \$136bn fossil fuels Energy Supply Banking Ratio = 0.7	
Energy demand results	~\$0.5tn total \$116bn low-carbon, \$340bn fossil fuels Energy Demand Banking Ratio = 0.3			~\$0.05tn total \$16bn low-carbon, \$30bn fossil fuels Energy Demand Banking Ratio = 0.5			N/A	

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 (ie, loans for electric vehicles). Most of these omissions are due to data limitations.

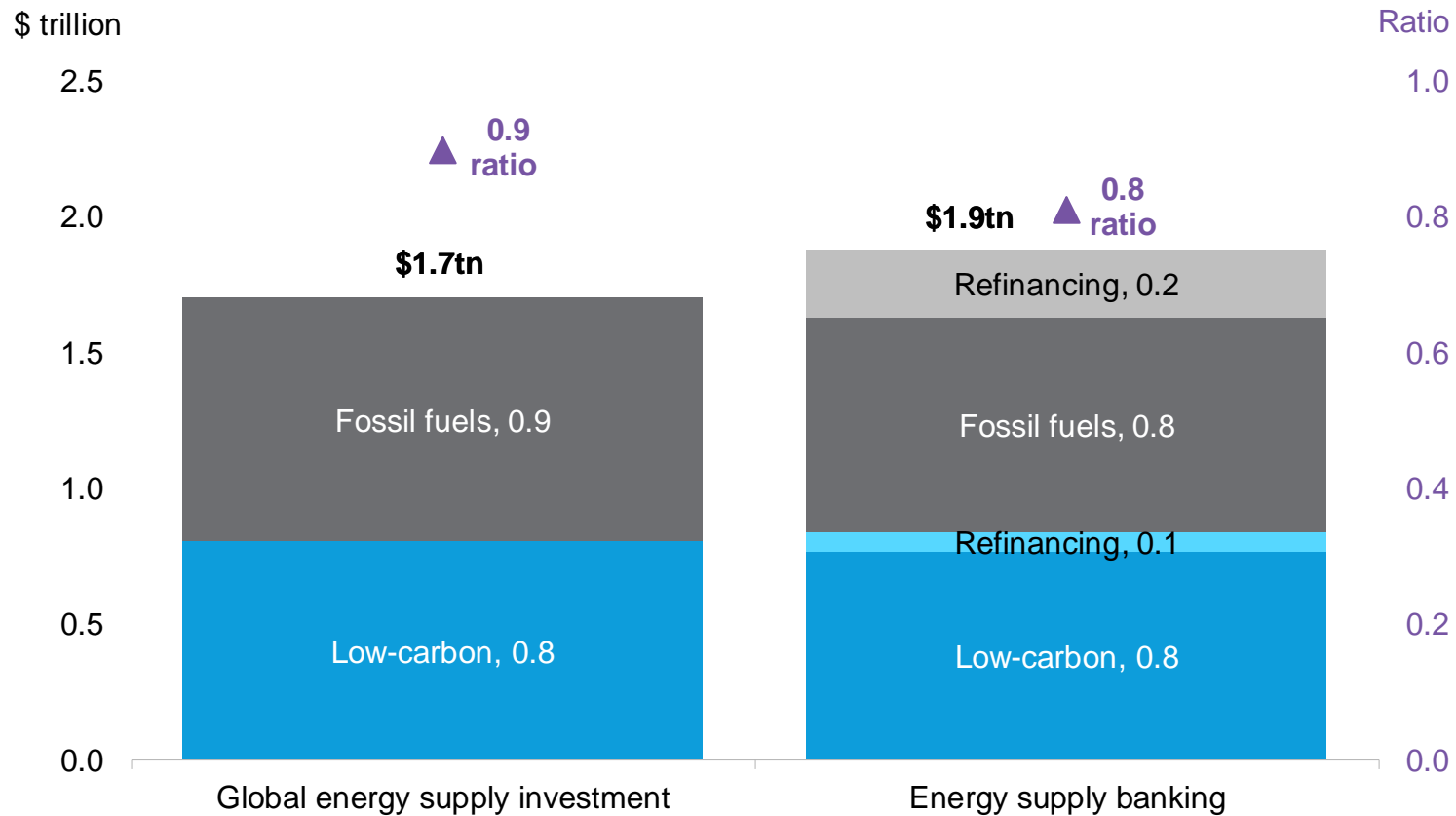
# Energy supply

Financing and ratios in 2021: global, regional and institutional



# Bank financing is broadly in line with the wider economy

## Global energy supply investment vs. energy supply banking in 2021



- The low-carbon to fossil-fuel **Energy Supply Investment Ratio (ESIR)** was **~0.9** globally in **2021**. This measure is derived from capital spending on energy infrastructure.
- The low-carbon to fossil-fuel **Energy Supply Banking Ratio (ESBR)** was **~0.8**. 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 2021 ESBR broadly mirrors trends in global capital investment. However, it is not precisely aligned.
- Factors that affect alignment include optimization of the capital structure of major companies through refinancing as operating and market conditions change and the varying use and access to capital markets for companies and sectors at different stages of their development.

Source: Bloomberg LP, BloombergNEF, IEA, Urgewald, Rainforest Action Network, IJGlobal.

# Capital investment differs from bank financing activity

## Energy supply investment vs. financing in 2021, by region

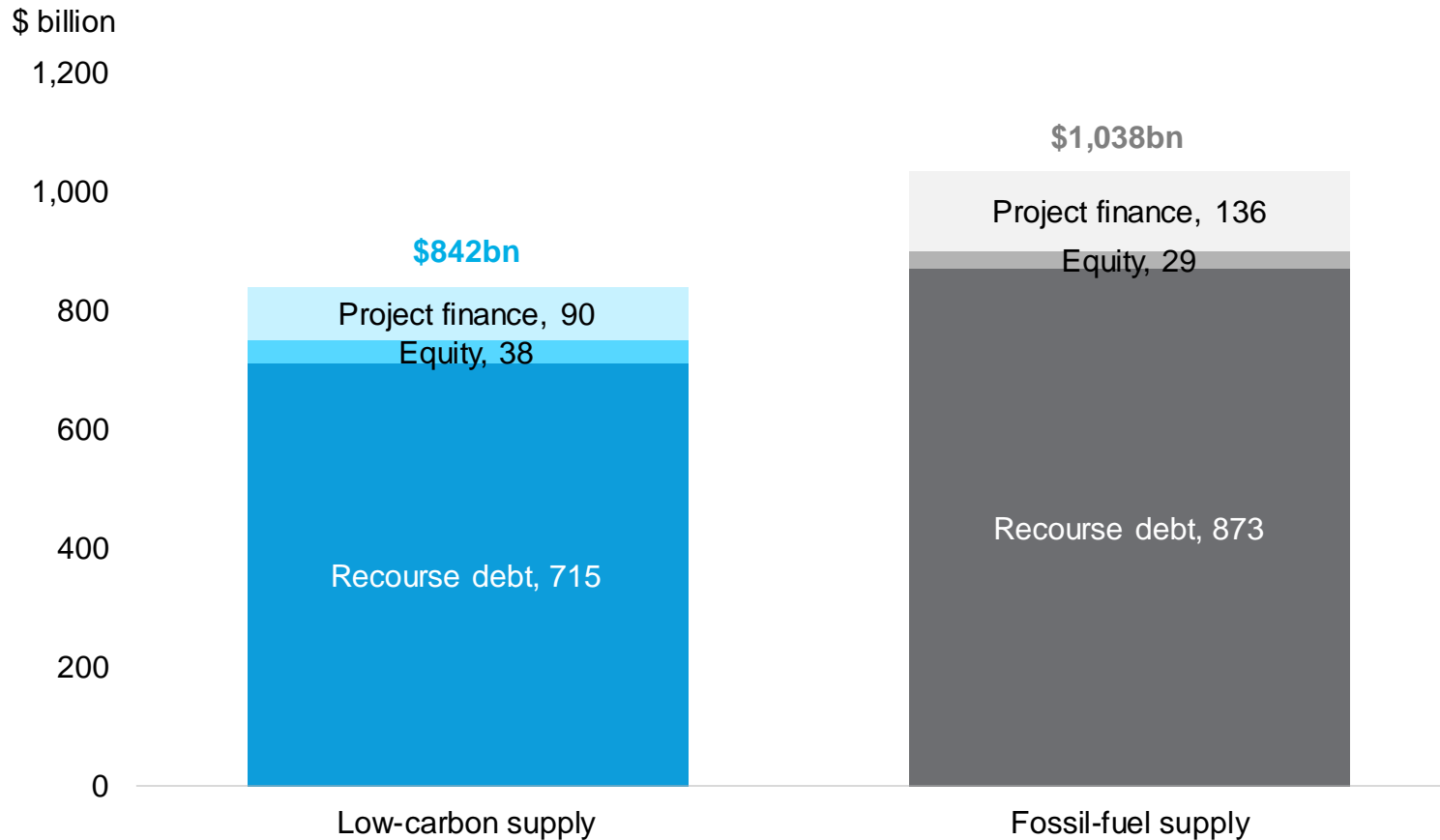
\$ billion	Investment by location	Financing by region of risk	Difference
Africa and Middle East	184	106	78
Asia Pacific excluding China	279	213	66
China	404	422	(18)
Europe	247	385	(138)
Latin America and Caribbean	83	65	18
North America	380	655	(275)
Multi-region or not specified	127	35	92
<b>Total</b>	<b>1,704</b>	<b>1,880</b>	
<i>Notes</i>	<i>Aligned to ESIR</i>	<i>Aligned to ESBR</i>	

- There is a correlation between financing activity and capital investment (also referred to as capital expenditure, or capex). However, they are fundamentally different measures, and this is revealed through a geographic lens. The Energy Supply Banking Ratio tracks financing.
- Financing activity refers to the funds raised by corporations, governments and supranational entities in the 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 cashflow – 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. Although volumes are similar at the global level, 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 [previous page](#)).

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.

# Banks' low-carbon financing was 81% of fossil-fuel financing in 2021

## Energy supply financing by all banks in 2021

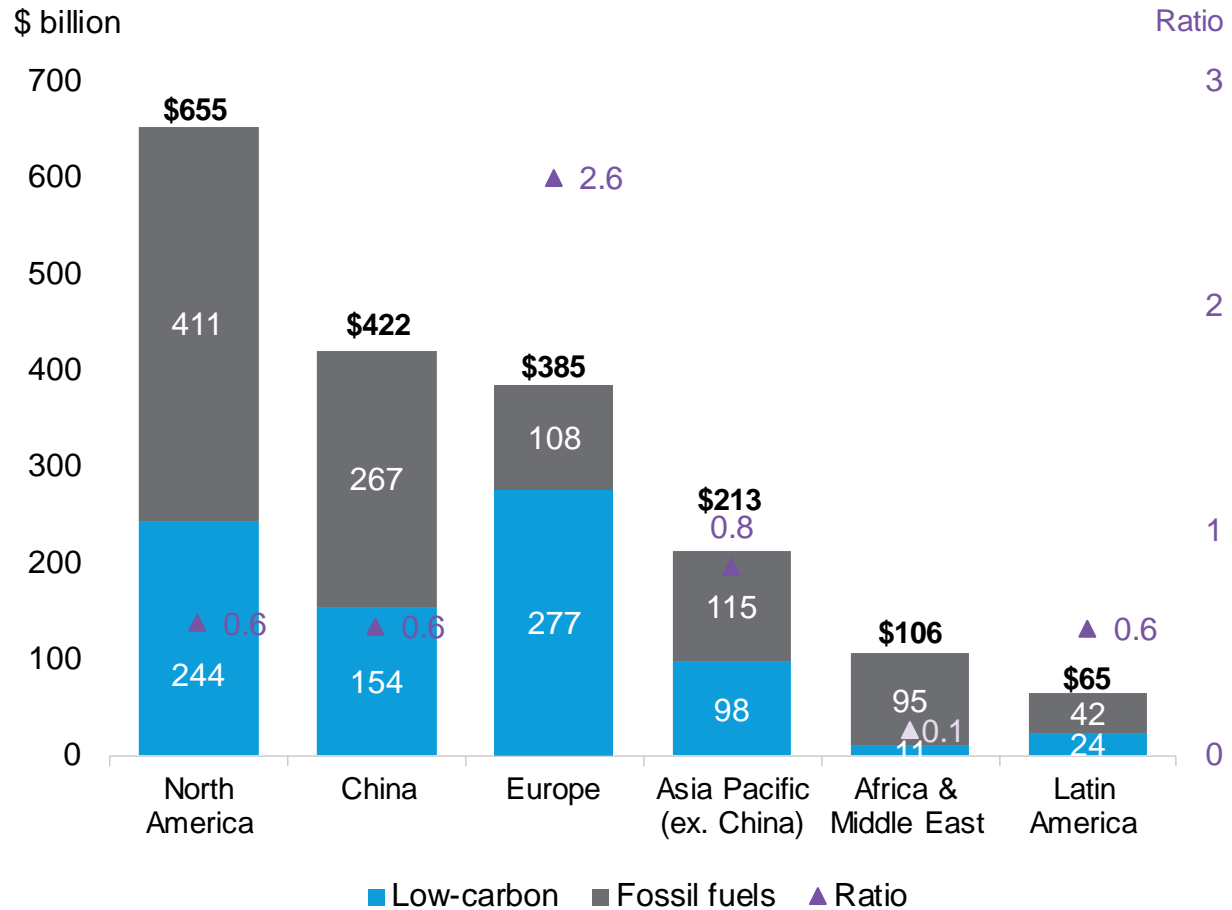


- The 2021 low-carbon to fossil-fuel Energy Supply Banking Ratio was **0.81** across all **1,142** banks engaged in some form of energy supply underwriting in this dataset.
- In aggregate, these banks underwrote **\$1.9 trillion** of energy supply transaction activity in 2021 (**\$842 billion** for low-carbon and **\$1.038 trillion** for fossil fuels). Of this, \$1.7 trillion went to capital underwriting and \$0.2 trillion to project finance.
- **585** banks were active in debt underwriting, **316** in equity underwriting and **443** in project financing.

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

# All regions but Europe have ESBR below 1:1

Energy supply financing by issuance region of risk in 2021



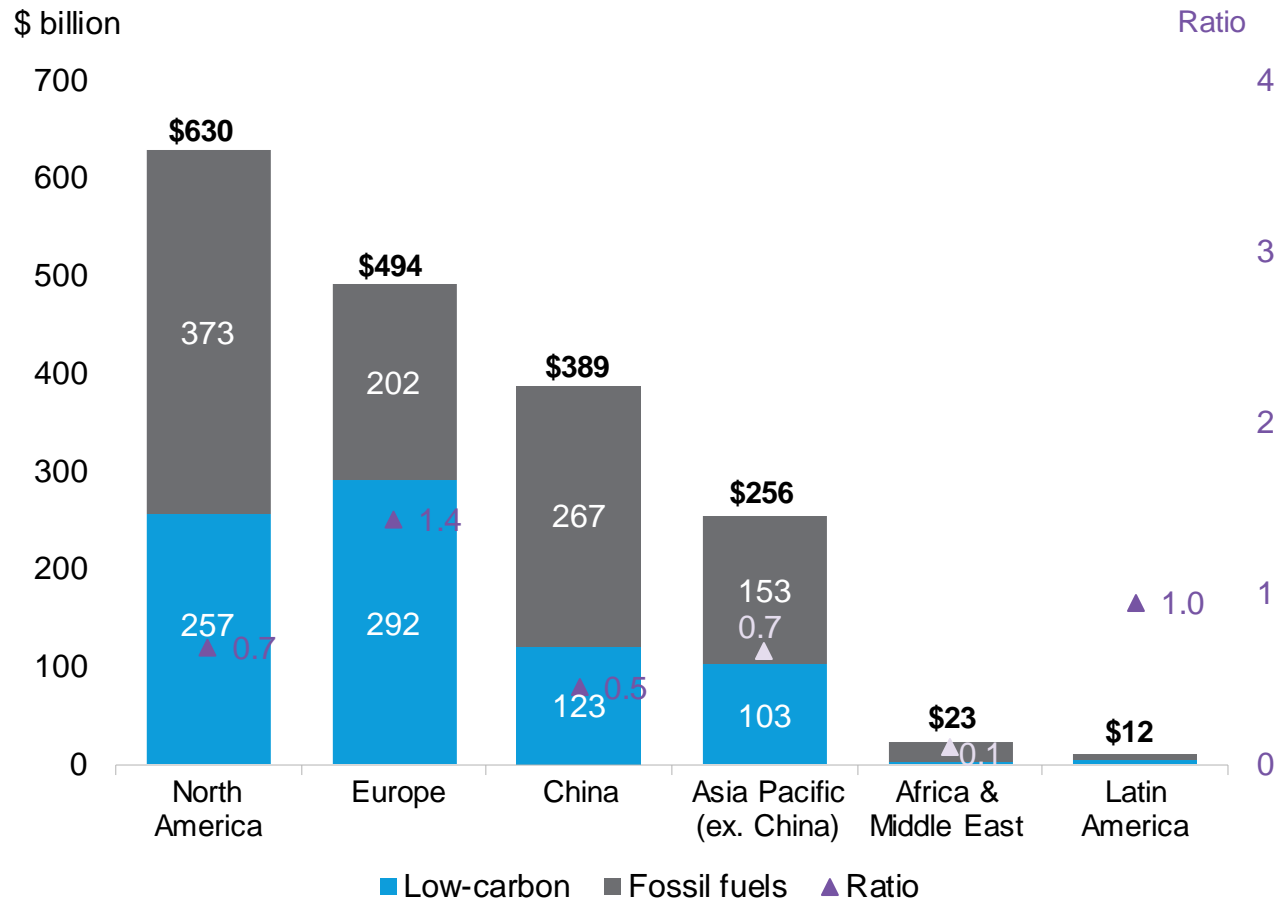
- The location of the capital raising entities is defined by the region of risk.
- North America saw **\$655 billion** of energy supply financing and facilitation in 2021, of which \$244 billion was for low-carbon and \$411 billion for fossil fuels, resulting in an ESBR of **~0.6:1**. This reflects the US, Canada and Mexico’s major role in the supply of energy for domestic and export use.
- China saw **\$422 billion** of energy supply financing, of which \$154 billion was for low-carbon energy and \$267 billion for fossil fuels, resulting in an ESBR of **~0.6:1**.
- Europe saw **\$385 billion** of energy supply financing, of which \$277 billion was for low-carbon energy and \$108 billion for fossil fuels, resulting in an **ESBR of ~2.6:1**. 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.
- Asia Pacific, excluding China, saw **\$213 billion** of energy supply financing and facilitation in 2021, of which \$98 billion was for low-carbon energy and \$115 billion for fossil fuels. This resulted in an ESBR of **~0.8:1**.
- Africa and the Middle East saw **\$106 billion** of energy supply financing, of which \$11 billion was directed to low-carbon energy and \$95 billion to fossil fuels, resulting in an ESBR of **~0.1:1**.
- Latin America and the Caribbean saw **\$65 billion** of energy supply financing, of which \$24 billion was directed to low-carbon energy and \$42 billion to fossil fuels, resulting in an ESBR of **~0.6:1**.

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



# North America-based banks account for the largest share of energy supply financing

Energy supply financing by bank headquarters in 2021

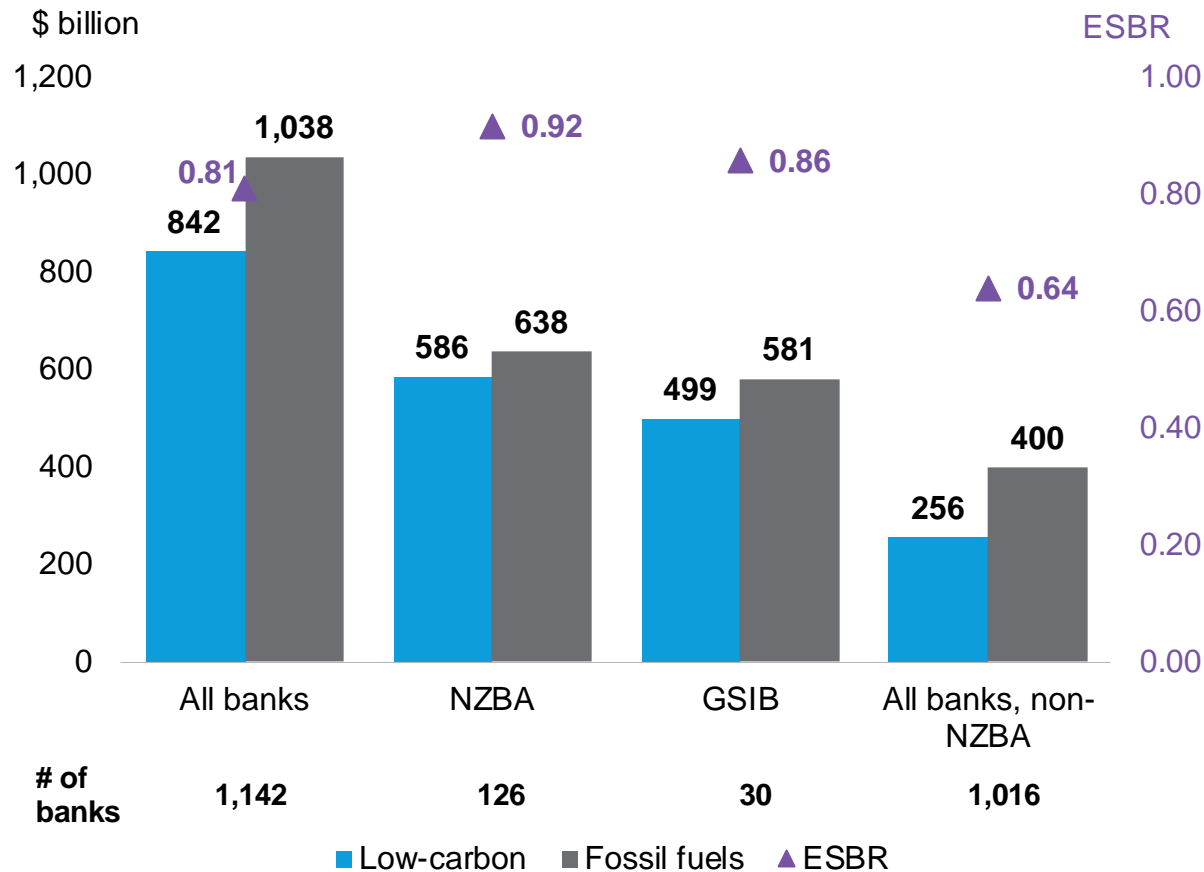


- North America-headquartered banks engaged in **\$630 billion** of energy supply financing and facilitation in 2021, of which \$257 billion was for low-carbon and \$373 billion for fossil fuels, resulting in an **ESBR of ~0.7:1**. This reflects both the leading role of North American banks globally, as well as the region’s role in the supply of energy for domestic use and export.
- Europe-headquartered banks engaged in **\$494 billion** of energy supply financing, of which \$292 billion was for low-carbon energy and \$202 billion for fossil fuels, resulting in an **ESBR of ~1.4:1**. This reflects the relative paucity of oil and gas investment in Europe and the historically favorable regulatory environment for low-carbon energy investment.
- China-headquartered banks engaged in **\$389 billion** of energy supply financing, of which \$123 billion was for low-carbon energy and \$267 billion for fossil fuels, resulting in an **ESBR of ~0.5:1**.
- Excluding China, Asia Pacific-headquartered banks engaged in **\$256 billion** of energy supply financing and facilitation in 2021, of which \$103 billion was for low-carbon energy and \$153 billion for fossil fuels. This resulted in an **ESBR of ~0.7:1**.
- Africa and Middle East-headquartered banks engaged in **\$23 billion** of energy supply financing, of which \$2 billion was directed to low-carbon energy and \$21 billion to fossil fuels, resulting in an **ESBR of ~0.1:1**.
- Latin America and Caribbean-headquartered banks engaged in **\$12 billion** of energy supply financing, of which \$6 billion was directed to low-carbon energy and \$6 billion to fossil fuels, resulting in an **ESBR of ~1:1**.

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

# Analysis of prominent banking groups reveals differences

## Banks' energy supply financing by subgroup, 2021



Source: Bloomberg LP, BloombergNEF, RAN, Urgewald, IJGlobal. Note: ESBR refers to Energy Supply Banking Ratio. Note: NZBA membership as of February 4, 2023.

- Banks underwrote **\$1.9 trillion** of energy supply transaction activity in total in 2021, with **\$0.8 trillion** being low-carbon and **\$1 trillion** for fossil fuels. This translates to an Energy Supply Banking Ratio of 0.81. ESBRs vary widely among all banks measured, from 0 to 65:1, 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 2021, several sub-groups are worth further examination:
- **Global Systemically 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 NZBA. In 2021, the GSIB as a whole underwrote **\$1.1 trillion** of energy supply financing (57% of the total) with a ratio of **0.86:1** for low-carbon to fossil fuels. The GSIB represents 59% of all low-carbon and 56% of all fossil-fuel financing.
- **Net-Zero Banking Alliance (NZBA):** Some 126 banks have committed to net-zero financed emissions by 2050 under the wider umbrella of GFANZ. In 2021, the NZBA collectively underwrote **\$1.2 trillion** of energy supply financing (65% of the total) with a ratio of **0.92:1** low-carbon to fossil fuels. The NZBA represents 69% of all low-carbon energy supply financing and 61% of all fossil-fuel financing.
- Banks that have **not joined the NZBA** underwrote **\$656 billion** of energy supply financing (35% of the total) in 2021, with a ratio of **0.63:1** low-carbon to fossil fuels – lower than those in the NZBA or GSIB.

# Energy Supply: Top deals

## Top low-carbon energy supply deals in 2021

Asset class	Issuer	Total deal amount (\$bn)	Low-carbon supply (\$bn)	Fossil-fuel supply (\$bn)
Loan	National Grid	11.4	11.4	N/A
Green bond	Republic of Italy	15.7	8.0	N/A
Loan	Enel SpA	11.9	7.5	4.4
Green bond	United Kingdom	25.3	7.5	N/A
Green bond	European Union	21.3	5.7	N/A
Loan	Nextera Energy Capital	8.5	5.2	2.6

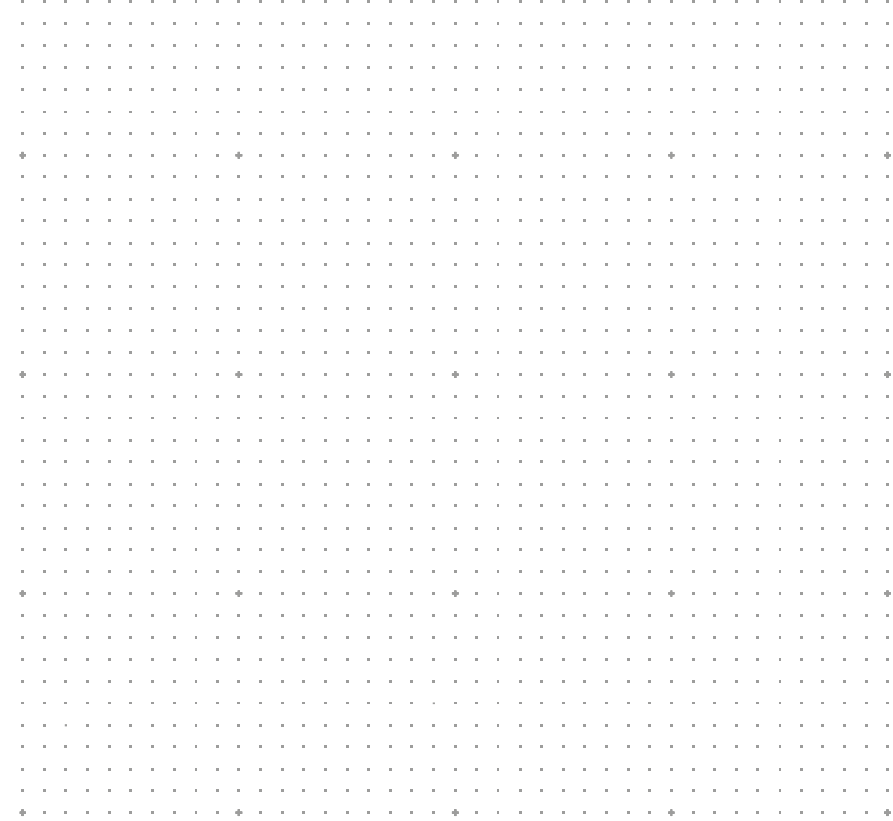
## Top fossil-fuel energy supply deals in 2021

Asset class	Issuer	Total deal amount (\$bn)	Low-carbon supply (\$bn)	Fossil-fuel supply (\$bn)
Loan	Saudi Arabian Oil Co	10.0	0.2	10.0
Loan	ExxonMobil	10.0	0.8	9.9
Bond	Petroleos Mexicanos	6.8	N/A	6.6
Loan	Exelon Generation	5.3	N/A	5.3
Loan	Petrobras Global	5.0	N/A	5.0
Loan	Equinor	6.0	1.4	4.6

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

# How this relates to bank 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
<b>Green financing commitment</b>  <i>Total figures banks have publicly announced</i>	<ul style="list-style-type: none"> <li>• <b>\$2.5 trillion</b> in sustainable development by 2030 through capital provision and underwriting</li> <li>• <b>\$1 trillion</b> for green/climate initiatives specifically</li> </ul>	<ul style="list-style-type: none"> <li>• <b>\$1 trillion</b> sustainable finance by 2030 through lending, investment, and facilitation</li> <li>• <b>\$500 billion</b> for environmental causes specifically</li> </ul>	<ul style="list-style-type: none"> <li>• <b>\$1.5 trillion</b> in sustainable development goal (SDG)-focused financing by 2030</li> <li>• <b>\$1 trillion</b> climate-related specifically</li> </ul>	<ul style="list-style-type: none"> <li>• <b>C\$100 billion</b> by 2030 to “support the low-carbon economy” through lending, financing and asset management</li> </ul>	<ul style="list-style-type: none"> <li>• <b>\$750 billion - \$1 trillion</b> by 2030 to support clients in net-zero goal</li> </ul>	<ul style="list-style-type: none"> <li>• <b>¥35 trillion</b> sustainable finance by 2030</li> <li>• <b>¥18 trillion</b> for environmental causes specifically</li> </ul>
<b>Reported progress</b>  <i>In areas most relevant to this report</i>	<ul style="list-style-type: none"> <li>• <b>\$106 billion</b> in 2021</li> </ul>	<ul style="list-style-type: none"> <li>• <b>\$163 billion</b> environmental finance since 2020</li> <li>• <b>\$130 billion</b> in 2021                             <ul style="list-style-type: none"> <li>– <b>\$20 billion</b> clean energy supply</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>\$350 billion</b> since 2007</li> <li>• <b>\$157 billion</b> in 2021: <b>\$28 billion</b> low-carbon supply, <b>\$4 billion</b> transport</li> </ul>	<ul style="list-style-type: none"> <li>• <b>C\$86 billion</b> since 2017</li> <li>• <b>C\$30 billion</b> in 2021: <b>C\$8 billion</b> energy supply, <b>C\$3 billion</b> transport</li> </ul>	<ul style="list-style-type: none"> <li>• <b>\$127 billion</b> since 2020</li> <li>• <b>\$83 billion</b> in 2021</li> </ul>	<ul style="list-style-type: none"> <li>• <b>¥5.6 trillion</b> since 2019</li> <li>• <b>¥1.9 trillion</b> in 2021</li> </ul>

How this relates to bank targets

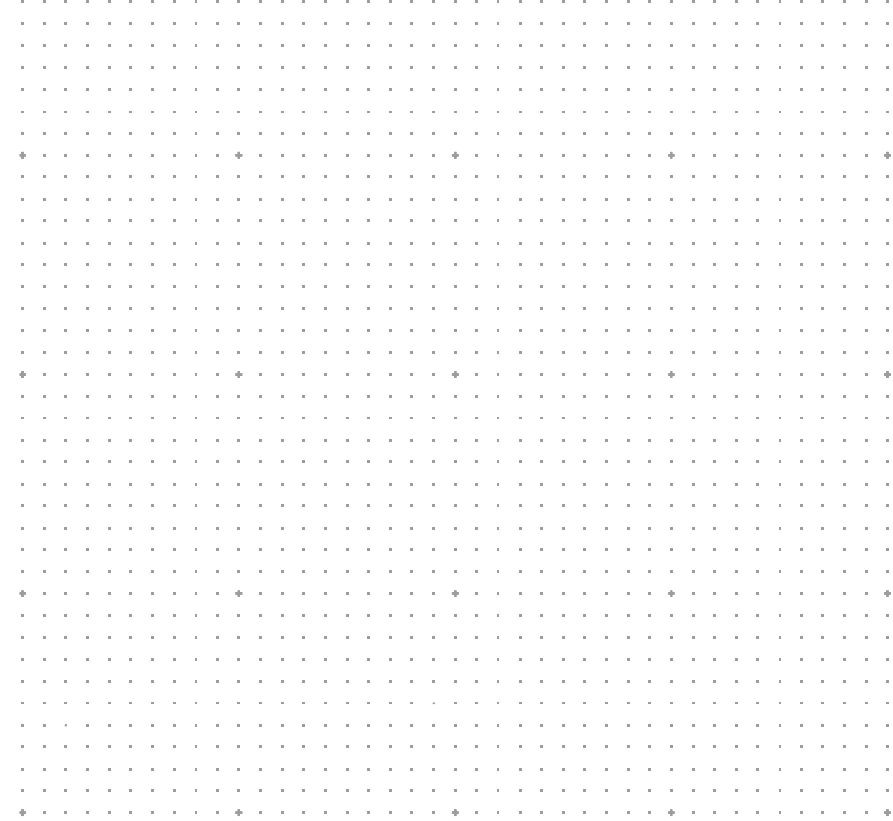
# What this report tracks vs. what banks count in their long-term goals

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 *Data limitations	✓	✓	✓	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	✓	✓	?	✓	✓	✓
	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



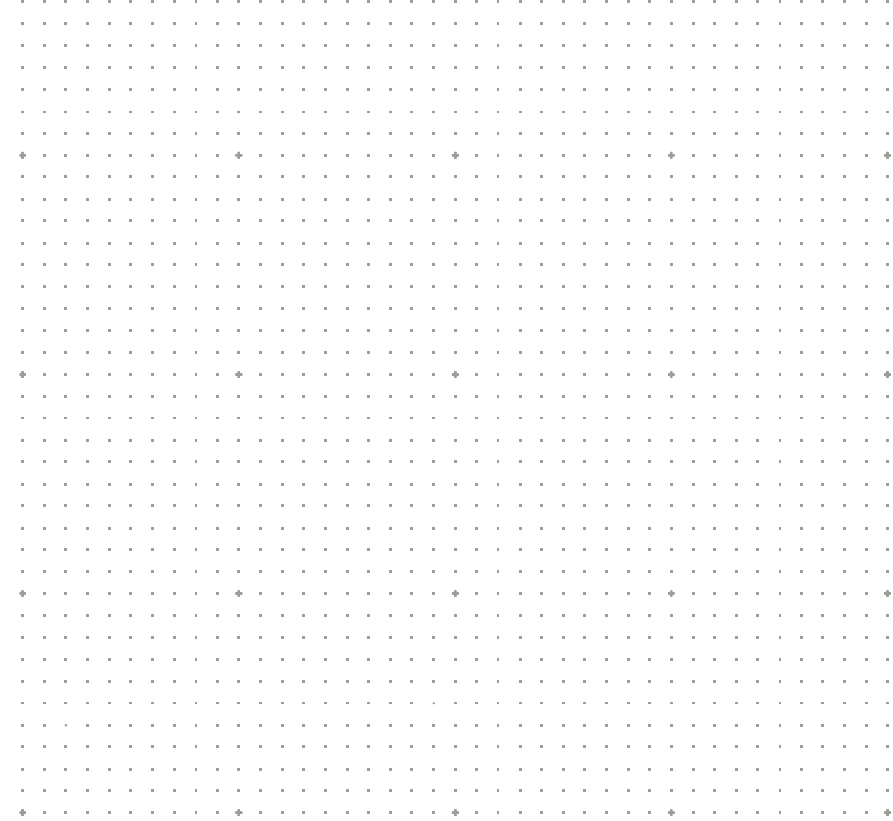


# Existing research provides a range of estimates due to methodological differences

Research organization	Report	Note	Scope		Coal		Oil and gas		Fossil fuels total value	Low-carbon total value
			Years	# 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> .	2016-2021, by year	60 banks	\$61 billion	Mining, Power	\$681 billion	Tar sands, Arctic, Offshore, Fracked, LNG	\$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	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, 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	1,142 banks			Not split out		\$1,038 billion	\$842 billion

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.

# Methodology detail



# Gathering transaction data

## ① Select company universe

- In order to capture the majority of the energy industry activity, we use available data on **company revenue by industry** from three sources: (1) the Bloomberg Industry Classification Systems (**BICS**), (2) the research NGO **Urgewald**'s fossil-fuel share of revenue data, calculated as a part of their Global Coal Exit List (GCEL) and Global Oil and Gas Exist List (GOGEL), and (3) BNEF's New Energy Exposure Scores (**NEES**).
- **BICS work:** We first designated each Bloomberg industry categorization, levels 1-7, to **low-carbon energy, fossil fuels, or neither**, and further broke it down into **energy supply or demand**. We then compiled all companies in the Bloomberg database with industry-classified revenue data, returning for each a percentage of revenue categorized by our energy classifications. This resulted in **12,660 companies with non-zero revenue in relevant energy categories**.
- **BNEF oil and gas capex:** We supplemented the above list of companies with the **40 oil and gas majors**, bringing in better bottom-up analysis on the portion of their capital expenditures dedicated to low-carbon energy.
- **Urgewald work:** We supplemented the above list of companies with **2,487 other coal, oil and gas companies**.
- **BNEF NEES:** We supplemented the above list of companies with **347 additional companies with New Energy Exposure Scores**.
- In total, our universe is **15,494 companies**.

## ② Gather financing activity

- **Recourse debt:** To gather **debt issuance deals (loans and bonds)** by the companies identified in Step 1 and their subsidiaries, we use the Bloomberg LEAG database. We first identify a comprehensive list of debt instruments issued by the companies of interest in the given year (2021). We supplement with labelled sustainable debt (in other words, green bonds and loans) based on an analysis of their use of proceeds, rather than the issuer's business model, since any company (even one without known energy revenue) can issue clean-energy-related green debt. We parsed each deal by the individual banks involved, their role and their credited amount underwritten for the deal. For loans, we measure **underwriting instead of direct lending** because the data is far more transparent; to do this, we analyze the banks named as **bookrunners**. For bond underwriting, we analyze **managers**.
- **Equity:** To gather **IPOs, additional share and rights offerings** by the companies identified in Step 1 and their subsidiaries, we use the Bloomberg IPO database. We first identify a comprehensive list of shares or rights offerings issued by the companies of interest in the given year (2021). We parsed each by the individual banks involved, their role and their credited amount of shares sold for the deal. In order to capture all of the material roles banks play in underwriting equity offerings, we analyze **left leads, managers, agents and bookrunners**.
- **Project finance:** To gather **energy project financing lending and underwriting**, we use the BNEF Energy Transition Investment (ETI) database for clean energy projects and an external data source, IJGlobal, for fossil-fuel developments. This analysis does not rely on the company list from Step 1, since these datasets include only energy-specific projects regardless of the borrower's other industry activity. We parsed each deal by the individual banks involved, their role and their credited amount arranged for the deal. We measure **lead arrangers and bond arrangers**.

## ③ Adjust transactions


- To derive an estimate for how much of a given transaction may go toward supporting the energy sector, we use **company adjustment factors** based on the analysis in Step 1. This is the **percentage of issuing company revenue or capex derived from clean energy or fossil-fuel sources** and serves as a proxy for how the proceeds of capital raised may be spent on average. This portion of our methodology borrows from the Rainforest Action Network's work on the annual *Banking on Climate Chaos*, for which the group uses company adjustment factors to estimate large banks' financing of fossil fuels.
- **Recourse debt and equity:** Adjustment factors are multiplied by the dollar amount credited to each bank, resulting in clean energy and fossil-fuel credit. For labeled sustainable debt, instead of company adjustment factors, we use the percentage of the listed use of proceeds that is considered clean energy.
- **Project finance:** Since these deals are project-specific, these transactions are *not* adjusted.
- Examples are illustrated on [the next page](#).

*Note: This report does not seek to differentiate subcategories of fossil fuel finance – for example, that supporting firms with net-zero strategies or transition plans. It also does not include tax equity – a significant factor in low-carbon financing in the US.*

# We estimate the energy-related portion of various transaction activities


## 1 Debt or equity issuance

Bank's credit on a transaction is adjusted by the issuer's energy sector revenue (or capex) from low-carbon or fossil-fuel activity.

Example issuance	Underwriters	League Credit	Relevant sectors	Adj. Factor	Energy credit
<b>\$10bn loan</b> General Electric Co 	JPM Chase BNP Paribas Citi Goldman Sachs Bank of America Morgan Stanley <b>6 banks</b>	$\$1.6\text{bn per bank} \times$	<b>Low-carbon</b> Supply <ul style="list-style-type: none"> <li>• Wind turbines</li> <li>• Grid equipment</li> </ul>	24%	\$402m
			<b>Low-carbon</b> Demand <ul style="list-style-type: none"> <li>• N/A</li> </ul>	0%	\$0
			<b>Fossil fuel</b> Supply <ul style="list-style-type: none"> <li>• Turbine generators</li> </ul>	17%	\$275m
			<b>Fossil fuel</b> Demand <ul style="list-style-type: none"> <li>• Aircraft engines and parts</li> </ul>	30%	\$496m


## 2 Green debt issuance

Bank's credit is adjusted by the portion of listed potential use of proceed considered low-carbon energy.

<b>\$0.9bn green bond</b> Engie SA 	BBVA Bank of America Credit Agricole Mizuho Deutsche Bank Banco Santander <b>6 banks</b>	$\$126\text{m per bank} \times$	<b>Low-carbon</b> Supply <ul style="list-style-type: none"> <li>• Solar</li> <li>• Wind</li> <li>• Hydro</li> <li>• Tidal</li> <li>• Geothermal</li> </ul>	<ul style="list-style-type: none"> <li>• Energy storage</li> <li>• Biofuels</li> <li>• GHG control</li> <li>• Sustainable buildings</li> </ul>	69%	\$103m
			<b>Low-carbon</b> Demand <ul style="list-style-type: none"> <li>• Electric</li> </ul>	<ul style="list-style-type: none"> <li>• Public</li> </ul>	15%	\$23m
			<b>Non-energy</b>	<ul style="list-style-type: none"> <li>• Coastal protection</li> <li>• Watershed protection</li> </ul>	15%	N/A

## 3 Project finance

Bank's credit is counted in full, according to project type.

<b>\$34mn term loan</b> Total Dubai PV 	National Bank of Canada Arab Petroleum Investment Corp <b>2 banks</b>	$\$17\text{m per bank} \times$	<b>Low-carbon</b> Supply <ul style="list-style-type: none"> <li>• Solar</li> </ul>	100%	\$1m
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# Our analysis spans three main financing activities

<b>Type of financing</b>	Recourse debt issuances			Equity issuances			Non-recourse project finance	
<b>Asset class or type</b>	Bonds	Corporate loans	Green debt	IPOs	Additional share offerings	Rights offerings	Fossil fuels	Clean energy
<b>Source</b>	Bloomberg LP			Bloomberg LP			IJGlobal	BNEF
<b>Notes</b>	<ul style="list-style-type: none"> <li>Bulk of the dataset, at about \$1.6 trillion</li> <li>Captures banks' underwriting activity</li> </ul>			<ul style="list-style-type: none"> <li>Small contributor to total financing, at about \$67 billion</li> <li>Captures bank underwriting activity</li> </ul>			<ul style="list-style-type: none"> <li>Smaller contributor to total financing, at about \$226 billion</li> <li>Captures banks' underwriting activity</li> </ul>	

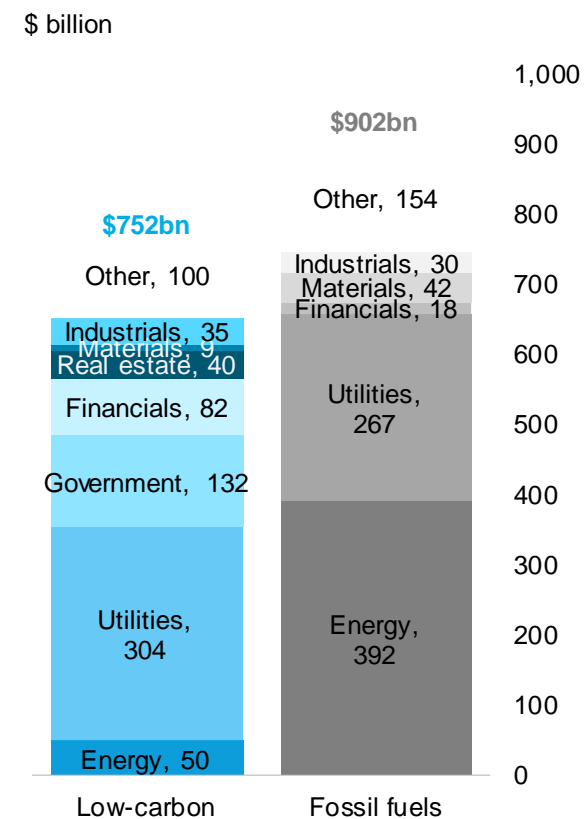
# Our methodology captures the broad universe active in the energy industry

## Debt and equity issuance

# of issuers by industry in 2021

Industry	Potential issuers searched	Actual issuers in 2021
Energy	3,259	646
Utilities	2,266	622
Industrials	3,374	310
Materials	1,739	278
Financials	308	317
Consumer discretionary	1,801	65
Real estate	135	230
Government	2	52
Technology	273	72
Consumer staples	190	37
Communications	37	40
Health care	55	35
Other	2,054	224
<b>Total</b>	<b>15,493</b>	<b>2,895</b>

Energy supply value by issuer industry in 2021

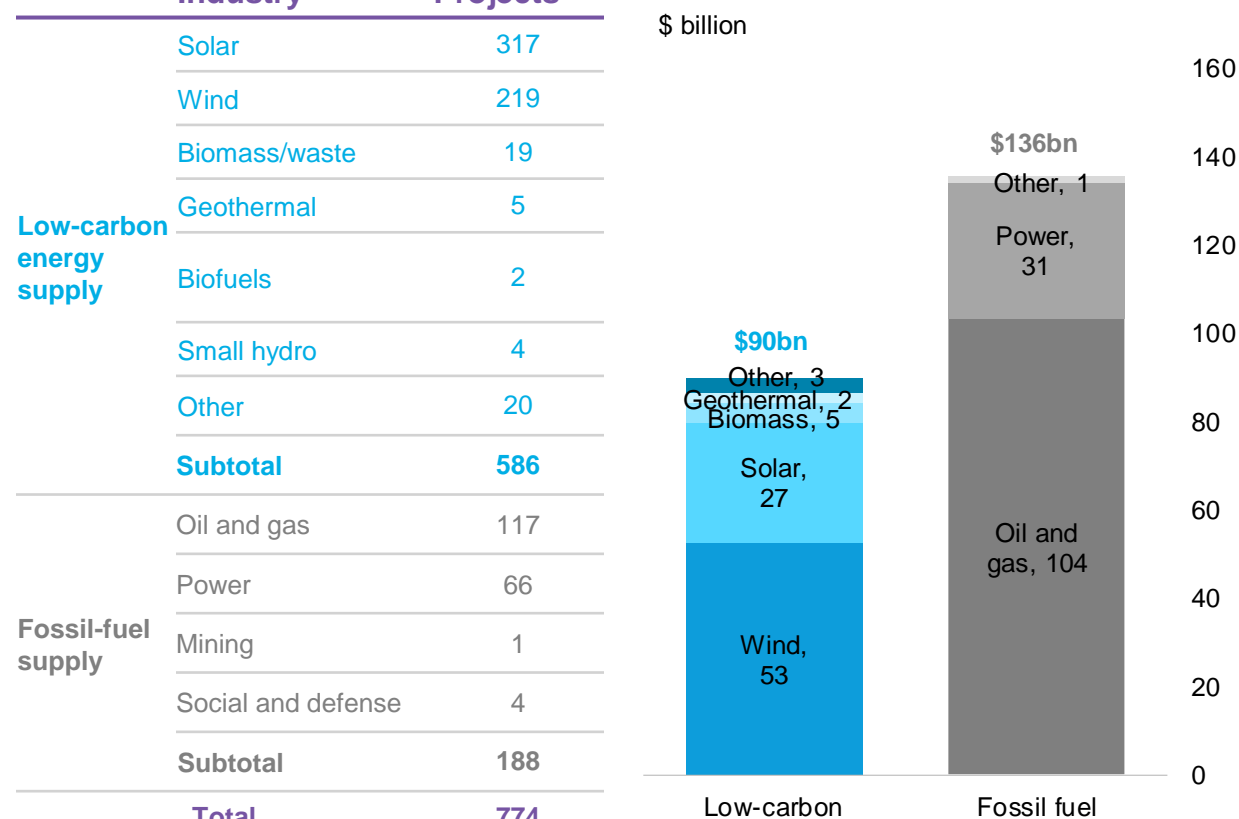


## Project finance

# of projects by type, 2021

Industry	Projects
Solar	317
Wind	219
Biomass/waste	19
Geothermal	5
Biofuels	2
Small hydro	4
Other	20
<b>Subtotal</b>	<b>586</b>
Oil and gas	117
Power	66
Mining	1
Social and defense	4
<b>Subtotal</b>	<b>188</b>
<b>Total</b>	<b>774</b>

Energy supply value by project type in 2021



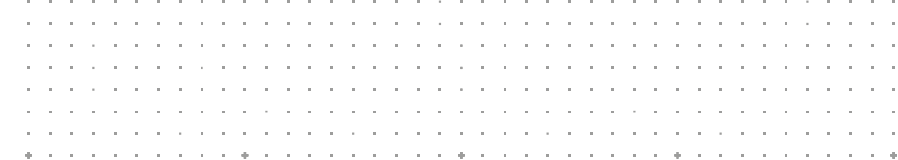
Source: Bloomberg LP, BloombergNEF, RAN, Urgewald, IJGlobal. Note: Our search for debt and equity issuances includes subsidiary companies – this is why, for example, 308 financials were ‘searched’ but 348 appear in results.

# Methodology FAQs and caveats

Topic	Description
<b>Bank activities included in this analysis</b>	<ul style="list-style-type: none"> <li>• <b>Bonds:</b> Covers major underwriters/facilitators of each bond issued; bookrunners included.</li> <li>• <b>Loans:</b> Covers major underwriters on each debt issuance but <i>not direct lenders</i>, as lending data is often private. Managers included.</li> <li>• <b>Equity:</b> Covers major underwriters/facilitators of each equity issuance; leads, managers, agents and bookrunners included.</li> <li>• <b>Project finance:</b> Covers direct lenders and underwriters; lead arrangers (low-carbon energy and fossil fuels) and bond arrangers (fossil fuels).</li> </ul>
<b>Bank activities not included in this analysis</b>	<ul style="list-style-type: none"> <li>• 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 (providing loans for electric vehicles or home solar systems, for instance). Most of these omissions are due to data limitations.</li> </ul>
<b>Reconciliation between data sources</b>	<ul style="list-style-type: none"> <li>• There is a risk of double counting deals across the Bloomberg debt dataset and IJGlobal project finance dataset. The BNEF team conducted a reconciliation exercise to minimize this.</li> <li>• There is also the possibility of error in the original data sources. The BNEF team does its best to account for these.</li> </ul>
<b>Sustainable debt</b>	<ul style="list-style-type: none"> <li>• Formally labeled green bonds and loans document a range of potential use of proceeds – some of which may be irrelevant for low-carbon energy accounting, such as sustainable water infrastructure, waste management. While these categories are important to sustainability, for the purposes of this research, we specifically examine energy. To address this, a percentage of the use-of-proceeds categories that we consider low-carbon energy, such as solar, wind and clean transportation, forms the basis of an “adjustment factor” for sustainable debt transactions.</li> </ul>
<b>Tax equity</b>	<ul style="list-style-type: none"> <li>• This research does not include tax equity, a financing structure in the US whereby banks provide upfront cash for renewable energy developments in return for tax credits. While tax equity is a significant portion of US banks’ low-carbon energy financing, disclosure is limited and inconsistent.</li> </ul>
<b>Subsidiary companies</b>	<ul style="list-style-type: none"> <li>• BNEF endeavors to capture issuances by all relevant intermediate subsidiary companies within an energy company’s corporate structure.</li> </ul>
<b>Refinancing</b>	<ul style="list-style-type: none"> <li>• These are included in our overall analysis as these are relevant to the activity of banks. Access to refinancing enables energy projects and companies to optimize their capital structures, realize value and ultimately generate economic returns.</li> </ul>



# Abbreviations



Abbreviation	Explanation
ESIR	<b>Energy Supply Investment Ratio</b> – The ratio of total US dollar investment in low-carbon energy supply technologies as a proportion of US dollar investment in fossil-fuel energy supply technologies.
ESBR	<b>Energy Supply Banking Ratio</b> – The ratio of total US dollar financing facilitation for low-carbon energy supply technologies as a proportion of financing facilitation for fossil-fuel energy supply technologies.
GFANZ	<b>Glasgow Financial Alliance for Net Zero</b> – Collection of financial institutions that are committed to facilitating net zero. GFANZ is an umbrella group working with several net-zero alliances, ranging from banking to asset management.
GSIB	<b>Global Systemically Important Banks</b> – 30 banks that have been assessed by the international Financial Stability Board (FSB) to be of such “size, interconnectedness, complexity or lack of substitutability” that they are too big to fail.
NZBA	<b>Net Zero Banking Alliance</b> – Collection of banks that are committed to aligning their operations to achieving net zero by 2050.

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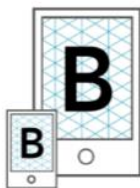
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