



The Global Green Finance Index 11



April 2023



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Beginning in March 2018, as part of its Long Finance initiative, Z/Yen published the first five editions of the Global Green Finance Index with the generous support of the MAVA Foundation. Z/Yen continues this work and is pleased to present the eleventh edition of the Global Green Finance Index (GGFI 11).

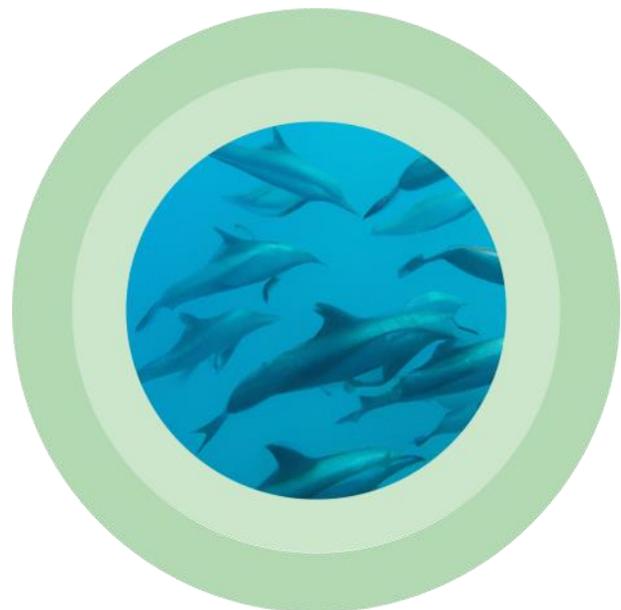
In 2022, Abu Dhabi Global Market (ADGM) became the sponsor of the GGFI, and we look forward to working with ADGM to develop the GGFI and to focus on the impact that financial centres make to sustainable finance.

Z/Yen helps organisations make better choices - our clients consider us a commercial think-tank that spots, solves, and acts. Our name combines Zen and Yen - 'a philosophical desire to succeed' - in a ratio, recognising that all decisions are trade-offs. One of Z/Yen's specialisms is the development and publication of research combining factor analysis and professional assessments.

Abu Dhabi Global Market is an award-winning international financial centre strategically located in the capital of the United Arab Emirates. Established by UAE Federal Decree, ADGM's jurisdiction extends across the entire 114 hectares of Al Maryah Island. ADGM's four independent authorities - the Registration Authority (RA), the Financial Services Regulatory Authority (FSRA), ADGM Courts and ADGM Authority - together ensure that its business-friendly environment operates in line with international best practices, recognised by major financial centres worldwide.

Long Finance is a Z/Yen initiative designed to address the question "**When would we know our financial system is working?**" This question underlies Long Finance's goal to improve society's understanding and use of finance over the long-term. In contrast to the short-termism that defines today's economic views the Long Finance time-frame is roughly 100 years.

The authors of this report, Mike Wardle, Simon Mills, and Professor Michael Mainelli, would like to thank Bikash Kharel, Sasha Davis, Charlotte Dawber-Ashley and the rest of the Z/Yen team for their contributions with research, modelling, and ideas.



[With thanks to OpenAI's DALL-E for collaboration on the cover image.]

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Summary

Overview

This is the eleventh edition of the Global Green Finance Index (GGFI 11). The GGFI is a factor assessment index, based on a range of instrumental factors - quantitative measures - and a worldwide survey of finance professionals' assessments on the quality and depth of green finance offerings in financial centres.

The centres which perform well in the GGFI are generally places that commit to environmental improvements across the economy as well as directly in finance. Centres such as London, New York, and Stockholm have a commitment to providing sustainable economic development and to building their skill base and green infrastructure.

In the last edition of the GGFI, we noted the growing interest in carbon pricing and trading as a mechanism to address the central issue of greenhouse gas emissions, particularly as existing systems of ESG analytics come under criticism. Among those responding to the GGFI survey, Sustainable Infrastructure Finance, Carbon Markets, and Energy Efficient Investment are rated as the areas of green finance with the most impact. The fact that carbon markets are now listed as one of the top factors with an impact on climate change reflects the increased focus on carbon pricing and trading.

Policy & Regulatory Frameworks continue to be identified as the leading driver in the development of green finance, alongside International Initiatives. This continues to highlight the importance of transnational cooperation and policy in setting the framework for green finance to thrive.

In the supplement to this edition of the GGFI, we focus on transition finance, and the efforts to move away from fossil fuels to renewable energy sources. The exposure of companies, economies and financial centres to transition risk needs both further research and policy change.

Index Results

- London retained its first position in the index, with New York moving up one place to take second place.
- Washington moved into the top 10, replacing Sydney.
- Western European centres take six of the top 10 places, with US centres taking the other four top 10 places.
- The margins separating centres at the top of the index continue to be tight in GGFI 11. Among the top 10 centres the spread of ratings is 31 out of 1,000, compared to 42 out of 1,000 in GGFI 10.
- Confidence in green finance appears to be strong, with all centres improving their rating in GGFI 11, and the average rating up just over 10% compared with GGFI 10.
- We researched 126 financial centres for GGFI 11. The number of centres in the index has increased to 86 (84 in GGFI 10), with the addition of Lagos and Kigali.

Western Europe

- Six Western European centres feature in the top 10 in GGFI 11.
- Edinburgh and Munich both gained 8 rank places to move into the top 22.

North America

- New York rose to second place overall, with Washington DC up six places to 9th position, San Francisco falling 5 places to 10th, and Los Angeles down 1 place to 7th.
- The four Canadian centres in GGFI 11 all improved their rankings, with Montreal up 13 rank places to 21st.

Asia/Pacific

- Singapore has overtaken Sydney and Seoul to lead the region and took 11th place overall.
- Five Asia/Pacific centres now feature in the top 20 across the world.

Middle East & Africa

- Dubai fell back four rank places to take 32nd place, but maintained its lead in the region, one rank place above Abu Dhabi.
- Casablanca maintained its position at 38th in the index and held on to third place in the region and remained the leading GGFI centre in Africa.
- Lagos and Kigali entered the index for the first time in 79th and 80th positions.

Latin America & The Caribbean

- Rio de Janeiro and Santiago have overtaken Mexico City to take first and second place in the Latin America & The Caribbean region.
- Five out of the seven centres in the region fell in the rankings.

Eastern Europe & Central Asia

- Astana has a clear lead in the Eastern Europe & Central Asia region, ranking 16 places above Istanbul in second place in the region and rising two places in the global rankings in GGFI 11.
- After falling in the rankings in GGFI 10, most other centres in the region regained ground in this edition. The exceptions were Almaty and Sofia, which both fell slightly in the rankings.

GGFI 11

GGFI 11 was compiled using 150 instrumental factors. These quantitative measures are provided by third parties including the World Bank, The Economist Intelligence Unit, the OECD, and the United Nations. Details can be found in Appendix 5.

The instrumental factors were combined with 4,498 financial centre assessments provided by respondents to the [GGFI online questionnaire](#). A breakdown of the 633 respondents is shown in Appendix 3. Further details of the methodology behind GGFI 11 are in Appendix 4.

The 86 centres listed in GGFI 11 are those which received a minimum of 25 assessments from survey respondents located outside of those centres. Assessments of respondents' home centres were excluded from the data, in order to avoid home centre bias.

GGFI 11 Ranks And Ratings

Table 1 | GGFI 11 Ranks And Ratings

Centre	GGFI 11		GGFI 10		Change In Rank		Change In Rating	
	Rank	Rating	Rank	Rating				
London	1	642	1	590	▶	0	▲	52
New York	2	641	3	578	▲	1	▲	63
Stockholm	3	621	8	550	▲	5	▲	71
Geneva	4	620	7	551	▲	3	▲	69
Luxembourg	5	616	4	554	▼	-1	▲	62
Amsterdam	6	615	2	580	▼	-4	▲	35
Los Angeles	7	614	6	552	▼	-1	▲	62
Copenhagen	8	613	9	549	▲	1	▲	64
Washington DC	9	612	15	542	▲	6	▲	70
San Francisco	10	611	5	553	▼	-5	▲	58
Singapore	11	610	16	541	▲	5	▲	69
Zurich	12	609	11	547	▼	-1	▲	62
Sydney	13	608	10	548	▼	-3	▲	60
Edinburgh	14	607	22	535	▲	8	▲	72
Seoul	15	606	12	546	▼	-3	▲	60
Oslo	16	605	13	544	▼	-3	▲	61
Paris	17	604	14	543	▼	-3	▲	61
Wellington	18	603	19	538	▲	1	▲	65
Chicago	19	602	26	531	▲	7	▲	71
Shanghai	20	601	17	540	▼	-3	▲	61
Montreal	21	600	34	523	▲	13	▲	77
Munich	22	599	30	527	▲	8	▲	72
Melbourne	23	598	18	539	▼	-5	▲	59
Helsinki	24	597	29	528	▲	5	▲	69
Shenzhen	25	586	20	537	▼	-5	▲	49
Busan	26	585	21	536	▼	-5	▲	49
Beijing	27	584	23	534	▼	-4	▲	50
Toronto	28	583	35	522	▲	7	▲	61
Boston	29	582	25	532	▼	-4	▲	50
Madrid	30	581	39	518	▲	9	▲	63
Tokyo	31	580	24	533	▼	-7	▲	47
Dubai	32	579	28	529	▼	-4	▲	50
Abu Dhabi	33	578	33	524	▶	0	▲	54
Vancouver	34	577	37	520	▲	3	▲	57
Qingdao	35	576	31	526	▼	-4	▲	50
Frankfurt	36	575	40	517	▲	4	▲	58
Hong Kong	37	574	41	516	▲	4	▲	58
Casablanca	38	573	38	519	▶	0	▲	54
Brussels	39	572	43	514	▲	4	▲	58
Calgary	40	571	47	509	▲	7	▲	62
GIFT City-Gujarat	41	570	44	513	▲	3	▲	57
Osaka	42	569	32	525	▼	-10	▲	44
Berlin	43	568	42	515	▼	-1	▲	53

Table 1 (continued) | GGFI 11 Ranks And Ratings

Centre	GGFI 11		GGFI 10		Change In Rank		Change In Rating	
	Rank	Rating	Rank	Rating				
Guangzhou	44	567	27	530	▼	-17	▲	37
Hamburg	45	566	51	499	▲	6	▲	67
Glasgow	46	565	53	497	▲	7	▲	68
Rome	47	564	49	505	▲	2	▲	59
Vienna	48	563	55	495	▲	7	▲	68
Guernsey	49	562	52	498	▲	3	▲	64
Dublin	50	561	45	512	▼	-5	▲	49
Lisbon	51	556	36	521	▼	-15	▲	35
Astana	52	554	54	496	▲	2	▲	58
Jersey	53	553	56	493	▲	3	▲	60
Milan	54	552	58	491	▲	4	▲	61
Kuala Lumpur	55	551	46	510	▼	-9	▲	41
Tel Aviv	56	550	50	504	▼	-6	▲	46
Isle of Man	57	549	72	463	▲	15	▲	86
Riyadh	58	547	48	507	▼	-10	▲	40
New Delhi	59	546	80	453	▲	21	▲	93
Jakarta	60	545	60	489	▶	0	▲	56
Liechtenstein	61	544	66	478	▲	5	▲	66
Johannesburg	62	538	64	482	▲	2	▲	56
Rio de Janeiro	63	531	65	481	▲	2	▲	50
Mauritius	64	529	59	490	▼	-5	▲	39
Mumbai	65	528	69	467	▲	4	▲	61
Doha	66	527	68	472	▲	2	▲	55
Cape Town	67	526	62	486	▼	-5	▲	40
Istanbul	68	525	73	462	▲	5	▲	63
Moscow	69	523	76	457	▲	7	▲	66
Santiago	70	517	67	477	▼	-3	▲	40
Bangkok	71	516	57	492	▼	-14	▲	24
Warsaw	72	514	79	454	▲	7	▲	60
Mexico City	73	511	63	485	▼	-10	▲	26
Sao Paulo	74	510	70	465	▼	-4	▲	45
Bahrain	75	508	61	487	▼	-14	▲	21
Malta	76	507	71	464	▼	-5	▲	43
Prague	77	501	81	452	▲	4	▲	49
British Virgin Islands	78	497	74	461	▼	-4	▲	36
Lagos	79	493	New	New	▲	New	▲	New
Kigali	80	491	New	New	▲	New	▲	New
Almaty	81	490	75	458	▼	-6	▲	32
Riga	82	489	82	448	▶	0	▲	41
Bermuda	83	488	84	438	▲	1	▲	50
Sofia	84	485	78	455	▼	-6	▲	30
Cayman Islands	85	482	83	440	▼	-2	▲	42
Nairobi	86	465	77	456	▼	-9	▲	9

GGFI Dimensions

The GGFI ascertains the green finance performance of international financial centres by asking practitioners to rate them on two dimensions:

- The depth to which green finance has penetrated the business of the financial centre, i.e. the prevalence of green financial services and products within the financial centre in question.
- The quality of the green finance products and services on offer.

The purpose of tracking both aspects is to enable respondents to rate a financial centre independently from its market volumes. Thus, for example, if a centre adopts weak green labelling standards in a bid to boost volumes, this may show up in the GGFI as a lower quality rating.

The additional data generated through this approach increases granularity, allows the identification of trends, and can assist policy makers to track the impacts of their decisions.

The detailed ratings of the dimensions for the top 15 centres are shown in table 2. Additional details are in Appendix 1.

Table 2 | Top 15 Centres - Rating Details For Depth And Quality Dimensions

GGFI 11 Rank	Centre	GGFI Dimensions			
		Green Finance Depth		Green Finance Quality	
		Rank	Rating	Rank	Rating
1	London	2	316	1	326
2	New York	1	319	2	322
3	Stockholm	3	314	6	307
4	Geneva	8	307	3	313
5	Luxembourg	4	312	14	304
6	Amsterdam	12	305	4	310
7	Los Angeles	8	307	6	307
8	Copenhagen	14	304	5	309
9	Washington DC	8	307	10	305
10	San Francisco	6	308	17	303
11	Singapore	5	309	20	301
12	Zurich	15	303	8	306
13	Sydney	12	305	17	303
14	Edinburgh	17	302	10	305
15	Seoul	6	308	23	298

Chart 1 shows the relationship between ratings of the depth and quality dimensions in the index and the generally close correlation between the assessments of each factor by respondents. Centres close to the trend line are balanced for depth and quality, centres further away have either a better rating for depth, or for quality. The relative score of Jersey for green finance quality is highest compared with its score in depth. On the other side of the line, Osaka, San Francisco, and New Delhi have high relative scores for depth.

Chart 1 | Relationship Between Ratings Of Depth And Quality

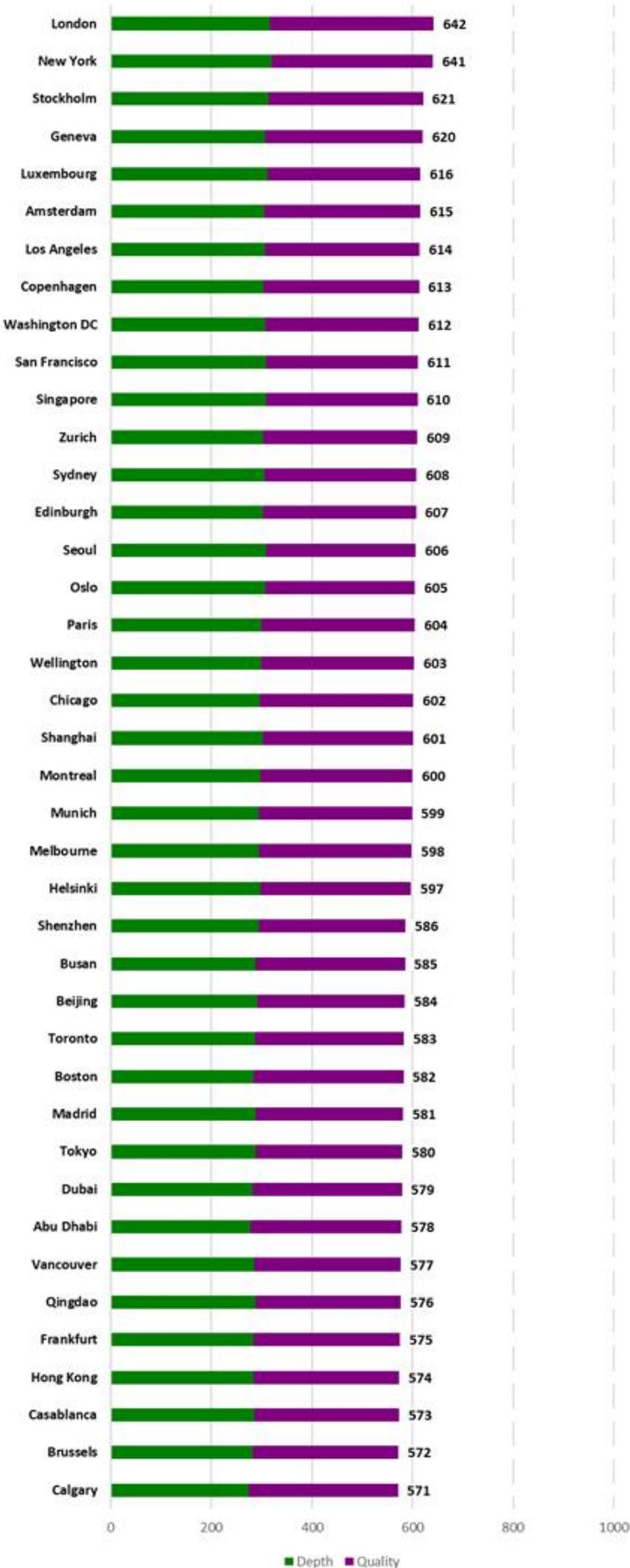


Chart 2 shows the contribution of each of the dimensions to the overall rating for the top 40 centres in the GGFI. London came first for green finance quality and New York led the field for green finance depth. Successful financial centres focused on green finance need both quality and depth in their green markets to thrive.

“Regulation is necessary, but it must first stay flexible in order to adapt to changes in e.g., technologies; and second, and most importantly, regulation must go beyond financial markets and set reliable frameworks for companies of the real economy (e.g., carbon pricing).”

HEAD OF ESG INVESTMENTS, BANK, ZURICH

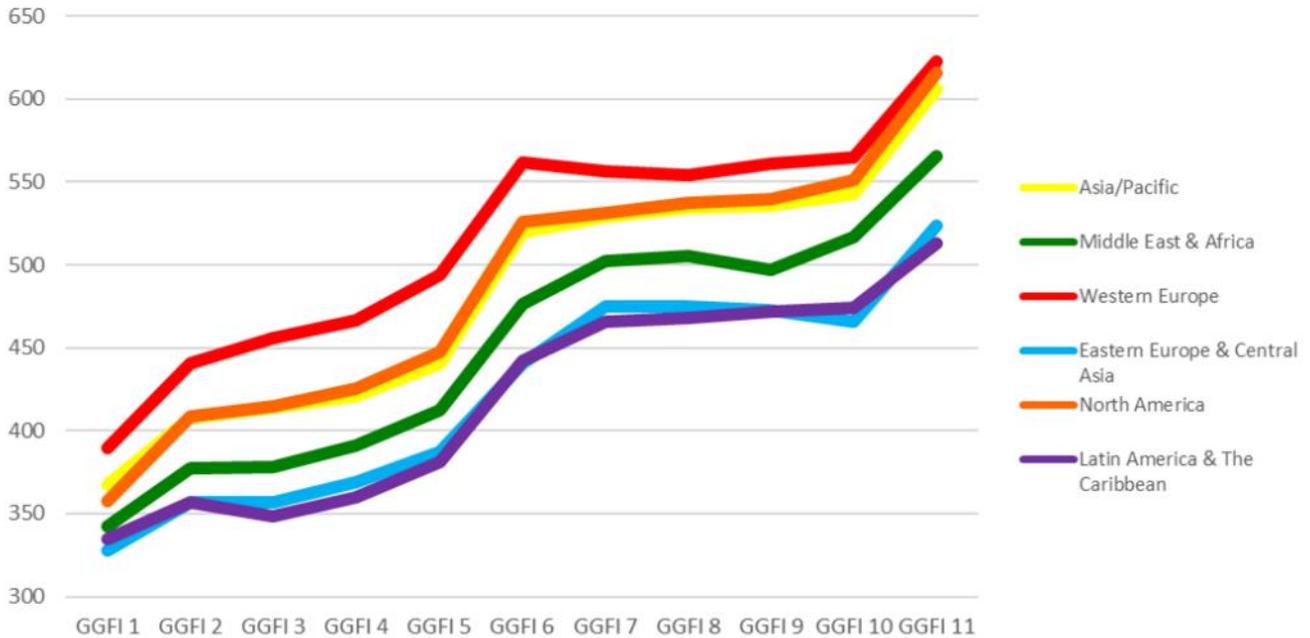
Chart 2 | The Contribution Of The Dimensions To The Overall Rating - GGFI 11 Top 40 Centres



Regional Performance

The average rating of the top five centres in each region all improved. The leading Eastern European & Central Asia centres overtook the leading Latin America & The Caribbean centres on this measure.

Chart 3 | Average Ratings Of The Top Five Centres In Each Region



“Regulation should incentivise the right corporate and institutional behaviours, as change is required more quickly than the free market might bring about by itself. Incentives accelerate change and can also help to make them sustainable.”

EXECUTIVE DIRECTOR, INVESTMENT BANK, EDINBURGH

Examination of the quality and depth dimensions demonstrates that on the depth ratings, all leading centres are improving. The rate of improvement for quality among leading Asia/Pacific centres has improved more slowly than in Western Europe and North America. In both measures, the leading centres in Eastern Europe & Central Asia have overtaken the leading centres in Latin America & The Caribbean.

Chart 4 | Average Ratings For Depth Of The Top Five Centres In Each Region

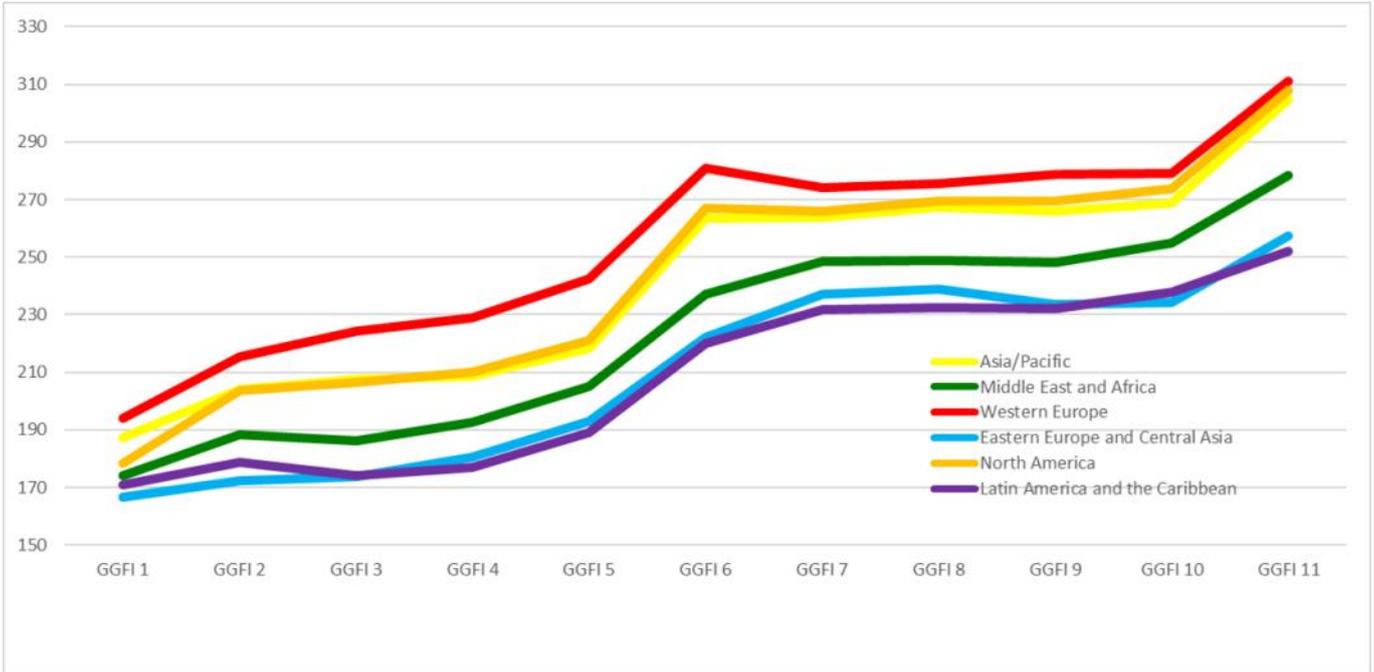
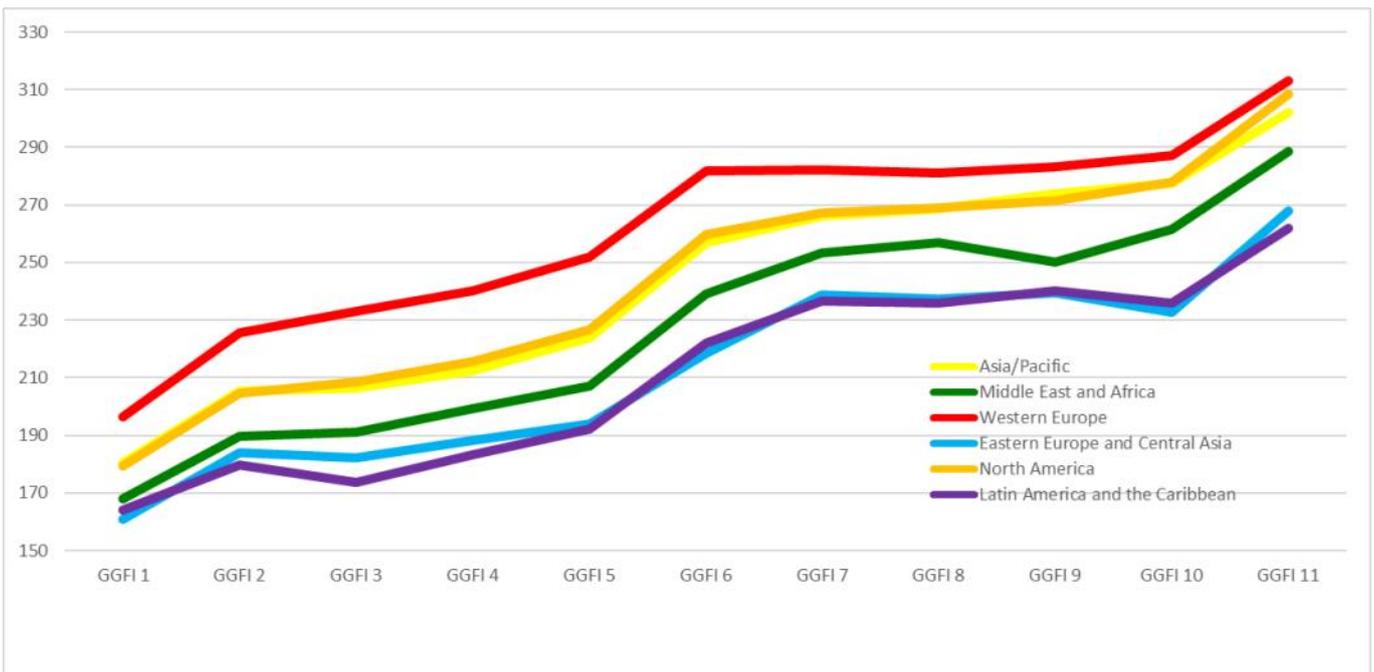


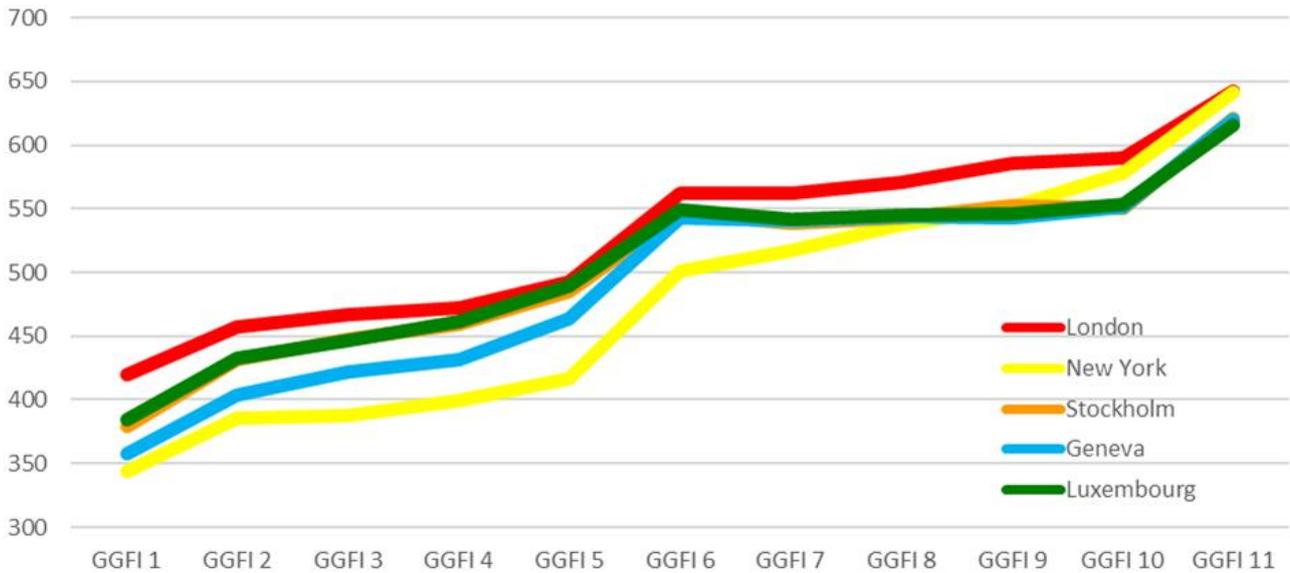
Chart 5 | Average Ratings For Quality Of The Top Five Centres In Each Region



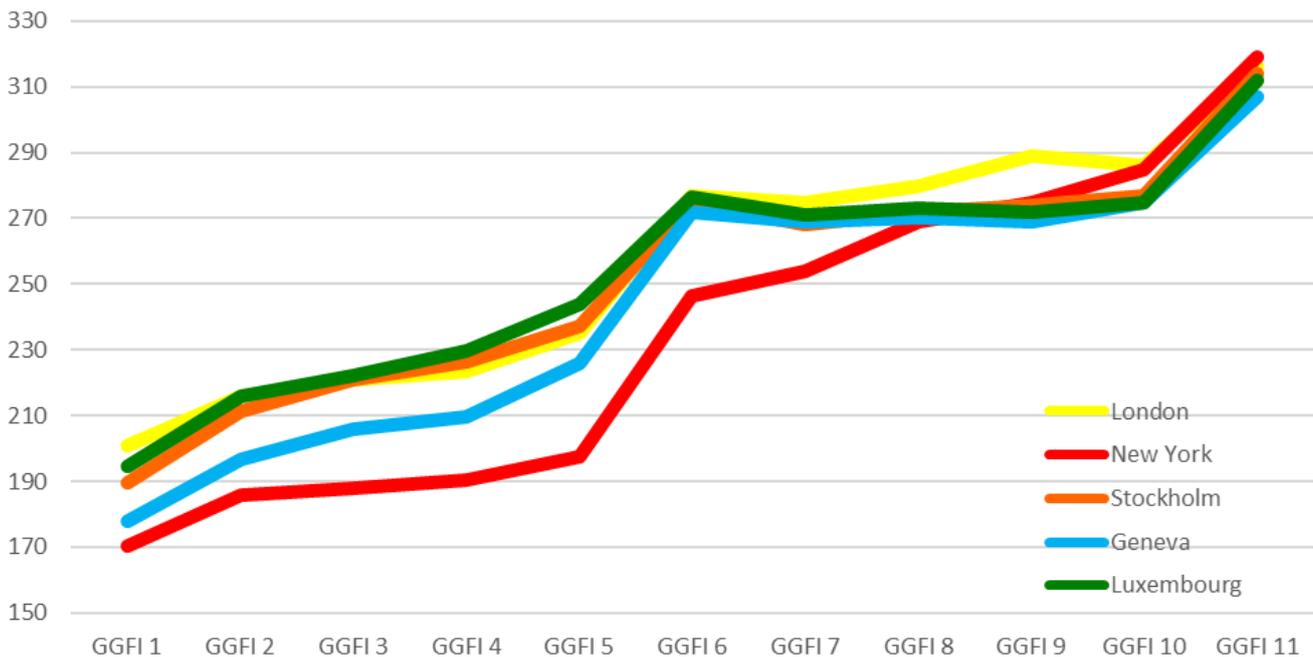
Top Five Centres

New York improved its rating to take second place in the index. Just one point behind London. Stockholm, Geneva, and Luxembourg are very closely rated.

Chart 6 | The Top Five Centres Over Time

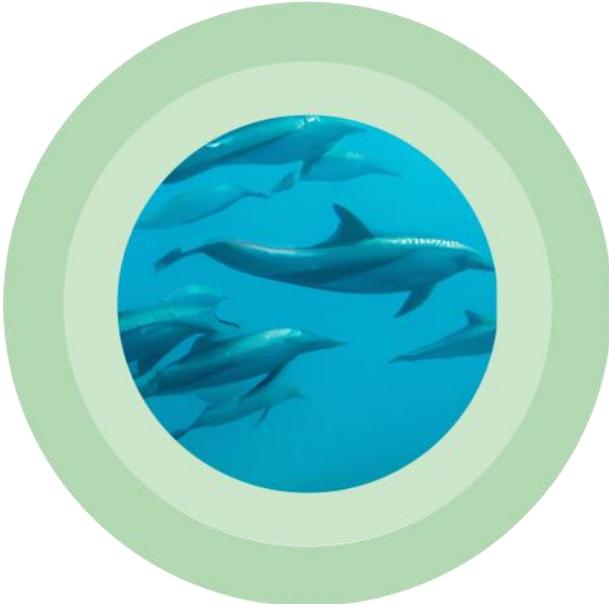
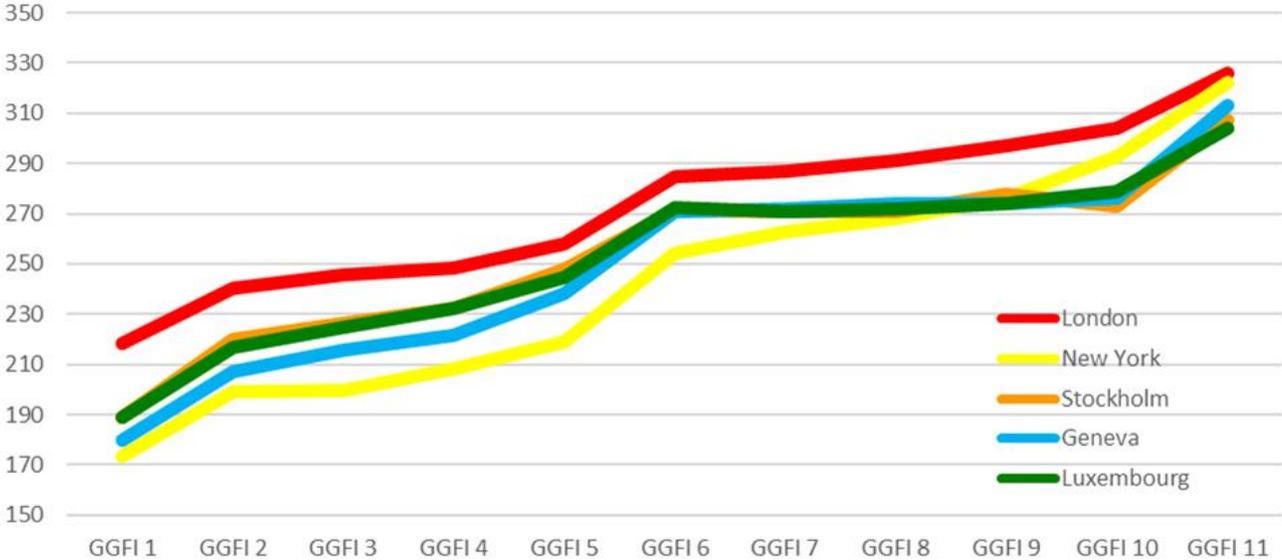


When the depth dimension is examined, New York overtook London to take first place in the index. The leading centres are very closely matched.



On the quality measure, again, the leading centres generally improved their position. Geneva moved into third place on this measure.

Chart 8 | Ratings For The Quality Dimension In The Top Five Centres Over Time



Leading Financial Centres

It is notable that some leading financial centres perform less well than expected in the GGFI, considering their performance in the [Global Financial Centres Index](#) (GFCI), which has been measuring financial centre competitiveness since 2007.

We can compare the centres which rank in the top 20 in the GFCI with their performance in the GGFI. This shows some disconnection between the highest performing centres in the GFCI and performance on green finance in the GGFI. In total, 14 centres feature in the top 20 in both measures with London, New York, and Los Angeles, featuring in the top 10 in both indices.

Table 3 | Leading Financial Centres - Comparison of GGFI And GFCI Rankings

Centre	Global Green Finance Index 11	Green Finance Depth	Green Finance Quality	Financial Centre Competitiveness
New York	2	1	2	1
London	1	2	1	2
Singapore	11	5	20	3
Hong Kong	37	35	39	4
San Francisco	10	6	17	5
Los Angeles	7	8	6	6
Shanghai	20	15	23	7
Chicago	19	22	8	8
Boston	29	34	23	9
Seoul	15	6	23	10
Washington DC	9	8	10	11
Shenzhen	25	23	39	12
Beijing	27	26	31	13
Paris	17	18	10	14
Sydney	13	12	17	15
Amsterdam	6	12	4	16
Frankfurt	36	35	34	17
Munich	22	24	10	18
Luxembourg	5	4	14	19
Zurich	12	15	8	20
Source	GGFI 11 Rank	GGFI 11 Depth Rank	GGFI 11 Quality Rank	GFCI 33 Rank

“The regulatory environment and the disclosure of carbon is key. Most IFCs focus on developing green finance products, but the differentiator will be which IFCs are successful in reporting on and reducing their own carbon footprint.”

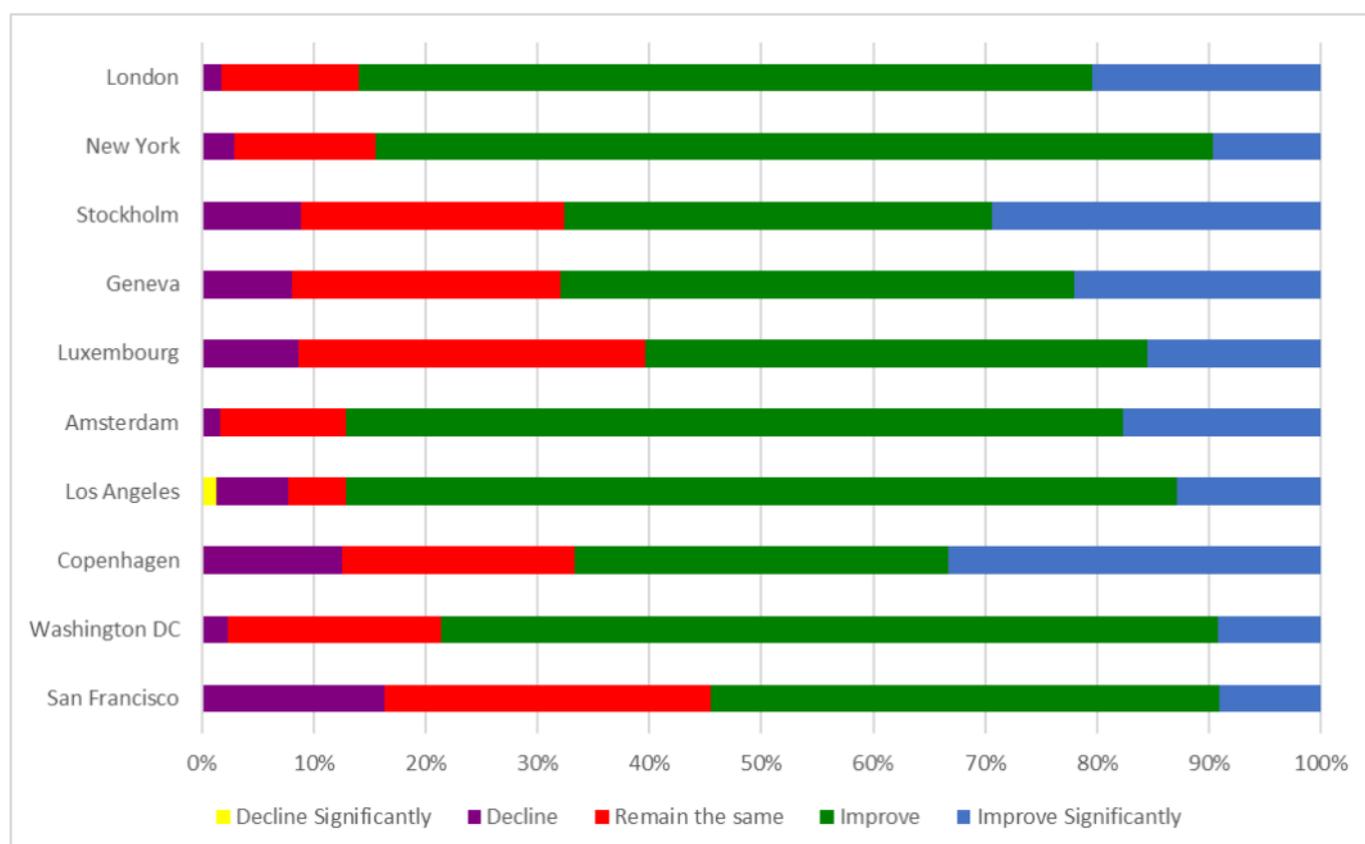
SENIOR OFFICER, FINANCIAL CENTRE, KIGALI

GGFI 11 Further Analysis

Expected Change In Centres

We asked respondents whether the centres they rated would improve, decline, or stay the same in relation to their green finance offering over the next two to three years. The results for the top 10 centres are displayed in Chart 9, showing high levels of confidence, with the majority of respondents predicting an improvement by all centres in this group, and with very high levels of confidence in London, New York, Amsterdam, and Los Angeles.

Chart 9 | Top 10 Centres - Expected Change In Green Finance Offering



“Skills availability is very important – and the interdependence of the financial and NGO sectors in driving green finance is understated by financial sector players but gives London and potentially New York/Berlin a bit of a head start because of strong civil society expertise and an element of 'revolving door' deployment of thought leaders.”

ASSOCIATE DIRECTOR, SUSTAINABLE FINANCE, PROFESSIONAL SERVICES FIRM, LONDON

Instrumental Factors

The GGFI is a factor assessment index, based on a worldwide survey of finance professionals' assessments on the quality and depth of green finance offerings in financial centres. These assessments are run through a statistical model which uses 150 instrumental factors relating to a range of aspects of financial centre competitiveness. These include measures of sustainability, the business environment, infrastructure, and human capital.

Table 4 shows the top 15 instrumental factors' correlation with the GGFI ranking. The correlation with the Global Financial Centres Index reinforces that leading financial centres continue to improve their green finance offering. Other highly correlated factors include the Urban Mobility Readiness Index, and the OECD Country Risk Classification. Infrastructure measures also feature strongly.

Table 4 | Top 15 Instrumental Factors By R-Squared Correlation

Instrumental Factor	R-Squared
The Global Financial Centres Index	0.804
Urban Mobility Readiness Index	0.718
Global Innovation Index	0.655
Smart City Index	0.603
OECD Country Risk Classification	0.594
Safe Cities Index	0.587
Agility Emerging Markets Logistics Index	0.562
Logistics Performance Index	0.551
Adjusted Net National Income Per Capita	0.547
JLL Real Estate Transparency Index	0.538
IESE Cities In Motion Index	0.538
Best Countries For Business	0.534
Fintech Activity Index	0.529
World Talent Rankings	0.519
Sustainable Cities Index	0.514

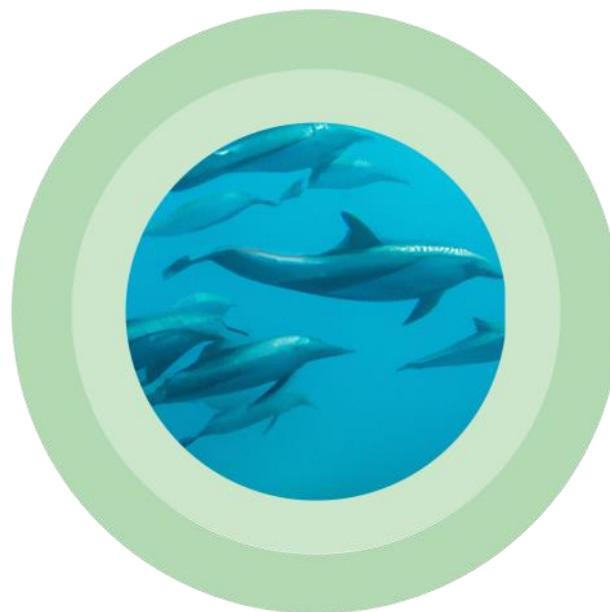
“A realistic carbon tax is needed if there is going to be any meaningful move towards net zero targets.”

SENIOR INVESTMENT OFFICER, INVESTMENT MANAGEMENT FIRM, LONDON

Focusing only on the instrumental factors which relate to sustainability, the factors most closely correlated in terms of their R-Squared relationship with the GGFI rankings are set out in Table 5. The leading factors continue to focus on cities as sustainable places and on the development of the green economy.

Table 5 | Top 15 Sustainability Instrumental Factors By R-Squared Correlation

Sustainability Factors	R-Squared
Urban Mobility Readiness Index	0.718
IESE Cities In Motion Index	0.538
Sustainable Cities Index	0.514
Quality Of Living City Rankings	0.484
Sustainable Economic Development	0.423
World Energy Trilemma Index	0.313
Energy Transition Index	0.288
The Green Future Index	0.272
Buildings Energy Efficiency Policies Database (Y/N)	0.242
Financial Centre Corporate Sustainability Performance	0.242
Global Sustainable Competitiveness Index	0.225
Quality Of Life Index	0.217
Proportion Of Population Using Safely-managed Drinking-water Services (%)	0.206
The Global Green Economy Index	0.202
Environmental Performance Index	0.188



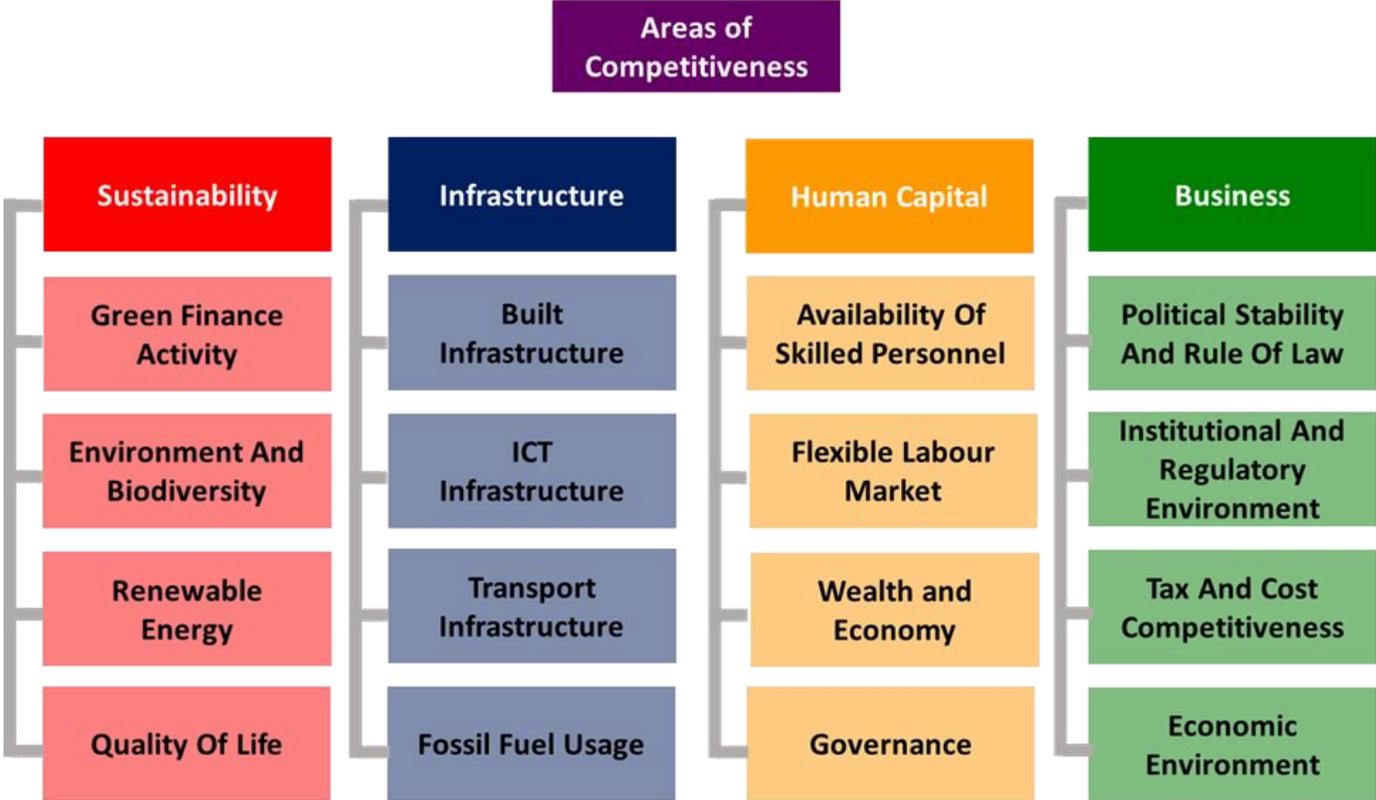
Areas Of Competitiveness

The instrumental factors used in the GGFI model are grouped into four broad areas:

- Sustainability
- Infrastructure
- Human Capital
- Business

These areas, and the instrumental factor themes which comprise each area, are shown in Chart 10.

Chart 10 | GGFI Areas Of Competitiveness



To assess how financial centres' green finance offerings perform against each of these areas, the GGFI statistical model is run for each area of competitiveness separately, allowing a picture to be built of centres' strengths and weaknesses. The performance of the top ranked 15 centres in each of these areas is illustrated in table 6.

The leading centres in the GGFI have strengths across all four areas of competitiveness. Some centres are strong in a particular area, for example, Washington DC and Paris in infrastructure or Singapore in the sustainability measures.

Table 6 | Top 15 Centres By Area Of Competitiveness

Rank	Sustainability	Business	Human Capital	Infrastructure
1	London	New York	London	London
2	New York	London	New York	New York
3	Stockholm	Stockholm	Stockholm	Washington DC
4	Singapore	Los Angeles	Zurich	Paris
5	Copenhagen	Zurich	San Francisco	San Francisco
6	Oslo	Amsterdam	Geneva	Sydney
7	San Francisco	Copenhagen	Amsterdam	Oslo
8	Washington DC	Singapore	Sydney	Stockholm
9	Geneva	San Francisco	Paris	Seoul
10	Edinburgh	Edinburgh	Seoul	Los Angeles
11	Amsterdam	Sydney	Oslo	Amsterdam
12	Paris	Luxembourg	Luxembourg	Luxembourg
13	Luxembourg	Geneva	Shanghai	Copenhagen
14	Zurich	Oslo	Munich	Shanghai
15	Los Angeles	Shanghai	Singapore	Munich

Index Ranking For Sustainability

We can compare the overall index ranking with the ranking based on the sustainability area of competitiveness, using only the instrumental factors that have a direct relationship to sustainability. This analysis produces slightly different results to the main index, as shown in the comparison in Table 7. The plus and minus figures show the difference between the main index and the index calculated using only sustainability factors.

Where only sustainability factors are included in the analysis, London, New York, and Stockholm retain their positions. Singapore and Oslo gain significantly, while Sydney and Seoul drop out of the top 15.

Table 7 | Top 15 Centres Using All Factors And Only Sustainability Factors

Rank	All Factors	Sustainability Factors
1	London	London
2	New York	New York
3	Stockholm	Stockholm
4	Geneva	Singapore (+7)
5	Luxembourg	Copenhagen (+3)
6	Amsterdam	Oslo (+10)
7	Los Angeles	San Francisco (+3)
8	Copenhagen	Washington DC (+1)
9	Washington DC	Geneva (-5)
10	San Francisco	Edinburgh (+4)
11	Singapore	Amsterdam (-5)
12	Zurich	Paris (+5)
13	Sydney	Luxembourg (-8)
14	Edinburgh	Zurich (-2)
15	Seoul	Los Angeles (-8)

“Building capacity and capabilities is one of the biggest barriers to the continued growth of green finance and substantial investments in skills are required in all financial centres to meet the commitments made and targets set by financial institutions and regulators.”

CEO, PROFESSIONAL ASSOCIATION, EDINBURGH

Commentary On Factors

The GGFI survey asks respondents to comment on factors that affect the uptake of green finance, and in particular on regulation, taxation, and the availability of skills. The responses are summarised in Table 8.

Table 8 | Commentary On Areas Of Competitiveness

Area Of Competitiveness	Number Of Mentions	Main Themes
Regulatory Environment	73	<ul style="list-style-type: none"> Increasing harmonisation of reporting and disclosure is having an effect. Regulation needs to go beyond finance to affect real-world economic decisions, e.g., carbon pricing Works best when in line with other policy directives.
The Availability Of Skills In Green Finance	71	<ul style="list-style-type: none"> Building capacity and capabilities is one of the biggest barriers to the continued growth of green finance and substantial investments in skills are required. There is a shortage of Green Finance expertise, both in finance and in technical expertise, e.g., in environmental regulations and standards, carbon calculations, industrial transformation, and modelling skills.
Taxation	65	<ul style="list-style-type: none"> Carbon taxes are needed to move towards net zero. Targeted tax incentives could help, e.g., to support energy transition and infrastructure investment, including in housing.
Other	16	<ul style="list-style-type: none"> There is ample capital available, but an insufficient quantity of bankable 'cross-border' projects. Need to promote public understanding about climate change and sustainability issues.

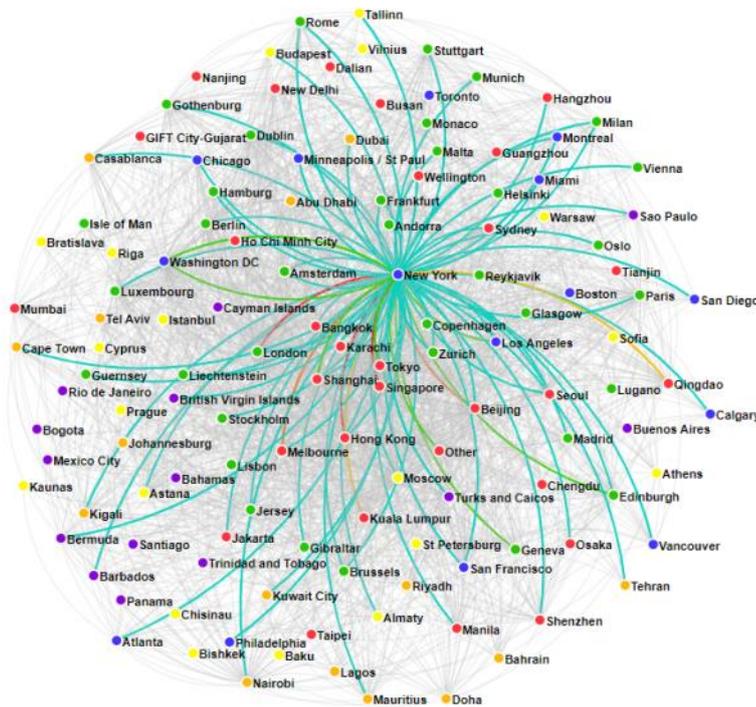
We also asked respondents to identify interesting initiatives in green finance. These included:

- Expansion of local initiatives, such as the Guernsey Green Finance Initiative, the Belize nature debt swap, Natural Capital in Scotland, the UK Green Finance Institute and Green Finance Education Charter, wind and solar projects in Southern Africa, Just Energy Transition Partnership models in South Africa, Singapore Government support for independent sustainability advice.
- The Blue carbon insurance scheme- ICEA .
- The Ghana Eni project.
- Carbon Markets, including the Voluntary Carbon Markets Integrity Initiative.
- Nature-backed currencies.
- The Task Force for Financial Disclosures for Nature.
- Forthcoming IFRS sustainability standards as a global baseline for sustainability disclosures.
- Green bonds, Green sukuk, Transition bonds.
- AgTech and HealthTech.
- Sustainable and ESG-aligned insurance.
- Digitisation of sustainability reporting.
- Energy attribute certificates (EACs) or renewable energy certificates.
- Swiss Positive Gold Fund.
- UNEP FI Principles for Responsible Banking Academy.

Connectivity

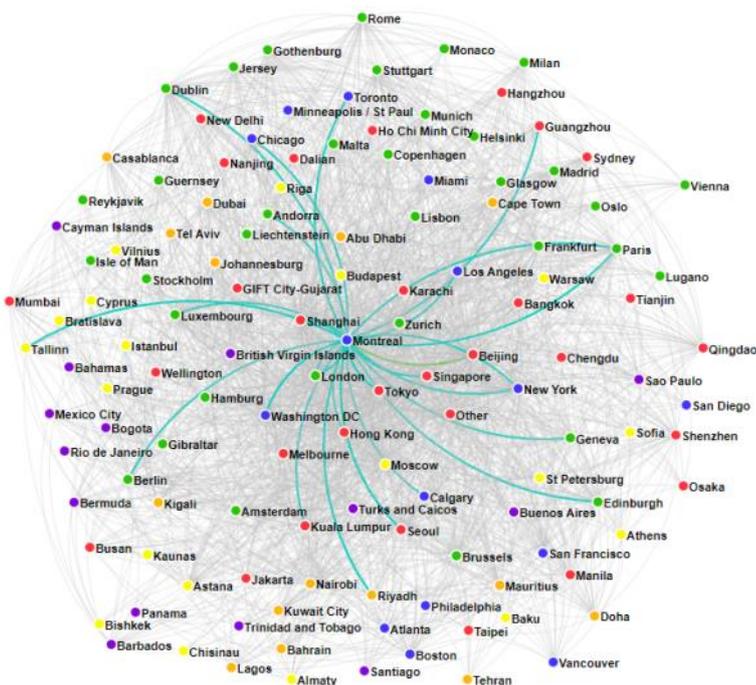
One factor where financial centres' green finance performance differs is the extent to which centres are connected to other financial centres. One way of measuring this connectivity is to look at the number of assessments given to and received from other centres in the GGFI survey. Charts 11 and 12 use New York and Montreal as examples to contrast the different levels of connectivity that the two centres enjoy. In this example, New York London has a wider spread of connections across all regions of the world than Montreal.

Chart 11 | GGFI 11 Connectivity - New York



- 1-5 ratings
- 6-10 ratings
- 11-15 ratings
- 16-20 ratings
- 21+ ratings

Chart 12 | GGFI 11 Connectivity - Montreal



- Asia/Pacific
- North America
- Western Europe
- Middle East & Africa
- Latin America & the Caribbean
- Eastern Europe & Central Asia

Financial Centre Profiles

We conduct further analyses based on three measures (axes) that determine a financial centre's profile in relation to three different dimensions.

'Connectivity' – the extent to which a centre is well known among GGFI survey respondents, based on the number of 'inbound' assessment locations (the number of locations from which a particular centre receives assessments) and 'outbound' assessment locations (the number of other centres assessed by respondents from a particular centre).

'Diversity' – the instrumental factors used in the GGFI model give an indication of a broad range of factors that influence the richness and evenness of factors that characterise any particular financial centre.

We consider this span of factors to be measurable in a similar way to that of the natural environment. We therefore use a combination of biodiversity indices (calculated on the instrumental factors) to assess a centre's diversity. This takes account of the range of factors against which the centre has been assessed – the 'richness' of the centre's business environment; and the 'evenness' of the distribution of that centre's scores. A high score means that a centre is well diversified; a low diversity score reflects a less rich business environment.

'Speciality' – the depth within a financial centre of green finance and sustainability. A centre's 'speciality' or performance is calculated from the difference between the overall GGFI rating and the ratings when the model is calculated based only on sustainability factors.

In Table 9, 'Diversity' (Breadth) and 'Speciality' (Depth) are combined on one axis to create a two-dimensional table of financial centre profiles. The 86 centres in GGFI 11 are assigned a profile on the basis of a set of rules for the three measures: how well connected a centre is, how broad its services are, and how specialised it is.

The Global Leaders (in the top left of the table) have both broad and deep green finance activity and are connected with a greater range of other financial centres. Other leading centres are profiled as Established International Centres.

Chart 13 | GGFI Dimensions

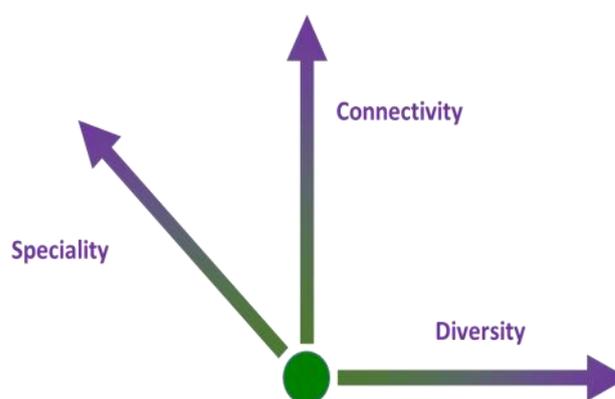
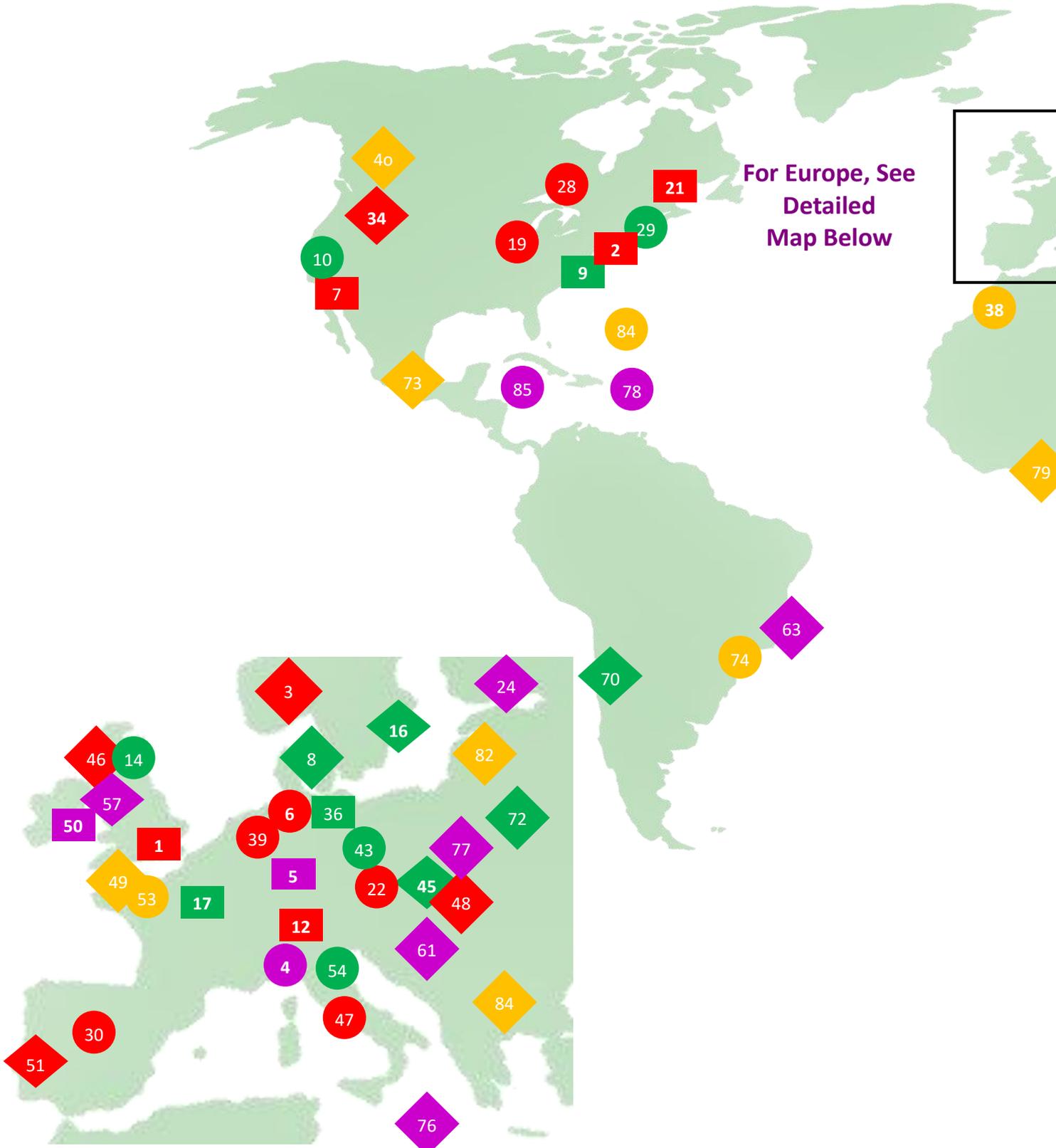


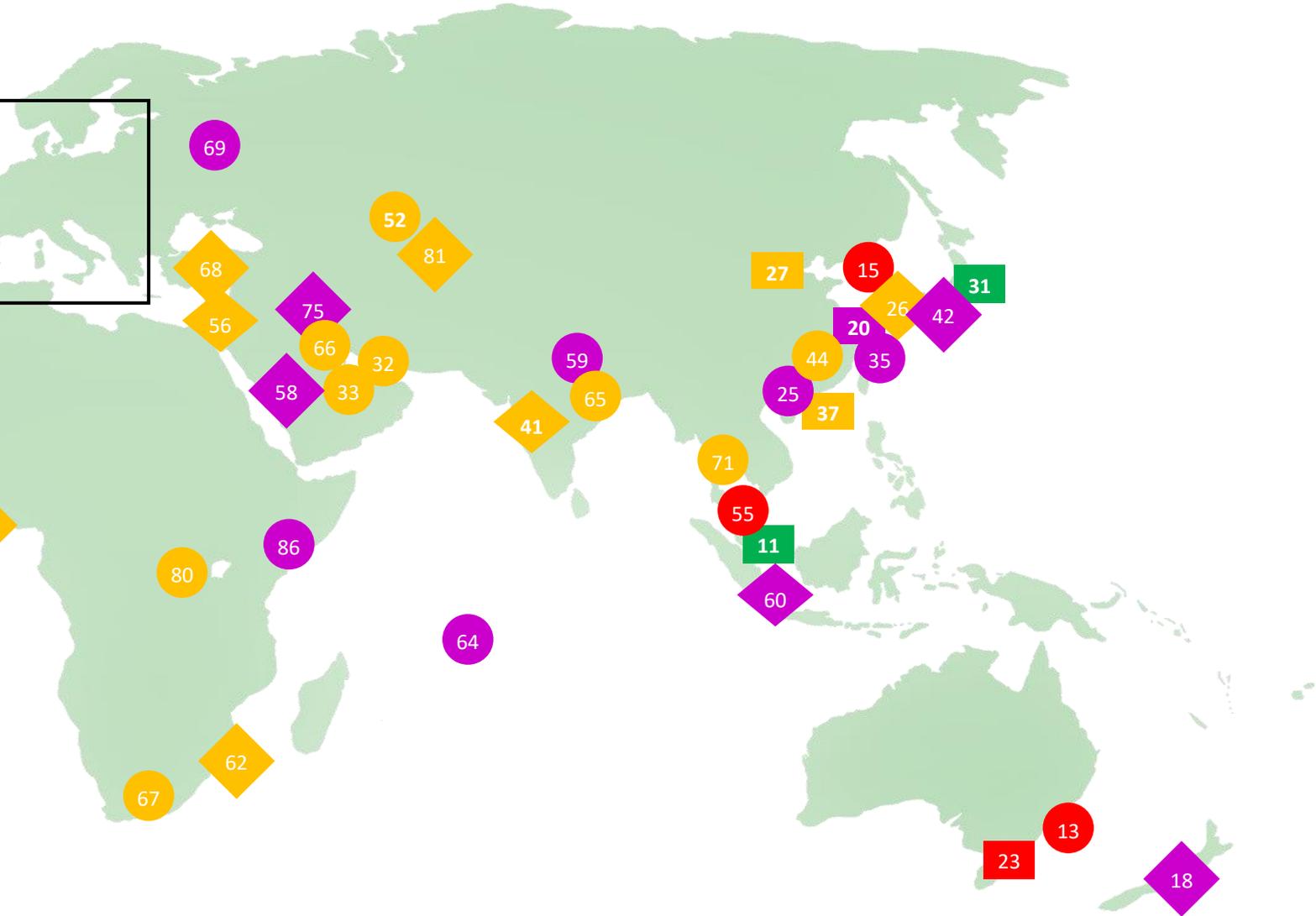
Table 9 | Financial Centre Profiling

	Broad and Deep	Relatively Broad	Relatively Deep	Emerging	
	Global Leaders	Global Diversified	Global Specialists	Global Contenders	
Global	London	Washington DC*	Luxembourg	Beijing*	
	New York	Singapore*	Shanghai	Hong Kong*	
	Los Angeles	Paris*	Dublin*		
	Zurich*	Tokyo			
	Melbourne	Frankfurt			
		Established International	International Diversified	International Specialists	International Contenders
International	Amsterdam*	San Francisco*	Geneva	Dubai*	
	Sydney	Edinburgh*	Shenzhen	Abu Dhabi*	
	Seoul*	Boston	Qingdao	Casablanca*	
	Chicago*	Berlin	New Delhi*	Guangzhou*	
	Montreal*	Milan	Mauritius	Astana*	
	Munich*		Moscow*	Jersey*	
	Toronto		British Virgin Islands	Mumbai*	
	Madrid		Cayman Islands*	Doha*	
	Brussels*		Nairobi	Cape Town	
	Rome			Bangkok*	
	Kuala Lumpur			Sao Paulo	
				Kigali (New)	
				Bermuda	
		Established Players	Local Diversified	Local Specialists	Evolving Centres
	Local	Stockholm*	Copenhagen*	Wellington	Busan*
		Vancouver*	Oslo	Helsinki*	Calgary
		Glasgow*	Hamburg*	Osaka*	GIFT City-Gujarat*
		Vienna	Santiago*	Isle of Man	Guernsey
Lisbon*		Warsaw	Riyadh	Tel Aviv*	
			Jakarta*	Johannesburg*	
			Liechtenstein	Istanbul	
			Rio de Janeiro*	Mexico City*	
			Bahrain	Lagos (New)	
			Malta	Almaty	
			Prague*	Riga	
				Sofia	

* An asterisk denotes a change since GGFI 10

The GGFI 11 World - Centres In The Index





The numbers on the map indicate the GGFI 11 rankings.

Broad and Deep	Relatively Broad	Relatively Deep	Emerging
■ Global Leaders	■ Global Diversified	■ Global Specialists	■ Global Contenders
● Established International	● International Diversified	● International Specialists	● International Contenders
◆ Established Players	◆ Local Diversified	◆ Local Specialists	◆ Evolving Centres

The Carbon Transition

“The Stone Age didn’t end for lack of stone, and the oil age will end long before the world runs out of oil.”

Ahmed Zaki Yamani, Minister of Oil for Saudi Arabia 1962 – 1986¹

Background

In 2006, the Long Finance team raised the issue of un-burnable carbon². At the time (before shale gas and fracking) a back of the envelope calculation showed that using all known fossil fuel reserves would result in CO₂ levels in the atmosphere around 1,200 parts per million (ppm) - nearly three times the levels required to keep temperature rises below 2 degrees centigrade.

In 2011, Carbon Tracker, a London-based financial services think tank, published ‘*Unburnable Carbon*’³. This ground-breaking piece of research calculated that if the world was to meet the objective of keeping global warming below 2°C (above pre-industrial levels), the total amount of CO₂ which could be released globally could not exceed 565 gigatonnes for the 40 years to 2050.

At the climate talks in Bonn in October 2015, (the last in a series of meetings under the UNFCCC prior to COP 21 which took place in December in Paris) the UN published a “non-paper”⁴ warning that limiting global warming to 2°C was not sufficient to avoid the most severe impacts of climate change. The non-paper ultimately led to the Paris Agreement⁵, which backed a long-term goal to limit global temperature rise to “well below 2°C” and to “pursue efforts towards 1.5°C”. The Paris agreement, which came into force in December 2015, was endorsed by 195 countries.

Despite the promise shown by Paris, subsequent COPs failed to make substantive process. COP 27, held in Sharm el-Sheikh⁶, did not achieve much success around mitigation and was unable to reach agreement on the phasing out of coal and other fossil fuels or for setting emission peaking periods. This severely impedes efforts to limit the average global temperature increase to 1.5°C. Ultimately, limiting temperature rises to 1.5°C means delivering “net-zero” emissions by 2050.

The UN defines Net Zero as “cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests”⁷. It is this transition to net zero which poses the greatest challenge currently facing the world. A myriad of definitions exist for the term “carbon transition”, but in simple terms it refers to the fundamental changes required to move society and the global economy from a high carbon pathway to a low carbon pathway. These changes are far reaching, covering every human activity – from transport and power generation, to farming, manufacturing and waste disposal. The economic risks and opportunities are enormous, and the political and societal changes will be seismic.

1. <https://www.energyintel.com/0000017b-a7dc-de4c-a17b-e7deb0a00000>
2. <https://www.zyen.com/research/research/sustainability/carbon-burn-it-all/>
3. <https://www.longfinance.net/programmes/sustainable-futures/london-accord/reports/unburnable-carbon-are-the-worlds-financial-markets-carrying-a-carbon-bubble/>
4. <https://unfccc.int/resource/docs/2015/adp2/eng/8infnot.pdf>
5. <https://unfccc.int/process-and-meetings/the-paris-agreement>
6. <https://www.un.org/africarenewal/news/cop27-outcome-reflections-progress-made-opportunities-missed#:~:text=The%20conference%20did%20not%20achieve,above%20pre%20industrial%20levels>
7. <https://www.un.org/en/climatechange/net-zero-coalition#:~:text=What%20is%20net%20zero%3F,oceans%20and%20forests%20for%20instance>

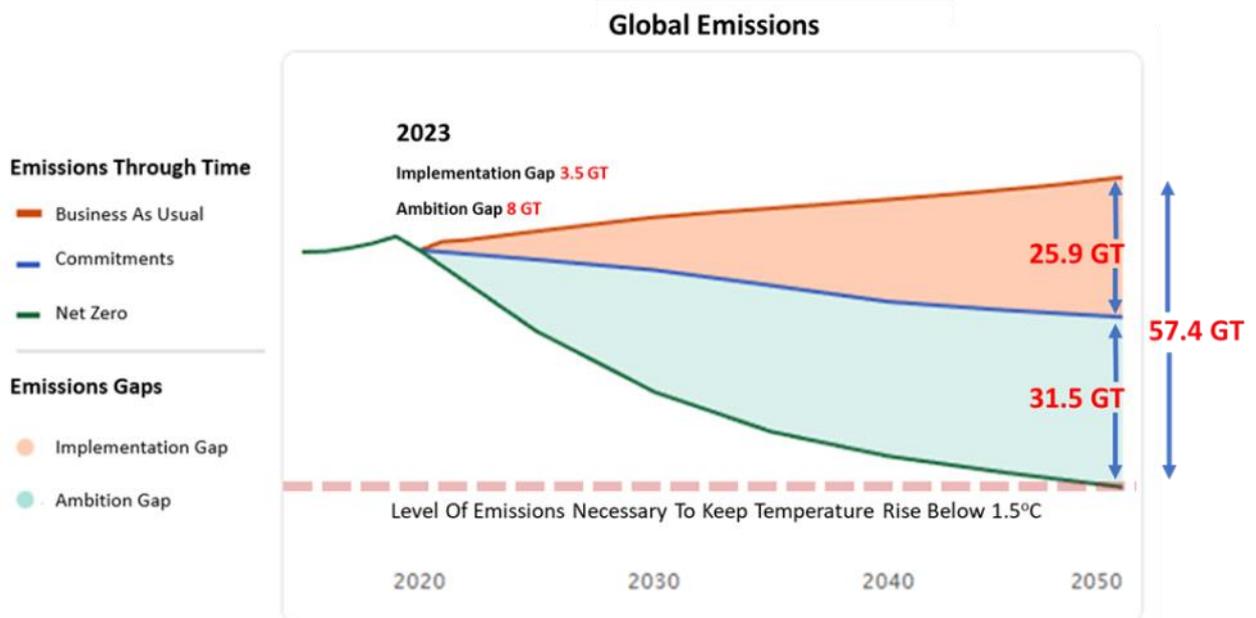
Mind The Gap

Policy makers frequently use the term net-zero, but the extended horizons of the carbon transition, which cross multiple electoral cycles, combined with conflicting demands from sectoral lobbyists, mean that there is rarely deep thought either into delivery or its implications for the short to medium term policy environment.

The World Emissions Clock⁸ (a tool launched at COP27 in Sharm el-Sheikh by the World Data Lab), lays this challenge bare (see figures 1 and 2):

- First, there is an “implementation gap”, which reflects the deficit of actual emission reduction relative to the commitments made in countries’ Nationally Determined Contributions (NDCs). This currently stands at 3.5 Gigatonnes rising to 25.9 Gigatonnes by 2050.
- Second, there is an “ambition gap” which reflects the shortfall of NDCs relative to actual reductions needed for the world to stay on course for a 1.5 degree trajectory. This currently stands at 8 Gigatonnes, rising to 31.5 gigatonnes by 2050.

Figure 1 | Global Implementation and Ambition Gaps



In other words, countries have not promised to do enough to cut emissions and, regardless of this, they are not sticking to the (inadequate) commitments they have made. Furthermore, the cost of failing to transition to a low carbon trajectory will rise as time goes on and paths become more divergent.

The World Emissions Clock is an interactive tool and readers are encouraged to view the sobering implementation and ambitions gaps for their own countries and regions.

8. <https://worldemissions.io/>

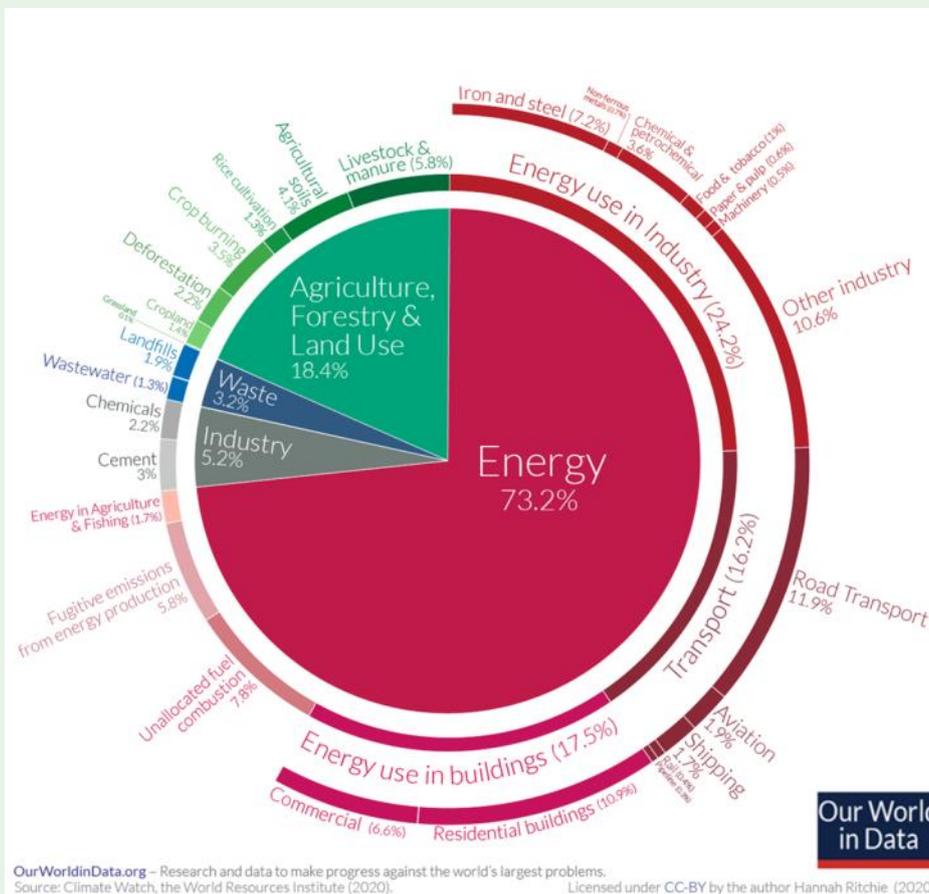
Figure 2 | World Emissions Clock - Global Carbon Budget



A Dirty Business

Carbon emissions arise from four main sources (see figure 3) – energy use, agriculture and forestry, industry, and waste management. Each of these can be further subdivided into industry sectors and sub sectors.

Figure 3 | Sources Of Green House Gas Emissions

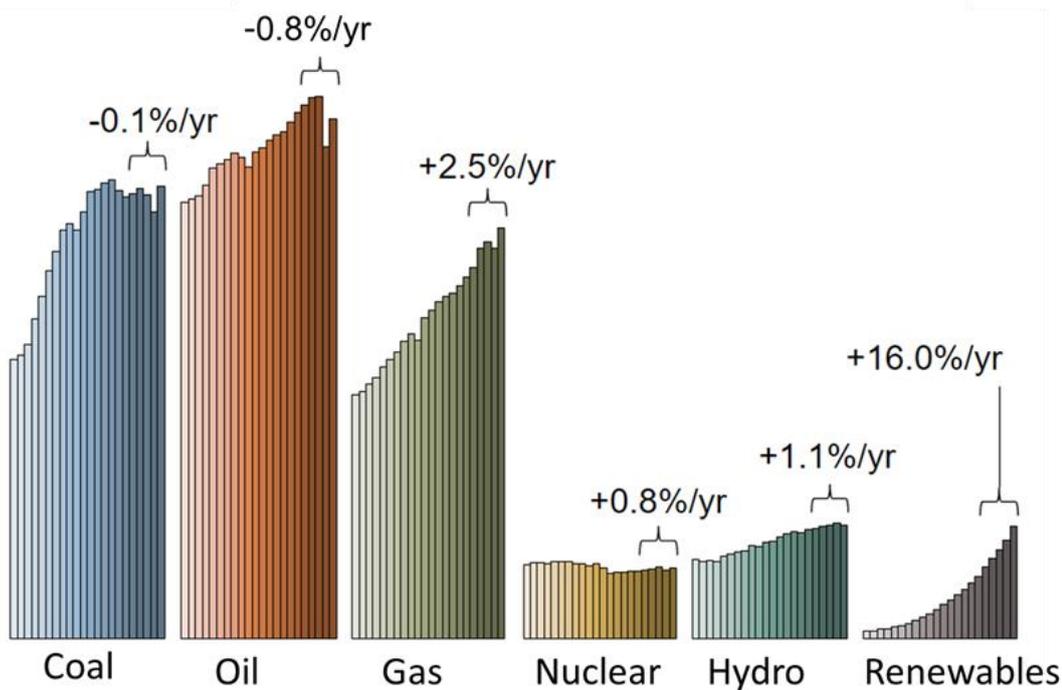


Energy is by far the largest contributor to emissions. The sources of emissions from this sector can be subdivided into industry (24.2%), transport (16.2%) and energy use in buildings (17.5%). Ultimately, the carbon intensity of energy is derived from its source and, regardless of a rapidly growing contribution

of renewables to the global energy budget (see figure 3), fossil fuels still provide the world with 70% of its energy. Without radical action and unprecedented investment, fossil fuels are likely to continue to contribute a significant proportion of total energy for decades to come.

Given the slow progress being made to decarbonise the world's energy sources, logically, attention should be focussed on energy use in industry, transport, and buildings. However, despite rising energy prices and a well-publicised "cost of living crisis" in most major economies, policy makers have been leaden footed in creating regulations and standards that bake carbon costs and energy efficiency into new development, whilst crumbling, high carbon, legacy infrastructure holds back investment and growth.

Figure 4 | Changes In Composition Of Primary Energy Sources 2000-2021 (Change In Contribution For The Last 5 Years Averaged As Percentage/Year)



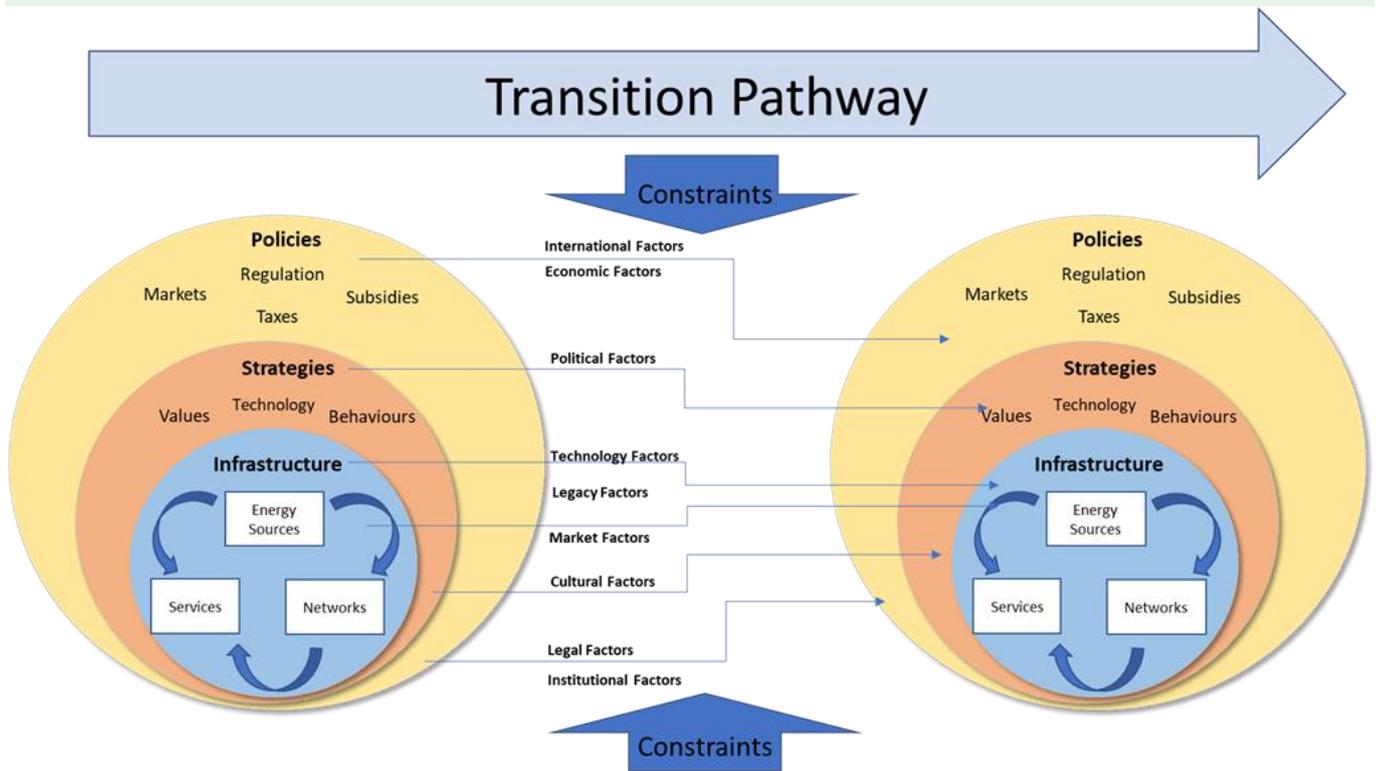
Source: <https://commons.wikimedia.org/w/index.php?curid=87755970>

None of this is news; all of these points were raised in The London Accord⁹, which was published a decade and a half ago, but attempts to get to grips with the climate crisis are still showcasing the reduction of agricultural emissions (see the [US](#), [the UK](#), [the EU](#), [New Zealand](#), and [China](#)) while failing to get to grips with the fundamentals – energy generation and use.

Despite this, economic forces, including the plummeting cost of renewable energy and the steadily rising price of fossil fuels, as well as new imperatives such as the importance of energy independence in the face of geopolitical uncertainty, are steadily nudging things in the right direction. None of this detracts from the sheer complexity policy makers must manage to achieve carbon transition (see figure 5).

9 <https://www.longfinance.net/programmes/sustainable-futures/london-accord/london-accord-2007/>

Figure 5 | Transition Pathways



Tools And Techniques For Carbon Transition

Despite the obstacles placed on the transition pathway, a number of successful tools have emerged which can be used to ensure that carbon budgets are moved towards the right trajectory. These include:

Carbon Trading

There are two types of carbon markets: compliance and voluntary. With respect to the former the long established EUETS¹⁰ and the newer (and far less extensive) CETS¹¹ are the largest markets. The EUETS has proven extremely effective¹², saving about 1.2 billion tons of CO₂ between 2008 and 2016 (3.8%) relative to a world without carbon markets, or almost half of what EU governments promised to reduce under their Kyoto Protocol commitments¹³. Issues remain however, notably fungibility between schemes and a requirement for long term policy stability in order to allow markets to mature.

Voluntary carbon markets – national and international – refer to the issuance, buying and selling of carbon credits, on a voluntary basis. The current supply of voluntary carbon credits comes from private entities that develop carbon projects, or (in rarer cases) governments that develop programmes certified by carbon standards that generate emission reductions and/or removals. Significant issues surround the voluntary markets, particularly around a lack of regulations or standards.

10. https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en

11. <https://chinadialogue.net/en/climate/the-first-year-of-chinas-national-carbon-market-reviewed/>

12. https://climate.ec.europa.eu/system/files/2021-10/policy_ets_allowances_bm_curve_factsheets_en.pdf

13. <https://www.pnas.org/doi/10.1073/pnas.1918128117>

Carbon Accounting

Carbon accounting, is the process of quantifying the amount of greenhouse gases (usually referred to as CO₂ equivalent (CO₂e)), arising directly (scope 1 and 2) and indirectly (scope 3) from a business's or organisation's activities within a defined set of boundaries. The terms scope 1,2 & 3 are derived from the GHG Protocol¹⁴, the globally recognised standard for accounting for greenhouse gas emissions.

Essentially, scope 1 and 2 are those emissions that are owned or controlled by a company, whereas scope 3 emissions are a consequence of the activities of the company but occur from sources not owned or controlled by it. In addressing the carbon transition, companies can adopt six distinct, but non-exclusive pathways to lower emissions:

- i. Different feedstock and/or energy sources,
- ii. Different process technologies,
- iii. CO₂ capture and storage or re-use,
- iv. Recycling of the produced products at the end of their life-cycle,
- v. Changes in the carbon content of the products made, and
- vi. The reduction over time of the carbon intensity of electricity, hydrogen, or heat that is bought by the site.

Understanding, capturing and communicating the value of each of these pathways to investors is critical, but currently requirements to provide carbon accounts vary by jurisdiction:

- In the UK, all large companies and large LLPs are required to report certain energy usage and carbon emissions under the Streamlined Energy and Carbon Reporting requirements¹⁵. Quoted companies under the Streamlined Energy and Carbon Reporting (SECR) need to report their full Scope 1 and Scope 2 emissions.
- Since 2009, the United States has required facilities emitting at least 25,000 metric tons or more of carbon dioxide to report their greenhouse gas emissions to the Environmental Protection Agency every year¹⁶.
- France, in 2015, became the first country to require investors such as pension funds and insurance companies to disclose their GHG emissions¹⁷.
- Since 2007, Australia has mandatory emissions reporting under the National Greenhouse and Energy Reporting Scheme (NGERS)¹⁸. Only companies that meet certain emissions thresholds are required to report. Companies use an online tool called the Emissions and Energy Reporting System (EERS) to report their data.

Policy Performance Bonds

Governments claim they are committed to pursuing sustainability and tackling climate change, but despite numerous conferences, papers, and communiqués, there is still a lack of confidence that governments are serious about meeting sustainability or carbon emission reduction targets.

14 <https://ghgprotocol.org/>

15 <https://www.gov.uk/government/publications/academy-trust-financial-management-good-practice-guides/streamlined-energy-and-carbon-reporting>

16 <https://www.epa.gov/climate-change>

17 <https://climate-laws.org/geographies/france/laws/law-no-2015-992-on-energy-transition-for-green-growth-energy-transition-law>

18 <https://www.cleanenergyregulator.gov.au/NGER>

This affects investment, particularly when the worsening economic environment leads governments to row back on commitments.

Missed targets, low fossil fuel prices, and low carbon prices reduce the profitability of clean energy and other sustainability projects, but Sovereign Sustainability-Linked Bonds (SSLBs) allow these risks to be hedged¹⁹.

The ability to hedge facilitates investment in green projects, because if there are changes in policy (such as subsidies or tax breaks) which affect the profitability of those investments, the government bears some of the direct costs by having to pay higher interest rates on government debt.

Policy performance bonds can be issued against a range of sustainability issues which is why they are also known as sustainability-linked bonds. Because SSLBs effectively sidestep the logjam caused by international treaties, countries issuing SSLBs can deliver on climate action and the UN's Sustainable Development Goals, whilst simultaneously attracting inward investment.

In 2022, Chile²⁰ and Uruguay²¹ released the world's first-ever Sovereign Sustainability-Linked Bonds (SSLBs).

Carbon Risk Exposure

Also known as transition risk, this refers to the exposure firms and investors face as jurisdictions accelerate the adoption and implementation of policies to cut CO₂ emissions. Due to the implementation and ambition gaps described earlier, carbon reduction policies will asymmetrically affect different national and supra-national regions, as well as different industry sectors and individual companies. Some, such as EV battery manufacturers, may flourish. Others, such as airline caterers, may face an increasingly hostile fiscal environment as margins are squeezed and carbon costs rise.

Transition risk can be subdivided²² into:

- **Policy risk:** Policy actions regarding climate change mitigation and adaptation are fluid, and subsidies and tax breaks are subject to the whims of politicians and change frequently, often with little notice (see Policy Performance Bonds).
- **Legal risk:** This is a relatively new risk and involves litigation against organisations perceived to be failing in their duty of care to tackle climate change effectively. In 2021, 38 law suits were filed against private sector companies²³ (often in combination with government actors). All but one of these cases were filed in the United States, Australia, and Europe. Figure 6 illustrates the sectors where cases are being brought.

19. <https://www.longfinance.net/programmes/sustainable-futures/london-accord/reports/sovereign-sustainability-linked-bonds-chile-sets-a-high-bar/>

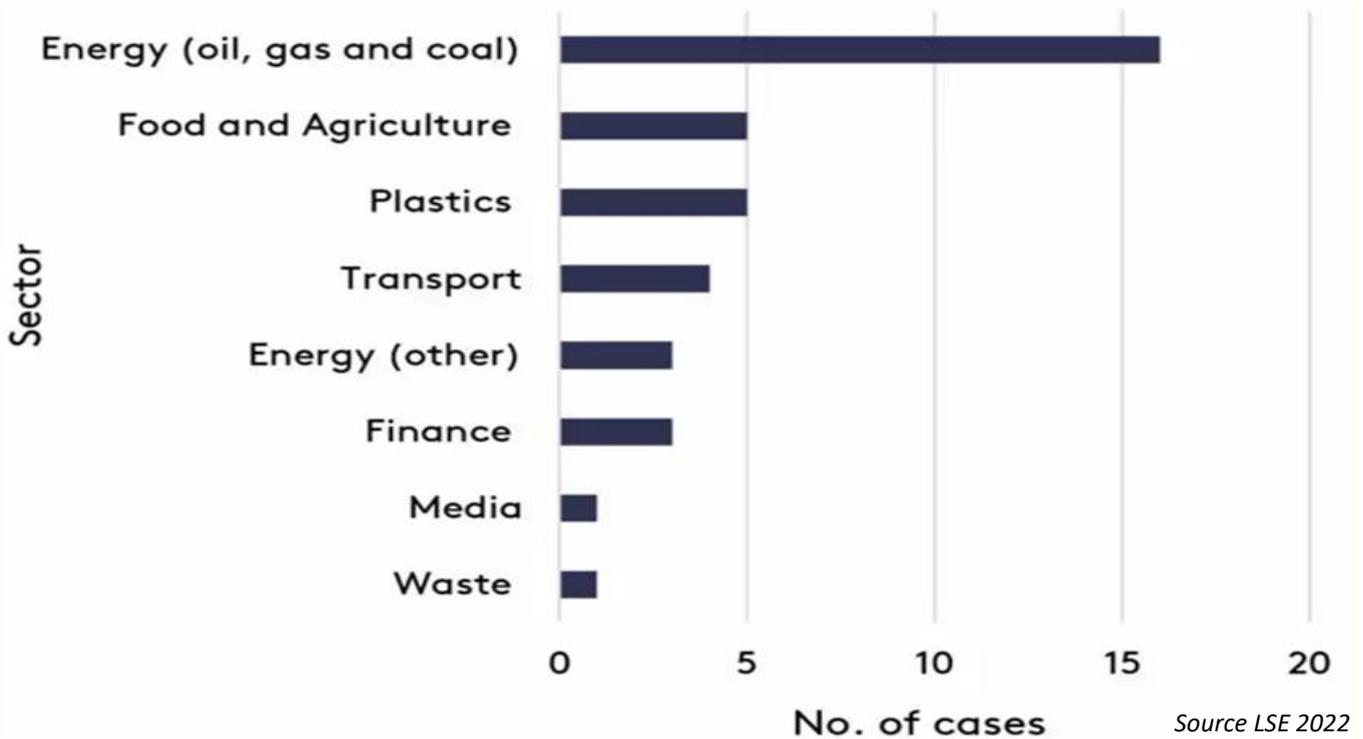
20. <https://www.hacienda.cl/english/work-areas/international-finance/public-debt-office/esg-bonds/sustainability-linked-bonds>

21. <http://sslburuguay.mef.gub.uy/>

22. <https://hbr.org/2022/01/how-to-evaluate-your-companys-carbon-risk>

23. <https://www.lse.ac.uk/granthaminstitute/news/taking-companies-to-court-over-climate-change-who-is-being-targeted/>

Figure 6 | Climate Change Litigation In 2021



- **Technology risk:** Firms may need to consider technological innovation and the transformation of processes and supply chains, both to comply with climate change legislation, and to mitigate physical risks. Those that fail to invest may lose market share to disruptive incomers or more fleet footed rivals.
- **Market risk:** Climate change may trigger a fundamental shift of supply and demand for certain commodities, products, and services.
- **Reputation risk:** Social media pile-ons resulting from customer or community perceptions have the potential to cause enormous damage to a firm's bottom line.

Financial Sector Implications And Opportunities

From an investor's perspective, a recent study by Bolton, Halem & Kacperczyk²⁴, published in the Journal of Applied Corporate Finance, showed that a carbon-transition premium does exist and is economically meaningful. The study found a significant link between performance and carbon emissions and can be interpreted as a measure of how fast the company is transitioning and so can be considered a short term risk factor from investors' point of view. This should have implications for the cost of capital for firms, although banks have been slow to price in carbon risk²⁵.

24. Bolton P, Halem Z, Kacperczyk M, 2022, The financial cost of carbon, Journal of Applied Corporate Finance, Vol:34, ISSN:1078-1196, Pages:17-29

25. Ehlers T, Packer F & de Greiff K 2021, The pricing of carbon risk in syndicated loans: which risks are priced and why? BIS Working Papers No 946

From a financial centre perspective, closer attention must be paid to the transition risks highlighted above. In 2019, we published a supplement to the Global Green Finance Index 3²⁶ focussing on carbon risk, which highlighted the financial centres that were most exposed (see Figure 7). Little has been done to ameliorate this risk.

Figure 7 | Percentage of Listed Companies' Revenues Derived From Fossil Fuels

Financial Centre	Percentage Of Revenue Derived From Fossil Fuels
Moscow	58%
Bangkok	36%
Warsaw	33%
Amsterdam	32%
Bombay	23%
London	21%
Shanghai	18%
Istanbul	18%
Vienna	17%
Toronto	16%

Source: Global Green Finance Index 3, 2019

Recommendations For Financial Centres

Given the evident risks associated with the carbon transition, financial centres should consider how the transition may affect medium to long-term market stability. Specifically it is recommended that centres:

- Identify and promote investment in critical sectors and technologies, including FinTech.
- Investigate innovative financial products and services which facilitate carbon transition, particularly with respect to policy performance bonds which assist in reducing political risk for investors.
- Identify and ameliorate transition risk exposure, in particular consideration should be given to whether new listings for high carbon industries (such as fossil fuels) are desirable or conducive to long term market stability.
- Lobby for regulations and standards on carbon accounting to ensure that carbon costs are factored into valuations and risk assessments.

26 <https://www.longfinance.net/programmes/sustainable-futures/london-accord/reports/value-and-values-warming-world/>

- Communicate the risks and opportunities with policy makers – financial centres are apolitical and trusted voices and effective communication can lead to effective policy making.
- Adopt a leadership position and work in partnership with other national and regional centres.

Conclusions

Financial centres are currently hampered by a lack of policy clarity and varying levels of support for low-carbon and renewable alternatives across jurisdictions and a great deal more research is needed on both transition risk and the physical risks to firms associated with climate change, including financially material metrics and analytical tools to measure and manage transition risks.

In many cases where financial authorities have undertaken studies analysing the potential impacts of the carbon transition, the focus has been on the medium-term financial stability risks of climate policies or low carbon technologies increasing tail risks associated with losses on stranded fossil fuel reserves²⁷.

A greater emphasis should be placed on the opportunities that the transition to a low carbon economy will present to markets. Fundamentally, the low carbon transition is inevitable (the alternative being widespread societal breakdown) and as such, financial centres that embrace new markets and techniques as early movers are likely to be in a stronger position than those who cling on to obsolete business models.

Financial markets are beginning to price these risks, in anticipation of the policy and reputational risks that are beginning to surface, but progress on the effective pricing of the impacts of carbon transition is hampered by insufficient and inconsistent data.

Market products such as green bonds and sustainability linked bonds (including sovereign bonds) are emerging, but measurement tools, such as ratings and indexing, are still in their infancy and need to evolve further and consider interoperability, if investors are to be allowed to better align their portfolios with climate-related objectives.

Ultimately, financial centres must take a lead in addressing their exposure to transition risk to ensure long term market stability as effective capital reallocation is an essential component of a successful transition to a low carbon pathway.

27. <https://www.oecd.org/finance/Financial-Markets-and-Climate-Transition-Opportunities-challenges-and-policy-implications.htm>

Regional Analysis

In our analysis of the GGFI data, we look at six regions of the world to explore their financial centres' green finance depth and quality.

Alongside the ranks and ratings of centres, we investigate the average assessments received by regions and centres in more detail.

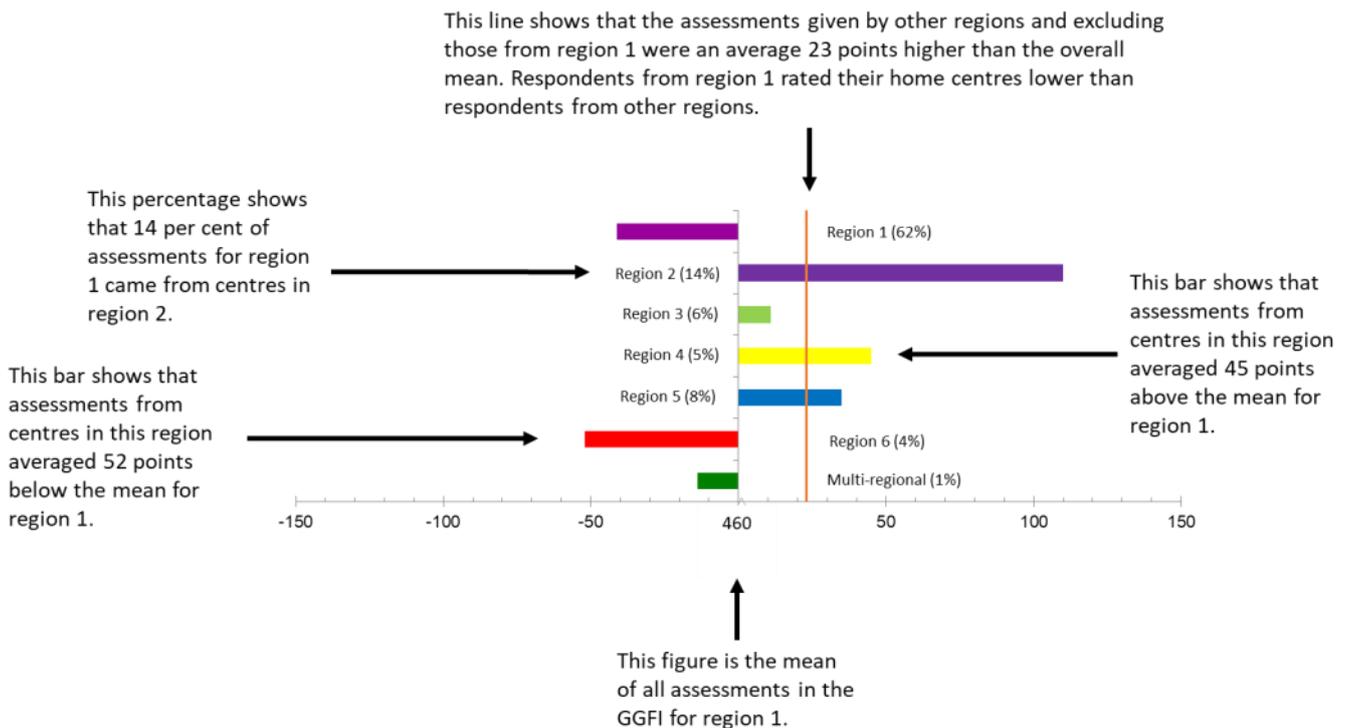
We display this analysis in charts, either for a region or an individual centre. These charts show:

- the mean assessment provided to that region or centre;
- the difference in the mean assessment when home region assessments are removed from the analysis;
- the difference between the mean and the assessments provided by other regional centres; and
- the proportion of assessments provided by each region.

Chart 15 shows an example of this analysis. Coloured bars to the left of the vertical axis indicate that respondents from that region gave lower than average assessments. Bars to the right indicate respondents from that region gave higher than average assessments. Assessments given to a centre by people based in that centre are excluded to remove 'home' bias.

The additional vertical axis (in red) shows the mean of assessments when assessments from the home region are removed. The percentage figure noted by each region indicates the percentage of the total number of assessments that are from that region.

Chart 15 | Example: Assessments Compared With The Mean For A Region



North America

- New York rose 1 ranking place to continue its lead in the region, with Los Angeles, Washington DC, and San Francisco also in the world top 10.
- Canadian centres all improved their ranking in GGFI 11.
- North American centres were rated significantly above average by people from the Asia/Pacific region and those from a multi-regional background and below average by people in other regions.

Table 10 | North American Centres In GGFI 11

Centre	GGFI 11		GGFI 10		Change In Rank	Change In Rating
	Rank	Rating	Rank	Rating		
New York	2	641	3	578	1	63
Los Angeles	7	614	6	552	-1	62
Washington DC	9	612	15	542	6	70
San Francisco	10	611	5	553	-5	58
Chicago	19	602	26	531	7	71
Montreal	21	600	34	523	13	77
Toronto	28	583	35	522	7	61
Boston	29	582	25	532	-4	50
Vancouver	34	577	37	520	3	57
Calgary	40	571	47	509	7	62

Chart 16 | Top Five North American Centres Ratings Over Time

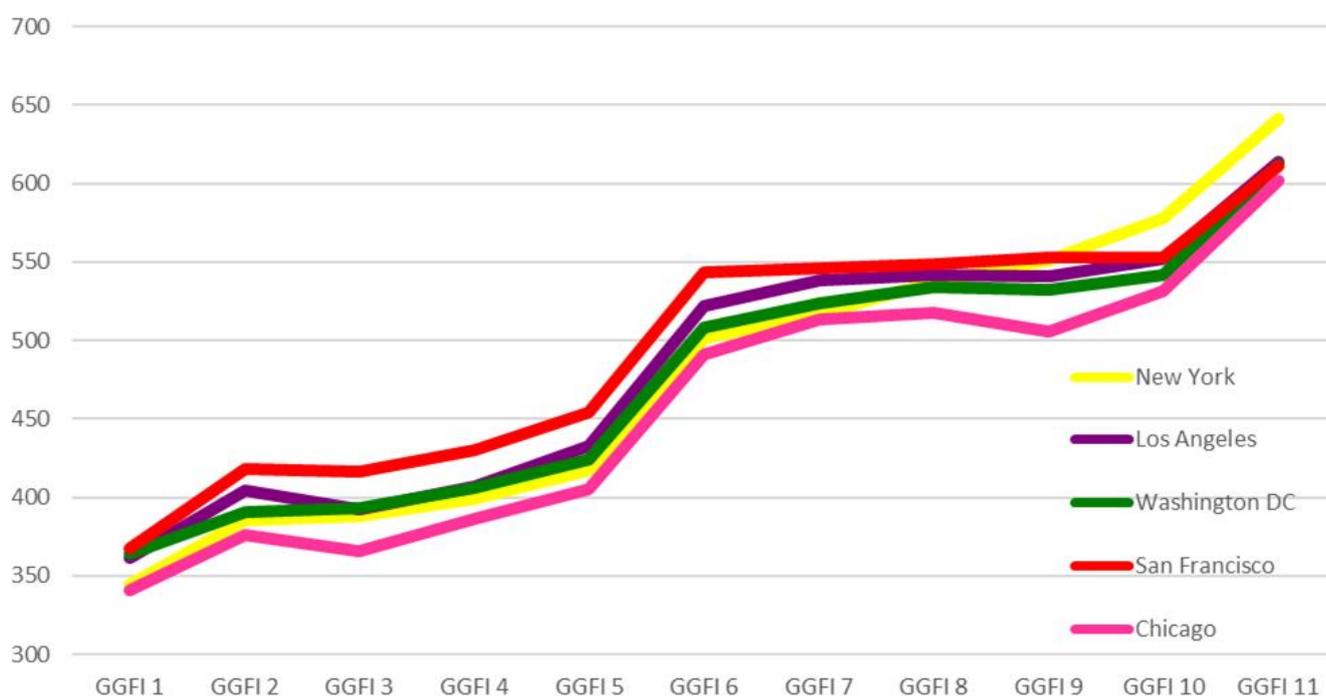


Chart 17 | North American Regional Assessments - Difference From The Mean

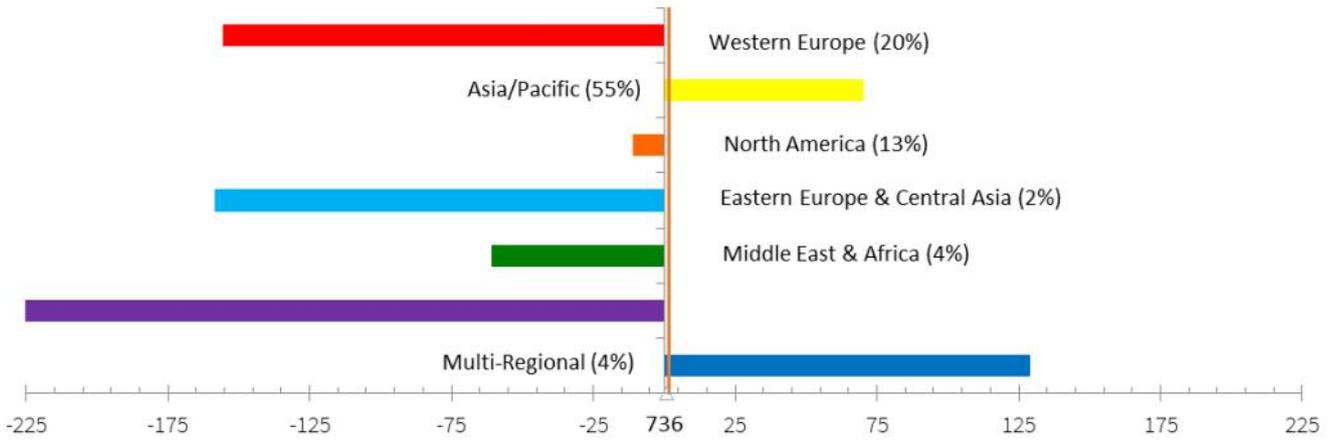


Chart 18 | Regional Assessments For New York - Difference From The Mean

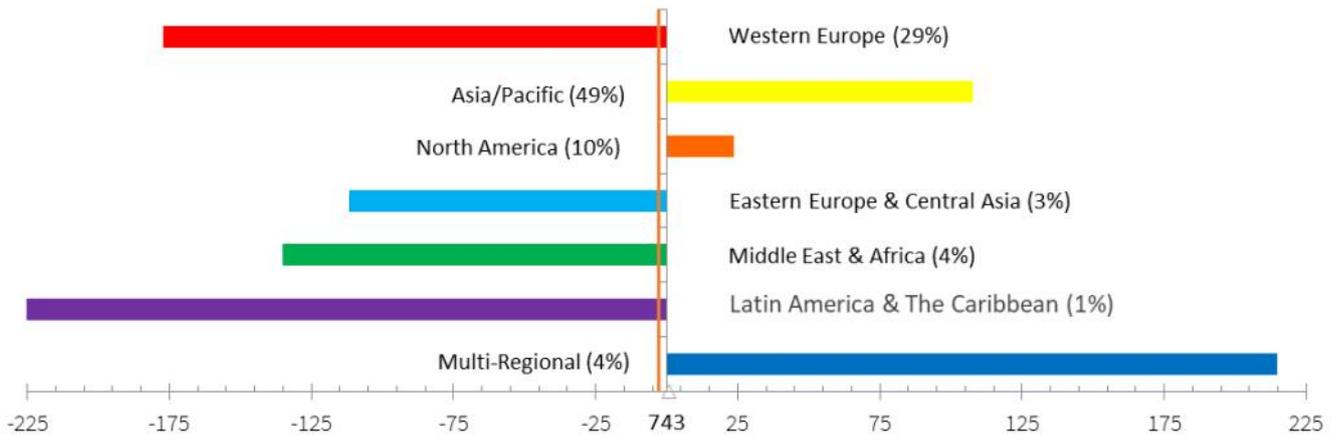
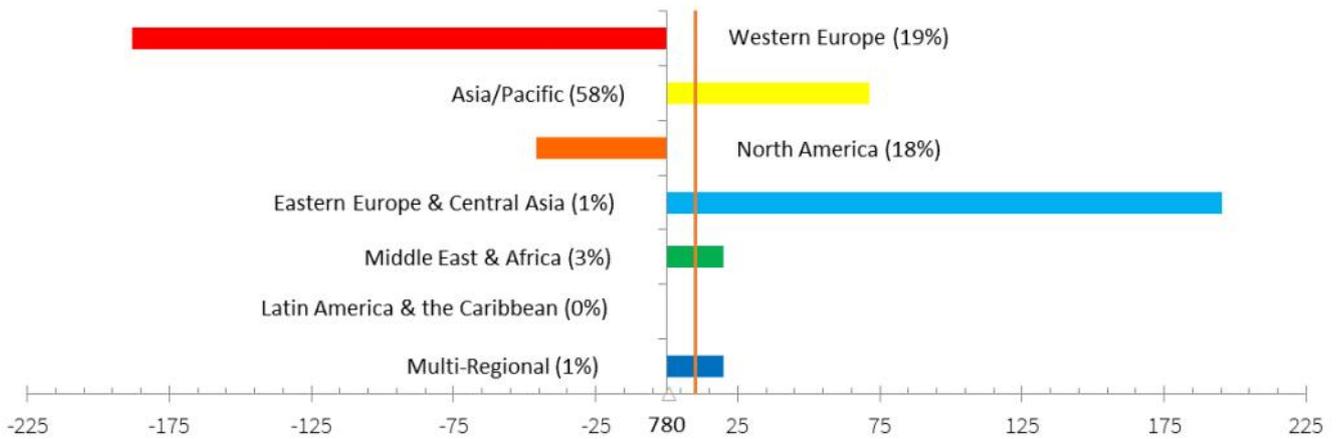


Chart 19 | Regional Assessments For Los Angeles - Difference From The Mean



Middle East & Africa

- Dubai leads in the region, but fell a few places, with Abu Dhabi in second place and Casablanca leading in Africa.
- Lagos and Kigali joined the index for the first time.
- Respondents from Western Europe, North America, and Latin America & The Caribbean rated Middle East & African centres lower than average.

Table 11 | Middle Eastern & African Centres In GGFI 11

Centre	GGFI 11		GGFI 10		Change In Rank	Change In Rating
	Rank	Rating	Rank	Rating		
Dubai	32	579	28	529	-4	50
Abu Dhabi	33	578	33	524	0	54
Casablanca	38	573	38	519	0	54
Tel Aviv	56	550	50	504	-6	46
Riyadh	58	547	48	507	-10	40
Johannesburg	62	538	64	482	2	56
Mauritius	64	529	59	490	-5	39
Doha	66	527	68	472	2	55
Cape Town	67	526	62	486	-5	40
Bahrain	75	508	61	487	-14	21
Lagos	79	493	New	New	New	New
Kigali	80	491	New	New	New	New
Nairobi	86	465	77	456	-9	9

Chart 20 | Top Five Middle East & Africa Centre Ratings Over Time

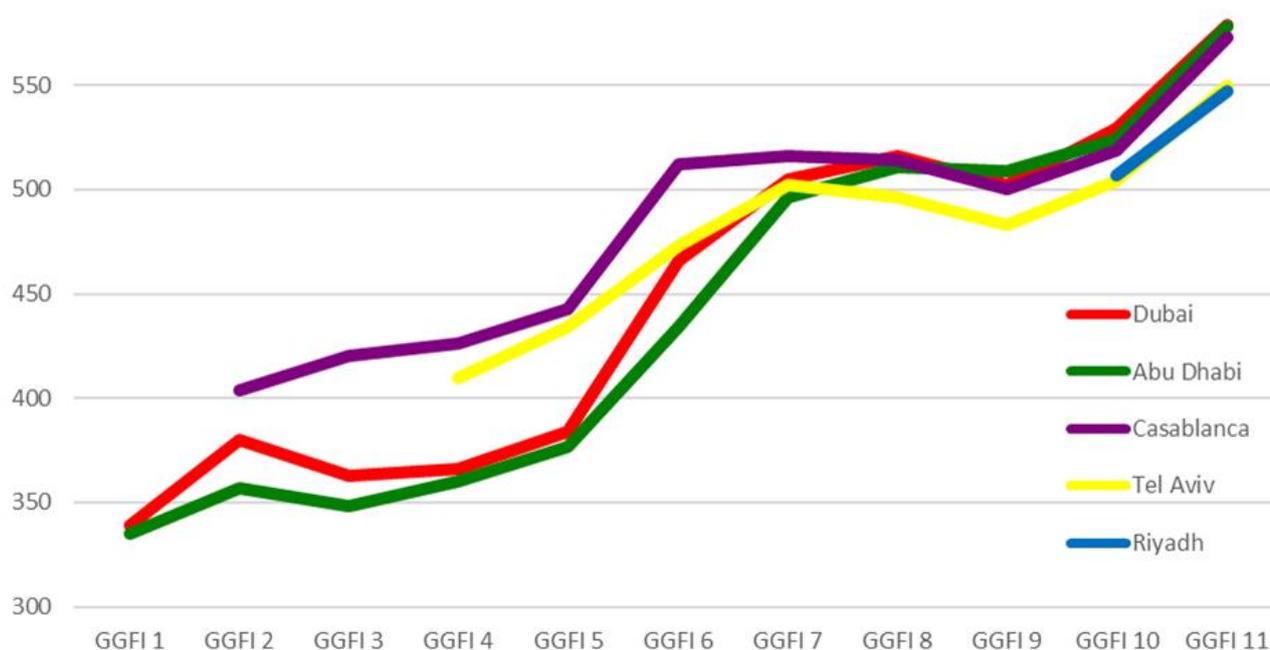


Chart 21 | Middle East & Africa Regional Assessments - Difference From The Mean

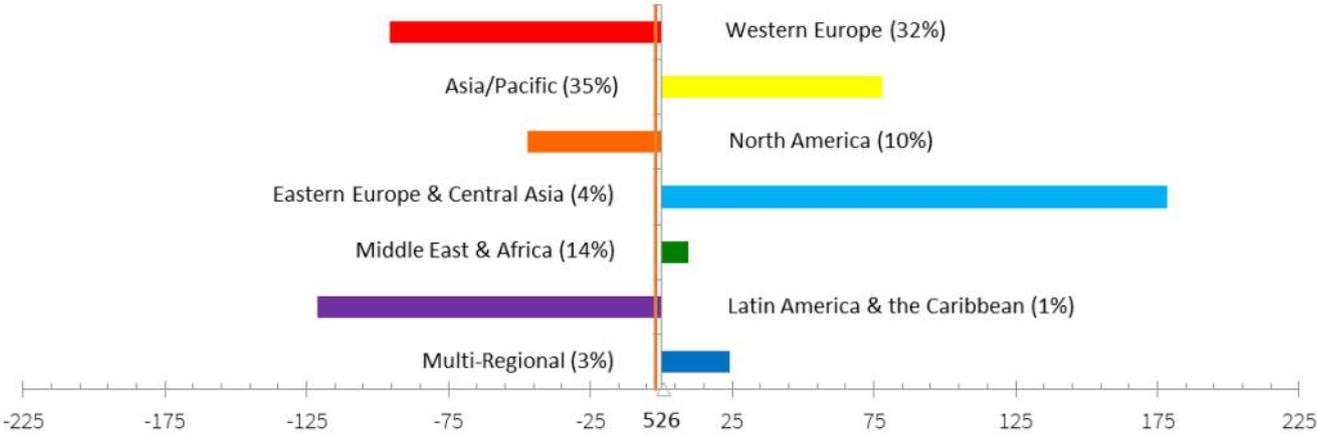


Chart 22 | Regional Assessments For Dubai - Difference From The Mean

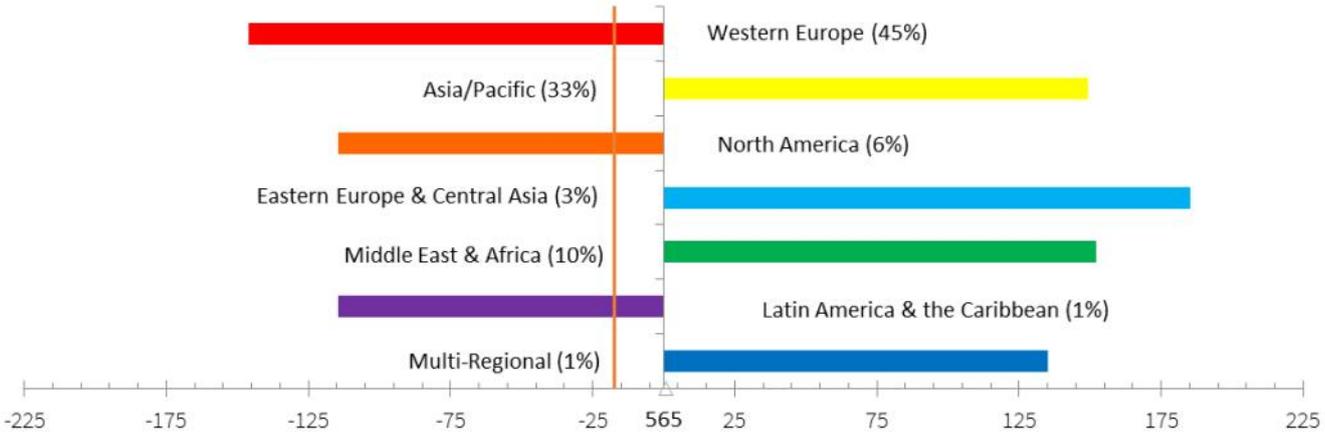
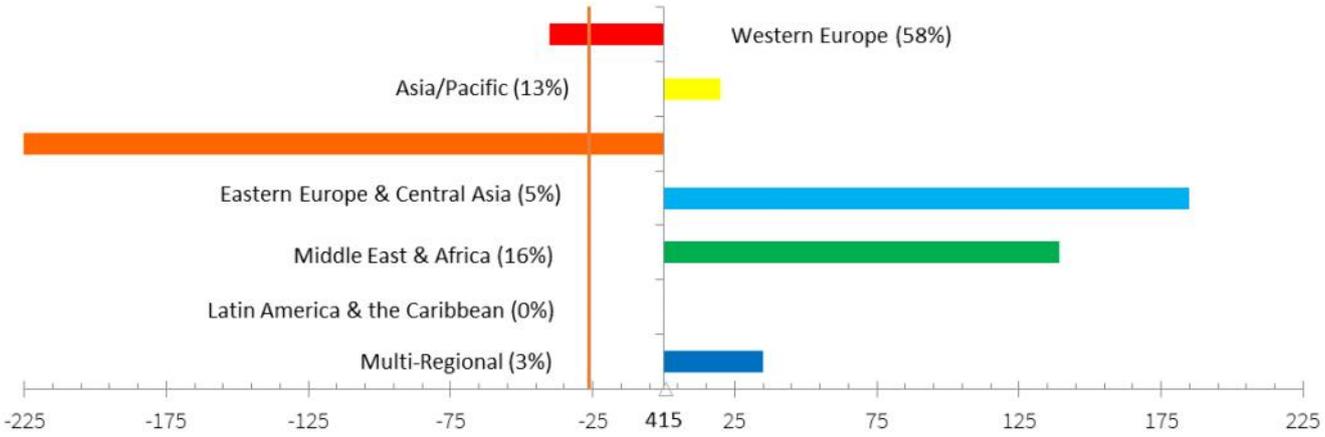


Chart 23 | Regional Assessments For Abu Dhabi - Difference From The Mean



Eastern Europe & Central Asia

- Astana is the clear leader in green finance in the region, ranking 16 places above Istanbul in second place.
- Respondents from Western Europe and North America rate Eastern European & Central Asia centres lower than average while those from all other regions rate them higher than average.

Table 12 | Eastern European & Central Asian Centres In GGFI 11

Centre	GGFI 11		GGFI 10		Change In Rank	Change In Rating
	Rank	Rating	Rank	Rating		
Astana	52	554	54	496	2	58
Istanbul	68	525	73	462	5	63
Moscow	69	523	76	457	7	66
Warsaw	72	514	79	454	7	60
Prague	77	501	81	452	4	49
Almaty	81	490	75	458	-6	32
Riga	82	489	82	448	0	41
Sofia	84	485	78	455	-6	30

Chart 24 | Top Five Eastern Europe & Central Asia Centre Ratings Over Time

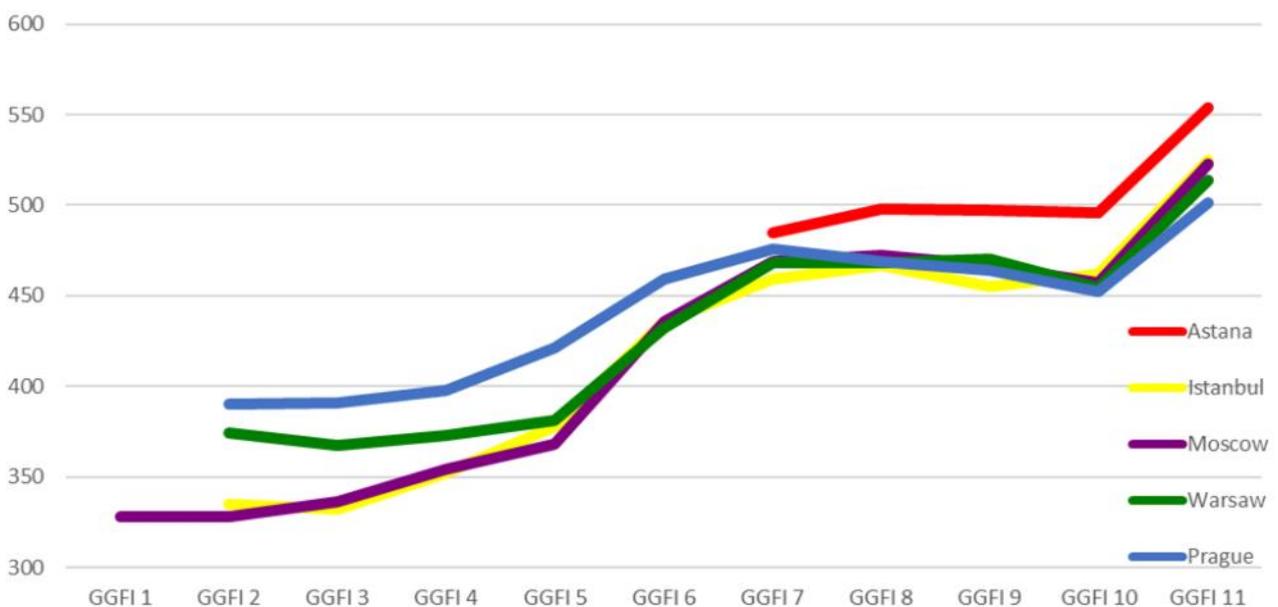


Chart 25 | Eastern Europe & Central Asia Regional Assessments - Difference From The Mean

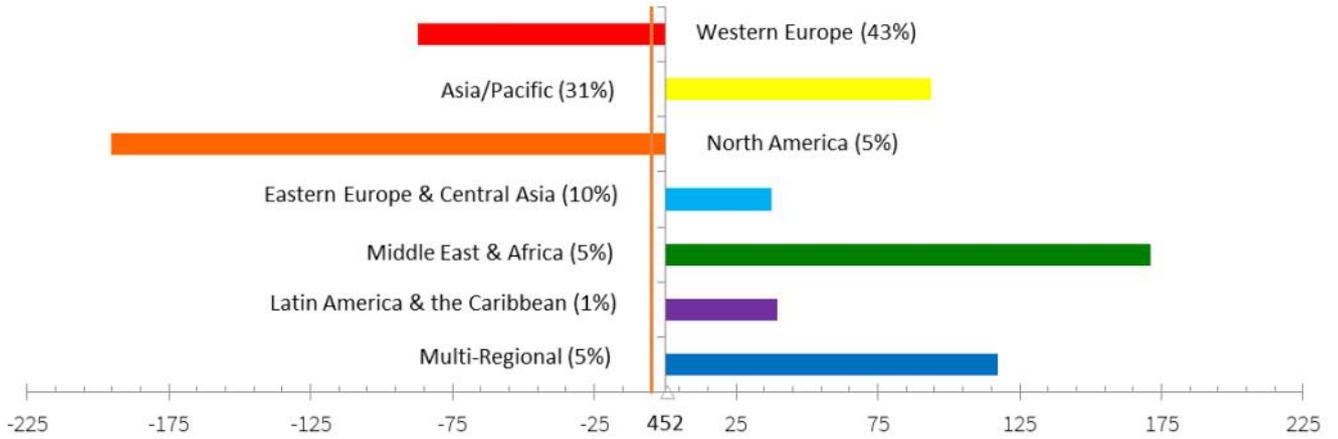


Chart 26 | Regional Assessments For Astana - Difference From The Mean

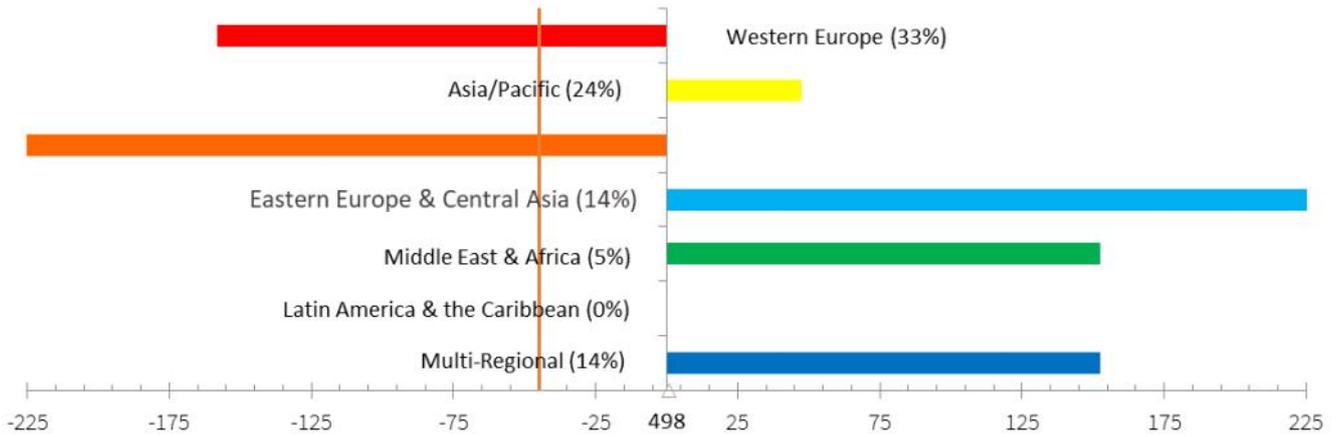
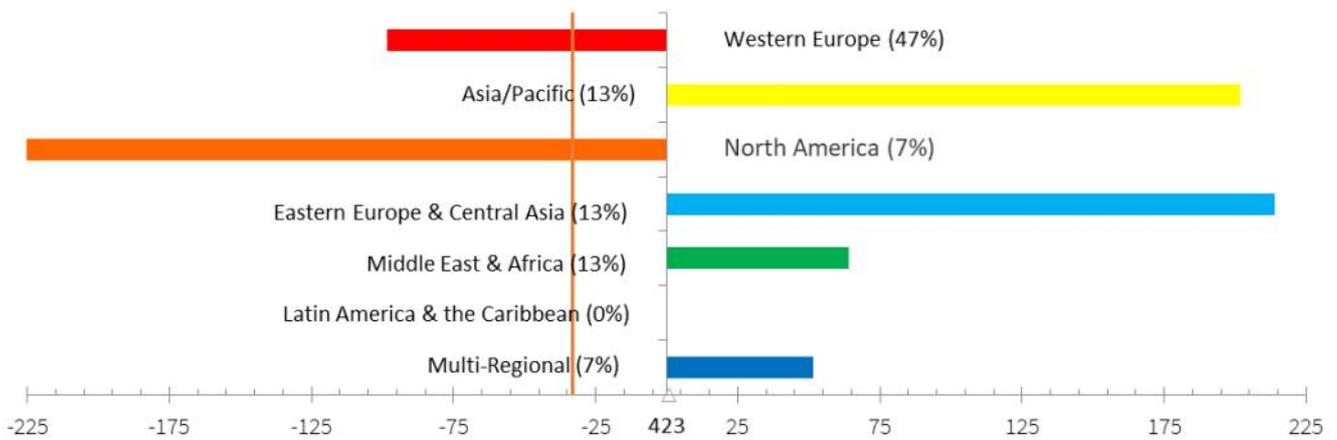


Chart 27 | Regional Assessments For Istanbul - Difference From The Mean



Western Europe

- Stockholm regained second place in the region, following London, and Geneva overtook Luxembourg to move into third place in the region.
- Six Western European centres feature in the world top ten.
- Respondents from Western Europe and North America rated Western European centres lower than average.

Table 13 | Top 15 Western European Centres In GGFI 11

Centre	GGFI 11		GGFI 10		Change In Rank	Change In Rating
	Rank	Rating	Rank	Rating		
London	1	642	1	590	0	52
Stockholm	3	621	8	550	5	71
Geneva	4	620	7	551	3	69
Luxembourg	5	616	4	554	-1	62
Amsterdam	6	615	2	580	-4	35
Copenhagen	8	613	9	549	1	64
Zurich	12	609	11	547	-1	62
Edinburgh	14	607	22	535	8	72
Oslo	16	605	13	544	-3	61
Paris	17	604	14	543	-3	61
Munich	22	599	30	527	8	72
Helsinki	24	597	29	528	5	69
Madrid	30	581	39	518	9	63
Frankfurt	36	575	40	517	4	58
Brussels	39	572	43	514	4	58

Chart 28 | Top Five Western European Centre Ratings Over Time

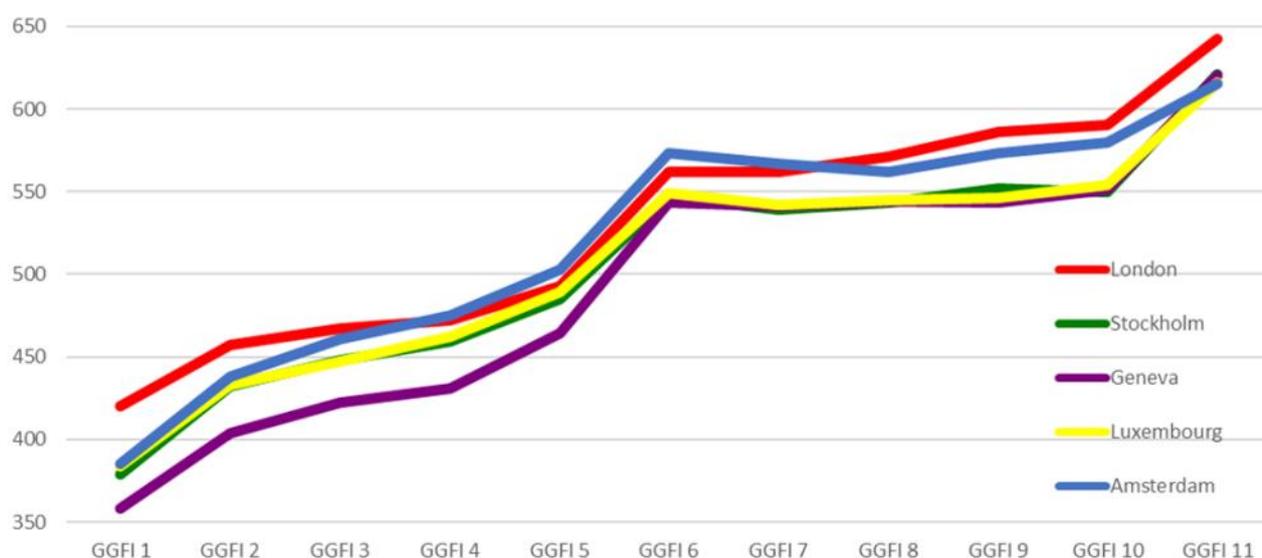


Chart 29 | Western Europe Regional Assessments - Difference From The Mean

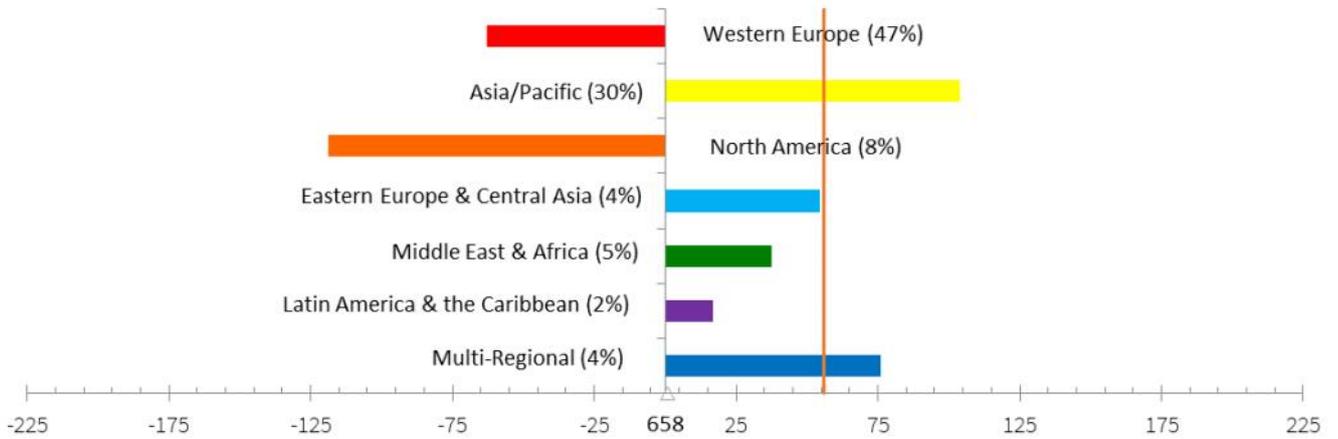


Chart 30 | Regional Assessments For London - Difference From The Mean

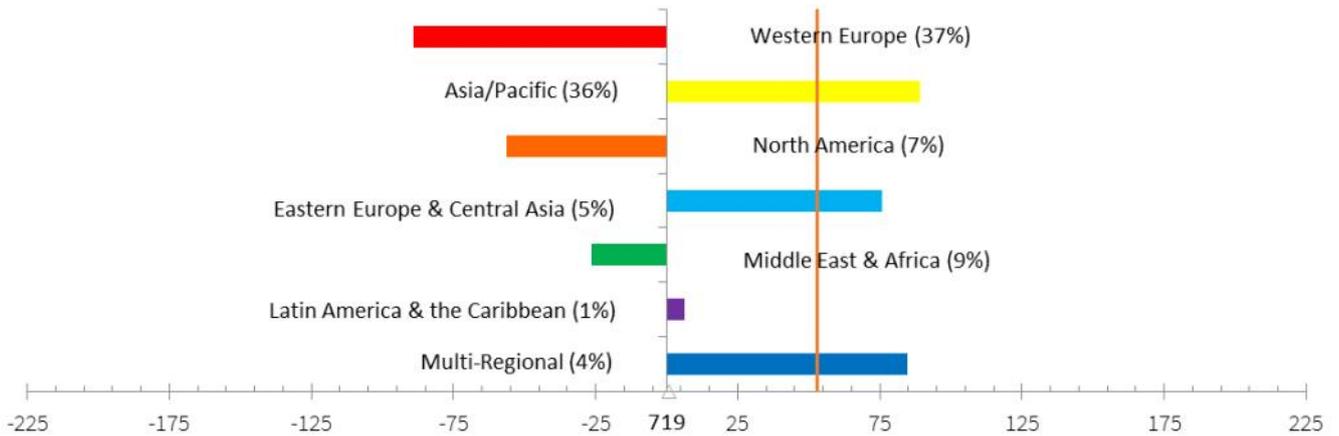
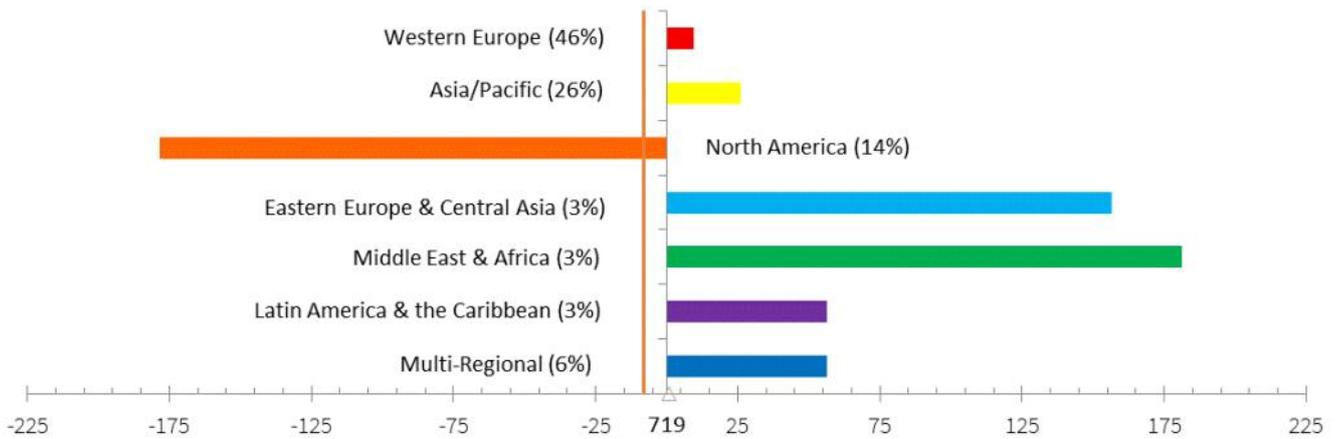


Chart 31 | Regional Assessments For Stockholm - Difference From The Mean



Latin America & The Caribbean

- Rio de Janeiro and Santiago overtook Mexico City to take first and second positions in the region.
- Respondents from Asia/Pacific, Eastern Europe & Central Asia, the Middle East & Africa, and those from multiple regions rated centres in this region above average.

Table 14 | Latin American & Caribbean Centres In GGFI 11

Centre	GGFI 11		GGFI 10		Change In Rank	Change In Rating
	Rank	Rating	Rank	Rating		
Rio de Janeiro	63	531	65	481	2	50
Santiago	70	517	67	477	-3	40
Mexico City	73	511	63	485	-10	26
Sao Paulo	74	510	70	465	-4	45
British Virgin Islands	78	497	74	461	-4	36
Bermuda	83	488	84	438	1	50
Cayman Islands	85	482	83	440	-2	42

Chart 32 | Top Five Latin American & Caribbean Centre Ratings Over Time

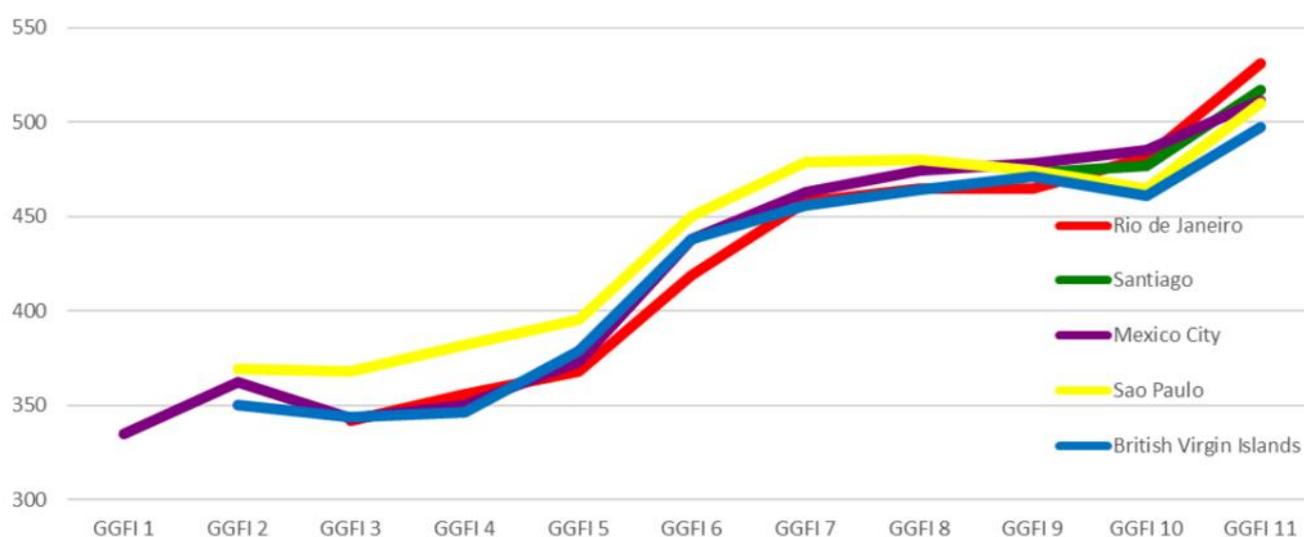


Chart 33 | Latin America & The Caribbean Regional Assessments - Difference From The Mean

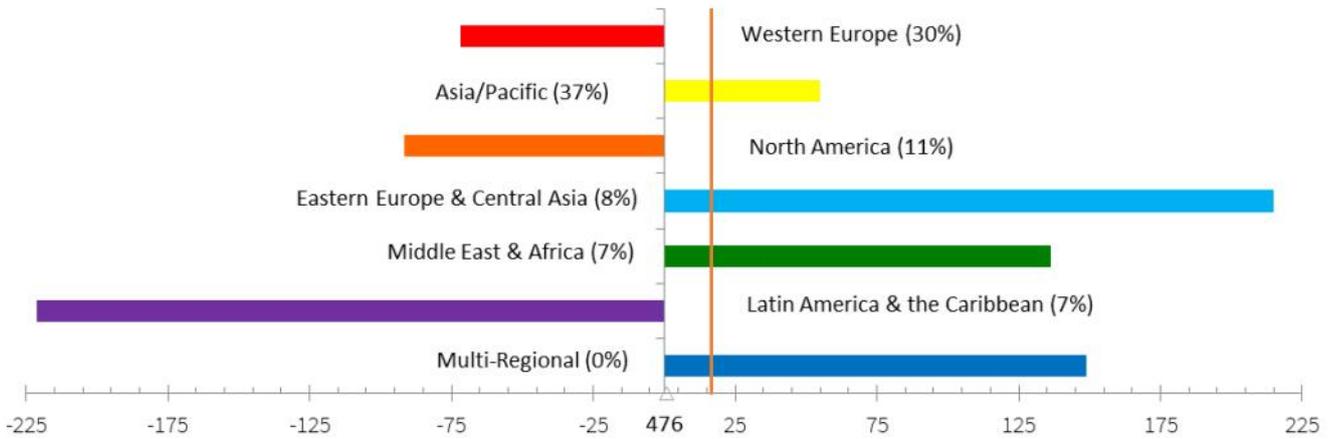


Chart 34 | Regional Assessments For Rio de Janeiro - Difference From The Mean

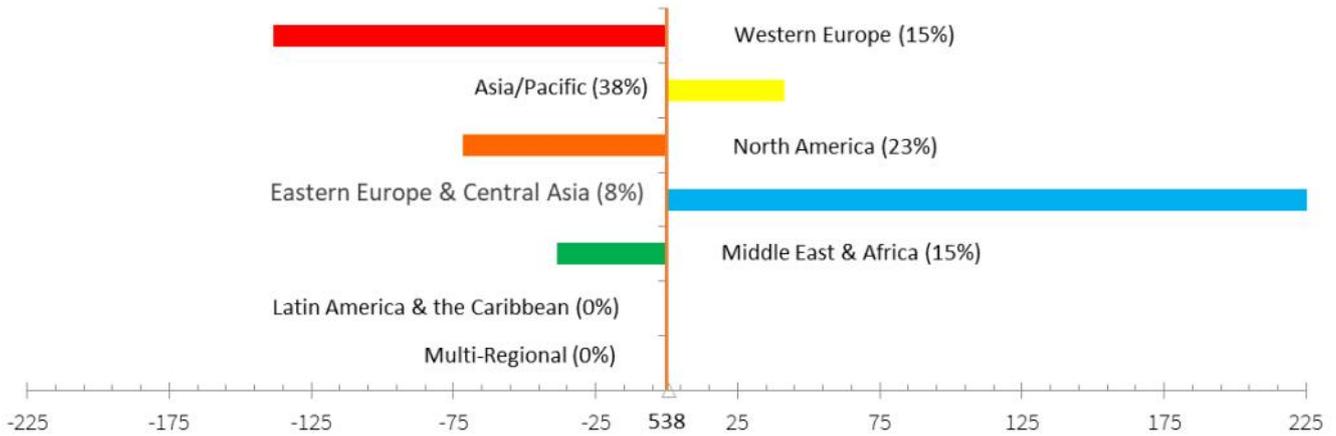
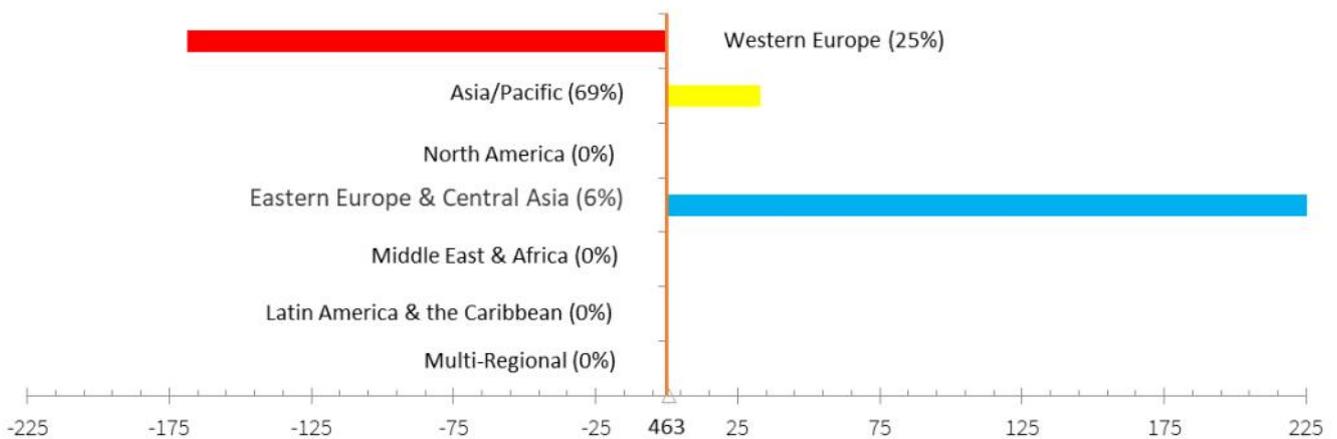


Chart 35 | Regional Assessments For Santiago - Difference From The Mean



Asia/Pacific

- Singapore rose above Sydney and Seoul to take the leading position in the region.
- Singapore, Sydney, Seoul, Wellington, and Shanghai featured in the top 20 in the world.
- Respondents from Asia/Pacific, Eastern Europe & Central Asia, and people operating across more than one region rated these centres above average.

Table 15 | Top 15 Asia/Pacific Centres In GGFI 11

Centre	GGFI 11		GGFI 10		Change In Rank	Change In Rating
	Rank	Rating	Rank	Rating		
Singapore	11	610	16	541	5	69
Sydney	13	608	10	548	-3	60
Seoul	15	606	12	546	-3	60
Wellington	18	603	19	538	1	65
Shanghai	20	601	17	540	-3	61
Melbourne	23	598	18	539	-5	59
Shenzhen	25	586	20	537	-5	49
Busan	26	585	21	536	-5	49
Beijing	27	584	23	534	-4	50
Tokyo	31	580	24	533	-7	47
Qingdao	35	576	31	526	-4	50
Hong Kong	37	574	41	516	4	58
GIFT City-Gujarat	41	570	44	513	3	57
Osaka	42	569	32	525	-10	44
Guangzhou	44	567	27	530	-17	37

Chart 36 | Top Five Asia/Pacific Centre Ratings Over Time

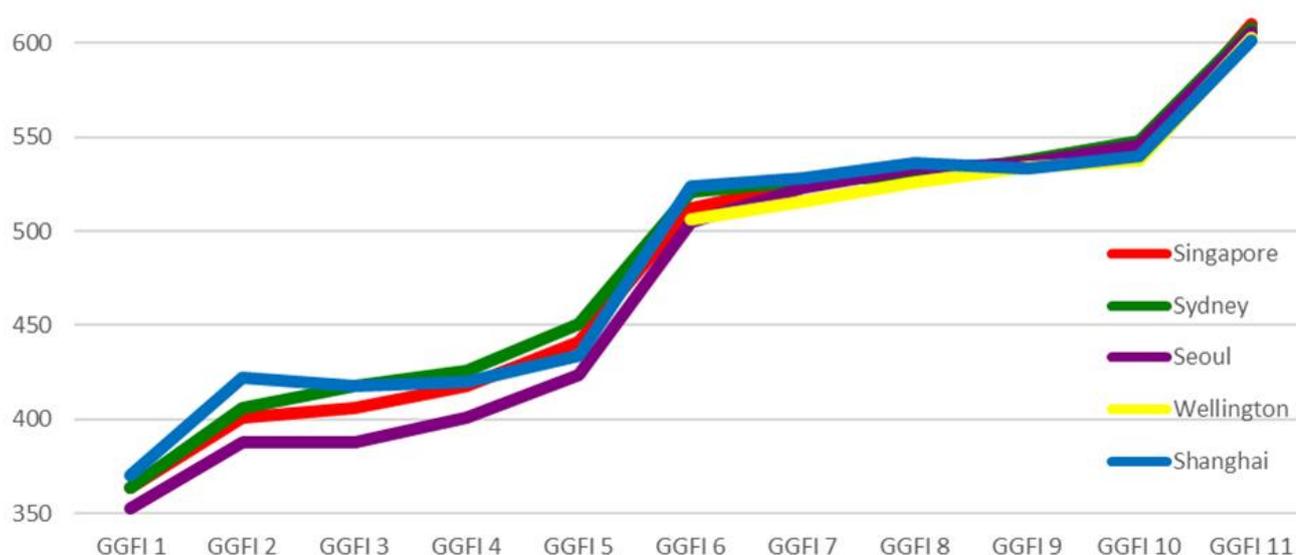


Chart 37 | Asia/Pacific Regional Assessments - Difference From The Mean

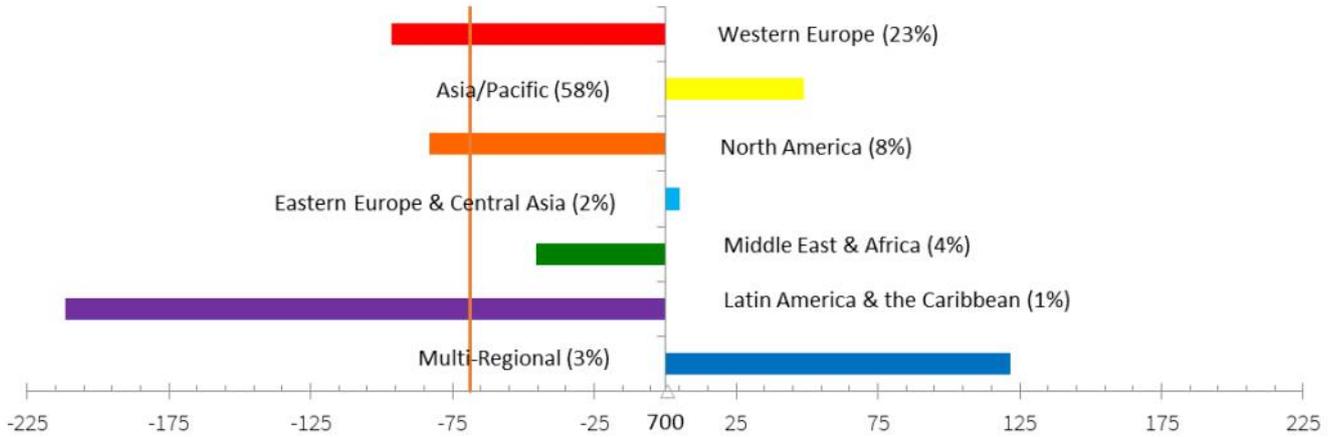


Chart 38 | Regional Assessments For Singapore - Difference From The Mean

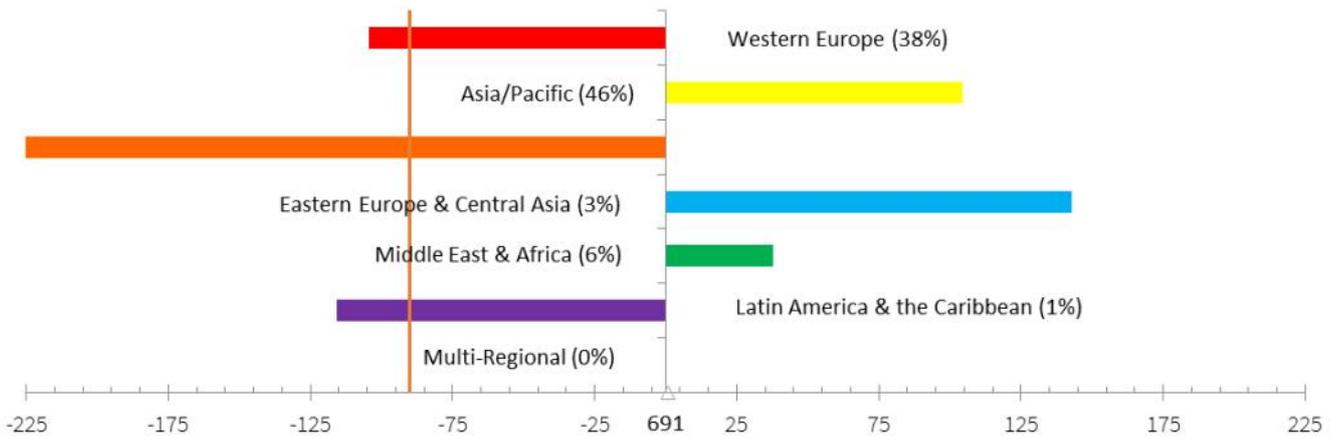
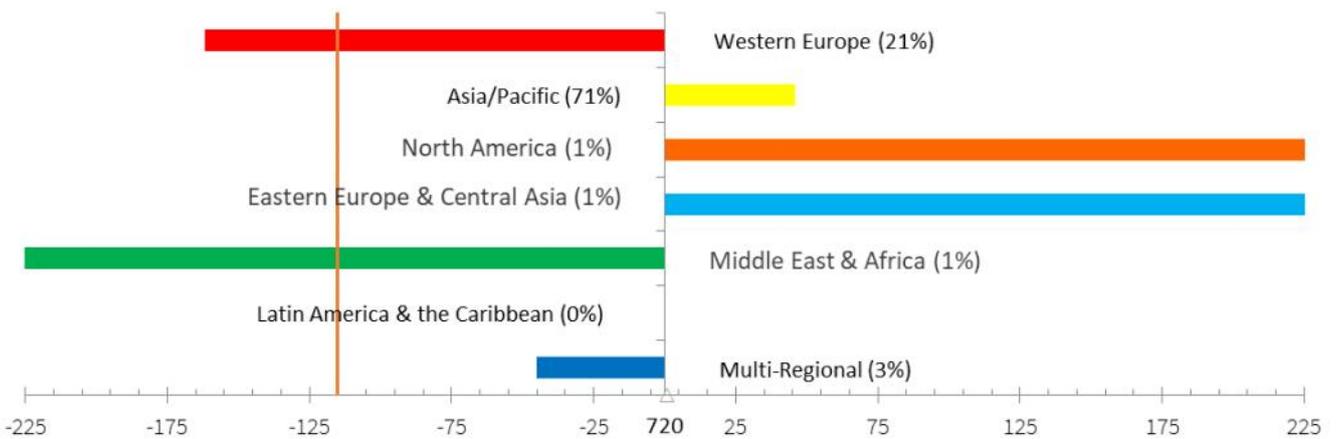


Chart 39 | Regional Assessments For Sydney - Difference From The Mean



Stability

The GGFI model allows for an analysis of the stability of financial centres in the index, which can be useful for centres when assessing their development strategies. Chart 14 contrasts the ‘spread’ or variance of the individual assessments given to the top 40 centres in GGFI 11, with sensitivity to changes in the instrumental factors.

The chart shows three bands of financial centres. In the top right segment, Zurich has a higher sensitivity to changes in the instrumental factors and a higher variance of assessments than other centres and centres in this area have the highest potential for future movement. The stable centres in the bottom left have a lower sensitivity to change and demonstrate greater consistency in their GGFI ratings.

Chart 14 | Stability In Assessments And Instrumental Factors



Industry Sectors

We can analyse the differing assessments provided by respondents working in various industry sectors by building the index separately using the responses provided only from those industries. This analysis allows a relative measure of the sectoral strengths and weaknesses for each centre.

Table 16 illustrates separate sub-indices for the Policy, Knowledge (incorporating universities and NGOs), Capital Markets, Investment, and Professional Services sectors. The table shows how the index ranking varies according to industry sector. The leading centres in the index generally feature in the higher ranks of the industry sector sub-indices, although there are interesting strengths and weaknesses. For example, New York ranks only 11th in the Policy sub-index, and at 22nd in the Investment sub-index.

Table 16 | GGFI 11 Industry Sector Sub-Indices - Top 15

Rank	Industry Sub-Sector				
	Policy	Knowledge	Capital Markets	Investment	Professional Services
1	London	London	New York	London	London
2	Singapore	New York	Washington DC	Amsterdam	New York
3	Luxembourg	San Francisco	Los Angeles	Zurich	Stockholm
4	Geneva	Amsterdam	San Francisco	Shanghai	Luxembourg
5	Zurich	Stockholm	Sydney	Washington DC	San Francisco
6	Oslo	Copenhagen	Paris	Singapore	Oslo
7	Stockholm	Los Angeles	London	Geneva	Seoul
8	San Francisco	Singapore	Singapore	Seoul	Amsterdam
9	Paris	Paris	Shanghai	Oslo	Sydney
10	Sydney	Edinburgh	Beijing	Luxembourg	Singapore
11	New York	Luxembourg	Tokyo	Beijing	Geneva
12	Los Angeles	Oslo	Dubai	Stockholm	Los Angeles
13	Copenhagen	Zurich	Chicago	Copenhagen	Copenhagen
14	Seoul	Geneva	Hong Kong	Los Angeles	Munich
15	Wellington	Chicago	Shenzhen	Helsinki	Paris

Taking the sectoral analysis further, we can also calculate the index using the responses only from those working directly in green finance in financial services organisations. The results are shown in table 17.

Table 17 | GGFI 11 Using Responses Only From Respondents Working Directly In Green Finance

Centre	Rating	Adjusted Rank	GGFI 11 Rank	Difference
London	643	1	1	0
New York	619	2	2	0
Stockholm	599	16	3	-13
Geneva	594	24	4	-20
Luxembourg	615	3	5	2
Amsterdam	614	4	6	2
Los Angeles	599	16	7	-9
Copenhagen	608	7	8	1
Washington DC	600	15	9	-6
San Francisco	599	16	10	-6
Singapore	612	6	11	5
Zurich	607	8	12	4
Sydney	604	11	13	2
Edinburgh	602	13	14	1
Seoul	599	16	15	-1
Oslo	601	14	16	2
Paris	613	5	17	12
Wellington	599	16	18	2
Chicago	586	29	19	-10
Shanghai	606	9	20	11
Montreal	589	25	21	-4
Munich	587	28	22	-6
Melbourne	589	25	23	-2
Helsinki	577	32	24	-8
Shenzhen	578	31	25	-6
Busan	597	23	26	3
Beijing	605	10	27	17
Toronto	574	33	28	-5
Boston	566	38	29	-9
Madrid	570	36	30	-6
Tokyo	598	22	31	9
Dubai	599	16	32	16
Abu Dhabi	603	12	33	21
Vancouver	560	40	34	-6
Qingdao	535	63	35	-28
Frankfurt	559	41	36	-5
Hong Kong	582	30	37	7
Casablanca	589	25	38	13
Brussels	568	37	39	2
Calgary	554	48	40	-8
GIFT City-Gujarat	544	57	41	-16
Osaka	559	41	42	1
Berlin	573	34	43	9
Guangzhou	559	41	44	3
Hamburg	572	35	45	10
Glasgow	548	52	46	-6
Rome	557	44	47	3
Vienna	554	48	48	0
Guernsey	515	76	49	-27
Dublin	555	46	50	4
Lisbon	557	44	51	7
Astana	566	38	52	14
Jersey	529	67	53	-14
Milan	552	50	54	4
Kuala Lumpur	541	60	55	-5
Tel Aviv	545	54	56	2
Isle of Man	527	69	57	-12
Riyadh	555	46	58	12
New Delhi	551	51	59	8
Jakarta	535	63	60	-3
Liechtenstein	526	71	61	-10
Johannesburg	545	54	62	8
Rio de Janeiro	517	74	63	-11
Mauritius	542	59	64	5
Mumbai	544	57	65	8
Doha	520	72	66	-6
Cape Town	527	69	67	-2
Istanbul	545	54	68	14
Moscow	530	66	69	3
Santiago	547	53	70	17
Bangkok	506	81	71	-10
Warsaw	536	61	72	11
Mexico City	536	61	73	12
Sao Paulo	520	72	74	2
Bahrain	510	79	75	-4
Malta	534	65	76	11
Prague	516	75	77	2
British Virgin Islands	501	84	78	-6
Lagos	506	81	79	-2
Kigali	528	68	80	12
Almaty	499	85	81	-4
Riga	507	80	82	2
Bermuda	515	76	83	7
Sofia	514	78	84	6
Cayman Islands	506	81	85	4
Nairobi	494	86	86	0

GGFI 11 Interest, Impact, And Drivers Of Green Finance

In addition to requesting ratings of depth and quality for financial centres, the GGFI questionnaire asks additional questions concerning the development of green finance. Amongst the topics covered are:

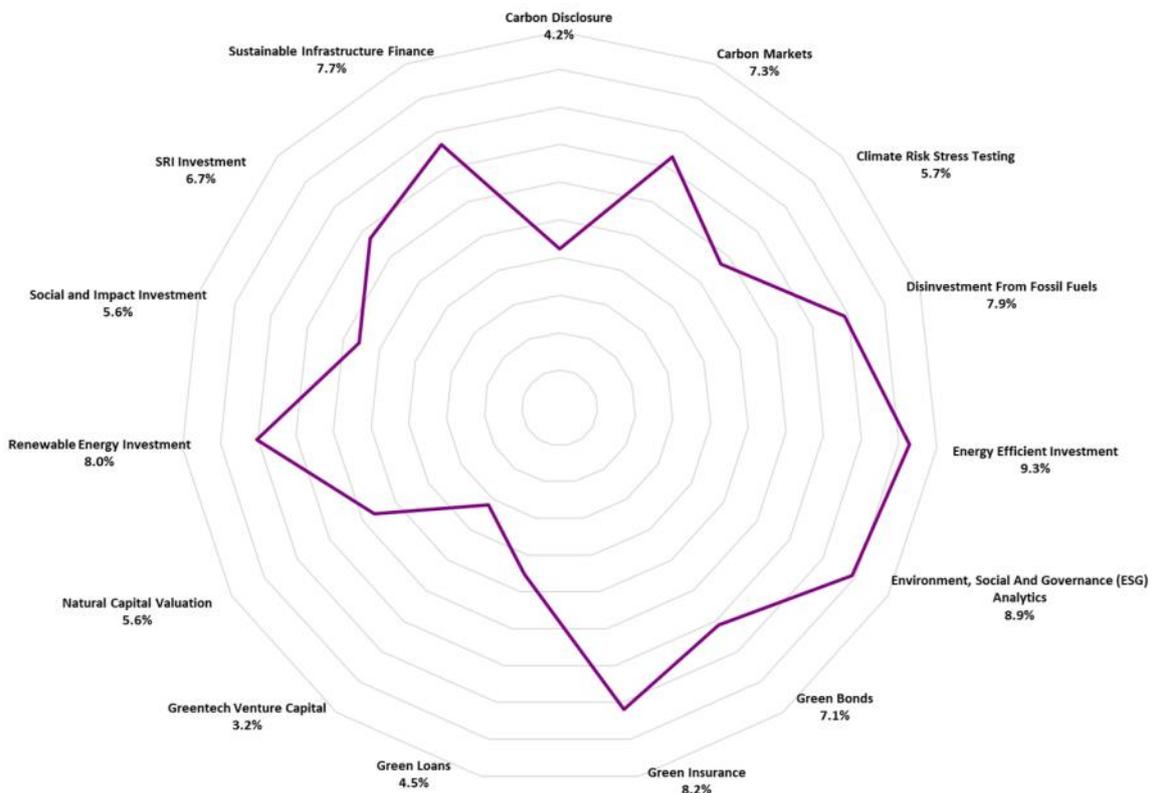
- The areas of green finance considered most interesting by respondents;
- The areas of green finance which respondents consider to have the greatest impact on sustainability; and
- Factors driving the development of green finance.

Areas Of Interest In Green Finance And Areas With The Most Impact

We asked respondents to identify the areas of green finance which they considered most interesting and separately the areas of green finance that they consider have most impact on sustainability. The results are shown in Charts 40 and 41.

With respect to interest, Energy Efficient Investment has taken over as the leading area mentioned by our respondents, just ahead of ESG Analytics. Green Insurance and Renewable Energy Investment take third and fourth place. Green Bonds which in the last edition of the index was listed second in terms of interest is now in eighth position. The areas considered least interesting are Carbon Disclosure and Greentech Venture Capital. In all previous editions of the index, Natural Capital Valuation has been last in this list, but in this edition, has moved up to 11th position.

Chart 40 | Interest - Percentage Of Total Mentions



With respect to impact, Sustainable Infrastructure Finance, Carbon Markets, and Energy Efficient Investment are rated as the areas of green finance with most impact. Carbon Disclosure, Green Loans, and GreenTech Venture Capital are ranked lowest on this measure by our respondents. Natural Capital Valuation, which has in past editions of the index ranked low on this measure, is eighth in this edition for its impact.

Chart 41 | Impact - Percentage Of Total Mentions

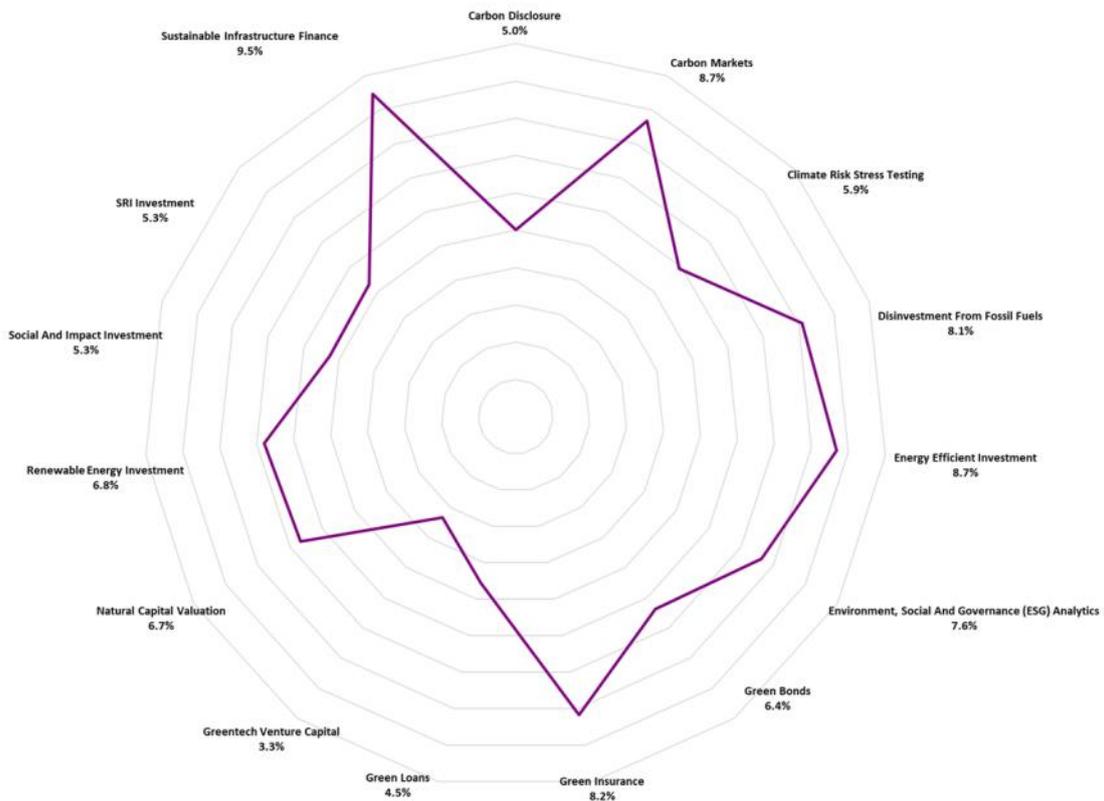
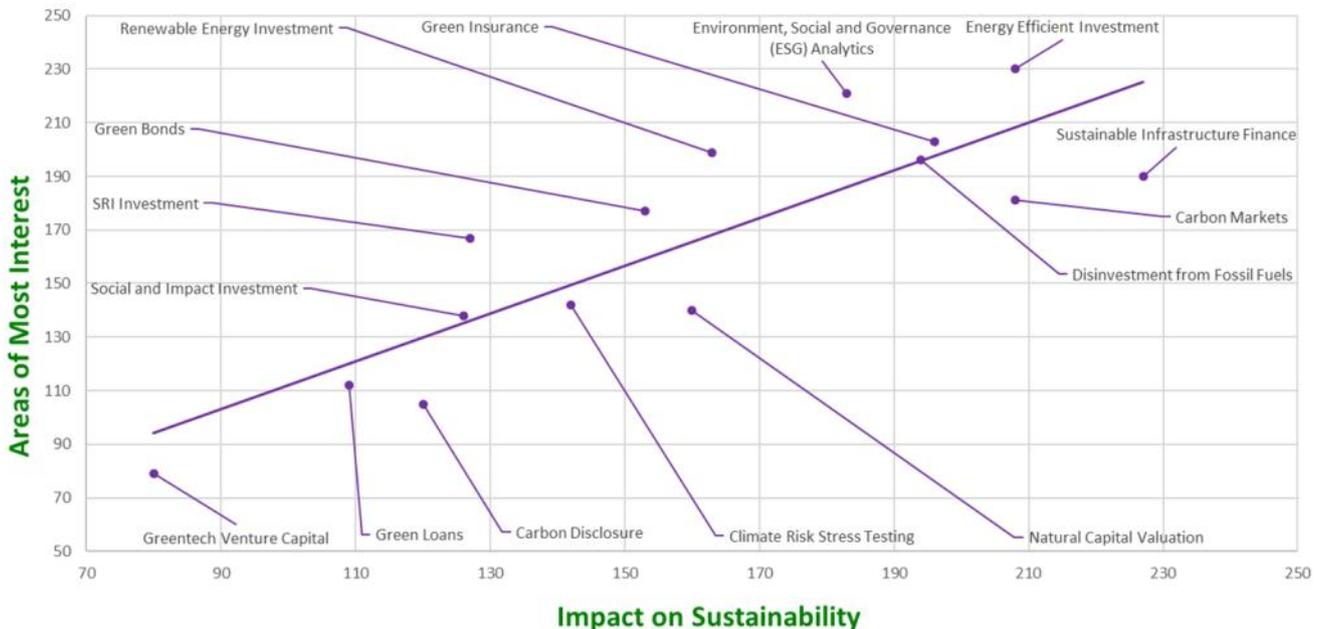
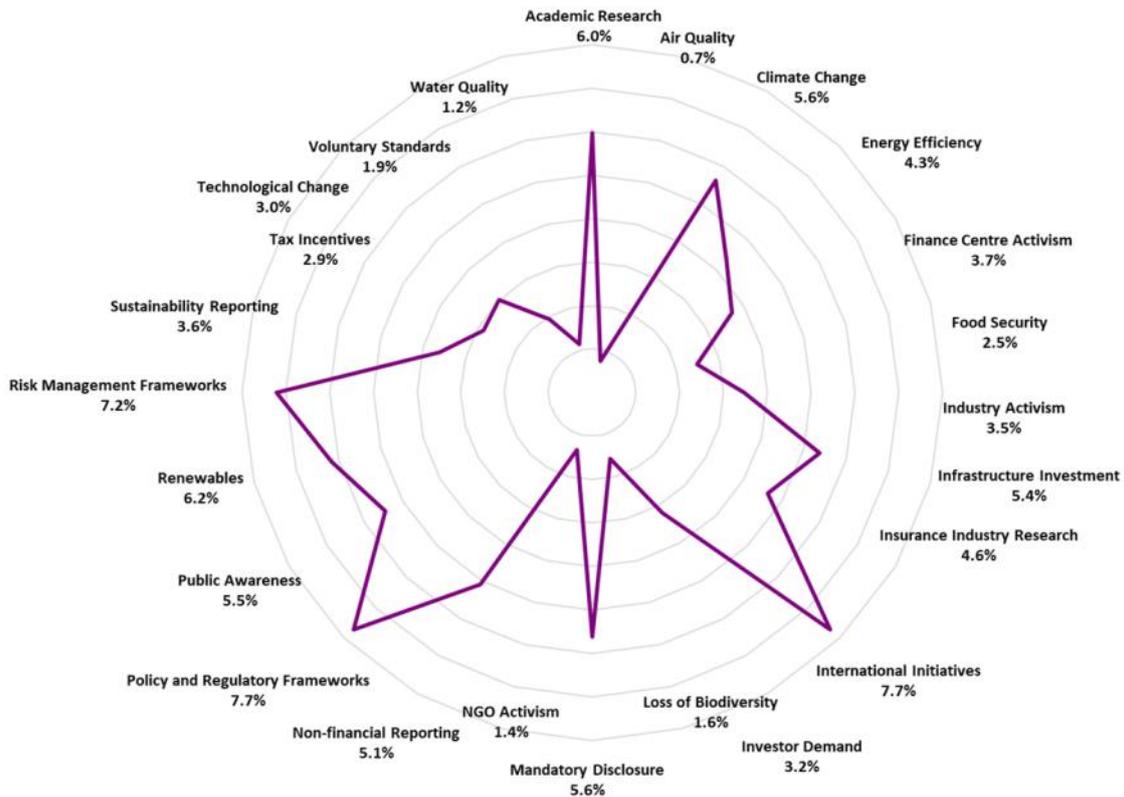


Chart 42 | The Correlation Between Interest And Impact



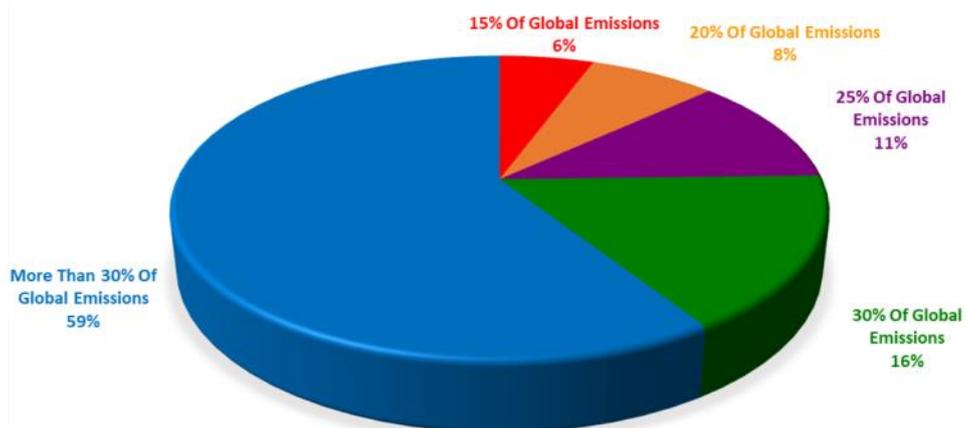
With respect to drivers, Policy & Regulatory Frameworks continues to be rated as the most important driver of green finance, equal with International Initiatives. Risk Management Frameworks and renewables took third and fourth position. NGO initiatives, Air Quality, and Water Quality are mentioned least frequently. These results underline the continuing importance of policy and regulation and international cooperation in the development of green finance.

Chart 43 | Drivers - Percentage Of Total Mentions



We also asked respondents to the GGFI survey to assess the proportion of global emissions that they thought will be covered by carbon pricing schemes by 2030, building on the World Bank’s estimate that 13% of annual global greenhouse gas (GHG) emissions were covered by carbon pricing schemes in June 2022 – both emissions trading schemes and carbon taxation. Chart 44 shows the response, with a very high percentage of respondents (59%) thinking that over 30% of emissions will be within carbon pricing schemes by 2030.

Chart 44 | Expected Proportion Of GHG Emissions To Be Covered By Carbon Pricing By 2030



Appendix 1: Assessment Details

Table 18 | Details Of GGFI 11 Assessments By Centre

Centre	GGFI 11		Assessments			Centre	GGFI 11		Assessments		
	Rank	Rating	Number	Average	Std Dev		Rank	Rating	Number	Average	Std Dev
London	1	642	172	719	211	Guangzhou	44	567	58	597	153
New York	2	641	241	743	238	Hamburg	45	566	25	659	264
Stockholm	3	621	35	719	211	Glasgow	46	565	34	663	256
Geneva	4	620	51	730	184	Rome	47	564	31	575	230
Luxembourg	5	616	60	703	195	Vienna	48	563	17	532	247
Amsterdam	6	615	63	669	218	Guernsey	49	562	24	597	237
Los Angeles	7	614	78	780	179	Dublin	50	561	49	590	228
Copenhagen	8	613	25	697	171	Lisbon	51	556	20	679	209
Washington DC	9	612	131	787	195	Astana	52	554	21	498	247
San Francisco	10	611	55	728	207	Jersey	53	553	22	532	250
Singapore	11	610	110	691	220	Milan	54	552	27	590	248
Zurich	12	609	56	652	247	Kuala Lumpur	55	551	32	626	189
Sydney	13	608	70	720	177	Tel Aviv	56	550	23	603	162
Edinburgh	14	607	44	661	199	Isle of Man	57	549	26	588	285
Seoul	15	606	48	681	148	Riyadh	58	547	19	500	185
Oslo	16	605	18	740	165	New Delhi	59	546	14	730	282
Paris	17	604	87	653	219	Jakarta	60	545	23	575	228
Wellington	18	603	8	778	154	Liechtenstein	61	544	16	653	211
Chicago	19	602	58	704	215	Johannesburg	62	538	32	594	228
Shanghai	20	601	113	648	212	Rio de Janeiro	63	531	13	538	216
Montreal	21	600	35	772	249	Mauritius	64	529	32	521	184
Munich	22	599	36	642	229	Mumbai	65	528	22	518	240
Melbourne	23	598	33	747	230	Doha	66	527	33	548	261
Helsinki	24	597	20	713	187	Cape Town	67	526	33	527	179
Shenzhen	25	586	72	637	165	Istanbul	68	525	15	423	243
Busan	26	585	22	690	127	Moscow	69	523	44	465	223
Beijing	27	584	123	615	196	Santiago	70	517	16	463	179
Toronto	28	583	63	695	198	Bangkok	71	516	25	519	203
Boston	29	582	37	651	254	Warsaw	72	514	22	395	229
Madrid	30	581	31	632	228	Mexico City	73	511	21	532	222
Tokyo	31	580	71	654	231	Sao Paulo	74	510	33	538	190
Dubai	32	579	87	565	254	Bahrain	75	508	20	501	200
Abu Dhabi	33	578	38	415	213	Malta	76	507	16	508	215
Vancouver	34	577	45	707	148	Prague	77	501	18	406	206
Qingdao	35	576	359	875	61	British Virgin Islands	78	497	33	477	214
Frankfurt	36	575	75	644	231	Lagos	79	493	28	468	209
Hong Kong	37	574	70	516	229	Kigali	80	491	27	500	262
Casablanca	38	573	17	560	171	Almaty	81	490	14	346	150
Brussels	39	572	54	655	221	Riga	82	489	19	508	165
Calgary	40	571	16	672	238	Bermuda	83	488	21	455	199
GIFT City-Gujarat	41	570	13	781	238	Sofia	84	485	17	525	195
Osaka	42	569	18	667	194	Cayman Islands	85	482	29	386	186
Berlin	43	568	51	645	220	Nairobi	86	465	33	433	172

Table 19 | Details Of Assessments Of GGFI Dimensions By Centre

Centre	Overall Rank	Depth Rating	Quality Rating	Centre	Overall Rank	Depth Rating	Quality Rating
London	1	316	326	Guangzhou	44	279	288
New York	2	319	322	Hamburg	45	274	292
Stockholm	3	314	307	Glasgow	46	278	287
Geneva	4	307	313	Rome	47	272	292
Luxembourg	5	312	304	Vienna	48	274	289
Amsterdam	6	305	310	Guernsey	49	275	287
Los Angeles	7	307	307	Dublin	50	276	285
Copenhagen	8	304	309	Lisbon	51	274	282
Washington DC	9	307	305	Astana	52	261	293
San Francisco	10	308	303	Jersey	53	275	278
Singapore	11	309	301	Milan	54	269	283
Zurich	12	303	306	Kuala Lumpur	55	268	283
Sydney	13	305	303	Tel Aviv	56	274	276
Edinburgh	14	302	305	Isle of Man	57	269	280
Seoul	15	308	298	Riyadh	58	266	281
Oslo	16	307	298	New Delhi	59	276	270
Paris	17	299	305	Jakarta	60	263	282
Wellington	18	299	304	Liechtenstein	61	274	270
Chicago	19	296	306	Johannesburg	62	272	266
Shanghai	20	303	298	Rio de Janeiro	63	260	271
Montreal	21	298	302	Mauritius	64	264	265
Munich	22	294	305	Mumbai	65	273	255
Melbourne	23	294	304	Doha	66	257	270
Helsinki	24	298	299	Cape Town	67	259	267
Shenzhen	25	295	291	Istanbul	68	264	261
Busan	26	288	297	Moscow	69	254	269
Beijing	27	291	293	Santiago	70	260	257
Toronto	28	287	296	Bangkok	71	251	265
Boston	29	284	298	Warsaw	72	258	256
Madrid	30	288	293	Mexico City	73	249	262
Tokyo	31	288	292	Sao Paulo	74	251	259
Dubai	32	282	297	Bahrain	75	245	263
Abu Dhabi	33	278	300	Malta	76	250	257
Vancouver	34	285	292	Prague	77	241	260
Qingdao	35	289	287	British Virgin Islands	78	237	260
Frankfurt	36	283	292	Lagos	79	249	244
Hong Kong	37	283	291	Kigali	80	246	245
Casablanca	38	285	288	Almaty	81	236	254
Brussels	39	282	290	Riga	82	249	240
Calgary	40	275	296	Bermuda	83	239	249
GIFT City-Gujarat	41	279	291	Sofia	84	240	245
Osaka	42	281	288	Cayman Islands	85	241	241
Berlin	43	283	285	Nairobi	86	228	237

Appendix 2: Interest, Impact, And Drivers Details

Table 20 | Areas Of Green Finance With The Greatest Impact

Area of Green Finance	Number Of Mentions	Percentage Of Total
Sustainable Infrastructure Finance	227	9.5%
Carbon Markets	208	8.7%
Energy Efficient Investment	208	8.7%
Green Insurance	196	8.2%
Disinvestment From Fossil Fuels	194	8.1%
Environment, Social And Governance (ESG) Analytics	183	7.6%
Renewable Energy Investment	163	6.8%
Natural Capital Valuation	160	6.7%
Green Bonds	153	6.4%
Climate Risk Stress Testing	142	5.9%
SRI Investment	127	5.3%
Social And Impact Investment	126	5.3%
Carbon Disclosure	120	5.0%
Green Loans	109	4.5%
Greentech Venture Capital	80	3.3%
Totals	2,396	100.00%

Table 21 | Areas Of Green Finance Of Most Interest To Respondents

Area of Green Finance	Number Of Mentions	Percentage Of Total
Energy Efficient Investment	230	9.3%
Environment, Social And Governance (ESG) Analytics	221	8.9%
Green Insurance	203	8.2%
Renewable Energy Investment	199	8.0%
Disinvestment From Fossil Fuels	196	7.9%
Sustainable Infrastructure Finance	190	7.7%
Carbon Markets	181	7.3%
Green Bonds	177	7.1%
SRI Investment	167	6.7%
Climate Risk Stress Testing	142	5.7%
Natural Capital Valuation	140	5.6%
Social and Impact Investment	138	5.6%
Green Loans	112	4.5%
Carbon Disclosure	105	4.2%
Greentech Venture Capital	79	3.2%
Totals	2,480	100.0%

Table 22 | Drivers Of Green Finance

Driver	Number of Mentions	Percentage Of Total
International Initiatives	186	7.7%
Policy and Regulatory Frameworks	186	7.7%
Risk Management Frameworks	174	7.2%
Renewables	149	6.2%
Academic Research	144	6.0%
Climate Change	136	5.6%
Mandatory Disclosure	136	5.6%
Public Awareness	132	5.5%
Infrastructure Investment	130	5.4%
Non-financial Reporting	123	5.1%
Insurance Industry Research	112	4.6%
Energy Efficiency	105	4.3%
Finance Centre Activism	89	3.7%
Sustainability Reporting	87	3.6%
Industry Activism	84	3.5%
Investor Demand	77	3.2%
Technological Change	73	3.0%
Tax Incentives	69	2.9%
Food Security	60	2.5%
Voluntary Standards	47	1.9%
Loss of Biodiversity	38	1.6%
NGO Activism	33	1.4%
Water Quality	28	1.2%
Air Quality	18	0.7%
Totals	2,416	100.0%

Appendix 3: Respondents' Details

Table 23 | Respondents By Industry Sector

Industry Sector	Number Of Respondents	Percentage Of Respondents
Banking	50	7.90%
Debt Capital Market	37	5.85%
Equity Capital Markets	54	8.53%
Insurance	17	2.69%
Investment	47	7.42%
Knowledge	66	10.43%
Local Green Initiatives	36	5.69%
Policy and Public Finance	78	12.32%
Professional Services	116	18.33%
Trading	39	6.16%
Other	93	14.69%
Total	633	100.00%

Table 24 | Respondents By Engagement In Green Finance

Engagement In Green Finance	Number Of Respondents	Percentage Of Respondents
Working Full-time On Green Finance	131	20.70%
Working Part-time On Green Finance	198	31.28%
Interested in Green Finance	265	41.86%
Other/not given	39	6.16%
Total	633	100.00%

Table 25 | Respondents By Region

Region	Number Of Respondents	Percentage Of Respondents
Asia/Pacific	297	46.92%
Western Europe	180	28.44%
Eastern Europe & Central Asia	25	3.95%
North America	56	8.85%
Middle East & Africa	34	5.37%
Latin America & The Caribbean	14	2.21%
Multi-Regional	27	4.27%
Total	633	100.00%

Table 26 | Respondents By Size Of Organisation

Size of Organisation	Number Of Respondents	Percentage Of Respondents
<100	132	20.85%
100-500	54	8.53%
500-1000	60	9.48%
1000-2000	87	13.74%
2000-5000	70	11.06%
>5000	179	28.28%
Other/not given	51	8.06%
Total	633	100.00%

Table 27 | Respondents By Gender

Gender	Number Of Respondents	Percentage Of Respondents
Female	161	25.43%
Male	291	45.97%
Other	1	0.16%
Prefer not to say/not given	180	28.44%
Total	633	100.00%

Table 28 | Respondents By Age

Age Band	Number Of Respondents	Percentage Of Respondents
18-30	106	16.75%
30-45	181	28.59%
45-60	123	19.43%
60+	48	7.58%
Other/not given	175	27.65%
Total	633	100.00%

Appendix 4: Methodology

The GGFI provides ratings of the green finance offering of financial centres. The process involves taking two sets of ratings – one from survey respondents and one generated by a statistical model – and combining them into a single rating.

For the first set of ratings, the financial centre assessments, respondents use an [online questionnaire](#) to rate the depth and quality of each financial centre's green finance offering, using a 10 point scale ranging from little depth/very poor to mainstream/excellent. Responses are sought from a range of individuals drawn from the financial services sector, non-governmental organisations, regulators, universities, and trade bodies.

For the second set of ratings, we use a database of indicators, or Instrumental Factors, that contains quantitative data about each financial centre. We use a machine learning algorithm to investigate the correlation between the financial centre assessments and these Instrumental Factors to predict how each respondent would have rated the financial centres they do not know. These 150 instrumental factors draw on data from a range of different sources covering sustainability, business, human capital, and infrastructure, including telecommunications and public transport. A full list of the instrumental factors used in the model is in Appendix 5.

The respondents' actual ratings as well as their predicted ratings for the centres they did not rate, are then combined into a single table to produce the ranking. We add the results for depth and quality to produce the GGFI.

Factors Affecting The Inclusion Of Centres In The GGFI

The questionnaire lists a total of 126 financial centres which can be rated by respondents. The questionnaire also asks whether there are financial centres that will improve their green finance offering significantly over the next two to three years. Centres which are not currently within the questionnaire and which receive a number of mentions in response to this question will be added to the questionnaire for future editions.

We give a financial centre a GGFI rating and ranking if it receives a statistically significant minimum number of assessments from individuals based in other geographical locations - at least 25 in GGFI 11. This means that not all 126 centres in the questionnaire receive a ranking.

We will also develop rules as successive indices are published as to when a centre may be removed from the rankings, for example, if over a 24 month period, a centre has not received a minimum number of assessments.

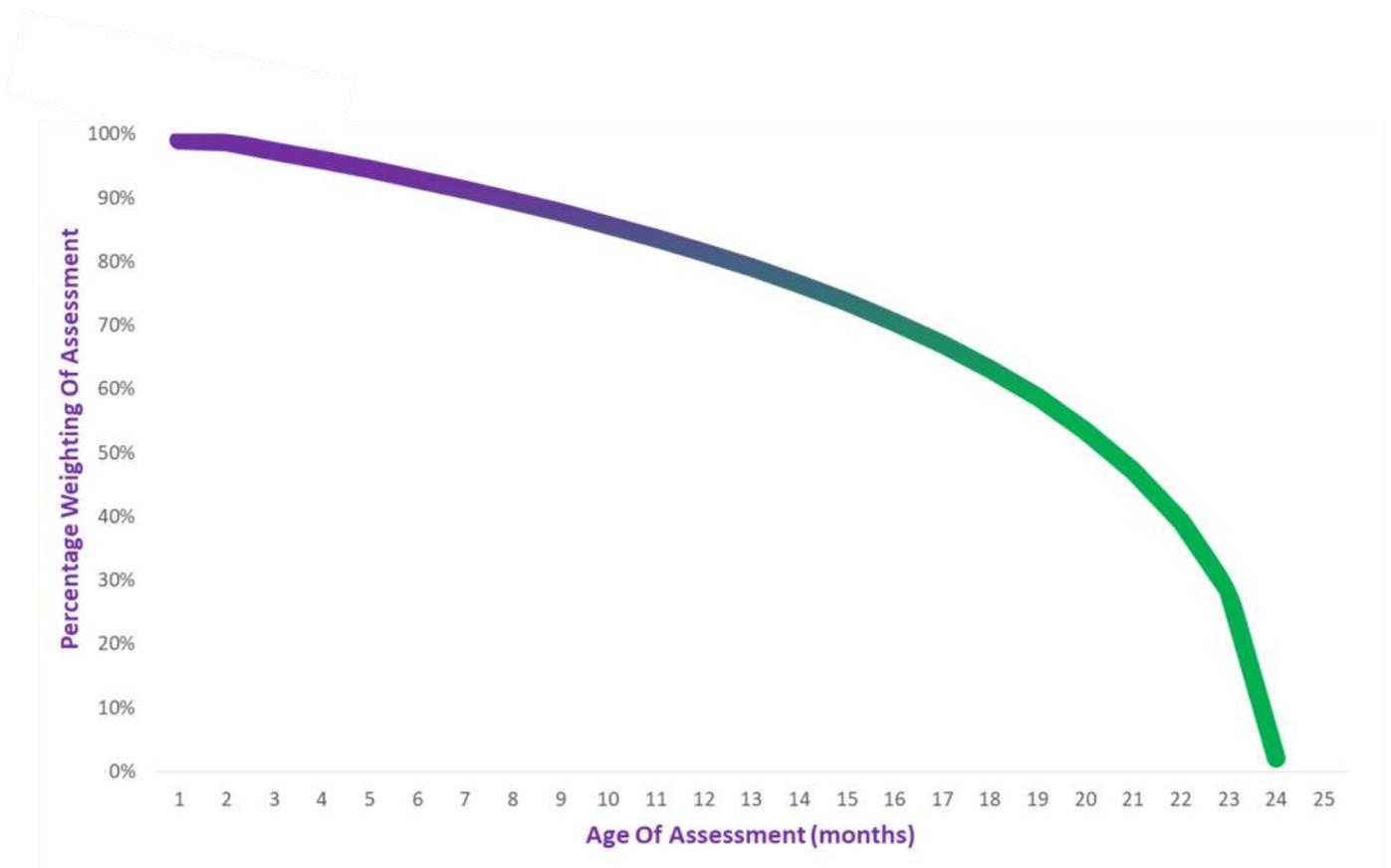
Financial Centre Assessments

Financial centre assessments are collected via an online questionnaire which runs continuously and which is at greenfinanceindex.net/survey/. A link to this questionnaire is emailed to a target list of respondents at regular intervals. Other interested parties can complete the questionnaire by following the link given in GGFI publications.

In calculating the GGFI:

- the score given by a respondent to their home centre, and scores from respondents who do not specify a home centre, are excluded from the model – this is designed to prevent home bias;
- financial centre assessments are included in the GGFI model for 24 months after they have been received – we consider that this is a period during which assessments maintain their validity; and
- financial centre assessments from the month when the GGFI is created will be given full weighting with earlier responses given a reduced weighting on a logarithmic scale as shown in Chart 45 - this recognises that older ratings, while still valid, are less likely to be up-to-date.

Chart 45 | Reduction In Weighting As Assessments Get Older



Instrumental Factor Data

For the instrumental factors, we have the following data requirements:

- data series should come from a reputable body and be derived by a sound methodology; and
- data series should be readily available (ideally in the public domain) and be regularly updated.

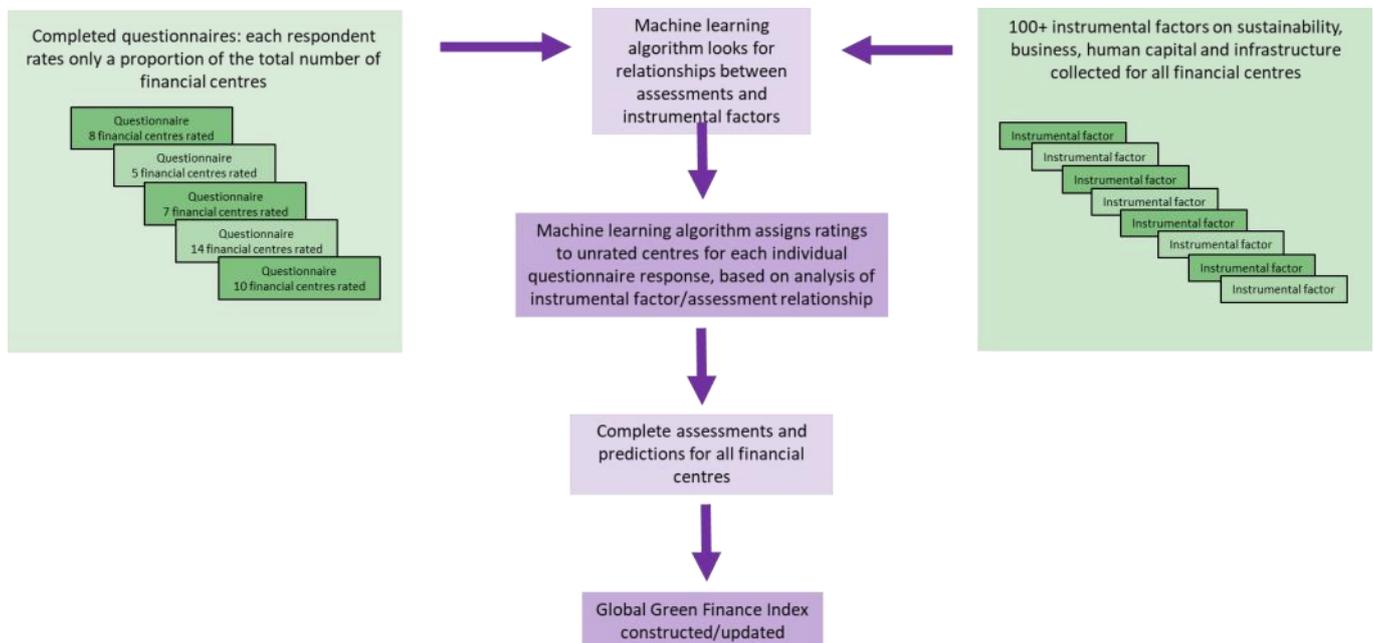
The rules on the use of instrumental factor data in the model are as follows:

- updates to the indices are collected and collated every six months;
- no weightings are applied to indices;
- indices are entered into the GGFI model as directly as possible, whether this is a rank, a derived score, a value, a distribution around a mean or a distribution around a benchmark;
- if a factor is at a national level, the score will be used for all centres in that country; nation-based factors will be avoided if financial centre (city)-based factors are available;
- if an index has multiple values for a city or nation, the most relevant value is used;
- if an index is at a regional level, the most relevant allocation of scores to each centre is made (and the method for judging relevance is noted); and
- if an index does not contain a value for a particular financial centre, a blank is entered against that centre (no average or mean is used).

The details of the methodology can be accessed at <https://www.longfinance.net/programmes/financial-centre-futures/global-green-finance-index/ggfi-methodology/>.

The process of creating the GGFI is outlined in Chart 46.

Chart 46 | The GGFI Process



Appendix 5: Instrumental Factors

Table 29 | Sustainability Instrumental Factor Correlation With GGFI Ratings - Highest 30 Factors

Instrumental Factors	R-squared
Urban Mobility Readiness Index	0.718
IESE Cities In Motion Index	0.538
Sustainable Cities Index	0.514
Quality Of Living City Rankings	0.484
Sustainable Economic Development	0.423
World Energy Trilemma Index	0.313
Energy Transition Index	0.288
The Green Future Index	0.272
Buildings Energy Efficiency Policies Database (Y/N)	0.242
Financial Centre Corporate Sustainability Performance	0.242
Global Sustainable Competitiveness Index	0.225
Quality Of Life Index	0.217
Proportion Of Population Using Safely-managed Drinking-water Services (%)	0.206
The Global Green Economy Index	0.202
Environmental Performance Index	0.188
Financial Centre Clean To Fossil-Fuel Related Revenue (Clean Revenue)	0.159
Pollution Index	0.152
Labelled Green Bonds Issued By Country Of Issuer	0.139
Global Green Growth Index	0.112
Total Number Of Labelled Green Bonds Issued To December 2018	0.102
Total Issuance Of Labelled Green Bonds To December 2018, USDm	0.102
Share Of Wind And Solar In Electricity Production	0.099
Climate-Aligned Bonds Outstanding by Country Of Issuer	0.089
City Commitment To Carbon Reduction (Cooperative Action)	0.079
Financial Centre Sustainability Disclosure	0.075
CO2 Emissions Per Capita	0.072
GRESB Green Real Estate And Infrastructure Investment Score	0.062
Financial Centres Green Alignment - Non-Regulatory Actors	0.046
Financial Centre Clean To Fossil-Fuel Related Revenue (Dirty Revenue)	0.045
Ratio Labelled Green Bonds To Total Debt Securities By Issuer Location	0.044

Table 30 | All Instrumental Factor Correlation With GGFI Ratings - Highest 30 Factors

Instrumental Factors	R-squared
The Global Financial Centres Index	0.804
Urban Mobility Readiness Index	0.718
Global Innovation Index	0.655
Smart City Index	0.603
OECD Country Risk Classification	0.594
Safe Cities Index	0.587
Agility Emerging Markets Logistics Index	0.562
Logistics Performance Index	0.551
Adjusted Net National Income Per Capita	0.547
JLL Real Estate Transparency Index	0.538
IESE Cities In Motion Index	0.538
Best Countries For Business	0.534
Fintech Activity Index	0.529
World Talent Rankings	0.519
Sustainable Cities Index	0.514
International IP Index	0.511
Quality Of Living City Rankings	0.484
Average Wages	0.481
Cost Of Living City Rankings	0.476
Government Effectiveness	0.461
Quality Of Road Infrastructure	0.458
Legatum Prosperity Index	0.457
Domestic Credit To Private Sector (% Of GDP)	0.438
Business Environment Rankings	0.433
World Competitiveness Scoreboard	0.429
Sustainable Economic Development	0.423
Quality Of Domestic Transport Network	0.410
Innovation Cities Global Index	0.406
Country Brand Ranking	0.400
Purchasing Power Index	0.394

Table 31 | Sustainability Factors

Instrumental Factor	Source	Website	Updated
Average Precipitation In Depth (mm Per Year)	The World Bank	http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators&series=AG.LND.PRCP.MM	N
Buildings Energy Efficiency Policies Database (Y/N)	IEA	https://www.iea.org/policies	N
Certified Climate Bonds Issued To December 2018, % Of Centre Total	CBI	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
City Commitment To Carbon Reduction (Cooperative Action)	UNFCCC	https://climateaction.unfccc.int/	Y
City Commitment To Carbon Reduction (Individual Action)	UNFCCC	https://climateaction.unfccc.int/	N
Climate Change Performance Index	Germanwatch, NewClimate Institute & Climate Action Network	https://ccpi.org/download/the-climate-change-performance-index-2021/	Y
Climate-Aligned Bonds Outstanding by Country Of Issuer	CBI	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
CO2 Emissions Per Capita	World Bank	https://databank.worldbank.org/reports.aspx?source=2&series=EN.ATM.CO2E.PC&country=#	N
Energy Intensity Of GDP	Enerdata Statistical Yearbook	https://yearbook.enerdata.net/download/	N
Energy Transition Index	World Economic Forum	https://www.weforum.org/reports/1edb4488-deb4-4151-9d4f-ff355eec499a/in-full/rankings	N
Environmental Performance	Yale University	https://epi.yale.edu/epi-results/2020/component/epi	N
Externally-Reviewed (excl CCB) Labelled Green Bonds Issued To December 2018, % of centre total	CBI	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
Financial Centre Carbon Intensity	Corporate Knights	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
Financial Centre Clean To Fossil-Fuel Related Revenue (Clean Revenue)	Corporate Knights	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
Financial Centre Clean To Fossil-Fuel Related Revenue (Dirty Revenue)	Corporate Knights	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
Financial Centre Corporate Sustainability Performance	Corporate Knights	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
Financial Centre Sustainability Disclosure	Corporate Knights	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
Financial Centres Green Alignment - Non-Regulatory Actors	Corporate Knights	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
Financial Centres Green Alignment - Regulators And Stock Exchanges	Corporate Knights	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
Financial System Green Alignment	Corporate Knights	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
Forestry Area	World Bank	http://databank.worldbank.org/data/reports.aspx?source=2&series=AG.LND.FRST.ZS&country=	N
Global Green Growth Index	GGGI	https://greengrowthindex.gggi.org/wp-content/uploads/2022/12/2021-Green-Growth-Index-1.pdf	New
Global Sustainable Competitiveness Index	Solability	http://solability.com/the-global-sustainable-competitiveness-index/the-index	Y
GRESB Green Real Estate And Infrastructure Investment Score	Corporate Knights	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
IESE Cities In Motion Index	IESE	http://citiesinmotion.iese.edu/indicecim/?lang=en	Y
Labelled Green Bonds Issued By Country Of Issuer	CBI	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
Not-Externally-Reviewed Labelled Green Bonds Issued To December 2018, % Of Centre total	CBI	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
Pollution Index	Numbeo	https://www.numbeo.com/pollution/rankings.jsp	Y
Proportion Of Population Using Safely-Managed Drinking-Water Services (%)	WHO	https://www.who.int/data/gho/publications/world-health-statistics	N
Protected Land Area % Of Land Area	The World Bank	http://databank.worldbank.org/data/reports.aspx?source=2&series=ER.LND.PTLD.ZS&country=	N

Table 31 | (Continued) Sustainability Factors

Instrumental Factor	Source	Website	Updated
Quality Of Life Index	Numbeo	http://www.numbeo.com/quality-of-life/rankings.jsp	Y
Quality Of Living City Rankings	Mercer	https://mobilityexchange.mercer.com/Insights/quality-of-living-rankings	N
Ratio Climate-Aligned Bonds To Total Debt Securities By Issuer Location	Corporate Knights	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
Ratio Labelled Green Bonds To Total Debt Securities By Issuer Location	Corporate Knights	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
Share Of Renewables In Electricity Production	Enerdata Statistical Yearbook	https://yearbook.enerdata.net/download/	N
Share Of Wind And Solar In Electricity Production	Enerdata Statistical Yearbook	https://yearbook.enerdata.net/download/	N
Sovereign Green Bond (Y/N)	Climate Bonds	https://www.climatebonds.net/2021/11/cop26-briefing-sovereign-green-bond-issuance-takes-start-long-boom	N
Stock Exchanges With A Green Bond Segment (Y/N)	CBI	https://www.climatebonds.net/green-bond-segments-stock-exchanges	N
Sum Of GHG Emissions	Corporate Knights	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
Sustainable Cities Index	Arcadis	https://www.arcadis.com/en/global/our-perspectives/sustainable-cities-index-2018/citizen-centric-cities/	N
Sustainable Economic Development	Boston Consulting Group	https://www.bcg.com/en-gb/publications/2021/prioritizing-societal-well-being-seda-report	N
Sustainable Stock Exchanges (Y/N)	UN Sustainable Stock Exchange Initiative	https://sseinitiative.org/members/	Y
Total Issuance Of Labelled Green Bonds To December 2018, USDm	CBI	http://www.finance-watch.org/our-work/dossiers?fid=192	N
Total Number Of Labelled Green Bonds Issued To December 2018	CBI	https://www.finance-watch.org/publication/global-greenfinance-index-3/	N
World Energy Trilemma Index	World Energy Council	https://trilemma.worldenergy.org/	Y
Urban Mobility Readiness Index	Oliver Wyman	https://www.oliverwymforum.com/mobility/urban-mobility-readiness-index/ranking.html	Y
The Green Future Index	MIT Technology Review	https://www.technologyreview.com/2022/03/24/1048253/the-green-future-index-2022/	N
The Global Green Economy Index	Dual Citizen	https://dualcitizeninc.com/global-green-economy-index/	N

Table 32 | Human Capital Factors

Instrumental Factor	Source	Website	Updated
Average Wages	OECD	https://data.oecd.org/earnwage/average-wages.htm	Y
Adjusted Net National Income Per Capita	The World Bank	https://data.worldbank.org/indicator/NY.ADJ.NNTY.PC.CD	Y
Corruption Perception Index	Transparency International	https://www.transparency.org/en/cpi/2021/	N
Cost of Living City Rankings	Mercer	https://www.mercer.com/our-thinking/career/cost-of-living.html	N
Crime Index	Numbeo	http://www.numbeo.com/crime/rankings.jsp#	Y
Educational Attainment, At Least Bachelor's Or Equivalent, Population 25+, Total (%)	The World Bank	https://data.worldbank.org/indicator/SE.TER.CUAT.BA.ZS	N
Employees Working Very Long Hours	OECD	https://stats.oecd.org/Index.aspx?DataSetCode=BLI	N
English proficiency	Education First	https://www.ef.com/wwen/epi/	Y
GDP Per Person Employed (Constant 2017 PPP \$)	The World Bank	https://databank.worldbank.org/reports.aspx?source=world-development-indicators&series=SL.GDP.PCAP.EM.KD	N
Global Cities Index	AT Kearney	https://www.kearney.com/global-cities/2022	Y
Global Health Security Index	Nuclear Threat Initiative, Johns Hopkins Center for Health Security, and Economist Impact	https://www.ghsindex.org/	N

Table 32 | (Continued) Human Capital Factors

Instrumental Factor	Source	Website	Updated
Global Innovation Index	INSEAD	http://www.globalinnovationindex.org/content.aspx?page=GII-Home	Y
Global Peace Index	Institute for Economics & Peace	https://www.visionofhumanity.org/maps/#/	N
Global Skills Index	Hays	https://www.hays.com/resources/reports/global-skills-index-2019	N
Global Terrorism Index	Institute for Economics & Peace	https://www.visionofhumanity.org/wp-content/uploads/2022/03/GTI-2022-web-09062022.pdf	N
Good Country Index	Good Country Party	https://www.goodcountry.org/index/results	N
Government Effectiveness	The World Bank	http://info.worldbank.org/governance/wgi/	Y
Graduates In Social Science, Business And Law (As % Of Total Graduates)	The World Bank	http://databank.worldbank.org/data/reports.aspx?source=Education%20Statistics&series=UIS.FOSGP.5T8.F400	N
Gross Tertiary Graduation Ratio	The World Bank	http://databank.worldbank.org/data/reports.aspx?source=Education%20Statistics&series=SE.TER.CMPL.ZS	N
Health Care Index	Numbeo	http://www.numbeo.com/health-care/rankings.jsp	Y
Henley Passport Index	Henley Partners	https://www.henleypassportindex.com/passport	Y
Homicide Rates	UN Office of Drugs & Crime	https://dataunodc.un.org/content/data/homicide/homicide-rate	Y
Household Net Financial Wealth	OECD	https://stats.oecd.org/Index.aspx?DataSetCode=BLI	N
Human Development Index	UN Development Programme	https://hdr.undp.org/content/human-development-report-2021-22	Y
Human Freedom Index	Cato Institute	https://www.cato.org/human-freedom-index	N
Individual Income Tax Rates	KPMG	https://home.kpmg.com/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/individual-income-tax-rates-table.html	N
Innovation Cities Global Index	2ThinkNow Innovation Cities	https://www.innovation-cities.com/city-rankings-2021/	N
International IP Index	GIPC	https://www.theglobalipcenter.com/ipindex2020/	Y
Legatum Prosperity Index	Legatum Institute	http://www.prosperity.com/#1/ranking	N
Life Expectancy At Birth, Total	The World Bank	https://data.worldbank.org/indicator/SP.DYN.LE00.IN	N
Linguistic Diversity	Ethnologue	https://www.ethnologue.com/guides/countries-most-languages	N
Lloyd's City Risk Index 2015-2025	Lloyd's	https://lloyds.spub7.com/locations	N
Number Of High Net Worth Individuals	Capgemini	https://www.worldwealthreport.com/	N
Number Of International Association Meetings	World Economic Forum	http://reports.weforum.org/travel-and-tourism-competitiveness-report-2019/rankings/#series=NRFAIREX	N
OECD Country Risk Classification	OECD	http://www.oecd.org/trade/topics/export-credits/documents/cre-crc-current-english.pdf	Y
Open Government	World Justice Project	http://worldjusticeproject.org/rule-of-law-index	Y
Patent Applications, Residents	The World Bank	https://data.worldbank.org/indicator/IP.PAT.RESD?end=2020&start=1980	N
People Near Services	ITDP	https://pedestriansfirst.itdp.org/	N
Personal Tax Rates	OECD	https://stats.oecd.org/index.aspx?DataSetCode=TABLE_I6	N
Political Stability And Absence Of Violence/ Terrorism	The World Bank	http://info.worldbank.org/governance/wgi/	Y
Press Freedom Index	Reporters Without Borders (RSF)	https://rsf.org/en/index?year=2022	N
Prime International Residential Index	Knight Frank	https://www.knightfrank.com/research/report-library/the-wealth-report-2022-8858.aspx	N
Purchasing Power Index	Numbeo	https://www.numbeo.com/quality-of-life/rankings.jsp?title=2022-mid&displayColumn=1	Y
Regulatory Quality	The World Bank	http://info.worldbank.org/governance/wgi/	Y
Tax Revenue As Percentage Of GDP	The World Bank	https://databank.worldbank.org/reports.aspx?source=2&series=GC.TAX.TOTL.GD.ZS&country=#	N
Top Tourism Destinations	Euromonitor	https://go.euromonitor.com/white-paper-travel-211202-top-100-city-destinations-index.html	N
World Talent Rankings	IMD	https://www.imd.org/centers/world-competitiveness-center/rankings/world-competitiveness/	N

Table 33 | Business Factors

Instrumental Factor	Source	Website	Updated
Best Countries For Business	Forbes	https://www.forbes.com/best-countries-for-business/list/	N
Bilateral Tax Information Exchange Agreements	OECD	http://www.oecd.org/ctp/exchange-of-tax-information/taxinformationexchangeagreementstieas.htm	N
Broad Stock Index Levels	The World Federation of Stock Exchanges	https://focus.world-exchanges.org/issue/december-2022/market-statistics	Y
Business Environment Rankings	EIU	http://country.eiu.com/All	Y
Capitalisation Of Stock Exchanges	The World Federation of Stock Exchanges	https://focus.world-exchanges.org/issue/december-2022/market-statistics	Y
Common Law Countries	CIA	https://www.cia.gov/the-world-factbook/countries/	N
Corporate Tax Rates	KPMG	https://home.kpmg/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html	N
Country Brand Ranking	Bloom Consulting	https://www.bloom-consulting.com/en/pdf/rankings/Bloom_Consulting_Country_Brand_Ranking_Tourism.pdf	New
Democracy Index	The Economist	https://www.eiu.com/topic/democracy-index	N
Domestic Credit To Private Sector (% Of GDP)	The World Bank	https://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS?most_recent_value_desc=false	Y
Ease Of Doing Business Index	The World Bank	https://www.doingbusiness.org/en/reports/global-reports/doing-business-2020	N
Economic Freedom	The Heritage Foundation	https://www.heritage.org/index/ranking	N
Economic Performance Index	The Brookings Institution	https://www.brookings.edu/research/global-metro-monitor-2018/#rank	N
External Positions Of Central Banks As A Share Of GDP	The Bank for International Settlements	http://www.bis.org/statistics/annex_map.htm	Y
FATF AML Effectiveness	FATF	http://www.fatf-gafi.org/publications/mutualevaluations/documents/assessment-ratings.html	Y
FDI Inward Stock (In Million Dollars)	UNCTAD	https://unctad.org/webflyer/world-investment-report-2021	N
Financial Secrecy Index	Tax Justice Network	http://www.financialsecrecyindex.com/	N
Fintech Activity Index	World Bank	https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099735504212234006/p1730060695b370090908c0bf80ed27eba6	Y
Foreign Direct Investment Inflows	UNCTAD	http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=96740	Y
Global Business Complexity Index	TMF Group	https://www.tmf-group.com/en/news-insights/publications/2022/global-business-complexity-index/	N
Global Connectedness Index	DHL	https://www.dhl.com/global-en/spotlight/globalization/global-connectedness-index.html	N
Global Services Location	AT Kearney	https://www.kearney.com/digital/article/?a/the-2021-kearney-global-services-location-index	N
Government Debt As % Of GDP	IMF	https://www.imf.org/external/datamapper/GG_DEBT_GDP@GDD/SWE	New
Jurisdictions Participating In The Convention On Mutual Administrative Assistance In Tax Matters	OECD	https://www.oecd.org/ctp/exchange-of-tax-information/Status_of_convention.pdf	Y
Level of Internet Freedom	Freedom House	https://freedomhouse.org/countries/freedom-net/scores	Y
Net External Positions Of Banks	The Bank for International Settlements	http://www.bis.org/statistics/annex_map.htm	Y
Office Occupancy Cost	CBRE Research	https://www.cbre.com/research-and-reports/Global-Prime-Office-Occupancy-Costs-2019	N
Open Budget Survey	International Budget Partnership	http://survey.internationalbudget.org/#download	N
Operational Risk Rating	EIU	http://www.eiu.com/site_info.asp?info_name=VW2_RISK_nib&page=rk&page_title=Risk%20table	Y
Percentage Of Firms Using Banks To Finance Investment	The World Bank	http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators&series=IC.FRM.BNKS.ZS	N
Real Interest Rate	The World Bank	https://databank.worldbank.org/reports.aspx?source=world-development-indicators&series=FR.INR.RINR	Y

Table 33 | (Continued) Business Factors

Instrumental Factor	Source	Website	Updated
Safe Cities Index	Economist	https://safecities.economist.com/	N
The Global Financial Centres Index	Z/Yen	https://www.longfinance.net/programmes/financial-centre-futures/global-financial-centres-index/	Y
The Global Fintech Index	Findexable	https://findexable.com/	N
Total Net Assets Of Regulated Open-End Funds	Investment Company Institute	http://www.icifactbook.org/	N
TRACE Bribery Risk Matrix	Trace International	https://matrixbrowser.traceinternational.org/	Y
Value Of Bond Trading	The World Federation of Stock Exchanges	https://statistics.world-exchanges.org/ReportGenerator/Generator#	Y
Value Of Share Trading	The World Federation of Stock Exchanges	https://focus.world-exchanges.org/issue/december-2022/market-statistics	Y
Volume Of Share Trading	The World Federation of Stock Exchanges	https://statistics.world-exchanges.org/ReportGenerator/Generator#	Y
World Competitiveness Scoreboard	IMD	https://www.imd.org/wcc/world-competitiveness-center-rankings/world-competitiveness-ranking-2020/	N

Table 34 | Infrastructure Factors

Instrumental Factor	Source	Website	Updated
Agility Emerging Markets Logistics Index	Agility	https://www.agility.com/en/emerging-markets-logistics-index/rankings/	N
Global Competitiveness Index	World Economic Forum	http://reports.weforum.org/global-competitiveness-report-2019/competitiveness-rankings/	N
INRIX Traffic Scorecard	INRIX	http://inrix.com/scorecard/	N
JLL Real Estate Transparency Index	Jones Lang LaSalle	https://www.jll.co.uk/en/trends-and-insights/research/global-real-estate-transparency-index	N
Liner Shipping Connectivity Index	The World Bank	http://databank.worldbank.org/data/reports.aspx?source=2&series=IS.SHP.GCNW.XQ	N
Logistics Performance Index	The World Bank	http://lpi.worldbank.org/international/global	N
Metro Network Length	Metro Bits	http://mic-ro.com/metro/table.html	Y
Quality Of Domestic Transport Network	World Economic Forum	http://reports.weforum.org/travel-and-tourism-competitiveness-report-2019/rankings/#series=TRSPEFFICY	N
Quality Of Road Infrastructure	World Economic Forum	http://reports.weforum.org/travel-and-tourism-competitiveness-report-2019/rankings/#series=EOSQ057	N
Railways Per Land Area	CIA	https://www.cia.gov/the-world-factbook/field/railways/country-comparison	N
Refined Oil Products Production	Enerdata Statistical Yearbook	https://yearbook.enerdata.net/download/	N
Roadways Per Land Area	CIA	https://www.cia.gov/the-world-factbook/field/roadways/country-comparison	Y
Smart City Index	IMD	https://www.imd.org/smart-city-observatory/smart-city-index/	N
Telecommunication Infrastructure Index	United Nations	https://publicadministration.un.org/egovkb/en-us/Data-Center	Y
TomTom Traffic Index	TomTom	https://www.tomtom.com/en_gb/traffic-index/ranking/	N

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Financial Centres

Vantage Financial Centres is an exclusive network of financial centres around the world looking for a deeper understanding of financial centre competitiveness. Members receive enhanced access to GGFI and GFCI data, marketing opportunities, and training for centres seeking to enhance their profile and reputation.



ABU DHABI GLOBAL MARKET

Abu Dhabi Global Market (ADGM), an award-winning financial centre in the capital of the UAE, opened for business in October 2015, consisting of three independent authorities: the Registration Authority (RA); the Financial Services Regulatory Authority (FSRA); and ADGM Courts. Comprised of the three independent authorities where Common English Law is directly applicable, ADGM plays an essential role in the diversification of the economy in the UAE and is committed to providing a comprehensive business ecosystem operating with the highest standards of integrity and is renowned for its ease of doing business.

Strategically situated in Abu Dhabi, home to one of the world's largest sovereign wealth funds, ADGM plays a vital role in positioning Abu Dhabi as a global trade and business hub and serves as a link between the growing economies of the Middle East, Africa and South Asia to the rest of the world. ADGM has earned industry recognition as the Financial Centre of the Year (MENA) four years in a row as well as being recognized as the leading FinTech Hub in the region.

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www.adgm.com/



The Long Finance initiative grew out of the London Accord, a 2005 agreement among investment researchers to share environmental, social and governance research with policy-makers and the public. Long Finance was established more formally by Z/Yen Group and Gresham College from 2007 with the aim of exploring long-term thinking across a global network of people.

We work on researching innovative ways of building a more sustainable financial system. In so doing, we try to operate openly and emulate scientific ideals. At the same time, we are looking to create a supportive and caring community where people can truly question the accepted paradigms of risk and reward.

www.longfinance.net



Approved by the China's State Council, China Development Institute (CDI) was founded in 1989 with 116 representatives from the government, academia and business in China. Being an independent think tank, CDI is committed to develop policy solutions via research and debates that help to advance China's reform and opening-up. After years of development, CDI has become one of the leading think tanks in China. CDI focuses on the studies of open economy and innovation-driven development, regional economy and regional development, industrial policies and industrial development, urbanization and urban development, business strategies and investment decision-making. Via conducting research, CDI provides policy recommendations for the Chinese governments at various levels and develops consultation for corporate sectors at home and abroad. CDI organizes events in different formats that evokes dialogue among scholars, government officials, business people and civil society members around the globe. Based in Shenzhen, Southern China, CDI has one hundred and sixty staff, with an affiliated network that consists of renowned experts from different fields.

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AIFC is an all-around financial centre located in Astana, the capital of Kazakhstan, which offers ample opportunities for businesses to grow. AIFC provides greater access to world-class capital markets and the asset management industry. It also promotes financial technology and drives the development of niche markets such as Islamic and green finance in the region.

AIFC provides unprecedented conditions and opportunities for its participants and investors: legal system based on the principles of English law, independent judicial system, regulatory framework consistent with internationally recognised standards, wide range of financial services and instruments, simplified visa and labour regimes, zero corporate tax rate, and English as a working language.

Located in the heart of Eurasia, AIFC is striving to become the gateway to the Eurasian Economic Union, Central Asia and Caucasus, and play a key role in the Belt and Road Initiative. AIFC is already gaining tremendous recognition as a leading financial hub in the region: recently, Asiamoney Awards recognised it as the best Belt and Road Initiative project of 2019.

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Since 2009 Busan Metropolitan City has been developing a financial hub specialising in maritime finance and derivatives. With its strategic location in the center of the southeast economic block of Korea and the crossroads of a global logistics route, Busan envisions growing into an international financial city in Northeast Asia. Busan Finance Center (BFC) will continue to develop and implement measures to promote Busan as the financial hub and bolster the local financial industry, while working together with various local economic players to pursue sustainable growth of the financial sector including FinTech. These efforts will enable BFC to play a leading role in taking Busan to the next level and become the international financial center and maritime capital of Northeast Asia.

BFC offers an attractive incentive package to global financial leaders and cooperation network of Busan Metropolitan City, and Busan Finance Center will support you to identify opportunities in Busan, one of the fastest developing cities in Asia.

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Established in 2001, the Financial Services Commission, Mauritius ('FSC') is the integrated regulator for the non-bank financial services sector and global business and is mandated to license, regulate, and supervise the conduct of business activities in the non-bank financial services sector and global business.

Our vision is to be an internationally recognised financial supervisor committed to the sustained development of Mauritius as a sound and competitive financial services centre.

The FSC aims to:

- promote the development, fairness, efficiency and transparency of financial institutions and capital markets;
- suppress crime and malpractices so as to provide protection to members of the public investing in non-banking financial products; and
- ensure the soundness and stability of the financial system in Mauritius.

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Luxembourg for Finance (LFF) is the Agency for the Development of the Financial Centre. It is a public-private partnership between the Luxembourg Government and the Luxembourg Financial Industry Federation (PROFIL). Founded in 2008, its objective is to develop Luxembourg's financial services industry and identify new business opportunities. LFF connects international investors to the range of financial services provided in Luxembourg, such as investment funds, wealth management, capital market operations or advisory services. In addition to being the first port of call for foreign journalists, LFF cooperates with the various professional associations and monitors global trends in finance, providing the necessary material on products and services available in Luxembourg. Furthermore, LFF manages multiple communication channels, organises seminars in international business locations, and takes part in selected world-class trade fairs and congresses.

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Casablanca Finance City is an African financial and business hub located at the crossroads of continents. Recognized as the leading financial center in Africa, and partner of the largest financial centers in the world, CFC has built a strong and thriving community of members across four major categories: financial companies, regional headquarters of multinationals, service providers and holdings.

CFC offers its members an attractive value proposition and a premium “Doing Business” support that fosters the deployment of their activities in Africa. Driven by the ambition to cater to its community, CFC is committed to promoting its members expertise across the continent, while enabling fruitful business and partnership synergies through its networking platform.

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www.casablancafinancecity.com



Seoul is a rising star among the financial cities of the world. It is already one of the top 10 cities in the world based on various indices, and it has many more opportunities to offer as a financial hub and great growth potential. Seoul believes global financial companies are our true partners for growth. There are many incentives provided to global financial companies that enter into Seoul, such as the financial incentives provided when moving into IFC, so that we can all jointly work towards the growth and development of the financial market.

It is sure that Seoul will become a top star of global financial hubs in the near future! Pay close attention to Seoul's potentials and pre-emptively gain a foothold in the Seoul financial hub. Seoul is the gateway to Northeast Asia and the world.

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Finance Montréal's mandate is to promote Montréal as a world-class financial hub and foster cooperation among its member institutions to accelerate the industry's growth. With renowned research capacities in artificial intelligence and a booming fintech sector, Montréal offers an experienced, diversified and innovative pool of talent as well as a stable, low cost and dynamic business environment.

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Dubai International Financial Centre (DIFC) is one of the world's most advanced financial centres, and the leading financial hub for the Middle East, Africa and South Asia (MEASA) region, which comprises 72 countries with an approximate population of 3 billion and a nominal GDP of US\$ 7.7 trillion.

DIFC is home to an internationally recognised, independent regulator and a proven judicial system with an English common law framework, as well as the region's largest financial ecosystem of more than 24,000 professionals working across over 2,300 active registered companies – making up the largest and most diverse pool of industry talent in the region. The Centre's vision is to drive the future of finance. Today, it offers one of the region's most comprehensive FinTech and venture capital environments, including cost-effective licensing solutions, fit-for-purpose regulation, innovative accelerator programmes, and funding for growth-stage start-ups.

Comprising a variety of world-renowned retail and dining venues, a dynamic art and culture scene, residential apartments, hotels and public spaces, DIFC continues to be one of Dubai's most sought-after business and lifestyle destinations.

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Supported by the industry, the Financial Services Development Council (FSDC) is a high-level, cross-sectoral advisory body to the Hong Kong Special Administrative Region Government.

FSDC formulates proposals to promote the further development of Hong Kong's financial services industry and to map out the strategic direction for the development. As of March 2020, 110 of the 137 policy recommendations had been adopted by the Government and relevant regulators since FSDC's inception in 2013. On top of research, FSDC also carries out market promotion and human capital development functions.

Among others, FSDC focuses on topics including Mainland and international connectivity, green and sustainable finance, FinTech, as well as asset and wealth management.

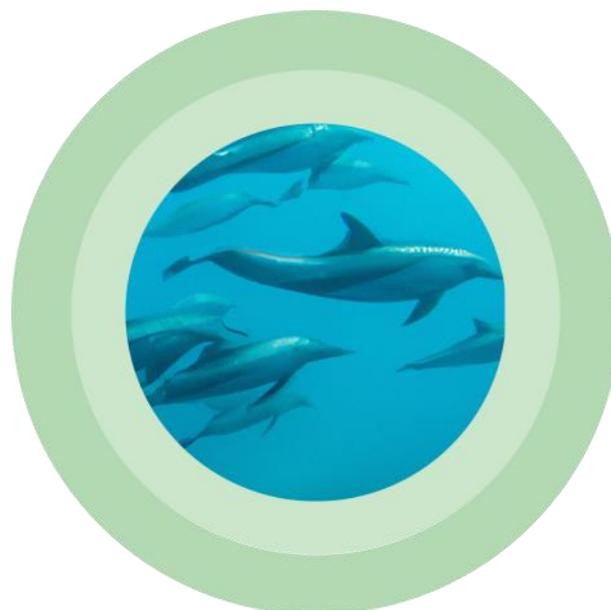
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Kigali International Financial Centre, KIFC, is Rwanda's financial centre facilitating international investment and cross-border transactions in Africa. KIFC was established in 2020 and positions Rwanda as a preferred financial jurisdiction for investments into Africa by providing an attractive destination for investors, with a robust legal and regulatory framework fully compliant with international standards and competitive tax structures, including a network of double tax treaties. KIFC attracts regional and international investors such as Pan-African based investment funds, asset managers and administrators, regional holding structures, foundations, and global trading firms.

In addition, with its niche focus on Fintech, KIFC offers FinTechs a framework to pilot their business models in a controlled environment before expanding into the wider African market.

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www.greenfinanceindex.net

The Global Green Finance Index provides a measure of how financial centres are responding to the challenge of developing a sustainable economy, enabling centres to compare their performance with their peers, improve policy makers' understanding of the drivers of green growth, and assist them in shaping the financial system to support sustainability goals.

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www.longfinance.net

Long Finance is a Z/Yen initiative designed to address the question **"When would we know our financial system is working?"** This question underlies Long Finance's goal to improve society's understanding and use of finance over the long-term. In contrast to the short-termism that defines today's economic views the Long Finance timeframe is roughly 100 years.

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SUSTAINABLE FUTURES



<https://www.longfinance.net/programmes/sustainable-futures/>

The sustainable futures programme focuses on ways in which the financial system supports the transition to a sustainable economic model. Alongside the GGFI, the programme supports the [London Accord](#), a free to access collection of over 700 environmental social and governance research reports from over 120 financial services, NGO, academic and policy making institutions.



www.financialcentrefutures.net

Financial Centre Futures is a programme within the Long Finance initiative that initiates discussion on the changing landscape of global finance. Financial Centre Futures comprises the Global Green Finance Index and other research publications that explore major changes to the way we will live and work in the financial system of the future.