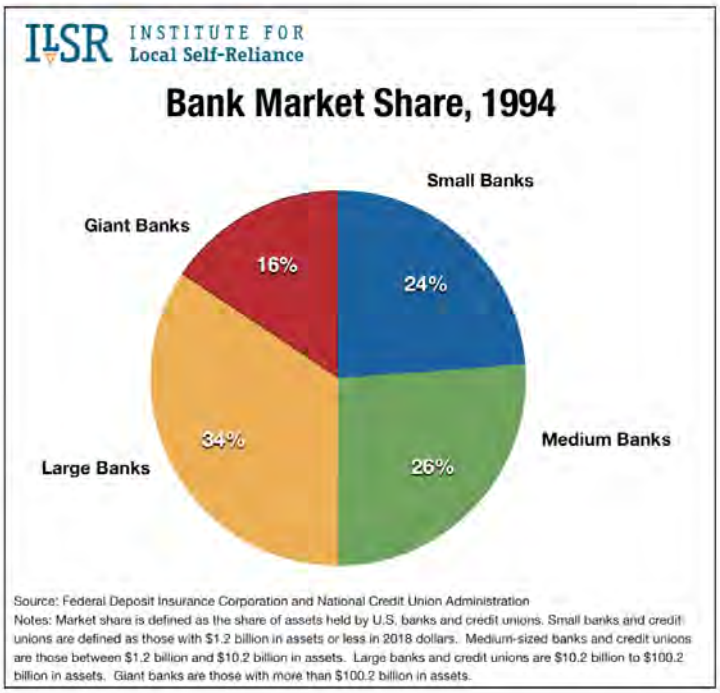
OREGON BANKERS ASSOCIATION

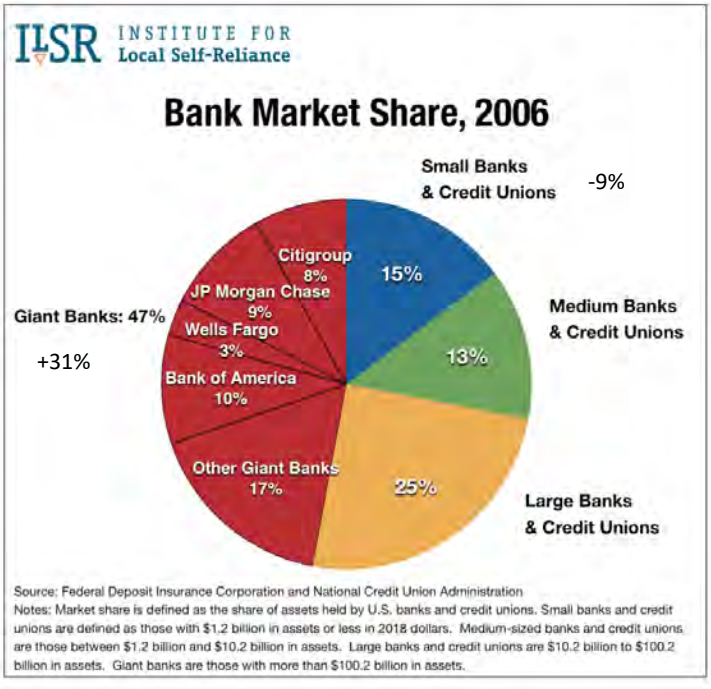
Why It's Time To Accelerate Corporate Social Responsibility in Banking

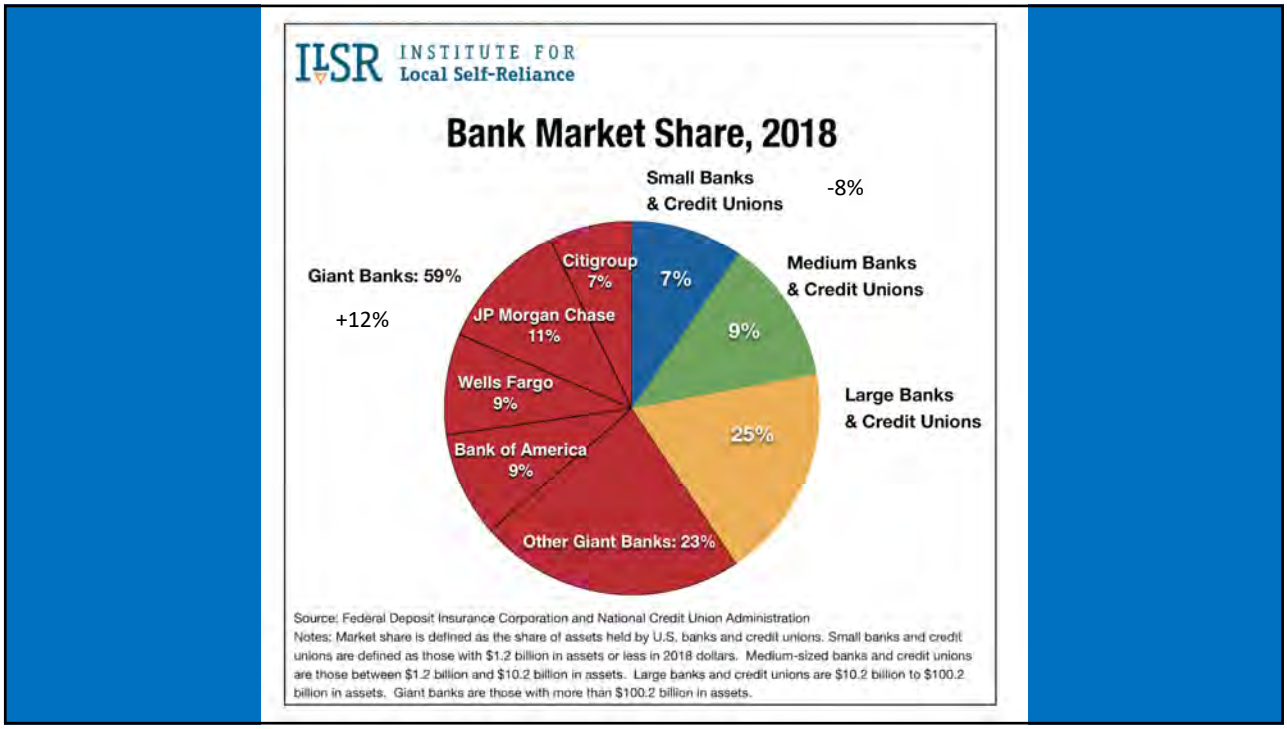
Francis Janes
Industry Relations & Partnerships Director
beneficial state foundation

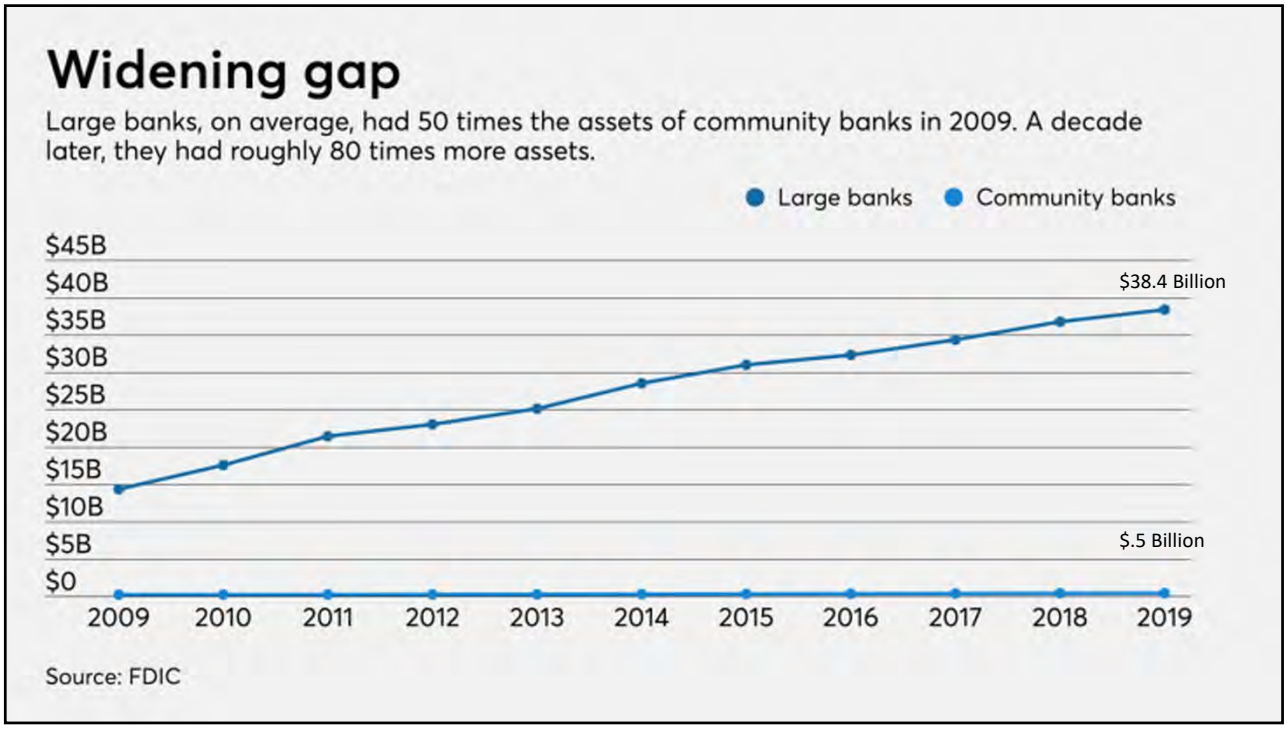
Presentation Outline

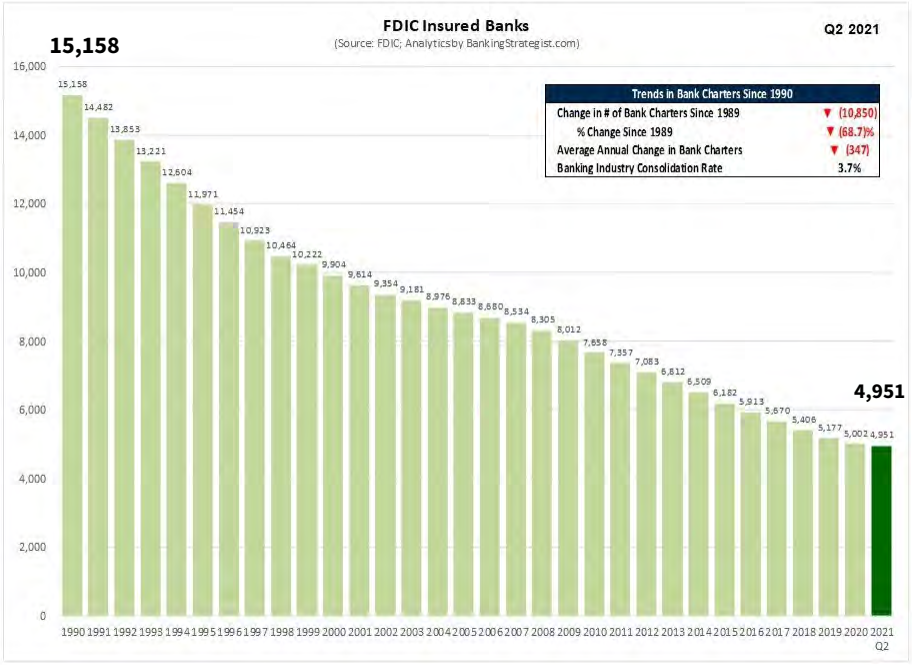
- Banking Trends
- Edelman Trust Barometer
- Public Health Crisis
- Racial Justice Crisis
- Climate Crisis
- The Great Resignation
- Corporate Responsibility Trends
- Certifications – Frameworks – Standards
- Do Responsible Banks Outperform?
- Questions


ILSR INSTITUTE FOR Local Self-Reliance
Bank Market Share, 1994
Small Banks
24%
Giant Banks
16%
Medium Banks
26%
Large Banks
34%
Source: Federal Deposit Insurance Corporation and National Credit Union Administration
Notes: Market share is defined as the share of assets held by U.S. banks and credit unions. Small banks and credit unions are defined as those with $1.2 billion in assets or less in 2018 dollars. Medium-sized banks and credit unions are those between $1.2 billion and $10.2 billion in assets. Large banks and credit unions are $10.2 billion to $100.2 billion in assets. Giant banks are those with more than $100.2 billion in assets.


ILSR INSTITUTE FOR Local Self-Reliance
Bank Market Share, 2006
Small Banks & Credit Unions
-9%
15%
Citigroup 8%
JP Morgan Chase 9%
Wells Fargo 3%
Bank of America 10%
Giant Banks: 47%
+31%
Medium Banks & Credit Unions
13%
Other Giant Banks 17%
25%
Large Banks & Credit Unions
Source: Federal Deposit Insurance Corporation and National Credit Union Administration
Notes: Market share is defined as the share of assets held by U.S. banks and credit unions. Small banks and credit unions are defined as those with $1.2 billion in assets or less in 2018 dollars. Medium-sized banks and credit unions are those between $1.2 billion and $10.2 billion in assets. Large banks and credit unions are $10.2 billion to $100.2 billion in assets. Giant banks are those with more than $100.2 billion in assets.


ILSR INSTITUTE FOR Local Self-Reliance
Bank Market Share, 2018
Small Banks & Credit Unions
-8%
7%
Medium Banks & Credit Unions
9%
Large Banks & Credit Unions
25%
Giant Banks: 59%
+12%
Citigroup 7%
JP Morgan Chase 11%
Wells Fargo 9%
Bank of America 9%
Other Giant Banks: 23%
Source: Federal Deposit Insurance Corporation and National Credit Union Administration
Notes: Market share is defined as the share of assets held by U.S. banks and credit unions. Small banks and credit unions are defined as those with $1.2 billion in assets or less in 2018 dollars. Medium-sized banks and credit unions are those between $1.2 billion and $10.2 billion in assets. Large banks and credit unions are $10.2 billion to $100.2 billion in assets. Giant banks are those with more than $100.2 billion in assets.


Widening gap
Large banks, on average, had 50 times the assets of community banks in 2009. A decade later, they had roughly 80 times more assets.
Large banks
Community banks
$45B
$40B
$35B
$30B
$25B
$20B
$15B
$10B
$5B
$0
$38.4 Billion
$.5 Billion
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Source: FDIC



Columbia Bank

\+

UMPQUA BANK

$20 B

\+

$30 B

Americans' Confidence in Banks, 1979-2016 Trend

Now I am going to read you a list of institutions in American society. Please tell me how much confidence you, yourself, have in each one -- a great deal, quite a lot, some or very little.

GALLUP

Confidence in Institutions, 2019-2021

60% had 'a great deal' or 'quite a lot' of confidence in banks in 1980

% Who have "a great deal" or "quite a lot" of confidence

	2019	2020	2021	Change, 2021 vs. 2020
	%	%	%	pct. pts.
The public schools	29	41	32	-9
The medical system	36	51	44	-7
Small business	68	75	70	-5
The church or organized religion	36	42	37	-5
Banks	30	38	33	-5
The U.S. Supreme Court	38	40	36	-4
The criminal justice system	24	24	20	-4
The military	73	72	69	-3
Technology companies	--	32	29	-3
Organized labor	29	31	28	-3
Newspapers	23	24	21	-3
Television news	18	18	16	-2
The presidency	38	39	38	-1
Big business	23	19	18	-1
Congress	11	13	12	-1
The police	53	48	51	+3

GALLUP

Global Report

Edelman

INCREASED URGENCY TO ADDRESS FOUNDATIONAL PROBLEMS

Change in importance since last year (more important minus less important)

Change in importance since last year	Net change	*More Important*	*Less Important*
Improving our **healthcare system**	+62	70	8
★ Addressing **poverty** in this country	+53	62	9
Improving our **education system**	+53	62	9
★ Addressing **climate change**	+51	61	10
Finding ways to combat **fake news**	+50	60	10
Protecting people's **individual freedoms**	+50	59	9
★ Closing the **economic and social divide**	+48	58	10
★ Addressing **discrimination and racism**	+42	53	11

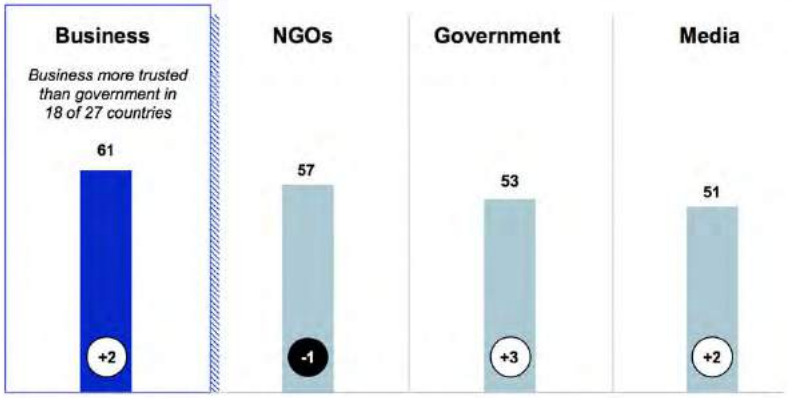
2021 Edelman Trust Barometer. IMP_POL_PRIORITIES. For each of the following issues and challenges, please indicate whether our country addressing it has become more important to you, less important to you, or has stayed the same in importance, since last year. 5-point scale; top 2 box; more important; bottom 2 box, less important. General population, 27-mkt avg. Net change is the difference between more and less important.

BUSINESS BECOMES ONLY TRUSTED INSTITUTION

Percent trust

56
TRUST INDEX

+2 pts
Change, 2020 to 2021



2021 Edelman Trust Barometer. The Trust Index is the average percent trust in NGOs, business, government and media. TRU_INS. Below is a list of institutions. For each one, please indicate how much you trust that institution to do what is right. 9-point scale; top 4 box, trust. General population, 27-mkt avg.

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BUSINESS EXPECTED TO FILL VOID LEFT BY GOVERNMENT

Percent who agree

CEOs should step in when the government does not fix societal problems

68%

CEOs should take the lead on change rather than waiting for government to impose change on them

66%

CEOs should hold themselves accountable to the public and not just to the board of directors or stockholders

65%

2021 Edelman Trust Barometer. CEO_EXP. Below is a list of potential expectations that you might have for a company CEO. Thinking about CEOs in general, whether they are global CEOs or a CEO who oversees a particular country, how would you characterize each using the following three-point scale? 3-point scale, sum of codes 2 and 3. Question asked of half of the sample. CEO_AGR. Thinking about CEOs, how strongly do you agree or disagree with the following statement? 9-point scale; top 4 box, trust. Question asked of half of the sample. General population, 27-mkt avg.

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BUSINESS GAINS THE MOST TRUST BY BEING A GUARDIAN OF INFORMATION QUALITY

Percent increased likelihood of trusting business associated with performing well on each action

When these actions are performed well…	Increased likelihood of trust
Guarding information quality	**+5.8%**
Embracing sustainable practices	**+5.7%**
Robust COVID-19 health and safety response	**+4.8%**
Driving economic prosperity	**+4.7%**
Long-term thinking over short-term profits	**+4.6%**

2021 Edelman Trust Barometer. Discrete choice analysis; results shown are marginal effects on likelihood to trust. PER_BUS. How well do you feel business is currently doing each of the following? 5-point scale; top 2 box, doing well. Question asked of half of the sample. TRU_INS. Below is a list of institutions. For each one, please indicate how much you trust that institution to do what is right. 9-point scale; top 4 box, trust. General population, 27-mkt avg. For a full explanation of how this data was calculated, please see the Technical Appendix.

EMPLOYEE EXPECTATIONS SHIFT: SAFETY AND UPSKILLING MATTER MORE

Change in importance since last year (more important minus less important)

Change in importance as an employer attribute since the start of the year…	Net change	*More Important*	*Less Important*
Keep workers, customers safe	**+49**	59	10
Job skills training programs	**+44**	54	10
Regular employee communications	**+44**	54	10
Diverse, representative workforce	**+39**	50	11

2021 Edelman Trust Barometer. EMP_IMP_VAL. When considering an organization as a potential place of employment, please indicate whether each of the following has become more important to you, less important to you, or has stayed the same in importance since last year. 5-point scale; top 2 box; more important; bottom 2 box, less important. Question asked of those who are an employee (Q43/1). General population, 27-mkt avg. Net change is the difference between more and less important.

CONSUMERS AND EMPLOYEES EXPECTED TO HAVE A SEAT AT THE TABLE

Percent who agree

68% Consumers …

62% Employees …

have the power to force corporations to change

50% of those who are employed

I am more likely now than a year ago to voice my objections to management or **engage in workplace protest**

2021 Edelman Trust Barometer. TMA_SIE_SHV. Please indicate how much you agree or disagree with the following statements. 9-point scale; top 4 box, agree. Question asked of half of the sample. EMP_ENG. Thinking about your current employer, to what extent do you agree with the following statements? 9-point scale; top 4 box, agree. Question asked of those who are an employee (Q43/1). General population, 27-mkt avg.

EMERGING FROM INFORMATION BANKRUPTCY

1

Business: Embrace expanded mandate

CEOs must lead on issues from sustainability and systemic racism to upskilling. Act first, talk after.

2

Lead with facts, act with empathy

Societal leaders must have the courage to provide straight talk, but also empathize and address people's fears.

3

Provide trustworthy content

All institutions must provide truthful, unbiased, reliable information.

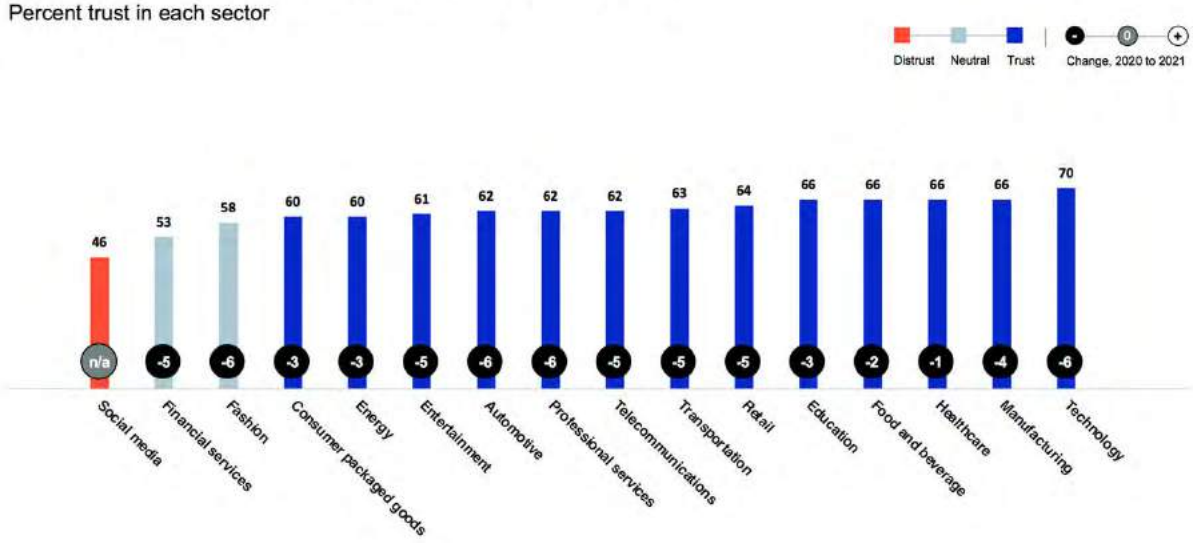
4

Don't go it alone

Business, government, NGOs and others must find a common purpose and take collective action to solve societal problems.

TRUST DECLINES ACROSS SECTORS

Percent trust in each sector



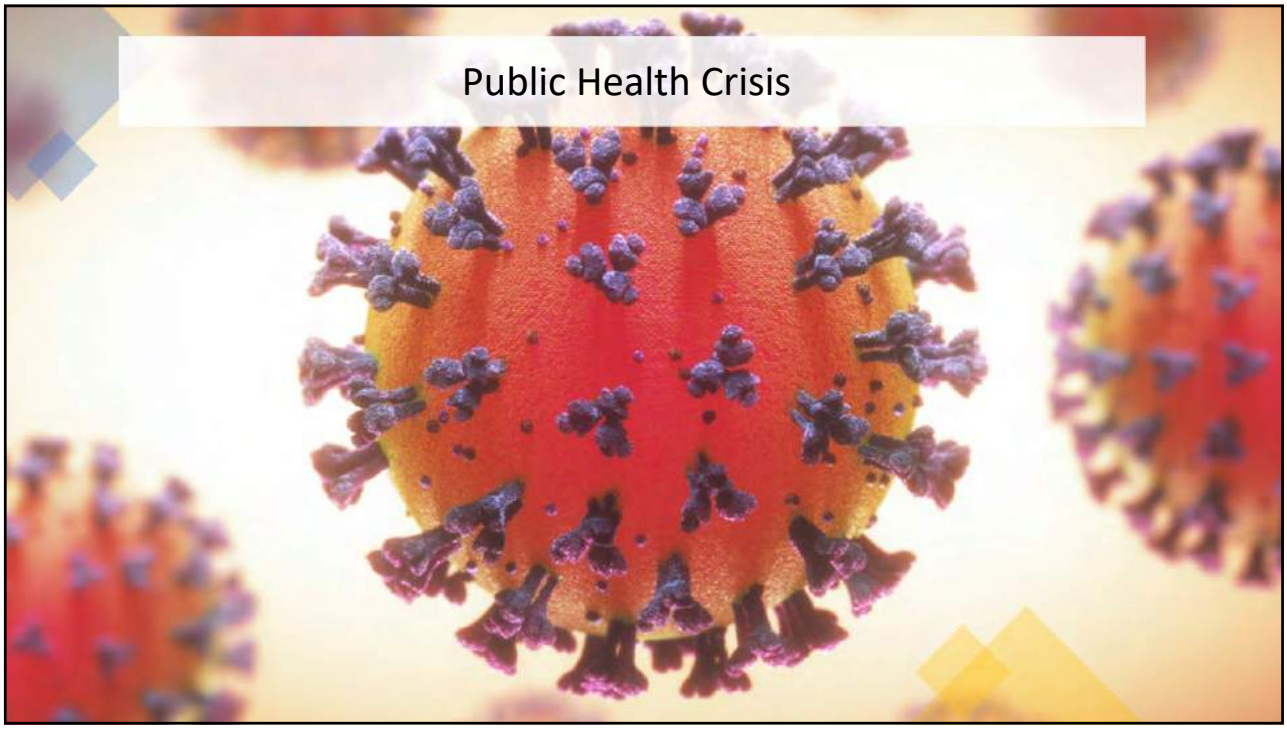
2021 Edelman Trust Barometer. TRU_IND. Please indicate how much you trust businesses in each of the following industries to do what is right. 9-point scale; top 4 box, trust. Industries shown to half of the sample. General population, 27-mkt avg.

INDUSTRY SECTORS OVER TIME

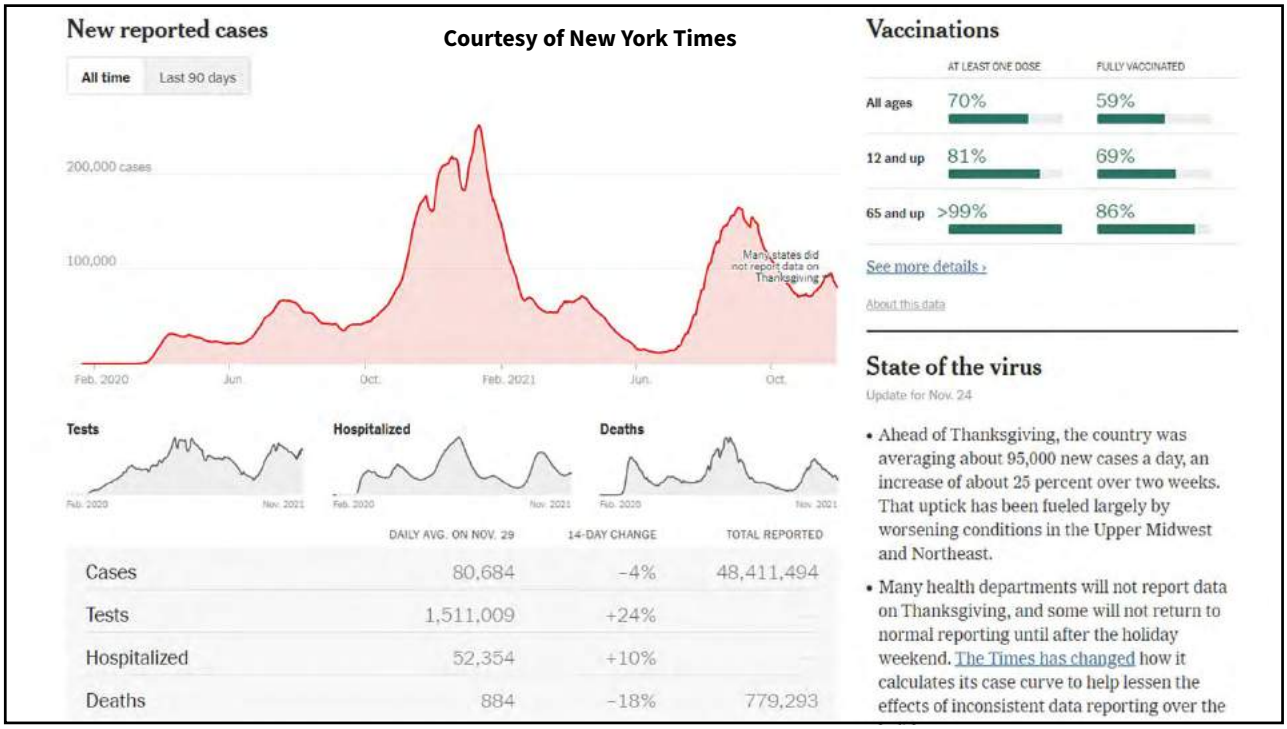
Percent trust in each sector

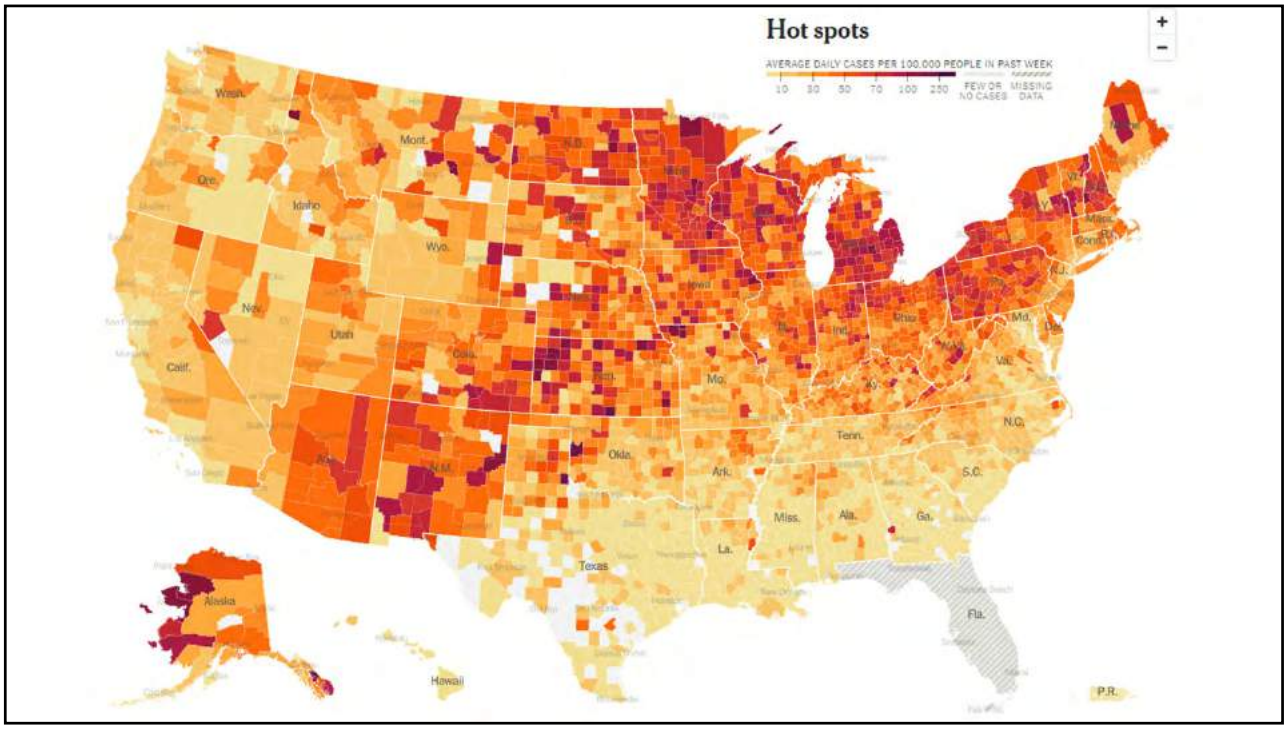
Industry	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	10yr. Trend
Technology	77	74	77	74	76	76	75	78	75	68	-9
Healthcare	-	-	-	-	64	67	65	68	67	66	n/a
Food and beverage	64	64	65	64	65	68	64	69	67	65	+1
Telecommunications	59	61	62	60	61	64	64	67	65	61	+2
Automotive	63	66	70	67	62	66	63	69	67	60	-3
Consumer packaged goods	58	61	62	61	62	64	61	65	62	60	+2
Energy	54	58	57	57	59	62	63	65	63	59	+5
Entertainment	-	63	66	64	66	65	63	68	65	59	n/a
Financial services	44	47	49	48	52	55	55	57	56	52	+8

2021 Edelman Trust Barometer. TRU_IND. Please indicate how much you trust businesses in each of the following industries to do what is right. 9-point scale; top 4 box, trust. Industries shown to half of the sample. General population, 22-mkt avg.

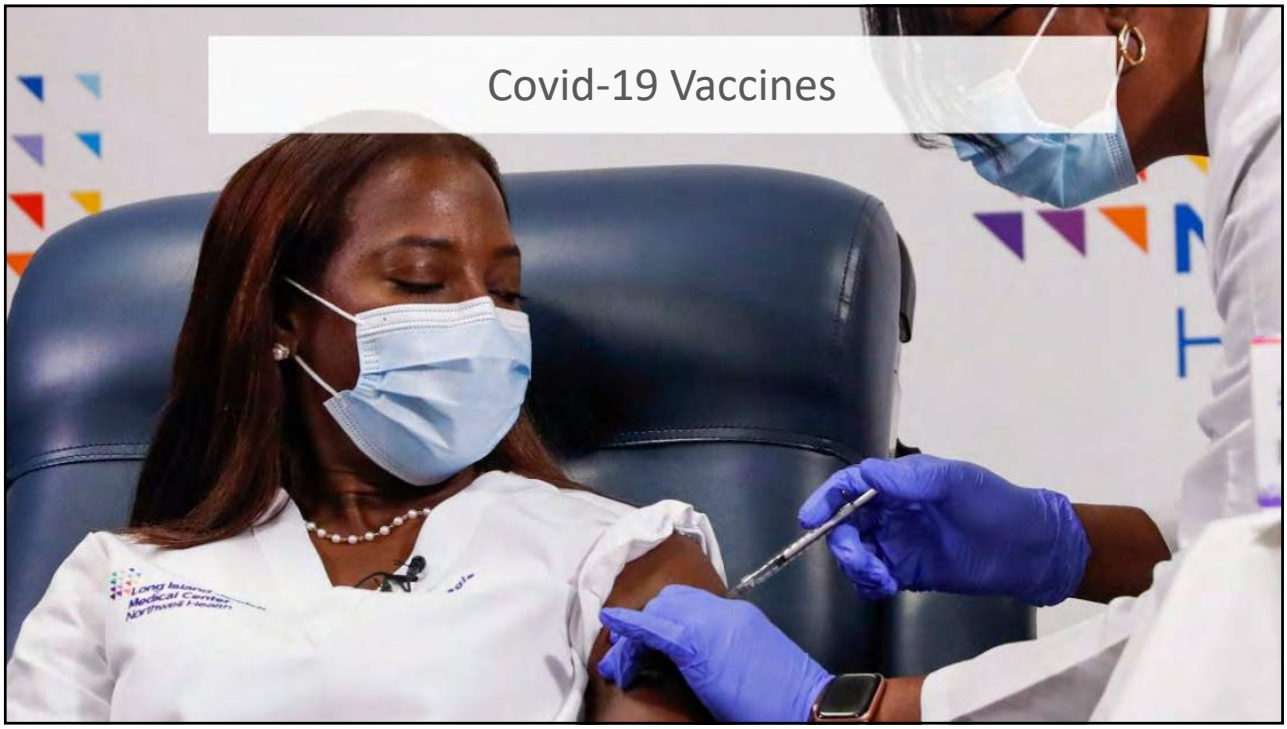


Courtesy of New York Times



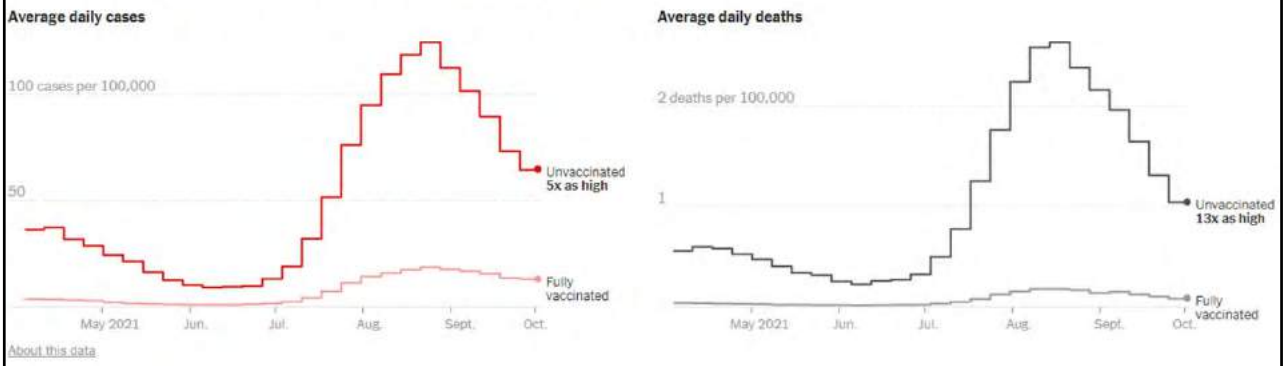

Hot spots
AVERAGE DAILY CASES PER 100,000 PEOPLE IN PAST WEEK
10
30
50
70
100
250
FEW OR NO CASES
MISSING DATA
Wash.
Ore.
Mont.
Idaho
Wyo.
Nev.
Utah
Calif.
Colo.
Kans.
Okla.
N.M.
Texas
Mo.
Ark.
La.
Miss.
Ala.
Tenn.
Ky.
Ohio
Ind.
Ill.
Mich.
W.Va.
Va.
N.C.
S.C.
Ga.
Fla.
Md.
N.J.
Alaska
Hawaii
P.R.


SARS-COV-2 / COVID-19 VARIANTS
WHO label
lineage
GISAID clade/lineage
Nextst. clade
ALPHA
B.1.1.7
GRY (formerly GR/501Y.V1)
20I (V1)
BETA
B.1.351
GH/501Y.V2
20H (V2)
GAMMA
P.1
GR/501Y.V3
DELTA
B.1.617.2
G/478K.V1
EPSILON
21C
ZETA
P.2
GR/484K.V2
20B/S.484K
ETA
B.1.525
G/484K.V3
21D
THETA
P.3
GR/1092K.V1
21E
IOTA
B.1.526
GH/253G.V1
21F
COVID-19
OMICRON VARIANT

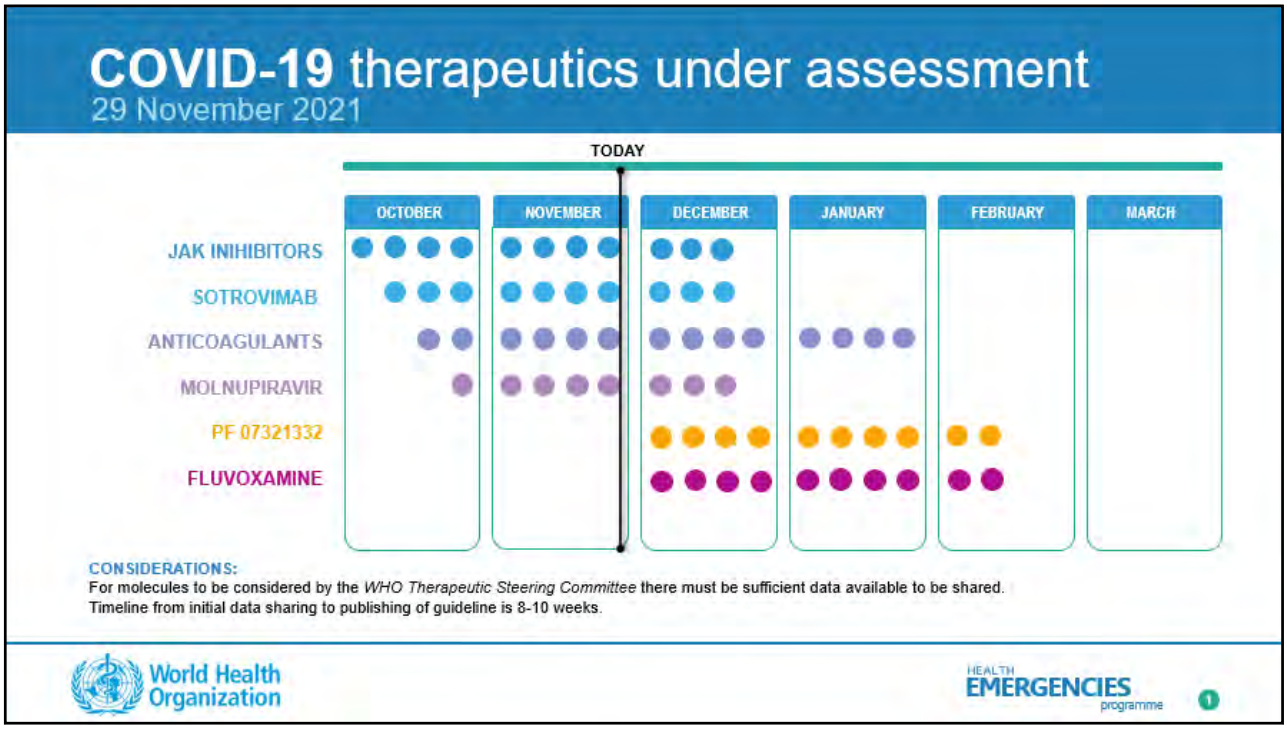


Rates for vaccinated and unvaccinated

Data from the Centers for Disease Control and Prevention shows that people who are unvaccinated are at a much greater risk than those who are fully vaccinated to test positive or die from Covid-19. These charts compare age-adjusted average daily case and death rates for vaccinated and unvaccinated people in the 22 states and two cities that provide this data.

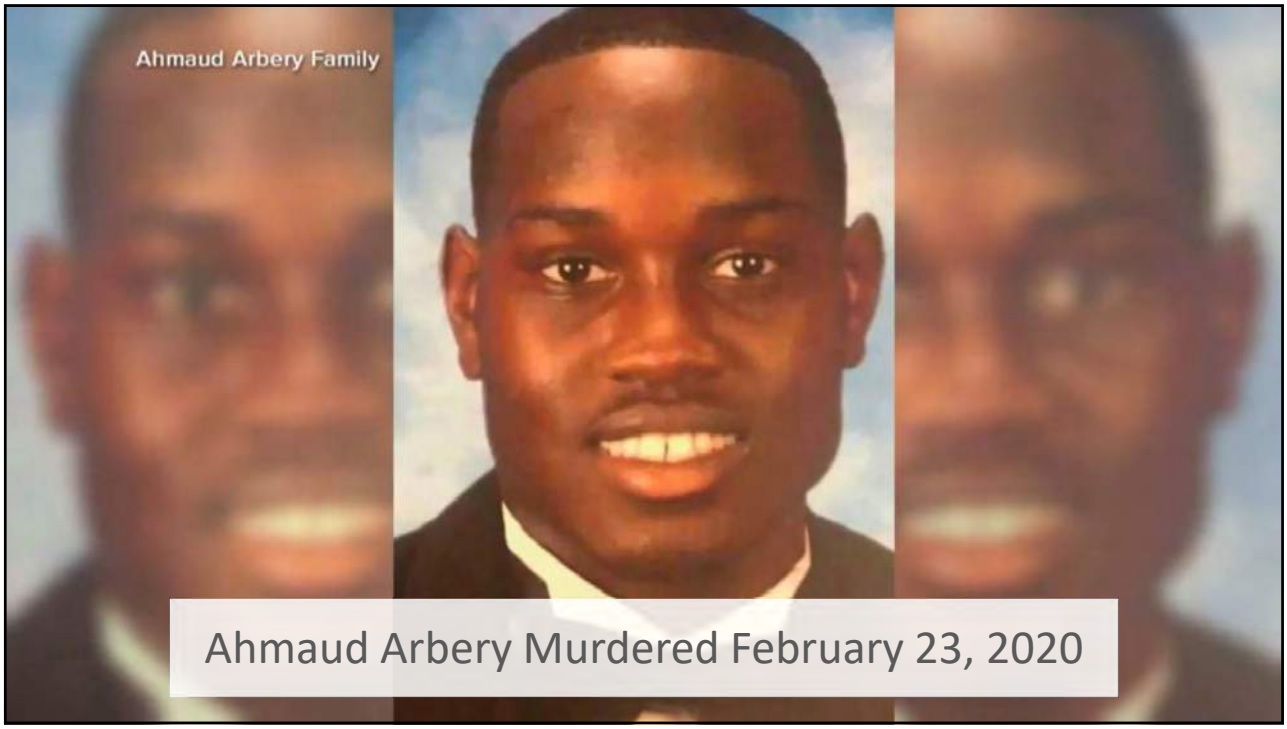


Courtesy of New York Times


COVID-19 therapeutics under assessment
29 November 2021
TODAY
OCTOBER
NOVEMBER
DECEMBER
JANUARY
FEBRUARY
MARCH
JAK INIHIBITORS
SOTROVIMAB
ANTICOAGULANTS
MOLNUPIRAVIR
PF 07321332
FLUVOXAMINE
CONSIDERATIONS:
For molecules to be considered by the WHO Therapeutic Steering Committee there must be sufficient data available to be shared.
Timeline from initial data sharing to publishing of guideline is 8-10 weeks.
World Health Organization
HEALTH EMERGENCIES programme


Racial Justice Crisis
I CAN'T BREATHE
SYSTEM


George Floyd Murdered May 25, 2020


Ahmaud Arbery Family
Ahmaud Arbery Murdered February 23, 2020


Breonna Taylor Murdered March 13, 2020


Washington, D.C.
LIVES
MATTER


Boston, Massachusetts
WHITE SILENCE VIOLENCE
BLACK LIVES MATTER
Say their NAMES
NO Justice PEACE


New York, NY
BLACK LIVES MATTER
MY SKIN IS NOT A CRIME


Minneapolis, Minnesota

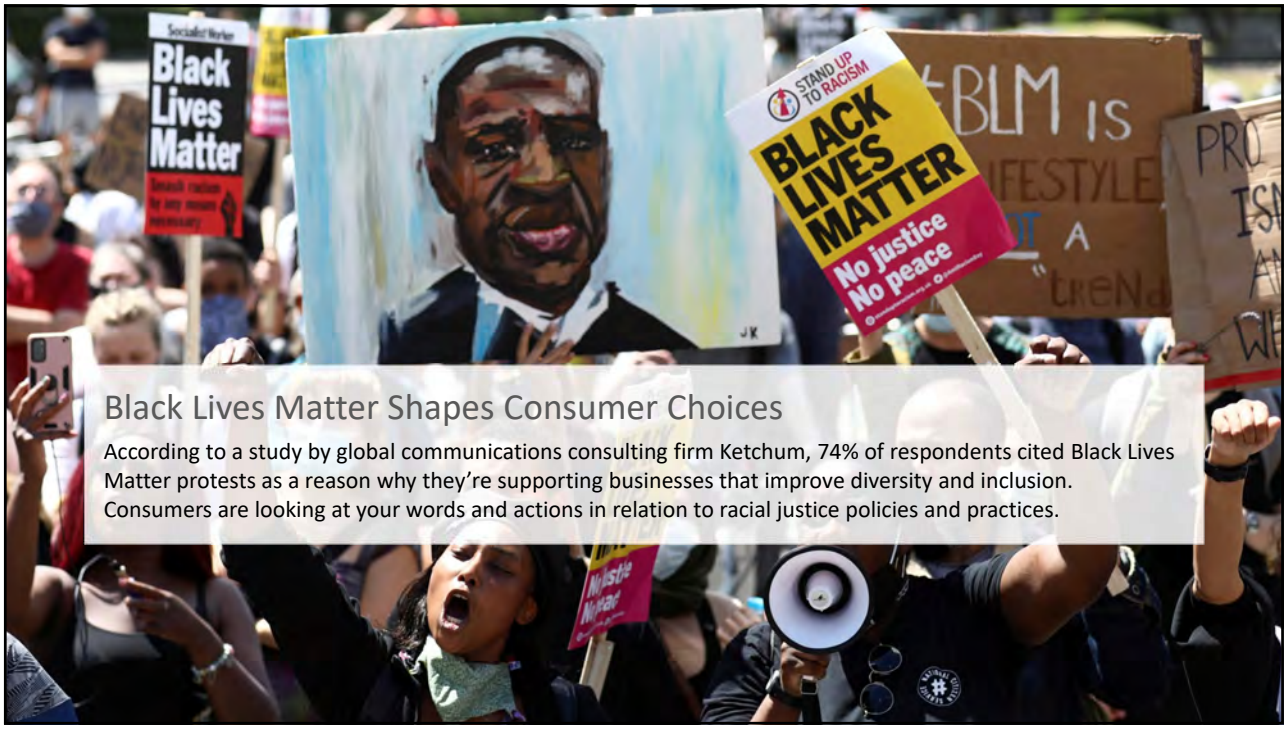

Los Angeles, California


London, England
STOP PRETENDING YOUR Racism IS Patriotism
GIVE UP THE FIGHT


Paris, France
#BLACK LIVES MATTER
no Justice no peace


Cologne, Germany
SILENCE IS VIOLENCE
BLM


Sydney, Australia
BLACK LIVES MATTER
STOP KILLIN US
THEY TRIED TO
OUR WORDS WILL BE HEARD
RACISM IS NOT AN AMERICA-ONLY PROBLEM.
BLACKLIVESMATTER
White
BLACK LIVES MATTER



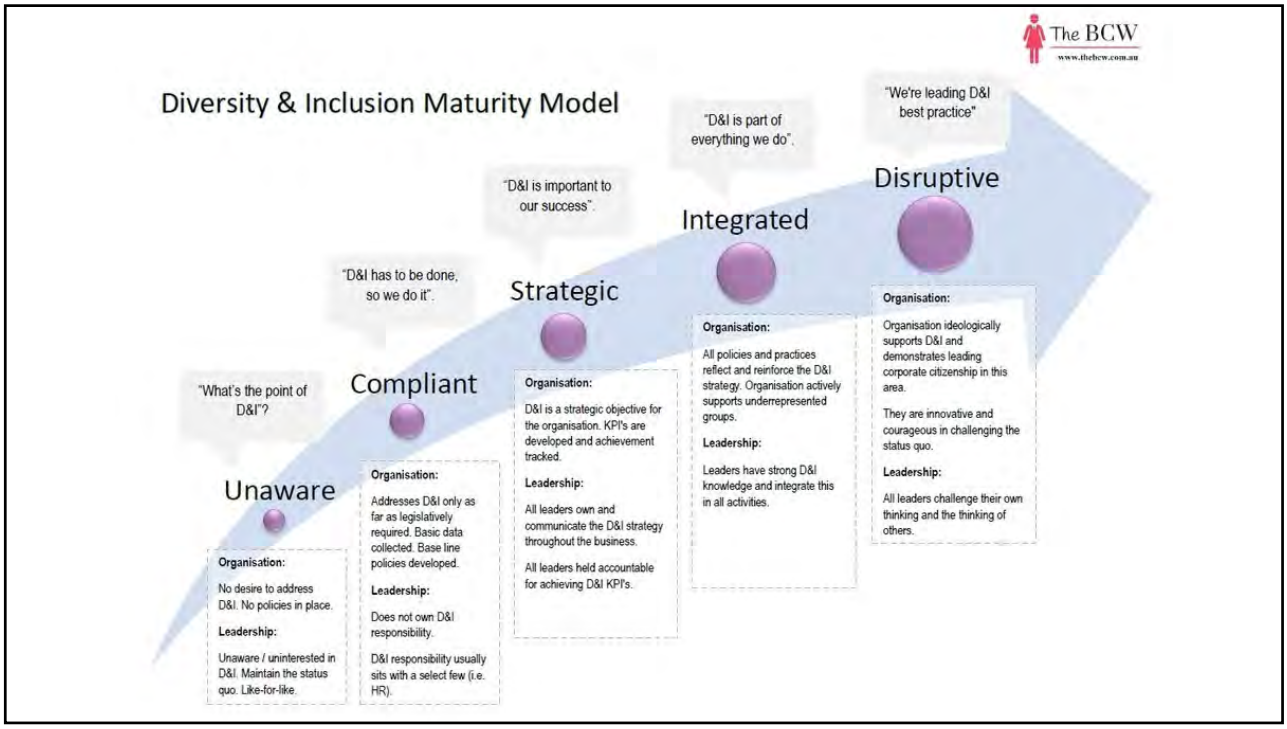
Black Lives Matter Shapes Consumer Choices

According to a study by global communications consulting firm Ketchum, 74% of respondents cited Black Lives Matter protests as a reason why they're supporting businesses that improve diversity and inclusion. Consumers are looking at your words and actions in relation to racial justice policies and practices.

"Business leaders saw first-hand (post George Floyd's murder) that this kind of civil unrest is bad for business. I believe strongly that this civil unrest is based on economic inequality. There are tremendous wealth differences in this country that are creating an unfair and unequal society. I believe that capitalism needs to work for more people."

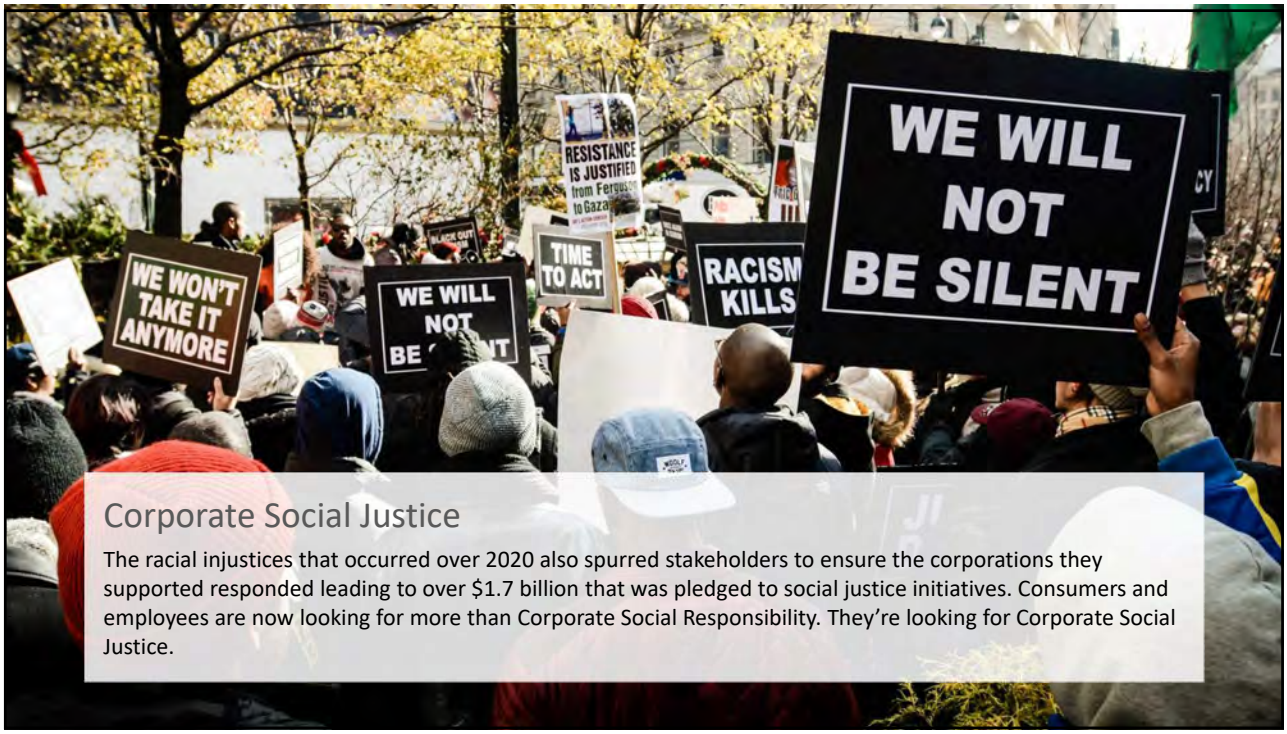
- Mellody Hobson, co-CEO Ariel Investments, Board Chair Starbucks, Board Director JPMorgan Chase


Taking Sustained Action for Racial Justice


The BCW
www.thebcw.com.au
Diversity & Inclusion Maturity Model
"What's the point of D&I"?
Unaware
Organisation:
No desire to address D&I. No policies in place.
Leadership:
Unaware / uninterested in D&I. Maintain the status quo. Like-for-like.
"D&I has to be done, so we do it".
Compliant
Organisation:
Addresses D&I only as far as legislatively required. Basic data collected. Base line policies developed.
Leadership:
Does not own D&I responsibility.
D&I responsibility usually sits with a select few (i.e. HR).
"D&I is important to our success".
Strategic
Organisation:
D&I is a strategic objective for the organisation. KPI's are developed and achievement tracked.
Leadership:
All leaders own and communicate the D&I strategy throughout the business.
All leaders held accountable for achieving D&I KPI's.
"D&I is part of everything we do".
Integrated
Organisation:
All policies and practices reflect and reinforce the D&I strategy. Organisation actively supports underrepresented groups.
Leadership:
Leaders have strong D&I knowledge and integrate this in all activities.
"We're leading D&I best practice"
Disruptive
Organisation:
Organisation ideologically supports D&I and demonstrates leading corporate citizenship in this area.
They are innovative and courageous in challenging the status quo.
Leadership:
All leaders challenge their own thinking and the thinking of others.

Creating a Culture of Inclusion and Belonging

Diversity refers to the characteristics that make people unique. Inclusion refers to the behaviors, attitudes and cultural norms that allow all employees to feel safe, welcomed, respected, seen and heard. Belonging refers to an individual sense of acceptance. Without a culture of inclusion and belonging, diverse talent will eventually leave your institution to seek other opportunities.



Corporate Social Justice

The racial injustices that occurred over 2020 also spurred stakeholders to ensure the corporations they supported responded leading to over $1.7 billion that was pledged to social justice initiatives. Consumers and employees are now looking for more than Corporate Social Responsibility. They're looking for Corporate Social Justice.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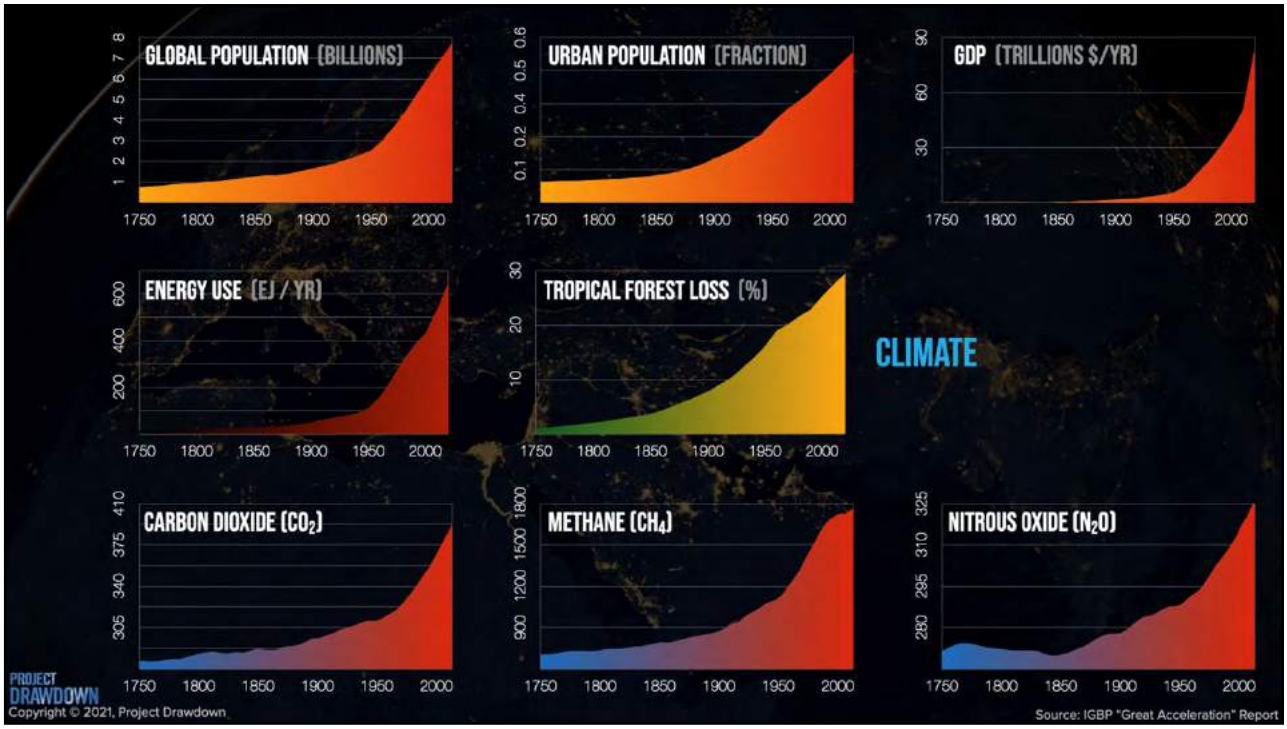
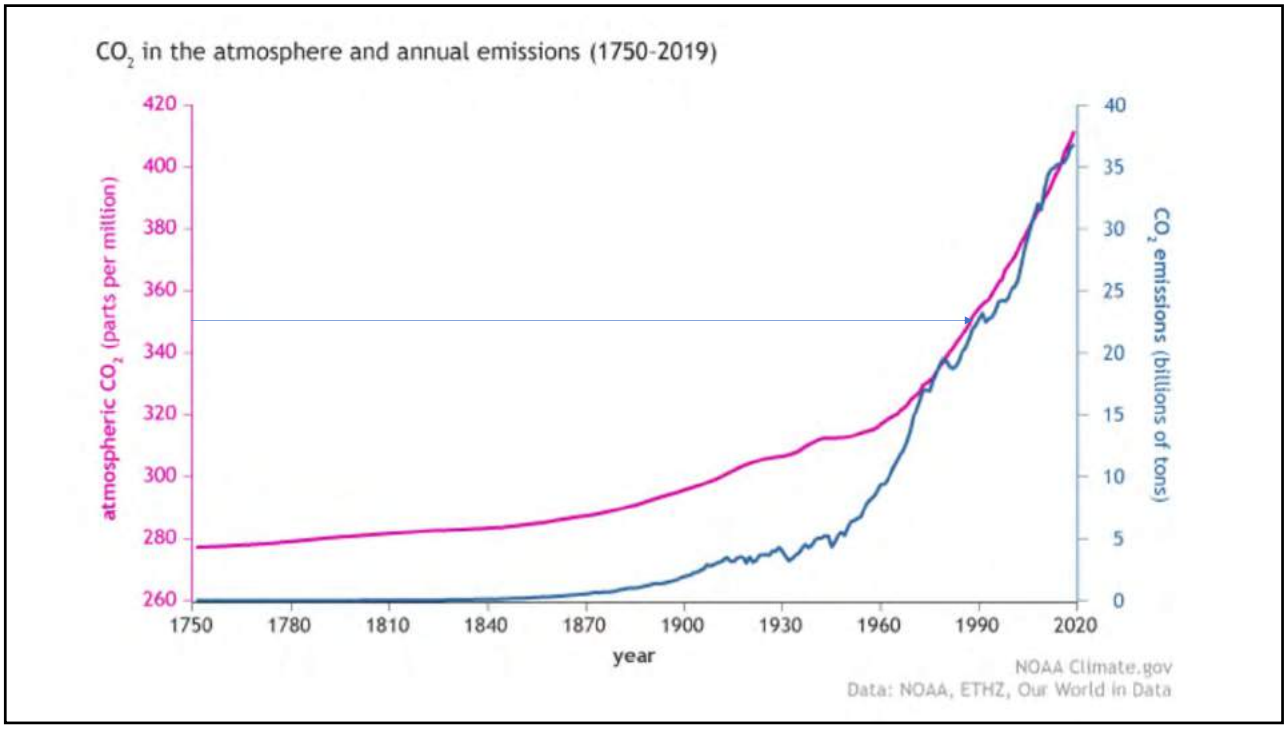
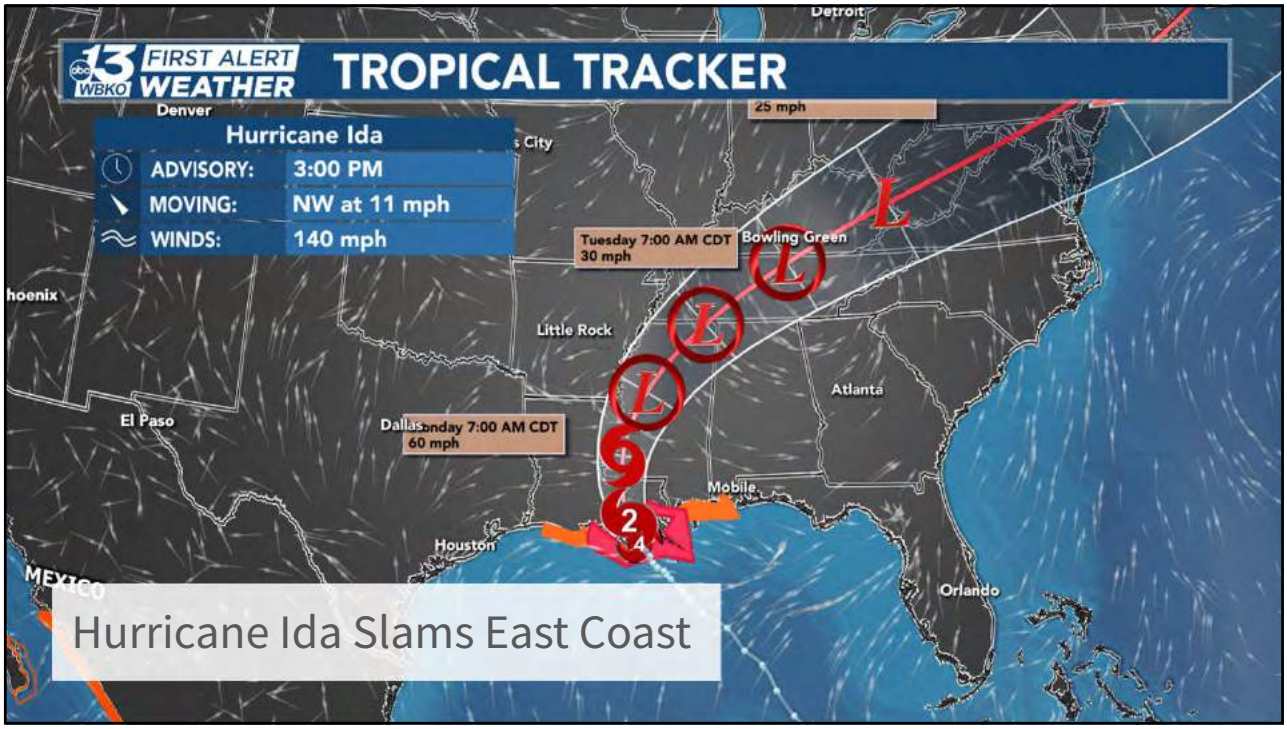
OREGON BANKERS ASSOCIATION
CALENDAR
ADVOCACY
EDUCATION & EVENTS
MEMBER CENTER
MARKETPLACE
COMMUNITY RESOURCES
FOUNDATION
Diversity, Equity & Inclusion
The Oregon Bankers Association believes in promoting and integrating diversity, equity and inclusion across our organization and the banking industry we serve. We believe that a vibrant and relevant banking community respects and embraces diverse perspectives, backgrounds, cultures, abilities and preferences among our employees and our customers. The Oregon Bankers Association is committed to raising awareness and empowering our members as they advance their own diversity, equity and inclusion initiatives that address barriers and expand access in the financial services industry.
BIPOC TASK FORCE
RESOURCES
EDUCATION
INDUSTRY ADVANCES

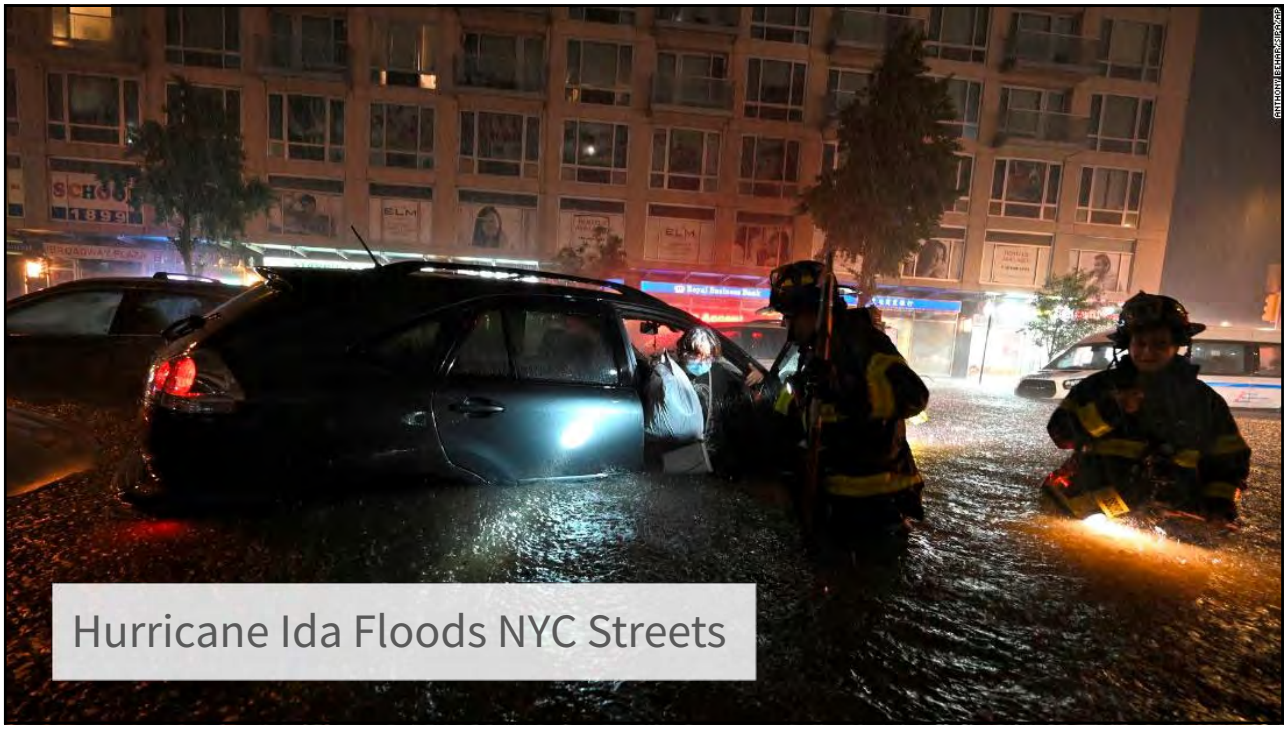

Climate Crisis


GLOBAL POPULATION (BILLIONS)
URBAN POPULATION (FRACTION)
GDP (TRILLIONS $/YR)
ENERGY USE (EJ / YR)
TROPICAL FOREST LOSS (%)
CLIMATE
CARBON DIOXIDE (CO_2)
METHANE (CH_4)
NITROUS OXIDE (N_2O)
1750 1800 1850 1900 1950 2000
PROJECT DRAWDOWN
Copyright © 2021, Project Drawdown
Source: IGBP "Great Acceleration" Report

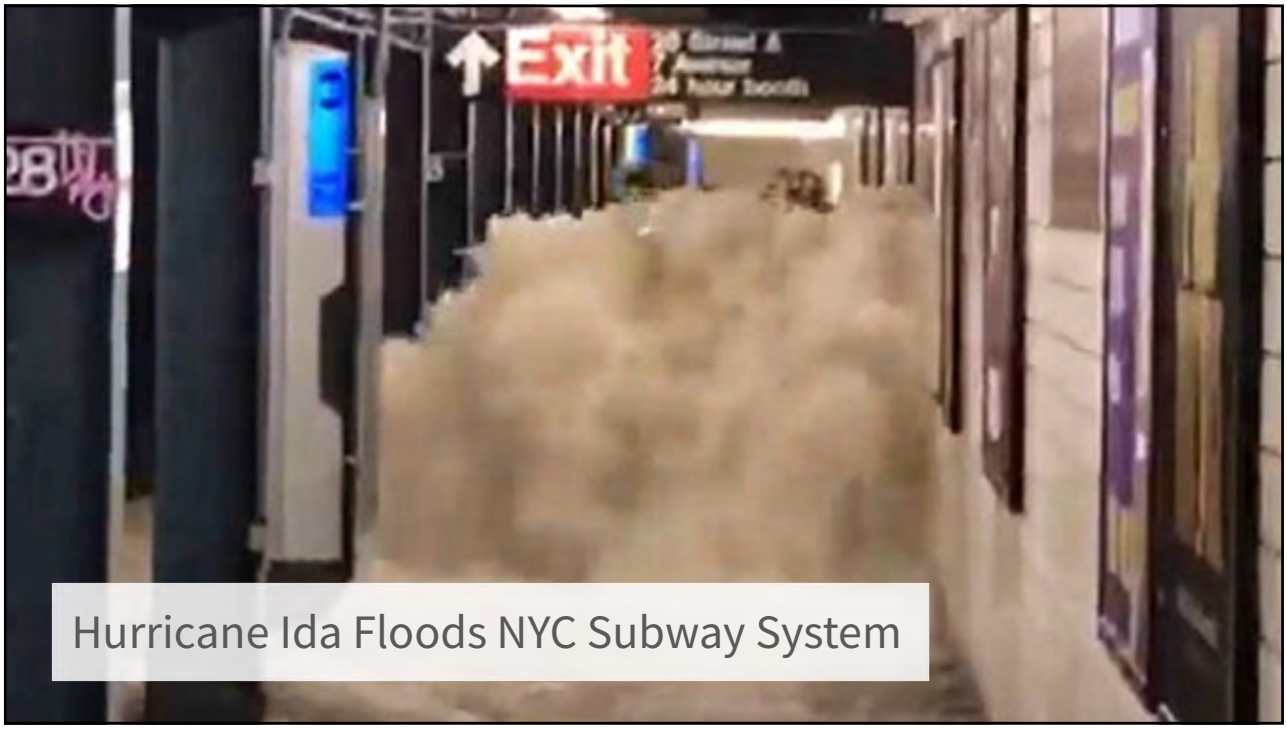

CO_2 in the atmosphere and annual emissions (1750-2019)
atmospheric CO_2 (parts per million)
CO_2 emissions (billions of tons)
year
1750 1780 1810 1840 1870 1900 1930 1960 1990 2020
NOAA Climate.gov
Data: NOAA, ETHZ, Our World in Data



Hurricane Ida Slams East Coast



Hurricane Ida Floods NYC Streets



Hurricane Ida Floods NYC Subway System

California Wildfires, 2021

As of Nov 8, a total of 8,400 fires have been recorded, burning 3M acres across the state. Over 3,600 buildings have been destroyed.

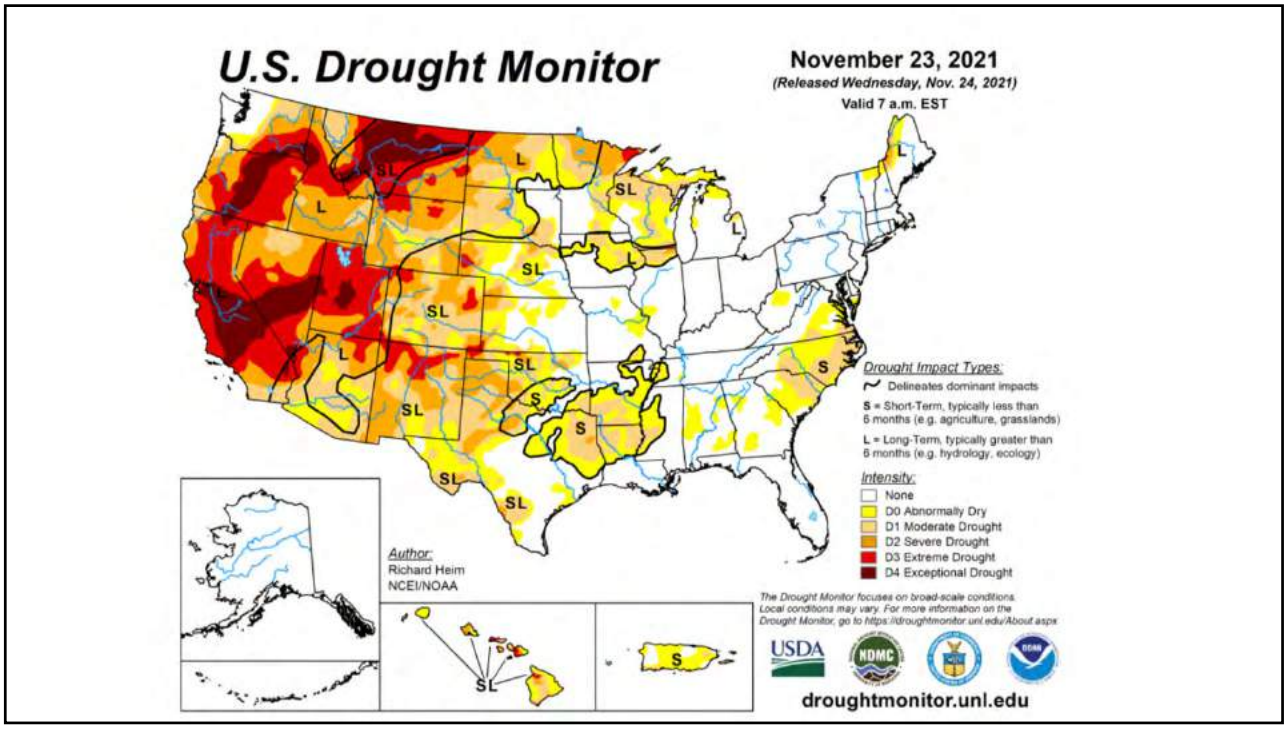
Dixie Fire, 2021

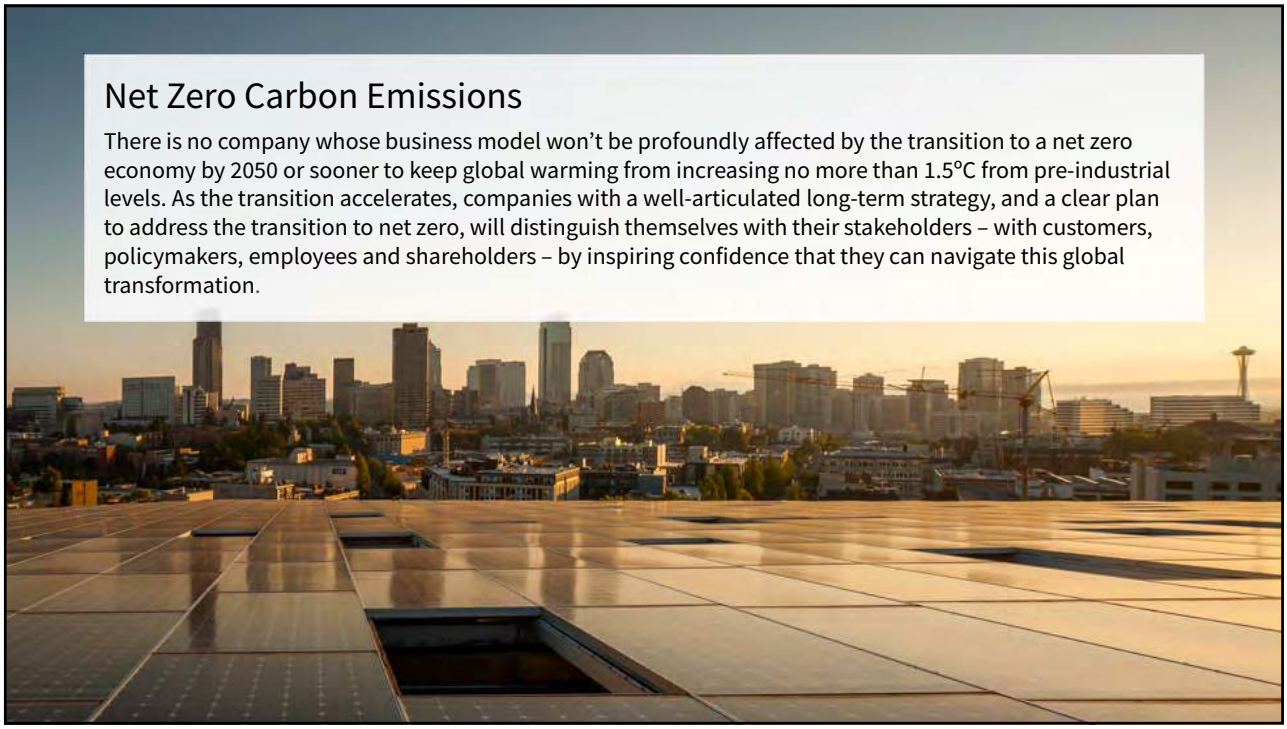
The Dixie Fire, the state's second-largest in history, has burned more than 960,000 acres, destroyed 1,300 buildings and killed one firefighter.

California Drought

The California Dept. of Water Resources said the 2021 water year, which runs from October through September, was the driest since 1924. The department reported that just under 12 inches of rain and snow was measured, adding that California typically receives an average of about 28 inches of rainfall.


JUSTIN SULLIVAN/GETTY IMAGES
Western States Drought
Severe drought conditions, worsened by climate change, continue to affect much of the Western United States and the Northern Plains, causing headaches for farmers and ranchers and setting the stage for large wildfires to easily spread.

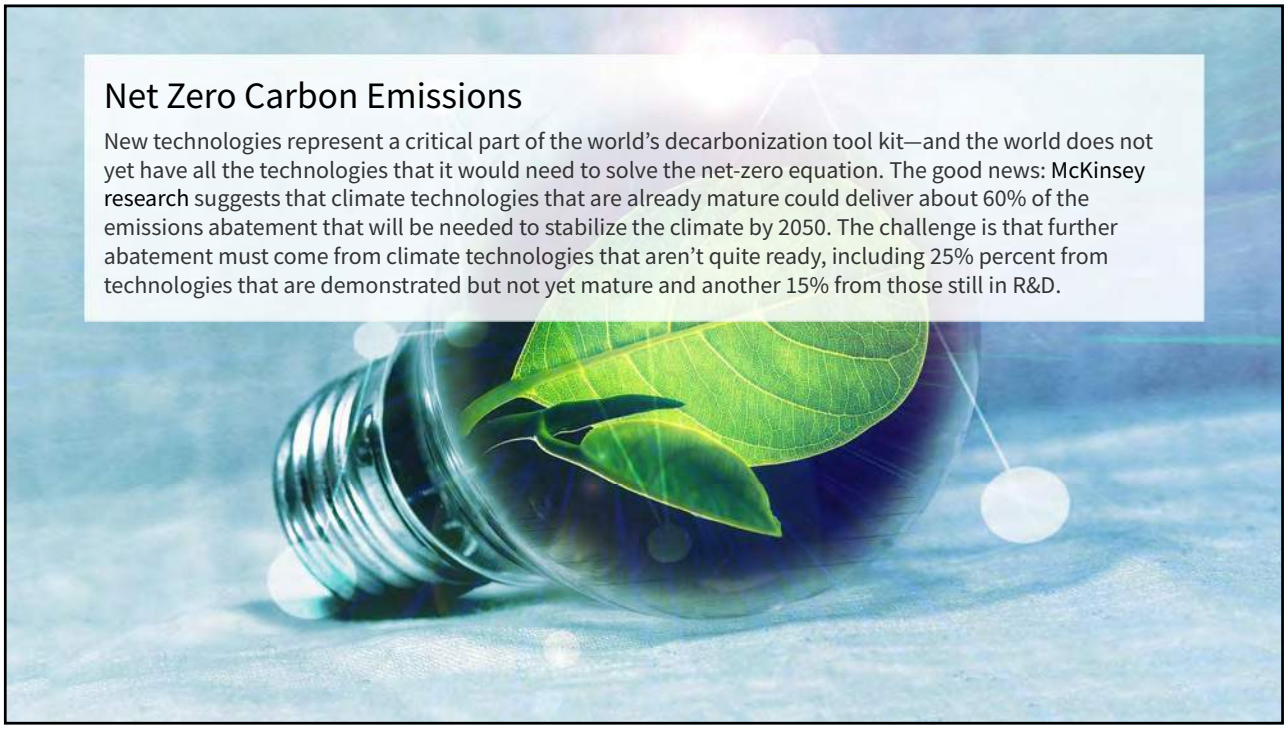

U.S. Drought Monitor
November 23, 2021
(Released Wednesday, Nov. 24, 2021)
Valid 7 a.m. EST
Drought Impact Types:
Delineates dominant impacts
S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)
Intensity:
None
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought
Author:
Richard Heim
NCEI/NOAA
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx
USDA
NDMC
droughtmonitor.unl.edu


Net Zero Carbon Emissions
There is no company whose business model won't be profoundly affected by the transition to a net zero economy by 2050 or sooner to keep global warming from increasing no more than 1.5°C from pre-industrial levels. As the transition accelerates, companies with a well-articulated long-term strategy, and a clear plan to address the transition to net zero, will distinguish themselves with their stakeholders – with customers, policymakers, employees and shareholders – by inspiring confidence that they can navigate this global transformation.


McKinsey Sustainability
Innovating to net zero: An executive's guide to climate technology
October 28, 2021 | Article

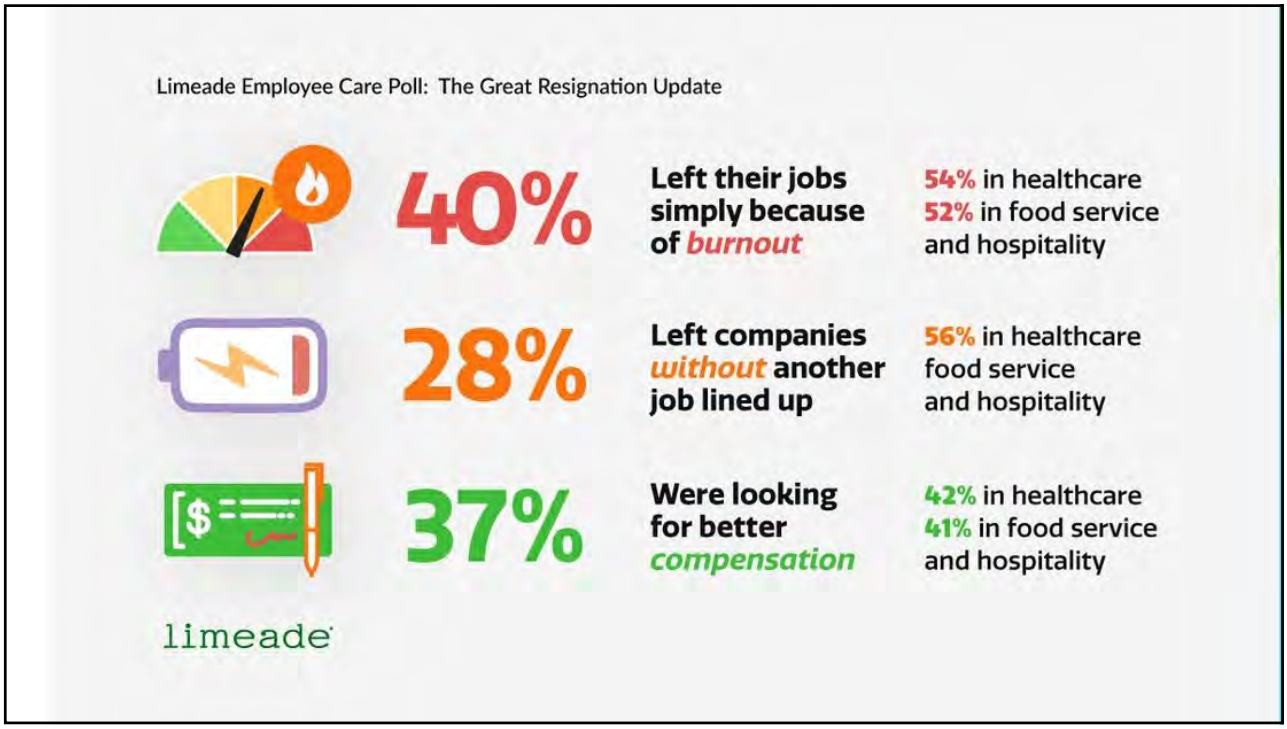
Net Zero Carbon Emissions

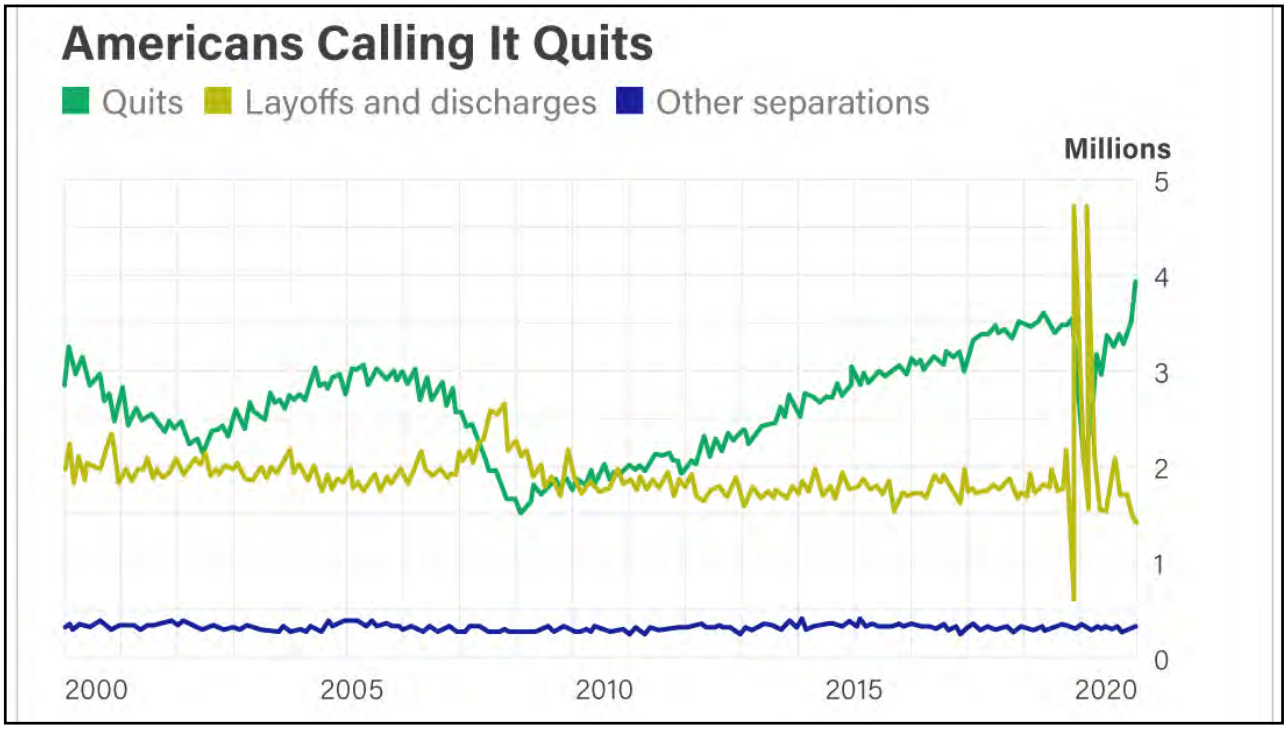
New technologies represent a critical part of the world's decarbonization tool kit—and the world does not yet have all the technologies that it would need to solve the net-zero equation. The good news: McKinsey research suggests that climate technologies that are already mature could deliver about 60% of the emissions abatement that will be needed to stabilize the climate by 2050. The challenge is that further abatement must come from climate technologies that aren't quite ready, including 25% percent from technologies that are demonstrated but not yet mature and another 15% from those still in R&D.



The Great Resignation


The Great Resignation
Spring, Summer & Fall 2021
"11.5 million workers quit their jobs during the spring of 2021"
Inc.
The Great Resignation caught the business world by surprise . It's always held that people needed work and so would be grateful for any job they could get. While this shift in work life culture might have some scratching their heads as to why people are leaving these once coveted


Limeade Employee Care Poll: The Great Resignation Update
40%
Left their jobs simply because of burnout
54% in healthcare
52% in food service and hospitality
28%
Left companies without another job lined up
56% in healthcare
food service and hospitality
37%
Were looking for better compensation
42% in healthcare
41% in food service and hospitality
limeade



GartnerGroup

Gartner 2020 ReimagineHR Employee Survey

Employers that support employees with their life experience see:

↑ **20%**

increase in the number of employees reporting better mental and physical health.

↑ **21%**

increase in the number of high performers vs. organizations that don't provide the same degree of support to their employees.

Three Key Elements of a New Employment Arrangement

COVID-19 has transformed the relationship between employers and employees. Today's new employment deal centers on positively impacting employees' lives while improving talent outcomes for employers. Organizations are providing employees more flexibility than ever before, creating a shared purpose and building deeper connections with employees.

Flexibility Fuels Employee Performance

Courtesy of Gartner Group

Creating a Shared Sense of Purpose

Organizations must go beyond corporate messages to real behaviors, and leaders must actively get involved with the societal and cultural debates of the day. When organizations put actions behind their words — by reallocating resources, giving employees time off to volunteer, PTO for mental health days, advancing Women/POC to senior leadership roles, etc. — the number of highly engaged workers increases significantly – from 40% to 60%.

Building Deeper Connections

According to the Gartner, when employers develop deeper relationships with their employees, there is a 23% increase in the number of employees reporting better mental health and a 17% increase in the number of employees reporting better physical health.

"When organizations take a more holistic viewpoint of their employees, employees report that their employer has a positive impact on multiple aspects of their lives. The employers that get this right will have a more engaged workforce, greater employee retention and better ability to attract top talent."

Brian Kropp

Group Vice President, Gartner Group


CORPORATE
SOCIAL
RESPONSIBILITY


Top CSR Trends Shaping Business
Since the start of pandemic, we began to see consumer attitudes immediately shaped by the pandemic and their new environments. The global health crisis created physical, emotional, social, and financial challenges all at once; causing many to reconsider what is most important in life. This focus grew and amplified a business trend across the globe — consumers not only want to know what corporations are doing for their communities but expect some sort of action.

Corporate Social Responsibility Aligned With Current Events

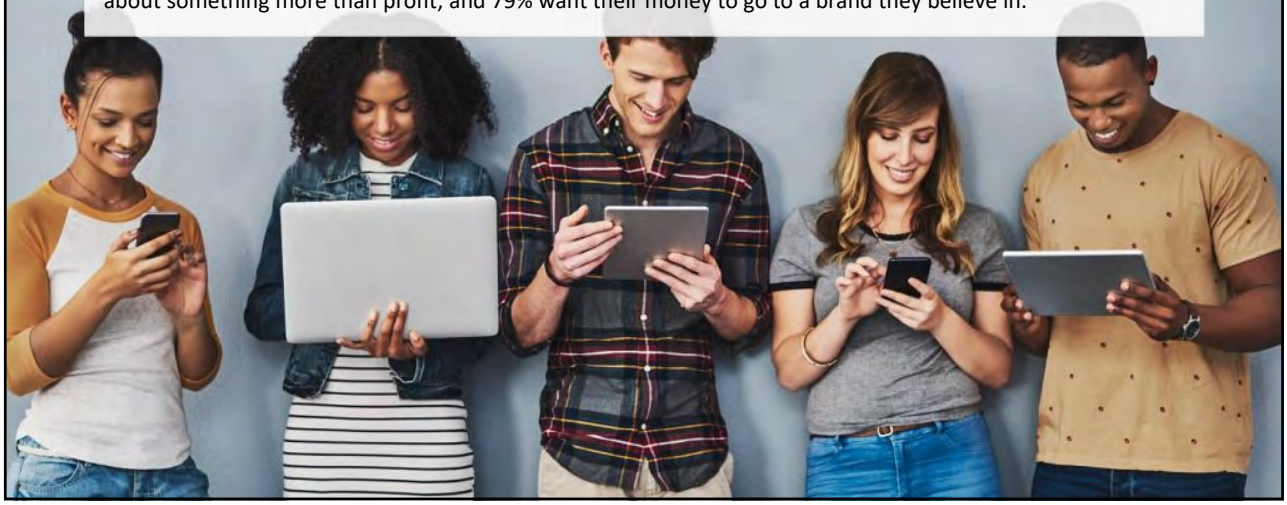
In the 2021 trends report released by global communications consulting firm Ketchum, 74% of respondents cited Black Lives Matter protests as a reason why they're supporting businesses that improve diversity and inclusion.

Ketchum

empathy + intelligence

Corporate Social Responsibility and Gen Z Activism

A new report by Wunderman Thompson Intelligence, titled Generation Z: Building a Better Normal, features five clear sections that cover young people's views on careers, identity, community, activism and brands, and draws on interviews with 1,000 Americans aged between 16 – 24 carried out in October 2020. Highlights from the report include: 75% believe that their generation will change the world; 85% believe brands should be about something more than profit; and 79% want their money to go to a brand they believe in.



Corporate Social Responsibility and Brand Awareness

According to a Deloitte survey of 2,447 consumers, 79% of respondents recalled instances of brands positively responding to Covid-19 to help their customers, employees and communities. Consumers saw this manifest in countless ways. With banks, consumers recall seeing practices such as the pausing of overdraft fees, the deferral of loan payments and working overtime to deliver PPP loans.

Corporate Social Responsibility and Social Causes

According to research and consulting firm GlobalWebIndex, consumers want meaningful support. They want to do business with companies that value the environment, and over 4 in 10 consumers say brands should place more focus on social causes and the wellbeing of their employees.

globalwebindex

Corporate Social Responsibility and the Rise of Social Enterprises

The social enterprise's mission combines profit with societal impact. Deloitte believes that businesses are trending in this direction as CEOs most often cite "impact on society, including income inequality, diversity, and the environment" as their most important success measures. It's not just CEOs either – millennials and Gen Z are most likely to support companies that share their values and walk away from those companies that don't hold themselves accountable to these values.

Certified B Corporation

Business as a force for good

B Corps are certified to be better for workers, better for communities, and better for the environment.

A Global Community of Leaders

3,905
Companies

150
Industries

74
Countries

1
Unifying Goal

Certified B Corporations are a new kind of business that balances purpose and profit. They are legally required to consider the impact of their decisions on their workers, customers, suppliers, community, and the environment. This is a community of leaders, driving a global movement of people using business as a force for good.

Governance: Ensuring that a company's legal policies account for sustainability, equity, and a higher purpose – such as adding ESG (environmental, social and governance) metrics to board-level accountability.

Workers: Taking care of employees, including a living wage, healthcare, equity, tackling discrimination, and more – investing in more strategic community-building initiatives in all sites where employees are based.

Community: Fostering community involvement and partnership, moving beyond donations and sporadic volunteering to meaningful partnerships – and investing in more strategic community-building initiatives in all sites where employees are based.

Environment: Accounting for all emissions and environmental degradation and working towards net-zero carbon and water – including adding public reporting to consumers and investors.

Customers: Ensuring products and services actually make a meaningful and positive impact on people and other stakeholders, which adds more layers of transparency in everything that is in the product.

beneficial state bank

amalgamated bank

cityfirst BANK

Aspiration
Do Well. Do Good.

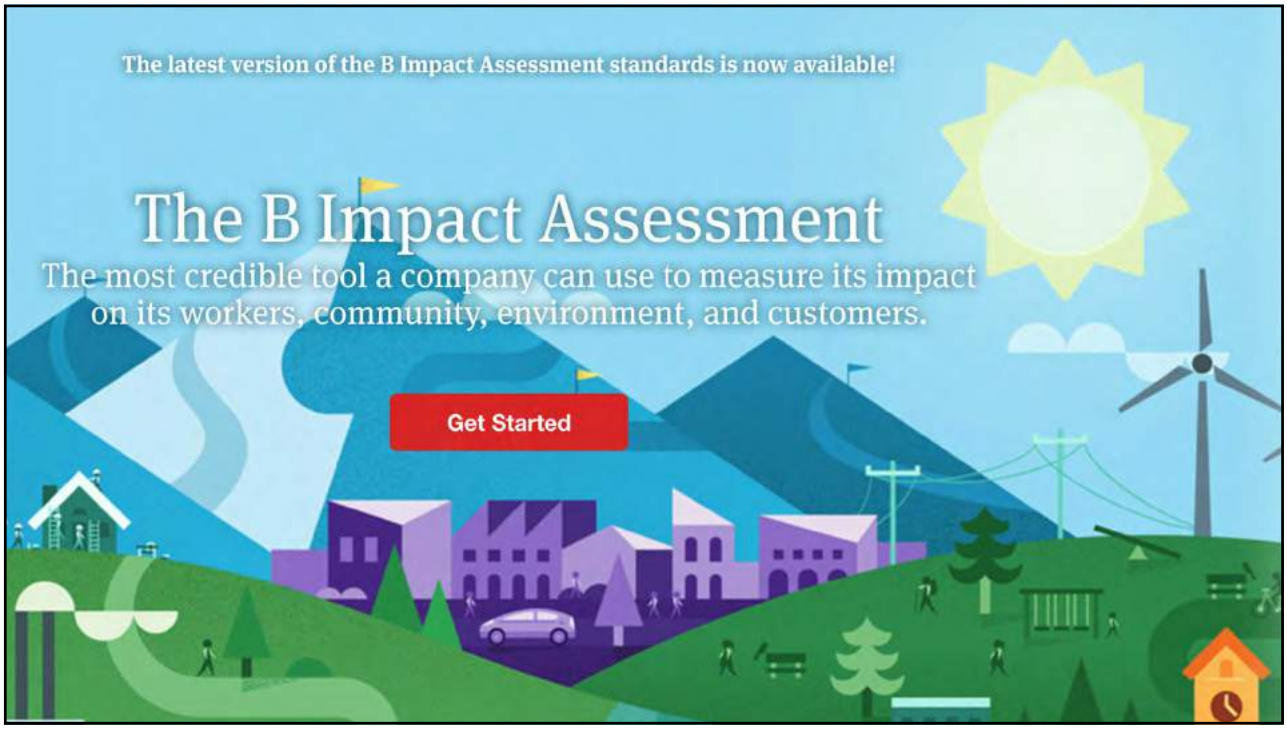
Certified B Corporation

Mascoma Bank

Southern Bancorp

SUNRISE BANKS

Brattleboro Savings & Loan


The latest version of the B Impact Assessment standards is now available!
The B Impact Assessment
The most credible tool a company can use to measure its impact on its workers, community, environment, and customers.
Get Started


Just.
THE SOCIAL JUSTICE LABEL
INTERNATIONAL LIVING FUTURE INSTITUTE


CREATING A REGENERATIVE WORLD: TOGETHER
The International Living Future Institute's mission is to catalyze the transformation toward communities that are socially just, culturally rich and ecologically restorative.
INTERNATIONAL
LIVING FUTURE
INSTITUTE

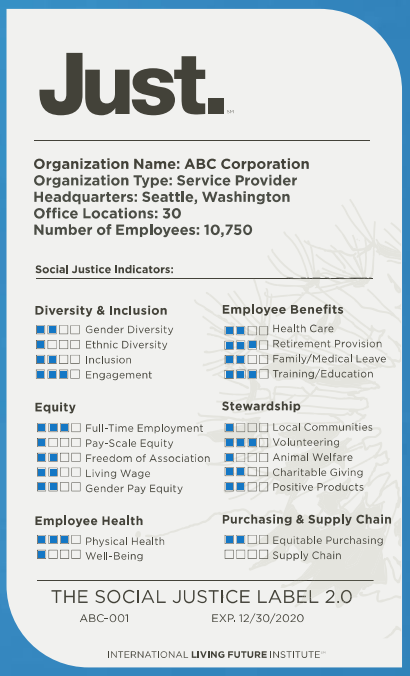

INTERNATIONAL
LIVING FUTURE
INSTITUTE
LIVING BUILDING CHALLENGE
LIVING COMMUNITY CHALLENGE
LIVING PRODUCT CHALLENGE
ZERO CARBON CERTIFICATION
ZERO ENERGY CERTIFICATION
Reveal.
Just.
Declare.
CASCADIA GREEN BUILDING COUNCIL
ECOtone publishing company

HOW DOES IT WORK?

Ratings for indicators correlate to performance: Transparent, Good, Better, Best

Organizations can choose to opt out of a total of six indicators (1 per category)

No minimum performance threshold required to earn label



Just.

Demonstrates an organizations' commitment to social justice and equity.

Increases organizational focus on equity, diversity and inclusion through a transparent and comprehensive third-party framework.

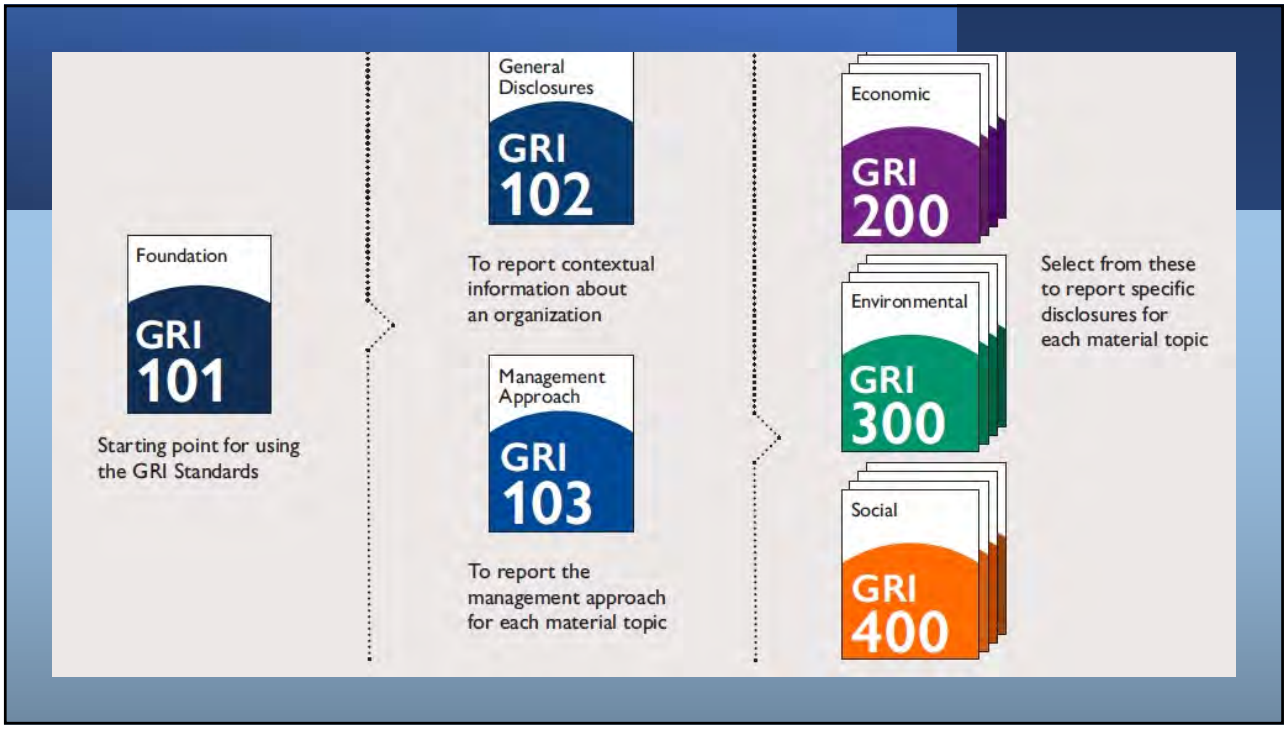
Establishes a roadmap to ensure employees are motivated and engaged through a strong connection to organizational purpose and values.

Increases an organization's capacity to recruit, retain and engage top talent.

The global standards for sustainability reporting

The GRI Standards create a common language for organizations – large or small, private or public – to report on their sustainability impacts in a consistent and credible way. This enhances global comparability and enables organizations to be transparent and accountable.

The Standards help organizations understand and disclose their impacts in a way that meets the needs of multiple stakeholders. In addition to reporting companies, the Standards are highly relevant to many other groups, including investors, policymakers, capital markets, and civil society.


Foundation
GRI 101
Starting point for using the GRI Standards
General Disclosures
GRI 102
To report contextual information about an organization
Management Approach
GRI 103
To report the management approach for each material topic
Economic
GRI 200
Environmental
GRI 300
Social
GRI 400
Select from these to report specific disclosures for each material topic


WHAT is the GABV approach?
global alliance for banking on values
1 Triple Bottom Line Approach
At the heart of the business model
2 Real Economy
Grounded in communities, serving the real economy and enabling new business models to meet the needs of both
3 Client Centred
Long-term relationships with clients and a direct understanding of their economic activities and the risks involved
4 Long Term Resiliency
Long-term, self-sustaining, and resilient to outside disruptions
5 Transparency
Transparent and inclusive governance
6 Culture
All of these principles embedded in the culture of the bank
#BankingOnValues
Join us to learn more
gabv.org

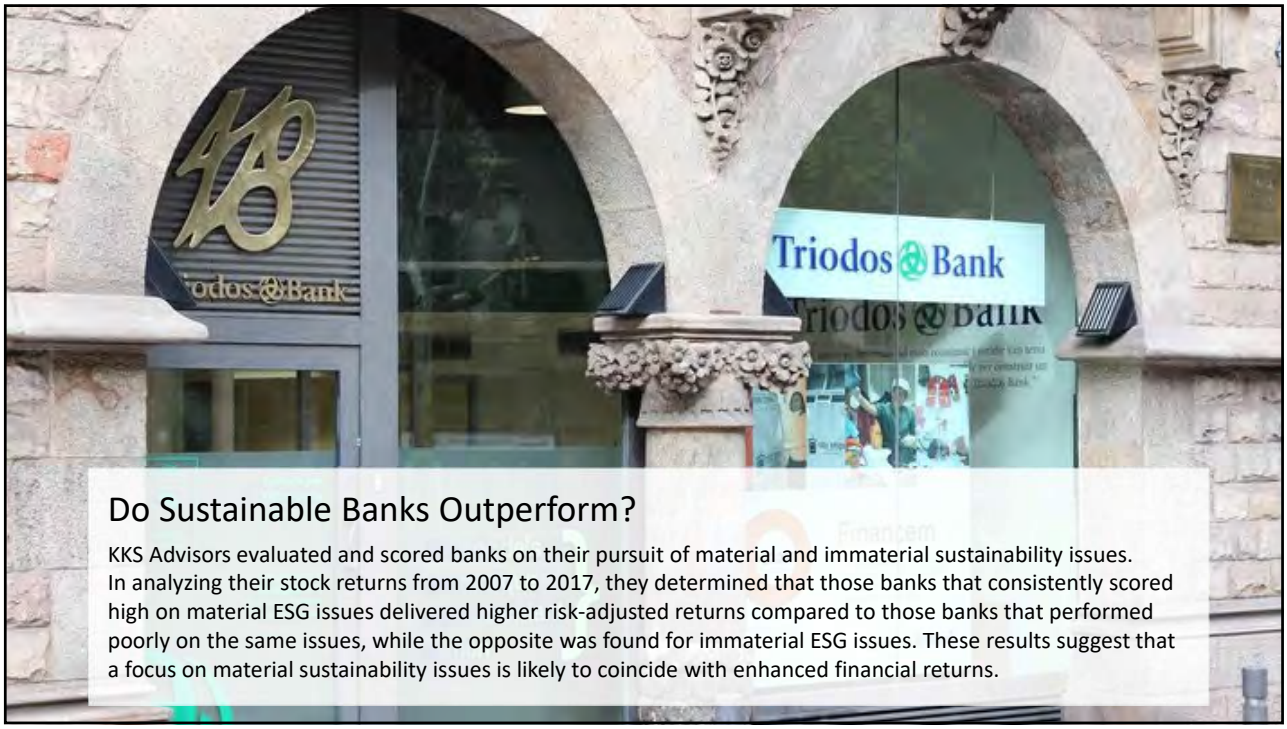
kks advisors
reshaping markets

Do sustainable banks outperform?
Driving value creation through ESG practices

Global Alliance for Banking on Values

Deloitte.

European Investment Bank
The EU bank



Do Sustainable Banks Outperform?

KKS Advisors evaluated and scored banks on their pursuit of material and immaterial sustainability issues. In analyzing their stock returns from 2007 to 2017, they determined that those banks that consistently scored high on material ESG issues delivered higher risk-adjusted returns compared to those banks that performed poorly on the same issues, while the opposite was found for immaterial ESG issues. These results suggest that a focus on material sustainability issues is likely to coincide with enhanced financial returns.

Do Sustainable Banks Outperform?

Research from the report shows that for financial institutions, the simultaneous pursuit of strategic sustainability priorities and strong financial performance does not conflict with one another but rather, support each other when driven by consistent strong overall leadership. The enhanced performance on ESG factors and financial returns are a result of this overall stronger leadership. These results are consistent with the GABV view that delivering value to society will lead to, or is directly linked to, value for all stakeholders including shareholders.

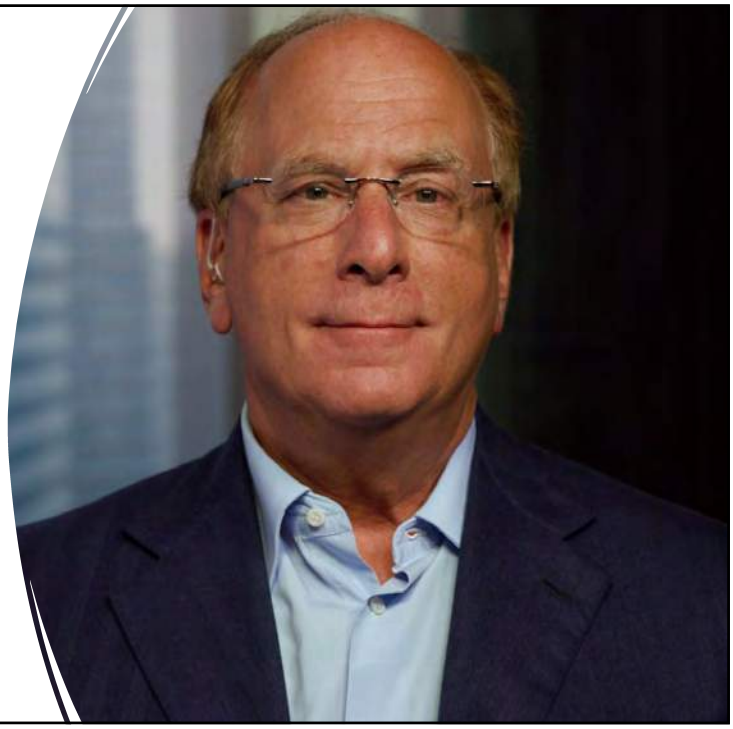
The JUST 100 Companies

JUST Capital ranks more than 900 public, US-based companies on their environmental and social performance and publishes a list of the highest performing, the JUST 100. Compared to the other companies they rank, the JUST 100 companies pay their workers 18% more for their median worker, use 123% more renewable energy, give 6X more to charitable causes and are 6X more likely to have set diversity goals. These JUST100 companies generate a 7.2% higher return on equity and enjoyed 56% higher shareholder returns over the past five years.

"Over the course of 2020, we have seen how responsible companies, with better environmental, social, and governance (ESG) profiles, have outperformed their peers. During 2020, 81% of a globally-representative selection of sustainable indexes outperformed their parent benchmarks."

Larry Fink

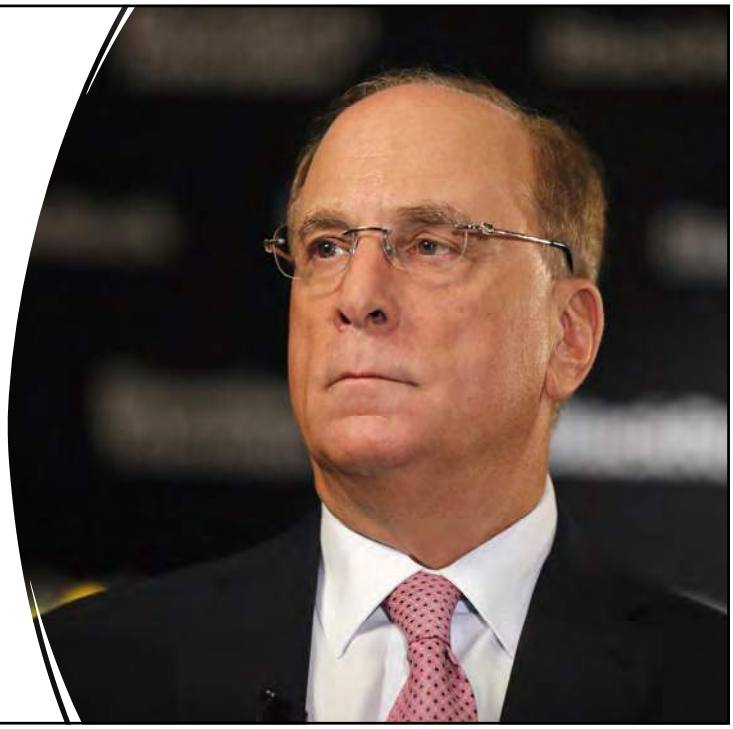
Chairman and CEO BlackRock

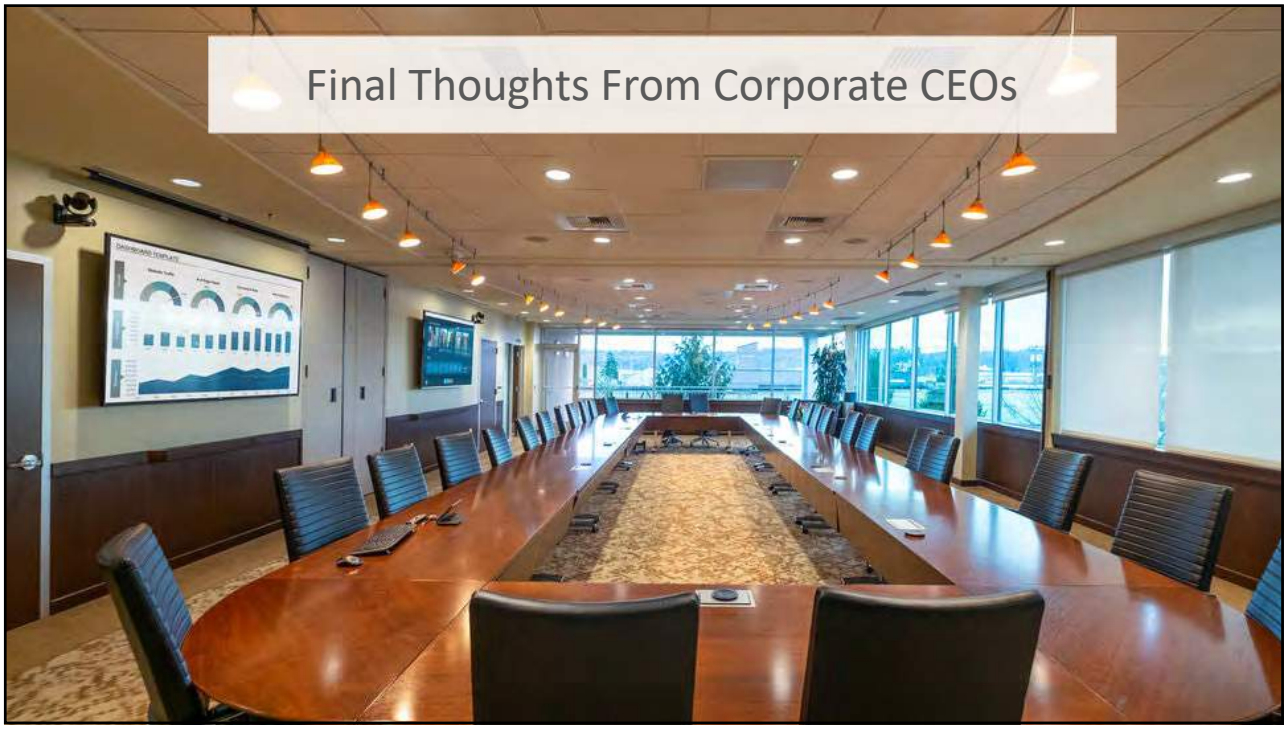


"But the story goes deeper. It's not just that broad-market ESG indexes are outperforming counterparts. It's that within industries – from automobiles to **banks** – we are seeing another divergence: companies with better ESG profiles are performing better than their peers, enjoying a "sustainability premium."

Larry Fink

Chairman and CEO BlackRock





Final Thoughts From Corporate CEOs

"It's time for businesses to take the lead, working with government and NGOs on serious issues like workforce opportunity, racial equity, climate, and sustainable, responsible supply chains. We simply won't be here if we don't take care of the very things that allows us to exist."

Doug McMillon

CEO Walmart

"By changing the way we work for the long term and by setting an example for others to follow, we expect capital from all directions to flow into minority-owned businesses and communities of color. If we could close the racial wealth gap today, we would add $5 trillion to the U.S. GDP over the next five years. Everyone wins."

Jane Fraser

CEO CitiGroup

"As tempting as it may be in moments of adversity, we can't afford to turn away from the horizon and focus instead on defending what we've already got. It is our most successful, innovative and agile companies that have a responsibility to lead on climate because they have the greatest capacity to act in a transformative way. And the converse is just as true. If you are an executive who has not developed an innovation strategy to address your impact on the climate, then you are failing in your duties as a leader."

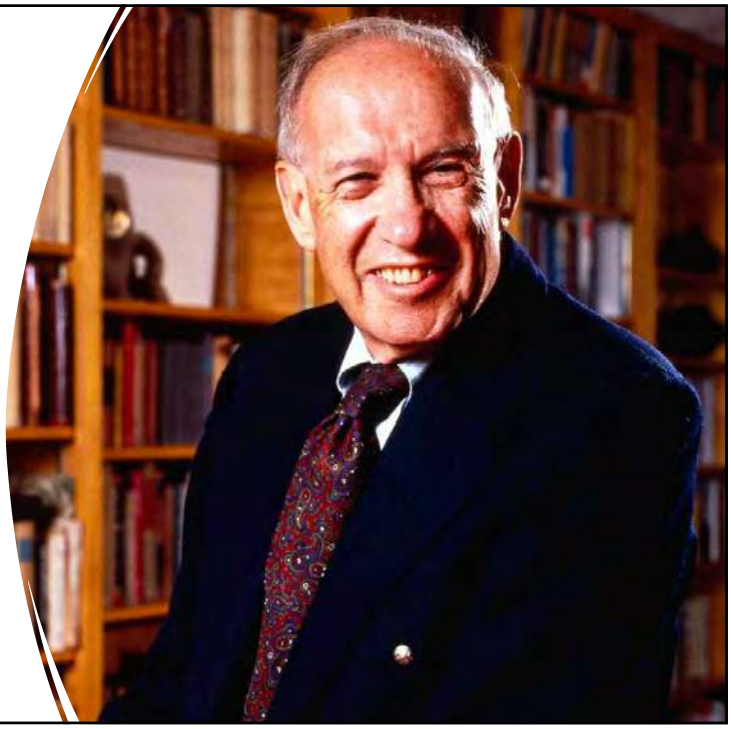
Tim Cook

CEO Apple

"Profit for a company is like oxygen for a person. If you don't have enough of it, you are out of the game. But if you think your life is about breathing, you're really missing something."

Peter Drucker

Management Consultant & Author



Francis Janes
Industry Relations & Partnerships Director
Beneficial State Foundation
fjanes@beneficialstate.org
206-920-8464

beneficial state foundation

kks advisors
reshaping markets

Do sustainable banks outperform?
Driving value creation through ESG practices

European Investment Bank
The EU bank

global alliance for banking on values

Deloitte.

Report background

This research was initiated by the Global Alliance for Banking on Values (GABV) following exchanges with the European Investment Bank (EIB) about the links between financial performance and sustainability focus. With the support of the EIB and Deloitte, GABV contracted KKS Advisors to replicate analysis originated by Professor George Serafeim regarding linkages between financial performance and focus on material sustainability issues as defined by the Sustainability Accounting Standards Board (SASB) for the largest commercial banks in the world.

Contents

1. Executive summary

Research shows that for financial institutions, the simultaneous pursuit of sustainability priorities and strong financial performance does not conflict with one another but rather, support each other when driven by consistent strong overall leadership.

A growing number of companies around the world have voluntarily adopted and implemented a broad range of sustainability practices as a response to emerging challenges and stakeholder expectations across the environmental, social and governance (ESG) space. These efforts have resulted in a proliferation of data and ratings available to investors to help them integrate ESG performance in their capital allocation decisions. Academics and practitioners using ESG information have presented extensive evidence on the benefits of integrating ESG criteria into the investment process, from both an operational and risk-return perspective.

In a seminal paper, Professor George Serafeim and co-authors found that firms with good ratings on industry-strategic sustainability issues deliver significant financial outperformance over firms with poor ratings on the same issues.[1] The research made a clear distinction between ESG issues that are deemed material and immaterial within an industry. In contrast with immaterial factors, material ESG factors are sustainability issues that are likely to impact the financial condition or operating performance of a company and, therefore, are most important to investors.

While ESG materiality-focused research has proliferated, to date there has been limited research focusing on the impact of ESG factors on returns in the financial sector, and more specifically in the banking industry.

The Global Alliance for Banking on Values (GABV) consists of banks that focus on delivering value to society by using finance to deliver sustainable economic, social and environmental development. The GABV believes that this focus delivers stable financial returns. Supporting this hypothesis is the annual research of the GABV, commencing with year end 2010, comparing the financial profiles and returns of its members with the largest banks in the world.[2] The GABV, along with the European Investment Bank and Deloitte have supported this research to give more scientific weight to the hypothesis that an ESG focus increases firm value. To that end, the purpose of this report is to test the relationship between ESG and financial performance within the context of the commercial banking industry.

Using publicly available data on each of the 100 banks included in the sample (see Appendix for the list of banks), we evaluated and scored banks on their pursuit of material and immaterial sustainability issues. In analysing their stock returns from 2007 to 2017, we determined that those banks that consistently scored high on material ESG issues delivered higher risk-adjusted returns compared to those banks that performed poorly on the same issues, while the opposite was found for immaterial ESG issues. These results suggest that a focus on material sustainability issues is likely to coincide with enhanced financial returns.

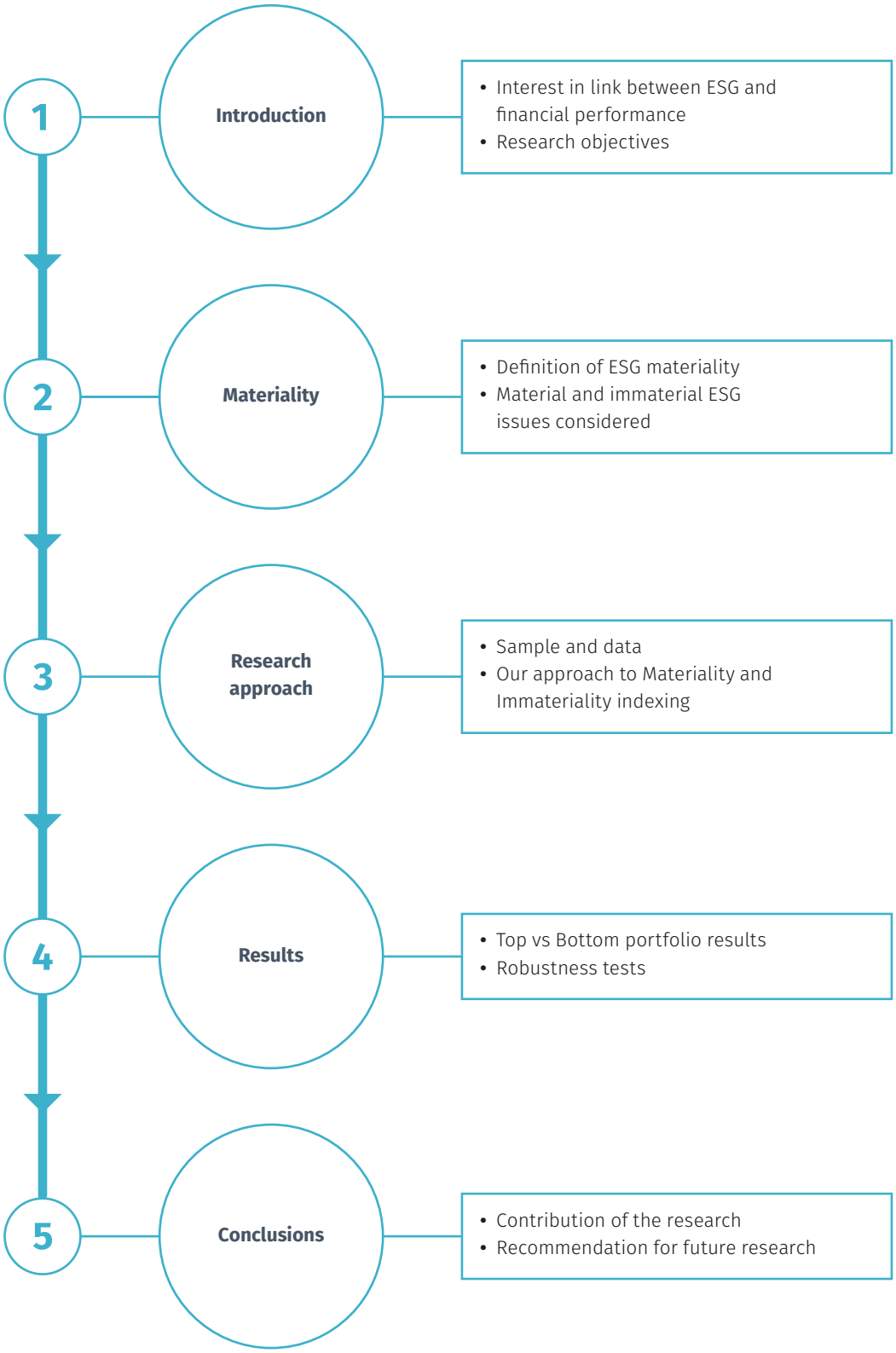
Research shows that for financial institutions, the simultaneous pursuit of strategic sustainability priorities and strong financial performance does not conflict with one another but rather, support each other when driven by consistent strong overall leadership. The enhanced performance on ESG factors and financial returns are a result of this overall stronger leadership. These results are consistent with the GABV view that delivering value to society will lead to, or is directly linked to, value for all stakeholders including shareholders.

We consider our evidence as a solid first attempt at providing industry-specific insights, adding significant weight to the argument for integrating ESG issues into corporate strategy and capital allocation decisions. Although the ESG data landscape has improved over the last few years, there is still a need for more ESG data that is financially material, forward-looking, complete and timely. By highlighting the financial relevance and importance of ESG factors, our research adds to the business case for action by all market participants to increase standardisation and robustness of ESG information, to enhance reliability for decision making by companies and investors.

1 Khan, M., G. Serafeim and A. Yoon (2016), "Corporate Sustainability: First Evidence on Materiality", The Accounting Review 91(6): 1697-1724.

2 The largest banks in the world are the Global Systemically Important Banks as defined by the Financial Stability Board. The GABV analysis is available at: http://www.gabv.org/wp-content/uploads/2018-Research-Report-v1.11.pdf

Report roadmap



2. Introduction

An increasing number of companies identify ESG issues as strategic components of long-term success.

Climate change and broader issues of sustainability have become urgent issues for society. Business leaders now see such factors as major risks affecting long-term success – whether as a response to the concerns of society to demonstrate positive impact, or as boards recognise that these issues can lead to substantial risks to their performance and prospects. This has been set out, for example, by Blackrock Chairman and CEO Larry Fink in his 2018 Letter to CEOs: "To prosper over time, every company must not only deliver financial performance, but also show how it makes a positive contribution to society. Companies must benefit all of their stakeholders, including shareholders, employees, customers, and the communities in which they operate."

Companies are increasingly seeking to integrate wider factors such as the needs of stakeholders and sustainability performance – into their business model, rather than considering them as a separate activity within the business. As a result, companies understand that long-term value creation and financial returns are inextricably linked to their core purpose and how they create value for their stakeholders. To quote Larry Fink again, "Purpose is not the sole pursuit of profits but the animating force for achieving them". These trends make ESG issues an integral component of companies' strategies.

The corporate side

Companies have historically used terms such as sustainability, corporate social responsibility, social impact, and shared value almost interchangeably to describe a wide range of goals and strategies to measure and manage their environmental and social impact. Understanding is now increasing of the relationship of these impacts with sources of value, competitive advantage, brand reputation, trust among customers and the ability to attract employees. Companies are therefore seeking to evaluate and integrate relevant ESG factors into their strategy and risk management.

An increasing number of companies identify ESG issues as strategic components of long-term success. Of the world's largest 250 companies, 93% report on their ESG performance.[3] The majority of publicly-listed companies, along with several private companies, are now being evaluated and rated on their ESG performance by a wide range of third-party providers of data and analytics. The Global Initiative for Sustainability Ratings identifies over 600 ESG products globally from more than 150 organisations, providing more than 10,000 unique ESG metrics and performance indicators.[4]

Numerous studies have emerged describing the benefits of having sound ESG standards for a company: from lower cost of capital, to better operational performance, and better stock price performance.[5] Moreover, companies that integrate ESG factors into their strategy and business model are significantly more likely to attract more dedicated long-term investors with low portfolio turnover and more concentrated holdings rather than they are to attract transient investors with high portfolio turnover and highly diversified holdings.[6]

In a seminal paper, Serafeim and co-authors found that companies with good ratings on material ESG issues significantly outperform companies with poor ratings on the same issues. Conversely, companies with good ratings on immaterial sustainability issues do not significantly outperform companies with poor ratings on the same issues.[7] These results emphasise the importance for companies and investors to understand the material and immaterial ESG issues that can affect financial and operational performance, given their impact on value creation.

3 See www.globalreporting.org/information/news-and-press-center/press-resources/Pages/default.aspx
4 Global Initiative for Sustainability Ratings (July 2017), http://ratesustainability.org/hub/index.php/search/report-in-graph.
5 KKS Advisors and High Meadows Institute (2016)
6 See, for example, University of Oxford and Arabesque Partners (2015), 'From the Stockholder to the Stakeholder – How sustainability can drive financial outperformance'; Clark, Feiner and Viehs (2015) who provide a comprehensive knowledge base on ESG and find that it is in the interest of companies to integrate sustainability into their decision-making process. Additionally, see Eccles, Iannou and Serafeim (2011) for more evidence on the positive impact on corporate performance deriving from valuable sustainability practices.
7 Khan, M., G. Serafeim and A. Yoon (2016), "Corporate Sustainability: First Evidence on Materiality", The Accounting Review 91(6): 1697-1724.

The main reason for investors to include specific sustainability information in their asset allocation decisions has been the current or potential materiality of ESG issues that are seen to be relevant to an industry.

The investor side

Investors are increasingly seeking to understand the ESG risks and performance of the companies they invest in, and how they can impact returns over time. They have employed a large number of terms, such as sustainable investing, responsible investing and ESG investing to describe how they are assessing the potential impact of ESG issues on a company's current and future performance. However, they are increasingly seeking to integrate ESG considerations into their mainstream portfolios.

ESG investment products flood the market in almost every investment category, from ETFs to fixed income and alternatives. The value of global assets allocated via ESG-related strategies has grown from US $13.2 trillion in 2012 to an estimated US $30 trillion in 2018.[8]

The main reason for investors to include specific sustainability information in their asset allocation decisions has been the current or potential *materiality* of ESG issues that are seen to be relevant to an industry.[9] Similarly, an MIT Sloan Management Review report found that due to the strong link between material ESG issues and financial performance, investors inform their investment decisions on the basis of companies' sustainability performance.[10] To further corroborate the evidence, several practitioner research papers and studies have looked at the integration of material ESG factors into investment strategies and found consistent results.[11]

This perspective is also consistent with investors' role as stewards – to seek long-term value for clients and beneficiaries which lead to wider economic, environmental and social benefits, to quote the UK's Stewardship Code 2020.[12]

8 Global Sustainable Investment Review (2018).
9 See Section 3 of this report on Materiality.
10 Unruh, Kiron, Kruschwitz, Reeves, Rubel, and zum Felde (2016).
11 Examples include but are not limited to: Bender, Sung, and Wang (2017); Schoenmaker and Scharamade (2018); Aschwin Kumar, Smith, Badis, Wang, Ambrosy, and Travares (2016); Amel-Zadeh (2018).
12 See UK Stewardship Code 2020, issued by the Financial Reporting Council, 2019.

Commercial banks need to take a long-term view relative to risk underwriting. That long-term view must incorporate potential risks from the impact of climate change or the impact of societal pressure on companies to address climate change.

ESG issues for commercial banks

The concept that 'doing good' is good business also applies to the banking sector. Since 2012, the GABV has conducted research looking at the impact of value-based banking on key economic and financial indicators.[13] Their findings echo the evidence of the broader ESG literature, highlighting how value-based banking is associated with steady financial returns, higher growth, and solid capital position.

But the wider ESG issues affecting banks' clients and customers also lead to risks to the banks themselves. The ESG risks of the companies that banks invest in or extend lending to are directly linked to credit exposure over time. Companies that are affected by climate change, risks to their 'social license to operate' or other ESG factors can succumb to financial and operational pressures that mean they are unable to meet their commitments to lenders. For example, a bank's issuance of loans to carbon-intensive industries and corporates could be significantly impacted by potential carbon pricing legislation. Such issues pose exposure risk that needs to be measured and managed.

Banks can also bring positive impacts to society and the environment. They can help people and businesses prosper and grow. The value created through this process is, by definition, shared with the broader community. This value can be increased through the policies adopted in other areas, for example supporting community business, and broadening access to banking services to the underbanked. But the biggest potential impact for commercial banks is through their portfolio of loans and investments. Providing attractive terms to companies that have high ESG performance or who are leading the transition to a low-carbon economy will create positive impact – and enhance the bank's own reputation. Likewise, adding clauses to lending agreements to reduce negative impacts can also lead to wider benefits.

This illustrates a cycle of value creation, where material issues relating to a bank's wider impact on society and the environment (stakeholder perspective) also affect the performance and prospects of the organisation itself (company and investor perspective). Thinking strategically about social and environmental responsibility and identifying the ESG issues that are most material for a bank is crucial to creating a positive cycle of value creation. Yet, banks have heterogeneous approaches to ESG issues that rarely place them at the heart of their business models. As a result, banks could be underplaying drivers of value and competitive advantage.

This model of the 'cycle of value creation' is well illustrated in the UN Principles for Responsible Banking, formally launched in September 2019.[14] On the one hand, the principles call for banks to manage their direct impacts on people and the environment (principle 2). On the other, the principles emphasise the key impact banks can have through their clients and customers, to "encourage sustainable practices and enable economic activities that create shared prosperity for current and future generations" (principle 3).

Our objective

The goal of this report is to explore the impact of material ESG issues on the commercial banking industry. More specifically, assuming an investor perspective, we wish to understand if commercial banks with good ratings on material ESG issues have the potential to outperform banks with poor ratings on the same issues.

13 'GABV (various years), "Real Economy – Real Returns: The Business Case for Values-based Banking". Available at www.gabv.org

14 See www.unpri.org/pri/an-introduction-to-responsible-investment/what-are-the-principles-for-responsible-investment

3. Materiality

When assessing the relationship between a company's performance on ESG issues with its financial performance, the reality is that not all ESG issues matter equally, and their relevance varies industry to industry.

Which ESG information is the most useful to shape firm strategies and investments? Does water resource management have the same potential to impact the bottom line of a mining company as it does for an investment bank? When assessing the relationship between a company's performance on ESG issues with its financial performance, the reality is not all ESG issues matter equally, and their relevance varies industry to industry. The concept of materiality helps in providing some framing to discern relevant and irrelevant, strategic and non-strategic ESG issues for a given industry. For this study, we have adopted a similar approach to financial reporting to define material ESG issues as those that are likely to impact the financial condition or operating performance of a company. This lens helps to identify the most valuable company information for investors.[15] Similarly, ESG immateriality in this study refers to any ESG issue that does not significantly impact a firm's financial performance, which may be of less relevance to an investor.

For the purpose of framing materiality for the commercial banking industry, we followed the guidance of the Sustainability Accounting Standards Board (SASB). The SASB identifies material ESG issues and associated accounting metrics for each of 77 industries grouped according to its Sustainable Industry Classification System (SICS), by collecting evidence of interest and financial impact together with the views and expectations of industry experts. The results of the SASB's materiality process are summarised in their Materiality Map.[16] We follow the SASB's guidance as of November 2018 to identify the following material ESG issues for the Commercial Banking industry. We have used the SASB definition of materiality for this study because of the investor lens that the SASB has applied to its standards (see the following page).

15 It is crucial that a bank's performance against all immaterial issues is quantifiable. We excluded all ESG issues that are either irrelevant for a commercial bank's business model or where data availability is significantly low. Excluded immaterial ESG issues are: Air Quality, Waste Management, Ecological Impacts, Product Quality and Safety, and Customer Welfare.

16 The latest version of SASB's Materiality Map can be found at https://www.sasb.org/standards-overview/materiality-map SASB updates its framework regularly. In every update materiality for each industry is updated to match new industry assessments. Accordingly, the mapping of issues to disclosure topics and/or metrics may also evolve.

We have used the SASB's approach to material ESG issues because it is aligned to the 'investor lens' and adopts standards that relate to operational and financial impacts on an organisation. This allows us to understand likely dependent factors that can directly affect the organisation's performance. "By viewing ESG factors through the lens of financial materiality… an organisation can focus on covering a small subset of ESG metrics that are most important to its success over time by reducing risk and contributing to growth and creation", as noted by Herz, Monterio and Thomsom.[17] This approach is consistent with the aim of this research.

Companies also consider their wider impacts on the economy, society and the environment, adopting a 'stakeholder lens'. They do this for a number of reasons: to engage with stakeholders; to measure and communicate the impacts achieved through the company's purpose and strategy; to show they are a responsible citizen. There are also increasingly disclosure requirements in this area (for example, greenhouse gas emissions). Furthermore, companies recognise that their external impacts can lead to future risks to the enterprise. For example, limits on availability and use of resources, reputation impact, increasing costs, access to talent, business disruptions.

The SASB's aim is to create and disseminate industry-specific accounting standards for material sustainability issues for use by publicly listed companies and their investors. SASB's model is very similar to the one of FASB (Financial Accounting Standards Board), set up almost 40 years ago to establish and improve standards of financial accounting and reporting. FASB's standards are now recognised as authoritative by the Securities and Exchange Commission (SEC). Therefore, SASB's focus is to get ESG information through mandatory financial filings (like the Form 10-K in the USA), which is different than other voluntary frameworks that provide a framing for voluntary sustainability reports. Although we use the SASB framework to define materiality, this is not the only framework available. For example, the Global Reporting Initiative includes guidance on materiality through their GRI standards.[18] The overall aim of the GRI standards is to help organisations communicate about the impacts they have on the economy, environment and society. In that sense, GRI recommends that organisations consider the full picture of their outward impacts when defining materiality, rather than just the impacts that have immediate consequences from a business perspective (such as financial costs or a damaged reputation).

Irrespective of the choice of the framework that is used to define ESG material issues for a company and an industry, a key takeaway is that materiality is a dynamic concept that evolves over time as new business models emerge, regulatory pressures increase, and consumer awareness and demands grow.

17 Herz, Monterio and Thomson, 'Leveraging the COSO Internal Control – Integrated Framework to improve confidence in sustainability performance data', page 50.

18 Source: https://www.globalreporting.org/standards/questions-and-feedback/materiality-and-topic-boundary

The main reason for investors to include specific sustainability information in their asset allocation decisions has been the current or potential materiality of ESG issues that are seen to be relevant to an industry.

Material issues for commercial banks

- **Access and affordability:** This issue revolves around a bank's deposit and customer base. Banks with significant and diversified deposit funding bases and strong management of credit and other forms for risk lower the bank's overall risk profile and should lead to a lower cost of capital, enhancing financial returns. The reputational benefits stemming from addressing the issue of access and affordability leads to a higher evaluation of a bank's intangible assets. For these reasons, issues such as lending to promote community development and small business growth, and financial inclusion, are material issues for commercial banks.

- **Labour practices:** Banks need to make sure that the service they provide is of the highest quality to attract more customers and increase their deposit base. High standards in the workplace and labour, with policies related to exploited labour, remuneration (fair wages and overtime pay), as well as appropriate benefits are crucial for attracting and retaining a strong workforce. A competent and loyal workforce can significantly enhance operational efficiency by reducing turnover and improving the quality of customer care, which is then able to help banks gain a larger client base. Moreover, the improved reputation stemming from fair workplace practices can increase a bank's overall value.

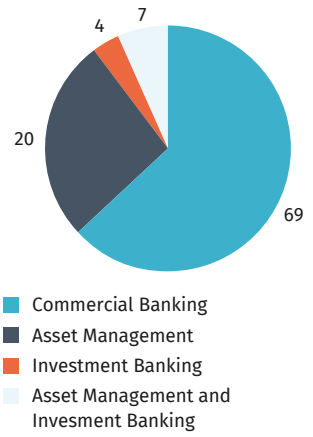
- **Data security and customer privacy:** Ensuring privacy and security is a crucial component of a bank's responsibility towards its customers. Potential accidents and breaches can lead to detrimental contingent liabilities, including fines, which can increase costs for a company and worsen its operational efficiency. The reputational damage associated with such breaches could also decrease the value of the bank's intangibles and the riskier profile would result in a higher cost of capital.

- **Lifecycle impacts of products and services:** Banks have to address multifaceted sustainability issues that can represent direct and often indirect risks and opportunities. Borrowers' risk profiles should be assessed by including ESG factors that can significantly impact their credit worthiness and impair loan repayments. In such instances, interest income could decrease, and the balance sheet would weaken due to the high risk associated with loans and collaterals. In the long-term, this could negatively affect a bank's credit rating, default risk and its cost of capital.

- **Business ethics:** This issue concerns a culture that promotes responsible practices, and compliance with the regulatory environment surrounding the commercial banking industry. An instance of regulatory non-compliance could not only harm a bank's reputation, but could also lead to costly contingent liabilities and reduced business activities, thus worsening a bank's operational efficiency. Overall, failure to comply with regulations and good practices could deteriorate a bank's credit rating, increase its cost of capital, and reduce shareholder value.

- **Systemic risk management:** Systemic risk management practices which respond to related regulations ensure a bank's resilience against financial and economic stress. High levels, quality, and consistency of capital ratios can thus provide a bank with a competitive advantage and improved operational efficiency. Overall, an adequately managed capital base improves credit rating and lowers cost of capital. Banks involved in litigations and external oversight due to regulatory non-compliance have to face costly contingent liabilities and reputational costs. As a result of worsened operational efficiency and lower value of intangible assets, market share and firm value can significantly decrease.

Diversified banks – Main industries (in %)



Diversified banks

As outlined, we have adopted an approach to materiality that is specific to an industry. Some commercial banks also have investment banking or asset management divisions, which creates the need to consider additional ESG material issues from these industries. The main industries of diversification for our sample are Asset Management & Custody Activities and Investment Banking & Brokerage (see chart).

For these industries, we followed the same approach described by the SASB to select ESG issues that are material to the two industries. These were:

- **Fair marketing and advertising:** Asset management companies have a fiduciary requirement to provide transparent information to ensure that clients appreciate the nature of risks undertaken. Failing to comply with fair marketing and transparent information requirements can result in higher regulatory oversight, higher administrative expenses, and higher risk of litigation, which lead to lower value for shareholders.

- **Compensation benefits:** Employee compensation can incentivise either short-term or long-term performance. Compensation practices that incentivise risk-taking in favour of higher short-term returns can disrupt client portfolios and decrease shareholder value. Long-term focused compensation schemes can limit losses, litigation and reputational damage, and safeguard shareholder value.

- **Diversity and inclusion:** Plentiful evidence suggests that diversity among company management and workforce in terms of age, race and gender, in addition to education, values and experience, is correlated with greater shareholder value and improved efficiency metrics. Enhanced disclosure on the topic of diversity will allow investors to assess how companies are managing risks and opportunities associated with this issue.

- **Integration of ESG risk factors:** ESG integration has been increasingly shown to contribute to improved market value. Asset management and custody activity companies failing to address these issues could suffer lower risk-adjusted returns and ultimately reduce shareholder value. Similarly, investment banking and brokerage companies that fail to include ESG issues in their advisory services and products offered would appear as negligent, leading to risks of litigation, reputational damage and decreased shareholder value.

- **Management of the legal and regulatory environment:** Failing to comply with relevant regulations can have detrimental effects on firm value due to contingent liabilities, reduced business activities, reputational risks, and increased regulatory oversight.

- **Systemic risk management:** Failing to comply with regulatory requirements and the lack of a prompt response to new regulations can result in intensified regulatory oversight, higher risk of litigation, contingent liabilities, reduced operational efficiency and a changed reputation, all leading to greater risk for shareholders and reduced firm value.

Immaterial ESG issues include sustainability fields and categories that the SASB did not reasonably consider would impact the financial condition or operating performance of commercial banks.

Immaterial issues for commercial banks

For this study, immaterial ESG issues include sustainability fields and categories the SASB did not reasonably consider would impact the financial condition or operating performance of commercial banks.

Similar to our previous materiality assessment, we follow the SASB's guidance as of November 2018 to identify immaterial ESG issues for our sample of diversified commercial banks.[19]

These issues are considered immaterial as they are assessed from the angle of the direct operational impacts of commercial banks (e.g., staff activities, use of offices, etc.). The issues (such as direct GHG emissions, health and safety, energy and waste management etc) are less material in the context of the operational impact of a commercial bank when contrasted with heavy industry, for example.

However, it is important to note that all these issues are considered as material for commercial banks through the impact of their investments and products. See for instance, the aforementioned issues of 'Lifecycle impacts of products and services' for commercial banks and 'integration of ESG risk factors' for diversified banks.

GHG emissions and climate change: The issue addresses a company's direct and indirect GHG emissions. The category further includes management of the regulatory risks, environmental compliance, and reputational risks and opportunities.

- **Energy management:** The issue addresses environmental impacts associated with energy consumption.
- **Water resource management:** The issue addresses a company's water consumption, use and wastewater generation, as well as the company's management of the resource through its operations and policies.
- **Human rights and community relations:** The issue addresses the relationship between businesses and the communities they operate in, including but not limited to: management of direct and indirect impact on core human rights, including socioeconomic community impacts, community engagement, environmental justice, and cultivation of local workforce.
- **Employee health and safety:** The issue addresses the company's ability to maintain a safe and healthy workplace environment that is free of injuries, fatalities and illness. It includes safety management plans, employee training, as well as regular audits.
- **Business model resilience:** The issue addresses the ability to manage risks and opportunities associated with incorporation of environmental, social and political transitions in the long-term business model and planning. It includes the ability to adapt to a low-carbon and climate-constrained economy. The category highlights industries (for example, construction, manufacturing and mining) in which evolving environmental and social realities may challenge companies to fundamentally adapt and reconsider their business model.

19 It is crucial that a bank's performance against all immaterial issues is quantifiable. We excluded all ESG issues that are either irrelevant for a commercial bank's business model or where data availability is significantly low. Excluded immaterial ESG issues are: *Air Quality, Waste Management, Ecological Impacts, Product Quality and Safety, and Customer Welfare.*

4. Research approach

100
top international banks by market capitalisation

2007-2017
time period

Materiality Index
banks scored on material issues

Immateriality Index
banks scored on immaterial issues

Sample and data

The sample of commercial banks we analysed comprises the top 100 international banks by market capitalisation as of September 2018, falling under SIC's primary industry classification of Commercial Banking.

We used Bloomberg to source ESG data for our sample of commercial banks. In order to identify which Bloomberg fields to use for assessing performance against material and immaterial issues, we used a SASB-to-Bloomberg mapping of metrics. The Bloomberg dataset we used provides only observed (collected) raw data and not imputed or modelled data. Therefore, the presence of a large number of data gaps required extensive data imputation efforts. For that purpose, we used both a rules-based imputation approach, drawing from the observed distribution of the data, and compared our results with a k-NN imputation as a robustness check. Our time frame of analysis spanned 10 years, between 2007 and 2017.

Materiality and Immateriality index and portfolio formation

In order to score commercial banks from highest to lowest each year on both material and immaterial ESG issues, we developed a Materiality Index and Immateriality Index. To make commercial banks comparable across issues, we standardised all Bloomberg metrics to create issue specific scores. These issue-specific scores were aggregated into a Materiality Index and Immateriality Index, and both were scaled from 0 to 100 to allow for easy interpretation of the indices. We follow this methodology for each year in our sample in order to a create a time series of Materiality and Immateriality indices to use in our stock selection process.

To form our materiality and immateriality portfolios, each year we select the top and bottom 20 scoring commercial banks in the Materiality and Immateriality indices, respectively, for that year. Equally weighted portfolios are held from the beginning of the year and rebalanced annually at the beginning of the following year.

Portfolios' alpha (or risk-adjusted return) is estimated using Fama and French (1993) monthly 5-factor regressions including market, size, book-to-market, momentum and liquidity factors. The meaning of the estimated alpha is the residual portfolio return predictability that is left unexplained by the systemic risk factors included in the model and that can instead be explained by the ESG materiality trading strategy here adopted.

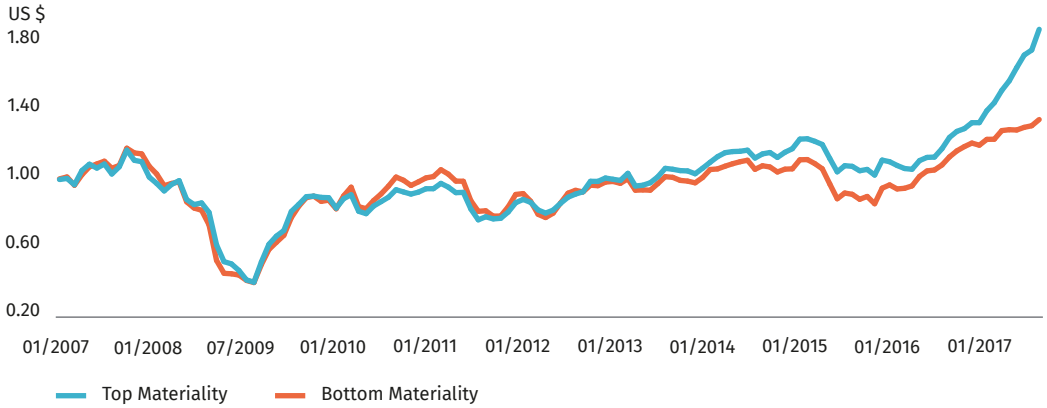
5. Results

The top materiality portfolio outperforms the bottom materiality portfolio by 2.65% in average risk-adjusted returns, making our results consistent with the literature on ESG-tilted investment decisions.

Materiality portfolios

Consistent with Serafeim et al. (2016), we found an outperformance of the top materiality portfolio with respect to the bottom materiality portfolio. The graph below shows the performance of $1 invested in each portfolio at the beginning of 2007 and held until the end of 2017. Investing $1 in the beginning of 2007 in the top materiality portfolio would have grown to $1.76 by the end of 2017. In comparison, investing $1 in bottom materiality portfolio for the same period, would have grown to $1.32.

Performance of top vs bottom materiality portfolios (2007-2017)



We found that from the beginning of 2007 to 2013, the two portfolios behave very similarly and show very little difference in compounded performance. In 2014 we start to observe an increase in performance from the top materiality portfolio and a spike in outperformance throughout 2017 compared to the bottom materiality portfolio. Potential explanations for the change observed after 2014 include:

- **Improvement in ESG data quality and coverage:** ESG data has been evolving over time, both in terms of the quality of the reported information but also in terms of the coverage. Better data reduces the error margin during data gap imputation and can lead to more accurate portfolio results.

- **ESG issues becoming more important:** An increasing interest in sustainable products from a consumer perspective could be directly linked to improved performance of commercial banks that have better minimised their ESG risks and capitalised in ESG opportunities.

Using a 5-factor model, we tested the difference in performance of the two portfolios average risk-adjusted returns (alpha) over the period of analysis. Both portfolios deliver positive alphas, but the top materiality portfolio outperforms the bottom materiality portfolio by 2.65% in average risk-adjusted returns, making our results consistent with the literature on ESG-tilted investment decisions.

Immateriality portfolios

Results for the immaterial portfolios are also consistent with Serafeim et al. (2016), where high scoring scoring companies in immaterial issues underperform low-scoring companies in the same issues. Though the extent of the difference in performance between the two immateriality portfolios is not as pronounced as for the materiality portfolios, our results suggest that investing in immaterial sustainability issues does not give commercial banks a competitive edge.[20]

Similar to our materiality portfolios, we tested the financial performance of our immateriality portfolios using a 5-factor model. Again, both portfolios deliver positive alphas (though lower than the materiality portfolios). We found an outperformance of 0.66% in average risk-adjusted returns of our bottom immateriality portfolio over the top immateriality portfolio, confirming the strategic relevance of material ESG issues over immaterial ones.

Key results

- Commercial banks with good performance on material ESG issues outperform banks with bad performance on the same issues.

- Good performance in immaterial issues does not lead to firm value destruction.

What does this mean?
Material ESG issues are promising signals for informing investment decisions based on ESG performance.

20 Russell Investments, 2018, 'Materiality matters: Targeting the ESG issues that impact performance.'

Robustness tests

What is a robustness test?

The point of a robustness test is to check if the conclusions of an analysis still hold by changing the underlying assumptions.

Changing the time period

Our first robustness test was to eliminate the time period from 2007 to 2010. There were two reasons for carrying out this test: the first one was to test the validity of our results outside the range of the financial crisis years that had significant impact on firm's financials, particularly for commercial banks. The second reason was the fact that raw data coverage improves drastically from 2010 onwards.

Results: Our results for the time period 2010-2017 corroborate our main findings, as we find a greater difference in alphas between top and bottom materiality portfolios. In contrast, the difference between top and bottom portfolio for immaterial issues is slightly smaller.

Changing portfolio size

In order to test the effect of different portfolio sizes on our results, we created bigger portfolios to test any potential bias embedded in smaller portfolio sizes (keeping in mind that our sample consists of 100 banks). To do so, we constructed median portfolios where we defined top and bottom performers as commercial banks with a Materiality and Immateriality Index higher and lower, respectively, than the median value of the indexes. By increasing portfolio size, we anticipate two effects: an ESG effect, whereby including stocks in the middle of the ranking would mitigate differences in performance between top and bottom portfolios; and a risk effect, whereby taking bigger portfolios allows us to address excessive company-specific volatility embedded in small sized portfolios.

Results: The results for the top and bottom materiality portfolio remained similar to our original results, suggesting that the ESG effect and risk effect are balanced out. With respect to the immateriality portfolios, we found that individual alpha estimates increased significantly compared to the original results, suggesting that the risk effect positively offset the ESG effect.

Changing stock selection and portfolio formation process

In our core analysis we selected stocks based on the absolute ranking of commercial banks in the Materiality and Immateriality index. As an additional test we orthogonalised 1-year changes in the Materiality and Immateriality Index with respect to 1-year changes in different firm characteristics over the time period of analysis. This allowed us to construct portfolios based on the unexplained portion of commercial banks' Materiality and Immateriality Index scores using the residuals of the indexes. This approach ensures that assessment of best and worst sustainability performance is not biased by firm characteristics correlated to ESG practices.

Results: We found consistent differences in alphas compared to the absolute ranking approach of the core analysis, although individual alpha estimates and differences were both always smaller in magnitude.

6. Conclusions

Materiality guidance can be helpful both for investors in improving the informativeness of ESG data, and for commercial banks in providing a prioritisation framework for ESG issues.

The work of the GABV has highlighted how value-based banks and banking cooperatives have continuously demonstrated financial returns while taking a strategic longer-term view of profit and prosperity. With this research we have provided more insights into the impact of improving ESG performance for banks on financial returns.

Our evidence supports the current thinking that adopting a strategic focus on ESG issues can lead to financial outperformance. We have found that commercial banks that score high on material ESG issues have better future performance than commercial banks that score low on the same issues. These results show that materiality guidance can be helpful both for investors in improving the informativeness of ESG data, and for commercial banks in providing a prioritisation framework for ESG issues.

Another important finding is that when looking at immaterial issues, although high scoring banks do not outperform low scoring banks, both portfolios deliver positive alpha, suggesting that investing in immaterial issues does not destroy firm value. Rather, banks that chose to focus on ESG issues that are immaterial to their industry failed to realise the same benefits as those that focused on material ESG issues. By contrast, there is no shortage of examples of companies where ESG shortcomings have caused major financial damage and destroyed company and shareholder value.

We recognise that the sample of 100 commercial banks we examine is concentrated both in terms of size and industry exposure, and that therefore our findings are not a recommendation for an investment strategy. However, we consider our evidence to be a valuable contribution in providing industry-specific quantitative ESG insights.

Materiality guidance can be helpful both for investors in improving the informativeness of ESG data, and for commercial banks in providing a prioritisation framework for ESG issues. Given the importance of these ESG factors to a company's financial performance, efforts to improve the ESG data landscape need to come from all actors. In this regard, the work of standards setting bodies the SASB or the Global Reporting Initiative is extremely valuable.

Our paper opens up many opportunities for further research:

- One key area of inquiry is better establishing the evidence regarding the influence of material and immaterial ESG issues on financial performance of commercial banks. Our study is only a first step.
- Another area of inquiry is a better understanding as to how ESG issues have an impact on financial performance.
- A third area of inquiry involves taking a dynamic perspective and trying to understand how ESG issues move from immaterial to material and in which time frame.
- Related to this, further research is needed to understand the increasing gap between banks performing well on material issues and immaterial issues after 2014:
  - Is it a case of capital markets becoming more informed about the effect of ESG performance and, as a result, pricing sustainability efforts better?
  - Is it a case of better ESG data availability driving our framework's results?
  - Or are customers, motivated by an increasing preference for sustainable products and services, choosing their bank based on its ESG and broader sustainability practices?

7. About the authors

Sakis Kotsantonis
Managing Partner, KKS Advisors
sakis@kksadvisors.com

Vittoria Bufalari
Associate, KKS Advisors
vittoria.bufalari@kksadvisors.com

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8. Research supporters

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Global Alliance for Banking on Values (GABV) is a network of banking leaders from around the world committed to advancing positive change in the banking sector. Our collective goal is to change the banking system so that it is more transparent, supports economic, social and environmental sustainability, and is composed of a diverse range of banking institutions serving the real economy.

David Korslund
Senior Advisor (retired)
davidkorslund@gabv.org

Adriana Kocornik-Mina
Metrics and Research Senior Manager
adriana.kocornik@gabv.org

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Hakan Lucius
Head, Corporate Responsibility and Civil Society
h.lucius@eib.org

Georges Gloukoviezoff
Officer, Corporate Responsibility and Civil Society
g.gloukoviezoff@eib.org

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Richard Kibble
Partner and Head of Strategy
Financial Services Consulting
rkibble@deloitte.co.uk

Sam Baker
Partner and Head of Purpose
Consulting
sambaker@deloitte.co.uk

9. Appendix: List of banks

Al Rajhi Banking and Investment Corporation
Australia and New Zealand Banking Group Ltd
Axis Bank Limited
Banco Bilbao Vizcaya Argentaria, S.A.
Banco Bradesco S.A.
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Banco Santander (Brasil) S.A.
Banco Santander, S.A.
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Bank of China Limited
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Bank of Montreal
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Canadian Imperial Bank of Commerce
Capital One Financial Corporation
China CITIC Bank Corporation Limited
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China Merchants Bank Co., Ltd.
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Citigroup Inc.
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Global Alliance for Banking on Values (GABV)

Mauritskade 63
1092 AD Amsterdam
The Netherlands
T +31 (0) 30 694 30 62
E mail@gabv.org
www.gabv.org

#bankingonvalues

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McKinsey Sustainability

Innovating to net zero: An executive's guide to climate technology

Advanced technologies are critical to stopping climate change—and the drive to develop and scale them is accelerating. Here are five themes that could attract $2 trillion of annual investment by 2025.

by Tom Hellstern, Kimberly Henderson, Sean Kane, and Matt Rogers

Illustration by Sinelab

October 2021

New technologies represent a critical part of the world's decarbonization tool kit—and the world does not yet have all the technologies that it would need to solve the net-zero equation by balancing sources and sinks of greenhouse-gas (GHG) emissions. The good news: McKinsey research on Europe's net-zero pathway suggests that climate technologies that are already mature could, if deployed widely, deliver about 60 percent of the emissions abatement that will be needed to stabilize the climate by 2050. The challenge is that further abatement must come from climate technologies that aren't quite ready, including 25 to 30 percent from technologies that are demonstrated but not yet mature and another 10 to 15 percent from those still in R&D.

This need for innovation makes the pace of decarbonization difficult to predict. When, for example, will clean hydrogen cost $1 per kilogram: in 2025 or 2050? The answer will affect the speed at which industries from aviation to steel can decarbonize. Similarly, unless manufacturers of utility-scale batteries can make them at low cost, power producers will have to keep running fossil fleets to cope with the intermittency of renewables. Uncertainty about the availability of financing for innovation limits capital formation and slows scale-up. Integrating most climate technologies into existing infrastructure, hardware, software, and operational systems will be complicated, too.

Yet there are reasons to be optimistic. Recent history suggests that researchers and businesses can deliver the necessary advances and cost reductions (see sidebar, "Charting cost reductions for climate technologies"). Over the past decade, the cost of some renewable-energy projects came down by almost 90 percent, as did the costs of electric-vehicle (EV) batteries, LED lighting, and other energy-efficient hardware. Capital is increasingly plentiful, evidenced by the revaluation of cleantech stocks that began in June 2020, and by the growth in investments earmarked for sustainability and environmental, social, and corporate governance (ESG) objectives. Governments are lending strong fiscal support to low-carbon innovation. Pledges from big companies not only to cut emissions but also to decarbonize operations and product lines—to buy only renewable fuel or make only EVs—give confidence to entrepreneurs and their backers. Talk of regulatory mandates lends weight to these demand signals.

Charting cost reductions for climate technologies

Absent incentives, climate technologies must compete with high-emissions technologies based on cost, efficiency, performance, and other attributes unrelated to their environmental benefits. Of these, high cost can be a significant barrier to widespread uptake—but not a permanent barrier. If demand for climate technologies is sustained over time, then manufacturers can create production efficiencies that allow them to reduce costs (exhibit).

For example, solar-power generation achieved cost parity with coal power in 2013 and gas power in 2015[1]—after more than 30 years of research and investment, during which solar-module costs fell by about 98 percent and about $270 million worth of panels were deployed. Analysis suggests that the cost reductions occurred in two phases, each of which saw cost declines of about 85 percent in the cost of solar modules. During the first phase, between 1980 and 2000, R&D investments accounted for the majority of cost reductions, and deployments of solar modules were relatively small (about $15 billion). Then, from 2000 to 2014, governments offered incentives, via mechanisms such as feed-in tariffs and renewable portfolio standards, that encouraged utilities and other organizations to buy and install solar systems. Roughly $255 billion of solar modules were sold over this time frame, with economies of scale and "learning by doing" in manufacturing accounting for the majority of cost reductions.[2]

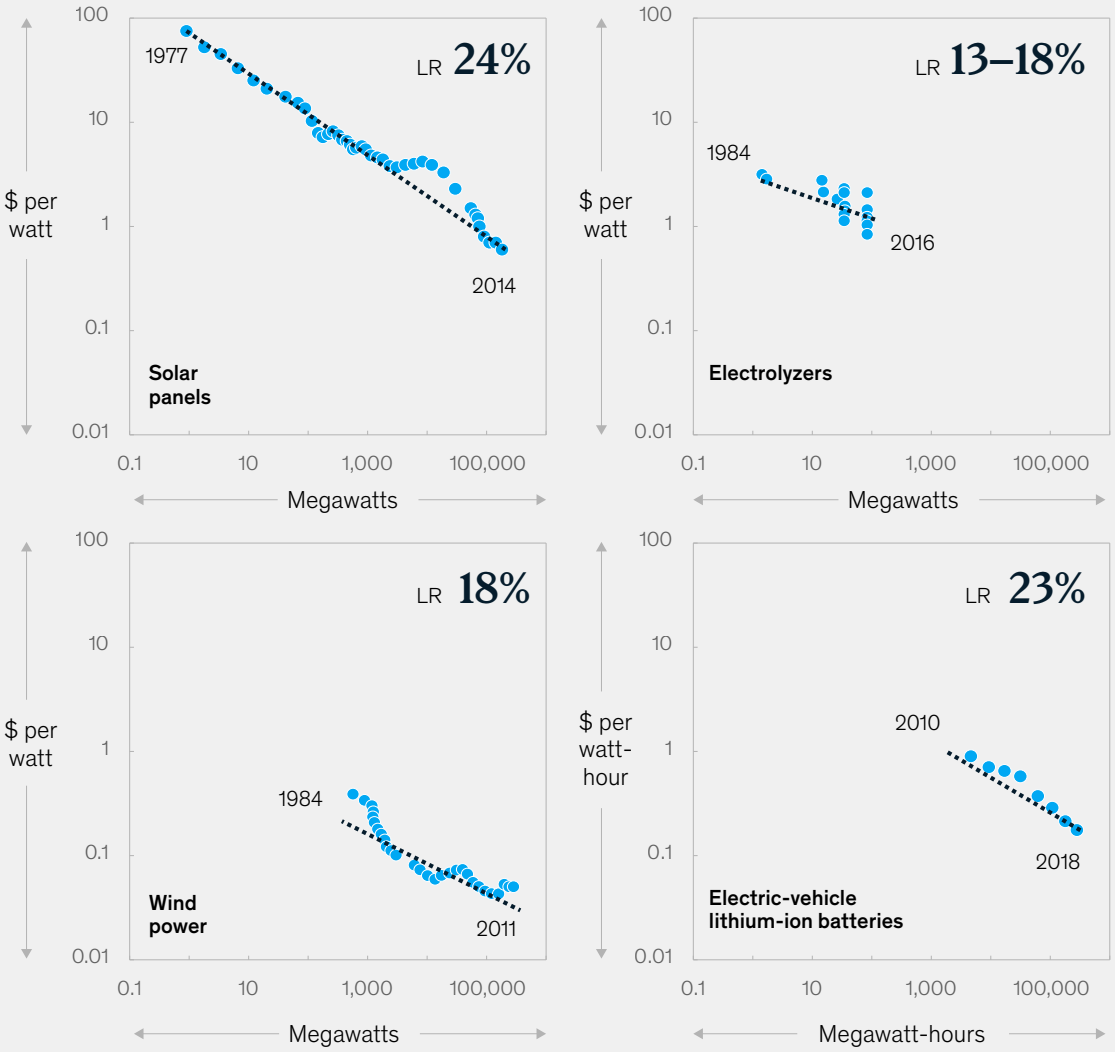
[1] *Levelized cost of energy, levelized cost of storage, and levelized cost of hydrogen*, Lazard, October 19, 2020, lazard.com.
[2] Goksin Kavlak, James McNerney, and Jessika E. Trancik, "Evaluating the causes of cost reduction in photovoltaic modules," *Energy Policy*, December 2018, Volume 123, pp. 700–10, sciencedirect.com; Amro M. Elshurafa, Shahad R. Albardi, Simona Bigerna, and Carlo Andrea Bollino, "Estimating the learning curve of solar PV balance–of–system for over 20 countries: Implications and policy recommendations," *Journal of Cleaner Production*, September 20, 2018, Volume 196, pp. 122–34, sciencedirect.com; Arvydas Lebedys et al., *Renewable energy statistics 2021*, International Renewable Energy Agency, March 2021, irena.org.

Charting cost reductions for climate technologies (continued)

Exhibit

The unit costs of some renewable-energy technologies have fallen by more than 10 percent a year, as production has scaled up.

Learning rate (LR) for renewable-energy technologies,[1] logarithmic scales



[1]The learning rate measures the fractional reduction in cost that occurs with a doubling of cumulative installed capacity. Costs include manufacturing costs only.
Source: Avicenne; Benchmark Mineral Intelligence; BloombergNEF; Gunther Glenk et al., "Economics of converting renewable power to hydrogen," *Nature Energy*, 2019, Vol 4, pp. 216–22, nature.com; Goksin Kavlak et al., "Evaluating the causes of cost reduction in photovoltaic modules," *Energy Policy*, 2018, Vol 123, pp. 700–10, journals.elsevier.com; International Energy Agency, *World Energy Outlook 2019*; US Energy Administration; McKinsey Center for Future Mobility

And, again, the need for climate technology is vast—which creates large potential markets and investment opportunities. Our estimates suggest that next-generation technologies could attract $1.5 trillion to $2 trillion of capital investment per year by 2025.[1] To enter these markets and navigate them successfully, established companies, start-ups, and investors will need a nuanced and ever-evolving understanding of technical advances, customer demands and commitments, and policy environments. In this article, we lay out five areas with considerable promise, along with potential obstacles along the path to scale (Exhibit 1):

— electrifying *transportation, buildings, and industry*

— launching the next green revolution in *agriculture*

— remaking the *power grid* to supply clean electricity

— delivering on the promise of *hydrogen*

— expanding *carbon capture*, use, and storage

Electrifying transportation, buildings, and industry

Coal, oil, and gas have been the main fuels used to power buildings, industrial machines, and vehicles since the early 20th century. Getting to net-zero emissions will require electrifying most equipment and processes that now run on hydrocarbons and converting the electric-power system to renewable sources (see the next section). Many forms of electric gear, from EV batteries to heat pumps to industrial furnaces, remain expensive. Further innovation will be needed to reduce costs and increase uptake of the electric hardware that will drive a net-zero society.

Better EV batteries. Electrifying transportation requires cutting the cost of batteries, which can account for as much as half the cost of an EV. However, the lithium-ion batteries that are most common in EVs may never fall below the critical threshold of $100 per kilowatt-hour. To boost energy density and cut costs, battery chemistry will have to improve. Companies are working on anodes with high silicon content, which represent the next frontier. Beyond that, innovations in solid-state, gel, and foam electrolytes would turn ultra-high-capacity lithium metal anodes from a concept into a reality, and one that is safer than today's battery technology.

Battery-control software. Hardware improvements aren't the only route to better batteries. Software control systems can also help, and even make up for shortfalls in chemistry. They can shorten charging times: imagine recharging an EV with a 300-mile range in ten minutes or less, instead of one hour at a supercharger or overnight on most home systems. They can prolong battery lives enough to match the life of the vehicle. And they could give EVs added pickup or hauling or towing capacity.

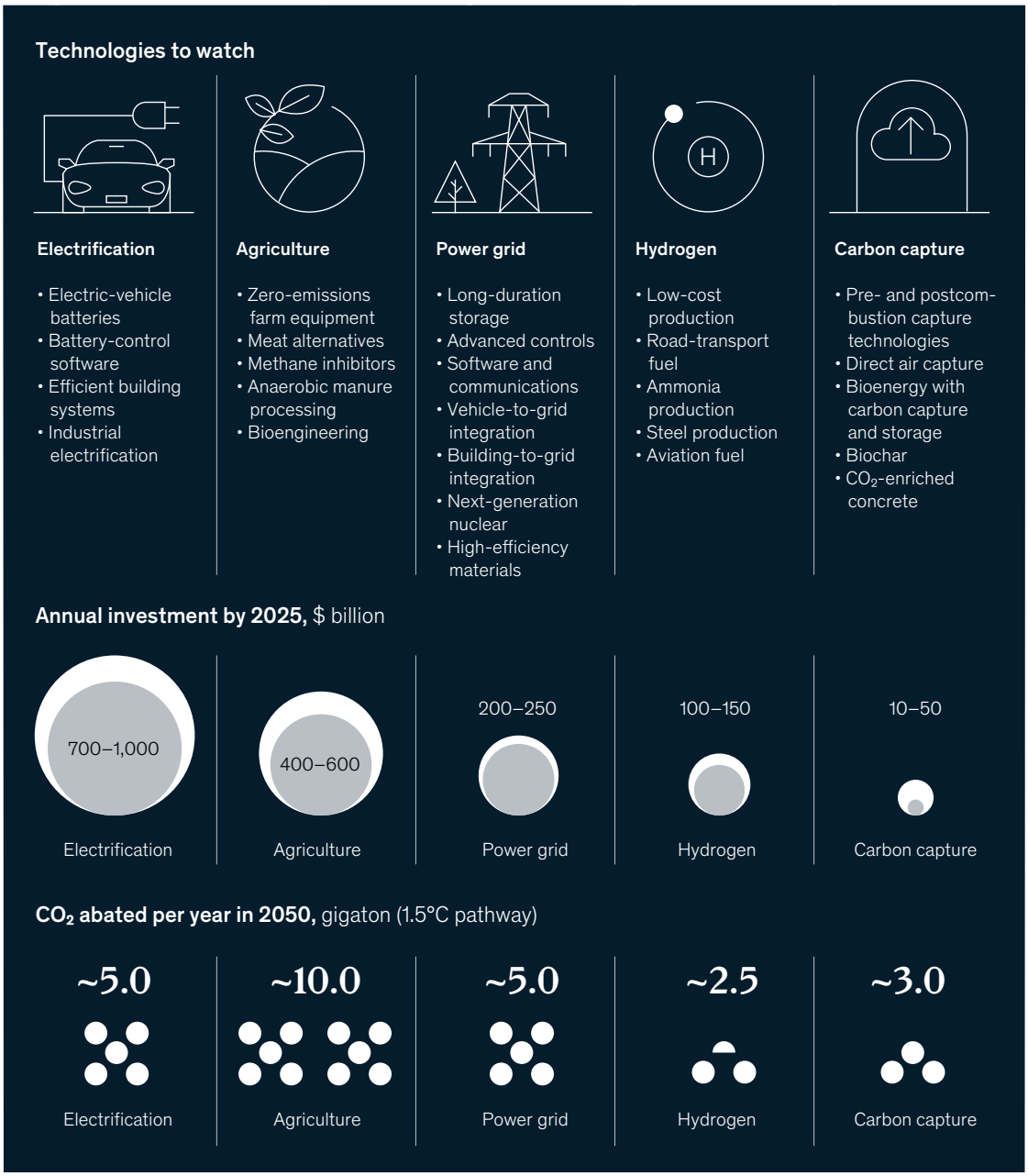
$700 billion–$1 trillion investment by 2025

5 $GtCO_2e$ abatement by 2050

[1] The estimates of annual capital investment were developed using McKinsey's suite of decarbonization and energy modeling tools, which include the Global Energy Perspective (*Global energy perspective 2021*, January 2021, McKinsey.com), Hydrogen Insights, Power Solutions, and our 1.5°C scenario (Kimberly Henderson, Dickon Pinner, Matt Rogers, Bram Smeets, Christer Tryggestad, and Daniela Vargas, "Climate math: What a 1.5-degree pathway would take," *McKinsey Quarterly*, April 30, 2020, McKinsey.com). Estimates of emissions-abatement potential are sized assuming that net-zero emissions are achieved in 2050, based on McKinsey's 1.5°C scenario. These include only the abatement that can be directly or indirectly attributed to climate technologies discussed in this article.

Exhibit 1

Five groups of technologies could attract $2 trillion of capital per year by 2025 and abate 40 percent of greenhouse-gas emissions by 2050.



Efficient building systems. Buildings account for about 7 percent of global CO_2 emissions. Cutting those emissions would require making buildings more energy efficient with technologies such as LED lighting, high-efficiency HVAC, and energy controls. But efficiency alone isn't enough. Buildings, like vehicles, have to go electric. Using heat pumps to keep buildings warm, instead of traditional boilers and furnaces, could cut global CO_2 emissions by 3 gigatons per year if implemented worldwide. Today's models are 2.2 to 4.5 times more efficient than gas furnaces, and recent advances, such as multiple or variable-speed compressors, let heat pumps work in cold conditions that once caused problems. Heat pumps do remain expensive, so cost declines, especially for air-source heat pumps, would likely have to happen before they are used widely.[2] In addition, energy-reactive windows and those with embedded solar cells could enable buildings to generate all the power they need.

Industrial electrification. As prices of renewable electricity and electric equipment drop, industrial companies could lower costs and emissions by electrifying their operations. The opportunity appears large. Industrial sectors such as cement, chemicals, and steel together consume more energy than other sectors (such as electric power and transportation), and only 20 percent of that energy is electricity. What's more, electrical equipment is less costly and more reliable for many industrial applications, though not all. Electric furnaces, for example, can make heat up to 350°C, but not the high heat of up to 1,000°C that many industrial processes need. Innovation will be needed to address these gaps. There is also the question of how to finance industrial electrification. Replacing long-lived equipment early can mean writing it off, and industrial products tend to have tight profit margins, which can discourage companies from making big capital outlays. New financial mechanisms could help companies cover the up-front cost of electric equipment even with the long payback period.

Launching the next green revolution in agriculture

Agriculture accounts for about 20 percent of global GHG emissions. The most significant GHG from agriculture is methane, which has many times the warming power of CO_2. Reducing methane emissions from agriculture (and other sources) would require major changes to how society farms, eats, manages supplies and waste, and stewards cropland and forests. Many of the changes would be enabled by climate technologies, some of which are relatively mature while others need further development.

$400 billion–$600 billion investment by 2025

10 $GtCO_2e$ abatement by 2050

Bringing these technologies to the more than two billion people who work in agriculture will be one of the most difficult tasks on any path to 1.5°C of warming, requiring cost reductions, assistance programs, and infrastructure (such as distributed clean energy). These developments would amount to a new green revolution, one with the potential to surpass the gains that were realized as efficient farming practices were applied widely in the 1960s. These are some of the technologies that could decarbonize agriculture.

[2] Michael Gartman and Amar Shah, "Heat pumps: A practical solution for cold climates," Rocky Mountain Institute, December 10, 2020, rmi.org.

Zero-emissions farm equipment. The largest amount of on-farm emissions abatement could be achieved by shifting from traditional fossil-fuel equipment and machinery—such as tractors, harvesters, and dryers—to their zero-emissions counterparts. The economic potential is significant: deployment of zero-emissions equipment could produce cost savings of $229 per ton of carbon dioxide equivalent (tCO_2e). Nevertheless, uptake of zero-emissions farm equipment and machinery is far behind that of EVs; most varieties are still in the proof-of-concept or prototype phases. Cost reductions and supportive financing would accelerate adoption.

Meat alternatives. Between one-quarter and one-third of global methane emissions are estimated to come from the digestive processes of cattle, sheep, and other ruminant animals. Those emissions will be difficult to abate unless consumers opt to change their diets. But some of the meat and dairy that people now eat could be healthfully, and cost-effectively, replaced with protein from crops such as legumes and pulses. This may require more land and different planting practices but could also reduce deforestation related to the clearing of land for pasture. Lab technology also points toward meat substitutes. Some are plant-based: Beyond Meat and Impossible Foods are two of the leading names in the field. Cultivated meats—those grown in bioreactors from animal cells—are also advancing. McKinsey research suggests that this could become a $25 billion global industry by 2030.

Methane inhibitors. Companies are developing feed supplements and substitutes that inhibit methane production by altering an animal's digestive processes. Trials have shown that these can reduce methane production by 30 to 50 percent. Propionate precursors—a class of free acids or salts, such as sodium acrylate or sodium fumarate—have been shown to inhibit methane emissions from cattle without affecting animals' growth, and one of these has entered the EU approval process.

Anaerobic manure processing. Manure from cattle and hogs can release significant amounts of methane. Processing manure in anaerobic digesters can cut emissions and also generate biogas, a renewable form of natural gas that can be used on farms, sold to the grid, or fed into production of "gold hydrogen." Such digesters are now used, though not widely, to control odor and pathogens. But companies are partnering with agriculture and landfill sites to produce biogas for various purposes, such as making compressed natural gas, which counts as a transport fuel under California's low-carbon fuel standard.

Bioengineering. Bioengineering advances agricultural productivity and carbon sequestration and thereby lowers the sector's emissions. Promising technologies include editing of plant genes to promote disease resistance and manage the soil microbiome.

Remaking the power grid to deliver clean electricity

Almost everywhere, power grids are old, inefficient, unreliable—and carbon-intensive. They are nowhere near ready to handle the doubling of electricity demand that could take place by 2050 as electrification happens, let alone prevent a commensurate increase in carbon emissions. Modernizing and decarbonizing the grid involves three main tasks. One is speeding the installation of renewable-generation capacity; to achieve a 1.5°C pathway, we estimate that the global installation rate would need to increase from 3 gigawatts per week to 15 to 18 gigawatts. Another task is adding energy-storage capacity to manage the intermittency of solar and wind. Last is upgrading the transmission and distribution network to accommodate more front-of-the-meter and behind-the-meter assets.

$200 billion–$250 billion investment by 2025

5 $GtCO_2e$ abatement by 2050

Few utilities are known as risk takers. For the most part, they are set up—and required by regulators—to deploy proven, mature technologies. These tendencies present limitations. But if innovators and grid operators work together (for example, on accelerating the scale-up of long-duration storage) and regulators send helpful signals (for example, by defining mechanisms to reward providers of battery storage and other services that help deal with intermittency), then the following technologies could help create a zero-carbon grid.

Long-duration storage. Even with falling solar and wind costs, as well as cheaper lithium-ion batteries, the intermittency of renewables makes these technologies impractical as the sole source of grid power. A solution is long-duration energy storage, which can store enough power to supply a network for two weeks or more (a typical period of limited renewable generation in many markets). In comparison, lithium-ion batteries can provide backup power cost-effectively for only four hours. At a levelized cost[3] of less than $20 per kilowatt-hour, long-duration storage would make 100 percent renewable systems cost-competitive in US states with ample wind and solar resources. Storage costs of $150 per kilowatt-hour would allow very high wind and solar penetration, provided that power systems also include strong demand-side management, backup gas turbines, or more integration of regional transmission networks.[4] Multiple storage technologies are emerging, including power-to-gas, flow batteries, and compressed or liquefied air. Big and small companies are active in this market, and start-ups are pioneering more advanced options such as mechanical systems and modular pumped hydro.

Advanced controls. Today, grid utilization tends to average below 50 percent because the grid is built for times of peak demand and its performance worsens in extreme heat or cold. As more renewables and storage systems are deployed at the grid edge, in homes and commercial sites, they will make power grids more complicated to operate. Resilience, flexibility, safety, and efficiency can be improved with technologies such as solid-state transformers, advanced flexible AC controllers that allow more controlled grid flow, and high-voltage DC technologies for data centers.

Software and communications. Traditional electrical grids use idling power plants to maintain grid balance. These so-called spinning reserves are expensive to run but can respond quickly when demand fluctuates. Modern electric grids would rely on ultrafast communications to maintain grid balance by managing every device on the network. Software-defined inertial substitution (to maintain grid balance when there are fewer spinning reserves), advanced "volt-var" management (to maintain proper voltage over long transmission lines or in highly congested urban markets), and network-wide instrumentation for condition monitoring and fault isolation would help utilities spot issues and prevent interruptions. Distributed energy-management software can coordinate all these elements. Digitized grids will require better cybersecurity protection.

Vehicle-to-grid integration. As more drivers switch to EVs, the big batteries in their driveways and garages could be hooked up to the grid to provide energy-storage capacity. One million typical EVs would offer about 75 gigawatts of storage, hundreds of times more than today's single biggest utility-scale storage facility provides. Residential backup batteries add more. Accomplishing this integration requires technologies such as inverters that connect rooftop solar, wall batteries, EV batteries, and the grid, as well as fast chargers that buffer the grid from demand spikes while keeping EV batteries full.

Building-to-grid integration. As buildings' energy controls improve, the buildings can be dispatched to the grid—that is, used to supply power—in ways that improve system performance. Buildings with energy storage or cogeneration could feed power onto the grid when called for, producing income for their owners. And if a utility could reduce power demand slightly in a central business district by signaling buildings to turn down lights, it could cope with demand spikes less expensively than by turning on a gas peaker plant.

[3] The levelized cost of storage refers to the full cost, per kilowatt-hour, of setting up and running a battery-storage facility.
[4] Micah S. Ziegler et al., "Storage requirements and costs of shaping renewable energy toward grid decarbonization," *Joule*, September 18, 2019, Volume 3, Number 9, pp. 2134–53, cell.com.

Next-generation nuclear. Nuclear energy has an uneven history: from the 1950s' promise of "too cheap to meter" energy to construction-cost overruns in the 1970s to post-Fukushima fears. Now, the push to decarbonize power has lent new appeal to nuclear generation, which is emissions-free. Emerging technologies include the sodium-cooled, molten salt, and helium-cooled reactors known as "GenIV"; small, sealed, modular, factory-built reactors; and fusion energy, an area where new start-ups are pushing costs down and timelines forward to prototype devices in the mid-2020s, ahead of government-backed research programs.

High-efficiency materials. Scientific advances could produce materials for a wide range of clean-energy applications. Solar cells made with perovskites, a special type of crystal, could outperform regular silicon solar cells—and cost less to make. Graphene, a single-atom-thick sheet of carbon, could revolutionize batteries (by enhancing conductivity and storage capacity), solar cells (by offering superior conductivity contacts with lower light blockage), and high-efficiency transmission lines to carry power from remote but productive renewable-generation sites.

Scaling up the use of hydrogen

Hydrogen could play a significant role in decarbonization, as a clean-energy carrier or fuel ingredient with many applications. High-energy density and zero-carbon combustion make hydrogen well suited to address the 30 percent of GHG emissions—across sectors as diverse as aviation and shipping, industry, buildings, and road transport—that would be hard to abate with electricity alone. Hydrogen could ultimately satisfy 15 to 20 percent of energy demand.

After a push in the early 2000s, innovation in hydrogen technologies stalled. Now it has new momentum. The Hydrogen Council identified 131 large-scale hydrogen projects announced between February and July 2021, bringing the total to more than 350. Direct investment in these projects, which would produce 11 million tons of hydrogen annually, is expected to top $130 billion.[5]

Hydrogen has a long way to go to fulfill its potential. An entire infrastructure of pipes and storage facilities would have to be built, at great expense. Europe is responding with a plan, the EU Hydrogen Backbone,[6] to link low-cost supply centers with European demand centers. Other technologies integral to the hydrogen economy include the following.

Low-cost production. If hydrogen could be made for less than $2 per kilogram in the European Union or $1 per kilogram in parts of the United States by 2030, major end uses would become economically viable. One production process is the electrolysis of water, whereby electricity is used to split water molecules into hydrogen and oxygen atoms. If electrolyzers run on renewable electricity, the resulting "green hydrogen" is carbon-free. (By comparison, "blue" hydrogen, made from natural gas, is carbon-intensive.) Estimates suggest that electrolyzer costs could fall 60 to 80 percent over the next decade.[7]

$100 billion–$150 billion investment by 2025

2.5 $GtCO_2e$ abatement by 2050

[5] *Hydrogen insights: Executive summary*, Hydrogen Council, July 2021, hydrogencouncil.com.
[6] *European Hydrogen Backbone: How a dedicated hydrogen infrastructure can be created*, Gas for Climate, July 2020, gasforclimate2050.eu.
[7] *Path to hydrogen competitiveness: A cost perspective*, Hydrogen Council, January 20, 2020, hydrogencouncil.com; *Green hydrogen cost reduction: Scaling up electrolysers to meet the 1.5°C climate goal*, International Renewable Energy Agency, 2020, irena.org.

Road-transport fuel. Hydrogen's higher energy density makes hydrogen fuel-cell electric vehicles (FCEVs) suitable for long-haul or heavy road transport. For FCEVs to be adopted widely, they would need to become less expensive, and fueling stations would need to be built.

Ammonia production. This is one of the most promising near-term uses for low-carbon hydrogen. Green ammonia, made with green hydrogen, should be the first variety to match the cost of conventional ammonia production. Hydrogen is also relatively straightforward to integrate in ammonia production, so less supporting infrastructure is required. And ammonia can be used as a fuel or as a "vector" for transporting hydrogen.

Steel production. The steel sector is one of the largest industrial emitters, producing about 7 to 9 percent of global emissions. The conventional blast furnace–basic oxygen furnace route for steel production emits approximately 1.8 tons of carbon per ton of steel. But using green hydrogen to power the direct reduction of iron as a feedstock for electric arc furnaces (which could also be powered by renewables) is one route to zero-carbon steel. Major steel producers in Europe are now piloting steel production with hydrogen.

Aviation fuel. As the travel industry recovers from the COVID-19 pandemic, air travel is expected to produce 3 percent of global carbon emissions. These emissions will be hard to abate until planes are made to fly on fuels other than petroleum-based jet fuel. The best near-term alternative, according to the Clean Skies for Tomorrow Coalition, may be sustainable aviation fuels made from renewable feedstocks such as agricultural biomass. Within the next decade, hydrogen could provide electric power for smaller aircraft equipped with fuel cells. Eventually, hydrogen could be used for combustion in larger planes.

Expanding carbon capture, use, and storage

Carbon capture, use, and storage (CCUS) is necessary to decarbonize hard-to-abate sectors and to remove CO_2 from the atmosphere (resulting in "negative emissions"). Presently, use of CCUS is minimal. Costs remain prohibitively high—typically $50 to $100 per ton of CO_2 (tCO_2)—and CCUS equipment consumes a lot of energy. Rollout of CCUS has generally stalled at second- or third-of-a-kind commercial-scale installations at coal or gas power plants, steel plants, and refineries.

$10 billion–$50 billion investment by 2025

3 $GtCO_2e$ abatement by 2050

Moreover, innovation has been slow. Many existing CCUS plants employ 30-year-old solvent-based technologies for postcombustion carbon capture. But new technologies are emerging. Further R&D would be needed to reduce costs, and additional incentives will likely be required to make CCUS financially viable at commercial scale. But if the full cost of CCUS were to fall below $50/$tCO_2$, it would make many applications economical. Here are some CCUS technologies that could help.

Pre- and postcombustion capture technologies. Precombustion technologies such as oxyfuel combustion represent promising ways to affordably capture CO_2 from point sources since they increase the concentration of CO_2 in flue gases. Development of new postcombustion technologies, such as

second-generation solvent formulations, sorbents, and membranes, is helping bring down the cost of capture. Companies, governments, philanthropy, venture-capital, and growth-equity firms have all helped finance improvements in capture technology.

Direct air capture (DAC). Withdrawing CO_2 from ambient air is difficult because air has, at most, one one-hundredth of the CO_2 concentration found in flue gases from industrial point sources. Nevertheless, DAC offers a way of removing CO_2 from the atmosphere—and the world is likely to need many different sources of negative emissions to achieve a 1.5°C pathway. To that end, several companies are investing in DAC, with the goal of achieving capture costs of \$100/tCO_2 to \$150/tCO_2 by 2030, 60 to 80 percent less than today's pilot projects. Low-cost DAC, coupled with low-cost hydrogen, could enable production of carbon-neutral e-fuels in the near to medium term.

Bioenergy with carbon capture and storage (BECCS). Many fossil-powered plants are nowhere near the end of their useful lives. Taking plants offline before they are due would burden utilities with stranded assets. But the value of these assets could be preserved by converting them to run on biomass, a renewable fuel. Adding CCS equipment to a bioenergy plant lets it produce negative emissions: biomass sequesters CO_2 as it grows, and when that biomass is burned, the CCS system keeps the CO_2 from entering the atmosphere.

Biochar. Biochar is a stable, charcoal-like material made by processing waste biomass such as crop residues through pyrolysis or gasification. Adding biochar to soil can improve soil health and agricultural productivity, opening the door for use in large-scale farming. This practice could sequester nearly 2 gigatons of CO_2 per year by 2050. Adoption rates will depend on the results of commercial-scale experiments over the next decade.

CO_2-enriched concrete. Concrete has two main components: cement, which is the "glue" that holds concrete together; and aggregate, such as sand or crushed stone, which gives concrete most of its mass. Both have heavy carbon footprints, but companies are working on solutions that would sequester CO_2 in concrete itself. Technologies for adding CO_2 as an ingredient in cement could reduce emissions by up to 70 percent and make cement stronger. Emerging processes might combine captured CO_2 with industrial-waste products such as fly ash, steel slag, and remediated cement to make artificial "rocks" for use in place of natural aggregate.

These climate technologies could contribute to solving the net-zero equation while creating growth potential for sectors and geographies. At present, the technologies exhibit varying levels of maturity, performance, market demand, and regulatory support. To bring them to commercial, climate-stabilizing scale would require companies, financial institutions, and governments to cooperate on investment and research programs as well as efforts to integrate technologies with existing industrial systems. This challenge is formidable, but the moment to devote creativity, capital, and conviction to addressing it is now.

Tom Hellstern is an associate partner in McKinsey's Seattle office, **Kimberly Henderson** is a partner in the Washington, DC, office, **Sean Kane** is a partner in the Southern California office, and **Matt Rogers** is a senior partner emeritus and a senior adviser in the San Francisco office.

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