

Panel Discussion: US Infrastructure Policy Agenda With A Focus On Environmental And Social Considerations



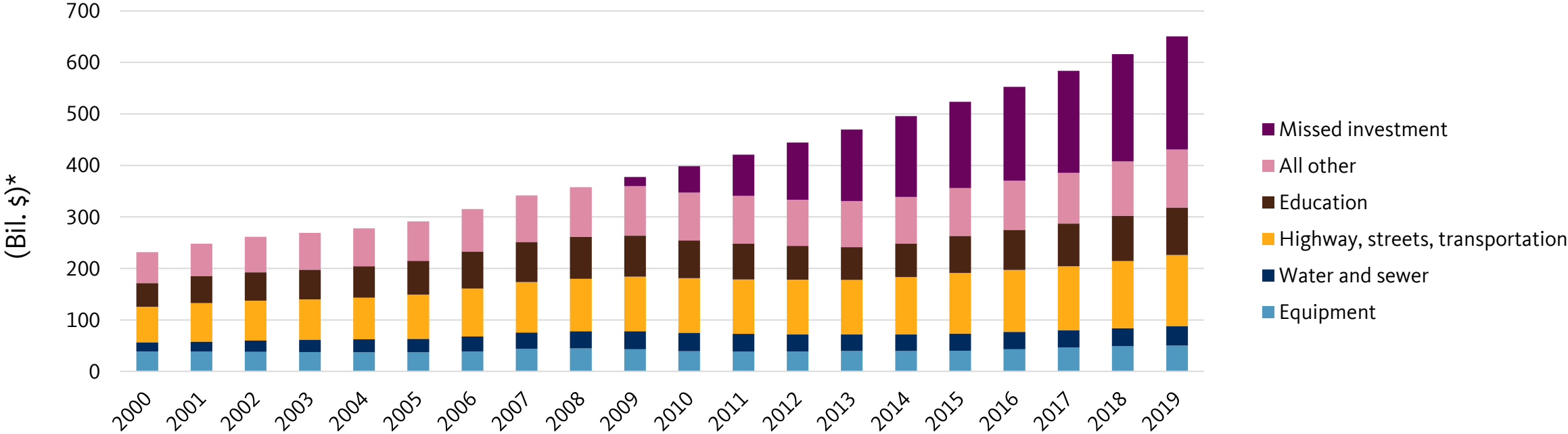
S&P Global
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Presenter: Trevor d'Olier-Lees, Senior Director
S&P Global Infrastructure Ratings
May 2022

Infrastructure After COVID-19: Risk Of Another Lost Decade Of U.S. State Government Capital Investment

U.S. State And Local Government Infrastructure Investment



*Billions of dollars, not seasonally adjusted. BEA defines investment as “the value of purchases of new fixed assets” and government fixed assets as equipment and structures owned by state and local government entities, including government enterprises, located in the U.S.
Sources: U.S. Bureau of Economic Analysis, Investment in Government Fixed Assets; S&P Global Ratings.

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How US Infrastructure Investment Would Boost Jobs, Productivity, And The Economy

What \$1 Trillion In Infrastructure Could Mean For The U.S. Economy Through 2030



A Bigger Pie

\$1.4 trillion more in U.S. economic activity through 2030



Crowding In

Businesses invest an additional \$1.7 trillion over 8 years



Extra Boost

Productivity boost lifts average potential growth to 2.1% from 2.0%



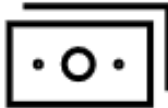
People At Work

883,600 jobs added by 2030. Unemployment rate falls 3.5 bps



Fatter Wallets

Per-capita disposable income widens by \$100.50 by 2030



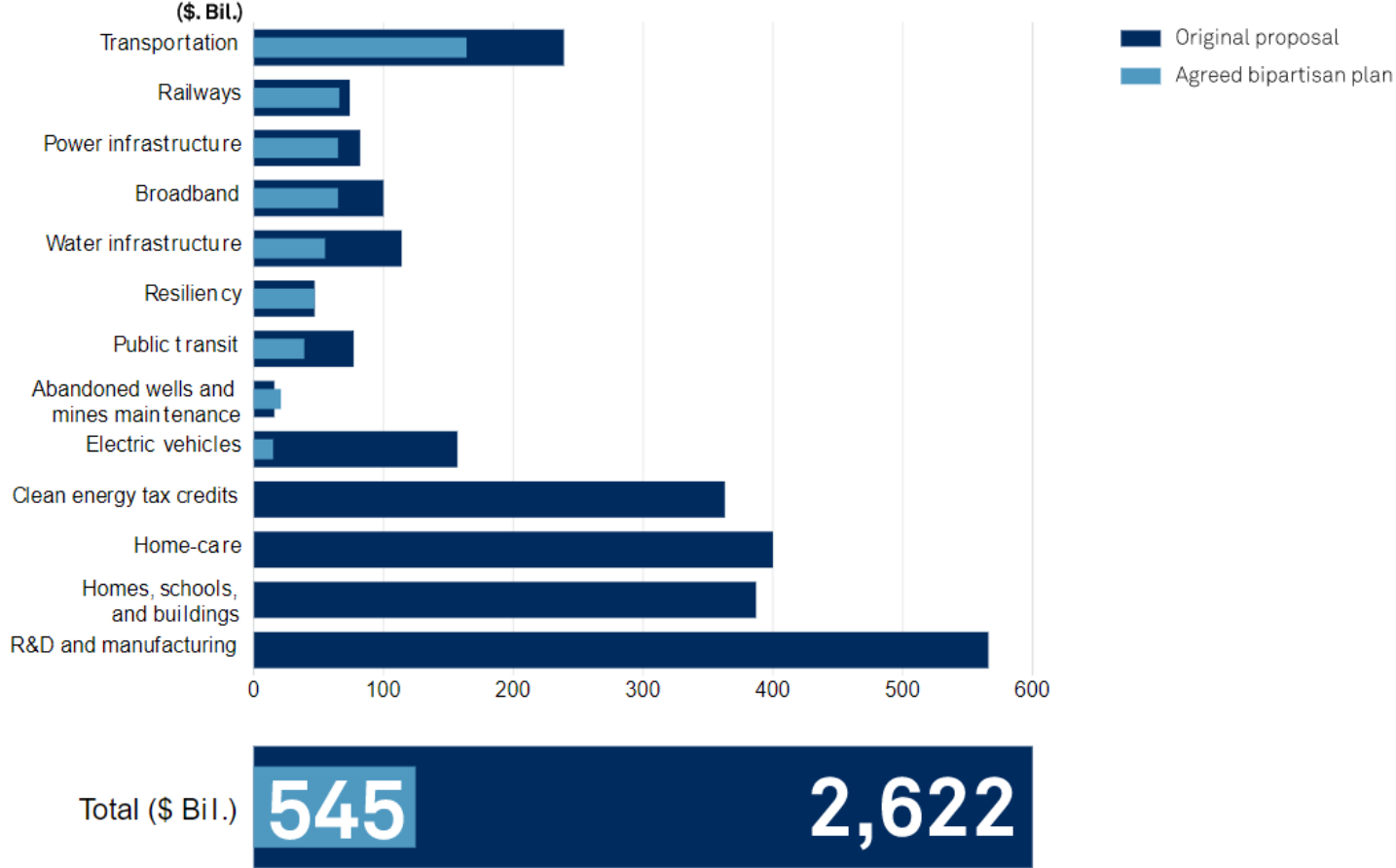
Money To Spend

Households spend an additional \$677 billion through 2030

Source: Oxford Economics, S&P Global Economics calculations.

Infrastructure Investment and Jobs Act

Net Difference Between Original Infrastructure Proposal And Agreed Bipartisan Plan

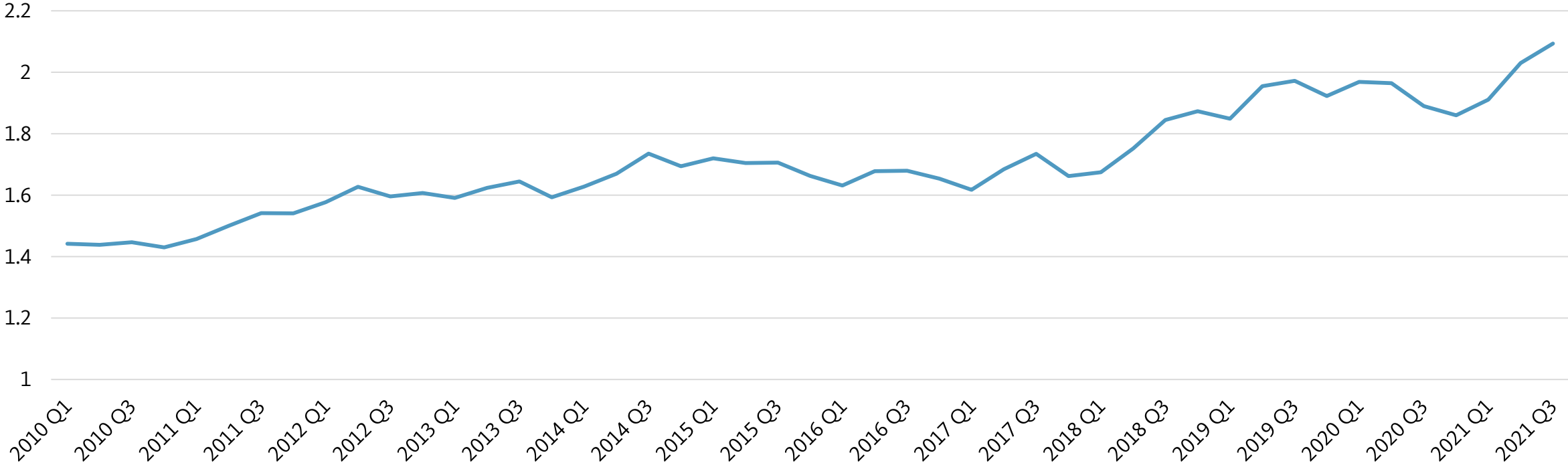


Source: S&P Global Ratings, Committee for a Responsible Federal Budget; White House.
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Construction Cost Inflation Weighs On U.S. Public Infrastructure Investment

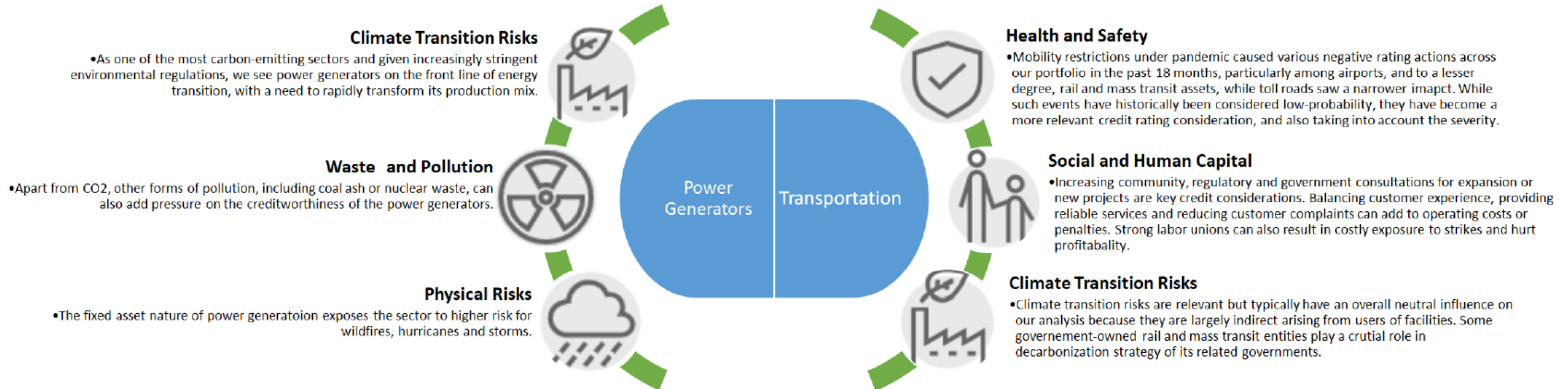
National Highway Construction Cost Index

First-quarter 2010 to third-quarter 2021



Source: U.S. Department of Transportation, Federal Highway Administration; 2003 Q1=100.
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Power Generation and Transportation Sectors ESG Factors



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U.S. Infrastructure and ESG

FIASI – ESG in Fixed Income

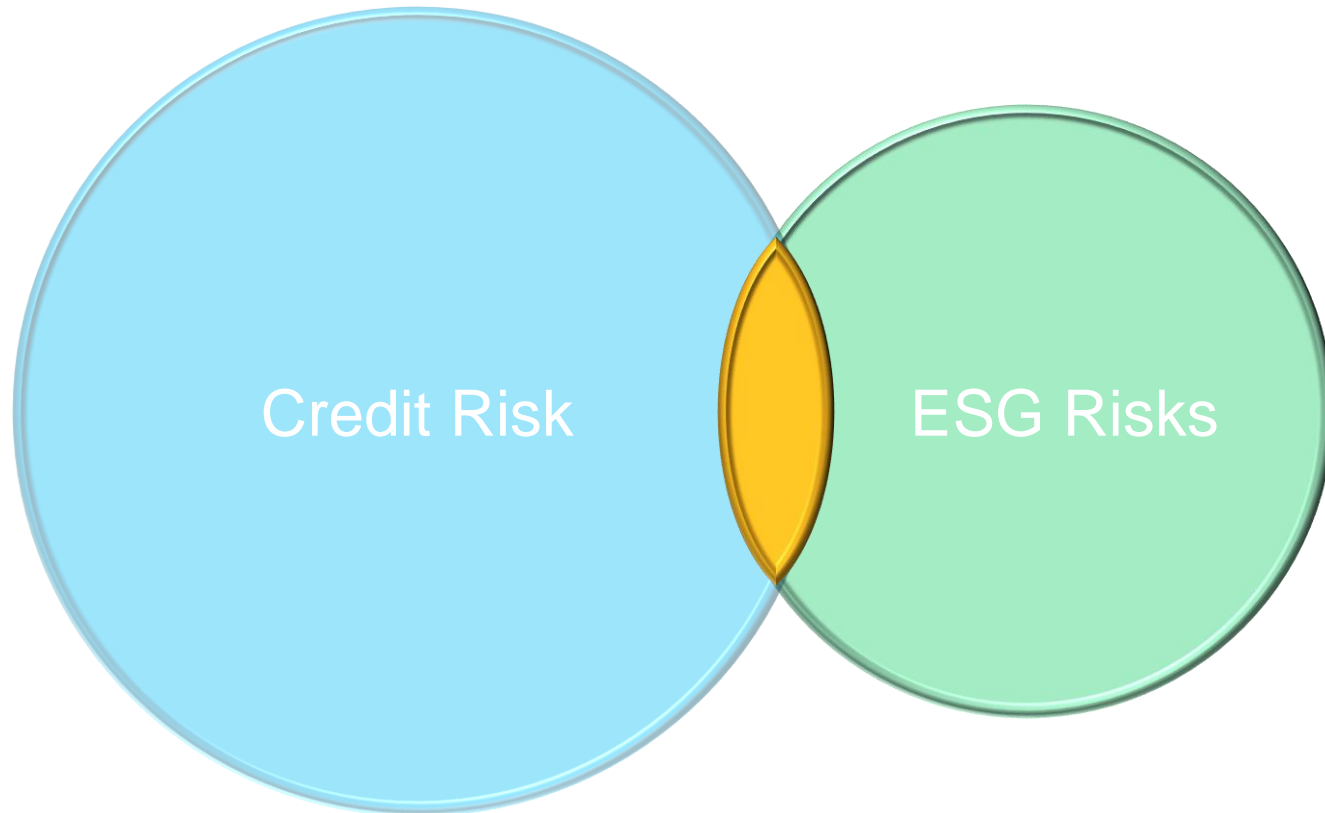
Emma Griffith, Senior Director, Fitch Ratings

May 19, 2022



How Does Fitch View ESG in Infrastructure?

ESG Relevance Scores: Intercept Between ESG and Credit Risk



- Which ESG risks are relevant for different industry sectors?
- Which specific ESG risks are relevant for each issuer's credit profile?
- Which ESG risks are having an impact in rating decisions for individual issuers?

Fitch ESG Relevance Score	Definition
5	Highly relevant, a key entity, transaction or program rating driver that has a significant impact on an individual basis.
4	Relevant to entity, transaction or program rating; not a key rating driver but has an impact on the ratings in combination with other factors.
3	Minimally relevant to ratings, either very low impact or actively mitigated in a way that results in no impact on the entity, transaction or program rating.
2	Irrelevant to the entity, transaction or program ratings; relevant to the sector.
1	Irrelevant to the entity, transaction or program ratings; irrelevant to the sector.

ESG and Credit Ratings

- Since 2015 investors have been calling on CRA's to systemically incorporate ESG characteristics into their credit ratings.
- Fitch's ESG Relevance Scores (ESG.RS) framework is designed to provide an integral, comprehensive and credit focused approach to displaying sector and issuer level ESG credit risks across all its ratings.
- ESG.RS do not assess "ESG performance", they are observations of whether ESG risks are relevant and material to credit rating decisions.
- Only a portion of ESG risks translate to credit risks, through a variety of transmission mechanisms.

ESG Navigator Example

Credit-Relevant ESG Derivation

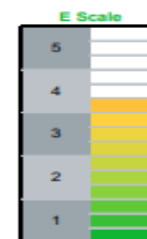
Rickenbacker Causeway (FL) has 1 ESG rating driver and 8 ESG potential rating drivers

- ➔ Rickenbacker Causeway (FL) has exposure to extreme weather events, resulting in loss of revenues, increased costs, and project construction delays which, in combination with other factors, impacts the rating.
- ➔ Rickenbacker Causeway (FL) has exposure to waste disposal; pollution incidents but this has very low impact on the rating.
- ➔ Rickenbacker Causeway (FL) has exposure to product affordability and access but this has very low impact on the rating.
- ➔ Rickenbacker Causeway (FL) has exposure to impact of labor negotiations and employee (dis)satisfaction; quality of contractors but this has very low impact on the rating.
- ➔ Rickenbacker Causeway (FL) has exposure to social resistance to major projects or operations that leads to delays and cost increases and/or unfavorable regulatory regimes but this has very low impact on the rating.
- ➔ Governance is minimally relevant to the rating and is not currently a driver.

				Overall ESG Scale	
key driver	0	Issues	5		
driver	1	Issues	4		
potential driver	8	Issues	3		
not a rating driver	5	Issues	2		
not a rating driver	0	Issues	1		

Environmental (E)

General Issues	E Score	Sector-Specific Issues	Reference
GHG Emissions & Air Quality	2	Emissions of assets or users	Operation Risk;Infrastructure Renewal Risk;Financial Profile
Energy Management	2	Energy consumption by assets or users	Operation Risk;Infrastructure Renewal Risk;Financial Profile
Water & Wastewater Management	2	Water use in operations	Operation Risk;Infrastructure Renewal Risk;Financial Profile
Waste & Hazardous Materials Management; Ecological Impacts	3	Waste disposal; pollution incidents	Operation Risk;Infrastructure Renewal Risk;Financial Profile
Exposure to Environmental Impacts	4	Exposure to extreme weather events, resulting in loss of revenues, increased costs, and project construction delays	Completion Risk;Revenue Risk;Operation Risk;Infrastructure Renewal Risk;Financial Profile



How to Read This Page

ESG scores range from 1 to 5 based on a 15-level color gradation. Red (5) is most relevant and green (1) is least relevant.

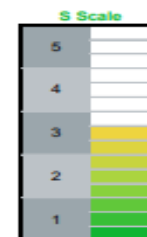
The Environmental (E), Social (S) and Governance (G) tables break out the individual components of the scale. The right-hand box shows the aggregate E, S, or G score. General Issues are relevant across all markets with Sector-Specific Issues unique to a particular industry group. Scores are assigned to each sector-specific issue. These scores signify the credit-relevance of the sector-specific issues to the issuer's overall credit rating. The Reference box highlights the factor(s) within which the corresponding ESG issues are captured in Fitch's credit analysis.

The Credit-Relevant ESG Derivation table shows the overall ESG score. This score signifies the credit relevance of combined E, S and G issues to the entity's credit rating. The three columns to the left of the overall ESG score summarize the issuer's sub-component ESG scores. The box on the far left identifies some of the main ESG issues that are drivers or potential drivers of the issuer's credit rating (corresponding with scores of 3, 4 or 5) and provides a brief explanation for the score.

Classification of ESG issues has been developed from Fitch's sector ratings criteria. The General Issues and Sector-Specific Issues draw on the classification standards published by the United Nations Principles for Responsible Investing (PRI) and the Sustainability Accounting Standards Board (SASB).

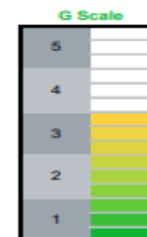
Social (S)

General Issues	S Score	Sector-Specific Issues	Reference
Human Rights, Community Relations, Access & Affordability	3	Product affordability and access	Revenue Risk;Infrastructure Renewal Risk;Financial Profile
Customer Welfare - Fair Messaging, Privacy & Data Security	2	User safety; data security	Operation Risk
Labor Relations & Practices	3	Impact of labor negotiations and employee (dis)satisfaction; quality of contractors	Operation Risk
Employee Wellbeing	2	Worker safety and accident prevention	Operation Risk
Exposure to Social Impacts	3	Social resistance to major projects or operations that leads to delays and cost increases and/or unfavorable regulatory regimes	Completion Risk;Revenue Risk;Infrastructure Renewal Risk



Governance (G)

General Issues	G Score	Sector-Specific Issues	Reference
Management Strategy	3	Operational implementation of strategy informed by sponsor strength/experience and ability to effectively manage risks; involvement of local parties	Structure and Information
Governance Structure	3	Board independence and effectiveness; ownership concentration; ring fencing	Structure and Information
Group Structure	3	Complexity, transparency and related-party transactions	Structure and Information
Financial Transparency	3	Quality and timeliness of financial disclosure; reliability, level of detail and scope of information (informed by data sources, use of expert reports)	Structure and Information



CREDIT-RELEVANT ESG SCALE	
How relevant are E, S and G issues to the overall credit rating?	
5	Highly relevant, a key rating driver that has a significant impact on the rating on an individual basis.
4	Relevant to rating, not a key rating driver but has an impact on the rating in combination with other factors.
3	Minimally relevant to rating, either very low impact or actively managed in a way that results in no impact on the entity rating.
2	Irrelevant to the entity rating but relevant to the sector.
1	Irrelevant to the entity rating and irrelevant to the sector.

Issuer Examples with Elevated ESG Relevance Scores

Environmental

- **AES Puerto Rico L.P., U.S.** has an ESG Relevance Score of '4' for Waste and Hazardous Materials Management due to exposure to waste disposal related to coal ash management and pollution incidents. This has a negative impact on the credit profile, and is relevant to the rating in conjunction with other factors.
- **Rickenbacker Causeway, U.S.** has an ESG Relevance Score of '4' for Exposure to Environmental Impacts due to the causeway's heightened exposure to extreme weather events in relation to rising sea levels, which has a negative impact on the credit profile, and is relevant to the rating in conjunction with other factors.
- **Port Commission of San Francisco, U.S.** has an ESG Relevance Score of '4' for Exposure to Environmental Impacts due to the port's significant unfunded capital needs including a significant seawall rehabilitation project and associated seismic upgrades, which are driven by the port's location along the perimeter of the City of San Francisco. This factor may potentially have a negative impact to the credit profile and is relevant to the rating in conjunction with other factors.

Social

- **Montreal Gateway Terminal, Canada's** ESG Relevance Score for Labor Relations and Practices has been revised to '4' from '3' to reflect the labor disruptions between the Maritime Employers Association and the Canadian Union of Public Employees which have negatively affected MGT's operations in both 2020 and 2021 and has a negative impact to the credit profile and is relevant to the rating in conjunction with other factors.
- **Port of Long Beach and Los Angeles Harbor Department** both have an ESG relevance score of '4' for Labor Relations and Practices due to follow-on impacts of labor relations between port tenants and longshoremen during periods of contract negotiations, which may potentially have a negative impact to the credit profile, and is relevant to the rating in conjunction with other factors.

Longer Term: Thinking About Environmental Impact

- Frequency, severity of stress is events increasing.
 - Superstorm Sandy; California wildfires; Texas winter storms; floods in Canada.
- Even medium risks can have considerable impact on revenue generation, and on operating + lifecycle costs.

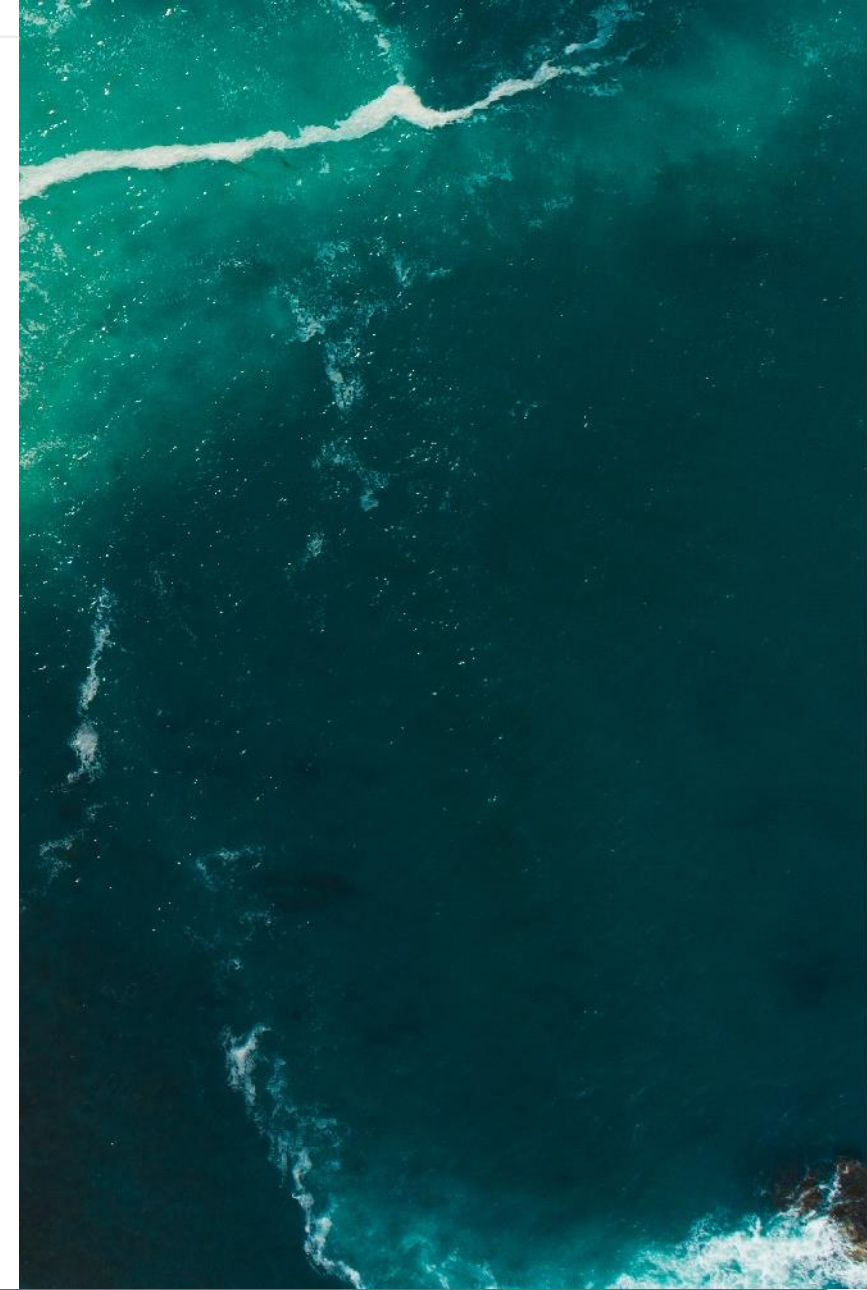
	Storms and Precipitation	Pluvial Floods	Agricultural and Ecological Droughts	Sea Level Rise	Landslide
Solar Plants	Medium Risk	Medium Risk	Low Risk	Low Risk	Low Risk
Wind Farms	High Risk	Medium Risk	Low Risk	Low Risk	Medium Risk
Hydro Plants	Low Risk	Low Risk	High Risk	Low Risk	Medium Risk
Thermal Plants	Low Risk	Medium Risk	Low Risk	Low Risk	Low Risk
Toll Roads	Medium Risk	Medium Risk	Low Risk	Medium Risk	Medium Risk
Airports	Medium Risk	Medium Risk	Low Risk	Medium Risk	Low Risk
Ports	Medium Risk	Medium Risk	Low Risk	High Risk	Low Risk

Source: Fitch

Note: These assessments are based on broad assumptions; project-specific assessments may vary considerably in the same sector or geographic region

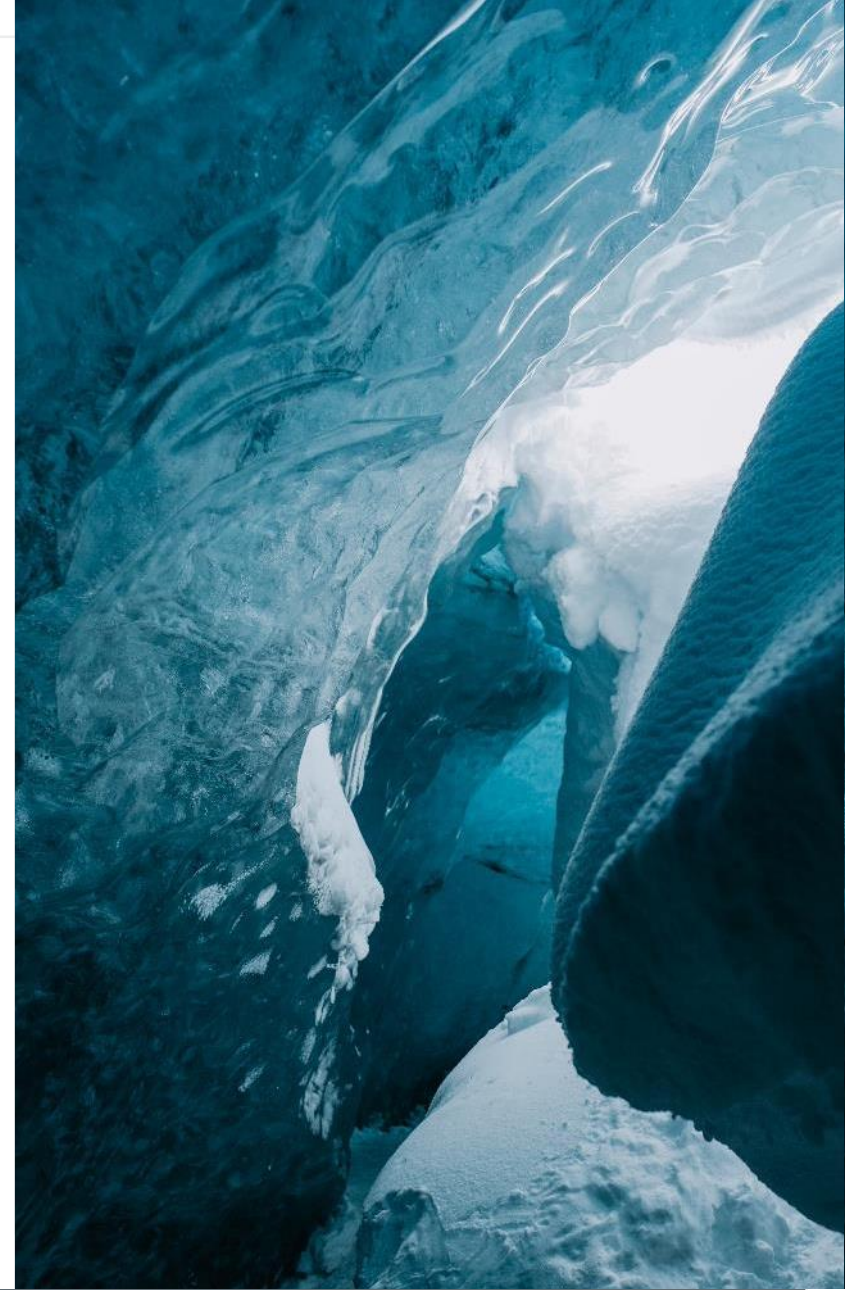
ESG Impact Across Infrastructure

- Severe weather and natural disasters are progressing beyond the realm of pure “event risk”.
- Thinking about assessments of the probability of occurrence, severity of impact.
- Need to address exposure broadly, not just the extreme examples.
- Management action to assess and plan to mitigate risk.



Project-Specific Considerations

- ESG topics as part of planning, design, construction and operation.
- Thinking about resilience: Balancing costs and benefits.
 - Existing facilities – Retrofitting existing infrastructure.
 - New facilities – New/more costly materials today, reducing long-term costs tomorrow.



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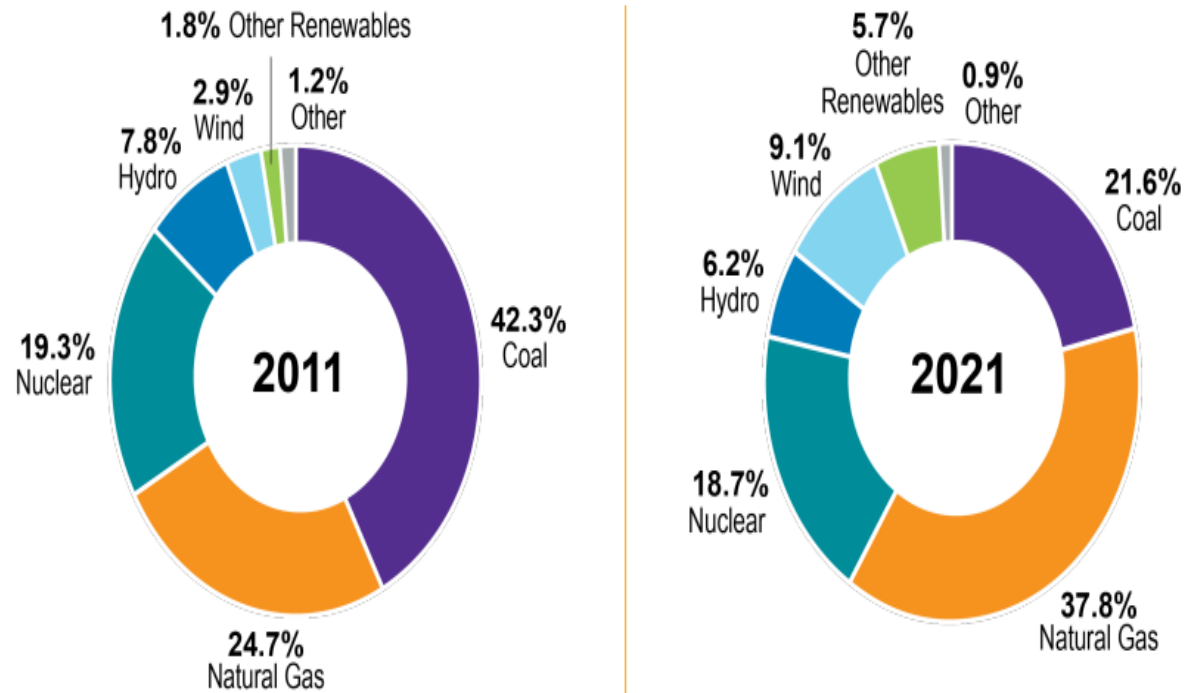
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Role of US Infrastructure Policy For Electric Utilities

Timothy M Winter, CFA

Net Zero Carbon & 100% Renewables

Transforming the Energy Mix

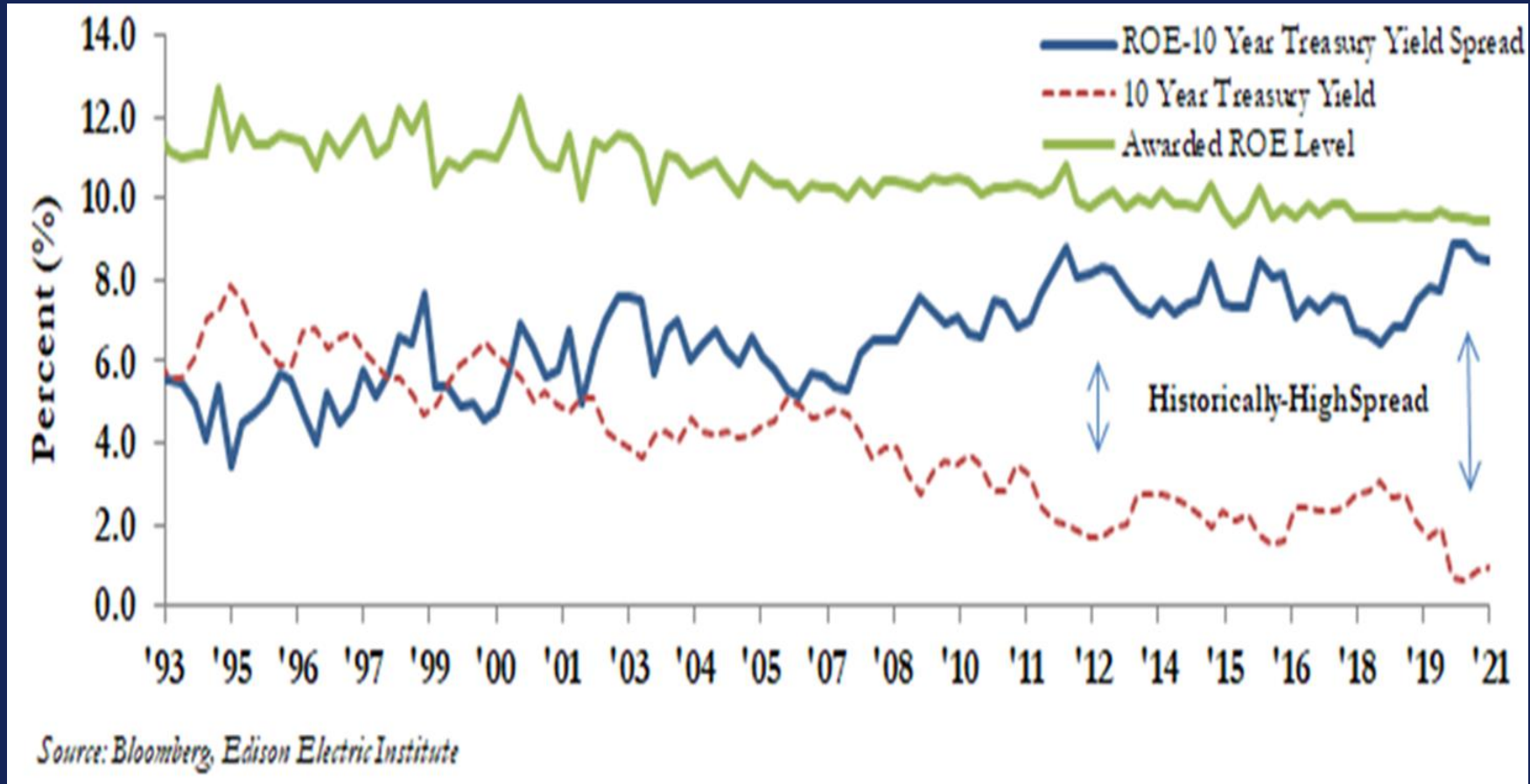


Note: "Other Renewables" includes universal (or large-scale) solar, private (or rooftop) solar, geothermal, and generation from biomass sources (agricultural waste, landfill gas recovery, municipal solid waste, wood, non-wood waste). Source: U.S. Department of Energy, Energy Information Administration.

Utilities Embrace Policy and Benefit

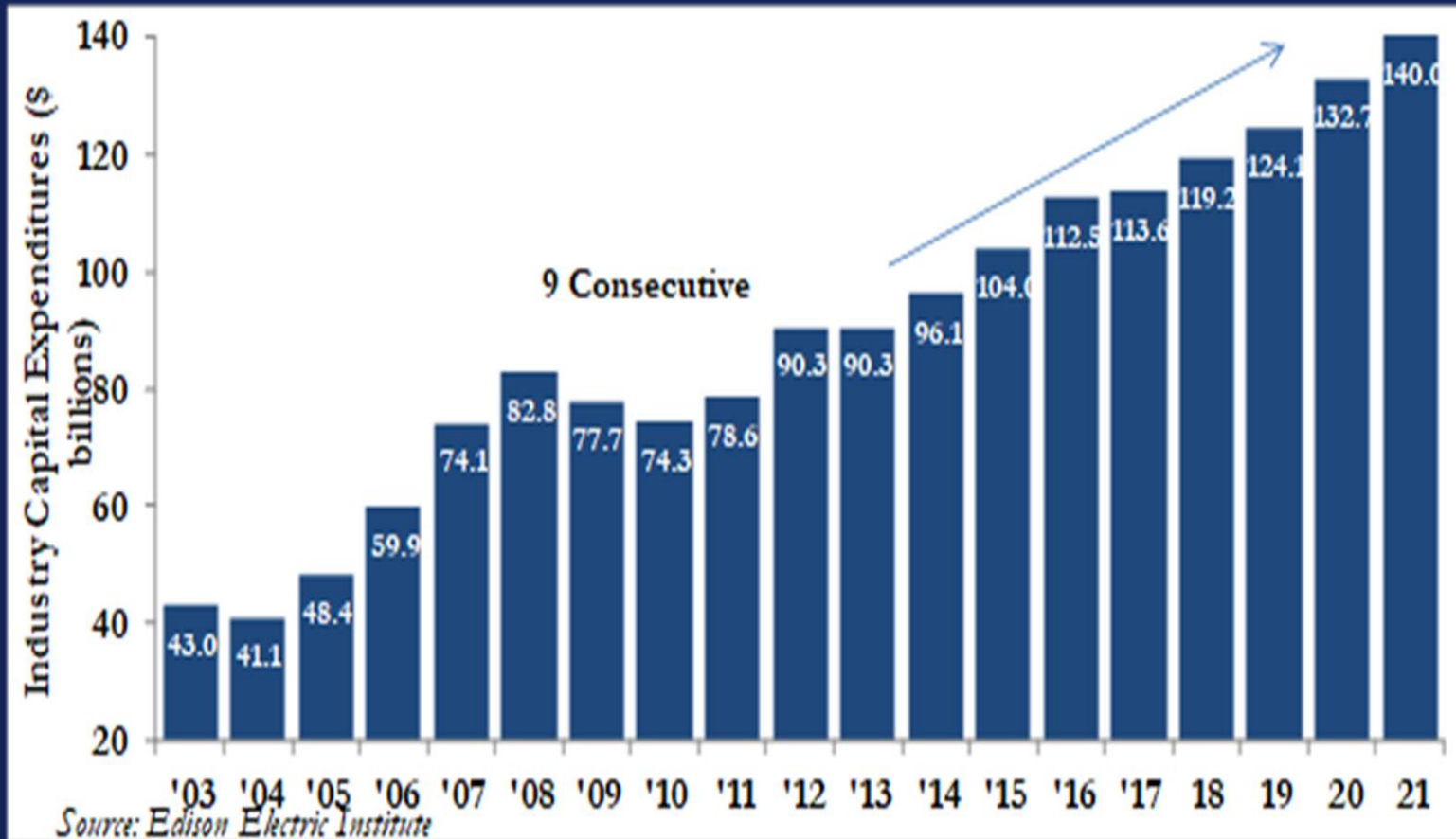
<u>Utility</u>	<u>Goal</u>	<u>Utility</u>	<u>Goal</u>
AVANGRID	100% carbon neutral by 2035	Idaho Power	100% clean energy by 2045
Avista	100% clean electricity by 2045	Madison Gas & Electric	Net-zero carbon electricity by 2050
CMS Energy	Net-zero CO2 emissions by 2050	National Grid	Net zero emissions by 2050
DTE Energy	Net-zero carbon emissions by 2050	Pinnacle West (APS)	100% carbon-free electricity by 2050
Dominion Energy	Net-zero CO2 and methane emissions by 2050	PNM Resources	100% carbon-free electricity by 2040
Duke Energy	Net-zero CO2 emissions by 2050	PSEG	Net-zero carbon emissions by 2050
Eversource Energy	Carbon neutral by 2030	Puget Sound Energy	100% clean electricity by 2045
Green Mountain Power	100% carbon-free electricity by 2025	Southern California Edison	Carbon neutrality by 2045
	100% renewable energy by 2030	Southern Company	Low-to-no carbon operations by 2050
Hawaiian Electric	100% renewable energy by 2045	Xcel Energy	Carbon-free electricity by 2050

Capital Investment Earns Returns



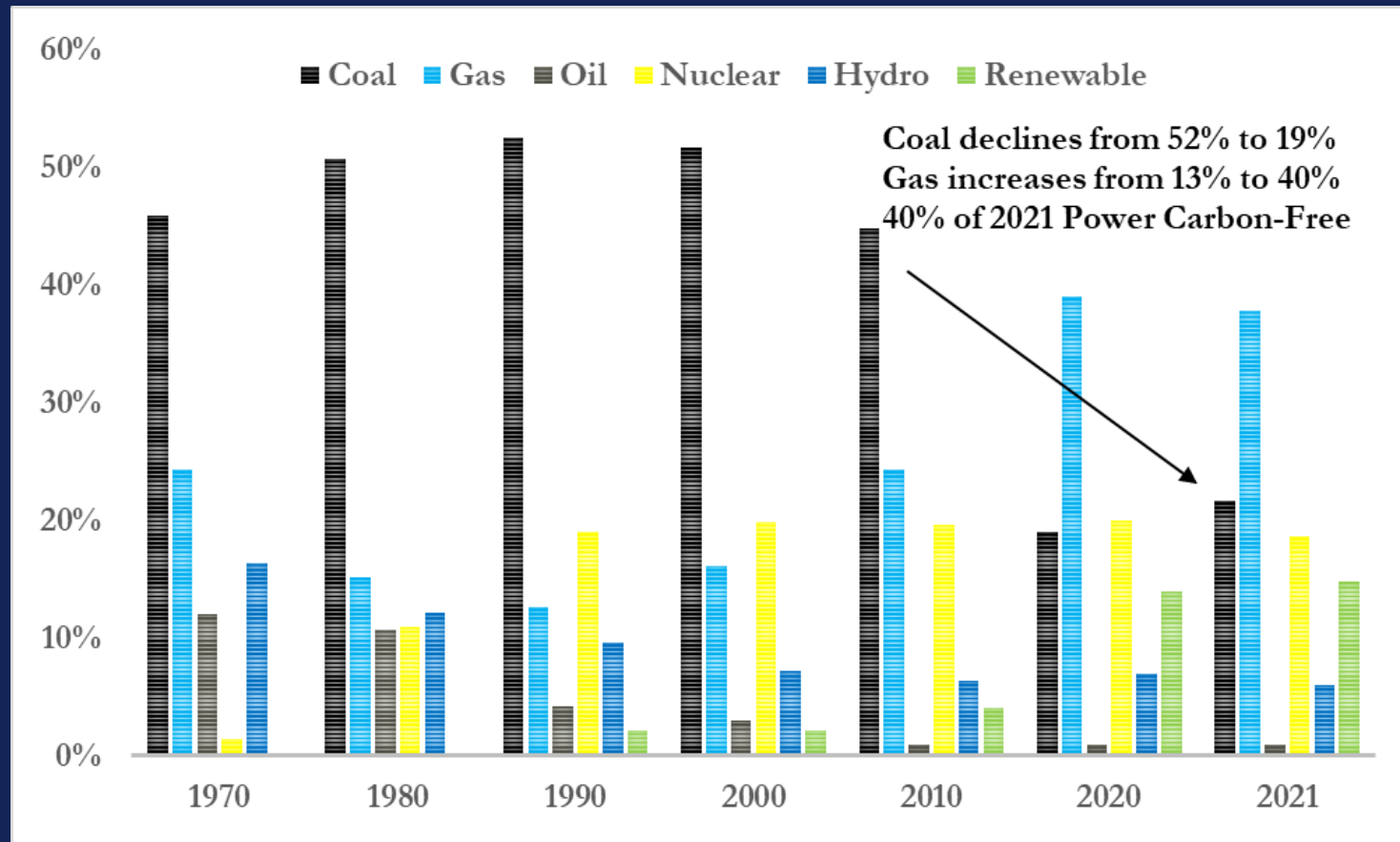
Record Electric Utility Investment

- Clean energy, wires, meters, charging, etc..



US Great Power Transformation

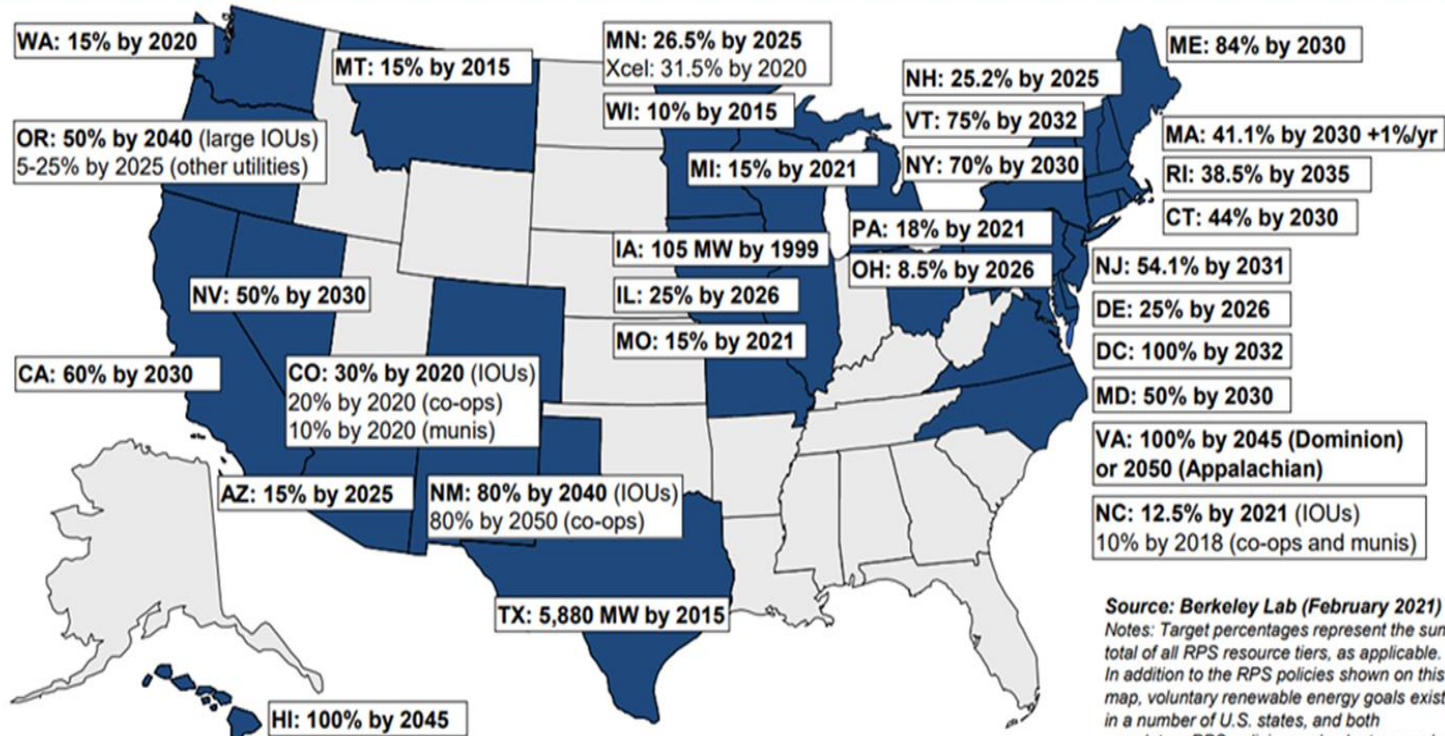
- Coal decline rapidly & renewables grow



Over 30 States Mandate Renewables

RPS Policies Exist in 30 States and DC

Apply to 58% of Total U.S. Retail Electricity Sales

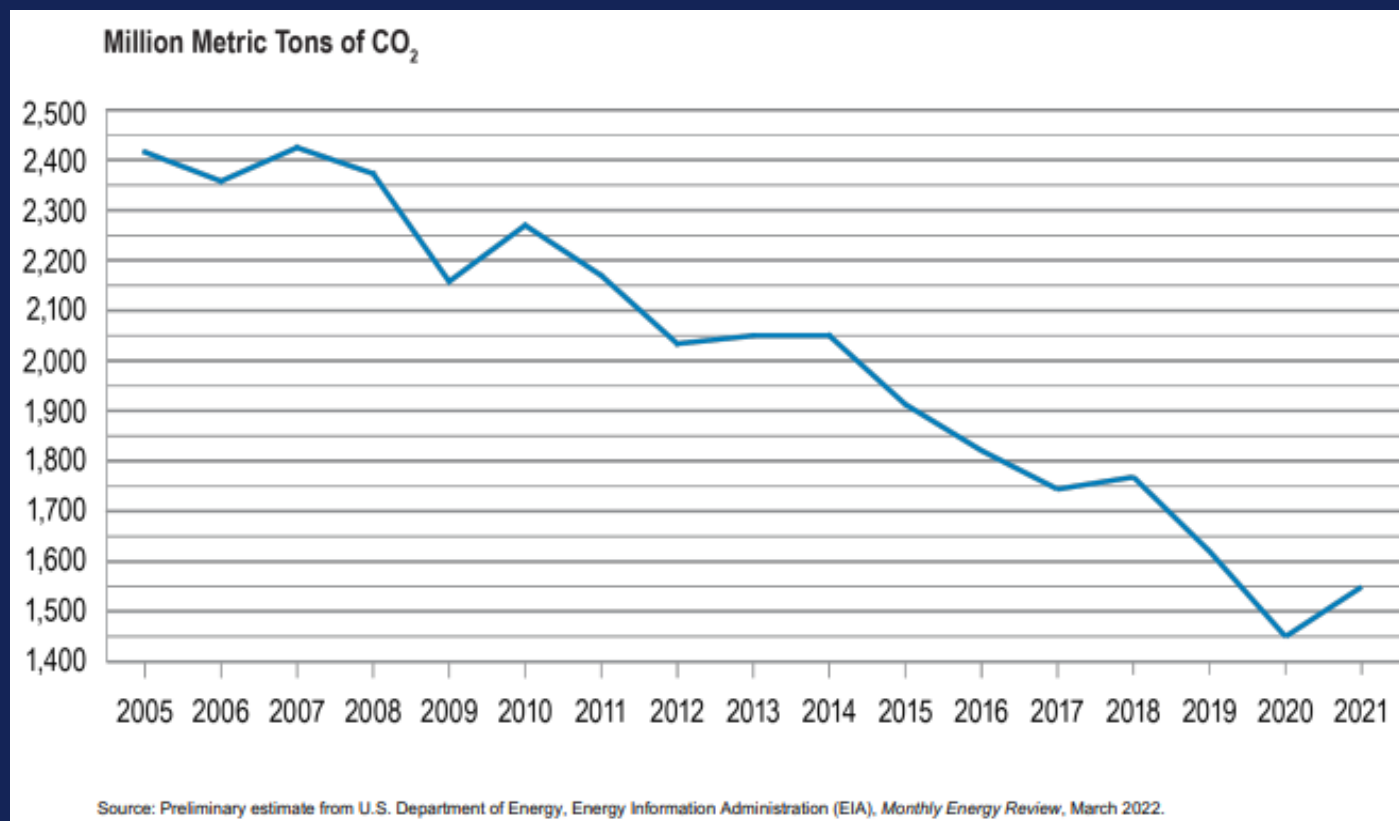


Source: Berkeley Lab (February 2021)

Notes: Target percentages represent the sum total of all RPS resource tiers, as applicable. In addition to the RPS policies shown on this map, voluntary renewable energy goals exist in a number of U.S. states, and both mandatory RPS policies and voluntary goals exist among U.S. territories (American Samoa, Guam, Puerto Rico, US Virgin Islands).

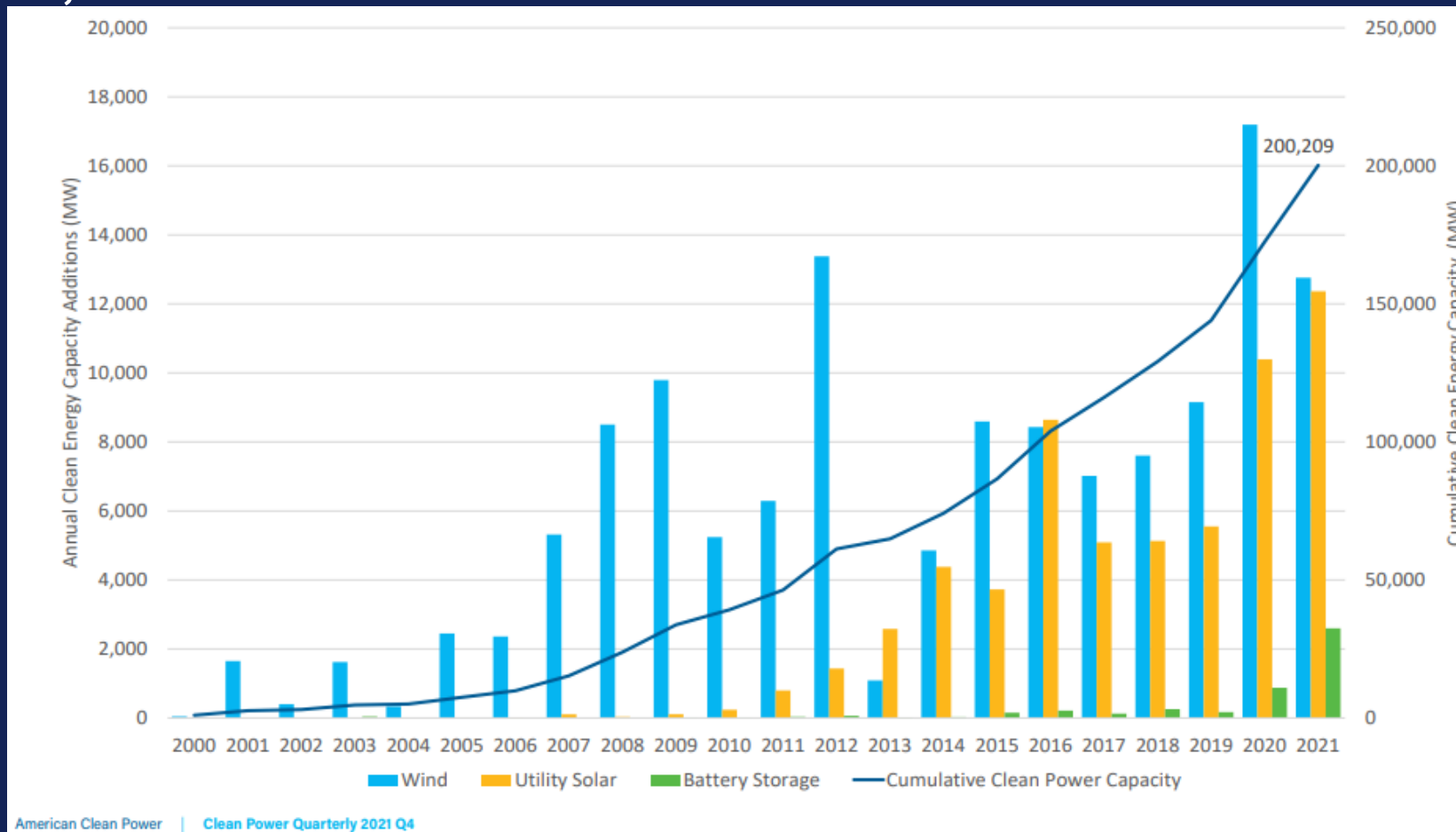
US Power CO2 Emissions Fall

- Power CO2 emissions 36% below 2005



US Clean Energy Capacity Growth

- In 2021, 28 GW's of renewables added



Infrastructure Policy Needed

- **Build Back Better/Infrastructure Investment & Jobs Act 2021**
- **Clean energy tax credits (on and offshore wind/solar)**
- **Utility scale batteries**
- **Green hydrogen**
- **Renewable natural gas**
- **Carbon-capture and sequestration**
- **Nuclear**
- **Transmission**
- **Natural gas**

- **All of the Above**

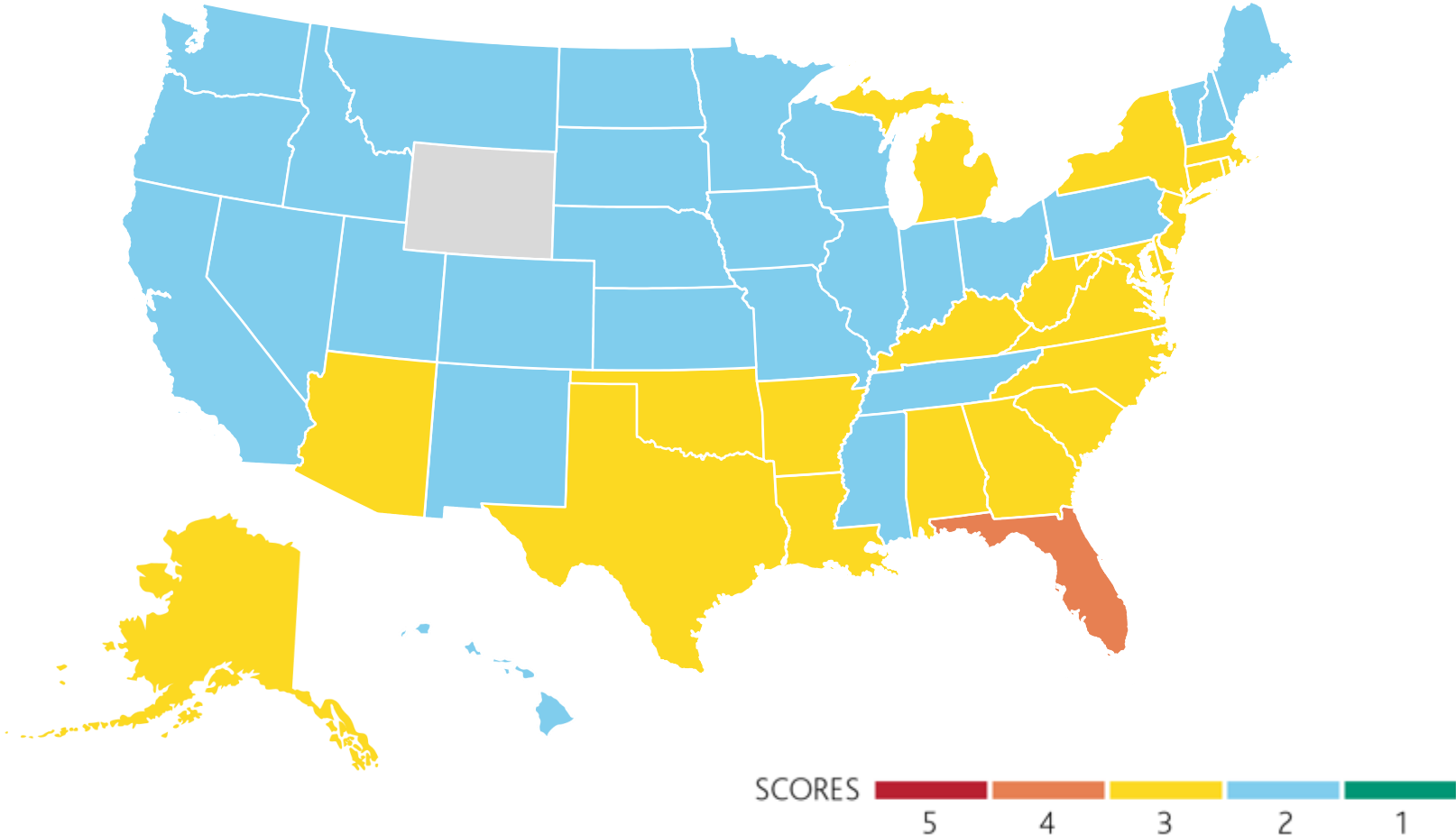


Moody's Investors Service - ESG in Infrastructure



May 19, 2022

States' environmental exposures vary by region

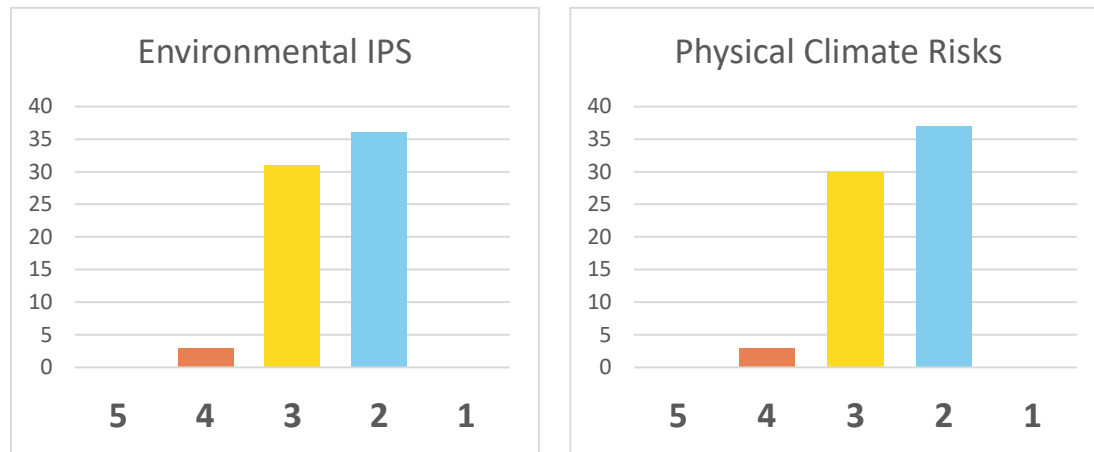


Source: Moody's Investors Service

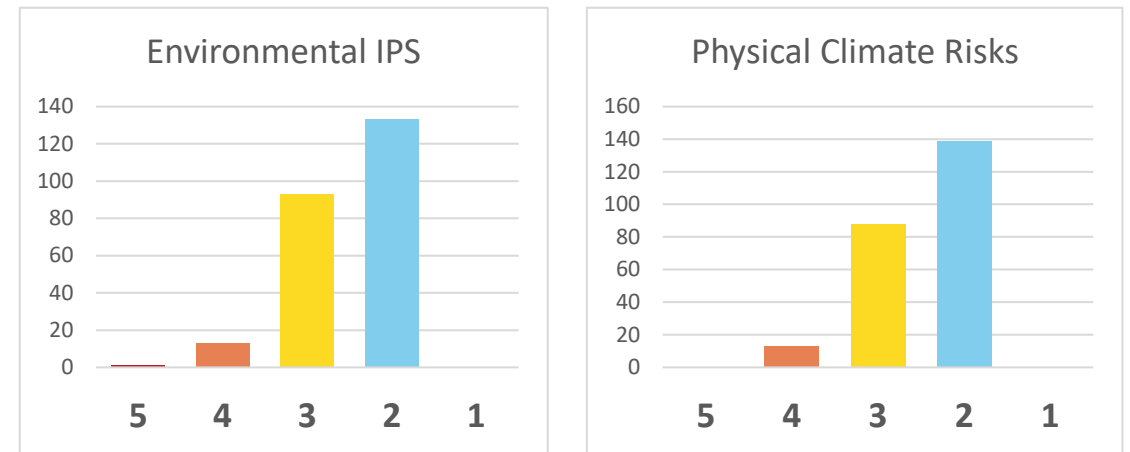
Local government environmental exposures

Negative exposure concentrated in Florida, Louisiana and East Coast

Cities



Counties



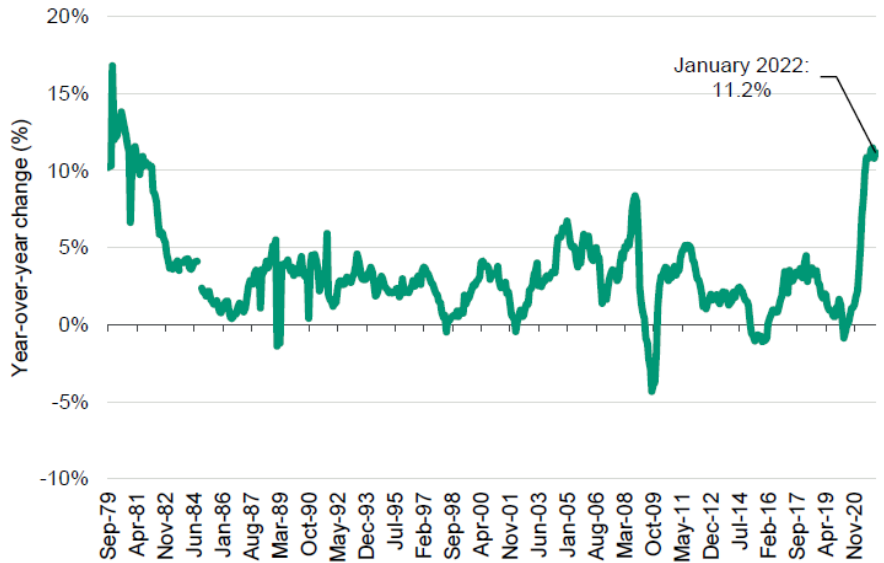
Data reflect 70 cities and 240 counties

Source: Moody's Investors Service

Issuers will face more challenging expense hikes if inflation persists into 2023

Inflation stands to impose practical and political limitations on the payers of taxes, fees and rates

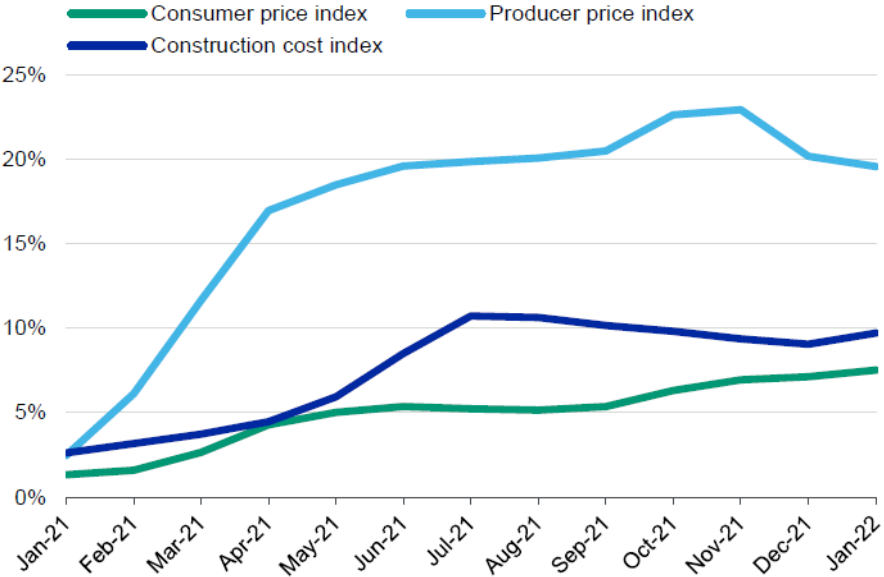
Costs to provide municipal services are rising at their fastest pace since the early 1980s...



Source: American City & County Municipal Cost Index

...driven by upward wage pressure, rising costs for materials and supplies and construction costs

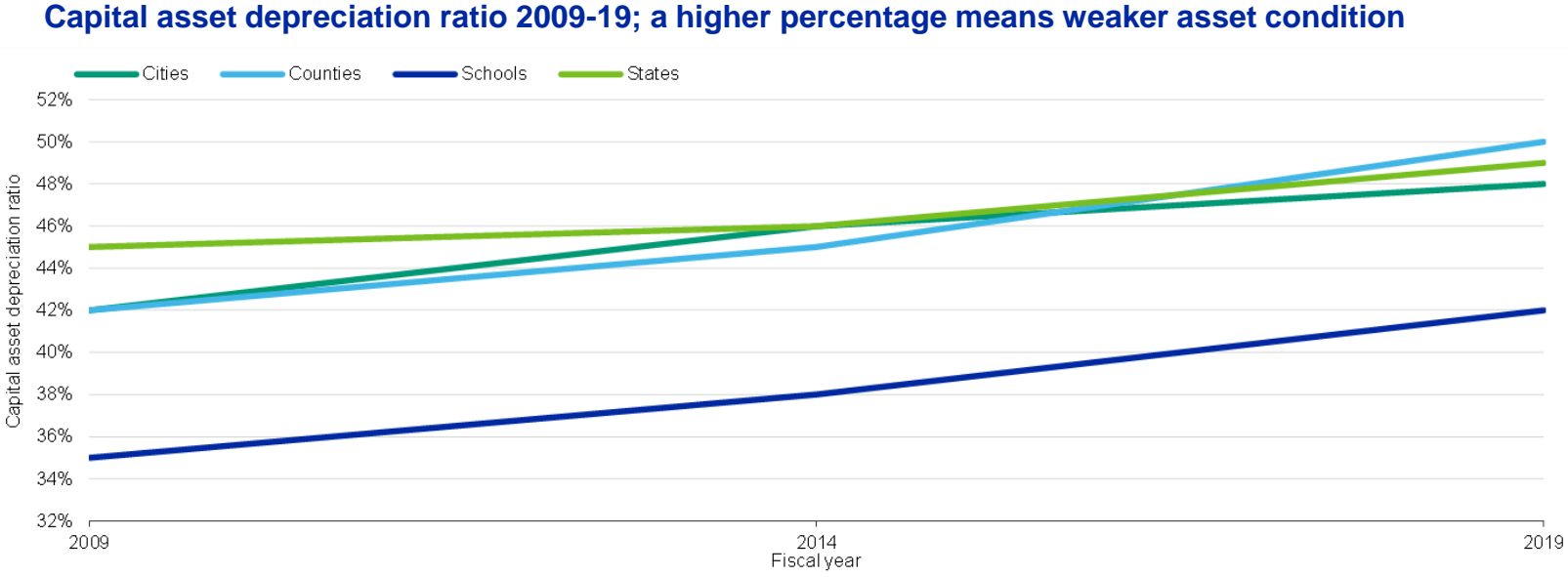
Year-over-year changes in key inflation indicators



Sources: American City & County Municipal Cost Index, US Bureau of Labor Statistics

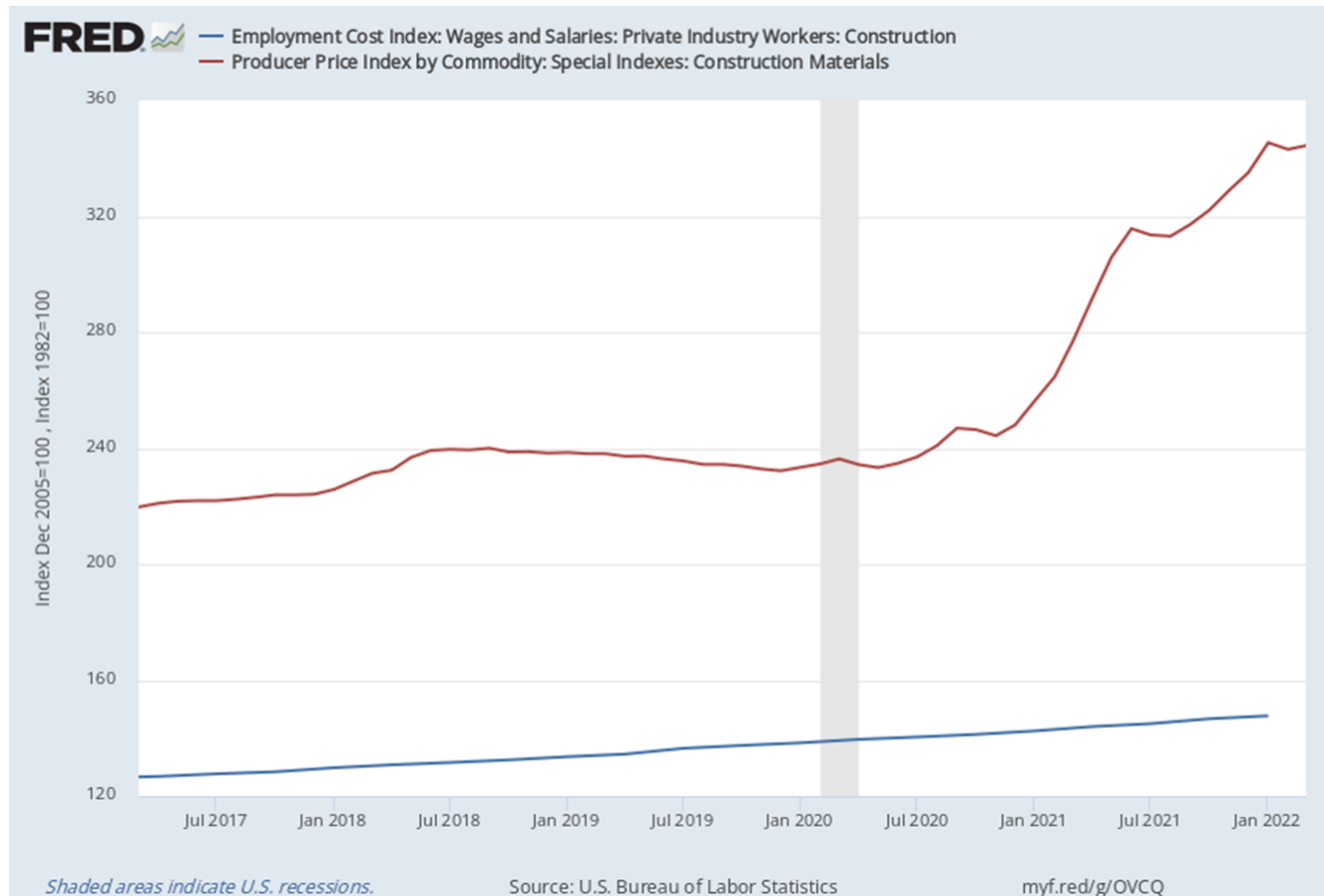
Weaker asset conditions necessitate increased investment for states and local governments

The median depreciated ratio for all local governments we rate increased to 46% depreciated in 2019 from 39% in 2008.



Local government data includes governmental fund assets and excludes municipal utility system assets.
Sources: Audited financial statements and Moody's Investors Service

Rising interest rates and inflation are impacting capital plan affordability



Source: Federal Reserve Bank of St. Louis

- » Spike in last year may subside, but demand is expected to increase, not decline
- » Infrastructure Investment and Jobs Act -\$33.4B
- » ARPA \$350B
- » CARES \$150B
- » Construction materials index change over past 5 years 57%
- » Construction labor index change over past 5 years 17%

Significant federal funding available for infrastructure

Federal stimulus measures provide material funding sources to leverage for capital needs

The IIJA's bridge formula program is sufficient for 11 states to fully replace their poorest bridges

State	Total IIJA allocation	Total cost to replace all bridges in poor condition	Percent that can be replaced with IIJA funds	Total cost to repair all bridges in poor condition	Percent that can be repaired with IIJA funds
Utah	\$225,000,000	\$37,005,398	608%	\$25,163,671	894%
Nevada	\$225,000,000	\$52,686,043	427%	\$35,826,509	628%
North Dakota	\$225,000,000	\$98,439,702	229%	\$66,938,997	336%
Vermont	\$225,000,000	\$124,612,457	181%	\$84,736,471	266%
Delaware	\$225,000,000	\$140,071,312	161%	\$95,248,492	236%
Wyoming	\$225,000,000	\$176,094,219	128%	\$119,744,069	188%
Alaska	\$225,000,000	\$205,272,770	110%	\$139,585,484	161%
New Mexico	\$225,000,000	\$210,141,337	107%	\$142,896,109	157%
Arizona	\$225,000,000	\$212,734,523	106%	\$144,659,476	156%
Idaho	\$225,000,000	\$218,039,707	103%	\$148,267,001	152%
Alabama	\$225,000,000	\$223,659,944	101%	\$152,088,762	148%

Source: Federal Highway Administration and Moody's Investors Service

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Appendix



Appendix

Priorities for Strategic Growth: ESG Integrated Across All Platforms, Driving Growth and Enhanced Relevance

MOODY'S

MIS Integration



Credit Ratings & Research



ESG Credit Scores



ESG Classification



Heat Maps

MA Integration



Real Estate Solutions



Moodys.com



Risk Analytics & regulatory reporting



Lending solutions and tools



APIs, and Data Feeds

Moody's ESG Solutions



ESG Measures



Climate Solutions



Index Solutions



SME Solutions



Sustainable Finance

Moody's Environmental Risk Heat Map

15 sectors have high or very high environmental risks overall

 89

Global industry sectors assessed



























































































 \$79

Trillion of US dollars in rated debt

 5

Subcategories of social risks

KEY  Very High Risk  High Risk  Moderate Risk  Low Risk

Sector	Total Debt (\$ Billion)	KEY					Overall Environmental Risk Score
		Carbon transition	Physical climate risks	Water management	Waste and pollution	Natural capital	
Airlines	86						
Automobile Manufacturers	555						
Building Materials	90						
Chemicals	536						
Coal Mining and Coal Terminals	10						
Mining - Metals and Other Materials, excluding Coal	253						
Oil & Gas - Independent Exploration & Production	365						
Oil & Gas - Integrated Oil Companies	799						
Oil & Gas - Midstream Energy	401						
Oil & Gas - Oilfield Services	141						
Oil & Gas - Refining & Marketing	68						
Shipping	15						
Steel	90						
Surface Transportation and Logistics	271						
Unregulated Utilities and Power Companies	542						

Source: [ESG – Global: Environmental heat map: Updates to scores for certain sectors](#), 04 February 2022

ESG Classification System Incorporates Credit Relevant Considerations

Categories which are the most material to credit



Environmental

Physical climate risks
Carbon transition
Water management
Waste and pollution
Natural capital



Social

Private sector	Public sector
Customer relations	Access to basic services
Demographic and societal trends	Demographics
Human capital	Education
Health and safety	Health and safety
Responsible production	Housing
	Labor and income



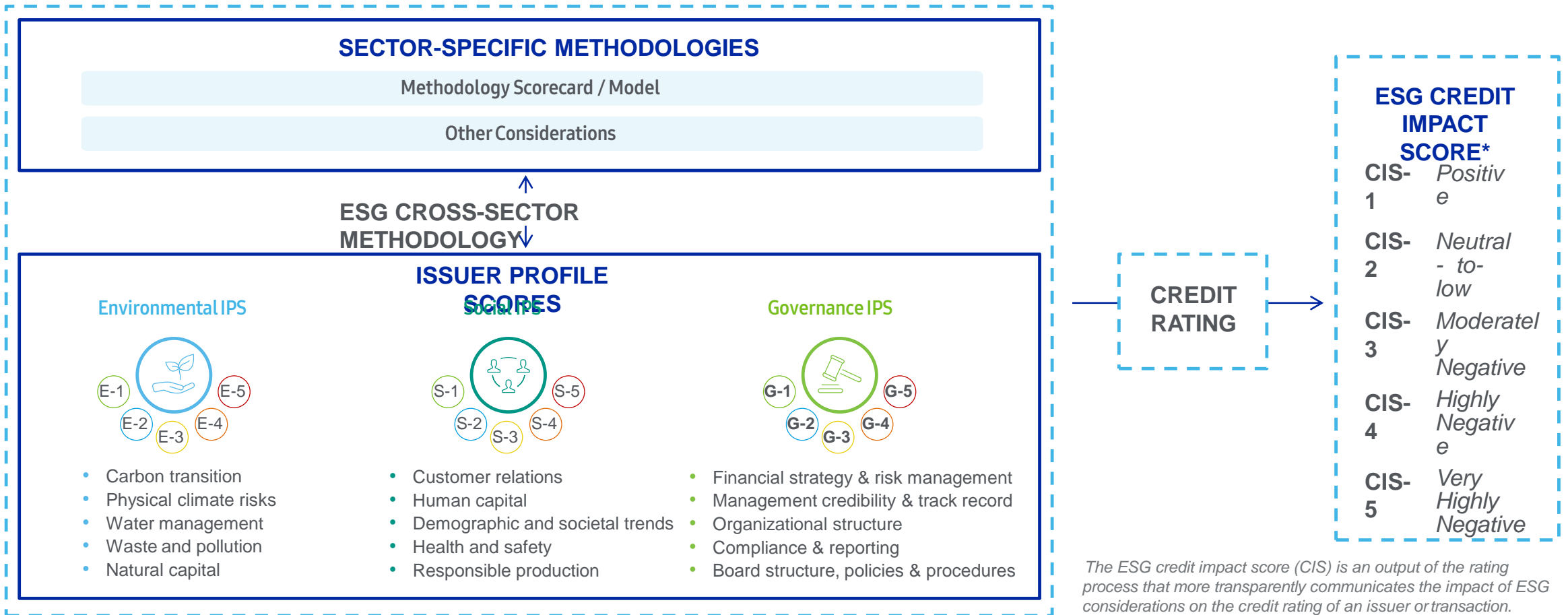
Governance

Private sector	Public sector
Financial strategy & risk management	Institutional structure
Management credibility & track record	Policy credibility and effectiveness
Organizational structure	Budget management
Board structure, policies & procedures	Transparency and disclosure
Compliance & reporting	

Source: Moody's Investors Service

ESG Integration into Credit Analysis

Our rating analysis considers all material credit considerations, including ESG



Moody's Investors Service ESG Scores Explained

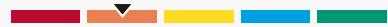
Our scores are **NOT** an opinion about a company's sustainability performance or ESG disclosures

Credit Impact Score (CIS)

Reflects the impact of ESG on the credit rating
NOT a combination of E, S and G-IPS

Example of Score:

CIS-4
Highly Negative



- Indicates the extent to which the credit rating would have been different in the absence of ESG issues
- Places ESG in the context of other rating considerations
- CIS-1 (Positive) assigned only if the credit rating is better because of ESG factors

Issuer Profile Scores (IPS)

IPS is our assessment of the issuer's exposure to Environmental (E), Social (S) or Governance (G) risks / benefits material to credit risk including relevant mitigants

Example of Scores:








- Scores are global and comparable across sectors
- Incorporate management's action/mitigants
- E-1, S-1 or G-1 (Positive) assigned only when considerations have material credit benefits








E, S and G Issuer Profile Scoring Scale

Assessed on a five-point scale from positive to negative exposure

	Score	Definition
 POSITIVE	E-1 S-1 G-1	<p>Issuers or transactions with a Positive E or S issuer profile score typically have exposures to E or S issues that carry material credit benefits.</p> <p>For G, issuers or transactions typically have exposure to G considerations that, in the context of their sector, positions them strongly, with material credit benefits.</p>
 NEUTRAL-TO-LOW	E-2 S-2 G-2	<p>Issuers or transactions with a Neutral-to-Low E or S issuer profile score typically have exposures to E or S issues that are not material in differentiating credit quality. In other words, they could be overall slightly credit-positive, credit-neutral, or slightly credit-negative. An issuer or transaction may have a Neutral-to-Low score because the exposure is not material or because there are mitigants specifically related to any E or S risks that are sufficient to offset those risks.</p> <p>Issuers or transactions with a Neutral-to-Low G issuer profile score typically have exposure to G considerations that, in the context of their sector, positions them as them as average, and the exposure is overall neither credit-positive nor negative.</p>
 MODERATELY NEGATIVE	E-3 S-3 G-3	<p>Issuers or transactions with a Moderately Negative E or S issuer profile score typically have exposures to E or S issues that carry moderately negative credit risks. These risks. These issuers may demonstrate some mitigants specifically related to the identified E or S risks, but they are not sufficiently material to fully offset the risks.</p> <p>Issuers or transactions with a Moderately Negative G issuer profile score typically have exposure to G considerations that, in the context of the sector, positions them positions them below average and the exposure carries overall moderately negative credit risks.</p>
 HIGHLY NEGATIVE	E-4 S-4 G-4	<p>Issuers or transactions with a Highly Negative E or S issuer profile score typically have exposures to E or S issues that carry high credit risks. These issuers may may demonstrate some mitigants specifically tied to the E or S risks identified, but they generally have limited effect on the risks.</p> <p>Issuers or transactions with a Highly Negative G issuer profile score typically have exposure to G considerations that, in the context of their sector, positions them them weakly and the exposure carries overall highly negative credit risks.</p>
 VERY HIGHLY NEGATIVE	E-5 S-5 G-5	<p>Issuers or transactions with a Very Highly Negative E or S issuer profile score typically have exposures to E or S issues that carry very high credit risks. While these While these issuers or transactions may demonstrate some mitigants specifically related to the identified E or S risks, they are not meaningful relative to the magnitude magnitude of the risks.</p> <p>Issuers or transactions with a Very Highly Negative G issuer profile score typically have exposure to G considerations that, in the context of their sector, positions them positions them very poorly and the exposure carries overall very high credit risks.</p>

Source: Moody's Investors Service

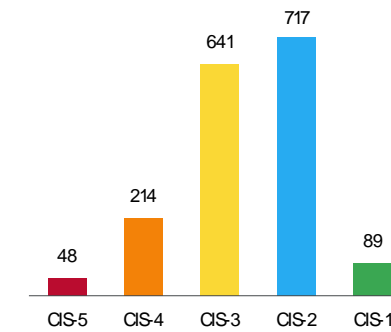
ESG Credit Impact Score (CIS) Scale

	Score	Definition
 <p>POSITIVE</p>	CIS-1	For an issuer scored CIS-1 (Positive), its ESG attributes are overall considered as having a positive impact on the rating. The overall positive influence from its ESG attributes on the rating is material.
 <p>NEUTRAL-TO-LOW</p>	CIS-2	For an issuer scored CIS-2 (Neutral-to-Low), its ESG attributes are overall considered as having a neutral-to-low impact on the current rating; i.e., the overall influence of these attributes on the rating is non-material.
 <p>MODERATELY NEGATIVE</p>	CIS-3	For an issuer scored CIS-3 (Moderately Negative), its ESG attributes are overall considered as having a limited impact on the current rating, with greater potential for future negative impact over time. The negative influence of the overall ESG attributes on the rating is more pronounced compared to an issuer scored CIS-2.
 <p>HIGHLY NEGATIVE</p>	CIS-4	For an issuer scored CIS-4 (Highly Negative), its ESG attributes are overall considered as having a discernible negative impact on the current rating. The negative influence of the overall ESG attributes on the rating is more pronounced compared to an issuer scored CIS-3.
 <p>VERY HIGHLY NEGATIVE</p>	CIS-5	For an issuer scored CIS-5 (Very Highly Negative), its ESG attributes are overall considered as having a very high negative impact on the current rating. The negative influence of the overall ESG attributes on the rating is more pronounced compared to an issuer scored CIS-4.

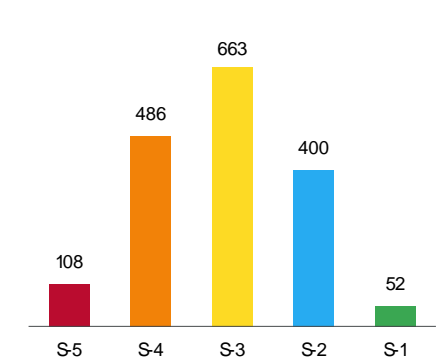
All Issuers Scored as of Jan 21, 2022

- » IPS and CIS scores for 1709 issuers so far
- » 20% have CIS 1,4 or 5 – meaning their ratings are different than they would otherwise be in the absence of ESG issues
- » CIS 1 shows that ESG considerations can also lead to a positive credit impact. Currently highly influenced by G factors, but there are also examples of E and S influencing positive credit considerations
- » CIS 1 heavily concentrated in state and local governments and advanced economies - Sovereigns
- » CIS 4 and 5 are concentrated in EM Sovereigns, Oil and Gas, Coal, Metals and Mining
- » CIS-3 implies that ESG has a moderately negative impact that could affect ratings in the future
- » E and S risks more heavily influence negative impact relative to G considerations

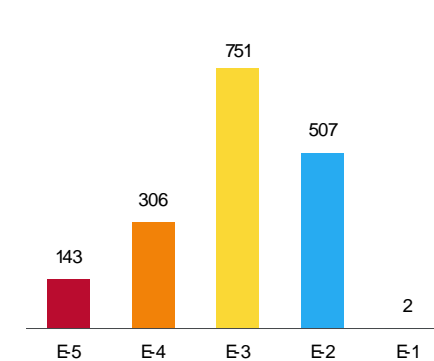
Credit Impact Score (CIS)



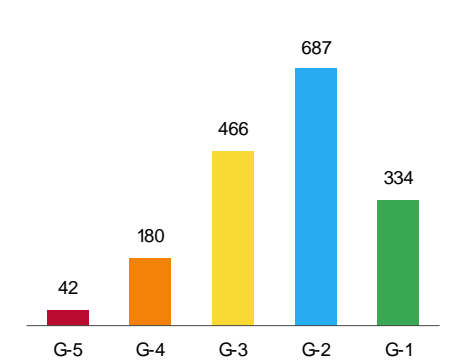
Social Issuer Profile Score



Environmental Issuer Profile Score



Governance Issuer Profile Score



Environmental classification for all issuers

Carbon transition

- » Current positioning for carbon transition
- » Technology, market and policy risk
- » Actions to mitigate risk
- » Long-term resilience to risk of accelerated carbon transition

Physical climate risks

- » Current and future effects of climate change
- » Exposure to heat stress, water stress, floods, hurricanes, sea-level rise and wildfires

Water management

- » Non-climate-related risks
- » Impact of economic activity
- » Availability, access and consumption
- » Innovations to enhance water use efficiency
- » Risk of pollution-related regulatory violations

Waste and pollution

- » Non-GHG air pollutants
- » Land-based accidents, spills and leaks
- » Hazardous and non-hazardous waste
- » Circular economy

Natural capital

- » Impact on natural systems (soil, biodiversity, forest, land, oceans, etc.)
- » Dependency on goods and services derived from nature (agriculture, fiber, fish, etc.)

Source: Moody's Investors Service

Five social categories relevant to credit quality for Private Issuers

Customer relations



- » Data security & customer privacy
- » Fair disclosure & labeling
- » Responsible distribution & marketing

Human capital



- » Labor relations
- » Human resources
- » Diversity & inclusion

Demographic & societal trends



- » Demographic change
- » Access and affordability
- » Social responsibility
- » Consumer activism

Health & safety



- » Accident & safety management
- » Employee health & well-being

Responsible production



- » Product quality
- » Supply chain management
- » Community stakeholder engagement
- » Bribery & corruption
- » Waste Management

Source: Moody's Investors Service

Six Social Categories Relevant to Credit Quality for Governmental Issuers

Demographics



- » Age distribution
- » Immigration
- » Birth rates
- » Racial & ethnic composition/trends

Labor & income



- » Labor force participation
- » Income inequality

Education



- » Access to primary/secondary / tertiary
- » Educated populace
- » Literacy

Housing



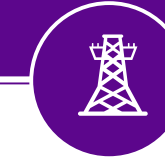
- » Availability and access
- » Condition of housing

Health and safety



- » Healthcare
- » Food security
- » Environmental quality
- » Personal safety & well-being

Access to basic services



- » Water
- » Sewer
- » Electricity
- » Financial services
- » Transportation
- » Telecom/Internet

Source: Moody's Investors Service

Five Governance Categories Relevant to Credit Quality for Issuers in the Private Sector

Financial strategy & risk management



- » Leverage policy
- » Capital modeling and stress testing
- » M&A strategy
- » Dividend and capital allocation policies
- » Risk management policies and controls
- » Internal controls

Management credibility & track Record



- » Earnings and guidance accuracy
- » Regulatory relationships
- » Succession planning and key person risk
- » Management quality and experience
- » Project or subsidiary sponsor support
- » Loss reserve development
- » Servicer or manager quality

Organizational structure



- » Organizational complexity
- » Legal and ownership structure
- » Insider and related-party transactions
- » Capital structure and organizational funding linkage

Compliance & reporting



- » Regulatory violations
- » Civil and criminal investigations
- » Securities lawsuits and investigations
- » Bribery and corruption
- » Accounting policies and disclosures
- » Consistency and quality of financial reporting

Board structure, policies & procedures



- » Ownership and control
- » Management Compensation design and disclosure
- » Board of director oversight and effectiveness
- » Financial oversight and capital allocation

Source: Moody's Investors Service

Four Governance Categories Relevant to Credit Quality for Governmental Issuers

Institutional structure



- » Strength of judiciary and civil society
- » Institutional arrangement that guide fiscal and macroeconomic policy
- » Control of corruption

Policy credibility and effectiveness



- » Fiscal policy track-record and effectiveness
- » Monetary and macroeconomic policy effectiveness
- » Regulatory effectiveness

Transparency & disclosure



- » Comprehensiveness and reliability of economic, fiscal, and financial data
- » Timely financial disclosure

Budget management



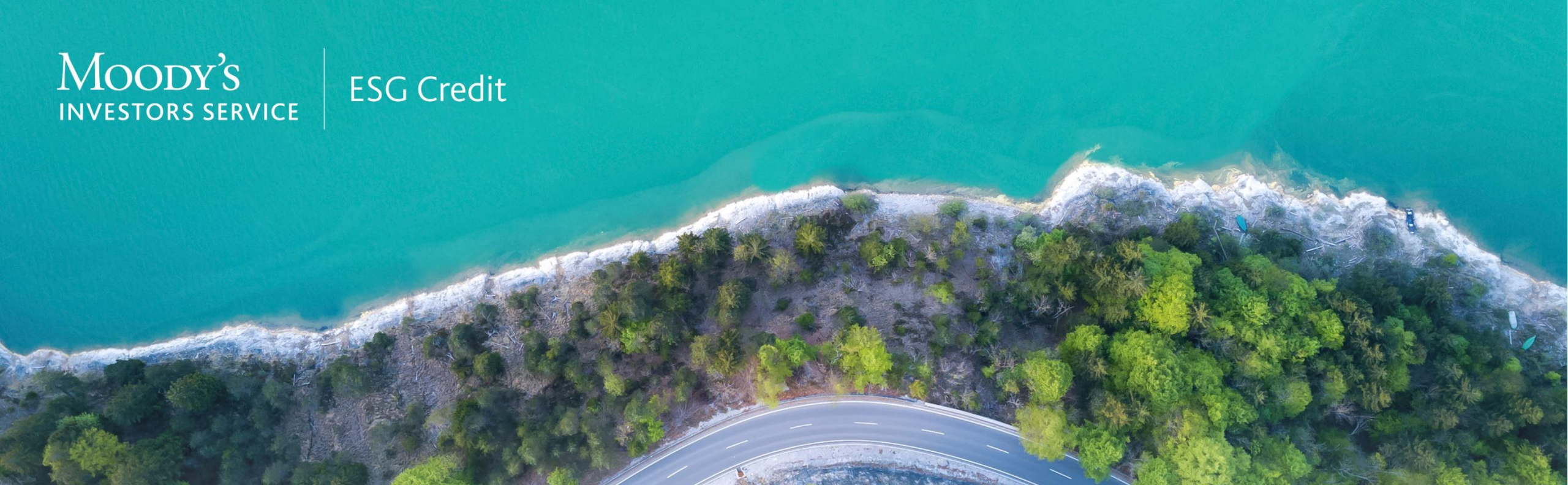
- » Budgetary and forecast accuracy
- » Management quality and experience
- » Effective use of multi-year planning for operating and capital spending.

Source: Moody's Investors Service



Reference Documents/Reports

- » [General Principles for Assessing Environmental, Social and Governance Risks Methodology](#)
- » (E) Environmental
 - [Environmental Classification](#)
 - [Environmental Risk Heatmap](#)
- » (S) Social
 - [Social Risk Classification \(Private Sectors\)](#)
 - [Social Risk Classification \(Public Sectors\)](#)
 - [Social Risk Heatmap](#)
- » (G) Governance
 - [Governance Risk Classification \(Private & Public Sectors\)](#)



Leonard Jones

Leonard.Jones@moodys.com

+1 212 553-3806

Panel Discussion: US Infrastructure Policy Agenda With A Focus On Environmental And Social Considerations



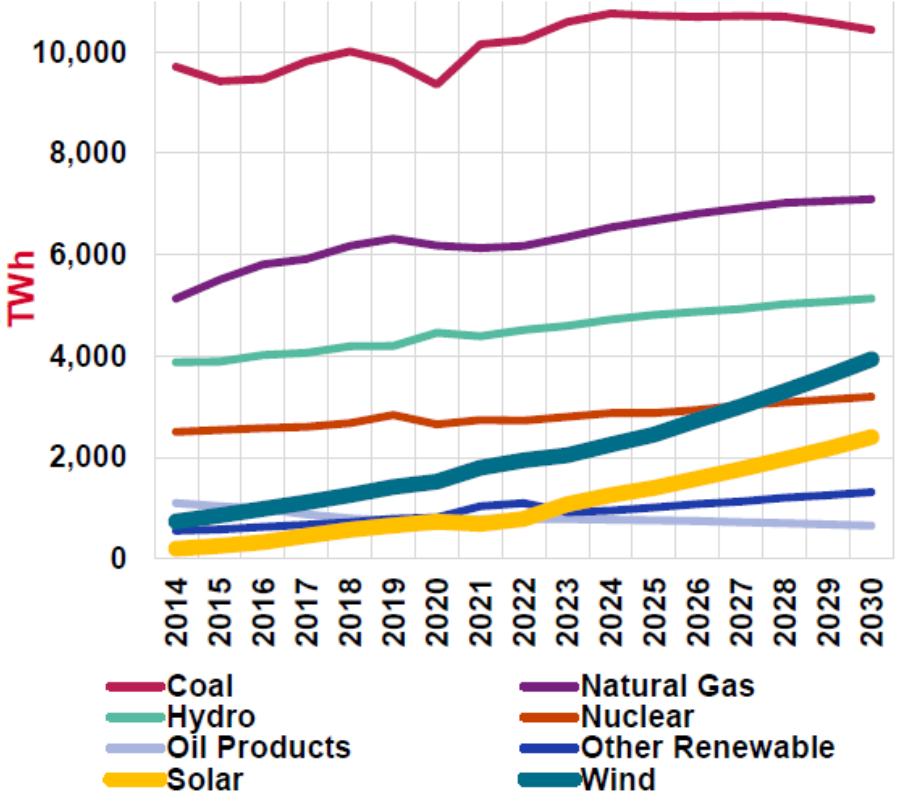
S&P Global
Ratings

This report does not constitute a rating action

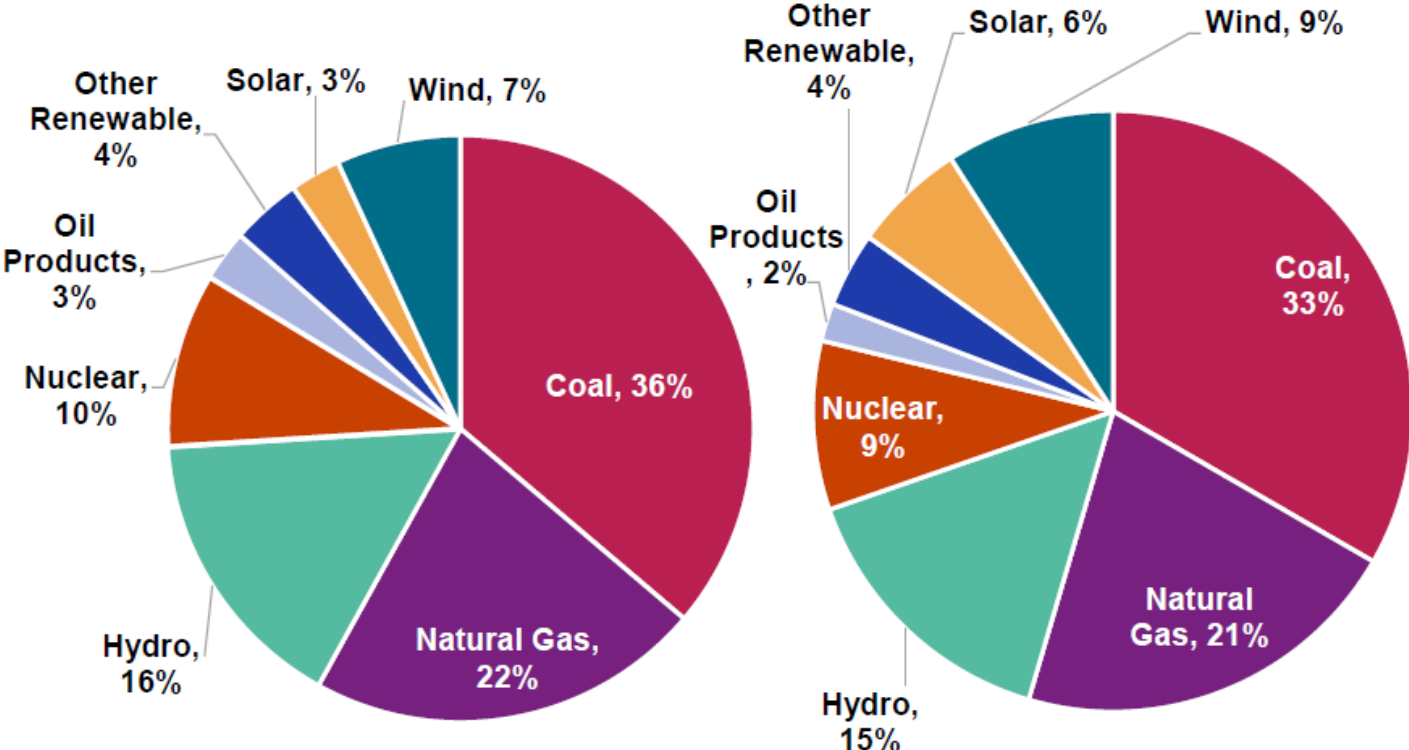
Presenter: Trevor d'Olier-Lees, Senior Director
S&P Global Infrastructure Ratings
May 2022

Globally, solar and wind represents about 10% of the generation mix, moving to 15% by 2027

Global electricity generation by source

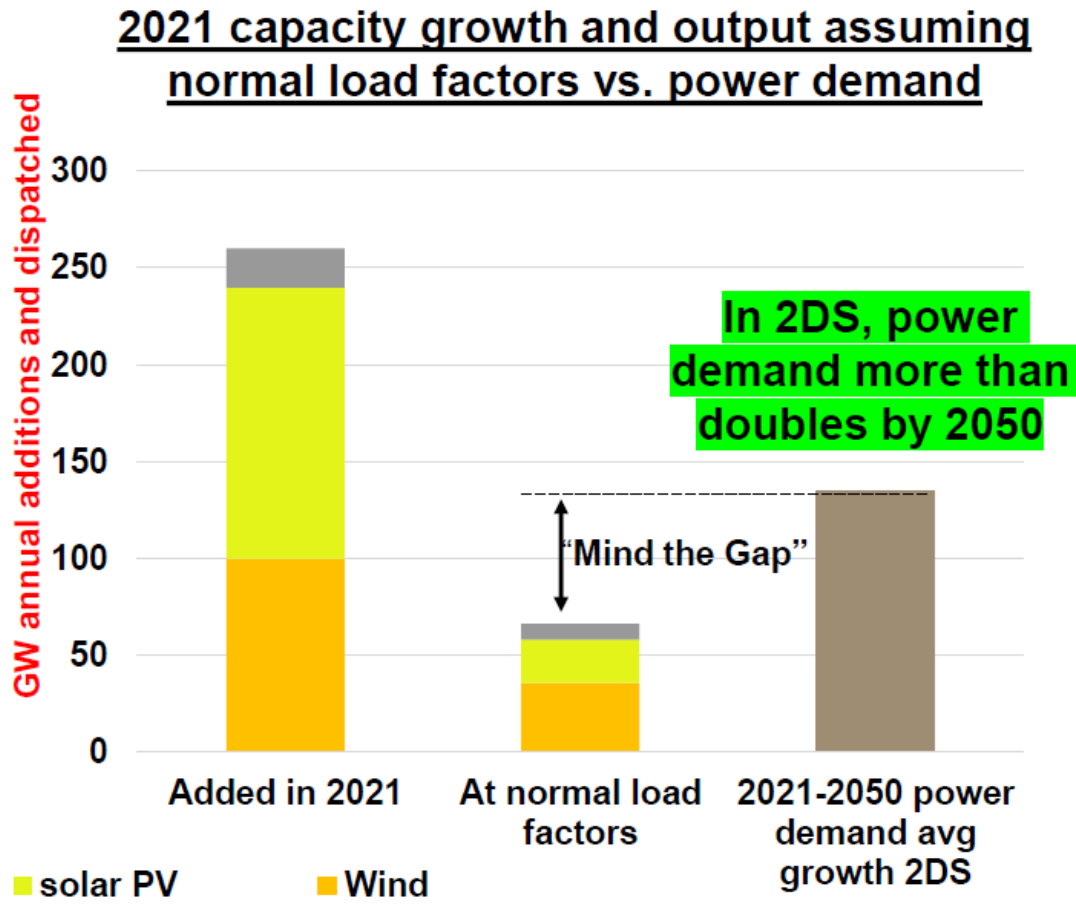
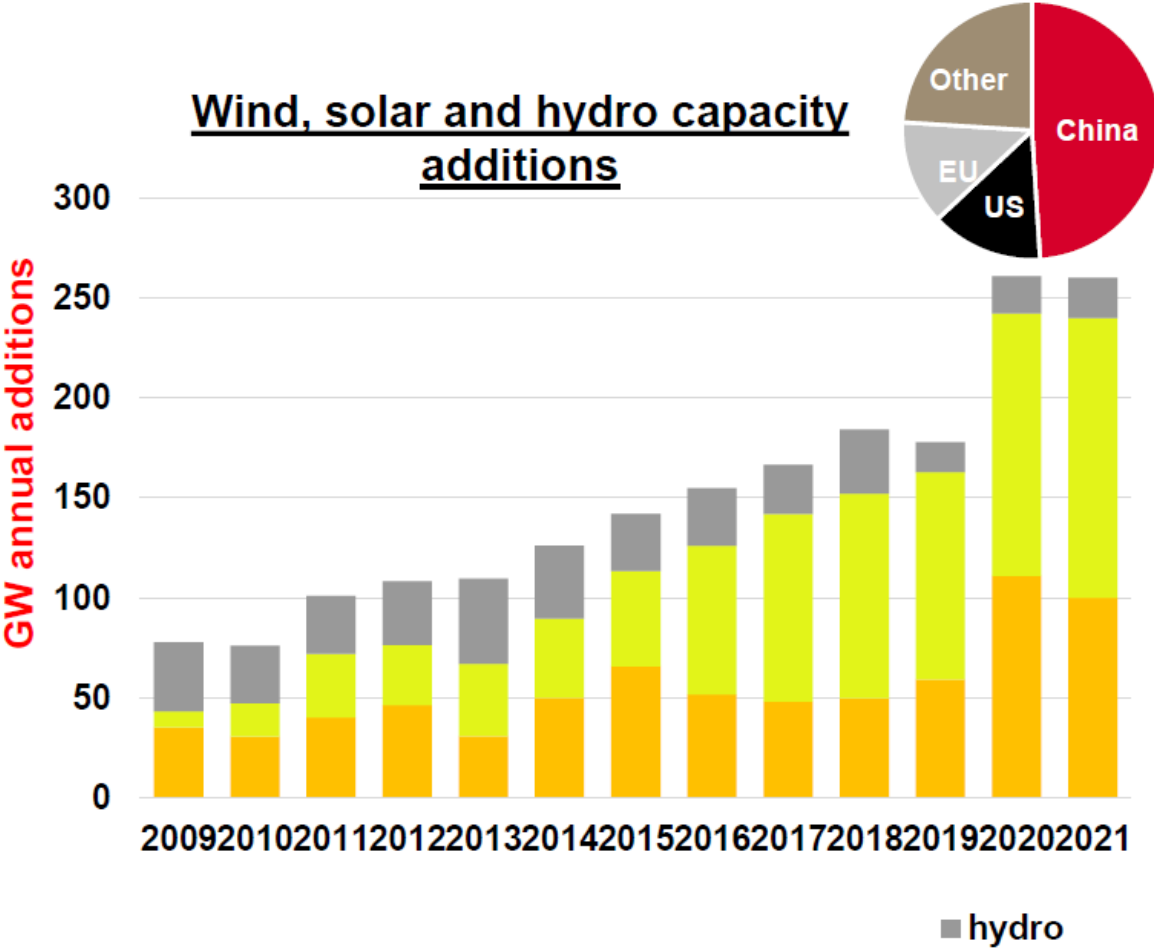


Global generation mix 2022 (left) and 2027 (right)



Source: S&P Global Platts Analytics Global Integrated Energy Model

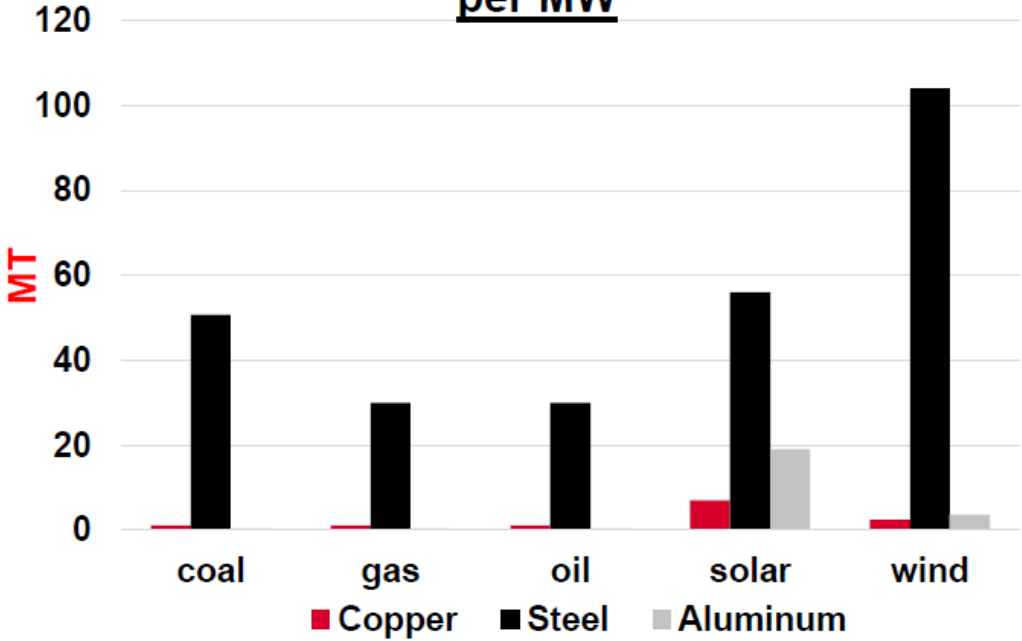
Despite record capacity growth, global renewables output lagging behind demand and not enough to meet increasing electrification



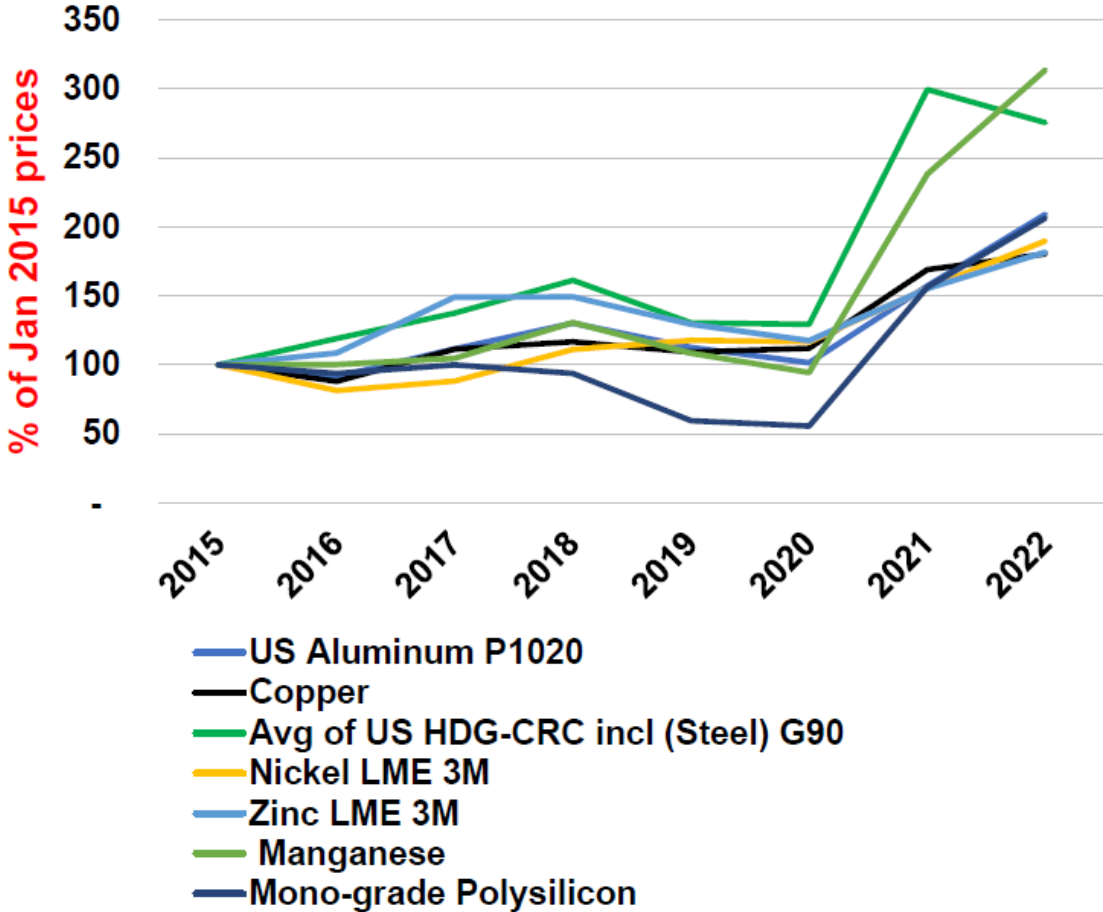
Source: IRENA, S&P Global Platts Analytics, Market Intelligence World Electric Power Plant database, EIA.

Headwinds from resource constraints and volatile commodity prices could hamper renewables growth

Typical requirements of key materials per MW

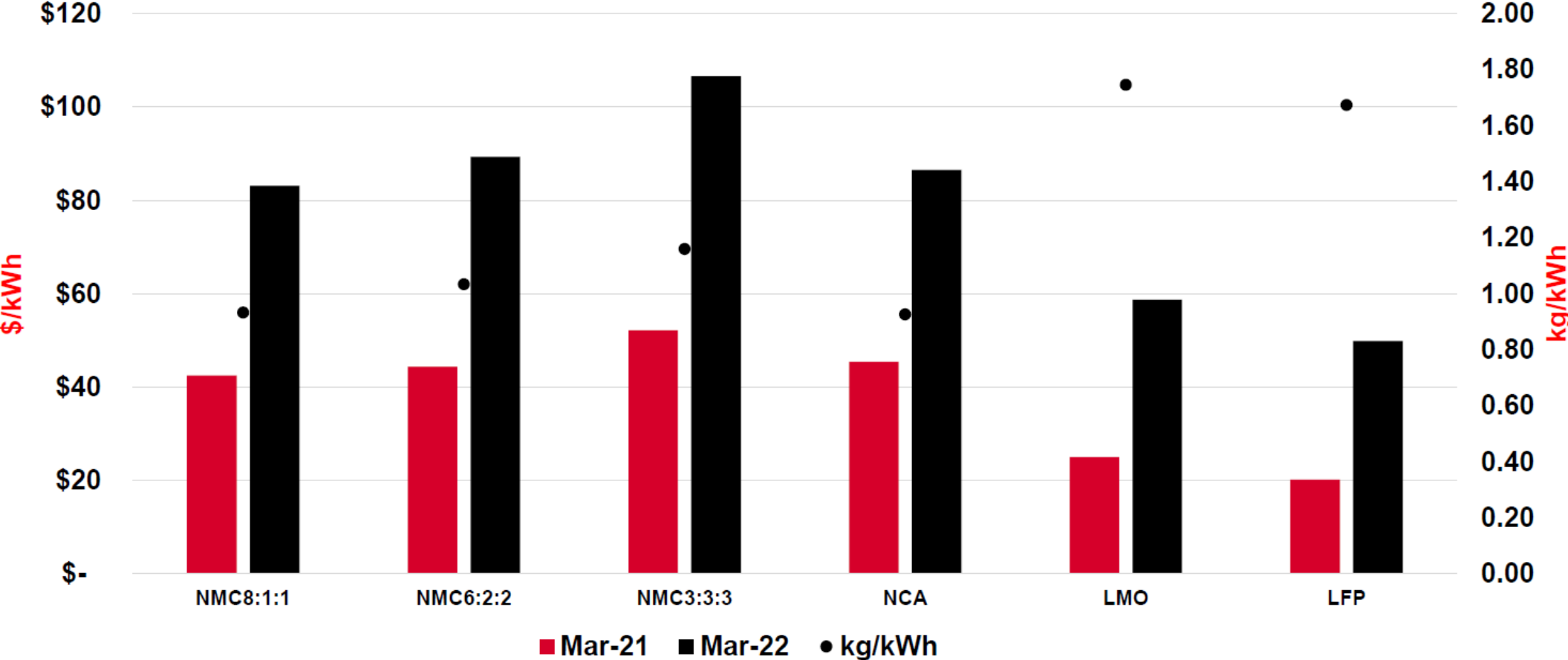


Historical key material benchmark prices (indexed to Jan 2015)



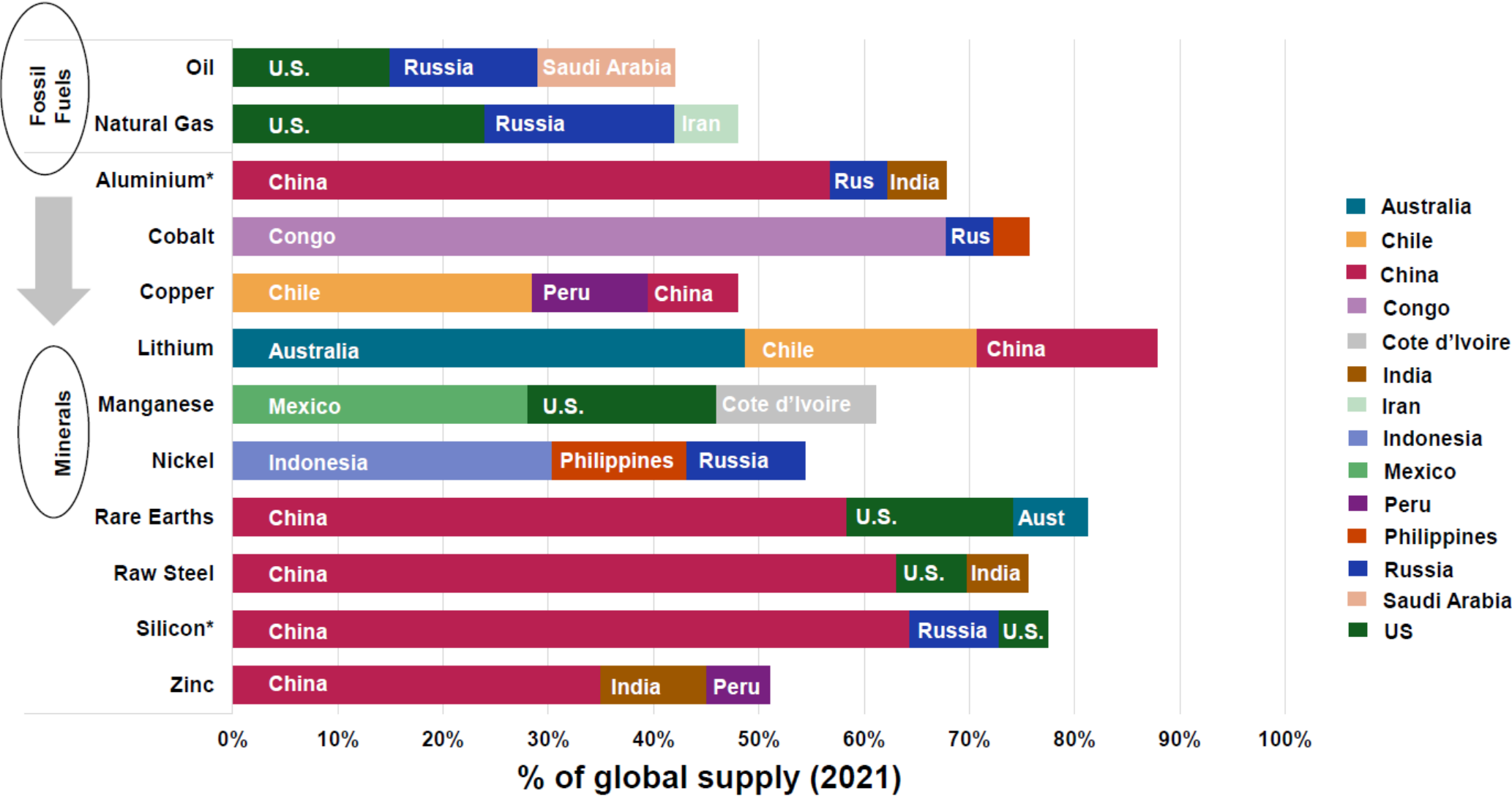
Cathode costs have doubled y-o-y and battery metal fundamentals remain tight on geopolitics and underinvestment in lithium

Cathode Prices (active materials)



Source: S&P Global Commodity Insight

The energy transition is re-defining geopolitical dependencies



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