Calvert

Decarbonizing the Electric Grid: A Climate Transition Investment Framework

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Responsible investing encompasses a broad range of approaches, but there are a common set of requirements for investors who seek to deliver value both to clients and to society more broadly. Core among these is a thoughtful investment framework for high-emitting sectors. This is no simple task, and indeed many sustainable investors have opted for divestment or exclusionary frameworks that direct capital away from large parts of the economy. We believe part of the motivation for this is to manage down so-called "financed emissions"—emissions reported by financial institutions when providing capital to another company—by strategically avoiding certain sectors. These frameworks may be intuitive, but ultimately we believe they are inadequate, in addressing the problem of greenhouse gas emissions and climate change. In our view, many frameworks simply wash their hands of the problem, content to engineer portfolios with low (and in many cases, artificially low) financed emissions. These approaches, in our view, risk not participating in the energy transition.

The energy transition is ambitious, complex, and, at times, downright uncomfortable for its many stakeholders. It requires responsible investors such as Calvert—those focused on the long-term financial risks of climate change—to sit across the table from prominent polluters and engage on ways to economically transition their businesses and effectively compete in a low-carbon economy. And the transition to a low-carbon business model, more than anything else, is an economic imperative—the structural forces at work will continue to reshape the energy system, with asymmetric consequences for companies that cannot keep pace. Calvert sees abundant investment opportunities and societal benefits in directly financing the transition to a low-carbon economy by prudently allocating capital where it is needed most: high-emitting sectors that have the capacity and willingness to decarbonize. As an experienced, responsible investor, Calvert seeks to leverage the breadth of the capital markets to finance the most compelling investment opportunities across asset classes in the energy transition.

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"The sector is at an inflection point, and global emissions are poised to turn lower for the first time in history, driven by the powerful secular tailwinds of electrification, grid modernization, and low-cost renewable energy, setting the sector up for decades of potential growth."

The utilities sector best represents the double-edged nature of investing in the energy transition: the foundation for decarbonizing the global energy system, the sector accounts for nearly 40% of the S&P 500's Scope 1 and 2 emissions, but less than 2.5% of its market capitalization.[1] But we believe the sector is at an inflection point. Global emissions are poised to turn lower for the first time in history, driven by the powerful secular tailwinds of electrification, grid modernization, and low-cost renewable energy, setting the sector up for decades of potential growth. Due to the significant capital needed to decarbonize the electric grid, investors must understand the economics of the energy transition as well as the associated risks and opportunities. In this paper, we develop a climate-integrated investment framework for the utilities sector. This analysis is intended to complement the Calvert Principles for Responsible Investment, which determine companies' eligibility for inclusion in investment products offered by Calvert. The utilities included in this analysis represent nearly $1 trillion of market value and more than 40% of the total market value of our global sector coverage at Calvert.

1 Current Emissions: Accounting for the Emissions Arbitrage

Climate risk is commonly split into two categories: physical risk and transition risk. Transition risk is the focus of this paper and concerns the changes necessary to create (or at least preserve) economic value in a rapidly changing energy system. It is also the element of climate risk that brings with it the largest set of opportunities. But, investing in the energy transition requires clear thinking about greenhouse gas emissions, and whether current emissions reporting practices accurately portray climate risk.

Climate risk, like any financial risk, can be distorted by information gaps. In this case, the gaps are inconsistencies in emissions data that result from operational and regulatory differences in the utilities sector. We believe these information gaps have created an emissions arbitrage, where some utilities receive an unwarranted structural benefit in emissions reporting (by reporting lower emissions than they should be entitled to) that can distort investors' perception of climate risk. This arbitrage has far-reaching impacts for asset owners, including price discovery, portfolio construction, engagement priorities, and the integrity of climate commitments.

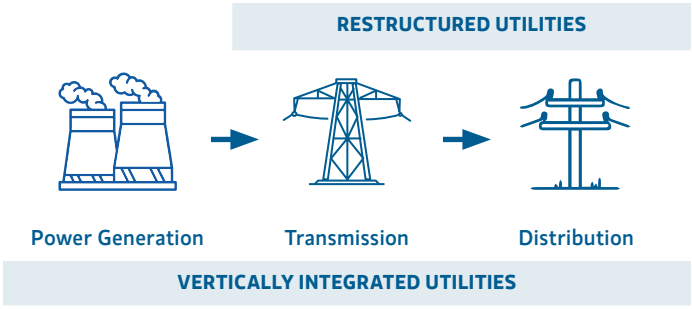
This emissions arbitrage stems from differences in how emissions are classified for the two common types of regulated utilities:

1. Vertically integrated utilities operate in regulated markets and operate their own electric grids as well as the power plants that supply them. Regulated markets are more often found in Africa, Asia, Eastern Europe and parts of the U.S.

[1] S&P Global and MSCI data as of April 30, 2024

2. Restructured utilities operate in deregulated (or liberalized) markets and procure power through bilateral contracts or in wholesale power markets. Generally, they only own electric grids—the poles and wires that deliver electricity to homes and businesses. Deregulated markets are commonly found in Europe, Latin America and portions of the U.S. Today, about half of global electricity volumes are produced in deregulated markets.[2]

DISPLAY 1
Electric Utility Value Chain



Source: Calvert Research and Management

Power generation is by far the largest component of direct emissions for the utilities sector, while emissions from transmission and distribution networks are negligible. Restructured utilities benefit from the perception that they have lower emissions, given their assets are almost entirely limited to the latter. As a result, restructured utilities report Scope 1 and 2 emissions that are, in many cases, 90%-95% lower than vertically integrated peers—even when total system emissions are comparable.

Vertically integrated and restructured utilities are fundamentally engaged in the same business (delivering electricity to consumers) so material differences in emissions profiles are largely a function of carbon accounting, and not necessarily differences in actual emissions intensity. Many restructured utilities do not report their Scope 3 emissions at all, further obscuring their true emissions footprint. We view these discrepancies as analogous to off-balance sheet climate liabilities that must be put back on the balance sheet for useful comparison.

DISPLAY 2
GHG Protocol Emissions Classifications for Utilities

	VERTICALLY INTEGRATED	RESTRUCTURED
GENERATION	Scope 1 & 2	Scope 3
TRANSMISSION		Scope 1 & 2
DISTRIBUTION		

Source: Calvert Research and Management, World Resource Institute, World Business Council for Sustainable Development

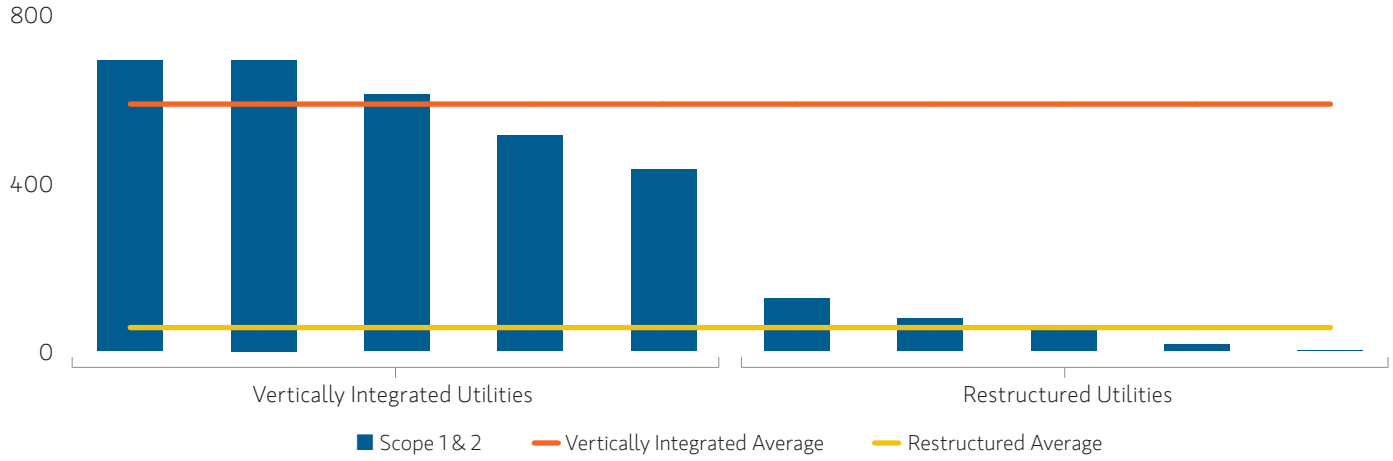
In *Display 3*, we show the reported emissions intensity of 10 of the largest utilities in the U.S.—five vertically integrated and five restructured—and the apparent gap in emissions. In this example, the reported emissions intensity of the vertically integrated utilities is nearly 10 times higher than the restructured utilities. But looks can be deceiving.

> "Present-day emissions are the result of decades of investment decisions for a company and by their nature look backward, not forward."

[2] IEA, Nuclear Power in a Clean Energy System, 2019

DISPLAY 3

Emissions Intensity for 10 of the largest U.S. Utilities—Scope 1 & 2



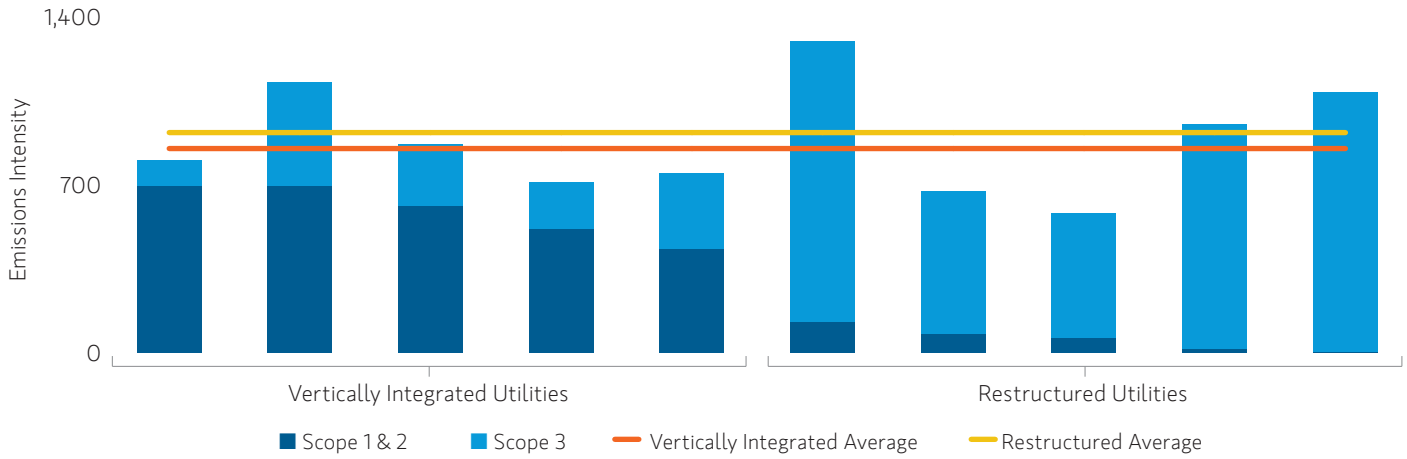
Source: Calvert Research & Management, Bloomberg. Note: emissions intensity is defined as metric tons of emissions divided by million dollars of enterprise value. Emissions data latest available, market data as of April 30, 2024.

After adjusting for Scope 3 emissions (which, in this analysis, includes both reported and estimated figures), the emissions gap between vertically integrated and restructured utilities all but vanishes. This sample of restructured utilities shows a slightly higher full-scope emissions intensity than their vertically integrated peers. We find this is a far different picture than is often presented, and underscores that true emissions reductions do not come easy.

One of the reasons restructured utilities continue to benefit from the market's focus on direct emissions are the challenges for investors to conduct meaningful Scope 3 analysis across all companies. The complexities of gathering, reporting and interpreting Scope 3 have led many to rely on Scope 1 & 2 emissions exclusively as they calculate financed emissions, portfolio emissions targets, and other sustainability reporting mechanisms. This ensures the figures used to manage these broad market portfolios are well-understood and trusted, but the bias this practice introduces into portfolio construction is readily apparent in the utility sector.

DISPLAY 4

Utilities Sector Emissions – Scope 1, 2 & 3



Source: Calvert Research & Management, Bloomberg. Note: emissions intensity is defined as metric tons of emissions divided by million dollars of enterprise value. Emissions data latest available, market data as of April 30, 2024.

Financed Emissions – Their Value and Limitations

Investors have long been asked to answer for the role they play in financing both fossil fuels and the energy transition. The concept of financed emissions, which are the emissions indirectly attributed to financial institutions when providing capital to another company, was an important milestone for responsible investing because it provided a quantitative framework for understanding climate risk. We see significant value in the concept because it provides a standardized representation of current climate risk that can be compared across companies and years, to assess performance of a portfolio. Financed emissions are, and will continue to be, an integral part of our sustainability impact reporting at Calvert.

In order to effectively allocate capital, sustainable investors must understand the value of the information contained in financed emissions as well as its limitations. One limitation can be observed in companies that have reached an inflection point in the emissions intensity of their business. Present-day emissions are the result of decades of investment decisions for a company and by their nature look backward, not forward. In our view, a decarbonization investment strategy that begins and ends with a single metric is incomplete. It is comparable to evaluating a company's financial condition by looking only at the balance sheet while ignoring the income and cash flow statements. To illustrate, we consider an anonymized vertically integrated utility, Company A.

DISPLAY 5

Illustrative Emissions Intensity for Company A

Scope 1	4,806
Scope 2	21
Scope 3 (Estimated)	778
Total Emissions (KT)	**5,605**
Enterprise Value ($M)	7,244
Emissions Intensity (tCO_2/EV)	**774**

Source: Company Materials, Bloomberg, data as of April 30, 2024

The emissions intensity for Company A are calculated to be 774 tCO_2, at the high end of peers, driven by a fleet of coal plants. Such a company would stand out in most low-carbon portfolios, but Company A has a leading low-carbon integrated resource plan (IRP) that is aligned with the Paris Agreement. The plan contemplates 1,800 MW of wind, 3,300 MW of solar and 1,500 MW of energy storage over the next 20 years. The company is planning to convert its coal plants to natural gas by 2030, which will further reduce emissions.[3] Importantly, the company is planning no incremental fossil fuel generation. In this case, we believe there is a credible argument that capital invested today is not financing any incremental emissions. This is not to say the financed emissions for Company A should be reported as zero, but the point remains that there is more going on here than can be contained to a single figure.

The problem with financed emissions arises when the focus becomes the number and not the risk the number represents. This is not an unknown issue—there is a growing consensus that financed emissions have become a barrier to getting capital from sustainable investors to high-emitting companies. As sustainable investors take on a company's securities, they also assume the weight of all its prior investment decisions, many of which were made decades ago. The green bond market is in many ways a response to this issue: sustainable investors wanting to put capital in the hands of high-emitters but needing to create distance between themselves and the associated financed emissions. The transparency of such instruments plays an important role today in getting capital to high-emitting sectors, as there is no widely accepted measure of marginal emissions productivity that can be aggregated across portfolios and compared across financial institutions.

Even with its limitations, financed emissions will continue to be a cornerstone of sustainable finance, but the rigidity of existing frameworks will naturally invite attempts to game the system. For instance, we see a growing number of market mechanisms seeking to financially engineer emissions into thin air, so to speak. These solutions range from low quality carbon offsets[4] to complex ownership structures that manipulate reporting boundaries[5] to emerging concepts like emissions risk transfers (ERTs).[6] The risk these emissions represent is not contained to the companies—it is spread across society—so moving the risk around on paper does not create real impact.

[3] Company A, 2023 Integrated Resource Plan

[4] Financial Times, "Scandal Bares the Problems of the Amazon Carbon Credit Market," 2023

[5] Financial Times, "Sembcorp Coal Deal Raises Concerns About Distortions in Green Bonds," 2022

[6] Bloomberg, "Banks Can Get Emissions Off the Books," 2024

Why This Matters for Investors

The discrepancies in the emission footprints of restructured utilities are more than an academic exercise. They carry significant risks to investors if the market needs to recalibrate the relative riskiness of emissions profiles. We believe a day of reckoning is coming—and soon. Both the European Union and the state of California have established disclosure requirements for Scope 3 emissions that take effect in 2025 and 2027, respectively.

This phenomenon could materially alter investor-reported portfolio emissions—most acutely for sustainable investors that disproportionally own restructured utilities that report low direct emissions (see *Display 6*). Some investors may prefer to wait until they can apply a consideration of Scope 3 emissions across all companies in a portfolio, before using it as an input in portfolio construction. This is reasonable, but we caution against taking too passive an approach, after all, incomplete data is better than no data. In the meantime, we see value in evaluating available Scope 3 estimates, if only to understand and manage such exposures. As seen in *Display 6*, we note that sustainable investors continue to show a strong preference for companies that report low relative emissions on Scope 1 & 2. At the same time, investors will also need to come to grips with the risks around the emissions trajectories of restructured utilities.

> "The problem with financed emissions arises when the focus becomes the number and not the risk the number represents."

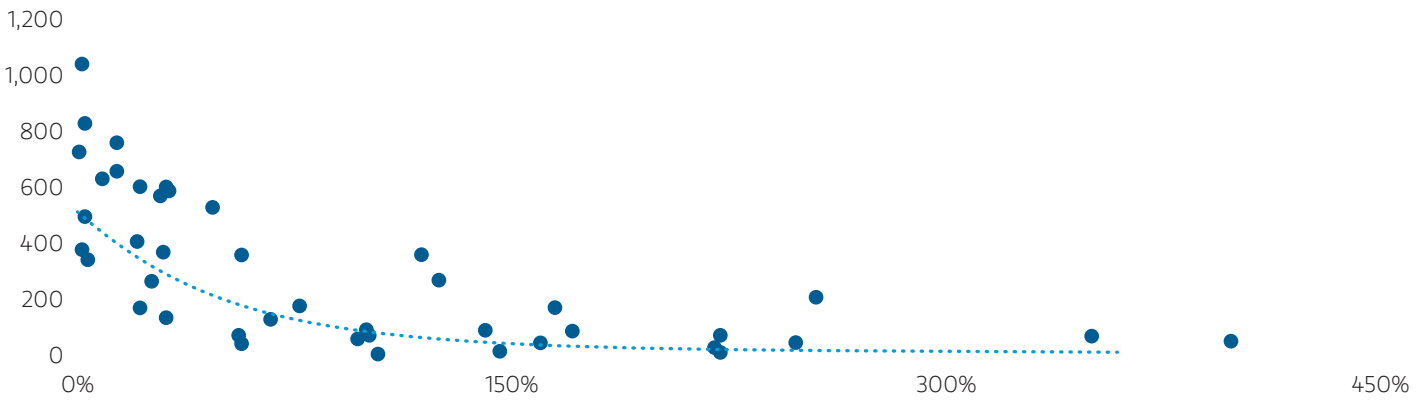
Strictly speaking, restructured utilities do not control the power generation from which they procure electricity, though some may be able to exercise a degree of influence. Vertically integrated utilities in general are retiring coal and older gas generation and building renewables to replace the capacity. Restructured utilities, on the other hand, are limited to investing in transmission and distribution networks (which is commendable in its own right, as it enables renewable deployment) but must rely on their counterparties to drive down the emissions of their systems. Whether emissions progress in deregulated markets will outpace regulated markets remains to be seen, but there is little doubt the lack of operational control creates a less transparent pathway to decarbonization.

We see risks to stakeholders, as externalities like greenhouse gas emissions are internalized and costs passed on to customers. Socializing these increased costs is likely

DISPLAY 6

Emissions Intensity Scope 1 & 2 vs. ESG Relative Ownership

Emissions Intensity



Source: Calvert Research & Management, Bank of America Research. Note: emissions intensity defined as metric tons of emissions divided by million dollars of enterprise value. Emissions data latest available, ownership data as of December 31, 2023.

"Climate leadership comes from providing transparent disclosures, committing the necessary capital, and engaging with stakeholders to reduce full-scope emissions, not from favorable reporting boundaries between Scope 1 and Scope 3."

to make the energy transition inflationary, pressuring both affordability and reliability, particularly in markets that have not made substantial progress in transitioning to low-carbon generation. The prospect of new regulations have the potential to create issues for poorly positioned utilities, where such regulations are likely to have an impact on customers. We believe a portion (and perhaps a significant portion) of the cost of compliance will ultimately be borne by shareholders.

Future environmental compliance costs could be substantial and are likely to be complicated by the aforementioned reliability concerns. The electric grid is already under strain from the physical impacts of climate change, seen in California where frequent power shutoffs are used to manage wildfire risk, or Louisiana, where hurricanes can leave customers without power for weeks.[7] On the other side, rising electricity demand from data centers (and eventually AI) is challenging existing decarbonization plans and prompting some utilities to push out planned coal retirements.[8] Reliability issues may require some utilities to divert capital to maintain service quality, which will further constrain the capacity to further invest in decarbonization. As such, it is critical to have a consistent basis for comparing current emissions of utilities in order to properly assess climate risk.

This is not to suggest that restructured utilities do not have a place in sustainable portfolios. There are many reasons investors might consider allocating capital to these companies, in our view—they have lower stranded asset risks (owing to a lack of fossil fuel power generation), abundant low-risk investment opportunities in grid modernization, and tend to operate in more climate-aligned jurisdictions—but they are not inherently greener than their vertically integrated peers. We see climate leadership exhibited by utilities in both groups, but this leadership comes from providing transparent disclosures, committing the necessary capital, and engaging with stakeholders to reduce full-scope emissions, not from favorable reporting boundaries between Scope 1 and Scope 3.

2 Emissions Targets: Apples and Oranges

Having established a consistent basis for comparing current emissions, we turn our attention to emissions reduction targets and how this information can be standardized. In doing so, we identify the utilities that will experience the greatest rate of change over the coming years—in this analysis specifically—through 2030. Emissions targets in the utilities sector are closely watched due to their wide-ranging impact. These emissions make their way into every other company's emissions supply chain, typically in Scope 2. Simply said, the rate of decarbonization of utilities will either make or break the decarbonization potential of the broad economy. And this impact will only grow as electrification of the economy gathers pace.

[7] New York Times, "3 Weeks After Hurricane Ida, Parts of Louisiana Remain Dark," 2021
[8] Bloomberg, "AI Needs So Much Power That Old Coal Plants Are Sticking Around," 2024

"The average utility markets a 65% reduction in emissions through 2030, but after standardizing base years to 2022 and factoring in the full emissions footprint of Scopes 1-3, we observe an average reduction target of less than half that amount at 27%."

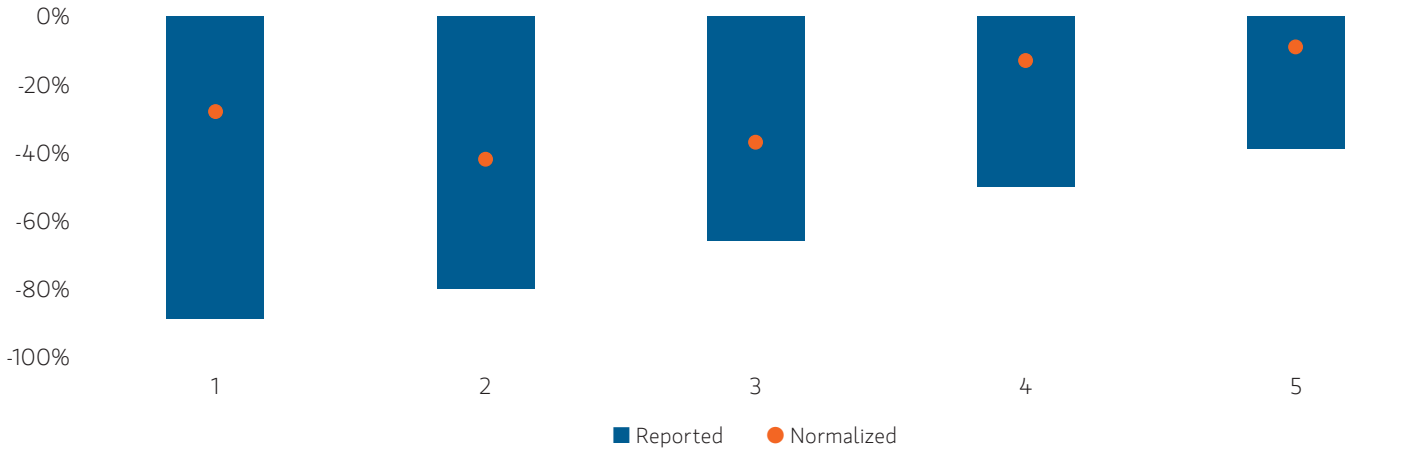
Why This Matters for Investors

Emissions targets are important because they are often a significant and visible part of a company's corporate sustainability strategy, representing a signal to investors and stakeholders, and conveying important information about the economics of decarbonization. We believe the utilities with the most aggressive targets are almost always decarbonizing because of strong economics; otherwise, they would not do it. The challenge is that every company has its own reporting basis and methodology for tracking emissions reductions, making direct comparison difficult. The standardization process can be manual and time-consuming, but thorough analysis can yield powerful insights that allow investors to direct capital to the best opportunities.

Not surprisingly, utilities are keen to show strong "headline" emissions reductions, which is to say, technically accurate, but often calculated in ways that are flattering and may limit their usefulness for comparison. Consistent with standard reporting practices, most targets are based off decades-old baselines, leaving unanswered how much progress has been truly made since intentional efforts to reduce emissions were put into place and how much is left to go. Consider an anonymized vertically integrated utility, Company B. Company B markets a 50% emissions reduction through 2030, but does so utilizing a 2005 baseline, and achieved their target several years ago. While the company secured regulatory approval to retire a portion of its coal fleet in the late 2020s,[9] investors are left to speculate on what the emissions trajectory looks like between now and 2030.

DISPLAY 7

2030 Reported Emissions vs. Normalized Emissions Reduction Targets by Quintile



Source: Calvert Research & Management, Company Reports. Note: Emissions data latest available. Reported emissions defined as company emissions targets relative to a stated base year and stated scope of emissions. Normalized emissions are Calvert estimates defined as company emissions targets relative to current year emissions across Scope 1, 2 & 3. Normalized emissions may contain estimated figures when reported emissions are not available.

[9] Company B, 2022 Integrated Resource Plan

Standardizing Emissions Targets

If the goal is to avoid comparing apples and oranges, it can be said that current emissions reporting is a veritable fruit salad. For a comparison to be meaningful, it must measure the same thing and start from the same baseline. We see several areas where reporting can distort the way utilities report their targets that prevent investors from easily making an apples-to-apples comparison.

BASE YEARS: Within our sector coverage, 2005, 2015 and 2019 are common base years for emissions targets. Each of these base years corresponds to important climate milestones like the Kyoto Protocol, the Paris Agreement, or the last pre-pandemic year. Different base years can conflate historic progress with expected progress, even with the same end state, say "net-zero by 2050." For example, a company with a base year of 2005 for its targets has a decade of progress in meeting targets compared to a company using a base year of 2015.

TARGET YEARS: 2030, 2040 and 2050 are common years for targets. In many cases, companies with 2050 targets have also set intermediate targets for 2030 or 2040. This gives investors more insight into the pace of investment needed to achieve further emissions reductions. Problems arise when attempting to interpolate interim targets since emissions in the utilities sector is not linear. In some cases, the majority of emissions may come from a few power generation assets, meaning the emissions see a step-change on the dates when these assets are retired.

SCOPE OF TARGETS: Most companies have set targets for Scope 1 & 2 emissions. Some utilities include Scope 3 targets, and we expect this will become more common. We favor utilities that set targets across all three scopes, which we believe creates a more resilient decarbonization strategy by encouraging utilities to engage with stakeholders to lower emissions across their system.

RESTATEMENTS: Typically, M&A activity resets the emissions and emissions intensity baseline for a utility. Utilities have been criticized for divesting high-emitting assets to artificially lower reported emissions without driving climate action. In our view, divestment of high-emitting assets can be considered a viable strategy only if the new owner commits to exercising proper stewardship of the assets.

EXCLUSIONS: In some cases, entire businesses are excluded from company-level emissions targets, most commonly because they are difficult to decarbonize and throw cold water on otherwise ambitious-looking emissions targets. While exclusions can allow similar business units to be compared more easily, we believe it is important to have comprehensive company-level targets.

In other cases, company-level targets may focus only on certain segments or exclude indirect emissions like Scope 3. For example, an anonymized restructured utility, Company C, markets a 100% emissions reduction through 2050, but excludes Scope 3, which, in their case, accounts for more than 99% of the emissions footprint.[10] While we expect Company C to see meaningful full-scope decarbonization between now and 2050, given the jurisdictions they operate in, the scope of their target is so narrow, it provides almost no information to make such an assessment. All this to say, direct comparison

> "The good news is all utilities studied in this analysis expect to reduce emissions, but the pace is uneven, and we advise not taking these numbers at face value."

across peers is not possible without careful adjustment, and there is a clear tendency to overstate emissions reductions.

In *Display 7*, we look at how some of the largest utilities in our coverage communicate emissions targets. We have collected the reported "headline" numbers found in their sustainability reports, presentations and regulatory filings, and compared them with our estimates of forward-looking targets through 2030. Notably, the average utility markets a 65% reduction in emissions through 2030, but after standardizing base years to 2022 and factoring in the full emissions footprint of Scopes 1-3, we observe an average reduction target of less than half that amount at 27%. Some cases are particularly stark, including several utilities marketing carbon neutrality by 2030, but excluding more than 95% of their true emissions footprint from their targets. We adhere to the view that companies should frame targets in the context of full value chain emissions rather than narrowly targeting carbon neutrality in convenient business segments, prioritizing real decarbonization over the use of market mechanisms like carbon offsets. For the record, we do not see any utility in our coverage coming close to true carbon neutrality by 2030.

We do not see this overstatement phenomenon as a case of deliberate deception or "greenwashing," but rather a combination of industry reporting practices and prevailing carbon accounting standards like the GHG Protocol,

[10] Company C, 2022 Corporate Sustainability Report

"The energy transition is inherently socioeconomic, so changes in where we get our energy are certain to be used as a mechanism by governments to promulgate various economic and social policies."

which at times can obscure rather than clarify. Still, the gap in reported versus normalized emissions reductions is significant and downplays the climate risk carried by these utilities. The good news is all utilities studied in this analysis expect to reduce emissions, but the pace is uneven, and we advise not taking these numbers at face value.

Calvert's Approach to Emissions Targets

When evaluating a company's emissions profile, we take a holistic approach. In this analysis, we consider their entire value chain—Scope 1, 2 & 3 emissions—using third-party estimates when companies do not report their own Scope 3 emissions. We then standardize emissions targets by benchmarking all companies in the analysis to the most recently available data, effectively creating a new base year—in this analysis, 2022—to isolate past progress from future commitment. The approach sounds simple, but often involves significant engagement with the companies to verify details. Many companies have different base years for each subsidiary business, and some have not disclosed a breakdown of base year emissions by segment. In other cases, companies do not provide absolute targets, but instead provide intensity targets that include assumptions on volumes of electricity to be generated and sold. These cases require parsing company filings to get the necessary data (plus a fair bit of estimation) to convert intensity targets to absolute targets.

Within the set of companies in this analysis, the current emissions intensity of companies aligned with the Calvert Principles is 12% lower than misaligned names (which are ineligible for investment in Calvert portfolios) on a full-scope basis. Further, eligible names expect to decarbonize twice as fast through 2030, which will further widen the performance gap through the end of the decade. All else being equal, we believe more aggressive decarbonization will require larger capital investment.

3 Credibility of Decarbonization Plans

Even the most ambitious of climate transition plans need to be executed on, and that will require access to capital. The best estimates indicate that completely decarbonizing the global energy system could cost upwards of $200 trillion, and while governments have significant levers they can pull to guide action, the sheer magnitude of investment

DISPLAY 8
Emissions Reductions 2022-2030 by Calvert Eligibility

ELIGIBILITY	CURRENT EMISSIONS (MT)	EMISSIONS REDUCTIONS (MT)	PERCENT REDUCTION	2022 TCO_2/EV	2030 TCO_2/EV
Eligible	952	-306	-32%	719	488
Ineligible	502	-81	-16%	818	686

Source: Calvert Research & Management, Company Reports, data as of April 30, 2024. Note: Emissions data latest available. Projections are based on Calvert estimates.

[11] Washington Post, "$200 Trillion Is Needed to Stop Global Warming. That's a Bargain," 2023

will require deep pools of private capital to finance the energy transition.[11] For this to happen, a widening base of investors will need to view decarbonization as an attractive and productive use of capital, or else be crowded out by more compelling opportunities elsewhere. Simply said, the energy transition will not happen if it's not supported by strong returns.

Structural changes in the energy system are being driven, in part, by coordinated government action to mitigate the most devastating impacts of climate change, but they are also being driven by a variety of other competing factors, including energy access, energy security, economic development, resource scarcity and geopolitics. The energy transition is inherently socioeconomic, so changes in where we get our energy are certain to be used as a mechanism by governments to promulgate various economic and social policies.

As such, we evaluate the credibility of emissions targets by considering the underlying economics of these decarbonization plans and the characteristics of regulatory jurisdictions that are effectively and responsibly facilitating the energy transition.

Regulated Economics

The way utilities make money has less to do with the volumes of electricity sold and more to do with the archaic-sounding concept of rate base, or regulated asset base (RAB). Regulated utilities are permitted to operate as monopolies, but they have their revenues set to levels that approximate the return on capital of comparable, competitive industries, often called a cost-of-service model. The cost-of-service model allows utilities to pass through all prudently incurred costs to customers (including, for instance, a future carbon price) while also earning a consistent rate of return on the capital they invest. The invested capital is called rate base, and includes all assets used in providing service to customers, including power plants, transmission lines, substations, distribution networks and much more. The rate of return a utility is allowed to earn is periodically determined by the respective regulatory commission. In *Display 9*, we show an example of how profitability is calculated for a utility with a $500 million of rate base. In this case, the utility would be allowed to set electricity prices to a level that recovers all operating costs plus a profit of $25 million.

DISPLAY 9
Rate Base Economics Example

Rate Base ($M)	$500
Equity Ratio (%)	50%
Authorized Return on Equity (%)	10.0%
Authorized Net Income ($M)	**$25**

Source: Calvert Research and Management

Regulatory commissions are the powerful bodies that oversee regulated utilities the world over. They often have the final say on how and when the utilities invest their capital, wielding both carrot and stick. These regulators preside over regulatory reviews called rate cases, often utilizing financial frameworks, like the capital asset pricing model (CAPM), to determine an appropriate rate of return. Regulatory reviews vary by jurisdiction; some happen annually, while others utilize multiyear planning periods, like the RIIO model used in the U.K. Regulatory reviews are lengthy legal proceedings, where stakeholders share information, present testimony, and hold public hearings.

"In highly regulated industries with vested public interest, decarbonization is not a unilateral decision by a company, but a multilateral agreement among stakeholders."

"Regulatory pathways are best viewed as a floor, not a ceiling, on decarbonization potential. Through their own effort, utilities can do better, but in our view, will not have the latitude to do worse."

Regulated economics provide utilities with exceptional financial visibility (in essence, a utility knows what the economic outcome will be before they invest the first dollar in a project) and an incentive to continuously invest in and maintain their systems. And the results have been impressive: today, the U.S. electric grid operates at 99.95% reliability, with a prevailing standard of two outages per year for less than two hours each for the average customer.[12]

Decarbonization in the utilities sector, like all sectors, hinges on the economics, so sustainable investors must understand both. To illustrate the mathematical connection between decarbonization and economics, we consider a hypothetical electric utility that plans to replace a 30-year-old 1,000 MW coal plant with renewable energy. In this example, the company originally invested $1.5 billion to build the coal plant, whose value has depreciated down to $203 million in the three decades of service. The utility is authorized by their regulator to earn a 10.0% return on equity (ROE) assuming a 50% equity ratio on this $203 million, which results in $10 million in authorized profit. If the utility were to retire this plant and replace the capacity with 1,200 MW of solar for $1.5 billion, the regulatory framework would permit them $75 million in profit—a significant uplift in earnings that also improves its emissions profile.

DISPLAY 10

Rate Base Economics Example

Replacing Coal With Renewables

GENERATION ASSET	COAL	RENEWABLES
Capacity (MW)	1,000	1,200
Capacity Factor (%)	40%	33%
Annual Generation (GWh)	**3,504**	**3,504**
Construction Cost ($/kW)	$1,500	$1,250
Current Rate Base Value ($M)	$203	$1,500
Equity Ratio (%)	50%	50%
Authorized Return on Equity (%)	10.0%	10.0%
Authorized Net Income ($M)	**$10**	**$75**

Source: Calvert Research and Management

Regulated economics are at work across the sector, as utilities invest capital to install renewables and modernize transmission and distribution networks while growing their rate base and consequently their earnings. The strong alignment between economics and sustainability enables utilities to improve their earnings and emissions profile at the same time, a unique quality that makes utilities an attractive risk-adjusted way to gain exposure to the energy transition. That said, the ability to secure regulatory approval to invest significant capital into fleet transition depends on the ability to provide safe, affordable and reliable service, and the resulting impact on the regulatory environment.

Regulatory Pathways

Our investment framework for utilities is built on an important premise: in highly regulated industries with vested public interest, decarbonization is not a unilateral decision by a company, but a multilateral agreement among stakeholders. The financial incentives for new investments are firmly in place due to attractive regulated economics, but utilities are all over the map in terms of progress on decarbonization and planned investment in fleet transition, so there's more to it than just the economics.

[12] EIA, "US Electricity Customers Averaged Five and One-Half Hours of Power Interruptions in 2022," 2024

"The key technological building blocks for decarbonizing the electric grid are in place—solar, wind and battery storage. The question that remains is which utilities have the necessary mandate to deploy the required capital to scale these solutions within existing regulatory frameworks."

The regulators discussed above, to whom utilities are beholden, are composed mostly of political appointees. As such, the sector at times exists in the space between private company and public agency, and must balance a disparate set of stakeholders, including customers, politicians, labor unions, indigenous communities and environmental groups. These stakeholders are highly influential in the regulatory process, and their positions on decarbonization carry significant weight. Regulators pay close attention to whether positive outcomes are being created for stakeholders. In some cases, competing priorities are balanced against decarbonization, for example, the importance of the fossil fuel industry to local economies, or the significant costs imposed on low-income communities from hurricane storm restoration. We advise not dismissing the lack of progress on decarbonization as inherently ideological (because often it is not), but rather seeking out productive engagement opportunities to address these concerns.

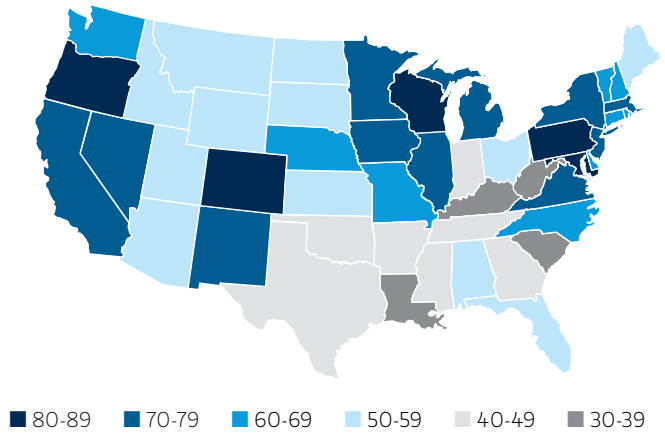
We believe that decarbonization for regulated utilities happens through what we call *regulatory pathways*, and these pathways are a key point of differentiation in our investment framework. Stronger regulatory pathways are a product of both factors inherent to the geographies in which utilities operate, and those over which utilities exercise some level of control. We believe all utilities will see progress on decarbonization, but those with the strongest support from regulators and other key stakeholders will decarbonize faster, likely with higher returns and lower risk. Weaker pathways do not reduce climate risk, but rather constrain investment and limit the ability of utilities to manage this risk.

Calvert employs a proprietary, first-of-its-kind metric to evaluate these pathways called the Calvert Regulatory Pathways to Decarbonization (CRPD). The CRPD expands our scope of governance beyond the four walls of the company headquarters and considers the positions and priorities of stakeholders and how those positions influence the regulatory process. The CRPD is based on several quantitative metrics that assess the regulatory pathways and thus the mandate for utilities to deploy capital into fleet transition and decarbonize their operations. The CRPD incorporates data on state clean energy targets, reliability, affordability, regulatory stability, supportive legislation and more. We see the strongest investment opportunities for the utilities operating in constructive jurisdictions, with the most notable states being Colorado, Maryland, Oregon, Pennsylvania, Wisconsin and Iowa. Based on the 2022 federal election, the highest scores came from states across the political spectrum, which supports our assessment that the CRPD is much more than a political barometer.

"We see a compelling opportunity to underwrite the transition to a low-carbon economy with a transparent and financially material investment framework."

DISPLAY 11

Calvert Regulatory Pathways to Decarbonization for the US



Source: Calvert Research & Management, data as of December 31, 2023

The CRPD produces a consistent investment signal across our coverage, with the highest scores associated with premium market valuations, which we believe reflects the superior growth and lower risks in those jurisdictions. In addition, we believe that future changes in regulatory pathways are likely to result in higher market multiples, rewarding investors in improving jurisdictions. This is not to say utilities located in jurisdictions with weaker pathways are necessarily mismanaging their climate risk, indeed we have identified several utilities that are markedly outperforming their regulatory pathways.

The CRPD is best viewed as a floor, not a ceiling, on decarbonization potential. Through their own effort, utilities can do better, but in our view, will not have the latitude to do worse. Developing a decarbonization plan is generally the easy part. The hard part is executing on the plan in the face of rising affordability and reliability risks. We believe jurisdictions with the strongest pathways provide the necessary support for utilities to set and maintain ambitious and responsible climate commitments.

DISPLAY 12

Market Valuation vs. CRPD

CRPD QUINTILE	5	4	3	2	1
Price/Earnings	18.2x	19.0x	18.1x	20.4x	21.9x
Price/Book	2.0x	1.6x	1.8x	2.2x	2.3x

Source: Calvert Research & Management, Company Reports, Bloomberg data as from December 31, 2018 to December 31, 2023. Note: Sample includes US companies with > 90% regulated earnings based on Calvert estimates and excludes California utilities EIX and PCG.

The market is already beginning to ascribe some value to the concepts contained in the CRPD; US companies in the highest quintile have traded at a 20% valuation premium to the peer average over the past five years (see *Display 12*), but companies in the lowest quintile do not yet trade at a discount. We think this makes sense—the growth opportunities afforded by stronger regulatory pathways are already tangible, but the downside risks of weaker pathways will materialize over time. This is consistent with our view that the market today is more efficient at climate opportunities than climate risks, given the latter tend to be longer-dated. Over time, we believe the market will efficiently price both. The qualities that make up the CRPD are acknowledged as indications of high-quality utility operations, but the concept is not fully understood by the market and rarely used as a foundation for an investment framework. As such, the CRPD provides unique insight into the long-term earnings potential of utilities with the strongest regulatory pathways.

4 Putting it All Together—the Energy Transition Investment Factor (ETIF)

As the final step in our framework, we put these components together to assess regulatory risk-adjusted emissions reductions through 2030 and employ a simple economic framework to estimate the potential investment

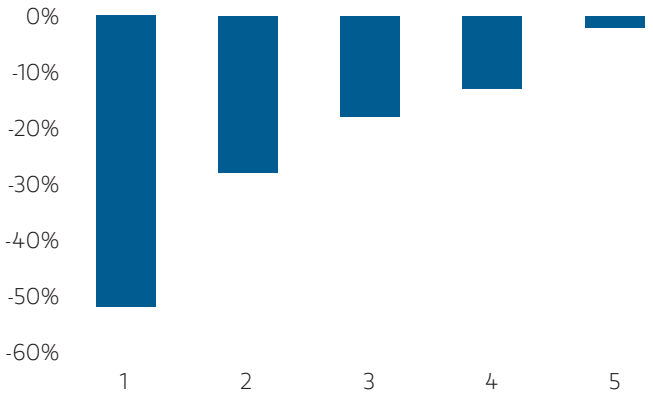
opportunity in reducing those emissions. Together, these factors represent the Energy Transition Investment Factor (ETIF) for our utilities sector coverage.

Our ETIF framework incorporates full-scope emissions for each utility, our proprietary estimates for emissions reduction targets through 2030, and a discount factor, which is driven by our proprietary regulatory pathway metric, the CRPD. We operate under the assumption that each company's emissions target reflects their understanding of what is technically feasible. We then add in a discount factor based on the CRPD that reflects how much of each target we view as likely, given existing regulatory pathways. The discount factor varies from a maximum of 100% credit and a minimum of 25% based on jurisdiction scores, and we then calculate a company-weighted average CRPD. The key technological building blocks for decarbonizing the electric grid are in place—solar, wind and battery storage. The question that remains is which utilities have the necessary mandate to deploy the required capital to scale these solutions within existing regulatory frameworks.

The results of this analysis yield a range of likely decarbonization outcomes (both in terms of absolute and proportional emissions reductions). We see the highest quintile of companies achieving more than a 50% reduction in emissions, and almost none in the lowest quintile through 2030. The ETIF framework is useful in several respects. First, it allows us to limit transition risk in companies that are behind the curve on decarbonization and in so lagging, accruing climate and regulatory risk that can crystalize into financial risk in the future. Second, it allows us to direct our capital toward companies with the largest investment opportunities to decarbonize.

DISPLAY 13

2030 Adjusted Emissions Reductions by ETIF Quintile

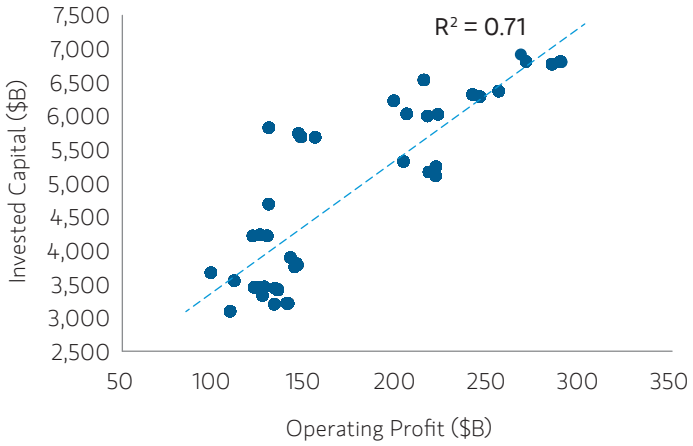


Source: Calvert Research & Management, Company Reports, data as of April 30, 2024. Note: Adjusted emissions reductions are projections based on Calvert estimates.

As discussed, the utilities sector's earnings potential is driven, often formulaically, by regulated economics, which set profitability based on total invested capital, or rate base. In *Display 14*, we show a 10-year regression of the sector's operating profit versus. invested capital, which shows the close statistical relationship between the two variables. Specific to the utilities sector, the capital investments needed to meet decarbonization targets are likely to result in higher earnings, though the details will vary by company. For vertically integrated utilities, most of the investment opportunity should come from reducing Scope 1 & 2 emissions by transitioning their generation fleets from fossil fuels to renewables. Restructured utilities, which do not own generation assets, will need to find investment opportunities within their Scope 3 emissions, which should come from expanding and modernizing their electric grids, connecting new renewables to market, and enabling electrification of customers. The majority of these investments will fall within the regulated economics of rate base.

DISPLAY 14

Utilities Sector Operating Profit vs. Invested Capital



Source: Calvert Research and Management, Bloomberg quarterly data 2013 through 2023

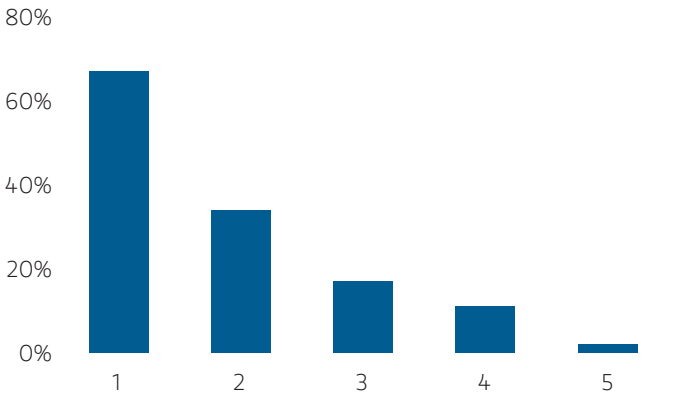
With the certainty afforded by regulated economics in mind, we estimate the rate base investments required to meet these emissions reductions. This is not a fixed constant and depends on the circumstances specific to the company. We have found that public estimates from recent green bond disclosures show investments of $600-$1,000 per ton of avoided emissions among utilities. We note that these reported figures are significantly lower than our own internal estimates, which range from $1,100-$1,800 (the former figures indicating a higher effectiveness at

converting capital into avoid emissions). This latter set of estimates standardize a set of feed-in assumptions used to calculate avoided emissions by utilities, and, in our view, are more accurate.

For this analysis, we assume $1,000 per ton of avoided emissions and calculate the total capital that would need to be invested by each company through 2030 (thus for the purposes of our analysis, results in a conservative estimate of total capital required). We then apply an unlevered return on capital of 5% (which approximates current regulated economics of a 50% equity ratio and a 10.0% ROE). In this case, a $1,000 investment with a 5% return would produce $50 of recurring earnings per ton of CO_2 reduced.

DISPLAY 15

2030 Green Earnings Uplift Potential by ETIF Quintile



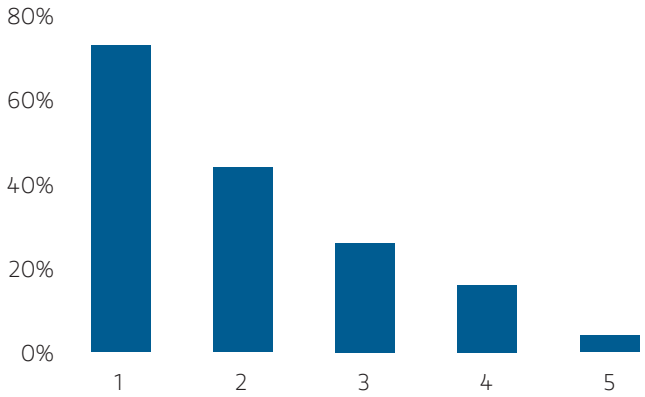
Source: Calvert Research & Management, Company Reports, data as of April 30, 2024. Projections are based on Calvert estimates.

The results of the analysis are striking, but not altogether surprising. The companies in the highest quintile show significant potential earnings uplift from green investments, while the lowest quintile show almost no benefit. This is not to suggest that the lowest quintile utilities will not grow earnings, but rather the growth is likely to come from lower-value investments that do not improve their emissions profile, such as additional fossil fuel infrastructure. For the utilities positioned to invest heavily in decarbonization, we see a beneficial cycle where lower emissions have the potential to lead to higher earnings as well as improved access to capital (stemming from a wider investor base), improving company valuation and amplifying the impacts of those green investments.

Finally, we compare the potential earnings growth from decarbonization investments through 2030 to the long-term earnings growth guidance issued by each company. We compare these figures to estimate what proportion of long-term earnings growth will need to come from decarbonization investments in order to meet stated emissions targets. Our analysis indicates that the highest quintile utilities will see more than 70% of long-term earnings growth come from green investments (including grid modernization), while the lowest quintile utilities may see less than 5% of earnings growth come from decarbonization.

DISPLAY 16

2022-2030 Green EPS Growth Mix by ETIF Quintile



Source: Calvert Research & Management, Company Reports, data as of April 30, 2024. Projections are based on Calvert estimates. In cases where long-term growth guidance is provided as a range, the midpoint is used. Equity dilution is calculated in line with a hypothetical 15% FFO/debt capital structure.

Calvert's Energy Transition Investment Factor (ETIF) incorporates both sustainability and economic analysis, providing a robust climate-integrated investment framework that seeks to identify companies that we believe will generate the greatest shareholder value while simultaneously delivering the greatest societal impact. We see a sector that is tantalizingly close to unlocking its decarbonization potential. The positive rate of change within the sector is impressive, and we see a compelling opportunity to underwrite the transition to a low-carbon economy with a transparent and financially material investment framework.

The energy transition will be complex, but we believe utilities are positioned to create significant value as the cornerstone of the electric economy. The utilities sector, like all high-emitting sectors, is often shunned by sustainable investors over concerns about financed emissions. We offer up a different solution: focus on financing emission reductions.

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