

May 2024

Sustainable Equity: Sustainability and impact report

Putnam Sustainable
Leaders

Putnam Sustainable
Future

May 2024

Dear investors, partners, and friends,

Over the past few years, communities, companies, and the stock market have all experienced an unusual mix of shocks, recoveries, challenges, and opportunities. Throughout this period, both strengths and shortcomings have been revealed.

For our team, the investments we've made in time, energy, and resources have created a foundation we can rely upon in all types of circumstances, keeping a clear view of our "true north" of process and purpose. Examples of our research process are found throughout this report, including the deep-dive exploration of water-related opportunities in section 3.

Perhaps most important, we've continued to benefit from the strong collaborative spirit across the entire Putnam investment team. As Putnam becomes part of the Franklin Templeton organization this year, we look forward to working with an expanded group of colleagues to continue to serve our clients.

Despite the sobering realities of the past several years, we have been heartened by the leadership, compassion, and generosity shown by so many. Corporate leaders have created new ways to support and develop their teams; new technologies have increased the effectiveness of many business processes; and innovations to improve human health, advance the circular economy, improve resource use, develop biological solutions, and decarbonize operating systems and our atmosphere have accelerated.

Dynamic circumstances can remind us of what is constant. We believe that companies helping to solve the world's most pressing needs have the chance to develop successful businesses. We believe that companies with relevant, leading sustainability strategies can prove to be more resilient than others over the long term. We believe that active management has the potential to add unique and meaningful value to the practice of sustainable investing. We believe that current conditions will illuminate new opportunities and solutions that contribute to thriving people, institutions, society, planet, and economy.

We deeply value your partnership and trust. We will continue to work hard and with the highest integrity on your behalf, connecting investing with the world it is intended to serve.



Katherine Collins, CFA, MTS
Head of Sustainable Investing

“Try to love the questions themselves, like locked rooms and like books that are written in a very foreign tongue. Do not now seek the answers, which cannot be given you because you would not be able to live them. And the point is, to live everything. Live the questions now. Perhaps you will then gradually, without noticing it, live along some distant day into the answer.”

Rainer Maria Rilke, *Letters to a Young Poet*¹

Introduction

We are pleased to share our sixth annual commentary for Putnam Sustainable Leaders and Putnam Sustainable Future. The portfolios share a goal of long-term capital appreciation, and we aim to identify investments where excellence in sustainability leadership or solutions is fueling potential financial performance. We believe that business-relevant sustainability leadership and solutions-focused innovation can create compelling investment opportunities.

Thoughtful fundamental research is at the heart of our investment process, and the same research-centric approach is reflected in the form and substance of this report. Our intention is for this document to provide views of our investment process, certain sustainability metrics, and the thematic research that complements our company-specific fundamental analysis. At the same time, we recognize that point-in-time analysis has inherent limitations, especially in a field that is actively growing and developing.

We are intense researchers and eager to share the information and indicators in this report with you, and we are equally eager to share the questions that warrant ongoing research. Sustainability issues and environmental, social, and governance (ESG) data continue to evolve and develop, and the answers we have are not always complete or easily represented by simple empirical outputs. Therefore, we view this report as part of an ongoing dialogue with our investors and as part of our research process. For all lines of inquiry, we aim to combine thoughtful analysis with an active and iterative questioning process.

In years to come, we look forward to sharing continued progress with you, so eventually we will “live into the answers.”

No assurance can be given that the investment objective will be achieved or that an investor will receive a return of all or part of their investment. Actual results could be materially different from the stated goals. Investors should carefully consider the risk involved before deciding to invest. As with any investment, there is a potential for profit as well as the possibility of loss. Investing with a focus on ESG-impact companies may cause the strategy to forego otherwise attractive investment opportunities or may increase or decrease the strategy's exposure to certain types of companies and, therefore, to possibly underperform strategies that do not invest with a similar focus.

Report highlights



INVESTMENT PROCESS AND ENGAGEMENT

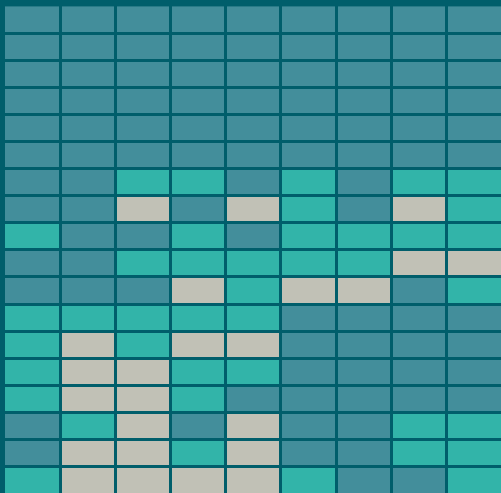
An in-depth look at our investment process, including our integrated fundamental research and our approach to engagement



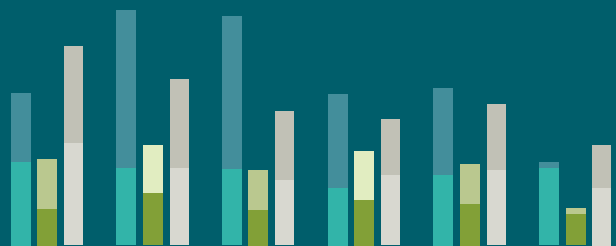
PORTFOLIO ANALYSIS AND ESG METRICS

Analysis of our portfolios according to a number of ESG-related metrics

MATERIALITY MAP



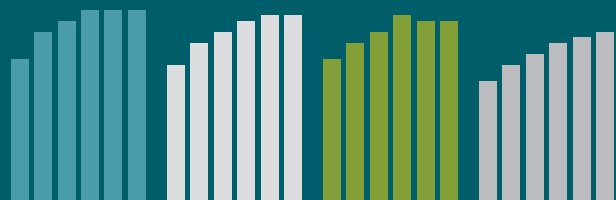
CARBON INTENSITY



SUSTAINABLE INVESTING LANDSCAPE MAP



WOMEN AT LEAST 30% OF BOARD





INVESTMENT THEMES AND SUSTAINABILITY SOLUTIONS

A description of our investment themes and related company examples, and how this research translates to a more complete investment understanding

This year, we highlight the importance of water systems and the variety of business models that are engaged in water-related leadership and solutions providers.

MAPPING THE WATER CYCLE TO BUSINESS SOLUTIONS



A note on metrics and measurements

The field of sustainable investing continues to develop at a rapid pace. This means the data and tools we have available to analyze relevant sustainability issues are also developing, and they are not yet fully standardized or complete.

For the purposes of this report, we have chosen several portfolio-level metrics that give an indication of our sustainability characteristics, recognizing the range of reportable measures will continue to improve in quality, specificity, and usefulness over time. We believe the metrics reported here to be as accurate as possible, and we have provided extensive commentary on how and why we use the measures noted so readers have additional context for interpreting the information presented. In this regard, the report reflects the nature of our fundamental research, where we always aim to understand data within its relevant setting, not in isolation. It is also important to note that all investing involves risk, and favorable sustainability or ESG metrics for a portfolio do not guarantee positive investment results.

In order to provide the most straightforward sustainability analysis with the most complete underlying data, we have chosen to compare certain metrics for our portfolios with the same measures for the S&P 500 Index. The financial performance benchmark for Putnam Sustainable Leaders is the S&P 500, and the benchmark for Putnam Sustainable Future is the Russell Midcap Growth Index.²

Please note that this report is not meant to review the strategies' investment performance, performance of our individual holdings, or the financial performance of our strategy benchmarks. Content in this report is not intended to be comprehensive and does not reflect all relevant or recent developments. Sustainability and ESG metrics are not uniformly defined, and applying these metrics involves subjective assessments. Sustainability and ESG metrics can vary across third-party data providers and may change over time. ESG-related information generated by third-party data providers may be inaccurate, incomplete, inconsistent, and/or out-of-date, which may adversely impact analysis of the ESG metrics relevant to a company, issuer, or portfolio.

SECTION 1

Investment process

Research is the foundation that supports our process and products. Here we discuss the context for sustainable investing at Putnam and our integrated sustainable equity investment process.

Sustainable investing at Putnam

Putnam Investments is an active manager with \$90 billion in assets under management as of March 31, 2024, with more than 85 years of investment heritage. In May 2017, Putnam formed the Sustainable Equity team and appointed Katherine Collins, CFA, MTS, to the newly created role of Head of Sustainable Investing. In March 2018, we launched the Putnam Sustainable Leaders and Putnam Sustainable Future strategies.

Our central investment premise is that certain sustainability issues are increasingly important to long-term business outcomes, and yet they are structurally under-researched. This creates opportunity for active managers with strong research capabilities. Putnam's firmwide fundamental research strength, long-term stockpicking acumen, and collaborative culture all offer specific strengths that benefit our sustainable equity investment process.

Beyond these firmwide strengths, our Sustainable Equity team is composed of individuals with both deep fundamental investing expertise and deep sustainability expertise. Our holistic team design that combines these skills, rather than treating them as side-by-side specialties, creates unique strengths that align with our holistic investment process.

Finally, our investment focus on identifying companies where sustainability excellence can enhance long-term fundamentals is designed to extend and amplify the fundamental research strengths noted above. We believe that sustainability leaders and solutions providers have the chance to create business advantages and strong long-term returns. Concentrating our process on identifying these positive attributes allows our team to identify areas where we see the greatest potential for outperformance, and to focus on the stocks that deserve to be included in our portfolios.

Over the past seven years, our team has continued to develop and now includes:



Katherine Collins, CFA, MTS
Head of Sustainable Investing
and Portfolio Manager



Stephanie Dobson
Portfolio Manager



Alexander Rickson, CFA
Portfolio Manager,
Quantitative Analyst



Samuel Alpert
Equity Analyst



Rob Forker
Equity Analyst



Devin Ahearn
Equity Associate



Mary Catherine Landy
Sustainability and
Stewardship Analyst



Michel Boulos, CFA, CAIA
Senior Investment Director,
Global Business Development

Firmwide research integration

Building on Putnam’s long-standing research strengths, over the past seven years, the firm has developed a fundamentally centered approach to analysis of environmental, social, and governance issues. Our Sustainable Equity team extends this firmwide foundation further to develop research and investment processes that support our dedicated products.

As noted in Putnam’s ESG policy, we believe that certain environmental, social, and governance factors are relevant and material to long-term business fundamentals and, therefore, important to all investors.³ Relevant issues vary by sector, geography, asset class, and company context.

Given this backdrop, Putnam’s ongoing ESG and sustainability research is guided by our internally developed materiality map, which was inspired and directly influenced by the work of the Sustainability Accounting Standards Board (SASB), now incorporated into the International Sustainability Standards Board (ISSB) and governed by the International Financial Reporting Standards (IFRS) Foundation.⁴ We believe this kind of integrated, long-term research focus has the potential to mitigate risk and to generate alpha.

In addition to information from company sources; government, non-profit, and scientific organizations; industry experts; and investment research providers, we also utilize ESG data from several third-party resources, including MSCI and Sustainalytics, as inputs to our research process.

We believe in the power of context-specific analysis. The map on page 7 shows that Putnam’s equity research focuses on different environmental, social, and governance issues for different types of businesses. We believe this kind of tailored and forward-looking research focus can contribute to long-term investment results.

ESG Integration: As part of our investment analysis, depending on the strategy or portfolio in question, we may integrate environmental, social, or governance (“ESG”) issues or considerations into our research and/or investment decision-making. At Putnam, we define ESG integration as the systematic inclusion of financially material ESG issues (including sustainability risks) as additional inputs into investment analysis and investment decision-making, where possible and appropriate. By considering financially material ESG issues across asset classes, we believe that ESG integration can inform better long-term investment decision-making and may contribute to long-term financial returns. As ESG integration is an enhancement to achieving a financial goal, we believe it can be applied across a wide spectrum of strategies and portfolios. The relevance and materiality of other ESG issues in our process will differ from strategy to strategy, from sector to sector, and from portfolio manager to portfolio manager. Unless stated otherwise in a financial product’s documentation, and included within its investment objective and investment policy, ESG integration does not change a product’s investment objective or constrain Putnam’s investable universe. ESG determinations may not be conclusive, and securities of companies/issuers may be purchased and retained, without limit, regardless of potential ESG impact. The impact of ESG Integration on performance is not specifically measurable as investment decisions are discretionary regardless of ESG considerations.

Putnam equity materiality map

		Consumer	Health Care	Financials	Tech (hardware)	Comm and Tech (software)	Industrials	Materials and Energy	Utilities	Real Estate
GOVERNANCE	Board structure and composition	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant
	Management incentives, ownership, and compensation alignment	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant
	Systemic risk management and leadership	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant
	Corporate purpose, culture, and strategic alignment	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant
SOCIAL	Diversity, equity, and inclusion	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant
	Employee well-being and development	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant
	Product impact and customer well-being	Most relevant	Most relevant	Often relevant	Often relevant	Most relevant	Often relevant	Most relevant	Often relevant	Often relevant
	Supply and distribution network management	Most relevant	Most relevant	Less relevant	Most relevant	Less relevant	Often relevant	Most relevant	Less relevant	Often relevant
	Privacy, data security, and data use	Often relevant	Most relevant	Most relevant	Often relevant	Most relevant	Often relevant	Often relevant	Often relevant	Often relevant
	Marketing and selling practices	Most relevant	Most relevant	Often relevant	Often relevant	Often relevant	Often relevant	Often relevant	Less relevant	Less relevant
	Pricing philosophy and access	Most relevant	Most relevant	Most relevant	Less relevant	Often relevant	Less relevant	Less relevant	Most relevant	Often relevant
	Climate change mitigation and adaptation	Often relevant	Often relevant	Often relevant	Often relevant	Often relevant	Most relevant	Most relevant	Most relevant	Most relevant
	Physical climate change risk	Often relevant	Less relevant	Often relevant	Less relevant	Less relevant	Most relevant	Most relevant	Most relevant	Most relevant
	Greenhouse gas (GHG) emissions	Often relevant	Less relevant	Less relevant	Often relevant	Often relevant	Most relevant	Most relevant	Most relevant	Most relevant
ENVIRONMENTAL	Energy intensity and renewable energy use	Often relevant	Less relevant	Less relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant	Most relevant
	Materials sourcing, intensity, and lifecycle management	Most relevant	Often relevant	Less relevant	Most relevant	Less relevant	Most relevant	Most relevant	Often relevant	Often relevant
	Water intensity and stress	Most relevant	Less relevant	Less relevant	Often relevant	Less relevant	Most relevant	Most relevant	Often relevant	Often relevant
	Biodiversity and ecosystems impact	Often relevant	Less relevant	Less relevant	Less relevant	Less relevant	Often relevant	Most relevant	Most relevant	Often relevant

Source: Putnam Investments, adapted from SASB Materiality Map, as of March 31, 2024.

■ Most relevant ■ Often relevant ■ Less relevant

Putnam Sustainable equity

Unlocking alpha potential through sustainability analysis

Putnam’s approach to sustainable equity investing offers three main attributes that reflect the strengths of our people, our investment process, and our portfolios:

1

**Dedicated
and integrated
investment team**

2

**Active fundamental
investment process
focused on key
sustainability issues**

3

**Inclusionary approach
results in high-conviction
portfolios driven by
stock-specific risk**

Dedicated and integrated investment team

We are investors first and foremost, and an integrated part of Putnam’s investment group. Katherine Collins, Stephanie Dobson, and Alex Rickson have led the team together since its formation, and the group now consists of eight dedicated professionals.

Portfolio Manager Katherine Collins has over 30 years of investment experience and was named to the inaugural Forbes “50 Over 50” list of leaders who are shaping the future of finance. She is a beekeeper, author, and founder of Honeybee Capital. Earlier in her career, she served as Head of Equity Research, Portfolio Manager, and Equity Research Analyst at Fidelity Investments. Katherine serves on several nonprofit boards, including the Santa Fe Institute, Harvard Divinity School Dean’s Council, and Wellesley Centers for Women. After nearly twenty years as a professional investor, she earned a Master of Theological Studies degree from Harvard Divinity School. Katherine is also an alumna of Wellesley College, where she earned a B.A. with honors, and is a CFA charter holder.

Portfolio Manager Stephanie Dobson has over 13 years of investment experience, including 7 years at Putnam Investments. She crafted Putnam’s approach to sustainable equity investing along with Katherine and Alex, and has been involved in portfolio management for all Putnam sustainable equity products since inception. Earlier in her career, she served as Equity Research Analyst across several sectors at Fidelity Investments. Stephanie serves on the board of directors of Rosie’s Place, a women-only sanctuary and shelter in Boston, and earned a B.A. from Middlebury College.

Portfolio Manager Alex Rickson has over 24 years of investment experience, including 22 years with Putnam. He is a member of the Sustainable Equity team and a Quantitative Analyst. Based in Putnam’s London office, he is responsible for portfolio construction, quantitative research, and risk management for a range of investment strategies. Alex’s expertise includes analysis and visualization of environmental, social, and governance data and its application to the processes of risk management and portfolio construction. He earned a B.A. from the University of Sheffield.

In addition to the dedicated Sustainable Equity team members, we include the entire research department and our fellow portfolio managers as colleagues and collaborators. Our work intertwines with Putnam's broader equity research and portfolio management team all day, every day. Our investment process incorporates sector analysis and stock recommendations from the core research team, and insights from other portfolio managers. We are supported by Putnam and Franklin Templeton expertise in risk oversight processes, trading platforms, and compliance procedures.

Likewise, our Sustainable Equity team's thematic and company-specific research is actively shared with the entire investment team, with a goal of benefiting the whole. We focus on research that highlights investment-relevant environmental, social, and governance issues, along with forward-looking thematic trends. Our company-specific research is intended to complement and extend the fundamental work of the core research team. In addition to the firmwide supports noted above, our work is also augmented by a series of internally developed tools that help us to assess ESG data and sustainability performance in a fundamentally relevant way.

Active fundamental investment process: Focused on key sustainability issues

We seek companies with effective sustainability strategies that drive superior fundamental prospects, and stocks that reflect reasonable valuations.

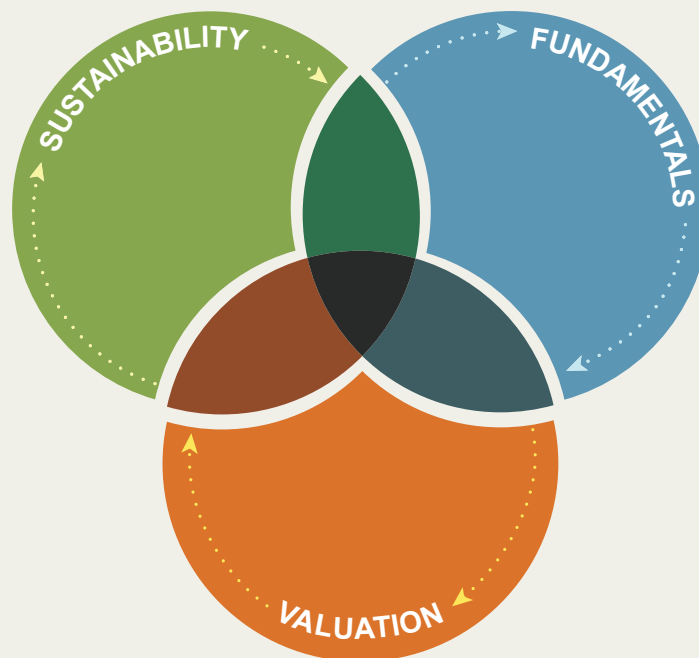
Specifically, we focus on identifying two types of companies where effective sustainability strategy can fuel fundamental success: sustainable leaders and sustainable solutions providers.

Focus on the most relevant sustainability issues and themes

Identify themes and issues where sustainability excellence and leadership can improve a company's business prospects

Take a disciplined approach to valuation

Assess valuation relative to business quality, growth prospects, and future cash flow generation



Identify compelling fundamentals

Look for durable growth, improving and defensible profit margins, high and improving returns on capital, and strong cash flow generation

For illustrative purposes only. No assurance can be given that the investment objective will be achieved or that an investor will receive a return of all or part of their initial investment. Actual results could be materially different from the stated goals. As with any investment, there is a potential for profit as well as the possibility of loss. Integration of environmental, social, and/or governance (ESG) factors into the investment process may not work as intended.

Portfolio management: Putnam’s inclusionary investment approach

Portfolio management

Putnam’s two mutual funds with a dedicated sustainability focus are Putnam Sustainable Leaders and Putnam Sustainable Future. Both portfolios are supported by the integrated research approach described above, each portfolio typically holds 50–80 stocks, and both seek long-term capital appreciation. The portfolios typically reflect a high level of active holdings at the stock, industry, and sector level, and risk management is focused on ensuring that stock-specific decisions are the largest driver of long-term performance.

Neither portfolio employs *a priori* exclusionary screens; as described above, our investment process focuses on what deserves to be *included* in our holdings.

Sustainable Equity Investing: Our approach to sustainable equity investing incorporates fundamental research together with consideration of sustainable environmental, social, and economic development impact. We believe that companies whose products and services produce positive environmental, social, and economic development impact also often demonstrate potential for strong financial growth. In selecting each investment, we consider the extent to which a company’s products or services may provide solutions to forward-looking sustainability needs, creating positive impact in environmental, social, and economic development areas. We believe that analysis of sustainability factors is best utilized in combination with a strong understanding of a company’s fundamentals (including a company’s industry, geography, and strategic position). Relevant issues vary by sector, geography, asset class, and specific company context. Therefore, we use fundamental research of ESG factors that is tailored to specific sectors, locations, asset classes, and companies. Our approach to sustainability analysis is deeply intertwined with the fundamental research process.

Putnam Sustainable Leaders: Focused on what matters

Putnam’s Sustainable Leaders portfolio invests in companies that have demonstrated leadership in the sustainability issues that are financially material to their businesses. Our investment thesis is that companies that exhibit this strength also often demonstrate potential for strong long-term financial performance. The stocks of these companies are often, but not always, considered to be growth stocks, and often are large cap in size.

Our sustainability leadership analysis focuses on what matters for a specific company’s operating environment. Putnam’s materiality map helps to identify the issues that are likely to be important for a given sector, and our more granular industry and company-level analysis are further tailored to address the individual company’s business setting. Through our markers of sustainability leadership, we seek to identify corporate strategy that goes beyond compliance or sufficiency in a way that improves to the company’s long-term business prospects.

Markers of sustainable leadership help determine product fit



Material

Focused on strategic, business-relevant issues



Proactive

Actions that go beyond basic requirements to create potential business benefit



Transparent

Reporting that is relevant, timely, and candid



Effective

Creating benefits both within the firm and beyond its corporate borders

Putnam Sustainable Future: Focused on solutions

Putnam's Sustainable Future portfolio invests in companies whose products and services provide solutions to essential sustainability challenges. Our investment thesis is that solutions-oriented companies with potential to create positive social and environmental impact also demonstrate potential for strong growth and long-term financial performance. The stocks of these companies are typically, but not always, considered to be growth stocks, and are often mid cap or small cap in size.

Our sustainable solutions analysis focuses on identifying products and services that contribute to thriving individuals, institutions, society, and planet, as described in Putnam's map of sustainability solutions. This thematic view helps us to identify areas where innovation might solve key sustainability challenges, and our more specific company-level fundamental analysis assesses the prospects for success of individual business models. Through our markers of effective solutions, we seek to identify solutions that can contribute to a company's long-term growth potential and financial returns.

No assurance can be given that the investment objective will be achieved or that an investor will receive a return of all or part of their investment. Actual results could be materially different from the stated goals. Investors should carefully consider the risk involved before deciding to invest. As with any investment, there is a potential for profit as well as the possibility of loss.

Investment mandates

Putnam Sustainable Leaders pursues its goal by investing mainly in common stocks of U.S. companies of any size, with a focus on companies we believe exhibit leadership in financially material sustainable business practices.

Putnam Sustainable Future pursues its goal by investing mainly in common stocks of U.S. companies of any size, with a focus on companies whose products and services we believe provide solutions that directly contribute to sustainable social, environmental, and economic development.

In both approaches, we aim to identify companies whose long-term business prospects are potentially enhanced by their excellence in sustainability.

(Note: These strategies may result in investing in securities or industry sectors that underperform the market as a whole, or may underperform others that do not invest with a similar focus.)

Markers of effective solutions help determine product fit



Advancing

Solutions that offer tangible improvement versus prior options



Relevant

Meeting an identified need and contributing to a thriving world



Expanding

Benefits that increase over time through added scope, scale or performance



Effective

Creating benefits both within the firm and beyond its corporate borders

Where Putnam’s portfolios sit within the sustainable investing landscape

The field of sustainable investing offers a range of different approaches and products.

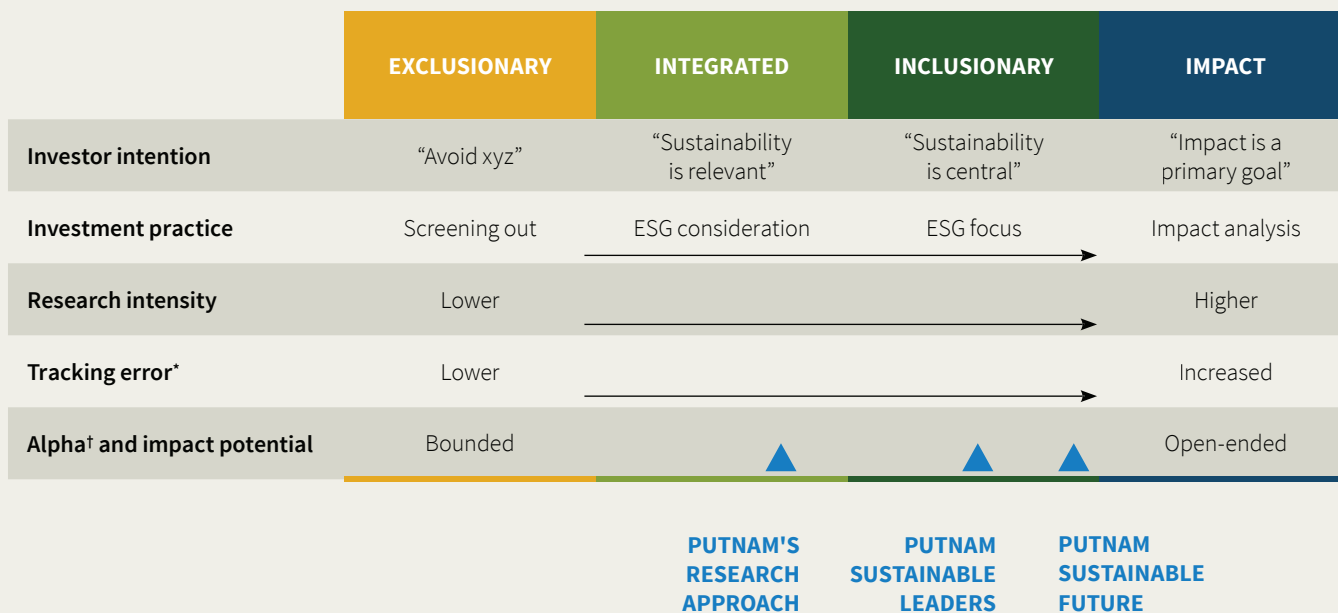
- **Exclusionary approaches** focus on avoidance of certain companies or industries.
- **Integrated approaches** seek to combine ESG data and analysis with other investment considerations.
- **Inclusionary approaches** employ ESG and sustainability analysis as a central part of the investment process.
- **Impact approaches** seek explicit goals for both financial return and social or environmental benefits.

In Putnam’s case, our equity research process focuses on the value that sustainability analysis can add to fundamental research (an integrated approach), and our sustainable equity portfolios extend this emphasis by putting sustainability analysis at the heart of our investment process, as described in detail in this report (an inclusionary approach).

Investment process

Both portfolios rely on Putnam’s well-established fundamental research strength to identify companies with attractive sustainability, fundamental, and valuation characteristics. Throughout the research process, our goal is to identify companies where excellence in sustainability is driving excellence in fundamental business prospects. This approach results in portfolios with meaningful active weights by industry and sector. We aim to utilize ESG data within the relevant context of each company and industry, and to incorporate more qualitative research in areas where new issues are developing or where data is not yet available or standardized. We do not use *a priori* exclusionary screens for the Sustainable Leaders or Sustainable Future portfolios; rather, we focus on what deserves to be included in our holdings.

Sustainable investing landscape map



* Tracking error, also known as active risk, measures the difference between a portfolio’s return and that of a benchmark or index.

† Alpha is a measure of performance on a risk-adjusted basis. Alpha takes the volatility of a portfolio and compares its risk-adjusted performance to a benchmark index. The excess return of the portfolio relative to the return of the benchmark index is a portfolio’s alpha.

Contributions to the field

We recognize the field of sustainable investing is actively growing and evolving, and each organization in this community has an opportunity to contribute to the field's development. Putnam and our Sustainable Investing team are helping to advance the field through engaged ownership, research leadership, public speaking and media participation, and collaboration.

Engaged ownership

We believe active managers have a particular role to play in working with company management teams. In addition to involvement in key stewardship functions like proxy voting, our fundamental research process involves regular, direct, constructive dialogue with company leadership teams regarding corporate strategy and execution.

CEO letters

To complement these ongoing research discussions, we send annual, individually tailored letters to the CEOs of companies held within Putnam Sustainable Leaders and Putnam Sustainable Future. These letters focus on key sustainability issues that are specific to each company, acknowledging efforts to date and encouraging future progress. Response rates to these letters have been robust, and the exchanges often lead to opportunities for ongoing engagement and learning that can improve our understanding of company strategy and fundamental business prospects.

Research

We share Putnam research and reflections on relevant sustainable investment issues in several different formats. Some of our publicly accessible research can be found in the Insights/Research section of Putnam's website. Additionally, we are members of the Applied Complexity Network of the Santa Fe Institute, where we are especially engaged with research on the “complexity of sustainability” — examining the interconnections between financial systems, social systems, and ecological systems. Putnam's Head of Sustainable Investing, Katherine Collins, currently serves as board chair of SFI.

Public speaking and media

We participate in many field-building events, contributing the perspective of active managers in sustainable investing. Over the past seven years, our team has participated in dozens of guest lectures and other academic gatherings; spoken about the investment and strategic relevance of environmental, social, and governance issues in numerous investment and corporate settings; and addressed similar topics for a number of nonprofit organizations. Our investment work has been featured by *Barron's*, *Forbes*, *Investor's Business Daily*, *Bloomberg*, *Kiplinger's*, *Ignites*, *GreenMoney Journal*, and the *Invest Like the Best* podcast.

Collaboration

In addition to our research-focused collaboration, Putnam is an advocate at the firmwide level for improved investment-relevant and decision-useful ESG disclosures and is affiliated with several organizations that support similar goals. More information on Putnam and Franklin Templeton firmwide affiliations can be found in the firms' respective reports.

Please see Putnam's annual [Engagement and Stewardship report](#) for more complete firmwide information on these topics.

A week in the life of an active manager

Our team’s sustainability and impact analysis is interwoven with our core investment process, not an isolated function. This type of integration can be difficult to explain, as we are not simply adding separate sustainability analysis to Putnam’s fundamental research. Rather, we are combining the two elements throughout the investment process. In doing so, we aim to create a holistic approach that is greater than the sum of its parts. Here we offer additional detail from a week of our team’s meetings, to bring these processes more vividly to life. This summary represents a small subset of the total research and investment activity for our team within the given week, and also reflects a small portion of such activity for Putnam’s broader equity research group during the period. Our integrated approach to sustainability research helps us to ask better questions, understand the strategic importance of various ESG issues, and engage on relevant ESG topics.

	MAJOR SECTOR	CATEGORY	THEMES
SUNDAY			
Participated in Santa Fe Institute's research symposium on Emergent Engineering, with applications to analyzing innovation across many arenas.	Utilities, industrials	Public	Shared infrastructure
MONDAY			
Discussed sector-wide growth drivers and trends across natural resources and utilities in an internal equity team update, specifically impact and investment opportunities from the energy transition.	Utilities/energy	Planet	Decarbonization
Discussed employee investments (wages, benefits, training) and the link to an improving store experience and revenues for a large coffee retail chain.	Consumer discretionary	Public	Stakeholder wellness and equity
Toured facilities and met with management teams of several public and private restaurant companies. Discussed approaches to labor acquisition, training, and retention as well as automation opportunities, among other topics.	Consumer discretionary	Public	Stakeholder wellness and equity
Met with management of the largest U.S. pure-play water infrastructure company. Discussed how the company helps customers reduce energy consumption through pumps, sensors, and AI.	Industrials	Planet	Resource stewardship
TUESDAY			
Met with an information services company that provides research and analysis across many industries to discuss their competitive advantages in training, hiring, and retention, and how these link to future growth and cost advantages.	Information technology	Public	Stakeholder wellness and equity; Business processes improvement
Discussed capital allocation strategy and its impact on customer access and financial returns with a cable services provider.	Communication services	Public	Access and opportunity

	MAJOR SECTOR	CATEGORY	THEMES
TUESDAY			
Met with management of a waste and recycling company. Discussed several human capital issues and how technological advancements on trucks have opened up new recruitment and labor opportunities, such as the opportunity to hire more women.	Industrials	Public, Planet	Stakeholder wellness and equity; Access and opportunity; Circular economy
Met with a large rental car company to discuss supply/demand, fleet optimization, growing demand in electric vehicles, and other elements driving higher utilization of the existing fleet.	Consumer discretionary	Public, Planet	Shared infrastructure; Decarbonization
WEDNESDAY			
Met with a large industrial enzyme company. Discussed the diversification of their bioenergy business into biomass, biodiesel, and renewable diesel applications.	Industrials	Planet	Biological solutions
Met with the management of an industrial distributor of water infrastructure products. Discussed potential impact to the business from changing regulation, in particular the expansion of access to drinking water.	Industrials	Planet	Water quality and access
Visited the headquarters of a large e-commerce retailer to discuss improvements to the buyer and seller experience on the platform and opportunities for continued innovation, including product, marketing, and infrastructure investments.	Consumer discretionary	Public	Business processes improvement; Access and opportunity
THURSDAY			
Hosted a very large e-commerce retailer to discuss human capital issues, namely investment in warehouse workers and related churn/retention dynamics, plus growing career development programs across the organization.	Consumer discretionary	Public	Stakeholder wellness and equity
Met with a leading residential solar installer to discuss the positive impact from regulatory changes on demand for solar panels, balanced with the potential headwinds to the business from higher financing costs.	Energy	Planet	Decarbonization
Participated as the keynote speaker for the annual gathering of a women's investment group, focused on trends in sustainable investing and the relevance of focused sustainability analysis to long-term financial returns.	Financials	Public	Stakeholder wellness and equity
FRIDAY			
Met with a jewelry company to discuss secular trends toward consumer preference for branded, digital, and sustainable options in the industry.	Consumer discretionary	Public, Planet	Business processes improvement; Circular economy
Throughout the week, met with or attended presentations for 15+ industrial companies at an industry conference, discussing a variety of issues including: training for specialized skills within an engineering and construction company; securing quality sourcing from suppliers with an electric power and engine manufacturer; investments in waste to energy projects, efficiency, and impact of recycling systems with several waste companies; improving efficiency of industrial equipment and water systems with several diversified industrial and water companies; development of an innovative team culture with a flow control company; and strategy to retain customers and employees with a specialty chemical company.	Industrials	Public, Planet, People	Stakeholder wellness and equity; Decarbonization; Circular economy; Resource stewardship; Business processes improvement

SECTION 2

Portfolio analysis and ESG metrics

We provide analysis of several key issues that have relevance for our portfolios and our investors.

Analytics related to ESG data continue to develop, with data availability and accuracy steadily improving. For some topics, information is fairly complete and metrics are well established, while for others, the questions and information are still at an earlier stage of development. As researchers and active investors, our team views this varied analytical landscape as being full of opportunity.

This analysis explores several important measures of our portfolios' ESG and sustainability characteristics, noting why we've chosen these measures, what they show with respect to our portfolios, how we use each metric, and where we aim to focus future research and attention.⁵ Please refer to Putnam's shareholder reports and regular performance updates on the portfolios for details on the financial characteristics of the portfolios in order to create a more complete view of the funds.

Specific investment examples: In the following section, the companies identified as investment examples represent the positions deemed most relevant to the applicable ESG metric and analysis being discussed. Specific metrics, analysis, and relevant investment examples are developed and determined by Putnam's Sustainable Investing team research, which is based on ESG factors specific to the connections between companies and the world's evolving sustainability challenges. ESG metrics and sustainability characteristics were selected without regard to whether such measures were profitable, or whether relevant securities were profitable, and are intended to help illustrate the investment process. A security may be selected for the portfolio based on factors other than the ESG metrics and sustainability characteristics highlighted herein, and the analysis is not intended to be relied upon as a forecast or investment advice, and is not a recommendation, offer, or solicitation to buy or sell any securities or to adopt any investment strategy. It should not be assumed that an investment in the securities mentioned was or will be profitable. Holdings and portfolio characteristics are for a representative account and are shown for illustrative purposes only. Each account is managed individually. Accordingly, account characteristics may vary.

Before exploring the details, we'd like to emphasize the principles we embrace regarding analysis and data representation

We recognize this type of analysis is ongoing and evolving — for us and for the whole field. Even with perfect data availability, there is always more nuance to explore, and new questions are constantly emerging.

We are researchers. We add context and analysis to data. We seek to understand the “how” and the “why” that are underneath the “what.”

We embrace unanswered questions. We recognize that getting to a better question or to a partial answer is an important form of advancement.

Metric #1: Carbon intensity

Why is this relevant?

Carbon dioxide and other greenhouse gases (GHGs) trap thermal radiation from Earth's surface, sustaining natural life. However, human activities, such as burning fossil fuels, are increasing the concentration of greenhouse gases, which is leading to rapid increases in climate-related risks.⁶ Environmental impact is an important topic for our sustainability analysis, and a key focus of the UN's Sustainable Development Goals (including SDG 7: Affordable and Clean Energy and SDG 13: Climate Action). The data involved in company- and portfolio-level environmental analysis is complex and often incomplete.

Standard disclosures for metrics like GHG emissions and carbon intensity offer important insights, particularly when combined with company-specific context and an understanding of potential future change. For example, lower or decreasing carbon intensity means a company is generating fewer emissions per unit of revenue, which can be better for the climate than higher or rising carbon intensity.

The aggregate emissions data for any investment portfolio often depends heavily on sector allocation, as one would expect: Companies in utility and energy sectors inherently have higher direct emissions (scope 1) when compared with less energy-intensive sectors like healthcare or financials, for example. Taken together, the four largest emitting sectors (utilities, energy, materials, and industrials) account for more than 80% of the S&P 500 Index emissions, though they only constitute less than 20% of the index weight.⁷

When we assess potential investments in carbon-intensive sectors, a key consideration is our analysis of the rate of change in those metrics and the magnitude of improvement we expect given individual company strategies. For the purposes of this report, we focus on carbon intensity, which measures the ratio of carbon emissions (scopes 1 and 2) to revenues. This is one important element of environmental efficiency.

What does this measure show, and why?

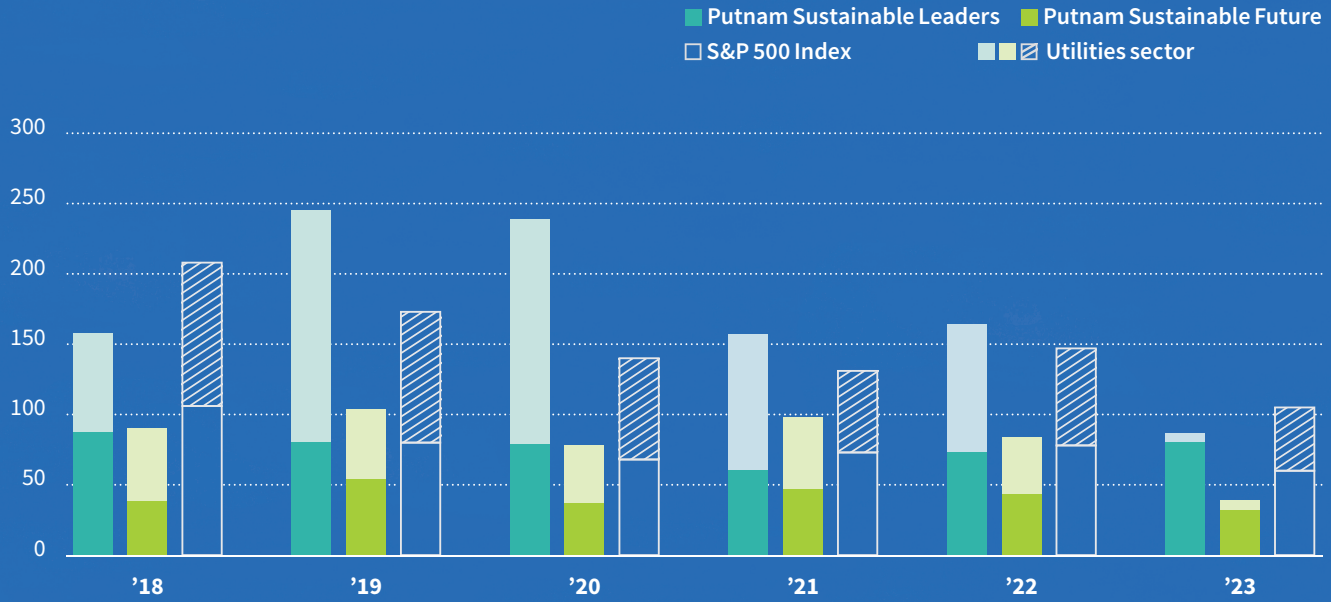
The carbon intensity measure shows the ratio of the total scope 1 and 2 emissions to revenues. Scope 1 emissions are direct emissions from owned or controlled sources, and scope 2 emissions are indirect emissions from the generation of purchased energy. The portfolio-level calculation aggregates the company-level intensity measures for all held securities. This metric offers the benefit of normalizing for company size, but in doing so, it necessarily obscures the absolute level of emissions, which is also important when considering a company's impact on our climate.

The carbon intensity of Putnam Sustainable Leaders portfolio is lower (less intensive) than the S&P 500 Index, which we use as a representation of the broader market. This metric is considerably lower (less intensive) for the Sustainable Future portfolio. Over the past year, the carbon intensity for Sustainable Leaders reduced by 47%, and for Sustainable Future, this measure decreased by 53%. In both cases, the changes were mainly due to differences in portfolio holdings from year to year.

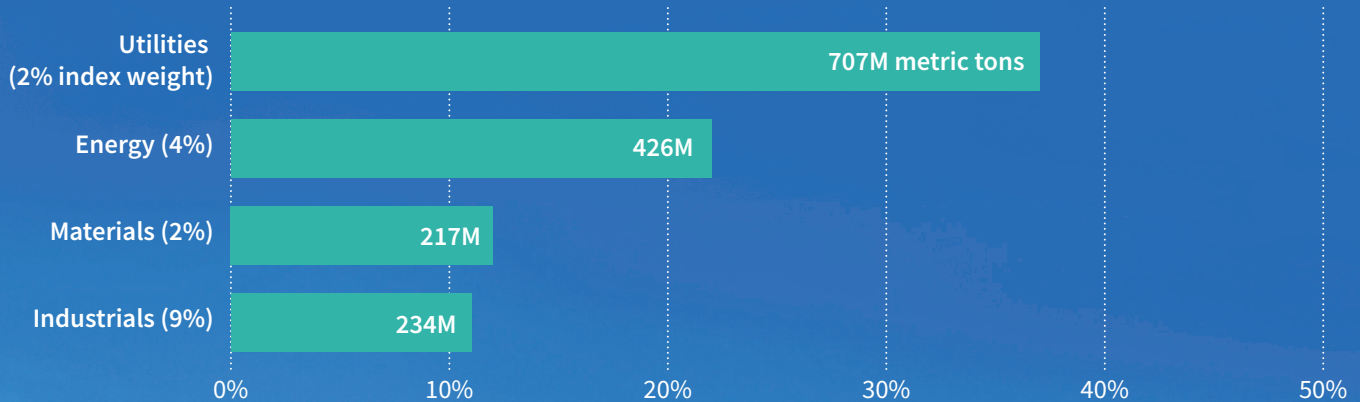
The lower carbon intensity of Sustainable Leaders this year versus last year, and also versus the S&P 500 Index, is primarily due to our investments in the utility sector. Over the course of the year, we reduced our exposure to the sector. In addition, our sole current holding within the sector as of December 2023 (Constellation Energy) has a much lower carbon intensity profile than other utilities, due to its asset base that is predominately carbon-free nuclear power generation assets.

The lower carbon intensity of Sustainable Future versus the S&P 500 Index is primarily due to the level of holdings in technology and healthcare, which tend to have lower emissions than other types of companies. The decrease in this metric for the portfolio over the past year is mainly due to a modest increase in exposure to technology and to reduced exposure to utilities.

Portfolio carbon intensity



Less than 20% of the S&P 500 Index accounts for more than 80% of total emissions



Percentage of total emissions by sector (scopes 1 & 2) of the S&P 500 Index

Sources: MSCI ESG Research LLC data as of December 31, 2023, and Putnam analysis. Carbon intensity is measured as a ratio of scopes 1 and 2 CO₂e metric tons to sales (USD millions). Portfolio carbon intensity is calculated as the weighted average of the carbon intensity for the stocks held, with uncovered assets dropped and holdings rescaled to 100%. Uncovered assets refer to cash held in the portfolio and holdings for which there is no carbon intensity score available. Some data may be estimated.

How do we use this measure?

We do not explicitly exclude or screen out energy or utility holdings (which have high carbon intensity) in our investment process, though it is typically unusual for companies in these sectors to meet our investment criteria. As active managers, we can selectively own and engage with companies that are committed to transitioning away from carbon-intensive energy sources in ways that benefit their business prospects. Therefore, when we assess potential investments in carbon-intensive sectors, key considerations in our analysis include the rate of change in those metrics, the magnitude of improvement we expect given individual company strategies, and the potential implications of these changes on company fundamental prospects and valuation.

For example, Putnam Sustainable Leaders invests in an industrial company, Linde PLC, that has relatively high current carbon emissions but contributes meaningfully to the energy transition and to lowering emissions of its customers. Linde makes up just over 2% of the portfolio as of December 31, 2023, but constituted nearly 28% of the portfolio's aggregate carbon intensity exposure.

Putnam Sustainable Leaders also invests in one utility: Constellation Energy Corporation, which has much lower carbon intensity than the overall utility sector given its focus on carbon-free nuclear power generation. Constellation Energy makes up under 2% of the portfolio and accounts for approximately 8.5% of the portfolio's aggregate carbon intensity exposure as of December 31, 2023.

Why have we chosen to invest in these companies?

We believe that climate change is the most pervasive risk of our era, as it is inherently linked to almost all other risks, including food supply disruptions, economic loss, and social instability. And, as noted above, fossil fuel use is a key contributor to greenhouse gas emissions and to climate-related risk. One option for investors is to avoid all exposure to fossil fuel generation and use, and this approach has some merits. As active managers, though, we believe that part of our opportunity is to identify companies that are essential in leading the systemic shift to renewable sources of energy. Some of the most impactful ways to support this shift involve investing in companies that are most actively changing the sources of global power generation. We have three main conditions for our selective investments in carbon-intensive businesses: First, there must be a demonstrated and meaningful commitment to shift away from fossil fuels; second, there must be regular reporting on progress, with transparency on relevant metrics; and third, the company must also meet our other investment criteria.

From an analytical perspective, historical standardized data is useful, but it is inherently backward looking, while our investment research is forward looking and focused on analyzing individual businesses. For example, Linde PLC is a leading industrial gas and engineering company. Linde has set clear goals for their own emissions reduction, and Linde's business also contributes directly to helping customers reduce their emissions. Linde has invested in blue and green hydrogen, carbon capture and storage, renewable diesel, and batteries, and their portfolio of technologies contributes to avoiding, capturing, and storing carbon. Linde's historical expertise with hydrocarbon-focused customers and related infrastructure contributes to their ability to invest effectively in these newer technologies that support the energy transition. We believe these investments will contribute to the company's financial success while also producing positive environmental outcomes. For example, recently Linde has added greater than \$2 billion in decarbonization projects to its backlog, and they estimate that the company helps customers avoid more than two times the level of emissions that Linde creates.⁹ In summary, Linde has clear initiatives in place to decarbonize its own operating footprint, decarbonize its customer's businesses, and establish and grow into new markets, all of which can drive future financial returns for the company.

A closer examination of the higher carbon intensity of this holding and others illustrates our investment philosophy: We recognize historical data is most useful when it is linked to understanding a company's specific operating context and potential future performance. We also recognize that research and engagement of companies that are in the midst of strategic shifts, or enabling strategic shifts for their customers, is a useful approach for active managers to take. We will selectively own companies with optically poor current metrics if — and only if — our research has convinced us of the trajectory of positive change and of the potential investment value of the shift.

Where do we see opportunities for further research and focus?

We expect to see continued improvements in the accuracy, breadth, and timeliness of environmental data, which will provide new opportunities for relevant and accurate analysis. For example, we are increasingly able to consider the vital metric of scope 3 carbon data, which incorporates assessment of a company's supply chain, investments, and the use of products sold. However, scope 3 emissions for one company often overlap with scope 1 emissions for another company. We therefore find that scope 3 analysis is more useful at an individual company level than at an aggregated portfolio level.

Additionally, improved metrics on water use are now more broadly available for certain sectors, and focus on assessing biodiversity impact is also increasing. Many companies are beginning to disclose more complete environmental metrics and to set explicit goals for improvement, while others are moving forward with thoughtful and detailed climate change analysis and early disclosures on biodiversity impact. Additionally, the U.S. Securities and Exchange Commission has proposals about climate-related disclosures under discussion. All of these developments will likely give investors more opportunity for analysis and engagement over time.

Metric #2: Gender diversity on boards of directors

Why is this relevant?

Numerous studies of board gender diversity have shown that diverse board composition is associated with higher financial returns, higher firm value, higher profitability, increased investment in research and development, and lower volatility.⁹ Gender diversity is also an important goal addressed in several of the UN’s Sustainable Development Goals: for example, SDG 5: Gender Equality; SDG 8: Decent Work and Economic Growth; and SDG 10: Reduced Inequalities). Board-level data is the most complete corporate demographic information available, and gender data is more complete than other measures of diversity. Though we often reference gender diversity on boards due to the stronger data integrity, we view this narrow, specific indicator as a starting point for analysis of broader questions regarding equity, inclusion, and justice across all types of diversity, with related potential impacts on corporate strategy and long-term success.

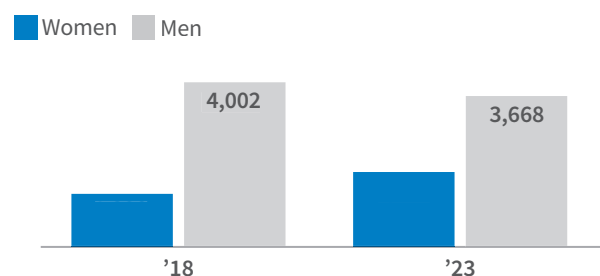
What does this measure show, and why?

While most of the boards of companies in which we invest have not reached gender parity, the level of gender diversity is increasing. Holdings in the Sustainable Leaders portfolio had a weighted average of over 35% female representation, and the Sustainable Future portfolio had a weighted average of 33% as of December 2023. As shown below, both measures are higher than their respective benchmarks, and all measures — both portfolios and benchmarks — have steadily improved over the past five years. The asset-weighted averages for the Russell Midcap Growth Index remain significantly lower than those of the S&P 500 Index, indicating that larger company boards generally have a higher level of gender diversity.

Additionally, our portfolios have a higher-than-market representation of companies where women comprise 30% or more of total board membership. This level is important because once women comprise 30% of a group, the inputs they might give shift from being perceived as “a woman’s point of view” to “an added

point of view.”¹⁰ In short, this level of participation allows women’s inputs to be more fully incorporated into corporate governance, which allows the potential benefits of diversity to be realized. As shown in the charts, this measure improved for both of our portfolios in the past year, with 78% of our Sustainable Leaders holdings and 68% of our Sustainable Future holdings with available data above the crucial 30% threshold. Perhaps even more important, this metric for the S&P 500 has improved from 25% to over 71% since 2018. Despite the improvement in the metrics above, around 3,700 S&P 500 board seats are held by men while just over 1,800 are held by women. Progress is notable over the last five years, yet at a ratio of 2:1 male to female, U.S. corporate boards are still far from gender parity.

S&P 500 company board seats by gender



How do we use this measure?

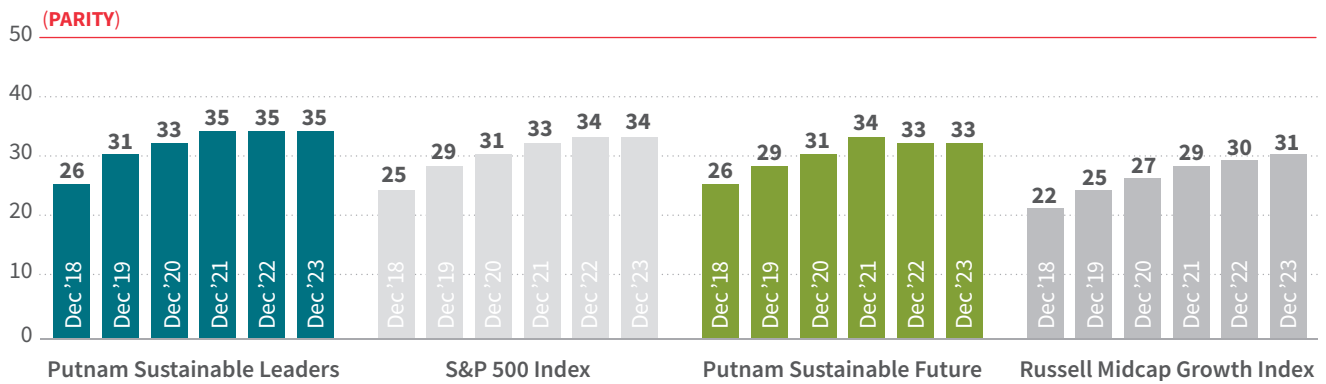
Our research process extends beyond the specific metric of women on boards, with an aim of understanding how companies prioritize diversity in all forms and at all levels of the organization. Teams with diversity of perspectives and experiences have stronger decision-making ability, particularly when facing dynamic and complex problems, and therefore, this is a relevant set of issues for all types of companies and for all investors.¹¹ In addition to this direct business benefit, we view diversity as a step toward equity, equity as a step toward inclusion, and inclusion as a step toward an ultimate goal of justice.

Where do we see opportunities for further research and focus?

These metrics combine with analysis of other aspects of board health — including diversity of perspectives and skills, accountability to stakeholders, and transparency — to help investors assess governance strengths of a company. The association between diverse boards and strong financial outcomes highlights potential benefits of investing in diversity and serves as a starting point for a more complete assessment of team composition beyond the boardroom. For example, availability of information on executive and team composition is improving, and these statistics often show different patterns than observed at the board level. As data continues to advance, investors will be able to analyze related questions in a more complete and useful way.

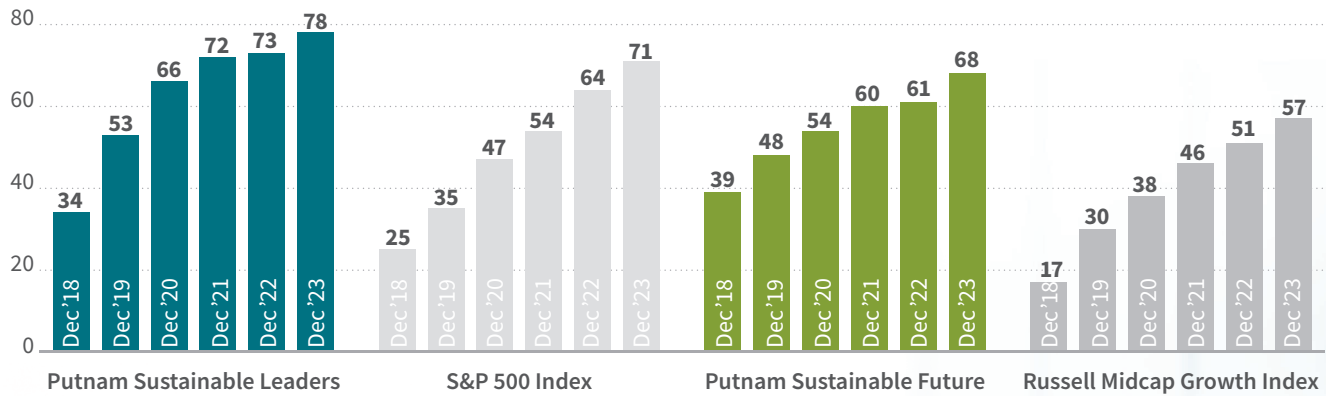
Percentage of board members who are women

Weighted average percentage; 50% represents parity



Source: Data from MSCI ESG Research LLC, as of December 31, 2023. Calculations by Putnam.

Percentage of portfolio/index companies with women comprising at least 30% of board



Source: Data from MSCI ESG Research LLC, as of December 31, 2023. Calculations by Putnam.



SECTION 3

Investment themes and sustainability solutions

We describe our forward-looking thematic research, which focuses on conditions that allow people, systems, society, and our planet to thrive.

One challenge for any point-in-time presentation of data is that it can freeze activity midstream. Writing about this phenomenon in the natural sciences, Goethe said, “The corpse is not the creature.” He was specifically referencing the study of butterflies, noting that you can measure every leg segment and model every wing shape, but if you’ve never seen them fly, you are missing the whole point.

Here, we aim to show our portfolios in flight.

The goal of our investment research is to identify companies whose excellence in sustainability is driving potential long-term outperformance. To achieve investment merit, we believe two attributes are essential: Analysis must be context specific, and it must be forward looking.

Here we illustrate Putnam’s forward-looking thematic research, which complements our company-specific fundamental work by asking the essential question, what promotes thriving? Our investment thesis is that companies that are contributing to thriving people, systems, society, and planet also can create businesses that thrive over the long term.

Our research on water-related issues explores trends in water reliance, access, and quality. We describe three essential functions related to effective water management — movement, cleaning, and use — and note how these link to different business structures and opportunities for solutions and leadership.

Putnam’s thematic “Investing for a thriving world” map shows the broader view of our sustainability-related research themes, where water quality and access is shown under the “Thriving Planet” category. The appendix to this report shows how our framework relates to the United Nations Sustainable Development Goals.

Our sustainability research focuses on three overarching categories

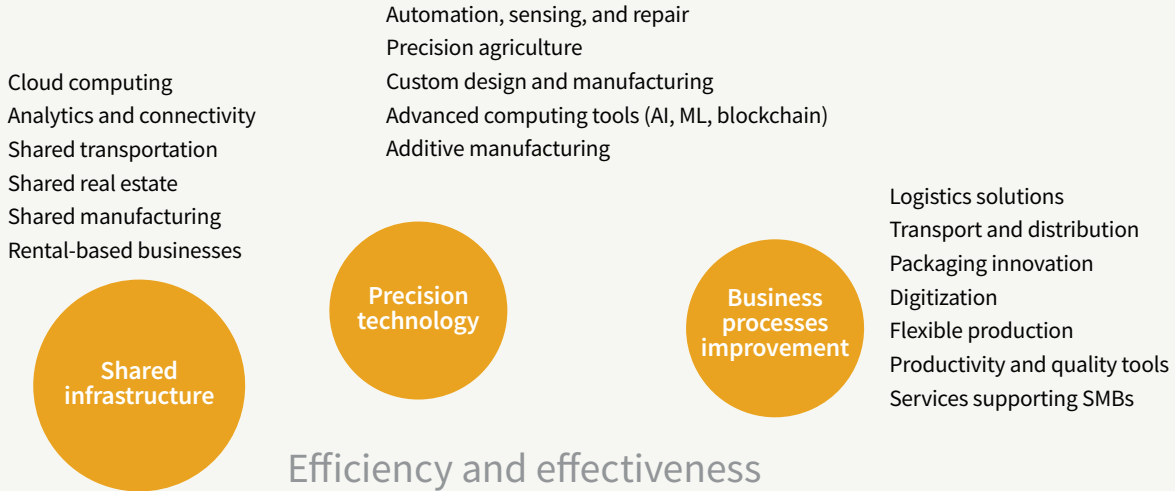


Some holdings address multiple themes; therefore, exposures do not add to 100%. Data reflects Putnam calculations based on internal analysis and is as of March 31, 2024.

Guide to thematic research and sustainability solutions

Below is Putnam's map of sustainability solutions across three overarching categories, Thriving People, Thriving Planet, and Thriving Public. It continues to evolve as our research unlocks new ideas.





Thriving Public[®]

Equity and access



Water, water, every where¹²

Insights and investment implications

Water is our most vital resource

A well-managed water cycle is critical to human well-being, economic development, and healthy ecosystems.

Less than 1% of the total water on Earth is available fresh water, and these supplies are threatened by factors such as the draining of aquifers, increased pollution, and the effects of climate change.

At the same time, demand for fresh water is rising significantly due to population growth, urbanization, industrialization, increased agricultural development, and changing consumption patterns. Water use has been increasing globally by roughly 1% per annum over the last 40 years, and it is expected to grow at a similar rate through 2050.¹³ Currently, 2.3 billion people live in water-stressed countries, of which 733 million people live in high and critically water-stressed countries.¹⁴ By 2030, it is estimated that the global demand for fresh water will exceed supply by 40%.¹⁵ By 2050, an additional 1.0 billion people are expected to live in extremely high water-stressed areas.¹⁶

Insufficient access to water supply and sanitation can have devastating effects on public health. Water supply and sanitation infrastructure is a precondition for human development given it is essential for guaranteeing basic needs, including direct consumption, food preparation, and hygiene.

Approximately 2.0 billion people lack access to safely managed drinking water services while 3.6 billion people lack access to sanitation services.¹⁷ Beyond accessibility, unsafe water supply conditions are associated with infectious diseases and health risks from exposure to contaminants in drinking water.

Water is deeply intertwined with the production of food, feed, fiber, timber, and energy. Globally, only 11% of water withdrawals are for municipal usage; 19% of water withdrawals are for industrial processes, and 70% of water withdrawals are used for agriculture.¹⁸ Increasing water stress threatens to destabilize industries that rely on water, from agriculture to power generation to apparel to semiconductors. Increasing water stress presents a risk for any company or industry where water is a key input.¹⁹

The water cycle is interconnected with both biodiversity and climate. Land use change, including deforestation, wetland depletion, and land degradation, is impacting precipitation patterns. Droughts often lead to fires, resulting in massive losses of biomass, carbon, and biodiversity. Decreases in soil moisture reduce the terrestrial and forest ecosystems' ability to sequester carbon.²⁰ The cumulative impacts of current consumptive practices are altering the water cycle which, in turn, threatens ecosystems.

High-intensity water use is common

A range of businesses and activities require high water inputs



Megawatt-hour
11,857 gallons



Semiconductor
3,250 gallons



Bushel of corn
3,000 gallons



Pair of jeans
1,800 gallons



Daily personal use
82 gallons

Potential for investing in leadership and solutions

While the water crisis is a global issue, manifestations are hyper-localized as freshwater resources are unequally distributed across the globe. There are significant regional disparities in water availability, water infrastructure, water usage, and water quality. As a result, there is no one-size-fits-all solution. Different regions may benefit from certain focus areas and solutions more than others. For example, in 2020, 75% of people worldwide had access to safely managed drinking water services. Coverage ranged from 96% in Europe and North America to only 30% in Sub-Saharan Africa.²¹ As such, in developing countries, ensuring the availability of drinking water, sanitation, and wastewater services is a key priority. In comparison, in developed countries, existing infrastructure is both aging and inefficient, so upgrading existing systems and improving resilience is a key priority. As it relates to water quality, in developing countries, low levels of wastewater treatment and runoff from agriculture often lead to poor ambient water quality. In contrast, in developed countries, the release of hazardous chemicals from production and emerging pollutants including microplastics, pharmaceuticals, and per- and polyfluoroalkyl substances (PFAS) are more of a focus. Therefore, a context-specific approach is helpful here.

Putnam’s sustainable equity strategies focus on the links between sustainability and long-term business fundamentals. Specifically, we seek to identify companies whose businesses are made stronger by their focus on relevant sustainability issues. We believe that sustainability leaders and solutions providers have the chance to create business advantages and strong long-term returns.

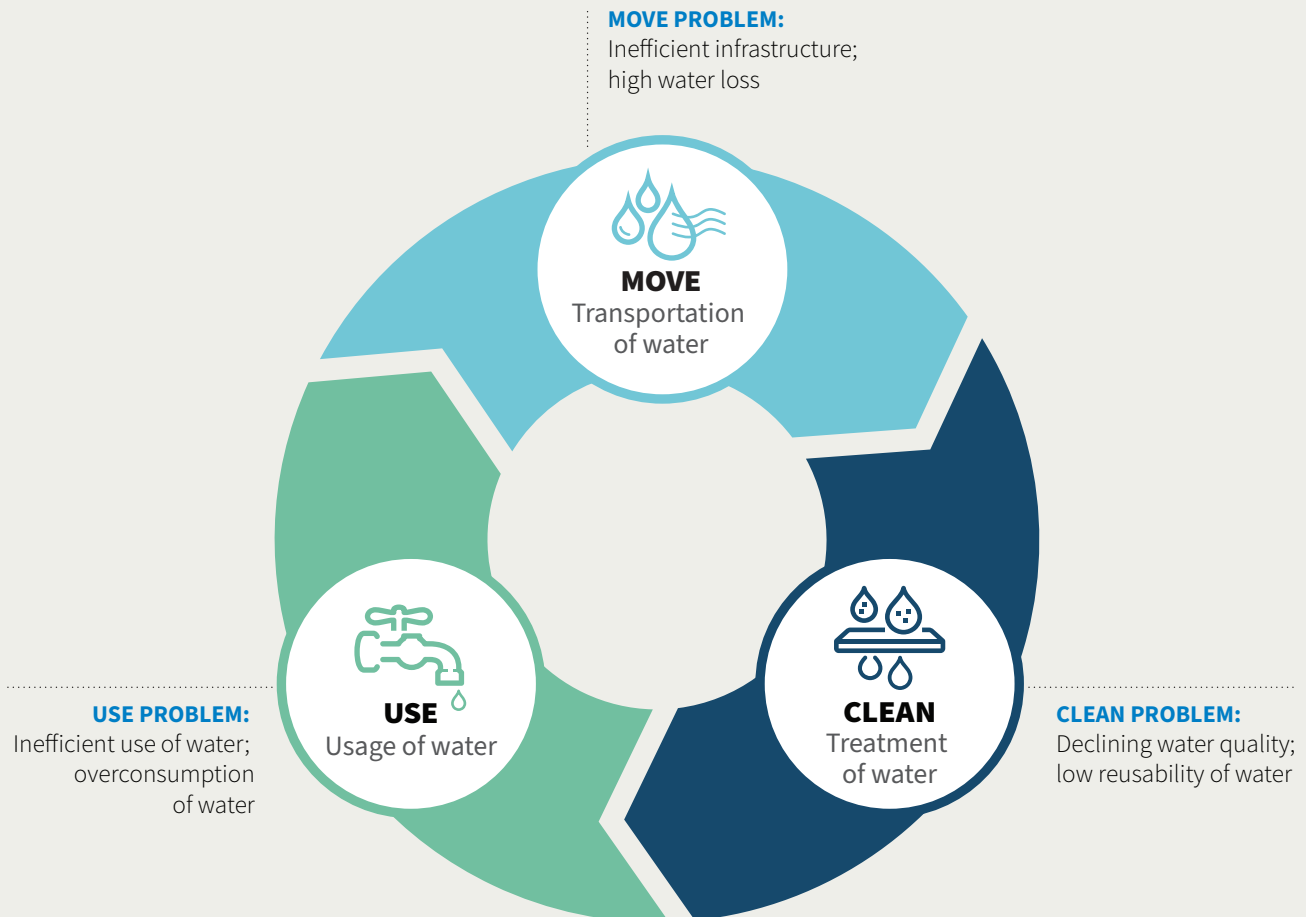
With these investment goals in mind, we identify two types of companies where excellence in water management can link to enhanced long-term business performance. First, there are solutions-oriented companies whose products or services aid in upgrading infrastructure, providing drinking, sanitation, and wastewater services, optimizing water use, and improving access to clean water. Second, there are leading companies in water-intensive industries who are taking a proactive approach toward managing their water usage through new technology, more efficient designs, and novel approaches to production. Both forms of action are needed to address the issues of water quality and water scarcity. Investors can aim to identify successful innovations and improved business practices that offer potential for revenue growth, attractive financial returns, mitigated risks, and environmental benefits.

Diagnosis of the challenge

Fresh water is a finite resource, and the natural water cycle is the system that controls the circulation and distribution of that resource. While the natural water cycle is well-balanced, problems arise when we overlay the anthropogenic water cycle onto this natural system. There are three basic functions that are consistent across both settings: the movement of water, the use of water, and the cleaning of water.

Water scarcity exists when the demand for water exceeds the available supply of water. As the demand for water continues to grow and the supply of water deteriorates, this exacerbates water scarcity issues. Underpinning the problem of physical water scarcity are challenges related to infrastructure, consumption, and quality, which directly relate to the movement of water, the use of water, and the cleaning of water.

Mapping the water cycle to business solutions



Source: Putnam.



In 2019,
\$7.6 billion
of treated water was lost
due to leaks in the
United States, equivalent to
2.1 trillion gallons
of treated water.

Infrastructure

Underinvestment in water infrastructure is a significant challenge as governments have chronically failed to consider the non-market-based values of water. There is a considerable financing gap in both developing countries, who need to create drinking water and wastewater infrastructure, and developed countries, who need to repair, replace, and upgrade existing infrastructure.^{22,23} Much of the water infrastructure in the United States, Western Europe, and other developed countries is aging and in serious need of replacement or upgrading, especially to address significant water loss within existing systems, the effects of a changing climate, and the risks posed by a new generation of emerging contaminants.

Underinvestment in water infrastructure is a significant challenge as governments have chronically failed to consider the non-market-based values of water.

In the United States, drinking water, wastewater, and stormwater infrastructure is composed of a complex series of networks with a shared mission to provide safe, reliable, and cheap drinking water; manage wastewater; and support power generation, agricultural irrigation, and other industries. This is an extensive but decentralized system with more than 148,000 independent subsystems, including roughly 50,000 community water systems and more than 2.2 million miles of drinking water pipes.²⁴ Many pipes are reaching the end of their design life and becoming increasingly inefficient. On average, there are 300,000 water main breaks per year in the United States, and an estimated 14%–18% of total daily water treated is lost through leaks, with some water systems reporting loss rates greater than 60%.^{25,26} In 2019, \$7.6 billion of treated water was lost due to leaks in the United States, equivalent to 2.1 trillion gallons of treated water.²⁷

Low operating efficiency due to aging infrastructure and low water pricing rates make it difficult for water utilities to recover costs and improve the sustainability of operations, creating a system focused on break-and-fix routine maintenance rather than proactive upgrades.

Consumption

Water is often viewed as an infinite resource, particularly in developed countries, which leads to unsustainable water consumption practices. Globally, 70% of water withdrawals are used for agriculture, 19% of water withdrawals are used for industrial processes, and 11% of water withdrawals are used by municipalities.²⁸

Agriculture is the world's largest consumer of water. The world's population will grow from 8 billion people to nearly 10 billion people by 2050. The UN anticipates that agricultural production will need to grow 50% to meet rising demand during this period, requiring global water withdrawals 30% higher than 2012 levels.^{29,30} At the same time, around 30% of all food produced is wasted,³¹ and around 85% of all irrigated fields (600 million acres) use flood irrigation, which routinely results in more than half of the water being lost to evaporation. Both of these figures highlight the inefficiency of the current system.^{32,33}

Water is also a key input across industries from energy to mining to apparel to technology. The electric power industry uses large amounts of water for cooling. Metals and mining companies need water for mineral processing, dust control, drilling, and slurry transport. Cotton production and textile processing require substantial water inputs. The cleaning and rinsing of silicon chips require significant amounts of ultra-pure water. As production continues to increase, water consumption increases as well, absent a clear focus on increasing efficiency and improving conservation.

In the 20th century, the world's population quadrupled, but water use increased sixfold.³⁴

The combined trends of growing populations, expanding urbanization, and changing consumption patterns will result in increasing municipal consumption. As incomes grow, households generally consume more water-intensive products and services.



Globally,
70% of water withdrawals
are used for agriculture



Globally, it is likely that **over 80%** of wastewater is released into the environment without adequate treatment.

Water quality

The availability of water is intrinsically linked to water quality. Increased discharges of inadequately treated wastewater, the expansion of agricultural production and resulting runoff, and growing volumes of sewage from rapidly urbanizing areas are contributing to the degradation of water quality. This is exacerbated by aging infrastructure and emerging contaminants.

Globally, it is likely that over 80% of wastewater is released into the environment without adequate treatment. On average, high-income countries treat about 70% of the wastewater they generate, whereas in low-income countries, only about 8% of industrial and municipal wastewater undergoes treatment of any kind.³⁵

The release of untreated wastewater generates physical, chemical, and biological pollution that prohibits water from being used for many purposes without costly pre-treatment.

Agricultural runoff can contain fertilizers, pesticides, insecticides, waste from livestock operations, and pathogenic microorganisms. Fertilizer runoff can create toxic algal blooms, and exposure to nitrates in fertilizer are linked to health complications.³⁶

Aging infrastructure and pipe corrosion present a risk, especially in areas with exposure to the 9.2 million lead service lines still in use.³⁷ One of the most notable examples is the water crisis in Flint, Michigan. In short, the city temporarily pumped water from the Flint River, which received raw sewage from the city's waste treatment plant, agricultural runoff, and toxins from landfills, and this highly corrosive, untreated water caused lead to leach out from aging pipes into thousands of homes. Upon assessing collected water samples, it was revealed that more than 40% measured above 5 parts per billion of lead and 17% registered above 15 parts per billion (the federal "action level").³⁸

Per- and polyfluoroalkyl substances (PFAS) are also an increasing area of concern, with up to 6,300 of the country's drinking water systems estimated to contain levels of PFAS that would violate the EPA's standards (70 nanograms per liter).³⁹ According to a new study by the U.S. Geological Survey, at least 45% of the nation's tap water is estimated to have one or more types of PFAS.⁴⁰

Water solutions map			
FUNCTION	 MOVE	 USE	 CLEAN
Product/Service examples	Pipes Valves Distribution Pumps	Irrigation Residential Utilities Meters	Chemical Treatment Testing UV Treatment Filtration Desalination
Challenges	Lack of drinking water infrastructure and sanitation services and/or aging and inefficient infrastructure	Water scarcity due to increasing consumption, inefficient use, and water loss	Declining water quality due to increased discharges of inadequately treated wastewater, agricultural runoff, and emerging contaminants
Solution form	Building new infrastructure; repairing, replacing, and increasing the resilience of existing infrastructure	Precision irrigation, water-saving technologies, advanced monitoring and data analytics, etc.	Treatment of drinking water prior to use and the treatment of wastewater prior to discharge
Success factors	Compatibility with existing infrastructure; application expertise; efficacy and reliability; potentially improved design and value proposition	Offers improvement to existing operations without being overly complex; value-added above and beyond cost of implementation	Technological superiority; high degree of efficacy and reliability; ability to anticipate customer needs and emerging trends
Outcome	Increased efficiency; less water loss	Reduced water consumption; increased efficiency	Improved water quality; increased reusability
Company examples	<p>Pipes Advanced Drainage Systems</p> <p>Valves Watts Water Technologies Mueller Water Products</p> <p>Distribution Core and Main</p> <p>Pumps Xylem Flowserve</p>	<p>Irrigation Lindsay Corporation Valmont Industries</p> <p>Residential Pentair A.O. Smith Corporation Watts Water Technologies Mueller Water Products</p> <p>Utilities American Water Works Essential Utilities</p> <p>Meters Xylem Roper Technologies Badger Meter Inc.</p>	<p>Chemical Treatment Veralto Corporation Ecolab</p> <p>Testing Veralto Corporation Xylem</p> <p>UV Treatment Veralto Corporation Xylem</p> <p>Filtration Dupont de Nemours Veralto Corporation</p> <p>Desalination Energy Recovery Inc.</p>

Solutions exist across a range of water technologies

The water crisis is a complex problem that requires a wide range of solutions, plus collaboration from numerous stakeholders including governments, corporations, communities, and individuals.

Given the uneven effects across the globe, the most efficient and impactful solutions would involve focusing on areas with the most water stress first.

Focusing collective efforts on the development of infrastructure, the optimization of water usage in agriculture, and the implementation of wastewater treatment, particularly in developing countries, would have the most positive impact on overall water scarcity and quality. Public companies based mainly in the United States, the primary focus of this report, address only a portion of this larger global landscape.

A broad portfolio of products and services are needed to address ineffectiveness and inefficiency across the water cycle. The problems noted previously, relating to infrastructure, consumption, and water quality, map to the three basic functions within the water cycle: the movement of water, the use of water, and the cleaning of water.

Solutions within each of these functions aid in minimizing water loss, increasing efficiency, reducing consumption, and augmenting supply. Products and services that address water availability and water cleanliness are often most critical, but all types of solutions are necessary for broad-based systemic improvement. Investors have the opportunity to identify innovations in this area that offer potential for strong growth, attractive returns, and environmental benefits.

Solutions for moving water — Increasing efficiency and improving water loss

There is a significant need to repair and replace aging pipes and outdated systems, as well as to build new water infrastructure in communities. The EPA estimates that the United States will need to spend more than \$743 billion over the next 20 years to maintain, upgrade, and replace critical water infrastructure, encompassing pipes, treatment plants, and wastewater management facilities.⁴¹ Private industry groups, including the American Water Works Association, estimate the costs could be over \$1 trillion.⁴² Under the Infrastructure Investment and Jobs Act, more than \$50 billion is earmarked for strengthening the nation's water and wastewater infrastructure, including the repair and upgrade of current systems.⁴³ The EPA projects water pipe replacements will peak in 2035 at 16,000 to 20,000 miles of pipes replaced per year, quadruple the current annual rate of 4,000 to 5,000 miles.⁴⁴

Companies that aid in the development and replacement of existing infrastructure are poised to potentially benefit from these trends, while also improving water availability through less loss and improved efficiency.

Some examples of these companies include:

Core and Main (CNM) is at the forefront of providing safe and sustainable water infrastructure. The company works with contractors and municipalities across the United States, supplying pipes, valves, and fittings to help provide clean, safe drinking water to communities while also addressing potential leaks and disasters. For example, the company helped the City of Waukesha, Wisconsin, to address its growing infrastructure challenge by providing 26 miles of ductile iron pipe made from recycled iron and steel scrap, and by training workers and other project partners about potential solutions. As a distributor, the company is more efficient and effective than others in the fragmented field of small, independent operators. This strength and scale make Core and Main uniquely suited to address disparate repair and replacement needs across the country. For example, when a major leak occurred between Ventnor Heights and Atlantic City, New Jersey, an associate discovered a coupling failure due to older infrastructure and traced it back to a failed connection. The pipe size was rare, but the company was able to resolve the problem within two days — a rapid timeline for this type of situation.⁴⁵

Advanced Drainage Systems (WMS) is a leading manufacturer of stormwater and onsite septic wastewater solutions. The company's broad portfolio of water management products includes corrugated high-density polyethylene pipe, corrugated polypropylene pipe, plastic leach field chambers, and septic tanks. Many of the company's products are generally lighter, more durable, more cost-effective, and easier to install than comparable alternatives made with traditional materials. For example, corrugated high-density polyethylene pipe is lightweight, highly adaptable, and flexible. It is resistant to corrosion, has a long service life, and has leak-free joints. This type of pipe also includes trenchless installation, resulting in less ground disruption. As older pipes need replacing, Advanced Drainage can potentially supply better, more resilient, and more cost-effective alternatives.⁴⁶

Solutions for water use — Reducing consumption and increasing efficiency

Water scarcity is intensifying due to increasing consumption, inefficient use, and water loss. As households and businesses seek to reduce their water usage, companies that provide new, more efficient technologies that aid in water measurement, analytics, and conservation are poised to potentially benefit.

Badger Meter (BMI) provides smart water solutions that enable customers to be more efficient, effective, and sustainable. In North America, 20%–30% of treated water that leaves utilities is lost before reaching the end customer.⁴⁷ This is attributable to main leaks and storage tank overflows, unbilled consumption and meter inaccuracy, unmetered consumption, and unauthorized use. Focus on reducing these types of water loss is driving a shift to more advanced metering. The company's E-Series ultrasonic meters for residential and commercial smart water meter applications use solid-state technology for 99%–100% accuracy throughout the products' useful lifespan, compared with only 90%–95% accuracy for traditional mechanical water meters. Furthermore, the transition to Advanced Metering Infrastructure (AMI), represented by other Badger products, allows customers to read meters daily instead of monthly. This allows customers to accurately and automatically detect leaks, triangulate the location of burst mains, and quantify the volume in real time. A utility in South Carolina, one of the largest AMI projects to date, reported that the number of inactive accounts that were consuming water decreased by 21%. Beyond this, Badger Meter's consumer engagement tool, EyeOnWater, allows customers to see usage patterns over time and set up leak notifications to help identify water loss issues before they cause a high water bill. All of these offerings encourage conservation and increase efficiency.⁴⁸

Lindsay Corporation (LNN) produces agricultural irrigation solutions, including center pivot and lateral move systems and remote irrigation and scheduling technology. The company's Zimmatic pivot irrigation systems and FieldNET technology help farmers meet the growing need for food while reducing the water and energy required to produce it. Since 2018, the company's solutions have enabled farmers to reduce their energy use by 1.5 billion kilowatt hours and to conserve over 469 billion gallons of water by helping growers understand when, where, and how to best irrigate. Considering that the agricultural sector is the largest consumer of water globally, efforts to improve the effectiveness of irrigation have potential to be particularly impactful.⁴⁹

Solutions for cleaning water — Improving water quality and reusability

Safe and clean water is necessary for both human and environmental health. Over the past 50 years, water quality in developed nations has increased due to stricter regulation such as the Safe Water Drinking Act and Clean Water Act in the United States and the Water Framework Directive in the European Union, but threats remain. In 2022, 43% of the community water systems in the United States violated at least one of the drinking water standards, which are the limits set for contaminants in drinking water.⁵⁰ In developing countries, water quality remains poor, particularly due to untreated wastewater discharge and agricultural runoff.

Water must be clean for both drinking and production processes, so companies with solutions related to water treatment stand to benefit from these needs.

Beyond this, technologies that enable desalination and treatment of wastewater for reuse in other settings have the potential to augment clean water supply.

Veralto Corporation (VLTO) offers one of the most comprehensive portfolios of water analytics, as well as differentiated water treatment solutions that enable the reliable delivery of safe drinking water by public and private utilities. The company's ChemTreat brand works alongside industrial customers to understand their water challenges and tailor chemical treatment plans and dosing protocols to help optimize water usage and maximize reuse. ChemTreat helped customers save over 80 billion gallons of water in 2022. The company's Trojan Technologies brand offers UV and membrane filtration systems for water disinfection and contaminant removal. Trojan Technologies treats and supports the recycling of 12 trillion gallons of water annually, helping to improve access to clean water for more than 250 million people every day.⁵¹

Xylem (XYL) is working with municipal and industrial customers to address PFAS contamination, with more than 80 mitigation installations in the United States alone. For example, after the Kennebunk, Kennebunkport & Wells Water District (KKWWD) detected PFAS in one of its system's well supplies, KKWWD worked with Xylem to deploy a granular activated carbon system that has treated more than 200 million gallons of water thus far, providing the utility's community with safe drinking water. In California, the Orange County Water District deployed over 30 liquid-phase media absorption vessel systems to treat for PFAS, delivering drinking water in compliance for its more than 2.5 million customers.⁵²

Leadership in sectors with high intensity of water use

Many companies have water footprints that span the globe, from raw material production to supply networks to direct operations. Many sectors depend heavily on water, including food and beverage, power generation, metals and mining, technology, and apparel. Functionally, water is used for raw material production, cleaning, cooling, heating, and many more applications.

As a result, most companies are exposed to water scarcity in one form or another, and thereby exposed to related operational, regulatory, and reputational risks.




Despite this dependency, reducing water consumption has not been a top priority for many companies thus far, given the relatively low cost of water and the relatively strong availability of water in the regions in which they currently operate. However, as the water crisis intensifies and climate change exacerbates extreme weather patterns, it is increasingly important for companies to have a strategy to manage their water risk. Business leaders have an opportunity to limit not just their own risk, but also the risks to all stakeholders relying on this shared resource. In some cases, this can result in direct cost savings, and in other cases, the benefits could be indirect.

There is a clear business case for reducing water usage. Water can be complicated and sometimes expensive to manage, as it represents an input that typically must be purchased from utilities, filtered, and treated prior to use, pumped throughout the system, and treated again prior to disposal.⁵³ In some settings, reducing reliance on water allows for a more resilient business model. The first steps for creating thoughtful corporate water strategy include analyzing current water usage, quantifying associated risks and opportunities, and focusing efforts on water-stressed regions. Beyond this strategic foundation, some companies have the chance to develop improved products, processes, and business models that offer potential for reduced risk and improved financial returns.

A number of business leaders have recognized the systemic water risks and opportunities that impact their operations, and a range of companies in water-intensive industries have demonstrated leadership by finding better ways to use and manage water in raw material production, supplier networks, and their own operations. There are numerous opportunities to optimize water usage throughout the value chain. Companies can prevent water loss, reduce use, and increase reuse. Beyond this, companies can create products that result in less water usage by the end customer.

For many corporate settings, pursuing multiple strategies will be appropriate, but a context-specific framework highlights areas of greatest opportunity.

For example, in apparel or food and beverage companies, where water is a primary input to products, focusing on reducing the water intensity of raw materials can result in a high level of benefit. In contrast, for industries like power generation, where water is withdrawn in large quantities but not consumed within the production process, prioritizing reuse can result in the greatest benefits.

Water leadership map			
FUNCTION	 PREVENT water loss	 REDUCE water use	 INCREASE reuse
Methods	Proactive maintenance	Better materials, more efficient technology, better processes	Recirculate water within a process; reuse water in another application
Focus area	Applicable to all processes	Companies where raw materials account for the majority of water usage Companies where water is consumed in production or other processes	Companies where water is required for various processes but not necessarily consumed
Form examples	Address aging equipment	Lower resource-intensity crops, regeneratively-grown crops, utilize more recycled materials Installing more water-efficient fixtures and equipment Less water-intensive production techniques like waterless dyeing or improved cleaning processes	Closed-loop cooling systems Utilizing grey water for non-potable purpose like landscaping, industrial processes, etc.
Company examples	All	PVH Corporation Ingersoll Rand Heineken N.V.	PPL Corporation Hilton

Source: Putnam.

Apparel

PVH Corporation (PVH) is an apparel company that seeks to use less water-intensive materials in garments, find innovative technologies that require less water usage in the production phase, such as waterless dyeing, and use more recycled water to avoid water pollution.

Raw materials account for the majority of PVH's water usage, with cotton representing 97% of the company's raw materials-based water consumption.

As a result, PVH has been focused on the scale and adoption of environmentally preferred cotton. PVH's supply chain accounts for nearly 100% of the company's water footprint, so the company has engaged in global collective action projects in various countries to address water challenges. For example, in Turkey, the team has focused on scaling sustainable agriculture practices. They developed guidelines on water and soil management in cotton production and implemented a regenerative agriculture pilot in the region. In Vietnam, the team has engaged supplier sites in trainings on water and energy efficiency, wastewater reduction, and cleaner production techniques. Nineteen factories took part in the trainings and made investments to improve water and energy efficiency. The accumulated annual impacts led to 2 million cubic meters of water savings and 133 million megajoules of energy savings.⁵⁴

Industrials

Ingersoll Rand (IR) is an industrial company that aims to minimize water use in operations, and the company is targeting a 17% reduction in absolute annual water use by 2030 relative to a 2020 baseline. To achieve this, Ingersoll Rand has concentrated on two pilot machines in its Sheboygan, Wisconsin, die cast operations, as the plant represents over 52% of the company's total global water consumption. By utilizing water circulation temperature control systems as well as improved piping arrangements, Ingersoll Rand realized a 23% reduction in absolute water usage at the plant, resulting in a 12% reduction in global absolute water usage. Beyond this, the company has added water meters, implemented automatic shut-off water valves, and inspected water savers for proper functionality, and the company has also utilized closed-loop systems in various operations.⁵⁵



By utilizing water circulation temperature control systems as well as improved piping arrangements, Ingersoll Rand realized a 23% reduction in absolute water usage at the plant, resulting in a 12% reduction in global absolute water usage.

Food and beverage

Heineken (HEIN.AS), a global brewer, takes a holistic approach to water management, focusing on responsible water use, effective wastewater management, and supporting water security in supply chains, production, and communities, particularly in water-stressed areas. The company has noted that insufficient local water availability could lead to an inability to meet the demand for their own operations and products. Approximately 90% of the company's water footprint is related to growing barley, which is highly water efficient and a relatively drought-tolerant crop. Heineken engages in sustainable sourcing programs and dedicated conservation agriculture projects to improve water usage. Beyond these agricultural inputs, water is directly required in the production of beer, including in operations like cleaning, steam generation and cooling, and of course, water is a main ingredient in the product itself.



In 2023, Heineken required 3.2 hectoliters of water to brew 1.0 hectoliter of beer. This is a 36% decline in average water usage (hl/hl) relative to 2008, when it took 5.0 hl of water to brew 1.0 hl of beer. By 2030, Heineken is targeting 2.9 hl/hl worldwide, and 2.6 hl/hl in water-stressed areas.

The company also continues to increase water efficiency in its operations, including a pilot program in Spain that delivered a 10% reduction in water usage. In Brazil, a brewery improved water efficiency by over 7% through a collaborative project with its local cleaning and disinfection partner.⁵⁶

Utilities

PPL Corporation (PPL) is a utility company that proactively manages the water it uses and monitors the impact of any wastewater discharged into waterways. Thermoelectric power plants require water for cooling and condensing steam. Open-loop systems withdraw large quantities of water from nearby water sources and then pump the water back into the water source after it has been used for cooling. While minimal water is consumed in the process, significant quantities are withdrawn.⁵⁷ PPL utilizes closed-loop cooling at generating plants, LG&E and KU, which has greatly reduced the volume of cooling water withdrawn from the region's watershed.

In 2022, approximately 86% of the total water withdrawn was recycled and reused. The company also continues to decrease consumptive water use as its power plants improve efficiency.⁵⁸

Hospitality

Hilton (HLT) is a hotel manager, franchisor, lessor, and owner focused on driving holistic water stewardship across its value chain.

The company has committed to reducing water use intensity by 50% by 2030 and has developed standards for the architecture, landscaping, and basic systems of hotels that lessen energy usage, limit pollution, and conserve water.

For example, in water-sensitive landscapes, the company replaces water-intensive lush gardens and lawns with drought-tolerant native plants or succulents. The Hilton Garden Inn Dubai Mall in the United Arab Emirates has significantly reduced water consumption by utilizing grey water (lightly used from day-to-day activities) for landscaping efforts. The company has also switched to water-efficient fixtures including high-efficiency, adjustable flow showerheads, toilets, and faucets, all of which conserve water. Hilton has also piloted the use of cleaning products that require lower energy and water use. In India, two hotels have piloted the use of a low temperature water program, Advanced by Diversey (DSEY), which uses 28% less water and 24% less energy while producing 28% less effluent waste. All Hilton hotels are required to regularly monitor and report water use metrics and to assess progress toward an improvement goal. These initiatives typically save franchisees money while reducing water intensity of operations.⁵⁹

Conclusion

Fresh water is the most vital resource on Earth, required to support thriving people, a thriving public, and a thriving planet. The water crisis is a complex problem that requires a range of solutions, including collaboration from numerous stakeholders. Investors have the opportunity to identify successful innovations and improved business practices that demonstrate potential for strong growth, attractive returns, and environmental benefits while also addressing increasing risks and uncertainties related to water scarcity and declining water quality.

Final note: The importance of connection

Putnam's Sustainable Equity team has developed in breadth and depth over the past seven years. We are encouraged by progress to date with respect to our research, investment process, engagement, and impact, and we also recognize that our efforts will continue to advance to meet the changing operating conditions of our profession and our world.

Throughout this report, one essential element shines through: All of our endeavors require partnership and connection.

Our research process involves collaboration with colleagues at Putnam, at other research and investment firms, and at the companies in which we invest. Our portfolio analysis involves partnership with external standard-setting bodies, data providers, academic researchers, and governmental and nongovernmental organizations. Our thematic research and engagement activity requires connection at all levels of systems, including practitioners, community members, scientific experts, and policymakers. Investing is often perceived as a purely competitive endeavor, but our portfolios and our shareholders benefit from the broad and deep community that supports our work.

Thank you for taking the time to understand the research process that informs our investing, the ways that we assess our progress, and the potential influence that our work and investments have in the world. As our practice continues to develop, we are encouraged by the increasingly evident and relevant links between sensible sustainability strategy, environmental and social improvements, and long-term business fundamentals. We are grateful for your engagement and eager to continue in our shared aspiration — to reconnect investing with the world it is designed to serve.

APPENDIX 1

UN Sustainable Development Goals

We explain how our sustainable investment themes align with the 17 UN Sustainable Development Goals, a global guide to sustainability efforts.

The Sustainable Development Goals are a set of global priorities developed by countries, NGOs, businesses, scientific communities, and other stakeholders from around the world. The SDGs were not explicitly devised as an investment framework, but serve as a guide for companies' and investors' long-term sustainability efforts and as a mandate to address the challenges facing our world.

Per the United Nations, the SDGs “are a call for action by all countries — poor, rich, and middle-income — to promote prosperity while protecting the planet. They recognize that ending poverty must go hand in hand with strategies that build economic growth and address a range of social needs including education, health, social protection, and job opportunities, while tackling climate change and environmental protection.”

The 17 SDGs are at the heart of the 2030 Agenda for Sustainable Development, which was adopted by all United Nations Member States in 2015. These goals “provide a global blueprint for dignity, peace, and prosperity for people and the planet, now and into the future.”⁶⁰

Sustainable Development Goals



1 NO POVERTY
End poverty in all its forms everywhere



2 ZERO HUNGER
End hunger, achieve food security and improved nutrition, and promote sustainable agriculture



3 GOOD HEALTH AND WELL-BEING
Ensure healthy lives and promote well-being for all at all ages



4 QUALITY EDUCATION
Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all



5 GENDER EQUALITY
Achieve gender equality and empower all women and girls



6 CLEAN WATER AND SANITATION
Ensure access to water and sanitation for all



7 AFFORDABLE AND CLEAN ENERGY
Ensure access to affordable, reliable, sustainable, and modern energy



8 DECENT WORK AND ECONOMIC GROWTH
Promote inclusive and sustainable economic growth, employment, and decent work for all



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
Build resilient infrastructure, promote sustainable industrialization, and foster innovation



10 REDUCED INEQUALITIES
Reduce inequality within and among countries



11 SUSTAINABLE CITIES AND COMMUNITIES
Make cities inclusive, safe, resilient, and sustainable



12 RESPONSIBLE CONSUMPTION AND PRODUCTION
Ensure sustainable consumption and production patterns



13 CLIMATE ACTION
Take urgent action to combat climate change and its impacts



14 LIFE BELOW WATER
Conserve and sustainably use the oceans, sea, and marine resources



15 LIFE ON LAND
Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss



16 PEACE, JUSTICE AND STRONG INSTITUTIONS
Promote just, peaceful, and inclusive societies



17 PARTNERSHIPS FOR THE GOALS
Revitalize the global partnership for sustainable development

Mapping Putnam sustainable equity themes to the UN SDGs

The United Nations Sustainable Development Goals (listed in the far left columns of the tables below) serve as a guide to the world’s most important sustainability priorities. Here we show the connections between our investment themes and the SDG framework, based on internal analysis. As more companies link their own operating activities to the SDG framework, we expect this type of analysis to extend and deepen over time.



Thriving People



Thriving Public

● Direct connection
● Indirect connection

United Nations Sustainable Development Goals (SDGs)	Delivery of care	Tools and therapies	Preventive care and wellness	Access and opportunity	Stakeholder wellness and equity	Security and privacy	Business processes improvement
 Poverty	●	●	●	●	●	●	
 Hunger	●	●	●	●	●	●	
 Health	●	●	●	●	●	●	
 Education	●	●	●	●	●	●	
 Economy				●	●	●	●
 Infrastructure and industry						●	●
 Cities				●	●	●	●
 Consumption and production					●		●
 Water and sanitation				●			
 Energy				●			●
 Climate change							●
 Oceans							
 Land							
 Gender equality	●	●	●	●	●	●	
 Reduced inequalities	●	●	●	●	●	●	
 Peace and justice	●	●	●	●	●	●	
 SDG partnership							

- Direct connection
- Indirect connection



Thriving Public



Thriving Planet

United Nations Sustainable Development Goals (SDGs)	Precision tech and shared infstr.	Circular economy	Biological solutions	Sustainable agriculture	Resource stewardship	Water quality and access	Decarbonization
1 Poverty					●		
2 Hunger	●		●	●	●		
3 Health	●		●	●	●	●	
4 Education							
8 Economy	●	●	●				
9 Infrastructure and industry	●	●	●	●	●	●	●
11 Cities	●	●			●	●	●
12 Consumption and production	●	●	●	●	●	●	●
6 Water and sanitation	●	●		●	●	●	
7 Energy	●	●	●		●		●
13 Climate change	●	●	●	●	●	●	●
14 Oceans		●	●	●	●	●	●
15 Land		●	●	●	●	●	●
5 Gender equality					●		
10 Reduced inequalities					●	●	●
16 Peace and justice					●		
17 SDG partnership							

APPENDIX 2

Sustainability Summary Reports

We share the sustainability scoring, analysis, and indicators for our portfolios as provided by Sustainalytics, an ESG research and data provider.

Some clients find these metrics useful, and selected metrics may be required in certain regulatory settings. As noted throughout this report, our investment process often analyzes and adjusts standardized third-party data to reflect more accurate, timely, or decision-useful information. Additionally, we assess the utility of specific calculations and methodologies involved in ESG data reporting, since many metrics are complicated and rely on partial or estimated data. Please refer to the footnotes and terms and definitions sections of these reports for more detailed information.

Sustainability Summary Report

Name: Putnam Sustainable Leaders

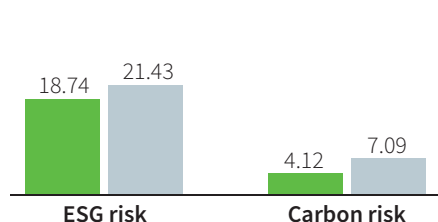
Benchmark: S&P 500 Index

As of March 31, 2024

Putnam Sustainable Leaders seeks long-term capital appreciation. The portfolio invests in companies we believe have strong fundamentals linked to leadership in financially material sustainability issues. Our investment process does not utilize third-party ESG scores to drive the overall decision-making process. Putnam uses Sustainalytics to provide additional input in the analysis of ESG-related criteria as part of the overall research and investment process and to understand potential ESG risks and opportunities. In no case do ESG scores or models result in automatic buy or sell decisions for the portfolio.

Portfolio summary scoring

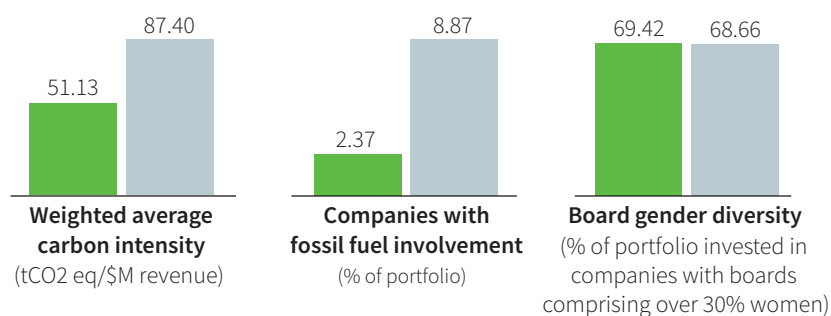
■ Portfolio ■ Benchmark



For definitions of Sustainalytics scores, please see the Appendix. Portfolios with lower ESG and carbon risk scores, based on Sustainalytics ratings, have lower ESG risk and lower exposure to material carbon and fossil fuel issues.

Key sustainability metrics

■ Portfolio ■ Benchmark



Business involvement

Business involvement	Revenue threshold	Count	% of portfolio
Private prisons	>10%	0	0.00%
Thermal coal	>10%	1	1.12%
Tobacco	>10%	0	0.00%
Gambling	>10%	0	0.00%
Controversial weapons*	>0%	0	0.00%

* Controversial weapons include the following: anti-personnel mines, biological and chemical weapons, cluster weapons, white phosphorus, depleted uranium, and nuclear weapons.

Controversy reporting

■ Portfolio ■ Benchmark

High and severe controversies (% of portfolio)



Controversy breakdown

Greatest controversy	Portfolio count	% of portfolio	Benchmark count	% of benchmark
Category 5 (severe)	0	0.00%	2	0.61%
Category 4 (high)	1	0.55%	16	9.73%

For definitions of Sustainalytics Category 4 and Category 5 controversy reporting, please see the Appendix.

Source: Sustainalytics, a third-party ESG research and data provider. Sustainalytics' data is aggregated at the portfolio-level and is for illustrative purposes only. Putnam uses Sustainalytics to provide additional input in the analysis of ESG-related criteria as part of the overall research and investment process and to understand potential ESG risks and opportunities.

For the purposes of this report, we have chosen several portfolio-level ESG metrics (key sustainability indicators) that we believe provide a diverse set of factors that can be used to highlight the portfolio's ESG characteristics and are intended to illustrate Putnam's assessment of ESG-related information. Sustainability and ESG metrics are not uniformly defined, and applying these metrics involves subjective assessments. Sustainability and ESG scoring can vary across third-party data providers and may change over time.

ESG-related information generated by third-party data providers may be inaccurate, incomplete, inconsistent, and/or out-of-date, which may adversely impact analysis of the ESG factors relevant to a company, issuer, or portfolio. Use of quantitative and ESG modeling techniques is no guarantee of investment success or positive performance.

Key sustainability indicators

Name: Putnam Sustainable Leaders

As of March 31, 2024

The indicators below aim to provide additional ESG metrics for the portfolio and were adapted from the European Union's Sustainable Finance Disclosure Regulation. This document simply serves as a way to demonstrate Putnam's capabilities to report these metrics through the use of a third-party vendor, such as Sustainalytics. This document does not serve in meeting any regulatory requirements.

	Indicator	Portfolio aggregate	Coverage ratio	Unit of measure	
ENVIRONMENTAL	Greenhouse gas emissions	Scope 1	87,156.44	93.39	tCO ₂ eq
		Scope 2	29,393.60	93.39	tCO ₂ eq
		Scope 3	1,893,594.76	93.39	tCO ₂ eq
		Total GHG	116,550.04	93.39	tCO ₂ eq
	Energy consumption intensity in high-impact climate sector	Carbon footprint	19.63	93.39	tCO ₂ eq/EUR M invested
		Greenhouse gas intensity	54.25	94.43	tCO ₂ eq/EUR M invested
		Exposure to companies active in the fossil fuel sector	2.37	2.37	Percentage of portfolio
		Non-renewable energy consumption	56.14	75.21	Percentage of total energy sources
		Non-renewable energy production	24.76	34.64	Percentage of total energy sources
		Agriculture, Forestry & Fish	—	—	GWh/EUR M revenue
		Construction	—	—	GWh/EUR M revenue
		Electricity, Gas, Steam & Air Conditioning	3.12	2.13	GWh/EUR M revenue
		Manufacturing	0.15	43.61	GWh/EUR M revenue
		Mining & Quarrying	—	—	GWh/EUR M revenue
		Real Estate Activities	0.16	2.75	GWh/EUR M revenue
		Transportation & Storage	—	—	GWh/EUR M revenue
		Water Supply, Sewerage, Waste Management & Remediation Activities	—	—	GWh/EUR M revenue
	Wholesale & Retail Trade & Repair of Motor Vehicles & Motorcycles	0.08	4.83	GWh/EUR M revenue	
	GOVERNANCE AND SOCIAL	Activities negatively affecting biodiversity-sensitive areas	0.00	0.00	Percentage of portfolio
		Emissions to water	—	—	t/EUR M invested
		Hazardous waste	458.33	94.43	t/EUR M invested (weighted average)
		Air pollutants	99.70	92.69	t/EUR M invested
		Investments in companies without carbon emissions reduction initiatives*	28.24	28.24	Percentage of portfolio
		Violations of UN Global Compact principles and OECD Guidelines for Multinational Enterprises	0.00	0.00	Percentage of portfolio
		Lack of processes and compliance to UNGC and OECD	51.66	51.66	Percentage of portfolio
	GOVERNANCE AND SOCIAL	Unadjusted gender pay gap	—	—	Percentage
		Board gender diversity	34.31	94.43	Percentage
Exposure to controversial weapons		0.00	0.00	Percentage of portfolio	
Lack of anti-corruption and anti-bribery policies		0.00	0.00	Percentage of portfolio	
Lack of a supplier code of conduct*		2.00	2.04	Percentage of portfolio	

* Optional PAI metrics.

Source: Sustainalytics, a third-party ESG research and data provider. Sustainalytics' data is aggregated at the portfolio level and is for illustrative purposes only. Putnam uses Sustainalytics to provide additional input in the analysis of ESG-related criteria as part of the overall research and investment process and to understand potential ESG risks and opportunities.

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ESG-related information generated by third-party data providers may be inaccurate, incomplete, inconsistent, and/or out-of-date, which may adversely impact analysis of the ESG factors relevant to a company, issuer, or portfolio. Use of quantitative and ESG modeling techniques is no guarantee of investment success or positive performance.

Sustainability Summary Report

Name: Putnam Sustainable Future

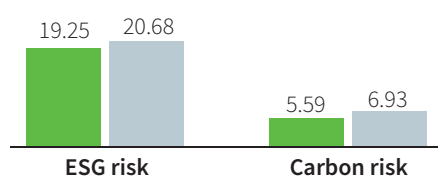
Benchmark: Russell Midcap Growth

As of March 31, 2024

Putnam Sustainable Future seeks long-term capital appreciation by investing in companies with the potential to produce strong financial returns and positive environmental and social outcomes. The portfolio invests in companies whose products and services provide solutions to essential sustainability challenges. Our investment process does not utilize third-party ESG scores to drive the overall decision-making process. Putnam uses Sustainalytics to provide additional input in the analysis of ESG-related criteria as part of the overall research and investment process and to understand potential ESG risks and opportunities. In no case do ESG scores or models result in automatic buy or sell decisions for the portfolio.

Portfolio summary scoring

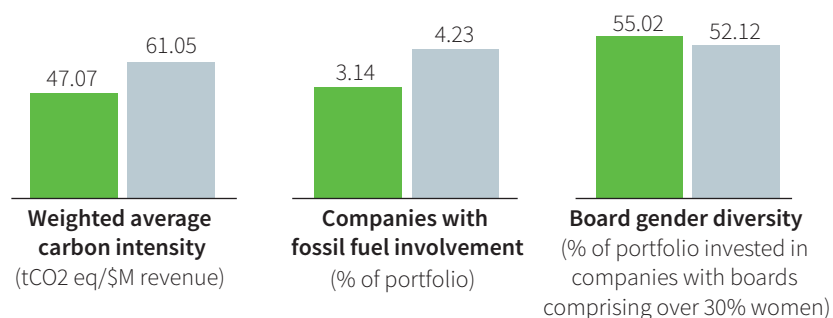
■ Portfolio ■ Benchmark



For definitions of Sustainalytics scores, please see the Appendix. Portfolios with lower ESG and carbon risk scores, based on Sustainalytics ratings, have lower ESG risk and lower exposure to material carbon and fossil fuel issues.

Key sustainability metrics

■ Portfolio ■ Benchmark



Business involvement

Business involvement	Revenue threshold	Count	% of portfolio
Private prisons	>10%	0	0.00%
Thermal coal	>10%	0	0.00%
Tobacco	>10%	0	0.00%
Gambling	>10%	0	0.00%
Controversial weapons*	>0%	1	1.20%

* Controversial weapons include the following: anti-personnel mines, biological and chemical weapons, cluster weapons, white phosphorus, depleted uranium, and nuclear weapons.

Controversy reporting

■ Portfolio ■ Benchmark

High and severe controversies (% of portfolio)



Controversy breakdown

Greatest controversy	Portfolio count	% of portfolio	Benchmark count	% of benchmark
Category 5 (severe)	0	0.00%	0	0.00%
Category 4 (high)	2	2.76%	3	0.38%

For definitions of Sustainalytics Category 4 and Category 5 controversy reporting, please see the Appendix.

Source: Sustainalytics, a third-party ESG research and data provider. Sustainalytics' data is aggregated at the portfolio-level and is for illustrative purposes only. Putnam uses Sustainalytics to provide additional input in the analysis of ESG-related criteria as part of the overall research and investment process and to understand potential ESG risks and opportunities.

For the purposes of this report, we have chosen several portfolio-level ESG metrics (key sustainability indicators) that we believe provide a diverse set of factors that can be used to highlight the portfolio's ESG characteristics and are intended to illustrate Putnam's assessment of ESG-related information. Sustainability and ESG metrics are not uniformly defined, and applying these metrics involves subjective assessments. Sustainability and ESG scoring can vary across third-party data providers and may change over time.

ESG-related information generated by third-party data providers may be inaccurate, incomplete, inconsistent, and/or out-of-date, which may adversely impact analysis of the ESG factors relevant to a company, issuer, or portfolio. Use of quantitative and ESG modeling techniques is no guarantee of investment success or positive performance.

Key sustainability indicators

Name: Putnam Sustainable Future

As of March 31, 2024

The indicators below aim to provide additional ESG metrics for the portfolio and were adapted from the European Union’s Sustainable Finance Disclosure Regulation. This document simply serves as a way to demonstrate Putnam’s capabilities to report these metrics through the use of a third-party vendor, such as Sustainalytics. This document does not serve in meeting any regulatory requirements.

	Indicator	Portfolio aggregate	Coverage ratio	Unit of measure	
ENVIRONMENTAL	Greenhouse gas emissions	Scope 1	5,072.97	92.38	tCO ₂ eq
		Scope 2	1,496.88	92.38	tCO ₂ eq
		Scope 3	63,151.99	93.47	tCO ₂ eq
		Total GHG	6,574.42	93.47	tCO ₂ eq
	Carbon footprint	Carbon footprint	16.62	93.47	tCO ₂ eq/EUR M invested
		Greenhouse gas intensity	49.77	95.04	tCO ₂ eq/EUR M invested
		Exposure to companies active in the fossil fuel sector	3.14	3.14	Percentage of portfolio
		Non-renewable energy consumption	65.41	58.33	Percentage of total energy sources
		Non-renewable energy production	30.98	15.26	Percentage of total energy sources
	Energy consumption intensity in high-impact climate sector	Agriculture, Forestry & Fish	1.06	0.81	GWh/EUR M revenue
		Construction	0.20	1.76	GWh/EUR M revenue
		Electricity, Gas, Steam & Air Conditioning	3.12	2.09	GWh/EUR M revenue
		Manufacturing	0.22	34.43	GWh/EUR M revenue
		Mining & Quarrying	—	—	GWh/EUR M revenue
		Real Estate Activities	0.00	1.39	GWh/EUR M revenue
		Transportation & Storage	—	—	GWh/EUR M revenue
		Water Supply, Sewerage, Waste Management & Remediation Activities	—	—	GWh/EUR M revenue
		Wholesale & Retail Trade & Repair of Motor Vehicles & Motorcycles	0.09	4.29	GWh/EUR M revenue
		Activities negatively affecting biodiversity-sensitive areas	0.00	0.00	Percentage of portfolio
		Emissions to water	—	—	t/EUR M invested
		Hazardous waste	31.85	95.47	t/EUR M invested (weighted average)
		Air pollutants	13.82	95.47	t/EUR M invested
	Investments in companies without carbon emissions reduction initiatives*	55.59	55.59	Percentage of portfolio	
	GOVERNANCE AND SOCIAL	Violations of UN Global Compact principles and OECD Guidelines for Multinational Enterprises	0.00	0.00	Percentage of portfolio
		Lack of processes and compliance to UNGC and OECD	68.77	68.77	Percentage of portfolio
Unadjusted gender pay gap		37.10	2.38	Percentage	
Board gender diversity		31.74	95.47	Percentage	
Exposure to controversial weapons		1.20	1.20	Percentage of portfolio	
Lack of anti-corruption and anti-bribery policies		0.00	0.00	Percentage of portfolio	
Lack of a supplier code of conduct*		5.20	5.18	Percentage of portfolio	

* Optional PAI metrics.

Source: Sustainalytics, a third-party ESG research and data provider. Sustainalytics' data is aggregated at the portfolio-level and is for illustrative purposes only. Putnam uses Sustainalytics to provide additional input in the analysis of ESG-related criteria as part of the overall research and investment process and to understand potential ESG risks and opportunities.

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Terms and definitions

Board gender diversity metric is the calculation of the percentage of companies in the portfolio where women comprise 30% or more of total board membership.

The metric includes holdings for which the percentage of female board members details are known. It is calculated only on the long holdings portion of the portfolio.

Carbon intensity is a relative metric used to compare company emissions across industries. Sustainalytics divides the absolute emissions by total revenue, meaning the figure is expressed in tonnes of carbon dioxide equivalent per million USD of total revenue. (Scope 1 and Scope 2)

Carbon risk rating quantifies the company's exposure and management of material carbon issues in its own operations as well as its products and services (as assessed by Sustainalytics).

Category 4 controversy reporting events have a high impact on the environment and society, posing high business risks to the company. This rating level represents systemic and/or structural problems within the company, weak management systems and company response, and a recurrence of incidents (as assessed by Sustainalytics).

Category 5 controversy reporting events have a severe impact on the environment and society, posing serious business risks to the company. This category represents exceptional egregious corporate behavior, high frequency of recurrence of incidents, very poor management of ESG risks, and a demonstrated lack of willingness by the company to address such risks (as assessed by Sustainalytics).

ESG risk rating measures the degree to which a company's economic value is at risk driven by ESG factors, as assessed through Sustainalytics' calculation of the company's unmanaged ESG risks.

Fossil fuel involvement measures the percent of portfolio exposed to companies that derive any percentage of revenue from fossil fuels.

It is important to note that, in pursuit of the portfolios' goal, the Portfolio Management team focuses on companies with a demonstrated commitment to sustainable business practices in areas that are relevant and material to their long-term financial returns and risk profiles. The team believe that companies that have exhibited such a commitment also often demonstrate potential for strong financial growth. This commitment may be reflected through environmental, social and/or corporate governance (ESG) policies, practices, or outcomes. The team believes that analysis of sustainability factors is best utilized in combination with a strong understanding of a company's fundamentals (including a company's industry, geography, and strategic position). The team's approach to sustainability analysis is deeply intertwined with their fundamental research process.

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Endnotes

- 1 Rainer Maria Rilke, *Letters to a Young Poet*, translated by M. D. Herter Norton, revised edition, 1993.
- 2 Putnam Sustainable Leaders changed its benchmark in August 2019 to the S&P 500 from the Russell 3000 Growth Index.
- 3 ESG Policy Statement (franklintempleton.com) https://www.franklintempleton.com/forms-literature/download/ESG03-WP?_gl=1*fynlog*_ga*MTIzMDA4Njg0Ny4xNzE0NDIzNzQ1*_ga_15V8ZZDP8Z*MTcxNjkxMzQ4OS4xMC4xLjE3MTY5MTM1MDUuMC4wLjA.
- 4 IFRS – SASB Standards <https://www.ifrs.org/issued-standards/sasb-standards/>
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- 6 IPCC, *Climate Change 2022: Impacts, Adaptation and Vulnerability, Summary for Policymakers*. See especially pages 13–22, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf.
- 7 Putnam analysis.
- 8 Putnam analysis and Linde corporate filings and publications. <https://assets.linde.com/-/media/global/corporate/corporate/documents/investors/events-and-presentations/why-linde-presentation.pdf>
- 9 Bernile, Bhagwat, and Yonker, “Board Diversity, Firm Risk, and Corporate Policies,” February 1, 2016, http://english.ckgsb.edu.cn/sites/default/files/files/Board%20Diversity_20160201.pdf.
- 10 Kramer, Konrad, and Erkut, “Critical Mass on Corporate Boards,” 2006, <https://www.wcwoonline.org/pdf/CriticalMassExecSummary.pdf>.
- 11 Hong and Page, “Groups of diverse problem solvers can outperform groups of high-ability problem solvers,” 2004, <https://www.pnas.org/doi/10.1073/pnas.0403723101>
- 12 Samuel Taylor Coleridge, *The Rime of the Ancient Mariner*, 1834. Text: <https://www.poetryfoundation.org/poems/43997/the-rime-of-the-ancient-mariner-text-of-1834>
- 13 United Nations World Water Development Report 2023, <https://unesdoc.unesco.org/ark:/48223/pf0000384655>
- 14 United Nations UN Water Facts, <https://www.unwater.org/water-facts/water-scarcity>
- 15 World Economic Forum, “Global freshwater demand will exceed supply. . .” March 2023, <https://www.weforum.org/agenda/2023/03/global-freshwater-demand-will-exceed-supply-40-by-2030-experts-warn/>
- 16 World Resources Institute, “25 Countries Face Extremely High Water Stress,” August 2023, <https://www.wri.org/insights/highest-water-stressed-countries>
- 17 https://www.cdc.gov/healthywater/global/wash_statistics.html
- 18 <https://www.fao.org/aquastat/en/overview/methodology/water-use>
- 19 Data sources for summary graphic:
 Megawatt-hour: 11,857 gallons, American Public Power Association, “How Much Water our Electricity Uses,” 2020, <https://www.publicpower.org/periodical/article/how-much-water-our-electricity-uses>
 Semiconductor: 3,250 gallons per unit. One chip might require as much as 2,200 gallons of ultra-pure water or 3,250 gallons of regular water. American Bar Association, “A Tale of Two Shortages,” https://www.americanbar.org/groups/environment_energy_resources/publications/wr/a-tale-of-two-shortages
 Bushel of corn: 3,000 gallons. United States Department of Agriculture, “Growing Crops and Saving Water in the West,” 2011, <https://agresearchmag.ars.usda.gov/2011/aug/water>
 Pair of jeans: 1,800 gallons use for the cotton. Production processes use more water, and vary by product. The 71 Percent, *Industrial Water Usage Statistics*, <https://www.the71percent.org/industrial-water-usage>
 Daily personal use: 82 gallons, United States average. United States Environmental Protection Agency, “Understanding Your Water Bill,” <https://www.epa.gov/watersense/understanding-your-water-bill>

- 20 Global Commission on the Economics of Water, “The What, Why and How of the World Water Crisis,” March 2023, <https://watercommission.org/wp-content/uploads/2023/03/Why-What-How-of-Water-Crisis-Web.pdf>
- 21 UNICEF, “Progress on Household Drinking Water, Sanitation and Hygiene, 2000-2020: Five Years into the SDGs,” July 2021, <https://data.unicef.org/resources/progress-on-household-drinking-water-sanitation-and-hygiene-2000-2020/>
- 22 World Bank, “Scaling Up Finance for Water: A World Bank Strategic Framework and Roadmap for Action,” September 2023, <https://www.worldbank.org/en/topic/water/publication/scaling-up-finance-for-water-a-world-bank-strategic-framework-and-roadmap-for-action>
- 23 American Society of Civil Engineers, “Chronic Underinvestment in America’s Water Infrastructure Puts the Economy at Risk,” August 2020, <https://www.asce.org/publications-and-news/civil-engineering-source/society-news/article/2020/08/26/chronic-underinvestment-in-americas-water-infrastructure-puts-the-economy-at-risk>
- 24 Council on Foreign Relations, “How U.S. Water Infrastructure Works,” March 2023, <https://www.cfr.org/backgroundunder/how-us-water-infrastructure-works>
- 25 American Society of Civil Engineers, “Infrastructure Report Card,” 2021, <https://infrastructurereportcard.org/wp-content/uploads/2017/01/Drinking-Water-2021.pdf>
- 26 McKinsey, “The US Bipartisan Infrastructure Law: Reinvesting in Water,” February 2022, <https://www.mckinsey.com/industries/public-sector/our-insights/the-us-bipartisan-infrastructure-law-reinvesting-in-water>
- 27 American Society of Civil Engineers, “Infrastructure Report Card,” 2021, <https://infrastructurereportcard.org/wp-content/uploads/2017/01/Drinking-Water-2021.pdf>
- 28 Food and Agriculture Organization of the United Nations, AQUASTAT Global Water Use Facts, <https://www.fao.org/aquastat/en/overview/methodology/water-use>
- 29 Center for Strategic and International Studies, “Water and Food: How, When, and Why Water Imperils Global Food Security,” October 2023, <https://www.csis.org/analysis/water-and-food-how-when-and-why-water-imperils-global-food-security>
- 30 Food and Agriculture Organization of the United Nations, “The State of the World’s Land and Water Resources for Food and Agriculture,” 2021, <https://www.fao.org/3/cb9910en/cb9910en.pdf>
- 31 United Nations, “Reducing Food Loss and Waste: Taking Action to Transform Food Systems,” <https://www.un.org/en/observances/end-food-waste-day>
- 32 PR Newswire, “PepsiCo and N-Drip Partner to Provide Water-Saving, Crop-Enhancing Benefits to Farmers Around the World,” March 2022, <https://www.prnewswire.com/il/news-releases/pepsico-and-n-drip-partner-to-provide-water-saving-crop-enhancing-benefits-to-farmers-around-the-world-301503782.html>
- 33 AgriTech Tomorrow, “Revolutionizing Agriculture: Innovative Irrigation Solutions for a Sustainable Water Future,” February 2024, <https://www.agritechtomorrow.com/article/2024/02/revolutionizing-agriculture-innovative-irrigation-solutions-for-a-sustainable-water-future/15247>
- 34 McKinsey, “Water: A Human and Business Priority,” May 2020, <https://www.mckinsey.com/capabilities/sustainability/our-insights/water-a-human-and-business-priority>
- 35 UNESCO, UN World Water Development Report, “Wastewater, The Untapped Resource,” 2017, <https://www.unesco.org/en/wwap/wwdr/2017>
- 36 Food and Agriculture Organization of the United Nations, “Water for Sustainable Food and Agriculture,” 2017, <https://www.fao.org/3/i7959e/i7959e.pdf>
- 37 United States Environmental Protection Agency, “Identifying Funding Sources for Lead Service Line Replacement,” <https://www.epa.gov/ground-water-and-drinking-water/identifying-funding-sources-lead-service-line-replacement>
- 38 NRDC, “Flint Water Crisis: Everything You Need to Know,” April 2024, <https://www.nrdc.org/stories/flint-water-crisis-everything-you-need-know#summary>
- 39 National Archives, “PFAS National Primary Drinking Water Regulation Rulemaking: A Proposed Rule by the Environmental Protection Agency on 3/29/2023,” <https://www.federalregister.gov/documents/2023/03/29/2023-05471/pfas-national-primary-drinking-water-regulation-rulemaking>
- 40 United States Geological Survey, “Tap Water Study Detects PFAS ‘Forever Chemicals’ Across the US,” July 2023, <https://www.usgs.gov/news/national-news-release/tap-water-study-detects-pfas-forever-chemicals-across-us>
- 41 United States Environmental Protection Agency, “FY 2024 EPA Budget in Brief,” <https://www.epa.gov/system/files/documents/2023-03/fy-2024-epa-bib.pdf>
- 42 American Water Works Association, “Buried No Longer: Confronting America’s Water Infrastructure Challenge” <https://www.awwa.org/Portals/0/AWWA/Government/BuriedNoLonger.pdf?ver=2013-03-29-125906-653>
- 43 United States Environmental Protection Agency, “Bipartisan Infrastructure Law: Resources for Clean Water,” <https://www.epa.gov/infrastructure/bipartisan-infrastructure-law-resources-clean-water>

- 44 American Society of Civil Engineers, “Report Card for America’s Infrastructure,” 2013, <https://www.sec.gov/Archives/edgar/data/1534155/000153415516000067/ex1021drinkingwaterreport.pdf>
- 45 Core and Main, Inc., “2022 ESG Report,” https://coreandmain.com/wp-content/uploads/Core-Main_2022_ESG_Report_2022_FULL_10.18.pdf
- 46 Advanced Drainage Systems, Inc., “2023 Sustainability Report,” <https://assets.adspipe.com/m/2039e6314feebf2c/original/Sustainability-Report-2023.pdf>
- 47 Xylem, Inc., “Non-Revenue Water,” Definition, Facts and Solutions, <https://www.xylem.com/en-us/solutions/smart-infrastructure/non-revenue-water/>
- 48 Badger Meter, Inc., “2022 Sustainability Report,” <https://badgermeter.widen.net/s/8mlb9kwwtz/badger-meter-2022-sustainability-report>
- 49 Lindsay Corporation, “2022 Environmental, Social, and Governance Report,” <https://d2ghdaxqb194v2.cloudfront.net/1278/190965.pdf>
- 50 United States Environmental Protection Agency, “National Enforcement and Compliance Initiative: Increasing Compliance with Drinking Water Standards at Community Water Systems,” <https://www.epa.gov/enforcement/national-enforcement-and-compliance-initiative-increasing-compliance-drinking-water>
- 51 Veralto Corporation, “2023 Sustainability Report,” https://filecache.investorroom.com/mr5ir_veralto/189/Veralto_2023_Sustainability_Report.pdf
- 52 Xylem, Inc., “Xylem Solution Removes PFAS Compounds from Water Utility’s Supply Well,” October 2023, <https://www.xylem.com/en-rs/making-waves/water-utilities-news/xylem-solution-removes-pfas-compounds-from-water-utilitys-supply-well/>
- 53 United States Environmental Protection Agency, “Lean and Water Toolkit,” <https://www.epa.gov/sustainability/lean-water-toolkit-chapter-2>
- 54 PVH Corporation, “2022 Corporate Responsibility Report,” <https://www.pvh.com/-/media/Files/pvh/responsibility/PVH-CR-Report-2022.pdf>
- 55 Ingersoll Rand Inc., “2022 Sustainability Report,” <https://www.irco.com/en-us/company/corporate-responsibility/sustainability-reports>
- 56 Heineken N.V., “2023 Annual Report,” <https://www.theheinekencompany.com/sites/heineken-corp/files/heineken-corp/sustainability-and-responsibility/heineken-n-v-annual-report-2023-final-22feb24.pdf>
- 57 National Geographic, “The Role of Water in the Generation of Electricity,” https://media.nationalgeographic.org/assets/file/Role_of_Water.pdf
- 58 PPL Corporation, “2022 Sustainability Report,” https://www.pplweb.com/wp-content/uploads/2023/04/PPL-Corporation_2022-Sustainability-Report_FINAL.pdf
- 59 Hilton Worldwide Holdings, Inc., “2022 Environmental, Social, and Governance Report,” <https://esg.hilton.com/wp-content/uploads/sites/4/2023/04/Hilton-2022-Environmental-Social-and-Governance-Report.pdf>
- 60 United Nations Department of Economic and Social Affairs, “Transforming our world: the 2030 Agenda for Sustainable Development,” <https://sdgs.un.org/2030agenda>.

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