



Primer

Sustainable Practices for Pharmaceutical Labs

With contributions from





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Executive Summary

Across the pharmaceutical industry, sustainability has quickly moved from aspiration to expectation. Current data highlights healthcare as a significant contributor to global greenhouse gas (GHG) emissions, with most of that footprint originating from pharma R&D and laboratory operations in the upstream supply chain.¹ As environmental, social, and governance (ESG) commitments evolve and regulatory and investor expectations intensify, sustainability is no longer optional for pharma organizations—it is a business, regulatory, and operational imperative.

As a result, pharma organizations are under increasing pressure to demonstrate tangible sustainability progress without compromising the core priorities that underpin their success: scientific productivity and efficiency, regulatory compliance, and the integrity of validated workflows.

Nearly all major companies have sustainability goals.² While ambition is strong, progress is often slowed by several barriers, including lack of visibility into net-zero progress and emissions reductions, regulatory and operational constraints, misalignment of stakeholder priorities, and uncertainties around return on investment (ROI). **The central challenge is therefore not a lack of intent, but a gap between strategy and execution.** Crucially, organizations' high-level sustainability ambitions must be translated into practical, measurable actions at the lab level in a way that enhances—rather than disrupts—performance.

Encouragingly, sustainability, operational excellence, and scientific productivity are increasingly aligned rather than competing objectives. The same actions that reduce waste, energy use, and resource consumption often simultaneously streamline workflows, optimize instrument and resource utilization, and reduce

costs. In turn, a more efficient, well-managed laboratory minimizes rework and manual effort, enabling scientists to spend more time generating high-quality, reproducible data.

Nevertheless, turning these opportunities into reality requires the right combination of scientific expertise and practical support. As an end-to-end partner for pharma labs, Agilent provides a connected, data-driven ecosystem of solutions, services, and life cycle support for regulated environments. This holistic solution, backed by insight and experience, helps labs translate sustainability ambition into clear, targeted actions that integrate seamlessly into—and optimize—existing workflows.

This primer provides a practical roadmap to continuous, measurable progress, helping organizations reduce environmental impact while boosting efficiency and scientific productivity—all with a demonstrable ROI.



The Current State of Sustainability in Pharma



Industry drivers

The healthcare industry has a significant carbon footprint. A 2019 study found that the climate footprint of healthcare represented around 4.4% of global GHG emissions. Of that, 71% of emissions originated from the healthcare supply chain, including pharma R&D and laboratory operations.¹

Against this backdrop, pharma labs are operating within an increasingly complex and pressured landscape, where sustainability expectations are mounting from multiple directions. Organizational leadership teams are embedding

ambitious ESG commitments into corporate strategy, while new and evolving regulatory and reporting requirements are driving greater transparency and accountability.³ At the same time, investors and society increasingly expect demonstrable sustainability performance, with growing scrutiny around how organizations manage their environmental impact. Together, these forces are positioning sustainability as a central consideration in how pharma labs operate today and evolve for the future.

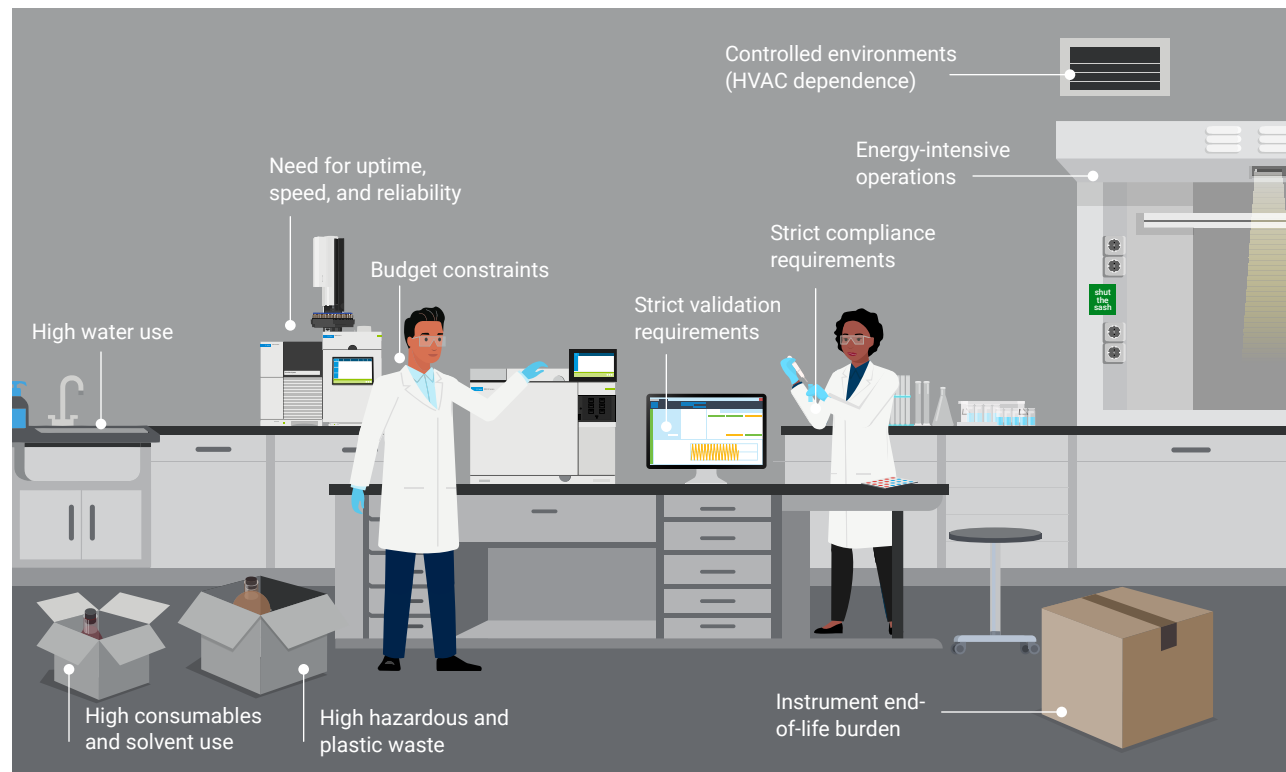




Operational reality in the lab

Labs are resource-intensive environments, consuming up to 10 times more energy and 4 times more water than office buildings⁴, representing a huge opportunity for change.

Labs in the pharma industry, specifically, carry out high-throughput, energy-intensive workflows with a high demand for instrument uptime and reliability. They also rely heavily on the use of consumables and chemical solvents. Strict validation and regulatory compliance requirements mean that processes are kept tightly controlled across the pharmaceutical drug development life cycle.



Types of greenhouse gas emissions

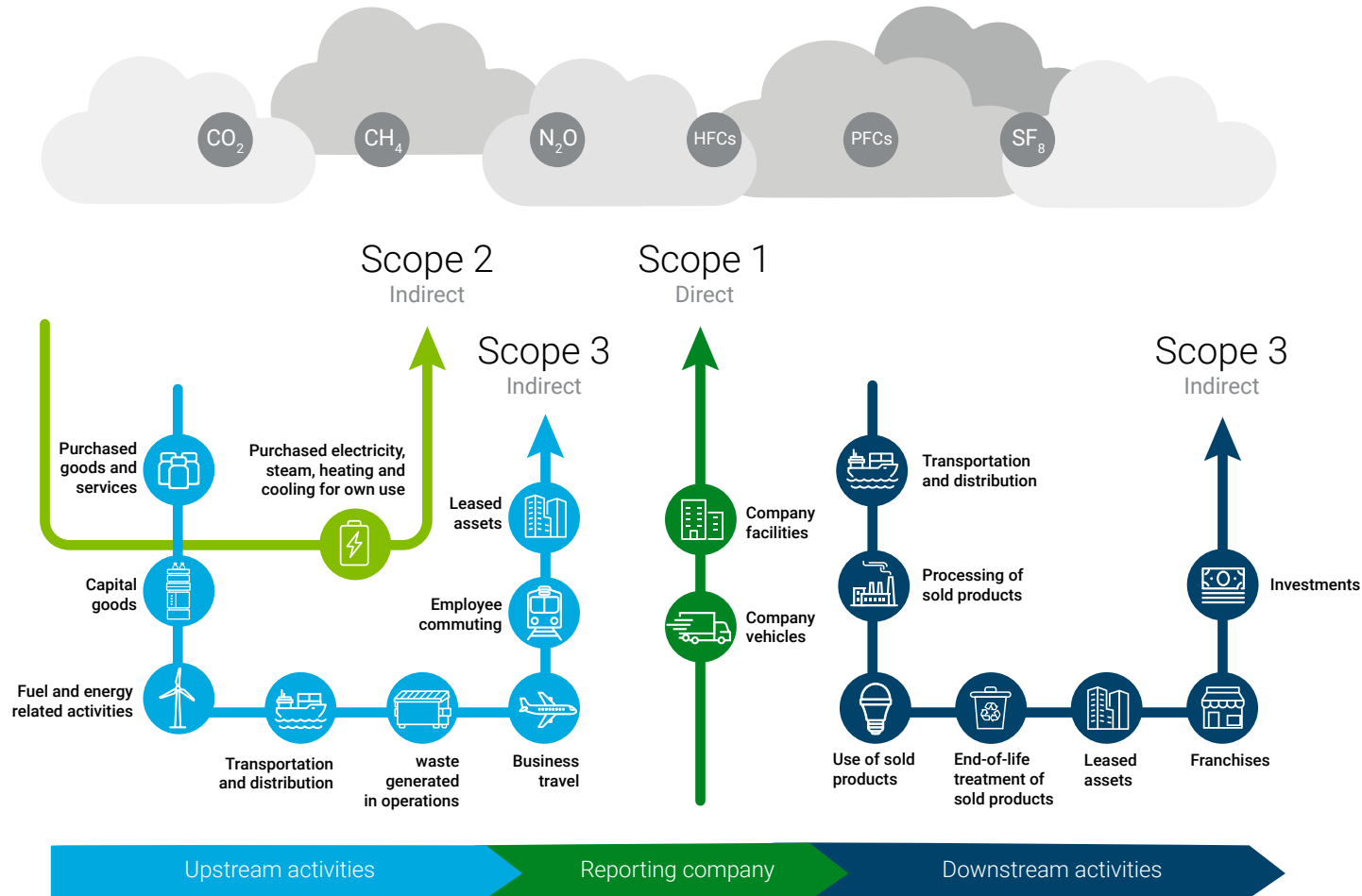
Greenhouse gas (GHG) emissions are typically categorized into Scope 1 (direct), Scope 2 (purchased energy), and Scope 3 (upstream and downstream value chain emissions). For pharma companies, Scope 3 emissions account for the largest share of impact (more than 80%)⁵, far exceeding that of Scope 1 and 2 emissions combined.

Scope 3 emissions are driven primarily by the upstream value chain, such as purchasing of laboratory equipment, consumables, and reagents, as well as their end-of-life disposal. As a result, what labs buy, use, and dispose of represent the largest share of impact—and the greatest opportunity and necessity for improvement.⁶ It is therefore not surprising that many pharma organizations

are seeking suppliers who provide cutting-edge technologies and end-to-end expertise to support the reduction of their Scope 3 emissions. In fact, approximately 85% of labs look to analytical instrument manufacturers to support the reduction of emissions with innovative product solutions.⁷

Scope 1 and 2 emissions are also contributors to the overall environmental impact of pharma labs. These are where labs can take direct and immediate action through improving energy efficiency, optimizing instrument use, and reducing resource consumption. Crucially, addressing Scope 1 and 2 reductions also reduces demand for materials and enhances operational efficiency, helping to drive reductions in Scope 3 emissions over time.





Scope 1

Emissions released **directly** from sources owned or controlled by a company.

Scope 2

Emissions generated **indirectly** from the production of purchased energy that a company consumes.

Scope 3

Emissions that occur **indirectly** across a company's upstream and downstream value chain.

Scope 1 to 3 emissions

Core Barriers to Sustainable Action

Approximately 97% of major pharma companies now report having introduced some level of sustainability plans², yet many still struggle to translate these high-level strategies into concrete, actionable steps at the lab level. Here we outline several interconnected barriers that can result in many organizations being unsure where to begin, ultimately stalling meaningful progress in sustainability.



Lack of visibility

Limited access to data and baselines makes it difficult to measure impact or track progress.



ROI uncertainty

Unclear or unquantified business value makes it difficult to justify, prioritize, or scale sustainability initiatives.



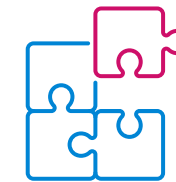
Stakeholder misalignment

Differing priorities across teams—from leaders to procurement specialists to lab scientists—prevent coordinated action and decision-making.



Constraints on change

Strict compliance and validation requirements make it complex to modify established, regulated workflows and may introduce risk.



Organizational disconnect

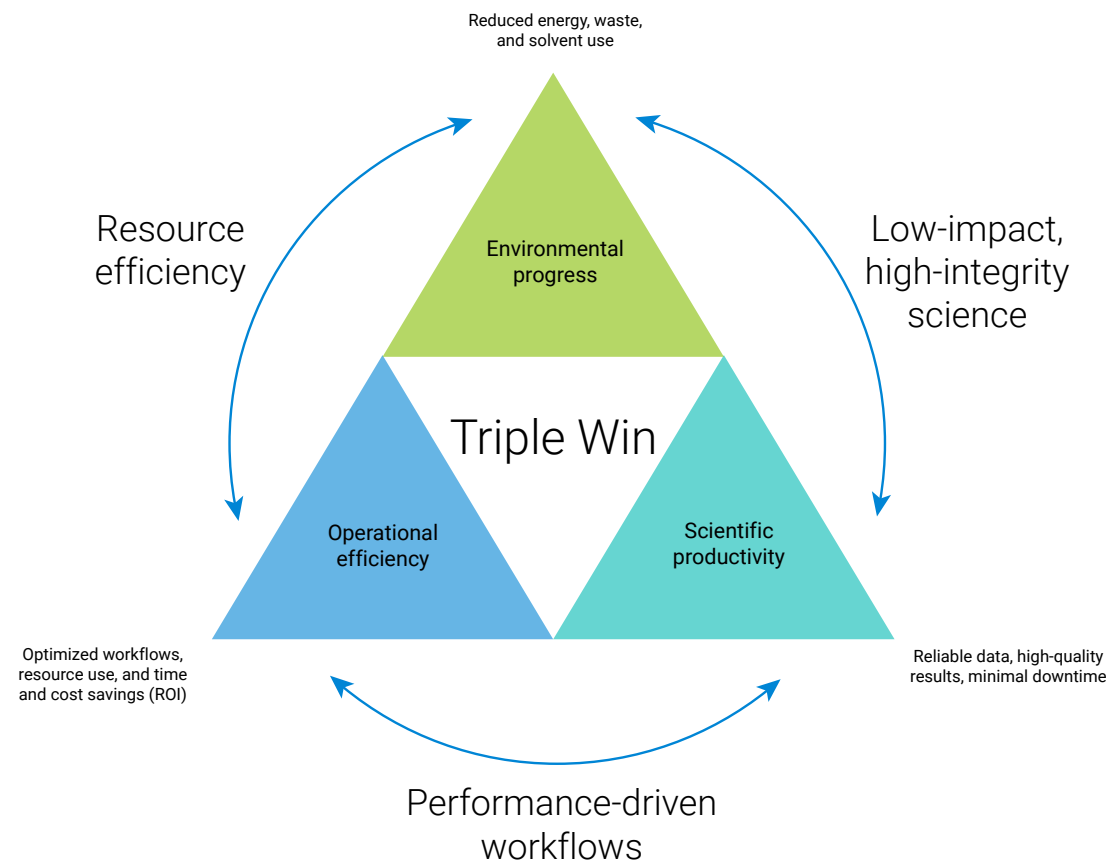
High-level sustainability goals are not clearly translated into actionable steps at the lab level.

The core challenge is therefore not a lack of ambition, but bridging the gap between strategy and execution. Crucially, addressing sustainability in pharma labs requires practical, data-driven approaches that fit within the realities of lab operations, enable informed decision-making, and deliver clear, measurable outcomes.

From Barriers to Alignment: The Triple Win

Addressing sustainability in pharma labs does not need to come at the expense of performance. When implemented effectively, many actions that reduce environmental impact—such as lowering energy use, minimizing chemical solvent and water consumption, and reducing waste—also create measurable business advantages for pharma companies in the long term.

This idea can be understood as a “triple win,” where environmental progress, operational efficiency, and scientific productivity are aligned rather than in competition.



Importantly, aligning on these three objectives helps address the differing priorities of stakeholders across a pharma organization:



Sustainability leaders need clear, credible data, audit-ready metrics, and direct links between initiatives and business value. Demonstrating measurable reductions in resource consumption alongside total cost of ownership helps justify investment and scale programs.



Procurement managers focus on cost, risk, and supplier performance. When sustainability initiatives deliver demonstrable savings and life cycle value, they can become a key criterion in supplier evaluation and long-term sourcing decisions.

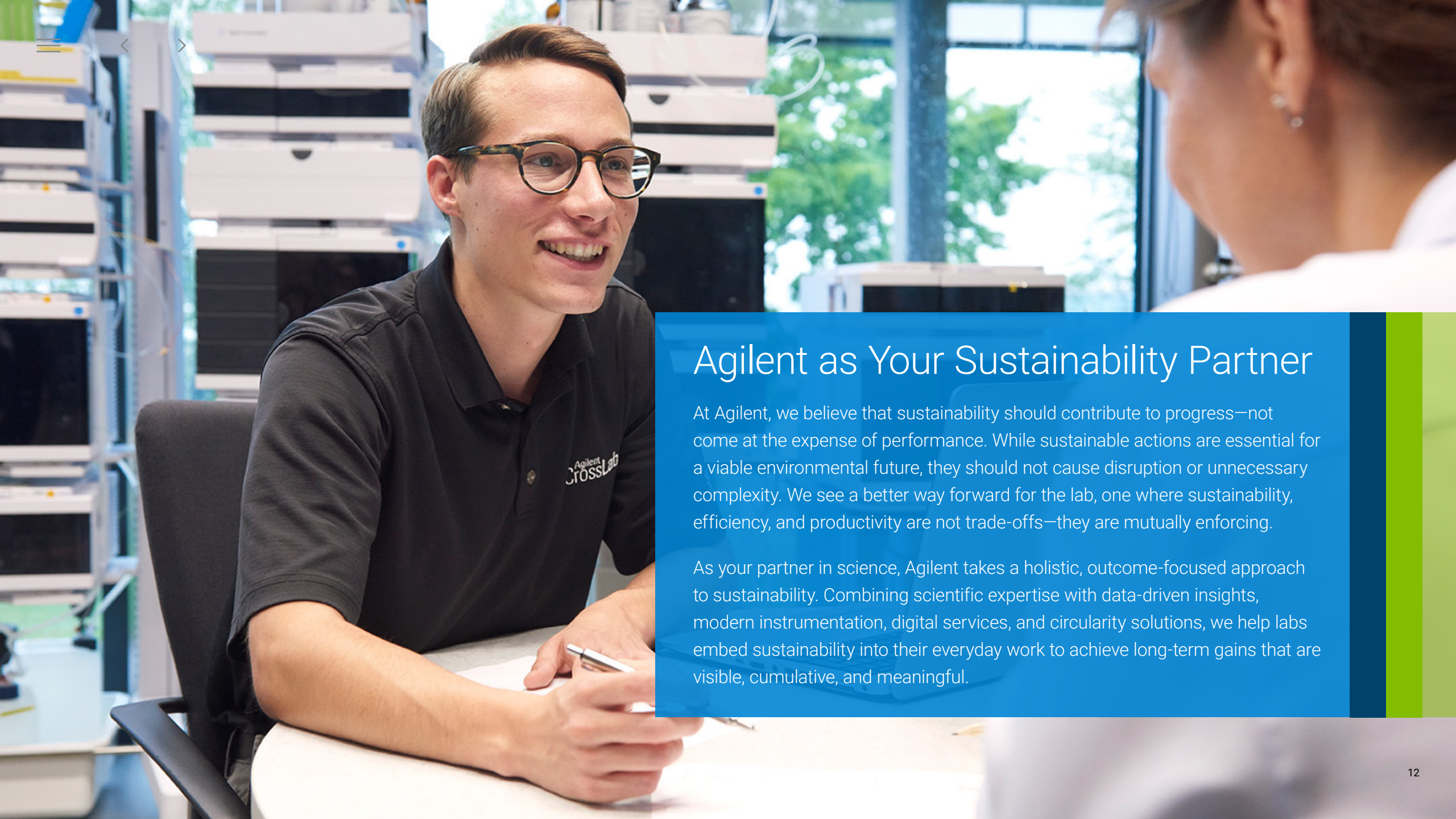
Lab operations managers prioritize throughput, efficiency, and uptime. Sustainability improvements can enhance performance while fitting into existing workflows.



Lab scientists need data quality, reproducibility, and workflow simplicity. Approaches that reduce variability and inefficiencies support more productive, high-quality work while minimizing unnecessary resource use.



Realizing the triple win consistently at scale requires a coordinated approach that delivers results across complex lab environments and diverse stakeholder needs. This creates a need for a partner who brings together scientific, operational, and sustainability expertise with holistic, data-driven solutions across the entire value chain. Such a partner can work with organizations to integrate sustainability seamlessly within their existing workflows and ensure tangible value in the long term.



Agilent as Your Sustainability Partner

At Agilent, we believe that sustainability should contribute to progress—not come at the expense of performance. While sustainable actions are essential for a viable environmental future, they should not cause disruption or unnecessary complexity. We see a better way forward for the lab, one where sustainability, efficiency, and productivity are not trade-offs—they are mutually enforcing.

As your partner in science, Agilent takes a holistic, outcome-focused approach to sustainability. Combining scientific expertise with data-driven insights, modern instrumentation, digital services, and circularity solutions, we help labs embed sustainability into their everyday work to achieve long-term gains that are visible, cumulative, and meaningful.

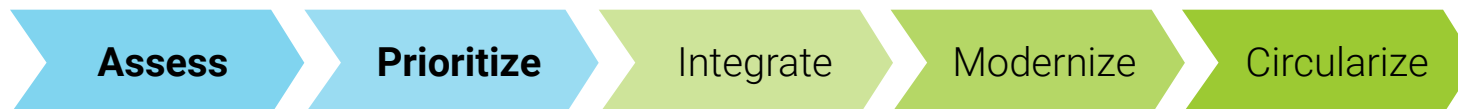
Five Principles for Sustainable Lab Transformation

To address each barrier to action, Agilent has defined five principles for building a more sustainable lab. Together, these principles provide a structured approach to make tangible environmental progress while empowering operational performance and scientific outcomes.





Five Principles for Sustainable Lab Transformation



How will organizations know if they're making progress?

1. **Assess:** Build a data foundation

Across an organization—from sustainability leaders to lab analysts—stakeholders need data-driven insights to recognize the full impact of sustainable lab practices.⁴ A comprehensive understanding of lab resource usage, including energy consumption and instrument utilization, can help establish a baseline to track new progress, highlight opportunities for waste reductions, streamline inefficiencies, and make informed improvements with a clear ROI.



How can workflows be adjusted if they are tightly regulated?

2. **Prioritize:** Start incorporating high-impact, low-disruption changes

The success of pharma organizations depends on the compliance, speed, and integrity of their workflows and the quality of their products—and leaders need to know that sustainable initiatives will not introduce risks. Incorporating sustainability into the lab begins with actions that have measurable impact without disrupting validated workflows, such as right-sizing instrument fleets and using shutdown, standby, or sleep modes where possible.



Five Principles for Sustainable Lab Transformation



How can sustainability be aligned across different teams and priorities?

3. **Integrate:** Embed sustainability into lab operations

Rather than treating sustainability as a separate initiative, embedding it into routine decision-making ensures it supports performance, quality, and cost objectives across the organization—creating a shared framework that aligns priorities across different teams. This means integrating sustainable practices into the processes that define how labs operate, from daily workflows and procurement decisions to method development and life cycle planning. This way, sustainability is not an add-on—it becomes a natural part of how work gets done.



How can labs unlock even bigger, long-term impact?

4. **Modernize:** Upgrade methods and technologies for long-term gains

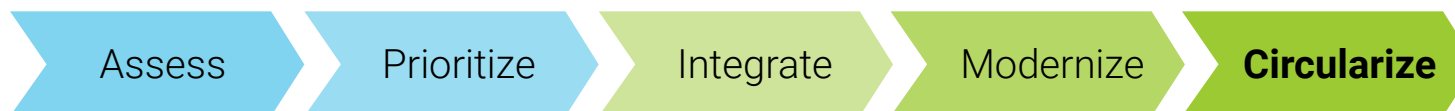
While Agilent promotes extending asset life when performance is sufficient, equipment and method modernization can deliver clear, measurable gains for your lab and the environment when inefficiency becomes a bigger cost than replacement.

By transitioning to more efficient methods, modern technologies, and greener chemical solvents, labs can reduce energy use, resource consumption, and waste while maintaining—or even enhancing—performance. This shift is increasingly supported by evolving regulatory guidance, including USP <621> and Ph. Eur., which enable method optimization and modernization without full revalidation.

While upgrades may require upfront investment, they deliver strong returns over time through lower operating costs, better health and safety, improved throughput, elevated efficiency and reliability, and reduced total cost of ownership.



Five Principles for Sustainable Lab Transformation



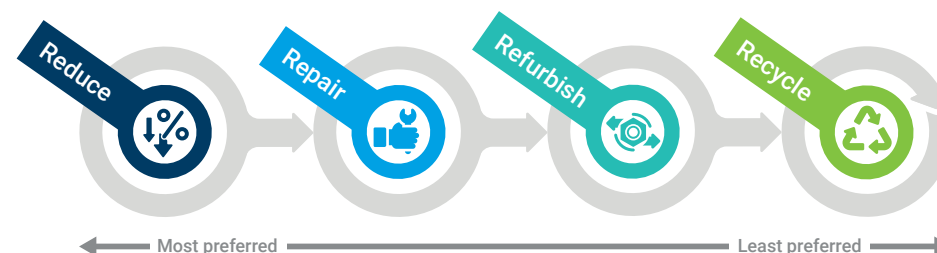
How can environmental impact be reduced beyond day-to-day operations?

5. **Circularize:** Build circularity into the lab life cycle

Through circularity principles like repair and maintenance, instrument lifespan can be increased to reduce waste and limit the need for new, virgin materials. Organizations are also increasingly looking to work with vendors who can offer a guaranteed lifespan for new instrument purchases, providing greater confidence in long-term performance and sustainability outcomes. Keeping materials in circulation for longer not only lowers emissions associated with manufacturing and supply chains but also improves operational efficiency by maintaining uptime and reducing disruption, while lowering total cost of ownership through avoided replacement costs.

When instruments are being replaced at a lab site, trading in retired instruments for refurbishment can give them a second life, helping to reduce waste and support other labs with cost-effective solutions. Parts harvesting and recycling of retired instruments is a last resort to recover valuable parts and materials for reuse, aiming to avoid landfill and the demand for new, raw materials.

By working with partners who support circularity and provide data-driven insights, organizations can more easily embed these decisions into procurement and asset management.



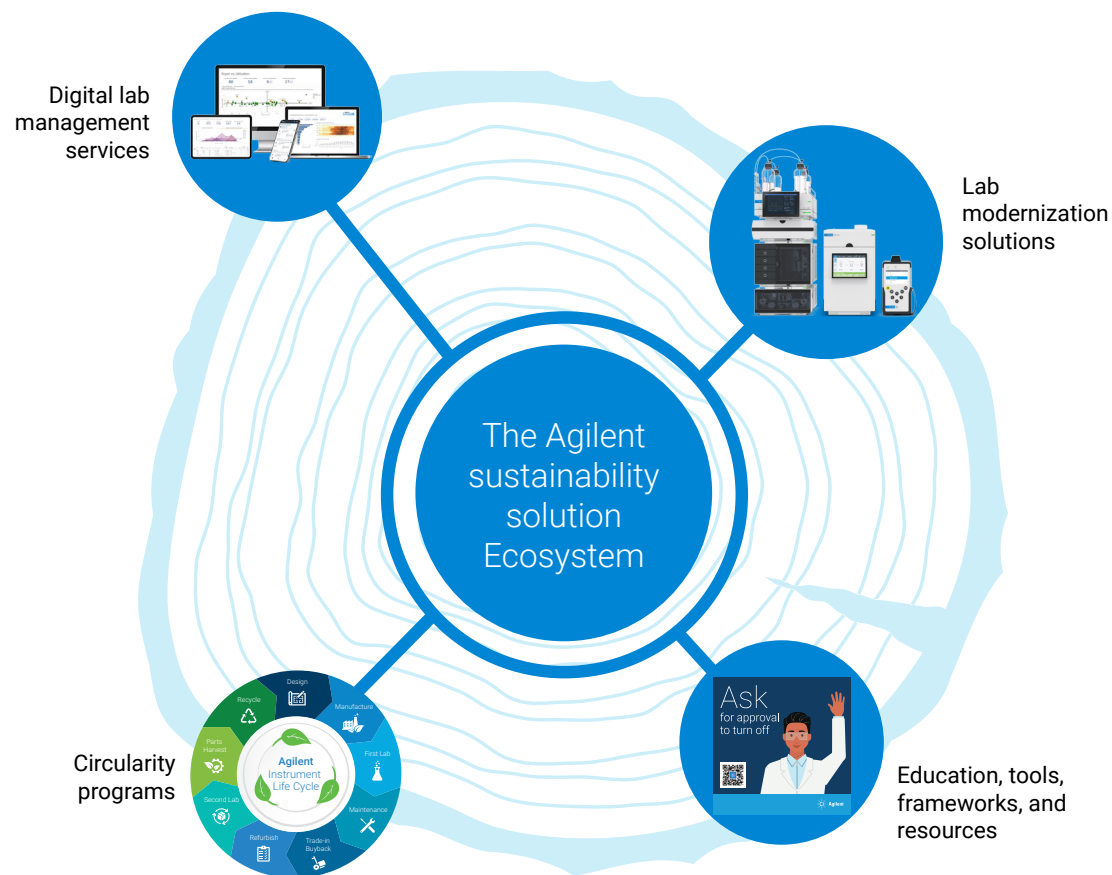
What is **circularity**?

Circularity refers to the practical application and measurable outcome of keeping products, components, and materials in use for as long as possible.

The principle transforms what has historically been a linear model to one that is circular—diverting valuable materials away from waste incineration or landfill. This is achieved through preferred approaches in the waste hierarchy such as reuse, repair, refurbishment, and recycling, all of which help to reduce waste and maximize the value of resources throughout the product life cycle.

The Agilent Sustainability Solution Ecosystem

Agilent enables organizations to accelerate sustainable lab transformation through a comprehensive, holistic ecosystem of solutions spanning digital lab management and insight, method and technology modernization, circularity approaches, and practical guidance.



Digital lab management services: CrossLab Connect

Agilent **CrossLab Connect** digital lab management services provide a complete set of lab operations and analytics capabilities designed to accelerate lab performance for an improved ROI, all while supporting regulatory compliance. With a comprehensive, lab-wide dashboard comprised of AI-powered digital features from inventory management to asset life cycle analytics, CrossLab Connect gives you complete visibility over all your instruments for improved efficiency, productivity, and sustainability. These digital lab management services are supported by a dedicated Agilent customer success manager, who can help guide data interpretation and decision-making to maximize value.



Baseline measurement

Establishing baselines is essential for quantifying environmental impact and tracking progress. CrossLab Connect provides a centralized, real-time view of lab operations, combining data from instruments, service records, and workflows into a single dashboard. With this visibility, labs can establish baseline metrics for their energy and resource use, instrument utilization and downtime, and costs—helping to inform and influence subsequent workflow optimization and investment decisions.

Energy and consumables consumption tracking

CrossLab Connect provides direct visibility into power, solvent, gas, and consumable usage, helping labs identify high-consumption instruments or processes, reduce overuse or unnecessary runs, and set targets for reduction. Identifying these resource consumption inefficiencies can save significant costs and improve operational efficiency.

Fleet performance

Monitoring instrument health and utilization improves both performance and resource efficiency. CrossLab Connect provides a fleet-wide view and analytics on asset health, utilization, uptime, and service history in real time, supporting informed decision-making. The platform's Smart Alerts feature also immediately alerts to maintenance needs or performance issues, and enables quick creation of new service requests, helping reduce rework and prevent downtime.

Instrument right-sizing

Having the right number and types of instruments is crucial for workflow efficiency and sustainability. CrossLab Connect identifies under- and overutilized assets by analyzing fleet composition and usage patterns. With this insight, labs have the confidence to eliminate unnecessary instruments, avoid overpurchasing, and redistribute workloads more efficiently—lowering energy use and overall footprint. When an energy-inefficient or high-maintenance legacy system is identified, data-driven insights can help determine the smartest course of action aligned with sustainability and business goals.



Performance in practice

The following illustrative examples are taken from real-world uses of CrossLab Connect.



Saving energy through asset optimization

A major biopharma lab significantly reduced its environmental footprint by using CrossLab Connect to identify and replace energy-inefficient instruments. Each upgraded asset delivered annual energy savings of 7.3 MWh—equivalent to powering 60 to 70 homes—directly reducing Scope 2 emissions. Smart maintenance insights also ensured optimal instrument performance and utilization, minimizing downtime and enabling more consistent, efficient lab operations.



Reducing consumable waste and idle time

A global contract testing lab used CrossLab Connect to uncover inefficiencies in argon usage, identifying ICP-MS instruments consuming gas while idle. By reducing idle time, the lab cut argon consumption by 10%, saving 6.75 million liters of gas annually and approximately \$72,000 across the lab. This not only lowered Scope 3 emissions associated with consumables, but also improved operational efficiency by aligning instrument use with demand—ensuring resources, cost, and performance were better optimized.



Optimizing workflows and space efficiency

A pharma lab addressed inefficiencies caused by poor instrument layout, where key systems in a workflow were physically separated, leading to idle time, excess energy use, and reduced productivity. Using insights from CrossLab Connect, the lab reconfigured its space and right-sized its footprint, creating more streamlined workflows. This resulted in improved productivity, reduced electricity consumption, and more efficient use of existing assets—demonstrating how better operational design can simultaneously enhance sustainability and scientific output.



Lab modernization solutions

The following examples demonstrate how equipment can support sustainability and improved operations.

Gas chromatography: The 8850 GC

Gas chromatography (GC) plays a critical role in many workflows but can require significant resources in operation, making it challenging for labs with GC instruments to operate sustainably. The **Agilent 8850 GC** is designed with these challenges in mind, helping users significantly reduce environmental impact while boosting productivity.⁸

Reduced energy consumption

Using 45% less power than conventional GCs⁸, the 8850 GC's design plays a key role in improving both sustainability and performance:

- **Compact oven design:** Uses a smaller oven volume to reduce energy while enabling faster temperature cycling and shorter analysis times.
- **Agilent GC Assist:** Provides built-in system intelligence to track energy use, alongside integrated system health monitoring, consumable lifetime tracking, and guided maintenance procedures to minimize downtime, rework, and unnecessary resource consumption.
- **Sleep mode:** Reduces power use during idle periods and returns to operating conditions when needed.





Helium savings

Helium is a finite, nonrenewable resource with an energy-intensive supply chain, and global shortages have reduced its availability and driven up costs. The 8850 GC offers ways of reducing helium consumption, as well as reducing reliance on helium by enabling switching to alternative carrier gases:

- **Built-in intelligence:**
Tracks gas usage and establishes a baseline to support data-driven decisions that reduce gas consumption over time.
- **Integrated leak detection and system diagnostics:**
Monitors system integrity and identifies and addresses leaks quickly, helping minimize waste and reduce emissions while maintaining high-quality analytical performance.
- **Gas Saver mode:**
Automatically reduces gas consumption during idle periods by reducing the split flow rate between injection, minimizing unnecessary use without impacting system readiness or performance.
- **Agilent helium conservation module:**
Automatically switches to nitrogen carrier gas during idle times while maintaining an inert flow path and stable oven temperature in standby mode. This both maintains system readiness and prevents unnecessary gas consumption.
- **Agilent hydrogen sensor module:**
Continuously checks for free hydrogen in the column oven, identifies leaks, and acts fast, providing peace of mind when switching to hydrogen carrier gas.





Performance in practice

The following examples show the how the 8850 GC can create measurable savings.



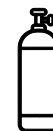
Energy savings with fast chromatography

For this [application](#), use of the 8850 GC allowed a three-fold reduction in energy usage per sample and three-fold faster analysis, tripling efficiency while significantly lowering annual power consumption. Methods were applied with helium, nitrogen, and hydrogen carrier gas.



Realizing efficiency gains with a gas switching device

This [application note](#) describes the 8850 GC and helium conservation module achieving 10- to 14-fold efficiency gains for helium and hydrogen usage during high-throughput carrier gas evaluation. The approach did not compromise chromatographic performance, precision, or linearity.



Saving costs by reducing gas consumption

To determine the cost savings that could be realized by implementing Gas Saver with and without nitrogen standby, use this [online calculator](#).

Lab modernization solutions

Modern liquid chromatography methods and technologies

Through advanced liquid chromatography (LC) platforms, column technologies, and method guidance, Agilent supports labs with modernization solutions that reduce energy and solvent use while elevating performance and productivity.

Transitioning to UHPLC

For LC systems, most environmental impact does not come from manufacturing the product, but from daily use. Of the **Agilent Infinity III LC Series**' cradle-to-grave product carbon footprint, 85 to 94% of its impact comes from its use in the lab, with electricity making up 71% of that figure.⁹ This makes reducing energy and solvent use during routine operation critical to lowering overall impact.

Advances in ultrahigh-performance liquid chromatography (UHPLC) systems like the Infinity III LC Series provide a direct pathway to achieving these reductions. By operating at lower flow rates and enabling shorter run times with higher throughput, UHPLC methods reduce solvent consumption and energy use per sample. The use of smaller inner diameter (id) columns, shorter column lengths, and smaller particle sizes can also increase throughput and, in turn, save solvent and energy—without compromising analytical performance.

Agilent supports these improvements through advanced system capabilities on the Infinity III Series LC, including:

- **Agilent InfinityLab Assist:** Creates automated make-ready, standby, purge, and shutdown LC workflows to cut unnecessary solvent consumption and reclaim up to 125.5 hours per year of analyst time per instrument.¹⁰
- **Agilent InfinityLab Level Sensing:** Monitors mobile phase levels, minimizes overpreparation, and prevents pump and column damage, saving \$1,500 per year.¹⁰
- **Agilent InfinityLab Sample ID Reader:** Automatically identifies sample information directly within the workflow, preventing identification errors that can lead to repeat analyses. This reduces unnecessary solvent use, energy consumption, and wasted samples, saving up to 135 hours per year.¹⁰





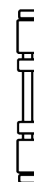
USP <621> method modernization

In regulated environments, Agilent supports method modernization through alignment with updated **USP <621>** guidelines, enabling labs to transition legacy methods to more efficient conditions without requiring full method redevelopment. This provides a practical pathway for improving efficiency while maintaining method integrity, allowing organizations to reduce resource consumption and operational costs while maintaining high-quality performance.



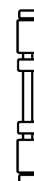
Performance in practice

The following examples illustrate how modern LC solutions can unlock significant savings.



Accelerating throughput and reducing resource use through method modernization

This **white paper** provides guidance on implementing updated USP <621> method adjustment allowances. It highlights how a reduction in analysis time and mobile phase consumption of 87 and 82%, respectively, can be achieved by transferring conventional HPLC methods to UHPLC conditions. In one example, the USP assay method for amlodipine besylate was successfully modernized using an Agilent 1290 Infinity III LC and a sub-2 μm column, maintaining method equivalence while significantly improving throughput and reducing resource use



Cutting analysis time and solvent use with advanced columns and UHPLC conditions

In this **application note**, method transfer to UHPLC conditions for the analysis of acetaminophen impurities delivered significant efficiency gains while remaining compliant with USP <621> guidelines. The updated method compared the use of a 4.6 x 250 mm, 5 μm column with a smaller id, shorter column (the **Agilent InfinityLab Poroshell 120 EC-C18**, 2.1 x 150 mm, 2.7 μm), with the latter enabling a reduced analysis time by 67.6% and solvent consumption by 87.4% per injection. The note also showed that upgrading from a legacy Agilent 1100 Series LC to an Agilent 1260 Infinity III Prime LC enabled rapid ROI, with the benefits of improved efficiency and reduced operating costs realized in fewer than 2,000 injections.



Lab modernization solutions

Dry vacuum pumps for mass spectrometry

Traditional oil-sealed vacuum pumps are energy intensive, generate significant heat, and require ongoing handling and disposal. Agilent supports lab modernization in mass spectrometry (MS) by providing oil-free **Agilent dry scroll pumps** directly as a fully integrated option or as an upgrade kit for our high-end MS instruments. Dry pumps reduce environmental impact by lowering energy consumption, eliminating oil waste, and simplifying maintenance while producing less heat. Lower heat generation can also decrease HVAC demand, improving overall energy efficiency. Users also have the added benefit of reduced noise and the elimination of inefficiencies associated with managing oil trays, oil changes, waste disposal, and oil fume generation.



Performance in practice



Reducing power consumption and heat dissipation with dry pumps

This **flyer** demonstrates how dry pump solutions provide a significant reduction in both power consumption compared to oil pumps. Specifically, the Agilent IDP-45 dry scroll pump for LC/MS uses 4,818 kWh per year compared to an oil pump.



Lab modernization solutions

Molecular spectroscopy

Agilent provides Raman spectroscopy solutions for raw material identification and end-product testing. We also provide UV-Vis technologies for workflows like API and biomolecules quantification, and thermal melt analysis of oligonucleotides. These solutions deliver significant savings in energy, solvent, cost, and time. Raman spectroscopy is not destructive to samples and has zero reliance on components such as pumps, heating or cooling systems, solvents, or other consumables, which reduces energy demand and limits waste generation. UV-Vis systems also support efficient, high-throughput workflows with reduced solvent and energy use per sample.

Zero-waste raw material identification

The **Agilent Vaya Raman raw material identity verification system** is a user-friendly, handheld spectrometer that enables rapid, safe identity verification of raw materials through transparent and opaque containers using spatially offset Raman spectroscopy. The Vaya only requires energy when it is turned on, and it uses no water or consumables during the workflow. By eliminating the need to open containers or take physical samples, Vaya reduces sample material waste, saves time, and avoids risk of contamination. This safe approach eliminates operator exposure and the need for PPE, which supports green chemistry principles by minimizing waste and the handling of hazardous materials.



Performance in practice

Realizing sustainability benefits across the product life cycle

This **white paper** outlines how the Vaya saves time and material waste. The Vaya can reduce operator hours by 50% as compared to conventional Raman.



Lab modernization solutions

Molecular spectroscopy

Fast, solvent-free end-product testing

The **Agilent TRS Raman quantitative pharmaceutical analysis system** provides fast, nondestructive bulk analysis of tablets and capsules. It can be applied to batch release testing, such as assay and content uniformity. When implemented in these workflows, TRS eliminates the need for sample preparation, associated solvents, consumables, and waste streams compared to the primary reference methods. As a complementary analytical technique, TRS can deliver significant improvements in laboratory productivity and efficiency while reducing environmental impact.



Performance in practice

Saving time and solvent with a zero-preparation Raman spectroscopy workflow

This **flyer** provides a guide to calculate the time, solvent, and cost savings the TRS can provide by eliminating sample preparation, cleanup, and disposal.

Efficient UV-Vis workflows for pharmaceutical analysis

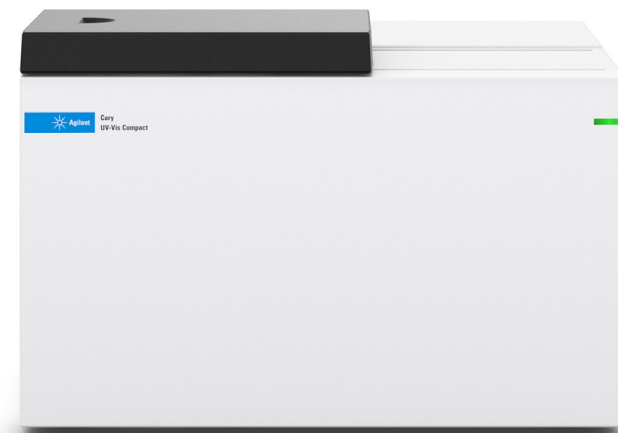
The **Agilent Cary 3500 UV-Vis spectrophotometer** supports a range of (bio)pharma workflows, including API and biomolecules quantification and temperature-controlled studies like oligonucleotide thermal melts. Its integrated, air-cooled Peltier system eliminates the need for water baths, recirculators, and tubing—simplifying setup and reducing water use, maintenance, and the risk of leaks or contamination. In addition, the xenon flash lamp only operates during measurement with no warmup time, enabling significantly lower energy consumption (typically >80%) than traditional lamp systems.



Performance in practice

Reducing water and energy use in temperature-controlled workflows

This **application note** outlines how the Cary 3500 UV-Vis enables efficient, water-free thermal experiments with precise temperature control, simplifying workflows while reducing resource consumption and lab hazards.



Lab modernization solutions

Product transparency

To help labs achieve their sustainability goals, Agilent was the first **Transformative Level** sponsor of My Green Lab®—an international nonprofit dedicated to building a culture of sustainability in science. Our partnership includes the certification of numerous Agilent products with the My Green Lab ACT® Ecolabel.

The **My Green Lab ACT Ecolabel** is the first sustainability-focused ecolabel designed specifically for laboratory equipment, chemicals/reagents, PPE, kits, and consumables. The ACT Ecolabel provides transparent, third party-verified data that empowers scientists and procurement teams to make more sustainable choices. Using a science-based, 100-point weighted score, the ACT Ecolabel provides information on key factors such as:

- Equipment energy consumption
- Product and packaging materials
- Chemical hazards
- End-of-life options that support circularity
- The sustainability performance of the manufacturing facility, including renewable energy investment
- Company commitments to reducing GHG emissions

ACT Ecolabel

Agilent

Agilent Pro iQ Mass Detector

LC/MS

SKU: G6160B

Singapore City, Singapore



Environmental
Performance Factor

72

Certified April 2026

Environmental Performance

Product		
Recycled/Renewable Content	0%	■
Chemicals of Concern	Yes	■
Electricity Consumed/Day	18.2 kWh	☑
Water Consumed/Day	N/A	☑
Refrigerant GWP	N/A	☑
Supported Lifetime	10 years	■
Recyclable Materials*	40%	■
Circularity Support	Refurbishing Program	■

Product Carbon Reporting

Reporting Framework	None	☑
Review	N/A	■
Product CO ₂ e*	Not Available	■

Manufacturing Facility

Best Practices	8.5/10	■
Renewable Electricity	100%	■
Renewable Energy	99%	■

Company GHG Reductions

Scope 1/2/3 Tracking	Yes/Yes/Yes	■
Near-Term Target	Yes	■
Net-Zero Target	Yes	■

Improvements

Increased Renewable Electricity	
Net-Zero Target Commitment	
Near-Term Target Commitment	+ 1 more

Audit Details

Third Party Reviewer: Verico
*See Definitions



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Circularity solutions

Agilent supports **circular** lab operations by offering several services, programs, and initiatives to help organizations extend instrument life, reduce waste, and maximize resource value. The **Agilent Value Promise** guarantees at least 10 years of usable life after the purchase of a new instrument. Through regular servicing, refurbishment programs, and responsible end-of-life management solutions, Agilent enables labs to embed circularity into the instrument life cycle.

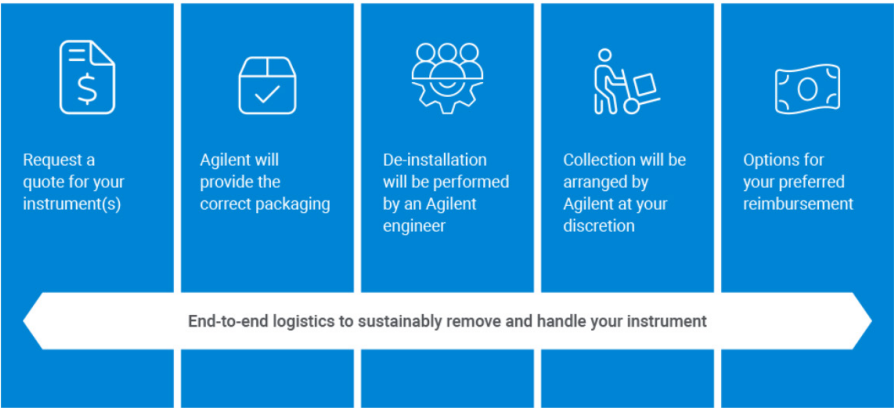
CrossLab service plans

Agilent helps labs extend the operational life of instruments by offering regular service, preventive maintenance, and expert repair. **Agilent CrossLab service plans** are available for both Agilent and select non-Agilent instruments, and enable labs to reduce downtime, minimize costly ad hoc repairs, and extend the life of instruments.

When labs need technical help, Agilent CrossLab Virtual Tech Support provides fast access to Agilent technical experts and advanced virtual tools to help quickly resolve troubleshooting, maintenance, or application issues remotely. This virtual support not only helps reduce downtime and save repair costs but also reduces a lab’s impact by avoiding unnecessary travel or instrument shipments.

Trade-In and Buyback program

When labs are ready to retire an instrument, Agilent provides better alternatives to product incineration or landfilling, taking the end-of-life burden away from labs and supporting circularity. The **Agilent Trade-In and Buyback program** covers everything from deinstallation, shipping, packaging, and customs fees—free of charge—and provides cash or credit to put toward a new instrument. This global initiative is available in over 20 countries and is designed to support labs in their pursuit of sustainability and lab efficiency. For products or regions not currently included in the program, a **product recycling program** may be available.



Performance in practice



Recognizing leaders in waste reduction and circularity

Boehringer Ingelheim was recently awarded the inaugural **Agilent Trade-In Impact Award** for achieving the highest sustainability impact through their participation in the Trade-In and Buyback program. The pharma company was able to divert an astonishing 6,600 kg of instrument waste away from landfill and waste incineration through their 2025 trade-in activity—representing the highest recovery value of any Agilent partner for the year.

Circularity solutions

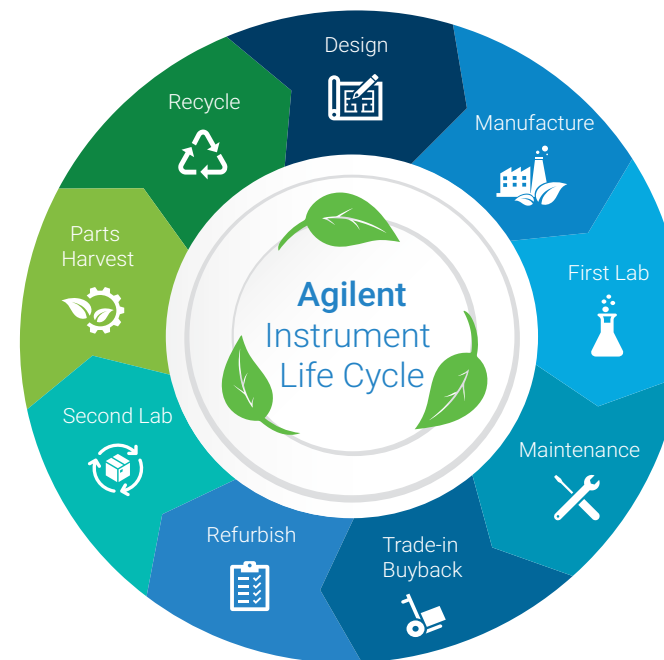
Certified Pre-Owned Instruments program

Extending the useful life of instruments helps avoid unnecessary landfill waste. The **Agilent Certified Pre-Owned Instruments program** gives thousands of used instruments a new life each year through refurbishment and resale, increasing their useful lifetime by an average of 50%. These instruments undergo a thorough refurbishment process by experts and must pass like-new performance specifications, ensuring they are rebuilt for longevity. Not only does this program provide a lower environmental impact purchase alternative, but it also makes essential technology accessible to budget-constrained labs to support their research needs.

Parts harvest and recycling

If an instrument cannot be refurbished, Agilent harvests as many parts as possible for reuse to sustain parts supply, prolonging the life of our oldest models. Parts that cannot be reused are recycled and transformed into raw materials for new products.

As part of the **How2Recycle** program, Agilent also provides customers with better information about the correct disposal of Agilent product packaging by including recycling labels on select packaging.





Educational tools, resources, and frameworks

Sustainable labs are achieved not only by technology, but by knowledge and behavior change. Agilent supports this through a range of educational resources, tools, partnerships, and frameworks that help labs translate sustainability goals into meaningful everyday actions. Whether labs are just getting started on their sustainability journey or are looking to make more impactful changes, our tools and resources are designed to provide measurable gains and support lasting progress.

Equipment etiquette labels

Plugged-in lab equipment quietly uses approximately 20% of a lab's energy every day.¹⁰ Where and when possible, turning off idle equipment can have a huge impact on energy consumption and costs. That's why Agilent has created **equipment etiquette labels**—clear, visible reminders to use on lab instruments to guide smarter energy use without compromising performance, safety, or results. Over time, these labels create a shift toward a more sustainable mindset in the lab that adds up to big energy savings.

Tips and tricks for sustainable operation

Whether labs are looking for simple, nondisruptive strategies or next-level sustainability upgrades, Agilent provides technology-specific, practical guidance to achieving a more sustainable lab. Our **tips and tricks infographics** offer actionable insights to reduce resource consumption while enhancing operational efficiency, extending instrument lifetime, and optimizing system performance.



Educational tools, resources, and frameworks

My Green Lab Certification program®

In a global lab sustainability survey conducted by Frost & Sullivan, it was found that 85% of labs expect their vendors to support them in achieving their sustainability goals, and 74% of labs said they would not commercially engage with a company that did not have a commitment to net zero.⁷



At Agilent, sustainability is woven into the fabric of our business. We are fully committed to improving the sustainability of all our processes, and we have a commitment to reach **net zero by 2050**. Agilent is a sponsor of the **My Green Lab Certification** program, which is widely recognized as the global gold standard for lab sustainability. The program provides a practical, science-based framework for improving lab sustainability, offering clear assessment tools, third-party verification of sustainability claims and initiatives, and guidance to help labs embed sustainability into everyday practice.

Through this partnership, we endorse this lab sustainability framework and applied it to many of our own operations, including certifying several onsite customer demonstration labs and **refurbishment centers** around the world, with a goal to strive for the highest 'Green' level of My Green Lab Certification. By partnering with My Green Lab, we implement sustainable actions into our everyday research and testing and reduce the environmental impact of the Agilent products, services, and workflows that scientists rely on. This helps our customers reduce their own Scope 3 emissions and inspires a culture of sustainability in science.

Additionally, the **My Green Lab Ambassador Program** provides a free and accessible way for individual scientists and lab professionals to build sustainability knowledge and connect with a like-minded global community, helping accelerate progress toward a zero-carbon future.

Agilent Community

Learning from other lab professionals is an invaluable way to obtain actionable strategies for sustainable lab operation. Agilent supports these conversations between our customers by providing **The Lab Sustainability Exchange**—a dedicated forum within the Agilent Community where professionals can come together and exchange insights, successes, and questions about implementing sustainable strategies in the lab.

The wider **Agilent Community** forum also provides useful blogs and videos on how to set up, use, and troubleshoot features like Gas Saver mode, leak detectors, and early maintenance feedback for GC systems, as well as scheduled tune and ventless ion capillary cleaning for LC systems, and many more.



Practical Roadmap to Continuous Improvement

Sustainable transformation does not happen all at once—it is achieved through a series of targeted, actionable steps that are consistently applied. This roadmap outlines how organizations can evolve from understanding their lab's current impact to actively driving continuous improvement. Each stage is supported by Agilent solutions that have been designed to deliver real, tangible results.

Establish visibility:

Build a clear understanding of current performance.

- Use **CrossLab Connect** to establish baselines for consumption and utilization
- Leverage **ACT Ecolabel certified products** for transparency into product impact and opportunities for continuous improvement.

Prioritize easy wins:

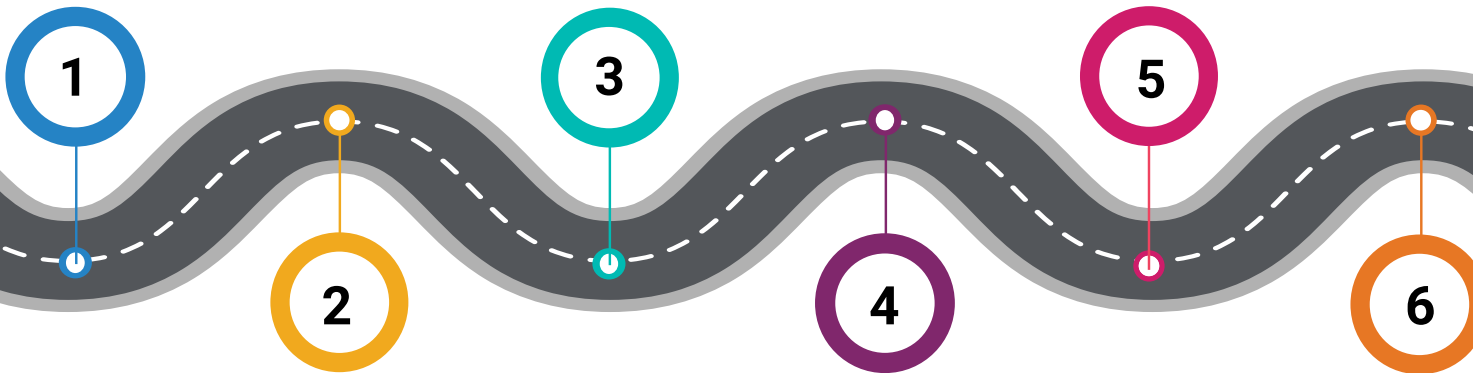
Start by implementing high-impact, low-disruption changes.

- Use **equipment etiquette labels** to reduce idle energy consumption
- Explore **tips and tricks** for practical efficiency improvements
- Engage with **The Lab Sustainability Exchange** to learn from peers and share best practices

Improve day-to-day operations:

Embed sustainability into how the lab runs.

- Leverage **CrossLab Connect** insights to optimize workflows and resource use
- Use **My Green Lab Certification** for a proven framework to implement better sustainable practices and foster a culture shift



Scale impact through modernization:

Upgrade methods and technologies when needed.

- Modernize LC methods using **USP <621>-aligned guidance**
- Upgrade to more efficient technologies when equipment inefficiency has a greater cost compared to extending equipment lifetime, with options such as the **8850 GC, Infinity III LC Series, dry vacuum pumps for mass spec**, and molecular spectroscopy (**Vaya, TRS, and Cary 3500 UV-Vis**) solutions.

Embed circularity beyond daily operations:

Maximize the value of assets.

- Implement **CrossLab service plans** to extend instrument lifespan
- Use the **Trade-In and Buyback program**
- Consider **Certified Pre-Owned Instruments**
- Utilize **CrossLab Connect** for data-driven decision-making

Sustain and continuously improve:

Track progress and optimize over time.

- Monitor performance using **CrossLab Connect**
- Use **ACT Ecolabel certifications** to guide future purchasing decisions
- Engage with **My Green Lab resources** and become a **My Green Lab Ambassador** to refine practices
- Build a culture of sustainability through our educational resources and **The Lab Sustainability Exchange** community



Appendix

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7. *Reducing the Environmental Footprint of Research*. Agilent Technologies infographic, 2023. [Lab-Sustainability-Survey-Infographic.pdf](#)
8. *Small Size, Big Impact: Agilent 8850 GC system*. Agilent Technologies brochure, 2025. Publication number 5994-7404EN. [Small Size, Big Impact: Agilent 8850 GC System](#)
9. *Agilent Infinity III LC System "Cradle-to-Grave" Product Carbon Footprints*. Agilent Technologies white paper, 2026. Publication number 5994-9372EN.
10. My Green Lab. *Resources: Energy*. [Sustainable Energy Solutions for Laboratories](#)

Appendix

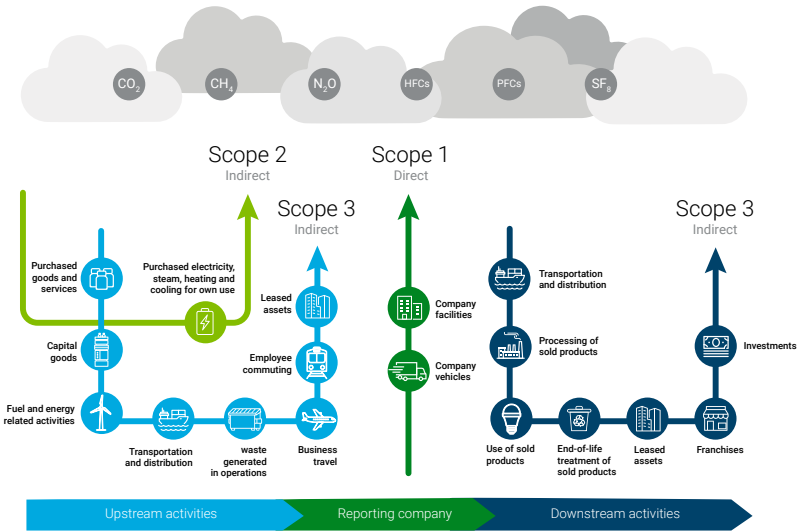
Carbon impact mapping

CrossLab Connect

Impact Area	Scope 1-3 Emissions
Lower instrument electricity use	Scope 2
Lower HVAC/cooling demand	Scope 2
Reduced consumables purchases	Scope 3, category 1 (purchased goods and services)
Reduced waste disposal	Scope 3, category 5 (waste generated in operations)

Lab modernization solutions

Impact Area	Scope 1-3 Emissions
Lower instrument electricity use	Scope 2
Lower HVAC/cooling demand	Scope 2
Reduced water consumption	Scope 3
Reduced consumables purchases	Scope 3, category 1 (purchased goods and services)
Reduced waste disposal	Scope 3, category 5 (waste generated in operations)



Appendix

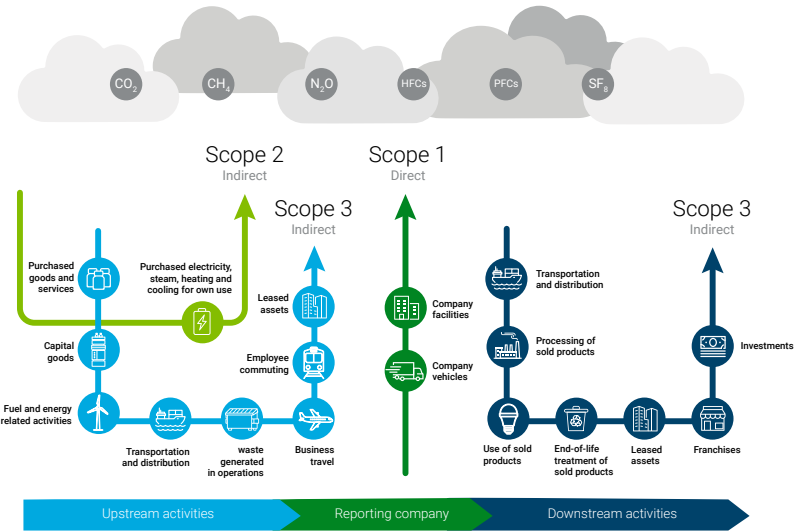
Carbon impact mapping

Circularity programs

Impact Area	Scope 1-3 Emissions
Lower instrument electricity use	Scope 2
Lower HVAC/cooling demand	Scope 2
Reduced consumables purchases	Scope 3, category 1 (purchased goods and services)
Reduced waste disposal	Scope 3, category 5 (waste generated in operations)

Sustainability resources

Impact Area	Scope 1-3 Emissions
Lower instrument electricity use	Scope 2
Lower HVAC/cooling demand	Scope 2
Reduced consumables purchases	Scope 3, category 1 (purchased goods and services)
Reduced waste disposal	Scope 3, category 5 (waste generated in operations)





Trusted Answers

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