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Center for Sustainable Business

Investing in Waste Management in the Auto Industry: Proposed Benefits & Monetization Methods

November 2025



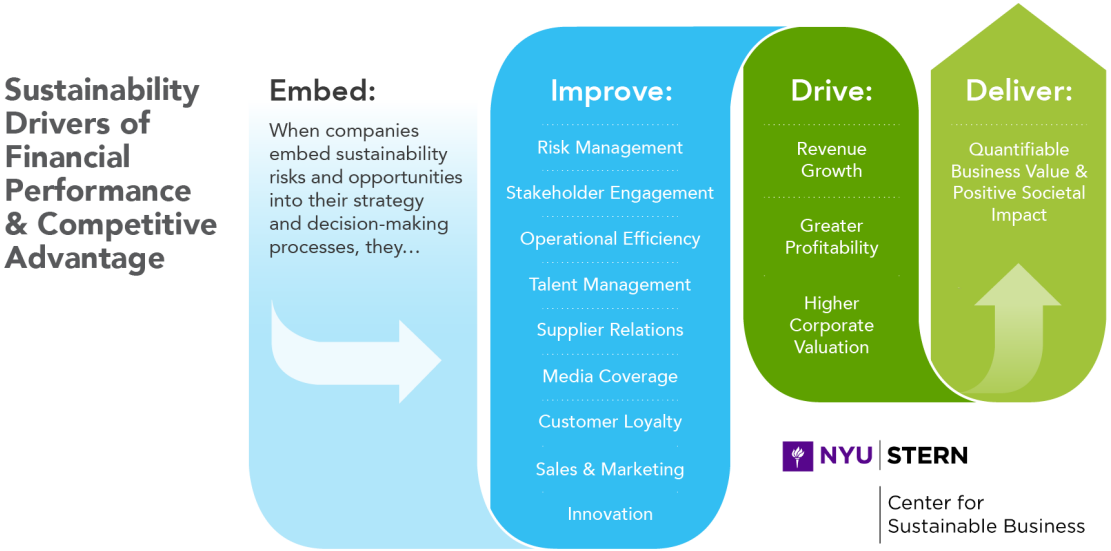
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ROSI™ Framework

Return on Sustainability Investment (ROSI™) Framework



By embedding ESG risk and opportunities within core business strategy, the return on sustainable investment can be quantified, delivering the possibility of both financial value and positive societal impact.

Overview of Auto Industry Framework

NYU Stern CSB is developing a ROSI™ framework for the auto industry with publicly available monetization tools to help the industry understand where and how sustainability can unlock financial value.

Based on research, experience, and engagement with industry leaders, we have identified the following sustainability strategies* used by the industry to include in the framework:

- Mitigate & Adapt to Climate Change
- Waste Management
- Water Management
- Chemical Management
- Support Electrification Ecosystem
- Circularity
- Cyber Security
- Sustainable Sourcing
- Driver Safety
- Supplier and Employee Well-Being

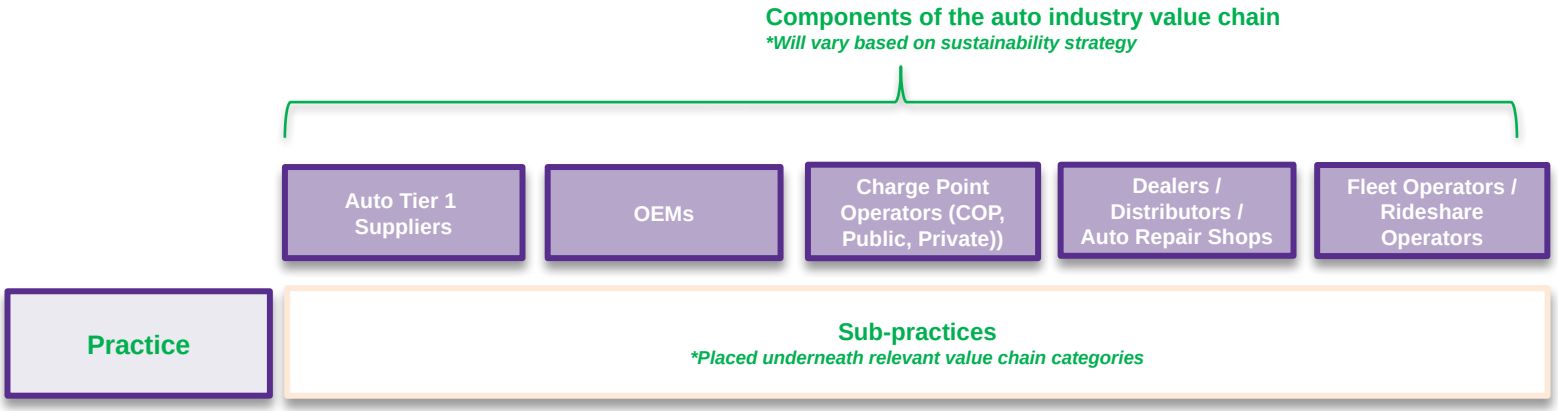
Identified Sustainability Practices and Sub-Practices

Framework Layout

Through our research, we identified key sustainability practices and sub-practices that auto industry value chains are using to achieve their sustainability goals.

- **Each practice is broken into sub-practices, which are mapped to the relevant components of the value chain (and excluded where not applicable).**
- **Benefits are mapped to sub practices, with some benefits appearing across multiple practices.**
- **Specific compliance or enforcement policies are not listed in this framework, except for the new Cross Border Adjustment Mechanism regulations.**

The diagram below illustrates the framework applied for each strategy in the following slides



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Investing in Waste Management

Investing in Waste Management*

	Auto Tier 1 Suppliers	OEMs	Charge Point Operators	Dealers / Distributors / Auto Repair Operations	Fleet Operators / Rideshare Operators
Identify Primary Sources of Waste and Related Costs	Implement value stream mapping and systems to track usage patterns to identify & pursue waste reduction opportunities			Implement value stream mapping and systems to track usage patterns to identify & pursue waste reduction opportunities	
	Incentivize employees to identify waste and process/product modifications			Incentivize employees to identify waste and process/product modifications	
	Establish zero waste to landfill facilities policy				
Reduce Waste Generation through Recycling	Recover, recycle and reuse materials, including packaging				
	Establish closed-loop recycling programs			Establish closed-loop recycling programs	
	Increase battery and electric vehicle supply equipment (EVSE) recycling				

***This strategy focuses on eliminating waste at the source and effective uses of waste. Additional benefits associated with the reuse of waste are detailed in Circularity (EOL recovery programs, recycled battery use) and Sustainable Sourcing (sourcing recycled/refurbished materials and parts) strategies.**

Investing in Waste Management (continued)

	Auto Tier 1 Suppliers	OEMs	Charge Point Operators	Dealers / Distributors / Auto Repair Operations	Fleet Operators / Rideshare Operators
Reduce Waste by Introducing New Technologies, Product Formulations, and Processes	Implement changes to parts and processes to reduce waste				
	Implement technologies or processes for demand planning				
	Use biodegradable materials				
	Convert non-recyclable waste into usable energy				

*Reuse of waste sources are also detailed in Circularity and Sustainable Sourcing strategies.

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Monetization Approach

Investing in Waste Management

Overview of Sustainability Strategy and Value Drivers

Sustainability Strategy Definition

Waste Management

Auto industry companies are advancing waste management by identifying major waste sources and costs, expanding recycling programs, and adopting new technologies, product formulations, and processes to reduce waste. Key actions include using value stream mapping and tracking systems to spot reduction opportunities; incentivizing employees to suggest waste and process improvements; adopting zero-waste-to-landfill policies; establishing closed-loop material, battery, and electric vehicle supply equipment recycling programs; increasing biodegradable material use; and converting waste into usable energy.

The following slides focus on the benefits and relevant value drivers derived from the *Waste Management* strategy

Relevant Value Drivers

Benefits that…

Operational Efficiency (OE)	Optimize corporate and supply chain efficiencies to lower cost and increase profits
Risk Management (RM)	Encourage risk mitigation and resilience within the value chain
Sales and Marketing (SM)	Increase volume of sales through brand and marketing policies

Investing in Waste Management

Overview of Sustainability Strategy and Relevant Value Drivers (continued)

The following slides focus on the benefits and relevant value drivers derived from the *Waste Management* strategy

Value Drivers not Captured in this Strategy	**Benefits that…**
Stakeholder Engagement (SE)	Improve goodwill among the broader stakeholder community (i.e. investors, NGOs)
Talent Management (TM)	Attract and retain high-quality internal talent
Supplier Relations (SR)	Improve upon the relationships between the company and its suppliers
Media Coverage (MC)	Increase a company's media presence with the development of traditional and social media content
Innovation (IN)	Create new revenue streams using sustainable business models
Customer Loyalty (CL)	Attract an increasing community of conscious buyers & consumers, while reducing retention costs

Investing in Identifying Waste Sources and Related Costs

Overview of Benefits and Monetization Methods

Practice	Sub-Practice*	Proposed Benefits	Value Drivers	Suggested Monetization Methods
Identify Primary Sources of Waste and Related Costs	Implement value stream mapping and systems to track usage patterns to identify & pursue waste reduction opportunities ——— Incentivize employees to identify waste and process/product modifications ——— Establish zero waste to landfill facilities policy	Reduced waste **disposal costs** due to changes in parts and processes to reduce waste	OE	Calculate waste cost per unit of production before and after the change in materials or processes. Multiply the differential in waste cost per unit cost by the number of units produced to calculate the savings and deduct any costs to implement to quantify the benefit
		Reduced exposure to **regulatory risks and related costs** due to changes in parts and processes to reduce waste. Relevant regulations include: EU (ELV, Circular Economy, Battery Regulation); Japan (ELV Law); US (EPA hazardous waste laws plus state-specific mandates)	RM	Assess the probability and average cost of receiving a fine and/or experiencing a regulatory sanction (fines, administrative costs, cost of production delays, legal/PR expenses) related to waste management. Estimate the reduction in probability of being sanctioned due to changes in parts and processes to reduce waste. Multiply the probability reduction by the average costs to quantify the benefit

*Each Sub-Practice has the potential to drive all benefits.

OE SM CL RM SE TM SR MC IN

Value Drivers based on color coding illustrated on previous slides

Investing in Recycling of Waste

Overview of Benefits and Monetization Methods

Practice	Sub-Practice*	Proposed Benefits	Value Drivers	Suggested Monetization Methods
Reduce Waste Generation through Recycling	Recover, recycle and reuse materials, including packaging _____ Establish closed-loop recycling programs _____ Increase battery recycling	Reduced waste **disposal costs** due to Increased recovery, recycling and reuse of materials	OE	Calculate the average cost of of waste per unit produced before and after the implementation of the practice. Multiply the differential in cost by the number of units produced and deduct any implementation costs to quantify the benefits
		Reduced material **input costs** (difference in the cost of using recycled vs virgin materials) due to increased recovery, recycling and reuse of material	OE	Calculate the average per unit cost differential for recycled vs virgin materials (parts and metals, solvents, lubricants,oils and other fluids). Be sure to include a conversion factors for differences in density, strength and weight. Multiply the differential in cost by amount of recycled materials purchased and subtract incremental expenses related to recycled materials to quantify the benefit
		Reduced **other costs** (such as energy, water, labor, etc) due to increased recycled and reused materials compared to virgin materials	OE	Calculate the amount of energy used per unit of production using virgin versus recycled materials. Multiply the differential by the average cost of energy to quantify the benefit Other Savings: calculate the per unit spend (water, labor, etc) on costs when using virgin versus recycled materials and multiply the differential by the units produced to quantify the benefit. Alternative approach using water as an example - calculate the reduced spend on fresh water due to using recycled water, and any waste water disposal cost savings, and subtract costs to to recycle to quantify the benefit

*Each Sub-Practice has the potential to drive all benefits.

Investing in Recycling of Waste (continued)

Overview of Benefits and Monetization Methods

Practice	Sub-Practice*	Proposed Benefits	Value Drivers	Suggested Monetization Methods
Reduce Waste Generation through Recycling	Recover, recycle and reuse materials, including packaging ——— Establish closed-loop recycling programs ——— Increase battery recycling	Increased **waste recovery** leads to increased revenues from sale of waste to recyclers	SM	Calculate the average selling price per ton of solid waste sold, deduct the cost to recover (calculated as $/per ton) and multiply by amounts sold to quantify the benefit
		Reduced **GHG emissions** due to increased recovery, recycling and reuse of materials compared to emissions associated with virgin material production and within manufacturing operations	OE, RM	Calculate the average annual per unit GHG emissions before and after implementing recycling changes, or changes in product life cycle assessments. Multiply the GHG emissions difference by an associated cost per unit (e.g. internal price of carbon or carbon offset costs) to quantify the benefit
		Reduced exposure to **regulatory risks** and related costs due to increased recovery, recycling and reuse of materials. Relevant regulations include: EU (ELV, Circular Economy, Battery Regulation); Japan (ELV Law); US (EPA hazardous waste laws plus state-specific mandates)	RM	Estimate the probability and average costs (fines, penalties, production delays, lost revenues, etc) associated with a regulatory violation. Estimate the impact of the change in practice on the probability and multiply by the costs to quantify the benefit

*Each Sub-Practice has the potential to drive all benefits.

Investing in New Waste Reduction Technologies and Processes

Overview of Benefits and Monetization Methods

Practice	Sub-Practice*	Proposed Benefits	Value Drivers	Suggested Monetization Methods
New Waste Reduction Technologies, Product Formulations and Processes	Implement changes to parts and processes to reduce waste	Changes in materials, technologies, and/or processes to reduce waste can lead to a reduction in **operational costs** (such as cost of waste disposal, inputs, energy, labor, etc.)	OE	Calculate the differential in impacted operational costs per unit produced for pre and post practice implementation (materials, energy, water and/or labor). Multiply the differentials by number of units produced and deduct any implementation costs to quantify the benefit
	Implement technologies or processes for demand planning	Better inventory planning reduces **inventory costs** (such as storage and obsolescence costs)	OE	Measure the impact of the practice implementation on working capital and inventory management (improved delivery times, lower buffer stock)
	Use biodegradable materials Convert non-recyclable waste into usable energy	Use of substitute sustainable materials and converting waste into useable energy lowers **GHG emissions** due to less use of fossil fuel based materials, less emissions related to biodegradable waste and overall reduced levels of waste	OE / RM	Calculate the average annual per unit GHG emissions before and after implementing changes, or changes in product life cycle assessments. Multiply the GHG emissions difference by an associated cost per unit (e.g. internal price of carbon or carbon offset costs) to quantify the benefit For converted energy: Compare company energy use before and after practice implementation of converting waste to energy. Adjust the expected improvement in energy efficiency due to practice implementation into a reduction in emissions using a energy emissions factor (such as EPA Ghg Emission Factors). Multiply the reduction amount by an associated cost (e.g. internal cost of carbon or cost of carbon offset) to quantify the benefit

*Each Sub-Practice has the potential to drive all benefits.

Investing in New Waste Reduction Technologies and Processes (continued)

Overview of Benefits and Monetization Methods

Practice	Sub-Practice*	Proposed Benefits	Value Drivers	Suggested Monetization Methods
New Waste Reduction Technologies, Product Formulations and Processes	Implement changes to parts and processes to reduce waste ——— Implement technologies or processes for demand planning ——— Use biodegradable materials ——— Convert non-recyclable waste into usable energy	Better inventory planning, use of substitute sustainable materials and converting waste into useable energy reduces overall **waste** and exposure to **regulatory risks** and related costs. Relevant regulations include: EU (ELV, Circular Economy, Battery Regulation); Japan (ELV Law); US (EPA hazardous waste laws plus state-specific mandates)	RM	Estimate the probability and average costs (fines, penalties, production delays, lost revenues, etc) associated with a regulatory violation. Estimate the impact of the change in practice on the probability and multiply by the costs to quantify the benefit

*Each Sub-Practice has the potential to drive all benefits.



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