Sweden – The Climate Matchmaker for Global Action

Uniting urgency with solutions at COP30,
to build resilient, prosperous societies

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Introduction

FOREWORD

SWEDEN – THE CLIMATE MATCHMAKER FOR GLOBAL ACTION

Uniting urgency with solutions to build resilient and prosperous societies

Addressing the interconnected challenges of climate change, biodiversity loss, and pollution requires collaboration across all sectors of society, including government, business, finance, academia, and civil society.

Simply put, no country can achieve its Nationally Determined Contributions (NDCs) without the active engagement of the private sector. Companies, in turn, cannot deploy green and circular solutions, or meet climate targets, without stable policy frameworks and enabling conditions. Although financial capital is available, it cannot be channelled effectively without clear rules and widespread climate literacy. Only integrated collaboration, underpinned by the active and meaningful participation of civil society, can drive the transition to resilient and prosperous societies.

Science confirms that financial resources, technologies, business models, and innovations needed to mitigate the worst effects of climate change are already available and scalable across all sectors. Yet progress in matching clearly defined climate challenges with existing solutions, and in implementing NDCs, continues to lag. The main barriers are not scientific, technological, or financial; they are policy-related. This report explores these barriers.

As the world nears a critical juncture in the climate journey, the stakes have never been higher, nor the opportunities for action greater; climate-related risks, highlighted in the World Economic Forum's Global Risks Report, threaten global stability by disrupting supply chains, straining national economies, and undermining competitiveness and resilience.

As such, the next round of NDCs, to be presented ahead of COP30, may prove to be among the most consequential documents of our time, shaping the future trajectory of people, the planet, and business alike. Their implementation is not only an environmental responsibility but also an economic imperative, essential for creating jobs, driving growth, strengthening resilience, and securing long-term competitiveness.

Alongside Sweden's official negotiating delegation to the annual UN Climate Conferences (COP), I am proud that Business Sweden leads the country's official non-negotiating delegation and hosts the Swedish Pavilion. This delegation unites some of Sweden's leading companies, government agencies, and partners with academia and civil society.

Each year at COP, we deliver a consistent, evidence-based message: solutions exist. With the ambition of serving as Climate Matchmakers, connecting global climate challenges with proven solutions, this report highlights available innovations and enabling conditions, sector by sector. It also reaffirms the delegation's commitment to supporting NDC and National Adaptation Plan (NAP) implementation through global collaboration and ambitious policies that build robust pathways to future-proof communities and economies.

Sweden may be a small nation, but we carry both the opportunity and the responsibility to make a significant global impact in partnership with others. We stand ready to scale climate solutions and forge alliances that transform NDCs and NAPs into investable, actionable plans.

The time is now. The race is on. Together, let's bridge the implementation gaps.

Jan Larsson
Chief Executive Officer
Business Sweden

EXECUTIVE SUMMARY – THE CALL TO ACTION

This report is the first of its kind. Developed in collaboration with Sweden's non-negotiating delegation to COP30, it brings together perspectives from leading companies, government agencies, academia, and civil society to present both Sweden's transformation needs and its wide range of sector-by-sector solutions and enabling tools. For the first time, a non-negotiating delegation has co-authored this document and offered interconnected stakeholders the opportunity to provide input – combining robust science, COP experience, innovation, financial instruments, policy learning, and capacity building.

The report outlines how countries can strengthen and future-proof their economies by clarifying climate and economic challenges, improving their ability to procure the right solutions and finance, and matching these with proven technologies and enabling conditions. By turning Sweden's climate strengths into a clear global offer of collaboration, it provides a pathway for countries to make their NDCs not only actionable but truly investable.

Representing all sectors, the participating companies have set ambitious climate commitments and offer scalable solutions to support global transformation across both mitigation and adaptation. However, deployment of these solutions is often constrained by insufficient and outdated climate and trade policies and frameworks, which slow the implementation of NDCs and NAP.

In response, these actors, together with public and private partners across sectors and borders, are preparing for yet another COP to actively advocate for bold NDCs, long-term targets, predictable frameworks, global standards, procurement criteria, and other incentives and enabling conditions that drive investment in climate-smart solutions and accelerate deployment aligned with the Paris Agreement.

Below are the delegation's key priorities for COP30, calling on governments, institutions, and investors to take action that accelerates inclusive, science-based progress on decarbonisation, adaptation, and sustainable development:

Policy

- Adopt ambitious, long-term NDCs and national climate targets in line with the 1.5-degree objective, as well as plans for national implementation, including sectoral roadmaps.
- Establish stable, long-term policy frameworks that create clear market signals for clean technology deployment, sustainable business operations, and required infrastructure development, including through the mandating of sector-specific climate transition plans for large emitters and publicly listed companies.
- Eliminate fossil fuel and environmentally harmful subsidies while implementing carbon pricing mechanisms and fiscal reforms grounded in polluter-pays principles.
- Provide policy support to ensure the deployment of essential infrastructure for the green transformation, including renewable and fossil-free energy, storage, energy efficiency, power grids, charging infrastructure, holistic food systems, and negative emissions technologies.
- Modernise and simplify regulatory processes to reduce emissions systematically and in a data-driven way across entire value chains, enabling behavioural shifts in production and consumption.
- Jointly develop national and regional innovation roadmaps that align with climate targets, while also addressing social inequality, biodiversity loss, and health risks.
- Define timelines and milestones to phase out all fossil fuels, recognising different realities in developed and developing countries, and enact legislation to triple renewable energy capacity and double energy efficiency by 2030.
- Secure a just transformation to a zero-emissions future by maximising social and economic opportunities, ensuring consistency with scientific evidence, and addressing the challenges faced by impacted communities and marginalised groups through inclusive social dialogue with special attention to gender equality and the respect of fundamental labor rights.
- Implement commitments to halt and reverse deforestation and forest degradation by 2030, and to conserve terrestrial and marine ecosystems, recognising their role as critical carbon sinks and sources of climate resilience.

Finance

- Mobilise public and private capital with transformative potential towards high-impact climate investments, ensuring transparency around disbursement, ownership, and results.
- Design de-risking tools and blended finance instruments to attract investment into underserved markets and communities.
- Increase targeted funding for mitigation, adaptation, and loss and damage in frontline regions, encouraging the co-creation of locally led approaches including grassroots and women's organisations.
- Introduce incentives to reward just transition efforts, including social protection measures, gender equality, inclusive green employment, and nature-based solutions.
- Strengthen access to R&D finance globally, particularly in the Global South, to develop context-relevant, inclusive solutions that accelerate climate innovation.
- Support cross-sector demonstration projects that prove the feasibility of emerging technologies in real-world settings, especially in vulnerable and under-resourced regions.

Collaboration

- Build coalitions among governments, private sector actors, and civil society to identify needs and share tools, technologies, and implementation know-how.
- Scale capacity support for low- and middle-income countries to adapt and localise solutions through technical assistance and co-creation.
- Use multilateral platforms, including the NDC Partnership, to coordinate efforts and amplify global ambition.
- Increase international cooperation, particularly between public and private actors, building bridges between worldwide research, policy instruments, financing tools, and innovation.
- Institutionalise inclusive dialogue mechanisms that centre voices from Indigenous communities, youth, women, and grassroots organisations in decision-making processes.

Science/ Behaviour

- Embed evidence-based monitoring systems in climate governance to track progress and inform iterative policy improvements.
- Run sustained public campaigns and targeted incentives to inspire behaviours among consumers, businesses, and policymakers.
- Integrate climate education across curricula and workforce training systems to embed sustainability mindsets and skills at scale.
- Include Indigenous knowledge, local expertise, and affected communities' perspectives in policymaking and governance, especially for managing, protecting, and addressing impacts on forests, marine life, and biodiversity.

> Read more about Sweden at COP

CO-DEVELOPED AND SIGNED BY:

SCOPE AND PURPOSE

The latest IPCC Synthesis Report (AR6) confirms that pathways to limit global warming to 1.5°C are already available, spanning strong policy frameworks, financial tools, advanced technologies, and circular economy models.[1] Realising their full impact, however, depends on coherent policy signals, accessible finance, and stable regulatory environments. The central challenge is therefore to match existing solutions more effectively with real-world needs and to remove barriers to scaling.

This report outlines, sector by sector, the contribution of Sweden's non-negotiating delegation to COP30 and beyond. Each chapter begins by setting out the global context and progress of each sector's green transformation. It then presents Sweden's transition pathways and climate commitments, followed by deployable and scalable solutions, as well as case studies from the non-negotiating delegation's efforts to advance mitigation and adaptation through innovation, financial instruments, policy expertise, scientific research, and capacity building aligned with national and international climate goals.

Each chapter concludes with a call to action, identifying the enabling conditions required to match urgent needs with existing solutions. These recommendations are designed to help countries strengthen and implement their NDCs, NAPs, and responses to loss and damage, while also delivering wider co-benefits such as enhanced competitiveness, resilient value chains, green jobs, energy security, improved health, and stronger biodiversity.

Driven by urgency and opportunity for action, Sweden aims to act as a global Climate Matchmaker for resilient and prosperous societies. As one of the world's most innovative countries – with leading technologies and research institutes, cutting-edge climate science, a strong tradition of progressive climate policy, one of the largest per capita donors of climate finance, an AAA-rated Export Credit System, and a culture of cross-disciplinary collaboration – Sweden's companies, researchers and institutions collectively act as Climate Matchmakers by:

1. Matching global climate challenges with proven Swedish solutions, accelerating progress toward the Paris Agreement, and
2. Matching Sweden's own transformation needs with international solutions, supporting the national path to net zero by 2045

By serving as a global Climate Matchmaker, Sweden seeks to increase its global contribution to the implementation of the Paris Agreement, reinforcing the nation's commitment to advancing international climate action while strengthening Swedish competitiveness, expanding international trade, and contributing to the 2030 Agenda.

Our ambition is to close the implementation gap by connecting global and national needs with scalable solutions across innovation, policy, finance, science, and capacity, advancing climate targets while ensuring competitiveness, resilience, and sustainable growth. This report aims to inspire greater ambition in the next round of NDCs to be delivered at COP30, contributing to strong outcomes and supporting the swift implementation of updated targets.

> **"This next round of NDCs may be the most important documents to be produced in a multilateral context so far this century."**
>
> – Simon Stiell, Executive Secretary, UNFCCC[2]

We acknowledge the historic responsibility of Sweden and other developed nations in driving the climate crisis, and we present these solutions not as a claim to leadership but as an invitation to partnership. Our aim is to share tested, adaptable approaches with clear terms to build trust, ensure access, mobilise finance, and clarify ownership.

While this document focuses on private sector solutions and the enabling conditions needed to scale their contribution to delivering on NDCs and NAPs, it does not capture the full spectrum of responses required. Instead, it represents one part of a broader vision for systemic change across key sectors.

We recognise that deeper structural transformation is essential, and that tackling inequality, advancing environmental justice, and reducing vulnerability must remain at the heart of the transformation. Rooted in the principles of justice, democracy, and the freedom to organise, Sweden offers this partnership to reaffirm the foundations of resilient and sustainable societies.

While this report focuses on private sector solutions and the enabling conditions required for NDC and NAP implementation, we acknowledge the vital role of civil society as facilitators, watchdogs, advocates, and enablers of inclusive, long-term decision-making. In line with the UN Guiding Principles on Business and Human Rights, and OECD Guidelines, civil society organizations contribute essential expertise, local insights, indigenous knowledge, and perspectives from affected and marginalized groups – including women and vulnerable communities – to shape policies and actions that foster inclusive, resilient, and equitable societies.

GLOBAL CONTEXT

The triple planetary crisis of climate change, biodiversity loss, and pollution is accelerating against a backdrop of mounting global instability, where environmental degradation, geopolitical tensions, inequality, and rapid technological change are reshaping the risk landscape.

As global temperatures approach 1.5°C, threats to food systems, public health, supply chains, and social cohesion are intensifying. The Global Risks Report 2024 identifies climate-related risks and extreme weather as the most likely global threats in the coming years, while tipping points may be crossed within the decade, triggering feedback loops that exceed adaptation capacities.

These dynamics endanger not only people and ecosystems but also businesses, national economies, and international security. Meanwhile, the cost of inaction is growing; in fact, a low-carbon transformation could generate global benefits of USD 26 trillion by 2030, compared with continuing along a high-emissions trajectory.[3] We stand at a generational moment to invest in a fossil-free, nature-positive future that is not only essential for planetary stability, but also economically wise.

Adaptation is now as critical as mitigation. Strengthening resilience through climate adaptation and nature protection is essential for development, economic stability, and energy security. Countries that fail to act will face escalating costs, cascading risks, and weakened geopolitical positions.

At the same time, linear value chains and extractive consumption models are locking in emissions and resource loss. Transforming to circular, climate-resilient value chains is therefore vital to reduce waste, regenerate ecosystems, and decouple growth from environmental harm.

As countries prepare to submit updated NDCs ahead of COP30 and respond to the findings of the first Global Stocktake, the urgency of transformative action is clear.

In numbers

In 2023, global emissions reached a record high of

57.1 Gt CO_2e[4]

Exceeding

1.5°C

risks irreversible ecosystem collapse and multiple tipping points, such as ice sheet loss and biome dieback. Every fraction of a degree counts.[5]

Current limited progress puts the world on track for

2.6-3.1°C

warming this century – far beyond safe limits, with systemic economic disruption, including a projected 15% drop in global GDP by 2050.[6]

By 2030, even if all current NDCs are fully implemented, emissions will drop just

4% (unconditional) or **10%**[7] (conditional)

To stay on track, by 2030, a:

28% cut is needed for 2°C

42% cut is needed for 1.5°C[8]

11 G20 members

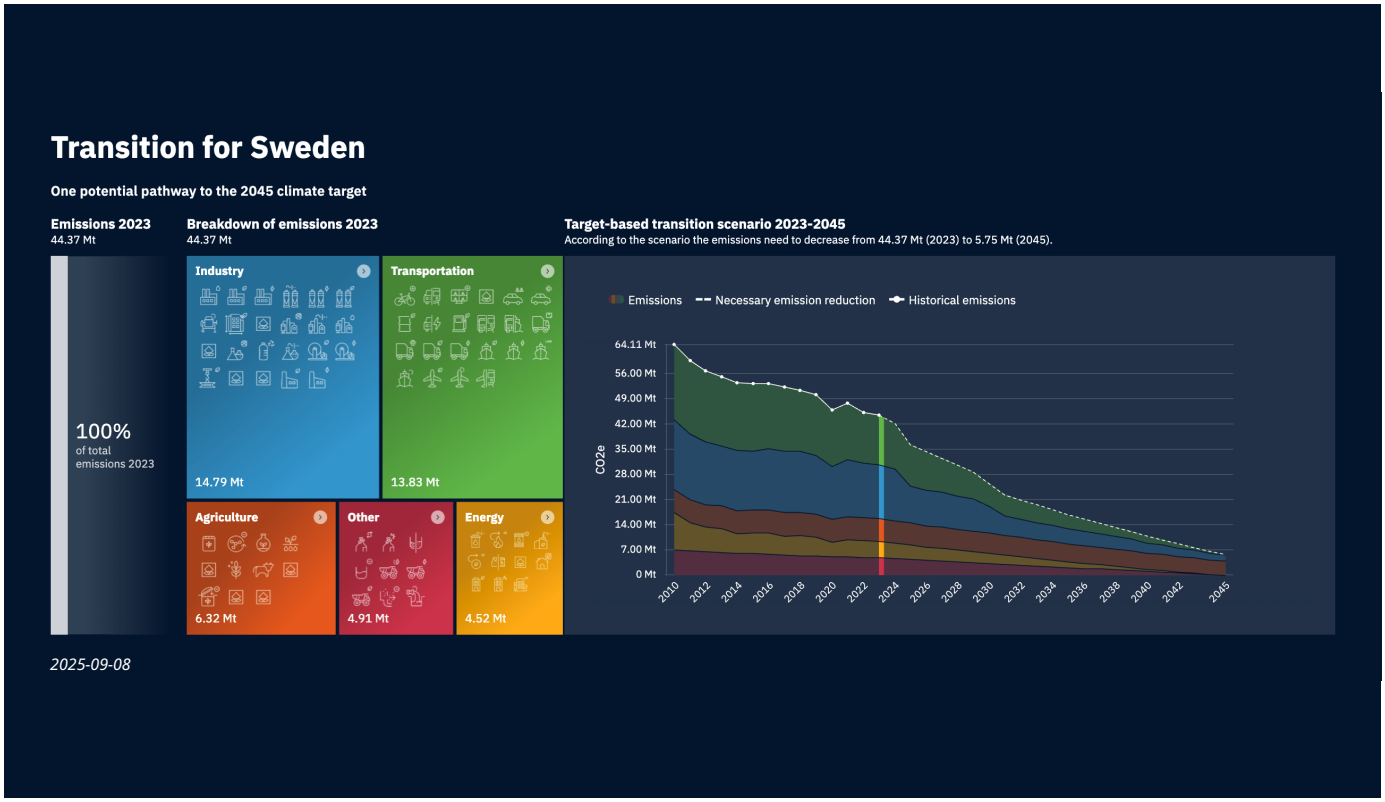
are off track to meet their current NDCs[9]

SWEDISH JOURNEY, COMMITMENTS, AND EXISTING SOLUTIONS

Sweden's Road to Net Zero by 2045

Sweden is committed to net zero by 2045, having already reduced emissions by 31% between 2010 and 2023, and advancing a just, inclusive transition grounded in equity, human rights, and transparent governance.[10] As the EU submits a collective NDC on behalf of its member states, Sweden does not have its own national NDC. However, Sweden's net-zero target for 2045 exceeds the EU's goal of climate neutrality by 2050.

Sweden's transition efforts towards this target are visualised through Panorama, a science-based, open-access platform developed jointly by the Swedish Climate Policy Council, the Swedish Environmental Protection Agency, and the Swedish Energy Agency. Built on a framework of data-driven transition shifts, Panorama outlines one possible pathway towards Sweden's 2045 net-zero target by tracking territorial emissions, mapping current and potential mitigation solutions, and identifying gaps and necessary shifts across key sectors. Each year, the Swedish Climate Policy Council assesses progress and submits a report evaluating the government's alignment with national climate goals and current emission trends.



Panorama translates mitigation knowledge, including insights from IPCC reports, into practical building blocks. It details the technologies, behaviours, investments, and policy instruments required for decarbonisation, visualising sector-specific pathways using official emissions data, expert assessments, and linked policy commitments and progress indicators.

In simplified terms, the Panorama tool can be described as a national dashboard for monitoring progress toward a country's NDC. By summarising climate transition data and making it understandable, measurable, and accessible, Panorama enables governments, businesses, academia, and civil society to expand their knowledge, monitor progress, and contribute to accelerating the transformation.

As part of Sweden's efforts to deliver on its national and sectoral transition targets, visualised in Panorama, the Swedish Government launched the Fossil Free Sweden (FFS) initiative in 2015. Led by a national coordinator, FFS brings together companies, municipalities, regions, and organisations committed to making Sweden the first fossil free OECD country 2045. The initiative works closely with industry to co-develop sector-specific roadmaps that outline joint action plans and policy proposals to meet transition targets while enhancing competitiveness. To date, 23 business sectors

have developed such roadmaps, combining industry commitments with political proposals, and FFS continues to support their implementation and advance strategies to accelerate the transformation with great support and backing from the Swedish industry – a process strongly endorsed and reinforced by the Swedish private sector.

This approach helps countries strengthen NDCs, implement transparent climate strategies, and enhance procurement capabilities to deliver measurable results, making NDCs both investable and actionable.

While Panorama and Fossil Free Sweden primarily focuses on domestic mitigation and transition scenarios within national boundaries, it is a valuable tool for visualising key challenges, identifying priority actions, and supporting strategic alignment. As with NDCs, however, it has limitations and must be complemented by international approaches, including cross-border collaboration, action across the entire value chain, circular systems, and adaptation strategies, to effectively address the global climate crisis. These broader dimensions are reflected throughout the sector chapters.

Sweden's transition journey demonstrates a strong track record of decoupling emissions from economic growth, despite factors typically associated with high emissions, such as high per capita GDP, a large industrial base, long transport distances, and cold winters.

Between 1990 and 2019, emissions fell by nearly 30%, while GDP increased by 86%, showing that net-zero ambitions and economic growth are not mutually exclusive.[11]

While progress has been made, we recognise that it is not enough. Delaying action only increases the costs and risks of the transition, while also affecting competitiveness, resilience, and well-being for all.

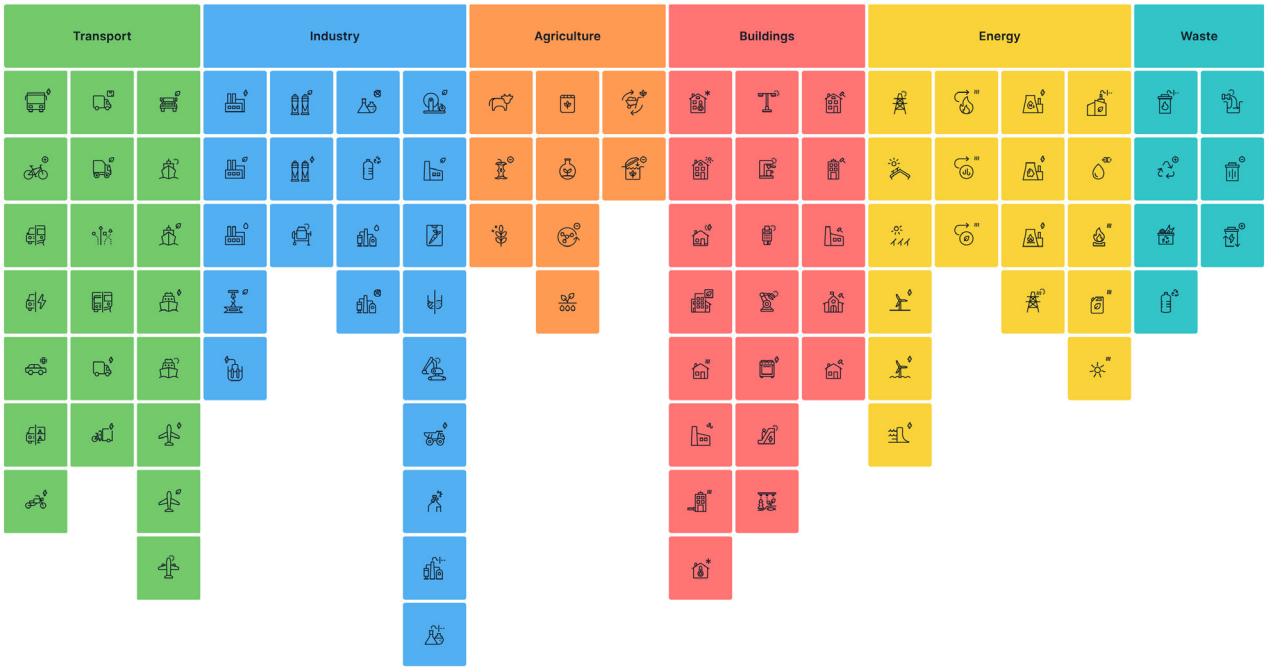
By acknowledging our limitations, Sweden calls for global inspiration, talent, and partnerships to meet targets and build inclusive, low-emission societies that generate jobs, growth, and prosperity. Read more here.

SOLUTIONS TO BRIDGE THE IMPLEMENTATION GAP

Swedish climate solutions address environmental, economic, and social challenges through system-wide approaches rooted in circularity and resilience. Designed to reduce emissions and improve resource efficiency, they provide scalable models for just, inclusive transitions across value chains, delivering co-benefits for economic competitiveness, job creation, health, livelihoods, and stability.

To showcase a selection of Sweden's solutions and tools relevant to NDC and NAP implementation, this report employs the Transition Element Framework (TEF), an open-source tool grounded in IPCC mitigation strategies and Panorama's pedagogical sector-based approach. While Panorama identifies the key transition shifts needed, TEF offers a corresponding framework of solutions, policies, and technologies that can be matched with the identified needs.

Together, they provide a coherent, science-based foundation for framing transition challenges, necessary shifts and actionable solutions. Aligned with the TEF structure, the report presents deployable solutions across sectors, organised by chapter as follows:



Energy

Sweden's energy system is grounded in fossil-free fuels, resilience, and efficiency. The country leads in wind, solar, hydro, nuclear, and emerging ocean energy, supported by fossil-free hydrogen, energy storage, and smart and flexible grid solutions. Waste heat recovery, heat pumps, and AI-driven energy optimisation further decarbonise district heating and cooling. Modernised, circular grid infrastructure and supportive regulatory frameworks ensure affordability, predictability, and cross-border integration.

Go to the sector chapter

Industry

Swedish industry is undergoing a profound shift towards resource-efficient, bio-based, recirculated, and low-carbon production. This includes fossil-free steel, fossil-free chemicals, carbon capture and storage (including bio-CCS), circular manufacturing, energy-efficient processes, industrial heat recovery, and sustainable construction materials. Strategic policy frameworks and industrial roadmaps help scale these innovations across supply chains and foster sustainable value creation.

Go to the sector chapter

Transport

In the transport sector, Swedish businesses and researchers are advancing electrification, renewable fuels, and smart urban design to cut emissions and enhance accessibility. Solutions include electric vehicles and battery systems, scalable charging infrastructure, renewable and hydrogen fuels, and decarbonised shipping, sustainable aviation. Innovations in active mobility and energy-efficient public transport and freight models are complemented by integrated urban mobility planning and policy tools that reduce fossil fuel dependency and promote cleaner, more accessible transport.

Go to the sector chapter

Buildings

In the built environment, Swedish firms and researchers offer solutions that reduce lifecycle emissions and energy demand. Theswe include low-carbon construction materials, smart and energy-efficient building technologies, and large-scale retrofitting. Waste heat integration and circular design principles enhance both performance and sustainability, supported by regulations and financing that guides climate-aligned development.

Go to the sector chapter

Agriculture & Food Systems

Swedish companies, researchers, institutions are advancing resilient, climate-smart agrifood value chains from production to consumption. Regenerative and precision farming improve soil health, reduce emissions, and build adaptive capacity, while advanced irrigation and nutrient recycling optimise resource use. Swedish actors are unlocking the potential of the often-overlooked 'hidden middle', processing, packaging, and distribution, through clean, energy-efficient, and circular technologies, solutions and logistics that reduce emissions, water consumption, and food losses. At the consumption end, sustainable proteins, food upcycling, and circular packaging lower environmental impact and increase resilience. These solutions are backed by Swedish policy expertise, climate finance, and capacity-building to strengthen food system resilience and security, rural livelihoods, and ecosystem health.

Go to the sector chapter

Waste

Swedish businesses are leading in circular economy practices, embedding circularity across the value chain, from design to end-of-life, by reducing material use, enabling reuse and repair, and extending product life. Circular business models like product-as-a-service and sharing platforms are reshaping consumption and addressing systemic inefficiencies. Organic waste is turned into renewable energy via biogas and waste-to-energy systems, while advanced recycling and e-waste recovery enable high-value material flows. Biodegradable materials are replacing conventional plastics and packaging, and integrated systems continue to cut landfill, lower emissions, and recover resources. Cities and industries are increasingly guided by strategic planning and strong policy frameworks that support regenerative over linear approaches.

Go to the sector chapter

Environmental Impacts

- **Six of nine** planetary boundaries have been breached, threatening ecosystems, economies, and human well-being.[12]
- **2024** saw the highest climate-related displacements in **16 years**.[13]
- **2024** marked the highest ocean heat levels in **65 years**; each of the past **eight years** broke previous records.[14]
- Humanity collectively uses the equivalent of **1.7 Earths** to maintain our current way of life.[15]
- **1 million** species are at risk of extinction due to pollution, resource overuse, and habitat loss.[16]
- Only **17%** of UN Sustainable Development Goals are on track for 2030.[17]

Social Impacts

- Climate damages could cut global income by **19%** by **2050**, with the greatest losses in low-latitude regions.[18]
- **80%** of those most at risk of crop failure and hunger live in Sub-Saharan Africa, South Asia, and Southeast Asia – with women disproportionately affected by food insecurity.[19]
- Climate change may push **68–135 million** people into poverty by **2030**, mostly in the Global South.[20]
- The IEA forecasts **30 million** green jobs created by **2030**, but **5 million** fossil fuel jobs lost.[21]
- Global climate finance hit **USD 1.46 trillion** in **2022**, yet needs to grow **fivefold** by **2030**.[22]
- Climate impacts are fueling **resource conflicts**, **forced migration**, **gender-based violence**, **child marriage**, and **rising geopolitical tensions.**[23]
- Linear value chains remain particularly vulnerable to **climate shocks** and **supply bottlenecks.**[24]

ENABLERS TO FACILITATE MITIGATION AND ADAPTATION

Many barriers are not technological but structural, rooted in policy inconsistency, restricted access to expertise and finance, short-termism, and weak regulatory frameworks that deter investment and delay implementation. These challenges lie within the power of governments and institutions to overcome through coherent long-term policies, strong governance, coordinated international action, and innovative enabling organisations. With stronger enabling conditions in place, existing solutions can be rapidly implemented and scaled to meet the urgency of the climate challenge.

Climate Tech Solutions

To support transparent, science-based decision-making, Swedish organisations are investing in data-driven tools that ensure accountability, track progress, and enable measurable and comparable outcomes. Digitalisation, AI, and modelling tools translate complex climate data into actionable insights, supporting information dialogues and enabling policymakers, businesses, and interconnecting stakeholders to align efforts, monitor progress, and adapt strategies based on real-time evidence. This structured approach strengthens governance, builds trust, and accelerates effective climate action that is transparent, measurable, and inclusive.

Financial Tools

Sweden's public and private sectors offer a suite of financial instruments that help bridge the gap between ambition and implementation in challenging markets. The top-rated Green Export Credit Guarantees from EKN (the Swedish Export Credit Agency) in combination with long-term financing from SEK (the Swedish Export Credit Corporation), with some of the most favourable terms globally, gives a competitive offer for sustainable projects involving Swedish suppliers. Sida and Swedfund provide climate aid, grants, guarantees, concessional finance, and impact investments to support adaptation, mitigation, and capacity-building in low- and middle-income countries.

Policy Tools

Swedish institutions, governmental agencies, and businesses offer advisory services, expertise, tools, and capacity building to support the development oof transformative decarbonisation policies at national, regional, and local levels. This includes technical assistance on decarbonisation roadmaps, adaptation measures, climate governance, and regulatory frameworks that promote low-emission technologies and sustainable practices.

Research and Science

Over 3% of Swedish GDP is invested in research and development, supporting world-leading universities and research institutes in driving innovation in climate, energy, and sustainability.[25] This scientific expertise underpins an evidence-based approach to climate action and enables the development of solutions that are scalable and globally relevant.

Capacity Building

Through Sida, the Swedish Energy Agency, the Swedish Environmental Protection Agency, and other institutions, we support knowledge transfer and institutional strengthening to enhance climate governance, encourage system-wide transformation, and build long-term resilience. These efforts aim to reduce inequality, address environmental injustice, and empower communities to anticipate, withstand, and respond to climate-related risks.

> Read more about Sweden at COP

CASE STUDY

IKEA

IKEA illustrates how an array of cross-sector climate solutions can deliver real impact. Building on innovations from Sweden and beyond, the company has scaled fossil-free energy, circular product services, zero-emission delivery fleets, and even plant-based foods. By financial year 2024, IKEA had reduced its climate footprint by 28% compared to its 2016 baseline, a reduction of 8.4 million tonnes CO_2 equivalent, while continuing to grow its business, driven by a growing share of renewable electricity (reaching 81% in retail, 95% in logistics, and 75% in production) and electrified transport. IKEA's science-based targets aim to halve emissions by 2030 and reach net zero by 2050 without relying on offsets. Continued progress, however, depends on countries strengthening their enabling conditions, such as forward-looking and harmonised policies, financing, and infrastructure, to support ambitious businesses in staying on track and continuing to contribute to national and international climate goals.

Read more

01

Energy

Energy Snapshot

Swedish Journey, Commitments, and Existing Solutions

Solutions to Bridge the Implementation Gap

Enablers to Facilitate Mitigation and Adaptation

Call to Action

ENERGY SNAPSHOT

Global Context

The energy sector accounts for around three quarters of global greenhouse gas emissions and is central to meeting the 1.5°C target. Yet under current policies, energy-related CO_2 emissions are projected to rise, putting the world on track for 2.7°C warming by 2100. Meanwhile, the global economy is expected to grow by 40% by 2030, even as energy use must fall by 7%, requiring a tripling of renewable power capacity and doubling of energy efficiency.

The next decade is critical for scaling up clean energy investment and infrastructure to build a resilient, low-carbon energy system that can both cut emissions and adapt to climate impacts. Achieving net zero by 2050 demands annual clean energy investment to more than triple to around $4 trillion by 2030. This will require coordinated action from governments, businesses, and financial institutions to drive innovation, strengthen energy security, and ensure reliable, affordable, and climate-resilient energy for all.[26]

In numbers

~75%

of global GHG emissions come from the energy sector[27]

13%

of global CO_2e emissions are directly from energy production[28]

6%

projected rise of CO_2 emissions from 2020 to 2030 under current policies[29]

>1.5°C

To stay below 1.5°C, energy-related CO_2 must fall **~40%** by 2030 and reach **net zero** by 2050[30]

40%

projected growth in global economy by 2030 yet energy consumption must fall **7%** by 2030 to remain on track[31]

x3 **Renewable energy** capacity needs to **triple**...

x2 ...and **energy efficiency** improvements need to **double** by 2030[32]

> Find out about existing solutions for climate/energy mitigation and adaptation

Key Challenges

- Insufficient investment and policy ambition
- Slow deployment of critical clean technologies
- Dependence on fossil fuels and subsidies
- Geopolitical tensions and market instability
- Rising energy demand from industry, cities, and digitalisation
- Critical material constraints and supply chain vulnerabilities
- Grid systems unfit for decentralised, variable renewables

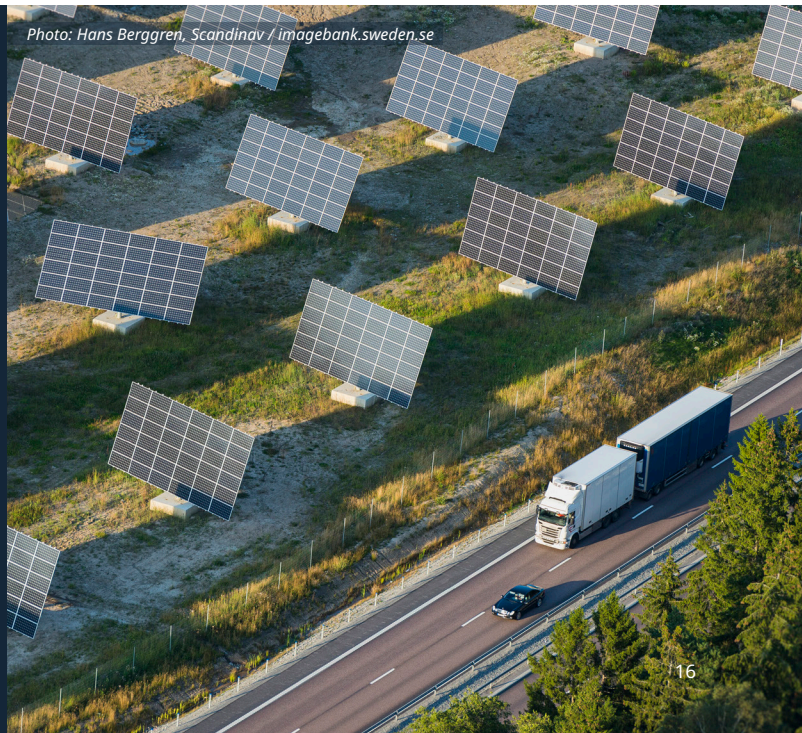


Photo: Hans Berggren, Scandinav / imagebank.sweden.se

SWEDISH JOURNEY, COMMITMENTS, AND EXISTING SOLUTIONS WITHIN THE ENERGY SECTOR

Sweden's Road to Net Zero by 2045

Energy is the backbone of Sweden's economy and a central pillar of its climate strategy. In 2023, the energy sector accounted for just 10% of national emissions, reflecting Sweden's long-term commitment to renewables, nuclear power, and energy efficiency. Since 2010, emissions from this sector have fallen by 56%, and fossil fuel emissions have dropped by 90% compared to 1990.[33] Sweden's energy mix is among the cleanest worldwide, with over 90% of electricity and 95% of heating produced without fossil fuels.[34] Between 2020 and 2022, solar capacity more than doubled from 1.1 GW to 2.6 GW, while wind power grew from 10 GW to 14.5 GW.[35]

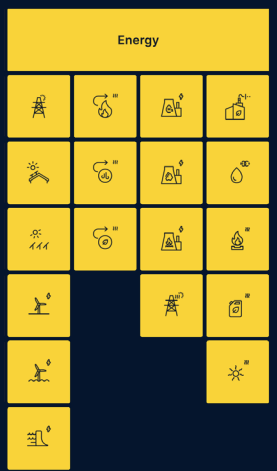
As of 2023, Sweden's total energy supply consists of biofuels and waste (29%), nuclear (27%), oil (19%), hydro (12%), and other renewables (8%).[36] To remain on track for net zero by 2045, emissions must be reduced by a further 17 percentage points by 2030.[37]

Fossil Free Sweden has co-developed roadmaps with industry and government for the Electricity sector, Gas sector, and Heating sector. These roadmaps support Sweden's climate goals and align with Panorama's energy pathways by outlining how to scale renewable electricity, modernise district heating, and phase out fossil gas, among other interventions. They provide a structured framework for investment and innovation, ensuring that decarbonisation and energy security advance in tandem.

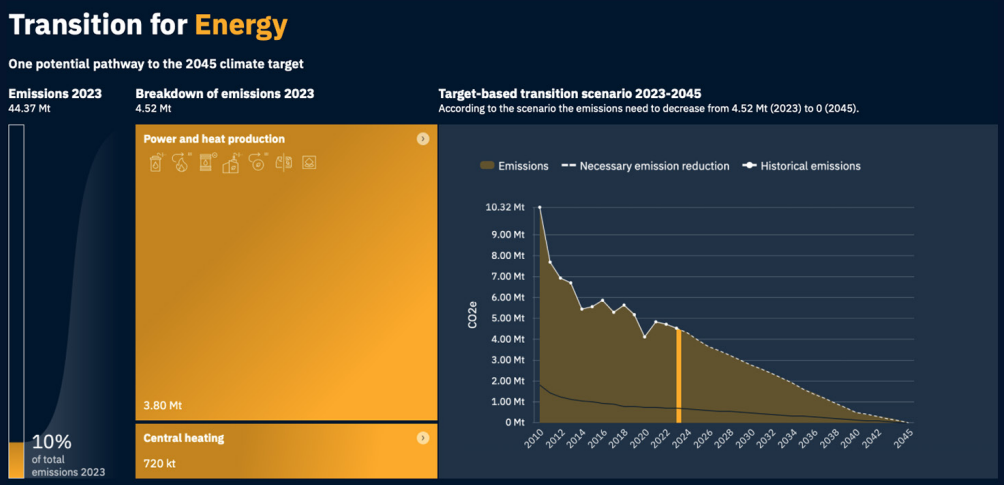
As shown in Panorama, Sweden's energy sector has already achieved significant emission reductions, demonstrating that decarbonising major emitters is both feasible and economically advantageous with existing technologies. The updated Transition Element Framework (TEF) complements this by identifying the specific solutions needed to sustain and accelerate these shifts.

By sharing these proven solutions, Swedish companies, researchers and institutions align innovation ecosystems and scale resilient, circular systems. This in turn supports the development of competitive, fossil-free value chains domestically and internationally, ensuring that clean, reliable energy underpins climate action across all sectors.

Possible Transition Shifts



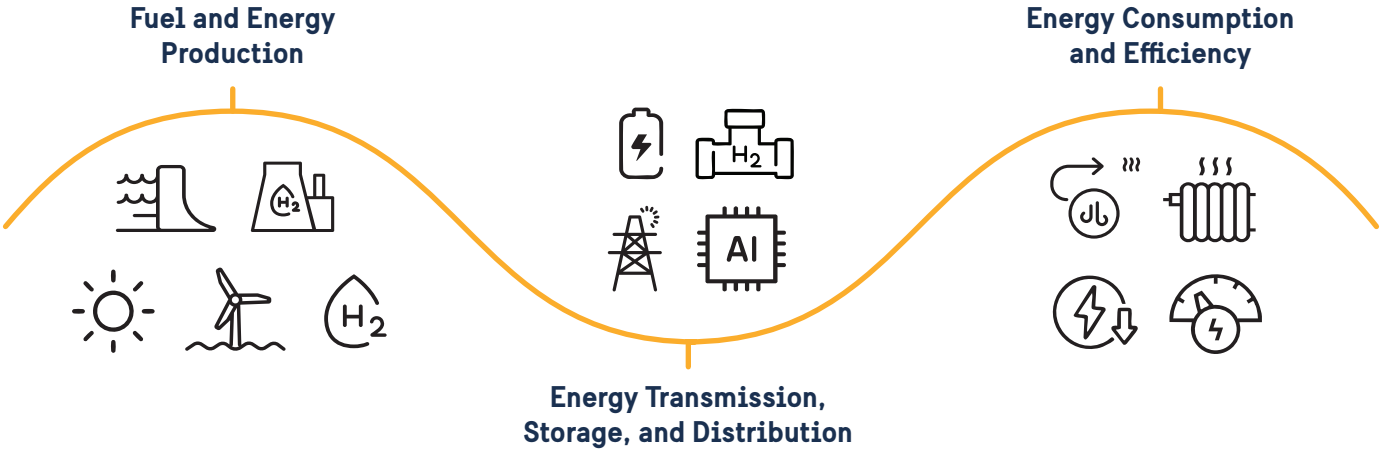
Relevant Transition Shifts for Sweden's Transitions



September 2025

SOLUTIONS TO BRIDGE THE IMPLEMENTATION GAP

The IPCC confirms solutions to limit warming to 1.5°C exist but requires urgent deployment. Sweden leverages its innovation and research to deliver scalable energy solutions that enhance security, equity, and sustainability while accelerating the shift from fossil fuels to renewables and boosting energy efficiency. These solutions address key challenges such as rising energy demand amid a projected 40% economic growth by 2030, the need to reduce energy consumption by 7% by 2030 to stay on track, the necessity to triple energy efficiency improvements, insufficient investment, fossil fuel dependence, geopolitical instability, supply chain risks, and outdated grids unfit for decentralised renewables.[38]



Fuel and Energy Production

Energy Generation

Swedish firms are at the forefront of fossil-free energy deployment, with leadership across wind, solar, hydro, nuclear, and emerging ocean energy such as tidal stream and wave power. These technologies provide reliable, low-carbon electricity, particularly important for coastal and land-constrained regions. They also strengthen energy independence, enhance resilience to fossil fuel price volatility, and support inclusive growth through decentralised access. However, the pace of deployment is slowed by long permitting processes, delays in grid connections, and local resistance to new infrastructure.

Hydrogen Production

Swedish companies are pioneering fossil-free hydrogen production using renewable and nuclear electricity, creating a scalable, zero-emissions fuel for sectors including transport, heavy industry, and heating. This clean hydrogen can play a central role in decarbonising hard-to-abate sectors while also enhancing energy resilience by enabling long-duration storage and sector integration. However, high production costs, energy intensity, and the lack of stable, long-term policy frameworks limit its commercial viability and investment attractiveness at scale.

Energy Transmission, Storage, and Distribution

Grid Infrastructure and System Integration

Swedish companies lead in developing smart grid solutions that optimise energy flows, integrate intermittent renewables, and improve system reliability. Technologies such as energy storage and balancing systems, including lithium-ion batteries and hydrogen-based storage, help stabilise grids, while grid modernisation and cross-border interconnectors enhance resilience and affordability through clean electricity trade. By supporting decentralised energy systems, AI-driven optimisation, and regional interconnectivity, Swedish firms enable countries to adapt energy infrastructure to climate extremes and shifting demand patterns. However, these solutions face structural barriers including ageing infrastructure, slow regulatory adaptation, and insufficient coordination across markets. Circular grid upgrades also require significant upfront investment and long-term policy certainty, which are not always in place.

CASE STUDY

FLOWER

In early 2025, Flower signed the sector's first AI-optimised wind Power Purchase Agreement (PPA) with SEB Nordic Energy's Locus Energy, covering 11 wind farms and 180 GWh annually in Sweden. Combining AI with a flexible portfolio of wind, solar, batteries, and EV chargers, Flower transforms variable generation into stable, dispatchable electricity. Its algorithms minimise imbalance costs (which can exceed €10,000/MWh), curtail production during negative pricing, and enable access to ancillary service markets. By reducing risk and enhancing revenue, Flower is making clean energy more predictable, reliable, and commercially viable.

Read more

Photo: Flower

CASE STUDY

INGRID CAPACITY

Ingrid Capacity builds the infrastructure and intelligence behind the electrified society. In 2024, Ingrid Capacity rapidly deployed our first portfolio of 14 battery storage sites in southern Sweden with a combined capacity of about 210 MW/210 MWh, easing acute grid bottlenecks. Commissioned in under a year, the batteries stabilise the grid, store surplus renewable energy, and enable greater renewable integration.

Powered by advanced AI analytics and automated trading, Ingrid Capacity's proprietary platform forecasts market conditions, predicts grid needs, and trades stored energy in real time to maximise value and stability. By boosting flexibility, reducing curtailment, and enabling smarter market participation, their portfolio lowers emissions and supports Sweden's electrification goals. The 14-site portfolio was inaugurated by Sweden's Minister for Climate and the Environment.

Read more

Photo: Ingrid Capacity

Hydrogen Storage and Distribution

Swedish expertise in hydrogen storage and distribution is essential to unlocking the full potential of clean hydrogen within industrial, urban, and regional energy systems. These technologies help stabilise supply, bridge mismatches between generation and demand, and facilitate cross-sector energy flows. By providing flexible, resilient alternatives for sectors that are difficult to electrify, they contribute to climate adaptation and energy security. Nevertheless, deployment is constrained by insufficient storage infrastructure, fragmented logistics networks, and varying technical standards across jurisdictions.

Energy Consumption and Efficiency

Heat Recovery, Heat Pumps, and AI Optimisation

Swedish firms are global leaders in energy efficiency technologies, offering solutions such as waste heat recovery systems, high-performance heat exchangers, and next-generation heat pumps that reduce energy use in buildings and industries. Energy Efficiency solutions are being implemented in industries and buildings, but also cities through District Energy, reusing heat from industry. AI-enabled optimisation tools further improve energy performance by managing heating and cooling in real time. These technologies not only support mitigation but also enhance adaptive capacity by reducing demand peaks and ensuring energy stability during climate extremes. Yet, adoption is held back by high retrofit costs, limited financing options, and split incentives between property owners and tenants, which dilute investment motivation.

Carbon Capture, Usage, and Storage (CCUS)

Swedish innovators are developing CCUS technologies to cut emissions from emissions-intensive sectors like cement and steel. When combined with waste-to-energy facilities, CCUS can also reduce landfill waste while generating low-carbon power. This circular approach contributes to both mitigation and adaptation by supporting clean energy generation from waste, reducing landfill emissions, and enhancing the resilience of urban energy systems. Swedish companies can assist with feasibility assessments, project development, and regulatory navigation, helping other nations scale CCUS while attracting climate finance and ensuring policy alignment. However, high capital and operational costs combined with limited availability of CO_2 storage infrastructure, and weak carbon pricing mechanisms can challenge large-scale deployment.

Photo: Alfa Laval

CASE STUDY

ALFA LAVAL

At its Hamburg site, the Aurubis Group faced the challenge of utilising waste heat from sulfuric acid production in an energy-intensive industrial area. Alfa Laval installed a customised heat exchanger system, allowing Aurubis to recover up to 20 MW of industrial waste heat, enough to heat 20,000 households. The solution cuts CO_2 emissions by around 100,000 tonnes annually, improves local air quality, and boosts energy efficiency across the industrial zone. Success factors include energy-efficient technology, strong collaboration between stakeholders, and local authority support. The approach is scalable and replicable for other heavy industrial processes with excess heat, as well as for data centres that generate recoverable thermal energy.

Read more

CASE STUDY

E.ON

E.ON's ectogrid™ is a smart, decentralised energy solution that reduces energy use by up to 75% in cities and industrial districts by recycling local waste heat and balancing supply through a digital platform. Operating on a low-temperature grid powered by electricity, the system enables shared heating and cooling between buildings while integrating renewable sources. This supports COP28 goals to triple renewables and double efficiency, and positions ectogrid™ as a scalable pathway to zero-emissions infrastructure. E.ON's approach shows how digital innovation can unlock efficiency and resilience at the district level.

Read more

Photo: E.ON

ENABLERS TO FACILITATE MITIGATION AND ADAPTATION

Sweden's energy sector combines advanced technology, policy expertise, financial innovation, and international cooperation to support the global transformation to a fossil-free, resilient, and efficient energy system.

Financial Tools

Sweden's public and private sectors offer robust financial solutions to support the global energy transition. The Export Credit Agency (EKN) provides Green Export Credit Guarantees with up to 100% risk coverage, enabling financing for large-scale renewables projects. The Export Credit Corporation (SEK) delivers long-term green loans for fossil-free infrastructure, including renewables, hydrogen, and storage. Sida mobilises climate finance through blended models to unlock private investment in developing countries. Sweden is also home to leading sustainable finance experts who advise on designing investment funds, blended finance, and public-private partnerships to close investment gaps and manage supply chain risks.

Policy Expertise

Sweden's ongoing energy transition is grounded in strong policies that drive emissions reduction and resilience. Swedish institutions support governments worldwide in crafting transformative net-zero targets, energy strategies and roadmaps, and robust regulatory frameworks and policies at national, regional, and local levels. They provide guidance on renewable incentives, carbon pricing systems, tax policies, and market mechanisms. Swedish parties also aid other nations' decision-makers in aligning national policies with international climate goals, as well as supporting collaboration between public and private sectors to accelerate fossil-free energy deployment.

Research and Innovation

Sweden's high level of R&D underpins advances in renewables, hydrogen, energy storage, district energy, energy efficiency solutions and smart grid technologies. Its research institutions ensure solutions are scalable, system-ready, and evidence-based. Swedish innovations support integration of emerging technologies into energy systems, improving efficiency and enabling flexible, resilient grids.

Capacity Building

Through Sida, the Swedish Energy Agency, and partners, institutional capacity, skills, and climate governance are strengthened across the global energy sector. This secures local ownership, supports equitable transformation, and builds long-term resilience to climate impacts.

Photo: Flower

ENABLING CONDITIONS REQUIRED TO MATCH THE URGENCY WITH SOLUTIONS

Transitioning energy systems in line with the 1.5°C pathway is crucial not only for meeting climate goals but also for driving economic growth, innovation, and public health improvements through reduced pollution. Many countries face increasing pressure to decarbonise amid rising energy demand, economic constraints, and geopolitical uncertainty. Major barriers include high infrastructure costs, policy gaps, limited access to capital, and challenges in integrating renewable energy. Without clear planning and enabling conditions, investments in low-carbon, resilient energy systems remain difficult to realise.

Call to Action

In response to these challenges, Sweden's non-negotiating delegation to COP30 calls for the following actions to drive urgent, inclusive progress on decarbonisation, adaptation, and sustainable development:

#1 Accelerate Innovation and Infrastructure

Invest in grid modernisation, energy storage, hydrogen infrastructure, and carbon capture to enable large-scale renewable integration.

#2 Mobilise Finance

Develop financial tools and risk-sharing models to attract private investment, supported by strong carbon pricing and targeted R&D funding.

#3 Strengthen Policy Frameworks

Implement clear fossil-free targets, remove fossil fuel subsidies, streamline permitting, and promote decentralised clean energy solutions. Set clear, measurable targets for energy efficiency. In particular, establish national systems to track energy savings and emissions reductions, and integrate energy efficiency indicators into the NDC reporting framework.

#4 Enhance Collaboration and Capacity

Forge international partnerships, knowledge sharing, and workforce development to support equitable, scalable energy transitions worldwide.

02

Industry

Industry Snapshot

Swedish Journey, Commitments, and Existing Solutions

Solutions to Bridge the Implementation Gap

Enablers to Facilitate Mitigation and Adaptation

Call to Action

INDUSTRY SNAPSHOT

Global Context

Industry remains one of the most carbon-intensive and technically complex sectors to decarbonise, with heavy industries such as steel, cement, aluminium, and chemicals highly reliant on fossil fuels, fossil feedstocks, and high-temperature processes. Despite growing awareness of the need for rapid emissions reductions, industrial emissions continue to rise, driven by increasing global demand and slow turnover of existing infrastructure. The transformation is further limited by the high cost and complexity of new integrating technologies, restricted access to clean energy, and inadequate infrastructure in many regions. Risk of carbon leakage, financing gaps, and regulatory uncertainty add further challenges, especially in developing economies.

Industrial transformation is urgent and far-reaching, requiring changes not only in technology but also across investment flows, supply chains, value chains, workforce strategies, and policy frameworks. It also calls for greater circularity and more efficient material use to cut waste and emissions throughout the life cycle. At the same time, this shift promotes green industrial growth, boosts resilience, and secures long-term economic competitiveness.

In numbers

~30%

of global greenhouse gas emissions come from the industrial sector[39]

To meet the 1.5°C target, emissions must fall by

42% by 2030 & **79%**[40] by 2050

However, since 2010, industrial emissions have increased by

1.3%[41]

Demand expected to rise by 2050:

30% steel and primary chemicals

80% aluminium

40% cement and ammonia[42]

Annual industrial decarbonisation investment must triple to

$500 bn[43]

Nearly

50%

of required emissions cuts rely on emerging technologies[44]

> Find out about existing solutions for climate/industry mitigation and adaptation

Key Challenges

- Slow technology turnover
- Limited access to clean, affordable energy and infrastructure
- High costs of low-emission technologies
- Financing barriers
- Risk of carbon leakage
- Supply chain preparedness
- Lack of demand-side measures and incentives
- Policy, regulatory and standards gaps
- Low material circularity and poor systems integration
- Exposure to climate risks and geopolitical disruptions
- Reskilling needs

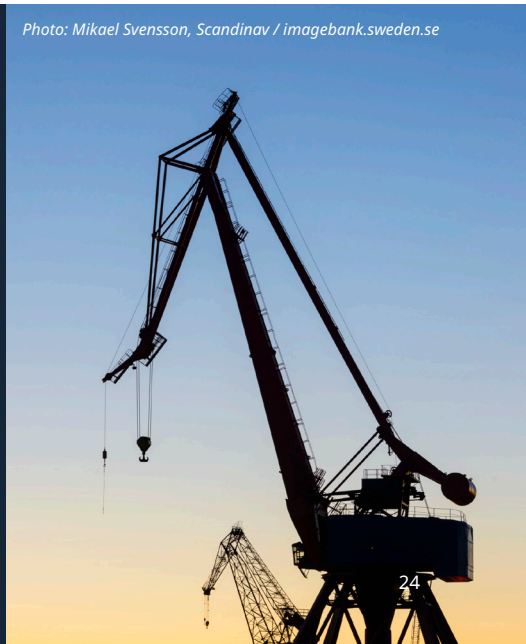


Photo: Mikael Svensson, Scandinav / imagebank.sweden.se

SWEDISH JOURNEY, COMMITMENTS, AND EXISTING SOLUTIONS WITHIN THE INDUSTRY SECTOR

Sweden's Road to Net Zero by 2045

Industry is a cornerstone of Sweden's economy, with the highest number of global manufacturing companies per capita worldwide.[45] The sector accounts for 33% of Sweden's CO_2 emissions, making decarbonisation vital to reaching net zero by 2045. Since 2010, industrial emissions have fallen by over 24%, but far greater reductions are needed to cut emissions by 87% by 2045.[46]

Sweden's strategy combines strong policy frameworks, clear roadmaps, and cross-sector collaboration to drive industrial decarbonisation and climate adaptation at home and abroad. Initiatives such as Fossil Free Sweden and the Panorama platform help inspire businesses, visualise transition pathways, and scale emerging clean technologies.

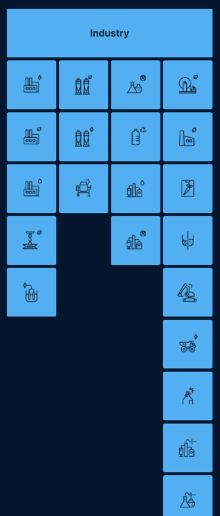
This includes:

- Designing market-based tools such as carbon pricing, with Sweden's carbon tax among the highest globally
- Promoting green public procurement to boost demand for low-carbon and circular products
- Supporting clean energy investment via schemes like the Sweden-Norway Renewable Energy Certificate System
- Facilitating international partnerships to transfer technology and finance industrial transformation in emerging economies
- Integrating climate adaptation measures to enhance industrial resilience against climate impacts, such as extreme weather and resource scarcity

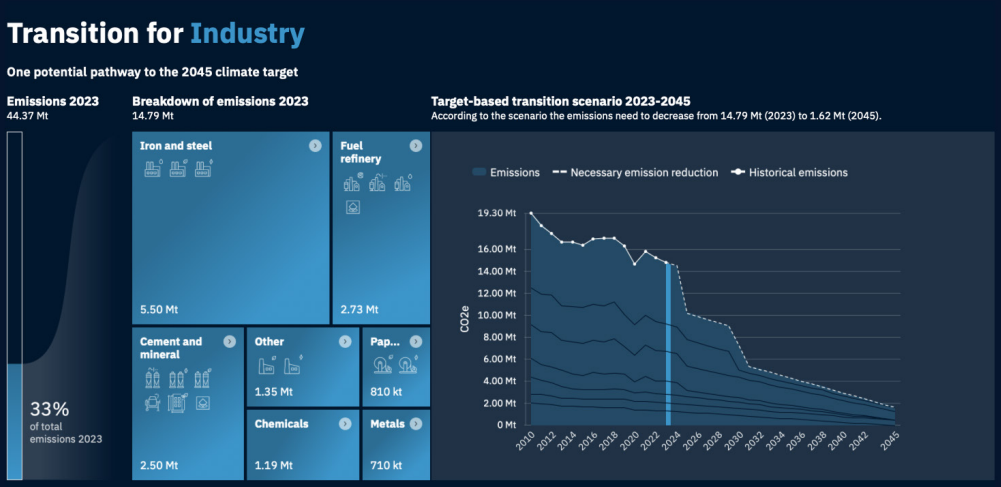
Sweden's industrial transformation is supported by Fossil Free Sweden's roadmaps for the Cement industry, Concrete industry, Steel industry, Mining and Minerals industry, Aggregates industry and Chemical industry. Codeveloped by industry and government, these roadmaps set out how Sweden can deliver solutions like fossil free steel, low-carbon cement, electrified mining, and circular production systems. Reflecting Panorama's industrial transition pathways, they demonstrate how decarbonisation and competitiveness can be advanced together through innovation and resource efficiency.

Our NDC-NAP solutions build on Panorama's foundation, aligning value chains with global goals for mitigation, adaptation, and circularity. While Panorama defines Sweden's transition shifts and challenges, the updated Transition Element Framework (TEF) specifies the solutions needed to address them, enabling flexible application across geographies and value chains. Sweden's role is to match international industrial needs with proven solutions, encouraging collaboration and investment to accelerate decarbonisation. By linking innovation ecosystems and scaling resilient, circular systems, Sweden is helping to build competitive, fossil-free, and climate-resilient industrial value chains both domestically and abroad.

Possible Transition Shifts



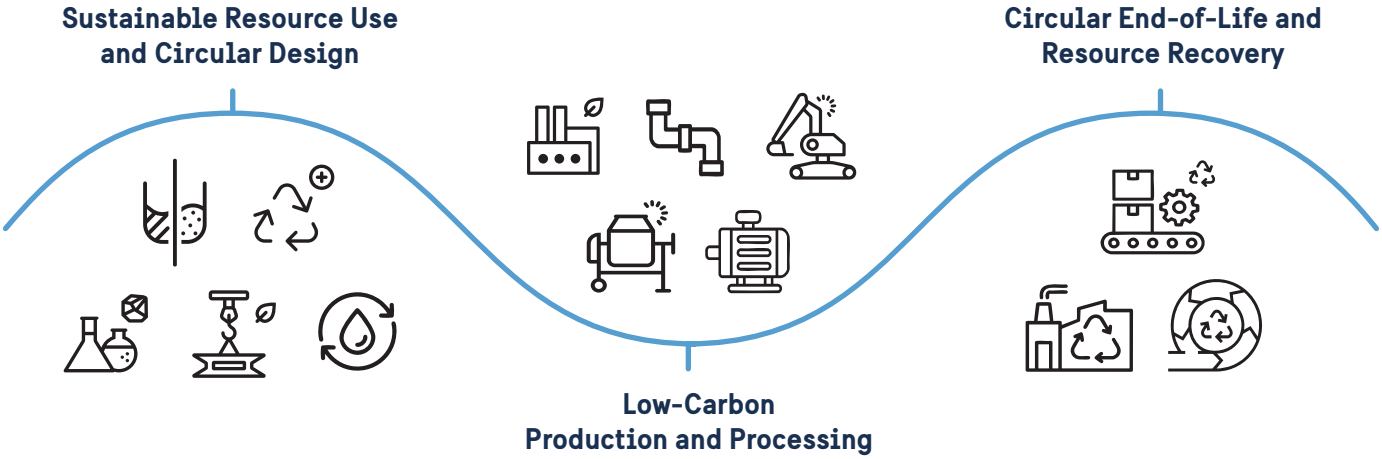
Relevant Transition Shifts for Sweden's Transitions



September 2025

SOLUTIONS TO BRIDGE THE IMPLEMENTATION GAP

The IPCC confirms that solutions to limit warming to 1.5°C exist but require urgent implementation. Sweden, a global leader in innovation and research, provides scalable industrial solutions that cut emissions while enhancing energy security, social equity, and green growth. These solutions help overcome barriers such as limited access to clean energy and infrastructure, slow technology turnover, and supply chain challenges. They also mitigate risks including carbon leakage, regulatory gaps, low material circularity, and exposure to climate and geopolitical disruptions, while supporting demand-side incentives, systems integration, and workforce reskilling. Together, these innovations accelerate the investment and structural changes necessary to achieve the necessary 42% emissions reduction by 2030 and 79% by 2050.[47]



Sustainable Resource Use and Circular Design

Circular Manufacturing by Design

Swedish firms are pioneering circular industrial processes by integrating recycled plastics, secondary raw materials, modular design, and bio-based composites. These approaches reduce dependency on virgin resources, cut life-cycle emissions, and enhance supply chain resilience. They also lower exposure to resource price volatility and support green job creation. Growth of circular manufacturing is hindered by fragmented secondary raw material markets, inconsistent product standards, and limited incentives for manufacturers.

Water and Resource Reuse

Circular systems in Sweden are enabling the reuse of treated wastewater and industrial by-products across sectors. These practices reduce address water scarcity and support climate adaptation, as well as enhancing resilience in water-intensive industries such as chemicals, food processing, and manufacturing. However, adoption is constrained by infrastructure gaps, regulatory barriers, and limited cross-sector coordination.

Demand-Side Flexibility

Swedish industry players are beginning to match energy use with grid capacity and renewable availability; demand-side flexibility reduces system strain and energy costs, and contributes to smarter, more adaptive energy use. However, barriers include low market participation incentives, limited digital integration, and grid inflexibility in some regions.

Low-Carbon Production and Processing

Fossil-free Steel

The Swedish steel industry is leading the global shift to a fossil-free steel industry, phasing out coal and fossil fuels for fossil-free electricity, bio based energy and hydrogen. This transition eliminates process emissions and positions Swedish firms at the forefront of green industrial competitiveness. It reduces exposure to fossil fuel volatility and sets a precedent for decarbonising heavy industry worldwide. Key challenges include the lack of a global level playing field with regards to carbon pricing, trade and over capacity, lack of standards, access to fossil-free electricity and hydrogen at scale, connection to and build-out of grid infrastructure, complex permitting processes and access to functioning infrastructure that meet the needs of industrial value-chains.

CASE STUDY

HYBRIT

HYBRIT, a collaboration between SSAB, LKAB, and Vattenfall, has developed the world's first fossil-free iron- and steelmaking process, replacing coking coal with fossil-free electricity and hydrogen. After six years of R&D supported with funding from the Swedish Energy Agency, the patented HYBRIT® technology will now be scaled industrially. The process, which emits only water vapour, has the potential to eliminate 10% of Sweden's carbon emissions and significantly reduce the global steel sector's carbon footprint. The project's success has been underpinned by strong industry collaboration with research institutions and universities, as well as a value-chain approach to innovation.

Read more

Photo: Yours Kommunikationsbyrå

Sustainable Construction Materials

Swedish firms are developing low-carbon cement by replacing traditional clinker with fly ash, slag, and alternative binders. They also deploy bio-based and circular composites, contributing to emissions reduction and material efficiency. These solutions support resilient infrastructure development and lower climate impacts in the built environment. Scale-up is challenged by limited access to low-emission inputs, conservative building codes, and cost competitiveness in global markets.

Fossil-Free Chemicals

The industry sectors' chemical emissions are driven by fossil fuel use for energy and carbon feedstocks. Full decarbonisation is not always feasible, as many chemicals require carbon. Therefore, Swedish firms are guiding the sector to pair decarbonisation, through electrification and efficiency, with defossilisation, using biomass, recycled plastics, and captured CO_2 to replace fossil-derived chemicals. Some solutions are already available, while further development and diversification will be required. This approach improves resource efficiency, industrial competitiveness, and reduces exposure to fossil fuel shocks. These measures also support adaptation by diversifying inputs and enhancing supply chain resilience. Key barriers include high costs and slow technology development and the complexity of long industrial value chains.

Energy-Efficient Production

Swedish industry is advancing energy efficiency through audits, right-sized equipment, digital twins, predictive maintenance, and process optimisation. These tools improve competitiveness, reduce emissions, and support economic resilience by cutting operational costs. Broader uptake is constrained by skills shortages and inconsistent policy support across sectors.

CASE STUDY

SKF

SKF is driving decarbonisation in industry by delivering solutions across energy efficiency, generation, storage, and distribution. At its factory in Xinchang, China, the installation of chillers with SKF magnetic bearings is projected to save 60 GWh over the equipment's lifespan, avoiding more than 35,000 tonnes of CO_2e emissions. Industrial heating, cooling, and ventilation account for a significant share of energy use and CO_2 emissions, and by adopting magnetic bearing technology, SKF enables factories and industrial facilities to cut energy consumption by 10–20%, demonstrating how targeted innovation can reduce emissions at scale.

Read more

Photo: SKF

Circular End-of-Life and Resource Recovery

Waste Heat Recovery and Industrial Heat Pumps

Swedish industries capture and repurpose excess heat using heat pumps, cutting reliance on fossil-based heating, lowering emissions and efficient heat exchangers. These systems support decarbonisation and improve energy security, particularly in energy-intensive sectors. Barriers include high upfront costs, limited incentives for heat recovery, and integration difficulties in legacy infrastructure.

Carbon Capture, Utilisation and Storage (CCUS)

Sweden is scaling up CCUS and bio-CCS to decarbonise hard-to-abate sectors such as cement, steel, and waste-to-energy. These technologies capture both fossil-based and biogenic CO_2, offering deep mitigation and long-term emissions reductions. CCUS also creates opportunities for CO_2 utilisation in products and fuels, supporting green innovation and job creation. Deployment is hindered by underdeveloped transport and storage infrastructure, unclear regulatory frameworks, and weak carbon pricing signals.

Circular Economy and End-of-Life Solutions

Innovations in materials recovery, battery recycling, and remanufacturing are closing industrial resource loops. These practices extend product life, reduce waste, and lower emissions from resource extraction. They enhance resilience to supply shocks, create jobs in recycling and repair, and build more adaptive, secure industrial systems. However, scale-up is constrained by inconsistent regulation, undeveloped recovery infrastructure, and insufficient economic incentives for circular design.

CASE STUDY

SEKAB

Sekab shows how fossil-free chemistry can drive both industrial transformation and business value. From its base in Örnsköldsvik, Sweden, Sekab has developed a unique production of industrial chemicals, including ethyl acetate, acetaldehyde, and acetic acid, using bio-based ethanol instead of fossil raw materials. This targets one of the most urgent climate challenges: reducing emissions from the almost totally fossil-dependent chemical industry.

Sekab's fossil-free products have up to 90% lower carbon footprint compared to conventional alternatives, based on ISO 14067-certified product carbon footprint assessments. Used in everything from paints and cosmetics to pharmaceuticals and food, these chemicals help downstream industries cut emissions and meet growing sustainability demands.

Key success factors include access to green electricity, industrial symbiosis, and highly resource-efficient processes. For climate pioneers like Sekab, supportive policy frameworks and access to sustainable biomass are continuously important to accelerate industrial decarbonisation across Europe.

Read more

Photo: SEKAB

ENABLERS TO FACILITATE MITIGATION AND ADAPTATION

Sweden's public and private sectors offer a robust set of tools to support global industrial decarbonisation and climate adaptation, combining advanced financial mechanisms, policy expertise, cutting-edge research, and inclusive capacity-building.

Financial Tools

To help countries meet their climate goals through tailored financial support, The Swedish Export Credit Agency (EKN) provides Green Export Credit Guarantees that cover up to 100% of risks for sustainable industrial projects aligned with the EU Taxonomy, fossil-free energy, circular economy initiatives, and climate-resilient infrastructure. The Swedish Export Credit Corporation (SEK) offers long-term Green Loans to make large-scale decarbonisation projects financially viable. Through Sida, blended finance unlocks private capital for industrial transformation in developing nations by reducing investment risks. Swedish organisations also advise governments and investors on designing effective public financing models, drawing on successful schemes like Klimatklivet and Industriklivet to accelerate emissions reductions.

Policy Expertise

Swedish experts support the development of industrial decarbonisation roadmaps and policy frameworks that link emissions targets with investment strategies. They provide guidance on regulations, subsidies, and co-financing for hydrogen infrastructure, carbon capture, and circular manufacturing, ensuring alignment between climate ambition, industrial competitiveness, and climate adaptation priorities, while promoting just transitions.

Research and Innovation

Sweden's strong R&D ecosystem fuels innovation in industrial decarbonisation and adaptation. Collaboration between academia and industry accelerates scaling of new technologies, while Swedish test beds and pilot projects reduce risks for global adoption. Research also supports monitoring, optimising, and building resilience into low-carbon industrial systems. The Industrial Leap, a Swedish government program, managed by the Swedish Energy Agency, is a key instrument in funding innovation to cut industrial emissions and enable negative emissions, with SEK 1.3 billion allocated in 2025 through 2031.

Capacity Building

Swedish organisations support skills development and institutional strengthening to foster sustainable industrial transitions. Through Sida and the Swedish Energy Agency, training and technical assistance is provided in climate governance, emissions tracking, energy management, and public–private cooperation. This builds local capacity for resilient, inclusive industrial transformation aligned with development goals.

Photo: Per Pixel Petersson / imagebank.sweden.se

ENABLING CONDITIONS REQUIRED TO MATCH THE URGENCY WITH SOLUTIONS

Decarbonising industry and transitioning to a 1.5°C pathway is vital for climate, economic resilience, and job growth. Yet, many countries struggle with ageing infrastructure, costly clean technologies, limited fossil-free energy, and carbon leakage risks. Just transitions are essential to support workers and supply chains through this complex transformation, and without clear policies, funding, and collaboration, scaling decarbonisation will remain challenging.

Call to Action

In response to these challenges, Sweden's non-negotiating delegation to COP30 calls for the following actions to drive urgent, inclusive progress on decarbonisation, adaptation, and sustainable development:

#1 Stable and long-term Policies and Incentives

- Set ambitious and enforceable decarbonisation targets
- Implement strong carbon pricing
- Adopt a standardised methodology for emissions reporting
- Streamline permitting processes to accelerate project deployment
- Introduce policies that create market demand for fossil-free products.
- Establish standards to define low-emission products and materials.

#2 Investment and Finance

Mobilise capital through green bonds, blended finance, and risk-sharing, especially in emerging markets. Phase out fossil fuel subsidies and boost incentives for clean technologies and climate-resilient infrastructure.

#3 Infrastructure and Innovation

Expand clean energy, green hydrogen, and carbon capture infrastructure. Support digitalisation, energy efficiency, and resilience-building in industrial systems, promoting international cooperation to scale new technologies.

#4 Workforce and Just Transition

Invest in training and planning to equip workers for electrification, hydrogen, digitalisation, and adaptation needs, ensuring a fair and resilient transition.

03

Transport

Transport Snapshot

Swedish Journey, Commitments, and Existing Solutions

Solutions to Bridge the Implementation Gap

Enablers to Facilitate Mitigation and Adaptation

Call to Action

TRANSPORT SNAPSHOT

Global Context

Transport remains one of the most emissions-intensive and fossil fuel–dependent sectors worldwide, and is currently off track to meet the goals of the Paris Agreement. Although emissions temporarily declined during the COVID-19 lock-downs, they have since rebounded, with road transport continuing to dominate and emissions from aviation and shipping rising steadily.[48] High infrastructure costs, limited circularity, complex international regulation, and accelerating urbanisation further exacerbate the challenge, particularly in low- and middle-income countries.

Transforming the transport sector is urgent and systemic, yet also offers multiple co-benefits, from sustainable economic development and improved health outcomes to more resilient mobility systems and energy security. Decarbonising transport is not only critical for meeting climate targets, but for ensuring long-term competitiveness, equity, and prosperity.

In numbers

~23%

of global greenhouse gas emissions stem from transport[49]

To limit warming to 1.5°C, global transport emissions must fall by

25% by 2030 & **90%**[50] by 2050

Instead, they have risen by

~12%[51]

Road vehicles account for

70%

of direct transport emissions...

...with the following distribution of responsibility:

12% aviation

11% shipping

1%[52] rail

> Find out about existing solutions for climate/transport mitigation and adaptation

Key Challenges

- Reliance on fossil fuels
- High investment and infrastructure demands
- Rising mobility and freight needs
- Decarbonising aviation and shipping emissions
- Policy and regulatory gaps
- Low circularity and systems integration
- Climate and geopolitical vulnerabilities
- Urban congestion and structural barriers

Photo: Per Pixel Petersson / imagebank.sweden.se

SWEDISH JOURNEY, COMMITMENTS, AND EXISTING SOLUTIONS WITHIN THE TRANSPORT SECTOR

Sweden's Road to Net Zero by 2045

Transport is essential to Sweden's economy and connectivity, but it remains a major emissions source, accounting for 31% of national greenhouse gas emissions in 2023. Emissions have fallen 34% since 2010, driven by targeted investments and strong policy frameworks. Still, accelerated efforts are needed to meet Sweden's climate goals, including a 70% reduction in domestic transport emissions (excluding aviation) by 2030 and net zero by 2045.[53]

Sweden's approach combines long-term resilience with cross-sectoral collaboration, with industry targeting:

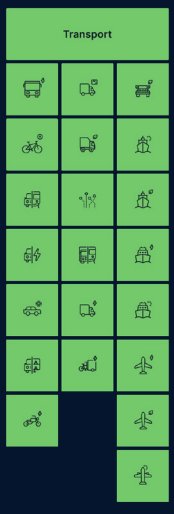
- 80% of new cars rechargeable by 2030
- 50% of new heavy vehicles electric by 2030
- Fossil-free domestic flights by 2030
- Zero-emission domestic shipping by 2045[54]

The transport sector is supported by Fossil-Free Sweden roadmaps for the Automotive industry (heavy transport and passenger cars), Heavy Road Haulage industry, Aviation industry, Maritime industry, and Petroleum and Biofuel industry. Developed jointly by government and industry, these roadmaps outline measures such as electrifying vehicles, expanding charging infrastructure, scaling fossil-free shipping, and developing sustainable aviation and maritime fuels. They reinforce Panorama's transport pathways, demonstrating how Sweden's net-zero transport ambitions can be met while achieving industrial competitiveness.

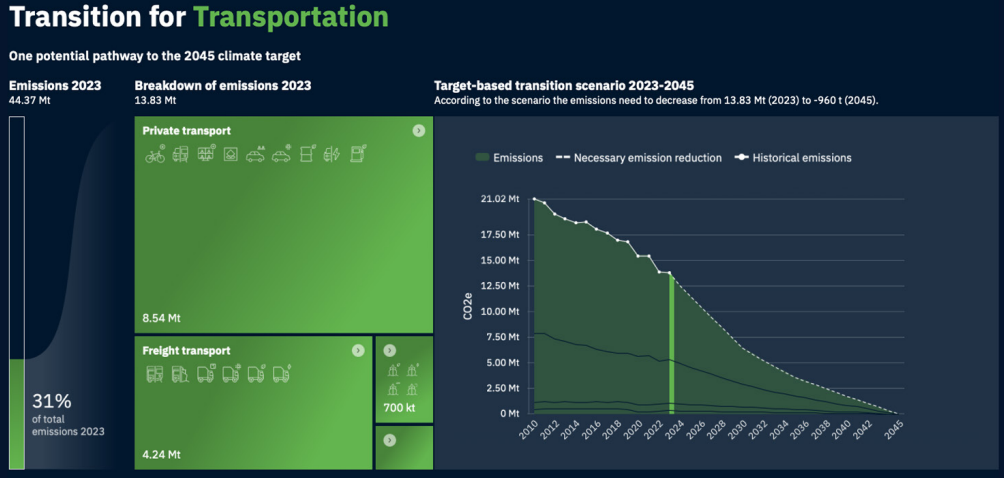
Progress is driven by circular, inclusive, and innovation-led strategies across the value chain. Panorama offers a structured overview of key sectoral challenges and transition shifts, tailored to domestic priorities. It tracks emissions and highlights enabling technologies, behavioural shifts, and policy tools. The Transition Element Framework (TEF) complements this by identifying the solutions required to deliver these transitions, each mapped to IPCC mitigation options and designed for flexible use across geographies and value chains. Together, these tools support matchmaking at national, regional, and city levels, bridging climate challenges with practical solutions, and making NDCs both more investable and more actionable.

Sweden aims to connect global needs with proven solutions, welcoming international collaboration and investment to accelerate the transport transition. By aligning innovation ecosystems and scaling resilient, circular systems, Swedish companies, researchers, institutions are helping build competitive, fossil-free value chains at home and abroad.

Possible Transition Shifts



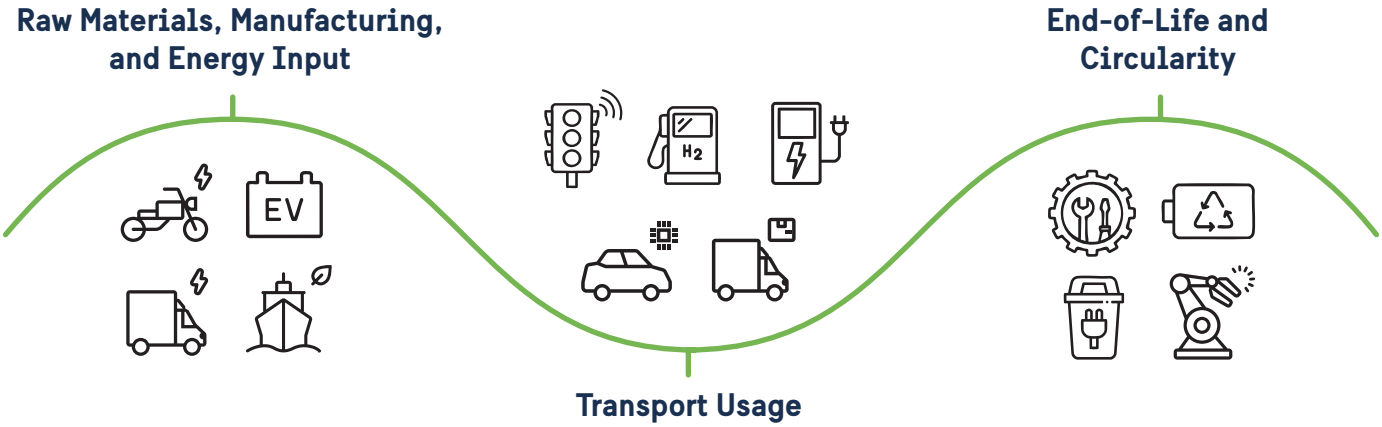
Relevant Transition Shifts for Sweden's Transitions



September 2025

SOLUTIONS TO BRIDGE THE IMPLEMENTATION GAP

The IPCC confirms that solutions to limit warming to 1.5°C exist but require urgent implementation. By applying a value chain perspective, Sweden, one of the world's most innovative and research-driven countries, is home to a wide range of organisations offering scalable transport solutions that reduce emissions while boosting energy security, equity, and sustainable growth. These address key challenges including fossil fuel dependence, infrastructure demands, growing mobility and freight, decarbonising aviation and shipping, and climate risks. Achieving the necessary 25% emissions cut by 2030, and 90% by 2050, requires overcoming these barriers with integrated, systemic action.



Raw Materials, Manufacturing, and Energy Input

Clean Energy and Low-Impact Materials

Swedish firms are advancing electric vehicle (EV) battery systems and hydrogen fuel cells that reduce reliance on critical raw materials and improve overall energy efficiency. These technologies support decarbonisation, enhance energy resilience, and strengthen supply chains. However, limited access to sustainably sourced minerals, high R&D costs, and complex permitting processes for new production facilities hinder broader deployment.

Fossil-Free Hydrogen and Waste-Based Biofuels

Swedish firms are scaling the production of hydrogen from fossil-free electricity, offering clean energy inputs for shipping, aviation, heavy industry, and freight. Waste-derived biofuels, from sources such as used oils and non-food crops like sorghum, provide alternatives in hard-to-electrify transport segments. These fuels contribute to emission reductions, rural development, and energy diversification. Yet, bottlenecks include insufficient market demand signals and competing policy incentives.

Green Vehicle and Infrastructure Manufacturing

Sweden is a hub for electric vehicle innovation, from passenger cars and e-bikes to freight trucks, ships, and aircraft powered by biofuels, hydrogen, e-fuels, and electricity. In shipping,

CASE STUDY

SCANIA

Scania deployed battery-electric trucks in Portugal to connect IKEA Industry's factory in Paços de Ferreira with the Port of Leixões and regional IKEA stores, addressing the challenge of decarbonising heavy-duty transport in a market with limited charging infrastructure. Using a "pick and drop" trailer system to avoid empty runs, the project improves uptime, lowers costs, and reduces emissions while enhancing local air quality. Collaboration was key: IKEA as freight owner, Scania as vehicle provider, KLOG as logistics operator, and the Port of Leixões as infrastructure partner. Careful route planning and coordinated charging secured operational feasibility, creating a scalable model for low-emission freight.

Read more

Photo: Scania

advances include hybrid engines, wind-assisted propulsion, and shore-side electricity, while Swedish firms are also developing sustainable aviation fuels (SAFs) and short-haul electric and hybrid aircraft. These solutions drastically cut emissions, improve air quality, and reduce exposure to fossil fuel price volatility. However, scale-up is constrained by supply chain bottlenecks, fragmented international standards, and high capital costs for fleet and infrastructure transitions.

CASE STUDY

TEAM SWEDEN

In 2025, Tanzania launched its first electric railway between Dar es Salaam and Dodoma, part of a 1,219 km network linking Dar es Salaam to Mwanza. The line halves travel time compared with road and cuts operational costs by two-thirds versus diesel, enhancing mobility, reducing emissions, and supporting economic activity across sectors. Team Sweden played a pivotal role, providing financing and export credit guarantees (SEK, EKN), capacity building through NIR grants from Sida, project development support via Swedfund, and coordination through Business Sweden. The project demonstrates how integrated technical and financial collaboration can deliver sustainable infrastructure that advances national development and climate goals.

Read more

Photo: Team Sweden

Transport Usage

Charging, Refuelling, and Infrastructure Readiness

The electrification of commercial and delivery fleets is advancing, particularly in high-traffic corridors. Investment is growing in Sweden for scalable charging infrastructure and refuelling systems, including battery-swapping stations and hydrogen refuelling hubs. These enable low-emission transport across passenger and freight networks, reduce fuel dependency, and support industrial competitiveness. However, infrastructure deployment is often hampered by planning delays, inconsistent coverage, and limited coordination between public and private actors.

Vehicle-to-Everything (V2X) and Energy Integration

Swedish-led V2X technologies allow EVs to interact with grids and infrastructure, enhancing resilience and flexibility during demand peaks or disruptions. These solutions strengthen energy security and contribute to grid stability. Yet, scaling remains challenged by interoperability issues, immature regulatory frameworks, and the absence of financial incentives for users to participate in flexibility markets.

Smart Mobility and Urban Efficiency

Swedish authorities are promoting integrated urban mobility plans that connect public transport, cycling, and walking to reduce congestion and emissions, while also strengthening climate resilience. By integrating these plans into long-term urban strategies, Swedish cities are creating cooler, permeable public spaces that reduce car dependency and enhance resilience to flooding and heatwaves. AI-enabled logistics and smart traffic systems further optimise passenger and freight flows, reduce exposure to air pollution, and improve adaptive capacity during extreme weather events. Nonetheless, uptake is slowed by institutional fragmentation, legacy transport models, and uneven public engagement in behavioural change.

Predictive Maintenance and Life-cycle Management

AI-powered maintenance tools developed in Sweden are helping reduce vehicle downtime, improve energy performance, and adapt systems to climate risks. These innovations lower operating costs and extend vehicle lifespans, contributing to both climate mitigation and economic efficiency. Still, high upfront software integration costs and limited digital capacity in smaller fleet operators restrict broader adoption.

End-of-Life and Circularity

Second-Life Battery Applications

Swedish firms repurpose end-of-life EV batteries for stationary energy storage, supporting energy access and circular energy systems. This approach reduces e-waste, enhances energy resilience, and improves resource efficiency. Key barriers include technical standardisation, safety assurance in reuse scenarios, and insufficient end-of-life collection infrastructure.

Materials Recovery and Traceability

Swedish companies lead in battery recycling and component traceability, reducing pressure on virgin material extraction. Digital tools track component life-cycles and support circular business models that reduce environmental harm and improve material security. Scaling these solutions is hindered by regulatory gaps, the complexity of reverse logistics, and underdeveloped markets for recycled materials.

ENABLERS TO FACILITATE MITIGATION AND ADAPTATION

Swedish companies, researchers, institutions offer a comprehensive set of tools to support global transport decarbonisation, grounded in financial innovation, policy expertise, scientific research, and capacity-building.

Financial Tools

Sweden's financial ecosystem supports the international uptake of low-emission transport solutions. Green Export Credit Guarantees from EKN and long-term loans from SEK enable investment in clean vehicles, infrastructure, and fuels. Sida provides climate finance and concessional funding for transport-related mitigation and adaptation, particularly in low- and middle-income countries.

Policy Expertise

Swedish institutions and companies offer advisory services to develop and replicate effective decarbonisation strategies. This includes support in building national transport roadmaps, designing policy, tax, and subsidy frameworks, and implementing governance structures that accelerate the shift to sustainable, accessible mobility.

Research and Innovation

With one of the highest R&D intensities globally, Sweden's universities and research institutions underpin progress in electrification, hydrogen, biofuels, and smart urban mobility. This scientific foundation helps ensure solutions are scalable, system-ready, and rooted in evidence.

Capacity Building

Through Sida, the Swedish Energy Agency, and other partners, Sweden supports institutional development, skills transfer, and climate governance in the transport sector. This strengthens local ownership, resilience, and long-term impact, with focus on inclusive and equitable transformation.

Photo: Simon Paulin / imagebank.sweden.se

ENABLING CONDITIONS REQUIRED TO MATCH THE URGENCY WITH SOLUTIONS

Transitioning the transport sector to a 1.5°C pathway is not only vital for meeting climate targets but also offers significant economic and social benefits. It can drive green job creation, boost innovation, and improve public health by reducing air pollution and congestion. Yet many countries face mounting pressure to decarbonise amidst rising demand, economic constraints, and geopolitical uncertainty. High infrastructure costs, policy gaps, and limited access to capital remain major barriers. Without robust planning and enabling conditions, the long-term investments needed to build low-emission, resilient transport systems are difficult to realise.

Call to Action

In response to these challenges, Sweden's non-negotiating delegation to COP30 calls for the following actions to drive urgent, inclusive progress on decarbonisation, adaptation, and sustainable development:

#1 Clear Decarbonisation Targets

Long-term roadmaps are essential for setting ambitious yet achievable goals aligned with the Paris Agreement. Swedish businesses can support countries in setting actionable decarbonisation targets.

#2 Incentives

Effective policies, including subsidies, tax incentives, and charging infrastructure development, are necessary accelerate the transition to electric vehicles and alternative fuels, including through reduction of the total cost of ownership (TCO).

#3 Public-Private Partnerships

Collaborations are critical to funding large-scale transport projects, such as electrified rail systems or urban mobility networks.

#4 Behavioural Change

Policies and campaigns promoting sustainable transport choices are key to shifting consumer and business behaviours towards cleaner alternatives.

04

Buildings

Buildings Snapshot

Swedish Journey, Commitments, and Existing Solutions

Solutions to Bridge the Implementation Gap

Enablers to Facilitate Mitigation and Adaptation

Call to Action

BUILDINGS SNAPSHOT

Global Context

The buildings sector is one of the largest sources of global carbon emissions. While energy intensity has slightly improved, emissions continue to rise due to a slow pace of change and growing floor area. To align with the 1.5 °C target, building emissions must fall by 40% by 2030, requiring deep cuts in both operational and embodied emissions. Yet fewer than 5% of new buildings meet net zero standards today[55], and investment in energy efficiency is well below what's required; in 2023, global investment fell by 7% to $270 billion, far below the $522 billion needed annually by 2030[56].

Transforming the sector is urgent and complex, yet decarbonising buildings can drive sustainable growth, improve health and energy security, and create green jobs. With the right policies, finance, and innovation, the transition to low-carbon, resilient buildings can support climate goals while boosting long-term competitiveness and well-being.

In numbers

In 2023, buildings accounted for

34% of global CO_2 emissions

32% of energy demand[57]

Emissions from the sector have grown by

0.7%

annually since 2015[58]

To align with the 1.5 °C pathway, building emissions must drop by

40%

by 2030[59]

Operational emissions need to fall by at least

45%

by 2030

By 2030, embodied emissions must drop by

25% for steel

20% for cement[60]

Energy intensity in buildings has declined by over

10%

since 2015, but floor area growth offsets progress[61]

By 2030, at least

30%

reduction in energy intensity is required[62]

> Find out about existing solutions for climate/buildings mitigation and adaptation

Key Challenges

- High energy use and slow efficiency gains
- Low investment in green buildings and retrofits
- Carbon-intensive materials like steel and cement
- Limited circularity and material reuse
- Ageing, inefficient building stock
- Costly and complex retrofitting
- Weak policies and poor code enforcement
- Gaps in national climate plans
- Skilled labour shortages and lack of training for green construction

Photo: Cecilia Larsson Lantz / imagebank.sweden.se

SWEDISH JOURNEY, COMMITMENTS, AND EXISTING SOLUTIONS WITHIN THE BUILDINGS SECTOR

Sweden's Road to Net Zero by 2045

Buildings are essential to Sweden's economy and quality of life, but the sector remains a major energy consumer and emissions source. It accounts for around 40% of national energy use and 20% of total greenhouse gas emissions from a life-cycle perspective.[63]

Swedish builders' approach to decarbonising buildings follows from a century of investment in clean, efficient energy systems. Nearly all electricity is fossil-free, and about half of all heating demand is met by district heating networks powered mainly by fossil-free and recovered heat.[64]

While emissions have fallen by 12% since 2008, faster action is needed to meet Sweden's climate goals[65], including a 50% emissions reduction by 2030 (from 2015 levels), 75% by 2040, and net zero by 2045[66].

In the buildings sector, Fossil-Free Sweden roadmaps for the Construction and Civil Engineering sector, Cement industry, Concrete industry, and Heating sector provide a collaborative framework for reducing emissions across the full value chain. These roadmaps focus on solutions like low-emission materials, energy-efficient construction, electrified heating, and resilient infrastructure.

Sweden welcomes global partnerships to accelerate this shift. Swedish companies, public institutions, and researchers are helping to scale sustainable construction and retrofitting solutions at home and abroad, aligning building decarbonisation with broader goals for competitiveness, energy security, and climate resilience.

While the current version of Panorama does not include a dedicated pathway for the building sector in its visualisation, key mitigation actions such as energy efficiency and low-emission materials are reflected in the Industry and Energy pathways. The updated Transition Element Framework (TEF) complements this by specifying the solutions, technologies, practices, and policy instruments needed across the sector. Sweden's NDC and NAP implementation builds on these insights, advancing value chain-wide strategies that integrate cross-border circularity, adaptive design, and resilient infrastructure. Selected examples are presented below.

Sweden welcomes global partnerships to accelerate this shift. Swedish companies, public institutions, and researchers are helping to scale sustainable construction and retrofitting solutions at home and abroad, aligning building decarbonisation with broader goals for competitiveness, energy security, and climate resilience.

Possible Transition Shifts

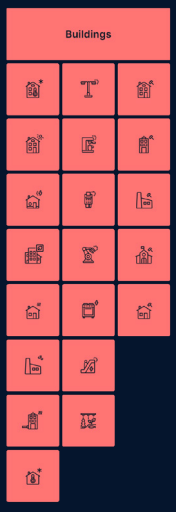
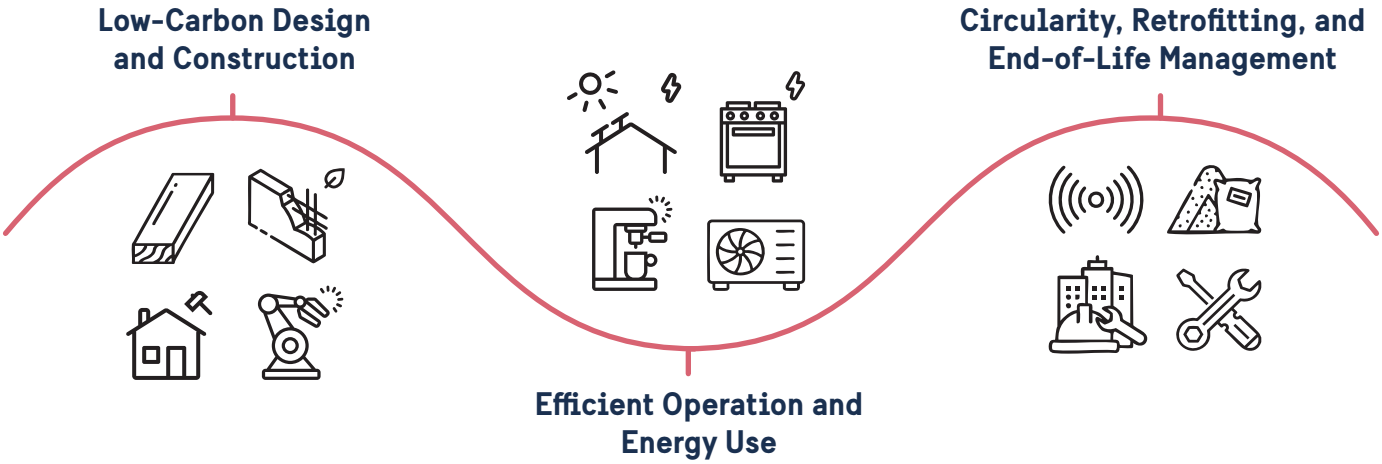


Photo: Werner Nystrand / imagebank.sweden.se

SOLUTIONS TO BRIDGE THE IMPLEMENTATION GAP

The IPCC confirms that solutions to limit global warming to 1.5°C are available but require urgent implementation. To align with this pathway, building emissions must fall 40% by 2030, including a 50% reduction in operational emissions, a 35% reduction in energy intensity, and cuts of 25% and 20% in embodied emissions for steel and cement respectively.[67] By applying a full value chain perspective, Sweden, home to leaders in innovative and sustainable design, offers scalable, circular, and low-carbon building solutions that cut emissions and boost resilience, directly addressing challenges such as high energy use, carbon-intensive materials, limited circularity, ageing inefficient stock, and shortages of skilled labour.



Low-Carbon Design and Construction

Circular Construction Materials and Low-Carbon Supply Chains

Swedish firms lead in circular construction by advancing recycled and low-carbon materials like eco-certified timber and low-carbon concrete, reducing embodied carbon and dependence on virgin resources while enhancing supply chain resilience and competitiveness. Flexible, modular, and prefabricated methods not only cut waste, emissions, and construction time, but also allow for faster delivery of high-quality social infrastructure, such as schools, care facilities, and housing. These solutions support sustainable urban growth, green reindustrialisation and infrastructure development, while meeting interim or emergency needs with low-footprint, reusable buildings. However, uptake is limited by inconsistent standards, scarce high-quality secondary materials, insufficient incentives for reuse, and workforce skill shortages in circular building techniques.

Clean Energy Infrastructure

Sweden's fossil-free electricity and integrated district heating networks, often utilising industrial waste heat and thermal storage, provide renewable energy for construction and retrofitting, reducing fossil fuel dependence and boosting climate resilience and energy security. Scaling these systems faces challenges from high capital costs, legacy system integration, and complex planning requirements across sectors and authorities.

Efficient Operation and Energy Use

Passive Design and Nature-Based Cooling

Swedish architecture incorporates passive design principles such as natural ventilation, thermal insulation, and strategic daylighting to reduce energy demand for heating and cooling while enhancing comfort. These approaches are complemented by nature-based urban cooling measures like green roofs, living facades, and biodiversity-rich greenery, which help mitigate the urban heat island effect, manage stormwater, and improve air quality. The three biggest constraints for scale-up are rigid building codes, higher upfront and maintenance costs, and limited integration between traditional engineering and ecological design approaches.

Integrated Renewable Heating and Cooling Systems

Sweden leads in deploying district-scale and decentralised renewable heating and cooling technologies, including geothermal energy, solar PV, and heat pump systems. These significantly reduce the operational emissions of buildings. Yet, despite their proven effectiveness, adoption is often hindered by fragmented regulations, limited support for decentralised generation, and complex integration with legacy systems and existing utility business models.

Smart Building Systems and Real-Time Energy Optimisation

Swedish-designed smart buildings equipped with AI-driven management systems can dynamically adjust energy use based on occupancy patterns, weather fluctuations, and electricity pricing. This allows for improved energy performance, reduced emissions, enhanced user comfort, and better alignment with grid demand, thereby supporting grid stability and cost-efficiency. However, these benefits are contingent on access to interoperable digital infrastructure, a skilled workforce for maintenance and management, and policies that support ongoing performance rather than just construction-phase compliance.

Circularity and End-of-Life

Monitoring and Predictive Maintenance for Long-Term Efficiency

Swedish innovators' smart monitoring systems enable predictive maintenance and operational optimisation, allowing buildings to maintain high performance over time. These technologies can identify inefficiencies before they become costly and support climate resilience by adapting to changing environmental conditions. However, their deployment is limited by low digital maturity, unclear return on investment in some sectors, and the absence of standard frameworks for ongoing performance evaluation. Additionally, the link between circular design and end-user or social resilience outcomes remains underdeveloped.

Retrofit Solutions for an Ageing Building Stock

Retrofitting existing buildings is vital for achieving near-term emissions reductions. Swedish companies offer high-efficiency heating and cooling upgrades, enhanced insulation, and advanced window technologies. These interventions extend building lifespans while slashing energy use. Modular, reusable structures can also serve as temporary solutions during deep renovations, maintaining service continuity while decarbonisation work is underway. Still, retrofit rates remain below targets due to split incentives between landlords and tenants, the complexity of working with historic buildings, and inadequate financial instruments to support deep renovations at scale.

Circular Design, Reuse, and Lifecycle Transparency

Swedish companies are at the forefront of enabling circular construction through modular design, material traceability, and disassembly-friendly architecture. Digital tools track material flows and support circular business models by enabling transparent lifecycle emissions accounting, which strengthens market confidence and compliance with sustainability standards. Modular and adaptable design increases building longevity, facilitates reuse across projects, and allows spaces to evolve with shifting needs, supporting resilience in the face of climate and social change. Despite their promise, these models face resistance due to the lack of data standards, fragmented value chains, and policy environments still geared toward linear consumption. Additionally, the link between circular design and end-user or social resilience outcomes remains underdeveloped, limiting the recognition of its full value.

Photo: Adapteo

CASE STUDY

AFRY

In 2025, AFRY partnered with Tornet to deliver the Tallbohov Electric Village pilot in Stockholm, combining AI-driven energy systems with a digital platform to reduce residential CO2 emissions. The project integrates hybrid solar panels, geothermal heat pumps, geoenergy storage, district heating, and electricity storage, optimised in real time to minimise greenhouse gas impact. The Torna app guides residents towards climate-smart choices, adapting recommendations on energy use, travel, waste handling, and laundry timing to individual lifestyle patterns. By linking AI-controlled systems with behavioural nudges, Tallbohov Electric Village demonstrates how digitalisation and sustainability expertise can make low-carbon urban housing practical, scalable, and aligned with the Paris Agreement and Agenda 2030.

Read more

Photo: AFRY

Photo: Adapteo

CASE STUDY

ADAPTEO

To support large-scale infrastructure projects, Adapteo delivers modular worker villages that scale with project timelines. One site expanded from 12 accommodation rigs in 2020 to 46 by 2024, now housing over 2,000 workers with canteens, offices, a gym, and landscaped areas. Another, built for a subsea transport link, grew from 300 to over 1,200 residents. Spread across 30,000 m^2, it includes 1,300 rooms, canteens, shops, and wellness facilities. Solar panels and heat pumps make it the country's largest certified low-energy site, halving grid electricity use. These villages offer a high-quality, low-emissions alternative to conventional worker housing. Modular design also enables reuse and expansion, cutting embodied emissions, and enhances worker well-being, while supporting faster, more sustainable project delivery. Once projects are finalised, the villages are removed, modules reused elsewhere, leaving no footprint behind on site.

Read more

ENABLERS TO FACILITATE MITIGATION AND ADAPTATION

Swedish companies, research institutes, agencies provide a full suite of tools to support the global transition to energy-efficient, low-carbon, and resilient buildings. This offer combines financial innovation, policy expertise, scientific research, and capacity-building aligned with international climate goals.

Financial Tools

Sweden's financial ecosystem supports the global shift to sustainable buildings. EKN's Green Export Credit Guarantees and SEK's long-term green loans de-risk investment in low-carbon construction, retrofits, and smart building technologies. Sida mobilises blended finance for energy-efficient and climate-resilient buildings in developing markets, expanding access to capital for NDC and NAP implementation.

Policy Expertise

Swedish institutions advise governments and cities on designing policy roadmaps for sustainable buildings. This includes developing building codes, carbon pricing mechanisms, incentives for fossil-free energy, and regulatory frameworks that promote retrofitting and circular construction. Experience from the Fossil-Free Sweden initiative helps inform sectoral decarbonisation advisory.

Research and Innovation

With strong public–private collaboration, R&D for low-emission construction, embodied carbon reduction, and climate-adaptive design have flourished in Sweden. Institutions such as SBUF, Vinnova, and Formas support the development and international scaling of innovative solutions for energy efficiency, fossil-free materials, and digital performance monitoring.

Capacity Building

Sida, the Swedish Energy Agency, and academic-industry partnerships strengthen global capacity for sustainable construction through workforce training, institutional development, and technical assistance for planning and implementation, helping countries build expertise for long-term transformation.

Photo: Felix Gerlach / imagebank.sweden.se

ENABLING CONDITIONS REQUIRED TO MATCH THE URGENCY WITH SOLUTIONS

Transitioning the building sector to a 1.5°C pathway is essential for achieving global climate goals and enhancing resilience to rising temperatures and extreme weather, and can generate jobs, reduce energy costs, and improve living standards. Yet many countries face substantial challenges in transforming their budlings sector, particularly amid rapid urbanisation, constrained budgets, and skills shortages. High retrofit costs, a lack of data, and limited policy frameworks continue to stall progress. Without clear strategies and enabling conditions, the long-term investment needed to decarbonise and climate-proof the buildings sector remains out of reach.

Call to Action

In response to these challenges, Sweden's non-negotiating delegation to COP30 calls for the following actions to drive urgent, inclusive progress on decarbonisation, adaptation, and sustainable development:

#1 National Roadmaps and Policy Reform

Embed building emissions targets in NDCs, introduce binding limits on embodied carbon, and support local governments to develop circular construction policies and retrofit strategies.

#2 Scaled Investment and Financial Incentives

Mobilise public and private capital for retrofitting, low-carbon materials, and energy-efficient technologies, with financial incentives tied to emissions performance.

#3 Innovation and Industrial Transition

Accelerate R&D in bio-based and carbon-negative materials, promote digital tools like AI and BIM, and support off-site construction for efficient, low-emission building delivery.

#4 Skills, Awareness, and Collaboration

Expand training and certification schemes, raise public awareness of sustainable building solutions, and foster partnerships between government, industry, and municipalities to share knowledge and scale solutions.

05

Agriculture & Food Systems

Agriculture Snapshot

Swedish Journey, Commitments, and Existing Solutions

Solutions to Bridge the Implementation Gap

Enablers to Facilitate Mitigation and Adaptation

Call to Action

AGRICULTURE SNAPSHOT

Global Context

Agriculture and food systems are crucial to ensuring food security and, as the largest global employer, providing economic and social inclusion. At the same time, they account for roughly one-third of global emissions[68], with impacts spanning the entire value chain, from deforestation and livestock farming to fertiliser use and transport. Without urgent transformation, the sector could contribute nearly 1°C of additional warming by 2100, jeopardising the 1.5°C target.[69]

Despite this, currently, less than 5% of climate finance is directed to agri-food systems. Only USD 16.3 billion of public funding flows into the sector each year, while an estimated USD 430–500 billion annually is needed to build secure, sustainable, and resilient food systems[70]. Funding that does exist often fails to reach micro-, small-, and medium-sized enterprises (MSMEs), even though smallholder farmers collectively produce more than one-third of the world's food. Structural inefficiencies further hinder progress, including heavy dependence on livestock, significant food loss and waste, and chronic underinvestment in the 'hidden middle' of value chains such as processing, storage, and distribution.

Effective agrifood systems transformation requires context-specific strategies that reflect the diversity of national conditions. The FAO's six-category typology, based on proxies for agricultural productivity[71], dietary diversity, supermarket density, and urbanisation, offers a structured lens to tailor mitigation and adaptation efforts, recognising the distinct characteristics, risks, and priorities of each system:

#1 Protracted Crisis

Defined by chronic instability, weak governance, and high food insecurity. These systems bear the highest hidden environmental and social costs relative to GDP. Resilience depends on adaptation finance and integrated humanitarian-development-peace approaches.

#2 Traditional

Marked by low productivity, limited infrastructure, and staple-heavy diets. High social and health costs call for rural transformation, better services, and investment in diverse, nutritious food production.

#3 Expanding

With modest productivity gains and rising urbanisation, these systems benefit from infrastructure upgrades, food loss reduction, and sustainable intensification to support ongoing transition.

#4 Diversifying

Showing dietary diversification and mid-level productivity. Rising health costs require integrated policies to promote healthy diets, regulate ultra-processed foods, and limit environmental impacts.

#5 Formalising

Featuring consolidated supply chains, strong institutions, and urban food environments. These systems can advance structural reforms in food governance, taxation, and waste management.

#6 Industrial

Highly productive, formalised, and logistics-intensive, with diets dominated by ultra-processed foods. While diet affordability is higher, global environmental and health costs are significant. Priorities include sustainable consumption, emissions reduction, and circular solutions.

For example, adaptation finance is particularly vital in protracted crisis and traditional systems, where rural and informal communities face acute climate vulnerability and limited institutional support. In contrast, formalising and industrial systems require structural shifts in consumption patterns, land use, and waste management to address their substantial environmental and health impacts. This typology ensures interventions are matched to each system's mitigation potential, risk exposure, and capacity for change, enabling more effective and equitable transformation.

Transforming food systems offers major mitigation and adaptation potential. A shift to circular, resilient value chains can reduce emissions, safeguard ecosystems, and enhance water and resource efficiency. Co-benefits of a just transition in the sector include improved food security, healthier diets, job creation, and greater resilience to climate shocks.

In numbers

1/3

of global greenhouse gas (GHG) emissions come from agriculture and food systems[72]

70%

of global freshwater is used by agriculture and food systems[73]

1°C

could be added to global temperatures by 2100 from the food system alone[74]

By 2030, emissions from the sector must be reduced by

25%[75]

By 2050, the sector needs to become a net carbon sink of

1.5 Gt CO_2e /year[76]

~1/3

of all food produced is lost or wasted[77]

<5%

of global climate finance is recieved by agrifood systems[78]

The share of global climate finance reaching smallholder farmers is only

20%[79]

Achieving food system transformation could yield benefits worth

$5-10T annually[80]

> Find out about existing solutions for climate/agriculture & food systems mitigation and adaptation

Key Challenges

- Insufficient finance and lack of investment
- Agricultural emissions and land use change
- Food loss, waste, and system inefficiency
- Low climate resilience
- High energy demand across the value chain
- Significant water use
- Inefficient livestock systems and rising meat consumption
- Food insecurity and malnutrition
- Neglect of the 'hidden middle' and weak value chain integration

Photo: Helena Wahlman / imagebank.sweden.se

SWEDISH JOURNEY, COMMITMENTS, AND EXISTING SOLUTIONS WITHIN THE AGRICULTURE AND FOOD SYSTEMS SECTOR

Sweden's Road to Net Zero by 2045

Sweden's food system is best classified as "modernising and formalising", with increasing features of "industrial and consolidated" systems. This gives it both mitigation responsibilities and adaptation lessons for other countries navigating similar transitions.

Agriculture and food systems are essential to Sweden's economy, rural livelihoods, and food security. In 2023, the agricultural sector caused 14% of national emissions, and while emissions have fallen 13% since 1990 due to more efficient farming and reduced livestock numbers, progress has stalled, with methane and nitrous oxide emissions proving difficult to reduce.[81]

Pathways to reduce emissions from this sector require a combination of circularity, resilience, and innovation across the food value chain. Key targets include:

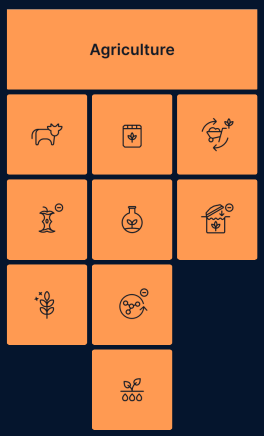
- 60% of public food procurement based on organic produce
- 30% of agricultural land under organic cultivation by 2030[82]
- 30% methane reduction from the agriculture sector by 2030[83]

Fossil Free Sweden's roadmaps for the Agricultural sector, Forest sector, and Food Retail sector, complement Panorama's suggested pathway. Developed jointly by industry and government, they outline strategies to reduce agricultural emissions, scale bio-based alternatives, enhance carbon sinks, and shift food system demand, among other critical solutions. These roadmaps illustrate how Sweden's climate objectives can be achieved through integrated value chain approaches that address both production and consumption, while maintaining competitiveness.

The Panorama platform highlights critical enablers for reducing emissions in agriculture, such as low-emission livestock systems and sustainable land use, tailored to Sweden's domestic context. The updated Transition Element Framework complements this by identifying the specific technologies, practices, and policy instruments required to deliver these shifts, mapped directly to IPCC mitigation options and adaptable across geographies and value chains. Building on this foundation, Sweden's NDC–NAP solutions extend the approach internationally, advancing cross-border, value chain-wide strategies alongside sector-specific measures for adaptation and circularity.

Sweden welcomes global collaboration to scale these solutions. Swedish companies, researchers, and institutions are already contributing to climate-resilient food systems worldwide, helping partners reduce emissions, adapt to climate impacts, and strengthen food and nutrition security.

Possible Transition Shifts



Relevant Transition Shifts for Sweden's Transitions

September 2025

SOLUTIONS TO BRIDGE THE IMPLEMENTATION GAP

The IPCC confirms that solutions to limit global warming to 1.5°C are available, but rapid implementation is essential. Emissions from the agriculture and food sector must be reduced by 25% by 2030 and become a net carbon sink of –1.5 Gt CO_2e per year by 2050[84]. Applying a value chain approach, Sweden, known for its innovation and research, is home to organisations delivering proven, scalable solutions that tackle agricultural emissions, food loss, value chain integration, excessive water use, and insufficient finance, while strengthening food security, rural livelihoods, and sustainable, resilient land use.

Agricultural Production and Land Management

Regenerative Agriculture

Swedish organisations are advancing regenerative agriculture to improve soil health, sequester carbon, and build long-term climate resilience. These practices reduce emissions from land degradation, decrease dependence on synthetic fertilisers, and enhance food system stability in the face of drought and other climate stressors. Regenerative techniques contribute to circular, climate-smart food systems by addressing waste, improving resource efficiency, and supporting ecological balance. Soil carbon enhancement and sustainable land management also strengthen rural economic stability and help smallholders adapt to shifting environmental conditions. However, challenges to scaling regenerative agriculture include fragmented land tenure systems, limited access to finance and technical training, and high upfront costs for implementation.

Agroforestry and Ecosystem Restoration

Agroforestry integrates trees with crops or livestock, enhancing yields, improving soil quality, and buffering farms against extreme weather. It also relieves pressure on natural forests and creates biodiversity corridors. Reforestation and native forest restoration contribute to erosion control, improved water cycles, and long-term carbon storage. These ecosystem-based approaches simultaneously support climate mitigation, biodiversity conservation, and local adaptation, particularly in vulnerable landscapes. Nonetheless, their wider uptake depends on consistent policy incentives, inclusive planning processes, and support for community-based land stewardship.

Precision Agriculture

Swedish innovations in precision agriculture harness AI, sensors, and data analytics to optimise inputs such as water, fertilisers, and pesticides. These technologies improve yields, reduce emissions from over-application, and enable farmers to anticipate and adapt to extreme weather or pest outbreaks. Precision systems enhance resilience by improving real-time decision-making, reducing input dependency, and increasing adaptive capacity in both high- and low-income settings. They also lower the energy footprint of farming operations and contribute to food system competitiveness by increasing efficiency. Constraints remain, including gaps in rural digital infrastructure, data accessibility, and affordability for smallholders.

Midstream Processing, Packaging, Storage, and Distribution ('Hidden Middle')

Processing and Manufacturing

Swedish companies enable climate-resilient, efficient food value chains through integrated processing solutions that lower energy and water use, reduce chemical inputs, and minimise production losses. Digitalised, modular, energy-efficient factories offer localisation and flexibility while cutting emissions. Circular technologies convert by-products into food, feed, or bio-based materials, and help prevent food losses, thereby enhancing resilience and resource efficiency. These innovations support food system decarbonisation and adaptation, particularly by improving system redundancy and reducing vulnerability to supply shocks. However, challenges to broader deployment include high capital costs, fragmented midstream operations, regulatory uncertainties, and difficulties integrating circular approaches into existing infrastructures.

CASE STUDY

TETRA PAK

Brazilian juice producer Tial cut steam consumption by 65% and water use by over 50% after adopting Tetra Pak's new aseptic blending line, which pasteurises only the concentrate rather than the full beverage. This innovative process, developed with Swedish expertise, not only reduces energy use, water demand, and product losses, but also improves blending accuracy and operational efficiency. Tial was the first in the world to implement the solution, which has enabled a 67% increase in production capacity and offers potential scalability to 37,000 litres per hour.

Read more

Photo: Tetra Pak

Distribution and Logistics

Swedish innovations in cold chain and logistics decarbonisation extend product shelf life, reduce spoilage, and cut supply chain emissions. Clean-powered refrigeration, aseptic packaging that eliminates the need for chilling, and renewable energy-based logistics systems contribute to food quality and inclusivity. Digital platforms enhance transparency and traceability, enabling more climate-smart supply chains and reducing loss along transport routes. These advances help ensure food availability during disruptions, building climate resilience. Yet, infrastructure gaps in developing regions, financing needs for clean logistics, and regulatory inconsistencies across markets continue to limit uptake.

Circular Consumption and Resource Recovery

Alternative Proteins

Swedish innovators are developing plant-based, fermentation-derived, and cultivated alternatives that can meet the nutritional needs of a growing global population while significantly reducing emissions, land use, and water demand compared to conventional livestock. These emerging protein sources contribute to climate mitigation and strengthen food system resilience by diversifying supply, lowering dependency on resource-intensive inputs, and reducing exposure to commodity volatility. With scalable potential, they play a critical role in ensuring future food security. However, broader adoption will require improved affordability, greater consumer familiarity, and consistent regulatory and policy support.

Use of Side Streams

Swedish companies are pioneering technologies that transform agricultural and food industry by-products and side streams into high-value nutrition inputs. These circular solutions cut emissions, reduce resource loss, and increase efficiency across the food system by keeping nutrients in use and reducing pressure on primary production. Public engagement, supportive policy, and clearer product standards are cultivating trust and increasing demand for these innovations. To scale, stronger market infrastructure, investment in processing capabilities, and consistent safety and quality regulations will be essential.

Circular Food Packaging

Swedish companies lead in developing circular food packaging – recyclable, biodegradable or compostable that cuts emissions, reduces marine and terrestrial pollution, and supports circular economy goals. These solutions also extend shelf life and reduce spoilage, thereby lowering food loss and creating demand for lower carbon products. Such packaging innovations align environmental protection with improved system resilience and competitiveness, particularly by reducing

dependency on fossil-based plastics. However, uptake may be limited by higher production costs, inconsistent standards, and underdeveloped recycling infrastructure, especially in low- and middle-income markets.

Water Systems

Swedish technologies in precision irrigation, wastewater recovery, and low-energy desalination reduce freshwater use, cut emissions, and bolster agricultural productivity. Circular water systems improve soil health, decrease pollution, and ensure water availability in drought-prone areas, significantly enhancing adaptation and climate resilience. These innovations reduce reliance on imported virtual water and support local water sovereignty in stressed ecosystems. Nevertheless, barriers include high capital costs, a lack of integrated water governance, and challenges adapting these technologies to diverse agricultural contexts.

CASE STUDY

RAGN-SELLS

Ragn-Sells, through its innovation company EasyMining, is deploying the patented Ash2™Phos technology in Schkopau, Germany, and Helsingborg, Sweden, to recover over 90% of phosphorus from sewage sludge ash. Each plant cuts 20,000 tonnes of CO_2e annually while producing cleaner fertiliser than mined alternatives.

Complementing this, EasyMining's Aqua2™N process recovers up to 30% of nitrogen from wastewater, reducing pollution and supplying agriculture with circular nutrients. By transforming wastewater treatment plants into resource recovery hubs, the projects strengthen local food security, reduce reliance on imported fertilisers, and showcase leadership in circular economy solutions.

Read more

Photo: Ragn-Sells

Photo: Jerker Andersson / imagebank.sweden.se

ENABLERS TO FACILITATE MITIGATION AND ADAPTATION

Sweden's agricultural and food sectors benefit from a broad range of expertise, tools, and innovations designed to accelerate global decarbonisation and climate resilience. Swedish companies, researchers, and NGOs provide comprehensive support worldwide, spanning finance, policy, research, and capacity building to develop sustainable, low-carbon food systems.

Financial Tools

Sweden is home to a range of financial solutions to unlock investment in sustainable agriculture and food systems. These include risk-reducing tools like guarantees and insurance, as well as long-term green loans and concessional funding for renewable energy, climate-resilient crops, and efficient irrigation systems. Climate finance from Sida and Swedfund supports smallholder farmers and SMEs, and strengthens food security in developing countries. In addition, Swedish advisory services help governments and partners design green finance models that promote sustainable land use and low-emission farming.

Policy Expertise

Swedish organisations also support policy development to accelerate agricultural and food system decarbonisation and resilience. Their expertise contributes to regulations on sustainable sourcing, food waste reduction, improved processing, circular packaging, and incentives for adopting renewable energy and low-carbon practices across the sector. Swedish businesses provide guidance on soil restoration and pollution reduction, while promoting agroecological and organic farming policies that enhance biodiversity and help farmers transition to more sustainable methods.

Research and Innovation

Sweden's leading research institutions and universities drive innovations in regenerative agriculture, smart farming, water-efficient technologies, and sustainable food processing and packaging. This scientific foundation ensures that solutions are evidence-based, scalable, and adaptable to diverse contexts.

Capacity Building

Organisations like Sida, the Swedish Energy Agency, and other bodies, support skills development, institutional strengthening, and climate governance. This builds local ownership, resilience, and inclusive transformation within the agricultural sector, particularly in vulnerable regions.

Photo: Karl Melander / imagebank.sweden.se

ENABLING CONDITIONS REQUIRED TO MATCH THE URGENCY WITH SOLUTIONS

Transitioning agricultural and food systems to a 1.5°C pathway is vital for meeting climate goals while boosting economic growth, green jobs, and public health. Yet many countries face challenges such as rising food demand, limited finance, and policy gaps. High infrastructure costs and weak enabling frameworks hinder the long-term investments needed for low-emission, resilient food systems, which are important not only for emission-reduction and prevention, but also as a driver of economic and social inclusion.

Call to Action

In response to these challenges, Sweden's non-negotiating delegation to COP30 calls for the following actions to drive urgent, inclusive, systems-wide progress on decarbonisation, adaptation, and sustainable development:

#1 Innovation and Technology

Invest across the entire food system, including the often-overlooked 'hidden middle', by prioritising solutions such as precision agriculture, low-emission livestock, alternative proteins, and renewable energy integration.

Support cleaner processing, packaging, logistics, and circular manufacturing, with a strong focus on reducing food loss and waste throughout the value chain to cut emissions, enhance resource efficiency, and improve food security.

#2 Finance and Inclusion

Raise climate finance for food systems and ensure it reaches the entire value chain.

Use green finance, concessional funding, and risk-sharing tools to back solutions that cut emissions, reduce waste, and build resilience, especially for SMEs and farmers.

Improve design of- and access to existent grants, subsidies and incentives for farmers and SMEs in agrifood value chains.

Phasing out and repurpose harmful subsidies and barriers that hinder innovation and proven solutions.

#3 Policy and Regulation

Recognizing agrifood systems as a pillar of global resilience, side by side with e.g., energy and water security.

Embed food systems transformation in NDCs through carbon pricing, targeted farm incentives, and binding food loss and waste targets.

Harmonizing sustainability metrics to enable cross-border collaboration, ensure fair competition, and foster innovation across agrifood systems.

Ensure policy coherence by aligning national food, climate, and economic strategies, and fostering coordination across ministries.

Enable SME- and farmer-led action through supportive regulatory frameworks and access to finance.

Secure that policies support solutions based on their real-world impact – efficiency, resilience, and sustainability.

Create innovation-enabling regulatory pathways that allow for scaling proven (new) technologies.

Reforming waste and environmental regulations to recognize waste as a resource and enable circular models.

#4 Collaboration and Capacity Building

Strengthen cross-sector partnerships to scale sustainable solutions. Promote joint innovation, digital tools, and training to support inclusive transitions, sustainable diets, and reduced food waste.

Putting farmers and MSMEs at the center in agrifood systems policies and decision-making, securing a just transition.

Focusing on food and nutrition security, underpinning solutions for all, rooted in accessibility and affordability.

Photo: Per Pixel Petersson / imagebank.sweden.se

06

Waste

Waste Snapshot

Swedish Journey, Commitments, and Existing Solutions

Solutions to Bridge the Implementation Gap

Enablers to Facilitate Mitigation and Adaptation

Call to Action

WASTE SNAPSHOT

Global Context

The waste sector alone contributes about 3% of global greenhouse gas emissions, with landfills producing around 20% of methane emissions, a gas over 80 times more effective at trapping heat in the atmosphere than CO_2, over 20 years[85]. Landfills also risk polluting water through leachate, especially where waste management is weak. Rising consumption means waste generation continues to grow, increasing environmental strain.

Circularity is essential to reducing emissions and resource use across all major polluting sectors. It improves efficiency and product durability, encourages reuse, and turns what would otherwise be waste into valuable resources. Applying circular principles throughout a product's life cycle, from design and use to lifetime and end-of-life, cuts demand for virgin materials and lowers emissions across value chains, particularly within the waste sector. Scaling circular solutions also delivers co-benefits such as reduced pollution, better public health, and increased climate resilience.

In numbers

~3%

of global greenhouse gas (GHG) emissions come from the waste sector[86]

~20%

of methane emissions from human activity come from landfills[87]

34%

of global waste is produced by high-income countries (**16%** of global population)[88]

x3

growth in waste generation is projected for low-income countries by 2050[89]

Only 9%

of all plastic waste has ever been recycled[90]

6.9%

of the **106 bn tonnes** of materials used annually by the global economy come from recycled sources, a **2.2%** point drop since 2015[91]

> Find out about existing solutions for climate/waste mitigation and adaptation

Key Challenges

- Limited investment and public awareness
- Inadequate infrastructure for reuse, refurbishment, and recycling
- Barriers to effective recycling: contamination, poor market demand, low participation
- Limited focus on circular design and material choices
- Resource inefficiency across product and value chains
- Methane emissions and leachate pollution from landfills
- Weak and inconsistent policy frameworks
- Trade-offs with waste-to-energy solutions
- Exposure of waste systems to climate risks

SWEDISH JOURNEY, COMMITMENTS, AND EXISTING SOLUTIONS WITHIN THE WASTE SECTOR

Sweden's Road to Net Zero by 2045

The waste sector accounted for around 2% of Sweden's total greenhouse gas emissions in 2023. Since 2010, emissions have fallen by 56%, and by 77% compared to 1990[92], driven by improved methane recovery from landfills, reduced organic waste disposal, and investments in recycling and waste-to-energy.

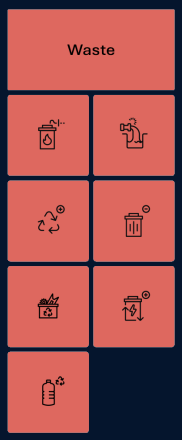
Fossil Free Sweden's roadmaps for the Recycling sector and the Fast moving consumer goods industry, co-developed by government and industry, are central to advancing Sweden's circular economy. They identify solutions for increasing material recovery, reducing landfill, and enabling industrial symbiosis, in line with Panorama's circularity pathways. By embedding circular flows into industry and construction, the roadmaps support national climate targets while maintaining and building competitiveness across multiple sectors.

Panorama visualises ongoing and potential mitigation solutions for waste, together with domestic policy instruments and initiatives that support the transition. The updated Transition Element Framework (TEF) complements this by specifying the technologies, practices, and policy tools needed to deliver these shifts, each mapped to IPCC mitigation options and adaptable across geographies and value chains. Sweden's NDC-NAP solutions build on this foundation by advancing international approaches that prioritise waste prevention, reuse, and high-value recycling, strengthening both environmental and economic resilience.

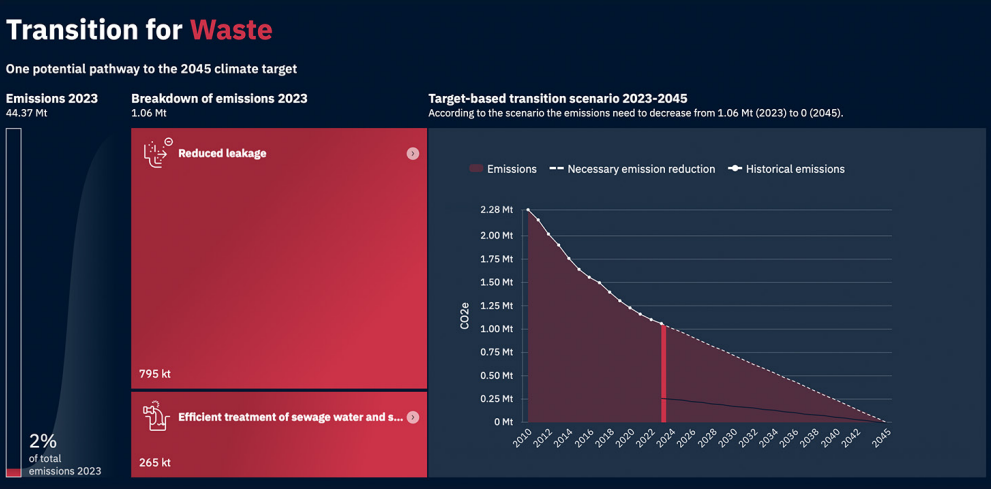
Reducing dependence on incineration is a key goal, alongside promoting circular business models such as product-as-a-service, take-back schemes, and materials platforms to maximise resource efficiency throughout the value chain.

These efforts are supported by strong policy frameworks and economic incentives aimed at sustainable waste management and long-term emission reductions. Swedish firms aim to share proven circular solutions internationally, strengthening collaboration to accelerate the transition to a low-waste, resource-efficient future.

Possible Transition Shifts



Relevant Transition Shifts for Sweden's Transitions



September 2025

SOLUTIONS TO BRIDGE THE IMPLEMENTATION GAP

The IPCC confirms that solutions to limit warming to 1.5°C are already available, though need urgent implementation. Through a value chain approach, Sweden, recognised for its innovation and research excellence, hosts a broad spectrum of organisations delivering proven, scalable circularity and waste management solutions to reduce emissions and promote resource efficiency. These efforts directly address key challenges such as limited investment and public awareness, inadequate waste collection and recycling infrastructure, methane emissions and leachate pollution from landfills, trade-offs with waste-to-energy, and the vulnerability of waste systems to climate risks.

Circular Design and Sustainable Materials

Circular Business Models

Swedish companies are creating and embedding circularity throughout product life cycles, including product-as-a-service models, industrial symbiosis, and secondary material marketplaces. Digital tools such as life-cycle assessments and supply chain audits enable better integration across value chains, enhancing resource efficiency and climate resilience, and reducing pressure on waste systems. These models help reduce costs, support sustainable consumption, and enhance competitiveness by retaining economic value within supply chains.

By reducing material demand and increasing resource reuse, circular models also support climate adaptation through improved material security and localised value chains. However, these models are often constrained by a lack of regulatory incentives, limited access to financing, and market volatility for recycled goods. Sweden's leadership in digital platforms and cross-sector collaboration helps overcome these barriers, supporting the development of stable, high-quality secondary material markets.

Sustainable Materials and Ecodesign

Eco-design initiatives led by Swedish organisations support the development of more durable, repairable, and recyclable products, in line with EU regulations such as the Ecodesign for

CASE STUDY

ADAPTEO

To meet urgent interim space needs in a fast-growing municipality, Adapteo redeployed modular buildings from previous projects, avoiding new construction. The units were refurbished and customised on-site, enabling rapid delivery of classrooms and community facilities. This circular approach reduced waste and emissions, with life cycle assessments showing up to 96% lower embodied CO_2 compared to new builds. In 2024, 61% of Adapteo's deployments used reused modules, with 1/4 million end users benefiting from reduced disruption, and public services continuing without delay or loss of quality.

Read more

Photo: Adapteo

Sustainable Products Regulation (ESPR). Innovations include bio-based and compostable materials, chemical recycling, and microplastic capture technologies that help reduce pollution.

These approaches reduce pollution, improve product lifespan, and help businesses align with regulatory and consumer trends towards sustainability, enhancing market access and long-term growth. However, scaling these efforts is hindered by high R&D costs, limited infrastructure for advanced recycling, and slowing growth in market demand for eco-labelled products. Sweden's expertise in creating supportive standards, policies, and industry collaborations helps address these bottlenecks.

Waste Sorting, Processing, and Material Recovery

Recycling and Material Recovery

Swedish firms operate advanced sorting and urban mining systems that recover high-value materials from residual waste, using technologies such as near-infrared scanning. These systems reduce incineration, increase reuse, and cut emissions from virgin resource extraction. They also enhance resilience by localising material supply and lowering exposure to resource shocks, while creating new value chains. Key barriers include inconsistent standards, high operational costs, and infrastructure gaps in underserved regions.

Wastewater and Water Management

Swedish solutions for water management include advanced purification systems, safe water reuse, and climate-adaptive drainage infrastructure that reduces flood risk and environmental discharge. These integrated systems build urban and industrial resilience to climate extremes, safeguard sanitation infrastructure, and reduce long-term costs. Adoption is held back by high capital costs, weak enforcement, and limited coordination between water and waste sectors.

Energy Recovery and Nutrient Cycling

Waste-to-Energy and Landfill Gas Recovery

Swedish waste-to-energy (WTE) systems convert non-recyclable waste into electricity and district heating, with the incorporation of carbon capture set to drastically reduce emissions. Landfill methane is recovered for biogas, and biochar from organic waste sequesters carbon and improves soil health. These technologies reduce emissions, increase energy resilience, and ease pressure on landfills, though trade-offs remain. Social resistance, feedstock competition, and immature markets for biogenic CO_2 and biochar remain obstacles.

Organic Waste Treatment and Biogas Production

Swedish firms transform organic waste into biogas for power, heating, and low-carbon transport, while also recovering nutrients to produce natural fertilisers and reduce reliance on synthetic inputs. These systems cut methane emissions, strengthen agricultural resilience through improved soil health, and support energy diversification and economic growth. Key barriers include underdeveloped biogas markets, limited collection infrastructure, and weak incentives for nutrient recovery.

ENABLERS TO FACILITATE MITIGATION AND ADAPTATION

Swedish companies, researchers, institutions and NGOs offer a comprehensive set of tools to support global circular economy transitions and waste sector decarbonisation. These tools are grounded in financial innovation, regulatory expertise, cutting-edge research, and capacity-building.

Financial Tools

Sweden's green finance ecosystem supports investment in circular economy and waste solutions. EKN's export guarantees and SEK's green loans reduce risk and enable innovative projects and infrastructure. Sida mobilises blended finance for waste and circular innovation in emerging markets. Vinnova and the Swedish Energy Agency fund business models and technologies that cut emissions, reduce waste, and improve material recovery, addressing funding barriers and infrastructure gaps.

Policy Expertise

Sweden's policies have halved its waste emissions since 2010. Swedish organisations' expertise in landfill bans, carbon pricing, and Extended Producer Responsibility helps other nations build regulatory frameworks that reduce landfill, promote recycling, and drive circular design. Swedish firms support policy development that aligns with NDCs, attracts investment, and integrates climate risk.

Research and Innovation

The Swedish economy's strong R&D investment is a cornerstone of its circular economy transition, enabling advances in product design, material reuse, and system-wide circularity. Programmes like RE:Source and close collaboration between academia and industry ensure innovations are practical, scalable, and aligned with circular principles. These efforts innovate to tackle key barriers such as inefficient recycling, contamination, and limited infrastructure for high-value secondary resource use, while also supporting waste management solutions that reduce environmental impact.

Capacity Building

Sida, the Swedish Energy Agency, and research partnerships support the development of institutional frameworks that prioritise circular economy strategies. This includes technical training, governance reform, and integration of climate risk into national circular economy planning. By strengthening local capacity to design inclusive, resource-efficient systems, Swedish partners help countries move beyond traditional waste management towards models that reduce emissions, improve resilience, and deliver long-term social and environmental value.

CASE STUDY

SIDA

In Sevan, Armenia, this initiative promotes 'polluter pays' principles and addresses key waste management problems like poor local sorting capacity and limited public awareness. By introducing source-separated waste collection, the project seeks to reduce landfill use and recover recyclables. It also supports better national waste policy and conditions for biogas production.

The project has had a significant impact environmentally, economically, and socially. It promotes responsible waste habits, reduces landfill waste, and builds the market for recyclables through a €300,000 investment in infrastructure (1,680 sorting bins and a collection vehicle). The initiative also supports national EPR policy development, empowers the CSO sector, and raises public awareness. Additionally, it has helped local stakeholders draft a roadmap for biogas production.

The project's success builds on strong institutional cooperation between the AUA Acopian Centre for the Environment, Sevan Municipality, ministries, private sector, CSOs, and media. Key components includes a (simple) two-stream waste-sorting system, technical capacity building, and public and private engagement. The Swedish Waste Management Association also (served as a project advisor) provided advisory services. The Sweden-funded Waste Policy Armenia (WPA) program enabled the equipment procurement, technical guidance, and outreach support essential to the project's launch.

Read more

Photo: Sida

ENABLING CONDITIONS REQUIRED TO MATCH THE URGENCY WITH SOLUTIONS

Transitioning to circular economies and 1.5°C pathway waste systems are critical to meeting climate and development goals. They can reduce emissions, limit resource extraction, generate green jobs, and improve resilience to climate impacts. Yet many countries face persistent barriers, from weak infrastructure and limited recycling markets to policy gaps and high investment costs. In low- and middle-income contexts, reliance on informal waste systems further complicates the shift. Without coordinated action and enabling conditions, the transition to circularity will remain slow and fragmented.

Call to Action

In response to these challenges, Sweden's non-negotiating delegation to COP30 calls for the following actions to drive urgent, inclusive progress on decarbonisation, adaptation, and sustainable development:

#1 Finance Circular Transitions

Direct climate and development finance towards entire value chains, including recycling, logistics, and secondary material markets, with specific support for circular SMEs and infrastructure in low- and middle-income countries.

#2 Strengthen Policy and Accountability

Implement Extended Producer Responsibility and tax incentives that promote repair, reuse, and recycling, and align waste policy with national climate mitigation and adaptation plans.

#3 Scale Innovation for Impact

Prioritise near-term deployment of waste-to-energy and sorting technologies, while investing in long-term circular design, reuse-based business models, and scalable technologies with both mitigation and adaptation benefits.

#4 Promote Behavioural Change and Collaboration

Invest in education and public engagement to promote circular practices, and strengthen partnerships across governments, businesses, and communities to build closed-loop systems and reduce dependence on virgin materials.

07

Enablers

Enablers Snapshot

Solutions to Bridge the Implementation Gap

Call to Action

ENABLERS SNAPSHOT

Global Context

Enablers, such as climate finance institutions, technology providers, policy advisors, training bodies, and cross-sector networks, play a critical role in accelerating global progress on climate mitigation, adaptation, and loss and damage. While individual sectors drive emissions reductions, enablers provide the systemic support needed to scale impact, from unlocking capital and transferring technology to building institutional capacity and aligning governance.

Yet the enabling ecosystem is under significant strain. Climate finance remains far below what is required, with just USD 632 billion annually mobilised compared to the UDS 100–300 trillion needed by 2050[93]. Access to advanced technologies such as AI, blockchain, and IoT is uneven, with many governments and businesses lacking the tools to implement efficient, low-carbon solutions. Regulatory frameworks are complex and evolving, creating confusion rather than clarity. Meanwhile, low climate literacy and capacity gaps among decision-makers hamper the uptake of effective strategies. Fragmented collaboration further limits knowledge exchange and slows coordinated action.

Despite these challenges, the work of enablers offers strategic and impactful ways to deliver climate ambition at scale. They support inclusive development, enhances institutional resilience, and lays the foundation for long-term systemic change.

In numbers

Global climate finance stands at

$632 bn /year

...far below the

$100-300 tn

needed by 2050 to meet the 1.5°C target[94]

COP29 set a new climate finance goal of at least

$300 bn/year

from developed countries by 2035[95]

To stay on track investments must

increase five-fold

(by 2030)

increase six-fold[96]

(by 2050)

Europe alone requires over

$700 bn/year

for its green transition[97]

> Find out about existing solutions for climate/enablers mitigation and adaptation

Key Challenges

- Insufficient and uneven access to climate finance
- Limited access to advanced technologies
- Complex and evolving regulations
- Low climate literacy and capacity gaps
- Fragmented cross-sector collaboration

Sweden's Road to Net Zero by 2045

Swedish firms offer cutting-edge climate tech, data transparency tools, and circular economy solutions. This has aided in its ability to increase climate financing from SEK 3.2 billion in 2015 to SEK 9.4 billion in 2023[98], making it a significant per capita contributor to global climate finance, as well as a hotbed for climate technology solutions provision worldwide.

SOLUTIONS TO BRIDGE THE IMPLEMENTATION GAP WITHIN ENABLERS

Global solutions to limit warming to 1.5°C already exist, but their impact depends on overcoming barriers such as insufficient and uneven access to climate finance, limited availability of advanced technologies, complex and evolving regulations, low climate literacy and capacity gaps, and fragmented cross-sector collaboration. Addressing these challenges is essential to unlocking the full potential of the green transition and facilitate climate adaptation.

Innovation – Solutions Empowering Transparency and Climate Action

Swedish climate tech innovations address limited access to advanced tools by enhancing transparency, monitoring, and climate literacy. By improving access to comparable data and enabling effective emissions tracking, these solutions empower global stakeholders to act on mitigation and adaptation. They also enhance competitiveness by enabling compliance with emerging regulations and positioning businesses for green growth. However, limited digital infrastructure in many regions, data ownership concerns, and uneven policy alignment continue to restrict scale and impact.

Digital Climate Accounting and Supply Chain Transparency

Platforms like **Normative** enable businesses to measure and reduce emissions across value chains, overcoming data gaps and supporting compliance with international policies. **TrusTrace** enhances supply chain transparency, reducing environmental and social risks, while helping unlock climate finance by demonstrating credible emissions reductions. These tools support companies in entering regulated markets, reduce reputational risks, and help secure long-term investment, boosting job creation in sustainability services and digital infrastructure.

Emissions Tracking and City Decarbonisation

ClimateView's software helps cities visualise emissions and track decarbonisation pathways, addressing urban governance capacity gaps and aligning with NDCs and NAPs.

Startup Innovation Ecosystem

The **Swedish Climate Startup Map** connects over 540 climate-focused companies with investors and expertise, scaling access to innovative solutions. This ecosystem accelerates commercialisation, drives export potential, and creates skilled employment in emerging sectors.

CASE STUDY

CLIMATEVIEW

ClimateView developed Panorama, Sweden's national transition dashboard, co-created with leading agencies to translate IPCC science into actionable pathways for achieving net zero by 2045. The platform tracks emissions, monitors progress, and identifies gaps across all sectors, providing a transparent, science-based foundation for climate strategy.

Building on this success, ClimateView has expanded globally, supporting more than 80 cities and regions, including the Ruhr region in Germany, Scotland, and ICLEI USA's network of 500 sub-national governments. By operationalising transition logic at scale, ClimateView enables governments to design fundable strategies, prioritise interventions, and accelerate systemic transformation.

Read more

Research and Capacity Building

Sweden's economy invests 3% of GDP in research, linking academia, industry, government, and society to close knowledge gaps and drive climate science innovation through institutions like Stockholm Resilience Centre, SEI, IVL, Chalmers, Lund University, and Abisko Station.[99] This robust research base strengthens national competitiveness, supports spin-offs, and creates highly skilled jobs in climate R&D.

Consumer Climate Literacy and Behavioural Change

Doconomy provides banks with financial tools that enable individuals to track and reduce their carbon footprints while enhancing financial well-being through goal-based savings. By increasing awareness of the environmental impact of spending, these tools promote informed decisions and sustainable lifestyles. Wider adoption can accelerate behavioural change, drive green finance innovation, and influence market trends towards a just and effective climate transition.

Finance – Solutions Driving Investment and Funding

Swedish financial institutions address the critical challenge of insufficient climate financing by providing innovative funding mechanisms that scale mitigation, adaptation, and circular economy solutions. These mechanisms improve investor confidence, stimulate private sector growth, and open new markets, supporting job creation across sectors. However, risks around regulatory uncertainty, market fragmentation, and insufficient bankable projects continue to limit the pace and geographic spread of investment.

Green Export Credit Guarantees

EKN provides up to 100% risk coverage for projects aligned with the EU Taxonomy, facilitating finance for fossil-free energy and low-carbon manufacturing. Its top-rated ("AAA") guarantees enhance the competitiveness of financing offers when Swedish suppliers are involved.

Long-Term Climate Finance

SEK offers Green Loans with some of the world's most favourable terms to support industrial decarbonisation projects, including hydrogen infrastructure and energy efficiency. These investments bolster industrial competitiveness and safeguard jobs in heavy industry and infrastructure.

Sustainable Finance Innovation

Vinnova funds R&D initiatives like the Sustainable Finance Lab, bridging research and practical green investment.

Grants and Blended Finance for Emerging Economies

Sida provides grants that act as catalytic seed funding and issues guarantees to encourage banks and other investors to invest in small businesses. Sida and **Swedfund** use blended finance and risk-sharing instruments to mobilise private capital for sustainable infrastructure and climate resilience in developing countries, reducing investment risk and attracting global finance.

Scaling Climate Start-ups and SMEs

Almi and **Tillväxtverket** provide funding and support to help climate-focused businesses commercialise and expand globally. This support stimulates entrepreneurial growth, strengthens the green economy, and creates resilient jobs in SMEs.

These mechanisms also help businesses navigate complex regulations, aligning investments with climate policies and reducing market risks.

CASE STUDY

SIDA

With the Green Financing Facility (GFF), UNHCR is cutting emissions by 50–1,000 tonnes CO_2 per site annually. The initiative results in up to 60% more efficient use of humanitarian aid money. The model mobilises private investment, strengthens local energy markets and improves livelihoods in host communities. UNHCR leads international action to protect people forced to flee from violence and conflict estimated to 123 million people worldwide (by the end 2024). Many UNHCR offices are located in fragile and conflict-affected contexts with unreliable power supply, forcing dependence on expensive and polluting diesel generators. The UNHCR budget structure makes it challenging to enter into long-term agreements with the private sector or to pay for high up-front capital expenditures. The Green Financing Facility addresses these challenges by offering scalable, long-term solutions. Swedish development aid has been instrumental for establishing the UNHCR Green Financing Facility. In 2019, Sida provided USD 4 million in catalytic seed funding, enabling UNHCR to develop the financial model and attract significant co-funding—including USD 23.7 million from IKEA Foundation. Sweden's contribution also supported the development of procurement templates that help private companies operate in fragile contexts. Sida initiated the Facility and helped catalyse additional donor and private investments.

Read more

Policy – Solutions Simplifying Regulatory Complexity and Collaboration

Sweden's policy frameworks and expertise address challenges such as regulatory complexity, low climate literacy, fragmented collaboration, and limited technology access to support effective climate governance. They also enhance business competitiveness by reducing compliance burdens, aligning markets, and de-risking innovation. However, misaligned incentives, political inertia, and technological uncertainty can slow the pace of policy-driven change, both domestically and globally. Developed jointly by industry and government, Fossil Free Sweden's roadmaps act as enablers across the economy, as detailed across this report, but also within the Digitalisation consultancy industry specifically, highlighting how digitalisation, consumer behaviour, and service innovation can accelerate the pace of transition. Guidance on adopting AI, blockchain, and IoT policies further support efficient resource use and accelerated decarbonisation. This enables innovation at scale, creating new markets and employment in digital transformation.

Climate Advisory

Sweden is home to a broad network of experts, including consulting firms, research institutions, and public agencies, that support governments and industries in developing systemic mitigation and adaptation strategies. These actors help align investments with climate goals, improve regulatory compliance, and generate high-quality jobs across policy, engineering, and advisory services.

Climate Policy Council

This independent body evaluates whether policies meet Sweden's climate goals, enhancing cross-sector capacity and climate literacy through data-driven insights. This strengthens institutional accountability and enables clearer signals for private sector investment and workforce planning.

Regulatory Frameworks for Green Investment

Swedish expertise supports the creation of carbon pricing, finance regulations, and climate risk disclosure, driving investment while helping businesses manage compliance.

International Policy Coordination

Swedish parties promote harmonised carbon policies and pricing to prevent carbon leakage and ensure fair competition globally. Policy alignment helps even playing fields, opens export markets, and supports cross-border job creation.

Fossil Free Sweden

Fossil Free Sweden is a government-led initiative launched in 2015 to support Sweden's goal of becoming the world's first fossil-free welfare nation. Co-developed with strong backing from Swedish industry, it has produced 23 sector-specific roadmaps to phase out fossil fuels while driving innovation and competitiveness.

ENABLING CONDITIONS REQUIRED TO MATCH THE URGENCY WITH SOLUTIONS

Accelerating the deployment of climate enablers is essential to meet climate goals and unlock broader economic and social benefits. These include driving innovation, creating green jobs, and strengthening resilience across all sectors and value chains. However, many countries face significant challenges including insufficient investment, fragmented policies, regulatory complexity, and limited collaboration. Without clear incentives, stable frameworks, and coordinated efforts, scaling up climate enablers remains difficult.

Call to Action

In response to these challenges, Sweden's non-negotiating delegation to COP30 calls for the following actions to drive urgent, inclusive progress on decarbonisation, adaptation, and sustainable development:

#1 Targeted Incentives and Financial Innovation

Introduce tax credits, subsidies, and grants to stimulate investment in climate enablers, while promoting innovative financial instruments and green fintech to channel capital effectively.

#2 Increased Public Investment and Risk Mitigation

Boost public funding for climate enablers via dedicated green bonds and investment funds, using public capital to reduce risks and attract private sector participation.

#3 Stable and Streamlined Policy Frameworks

Simplify environmental regulations to provide a predictable, enabling environment that encourages business and investor engagement in climate solutions.

#4 Strengthened Collaboration and Knowledge Sharing

Foster partnerships across public and private sectors, support innovation clusters, and encourage cross-border cooperation to accelerate solution development and global dissemination.

08

Outro

OUTRO

SWEDEN – THE CLIMATE MATCHMAKER FOR GLOBAL ACTION

This report is the product of a collective effort. We would like to extend our sincere thanks to the many Swedish companies, government agencies, research institutions, NGOs, and civil society actors who contributed their insights, innovations, and commitment. Together, they showcase the breadth of Swedish climate solutions and reaffirm that progress is possible when knowledge, finance, policy, and technology align.

The message that underpins this report is clear: solutions exist. Technologies, business models, and innovations are scalable and available today. The barriers are not scientific, technological, or financial: they are policy-related. Without coherent, long-term frameworks, neither finance nor innovation can flow at the speed and scale required. With the right policies in place, however, solutions can be deployed globally, bridging the implementation gap and accelerating the just transition to resilient, low-emission societies.

As one of the world's most innovative countries, with leading technologies and research institutes, cutting-edge climate science, a strong tradition of progressive climate policy, one of the largest per capita donors of climate finance, an AAA-rated Export Credit System, and a culture of cross-disciplinary collaboration, Sweden aims to accelerate its global contributions to the implementation of the Paris Agreement and act as a global Climate Matchmaker by:

1. Matching global climate challenges with proven Swedish solutions, and
2. Matching Sweden's own transition needs with international solutions to reach net zero by 2045

Together, we can make the green transition the greatest collaboration in human history.

Sweden at COP30

We invite all readers and partners to continue this dialogue with us at COP30, where Sweden's official non-negotiating delegation, led by Business Sweden, will host the Swedish Pavilion. We stand ready to matchmake, to listen, to share, and to collaborate. Join us at COP30 to explore how Swedish expertise, innovation, and partnerships can support ambitious climate action, and how together we can turn NDCs and NAPs into investable, implementable plans. Explore the climate action here.

Team Sweden

Team Sweden is a collaborative network of Swedish public sector organisations, agencies, and companies working together to promote Swedish solutions globally, strengthen international partnerships, and support investments in Sweden. Coordinated by Business Sweden and the Ministry for Foreign Affairs, and supported by more than 100 embassies, consulates, and delegations worldwide, Team Sweden represents a flexible, global network dedicated to connecting needs with proven solutions. Explore Team Sweden here.

Business Sweden

Business Sweden is jointly owned by the Swedish state and the business sector, with a mandate to help Swedish companies expand globally and support international companies investing in Sweden. With over 45 years of experience and a team of 550 across more than 40 markets, Business Sweden provides strategic advice, hands-on support, and access to public and private networks to help build resilient and prosperous societies. Find out more here.

Sweden's non-negotiating delegation

Alongside Sweden's official negotiating delegation, Business Sweden leads the country's official non-negotiating delegation that unites some of Sweden's leading companies, government agencies, and partners from academia and civil society. Explore the delegation here.

Sweden – the climate matchmaker

Sweden the climate matchmaker is an initiative by the Swedish Institute and Business Sweden.

The time is now.
The race is on.
Together, let’s bridge the implementation gaps.

Sweden – the climate matchmaker

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