

# Messages from 2030

Sweden: A picture  
of transformation

**SIEMENS**



# Table of contents

○ Foreword by the Siemens Sweden CEO	3
○ About this project	4
○ Drivers of transformation	7
○ Society & Economy	9
○ Deep Dive I: Infrastructure	11
○ Deep Dive II: DigiTech & Security	14
○ Deep Dive III: Mobility	18
○ Deep Dive IV: Energy & Industry	22
○ Siemens' contribution to advancing Sweden	26





## FOREWORD BY THE CEO

# Transforming the everyday to create a better tomorrow

How will we live in the future? And how can we – as a company and as individuals – contribute to a healthier, fairer, and essentially sustainable world?

At Siemens, we frequently ask ourselves these questions. For our “Picture of Transformation” project, Sweden was deliberately chosen due to our country’s position as an excellent starting point for the change we need globally. In an extensive study, the project team put the future under scrutiny – and their report traces a technological path leading to one simple fact: Society and the economy can change for the better by 2030.

Now is the time to act, and Siemens is fully committed to driving this change. By multiplying our sustainable practices across industries, economies, and whole societies, we enable our partners to use planetary resources more efficiently so that together we may tackle the climate crisis.

Of course, nobody can predict the future. But I am convinced that real progress can only be achieved through collaboration. When we strive jointly to create a positive impact on our environment and society, we can multiply our efforts towards a common goal. This comprehensive, realistic outlook is an invitation to everybody to join us on this journey.

Yours sincerely,

Mikael Leksell  
CEO Sweden & Nordics

## ABOUT THIS PROJECT

# How will Sweden look in 2030?

For the last couple of months, we have gathered and reviewed expert knowledge of global and local developments and (future) trends with the help of internal and external experts, and the additional support of research consultancy agencies. We have conducted in-depth research on trends across industries, sectors, and potential transformation areas – and identified global trends as well as specific local trends in Sweden. To gain additional insights and to validate existing trends, we have talked to scientists, as well as representatives from various industries, the Swedish start-up scene, and politics. We have interviewed tech experts and government officials, representatives from health institutes and institutes for future studies, and experts on digital trends and sustainability, about their expectations for Sweden in 2030. The results were then evaluated by Siemens and external Swedish specialists in their specific fields. Our Picture of Transformation is based on all of these insights.



Our 2030 vision for Sweden is digital, electrified, connected and full of new business models and partnerships – this is true for mobility, as well as many other sectors. The potential for decarbonized and more efficient mobility in our society is vast and I'm proud that we at Siemens can shape these transformations together with our customers!

**Kristina Nyquist**  
CEO Siemens Mobility Sweden



Without a global shift to Net Zero by 2050, the other transformations mean little. Technology led us here, and technology is what is going to take us out of it – if we take action now and make Net Zero the True North of Transformation.

**Victoria van Camp**  
PhD in engineering and board member at Billerud Korsnäs

## ABOUT THIS PROJECT

# Agenda

This project has identified the following eight key areas of transformation:

-  DigiTech
-  Security
-  Infrastructure
-  Mobility
-  Industry
-  Energy
-  Economy
-  Society

# You are about to discover the future of Sweden in 2030



This is not a vision of a distant utopia. It's not a flight of fancy. Rather, we present a scenario that is very probable – as long as we meet the present challenges with determination. The need for a successful transformation has never been greater. If we fail to act now, it might simply be too late. If we succeed, we can transform the everyday to create a better tomorrow.

It's human nature to aspire, to invent, and to evolve our societies. In this paper, we sketch the current vision of the future based on expert knowledge.

Let's make it happen!

# Holistic vision of 2030

This visual illustrates Sweden in 2030. The country has experienced massive digital and sustainable transformations affecting all areas of life, changing the look of our cities, and our everyday lives.



We live in complex times – and more challenging roads lie ahead. An immediate reduction in emissions is required while society reaches further, asking for more flexible, integrated, and healthy ways of living. A strong drive towards technological innovation is the starting point for improving the world of tomorrow. In the following pages, you will find the key drivers of transformation that we have identified through the Picture of Transformation project and that are valid across all sectors.



### Decarbonization

The fossil fuel era must end. Science could not be clearer: If global greenhouse gas emissions overshoot the Paris Agreement's thresholds, disastrous climate tipping points will be triggered. Electrifying the various sectors is a prerequisite to decarbonizing our economy. This, however, leads to a shift in energy consumption, with energy-intensive industries establishing in Sweden and requiring a reliable power supply. Forming a net-zero economy in a quarter of a century therefore requires immediate collaborative action on the part of public institutions and private businesses. This results in a massive push for solutions and technologies that can help manage such an unprecedented transformation.

### Circularity

Many natural resources and raw materials seem abundant. But actually all of them are limited. At the same time, given that our ethical standards have been brought into focus by globalization – such as labor rights, occupational safety and health, environmental pollution, and economic and political participation – Swedish society has developed a stronger sense of responsibility. Accordingly, the drive for more sustainable management of resources is multidimensional: Laws require increasing transparency regarding supply chains. Consumers try to reduce their footprints. In their pursuit of the circular economy, companies implement new methods for sourcing materials as well as for production.

## Social impact

Human labor has always been the most important source of value creation. Digitalization and new working models can only partially overcome this inextricable link. The smart and autonomous networks of the future still have to be developed, built, and maintained by highly qualified people. A shortage of IT experts and engineers could be a bottleneck for progress – making education and upskilling key factors for establishing a resilient yet highly flexible labor market. However, the demand for labor stretches across all levels of education, all economic sectors, and age groups. Teachers, craftspeople, and health workers are also much in demand in 2030.



## Purpose-driven technologies

Digital technologies and new business models are key to the transformation: With more information being collected by sensors, new platform approaches and connectivity solutions can re-organize more parts of our daily life. They bring together ground-breaking efficiency and convenience in the design, production, and distribution of goods and services. Artificial intelligence (AI), virtual reality, and automation are strong forces in the creation of a more efficient industrial sector. Due to rising public concern, their implementation has to be accompanied by an equally strong regulatory framework that guarantees cyber security, human rights, and consumer trust.

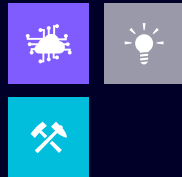
### Disclaimer: **Unforeseeable events**

The global economy will be shaped by multiple headwinds during the next decade. Some will still exist in 2030 – and new ones will emerge. This report focuses on today's knowledge and likely developments. It does not consider the impacts of possible geopolitical uncertainties like new pandemics, wars, and other developments.





## Sweden: Europe's Silicon Valley



The Swedish approach to higher education and the philosophy of supporting tech start-ups have earned the country its status as the European equivalent to Silicon Valley – making Sweden a role model for the rest of the world. These factors have also maintained its leading role in Europe's start-up scene. Many creative tech specialists have used the excellent starting conditions to fertilize new business models in Europe and the world. Some focus on sustainability-related, purpose-driven ICT and life science projects. Others have kept their focus on Krypto, blockchain, and no-code tech. In any case, startups are highly disruptive to corporate value chains as their solutions shift value creation up the value chain.

## Triple helix pushes innovation



State institutions, the nation's universities, and research facilities closely cooperating with each other and with the public sector: This triple helix, which seems like a distant vision to officials in other countries, has become established practice in Sweden. The government has left no one in doubt that they aim to make the country a world leader in digital technology and harness its opportunities. One of the most effective outcomes is the National Approach to AI, which has been carefully carried out and expanded since it was announced in 2018. Sweden is now one of the world leaders in AI development – based on an acceptance of the priorities promoted by the triple helix.

## Battle for skilled workforce



In a digital world, knowledge and technical competence are invaluable: The more complex a system, the more competent, creative, and critical-thinking people are needed to maintain, operate, and further develop it. In 2030, upskilling through digital learning helps address the lack of educated workers. However, the strong need for qualified staff in many fields remains. Companies compete in the battle for skilled workers by offering the biggest benefits for employees. But talent moves frequently between companies, constantly looking for the most exciting business models and projects. (International) talent management becomes a matter of urgency.

## Global trade, local production



Sweden has become a highly attractive location for (manufacturing) companies. Low operating costs due to the abundance of renewable energy, a large pool of raw materials, and a good education system are just some of the advantages. In 2030, companies have partly moved production (back) to Sweden wherever it makes sense – knowing they can rely on politically stable conditions that facilitate resilience to outside influences. This shift to “Glocalization” has been accompanied by high consumer demand for sustainable products – and is decisively supported by the public: It brings production closer to home, and in this way shortens geographical dependencies, and reduces environmental impact.

## Making conscious choices



In 2030, consumers are highly aware of the impact their consumption has. They demand full transparency when it comes to sustainability, greenhouse gas emissions, and inventory availability across all channels. National and international legislation has led to higher standards and accelerated the transformation towards environmentally sound business models. All products and processes along the value chain are directly associated with certain information on their sustainability in economic, social, and governance terms. Nowadays, providing full transparency on production and value chains is valued as a sign of a company’s credibility and competitiveness.

## Visible mindset shift

across society to make the needed transformation happen.

## Future of work

is flexible – but still about the well-being of people in an increasingly digitalized world.

## Upskilling & reskilling:

Life-long learning via digital platforms is a new way of life.

# Infrastructure

Be it (prosumer) buildings, roads, or any other thing in the city: Everything is smart and connected in Swedish cities in 2030, elevating infrastructure to a whole new level of smartness and resilience – in the real and the digital worlds.



# Infrastructure: Smart, decentralized and interconnected

In 2030, big Swedish cities such as Stockholm have become human-centered: Smart management has reduced traffic, allowing the first green streets to be created. E-commerce is the general standard, and where shops and service centers used to line inner-city streets, people increasingly meet and socialize now. AI and sensor technology help to organize most of the needs of everyday life in an effective and convenient way: Streets can prevent accidents, buildings produce their own energy, and co-working spaces provide a space to focus wherever one happens to need it.

## People contribute to producing energy

More people now contribute to producing energy in one way or another. Electrical and heating power production for houses has largely been decentralized. “Prosumer” (production + consumer) houses have become increasingly common. They are equipped with solar panels and produce more energy than they consume. Smart building technology has taken over important parts of grid management – and transferred it into new ecosystems consisting of small energy-producing units that seamlessly work together. Inductive charging possibilities for electric vehicles are on the increase. Throughout the day, e-cars can serve as potential energy storage – and when the sun sets and solar power becomes rare, they are able to provide the energy that is needed, for example in family homes.

## A mixture of satellites and 6G

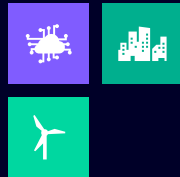
This shift towards smart, resilient infrastructure has happened gradually. Eventually, an integrated mesh of 6G stations and satellite technology has been established – with new kids on the block having started to provide their own satellite communications net. While existing digital service providers face competition from these newcomers, the launch of this new breed of startups has created new types of employment opportunities – also enabling increasing exports of digital services.

## Greener and healthier city spaces

Thanks to a new mindset, people and communities have also started to rebuild their environment as part of a collaborative process. Metaverse, AI and VR solutions have given them the power to analyze their infrastructure to its core, using digital twins and digital information modeling. Stockholm’s urban development, for example, saw some brownfield areas vanish in favor of greener and healthier spaces that have been planned with both economic and social benefits in mind.

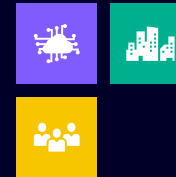
## PERSPECTIVES ON DETAILS

### Buildings power the grid



Offices, factories, and homes are more than places to work, live, and get together. In 2030, they play an active part in generating and storing energy as well as leveling the grid. Almost every new building is equipped with solar panels, thermal or battery-based energy storage, and heat pump systems, or uses district heating power from carbon-free sources. This makes them largely self-sustaining. Smart sensor technology has increased efficiency and transparency while at the same time lowering costs: Most homeowners can analyze the eco-balance of their houses via their smartphones, and AI supports real-time improvements to limit the waste of energy.

### Connected data across cities



Be it sensors for traffic prediction, smart lighting solutions, or smart locks: In 2030, we can see various smart use scenarios being implemented on a large scale across cities – supporting a safer, more economically friendly, sustainable, and convenient way of living. As the increased capacity of digital platforms is made openly accessible through standardized application programming interfaces (APIs), cities can use them to manage real-time data collection. This new data access on a broad scale helps develop new and smart services and facilitates the planning of more human-centered cities. This results in new growth and innovation opportunities for small and medium-sized companies in this field.

## HIGHLIGHTS

### Billions

of connected IoT devices implemented in commercial smart buildings worldwide by 2030.

### Swedish buildings:

more connected, greener, self-sustaining, and sustainable.

### Smart city

use scenarios enable a safer, more economically friendly, sustainable, and convenient way of living.

# DigiTech & Security

Digitalization is the driver and enabler of massive transformation in all sectors. (Autonomous) artificial intelligence supports, shapes, and simplifies all areas of our lives and the lives of our digital twins – in the real world and in the Metaverse.



# Digitalization: Potential and basis for mastering challenges

In 2030, digitalization is still the key driver of developments in all parts of Swedish society – be it mobility and infrastructure, industry and economy, or the way we organize our private lives. AI provides great fundamental support for people. And the combination of data collection and AI creates limitless possibilities.

## AI adoption has been fluid

In recent years, we have experienced a perfect storm: Technological development, business models, and the need for economic and social resilience have leveraged each other. AI adoption and integration has been fluid.

## Interacting with digital twins

The fusion of the real and virtual worlds in the Metaverse has become a daily opportunity for people to adapt to the next stage of the digital age. In the Metaverse the exchange of data is the foundation and main influence on the way we communicate and interact with each other and with things. Automated work activities, business meetings taking place in the Metaverse, and interacting with digital twins have all required people to learn new soft skills for communicating with physical and virtual beings. Thanks to vast improvements in user interfaces – that are more convenient than ever before – the fully digitalized workplace is now the natural choice in many fields of work.

## Living in an interconnected world

In this interconnected world, everyone and everything can be connected. Sensors deliver data of all sorts, using 5G and 6G connectivity supported by new satellite networks. Society is driven by data, with advanced AI enabling autonomous systems, devices, and processes: (Autonomous) cars, lorries, and trains permanently scan their vicinity and elevate passenger safety. Bank accounts analyze cash flows and suggest measures to optimize savings. Apartments and houses regulate their energy consumption to combine high efficiency with comfort. And in healthcare, digital gadgets can detect early symptoms, prevent injuries, and monitor the progress of therapy.

## Legal adjustments needed to build trust

Of course, appropriate legal adjustments are needed to enable technological improvements: Step-by-step, they set new standards for the better handling of (personal) data. They can clarify how the owners of digital ecosystems are responsible for the information conferred on them during business. They can define rules for the mutual power supply within a decentralized power grid. They can protect consumers from being held responsible for actions taken by their automatized appliances. They can build trust. Accordingly, they are key to laying the foundations of a resilient society.

Communication net in 2030:  
Multi network without human interactions, sustainable, trustful, and with self-reliant data provider –

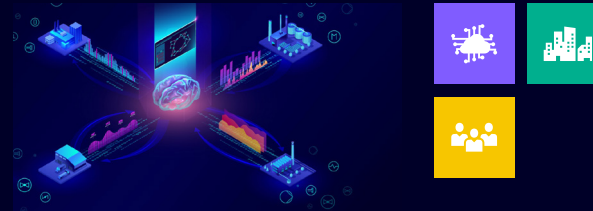
partly through new kids on the block.

Self-adaptive & reliant User eXperience (UX) systems as a precondition for future virtualization/Metaverse.

Individual cybersecurity –

New systems for user identification will be used, privately and in work.

## AI: smart decision-maker



As a decision-maker AI is central to our world in 2030. Thanks to the omnipresence of data sourced from everything and everybody, advanced AI enables new prognosis and decision-making levels almost without human interaction. Buildings, infrastructure installations, cars, industrial plants, warehouses, and people using wearables and data goggles – all of these are data providers. AI is the key to extracting intelligent and high-quality usable data from large amounts of source data (Big Data). Self-learning AI uses this material as a basis for building and operating increasingly autonomous systems, devices, and processes. Over the years, AI has naturally integrated into people's lives.

## Connectivity is everywhere

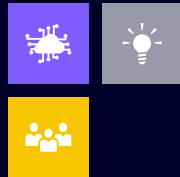


In 2030, connectivity shapes all areas of life in Sweden – thanks to 5G, 6G, satellites, cloud services, and advanced, real-time data-processing options. The emergence of ubiquitous, borderless connectivity applies to all parts of society, to industry, infrastructure, and trillions of devices. Connectivity and automation have become prerequisites for the shift to renewable energy and multiple decentralized energy sources. Thanks to the connectivity of mobility services, every citizen can move around seamlessly. End to end connectivity enables better oversight, transparency, and control of logistics and value chains.



## PERSPECTIVES ON DETAILS

### Merging the real and digital worlds



Real or digital world? Imagining or doing? This line has become blurred. The virtual world brings people together in shared, virtual spaces to interact and create in private and business settings alike. User experience (UX) systems use augmented and virtual reality (AR and VR) for nearly seamless human-machine interfaces. Be it energy grids, the complete industry, supply chains, people, and places: The real world is mirrored in the virtual as its digital twin. In this mixed reality, we can simulate, analyze, and test products, services, and technologies; we can test functionalities, improve processes and maintenance in all aspects of life before we apply them in reality – and all of this without physical boundaries.

### Zero Trust becomes fundamental



As everyone and everything is connected, digital security acquires a whole new level of seriousness. Secure and reliable data enables new applications and business models. Confidence and trust are the key elements in this. As more and more data is collected and exchanged, zero trust concepts become increasingly mandatory. The Zero Trust strategy mandates preliminary security checks for everyone and everything and is becoming increasingly common within companies and private use scenarios. This requires strict identity verification for any person or device. User identification is used to ensure that zero trust policies are manageable and scalable.

## HIGHLIGHTS

### The Industrial Metaverse mirrors

real machines, buildings and transportation systems to solve real-world problems.

**Trust:**  
A precondition for every business transaction.

Police implement more digital technologies for  
**prevention measures.**

# Mobility

Mobility in Sweden has seen significant transformations by 2030. Because everything is connected and there are seamless (ticketing) systems, people and goods can travel more conveniently in a climate-neutral way.



# Mobility: Flexible, seamless, convenient, and electrified

The way people and goods move around is one of the most fundamental social and economic processes, entailing all kinds of questions: How and where do we live? Where and how can we grow food or build factories? When do we work, where do we meet our friends, how much time do we spend on roads or trains? Who can afford to move quickly and comfortably?

## Seamless, connected travel solutions

In Sweden, mobility in 2030 has evolved in many ways: E-vehicles, car-sharing, and smart mobility apps were only the early signs of a large-scale transformation. People now move more efficiently, sustainably, and comfortably. They have access to seamlessly connected travel solutions like bikes, scooters, cars, buses, and trains using new ecosystems. Goods can be delivered on short notice and through more flexible options – consumers and companies have partial access to drones, new air-mobility services, and in specific cases even self-driving vehicles. These transformations have not been achieved solely by existing mobility providers, but rather by new market players, collaborations, and unexpected partnerships with new, innovative business models.

## Mobility as a service is the new norm

“Mobility as a Service” solutions are the common way to move around for many people. Smart apps, new data pools, and new business models allow providers to integrate formerly separated fields – and provide the most efficient combination

of transport possibilities. These new connected mobility services offer end-to-end solutions for customers: on demand, in real time, and with precise information for customers, drivers, operators, and more. All of this is enabled through 6G, sensors, and integrated data interfaces. With more data, public transport solutions are more flexible, more user-friendly, and more sustainable. Peaks in demand are being reliably predicted, waiting times are reduced, routing is optimized, and emissions are cut. To achieve this, government and companies have mastered a massive infrastructure roll-out in recent years.

## Cities: Less pollution, less noise

Sweden has been able to use its excellent starting conditions. Thanks to more connected, seamless, and digital mobility, cities like Stockholm or Gothenburg especially have moved in a greener, cleaner, and healthier direction: There is less air pollution and less noise but more space for recreation and for rich social interaction. The country now serves as a role model for others. Many challenges that seemed overwhelming at the beginning of the century have become manageable.

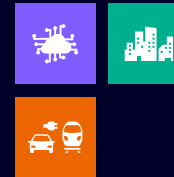
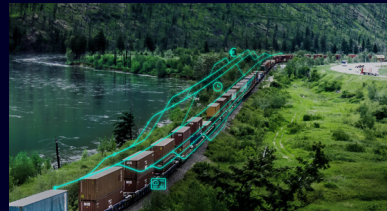
## Mobility as a service

is a norm & new mobility ecosystems have emerged.

Massive build-out in public & at homes of  
**stationary e-charging infrastructure.**

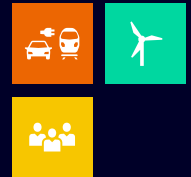
Digitized passenger interface, monitoring control system & “signaling in the cloud”  
**increase rail efficiency.**

## Digitally connected rail solutions



Be it transporting goods or through people traveling from one place to another: Rail systems have increased in significance. Their transformation is still ongoing, providing a convenient and eco-friendly way to commute and travel. Digitally connected rail transport solutions, which continue to emerge, enable significant capacity increases. Digitized passenger interfaces, monitoring control systems, longer and heavier trains, and automated processes for operation and maintenance are being used to increase efficiency. A system of night trains and seamless ticketing connects cities all over the continent, challenging aviation as the most important means of international travel.

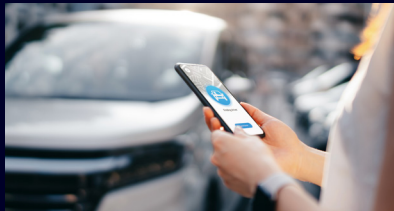
## A world full of wall boxes



In the early years of electric mobility charging along the route was one of the key obstacles for users. In 2030, those inconvenient times are long over. Thanks to a massive roll-out of stationary e-charging infrastructure within cities and across the country, orchestrated by the public and private sectors, public places and private homes are equipped with high-power charging. The massively built-out grid benefits from the option of vehicles partly serving as energy storage when production peaks on windy or sunny days – and vice versa providing energy when turbines stand still and at night. Inductive charging is slowly becoming more prominent.

## PERSPECTIVES ON DETAILS

### Smart transport management



Instead of being overcrowded during peak traffic times, cities and transport routes are calmer and safer even on busy main streets. The 2020s saw a series of victories by “Mobility as a Service” providers developing smart solutions for urbanized areas. In cities, fewer people than ten years ago own cars as seamless transport solutions have become cheaper and more convenient. Real-time data delivery, smartphone apps, and connected interfaces between providers have established ecosystems that guarantee efficient routing for people’s mobility and the transport of goods. This has helped bring intermodal delivery solutions to a new level – for urban goods distribution and end-to-end freight.

### Major progress in air mobility



The way we move through our cities and how we transport goods has visibly changed. People are starting to see the first vertical take-offs and landings here and there – but new air mobility solutions such as electric city air taxis, regional e-jets and electric helicopters are ready for their first commercial use. Delivery drones are used for express deliveries in situations like health emergencies or for essential production goods. Advanced Air Mobility (AAM), though still in its infancy, promises to make life much more convenient and to further reduce the load on urban streets and rail. And in addition, it supports the transition towards a decarbonized transport sector.

## HIGHLIGHTS

95%

of new cars produced are powered by electricity.

~50%

of all cars and light trucks on the streets in Sweden are electrified.

### Advanced air mobility e-solutions

(eVTOL air taxis, e-jets, electric planes, drones) are in first commercial use for private individuals.

# Energy & Industry

A perfect interplay of renewable energies – including solar, wind, and green hydrogen – puts Sweden on the path to being climate-neutral, enabling a decarbonized industry, driven by AI and supported by new business models.



# Energy & Industry: Circular, automated, and decarbonized

The drive for decarbonization has been a key driver of massive developments. In 2030, we acquire, produce, store, and use energy in ways much more apt to maintaining our planet as a place worth inhabiting. Compared to ten or twenty years ago, we have massively increased sustainable power production in order to fulfill the requirements that come with a largely electrified industrial sector, the new establishment of energy-intensive industries, and in turn the rising demand for energy. Thanks to a concerted effort, Sweden has changed at an enormous pace and is on its way to being climate-neutral.

## Sweden is pacesetter for renewables

The country has kept its strong position when it comes to renewables: Most buildings are equipped with some form of decentralized energy production, and solar panels are visible on rooftops all across Sweden. Improved permit processes have enabled skyscraper-tall wind turbines on- and off-shore. Sweden and the Nordics have become the leaders in Europe for green hydrogen production due to a combination of ambitious climate targets and large amounts of cheap and fossil-free energy – enabling new uses of green hydrogen in the industrial sector.

## New business models and digital solutions ensure grid flexibility

To incorporate the millions of diverse and variable energy production sources, the grid has undergone an evolution. We have shifted from an energy system where generators plan generation based on demand. Today, storage and demand adjust

output levels according to the availability of generation and capacity in the grid. To optimize the grid, different flexibility solutions have been applied. Digital solutions, such as sensors placed in all parts of cities, generate large amounts of data. AI evaluates this data in real time, ensuring that power peaks are equalized and that energy is efficiently stored and distributed. Also, new business models, such as performance-based contracting, revenue sharing, or similar, play a vital role in securing a stabilized and efficient grid.

## Companies are motivated to push further

Industry has been one of the main drivers and enablers in moving Sweden towards climate-neutrality – and with this success in mind, companies are more motivated than ever to push further. The demand for renewable and fossil-free energy is an enabler for the industry to be CO<sub>2</sub> neutral. The steel industry, for example, has become a frontrunner for sustainability by switching to using green hydrogen in its production. Understanding the need for circular value chains, companies are working hard to shift the way they use materials, how they design products, and how they keep after-life materials in the production cycle – with the support of digital solutions and AI.

## All energy grids

have a digital twin.

Huge demand for renewable energy,

since industries need to be CO<sub>2</sub> neutral.

Industry are steered by self-reliant & self-learning cobots.

## Resilience based on forecasts



With more manufacturing and energy production being decentralized and more players in the market, economic development has become harder to predict. Load balancing, market forecasts regarding pricing levels and volumes or supply chain management, trading companies, aggregators, balance-sheet managers, energy providers, and many more, all need reliable data. Quality and precision are ensured by advanced forecasting algorithms. Industrial and infrastructure companies especially benefit from prediction methods that can flexibly adapt to sudden disruptions and changing customer requirements. This ensures stable business patterns despite volatile markets.

## Smart autonomous factories



Self-learning AI is a (key) decision-maker for most business, manufacturing, and logistics processes – increasing efficiency and precision almost without human interaction. In many areas, humans and cobots seamlessly cooperate, connected through collaborative tools in the Industrial Metaverse. Devices integrate and evaluate information, using AI to ensure feasibility in industrial applications and working in ecosystems of self-learning algorithms. These semi-autonomous systems, devices, and processes support for example “lights-out” factories. Plants in the Machine Economy act as autonomous market participants, powered by the Internet of Things (IoT), blockchain and AI/machine learning.



## PERSPECTIVES ON DETAILS

### New business model: XaaS



Anything-as-a-Service (XaaS) has become the key for B2B platforms and related data-driven platforms. Software-, Ransomware-, and Platform-as-a-Service are the major business contracts. Due to information and operative technology (IT/OT) blurring, platform economy and digital marketplaces like XaaS business models have arisen in almost every industry and for all kinds of products, tools, and technologies. B2B is more and more done as pay per use, pay per services, pay per CO<sub>2</sub>, or pay per steel. XaaS models also support recycling, reuse and remanufacturing – and especially thanks to data from the entire lifecycle, products can be optimized.

### Developed and digitized energy grid



As more and more (intermittent renewable) energy sources are fed into the grid and transmission needs have changed, the grid needs to be used increasingly intelligently. Digital twins for the energy networks have proven to be crucial for capacity planning and control. Therefore, we can observe increasingly proactive data generation from field devices managed by the digital twin. This has increased transparency and analytics to enable more efficient and stable operation of the grid. This ensures that enough power is transmitted to where it is needed. AI is being increasingly used to make grids more and more autonomous, self-healing, and self-organizing.

## HIGHLIGHTS

### Sweden:

Leader in green-steel and battery production, and setting up bioeconomics.

### Doubled electricity demand

by 2045 due to electrification of industry and establishment of energy-intensive industries.

Every product, process, operation shares sustainability information (ESG)

along the  
value chain.

# Advancing Sweden's society and economy

At Siemens, we work with all sorts of relevant partners to create a better tomorrow. Our activities in countries like Sweden revolve around the goal of a net-zero economy by 2030. Challenges include the rebuilding and updating of factories to ensure clean industry, digitalizing existing infrastructure, establishing reliable ecosystems that help companies improve their production efficiency, as well as contributing technology for more sustainable ways of working.

## Help customers achieve their goals

Our customers in Sweden embrace this transformation. They are pioneers who need technology to solve real problems, create value, and obtain competitive advantage. That is why Siemens' ambition is to create technology with purpose: to help them transform their businesses. To translate the drivers of change into sustainable progress, businesses need simulation technology to support the analysis of processes. They need resilient systems that can grow as fast as their companies, enabling sustainable value growth. They need a partner like Siemens that thinks outside the box.

## Creating technology with purpose

With our deep domain know-how, a strong partner ecosystem, and our leading technologies, Siemens is positioned to drive Sweden's sustainable transformation. Our ambition is to drive sustainability in all areas and strategically

invest in our portfolio. We have always had a strong commitment to our role in society, our communities, and as an employer. By investing in our people, we create an environment where they can thrive, with a commitment to lifelong learning, equity, and well-being. Through our Environmental, Social and Governance framework (ESG), DEGREE, we are committed to creating a better tomorrow by doing more with less.

## Multiply impact: Transformation needs cooperation

Now is the time to act to master humanity's biggest threats and improve people's lives. We believe that the upcoming transformation will work best if different stakeholders come together. Within an ecosystem of partners, businesses and communities, people need to jointly develop solutions for a more flexible, cleaner, and healthier Swedish economy, using planetary resources more efficiently. We want to enable our Swedish partners to achieve their goals, multiplying our collective impact across whole industries and the backbone of our economy.

Looking back through history we know one thing for sure: Real progress always needs collaboration. By working with each other, we are stronger and can multiply our impact. We stand ready to work together with anyone who wants to make an impact for a more sustainable future.



## OUR CONTRIBUTION

With our portfolio, and together with our partners, we develop sustainable innovations for a more livable world.

The key opportunity areas we identified throughout this project include:

- Digital Decarbonization
- Electrification and new Business Models
- Circularity
- Ecosystems & Partnerships
- Emerging sectors focusing on new green technologies
- Shaping new industry standards
- Digital Twins & Simulation
- Connectivity and Data Management
- Autonomous Decision Making & Prediction

# SIEMENS

## Published by Siemens AG

Werner-von-Siemens-Straße 1  
80333 Munich  
Germany

Disclaimer:  
No part of this report may be reproduced or used without  
express prior permission.

© Siemens 2022.  
All rights reserved.

