



# Strategy for fossil free competitiveness

FINANCE STRATEGY



Fossil Free  
Sweden

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A strategy by  
Fossil Free Sweden



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# Foreword

Sustainable financing is high on the public and political agenda. There is a constant flow of different definitions of sustainable investment, the most topical of which is, of course, the European Commission's controversial proposal of a green taxonomy. At the same time, finance market actors are competing to get involved and finance what is green, and the demands for transparency and reporting are growing.

It has been incredibly informative and interesting to be involved in the work of this strategy. When we talk with companies about barriers to implementing their roadmaps, other barriers are usually higher up on the agenda. However, now that the pace of the transition is increasing, faster decision-making processes alone are not enough – the state also needs to help reduce the risk of investing in fossil free solutions in various ways so that the transition can happen in time.

The financing issue is paradoxical, since there is a surplus of capital in the market that wants to invest fossil free, but there is also a shortage of capital that is willing to take risks. It is private capital that will ultimately finance the transition, and the strategy sets out how the state – over and above ensuring infrastructure and market-building measures – also needs to contribute various services and decisions to make it easier for private capital to see new opportunities in financing the transformation of companies.

What surprised me was that the measures we are proposing are so cheap. The implementation of these measures involves virtually no new money for companies in the form of direct subsidies. On the contrary, this strategy will increase revenue coming into the country as more companies become competitive by becoming fossil free. What makes the costs for the state so small when it comes to various forms of business support is partly the fact that the market and the willingness to pay are already there in many cases. For example, companies are queuing up to buy more expensive fossil free steel.

It is also interesting to note that new ways of calculating and setting targets for companies' emissions are a strong driving force.

As more companies set goals for scope 3, in other words their entire value chain, this creates enormous purchasing power which gives companies a chance to sell their fossil free products before the factory is even ready.

An additional insight into this finance strategy is that new investments in fossil free technology are not being made on top of planned investments, but instead often replace investments in older, proven technology. Sweden currently has an investment-to-GDP ratio of 25 percent, corresponding to around SEK 1,300 billion that is mainly still invested in fossil technology. In the very near future, all this money will instead be invested in fossil free solutions. This is a double win for society, since it also makes these companies more competitive. However, in order for climate work to step up a gear, this redirection of capital flows must become much faster, and many of our proposals in this finance strategy must be carried out immediately.



**Svante Axelsson**

National Coordinator, Fossil Free Sweden



# Companies behind the strategy

Fossil Free Sweden has developed and owns this finance strategy. During this work, Fossil Free Sweden has engaged in dialogue with a number of companies and organisations which, in all essential respects, share the

overall direction and conclusions of the finance strategy, but not necessarily all the individual wordings and proposed measures.

**Anders Egelrud**, CEO, Stockholm Exergi

**Camilla Larsson**, CEO, KPA Pension

**Claes Fredriksson**, CEO, Liquid Wind

**Fredrik Öjdemark**, CEO, Närkefrakt

**Hans Sterte**, Head of Investment Management, Alecta

**Helena Hagberg**, Head of Sustainability, Skandia

**Karin Svensson**, Senior Vice President, Group Public Affairs, AB Volvo

**Magnus Heimborg**, CEO, Preem

**Martin Pei**, CTO, SSAB

**Peter Carlsson**, CEO, Northvolt

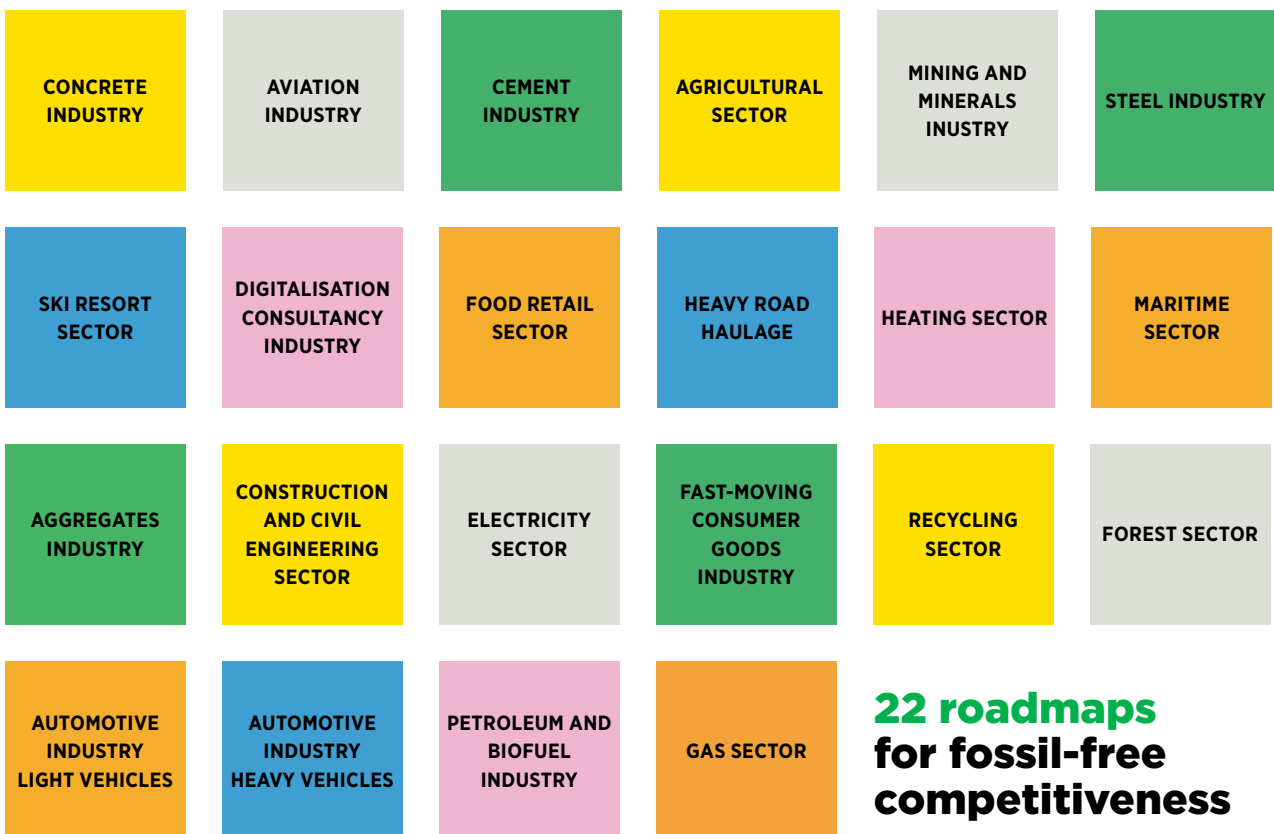
**Richard Gröttheim**, CEO, AP7

**Tomas Flodén**, CEO, AMF Fonder and CIO, AMF

**Ylva Wessén**, CEO and President, Folksam Group

# 22 roadmaps for fossil free competitiveness

In the roadmaps for fossil free competitiveness 22 sectors describe how they can contribute to the Swedish climate target of climate neutrality by 2045. Together they also show in what key areas decisive action needs to be taken in order to succeed with the transition in a way that strengthens competitiveness. Because of that, Fossil Free Sweden has developed horizontal strategies together with the actors in the different value chains to pave the way and show the road ahead.



# Summary

Within the framework of Fossil Free Sweden, 22 industries have developed roadmaps showing how, with increased competitiveness, they will become fossil free by 2045. These roadmaps show that the industries share several common challenges. To tackle these and to clarify which decisions that are required from politicians to be able to implement the roadmaps, Fossil Free Sweden is developing horizontal strategies. This finance strategy aims to identify how the state can share the risk involved in accelerating private capital investments in industry's climate transition.

## The role of the state is to minimise risk

Despite the need for enormous investments in the climate transition, the financial challenges faced by companies are not thought to involve a lack of capital. On the contrary, the market features a great deal of capital with an interest in investments with a green profile. Instead, one challenge for companies is to acquire the right sort of financing at the right stage of their development, and especially to find enough capital that is sufficiently willing to take risks and sufficiently long-term. Another challenge involves managing the risks that are often associated with the development and commercialisation of new technology, such as technological, market and political risks, and thereby also the cost of financing such projects.

The primary role of the state is to minimise risk for new investments by creating the right conditions for a transition to fossil freedom. In the first place, this involves ensuring that infrastructure for fossil free electricity generation and transport are put in place quickly, and in the right locations. Secondly, this involves limiting various market failures, such as negative external effects not being internalised in the price. This can be achieved through a policy that boosts the demand for fossil free products in various ways, making the investments easier to finance. In addition, the state also needs to reduce the financial risk in the market by working in various ways to limit the lack of information caused by long timeframes, and to limit the technological risks when new technical solutions are trialled and scaled up.

The financing strategy focuses on the financial challenges and, to a certain degree, the market stimulation measures, and is based on challenges for three main types of investment that are key to the transition. Three types of companies are in focus: 1) existing industrial companies that invest to make the transition from operations with large volumes of fossil greenhouse gas emissions to fossil free operations, 2) newly established operations that are started in order to produce fossil free products, and 3) small and medium-sized businesses that act as facilitators in the form of subcontractors to industrial companies.

## The conditions for industry's transition

The roadmaps for fossil free competitiveness identify areas where the state and the government have an important role to play in order to clear aside obstacles. If these basic conditions are not met, a financing strategy will understandably have less significance since there is no investment to finance. This involves aspects such as:

- **Shorter and more predictable permit processes:** The permit processes currently take too long, and are too unpredictable for industry to manage to increase the pace of the climate transition and strengthen competitiveness.
- **Access to electricity, hydrogen and minerals:** There needs to be a clearer direction and a faster pace when it comes to expansion and the development of regulations within areas such as wind power, electricity power lines and hydrogen. Even more minerals are needed for the new electricity power lines and batteries required for the transition.
- **The need for competence:** Sweden is facing a structural change of great proportions, where old jobs are disappearing as new ones are created. The country has traditionally dealt with structural changes well, but active policies are needed to deal with this matching process.
- **Level the playing field within the EU:** Several countries are now making major budget investments and announcing significant financial support for their industries. This creates different conditions for

industrial transition and establishments in different countries, which Sweden needs to address actively.

- **Sustainability:** It goes without saying that industry's climate transition must take place in a more sustainable manner, from ecological, social and economic perspectives. However, goal conflicts may arise. Both the forestry industry and the mining industry need to become more sustainable in climate-related and environmental terms. Landowners, the armed forces and other government agencies need to find new ways of working so that key development areas can be promoted. At the same time, clarity within the system needs to be enhanced and, for example, compensation measures for landowners need to be better structured and more predictable.

### Policies that enable for more private capital investments

Many important investment decisions need to be taken during the coming years to make the climate transition possible, and the pace is of crucial importance. The initiatives and policy proposals highlighted by this finance strategy involve key steps towards Sweden's goal for climate neutrality by 2045, while at the same time strengthening Swedish industry and thus contributing towards improved welfare.

Some prioritised political proposals to ensure better conditions for private capital to contribute towards the necessary investments in Sweden's transition are listed below. (Chapter 6 goes into greater depth and includes additional proposals.)

#### State financial services for climate transition and economic development

The Government should take responsibility for creating the following services:

- Credit guarantees for loans under SEK 500 million without a link to exports.
- Loans for companies and projects at very early stages.
- One or more niche state investment funds for direct investments at early stages.
- A service that helps to match companies and projects with financial market actors.

- A service that guides actors correctly within the Swedish and European support systems.
- An expert competence centre that makes an overall assessment of different technologies' and investments' climate benefit, climate impact and political context, so that the risks for private capital are reduced.

The above six services can be created in different ways. They can be created either in decentralised form with various existing actors that already have – or can build up – the necessary competence to offer such services. Another alternative is that the Government enlarges an existing actor to become a new competence centre that can offer a couple of the services – as a suggestion, the competence-intensive services – while the remaining services are created within existing actors. A third alternative is that the Government creates a new institution that can offer all the services combined – a transition bank corresponding to the investment banks or development banks that exist in other countries.

#### Clarifications and development stages within state organisations

- The Government should commission the National Debt Office to double the guarantee framework for the green credit guarantees to a total of SEK 160 billion in 2024.
- The Government should appoint which agency that helps actors within the finance industry to interpret the taxonomy.
- The Government should give Almi an expanded assignment for its lending and investment operations, with a focus on making a climate transition possible for small and medium-sized businesses.

#### Market stimulation measures

- The Swedish Parliament politicians should work to reduce market risks and financial risks by developing several cross-party agreements, for example regarding electrification, hydrogen and bioenergy.
- The Government should ensure that all public procurement is climate neutral within a few years. For example, the Swedish Transport Administration should be commissioned to ensure that all state-owned roads and railways are built using climate neutral methods by 2030.



- The Government should introduce a system to cover more distances with hydrogen and charging infrastructure for heavy transport. As a suggestion the state should identify distances and auction off concessions for these, and provide contracts for difference support for the difference in those cases where infrastructure investment is not commercially profitable.

**Work at EU level:**

- During 2022, the Government should draw up a focused EU strategy with the aim of creating equal conditions for industries in the European market that want to make the transition. The impact within the various countries' different implementation of state subsidy regulations is particularly important.
- The Government should work to implement a Carbon Border Adjustment Mechanism (CBAM), and at the same time begin to phase out the free allocation of EU ETS emissions rights, in accordance with the European Commission's proposed timeline and prioritised sectors.



# 1. Introduction

Sweden aims to have zero net greenhouse gas emissions by 2045. As a step in the implementation of this, 22 industries have developed roadmaps for fossil free competitiveness within the framework of Fossil Free Sweden. These roadmaps show how, with increased competitiveness, the industries can become fossil free by 2045, which actions they need to take themselves, and which political conditions are needed for them to succeed. The focus is now on implementing the roadmaps, and Fossil Free Sweden is developing strategies to step up the pace by resolving a number of industry-wide challenges and clarifying the necessary decisions. Fossil Free Sweden's finance strategy is presented in this report.

Industry's climate transition is now largely strategically and economically driven, which provides new business and export opportunities. Within many industries, financing investments in new technology is key for maintaining the fast pace of the transition. In most cases, the technology required to create fossil free production is already available and mature for scaling up. The challenges faced by transitioning industries involve managing the processes for demonstrating, upscaling and commercialising this technology. Securing financing is crucial in order to succeed with these processes and the transition to fossil freedom at the rate that is now required.

Several efforts have been made to summarise the cost of the transition. The European Commission has estimated that approximately another EUR 470 billion is required for investments in transport, energy, water and waste in order to achieve the climate and energy goals.<sup>1</sup> This corresponds to around 2.5 percent of the EU's annual GDP. In a study conducted by the Stockholm Sustainable Finance Centre,<sup>2</sup> it was calculated that net increases in capital investments corresponding to SEK 66 billion would be needed to reduce 70 percent of the direct emissions within the processing industry between 2020 and 2045.\* Industrial actors have confirmed that these figures are of the right magnitude, but at the lower end

of the likely interval.<sup>3</sup> These examples show the difficulty of estimating the size of investments required for the transition, but still make it clear that significant investments will be needed during the coming decades, in terms of both equity and credit.

Despite these enormous sums, the financial challenges faced by companies are not thought to involve a lack of capital. On the contrary, the market features a great deal of capital with an interest in investments with a green profile. Instead, one challenge for companies is to acquire the right sort of financing at the right stage of their development, and especially to find enough capital that is sufficiently willing to take risks and sufficiently long term. Another challenge involves managing the risks that are often associated with the development and commercialisation of new technology, such as technological, market and political risks, and thereby also the cost of financing such projects.

The state's role is thus not primarily to use more tax revenue to speed up the transition, but – in this transformative time – to minimise the risks for the investments needed for industry's transition. This mainly involves ensuring that infrastructure for fossil free electricity supplies and transport are put in place quickly, and in the right locations. It also involves limiting various market failures, such as negative external effects not being internalised in the price, by pursuing a policy that boosts the demand for fossil free products in various ways and makes the investments easier to finance. In addition, the state also needs to reduce the financial risk by working in various ways to limit the lack of information caused by long timeframes, and to limit the technological risks when new technical solutions are trialled and scaled up. This finance strategy mainly focuses on the second and third challenges, i.e. on how the state can boost demand and reduce financial market actors' economic risk.

\* This refers to the investments required for upscaling the technology once it is ready and for maintaining current production levels with existing technology.



### 1.1. Aim

This finance strategy aims to identify how the state can share the risk involved in accelerating private capital investments in industry's climate transition. The strategy is based on the challenges and needs of different value chains and sectors in order to finance the transition to a fossil free society. The focus of the finance strategy is on: 1) existing industrial companies that invest to make the transition from operations with large volumes of fossil greenhouse gas emissions to fossil free operations, 2) newly established operations that are started in order to produce fossil free products, and 3) small and medium-sized businesses that act, for example, as facilitators in the form of subcontractors to industrial companies.

### 1.2. Limitations

This finance strategy does not aim to take an overall view of the public financing scope for succeeding with different infrastructure initiatives or climate adaptation measures. The strategy also excludes municipalities' and regions' transition and financing. The strategy focuses on the challenges and needs of those companies that require financing for their own transition. The focus is on the companies' operations in Sweden, with regard to both corporate actors and actors within the finance industry. However, it is important to note that the finance industry is international in nature, and that investments are not limited by the actors' geographic location. The conditions for investments in transition are affected to a large extent by politics at both national and international levels.

The report first provides a background in the form of a description of what is required for the transition in Sweden, and then describes challenges for financing the transition. This is followed by a presentation of a proposed action plan for the necessary government decisions and the measures other players need to take in order for Sweden to become a fossil free welfare nation.

### 1.3. Method

This finance strategy is an initiative by Fossil Free Sweden. The work has been carried out with support from IVL Swedish Environmental Research Institute, industry and the finance industry. The strategy is based on acquiring knowledge from the literature, and from

input from and discussions with the established reference group and other stakeholders from the banking and finance sector, the refinery industry, the iron and steel industry, the battery industry, the transport industry, technology providers, industry organisations and government agencies, among others. Most of the financial and corporate representatives share – in all essential respects – the overall direction and conclusions of the finance strategy, which are listed in the introduction. The work was carried out with the valuable assistance of the reference group, consisting of Klas Eklund (Mannheimer Swartling), Cecilia Hermansson (KTH Royal Institute of Technology/the Climate Policy Council), Jens Hedar (the Swedish Export Credit Corporation) and Harald Mix (Altor and Vargas Holding).

## 2. Conditions for fossil free competitiveness

The transition will not happen by itself. All sectors of society need to do their part in order to increase the pace of the transition. The 22 roadmaps for fossil free competitiveness identify challenges where the state and the Government have an important role to play in order to clear away obstacles. If these basic conditions are not met, a finance strategy will understandably have less significance since there will be no investment to finance.

**Shorter, more predictable permit processes:** Extensive investments and infrastructure expansion are required in order to be able to realise new processes and the commercialisation of technology. In particular, this involves the generation and transmission of fossil free electricity, as well as the production and storage of hydrogen. One major challenge in order to kickstart this trend is to allow for fast permit processes for making changes to existing industrial facilities and expanding new ones. These processes take too long if industry is to step up the pace of the climate transition and strengthen competitiveness and processes, and are hard to predict – even if the environmental requirements are known. A couple of inquiries have been appointed and will be submitting concrete proposals before the summer, and increased funding for permit processes are included in the budget for 2022, but more will be needed.

**Access to electricity, hydrogen and minerals:** Wind power is the power source that generates electricity at the lowest cost, and the generation of wind power in Sweden is also expected to increase. However, a clearer strategy is needed from government agencies on, for example, where offshore wind farms should be built in order to maintain the necessary pace.

When it comes to transmission capacity, there is also a need for more efficient permit processes and a long-term electricity grid plan. The state-owned electricity transmission operator Svenska Kraftnät can already finance significant increases in electricity grid expansion

itself within its existing operations. It is therefore not a lack of capital that is preventing a rapid expansion of the electricity grid. In February 2022, the Government launched an electrification strategy that deals with some of the above areas.

When it comes to infrastructure for hydrogen, Sweden – along with many European countries – still lacks a regulation for pipelines for hydrogen distribution, which needs to be put in place quickly in order for market actors to have the right conditions for investing and building. It is therefore not a question of the state financing hydrogen pipelines, but of the state creating the right market conditions.

Electrification involves a need for more copper wire and more batteries for various applications. Battery recycling will be a key factor, but even if 100 percent of batteries were to be recycled, there is still a considerable need for more minerals and metals. In order to meet this need, new and even more sustainable and climate-neutral mines will be required.

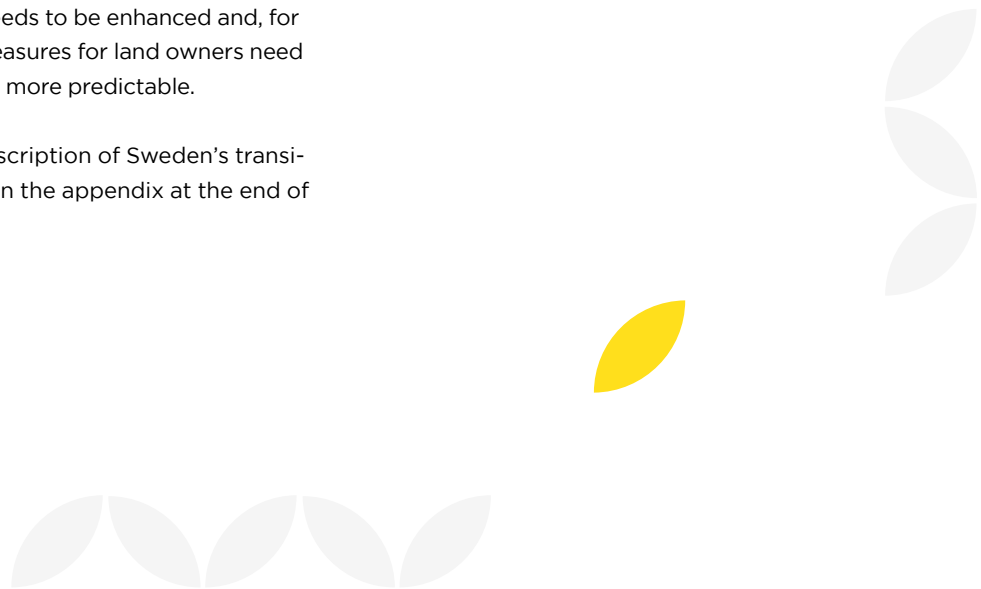
**The need for competence:** Sweden is facing a structural change of great proportions, where old jobs are disappearing as new ones are created. The country has traditionally dealt with structural changes well, but active policies are needed to deal with this matching process. The Government has started a number of smaller skills boosts, but larger-scale focuses on upper secondary, university college, university and vocational education within key areas – as well as further training for those who are already working – will be essential if the roadmaps are to be implemented.

**Equal conditions at EU level:** Several countries are now making major budget investments and announcing significant financial support for their industries. For example, Germany is investing EUR 200 billion in support for the industrial transition by 2026, and Spain has app-

roved investment and operational support for the transition of various industries. This creates different conditions for industrial transition and establishments in different countries, which in turn affects the pace of transition for small countries such as Sweden, which cannot set aside such large amounts. If this 'arms race' of increased subsidies to countries' own businesses will be significant in scope, Sweden will also need to take an active view of this, and the potential sums required from the Swedish state are not identified in this finance strategy.

**Sustainability:** It goes without saying that industry's climate transition must take place in a more sustainable manner, from ecological, social and economic perspectives. However, goal conflicts may arise. For example, increased demand for bio-based raw materials involves a greater risk of reduced biodiversity and other negative environmental impacts. Another example is the increased need for cost-effective, renewable electricity generation and the demands that wind power places on the land and the sea. A third example is the greater need for minerals and metals for electrification and batteries, and that new mines will then be needed. All actors have the potential to improve, and continuous development is needed. Both the forestry industry and the mining industry need to become more sustainable in climate-related and environmental terms. Land owners, the armed forces and other agencies need to find new ways of working so that key development areas can be promoted. At the same time, clarity within the system needs to be enhanced and, for example, compensation measures for land owners need to be better structured and more predictable.

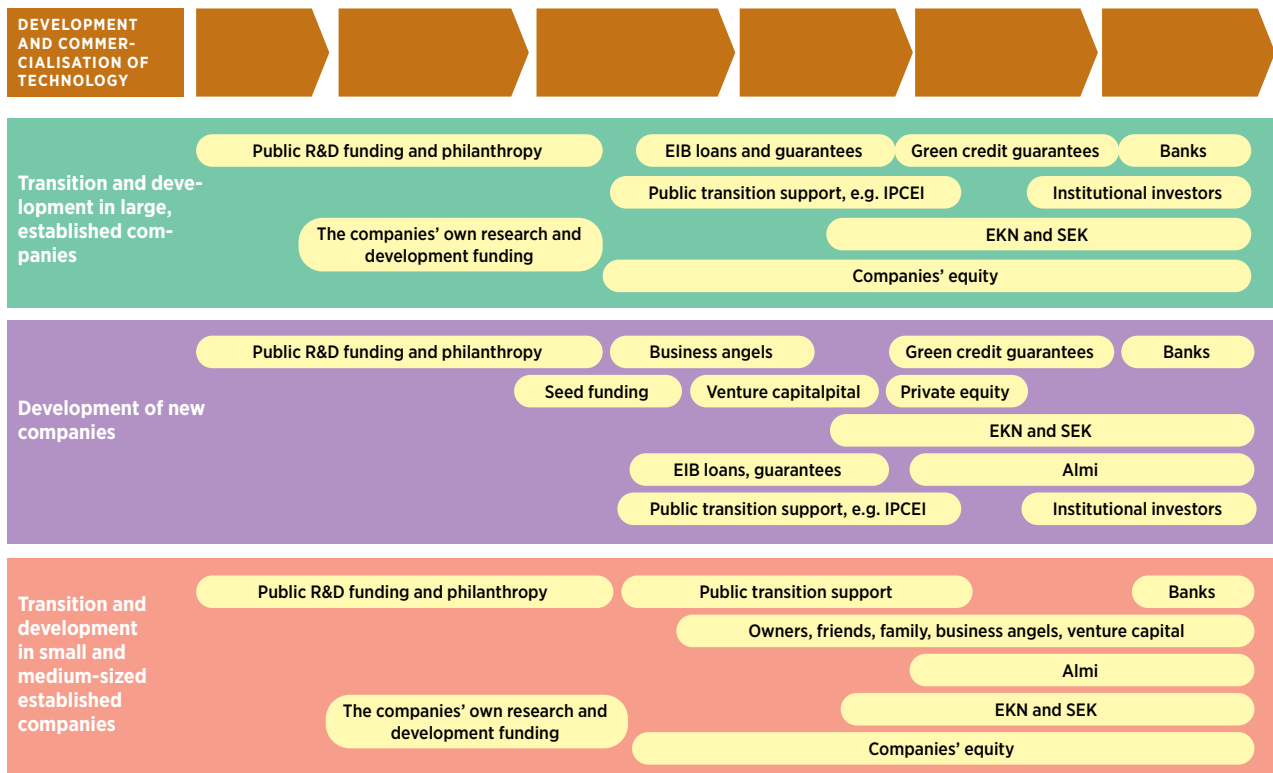
A more comprehensive description of Sweden's transition journey can be found in the appendix at the end of the finance strategy.



# 3. Companies' opportunities for financing

In order to achieve a society with low climate impact, existing companies and value chains first need to make the transition so that direct and indirect emissions are reduced. This could involve a need for investments in new technologies, production processes and business models for circular resource flows. This includes both large industrial companies and small and medium-sized companies, including subcontractors to industrial companies. Secondly, the transition may require new companies and value chains to be developed, which – from a financing perspective, for example – involves different challenges and opportunities compared to the transition of existing companies.

How established companies finance the transition varies from case to case, and depends on the character of the company in terms of size, ownership, current financial structure, etc. Large companies can set aside their own funding for research and development, and can also invest their own funds in new initiatives, cooperation and the commercialisation of new technology. Research and development can also receive support from public funding. Small and medium-sized companies often experience difficulties obtaining funding for investments, particularly if they grow. Start-ups and growing companies are often dependent on obtaining capital in order to develop both the company and technology. There are



**Figure 1** Financing transition in established companies and development of new companies.

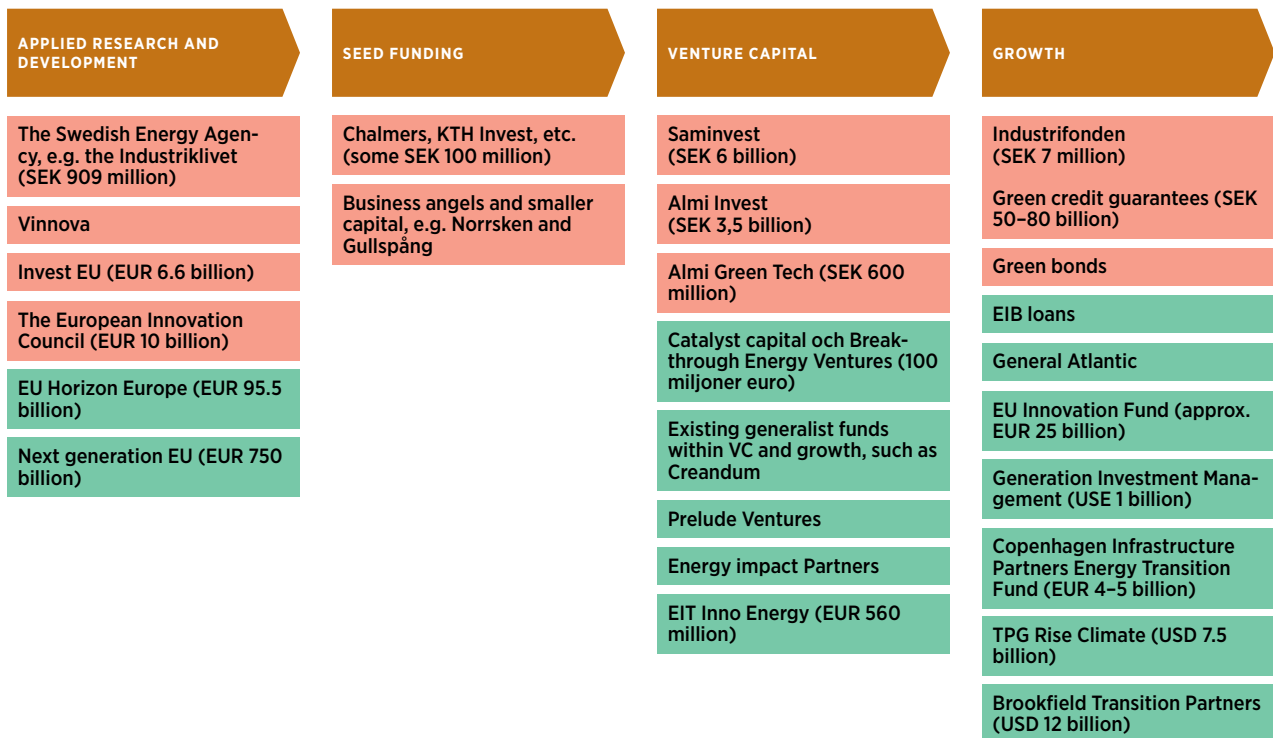
several different financing methods for this, as presented in overview form in Figure 1.

Another way for new or established companies to finance investments is for existing or new owners of the company to contribute funding, for example via new issue of shares for limited companies. For small and medium-sized companies, this often takes place via capital contributions from owners, family or friends. During early stages, this can take place via business angels or venture capital companies in various forms.

Institutional investors, such as pension funds and insurance companies, may be important owners for established companies that are making the transition. These investors manage large sums of capital. For example, the total capital managed by AMF, Alecta, Afa and Folksam is approximately SEK 2,700 billion. These actors take a long-term approach and have funding expectations for returns, but do not usually accept a high degree of risk. For companies with investments that meet this profile,

institutional investors may be important owners and support the transition. For example, in summer 2021 Folksam increased its ownership of SSAB, with the aim of being involved and supporting the company's transition towards fossil free steel production as an active, long-term owner.

Companies that are still being built up do not have the same opportunities for self-financing with working capital, and are instead dependent on obtaining capital to a greater extent. During early stages, venture capital may be needed from national or EU level, business angels and venture capital companies, and later on from various forms of private equity fund. Institutional investors invest in these companies indirectly by investing in venture capital or private equity funds, which then invest in the companies. Recently, there has been great interest in directing funds towards climate transition. One example is the asset management company Brookfields Global Transition Fund.<sup>5</sup> Another example is the investment fund TPG and its climate investment strategy TPG RISE



**Figure 2** Some examples of possible forms of venture capital. Note that several of the examples can span multiple phases. Red examples are national, and green examples are international. **Source:** Financing working party within the Industry's Climate Transition collaborative programme<sup>7</sup>



Climate.<sup>6</sup> Figure 2 provides examples of actors at different stages of company development.

Project financing is a way of funding new initiatives that involve the financing being linked to a specific project or new company. If this relates to an existing company, the project is separated from the rest of the company and the financing only relates to this, which – in most cases – makes it easier to finance. The banks have an important role to play in establishing structures for this type of investment, allowing for a number of different actors to come together and share the risk.

Guarantees also play an important role in various forms of financing for new technology or other types of investments that involve significant risk. The Swedish Export Credits Guarantee Board (EKN) is a Swedish government agency tasked with promoting Swedish exports. EKN's working credit guarantees cover 50 percent of the bank's risk in the case of loans or overdraft facilities. EKN also offers green credit guarantees to businesses with direct or indirect exports, which also contribute towards the climate transition. By covering up to 80 percent of the bank's risk, EKN can facilitate access to financing of Swedish transition projects with up to SEK 500 million. In 2021, state green credit guarantees were also introduced at the National Debt Office, targeted at green investments within industry where the guaranteed loan is at least SEK 500 million.

Investment and development banks at both national and international levels have also been used historically to finance sustainable development. The multilateral European Investment Bank (EIB) and Nordic Investment Bank (NIB) are of particular importance, as they can give guarantees and offer various forms of financing – see section 5.1 for a more detailed description.

In summary, there are a number of different financing forms for companies at different stages and with different focuses, but despite this there are some areas where the state should use various initiatives to reduce the risk and persuade private capital to invest in different transformative steps, since this is currently seen as too risky. These proposals are reported on in section 6.





# 4. Case studies: Four routes to fossil free competitiveness

This section presents cases that illustrate the challenges faced by various types of companies when it comes to financing investments for transition. The first two cases are the steel company SSAB and the refinery company Preem. These cases highlight established companies that currently have high carbon dioxide emissions from their operations, but that are investing in making the transition. The third case is the battery company Northvolt, which is developing a brand new and rapidly growing value chain that is central to making the transition possible. The fourth case, Närkefrakt, is a medium-sized transport company that wants to transform its operations to facilitate transition and fossil free transport in other value chains and sectors.

## 4.1. SSAB

### 4.1.1. The company's character

SSAB is an established company that is investing in the transition of its own operations.

SSAB is a listed Swedish company steel company, with LKAB, the Finnish state and Folksam as its three largest shareholders.<sup>8</sup> The company's roots date back to the late 19th century, and it now carries out blast furnace steel production in Sweden (Oxelösund and Luleå) and Finland (Raahe), and scrap-based production at two facilities in the US.<sup>9</sup> There are also facilities for processing steel products in Sweden (Borlänge) and Finland (Hämeenlinna). With around 14,000 employees and an annual production capacity of around 8.8 million tonnes, the company is a smaller player in the global steel market. Production focuses on specialist products, and the company is a global leader within high-strength steel – particularly in its domestic markets in Europe and the US.

Iron and steel production accounts for around 7 percent

of the world's greenhouse gas emissions, and SSAB's Swedish operations are responsible for around 10 percent of the country's emissions. In order to dramatically reduce emissions and create a fossil free value chain from mine to steel, with fossil free electricity and hydrogen, SSAB began cooperation in 2016 with LKAB and Vattenfall, under the name HYBRIT (Hydrogen Breakthrough Ironmaking Technology). 2021 saw the production of the world's first sponge iron, which was made via 100 percent direct reduction with hydrogen at the pilot facility in Luleå, and in October the Volvo Group was able to present the world's first vehicle made from fossil free steel plate from SSAB. The next step for HYBRIT will be a demonstration facility on an industrial scale. This will be ready in 2026, and will include hydrogen production and sponge iron manufacturing.

SSAB's goal is to offer the market fossil free steel at commercial volumes by 2026. Together with its partners and customers, SSAB is aiming to create a fossil free value chain, and has begun cooperating with customers such as Volvo Group, Mercedes-Benz, Volvo Cars, Autoliv, Lindab and Peab. These are customers who also want to reduce emissions from the production process and in the materials included in vehicles.

SSAB's board decided in January 2022 to rebuild the Nordic production system and accelerate the company's green transition. The ambition is that carbon dioxide emissions as a whole should be near zero around 2030 – 15 years earlier than the previously communicated plan. This will enable Sweden's total carbon dioxide emissions to be reduced by around 10 percent, and Finland's by around 7 percent.

The new plan will involve the Luleå and Brahestad facilities being rebuilt as minimills, with electric arc furnaces

# FOSSIL-FREE STEEL

Using fossil-free sponge iron and fossil-free power.

CO<sub>2</sub> EMISSIONS:

**0.0 tonnes CO<sub>2</sub>/tonne steel**

GLOBAL AVERAGE CO<sub>2</sub> EMISSIONS:  
**2.0 tonnes CO<sub>2</sub>/tonne steel**  
(iron ore based)



500 GRAMS OF STEEL

CO<sub>2</sub> EMISSIONS:  
**0.0 kg CO<sub>2</sub>**

GLOBAL AVERAGE CO<sub>2</sub> EMISSIONS:  
**1.0 kg CO<sub>2</sub>**

FOSSIL-FREE STEEL  
BAR ID - 023

SEE BACK FOR  
FULL DETAILS →

# SSAB

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and rolling mills, and the Borlänge and Tavastehus facilities being developed for the new production processes. How quickly and in which order the Luleå and Brahestad facilities are converted will depend on factors such as access to the necessary infrastructure, especially access to competitive electricity. The conversion of the Oxelösund facility will take place first, and a new power line to the facility needs to be in place by 2025 so that the arc furnace can be commissioned.

#### 4.1.2. Challenges

**Technological development:** HYBRIT's technology is partly proven. For example, direct reduction of iron ore is already carried out using natural gas. Direct reduction takes place with hydrogen within HYBRIT, and the technologies are being combined in new ways which involves challenges linked to the integration of different technological systems and upscaling the systems to a commercial scale. One example is scaling up the production of hydrogen via electrolysis, which requires the adaptation of regulations, and of technology and infrastructure.

**Infrastructure and permit processes:** In addition to the development taking place at SSAB's industrial sites, there is also a need to expand infrastructure and production capacity for fossil free electricity. The lengthy permit processes risk delaying the transition. The permit process for the concession for a new airborne power line to Oxelösund that Vattenfall Eldistribution applied for needs to progress considerably faster than is currently the case in order to be in place by 2025.

**Market:** Compared with today's cost level, a value chain for iron and steel production based on the HYBRIT technology will give a cost increase of 20 to 30 percent when producing raw steel. Several customers have already shown an interest in fossil free steel, and several partnerships have been entered into. This shows that there is demand for fossil free steel, and that certain customers are prepared to pay a premium initially before it has become the norm.

**EU rules:** External factors such as EU regulations also affect competitiveness, profitability and market risk. Here, the European Commissioners' proposals on, for example, the European Union Emissions Trading System (EU ETS), the Carbon Border Adjustment Mechanism (CBAM)

and how the EU chooses to define the performance of hydrogen, electricity and products as 'green' are important. Changed state subsidy regulations can also allow for increased use and acceptance of state subsidies as industrial policy. If other EU nations allow large-scale support for individual industries, this may involve a distortion of competition internationally, which could affect smaller countries such as Sweden in particular.

#### 4.1.3. Solutions

**Investments with own cashflow:** It is hard to estimate what this transition will cost and to what extent it is a challenge. SSAB has said that the transition of Oxelösund will cost around SEK 5 billion, and that the accelerated transition of the Nordic production system will amount to approximately SEK 45 billion during the period 2022–2030. At the same time, the need for investment is eliminated in current systems with blast furnaces, steel mills and rolling mills. SSAB's assessment is that the strategic investment programme can be financed with its own cashflow.

**Support and risk sharing:** Work began recently within HYBRIT to build a pilot hydrogen storage plant which, alone, is estimated to cost SEK 250 million.<sup>10</sup> To address the increased risk and costs involved in upscaling new technology, for example – as in the HYBRIT case – several support programmes have been established at both national and EU levels. HYBRIT has received significant support from the Swedish Energy Agency via the Industriklivet, which is the Government's long-term initiative to support the industry's transition to net zero emissions. HYBRIT is also one of the seven projects selected by the European Innovation Fund for the first round of investments, worth a total of EUR 1.1 billion. Revised state subsidy rules and other forms of financial support are key factors for contributing towards research and development, and for reducing the risk when upscaling new technologies. However, the companies perceive a risk of distortion where EU countries allow large state subsidies for transition for technologies that are already commercially available.

**Electricity use, electricity power grids and permit processes:** To allow for a faster transition, Sweden as a nation needs to plan for at least a doubling of electricity use, and it is essential that there is electricity in the right

place at right time. This also involves making the permit processes more efficient. The political objective is to halve the lead times for putting new lines in place, and in the 2022 budget the Government proposed an additional SEK 28 million in grants to the Swedish Environmental Protection Agency, the county administrative boards and Sweden's courts for working with permit processes. Increased grants to the Energy Markets Inspectorate are also proposed for this additional work that the energy system's transition involves.<sup>11</sup>

#### 4.1.4. How can we increase the pace?

- Faster permit processes
- Expansion of electricity generation at the right time
- Defending the competitiveness of Swedish industry through an even playing field within the EU and globally

## 4.2. Preem

Preem is an established company that is investing in the transition of its own operations.

### 4.2.1. The company's character

Preem AB is Sweden's largest fuel company, and refines and sells fossil and renewable fuel, as well as fuel oil and lubricating oils for both companies and consumers. The company was founded in 1996 following a merger between Texaco and OK fuel stations in Sweden, and is an unlisted limited company that is fully owned by Mohammed H. Al Amoudi's company Preem Holdings AB.<sup>12</sup> Preem has refineries in Gothenburg and Lysekil, which together account for around 80 percent of Sweden's refinery capacity. The company also operates the Scanlube lubricant factory in Gothenburg, as well as 500 filling stations. A large proportion of the crude oil comes from the North Sea, with the remainder coming from Nigeria, Russia and the US. The company has more than 1,400 employees. In 2020, its production totalled 17.4 million m<sup>3</sup>, with just over half of this being exported.<sup>13</sup>

Refineries account for almost 5 percent of the world's greenhouse gas emissions, and this figure also applies to Sweden.<sup>14</sup>

In 2020, emissions from Preem's refineries made up

almost 3 percent (1.5 million tonnes) of the country's emissions, coming primarily from the production of hydrogen and in refinery heating processes.<sup>15</sup> However, the largest emissions – 43.9 million tonnes of carbon dioxide – come from the user stage.

Preem has set a goal of achieving a climate-neutral value chain by 2035, and will produce at least 3 million cubic metres of renewable fuel by 2030.<sup>16</sup> To reach this goal, the company must adapt its refineries so that fossil crude oil can be replaced with renewable raw materials, establish carbon dioxide capture facilities, and replace natural gas with renewable gas and the production of fossil free hydrogen through alternative sources such as electrolysis.

This work has already started, and during 2020 Preem carried out carbon dioxide capture trials at the refinery in Lysekil. The company is involved in several projects within CCS, such as CINFRACAP, Preem CCS and Zeroc.<sup>17</sup> As early as 2008, Preem and several forest companies invested SEK 400 million in SunPine's Piteå facility, which produces crude tall diesel – an input product for HVO production – corresponding to 3 percent of Sweden's diesel requirements.<sup>18</sup> Preem has also invested in adapting an existing facility at its Gothenburg refinery for converting crude tall diesel into HVO diesel. This involves a total investment of more than SEK 1.25 billion, and the facility – which came into use in 2010 – has been modified by degrees to increase capacity. Production of pyrolysis oil from sawdust began in 2021 at the Pyrocells facility in Gävle, which Preem co-owns with Setra.<sup>19</sup> Trials have been carried out at the refinery in Lysekil to produce petrol from pyrolysis oil. Preem has also begun cooperating with Vattenfall on the production of fossil free hydrogen for biofuel.

### 4.2.2. Challenges

**New direction:** A change in course from producing fossil fuels to setting time-based climate neutrality goals and focusing on the development of renewable fuels is necessary due to society's transition and since calculations show that profitability for biofuel production is higher – both now and in the long term – than for fossil diesel and petrol. Around 30 percent of the demand for fossil fuels from the transport sector is expected to disappear by 2030, compared to 2018 levels. Since 2018, six refi-



neries have been closed or converted into terminals or biorefineries.<sup>20</sup>

This shift represents yet another challenge in terms of bringing investors and other stakeholders on board with the new direction. Another challenge with this new direction is the view of the product in the long term. When the road transport sector is becoming electrified at a fast pace, it may appear risky to finance a transition to liquid biofuel. The significant need in future markets such as aviation, shipping and the chemical industry must therefore be communicated in a credible manner to financial market actors and politicians.

**Technological development costs:** Testing and demonstrating new technology requires resources for innovation and development. Financial support for this would facilitate and increase the pace of development.

**The EU's view of biomass resources:** The EU wants to limit the extraction of forest resources and the use of agricultural land for energy purposes. This means that financial market actors and investors are starting to have doubts about new biofuel production projects. For example, the EU's taxonomy – which aims to steer investments towards sustainable projects and companies – will represent a challenge for Preem.<sup>21</sup> This means that even if the investments Preem wants to carry out aim to achieve climate neutrality, it can be hard to obtain loans from commercial banks, for example, for these types of investments since they are evaluated based on the entire company's climate impact rather than the individual investment or the transition that the investment leads to.

**Access to raw materials and infrastructure:** One immediate challenge is to show the market that there is sufficient volume of sustainable bio-based raw materials at a reasonable price, at a time when more sectors and industries want to use them. Hydrogen is also a key raw material for renewable fuel production. Electricity or biogas are required to produce hydrogen, and getting this to Lysekil and Gothenburg in sufficient quantities at competitive prices is a major challenge. When it comes to CCS, there is a risk that a monopoly situation will arise whereby Preem becomes dependent on one actor which can determine the price for itself for storing carbon dioxide beneath the seabed.

**Ownership structure:** Another challenge for Preem is its ownership structure, with a single owner – Mohamed H. Al Amoudi – who controls the company. When the transition needs to be accelerated, retained profits and support from the owner will not be enough; Preem is instead referred to the international finance markets for raising sufficient capital for capital-intensive infrastructure projects.

#### 4.2.3. Solutions

Three things have helped to facilitate Preem's opportunities for transition.

**Reduction obligation:** Firstly, the national reduction obligation for fossil fuels has contributed towards creating long-term demand for biofuel, which is also gradually increasing. It has also been decided to increase the requirement for mixing biofuel into fossil fuels in the rest of the EU.<sup>22</sup>

**Directly targeted support:** Secondly, some of Preem's projects have received support from the Industriklivet programme of grants. This applies to its cooperation with Vattenfall to develop a hydrogen plant,<sup>23</sup> the Preem-CCS project and the CinfraCap project on infrastructure for carbon capture.<sup>24</sup> This support is used to investigate and develop new technological options. The pyrolysis plant in Gävle, in which Preem and the Setra Group have invested, has received support from the Klimatklivet, making it possible to cover the additional costs in connection with being the first to invest in large-scale production of a new product.

**Tax exemption:** During the first decade of this century, tax exemptions were granted for all renewable fuels, and this is still the case today for high-mix fuels. In the initial stage of Preem's transition, the tax exemption had a major impact on the opportunity to invest in green production, but since the introduction of the reduction obligation this measure has become less significant.

#### 4.2.4. How can we increase the pace?

- Clear wording from the EU to the effect that sustainable biofuel is part of the solution for achieving the road transport climate goal in the short term, and that this is essential for aviation if the industry is to be climate neutral by 2050.



- Significantly shorter processing times for applications in all respects.
- Retain the current rate of reduction obligation to create long-term sustainability and clarify market conditions for renewable production.

### 4.3. Northvolt

In contrast to companies whose production features high levels of fossil greenhouse gas emissions and therefore need to make the transition, Northvolt is starting a brand new business which is part of the electrification process and is thus central to a fossil free society.<sup>25</sup> This means that, in Northvolt's case, building up the actual company and its production is the same as a transition to fossil freedom.

#### 4.3.1. The company's character

Northvolt AB is a Swedish limited company that was founded in 2016 by Peter Carlsson, Paolo Cerruti, Carl-Erik Lagercrantz and Harald Mix with the vision of making the world's greenest lithium ion batteries with a minimal carbon dioxide impression.<sup>26</sup> This vision shall be achieved by 2030, using 100 percent renewable energy and with 50 percent recycled material in all new battery cells. Northvolt's concept also includes scalability, integrating most parts of the value chain and automation.

Northvolt has several plants in Sweden. Northvolt Labs in Västerås carries out research and development, and Northvolt Ett in Skellefteå has a planned production capacity of 60 GW. In February 2022, a development centre for electric car batteries in Gothenburg was presented, in partnership with Volvo Cars. Northvolt Jeden – in Gdańsk, Poland – is a plant for combining various battery system solutions. At the end of 2021, Northvolt had around 2,400 employees and is expected to continue growing rapidly in the future. The aim is to achieve a total production capacity of 150 GWh per year by 2030 and a 25 percent market share in Europe by 2030.

#### 4.3.2. Challenges

**Recruiting competence and coordination:** Establishing, financing and launching a company with Northvolt's production volume in a short space of time involves a number of challenges, such as building a competent and

reliable core team, recruiting competence, and planning, financing and building a new battery factory. It also involves ensuring coordination with various actors to the extent required for the company's plan, for example securing permits so that the timetable can be adhered to.

**Project financing:** One major challenge for Northvolt has been obtaining the project financing required to set up the company. A new full-scale production facility with few comparable examples globally has been viewed as risky by financial market actors, and has required a great deal of innovation in relation to financing.

**Societal services:** In the ongoing development of Northvolt Ett, recruiting competence to a significant extent will be a challenge. This primarily involves competence within relevant technological domains. Northvolt's establishment in Skellefteå will also mean a significant increase in the city's population, placing considerable demands on societal services for new citizens such as education and healthcare. It will also place demands on opportunities for commuting, including rail links between Skellefteå and Umeå.

#### 4.3.3. Solutions

**Financing rounds:** Following an initial pilot study and funding round in which Vinnova and the Swedish Energy Agency participated together with a number of private actors, Northvolt succeeded in securing a loan of SEK 500 million from the EIB. At the same time, partnership agreements were signed with a number of private actors who then contributed capital via share purchases.

Financing the facility in Skellefteå required SEK 20 billion. In 2019, private actors together with Volkswagen and Goldman Sachs contributed a total of USD 1 billion, and the EIB lent an additional USD 350 million for the project. The decisive project financing of USD 1.6 billion was received in summer 2020 in the form of a structure involving several banks and guarantees from the credit institution Euler Hermes (a German private equivalent of EKN), Nippon Export and Investment Insurance (NEXI) and BPI France.

In 2021, USD 2.75 billion was raised to finance additional battery cell production capacity and research and development. The Swedish National Pension Funds have



been involved via a company that was created for the purposes and is co-owned by the four funds, 4 to 1 Investments KB, which has invested SEK 400 million. In total, Northvolt has received more than USD 6.5 billion in loans and venture capital.

**Take-or-pay contracts:** One key success factor for the fourth financing round was that Northvolt succeeded in signing take-or-pay contracts with several industrial partners. This is a new concept within the automotive and battery industries. The industry parties involved demonstrated a clear demand for their products before production had even started. This has helped Northvolt to obtain loans, credit guarantees and better risk assessments.

**Develop project financing:** By negotiating with banks and shareholders, and eventually securing project financing, Northvolt has helped to develop the project financing market and has shown how the risk of new establishments, which is part of the transition, can be shared between different actors. Lessons can be learnt so that similar processes are made easier for other actors. For example, H2 Green Steel is now carrying out a financing round for around SEK 40 billion. German state actors in particular, such as the Federal Ministry for Economic Affairs, have shown that battery production is of great strategic and geopolitical interest. As a result, the area now has a higher priority, resulting in greater flexibility in discussions and negotiations on guarantees, loans and subsidies.

#### 4.3.4. How to increase the pace of the start-up phase?

- Loans and guarantees: There is a need for an actor who can give large loans to projects or companies with a high degree of risk. What is currently lacking in the market is ‘flexible’ loans that can be granted at a relatively high speed and with a clear agenda to support Swedish objectives such as the climate goal. These should be granted without onerous demands for offtake agreements, for example. Credit guarantees help to facilitate loans for actors like Northvolt. Companies may be prepared to pay a little more for such loans and guarantees. The important thing is that help is available to manage risks.
- Advice and assistance from both Swedish government agencies and foreign banks and credit institutions – such as the EIB, BNP Paribas and Euler

Hermes – have been an important form of support for Northvolt in finding financing solutions. Greater national competence and capacity are central to enabling more actors to make the same journey as Northvolt.

- The need for subsidies for an even playing field across Europe. All EU Members States must follow the state subsidy regulations, but many countries are more aggressive in taking advantage of the opportunities for exceptions. This is a relative disadvantage when setting up in Sweden. The pace and attractiveness would increase with state subsidies for upscaling and commercialisation.
- Identifying capital that is sufficiently willing to take risks in early stages and on upscaling is a challenge. To make this easier, there is a need for a reliable actor who can give signal value and reduce the risk, thereby helping private actors to contribute capital and loans. For example, the partly EU-owned InnoEnergy was early to invest in Northvolt.

## 4.4. Närkefrakt

Närkefrakt is a medium-sized transport company that wants to transform its operations and thereby facilitate fossil free transport in other value chains and sectors.

### 4.4.1. The company’s character

Närkefrakt is a transport company that is run by a cooperative society with more than 80 co-owners and six subsidiaries.<sup>27</sup> The company’s history stretches back to the 1930s. It resulted from a merger between several haulage depots with links to the area around Örebro, which is where the company’s operations are now based. Närkefrakt covers the whole of Sweden, and provides transport services within building and construction, long-distance transport and distribution, waste and recycling, and crane truck transport and environmental transport. Its larger customers include the white goods company ELON, Stena Recycling, major construction companies such as NCC and Skanska, and Svensk Glasåtervinning. In total, the company’s fleet consists of almost 400 trucks, which are owned by hauliers which in turn co-own Närkefrakt.<sup>28</sup> Närkefrakt has around 60 employees and a turnover of approximately SEK 850 million.

Goods transportation accounts for around ten percent of Sweden’s emissions.<sup>29</sup> Diesel-fuelled trucks still do-



minate, although there are now also trucks that run on liquid biogas. The reduction obligation is contributing towards a growing degree of drop-in renewable fuel. There are several parallel development paths within the electrification of goods transportation, such as electrofuel, electrification with electric roads and electrification with battery operation.<sup>30</sup> There is a high pace of development, and Sweden is at the leading edge with two vehicle manufacturers within this area. Nevertheless, electrifying heavy vehicles for large-scale, long-range transport within the next decade is deemed to be a challenge for Europe.

Närkefrakt's ambition is to help drive the transition, and electric trucks are seen as a central element in this. The company's current goals are to double the number of climate-smart cars each year for the next two years, and to be five percent better than the reduction obligation for the next five years.<sup>31</sup> The company also has a goal that much of the vehicle fleet should be climate smart by 2030, which involves the electrification of vehicles to a great extent.

#### 4.4.2. Challenges

**Immature technology and high investment cost:** The alternatives for electrified heavy vehicles are still at an early stage of development, and are much more expensive than the diesel alternatives that currently dominate. For example, a heavy truck for city distribution costs almost twice as much to purchase. This is a challenge for the individual hauliers who own trucks. Many of them are small and only have one truck. For these hauliers, an investment also includes a high degree of personal risk, and it is hard to choose a significantly more expensive alternative if the additional cost cannot be passed on to the customer.

**Weak demand:** Närkefrakt's customers have shown an interest in transitioning to fossil free transports, but few customers are prepared to pay the higher price that such investments require. This makes it hard to invest in electric trucks. Demand may increase as more companies set scope 3 goals, but there is a need for incentives that will create demand. One way of dealing with the higher investment cost is through longer contrasts with customers, but few customers are currently interested in this.

**Charging infrastructure:** A small proportion of Närkefrakt's trucks could already be switched to electric operation, particularly within urban transport. In order to electrify a larger proportion or the entire fleet, including long-distance heavy transport, access to charging infrastructure is a challenge. Charging itself can also represent a challenge, since the vehicle needs to remain at a standstill while it is being charged, which means fewer hours when it is available for transport, further affecting economics.<sup>32</sup>

#### 4.4.3. Solutions

**Support for immature technology:** The opportunity to seek support for the additional costs via the Klimatklivet programme of grants has been important for the development and proliferation of trucks that run on liquid biogas. In the same way, support for investments in electric trucks – such as the Klimatklivet and the climate premium for environmental commercial vehicles and work machinery – is important to get the technology spread started and to encourage actors to take the lead.

**Longer contracts:** Another way of dealing with the higher investment would be through longer contracts with customers, giving hauliers the security to write off the investment over the entire contract period, which would then be at least seven to ten years. However, few customers are currently showing an interest in signing this type of contract.

**Public procurement:** The public sector could lead the way by imposing climate requirements on public procurements, thereby demonstrating the demand for fossil free transport. By offering longer agreement periods for the procured transport, public procurement would give all actors the opportunity to submit tenders with new technology and the security to write off the investment over the entire agreement period. This gives greater confidence, which can allow small companies such as hauliers to invest in new technology.

**Business models:** Truck manufacturers could also contribute towards managing the higher cost and significant risk associated with the immature technology for electric trucks, while at the same time facilitating the proliferation of the technology by developing new busi-



ness models. One example is leasing, which has proven successful for encouraging greater use of electric cars.

Expanding charging infrastructure: Expanding charging infrastructure is a decisive factor in terms of allowing for extensive electrification of the vehicle fleet and being able to provide fossil free transport solutions nationwide.

#### 4.4.4. How can we increase the pace?

- Support for meeting the higher cost of immature technology for electric trucks and getting the technology spread started.
- Longer contracts with customers would allow them to write off the vehicle with an agreement as security, and would be a way to deal with the higher investment cost of electric trucks.
- Public procurement is an important tool for showing larger volumes of demand and creating incentives for investments in electric trucks. Public sector operations often take a long-term perspective, and it would be a major advantage if this could be reflected in longer agreements, which – as mentioned above – would allow investments to be written off over a longer period of time and would be a way of managing the higher investment cost of electric trucks.
- Expanding charging infrastructure.



## Conclusions on the companies' challenges and needs

The above case descriptions of companies give a broad – although not exhaustive – picture of the challenges, solutions and possible ways forward. Although the descriptions are company-specific, they can offer generalisable conclusions for similar companies, which are presented here.

The following challenges and needs relate to both established and new companies.

**Creating the right conditions:** Several of the cases show how the basic conditions for transition need to be developed to create the right conditions for transition and investments in transition. One clear example of this is permit processes, the length and uncertainty of which can jeopardise entire investments. In order for loan agreements to be binding, it is often a condition that environmental permits must be in place.

**The challenge of dealing with a long-term approach and risk:** The uncertainty associated with developing, scaling up and commercialising new technology means that companies may need financing with longer terms. Actors within both industry and the finance industry also emphasise the challenge of how the financial risk in the long-time perspective can be shared in order to obtain investments. Ordinary bank loans usually have a five-year term, since this is the interval the bank normally loans up to, while transition investments with long time perspectives and high capital intensity mean that the company may need financing with other terms, for example ten to 15 years. There are various forms of state credit guarantees for dealing with the significant risk (see section 5.2.4 Measures directed towards the finance industry). However, this opportunity is not available for loans below SEK 500 million without a link to exports. In certain contexts, other countries' export credit guarantees can be used, as was the case with Northvolt. This means that there is a gap and a need for Swedish credit guarantees for loans below SEK 500 million without a link to exports.

**The need for capital that is willing to take risks:** New

and growing companies are often dependent on obtaining capital in order to develop both the company and technology, which can be challenging. Different types of venture capital are aimed at different stages of a company's development. Despite that, there is a need for a state player who can provide venture capital at an early stage and show the way by putting a quality stamp on these investments and making it easier for private actors to follow with more capital or loans.

**The need for advice and process management support in order to obtain financing:** The case of Northvolt has shown the importance of skill in structuring capital and process managing the various parts of the financing process in the growth phase. Part of the challenge is that extensive knowledge is needed within many different areas, and that these processes are extremely time-consuming. There is a shortage of Swedish actors who can link companies and projects with various kinds of financial market actors and help with the capital structuring process. If more projects are to succeed, there is a need for advice and support during the financing process.

**Competence in assessing investment projects:** Multilateral investment banks such as the EIB have competence in assessing this type of investment, but for corporate banks and asset managers a lack of competence can make it hard to assess these investments, regardless of their size. There is a need for greater competence and a capacity to make credit assessments that requires in-depth knowledge of new technologies.

**The need to interpret the EU's taxonomy:** The EU's taxonomy aims to steer investments in a more sustainable direction, but may involve challenges depending on how it is interpreted by companies and actors within the finance industry. For example, this applies to investments linked to the use of bioresources such as biofuel production facilities. The EU has proposed that Member States' financial supervisory authorities should be responsible for this, but it has not been determined who should have this responsibility in Sweden.

**The challenge of weak demand for fossil free products:**

Some of the challenges involved in obtaining financing are the lack of clear demand or need to create new markets for materials and products produced with low emissions. Such uncertainties lead to high market risks. For example, it is important for companies such as SSAB and other industrial companies that operate in a global market and at the leading edge of the climate transition that the market is incentivised to choose the green alternative. The case of Närkefrakt illustrates the problem that even customers who are interested in fossil free transport are rarely prepared to pay the higher price that this type of investment requires. In order to strengthen the business case and reduce the risks, a company needs to be able to demonstrate clear demand, for example via take-or-pay contracts with future customers or by reference to policy instruments that stimulate demand and form markets.

**The challenge of equal conditions for industrial transition:**

It is also important for both established and new companies that equal conditions are created between different countries to transform and develop new companies, both within the EU and between the EU and the rest of the world. This includes the implementation of the EU's Fit for 55 proposals, including changes to the EU ETS and implementing support such as carbon contracts for difference in certain countries. Countries and regions with good conditions will attract new actors and value chains. For companies based in countries that do not have the same conditions, compensating for this will be a challenge.

# 5. National and international financing initiatives

This section describes how politics and actors within the finance industry are currently working to finance investments in transition.

## 5.1. The finance industry and financing the transition

There has long been great interest among actors within the finance industry in contributing to increased social and environmental sustainability. This includes identifying both risks and opportunities, and acting accordingly

– within their own operations, but above all by helping their customers, as well as their customers' customers and suppliers, to become more sustainable. This requires good knowledge and reliable data from customers and their opportunities for transition. In order to work with this in the same way within different organisations and countries, many international climate-related initiative have been started. A few examples of these are given in Table 1. Judicious tools have also been developed for measuring aspects such as climate impact and climate risks – see examples in Table 2. Swedish actors are

International initiative	Description
Principles for Responsible Banking	A UN initiative on principles for responsible banking operations, which many Swedish banks have signed.
UN Global Compact	A UN initiative with ten principles for social responsibility and sustainability.
Equator Principles	A framework for assessing and managing environmental and social risks in project financing.
Task Force on Climate-related Financial Disclosures	A standard for reporting a company's sustainability work in a comparable manner.
Net-Zero Asset Owner Alliance	An initiative formed at the UN's climate summit in 2019, including Nordea Life & Pension, Alecta, AMF and Folksam. There are now 70 members, which together manage SEK 97,000 billion. The initiative aims to achieve net zero emissions in its members' asset portfolios by 2050, but a more short-term aim of being in line with the 1.5°C target by 2025 has also been adopted.
The Glasgow Financial Alliance for Net Zero	Initiative formed ahead of COP26 to unite existing and new net zero initiatives in the financial industry aimed at putting words into action and attaining the goals set within the Paris Agreement. It includes a total of 450 financial firms in 45 countries, with combined assets under management of USD 130,000 billion.
Climate Investment Coalition	An initiative that has promised USD 130 billion in climate investments up until 2030. Companies including Skandia have signed up.
Science Based Targets Initiative	A method that enables companies to set goals for their operations and how they will reduce their emissions to be in line with the goals of the Paris Agreement, with independent verification.

**Table 1** Examples of international climate-related initiatives, recommendations and methods within the finance industry.



actively involved in most of these, and are working to include climate-related risks and opportunities better in their operations. One example of a national initiative is the Swedish Bankers' Association and its member banks, which have drawn up a joint climate roadmap for the Swedish banking industry. This roadmap involves the banks undertaking to adapt their operations to contribute towards Sweden achieving the climate goal of net-zero carbon dioxide emissions by 2045.<sup>33</sup>

As part of the work towards greater sustainability, various products have been developed such as funds, loans and bonds with a focus on sustainability. Most banks and asset managers now offer funds within this area. There are also bonds with a sustainability focus. The first green bonds were launched by the World Bank. In 2013, SEB was the first bank to launch green bonds from a city (Gothenburg); that same year, it was the first to launch green bonds from a company (Vasakronan) and in 2014 from a government agency (the Export-Import Bank of Korea).<sup>34</sup> The market for green bonds has now grown considerably, and they are issued in various forms such as 'light green' and 'dark green', and as social bonds and sustainability bonds.

Green loans targeted at companies are issued in order to finance an investment that has a positive impact on the environment. One example of such a loan is issued by Almi, whose green loans for small and medium-sized

companies are aimed at initiatives within those areas highlighted in the EU's taxonomy (see section 5.2.4 Measures directed towards the finance industry). Backed by a guarantee from the European Investment Fund, these green loans have a longer term (six years), are repayment-free for the first two years and have lower interest rates compared with other loans from Almi.<sup>35</sup>

However, these types of funds, bonds and loans are mainly targeted at companies and sectors that already have 'green' solutions, meaning that they do not necessarily cover companies that currently have large emissions but plan to invest in technology or other solutions to reduce their climate impact. In other words, companies that are making the transition 'from brown to green' are not covered.

The latest development within this area is sustainability-linked bonds and loans.<sup>36</sup> While green loans can be granted for a specific project that meets the requirements for being green or sustainable, sustainability-linked loans are granted for a company to reach certain environmental or sustainability goals. If these set goals are achieved, the company pays a lower interest rate. If not, a higher rate may be applied. The loan can be used freely by the company instead of being linked only to a specific project. In the same way, sustainability-linked bonds are linked to the company's environmental or sustainability goals. Both sustainability-linked bonds

Tools, Standards	Description
Paris Agreement Capital Transition Assessment	A tool that shows how a portfolio's holding of shares and bonds corresponds with the Paris Agreement.
Carbon Disclosure Project	A tool that evaluates companies' climate work and actions to mitigate climate risks.
Greenhouse Gas Protocol	A standard for calculating and reporting countries' and companies' greenhouse gas emissions.
Global Reporting Initiative	A standard for reporting a company's sustainability work in a comparable manner.
Partnership for Carbon Accounting Financials	A standard for financial organisations for devising methods to assess carbon dioxide emissions from loans and investments.

**Table 2** Examples of international tools and standards for measuring climate impact and climate risks.



and sustainability-linked loans can be used to finance the transition for companies since, for example, reduced carbon dioxide emissions is a common goal.

Long-term investors can work for increased sustainability by engaging in dialogue with the companies they own and rectifying any shortcomings they identify linked to working conditions or environmental impact. In those cases where the shortcomings are not rectified, this may lead to the company being sold. For example, the Swedish National Pension Funds – the First, Second, Third and Fourth National Pension Fund buffer funds – have worked together since 2007 via an ethics council to push for greater sustainability and positive development in foreign companies.<sup>37</sup> However, requirements for this include reliable data on aspects such as companies' climate impact and investors being able to communicate and explain whether and why they invest in companies that currently have large emissions but plan to make the transition to reduce these.

Multilateral investment banks and national development banks are institutions that are financed with public funding in order to mobilise private capital for investments, and have historically been used to finance areas such as sustainable development. One example is KfW in Germany, a national development bank that offers green loans to German and European economies via its export branch. Another example is the former Green Investment Bank in the UK, which was started to help achieve the country's ambitious goal of reducing its greenhouse gas emissions, including via investments and loans in green projects. Other examples are NWB Bank in the Netherlands and ICF in Spain. One important aim of these institutions is to show private actors that investments in transition and sustainability are profitable, which helps to make it easier to obtain private capital.<sup>38</sup> In addition to these examples, the European Investment Bank (EIB) and the Nordic Investment Bank (NIB) are also of great importance, as they can give guarantees and offer various forms of financing. NIB operates in the Nordic and Baltic countries. It presented a new sustainability policy at the end of 2021, emphasising the importance of sustainability as a foundation for a prosperous, effective society, which is what guides the bank's actions.<sup>39</sup> This is an important step along the way, but does not fulfil the role played by the EIB at EU level.

The EIB is the EU's investment bank, and finances its operations through bonds in the international capital market. In connection with the EU's Green Deal strategy, the EIB announced its goal of becoming 'the EU's climate bank' in 2019. The bank will increase its financing of climate-sustainable and environmentally sustainable investments to over 50 percent of its lending by 2025.<sup>40</sup> All financing is already in line with the Paris Agreement, and the EIB does not finance any new energy investments in natural gas, coal or oil, which is stricter than the criteria in the proposed EU taxonomy. In addition to its ambition, the EIB also has extensive competence for carefully evaluating the technological, environmental and market-related risks of investments. An investment from the EIB therefore sends a clear signal to other actors in the finance industry that the investment is 'approved'. The EIB can grant loans directly to large projects and via other banks to smaller projects. The EIB also has a loan programme for investments with higher risk, such as innovative demonstration projects within energy system transformation or growth companies with a high degree of innovation. In Sweden, the EIB has financed Renewcell with a loan agreement for up to SEK 311 million and Northvolt Ett with a loan agreement for USD 350 million in recent years. In addition, the EIB's subsidiary the European Investment Fund provides Sweden with investments in venture and equity funds, guarantees for financing institutes to finance small and medium-sized companies, and financing for microfinancing institutes.

In 2022, the Financing working party within the Industry's Climate Transition collaborative programme mapped the finance industry's structure and identified a gap in relation to needs, including with a focus on deep greentech and early stages.<sup>41</sup> Its report shows that actors within the finance industry want to see more ideas and projects to create a greater breadth of projects that can be financed to develop companies that can contribute towards the transition. It also identified a need for knowledge, and for the 'right' people to sit on the company's board to guide the company through the various phases of its development.

## 5.2. Politics and financing the transition

Political decisions within the Swedish Parliament and the EU are central for creating the right conditions for financing the transition in several respects. Politics

shows the way for the transition by presenting visions and setting goals. In certain respects, politics also needs to introduce rules via legislation, economic incentives and requirements for reduced emissions and other environmental impact, which – together with the market and various actors' willingness to pay – creates demand for fossil free services and new products. The role of setting the rules also includes the frameworks for how the finance industry is regulated and can contribute towards financing the transition. Political decisions also contribute in various ways by creating the right conditions for the development and commercialisation of technology, innovation and new companies, which facilitates the transition through research and innovation policy and support for the commercialisation of new technology. Another important role is to create the right conditions for transition by enabling infrastructure to be built at the right time and in the right place.

### 5.2.1. Political goals and vision

For a few years, there have been climate goals at both national and international levels which are of great significance for showing the importance of a transition. The most important ones are described below.

**Climate policy framework:** A climate policy framework has been adopted at national level, which includes a Climate Act, a climate goal and a climate policy council.<sup>42</sup> The Climate Act came into force in 2018, and states that the Government should present an annual climate report within the Budget Bill, and that a climate policy action plan should be drawn up every four years, reporting on how the climate goals will be achieved. The climate goal is part of the environmental goals system, which is steered at an overall level by the 'generation goal': "to hand over a society to the new generation in which the major environmental problems have been resolved, without causing greater environmental and health problems outside Sweden." The climate goal established that Sweden should not have any net greenhouse gas emissions to the atmosphere by 2045, and should then achieve negative emissions. This goal involves Sweden's territorial emissions being at least 85 percent lower than the level for 1990, which allows supplementary measures for the remaining 15 percent in forms such as bio-CCS or verified emissions reductions by using investments in other countries. The task of the Climate Policy Council

is to evaluate whether the Government's overall policy is compatible with the climate goals.

**Goals for the transport sector:** For the transport sector, which accounts for a third of Sweden's territorial emissions, there is also a specific national goal to reach by 2030. The interim goal for greenhouse gas emissions from domestic transport (excluding flights) involves a reduction of 70 percent by 2030 compared to 2010. Up until 2020, emissions had fallen by 21 percent.

**The Paris Agreement:** The Paris Agreement is of great international significance. Through this international climate agreement, states undertake to limit global warming to well below 2°C, and to pursue efforts to limit it to 1.5°C. The individual states should present their national contributions every five years, with a progressive tightening each time.<sup>43</sup> This goal shows a broad international consensus on limiting global warming, giving many companies an incentive to reduce emissions from both production and consumption. At COP26 in October 2021, important steps were taken to drive this work forward with new undertakings, and the need to reduce coal power and ineffective subsidies for fossil fuel was mentioned for the first time in the conference's documents, but additional and more powerful measures will be needed.

**The EU's goal:** Via the European Climate Law, the EU has established a binding goal for climate neutrality within the EU by 2050. The EU also has a binding intermediate climate goal by 2030 of a domestic reduction in net greenhouse gas emissions of at least 55 percent compared to 1990 levels.<sup>44</sup> This goal shows that the EU takes the climate challenge extremely seriously, and will push for a societal development in this direction.

### 5.2.2. Support for research, innovation, commercialisation and transition

There are currently several initiatives and systems for supporting research, development and the commercialisation of technologies that can hasten the transition to fossil free at both national and international levels, not least within the EU. The most important ones are described below.

**The Industriklivet programme of grants:** The Industriklivet is a 2017 initiative from the Swedish Government to support a reduction in industry's process-related green-

house gas emissions, and can be applied for by companies within emissions trading. The total budget for 2022 is SEK 909 million for financing projects that run until 2029. The investment gives industrial companies the right conditions for working with research, development and innovation for solutions that can help to reduce emissions.

**The Klimatklivet programme of grants:** The Klimatklivet aims to reduce greenhouse gas emissions with the greatest possible reduction in emissions per krona invested. It can be applied for by actors outside emission trading, and by regional and municipal actors. In 2020, 75 per cent of support went to industry.<sup>46</sup>

**Horizon Europe:** Horizon Europe is Europe's leading financing programme for research and innovation, and has a total budget of EUR 95.5 billion up until 2027.<sup>47</sup> The programme consists of different pillars and clusters, with the most important in this context relating to digitalisation, industry and competitiveness.

**The European Regional Development Fund:** The European Regional Development Fund is part of the European Structural and Investment Funds and the funding programmes.<sup>48</sup> The Member States' authorities select projects for funding, and are responsible for ongoing management. In Sweden, the money is allocated via eight regional funds and one national programme. For the 2021–2027 programme period, the fund will finance projects for a greener, smarter and more competitive Europe.

**The European Just Transition Fund:** Sweden has been awarded EUR 324 million from the European Just Transition Fund, which runs from 2021 until 2030 and is part of the EU's Just Transition Mechanism.<sup>49</sup> The Government is currently negotiating on the Swedish Agency for Economic and Regional Growth's proposed transition plans, which single out three regions with their related industries that should receive support: the steel industry in Norrbotten, the mineral industry on Gotland and the metal industry in Västerbotten.<sup>50</sup>

**The European Innovation Fund:** The fund is financed via the European Union Emissions Trading System (EU ETS), and can support both investments and certain operating costs. Between 2020 and 2030, the fund will finance commercial demonstrations of innovative technology with low carbon dioxide emissions with around EUR 10

billion, depending on the carbon dioxide price trend.<sup>51</sup> In Sweden, the fund is administered by the Swedish Energy Agency, and projects including Perstorp's cooperation with Uniper and Fortum, Project Air, and Hybrit and Stockholm Exergi have received support.<sup>52, 53, 54</sup>

**The EU-Catalyst partnership:** During the UN's COP26 climate conference, the European Commission, the EIB and Breakthrough Energy Catalyst launched a partnership for mobilising capital worth EUR 820 million – both public and private funding – during the period 2022–2026. This capital will be used for investments in implementing and driving forward the commercialisation of innovative technology (within the fields of pure hydrogen, sustainable aviation fuel, capturing carbon dioxide directly from the air and energy storage) that contribute towards the EU's Green Deal and climate goals by 2030.<sup>55</sup>

**Important Projects of Common European Interest:** The EU's Important Projects of Common European Interest (IPCEI) mechanism has been designed to overcome market failures caused by a lack of private support for innovation due to the significant risk involved in such support.<sup>56</sup> The IPCEI allows Member States to support such innovation jointly. For example, Sweden is involved in two IPCEI collaborations on batteries and one on hydrogen. In its budget for 2022, the Government proposes to earmark SEK 200 million for IPCEI cooperation in 2021, SEK 200 million for 2022 and SEK 70 million for 2023–2027.<sup>57</sup> The Swedish Energy Agency has been tasked with recommending projects that the Government can decide to nominate for the IPCEI process. There is a fear among Swedish actors that the outcome of the funding within IPCEI may be very unevenly distributed among different member nations, creating different conditions for transition and industrialisation.

### 5.2.3. Measures to create demand and form markets

One of the most important tasks for a state or the EU in order to reduce the economic risks when investing is to create a stable market for climate-smart products and services. The most important measures for contributing to this are described below.

**The European Union Emissions Trading System:** The most important mechanism in the EU for driving forward

the development of markets for products with low emissions is the EU's European Union Emissions Trading System (EU ETS). The system aims to reduce greenhouse gas emissions in a cost-effective manner by introducing a ceiling for emissions. The system includes the EU's Member States and Norway, Iceland and Liechtenstein, and covers 13,000 facilities of which around 750 are in Sweden.<sup>58</sup> Many of these facilities are within energy-intensive industry and energy production, but aviation within the EU is also covered. For a long time, the price of greenhouse gas emissions within system was too low to have any real effect. However, it has been raised in recent years from around EUR 5 per tonne of carbon dioxide to just over EUR 80 per tonne in 2021. The fourth phase of EU ETS began in 2021, in connection with which a new mechanism was introduced meaning that surplus emissions rights are removed from the system to reduce the scope for emissions. For more information about EU ETS, see section 5.2.5 Policies in progress.

**Measures for the transport sector:** Nationally, there are several measures to create demand that is specifically targeted towards the transport sector. The bonus-malus system aims to drive demand for cars with low emissions by rewarding buyers with a bonus while at the same time applying higher taxation to vehicles with relatively high emissions.<sup>59</sup>

The national reduction obligation for fossil fuel was introduced in 2018, and aims to reduce greenhouse gas emissions by increasing the use of biofuel. The reduction obligation is a more long-term measure compared with previous tax reductions, and involves a gradually increasing proportion of fossil fuel being replaced with renewable or other fossil free fuels to achieve a predetermined reduction in emissions. For 2022, the emission reduction is set at 7.8 percent for petrol, 30.5 percent for diesel and 1.7 percent for aviation fuel.<sup>60, 61</sup> The refinery industry and parts of the forest industry take a positive view of the reduction obligation, since it creates clear rules for investments and shows how the target of reducing emissions from domestic transport by 70 percent by 2030 can be achieved.<sup>62</sup>

**Ecolabelling and standards:** Ecolabelling and standards make it easier for customers who want to make active choices. By showing that there is a demand, they can indirectly drive forward the transition within

industry. At EU level, the Ecodesign Directive aims to contribute towards reducing products' environmental impact during their lifecycle. The directive includes requirements for product types that use energy, such as domestic and office lighting, electrical equipment, household appliances and heating and cooling systems. The harmonised Cenelec and CEN standards are used for product labelling, whereby the directive's requirements must be met. Another example is the Environmental Product Declaration system.

**Reporting and goals:** Reporting and goals can be another way for companies to show their products' environmental impact, making it easier for consumers and investors to make conscious choices. To show the climate impact of their operations, companies can report in accordance with three different 'scopes' for greenhouse gas emissions. Scope 1 covers their own operations, while scope 2 covers indirect emissions from the purchased electricity, steam, heating and cooling used by the company. More and more companies are now also reporting emissions within scope 3, which includes all other indirect emissions that arise within the value chain.

#### 5.2.4. Measures directed towards the finance industry

**Green credit guarantees:** At national level, the National Debt Office was tasked by the Government in June 2021 with introducing state credit guarantees for green investments in industry. Through credit guarantees, the state offers to share the risk for those banks that grant loans for large industrial investments. Up to 80 percent of the loan can be covered by the guarantee. Credit guarantees are given for investments where the guaranteed loan totals at least SEK 500 million with a maximum term of 15 years.<sup>63</sup> To be eligible for the guarantee, the investment must meet the environmental criteria specified in the Ordinance (2021:524) on state credit guarantees for green investments. The aim of these guarantees is to contribute towards Sweden's goal in the environmental goals system and the climate policy framework.<sup>64</sup>

The Swedish Export Credits Guarantee Board's export credit guarantees: EKN's working credit guarantees, which cover 50 percent of the bank's risk in the case of loans or overdraft facilities for exporting small and medium-sized companies or for companies that are subcontractors to exporting companies, should also be

mentioned in the context of green credit guarantees. There are also EKN's green credit guarantees, which are offered to businesses with direct or indirect exports, which also contribute towards the climate transition. By covering up to 80 percent of the bank's risk, EKN can facilitate access to financing of Swedish transition projects with up to SEK 500 million. There is currently significant capacity for new guarantees. The starting point for EKN's green assessment criteria are those activities which, in accordance with the EU's taxonomy, contribute towards climate transition. In special cases, EKN can also class projects as cases outside the EU's taxonomy as green. In such cases, the classification should be based on other trustworthy frameworks that support Sweden's climate goal, such as Fossil Free Sweden's roadmaps, and the project should be classed as green by the applicant bank.

The pricing of the different guarantees and other services provided by the state should be at market rate for state subsidy purposes, but there should also be an opportunity of offering them at lower prices for companies that receive state subsidy exemptions through participation in an IPCEI, for example.

**The taxonomy for sustainable investments:** At EU level, the work relating to the EU's taxonomy is central. This is a classification system for environmentally sustainable economic activities. The taxonomy aims to steer large investments towards six different environmental areas, to avoid these investments causing significant harm within any of these areas and to ensure that they are in line with the minimum requirements of the UN and the OECD, for example.<sup>65</sup> The six focus areas are climate change mitigation, climate change adaptation, sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control, and protection and restoration of biodiversity and ecosystems. The taxonomy is still under negotiation, and there are major differences between Member States in terms of how different types of energy, such as nuclear power and bioenergy, should be interpreted. One area of concern ahead of the taxonomy's introduction is that its interpretation will primarily steer investments towards operations that are already deemed to be sustainable, and to a lesser extent towards operations that are currently making the transition. From the perspective of Swedish actors, there is also a risk of bioenergy being disadvantaged within the taxonomy.

The EU regulation on sustainability-related disclosures: The EU regulation on sustainability-related disclosures (the Disclosure Regulation) places demands on certain sustainability-related information that actors and advisors within the finance industry must submit.

### 5.2.5. Policies in progress

In addition to the measures and support that have already been decided on, extensive work is being carried out on new proposals for measures and support to stimulate and drive forward the transition to fossil freedom.

**Requirements in public procurement:** At national level, there is a new proposal for tighter rules for public procurement, which could offer a tool for driving demand for materials and products produced with low emissions. The Government proposes changing the current recommendation into an obligation for procuring agencies and units to always take the climate into account in public procurement. It is proposed that the legislative change should come into force in July 2022.<sup>66</sup>

**Reverse auctions for bio-CCS:** Sweden has good conditions for capturing and storing biogenic carbon dioxide (also known as bio-CCS), as there are large point source emissions and an industry that is focusing on developing the technology. However, the business economic conditions for developing the technology are currently lacking. The Swedish Energy Agency has proposed support in the form of reverse auctions for the development of bio-CCS, which involves actors such as the paper and pulp industry submitting bids for how much carbon dioxide they can capture and store, and at what cost.<sup>67</sup>

**Standards:** Standards are a long-term market-expanding instrument that can be significant for materials that are traded internationally, such as steel. Several international dialogues are taking place, for example within UNIDO and IEA, on developing methods and standards for showing the climate impact from products. Two initiatives for iron and steel production are Responsible Steel and SteelZero. At national level, the National Board of Trade has been tasked with promoting climate-focused standardisation. The Sustainable Product Initiative is expected to be presented within the EU in spring 2022.

**Fit for 55:** The European Commission's Fit for 55 (FF55)

package was presented in July 2021. This consists of proposals to review and update legislation at EU level and to introduce new initiatives that aim to ensure that the EU's policy is in line with the climate goals that the EU should reduce its emissions by 55 percent by 2030 and be climate neutral by 2050.<sup>68</sup> The 13 proposals and initiatives presented in FF55 include the following:

- A review of EU-ETS that involves scrapping the emissions reduction ceiling and expanding the trading system to include e.g. shipping from 2023 onwards. The proposal covers ships larger than 5,000 tonnes, which are estimated to account for 90 percent of emissions from shipping. In addition, it is proposed that the rule for aviation should be reviewed and that a separate system for road transport and buildings should be established. Beginning in 2026, it is proposed that free distribution of emissions rights should be phased out over a ten-year period.
- It is proposed that the new income from EU ETS should finance a new social climate fund and expand the European Innovation Fund to EUR 50 billion by 2030.
- It has also been proposed that a Carbon Border Adjustment Mechanism (CBAM) should be put in place by 2026, covering cement, steel, aluminium, artificial fertilisers and electricity. This mechanism aims to even out the competition between producers within EU ETS and producers whose goods are imported into the EU. The proposal involves those who import goods into the EU being able to purchase certificates corresponding to the price paid within EU ETS. The mechanism also aims to avoid emissions-intensive trade moving outside the EU.<sup>69</sup>
- A new Energy Efficiency Directive has been proposed, with a more ambitious goal of reducing primary

	NATIONAL POLICY		INTERNATIONAL POLICY	
	Implemented	In progress	Implemented	In progress
<b>Political goals and vision</b>	Climate policy framework Goals for the transport sector		The UN Paris Agreement The EU's goals for 2030 and 2050	
<b>Support for research, innovation, commercialisation and transition</b>	The Klimatklivet The Industriklivet	National funding for IPCEI Increased funding for permit processes	The European Innovation Fund Horizon Europe The European Just Transition Fund IPCEI The European Regional Development Fund Breakthrough Energy Catalyst	The EU Fit for 55-proposal with e.g. social climate fund Proposal for CCFDs within the European Innovation Fund
<b>Measures to create demand and form markets</b>	Reduction obligation for fuel Bonus malus for vehicles Ecolabelling and standards Reporting and goals	Proposed stricter rules for public procurement Reverse auctions for bio-CCS	EU Taxonomy, EU Sustainable Finance Disclosure Regulation	The EU Fit for 55-proposal with e.g. review of ETS and proposal on CBAM Standard(s) for steel with low climate impact
<b>Measures directed towards the finance industry</b>	Green credit guarantees EKN's export credit guarantees		EU's taxonomy EU Regulation on sustainability related disclosures	Standards within finance industry and dealing with climate risks EU Corporate Sustainability Reporting Directive

**Table 3** Implemented and proposed national and international measures with an impact on industry's transition.

energy consumption by 39 percent and final energy consumption by 36 percent by 2030, compared to today's goal of a 32.5 percent reduction for both primary and final energy consumption.<sup>70</sup>

- A review of the Renewability Directive, in which it is proposed that the ambition should be raised in terms of the proportion of renewable energy within the EU from the current 32 percent to 38–40 percent.<sup>71</sup>
- A review of the Ecodesign Directive and the Energy Taxation Directive, and an overhaul of the rules for including emissions from land use, land-use change and forestry (LULUCF).

**Carbon contracts for difference:** The European Commission proposes to introduce carbon contracts for difference (CCfDs) within the framework of the European Innovation Fund. Warning has also been given that an EU-wide introduction of CCfDs in the new REPower EU plan, which was launched in March 2022 to make Europe less dependent on Russian fossil fuel, will be brought forward.<sup>72</sup> CCfDs are an instrument that can help to reduce price uncertainty within emissions trading and secure income, and can be seen as a way of providing state support to companies that invest in green technology. The instrument works by a contract being drawn up between a government and a company within the trading system for a fixed price of carbon dioxide during a set time period. If the price within the trading system is lower than the contract price, the actor will be paid for the difference by the public party.<sup>73</sup> If the price within the trading system is higher than the contract price, the actor will pay back the difference to the public party. CCfDs have been trialled in Germany since 2021.<sup>74</sup>

Standards within the finance industry and managing climate risks: There is no global legislator for banks, but the Basel Committee on Banking Supervision includes central banks and supervisory authorities from the G20 nations, as well as other countries such as Sweden. The committee sets global standards for banks, for example regarding minimum requirements for regulating capital requirements, supervision, etc. In all, more than 120 countries have committed to implementing these standards within their national legislation. The Task Force on Climate-related Financial Risks was formed in 2020, and is currently reviewing regulations and ascertaining whether climate risks can be dealt with within current

regulations or whether there are gaps that need to be filled – and if so, how. Work is also under way between various initiatives and standardisation organisations to coordinate different frameworks and standards (see Table 1 and Table 2, for example) to make them comparable and to facilitate reporting.

The EU's Corporate Sustainability Reporting Directive: A review is being carried out of the EU's current Non-financial Reporting Directive, which requires companies with more than 500 employees to report on non-financial information, including sustainability issues. Spring 2021 saw the presentation of the new proposal, the Corporate Sustainability Reporting Directive, which would involve more extensive reporting, more and more companies being covered by the requirements, and reported information being reviewed by an independent party.<sup>75</sup>

Table 3 summarises implemented and proposed policies that are significant for the transition and investments in it.



## Conclusions on the finance industry, politics and financing the transition

This section presents conclusions on the work being carried out by the finance industry and politicians to create the right conditions for companies to make the transition to fossil freedom, and the challenges that need to be dealt with to speed up the transition.

**The need for a narrative on Sweden's transition:** To tackle the challenges faced by the companies, there is a need to show the way and describe how the transition in Sweden will take place, in order to allow major investments to be made by both public and private capital. This narrative needs to show how the transition to a society with dramatically lower climate emissions could take place, which investments are needed for this, and the roles played by various actors. The narrative also needs to show which investments will not lead to society's transition to a sufficient extent, and therefore involve great risk from a societal perspective. There is consequently a need to clarify how the transition will take place in practice, and what a future society might look like during and after the transition.

**The challenge of communication on investments in transition:** There is a communicative challenge when a company that currently has large emissions will invest in making the transition. When, for example, an institutional investor increases its ownership in such a company, this means that the reported emissions from the investor's investment portfolio increases significantly in the short term, even if the company makes large-scale investments to reduce its emissions. The investor must thus consider how it can communicate that it has chosen to invest in a company that may, in the short term, bring a poorer emissions outcome from the administrator's holding. This may present challenges for the company in finding financial market actors.

**The challenge for the finance industry to finance transition:** As described above, there is great commitment from the finance industry to contribute towards more sustainable development, and many actors have become experts at green investments. However, given the difficulty currently associated with communicating on

financing companies with high emissions and that these investments or loans are often linked to higher risk and longer timescales, it is a challenge for the finance industry to be involved in financing these investments.

**A need for owners who drive transition:** Companies with sufficient cashflow can largely finance their investments with the help of bank loans. The investments that the transitioning industries now face are unusually large and will take place in a short time. Since the loans need to be matched with sufficient equity, a limitation on investment volume may arise in the short term. If the company has the opportunity to reduce its return requirements and increase its debt/equity ratio, for example, this facilitates a higher level of leverage and thus allows for a faster pace. This also increases the total risk for the company. Important aspects for achieving this are owner directives and active corporate governance.

**A need for knowledge and information for investments in transition:** There is a great need for more knowledge building and knowledge exchange on the potential of green, climate-neutral and transition-focused investments and criteria for how serious transformative companies and their plans should be differentiated from less serious actors with weak credibility. In order to evaluate investments in transition projects, data is required that is currently hard to obtain. For example, there is often a lack of climate data for small and medium-sized companies and data on indirect emissions (scope 3). The lack of such information leads to a new type of market failure, and is a barrier for actors in the finance industry who want to invest in making the transition but may lack the data for making decisions.

**The challenge of getting an overview of possible support:** As shown by the above review, there is a large number of support programmes at both national and international levels for research, development, innovation, demonstration and upscaling of operations that can contribute towards the transition to a fossil free society. One challenge for small and medium-sized companies is obtaining information and knowledge about how



to work with the climate issue, and how this work can be funded.<sup>76</sup> Industrial companies in western Sweden point out that it is relatively simple to apply for and receive national financing, but that it can be hard and time-consuming to apply for funding from EU programmes.<sup>77</sup> For companies in general, and for financial market actors, it is difficult to get an overview of possible support that can be applied for, which support systems are suitable for a specific project, and how private capital can match this in the most appropriate way.

**The challenge of creating demand and forming**

**markets:** Both companies and actors from the finance industry emphasise the importance of being able to demonstrate demand in order to obtain financing for making the transition. When this is stimulated via political decisions, however, it is important that this occurs in a long-term and transparent manner, so that the market risk is not dealt with but is replaced with a political risk. As mentioned above, there are additional needs to drive demand and form markets for materials and products produced with low emissions.



# 6. Action plan

This finance strategy relies on the insight that there is plenty of capital in the market that wants to invest in sustainable solutions. The primary role of the state is to minimise risk for these investments by creating the right conditions for a transition to fossil freedom.

The most important aspect of reducing risk is to achieve stable, long-term conditions for industry in various ways, which can ideally be done through cross-party agreements. In the first place, this involves ensuring that infrastructure for fossil free electricity supplies and transport are put in place quickly, and in the right locations. Secondly, this involves limiting various market failures, such as negative external effects not being internalised in the price. This can be achieved through a policy that boosts the demand for fossil free products in various ways, making the investments easier to finance. The market stimulation measures are important, because if the investments are not profitable it does not matter whether the state offers different loans or guarantees. In addition, the state also needs to reduce the financial risk in the market by working in various ways to limit the lack of information caused by long timeframes, and to limit the technological risks when new technical solutions are trialled and scaled up.

This finance strategy focuses on the financial challenges and – to some degree – market stimulation measures, and is based on challenges for three main types of investments that are central for the transition. Three types of companies are in focus: 1) existing industrial companies that invest to make the transition from operations with large volumes of fossil greenhouse gas emissions to fossil free operations, 2) newly established operations that are started in order to produce fossil free products, and 3) small and medium-sized businesses that act as facilitators in the form of subcontractors to industrial companies. Section 2 describes some conditions that need to be given high priority by politicians in order for the companies to be able to make the transition at all, and for the necessary investments to be made relatively quickly. This involves aspects such as halving the time for permit processes, the possibility of doubling electri-

city by 2045, succeeding with the provision of skills and creating more equal conditions at EU level. This section presents the political proposals whereby the state can contribute in various ways towards reducing the risk for private capital to resolve the financial challenges.

Many companies and actors within the finance industry highlight a need for a clearer common narrative on how the transition will take place in practice and what society will look like during and after the transition. This narrative needs to show how the transition to a society with dramatically lower climate emissions will take place and how different allocation and goal conflicts can be resolved, as well as which private and public investments are needed and the roles played by various actors. The narrative also needs to show which investments will not lead to society's transition to a sufficient extent, and therefore involve great risk from a societal perspective.

## 6.1. Proposals for politics

### 6.1.1. State financial services for climate transition and economic development

Below are a number of proposed services that there is currently a need for, and that can be carried out by a state player since this makes it easier for private capital to dare to invest. This depends partly on a state quality stamp being able to reduce the risk for other investors and thereby leading to a reduction in the entire financing cost, but also on a state player being able to take greater risks and, under certain circumstance, have lower return requirements.

**The government should take responsibility for creating the following services:**

#### 1. Credit guarantees for loans under SEK 500 million without a link to exports.

One need that is common to many companies is the ability to share risk in order to obtain investments.

To address this, there are currently various forms of state credit guarantees. The advantages of credit guarantees are that they show state 'approval', ma-



king it easier for other forms of capital to follow, and that they offer an opportunity for the banks to issue loans with longer terms. Ordinary bank loans usually have a five-year term, since this is the interval the bank normally loans up to, while transition investments consist of long time perspectives and high capital intensity, meaning that the company may need financing with other terms, for example ten to 15 years. The guarantees that Swedish transition projects can currently apply for include Swedish export-related credit guarantees and green credit guarantees for large green projects with loans of more than SEK 500 million. This means that there is a gap and a need for green credit guarantees for loans below SEK 500 million without a link to exports.

**2. Loans for companies and projects at very early stages.**

As mentioned above, transition investments often have long time perspectives and capital intensity, meaning that the company may need financing with longer terms. There is currently no Swedish player with specific competence within project and upscaling risks that can issue loans to companies or projects with relatively high levels of risk and at very early stages, for example to allow for a demonstration facility. These loans would thus be targeted at earlier stages than where the commercial banks are currently prepared to get involved. Such loans could, for example, be issued without major demands for take-or-pay contracts, but careful risk and credit assessments should naturally be carried out, and the loans priced accordingly. It should also be possible to grant them at a relatively high speed. Another important criterion is that the loan should have a clear agenda to support the Swedish climate goals, for example.

**3. One or more niche state investment funds for direct investments at early stages.**

New and growing companies are often dependent on obtaining capital in order to develop operations and technology, which can be challenging. Different types of venture capital are aimed at different stages of a company's development. Despite that, there is a need for a state player who can provide venture capital at an early stage. This would send out an important signal, put a quality stamp on the investment and share

the risk, and would make it easier for other private actors to contribute more capital or other financing. A state investment fund could have lower return requirements in relation to its owners, and could offer companies a specific solution for being able to sell to private investors at a predetermined price after a particular time. The Israeli state investment fund Yozma Group is an example of one such successful structure.

**4. A service that helps to match companies and projects with financial market actors.**

There is a shortage of Swedish actors who can act as investment managers in transition investments, and who can link companies and projects with various kinds of financial market actors and help with the capital structuring process. This includes offering process management support in a financing process, carrying out credit assessments, helping to structure capital and providing advice. Major international investment banks such as the EIB have competence in assessing this type of investment, but this can be hard for corporate banks and asset managers, regardless of the size of the investment.

**5. A service that guides actors correctly within the Swedish and European support systems.**

It is currently hard for companies, projects and financial market actors to understand Sweden's and the EU's myriad support systems and funds. There is a need to be able to get help with understanding which support system or systems are suitable for a particular project, and how private capital can match this in the most appropriate way. There is also good reason to review and coordinate the various national support systems to streamline the state's existing initiatives.

**6. An expert competence centre that makes an overall assessment of different technologies' and investments' climate benefit, climate impact and political context, so that the risks for private capital are reduced.**

There is a great need for more knowledge building and knowledge exchange on the potential of green, climate-neutral and transition-focused investments. In order to evaluate investments in transition projects, new information and data are needed, which can currently be hard to access. The expert competence centre should involve actors from the finance

industry, decision-makers, industry and academy. The centre needs to offer knowledge within areas such as key technologies for the transition and their climate benefit, and how policy instruments affect new and existing markets, and to give a political assessment on taking a long-term approach and risks. This knowledge and service should be aimed at companies, specific projects and financial market actors, and should create a collective utility that can boost commitment from all actors by giving them an opportunity to obtain better decision-making data. Private financial actors can use this information to ensure a lower level of technological and political risk in various investment and financing projects.

The above six services can be created in different ways. They can be created either in decentralised form with various existing actors that already have – or can build up – the necessary competence to offer such services. The Government may then need to issue expanded directives to the actors in question. Another alternative is that the Government enlarges an existing actor to become a new competence centre that can offer a couple of the services – as a suggestion, proposals five and six – while the remaining services are created within existing actors. A third alternative is that the Government creates a new institution that can offer all the services combined – a transition bank corresponding to the investment banks or development banks that exist in other countries. This can give several synergy effects and improved quality, since the competence is concentrated in one place and can be used for all services. If such a structure is established in Sweden, gaps in the current alternatives for financing need to be identified and the roles of existing state financial actors need to be evaluated.

#### **6.1.2. Clarifications and development stages within state organisations**

The EU is tightening the rules for the financial market, creating a need for clarifications. There is also good reason to create more equal conditions between the companies that are part of emissions trading and the companies that are not included when it comes to support for early phases of projects.

#### **7. The Government should commission the National Debt Office to double the guarantee framework for**

**the green credit guarantees to a total of SEK 160 billion in 2024.**

#### **8. The Government should appoint which agency that helps actors within the finance industry to interpret the taxonomy.**

#### **9. The Swedish Environmental Protection Agency should expand the Klimatklivet program of grants to, for example, allow for grants for pilot studies, in a similar way to how the Industriklivet now allows companies within emissions trading to apply for grants.**

In the longer term, it should be investigated whether the Klimatklivet and the Industriklivet can be combined into a Transition Leap. The aim would be to have a single contact point for these forms of support, and to achieve synergy effects and a more efficient system.

#### **10. The Government should give Almi an expanded assignment for its lending and investment operations, with a focus on making a climate transition possible for small and medium-sized businesses.**

The return target for the expanded initiative should be adapted to be able to take necessary risks at early stages, which the market is currently often unable to take. If necessary, there should also be the possibility of deviating from the market-complementary role and finance more than 50 percent at early stages.

#### **6.1.3. Market stimulation measures**

One market risk is the lack of clear demand for material and products produced with low climate emissions, which is partly dependent on environmentally harmful subsidies that distort the competition. Having a large proportion of planned sales secured is an important guarantee for a company in an early financing phase. This can give the project a lower risk profile and thus lower costs. One way for the state to clarify how the transition will take place and to legitimise transition investments is to demand fossil free products and services itself.

Since the state has an objective to become climate neutral by 2045, making its own procurement climate neutral is an obvious step to take. The state can also help to develop and expand markets in other ways, for example by setting statutory quotas for certain products or plan-

ning goals so that government agencies and the market can plan for specific volumes. Agreements with private procurers are also a successful way of securing sales and reducing risk.

**11. The Swedish Parliament politicians should work to reduce market risks and financial risks by developing several cross-party agreements, for example regarding electrification, hydrogen and bioenergy.**

**12. The Government should ensure that all public procurement is climate neutral within a few years.**

For example, the Swedish Transport Administration should be commissioned to ensure that all state-owned roads and railways are built using climate-neutral methods by 2030.

**13. The Government should take an international leading role in developing a method for how emissions should be measured for products such as fossil free steel, and a standard for near-zero emission steel.**

The Government should also work to ensure that this eventually becomes an ISO or IEC standard to allow for clear rules in the market.

**14. The Government should introduce planning goals within a number of areas.**

Planning goals are a way for the Government to show the route and direction that developments should take. Planning goals are needed within areas such as offshore wind power, hydrogen and technological carbon sinks.

**15. When procuring waste incineration, municipalities should also procure carbon sinks.**

**16. The Government and the EU should develop quota obligations within a number of areas.**

Quotas clarify to the company how demand for various products will develop, and also hasten the sale of fossil free and circular products. One example is the quota obligation on biofuel, which has increased biofuel investments in Sweden. Quotas are needed to increase the amount of recycled material in plastic, concrete and textiles. Sweden should also influence the EU to introduce the plastic industry's pro-

posal for a mandatory EU goal for recycled content of packaging.

The automotive sector's shift towards electrification creates challenges for hauliers to invest in the new technology. The state should therefore take overall responsibility for putting the infrastructure in place quickly. In the short term, investment support is needed for trucks and infrastructure. In the longer term, the more general taxation and fees system needs to be changed to become more accurate based on set goals.

**17. In the short term, the Klimatklivet program of grants, the climate premium for environmental commercial vehicles and work machinery, regional electrification pilots and support for mapping and analysing infrastructure should be combined into support that consortiums can apply for.**

This is inspired by the German support model, which more clearly brings together all kinds of support for the electrification of heavy transport in a single system.

**18. The Government should introduce a system to cover more distances with hydrogen and charging infrastructure for heavy transport.**

As a suggestion the state should identify distances and auction off concessions for these, and provide contracts for difference support for the difference in those cases where infrastructure investment is not commercially profitable.

**19. In the longer term, support for trucks should be phased out, and a strongly environmentally differentiated and distance-based fee should be introduced instead.**

Different fees for truck transport should be applied, depending on the vehicle technology, where in the country the transport takes place and at what time of day, within the framework of what the Eurovignette system allows. This should take place in exchange for reduced fuel taxation.

#### 6.1.4. Work at EU level

In order to give Swedish industry equal conditions for the development and upscaling of new technology, and

to create demand for fossil free products and materials, an even playing field is needed within the EU where certain countries do not subsidise their companies more than other countries. This includes the implementation of the EU's Fit for 55 proposal with, for example, changes to emissions trading, but above all it is important that those countries with the largest budgets do not create unfair subsidies. The different support systems within the transition should therefore be steered by different mechanisms and systems at EU level.

**20. During 2022, the Government should draw up a focused EU strategy with the aim of creating equal conditions for industries in the European market that want to make the transition.**

The impact within the various countries' different implementation of state subsidy regulations is particularly important.

**21. The Government should work to implement the Carbon Border Adjustment Mechanism (CBAM), and at the same time begin to phase out the free allocation of EU ETS emissions rights, in accordance with the European Commission's proposed timeline and prioritised sectors.**

**22. In its work with the Renewability Directive, the Government should strive to ensure that the proposal on the additionality of renewable electricity does not apply to green hydrogen.**

The current proposal involves the future need for electricity for the production of green hydrogen having to be met by new, renewable electricity generation. This involves a risk that Sweden's current fossil free electricity mix will be unusable, and that it will only be possible to use newly built electricity generation linked specifically to the facility in question.

**23. The Government should work for a clearer biostrategy from the EU, in which more sustainable biofuel plays a clearer roll in meeting the EU's climate goals.**

**24. The Government should work for the EU-wide introduction of carbon contracts for difference (or other contracts for difference).**

In brief, this involves the company being able to invest based on a set future price of emission rights during a time period through the EU paying the dif-

ference. The system is intended to be financed via the expanded ETS system and reduced free allocation of emissions rights.

## 6.2. Measures within the finance industry

The finance industry has worked in various ways to develop methods and guidelines for clarifying the consequences of the Paris Agreement's goals for the market to asset managers and lenders. The aim is to raise awareness of the risks involved in financing or investing in companies that use fossil energy. Another challenge is how to finance companies that currently have large emissions but that want to invest in making the transition to become fossil free, and how this can be communicated to actors in the market. There are also challenges linked to the lack of expertise and capacity for evaluating and monitoring investments in transition. Actors within the finance industry intend to take some measures themselves.

- 1. Financial actors intend to work to understand the need for financing in the industry's roadmaps for fossil free competitiveness developed within Fossil Free Sweden, and to contribute jointly towards helping the industries in their transition.**
- 2. Financial actors intend to contribute towards work to create a common explanatory model for the transition narrative, in order to clarify the benefit of financing the transition project, and to make this easier.**
- 3. Financial actors intend to strengthen their role as active owners and lenders by working to ensure that the companies they own and lend to will report their emissions in scopes 1-3, and set emissions goals for the respective scope.**
- 4. Financial actors and the education sector intend to work together to build the knowledge and competence that actors within the finance sector need in order to evaluate and monitor investments in transition.**
- 5. Financial actors are continuing to work to increase climate competence for the boards they are involved in appointing, in order to increase the pace of the transition and contribute towards reduced climate risk for the companies' operations.**



Actors in the finance industry have made a number of promises and undertakings in various contexts, to contribute to the development towards a climate-neutral society. Here are a few examples of undertakings from the finance industry.

- The members of the Swedish Bankers' Association have undertaken to ensure that their business operations shall be in line with the climate goal of net-zero greenhouse gas emissions by 2045. The Association has signed the Principles for Responsible Banking, and has encouraged those members who have not yet done so to do likewise.
- The Association's members have undertaken, within a number of time-bound subsidiary goals during the period 2021–2026, to identify their own effects on society, the economy and the environment, to measure the carbon footprint of their relevant financing and investment activities up to scope 3, and to ensure that strategies and objectives for their Swedish operations contribute towards achieving Sweden's agreed target for net zero emissions by 2045.
- Nordea Life & Pension, Alecta, AMF and Folksam are Swedish co-founders, and are members of the UN initiative Net-Zero Asset Owner Alliance, in which they have undertaken to transform their entire investment portfolios to net zero by 2050, and to set subsidiary goals every five years at both portfolio and sector levels. As well as drawing up clear goals and methods, there is also close cooperation within the alliance with leading researchers to ensure that methods and goals are based on the best available science.
- The Swedish members of the Net-Zero Asset Owner Alliance will start the 'Climate Capital' training initiative during 2022. This brings together key individuals within Swedish industry, politics and other key stakeholder groups for education and dialogue, with the aim of improving understanding of the finance industry's contribution and long-term undertakings by describing what capital and industry currently do. The aim is that this should lead to increased adequate review and more reliable incentives and steering tools.
- By signing the Net Zero Asset Owners Commitment within the Paris Aligned Investment Initiative, AP7 has undertaken – through its investments and its ownership work – to contribute towards net zero emissions by 2050. This will be achieved partly by doubling the proportion of green investments by 2025 (compared to 2020) and implementing a specific investment strategy for the 'transition companies' named in this report, and partly by working actively to ensure that their portfolio companies achieve net zero emissions by 2050. By 2025, at least 50 percent of the companies in AP7's share portfolio with the greatest climate impact shall be carrying out reliable transition work.
- EKN and SEK have drawn up an action plan for a climate-neutral export financing system.
- Within the Net-Zero Banking Alliance initiative, SEB, Handelsbanken, Nordea and Swedbank have undertaken to adapt their lending and investment portfolios towards net zero emissions by 2050.
- Skandia decided on a climate roadmap in 2020 to reduce the financial climate risk while also steering more capital towards the future's climate solutions, promoting both return and transition. An undertaking was made in 2021 to invest an additional SEK 40 billion in assets that play a role in the climate transition. These investments are primarily being made in bonds, credit, loans, property, unlisted companies and infrastructure.



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# Appendix: Sweden's transition journey

The 22 roadmaps show the industries how they can become fossil free by 2045 with increased competitiveness, which actions they need to take themselves, and which political conditions are needed in order to increase the pace. With a large proportion of renewable electricity generation, industrial expertise and objectives to achieve climate neutrality by 2045, Sweden has excellent conditions for remaining an outstanding nation within industrial development in the future. If Sweden acts strategically, new sectors can be created and existing ones can be developed, strengthening Sweden's competitiveness, employment, exports and welfare.

In order to succeed with this transition, it is important that the whole of society is aware of which type of investment will be needed in order to carry out the roadmaps and strategies for fossil free competitiveness, and thereby develop the world's first fossil free welfare state. Here are few examples of the cornerstones of Sweden's transformation.

**Electrification:** Light and heavy transport are already

being electrified at a high rate, and the same development is under way for work machinery. Electrification is also an option for other types of industries. In certain warm-up processes, electricity can replace fossil gas, for example, but the largest portion of the increased need for electricity within industry will be used to split water into hydrogen in the electrolysis process. The implementation of the roadmaps and the establishment of the new fossil free companies that are now starting up in Sweden will lead to electricity consumption roughly doubling. There is now great commercial interest in building offshore wind power in order to quickly increase electricity generation in southern Sweden. However, the really urgent issue is to allow for the construction of new electricity power lines so that all users can be supplied with electricity at the right time and in the right place.

**The bioeconomy:** In order for Sweden to achieve the sector goal for domestic transport of a 70 percent reduction in emissions by 2030, increased use of biofuel is an important solution for the existing vehicle fleet. There will therefore be a need for more biorefineries and technology that enables lignin from forest waste to be converted into competitive fuel, for example. Even if electrification reduces the road transport sector's need for biofuel and biogas in the long term, demand within new markets such as shipping, aviation and material manufacturers will increase. Biogas, alongside electricity, will be able to replace fossil gas in many industrial processes, and the actual bio raw material has potential within material manufacturing, for example textiles and plastics.

**Hydrogen development:** The fossil free hydrogen produced via electrolysis has the potential to revolutionise the transition to fossil freedom within industry, transport, aviation and agriculture, to give just a few examples. It will be key to the steel industry's transformation to zero emissions through what is known as direct reduction. Hydrogen can also join together the different sectors in the future energy system, and can contribute

flexibility in the form of energy storage and thereby support the system by adding potential regulating and balance power. However, technology, regulations and business models are still under construction, and there is currently a lack regulations for hydrogen distribution pipelines, for example.

**Carbon dioxide capture:** Many industries and sectors can make a transformative change to completely different technology, while other industries are more or less locked into processes which must, quite simply, be made climate neutral. Cement production is currently one such industry, and here carbon dioxide capture can play an important role in achieving zero emissions. The captured carbon dioxide then needs to be transported and stored beneath the seabed. A number of countries are currently investigating how they can become Europe's 'carbon dioxide hotel'. Norway has already decided on an extensive project to offer carbon dioxide storage, but there are also similar plans in the Netherlands and the UK. The on-site technical capture is based on known technology, but the value chain for the entire transport chain and storage has not yet been developed. However, carbon dioxide capture involves not only neutralising fossil emissions but also creating negative emissions. In Sweden, this can involve capturing and storing biogenic carbon dioxide from industry and the heating sector, which burn biofuel.

**Sustainability:** It goes without saying that industry's climate transition must take place in a sustainable manner, from ecological, social and economic perspectives. However, goal conflicts may arise. For example, increased demand for bio-based raw materials involves a greater risk of reduced biodiversity and other negative environmental impacts. Another example is the increased need for cost-effective, renewable electricity generation and the demands that wind power places on the land and the sea. A third example is the greater need for minerals and metals for electrification and batteries, and that new mines will then be needed. All actors have the potential to improve, and continuous development is needed. Both the forestry industry and the mining industry need to become more sustainable in climate-related and environmental terms. Land owners, the armed forces and other agencies need to find new ways of working so that key development areas can be promoted. At the same time, clarity within the system needs to be

enhanced and, for example, compensation measures for land owners need to be better structured and more predictable.



